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New Guinea's Rare Birds and Stone Age Men

Filming Exotic Birds of Paradise and Living with Primitive Tribes, an Ornithologist Scores Important New "Firsts"

By E. THOMAS GILLIARD

HERE in the cloud forest of New Guinea's central highlands the night had been long and wet, but dawn had nearly come now, and the rain had stopped. The two natives who had slept fitfully on a bed of leaves beside my cot crouched, shivering, over their smudgy fire.

To the tribesmen in a near-by hut I shouted, "Workem ki!" ("Get the food ready!"). Soon a big, jet-skinned mountaineer entered the shack carrying bread, a can of butter, and a pot of steaming coffee.

A few minutes later we took off through the dripping vegetation, feeling our way over a steep, muddy trail cluttered with fallen timber. Through rhododendronlike growth we climbed steadily to 7,500 feet until, just ahead, we made out our well-camouflaged objective—the 50-foot tower of poles and vines we had fastened together the day before. Up its shaky, slippery ladder we clambered, a small fortune in lenses and cameras swinging from our shoulders and necks.

On the Trail of a King

To an onlooker our patrol might well have appeared a sinister operation. But to me it suddenly seemed a little comic. Here I was, half a world away from my home in Manhattan, clinging to a flimsy rung high above a forest no white man is believed ever to have visited. Why? Just to see some birds!

For this I had bought, nine months before, food and equipment for 900 man-days in one of the remotest parts of the globe. For this I had stocked up with—among other things—enough yeast and flour to bake 200 loaves of bread, and half a dozen soccer balls to give to important chiefs. In the National Geographic Society's headquarters at Washington, I had worked day after day striving to master the mysteries of electronic lighting and the complexities of special cameras.

Yes, all this just to see some birds. But what birds! Our quarry was no less than the birds of paradise—especially the most spectacular of them all, the King of Saxony. Only one specimen had ever been taken alive to a zoo, and that one died almost immediately.

No still pictures of this bird of paradise in its native habitat had yet been made. Until our 1950 trip to New Guinea two years before, only one or two white men had witnessed its peculiar, long-fabled dance of courtship.*

The King Woos a Queen

Despite the rarity of paradise birds, we had already seen their plumes by the score. Natives hunt them with the intensity of gold prospectors, and on special occasions wear fantastic arrays of plumes beyond all price. Reserved for chiefs are those of the King of Saxony, whose wooing we now hoped to watch (pages 444–445).

Reaching the top of the tower, I set up tripods, cameras, and sound recorder. Then I aimed a 16-inch telephoto lens at a little spirelike limb that rose in the mist above the crown of a subtropical forest giant.

Presently, in the first rays of sunlight, I heard from afar soft hissing notes which sounded more reptilian than birdlike. My

* See "Strange Courtship of Birds of Paradise," by Dillon Ripley, NATIONAL GEOGRAPHIC MAGAZINE, February, 1950.

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Stone Age Man Meets the 20th Century in New Guinea's Kubor Range

This de Havilland Dragon ferried the author from Lae into the 5,000-foot-high Wahgi Valley. Curiosity almost wrecked the plane when the men, gathered for a dance festival, rushed blindly across the landing field.

Kodachrome by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Spear Bearers, Resplendent in Plumes, Shells, and Paint, Welcome the Author to Kup

Many Kup people, remembering Mr. Gilliard from a previous journey, greeted him as an old friend. Father Michael Bodmar, a pioneer missionary, maintains the air strip; Kup is virtually inaccessible by land.

guide stiffened and pointed. We waited minute after long minute. At last a small bird, hardly larger than a robin, flew to the perch. Dipping and bowing, he began like a drunken devil to wave and toss his weird, exotic plumes.

Were they feathers? We knew they were; yet they strained credulity. Pointed, brilliant, they seemed to spring like horns from the bird's crown, trailing behind him in two fantastic parabolas. Here was the King of Saxony indeed, panoplied like a Teutonic monarch riding to battle with great plumes streaming from his casque of iron.

Through the binocular I saw that the bird's breast was egg-yellow, his plumes sky-blue. He grasped a slender vine and, after a few moments of nervous gawking, began to bounce up and down, like a diver testing a board. The short black-velvet cape covering his back spread out over his shoulders like the partly opened wings of a beetle.

Gradually the tempo of his bouncing increased. The magnificent plumes swept forward and down like the tines of a huge fork. Uncontrollably excited, the King became a trapeze artist. From his beak issued a series of hissing notes, like steam escaping.

I scanned the perch for the female bird who must be there. I could not spot her rather drab body, but neither had I been able to see her in 1950, the only other time I had witnessed this dance. Yet on the movie film we brought back it was possible to glimpse her demure entry into the nuptial chamber.

As suddenly as it began, the dance concluded. The King, reaching a climax of ecstasy, leaped upward in a great flutter of wings, then flew off to another of his dance trees, beyond our visual range.

Climax of Centuries-old Search

The scene we had just watched was, in a way, the culmination of a search some four centuries old. The date when the plumes of a bird of paradise first reached Europe is uncertain, but we know that the first definite description of them came from two skins brought back from the Moluccas in 1522 by Magellan's men on their return from the circumnavigation of the globe.*

Few things from the Orient stirred the imagination of Europeans more. The plumes of later specimens were attached to skins from which the feet and legs had been removed, a procedure still followed today by native collectors. Europeans decided that these extraordinary birds had no feet and that they must have been blown to earth from a celestial paradise.

The legend faded, of course, but the name remained: These were the "footless" birds of paradise—species *apoda*. And, because white men over the years continued to rely exclusively upon aborigines to trap or shoot the specimens, the birds remained long among the least-known of all the spectacular forms of animal life inhabiting the world.

To dispel some of the mystery which still clung to these birds, I had led an expedition for the American Museum of Natural History, New York City, into remote ranges of New Guinea in 1950.† We had collected 171 species of birds, among them 19 forms entirely new to science. In addition, we had found the display grounds of bowerbirds and of some of the rarest of the birds of paradise.

How the 1952 Expedition Began

I had wanted, however, to go back again. We had done much, but there was much yet to be discovered, pinned down, recorded on sound track, film, and notebook. Thus I was elated when, at the Explorers Club in New York one evening, a tall, deeply tanned member approached me, introduced himself as Armand Denis, and suggested I organize another expedition to New Guinea.

Quickly we came to an agreement. Denis (producer of many fine films, among them *Dark Rapture* and *Savage Splendor*) would be the leader; I, the general manager. Robert Doyle, an Australian explorer; Robert Carmet, a French photographer; and young Henry Kaltenthaler, a Philadelphia botanist, would accompany us. So would Denis's wife Michaela, and my wife Margaret. Both were veterans of expeditions to Africa, Asia, the Philippines, and South America.

Our mission would be multiple: To film the Stone Age men who inhabit the land of the

* See "Greatest Voyage in the Annals of the Sea," by J. R. Hildebrand, National Geographic Magazine, December, 1932.

† See "New Guinea's Paradise of Birds," by E. Thomas Gilliard, National Geographic Magazine, November, 1951.

© National Geographic Society Kodachrome by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Wrinkled Warrior Bears Plumes of Paradise Like a Blazing Torch in the Sky ➤

New Guinea boasts perhaps the most splendidly arrayed men in all the Pacific. This highland "strongfellow," or subchief, looking older than his 50 years, proudly carries the skin and plumes of an upended Greater Bird of Paradise (pages 437, 438, and 439).

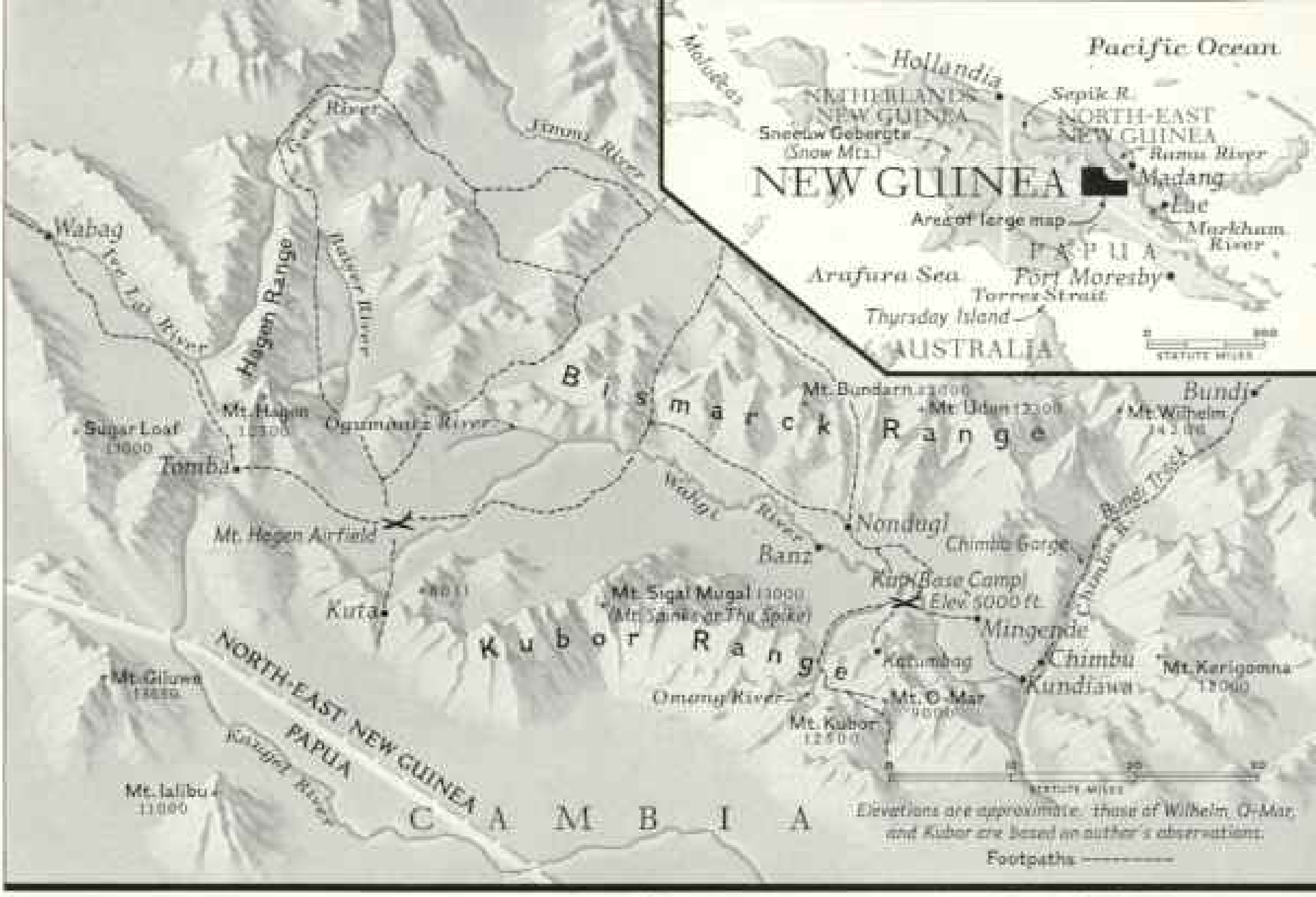
His fur cap comes from the *kapul*, a forest marsupial related to the opossum. Green scarab beetles encased in orchid fiber and cowrie shells sewed to a headband serve as the jewels of his crown. A strand of pigtails around his neck, a bailer shell on his forehead, and sections of mother-of-pearl on neck, chin, and nose complete the ensemble.

Pig grease and charcoal blacken his face in the approved New Guinea manner: the darker, the handsomer. Bow and arrows peep above his shoulder.

426 E. Thomas Gilliard, American Museum-Armand Denis Expedition

Wahgi Valley, Land That Time Forgot, Shelters a Hidden World of Stone Tools

Two decades ago Michael Leahy, a gold prospector, made front pages the world over by discovering this valley with its thousands of Stone Age savages. This vista confronted Mr. Leahy when he topped a mountain barrier 9,400 feet high. The Chimbu River snakes south through the Bismarcks (foreground) and across the shadowy Wahgi Valley toward the fog-shrouded Kubors. Bundi Track, a pioneer trail, scratches the landscape at lower right.



Drawn for Irvin E. Altman

New Guinea, One of the World's Last Frontiers, Harbors a Paradise of Birds

Onetime German territory, North-East New Guinea is now administered by Australia under the United Nations. Last year the author made his fourth visit to the island, serving as manager and ornithologist of the American Museum of Natural History-Armand Denis Expedition. Mr. Denis, film producer and expedition leader, made a photographic record of New Guinea's birds of paradise and the people who wear their plumage, even as American Indians wore turkey feathers. His film is being released soon. Veterans of MacArthur's drive to regain the Philippines will remember the Papua campaign of 1942–43 and the Hollandia landing in 1944.

birds of paradise, to photograph the courtship and display of the birds themselves for the American Museum, and to make still pictures of many other birds and animals.

It was one thing, of course, to plan such an expedition from the comfort of our armchairs, but quite another to get it into territory long charted as "uninhabited." We never could have accomplished it without the sympathetic help and interest of the New Guinea authorities.

When, for example, we arrived at Lae, our jumping-off place on New Guinea's east coast, we found that air travel into the interior no longer looked quite as simple or safe as it had from New York. A rather dispiriting list of accidents, in fact, had piled up since our last flights out of Lae in 1950.

In the interim, the pilot of Count N. C. G. F. Gyldenstolpe, a Swedish naturalist, and all the count's scientific materials had been lost in 1951, smashed against a hidden peak of the Bismarcks. The pilot we had last flown with in New Guinea had crashed on a mercy flight two days after we left. Bill Lamont, veteran of our 1950 Mount Hagen expedition, had cracked up at Madang. Father Michael Bodnar had barely survived a wreck in the interior.

Even our own pilot for the forthcoming venture—the much-decorated wartime flyer, Robert Gibbes—had lost two planes in the previous two years. When my wife and I, then, climbed into a 15-year-old light plane for a reconnaissance flight with pilot Larry Crowley, we experienced just a touch of misgiving.

We took off safely, however, skimming the 100-foot-high matted forests which border Lae, and followed the broad valley of the Markham River (map, above).

Threading the Bismarck Passes

For an hour and 10 minutes we flew inland, until before us loomed the 12,000-foot peaks of the Bismarck Range, fringed with clouds. Dodging rafts of mist, Crowley spiraled upward, searching for an opening. At last he found one, and we bored through the Chimbu gorge and planed down a narrow valley. We headed toward a plateau which extends north from the Kubor Range in a series of lobes overlooking the Wahgi River (opposite).

Spider-webbed with ancient trails, deeply scored here and there by wider roads, the area under cultivation looked prolific and luxuriant. Flat-topped promontories capped with casuarina forest and dotted with native gardens

© National Geographic Society

A Pack Train Treks Across Wasteland Trails in the Kubors

Early in the morning before a trip the expedition leader sings out for the area's strong-fellow and tells him how many carriers are needed, whereupon the chief summons his followers with a bellow.

Just as a drum message is relayed in Africa, the call is picked up far down the valley and repeated again and again. So faithfully do New Guinea men observe this custom that messages swiftly travel as far as 50 miles. The wave of sound rising and falling ever farther awes Western man.

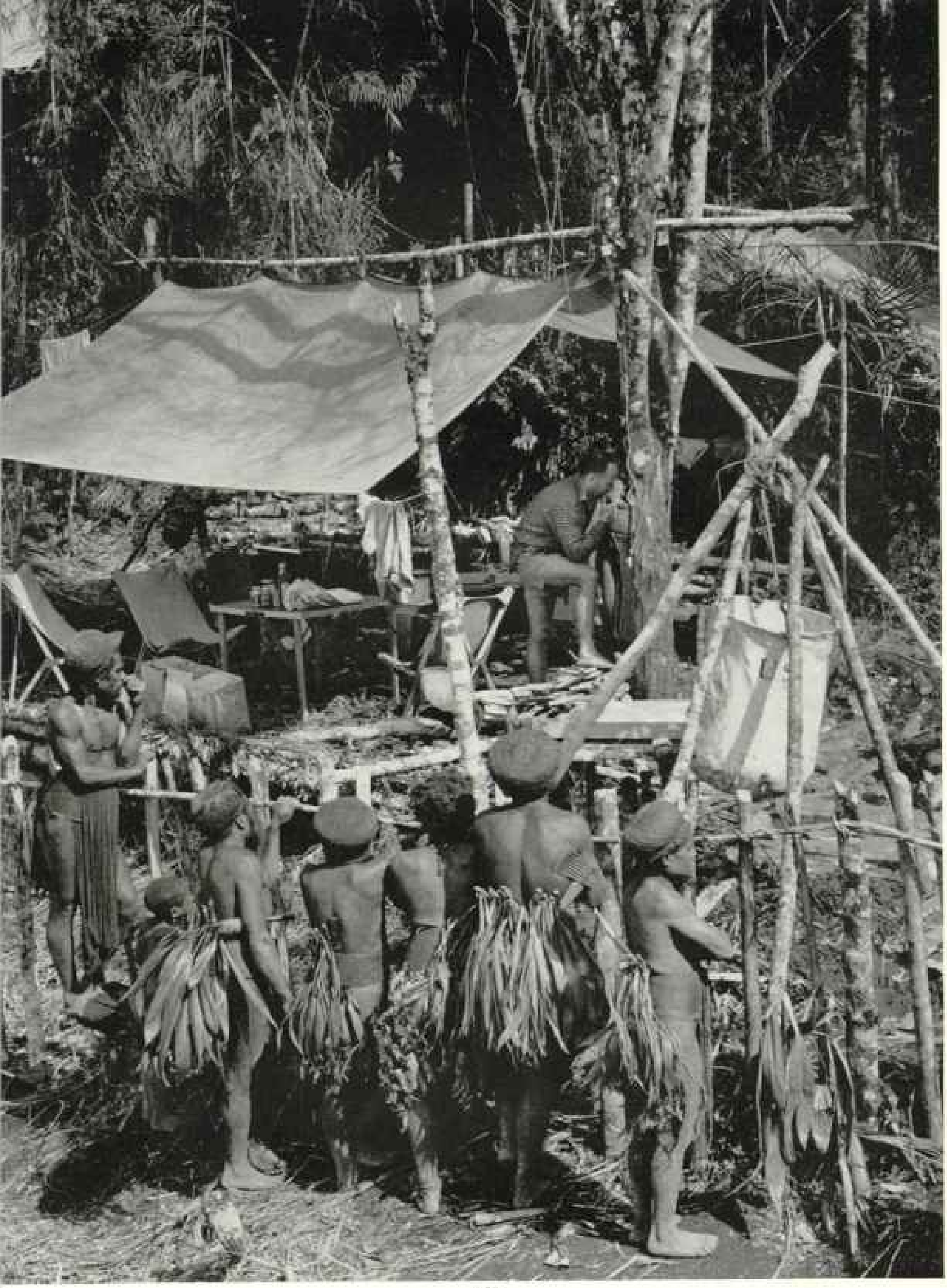
Offers of beads and shells bring porters running into camp. Bearers carry 45 pounds each for a large pinch of beads a day.

This pack train heads over well-marked trails toward Mount O-Mar, lost in the clouds a two-day march away.

Inset: Stone artifacts hundreds of years old capture the attention of expedition leader Armand Denis and his wife Michaela (page 487).

→ "Atop a column of porters, we crossed the Omong like a disjointed centipede," says the author.

Kodachromes by E. Thomas Gilliard and Henry Kalmthaler, American Museum-Armand Denis Expedition



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Fences? Nothing Could Stop the Stares of Mobs That Came Calling Every Day

Robert Doyle, an Australian explorer, shows less curiosity about these Mount Hagen people than they do about him. He enjoys the sun canopy even at 7,400 feet. The canvas bag stores purified drinking water.

Expedition Cameramen in a Tree House Aim Lenses at a Rare Bird

From its home base at Kup the expedition established nine camps as far away as 70 miles for close study of the elusive birds of paradise. Scientists set up tree platforms and blinds near each camp.

Rain and darkness shrouding New Guinea's deep cloud forests called for utmost ingenuity and the finest equipment to get photographic results. To meet this problem, Harry L. Parker of the American Speedlight Corporation constructed electronic flash equipment capable of flooding the forest with daylight for as short a period as 1/5000 of a second. Edwin L. Wisherd, Chief of the Photographic Laboratory of the National Geographic Society, provided special cameras with long lenses and auxiliary shutters to flash the lights.

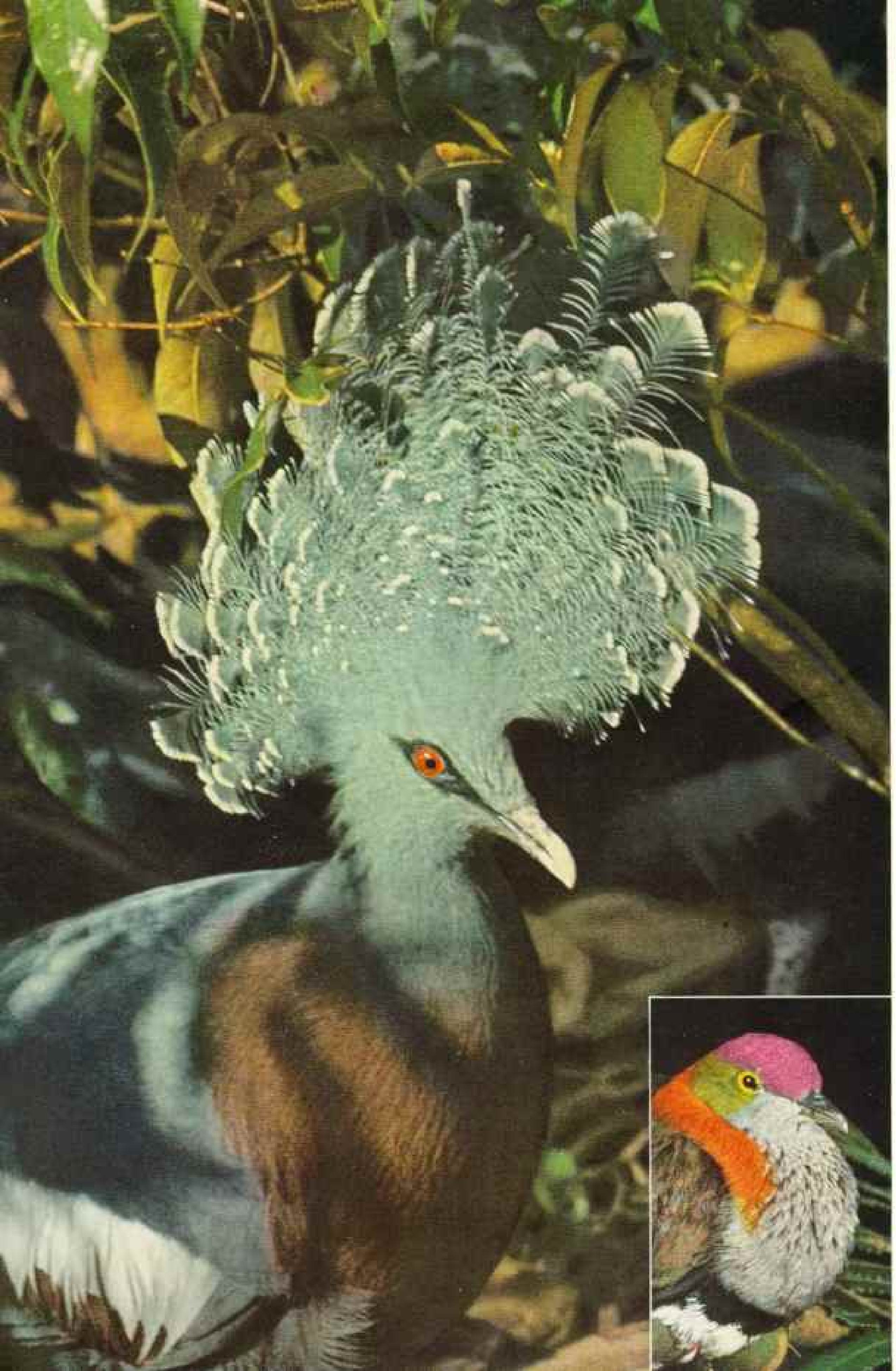
Shining reflectors, even at the maximum distance of 19 feet, frightened shy birds, which refused to return to their favorite trees. Thus much of the photography in natural settings had to be done without the special equipment.

Rain frequently made picture taking impossible. Moisture impregnated everything; lenses had to be wiped every few minutes. Cameras corroded after a short time in the open.

Here, 30 feet up, Mr. Gilliard (with beard) and Mr. Denis try to film a bird of paradise displaying its plumage on a limb 150 feet across a gorge.

→ Henry Kaltenthaler, a Philadelphia botanist, mans a blind not far from a Gardener Bowerbird's dance ground (page 452). He holds a tape recorder to catch the bird's call. Cock pheasant feathers in his hat confounded New Guinea men, who were unfamiliar with the plumage.

E. Thomas Gilliard and Robert Cornet, American Museum-Armand Denis Expedition



stretched between the hills like outflung fingers (page 458). On one of these lay a green strip. This was our destination, the tiny airfield maintained by Father Bodnar at Kup.

Threading the tight gorges of the Wahgi, Crowley set our little plane down expertly, then swerved it sharply as a horde of savages converged upon us. They were not trying to scalp us—just to greet us (page 422).

We knew they had gathered for some ceremonial occasion, for they were all splendidly plumed in rare bird of paradise feathers.

They were followed a moment later by Father Bodnar himself, one of those grand, self-effacing pioneers one meets occasionally in the big bush, who had in so many ways befriended us on our 1950 expedition.

We joined forces again with much back-slapping and enthusiasm, in which the good padre participated with even greater fervor when he learned we wished to plant a base camp in his bailiwick. For several hours we explored the vicinity, finally deciding on a near-by promontory for our site.

Then I sent word to Maima, chief of the Kubor tribes, asking him to come and see me on my return to Kup later. It was important that he should. Two years before, we had plunged deep into his realm, entering valleys no white foot had yet trod, and, with Maima's assistance, had climbed to the high plateaus where the rarest birds of paradise make their homes. With his cooperation, our second exploration might be even more profitable.

Bush Telegraph Brings Help

Back to Lae we flew and, on March 29th, returned in Gibbes's plane with two tons of gear and Robert Doyle. This time we set natives to constructing 16 buildings which would comprise our base camp at Kup—aviaries, a mess hall, cookhouses, work sheds, a powerhouse, storehouse, and dormitories, the whole compound surrounded by a large fence.

By the time we were joined by Margaret, native boys who had worked for us in 1950 had picked up word of our arrival on the bush telegraph. Beaming from ear to ear, they began to drift into camp. Among them were Mar, a good taxidermist ready for any job demanding perseverance and leadership, but equally ready to make himself scarce when confronted with more routine tasks; and Tai, courageous enough to climb the topmost pinnacle of Mount Wilhelm, but often more preoccupied with various love affairs.

Chief Maima Arrives—with Gifts

Finally came Maima himself at the head of a retinue of 100 men, all decorated with the most vivid paradise plumes and bearing gifts of food, dead birds, and live pigs slung from poles. In one hand Maima clutched a spear; in the other, a badly worn soccer ball.

I recognized the ball as the one I had given his clan for its help two years before. After we had greeted each other as brothers, I withdrew to our storehouse with smug satisfaction at my forethought. Howls of pleasure greeted the new ball I brought.

Promptly I called a meeting of the mountain men. Forming a wide circle about me, they watched with speculative eyes as I unpacked a big case. From it I drew, one after the other, mounted birds of paradise.

First I showed them a male Greater bird, faded from its 50 years at the Museum. They shouted its native name, "*bounde!*". Then came the Superb, "*kongeral!*"; the Magnificent, "*kombok!*"; Princess Stephanie's, "*meg!*"; the Sicklebill, "*tomba!*"; the Blue, "*goy!*"; the Grassland Bowerbird, "*cell!*"; and finally the most bizarre of all, the King of Saxony, "*kisaba!*".

Next I presented color pictures of themselves and their mountains which had appeared in the NATIONAL GEOGRAPHIC MAGAZINE. Joyfully they passed the pages around, marveling at their own likenesses.

Then I explained through my pidgin interpreter that this time I intended not to shoot or purchase birds, but to photograph them in their habitat. Holding up a gold-lip shell (one of 300 I had ordered from a pearling company on Thursday Island), I said that any man who could show me the dance limb of a bounde would receive one shell, the equivalent of seven weeks of labor. I would also give one shell for a King of Saxony and for other varieties of birds of paradise. For a MacGregor's bird, the price would be three; we ornithologists knew virtually nothing about this rare creature, not even whether it was a true bowerbird or a bird of paradise.

With that, our men vanished into the jungle, 50 strong. The hunt had begun.

A few days later the first messengers filtered

© National Geographic Society Kodachromes by E. Thomas and Margaret Gilliard, American Museum Archbold Dexia Expedition

← Crowned Pigeon Carries a Lacy Crest Like a Dowager's Frilly Hat

Goura victoria beccarii, the **Crowned Pigeon,** is as closely identified with New Guinea as are the birds of paradise. Like them, it was once slaughtered for gorgeous, lacy feathers. Today, although protected rigidly by government decree, it seems doomed to extinction like its relative the dodo. Natives continue to hunt the chicken-size bird for its delicious white flesh. When one of a flock is shot, the others gather on low limbs, gawk at the hunters, and invite a similar fate. One man, zoo director Paul L. Breese of Honolulu, has succeeded in breeding the bird.

Inset: **Superb Fruit Pigeon** (*Ptilinopus superbus*) ranges from Celebes and New Guinea to Australia. Wearing a variety of colors, it appears as gaudy as the fruit on which it lives.

New Guinea Belles Rouge Entire Faces

These three women never feel that they have too much decoration. For generations their sex has used shells, feathers, flowers, bark, and paint to adorn bodies. To these they now add strands of tiny glass beads imported by traders. In addition they scar faces and arms.

Helmets are woven from inner fiber of casuarina bark and often decorated with sequinlike shells called tambu. Woven orchid fiber forms arm bands.

The smiling girl wears a hollow reed in her nose. Below her beads and shell dangles a souvenir from a wrecked plane.

The girl below wears a cassowary-wing quill as a sort of gigantic handlebar mustache, and she adorns the tips with kapul fur. Her bamboo instrument, a favorite in the Kubors, produces a melodious but whisper-faint note.

➔ Feathers of many paradise birds add majestic stature to masked dancers. They carry ceremonial drums headed with python skin (page 422).

© National Geographic Society
Kodachromes by E. Thomas Gilliard and Henry Kaltenthaler, American Museum-Automit Denis Expedition

back into camp with stories of discoveries made. I was in the cookhouse one morning when Tai, my No. 1 boy, rushed in to say, "Master, Master, bush Kanaka he talk. He talk talk plenty plenty bounde stop along diwai belong em. Plenty man, e Mary. Sing-sing morning time true." ("Kanaka man says lots of bounde come to his trees. Many males and females go through the noisy courtship dance every morning, early.")

That sounded good to me, of course. The following day at dawn I took five men, my cameras, binocular, axes, and emergency cover to the place which the native had spotted. It was a clump of casuarinas two hours' walk distant, the site of an old native graveyard.

From 400 yards away I could hear the high-pitched cawing of what seemed to be crows, interspersed with low, repeated growls. In the lacy top limbs a dozen birds flew about excitedly. Crawling through the grass with great caution, I reached the butt of a large tree where I could lie without being seen.

Strange Antics of Courtship

Looking up, I saw on a limb high above me the most gorgeous bird I had ever laid eyes on (next page). Sunlight breaking through the leaves illuminated his perch, and, against the dark green of the foliage, his flame-colored flank plumes shone like live fire.

Slowly he hopped up the branch, dipping his head in a snakelike manner, grasping at little twigs and knobs and shaking them, his wings partly open and his plumes nervously twitching. Then, at the upper end of the limb, he turned sidewise and, like a child jumping with both feet at once downstairs from step to step, he made a series of little leaps down the pencil-size incline to the bottom.

Here, suddenly, he raised his wings, lowered his neck in a heronlike crook, and began to thump the wrists of his wings above his back—rapidly and strongly enough so that I could hear them distinctly 60 feet away. At the same time he cast his plumes upward and backward in a curving spray. The whole rear of his body shook like a feather duster.

Two other males flew to limbs near by. One of them dared to land near the display perch itself, only to be charged and driven off by the indignant owner.

As for the females, six of them fluttered around within 5 to 50 feet of the dance limb. For the most part, they sat quietly aloof to the male's antics; but when he became greatly excited, lowered his head, and emitted a number of low, burring growls, they flew to perches directly above his gaudy plumes, and even down to a spot beside him.

Once, in Australia's Taronga Zoological Park, I had seen an Emperor of Germany Bird of Paradise reach such a peak of ecstasy that he swung head down from his perch like a shimmering pendulum, his plumes cascading from his flanks like fragile white fans. As I watched the Greater bird preening and prancing along his limb, with head low and plumes high, I wondered if he might do the same.

And he did. A brilliant ball of plumage, he tumbled forward and swung beneath the perch, luminescent in the morning sun. A female flew to the limb and stood just above him. Reaching up, the male pecked and fenced with her in a kind of continuation of their ritual. Then, as if upon a signal, the dance ended, and all the birds soared off toward a large wooded canyon to feed.

Back at camp we quickly organized a safari to return and capture this unusual dance on film. Thanks to the American Museum and the National Geographic Society, I had been showered with more elaborate equipment than any ornithologist of my acquaintance has ever carried into primitive country.

I had been forced, in fact, to train my bearers like an army mortar squad. At the head of my unit I placed a man with my color camera; attached to it was a reflex housing containing a 400-mm. telephoto lens. Behind him came a bearer with another camera, mounting a 200-mm. telephoto. Both cameras were mounted on ball-socket tripods.

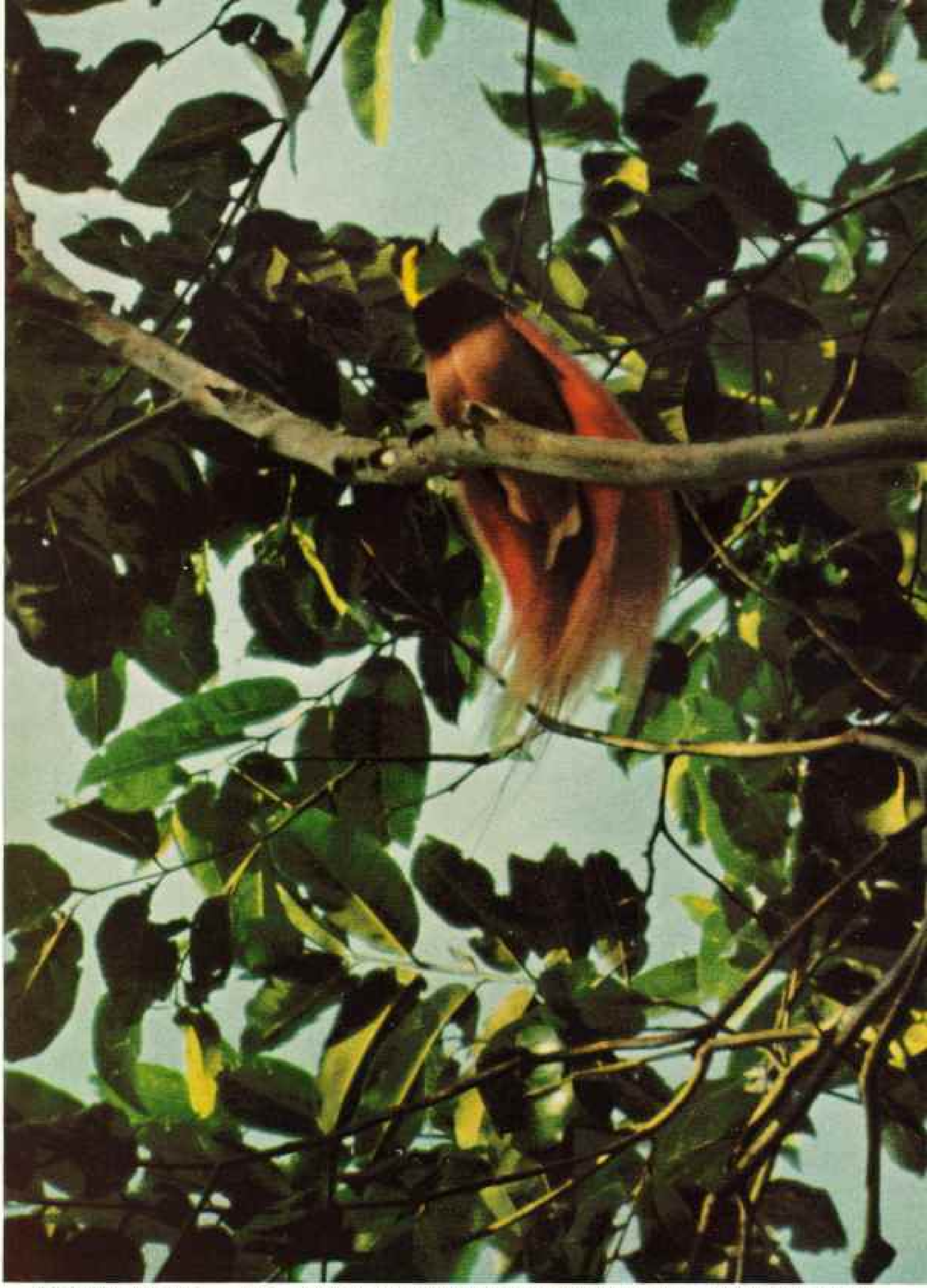
Then came six men, each carrying a 35-pound power pack capable of producing a 2,000-volt flash for the speedlights. Next followed men with huge coils of rubber cable with waterproof couplings, an automobile battery, and boxes of extra equipment and film. I had only to sing out, and this platoon fell in with a minimum of confusion; we were off.

Trials and Tribulations

Unfortunately, on many occasions we resembled the King of France who marched up the hill with all his men and then marched down again. Nature seemed to conspire against us. Mist formed on our lenses. Persistent rain soaked our power packs—and detonated them with a shotgun blast that cleared the bush of every bird in the area. Worst blow of all, our electronic lights, on which we had placed such hope, proved tremendously effective scarecrows.

We knew well how wary the Greater Bird of Paradise is—any bird of paradise, for that matter. Yet we had thought that by wiring the dance trees unobtrusively and positioning the lights with care, we could then retreat to our blinds many feet away and obtain photographs of great clarity, taken at 1/5000 of a second.

It was not to be. Even though we left the lights in place and went away for weeks at a time, the skittish birds never accepted them.



© National Geographic Society Kodachrome by E. Thomas Gilliard and Henry Kaltenthaler, American Museum-Armand Denis Expedition

Plumes Rise and Fall Like a Ballerina's Skirt as a Paradise Bird Dances in a Treetop

Daily the **Greater Bird of Paradise** visits his dance platform. There, to attract mates, he postures amid a crescendo of growls, whistles, and caws. This is the first published photograph of a paradise bird displaying in the wild.

↑ Shimmering Red Halo Worth a Chief's Ransom Comes from the Tail of a Glorified Crow

The first written description of the bird of paradise followed the return of Magellan's crewmen who, on the first voyage around the globe, 1519-1522, picked up two plumed skins of the Greater variety. Feet and legs of some early specimens were removed by hunters, and in their place huge lacy plumes seemed to grow. So a shroud of myth quickly surrounded the fantastic creature. Sages of the day concluded that it must have been blown accidentally to earth from a heavenly paradise. It was named *apoda*, or footless. The misnomer stuck; today the Greater is known as *Paradisaea apoda*. It is cousin to the sombre crow.

Until legalized slaughter was stopped in the 1920's, whole villages in New Guinea lived by killing paradise birds. Plumed pelts left the island at the rate of 100,000 a year and sold for as much as $50 each in the millinery marts of Paris and Amsterdam.

↓ Female and young (left) of the Greater are not conspicuous. Only the male (right) develops the coveted plumage worn by the warrior opposite.

Kodachromes by E. Thomas and Margaret Gilliard, American Museum-Armand Denis Expedition

← **Like an Elizabethan Ruff, a Collar of Gold Decks the Magnificent Bird of Paradise**

Fourteen man-days of concealment beside dance arenas of the **Magnificent Bird of Paradise** were required to complete the story of his courtship performance. The male (left) is a thrush-size, golden bird. As in all of the plumed birds of paradise, the female (above) is nondescript by comparison.

For the courtship dance, *Diphyllodes magnificus* selects a slender tree on a steep hillside. He systematically clips the leaves to let in shafts of sunlight, and cleans the ground beneath. Then, prancing up and down the tree trunk, he attracts mates by flexing his green chest shield like a fan, elevating his golden nape, and whistling persistently.

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Austria's Crown Prince Rudolph of the Mayerling Tragedy Gave His Name to *Paradisaea rudolphi margaritae*, the Blue Bird of Paradise

When he displays his plumage during courtship, the **Blue Bird of Paradise** shimmers with delicate, lacy beauty. Wherever men cut down the forests, few Blues survive. Traders once offered £25 for a single male (right). A female (center) and a partial albino complete the gallery (page 465).

Kodachromes by E. Thomas Gilliard, Henry Kalloothofer, and Michael Bednar, A.M.N.H., American Museum-Armand Denis Expedition

© National Geographic Society

A Bedizened Brow Carries New Guinea's Badge of Authority

Australian administrators maintain peace through *tul-tuls*, who wear the brass medal at right. Seven gold-lip shells pierce this chief's nose. His headdress is fledged with loot from parrot, cassowary, and four birds of paradise. Pearl-shell fragments sway on strings of tambu.

"Young Fella Mary" Wears the Cape and Shield of a Superb Bird of Paradise

From the Thursday Island group in Torres Strait, between Australia and New Guinea, come giant mother-of-pearl gold-lip shells prized as currency and jewelry by highland natives. Exactly how these shells formerly made their way into the rugged interior no white man knows; even the natives could not explain the source.

Men polish the shells and cut them with stone. Hinged portions make clacking ornaments on caps and skirts; fragile gold-edge slivers form valued nose pieces. Remaining portions hang as face and chest guards. Fifty days of labor buys one large shell.

This girl wears 12 pounds of shell around her neck, denoting that her father is wealthy (page 476). Velvet cape and blue chest shield of a male Superb Bird of Paradise top her tambu headdress. The chief (opposite) displays his Superb regalia exactly as does the expanding bird (below).

Turquoise Chest Shield Glints Like a Mirror

Along his back the **Superb Bird of Paradise** carries soft plumes like beetle wings. These he elevates during display and whips back and forth like a matador's cape. New Guinea men eagerly seek *Lophorina superba feminina* for his cape and flashing breast.

Kodachromes by R. Thomas Gilliard and Henry Kalmbacher, American Museum-Armand Denis Expedition

← King of Saxony Displays a Giant Fork Hung with Waxy Blue Flags Like Cellophane

Naturalists regard the **King of Saxony** as one of the most bizarre of the birds of paradise. For half a century they knew nothing of the bird; yet they were sure of his existence because skins bearing his crown plumes appeared in shipments of fashion trappings from the South Pacific.

Scientists call the bird *Pteridophora alberti hallstromi*. His species name refers to Albert, King of Saxony. The subspecies name honors Sir Edward J. L. Hallstrom, Australian naturalist and philanthropist.

One of the most important objectives of the American Museum's 1950 and 1952 expeditions to New Guinea was the discovery of the bird's home grounds and observation of its courtship habits.

Like the bird itself, the courtship is extraordinarily spectacular. Crouching on a perch no thicker than a man's finger, the robin-size bird bounces rapidly like a diver testing a board, until his slender branch whips violently up and down. His velvet-black cape expands in striking contrast to the egg-yellow breast (page 424).

Long head ornaments swish through the entire trapeze performance, now draping far to the back and again rising high in the air.

When a female is attracted by this display, the male leaps into the air with an explosive hissing call, *kis-sa-ba*, from which comes his native name, kisaba.

Queen of Saxony Appears Drab → Compared to Her Elegant Mate

Possession of kisaba plumes testifies to extraordinary hunting ability of the owner. He kills with nothing more lethal than bow and arrow, and his tiny prey rarely descends from the uppermost tier of the dripping cloud forest.

A hunter builds a telephone-booth-size blind 80 feet high in a tree and as close as possible to a Saxony dance perch. Before daylight he squeezes into his leafy camouflage and aims his three-pronged arrow at the perch. He may wait in vain, for the kisaba is wary.

After a brief courtship and mating, the queen leaves and carries on without assistance, while the rakish king goes back to his dance stage to make new conquests. This is well for the Saxony family, for any spying predator would quickly discover the nest if the brilliantly marked father took part in the care of eggs or young.

In lieu of flag-lined plumes, the female carries a short white spike. These are the first published photographs of the King of Saxony in life.

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^ Highland Chiefs Prize Saxony Plumes

Only chieftains may wear these incredible feathers, and they reserve them for ceremonies. The unique quill sweeps from nose to forehead, rimming the face with tiny blue lights (page 438).

-> Kubor people in infancy have the nose's sides and septum pierced. Twigs keep the flesh open.

Kodachromes by E. Thomas Gilliard, American Museum-Armand Denis Expedition

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Lesser Bird of Paradise Resembles a Sharp-eyed Teacher Reproving a Pupil

Many so-called rare birds of paradise turn out to be hybrids. One such, a bird with snowy, lacelike feathers, is offspring of the Greater (page 439) and the golden **Lesser Bird of Paradise** (*Paradisaea minor*, above).

Delicate as Moth Antennae, Fernlike Crests Rise from MacGregor's Brow

The expedition gave science its first information about habits of **MacGregor's Bird of Paradise.** Previously this creature of the high mountains was assumed to be a bowerbird.

Last summer *Cnemophilus macgregorii* was the object of one of the most intensive hunts ever staged by primitive man. Hundreds of hunters were shown a skin and told that a fortune in shell and red calico awaited the one who could find its nest or dance ground. These men spent weeks searching the mountain forests between 8,500 and 11,000 feet, the zone where MacGregor's lives. The expedition secured specimens and determined that MacGregor's does not build a bower.

New Guinea men say this species does not display like most other birds of paradise, but "walks about nothing" on the treetops. Loosely translated from pidgin English, this phrase means that MacGregor's lives like an ordinary bird in the upper tier of the forest, just as does Loria's Bird of Paradise, to which it seems to be related (page 452).

Male and female wear crests. These views show the same subadult male.

Right: The bird's delicate orange-red crest is retracted and concealed in a slot among darker feathers on the crown.

Photographs by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Queen Carola Screams Defiance

A half-dozen wire-shafted, flag-tipped feathers spring from the male of **Queen Carola's Six-wired Bird of Paradise.** Here three wires are in molt. An iridescent violet shield covers the chest.

Unlike most paradise birds, *Parotia carolae chrysenia* performs courtship dances on the ground.

↓ Grandpa with crew cut is molting. New feathers sprout between eye and bill.

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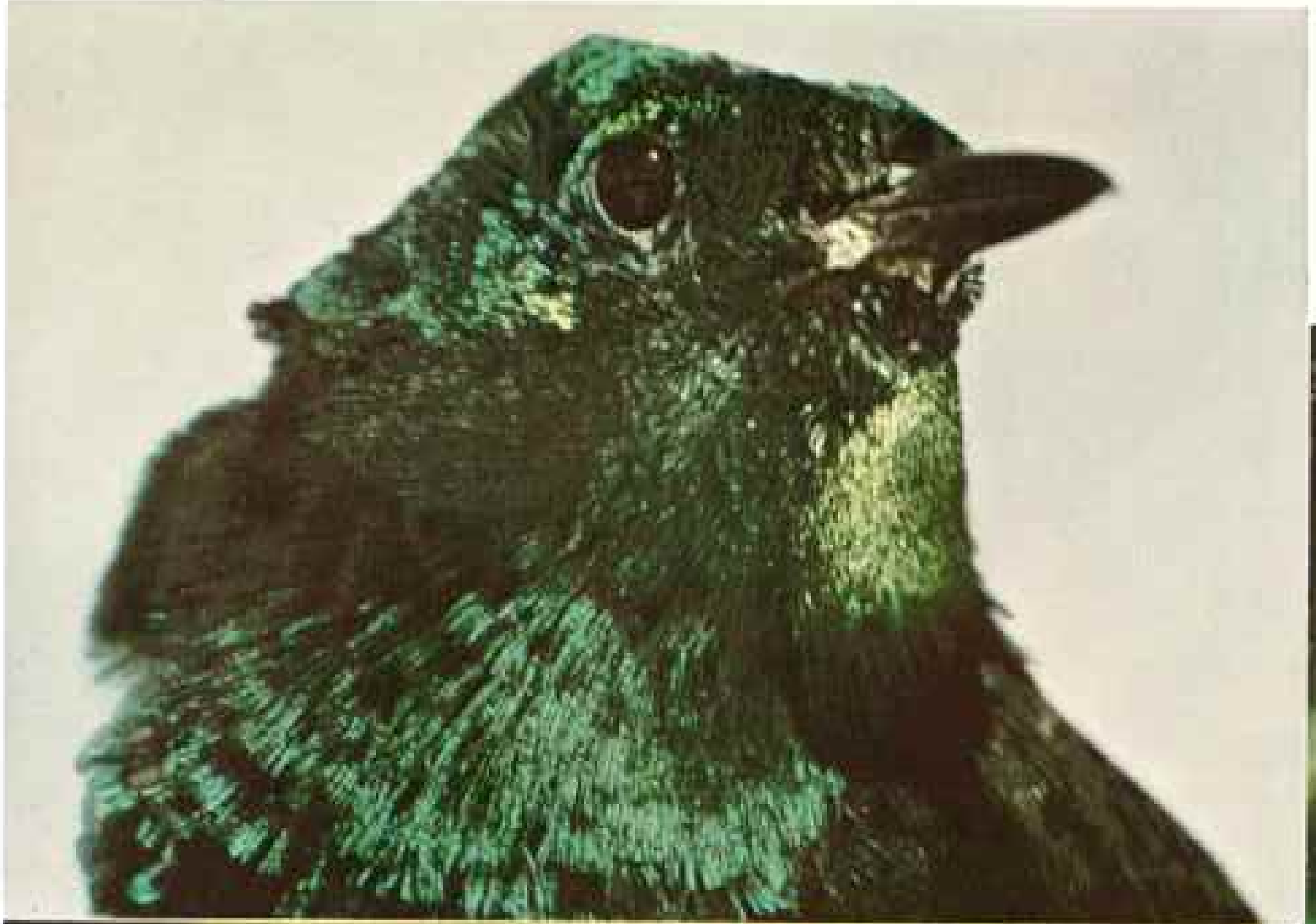
← Princess Stephanie's Namesake Glitters in Emerald Brilliance 449

Astrapia stephaniae, **Princess Stephanie's Bird of Paradise,** a creature with tremendously elongated tail feathers, shows velvet black except in direct sunlight. His note is a catlike mew. A cobalt-blue eye differentiates **Wahnes' Six-wired Bird of Paradise** (*Parotia wahnesi*, below, left) from Queen Carola's (page 448).

↓ A grumpy **Sicklebill Bird of Paradise** *(Epimachus meyeri bloodi)* glares down her crooked nose. The male (not shown) makes triphammer noises (page 456).

