VOLUME CII NUMBER THREE

THE NATIONAL GEOGRAPHIC MAGAZINE

SEPTEMBER, 1952

New 10-Color Map of the Far East

Sixty-four Pages of Illustrations in Color

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

$6.00 A YEAR 60c THE COPY

VOL. CII, No. 3 WASHINGTON SEPTEMBER, 1952

THE NATIONAL GEOGRAPHIC MAGAZINE

Indochina Faces the Dragon

France and Her Former Protectorates Fight Side by Side to Stem the Menace of Communist Forces in Southeast Asia

BY GEORGE W. LONG

With Illustrations by National Geographic Photographer J. Baylor Roberts

THROUGHOUT the age-old Orient, wherever time is reckoned by the Chinese calendar, this is the Year of the Dragon.

For war-torn Indochina, facing the rampant dragon that is Red China across 750 miles of frontier, that fact has an ominous sound.

Today the big question in Indochina is whether the dragon, breathing fire, will rend the Bamboo Curtain and lunge southward as it did in Korea. On time's answer hangs the fate of this former French colony, of Southeast Asia, and perhaps of the world.*

Islands of Peace in a Sea of War

To bring NATIONAL GEOGRAPHIC readers an up-to-date picture of this Asian trouble spot, staff photographer J. Baylor Roberts and I flew half around the world and spent two months traveling by plane, jeep, boat, and horseback about this fabulous land.

Seeing embattled Indochina, we found, is like watching a baseball game through a knothole—vision is limited. The French and their native allies hold chiefly the main cities and towns.

Since 1948 the French have abandoned colonialism and helped create new nations from this territory in Southeast Asia. Today "Indochina" is only a convenient geographical expression. In its place stand the young Associated States of Viet Nam (formerly Tonkin, Annam, and Cochin-China), Cambodia, and Laos, recognized by 33 nations of the free world. Working toward complete independence, they assume increasing powers.

The Society's new Map of the Far East, published as a supplement to this issue, shows in detail the territory covered in this article and clearly delineates in color the borders of the three new States.

In Viet Nam, where most of the fighting has taken place, the similarity in the names of opposing forces is sometimes confusing. Viet Nam, revival of a historic name, means "People of the South."

Viet Minh, the name of the Communist forces, means "Association of the People." At the end of World War II, before it came under Communist control, Viet Minh was working for a free and better Indochina.

As I write, the only large-scale fighting rages in the rice-rich Tonkin delta in the north. Some provinces with strong local forces, especially in the far south, are islands of peace. Some are twilight zones, quiet by day, harassed by night. Others are frankly labeled "Viet Minh Territory."

Except in the larger cities, which have doubled or tripled their population in recent years, there is no absolute security anywhere. The war is a weird half-war of sabotage, hit-and-run guerrilla tactics, ambush, and sudden death in lonely places.

Travel in Indochina is largely by air; most road and river traffic moves in convoy. Seldom did we travel even a few miles outside cities without an armed escort.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Portrait of Indochina," by W. Robert Moore and Maynard Owen Williams, April, 1951; "Strife-torn Indochina," by W. Robert Moore, October, 1950; and "By Motor Trail Across French Indo-China," by Maynard Owen Williams, October, 1935.

Cycles Swirl Around a Traffic Circle in Saigon, the "Paris of the Orient"

A century ago, Viet Nam's capital was a mere fishing village; today, with its twin city of Cho Lon, it counts nearly 2,000,000 residents. Its European section has broad avenues and fashionable shops (opposite page). Most riders favor bicycles and pedicabs. Police sometimes stop all traffic and search for grenades.

At night villages close bamboo gates and put up highway barriers. Watchtowers, spaced at kilometer intervals, guard main roads; bridges are heavily fortified. The few trains that run bristle with armament and carry empty cars ahead of the engine to detonate mines. In the more remote towns men pack shooting irons as they did in the old West.

Like the Koreans, the people of Indochina are caught in the global struggle between Communism and the free world. After some six years of war they long for peace above all else.

The French, too, find the struggle exhausting. It costs France more than a billion dollars a year. Half her regular Army is serving in Indochina; there every year it loses more officers than are graduated from St. Cyr.

Many a French officer told us: "We must keep Indochina from Communism. It's the keystone of Southeast Asia. If Indochina falls, so in time will Siam (Thailand), Burma, Malaya, and perhaps the islands with all their vast resources."

Saigon, "Paris of the Orient"

When we arrived in Saigon, Viet Nam's bustling capital, police in tropic whites, apprehensive after recent terrorist bombings, were stopping cars, pedicabs, and even bicycles to search for hidden grenades.

The city itself showed no concern. A torrent of traffic flooded its streets and swirled around circular intersections. Late afternoon shoppers and workers sauntering homeward thronged downtown sidewalks. Outdoor cafés filled rapidly as the apéritif hour approached.

In little more than a lifetime this teeming metropolis has grown from a rude, thatch-roofed fishing village. Having tripled its population in the last decade, Saigon, with its Chi-

289 French Information Service

French Paratroopers Search for Snipers on the Retreat from Hoa Binh

Communist rebels slash constantly at the rice-rich Tonkin delta, but a ring of forts helps save grain and manpower from the enemy. This withdrawal was made from a Red-enveloped strong point southwest of Hanoi. War here often resembles a field campaign in Europe; elsewhere it consists of guerrilla raids.

nese twin city of Cho Lon, holds nearly 2,000,000 inhabitants. It sprawls on a wide bend of the meandering Saigon River, 40 miles from the sea, and is Indochina's biggest port as well as its largest city.

Called the "Paris of the Orient," Saigon, in its European section, boasts wide streets and boulevards, spacious parks, imposing public buildings, palaces, and urban villas.

Here and there modern office and apartment buildings contrast with older French colonial structures. Fashionable shops line Boulevard Charner and exclusive Rue Catinat, the city's Fifth Avenue. Broad pavements are shaded by tall tamarinds and stately rubber trees, which youngsters tap to get free chewing gum.

On Saigon's side streets and in its outlying parts live the Viet-Namese. There, and in the swarming streets of Chinese Cho Lon, the visitor finds strange scenes of endless variety and discovers that Oriental lives are lived in public. The pavement is but the extension of the house or shop (page 317).

At dawn people roll out of bed and make for the sidewalk, where they eat, wash, play cards or dice, take naps, gossip, and run businesses.

Life Is Lived on the Sidewalk

Barbers hang mirrors on trees, unfold stools, and are ready for business. Dentists pull teeth and fit gold replacements before admiring audiences. Physicians cup and massage their patients. Herbalists hawk bottled cure-alls, and fortunetellers feel heads, measure palms, and divine the future. Squatting vendors sell anything from American cigarettes to lottery tickets and incense sticks.

Curbside booths on wheels, gaudily painted, cater to appetites at any hour. Their owners pride themselves on the artistic presentation of

George W. Long, National Geographic Staff

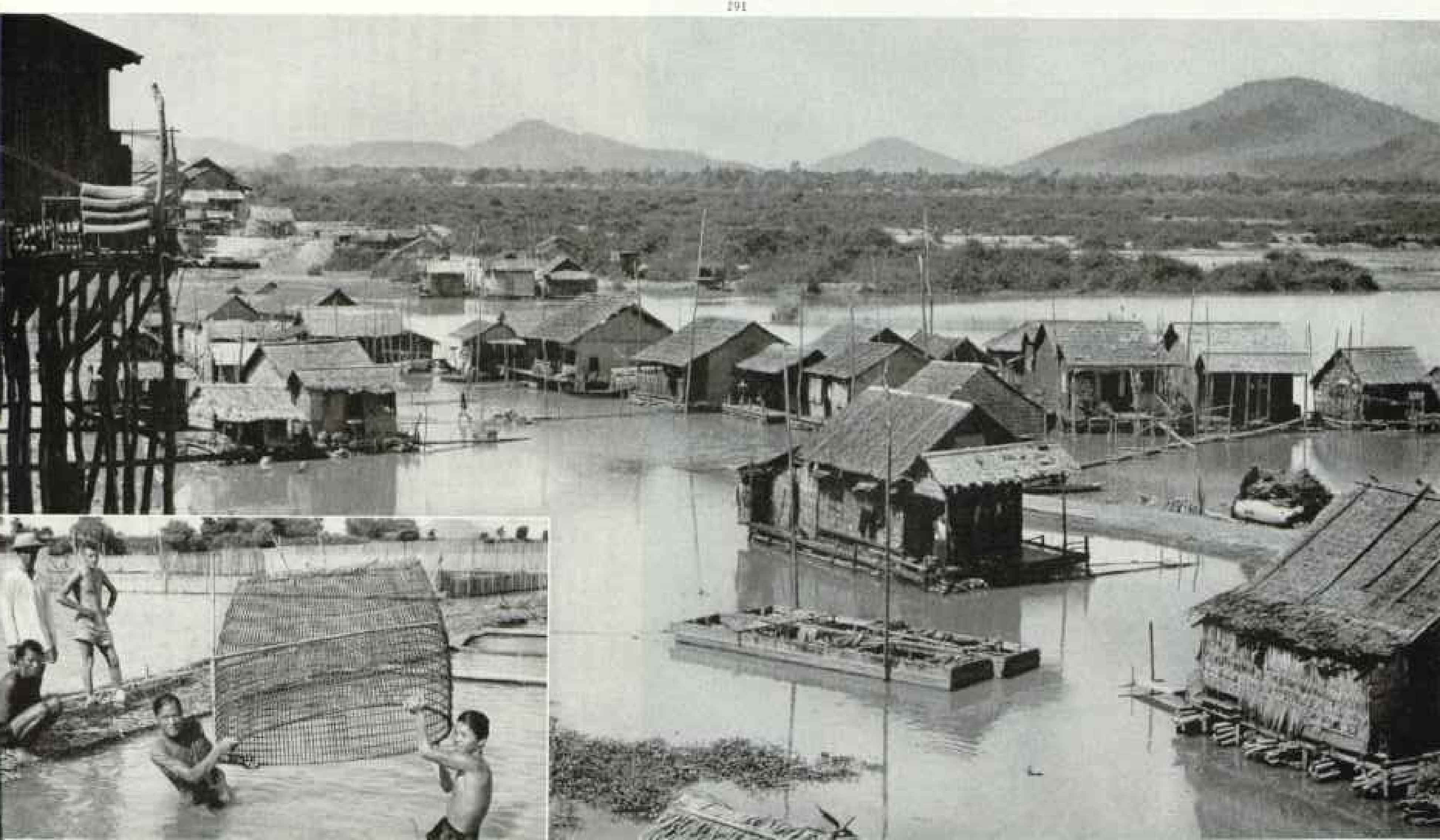
Thousands of Indochinese Spend Their Lives on Rivers. They Eat, Sleep, and Fish on Cramped Houseboats

Sampan men on the River of Perfumes drive past the French section of Hue by sticking poles on the bottom and walking the boat's length. Fishermen live on the near shore. Mother and children rest beneath a bamboo shelter which often doubles as a clothesline. Father (right) repairs a fish trap (pages 306-7, 315).

Cambodian Fishermen's Houseboats Ride the Tonlé Sap, the River That Flows Backward Once a Year

In the dry season the river drains the lake of the same name. When summer's rains swell the Mekong River, its confluent, the Tonlé Sap reverses itself and floods the lake. Fish, feeding on submerged forest lands, grow unbelievably large and numerous (page 313). Inset: A bamboo basket nets fish herded into a pen.

191



297 French Department of Information

A Flooded Trail near Hoa Binh Offers No Obstacle to Armored Car and Jeep

Indochina's Red guerrillas seem everywhere and nowhere, threatening sabotage, ambush, and sudden death. Fast armored cars scouted the enemy during the French capture of Hoa Binh, a Communist depot, and the retreat three months later (page 289). Viet-Namese soldiers (upper right) prefer floppy jungle hats.

their wares. Roast chickens and ducks, lacquered bright red, hang by the neck in rows alternating with baby octopuses. Parts of pigs, deftly cut, grace china dishes. Sliced cockscombs garnish cured pigs' snouts and the heads and feet of ducks. Canary-size birds sizzle in pans. Boiling caldrons of Chinese soup send up mouth-watering clouds of steam.

Many street vendors cater to the national love for games of chance. A woman selling fruit-flavored ice on sticks holds four marked beans in a small bowl. A customer gives them a toss. If he wins, the sweets are free; lose, and he pays double.

Saigon goes to work early. While housewives bargain in crowded market places, office workers, clerks, and Army officers converge on the downtown area in a bewildering rush of bicycles, pedicabs, and small French cars.

At noon the tide reverses itself, and stores and offices close for three hours while the city lunches and enjoys a siesta. Then it's business as usual, until the convivial apéritif hour ends the day and ushers in the evening.

Sipping a cool drink at a sidewalk café, one watches a cosmopolitan cast of characters stroll by, hears a medley of strange tongues, and witnesses a dazzling international fashion show. Like extras in a Hollywood spectacle, French officers, sailors, Foreign Legionnaires, bearded priests, black-robed nuns, Viet-Namese natives, military police, Chinese and Indian merchants, and occasional Americans make their entrances and exits. A wide variety of uniforms—and an occasional Aloha shirt—brighten the male strollers.

But the ladies steal the show, and, despite Paris and New York, it's the Oriental costume that catches the eye. Slim, prim Chinese girls in traditional flowered dresses lend gay splashes of color. Graceful Viet-Namese belles in white satin trousers and silk dresses split waist-high seem to float by, their trains blowing in the breeze. Their only rivals in grace

203

Smoldering Ruins—the Calling Card of Hit-and-run Rebels in Viet Nam

An hour or so before the author arrived, guerrillas pounced on Huong Thuy, put it to the torch, and retreated. French fire and bombs echoed in the hills as these dazed villagers poked about homes to salvage a few possessions. They rebuilt thatched huts in a few days (page 314).

and beauty of costume are the Indian beauties in flowing pastel saris.

The strangest sight in Saigon for many visitors is the riverside café that springs up nightly on the narrow quay near the foot of Boulevard Charner. By day, long lines of chanting men load and unload river junks on this sun-baked gravel strip. A small locomotive, puffing and whistling, shuttles rattling cars back and forth.

At twilight, chairs, tables, rolling refreshment stands, portable kitchens, and a small army of individual vendors appear as if by magic. By dark this mushroom café is thronged. Diners shop for delicacies by the light of countless oil lamps. For the thirsty, hand mills grind out sugar-cane juice, and small bars serve soft drinks and beer.

Music blares from portable radios brought by patrons. Battery-powered projectors mounted on bicycles show peephole movies. Small boys sell balloons, peanuts, and fruit.

Occasionally the locomotive, as if returning for something it forgot, snorts through the scene.

American Aid Flows into Busy Port

To see the war-busy port of Saigon, I cruised the river in a Customs Office launch. Upriver an imposing display of French naval power rode at anchor. Berthed at the foot of Rue Catinat, a trim cruiser glistened under a fresh coat of paint.

Downriver a dozen deep-sea freighters were moored. Giant cranes, describing arcs in the sky, swung boxes and crates ashore; some unloaded tanks, trucks, and other U. S. military aid equipment. While I watched, the S.S. *Washington*, flying the Stars and Stripes, steamed into port carrying another cargo of American Aid.

A fleet of junks, some piled high with rice for export, swarmed around several of the sea-going giants. Sampans skittered like water

bugs from junk to junk selling fruit, vegetables, and ready-cooked lunches. One, lined with white enamel, carried fresh water for sale.

Uncounted thousands live their lives on sampans in Arroyo Chinois (Chinese Canal). Before returning we toured the watery main street of this floating village. Charcoal fires in clay pots were cooking lunch. Under rounded mat roofs people played cards, chatted, ate, or slept.

Old men dozed over fish lines. Bare children romped decks or splashed in the water; toddlers, tethered for safety, watched enviously. Young women laundered clothes or bathed. Chickens strutted or sat on nests; flowers grew in dirt-filled packing cases. Hawkers in small skiffs passed, calling in melodious tones or sounding gongs.

Ancient Drama with Wild West Touch

In Cho Lon one Sunday we visited an old Buddhist temple (page 302). In its dimly lit incense-filled interior, worshipers knelt on mats before the ornate altar.

Outside, a crowd packed the temple courtyard watching a Chinese play. Actors in ancient dress told in words and song the story of a poor but virtuous student at the Manchu court. Jealous of the emperor's affection for the youth, wily courtiers continually plotted against him.

Then came a character as surprising as an Indian in an ancient Greek play. Whenever the hero found himself in real danger, an actor in Wild West costume swaggered across the stage shooting a cap pistol and putting the villains to rout!

Chinese immigrants founded Cho Lon in the 18th century; since 1932 it has been fused with Saigon into one city, without, however, losing its identity. Big market for the vast rice crops of South Viet Nam and Cambodia, it also traffics in hides and skins, dried fish, pepper, tea, sugar, and vegetable oils. It makes cigarettes, soap, industrial alcohol, and matches, and polishes rice in 20-odd mills.

Planning to see as much of Indochina as possible, we chatted with M. Edouard Axelrad, of the French Information Service.

"It's a big area you're covering," he pointed out. "Indochina is more than a third larger than France and three times the size of Great Britain. An American once told me that, placed on your east coast, it would stretch from Maine to Georgia.

"Rugged mountains and thick jungle cover 90 percent of Indochina," he went on. "Three-quarters of its 28,000,000 people are squeezed into plains bordering the sea.

"Viet Nam, you know, is like two baskets of rice hung on a shoulder pole. The baskets are the fertile paddy-covered deltas of the Red and Mekong Rivers. The pole is the Annamite chain of mountains connecting them.

"The Red River Delta, where most of the fighting goes on, averages 1,400 people per square mile; it's one of the world's most thickly populated places. The Mekong Delta is also heavily populated and intensely cultivated. Largely because of these baskets, Indochina is a big rice exporter, and Viet Nam has nearly six times as many people as Cambodia and Laos combined."

Our first trip out of Saigon was a three-day tour by automobile through the flat, fertile Cochin-China rice basket. Leaving at dawn, we waited at the city limits with a long line of trucks and buses for the nighttime barricade to be lifted. Peddlers did a land-office business selling roasted ears of corn, cane juice, Chinese soup, patent medicines, and morning newspapers.

Past miles of paddies and hundreds of guard towers we drove to the provincial capital of Bến Tre. Everywhere black-garbed farmers cut, threshed, and stored a bountiful harvest. Big gray water buffaloes wallowed in shallow ponds, and men poled flat skiffs filled with golden grain on roadside canals. Occasionally large banana and coconut palm plantations broke the seemingly endless rice-field pattern.

Progress Comes to Bến Tre

The governor of Bến Tre is dynamic young Col. Jean Léon LeRoy, who heads a provincial army called Mobile Units for the Defense of Christianity. His province, completely cleared of Viet Minh, is 65 percent Christian.

Under LeRoy, amazing strides have been made in Bến Tre. In recent years schools have quadrupled, students tripled. Hospitals and clinics have jumped from three to 94. Miles of roads and acres under cultivation show big increases. Absentee landowners' share of crops has been limited to 20 percent. Population has more than tripled since 1950.

The colonel was away, but his Director of Public Health and a young lieutenant, veteran of many battles with the Viet Minh, took us in hand. Touring the town, we saw a large shipment of American Aid medicines that had just arrived.

Luncheon was served in a pavilion in the middle of a quiet lake, to music played by a string orchestra. Then in dusty cavalcade we all, including the orchestra, drove to Binh Dai, a fishing village near the sea on a wide breeze-swept mouth of the Mekong.

There we met town officials, mingled with shoppers in the market (exotic sea creatures a specialty), and visited a rustic factory making *nuoc mam*, the strong fish-essence sauce that appears on every Viet-Namese table.

Passing a big cage near the market, we

Kodachrome by George W. Long, National Geographic Staff

Girls in Gay Hats, Split Dresses, and Satin Trousers Reflect None of Viet Nam's Tragedy

Though violence and terror threaten everywhere, life's routine goes on. Crisscrossed bamboo stakes mark the approach to a roadside watchtower in the Mekong Delta, one of thousands guarding the main highways.

Author George Long Sips Rice Wine from a Yard-long Tube While His Hosts, the Primitive Moi, Admiringly Measure His Capacity

To reach this village near Dalat, writer and photographer drove through tiger country. When they left, the Moi gave them "keys to the city"—brass bracelets. French Lieutenant Vicomte Verbe (left) organizes, trains, and leads the Moi in resistance to Communists' hit-and-run raids.

A Mortar Crew Fires Toy Shells with Rubber Bands

Colonial Indochina has split up into Viet Nam, Cambodia, and Laos, now three Associated States within the French Union, working toward complete independence.

The French, who remain in a supervisory capacity, keep roughly a quarter of all the French Union forces in their former provinces to ward off Communist attacks, which threaten to overrun all Southeast Asia.

Here at the Dalat Military School, Viet Nam's West Point, student officers train for eight months and graduate into their country's army as second lieutenants. They learn vigilance by performing maneuvers in a country sometimes penetrated by Red patrols. When standing sentry duty, they must guard against the one careless wink that might mean death.

These boys practice war on what amounts to a contour map of the local terrain; it is complete with roads, trees, houses, and command posts. Firing harmless wooden missiles from a training gadget attached to a United States Army field mortar, they use no explosives, but flex the heavy elastic bands forming a V at bottom of the weapon as their propellent power. To get the range, they add or subtract bands.

Thus, without wasting a shell, students learn the elements of gunnery. Field practice with live ammunition comes later.

Kodachromes by National Geographic Photographer J. Baylor Roberts

↑ **Visitors from Eight Nations Inspect a Jungle-girt Ruin in Angkor Thom, Capital of the Vanished Khmer Empire**

↓ A drum and bugle corps from the Viet-Namese Army honors France's Marshal Jean J. M. G. de Lattre de Tassigny, who died early in 1952. De Lattre, going to Indochina when the guerrilla war looked blackest, galvanized the French fighting spirit and stopped the Communists.

Here Saigon's Rue MacMahon is renamed for De Lattre; the street sign (right) is draped like a statue awaiting unveiling. Viet Nam's yellow flag with three red bars customarily flies beside the French Tricolor on guard towers and public buildings.

Kodachromes by National Geographic Photographer J. Baylor Roberts

Kodachromes by George W. Long, National Geographic Staff

Natural Rubber for the World's Wheels Rolls Out of Indochina Despite Red Terror

Solid jungle a generation ago, the Quan Loi plantation north of Saigon today has some million and a half rubber trees. Quan Loi's old trees (20 years) are replaced with seedlings, which become producers after six years.

Communist terrorists still try to drive away the workers, but they have stopped damaging the trees, which they consider national property. Every rubber grove in Indochina, as in Malaya, has to be a self-sufficient, armed camp. Gates are locked at night; jeep patrols keep constant vigil.

Here a girl in the Quan Loi factory inspects sheets of rubber against a light table. She snips out imperfections with scissors.

→ A tree tapper scores a fresh spiral incision as a groove to channel the milky latex into the cup. Bark is bled twice a week for 11 months; the other month it rests.

Biên Hoa Art School Revives Old Viet-Namese Crafts—Pottery, Wood Carving, Painting, and Bronze Work

A French lieutenant colonel and his wife inspect a figurine held by the school's assistant director. Chinese influence is evident.

Kodachrome by National Geographic Photographer J. Baylor Roberts

A Worshiper Lights an Incense Spiral; Fire and Fragrance Last for Days

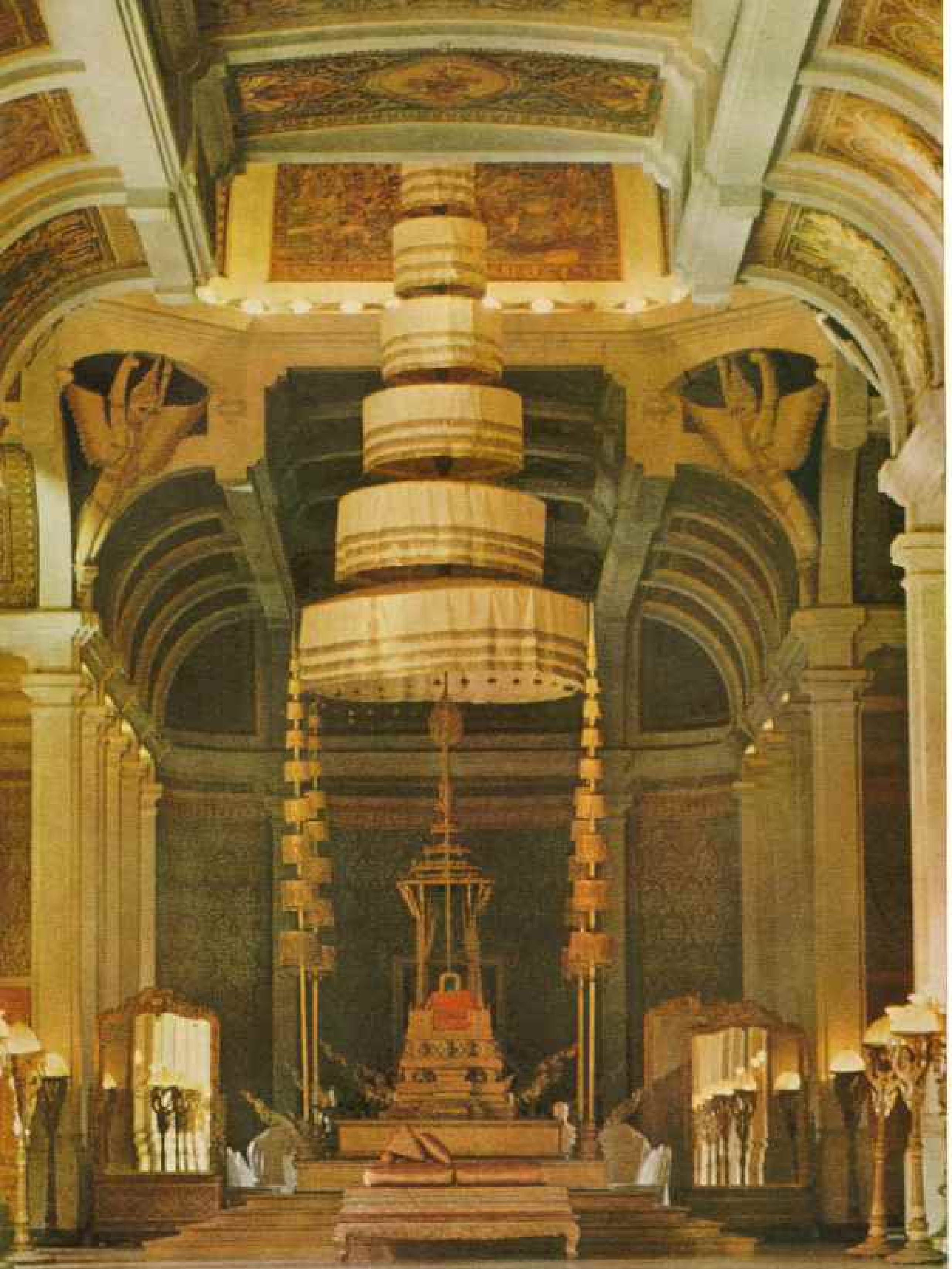
The Chinese woman in Cho Lon's Fukien Temple kneels over a jar of bamboo sticks, one of which, selected by chance, will tell her fortune when matched against its number in a sacred book. Americans use incense sticks as punk to light July 4 firecrackers.

Phnom Penh Girl Sells Sweets Sliced into Bars Like Soap

A Chinese soup is served in the bowls (left). Banana leaves (right) are Indochina's universal wrapper. Rattan baskets (right), often suspended from shoulder poles, carry everything. Bread is baked in French fashion. Only a fragment of the huge market is shown.

Golden Buddha under Glass Stands above a Floor Covered with 4,700 Silver Tiles

A novice priest in yellow robe prays in the Silver Pagoda on the grounds of the Royal Temple in Phnom Penh, capital of Cambodia. Some 190 pounds of gold were cast into the standing Buddha.



Royal Dancers Duel in Phnom Penh

Actors on the steps of the throne room (opposite) present a scene from the *Ramayana*, the Indian epic. They tell the story of Rama, an exiled prince living in a forest. When his wife Sita is abducted by Ravana, a demon-king, Rama allies himself with the monkey kingdom, vanquishes his enemies, and regains his wife. White-masked Hanuman, the monkey god, here battles one of Ravana's demons.

→ Ballet dancers depict a Beauty-and-Beast legend. Tiered crowns identify these two as prince and princess. Both are girls, but the winged epaulets show that one plays the part of a man. Dropping tradition's mask, the girls black eyebrows and apply lipstick.

← Nine-tiered umbrellas, the symbol of a king, guard Cambodia's throne in Phnom Penh's Royal Palace. Here kings are crowned and ambassadors presented. Women may not appear in front of the throne; they have a reception room in the rear.

Kodachromes by J. Baylor Roberts and George W. Long, National Geographic Staff

Workers Clear Weeds Clogging the Moat of the Old Walled City of Hue

The Annamite emperors' onetime Royal Forbidden City, which lies beyond the gate on the left, is now crowded with troops and DP's. Soldiers search arriving pedicabs for hand grenades. The countryside is beleaguered.

Kodachrome by George W. Long, National Geographic Staff

Thatched Dwellings of Guerrilla War Refugees Crowd the Water Front

Huong Giang, River of Perfumes, named for the fragrance of flowering trees along its banks, flows on the right. Dynamited by Reds, the steel bridge bears a temporary span. Hue's French colony stands on the far shore.

Mother and Son Cross the River in Bamboo Basket

Tourane, home of these fishing boats, is the chief port of central Viet Nam.

Deep-draft freighters stand out in the harbor and lighter cargoes ashore. Nowadays many of them land war matériel for near-by Hue; Tourane transfers it to freight cars. About once a week Red guerrillas blow up the tracks and derail a train, but the service carries on.

The French, having bought a spit of land in Tourane, plan an enlarged naval base with deep-water docks; underground fuel tanks, and ship-repair facilities. They recently completed a bridge from Tourane to the distant wooded shore.

Twin-masted fishing junks moored in the river are all vegetable. Hulls and even anchors are made of wood, fittings of bamboo, sails of woven rattan, and ropes of coconut fiber. When the wooden fleet goes out to sea, its rakish sails create a lovely sight.

For dinghies, fishermen and their families use gum-calked baskets not unlike the clumsy circular *gufas* paddled in the Tigris 4,000 miles away. Though lacking bow and stern, they somehow make good headway without spinning.

An 1810 Road Map and a 1952 Scale Model Suggest the West's Roaring Impact on the Orient's Ancient Serenity

Using the illustrated map, Hue's ambassador traveled to Peking (Peiping) 142 years ago. This page of an atlas outlines a town where he stopped. Right: A French officer at Dalat Military School teaches Viet Nam soldiers the principles of driving. Students, pushing toy cars, learn the meaning of highway signs (on wall).

309

Kodachromes by National Geographic Photographer J. Baylor Roberts

Kodachrome by National Geographic Photographer J. Baylor Roberts

Father and Son Wearily Pedal Humanity's Revolving Squirrel Cage, but Get Nowhere

Thousands like these two mount creaking wood and bamboo treadmills and pump irrigation water from canals to rice fields in the rich flatlands near Hue. Women sometimes do the job.

watched a boy go in and catch half a dozen wild ducks.

"For dinner tonight," said the lieutenant.

Dinner turned out to be a three-hour 11-course banquet in the town common house, a templelike building complete with Buddhist altar and incense. Next morning we ate a seafood breakfast in a riverside bungalow while the ever-present orchestra played Viet-Namese songs and the fishing fleet put out to sea.

Returning to Bến Tre, we left our friends and drove to Can Tho, seat of power of the Hoa Hao (pronounced "Wah-how"). This group, numbering almost a million, has its own religion, army, flag, and armament factories. Like Colonel LeRoy's followers, the Hoa Hao keeps the province cleared of Viet Minh.

American Aid has constructed more than 400 palm-thatched dwellings around Can Tho for war refugees. We drove to one small settlement built on the site of a once-thriving town completely destroyed in 1947.

Apparently the refugees were prospering. Mounds of yellow rice awaiting shipment flanked the village's single street and filled the front rooms of most cottages.

Returning to Saigon, we journeyed on a later day to fabulous Tay Ninh, Holy City of Caodaism, the Universal Religion. Sun-baked and dusty, it lies exposed on a flat plain near the foot of brooding Black Goddess Mountain.

Synthesis of half a dozen faiths, including Christianity, Caodaism was founded in 1926 and claims 2,000,000 adherents. Its church organization copies Rome, with pope, cardinals, and bishops, but its elaborate ritual is strongly Oriental. A galaxy of saints includes Victor Hugo, Joan of Arc, Sun Yat-sen, St. John the Baptist, St. Bernard, and the Jade Emperor.

On the temporal side, a cabinet of nine, who are also church dignitaries, directs the theocratic State. An army of 20,000, veterans of a hundred battles with the Viet Minh, protects it. Weapons, handmade in small local factories, are faultless copies of Western automatic arms.

Volunteer Labor Builds Caodai

Caodai citizens give five to ten days of labor a month to the State, building houses, making roads, clearing land. Some 20 refugee families a day drift into Tay Ninh. Each receives in time a small daub-and-wattle cottage and a parcel of land.

Caodaists stress education: some 17,000 students attend school in Tay Ninh. In addition, the church supports and educates 1,000 war orphans.

In hundreds of small shops littered with shavings, carpenters fashioned furniture, Tay Ninh's chief source of income.

Before noon we visited the cathedral, a Disney fantasy that combines features of church, mosque, and temple, to see a Caodai service.

At the stroke of 12, white-robed men and women filed in and seated themselves on the polished floor of the nave between rows of dragon pillars. Musicians in the balcony played Oriental music, and a choir of schoolgirls sang. Before the ornate altar high priests in scarlet, gold, and turquoise robes struck gongs, burned incense, and lighted papers containing prayers.

Watched by countless "Eyes of God," the Caodai symbol, the dignitaries sat throughout the long service without a flicker of expression, occasionally bowing and chanting in unison.

Later we had an audience with white-robed Pham Cong Tac, spiritual leader of Caodaism. Over cups of perfumed tea he told us of its temporal aims.

"We are trying," he said, "to build a civilization in the jungle, to make a refuge in these troubled times. It's very difficult. Like your own Lord, we live and work among the poor."

Guns Guard Rich Source of Rubber

To see a typical Indochina rubber estate operating in wartime, we flew to plateau country north of Saigon. Parklike groves of dark-green trees appeared beneath our wings long before we landed on the company airfield in Quan Loi (page 300).

"All this was jungle a generation ago," Director Jean Simon told us. "After World War I we brought in the first rubber trees from Ceylon and Sumatra; now Quan Loi has a million and a half. Two other near-by estates double the figure."

"Much trouble with Viet Minh?" I asked.

"Fairly quiet lately," he answered. "They now consider rubber estates national property, so they don't destroy the trees any more. But they terrorize the workers; we have fewer than half as many as before the war. Even so, we put out 70 percent as much rubber—15,000 tons last year."

Here barbed wire and split-bamboo fences surrounded villages and important buildings. At dark countless gates were locked, road barriers put up, sentries posted, and searchlights switched on. Heavily armed squads with radio-equipped jeeps patrolled around the clock.

Invited to dinner by fellow officials, guests came with automatic weapons and stacked them in the hall. Most of them brought the children, too, and put them to sleep upstairs. Leaving, many a father carried an infant on one arm and a carbine on the other.

Branching out, we flew to Phnom Penh, royal capital of Cambodia (pages 302-304).

312 George W. Long, National Geographic Staff

Photographer Roberts Aims His Camera at Cambodia's Royal Dancers

King Norodom Sihanouk, entertaining the National Geographic men in Phnom Penh, escorted them to the royal dance pavilion. There his court dancers told ancient legends with tradition's rhythms and gestures. Next morning picture taking was allowed. Page 305 shows the results.

There we lived in the French Commissariat, a riverside palace guarded by tattooed Senegalese troops. Near by loomed the temple-crowned *phnom*, or hill, that gives the city its name.

Although it has a population of 350,000, Phnom Penh takes life easy. Its tempo is unhurried; hustle and bustle are delightfully lacking. Thousands of yellow-robed, barefoot Buddhist priests stroll its streets; and creaking oxcarts, their design unchanged for centuries, set the pace for traffic.

Located where the Tonlé Sap River meets the Mekong, Phnom Penh carries on a thriving river trade. Ships up to 6,000 tons berth at its quay, haul farm products, livestock, and dried fruits to Saigon.

Like most Indochina cities, Cambodia's capital is three in one: European, Chinese, and native.

Tall coconut palms and leafy banana trees impart a lush tropical look to suburbs and countryside. There the Cambodians live in frond-thatched bamboo cottages on stilts. In such cottages Cambodia's ancient skill in making intricate silver jewelry is preserved.

The short plane flight from Saigon to Phnom Penh projects visitors into a different world. Unlike Viet Nam, which took China as its teacher, Cambodia and Laos received much of their art, religion, and language from India. Both countries resemble Thailand more than they do their Indochinese neighbor. Most obvious similarities are the ancient court dances, the curving roofs and decorative snake cornices of public buildings, and the slender cone-shaped spires of temples.

Nor has Cambodian writing been changed to Roman letters like Viet Nam's; it uses graceful, rounded lines of Sanskrit.

We Dine with the Cambodian King

With American Chargé d'Affaires Don V. Catlett, we attended a dinner party given in the royal palace by His Majesty Norodom Sihanouk for Norris E. Dodd, Director General of UN's Food and Agriculture Organization.

After dinner the young King, walking under a golden umbrella and flanked by attendants carrying tapers, led the way to the royal dance pavilion. There in glittering pageantry, to the strains of exotic music, the court troupe told ancient folk tales and legends from the classical *Ramayana* with the graceful gestures and slow, stately rhythms of the Cambodian dance.

Next morning, through the courtesy of His Excellency Nhiek Nou, Chief of Protocol, we photographed the dancers outside the throne room (page 305 and opposite).

Sitting in the shade of a near-by building I noticed a score of humble barefoot men and women. Some carried lunches and had apparently traveled far.

When I asked who they were, His Excellency replied: "Subjects of the King who have grievances or petitions. Every Thursday His Majesty holds private audiences for such people. Even the humblest may come."

A River That Reverses Itself

Before leaving Phnom Penh, we took a two-day cruise up the Tonlé Sap River in *Madelon*, a cabin cruiser. *Madelon* was old and slow, but on her mast she wore a gay corsage. With us went an escort of eight soldiers, armed to their gold teeth.

No ordinary river is the Tonlé Sap. During the dry season, November to May, it flows into the Mekong, but the rest of the year, when heavy rains swell the larger river to flood, the Tonlé Sap reverses itself and flows into the Great Lake it normally drains!

Then the lake expands to four times its usual size, and fish by the millions spawn and grow large in the submerged forest land. During the main fishing season, October to January, lake and river are alive with fish. They yield 10 times as large a catch per watery square mile as the fishing grounds of the North Atlantic and the North Sea (page 291).

Hour after hour *Madelon* chugged upstream through backwoods Cambodia, occasionally threading her way through bamboo floats of fish traps.

Mile after mile the jungle held sway. Strange birds, disturbed by *Madelon's* engine, took off in soundless flight. Here and there rude huts accentuated the loneliness. In such places men in shallow dugout skiffs fished with lines, nets, or basket traps. Twice we passed fleets of junks with threadbare sails, gliding silently downstream.

After dark we arrived at Kompong Chhnang and tied up to a battered Chinese river steamer. Watched by a gallery of piratical faces, we crawled through her and climbed an embankment.

Just as we were wondering where to find lodging, a jeep drove up and came to a screeching halt. Out climbed a well-armed Frenchman, the sheriff on patrol. Amazed that we had made the trip safely, he offered us lodging and took us to a restaurant.

Thronged with French soldiers and townsmen, the smoke-filled "Bungalow" was an Indochina version of a scene from an American western. Noncoms and civilians in floppy campaign hats wore pistols and belts of grenades and carried carbines. Conversation centered on the latest "incident"; discussions waxed hot on the merits of various firearms.

Kompong Chhnang by daylight turned out to be a dusty frontier town of 15,000. Besides fishing, it makes fine clay cooking pots, which are shipped all over Indochina. They give the town its name, which means "Where the Pots Embark."

With the sheriff and a one-man army named Georges we went farther upstream. Soon we reached a bank-to-bank wall of bamboo, a weir for catching fish. Atop the big central gate was a small pagoda, with paper streamers and incense sticks, to placate water spirits.

Men drive fish on the river as cowmen drive cattle. They drag weighted nets upstream toward the weir while boys in dugouts bang sticks together and slap the water with paddles. Slowly the fish are forced to the wall, through the gate, and into floating corrals.

Flying next day from Phnom Penh to Siem Reap, site of the fabulous ruins of Angkor, we saw many such weirs, shaped like broad arrowheads or crescent moons.

In Siem Reap we strolled the banks of a palm-shaded river where water wheels, irrigating gardens, creaked lazily and families bathed in pools. School children, carrying Cambodian flags, awaited the finish of a bicycle race.

Capital of a Vanished Empire

With visitors from four continents dressed in sports shirts and shorts, we toured the vast ruins of Angkor, hiking miles of jungle paths, exploring labyrinthine passages, and viewing fantastic murals. Angkor, buried in jungle for nearly 500 years and uncovered by French scholars, was the resplendent capital of the mighty Khmer Empire, which covered much of Southeast Asia from the 9th to the 15th centuries (page 298).*

By moonlight and the eerie, flickering light of rush torches, we watched the ancient dances of Cambodia, in perhaps their original setting, before the colossal temple of Angkor Wat.

Returning briefly to Saigon, where Viet-Namese were celebrating their country's third birthday, we flew to air-conditioned Dalat. There, at 4,900 feet, fireplaces replaced ceiling fans in our hotel room, and my winter suit came out of hiding.

