

VOLUME CVIII

NUMBER FOUR

THE NATIONAL GEOGRAPHIC MAGAZINE

OCTOBER, 1955

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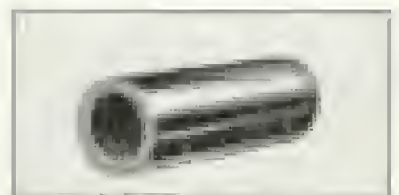
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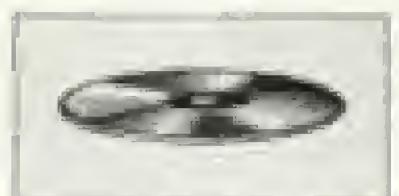


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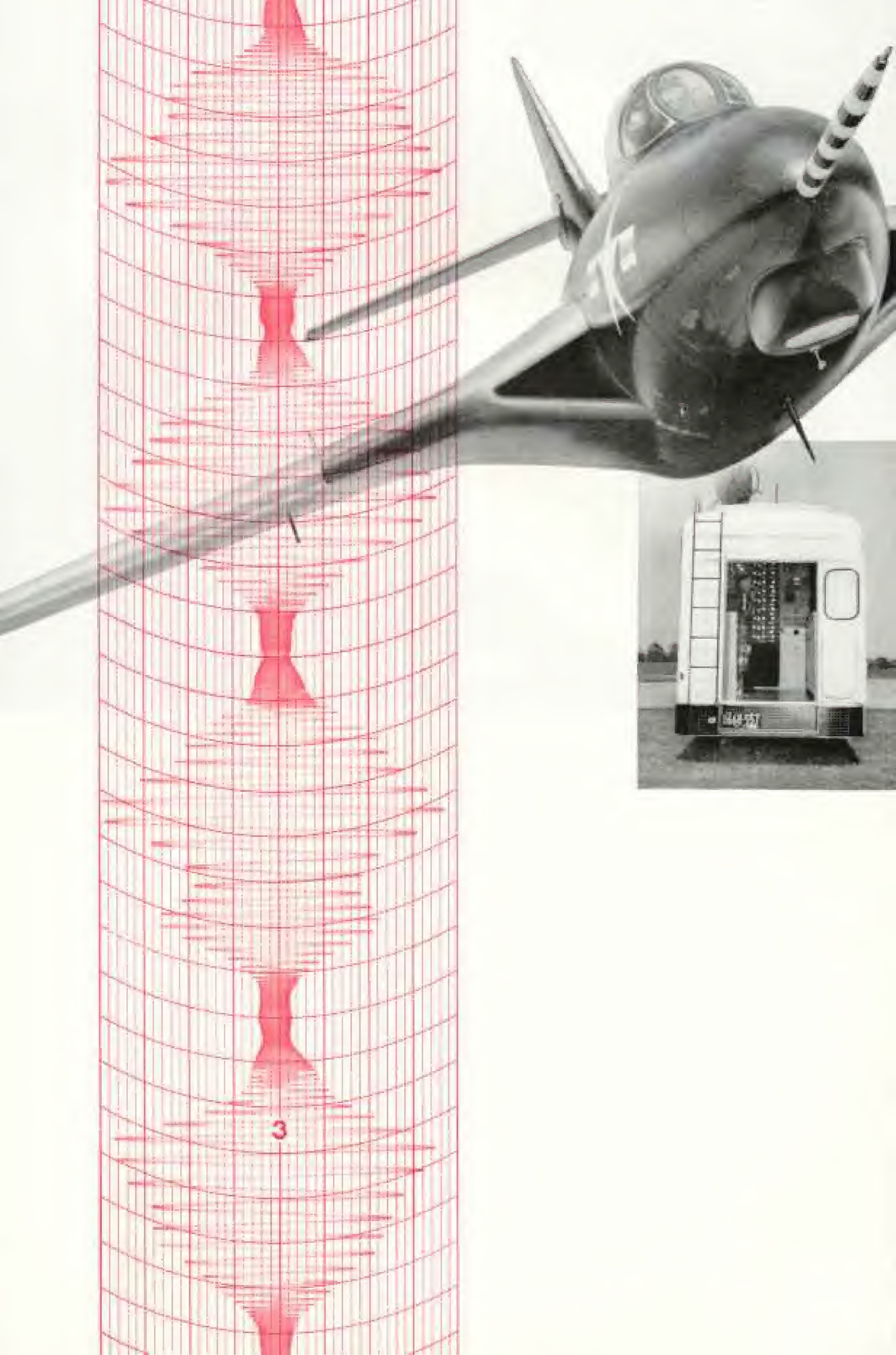
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My Hartford Fire Insurance Company

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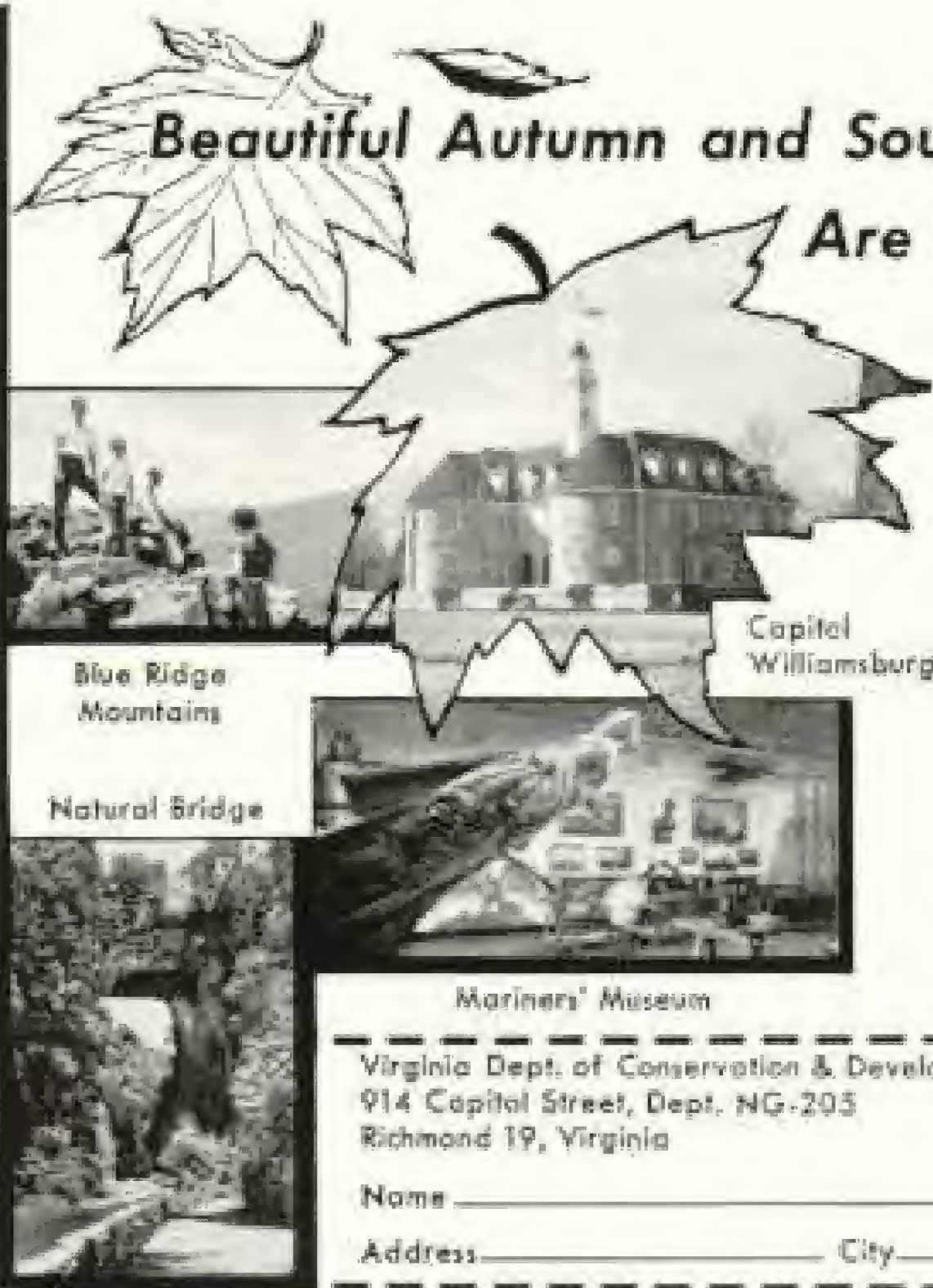
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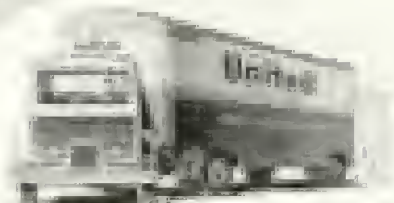
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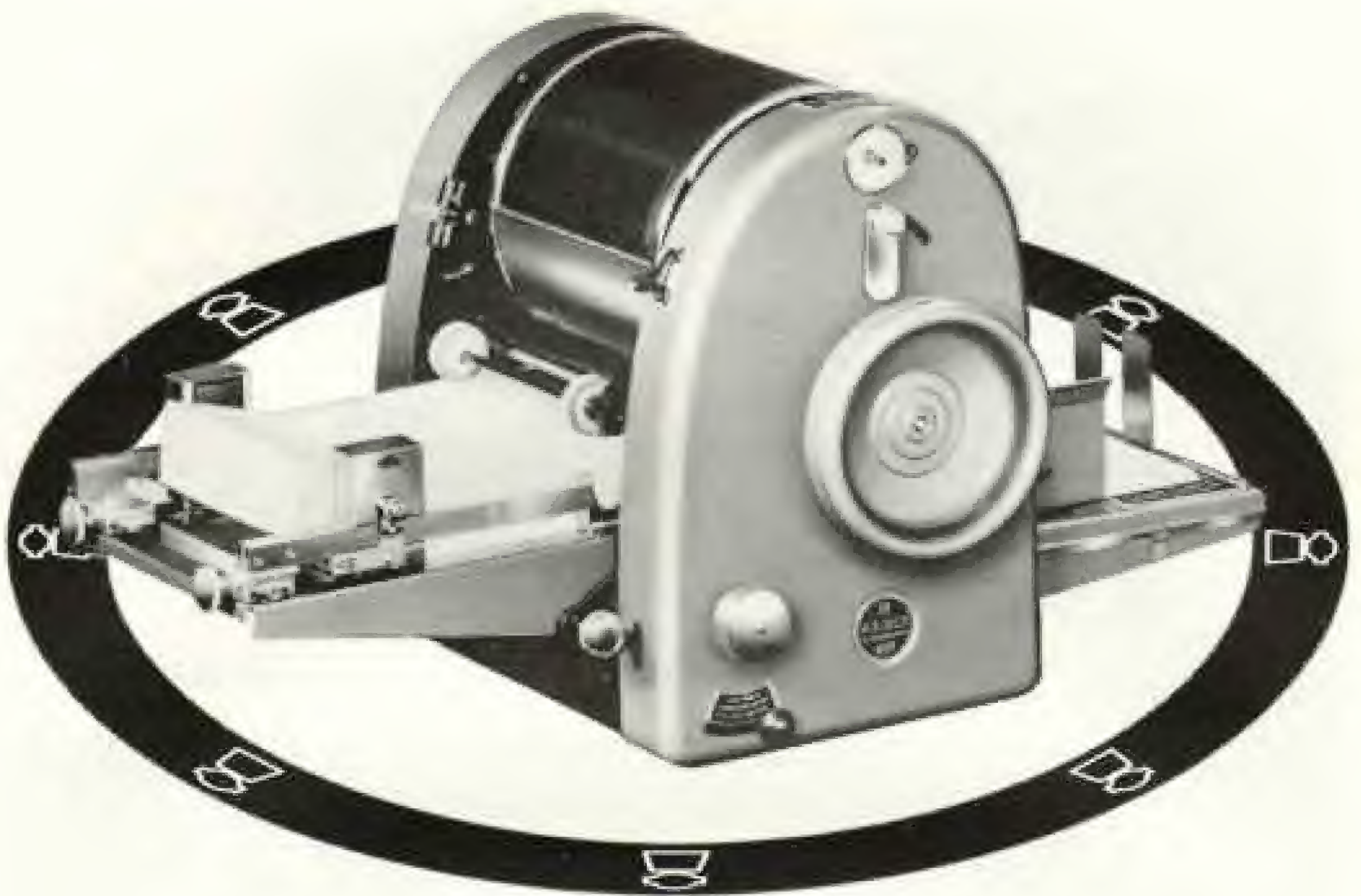


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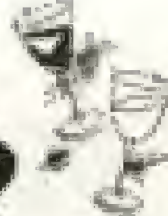
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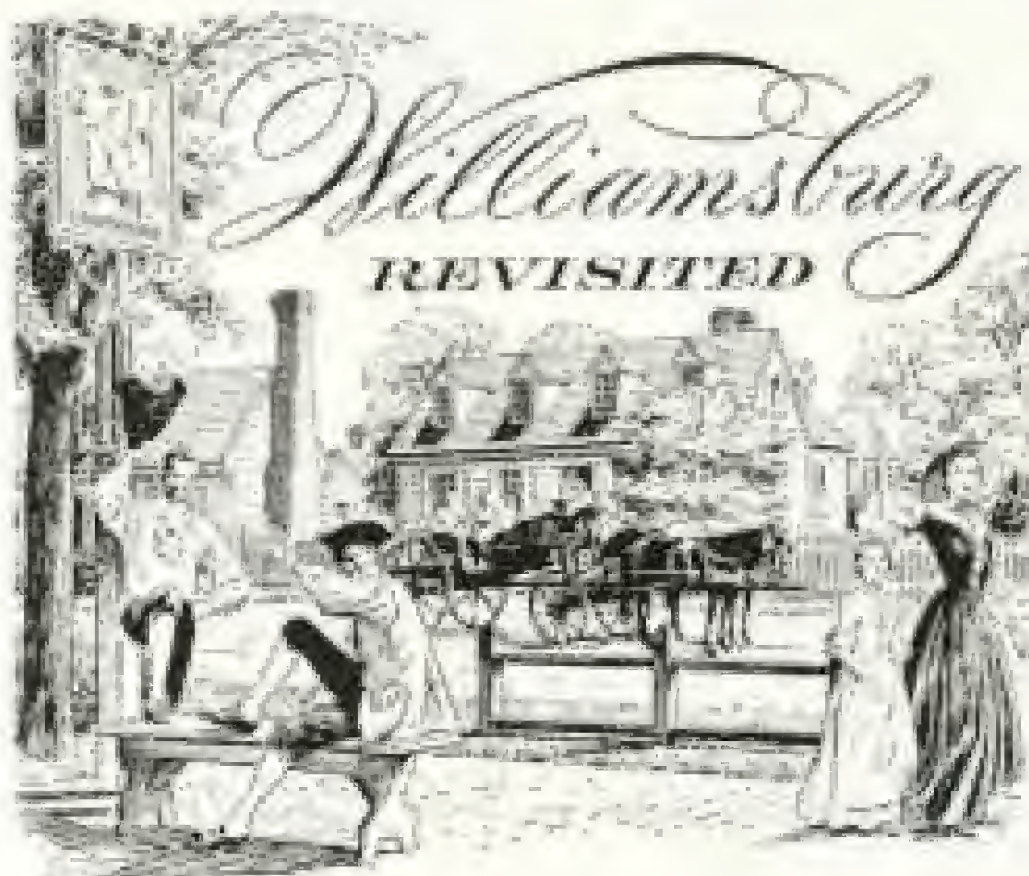
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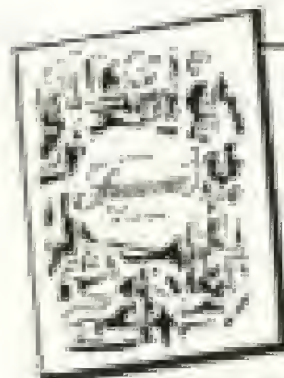
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TODAY, medical and nursing authorities are recommending home care for more and more patients . . . especially if someone in the family is skilled in home nursing.

There are several reasons why home nursing is of such great importance now. Nearly all of our country's hospitals are crowded. In fact, they care for more than 20 million patients a year. Naturally, doctors, nurses and their assistants are busier than ever before. So, whenever a patient can be adequately cared for at home, hospital beds and personnel are freed for more serious cases.

Moreover, the cost of a long hospital stay is a heavy financial burden to the average family . . . as well as a source of worry to the ill person. Lengthy hospitalization may also make the sick person depressed and even doubtful of his recovery. These attitudes can often be offset when the patient can safely and conveniently be cared for within the family circle. In fact, familiar home surroundings and family companionship can often help to hasten recovery.

Fortunately, in such circumstances, home nursing can usually be performed adequately by a family member under the direction of the doctor. To give the best possible help to an ill person, however, the home nurse must know how to follow the doctor's specific instructions, and be able to care for both the physical and emotional needs of the patient. In addition, the home nurse should be pre-

pared to make some simple but essential observations which help the doctor determine the patient's progress.

Suppose you had to give home nursing care to someone in your family. Would you know how to do any of the following:

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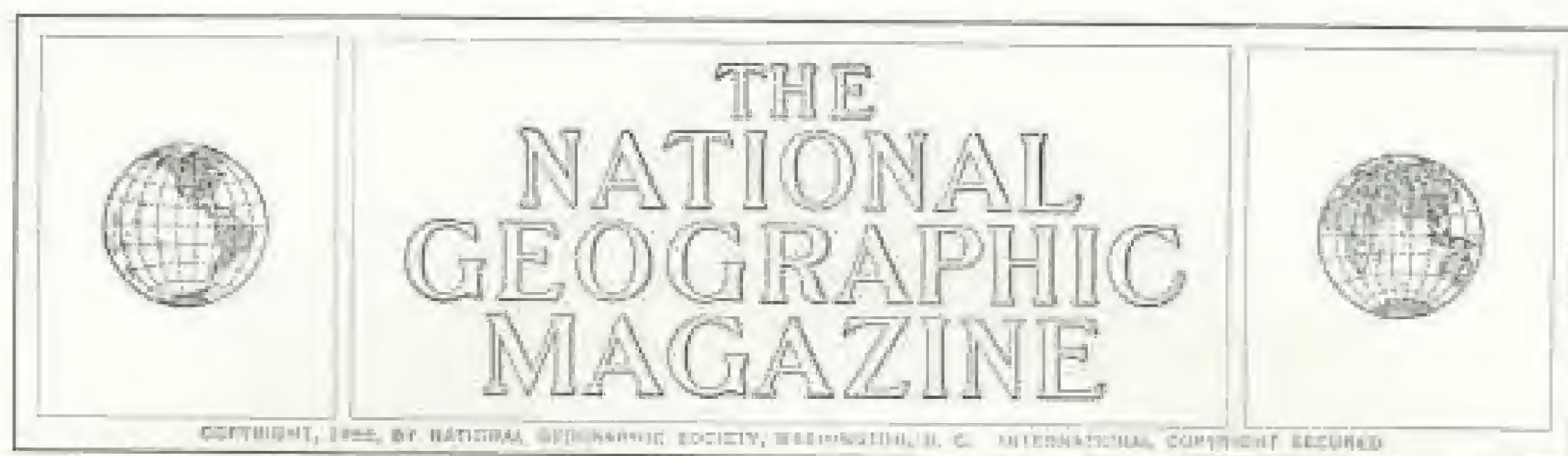
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To the Land of the Head-hunters

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An Ornithologist Finds Bird Rarities and Glimpses
a Dying Culture in Innermost New Guinea

BY E. THOMAS GILLIARD

Associate Curator of Birds, American Museum of Natural History

With Illustrations from Photographs by the Author

CALMLY, with impeccable accent, the radio announcer blew our plans sky-high.

"In a clash with natives of the Telefomin area of New Guinea," he declared, "one resident patrol officer is reported dead. He was tomahawked by members of the savage Mianmin group, the 'big pygmies' of this remote mountain region."

A day later he had more news: "A second massacre by Mianmin natives has brought death to another patrolman and two policemen. The two Australian patrol officers killed thus far are Geoffrey Harris, and Gerald Leo Szarka of Leura, New South Wales..."

Murder Raises a Roadblock

Incredible. Only a few weeks before, these two young men had studied and approved the itinerary of our expedition. They were standing by, up in their little hidden Neolithic valley between the Victor Emanuel and Hindenburg Ranges, ready to oversee our forays into the surrounding mountains after plants, mammals, and birds. Harris, an enthusiastic member of the National Geographic Society, had even ordered a copy of Arthur A. Allen's *Stalking Birds with Color Camera*.

Of a third white man in this isolated area, the Baptist missionary Norman Draper, we learned later. Quickly he had broadcast word of the murders to Wewak, and sent out

police boys and mission boys to investigate the situation.

Draper had, in fact, saved the outpost. But the Australian authorities in Port Moresby, Papua, naturally enough, now took a rather dim view of our proceeding to Telefomin. Flatly my wife and I were told: "If you can't shift your work to another area, you might as well start back to America."

This was not a happy prospect. Late in 1953, after nearly three years of planning, we had, with the generous support of the American Museum of Natural History, the National Geographic Society, the C. R. Vose Exploration Fund of the Explorers Club, and the Frank M. Chapman Memorial Fund, brought our intricate equipment and carefully marshaled supplies some 10,000 miles to this small jumping-off point.

Sent six months before and waiting for us in Lae, on the eastern coast, were not only our specialized collector's gear but a formidable assemblage of cameras, electronic power gadgets and lights, and "electric eyes" for firing remote flash cameras. Two tons of other equipment included ammunition, shotguns with auxiliary barrels of various calibers, and all the complex gear needed for camping anywhere from sea level to mountaintops.

To return was unthinkable. Yet the news filtering-in was hardly reassuring. The "seat of government" house in the Telefomin sec-



Margaret Gilliard, Sketching Kanganaman Village, Records a Stone Age Way of Life

Collecting birds, ornithologist E. Thomas Gilliard and his wife spent three months last year in the hot, steaming swamps of New Guinea's Sepik River. White man has almost completely skinned this fever-plagued area.



Thatched Apartment Houses Ride Stilts to Keep Floors Dry During Annual Floods

"A man who has not killed is nothing," Sepik men used to say. Former head-hunters now toil on coastal plantations, they return with new ideas. This series captures the last moments of a dying culture.

tor had been mysteriously burned. A Norseman plane landing with emergency ammunition, weapons, and broadcasting equipment had been unaccountably wrecked on the airstrip.

We decided, then, to get on with the first phase of our exploration, a 200-mile trip up the Sepik River, and to let the Telefomin situation simmer down. Officialdom would permit us that much.

A Head-hunter Culture Disappears

Accordingly, we flew along the coast to Lae, collected our equipment, and steamed around the headwaters of the Huon Peninsula toward Madang, where we boarded the *Kulau*, a little diesel-powered craft captained by Les Ingle (map, page 443).

It was pleasant to find that Les didn't seem to think our journey foolish, as so many of Port Moresby's sages had. Some of these old hands had told us cheerfully that we would be eaten alive by hordes of Sepik mosquitoes capable of blackening a man with their bodies within a minute of his emerging from his tent. Others assured us that the original culture of the Sepik head-hunters had disappeared as completely as the Indian settlements of Manhattan.

We still thought it worth a try. Noted pioneering anthropologists like Dr. Margaret Mead, Gregory Bateson, and Dr. R. F. Fortune had studied these people before and had written of their extraordinary cavernous halls decorated with elaborate carvings and grisly trophies. But no one had yet adequately photographed in color their unique way of life, grimly pagan yet often spectacularly beautiful. Since that culture has all but eroded as coastal customs and values have pressed upcountry, we thought it more than ever important to capture it on film.

Les didn't minimize the difficulties we confronted. Only a few months before, he had refused to take a team of Danish photographers upriver—and had seen one of them, who pressed ahead anyway, reel back through these awesome swamps half dead with fever. But perhaps because of our previous experience in South America, the Philippines, and on three other expeditions to New Guinea itself, he felt more hopeful about us.

Aboard the *Kulau* we numbered 54—passengers, captain, and crew. And we had a single bunk in a single cabin, both assigned to the captain. At night Les would tie up along

the bank and put the natives ashore. We first-class passengers (a warmhearted crocodile hunter, H. C. "Shanghai" Brown, Margaret, and myself) tried sleeping on deck until a tropical storm on our third night drove us all into Les's 6-by-8 cabin to slosh around like so many sacks of flour in the water which dripped down through the hatch. After that, I pitched one of our tents on top of the wheelhouse.

We had hardly chugged 10 miles beyond the Sepik's mouth when we struck a submerged log. The *Kulau* shuddered as if it would shake its pistons into the current; its hammering diesel drowned out even Captain Ingle's bull-throated commands. As the native helmsman seemed to shrivel in fear, Les gave the engine balanced throttle, trying to stem the boat's backward drift.

I knew we had no radio and that it might be days or weeks before any other vessel came this way. Yet I failed at first to realize the extent of our danger. It lay in the innocent-seeming grass islands floating lazily downriver like pieces of landscape on the run. These fantastic green carpets, buoyant with thousands of bulbous-rooted aquatic plants and often crested with sizable trees and bushes in which herons and gallinules roosted, sometimes covered several acres. Any small ship caught by these impenetrable rafts would be remorselessly swept out to sea unless it could cut straight through them.

To Marienberg on a Prayer

Theoretically, we could have tied up to the bank. But in the wet season the edges of this vast, inhospitable swamp consist largely of flooded cane grass standing 18 feet high and clinging precariously to quaking silt. We could have drifted back down to the ocean and raised a sail, except for one fact: we had no sail.

Our only course, then, was to hold our breath, pray that the wobbling hull would stay in one piece, and inch our way upriver at a trembling snail's pace.

Somewhat to our surprise, it worked. Hours later we limped around a great bend in the river and saw the docks of Marienberg. We would have been pleased to see anyone, but it was a special delight to meet a man with whom I had already been in correspondence: Father Ivo Schaefer, a veteran of 40 years in New Guinea, 13 of them on the Sepik. His not too encouraging letter, received in New York, had told of five villages, all on the



Head-hunter Emeritus Paints and Preen's for a Dance

Parrot-plumed tassels on rattan collar broadcast that this Iatmul tribesman has taken four heads. He pierces nose and ears for shell ornaments. Betel nut stains his teeth. Cowrie shells spangle a crown of golden fur.



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Airless Sacks Foil Sepik Mosquitoes

At bedtime each wife seals herself and babies in a dark, noisome bag like this. Weaned children and the husband occupy other grassy cocoons. "The heat and stench are frightful," reports the author, who slept behind his own mosquitoproof net walls (page 452).



middle reaches of the river and all 50 to 100 miles from the nearest white resident. Here, he thought, we might find traces of the fast disappearing Sepik culture. But the mosquitoes were "horrible," he said.

Beating our way another 20 miles upriver in our crippled craft, we edged into Angoram. Here we picked up more pithy observations on the birds and tribes we would encounter from a pioneer zoological collector, Frederick Eichhorn, E. D. "Sepik Robbie" Robinson, and Peter England, a hulking lumber cruiser with a brilliant war record and a taste for adventure. We picked up something else, too: a new skipper.

With the *Kulan* laid up we were thrown on the not-too-tender mercies of a Scots river boatman with an abiding dislike of anyone trespassing on the Sepik. His craft, the *Glenidle*, turned out to be a sturdy 36-footer roofed from stem to stern and hung with rolls of netting. Our luggage was piled on top, and some 30 natives piled on top of that. Inside gathered Margaret and I, a young patrol officer named Jock MacGregor, the huge, gray-haired beet-red captain, and Chu Leong, an ancient Chinese trader, with whom we talked in pidgin English.

We got under way at dawn, hugging the grass wall and sidling the boat through the

The Netherlands controls western New Guinea pending settlement of a dispute referred to the United Nations by Indonesia in 1954.

Australia administers Papua, North-East New Guinea, and adjacent islands.



A Last Frontier: the Sepik River Swamps

On his fourth expedition to New Guinea the author recorded a culture vanishing before the impact of the 20th century. He made the first zoological exploration of the Hindenburg and Victor Emanuel Ranges.

endless convolutions of the sluggish river, flushing birds and crocodiles as we went. I, for one, felt fully occupied trying to keep clear of our captain's sharp tongue.

I couldn't blame him much. We were deep in the water, overloaded, and towing two long canoes filled with natives who couldn't find even a foothold on our decks. For a man who had come a long way to be alone, he had certainly failed miserably. When, on one occasion, the boat ran aground and 30 of us had to jump off and push it free, I could swear the captain was praying less for the safety of his craft than for the intervention of an ambitious crocodile.

Ever and again along the river we would stop to explore some village, peering hopefully into the huge vaulted house *tamburans*. Always we found them stripped of any but the most superficial artwork—a few stools, a bench, some posts almost unadorned. Only the big slit gongs, or *garamuts*, fashioned from tree trunks, remained.

At a few points we passed evidence of the

bitter intertribal fights which for ages racked the Sepik. On some pretzel-like bends of the river one tribe would have built a ditch diverting the main current and isolating a rival village on a now-stagnant loop. Such vindictive engineering feats often led to 20-year-long feuds.

Repeatedly we would stop while the ship's trunkload of curios was broken open for river-side trade. Natives with crocodile hides to sell would get their cash and promptly spend it on these trinkets. They didn't need to buy the salt with which the hides were preserved, nor the flashlights with which the reptiles were hunted in the dark of the moon; the traders supplied these.

At last, on December 12, two months from the day we had left the United States, we tied up to trees at Kanganaman, 192 miles up-river. Here we would plant our base camp, and from it we hoped to make our way to Galkarobi and to some of the other villages which Father Schaefer had recommended.

Kanganaman has often been visited by pa-





← Girls Work in the Shadow
of Their Tribal History

Page 444: Hardwood panels hanging at the open end of this Gaikarubi house serve the people as books. Paintings detail the glory of the past. Skulls, endlessly repeated, represent great men; their hollow eyes glow with sunlight. These panels, once common in the Sepik, were the only two the author found.

Woman on the left makes coarse meal out of a dried cake of starch derived from sago palm. Mixing the meal with water, she fries pancakes for dinner. Her companion fashions a grass skirt.

Lower: A youngster tweaks the nose of a pixie face molded on the scalloped rim of a clay fire basket.

Lacking ice, the people preserve sago for months by drying it in cakes. Liquid sago, which sours in a few weeks, is stored in the large urn at left. Five-gallon pots (right) hold water.

House Fires Smoke Out Insects,
Keep Attic Safe for Treasures

→ Carved wooden images frighten off demons while serving as storage hooks for bags and drum. Basketlike fish traps line rafters beyond the dance skirt.

↓ Malingai villagers make dance decorations in the safety of a smoke-filled room, a refuge from swarms of bloodthirsty mosquitoes. Fish cures on the rack above the earthenware fire pits.

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Kochi-puma by E. Thomas Gilliard

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Kanganaman Spirit House Soars 65 Feet. Its Large Posts Represent Savage Gods

troop officers, missionaries, and labor recruiters, but rarely, if ever, had anyone stayed in it for more than a few hours since anthropologist Bateson had settled among the Iatmul natives some 23 years before. When the local leader, or *lutmai*, heard that we had arrived not merely to pay an hour's call or even to spend the night, but to debark for two months, his face became a rich study of misgiving.