Kodachromes by E. Thomas Gilliard and Henry Kaltenthaler, American Museum-Armand Denis Expedition



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Hunter Invades a Bowerbird's Elaborate Bridal Chamber

Chlamydera lauterbachi, **Lauterbach's Bowerbird,** builds a nook in the grass to carry on his courtship in seclusion. Some 3,000 sticks and 1,000 hairlike strands of grass go into the construction. Hunters, on finding a new bower, place red leaves on top. If a bird is in attendance, he moves the leaves and betrays himself.

Dowdy Bowerbirds Attract Mates with Shiny Berries and Stones

In six of New Guinea's 10 species of bowerbirds the male lacks ornamental plumage. As a lure, Lauterbach's exhibits in his bower a hoard of stones and red, blue, and green fruits. Replacing berries daily as they shrivel, he rolls the ornaments around and waves them overhead to attract females (page 468).

Mamma Bowerbird →
Guards a Week-old Infant
in a Pit-pit Swamp

Bowerbirds might be called ground-displaying birds of paradise, although they differ from their ornate cousins in general by having inconspicuous plumes.

Lauterbach's Bowerbird inhabits forest edges and swamps cloaked in a tall grass called pit-pit. The bower area, usually close to running water, is used for years by the same bird. So firmly does he interlock twigs and grass that the bower possesses a box's rigidity (above).

Lauterbach's comes to his bower every day in the year, but he frightens easily. Photographers spent days in hot blinds to catch the male in his house of sticks.

The female builds her nest as much as 15 feet high in the swamp grass.

↓ The egg—slightly smaller than a crow's—appears decorated for Easter.

Kodachromes by E. Thomas and Margaret Gilliard, American Museum-Armand Denis Expedition

A Flaming Crest Flashes High on the Gardener Bowerbird

Quail-size **Gardener Bowerbird** lives above 8,000 feet in the cloud forests. *Amblyornis macgregoriae* plants a garden of moss and on it builds his bower—a three-foot Eiffel Tower of sticks.

The builder, remaining close to the bower much of each day, sounds a repertoire of scratchy notes. So accomplished a ventriloquist is he that observers have difficulty locating him.

Kubor men call this bird *kombok*, but in confusing fashion they apply the same label to the Magnificent Bird of Paradise (page 440), which lives several thousand feet lower in the forests. They differentiate by pointing up to the mountaintop or down to the river, depending upon which bird they mean.

Loria's Bird of Paradise (*Loria loriae amethystina*) was long thought to be a bowerbird. The male, whose melancholy, flutelike notes penetrate the forest, wears black spiced with flashes of iridescent purple. The female (shown) dresses modestly.

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Kodachromes by R. Thomas Gilliard, American Museum-Armand Denis Expedition

Our intentions may have been more honorable or innocent than those of the natives who kill them with shotgun and bow and arrow, but the birds apparently assumed that we had rigged some devilishly lethal device that should be shunned at all costs.

Our expectations, dashed by this first encounter with the Greater birds, were raised by the addition to our party a fortnight later of Robert Carmet, who has made excellent wild-life movies in Africa and elsewhere.

Carmet, it turned out, had been able to take only $84 with him from France. Yet he had made his way half around the world and arrived on time, in sneakers, to be sure, and not much else, but with cameras that rivaled my own.

We began planning a trek into the 12,000-foot mountains of the Kubor. Carmet remarked rather testily that the highest he had ever climbed was into the seat of a jeep station wagon, but he exchanged his sneakers for spiked boots willingly enough and, in the early hours of an April morning, our boss boy sang out for a party of bearers.

From under my mosquito net I heard the hellowed notes picked up by natives on the other side of the valley and relayed, in dwindling but still awesome volume, across the forests of the Wahgi and the Omong Rivers.

By 5 a.m. "seven-fella ten men" had assembled outside camp. We loaded these 70 bearers with tents, food, cameras, lights, weapons, and other gear and set off over hilly grasslands through Chief Maima's province (page 428).

In 10 days we reached the north slopes of the Cambia region, true Stone Age territory. Few natives here had even seen steel. Beside their low little grass huts lay their own tools—stone axes ground in the age-old manner on a dampened sandstone.

White Woman Amazes Natives

My wife was the first white woman these people had ever seen. They greeted her with amazement, dancing and howling around her. One huge native, coated with pig grease, hoisted her aloft and carried her through the procession for 20 or 30 yards.

Food proved no great problem. In exchange for salt, razor blades, powder paint, and matches, the natives brought us string bags of sweet potatoes, sugar cane, pigs, chickens, and even a few eggs. They wanted our trade goods; yet we noted that they had been able to live without them very well.

Fire, for example, they make by plucking a dried vine from their string aprons, threading it through a cleft stick, and sawing it back and forth until, under friction, it breaks into a punklike glow.

Salt they manufacture by soaking bundle after bundle of dried grass in salt springs. These are then thrown on the fire and burned. In the ashes a salt cake forms amid the lye. When it is thick enough, they remove it and bind it with others into disks about the thickness of three or four phonograph records.

The Kubor people still make most of their decorative dyes and paints from seeds, soft stones, clays, and ashes, but quantities of beads from Czechoslovakia and Italy have filtered into the interior from the coast. We saw scarcely an aborigine who wasn't as festooned with beads as a gypsy fortuneteller.

Murder in the Stone Age

We noted these little encroachments of civilization with some alarm, not simply because we disliked seeing one of the world's last pockets of Stone Age people lose its pristine uniqueness, but because, paradoxically, it is the coming of the white man which tends to make the native rapacious.

Almost invariably explorers in New Guinea have found the aborigines friendly when first approached. Only after they have become aware of the treasures which the white man carries—shells and axes and trinkets—do their thoughts turn to murder and loot.

Helmuth Baum, a veteran of many sorties into the interior, died with a Kukukuku stone blade in his skull a few seconds after he had opened his trade box and revealed half a dozen steel axheads. The Leahy brothers—Michael and Pat—suffered near-fatal wounds in an attack on their camp in 1931 by natives who had always been quite amicable.

Nevertheless, as an ornithologist, I felt that whatever risks I was running among these Stone Age primitives were greatly outweighed by the rare opportunity I had to study New Guinea's strange birds and people.

And in New Guinea, in contrast to parts of Europe and America, the naturalist is regarded as almost sane. Here the savage is vitally interested in the plants and insects and animals of his region. To him, the white men who come to scratch for yellow metal in his stream beds are the ones who are "long-long"—crazy.

The native, moreover, is as well-informed about flora and fauna as he is interested. Without any sort of written language he manages, nonetheless, to pass on from generation to generation a steadily increasing store of expert knowledge. I didn't find it always easy to believe; yet when I tested the Kubor people on some particular question, they invariably came through with top marks.

For example, a boy wandered into camp with a drab little nest made by a bird which he called a *dengalap*. I knew that this was a sort of flycatcher rarely seen in the Kubors.

Hands Slap Python Skin and Feet Stamp Earth in the Mad Rhythm of a Tribal Dance

Once a year or so in every sizable community people gather for a celebration which may last for weeks. Hundreds of men come with their families from places as much as six days away to show off their magnificent regalia and to dance and drum (pages 466 and 472).

Platoons of dancers pound stiff-legged on the packed earth. Chieftains sing haunting songs like melodies out of a fevered dream. Shuffling foot noises, resonant drum notes, repetitious songs, and a shimmering sea of gold, blue, and red plumes lull the braves into a semitrance.

Women, children, and oldsters mill around in confusion, admiring the dancers and commenting on their strength and beauty. They judge a man's importance by his plumes.

An ax-carrying "long-long," or crazy man, provides comedy relief by driving away evil spirits. Covered with yellow mud and dead grass, this fearsome character charges about like a cornered animal and pretends to attack bystanders. Several stooges check his murderous blows just as he lets the ax fall.

Only rain stops the dancers. At the first drops men break for cover and remove their plumes to safety.

These chieftains, drum-dancing at Kup, carry a treasure of feathers from eagles, parrots, owls, cockatoos, cassowaries, and numerous birds of paradise. A parrot wing shines blue and green on right.

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Kodachrome by R. Thomas Gilliard, American Museum-Armand Denis Expedition

Yet when I questioned a dozen different natives about the nest, each identified it correctly and without hesitation.

It was for this reason that I put great store by native opinion when we turned to one of our prime objectives in New Guinea: the settling of an old issue among ornithologists as to whether MacGregor's is a bird of paradise or a bowerbird.

The chief difference between the two is that bowerbirds usually clear a bit of ground and build their courtship chambers there, while birds of paradise customarily perform their love dances in trees. Birds of paradise, too, tend to have unusually developed plumes in contrast to the bowerbirds' short and inconspicuous appendages.

We thought we might have the definitive answer when a native who had taken part in our dragnet operation finally brought in a live MacGregor's. It was an adolescent male and so overwhelmed by being captured that it sat numbly, without protest, as I frantically took portraits of it in color.

Yet even after I examined its six curious orange crest plumes, which it can retract into a slot of darker feathers on its crown, I could not say for sure, on this evidence alone, that it was a bird of paradise. Nor was the size and shape of its tail a determining factor.

Another consideration which had a bearing on my decision that this was no bowerbird was that the natives were positive it did not build a courtship chamber on the ground, as do most bowerbirds. Nor could we, in all our searching, ever find such a bird displaying there. As one ornithologist, I am willing to take the verdict of these local experts: MacGregor's is a bird of paradise (page 447).

Finding the King of Saxony

At long last, while we were ransacking the Kubor Range, we caught up with the King of Saxony (page 444). Margaret and I had finished supper and were sitting by the campfire, huddled against the chill, when we dimly made out a wavering figure coming down the dark forest trail. Presently a gimlet-eyed native, virtually naked, stepped up to the flames, squatted, and began to warm his hands.

It was a custom I knew but never wholly relished: no traveler in these parts is ever denied the hospitality of one's fire. This is all very well, but it can become a little trying to have chaps dropping in and out of one's hut at any hour of the day or night, helping themselves to "glow-sticks" from the blaze, or just subsiding onto their haunches and staring.

This time, however, our irritation quickly evaporated when Tai, my "turn-talk," informed me, "Dis fella he talk—kisaba, grass belong em long fella to mas, he stop long hop."

In short, a male King of Saxony Bird of Paradise had been sighted a day's walk distant. We needed no further urging. Next morning, and for several thereafter, we reconnoitered sodden trails on the flanks of Mount O-Mar. Finally we hit upon three trees within a mile of each other where various Kings displayed their plumage daily.

One of this trio was photographically impossible; at the second, the bird in residence was molting. So we picked the third and built near it our lofty, ramshackle tower.

Thus it was that I found myself, on that memorable morning, watching with avid eyes the sight only one or two white men had ever seen before—the love dance of the King.

In the days that followed, we tried repeatedly to place that spectacle on film. With still pictures we had poor luck; the problems which had defeated us with the Greater bird vanquished us once more. But with movie film and with sound recordings we succeeded reasonably well.

Sicklebill Rattles Like Machine Gun

If the King gave us one bird of paradise feather for our caps, other species were just as generous. We photographed more than 100 species, most of them never filmed before, including the rare river duck, *Salvadorina*, and the little mountain parrot, *Psittacella picta excelsa*, which we had discovered in 1950.

Scientists recognize 42 species of birds of paradise; in New Guinea there are 20 known ornamented species. Of the latter we observed 16 and filmed 12 in color.

Particularly entrancing was Blood's Sicklebill Bird of Paradise (page 449). We found its mating tree 7,300 feet up Mount O-Mar and built near it a pandanus-thatched hovel from which, one frigid morning, we watched tomba perform.

From its perch the Sicklebill would loose a machine-gunlike burst of bass notes. Then, as the sound died away into the cathedral hush of the forest, the bird would begin to drum like a grouse, beating its wings against its sides and making loud, cracking reports which quite mystified us. It seemed impossible that wings alone could make such a fuss.

Just as bizarre in a different way was Princess Stephanie's (page 449). This bird of paradise has a very long black tail, a jewellike head, and a quiet mewing call that is uncannily feline. It displays in trees cloaked in moss and flamboyantly decorated with all manner of ferns, plants, and orchids.

Its dance, which we were among the first naturalists to see in its wild setting, began with the male slowly picking its way along a heavily festooned limb. Its tail, nearly two feet long, trailed among the orchids like a

Brown Crusts Excite Explorers' Appetites

Several tons of food and equipment for the expedition went by air into New Guinea's wilds—enough for 900 man-days. Table needs were completely anticipated, from flour and yeast to olives and catsup.

For trading, the explorers took along 300 gold-lip shells, quantities of glass beads, stick tobacco, and 4,000 sheets of newspaper. The last, prized for cigarette paper, was useful in making small change.

New Guinea boys did most of the cooking, but Robert Doyle (right) and Mrs. Gilliard handled the baking, since it involved gasoline stoves.

Margaret Gilliard, accompanying her husband to New Guinea, painted 200 native and wildlife scenes. Here she depicts a Magnificent paradise bird (page 440). A pet parrot watches from her shoulder. Her helper wears a gourd necklace.

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Kodachromes by E. Thomas Gilliard, American Museum-Armand Denis Expedition

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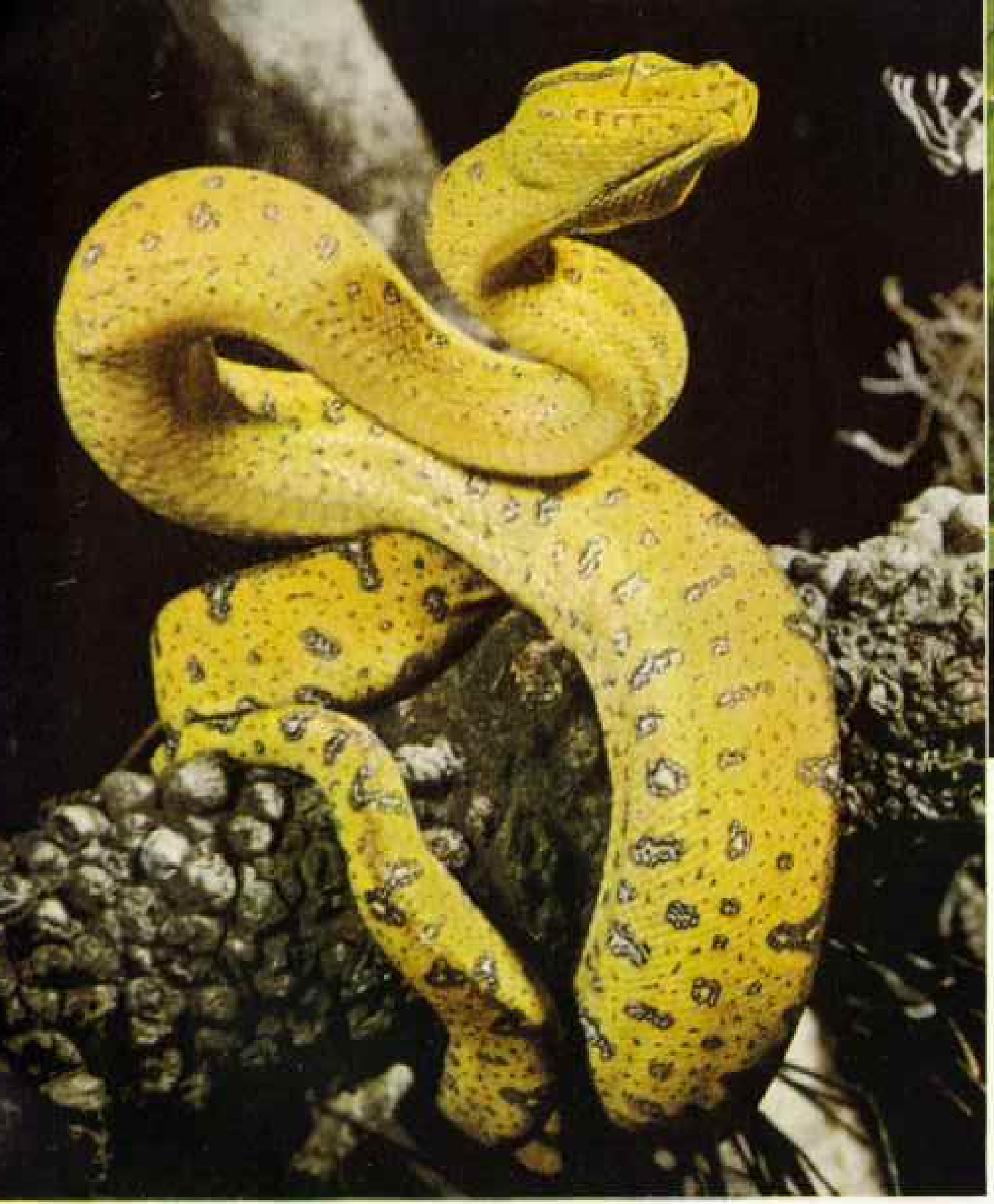
Drainage Ditches Carve a Waffle-iron Pattern Across Wahgi Valley Sweet-potato Beds

Vast areas in the highlands have been deforested for farms. Once depleted, the soil becomes wasteland. Grassed-over areas show the checkerboard imprint of bygone gardens.

E. Thomas Gilliard and Michael Bichar, A.N.H., American Museum-Armand Denis Expedition

Fingers of Fire Race Each Year Across the Grasslands of Central New Guinea

Abandoned lands seldom revert to forests because the highlanders set fires every year to round up their pigs. Inset: Flame and smoke roar through the dry Markham Valley (page 465).



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↑ Speedlight Freezes a Neon-hued Tree Frog in Motion

Frogs, rats, lizards, and insects are delicacies to Kubor natives, who always have ravenous appetites, particularly for meat. If no fire is available, small animals are pulled apart and eaten raw. This **Giant Tree Frog** *(Hyla humeralis)* spans a foot—one of the world's largest tree frogs. The electronic flash at 1/5000 of a second stops his jump out of water.

← Python's Golden Coils Make Native Mouths Water

Pythons occur in greater variety in New Guinea than anywhere else. When mature, the Kubor Range's **Green Tree Python** *(Chondropython viridis)* measures six feet.

This young specimen resembles nothing so much as a ribbon of yellow calico. Its golden coloration serves as camouflage among lichens and orchids. Tribesmen value the serpent for food and drum heads (pages 454 and 467).

← Only Insects Need Fear Giant Frogmouth's Baleful Eye and Dreadful Jaws

No land bird has a larger mouth in proportion to its body than the **Giant Frogmouth.** From late afternoon to morning *Podager papuensis* wings through the night air. Big as a barred owl, the ugly bird feeds in flight, scooping up insects like the radiator grill of an automobile.

Goateed frogmouth strikes terror with his hooked snout, reptilian throat, and ruby eye gleaming like a pool ball. Actually, he is clumsy and weak. He bluffs with ominous clacking and croaking, fearsome postures, and sudden flexing of wings and tail.

↓ New Guinea's large insects keep frogmouth well-fed. Best known are the **Birdwing** butterflies.

This *Papilio priamus poseidon* spreads his wings across six inches of hibiscus petals. Females expand several inches more.

Kodachromes by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Katumbag Couples Rub Noses and Sway in Public Assembly

New Guinea folk gather weekly in thatched huts for a sit-down dance called the sing-sing. Like the square dance of frontier days, it is an important social event. While older people, laughing and chatting, sit around the sides, dancers take places on a low, horseshoe-shaped platform, where they chant, sway, and rub noses in the fashion of their forefathers (pages 474, 478).

Opposite: The roof of this hut was removed for picture-taking. At first, the natives were self-conscious, but they soon forgot the battery of lights and cameras.

E. Thomas Gilliard and Henry Kahlenbaker, American Museum-Armand Denis Expedition

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Kodachrome by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Cuckoo-tailed Parrot Glows with the Hues of a Child's Paintbox

Alisterus chloropterus, one of the most beautiful of New Guinea's 40 species of parrots, pleases the native taste for feathers. **Cuckoo-tailed** males show bright red. This female wears a green cloak.

train. Its curved bill darted and nudged among the moss and flowers.

Suddenly, in a series of graceful leaps, it hopped to a bare limb about six inches in diameter and some 80 feet above the ground. With my 8-power glasses glued to my eyes, I watched it quickly flex its wings. It curved its tail inward, spread wide the tips of its two immense central plumes, and waved both tail and wings together in nervous but related cadence. For half a minute it held its wings cocked far behind its back, so that the wrists touched; thumped several times like the Greater bird; then, as abruptly as it had begun, relaxed, sat sedately for a little while, and flew away.

Fire Menaces Blue Bird's Home

From these ventures on Mount O-Mar we turned for a quick two-week side trip to Mount Hagen in search of the elusive Ribbon-tail and the Golden-crowned Bowerbird, which in 1950 we had discovered and named *Archboldia sanfordi*, after our friend and sponsor, the late Dr. Leonard C. Sanford.

We learned much on Mount Hagen about hybridization of the long-tailed birds of paradise; we obtained some excellent photographs of the Wattled bird and Loria's Bird of Paradise (page 452); but the Ribbon-tail and Golden-crowned gave us the slip.

Our disappointment was keen, but it was softened by the arrival at our base camp of young Henry Kaltenthaler, the botanist from Philadelphia. I had saved for him several particularly sticky assignments, including the photographing and recording of the Blue Bird of Paradise (page 441).

Henry shared my concern over the fate of this bird—*Paradisaea rudolphi*—threatened with extinction by native hunters and farmers. The most delicately beautiful and lacelike of birds of paradise, this creature has about it an aura of romance. Crown Prince Rudolph of Austria, for whom it is named, was the ill-fated hero of the tragic Mayerling story. The target of native collectors for a good half-century, the Blue bird is now gravely reduced in numbers. More serious still, deforestation is wiping out its very home.

As primitive man has pushed up from the coast into the interior, he has stripped the upper reaches of the Markham, Ramu, Sepik, and Wahgi valleys of their timber and left a sea of inflammable grass. When fire strikes, 30-foot palisades of flame sweep these upland meadows, charring the earth and driving bird and man into cramped gulches (page 459).

The Blue bird is all the more vulnerable in that it will not live higher than 6,300 feet, no matter how inviting the forest; its range stops there with the precision of a topographer's contour line. Yet the tide of destruction now laps to 7,200 feet in the Kubor Range and up to 8,300 feet in the Chimbu gorge.

Result: Where thousands of Blue birds once fluttered and danced in the forests, it is hard now to find a few inbred coveys backed into precipitous cul-de-sacs. One of the most forlorn memories I retain of the island is the spectacle of a male Blue bird I saw at Katumbag, perched on a fire-blackened tree trunk in the heart of a burned-out wilderness.

Can anything be done to check these ravages? Our Australian member thought so. What is needed is a bird of paradise reservation, rather like Africa's Kruger National Park, in which primitive man can be taught to live side by side in harmony with those treasures of Nature that can be found in New Guinea alone. It would not be too difficult, Bob Doyle pointed out, to administer such an area through the government's district officers, men well-trained, fair, and much respected by the highlanders.

This project, however, is still but a gleam in a naturalist's eye; and in the shrunken domain still left to the Blue bird we found slim photographic pickings. We were luckier in our pursuit of the Magnificent Bird of Paradise (page 440).

We discovered, in fact, no fewer than five dance grounds of the Magnificent, all within two miles of our base camp at Kup. Hitherto, kombok's courtship had been observed and fully described by only one white man—Dr. Austin L. Rand, of the American Museum-Richard Archbold Snow Mountain Expedition.*

Altogether, Kaltenthaler, Robert Doyle, and I spent 14 man-days in blinds close to the Magnificent's dance grounds before we were able to snare the bird's choreography on film. We felt well rewarded, however, for the antics of this strange bird with its police-whistle voice are among the most intriguing in the bird kingdom.

Dance of the Magnificent

Golden-naped, the Magnificent boasts a shining blood-red back patch and a chest shield of blackish green. For its dance it selects a tree of broom-handle size, deep in the forest and usually on a steep slope. Meticulously it clears the ground beneath the trunk and snips the leaves overhead to spotlight its arena with dramatic shafts of sunlight.

When all is ready, the male screeches his invitation to those whom it may concern and whirs down upon his sharply slanted stage. There he flexes his plumage and promenades slowly and with obvious pride up and down

* See "Unknown New Guinea," by Richard Archbold, National Geographic Magazine, March, 1941.

Trussed-up Porkers Await the Appetites of Dancing Warriors

Kup people, gathered here for days of dancing and feasting, take pride in their personal adornment. They preserve sumptuous plumes in pandanus-leaf cases, giving them all the care deserved by fine embroidery.

Dressing for the dance, men hide in the forest, where they spend hours preparing their faces and plumes.

After all the men of a clan have decorated themselves, they form a column of fours and stamp into the dance arena. As they come on stage, they raise an outcry and jump vigorously to attract attention. Spectators turn to admire, and dancers pause to examine the newcomers.

Clans compete not only in dancing but in providing food. For the honor of being the biggest contributor, a clan will exhaust its food reserves and starve for weeks.

Each man wears a casuarina-fiber apron. Aft he carries a thick brush of twigs and leaves.

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Captive Pythons Hang as Scarecrows Above Piles of Food >

Kubor mountain people eat voraciously. They have not discovered alcoholic beverages or betel nut, but they consume poisonous mushrooms, which drive them into a stupor.

These poles serve in lieu of refrigerators for tethered snakes and fowl awaiting a tribal feast. Each time the hungry green python slithers close to a nervous chicken, a boy raps it on the snout with a stick.

Omong River men carry pandanus seed pods on shoulders and squash on poles.

Kodachromes by R. Thilver Gilliard, American Museum-Armand Denis Expedition

468 Henry Kalkenbach, American Museum-Armand Denis Expedition

Stone-ax Craftsmen Split Casuarina Logs for a Waligi River Suspension Bridge

Primitive stone axes, finely ground and polished on wet sandstone, are capable in trained hands of the exact work of ordinary steel blades (pages 479, 486). These Kup workmen learned bridge building from their fathers; they will pass the skill down to sons. Split staves will be fastened with vines.

his little runway. Like a Parisian model he pauses now and again to flaunt his gay apparel. Then he calls once more, circles his tree trunk, and repeats the routine.

The Magnificent usually puts on his act in the morning, with a matinee performance later in the day. For audience he can, as a rule, count on one or more females. Drab little things, they land on near-by sticks or even on the outer apron of the stage and squat like lumps, to all outward show aloof and quite uninterested in the patently bawdy exhibitionism of the polygamous male.

Male's Work Is Never Done

Turning for a time from birds of paradise, we took a long look at the courtship of the bowerbirds—particularly Lauterbach's and the Gardener. The males of these highly specialized species cannot always rely on brighter plumage than the female's to attract her. So some, such as Lauterbach's, decorate nuptial bowers with colored objects—red, blue, and green fruits, slate-colored stones, lumps of hardened clay (pages 450, 451).

Under this sort of regime it is the male who becomes the housekeeper, though the female dominates the actual nest. Lauterbach's, for example, builds his bower typically of some 3,000 twigs and about 1,000 hairlike strands of grass, woven together with the stiffness of a parrot cage. Then he polices it every day of the year, removing debris and replacing the pellet-sized fruits as soon as they begin to fade or decay.

The Gardener, which inhabits the cloud forest from 8,500 to more than 9,500 feet, makes his bower in the form of a circlet of moss a yard in diameter, rimmed with a moss wall. In the center he erects a rickety tower of sticks up to three feet tall (p. 452).

Lurking around this chamber much of the day, or fussing inside it, the male Gardener favors females in the vicinity with a disarming serenade of hoarse ventriloquistic notes. He couples this concert with elaborate

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"Please Stay with Us!" Owl-winged Chiefs Bring Gifts to the Departing Expedition

Highlanders never refuse a gift, and they return favor for favor. These Wahgi strong-fellows, pleased with presents of soccer balls, express their gratitude with sugar cane, bananas, peanuts, onions, and squashes.

Reeds, Petals, and Shells Make Mustaches for Either Sex

The young fella Mary at right, above, wears everyday attire of neck shells and a netted snood supporting a purselike carryall. Below, at left, she dresses in her go-to-meeting leaves, shells, and furs.

A Surly Mountaineer Leans on His Ceremonial Spear

New Guinea highlanders show strains of Melanesian, Papuan, and Negrito stock. Older men remember intertribal wars, cannibalism, and head-hunting. Now their war spears are used in rituals. Shafts are of hardwood.

Mountain men do not pluck the beard as commonly as valley dwellers. This Mount Hagen fellow ornaments his tambu cap with ferns and the feathers of red parrots and white barnyard fowl.

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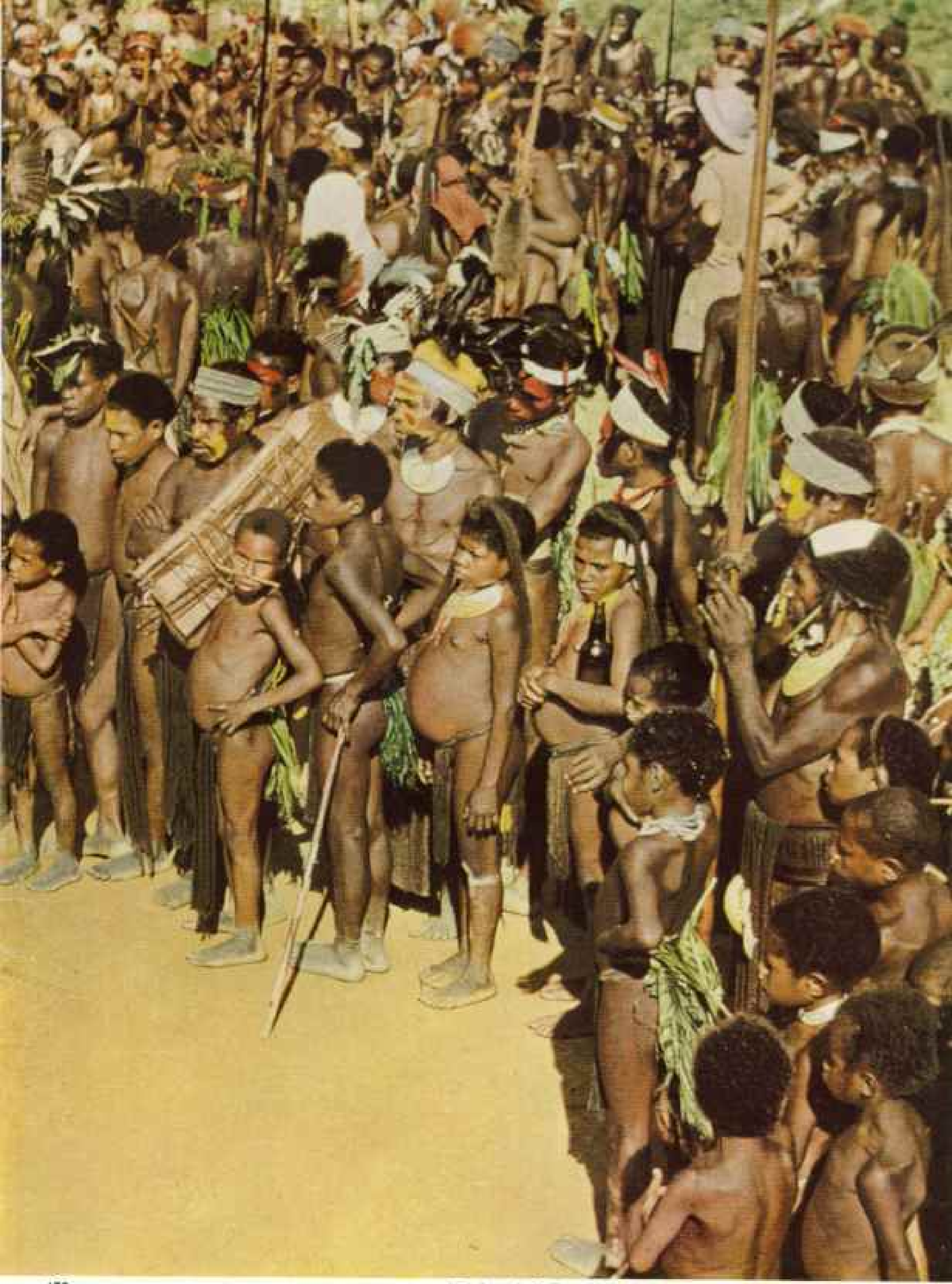
Bird-of-paradise Courtship Antics Find Their Counterpart in a Holiday Dance

Acrobatics of a male bird in attracting females and fighting off rivals influenced movements of the four men jigging in a circle on the left. Seeming never to tire, they danced monotonously for hours.



Kodachrome by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Puzzle: Find the White Men. Three Expedition Members Mingle with the Crowd

Almost hidden in center background are expedition leader Armand Denis and Robert Carmet. Robert Boyle (right) wears a pith helmet. Girl in the front line treasures a rum bottle for carrying water.

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Nose Meets Nose as Katumbag Couples Perform the Sing-sing

New Guinea people journey from lonely huts in the hills to enjoy their chief social event, the sing-sing (pages 462 and 463). They carry on this unusual community dance with the gusto of old-fashioned Americans taking part in a husking bee.

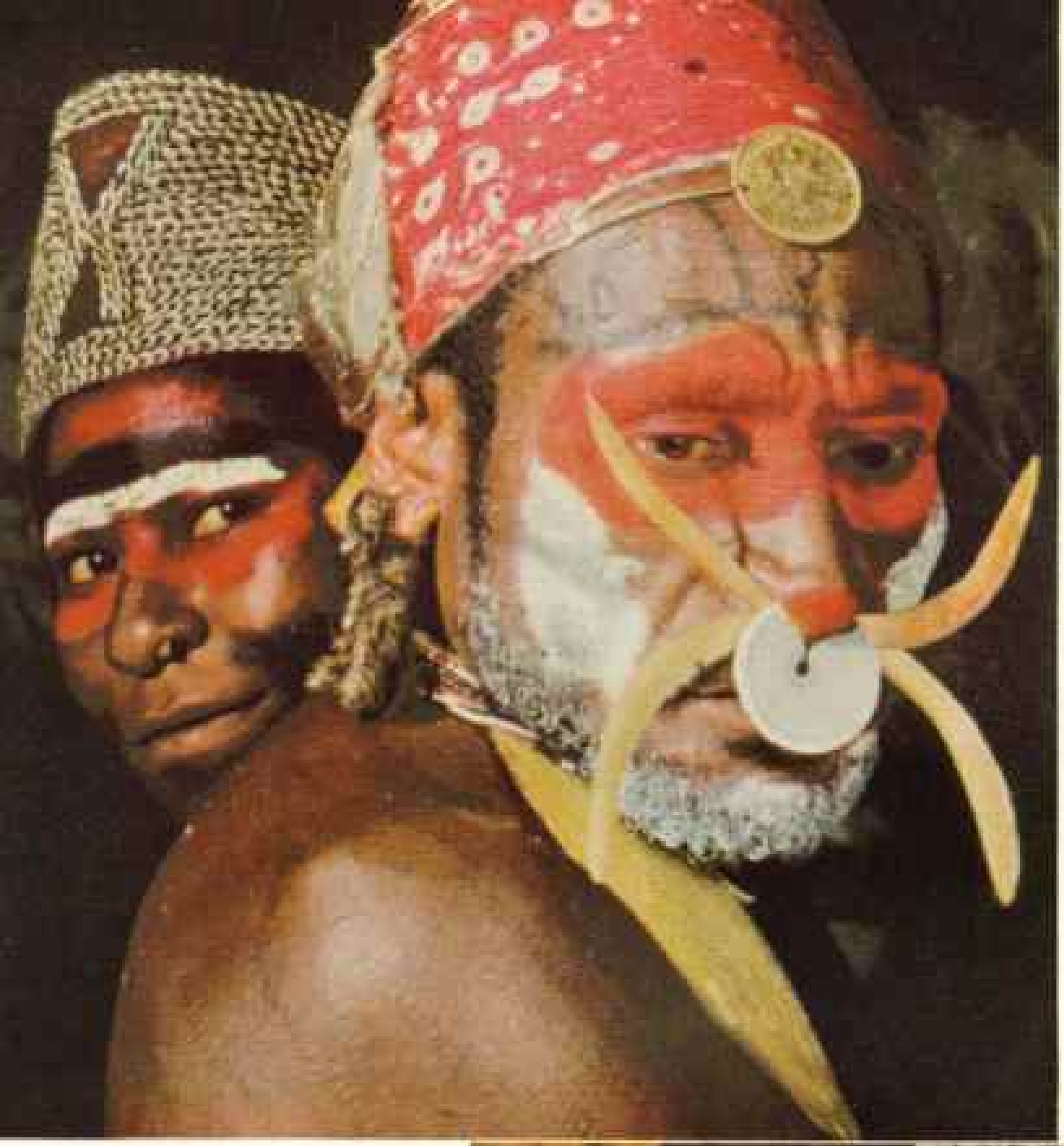
Preening for the sing-sing, dancers smear faces with treasured pig grease and red and yellow paint until feathers and shells hang glued in place. Then men and women sit in rows in flickering firelight. Men sway and chant in a nasal singsong. Women, ornaments tinkling, move in cadence in the opposite direction.

Both men and women seem to go into a trance as chanting grows louder and bodies sway faster. Contact is taboo except on noses and faces. However, the girl may grasp the man's shoulder with one hand.

Women brush noses gently, first with the man on the left, then with the one on the right. Heads roll in opposite arcs while seemingly hinged at the nose. In this way heavy coats of paint and grease transfer themselves from face to face like inks on printing-press rollers.

Finally faces are mashed with an intensity which sometimes injures the features and eventually makes noses soft and flabby (opposite).

Kodachromes by E. Thomas Gilliard, American Museum-Armand Denis Expedition



Brass-medaled Chief Finds a Cheap Bandana More Alluring than Fine Paradise Plumes

Boma, a mountain chieftain, revealed unusual vanity. Once when the expedition artist painted a clan member, Boma sulked until his own portrait was done. When one of his wives received a gift mirror, he blacked her eyes until she tearfully yielded it to him.

Here the chief and a partner await the start of the sing-sing ritual. His tul-tul medal (page 442) shines below a cap of cellophane and bandana. He fastens a marsupial's gland to his ear in the fond belief that it adds to his virility.

Boma decks his nose with two slivers of gold-lip shell and a cut shell resembling a poker chip. Before the sing-sing ends he may remove this hardware for comfort.

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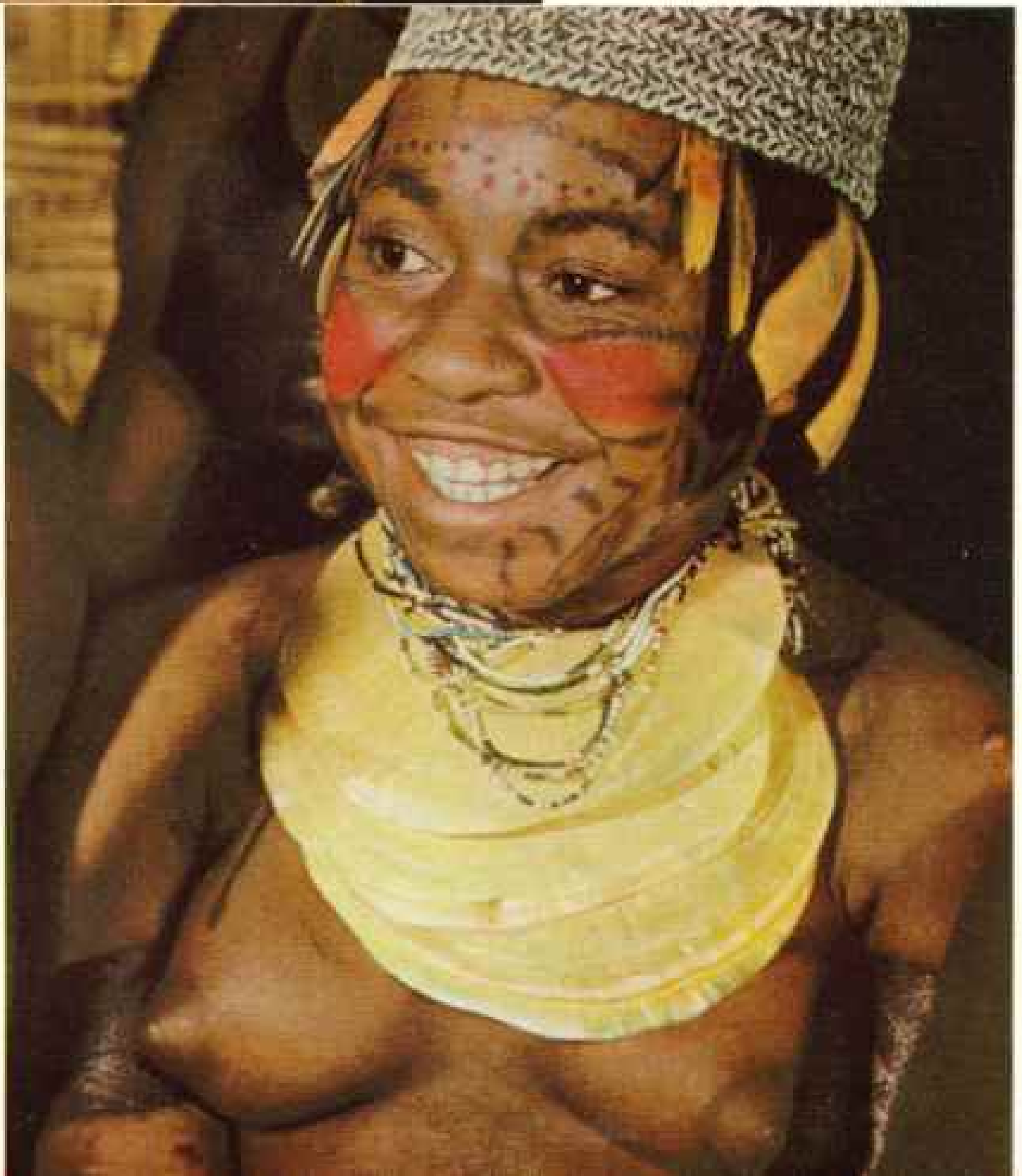

Neck Shells Say, "Pay Dearly if You Want a Wife"

A Wahgi Valley debutante does no work; she lives a merry life. Marriage in her mid-teens ends freedom and makes her a drudge. The rest of her life she gathers wood, hoes gardens, cooks meals, tends children and pigs.

The amount of shell worn by a girl measures her father's wealth and her cost. Eight gold-lip shells and eight "things" would buy this scarified beauty. A thing may be a tambu crown, a hog, an ax, a long string of cowrie shells, or perhaps a spear. Since the price of a high-class wife may add up to 800 man-days of labor, some girls are sold on the installment plan.

An unhappy bride may desert her husband with no penalty except forfeit of the marriage payment. She thus retains some control over her destiny, and in practice she subtly chooses her life partner.

gesticulation of his crest plumes, his motions as jittery as a mud wasp's.

We went on to locate three display limbs of the Superb Bird of Paradise and to attempt photographs of its dance (page 443). But our days were growing short. One morning a runner broke into camp with news, "Dry fella master and misse belong em a fall down finis along cargo balus along morningtime true." In brief, our expedition leader, Armand Denis, and his wife had landed early that morning. They would join us shortly, and we would drop our ornithological survey for the filming of the Stone Age natives around us.

Denis appeared within a few days, and we set out for Katumbag, deep in the Kubor Range. We were, beyond doubt, a cosmopolitan crew—Armand, Michaela, Carmet, Bob Doyle, Kaltenthaler, Margaret and I. Father Bodnar, and Father John Nilles, a highly trained anthropologist, often joined us.

We were, in fact, a United Nations on the march, with Czechoslovakia, Belgium, France, Australia, Germany, Switzerland, and the United States represented. For most uses French and English sufficed, but in moments of strain we tended to lapse into pidgin. It can be most expressive.

Chief Boma Holds a Sing-sing

Our goal was an elaborate sing-sing to be held in the realm of a chief named Boma (opposite). The nearer we got to his village, the sounder appeared our news sources, for from the hills around natives were trickling down to the valley, painted and feathered, greased and spruced up for a party.

Chief Boma met us affably. No shrinking violet, he more nearly resembled a walking bird of paradise. We contributed some cloth and cellophane to his costume, and Margaret handed his No. 1 wife a mirror—which he later snatched, giving the poor woman a couple of black eyes in exchange.

The preliminary daytime dances proved almost as fascinating as the sing-sing itself. From sunup to sundown three days in a row, platoons of natives pounded the dance arena with their feet, led by a chieftain who intoned a restless, repetitious chant which held all the relentless madness of delirium (pages 472 and 481).

All day long the bare feet tramped and shuffled; the red, blue, and gold field of paradise plumes nodded and swayed; the pulsing drumbeats and incessant songs wove a hypnotic spell upon the dancers. Around them crowded spectators—women, girls, children, oldsters—gaping and remarking upon one brave's agility, another's grandeur.

Then came the "long-long"—the crazy man. Daubed with yellow mud and dead grass, he charged the assemblage like a frantic, twitching, cornered animal. Though he brandished an ax and spear, the children, screaming in delight, followed him in packs.

The long-long respected neither age nor sex nor status. He attacked all with the same seemingly murderous inclination. Only the stooges who accompanied him appeared able, in the nick of time, to deflect his weapons as he was about to brain or impale some hapless onlooker. His function was to drive away evil spirits so that the coming sing-sing might be fun for everyone.

Meanwhile, the dancers were preparing themselves for the evening performance. Hiding in the forest, they spent hours primping, painting their faces, and inserting their splendid plumes. One man would help another to make up, and, as the final touch, to don his toplofty, feathered headdress.

Our own boys came to us with requests for powder paint. This they applied with patience and artistry to the sides of their foreheads, between ear and eye. As we were shortly to realize, each boy intended to transfer this coloring by contact to the corresponding skin area of his "young fella Mary," like ink rolled off a printing pad.

It was 8 in the evening before we filed at last through an excited, jabbering throng into the long, low sing-sing house. Some 20 by 40 feet in size, this hut had along its sides and across its far end a foot-high dais of woven bamboolike grass.

Pig Grease Serves as Perfume

The darkness within was lightened somewhat by two small fires. As soon as our eyes had adjusted to the gloom, we saw two young girls kneeling across a narrow aisle from each other. Now others trooped silently in and took their places beside them, about two feet apart, tucking their string aprons modestly between their legs and sitting as immobile—and as shiny—as carved wooden statues.

In the flickering light they made an entrancing tableau. An occasional girl had a bamboo musical instrument slung from her neck (page 434). Others wore crowns of tambu shell, with triangular or diamond-shaped designs in front, while a few sported crowns of cowrie trimmed with golden kapul fur.

Many of the girls had bracelets of notched wood; most had arm bands of woven orchid fiber so tight they were more tourniquet than decoration. All, without exception, had topped their toilette with generous applications of treasured pig grease.

Presently, accompanied by a sudden rustling and chattering outside, a line of handsomely decorated men pushed through the hut's small door and circled the U-shaped formation of

girls until each stood behind the partner his precedence had allotted him.

At a signal, Chief Boma sat down with his back to the aisle, a girl facing him on either side. I noted, to my surprise, that his partners were two attractive and very young belles from Katumbag; the whole group of girls ranged from about 13 to 17 years.

Soon a voice from somewhere in the hut began a singsong chant. Louder and louder it rose as the men chimed in and took up the beat. The women remained mute.

Gradually, as the music took hold, girls and men began to sway slightly. The chief's partners, firelight flashing on their tawny skins, moved whiplike with the dance's rhythm, ornaments tinkling and swinging across their breasts. Their torsos did not touch the chief's, but one gripped the old man's shoulder as if she were squeezing a grapefruit, and her nose rubbed his.

Dancing Nose to Nose

It was this nose rubbing which appeared to produce the ecstasy that seized the dancers. Man and girl would touch noses for an instant, lightly, at the beginning of the song. Then the girl, eyes closed in seeming pain, would sway ever more rapidly from the man on her left to the one on her right. Nose touched nose for longer and longer periods, until at length the girl rested against one man

for as long as five minutes, face frozen, body relaxed, nose pressed against nose with something like ferocity (pages 474, 475).

Yet, for all the intensity which the participants put into the dance, it retained an informal and agreeable air. Children raced around the aisles; old people tossed wood on the fire, chuckled and chattered among themselves; and when each bout had ended the girls broke the tension with a peal of laughter, mischievous, gay, infectious (pages 462, 463).

There is a connection, of course, between the girls' youth and their light-heartedness, a stronger one than in most societies. For in this Stone Age community the subdebs enjoy a freedom they will never know again. They are free to go or come. They do no work and are much sought after by all the men, young and old.

For two years or three or ten they continue this carefree life. Then some man buys them, and their existence as a beast of burden begins. Henceforward they gather wood, tend pigs, garden, cook, bear children and rear them, till they die.

A girl's price in marriage varies with her social status, naturally; but an average figure might be eight gold-lip shells and eight "things"—a tambu crown, a large pig, an ax, a bush knife, a long string of cowrie shells, or even a spear.

She is, if you will, a slave—yet there are

Swaying Vine Bridges Leap Broad Rivers

Expedition directors found they could not load bearers too heavily lest the human caravan break down the lightweight suspensions. Even at best, these crossings seldom last more than three years; trained crews rebuild them in half a week (page 468).

Above: Workers lace floor staves with vines. This bridge spans 115 feet. Approach trails are rutted by centuries of travel.

Opposite page: An archer working on a bridge near Kup shoots a string of casuarina fiber as a drag line for the span's heavy vine cables. Below: Bamboo abutments rise 30 feet.

E. Thomas Gilliard and Henry Kaltenthaler, American Museum-Armand Denis Expedition

limits to her bondage, and compensations. Since the courtship period is often long, the girl has some opportunity to see to it that the right man chooses her. If she is not happy after marriage, she can flee her husband and return to her old home, forfeiting only the original bride payment. And polygamy, while it forces her to share her husband, also forces her fellow wives to share the work.

Climax of the dance comes on the last day with a great feast. Pigs, corralled in a special stockade, admired and ogled with much smacking of lips, are now slaughtered by crashing blows on the forehead. Teams of men bleed them, store the inedible fat in gourds for adornment, cut the meat into chunks, and prepare the ground ovens (page 466).

Pork, à la Kubor

These ovens are hollowed from the earth itself or from tree trunks. Stones heated on cribs of burning logs are placed at the bottom and interspersed with meat, vegetables, and fragrant leaves. Then water from a bamboo tube, doused on the stones, sends up a head of steam. This is quickly and solidly capped by wet grass, broad leaves, and reeds, converting the oven into a primitive fireless cooker (pages 482, 483). In about an hour and a half the succulent feast is ready.

Distribution of the *pièce de résistance* is far from casual. Where many chiefs have gathered, and hundreds or even thousands of pigs have been barbecued, the first chunks go to the headmen. These pass pieces to their lieutenants, often on the tip of an outthrust spear, and they in turn whip out unbelievably efficient bamboo knives and carve morsels for their serfs.

The gastronomic orgy may last for days. It sometimes proves fatally wasteful of the tribe's meat reserves. But at least no part of a pig goes unappreciated. Even the entrails are carefully braided and cooked, and the tusks, hoofs, and bones are preserved for decoration. Men keep the scrotums to wear, skewered, from ear and neck, in the curious faith that they act as aphrodisiacs. Women and old men string varicolored pigtails together for necklaces.

