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COVER: Deer grace a sacred island of Japan's Inland Sea, near the water gate of a Shinto shrine (page 296).

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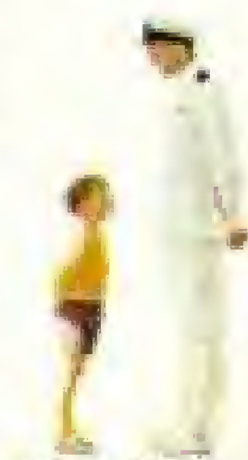

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September, 1967

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Kayak Odyssey
From the Inland Sea to Tokyo

By DAN DIMANCESCU

Photographs by CHRISTOPHER G. KNIGHT

CONVENTIONAL MARINERS would have thought us foolhardy, braving Japan's notorious Shimonoseki Strait in fragile kayaks. The ten-mile-long narrows between Kyushu and Honshu is a sailor's nightmare of hidden shoals and swift currents.

But kayaks are no ordinary craft, as our first morning under way quickly proved. We had left Shimonoseki, at Honshu's western tip, on an ambitious voyage—ten men in five kayaks, bound for Tokyo, 1,100 miles away. Our course lay through Japan's legend-laden Inland Sea and along Honshu's rugged Pacific coast (map, pages 300-301).

Now, as we rode a following current and battled choppy seas, our days of intensive training with the kayaks paid dividends.

"Brace!" Bill Wilson, my boatmate, shouted whenever a wave threatened to capsize us. Our double-bladed paddles, slapping the water hard on the same side, served as an outrigger to steady us over each crest. Shoals offered little problem; our shallow-draft kayaks skimmed over submerged rocks that would have made matchwood of ordinary boats.

EKTACHROMES (INCLUDING PAGES 296-7) © NATIONAL GEOGRAPHIC SOCIETY

Cockleshell cruise: Thin-hulled but sturdy, kayaks carry American and British youths on a people-to-people journey across Japan's Inland Sea and along her rugged Pacific shore.

Paddling gilded waters at dusk (next two pages), the Western pilgrims approach the great camphorwood gateway to shrine-dotted Itsukushima. The *torii*, traditional entrance to a Shinto shrine, rears 50 feet above the ebbing tide of Hiroshima Bay.

Within half an hour the worst was past. Soon we had left Shimonoseki Strait behind and were riding the gentle swells of a large protected bay. The five kayaks drew together within hailing distance.

"So far so good," came a cheerful voice across the water. "Only eleven hundred more miles to Tokyo!"

Danube Sailors Set Sights on Japan

Our adventure owed its origin to another voyage completed two years earlier, a canoeing expedition down the Danube River from the Black Forest to the Black Sea.* Nine Dartmouth College students, photographer Chris Knight and I among them, had made the 1,685-mile trip under the sponsorship of Dartmouth's Ledyard Canoe Club. Judged by what we had learned of countries and people—and by what we hoped they had learned of nine young Americans—the expedition had been a vast success.

Inevitably, during our reunions back in the United States, talk turned to the possibility of a sequel expedition. Quicker than I would have imagined, the idea took shape, with the choice of a country far removed from the Danube—Japan.

Among the members of the original expedition, only Chris and I could spare a second summer away from studies or careers. From that disappointing fact stemmed a new approach in our planning—the concept of an international team. If we were to visit only a single country this time, rather than half a dozen, why not add another nationality to our own group?

Before long the expedition roster was complete: four British boating enthusiasts from Cambridge University and six equally enthusiastic Americans. On the British side were John Dalton, Anthony Stapleton, Timothy Barnes, and Richard Bowring. The Americans included Dewitt Jones, Jr., Laurence Davis, William Wilson, Thomas Seymour, Chris Knight, and me (pages 300-301).

From the beginning we recognized that our faithful canoes of the Danube journey had no place in the new venture. Our plan was to visit the remote areas bordering Japan's Inland Sea, the Seto Naikai, notorious for its treacherous currents and violent typhoons.

"What we need," declared Chris Knight, who doubled as our expedition navigator, "are boats that can hold their own in a rough sea but that handle as easily as canoes."

In a word—kayaks.

We found the ideal craft through a Swedish firm, Vituddens Kanotvarv, long experienced in building kayaks for Olympic teams. They recommended a 20-foot, two-seat model of slightly heavier construction than the Olympic kayak, but with the same quick-release waterproof canopies fitted around the paddlers' waists. The absence of internal frames in the hulls would give us ample storage space for sleeping bags, tents, and other gear.

As our plans gained momentum, we received financial support from both American and Japanese sources. To prospective sponsors we explained that the expedition was no mere lark or an excuse for a summer abroad. Our Danube experience among widely diverse peoples had taught us the lasting value of understanding. In exploring Japan's Inland Sea, we planned to visit isolated communities—many, perhaps, with little knowledge of the outside world.

Shinto Prayers Invoke Sea Gods

While demonstrating our two countries' friendship for the Japanese people, we hoped to learn something of their national character as well. Too often, we realized, foreign visitors gain their impressions of Japan only from the vast, densely packed metropolitan areas, such as Tokyo and Osaka. These we hoped to visit, too, but only after seeing what lay behind them—the rural areas on which Japanese life and tradition are founded.

There came at last a mist-shrouded morning in June beside the waterfront of Shimonoseki. We had enlarged our original plan of traversing the Inland Sea to include a stretch of Japan's Pacific coast. With good luck our kayaks would carry us all the way to Tokyo.

From our contacts with Japanese in the

(Continued on page 305)

*William Slade Backer described the journey in the July, 1965, NATIONAL GEOGRAPHIC.

Apparition from the ages, a Shinto priest in ferocious lacquered mask and richly embroidered silk portrays a prince in battle. With stately movements, he performs one of the imperial court dances that reached Japan from mainland Asia in the eighth century. The stage at Itsukushima sits amid a complex of sacred buildings that rise on pilings behind the graceful torii.

KODACHROME © N.G.S.

Kayak Journey

INLAND SEA TO TOKYO BAY

Author's route by kayak

By auto and bus

By train

Elevations and soundings in feet

DRAWN BY IVANHOAN NADNY AND ELIE SABBAN
GEOGRAPHIC ART DIVISION
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Seto Naikai (Inland Sea) National Park comprises numerous islands and coastal sites stretching from Osaka Bay west to Umashima. All command panoramic views of sea and coast.

Celebrities on arrival, the unusual travelers appear on the "Good Morning, Japan" program of the Tokyo Broadcasting System. Facing an interviewer from behind one of their five kayaks: from left, Timothy Barnes, John Dalton, Richard Bowring, and Anthony Stapleton, all of England's Cambridge University; and Christopher G. Knight, Laurence

Wakasa Bay
Tsuruga
Gifu
Ogaki
Lake Biwa
N S H U
Nagoya
Kyoto
Otsu
Uji
Nara
Osaka
SUZUKA MOUNTAINS
Ise Bay
Tsu
Okazaki
Toyohashi
Hamamatsu
Ise
Toba
Enshu Sea
Hamajima
Mt. Hakken
Kii Peninsula
Shimakatsu
Kajika
Yuki
Shingu
Shiono Misaki
PACIFIC OCEAN
NEW TOKAIDO LINE
Route of 130 m.p.h. super express train
KISO MOUNTAINS
Tenryu
Mt. Aino
Kofu
Fuji
Gotemba
Numazu
Shizuoka
Suruga Bay
Izu Peninsula
Matsuzaki
Kumomi
Futo
Shimoda
Minato
Atami
Sagami Sea
Zushi
Miura
Kamakura
Yokosuka
Yokohama
FINISH
Tokyo
Tokyo Bay
Chiba
Boso Peninsula

Blistering sun, driving rain, and typhoon winds harried the kayakers during their summer-long trip. After traversing the Inland Sea, they ventured into the open Pacific on their way to Tokyo, detouring by land to avoid one particularly treacherous stretch. Four of the group climbed the volcanic cone of Mount Fuji.

Davis, Dewitt Jones, Jr., Thomas Seymour, William Wilson, and Dan Dimancescu, expedition leader, of Dartmouth College's Ledyard Canoe Club. By the glare of a TV cameraman's light (right), the youths launch their craft in Shimonoseki Harbor before dawn.

EKTACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Kayaks barely visible above the water, students stroke toward Umashima—one of 300 islands, plus thousands of rocky islets, that stud the 240-mile-long Inland Sea. Villagers line the quay to welcome the foreigners and their strange craft. The terraced island, appearing high and dry from the sea, climbs a broad water-paved stairway to its summit (below).

Working muck with an ox-drawn harrow, a farmer prepares for rice planting high on Umashima. Newly set plants already spike watery lower levels; vegetables carpet fields at left. Using every arable inch, Japanese still can farm barely a seventh of their mountainous land. With simple tools, hard work, and skill, they coax forth yields that place them among the world's most efficient farmers. Rice grows on one of every two cultivated acres.

EKTACHROME (BELOW) AND KODACHROME BY CHRISTOPHER G. KNIGHT © N.G.S.

Like a length of wind-rippled silk, the undulating Bridge of the Brocaded Sash spans the Nishiki River. To the voyagers it seemed a living stage set for the "night of rapture" from Puccini's opera *Madame Butterfly*. Four stone piers support graceful wooden arches first built in 1673. The bridge, at the textile-spinning city of Iwakuni, measures 750 feet.

Music bridges the language gap at Kamunoseki. Guitarist Bill Wilson accompanies Dewitt Jones in a folk song for villagers gathered in the rain below the balcony of an inn.