Chaletlike villas sprinkle this resort town. Pine-clad mountains, clear lakes, and sparkling waterfalls of the surrounding region reminded me of Carinthia in southern Austria.

* See "Four Faces of Siva: The Mystery of Angkor," by Robert J. Casey, NATIONAL GEOGRAPHIC MAGAZINE, September, 1928.

314

Toothbrush Beautifies a Meo Girl but Cleans No Teeth

High in the hills of Viet Nam and Laos, the Meo raise gardens and collect opium for barter. Men wear braids, skullcaps, and pajamalike suits (pages 320, 324, 326, 327). Women twist hair high under turbans. This 16-year-old prizes her toothbrush equally with the solid silver necklace.

This is the hunter's paradise; tigers, leopards, deer, wild buffalo, and other game roam the Lang Bian plateau. Eating dinner in a farmhouse inn, I drew attention to a magnificent tiger skin on the wall.

"Shot him in my own garden," said the proprietor. "He was stealing my pigs, chickens, and dogs. Weighed more than 500 pounds."

Dark-skinned Moi tribesmen walking the road in loincloths looked as if they had stepped from the Stone Age. Many of these primitive people live in the highlands of Viet Nam, where they were pushed centuries ago by the Annamites.

Atop the easternmost ridge of the Annamite chain we looked out on the South China Sea and a narrow coastal plain—Viet Minh territory, we were told. There we met Sergeant Ribière, a lanky, soft-spoken soldier of fortune with steel-gray eyes. With a squad of Moi soldiers and an antitank gun, he guarded the pass that cuts the ridge.

All over Indochina such men, akin in spirit to the voyageurs who founded New France in America, keep lonely vigil in exposed places.

Across tiger country on a barely perceptible road we jounced to a Moi village. The chief was a dignified gray-haired man. When we asked to take his photograph, he disappeared inside and came out in a neat business suit.

Villagers brought a jar full of rice mash, symbol of Moi hospitality. Adding water, they stuck long, curving bamboo "straws" into its mouth. Seated around the jar with the chief, we took turns sampling the gargantuan drink while his people watched. Murmurs of approval or disappointment followed each sample, depending on the drink's duration (page 296).

With the whole village we adjourned to a rice field for a feast to honor tribal spirits. Bamboo poles with long streamers called the spirits' attention to the ceremony. Venison stew and rice bubbled in caldrons.

Ruefully I noticed several more jars of mash. But shadows were lengthening, and we had to leave without more Moi hospitality.

Aftermath of a Viet Minh Raid

Hopping to Hue, once the imperial capital of old Annam, we had our first stark view of the war. Shortly before our arrival Viet Minh guerrillas attacked a village between airport and city. A dozen fires raged (p. 293).

Dazed villagers wandered aimlessly about; some threw water on thatch roofs. Schoolboys carrying slates and pencils watched in speechless fright. Old people, sitting by the road, gazed with sad, unseeing eyes. Long lines of refugees trudged toward Hue, salvaged possessions on their backs.

Above the commotion and the crackle of flames rose a heart-rending chorus of wails. From near-by hills came the thunder of

avenging artillery and the roar of French dive bombers.

Several days later when we returned, reconstruction was in full swing. Bricklayers worked feverishly; bamboo frames for houses were going up, and new thatching was in place.

Hue itself seemed like a beleaguered city. Special military passes and a sizable armed escort were necessary to go beyond its limits. The rumble of mortar fire was frequently heard, especially at night.

We found the city bustling, overcrowded. Traffic raised clouds of dust in its palm-fringed streets and surged back and forth across the temporary steel bridge that spans the River of Perfumes, or Huong Giang (pages 290, 306-7).

Heart of old Hue, and of Annam, was the spacious double-walled Imperial City. Now refugee settlements crowd between the walls, and Viet-Namese troops train within the inner citadel. The imperial palace and several other royal buildings have been destroyed by Viet Minh.

315

Boy and Buffalo—a Fixture in Indochina's Landscape

Viet-Namese prize the sluggish water buffalo as a faithful, powerful worker. In many instances he represents most of a farmer's wealth. Travelers see him working in rice fields, wallowing in mud, or feeding quietly while urchins climb all over him. Beast and herdsboy often become firm friends.

In Khai Dinh Museum we met His Excellency, Vo Chuan, Director of Cultural Services. When we mentioned the NATIONAL GEOGRAPHIC, he beamed. Reaching into a desk drawer, he brought out the August, 1931, issue.

"I remember your Mr. Robert Moore, who wrote this article about his travels on the old Mandarin Road," he said. "He took my picture in ceremonial court costume. Here it is."*

"Not long ago," he continued, "French troops recovered the ancient seal and sword of Annam, taken by the Viet Minh. We consider that a good omen."

Alone I strolled along the River of Perfumes—scentless then, for it was not blossom time. Fishermen push-rowed junks, while others ashore hung nets to dry or spun fish lines. Men cut firewood into lengths, and women, their trousers hiked high, pounded and scrubbed laundry.

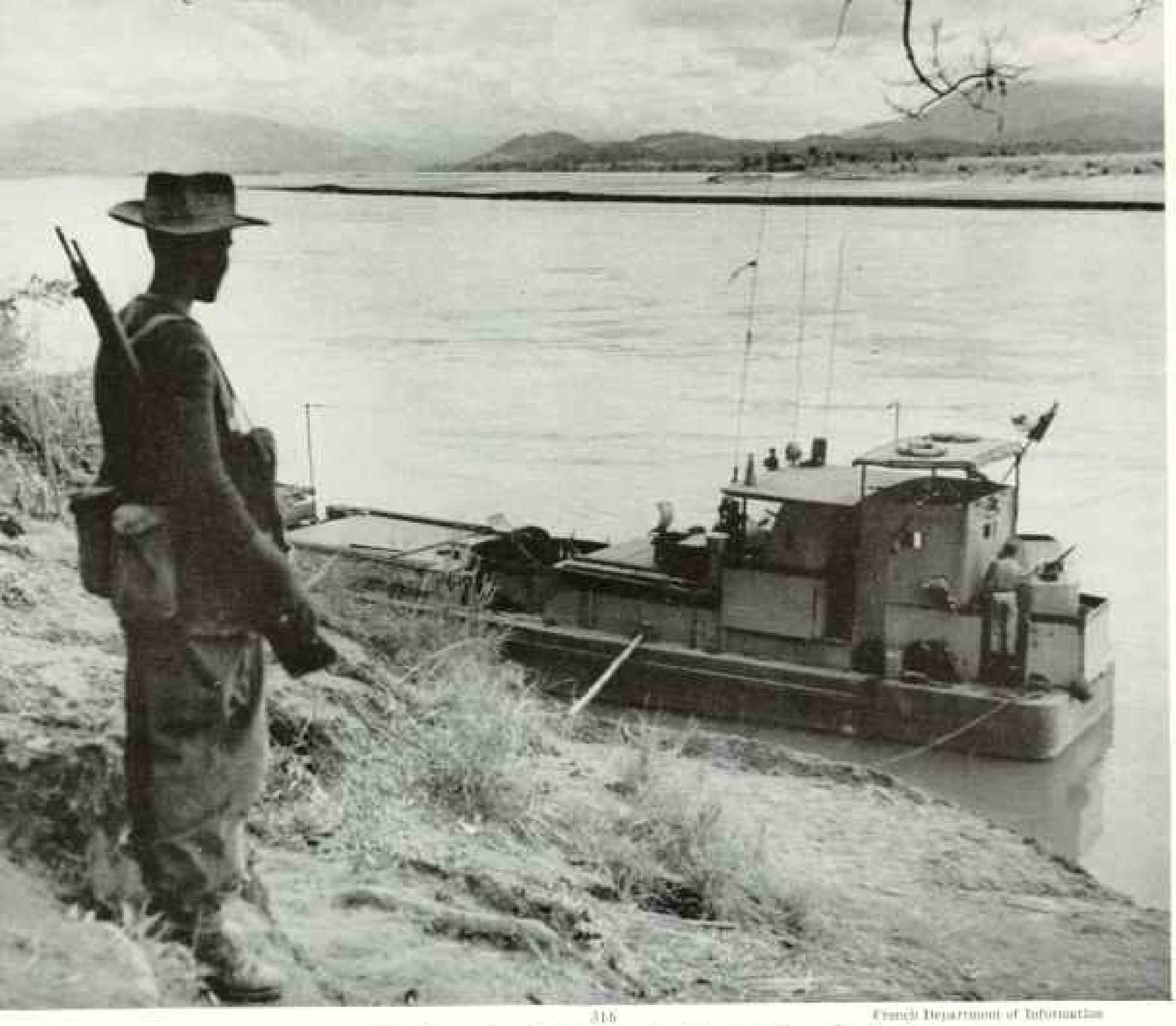
Later, with a truck and several jeeps full of soldiers, we drove to the royal tombs, which dot a green valley outside Hue. Emperors of Annam spent much time overseeing construction of their elaborate resting places. We found the tombs faultlessly cared for, ready for visitors who rarely come in these troubled times.

Hanoi Close to the War

With a cargo of dried fish and fish-essence sauce, we flew in a snub-nosed Bristol to Hanoi, chief city of the fertile Red (Rouge) River Delta and capital of Indochina until recently.

Street names in the teeming native-Chinese section are a guide to the shopper. Each bears the name of the product traditionally

* See "Along the Old Mandarin Road of Indo-China," by W. Robert Moore, NATIONAL GEOGRAPHIC MAGAZINE, August, 1931.



316 French Department of Information

Landing Craft, a Gift from the U. S., Patrols North Viet Nam's Noire River

American equipment supports French resistance to the Reds. This converted LCM (landing craft, mechanized) shuttles 32 tons of men and equipment at 7½ knots. Its guns help control the river.

sold there—silk, tin, scales, spice, brass, paper, jewelry.

Behind its dikes and levees this river city is bursting at the seams. Its population has more than tripled in 10 years, and refugees pour in at the rate of nearly 6,000 a month.

In Hanoi the visitor feels close to the war. Tanks rumble through streets thronged with soldiers on leave. Communiqués cover the Press Club bulletin board. Fighter planes streak the sky, and artillery mutters in the distance.

In Hanoi's historic citadel, the Pentagon of Indochina, we talked with four-star General Gonzales de Linares.

"It's a queer war," he said. "Except for occasional big engagements, it's a grim game of hide-and-seek. Much of the delta is secure, but mopping-up operations go on continuously.

"Around the delta's perimeter we've built some 800 strong points, or forts, but we can't seal it tight. Viet Minh units infiltrate, often disguised as farmers or even as women. Some irregular troops live in the delta, farm by day, and fight by night.

Viet Minh Clever at Disguise

"With paratroops and mobile units we surround villages suspected of harboring Viet Minh. Searching everywhere and everyone is a long job; they're clever at eluding our dragnets. They disguise themselves, bury their arms, and often hibernate in underground hide-outs, some of which have their entrances beneath the surface of ponds.

"In a recent operation we took 176 bona-fide prisoners and 1,200 suspects. Probably a third of the latter were Viet Minh soldiers. How to tell them from the others?"

The object of holding the delta is to deny as much as possible of its huge manpower reserve and vast rice harvests to the enemy. Viet Minh come in and take some of the rice, giving for it the worthless money of Ho Chi Minh, their Moscow-trained leader; or bring

317

A Chinese Shopkeeper Hangs His Roast Ducks Up to Public Gaze in Saigon

Saigon lives are lived in public. Sidewalks are extensions of homes and shops where people eat, wash, gamble, sleep, gossip, and barter (page 289). These ducks are lacquered red, a Chinese custom.

firewood and opium down from the mountains for bartering.

In a misty rain we visited a front-line strong point 25 miles southwest of Hanoi. Near by, sawtooth mountains rose abruptly from the plain. The first, crowning a steep, flat-topped foothill, commanded the road from Hoa Binh (pages 289, 292). Sandbagged outposts honeycombed its brow; concrete bunkers encircled its base.

"Need any help?" a strange voice shouted in English.

A young sergeant was running toward us. He thrust out his hand.

"I'm Georges Messanot," he said. "Born in Canada and lived my first 12 years near Palisade, New Jersey. How's the good old U.S.A.?"

With the sergeant we hiked all over the hill. Crude signs named parts of it after Paris precincts; rough trails bore the names of Paris boulevards. On this quiet day the enemy was boredom. Soldiers in dugouts wrote letters, read, or whittled toy planes. Some of the more energetic played a brisk game of volleyball.

American Arms Aid French

The fort's armament was American-made. Everywhere, but especially in the delta, we saw evidences of United States military aid. Ever since the end of 1950, when the late Brig. Gen. Francis G. Brink, chief of the Military Assistance Advisory Group for Indochina, hurried to Tokyo and obtained urgently needed war matériel from General MacArthur's reserve supplies, tanks, trucks, guns, planes, and landing craft have streamed in from Japan and from the United States.

Because rivers are important highways in Indochina, and in the wet season millions of acres of rice fields are flooded, amphibious craft, even small seaplanes, play an important role in the war. The French Navy and Air Force coordinate closely with ground forces for even the smallest operations.

We saw plenty of evidence, too, of American technical and economic aid. In Hanoi alone we visited large-scale housing projects for refugees, inspected a recently finished artisans' center which aims to restore the crafts of Tonkin, and attended night literacy classes taught by Americans who volunteered their services after office hours.

At Son Tây I watched newly installed American Diesel engines pump Red River water to irrigate some 12,000 acres of rice land.

Throughout Indochina American experts and dollars have aided the war-needy, erected prefabricated hospitals, provided fertilizers, and dug wells. They have distributed medicines, provided generator-driven community radios to keep villages informed, resurfaced roads, built bridges and harbor installations.

Public health officials have launched training courses for nurses, fought malaria mosquitoes, sprayed tons of DDT, and treated thousands of trachoma sufferers and victims of other dread diseases. Eleven mobile trucks carry recorded educational talks and movies even into remote areas.

With a planeload of turbaned Moroccan troops, we flew to Lai Chau, deep in mountains near the China border. Our wing tips seemed to brush the walls of its narrow valley as we swooped toward the pasturelike airstrip.

To a White Thai Shangri La

In this Shangri La valley we felt as if we had reached world's end. Isolated by Viet Minh territory, Lai Chau keeps touch with the outside only by military radio and one commercial plane a day, weather permitting. In the rainy season it often waits more than a fortnight for a plane (page 328).

This frontier outpost, typical of many in Indochina, is the center of the White Thai country. Across the Black (Noire) River bamboo-built Muong Lai, capital of the Thai confederation, sits on a bluff.

With headquarters in Lai Chau, a handful of French officers and men with 15 companies of Thai partisans control the region and keep an apprehensive eye on the Chinese frontier.

Close kin of the Siamese, the Thai—called White, Black, or Red, depending on the color of the women's blouses—inhabit the valleys of rugged North Viet Nam and Laos (pages 319, 325). At other altitudes and in other sections live the Man, Meo, Nung, Phuteng, and Lolo.

The Thai grow rice, keep livestock, hunt, and fish. The men wear a Chinese pajama-like garb; the women wear long black skirts, tight-fitting blouses fastened with silver buckles, and huge cartwheel hats.

With English-speaking Capt. Charles Breton we explored the valley romantically named the Valley of Love and hiked high in the mountains to a Meo settlement. Unfortunately, Muong Lai was in deep mourning for the chief's son, drowned in a river accident. At intervals a deep-throated cannon spoke the people's sorrow.

Lai Chau was loath to let us go. For most of two days, clouds kept the valley sealed.

With time on our hands, we walked the single street, browsing in Chinese and Indian shops. Considering that all merchandise must be flown in, the stores carried a varied stock. American products were conspicuous—ink, soap, household oil, cosmetics, and tooth paste. Chinese tailors kept Singer sewing machines humming. The town barber shaved heads while his wife sold chickens.

Thai women bargained for cloth or clustered about artisans making silver buckles. Little girls played a game like jacks with pebbles.

In some stores male customers were treated to a free smoke from a rack of water pipes. Occasionally a drum boomed from the local casino, enticing shoppers to try their luck at a game of chance.

"Spare Parts" to the Rescue

Back in Hanoi, our friend Axelrad joined us. In a battered taxi we drove to Haiphong, gateway of the delta.

On a jump seat sat a small boy in greasy overalls who held a latchless door closed and every 20 miles or so refilled the radiator from a roadside paddy and added oil. We dubbed him "Spare Parts," which was prophetic. With a loud bang we lost a shock absorber, but S. P. pulled a new one from the luggage carrier and installed it in no time.

The delta gave little indication of its huge population. Lacy bamboo trees hid villages; only a few farmers plowed fields in preparation for the rains.

Busy indeed is Haiphong, the Marseille of Indochina. One of the largest cement factories in the Far East belches white smoke day and night. Shiny brass plates of commercial firms cover the façades of downtown buildings. Ocean-going freighters, stern to bow, line the quays; the U. S. war matériel they bring crams the city's race track and other big depots.

Fantastic Rock Formations

In a harbor-patrol boat we cruised Indochina's northeast coast to fabulous Baie d'Along. The matchless beauty of the bay is one of Asia's scenic wonders. Ten thousand rocky islands of every size and shape dot its jade-green waters. Credulity is strained, imagination runs riot—there's Pisa's Leaning Tower, here a crouching dinosaur, over there a fairy

Kodachrome by National Geographic Photographer J. Baylor Roberts

White Thai Girls Tease the Cameraman by Tipping Cartwheel Hats and Hiding Faces

When the camera was out of sight, the women tipped hats politely and revealingly. They are called White Thai because of the color of their blouses. Noire River (background) flows past their home near Lai Chau.

↑ **Pulling a Single Rein, a Meo Plowboy in Silver Necklace Guides His Belled Buffalo in the Mountains near Lai Chau**

↓ Education for girls is a relatively new idea in Indochina, where women used to be trained only in the domestic arts. These girls attend a high school in Hanoi. As they leave for lunch, each carries her briefcase and some push bikes. "It was a sight to see," remarks the author. "Every color of the rainbow appeared in their dresses."

Kodachromes by National Geographic Photographer J. Baylor Roberts

Chinese Sailmakers Spread Fiber Mats and Bamboo Battens on the Beach in Apowan

Many of these villagers are refugees from Communist China; they fly Nationalist flags from store fronts. Their small sons and daughters followed the photographer everywhere.

 Kodachrome by National Geographic Photographer J. Baylor Roberts

Fishermen's Boats Dot the Harbor; Their Homes Stand on Stilts above the Tide

Other spots showed the scars of war, but Apowan's bay gave the author a feeling of complete remoteness, as if it were shut off from the rest of the world.

Striped Meo, Known for the Women's Tartanlike Skirts, Say Farewell to a Visiting French Delegation

Mounted (l. to r.) are M. Mathivet de la Ville de Mirmont; his wife; M. Edouard Axelrad, and M. Thibet. The last named, chief of the local Meo, shakes hands with the black-pajamaed headman of a village near Xieng Khouang.

Black Thai Lives Up to Her Name; She Wears Black

Following hill-country custom, mother carries son on her back. He rides a carrying rig which fits over her shoulders and around the middle, the ends knotted in front. Mamma makes every stitch of her own clothes, but baby gets his in stores—witness the beret.

Named for her blouse, the Black Thai lives near Lai Chau, a White Thai headquarters. Indochina has Red Thai, too, but they're not Communists.

Bouquet of Flowers Is a Laotian Dancer

One evening in Vientiane, capital of Laos, the photographer saw a group of schoolgirls performing the old Laotian dances at a party given by the Prime Minister. Mr. Roberts arranged to meet the group by daylight, and among them was Bouquet of Flowers (a translation of her Laotian name). She wore the national dress. Lustrous dark hair was pinned back with a golden chain and scented with blossoms.

Kodachromes by National Geographic Photographer J. Baylor Roberts

A Meo's Necklace Is Her Treasury. It May Weigh as Much as 10 Pounds

The Meo, disliking paper money, prefer silver, which men and women love to display around their necks. This turbaned daughter of a chieftain is married to a French scientist studying her people's folklore.

castle. High-stern junks with orange sails lend the fantastic scene perspective.

From Hon Gay we drove to a huge open-pit anthracite mine. Atop a mountain of coal a monstrous Diesel-electric shovel took 10-ton bites of overburden to uncover a new seam. We stood on the brink of a black pit that seemed large enough to hold the U. S. Capitol. On the giant steps of its terraced sides smaller shovels scooped coal and filled strings of cars.

Half the output of this unusual mine stays in Indochina or is shipped to France; the remainder is sold in Japan, in Singapore, Hong Kong, and other Asian ports.

Because of wartime labor shortage, production is only half the figure of a dozen years ago. By using machines like the electric shovel, which does the work of dozens of laborers, officials hope to solve the problem.

Island of Peace

Back in Hanoi, we flew over mist-shrouded mountains to Xieng Khouang in the green rolling highlands of Laos. There we stayed with M. Mathivet, the French representative.

"You're in an island of peace," he told us. "There's no trouble here. My family and I have just returned from a 5-day horseback trip, alone and unarmed, all over the province. It's beautiful, this land, and one of the richest cattle regions in Southeast Asia.

"You'll see more Meo here than Laotians," he added. "There are about 35,000 around Xieng Khouang."

We saw them, and people of half a dozen other tribes, in colorful costume in the town market. Later, with a Meo chief and the Mathivets, we rode steep trails to a near-by village.

Men in black pajamalike dress, skullcaps, and braids came to meet us, unsaddled our horses, and let them roll in the dirt. Adjourning to the headman's lodge, we drank tea and ate popcorn cooked over an indoor campfire.

Outside, we started taking pictures. Women giggled when asked to pose. Men vied with them for attention, bringing out flintlock rifles, daggers, and musical instruments.

Necklaces Are Bank Accounts

Meo women here twist their hair in a high knot. They wear black blouses, pounds of silver, multipleated skirts resembling kilts that give their wearers the name Striped Meo, and black wrap-around leggings (pages 314, 320, 324, 326).

Silver rings dangle from ear lobes; numerous silver necklaces, which may total more than 10 pounds in weight, adorn the neck. These are the Meo woman's bank account.

In a cottage overlooking Xieng Khouang I met missionary Linwood Barney and his family, from New Hampshire.

While we munched homemade doughnuts and sipped cool drinks, he told me about his work among the Meo.

"Sometime ago," he said, "a medicine woman in a near-by village told her people that a man would come and teach them of the true God. One of our students from Luang Prabang happened to visit the place a few months later. Now there are 3,000 Christian Meo around Xieng Khouang.

"My job is to learn the language, reduce it to written form, and translate the Bible into Meo. Not an easy job. Their speech has seven tonal levels; a word may have seven meanings, depending on the pitch and inflection."

Laos is a land for lotus-eaters. Rich and uncrowded, it exacts little hard toil. Life is simple, unhurried; siestas are long. What isn't done today may be done tomorrow. Laotians' favorite saying is *Bau pèniang*—"never mind." Occidentals find it easy to become *sanu*, as the French call it, to adopt this easygoing attitude.

In sultry, sleepy Vientiane, on the Mekong River, the Laotian outlook was even more apparent. It was typified by the pedicab boy I saw dozing in his vehicle near the market. Needing transportation, I nudged him. Slowly he opened his eyes, looked at me, shook his head, and closed them again. I should have realized—it was siesta time.

Few Crimes in Laos

A young judge told us his troubles.

"I have so little work," he sighed. "The prison here, for all Laos, has room for 800 prisoners. It now has 18. That's good, but I average less than one case a week. Friendly, naturally courteous, easygoing Laotians very rarely get into trouble."

A town of 20,000, Vientiane is the capital of Laos. Its center, except for the many pagoda temples, resembles a French hamlet. Visiting a near-by suburb, we found that it looked like a Hollywood set for a tropical romance.

Thatched cottages stood in rows on stilts in a grove of palms and bananas. Beneath their homes women in sarongs spun thread or wove the gold lamé cloth for which Laos is noted. Old men repaired fish traps; a young swain strummed a soft-toned instrument. One householder made a big-wheeled oxcart while his wife polished a bicycle that wore flowers in its spokes. Naked tots played happily; babies slept in hammocks.

One evening, feeling gay, we attended a musical comedy in a barnlike building of woven matting and bamboo.

A18

French Officers Meet the Airlift, a Social Occasion in Lai Chau

A few French guards and Thai battalions hold Lai Chau's frontier outpost near the China border. Surrounded by Communist territory, the town keeps touch with the world by radio and airlift. In good weather the plane flies in once a day, and everyone who can spare the time goes out to meet it. The rainy season may mean three weeks without supplies (page 318).

Families with broods of children crowded the benches. A wailing chorus with xylophone-and-flute orchestra provided the music offstage. Two male comics dressed like Charlie Chaplin kept the crowd in stitches; other parts, male and female, were played by young Siamese girls.

"Applause" Is Tangible

Instead of applauding, patrons threw cigarettes and paper cones of candy to the stage. Acting stopped while players collected their reward.

Another evening we attended a soirée given by the Prime Minister. Guests took part in a dance which combined Western and traditional steps imported from Thailand. Partners circled each other with graceful gestures and slow steps, now near, now apart, but never touching.

Later, young girls performed old Laotian dances, resembling those of Cambodia and Thailand (page 325). Sitting under a frangipani tree, I watched the graceful performance and listened to the haunting music. Fragrant blossoms dropped around me. Stars blinked; a full moon cast its spell. How easy, I thought, to become *suxa*.

But now, when I remember Indochina, I think rather of the young lieutenant in Bến Tre, who already has spent six of his 22 years fighting.

Raising his glass, he said: "To our American visitors. I hope they will return someday. And when they do, I hope they will find this country happy, prosperous, and at peace."

Down East Cruise

Nomad Sails Along Maine's Rocky, Tree-clad Coast, Home of Yankee Lobstermen, Salty Fishermen, and Blue-water Sailors

By Comdr. Tom Horgan, USNR

With Illustrations by Luis Marden, National Geographic Staff

THAT eminent landlubber, Dr. Samuel Johnson, once growled that "No man will be a sailor who (can) get himself into a jail; for being in a ship is being in a jail, with the chance of being drowned. . . . A man in a jail has more room, better food, and commonly better company."

To me, however, a cruise Down East from Boston on my 40-foot ketch *Nomad*, with five genial companions for a crew, seemed more like getting *out* of jail than into it. Freed from the constrictions of life ashore, we could look forward to a relaxed and reasonably carefree voyage through some of the pleasantest waters ever charted—the 3,478 miles of Maine's deeply indented tide line, from Kittery to Quoddy (map, page 332).

Nor had we anything to worry about on the score of food. *Nomad's* crew included Col. William H. Speidel, on leave from the Army, and Robert G. Allen, cotton merchant, both veterans of many previous cruises in *Nomad* and skilled hands with a skillet. They pursued a rivalry in the galley which ensured a seagoing cuisine second to none.

As for shipmates, it would have been hard for Dr. Johnson himself to have found livelier and more engaging company than Luis Marden, of the National Geographic staff, who came along to record the cruise with his camera, and Charles Renn and Frank Kellogg, GI students at Massachusetts Institute of Technology, who proved that a course in engineering helps make a good sailorman.

We set sail, then, from Boston with a leisurely wind and the best of spirits (page 335). Gloucester was our first port of call, and in a truer sense our real point of departure; the old fishing town had been the easternmost anchorage on *Nomad's* cruise the previous year.*

Canal Makes Island of Cape Ann

In Gloucester we tied up alongside Capt. Ben Pine's 72-foot schooner *Blue Water*. Captain Ben, last Gloucesterman to contest the International Fishermen's Races, advised us to await a favorable tide next day in the Annisquam Canal.

The canal, joining the waters of Massachusetts and Ipswich Bays, makes most of Cape Ann an island (page 336). As we threaded its well-marked channel into the river, we passed beneath a new highway bridge under construction. Gaunt steel arms reached out from opposite banks. Running on the auxiliary engine, we passed under a gap high above *Nomad's* mainmast.

Leaving the canal, we crossed Ipswich Bay, where sportsmen hook giant tuna; a 927-pound bluefin caught here in 1940 held the world's record for 10 years. Though we saw many boats with lines out, none, apparently, had found fish.

Visibility was so fine we at first mistook Mount Agamenticus, inland in Maine, for one of the Isles of Shoals. But soon we picked up the light on White Island, and went in to anchor in Gosport Harbor. There the sea gulls were so tame they perched at mealtime on *Nomad's* mizzen boom and in the dinghy, patiently waiting for scraps.

We weren't at all sure whether we had anchored in Maine or in New Hampshire water, for the State line, confirmed in 1740, passes right through the harbor. On the Maine side lies the island of Smuttynose, made famous by a crime.

Tide Aided Murderer's Escape

In *The Murder at Smuttynose, and Other Murders*, Edmund Pearson tells how Louis Wagner, on a bitter wintry night in 1873, came out to the island in a dory, killed two women whose menfolk were away fishing, and rowed back to Portsmouth with his victims' small savings. Wagner timed his savage mission to the racing tides of the Piscataqua River, but the executioner finally overhauled him.

The Isles, rocky and uninviting, have a long and varied history. In 1614 Capt. John Smith charted the group as "Smith's Isles."

Myles Standish journeyed "to the eastward" in 1623 to obtain provisions for the Pilgrims at Plymouth and may have visited the Isles. In 1636 Thomas Mayhew came up from Martha's Vineyard for a similar reason. At one time, there was a 270-foot ropewalk on Smuttynose.

In 1650 the islanders were petitioning for repeal of a law barring women as residents. On another occasion, militia was sent to persuade the residents to behave better.

* See "Windjamming Around New England," by Tom Horgan, National Geographic Magazine, August, 1950.

330

Explorer MacMillan and Wife Visit the Author at Castine, Maine, Their Summer Home

Comdr. Donald B. MacMillan (left) helped Admiral Peary discover the North Pole in 1909. Recently he completed his 29th Arctic voyage. Author Tom Horgan (right) owns *Nomad*. *American Sailor* (left), a World War I cargo ship, trains Merchant Marine students at Maine Maritime Academy, Castine (page 369).

Malaga, the smallest island, is joined to Smuttynose by a breakwater built in 1820 by Samuel Haley, who financed the work with four bars of pirate silver he found beneath a rock. Since our visit, a new treasure search has been undertaken.

During the latter part of the 19th century the Isles of Shoals were one of the most popular summer resorts on the coast, attracting many prominent artists, authors, and musicians. Now chief activity centers on Star Island, where Unitarians, Congregationalists, and other religious groups convene for summer conferences in the huge, rambling Oceanic Hotel.

Candlelight services are held in a little stone meetinghouse atop the highest point. The night we anchored, a procession was winding from the hotel to the meetinghouse, the worshipers' lanterns blinking like fireflies along the rough path.

On Star Island also is Miss Underhill's rock, mentioned by Nathaniel Hawthorne in his *American Notes* of 1852. According to Hawthorne, the island schoolteacher was gazing out to sea from this lookout when a great wave enveloped and carried her away.

John Paul Jones's *Ranger* Built Here

At Portsmouth, on the New Hampshire mainland, we picked up the Piscataqua River's incoming tide, and that, rather than the breeze, carried us upstream to the hospitable Portsmouth Yacht Club. Across the river lay Kittery, Maine, the U. S. Naval Base on Seavey Island, and Pull-and-be-damned Point, so called because it is impossible to row past against the tide.

331

Nomad Passes Portland Head Light, Which Was Built by Order of George Washington

Nomad is called a ketch because her mizzenmast is stepped forward of the helm; if it were aft, she'd be a yawl. Built in Fairhaven, Massachusetts, in 1929, the yacht survived the 1938 hurricane by riding at her moorings, one of the few that did. The view from the lighthouse inspired some of Longfellow's poems (page 333).

At the yacht club supper and dance that night we met Lt. Comdr. Lafayette Remillard, USN, and Mrs. Remillard, who took us on a tour of the old navy yard next day. It was here, they reminded us, that John Paul Jones's *Ranger* was built in 1777. She was the first United States warship to hoist the Stars and Stripes and the first to receive a foreign salute to that flag—from France.

The red-brick building now housing administrative offices was the scene of the Portsmouth Conference, which ended the Russo-Japanese War. A large framed photograph shows the big, bearded Russians seated at one side of a long table, and the little Japanese delegates on the other, their feet barely reaching the floor.

In a pond which formerly supplied the yard with ice are submerged oak timbers, some of undetermined origin but all relics of the days of wooden ships. Timbers last many years in such water storage.

A morning mist shrouded our departure as we shaped a course for Cape Elizabeth, 45 miles distant. Mount Agamenticus kept us aloof company until long after we passed between Cape Neddick and Boon Island (page 352). Bartholomew Gosnold in 1602 called the cape "Savage Rock."

As for Boon Island Light, it perches on one of the coast's most desolate ledges. Before the lighthouse was built, during the War of 1812, a number of ships had left their bones there, and some have done so since.

But we sailed in clement weather, and the sea was so smooth that when we arrived at the Cape Porpoise "whistler," our shipmate Bob Allen was able to step aboard the bright-red buoy to be photographed by Marden (page 338).

QUE
N.B.
MAINE
VT.
N.HAMPSHIRE
MASS
NOVA SCOTIA
RIGHT
LEFT
Atlantic Ocean
North
Boston
Scale for both sections
STATUTE MILES
Rockland
Waldoboro
Friendship
Tenants Harbor
Damariscotta
Muscongus Bay
Damariscotta R.
Wiscasset
New Harbor
Monhegan I.
Manana I.
Boothbay Harbor
Pemaquid Point
South Bristol
Christmas Cove
Squirrel Island
Kennebec River
Sheepscot R.
Bath
Brunswick
Androscoggin R.
Popham Beach
Seguin Light
Freeport
South Freeport
Bailey I.
Cape Small
Mackerel Cove
Harpswell Neck
Great Chebeague Island
Chandler Cove
Falmouth Foreside
Casco Bay
Long Island
Portland
Sebago Lake
Westbrook
Portland Head Light
Gorham
Cape Elizabeth
Prouts Neck
Old Orchard Beach
Saco
Biddeford
Saco R.
Cape Porpoise
*Cape Porpoise Lighted Whistle Buoy
Kennebunk
Kennebunkport
Sanford
Wells Beach
Ogunquit
Bald Head Cliff
Mount Agamenticus
Boon Island Light
Cape Neddick Light
York Harbor
Dover
Piscataqua R.
Kittery
Kittery Point
Pull-and-be-damned Point
Seavey Island
Portsmouth
Duck Island
Malaga
Isles of Shoals
Smuttynose Island
Star Island
White Island
Gosport Harbor
Great Island
Durham
Adams Point
Rye Beach
Exeter
N. H.
Hampton Beach
Salisbury Beach
Amesbury
Merrimack R.
Newburyport
Plum Island
Ipswich Bay
Rockport
Cape Ann
Gloucester
Annisquam Canal
Ipswich
Essex
Haverhill
Manchester
Lawrence
Beverly
Salem
Marblehead
Lynn
Nahant
Lowell
Merrimack R.
Massachusetts Bay
Revere Beach
MASS.
Lexington
Concord
Boston
Hull
Cohasset
Scituate
Hingham
St. George
Bay of Fundy
Passamaquoddy Bay
Passamaquoddy Indian Reservation
Deer Island
Moose Island
Campobello Island
St. Andrews
CANADA
U.S.A.
Lubec Narrows
Grand Manan Island
Calais
Pleasant Point
Quoddy
East Port
Lubec
Deep Cove
West Quoddy Head Light
Whiting
Cutler
East Machias R.
Cross Island
Machiasport
Burnham Tavern
Machias
Roque Bluffs
Englishman Bay
Roque Island
Double Shot Island
Great Spruce I.
Chandler Bay
Machias River
Jonesport
Great Wass Island
Addison
Pleasant River
Cherryfield
Milbridge
Petit Manan Island Light
Winter Harbor
Schoodic Point
Bald Porcupine Island
Anemone Cave
Frenchman Bay
Bar Island
Bar Harbor
Cadillac Mountain
1530'
ACADIA NATIONAL PARK
Mount Desert I.
Seal Harbor
Northeast Harbor
Southwest Harbor
Ellsworth
Somes Sound
Blue Hill Bay
Casco Passage
Swans Island
Blue Hill
Jericho Bay
Bucksport
Buck Harbor
Harbor Island
Fort George
Castine
Deer Isle
Little Deer Isle
Eggemoggin Reach
Isle au Haut
Stonington
Searsport
Cape Rosier
Dice Head
Bear Island
Penobscot Bay
Penobscot River
Belfast
North Haven
Pulpit Harbor
Vinalhaven
Pulpit Rock
Hurricane Island
Mount Megunticook
Mount Battie
Camden
Rockport
Megunticook R.
Owls Head
Rockland
Thomaston
Two Bush Island Light
North Waldoboro
Waldoboro
West Waldoboro
South Waldoboro
Friendship
Tenants Harbor
Muscongus Bay
Monhegan I.
Manana I.
Damariscotta
Augusta
Kennebec River
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Cape Porpoise affords a snug haven, its chief hazard being a fantastic number of lobster-pot buoys which can foul a propeller, even with a vessel under sail. We did not tarry but proceeded to Cape Elizabeth and Portland, that fine harbor which the explorer Champlain seems to have overlooked.

The white shaft of Portland Head Light reminded me of previous visits, many years ago, in an old square-rigger, the four-masted Swedish bark *Abraham Rydberg*, now the *Foz do Douro* of Lisbon, and much later in the U. S. submarine *Sea Robin*. The poet Longfellow, when a Portland resident, composed many of his verses perched beside the lighthouse as the seas crashed on Maine's rocky coast (page 331).*

Nomad had developed an annoying leak in the shaft log; so we had her hauled out at the Handy Boat Service, next door to the Portland Yacht Club on Falmouth Foreside's wooded shore (page 369). It was there we began getting so well acquainted with Maine lobsters that Marden remarked toward the end of the cruise that it was the first time he ever had enough lobsters.

In a small building on the boat-yard pier the wives of the yard operators served, at very moderate prices, lobsters fresh from the sea and excellent homemade doughnuts. This fare was augmented by tinker mackerel caught off the float by Luis on a trout fly rod.

Visiting yachts sometimes are considered sitting ducks by boat yards, so we called for our bill with some misgivings. It came to only $6 for labor and 26 cents for material, an agreeable example of the fair and friendly treatment we enjoyed everywhere Down East.

An Island a Day

With *Nomad* shipshape once more, we put out boldly across island-strewn Casco Bay, which is reputed to have one island for every day of the year. Passages between them, we found, were often so narrow that the shores were only a fly cast away, but they are so well marked that there would have been little excuse for going aground.

Sailing close to attractive Haskell Island, we gave it more than casual attention because of a shuddery chapter in its past. Late in the last century a lobster fisherman named Humphrey lived there. The island was overrun by rats, but the elderly man got along well enough with the rodents, even though they continually raided his bait barrels.

One day, however, a passing fisherman noticed the absence of smoke from Humphrey's chimney and landed to investigate. He found the shack swarming with rats; but little remained of their host.

Cats Battle Rats on Haskell Island

A first attempt to exterminate the rats failed. Later, two young fishermen, Bruce and Wallace Mills, established themselves on the island, taking along about a dozen husky cats. A war seldom equaled in fury ensued. The cats suffered some initial reverses, but eventually triumphed. Not a rat remained on Haskell.

The cats, however, multiplied at a great rate and increased in size and ferocity. Although the Mills brothers strove to satisfy the wranglers with fish, birds vanished from the island, their songs succeeded by nocturnal feline yowling.

Eventually the island was wanted for summer homes, and the Millses were told they were squatters and must leave. Their refusal was supported by their fierce pets, until someone put poison ashore at night and wiped out the entire cat population. Heartbroken, the brothers left and were never heard from again.

It was breezing up as we arrived at Bailey Island, and we were glad to slip into Mackerel Cove, the island's harbor. There a big man on the steamboat wharf invited us to tie up to the lee of that structure. We appreciated our snug berth even more when the wind piped up to a shrill whistle and several anchored craft began to drag.

Our friend proved to be Phil Johnson, brother of Elroy who was named by the State its typical lobstering man. Robert P. Tristram Coffin, enthusiastic historian of Maine, in his *Yankee Coast*, has this to say of the lobstering man:

"From being so much in the weather, the lobstering man gets a face like bronze. He gets to standing bronze-like in his body, too. He never puts on fat, he moves about so much. Leaning against the wind, he grows lean himself. He is cut right down to essential muscle and bone. . . . He would look fine in bronze.

"And he does. One of the best of his kind has got into a statue. He is Elroy Johnson, . . . and he went to the last World's Fair, the one in New York, in bronze. . . . Elroy is about the best lobsterman along the whole coast. . . . He looks a lot like Will Rogers—easy to look at and very American. He talks

* See "Maine, the Outpost State," by George Otis Smith, National Geographic Magazine, May, 1935.

A Deeply Indented Shore Makes Maine Waters Ideal for Yachting

The imaginary crow that flies in straight lines so convenient to distance measurers would cover 228 miles to reach Quoddy from Kittery. If a sailor followed all the tidal shore line, he would log 3,478 miles; and, if the kinks were taken out, that mileage would stretch from Canada through the Panama Canal to Guayaquil, Ecuador.

the way Will Rogers used to, too. Maine coast men are very easy on their words, softer-spoken than Southerners. They are good men to put the baby to sleep when they talk, they are so gentle and deep in their speaking.

"So now the world knows how a lobstering man looks. A bronze, lean man. The world ought to be proud to know him." *

We were delayed in meeting Elroy. His son and another youth, home from school, had gone tuna fishing in an outboard-motored skiff. Darkness, accompanied by sheets of wind-driven rain, was coming on, so Elroy went out in his own boat to look for them. He found that another lobster boat had picked up the pair, their skiff, and their catch, a 200-pound tuna—not unusually large, as tuna go, but more than enough when fastened to an open skiff.