Hemmed in by the uninhibited hospitality of these Kubor tribesmen, we soon began to feel as if we were attending a college reunion held on a subway at the rush hour. But I made a point of learning as much as I could of the manufacture and the employment of the tool which gives this culture its historic stamp, the stone ax.

I had been impressed before with the speed and ease with which a good stone-axman can split casuarina logs, even those a foot or more in diameter (page 468). The thickness of the blade, I could see, made it possible to strike the log very forcefully without getting it stuck in the wood. But I was unprepared for its sharpness. The blade is razor-keen—and it holds its edge.

Stone for the best of the work axes is quarried from the Jimmi River and at a spot halfway up the Wahgi Valley toward Mount Hagen. But only the old people seem to know how to fashion them into blades.

Day after day, one of these old-time craftsmen will sit by a puddle of water, grinding the stone upon a big, well-worn sandstone. The blade scrapes forward, turns slightly in the grinder's hand, clacks against the stone, then scrapes back upon its other edge with a hollow, grating sound. It takes almost three months of constant toil to make a good stone ax, and another week to complete a woven stock and handle for it (page 486).

Other stone implements are not common in the Kubors, but they can still be found—clubs, knives, emblems, "money," pestles, mortars, even carved birds. They are clearly the work of another age. Say the natives, "Em belong before; me fellow no savvy."

It is easier for the natives to make the elaborate ceremonial axes, with their flat, slatelike blades of softer, volcanic chert (page 487). It will become easier still for them to acquire the steel ax of the white man as he visits them with increasing frequency.

The Hollow Echo of Prehistory

I thought often of that as we turned back toward Kup for our outward flight to civilization. Following steep, narrow trails, we occasionally crossed a little valley, and from some remote pocket in the hills there would drift down the old, ancestral sound of stone upon stone, the clack and scrape, endlessly repeated, of the axmaker.

I hear it yet in my imagination. But it will not be many years before the source of this frail, fugitive echo will itself be stilled. Then, perhaps, over the whole inhabited globe a music that has been played by primitive man since the dawn of time will resound no more, and in those few of us who heard it last, the memory will fade.

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Dancers Flourish a Sacred Shield to Repel the Evil Power of Pigs

Tribal lore associates the ghosts of pigs with the souls of departed relatives. To placate slaughtered porkers, the people make *gerway*, symbolic wooden shields, and carry them during butcherings in graveyards. Once used, the shields are left to rot in a forest. There the sorcerers' taboos guard them against further use. People believe that if this ritual is not faithfully carried out, their ancestors will return to haunt them.

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Butchers Prepare a Feast; Razor-sharp Bamboo Knives Slash Pork

Orgies of cooking and eating climax days of dancing. Hundreds of pigs die a ritual death. They are sliced into chunks (above) and stewed with vegetables in hardwood pots (right). Firewood (stacked behind tree) was split by stone axes; smoke indicates the heating of stones (opposite page).

← Water Douses Hot Rocks; Steam Hisses from a Fireless Cooker

Though they will eat meat raw, highlanders go to considerable pains to cook pork for feasts. Chefs fill hollowed logs with meat and vegetables and add budding leaves of the giant breadfruit for flavor. They weave in layers of heated stones (left, below) and create steam with water from bamboo tubes (left).

↓ Capped with broad leaves, wet grass, and reeds, the pot becomes a primitive fireless cooker. This unlikely-looking contraption feeds 40 diners. The feast is ready in about 90 minutes.

Kodachromes by E. Thomas Gilliard, American Museum-Armand Denis Expedition

Startled Owl Takes Flight; Possum Uses Tail Like a Monkey

Ten species of owls, including the **Boobook** (*Ninox theomacha*, above), occur in New Guinea. Highland men wear the wings spread like sails (page 469). **Carol's Ring-tailed Possum** (*Pseudocheirus caroli*, left) makes a cat-size, silky-furred pet. People in Kup carry such balls of fur on poles like hobo sacks. "He is my baby," they say.

Evil Gleams in a Killer's Eye: the Village Cassowary

Flightless cassowaries are valued for headdress plumes and nose quills. A grown bird is worth a wife or 500 man-days of labor.

When young, **Bennett's Mountain Cassowary** is treated as a pet. Natives seem unconcerned that as the birds mature they may become as dangerous as vicious dogs.

This 100-pound specimen of *Casuarius bennetti*, wearing helmet and nose shield like a football player, has a bloody history. In 1950 he disemboweled a man with his knife-like talons. Two years later he struck again.

"As I photographed him," says the author, "groans and windy sighs came out of his innards. He moved deliberately, placing each foot carefully. Then without warning the bird jumped a low fence and struck an old woman with his weaponlike feet. She fell screaming, her abdomen punctured and one arm slashed to the bone. If left to the witch doctors, she would have died, but the expedition's penicillin pulled her through. To our amazement, the bird continued to run free."

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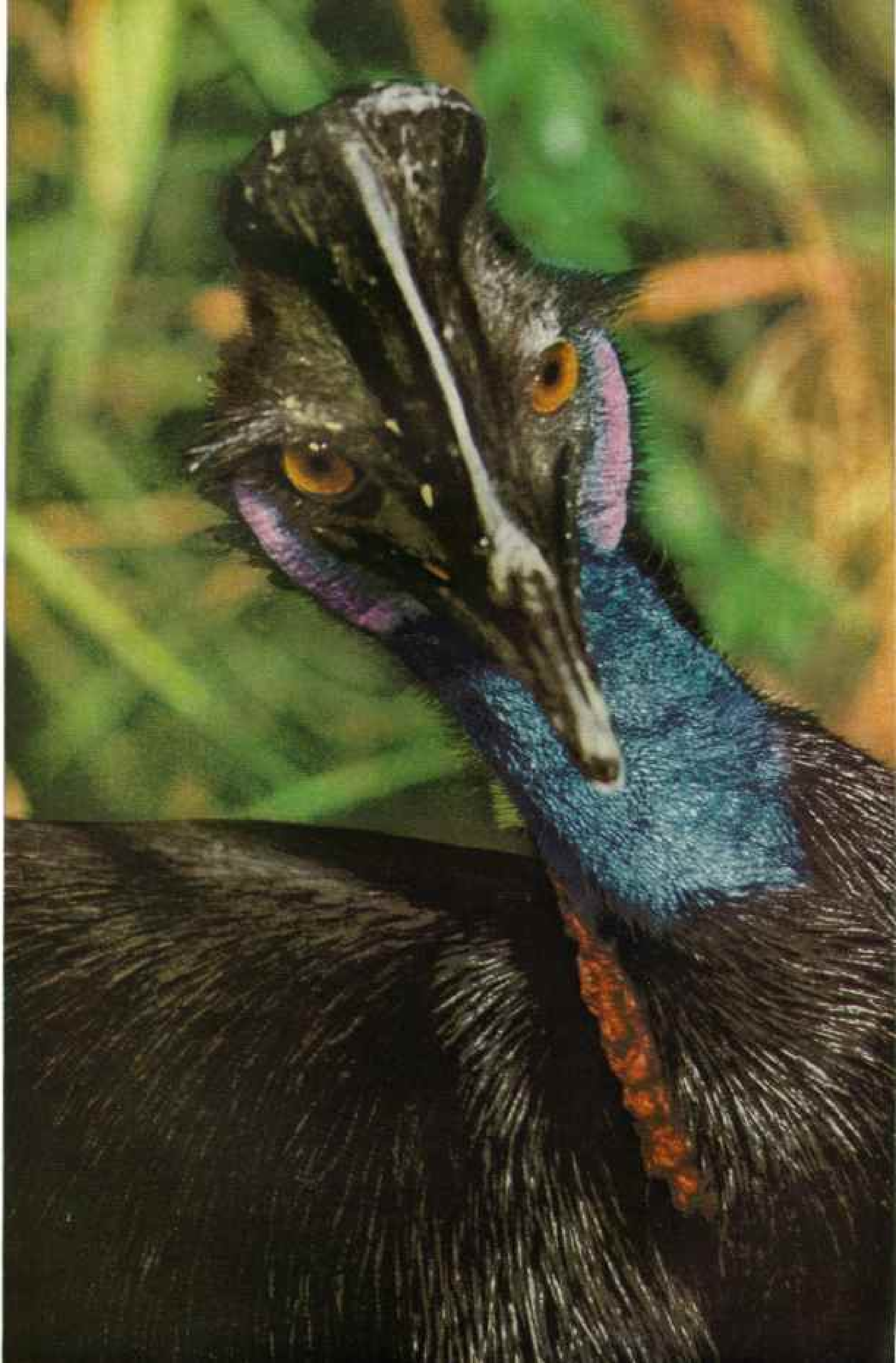

Only a Few Oldsters Retain the Secret of Making Stone Axes

Stone blades still chop logs and cut trees in the Kubor mountains. The rapidity with which they split foot-thick logs is amazing. Thickness of the blade permits forceful swinging without sticking. Flint-hard stone used in work axes stands up under continuous pounding (page 480).

Mountain men did not immediately abandon stone when they learned about steel. A few old chiefs retained their prejudice for years. Today every man covets the imported ax. Of the older men who used to grind stone heads, only a few are left. This artisan, commissioned by the author, ground steadily for three months to make the blade below. Similar implements are still used in bridge construction (pages 468, 479).

Museum Pieces Attest a Bygone Culture

Mortar and pestle date back possibly a thousand years. When asked about them, a chief shrugged and said, "Em belong before; me fella no savvy." His pidgin English meant, "They belong before my time; I know nothing about them." Scientists believe these grinding tools indicate the existence of an earlier and different culture.

Broken bits on the table are pieces of war clubs and a knife.

Elaborate ceremonial axes are made of soft volcanic stone and covered with orchid stems or bands of fur.

This craftsman holds a ceremonial ax in his right hand. In his left he admires a lighter stone work ax.

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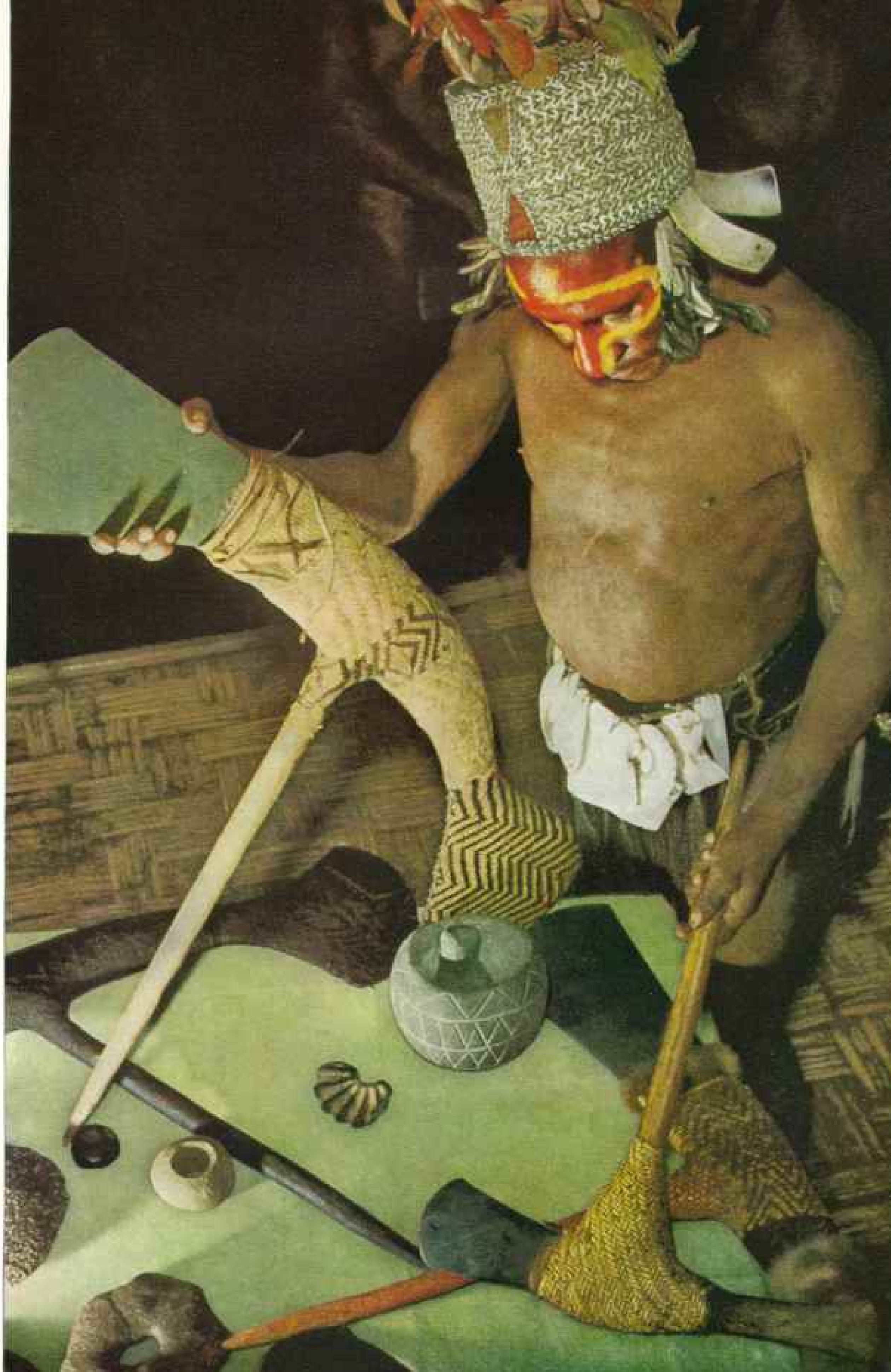

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Palm Nuts Click Like Castanets When a Warrior Walks or Dances

Long chains of these nuts are suspended from the neck or draped over a shoulder and allowed to hang to the knees. King Parrot feathers festoon the man's temples. Paint and grease have been applied so liberally that they dribble onto his chin guard.

Man Competes with Parrot in Flamboyant Exhibition

Opopsitta diophthalma, the **Double-eyed Parrot,** became a camp pet, as did two cockatoos. The latter were as destructive as they were amusing. Their strong beaks chewed hats to shreds and even mangled thick rubber cables of the photographers' lights.

Three Months on an Arctic Ice Island

Floating on a Glacial Fragment, U. S. Air Force Scientists Probe Top-of-the-World Mysteries Within 100 Miles of the Pole

By Joseph O. Fletcher

Lieutenant Colonel, United States Air Force

HIGH over the cold, vast Arctic Ocean, the radar officer in a converted B-29 Superfortress droning toward the North Pole stared unbelievingly into his scope. There, outlined against the characteristic pattern of the ice pack, was radar's picture of land—an island rising from deep sea where no land should be.

Quickly the airman called the plane commander on the interphone and verified the position as 300 miles north of Point Barrow, Alaska. He sketched the discovery on his chart and marked the date—August 14, 1946.

I think this marked chart and accompanying report, turned in by the 72d Photo Reconnaissance Squadron at Ladd Air Force Base, Fairbanks, Alaska, should rank with the important documents of Arctic exploration.

This young American had not discovered new land, as he believed. But he had provided a key which was to unlock one of the Far North's old mysteries and give his country a valuable base closer to the Pole than men had ever lived in comfort and safety.

For me personally, that key opened the door to a white world of scientific discovery and adventure. I was first commander of America's northernmost outpost, and for a quarter of a year lived 150 miles and less from the very top of the world.

"Land" That Moves with Arctic Winds

After the B-29's return other airmen roared over these northern wastes to confirm the existence of what was now termed "Target X." They looked down on the robin's-egg blue of lakes, the steely glint of rushing streams, and a coast 20 to 40 feet high rising from the tumbled sea ice of the polar pack.

Rocks, they reported, jutted from a wind-swept plain. Patches of earth showed darkly. In vain did the pack, destroyer of explorers' ships, attack the island's shores. Giant fragments piled under coastal cliffs attested the strength of this 200-square-mile mass.

But, mysteriously, it was several miles from where it had first been plotted. There could be only one answer. Target X was a drifting island of ice!

"Ptarmigan" flights—planes sent regularly over the North Pole by Air Weather Service to observe conditions there—were alerted to watch for more ice islands. They found two other large ones drifting far from land in the central Arctic basin. Canadian flyers later discovered some 40 smaller fragments in the channels of their country's Arctic archipelago.

Gentle parallel swells, or waves of ice, from a few inches to 15 feet high and from 800 to 1,000 feet apart, crossed the islands' relatively flat surfaces. Imperviousness to the battering of the pack suggested frozen fresh water, harder and stronger than salt ice. Thicknesses of 200 feet or more, 20 times that of the sea ice, were deduced from their height above sea level.

Peary's Explorations Give a Clue

Somewhere along an Arctic shore a giant glacier must be spawning these immensities. But where was such a glacier? Narratives of early explorers supplied an important clue.

Lt. Pelham Aldrich, member of the British Arctic expedition headed by Sir George Nares in 1875-6, and Rear Adm. Robert E. Peary 30 years later, had seen a unique ice foot, or shelf, fast to Ellesmere Island's north shore and extending far seaward. This was apparently a glacial remnant, part of the prehistoric ice that once covered Ellesmere and the surrounding sea as an icecap now covers the interior of Greenland (page 494).

A puzzled Peary wrote a description of the shelf that perfectly fits today's ice islands. Later we were to land on Ellesmere ourselves, and, by comparing corings, match islands to the glacial shelf still extending 10 miles to sea in places.

It is thus still true that there are no icebergs in the Arctic Ocean; bergs as we know them in the Atlantic break from "live," moving glaciers when they reach the sea. Arctic ice islands, much older and larger, have split off from the dead Ellesmere shelf. The process must have been rapid since the turn of the century, for Peary described a far more extensive ice foot than now exists—further evidence of a steady warming in the Arctic.

From a geographer's point of view, the most interesting result of recent ice island studies is a possible solution to mysteries of "new lands" never seen again after "discovery." Crocker Land, sighted by Peary in 1906 and marked on Arctic maps until Comdr. Donald B. MacMillan in 1914 disproved its existence, may well have been an ice island.

Fletcher's Ice Island, a United States Air Force Station, Drifts Near the North Pole

Born of an ancient glacier, this 150-foot-thick slab of fresh-water ice gave Americans a floating but stable platform to establish camp and make a leisurely study of the secrets of the inhospitable Arctic Ocean. Air Force planes like this parked C-47 had no great difficulty landing even before a runway was leveled. Tumbled salt-water pack ice, which discourages permanent stops at the top of the world, grinds at Fletcher's far shore. Distant camp shelters scientists taking records of weather, ocean, and ice. Two tracked weasels dot the trail.

So might Keenan Land, President's Land, and Sannikov Land. Takpuk Island certainly was. Its discoverers, an Eskimo, Takpuk, and the crew of his sloop, landed there in 1931, photographed it, and left still thinking it was land, but their photographs show an ice island.

No discredit reflects upon the brave and experienced Arctic explorers of another day. Men of the Air Force, including that radarman, can testify that ice islands closely resemble land, particularly when the viewer is walking around on one on a summer day.

Air Age Overcomes Ice Barrier

Discovery, history, old mystery are one thing; our Air Force missions of today and tomorrow another. What use could be made of ice islands in the Arctic, repository of vital secrets of ocean and weather?

For more than 2,000 years the unpredictable pack had denied man more than brief and hazardous visits to its domain. To this day, no ship can smash through it at will. Some have managed to buck and thread a way into the ice in summer. Winter locked them fast; the fortunate ones came out again, but many fine vessels perished.

Lt. Comdr. George Washington De Long's *Jeannette* was crushed in 1881, a mishap which cost the gallant naval officer his life. In the same year Leigh Smith, an intrepid Arctic explorer, lost *Eira*, a specially built steam yacht, which sank in two hours. Some seven years earlier *Tegetthoff*, under Lts. Karl Weyprecht and Julius Payer of the Austrian military forces, was crushed and abandoned.

The British have left many ships in the Arctic, among them the ill-fated Sir John Franklin's *Erebus* and *Terror*. Other casualties are *Karluk*, used by Vilhjalmur Stefansson's Canadian Arctic Expedition of 1913-1918, and the Russian icebreaker *Chelyuskin*, smashed in 1933.

U. S. Air Force, Official

Airmen Bundled Against Minus 20° Cold Survey Their Snowbound Domain in the Polar Sea

Explorers may well have mistaken ice islands for land; they inked Arctic charts with "discoveries," only to have them vanish before the next man appeared. In 1946 the Air Force determined such objects were adrift, and in March, 1952, a ski-footed C-47 left three Americans on island T-3 to man a station (page 493). One of them was the author, Lt. Col. Joseph O. Fletcher (left), for whom the spot later was named. Lt. Col. Jack W. Streeton (right) was able to land this C-54 on wheels because a snow path had been smoothed.

Sledges can move perilously across the pack, but they carry little. The men who first came by air had no stable platforms for their camps, supplies, and scientific instruments. But here, at last, in the form of ice islands, were the platforms.

In January, 1952, the Alaskan Air Command organized "Project Icicle." Its mission was twofold: to establish on an ice island a weather-reporting station for Air Weather Service and a geophysical research base for Air Research and Development Command. I was placed in charge.

A first consideration was selection of the island. Of the three in the polar sea, old Target X, now named T-1, had drifted back home to Ellesmere. T-2, which squarely crossed the geographical Pole, was leaving our field of action (page 497 and map, page 493).

We took T-3, about a quarter the size of T-1 and slightly more rugged of surface (pages 490, 495). By the time we were ready, it should be 120 miles from the Pole, although this was of no practical importance as long as the island stayed well at sea in an area where no weather data were being obtained.

Preparations kept us at Ladd Field during January and February. Then we flew to Thule, in Greenland, an Air Force base so new that we pioneered the supply route from Alaska.

Scouting an Icy Future Home

On March 14 we judged it time to scout our island, unseen for three months. A flight of 975 miles brought our four-engined transport over it at 88° 17′ N., 166° 13′ W. As nearly as we could judge, it had not changed a whit since it was photographed a year before.

Only at the tips of the irregular ellipse were the island's ice ridges too high for safe landing. We agreed it would not be difficult to bring a ski-equipped C-47, grand old twin-engined work horse of the armed forces, down onto the packed snow surface of T-3.

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U.S. Air Force, Official

Saw and Shovel Build a House of Snow Blocks to Shut Out Icy Winds

Copying the Eskimo, Fletcher's Island settlers worked without lumber or nails. When snow walls melted in summer, the men put up empty fuel drums in their place. Hard blue glacier ice formed floors, and tarpaulins made roofs. When this airman finished the hut, he tunneled a passage to the canvas-covered house in the rear. Snowshoes (jammed into the snow) enabled him to cross drifts (page 499).

Our firsthand view of this enormous slab of glacier majestically grinding its way over the roof of the world gave substance to hours of briefing, discussing, and training. An enthusiastic party returned to Thule. Once more we reviewed our plan.

Clear weather and good light would be essential for the landing. With Maj. Gordon F. Bradburn, who would command the three aircraft we planned to use, I consulted weather forecast and air almanac. On March 19 we would go, just before the spring solstice when the sun would again return to the Arctic from its long winter sojourn in more southerly latitudes.

At 8 o'clock of the appointed morning the heavily laden planes thundered off the runway into the crisp air. We were on our way at last.

Only our C-47 was to land. Two of the three men it would leave on the ice were working passengers. To save weight, Capt., now Maj., Marion F. Brinegar, known to colleagues in the 10th Air Rescue Squadron as "Ice-pack Mike" because of his prowess as an Arctic camper, doubled as second navigator. I was radio operator. Dr. Kaare Rodahl, physician and research physiologist from the Air Force's Arctic Aeromedical Laboratory at Ladd, had no flying duties.

General Flies as Copilot

Capt. Lewis Erhart flew the ship. Characteristically, Maj. Gen. William D. Old, head of the Alaskan Air Command, had decided that he would allow no one under his orders to take risks he would not take himself; he flew with us as copilot.

One of our two four-engined planes (C-54s), with Capt. Edmund G. Smith at the controls, was to fly ahead. "Smitty," as we called this son of the South, would find T-3, then

guide us to it with high-frequency radio homing devices. We were to set down for gasoline cached earlier on the sea ice near Cape Sheridan, Ellesmere Island. On the way we would fly over Cape Sabine, where 18 members of Maj. Gen. A. W. Greely's Lady Franklin Bay Expedition died in 1884.*

High aloft, the wind blew strong out of the north. Dodging it, we went out very low. Already difficult navigational problems were made worse by clouds and haze blotting out the sun on the horizon. The twilight glow dimmed the stars we might have used for celestial reference. Navigation became mostly dead reckoning.

Island Lost in Arctic Twilight

It surprised no one, but nevertheless added to the mounting tension, when Smith was unable immediately to find T-3. Then, strikingly incongruous in these parts, came an Arkansas drawl in my earphones. "Over T-3," said Smitty.

"Good!" broke in Bradburn from the other C-54. "How does it look?"

"Cold," reported Smitty, "and there's nobody there."

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Drawn by Irvin E. Altman

Ellesmere Mothers the North's Ghostly Ice Islands

Breaking from Ellesmere's ice foot, remnant of an ancient glacier (page 494), three huge masses have drifted in the polar basin since 1946. T-1, the initial discovery, swept a 1,600-mile course, then ran aground off Ellesmere. T-2 directly crossed the Pole. Traveling about two miles a day, T-3 (Fletcher's Ice Island) has backed and filled, circled and pushed along a 2,400-mile path. The only island manned, T-3 saw its first airborne pioneers in 1952. They came from Thule, Air Force base in Greenland.

In less than two hours that lack was remedied, and routinely enough. First, smoke bombs out the door to get wind direction. Next, circles at 300 feet while Erhart picked his spot. Then came the sensation of sudden slowing that showed flaps were down, a few tentative touches with the skis to test the snow, and finally the soft thud of landing.

For a moment after the ship skidded to a stop no one moved, affected by the realization that at last we had reached our objective. Then we piled out in an eager rush.

My first impression was of cold striking with chilling force even though the wind was a mere 10 miles an hour. We estimated the temperature to be minus 50° F. My next reaction was apprehension: General Old was prepared to order us back into the air if our survival appeared doubtful.

He looked around and grimly shook his head. "I don't see how anybody could live here. Better get out—if we can," he said.

Following him back along the plane's tracks, I agreed that landing in the snow with heavy aircraft bringing equipment would be difficult, but pointed out we had made plans for dropping almost everything by parachute.

"We'd feel awfully bad to leave now," I said to the general.

"How do you know the others want to stay?"

I put into words the anxious looks my companions had given me when we walked off over the snow. "They've already told me."

* Major General Greely, leader of the expedition to the farthest-north point reached up to that time, 83° 24', later became one of the founders and a life trustee of the National Geographic Society.

Canada Collects No Real-estate Taxes on Desolate Ellesmere

Once Ellesmere Island lay beneath a glacial icecap like Greenland's. Retreating as the Arctic warmed, the prehistoric glacier dwindled to mountain areas and the ice foot, a thick offshore shelf retaining a frigid grip on land. At intervals huge sections like T-3 break off and drift away.

This air view of the north coast, taken in the vicinity of Ward Hunt Island, shows the line between the solid, thick, fresh-water ice foot and the thinner, shifting, salt-water pack, which is broken by water gaps known as leads. Though the pack appears fairly smooth, it actually is a welter of pressure ridges and hummocks (page 503). This jumbled wilderness presents no discomfort to flyers, but it offers an almost impassable track to men afoot.

Peaks in the Challenger Mountains rise at the shore line. Admiral Peary, who had no planes to lift him aloft, sometimes found the ice foot an easier highway than this rugged land. From near-by Cape Columbia (page 502), he left land and glacial shelf to begin his successful sledge journey across sea ice to the North Pole.

Ellesmere's north coast has no permanent inhabitants. American and Canadian military forces jointly operate weather stations at Alert and Eureka, and the Royal Canadian Mounted Police maintain a detachment at Craig Harbour. Greenland Eskimos occasionally migrate to hunting camps along Smith Sound (map, page 493).

Maynard M. Miller

Winter Locks T-3 in the Ice Pack's Frozen Grip

The Air Force had not made its 1952 landing when this picture was taken. An artist has drawn in installations. Here, on a wintry April day, the pack shows little of the open water seen on the facing page.

Viewed from 18,000 feet, Fletcher's Ice Island presents the effect of a lake frozen smooth in a treeless, skate-scratched wilderness.

Cliffs, hillocks, and surface swells fail to stand out. Similarly, Fletcher's true size is not apparent. If a man followed the shore line, he would walk 30 miles in circling the island.

Softer salt ice of the pack fails to wear away Fletcher's hard shores, and summer thaws erode but a fraction of its bulk, about eight-ninths of which hides beneath the sea. Consequently, the island could drift indefinitely unless it dipped into a warmer clime. Now T-3 seems to be starting its second known circuit of the Arctic basin.

Fletcher's Island is not always easy to pick out from the air. It may be lost to sight beneath whirling snow. Arctic "whiteout," the destroyer of shadow, may cause it to blend into the seascape. Such difficulties sometimes leave radar the sole means of locating the target. Today T-3 is equipped with radio homing devices to guide aircraft.

U.S. Air Force, Official

← Food and Fuel Drop Like Manna out of the Sky

Even delicate machinery has been parachute-dropped onto Fletcher's Island. Some bulky objects, slipping from lashings, fell but landed in the crusted snow undamaged. Flyers, learning from such accidents, delivered other supplies by free fall. Here two men (left) await food and fuel flown from Thule, Greenland.

Below: The Stars and Stripes fly over Fletcher's, the United States' northernmost outpost. Skis and ski poles (center) stand upright lest they be lost in drifting snow. Tarpaulins cover storehouses (page 492). Empty fuel drums will mark trails. The tracked weasel was carried in by a cargo plane to level runways in the snow. The box on four legs shelters weather instruments. Airman at lower right builds a tower for a wind-driven generator.

↓ T-2's Icy Face Is Wrinkled with Age

This 250-square-mile cake bears the washboard appearance characteristic of all the ice islands. There is little doubt that these parallel furrows originated at Ellesmere, where the shelf is creased in similar fashion, but man can only guess how or when they grew.

T-2's ridges stand 800 to 1,000 feet apart but, despite appearances to the contrary, they rise only a few inches. Summer fills them with thaw water. Dark rivers, 300 feet wide, run counter to the prevailing parallels. The ice pack's open water shows up as dark patches in background.

Maj. M. P. Bringsaar
R. D. Conti

U.S. Air Force, Official

A. P. Gray

River, Earth, and Boulders Heighten the Illusion that Fletcher's Ice Rests on Land

Solid ground—the ocean's bottom—lies 12,000 feet below the island, so the rocks scattered on its surface must have been deposited by an Ellesmere glacier. Above: A spring freshet carved this channel. Distant hump wears a cap of unmelted snow. Below: Airmen vainly tug at a boulder. Tundra, the dog, is Colonel Fletcher's pet.

Lt. Col. Joseph O. Fletcher

"All right," capitulated the general. "I guess, if we had to, we could get you out somehow."

Fluorescent flags were set out in the snow to mark a drop zone; on it the planes circling above parachuted fuel for the C-47 and supplies for us. Erhart and General Old maneuvered the ship into take-off position. A final good-by and it was off, hurled into the air by four JATO (jet-assisted take-off) units. The sound of engines died in the distance. We three were alone.

Knowing that raging arctic gales could shriek down with scant warning, we set about digging in. Our first shelter was a double-walled mountain tent, regulation government issue, with tarpaulin floor. We banked the outside with snow.

Inside, we wriggled into two-piece GI "mummy bags," over which we drew larger sleeping bags, keeping our arms free.

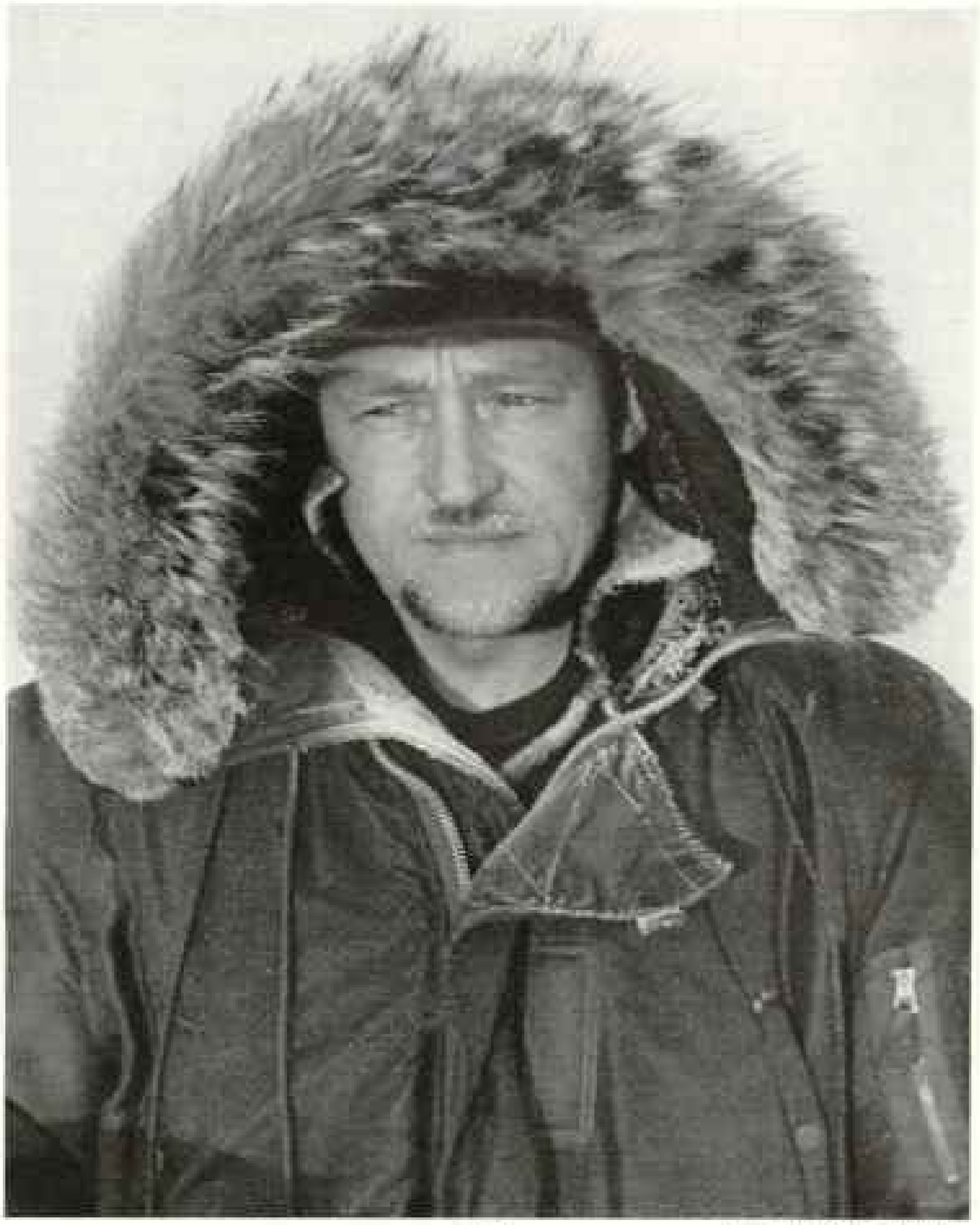
Not until then did we start dinner. Like many Arctic travelers before us, we had trouble lighting the primus stove, partly because of our cold clumsiness and partly because the kerosene fuel showed a tendency to solidify. However, we managed a first meal of frozen sausages, crackers, fruit, and hot chocolate.

Already in bed, we drifted after dinner into sleep interrupted by sharp sounds, like the popping of pistol fire, caused by the cracking of ice in the extreme cold. We found that the shooting gallery shut down as soon as the weather became a trifle warmer.

Exploration began in earnest the next morning. The first discovery was that the dry snow, of sandlike consistency, was a few inches deep along the ridges, three feet in the wave troughs. Feet shod only in Eskimo mukluks went through the surface crust, leaving us floundering. We put on snowshoes.

Carrying rifles and a portable two-way radio, we headed for the sea ice at the island's edge. It took us two hours to cover two miles, with frequent stops to thaw frostbitten noses and cheeks. This was to be our coldest day, much colder than when we had landed.

Vapor trails appeared high in the sky. The walkie-talkie soon put us in prearranged touch with a Ptarmigan flight, and we assured its crew that all was well on T-3.



499 From Maj. M. F. Brinegar

Frozen Breath Whitens Mustache and Beard

Maj. Marion F. Brinegar, one of Fletcher's Island's first settlers, looks out from a regulation Air Force arctic flying parka trimmed with Alaskan wolf fur. He wears long woolen underwear, sweater, and flying suit beneath the parka. Four pairs of wool socks, felt slippers, and mukluks protect his feet. Zippered pocket on left sleeve holds cigarettes and lighter.

Weather Planes Keep in Touch

This and later contacts with Ptarmigan planes brought us more than official messages. Dr. Rodahl received word from the sky that he had become a father. The foresighted scientist rummaged in his luggage and came up with the traditional box of cigars.

For me in particular there was reassuring warmth in the sight of sturdy ships overhead and the sound of friendly voices on the radiophone. I had commanded this fine Arctic flying unit, the 58th Strategic Reconnaissance Squadron (Weather), for the two years

preceding my assignment to Project Icicle, and I knew every man in the squadron.

One of the pilots who regularly looked down on us, Maj. James W. Soderberg, had been my operations officer and my next-door neighbor at Eielson Air Force Base near Fairbanks. Never had I found him wanting; it was good to know he was still near, ready and able to help if help was needed.

As the ship overhead passed on, we continued our first ice island exploration. From the vantage point of a 40-foot ice peak on the shore, we looked out over the pack. It was a wild panorama—grotesque white ridges as far as the eye could see, one large lead of open water in the distance, immense blocks of ice lying in 30-foot-high masses.

"How would you like to drive a dog team over that?" I asked Kaare and Mike, thinking of the indomitable explorers of yesteryear.

"I'll take the airplane," said Rodahl.

Sight of the frigid chaos, in which anything wearing a white fur coat could easily escape detection, brought up the subject of polar bears. Dr. Fridtjof Nansen had met them above 84° N., and some of his companions had been deliberately attacked by a hungry bear.

Dr. Nansen commanded the specially built Norwegian ship *Fram*, purposely frozen into the pack toward the end of the last century. She drifted across the Arctic, becoming the outstanding exception to the rule that ships cannot survive the grip of the pack.

During our stay on the island we never saw a bear, nor a fox, whale, seal, or other living creature larger than a sea bird. But a few days after our first venture afield, we did find large bear tracks and signs of fox close beside our trail. Such evidence is soon drifted over by wind-driven snow.

In the warmer months small translucent shrimp were abundant in leads near the island. Those who manned T-3 after my return to the United States in June found the remains of what appeared to be a lemming, and of fish on the glacial surface after the snow and some six inches of island itself had melted off.

Arctic "Whiteout" Shrouds Island

A pair of caribou horns emerged from the ice one warm day. Possibly the caribou was still frozen below them, but excavation was postponed until the summer of 1953 (page 503).

Many explorations followed the first one. Soon we met the Arctic "whiteout." Wrote Admiral Peary, describing the conquest of the Pole in the National Geographic Magazine for October, 1909:

" . . . we experienced that condition, frequent over these ice fields, of a hazy atmosphere in which the light is equal everywhere. All relief is destroyed, and it is impossible to see for any distance."

It was an apt description. We found that when thick clouds obscured the sun no shadows were cast to reveal hummocks, drifts, and depressions in the snow. Everywhere there was only whiteness.

We stumbled into drifts and tumbled into holes. In the whiteout, a man out of sight of camp would be hopelessly lost without a compass. Small, dark objects were visible at a surprising distance and often appeared many times their actual size.

Population Jumps Two-thirds

April 1, thirteen days after our landing, was a red-letter day. The C-47 returned, carrying geophysicist Albert P. Crary, of the Air Force Cambridge Research Center, and Capt. Paul L. Green, communications officer. They brought our permanent radio station, the first of the weather and geophysical equipment, and replenishments for the larder.

Camp by now consisted of two 12-foot-square tarpaulin-roofed huts of snow blocks and two tents. The second tent became our kitchen, complete with oil stove. One hut was a storeroom. The other, connected to the first by a tunnel, was intended for emergency shelter, but we moved into it bag and baggage the day after the first real storm.

The island acquired a name. Newcomers carried written orders from Alaskan Air Command sending them to "Fletcher's Ice Island." Crary had a neatly lettered sign to go over the door to headquarters.

We said a fond good-by to Dr. Rodahl and a few days later, with the arrival of Robert D. Cotell and First Lt. Robert R. Danner, we saw Mike Brinegar off. Officially, the scouting party had been replaced with a permanent one—Crary, his assistant Cotell, Green, Danner, and me.

During the next three months we worked long and hard. Many with whom I have talked since my return to the United States were skeptical when I told them we never found time heavy on our hands, were never bored. There was always plenty of work to do; and we never had time to become irritated with one another's constant proximity.

Rank disbelief often greets my assertion that after the first few weeks we were very comfortable. Our supplies—clothing, equipment, food—were the best. Our permanent station had everything we needed.

One of three insulated huts 16 feet square, flown to the island in sections and assembled on hard blue ice scraped clean of snow, became a combined kitchen and assembly room. It had a modern oil range, washing machine with drier, fluorescent lights, electric food

U.S. Air Force, Official

Americans Stand on the North Pole for the Second Time in History

This Air Force party duplicated in a day the feat which cost Admiral Peary weeks of weary sledge travel. The men flew 100 miles from Fletcher's Island, landed on the polar ice, and made scientific observations. Colonel Fletcher (in sweater) kneels at right. Other T-3 pioneers are Albert P. Crary (fourth from left) and Robert D. Cotell (standing, right). Lt. Col. William P. Benedict (insignia on cap) piloted their plane.

mixer, phonograph, and comfortable furniture.

A second hut was sleeping quarters; the third, our all-important laboratory. In it were weather station, radio, and geophysical equipment. Captain Green broadcast important weather data every six hours.

Between broadcasts he talked to radio hams all over the world. Offhand, I can recall conversations with people in Japan, Scotland, and Nairobi, Kenya. When conditions were good, amateurs in the United States helped complete telephone calls to our families.

Scientific instruments were calibrated and repaired at a compact workbench in a corner. Instruments within and without the shack measured atmospheric pressure, temperature, humidity, and wind velocities. We shot the sun regularly for observations of terrestrial position so we could determine movement of our island and the pack.

Because of the rotation of the earth, our frozen home appeared to drift about 40° to the right of wind direction, and at about 1/45 of the wind's speed. Main cause of the island's movement is wind; consequently it was an erratic traveler, but it averaged one-and-a-half or two miles a day.

We found no clear trace of sea currents, except those induced near the surface by the wind.

The little known Arctic Ocean on which we floated was the special province of Crary and

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U.S. Air Force, Official

Air Explorers Cross Admiral Peary's Sledge Trail on Ellesmere Island

Admiral Peary fixed the date of his arrival at Cape Columbia as June 8, 1906. Other members of a subsequent Peary expedition erected the marker in 1909. Flying from Fletcher's Island, the author (left), Colonel Benedict, and First Lt. Herbert C. Thompson (background) landed to investigate strange objects on the ground. Besides the Peary memento, they found a cairn left by Danish Adm. Godfred Hansen in 1919.

Cotell, who set up hydrographic equipment on the thin sea ice. They measured temperatures and salinity at various depths.

Up to the time we moved onto the island, depths had been measured at only a few places in this vast sea. We took scores of soundings, using seismic equipment. Although the bottom was generally flat and more than 12,000 feet down, here and there mountains rose to within 7,000 feet of the surface.

Submarine Grand Canyon Discovered

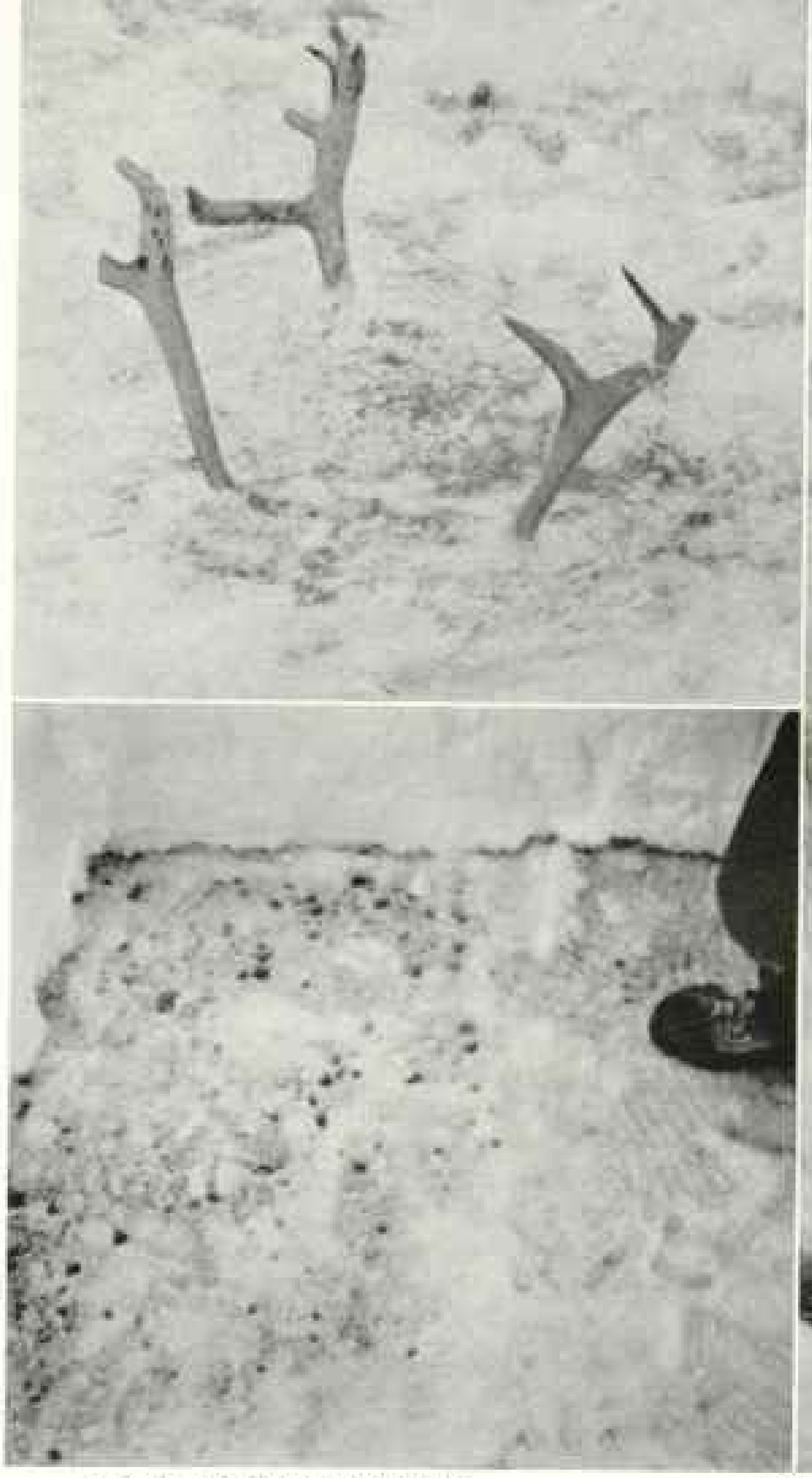
Crary discovered a giant submarine canyon; altogether T-3 drifted seven times over its sheer precipice, which was more than 4,000 feet high. Samples of the bottom were brought up; plankton was strained out of sea water from many depths.

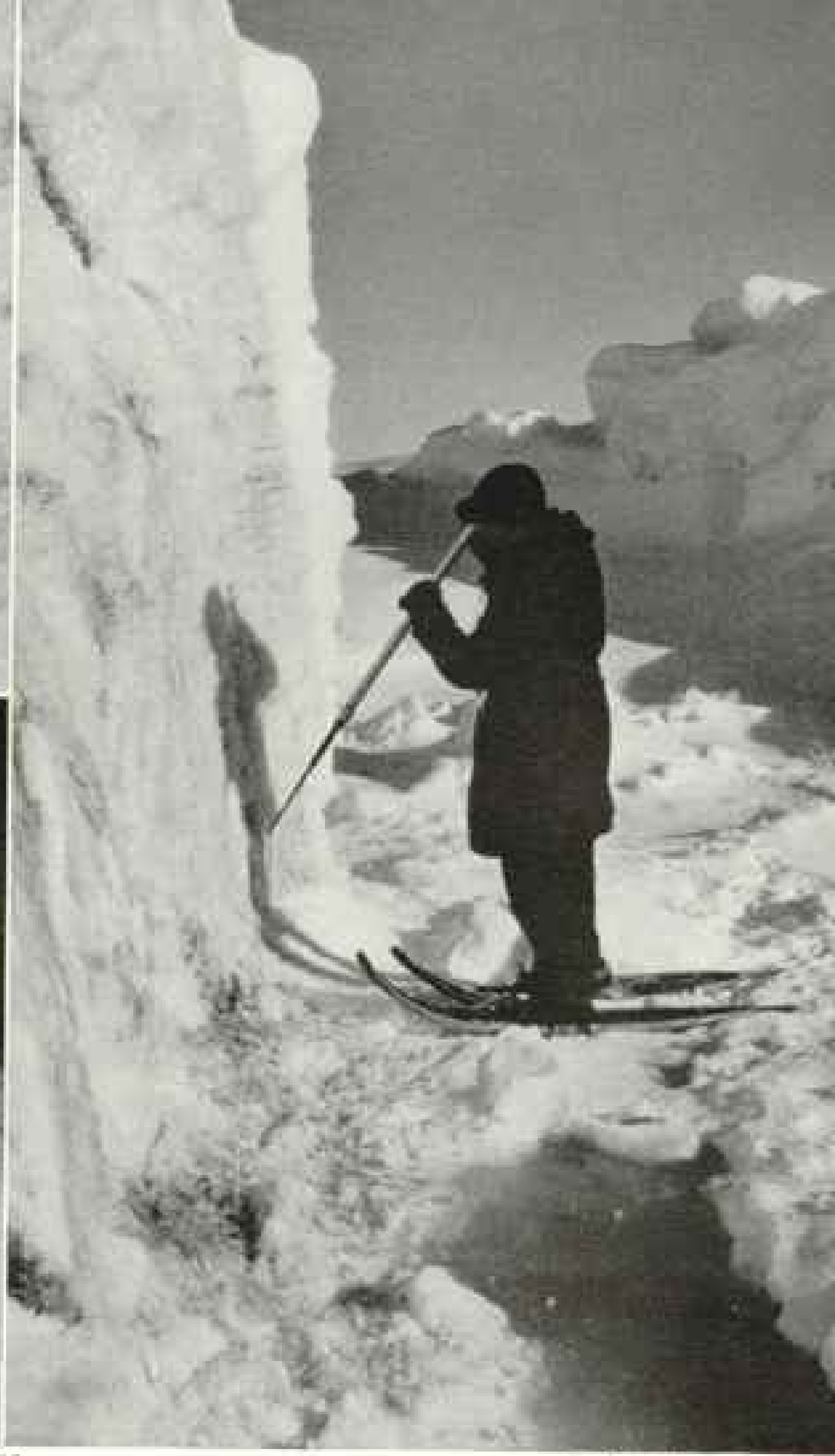
Fresh water was plentiful. All we needed to do was locate a subsurface lake, a pocket of crystal-clear water trapped in our glacier, and dig down to it.