Mobbed by youngsters (bottom), photographer Chris Knight learns that goodwill needs no interpreter.

Sharing a sport, Larry Davis shakes hands with Mrs. Katsuko Sumita, a Japanese kayaker in training for the 1968 Olympic Games (bottom, right). Her jersey bears the emblem of Hiroshima Prefecture.

KODACHROME (OPPOSITE, LOWER RIGHT) AND EKTACHROMES © N.G.S.

previous few days, we expected one or two witnesses to our departure. Instead, as the slender, varnished hulls of our kayaks slid into the water, we found ourselves surrounded by a sizable delegation.

Television floodlights banished the pre-dawn gloom, and cameras tracked us with the precision of radar. On the shore near the quayside, a dozen brilliantly kimonoed young girls performed a sprightly dance to the booming throb of a huge drum.

In rather somber contrast were the activities of three Shinto priests, robed in white and wearing their high-crowned black hats. One began reading from a lengthy scroll, a second waved a wand of evergreen over the boats, and the third priest gave us each a small wooden plaque inscribed in Japanese. Puzzled, we bowed our thanks.

"What do the plaques say?" I quietly asked Tom Seymour, one of our two interpreters.

"They're talismans, placing us under the protection of the sea gods," Tom answered. "The other priest is reading prayers from the scroll, and the one with the wand is invoking a blessing on the kayaks." He grinned. "I'd say they aren't taking any chances."

Practice Runs Reassure Worried Japanese

Neither, for that matter, was the Kaijo Hoancho, Japanese equivalent of the U.S. Coast Guard. As we left Shimonoseki Harbor and stroked eastward toward the open sea, a patrol boat trailed at a polite distance.

During the previous week the coast guard had watched our offshore practice runs closely. Finally they seemed satisfied that we weren't bent on collective suicide, but in the

early days of the expedition they frequently hailed us in halting English over their patrol boat's powerful loudspeaker.

"Reader," would come the polite request across a quarter-mile of water, "pu-rease to show up handu." And I, as nominal leader of the expedition, would stop paddling and raise my right hand. Seemingly relieved to find that all was well, our escort would settle back for a day's steaming at three or four knots.

Kayaks Follow Route of Empire

Shimonoseki Strait had quickly reassured us on our choice of boats. Despite the millrace current and an angry chop, the kayaks had handled beautifully. In each of the five boats the forward paddler acted as both lookout and helmsman, steering with pedals joined to the rudder aft by cables.

For stability we had our weight—and the versatile paddles. With Chris's helpful advice we had learned that in an emergency one can actually lean on the water with the flat of a paddle. The maneuver is a split-second one, but with good coordination two men can right a kayak that has rolled almost onto its beam-ends. Fortunately our worst weather was to occur far along in the voyage, when our backlog of experience counted heavily.

Once beyond Shimonoseki Strait, we entered that vast arena of legend and beauty, the Inland Sea. Wrapped in the volcanic fist of Kyushu, Shikoku, and Honshu islands, Seto Naikai stretches 240 miles, east and west.*

To Japanese, the Inland Sea has a significance matched in our country perhaps only by the Mississippi River and the Great Lakes combined. Historically, Seto Naikai has

*Willard Price told of "Cruising Japan's Inland Sea" in the November, 1953, NATIONAL GEOGRAPHIC.

served its seafaring masters as a highroad of migration, commerce, and empire. Centuries ago the flood tide of Chinese civilization swept from Kyushu eastward through the great basin to the heart of Japan. As early as the 14th century, vessels by the thousands passed through the Inland Sea each year.

What those long-ago crews had seen unfolded now before us—broad reaches of sapphire water flecked with hundreds of volcanic islets that resembled a maze of giant navigation buoys. Ashore, the white beaches stretched beneath the dark groves of pines, tempting us every few minutes to stop and pitch camp. Now and then, from the crags above, a lordly osprey glided lazily out as if to inspect us. Occasionally, along the shores of larger islands, we glimpsed splashes of orange tile above weathered wood—fishing villages huddled close to the life-giving sea.

The effect was magic and recalled for each of us some haunting seascape in another corner of the world. "Alaska—the Aleutians," wrote Chris in his notebook. "The Aegean Islands," was the choice of Britisher Tim Barnes. To me it spoke of Maine's harshly beautiful coast.

Judgment Improved by Aches and Blisters

By evening we were inshore near the twin lighthouses of Ube, a small port east of Shimonoseki. It had been a long day's paddle, not only in miles—27—but also in blistered hands, cramped shoulders, and sunburn. Clearly, our enthusiasm had outrun our judgment. Never again in the 11 weeks that followed did we attempt 27 miles in a day.

Ube had the cure for our aching bones—that marvelous Japanese institution known as *furo*, the bath.

EKTACHROME (LEFT) AND KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Commanding the awe of innkeepers, 6-foot 5-inch Tim Barnes requires a second *futon*, a sleeping pallet designed for a people whose men average only five feet three.

Inquiring eyes at a restaurant window take the measure of the tall Westerners as the kayak crews assemble for lunch.

Hazy morn veils mountain and sea as a lone fisherman mends his net on a Shikoku beach near Imabari. Long-lasting nylon mesh in varied colors has replaced traditional nets of cotton or hemp. Pennants fluttering at the stern of the boat boast of a good catch the day before.

Word of our expedition had preceded us, not only in newspapers and on television but through the Japanese Foreign Ministry, which had kindly alerted the towns and villages along our route. Now, with instinctive hospitality, Ube introduced us to the type of warm welcome with which we were to become so familiar in the months ahead.

From the crowd of well-wishers and officials at the water's edge, a young English-speaking girl stepped forward and bowed.

"Welcome," she said gravely. "First, now, bath for tired. Then all eat"—she smiled—"and meet Ube."

Talk Ranges From Boxing to Beatles

Meet Ube we did, during a long and memorable evening. First we were ushered to a public bath, familiar territory to Tom Seymour, who had studied Japanese and traveled the country some years before. Following his lead, we soaped ourselves thoroughly on the tiled walkway around the steaming pool, then rinsed down with the small wooden buckets set nearby. Finally came the long, luxurious soak, as we sat neck-deep in the water and inhaled clouds of soothing steam.

Dinner took place at a small and delightful inn, with half a dozen townspeople acting as our hosts. Sitting cross-legged on the rice-mat floor around a low lacquered table, we found ourselves overwhelmed with food—and with questions.

The range of the conversation was astonishing. Our Japanese friends wanted to know our views on Viet Nam, the European Common Market, Cassius Clay, Japanese supermarkets, and the Soviet space program. We tried to deal with each topic while sampling various delicacies before us—smoked octopus, bean-curd-and-onion soup, cubes of rice wrapped in paper-thin strips of seaweed, and endless cups of tea.

For our British colleagues there were questions about the Beatles, who had just finished a series of performances in Tokyo.

"Great," was Tim Barnes' frank evaluation. Then Tony Stapleton abruptly made half a dozen lifelong friends by praising some of the current favorites among Japanese rock-and-roll bands—the Croakies, the Hummingbirds, and a group with the curious title of the Lumbering Varmints.

Bill Wilson, our guitarist, also earned a number of friends when he added quietly, "But none of those can equal your Japanese classical music."

Outside we were greeted by what seemed to be every citizen of Ube under the age of ten, in a smiling, jockeying throng. Like all Japanese children they knew at least one word of English, a greeting they chanted in joyful refrain—"Herro, herro, *herro!*"

To channel their enthusiasm, we offered them a guided tour of our squadron of beached kayaks. The children followed us as

EKTACHROME © N.G.S.

though we were ten Pied Pipers, and the adults formed a leisurely rear guard.

The hits of the evening were the names of our boats: *Tobiuo*, Flying Fish; *Akiba*, Autumn Leaves; and *Itsukushima*, the name of Japan's sacred shrine southwest of Hiroshima. More puzzling to our hosts were *Ulmer Spatz*, the Sparrow of Ulm, named for our port of departure on our Danube journey, and Chris Knight's *Wasso III*, echoing a name traditional in our Dartmouth canoe club.

The evening ended with one of Bill Wilson's guitar concerts, augmented now and then by our voices in such favorites as "Monday, Monday," "Camptown Races," "The Sloop John B.," and our expedition theme song, "Look Through Any Window," whose words were particularly appropriate to Ube:

Look through any window,
What do you see?
Smiling faces all around . . .
Where do they go?
People with their shy ways . . .
You can see the little children
*all around.**

That night we slept long and happily on *futons*—thin mattresses—laid out on the floor of our Japanese inn (page 307).

*By Graham Gouldman & Charles Silverman, © 1965 B. Feldman & Co., Ltd., London. Used by permission Miller Music Corp., New York, and B. Feldman & Co., Ltd.

In contrast to Ube, Umashima was the back of beyond. We decided to visit the island because its solitary fishing village was one of the smallest communities on our charts. Indeed, the harbor seemed not much larger than the bath at our inn back in Ube!

In Japanese Umashima means "horse island," a curious name for a place whose only livestock seemed to be bullocks. Even more curious is Umashima's principal claim to fame: During World War II it became a training base for the Japanese Navy's midget submarines. Perhaps the idea had a certain logic after all—scarcely anything else could maneuver in Umashima's vest-pocket harbor.

What the village lacked in size it made up for in hospitality. Practically the entire population met us at the waterfront, and the cries of "herro" began resounding even before we beached the kayaks. We were particularly impressed, for Umashima had been a spur-of-the-moment choice, and had received no advance word of our arrival.