Nevertheless, he marched dutifully off and returned with five young men to whom we could teach the rudiments of preparing scien-

tific specimens. Other natives began to throw up palm-thatched sheds at points I designated by stakes. Lyster bags, familiar to many GI's, hung beside large tarpaulins, ready to impound rain water. A long rack was constructed to hold the expedition's boxes, a guard system was quickly arranged, a flight cage for birds went up, and we soon dispatched another team to pitch and keep watch over our virtually invisible silk Japanese bird nets.

Our most important structures were two netted houses, pitched well above ground, with

muslin roofs, five-foot walls, and seven-foot zippers. The weave was the finest obtainable. In one we planned to work and eat; in the other, to sleep and store our valuables.

These screened refuges became enormously important to us, of course, as we encountered the Sepik mosquito in full force. On the river we had found a generous smearing of war surplus "6-12" repellent quite effective, and now on shore we discovered that by cutting all the grass for some 50 feet away from the houses we could be miraculously free of mosquitoes during the day. But in the forest it was another matter.

There, at certain times of day, the insects became nearly impossible, and at night they were really beyond description. One terrible period would come just after dusk. A high whine like a distant siren, produced by millions of little wingbeats, would herald their approach. If one were lucky enough to be inside a net, the outer surface would seem

enveloped by a dark cloud. The other fiendish moment came at dawn, when every mosquito in the area apparently roused itself to steal a final sip of blood before settling down for the day.

Eventually we found that dousing ourselves with river water would, for some reason, hold even great swarms of the mosquitoes at bay, at the same time cooling us pleasantly from the evaporation. Another technique was to keep a special slapping broom of thin palm ribs or a fan of whiplike tassels in constant motion. Better still, I learned, was to have a man following me and alternately flailing himself and my back.

House *Tamberans* Yield Treasures

We set out on our first excursion to Kanganaman's house *tamberans* fully expecting to find them the same disappointing hollow shells we had already seen along the Sepik. Yet it was hard not to be keyed up by the cre-

Margaret Gilliard Meets a Head-hunter's Victim and Holds a Snaky Rope of Its Hair

Revelers mount the skull on a pole dressed as a man. "The figure makes an eerie sight," says the author, "as it bounces up and down, hair flapping, blind eyes staring, synthetic expression fixed and cold." Clay and paint clothe the skull with mock flesh. A monstrous bark mask hangs on this house *tamberan* at Gaikarobl.





Tasseled Chains Proclaim a Warrior's Proudest Achievements: the Killing of Five Men

Skull of a village leader, fleshed with clay, holds an honored niche in this native hall of fame at Gaikarobu. The gourd contains lime for chewing with betel nut; the tasseled stick dishes it out with a rasping noise.

scendo of drumming which announced our coming. Past a pair of upended stones we strode down a broad avenue of grass. On either side, in a forest of coconut palms, stretched stilted houses 75 feet long, with canoes parked beneath them. During the annual floods, I thought, the village must resemble a fleet of houseboats at anchor.

Ahead of us now, dim in the evening light, loomed a building of slender, graceful proportions that towered 65 feet above the green common. The carved figure of a hornbill, atop a man's figure and pierced by long, arrowlike rods, crowned the ridgepole. The lodge itself was supported by great incised posts which, the natives told me, sometimes rested upon human skulls.

A massive ladder led up to a loft hung with small, odd-shaped objects hanging like corpses from long ropes. High up on the building's façade reposed a garish, orange-red female figure eight feet long, fashioned from the roots and trunk of a tree. In the gloom beyond clustered the village elders, the whites of their eyes flashing in our direction.

Spirit Houses Taboo to Women

Until she could receive permission from the tribal "big men," Margaret remained outside. She knew that Sepik custom forbids women and children to trespass on the grassy promenades leading to a spirit house or on the lawns at either side, much less to enter the structure itself.

I walked on, past plots of ground whose root systems formed islands up to eight feet in height above the flood plain. Entwined among the roots were flowers, citrus trees, slim betel and *Borassus* palms of marvelous height, moss, lichens, and bushes laden with candy-shaped yellow and orange gourds. I was struck, even awed, by the serenity and magnificence of the house and its setting; it was like stumbling upon an active Mayan temple in the jungles of Yucatan.

Entering the hall, I stared down a 112-foot nave lined by lofty totem pillars deeply engraved with extravagant figures of animals and gods. From hand-wrought hooks swung buffoonish effigies with bulging eyes.

On other lines hung from the dusky ceiling drying trays were suspended over low smudge fires. Trays that once held craniums now held sheaves of native-grown tobacco and personal belongings tossed there by men who had dropped by to chat. Of even greater

interest were the huge carved faces and the miniature doll-like images called *marsakai*.

Each *marsakai* had a special name and represented the dreaded spirit of a particular whirlpool, swamp, or bog. Placed in strategic spots, they are believed to absorb the anger of their respective demons and divert it from mankind. All superstition, if you will, and nonsense in Western eyes; but in New Guinea one does not shrug it off. So many natives have been known to wither and die under the impact of "black magic" that the Australian Government has had to decree severe penalties for anyone practicing it with intent to do bodily harm.

Gossip via Drumbeat

Along the side of the house lay 10 hardwood slit gongs, *kuila* logs so old that some had clearly been trimmed with stone adzes and axes. The loudest of these *garamuts* measured 14 feet 10 inches and could be "read" five miles away. With these and with smaller, sweeter-toned drums the villagers operated a local communications system linking about 350 people in 65 homes of the immediate area and about a dozen scattered Iaimul villages in the middle Sepik region. Each Kanganaman man had his own special call signal (pages 455, 459).

As I stood in the spirit house that evening, I could see my hosts cocking their ears to drink in the drum gossip pulsating from Yentchan to the north, Malingai to the west, Kararau to the southeast, and Galkarobi to the northeast. Word of our arrival and at least the bare details of our activities had doubtless filtered by now to the innermost recesses of the jungle—the Torricelli Mountains on the northwestern horizon, the land of the Arapesh, and to Aibom, on the edge of the magnificent water-lilled lake of Chambri with its vast floating islands.

It occurred to me that they might as well get their information straight from us, and I requested permission to address the assembly. The elder consulted with the leaders of six "lines" or groups of men, each of which had its own little fire and meeting area within the house, and received their consent.

Ordinarily a speaker would approach the tall ceremonial debating chair (in this case a three-legged stool with a grotesque face for a back—page 451) carrying a fistful of reeds. As he made each telling point, he would formally place a reed on the chair, sometimes





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↑ **A Child Learns Tradition at the Knee of a Wooden Image**

This carving of a mythical ancestor may be 125 years old. It embosses a rotting column in front of a ceremonial house at Kanganaman (opposite). Such figures, a form of writing in the Sepik Valley, instill a respect for the head-hunters of the past.

Not a Halloween Mask → but a Debating Chair

Carved from a log and dressed in cuscus-fur hat and hibiscus necklace, the chair sits in the center of a men's house at Malimurai village. Standing beside it, speakers harangue for hours and sometimes whip their audiences into frenzies of hate. Once a Sepik mob became so aroused that it swarmed out of the hall and killed nearly everyone in a near-by village.

← **A Heavy Timber Rises on Arms and Poles**

Page 450. Many of the men's clubs, or spirit houses, have fallen into ruin. This one undergoes repairs at Kanganaman. The floor joist will balance in crotches of upright posts. No walls or pins are used.

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Endpapers by E. Thomas Gilliard



softly and carefully, sometimes whipping it down like a saber in a rush of rhetoric. I had no reeds, but I had a lot on my mind as I strode up to the chair, cleared my throat in the smoky air, and gazed around at the firelit faces before me.

First I told of our trip and of our mission, thanked the villagers for permitting us entry, promised that we would try to do nothing to upset the pattern of their life, and said we would welcome any help they could give us. Then I explained that I had come to "workim" a book like that by "Masta Bateson."

As I looked around, I realized that, though Bateson's name was still a household word among them after a quarter-century, the book, *Naven*, in which he had described them was wholly unfamiliar. So I quickly detailed the things they could do to assist us and stated how much we would pay.

Most of the prices I listed were nominal. But for four items, I said, I would pay quite fabulous sums. The first three were the nests respectively of the Lesser, the Twelve-wired, and the King Birds of Paradise. The fourth was a human skull modeled in clay after the ancient Sepik manner. I wanted none of these things brought to me; I wanted to be brought to them, so that I could photograph them on the spot.

This oration of mine in pidgin English consumed most of an hour, at the end of which I had been driven nearly mad by the mosquitoes. Yet, as speeches go, it was gratifyingly effective. Before long the jungle's Associated Press was knocking off bulletins, followed by price quotations, to all subscribers.

Violent Feuds Rack the Sepik

In any land without lamps one can, of course, expect the citizenry to bed down promptly after supper. Yet I was often surprised at the amount of night life that occurred in Kanganaman. Without warning the drums would begin to boom, echoing from village to village.

One night a crocodile crawled out on the beach within 20 feet of our beds, and on many an evening we would hear the splashing and snorting of large, unidentified animals along the Sepik.

Then there was the night, very late, when I lay awake restively, staring riverward. Suddenly a flash of heat lightning revealed, just a few feet from our tent, a man with an ax

on his shoulder. I yelled, flicked on my torch—and he was gone like a ghost. I hadn't been dreaming. It happened again on another night when Margaret was the witness.

Sometimes it was the things we couldn't fathom which worried us most—vague undercurrents of bitterness and hatred that rippled along the river, mutterings of an itinerant boatman, tense rumblings of the slit gongs.

Property Rights Stoutly Defended

Sometimes the menace was all too tangible, as when, one afternoon, two canoeloads of 40 angry savages swept downriver at motor-boat speed to quarrel with the village of Kararau. I remembered what the men of Kanganaman had done at Kararau once before and shuddered, thinking of the victims surprised at dawn and hacked to death in their long mosquitoproof bags.

Feuds came easily, for in this part of New Guinea every single object is staked out, owned, and jealously defended. Each edible thing, from a sago palm to vine leaves, has an invisible tag on it. Even a few of the wild birds, like the cassowary, are assigned. Where the trouble comes is on the ill-defined margins, the death lines, between one village and another. Ponds, with their game, their countless waterfowl, fish, and buoyant plants, are particularly hard to demarcate and are easily subject to poaching.

Our village of Kanganaman lay back in the swamp, somewhat protected from sneak attacks. For the most part, its braves now countered invasion of their rights by debate, by threat, and sometimes by recourse to law, taking their case to the local *kiap*, or Government officer. But one could read plainly in the eyes of these men a frustrated desire to revert to ambush and bloody raid; and we often wondered how their leaders were able to restrain them as well as they did.

On hot afternoons I would sometimes sit with one of these tribal "big men," Avaran, and listen to his talk of the good old days. His house, planked with palm, stood eight feet above the ground. On the floor around us were strewn a dozen sleeping bags, some of them 18 feet long. Collapsed by day, they were ballooned out at night with rattan ribs, making them look like sausages. Avaran and his relatives, plus their babies and children, would crawl into these fetid cocoons at sundown to escape the mosquitoes (page 442).

(Continued on page 461)

Two-faced Sorcerer in Grass Skirt Warns a Child to Be Good

Tribal law is enforced among Sepik people with bizarre ghost shows.

Only men and boys who have been initiated into clan secrets are supposed to know that this apparition is not a true witch. When discipline is needed, initiates put on costumes and prowl village lanes. They strike terror with the chilling whine of a concealed bamboo flute representing the voice of an ancestor. And they whip dissidents into line with warnings of supernatural punishment.

Human hair "grows" on the top-most head of this figure at Gaikarobi village. Both faces show the long nose esteemed by Sepik people.

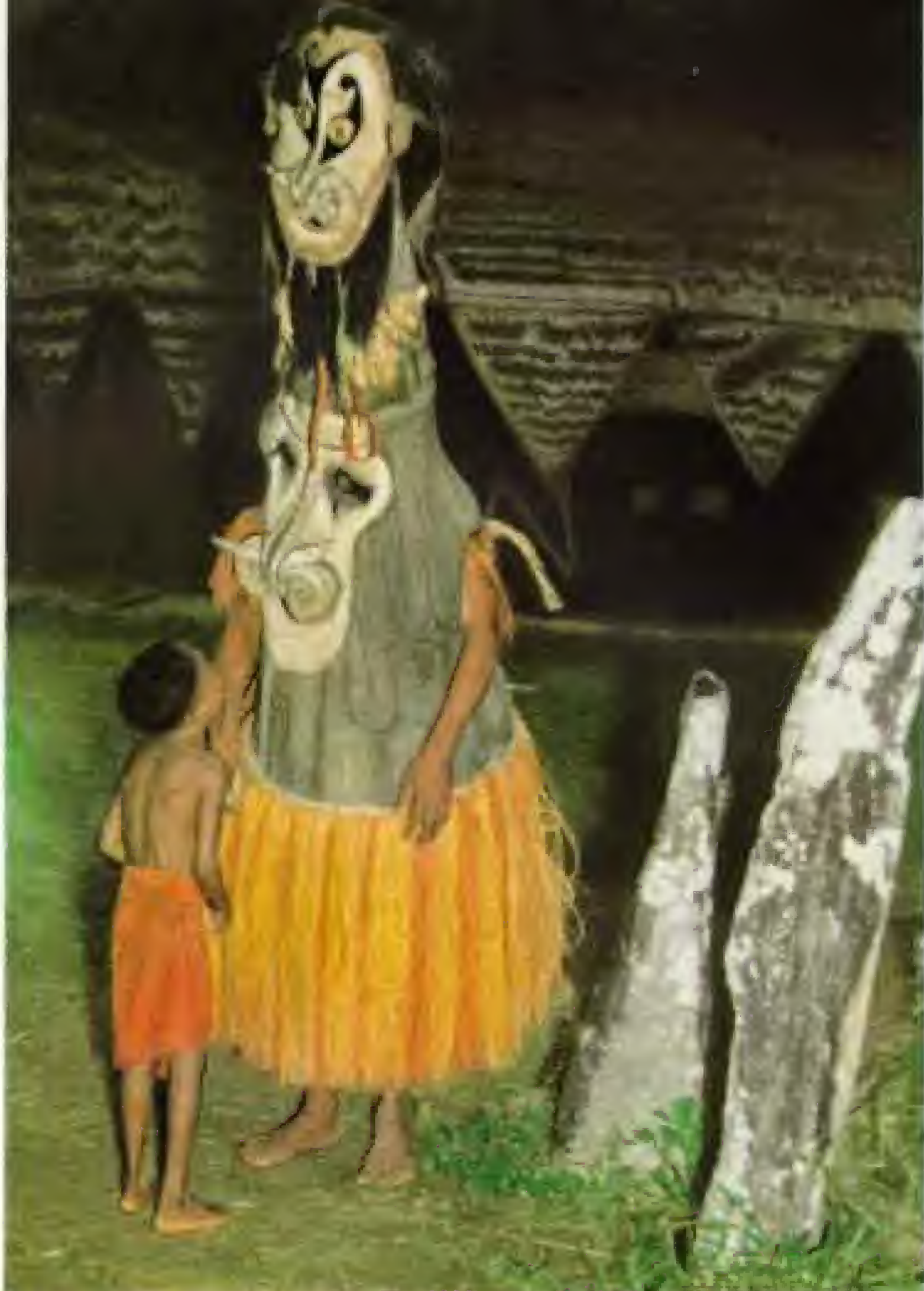
Stones mark the boundary of the house *lambevan*, or men's clubhouse, where the sorcerer dressed in the dark recesses of the attic. Warriors in old times set freshly taken heads atop the rocks for all to admire.

↓ The Animation Quits a Witch's Magic Husk

Leaving his costume on a bank in the clubhouse left, a performer scurries off with his spirit flute. Sepik people so believe in magic that a man may wither and die at the suggestion of an evil spell.

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→ **Boar Tusks Make
a Handlebar Mustache
for an Old Wood Carver**

Sepik people's finest creative expression shows in their celebrated wood sculptures. All men appear born to carve, but the best work comes from older hands.

Bearded Asiman was the valley's foremost sculptor. Before his death in 1954 he earned a living as the village carver of Kangamanan.

Cutting hardwood, Asiman worked from mental patterns only. Formerly he used stone axes and knives; in recent years, steel.

Here Asiman holds a drum scooped out of the end of a log that has been covered with the skin of a monitor lizard.

Mystic circles and scaly fish decorate the drum.



**Asiman's Ghostly Art
Attracts an Admirer**

→ This column rises in the center of a ceremonial house at Kangamanan (opposite).

Asiman cut a cluster of death's-heads on the post. They represent men killed by the sacred snake of the Sepik, whose image worms down the column and noses into the picture at upper right.

The extraordinarily long nose of the mask above the man's arm suggests another serpent.

Garamuts, or log slit gongs, in background are used to send messages between villages. Pig and crocodile heads adorn the ends.

The man carries a broom of palm ribs to beat off the ever-present mosquitoes.



← **Wizardry's Gadgets Hang
in the Spirit House**

Page 454. Called *marsalais*, these images are fashioned to resemble the evil spirits they are supposed to frighten away. One (left) inhabits the body of a fish.

These leathery old men believe that true *marsalais* emerge from gurgling whirlpools at night and drive men mad or kill them.

Axmen cut the hall's floor boards from palms.



TRADITIONAL
MASCOT
MUSEUM
MUSEUM
MUSEUM
MUSEUM

Artist with Steel Adz Carves
an Insurance Policy Against Demons →

Every home in some Sepik villages displays a collection of masks. Other communities limit them to the men's houses. The carver took six hours to chip out this much of a bug-eyed talisman. He completed it two days later and hung it under the eaves of a house at Mallimi.

← Halo of Feathers and Coconut Fiber
Crowns a Fearsome Mask

Page 455. No American Indian ever set forth to battle with more garish paint or gaudy finery than this mask wears for its war against the forces of evil.

Trident combs, bound with rattan and topped with cowrie, sprout like horns. Circlets of cut shell line the forehead. Strands of coconut hair fall behind earrings of black tortoise shell. Metal chain, a treasured contribution from the outside world, dangles from the blue lips.

A shipping tag in pidgin English explains that the mask hung in a men's house between the Sepik and Ramu Rivers.

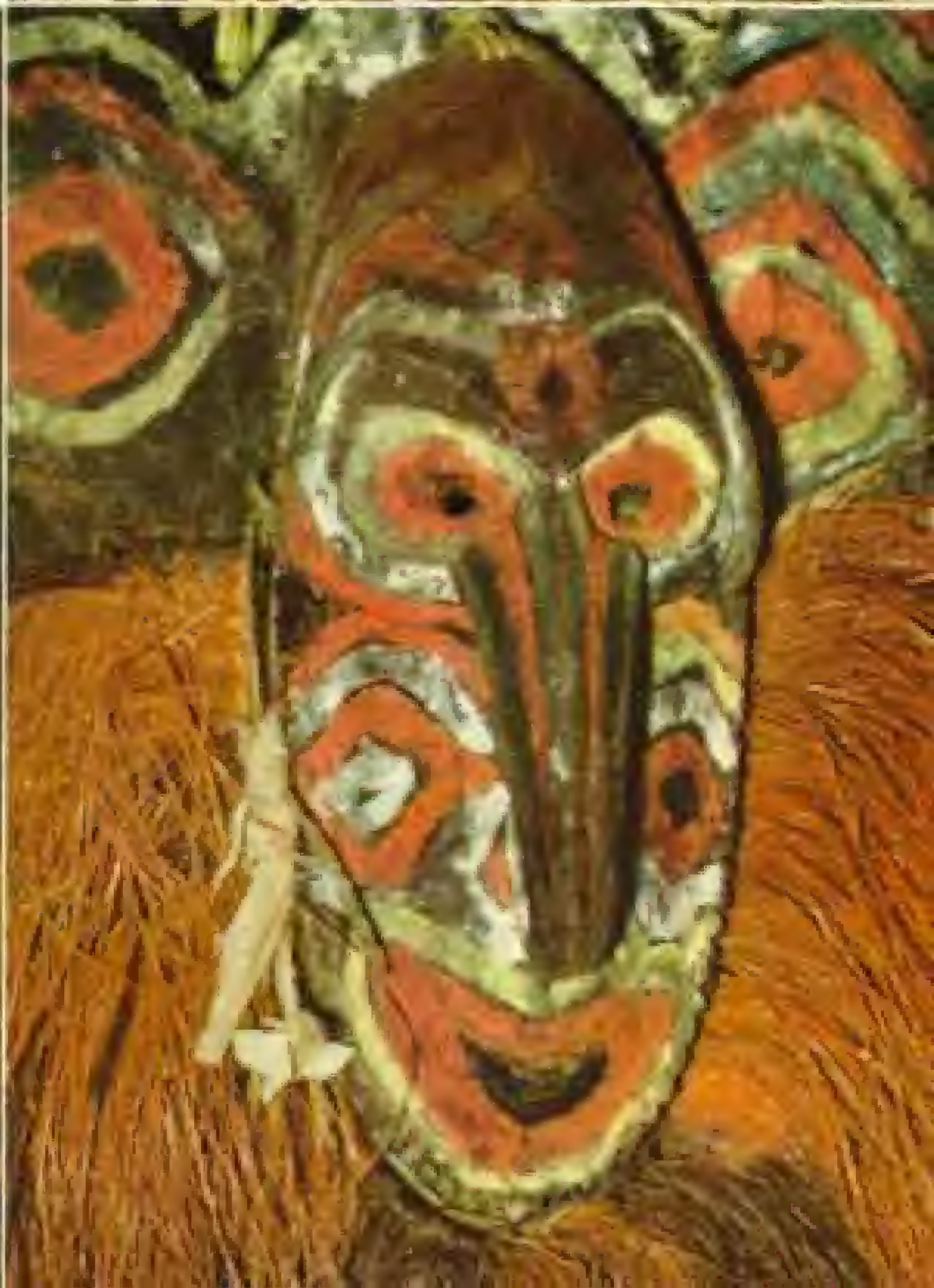
In the habel of dialects throughout New Guinea, pidgin English serves as the universal language. The author reports that Sepik people showed a remarkable thirst for learning. His carriers often held impromptu classes in writing.

↓ False Faces Show a Clownish Mood

With cutout eyes and mouth the mask at left covered the face of a witch doctor. Big ears and a beard of coconut fiber distinguish the other mask. Both carvings were collected in the Sepik-Ramu swamplands.

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Illustrations by E. Thomas Gilliard





← Shells Are as Jewels to a Sepik Girl

Gregory Bateson, an English anthropologist who lived in the area for several years, described in his book *Naven* the difference between Sepik men and their wives. Men, he said, "behave almost consistently as though life were a splendid theatrical performance—almost a melodrama—with themselves in the centre of the stage. The women behave most of the time as though life were a cheerful cooperative routine in which the occupations of food-getting and child-rearing are enlivened by the dramatic and exciting activities of the men."

This 12-year-old girl prepares to wed a man who has three other wives, an arrangement that suits her perfectly, since the older women will share the heavy burden of work. Her robing room is divided among five families at Malingsai village. Out of camera range, female relatives sit laughing, chewing betel nut, minding some 30 children, and tending smudge fires.

An uncle helps the girl into her shell ornaments. These are valued as money in the Sepik area.

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Paradise Plumes Form → a Bride's Eye Patch

Virtually everyone gets married in the middle Sepik Valley. A man cannot manage his affairs without a wife; there are no careers for bachelor women. This girl's marriage may have been arranged by her parents, though romantic love is not an unacceptable reason.

After marriage the bride will rise before dawn with other matrons and set out in her canoe to catch fish and prawns and gather watercress. Every third day she will visit bush natives to trade her surplus harvest for sago.

Here on the threshold of a new life, the girl wears a neck ring of gold-lip shell from the Gulf of Papua. Cowrie shells stud the cap and cape. The Lesser Bird of Paradise covers her eye.

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✦ **High Finance Among Sepik People:
Father Counts the Bride's Price**

A man must be well off to afford a fourth wife. He pays more for her than for his other spouses, insisting on putting up a large price in order to display his wealth.

Here a fortune is laid out on the floor of the man's house to be tallied. Mother-of-pearl crescents lie alongside snail shells daubed with red. Black tortoise-shell ornaments are part of the purchase.

Ten pounds in Australian currency also changed hands at this affair. After the deal was completed, the treasure was taken to the bride's house and attached to a fence. Women then shouldered the display and paraded it through the village. They were accompanied by crones and old men who waved flaming torches and ran screaming among the spectators to frighten demons away from the fortune.



✦ **A Woven Bird
Joins the Dowry**

Cassowary feathers encircle the image, which sits on a snail shell.

✦ In the manner of auctioneers, men drum out the bride's price on a slit gong. Each strike represents an item of purchase. Sticks keep count.

© Kodachrome by
E. Thomas Gilliard

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↑ **Proud Parents Dress Small Daughter for Her Debut as a Dancer**

Father carries on his waistband the fur of the flying fox, an adornment permitted only to the successful head-hunter. He took a life 25 years ago at his initiation into manhood. A criminal, war prisoner, weakling, or unwanted infant was the likely victim.

↓ **Sepik Matrons Wear Their Finest as Baby Sitters at a Sing-sing**

Woman at left uses lime and ashes as her make-up. She covers her bald head with a hat of golden cuscus fur. Beads and shells veil the other. Both women served at a social affair where young men and women locked arms and danced in the manner of a chorus line.



A handsome man of about 55, with a great aquiline nose, Avaran was patently proud of his tasseled lime stick. Made of human bone, it was carved to resemble a cassowary; with its tip he would draw lime from a gourd and mix it on his tongue with hot-tasting betel nut. This confection, capable of giving one a mellow sense of well-being, seems to be New Guinea's substitute for alcoholic beverages, which the tribesmen do not brew.

Avaran was concerned less with the stick's utility, however, than with its significance: each tassel meant he had taken a man's life. In local pidgin the saying went: "Man i no save kilim man i man nating"—a man who hasn't killed another just doesn't rate.

Slaying Marks Puberty Rites

At first I was rather impressed by the rugged past of such head-hunters as Avaran. But as I learned more, deglamorization set in. At the age of 12 or 14, it turned out, the boy would have faced initiation into the men's cult, with its requirement that he kill. He would be led to the clearing in front of the spirit house, where the important men would be gathered.

There he would confront a bound captive, some hapless victim of any age and either sex, sometimes an idiot obtained through barter from another village, and be forced to perform the ritual murder. If he proved unable, a relative would be permitted to guide the steel or bamboo blade.

As part of the puberty rites, the boy would endure some two hours of torture as three men "beautified" him by cutting slots in his back and shoulders, stomach and arms, filling them with dirt to make the scars bulge.

Nor was the actual head-hunting, in most instances, any more admirable. Plunging from ambush along the river, a band of screaming Kanganaman warriors in their war canoes would race after some peaceful travelers. It was strictly no contest. Like a cat playing with a crippled mouse, the pursuers would overtake the fleeing dugouts, howl, brandish their spears, then at length close in for the kill. The fact that, more often than not, the victims were women and children did not seem to dull their jubilation.

I had reason, however, to be grateful in the end to old Avaran. For many weeks we had been hunting the elusive Twelve-wired Bird of Paradise. I had seen the male at a spot two miles downriver and had recorded

its whooping, crowlike voice. But I had failed to locate any trace of the female.

One day Avaran walked into camp smiling from ear to ear. He had found the nest we wanted. We were frankly incredulous. Our hopes had been raised and chilled too often. But we followed him through a ghastly swamp covered with puddles of stinking slime and infested by swarms of aquatic insects and by even less attractive snakes.

There in the middle, low on a nest of dead leaves near the trunk of a pandanus, sat the female Twelve-wired Bird of Paradise. Overjoyed, we pushed on through the muck and made our way stealthily to the base of the tree. Steadying a pole in the ooze with four pairs of hands, we sent aloft one of our best climbers, Mava. From his perch well above the nest he reported that it held two eggs!

We had Mava cut away a few of the needle-edged leaves to permit later photographs of the incubating bird, then withdrew to a little island of mud 30 feet distant. Here we built a wall of palm fronds to serve as a blind.

The crucial moment had arrived. Could we get a picture of the female approaching its nest? If so, it would be the first ever obtained, just as this would be the first nest of a plumed bird of paradise any ornithologist had ever located. To Avaran it meant winning the Kanganaman sweepstakes. To me it meant virtual success for the expedition.

Certainly, thanks to the electronic flash equipment from the National Geographic Society, we were well prepared to do the job. To mount our speedlights, we drove poles into the ground 35 to 40 feet from the nest on either side. On them we placed the lights, which were in glass-fronted boxes. At the blind we rigged a 35-mm. camera with a 16-inch telephoto lens (page 467).

Photography at Its Hardest

Maneuvering all this gear into position would have been no picnic even without the rain, the mosquitoes, the mud. Always I had, too, the nagging awareness that we were dealing with one of the wariest of birds. Closely related to the crows, birds of paradise are quite as wily. Our only hope lay in the fact that the telephoto lens and the mirrors behind the electronic lights had allowed us to set up our suspicious gadgets no closer than 30 feet from the nest.

With everything ready at last, I squatted in the mud and waited. And waited. Finally,



← Lesser Bird of Paradise Trails a Golden Plume

Page 462: Unlike males of other birds of paradise, *Paradisea minor* loves company. Each morning and evening he joins others of his kind in a favorite wood, there to posture and preen in a stylized dance of love.

Individuals stimulate one another with raucous huzzing and crowlike calling and mowing. They hop about with heads bent into a crook and wings stretched at right angles to the body. Finally they elevate long flank plumes in a lacy cascade.

As the males promenade, females watch admiringly.

Fashion at the turn of the century demanded bird-of-paradise feathers for ladies' hats and fans. Get-rich-quick hunters swarmed to New Guinea, the only home of the 18 species of the plumed birds of paradise. In 1924 some 80,000 skins were exported; probably more than half were of the **Lesser Bird of Paradise**. International decrees forbade the traffic after that year.

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Black Network Caps This Bird of Paradise

Wilson's Bird of Paradise lives only in the hill forests of Batanta and Walgea Islands, west of New Guinea. Isolated from its ancestral stock, the bird developed individual characteristics such as naked head and red-splashed wings.

Diphyllodes republica shares with its cousin, the Magnificent Bird of Paradise, the iridescent-green vest, sickle tail, and courtship ritual (page 478).

All vanity, the wild bird trims jungle leaves to set up a spotlight from the sun. The show begins when he whistles and gurgles, expands plumage, and prances up and down the vertical perch like a gymnast. His audience, a drab brown female, never seems to applaud.

This male, shown in two views, is a captive. At left he leans down to clean debris from his courtship stage.

Reproduction by E. Thomas Gilliard



when I had almost despaired, our quarry came. Skimming low over the swamp's dark expanse, she flew to the base of the pandanus, swooped upward through a space relatively free of brush, and landed on a big leaf.

After perching stock-still for several seconds, she picked her way cautiously toward the nest. Just as she was about to settle on the eggs, I fired (page 468).