During the cold period, we noticed that we developed a craving for fatty foods.

Two of the versatile weasels, tractor-type vehicles ideal for snow travel, were flown in. They were kept in a garage of snow blocks, in which we also set up the electric-generating plant. Heat from the generator kept the weasel engines warm, so they started easily. With them we smoothed a landing strip.

One day we had visitors from the Navy. Out of the polar sky dropped two planes of its Ski-Jump II project, which is devoted primarily to oceanographic research. One had engine trouble; its crew stayed with us three weeks while a new engine was flown in by the 54th Troop Carrier Squadron.





A. P. Crary, Lt. Col. Joseph O. Fletcher

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R. D. Cotell

Summer Thaws Bare a Caribou's Antlers. Fletcher's Cliffs Tower above the Ice Pack

Mr. Crary stands on the sea ice and picks at T-3's perpendicular coast. Ocean water bubbles through a dark hole at his feet. The pack's tumbled pressure ridge (right) took shape under a tremendous squeeze from the sea. Small holes in the lower left formed when bits of earth absorbed solar heat and melted the ice. The caribou died when T-3 belonged to Ellesmere, and winter sealed him in a deep freeze.

Another time two aircraft on skis winged in from Alaska headed for the North Pole. This was an Air Force mission, and several of us from Fletcher's Ice Island went along. It was entirely successful, thanks primarily to the fact that our drifting base, with all its facilities and comforts, by then lay about 100 miles from the Pole (page 501).

We flew to T-1, and to Ellesmere and its glacial shelf. Flying over bleak Cape Columbia, we saw a marker of some sort and a crude tripod below (opposite). Landing, we found a signpost left by a Peary party in 1909 and sled runners projecting from a cairn built in 1919 by the Danish explorer Adm. Godfred Hansen.

In June the temperature on the ice island climbed to freezing and above. Bright blue lakes formed in hollows. Draining them, small streams rushed pell-mell to the sea, cutting tunnels and miniature canyons (page 498).

Snow-block walls melted but were replaced with empty fuel drums from a steadily growing collection. Small, dark objects lying on the ice sank beneath the surface. Instead of reflecting the sun's heat back into the atmosphere, as did the ice on which they lay, they absorbed it. Thus warmed, they melted the ice beneath them and dropped into tiny wells of their own making.

This familiar phenomenon came in handy for playing jokes on visitors. We told them the holes were ice-worm burrows. To lend credence to the tale, we froze spaghetti into ice cubes served at table and apologized profusely to our aghast visitors for our "careless" kitchen inspection.

Late in June came orders for Cotell, Green,

and me to leave. We went reluctantly, replaced by an augmented crew with still more equipment for probing sea, ice, and sky.

As this is written, Fletcher's Ice Island is still inhabited, and valuable work goes on. Ways in which temperatures of ice and atmosphere affect each other are being studied. Gauges set between salt-water ice and island measure the terrific pressure of the pack.

Weather information is most important, and broadcasts continue every six hours. Instruments now go far aloft on balloons. Equipment used to track their course was successfully flown in.

Clues to Mysterious Jet Stream

In Washington, D. C., Air Weather Service meteorologists search reports from Fletcher's Island for clues to the general circulation of the earth's atmosphere. Such information may help to explain the existence of the jet stream, the mysterious, undulating current of air that travels at high speed far above the earth. Knowledge of jet-stream positions often enables airmen to ride tail winds, cutting hours from long trips.

Generally our island home proved itself directionally stable. It had no recognizable bow or stern, of course, but its inhabitants aligned it with true north by means of markers arbitrarily established on the ice.

Twice, for unknown reasons, the island made partial rotations in a clockwise direction, turning the first time through 50° and the second through 80°. These rotations were slow, the 80° turn requiring nearly a month.

A sensitive bubble level, reading to within 1/10 of a second of arc, showed that the island tilted a small, varying amount. This was ascribed primarily to wind, but sometimes the levels were thrown into confusion by localized surface upheavals caused apparently by internal pressures.

Also products of pressures from within the island mass were strange "ice bumps." These domelike protuberances occurred on the tops of ridges near the shores and were occasionally three feet high.

Coring bits were driven down 52 feet. Within this distance 54 distinct layers of dirt were encountered. Mostly mineral matter, they also contained a few bits of twigs and leaves.

The presence of the dirt was accounted for in several ways. Boulders and large earth mounds were terminal moraines left by tongues of glaciers which thrust out on the Ellesmere-fast shelf, then retreated. Summer streams coursing down from the land left silt and small pebbles. Some fine layers may have arrived as atmospheric dust.

The boulders were conspicuous features of the landscape. Some were big, weighing many tons and measuring as much as 10 feet in diameter. They stood ranged in a rough row, as if a careless giant had tried to build a stone wall. A few of the smaller ones were shipped to the United States for study.

A reliable estimate of the island's thickness was made. Charges of TNT sent shock waves, which travel at known speeds, through the ice. Measuring the elapsed time, Crary and Cotell reported that our camp rested on a 150-foot-thick block of ice, a cold, inert mass as thick as a 14-story building is tall. The figure indicated that the original 200-foot estimate for T-1 might have been a bit high.

To measure movements of the pack with relation to the ice island, our scientists triangulated on several big sea-ice hummocks. One day the most conspicuous of these toppled over with a roar.

A persistent "warm" layer of ocean was discovered 400 feet below the sea's surface. Less than 150 feet thick, it averaged about 2° warmer than the water above and below it. There was no satisfactory explanation for its presence.

Survey parties mapped the island in detail. Early in April the camp began taking its fresh water from two lakes found beneath four to eight feet of ice. Freezing on all sides subjected these water pockets to pressure; when first tapped they spouted in gushers.

Passing sea birds were identified tentatively as gulls and jaegers. Nobody had time for hunting, nor for hiking two miles over the pack to the nearest open water where it might be possible for large marine animals, such as seals and narwhals, to come up for air.

Winter darkness made it necessary to light the landing field, now provided with two runways. A complete portable lighting system was delivered by parachute.

Men Toil Through Long Polar Night

An oceanographer, a marine biologist, and two geophysicists are among the nine men who have toiled ceaselessly through the Arctic's long winter night, adding constantly to our knowledge of one of the least understood regions on earth. Each day has brought a new discovery, a surprise, or a revision of previous theory.

The future of the drifting polar base is difficult to predict. It could float off into warmer climes and break up, rejoin Target X back at its birthplace, or make another circuit of the Arctic basin—possibly many more.

Latest reports indicate that the ice island is beginning a second polar swing—good news for the Air Force, since it would mean another five or six years of useful service for T-3. If it does go around again, many of its former residents would like to go along.

Eyes on the China Coast

United Press

By George W. Long

"I AM . . . issuing instructions that the Seventh Fleet no longer be employed to shield Communist China."

When President Eisenhower spoke these words in his first message to Congress, eyes of the world turned to the coast of China. They focused on Formosa Strait, where, since the Korean war began, United States Navy patrols had "neutralized" the island refuge of Generalissimo Chiang Kai-shek's Nationalists (map, page 507).

That Formosa stronghold, shaped like a fried fish, lies 85 miles off China's bulging midriff. Some 9,000,000 people—1,500,000 of them refugees—jam an island smaller than Connecticut and New Hampshire but having 3½ times as many inhabitants.*

For four years Formosa has swarmed with Chiang's lean, poker-faced young troopers in tan. They number more than 500,000.

Troops Practice for Invasion

In camps placarded with fighting slogans they keep fit by maneuvers and basketball. On the beaches (as above) they practice landing operations, hoping—yet dreading—some day to return to mainland China (page 512).

* See in the National Geographic Magazine, "Formosa—Hot Spot of the East," by Frederick G. Vosburgh, February, 1950.

"Range, 5,000 Yards!" Shouts a Chinese Antiaircraft Gunner

Martial atmosphere hangs over Formosa, where Generalissimo Chiang Kai-shek's troops are training.

Beaten and dispirited when they fled the Chinese mainland in 1949, the Nationalists have since increased morale and strength through United States aid. Some 750 American military experts under Maj. Gen. William C. Chase are helping streamline their forces.

On Formosa the Chinese have built replicas of Fort Benning and other United States military establishments. There soldiers train with American equipment.

By Oriental standards the troops are well fed, but they must eke out their messes by tilling gardens. Wives help make soldiers' uniforms.

Gun pointer Lu Ying-tsai (left) and seaman Feng Teh-chen (below) train aboard a destroyer escort. "Republic of China Navy," say the characters on Feng's cap.

United Press

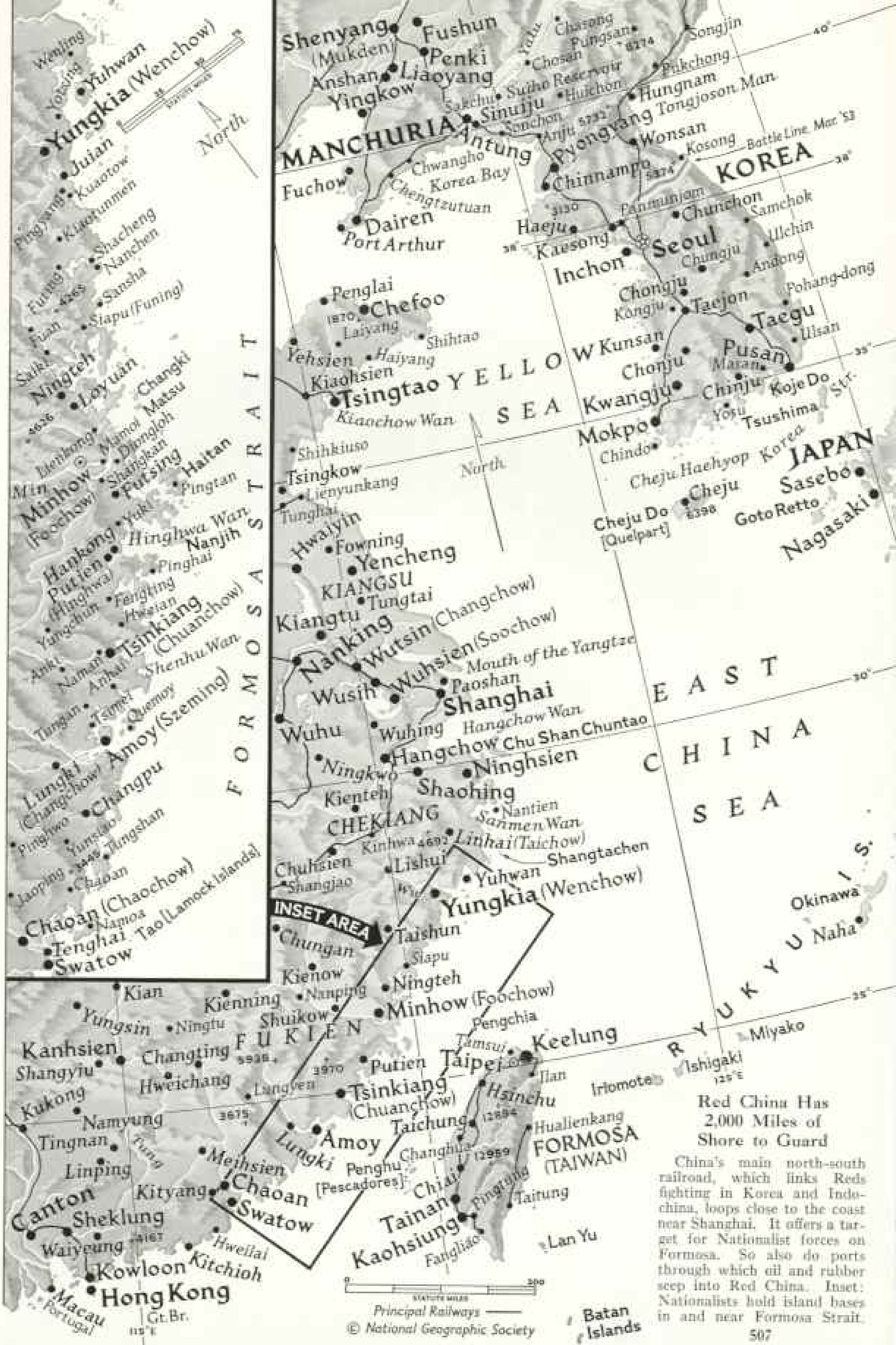
Besides Formosa—called Taiwan by its people—the Nationalists hold the Pescadores and 30-odd small islands off Fukien and Chekiang Provinces. Their main offshore bases are Shangtachen, Matsu Island, and Quemoy and Little Quemoy. Red troops, in October, 1949, assaulted Quemoy, but Nationalists drove them off with heavy losses.

From these close-in island bases, Nationalist commandos raid Red positions, gather intelligence in night sorties, and keep in contact with mainland guerrillas. Armed junks and small navy units operate against coastal shipping and partly blockade near-by ports.

So huge is China that the Communists must guard a coastline roughly twice the length of our Pacific shore, or as long as from Maine around Florida and all the way to New Orleans. From tragic Korea to embattled Indochina, the coast curves about 2,000 miles, not counting indentations.

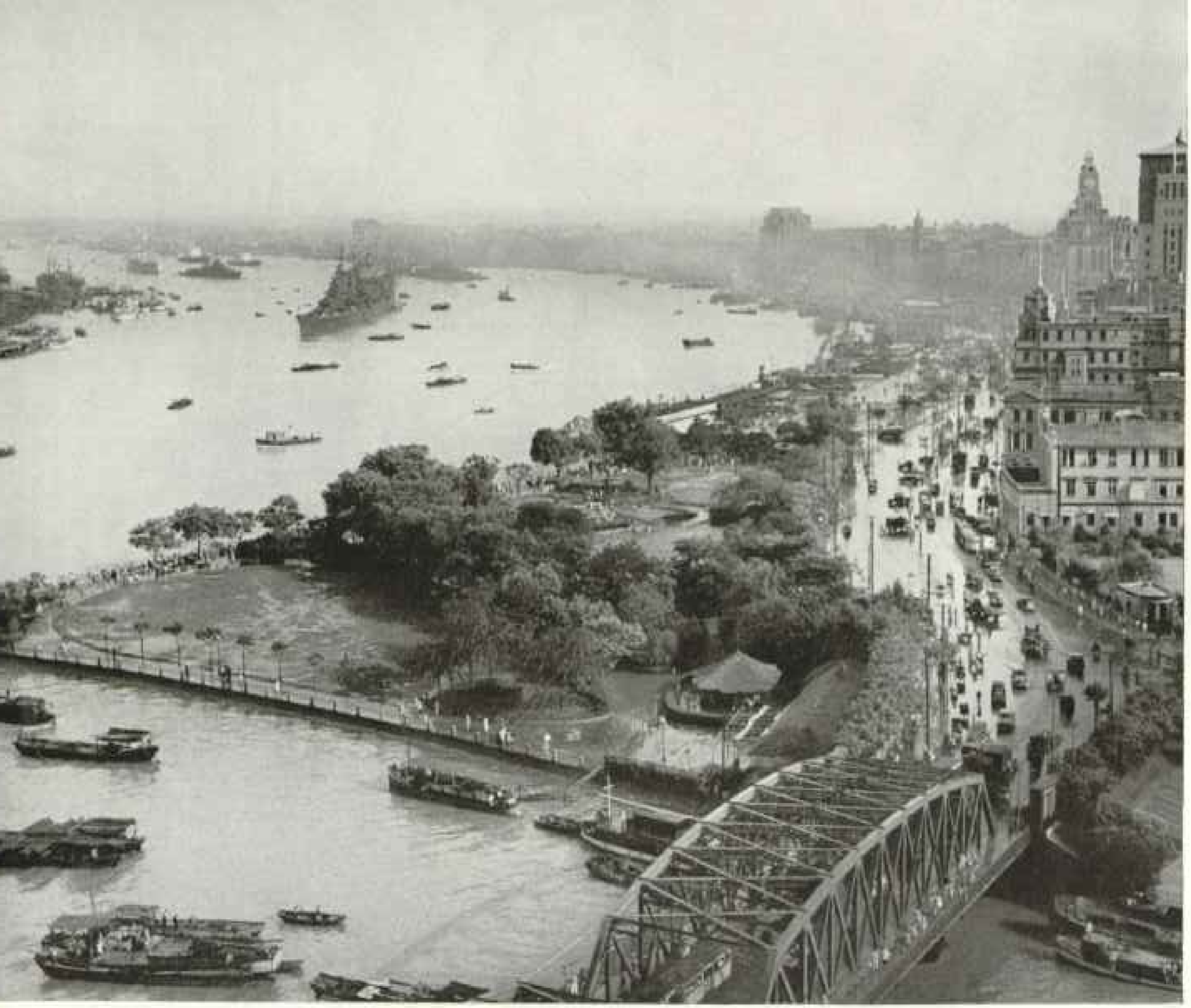
Except at two points 40 miles apart, this whole coast is held by a regime hostile to the Western World and in conflict with the United Nations. Those two small windows of the West are Britain's Hong Kong and Portugal's Macau. I visited both last year, but I saw little of China's coast, for planes of the free world fly straight in and out again.

From high above, what I saw looked peace-



Red China Has 2,000 Miles of Shore to Guard

China's main north-south railroad, which links Reds fighting in Korea and Indo-china, loops close to the coast near Shanghai. It offers a target for Nationalist forces on Formosa. So also do ports through which oil and rubber seep into Red China. Inset: Nationalists hold island bases in and near Formosa Strait.



Shanghai: the Hub of the Orient Before Communist Conquest

Developing concessions on seemingly worthless mud flats near the mouth of the Yangtze River, Western businessmen made Shanghai one of the most populous and prosperous cities in Asia. Its skyscrapers, neon lights, and race track suggested the Occident. Ocean liners, junks, and sampans crowded harbor and creeks. Europeans and Americans invested millions; many lived in the International Settlement and French Concession.

First the Japanese, then the Chinese Communists shut off Shanghai from the world. Today the metropolis is sorrowful; its bustle is gone. Tools have been stripped from many industries and shipped north. Chinese financiers and much of their capital have fled to free Hong Kong (opposite page). The population, once 5,000,000, has dwindled to 3,500,000. Some who stay are subjected to "brain-washings" of Red propaganda.

Many of the Nationalist Chinese on Formosa fled there from cosmopolitan Shanghai.

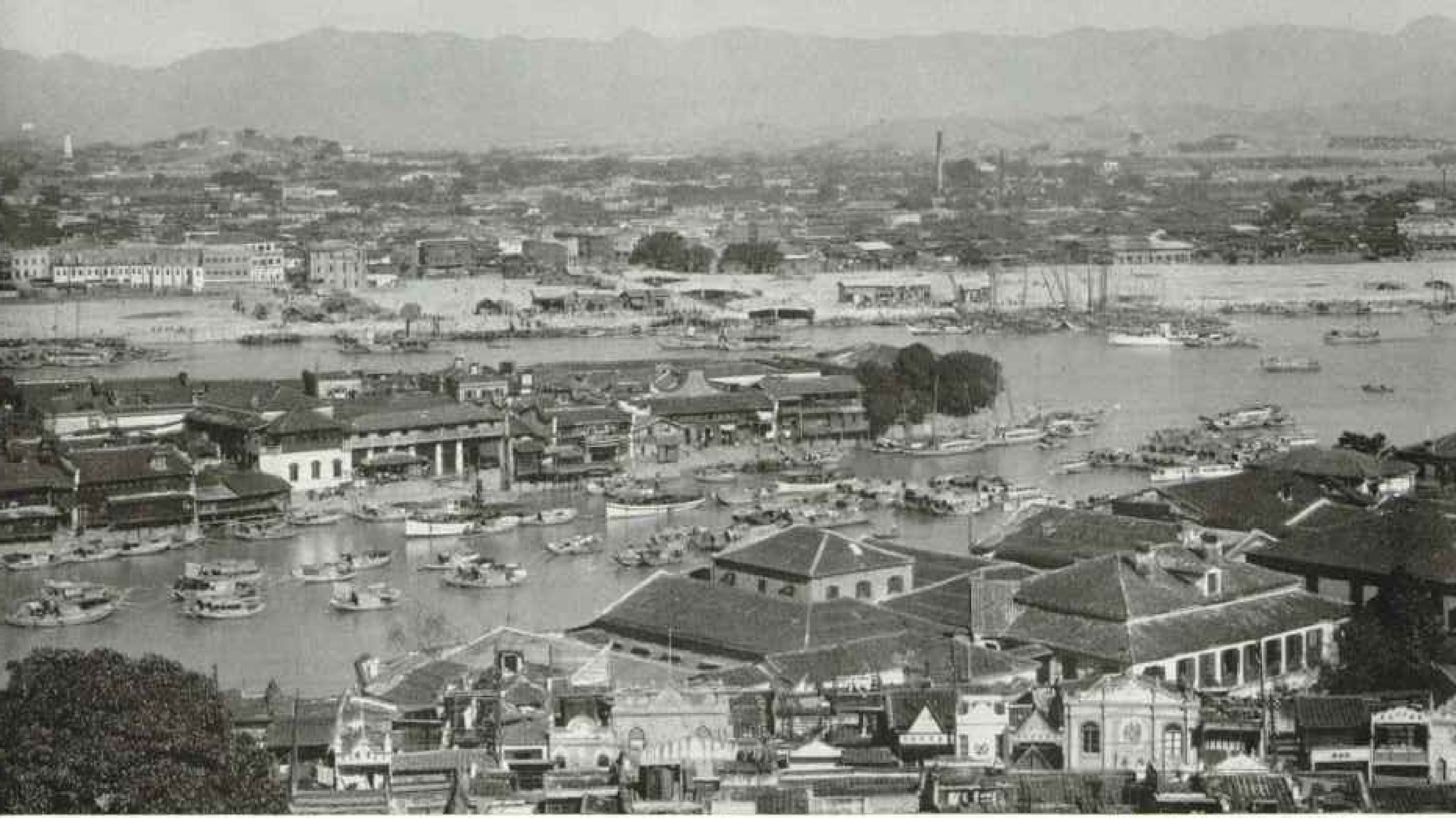
This 1946 view shows Shanghai's teeming Bund, facing the Hwangpu River, which flows into the Yangtze. The cruiser U. S. S. *Los Angeles* anchors in midstream. Garden Bridge (lower right) spans Soochow Creek.

W. Robert Moore,
National Geographic Staff

Ships Tug at Their Moorings at Hong Kong's Busy Docks. Handsome Homes and Apartments Dot the Distant Peak

Great Britain's crown colony is a free-world outpost at the edge of Red China's Bamboo Curtain. The Korean war, cutting trade with China, has hit Hong Kong hard, but its port still handles some 6,000,000 long tons of cargo a year. New industry and vastly increased trade with Southeast Asia keep it going.

National Geographic Photographer J. Baylor Roberts



W. Robert Moore, National Geographic Staff

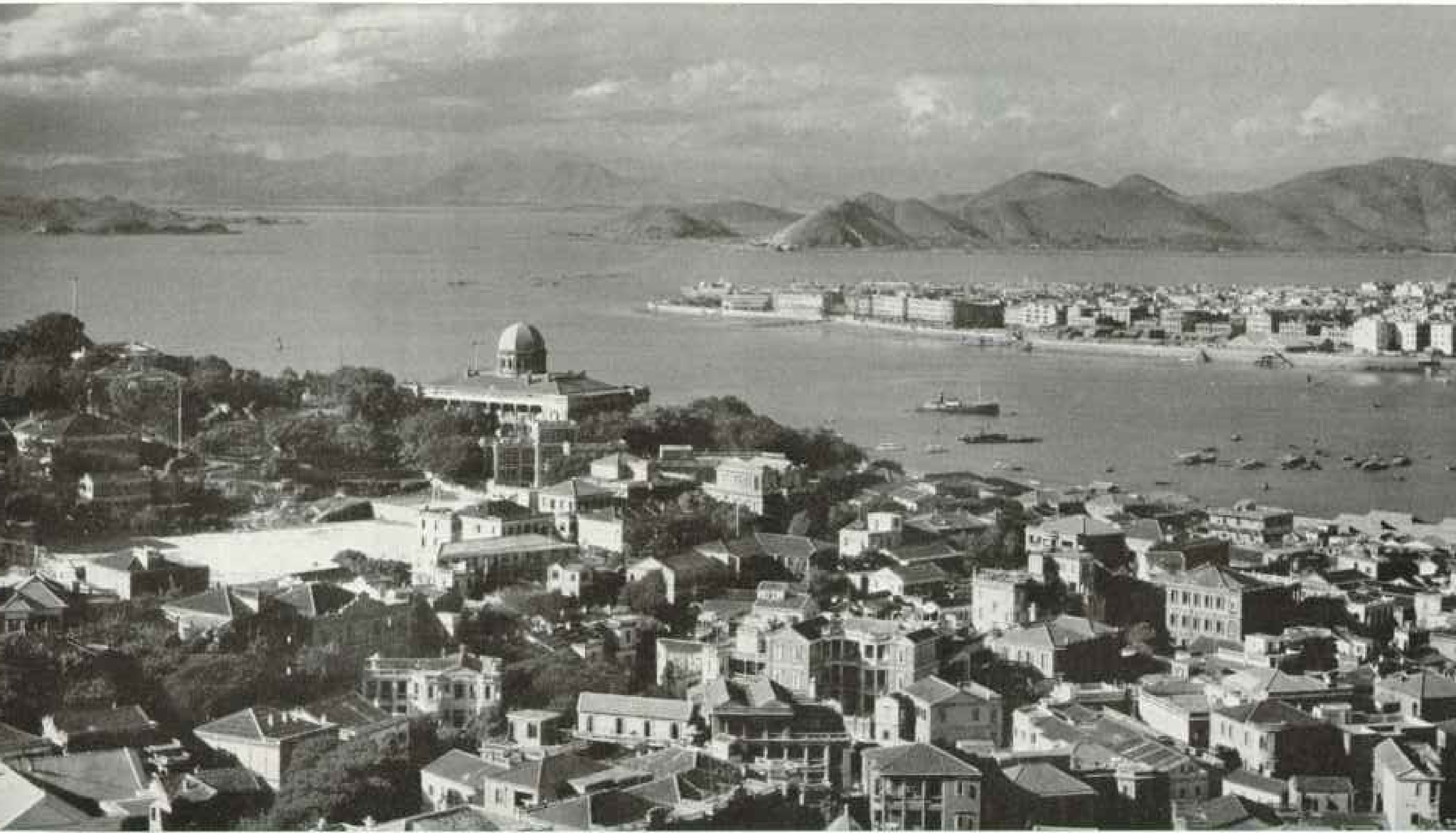
Foochow, Isolated by Mountains from Quick Reinforcement, Presents a Tempting Objective to Sea Raiders

South China's rugged coast provides hundreds of shelters for light-draft junks, but few good harbors. Deep-draft vessels heading for Foochow must stop 10 miles short at a Min River anchorage. Capital of Fukien Province, Foochow is one of several big ports opposite Formosa. Clipper ships used to come here for tea. Thousands live on river boats, which throng close to Changchau Island (left center).

Amoy's Deepwater Harbor Lies Within Artillery Range of a Nationalist-held Island

Chiang's troops continue to garrison a few small islands in Formosa Strait. Such outposts are the Quemoy Islands, within shooting distance of Amoy and the mainland. Commandos have been raiding the Communists from bases on Quemoy. Amoy city lies on islands in the harbor. The domed building housed a Christian school before Reds moved in. Mainland China's mountains isolate the city.

Fred Hamilton



512

United Press

Nationalist Marines Storm Ashore in a Mock Landing on Formosa

These men are proud of their new marine brigade. When an American adviser makes suggestions, they ask if United States Marines do it that way. "Yes," he says. "Okay, then we do it, too," they reply.

ful, and as brilliant as Chinese jade—the turquoise sea glinting in the sun, steep green hills, azure bays, white beaches, mountains of lazy clouds, and fleets of junks with high sterns and patched orange sails. These myriad junks make elusive blockade-runners.

Hong Kong I found to be bulging and booming. Chinese refugees have trebled its population from 600,000 in 1945 to more than 2,000,000. They crowd every available space and live in shanty towns on hillsides.

Ships by the score still anchor in this free port's magnificent, mountain-ringed harbor (p. 509). Products from all over the free world fill store windows. Refugee money, fleeing Shanghai, has built streamlined factories, fostered new industries, raised huge housing developments and skyscrapers.

Walking Macau's narrow, cobbled streets flanked with Old World houses in pastel colors, I imagined myself in a Mediterranean town. Four centuries old, the colony shelters 300,000 on a three-square-mile peninsula. As in Hong Kong, 99 out of every 100 are Chinese. Overshadowed commercially by Hong Kong, the colony has a big fleet of fishing junks, makes firecrackers and matches, and dabbles in international intrigue.

Scattered along the Chinese coast are dozens of famed, once-busy ports.*

Shanghai, colossus of all China, rears on land built by the muddy Yangtze (page 508). It waxed fat on trade of the Yangtze basin, where half of China's 450,000,000 people live. Reports say the Communists have deindustrialized Shanghai, moving many of its factories north and resettling more than a fourth of its 5,000,000 inhabitants.

Opposite Formosa lie Minhow (Foochow), Amoy, and Swatow, cities built up by trade with the West in the days of clipper ships (pages 510, 511).

Behind the coast facing Formosa, mountains rise 3,000 to 6,000 feet. There roads are poor; no railway reaches the coastal cities, and traffic takes to the sea in junks.

Well inland through most of its length runs China's vital north-south trunk railway, linking armies as far apart as Korea and Indochina. Only in 1951 was it extended to China's southern border.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: The Society's 10-color map of the Far East, September, 1952; "Along the Yangtze, Main Street of China," March, 1948, and "Coastal Cities of China," November, 1934, both by W. Robert Moore.

Washington's Historic Georgetown

A Proud Colonial Port, Made Part of Young America's New Capital, Refused to Be Abolished and Now Sees Its Old Identity Restored

By William A. Kinney

WE STOOD on the heights above a town abolished by Federal law more than half a century ago.

The law was thoroughgoing; it took pains to proscribe not only the town's name, Georgetown, but also the very names of its streets. And the streets had interesting names—Gay Street (two of them), Needwood, Fishing Lane, Cherry Alley, Niagara, West Lane Keys, Wapping.

Southward past our vantage point a broad band of water slipped by in the sun. Trees along its banks wore a mist of faintest green under the first touch of spring.

"This is the River of Swans, *Cohonguroton*," said my companion, well versed in local lore. "When the first white men came, the Piscataway Indians told them it was a very old name, the oldest they knew."

Looking down at the river, I could glimpse a small part of a water front where rich confusions of cargo once piled the docks. So much shipping crowded the berths that merchants of those days dreamed of displacing New York as the Nation's foremost port! Only a scow idled in to tie up now.

Not far from the shore, some two miles downstream, a swordlike shaft thrust up in sharp white against the sky. We were getting an unusual view of the Washington Monument from venerable Georgetown—40 years old when it assisted at the birth of our Nation's Capital, of which it forms a part. The River of Swans below us is better known by a later name: Potomac.*

Indiamen Anchored in Rock Creek

Our vantage point was a remote spot on the far edge of town. A short distance away sheep grazed, and an old vineyard was still cultivated. The pastoral touch seemed a bit unreal to me, for by taxi the White House was less than 10 minutes away.

I left on foot, however, bound for my own house on the opposite side of town. It is hard by the valley of Rock Creek, the steep-sided moat which is Georgetown's eastern boundary. In the golden days the mouth of the creek was a wide, deep estuary where large Indiamen rode at anchor, laden with goods from far ports of the world. Tides surged up the valley for a mile or more.

Today the estuary has shrunk to a small stream. Few motorists who use the parkway snaking along its banks suspect they are driving on what was once the bottom of a busy bay.

For part of the way my homeward path led along the Georgetown-Bladensburg road, an important link in north-south communications during the Revolution and through the early years of the Republic.

I strayed once to window-shop at Stombock's saddlery. Gen. George S. Patton, Jr., stopped here just before departing for the north African invasion. He strode in to pick up the belt and holsters he had ordered for his pearl-handled pistols.

The saddlery is on the Falls Street stretch of the old main road, which became Bridge Street as one neared Washington. (After the abolition law of 1895 the prosaic letter "M" replaced both names.) On Bridge Street I passed Stone House, one of the town's few remaining pre-Revolutionary buildings. Tradition says Maj. Pierre L'Enfant, the French engineer who served so ably in the Revolutionary War, had his headquarters here when he was laying out the Federal City (page 532).

To Miz Hullybus's Corner

The true gateways to Georgetown are side streets which lead away from the busy shopping section into sudden and unexpected calm. The houses seemed to doze in the soft weather that day, and my gait slowed before I reached my corner bookstore to stop for a book—and find coffee waiting, too.

This corner of 28th and O Streets holds a fond place in Georgetown lore. It's Miz Hullybus's Corner, although she hasn't been there for a long time. Hullybus was not even her name; it just sounded that way to children. She was Mrs. Gottlieb Hurlebaus, a kindly lady who kept Hurlebaus Bakery and Sweet Shop and made it an institution. There was mourning when it passed shortly before the turn of the century.

I think Miz Hullybus must have left some of her obliging spirit about the premises. That might explain the helpful operations of the Francis Scott Key Book Shop, which occupies them today (page 514).

Books may be purchased there, of course, but the shop seems to devote as much time to extracurricular odd jobs and emergencies. It produces baby sitters when none can be

* See in the National Geographic Magazine: "Down the Potomac by Canoe," by Ralph Gray, August, 1948, and "Potomac, River of Destiny," by Albert W. Atwood, July, 1945.

National Geographic Photographers B. Anthony Stewart and John E. Fletcher

A World Map for a World Business in Little Georgetown

Martha Johnson (left) and Doris Thompson, owners of Francis Scott Key Book Shop, search the globe for rare volumes and cater to patrons on six continents (page 513). The National Geographic Society's World Map helps them keep track of customers sent abroad by diplomatic and defense services.

found, takes care of customers' canaries or goldfish over week ends, keeps spare keys for forgetful neighbors, gets your shoes to the cobbler, and locates owners of lost dogs that stray in. One grateful poodle even sent a bouquet, and another time there was a cake from a cairn.

When the limits of the District of Columbia were traced in 1791, Georgetown found itself within them as part of Maryland's contribution toward the area, "not exceeding ten miles square," authorized for the Federal City that was to be. This chance circumstance, however, has never kept the town from priding itself on its separate identity.

At first no one could challenge that identity. Founded in 1751, Georgetown was already a mature community by the new Republic's standards. It had a thriving trade, gay social life, and developing culture. Only paper plans existed for rearing a Nation's Capital on the wild, tangled, and swampy lands to the east and south.

A scattering of structures and brick kilns broke this uninviting expanse in the spring of 1800, when the entire National Government began arriving from the temporary capital at Philadelphia. Counting the President, cabinet members, officials, and clerks, the total of Federal employees was fewer than 150.

Georgetown, with a population of 3,000, was not impressed. Lawmakers' activities found scant space in its gazettes. Shipping news was more important.

In time—and it took almost a century—the Federal City engulfed Georgetown, and the 53d Congress finally voted it out of official existence on February 11, 1895.

Georgetown, however, kept on being Georgetown.

This perseverance had its eventual reward. Three years ago Congress decided the legally nonexistent community had been surviving all along. A new law was approved, September 22, 1950, which defined its boundaries and set up precautions to preserve its character as a place of historic interest, though keeping it legally still part of the District of Columbia. "Old Georgetown," as the law chose to call it, received the news with calm satisfaction.

Where Tranquillity Waits

Among the first evidences of community gratification was restoration of old street names. For the benefit of non-residents, our lampposts continue to display the designations imposed half a century ago when Congress directed the change of "nomenclature of the streets and avenues of Georgetown to conform to those of Washington."

Some old-school Georgetonians still speak of a trip "into the city" if they leave to shop or visit elsewhere in the District of Columbia. The nearest boundary line is rarely more than half a dozen blocks away, for our town is a small place. Its area covers little more than one square mile; its people number about 15,000.

To come from "the city" to tranquil Georgetown is like being transported to a tight little village, remote and pleasant.

There is a serenity about its narrow colonial streets with their uneven sidewalks of red brick. In summer arching trees turn many streets into tunnels of green. Old-fashioned coach lamps beside inviting doorways with polished knockers suggest a waiting welcome. Ivied walls, traceries of wrought iron, and historic houses small and great add to the illusion of timelessness.

A visiting architect will find many superb examples of the Federal period to delight him. He may also see things to make him wince, where Victorian, modern, and nondescript styles clash with the classical near by.

The 1950 law was designed specifically to safeguard the architectural tradition that distinguished the town of yore. Exterior renovations or new construction now must be approved by the national Commission of Fine Arts.

Owners of shops remodeled since the law's enactment say their experience is that compliance with the "old-look" regulations brings better business. However, the two main business streets, M and Wisconsin Avenue, still have a way to go to catch up with residential areas in restoration work.

515 National Geographic Photographer B. Anthony Stewart

Revived, Old Street Names Proclaim Georgetown's Identity

Abolished by law in 1895, the town saw its charming but confusing street markers replaced by humdrum but informative letters and numbers. Today many lampposts use both systems. East Lane once lay on the outskirts. After a block it became Fishing Lane, which led to the Potomac River.

More Than a Good Neighbor

My wife and I bought our little home on 28th Street (originally Montgomery) not many years ago. We were veterans of Washington apartment-dwelling and had experimented with houses in the suburbs. Our first reaction to Georgetown was what a neighborly place we had discovered. We still feel that way.

The neighborliness goes beyond exchanging recipes over back-yard fences, shopping for someone else, or a spur-of-the-moment thought to take flowers to the lady across the street.

When the owner of a small tailor shop was hospitalized by an accident, a Government official came to the rescue. He got the shop key from the injured woman, then worked before and after his own office hours handing out finished laundry and dry cleaning to fellow customers.

Strangers find themselves speaking to strangers, often at length. The day war came

Georgetown, Hemmed In by Washington, Clings to Its Potomac Beachhead

As first laid out, the town embraced only 60 acres. The surveyor got a goodly fee, 1,000 pounds of tobacco (page 518).

Francis Scott Key Bridge, here seen from the air above Virginia, honors the Georgetonian who wrote *The Star Spangled Banner*. Ironically, Key's home had to be razed for the approaches.

More than 45,000 vehicles use the bridge daily. To by-pass congested M Street, Georgetown's main artery to "the city," many cars use the elevated Whitehurst Freeway, which curls ribbonlike from the bridge and passes along the water front.

Abandoned piers make stepping-stones across the river to the Washington Canoe Club. These piers call to mind the Aqueduct Bridge, which opened in 1843. Twice rebuilt, it was demolished in 1923.

The canoe club boasts a 1952 Olympics champion, Frank B. Havens, who won the 10,000-meter single-blade canoe race.

Fairchild Aerial Surveys, Inc.

✝ Peace Seekers Meet in Dumbarton Oaks

August 21, 1944: In quest of a postwar peace formula, delegates of the United States, Great Britain, and Russia began talks in the music room of Dumbarton Oaks (page 528). The United Nations resulted. Cordell Hull, central figure at the head table, keynoted this first session. Beside him sat the Earl of Halifax and Andrei Gromyko.

Wide World

in Korea I received a surprise briefing on conditions there from an engineer just back by air on leave. His job was on a project in the invaders' path. I could have listed all its important equipment when he finished. We had never been introduced—just happened to pick up our newspapers at the same time.

The town's residents offer a goodly variety. Butchers and bakers live here, and I should not be surprised to learn of a candlestick maker. There are families of social prominence, diplomats, legislators, jurists, journalists, writers, and artists. There also are modest households of young men and women striving to get launched on a career, and just "little people," as the saying goes.

One of the happiest men I have ever met was the padre of a small Georgetown parish whose salary was $150 a year!

When I heard this, I was incredulous. "Oh, I don't need much," he explained. "I have the rectory to live in. I don't require much food, and those bills come out of the church fund. Some of the women come in to cook and clean the house. My clothes seem to last; a new suit or pair of shoes every year or two are about the only major things."

He smiled in his unworldly way. "Perhaps it was a blessing my health made me give up smoking years ago. With prices so high today, I might otherwise have difficulty with my budget."

Maryland Saw Possibilities

Rock of Dunbarton, Rock Creek Plantation, Knave's Disappointment, Beall's Levels, Frogland, Discovery, Pretty Prospect, Conjurer's Disappointment, Resurvey on Salop—such were the names of holdings which, in whole or part, went to make up Georgetown.

The site, with its rampart of heights, attracted the attention of a courageous Scot, Col. Ninian Beall (pronounced "Bell"). He had commanded Maryland's forces so ably against attacks by Indians that in 1703 the Province rewarded him with a patent of 795 acres on Rock Creek. This he called Rock of Dunbarton (later spelled Dumbarton), perhaps for the great rock above the Clyde in his native land.

Three decades later one George Gordon acquired some 100 acres adjoining Beall's. Other settlers came, most of them Scots, with a few Irish and Germans.

Maryland began to see possibilities in this area, so close to the head of navigation on the river. In 1751 the Assembly at Annapolis authorized purchase of 60 acres for a town "which shall be called by the name of George Town," honoring King George II of Britain.

The 60 acres were bought, at 50 shillings each, from George Gordon and a most reluctant George Beall, the colonel's heir, who fought to the bitter end. Rapid expansion added almost 82 acres to the town before Washington became President.

The port boomed because it tapped a rich agricultural area. Tobacco for export was almost gold; a single hogshead (1,000 pounds) brought "enough to purchase all the luxuries a family needed in the course of a year," a historian of the era reports. Sister colonies and other parts of the world looked on Georgetown as their flour bin. Lumber, fish, and other goods moved in brisk demand.

Come autumn, P Street often was choked from dawn to dusk with thousands of cattle and sheep from Virginia and large flocks of Maryland turkeys. Some were sold locally; others would be herded along to Baltimore or markets beyond. Heavy-laden Conestoga wagons rumbled to the wharves.

From Silks to Sand and Gravel

I have pored over copies of ships' manifests which conjure up the bustle of those days. Imports are eloquent of a young country's endless needs: silks, satins, buttons, shoes, wines, tea, powder for wigs, coal, sugar, soap, tinware. An entry, "One Trunk Hosiery," reminds one that men wore knee breeches then.

Anyone knowing the romance of its past will find today's water front a disillusioning place. Much of it lies in shadow under an elevated motor freeway (page 516).

On Sunday mornings with my dog I have done a bit of nostalgic prowling along the river looking for ghosts where bulging warehouses used to be. Sand, gravel, and cement companies occupy most of the shore. There are a few lumberyards, building-supply firms, and a dump for structural steel. A stubby engine shunts freight cars about. Noisy echoes bounce back from the highway overhead.

Few sizable industries exist now, most of them in the water-front section. A flour mill and a cooperage are the only ones reminiscent of the distant past.

Thus it is always reassuring to pass the offices of William King & Son, purveyors of coal and firewood to the town for generations. A sign on the brick wall proclaims: "On This Corner Since 1835."

Businesses less than 50 years old here are regarded more or less as newcomers.

The era of full-rigged merchantmen and flourishing commerce may be gone, but Georgetown remains Washington's port of entry, as it was from the start. Our Custom House still collects substantial revenue for the U. S. Treasury. Last year's total was nearly two and three-quarter million dollars.

Collection of duties began soon after the War for Independence. The present Custom

National Geographic Photographers Volkmar Wentzel and Bates Littlehales

A Slum Alley in 1950, Pomander Walk Presents a Tidy Look Today

Authorities condemned ten houses in this small court as unfit for habitation. Restoration experts modernized interiors and repaired brickwork. Here Georgetown's itinerant knife sharpener makes his rounds.

House, completed in 1858, shares its space with the Georgetown Post Office.

Regardless of what coast or harbor a vessel uses, consignments for Washington from another country must clear customs here. The office also handles anything dutiable outbound from the District, and its jurisdiction extends more than three miles down the Potomac to National Airport, where international air freight and baggage are checked.

Missing: a City Hall

I stopped at the Custom House one day to chat with an official. It was good to hear that silks and satins for milady are still prominent among imports as in early times.

Almost anyone can direct a stranger to the Post Office on the first floor. Fewer are aware that customs is just upstairs. It takes a real old-timer to tell you the whereabouts of the missing City Hall. It, too, was in this building.

The customs man recalled hearing about it.

"When I came here as a young man, there was a battered metal sign drifting around. It read 'Office of the Mayor.' You never knew where it would turn up. That went on for several years, and then it disappeared."

The sign had survived a long time. The last mayor, councilmen, and magistrates moved out in 1871, the year Congress integrated the town's government with that of Washington. Georgetonians had reason to mourn their lost autonomy. Town ordinances over the years indicate that the officials were unusually practical and conscientious men.

Indeed, the act founding the town provided that those failing to improve their property should lose it. Although legal penalties have lapsed, residents today comply with the law's spirit, some with their own paintbrushes and ladders.

Councilmen were stern with themselves, too.

Undue absence from a session or tardiness meant a fine for the offender. That law had teeth in it. Checking on sessions in 1791, I found three of the most important men in town, John Threlkeld, William Deakins, Jr., and Charles Magruder, listed among those penalized for being late. The fine assessed was 78 cents, no trifling amount then or for some years to come. The town's first police force, known as the watch, did not come into existence until the early 1800's, and the men's pay was $2.89 a week!

Celebrities from Washington to Spaatz

Georgetown today is credited with having more listings in *Who's Who* than any other place of comparable size. Illustrious ghosts might add that the town has been associating with famous names for generations and producing its own share of them.

George Washington, a frequent guest, passed this way to his first inauguration.* Earlier, the town watched Braddock's redcoats depart for disaster at Fort Duquesne during the French and Indian War, then Lafayette leading troops through for the rendezvous with victory at Yorktown in 1781.

Union Tavern, on Bridge Street, long was a favorite with Government officials and celebrated visitors. Congressmen who dwelt there rode to and from Capitol Hill in a special stagecoach drawn by cream-colored horses.

The hostelry sheltered such men as John Adams, Thomas Jefferson, Aaron Burr, Henry Clay, Martin Van Buren, John Marshall, Louis Philippe, Robert Fulton, Talleyrand, Jerome Bonaparte, and Washington Irving. Francis Scott Key stopped there often after taking a house a few blocks away, near the site of the modern bridge that bears his name.

One of the last public functions Washington attended was held in the tavern. Decades later Louisa M. Alcott, author of many novels, nursed Civil War wounded in its ballroom.

Sight-seers should have no trouble locating the northeast corner of Bridge and Washington (M and 30th) Streets, where the inn stood until 1935. A gasoline station has inherited the historic site.

Prominent Georgetonians of the Nation's fledgling years included Dr. William Thornton, architect of the U. S. Capitol;† Henry Foxall, whose foundry supplied many of the guns for the War of 1812; Stephen Bloomer Balch and John Carroll, noted clergymen and educators; William W. Corcoran, philanthropist who gave the Capital its Corcoran Gallery of Art; and George Riggs, Corcoran's partner in the banking company which helped restore Europe's shaken faith in the credit of the United States at a critical period in 1848. This firm was the precursor of Riggs National Bank, now the foremost in Washington.

Many notable names have since been added: U. S. Grant, Robert Todd Lincoln, Alexander Melville Bell (page 535), Gen. Adolphus Greely, Maj. Walter Reed, Julia Marlowe, E. H. Sothern, Mrs. E. D. E. N. Southworth, James Forrestal, Sir Willmott Lewis, and J. R. Hildebrand, beloved Assistant Editor of the National Geographic Magazine.

Among well-known residents at the present time are Supreme Court Justice Felix Frankfurter; Senate Majority Leader Robert A. Taft; Massachusetts' John F. Kennedy, youngest member of the Senate, and almost a score of Congressmen; Allen W. Dulles, Director of the Central Intelligence Agency; Dean Acheson, former Secretary of State; Adm. Alan Kirk, Ambassador to Moscow, 1949-1952; Gen. Carl Spaatz, former Chief of Staff of the United States Air Force, and other officers of the armed forces and diplomatic service, both active and retired.

Loss of Trade Brought Dark Days

Georgetown has been called a city of brick. The bricks and exceptionally fine masonry work were major factors in preserving the Federal character of the town during the lean years that befell it. Many factors contributed to the decline, but the full impact was not felt until late in the last century.

A fall in the area's water table and the silting up of the Potomac, due in part to bridge building for Washington, probably marked the beginning. As early as 1807 Georgetown reminded Congress of the gravity of the problem. Another memorial in 1836 complained that $180,000 of town funds had been spent between 1802 and 1830 for navigational improvements below the Capital and on the town harbor. Adequate aid did not materialize. Larger vessels sought other ports. Trade kept dropping off, however slowly.

The Chesapeake and Ohio Canal, in which the town invested heavily to recoup its big

* See "Travels of George Washington," by William Joseph Showalter, National Geographic Magazine, January, 1932.

† See "U. S. Capitol, Citadel of Democracy," by Lonnelle Aikman, National Geographic Magazine, August, 1952.

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Tiny Homes and Inviting Doorways Lend Charm to Georgetown

Many small houses once used as slave or servant quarters were modernized during the community's recent renaissance. Their narrow façades in many cases mask fairly spacious living quarters. Less than 11 feet wide, this recessed three-story home is one of the smallest. It was fashioned from the domestics' wing of a house on N Street near 31st.

3045

Georgetown Marks → Its 200th Year

Francis Scott Key in 1817 helped to found Christ Episcopal Church, one of Georgetown's 24 places of worship. Here the rector, the Rev. John R. Anschutz, greets costumed parishioners celebrating the town's bicentennial.

← In This House Lives the Man Who Says "No"

Dr. David E. Finley, Director of the National Gallery of Art, heads the commission named to guard Georgetown's traditional character. His group vetoes plans for any building that does not conform to standards. Experts consider the door of the Finley home on O Street one of the best of the colonial period; it came from an old house in Salem, Massachusetts.

↓ Bach Chorales Are Their Joy

Some 10 years ago "a group that loves to sing" dubbed itself the Bachanbeer Society. From autumn to spring, it has gathered every other week since to sing the composer's works and afterward to relax over beer, cheese, and crackers. This meeting was held at the home of Mr. and Mrs. Slocum Kingsbury on 30th Street.