Elroy told us he would chop up the skiff to prevent his son from taking such chances, but we knew he wouldn't do it. He was too proud.

While he yarned, Mrs. Johnson cooked lobsters for us in the restaurant she operates on the wharf. The lobsters embarrassed us a little, for we had purchased them at sea from a fisherman we met hauling his traps while sailing over to Bailey (page 342). We did not fancy cooking them aboard *Nomad*, tightly battened down against the rain, and now we wished we had waited for some of Elroy's catch. But neither she nor Elroy saw anything amiss—still another example of Down East hospitality.

Sea Gull Finds Friend Despite Fog

Elroy told many stories, but the one we liked best concerned his pet sea gull. The gull visits him daily when he is out hauling his traps. Elroy recognizes him by a ruffled feather topknot. A few days earlier, in the densest fog, the gull alighted on his boat.

"I hadn't any bait scraps left for him," Elroy said, "but I figured that, if the old fellow could find me in that pea soup, I couldn't let him down, so I gave him half of my sandwich."

A fine sailing breeze carried us away from Bailey, past the mouth of the Kennebec, and Seguin, one of the best-known lights on the coast, and close to Popham Beach. There, in 1607, was launched the first American-built vessel to cross the Atlantic. She was the little sloop *Virginia*, constructed under direction of Capt. George Popham, kinsman of England's Lord Chief Justice.

Entering Boothbay Harbor, we were kept company by a beautiful Friendship sloop, the *Susannah*, with a gay party aboard. One of the survivors of a grand but fast-vanishing type perfected by Wilbur Morse, the *Susannah* is distinguished by sturdy construction and the graceful curve of a clipper bow (page 340).

It was lucky, we decided, that *Susannah* was so solidly built; closer investigation revealed she was fitted with a bolted-in square piano, making her probably the only craft of less than 40 feet so equipped.

At Boothbay Harbor, we discovered, laboratories of the State and of the U. S. Fish and Wildlife Service are investigating the supply and conservation of important resources of the sea, notably the North Atlantic salmon, herring, and the clam.

We saw many curious specimens, but none more curious than one small bicolored lobster. One half was normal in color; the other, a robin's-egg blue (page 342).

The technicians introduced us also to steamed periwinkles, which tasted rather like turkey. Nothing that comes out of Maine waters, they assured us, is inedible.

Birthplace of a Famous Sloop

When we left Boothbay to continue our sail Down East, *Nomad's* crew approached Friendship in the spirit of pilgrims visiting Mecca. We found, however, no monument to the genius who made the name of the tidy little fishing village at the head of Muscongus Bay known throughout the yachting world. No boat of Wilbur Morse's design lay in the harbor. The craft surviving him are widely scattered.

Morse was about 21 and without technical training when he built his first Friendship sloop to go lobstering in. Despite steady improvement, he was not content with her nor with several he launched in annual succession. When finally he built one that satisfied him, his sloops were in such demand by fishermen that he stopped fishing to build about 400 of the sturdiest craft of their size and type ever launched.

Giving numerous islands a respectful berth, we sailed to Tenants Harbor, a place typical of countless small but excellent havens along Maine's coast. Old granite quarry derricks stand as stark reminders of the quiet village's former industry. Fishing now is its chief occupation, and Hugo Lehtenin, the "Flying Finn," plays an important part in that.

Air Force veteran Lehtenin was making a comfortable living spotting schools of fish from his Piper Cub and furnishing the information to fishermen for a share in their catch. In addition, he now operates two seining crews.

We sailed for Camden in a bright dawn and watched an impressive sight as the rising sun gilded the peaks of a distant mountain range. We were hardly five miles out, however, when

* *Yankee Coast*, by Robert P. Tristram Coffin. New York, 1947. By permission of The Macmillan Company, publishers.

Heading Down East, Slender-hulled *Nomad* Makes Knots Before a Good Breeze

History, scenery, and carefree weeks lie in store for the crew as they start a summer cruise along the New England coast. *Nomad*, a 40-foot auxiliary ketch, is balanced so well that she almost sails herself.

Bridge Arms Rise as *Nomad* Enters the Annisquam, the Canalized River That Makes Cape Ann an Island

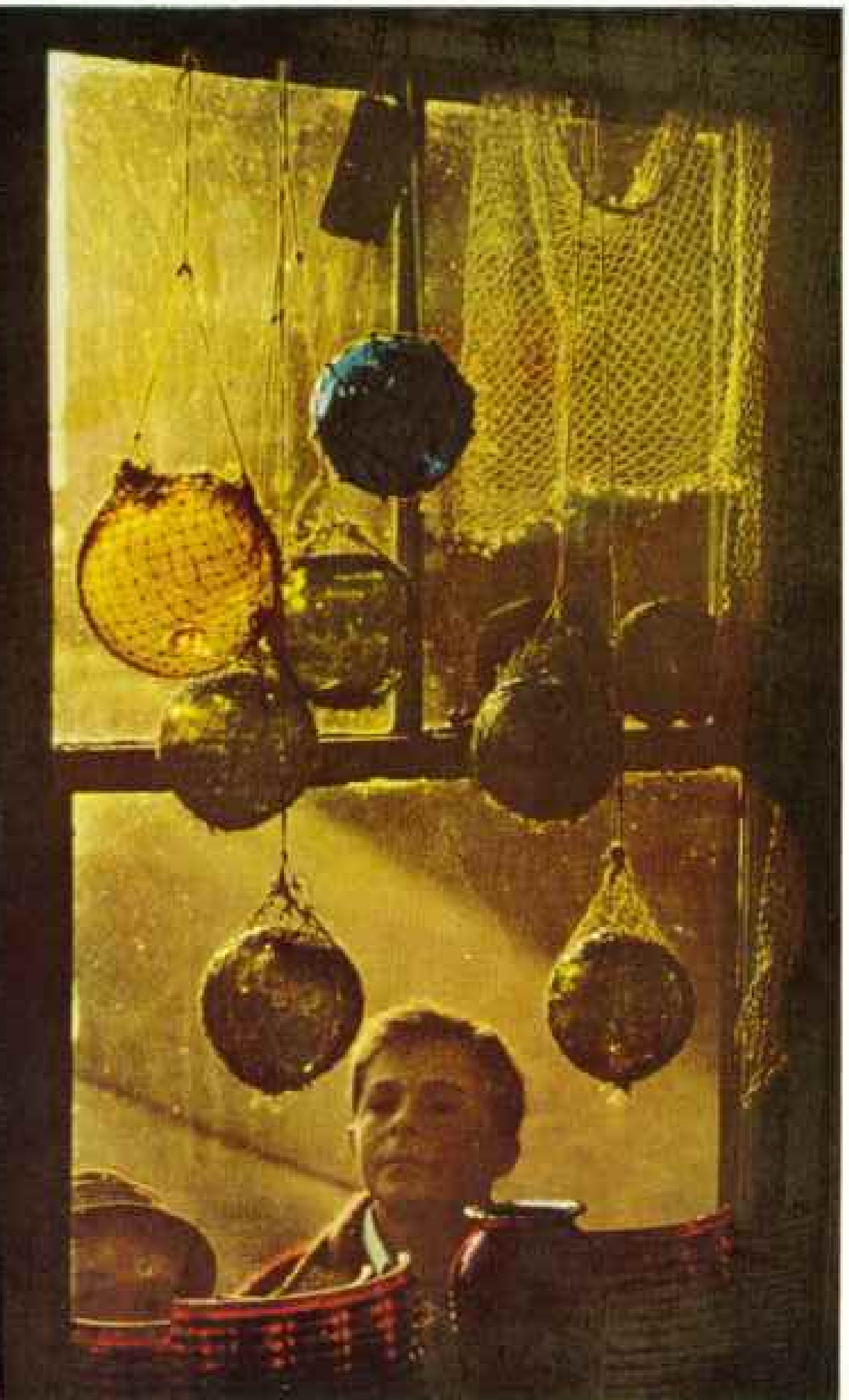
Fishermen have used the waterway 300 years in delivering cargoes to Gloucester, Massachusetts (right). Artists and writers have spread the town's air of tar and drying fish. Opposite: Nocturnal lookouts using the crow's-nests of these Gloucester seiners can spot mackerel by phosphorescence.

From Gloucester Comes the Groan Heard in Fog Around the World

Small-boat sailormen in every sea use these lever-operated Lothrop foghorns, which make a noise out of all proportion to their size. A canvas bellows, pumped by hand, sends a melancholy blare from the copper horn.

➤ Bob Allen, a member of *Nomad's* crew, climbs aboard a whistling buoy off Cape Porpoise, Maine. Each time the buoy rides downward with the sea, air is forced through an opening into the whistle's long pipe, sounding a deep-toned blast.

The acetylene lantern flashes day and night. Gas cylinders in the body of the buoy hold approximately a year's fuel. A concrete block 157 feet down on the ocean bed anchors the buoy.



← Hollow Glass Orbs Once Supported Ocean Fish Nets

Floats of colored glass, common and utilitarian before the war, now bring high prices as ornaments. Most came from Czechoslovakia's famous glassworks. Today such floats are made of metal or domestic amber-colored glass.

These specimens hang above running-light lenses in a Gloucester curio shop.

A Pumpkin Adds → Autumn's Glow to an Antique House

Stagecoach House, a splendid example of early-American architecture in West Gloucester, was built about 1649. Now a residence, the weather-stained, unpainted building served for a time as posthouse on a stagecoach route.

New Englanders for generations have placed autumn's ornamental pumpkins on their doorsteps.

Kodachromes by Lois Marden,
National Geographic Staff

Nomad Whips Past Green *Susannah* in Boothbay Harbor

Clipper-bowed *Susannah* is one of the survivors of the sturdy fleet of Friendship sloops, so called because they were built at the little fishing village of Friendship, not far from Boothbay Harbor.

Wilbur A. Morse, the builder, constructed his first Friendship sloop as a lobster vessel in 1874. He turned out about 400 Friendship sloops before he died in 1949 in his 96th year. Yachtsmen, discovering the Friendships' seaworthiness, bought up all they could and converted them.

Susannah, launched around the turn of the century, has been rebuilt so often that only the keel remains of her original timbers. A square piano fitted into the cramped cabin helps balance the vessel, and skipper Paul Coolidge plays it sitting on a portable foghorn mounted on a bunk.

Nomad's masts are hollow-built of Sitka spruce for lightness and strength; *Susannah's* old-style masts are solid spruce.

Pigments Injected into Blood Systems Trace the Circulation of Dogfish

It seems only just that many dogfish, which make voracious raids on edible fish, should wind up their careers as specimens for dissection by biology classes.

These technicians at the Bailey Island station of Ward's Natural Science Establishment force red and yellow pigments into arteries and veins for the benefit of scientists and inquisitive students.

Strong and swift, the pestiferous dogfish rushes through schools of herring and mackerel, killing right and left. Valuable cod and haddock, too, become the prey of this little member of the shark family. Commercial fishermen, consequently, welcome the station's dogfish collections.

To Fish, These Brilliant Flies Represent Minnows, Not Insects

Long-hooked flies, tied with cock feathers, deer hair, silk, wool, and tinsel, are a Maine specialty. Here the experienced hands of a tier at Percy Tackle Company in Portland finish the head of a Parmacheene Belle streamer. The original pattern, first tied in 1878 to imitate a brook-trout fin, was named for a Maine lake. Finished flies usually have "eyes" of jungle-cock feathers (left) from a Pakistan wild fowl.

Three dull-hued streamers imitate smelts, a favorite food of trout and salmon. Six white, black, and yellow flies are Black Ghosts, one of the best smelt imitations for spring. Five silver flies (in both rows) are Supervisors.

Kodachromes by Luis Marden, National Geographic Staff

A Lobsterman Sells His Wares at Sea

Wherever *Nomad's* crewmen saw the bright-colored cedar buoys of lobster pots, they knew they could navigate, as the traps were set in 15 to 100 feet of water. Lobsters seek the bait through funnellike net heads in the ends of the pot. Some traps contain an inner chamber, the "parlor."

Nomad's crew dined on lobster nearly every day. Usually they boiled the crustaceans in sea water and ate them hot. Some shipboard gourmands consumed three or four at a sitting.

Here the Navy's Comdr. Harrison H. Holton, who cruised with *Nomad*, squeezes a freshly caught lobster to see if its shell is hard. He knows that hard-shells have more meat and flavor.

←Half blue, half normal, this lobster was a rare but edible freak at the Fisheries Research Station in Boothbay Harbor. Occasionally an all-red lobster is taken alive from the sea.

Kodachromes by Luis Marden,
National Geographic Staff

a solid bank of fog rolled in and cut off our view of the distant mountains. We caught a fleeting glimpse of Two Bush Island Light and after that saw only an occasional lobster-pot buoy. When finally we picked up a sea-worn, unmarked navigation buoy, we couldn't believe it was the one we sought, even though our reckoned time had run out.

The good old lead line, oldest and in some ways the most dependable aid to navigation, gave us the answer we wanted: by the depth we knew that the buoy could only be the one outside Camden. In we went, straight up the harbor by compass.

A hail from the wharf startled us before we could see the structure. *Nomad's* top hamper already was visible ashore, and soon our greeter was taking our dock lines.

When the dungeon fog lifted in the morning, we moved up into the inner harbor and anchored close to where the Megunticook River tumbles noisily into the cove after turning the wheels of busy woolen mills.

Camden Hills Echo to Heavenly Music

Above us, the green hills of Camden furnished an almost theatrical backdrop for the town. They inspired some of the earliest verses of a Camden schoolgirl, Edna St. Vincent Millay, and it was not hard for us to see why.

Champlain charted the region around Camden and near-by Rockland as "Bedabedec," and Capt. John Smith described the town site as "adjoining to the high mountains of Penobscot, against whose feet doth beat the Sea." From one of the hills, Mount Battie, most of Penobscot Bay can be seen on a clear day (page 354).

Camden may fall short of heaven, but it has celestial music. A visitor wandering through the streets can hear harp notes coming from numerous dwellings—students at work. Camden, in fact, has been called the harp center of the world. Every summer harpists from many countries come to play and study with Carlos Salzedo, world-renowned harpist (page 355).

One of the most popular and prosperous summer places on the coast, Camden is also the center of a new and curious industry, the "growing" of crystals used in hearing aids. The crystal-growing room in Tibbetts Industries, Inc., cushioned against shock, is literally a room suspended within a room.

Here seed crystals of Rochelle salt and other substances mature in a "mother liquor," the molecules arranging themselves in definite pattern and symmetry. Growing almost as a plant grows, the faceted, razor-edged crystals reach six inches in length and four inches in breadth, and weigh two to three pounds.

Such crystals have the property of piezo-electricity: that is, they transform pressure into electric impulses. Tiny slices, the thickness of four human hairs, go into the miniature hearing-aid microphones. Tibbetts supplies a major portion of the world market.

While we lay at anchor, a visitor rowed out to us. He introduced himself as Carl Lane, of Rockport, and from him we learned much of the rugged, satisfying way of life in Maine. Lane explained he had tired of New York's frenzied pace and come to Maine to write.

But magazine fiction and books, including several volumes on nautical subjects, had not satisfied a desire to work with his hands; so Lane opened a boat-building yard. Now he and his son build four standardized types of yachts, one sail and the other three power. Even though he does not advertise, he is hardly able to keep up with the orders.

Lane's experience, we found, was not unique. We heard of the operator of a small woodworking shop who did well enough supplying milking stools to the quasi-antique trade. But since he renamed them "television stools," orders have poured in faster than he can fill them.

An enterprising ex-Navy man ships Maine's choice sea-food products direct to the homes of many satisfied customers. Re-iced every 24 hours en route, they are guaranteed to arrive "alive and kicking."

Camden is the home port, too, of a delightful vacation enterprise — Windjammer Cruises. The skipper in charge of these jaunts, Capt. Frank Swift, has assembled seven old schooners on which vacationers cruise Penobscot Bay and adjacent waters, stopping ashore for sightseeing, clambakes, and square dances at Grange halls.

Lane told us we could intercept the fleet at Rockport; so we made sail. We arrived as five of the holiday-freighted vessels came up the small, deep harbor.

Most of Swift's schooners were once in the coasting trade, but some, in their palmy days, hauled fruit from the West Indies. None is equipped with power other than sail, but all have yawl boats astern, stout powerboats to nudge the old windjammers along in a calm.

Yankee Ingenuity Put Hole in Doughnut

Rockport, apart from its other attractions, can claim to be the birthplace of a unique benefactor of mankind: Capt. Hanson Crockett Gregory, the man who invented the hole in the doughnut.

A bronze plaque on Gregory's old home records the deed. According to one version of the story, as a boy of 16 more than a century ago, Gregory watched his mother cook "fried cakes," some of which had soggy, indigestible

centers. Gregory suggested she cut a hole in them. Mrs. Gregory tried it—and the world knows the result.

Captain Gregory was decorated by Queen Isabella for saving the lives of some shipwrecked Spanish sailors. There is no record of how many lives he has saved by punching holes in fried cakes.

At Rockport, too, is the Round Table Laboratory of Experimental Electrobiology, where an understanding of the human nervous system and of extrasensory perception is sought.

Carl Lane rejoined us at Rockport and readily accepted an invitation to sail with us next morning for the galaxy of islands out in Penobscot Bay, of which Vinalhaven is the center. We were glad to have him aboard, for visibility was poor, and he was as familiar with the narrow island passages as a professional pilot.

Sounding the foghorn in tattered patches of vapor, we groped our way to beautiful "Treasure Island," not to be found on the charts under that name. The cordial hospitality shown us by the owners of this unspoiled retreat included a prodigious meal featuring dozens of fresh lobsters, boiled in a huge iron caldron over logs blazing in a cavernous fireplace (page 368).

We ate at a plate-glass table whose supporting base was a huge ship's wheel, the spokes neatly separating the guests.

Later we roamed the island and admired the snug guesthouse converted from a capsized island steamer (opposite page).

Hurricane Island Has Granite Ghosts

Our hosts and some of their young friends guided us to near-by Hurricane Island. Once the site of a bustling community, when granite quarrying was a thriving industry, the island is now inhabited only by wild sheep and an occasional stray moose that swims over from neighboring islands.

Hurricane's buildings had such substantial stone foundations that it was easy to trace the streets of the vanished town. Within one granite enclosure that had been the bank's supporting walls stood a rusty safe. When we heard hymn singing and went to look, we found the "choir," our host's daughters and their companions, perched on the foundation of the village church.

Everywhere were reminders of the island's past, when residents engaged in the Herculean task of harvesting granite. From many neighboring islands, also, granite was quarried for public buildings and churches throughout the Nation. Granite pillars from one near-by island stand in the Sanctuary of the Cathedral of St. John the Divine in New York City.

On Hurricane, woodland vines wreathed old hoisting machinery, and weeds invaded grates of rusting steam boilers. Unfinished granite columns, cornices, copings, and headstones lay scattered in the encroaching brush and woods.

Raspberry bushes, their fruit plump and sweet, grew wild over much of the island. Unattended apple trees, abundant with yet unripe fruit, had escaped insects and other blights common to the mainland.

Clipper Faster than Some Modern Ships

Returning to the mainland, we called at Rockland, widely known for its lobsters (page 360) and lime, and also for the clipper ship *Red Jacket*, which in 1854 made a historic crossing from New York to Liverpool.

Although dogged by almost constant rain, hail, and snow, the *Red Jacket* (named for a famous Indian chief) logged better than 17 knots on her best day, enough to run away from many modern steam and motor ships. There is little likelihood that her dock-to-dock time of 13 days, 1 hour, and 25 minutes ever will be broken under sail.

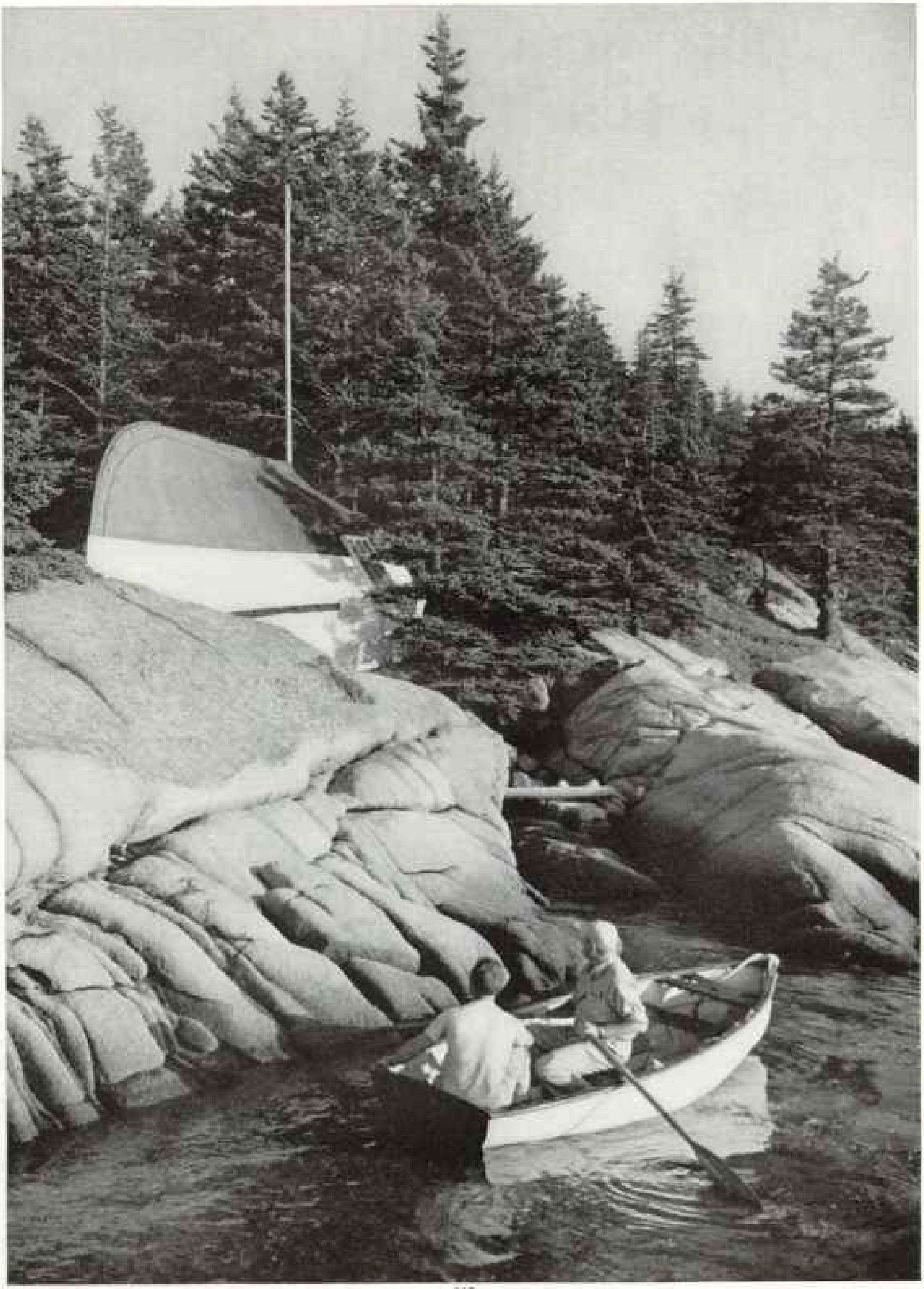
More efficient methods have displaced the picturesque era of Rockland's lime industry, when oxen hauled the raw limestone, and the most nondescript fleet of sailing craft ever assembled brought wood to feed the kilns along the harbor shore.

Some of the old hulls were as leaky as baskets; only their buoyant wood cargoes kept them afloat. Sometimes the windjammers arrived with the man at the wheel knee-deep in water. Because he could not see over a monstrous deck load, a man perched on the timber piles would shout course directions.

Far more perilous was the task of carrying away the finished product. For that purpose, vessels tight as a bottle were required. If water reached a cargo of quicklime, a violent reaction would produce high temperatures and, almost certainly, a fire which could not be fought with water.

Usually the vessel was doomed. The only hope was to smother the fire by sealing every crack and seam. Charred timbers still found along the coast show such efforts were not too often successful. Even if a limer survived a fire, she usually was extensively damaged by swelling of the quick-tempered cargo, which buckled decks and started fastenings. Steel barges now are used, with far less risk.

In bright moonlight we sailed to Monhegan Island, roughly ten miles off the mainland. Although the wind was moderate, the sea was not, and we were glad, as the ship's clock briskly sounded eight bells at midnight, to drop the hook where Capt. John Smith anchored in 1614, between Monhegan and Manana Islands. Even at that, the sea kicked up so wildly that we had to stand one-hour anchor watches all night.



343

Shipwreck House on "Treasure Island" Turns Keel Skyward as a Snug, Tight Roof

Salvaged and capsized, the vessel's bow shelters guests of the owners, who, "discovering" the island, called it Treasure. They cut doors and windows in the hull and replaced deck with flooring. Inside, the high roof slopes like a tent.

New Hampshire Men Launch *Driftwood*, a Brand-new "Antique"

As he gained years, Capt. Edward H. Adams, the last active gundalow skipper, yearned for the feel of those old-time, heavy, flat-bottomed river boats. Largely for sentimental reasons, he spent 20 years building a gundalow. With his son, Edward Cass Adams, he scouted forests for timber, accepting only knees and bow planks bent by Nature, and put them together with treenails, or wooden pegs.

On Captain Adams' 90th birthday, virtually all Durham, New Hampshire, turned out to see the vessel slide into Great Bay, an arm of the Piscataqua River.

Gundalow that she is, *Driftwood* was built for the shallow Piscataqua. Shoal draft for shallow water, she draws less than three feet. Her predecessors for more than two centuries carried coal, wood, bricks, and other bulky cargoes between river towns.

Rigged with stump mast, a gundalow passed beneath low bridges by dipping her slanting yard, on which lateen sails were set.

Anticipating the battles of Concord and Lexington, Durham men carried powder in gundalows in 1774. These scowlike New England vessels are thought to have derived their name from the word gondola.

Captain Adams died April 9, 1951. His son sails the new gundalow, sometimes with the aid of motors. He lives on Adams Point, in the white house, the Adams residence for generations.

Fog and Dawn Produce the Effect of a Winslow Homer Painting: the Sardine Fleet off Eastport, Maine

Men in shirtsleeves and oilskins work boats and scoops within a huge net whose end they slowly draw in like a purse string. Their catch is a small herring which, transferred to tins, becomes a sardine (pages 348 and 350).

348

Arms Strain under 100 Pounds; Ankles Sink in Fish

Maine's silvery sardines are prized as much for scales as for flesh. Dislodged, the silvery particles sink through the grating of this scale boat. Purified and suspended in lacquer, the pearl essence turns glass beads into artificial pearls (page 350). Lacking ice, cargo ships rush home as soon as a catch is made.

Captain Smith had come to Monhegan seeking gold and copper. Not finding them, he put his men to fishing in the teeming waters near the island. Long before that, Monhegan was known to other European fishermen, and at one time it was the retreat of the pirate Paulsgrave, or Paul Williams.

Now, in summer, painters and other visitors exceed the fishing village's year-round population.

Maine Indians Were Poor Sailors

Two factors have contributed to the long and uninterrupted occupation of Monhegan. First, superlative fishing waters surround it. Second, it enjoyed virtual immunity from Indian raids.

The island's rugged shore, desolate, exposed, and only a mile and a half long, discouraged amphibious landings in canoes, even if such frail craft could have survived the rough crossing from the mainland. The Maine Indians were not good sailormen, in any event; and whenever they stole a sailing vessel, they forced captured white men to handle the craft.

Returning to Boothbay for supplies, we passed close to Christmas Cove, a favorite with cruising people. The tireless Capt. John Smith is said to have named it when he anchored there on Christmas Day, 1614. It was Smith who said he would rather live in Maine than anywhere else, and that if a colony couldn't support itself there, it deserved to starve. He may have been right; famine seems to have shunned Maine.

At Camden, which again became our base for eastward cruising, *Nomad's* crew underwent considerable change. Demands of military and civilian pursuits left only two of the original company, Luis and the writer. Coming aboard were Comdr. Harrison H. Holton, on leave from the Navy; John Trueman, Boston engineer, and Robert R. Sewell of Montreal, combat pilot in two World Wars.

Apprehension that the change might lower our standards in the galley was short-lived. The new recruits showed a real aptitude in that department, in addition to being good sailormen. And Harry added a measure of Navy precision to our navigation.

The Camden Hills basked in the afternoon sun astern as a brisk norther carried us across West Penobscot Bay to Pulpit Harbor on North Haven Island. The narrow entrance

to this little haven is unmarked by man, but Nature erected an unmistakable beacon, Pulpit Rock.

On the rock reposed the untidy nest of a fish hawk. As we passed, one of the big birds swooped down with a fish for its young. Though the nest seemed little more than a loose bundle of twigs, it couldn't have been as flimsy as it looked. We were told that records show the isolated pinnacle has harbored similar nests for three centuries (page 353).

Of no commercial importance, Pulpit Harbor is little known except to cruising folk. We found several pleasure craft already secured for the night in the tree-fringed, virtually landlocked anchorage.

With no lights to lure us ashore, all hands turned in early, and we were off with the rising sun on a fine sail to Southwest Harbor, on towering Mount Desert Island about 30 miles away.

The course through island-bordered Merchant Row took us close to Isle au Haut, so named by the explorer and cartographer Champlain back in 1604. The near-by Camden Hills and Mount Desert, within sight of each other on a clear day, are among the highest promontories on the Atlantic coast of the United States.

Isle au Haut once was an important cog in the West Indies trade, when the island's vessels took out salt fish and returned with rum and molasses. Now summer visitors form the chief industry.

We crossed Jericho Bay, threaded narrow, winding Casco Passage, and entered Blue Hill Bay. It was then only a short run to the placid waters of Southwest Harbor.

Next morning we received a visit from Rear Adm. Samuel Eliot Morison (Ret.), the Harvard professor who is writing the history of the Navy in World War II. The seafaring professor was cruising in his little yawl *Emily Marshall*, a family name of many generations. Having long known the Maine coast as his own front yard, he speedily marked on our charts places we should visit and, more important, others we should avoid.

After more than 50 miles over the open sea, we reached one of the places Admiral Morison recommended—the little town of Machias, on the Machias River. This was one of the last of the Maine streams used for "long-lumber" drives, a far more spectacular operation than floating short lengths of pulpwood. With its

349

Snagged by Boat Hook, a Speeter Rises from the Sea

Kelp, a seaweed, yields a processed livestock feed and algin, a smoothing agent for ice cream. Maine's coastal farmers sometimes spread it as a fertilizer. Title tore this piece loose off "Treasure Island"; its holdfast, or anchor, trails like a cable. Col. William H. Speidel makes the catch.

rough and roaring water, the Machias still demonstrates why the Indians called it "Bad Little Falls."

Navy records relate that soon after the Battle of Lexington, in April, 1775, Machias raised a liberty pole, symbol of freedom. The commander of the British sloop of war *Margaretta* ordered it cut down, under threat of destroying the town. But, says the Navy:

Revolution's First Naval Battle

"A lumber sloop left Machias and lazily drifted toward the sea as if about to pass near the warship. The sloop, apparently badly handled, fouled the warship, and instantly scores of Yankees boarded the foreign craft armed with pitchforks, axes, and muskets. A battle followed, in which the Americans were victorious after losing six men and killing ten of the enemy, including Lieutenant Moore [the commander].

"This was the first naval engagement of the Revolution. The lumber sloop was in command of Jeremiah O'Brien, and four [possibly five] of his brothers were in the crew. Joseph O'Brien, the youngest brother, was only 16 years old, and his request to form one of the party was refused. He smuggled himself aboard the craft and during the fight proved to be very much a man. Lieutenant Moore's sword was given to Joseph O'Brien, the baby of the crew."

Since then, four Navy vessels have successively borne the name of this early American naval hero. We sailed, we believe, right over the spot where the battle was fought.

We anchored *Nomad* off a big sardine factory at Machiasport—the town of Machias is several miles farther up the shallowing stream—and began to get acquainted with one of Maine's most important industries. More than forty such factories give seasonal employment at good wages to thousands of Maine women. Men also are employed, but fewer of them, for it takes the nimble fingers of women to arrange the small fish in their tin containers.

Employment in a sardine factory is much like membership in a volunteer fire department. When a cargo of fish arrives, it must be packed without delay, and employees are summoned at any hour of the day or night.

The same urgency drives the skippers of sardine carriers, the vessels employed to bring fish from traps to factories. No ice but only salt is used, and the fish will not keep more than six or seven hours. Once loaded, a sardine carrier must push through, regardless of the weather.

A typical carrier, the *Chester L. Pike*, was tied up at the factory wharf—fortunately for us. While we were inspecting the old Burnham Tavern where the dying Lieutenant Moore was taken, and visiting a little tree-grown cemetery where Captain O'Brien and members of his family sleep, contrary wind and tide broke out *Nomad's* anchor. Returning, we found her tied securely alongside the *Pike*.

Capt. Guy Leighton, skipper of the carrier at the time, explained that *Nomad*, dragging her anchor, had cruised back and forth across the river, in danger of going aground, until he got a line aboard.

Leighton has sailed Maine waters since he was a boy of 14. There was little he did not know about them or about the sardine industry. A sardine, he explained, can be any of several species of small fish; those caught in Maine are small herring (page 348). Sometimes the herring scales bring more than the fish themselves; they are used to make pearl essence for the jewelry industry and others.

Collecting the scales is a surprisingly simple process. The fish are transferred to scale boats, where, as they flop about in water, the scales are dislodged and sink through gratings to the bottom of the small craft. Then the fish are hoisted from the scale boats into the carriers, the gratings removed, and the scales dipped out.

Secret chemical processes remove the white coloring matter, guanine, from the tiny scales, and refine it into crystals. Suspended in lacquers, the silver pearl essence is used to coat glass beads in the making of artificial pearls.

Beyond Domain of the Summer Visitor

From Machias we were bound for the Canadian border and West Quoddy Head, easternmost point of the United States. It soon became apparent that we had sailed beyond the domain of the summer visitor, the summer hotel, and the glittering powerboats. We saw only one pleasure craft along the way.

A tall lighthouse, which we had difficulty picking up despite its Christmas-candy red and white stripes, marked West Quoddy's headland (page 366). Patches of fog limited visibility all the way; there was little danger of running aground, however, for, as the chart showed, the mainland shore fell off as steeply as the side of a house.

The fog lifted conveniently soon after we felt our way with the lead line inside West Quoddy Head. We timed our arrival to the rising tide, a necessary precaution since the tides through Lubec Narrows run at four to eight knots, depending on the season. Contrary currents, too, can be baffling. The *U. S. Coast Pilot* counsels against attempting to sail against the tide.

Our run up to Eastport, along the watery international boundary which follows the middle of the channel, was pleasant and comfortable. We passed the little town of Lubec close

Kodachrome by Luis Marden, National Geographic staff

Every Maine Lobsterman Floats His Own Colors to Identify His Traps

Lobster fishermen register their colors. Pirating another man's pots is as serious an offense as horse stealing used to be in the West. Waldoboro men use this rocky isle as a storage depot.

Kodachrome by Stewart Anderson

Cape Neddick Light's Fog Bell and Red Glow Warn Seamen from Rocks That Have Sent Many Good Ships to the Bottom

In 1842 a crew member of the bark *Isidore* dreamed of disaster, the story goes, and at sailing time hid himself on shore. He was the only survivor when the *Isidore* cracked up off Bald Head Cliff near by. Erected in 1879, the light was electrified later.

Commander Holton Looks for Ospreys as *Nomad* Leaves Pulpit Rock, a Nesting Site for Centuries

The crag guards the entrance to hidden Pulpit Harbor on North Haven, one of Maine's best small-boat harbors. Ospreys have been noted on the rock since 1614, when Capt. John Smith observed "divers sorts of Hawkes." This view looks out from the lagoon.

Kodachrome by Luis Marden, National Geographic Staff

Green Woods and White Yachts Give Camden One of Maine's Loveliest Views

Champlain and John Smith explored hills and harbor. Lately the town has developed into the summer colony here seen from Mount Battie. *El Fetal*, the big yacht at left, carried two motorcars and a helicopter.

Kodachromes by Luis Marden, National Geographic Staff

"Hast Thou, Spirit, Perform'd . . . the Tempest That I Bade Thee?"

Actors of Camden's summer theater enact a scene from *The Tempest*. Here Prospero, with his daughter Miranda, questions the spirit Ariel. Grass, flagstones, and shadowy forest form an outdoor stage for the drama which Shakespeare based on a shipwreck in Bermuda.

In Summer Celestial Music Echoes Among the Camden Hills

Carlos Salzedo, celebrated harpist, heads a summer colony that attracts musicians from all corners of the world. Some 40 artists gather each season to study under him. Here he plays with a young associate while another listens.

An Unrealized Dream, the Schooner *When and If* Looms Through the Mist off Mount Desert

Gen. George Patton, World War II tank specialist, ordered the vessel built with the idea of cruising the world in her when and if he retired, but sudden death cut short his plan. Last winter Mrs. Patton and her brother, Frederick Ayer, carrying out the general's dream in part, sailed *When and If* through the West Indies.

Kodachromes by Luis Marden, National Geographic Staff

All Hands Gather to Hear the Mate Sing Chanteys

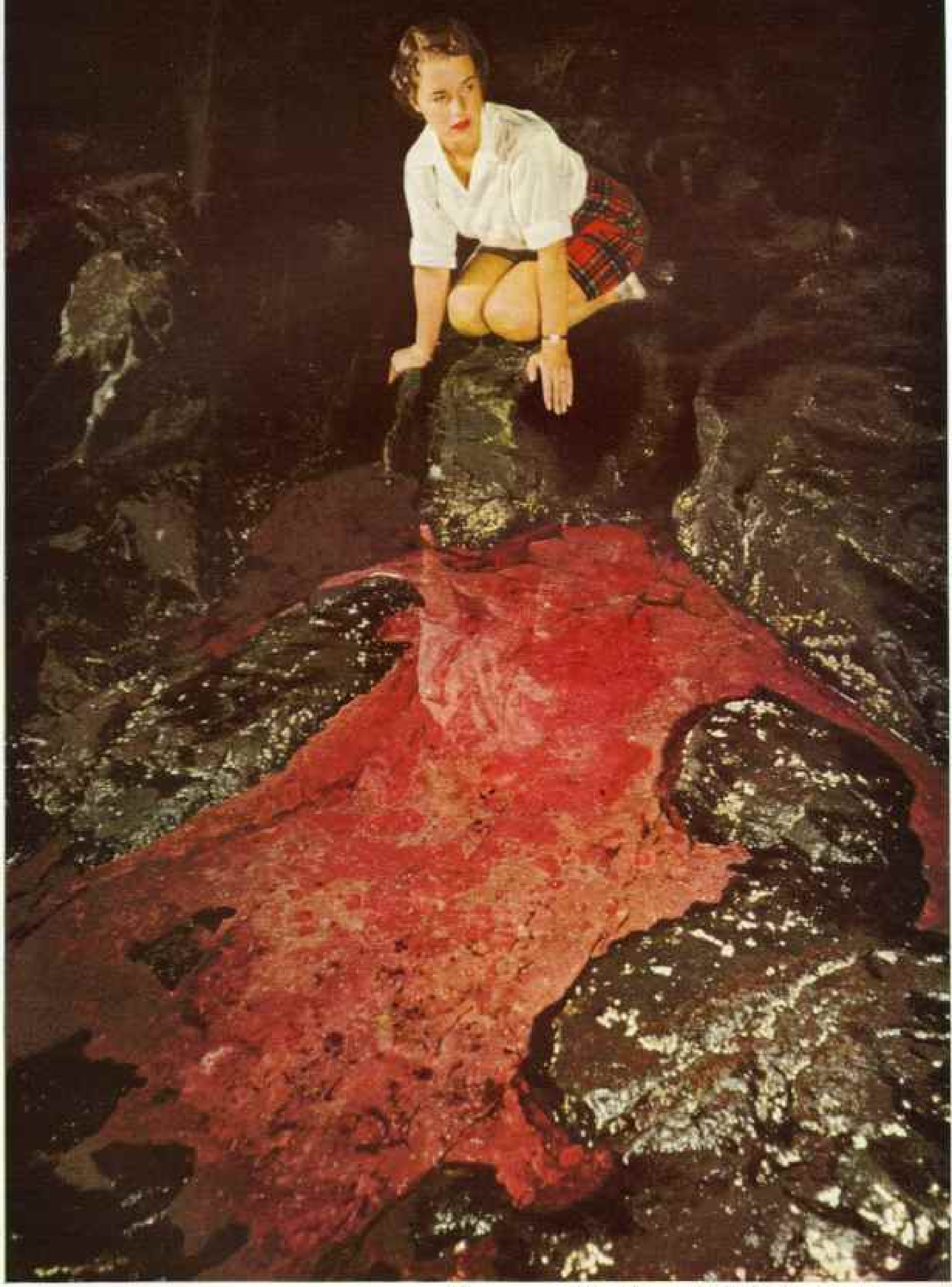
Maggie's summer cruisers, who pay for their keep, may help with deck chores if they choose. In ports they step ashore for sight-seeing, clambakes, and square dances. Here at anchor in Buck Harbor they hear old songs from the days of sail.

Summer's Sailors Relax in a Snug No Man's Land

Cruise vessels, some of them converted schooners, sail every Monday from half a dozen Maine towns during the season. Each has its men's and women's cabins below deck. A few windjammers provide twin bunks for married couples.

Autumn Leaves and Meetinghouse Spire: This Is New England

Students at Gorham State Teachers College study by afternoon's fading light. Gorham, Maine, preserves some beautiful frame homes built in colonial times.