The brilliant flash of light, four feet in diameter, startled her, but did not, to my surprise, drive her away. Encouraged, I took half a dozen more shots. Some of these flushed her, some she ignored. But even when she flew away, diving down toward the marsh's substage of aquatic vegetation, she always returned.

When we at length trudged back to camp, I knew that, barring accidents in developing our film, we had a new feather for our caps.

Trapped by Floating Grassfields

From Kanganaman we now began to branch out on photographic and hunting expeditions. On one we traveled six days by motor dinghy, visiting many places, including Aibom at Chambri Lake, center of a unique and still-flourishing pottery industry. Coming back, we were threading our way through endless grassfields when the winds veered and blew the floating vegetation athwart our channel, closing it around us like a zipper.

We tried to act calmly, though the situation was far from good. We couldn't help remembering the plight of the *African Queen*, of fiction and movie, trapped in just such a swamp on its voyage to an inland lake. The sun burned down on us, the insects swirled around, the oven-hot grass pressed in relentlessly on all sides. Well out of sight of land, our two tiny craft piled high with photographic and collecting equipment but with precious little food, we wondered whether our end would be as fortunate.

We were lucky. The wind lessened and shifted just enough so we could fight the boats through the dense grass to an inlet before the noose tightened irrevocably.

For our next journey, to Gaikarohi, we chose two of the low-slung dugouts favored by the Sepik natives. Laden, these boats have only two or three inches' clearance above the water at the stern. The after section is shaped like a square-bladed shovel, so that a man standing in the stern can, with only a few strokes, sweep it clear of rain water.

In an area with 80 to 100 inches of rain a year, this is important.

On the dugout's tail gate the natives place a clay plate and light smudge fires to discourage the insects. As a flotilla of these fragile craft snakes single file through the swamp, it looks like a moving tube of smoke.

Our route took us through dark corridors of vegetation cut by the natives. These water trails, usually 6 to 10 feet wide, sometimes narrowed so that our gunwales brushed each side. Above, thickly matted leaves of sago palm, studded with three-inch spines, all but shut out the sky.

From the tangle of fallen tree trunks around us would rise occasionally a flight of Crowned Pigeons. Largest in the world and very beautiful, these pigeons seem doomed to extinction by their own stupidity. When one of the flock is shot and injured, the rest hover sympathetically around, making it easy for an unscrupulous hunter to kill them all.

Another swamp creature now increasingly hunted, but a little better able to protect itself, is the crocodile, a beast to which we devoted considerable thought as we paddled and ducked and poled through its haunts.

Two species are found in New Guinea. One, the fresh-water crocodile, lives by the thousands along the Sepik. Though it grows to large size, it is believed to attack only rarely. The other is the salt-water crocodile, much heavier and much more ferocious.

Sepik Boys Tread for Crocodiles

Most crocodile hides are now brought in by hunters using jack lights. But Sepik boys, I was told, still engage in one of life's most dangerous sports: treading for crocodiles. When the river is low and the swamps tend to dry up, the habitat of the fresh-water crocodile shrinks and becomes quite congested. Then strings of natives walk through the muck, sometimes in water up to their necks, feeling with their feet for sleeping crocodiles as we would tread for clams.

When a boy touches a crocodile, he signals the others. They converge on him stealthily. He prods cautiously about with his toe, trying to locate the reptile's head. Then he ducks under water and probes for its eyes.

This is the dangerous part. He must place his fingers under the crocodile's jaw in such a way that he can simultaneously clamp each thumb hard into an eye and hang on until his companions lift both him and the reptile



In the Wilds of New Guinea, the Purple Gallinule Abides Without Fear of Shotguns

This **Swamp Hen** walks on buoyant vegetation, feeding on mollusks and berries. Occasionally *Porphyrio porphyrio* hops on a bush to survey a passing canoe. Red head shield may play a part in courtship.

clear of the water. As long as he keeps his thumbs in the eyes, the creature will freeze and play dead. But if the boy's friends take too long or prove too weak to hoist him and the beast, he will have to break off and come up for air—and the fun will begin.

Again, if the boy has made the mistake of treading on a salt-water crocodile instead, he will remember it as long as he remembers anything. For the seagoing type refuses to play possum. It resents having someone gouge its eyes, and it knows how to express its resentment.

Gaikarohi Preserves Old Customs

Gaikarohi took us some five hours by canoe and on foot. It is northeast of Kanganaman. We found the village perched on a tiny island which rose above the flood plain a scant one to five feet. To our surprise and elation, we discovered that Gaikarohi boasted four spirit houses, one apparently quite ancient and well preserved.

The man responsible for keeping this house and the tribe's time-honored customs largely intact was Soatmeri, an old head-hunter of considerable prestige (page 448). During the last war his village had been occupied by Japanese soldiers who infiltrated overland from Wewak; yet he had maintained his *uluwai* status and had resisted the impact of an alien culture.

His splendidly beautiful dwelling house testified to his integrity. Laced to the primary rafter hung a series of bark sheets several feet tall. Flattened, painted in curious designs, they formed a system of totemic signs and "memos." Old Soatmeri, pacing in front of them, read them off for nearly 20 minutes, pausing only once in a while as his memory seemed to waver and he turned to his 18-year-old son for prompting.

Just as remarkable as these bark paintings were two carved hardwood panels we found at the far end of the house. Skillfully painted and rubbed to the smoothness of ebony, they stood about six feet tall and two feet wide. Oddly surrealist, their design seemed to consist of dozens of skulls, eyes and mouths agape, seething together like so many spermatozoa (page 444).

Beneath these panels women were weaving skirts from yellow fronds of sago bark, larding the sago's gray gelatin onto wooden platters, drying some of it in earthen dishes for trade along the river. Later they might bar-

ter some of this preserved sago for bamboo tubes stuffed with little roasted prawns.

Gradually aware that we were interested in photographing rather than purchasing native treasures, Soatmeri brought out the true prizes—long-nosed initiation masks sheathed with cowrie shells, carved mother-of-pearl disks, and human hair; plaited masks and figures of all sizes, daubed in yellow, white, and blood-red; and, finally, the gem of the collection, a Sepik skull.

This awesome object lay in a bark basket with twin handles. Separating them, we gazed down at the blind eyes and expressive mouth of a dead man. His face had been modeled in clay; only the top and back of the cranium attested to the authenticity of the foundation. Once he had gone confidently into battle; now he hung as a trophy in the house of his enemies.

Up in a loft guarded by glowering phallic figures I came upon other wonderful items: a woven crocodile through which terrified boys were forced to crawl in the ceremony of rebirth; skirted bodies that would bear, as heads, the modeled human skulls; salaciously carved flutes and pillows; models of birds swinging from long elaborate chains.

Off in one corner reposed a water-suction drum shaped like a big garbage-can lid. Clapped down on mud or water and then drawn upward by a dozen powerful arms, it would produce a mysterious, bloodcurdling noise.

To Telefolmin at Last

Late in March, after three months on the Sepik, we decided at last to strike out for Telefolmin. On our way downriver we ran again into the gruff old captain of the *Glenidle*, Johnny Young. He admired the birds we had managed to collect, but had his doubts about our next objective.

"Telefolmin?" he said to Margaret. "Well, ma'am, you'll never make it."

After a stormy voyage westward along the coast we landed at Wewak during an earthquake, making a run through the surf in a small boat. The shore seemed uncommonly unsteady when we landed.

Wewak is situated on a little spoon-shaped peninsula, its handle merely a narrow causeway from the mainland to the round chunk of land on top of which sit the Government buildings, stores, and private homes. As ex-Wing Comdr. Robin Gray in an old truck

drove me up the hill, I could feel butterflies fluttering in my stomach, so much depended on the news I was about to receive.

At the office of the District Commissioner, however, Mr. Sydney Elliott-Smith gave us welcome reassurance. Telefomin was again safe, he declared cheerfully. I should take five armed men with me, just to be sure; but things had quieted down so much that it would be all right for Margaret to come along with me, too.

Less optimistic were reports of flying conditions. It had recently taken 17 abortive flights into Telefomin to land—on the 18th try—a single load. Our own first chartered mission carrying food and gear had to turn back after four futile hours. Next morning, however, our freight broke through, and we ourselves followed in a Norseman of the Gibbes Sepik Airways with Dave Grace at the controls.

Across the Prince Alexander Mountains we labored. Below, industrious bushmen had cut the forested ridges into so many notches they resembled a rip saw. Stretched across the giant teeth, between the high trees, were intricate nets to catch the huge flying fox, earth's largest flying mammal. Unbelievably abundant in this part of New Guinea, this bat is considered a great delicacy.

Our plane droned on over an interminable sea of bamboo-sized cane, innocent-appearing from



Author Sets a Camera Trap to Catch a Jungle Secret

Triggering an electronic flash lasting only 1/5000 of a second, Mr. Gilliard freezes the motion of a bird on the wing so that the picture will show it at a standstill in mid-air. He makes photographic history by using for the first time in the jungle a remarkable speedlight spotlight, here seen mounted on three peeled timbers. A reflector within the box throws a beam four feet in diameter for an effective 40 feet. Telescopic lens on a tripod brings the image, brilliantly illuminated, up close. Power packs on the ground step up energy from batteries. Dr. Harold E. Edgerton of the Massachusetts Institute of Technology, who received The Society's Burr Prize for his electronic achievements, designed the special spotlights for the expedition.





← **Plumed Bird of Paradise Sits for Her First Nesting Picture: Highlight of the Expedition**

All plumed birds of paradise are polygamous. Females build the nest, shoulder chick-rearing duties. Their philandering mates continue a gay round of courtship.

This **Twelve-wired Bird of Paradise**, which scientists call *Selenicodes ignotus*, keeps house amid the saw-toothed spears of a palmlike pandanus, where she guards two eggs. She is the first of the plumed birds of paradise ever to be photographed on a nest. As the dowdier of her species' sexes, she lacks the male's 12-wired crest.

To get his extraordinary picture, Mr. Gilliard built a palm blind 35 feet from the nest. Then, working from a ladder set deep in swamp water, he climbed up and chopped foliage obscuring the view. The Edgerton speedlight made the picture possible.

Page 468, lower: Unlike his North American cousin, New Guinea's **Wood Kingfisher** scorns fish. He dines almost exclusively on lizards, salamanders, and centipedes. In an apparent demand for such delicacies, baby birds gurgle constantly. The noise often betrays them.

Melidora macrorhina jobiensis does not voice the silly bray of its close relative, Australia's laughing jackass.

↓ **Honeyeater Has a Crimson Ruff**

When hunting nectar, tiny *Myzomela rufenbergi* scrapes flowers with brush-tipped tongue and, in passing, gulps any insect working on the same task.

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this altitude, but, as I knew from all too intimate acquaintance, a deathtrap to anyone forced to crash-land. Clouds closed in. Only a few ranges thrust their rugged shoulders through the cotton wool. Grace turned east around the western terminus of the Mittags, dropped below the clouds, and followed a wooded gorge.

The terrain suddenly flattened, the forest parted, and there before us lay the Telefomin clearing, the tiny grass airstrip cleared by American paratroopers as an emergency landing field. Beyond, as a warning, loomed the wall of the Victor Emanuel Range which Charles H. Karius and Ivan F. Champion had finally succeeded in crossing in their arduous expedition of 1927-28. Beneath us lay three neatly arranged little villages, and from a stockade waved the Australian flag.

As we climbed out of the plane, Assistant District Officers Frank D. Jones and Alec Zweck, and the medical officer, Berney Gobel, greeted us. We were assigned some police boys, given a bamboo house, and told not to wander off without permission. One of the culprits in the original massacre had

Expedition Guards Keep Loaded Guns on Shoulders

While the author and his wife were in New Guinea, head-hunters murdered two white patrol officers and two police boys at Telefomin. To visit the massacre area, the Gilliards had to accept a police escort.

Only men live in this barnlike structure; women and children occupy the huts.

Page 470, lower: The defiant leader of the murder band stands handcuffed to a companion. Two men at right confessed taking part in the killings. More than 100 stood trial at Wewak; 19 were sentenced to 10 years at hard labor.

♦ Jawbones of sacred pigs wall a house timberan in the Telefomin area. Two bags at top contain human skulls. Stone disk in man's hand resembles Melanesian form of money.





just escaped from the stockade, said Jones, and others had still to be caught. All the available beaters were being used by police search parties.

Whiling away our time in camp, I became friends with the local leader, Femsep, a man with an impressive knowledge of wildlife and a startlingly good memory. When I spread out a wide assortment of bird photographs, including those published in one of my earlier articles in the NATIONAL GEOGRAPHIC MAGAZINE,* Femsep ilabbergasted me by identifying nearly all of them.

A few of the illustrations particularly excited him, and he kept repeating the native names for these birds of paradise. I understood "inem" for the King of Saxony, "blak-blak" for the Sicklebill, "trang" for the Superb.

When he came to a picture of the Ribbon-tailed Bird of Paradise, he put his finger on the long white tail and said that no such bird in his area had this plumage, but there was one called the "dan" which had the same kind of body.

I nearly jumped. His description fitted the *Astrapia*, one of the rare genera of birds of paradise which had taken to the high peaks of New Guinea. In geographical isolation they had evolved along many different lines. Some now had white tails, some broad black ones, some small, others large. All were exceptionally beautiful. What would Femsep's dan look like?

I gazed at the lofty crests of the mountains surrounding us. To the east, 200 miles off, lay the home of the fabulous Ribbon-tail; far to the west, the little Splendid. The zoologically unexplored area between was my goal.

There, too, we might find still another collector's item. Femsep from time to time had spoken of a "komdimkait." This name meant nothing to me. But from his explanation I gathered that it was a blackish bird with ornaments about the head, and that it lived

"long ples cold osem inem." In short, we might expect to find it in the same chilly mountain forests where the King of Saxony held forth. At once I passed the word that the komdimkait would be worth ten times its weight in axes, knives, tobacco, and matches.

This offer brought some unexpected dividends. Stimulated, the natives brought in reports, not of the komdimkait, but of other birds in which we were also keenly interested. A series of short expeditions took us to such places as the sing-sing ground of Queen Carola's Six-wired Bird of Paradise (page 479) and to the dance ground of the Lesser.

Golden Bird Dances Like Fireworks

The Lesser's display proved to be the finest spectacle an ornithologist could hope to behold. Four to ten birds in full regalia put on a group performance on a ridge two miles southwest of Telefomin (page 462).

Extending their wings straight out from their sides, their heads lowered in a reptilian crook, they would begin cawing. Gradually their flank plumes would rise straight up over their backs, exposing others that looked like a brilliant sparkler spewing flame. The stiffened wings would beat in short, spasmodic strokes, and in violent disarray the golden birds would strut and jump around, bowing and wiping their bills. We tried for days to photograph this sight and failed. But just to see it was almost reward enough.

As we came to know Femsep better, he made it possible for us to visit some of the villages near Telefomin. One house especially intrigued us. A picket fence barred it from entry by any but the elder tribesmen; Margaret, for instance, was permitted only to make watercolor sketches of it from a discreet distance.

One day, however, Femsep obtained permission for me to go within. Clambering up a 15-foot ladder, I groped through a small round door into the dark, misty interior.

Soon I made out several openings through which the daylight filtered. Set at shoulder height for a smallish man, they were clearly designed as arrow slits, and they commanded admirably the approaches to the village. The walls themselves were lined in curious fashion with row after row of bones, mostly jawbones and skulls of pigs (page 471).

* See "New Guinea's Rare Birds and Stone Age Men," by E. Thomas Gilliard, NATIONAL GEOGRAPHIC MAGAZINE, April, 1953.

★ New Guinea's Raucous Rainbow Stages a Spectacular in the Jungle

From sea to mountains, 46 species of lorises, parrots, and cockatoos inhabit the island's forests. Some large members of the family carry sickle-shaped bills capable of reducing hardwood to shreds. Others, the size of finches, trail spine-tipped tails that aid them in climbing. Walking up a tree, they suggest the woodpecker, a bird curiously lacking in New Guinea. This **Coconut Lory**, *Trichoglossus haemateros*, is a foot long.



† Remote, Misty Heart
of New Guinea: the
Victor Emmanuel Range

← Moss, sometimes several feet thick, blankets every surface of the cold rain forest, sopping up cloud moisture like a sponge. The author found that a towel could absorb considerable drinking water from these massive clumps.

Here a hunter fights his way through a tangle on 10,000-foot Mount Hal, summit of the range. Mr. Gilliard climbed within 1,500 feet of the peak over a mat of roots and rotting logs that concealed plunging fissures in the limestone.

→ Page 475: Flowers of the forest: an orchid (left), believed of the *Glomera* genus, and a double-starred *Roya*, climbing shrubs of the milkweed family.



In the center of the house hung two little bags. Sure that they contained human skulls, I wanted to examine them. But one glance at the Telefolmin "big pygmies" squatting on the sidelines and following my every move with stolid but somehow ferocious gaze made me abandon the notion.

On the floor lay shields, elaborately carved and painted, and round flat stones punctured by holes. These stones certainly resembled Melanesian money, but I thought it more likely they were a kind of combat ax.

As interesting as anything in the great room was something no longer there. Immediately to my left I glimpsed a section of the wall conspicuously bare. It was obvious that some important item of the house's decor had been very recently removed.

I wondered even more about it after Margaret made her report. While I had been photographing the interior, she had been sketching a dwelling near by. Noticing a large bag that hung far back in a corner and bulged mysteriously, she started to investigate it. At once the women who had allowed her to enter set up a hubbub and leaped at her.

She never did find out what was in the bag, nor did I discover what had been snatched from the big house. But we did know this: the dwelling belonged to one of the big men who was the curator of many highly coveted skulls.

Expedition Probes Hindenburg Range

One day, at long last, a shambling file of wild-looking men, guarded by police with drawn bayonets, marched into camp. Among the prisoners strode a young man carrying a rusted rifle captured by the natives who had ambushed Szarka. Here were the last of the men the police had been seeking since the Telefolmin massacre (page 470).

We were glad they would be brought to justice in Wewak, but, frankly, even more glad that their arrest would now release us to push off from our Telefolmin base into some of the most exciting country in the world. Only one other scientific expedition—the party led by Richard Archbold for the American Museum of Natural History in 1936—had ever attempted to probe this country. It was unsuccessful. Promptly we chose carriers and organized our line of march, ammunition at the head, medical gear at the end, and other material strung out toward the rear in descending order of importance.

Moving south, we dropped 1,000 feet into the Takin gorge, crossed a precarious bridge of vines hung above angry white water, climbed a small mountain, and moved down into the valley of the Nunk River. From there we began the long ascent of the Hindenburgs, the range which divides the watersheds at the very heart of New Guinea.

Only one man, Laurie Nolan, had ever crossed this barrier here on foot, in 1952, and he had spent little time in the cold moss forests which were our target. On our left rose Mount Mabion, which marked the farthest point of penetration of the Archbold group, led by Dr. George H. H. Tate.

Searching for the King of Saxony

From odd crannies of the rugged terrain we were traversing would suddenly materialize gremlinlike natives who knew all the trails, visible and invisible, which spiderwebbed this area. Their advice guided us along key ridges and saved us from many a cul-de-sac. Always I would ask, "Inem i stop wer?"

At first the answer was usually, "Longwe tumas"—a very long way. Then "Lik lik longwe," perhaps 10 miles, and "A longwe lik lik," which means about a mile or two. Finally we heard what we most wanted: "Ples inem i klosta." The locale of the inem, or King of Saxony, was within half a mile.

Near the crest of the Hindenburgs we suddenly encountered a band of lighter-skinned savages searching for pandanus nuts. They worried us not a little, for this tribe had lost at least 10 victims in a recent boundary dispute with our Telefolmin natives. Moreover, they kept returning to our camp in larger and larger numbers. My anxiety was allayed only as I came to realize they were immensely curious to get a glimpse of Margaret, the first white woman any of them had ever seen.

When, a little farther on, we set up our base of operations at the top of a low pass, we faced what we knew would be our chief problem: water.

On this limestone roof there were no brooks, no springs, no running water, not even puddles at the bottom of the deepest draws. Here all precipitation immediately vanished through thin fissures into inaccessible chambers underground. Tarpsulins and army Lyster bags set up to catch the rain seemed to collect only a bitter, fermenting witches' brew. Each shower found the natives

(Continued on page 485)

Archer Hunts Dinner of Raw Lizards

Using three-pronged arrows and black-palm bow, this Telefomin forest man picks off birds with uncanny accuracy. Salamanders, frogs, fungi, pandanus nuts, tender grasses, roots, and grubs round out his meals. He joined the expedition as a bird hunter.

The bowman binds his hair with rattan strings and thin reeds; a dress allowed only after puberty rites. Once bound, the hair remains fixed for months.

✦ Author and Assistant Skin Rare Birds

Mr. Gilliard and his wife took 220 species and subspecies of birds, among them representatives of two new birds of paradise, for preservation in the American Museum of Natural History, New York.

Here Mr. Gilliard labels a **White Lored Flycatcher**; his helper skins a **Honeyeater**. Each specimen took about 30 minutes to prepare, weigh, and tag. A carrier tends fire to guard against the chill of the moss forest.

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Kodachromes by E. Thomas Gilliard
(right) and Margaret Gilliard

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♣ **Vain Suitor Preen**
for a Conquest →

Queen Carola's Six-wired Bird of Paradise spends much of his day brooding out of sight close to the ground. When females fly near, *Parotia carolar* dances to attract them into his harem. Dipping his head, he waves wire-shafted, flag-tipped crown feathers.

← **Paradise Birds**
Perch in the Jungle

Page 478, upper: The female **Splendid Bird of Paradise** dresses so drably that she appears to wear mourning. Elsewhere in the forest her mate, robed in iridescent red and bronze and sparkling green and blue, glitters like a Christmas-tree ball.

So rare is *Astrapia splendida* that the discovery of a new race of this bird of paradise proved a major achievement of the expedition.

Lower: **Magnificent Bird of Paradise** poses in cloak of gold, a dazzling costume for his song and dance. Ornithologists have named him *Diphyllodes magnificus*.







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← **Egyptian-style Hood Contains Hair, Resin, and 40 Scarab Beetles**

Page 480: Shell on forehead is a buller, so called because seashore dwellers use it to bail canoes. Green scarabs show beneath the hood's golden lattice. This painted warrior danced at a festival in Miramar valley, visited by the author on his way out of New Guinea.

↑ **Miramar Flute Players Patrol a Sing-sing to Placate Evil Spirits**

↕ Dancers admire a vivid ceremonial ornament lashed to a helmet of woven rattan. Once the owner has worn the towering gear to a special dance, he will leave it in the forest to guard an ancestor's grave. To touch it again means death.





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↑ Glowering Elders Inspect a Small Recruit

Every five years the people of Miramar valley retire to parklike clearings set aside for festival, song, and dance.

With them go provisions garnered over a year's time. Famine followed one sing-sing that consumed a thousand pigs.

For three months revelers dress in their party best. Plumes, fur, shell, and wooden jewelry adorn greased bodies. Aprons of braided strips of bark hang from belts.

In a thundering, drumming herd the people sway, perspire, and chant hour after hour.

In few other places in New Guinea do children take such an active part. This five-year-old gets final approval of his costume. Distended stomach is one result of his starchy diet.

← Festival Goes Swarm Past a Mission House

A tall dancer wears the paired tail feathers of the Princess Stephanie Bird of Paradise. He trims his hood with the skin and wings of the rare MacGregor's Bird of Paradise.

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**Pickaback Baby →
Cranes for a Look**

Watching the festival in Miramar, a visitor (center) wears crinkled leaves in his hair. The albino child hangs by a toehold on mother's bustle of cotton leaves.

Hidden from the camera, 400 men and women in 20 clusters shake the earth with their stamping. Plumes from some 1,500 birds of paradise wave in a sea of color.

**↓ Young Drummers
Wear Fiery Halos**

These painted miniatures of their fathers will beat the log drums far into the night until they topple over in sleep. Their red glass beads are imports from Europe. Plumes came from Salvadori's Greater Bird of Paradise. Shell neck rings would buy a month's labor.

© Kodachromes by E. Thomas Gilliland

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frantically filling little meat tins and boarding them against the day when we would run short altogether.

On the ornithological front, however, we had reason to cheer. We collected not only the bizarre King of Saxony, the Loria, the Mountain Sicklebill, the giant Sicklebill, the Superb, the Magnificent, the Wattled, the Lobed, the Lesser, and the Queen Carola Birds of Paradise, but 117 other rare species.

Our second day in camp saw one boy return from the moss forest with a bird that had me especially excited. It was a dan! Femsep had been right, for here was a "new" *Astrapia*, much like yet different from the species hitherto found only in the high peaks of Netherlands New Guinea.

Carefully I set down its exact description, studied it, and made it into a scientific specimen. Then I grabbed my shotgun. I needed another if I was to prove that this bird was not just a freak.

At the end of the third day, however, I had failed to find one. Half jokingly I announced that we would not break camp until we had succeeded.

It was not a completely popular decree. One and all, we hated this cold mountain bivouac. From dawn to dusk we plunged into the soaking, mist-shrouded forest, rewarded only by fleeting glimpses of our bird far off across some gorge. As soon as one of us trudged back to camp, another would take his place; we never had fewer than three guns in the field.

Finally, on the afternoon of the tenth day, our boy Rambur shot the second specimen. A male, in fresh plumage, it agreed completely in its characters with our first one. Clearly, the dan was a new race of the rare Splendid Bird of Paradise. In gratitude, we plan to name it in honor of the charming wife of District Commissioner Sydney Elliott-Smith, without whose unsparing efforts we would

never have reached these remote mountains at all.

But Femsep's kondimkait still eluded us. We hunted across to the headwaters of the Isam in the watershed of the Fly without success. Worse, the rain gods gave us a bad time, and during one crucial water-short period the boys even threatened to quit. In the end, deciding that the kondimkait might inhabit still higher terrain, we recrossed the Takin gorge and made for the virgin forests near the D'Albertis Dome, just under the crown of the Victor Emmanuel Range.

It was only a four-day trek. Yet it seemed as if we had traveled hundreds of miles. For here we found isolated populations of birds racially quite distinct from those we had just left in the Hindenburgs.

Danger Lurks Below the Moss Forest

We pitched camp below the western flank of Mount Ijal on a very steep slope shrouded in mist and blessed with an abundance of rain. The peak above us, which seemed to me to rise about 10,000 feet, offered alpine grasslands of sufficient height to lure us on. For it was at such altitudes on Mount Hagen and Mount Wilhelm that we had previously found our greatest ornithological rarities.

We cut our trails laterally along Mount Ijal's talus incline. Day by day we chopped them farther up the mountain as we hunted, aiming at a house-sized rock some four miles away which represented the uttermost elevation of this range.

Travel had its dangers. Our track snaked through the moss forest on hidden, knifelike ridges muffled with an unbelievable verdure of ancient origin. A matting of roots thicker than an inner-spring mattress covered the deeply fissured limestone, concealing rotten logs, crevices, and cliffs.

It was like crossing a ramshackle suspension bridge. Danger waited in crevasses of rock below, and several times one of us fell through the matting to his hips, saved only by vines caught between his legs.

Yet this was a fairyland, too. Clumps of moss and lichens, some as big as tents, mantled every limb, every tree trunk, every inch of the ground, interlaced with garlands of orchids in many sizes and colors (page 474). For these tremendous arboreal gardens all nourishment was drawn from the air; few roots of any sort groped toward the earth. Here was the world of the epiphyte.

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★ A Lion on the Field, This Warrior Does Not Awe His Better Half

Men fear and respect Miramar valley's leader, but at home he's just another husband with a virago on his hands. While he was reprimanding his nagging wife for stealing wood, she threw a yam at his head, breaking his handsome chin shield.

Plumes from the Lesser Bird of Paradise (left) and the Empress of Germany Bird of Paradise (center) wave from the crown. Cuscus fur bands the spear and trails beardlike from the chin.

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Circular Cottages in a Miramar Holiday Resort Wear Gay, Tasseled Hats

People occupy these huts only when attending sing-sings at festival time (pages 481-484). A 15-family unit, the house on left is half the length of an American football field, the author heard of one 300 yards long.

It seemed incongruous that birds of paradise, so brilliant and delicate, should live in such moist, gigantesque, subdued surroundings. They were as tiny jewels strewn about a cornfield. Nevertheless, we found here six more specimens of our new clan.

By the ninth day of our sojourn at this 7,500-foot camp, the trail we had hacked out toward Mount Ifal had become quite long. We set out at dawn. For six hard hours we slogged ahead, only to encounter a crevasse we couldn't cross.

Next day we returned on what proved our last chance to reach the summit of the mountain and to capture the elusive komdimkait. We attempted a circuitous detour of the crevasse and shortly ran into another barrier. Beyond, a ridge led directly to the bare rocky top, less than 1,000 feet above us. It might as well have been 10,000. Sadly we turned

our backs on Mount Ifal and began the long journey back to camp, where, I knew, Margaret awaited us with mingled anxiety and hope.

Our adventures in New Guinea were virtually at an end. We had collected 220 different species of birds, some of them rarities of the first magnitude. We had largely filled in the last great blank on the ornithological map of this dark, mysterious island.

True, we had failed to locate the komdimkait. But, after the first pangs of disappointment, I could not honestly say I was sorry. It will be a sad day for naturalists when the last shy unclassified bird is tracked down, preserved, described, and interred forever in a scientific treatise.

Would that there remained to be found a thousand komdimkails on a hundred hostile, untouched islands!

Australia's Famous Marsupial Sits on Its Tail, Fights Like a Man, Bounces Like a Steel Spring, and Graces a Coat of Arms

BY DAVID H. JOHNSON

Acting Curator of Mammals, National Museum, Smithsonian Institution

IN 1629 the Dutch ship *Batavia*, carrying immigrants to the Molucca Islands, was blown far from course and smashed onto Houtman Rocks off western Australia.

While the vessel's master, Francis Pelsart, was away seeking help, a band of cutthroats among the crew murdered many of their fellow castaways, stole the ship's chests of silver coin, and plotted to seize the relief vessel for a career of piracy.

Forewarned, Captain Pelsart on his return managed to outwit the mutineers. He summarily hanged all but two, who were abandoned on the mainland of Australia.

White Man Meets His First Kangaroo

The story of Captain Pelsart's grim experience might well be forgotten today were it not for the description in his journal of a strange animal he encountered in abundance on the rocky islets where he suffered shipwreck.

"A species of cats," he called it, adding that it was about the size of a hare, with a head resembling that of a civet cat, a long tail, and very short forepaws like those of a monkey.

"Its two hind legs, on the contrary, are upwards of half an ell in length, and it walks on . . . the flat of the heavy part of the leg . . . it sits on its hind legs, and clutches its food with its forepaws, just like a squirrel or monkey," he wrote.

Today's naturalists find this report singularly interesting, for it is the first authentic account of any member of the kangaroo family. Indeed, so accurate was the Dutch seaman's description that his animal could be identified three centuries later as the Tamar wallaby, a small member of the kangaroo clan.

Oddly enough, the wallabies were the first of the kangaroos that I met when I, too, went to Australia. Before leaving the land down under, however, I made the acquaintance of many another member of this clan.