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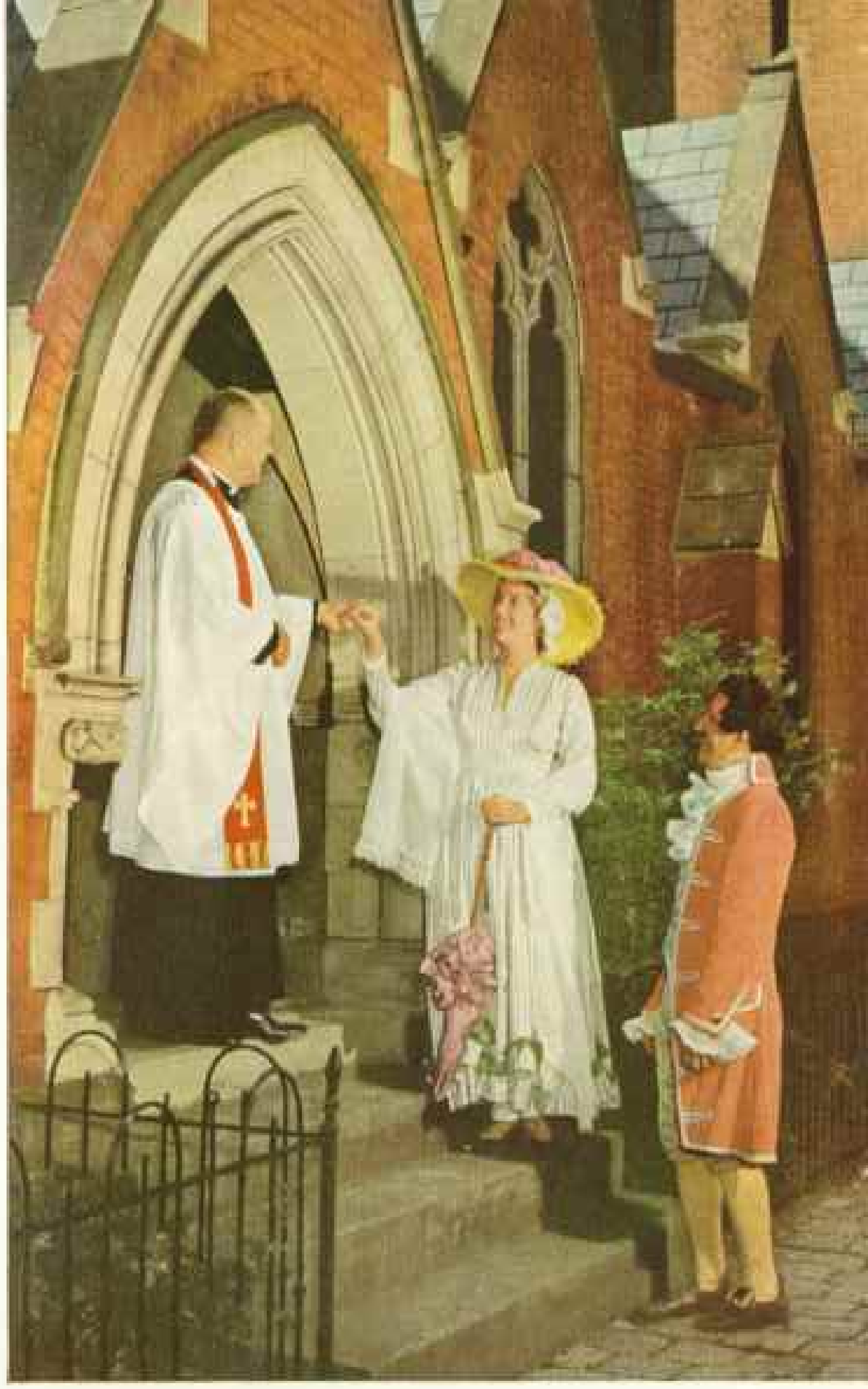

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An Artist Shows His Canvases Beside Chesapeake and Ohio Canal's Old Lock Gate

Canal builders dreamed of linking the Ohio and the Potomac and making Georgetown a prosperous terminal, but work, begun in 1828, stopped at the halfway mark in 1850. Floods and finances plagued construction.

Kodachromes by National Geographic Photographers B. Anthony Stewart and John E. Fletcher

Houses of "Rainbow Row" Line an Erstwhile Towpath Worn by Plodding Mules

Now Federal property, the waterway is preserved for its historic and scenic values. Commercial traffic, doomed by railroad competition, ceased in 1924, but sight-seers still take five-mile rides on a mule-drawn barge.

Evermay's Fine Lawns and Classic Façade Reflect Serenity

This restored mansion was built in 1801 on Evermay height. The owner, Samuel Davidson, paid for it after selling to the Federal Government much property in Washington, including part of the White House site. Yellow paint masked the original beauty of the façade before renovation. Evermay's formal gardens, noted for box, magnolia, and azalea, draw crowds during the annual garden tours, which raise funds for charities.

♆ Byzantine Mosaic Enthralls Students

Dumbarton Oaks, gift of Mr. and Mrs. Robert Woods Bliss to Harvard University, is a research center for Byzantine and medieval studies. Besides art treasures, it contains one of the country's largest Byzantine libraries.

This copy of a ninth-century mosaic lunette in the narthex of Hagia Sophia in Istanbul depicts the enthroned Christ adored by a Byzantine emperor, possibly Basil I (867-886). Medallions show the Virgin Mary (left) and the Archangel Gabriel. Greek letters on the book read: "Peace be with you. I am the Light of the World."

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Visitors Stroll the Grounds of Dumbarton Oaks, Birthplace of the United Nations

This beautiful R Street mansion, set amid 16 acres of gardens and trees, dates from 1801. Here Vice President John C. Calhoun feted Lafayette during the Marquis's American visit in 1824. In those days the Belgian schipperkes on the path would have been a merchant's joy, for the breed was developed to guard boats and barges. The estate has attracted many visitors since the 1944 diplomatic meeting that laid the groundwork for the UN.

commercial losses, also proved a disappointment (page 524). Begun in 1828 to funnel more of the goods of a developing hinterland through Georgetown, it was not completed as far as Cumberland, Maryland, until 1850. Floods, financial woes, and reorganizations harried its progress. Meanwhile the railroad had emerged as an increasingly ominous rival.

This threat did not prevent the canal from enjoying its best years during the 1870's and '80's, although Georgetown's stanch sympathy for the Confederate cause became a political liability after Appomattox, complicating the town's fortunes. When the panic of 1873 came, it hit the old port hard.

And all the while the city of Washington was steadily growing. In the closing decades of the last century families of wealth and prominence from many parts of the Nation began moving to the Capital to take part in its political and social life. They built magnificent homes on L'Enfant's once-empty avenues and entertained lavishly. Families drifted away from Georgetown for what were becoming more fashionable surroundings.

"Georgetown? Why nobody lives there!" It came to that.

The community deteriorated into a cheap-rent neighborhood. Fine homes became second-class boardinghouses. Neglect and disrepair produced a dilapidated look. Property values hit bottom. For a mere $8 a month tenants had their choice of many snug brick houses of the Federal period, including the one now my own.

Only a small Old Guard stubbornly held out, hoping against hope that Georgetown would have a rebirth.

Americans Awake to a Heritage

The Wilson administration brought Newton D. Baker to Washington and house-hunting troubles to Mrs. Baker. She almost despaired of finding a place with a yard for her children and thought of trying Fort Myer in Virginia.

"Too bad," sympathized a friend, "you'll have to go through Georgetown."

Instead the Bakers went *to* Georgetown; the Secretary of War leased a fine old house at 3017 N Street (page 544). That may have been the town's turning point.

After World War I Americans began awakening to the graceful heritage of the country's early architecture. Two influences helped to stir this interest—the opening of the American Wing of the Metropolitan Museum of Art in New York, and the work of John D. Rockefeller, Jr., in restoring Williamsburg, Virginia.*

This was Georgetown's moment. The craftsmen who reared it had built the town to last. It was steeped in history and tradition.

People started buying old houses and restoring them, much to the amazement of real-estate men. By 1930 the revival had picked up a momentum which economic stresses and World War II failed to check. Property values did more than perk up. The $8-a-month houses, restored, brought $157.50 even with wartime rent control in effect.

Perhaps the most remarkable feature of the whole restoration movement is that it has been financed by private money, most of it on a family scale. No support came from large foundations, nor a cent in Government subsidy.

Old Town Spirit Survives

This may explain the resurgence of the old community spirit. The Georgetown Citizens Association and the Progressive Citizens Association led the fight to preserve the town's character.

When apartment builders threatened invasion during the revival's early days, Georgetonians marshaled such a persuasive case that the District Zoning Commission fixed 40 feet as the maximum height for new structures in residential areas. Next they won their fight to have the town rezoned, so that commercial enterprises are now largely confined to Wisconsin Avenue and M Street, or the water-front district. The biggest feather went into the town's cap with enactment of the "Old Georgetown" legislation restoring the town's identity in 1950.

Visitors are often surprised to discover the city of brick is a town of small houses. We have our big show places—Tudor Place (page 542), Sevier Place, Evermay (page 526), Dumbarton Oaks (page 527 and opposite), and other large houses of grand tradition that are architectural gems. But many houses are small, some even tiny.

The narrowest one I know is 2726 P Street. I measured its frontage not long ago. The tape said 8 feet 2 inches. There are others only 9, 10, and 11 feet wide (page 521).

Some are adorned with iron plaques which go back to the days of bucket brigades and amateur firefighters. These fire seals bear the emblems of the first local insurance firms.

Volunteer fire companies controlled such underwriting ventures, and they did not forget the fact in answering alarms. If two houses in a neighborhood caught fire at the same time, the volunteers concentrated on the house bearing the insignia of their company. Any damage claims collected by their insured would affect the firemen's pocketbooks. A noninsured house could wait.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Genesis of the Williamsburg Restoration," by John D. Rockefeller, Jr., and "Restoration of Colonial Williamsburg," by A. R. Goodwin, April, 1937.

House fronts, particularly the small ones, give no hint that behind them are carefully tended yards, some of doll size, others of more comfortable proportions. I think more effort is lavished on these gardens than on any other plots of soil in the world.

It is estimated the town has 5,000 gardens, as against six swimming pools (page 539). Relatively few gardens are of the large, formal class, with expertly trimmed hedges and professionally tended plants. The others are zealous hobbies, and rewarding even when they don't fulfill spring's optimistic expectations.

These garden-backyard combinations are like an extra room, and a favorite place for entertaining (page 538). Since available space is so often the arbiter, most groups are small. Only the big houses have gardens extensive enough for large parties.

Except for working hours, many residents virtually live in their private outdoors a good part of the year. Spring comes early; autumn is usually long and mild. And in sultry, humid summer a shaded yard, however modest in size, is an inviting retreat.

We cite Charles Dickens on our summer advantages. He found Georgetown preferable to Washington's burning heat and "insalubrities." Interestingly enough, the author's great-granddaughter, Monica Dickens, herself a writer, resided here until last year.

College Born with the Constitution

Graceful spires crown the heights above Georgetown. Viscount Bryce, the brilliant British diplomat, wrote of the pleasure he found in admiring them in the sylvan setting he beheld from "modest little N Street," where he had his house. They are the towers of Georgetown University, the country's oldest Catholic institution of higher learning.*

Like the United States, the school was born in 1789, the year the Constitution was inaugurated and Washington became the first President. It was brought to being by Archbishop John Carroll of Baltimore, an intimate of both Washington and Benjamin Franklin.

A prospectus, issued before any students were enrolled, speaks for the spirit of the founder. In a faded copy I read: "The School will be open to Students of every Religious Profession. They, who in this respect differ from the Superintendent of the Academy, will be at liberty to frequent Places of Worship and Instruction appointed by their Parents." This policy has prevailed ever since.

The college made its start with one small building, a few students, and a very limited library. It had an acre and a half of land, purchased from John Threlkeld, the tardy town councilman who was fined (page 520).

For 1953 the university enrollment is 5,000, representing most States, many foreign countries, and a variety of religions. A quarter-million books crowd its libraries. The campus has expanded to more than 100 acres and there are now 25 buildings. The President, the Very Reverend Edward Bernard Bunn, S.J., administers, in addition to the college, eight graduate schools, astronomical and seismological observatories, a medical center, and a chemo-medical research institute.

Before visiting the heights I never suspected how the decision on the college site affected the present face of Washington.

Among locations given consideration was an undeveloped rise of land called Jenkins Hill, three and a half miles away. The idea was discarded because the area was wild and "too far from the city"—Georgetown. L'Enfant later chose Jenkins Hill for the Capitol.

"That has its postscript," a faculty member said with a smile. "We almost had the Capitol on campus, after all.

"When Washington was burned in 1814, 'Old North' was the largest structure in the vicinity. It was offered to Congress for a temporary meeting place. To buoy national morale, however, Congress finally thought it best to get along in the least damaged buildings of the burned city."

Old North, the second college building erected, is still in use.

Presidents of the United States, from Washington to Eisenhower, with occasional exceptions, have honored the university by attending commencements, by special visits, or in other ways. Washington set the precedent in 1797 when he rode up from Mount Vernon to Old North and addressed the student body, which included two sons of one of his nephews.

Where Eclipse Hunting Starts

Lafayette was feted on his triumphal visit in 1824. The reception at the college so impressed him that he made special note of it in his speech to the National Assembly upon his return to France. Leading figures from other countries have been received at the university ever since.

The astronomical observatory holds special interest for National Geographic Society members who followed the reports of their Society-sponsored eclipse expeditions to Russia in 1936, to the Pacific's Canton Island in 1937, to Brazil in 1947, and to the Far East in 1948.†

*See, in the National Geographic Magazine: "Washington Through the Years," by Gilbert H. Grosvenor, November, 1931; and "The Nation's Capital," by James Bryce, June, 1913.

†See, in the National Geographic Magazine: "Operation Eclipse: 1948," by William A. Kinney, March, 1949; "Eclipse Hunting in Brazil's Ranchland," by F. Barrows Colton, September, 1947; and "Nature's Most Dramatic Spectacle," by S. A. Mitchell, September, 1937.

Georgetown Residents Get a Lesson in Federal Architecture

Ell-shaped brick dwellings with servants' wings became a basic type in American design between 1780 and 1820. These models, exhibited before the Progressive Citizens Association, are complete down to back gardens.

Extensive planning for these projects has been done under the observatory dome. Both the present director, the Reverend Francis J. Heyden, S.J., and his predecessor, the Reverend Paul A. McNally, S.J., have been expedition leaders.

This is one of the country's first observatories. Among its prized possessions are two grandfather-size clocks, sidereal and solar, which tick away with the same precision they brought with them in 1845 from London where the house of Molyneaux made them.

I spent hours poring over the first volume of the observatory log, covering a span from its founding in 1841 to 1946. Not all entries are astronomical. I found one, dated May 14, 1860, on the arrival of the first Japanese diplomatic mission to the United States.

"At 11 A.M.," it read, "saw the steamer *Philadelphia* by means of the Courtney telescope. The steamer carries from Norfolk [Virginia] the Japanese Embassy; they are to land at the Navy Yard and to be escorted by a military and civic procession to the Willard's Hotel, Washington. Our military company being invited to form part of the procession went out at 10 o'clock to the Navy Yard and many other students . . . with them."

Almost fourscore years later the log records the assignment of my colleague, W. Robert Moore, of the Society's Foreign Staff, to join the eclipse expedition to Russia.

The faded entries covering the initial half-century are, with few exceptions, in the firm hand of the founding director, the Reverend James Curley, S.J. A versatile scientist, he was the first to compute accurately Washington's latitude and longitude. He also kept meteorological records on the area for 43 years before an official weather bureau existed.

Vaults Guard Rare Treasures

This log and his weather books will be preserved in the banklike vaults that safeguard the university's archives and its treasures of hand-lettered parchments from medieval and Renaissance times, rare editions, and other irreplaceable items.

In the archivist's office I examined the priceless manuscripts of two masterpieces given to the university, *Tom Sawyer*, by Mark Twain, and Richard Sheridan's *School for Scandal*. I now know that Mark misnumbered the tablet paper he used; the manuscript is

Stone House Stood Before Washington Was Even a Plan

Legends cluster thickly about this house at 3051 M Street. One says Maj. Pierre L'Enfant made it his headquarters while he was laying out Washington (page 513). One of the few remaining pre-Revolutionary buildings in the town, Stone House appears to have been built about 1765. The Federal Government is taking steps to preserve it.

Stone House had a prominent place in Georgetown's bicentennial program. These kilted bandsmen (center) served as reminders that many of the town's early settlers were Scots.

Memories Haunt This Old Cabin

Before Georgetown existed, the Threlkeld family farmed its western heights, where the cabin now stands in a restored condition. Servants or slaves may have occupied the place. Today it is a favorite picnic spot for students on the 37-acre campus of the Convent of the Visitation, oldest Catholic girls' school in the Thirteen Original States. A unit of the Georgetown University Medical Center rises near by.

National Geographic Photographers B. Anthony Stewart and John E. Fletcher

National Geographic Photographers B. Anthony Stewart and John E. Fletcher

eight pages less than the author's count shows.

Anyone interested in Americana will find many reasons to tarry. Here I found General Sherman's shoulder straps, and paper money our town printed in its own name between 1800 and 1860—tobacco-coupon-sized notes worth from 12½ cents to a dollar.

The name of William Gaston begins the lengthy list of those who have been students on the heights. Congressman and orator, he was rated the equal of Clay and Webster in debate. North Carolina, his native State, made him its Chief Justice.

"Maryland, My Maryland" came from the pen of another alumnus, James Ryder Randall. Joseph Clark, an early graduate, taught and encouraged Edgar Allan Poe, recognizing him as "a born poet."

Five relatives of George Washington attended the college. The sons of Presidents Van Buren, Tyler, and Johnson are on the rolls, and the adopted son of Jackson. An esteemed Chief Justice of the United States Supreme Court, Edward Douglass White, is only one of the many sons of Georgetown who became distinguished public servants.

Near the university campus is a celebrated institution, the Volta Bureau to promote the teaching of speech to the deaf. First of its kind in the world, the bureau was founded by Alexander Graham Bell, inventor of the telephone and second president of the National Geographic Society.

In its Grecian-style building the bureau houses the world's largest library on deafness. From it, for over 60 years, have sprung many far-flung efforts to help the deaf speak. Along the lines of the bureau England modeled its National Institute for the Deaf and Japan revised its method of teaching the deaf.

Last year the bureau's small but dedicated staff answered thousands of letters from 37 foreign countries and the United States. It tells parents how to help their deaf babies talk and how to lead deaf sons and daughters from their silent world into the world of hearing people.

A Romantic Story

The Volta Bureau publishes a monthly review for teachers of speech and persons who are concerned with deafness. Sinclair Lewis was one of its early editors. Honorary President of the organization is Mrs. Calvin Coolidge, a teacher of the deaf before her marriage. Board members include Helen Keller, Mrs. Spencer Tracy, Supreme Court Justice Harold Burton, J. Edgar Hoover, and Dr. Gilbert Grosvenor.

Behind the Volta Bureau is a romantic story. Alexander Graham Bell's wife, deaf at the age of four years, had learned to speak and read lips with great facility as a child. This she had accomplished with her mother's help at a time when no schools in the United States taught deaf children to speak.

Inspired by his wife's extraordinary achievement and realizing what her success meant to him, Bell determined that "no deaf child in America shall be allowed to grow up mute without earnest and persistent efforts having been made to teach him to speak and read lips."

Across the street from the bureau stands the former home of Alexander Melville Bell, father of the telephone's inventor. Bell senior was himself the inventor of a system of visible speech which was an early aid in teaching the deaf to speak (opposite).

Telephone Aids the Deaf

For 30 years Alexander Graham Bell maintained a laboratory in his father's house, using the part which is now the garage. He called it the Volta Laboratory, for he financed it with France's Volta Prize money which he won in 1880 for inventing the telephone.

In this laboratory he and his associates perfected the graphophone. Few people are aware that the graphophone made the phonograph practicable by replacing short-lived indented cylinders of a yielding material with durable engraved wax records which could be used over and over again. Bell disposed of his patents and gladly used the money to endow the Volta Bureau.

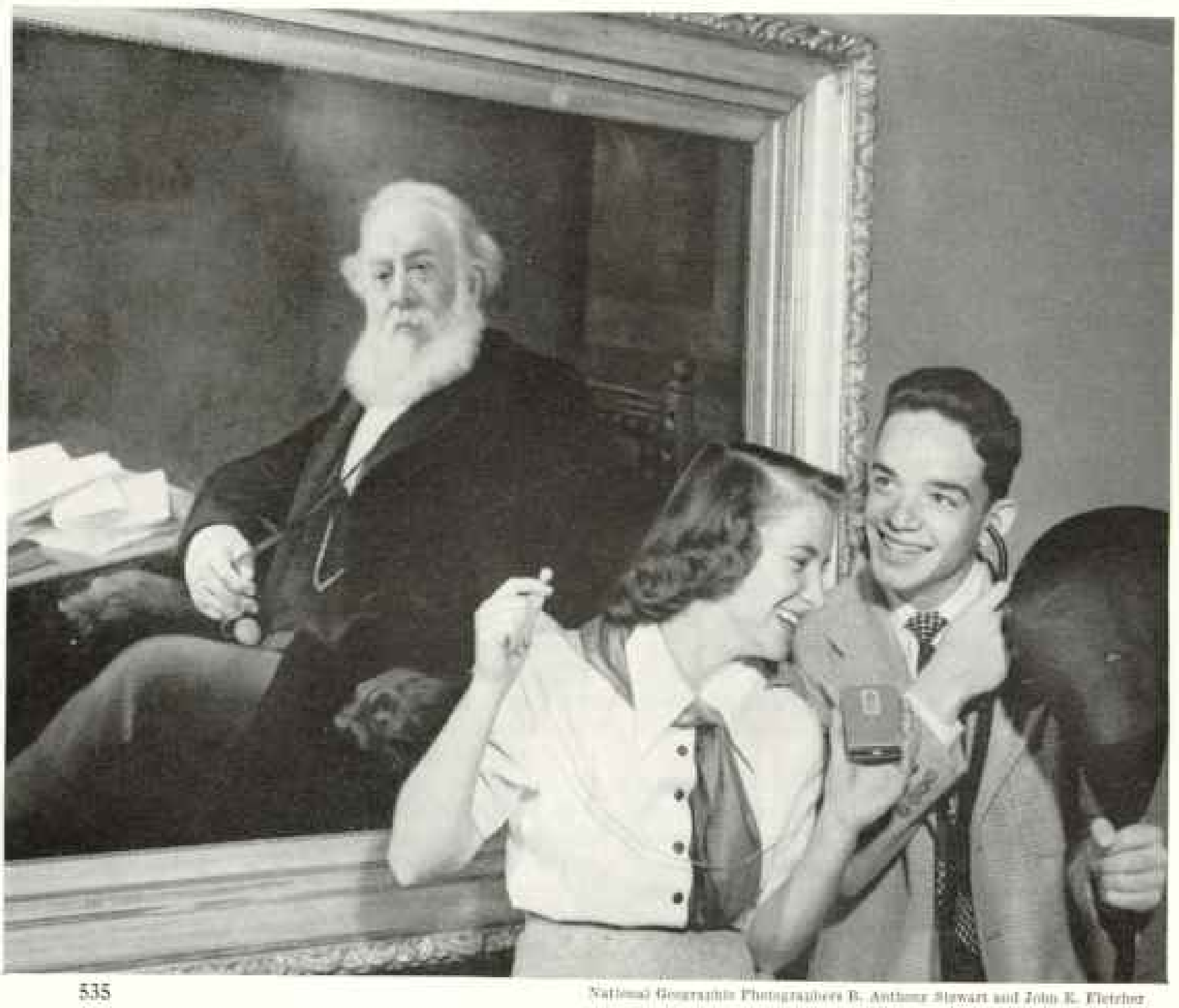
Another university neighbor is the Georgetown Visitation Convent, a girls' boarding school, founded in 1799. Three red brick buildings—the academy, chapel, and monastery—front on the street.

The monastery windows are firmly shuttered from the inside. No curious passer-by may peer in. Those within have no desire to look out. They are cloistered nuns who teach in the academy. There is, of course, a street entrance for the 300 students, who are in high-school or junior-college courses.

So well regarded is this convent, the first established in the infant United States for the higher education of Catholic girls, that there is always a waiting list. One man took no chances on his daughter's admission. A few hours after her birth he wired, "Please enroll daughter for class of 1964."

The movement to restore Georgetown was still in its early stages when it mothered two community undertakings that have blossomed into annual attractions. They are the garden and house tours, which each spring are a magnet for throngs of visitors.

In 1928 an overburdened charity worker plainly needed a car. Public-spirited women decided to do something about it, and the



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Alexander Melville Bell (1819-1905): He Invented Visible Speech

This distinguished Scot devised an alphabetlike system which used printed symbols to represent positions taken by the vocal organs in uttering vowels and consonants. His method was a boon to the deaf. Bell's portrait hangs in the Volta Bureau, founded in 1887 by his son, Alexander Graham Bell, inventor of the telephone, who was determined that "no deaf child in America shall be allowed to grow up mute." Dr. Bell conceived the Georgetown institution as a world clearinghouse for information that would help solve the problems of deafness. These visitors contrast a modern hearing aid with an old-fashioned trumpetlike device.

idea of a garden pilgrimage was born. The car financed, the women raised their sights. Admission fees, program advertising, and gifts, plus hard work and enthusiasm, finally gave them their monument. It was the Georgetown Neighborhood House, which opened in 1937, seven years after a first humble beginning had been made.

Here parents with jobs may leave nursery-age children. Hot lunch is served for those of school age, and they may return for a variety of after-school activities. Teen-agers and adults use the building evenings for recreation and club purposes.

The house tour, started in 1927, raises funds for the welfare work of St. John's Episcopal Church. In the eyes of its present rector, the Reverend William M. Sharp, the opening of fine old mansions to the public is symbolic of a broader objective.

"That goal is to open the door to better living for everyone of the community, regardless of race, color, or creed."

Democracy at Work

I have heard it said that Georgetown is a good example of democracy at work. Well-to-do and poor families of different races and religions are often found living side by side in amity and mutual respect.

One reason Georgetonians manage so well may be that a substantial number of them appear to take their churchgoing seriously. For a comparatively small community we have a large number of places of worship—22 Protestant and Catholic churches, a synagogue, and a "Temple of Islam" which serves a Negro Moslem sect.

The Temple is half a block from my house. Women worshiping there give the street an

odd note of color as they pass on Sundays, clad in green, red, white, and lavender robes very much like Biblical dress.

The Mount Zion Methodist Church, oldest Negro congregation in the District of Columbia, was founded in 1816 with 125 members. Before the Civil War its membership book frequently recorded opposite a name the single word "sold." It meant the sale of a slave member. After the name of Edward Brown in 1834 appears: "sold—poor fellow."

The More Things Change . . .

One of Georgetown's chief concerns in its early days was to keep the town clean. Residents are equally mindful of the problem today. When the restoration began, it was accompanied by a crusade against trash, refuse, and unsanitary conditions.

Street cleaners are held in proper regard here. I've encountered them at work in the still sleeping streets as early as 6 in the morning. Each year they are guests of honor at a special garden party which includes speeches, lunch, and gratuities. One of the town's leading women is hostess.

Traffic also worried the first officials, apprehensive about the breakneck passage of stagecoaches or horsemen galloping through town. Since M Street is a busy channel for the Capital's populous suburbs in Virginia, the traffic problem is still with us.

In the past few years optimistic pleas have been made for holding motorists to the leisurely pace of bygone times, even if it meant stop signs at every intersection. As far as I can learn, such proposals are still tactfully pending.

Some reminders of the past are convenient, even touching.

Negro sawyers used to make their rounds, wagons stacked with logs cut to varying lengths so a householder would have no trouble getting the right size to fit his fireplace. Sawyers are still part of the scene in late fall and winter. Most wood peddlers are motorized now, but from time to time I have seen some who rely on the old-style horse-drawn wagon. Like them, the itinerant fishman also believes old dobbin is here to stay awhile.

On Christmas Eve, from colonial times until the Emancipation Proclamation, bands of slaves went through town singing carols in soft, rich voices. They were rewarded with sweetmeats and other gifts.

Despite Georgetown's stretch of lean years, the custom survived. Negro children still go about the streets singing Christmas hymns and spirituals as only they can sing them.

Georgetonians celebrated our town's 200th anniversary in 1951 with understandable pride, heightened by the still sweet victory of the "Old Georgetown" bill (page 522). A decorous observation it was, nothing to flaunt an older heritage and traditions before the much younger sections of the District of Columbia.

The program provided for a parade, fancy-dress ball, dancing in the streets, concerts, and special church services. Its most imaginative feature was a revival of the fair authorized by the colonial act creating the town, said fair to be held spring and fall as "encouragement to back Inhabitants, and others, to bring commodities there to sell and vend."

One pleasant evening after the bicentennial, my wife and I were sitting in the yard with the couple next door, a U. S. Navy commander and his wife, now lost to us by assignment in north Africa. We fell to talking about Georgetown.

I recall observing how many towns there are in this country and the world which have kept one rendezvous with history and are content to bask in the reflection of that moment. Georgetown, it seems to me, has been keeping such appointments for a long time and evidently intends to continue.

The Dumbarton Oaks meeting laying the groundwork for the United Nations might be cited as a recent indication of intent (page 517).

The commander's wife happened to be an Englishwoman, just about to become an American citizen. Perhaps her British background had something to do with the unexpected comment she offered.

"Go It, Old Girl!"

"You know," she said in the clipped manner that always delighted us, "I love it here. The town keeps reminding me more and more of the curtain lines in Laurence Housman's *Victoria Regina*. The Queen describes how her jubilee procession neared Hyde Park Corner where suddenly a surge of men broke through the lines of police and troops.

"They ran alongside her carriage, cheering and shouting: 'Go it, old girl! You've done it well! Go it.'

"Somehow, you almost get to feel that way about Georgetown."

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A Onetime Inn Reveals a Stately Hall Not Suggested by Its Plain Exterior

Eighteenth-century Yellow Tavern catered to wealthy merchants and political notables. Legend says fugitive slaves once hid in the balcony of its taproom. Remodeled, the place is now a 33d Street residence.

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House Fronts Built Up to the Sidewalks Give No Hint of Cool Green Gardens in Back

Back-yard Space Is Precious. Just Big Enough for This Georgetown Garden Is Its 12-foot Swimming Pool, Like a Giant's Bathtub

Kodachromes by National Geographic Photographer B. Anthony Stewart

This Ice-cream Shop Has Been a Rendezvous of the Younger Set for Generations

The business venture known as Stohlman's, one of Georgetown's oldest, has occupied the same Wisconsin Avenue site since 1820. Through the years it has catered to the sweet tooth of many a celebrity. The Stohlman family has owned the business since 1865, serving frozen confections in the back parlor at marble-top tables now almost 100 years old.

✓ Here Six Languages Are Taught at a Time

Georgetown University got the idea for its Institute of Languages and Linguistics from a communications system used at the Nürnberg trials, and a faculty member perfected it. Today the university gives courses in 32 tongues. Instructors put lessons on tape recorders, and students, like United Nations delegates, select their particular language channel. A single classroom replaces six.

This technique, freeing teachers from classroom routine, allows them to give more help to individuals.

Sound-absorbing boards separate these students.

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Stately Tudor Place Has Been the Home of the Peter Family a Century and a Half

Dr. William Thornton, who designed the Capitol, created this mansion at 31st and Q Streets. For years it was the home of Martha Parke Custis, a granddaughter of Martha Washington. She came here in the early 1800's as the young wife of Thomas Peter, a founder of Georgetown's first bank. Tudor Place has remained in their descendants' hands ever since.

The Peters bought the land from a wealthy tobacco merchant in 1805. At first only two wings existed, one used by the family for living quarters, the other for a stable. Mrs. Peter used her legacy from George Washington to finish building, a project which took until 1816.

Considered a striking example of Federal architecture of semirural type, the mansion was long a center for the town's social life. One of its priceless possessions is a collection of Washington family relics.

Three of the Peter girls were named America, Columbia, and Brittania. The last-named was bridesmaid in 1831 at the wedding of Lt. Robert E. Lee to Mary Custis, great-granddaughter of Martha Washington. On his last visit to Washington, in 1869, General Lee stopped at Tudor Place.

Armistead Peter, Jr., is now the master of the mansion. His granddaughter, Anne Custis Peter, who enjoys the book and the sunshine on the broad south lawn, represents the sixth generation of the family to reside here.

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Spring Returns! Youth Blooms Like the Dogwoods

Gordon Junior High School students plan and work the year around to make their annual Dogwood Festival a success. They celebrate with songs, dances, gymnastics, clown acts, and a parade. Serried banks of the trees on the slopes turn the recreation area into a floral amphitheater.

Queen for the day was Cyanne Hanson (right). Supervising the planting of a new pink dogwood tree was her foremost duty.

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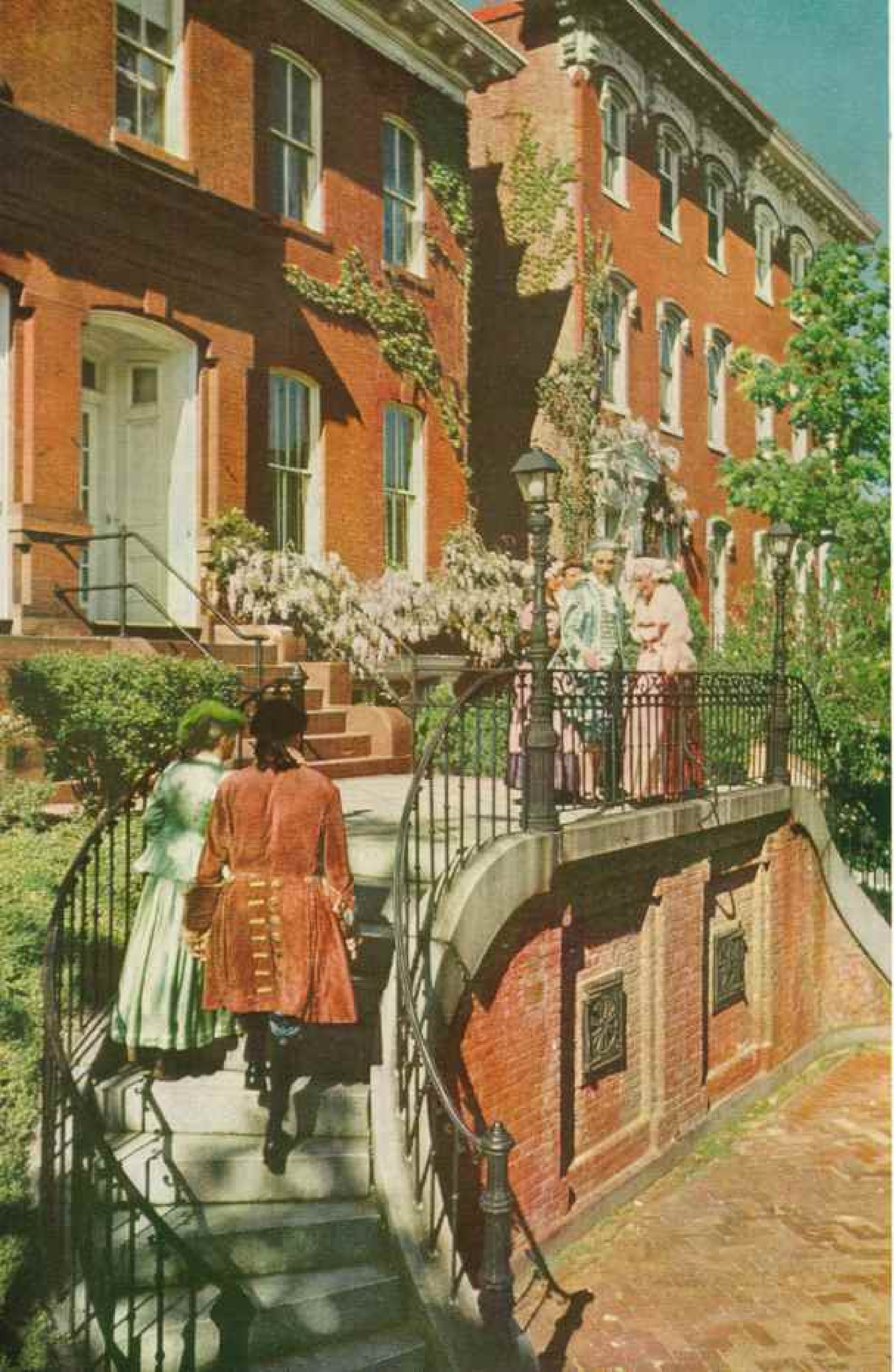

Report from the Locust Wars

From Africa to India Men Fight an Ancient Enemy with American Aid; the Authors Describe Operations in Iraq's Vast Desert

By Tony and Dickey Chapelle

THROUGH a tense campaign in the hot, forbidding desert of Iraq, we served as war correspondents with one of mankind's oldest armies.

The foe was the migratory grasshopper, the locust of the Bible. For centuries famine has stalked over land after land in the wake of whirring, hungry hordes. The desolation they leave is best described in the Bible: "there remained not any green thing in the trees, or in the herbs of the field, through all the land of Egypt" (Exodus 10:15).

Loneliest and least honored of legions are the armies of locust fighters. Their banner is a crumpled poison-bran sack. Their weapons move on trucks that every other army has discarded. Their patrols jolt by jeep or rock on camelback across the desert's wastes.

Whole battalions weave casually across national boundaries, occupying and withdrawing overnight. Platoons survive and fight on a goatskin of tepid water. Sentries club the horned snake at the edge of camp, step on the fat scorpion, or drive the desert wolf away with flaring sagebrush fires. Vehicles are overturned and engulfed in fierce, blinding sandstorms.

U. S. Planes Join Iraq's Locust Army

In a pink wasteland almost blank on the map, the Iraq army against invading locusts battles barehand and barefoot under a sun that can suck the life out of a man's throat in half a day. Its first air arm, two small planes bearing United States insignia, learned to navigate across this desolate region by following flag markers, and to use a handful of sand flung into the air as a wind sock.

A year ago we joined the Iraqi locust fighters at Al Busaiya, an advance base 75 trackless miles from cultivated land.

Millions of locusts, hatching in the desert, stretched beyond the country's southern border. To the north, ripening grain and dates covered the Mesopotamian valley, traditional site of the Garden of Eden. Every insect killed here in the wasteland would be one less to ravage these crops.

The use of an organized force to battle the locust is thousands of years old; the idea of meeting the enemy in the desert is only 25. If the men who had that idea were right, the locust scourge may someday be halted for good in wastelands like Iraq's.

In past years the whirring horror had been checked in Iraq—but only checked. Some swarms slipped past the army; others hopscotched in from deep in other nations beyond the reach of defending Iraqi forces.

Airborne Invaders from Africa

The swarms which had sired this generation of half-grown locusts—our immediate enemy—had come from Saudi Arabia and Egypt. They had moved inexorably along a broad path, just as locusts have done countless times since an unknown craftsman carved the earliest record of their migration, a decoration on an Egyptian tomb of 2400 B. C.

Such movements mark the crisis years of Near East locust cycles, often computed—and in our camps warmly debated—as about 15 years. The climax may last six or seven years. Some fields are denuded each season; then the year's labor of a whole region may disappear in a day and the price of bread soar beyond the reach of the poor.

The plague's grim timetable includes half the countries of Africa, every Near East nation, and much of South Asia (map, page 546).

Recent invasions have come in late winter from Africa to Arabia, then to Jordan, Israel, and their neighbors, and in March and April to Iraq. In late spring and early summer the wide land belt from Iraq to India is struck, and by August the insect horde has started back whence it came. Every winter campaigns against the locust reach their height in Africa—Somaliland, Kenya, and Ethiopia.

In the worst years the insects leave stark famine behind them. Iraq suffered one of its most devastating invasions in 1945. The first postwar date crop was ripening when the locusts whirred in, like the hordes over Egypt in Biblical times, riding winds off the Persian Gulf.

One day thousands of palms around Basra nodded with their weight of fruit, and grain-

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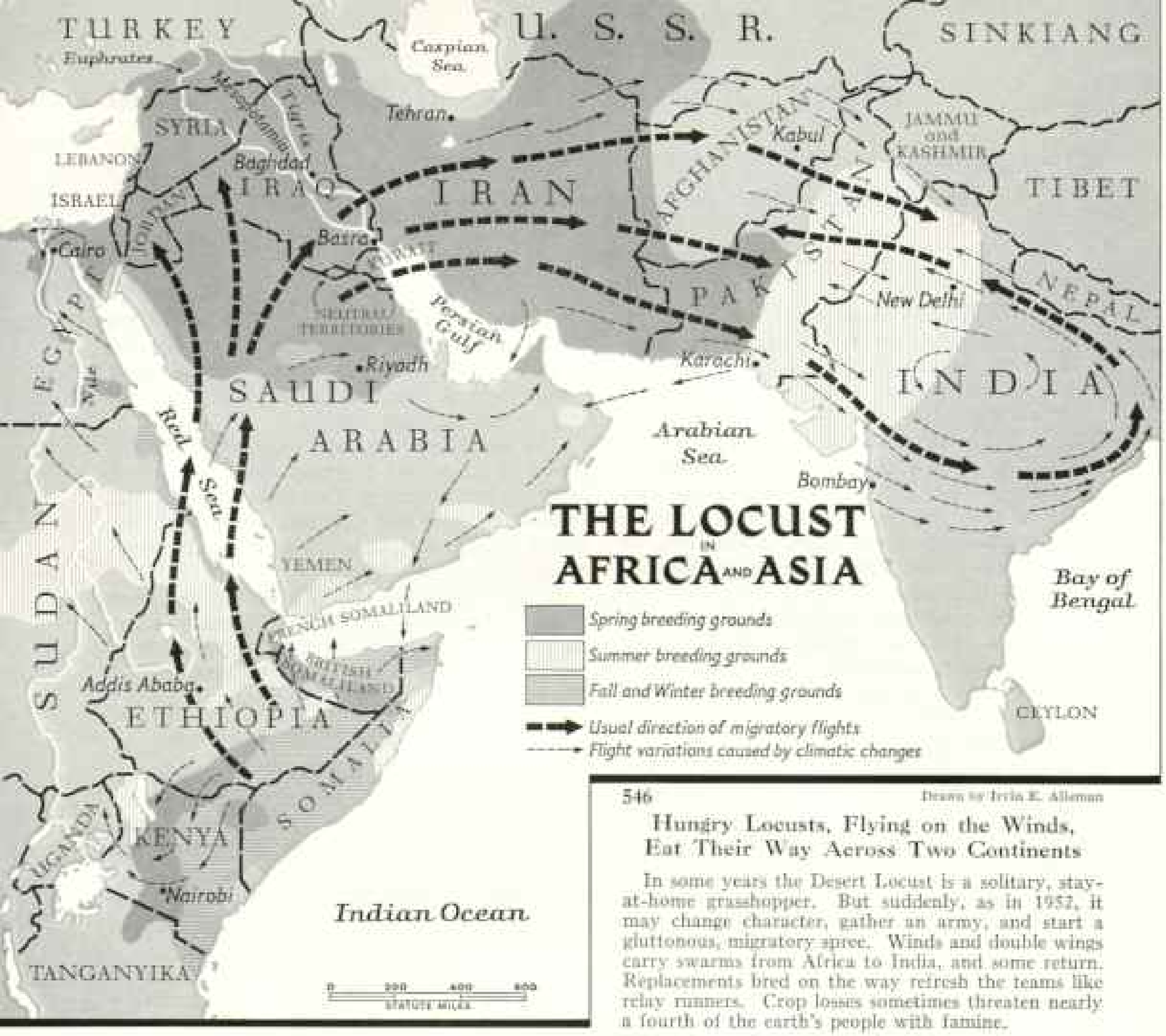
← Colonial Color in Old Georgetown Makes the Yesteryears Live Again

Trees and 18th-century costumes blossom on a street prosaically renamed N to conform with Washington usage. Gay Street, the former name, gave no stranger his bearings, but it sounded livelier.

Built in 1794, the house on the right is a splendid adaptation of Federal period types more common in New England. Secretary of War Newton D. Baker made it his home during World War I.



546 Drawn by Irvin R. Alleman

Hungry Locusts, Flying on the Winds, Eat Their Way Across Two Continents

In some years the Desert Locust is a solitary, stay-at-home grasshopper. But suddenly, as in 1952, it may change character, gather an army, and start a gluttonous, migratory spree. Winds and double wings carry swarms from Africa to India, and some return. Replacements bred on the way refresh the teams like relay runners. Crop losses sometimes threaten nearly a fourth of the earth's people with famine.

fields to the north were golden velvet in the hot stillness. The next, locusts came—first a stippling, then a sea of crawling yellow. Their rustling filled all ears and hearts.

When the invaders left, the Basra region looked like a vast battlefield. Date groves showed a forest of bare spars, grainfields were stubble, and even tough, wild marsh reeds had disappeared.

Official reaction to the disaster was prompt. It was then that Iraq's modern locust army was born. Legislators as far away as London and berobed sheiks in the stricken zone united to move against the locust.

But once the victims were buried, survivors fed, and political consequences reckoned with, the locust was forgotten except by a handful of entomologists who were to be our hosts in the new crisis of 1952.

During this recent invasion the locust fighters of Iraq, like those in Pakistan and Iran the previous year, began using two new weapons. One was aldrin, an insecticide developed in the United States, so potent that two ounces in a gallon of water or diesel oil will rid an acre of locusts; the other, small, efficient airplanes which can spray the solution over 100 acres in half an hour.

Supplying planes, pilots, and poison is a project of Point 4, the U. S. program of technical cooperation with foreign countries.

The locust is a leavener among governments, and the Iraqi force fighting the invader last year was part of an international army. Much of its intelligence came from British locust-control officers in Saudi Arabia, Kuwait, and Nairobi in Kenya.

Pakistan cooperated by lending much of the precious aldrin. The poison was flown in from Karachi when it was feared that Iraq's allotment might be delayed in transit.

Winning Allies in Desert and Town

But the addition of American pilots and spraying planes to the 400-man Iraqi force was the most dramatic new alliance.

We soon discovered that the locust fight cuts across race, religion, tribe, wealth, creed, education, position—every consideration except the necessity to kill insects. There is no

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Arabs and Americans Unite Against the Locust, Which No Nation Can Whip Alone

Some 20 peoples trying to survive in the Desert Locust's broad realm now ignore political differences and team up to control an enemy which, in overpowering numbers, disregards geographical frontiers. Since 1951 the United States has given technicians, airplanes, and insecticide to the fight. Here in a tented field office on the great Iraqi desert, Dr. Dhia Ahmed (left), Iraq's director of plant protection, spots the insect's invasion areas on his map. The authors, Tony Chapelle (center) and his wife Dickey, covered the Iraqi front documenting the 1952 Locust Control Project of Point 4, or TCA (Technical Cooperation Administration).

need to explain the locust danger to any farmer, and nine out of ten Iraqis are farmers. Hence the U. S. mission joined not just Iraq's Department of Agriculture, which issued the invitation and acted as official host, but most of the people of Iraq.

Our personnel became comrades in arms of Bedouin camel herders who traditionally quarrel with government, but who hate the locust so much they seek out anti-locust crews to report where they last encountered the enemy.

Even Smugglers Lend a Hand

Desert police patrols, chasing smugglers' trucks, stopped to report signs of infestation to us. The smugglers themselves risked our camp's proximity to a police post to tell us about locust eggs, swarms, or hoppers seen.

A desert sheik, land-poor but wearing an azure robe with bullion tassels, offered to guide our locust patrols.

In towns taxi drivers, shopkeepers, sharecroppers, and children trudged to the agricultural office with insect specimens and word about where they found them.

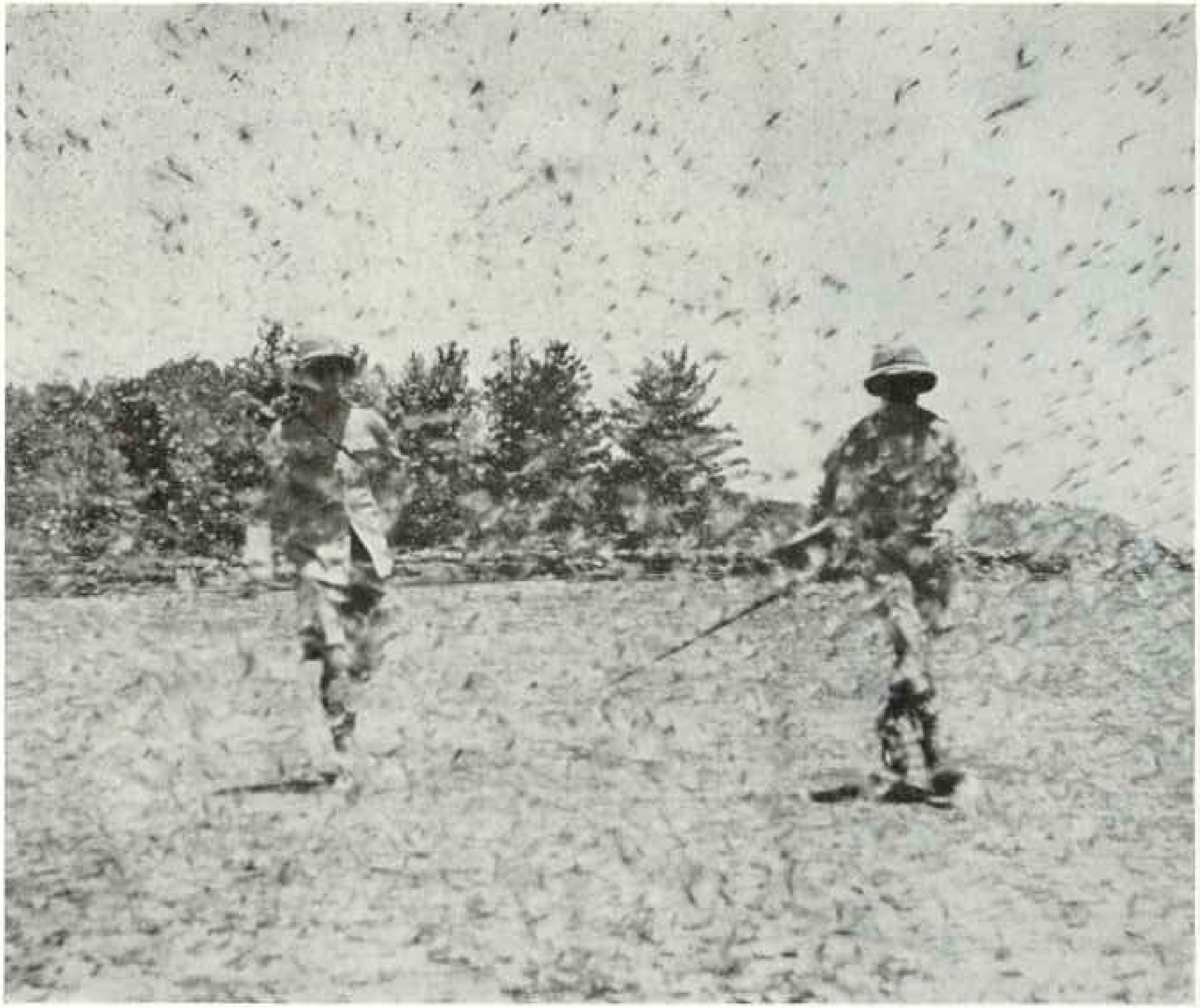
At the farthest front of the Iraqi locust war —the Neutral Territory jointly owned by that nation and Saudi Arabia—an Arab prince sent emissaries in ceremonial capes to offer aid to the locust army's local leader.