The local schoolmaster, who had hurriedly donned his best blue suit, offered us sleeping-bag space in a classroom. With Tom Seymour interpreting, Tony Stapleton, our commissary chief, asked about the village store. Three elderly women with smiles blindingly enhanced by silver-capped teeth took charge —"Com-u, com-u!"—and led Tony happily off down the dirt-packed main thoroughfare.

Peace Hopes Strike Common Chord

We had agreed from the outset that we would carry neither British nor American foods with us, but would live off whatever we could purchase in local Japanese stores. Reliable shopper that he was, Tony soon appeared at the schoolhouse with canned vegetables, some dried noodles, and *kashipan*, tasty Japanese cookies. In addition, he had the makings for our standard breakfast—boiled eggs, buttered toast, and tea—all to be prepared on our portable primus stoves.

That evening Umashima's schoolhouse rang to several guitar solos and a mixture of American and local folk songs. Among the latter we learned the Japanese school child's perennial "*Moshi, Moshi, Ano Ne*," whose nonsensical lyrics are sung to the tune of "London Bridge Is Falling Down." Our hosts taught us a second delightful song in which everyone beats time with his hands, and which of course became known among us simply as "The Japanese Clapping Song."

Later the conversation turned to serious topics, particularly the war in Viet Nam, and our mutual hopes for peace. One brief but poignant speech by a young high-school girl I wrote down in my diary that night:

"There are many good in this world. There are many use for *Japanese* good. I always hope Japan most peaceful—and other country imitate Japan."

Barefoot Mayor Wades to Pay a Call

One day soon afterward we learned the meaning of traditional Japanese courtesy. From Umashima we paddled northeastward back to the coast of Honshu, planning to pitch camp in the quiet cove of Tsuzu on the shore of Hiroshima Bay. Soon we noticed a small group of people standing on the far bank of a stream that emptied into the bay.

A well-dressed elderly man, obviously the leader of the group, at last bent down and removed his shoes and socks, rolling his impeccably pressed trousers to the knees. Wading the stream, he bowed to us and said in fluent English:

"Good afternoon. I am very glad to see you. I hope you will accept our hospitality."

He was Kyoichi Doi, Mayor of Iwakuni, a city of textile plants and oil refineries some six miles away. A house was at our disposal in the town, he explained, and there was a delegation waiting to escort us there. Would we be their guests? We would.

The Fourth of July found us at the namesake of one of our kayaks, the great Shinto shrine of Itsukushima, also called Miyajima —literally, "shrine island." With a mixture of British brevity and warm feeling for Americans, Dick Bowring commented on our anniversary of independence from his country:

"Really, you know, we've rather missed you chaps."

At sunset we glided beneath Itsukushima's vast *torii*, or ceremonial Shinto gate, soaring 50 feet above the mirroring sea (pages 296-7). The wondrous beauty and profound peace of the shrine touched us all, as they have the Japanese for more than a thousand years. Little wonder that Itsukushima ranks with the shrines at Ise as one of the most hallowed spots in all Japan.

Next morning, we paddled close to a great platform that appeared to float above the water to watch five Shinto priests in a performance of *bugaku*, a classical dance that traces its origins to several Asian lands.

Like a phoenix reborn, a lone bird flies symbolically above a skeletal reminder of doom at Hiroshima. On August 6, 1945, the first atom bomb used in war stripped bare these steel bones that supported the dome of the Industrial Exhibition Hall. The gutted structure, now called the Atomic Bomb Memorial Dome, stands across the Motoyasu River from Peace Memorial Park (below). The park lies within the 3.9-square-mile area destroyed by the blast. At first people feared the "Hiroshima desert" would remain barren for decades. But by spring of 1946, heartened by cherry trees blossoming amid the rubble, survivors began returning to the wrecked city in large numbers. Today with half a million residents, Hiroshima burgeons as an important industrial center, manufacturing products ranging from paper umbrellas to ships and machinery.

EKTACHROME (BELOW) AND KODACHROME BY CHRISTOPHER G. KNIGHT © N.G.S.

In quiet reverence, expedition members lay a wreath at the cenotaph of Hiroshima's peace park. The simple concrete marker, placed near ground zero of the atom-bomb raid, honors the estimated 80,000 people who perished—a quarter of the city's population at that time. The wreath joins another left by Red Chinese attending a youth festival. The cenotaph's arch frames the distant Atomic Dome.

To the accompaniment of wailing flutes, a drum, cymbals, and lutes, an elaborately costumed dancer wearing a grotesque mask arched his body and stamped his feet in the role of an ancient prince leading his men in war (page 299). Beside the shrine, sacred deer peacefully waded the shallows.

Cherry Trees Inspire a City's Rebirth

The city of Hiroshima is several things—the closing agony in a global war, the symbol of man's will to accept and to endure, and once again a thriving industrial port.

The Peace Memorial Museum documents the first of these roles with its displays of molten glass, scraps of charred clothing, and photographs of the holocaust that engulfed the city in one blinding instant on August 6, 1945. The skeletonized Atomic Bomb Memorial Dome, formerly an exhibition hall and now the one deliberately preserved ruin, presents an eloquent tableau of its own (preceding page).

The spirit of Hiroshima came alive for us during our meeting with Shinzo Hamai, the city's famous mayor, who resigned this past April after 16 years in office. We called on him at the City Hall shortly after we had placed a wreath at the Memorial Cenotaph in Peace Memorial Park.

"During the winter of 1945-6," Mayor

Hamai began, "Hiroshima lay dead and deserted. But the following spring people slowly trickled back, and that is when we noticed the cherry trees.

"There were three of them, standing beside the municipal offices; to us they seemed hopelessly withered and blasted." Mr. Hamai smiled softly at the recollection.

"Then suddenly one April morning there were blossoms on the branches, and for the first time I believed that Hiroshima would return to life."

East of Hiroshima a hard, driving rain greeted our approach to the island of Kami-kamagari. As a result, we had foregone our usual noontime stop for lunch and nibbled under way instead on a cheerless snack of *onigiri*, seaweed-wrapped rice balls.

On tiny out-of-the-way Kami-kamagari, no one could recall having seen a foreigner in ten years. The last Western visitor had been an American passenger on a boat blown off course while threading the Inland Sea.

Bagpipe Imitators Start a Stampede

Despite the downpour, our dockside welcoming committee stood its ground, the members' homemade paper Union Jacks and Stars and Stripes (below) almost turning to pulp in their hands. A Japanese bath and clearing

EKTACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Hiding shyness behind giggles, a young greeter clutches a furled British flag; another holds the Stars and Stripes. Kami-kamagari children began making paper banners weeks before the Westerners' arrival.

Sunny welcome brightens a rainy day at Kami-kamagari as author Dan Dimancescu, in hood, and John Dalton carry the kayak *Wasso III* ashore. After soaking away weariness in a steaming Japanese-style bath, the crewmen joined the mayor for dinner. They were told they were the first foreigners to visit the orange-growing island in ten years.

Tongues of flame kill boring worms infesting the bottom of a fishing boat, but do not harm the wooden hull—if the boatman knows his business. He controls burning straw with a bamboo pole, swishing away clumps before the planking ignites. Low tide leaves the boat exposed beside the harbor wall of Shimotsui.

To put protein in her diet, Japan sends out nearly half a million fishing vessels, mostly small craft similar to this. Boats ranging no farther than 20 miles offshore produce 70 percent of the national catch. Overlooking nothing edible, fishermen drop clay jars to the bottom to lure octopus. The multi-armed mollusks, loving dark crannies, crawl inside and, never suspecting danger, let themselves be hauled gently to the surface.

Like grotesque kites trailing multiple tails, fresh-caught octopuses stretched on rods for drying sway at Shimotsui.

Golden harvest of the Inland Sea, five-inch-long fish, painstakingly arrayed on a layer of ice, await buyers at Imabari.

evening skies restored our sodden spirits. Bill Wilson's guitar had a similar effect on our hosts.

By way of innovation, our British colleagues tried to teach some Kami-kamagari girls a Scottish Highland fling. Bill struck up the chords and the rest of us did our best to sound like bagpipes—probably the fatal touch to the whole scheme. In a flurry of skirts and kimonos, the prospective pupils streaked for the door. Finally, to Bill's solo rendition of an American dance tune, "The Hokey Pokey," the girls were persuaded to return for a few hesitant spins around the floor.

Later Dick Bowring pronounced judgment on our vocal talents. As we settled down for the night in a borrowed dormitory, he remarked, "You know, I used to think real bagpipes sounded awful."

Long Fingernail Steadies a Master's Hand

Occasionally some seemingly remote town would surprise us with its range of interests. During one question period in a high school at Imabari on Shikoku, Tony Stapleton faced a sobering challenge: "Please to discuss basic development of English and American literature in last half-century." To Tony's credit, he didn't bolt for the door.

Forty-two pounds of kayak, the slim craft of Richard Bowring, left, and Tom Seymour knifes through a swell. Spray-breaker and blue cockpit canopies drain off the splash. A 20-foot plywood shell, the modified Olympic-style kayak needs no internal framework—a factor that minimizes total weight and increases storage space.