As mammalogist for the Arnhem Land Expedition,* sponsored by the National Geographic Society, the Smithsonian Institution, and the Australian Government, I wanted

especially to study the kangaroos, the largest and most spectacular of the native Australian land mammals.

Kangaroos are vigorous modern members of the ancient order of animals known as marsupials, which take their name from a Latin word meaning "pouch." The ones we know today carry their babies in pouches on their bellies.

Long ago, during the later days of the dinosaurs, the marsupials were common mammals. Eventually, in most places, they were superseded by the more advanced animals that dominate the earth today—the placental mammals that bear their young so well developed that they do not need pouches for protection.

But in Australia, cut off from other continents ages ago, advanced types of mammals were excluded, and the marsupials continued to prosper.

As a result, the continent remained a kind of natural zoo of primitive mammals, including not only the marsupials, but such oddities as the egg-laying platypus.†

Kangaroos Come in Many Sizes

Kangaroos lacked competition from hoofed animals such as deer, antelope, and bison, and had few enemies; thus they developed into a multitude of types. Today they occupy many kinds of environment: some climb trees (page 495); some bound gracefully among rocks and cliffs with the sure-footedness of a chamois; some prefer swamps; some take kindly to the desert.

We have counted more than 50 species. They range in size from the musky-rat kangaroo of Queensland, little more than a foot long, to the great red kangaroo of the plains, which sometimes towers 7 feet (unlike humans, male kangaroos continue growing after maturity). All of them live in Australia and

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Exploring Stone Age Arnhem Land," by Charles P. Mountford, December, 1949; and "Cruise to Stone Age Arnhem Land," by Howell Walker, September, 1949.

† See "Australia's Patchwork Creature, the Platypus," by Charles H. Holmes, NATIONAL GEOGRAPHIC MAGAZINE, August, 1939.



Australian Double-header: Joey Wallaby Surveys the World from a Fur Cradle

The kangaroo family has 50-odd members; some are called by other names: wallaroo, wallaby, euro, and pademelon. They range from the foot-long musky-rat kangaroo to 7-foot roos and great grays. Long thick tail serves as a stool for this pretty face wallaby. As a pouch carrier, she is distantly related to the American opossum.



Baby Listens In as Great Gray Kangaroos Hold a Family Conference

The kangaroo moves with a curious gait. He balances on forearms and tail and swings long hind legs forward under the arched body. On the run, hind legs carry him in bounding leaps (page 496). Powerful shoulders identify animal on right as a male. Joey's legs as well as head project from mother's pouch.

adjacent islands; indeed, marsupials are found nowhere else except for the opossums and their relatives in the Americas.*

These grazers and browsers are grouped roughly according to size and shape. The large fellows of the coast and plain are well known as kangaroos. Creatures of distinction, they stand proudly alongside the flightless emu on the Australian coat of arms.

The heavy-set climbers of the hills are wallaroos and euros. The middle-size, shy members of this vast, bouncing clan are labeled wallabies and pademelons. The little ones are rat kangaroos.

Whatever the name, they all are kangaroos. They all belong to the family Macropodidae, meaning "long foot," and all use their overlong hind legs to make the spectacular leaps for which they are famous.

Most widely known of the lot is the great

gray, or forester, kangaroo of the open woods and brush country of eastern and southwestern Australia. Affectionately known as "Old Boomer," as are the other large male kangaroos, he is the species you will most likely see in the zoo.

Old Boomer Carries His Own Stool

A large male gray, rearing up on his tripod of massive tail and powerful hind legs, can look over a man's head, and he may weigh up to 200 pounds. Bushmen claim that the great gray can bound 20 feet at a time and spurt to speeds of 30 miles an hour (page 500). He can escape most enemies, although a horse can outrun him on a long stretch.

This almost silent creature—he has only

* See "Br'er Possum, Hermit of the Lowlands," by Agnes Akin Atkinson, *NATIONAL GEOGRAPHIC MAGAZINE*, March, 1933.

a rasping cough or grunt for a voice—is not overly blessed with intelligence. Sometimes he will dash madly against a fence or try to go through the wires, when he could with ease jump over.

The gregarious grays live in "mobs" that feed on vegetation early in the morning, late in the evening, and at night. During the heat of the day they rest, their mouse-colored coats blending into the tall grass and bushes so that they are difficult to spot. When they rise to scratch, play games, or watch an intruder, the "old man" of the mob may be distinguished by his greater bulk and massive shoulders (page 489).

Kangaroos spend long periods washing cat-fashion, licking their forepaws and running them through their fur.

They are timid creatures. One moment they may be wallowing peacefully in "nests" of sand or grass, or perching on their mulish haunches in the shade, twitching rabbitlike noses. The next moment they may be scattering in every direction, panicked by the

alarm thump of a nervous doe who has caught sight of a wedge-tailed eagle circling high above.

Although by nature kangaroos are gentle vegetarians, an old man will stand his ground when cornered by dogs, or he will battle another male viciously for the privilege of being boss of the mob.

Fighter Packs a Kick Like a Mule

For fighting, kangaroo forearms seem underdeveloped, but the powerful five-fingered hands are skilled at feinting and clouting, and the apparently puny forearms can clutch an opponent in a merciless bear hug. A favorite stunt of the big fellow when beset by dogs is to wade breast-deep into a river, catch his tormenters as they swim out to him, and hold them underwater until their drowning struggles have ended. One story tells of an old boomer that dispatched six dogs in succession in this manner.

Young kangaroos love to spar, and the almost human manner in which they square

A Bumblebee-size Kangaroo Finds Food and Warmth in the Sanctuary of the Pouch

Blind and hairless, a joey of the largest kangaroo measures less than an inch at birth. Guided by instinct, he scrambles through belly fur into the pouch, using surprisingly strong forelimbs. Then he clamps his tiny mouth over a nipple and remains attached for weeks. Removing the suckling might rupture both mouth and teat. Aborigines believe the joey is born attached to the nipple. Right: Two weeks old and two inches long, the great gray still suggests an embryo more than a live birth. At maturity he may stand 6 feet tall,

Harner P. 1938



off and trade flurries of blows is a source of never-failing amazement. To some observers it seems that they observe periods of rest between rounds, almost as if they were in the prize ring.

But Marquis of Queensberry rules hold no place in a serious fight, when the old 'roo brings his hind legs into murderous play. Bracing on his massive tail, he unexpectedly lashes out with both legs. A long clawlike nail on the middle toe of each hind foot rips fur and flesh, and the savagery of the kicks quickly discourages all but the hardiest foes (page 497). Fighting 'roos even use their rodentlike teeth in the clinch, tearing at each other's throat and at shoulder muscles.

Captive kangaroos can easily be taught to box men in exhibitions. Chief problem of the trainer is to persuade the animals to forego their terrible kick.

A doe is smaller and slimmer than the old man, and exhibits the famous pouch from which often peers the alert face of a baby, affectionately called a "joey" by the Australians (page 498).

When Captain Pelsart examined his first wallabies more than three centuries ago, he quite understandably assumed that the young was born within the pouch. He believed that it developed from the mother's nipple, to which he found it so firmly attached. Even today some people of the Australian outback accept this explanation of marsupial birth.

The true story is almost as remarkable as Captain Pelsart's fancy. A kangaroo's joey is born in essentially the same fashion as other mammals, but at an extremely early stage of development. Even in the largest variety of kangaroo he is a mite of a creature—less than an inch long, blind, hairless, and so pink as to seem half transparent.

At this stage other mammalian infants are still being fed in the womb by means of the placenta, a marvelous structure through which nourishment is transferred from the mother's blood to that of the baby. But the joey's

mother has no true placenta. Thus when the infant has absorbed all the nourishment in the yolk sac that surrounds his small body, he must go in search of his mother's milk.

Young Joey Makes a Hazardous Trip

Once ushered into the outer world, the joey does not tarry long. Keen instinct urges him forward on his first and most critical journey in search of food and shelter. The momentary wait uses his strong and already clawed forelimbs, much better developed at this stage than the hind limbs and tail, to



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Old Man Red Stretches Almost 6 Feet for a Peanut

Though outweighed by the great gray, the red is the tallest kangaroo. Back and sides are a brilliant wine red. Smaller female is smoky blue. Owing to her grace and fleetness, Australians call her the blue flyer. These animals wander freely in a sanctuary.



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◆ Startled Kangaroos Stampede in Alarm

Civilization has driven most kangaroos inland from Australia's heavily settled east coast. In some parts of the interior, however, they compete with sheep, raiding grass, crops, and water.

Gregarious kangaroos live in mobs. A century ago mobs of 1,000 were common, but men and dogs have decimated their ranks to 50 or less.

Startled from midday dozing, this mob flees through eucalyptus-bordered fields near Lake Macquarie in New South Wales. Leg muscles like steel springs easily carry them 10 feet with each leap.

◆ When nervous, the kangaroo licks her forearms. The camera appears to disturb this mother more than her joy.

Ellen West





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Forepaws Guide Food ➔ to the Mouth

Out in the bush, nomadic kangaroos graze like sheep, nibbling grass close to the ground.

This captive wallaby holds food and consumes it slowly, as if savoring each bite. He is a strict vegetarian. Unlike, he washes his fur after each meal, licking the forepaws and running them through his coat. He may spend hours in preening. His friend (right) seems to beg for another helping.

Australia ships kangaroos around the world. In 1791, three years after the first British colonists arrived, a great gray was sent as a gift to King George III.

In captivity, the animal's diet must be watched to prevent a fatal jawbone infection.



clamber upward through the fur of his mother's belly and into the opening of her pouch.

Despite his blindness and apparent helplessness, the joey makes the journey within five minutes to half an hour. Usually he proceeds without aid, although the mother may lick a path to the pouch.

Safely inside, the joey clamps his mouth over one of the nipples, which swells to form an almost unbreakable bond (page 490). To prevent the milk from straying into the lungs and choking him, the infant possesses an exceptional tubular arrangement leading from the nose passages directly to the windpipe and lungs. Thus he can continue to breathe normally while avidly drinking down his milk.

Now the joey develops fur, and his hind limbs and tail—insignificant structures when he entered the pouch—grow faster than the rest of the body, becoming the powerful organs of locomotion that are the trademark of his clan.

After about three months the young kangaroo may venture into the outer world to try his legs and sample tender young grasses and leaves. But at the slightest sign of danger he dives back into the pouch, tumbling in head-first with legs and tail projecting from his mother's elastic crib like oversized tent poles in a camper's pack (page 489).

Hunters who bring down a female kangaroo after a long chase seldom find a large joey in the pouch. The doe has usually lightened herself for flight by tossing the joey into a thicket. She thus improves her chances of escaping and returning, and if she is killed the youngster may still have a chance to live.

When the joey is too large to fit comfortably into the pouch, mamma decides that she has had enough. She ejects the burdensome offspring for good, cuffing him soundly as he tries to climb back in till he realizes he is no longer wanted.

Sounds in the Night

Kangaroos are not the easiest animals to observe, as I soon found out when the Arnhem Land Expedition reached Darwin, on Australia's northern coast. We took quarters in a tourist camp at Night Cliff, outside Darwin, waiting for cooler winds from the southeast to extinguish the torrential rains and usher in the long dry season of bright days and starry nights.

Between showers I got my first look at tropical Australia, with its junglelike rain forests, fields of grass four feet higher than a man's head, and twisting coastline of mangrove swamps, rocky headlands, and white sand beaches.

In the darkness of the first night a series of quick thuds told of some creature running through the tangle of dripping scrub outside my cabin. I went out with my flashlight, hoping to glimpse the noisy phantom, but in vain. Next morning I found many sets of wallaby tracks in the muddy jungle paths, on the wet sand of the beach, and in the mud under the salt-water mangroves, proving that several dozen of the creatures lived within half a mile of our cabins. But on my first attempts to glimpse them, my only reward was to see a sudden writhing of the dank grass or a vaguely defined flash of brown hurtling into a thicket.

Speed, Agility Mark Sandy Wallaby

Gradually my perception sharpened. I learned to walk softly and watch patiently for the Y-shape of a pointed nose and a pair of erect ears as an alert wallaby peered at me over the grass tops. Waiting quietly at the edge of a meadow in the early morning or evening, I was able to watch small family groups at the business of filling their capacious stomachs with green vegetation.

This was the sandy wallaby, an elegantly trim little creature with a snowy-white chest and a narrow white crescent over each hip. To me he will always typify the great and varied family of kangaroos, even more than the majestic great gray. Speed and agility are the sandy's outstanding attributes; in recognition of this his species bears the Latin name *agilis*. He can hide behind a tuft of grass, then take off with the thudding scurry, burst of speed, and nimble dodging that have saved his kind from many a white man's bullet and black man's spear.

These tactics protect him also from more ancient enemies still on hand to persecute him—the dingoes, or wild dogs, the wedge-tailed eagles, and the big green rock python.

His edibility is a matter of considerable importance to the sparse human population of northern Australia. Roasted whole over a blazing fire or a glowing bed of coals, he provides a staple food for the aborigines. As "hopping mutton" he appears regularly on many a more formal table at missions, cattle

Tree-climbing Roos → Bed Down at Dawn

Tree dwellers in the jungles of northern Queensland and New Guinea differ markedly from their land-bound cousins.

Though still built for hopping, the tree kangaroo's hind limbs are shorter and broader, the better for climbing. Its slender, brushy tail, though not prehensile like an opossum's, serves as a rudder and balancing organ. Hind paws have nonskid soles cushioned with thick skin. Sharp curved claws on the large forepaws grasp swinging boughs.

As an aerialist, the tree kangaroo travels monkeylike from tree to tree, often leaping downward 20 to 30 feet among the branches. It can jump to the ground without injury from heights of 40 feet or more. The creature sleeps by day with head tucked between hind legs.



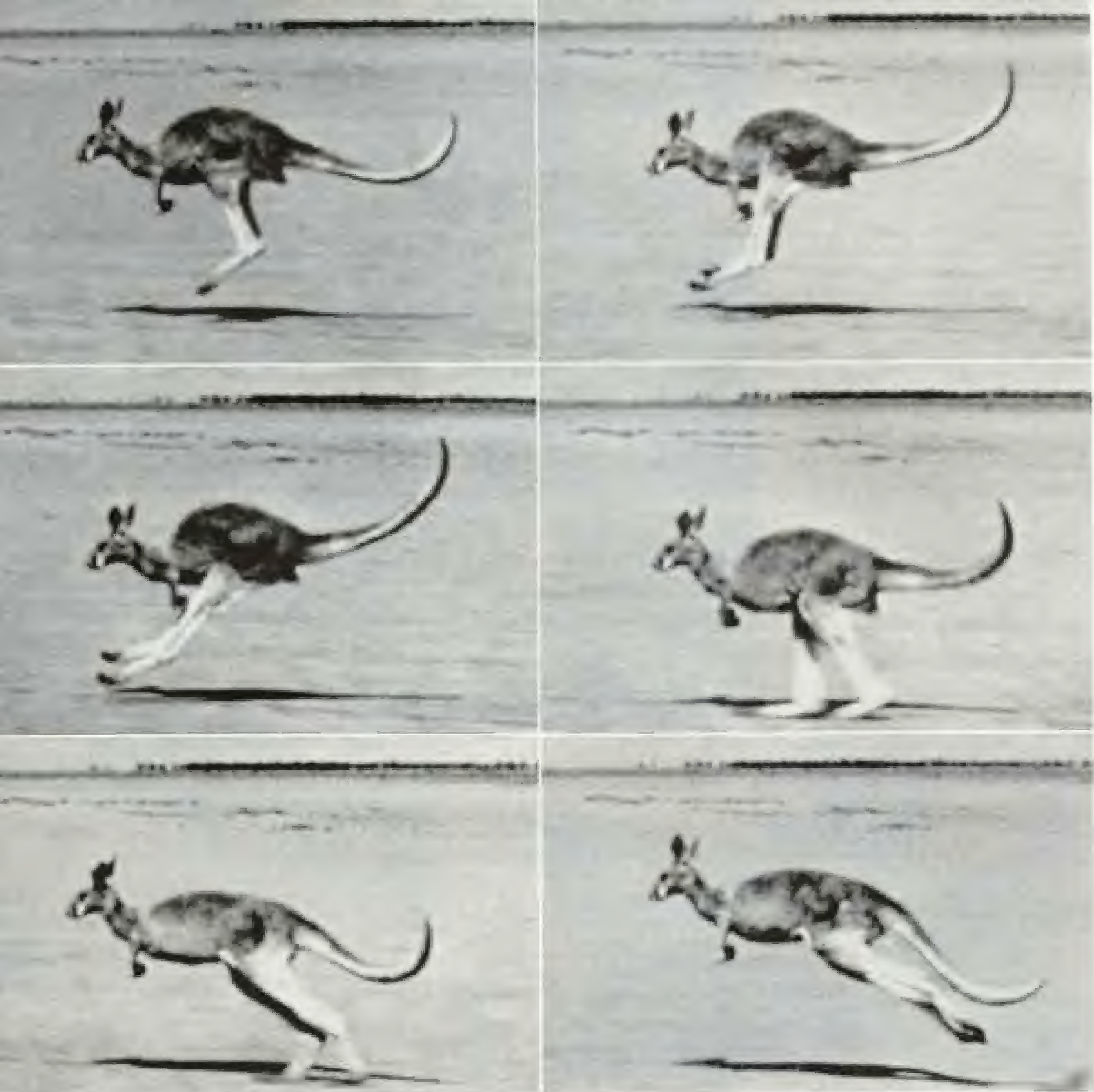
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← Not a Snarling Bear but a Gentle Marsupial

Believing his name, the tree kangaroo spends much time on the ground. He ascends to feed on foliage and fruits, to sleep, or to escape enemies. Short rounded ears, unlike those of ground-dwelling kangaroos, lack the ability to turn in several directions and detect the approach of predators.

Backing down his tree, the arboreal kangaroo descends at sunset, usually to visit a water hole. Ungainly on the ground, he walks in short awkward hops. Zoo specimens have been observed going backward. Males often fight in captivity.

Aborigines on the Cape York Peninsula relish the flesh of the "boongary," as they call him. Hunting with trained dingoes, the natives' dogs, they track him to a treetop. There a hunter climbs after him, and the frightened kangaroo leaps to his doom among the dogs.



Piston Legs Carry a Red Across Sun-baked Plains at 30 Miles an Hour

In Australia's outback, where forage is sparse and water holes far apart, the kangaroo must roam vast distances. He does so in soaring broad jumps, forepaws tucked in, and head and tail in balance. To make this sequence, the photographer paced the kangaroo in an automobile.

stations, and mining camps. Loin and tail (for soup) are specially prized; other parts are generally coarse and gamy.

One evening we camped west of Melville Bay by a stream the natives called Kwaiturumuru. A wallaby had been killed by one of the natives for the evening meal, and as usual I intended to save its skin and skull as scientific specimens. Since it was a female, I looked into the pouch; sure enough, there was the limp body of a joey about eight inches long. It would make a fine addition to my collection of pouch young, I thought.

Suddenly a small black hand darted into

the pouch and seized the joey. I found myself engaged in a struggle for possession of the prized specimen. My opponent was 4-year-old Bilibili, youngest member of our party and until that time a good friend of mine.

Scientist's Zeal vs. Tribal Custom

The dispute was finally settled in my favor when Bilibili's mother intervened, laughing at my discomfiture. The young aborigine retired only slightly mollified by an extra ration of the hard candy that Australians call "lollies."

Later, over the campfire, our guide explained that I had unknowingly run up against tribal custom. According to complex rules that govern the division of food after a successful hunt, joeys from the pouch always go to the children. Since Bilibili's father had killed the wallaby, the boy was merely insisting on his rights.

Gathered around their own fire near by, the natives, too, were discussing the day's events. Content with full stomachs and stimulated by repeated rounds of the tobacco pipe, they were in a happy mood. The quavering voice of the storyteller of the moment rose and fell, accompanied by the rhythmic "clack-clack, clack-clack" of beaten sticks, as he gave his version of the hunt and added his bit to the evening's entertainment. An occasional burst of shrill laughter from the appreciative audience revealed that the natives' sharp eyes had missed nothing of the white man's awkward ways in their homeland.

Near Yirrkala, our second base camp, there was bigger game in the kangaroo line. Back from the coast a mile or so, where the flat interior plateau falls off in a series of ironstone bluffs and narrow ravines, live the great red wallaroos.

Unlike the plains-dwelling red kangaroos and the grays of the open woodlands, the wallaroos prefer rock-studded slopes. In keeping with this habitat, they have comparatively short legs, thick necks, and sturdy bodies, and their movements have an air of stolid deliberation. It is an impressive sight when an old man wallaroo, disturbed on his evening trip to a creek bottom water hole, clumps off upslope to lose himself among tumbled rim-



Boxers Aim for the Solar Plexus. Kicks and Fouls Are Fair

Battle begins with forepaws held in a tight guard close to the chest, not unlike the manner of John L. Sullivan. Antagonists feint blows to the head, then lash out with haymakers. Suddenly one rises on stiffened tail and strikes at the other's belly with his "brass knuckle," the spiked middle toe on each hind foot. Playful young kangaroos love to box (page 491).

rock boulders where pursuit is impossible.

With a full schedule of other field work to attend to, I found that wallaroo hunting took time out of all proportion to its rewards. So I turned over the job of getting specimens to a native named Marguri, to his great pleasure.

Marguri knew the measurements I wanted, but was baffled by the millimeter-measuring tape. At first, therefore, I insisted that he bring each wallaroo into camp, where I could measure it in the flesh. This, of course, made hard work for the hunter, for some of the



← "Hopping Mutton" May Be This Pet's Fate

When author Johnson, a mammalogist, accompanied the National Geographic Society-Smithsonian Institution-Australian Government expedition to northern Australia, he witnessed the kangaroo's importance to Stone Age tribesmen.

In Arnhem Land, an aboriginal reserve about the size of Maine, kangaroos provide a staple food for the nomadic blacks, who hunt them with spears and roast the flesh over coals.

Isolated missions, cattle stations, and mining camps also serve kangaroo. Some gourmets prefer kangaroo tail to ox tail for soup. Most of the meat is gamy and coarse.

This Roper River boy smiles his delight at capturing a young sandy wallaby.

What the sandy wallaby lacks in size he makes up for in speed and agility. He prefers damp coastal regions where, at the least alarm, he dashes into tangled marsh grass, pandanus, and scrubby thicket.

Howell Walker, National Geographic Staff

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Too Big for Pouch, → Joey Tests His Legs

White men value the kangaroo for its hide, which makes excellent glove and boot leather.

To reach maturity, young kangaroos must dodge eagle, rock python, and wild dog, as well as spear and bullet. The popular name—great gray—distinguishes this young specimen from the smaller gray-toned wallabies.

Female grays usually breed but once a year; multiple births are rare.

Evicted by his mother, the joey will remain at her side for several months. Occasionally he may still plunge his head inside the pouch and suckle while standing up. No one had to teach him that tall and legs make a fine tripod.



animals weighed more than 100 pounds, and often they were killed miles from camp.

Eventually I devised a system by which Marguri brought each neatly rolled skin with a slender pole cut to the exact length of the wallaroo and notched to show the other measurements. I suspected that Marguri was pleased with this system for more than one reason: he no longer had to divide the meat in the presence of his wife's numerous relatives, nor did he have to give a generous share to the expedition's cook.

At Oenpelli, where rocky Inyalark Hill loomed close to the expedition's green tents, I made the acquaintance of the rock wallaby, a confirmed cliff dweller. Our anthropologists, sketching aboriginal rock paintings, found these wallabies skipping like little ghosts through the labyrinth of galleries and fissures formed by tumbled rock slabs. I spent many a delightful hour watching the sprites of Inyalark Hill at their play.

Imagine an animal not much larger than a house cat, its fur thick and soft with the gray luster of chinchilla, its powerful hind legs equipped with nonskid treads, its long tail seeming not to taper at all. This acrobat has absolutely no fear of heights. It creeps weasel-like through narrow fissures in rocks and makes flying leaps across impossible chasms. To traverse a floorless hallway of its home or to ascend a narrow chimney, it may ricochet like a bullet from wall to wall, finding momentary support for its glancing weight on ledges no broader than a man's finger.

Except for the rock python, few enemies threaten this wallaby. Even the resourceful aborigines balk at hunting him. A thrown spear that misses its mark is likely to be splintered on a rock or lost in a deep crevice.

After we finished our work at Oenpelli, I bade the other expedition members goodbye



Kangaroos Climb Chasm Island Cliffs on Grasshopper Legs

Aboriginal artists centuries ago decorated cavern walls and ceilings with ochre and charcoal paints. The Arnhem Land Expedition found these pictures in 1948. Rocky Chasm Island rises in the Gulf of Carpentaria.

and set off to visit the arid center of Australia. There I met the red kangaroos (page 491).

Their tall forms stood like statues in the night as our headlights illuminated a smooth macadam road north of Alice Springs. The truck driver who had given me a lift said that had accidents occur when fast-moving automobiles smash into stubborn or bewildered old man kangaroos that fail to move out of the road.

Swift Runner of the Plains

The red kangaroo is the fleet-footed runner of the undulating, rusty-colored barren heart of Australia. In this land of sparse forage and widely separated water holes, he must cover vast distances in order to survive, just as do the Old World gazelles and the American pronghorn antelopes in their own, equally dry, habitats.

Old red is the largest of living kangaroos,



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Great Gray Hurdles a Log Barrier with One Effortless Bound

if judged by linear measurements, but he is gaunt and rangy in build and may be outweighed by the grays or the massive wallaroos.

Because he competes with cattle for the thin pasture of the plains, stockmen have no love for him. They would rather see his hide used for shoe leather. After a night's shooting by professional hunters, I have seen piles of carcasses stacked beside the road, while bales of skins on the docks at Port Pirie gave evidence of a thriving trade in the hides.

My collecting of specimens completed, I

shipped my guns, traps, and field gear back home and boarded the southbound train at Rumhalaria, near the center of the continent. As we puffed out of the desert station, a big red kangaroo rose from his rest in the sparse shade of an isolated tree and loped alongside the train. Slender neck and tail straight out, legs working in unison, he kept easy pace with us in long, effortless bounds. With true Australian hospitality the big red was escorting the departing guest on the first mile of his homeward journey.

Legends of Shipwrecked Galleons, Pirate Lairs, and the Lost Colony
Enliven North Carolina's Wind-swept Island Playground

BY NIKE ANDERSON

With Illustrations by National Geographic Photographer J. Baylor Roberts

THE North Carolina coast has a siren quality. Rosy conch shells and galaxies of starfish stud the sandy white beaches. Oranges ripen in November on wild Cape Hatteras, and camellias redden from October to April beside the fisherman's cottage. Porpoises frolic offshore, and the exciting silver blue of sailfish flashes in the warm Gulf Stream.

But the cool Atlantic, which must share these shores with the Gulf Stream, harbors a violent resentment of this invader and its care-free ways.

Off Hatteras battle is joined. Spray shoots into the air; sand bars and shoals shift treacherously. Storms born of the conflict have left many a schooner—and many a steamer—rotting on the beaches from Currituck to Cape Fear (page 503).

Witness to these struggles is a slender finger of sand that stretches in curving sweep for 320 miles between the North Carolina mainland and the Atlantic. Along this wind-blown strip, called the Outer Banks, history has paraded some of its most romantic, its most mysterious, figures.*

Vacation Trip Gets Sidetracked

My husband Glenn and I came to these strange and beautiful beaches by accident, simply because we wished to drive along the sea as far as possible on our way south. We had come down the Potomac from Washington by steamer one October night. Awakened in the chilly Chesapeake before dawn by the steamer's stentorian foghorn, we were shortly deposited on the Norfolk dock. In the mood for a holiday, we sped southward, thinking of Savannah and St. Augustine. Somehow we never got beyond the Banks.

After Norfolk and Portsmouth, the little towns with fanlighted doorways and brick-walled gardens of boxwood, their streets lined with crape myrtle trees that touch the second-story windows, appeared farther apart. We skirted, briefly, the Dismal Swamp, where loblolly and pond pines, bayberry bushes, and dense growths of gallberry gave more than a

suggestion of deer, otter, and water moccasin.†

After the swamp, harvested fields stretched on either side. The sandy soil of eastern North Carolina looked anemic to eyes accustomed to Virginia's robust red clay. Sometimes the fields were politely plowed around a little cluster of gravestones, huddled in the grass behind iron fences, or around a stone chimney standing like a drained wine bottle, reminiscent of the hospitality that had been.

Three-mile Jump to the Banks

Then we crossed the three-mile Wright Memorial Bridge spanning Currituck Sound and found ourselves for the first time on the Outer Banks. So far as climate was concerned, those three miles might have been many more.

Spanish moss began to festoon the trees: tall hollies, and live oaks bent nearly double by the sea winds. Big fig bushes and even a few palmettos sprouted in the sandy yards of scattered houses.

Yet we had come only 90 miles from Norfolk (map, page 507).

Beyond the slight hummocks of sand, crested with coarse grass, the Atlantic was an angry azure. The months of the hurricanes were not yet over. Beaches were almost as bare as the day the first colonists came; the last bright umbrella was folded, the shutters bolted against the savage storms which sweep off Hatteras, the "Graveyard of the Atlantic." North of Nags Head, sand dunes had begun to rise to our right, golden and sparse of leaf or blade. The Dunes of Dare some people call them, in memory of Virginia Dare, first English child born in the New World.

"The early colonists must have thought this country wild and strange, after the crowds of London and the neat little English villages," I thought aloud. "Wonder what really happened to the Lost Colony?"

"So do the historians; they've been ponder-

* See "Exploring America's Great Sand Barrier Reef," by Capt. Eugene R. Guild, NATIONAL GEOGRAPHIC MAGAZINE, September, 1947.

† See "Dismal Swamp in Legend and History," by John Francis Ailes, NATIONAL GEOGRAPHIC MAGAZINE, July, 1932.





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↑ Boisterous Seas Pound Cape Hatteras

A few miles offshore lie treacherous Diamond Shoals, the "Graveyard of the Atlantic." Strong winds churn the Gulf Stream as it flows north across shallow reefs edging the Cape. Hundreds of vessels have been wrecked in these turbulent seas.

↔ The Graveyard clutched at the Honduran freighter *Omar Babun* in May, 1954. U. S. Coast Guard men rescued the 14 crewmen by breeches buoy. Ship and cargo were salvaged.

↓ Peggy Harrell of Hertford, North Carolina, catches the echo of crashing surf in a conch shell found at Nags Head.

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Illustrations by National Geographic Photographer L. Eugene Roberts



ing that one for more than 350 years," Glenn replied. "When Queen Elizabeth finally took time out from her war with Spain to send relief ships and supplies over here, there wasn't anybody around to relieve. Not a living soul. And yet no signs of massacre. Just one word—CROATOAN—carved on a tree about five feet above ground, where the bark had been stripped off, and the letters *cro* on another tree."

"The Sphinx sounds like an informer by comparison," I said. "What did Croatoan mean?"

"Name of an island inhabited by friendly Indians. Some people think it's the one they call Ocracoke today. Maybe the colonists were beginning to starve—"

Geese were flying low over the dunes toward a fresh-water pond, and we had flushed pheasants on the road a few miles back. There had been two deer heads in a drugstore where we had stopped.