159 Kodachromes by Luis Marden, National Geographic Staff

Tiny Algae Make Sea Water Appear the Color of Wine in Mount Desert's Anemone Cave

Tide, retreating out of the grotto, left this stagnant pool. A red alga, *Hildenbrandia rosea*, clings barnaclelike to the rock and stains it red. Acadia National Park visitors may enter the cave at low tide.

Neither Devils Nor Boxers, They're Lobsterettes

These girls in boiled-red "shells" and padded "claws" took part in the Lobster Festival's pageant at Maine's port of Rockland, which calls itself the lobster capital of the world. More than 15,000 people attend the town's annual summer festival.

"I've Picked All the Lobster Meat," Says the Winner. "Now May I Eat It?"

Children at Rockland's Lobster Festival competed to see who could remove meat from the shell in the shortest time. Even the small claws had to be emptied. The girl raising her hand finished first. Whole lobsters await new contestants.

361 Kodachromes by Luis Marden, National Geographic Staff

Buoys Get Bright New Coats of Paint as Guideposts to Sailors

Many landlubbers are astonished by the size of light and whistle buoys seen ashore. To the sailor peering through fog or rain, they look small enough! These undergo the Coast Guard's repairs at Southwest Harbor.

Blueberry Pickers atop Mount Desert Island Overlook the Scene of a Forest Fire

In October, 1947, fire raced across Cadillac Mountain's eastern slope after one of the driest summers in 300 years. Flames, starting outside a dump, spread over a third of the island behind winds of almost hurricane force. Some residents fled the island by boat.

The fashionable resort town of Bar Harbor faces a series of islands: Bar Island (left) and the four Porcupines. A breakwater extending shoreward from Bald Porcupine (right) protects the harbor.

383 Kodachrome by Luis Marden, National Geographic Staff

Summer Fog Conceals the Islands of Frenchman Bay in This Pre-fire View

Taken a month before the fire, the photograph shows Mount Desert Island's wooded landscape as it existed in September, 1947.

Cadillac Mountain lies in Acadia National Park, the first national park east of the Mississippi and the only one on our Atlantic coast north of the Florida Everglades. The mountain is named for Sieur de la Mothe Cadillac, the French explorer who founded Detroit. Louis XIV gave him Mount Desert Island as a fief.

Kodachrome by Walter Meayers Edwards, National Geographic Staff

Kodachrome by Melville Bell Grosvenor, National Geographic Staff

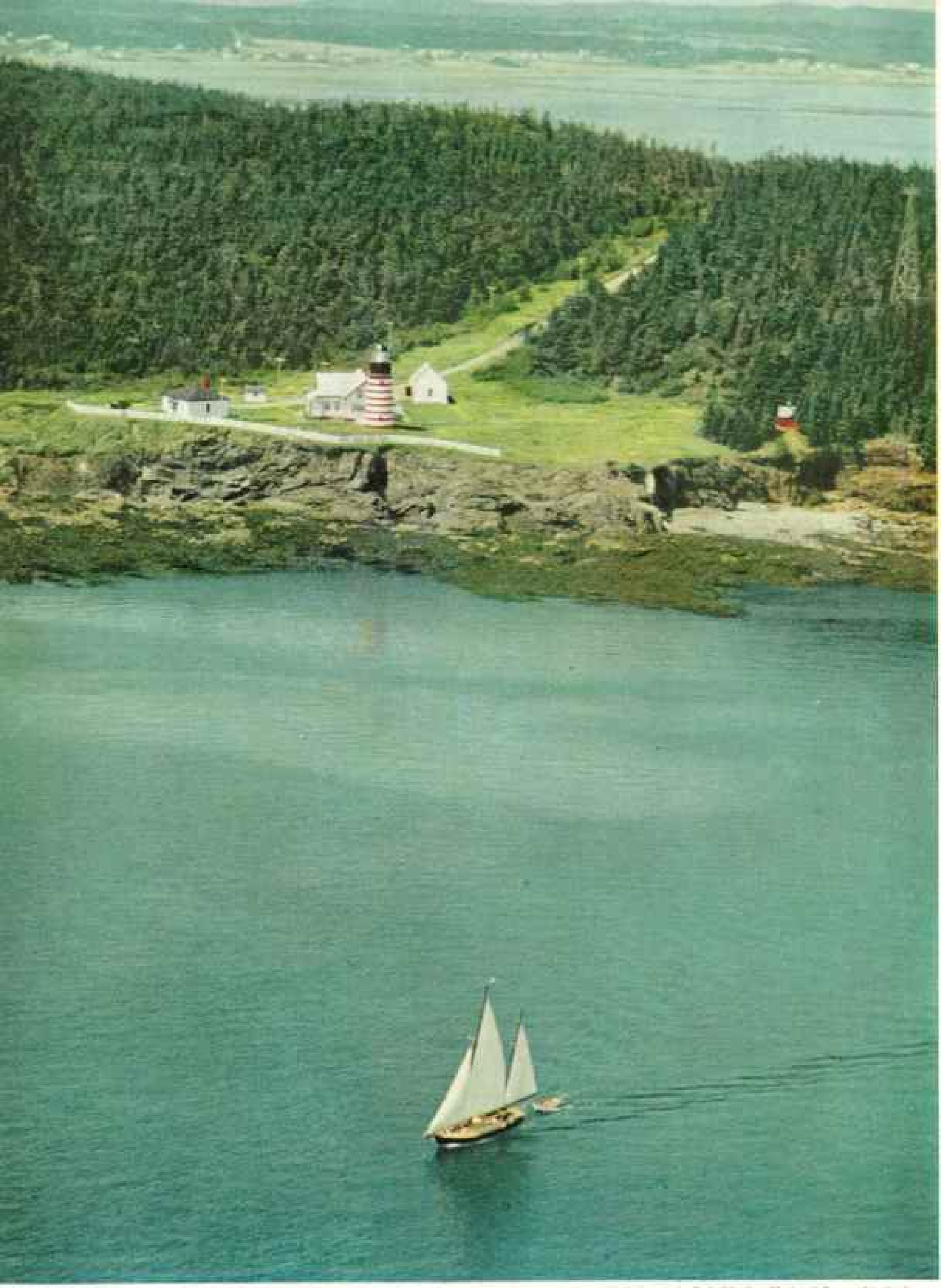
Fog May Blanket the Ocean, yet Boats Sail Maine's Inland Passages in Bright Sunlight

Maine's corrugated coast abounds in narrow islands and deep rivers. Indians and pioneers used the warmer waters of these twisting guts, bays, and rivers as highways, even as yachtsmen and lobster fishermen do today. Here the *Avelinda*, cruising near the mouth of the Sheepscot River, escapes the offshore blanket of fog which breaks off over the land. Owner and skipper Thomas D. Cabot (left foreground) conns his yawl through the inland passage.

Fog and Sunshine Make Quick Shifts in Maine's Late Summer Months: Bar Harbor's Municipal Pier

Bar Harbor is not all yachts and mansions. Many vacationers pursue humbler diversions; this couple fishes for flounder and pollock with clam-baited hooks. Low tide leaves a bridge between distant Bar Island and Mount Desert Island.

Kodachrome by Walter Meayers Edwards, National Geographic Staff



Kodachrome by Luis Marden, National Geographic Staff

Nomad Tacks past West Quoddy Head Light on the Nation's Easternmost Point of Land

Here the skipper, suspecting shoals, turned away. The photographer, flying to get an air view of ketch and light close together, could see that the bottom was clear, but could not make his yells understood on deck.

to port and, on the Canadian side, Campobello Island, long the summer home and sailing headquarters of the late President Franklin D. Roosevelt. Both Lubec and Eastport, which is on Moose Island, were lively centers of the smugglers' trade early in the 19th century.

Taking the advice of several fishermen, we put in at Deep Cove, about two miles from Eastport proper. There, at the invitation of her captain, we tied up alongside the sardine carrier *Juliet M.*, moored at a wooden pier.

This was a matter of more than ordinary convenience, for the tides at the time were rising and falling a span of 24 feet. *Nomad* went up and down comfortably in company with *Juliet M.* At low water, little of her topmasts showed above the pier.

Across the pier lay a small steamer under charter to the Government and staffed by Geological Survey scientists and a group of Army Engineers. They were making a preliminary analysis of the proposal to put to work the great tides of the Bay of Fundy and Passamaquoddy Bay.

How Moon Would Work for Man

Two natural features make Quoddy unusually tempting to proponents of tidal power. The range of tides in the Passamaquoddy area is extremely high—13 to 25 feet. And there are two bays, or basins, almost completely landlocked, adjacent to each other.

The basic concept is simple. Dams and locks would keep one basin, the larger Passamaquoddy Bay, at or near high-tide level by means of sea gates opening inward as the tide nears full height and closing when it starts to recede. The other basin, Cobscook Bay, would be kept at the low-tide mark by sea gates opening outward on the ebbing tide and closing as the tide turns.

Difference in the two water levels would average 19 feet, and power would be generated by turbines in another dam between the two basins. The enormous, unfailing flow of water would yield a continuous, though variable, output of power 24 hours a day.

The most recent report on the project says that such a system for "harnessing the moon" would yield an estimated 1,310,000,000 kilowatt-hours of power per year.

Classified Navy sounding equipment was used by researchers. Their preliminary and unofficial findings indicate the existence of better foundations for dams than had been supposed.

Perhaps now there will be new interest in the long-suspended International Passamaquoddy Tidal Power Project. If so, neatly arranged Quoddy village may again be fully occupied. Built to house project construction men in the 30's, the huge housing development later was used by the National Youth Administration, and more recently, during World War II, by the Seabees.

A village of another sort is located in the Passamaquoddy Indian reservation at Pleasant Point, about five miles from Eastport. Old residents remember when the Indians came to town paddling canoes laden high with baskets. Now they arrive in automobiles. The baskets they bring are used by the sardine industry, which, with its by-product output of pearl essence, constitutes one of Eastport's chief sources of revenue.

No visit to Eastport should omit the whirlpool in midstream near the international boundary. It is considered a menace to small craft, and many stories are told of ships and men sucked down and drowned within it.

Yet the whirlpool is a prime favorite with sea gulls. The birds wait for small fish to be impelled their way; then they ride around in its outer swirl like merry-go-round patrons. Whales, too, often spout and play around the whirlpool's outer edges.

We filled *Nomad's* tank, bucket-brigade fashion at Deep Cove. Then we came about, and *Nomad* turned her bowsprit southward for the homeward leg of our voyage.

We made the 40-mile run to Roque Island in bright, sunny weather. The wind was light, however, and we arrived at that unspoiled and unlighted harbor well after dark and only after much probing with the lead line.

Next morning we left in a dense fog, but we found the narrow channel between Great Spruce and Double Shot Islands without mishap.

Later we were glad we had not waited for visibility to improve, because, long before the lighthouse on Petit Manan Island drew abeam, we broke through into bright sunlight, driving over a sparkling sea so smartly that *Nomad* cut two hours off our estimated time of arrival at Bar Harbor.

Foreign Warships Visit Bar Harbor

At Bar Harbor we met Dr. John B. Ells, who jovially bears the imposing title of Chairman of the Warship Committee. The Navy has no establishment on Mount Desert, and Dr. Ells represents the service in receiving visiting warships, including many foreign vessels. During our visit, he was preparing a reception for the Royal Navy cruiser H.M.S. *Superb*, with a British admiral aboard.

Bar Harbor long has held an international reputation as a smart summer colony, with many of the Nation's wealthiest families as summer residents. They built multiroomed mansions they chose to call cottages, some of which went up in smoke during the devastating forest fire of 1947. That conflagration

368

A 25-pound Lobster Guards "Treasure Island" Fireplace

Twenty-pound lobsters, though rarely trapped, are not uncommon. The Virginia capes yielded a 42-pounder in 1934. Stories about 60-pound prizes remain unconfirmed. Maine protects undersize and oversize lobsters from commercial fishing but allows a few giant specimens to be taken for mounting.

forced some residents to evacuate by sea and burned a huge swath across the island; yet few scars remained visible at the time of our visit (pages 362-3).

Behind the town towers 1,530-foot Cadillac Mountain, part of Acadia National Park, an extensive wildlife sanctuary.

Harry Holton's leave ran out at Bar Harbor, but, as he stepped ashore, his berth was taken by Dave Hall, who moors his sloop *Doxie* outside my front window at T Wharf, Boston. With Hall aboard, we set off for Somes Sound, a deep wedge of water driven into Mount Desert from the south. It cuts the island almost in two.

About five miles long, with mountains coming down precipitously on either side, Somes is the only fjord on the Atlantic coast of the United States. We had been told to beware of williwaws, confusing winds common to such places, but we did not find them; or, better still, they did not find us, and we sailed the sound quite tranquilly.

Pausing at Northeast Harbor, we shaped a course for Eggemoggin Reach, a strikingly beautiful inland waterway 12½ miles long and about a mile wide, lying between Deer and Little Deer Isles and the mainland. The tide rises and falls through both ends simultaneously, stemming the flow to such an extent that current need not be considered.

Passing beneath a lofty highway bridge connecting Little Deer Isle and the mainland, we found ourselves off Buck Harbor. Guarded by heavily forested Harbor Island, Buck's anchorage is protected from all winds. Its popularity was indicated by the presence of numerous cruising and other craft, including one of the windjammer cruise fleet, the old schooner *Maggie*, laden with vacationers (page 357).

Presently we rounded Cape Rosier, bound for Castine at the head of Penobscot Bay. Site of an early settlement called Pentagoet, Castine was disputed by France, Holland, England, and the Colonies, with visits by Indians and Flemish pirates thrown in for good measure. But he who left the settlement his name, the Baron de St. Castin, was perhaps its most picturesque master.

The baron married an Indian princess, daughter of the great chief Madockawando of the Tarratines; she bore him several children, all of whom married well.

Little tangible evidence remains of Castine's

360

A Duck out of Water, *Nomad* Rests Against a Pier, Her Anchor Never More Useless

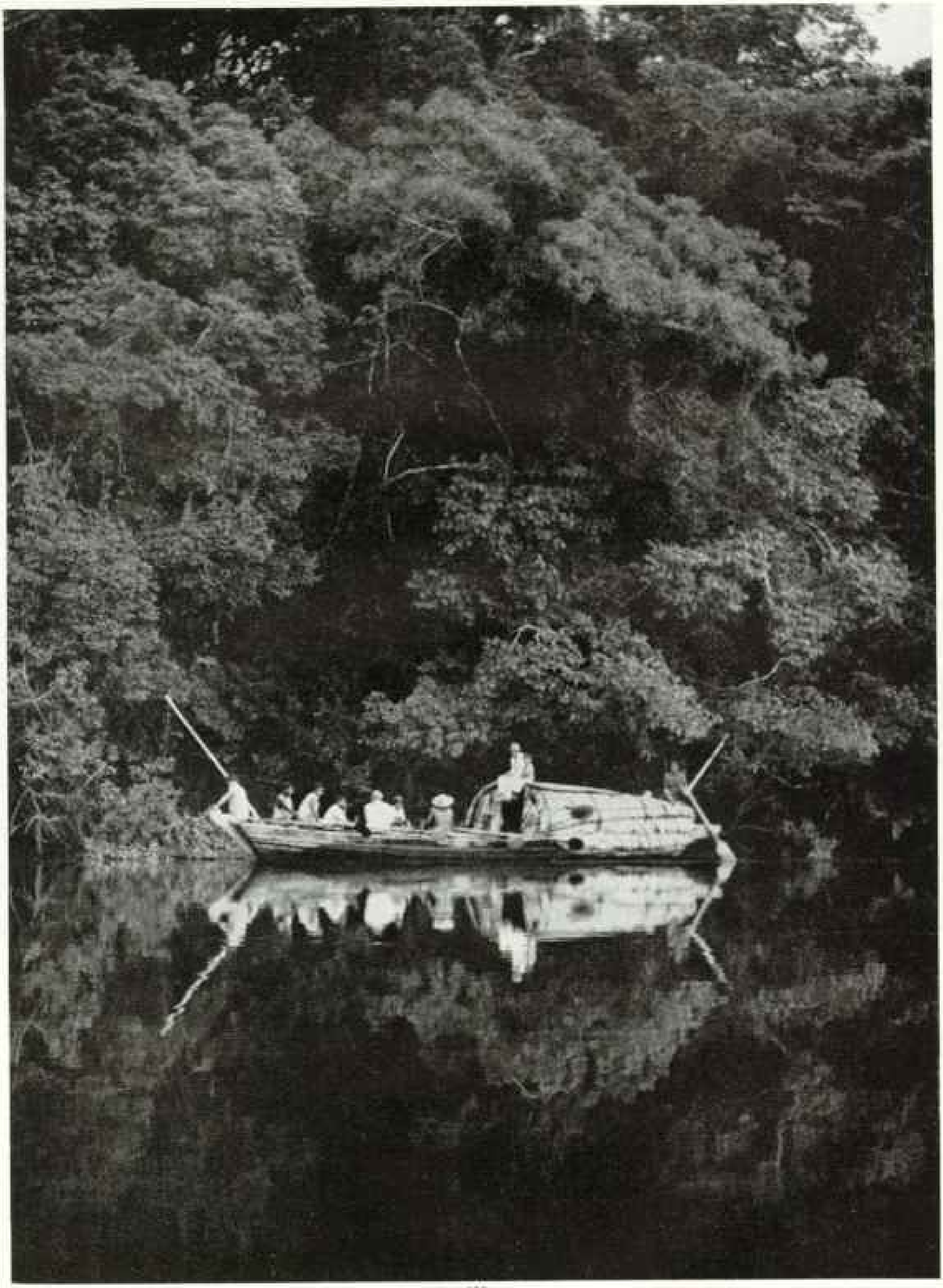
A leaky stuffing box forced the ketch to seek repair at Falmouth Foreside, Maine. A servicing crew secured her to the pier, let tide run out, and repacked the propeller's drive shaft. The author, who was prepared to pay a high price, was agreeably surprised when he got a bill for $6 (labor) and 26 cents (materials). Here the crew waits for high tide, which may raise the water level 12 feet (page 333).

warlike past except such crumbling ruins as old Fort George and numerous signs marking historic scenes. One, on Moore's Hill, proclaims that here the famous English general, Sir John Moore, then aged 18 and a lieutenant and paymaster of a British regiment, fought his first battle in 1779.

We moored at the town pier, just astern of the Maine Maritime Academy's training ship *American Sailor* (page 330). The academy, up a steep grade from the water front, annually graduates from 45 to 80 young men as merchant marine officers, with accompanying bachelor of marine science degrees, licenses as third mate or third assistant engineer, and commissions as ensigns in the Naval Reserve.

Comdr. Donald B. MacMillan, USNR, the noted Arctic explorer, and Mrs. "Mac" came aboard for a gam, as early whalers called a shipboard visit. Then they took us over to see their new summer home, perched on Dice Head, where they have more than 14 fathoms of water in the front yard. Cap'n Mac insisted sunsets across Penobscot Bay from his front porch are the most beautiful anywhere.

We know what he meant. The sun overtook us as we sailed down the bay, back to the green hills of Camden and the melancholy task of writing the final entry in the log of our Down East cruise.



370

Against a Towering Forest Backdrop, Chicle Hunters Pause to Stare at a White Woman

At dawn waking birds fill the jungle with hysterical melodies. By siesta time only a curassow call breaks the drowsy stillness. At 5 p. m. the forest comes alive again with the screech of parrots. Darkness brings a beating, insistent rhythm punctuated by the trombonelike shrieks of tree frogs and the howling of monkeys. These oarsmen were rowing a Brazilian trader's craft up the Vaupés River when they passed the author's canoe.

Jungle Jaunt on Amazon Headwaters

Foaming Rivers Led a Lone White Woman to Remote Clearings Where Primitive Indians Peered at Her in Wonder

By Bernice M. Goetz

With Illustrations from Photographs by the Author

ACROSS a map of eastern Colombia and northwestern Brazil, the Vaupés River winds like a satin-smooth blue ribbon. Actually, it is more like a ribbon that has been pulled taut, then abruptly released to fall into tortuous twists and turns.

Far from smooth, the river leaps and roars through a jungle world peopled by appealing but primitive forest Indians to whom even such a simple and familiar mechanism as the wheel is a novelty.

Working in Bogotá for an oil firm and planning once again a wilderness vacation, I studied maps of the isolated reaches in southeastern Colombia. The Vaupés (Uaupés) was my choice for exploration because it flows into Brazil through vast jungles I had never penetrated.

On each of eight previous jaunts into mountains and jungles of Central and South America, I had managed to see and experience something new and different. I had discovered an Inca fortress. Another time I lived among Jivaro headhunters in Ecuador. Once, deserted by my Indian companions, I had to sit for a week, alone in the jungle, awaiting rescue.

"Alone," but in Good Company

Except for a crew of Indians, I go alone; primitive peoples are a hobby of mine. This time I would select my Indian guide in Mitú, capital of the extensive Commissary of the Vaupés (map, page 372).

One who is wise in jungle ways realizes long before reaching white water that an Indian is particular about the trade goods he accepts as reimbursement for his help. The time is past when the traveler could provide simply paring knives, combs, pocket mirrors, perfume, and salt. What these Indians really crave is small white, blue, or gold beads.

These were not to be had when I was preparing for my journey. Luckily I was aware that fishhooks were scarce along the Vaupés, and I took as many as possible.

A rubber collector posted me on the quality of cotton skirt material to buy for Indian women. A three-yard length is considered sufficient payment to a woman bearer for one day's hard toil on the trail.

I also purchased yards of dish toweling with blue stripes. Somewhere along the Vaupés today, an Indian woman is unwittingly walking around in a dish towel.

As an afterthought, I bought five toy airplanes with wheels and propellers that turned. They have never failed to intrigue Indians in every jungle I have visited where the theory of the wheel is unknown.

Because of a scarcity of flashlight batteries, I selected an alternative which contained frightening magic for Indians—a miner's carbide head lamp with a spare supply of fuel.

Light Reading for Jungle Nights

Twenty-five-pound sacks of rice, red beans, and salt went with me as air cargo. My two duffel bags and borrowed field box contained only essentials—a Boy Scout mess kit, pots and pans, a snake-bite kit, and matches.

I took two small blankets, a miniature pillow, and a mosquito-netting bar tucked into a native hammock. As a pastime for peaceful nights, I packed 15 mystery novels.

Before leaving, I visited amiable Gen. Alfredo de León, then in charge of Colombia's territories. He gave me permission to enter the region and provided an official introduction to the Governor of the Commissary.

The flight to Mitú was spectacular. While Bogotá rests on a plateau at 8,660 feet, the mountains around it loom 5,000 feet higher. Where they dropped abruptly to the east, the grasslands of the *llanos* (plains) extended out in the smoky haze of the dry season. The *llaneros* (plainsmen) were burning the old grass in preparation for the rains.

Wilderness Unfurls Below

Beyond Villavicencio, the cattle town which is the jumping-off place to thousands of square miles of grass,* I was the sole passenger. On each seat were bales of emergency rations for the Governor in Mitú. At least eight Government employees were dependent upon the potatoes, onions, rice, beans, cheese, and fresh meat being carried to them. Ten pounds of butter oozed out of a package.

From the copilot's seat I viewed the tremendous spread of country in central Colombia. Where the grass stopped the jungle took over in a choking green mat.

* See "Keeping House for a Biologist in Colombia," by Nancy Bell Fairchild Bates, National Geographic Magazine, August, 1948.

River of Danger, the Vaupés Writhes Through the Brazil-Colombia Wilderness

Veteran of several tropical expeditions, the author chose for this venture the remote headwaters of the Amazon. Miss Goetz traveled this roadless borderland entirely by canoe and foot. Leaving Mitú, she went to the headwaters of the Querarí River, then retraced her steps. Canoeing down the Vaupés, she walked a jungle trail to the Aiarí and, journeying down that stream, stopped close to the Isana (Içana).

We stopped briefly at San José del Guaviare, on the Guaviare River, an emergency landing field during the war. Indians in bark-cloth skirts stood quietly beside the plane in the steaming heat. Then we started on the hour's flight over unbroken growth to Mitú.

Below us clearings studded with long low-roofed grass houses began to appear. Later on, I knew them for *malocas*, an Indian word for such forest communities. They consist of a communal hut large enough for five families—about 30 Indians. When food for my Indians ran low, I would look searchingly for the worn paths leading to them from the riverbank.

As we taxied in across the airstrip at Mitú, I saw a tall, dignified gentleman with a kindly face. He was Señor Guillermo Lynn, Comisario Especial. His wife and daughter were with him awaiting the food plane.

With quick, gracious Latin hospitality they covered up their surprise at my arrival and invited me to the Governor's house. They offered me far more than I expected—a cot with fresh linen, bath towels, and a hammock for siestas. I used it to practice for the jungle nights ahead.

Buildings hemmed the plaza: a schoolhouse with a bell which scolded loudly, the two-story home of a mission priest, an impressive storehouse filled with crude-rubber sheets, a commissary, and a small Government-run clinic with an enthusiastic young doctor. Six cows flown in by the wartime Rubber Development Corporation grazed in the plaza.

Fructuoso All Right, Even His Shoes

Governor Lynn set about securing a guide for me. On the third day Fructuoso appeared.

Fructuoso looked like a jungle Charlie Chaplin. His shoes were too big for him, the turned-up toes warped from many a rubber season. Since they were both for the right foot, he kept switching them to equalize their wear and comfort. His gaunt cheekbones showed his Indian blood, but he wore white man's clothes with dignity. It didn't matter that his shirt hung loose or that his trousers were in tatters.

I liked Fructuoso immediately. He had a quiet self-assurance gained from years of careful calculation as a river pilot. He was favorably impressed with the trade goods I had brought along. He fondled my Ithaca .20-gauge shotgun, tracing the engravings of ducks on the stock with a horny finger.

Fructuoso approved of my camping equip-

373

Alone in the Jungle with Her Indian Crew, the Author Rests by the Aiari River

Up at 4 each morning and on the river by 5, the travelers made the most of daylight hours. Indians, who feared the dark, preferred to keep moving until they found a safe camping place. Here the voyagers had to wait for a dugout. Moments later, biting flies and ants turned smiles to frowns.

ment as well as the bulk food for emergency rations. He was as much concerned as I that we should mutually qualify for the hard journey ahead. I held back certain surprises for him, such as the short .32 Smith & Wesson revolver hidden in my knapsack.

Next morning Fructuoso and I started ignominiously downriver in a faded red rowboat (page 376). A half-breed accompanied us to bring back the boat. We were looking for a maloca where we might engage Indians to carry my equipment to the Querari River.

Out of sight of Mitú, the river stretched wide and smooth-flowing. The water was dropping rapidly with the dry season, and white beaches loomed ahead. We came upon a lone Indian fishing from a dugout. He stood up expertly in the fragile craft with a hand-carved spear poised in his hand.

With a flick the Indian released the spear, and a large fish came flapping up on the steel barb. The fish was ours for 20 fishhooks. The Indian also gave us a bunch of wild grapes; they were black, nearly the size of golf balls, and sweet to the taste (page 381).

In the afternoon we arrived at the maloca where we were to secure our carriers. Watching as we unloaded was the chosen headman of this small communal clan, known as the "captain." He greeted Fructuoso jovially in the Cubeo (Cubeyu) tongue. His face was kind and wise. I perceived in him the same dignity I was to find in other captains who had full responsibility for the 30 or more Indians living in their charge.

Stares Greet a Woman in Breeches

The headman wore only a breechcloth. Although his arms were sinewy, with the well-developed muscles of a riverman, he appeared to have a paunch. I learned later that the full abdomen was caused in part by a predominantly starchy diet since childhood. I was to see many young Indians and children with abdomens distended from this cause.

As soon as I entered the house, I realized

what a curiosity I was; all eyes were on me. Smoke from cooking fires curled up to the high blackened rafters. The hut was divided into family partitions by bamboo poles with grass hammocks crisscrossing them.

The men stepped forward bravely, since they knew Fructuoso, but their black eyes scanned my clothes. A woman in boots and breeches was a shattering marvel.

Since we were going to stay there that night, I particularly wanted to make friends with the women. I walked toward them as they huddled in a corner and shook each grimy hand.

Young girls hung their heads in fright. Middle-aged women were openly curious, though distrustful. Small children screamed with terror, burying their heads in their mothers' soiled cotton skirts, the women's only clothing.

Wrinkled crones with shrunken breasts and skin the color of mahogany gave me wizened smiles; we liked each other immediately. Necklaces of twine hung with tin pendants were the ancients' only adornment.

Foot Fires near the Equator

I passed cigarettes, which were accepted eagerly by everyone, down to the four-year-olds. Chickens, dogs, and young pigs scampered among crawling babies on the sandy floor. The old women returned to their hammocks and dangled their feet over the low flames of small fires burning beneath them.

The younger women turned to the huge fires where they were toasting *casabe*, a tortilla made of the coarse cereal *farinha* (manioc flour). Without casabe the Indians will not hunt, fish, gather rubber, or contract to join canoe trips. Without salt, casabe is tasteless and dry. It is served with *ají*, a small, intensely hot red pepper (page 377).

The casabe tortilla was expertly turned in black pottery bowls three feet in diameter. In other bowls, coca leaves, from which cocaine is derived, were roasting and being pounded into powder for chewing.

Fructuoso and I started bargaining for six Indians to carry my equipment. A group gathered to view the contents of my mysterious duffel bags. The sturdy men stayed in the rear. I was amazed to find that this was a women's show!

Two of the older women stepped up to heft the heavy field box. The oldest decided that she could carry it. Four others came forward to judge the duffel bags. Two were young girls of 15, perhaps. Each woman accepted a skirt length for her pay.

Surrounded by nudity, I felt civilization and its standards slipping away. But that night I learned the courtesy and conventionality that made it possible for five Indian families to live together in harmony in one maloca.

I retired early and adjusted my neck to my pillow. My mosquito netting extended to the floor over my hammock and made a shelter where I could undress and sleep in comfort.

The netting had the effect of Venetian blinds: I could see out, but not be seen.

Courtesy in the Jungle

Everyone was in his hammock by 7. A few women shouted in their sibilant tongue. Someone politely hissed for quiet, and there was absolute silence, with crying babies carefully muffled.

This courteous habit never varied in the villages. How impressive to come upon a group of primitive people who live together in peace with a high degree of mutual regard! I soon grew accustomed to these communal nights.

The entire hut arose together at 4, an invariable practice among these people. We boiled rice for breakfast and started off in a large dugout.

For my comfort the men made a low seat of crossed twigs in the middle of the canoe. The two young girls paddling in the bow with short round paddles fell in with the rhythm of Fructuoso's strokes as he piloted our craft from the stern.

We soon arrived at the entrance to the Querari River trail, about five miles above the stream's mouth. As I stepped out into the shallow water, one of the girls leaped from the canoe and swung swiftly with my machete. I looked down to see the headless body of a pit viper floating down the current. I had almost stepped on the poisonous reptile.

After adjusting our heavy bags to bare backs with jungle vines, we set out, struggling over projecting roots and fallen trees. The women carefully avoided long lines of umbrella ants carrying leaves to underground nests. Fructuoso stopped often to shift his shoes from one foot to the other. We were constantly soaked by sudden showers or from wading knee-deep through swamps. I learned to carry a pole for support while tightroping across streams on slippery tree trunks.

Birdcall Ricochets Like Bullet

We walked in shade in the green aquarium light of the jungle. I heard a bird with a shrill note like the report of a gun. Its sharp accent seemed to ricochet like a dumdum bullet against tree bark. Another bird distinctly sang out "yahudi."

In the afternoon we reached a bad windfall where tall ceiba trees had blown down. Their great branches snagged the equipment

Kodachrome by Bernice M. Gross

By the Strength of Her Brow, an Indian Woman Packs a Wild Pig to Market in Mitú, Colombia

Fresh meat was scarce in this rubber-collecting town near the Brazilian border. High prices encouraged Indians to haul in game over long distances. A vine rope attached to the forehead supported this dead weight.

Leaving Mitú, the Author Starts Her Daring Jaunt into Forbidding Jungles to Visit Primitive Indian Tribes

Baggage and provisions ride high in the borrowed red rowboat. Fructuoso, Miss Goetz's guide and interpreter, holds the stern paddle. A white woman in trousers and boots awed the simple Indians; children averted their eyes and screamed.

Sanuel, the Pilot, Holds Manioc-flour Tortillas

Indians eat the cakes with a burning-hot pepper.

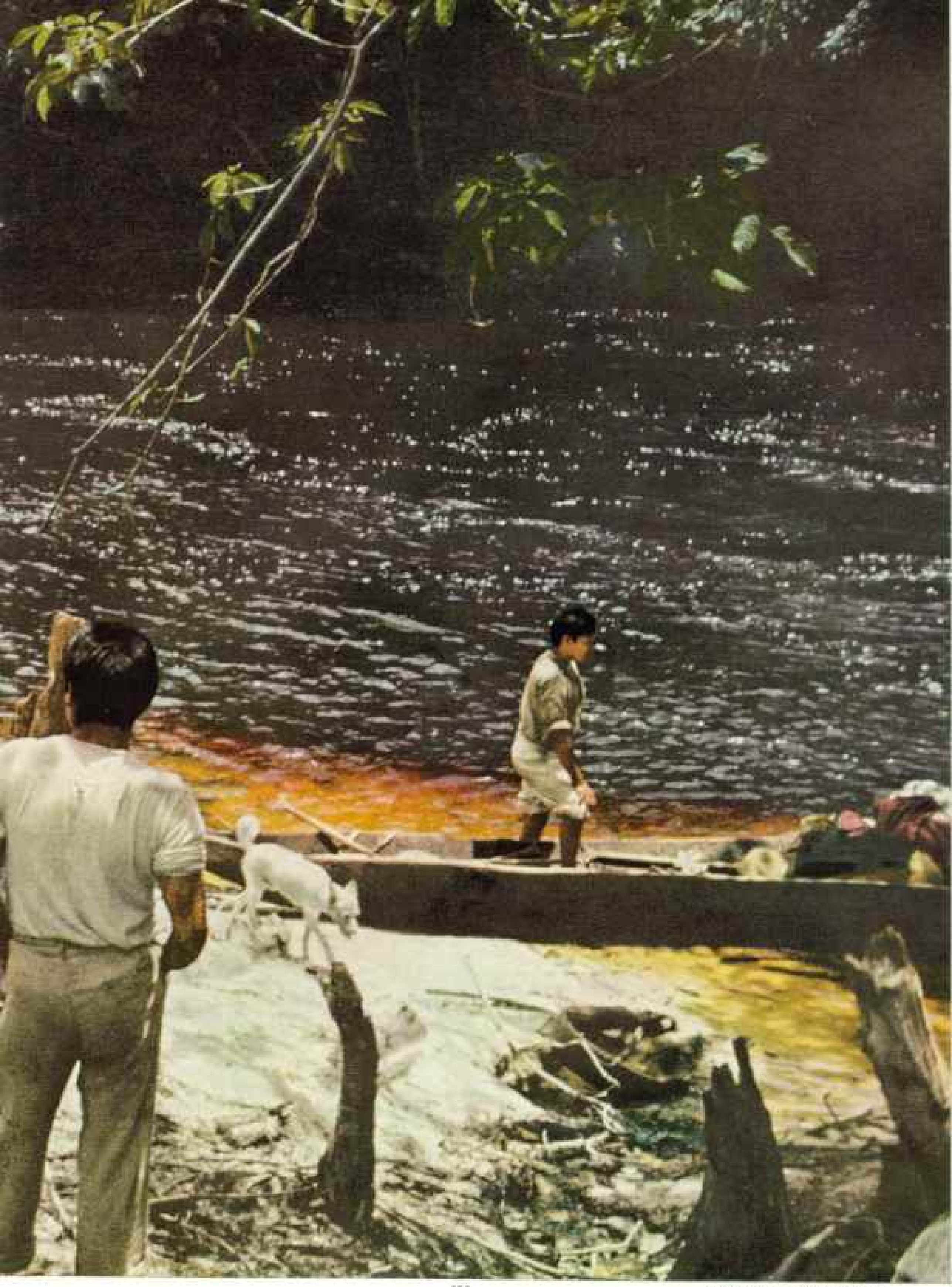
Witch Doctor Didn't Know His Picture Was Being Taken

He traded one of his feathered gourd rattles for a bread knife.

Kodachromes by Bernice M. Goetz

Cold and Red, the Aiari River Is as Wild as the Forest Through Which It Flows

Along these shores, the hospitable Baniva Indians offered roast deer and wild duck. Here jaguars roared by night as tapirs stole down to the river to drink. Decomposing vegetation stains the water.



179 Kodachrome by Bernice M. Goetz

Curiosity-filled Visitors Hover Like Flies over the Expedition's Lunch Spot

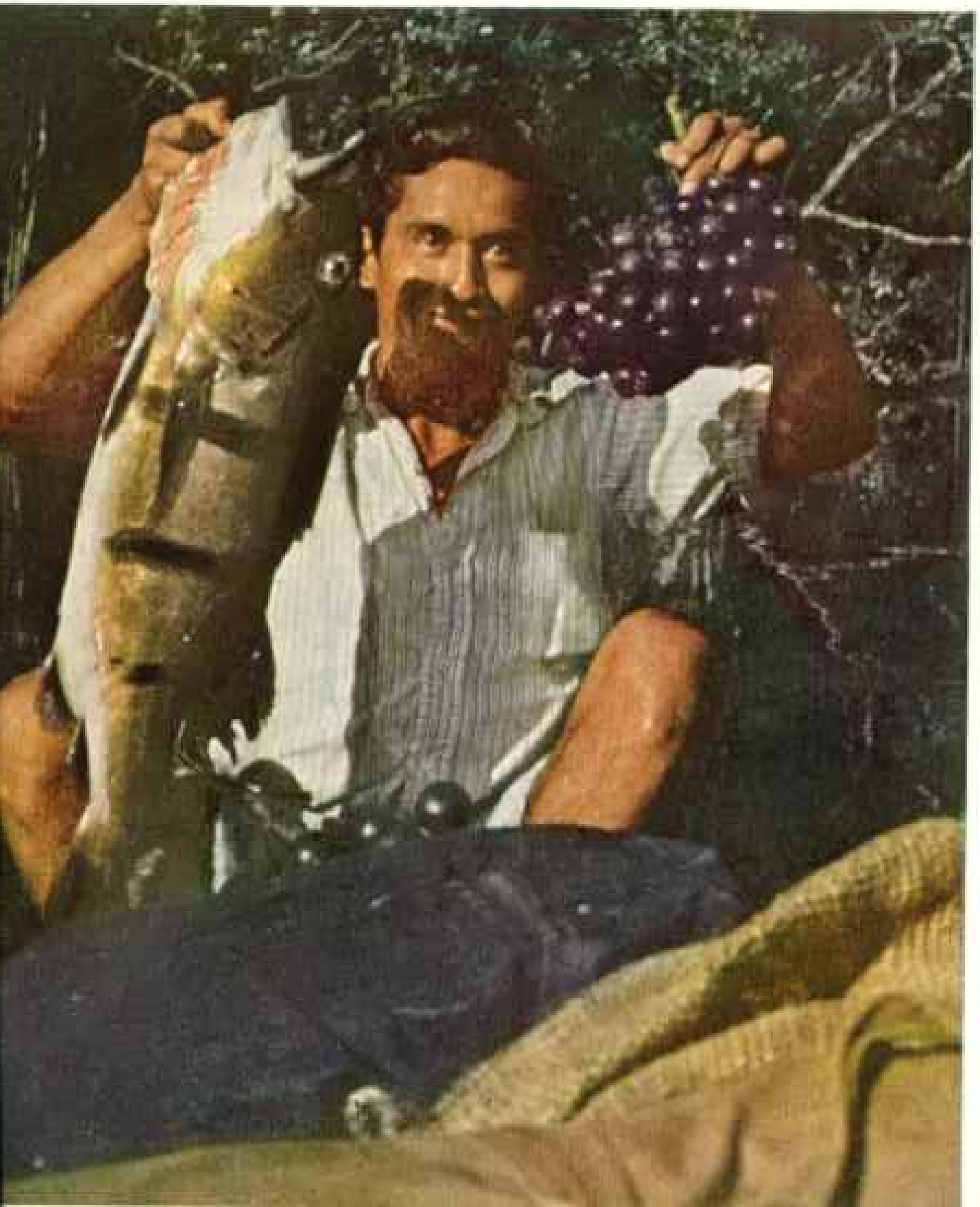
The crew, in white man's clothes, was about to pack up when a dog grabbed a shank of tapir meat and ran off into the jungle. Ten whooping boys pursued the thief in vain.

Rather than Portage, Dugout Paddlers Prefer to Gamble on a Swift Passage or a Tumble into the Rapids

Indians often challenged the most furious currents. Later, in quieter water, they relaxed and giggled like children. After the author's first experience shooting rapids, her guide exclaimed, "Señorita, you are as white as an egg!" Here the canoe shoots the Aiari's last big stretch of white water.

Fish and Grapes Cost 20 Hooks and a Mirror

Grapes almost the size of golf balls grow wild beside the Vaupés River.



Fruit of the *Pupunha* Palm Makes Firewater

Old women chew the pulp, then let it ferment in a dugout canoe.

Kodachromes by Bernice M. Goez

▲ Portaging Heavy Packs Through Jungle Is Woman's Back-bending Job

When the word "carry" was mentioned, men stepped back in dignity and summoned their women. Each porter earned three yards of cloth for a day-long haul.

▼ Cubeo Mother and Son Seem to Reflect the Dots on a Treasured Dress

Food was exhausted. Men had wandered off in search of game. Women and children painted bodies, the author believes, to invoke supernatural aid.

as we jumped from trunk to trunk. Thick spider webs meshed the span between branches. That night we camped under a palm-thatch shelter on the banks of the Querari.