It took a steady hand to guide this far-flung defense against the insect hordes, the hand of Darwish al-Haidary, Iraq's Director General of Agriculture (page 552). His firm grip was as often on a jeep wheel as around a telephone or a glass of tea for a visitor in his Baghdad office. Thirteen years in his job, he is a graduate of Texas A & M and an adopted son of the Lone Star State.

Darwish still has a flourishing fund of Texas humor and a broad command of colloquial English. When negotiating in his native tongue, he often gives vent to a quick temper by bursting out in English, then dropping his voice back into patient Arabic.

They still tell how the director general obtained insecticide when the locust army was being formed. He told the then Minister of Finance, "I need 600 tons. That will be several years' supply."

The minister objected. "I can't commit the government that far ahead," he said. "I



"Flying Stomachs" Attack Pakistan; Men Cannot Stop a Migratory Swarm

Ancient scourge of mankind, the ravenous grasshopper, or locust, has been described in carvings and writings for 4,400 years. Exodus 10:15 tells the horror of the eighth plague which the Lord visited upon Egypt because Pharaoh would not release Moses and his people:

"For they [the locusts] covered the face of the whole earth, so that the land was darkened; and they did eat every herb of the land, and all the fruit of the trees, which the hail had left: and there remained not any green thing in the trees, or in the herbs of the field, through all the land of Egypt."

Joel's dire prophesy (Joel 2:3, 10) has often been fulfilled:

". . . the land is as the Garden of Eden before them [the locusts], and behind them a desolate wilderness; yea, and nothing shall escape them. . . . The earth shall quake before them; the heavens shall tremble: the sun and the moon shall be dark, and the stars shall withdraw their shining."

At least eight major locust species have wrought destruction on six green continents throughout history. Not until the 1920's did man begin to understand that the insect led a double life. Knowledge that the inoffensive solitary grasshopper may become the swarming migratory destroyer gave its victims a new weapon.

Wide World Photos, Inc.

Locust Fighters Mix Bran with Insect Poison and Water and Sow the Bait on a Hopper-infested Desert

Water lures thirsty locusts to death on the parched desert. Teams use it sparingly, since they must truck it as much as 150 miles. Spread by hand, the poison bran gives ground crews their most effective weapon. These men work at Samah in the Neutral Territory between Iraq and Saudi Arabia.

Technical Cooperation Administration, Department of State

Technical Cooperation Administration, Department of State

Camel-borne Scouts on Patrol Seek Fresh Infestations in the Hot, Dry Sands. A Ground Platoon Spreads Bait

Ground crews form most of Iraq's 400-man locust army; they work out of 30-odd desert camps. Camels carry sleeping mats, dates, water, and locust fighters on 125-mile inspection tours. The prevailing shrub, known as *arfaj*, serves nomads as fuel, windbreak, and camel fodder.

Ammunition for Iraq's Insect Wars Moves from Warehouse to Station Wagon at An Nasiriya

Arsenals in the locust campaign speed supplies to the battle front whenever an invasion is discovered. Here tents, poison, and bran start into the desert. Dr. Dhia Ahmed (in dark glasses) directs Iraq's crop defenses; he earned his doctorate at Ohio State University (page 553).

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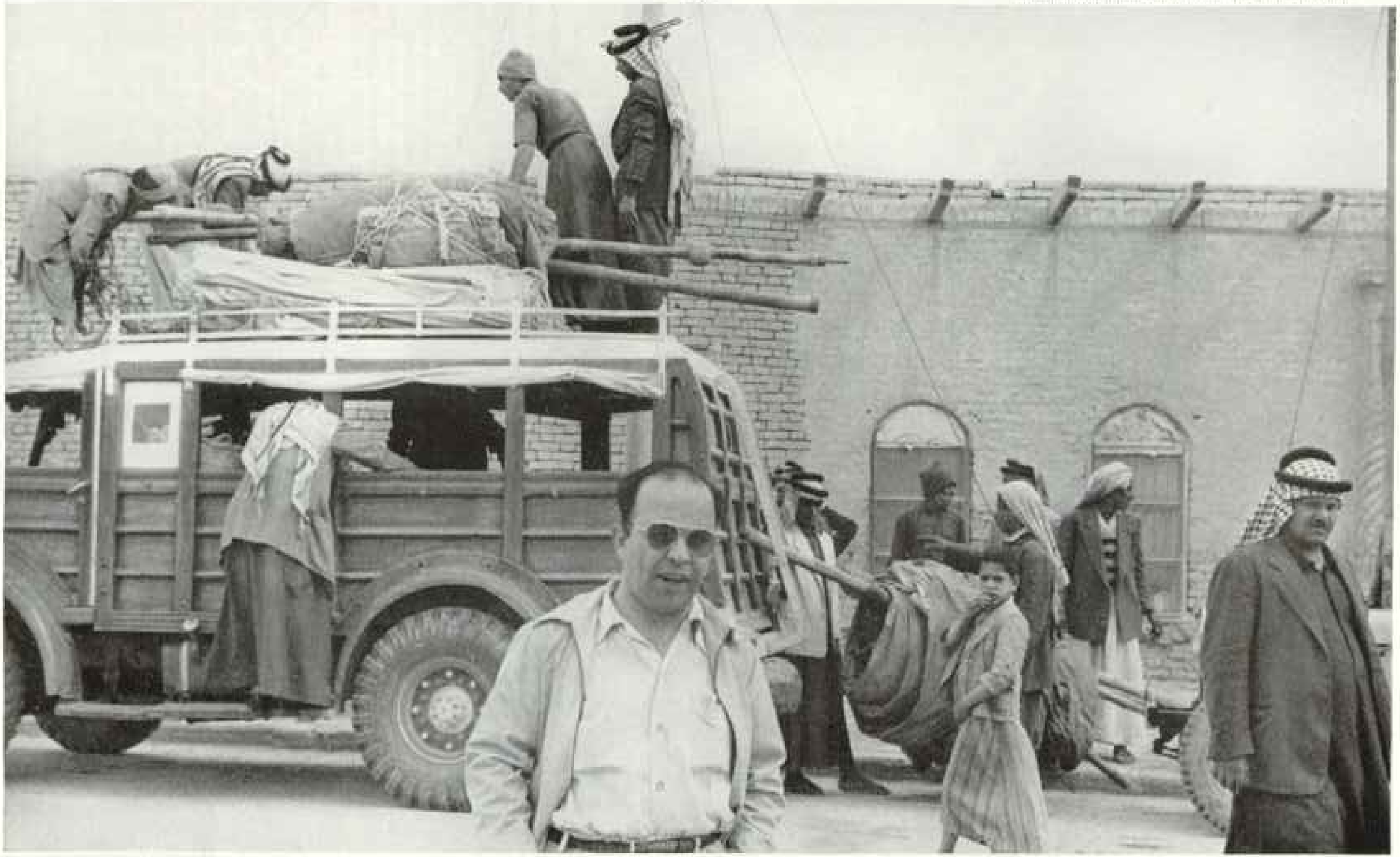

American Planes War on Iraq Locusts

▲ At dawn one day in 1952 this lonely stretch bustled with activity. Supply trucks rendezvoused with two light planes (one shown). Pilot and Point 4 technician mixed insecticide and water and funneled the solution into wing tanks. Other workers staked out flags to mark the spray area (page 560).

Taking off, the aircraft scattered aldrin, a new insecticide deadly to locusts but harmless to livestock when properly used. One hundred ounces in 50 gallons of water killed all the hoppers on 50 acres.

◀ Pilot Keith Anderson adjusts the planes' shower nozzles. Darwish al-Haidary (left), Iraq's Director General of Agriculture, got his training at Texas A & M College (page 547).

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A Sand-hopping Plane Drenches the Iraq Desert with Lethal Mist

Sixteen light planes in the spring of 1952 killed hoppers in Iraq, Iran, and Pakistan; later some of them flew to India, Jordan, and Ethiopia to continue their work. Dr. Lewis H. Rohrbaugh (right), from Pennsylvania, director of the Point 4 project in Iraq, and Darwish al-Haidary watch this operation.

myself may not stay in office much longer. For me to pass this requisition is impossible."

"For you," quipped Darwish, straight-faced, "I would not need 600 tons. Only a few ounces. But this is to kill locusts."

Darwish got the chemical.

He is one of the few Near East officials who took the locust fight out into the blank spaces on the map.

"I decentralized it," he says. "Six years ago, by the time my men sent me a report on locusts, and I got word back telling them what to do, it was too late.

"Now, every local agricultural supervisor is his own locust-control officer. He has stores of bran for baiting and poison for killing. He has authority to hire men to spread the bran, so he doesn't need to organize vigilantes at the last moment.

"Under each supervisor we set up advance bases with their own leaders, transport, and supplies. I don't have to be consulted unless what is needed is far in excess of what we have planned."

We watched much of that planning being done on two worn Arabic maps. One hung in Darwish's Baghdad office. Only the movements of infestations and hatchings were shown, sinister red triangles pointing at the cultivated lands.

Desert Tracks Are *Darbs*

The other map rode in the brief case of Darwish's chief of staff, Iraq's director of plant protection.

He is Dhia Ahmed, who earned his doctorate and mastered English, which he speaks with a Midwest accent, at Ohio State University (pages 547, 551). On Dhia's map every anti-locust camp showed as a colored circle. But any student of cartography would have noticed something odd. While the map showed 30-odd locust-control bases, there was no hint of how to get from one to another.

The reason was simple. There were no roads in this 200-mile depth of desert battleground. This is not to say there was no transport; Dhia's jeep and 50 supply trucks operated cross-country, using guides, following camel or police-car tracks. The Iraqis call any faint track a *darb*—which is not an expression of opinion but an Arab word for road.

When our Point 4 pilots, William Schaefer and Keith Anderson, began navigating by these darbs, the term caused much wry humor. There was no humor, however, in one of Dhia's desert rules of the road. The danger of becoming lost was so great that he always required at least two vehicles to travel together.

"And that goes for planes, too," the pilots agreed after their first desert flight.

Dhia's map soon had its face lifted. By kerosene lamp one night he lettered on it the name of each camp in English. The words stood square and uncompromising beside the graceful Arabic script. The pilots were pleased as the names emerged—until they read them: Twai al Hashash, where the first aerial spraying was done; Khadhra al Ma, an advance base for the planes, Qasr Abu Ghar, Samah, Al Busaiya. . . .

"Something tells me they're not in the atlas my wife has at home," one pilot said to the other with a smile.

Bedouin Guides Lead Patrols

Unwittingly they had touched on an old Bedouin mystery, how one stretch of desert indistinguishable to our eyes from all others can be named, known, and found unerringly by nomad tribesmen who are only confused by a map. The desert war against the locust depends to a large extent on guides who perform this trick again and again.

No nomad, but a Baghdadi, Dhia had to place and oversee a dozen remote camps like Al Busaiya and twice as many in scarcely less isolated areas.

During locust months Dhia lived only to kill the insects. A vastly tolerant and friendly man, he became a different person at sight of a live locust.

On the way to Al Busaiya we followed a trail full of sand traps. Dhia bulled his jeep through perhaps twenty in a row, hitting the edge of each at exactly the speed to skid and rock him through.

But in the center of the next trap he jammed on the brakes, slewing the jeep in up to the hub caps. He had glimpsed a field of hoppers and wanted to examine them. Digging out the jeep could wait.

Dhia was host and quartermaster to the U. S. Point 4 Regional Locust Control Project. Among other things, this involved setting up a traveling mess. He was surprised when the men appeared to enjoy the diet of fresh chicken, lamb, and boiled rice.

"Why don't you fellows tell me what you really want? I know this isn't what you'd eat at home. Just what would you like?"

The pilots, not wanting to take advantage of Arab hospitality, shrugged. The answer came from the third member of Iraq's anti-locust general staff, entomologist Albert Meymarian.

"Drugstore Coffee" Comes to Iraq

"They'd like 'dishwater,' Dhia. Remember the coffee you used to get at the corner drugstore across from the campus?"

That's how American-style coffee came to the locust camps.

Albert had studied at Texas A & M at the same time the director general attended. His feelings about his alma mater are best expressed by the big silver belt buckle he wears in the field. It says in block letters: TEXAS AGGIES.

Albert is the scientist of the Iraq locust-fighting army.

Would you like to see a sample of locust eggs? They are in a cigarette tin in his shirt pocket.

Or a black locust arrested in its development by a bath of aldrin? He carries specimens of these in a pair of watch crystals that make a transparent case.

Or perhaps a full-grown locust? Albert has a glass tube containing a yellow-winged adult. Sharing it is one of the world's most lethal insects, a scorpion caught outside our tent.

Albert briefed us on our foe, the Desert Locust (*Schistocerca gregaria*, page 558), during an early patrol into the desert, using the "Yellow Peril" as his classroom. The Peril is his jeep, which came, he says, equipped with dual forward speeds: too fast, and too slow.

"I don't take anything for granted with the locust," Albert shouted from the front seat. "The insect goes through a number of stages, and he's fussy in each of them. Unless the humidity and soil and temperature—even the wind and his food—are right, he doesn't develop at all. But here conditions are too often agreeable. He grows and travels. Locusts have traveled as far as 900 miles in 14 days."

Locusts—Eggs to Winged Hordes

Our own journey was interrupted here by a wait at the single-lane pontoon bridge across the Euphrates at the last town on our route, An Nasiriya. We waited for a camel loaded with date-palm seedlings; for a herd of fat-tailed sheep; for veiled women carrying water in shiny kerosene cans. Then the white-coated policeman warbled on his whistle, and we moved on.

"First the pest is an egg," Albert continued, "just one of 70 to 100 laid in the soil in a tiny cluster, like bananas. This stage lasts up to 40 days. Then it is a hopper, with three pairs of legs. It is black then, and here is the important thing: it can only hop and crawl.

"For several weeks it moves with a group, but very slowly. This is when we get them. We feed them poison mixed with bran and spread by hand. Or your planes spray them with aldrin-and-water solution."

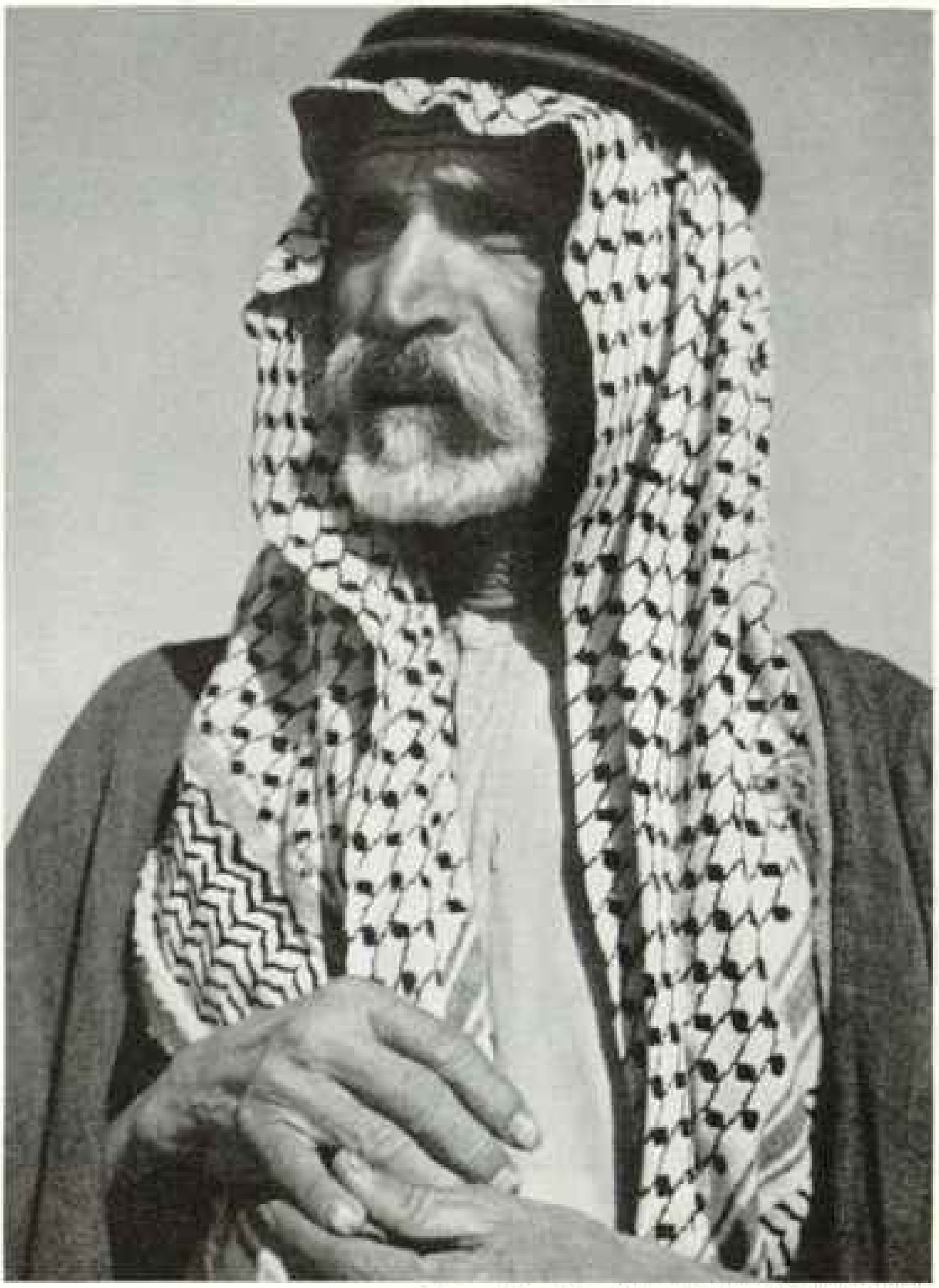
Came a diversion few professors have to contend with. We slowed down for a camel herd feeding across the track. The herder, a robed Bedouin with a shiny rifle, rode atop the tallest camel. He tried to guide his beast out of the way, but it had another idea.

In the track the camel halted with a jerk, and the herder slid down its neck like a child on a playground chute. As the Bedouin picked himself up, audibly reflecting on the beast's ancestry, Albert good-naturedly shook his finger at him.

"That's fine camel riding to show our visitors!"

Then he took up his favorite subject again. "When the locust first becomes an adult, it is pink, and its two pairs of wings are grown. Later, when it can reproduce, it is yellow. These are the most deadly periods, the times when locusts may become a devouring horde.

"I've never been so afraid as I was one morning in 1945, not far from here, when I first saw a dark band on the horizon holding back the sun from rising. I knew that this was locust invasion, and that I, with only a few buckets of bait, must try to halt it before it reached my people's food. Since then we have learned how to do it, but what an awful feeling that was then!



Technical Cooperation Administration, Department of State

Bedouin Patriarch Scans the Horizon for the Enemy

His nomadic people, traditionally at odds with government, willingly join the battle against the locust. Confused by maps but never by monotonous, trackless sands, they guide control crews unerringly.

"There aren't two species of the Desert Locust as we once thought—one friendly and solitary, the other a ravening horde," Albert continued after a pause. "There's only one—but we see it in two phases. The solitary locust becomes a destructive, gregarious insect when conditions are right for multiplying."

Locust Is a Dr. Jekyll-Mr. Hyde

The entomologist explained that the insect, when it remains scattered under normal conditions, is a grasshopper of quiet, almost bovine disposition. But occasionally Nature creates just the proper conditions, and then a handful of grasshoppers can quickly produce a vast progeny. Soil, temperature, rainfall, and vegetation must be exactly right.

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Horst Ammann, Three Lions

This Swarm in Uganda Blotted Out the Sun and the Photographer's Windshield

A typical horde moves on a two-mile front 20 miles or more deep. Taking days to pass, it devastates crops leisurely but thoroughly. Locusts buck winds up to eight miles. In plague years three species chew up Africa from Cairo almost to Cape Town. Some swarms grease rails until trains cannot start.

Locusts hatched under such favorable conditions differ from their ancestors in metabolism. Even body temperature is higher. Giving up the individualism of their forefathers, they act only as a group.

There is not enough food for the horde when its members begin to grow, of course. They do not battle for what there is, but simply forage beyond their birthplace, first crawling, then flying as their wings develop.

This is the birth of a swarm, and a swarm is self-propagating. In Iraq, for example, there are almost always two generations of locusts moving from south to north during a year of infestation.

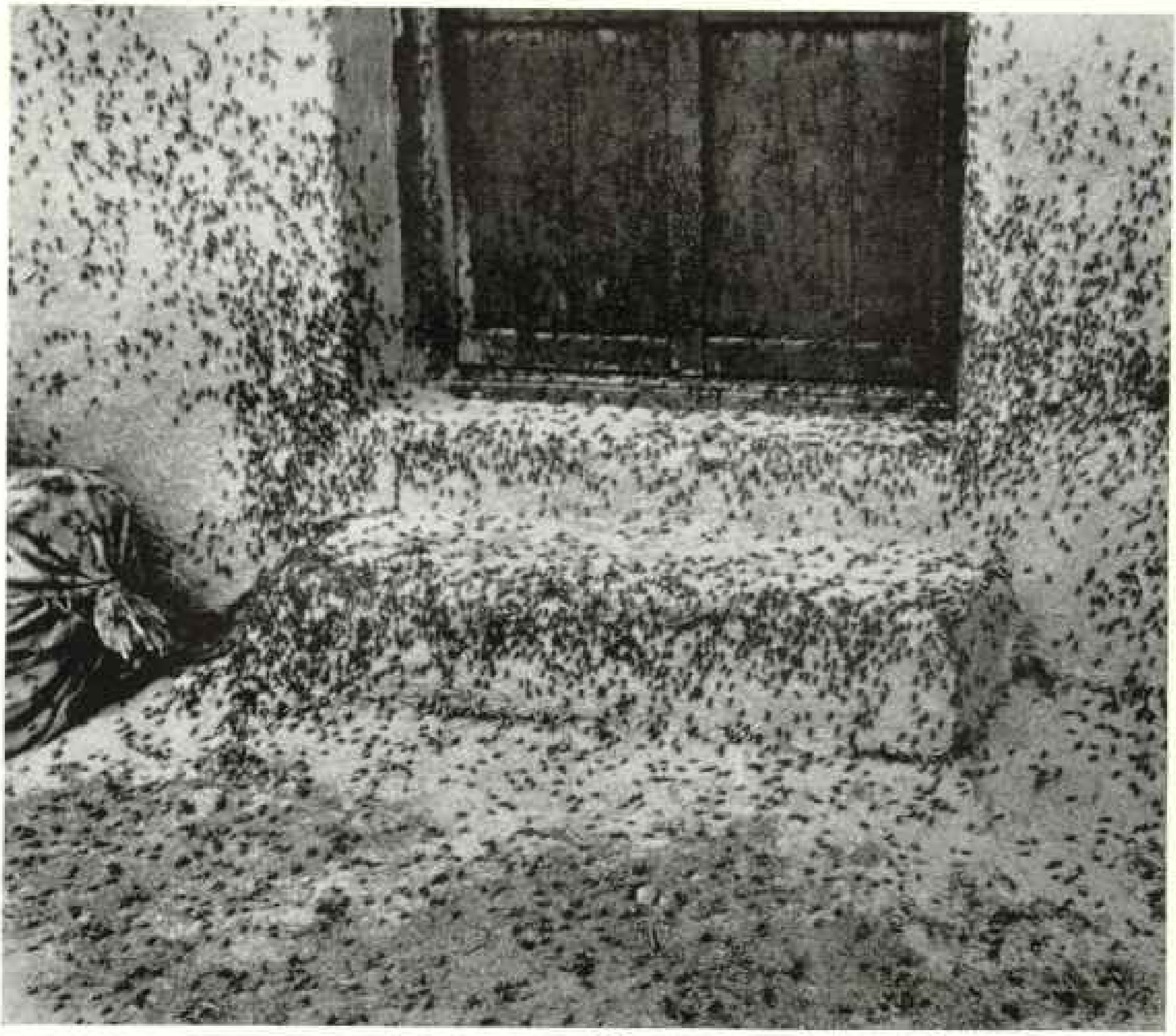
But as a swarm is created by a single hideous mischance, so it often dies, or a part of it dies, by mischance—sometimes quickly, but usually only after several years.

Some swarms inexplicably commit suicide, flying out to sea after veering away from good feeding areas. Others blunder into cold or are shriveled by intense heat. Some end their raiding after a single generation, when their eggs lack the heat to hatch.

Ravenous Swarms Defy Man

But while they live, moving swarms are almost safe from every control device man has tried. No one can tell how big or dense a swarm will be at a given place, or even whether it will come at all. No one can predict how hungry or disdainful of food it will be. A swarm a mile in width, say, might take 10 days to pass through an area, utterly destroying a mile-wide belt and never looking to right or left.

But even if a swarm should remain long enough for us to mobilize our forces, locusts are a tough enemy to destroy. About three inches long, this desert species is impossible to discourage once it has settled to feed, and



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Department of State

"They Shall Fill Thy Houses, and the Houses of All Thy Servants" (Exodus 10:6)

Homes become fortresses when hoppers mass by thousands and seep in like water if a crack allows. These pests appeared in Iran. Neither brooms nor feet interrupted their relentless siege. Nature, creating the locust hordes, often destroys them with drought, heat, or cold. Billions fly out to sea and perish.

hard to hurt with any quantity of poison small enough to be safe on crops destined for human consumption.

Short of the winged, swarming state, however, the locust is vulnerable. This point Albert made several times. Then he told us of a new hope, based on the fact that certain possibly recognizable areas periodically cradle the gregarious locust.

"I'm making experiments to control the insect in the solitary phase in places where it might become gregarious," he said, almost shyly.

"If we can find and poison every breeding ground with a long-lasting insecticide, we'll be making real progress. Then the first thing the locust eats will kill it. If we can wipe out the locust in the solitary phase this way, we can wipe out the locust threat."

There was a moment of silence in deference to this dream of so many thousands of years.

"But I must repeat," Albert concluded, "that I don't take anything for granted with the locust."

Caravan in No Man's Land

We accompanied one caravan that worked out of Samah in the Neutral Territory, buffer zone between Iraq and Saudi Arabia.

There the young supervisor was Mohammed Hassin, a chunky, black-eyed man who wore corduroy slacks, sport shirt, and a felt hat. Mohammed is the only son of a merchant of Shatra, a village in the cultivated area.

Some months previously he had created a camp for the ground locust fighters there in the Neutral Territory, 11 days by camel from his home town. He had not been back since. Overseeing and controlling an area of 10,000 square miles with 24 men, two trucks, and three buses had kept him fully occupied.

Mohammed's command post was one of six

Technical Cooperation Administration, Department of State

Yellow Skin Means Grasshopper Gone Berserk

When the Desert Locust prepares to go on its ravening migration, it turns a handsome orange-yellow spotted with black. Two pairs of wings bear the three-inch insect aloft. William B. Mabee, a Nevadan, examines this specimen in Iraq. A 20-year veteran of the grasshopper wars in the U. S., he directs the locust campaign of Point 4 in Pakistan, India, and the Near East (page 559).

white tents comprising the camp. Through its back flaps he looked at a wide bowl of unmarked desert. Through those in front he saw a pile of bran sacks, beyond which in the distance stood the tents of Saudi Arabian police. The Iraqi police huts, of straw matting, were off to one side.

This was a real frontier post, and Mohammed welcomed us with real frontier hospitality. The veteran Iraq police chief, too, joined the festivities. Weathered and bearded, he wore his bright star of office above a red head scarf. His white-robed servant poured coffee from a full brass pot. We all drank from the same tiny bowl, three sips each—not as unsanitary as it sounds, for we became convinced that boiled desert coffee is antiseptic merely by virtue of its strength.

As the server finished his rounds, Mohammed excused himself and turned away. He tore a sheet of air-mail paper in two and put one precious half back in his strongbox. With an American fountain pen he wrote swiftly in flowing Arabic on the other piece, then carried the paper to the near-by police radio transmitter. From the guy wires of the short aerial hung the operator's drying laundry.

Mohammed's message warned fertile areas to the north that Bedouin patrols had just reported a swarm passing 20 miles away.

Mohammed shortly became something of a hero to his American colleagues. They noted his Spartan quarters—a metal cot, thin mattress, and goat-hair blanket; a three-decker table of crate lumber; a wooden chair, the locked strongbox; a pottery water jug with a cotton mesh rag across its mouth as a filter, and two bright goat-hair rugs.

When we asked Mohammed about his adventures at this frontier base, he seemed embarrassed; it was quite dull, he said.

Dhia suggested that the danger of being shot might have livened things up a bit. Well, yes, Mohammed allowed, there was such a danger.

The previous week, while he was surveying a hatching area, two armed nomads had ridden up on horseback. They asked what he was doing, and he told them.

Trouble on the Frontier

"If we find out that you are really killing locusts, we will shoot you the next time we meet," said one of them, brandishing his rifle. "The locusts are food for us when there is nothing else. Kill them when they reach your crops, but let our food alone here."

"Perhaps he didn't mean it," Mohammed finished. "Anyway, I haven't seen him again."

Dhia recalled a recent tense visit to a near-by village of tribesmen to arrange for the locust army to work across the border. He described an unhappy half hour in the tea-house there, a long, low building of mud bricks

with dirt floor and straw roof.

"I arrived in the town at prayer hour, and I knew it would be some time before I could do business. So I went to the teahouse.

"At first I had the place to myself. Then three tribesmen entered. They did not order tea. Instead they stared at me. I'm afraid I stared back—you know, there's no law that you must check your artillery when you go into a teahouse, and each man had a rifle.

"They admired my cigarette lighter. It's windproof, you see," and Dhia held it up. "I thought of giving it to them if they would point their rifles in another direction."

Then, Dhia said, one tribesman shifted his gun to a businesslike position and remarked, "You locust people killed our camels."

Dhia demurred, explaining that they had already demonstrated the harmlessness of the poisoned bran to animals. "It's the same stuff we use on our own crops," he pleaded.

"We found out the poison you showed us isn't what you use at all," retorted the second tribesman.

"When some of our camels died this month, they had worms in their brains. Until you came, they never had worms."

"Fortunately," Dhia finished, "the town began to stir about, and I guess the tribesmen thought it wasn't cricket to start a lynching in their own teahouse."

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Department of State

Wingless Infants Start Life Black

Before she dies, the female Desert Locust deposits several egg pods in the sand. One pod may produce a double handful of crawling hoppers in a few weeks. Five moltings take place before wings develop fully. The color turns increasingly pink until, at the migration urge, it becomes yellow. Wingless hoppers are especially vulnerable to large-scale control measures (page 557).

"Operation Sandstorm" on Easter Sunday

Later we moved back from our border forays to Al Busaiya again, facing a bigger threat. This was a broad front of hatchings from an unexpected tide of locusts that whirred across two international boundaries while our air arm was working elsewhere. On the ground the full strength of the Iraqi bran-spreading crews had been mustered.

On our planes rested the responsibility of stopping the forward echelons of the new invasion as it moved by the desert base. At least it had been moving by until the pilots flew a dawn mission on Easter morning against the advance guard.

This turned out to be one of the most dangerous missions they flew in Iraq, for a sandstorm was on the way. Before the day was half done, the sun was to fade to a sullen full moon and the horizon to disappear in a universal gray as gritty winds buffeted our camp and the anchored Piper Cubs.

The mission began before sunrise in deference to the noon heat we expected. Reveille, which Dhia tootled on his jeep horn, came at 4:30 a.m. The tootling was to rouse flyers and photographers.

William B. Mabee, of Elko, Nevada, who has seen dawns in a dozen countries in the course of 20 years' locust fighting, was already up, dressed, and ready for work. Bill is the

technical director of the Point 4 Regional Locust Control Project, sent from the U. S. Department of Agriculture's Bureau of Entomology and Plant Quarantine (page 558).

That Easter morning we had a cheerful breakfast—scrambled eggs hot on a big white platter which had refused to break through 1,200 miles of jeep riding.

Before we were finished, the camp's station wagon ground out into the dunes. Target area for today, located the previous afternoon as we had moved toward Al Busaiya, was a long drive away. The station-wagon crew, a supervisor and six workmen, were going out to mark it. Yellow-and-white muslin flags on stubby bamboo poles plumed their vehicle. These they would plant at the corners of infested areas so the planes could see where to spray.

Target for Today

The enemy were young black hoppers, spots on the sand now no longer than a thumbnail and only a quarter as wide (page 559). They made a shimmering, moving veil across the pink face of the desert, moving in one direction, growing, eating, spreading. Here their diet was wild desert brush. Still wingless, they could be killed easily.

Riding out to the scene of action, we were delayed in the first streaks of dawn by a baby camel asleep on the track.

The animal lay motionless, a bundle of patchy blond fur. Finally, pipestem legs, a twisted neck, and a swinging tail untangled themselves. The baby lurched awkwardly to his feet and began to amble along, just ahead of our bumper.

His method of locomotion was spectacularly disorganized. It was as if four legs were too many for a baby camel, and after each step he had to stop to choose carefully which leg he should splay out next.

All over the desert, as our convoy moved, other locust-control convoys were traveling too. We alone had the planes and aldrin, but otherwise our equipment was similar. Except for an occasional police truck, all the traffic in an area as big as North Dakota consisted of locust-fighter transports. Their communications reached back by police radio to provincial agricultural offices, and still farther back by telephone to Darwish's sunny office on the Baghdad main street still named for Harun al-Rashid, caliph of the *Arabian Nights*.

We reached a fork in the track. The pilots, leaving long after we did, had asked us to stop a little past this turning so they could pick the correct fork from aloft. The first of our two jeeps, driven by Dhia and carrying locust fighter Mabee, was already parked.

Soon two specks that were our planes hummed out of the horizon. Bill feared the flyers would fail to see our desert-stained caravan, and he was right. The specks grew larger, then veered away.

Bill snatched a white head scarf from one of the party and waved it for half a tense moment. The first plane's pilot saw it and came toward us; soon the other followed. Then, to show that they, too, were relieved, they came in low, close behind us.

We must have looked a bit apprehensive until Bill, who knows his planes and men, set us at ease with the right remark.

"Gives one a start," he said, "to see an airplane in the rear-vision mirror signaling to pass."

Ten minutes later we found the first of the four patches of hoppers, its flag markers whipping in the wind. Between the first and second marked fields Bill had selected a strip of gravel to serve as landing area for the planes. We rounded up the ground transport there first, Dhia leaning out of his jeep and shouting that byword of Arab enterprise, "*Yallah!*"—equivalent of "Let's get going!"—to the crew.

Planes Move Against Invaders

Finally, jeeps and trucks stood wheel by wheel along the edge of the impromptu airstrip. As the planes made their approach, Bill threw a handful of sand into the air to show them the wind direction. The aircraft settled down together in a double plume of sand.

Huddled in what seemed the middle of the world, the planes and vehicles were the only visible objects more than a few inches high. Casting long shadows in the early sun, they appeared utterly alien.

Before we came, the desert had been alone and quiet. Now the grinding vehicles, taxiing planes, and human beings seemed more than life-size, despoiling something untouched for centuries. Even the slosh of water as the aldrin solution was mixed sounded loud and out of place.

Bill Mabee did the mixing himself, 10 tins of water measured with an old kerosene can, and half of a smaller measure of pungent aldrin. As Dhia watched Bill, his hands dripping, climb on a barrel to reach the high mouth of a plane's tanks, he said, "That fellow works so hard he makes us all ashamed."

Each plane took four loads of lethal solution that morning. Each shuttled across the horizon spraying between the flags for more than an hour (pages 552, 553). The ground crew, many of whom were farmers from the cultivated area, men with no mere academic interest in locust control, stood in an approving row watching from the landing strip.

"See," said the driver of a truck, "he never

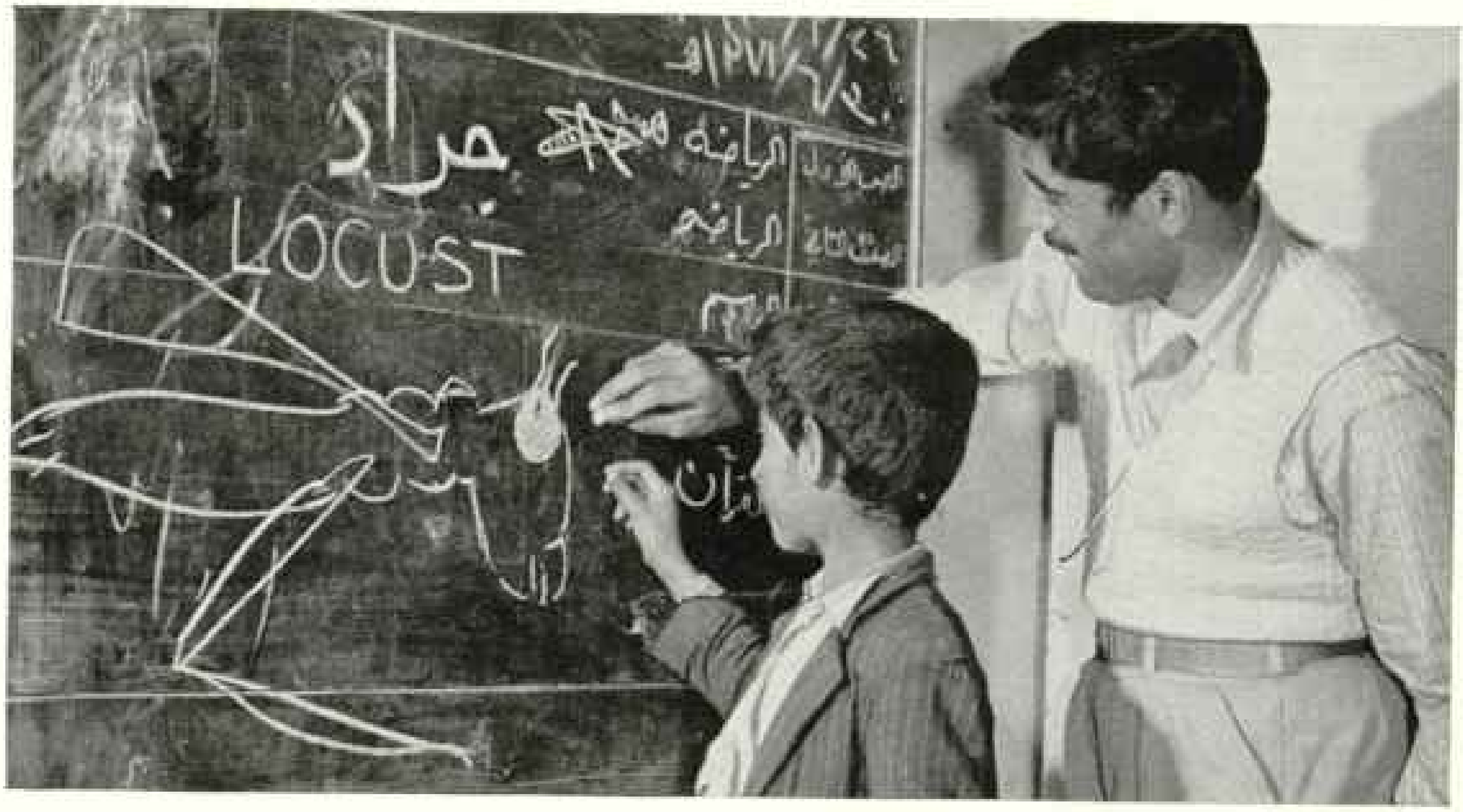
Technical Cooperation Administration, Department of State

An Iraq Class Trains Locust Scouts

Boys who serve as spotters regard the fight as sport. Some travel 50 miles a day to attend this one-room school in Luqait. A farm supervisor (left) demonstrates a stage in the locust's development.

Blackboard Chalk Outlines the Enemy

As part of an arithmetic lesson, the supervisor asks: "If a locust weighing two grams eats seven times its weight in a week, how much grain will we lose if we fail to destroy it?"



misses. He starts this time on the row right next to the last one he sprayed. I thought maybe he would forget a row, but no, he covers every one as thoroughly as we could on the ground."

This tribute was for Schaefer, finishing the field of hoppers nearest the trucks.

We drove over to get a bug's-eye view. Because the planes were working from such a low altitude, we parked the jeep well away from the flags and walked in to lie flat on our stomachs at the edge of the marked area, steadying our cameras with elbows braced in the sand. We intended to stay away from among the hoppers, but they had spilled over the boundaries in the hour since the flags were placed. Before we knew it, Dhia had moved the flags back, and we were 30 yards inside the target area.

Schaefer had started his next run in our direction with only a slit of sky showing under his wheels. It was no time to stand erect.

It seemed impossible that the fast-approaching plane did not intend to land on us. Quickly it grew too big for the camera finder, too big for the eye. Then we were overwhelmed. The noise was deafening: we shoved our faces in the sand and plugged our ears with our fingers.

Caught in a Reeking Rain of Poison

The reeking poison fell, a fine, drenching mist hardly visible but feeling like a slap from a wet dishcloth. Slowly we got up, hair and clothing redolent, droplets in our ears and on our glasses and camera lens.

Before we could exchange words of sympathy, Schaefer was back from the other direction—another flop, another picture, another aldrin bath. Then, mopping ourselves, we jeeped back to the landing strip, picking dying black hoppers off one another.

From the strip, spraying looked extremely dangerous. Almost from the first take-off the wind had buffeted the planes with strong, fitful gusts. This is the most feared hazard of the crop-dusting pilot, and the strain began to show on the flyers' faces as they reloaded their tanks.

After the first run pilot Anderson took his shirt off, perspiration dripping from his chin. After the second, Bill Mabee stood beside the biggest truck, sucking a cold pipe and squinting minute after minute at the skimming planes.

"I don't like this. It's not good to spray in this wind. It's like waiting for—waiting for—something," he finished lamely.

The burden of waiting for the planes to return grew heavier. Even the crewmen were silent as time and again a plane seemed to hit the ground. When the wind rose, the plane steadied itself at 10 feet. Suddenly the wind would drop, and the sound of the engine being gunned as the plane lost precious altitude would reach us. The roar always seemed too late.

We were thankful when the job was done; no one could have borne another trip. Both pilots were soaked with perspiration now, and they tried before they took off for the base to explain their nervousness.

"It's So Easy to Crack Up"

"It's that wind," one said, as though the rest of us had been unaware of it. "In weather like this, the plane gets bounced up. When you try to put her nose down again it's so easy to crack up, if you put it too low."

By the time we reassembled at camp the wind had become a gale. Now we were enfolded in a muffled world of whirling sand. When the sun chose to shine again, trucks and planes would roar out to kill more locusts. But not today.

In Iraq's Parliament or our Congress in Washington, D.C., sheiks and senators might inquire into the worth and meaning of international cooperation to increase the world's living standard. There it may be hard to define "Point 4 Mission." Here it is so easy.

Here, Point 4 is men from two nations squatting around a lamp, planning campaigns against invading insect hordes on a bilingual map. It is men working long hours in remote wastes to conquer one of man's oldest scourges. It is pilots risking their lives to help prevent famine.

Point 4 is an American flyer saying, "Let's see, Bill. You say the hoppers on one acre will grow up to eat the food on 200 acres. We sprayed 200 acres this morning. That means we've saved 40,000 acres up north."

New Hope for Victory

Point 4 is the Iraqi entomologist with a locust specimen in his palm, its feelers curled about a finger, saying, "I checked the field you sprayed yesterday, Schaefer. Every hopper is dead."

It is Bill Mabee, sitting like a Bedouin with boots tucked under his haunches, fingering his belt buckle, souvenir from a grasshopper campaign in Nevada, and musing over the map:

"If this wind changes, they'll come back again, and there'll be trouble in Afghanistan, too. I wonder how many people know we could stop their milling back and forth like this, Dhia—stop them for good."

And Point 4 is pilot Schaefer, looking up from the letter he is writing to his wife and sons and saying casually, "I thought we were out here to help keep people from starving. I'm hungry—isn't it chow time?"

The Society's Hubbard Medal Awarded to Commander MacMillan

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FOR outstanding Arctic explorations from 1908 to 1952 and for valuable service to geographic education and science, the National Geographic Society has awarded its highest honor, the Hubbard Medal, to Donald Baxter MacMillan, Commander, United States Naval Reserve.

The presentation was made by Dr. Gilbert Grosvenor, President of the National Geographic Society and Editor of its Magazine, at Constitution Hall, Washington, D. C., on January 9, 1953. More than 4,700 members and friends of the National Geographic Society witnessed the ceremony, which preceded afternoon and evening lectures by the guest of honor.

Sharing the platform as Commander MacMillan received the medal from Dr. Grosvenor (above) were Mrs. MacMillan, who has participated in eight of her husband's voyages, and two of his comrades of Arctic explorations 28 years ago—Rear Adm. Richard Evelyn Byrd, USN, Ret. (in uniform) and former Navy Lt. Comdr. Eugene F. McDonald, Jr. Both played important parts in the 1925 National Geographic Society-United States Navy MacMillan Arctic Expedition, the first to explore the Arctic land and sea with airplanes.

Experience gained on this expedition as commander of the naval flyers made possible Byrd's epoch-making flight over the North Pole the following year.*

Mr. McDonald, now president of the Zenith Radio Corporation, was MacMillan's second in command and had charge of the radio work.

44 Years of Exploring

In presenting the medal Dr. Grosvenor pointed out that Commander MacMillan's achievements north of the Arctic Circle have been outstanding and continuous for 44 years.

"I can find in history no explorer," he said, "whose active devotion to solving the geographic secrets of the Arctic has continued for so long."

Dr. Grosvenor told how, as a young teacher,

*See, in the NATIONAL GEOGRAPHIC MAGAZINE, "The MacMillan Arctic Expedition Returns," by Donald B. MacMillan, and "Flying Over the Arctic," by Lt. Comdr. Richard Evelyn Byrd, November, 1925; "First Flight to the North Pole," by Lt. Comdr. Byrd, September, 1926, and "Far North with 'Captain Mac,'" by Miriam MacMillan, October, 1953.

Illustrations by National Geographic Photographers Robert F. Sisson and Bates Littlehales

Hubbard Medal Is Named for The Society's First President, Gardiner Greene Hubbard

This new gold Hubbard Medal, presented to Commander MacMillan, was designed by the noted sculptress Laura Gardin Fraser. It is 3½ inches in diameter. On one side is the seal of the National Geographic Society. On the reverse appear land, sea, and sky, races of man, animals, birds, and sea creatures.

In clockwise order from top appear an eagle, before a sun rising from mountains, with planets and moon in the background; an American Indian, bison, llama, and camel. Beside the Southern Hemisphere stands Western man, engaged in the agriculture that sustains him; then a lion, elephant, sea lion, and pronghorn antelope. Above the Eastern Hemisphere a ship of discovery sails a sea from which fishes jump; then come a kangaroo, crocodile, rhinoceros, and bear. Next is shown the Northern Hemisphere, beside Asiatic man in his rice field; then a tiger, giraffe, and wapiti. Completing the circle is African man, prepared for the hunt.

the future explorer rescued three women and three men from drowning in Casco Bay, Maine, after their sailboat overturned, and how this started him upon his career of exploration. The exploit attracted the attention of Robert E. Peary.

"A few months later, MacMillan was crossing the Arctic Circle, a trusted and important member of Peary's expedition which discovered the North Pole on April 6, 1909.

"MacMillan returned again and again to the Far North as the leader of his own expeditions, usually on the *Bowdoin*, an 88-foot auxiliary schooner built by MacMillan's friends for his use. . . .

"Commander MacMillan and the National Geographic Society have the great pride of having introduced to Arctic exploration that gallant Virginia gentleman and American ideal of a hero, Admiral Richard Evelyn Byrd."

Admiral Byrd, who received the Hubbard Medal in 1926, recalled that the Arctic was long regarded as a no man's land and a barrier against attack. Now, he observed, it is recognized instead as "a corridor from which our potential enemy could attack us."

"The man," he said, "who has shown us most about the truth of that area . . . is Commander MacMillan," thanks to his 29 expeditions into the Far North.

Admiral Byrd and Dr. Grosvenor also paid tribute to the MacMillans for their humanitarian work among the Eskimos. Through the MacMillan-Moravian Eskimo School at Nain, Labrador, more than 500 Eskimo boys and girls have received educations.

In accepting the medal, Commander MacMillan recalled "sledging out over the rough ice of the polar sea" with Peary, of living with the Eskimos for four years and for three of those years knowing nothing of the outbreak of the first World War, of going back and living with the Eskimos again and again.

"And so the years have gone by. But all that work I did, if it might be called work, was not done with hopes of reward or honor. Just the consciousness of the fact that I was adding something, perhaps a tiny bit, to the sum total of human knowledge—that was my compensation; that was my reward."

As the 15th winner of The Society's highest honor, Commander MacMillan joined a distinguished roll headed by Robert E. Peary in 1906 and including such notable explorers as Capt. Roald Amundsen, Sir Ernest Shackleton, and Admiral Byrd.

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To carry out the purposes for which it was founded sixty-five 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 photograph 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 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.