Sixty thousand tons of freighter, a beamy heavyweight of the high seas takes shape inside bamboo scaffolding at Aioi. Workers put the bulk-cargo carrier together by joining prefabricated interlocking units. Devising such techniques to produce ships far more quickly and cheaply than European or American yards, Japanese builders now launch almost half the world's new vessels—and the biggest. This one's creator, Ishikawajima-Harima Heavy Industries Co., Ltd., also built the largest ship afloat, the fifth-of-a-mile-long, 209,000-ton supertanker *Idemitsu Maru*. Japanese designers now plan leviathans of more than twice that tonnage. EKTACHROME © N.G.S.

The translator had trouble—but the message comes through. Dan Dimancescu ducks under a steel beam reinforcing restored Egret Castle, a 14th-century fortification in Himeji.

Incandescent spaghetti, painted by traffic in this two-minute exposure, fills Himeji's main street, a neon-lined artery leading toward Egret Castle. White walls and winglike gables inspired the stronghold's name. Japanese drivers, like British, keep their vehicles to the left.

Tuba-player's view of a high-school baseball game at Takamatsu includes the photographer, inverted at the top of the horn's bell. Cheerleaders wearing white headbands rally support for the home nine. Baseball, reaching Japan in 1873, has become as much a national pastime there as in the United States.

PHOTOGRAPHED BY CHRISTOPHER G. KNIGHT © N.G.S.

Imabari, we learned, is famous for its creation of fine lacquer ware, an art form once regarded almost religiously by the Japanese. The Emperor himself had visited the town not long before us and had seen its master craftsmen at work.

We spent a fascinating hour watching one veteran designer trace fragile lines of dragons, flowers, and birds on the gleaming surfaces of bowls and vases. The work was entirely freehand, yet the lines never wavered. I noticed that the old man used only a single bizarre prop—the incredibly long nail on the little finger of his right hand.

Such skill, we thought, must bring a high price, but the artist shook his head.

"In Japan today, few want such a job when factories pay twice the money. But money is not everything if one does what he loves."

Down the street we met another elderly man who, with his wife, put the finishing touches on lacquer ware. With patient strokes the old couple rubbed gold or silver leaf over the work, so that particles lodged in the minute crevices, giving the appearance of inlay. They told us they had done the same job together for fifty years.

Some Advice on Being a Pepper

That night, reflecting on the artists' devotion to their work, I recalled a Japanese maxim:

"If you are a pepper, be the best pepper. Do not try to be a squash or an eggplant."

A hot and humid month had passed, and we had paddled hard through most of it; we decided to take a day or two off. On a tranquil islet called Sashima we pitched camp and sat back to watch the workaday Inland Sea.

Beyond the dazzling beach with its fringe of dark pines, giant tankers and smaller

Classic expression of Japanese art, the Phoenix Hall of Byodoin Temple in Uji embodies the Oriental ideal of harmony between man's works and nature. The 11th-century building shelters an ornately carved wooden statue of Buddha. Uji also grows the green tea so popular with Japanese that they use it to flavor ice cream and candy.

coasters slipped by, laden with cargoes from the great refineries and factories of Tokyo, Nagoya, and Osaka. Now and then among the giants we made out the squat silhouettes of interisland ferries, tirelessly knitting together the scattered outposts of the Inland Sea.

Sardines Eaten Alive and Wriggling

Most of the craft belonged to the fishing fleets, and they ranged in size from sampans to large trawlers. The sight recalled several gams we had earlier—conversations with fishing boats out on the grounds. Usually these had begun with gestures by the fishermen, asking our destination.

"Tokyo!" we always sang out, and the fishermen's initial looks of surprise quickly shifted to knowing smiles.

"*So desu ka, Tokyo! Hontoni ne!*"—roughly, "Tokyo, why of course! Naturally!"

Following our brief rest on Sashima we became better acquainted with the fishing industry, and one day spent several hours aboard a boat working southeast of Kure. Gone were the laborious hand hauling of nets and the everlasting masthead vigil for surface signs of fish. Working in partnership with another boat, our captain located the quarry—enormous schools of sardines—with sonar and then launched the attack.

Bearing down side by side on the target area, the boats suddenly parted to encircle the

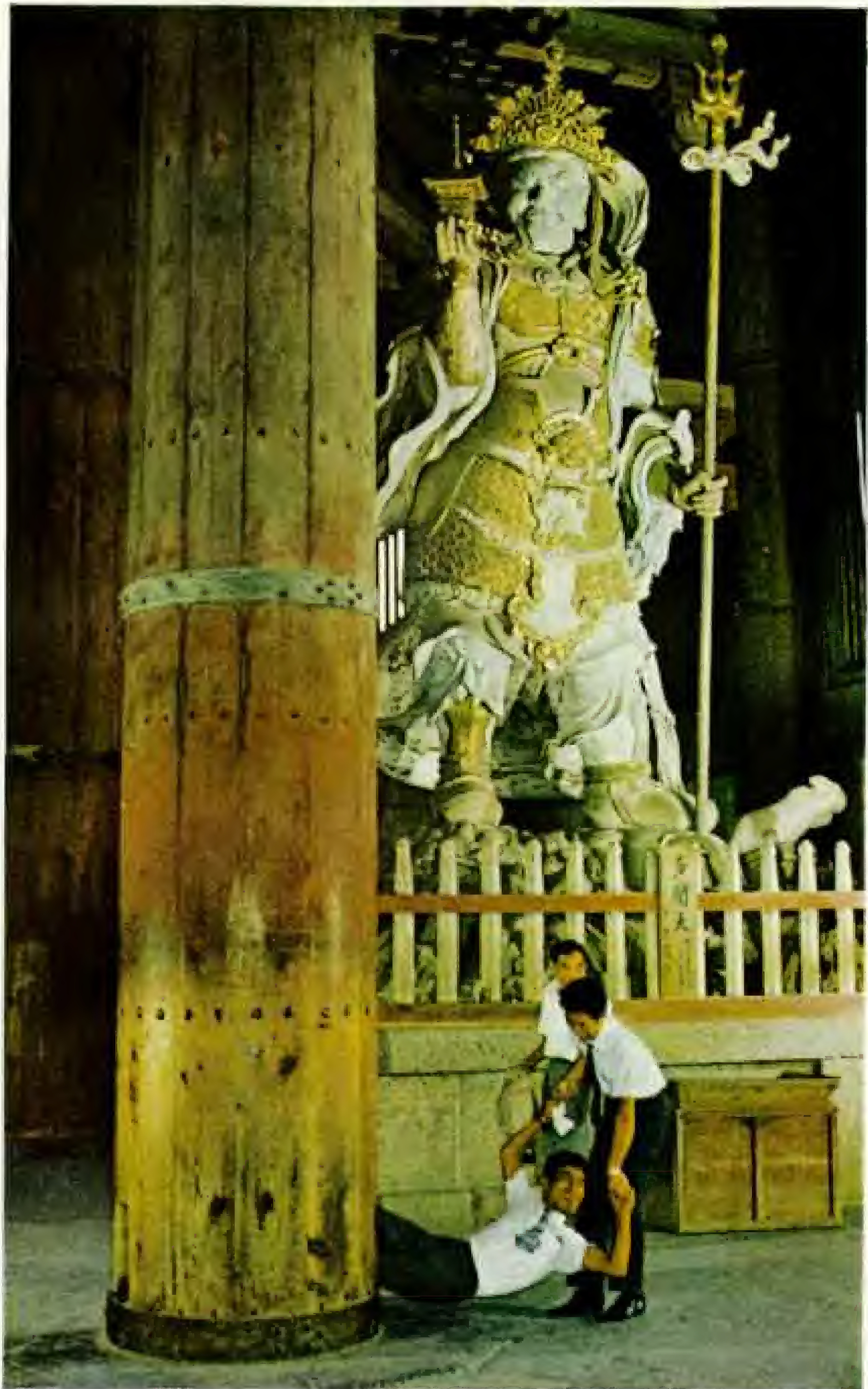
Tending living velvet, a gardener weeds a moss garden that carpets eight wooded acres at Saihoji Temple, Kyoto.

Four feet tall, 80 years old, a Kyoto gardener accepts her first portrait, a Polaroid print presented by the author. Japanese consider gardening one of the fine arts.

school, the huge net shared between them paying out at the two sterns. Closing the circle, the partners slowly winched in the net—and presently a torrent of quicksilver cascaded across the two decks. To free both boats for further fishing, the catch was transferred to the ice-filled hold of a smaller service boat and sent directly to market ashore.

During a pause we joined the crew in a disconcerting meal—sardines dipped in soy sauce and eaten whole and still wriggling. The expression on our hosts' faces was blissful. Ours, I'm sure, revealed mixed emotions.

"Oishii, ne?" the captain asked—"Delicious, isn't it?" To which Tim Barnes replied, in English, "But a bit active."



EKTACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Hoping to win a place in paradise—with the help of friends—a visitor to Todaiji Temple at Nara squeezes through a hole in a massive wooden pillar. Ferocious-faced Tamonten, a heavenly guardian charged with protecting Buddhism, towers behind. Founded in the eighth century, Todaiji serves as headquarters of the Kegon sect.

Proving his devotion, a penitent prays while an icy waterfall pummels his back. Three streams plunge 25 feet from a rock face in rambling Kiyomizu Temple, a celebrated center of Buddhism. Its buildings cling to a steep hillside overlooking Kyoto, early seat of Japanese civilization. Athletes condition themselves by meditating under the punishing falls for as long as an hour at a time, even in the dead of winter.