With characteristic enterprise, Fructuoso left at once for a near-by maloca to obtain our permanent crew and a dugout. Next morning he was back in a large canoe with Sanuel, Manuel, and Mandú. Sanuel was 22 years old, he thought; the two boys about 14.

The Indians along this river were called Cubeos, but actually they were members of the Tucano tribe who spoke the Cubeo dialect.

During three days of upstream travel I grew accustomed to the happy, carefree river life. Fructuoso, assuming his rightful position as chief of the party, sprawled lazily on top of the equipment. Ensconced on the bottom of the dugout and supported by the duffel bags, I rode comfortably with most of my body below the surface of the river; the dugout's gunwales had no more than three inches of clearance above water level.

The Cubeos would shout with glee at a bright-eyed frog sitting on the riverbank. They would stop the canoe to follow a butterfly in its course or to watch a river heron fishing somberly.

Flies Take Joy Out of Bathing

We cooked quick lunches on the beaches, usually taking time out for a cool dip first. There were no caribes, man-eating fish, in these waters, but small flies called *jejenes* attacked parts of any swimmer showing above water. Their bites drew blood.

Before our first dip, Fructuoso, translating for the Cubeos, said, "Señorita, they want you to promise not to look at them." The agreement was mutual, and each party retired to its own private beach.

We became a tightly knit group, each performing his special duties. The responsibility of feeding four hungry Indians fell full upon me. My 45-pound bundle of farinha dwindled rapidly. Four times a day each Indian ate a gourdful, dipping it into the river for just enough water to soften the cereal, then sieving it through the teeth for sticks and leaves. At night it was boiled into a glutinous mass.

I found myself preaching an old slogan to Fructuoso, "truth in advertising." When I opened tinned food, he would look skeptically at the label and say, "Who knows, señorita, if that is what it contains?" I would reassure him forcefully.

One day I selected a can featuring three delicate pink pork tongues. "How do you *know* they are *lenguas de puerco*?" he asked. I grew fearful myself, but the opened can revealed three whole tongues neatly interlocked, and the reputation of American canners was saved!

The members of the crew made themselves at home in most of the settlements. But in the upper reaches of the headwaters, where the river was a narrow stream of black swamp water, we entered a maloca with no sign of life. The men hung timidly at our heels.

Painted Faces Mean a Famine

Fructuoso called out to anyone who might be hiding in the bushes. Presently, terrified women emerged slowly from a manioc patch. They presented a weird appearance. One had her face painted like an orange mask; another was holding a sickly baby peppered with dye spots like a purple pox (page 382); an old woman had swastika-bordered breasts and arms beautified with red latticework. Bringing up the rear was an old man with fresh red berry dye running down his chin.

Body painting can be a measure to ward off evil spirits; I wanted very much to learn what was the purpose here.

At once, we found there was no food. The rest of the inhabitants had set off for the Surubí River—"afar . . . ," Fructuoso explained with an outstretched arm, holding the tone of the Spanish word like a soprano prolonging a high note, perfectly conveying the endless reaches of jungle.

We immediately went hunting and fishing, but the jungle yielded only wild doves and the river some iguanas. These I stewed with red beans, but they cooked too slowly to delay the decision: Sanuel asserted he would not portage to the Surubí without sufficient farinha.

8-foot Blowgun for a Paring Knife

Although the maloca lacked food, it contained finds for me in blowguns and feather costumes. This was my first chance to dip into a sacred box of feathers.

Black thorns of the spiny palm pinned together palm-leaf packages of macaw, green parrot, and tinamou feathers. Carefully sorted by color, they were waiting to be made into new adornments.

The old painted Indian in charge obviously was tempted by my trade goods and by the absence of the younger males. A paring knife produced an 8-foot-long blowgun, and he tossed in a quiver of darts tipped with fresh curare poison.

For mirrors, combs, and bright-red ribbon, I secured a finely woven headdress of parakeet feathers with a train of soft, white breast feathers of the river heron; also two whole egret skins crudely tanned into a breast shield for a witch doctor.

I fixed a red bow in the greasy hair of one

of the women. While I did so, the woman with the orange mask touched my hair. I pretended not to notice while several more brushed leathery palms over my head. In Cubeo they told me that my hair was like silk.

What struck me most about these people was their utterly lost look. They might have been abandoned to die—the sickly, the middle-aged, and the old—since the surrounding jungle was hunted bare and the river yielded no fish. There was no doubt in my mind that in their plight they had applied paint as a means of invoking friendly spirits.

My hammock, at this encampment, was slung between two trees at the edge of the cave-dark forest. To keep off the dew, which fell like rain, I had thrown ponchos over the mosquito-netting canopy.

Snug as the proverbial bug, I lit my carbide lamp and pulled out a mystery novel. The intermittent noises of my Indians moving and talking around their campfire died away, and the jungle underworld came alive. The walls of netting waved like silken spider webs in the breeze.

Imps of Night Dance in Glee

About 8 o'clock I was aware of movement through the trees. My hammock pumped slightly up and down. I thought Fructuoso was testing the support ropes of my "bedroom"—until I heard a chorus of squeaks.

Quickly stepping clear of the netting, I flashed the carbide ray into the velvet blackness. Six sets of eyes stared at me from the ropes. Small monkeys, probably squirrel monkeys, were bouncing up and down with glee while they chewed the strands of rope. Their parents high in the branches above shrieked advice.*

I blew out the lamp and in the soft, caressing darkness the nimble little creatures took flight, chattering like noisy children.

As the full moon shone on the coiling river, I was quieted by the knowledge that loud shrieks like trombones were only tree frogs.

Later I woke up, suddenly alert to a beat, a far-distant beat, in the air. I could not be sure the sounds were of human origin until I heard the thin notes of flutes. A drum commenced a double beat, and the whole rhythm rose to hysterical pitch. As the waves of sound faded, I felt my heart pumping with excitement; then the primitive melody would envelop me again.

Over the breakfast fire I asked Fructuoso if he had heard the drums.

"No," he said unbelievingly, "there were no drums last night."

He and Sanuel laughed at me.

Here began the jungle trail I had planned to follow to the Surubí (map, page 372), but my Indians adamantly refused to go on. The trail was grown over, the jungle dark and forbidding, and no Indians lived there, they said. I had to yield.

So next morning we set out to retrace our steps downriver and, after we had traveled some distance, it was my turn to laugh. We arrived at a maloca where music still was playing. A jungle dance was being held.

Flowing Bowl at a Jungle Jamboree

When the brilliant orange fruit of the pupunha, or peach palm, ripens, a festival is declared (page 381). Three days before the dance, the fruit is masticated by old women, who spit it expertly into a dugout canoe hauled out in the middle of the maloca. The mash is covered with palm leaves to ferment.

The captain proffered me a gourdful. I drank some; surprisingly, it tasted like nothing worse than a powerful fruit cider. Sanuel finished it off in one draught.

Women sat on one side of the maloca, and the men, shiny with sweat and fresh paint, sat on logs. I went through the ordeal of passing cigarettes and shaking wet hands. These people were not frightened; intoxication freed them from self-consciousness.

The orchestra was swelled by four boys with reed flutes, three others who stood up playing heavy oboes or flageolets made of hard palm, and two with resilient wrists who beat hollow drums, setting the pace for the dancers.

Young warriors in sets of four shuffled back and forth in the sand, linked arm in arm. The beat always descended on the left foot; around the left ankles the braves had tied hemp anklets of nutshells or jaguar fangs. The women just tagged along, hanging on to the dancers' left arms, being paid no heed.

The captain sat by my side. His capacity was magnificent. For every gourd passed around he drank a full one first.

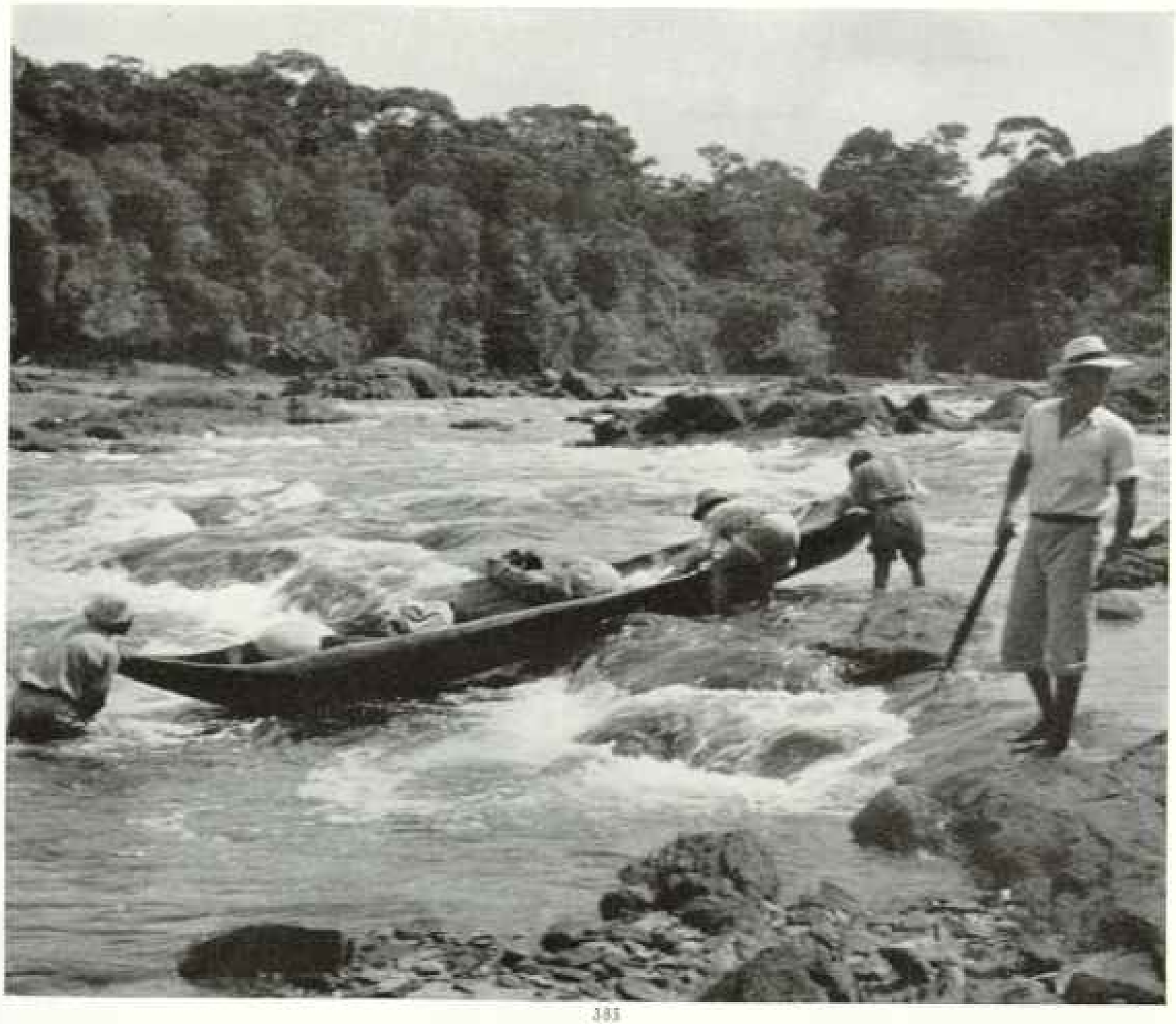
Sanuel sat at the captain's feet and politely held up his end of a conversation as drugging as the music. After each statement, Sanuel agreed with a loud "uh-huh" and repeated the captain's words, parrotlike.

Eyes became bloodshot, the dances more suggestive, and the bottom of the canoe punch bowl was being scraped when I left for my hammock, which that night was hung a good distance from the clearing.

Vaupés River Shows Its Teeth

On our way next day we approached the mouth of the Querarí where it enters the Vaupés at the Brazilian border. Here the river took on a different face. We threaded narrow rocky channels, pushing and pulling

* See "Monkey Folk," by William M. Mann, National Geographic Magazine, May, 1938.



385

Indians Heave the Canoe over Rocks in a Tug of War Against Foaming Rapids

One slip of the wrist and the precious equipment spills overboard. Unexpected holes, treacherous eddies, and submerged rocks multiply hazards (text below). So dangerous are the rapids that Indians give each a name and speak of it with respect. Fructuoso wears the author's panama, her companion on many a trip.

the dugout through. We unloaded and reloaded time and again.

Richer by a gift of 20 pounds of farinha from the captain of the festival, the Cubeos once again took interest in traveling. They were not laughing at butterflies now. The river demanded their constant attention, and Fructuoso put to good use all his 38 years' experience on the Vaupés.

I noticed the glassy smoothness of the water at my elbow and the racing speed of blobs of foam. We sped toward the vortex ahead, where the mist mounted like smoke and white water roared.

Ponchos had been tucked over the luggage. I fastened my knapsack, with its cameras and film, under my chin.

This experience was so new to me that I did not know where the greatest danger lay. You do not portage around these rapids; you either sweep safely through or are tumbled into the melee.

In the canoe each move and command was significant. I was ordered to sit absolutely still. Tension edged Fructuoso's voice. Samuel's face was grim.

White Water Makes a White Face

The young boys in the bow held their paddles tensely. Just above the white water, Samuel stood up to choose his channel. At his shout of command the boys released the canoe and it shot forward. The first rush of water was exhilarating, but as we swept into a stretch of wild, leaping waves I blanched.

Where the entire river poured into a churning maelstrom, Samuel shot the canoe across diagonally, and the boys in the bow swung their paddles madly. We had to cut across the rapids with enough speed to prevent the waves from swamping the canoe and with sufficient skill on the pilot's part to keep it from falling into the furious rush of surging water in the main channel.

386

Young Muscles Do a Man's Work. Cubeo Lad Paddles Tirelessly Through the Day

Miss Goetz and her guide (left) caught a ride with this Indian father and son. The boy never saw a school, but he handled the paddle with an adult's skill. Poor diet and hard life will make him an old man at 35.

I looked up from bailing to see the whole expanse of river pouring in upon us—and my arm froze in mid-air! We were across in instants, but this split-second dash seemed like an eon. The boys laughed weakly, and Samuel shouted with relief.

Though we had reached the Brazilian border, we still faced three days more of rapids, with all their devilish effervescence, whirlpools, and wide expanses of leaping waves (page 380), until we beached mercifully at a small cluster of huts deep in Brazil.

I had had enough of the Vaupés and looked forward eagerly to reaching the Aiarí, in the hope (which proved to be a false one!) that it was a quieter stream.

Like a sign of peace, the sun came out whitely after a day's rain, lighting the jungle as if with a phosphorescent glow. Blossoms, silver backs of leaves, and glossy vines shone with an unearthly gleam. Bird songs rang out from the dripping growth, their liquid notes like quicksilver dropping in a rain barrel. I, who had thought the jungle a tranquil garden inhabited by gentle conspirators, was the tamed one!

"Is That a Woman?"

A large boat with six oarsmen passed us, bound upstream. The chicle hunter sitting atop the palm thatch shouted to us in Portuguese and I answered. My "Boa viagem" (bon voyage) betrayed more than my taut nerves.

The question came, "Is that a woman?" Like an eager crayfish, the boat rapidly drew near. The Brazilian swept off his pith helmet and presented me with a cigar! I reciprocated with cigarettes, and the craft bravely headed toward the rapids' furies.

On the trail to the Aiari there were no women to be bribed with skirt lengths. Only Fructuoso could speak to the Baniva Indians we met. Independence was written in their features. They were craftsmen taking beautifully woven baskets for trade with the Vaupés River Indians.

This jungle was luxuriant with birds, monkeys, and wild game. We stopped under a tree full of red howling monkeys and debated shooting some. Since they would panic, we decided on bigger game. When a young tapir crashed through the brush, Sanuel and I took off in pursuit. It was like knocking over a ponderous Humpty Dumpty.

Tapirs, which may weigh up to 500 pounds, must be shot through the head. If only wounded they are impossible to follow, for they run blindly through the growth. We feasted on tapir that night on the banks of the Aiari.

Fried Ants as Hors d'Oeuvres

The palm-thatch shelter rustled with snakes hunting rats. Then into the light of our fire marched ants prime for roasting, being three-quarters of an inch long.

The Cubeos swept the ants into their palms and would have toasted them in the ashes of our campfire. But I pulled out my frying pan and greased it with tapir fat. As the men tossed in handfuls of ants, I stirred and salted them. We apportioned them as hors d'oeuvres; they tasted like delicious roasted pecans.

Fructuoso left in a one-man boat to find a large dugout. I gave Sanuel my gun, and he happily faded into the forest. This, I decided, was an auspicious moment to give the toy airplanes to the boys. Manuel and Mandú were captivated by wheels that moved and by the slow turning of the propellers.

Through all the rapids that followed, Mandú kept his toy plane in the canoe beside him.

When Sanuel returned with a curassow, he spoke sharply to me in Cubeo. He wanted an airplane too!

That afternoon Sanuel turned surgeon. With a needle he extracted from the boys' toes the sacs of swollen eggs left from bites made by the foot flea, or jigger flea. The female buries herself under the toenails, laying eggs which become extremely painful when they mature. The principal danger is infection after extraction.

The Aiari proved to be a wild red-brown river which ran icy cold (pages 373, 378-379). Tapirs came down in twos to drink and gorge on lily roots. At night we heard jaguars roar.

Fructuoso had been able to obtain only two small shell-like dugouts. If I merely breathed hard, the shallow craft seemed to rock. Terrified, I hung on with both hands. At this the Cubeos shrieked with laughter. They kept asking me questions to force me to turn my head, but I kept eyes and nose directed straight ahead as we shot downstream.

The Banivas are meat eaters. At their villages we were offered roasted deer shanks and wild duck. Ammunition was highly valued in trade. For the promise of some, the owner of a large dugout not only lent it to us, but guided us through the worst rapids.

Before long we came to the brink of rapids so violent that even the Cubeos decided to portage. They went ahead along the trail.

That was when I met "Tarzan." No other nickname could be so appropriate. He came out of the growth and stood with his hands on his hips facing me. Not a muscle moved. His Dutch bob stopped at his eyebrows; his lips were parted to show chiseled teeth.

Slowly he came toward me and did not stop until his straight nose was an inch from mine.

After my first fright, I realized that Tarzan was only curious; probably he had never before seen a white woman or blue eyes. I stepped aside and walked slowly away, although I wanted to run. Behind me I heard the soft padding of bare feet. Had I stopped suddenly, Tarzan would have bruised his chin against the back of my head.

We came abruptly to a clearing, and I was surprised to see a group of malocas instead of the usual large one. It was a natural stopping place for the night. But we found so much of interest that we stayed a week.

Tarzan joined his wife, who was surrounded by five small children. His eyes never left my face. I wanted to return his stare, since his unrestrained fierceness fascinated me.

Some Indians of Pygmy Stature

The Banivas clustered around us. Some were of pygmy stature, with stunted though muscular bodies. The women wore bark-cloth skirts shredded out of tree bark. The men were weavers, costume makers, and wood carvers.

The captain of the settlement capped his hospitality by presenting me with a twirling stick, which he whirled in his left hand and struck with the flat of his right palm. The revolving stick vibrated with a high singing noise; its sound, and the authority it conveyed, carried throughout the near-by jungle.

The captain explained that his little boy was destined to be a witch doctor. He brought the lad forth covered with maroon dye. As protection from evil spirits with which he would later be familiar, the boy wore rattle leglets of hollow nuts, and armadillo claws and jaguar teeth around wrists and ankles. Of special power was his twine necklace with a single white highly polished quartz pendant.

The witch doctor currently in office was receiving visitors in a separate maloca. I entered hesitantly. He lay in a solitary hammock in a large empty room. I thought he was asleep until I noticed his eyes, mere slits. They followed my every movement.

Doing Business with a Witch Doctor

A bark shield covered with mystic symbols hung on the wall. There were dark-red rattle gourds adorned with parakeet feathers, and necklaces of jaguar fangs and armadillo claws.

Testing the medicine man's susceptibility to a trade, I pointed with a shiny bread knife at a tooth necklace. His eyes glinted and he arose from his hammock. His body was small and shriveled, his head proportionately enormous. From his breechcloth hung clusters of cloth sacks that I knew contained powders, herbs, animal hair, and other charms.

The witch doctor selected two finely carved red gourds tipped with macaw feathers, and we took them out into the bright sunlight. He did not speak, but traced the gourd carvings with a finger tip. When I took pictures of him, he stared uncomprehendingly (page 377). He accepted the bread knife with alacrity, however. That night a tooth necklace and a red gourd appeared mysteriously on my hammock.

The next day I followed a well-worn trail away from the clearing. I wanted to get away from the Banivas, who were constantly watching me.

I came upon a small hut and put my head in the doorway. A young good-looking Indian was lying in a hammock in a room bare of cooking utensils or any evidence of being lived in. He took in the appearance of his utterly strange visitor, but did not move.

Standing there, I suddenly realized that this might possibly be the couvade, or male childbed. I retired hurriedly.

This discovery, authenticated by Fructuoso, was an important one. Under questioning, Samuel conceded that a newborn child was threatened by many evil spirits upon its entry into the world. Both mother and father had to conduct themselves with care.

Father Fasts after Childbirth

Although the mother returned to her work immediately after childbirth, the father retired to an isolated hammock to lie still for several days and fast. After that, he might eat a little casabe, but would not be able to partake of birds or fish for a month. Both parents, in fact, would be on a strict diet for as long as six months.

Far from being an act of laziness, this procedure indicated the father's sense of responsibility toward the infant. The relationship is considered so intimate that the child is affected by anything that happens to the father before its new soul has become accustomed to the earth world. If the father gorged on tapir, for instance, the child might die of indigestion!

That night, while we prepared our meal, a windstorm raged through the growth. Above the noise of lashing trees, Fructuoso informed me calmly that some years ago the Banivas had been cannibalistic.

At my request, he turned to the captain and in Baniva asked which part of the human body he considered the most tasty. Without hesitation, the captain replied, "The palm of the hand."

As an ultimate gesture of hospitality, the captain invited us to attend a festival a week later. Fructuoso translated hesitantly.

"Señorita, he says that the father of his wife is buried where we are now sitting. In a week his spirit will be reborn. They will cook his remains to prepare the liquid of which his family will partake."

I later authenticated what the captain told us. This gruesome-sounding ceremony has been reported from other tribes in the northwestern part of Brazil. The basis for it is faith in reincarnation and the belief that the virtues of the forefathers can be transmitted to the living descendants.

That night I chose to sleep with my hammock hung out in the rain and wind. Again and again I awoke shivering in the depths of jungles commonly thought hot and dank.

Jungle Indians Dazed by City Sights

The rainy season, to our dismay, set in with violent storms. Each day now the boiling waters of the Vaupés would rise, making upriver travel a constant battle. We could not afford to delay our return to Mitú. My desire to reach the Isana (Içana) River would have to wait for another trip.

My valiant travel mates elected to stay with me the long way back to Mitú. For them it was a chance to visit a great metropolis. There they saw their first cows!

Fructuoso showed our tried and trusted crew the sights. Even in his travel-worn garb and the shoes with the turned-up toes, he had the air of a man about town.

The Cubeos strolled on the plaza in a daze. When I said goodbye to them, they looked more than ever the simple-natured children of the jungle to whom I had grown so devoted.

It was my turn to be flustered when they said: "We would like you to come back again, señorita, to show you other, vaster parts of our jungle."

I was tremendously pleased to be their chosen paying guest!

Giant Effigies of the Southwest

By General of the Army George C. Marshall

IN 1943 I was flying across southern California on the last leg of an inspection trip with Gen. Henry H. Arnold, then Commanding General of our Army Air Forces. As our plane droned across the desert, General Arnold glanced down at the rumpled mesas below and then turned to me.

"Have you ever seen the great effigies near Blythe?" he inquired.

I had not, nor had I even heard of them. I asked him to explain. He told me then that on a bluff above the small California town of Blythe, a local pilot, George Palmer, had discovered several remarkable figures of great size outlined in the rocky soil. One of them appeared to represent a man; others depicted animals.

The curious thing about them was this: So huge were they in outline and so shallow in indentation that they were virtually invisible to anyone standing only a few yards away. Nor were there any hills near enough to afford a comprehensive view.

In short, not even their creators could ever have glimpsed their handiwork's total design. This would have been plain only to the gods of the mesa, a passing bird—or the unforeseen invention in which we were now traveling.

"When these effigies were first reported to me," said General Arnold, "I was commanding March Field, only a few hours' flight away. Calling on one of our young pilots, I asked him to reconnoiter the area. He did, and brought back a startling photograph [above] taken by his technical sergeant, Stephen McAlko. Would you like to see what that picture showed?"

I said that I would, very much.

General Arnold promptly changed our plane's course, and soon we were scanning the ridges sloping back from the lower Colorado River above Blythe. Then we saw them: gravel sculptures such as few men had ever laid eyes on—simple in outline, childish in form, and yet so grandiose in scale as to take one's breath away.

It was a sight which left upon me a lasting impression. Years later, attending a meeting of the National Geographic Society's Board of Trustees, I suggested that important questions about these gravel effigies still remained: Who made them? What was their purpose? Were there any more like them in the vicinity?

Now, in the article which follows by Frank M. Setzler, I am happy to find some of the answers authoritatively presented.

Seeking the Secret of the Giants

A Flying Archeologist Attacks the Mystery of Strange Figures, Visible as a Whole Only from the Air, Outlined on Desert Mesas

By Frank M. Setzler

Head Curator, Department of Anthropology, U. S. National Museum *

With Illustrations by National Geographic Photographer Richard H. Stewart

TWO thoughts were uppermost in my mind as I swung aboard the Catalina amphibian. The first was that archeology is a terrestrial science; it was surely never meant to be airborne. The second was that, if we succeeded on this mission, we could with confidence take up a career of locating needles in haystacks.

Our immediate objective was this: to find, and photograph, in the parched, trackless desert near Blythe, California, crude figures of men and animals reported by airplane pilots (page 389). Later I hoped to solve the mystery of these immense and lonely figures—to arrive at a scientific conclusion as to who made them, when, and why.

Taking off from March Air Force Base, just east of Los Angeles, we flew through San Gorgonio Pass, skimmed north of Palm Springs, skirted the date groves of Indio, and rumbled over peaks that had claimed more than one unlucky airliner.

Dusty and anonymous, the desert spread out before us. On its barren face we could discern a few trails, faint roads, and the whorls and curlicues scribbled by the steel treads of General Patton's North African tank corps, which took its pre-invasion training here. To the south extended a thin blue streak that was the Salton Sea, 241 feet below sea level.

Crossing the town of Blythe, we picked up the Colorado River and the green irrigated fields fanning back from it. As we followed the river's course northward, the cultivated land gave way again to mesas, brown and tan, and to gray, dry creek beds.

Giant Figure Basks in Desert Sun

From the plastic "blister" on the left side of the fuselage peered photographer Dick Stewart of the National Geographic; I occupied the bubble on the right. We stared down at the desert floor, searching its every crevice as the big amphibian began to circle and recircle the area.

Suddenly and almost simultaneously we spotted our target. On a broad, bare mesa sloping up from the mesquite-dotted plain stretched a gigantic figure, crudely outlined in the dark-brown gravel. It lay upon its back, arms and legs flung out as if sprawled there for some interminable sun-bath (pages 394-395).

From our altitude of 1,500 feet, the great effigy seemed about two or three inches long; on the ground, we quickly calculated, it must extend a good 100 feet from head to toe.

Wheeling around, we scrutinized the surrounding territory. In a minute we sighted two other recumbent figures, then a third. One was a misshapen four-legged creature, the others an odd circle and a scraggly ellipse.

Impatient to get down to earth at once and examine these weird caricatures, I checked their location as rapidly as possible by reference to the river, an adjacent highway, and a line of high-tension wires. Then we flew north along the Colorado, soaring over Parker Dam and its long new reservoir.

As the amphibian dipped over the Topock bridge, which carries the Santa Fe tracks across the Colorado, I again scanned the ground carefully, for in this area, too, other effigies had been reported.

All at once, on a T-shaped mesa farther west, there loomed up the perfect outline of another grotesque figure. Banking sharply so that Dick could bring his camera to bear on the giant, we feasted our eyes upon it.

Pioneers May Have Passed Site

What a site the big fellow had chosen! From this vantage point he could have watched the first little bands of Spanish explorers, the creaking wagon trains of the pioneers, the coming of the railroad, and finally the flash of the sun on metal wings.

When Dick had photographed his fill, we flew northwest, over the Granite Mountains to Crucero. Picking up the twisting silver thread of the Union Pacific tracks, we followed them westward, trying to locate various cairns and gravel mounds described by earlier investigators. Erosion and wind-blown sand, however, seemed to have erased or disguised them effectively.

* F. M. Setzler also was Deputy Leader of the National Geographic Society–Smithsonian Institution expedition to Arnhem Land, Australia, in cooperation with the Australian Government in 1948. See, in the National Geographic Magazine: "Exploring Stone Age Arnhem Land," by Charles P. Mountford, December, 1949, and "Cruise to Stone Age Arnhem Land," by Howell Walker, September, 1949.

Rotachromes by National Geographic Photographer Richard H. Stewart

Patrol Plane, Helicopter, and Truck Push the Search for Strange Indian Effigies

Cooperation by all three transports proved essential to the National Geographic-Smithsonian Institution expedition into the lower Colorado River Basin. Gravel sculptures which it sought were carved on the desert so long ago that modern tribes have forgotten their significance. To help decipher this anthropological puzzle, the U. S. Air Force lent the expedition an Air Rescue team. When the team's truck broke down in a canyon, the Catalina (above) dropped food, water, and parts. The helicopter functioned as a flying platform for author and photographer. Carryall and aircraft here communicate by radio.

↑ Smoke Announces a New Discovery Beside the Colorado

A civilian pilot found the Blythe, California, effigies in 1932. The National Geographic Smithsonian expedition of 1951 detected these sculptures some 15 miles away, near Ripley. Indians designed them by scraping away gravel and exposing the mesa's hard tan soil. Here they scratched an approximation of the Maltese cross beside a distorted human figure.

➤Expedition leader Frank M. Setzler, head curator of the Smithsonian's Department of Anthropology, jots down the fantastic size of the Ripley effigy, 164 feet long. It took two trips in the helicopter to convince him that these gaunt furrows, almost invisible on the ground, sketched a portrait.

↓ A smoke grenade held by Staff Sgt. W. T. Tanski indicates the wind's drift to a helicopter about to land.

Kodachromes by National Geographic Photographer Richard H. Stewart

A Giant Sun-bathing on a California Mesa Wears the National Geographic Flag

Flying near this Blythe site in 1943, the late General of the Air Force Arnold detoured his plane to give General of the Army Marshall a glimpse of the grotesque effigy. Struck by its size and by the unanswered questions surrounding its origins, General Marshall later interested fellow Trustees of the National Geographic Society in dispatching an expedition to study this and similar gravel carvings.

395 Kodachrome by National Geographic Photographer Richard H. Stewart

Sculptors in Gravel Made a Design Which Only Gods or Birds Could Grasp

Windrows of scraped gravel composed a figure too large and indistinct for the builders to visualize except in the mind's eye. Hills gave the Indians no view; a helicopter made this photograph possible. The author believes the Indians made the sculpture between the 16th and mid-19th centuries, portraying a female monster or her hero-slayer. Air Force men here stake out hands and feet, while the author stands on the head.

Kodachromes by National Geographic Photographer Richard H. Stewart

▲ An Air Force Amphibian Used in the Effigy Hunt Taxies Across Orange County Airfield

▼ Visitors, leaving tire tracks and foot trail, defaced these figures at an abandoned Indian shrine near Blythe. Various Kilroys carved names or initials on the mesa's hard top and ringed the human figure with concentric jeep tracks.

Indian dancers generations ago evidently tamped out the large, rough circle at right with moccasined feet. Artists later drew the reclining giant, the horse, and the serpentlike coil.

 198 Kodachromes by National Geographic Photographer Richard H. Stewart

↑ Author and Pilot Check Maps Before Going Aloft to View Giant and Horse

Mr. Setzler enjoyed hovering in the helicopter, but its vertical descents seemed like jumping off the Washington Monument and stopping halfway down. Capt. John Peacock ably manned the U. S. Air Force craft.

↓ A female figure spread-eagled on Site 3 at Blythe stretches 170 feet from head to toe and 158 feet from hand to hand; she is believed to represent the child-devouring ogre of an Indian myth. The long-tailed horse, with a stone for its eye, dates the sculpture as having been made later than 1540, when Spaniards reintroduced the animal to western America. The native Pleistocene horse became extinct in America some 10,000 years ago.

We headed back to the airbase. Bouncing through the air currents of Cajon Pass, we held tight to our seats, then relaxed as the plane dropped down over the green citrus groves of San Bernardino to March Field.

Now that we had scouted our objectives, I was eager to see them at close range and begin the careful study to which I had been assigned jointly by the National Geographic Society and the Smithsonian Institution.

As General of the Army George C. Marshall had pointed out to The Society's Board of Trustees, surprisingly little was known about these figures. Before leaving Washington, I had made a preliminary search of archeological literature, without finding much information.

In the *Air Corps News Letter* of October 18, 1932, I had found a four-page article by 2d Lt. Minton W. Kaye entitled: "Was There An Advanced Culture in the Southwest?" Accompanying it were two small drawings of effigies reported seen near Blythe.

A 1939 report by archeologist Malcolm J. Rogers on *Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas* contained a section on "Gravel Pictographs" which gave a good description of the Blythe figures.

But that was about all I had found.

Airmen shared our interest in the problem. Through Brig. Gen. Sory Smith, of the United States Air Force, arrangements were made for us to have the help of Flight B, 4th Air Rescue Squadron, at California's March Air Force Base. It was in Flight B's Catalina, in fact, that we had flown our first day's reconnaissance along the Colorado.

Help from a Helicopter

After an effigy-haunted night's sleep at the airbase, we returned by Catalina to Blythe. Here we were soon joined by the Air Rescue helicopter which was to help us get a closer look at the effigies (page 398). Flying it was Capt. John R. Peacock, an old friend of The Society. He had piloted Dr. Matthew W. Stirling and Dick Stewart on the National Geographic-Smithsonian archeological expedition to Panama in 1949.*

That night I went into a tactical huddle with Peacock, thankful that his experience with the Panama expedition had familiarized him with the curious requests an archeologist is likely to make.

The plan we agreed upon was for me to drive up in Flight B's truck and for Dick and Peacock in the helicopter to track down a rumored effigy site to the south. They would then join us at the giant's solarium north of Blythe—if we could find it.

I was not overly optimistic. It was one thing to spot these figures from the air, where their yellowed design stood out distinctly against the dark gravel; it would be another to identify them from a strictly horizontal perspective.

Our luck held, however. Pushing some 15 miles north of Blythe, we turned off U. S. Highway 95 and came upon the effigies almost immediately.

Kilroy Was Here, Too

It was quickly apparent that others had anticipated us. Whether or not they knew what they were intruding upon, motorists had crisscrossed the giant's figure and its circle with tire tracks and a beaten path (page 397).

The four-legged animal about 100 feet southeast of the circle, however, proved to be virtually unscathed. It had a long tail, we found, and near one foreleg was a design resembling a coiled serpent. These, like the human figure, had been sculptured by scraping aside furrows of dark-brown gravel, revealing the underlying tan and gray soil of the mesa and thereby producing the figures in contrasting color.

The effigies themselves showed no signs of having required special tools. Their creators could easily have constructed them by pushing gravel to one side with their feet and then shaping the windrows with their hands. The engraved circle which encompassed the body, on the other hand, seemed to have been made by moccasined feet pounding the brown varnished-looking gravel into the ground.

If the scraped-out, ridged effigies were hard for a pedestrian to see, the beaten-down segments were almost invisible until one was on top of them. Even then, it was not easy to make out the total design.

One of the first and most obvious questions that occurred to us was: Could the makers of these sculptures have hoped to view them from some near-by eminence? To settle the point, I asked Captain Peacock, when he arrived, to fly his helicopter to the top of the nearest ridges on the south.

He did so and reported back that, even though he knew where the effigies were located, he could see no trace of them. I went up myself and confirmed his observations. At hilltop height the figures melted into the uniform patinated gravels of the mesa.

The measurements we took of the effigies revealed that we had not been far off in the guesses we had made from the Catalina. The human figure which we dubbed "Site No. 1 Blythe" stretches 94 feet from head to toe; his arm spread we found to be 67 feet 8 inches.

The largest and most impressive is the

* See "Exploring Ancient Panama by Helicopter," by Matthew W. Stirling, NATIONAL GEOGRAPHIC MAGAZINE, February, 1950.

400 Drawn by Irvin E. Allaman

Archeology's Blythe-Ripley Area Is Familiar Terrain to Air Force Pilots

Air Rescue Service planes searching for Indian effigies took off from California's March Air Force Base, climbed through San Gorgonio Pass, then droned eastward to Blythe. In 1932 an ethnologist discovered the Maricopa Indians near Sacaton, Arizona, using a giant effigy outlined in gravel as a shrine. The National Geographic-Smithsonian expedition of 1951 found similar figures executed by Indians along the lower Colorado.

female effigy at Site No. 3 Blythe. It is 170 feet 9 inches long, and its outflung arms measure 158 feet 1 inch (pages 389, 398).

Several features distinguish this latter figure. It has exaggerated elbows and knees, rather well-defined fingers and toes, an abdomen slightly distended on the right side, an elongated neck, and quartzite stones to represent eyes, nose, mouth, and breasts.

Perhaps the figure's most striking adornment consists of six strands of hair on one side of its head and seven on the other. These extend 39 feet 6 inches to the right, and 45 feet 11 inches to the left.

The other types of figure proved to be on the same huge scale. The quadruped at Site No. 3 turned out to be 53 feet long and 43 feet 10 inches tall (pages 389, 398). One of the larger formations of circles and other insignia is 296 feet long.

A New Set of Giants Found

Having duly noted these and other data about the Blythe figures, we turned even more eagerly to a new find. Peacock and Stewart, on a reconnaissance flight over the Black Mesa sector, east of Blythe, had confirmed the existence of effigies hitherto unknown.

Backtracking to Blythe, we inquired about possible roads leading to the area. Assured that there was a dry-season road which would bring us fairly close to our objective, we set out along U. S. Highway 70, with the helicopter flying "cover" for us. Just across the Colorado River, in Arizona, we drove south along the Cibola Road.

From the hovering copter, Peacock and Stewart directed us by radio. Finally we came to a high bluff overlooking the Colorado and the flat irrigated fields on the other bank, with the town of Ripley off to the west.

"Figures are right ahead of you," said Stewart over the intercom.

"Maybe so," I radioed back, "but we won't know it till we stub our toes on 'em."

Presently I caught sight of a faint ridge, then another furrow, and another. We had arrived (pages 392, 393, 403). But from the ground we still could not tell just what we were looking at.

There were three distinct groups; we could decipher that much. It was apparent that some of the figures had been made by scraping and others by treading down the gravel. To get an accurate idea of all the markings, however, I had to get up in the air.

Peacock obligingly landed the helicopter, and I climbed up in front of him. We circled slowly over the mesa.

To my surprise I found that even from this height some of the figures remained obscure. The "desert varnish" was not so dark as at Blythe, and the contrast with the underlying gravel was less sharp. A different geological formation, moreover, had led to more rapid erosion; one human figure, in fact, had lost portions of his lower limbs.

Nevertheless, at Site No. 1 Ripley, as we christened the first group, we could make out a figure with arms akimbo which proved to be 50 feet long. Another giant, a little to the north of it, measured 118 feet from the left shoulder to the edge of the cliff, where erosion had lopped off its feet (page 403).

Site No. 2 held another human effigy of the intaglio, or scraped, type similar to those at Blythe. About 36 feet north of its head lay a beaten circle some 48 feet in diameter. As for Site No. 3, it consisted of circles, partly eroded, at the brim of another high mesa near by.

Horselike Figures Form a Clue

More than ever, now, I wanted to tackle these questions: How old were these effigies, who made them, and why?

To get the answers, however, would take digging of another sort, not in the gravel of mesas but in the sometimes equally dusty deposits of archeological and ethnological literature. Accordingly, after a final day's survey of the Blythe sites, Dick and I returned by plane to Washington.

There I turned my attention to one of the first and most obvious clues—the big quadrupeds at Sites No. 1 and No. 3 Blythe.

They looked like horses, certainly. But what kind of horse? The late Pleistocene horse which once roamed the American plains, only to disappear about 10,000 years ago, or the European horse which the Spanish brought into the Southwest in 1540?

To some earlier archeologists, of course, the question might have seemed an empty one. What proof had we, they would have asked, that man had arrived in America soon enough to see a Pleistocene horse?

Well, we are still not certain that he ever did. But we do know that paleontologists, digging up some human bones around Melbourne, Florida, in the 1920's, uncovered in the same geological stratum 250 teeth belonging to Pleistocene horses. And we do know that these horses so closely resembled the European horse that only a paleontologist could tell them apart.

Thus, if the Melbourne evidence is accepted, Paleo-Indian man of about 10,000 years ago could have used the Pleistocene horse as a model.

However, a different kind of evidence makes me think the effigies were made a good deal later. That is the fact that the shallow depressions which comprise the great Blythe "horses" and men—unlike the surrounding, undisturbed surface of the mesa—are coated with no patina, or "desert varnish."

Patina of Great Age Is Absent

That patina, according to J. D. Laudermilk, probably comes from the action of certain lichens forming on the gravel. These lichens serve as a catalyst for deposits of iron-and-manganese oxides which, during the intense heat of the desert's dry season, become baked into a brown and black coating (page 402).