Mystery Still Shrouds Colony's Past

"All this game, and oysters and clams and crabs that even a child could catch, and col-lards staying green all winter this far south—and they were starving?" I interrupted. "I don't believe it. Especially if the Pilgrims farther north could survive on parched corn and a freezing rock."

"Maybe these settlers were hungry for fruit tarts and pork pies. Maybe they were killed or carried off by hostile Indians, or else absorbed into a friendly tribe," Glenn said. "There were a lot more men than women among the settlers, you know, and those local Pocahontases must have begun to look pretty attractive as time passed.

"At any rate, in Robeson County and a few others, some Indians claim those early colonists for ancestors. They'll tell you about the legend that their forefathers 'came over on a boat,' and they'll cite their combination of light skin and black hair. There isn't much else to substantiate the claim.

"But it seems to me it's as reasonable as any other solution I've run across to the riddle of what became of Sir Walter Raleigh's little band."*

As he spoke, we spied a brown-shingled inn, laced by double-deck white porches, sprawling between the ocean and the road near Jackey Ridge, largest of the dunes (page 524). On the back porch a white-haired man lounged in a blue-checked lumberjack coat.

At his side his "missis" was stringing a mess of snap beans.

As we pulled to a stop beneath their wind-flopped sign, a little dog ran down the clam-shell drive to greet us.

We were in luck at that moment, although we didn't know it. The "Cap'n" and his missis were Bankers, born and bred, the Cap'n's ancestors having come to the Banks generations before. They were able to interpret their land and legends as few people are gifted to do, no matter how deep their love may be.

Supper conversation was exciting. Yes, we stayed for supper, and for eight suppers afterwards. A slim brown girl, called Rubell, brought in golden sea trout which had been flopping in the nets an hour earlier. Roast pork, tender and succulent, came next, with yams, squares of yellow corn bread, and the snap beans cooked with fat back to a slick green onyx. Bread pudding and strong tea ended the meal.

As I ate and listened, I began to feel a sensation I thought had vanished with childhood, a delicious blend of thrill and terror. The world of adventure and mystery had not ended with the snapping shut of book covers.

Tales of Romance and Terror

Blackbeard the pirate, politely referred to as Edward Teach by the Cap'n, wandered in and out of the conversation, along with "Calico Jack" Rackam. These seagoing gangsters were spoken of casually, just as townspeople are wont to refer to rather eccentric fellow citizens.

The sails of a mystery ship swelled out in our talk, carrying into eternity beautiful Theodosia Burr, daughter of ill-starred Aaron Burr. We were to hear more of her later as we roamed the Banks.

When talk veered to German submarines offshore during World War II, the Cap'n grew grave.

"They were there, all right," he said heavily. "What was there to stop them? At first, you remember, there wasn't any blackout along the coast. When the ships passed by, they were just like sitting ducks, outlined against the lights on shore. One night the U-boats sank five."

(Continued on page 510)

* See "Bit of Elizabethan England in America," by Blanch Nettleton Epler, NATIONAL GEOGRAPHIC MAGAZINE, December, 1933.



Sun-drenched Sands and Rolling Surf Invite Bathers to the Outer Banks

Uncrowded beaches line the pencil-thin chain of islands shielding the North Carolina coast. Cape Hatteras National Seashore Recreational Area, the first of its kind in the United States, stretches along an 80-mile segment of the narrow sands. With completion of a paved road to Hatteras village, numerous commercial resorts have sprung up in the once-isolated region. These vacationists enjoy warm waters at Nag's Head.



† Jeeps Race on Nags Head Sand Dunes in Dare County's Pirate Jamboree

Pony and boat races, treasure hunts, a buccaneers' ball, and a fish fry entertained thousands at a festival launching the 1955 vacation season. Beach homes line a highway beside the Atlantic. Stilts protect many cottages against hurricane floods.

‡ Candidates for Pirate King Let Beards Grow for 90 Days

Gov. Luther H. Hodges of North Carolina has just crowned Sara Alford, of Manteo, as queen. Mrs. Lucille Purser presents a bouquet to the winner. Pirate at right discovers that it takes both eyes to fit his sword into the scabbard.





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Outer Banks Guard Mainland and Sounds

Waters here are still spotted with the bones of ships wrecked in the "Graveyard of the Atlantic" off Cape Hatteras. State Route 170, which edges Dismal Swamp, leads toward U. S. 158 and the islands.





Kill Devil Hill Has a Replica of the Workshop Used by the Wright Brothers in 1903

Visitors to the Wright Brothers National Memorial stand beneath bunks like those in which the brothers slept. Furnishings duplicate originals. Cans bear facsimiles of labels shown by half-century-old photographs.

➔ Page 509: Before its steep slopes were anchored with grass in 1950, winds continually shifted the sands of Kill Devil Hill near Kitty Hawk. Memorial pylons crowning the dune look north toward the Wright hangar and workshop. Granite boulder circled by a paved road designates the take-off spot of the first successful powered flight in a craft heavier than air. White markers in the distant fairway measure the four flights made by the brothers on the cold, windy morning of December 17, 1903. The fourth and longest spanned 852 feet in 39 seconds.



WILBUR
WRIGHT
ORVILLE
WRIGHT

Seldom before had there been such a savage gantlet through which men were forced to dash—the furies of Hatteras on one side, the dread submarine wolf pack waiting on the other.

"We saw the wrecks of those ships along the coast for a long time afterward. That was when our ships started comin' in close to shore, so close you could see the men standin' on the decks."

What ghostly companions those submarines must have had, lying on the sandy bottom off Hatteras, where barks and brigantines from all over the globe had gone down, never to surface again.

Even before breakfast next morning we went out to explore the shore. The storms of September and October had left a dazzling array. Whereas most resort beaches are picked clean by amateur and professional beachcombers, these were as untouched as wild West Indian shores. Conch shells came in vivid shades—cinnabar red, glowing peach, fresh rose—or in the more



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Rescuers Haul In Sailors from the Stranded *Omar Babun*

The freighter was bound for Habana when she met disaster (page 503). Her heavy cargo broke loose during a storm, and the captain beached the ship lest she founder.

Coast Guard men on shore fired a line across the ship, and crewmen rode to safety.

This photograph was made from a Coast Guard plane whose wing appears at right.

◀ Personal gear clutched in his arms, a sailor skims across the breakers.

Some 2,500 vessels have wrecked in the vicinity of Cape Hatteras in the last 400 years.

John M. Wright, U.S.N. (1918), and
U. S. Coast Guard, 1917/18





somber hues of violet and slate blue. Some had been broken and carved into harp and calla lily shapes by the sea.* There were sea urchins delicate as snowflakes and a variety of white, stumpy coral.

We came back to breakfast laden with twisted driftwood, rivulets of sand running from our overloaded pockets. We had found a tiny starfish, which we put in a blue glass jar filled with sea water and shells. Its antics would have been the basis of a delightful slow-motion ballet.

Tramping in the cool morning air had put the finest of edges on our hunger. So it was with tremendous satisfaction that we sat down at the table and watched Rubell bring in hot cakes with honey and blackstrap molasses, amber-colored Carolina bacon, scrambled eggs—and fish. We were to discover that fish

appeared at every meal as automatically as water glasses or salt and pepper.

After breakfast we found out why. At Oregon Inlet, where the Cap'n steered us, we saw men bringing in 40- and 50-pound red drum, or channel bass. He shrugged at our surprise (pages 528 and 529).

"Seen 'em run up to 70 pounds. But I don't like 'em—they're too big for one and not enough for two."

He wasn't entirely joking, either. Bankers would be flabbergasted at the modest portions served by inland restaurants. Any Banker woman fries as many pan fish for each person as an Iowa farm woman boils ears of corn—at least four or five.

* See "Shells Take You Over World Horizons," by Rutherford Platt, NATIONAL GEOGRAPHIC MAGAZINE, July, 1949.



Currituck Beach Light Stands Framed in the Arch of an Old Wooden Bridge

The span leads to Whalehead Club, a fishing and hunting lodge on the Outer Banks. Nightly the beacon flashes to vessels sailing the North Carolina coast.

"What other fishing is there?" asked Glenn eagerly.

"Well, these red drum start schoolin' up about April here at Oregon Inlet, though right about now is one of the best times to catch the big ones. April is the time to start surf castin' for bass. Then come your bluefish and your mackerels—king mackerel, and small Spanish mackerel.

"For real sport, there's Gulf Stream fishin'. You've got dolphin and amberjack and red snapper, which is wonderful eatin'. You can go after them till November. Sailfish and marlin are good sport, too, both extra-good fighters.

"If you like fresh-water fishin', you can go over to Kittyhawk Bay from our place and catch large-mouth bass."

If we missed anything in our Banks visit, I cannot imagine what it was. We saw the spreading "Mother Vineyard," where the oldest scuppernong grapevine in the United States is said to grow. The great gnarled branches that, tradition says, first sent down their roots in the 16th century were massed with large sweet grapes, glorious yellow-green in the October sunlight.

One Grapevine, One Acre

The tremendous mother vine covers about an acre. It has propagated a multitude of vines that now spread over many a farm arbor on the southeastern seaboard.

We made the wild ride north on the old sand road to Duck, with two wheels in Currituck Sound and two against a bank. We complained bitterly about the hazardous ride until we met a smiling 16-year-old girl jauntily driving a school bus along this same "road." We were still laughing when six U. S. Coast Guard men in a jeep came along and pushed and pulled us out of the sand.

We passed through forests of misty enchantment, their only touch of light the tendrils of gray Spanish moss. Wild grapes draped the tree trunks, and prickly pear cactus blossomed with delicate yellow flowers. Clumps of mistletoe, enough to guarantee kisses for a metropolis, crouched like spiders on the highest branches.

The sandy summit of Duck, when we finally got there, was a mass of clamshells, shining white evidence that Duck had been a favorite Indian feasting ground. I picked up a fragment of a cook pot, memento of one of these colossal clambakes. There were also arrow-

heads, mixed in with the symbols of modern warfare—empty cartridge shells from a nearby Navy target range.

We went to Fort Raleigh on an ominous gray day when high winds fairly shouted that winter was blowing in across the cold Atlantic. On this Roanoke Island site of the original English settlement in the New World have been built rustic blockhouses and cabins enclosed by a stockade. The setting is a woodland of pines, oaks, dogwoods, and graceful young hollies.

Pageant Recaptures an Early Mystery

Where the summit slopes away to Roanoke Sound stands an impressive outdoor amphitheater. Here during the summer months the Roanoke Island Historical Association presents Paul Green's symphonic drama, *The Lost Colony* (pages 517 and 518).

The cast of this play, bristling with Indians, Elizabethan elegance, and beleaguered settlers, includes many folks from near-by towns—guides, housewives, fishermen, and school children—as well as semiprofessional actors, college students, and teachers of drama.

On the October day when we first saw the amphitheater it was deserted. No more than a pale sun served for a spotlight. It must have looked much like this when Queen Elizabeth's ships sailed into harbor more than 350 years ago.

The museum, a large log cabin sweet with the smell of cedar, has power to evoke giants of the Elizabethan era: Sir Francis Drake, Sir Richard Grenville, Sir Walter Raleigh—not as daredevil adventurers and reckless romantics, but as sound businessmen who envisaged a limitless empire.

Museum Displays Governor's Art

Cases display the relics of the colonists' everyday life—clay pipes, cook pots, hand-made bricks, iron tools, armor, and coins. But nothing brings the original settlement into such sharp focus as the reproductions of on-the-spot water colors by its Governor, John White. These impressions of Indian life are as vivid as any book or movie could ever make them: a village lined, not with tepees but with huts; three fields of corn, each in a different stage of development; places for the honored dead, for feasting, for worship.*

* See "Indian Life Before the Colonists Came," by Stuart E. Jones, NATIONAL GEOGRAPHIC MAGAZINE, September, 1947.

Spring's Magic → Sets Woods Aglow on Roanoke Island

The Outer Banks vary from narrow stretches of sand, periodically inundated by storm tides, to islands three miles wide.

Pine, holly, and live oak, often festooned with Spanish moss, mistletoe, or wild grapes, mantle the higher ridges. Banks of ferns, shrubs, and climbing vines lend a subtropical air to ponds and marshes. A mild, humid climate provides a long flowering season.

Deer and small game abound in the woodlands. Ponies and cattle once ran wild in the salt marshes.

Roanoke Island, separated from the Banks by a shallow sound, gained fame as the site of Fort Raleigh, where the first English settlement in America was attempted in 1585 (page 518).

Stepping from a Dare County school bus, these island youngsters head home through a flowered lane of dogwood, redbud, and azalea.

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← Wisteria Embowers a Girl of Manteo

Mystery still shrouds the fate of the 100-odd men, women, and children who arrived at Roanoke Island from England in 1587. A royal expedition found no trace of the colonists in 1590. The word CROATOAN carved on a tree provided the lone clue; an island farther south had that name.

Manteo, the island's largest town, bears the name of an Indian chieftain who befriended the settlers.

→ Page 513: Wild pinks and dwarf iris (far right) add a pastel beauty to spring's bright display on Roanoke Island.

Illustration by National Geographic Photographer J. Berlin Roberts



There are things to see at every turn on Roanoke Island. Whale bones bleach in the yards, ribs the size of cowcatchers and vertebrae as big as nail kegs. A torpedo case stands like a sentinel in a gateway.

Mr. Tarkington, a Manteo grocer, sold us fried pork skins in cellophane bags and powerful New Orleans coffee with chicory. Mrs. Midgett (a Banker name famous in Coast Guard history) offered pepper hash and preserved artichokes for sale.

But we sought a more significant memento of the Banks. And so it was that we met "Miz" Culpepper, a dealer in antiques.

Miz Culpepper is as wiry, as wispy, as breeze-whipped as the grasses that blow in her yard. From her we acquired three things of enduring charm.

Banks Version of the Theodosia Story

One was a ship's clock, so old that we had to have the missing parts made by hand. When the bells sound in the still of night, we reflect thoughtfully on the sailors who once heard them striking far out at sea before their ship was lost in the Graveyard.

Our second acquisition was an arrowhead, small, neatly turned, of turquoise-blue stone. The color, Miz Culpepper said graciously, "matches your coat."

The third was a legend about the mysterious disappearance in 1813 of Theodosia Burr Alston. Related by Miz Culpepper in rooms jammed with the relics of shipwreck and with a backdrop of nets and the bright glass "witch balls" that keep them afloat, the story sounded like an eyewitness account. Theodosia's picture, reproduced from a portrait, smiled Mona Lisa fashion from the wall.

"Miz Alston," began Miz Culpepper with Banker courtesy, "she was the wife of the Governor of South Carolina, you know. Set sail from there to New York. She went on a ship called the *Patriot*. Only thing was, the *Patriot* never got there. 'Bout the time she was due to pass Cape Hatteras, a big storm blew up. That was the last they ever saw of the lady or the ship.

"Only, a long time afterward, there was a lady lived here on the Banks was taken sick. The doctor came and took care of her till she got well, but there wasn't any money to pay him. Then she remembered how he had noticed and admired this paintin' of a lady she had hangin' on the wall. So she gave it to him for payment. And they do say, it turned

out to be a portrait of Theodosia Burr—Miz Alston."

"Where had the Banker lady got it?" I asked.

That was the cue for which Miz Culpepper had been waiting.

"Well," said she, "one real rough winter mornin' her husband found a ship ashore, near Nags Head, it was."

She parceled out her plums of information with perfect timing.

"Here she was, in full sail, and no harm come to her, not a scratch did he see.

"There was not a soul aboard," she continued, after a significant pause. "But there wasn't a sign, either, that pirates might've boarded her. Everything neat and shipshape in the cabin. And in the cabin, 'long with a lot of lady's fine things, he found this portrait."

"Maybe the passengers and crew were all drowned, trying to get ashore when the *Patriot* got stuck on the shoal," Glenn suggested.

Miz Culpepper had heard that one before. "No bodies," she pointed out succinctly.

"Pirates would have asked ransom. Would have recognized her as the daughter of a former Vice President and the wife of a governor," he continued, thinking aloud.

We sighed and gave up. Another mystery had been added to our storehouse of strange happenings on the Banks. It would have been a shame to solve it.

Bountiful Sea Gives Up Treasure

Just as the Italians once regarded the Mediterranean as "Mare Nostrum" (our sea), so do Bankers look upon the Atlantic with a possessive affection. Small wonder; the sea becomes synonymous with a doting fairy godmother when one considers that in the space of 400 years some 2,200 craft—by conservative estimate—have met disaster in the vicinity of Cape Hatteras. Cargoes have yielded stout timber for building Banker houses, coal for their stoves, rum, and treasures from all over the world.

We scarcely saw a house that did not have some souvenir of shipwreck, if only a rusty lantern or a verdigrised cannon ball. But, most important, the sea also brought men, for many a shipwrecked mariner remained on the Banks by ardent choice. Thus was begun a strain of hardy, adventurous men, among whom courage is commonplace.

(Continued on page 525)



Sir Walter Raleigh Beseeches Queen Elizabeth to Smoke a Pipe of Carolina Tobacco

"Try it, your majesty," Raleigh begs. She takes a puff and cries, "It bites like an adder." Performers at Roanoke Island Waterside Theatre in Manteo enact an episode in *The Lost Colony*, by Paul Green (pages 518-519).



Mock Indians Dance at Manteo: a Scene from *The Lost Colony*

Sir Walter Raleigh dispatched Captains Philip Amadas and Arthur Barlowe from England in 1584 to "plant the English nation" in the New World. After a 67-day voyage, Amadas and Barlowe reached the North Carolina coast. They entered Ocracoke Inlet, crossed Pamlico Sound, and landed on an island "which the Indians called Roanoke."

Befriended by the tribesmen, the explorers remained two months on Roanoke before returning to England. An expedition the following year established a colony, built Fort Raleigh, and departed 10 months later.

In 1587 a second group of colonists arrived. Among them were Eleanor and Ananias Dare, whose daughter, Virginia, was the first English child born in America.

These colonists rebuilt the fort and eagerly awaited a supply ship from England. But none arrived for three years, for the Spanish Armada's attack on England delayed Raleigh's sending a relief ship until 1590. The crew found the site of the colony overgrown with weeds, Fort Raleigh deserted, and the colonists vanished.

The Lost Colony, a pageant presented at Manteo each summer, traces the colonization attempts.

→ Page 519: Actors stage an Indian harvest festival.

← A medicine man waves feathered scepters.

↓ English and Indian maids apply final touches to their make-up.

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Outer Bankers Adorn Cottages with Sea's Bounty

Fishing and other maritime pursuits provided the Bankers' chief interests for generations. As their isolation retreats, many turn to guiding, feeding, and housing visitors.

Above: Jerry Turner used to be a fisherman; now he runs a boatyard. Today Mrs. Turner uses part of his old fishing boat for a kitchen in their home on Roanoke Island.

← Page 520: Cast-up buoy, life preserver, and whale bones decorate the yard of John Evans Midgett in Buxton, Hatteras Island.

Upper right: Manteo girls model Bankers' bonnets.

→ Sunset's glow ruddies the face of pretty Ann Ethelidge.

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Playmakers Picnic in Manteo Woods

Mary Wood Long, the Queen Elizabeth of *The Lost Colony* (page 517), and William I. Long, the production's technical director, often play host to members of the cast. The theatrical company helped the Longs build their cottage on Roanoke Island.

Mrs. Long (standing, left) joined the cast of *The Lost Colony* in 1949. Her husband (sitting, watermelon) has served 12 summer seasons. During the rest of the year he teaches drama at a South Carolina college.

Toy Ships Sail a Sea of Canned Goods

To merchant George O'Neal the ship models displayed in his store at Avon call to mind his sailing days. Schooners, square-riggers, tugs, and freighters line shelves and counters. A lighthouse rises on four piles at left.

Customer George H. Meekins, retired after 32 years in the Coast Guard, commanded at one time the lifeboat stations on Cape Hatteras.

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Kalifornia by National Geographic Photographer J. Becht Roberts

↑ **Playtime Diggers Seek Pirate Loot
Beneath the Rib of an Old Sailing Ship**

Blackbeard, Stede Bonnet, Anne Bonny, Mary Read, and other buccaneers rendezvoused off the Banks and waylaid trading ships. Modern resorts prize the bleached hulls strewn upon their beaches; one hotel insured its picturesque wrecks against storm damage.

↓ **Golden Dunes Tower Above the Sea;
Eternal Winds Fret the Sands**

Majestic mounds of loose sand retreat slowly in the face of the strong prevailing winds. Gnarled live oaks, bowed into fantastic shapes, hug the hollows. Here Sally Alford of Manteco paints Jockey Ridge (locally spelled Jockey), highest of the Nags Head dunes.



Feminine beauty also is evident. If any of the girls on the Banks are homely, we did not see them. Their beauty is a reflection of their life—light-blue and green eyes mirroring the sea, lovely legs shaped by swimming and walking in the sand. There are many blondes, and even the hair of the brunettes is shot with copper from the long summer sun.

Lady Pirates Were No Ladies

In the old days there were "lady" pirates, such as Mary Read, who spent most of her young life dressed as a man till love forced her to reveal her secret, and her friend, Anne Bonny.

History records that Anne Bonny, the daughter of a successful South Carolina lawyer, was a sweet girl—except, of course, for the time when she slew her serving maid with a case knife.

Mistress Bonny is further described as pretty, but an early print shows a figure in baggy trousers, two pistols tucked in her blouse and a mean-looking cutlass in her hand. I could be wrong about her beauty, since she was comely enough to catch the roving eye of the rich and dashing Capt. John Rackam. He was known throughout the Spanish Main as Calico Jack, probably because of his striped seaman's trousers.

Anne and Mary Read both joined Calico Jack's pirate crew. They fought and raided so savagely, so lustily, that according to legend Anne scorned Calico Jack, about to be hanged in Jamaica, with these words: "If you had fought like a man, you would not now hang like a dog!"

A sweet girl to the very last, which some say was the end of a rope, although others say she was pardoned because she was expecting a little pirate.

Buccaneer Flees a Nagging Wife

Maj. Stede Bonnet, who is sometimes confused with Anne Bonny because of the similarity of their surnames, also raided along these shores. The major, once a retired resident of Barbados, is looked upon with some sympathy, if not respect, since his wife is supposed to have nagged him right out of their comfortable island home into murder on the high seas.

This seagoing gangster is one pirate who is credited with having actually made his victims walk the plank.

Stories about the ruins of a pirate stronghold attracted us south along the Banks. Delightful little villages lined the way, where many old-time customs, such as celebrating "Old Christmas" on January 5, are still observed. Wrecks of ships lay on the beach, a sight at once sinister and exciting.

We found what we imagined might be the ruins of a pirate lair hidden in a grove of live oaks, placed where it had a strategic view of the sea. It was just rubble, as the Cap'n had told us; it may have been discarded ballast from early ships, but it was a powerfully suggestive pile of rocks, nevertheless.

One could easily picture Blackbeard, one of the most fantastic pirates ever to scuttle a brig, spending quiet evenings in such a place, counting his doubloons. Tradition says that the brigand had headquarters on the Outer Banks, but the exact spot is still disputed.

Blackbeard Had 14 Wives

The story goes that this terror of the Spanish Main would plait his famous black beard—it grew from below his eyes to his waist—into many little pigtails. Each of these he tied with a perky little bow of bright ribbon. When going into battle, he would stuff lighted matches under the brim of his hat to give this hideous countenance terrifying illumination. With cutlasses and derringers, he was a walking arsenal.

Yet Blackbeard had his tender side, as 14 wives could attest. No Bluebeard, he—most of them were rumored to be alive to mourn him when he was killed in hand-to-hand combat with gallant Lt. Robert Maynard of the Royal Navy. Chances are that a few descendants of the buccaneer could be found among the Bankers, who hold a tolerant regard for him.

Sir James Barrie might well have drawn his duel between Peter Pan and the vicious Captain Hook from the real-life battle between young Maynard and the savage Blackbeard in 1718.

Finding the pirate ship conveniently aground in an inlet, Maynard and his crew made short work of the buccaneers. In story-book style the youthful lieutenant inflicted 25 gun and sword wounds before felling Teach, but received only a few scratches himself. Then with the head of Blackbeard in all its dark fury impaled on the bowsprit of his sloop, he sailed triumphantly home.

On one of our later visits to the Banks we



Live Oaks Whiskered with Spanish Moss Shade a Forest Trail on Colington Island

Moss in hoary gray streamers drapes trees, fences, and wires from Virginia southward. It is an epiphyte, or air plant, closely related to the pineapple. Unlike parasites, it derives no nourishment from its host.

stayed in a hotel at Kitty Hawk, facing Kill Devil Hill. There the Wright Brothers National Memorial rises from the top of the highest dune where Orville and Wilbur Wright launched their gliders and near which they made their historic powered flight. Engineers have kept the shaft atop the once-shifting dune by planting special grasses to hold the sand (page 509).

Bankers look upon their dunes with toleration, if not affection. "One minute," they say, "you've got a garden; the next, it's a sand pile."

Early Flights Aroused Skepticism

Watching the hills by dawn, daylight, and dusk, we became increasingly curious about the amazing event which had taken place there. We were not alone in our desire to know more about the men who had brought about this near miracle; on the hotel's register was inked the name of the great aircraft designer, Igor Sikorsky.

Then we met Mr. Alpheus W. Drinkwater. He is the telegrapher who, during the Wrights' 1908 tests near Kitty Hawk of an improved plane, relayed thousands of words of news copy for astounded reporters. Although that was five years after the epoch-making 1903 flight, the story still seemed so fantastic to press and public that one editor replied with the stern admonition: "Cut out the wildcat stuff!"

Each season Mr. Drinkwater welcomes the cast of "The Lost Colony" back to Manteo with a garden party, and a dozen players are housed under his roof-tree. While we talked about the flying brothers and Kill Devil Hill, an actor with hair and beard as bright as copper shavings strolled out in shorts, returning presently with a bag of groceries. Such sights cause no more of a stir than they would in Greenwich Village or at Hollywood and Vine.

Even the Drinkwater grandson, to whom talk of the Wright brothers is old stuff, has a part in the play. "I bring flowers to Virginia Dare's mother, and I say, 'But God is so-oo long sending the baby!'"

One can't help getting a thrill holding Mr. Drinkwater's sheaf of telegrams, whose import changed the course of the world. The dispatches are specially mounted, as ordered by Secretary of Commerce Herbert Hoover when he visited Mr. Drinkwater.

Mr. Drinkwater chuckles when he remem-

bers the visit of Associated Press writer Hal Boyle, who asked Mrs. Drinkwater, now dead, what she thought of aviation.

"Well, it's done a lot of good, I suppose, and then I suppose it's done some harm, too," she said as she picked up her tatting.

Leafing through the telegraph dispatches, we read: "Wright Brothers, the aeronauts, now at Kill Devil Hill, near here, made a first flight in their new aeroplane this afternoon. Although but a test flight it was successful in every respect, the machine, under the perfect control of its two makers traveling for a distance of 1,000 feet." And the magic sentence: "Apparently it could have been flown a thousand times as far as easily as not."

After this brush with destiny and glory, Mr. Drinkwater developed an understandable taste for excitement. When none was forthcoming, he created some. Once he sent a jar of preserved figs to the Queen of England, who was probably just as glad to get them as her secretary said.

Buried Wreck Believed a Galleon

Another time he announced that he had found the wreck of a galleon on the shore of Bodie Island. No ordinary galleon, either, but one of Sir Francis Drake's, he fondly believed. A crew of boys from the Civilian Conservation Corps were so captivated by the idea that they donated their labors to digging her out of the sand.

Speculation ran wild at first; some of the newspapers even said she was a Viking vessel. Later they said she was a pinkie, one of the coastal vessels of colonial days.

Finally the National Park Service made a careful study and concluded that the buried wreck was a U. S. naval gunboat that exploded and burned in 1814 near Ocracoke Inlet.

Maybe the truth wasn't quite so romantic as the speculation. No matter; it was exciting enough. After you shake out fact from fancy, the Outer Banks are still an incredible place where anything can happen and often does.

And when you think of Blackbeard and his brigands plundering along the coast, of ship after ship smashing on the shoals off Hatteras, of two brothers on a lonely coast cracking man's age-old riddle of flight, of the mysteries of a vanished colony—do you wonder that we have gone back to the Banks again and again since that first October visit?



↑ Surf Fishermen Cast for Channel Bass

The Outer Banks are renowned as a fishing ground. In spring and fall the reflected line of thousands of channel bass turns the ocean reddish brown. Bluefish, Spanish mackerel, sea trout, and pompano run coastal waters. Deep-sea enthusiasts find amberjack, blue marlin, wahoo, dolphin, and sailfish in the Gulf Stream.

Large-mouth black bass abound in brackish bays and fresh-water ponds.

Striped Cape Hatteras Light, tallest in the United States, rises 191 feet. It warns shipping against dread Diamond Shoals (page 503).

← Concessionaire Toby Tillett (right) sells fishing gear at Oregon Inlet. A customer reels in new line through a metering device.

→ Oregon Inlet charter boats seek channel bass.





↑ **Proof That Four Did Not Get Away**

Launches line the docks at Oregon Inlet. A record channel bass, 75 pounds, was caught in the Hatteras surf. These bass, hauled in by a vacationing couple and skipper (right), average 25.

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Photographer: T. Baylor Roberts

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An American Joins a French Family Aboard the Canal Barge *Saigon* to Explore the Inland Waterways of France and Belgium

BY DAVID S. BOYER

Foreign Editorial Staff, National Geographic Magazine

With Illustrations from Photographs by the Author

INTENT on some game, the captain's little mongrel galloped down the 30 yards of rattling steel deck plates and crashed against a cabin window. The first mate snatched him up, boxed his ears, twisted his head toward an island we were passing in the Seine near Paris, and threatened in French:

"See that? That's the 'Island of Dogs.' And see all those tombstones? That's the Cemetery of Dogs. You wouldn't want to finish the voyage over there, would you? Two meters underground, alongside Rin Tin Tin and all the other famous dogs? All right, then. Be careful of my kitchen windows!"

Then she kissed him—for our first mate was a woman—and tossed him back on the hatch covers of the canal barge *Saigon*. She threw a cookie onto the deck after him, to prove they were still friends.

Landlubber Becomes "Second Mate"

Mme. Marie Jeanne Juliette Yvonne Giseline Chartier Richl was born on a cargo boat somewhere on a European river or canal. So was her husband, Louis, captain of the *Saigon*. So was their son, Thierry, age six. And so was the dog, Tino.

I was the only landlubber aboard. The Richls had adopted me for a voyage from Paris to Antwerp, Belgium. They were carrying 250 tons of wheat, and I had signed on as "second mate" in order to learn about the lives of the water gypsies of western Europe.

The Richls were among the more than 100,000 people who man some 40,000 boats and barges that shuttle cargo over more than 13,300 miles of rivers and canals in France, Belgium, the Netherlands, and West Germany (map, page 533).*

We were three hours from our starting point, the Quai Henri IV, where boat families in Paris often tie up under the majestic spell of the Cathedral of Notre Dame.