Skirting cliffs near Shirahama, kayaks round the coastal ramparts of Honshu's Kii Peninsula. Sightseers take in the scene of weathered rock and sapphire sea from an observation point at upper left. The craggy beauty and precipitous drops have also lured disappointed lovers, giving the bluffs a reputation as suicide cliffs. In graves atop this headland rest remains of many persons whose bodies were recovered from the sea.

Flying fish for dinner: Four paddlers prepare to cook a meal on a rock-strewn shore near Shimakatsu. The travelers subsisted largely on Japanese fare purchased at villages along the way—seafood cooked and raw, rice, bean curd, and seaweed.

Keeping a rendezvous, Japanese kayakers of the Spirit of Adventure Club pitch their tent with the Westerners on Shodo Shima, a part of Inland Sea National Park. Becoming fast friends, the two groups camped together for a week on this island and the nearby mainland.

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

Now we headed for Osaka, Japan's second largest city and our port of preparation for the Pacific portion of our journey. Each of us had a diary crammed with memories and the names of friends along the Inland Sea.

There was the village shopkeeper who insisted on giving us a free watermelon with every purchase. There was the young girl of Shimotsui who begged us, "Be very careful—there are twenty-four large and small rocks between here and Takamatsu," and the middle-aged lady in smoke-stained, industrial Kobe who insisted on inviting us home for sliced onions and *saki*, Japanese rice wine.

There were short but happy days with the Spirit of Adventure, a boating club whose young members we met literally at sea (opposite, lower). They, too, were bound eastward to Osaka—in heavy collapsible canvas kayaks.

We admired our traveling companions' courage and energy, for their kayaks were slower and far harder to manage than ours. One night around a driftwood fire, they explained the purpose of their voyage to us:

"Like you, young Japanese look outward and reach for new experience. In our country runs a proverb: 'Frog in the well knows nothing of the ocean.'" They smiled shyly. "So with Spirit of Adventure, frog must go to sea."

Aioi Builds Giants of the Deep

We parted company reluctantly, promising to look for them in Osaka. But first we made a brief stop at Aioi. Here the vast Ishikawajima-Harima Heavy Industries Co., Ltd., helps Japan maintain its lead as the world's largest—and fastest—builder of ships.

With an IHI representative we toured

the immense ways containing embryo freighters, ore carriers, and tankers (pages 316-17). Our guide explained that, with the miracle of prefabrication, IHI can deliver a 70,000-ton vessel in five or six months. In most yards, such a job might take three times as long.

IHI proved typical of the sweeping revolution in Japan's shipbuilding industry. There was little of the old "make-work"—useless jobs for the sake of jobs—once characteristic of Japan's paternalistic companies. Mechanization had cut payrolls further. The average IHI worker's monthly salary of $100 plus substantial bonuses ranks creditably on the Japanese wage scale.

"We have occasional strikes," our guide admitted, "but the real problem in shipbuilding is demand—and the resulting need to devise new techniques quickly to meet that demand. When shipowners need new ships, they all seem to need new ships at the same time, and we are busy night and day."

Other industries of Aioi have changed little in a thousand years. As we left the yard, we passed summer-green fields of rice, bathed in the rich glow of an afternoon sun. Women

Typhoon sideswipes Shiono Misaki, southernmost point of Honshu, as crewmen watch, transfixed by the violence. Although the center of the storm passed south of

field workers—their pantaloon-like *mompei* rolled beyond the reach of water—tended the new blades with deft fingers. Although the tractor and mechanical reaper have infiltrated farm life in Japan, the age of the hand sickle is far from over.

From Noisy City to Classic Garden

Osaka, with its thousands of factories, its huge port and vast rail yards, typifies the roaring energy of urban Japan. Abandoning our kayaks temporarily, we made the great industrial center our headquarters for side trips to the shrines and landmarks of Kyoto and Nara.

To many of us the most memorable event was a visit

Japan and winds here reached only gale force, torrential rains set off landslides and floods, killing 48 people.

EKTACHROME (BELOW) AND KODACHROMES BY CHRISTOPHER G. KNIGHT © N.G.S.

Grimacing, skeptical policeman at Miura's waterfront learns of the group's travels in its frail-looking flotilla from Tom Seymour, whose headband keeps perspiration out of his eyes. Even in the sheltered Inland Sea, ripping currents and sucking whirlpools could doom a kayak. Concerned for the expedition, the Maritime Safety Agency—Japan's equivalent of the U. S. Coast Guard—often shadowed it with patrol boats. But the voyagers—well drilled in handling their craft—completed their summer's journey without mishap.

Halting for lunch, the kayakers beach their craft with the local fleet at Yuki (right), then join youngsters splashing in the mole-protected harbor. A storm-loosed slide scarred the hillside at left, but caused only minor damage.

Prolonging *sayonara*, well-wishers at Gobo show their reluctance to bid farewell. They cling to colorful streamers holding a kayak until the paper ribbons break. Members of the Rotary Club played hosts at Gobo, asking the crewmen into their homes.

to Ryoanji, Kyoto's world-famous garden fashioned of rocks set in a simple, exquisitely proportioned expanse of raked sand. Mindful of Japanese custom, we viewed the 15th-century Zen Buddhist masterpiece while sitting cross-legged on the polished wood veranda of the temple.

The wonder of Ryoanji is that no two visitors ever see it the same, yet few come away unmoved. To me the dark rocks in their bed of rippled sand suggested the Inland Sea.

During our time in Osaka the ten of us often went our individual ways, to the astonishment of many Japanese.

"Among our people," a member of a television crew told me, "even a group of sightseers operates together. There is a leader and there are members—quite a formal arrangement. One does not break it lightly."

My friend spoke mainly for older Japanese; the young are less bound by tradition. According to Masayuki Harigai, an able member of the Japanese Foreign Ministry, many of the old traditions are losing their hold.

"The family is no longer a small autocracy," Mr. Harigai told me. "Such customs as the arranged marriage, or the new wife's apprenticeship in her in-laws' home, are beginning to disappear, especially in larger cities.

"The cities themselves are heavily Westernized, as a result of the war and of new trends in architecture. Older Japanese, of

EKTACHROME [illegible] AND KODACHROME © N.G.S.

course, insist that our culture is dying, but I think that is a bit pessimistic.

"After all," he said, smiling, "our culture was borrowed to begin with—yet it has survived nicely for some two thousand years." *

Kennedy Photo a Passport to Pacific

Getting out of Osaka was more complicated than getting in, for the Kaijo Hoancho, the coast guard, was worried about us.

"The Inland Sea is one thing, the open Pacific another," Bunjiro Ninomiya, chief of the Osaka station of the Maritime Safety Agency, told us. We had been invited to confer with him and with Shojiro Kato, the agency's regional Rescue Service chief in Kobe, regarding the remainder of our voyage to Tokyo.

"Now is the season of typhoons," Mr. Kato added, pointing on a chart to the Kii Peninsula, last barrier against the open ocean. "Here, along the high cliffs, storms create *doyonami*, terrible waves that look like this. . . ." He made a steeple with his hands.

Mr. Ninomiya agreed. "Also, there are the strong currents—even our large patrol boats must be careful—and there are few good harbors. Many seagoing vessels have foundered on our Pacific coast, and you are only small craft, with a few inches of freeboard."

Carefully, Chris Knight, our navigator,

*See "Japan, the Exquisite Enigma," by Franc Shor, NATIONAL GEOGRAPHIC, December, 1960.

Twist and frug rock the community hall of Shimakatsu as the expedition waits out a second typhoon that never came. The barefoot Westerners, soaked with perspiration in the humidity, attempt to offset their failure at Japanese dances the girls tried to teach them. This merry gathering ended a three-day stay, during which the visitors helped fishermen secure their boats and nets against the expected storm, gave the children piggyback rides, and got to know most of the town's 1,500 population.

answered each objection, pointing out that kayaks, despite their size, were extremely seaworthy. Moreover, each paddler had his life jacket handy, hooked just forward of the cockpit. We had run endless emergency drills, deliberately capsizing the kayaks in deep water and then righting them and pumping them dry. Finally, in an emergency, we needed no conventional harbor, for the boats could be beached on any sheltered shore.

To prove our point about the seaworthiness of kayaks, Chris played what we hoped might be a trump card. Politely, he handed Mr. Ninomiya a photograph of Senator Robert F. Kennedy paddling a kayak down the raging rapids of Idaho's Snake River.

Mr. Ninomiya and Mr. Kato took the picture to the window for better light, and studied it. There was a whispered conversation in which we caught a single phrase, a respectful "Bobby-*san*"—"Honorable Bobby."

Whether as a result of Chris's logic or of a fellow kayak-lover's skill, Mr. Ninomiya finally relented. We might proceed, he declared, if we would agree to a land detour of Ise Bay, and if we would check faithfully with the Kaijo Hoancho all along our way.

Height and Hospitality Make Impression

It was already late July, and we wasted no time in putting to sea. Instead of threading a maze of hundreds of small islands, we now skirted a single towering battlement—Japan's fortress frontier with the Pacific (pages 324-5). Lumbering ocean swells lifted our kayaks with massive gentleness, then thundered to a violent end against the sheer cliffs. In contrast to the Inland Sea, the water was crisply cold and infinitely clear.

Now we settled down to a steady routine,

for Tokyo still lay 500 miles to the northeast. As a rule, we stopped in late afternoon at some deserted cove or a fishing hamlet and made an early start the following morning. Occasionally at midday we pulled in to a seaside village for a cool drink, a swim, and a short nap in the shade of a pine grove.

Particular towns stand out sharply in memory. For Tim Barnes such a place is Gobo, on the west coast of Kii Peninsula. We arrived there one evening, surfing on a wave that swept us into the harbor.