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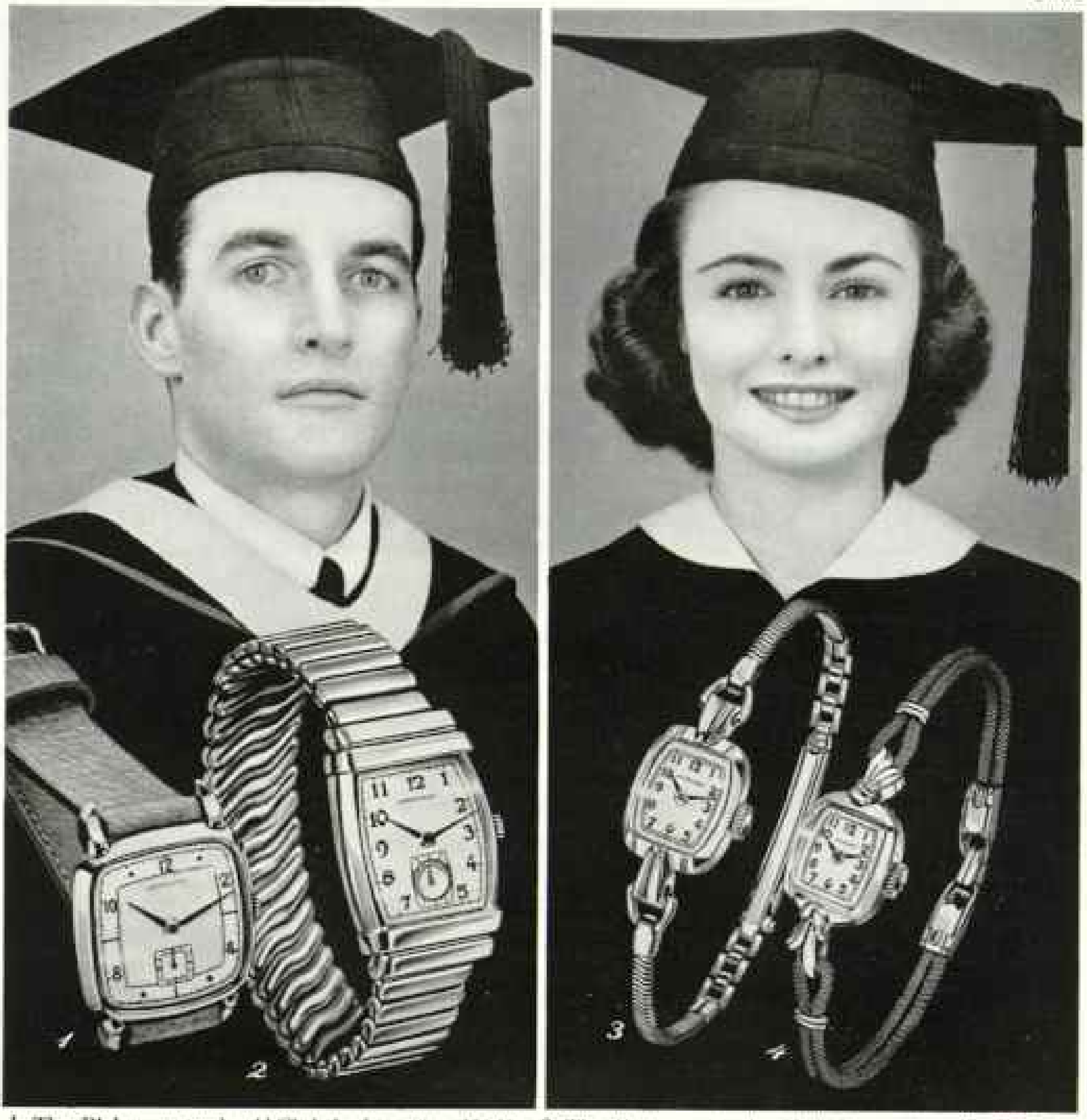

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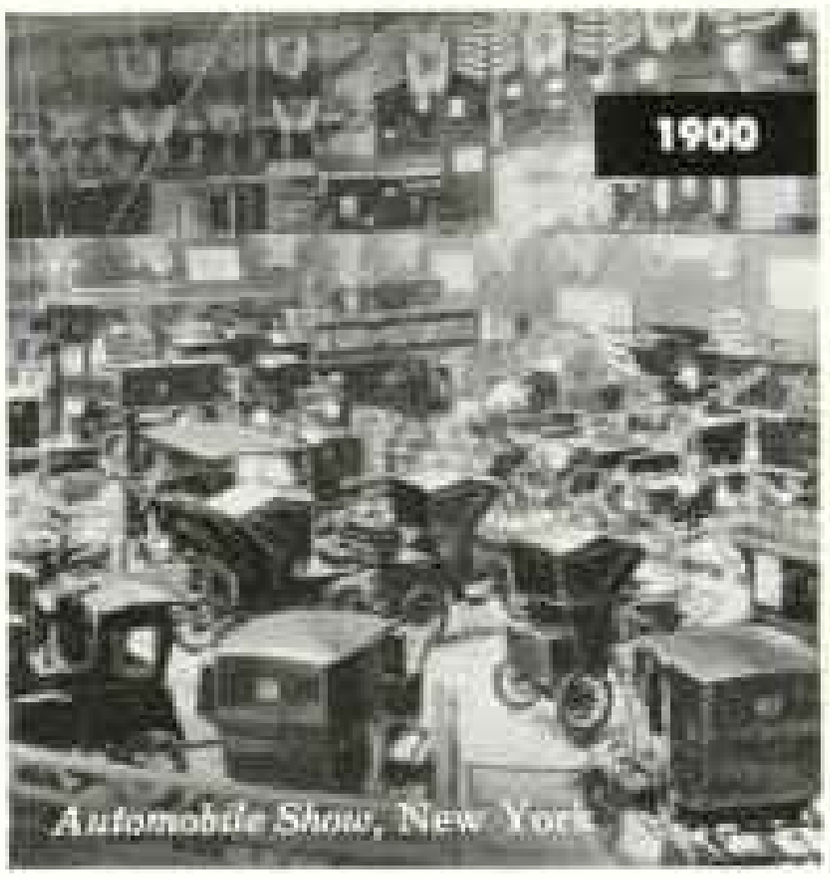

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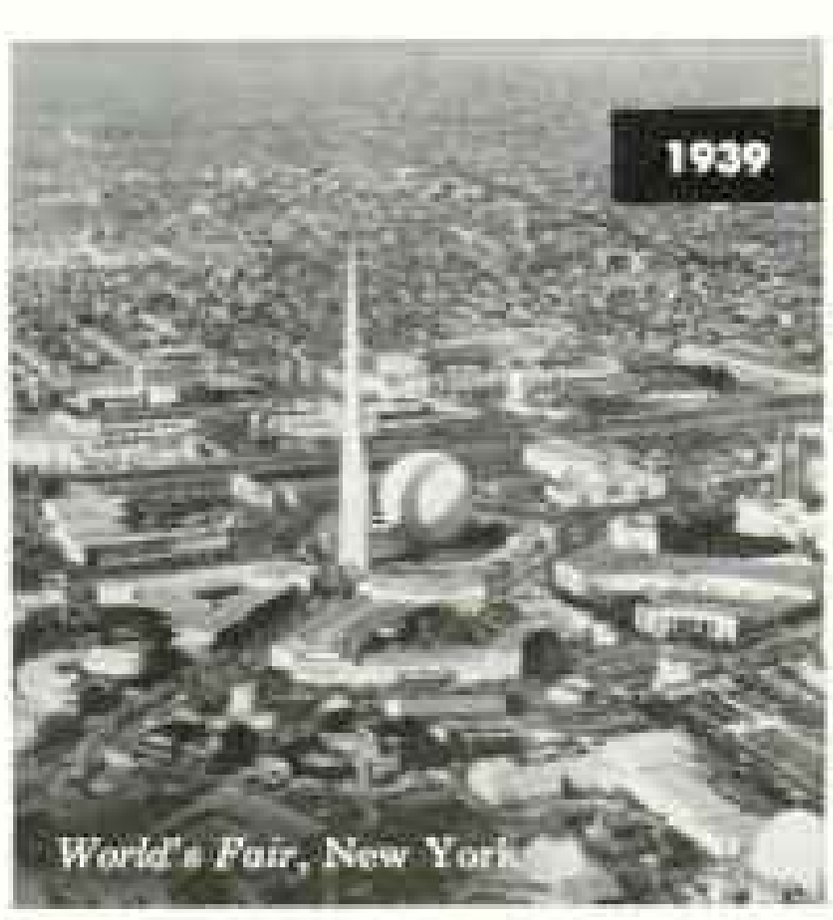

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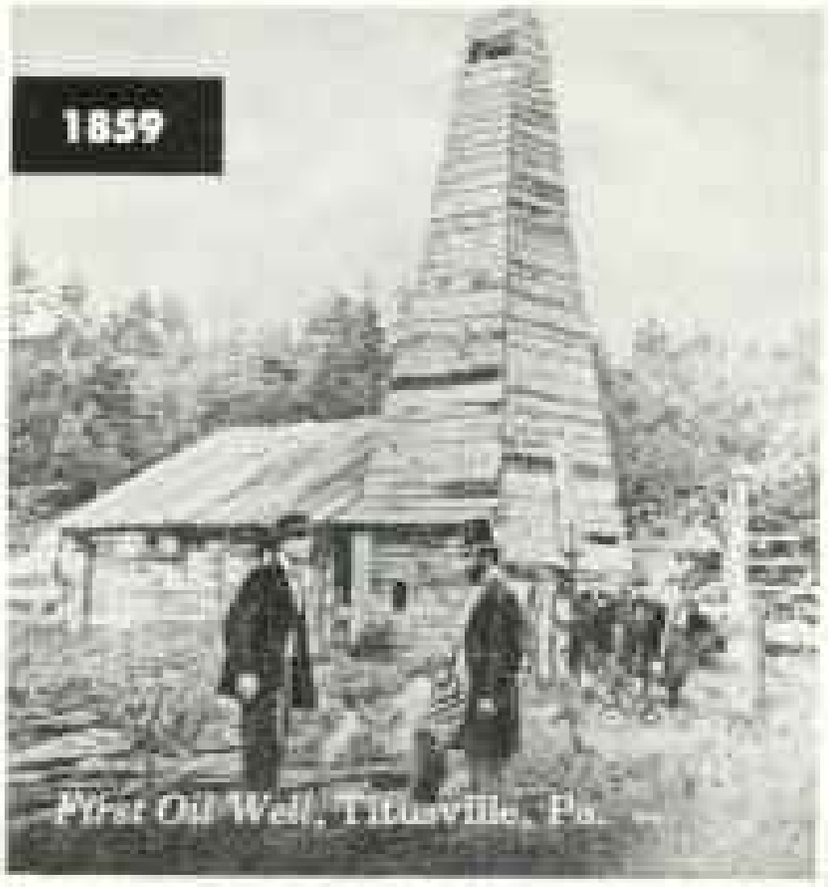

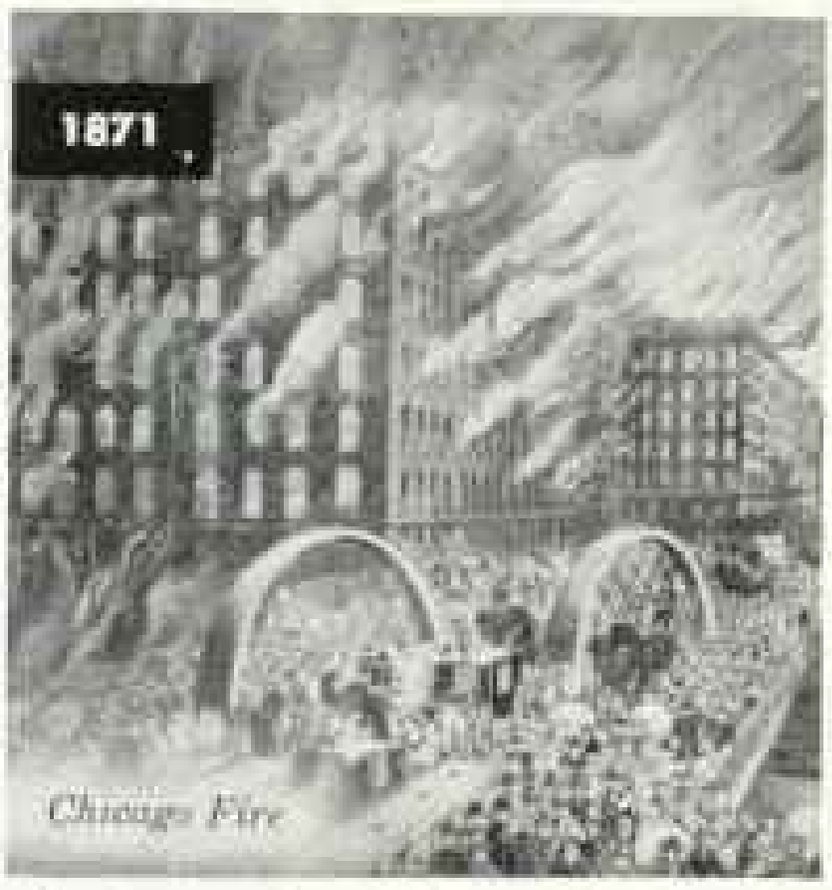

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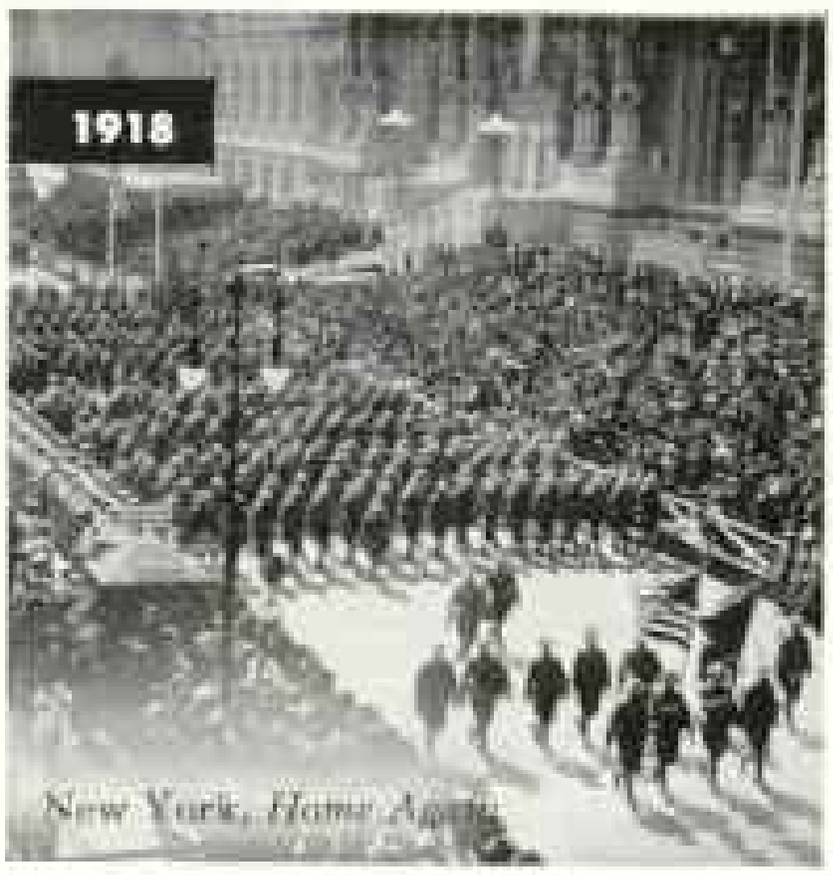

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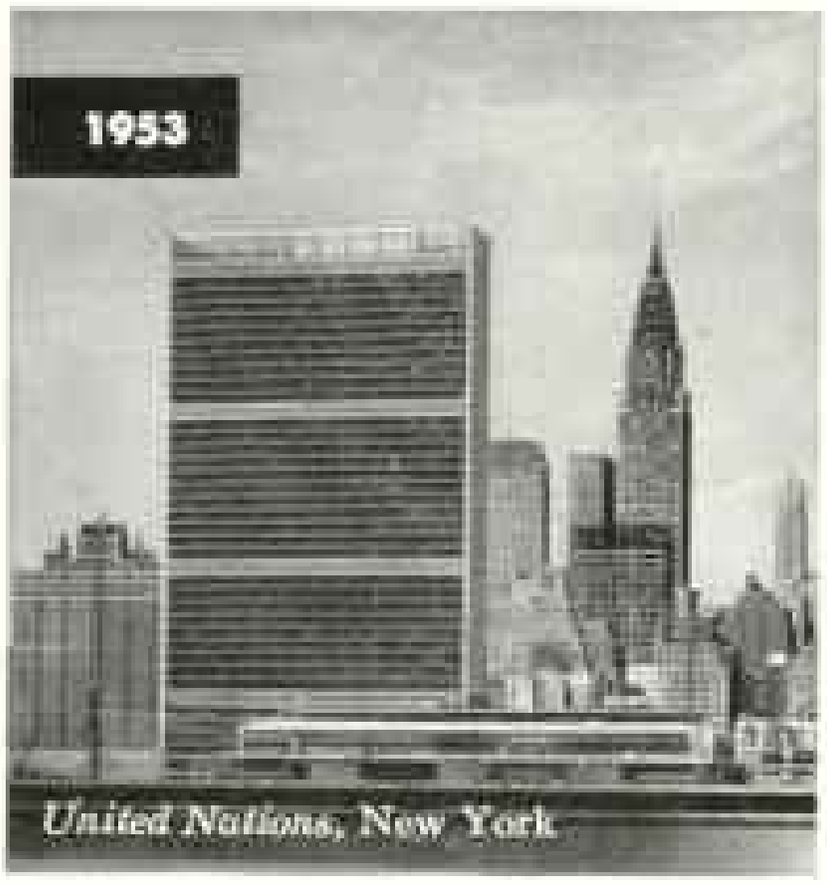

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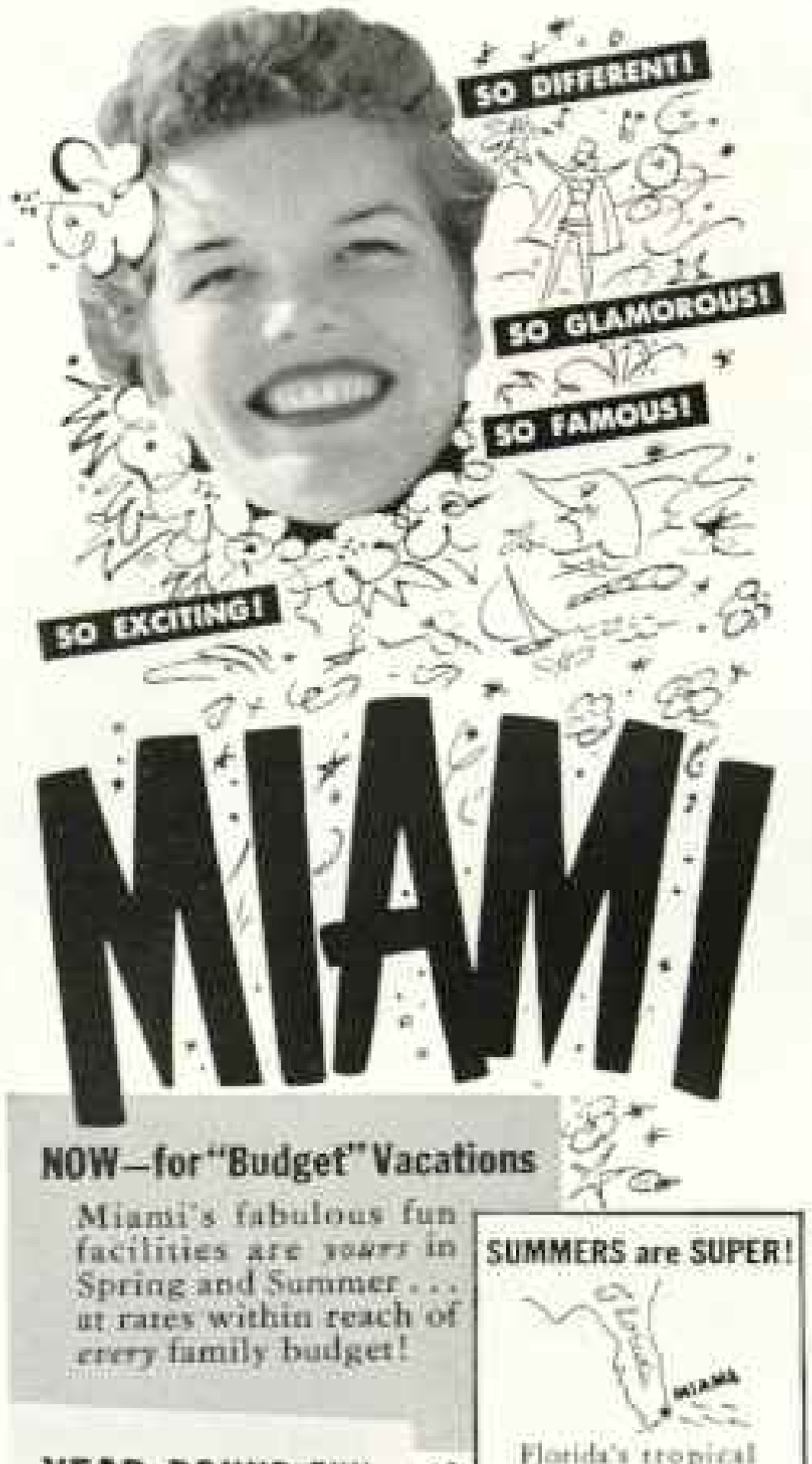

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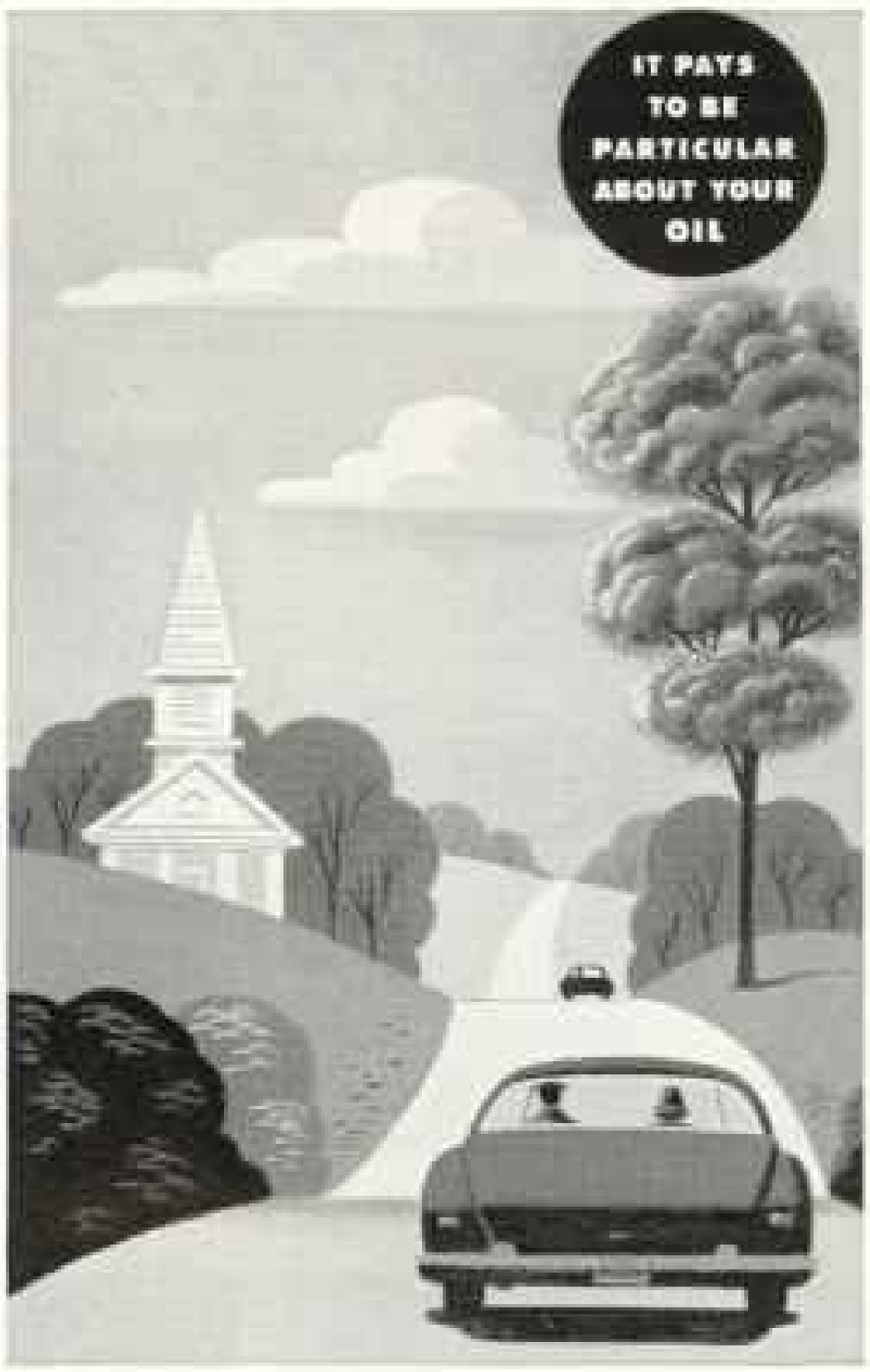

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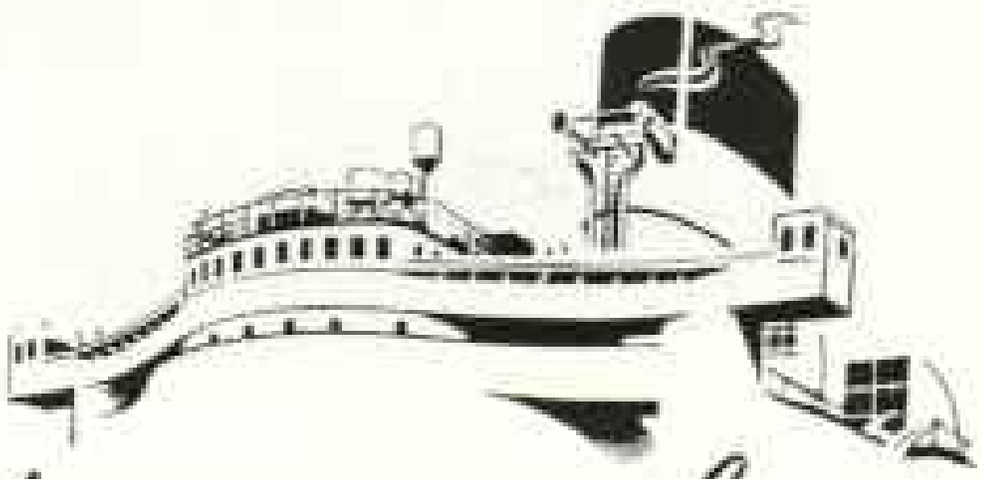

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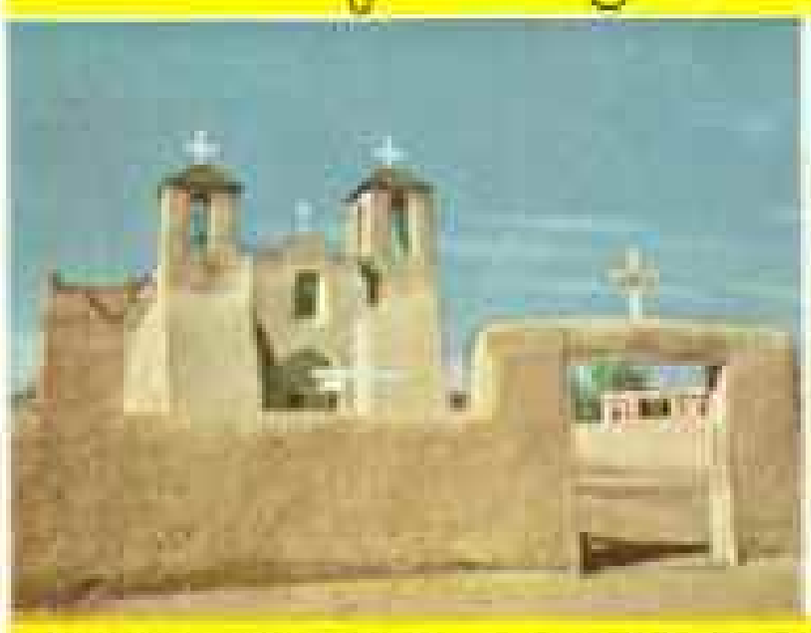

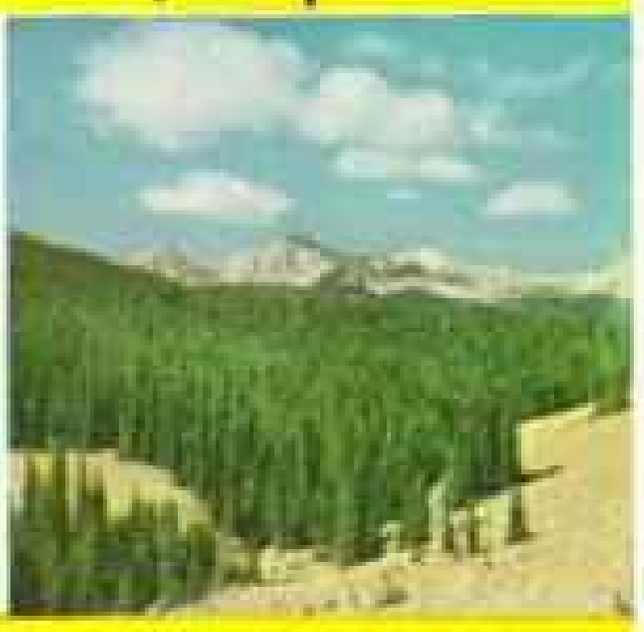

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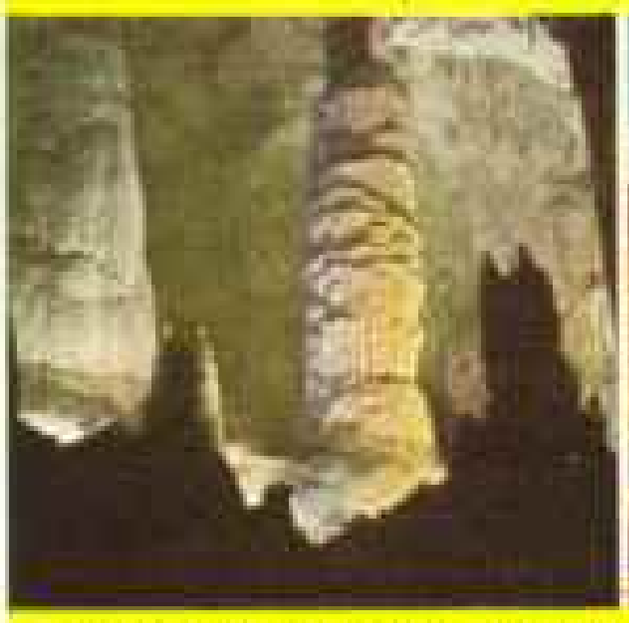

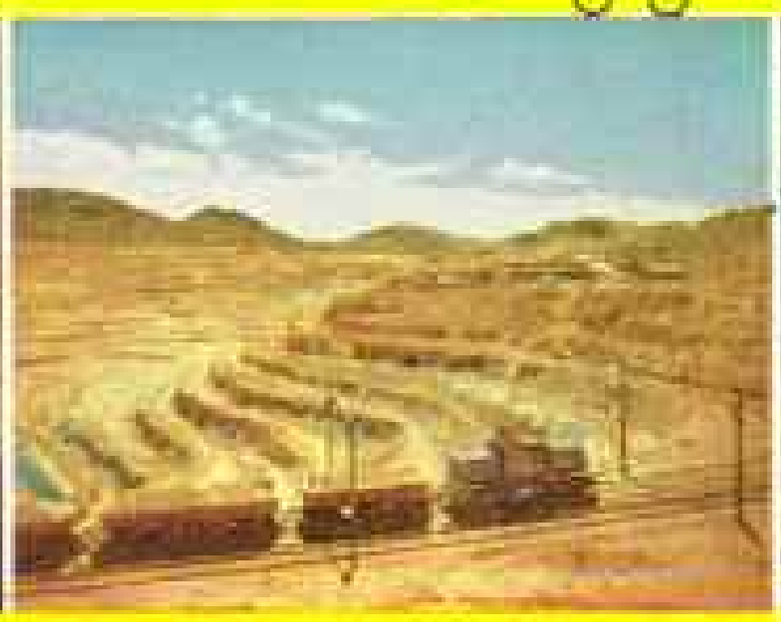

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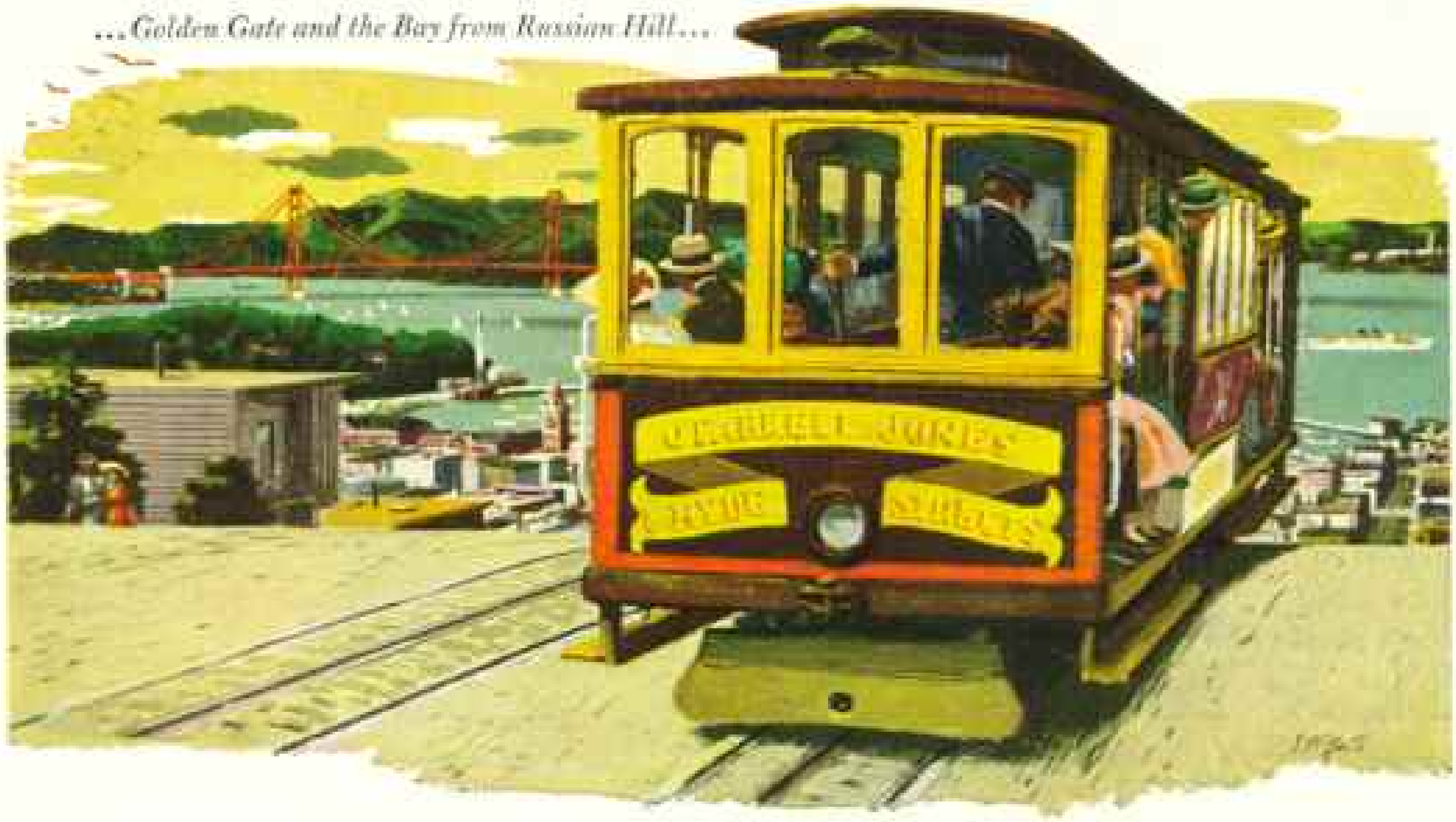

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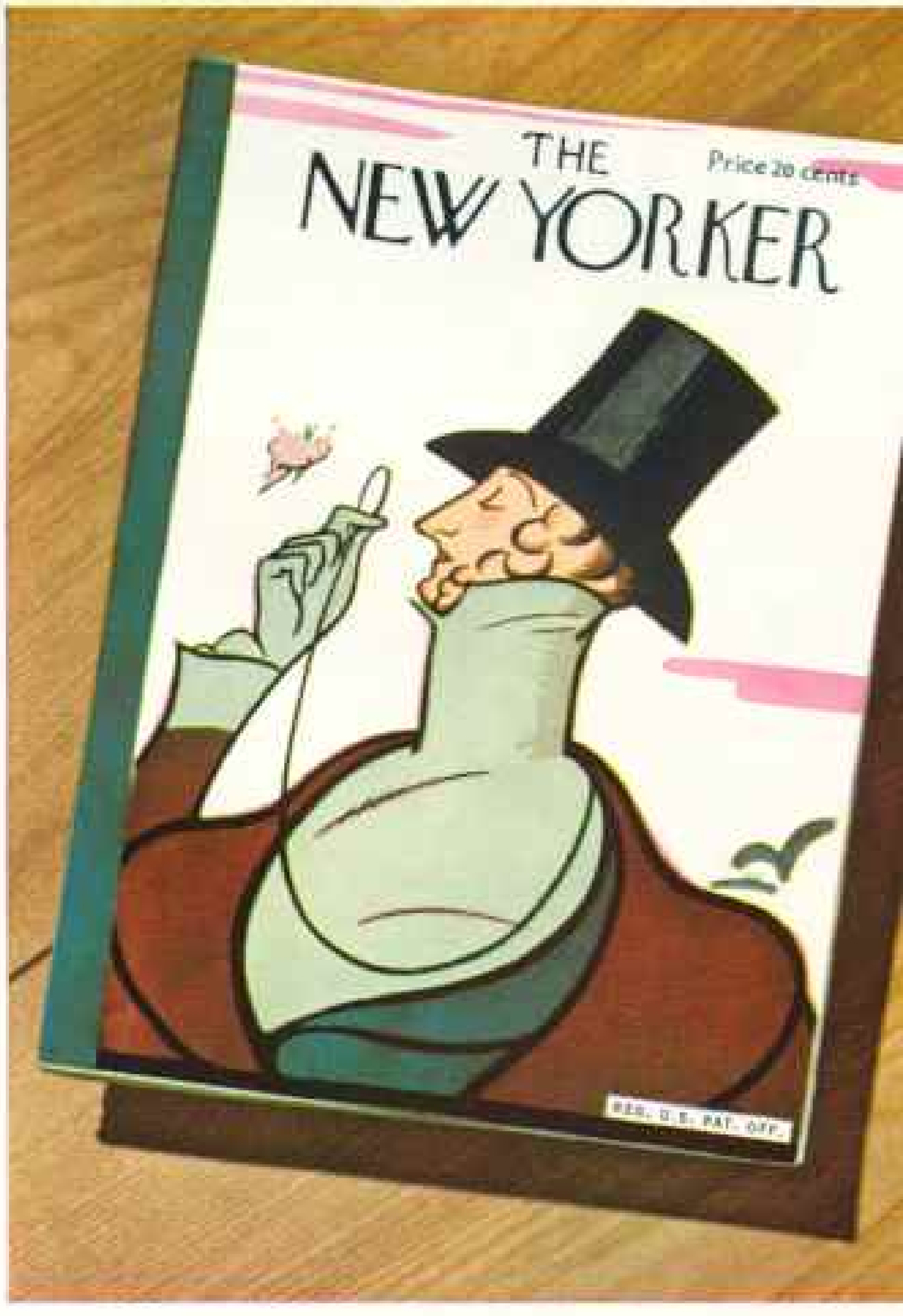

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Please send me complete free information on my trip:

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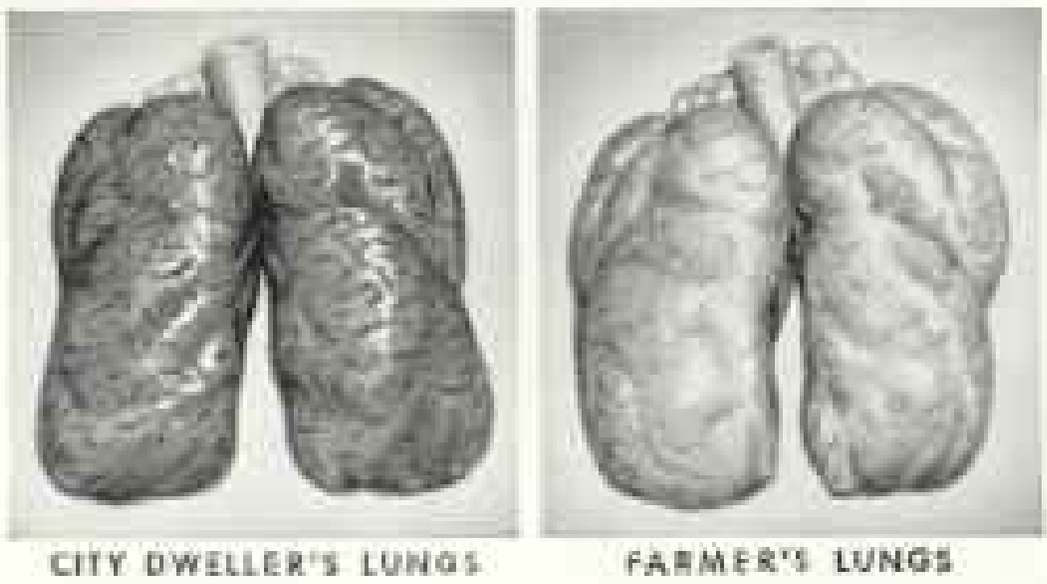

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LIVE, sleep and work in air free of lung-irritating dust, pollen and soot! The new Fedders Room Air Conditioner filters the air, helps relieve hay fever. Circulates cool, mountain-fresh air, lets you sleep soundly on hottest nights! Keeps humidity healthfully low. Only Fedders offers the amazing Built-in Weather Bureau. Gives the weather you want at the flick of a button! The handsome Fedders unit fits in windowsill of bedroom, livingroom or office. No building alterations, pipes, or ducts. Mail coupon for fascinating booklets on health protection, and new home comfort!

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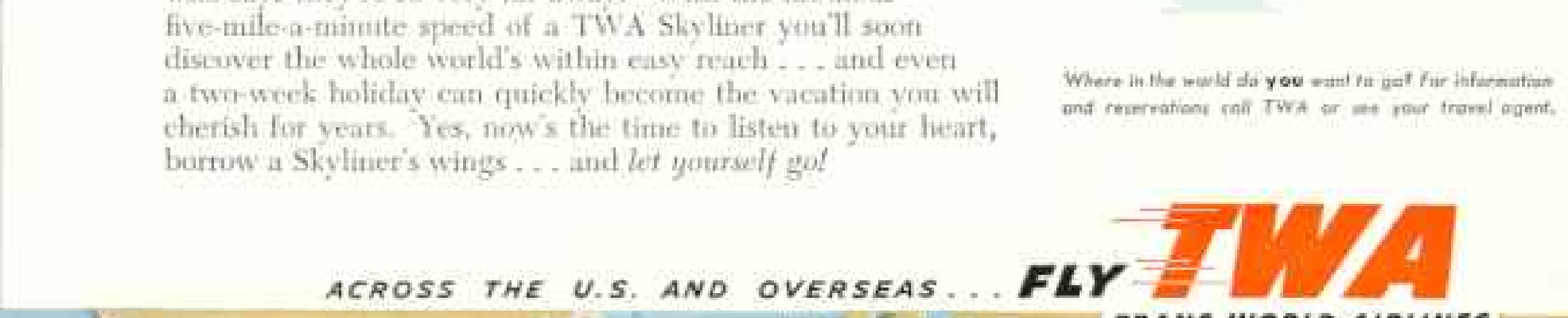
This year... let yourself go!

Forget about the same old places . . . same old faces . . . same old things. This year, why not give the globe a good spin and pick out the places you'd really like to see? San Francisco . . . New York . . . London . . . Paris . . . Cairo . . . or even India . . . who says they're so very far away? With the fabulous five-mile-a-minute speed of a TWA Skyliner you'll soon discover the whole world's within easy reach . . . and even a two-week holiday can quickly become the vacation you will cherish for years. Yes, now's the time to listen to your heart, borrow a Skyliner's wings . . . and *let yourself go!*

Where in the world do **you** *want to go? For information and reservations call TWA or see your travel agent.*



Turn back the clock 500 years

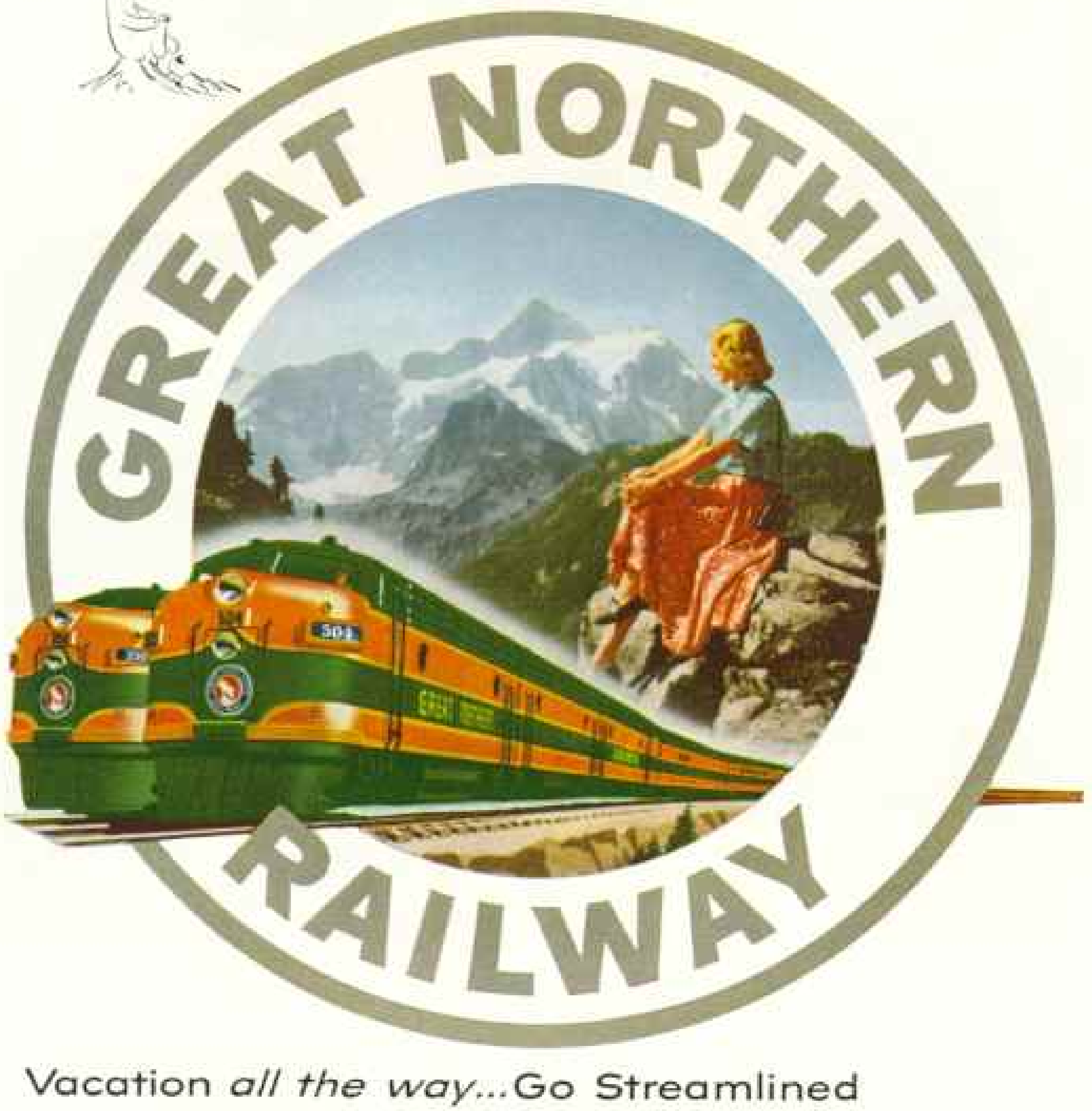
MARK TWAIN once said: "England's beauty is made up of very simple details—just grass and trees, and roads and hedges, and churches and castles. And over it all a mellow dream haze of history." To prove his point, we submit the village of Kersey in Suffolk, just as it looked in Twain's time. The "mellow dream haze" is here, and everywhere in Britain. At every stop, history turns back the clock for you, five centuries here . . . ten there. Go west to Wales, and stride the ramparts of Conway Castle, built for King Edward I in 1285. Cross over to Northern Ireland and stand in the ruins of Greyabbey in County Down, founded 700 years ago by Affrica, daughter of Godred, King of Man. Visit Stirling, gateway to the romantic Scottish Highlands where Mary was crowned Queen of Scots. In Britain, entire villages are antiques and around the bend of every road stand the heirlooms of the ages. "Now that I have sampled the globe," added Mark Twain, "I am not in doubt—*that beauty which is England's alone has no duplicate.*" See your Travel Agent and Come to Britain now.

For further information and free literature, see your Travel Agent or write British Travel Association, Box 11C, 336 Madison Ave., New York 17, N.Y.

For a great vacation

Pacific Northwest

by way of Glacier National Park



Vacation *all the way*...Go Streamlined

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New vistas await you in the majestic Pacific Northwest! . . . the Cascades and the Columbia . . . Puget Sound and Mt. Rainier. On your way, stop in Glacier Park, in the Montana Rockies. See it all on one great trip. Go carefree, be car-free. Go Great Northern!

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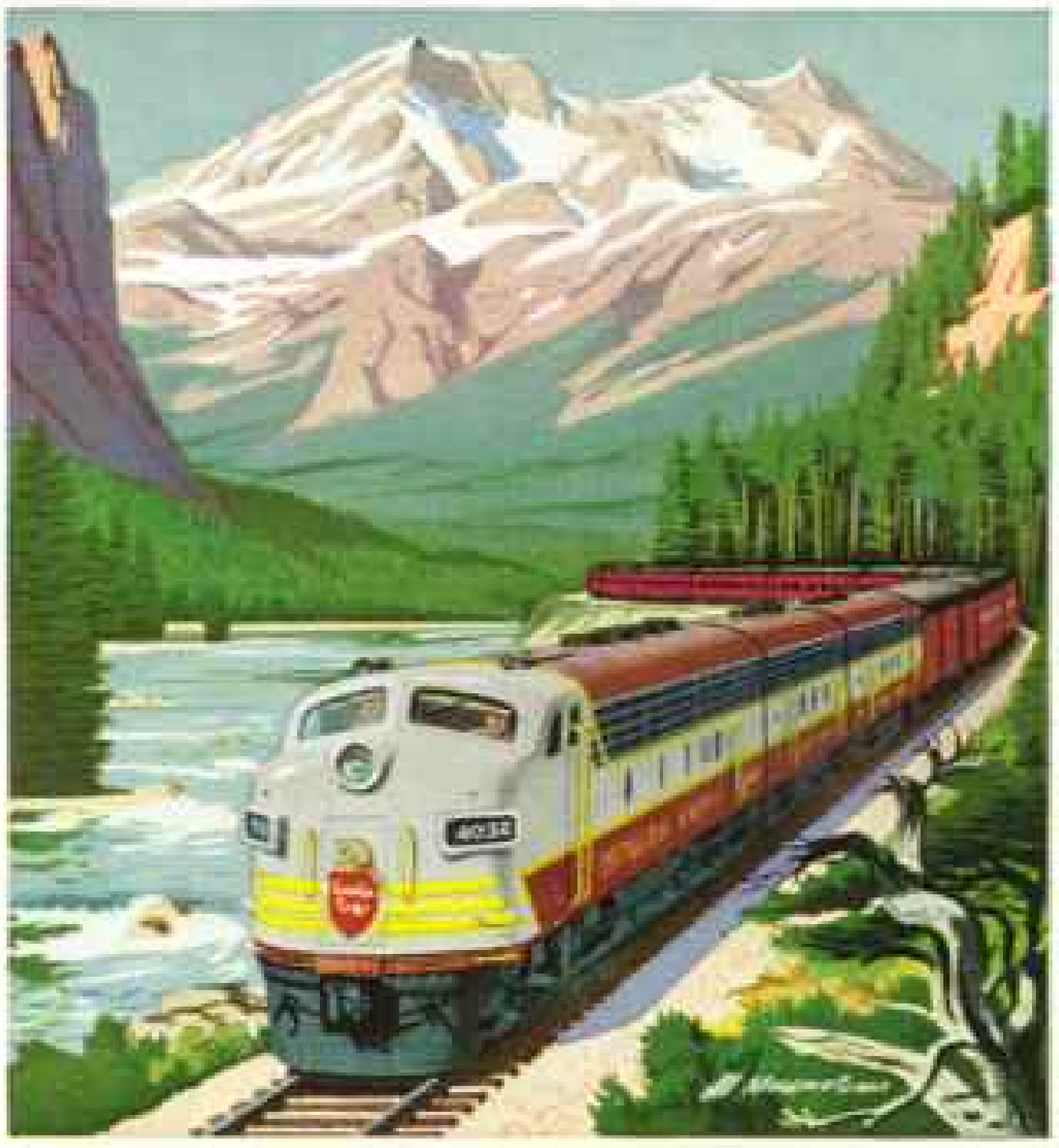

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See the skyscraper Canadian Rockies—by Canadian Pacific *Diesel* train. Stop over at Banff and Lake Louise, the area for thrilling budget vacations. Soaring views, Alpine sports. In balmy breeze-swept Victoria, British Columbia—stay at the famous *Empress Hotel*. Revel in the roses. Go sightseeing, shopping. Sporty golf courses...swim in Crystal Garden, world's largest enclosed sea pool. Enjoy climate like springtime all year 'round.