Three hours from the heart of Paris—and yet, because of the meandering of the Seine, we were only a short distance from where

the city's walls once stood. I could have jumped ship at St. Denis, our first overnight port of call, and scurried back in 15 minutes for shore leave among the gay crowds of the Champs Elysées.

But this would not have been in the best tradition of these nomads of the canals, who seldom get beyond hailing distance of their floating homes. Besides, I had already been influenced by the curious kinship with inland waters which sets Europe's boatmen apart. Like them, I was already beginning to think of those who live on land as captives, tied unhappily by circumstance to houses, shops, neighbors, streets, and automobile horns.

That afternoon I had seen a different Paris—a Paris of whose existence many of its own inhabitants are vaguely, if at all, aware.

I had seen the ports of Paris, the miles of quays where the French capital receives much of its sustenance—coal from the north, gasoline from abroad, wines from the east and south, grain and building materials from almost every direction. I had begun to understand the paradox that Paris, 230 miles by river from the sea, is one of the largest ports of France. Some years it has surpassed in tonnage any of the country's seaports.

* See "By Sail Across Europe," by Merlin Minshall, NATIONAL GEOGRAPHIC MAGAZINE, May, 1937.

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A Gasoline Tanker in Paris Plies → the Seine Below Notre Dame

Though better known for its excursion boats than its cargo carriers, Paris rivals France's largest seaports as a shipping center. Its *péniches*, or barges, carry millions of tons yearly and journey as far as Belgium, the Netherlands, Germany, and Switzerland. Some moor in the very shadow of 12th-century Notre Dame.

Here the Cathedral is partly sheathed in scaffolding for cleaning and repair. Pedestrians cross the Pont de l'Archevêché to the Ile de la Cité, heart of ancient Paris. The tanker, belonging to a Franco-American company, is one of some 650 boats carrying oil over the French system of waterways.

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Enfichonne by National Geographic Photographer David S. Boyer





Barge Wife in Dinghy Lashed to Deck Guides the Pilot Around a Blind Turn

Plying the Ardennes Canal, the boat will enter the lock ahead with inches to spare. Tractors sometimes use the towpath to pull motorless barges. Horses get the job only in one section of France.

With Captain Riehl leaning far out of the *Saigon* wheelhouse to admire the scene, we had glided that afternoon past Notre Dame, the Ile de la Cité, the Louvre, the National Assembly, the Eiffel Tower, the Trocadéro, and the Statue of Liberty, the replica in miniature of the lady of freedom in New York Harbor. Overhead, in almost endless procession, arched the bridges of Paris, bridges that inspire poets, fishermen, and lovers alike.*

Then the bridges fell behind. At the first lock below the city we passed tankers and coal boats carrying part of the city's daily fuel supply. If these boats should stop their monotonous chugging, electricity, gasoline, and heat would soon be rationed.

We had passed through Paris in a splash of June sunshine. By evening, however, when we lashed the *Saigon* to a pier at St. Denis, it had turned cold and wet, as much of Europe's summer was to be. It was incongruous, then, as we went ashore for a last meal of restaurant delicacies—onion soup, snails in garlic sauce, and delectable little *alouettes* (clarks)—that I should find Louis and Marie Jeanne stopping to look at refrigerators.

They had long debated whether to spend a

* See "Paris, Home Town of the World," by Donald Williams Dresden, NATIONAL GEOGRAPHIC MAGAZINE, June, 1952.





tenth of their annual income on a tiny gas-powered refrigerator they could buy for \$150. Soon I was to understand why.

Like all Frenchwomen, Marie Jeanne believed that food, to be appetizing, must be absolutely fresh. If possible, it should go to the table from the butcher, the baker, and the greengrocer almost in a matter of minutes.

But foraging into canalside villages before every meal cost hours of time. And Louis was paid five francs (1½¢) over and above his wages for every kilometer the *Seigon* covered. Marie Jeanne, as first mate, collected one franc.

Furthermore, they were sometimes disagreeable, those trips ashore.

I remember how deeply I felt for Marie Jeanne one night in Beaumont sur Oise. Disdaining with professional pride my offer to shop for her, she had rowed away against a stinging rain. What a touching figure she made as she struggled up the muddy bank of the Oise River and bent into the storm! A thin kerchief over her hair, a threadbare jacket on her shoulders, she marched against a gray row of aged houses huddled together, their broken shutters hanging in the wind as if to keep them warm.

That night I wanted to buy her a refrigerator. That night Marie Jeanne willingly would have prepared food that wasn't absolutely fresh.

In St. Denis, however, the refrigerator remained a shopper's dream. Over our delectable snails we toasted the day of its eventual purchase.

Later we drank strong, black coffee in a café frequented by mariners. One inland salt, a friend of Louis, colored with paternal pride as he reported that tomorrow his

son would receive the prize as the best student in his school at St. Denis. Furthermore, he added, to temper the remark with modesty, the next five prizes were going to sons of mariners.

Perhaps this remarkable showing was due to the boys' appreciation of their opportunity. Few sailors can afford the 10,500 francs (about \$30) monthly fee to send a son to boarding school.

Then how, I wanted to know, do most boat children get an education? The answer to that question, Louis said, I could get the next day in the town of Conflans Ste. Honorine, at the confluence of the Seine and the Oise.

Water Gypsy Headquarters

Conflans is in one sense the hub of a 5,260-mile system of navigable rivers and canals that covers the map of France like a spider's web. Here, Louis told me, was the headquarters of a society devoted to the health, education, religion, and general welfare of thousands of French water gypsy families.

We anchored alongside the society's boat, the *Je Sers* (I Serve). Built of concrete, it resembled less a boat than a floating blockhouse, as if a chunk of the Maginot Line had been tossed into the river. Tethered among dozens of wooden or metal craft, it somehow took on the appearance of a sanctuary.

Aboard the *Je Sers* I met the Abbé Joseph Blaizot, chaplain to one of the most wandering flocks in the Christian world. Before learning about education, he said, I should gain an insight into the religious life of my new friends of the canals.

With a twinkle in his eye that belied the somberness of his black cassock, Abbé Blaizot led me through his floating chapel. We passed a carved image of St. Thérèse, patroness of Catholic river boatmen, and reached his sacristy in the bow. Maneuvering about a taut anchor chain, he talked while changing his vestments for Mass. Here, he said, he conferred with mariners or their wives who brought spiritual or family problems to him. Young inland sailors and their fiancées often came to discuss marriage.

"It is seldom that a mariner marries a girl who was born ashore," he explained, "and equally rare that the daughter of a boatman finds a husband who works on land. The two kinds of life are incompatible.

"Besides," he mused, "a boy born on a

← Life Aboard a French Barge Is Crowded but Happy

For 15 days between Paris and Antwerp the author shared the lives of the Riehl family on the barge *Seigon*.

Six-year-old Thierry, who has no brothers or sisters to play with, shows more energy at daybreak and bedtime than his mother can cope with. Mme. Marie Jeanne Riehl here tries to get him to drop his father's harmonicon and put on his clothes.

Below: Capt. Louis Riehl sometimes has to remind Thierry about his table manners. Their dog, Tina, waits his turn at the window like a gentleman. Thierry, like most French children, drinks diluted wine.

Saigon's Sister Barge Sails Through Soissons

Rippling the quiet Aisne River, the steel-hulled péniche passes the spires of the Abbey of Saint Jean des Vignes.

German artillerymen damaged this French cloister in 1918 on their final retreat from the city after four years of seesaw fighting. Following the war, Soissons was rebuilt from its ruins.

Many provision stores like *Le Familistère* (center) stand at riverside convenient to boat wives.

Page 537, lower: French Boy Scouts launch U. S. Army surplus rafts from their camp site on a lateral canal of the Meuse River in the Ardennes.

Canals parallel the Meuse in places because the river is not everywhere deep enough for navigation. Leaving the canal, this barge heads into the river.

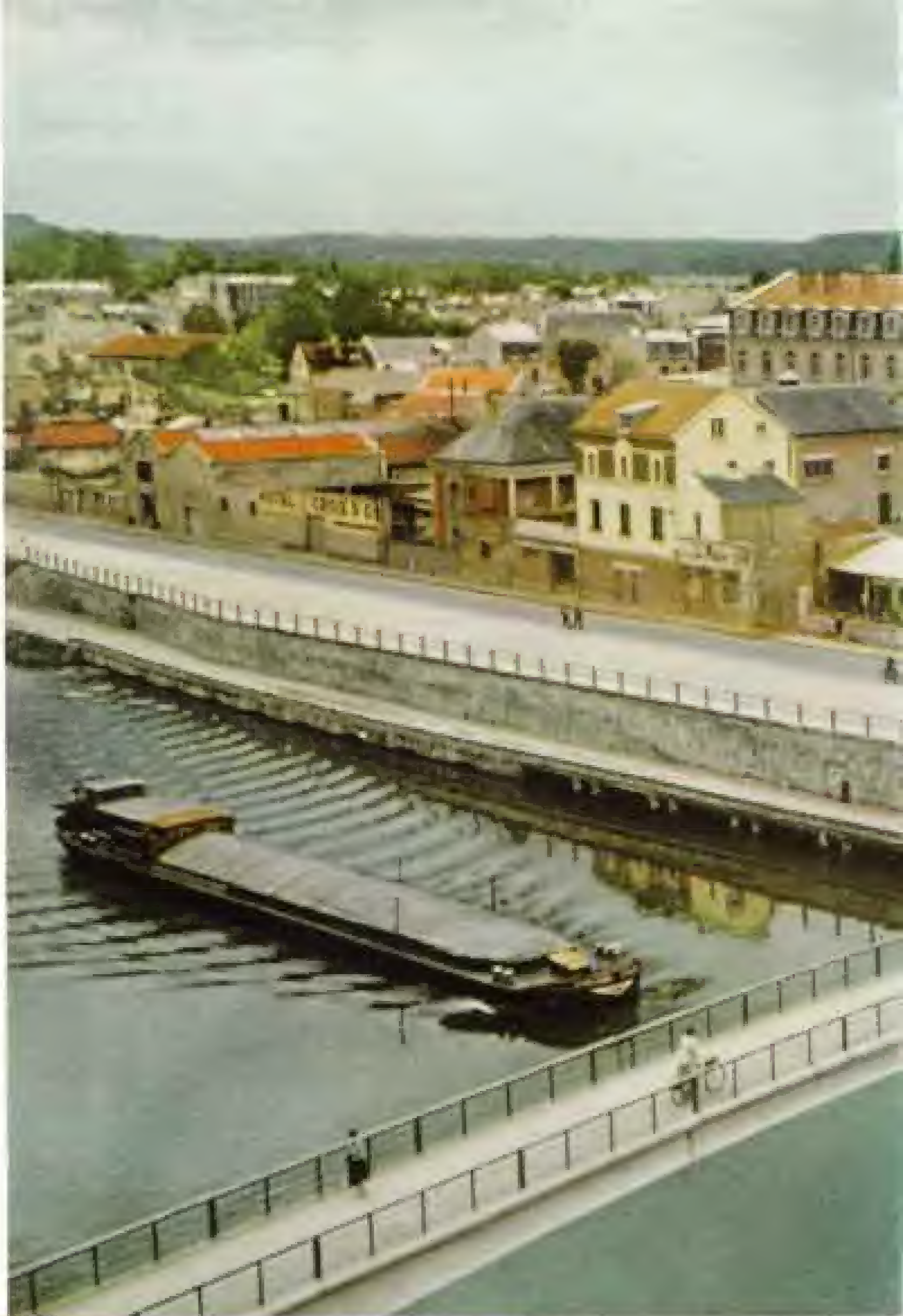
✦ *Thierry and Tino Wear Safety Lines*

Often the boy plays at being a captain like his father and maneuvers his toy boat into imaginary locks. If he follows the barge child's pattern, he will become a deck hand, get married, and take over a boat as skipper.

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Editor-in-Chief: National Geographic
Photographer: Harold S. Borer

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boat learns to become a deckhand and then a pilot. In the meantime, he falls in love with some girl on another boat when they are tied up somewhere waiting their turn for a new cargo. *C'est la vie!*"

But getting married is not nearly so simple for these nomads of the waterways as falling in love.

"As you may know," he said, "French law requires a birth certificate for marriage, as well as a certificate of domicile. And the Church requires a certificate of baptism."

These passports to happiness, Abbé Blaizot went on, usually turn up missing when the time comes.

"Where were you born?" he will ask a young girl who comes to announce her intention to marry.

"Well, just a few meters from lock number 7 in the St. Quentin Canal," is a likely reply. "*Maman* always mentions when we pass there that 17 years ago they held up a load of sugar four days for me."

"And were you baptized?"

"Oh, yes! Papa took me into a little church somewhere between there and Valenciennes. He doesn't remember where."

I nodded understandingly at Abbé Blaizot's sad story, and with more sympathy for these problems of his parishioners than he knew.

Six years ago, when I myself had married in Paris, it had taken us two months to collect the necessary papers and gather from various French bureaus the sundry authorizations, complete with impressive swatches of canceled stamps representing the taxes on matrimony. By the time our collection was complete, some of the first papers had expired, and we had to begin again.

Je Sers: Floating Schoolhouse

Before the Abbé went in to his Mass, he introduced me to Mlle. Madeleine Bouvier, schoolmistress to a class scattered over all of western Europe. She led me into her office, a cubicle on the *Je Sers* that served as an educational dispensary to hundreds of scholastic outpatients (opposite).

Four of them had just come in, two girls and two boys of the same family. Their boat was in Conflans on a one-day stopover between Le Havre and Paris. Mlle. Bouvier motioned to me to sit down.

"Now you will see," she said, "how we try to prepare our future mariners for the records they must keep and the many books

they will have opportunity to read on long, lonely evenings—and how their future wives learn to keep household accounts."

With that, she rifled through a stack of brightly colored notebooks and extracted those sent in by mail from the four pupils who had arrived. She plunged into the matter of grammar with 10-year-old Françoise, whose grasp of verb conjugations by correspondence seemed a bit shaky.

Later she told me that besides reading, writing, arithmetic, and geography, her girl students study sewing, child care, and cooking. The boys fashion articles of wood and metal, and either mail or bring them in for criticism.

Barge Children Live Geography

"Although there is compulsory education in France," Mlle. Bouvier confided, "there is really no way to force boat children to attend. Those whose parents cannot afford boarding school simply get such rudiments of learning as they can, with our help.

"They are usually very good geographers, you know," she added, watching me jot a final note on the back of a NATIONAL GEOGRAPHIC envelope. "They not only read geography, they live it. Many of them could name in order all the towns you will pass on your way to Antwerp. They could tell you what is raised on the farms, brought out of the mines, and produced in the factories.

"Of course," she smiled, "they're inclined to think the earth is flat and literally laced with canals and rivers! But you'll discover how understandable these misconceptions are."

Before many days had passed, I too was half convinced the earth was flat. The *Saigon* moved up the winding Oise River, into the Aisne, and finally into the lateral canal of the Aisne where the river itself is no longer navigable. The world had become nothing but a level strip of water, flanked on either side by poplar trees standing like troops in review. The only inhabitants of this tranquil expanse were boatmen who waved, lock keepers who turned sluice handles, or fishermen who sat stolidly in the rain—never, apparently, catching anything.

Even the towns we passed gave little impression of activity. Viewed from the solitude of the river, they were without noise, without movement.



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† Lock Keeper's Sons and Barge Boy Live in Different Worlds

Youngsters in the kitchen of a lock keeper's house on the Ardennes Canal exchange wistful stares with a lad who may be on his way to foreign scenes. They were so shy that not one spoke during the 10 minutes the boat stood in the lock.

→ Four children of a nomadic boat family go to school for a few hours with Madeleine Bouvier at Conflans Ste. Honorine. Schoolmistress to students dispersed over all of Europe, she reviews lessons mailed to her social service office aboard the boat *Je Sers*.

When a family docks in Conflans, children rush to Mlle. Bouvier for tutoring. Adult correspondence courses teach boat wives to cook, sew, and care for babies.

Doll beside the globe was dressed by a boatman's daughter, who mailed the toy to Mlle. Bouvier for criticism.

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Photographer David S. Boyer



Through Pontoise we drifted and through Compiègne, remarking on their handsome new stone bridges. Had I not dashed up the bank, I should never have realized that these bridges are monuments to German and Allied air power. The strategic bridges of Pontoise and Compiègne were shattered in the war, and with them many of the houses, shops, restaurants, and hotels on either side.

Both cities, thus displaced from the river bank, laid out wide traffic circles over the rubble. Behind them they built ultramodern business centers of stone to match the bridges. It was startling, in France, to see the venerable architecture of the past, centuries-old, unventilated buildings sagging against each other, suddenly give way in the heart of town to solid, gleaming façades where neon lights flickered above a parade of picture windows.

Sight-seeing Only Incidental

But Louis and Marie Jeanne and Thierry and Tino and I were not sight-seeing. Seldom did we manage to tie up the *Saïgon* for the night in a city or other place of interest.

Every morning our one-cylinder motor choked itself awake at 6:30, and at 7:30 p.m. Louis religiously cut the throttle. Our working day was officially 10 hours, but the Compagnie Générale de Navigation, owners of some 500 boats and France's largest inland shipping firm, allowed Louis three hours' overtime in the summer at 41 cents an hour. Lock keepers, paid by the Government, also received overtime to keep the locks running until 7:30.

More often than not, we tied the *Saïgon* to a poplar tree with no sign of habitation near. We would tap a basinful of hot water from the motor before it cooled, to wash and shave. (Two or three times during the voyage, when the water was not too murky with oil, I went over the side with a bar of soap.)

Thus presentable, we would crowd into Marie Jeanne's combined living room, dining room, library, and kitchen. Bottles of *apéritif* and wine would be uncorked, and we would cluster around the tiny table loaded with fresh bread, tomato salad, roast chicken with mushrooms, mashed potatoes, asparagus, cheese, fruit, and coffee.

Whatever Marie Jeanne cooked (and I wondered what fabulous salary she might command as a chef in New York), she threw

in liberal portions of garlic. On cold days when the kitchen windows had been closed, the garlic fumes, mixed with the heady scent of wine and roasting meat, created an aroma thick enough to eat.

Like all French workers' wives, Marie Jeanne spent the lion's share of the family income on food and wine. Many Frenchmen believe that rich food and drink bring on liver trouble, but they accept *mal au foie* as a natural hazard of having French gourmet blood in one's veins. Marie Jeanne's prescription for high blood pressure was simple—a chunk of raw garlic eaten first thing on rising in the morning.

During one halt for groceries I investigated a relic of the Nazi invasion. Past a blockhouse sheltering a homeless farm family at St. Leu d'Esserent, I entered a mammoth underground quarry with a foreman of mushroom cultivators. The German Army had swept out the mushrooms, built truck roads through the extensive caverns, and used them to store V-1 buzz bombs and V-2 rockets, safe from Allied bombing.

Our headlights twisted through the underground maze, flashing back kaleidoscopic views of Nazi symbols and crude cartoons burned onto the quarry walls by candles.

The mushrooms, however, were back—acres of them. We walked pigeon-toed between the ridged beds. Our carbide lamps cast grotesque, flickering shadows over the sculptured mounds of white clay stretching like endless, newly covered graves. Rooted in manure beneath, the even whiter budding mushrooms only added to the ghoulish picture. Our feet made no sound in the powdery dirt. Never was silence so silent, blackness so black. I shuddered in the clammy 54° temperature.

It felt good to get back to the boat, and
(Continued on page 549)

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Skippers Worry over Customs Forms → Beneath Charlemont Fortress

Meuse River bargemen entering Givet, close to Belgium, are accustomed to waiting two hours or more for inspection, depending on the number of boats ahead of them.

These Belgians, father and son, confer over motors, fuel, cargoes, and personal possessions to be declared to French officials expected aboard momentarily. *Saïgon* likewise awaits clearance.

Charlemont, whose walls crown a 700-foot crag, was built in the 16th century by Charles V.

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Scenic Revin Lies on an Oxbow Bend of the Meuse River

An old Spanish town, Revin was turned over to the French in 1679. Spanish character can still be detected in some of its houses.

These young miners, on holiday in the Ardennes, rest on Mont Malgré tout.

Boats navigating the river often do not follow this sweeping bend but save three miles by passing through a tunnel near the railroad bridge at right.

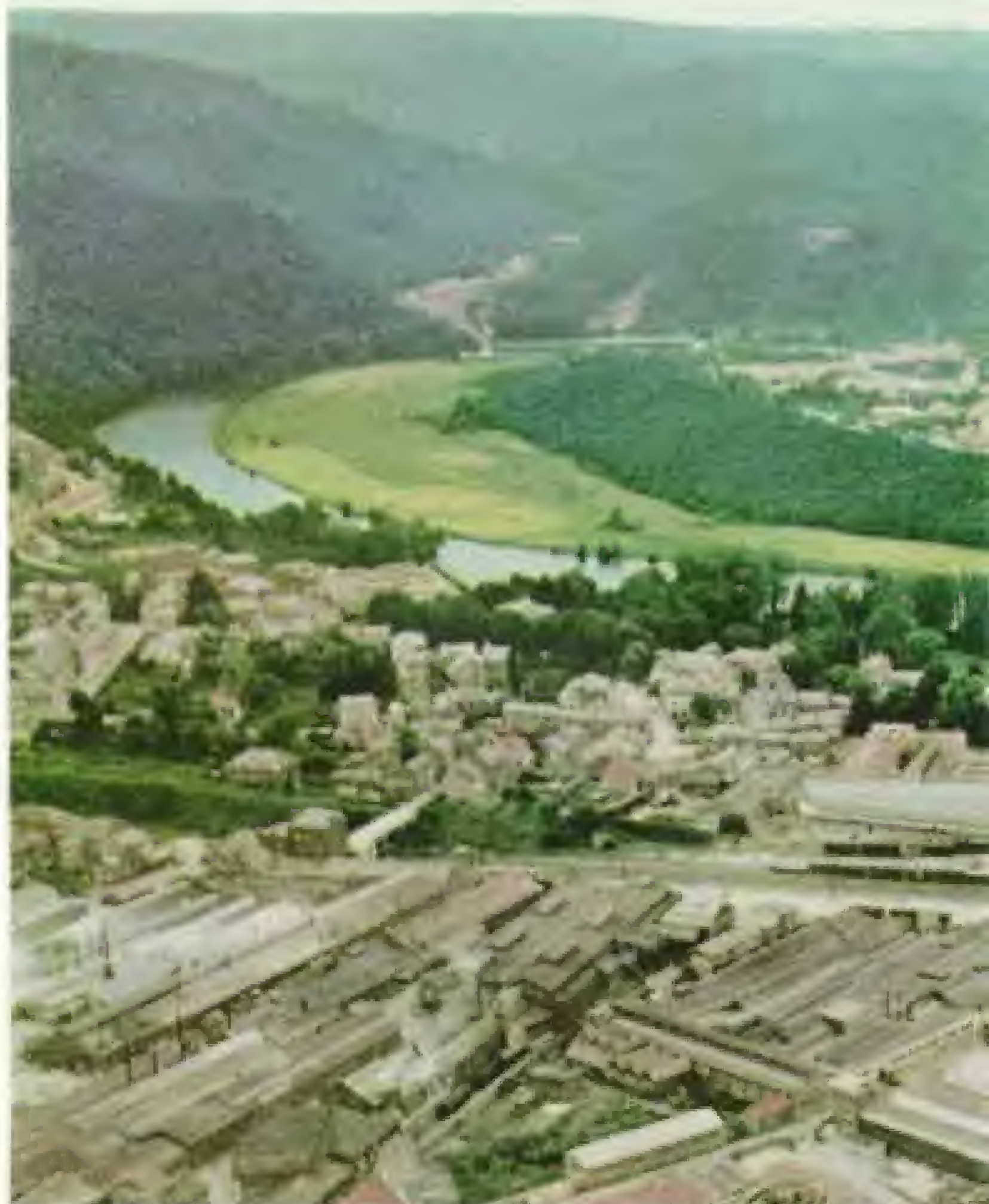
Page 543, lower: A newly wed Dutch boat wife neglects her rug cleaning to admire villas and hotels lining the Belgian Meuse between Dinant and Namur.

The Meuse will take her to Maastricht, her home in the Netherlands, where the river is called the Maas.

✦ A Belgian customs official prepares to seal hatch covers of the Saigon at Heer Agimont, where the Meuse enters Belgium. Louis Riehl sees his motorcycle pass inspection.

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Photographer David G. Ryan

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A Cargo Boat Glides Past Dinant, Belgium, the Target of Repeated Invasions

In 1466 Philip the Good, Duke of Burgundy, sacked the Walloon metropolis and stilled the anvils of its thousands of coppersmiths. Kaiser Wilhelm's army virtually destroyed the town in 1914. Hitler struck in 1940. American and British armies in the Battle of the Bulge stopped the Germans just short of Dinant.

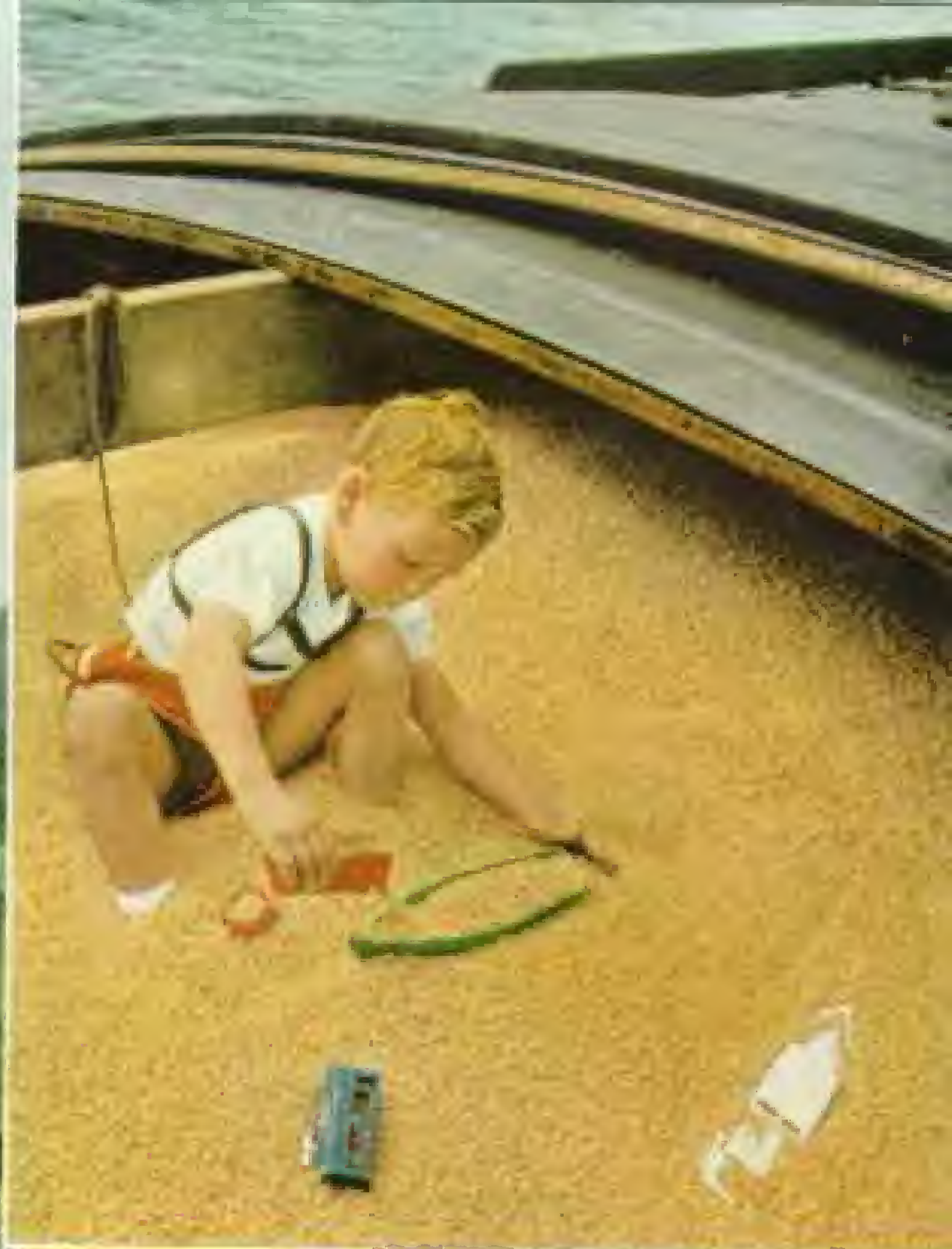


Vacationists Ride a Cable Lift Up Montfat for a Panorama of the Meuse Valley

From this lookout point a short walk leads past a French military cemetery. Because the French helped defend Dinant in World War I, the Tricolor flies here on Belgian soil and even joins the Belgian flag on the ski-type lift. Artisans, reviving Dinant's medieval arts, make warts of beaten copper.



From Belvédère Lookout, Belgian Sisters Watch an Excursion Boat Ripple the Meuse. Villas of well-to-do folk hide among the trees; cafés and resort hotels dot the shore near Profondeville. Here the Meuse flows past the Wood of Nimes. The little steamer sails upstream toward Dinant.



Europe's Barge Children Play Solitary Games on River Trips That Never End

Thierry Richl loads a toy barge with wheat, his father's cargo. Lacking playmates, he must invent many of his own amusements. The girl, playing aboard another péniche, tries on wooden shoes used by deck hands.



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↑ **Herring a Day Keeps the Doctor Away,
Says a Pusheart's Sign in Liège**

Liège provides miles of parking space for canalboats of Belgium, France, the Netherlands, and Germany. Its heroic resistance to German siege guns in 1914 gave the French time to defend Paris. Grated onion comes automatically with the herring.

↓ **A Canalboat Unfit for Water
May Make a Snug Haven Ashore**

Charles Verstrueten holds a pheasant he raised near his dry-land houseboat at Grobbendonk, Belgium. He bought the boat, a wreck in the Schelde River, during World War II. Rebuilt, his home was caught in the war's crossfire. Verstrueten preserves the bullet scars.



Marie Jeanne was delighted with the freshly picked mushrooms.

Most of the scars of World War II had healed over the countryside, though frequently we passed beneath temporary bridges, even old U. S. Army Bailey bridges. At the time of France's liberation, more than 2,200 damaged or destroyed bridges obstructed water traffic.

Louis and Marie Jeanne often recalled the war on the waterways. Here, they would say, they were bombed and strafed by Luftwaffe planes. At some other place, during the German occupation, the Allies had attacked them. Marie Jeanne pointed out the spot where her father's *péniche* had been scuttled by the retreating Nazis in 1944.

Anti-Nazi Wrecked Canals

Destruction of locks was a favorite pastime of French underground fighters. Throughout the war they hindered Hitler's occupation by slowing down waterway traffic.

"We never put a canal beyond repair, however," one resistance leader told me. "We might blow a hole big enough to stop traffic for a week or two. Had we put the canals out of operation, our boatmen would have been sent off into forced labor."