The town knew of our coming, and the Rotary Club had divided us up in advance, assigning each to a different home. Tim, who towers six feet five, was the guest of a man almost his equal in height—rare indeed for a Japanese. The wife of the house stood five feet four, above average for a Japanese woman but like a child beside her giant spouse.

The couple treated Tim as though he were a member of the family, insisting that he sleep in one of their treasures—a roomy Western-style bed. During the night the wife quietly collected Tim's mildewed laundry, presenting it to him freshly washed and ironed as he left the next morning.

How do you thank such people?

Storm Waves Provide Wild Ride

Beyond Gobo lay the tip of Kii Peninsula—and fulfillment of the Maritime Safety Agency's weather forecast. All one morning, as we paddled, we watched a storm build around us. The wind rose steadily, and spindrift sheeted from the waves. We were in no danger, for the coast lay roughly two miles to leeward, with countless small coves and bays for a fast beaching.

"Let's ride it a while!" urged Chris Knight. "It's the best sea we've had." So for an hour or two more we churned ahead, bucking stinging spray and waves that crested to eight feet. Clearly, however, a typhoon was on the way, and we finally turned and drove for the shore with a powerful following sea.

Riding white water in a kayak is much like surfing with a board, except that the rider is actually closer to the water. There is the same sense of express-train speed with the requirement of perfect balance, for a broached kayak is even worse than a surfer's "wipeout." Another danger is "pitchpoling," the end-over-end capsizing of a kayak when the bow buries itself in a wave and the stern simply flips over the rider's head—an accident that might easily snap the craft in two.

Like rodeo contestants on particularly

Adopting a fad—wearing a T-shirt bearing an English inscription—a teen-ager advertises the mythical ELC, "The mountain Everest lock-climbing club." The Japanese often confuse the sounds of "r" and "l"—hence the misspelling of rock.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

SERENELY MEDITATING *through seven centuries, the Daibutsu, or Great Buddha, sits at Kamakura with hands in position of steadfast faith. Tormented by earthquakes and frequent typhoons, the 42½-foot-high bronze image also survived a tidal wave that swept away a sheltering building in 1495. A beach resort, Kamakura draws holidaying thousands from Tokyo and Yokohama.*

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

energetic mounts, we careered ashore in what must have been the wildest two miles of our entire voyage. Sodden but happy, we took refuge at Shiono Misaki, the very tip of the Kii Peninsula. As we ate lunch, the roar of waves crashing on the cliffs of the Pacific made us acutely aware of the restless seas we would now be traveling.

Unlike Americans, who give names to their hurricanes, Japanese simply number typhoons in series, beginning anew each season. Ashore, we learned that our typhoon was No. 13, and that by autumn the count might run as high as 30. For two days we were immobilized while No. 13 drowned the coast in rain liberally salted with flying spray (pages 326-7).

Ancient Sport Wins Modern Following

Freed at last by clearing skies, we made our way to Shingu, a lumber port on the Kii Peninsula's east coast. There we saw a demonstration of *aikido*, an ancient form of hand-to-hand combat whose name means roughly "the way of fitting in the spirit." A modern form developed before World War II, under patronage of the ruling classes, and gained popularity in the postwar era, though it has yet to be added to public-school curriculums.

As with judo, aikido rarely results in harm when practiced as a sport, but seeks only to mold the spirit through bodily discipline. We watched as several pairs of students in loose-fitting white trousers and belted jackets exchanged lightning holds and parries.

"Aikido is a sport that emphasizes defense," the dignified teacher told us when the contest ended. "In the case of two equal opponents, the attacker generally loses.

"Spiritually, that is also true. And in a way perhaps difficult to understand, both persons achieve a certain unity through the experience.

"We hope," he added modestly, "that in its small way, aikido may contribute to unity and peace in the world."

Japanese love of physical fitness often assumes such spiritual overtones. Perhaps the most famous example is the aura of pilgrimage surrounding an ascent of Fuji. The climb proved spiritually rewarding and physically unforgettable for Tim Barnes, Larry Davis, Tony Stapleton, and Dewitt Jones.

The four had decided to try scaling Japan's sacred peak while the kayaks, true to our agreement with the coast guard, traveled by truck around treacherous Ise Bay, the Enshu Sea, and Suruga Bay as far as Matsuzaki. Tim and party set off one morning by train for Fuji's lower slopes.

By their own account, it was a ragamuffin crew that set out with the more properly attired Japanese.

"Among the crowd of waterproof windbreakers," Tim told us later, "Tony was easy to pick out in a faded football jersey, and Dewitt looked like the Abominable Snowman under a layer-cake assortment of five sweaters. My own suede shoes were hardly standard climbing gear, but at least they were better than Larry's battered thong sandals. To top off his costume, Larry wore an incredibly mangled straw hat he had salvaged from the middle of the Inland Sea."

The Japanese soon learned the identity of the group and were happy to meet the young foreigners they had seen on television.

Fuji's 12,388 feet proved little problem for our well-conditioned colleagues, but the bone-chilling cold and high winds at the top were another matter. The four climbers had determined to spend the night on the mountain to see the sunrise in traditional fashion from the rim of the crater.

"Fortunately," Tim said, "the night was beautifully clear. Far to the northeast, like a great grass fire on the Kanto Plain, we saw the lights of our final port of call—Tokyo."

Night Atop Fuji Passes Quickly

Instead of resting in small huts below the summit, the boys scrambled over a stretch of loose volcanic rock, past several torii. Finally they spread their sleeping bags in a crude shelter at 12,000 feet, within sight of the solitary Shinto shrine on the crater rim.

"I expected sleep would be out of the question in the cold and the incessant wind," Tim said. "But suddenly there was Dewitt, shaking me and saying cheerfully, 'Come on, open your eyes—I thought you'd frozen to death!' "

The sunrise made it all worthwhile. "Banks of orange and gold," Tim described it for us, "scaling the sky like some enormous tiled roof. High overhead, a single jet contrail formed a pink-and-silver strand against the field of dark blue. Where Tokyo had been the night before, there was a flat expanse of cloud, with towers of cumulus jutting up like icebergs trapped in a frozen sea.

"Among the Japanese, British, and Americans standing there," Tim concluded, "there were no words—and no need for them."

Joining up with our kayaks at Matsuzaki, we stroked steadily for Tokyo. In the August sun on Suruga Bay we watched a peculiarly Japanese harvest—the commercial gathering of seaweed from great beds that flourish on the submarine ledges.

"Black Ships" Opened Japan to West

Unlike the cultured-pearl industry, where women divers predominate, Suruga favors men for the work of harvest. Diving and surfacing, their backs glistening in the sunlight, they resembled a school of leisurely porpoises. Ashore, teams of women spread the red-brown crop to dry, later bundling it for market. Food shops, pharmaceutical firms, and fertilizer plants all use various types of seaweed.

American history sailed with us as we rounded Izu Peninsula and entered the small port of Shimoda. Here in 1854 Commodore Matthew C. Perry of the United States Navy anchored during his visit to Japan, after successfully demanding that the country open its doors to U. S. trade and influence.* To awestruck Japanese, Perry's great, somber vessels became known as *Kurofune*, the "Black Ships."

One of our final stops before entering Tokyo Bay was the seaside resort of Atami, so popular for its hot springs that on weekends one can scarcely see the shore for the people. As we landed we became aware of curious glances from vacationers strolling in spotless *yukata*—light summer robes. Our own salt-stained jerseys, ragged khaki shorts, and faded bandannas gave us an air of survivors from a month-old shipwreck.

Near the mouth of the bay, we spent a night as virtual stowaways aboard a ferry. A retired Japanese merchant seaman who paints seascapes for a living insisted that the ferry company would have no objection. We must only make sure to come ashore before seven o'clock in the morning, when the ferry would begin its day's work.

"Otherwise, *sayonara* across bay."

*See "The Yankee Sailor Who Opened Japan," by Ferdinand Kuhn, NATIONAL GEOGRAPHIC, July, 1953.

Mastering an American sport, football players work out on the parade ground of the Japanese defense force's Fuji School at Gotemba, a training center that takes its name from the sacred mountain nearby. Several universities and secondary schools play American-style football, but the game—first staged at Tokyo in 1934—still trails soccer and rugby in popularity.

KODACHROME © N.G.S.

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5

There came at last a moment as we neared Tokyo when we said goodbye to the peace and beauty of the open sea. A season had passed since we had left Shimonoseki. Behind us, the fishermen and farmers we had known briefly would labor through cooler days and under clearer skies as autumn approached. Ahead lay Tokyo Bay, and our final port of call.

Whatever else may be said of Japan's gateway to the world, it is neither tranquil nor scenic. In the broad roadstead north of Yokosuka, once a Japanese naval base and now home for the U. S. Seventh Fleet, ships of the world jostled one another almost gunwale-to-gunwale in an endless, churning armada. Beyond them, along the low shore of the bay itself, thousands of factories stained the sky dark with their breath, as if in testimony to Japan's volcanic origin.

Festive Tokyo Welcome Ends Epic Voyage

We reached Tokyo on September 10, paddling the last few miles through a labyrinth of barge canals leading from the bay to the city. Our reception committee included an aerial escort of two newspaper helicopters and a sizable crowd beneath the "Welcome To Tokyo" banner at a landing stage in the Hama Detached Palace Garden.