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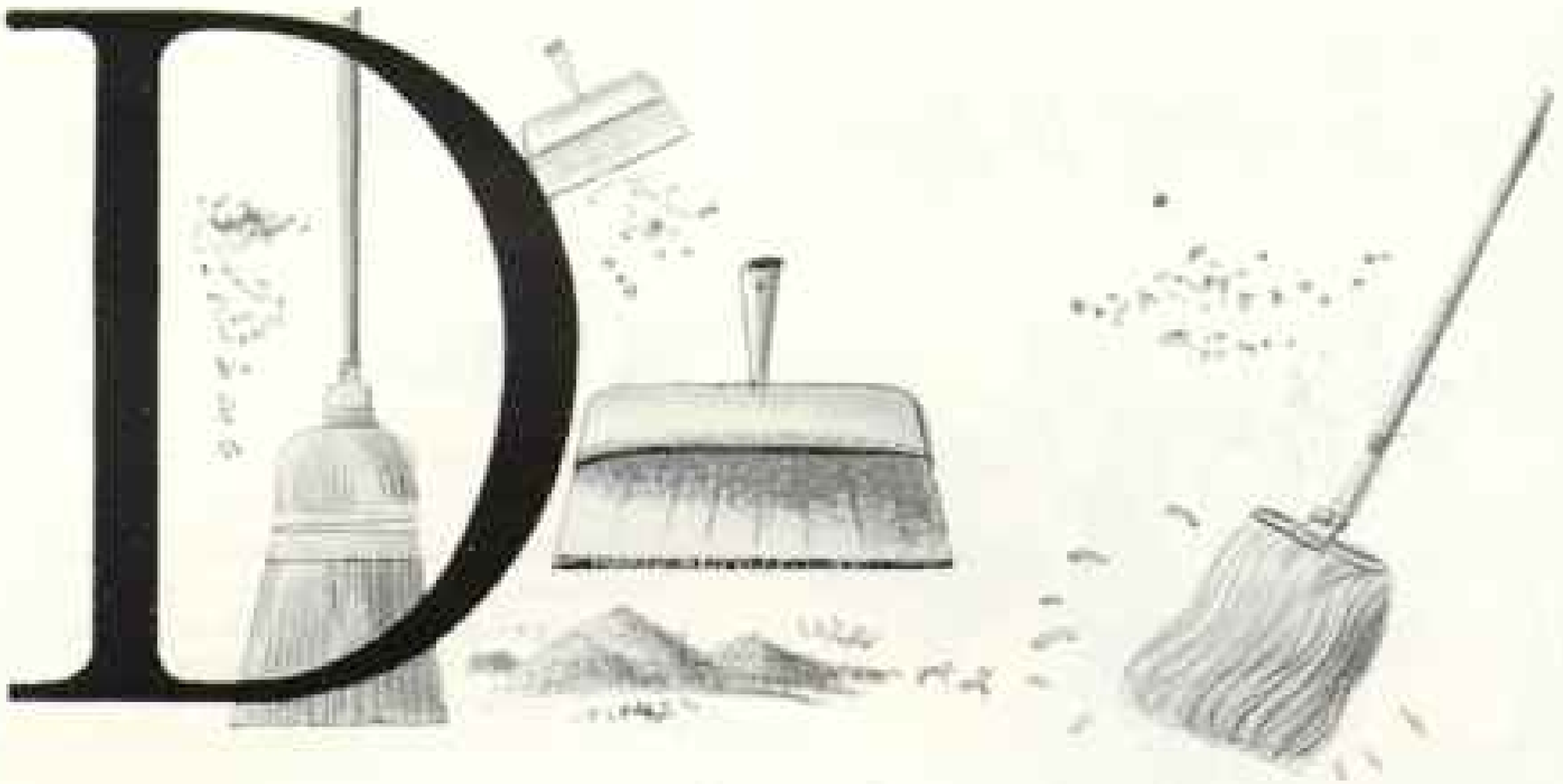
Canada is news! See it by Canadian Pacific.



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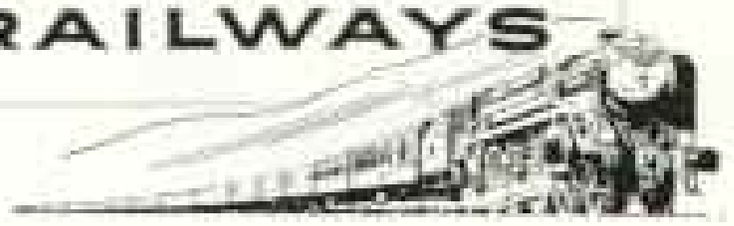
BRITISH RAILWAYS



In Coronation Year!

Here's all it takes to take you into court

. . . a story that shows what 3¢ a day can do to protect you against damage claims

(Typical of what happens somewhere every day)

"Our youngster doesn't often leave his things outside. But one night, last year, he did. He forgot his skates—I forgot to pick them up—and I'll never forget what happened as a result.

"Our milkman stepped on one of them, lost his balance, and fractured his right leg. By the time he was back on his feet, his medical bills had reached $900. He held us responsible, and we *were*.

"Happily, we had Personal Liability Insurance covering his claim so we were spared having to dig into our own slim savings to pay his bills."

Now why do we bring you this story?

First, to show you how little it takes to expose a householder like *yourself* to heavy, and sometimes ruinous, damage claims.

Second, to show you how little it takes—as little as three cents a day buys you $10,000 Comprehensive Personal Liability Insurance—to protect yourself against such claims.

As little as three cents a day! Get your Hartford Accident and Indemnity Company Agent or your own insurance broker to tell you more about this essential, yet low-cost Personal Liability policy. If you don't know the Hartford Accident and Indemnity Company Agent in your community, write us for his name and address.

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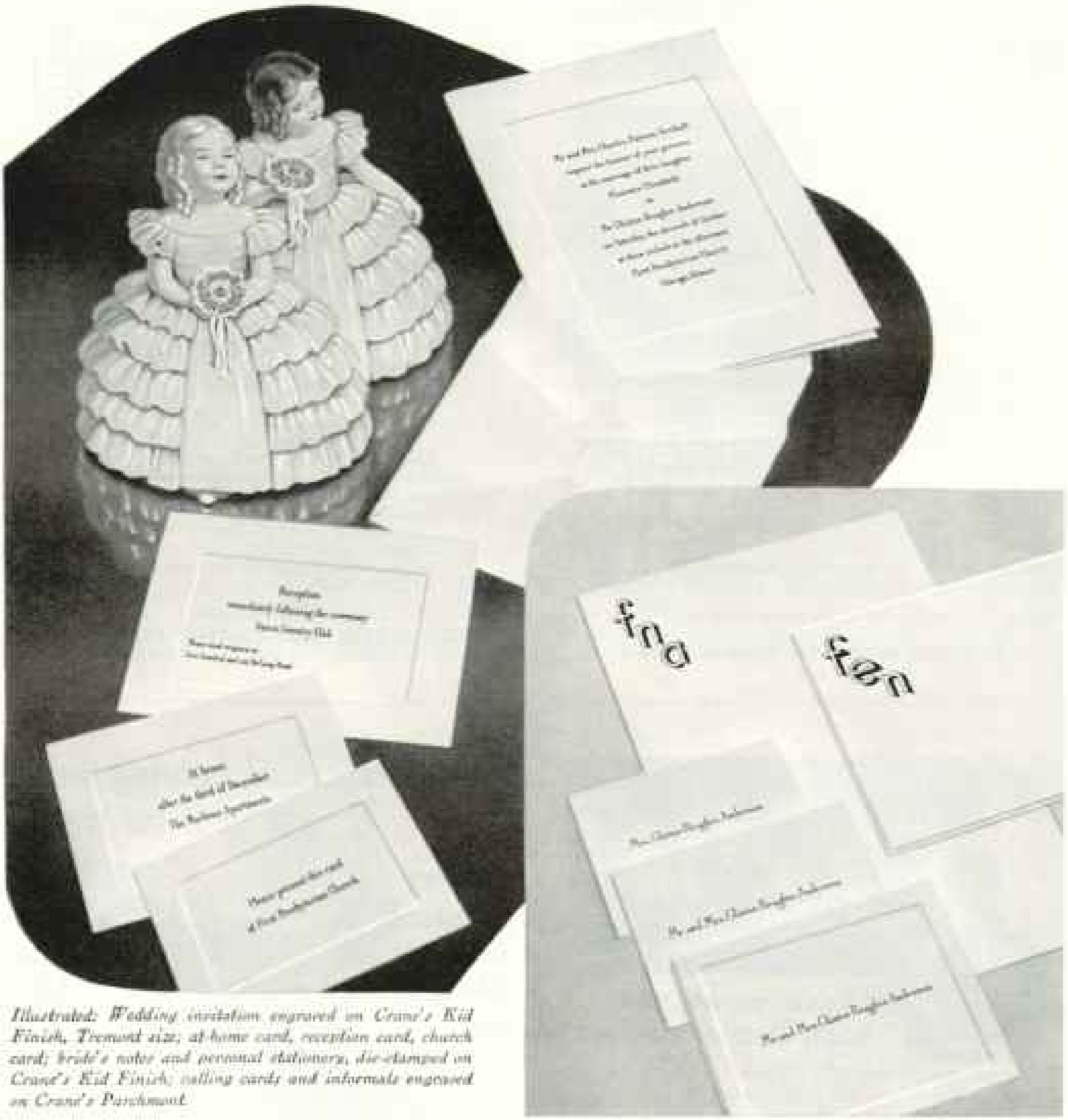

Illustrated: Wedding invitation engraved on Crane's Kid Finish, Tremont size; at-home card, reception card, church card; bride's notes and personal stationery, die-stamped on Crane's Kid Finish; calling cards and informals engraved on Crane's Parchment

CRANE'S ASSURES CORRECTNESS . . . CONFERS DISTINCTION—The exquisite tone and finish of Crane's give your invitations the commanding quality that is instantly recognized and honored. Your bride's notes on Crane's add grace to the thanks you return for the gifts you receive. And you start your new career smartly and correctly with Crane's for your letter paper, calling cards and informals. You will enjoy choosing your complete paper trousseau from your stationer's collection of Crane's Fine Papers.

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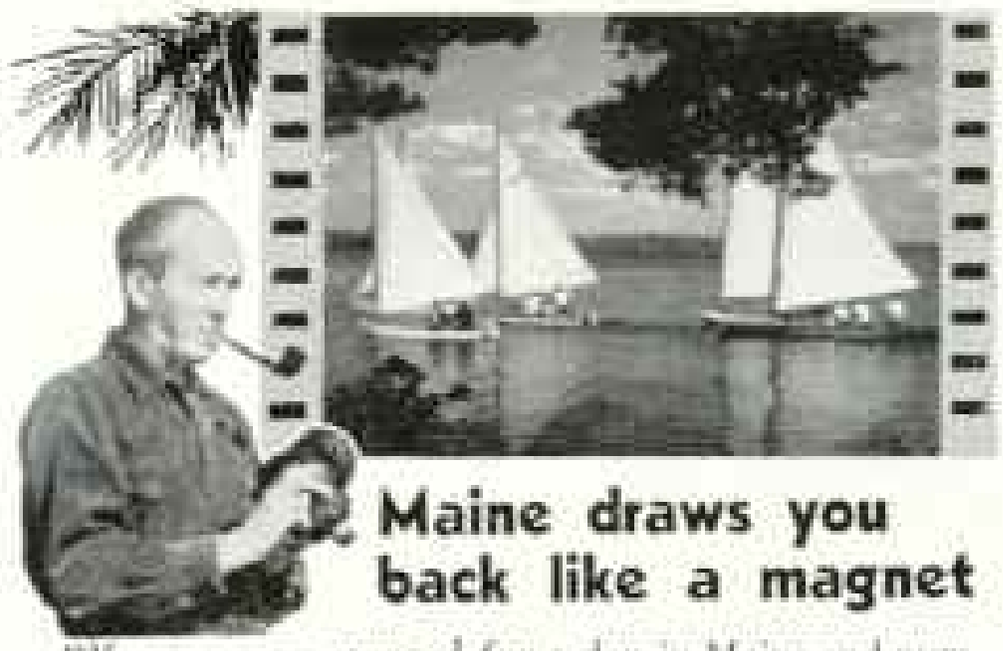

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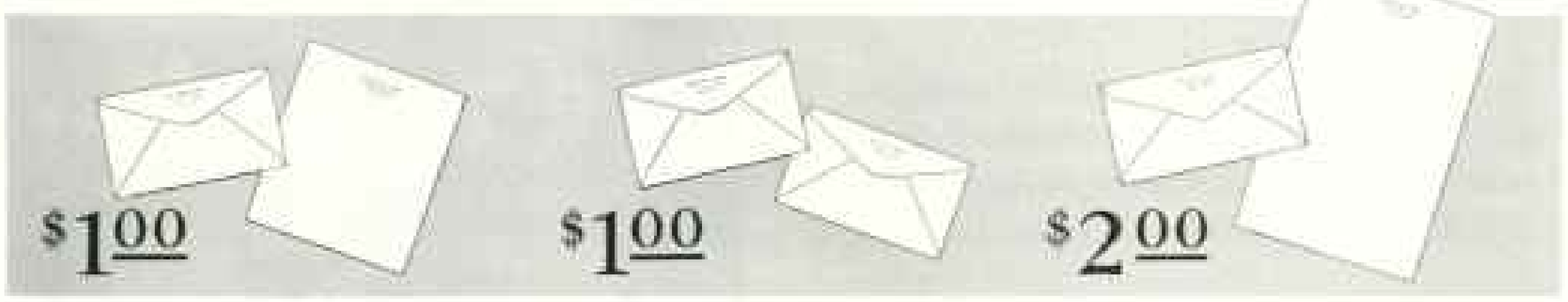

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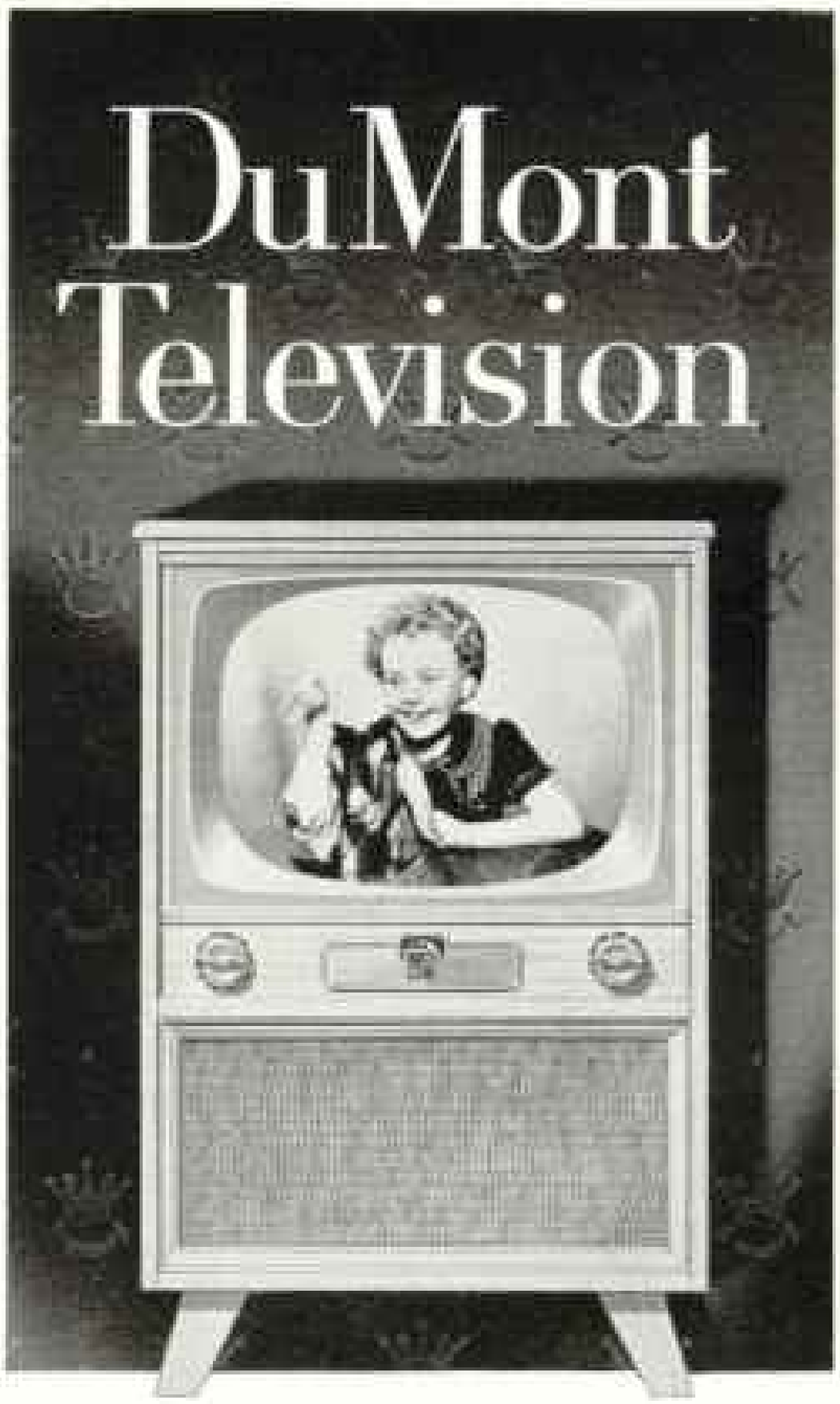

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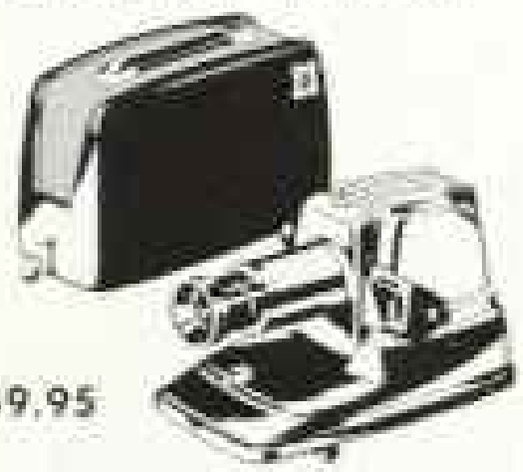

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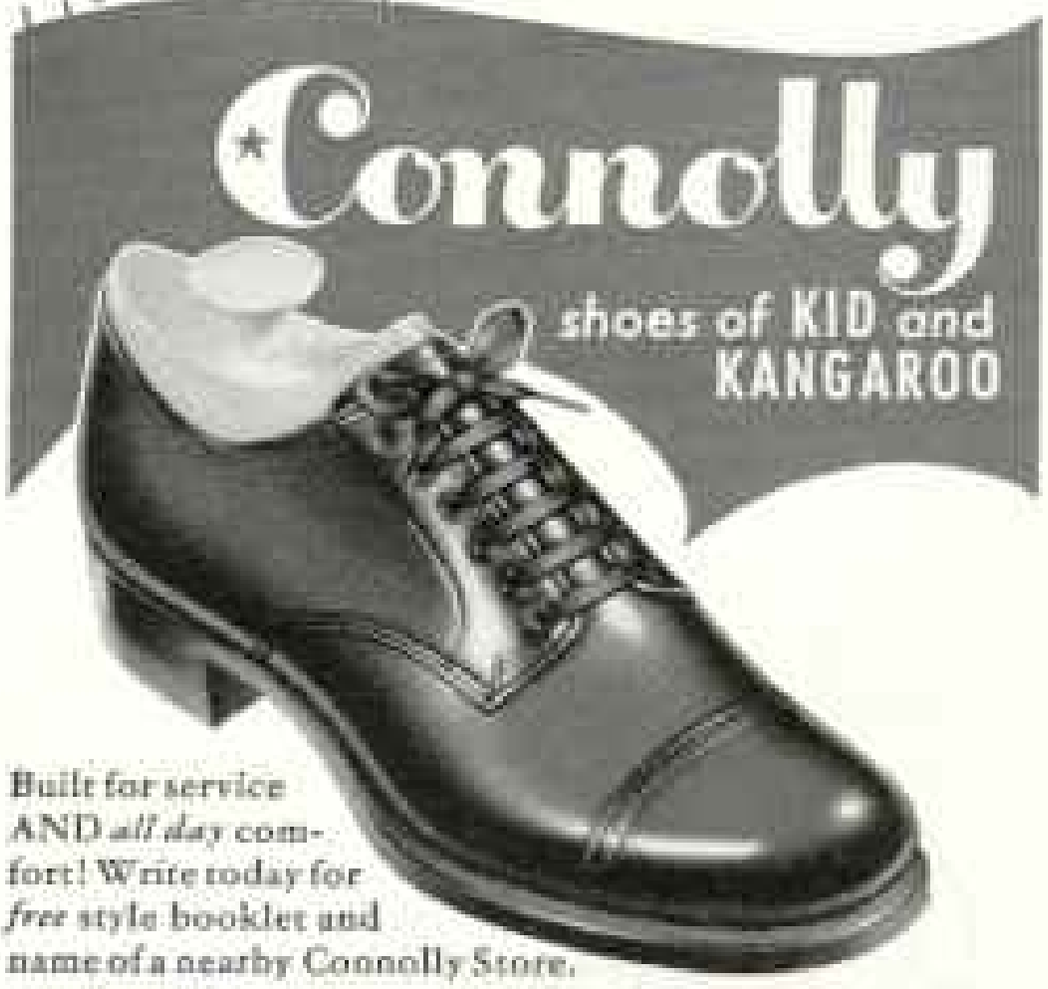

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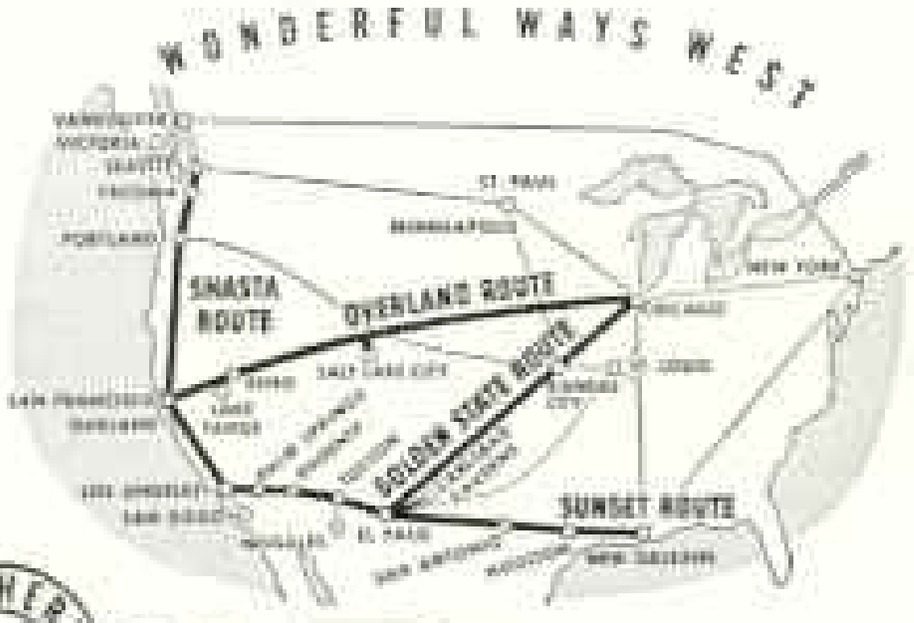

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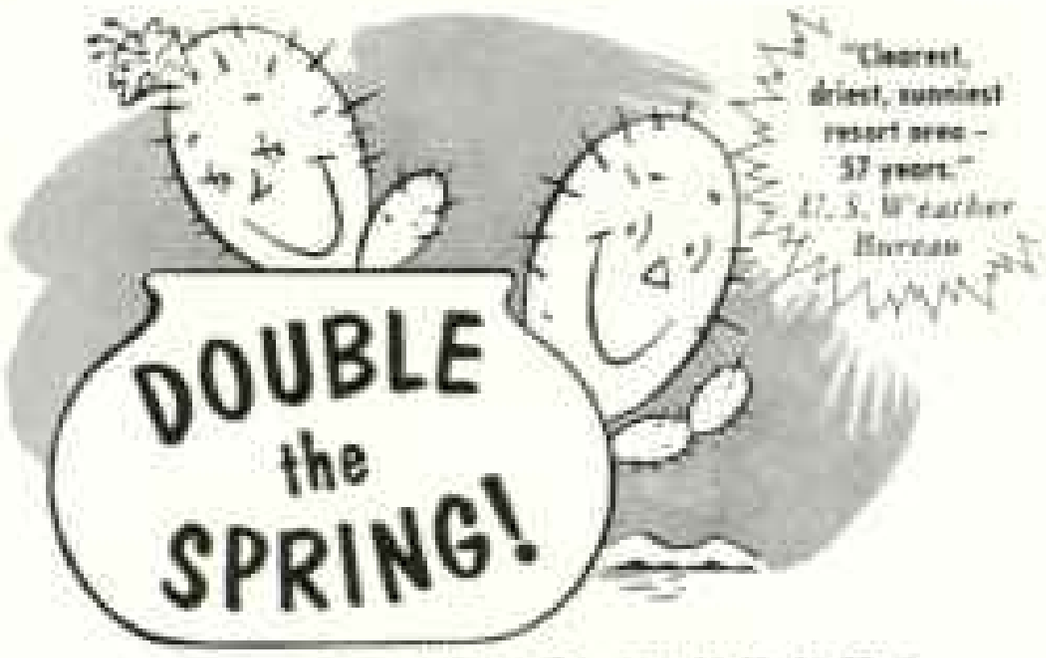

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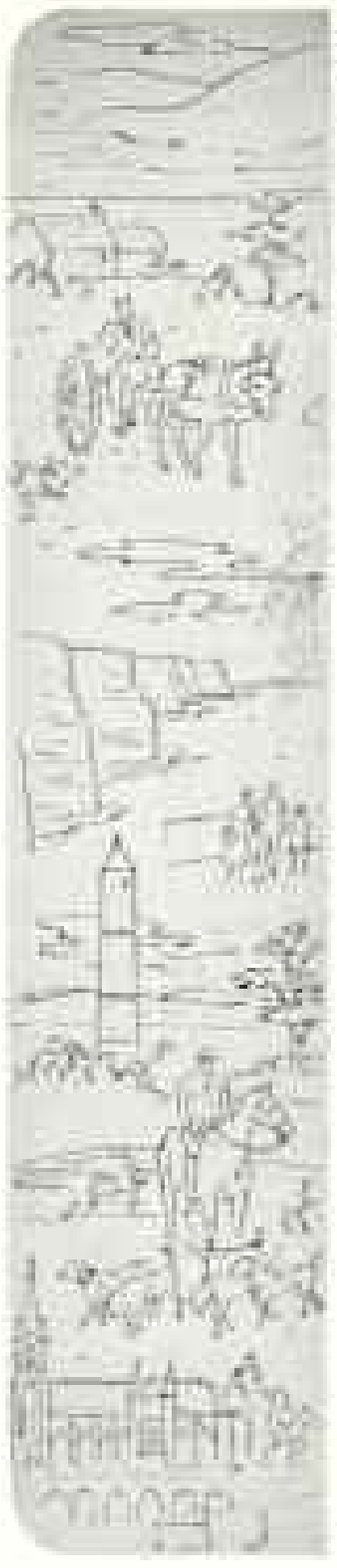

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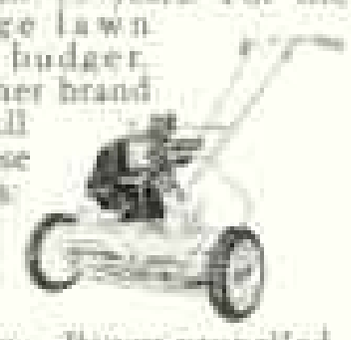

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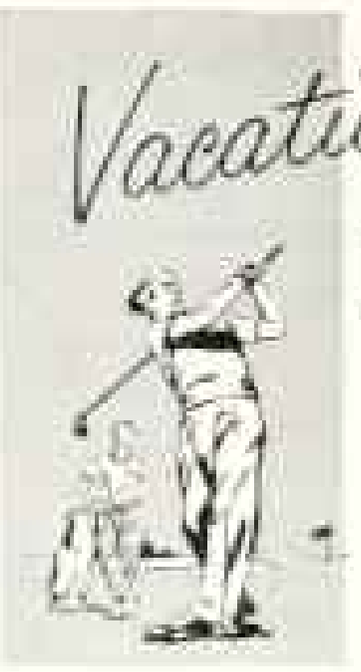

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A scene in one of the research laboratories of Memorial Center for Cancer and Allied Diseases, New York City. In these laboratories, research on hormones is helping to shed new light on cancer.

A MESSAGE OF HOPE ABOUT CANCER

EACH YEAR, according to the American Cancer Society, an estimated 70,000 persons recover from cancer. The Society also estimates that the number of cases that are now saved could be *doubled* if patients received prompt and thorough medical or surgical treatment.

Today there is hope for even greater gains in our fight against this disease. This is because medical research is constantly yielding new facts about how and why cancer develops.

Some recent research findings

In surgery—major operations can now be performed with far less risk to cancer patients. Largely because of greater surgical skill, the number of patients recovering from cancer of the head, neck, stomach, and uterus has been more than doubled over the past few years.

In chemotherapy—or treatment with chemicals—encouraging progress is being made. Some chemical substances are now being used which temporarily inhibit the growth of a few types of cancer in human beings.

In radiology—or X-ray treatment—intensive studies are under way on devices that are not only capable of producing more powerful X-rays, but also offer hope of a more effective use of them.

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First—learn cancer's warning signals which are listed below. Should any of them appear, report to your doctor at once. These signals do *not* invariably mean cancer. In fact, in the majority of cases the suspected symptoms are proved *not* to be caused by cancer.

Second—have periodic health check-ups. Cancer may develop without any outward warning signals. Only examination by a physician may discover these "silent" cancers in their early stages. This is why periodic medical examinations are so important, especially for older people.

Third—do not rely on unproved methods for the treatment of cancer. Only surgery, X-rays, radium—used singly or in combination—can remove or destroy cancer.

Above all, remember that cancer is often cured . . . and that getting to your doctor early is your greatest contribution toward recovery.

CANCER'S 7 WARNING SIGNALS: 1. Any sore that does not heal. **2.** A lump or thickening in the breast or elsewhere. **3.** Unusual bleeding or discharge. **4.** Any change in a wart or mole. **5.** Persistent indigestion or difficulty in swallowing. **6.** Persistent hoarseness or cough. **7.** Any change in normal bowel habits. (Pain is not usually an early symptom of cancer.)

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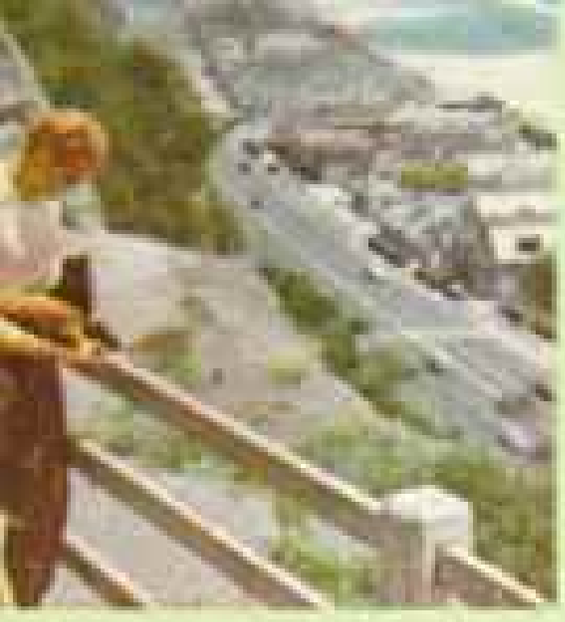
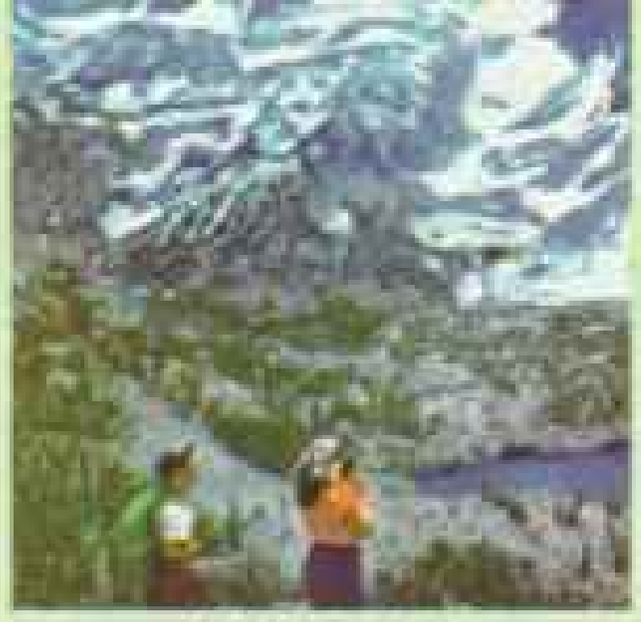


Santa Monica Palisades

Shopping amid palms



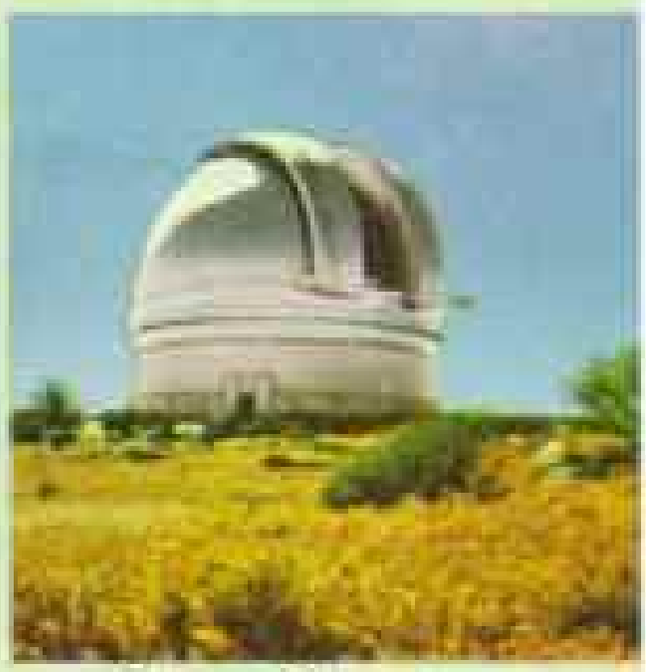
High Sierra lake

Acres of flowers

Jimmy Cagney's schooner

Seaside patio

Hollywood night life



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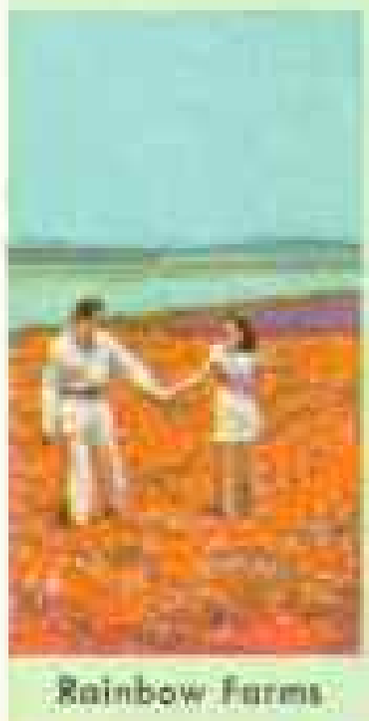

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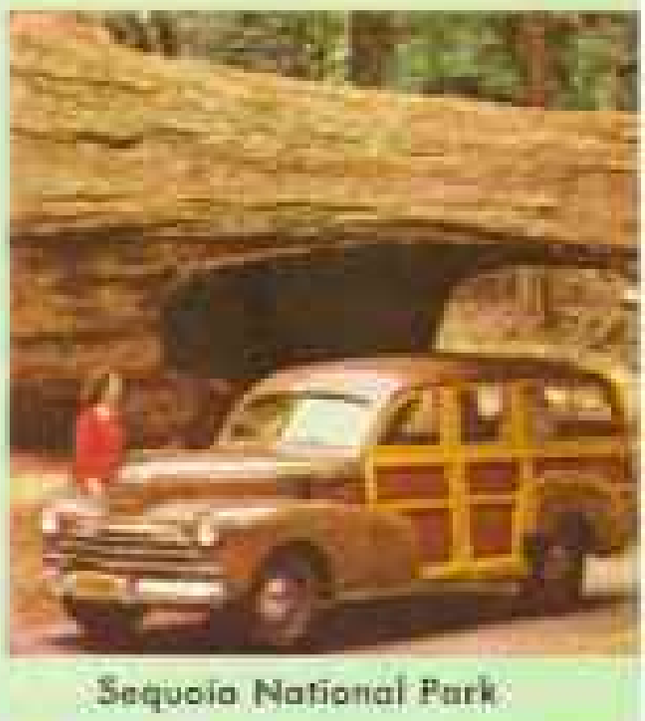

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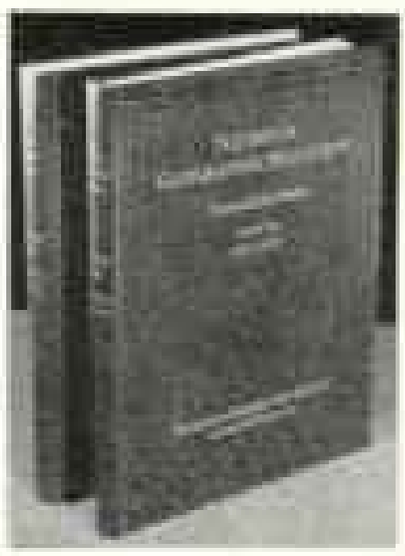

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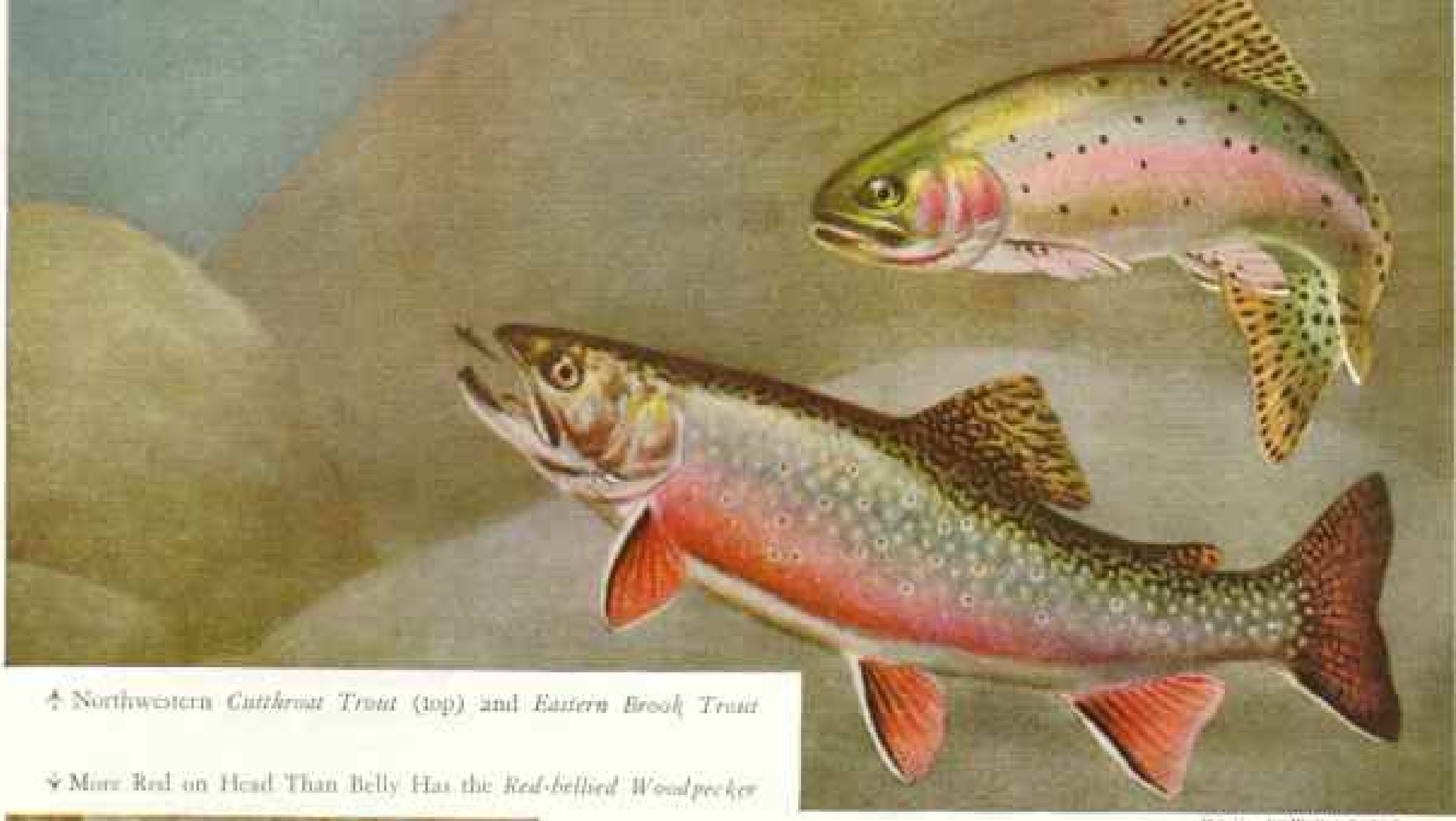

↑ Northwestern *Cutthroat Trout* (top) and *Eastern Brook Trout*

↓ More Red on Head Than Belly Has the *Red-bellied Woodpecker*

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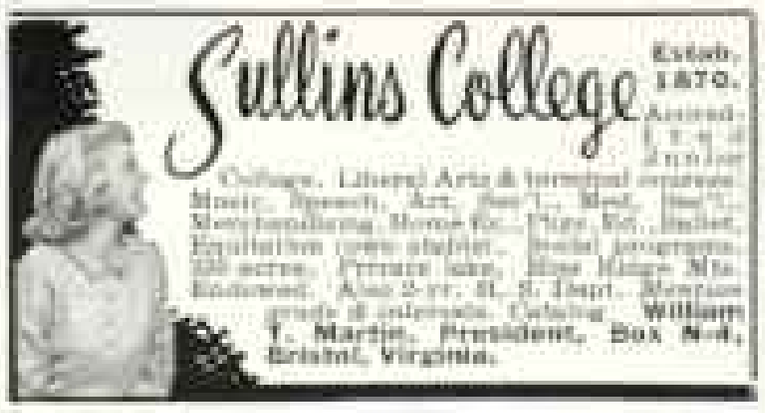

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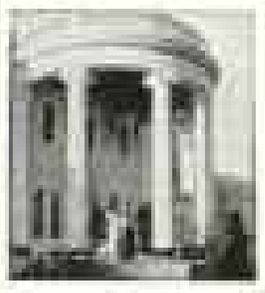

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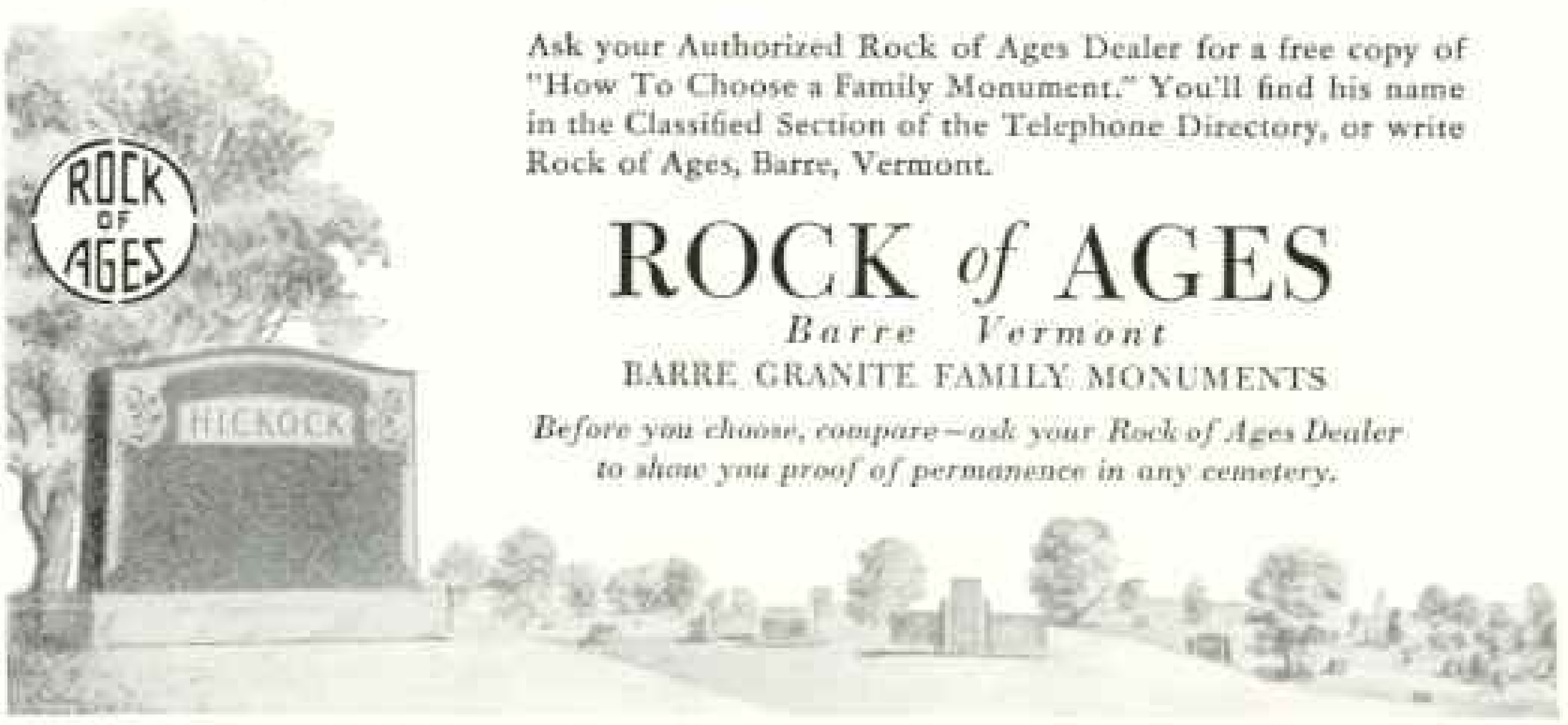

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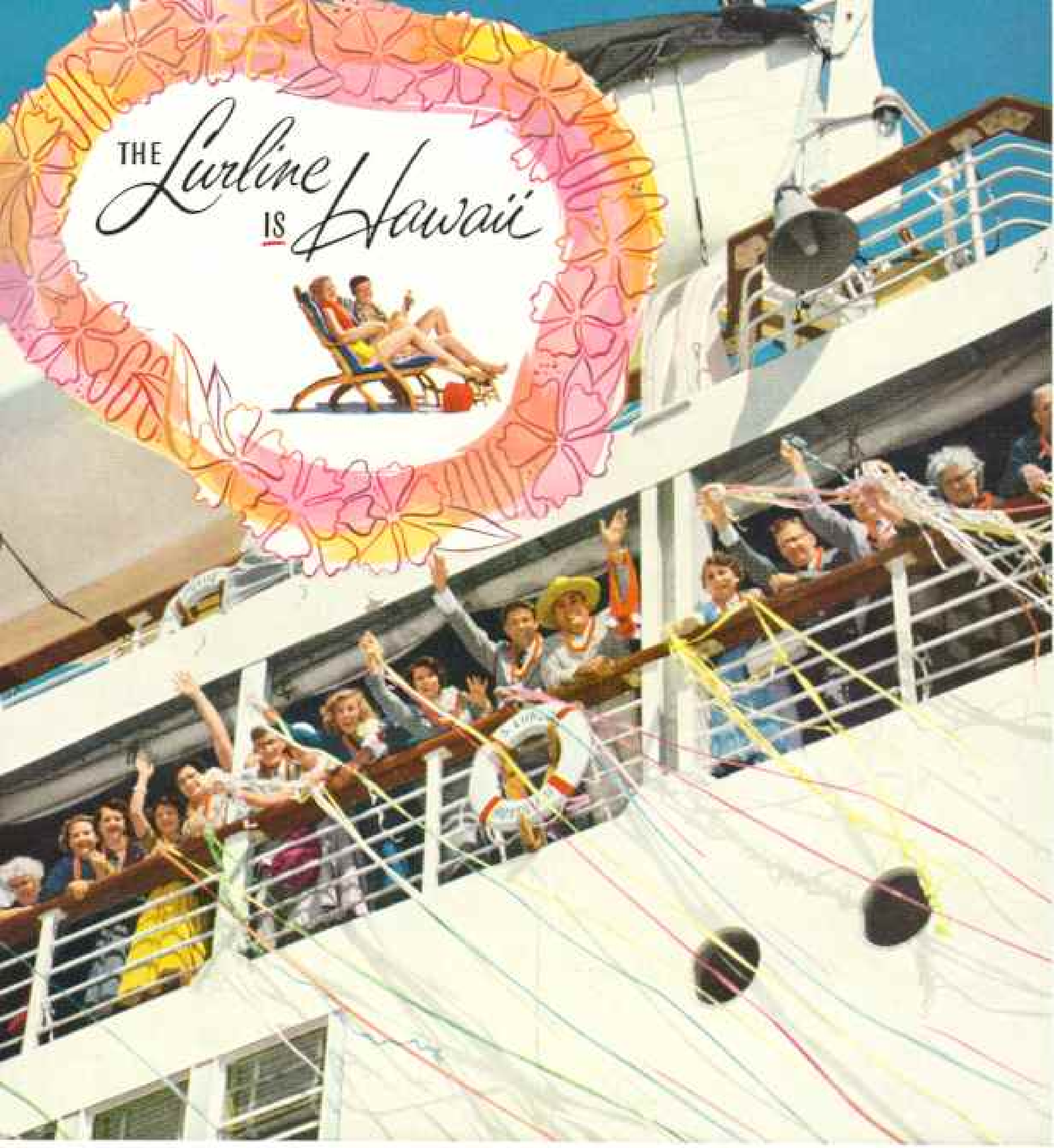

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