My informant was André H. Lafouge, president of a shipping agency at Charleville and local representative of the *Saigon's* owners. A jovial businessman, M. Lafouge scarcely looked the part of saboteur. He took me off the *Saigon* in Charleville for a daylong tour of the Meuse River where it winds through the scenic Ardennes. While the boat navigated the oxbow bends of the Meuse, he said, I could interview waterway engineers, make photographs from lookout points above the river, visit several river towns, and rejoin Louis and Marie Jeanne at night—17 miles downstream, but scarcely six miles as the crow flies.

A cold rain made photography less pleasant than interviewing. And the hospitality of M. Lafouge and his friends, the waterway engineers and the business community leaders, proved contradictory to the tradition that the Ardennais are a cold people in a cold land.

The region is one of industrial beauty. Manufacturing villages nestle, as if placed there for photographers, at becoming locations on the horseshoe bends of the Meuse. One delightful lookout point which we climbed atop the Ardennes plateau is circled front and

back by the meandering river and bears the name of the Rock of Seven Villages.

M. Lafouge pointed to stands of young trees struggling to cover the valley's steep banks. Elsewhere dense forest clothed the land.

"Next to rock mining and manufacturing, forestry is our big industry," he said. "One reason the Ardennais are so bitter about the wartime occupation is that the Germans slaughtered our forest lands."

The wet roofs of the villages cast a gleam into the dripping day. Probably the area's best-known product is ardoise, the slick bluish-gray slate that roofs the village houses and churches. From the mines the slate goes abroad to cover fine public buildings and cathedrals.

Crushed quartz rock, for ballast under railroad ties, comes from open quarries that scar the valley's magnificent slopes. It is loaded directly from the hills into Meuse barges by conveyor belts, or *tapis roulants* (rolling carpets), as the French call them.

The Great Rabbit Tragedy

That night with M. Lafouge I dined on sautéed rabbit.

"Why," I asked, savoring this French specialty, "was there no rabbit on the menus of Paris restaurants this year?"

Hadn't I heard of the great scourge? The near demise of the European rabbit? The dread disease myxomatosis?

No.

M. Lafouge was astonished.

"We don't have it here in the Ardennes yet," he said. "When we do, you'll see rabbits lying dead by the thousands." He grimaced.

Myxomatosis was the infection given to rabbits in Australia when other methods of controlling their numbers had failed. Wishing to rid his estate near Dreux in northern France of rabbit marauders, an elderly French doctor obtained in 1952 a test tube of the virus. He inoculated two wild rabbits with the substance.

The disease, believed to be transmitted by rabbit fleas, spread like wildfire. Rabbits died by millions. In some places disposing of them became a major sanitary problem. No effort to check the epidemic was successful. First racing across France, then into the Low Countries and Germany, myxomatosis fanned out into central Europe and jumped the Channel into England.



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↑ **A Belgian Soldier Looks Across
Albert Canal into the Netherlands**

Belgium built the 81-mile-long Albert Canal not only as a Liège-Antwerp link but as its own watery Maginot Line. But German paratroops in May, 1940, surprised Eben Emael, key fort along the canal, and laid Belgium wide open. Eben Emael's grass-grown ruins support this soldier.

Here a barge, gliding through the canal, passes the lock of Lanaye, leading to Juliana Canal in the Netherlands.

This electric lock will be enlarged one day to receive 3,000-ton boats from the Rhine. Meuse River lies on the far side.

← Madame Richl hooks the Saigon to the wall of a lock.

→ Albert Canal's Eigenhiltzen Cut connects the Meuse and Schelde basins. When the cut was dug, it protected prewar Belgium's most vulnerable frontier, the so-called Maastricht Gap. Belgians looked on the fortified canal as an impregnable tank trap, but Nazi paratroops quickly captured it.

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↑ Locks Can Pass 120,000 Tons a Day

Albert Canal's builders moved almost half as much earth as the diggers of the Panama Canal.

This operator floods the Wijuegem Lock. He uses one of six series of electric controls between Liège and Antwerp.

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Spread of the disease virtually wrecked the business of raising domestic rabbits and trapping wild ones for market. Before myxomatosis, some 85 million rabbits yearly went to the table in French homes and restaurants. Fur, primarily for felt hats, represented a business of billions of francs a year.

Most of France's 2,000,000 hunters used to go gunning for rabbits. Now they bought neither hunting licenses from the Government nor shotgun shells from manufacturers. One company laid off 750 workers. Hotels and restaurants that specialized in catering to hunters were deserted.

"Soon we shall have myxomatosis," M. Lafouge predicted. "But the rabbits will not all die. Already in some parts of France they are making a recovery. They build up a certain immunity to the disease."

Even that doctor, I discovered later, again had rabbits on his estate.

Author Uses a Pillow of Wheat

When M. Lafouge drove me back to the *Saigon*, his two young sons came along to wave *au revoir*. They insisted on coming aboard to see how an American installed himself in the forward cabin of a French barge. They were amused at my improvisations—a kerosene lantern mounted on a stack of wobbly flash-bulb cases, so that I could see to typewrite in an upper bunk at night; and, in lieu of a pillow, a burlap sack full of wheat, borrowed from the cargo.

For days, in July, we were buffeted on the *Saigon* by storms marching down the Meuse like waves of shock troops. Day would turn to night; black clouds would squirm and twist overhead, as if half the locomotives in France were belching smoke in some frantic competition; then the rain would beat a thundering tattoo on the deck of our barge.

Between these flash storms, Louis and Marie Jeanne and Thierry enjoyed a two-day holiday at the border town of Givet. We waited with a hundred other boats for customs officers to cope with a sudden crush of traffic. The *Saigon* was moored in the shadow of the 16th-century fortress of Charlemont and near a temporary wooden bridge creaking on stone piers which, I was told, were laid down by Napoleon (page 541).

Marie Jeanne spent some time preparing a list of the family's belongings, mentioning Thierry's new shoes, so that on the return

trip the customs might not allege that they had been bought in Belgium.

The French recorded our gasoline and oil supply and the number of the *Saigon's* engine. There would be no returning with a full tank of cheap Belgian fuel, or a new Belgian motor, without paying import duties.

The Belgians sealed our cargo of wheat destined for transshipment abroad. Customs inspectors at Antwerp would accord it free passage if they opened the hold and found it intact. If part of it were missing, there would be trouble.

I was glad I already had my pillowful.

Released by customs, the *Saigon* chugged cheerfully into the Belgian Meuse, toward Dinant and Namur.

This Belgian vacationland was a panorama of inviting cafés, hotels, and homes. Water skiers circled us, paddlers in kayaks or water scooters raced us, and swimmers clambered into the trailing dinghy for free rides. Campers hailed us from brightly colored tents lining the Meuse banks. High overhead, as we rode beneath forested cliffs, mountain climbers paused on ledges to wave to us. On the highways on either shore, French, Belgian, and German automobiles skimmed past.

Every tenth vehicle was a sight-seeing bus, roofed in Plexiglas and resembling the Vista-dome of an American railroad car. Built for only a dozen passengers, they looked like an American designer's dream that had been caught in the rain and shrunk.

On this wide river Louis allowed me to pilot the *Saigon*. He had canceled my "operator's license" in the Ardennes Canal, for there I had run the boat aground. I had lapsed into the familiar reflexes of driving an automobile. That was bad, for the *Saigon* turned left when the wheel spun right.

Traffic on the river became heavier as we passed the quarries, cement factories, and

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Barges Bound for Inland Ports Await Orders in Antwerp Harbor

House cleaning and laundry are the order of the day for these river boats tied up in Strasbourg Dock, entrance to Belgium's Albert Canal. A giant crane leans over the drydocked freighter across the basin. Tall buildings house grain.

Busy Antwerp handles nearly 50,000,000 tons of merchandise a year. Some 250 regular shipping lines use the port.

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Meuse-side Homes Glide by a Belgian Girl Steering Her Father's Boat

A captain's wife and older children share his duties. This girl's turn at the wheel indicates *papa* and *maman* are dining in the flower-scented pilothouse, their one-room home. They pass Givet, France.

coal mines below Namur. Large Belgian boats carrying 1,000 or more tons lumbered past us. Dutch boats appeared, looking, with their wide turned-up bows, like motorized wooden shoes.

Belgium and the Netherlands both observe the principle of free competition on the waterways—that is, boats from other countries work under the same rules as nationals; France, on the other hand, restricts foreign shipping. A Belgian boat may operate between France and Belgium, but not, as a rule, between French ports.

Soon we penetrated the outskirts of Liège, and here we witnessed an impressive demonstration of the significance to Europe of inland shipping.

For 10 miles, as we neared the center of the city, the *Saigon* churned a wake between ranks of coal mines, cokeries, steel mills, zinc foundries, chemical plants, cement mills, and electric generating stations. Smoke poured from blast furnaces. Whistles shrieked. Cranes groaned as they unloaded coal and ore from dozens of boats and reloaded others with steel and other products.*

This pulsing industrial complex has been tied to the sea by a watery superhighway,

the Albert Canal. Tomorrow we would take this turnpike canal. But today I must try to see the engineers whose job it is to maintain the canal and thus the industry of Liège as a working adjunct of the great port of Antwerp.

In this I was extremely lucky.

Efficient Belgians Get Results

Belgian efficiency and hospitality were to impress me more than once, but nowhere more than in Liège. There I boarded a tugboat belonging to the Office of Navigation, a semi-independent Government agency in charge of the Albert Canal and related waterways in Belgium's northeast corner.

With me were waterway engineers Raoul Lievens and Marcel Vandormael-Houben; the Office of Navigation general manager, Paul De Rudder; and the chairman of the Office of Navigation board of directors, Alexandre Delmer. Professor emeritus of geography at Liège University, M. Delmer was also former Secretary General of the Ministry of Public Works.

M. Delmer, I soon learned, had been in

* See "Belgium Comes Back," by Harvey Klemmer, NATIONAL GEOGRAPHIC MAGAZINE, May, 1948.

charge of construction of the Albert Canal. He had been forced to retire from its direction by the Germans, who captured this waterway defense line in May, 1940, by dropping paratroops on the roof of Eben Emael, key fortress of the Belgian "Maginot Line," and on vital bridges near by (page 550).

The "grand old man" of Belgian waterways was back at his desk on Liberation Day. Even now, at 75, he is Belgium's chief enthusiast for the contribution of inland navigation to increased western European prosperity.

As our tugboat ranged the city, we saw that in places only rooftops peeped over the concrete retaining walls of the Meuse.

Certain areas of Liège, M. De Rudder explained, face danger of collapse. Some coal-mining tunnels beneath the city already have caved in. In many cases the cave-ins have been deliberately provoked as an economical method of getting at the coal. The result is that much of the city has settled and the river wends its way like an elevated highway. Pumping stations throb along the banks, spouting seepage back into the channel.

We slowed down to admire the waterbound statue of King Albert where the Albert Canal strikes off from the Meuse toward Antwerp. When the Government acquired land for the Albert Canal, I was told, it took over as well the undeveloped ground on

either side. Sale or lease of the ground to industry provides funds for the canal's maintenance. Thus, with tolls charged to boats, the waterway is nearly self-supporting (page 551).

We paid 550 Belgian francs (\$11) toll next morning. Louis washed the deck while I took the *Saigon's* wheel. On the broad highway of the Albert, he calculated, even a novice could avoid a collision. Even so, I saw him hold his breath once or twice when we squeaked by in the wash of an overwhelming 2,000-tonner.

Engineer Lievens relieved the captain's mind when he took me off at Genk to show me a canal port where coal from the region of Campine is loaded for the one-day boat



Canal Nomad Buys Milk; the Dealer Keeps the Bottles

Unlike her French counterpart, this Dutch barge wife seldom serves wine at meals; she prefers milk and coffee. The milkman cycles the quails of Heer Agimont, a Belgian customs stop on the Meuse.





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Antwerp's Floating Elevators Spew Russian Wheat into Barges

Grain aspirators probe the holds of a Russian merchantman with long tentaclelike tubes and discharge her cargo into canalboats. This technique is one reason Antwerp competes successfully with lower-cost harbors.

The Soviet freighter does not require expensive pier space; it can be unloaded from both sides simultaneously. When necessary, work goes on all night.

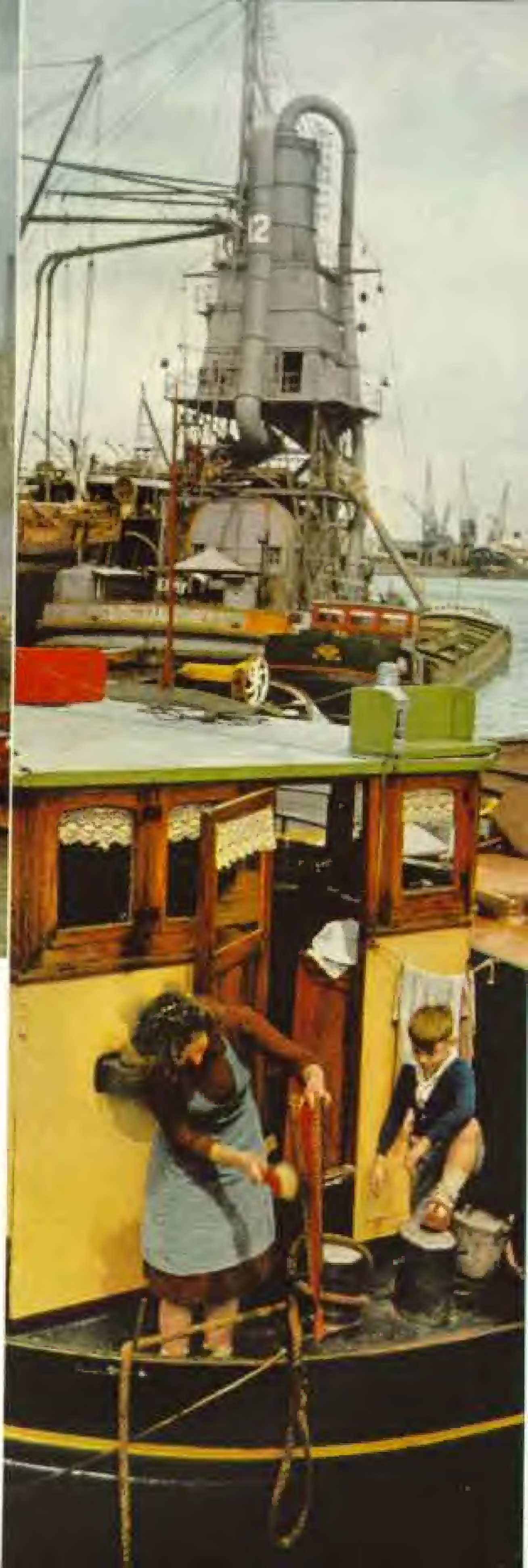
More than 20 *grainzingers* (grain suckers) do the harbor's work, sometimes as many as eight operating on the hatches of a single freighter. Wheat from this shipment will go inland to the Low Countries, Germany, and France.

←Page 556: Skipper levels Russian grain in his barge. The distant steamer loads potash at a warehouse.

→A Belgian boat wife cleans house while her barge awaits its turn at the floating elevator.

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Illustrations by National Geographic Photographer David H. Boyer





French Girl, Riding a Boom Ashore, Risks a Ducking in the Oise Canal

Most canalboats carry metal arms to swing passengers on and off. At times a wife goes ashore, shops the main street, and meets her leisurely barge at the other end of town.

ride to Liège. Railroad cars lining the quay were divided into three bucketlike sections, each holding 10 tons of coal. Traveling cranes hoisted the sections and spilled their loads into the holds of waiting péniches in a few seconds.

From the Albert Canal one would never suspect that Belgium, with some 8,500,000 people, is one of the most thickly populated countries of Europe. Louis and Marie Jeanne and I had seen little sign of habitation.

In M. Lievens's American car, however, we crisscrossed the canal to visit its enormous electrically operated locks, as well as ports on spurs of the canal. Towns and villages were everywhere.

Engineer Lievens had an impulse to sit once again in the cool evening over coffee at a sidewalk café in the town of Geel. There he could gaze across the same quiet little square where 15 years earlier he and other engineers had relaxed after hard days of construction work on the canal that we had just threaded in the *Saigon*.

The café proprietress welcomed us and soon

took us into an oak-beamed dining room, where murals illustrated her account of the singular story of Geel.

Around the room, over a vista of gleaming silver and starched napkin peaks, were paintings of the life and death of St. Dymphna. According to legend, the proprietress told me, this Irish princess took refuge in Geel after fleeing her mad father. Traced to Belgium by a trail of gold Irish coins, Dymphna was pursued by her father. One mural pictured the crazed Irish king, wielding a great battle ax, about to slay his daughter as she prayed at an altar.

Canal Town Cares for the Mentally Ill

The martyred girl was canonized, and St. Dymphna has ever since been invoked as a protectress against insanity. Miraculous cures of mental illness are said to have occurred at her shrine.

Today, as for centuries, Geel is the home of deranged pilgrims. The villagers of Geel have made a calling of caring for the mentally ill, accepting them into their homes, pro-

viding them with love and understanding as well as treatment.

"We have more than 2,500 of them in the town," the proprietress told me as we returned to our sidewalk table.

"They sometimes come here for coffee or dinner. Any person you meet on the street may be one. People here feel that if all of us accept them as normal, many will recover. And they do."

As we talked, night arrived, and the church spire became a black stiletto against the fading light. Silently we drove back to the canal. Strange-looking figures haunting doorways caused me more than once to glance back over my shoulder. But not with any feeling of insecurity; it was only with the wish that Dymphna, the Irish princess, might come back after about 1,550 years to see how lasting is the inspiration she fired in the hearts of the people of Geel.

Journey's End at Antwerp

Fifteen days after we left Paris, Louis tied up in the Strasbourg Dock of Antwerp harbor in a flood of sunlight as welcome as it had been rare (pages 553 and 557). Our journey was nearly completed.

We were scheduled to transfer our wheat to a seagoing merchantman. Louis would contact the agent of the Compagnie Générale de Navigation to find out where. Meanwhile, all hands gladly accepted shore leave.

I placed a request with port authorities for permission to visit and photograph the 3,460-acre harbor, where some 250 regular shipping lines annually take on or discharge nearly 30,000,000 tons of cargo.

A day or two might go by, I thought, before officials had processed my application.

I simply didn't know my Belgians. Within the hour I was in conference with Oscar Lee-mans, general manager of the port of Antwerp, and Robert Vleugels, his assistant. Other assistants soon were coming and going with passports, permissions, and letters of authority.

In an incredibly short time my briefcase was full of literature on the port of Antwerp, most of it in four-color printing and four languages. Port inspector A. P. Vermeersch then took charge, and presently I was surveying the harbor from an official tugboat.

Antwerp ranks with Rotterdam and Marseille among the largest ports in continental Europe and surpasses them in general merchandise tonnage.

The harbor, said my guide, is more expensive per hour for shipowners than many of its competitors. Wages of the harbor's dockers are higher. Pier space costs more. Rental of cranes and warehouses and drydocks from the port authority is steeper.

"But we make up for those handicaps in efficiency and speed," he declared. "Whenever necessary, the port works around the clock. Turnaround time is important to shippers and steamship operators. One reason for our speed is that cargo can be transshipped by trucks, trains, or barges everywhere in the port. More than half our tonnage is transshipped by barges.

"Look at that," he said. In the falling light he directed my attention to a freighter anchored in mid-harbor. Half a dozen floating grain elevators leaned over her on both sides. In the distance they looked like huge insects, their long tentaclelike tubes probing into the ship's hatches.

As we steamed closer, I saw a brood of peniches clustered around the merchantman, goslings around a goose. The grain aspirators were sucking wheat from the small boats, then spewing it into the freighter.

Saigon Rides High Again

And there was the *Saigon*! No longer were her decks at water level. She was lighter by 250 tons. Her wheat was gone, and she rode high in the water. Her job was finished.

We pulled alongside, and I clambered aboard, falling on Louis and Marie Jeanne as if they had been long-lost friends.

Yes, they were finished at Antwerp. They had another job. They were to go to Genk. There the *Saigon* would load with coal, and the Riehl family would strike back up the Albert Canal and the Meuse, all the way to Nancy on the Meurthe River in France.

Nancy, I knew, was where Marie Jeanne's parents lived in retirement, in a little house by a canal. The Riehls were in luck. They were in for a reunion.

I leaped back onto the tugboat as the *Saigon* wheeled around in the harbor and pointed her bow for the Strasbourg Dock and the entrance to the Albert Canal. Louis and Marie Jeanne and Thierry stood by the wheelhouse, waving goodbye. Even Tino wagged his tail in salute.

And I shouted a French farewell as the canalboat I had learned to call home slipped away in the gathering darkness.



BY THOMAS J. HARGRAVE

Chairman of the Board, Eastman Kodak Company

An eagle's-eye view of an erupting volcano is a picture-taking opportunity not to be missed—even when it involves a jolting flight in a Piper Cub with no seat belt and a cabin filled with sulphurous fumes.

My wife and I had flown from Honolulu early last spring to Kailua, on the island of Hawaii. We wanted to see the sights of this largest of the Hawaiian group, but my personal objective was a bit more adventurous. I hoped to get a first-hand look at a new volcanic cone, as yet unnamed, that had burst from the seaward flank of fiery Kilauea a couple of weeks before.

Kilauea and its sister volcano, Mauna Loa, lie within Hawaii National Park, set aside in 1916 to conserve one of the most interesting volcanic regions on earth. To Halemaumau, the fire pit of three-mile-long Kilauea, locally dubbed "the drive-in volcano," crowds of tourists have often flocked by car to witness pyrotechnic displays. This eruption, however, was another story. Far down the seaward slope of Kilauea, lava had broken through and was oozing inexorably over forests and fields of coffee and cane.

My personal project got off to what seemed an auspicious start; at Volcano House, on Kilauea's rim, we felt tremors during the night. Then, just as suddenly, my hopes were dashed. No automobiles would be permitted within five miles of the new outbreak.

I was very disappointed as we drove to Hilo, the island's chief city, for lunch. We had scarcely picked up our napkins, however, before our driver rushed in with good news. He had found a pilot who would take me up.

At the Hilo airport my son-in-law, Bud Frame, insisted on going along. The two of us crowded in behind pilot Charles K. Okuna and struggled—in vain—to fasten the seat's one safety belt over our two laps.

The window on my side was dirty. When I mentioned this fact to the pilot, he calmly reached back and opened the window—giving us a perfect view but no protection against the fumes that soon drifted into the plane.

Soaring over a Lava Fountain

Flying about 500 feet above the base of the spouting fountain, we made three passes at our target. The plane jumped frantically as it went through updrafts of hot, sulphurous gases above the vent. Below us streams of doughy, incandescent lava burned their way across an estimated 2,000 acres of woodland and rich Hawaiian topsoil. The fountain wove back and forth in the crater, lava and ash spouting in a continuous geyser. Clouds of acrid gas drifted seaward.

Back in Hilo after more than an hour of aerial picturemaking, I asked some of the questions that had occurred to me after we had circled the volcano's fuming heart. Kilauea and Mauna Loa, I learned, are perhaps the world's most closely watched volcanoes. For years a research center has been maintained at Kilauea; its records make up one of the most notable volcanological libraries in existence. The two volcanoes even boast a quarterly paper, the *Volcano Letter*, devoted in large part to their sulphurous doings.

One writer has labeled Kilauea "the safest and friendliest volcano in the world." Mauna Loa more justly deserves the tag, however, for Kilauea has killed a number of people, including a contingent of Hawaiian warriors wiped out in 1790, and a foolhardy photographer killed by falling rock in a 1924 eruption.

Islanders depend heavily upon the U. S. Geological Survey's Volcano Observatory for prompt warning of eruption. But once, in 1935, more direct relief was needed—and granted. Alerted that a lava flow threatened the city of Hilo, a fleet of United States bombers dropped thousands of pounds of high explosive in its path. The course of the flow was changed, and both town and harbor were saved from almost certain destruction.

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← A Fountain of Lava Spurts 500 Feet from a New Volcanic Crater

Volcanoes created the Hawaiian Islands. Erupting in the depths of the Pacific millions of years ago, they pushed their summits above the surface and formed the archipelago. Except on Hawaii, largest of the group, they are dormant today. That island boasts two of the world's largest active volcanoes, Mauna Loa and Kilauea.

Kilauea broke loose again last February and was active until May. When earthquakes shook its slopes, a narrow fissure opened and lava burst forth. This photograph was made from the air two weeks later. Surf breaks against the shore about three miles away.

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Seething Lava Swallows Forests and Farms. Sulphurous Gas Fills the Air

"Pele is angry," islanders say each time Kilauea erupts. Pele's hair, bits of aerated basalt shredded as fine as spun glass, floats overhead. The fire goddess supposedly dwells in the main crater (not shown). Thousands rimmed that huge bowl in 1952 and 1954 to watch Nature's fireworks in Halemaumau, a 430-foot-deep pit inside the crater. This year's minor explosion created a parasitic cone on Kilauea's slope.



Volcanic Bombs, Blown Skyward by Exploding Steam, Rain on the Cone

Fiery boulders cool even as they fall, but many still glow upon the ground. Sticking together, they build up a cone 150 feet high. In the center a cataract of molten stone breaks through the dam; its speed may reach 30 miles an hour. Farmers fled to safety as the incandescent stream swept across papaya, coffee, and sugar-cane fields. As it tanned out, the lava slowed to a crawl and cooled to a wall of cokelike clinkers.

Caldy, the Monks' Island

By JOHN E. H. NOLAN

With Illustrations from Photographs by the Author



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AMONG the many small islands that dot the coasts of Great Britain there is one, rising sheer out of Bristol Channel, where the slow-paced measures of Gregorian plain song mingle with the sound of the sea. This isle, shaped like a turtle a mile and a half long, lies on the doorstep of Wales, two and a half miles south of the fishing port of Tenby in Pembrokeshire.

If you, like me, are fond of small islands, you might care to know more about this unusual little place. It is Caldý (also spelled Caldey), known to the Welsh as Ynys Byr—the only island in Britain wholly owned by monks (map, page 567).

A Link with John Paul Jones

In addition to its Cistercian monastery, the Abbey of Our Lady and St. Samson, Caldý boasts three churches, a village, and even a ghost. It has a guesthouse, but no person can land without permission.

My interest in this strange little island began one morning when I picked up a copy of the *Western Mail and South Wales News* and saw an intriguing paragraph. It reported

that a hoard of prehistoric human remains had been found in Caldý's cliffs near a spot called Jones Bay, named after the American naval hero.

Wondering what link there could have been between John Paul Jones and an island so far removed from America, I thought I might find the answer on Caldý itself.

I wrote to the Prior for permission to visit the island, received a most gracious invitation, and set off on a sunny May morning for Tenby, where the monks' own boat was to pick me up.

A burly, rosy-faced monk, wearing the rough brown habit of a Cistercian lay brother, met me there. Holding a bag of mail, he glanced down at a dinghy bobbing in the shallows beyond the quay at low tide. Farther out the monks' motor launch was anchored.

Without more ado, the good monk picked up my baggage and would have taken my typewriter and camera too had I not insisted on sharing the load. Pausing at the water's edge to hitch up his gown, he announced his intention of carrying me out to the dinghy.

To be carried pickaback seemed both ridiculous and embarrassing. But having no option, since I was not attired for wading, I accepted his offer and was dumped into the dinghy like a sack of meal.

As we drew alongside the boat, it occurred to me that her name, *Lollipop*, sounded rather odd for a vessel owned by the strict Cistercian order. Moreover, the boat's appearance hardly suggested the name; her interior was completely gutted for the transport of cattle and pigs.

War Hero Becomes a Monk

I was helped aboard by a novice, whose white habit was spattered with engine grease. He smiled but, following the custom of silence, did not reply to my greeting.

Whispered my companion: "The father is making the trip to test the motor."

Later I learned that this monk had been a distinguished pilot in the Royal Air Force during World War II.

I learned also about the boat's curious name. When the monks bought the craft,

they intended to rechristen her, but this idea was opposed by the local fishermen. Being superstitious, the villagers harped upon the sad fate of her predecessor, which had been lost after her name had been changed. They begged the monks to leave well enough alone, and thus the matter stands.

Stores were strewn over *Lollipop's* deck. Picking my way among sacks of flour, bags of cement, and drums of oil, I tripped over a cat in a cage. Scattered helter-skelter were piles of roofing tiles, cans of paint, and parcels of bread and joints of meat for the island's lay community.

Ahaft the wheelhouse I met the only other passenger, a 74-year-old islander named David Lloyd. He was squatting on a crate of chickens.

Soon we were edging cautiously through a narrow passage, with Tenby's obsolete fort on one side and black weed-covered rocks on the other. Two and a half miles ahead lay Caldly, glowing in the track of the westering sun and crowned by a curious ring of vapor. Since the sky was otherwise cloudless, I asked Lloyd

← A Caldly Monk Looks Seaward from a Flemish-chimneyed Ruin

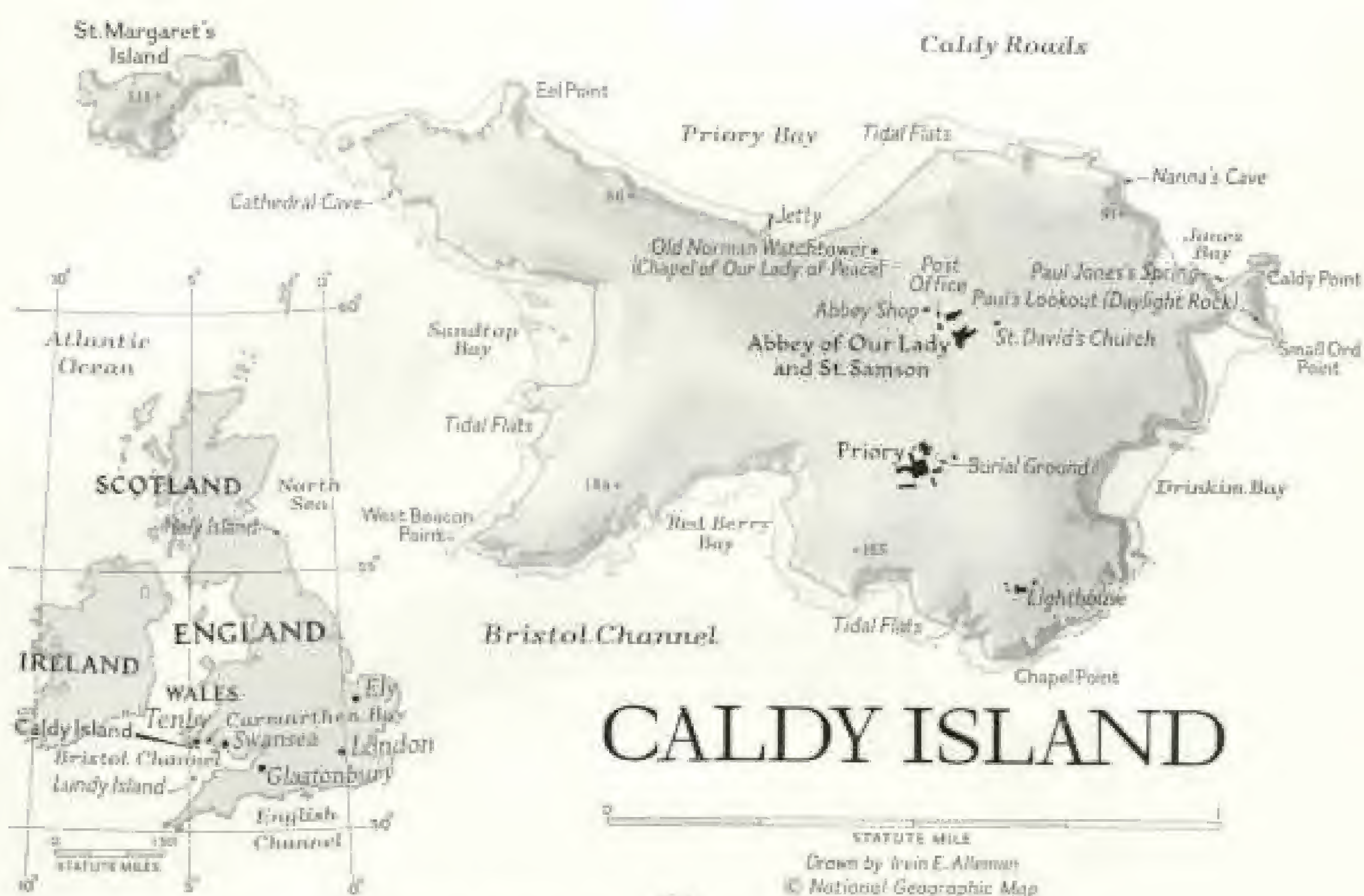
✦ Fishermen haul some 11,000 people to the island each summer. Without special permission, visitors may not stay over night or converse with the monks. At low tide most passengers take off shoes and wade ashore. A monk carried the author pickaback through the shallows in Tenby harbor.