Behind lay 1,100 miles of voyaging, three happy months, and countless warmhearted friends. But had our journey really contributed to better understanding? We were delighted to receive an emphatic yes to this question from a man in a position to judge—Edwin O. Reischauer, for five years U. S. Ambassador to Japan and now University Professor at Harvard. Asked for an assessment, he said:

"I met the ten American and British kayak adventurers in Tokyo shortly before they started on their voyage. By the time they had paddled their way back to Tokyo, I had resigned my position as Ambassador and left Japan, but I could tell from television programs and newspapers that their people-to-people program was having an impact far beyond the narrow route they were following. In my judgment, our ten young kayakers were among the more effective ambassadors who have been in Japan in recent years."

THE END

DWARFED BY SHIPPING *in Tokyo Harbor, the little fleet nears its goal. Favoring wind, boosting the kayaks' pace to eight knots, speeds them on this last leg of their journey*

Houston, *Prairie Dynamo*

By STUART E. JONES *Photographs by WILLIAM ALBERT ALLARD*

Both National Geographic Staff

Explosion on the plains: New skyscrapers sprout from the heart of Houston and freeways arch above its streets. Already it ranks as the Nation's sixth largest city—population 1,200,000—and third largest port, with annual tonnage exceeded only by New York and New Orleans. KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

TWENTY YEARS AGO a columnist for the *Houston Post* sat down at his typewriter and created a phrase that, in his view, captured the personality of his city. Houston, he wrote, was a "whiskey and trombone town."

Recently I encountered the author of the widely quoted phrase, Hubert Mewhinney, at a Houston social affair. He was holding a glass of champagne and listening to a string ensemble playing Vivaldi.

That kind of decorous, mannered affair is commonplace in today's Houston, and it strengthened a growing conviction in my mind: If Houston ever was a whiskey and trombone town, it isn't one now.

Houston has tired of its reputation

as happy hunting ground of the "Big Rich," the domain of the brash, free-spending wheeler-dealer—the city where everything is bigger than life. It doesn't think it ever really deserved that reputation, and it believes the time has come to try to correct the image.

Facts, Not Boasts, Now Speak for Houston

During a recent return visit to the city I have long regarded as a second home, I talked with an old friend, Gordon H. Turrentine, a former newspaperman, now the able general manager of the Houston Chamber of Commerce. I hadn't seen him since World War II, when our paths crossed at an Army Air Forces headquarters in Italy.

He winced and then laughed when I reminded him of a sign he used to keep propped on his desk. It said "HQ, Texas Air Force."

"That was a Texas brag," said ex-Major Turrentine. "I was a lot younger then.

"Frankly," he went on, "this city is trying to shed that brag label, which has been hung on the municipal neck like a horse collar. We've adopted the British style of understatement. We simply state the facts, and if they *appear* extravagant, it isn't our fault."

A telephone call interrupted our talk. Turrentine listened for a while and then patiently told his caller:

"No, George, it isn't true. Lloyd's of London never made such a prediction. See you at lunch, George."

He returned to me with a resigned look.

"That," he said, "was another businessman asking if Lloyd's of London predicted that

EKTACHROMES (BELOW) AND KODACHROME © N.G.S.

Temple to the arts, downtown Houston's Jesse H. Jones Hall presents symphony and jazz concerts, ballets, operas, musical comedies, and dramas. Houston Endowment Inc., a foundation established by the late civic leader and his wife, gave the $7,400,000 cultural palace to the city.

Performer and patron meet at a postconcert party in Jones Hall. Pianist-composer André Previn talks with Miss Ima Hogg, who recently presented her home, Bayou Bend, and its outstanding collection of American antiques to the city's Museum of Fine Arts. This fall Previn succeeds Sir John Barbirolli as conductor of the Houston Symphony Orchestra.

NIGHT FINAL GOES FORMAL *for the opening of Jones Hall last October in culture-conscious Houston. Even the gloomy headline about the stock market fails to dampen the enthusiasm of first-nighters, but Houstonians will take note of the news. Their business acumen helped shape this energetic and exciting city, a heady blend of the industrial enterprise of the East and the pioneer spirit of the West.*

Houston would be the largest city in the world by the year 2000. We are trying to bury that fiction forever. We don't know for sure how the rumor got started, but it's been making the rounds for fifteen years or so."

City Boomed During the Depression

I first knew Houston back in the early 1930's, when I arrived in search of a job. I didn't want just any job; I wanted a newspaper job. The two afternoon dailies turned me down, but at the morning *Post* city editor Max Jacobs told me to report for work the next day. I stayed three years, and served two more as United Press bureau manager.

Soon after I joined the *Post*, I became deeply involved in the life of a city that was a lot quieter than today's dervishlike Baghdad-on-the-Bayou, yet was not exactly standing still—even during the Depression. For a novice from the staid East, it was a heady experience to be suddenly on first-name terms with oil and cotton barons, mayors, sheriffs, judges, district attorneys, policemen, assorted felons, and a variety of other newsmakers.

Journalism probably was neither more nor less exciting there than elsewhere, but Houston even then was a restless, booming city, producing bold new schemes almost daily.

In at least one respect—violent death in its

many forms—the city was unquestionably a leader. It had then, as now, one of the highest homicide rates in the Nation.

In the old days a sense of violence, or the threat of it, extended even into the *Post* city room. This struck me forcefully the first time I saw a fellow reporter come in from his beat, remove a large revolver from a shoulder holster, and stow it in a desk drawer before he attacked his typewriter. At least two other colleagues customarily wore side arms.

It was that kind of city, and it was that kind of atmosphere that Hubert Mewhinney later equated with whiskey and trombones.

But now the rough edges have been rounded off. The city, beginning its 132d year with extraordinary vigor and mounting concern with quality rather than quantity, looks to solid achievement rather than self-congratulation. And both the *Post* and the afternoon *Chronicle*, far from hiring gun-toting reporters, campaign vigorously for firearms control.

Population and Trade Go Up and Up

And how Houston has grown! In 1930 its population was 292,352; today the city proper inches steadily toward 1,200,000, making it the sixth largest in the United States—after New York, Chicago, Los Angeles, Philadelphia, and Detroit. In that same period the

EKTACHROMES BY WILLIAM ALBERT ALLARD © N.G.S.

Bodies swaying to the rhythm of the sea. Lisa Bradley and Richard Gain of New York City's Robert Joffrey Ballet dance a *pas de deux*, "Sea Shadow," during an opening-week performance in Jones Hall.

Elegance of space and light distinguishes Jones Hall's Grand Lobby, where Richard Lippold's "Gemini II," twin forms of polished aluminum rods, hangs suspended on golden wires.

city area has grown from 72.1 to 446.7 square miles (map, page 357). Its deep-sea port, ranking third in the Nation in tonnage, handles some 60 million tons of cargo a year, about half of it petroleum products.

Putting statistics aside, I let nostalgia guide me around the city I once knew so well.

First I looked for three apartment houses where I had lived at various times. They had disappeared. Two had been replaced by tall office buildings; on the third site was a multilevel parking garage. Near the old Harris County Courthouse, I sought a modest restaurant the working press had favored because its Greek-American proprietor offered low prices and liberal credit. It also had vanished, but elsewhere the owner operated two of the city's best eating places, featuring beef from his own ranch.

A struggling school I remembered as Houston Junior College had become the state-supported University of Houston, complete with a nationally accredited law school, a college of optometry, the Nation's first educational television station, and 20,000 students on a 300-acre campus.

For a panoramic look at the new Houston, I joined other sightseers in the observatory atop the 44-story Humble Building. The pencil-slim, starkly simple headquarters of the Humble Oil & Refining Company currently ranks as the second tallest building west of the Mississippi River. Dallas has the tallest, a truth that in other days would have pained many Houstonians.

Materials Delivered by "Spaghetti Bowl"

From the observatory, and from the quietly elegant Petroleum Club a floor below, one can look down upon Humble's competitors. Some wear their trademarks as lofty crowns, in the form of huge illuminated, revolving signs—the orange disk of Gulf, the red triangle of Conoco, and so on.

In a year or two all will be topped by One Shell Plaza, a block-square structure that will be taller than the Humble Building and, let me understate, taller than anything in "Big D."

Looking east along the Houston Ship Channel toward upper Galveston Bay, I could see a vast array of oil refineries and chemical plants, attracted to the area by the great store of raw materials and access to deep-sea shipping (pages 346-7).

The seven oil refineries have a daily capacity of 717,750 barrels. Three refineries in Texas City, near Galveston, increase the total to 985,500 barrels. A barrel of crude oil equals 42 gallons; thus the ten refineries can provide the Nation annually with some 15 *billion* gallons of gasoline, jet fuel, lubricants, and countless other products.

Pipelines from distant oil fields in Texas, Louisiana, and other rich producing areas quench the insatiable round-the-clock thirst of the refineries for crude. Together with related natural-gas processing plants, the complex forms the heart of an industry that provides about 75 percent of the Nation's energy.

Among the refineries rise the stacks and oddly shaped towers of some 30 petrochemical plants. Materials used by many of these are by-products of the oil refineries, delivered through a 1,000-mile underground labyrinth of pipelines called the "spaghetti bowl."

While bringing prosperity to Houston, industry along the ship channel has also created a smog problem. Easterly winds often

sweep along the channel toward the city, collecting odors and stack emissions from plant after plant and producing a blend of aromas sometimes called the "sweet smell of money." Lately the growing urge to improve the quality of living has united civic leaders and industry in a campaign to reduce air pollution.