How long does it take for that varnish to develop? Unhappily, we cannot yet be sure. But I think we can be pretty certain that it forms in less than 10,000 years. So it is not very likely that Indians of the late Pleistocene period, artistically inclined or not, made these particular figures. Furthermore, if they *had*, we certainly would have found far greater damage from erosion.

That brings us right up to 1540; for in the intervening centuries there were no horses around to serve as models for the Indian sculptors.

Not the Work of Nomads

Here we can explore still a different line of thought. The very size and scope of these effigies indicate that they must have been carved by members of a large and sedentary society. Their makers were not nomads, in short, as so many of the prehistoric (or pre-Spanish) Indian peoples of this region were.

The mysterious sculptors had to be numerous simply to see what they were depicting; our own observations demonstrated that. Even when five or six of us stationed ourselves at various points along a figure's extremities, we could barely make out its design. Thus it hardly seems possible that a couple of nomadic families could have made such a figure, or that a people would go to the immense pains of creating these huge effigies only to leave them and wander on.

When we examine the history of the Southwest, we find that the most stable and most important Indians living in this lower Colorado River area in the post-1540 period were the Yuman-speaking tribes.

It was not exactly a peaceful era. Hernando de Alarcón, one of the first Spanish explorers, wrote of the Yumans and their contemporaries:

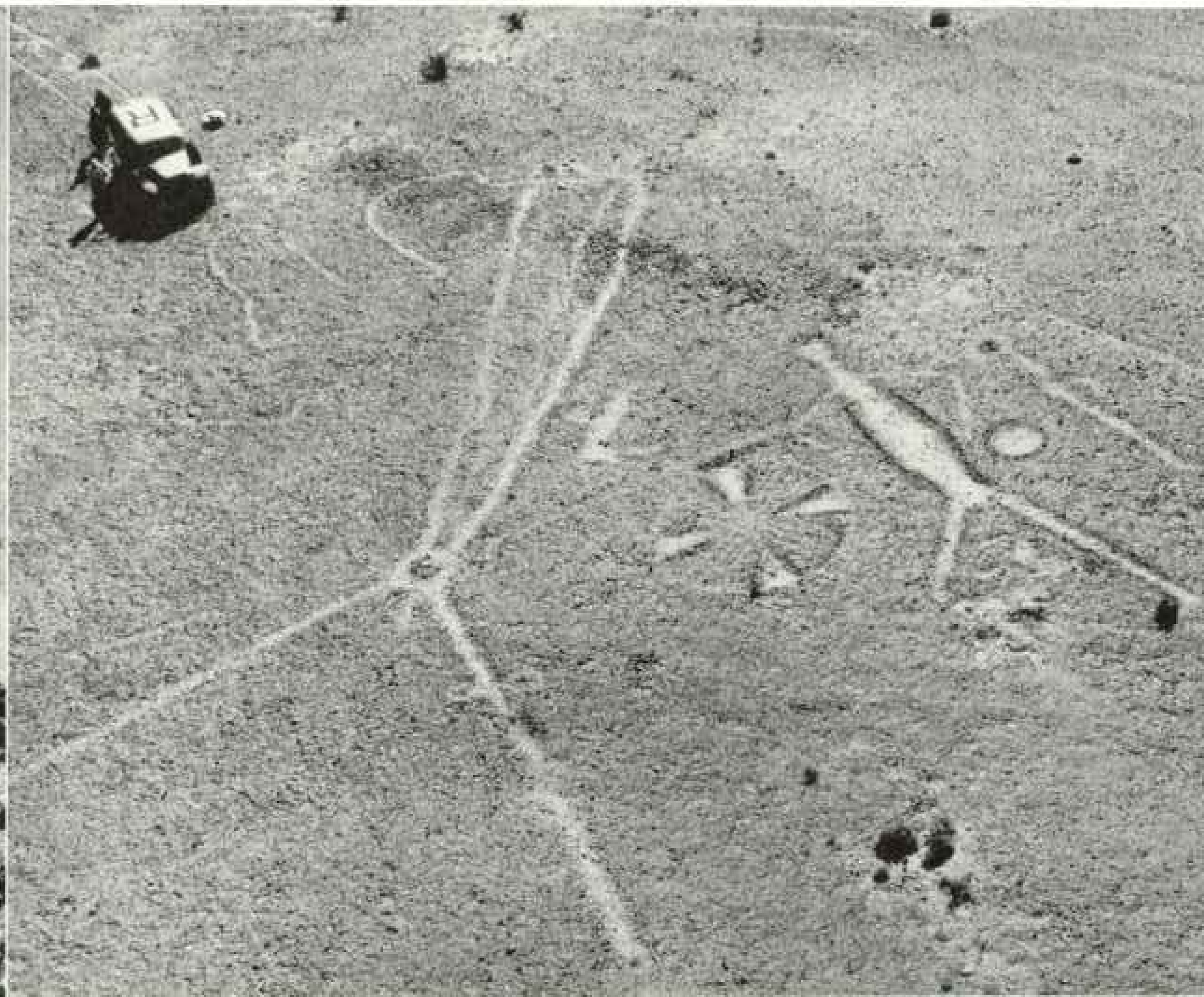
". . . when they had no cause to make war, they assembled together and some of them said let us go to make war in such a place

One Clue to an Effigy's Age Is the Color of Its Gravel

Surface pebbles which the Indians scraped away are coated with "desert varnish," an iron-and-manganese oxide produced by an arid environment (page 401). This dark-brown patina forms slowly, but it is doubtful that the process takes longer than 500 years. Since subsurface gravels exposed by the artists have no such coating, and since erosion has not been more severe, the author concludes the figures are not very ancient. Here F. M. Setzler examines patinated windrows of Indian tracings near Blythe.

A Sculptor's Daddy Longlegs Lies on His Back and Stares at the Sky from an Arizona Mesa Top

Air Force Captain Peacock and National Geographic photographer Stewart spotted these effigies near Ripley from a helicopter while searching for an Air Rescue team's broken-down carryall. Erosion's toll is plainly shown on the left. The cliff's slow retreat has cost the largest figure half his right leg; the other stretches 102 feet. Right: The encircled Maltese cross may indicate European influence in the Indian art style (page 392).



and then all of them set forward with their weapons."

The Yumans, however, seem to have survived this brawling and to have maintained for generations their grip on the Blythe-Ripley sector. They were the logical candidates to tag as the creators of the effigies.

But there remained one stumbling block. In all the historic and linguistic literature dealing with the Yuman tribes, their legends and their mythology, I could find no specific reference to the construction of these gigantic figures.

That was a puzzler. However, following up a lead suggested by Dr. Arthur Woodward of the Los Angeles County Museum, I came upon an intriguing piece of evidence. It was an account set down by an ethnologist, Dr. Frank Russell, in 1901-02, and it dealt with a myth held by the Pima Indians of the Gila River Indian Reservation, near Sacaton, Arizona.

This was the legend: To the daughter of Si'al Tcu'-utak Sivan was born a strange-looking child, with long claws instead of fingers and toes, and teeth that were long and sharp. People named her Hâ-âk, which meant something dreadful, or ferocious.

Indian Monster Ate Children

In only three or four years the child grew to maturity. She ate any kind of meat, cooked or raw. When she began to eat children as well, the people became frightened and tried to kill her. She escaped, however, and fled to a cave.

Then the people called upon the all-powerful "Elder Brother" for help. He went up to the cave and destroyed the monster.

To commemorate this deed, the Pima built a shrine. Here is how Dr. Russell described it:

"Hâ-âk Vâ-âk, [or] Hâ-âk Lying, is a crude outline of a human figure situated about 5 miles north of Sacaton [about 30 miles southeast of Phoenix, Arizona]. It was made by scraping aside the small stones with which the mesa is there thickly strewn to form furrows about 50 cm. [20 inches] wide.

"The body furrow is 35 m. [105 feet] long and has a small heap of stones at the head, another at a distance of 11 m. [33 feet] from the first, and another at the junction of body and legs. The latter are 11 m. long and 1 m. [3 feet] apart. The arms curve outward from the head and terminate in small pyramids."*

When I read this account, I felt certain a real clue had turned up. Here was a letter-perfect description of a giant human effigy like the one we had seen and photographed at Site No. 2 Blythe. Surely this was the mythological link for which I had been searching!

If we had solved one problem, however, we had posed another. How had the Pima come by this legend and this shrine-building tradition? The Pima belong, linguistically, to a group quite distinct from the Yuman; culturally, they are more closely related to the Pueblo tribes. And the archeological evidence indicates that their ancestors did not live along the lower Colorado River.

Yet, I reasoned, there must have been a "bridge" between the tribes. At last I found it.

Maricopa Form the Bridge

In 1775 a Yuman-speaking tribe called the Maricopa were living along the Gila River, which empties into the Colorado near the town of Yuma, Arizona. Shortly a feud broke out between the Maricopa and the Yuma over the selection of chiefs.

So bitter did the eventual tribal warfare become that the Maricopa finally pulled out and joined forces with their eastern neighbors, the Pima. When, in 1857, the Yuma and their allies raided the Maricopa in southern Arizona, they were driven off by combined Maricopa-Pima forces.

We can only guess, of course. Yet it seems eminently reasonable to suppose that the original legend of Hâ-âk stems from the Yuma, in whose sector we find so many of the intaglio shrines; that this legend was shared by their linguistic brethren, the Maricopa; that the Maricopa passed it along to their colleagues-in-arms, the Pima; and that the Pima, in turn, preserved the myth long after the Yuma had forgotten all about it.

This speculation gains somewhat in force when we consider the position occupied by the Maricopa midway between the Yuman and Piman mythologies. The Maricopa share about half of the incidents which comprise the Pima's creation tales. The other half are more comparable to those of the Yuma.

In short, the Maricopa are our "bridge."

It is not easy, and it is often rash, for an archeologist to date things with any precision. Nevertheless, as I looked up from the books and reports I had assembled at my desk in the Smithsonian and let my mind's eye rove for a moment across those strange effigies staring up at the southwestern sky, I felt impelled at least to register my modest guess.

Here we go, then. I think the giant effigies we found at Blythe and at Ripley were made by Yuman-speaking Indians; that they served in some fashion as shrines to the memory of Hâ-âk and her destroyer, Elder Brother; and that they were fashioned sometime between 1540 and the middle of the 19th century.

* See *28th Annual Report of the Bureau of American Ethnology*, 1904-05, page 254, figure 102.

Nature's Clown, the Penguin

By David Hellyer and Malcolm Davis

IF, in some distant reincarnation, you should become an emperor penguin, the chilly month of July would find you squatting on an ice field in Stygian darkness with an egg on your feet—and very happy about it all, despite the 50°-below-zero blizzard ruffling your feathers.

Though the prospect may leave you cold, to be a penguin is to be a bird of distinction. Aristocrats of the bird world, penguins stand in a class by themselves as one of the four great superorders of birds.

For as long as ships have sailed antarctic seas, penguins have fascinated the humans whom they so comically seem to resemble.*

Magellan sighted strange "geese" near the Patagonian coast in 1520 in flocks so vast his five ships were easily provisioned with them. Today South Pole-bound explorers await their first sight of an Adélie penguin as a sure sign they are at last within the Antarctic Circle.

The name "penguin" is thought by some to have originated with 17th-century Spanish navigators, who called the birds *pinguinos*, from *pingüigo*, or "greasy one," because of the abundant fat which blankets their bodies.

Others claim the term comes from the Welsh *pen gwyn*, or "white head"; while a third opinion suggests that the name is a corruption of "pin wing," a bird whose wings have been clipped.

The penguin has been with us for a long time. More than a score of extinct forms have been identified from fossils.

Giant Penguins Once Roamed the Earth

Millions of years ago, when the Himalayas were beginning to rise out of the primordial land, truly gigantic penguins roamed parts of the earth. These gargantuan specimens, which flourished in the Age of Mammals, are thought to have reached five feet in height and to have weighed more than 200 pounds.

Fossil remains of these creatures have been unearthed in New Zealand and on Seymour Island off Palmer Peninsula in Antarctica, while other important fragments have come to light in Argentina and Australia.

Today ornithologists recognize six genera

* See "Antarctica's Most Interesting Citizen," by Worth E. Shoults, National Geographic Magazine, February, 1932.

and from 17 to 22 living species and races of penguins.

The "little people" are distributed throughout the southern half of the globe, from Equator to pole, but they have never been found north of the earth's midriff.

Contrary to hoary legend, penguins do not live exclusively on icebergs. Only four species are known to touch the shores of Antarctica. Few others even cross south of the Antarctic Circle.

Actually, the penguin is typically an inhabitant of the subantarctic. Four kinds even have the temerity to be tropical or subtropical in their habitats. These, however, are found largely in areas washed by cold currents from the far south.

Penguin rookeries are found on both coasts of South America and on the shores of South Africa. Large flocks exist in Australia and New Zealand, and many Pacific islands, including the Galápagos, have penguin colonies.

Penguins range in size from the powerful emperor, which sometimes towers four feet in height, to the bantamweight *Eudyptula minor* of Australia, which measures a bare 15 or 16 inches. One unusually large emperor, captured by members of Capt. Robert Falcon Scott's second polar expedition, weighed more than 90 pounds. Another large specimen boasted a girth of 52 inches just below the shoulders.

Dressed in their far-famed formal attire, all species of penguins look much alike. Barring differences in size, the main distinctions are found in the coloration of their heads.

Johnny, or gentoo, penguins have coral-red bills and orange feet, and wear tiny white nurses' caps (page 413). The emperor and king (pages 409 and 412) fittingly wear a golden patch on either side of the neck; while the Adélie, in character as a comic, can be distinguished by the quaint white rings around his eyes (pages 423 and 428). The rockhopper sports a yellow pompon over each eye (page 422), and the macaroni has golden-yellow eyebrows (page 424).

Sound effects are helpful in some identifications. The king snores softly while sleeping; the Magellanic, or jackass, owes its uncomplimentary nickname to its braylike call; the Johnny trumpets like a tin horn, or hisses when angered and while courting.

Thick Blubber Girdles Give Warmth

One writer speculates that the ghostlike braying of the jackass may explain the calls of lost souls heard on dark nights by superstitious sailors.

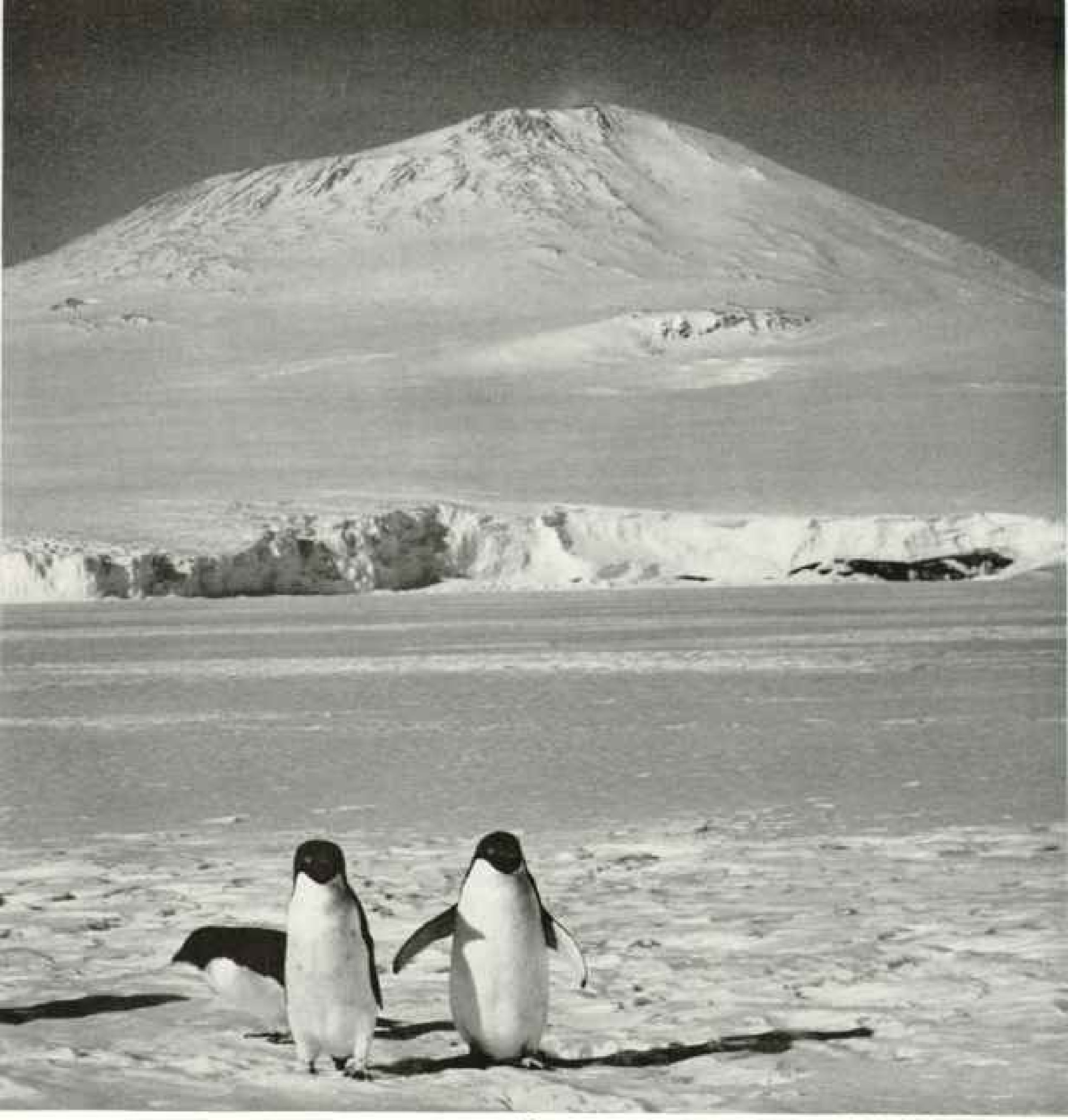
Unlike fish, which they rival as swimmers, penguins are warm-blooded. The ability of the emperor to endure some of the coldest temperatures on earth, while maintaining body

406

heats exceeding 100° F., is one of the most remarkable feats of natural adaptation in the animal kingdom. A girdle of blubber an inch thick is part of the key to this resistance to cold.

Though they are perhaps the least birdlike of all feathered creatures, penguins still share one habit common to sparrows, chickens, and ducks: When bedtime comes they put their bills under their flippers, their nearest approach to wings.

Thanks to their streamlined bodies and to their powerful and highly developed "wing" muscles, penguins can swim like seals and play leapfrog like porpoises. Johnnies have been clocked swimming 30 feet a second *submerged*.



407 © Herbert G. Ponting

Adélie Penguins Romp on Ice Below the Hot Mouth of Antarctica's Mount Erebus

Ross Island abounds in emperors and Adélies, the only penguins found on the polar continent in great numbers. These comical "little men" delight and amaze every explorer reaching South Polar waters. Their meat and eggs have saved more than one adventurer from starvation.

Here on Ross Island, Britain's Capt. Robert Falcon Scott, on his second expedition to Antarctica, set up winter quarters in 1911, hoping to be the first to attain the South Pole. After tremendous hardships, Scott and four companions reached their goal early the next year, only to discover Norway's flag already there. Explorer Roald Amundsen had beaten them by one month.

Sick with disappointment, Scott and his men began a terrible 940-mile journey back across the frozen wastes. Violent blizzards lashed them, food and fuel ran out, and all five men perished, three of them only 165 miles from their base at Cape Evans.

Mount Erebus towers 13,200 feet above the sea, the only known living volcano in the Antarctic. Usually it wears a plume of vapor; occasionally it spits fire into the darkness. Below the volcano stands the great Ice Barrier, a 200-foot cliff running hundreds of miles across Ross Island and Ross Sea.

Herbert G. Ponting, photographer for the second Scott expedition, made the picture on January 13, 1911. The National Geographic Society holds sole United States rights to many of his records of the Antarctic. Today Ponting's remarkable pictures are still esteemed for their quality, despite photography's advances during the past 40 years (pages 423, 424, and 428).

Penguins literally fly under water, using their powerful flippers for propulsion and their feet and tails for rudders (page 427).

On land, flippers become weapons, or ski poles for propelling or steering while tobogganing. One emperor was timed tobogganing on his belly at 10 miles an hour. Incidentally, on the antarctic ice, penguins are seen most frequently on their stomachs (pages 406-7 and 420).

Most species can leap several feet out of water, often coming to a perfect two- or three-point landing on rocks or ice. Adélies size up their potential landing field from a distance of 20 or 30 feet. Then, after a breath-taking rush under water, they shoot up from the depths and land feet first on snow, or plop down on well-upholstered midriffs on slippery rocks or ice.

Penguin High-jump Champion

The emperor is high-jump champion of penguinland, for he can put his 90 pounds or less, feet first, on a ledge five feet above the surface.

Another species, the rockhopper, shares the dignified mien of the emperor and king much of the time, but is sheer comedy when in a hurry. Then he earns his nickname by moving in a series of jerky bounds, like a kangaroo, or an old man with his ankles tied together.

One curious habit common to many kinds of penguins is that of swallowing pebbles. Old-time sealers and whalers believed that penguins used pebbles for ballast. They reported that jackass penguins ejected pebbles from their stomachs on emerging from water, and ingested a new load just before plunging in again.

Capt. James Cook, on his renowned world cruise, captured a king penguin whose stomach contained a veritable geological museum—32 pebbles ranging in size from a pea to a hazelnut.

One of the authors of this article, ornithologist Malcolm Davis of the National Zoological Park at Washington, D. C., dissected many penguins on a recent expedition and found stones similar to those lining the bottom of the Bay of Whales.

This strange pebble-eating habit helped, in a very practical way, in the discovery of Antarctic land. In January, 1840, the U. S. Exploring Expedition, commanded by Lt. Charles Wilkes, USN, captured an emperor penguin at sea. Its stomach contained a number of stones, which the scientists interpreted as evidence that land lay near by. This shortly was substantiated when the party sighted Antarctic shores.*

Penguins feed on crustacea known as krill, and on cuttlefish, and other sea food. The emperor is a fish eater and will consume trout in captivity. Davis has seen the sea colored red for acres with the crustacea on which penguins feed. These crustacea follow the Peru (Humboldt) Current, and several penguin species show common sense in doing likewise. The courses of the penguins' remarkable migrations are governed by their food supplies.

Penguins appear incapable of recognizing their typical food outside its native element. Most newly captured penguins would starve unless force-fed. The emperor recently on exhibition at the Washington zoo would not pick up a trout from the ground or a rock, but had to have the fish placed in her mouth.

It is fortunate that Adélies and emperors are sea-food lovers, for vegetable life within the Antarctic Circle is too scarce to support them. During its month-long period of courtship and incubation of eggs, the Adélie eats nothing but snow.

Careful studies of life in penguin colonies have led some ornithologists to conclude that the birds enjoy a relatively high level of social organization. Living among them for many months, one observer found that the daily lives of these birds resemble the day-to-day histories of the two-legged mammals they seem to mock in appearance. Weddings, fights, divorces, frolics on the seashore—the gamut of human activities which make gossip and headlines in any small-town newspaper—these he found duplicated among the penguins.

Courteous Birds Call on Newcomer

Even the reception given the scientist by the "local folks" resembled that accorded new residents in many small communities. Having pitched his tent, he was visited night and day by hundreds of curious birds. They lined up in a long queue in front of his dwelling to inspect the newcomer.

Most penguins set examples of marital fidelity worthy of the most upright societies. Monogamy seems to be the rule for the season, and the mating ceremony, though very colorful, appears quite discreet. Davis has seen penguins mating both in the wild and in captivity, but one ornithologist who spent 10 seasons carefully studying the sexual behavior of colonies of yellow-eyed penguins on New Zealand's South Island never once observed a pair mating.

In the courting process, a pebble is the jewel of several of the penguins. Like a cavalier presenting a priceless pearl to his heart's desire, Sir Penguin offers a rounded stone to

* See "American Discoverers of the Antarctic Continent," by Maj. Gen. A. W. Greely, National Geographic Magazine, March, 1912.

409 National Archives

A Gentleman Bows to a Lady. Or Vice Versa? Not Even a Penguin Can Be Sure

Aptenodytes forsteri, the emperor penguin, always dresses up, though he may have no place to go. His white dress shirt, satinlike tail coat, and dignified mien would gain favor in a true emperor's court. Ruler of the Antarctic, he may tower nearly four feet and weigh 90 pounds. When other birds flee the polar winter, the emperor stays in 70°-below-zero weather to raise a family. Male and female look exactly alike.

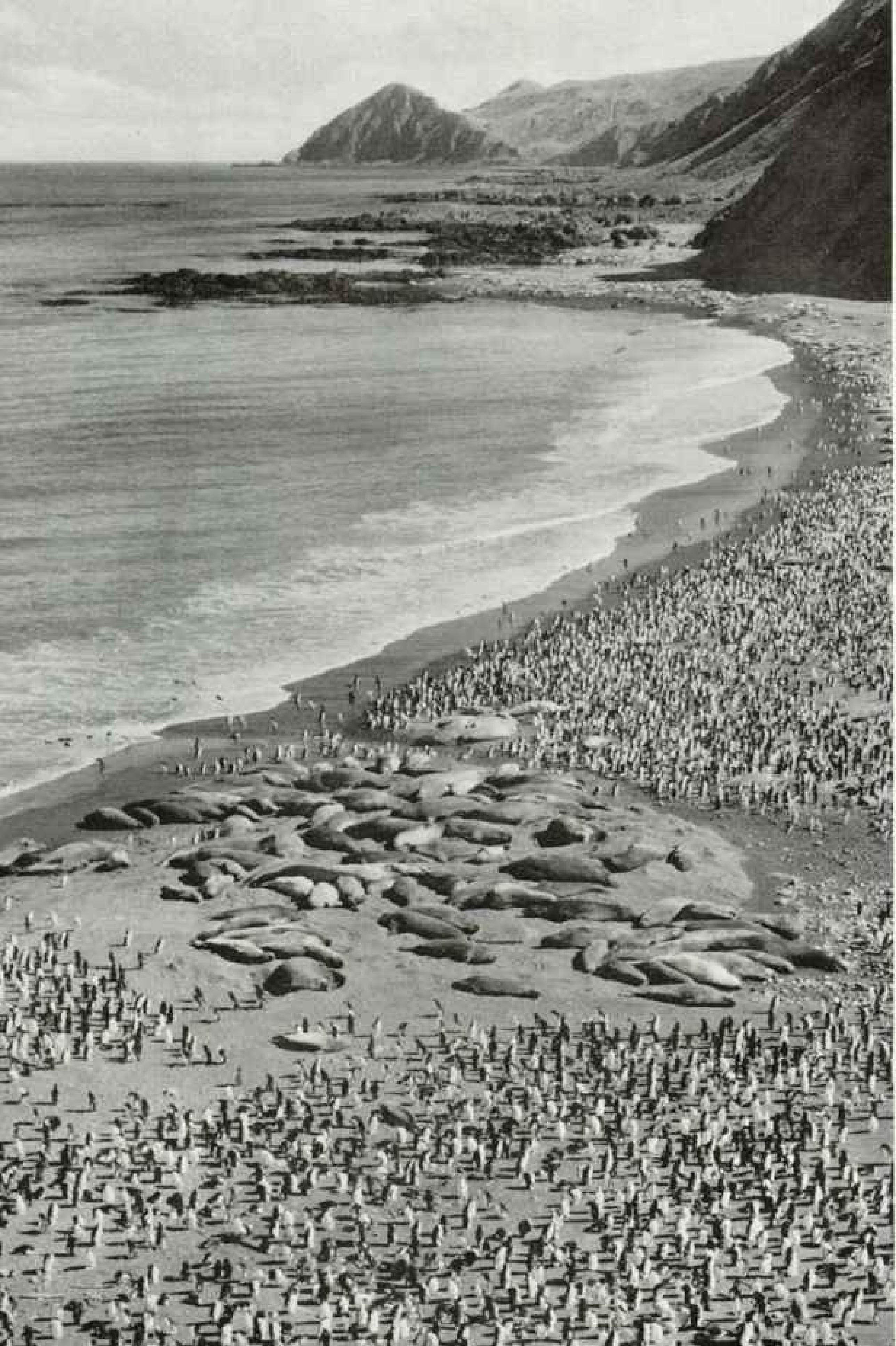
the lady of his choice. If "she" proves to be a "he," as is often the case, the confusion is passed over lightly and the search continues, for males and females look much alike, even to penguins.

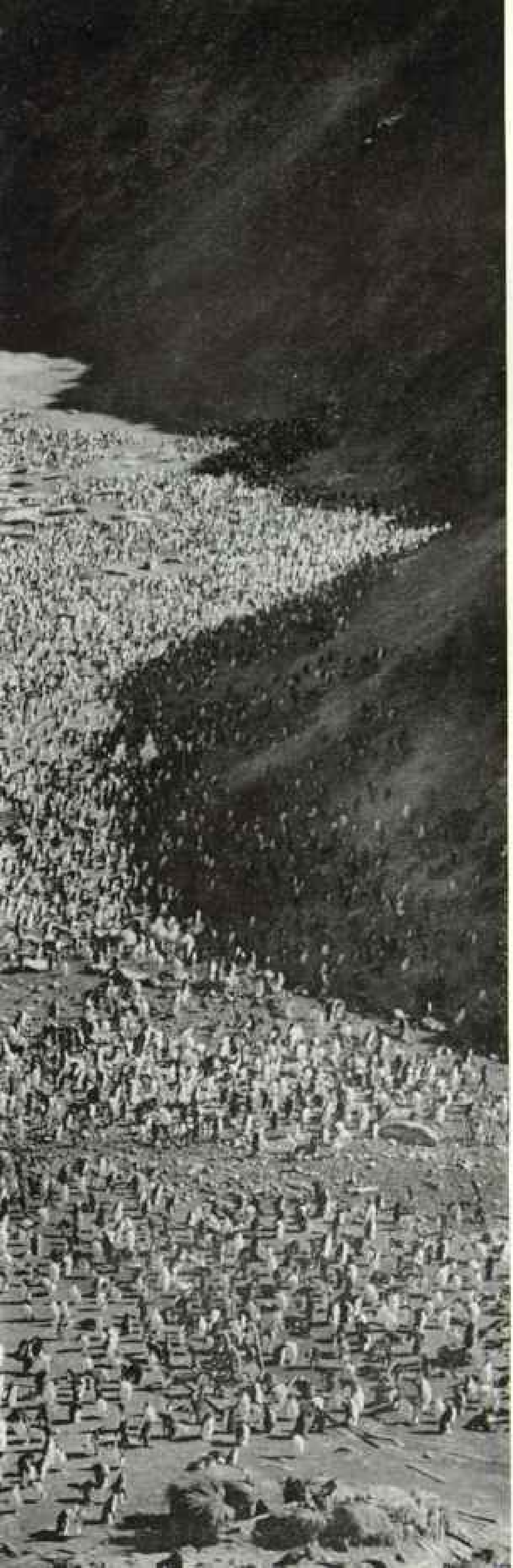
Davis once was a victim of this perplexity. He had prepared a paper for the American Ornithologists' Union on the courtship of penguins, based on observations made on two emperors then in the Washington zoo. Shortly before the meeting, they died. Post-mortem examinations showed both were females.

The penguin's shortsightedness sometimes reaches absurd limits. The noted ornithologist Dr. Robert Cushman Murphy once was approached by a penguin which gravely laid a pebble at the astonished gentleman's feet.

Emperors Have No Housing Problem

Eventually Mrs. Emperor lays a big one-pound egg. Rearing children poses no housing problem for the emperors, for they build no nest. Emperors incubate the egg by holding it on their feet, as if to keep junior from getting chilblains from the ice ledge they call home. They warm the egg, and later junior





Little People in Dress Shirts Share Macquarie Island with Basking Elephant Seals

A slender island, no more than three miles at its widest, Macquarie juts suddenly from the sea halfway between New Zealand and Antarctica.

No one lives on Macquarie; the isolation, harsh climate, and drab landscape lack appeal for men. Famed explorers, however, have visited the island, among them Captain Scott and Sir Ernest Shackleton.

Not long ago an Australian scientific expedition gave Norman Laird, a Tasmanian, the opportunity to take the Macquarie pictures in this issue.

Seal hunters, such as Capt. Frederick Hasselborough, who discovered the island in 1810, are gone. For more than a century they shot, speared, and clubbed seals until the colonies faced extinction. Today Australia protects Macquarie as a wildlife sanctuary, and only the wrecks of sealers' ships hint at the tragic past.

Seals by the thousands now converge here each August. Their heavy bodies cover the beaches; fighting and mating cries fill the air.

A few fur seals, perhaps no more than 200, remain from the vast herds once common in subantarctic waters. Fashion's demand brought about their downfall.

Elephant seals such as these sluggish fellows were slaughtered until so few remained they were scarcely worth hunting. Protected now, they gain rapidly in numbers.

Life is difficult for pups of the elephant seal. Enraged bulls charging across the beaches sometimes leave trails of crushed young. Towering waves carry away youngsters playing on the shore. Giant petrels and skuas dive in screaming attack on any unprotected pup.

The elephant seals' diet is a mystery. Scientists believe they may eat krill, the minute shrimp on which some whales feed.

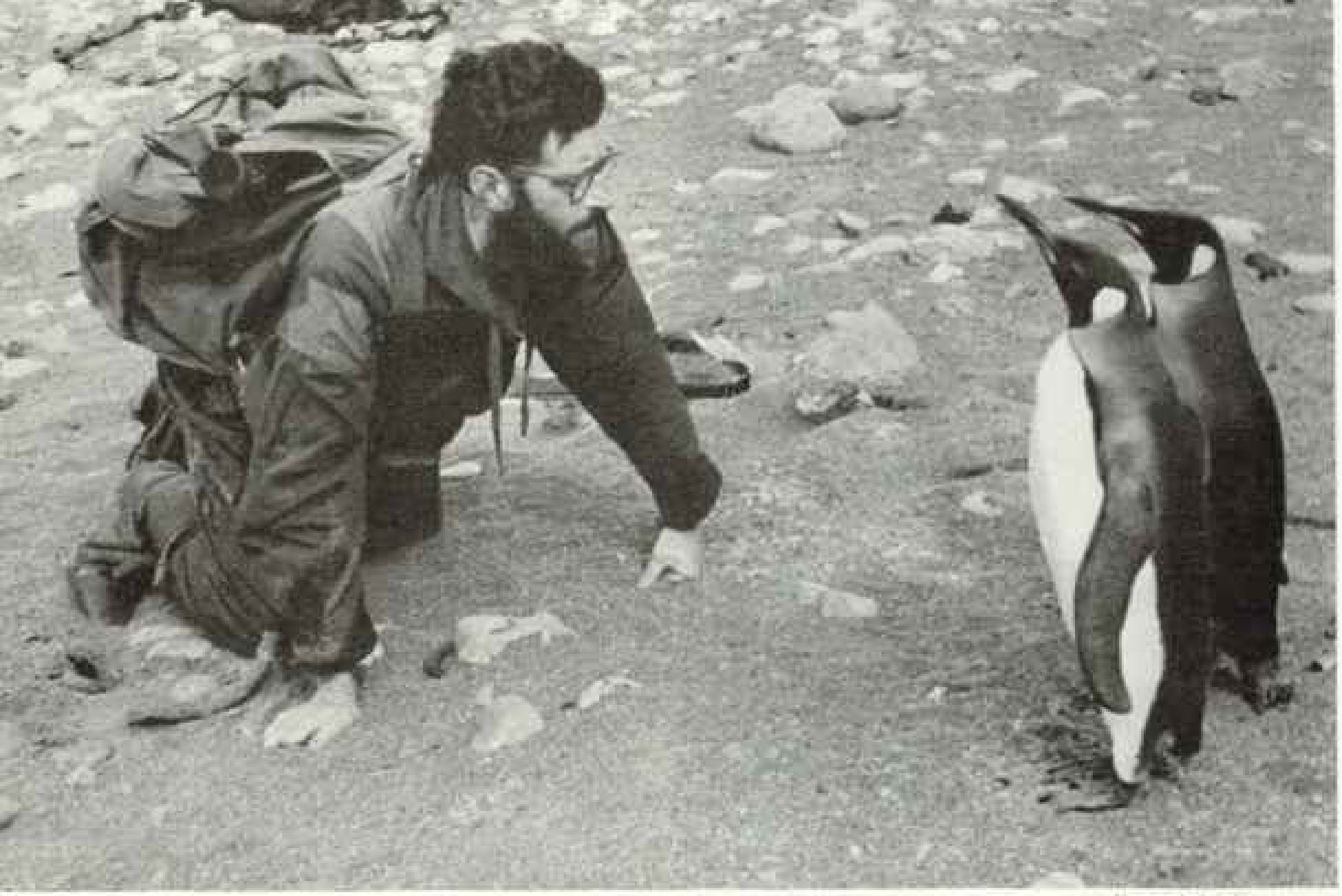
Winter's ice brings another seal, the flesh-eating sea leopard. Savage enemy of fish and sea bird, this predator lurks near shore and darts in snakelike fashion at diving penguins.

Above all, Macquarie is an island of penguins. Like strange little men, they stand on the crowded beaches, seemingly engrossed in the endless task of doing nothing.

Here live the royal penguins, which breed nowhere else (pages 418-19). They arrive about mid-September and stay through the antarctic summer. In April they disappear; where they go no one knows.

Other residents are the king penguins, most beautiful of the family (page 412), and the irritable rockhoppers (page 422). Rookeries of the Johnny, or gentoo, climb the cliffs (pages 413, 414, and 415).

Norman Laird, Pix



412 Norman Laird, Fiz

Aloof King Penguins Take a Bird's-eye View of Photographer Laird

Macquarrie's king penguins carry their eggs between belly, tail, and feet. While incubating, they hunch along with short steps, never letting the egg roll out. If they chance to trip, they fall as stiff as a statue, the egg still in place. Next to the emperors, who usually stay in frozen Antarctica, the kings (*Aptenodytes patagonicus*) dominate the penguin world with their size, graceful lines, and orange markings.

himself, with the bottoms of their tummies, where Nature has provided a thick dewlap of warm fat. This mode of brooding also is practiced by the king penguins.

Earlier observers all have thought that emperor and empress alternate as baby sitters, one staying on duty while the other rustles up a few fish in some near-by open channel in the ice.

Mother Gets Vacation

According to an ornithologist who recently spent 10 weeks observing an emperor rookery, however, incubating isn't a labor-sharing process at all. This observer writes that after Mrs. Emperor has done her duty as egg layer, she returns to open water, leaving to the male the 60-day ordeal of hatching. When the chick emerges, mother comes home to take over, and the male, who has not eaten during the entire two months, gratefully goes off to feed.

Whoever does the sitting, the egg must be protected with great care, for temperatures in the antarctic midwinter may nose-dive to as low as —77° F. Finally the chick breaks through into the cold, cold world.

Once the emperor eggs are hatched, smother love is in order, for antarctic penguins sometimes actually love their children to death. Since there is only one chick to every 10 or 12 adults, there is great scrambling for the poor little newcomer, and a free-for-all ensues whenever a youngster is left unattended.

In the savage competition for the privilege of baby-sitting, the young often are treated quite roughly. Sometimes they are killed in the process, being either badly mauled or pushed into a crack, where—at least in the Antarctic—they freeze to death while the old folks above them squabble and squawk for a chance to love them. Natural hazards, plus the struggles among adults, have led observers to estimate that mortality among chicks is as high as 75 percent.

Unlike the Spartan antarctic dwellers, other species, breeding in ice-free lands, build nests or excavate burrows in the ground.

A blind visitor could easily identify a penguin rookery; his senses of hearing and smell would be quite adequate.

Dr. E. A. Wilson, who accompanied Captain Scott on his Antarctic expeditions, reported that he could smell Ross Island's Cape Crozier rookery of emperors from 30 miles to leeward!

The noise of a large rookery is literally appalling, continuing without break night and day. One observer likened the noise to "a gale howling through an autumn wood," while

413 Norman Laird, Pix

Nurse-capped Johnny, Nesting on a Haystack, Trusts Her Brood to a Stranger

A slow, awkward bird, the Johnny, or gentoo, penguin (*Pygoscelis papua*) ranks nonetheless as an excellent mountaineer. Her tussock-grass nests dot the windy slopes of Macquarie and other subantarctic islands. Explorers spot her as the only penguin with a white topknot. During courtship her suitor brings huge loads of grass as tokens of love. Most penguins show little fear, but the gentoo is shy unless approached gingerly.

another said that "the babel of voices sounds like a language."

Penguins molt standing alone in a fixed spot, on land or ice, and are indeed a sorry spectacle in the process. For nearly a month they neither eat nor bathe, until, finally, their new plumage grows out and they go back to sea.

Because they look so much like little people, penguins often are regarded as intellectuals in feathers. The resemblance is so marked that several famous works of fiction have cast them as characters. Anatole France employed them in his classic satire *Penguin Island*. Edgar Allan Poe found them fascinating enough to incorporate in his *Narrative of A. Gordon Pym*.

In reality, penguins are rather stupid, relying on a heritage of instinctive behavior rather than on original thinking. They are so pea-brained that, in their anxiety to be good fathers and mothers, they often will brood over a smooth rock, a piece of ice, or a dead and frozen chick. Lacking the genuine article, one Adélie was observed baby-sitting on a discarded cheese tin!

To offset somewhat this short supply of wit, penguins possess a wondrous navigational sense. Sir James Ross observed penguins 1,000 miles at sea. They can stay at sea for months, and often make long journeys across boundless ice fields without losing their way, despite the absence of distinguishing landmarks and the fact that their horizon cannot exceed a mile or two in the clearest weather.