Black Capes, Bright Aprons, and Mother Goose Hats Proclaim Caldy a Welsh Isle

Residents wear the national costume once a year. Miss Stanton (left), who manages the Abbey Shop, knits as she chats with Florence Roch, daughter of an earl. The dog is a Corgi, a Welsh breed. Like a fairy-tale palace, the monastery crowns the wooded hill overlooking the post office and village green.



CALDY ISLAND

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Tiny Caldy Island, Home of Forty Cistercians, Is a World to Itself

if he could account for this strange bright haze.

"It's called St. David's halo," he explained. "It appears when cold and warm air layers mix in a certain way. There's nothing particularly remarkable about it as far as scientists are concerned, but most Pembrokeshire folk regard it as a reminder of the holy men who made Caldy their retreat long ago."

He was referring to those tough Celtic sailor-monks who, between A. D. 450 and 600, carried their missionary work to Ireland, Wales, Cornwall, and the Continent. Among these were Pyro, Caldy's first Christian inhabitant, and St. Illtyd, held by legend to have been a knight in King Arthur's court.

Now, as our 16-ton boat heeled to the swell, I could more readily appreciate the courage of those old-time missionaries who traveled to and from the mainland in tiny coracles, flat-bottomed, rudderless, and dangerously lightweight.

Twenty minutes later Caldy towered grim and gray above us. We were nearing its north side, a limestone barrier more than 100 feet high. One headland to the right, whose summit had the appearance of a ruined castle, was alive with birds. Another, directly ahead, carried a giant crucifix.

David pointed to a spot in the cliffs where two caves, side by side, stared vacantly like

eye sockets in a skull. In these had been found bones and teeth of rhinoceros, hippopotamus, mammoth, and other Pleistocene animals, evidence that Caldy was once part of the mainland.

Through the only gap in the cliffs I spied a winding trail sloping up from a silver beach. Beyond, peeping from dark clumps of trees, white-walled, red-roofed buildings raised their towers and spires.

Through Breakers to an Isle of Peace

Because of the low tide, we could not make the little jetty in Priory Bay. Instead, we edged up to *Lollipop's* permanent anchorage, a black-and-white striped buoy, and made fast the chain.

Then we hopped into a dinghy—just two of us at a trip. More might have meant being capsized in the tumbling surf. A powerful oarsman, my companion monk had all he could do to scull us through the breakers.

Within half a minute of our jumping ashore my companion had loaded a barrow with my baggage and was pushing it up the winding trail.

Soon I sensed a feeling of peace that I could almost touch, for no sound save the mewling of gulls broke the silence. Beside the path huge fuchsias, much taller than a man and with boles as thick as my leg, overshadowed



banks of young ferns. Here and there blue fleabane, violets, and primroses splashed the undergrowth with color.

At length, reaching the top of the rise, we came upon a line of sand dunes. There, in the dense covering of marram grass, I saw specimens of a Mediterranean snail which lives on the island.

Suddenly it dawned on me that my companion seemed perfectly willing to converse. Since I had assumed that these Cistercians observed strict silence, I asked him to explain.

The monk made his position clear. As the island's "general factotum," he goes to the mainland regularly except when rough weather prevents. He shops, banks, sells pigs and cows, collects the mail, and meets incoming guests. Such duties make speech necessary, and the Prior has therefore sanctioned his freedom to speak outside the monastery.

He told me further that the Rule of St. Benedict, which they follow, is purely contemplative, and that silence is enjoined only as an aid to spiritual meditation, not as a penance.

"But don't the monks lose their voices?"

He laughed at that.

"You forget," he answered, "that we spend some eight hours a day in choir."

I gathered that when it is really necessary to speak, the Father Prior readily grants permission. Otherwise the monks, when working

together at their daily tasks, pass messages by a simple code of signs.

Tramping through ground ablaze with golden gorse and carpeted with purple thrift, we arrived at the monks' guesthouse.

Here I was welcomed by the white-robed guest master, a gentle, quiet-spoken man whose soldierlike carriage impressed me. Later an islander told me that, before receiving the habit, the monk had been a British Army officer and had won the Military Cross in World War I.

Rooms Dedicated to Saints

I was shown to a simple but comfortably furnished room. Using the wide hem of his robe as a duster, the monk swept the surface of a large writing table. He announced that meals would be served at the monastery and marched out with a whispered "God bless you, my son."

Left alone, I inspected my surroundings. In the corridor outside I found a plaque marking each door, inscribed with the names of early Celtic saints: Samson, Gildas, Malo, Briec, Paul Aurelian, David of Wales. My own room was dedicated to St. Iltyd.

I was surprised to find piped water, and electric light from the monks' own generating plant, which supplied every dwelling on the island. The water, power-pumped from a well, comes from the original spring used by



◀ Monks Cart Coal from a Ship Beached by Low Tide in Priory Bay

Once a year *Staffa* or a sister ship brings 100 tons of coal from Swansea in south Wales. All able-bodied monks help haul the cargo. On finishing the job, they appear as sooty as miners.

✦ Caldy Men Dedicate Their Lives to the Service of God

From the moment he makes his vows the Cistercian no longer lives for himself but for his monastic family. Meditations, eight daily church services, and farm chores occupy him from 2 a.m. to bedtime. He abstains from meat, fish, and eggs except on doctor's orders.

Cistercians believe silence aids contemplation. Field workers never speak to one another, but pass messages by simple signs.

Farms provide most of the monastery's income. Exports include wheat, oats, barley, vegetables, cheese, butter, and livestock.

These monks in gray smocks are Belgians. Their pets are two of Caddy's 13 dogs and cats, whose number is limited to protect the island's birds.

The Priory (background) is believed to have been built in the 12th century. Its stone spire leans 14 inches from the vertical (page 575).





Caldy Treasures the Ogham Stone

Uncovered in a burial ground, the slab is preserved in the Priory church. Fragmentary characters from the Ogham, an ancient Irish alphabet, look like runes (upper left corner). They are believed to have been carved in the 6th century. Latin inscription dates from about 900 (page 576). The photographer chalked letters to make them stand out.

Pyro. The monk was drowned in this well about A. D. 500.

Setting out to visit the village, I passed a large lily pond whose flowers, still in bud, promised a marvelous display of both yellow and pink blooms. A monk stood in the water up to his knees examining the plants.

Farther on, whitewashed cottages with blue slate roofs dotted a large village green. Here I stopped to speak to a Miss Harris, who was leaning over her garden gate. She invited me into a home as comfortable as any on the mainland.

Questioning brought out the fact that the island's population numbers about 20 lay people and 40 monks.

"Not one of us was born here," Miss Harris said. "The last native family left six years ago. Now there are no children," she added regretfully.

Average age of the laity is about 65. I met Mrs. Plenty, spry at 94, and Miss Allis-Smith, who still planned to travel at 92. She told me she had visited every inhabited country, including Tibet. "That was before the Communists got there," she remarked with a sniff.

Except for two men employed by the monks, the lay residents have sufficient private means to live in retirement. As tenants of the Cistercian order they pay low rents.

Unlike the people of England's Holy Island,* these carefree people are exempt from local (though not national) taxes, a privilege protected by seigneurial laws laid down centuries ago.

No Rushing Motor Traffic Here

Never troubled by traffic, the islanders do not own even a bicycle. The only powered vehicle, an American tractor, belongs to the monastery farm. It raises the dust on the one and only road, barely half a mile long by 10 feet wide.

As no hard liquor is sold, those of the laity who like a drop of Scotch or noggin of rum must fetch it from the mainland.

In this narrow isle, only three-fourths of a mile wide at its broadest part, I spoke to people of 11 nationalities, from every part of the British Isles as well as from France, Belgium, the Netherlands, Poland, Trinidad, and Ceylon. Here, indeed, I found a United Nations. I never heard an argument or even a cross word in my seven weeks' stay.

Although there are 13 dogs and cats in the town, pets are restricted, for the monks desire to protect the thousands of birds which make the island their sanctuary.

Rabbits and rats can be shot, as well as lesser and greater black-backed gulls, which rob other birds of eggs and young. But nobody owns a gun except the monks, and they find little time to use it.

Caldy has only one store, the Abbey Shop. I found its window filled with an amazing array of glazed earthenware, potted plants, curios, and religious souvenirs. Wondering who purchased the goods, I inquired inside.

Miss Stanton, a voluntary worker who man-

* See "Pilgrimage to Holy Island and the Farnes," by John E. H. Nolan, *NATIONAL GEOGRAPHIC MAGAZINE*, October, 1952.

ages the shop for the monastery, was busy taking stock—getting ready, she told me, for the season to start. I must have looked puzzled, for she explained that between May and September day visitors are permitted to land. About 13,000 come each summer, ferried by the motorboats of Tenby fishermen at four shillings (56 cents) for the round trip.

Some journey as pilgrims to see the monastery's relic of St. Samson; others are brought by sheer curiosity. Either way, their fees greatly assist the island's tiny and limited economy.

On arrival visitors are told that they must neither speak to the monks nor photograph them, but keep to the main trail and be ready to leave before the evening Angelus sounds.

To me, the monastery towering over the village suggested the Tyrol, with its red roofs, spired and turreted, soaring above white walls overhung by wide eaves.

Records show that Caldy's long ecclesiastical past was interrupted briefly in the 10th century, when Danes ravaged the coast of Pembrokeshire. Up to a few years ago no one knew what fate had befallen the old Celtic monks.

One answer to the riddle was suggested by a Cistercian archeologist, who showed me an excavation he had made near the tiny Celtic church of St. David. The pit had held a heap of skeletons, piled one upon the other. They were not of pre-Christian age, and they were not the remains of pirates. A close examination seemed to indicate that they were from the 9th or 10th century and that they were the victims of the marauding Danes. The bones were reverently laid to rest again with proper Christian rites.

I did not take meals in the monastery's refectory, a large, oak-paneled room with well-scrubbed tables and stools; instead, I was served in a small adjoining room, where I was waited upon by a gifted young monk who speaks six languages and was once a member of the British Intelligence Corps.

Except for an occasional slice of cold meat for dinner and a boiled egg for breakfast, my food was the

same as that of the monks: a vegetable diet, mostly beans, potatoes, cabbage, and salads. Sometimes I had cheese, with fruit and junket to follow. There was plenty of homemade bread and farmhouse butter. The monks eat meat, fish, and eggs only on doctor's orders and cheese for only a few weeks in the year.

Ex-Army Colonel Serves as Doctor

Until recently the island had no doctor; now a new recruit solves the Cistercians' medical problems—a former colonel in the Royal Army Medical Corps. He was a novice, studying for the priesthood, when I was there.

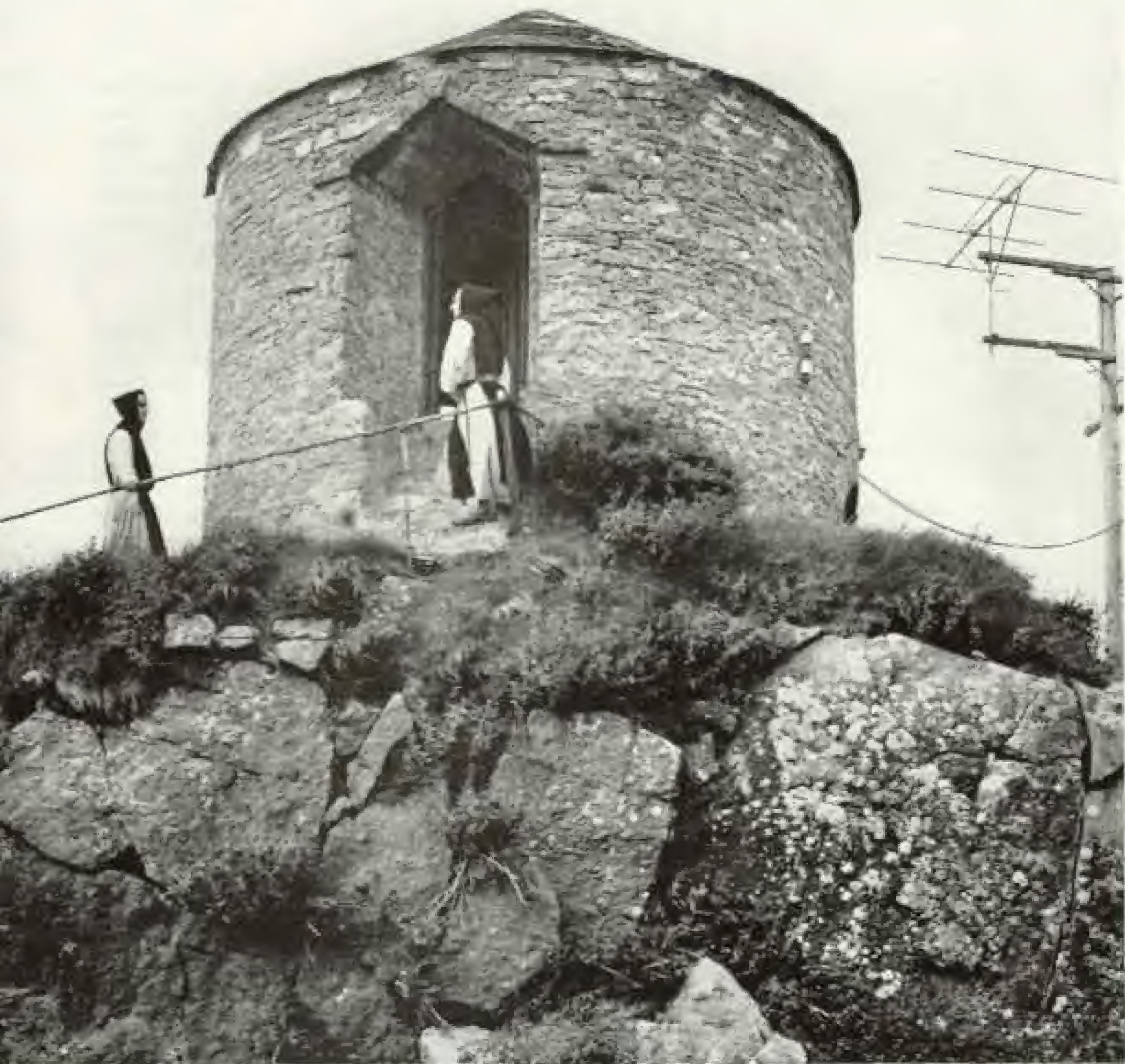
Two days after my arrival I was interviewed by the Prior, a tall, spare man. I already knew a little of the background of this distinguished scholar, who had barely escaped death at the hands of the Gestapo.

The Prior listened attentively to my plea for permission to speak to the monks and to take photographs. When I had finished, he smiled and pondered a while. Then he reminded me of the strict rules.

Here John Paul Jones Kept Watch for Men-of-war

During the Revolutionary War the Americans aided British shipping close by. Seeking fresh water, he landed on Caldy. Daylight Rock served his crewmen as a lookout (page 578).





Eventually, however, he granted permission, provided I did not speak to any monk after complin, the last prayers of the day at 8 p.m., or use my camera in any way that might give offense to the brethren.

Weird Symphony of the Night

The first two nights of my stay I had been fitfully aware of a strange churring sound, rather like that of a sewing machine. On the third night, as it started again, I slipped on my clothes and hurried outside. A three-quarter moon spread its light over the sunken garden of the guesthouse, where the weird symphony continued unabated.

Something like a big bat circled overhead. Suddenly it brought its wings together in a series of loud claps, startling at close range.

Another of the creatures appeared, and the two long-winged, long-tailed shapes flitted silently about at head height. The churring had ceased.

All at once it dawned on me that I had intruded on the courtship of the nightjar, or goatsucker.* This migrant from Africa builds no true nest. It lays two eggs on the ground, usually under gorse, where its color, like that of a brown lichen-covered stick, tones with its surroundings. Of course it doesn't suck the milk of goats, though old-time naturalists thought it did. Its food consists of harmful insects and beetles.

As the days passed, I quickly got on

* See "Humming Birds, Swifts, and Goatsuckers," by Alexander Wetmore, *NATIONAL GEOGRAPHIC MAGAZINE*, July, 1932.

Radiotelephone Is → Caldy's Sole Link With the Mainland

First of its kind in the British Isles, the instrument operates like an ordinary coin-in-the-slot phone; a call to Tenby costs about 5½ cents.

This brother attends to the monks' external affairs. He shops, banks, collects the mail, and meets guests. His freedom to speak outside the monastery is sanctioned by the Prior. Young visitors watch him make a call.

← Clifftop antenna serves the two-way radiotelephone. Below lies Priory Bay. The Norman watchtower used to rise more than 40 feet. Its ruins has been roofed to make the Chapel of Our Lady of Peace. Two monks climb to the lofty oratory.

friendly terms with all the villagers, including the carpenter, Mr. Dalby. His wife, an excellent cook, specializes in omelets and cakes. She makes good use of the eggs of the herring gull, which, though free from any fishy quality, are rather fuller in flavor than the ordinary farmyard egg.

One day I watched an islander rummaging among the rocks at Sandtop Bay. At intervals I saw him pop something into his mouth. Curious, I approached and asked, "What is it you're enjoying?"

"Limpets," he grinned. "All you have to do is to knock one off the rock and scoop it out of its shell; it's a really good thing, even better than its relative, the oyster."

Shortly after my arrival I met the postmaster, keen-eyed Albert Grigg, a British Navy pensioner. Besides running the post office, he and his wife sell picture postcards and cigarettes and exchange weather reports with Lundy, Caldý's sister isle 30 miles south.* An old Marconi radiotelephone carries the messages.

On my first visit to the post office I noticed letters in the window for the islanders to pick up. One letter bearing the imprint of the National Geographic Society was for me. Mr. Grigg, curious to know what I was going to write, suggested that I might be interested in



the Black Monk. This took me aback, as I had never heard of him.

He looked at me with surprise. "Ah," he said, "so you haven't come to write about Caldý's hidden treasure. Come along, and I'll show you something."

As we trudged up to the old Priory I wondered what he had in mind, for he seemed most secretive, and I asked whether the treasure had anything to do with John Paul Jones.

He smiled. "You'll see Jones Bay, but he wasn't thought of when the Black Monk was alive."

I suggested that it might be a ghost we were going to see.

* See "Lundy, Treasure Island of Birds," by Col. P. T. Etherton, NATIONAL GEOGRAPHIC MAGAZINE, May, 1947.



"Not exactly," he answered, "although the Black Monk is a ghost!"

His story took me back to the time when Henry VIII turned his attention from feminine entanglements to the acquisition of riches and began to plunder the monasteries. The treasure, according to legend, consisted of a valuable collection of jewels and sacred vessels, the offerings of devout pilgrims. In the 16th century it was secretly removed from England's famed Glastonbury Abbey* and taken across Bristol Channel to Caldy.

The monk in charge of the treasure arrived dressed as a peddler. Obeying his abbot's in-

structions, he asked the Prior of Caldy to suggest a hiding place.

According to the story, the Prior was not overjoyed at the receipt of such great responsibility, especially since he momentarily expected the suppression of his own monastery.

However, he selected a spot in the Priory and under cover of night brought stone and mortar to the chosen place, unknown to any but himself and the monk from across the water.

* See "Landmarks of Literary England," by Leo A. Bordi, NATIONAL GEOGRAPHIC MAGAZINE, September, 1955.



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Next day the Prior received the dread summons to the mainland, where the King's order for the dissolution of his monastery was waiting to be signed. As he was about to leave, the monk knelt for his blessing, saying: "Bless me, father, for when you return I shall not be here to receive your blessing."

Thinking that this remark referred only to the completion of the task of hiding the treasure, the Prior blessed him and went his way, never to return.

That same night, the legend continues, the monk locked himself in the room where the stone and mortar had been collected. He

← Cliff-top Hotels and Georgian Houses Ring Tenby's Snug Harbor

Tenby, a Welsh resort town, supplies provisions for Caldy. Fishing boats crowd its harbor; bathers sun on the wide, sheltered beach (right). Caldy Island's north face appears across a 2½-mile channel. Cultivated fields cover most of the island.

Acro Films Ltd.

solemnly bricked up both the treasure and himself in a cavity in the massive wall.

Ever since, his ghost has haunted the island.

As the postmaster finished his tale, he pointed upward to the Priory tower, which leans 14 inches out of the perpendicular.

"When that comes down, as it may well do one day, perhaps the treasure will come to light," he remarked, and we entered a small court paved with the smallest cobblestones I had ever seen.

My guide took me up a turret stairway, crude in structure and unskilled in design, the work of a primitive people. At one point I peeped in through an embrasure just wide enough for a bowman to flight his arrow.

Treasure Hunters Raid the Priory

Ducking our heads, we entered a low-ceilinged room, formerly a guest chamber. It was completely bare except for a pile of rubble. Above this heap a hole big enough for a man to step through was torn in the wall.

"There you are!" exclaimed Mr. Grigg dramatically. "That's what the last treasure seeker did only six months ago."

I gaped at the cavity and asked whether anything had been found.

"Not so far as we know; you see, he was bundled off the island the same day."

The postmaster pointed to another place in the wall where three rough stone steps led to a door which had obviously been sealed for years.

"The Black Monk appears there!"

From further remarks I learned that, a year before, two students who had not known of the ghost's existence claimed to have seen such a figure. One described the spirit as a man dressed in a long black gown, who had stalked across the room and disappeared through the bricked-up door.

In the Priory church Mr. Grigg showed me one of Caldy's real treasures, an inscribed slab of stone 5 feet long and about 18 inches wide. Some 1,400 years old, it was found in a field thought to have been an old Celtic burial ground. As its value was not immediately recognized, the slab was used as a window sill, then as a garden seat.



Departing Visitors Follow a Winding Trail to the Small-boat Pier

Dinghies from Tenby tie up here at half or full tide. Strong winds stunt trees on the heath.

Two inscriptions mark the stone. One, in Ogham characters—the ancient Irish alphabet—around the upper part, dates from the 6th century. An incised cross separates it from a Latin legend below (page 570).

Sir John Rhys, Oxford's famed Celtic scholar, deciphered the fragmentary Ogham carving as *MAGL DUBR*, which he took to mean, "the tonsured servant of Dubricius."

It is known that St. Dubricius, a Celtic bishop who lives in legend as the man who crowned King Arthur, came to Caldy every year for the Lenten season.

Thousand-year-old Inscription

The Latin inscription is generally believed to date from about 900. Experts differ in reading it.

Sir John translated it thus: ". . . and I have provided it with a cross. I ask all who walk in this place to pray for the soul of Cadwgan."

One of my purposes in visiting Caldy was to see its multitude of birds. Accompanied by a monk and Nigel Hepper, a Kew Gardens

botanist, I set out to visit the northwest side of the island. After passing an old Norman beacon or watchtower, now serving as a tiny oratory, we followed a barely visible trail to Eel Point.

Our abrupt appearance was met with loud cries from hundreds of nesting birds. Fiercely resentful, they rose to ride the sky, sideslipping, braking, some raising great splashes as they dived into the sea. Two ravens, croaking hoarsely, sailed overhead. One turned somersaults, straightened out, and flew upside down—a most amazing performance.

A pair of stormy petrels, or Mother Cary's chickens, winged silently out of a crevice. Flying low, they soon disappeared from view in Carmarthen Bay. Black-backed gulls, seizing their chance, swept down to raid the deserted nests.

Suddenly Nigel spotted two choughs, among the rarest of British birds. There was no mistaking their glossy black plumage, scarlet legs, and long, curved, scarlet bills. Only a few pairs remain on the extreme west coasts of Devon, Cornwall, and Wales. Captured alive,

they are readily sold for between £20 and £30 each to pet lovers.

Although the chough is not a sea bird, it makes its home in shoreline crevices where it builds nests of sticks and roots lined with grass and wool. It feeds mostly on insects; its cry, *chee-ate*, is not unlike that of a crow.

As we crouched in the gorse, hundreds of herring gulls, guillemots, oyster catchers, and razorbills drifted slowly back to their nests. Even the grotesque and timid cormorants soon settled down again.

After we left Eel Point, I was startled by the explosion of a rocketing cock pheasant at my feet. Only a few wild specimens of this bird nest here. Grown very cunning, they skulk in the undergrowth and are not often seen except by patient bird watchers.

Our plan to see Cathedral Cave, a spot rarely visited even by the monks, brought us to the head of the island, which overlooks the islet called St. Margaret's (map, page 567).

Here Nigel and I were warned to keep a sharp lookout for falling rocks. We were told,

too, that we could not stay long because of the tide's early return.

Clambering down to a rock-strewn beach, I was hard put to keep up with my younger companions. Ahead was a wilderness of scattered boulders and sharp limestone ridges several feet high.

After scaling a razorback ridge, we came to a precipitous cliff overlooking a dark, deep pool in which lurked all sorts of creeping marine creatures. There was the cave we had come to see. More by luck than judgment I managed to follow my companions along an eight-inch-wide ledge into the reeking cavern.

The monk had brought an electric torch; its beam fell upon a tangled mass of broken spars, barrels, planks, ships' fenders, frayed ends of rope, and splintered hatch covers—silent and melancholy evidence of some forgotten sea tragedy.

As we advanced slowly over limestone slabs and water-polished boulders, our words returned to our ears in thunderous echoes.

Sixty feet high and 286 feet long, this oft-

A Monk Waves Farewell to Guests Moving Out to the *Lollipop*

Twice a week the monastery's boat sails to Tenby for provisions, but makes sometimes isolate the island.



submerged cavern is longer than the nave of Ely Cathedral. From its 40-foot-wide floor, slippery with seaweed and minute organisms, came a faint phosphorescent glow.

Cautiously we approached the far end, where a thin shaft of daylight stabbed the darkness. Glancing up, I saw a circular patch of sky. It was like looking into a giant telescope, for the light fell through a narrow funnel more than 150 feet long. This was one of three blowholes left by the ceaseless underboring of the sea.

The monk told me that in really rough weather water is forced up through this pipe to fall in spray on the land above.

Nigel, on our return to higher land, stooped many times to pluck a flower or fern, placing the specimens between sheets of blotting paper in a satchel. I was amazed when he said that on this one tiny island have been found more than 300 species of flowering plants and ferns. Still the search goes on for others.

Here and there as we made our way along the edge of the cliffs our guide showed us traces of iron ore, malachite, and mica; also gypsum, porphyry, and quartz.

Stone Age Man Lived on the Island

At last, on the northeast side just below the cliff edge, the monk stopped beside his work of the previous 18 months, a pile of debris which had been scooped out of a hole called Nanna's Cave. Besides bones, he has found implements of both Paleolithic and Neolithic types, a wide variety of scrapers, blades, and arrowheads—some 7,000 in all. Above the remains he has unearthed bowls and jars of Roman-British pottery and oddments of the Bronze Age.

The notable discoveries here and at other sites on the island have added greatly to archeologists' knowledge of the early inhabitants of Wales.

A few yards beyond Nanna's Cave, the monk, with a faint smile, stopped beside a cross of rough wooden poles. Looking down at a cove below, he said: "This is the place you wanted to see... Jones Bay!"

It was impossible to get down that steep cliff, and he would not allow me to test

even the first rung of a rope ladder which dangled over the side. "It's rotten," he warned.

But, as the tide was still out, he was able to indicate a spot, a little way under high-water mark, where a stream of water gushed onto the sand below.

"That's Paul Jones's spring."

John Paul Jones Fools the Enemy

He explained that once, when the American captain was raiding British shipping, he was forced to seek fresh water. Keen-eyed watchers on the mainland were too alert to let him get away with landing there. But resourceful Paul was not to be denied; he found this cove and its spring, well hidden from the watchers at Tenby.

The monk also showed me Paul's Lookout, sometimes known as Daylight Rock. Here one of the crew kept watch through a hole in the rock (page 571).

Two clay pipes, a seaman's button, ship's nails, and a child's bangle—all of 18th-century vintage—have been found near Paul's Lookout, but no effort has been made to dig for other relics there.

More than a century after John Paul Jones's death in Paris in 1792, his body was returned to the United States with an escort of U. S. warships and placed in a crypt at the Naval Academy, Annapolis, Maryland, where it now rests. But on Caldy the legend still persists that his followers disinterred his body in Paris and hid it here in a cleft above Daylight Rock. Tradition says, too, that on All Souls' Eve the great sea raider may be seen on Small Ord Point, surrounded by a ghostly throng dressed in stocking caps.

The visit to Paul's Lookout climaxed my stay on Caldy. Back at the monastery I arranged to return to the mainland, sorry to leave and half convinced that if I could but stay a little longer on this island of silent men its ghosts would surely come alive for me. But my time was up, and I climbed aboard the *Lollipop* from the bobbing, surf-tossed dinghy with nothing more ghostly than Gregorian plain song and the sound of the sea ringing in my ears.

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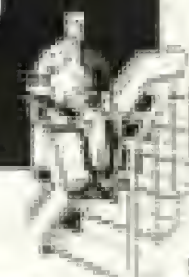
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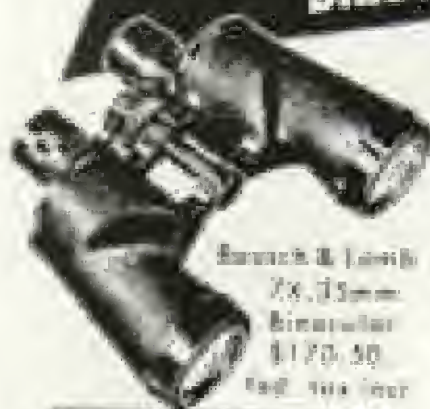
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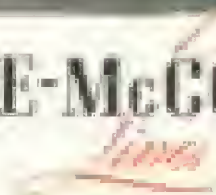
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