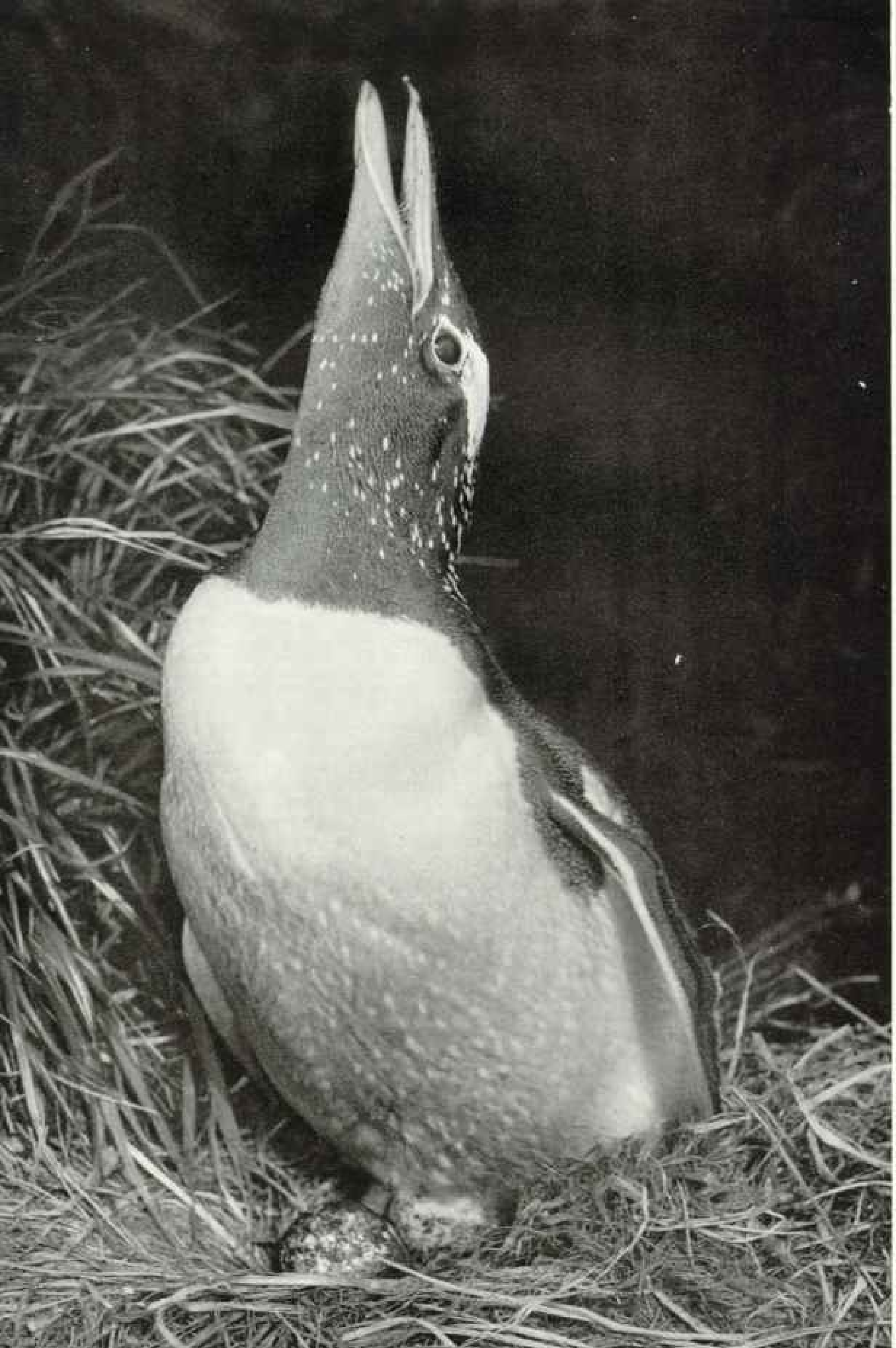
One party of explorers, when fogbound offshore toward evening, learned to follow the penguins to land; their homing propensities proved infallible.

Penguin No Gourmet's Delight

As food, penguins rank considerably down the scale from filet mignon, though Sir James Ross found their meat made excellent soup. Both bird and egg are edible, a fact for which many a starving mariner or explorer has been extremely grateful. As early as Sir Francis Drake, voyagers learned to depend on them, and Drake admits to having killed "no less than 3,000" in one day off Isla Isabel, in the Strait of Magellan.

Capt. Benjamin Morrell found penguin eggs so abundant at Cabo dos Bahias on the Patagonian coast that a ship's crew could collect 50 barrels in a few days.

Sir Richard Hawkins, following Drake's route through the Strait of Magellan, reported that penguins were "reasonable meate rosted, baked, or sodden; but best rosted. We salted some doozen or sixteene Hogsheads, which



Expectant Father Sits on the Eggs and Blows His Horn

The female Johnny, or gentoo, penguin lays two greenish-white eggs. If the nest is robbed, she deposits more. Almost the size of tennis balls, the eggs make excellent eating. Men collect them by the hundreds early in the month-long incubation period.

When courting, the birds bow repeatedly to each other, then point heads upward and trumpet loudly. After pairing, the male collects grass and seaweed for the nest. He bows as he brings each load, and stands trumpeting as his mate does the building.

Baby Johnny Breaks Out of Prison

It takes all of a penguin's strength to demolish his shell. He hammers a hole with his beak, sticks his head through the opening, and kicks. When the tough shell finally gives way, the chick sinks back exhausted.

Several days more will see him a soft, gray-white ball of fuzz, much larger and ravenously hungry (page 417). For some time he seems extraordinarily feeble and dependent on his parents. Lacking stamina to elude enemies, he avoids the water for weeks.

Norman Lauré, Phs

↑ Frightened Johnny Babies Cower. Mother Scans Sky Like an Air-raid Warden →

Timid at other times, Johnnies fight fiercely if their babies are threatened. Hissing with wrath, they shower intruders with blows from flippers and beaks. When the dread skua swoops over the rookery, brooding birds stretch high, ready to beat off an attack (right). Heads and eyes turn in unison, like those of spectators at a tennis match, and gauge the enemy's flight. Danger past, each parent inspects its offspring with near-sighted eyes.

The skua, an intelligent pirate, often works in pairs. One gull worries the Johnny to distract her attention from the nest. Its partner, approaching from the opposite direction, seizes the nestling by its feet. Casualties run high; one witness saw skuas destroy every baby in a colony.

← Fledgling Johnnies Pant in Discomfort in 45° Heat

Penguin swimmers, gulping and expelling sea water, use spiny tongues as sieves. Spines allow the water to escape but catch tiny shrimp and other food. Macquarie's penguin babies, accustomed to the cold, suffer when temperatures rise much above freezing.

↓ Young Johnnies eat so gluttonously that their distended tummies almost anchor them to the nest. They feed from the gullets of parents, who swallow the food and then regurgitate it. Older birds take turns guarding the nest and trudging to shore for fresh supplies. Later a few adults take over as baby sitters for the entire colony. Then both parents, harassed by the demands of never-satisfied youngsters, bring food by the bellyful.

Norman Laird, Fix

419 Norman Laird, Pix

Countless as Daisies, Macquarie's Royal Penguins Fill 65 Rocky Acres

Emperor Penguins, Drawn by Curiosity, Toboggan Across Ice to Inspect a Photographer at the Bay of Whales

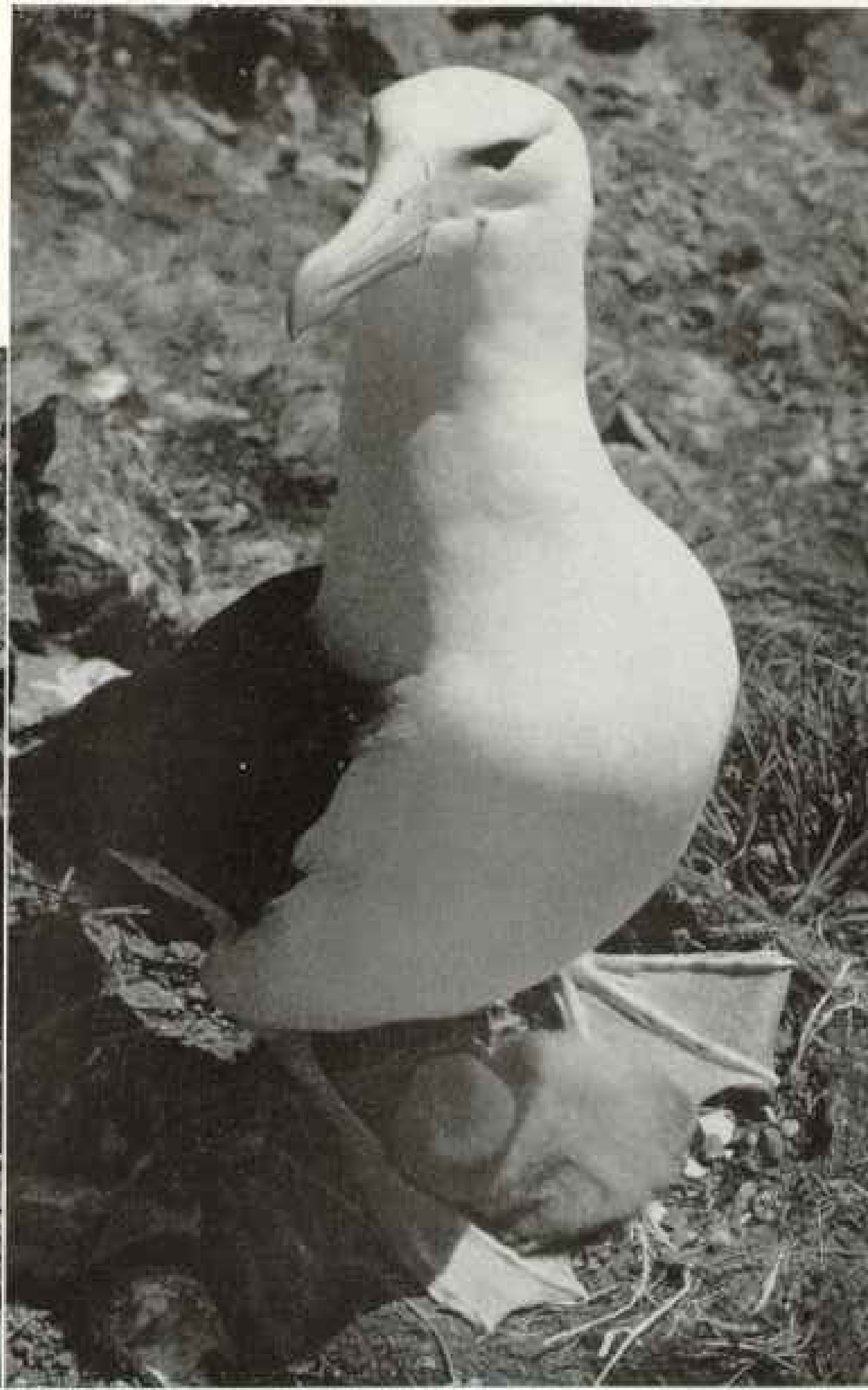
Many penguins, when tired of walking on extremely short legs, turn themselves into ice boats. Using flippers as oars, they slide on thick coats of scalelike feathers. Admiral Byrd established Little America, his camp in Antarctica, on the distant ice shelf.

Black-browed Albatross Guards Her Offspring Between Webbed Feet ➤

Unlike the flightless penguin, the albatross is well-nigh peerless in the air. With indescribable grace it glides for miles against a breeze, tremendous wings hardly quivering. Mariners in the southern hemisphere often sight the black-brow *(Diomedea melanophrys)*, commonest and most fearless of the albatross family. This bird, nesting near a Macquarie Island penguin colony, protects her downy fledgling from skuas (page 425).

▼ Light-mantled sooty albatross *(Phoebetria palpebrata)*, with pearly body and dusky hood, resembles a cowled monk. Perpetually astonished eyes and a hollow, ghostly trumpeting, one of the weirdest sounds in the bird kingdom, make the sooty a legendary figure with seafarers.

Norman Laird, Pix



H. W. Baldwin, Washington Post

Plumes Raised Angrily, Rockhopper Walks Off in a Huff

Yellow plumes and black crest mark the rockhopper (*Eudyptes crestatus*). While most penguins waddle awkwardly, this red-beaked jumping jack hops kangaroo fashion when he is in a hurry.

This grumpy character was hitchhiking home—8,800 miles as the penguin would fly, if he could—when the Washington, D. C., zoo keeper caught up with him. Days before he had escaped from the flagship of the Navy's 1947 Antarctic expedition. Here he duplicates his flight for the camera.

served us (whilest they lasted) instead of powdered Beefe."

Even Hawkins had to admit, however, that "by the taste it is easily discerned that they feed on fish."

Sir Ernest Shackleton's men, out of necessity, tried penguin stew, compounded of seaweed, limpets, and penguin meat, and found it a good tonic.

Present-day travelers to Antarctica recognize that the flesh of the penguin is very rich in food value, especially the fresh heart, kidney, and liver. The objectionable oily flavor can be minimized by carefully removing blubber and blood. Then, when ground and well-seasoned, the meat is said to make a very tasty penguinburger.

Like the sea otter's and the whale's, the penguin's ranks have been sadly decimated by man. Penguins once were hunted for their oil. The rockhopper was a prime source of lamp oil in olden days.

When the penguins first came ashore in the spring, crews of visiting schooners would drive them into corrals by the thousands. Each penguin yielded about a pint of oil, worth then about two shillings, sixpence.

In 1857 the crews of four small schooners at the Falkland Islands pressed out 50,700 gallons of penguin oil, killing perhaps half a million birds in the process. More recently, one enterprising bird killer admitted destroying 70,000 penguins annually.

Although this slaughter has been halted, on West Falkland Island today the sight of a king penguin is a rarity. One legend says that all the remaining residents were boiled down by a shepherd, who used their oil to waterproof the roof of his hut!

On Macquarie Island, south of New Zealand, single colonies of king penguins totaling millions of birds once covered 30 to 40 acres, and hordes of 60,000 or more could be observed entering or leaving the water at any hour.

Then, for a time, oil hunters were permitted by law to destroy as many as 300,000 penguins annually on this island. By shortly after 1900, the penguin population of Macquarie Island had been reduced to about 7,000.

The island was made a wildlife sanctuary in 1933, however, and this has made possible a strong comeback on the part of some penguin species (pages 410-11 and 418-19).

As pets, penguins leave something to be desired. Though they sometimes are tamed in Peru, the little people have not yet been widely accepted socially.

Emperor a Bad Insurance Risk

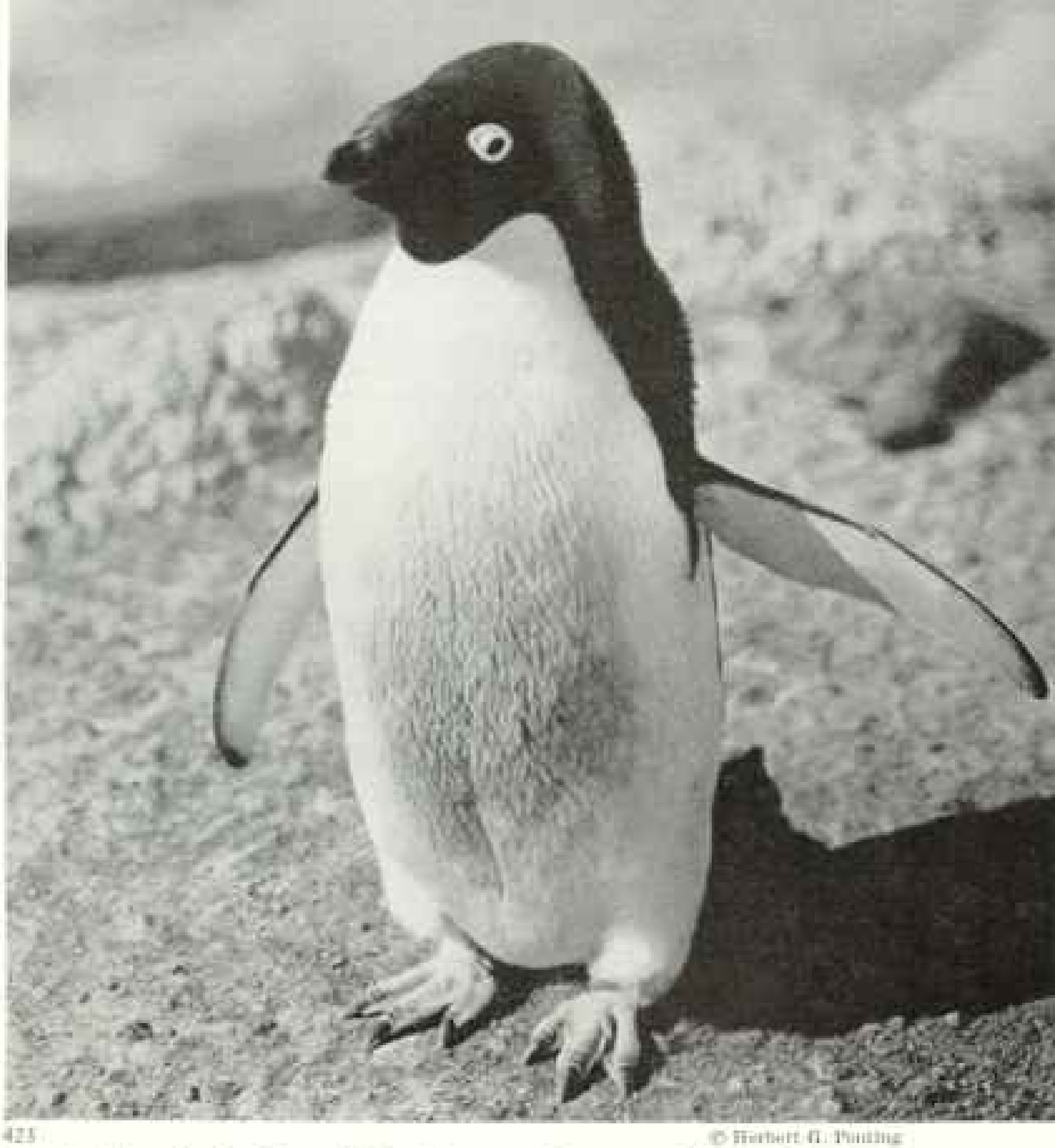
With his bare hands, a Navy helicopter, and a flying tackle, Davis captured 21 emperors on his last trip to Antarctica, in 1948, and succeeded in nursing eight of them home to Washington alive.

But it's one thing to catch an emperor, and another to keep him healthy. Though the Washington zoo penguins were kept in a special air-conditioned enclosure and fed fresh trout, squid, and other delicacies, the last survivor died in 1951.

The Antarctic is one of the most healthful spots on earth, if you don't mind the climate. It is too cold for germs or harmful fungi. So the emperor at home usually dies of old age, in full dress, on or about his 35th birthday.

The emperor wouldn't trade his climate for the Riviera. His remarkable specialization of physical structure and habit makes it natural for him to select the most southerly coast known, on the edge of the great Ice Barrier, as a wooing ground and nursery. He chooses the dead of antarctic winter for these typically springtime activities, so that the young may be fully prepared to weather the following winter.

The emperor is the only inhabitant of the frozen continent who remains there throughout the year. He lives in a silence so profound that, when the wind is quiet, the crunching footsteps of men walking three miles away can be heard with crystal sharpness. Dust and other solids in the air are virtually unknown, as are insect pests.*



423 © Herbert G. Ponting

An Adélie Cocks Inquisitive Eye on Someone Else's Business

Nearly everyone knows *Pygoscelis adeliae*, most studied and best publicized of penguins. His absurd white-ringed eye, cocky manner, and Chaplinesque walk are penguin trademarks.

Adélies resemble nothing so much as boisterous children. They joy-ride on cakes of ice, play games, and march like toy soldiers. They push one another into the sea and dive gleefully after. When ships pass close, they squawk defiantly or gawk upward like tourists inspecting a skyscraper.

His astonishing ability to withstand the deep-freeze makes the emperor undisputed ruler of the Antarctic Continent. Except for an occasional exploration party, in winter the emperors have the continent's six million square miles of ice almost entirely to themselves, though they live only on its fringes. This makes them rulers of one of the earth's biggest, highest parcels of real estate (average altitude 6,000 feet), overseers of an active volcano, and lords and ladies of a kingdom almost as large as the United States and Europe combined.

Five Men No Match for Irate Bird

The strength and pugnacity of emperors are legendary among explorers and whalers. Five men from a whaling ship once tried to overcome an emperor without harming it. Seizing the bird, they attempted to pin it down on the ice, but were quickly scattered to all points of the compass by this feathered threshing machine.

At last they secured two leather belts around the bird's body, and stood back, taking a deep breath of relief. So did the emperor, bursting both belts!

The giant finally was subdued and hoisted aboard the whaler, where it promptly knocked out the ship's dog with one blow of a flipper. This rugged individual weighed 74 pounds.

Except when molested, however, the emperor is a true southern gentleman. Should two groups of emperors chance to meet, their leaders solemnly bow to one another, then lower their beaks onto their breasts and begin a long discourse. To terminate the audience, they raise their heads and describe great circles with their beaks.

Alan Villiers tells of the reception given a party of whalers by emperor penguins who were gathered on the shore when the men landed.

* See, in the National Geographic Magazine, "Our Navy Explores Antarctica," October, 1947; "Exploring the Ice Age in Antarctica," October, 1935; and "Conquest of Antarctica by Air," August, 1930, all by Rear Admiral Richard E. Byrd.

The Clowns: Adélies Frolic with Members of Scott's 1911 Expedition

Excessively curious and fearless, Adélies take keen interest in their occasional visitors. One expedition discovered that the tooting of a cornet would bring lines of penguins waddling aboard ship like the Pied Piper's rats. During incubation Adélies eat nothing but snow.

The Dignitaries: Sage Macaroni Penguins Hold a Council of State

Named for his bushy golden eyebrows, the macaroni penguin (*Eudyptes chrysolophus*) shows an ill temper like that of his cousin the rockhopper (page 422). He has a goatish smell and a harsh, braying voice. A transparent extra eyelid helps him see underwater.

American Museum of Natural History

425 © Herbert G. Ponting

A Marauding Skua Gull Grabs an Adélie Egg; Penguin Hens Scream in Protest

No bird goes farther south than the swift and powerful skua gull *(Catharacta skua maccormicki)*. Scott reported seeing it within 185 miles of the South Pole, far from any food supply. This flesh-eating scavenger preys constantly on penguin rookeries. Known as the thief bird, it steals uncovered eggs and pounces on wandering chicks (page 426). Adélies strangely tolerate skua nests within a few yards of their own.

"As soon as they were ashore," he writes, "the penguins approached in procession to a respectful distance, and stood still, while one very fat big one, leaving the others, strode out with a most dignified air, which would have been comical had it not been so sincere, and came forward a few paces to the party. Arrived in front of the men he stopped and bowed his head low until his beak rested in the down of his white waistcoat. He remained like this for about half a minute . . . and then he drew up his head and commenced to address the men with a painfully long guttural speech. He muttered and talked away for fully five minutes, and then, the speech apparently ended, he looked up into the solemn face of Captain Gjertsen . . . to see if he understood." *

Some Penguins Live near Equator

In contrast to the emperor, the Galápagos penguin lives practically on the Equator, in flagrant violation of the time-honored misconception which avows that penguins can live only in ice water.

The Galápagos pays for this whimsy by being captured frequently. He shares that misfortune with the Humboldt penguins of Chile and Peru, and the jackass of South Africa; these three species are the ones most commonly seen in zoos throughout the world. The Humboldt and jackass also are famed as producers of guano.

But these warm-water sissies are dull company indeed when compared with their cold-water cousins, the Adélies. Here is the beloved penguin of legendary fame, the royal jester of Antarctica, the chap who out-Chaplins Charlie Chaplin (pages 406-7, 423, and opposite).

Adélies are born clowns. Like children, they play together such games as king-of-the-mountain, one scaling a snow hill to reign until another pushes him from his throne. They will pop up from the depths to plop into a rowboat in a shower of salt water, or stand soberly like sidewalk superintendents to watch a man dig a hole.

Adélies appear to live for the sheer pleasure of living—a habit pattern in which they do not resemble man. Emulating the ancient Romans, who sometimes regurgitated their food at feasts so as to be able to eat meal after meal at one sitting, this penguin will fill his tiny belly with crustacea, disgorge his dinner, and start over again.

* This and the quotation on page 426 are from *Whaling in the Frozen South*, by Alan J. Villiers, copyright 1925, 1931. Used by special permission of the publishers, The Bobbs-Merrill Company, Inc.

Breeding on the more or less snow-free headlands of the continent, the Adélies live a socialistic life. Nationalizing production and distribution, they hatch each other's eggs, care for one another's chicks, and share the job of feeding the young. Many other species do likewise.

The cocky and arrogant Adélie has three dangerous enemies: the sea leopard, or leopard seal, the killer whale, and the skua gull, which steals its eggs and attacks its young. Because men and dogs are relative strangers to his domain, it apparently does not occur to the Adélie to fear them.

Rear Admiral Richard E. Byrd reports seeing one of these tiny rowdies attacking a team of nine dogs. The explorer plucked the little bird from the jaws of death with only seconds to spare, but the Adélie showed no gratitude. When the admiral had set him free at a safe distance, the penguin strutted off grandly, as much as to say, "I certainly showed those stupid dogs a thing or two!"

Leopard Seal a Deadly Danger

But the Adélie respects and fears the leopard seal, a voracious hunter which lurks under the ice shelves in wait for careless penguins. Some of these great predators attain a length of 14 feet. In a sudden burst of speed, the leopard seal seizes its prey in the depths, where the hapless one has dived for food.

Before eating its catch, the seal sometimes brings the captured bird to the surface and tears it out of its skin by violent, terrierlike shaking. As skin and feathers float off before the wind, the tragic little carcass is gulped down in one mouthful.

One explorer, dissecting a leopard seal, found the remains of four king penguins—a 140-pound meal! Another specimen contained the bodies of 18 birds. To avoid this horrible end, Adélies will shove one another off an ice shelf, hoping the unfortunate one will serve as a trial balloon. If nothing happens, the whole gang follows him.

Leap for Life from Killer Whales

Feared by all penguins, too, is the voracious killer whale, which cruises in the sea near the edge of the Ice Barrier, ever on the alert to gulp down victims which might jump or fall into the water.

Groups of these whales also will chase flocks of penguins beneath the surface in an effort to seize and devour them. When pursued by the killers, the penguins often achieve safety by leaping out of the water onto the ice.

The male killer whale reaches a length of 30 feet and has about a dozen pairs of teeth three inches long in each jaw. Its body is slender with a pointed head. It preys on all sea life and has even been known to attack men on the edge of the ice. The killer sometimes will thrust its horrible head, with grinning rows of teeth, up out of the water to get a better look at the prey which it is trying to seize.*

The South Polar skua gull, which has one of the most southerly ranges of any bird in the world, is the penguin's other great enemy. This flesh-eating scavenger plays the ogre in penguin colonies, specializing in kidnapping babies and devouring eggs (page 425).

Toward man the Adélie is contemptuous. One of these cocky little comedians was seen on an iceberg savagely scolding a 17,000-ton ship making its way gingerly through the ice.

Alan Villiers also recounts a whaler's tale of observing two Adélies perched on a dead whale, squabbling violently because one had stepped on the other's feet:

"The two stood closely together, while the angered one poured forth his wrath in an excited voice, holding his flippers straight down by his sides as if ready to bring them into action. The abused penguin stood for a time with his nose high in the air, a most bored look in his eyes, a flipper raised across his body. Then he joined in the abuse, and both carried on together for about a quarter of an hour, when, apparently becoming tired, they stalked haughtily to different ends of the whale on which they stood, and promptly went to sleep."

Brooding Parent Sometimes Snowed In

During spring and summer months, when these penguins are nesting, blizzards often cover their rookeries completely. Being a good parent, the Adélie stays with its eggs and permits itself to be buried in the snow. Many perish, while others live for weeks with only their heads protruding (page 428).

But the parent who gets snowbound is in luck, for egg sitting is much desired among Adélies. The unfortunate mate who missed the blizzard is literally left out in the cold, with nothing to do but walk around on top of the snow crust, stooping occasionally to berate the baby sitter which is up to his or her neck in his or her work.

Baffling Penguin Puzzles Remain

Bird experts long have regarded the penguin as one of Nature's most remarkable inventions, and certainly as one of her most mysterious.

Did the penguin ever fly? Are its present-day flippers merely vestigial wings, remnants of members once used for aerial locomotion?

Some ornithologists think that the penguin

* See "Whales, Giants of the Sea," by Remington Kellogg, National Geographic Magazine, January, 1940.

King Penguin, a Winged Submarine, Surfaces for a Quick Breather

Enemies find it hard to spot the swimming penguin. Seen from above, his black top blends with ocean's depths; from below, his white breast melts into the sky. A thick layer of blubber protects him from cold. Steering with tail feathers and feet and swimming with powerful flippers, he torpedoes through the water at 30 feet a second. Cameras seldom catch his swift flash; this rare picture was taken in a Berlin zoo.

might have been a flying bird when what is now the Antarctic region was a temperate, forested land.

Then, with the advent of the ice, the area changed to desolate waste. But the penguin stayed on to become supreme ruler. As need to fly lessened, his wings degenerated until he became flightless.

Others contend that the wing is not a degenerate member and that the penguin never did possess the power of flight.

Another theory holds that the bird took to flying through water as well as the air, finally abandoning the air entirely in favor of flight under water.

Many scientists hold that the penguin is one of the most primitive of all birds.

In an effort to throw further light on the question, three members of Scott's last expedition to the Antarctic undertook what one of them called "the worst journey in the world." Dr. E. A. Wilson, official zoologist for the expedition, believed that a study of the eggs of the emperor would establish links with the past.

Fighting almost superhuman odds, Wilson and two companions battled blizzards, mountainous ridges of pressure ice, crevasses, and temperatures as low as —77° F., many times facing death in their six-week, 100-mile trip on foot across Ross Island, from Cape Evans to the Cape Crozier rookery and back.

Precious Eggs Broken in Retreat

There, in the shadows of Mount Terror, they snatched five eggs and fled to avoid certain death in the face of an approaching blizzard. Two of the eggs were broken as they made their perilous way back to their flimsy tent.

Months later the precious specimens were delivered to a scientist in England for analysis. But his study did not solve the puzzle of the penguin's evolutionary history. Even today the question is not settled to ornithologists' satisfaction.

428 © Herbert G. Ponting

A Nesting Adélie Warms Her Eggs in a Snowbank

Adélies, which love to sit on eggs, show no dismay at being snowed in while brooding. Refusing to leave their nests for shelter, they stay for days if necessary. Fresh air comes to them through holes melted in the snow by their breath. At storm's end hundreds of beady eyes peer through the passages. When the mother finally breaks through, her feathers are stained with mire. Then father takes over while she takes a bath.

Other penguin mysteries remain unsolved. No one yet has figured out why penguins perform marvelous swimming exhibitions, single file, like well-trained bathing beauties in an aquacade.

At certain seasons of the year, too, the Adélies congregate by thousands on the edge of the sea ice to drill like soldiers. First they form small bands, like military squads; then these units fuse into regiments, and the drilling begins.

For hours the entire army maneuvers, turning about-face in unison, marking time with webbed feet, or marching in single or double file.

Some scientists suggest that this unexplained habit may stem from a vestigial urge born of the days when penguins could fly. Then, like geese, they may have flown in military order.

This most fascinating of all penguin puzzles may never be solved. Possibly if the little people knew more about humans, they might wonder why soldiers act like penguins!

INDEX FOR JANUARY–JUNE, 1952, VOLUME READY

Index for Volume CI (January–June, 1952) of the NATIONAL GEOGRAPHIC MAGAZINE will be mailed upon request to members who bind their copies as works of reference.

Far East's Turmoil Shakes the Globe

National Geographic Society's New Map Reflects Events That Change This Ancient Land and Bring It Nearer the West

YOUR new 10-color supplement Map of the Far East is a backdrop for today's news. It shows places and names that are mentioned almost daily in your own newspaper. In these lands on the other side of the globe, American history is being written as surely as it was at Plymouth Rock or Bunker Hill.*

In the large Korea inset, on the right side of the map, there are names with a noticeably American ring. "Punch Bowl," "Heartbreak Ridge," and "Iron Triangle" are names given by American soldiers to places where they fought and died.

Off Korea's southern shore lies Koje Island (Koje Do), 150 square miles of green hills and pleasant bays. Until the Korean war, Koje was occupied chiefly by peasant farmers, who raised rice and lived peacefully in mud-walled mushroom-shaped huts.

Koje was chosen as the site of a United Nations camp for war prisoners: in the spring of 1952 it suddenly sprang to world prominence when the prisoners revolted and kidnapped an American general.

In June, 1952, more than 500 American Air Force, Navy, and Marine planes bombed North Korean hydroelectric plants along the Yalu and Songchon Rivers and at the Changjin Reservoir. This raid, mounted from South Korean bases and from four U. S. aircraft carriers, was the biggest mass air bombing since World War II. Its most important target was the Suiho Reservoir plant, which lies only 1,000 yards from the Manchurian border and provides electric power for North Korean and Manchurian bases.

A tiny village of thatched houses in west-central Korea bears the name Panmunjom, which has been translated variously as "Gateway of the Rafts" and "Inn with the Wooden Door." Whatever its English meaning, Panmunjom, as scene of Korean truce parleys, has become almost as familiar to Americans as Appomattox or Versailles.

"Far" East Is Near to U. S. Soldiers

A red stripe across the map of Korea from Panmunjom to Pooejin-ni marks the battle line of UN and Communist troops as the truce talks dragged on. And many an American soldier who spent long months in those bleak and bloody hills will tell you that the distance from the West to the "Far" East was really no farther than he could shoot a rifle.

The Red soldier on the other side of the battle line may be a Chinese "volunteer." His country, and some 450 million of his countrymen, came under the rule of a Communist dictatorship in 1949-50. On the map a star at Peiping, in northeast China, marks the new Red capital.

Conquerors are nothing new to Peiping. As early as the 12th century B.C., when it was the frontier capital of the feudal state of Yen, it was a prize for Tatar invaders. The Great Wall of China, built later to hold back the invaders, passes only 35 miles away. The wall failed in its mission, however, and when Marco Polo reached the city some 23 centuries later, he found it occupied by a Mongol conqueror, Kublai Khan.

City of the Great Khan

Kublai rebuilt the city on a magnificent scale and modestly named it Khanbaligh—"City of the Great Khan." So awed was Marco Polo by the Khan's vast gold and silver palace that he wrote: "No man on earth could design anything superior to it."

Another group of conquerors, the Manchus, settled in Peiping (then called Peking—"Northern Capital") in 1644. For the next 250 years this comparative handful of "foreigners" ruled over millions of Chinese. The Manchus, in turn, were overthrown by Chinese Nationalists in 1911-12.

Today Peiping's streets resound to marching feet of Red troops and parading Communist Youth groups. Its purple-walled "Forbidden City," which housed China's mightiest emperors, is now a park and museum festooned with Communist propaganda posters. The new foreign invaders shuttle by plane between Peiping and Moscow and speak Russian.

A star at Taipei, on the island of Formosa, indicates the present headquarters of the Chinese Republic. More than 8,000,000 people are now crowded on this small island. Two million of these are recent immigrants, chiefly political refugees and Nationalist Chinese soldiers.

A dotted red line in the Pacific Ocean east of Formosa encloses the Ryukyu Islands, placed under United States administration by the Japanese peace treaty of 1951.

* Copies of the new Map of the Far East are distributed as a supplement to the September, 1952, issue of the NATIONAL GEOGRAPHIC MAGAZINE. Members may obtain additional copies of this map (and of all standard maps published by The Society) by writing to the National Geographic Society, Washington 6, D. C. Prices in United States and elsewhere, 50¢ each on paper; $1 on fabric; Index, 25¢. All remittances payable in U. S. funds. Postpaid.

The largest of these, Okinawa, was the scene of bitter fighting in World War II. The United States is now spending millions of dollars to convert it into a permanent and powerful air and navy base—a "Pearl Harbor" only 400 miles from Asia.

To the north, Japan now governs itself again under a new constitution, and Allied occupation officers have moved out of the luxurious Imperial Hotel in Tokyo.

The new treaty still permits stationing of U. S. forces in Japan, however, and American air or naval installations are maintained at Fukuoka, on Kyushu Island, and at Osaka, Nagoya, Tokyo, Yokohama, Yokosuka, and Misawa, on the main island of Honshu.

Railroads Grow in China

The shift of China from a free to a Communist nation has lowered the Iron Curtain on all the mainland area on the Far East map north of India, Burma, Thailand, and Indochina. As always, information from behind the curtain is scarce and unreliable. Nonetheless, certain recent activities in China and in the USSR can be shown on the map. Most notable is railroad building.

Starting at Canton, near the center of China's southern coast, a solid black line marks the great Chinese trunk line leading north to Peiping and beyond. For years this was probably the world's most disrupted railroad. Chinese Communists, Chinese Nationalists, and Japanese troops all took turns tearing it up, each trying to prevent the other two from using it. Now, with the Japanese gone and the Nationalists in exile, the Red Chinese have rebuilt it.

Another solid line on the map, 320 miles west of Canton, has been called a dagger pointed at the heart of Indochina. This railroad, completed hastily in 1951, after the start of the Korean war, connects the Chinese trunk line with Yungning (Nanning), and the Indochina border close to the "powder keg" area where Communist guerrillas are battling French and Indochinese troops.

Still farther west, running generally north and south from Chungking, alternating dashed and solid lines show stages in another Communist project, the western Chinese trunk line.

Much of the information that does leak out of Communist Asia filters through the British colony of Hong Kong, a partly open spigot on the bottom of China. Most of Hong Kong proper stands on an island only 32 miles square, though there is an "overflow" area of leased land on the Kowloon Peninsula.

Into Hong Kong in recent years have flowed hundreds of thousands of refugees from the north. To support this vast population, largely unemployed, the colony must depend almost entirely on trade between China and the outside world. But this trade, in 1951, fell off sharply. Not only did the Communist Chinese government cut down on purchases, but the UN strangled sales by placing an embargo on shipment of strategic war goods to China. As a result, some of the big business houses recently have been closing their offices.

Although the mainland areas shown in the northern half of the new Far East map—China, Tibet, Mongolia, Manchuria—have fallen under Communist sway, the island and peninsular countries to the south have taken important strides toward political freedom. Burma, Indochina, Indonesia, and the Philippines have all graduated from colonial or dependent status since World War II.

The young Indonesian Republic is a watery nation scattered across the bottom of the map on more than 3,000 islands. Here, as in much of the Far East, hunger and overpopulation are problems for the new government. Indonesia includes nearly 80,000,000 people. According to President Ahmed Sukarno, the country's annual rice production—its principal food source—runs about a million tons a year short of a subsistence diet.

Yet Indonesia's outlook is basically optimistic; it is rich in sugar, spices, copra, tin, oil, coal, and rubber. Despite great progress in the production of synthetic rubber, natural rubber is indispensable in the modern world. In the lower left-hand corner of the map lies the area where most of the world's natural rubber is grown and collected a cup at a time.

The Ancient East Still Glitters

Present unrest and man's unceasing struggle for food cannot wholly obscure the Far East's ancient glories. Magnificent relics dot the area from Borobudur and Angkor to Peiping and Nikko's temples, shaded by tall cryptomeria trees. Rangoon, Bangkok, and Phnom Penh thrust their gilded spires toward heaven. Across half the map, the Great Wall of China takes the hills with giant strides.

Taoism, Confucianism, Buddhism, Islam, Hinduism, Shintoism, and Christianity have elevated their tablets, carved calm Buddhas, raised their minarets, gopuras, torii, and steeples in teeming city and on lonely hill. The Far East, land of trader and moneychanger, is also a land of prayer.

This strange, confusing area on the far side of the earth is a section of our world, a battlefield of our sons, a factor in our destiny. The Marco Polo wonders have become a part of our heritage. The Far East is as close as our radio, our letters from the war front, our deepest hopes for a free and peaceful world.

NATIONAL GEOGRAPHIC SOCIETY

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON 6, D. C.

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded sixty-four years ago, the National Geographic Society publishes The National Geographic Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for three hundred years.

In Mexico The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola a ton of scientific instruments and obtained results of extraordinary value.

A notable undertaking in the history of astronomy was launched in 1949 by The Society in cooperation with the Palomar Observatory of the California Institute of Technology. This project will require four years to photomap the vast reaches of space, and will provide the first sky atlas for observatories all over the world.

In 1948 The Society sent seven expeditions to study the sun's eclipse on a 5,320-mile arc from Burma to the Aleutians.

The National Geographic Society and the Royal Ontario Museum in 1951 explored and measured newly found Chubb's meteor crater, 11,500 feet in diameter, in northern Quebec.

The Society granted $25,000, and in addition $75,000 was contributed by individual members, to help preserve for the American people the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.

EXECUTIVE STAFF OF NATIONAL GEOGRAPHIC MAGAZINE

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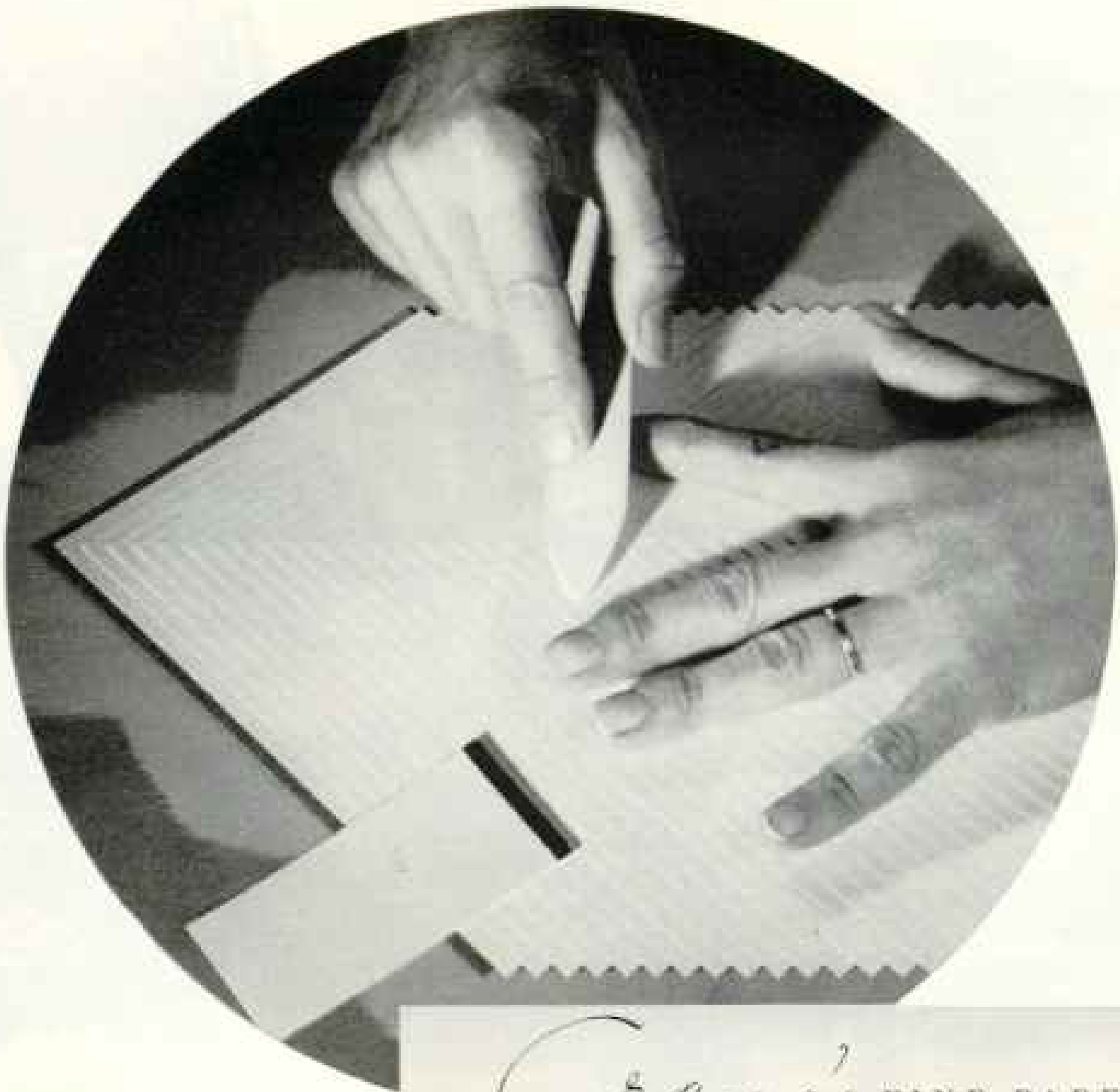

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BEAUTY AND SPACE. Wide seats, and ample head room in this De Soto. Extra space inside, no extra bulk outside.

WHAT'S THE BEAUTY SECRET OF CHRYSLER-BUILT CARS?

A car need not be four wheels, a body and an engine lumped into any shape that designers please. It can be a graceful mechanism, the form of which is chiefly determined by function.

This is the practical principle that underlies the building of every Plymouth, Dodge, De Soto and Chrysler.

A plain example is the beautiful flowing lines of the roof on a Chrysler-built car. Chrysler engineers and designers consider the passengers' needs—the space for sitting, the depth of seats, the clearance between head and roof. All this is function. The graceful outer form then follows.

This approach to design produces cars which are rightly proportioned, handsome, and eminently suited to your purposes.

BEAUTY AND VISIBILITY. Note how much glass area this Chrysler has all around. Visibility blends with beauty, too.

BEAUTY AND COMFORT. Seats in this Dodge, as in all Chrysler-built cars, are chair height. And the whole interior is harmoniously and fashionably designed.

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TIPS ON TRAVEL

by BRADLEY WESTON
World Traveler, Author and Travel Columnist

YOU CAN SAIL INTO CENTRAL EUROPE (WELL, NEARLY) ON THE SOUTHERN ROUTE OPENED BY HERCULES

A number of moons ago, long before cigarette packages danced on a screen in the living room and beans came cut and washed and frozen like an ice block, a mountain range ran from Gibraltar across to the tip of North Africa, sealing off the seas. A local strong man, name of Hercules, according to usually informed sources, wrenched the mountains apart, permitting the Mediterranean to swish around with the Atlantic.

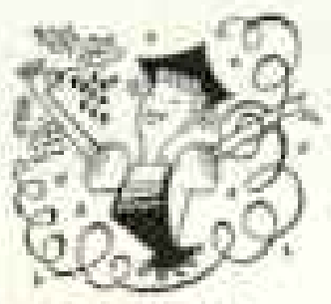
Hence the chunks of real estate north and south of the straits are called the Pillars of Hercules today, and through them pass a number of decorous steamboats on their way to deposit a number of the frivolous and the studious on the southern shore of Europe.

Counts and Kansans

The southern shore of the Continent is a handy place to debark for anyone looking to loll about in Southern France—or for anyone bound for Italy, Switzerland, Austria and the tourist belt of Germany.

Stepping ashore at Genoa, one can zip up through Milan and have cocktails on the grand terrace of the Villa d'Este by the very edge of Lake Como. Counts and Kansans mix in equal quantities, and the better-dressed titles wouldn't be caught dead without a cigarette holder half a foot long.

Along the Riva Vela



Over on the neighboring lake, the Swiss pleasure town of Lugano has a ring of hotels surrounding the water. Danes and Zurichers, Florentines and Londoners walk under the shade of the chestnut leaves on the Riva Vela, and in the late afternoon everyone gathers at the café tables set up in the Piazza Rezzonico to spoil dinner appetites with irresistible pastries and a pot of tea.

North to Bavaria

Or, debarking at Genoa, you can step north through St. Moritz and the Brenner Pass to the Austrian town of Innsbruck, a Gothic settlement by the banks of the Inn, looking down into the valleys of Tyrol. Eighty-five miles farther and you're in Munich, the capital of Bavaria.

In Bavaria, men wear black felt hats with bright green bands or sometimes fuzzy numbers with great brush dusters. Chances are you'll also see them in *lederhosen*, which are short leather pants worn with leather braces and long white stockings. Near at hand are Oberammergau and Garmisch-Partenkirchen and Egern-on-the-Tegern See, not to mention huge *wursts* and steaming, succulent mountains of sauerkraut.

Hercules and the Sun-Liners

The Sun-Liners Independence and Constitution that ply the Mediterranean also call at the port of Cannes on the French Riviera. From there, play your way left to the Golf Hotel at St. Raphael or right, through Nice, to Monte Carlo.

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See your Travel Agent

If you're bound for the heart of Europe, you can eat, sleep, swim and dance your way to the nearby ports on one of these air conditioned Sun-Liners that sail the gentle Sun-Lane to Europe. They're mighty popular ships, so it's a good idea to make your reservations well in advance. Talk it over with your Travel Agent today.

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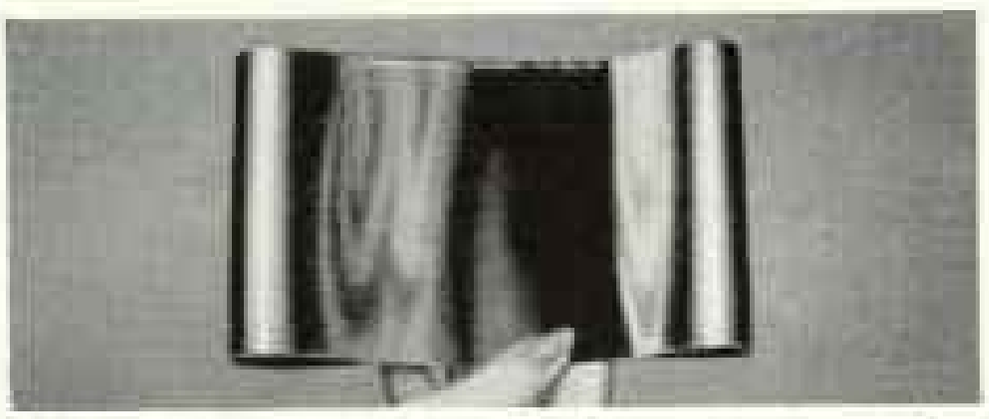

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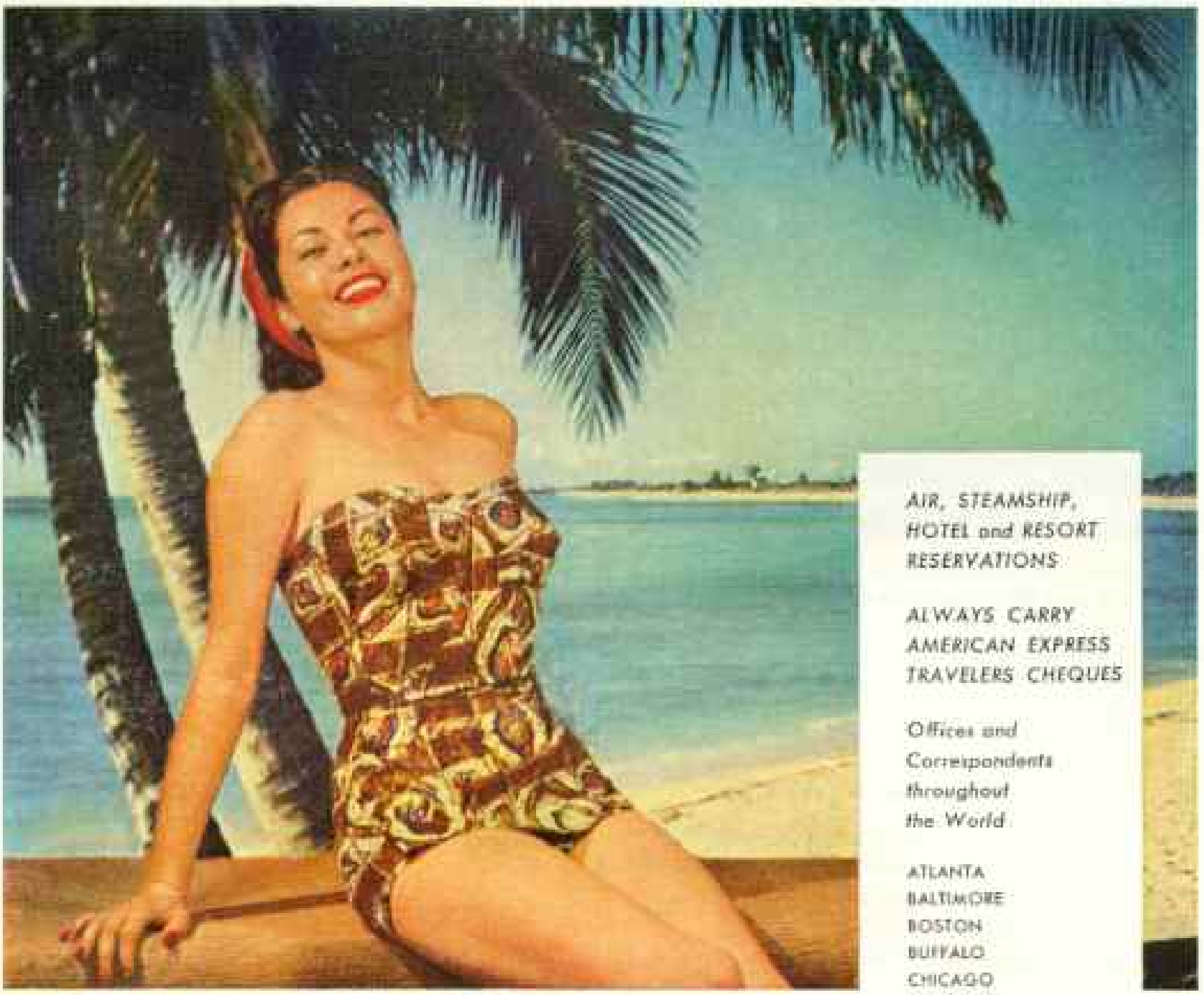

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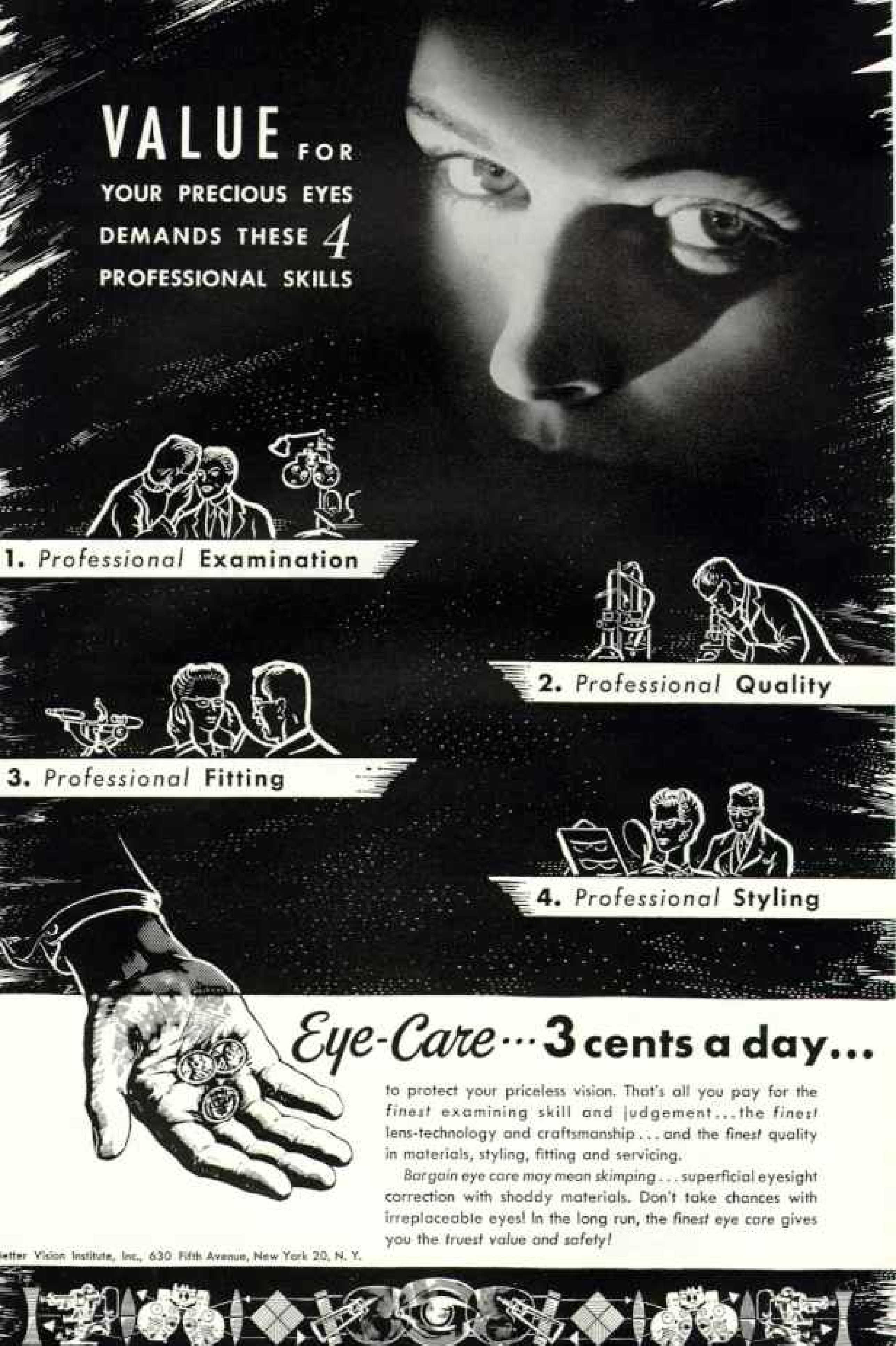

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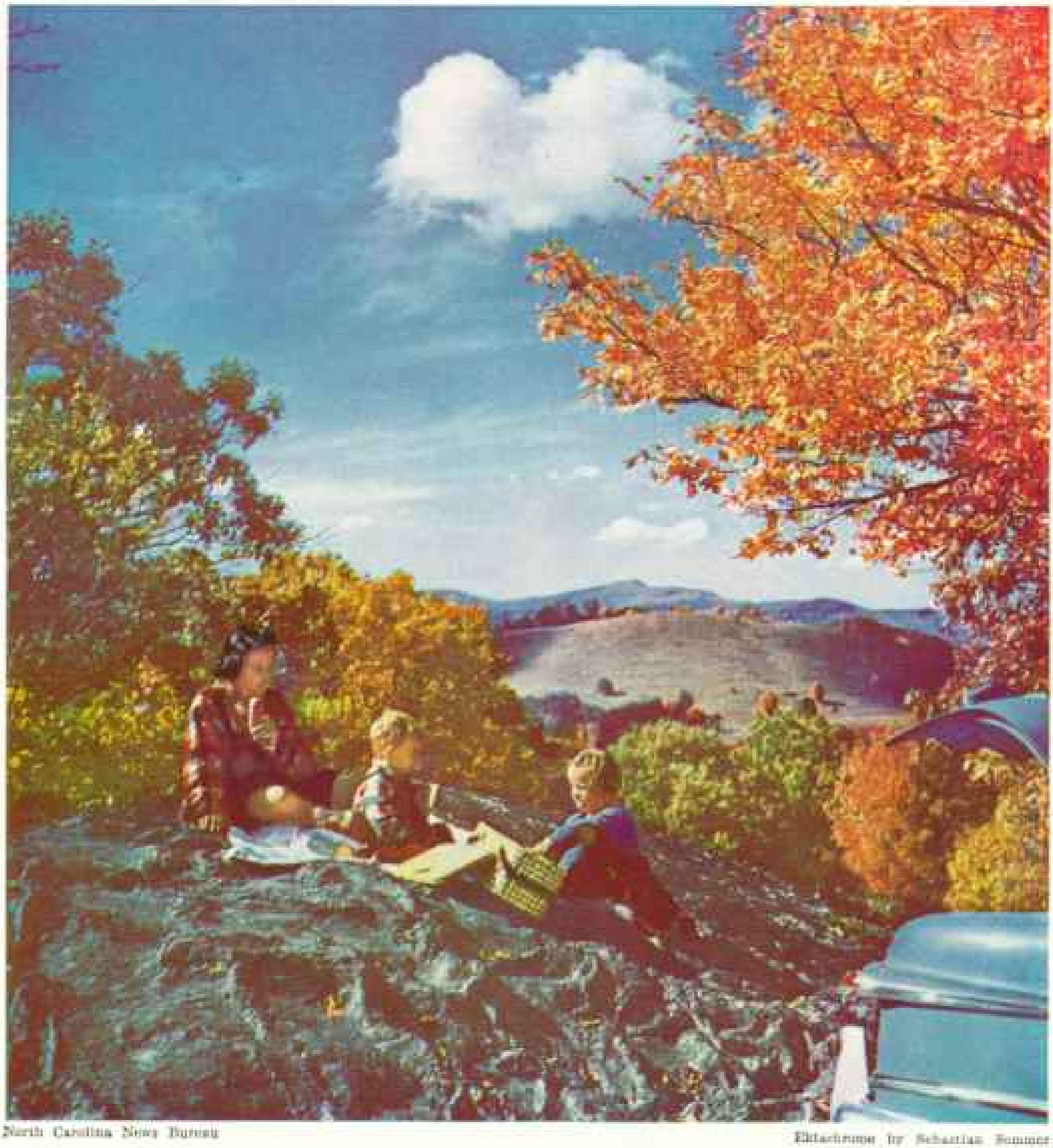

North Carolina News Bureau

Illustration by Sebastian Sommer

Autumn Color is Gorgeous in North Carolina's Variety Vacationland Where the Blue Ridge Parkway Soars Over a Mile High and through 8 Skyline Tunnels to join the Great Smoky Mountains National Park.

Every year more people motor to the Great Smokies and Blue Ridge Mountains of North Carolina for the autumn color parade.

Beginning in September and reaching its peak in October, the autumn foliage show in North Carolina attains spectacular quality in wide variety. Within a few miles motorists may witness it both in advanced stages atop the highest mountains of Eastern America and in contrasting hues at relatively low altitudes along highways in picturesque gorges such as Nantahala, Cullasaja, and Hickory Nut.

In 1951 more than 10,000,000 people visited North Carolina's State and National Parks and Forests, including the Great Smoky Mountains National Park, which topped all National Parks in attendance. Many visitors cross the 503 mile long state to its Atlantic coast for salt water fishing which also reaches its peak in autumn.

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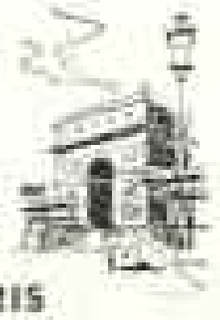

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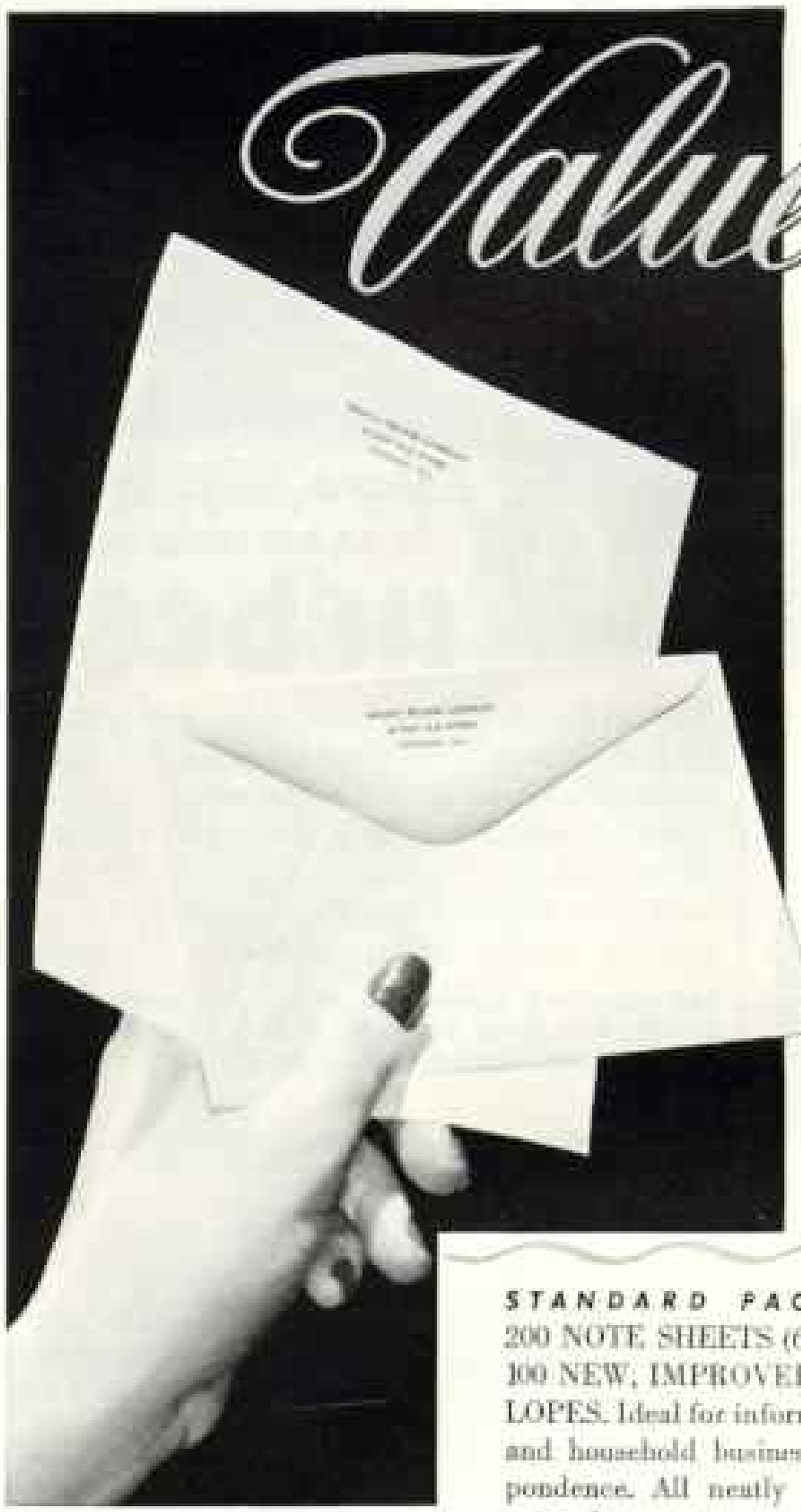

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Each of these can cause an allergy

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In addition, millions of other people in our country have asthma, sneezing spells, digestive upsets, or skin rashes because they are allergic to a wide variety of seemingly harmless things.

Allergy is a *sensitivity* to certain substances which cause no trouble for most people. While allergies are seldom, if ever, fatal, they can cause great discomfort. Moreover, if allowed to go untreated, they may undermine good health. This is particularly true of asthma.

Medical science has developed increasingly effective ways to control allergies. For example, inoculations against "hay fever" help many people to avoid this seasonal ailment entirely, or make it much milder.

Treatments for this condition are most beneficial, however, when taken well in advance of the pollen season. In fact, at least 85 percent of the patients are relieved through early treatment, but only 40 percent are helped when inoculations are delayed.

Relief from allergies due to obscure causes generally requires much "detective work." This is why the doctor asks detailed questions about when, where, and under what circumstances the condition occurs. Such questions give him clues to the identity of the offending substances. They also help him to determine if other factors—such as emotional upsets—may be involved.

Once he has found what causes the allergic reaction—through the history of the case supplemented by diagnostic skin tests—appropriate treatment can be started.

This may be simple. If, for instance, a patient's sensitivity is caused by feathers, relief may be had by substituting a pillow made of rubber or other materials. Sometimes, however, treatment may be prolonged, especially if an allergy is caused by a sensitivity to many different things.

There is no "sure cure" for any type of allergy, but prompt and proper treatment may lead to its control. So, if you are bothered by an allergic condition, even a minor one, consult your doctor. He, or a recommended specialist, may help you avoid further reactions through treatment that effectively relieves three out of four cases.

How many mousefish can you find?

In the place where he hangs out, among the weeds of the Sargasso Sea, the mousefish, *Histrio histrio*, is really hard to see.

For the mousefish (there are four of them in this picture) looks like a seaweed, even to the white dots on his frond-fringed body that seem to be worm holes. As a result, bonitos looking for a fish dinner, are likely to pass Histrio by as another bit of floating vegetation, not palatable at all.

Clever as the camouflage of the mousefish is, we'd like to mention that man has improved vastly on Histrio and nature in coping with trouble. Not only has man devised ways to fend off trouble, but he has also figured out a way to keep unavoidable mishaps from costing him money.

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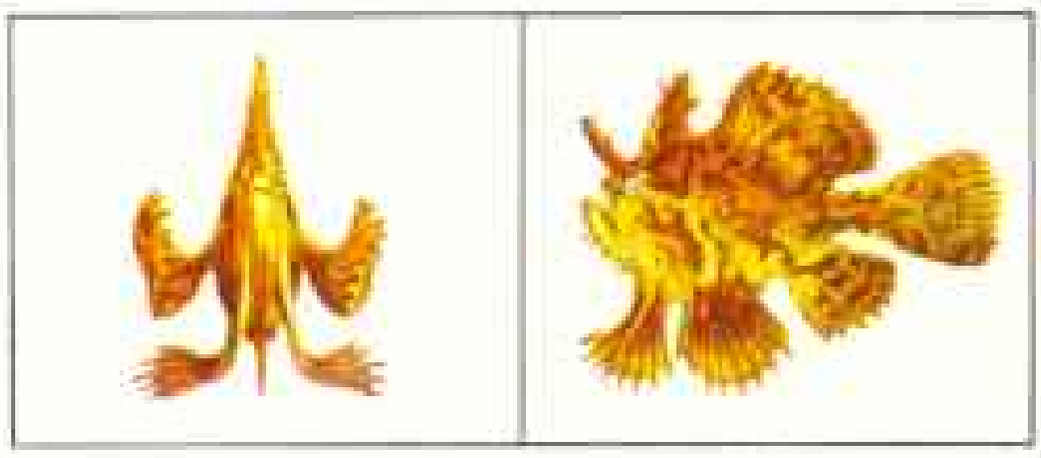

This is what the mousefish looks like. If you can't find four in the picture above you can get help from the diagram on second page following editorial section.

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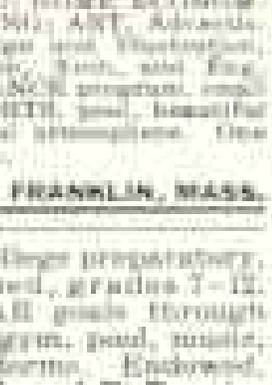

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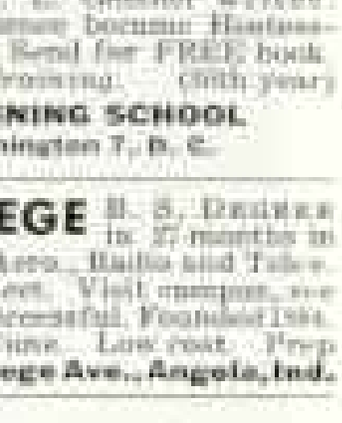

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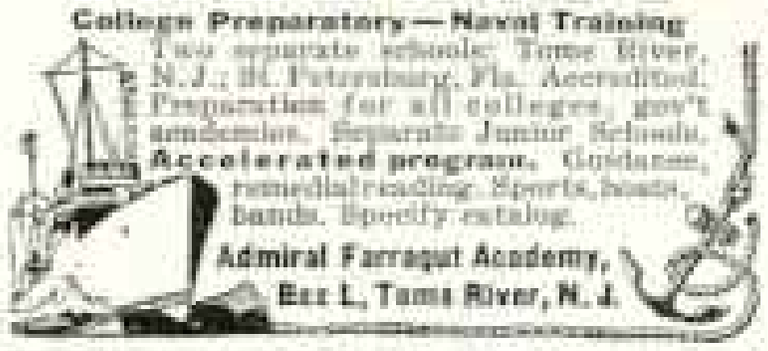

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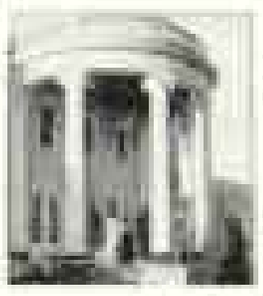

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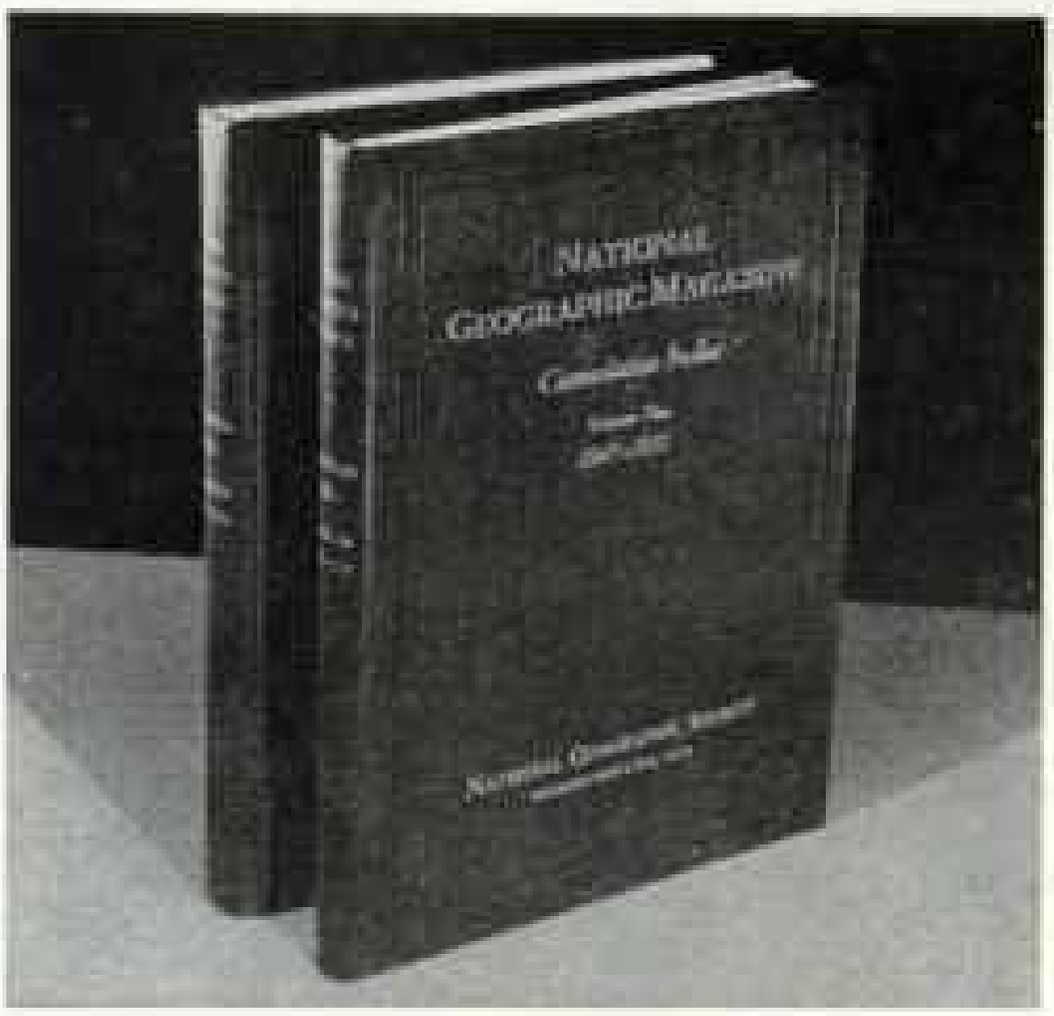

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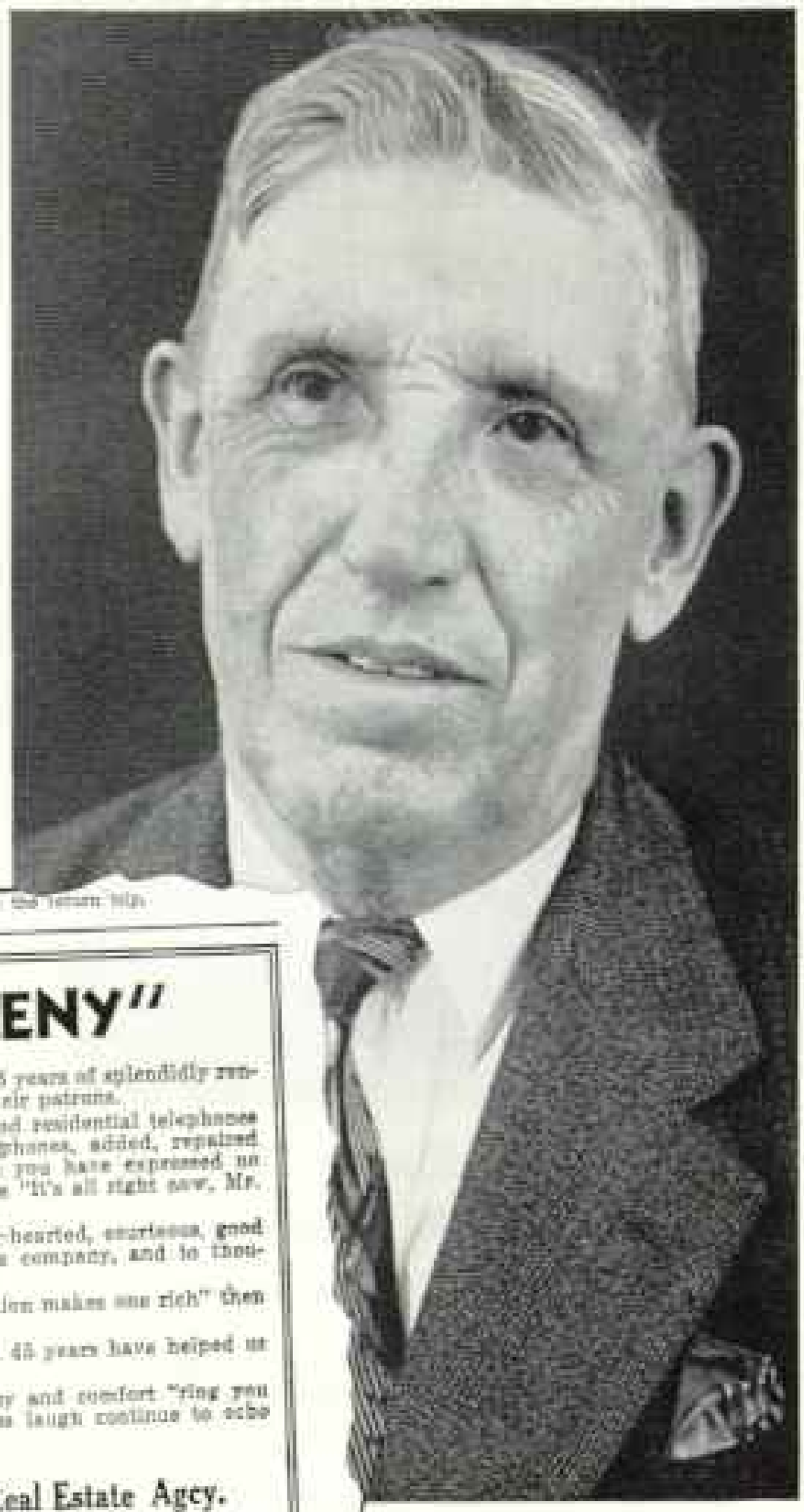

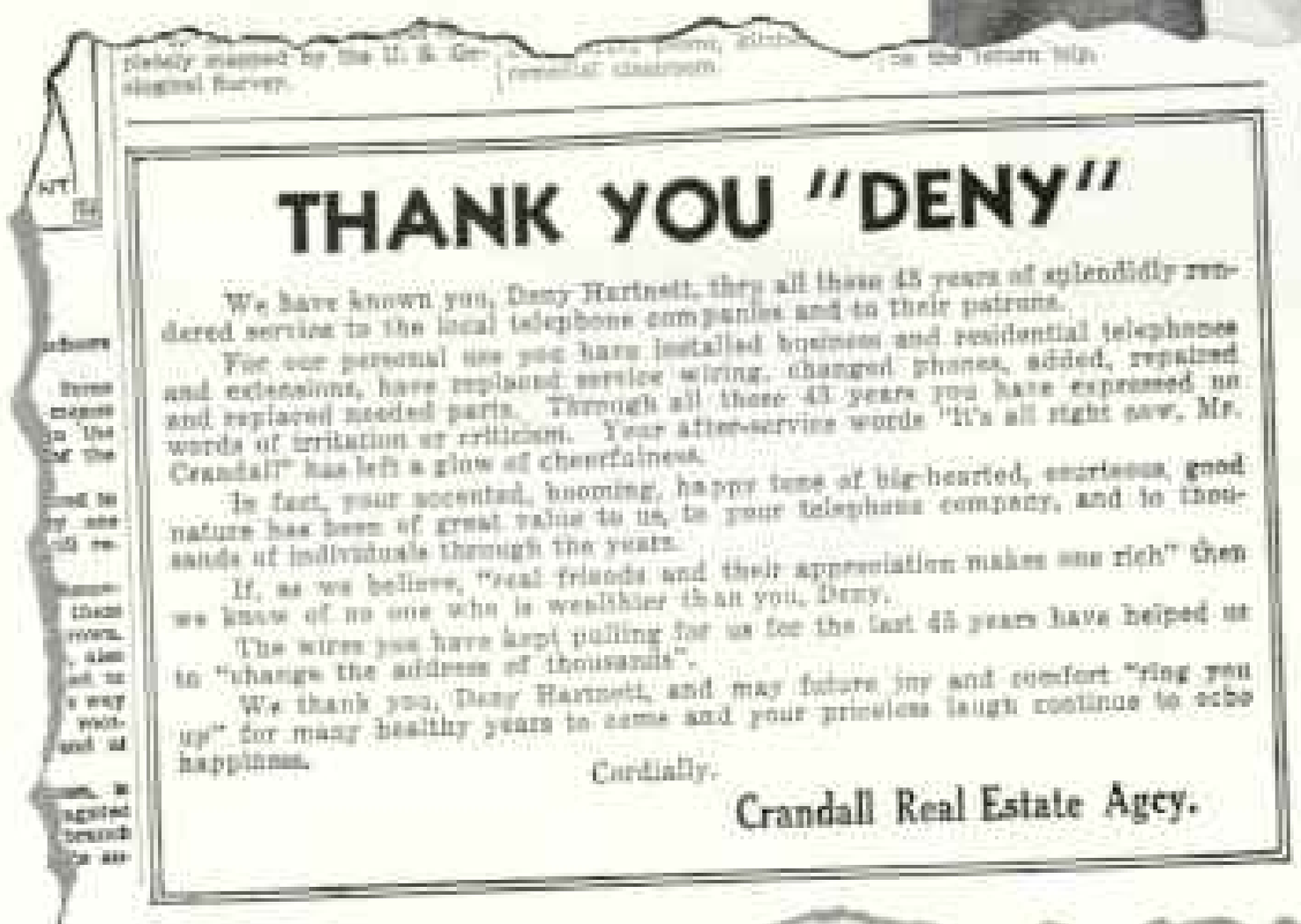

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