Command Post in the Race to Space

Turning to the southeast, I spotted white gleams that were the clean, functional buildings of the Manned Spacecraft Center, 25 miles away. For a closer look, I drove over the Gulf Freeway to the command post of the Apollo program that may send men to the

Cleopatra's envy might have been aroused by the luxury of the First Lady Health-Beauty Club at Post Oak Plaza. In the Bathsheba Tepidarium, beneath hand-painted tile murals depicting legends of ancient Greece, women of Houston practice Balinese water exercises. Other lavish salons offer them whirlpool baths in milk or perfumed water, the heat of a Finnish sauna, or Swedish "cold-energy" plunges. For contouring the figure, they can pedal bicycles with saddles upholstered in mink. Businessmen combat middle-age spread at the Presidents Health Club in midtown Houston.

EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

Liquid lane of heavy industry, the 50-mile-long Houston Ship Channel winds past banks lined with refineries, warehouses, oil terminals, and plants that manufacture products from jet fuel to fertilizer.

"Houston dared to dig a ditch and bring the sea to its door," Will Rogers once said. Dredged through three shallow bodies of water—Buffalo Bayou, the San Jacinto River, and Galveston Bay—the channel links the city with the Gulf of Mexico. More than 4,000 vessels annually steam into the port, where last year 10,000 workers handled some 60 million tons of cargo.

See not, fear not: Enduring the pain of tattooing, a girl has the name of her seafaring love inscribed on her arm. Sailors the world around know Houston as a regular port of call and a good-time town.

EKTACHROMES BY ROBERT F. PATTON (ABOVE) AND WILLIAM ALBERT ALLARD © N.G.S.

moon and back by 1970 (pages 350-51).*

Seconds after a spacecraft hurtles aloft from Cape Kennedy, Florida, the world begins getting reports of its progress from "Mission Control in Houston." The calm, laconic voices of astronauts and ground directors come from one of 58 spanking-new buildings that sprawl over former ranchland near Clear Lake.

There I looked up an old friend, Christopher Columbus Kraft, Jr., Director of Flight Operations. I had last seen him in May, 1962, when he was based at NASA's Langley Research Center in Virginia. He had seemed depressed, and I asked him why.

"I've got to move to Houston, that's why," he replied morosely. "They've decided to locate the Manned Spacecraft Center there."

I told him it probably wouldn't be as bad as he feared. He refused to be comforted.

"It's not that I have anything against Houston or Texas," he said. "It's just that I'm very happy living in Hampton, Virginia."

When I saw Chris Kraft again, he had been living at Imperial Estates, near MSC, for more than three years. I asked him how he liked it, and he beamed.

"I wouldn't dream of living anywhere else."

After the Moon Race, a Boat Ride

Chris's boss, space center Director Robert R. Gilruth, takes the same view. When he and his wife Jean, an aeronautical engineer like himself, arrived, they moved into an apartment and began looking for a housebuilding

*Dr. Hugh L. Dryden, late Deputy Administrator of NASA and a National Geographic Society Trustee, told of the United States program to put "Footprints on the Moon" in the March, 1964, GEOGRAPHIC.

site. They bought a tract on Dickinson Bayou, seven miles south of MSC, and as their first step called in bulldozers and dredges to scoop out a slip for their hydrofoil speedboat.

Next came a combination garage and workshop, and here the Gilruths began building a bigger boat of their own design, while the rest of their home was under construction.

"We call the boat project 'A.M.—after moon,' " said Dr. Gilruth, who manages little spare time from his duties.* When the 52-foot outrigger ketch is finished, the Gilruths hope to sail it around the world.

Space Program Brings a New Boom

When the National Aeronautics and Space Administration began building MSC six years ago, it not only changed a landscape beyond recognition but brought Houston to the fore as a capital of science and technology.

NASA's impact on the area almost defies measurement. A recent estimate indicates that an additional 65 jobs are created in Houston commerce and industry for each 100 jobs at the center. Counting an approximate 4,600 civil service employees and 6,000 employees of supporting contractors, this would mean about 6,900 new jobs in the community resulting from the direct impact of MSC.

"Each employee represents a household of 3.59 people," explained Administration Director Wesley L. Hjornevik. "Therefore NASA and its contractor employees, plus the 6,900 'first-impact' jobs they create, mean a population of 63,000 people who buy homes and furniture, clothes and automobiles, and boost all the other economic activities that encourage and support commercial growth and expansion."

MSC's coming has brought spectacular growth to long-established villages around Clear Lake and dotted the map with pleasant new communities (pages 352-3). From the surrounding prairie have blossomed multimillion-dollar office complexes to house the aerospace, computer, data-processing, and other firms that do business with the space center.

Tourists and distinguished visitors come to MSC to look at recovered spacecraft, a mock-up of the Apollo moon vehicle, an acre of slag that simulates the lunar surface—perhaps to see some of the astronauts who live nearby.

Returning to the city, I drove through pine-shaded suburbs and satellite villages that seemed lost in the flat, limitless reaches of the Texas prairie. Later, as I drove south from midtown, I found the most striking growth—evidence of Houston's transformation into a major city. I recalled the words of a man who served for 22 years as one of the city's most dynamic and far-sighted mayors.

"A couple of Easterners came here with some money to invest, and they asked me for advice," said Mayor Oscar F. Holcombe back in the thirties. "I told them, 'Gentlemen, buy

*Dr. Gilruth wrote of "The Making of an Astronaut," for the January, 1965, NATIONAL GEOGRAPHIC.

EKTACHROME (BELOW) AND KODACHROME BY WILLIAM ALBERT ALLARD © N.G.S.

Eiffel Towers of Texas, oil derricks cast short shadows on sun-lacquered Galveston Bay, but long ones across the economy of Houston. Though cotton sparked the city's initial growth, rich strikes of oil and natural gas in the early 1900's brought its most prosperous era. In many a neighborhood—some affluent, others not—rocker pumps seesaw day and night (right).

Home town of the moon race, the Manned Spacecraft Center (below, right) spreads like a university across 1,620 acres southeast of Houston. Ponds, curving walks, and young trees set off its dozens of modern buildings. But no school warrants the heavily guarded gates of the command post, where astronauts, backed up by more than 10,500 government and private employees, train for voyages beyond the earth (pages 354-5). When the spacemen soar aloft, an army of scientists and technicians stands watch at Mission Control in the MSC complex, maintaining second-by-second contact.

So space minded has the city of Houston become that even playground gear assumes shapes of fanciful rockets, like the climbers' cage in Hermann Park (right).

"Enthusiastic unofficial members of the Houston Chamber of Commerce," Jean Gilruth labels herself and husband Robert, Director of the Manned Spacecraft Center. "We like the climate, the wide-open spaces, the sense of drive, and the pride in community," she explains.

Dickinson Bayou, where the Gilruths live, combines the refinements of urban living and the pleasures of the rural. Trusting raccoon enjoys a handout on the patio.

land—buy land anywhere from here to the Brazos River.'"

If the Easterners followed Mayor Holcombe's advice, they must have realized handsomely on their investment. At its nearest the Brazos lies about 25 miles southwest of Houston. Steadily, urban sprawl pushes toward the river, creating high-rise apartment and office buildings, air-conditioned shopping centers, industrial parks, and whole new towns.

"Earthmen" Tend Astrodome's Nylon Turf

Following ruler-straight Main Street, I passed the green expanse of Hermann Park, with its neighboring Museum of Fine Arts and the Mediterranean-style buildings of Rice University (pages 362-3). Beyond them sprawled the 175-acre enclave of the Texas Medical Center. In this teaching, research, and treatment complex, a staff of more than 11,000 works tirelessly toward victory over cancer, heart and mental diseases, and a host of other ills (pages 364-5).

Hard by the old and still-producing Pierce Junction oil field, Houston's most famous new landmark, the Astrodome, rises implausibly from the prairie. Here I visited its presiding genius—Judge Roy Hofheinz, a man no less fabulous than the steel, concrete, and plastic miracle he created (pages 358-9).

I found the Judge in his box, a three-room-kitchen-and-bath suite plus a row of spectator seats overlooking right field from the seventh of the Astrodome's nine levels. He hung up his gold-hued telephone, leaned back in a swivel chair, and snipped off the end of a long cigar. He lighted up and tossed the match into a golden ashtray shaped like a fielder's glove. In the glove's palm were the word "Astros," the name of Houston's National League baseball team, and a picture of the Astrodome.

Far below us spread the stadium's playing field, in its baseball configuration. Around it rose tier upon tier of seats and boxes above them, in hues of gold, blue, purple, black, orange, and red—room for 45,000 fans.

In Timber Cove, an aptly named community near the space center, canal waters lap the lawns of two famous fliers. Retired Marine Col. John H. Glenn, Jr., and Navy Comdr. M. Scott Carpenter, first and second Americans to orbit earth, live side by side at the channel's far end

Sunday interlude between churchgoing and boating sees the Glenns' yard swarming with children and pets. Rene Carpenter, who writes a syndicated newspaper column, focuses on her husband and neighbor John Glenn, in shorts.

KODACHROME (ABOVE) AND EKTACHROMES BY OTIS IMBODEN © N.G.S.

First American to streak into space, Navy Capt. Alan B. Shepard, Jr., left, rode *Freedom 7* on a suborbital flight in 1961. One of the seven original astronauts, he now serves as Chief of the Manned Spacecraft Center's Astronaut Office and also participates in business affairs. Co-chairman of a bank in nearby Baytown, he inspects a model of its proposed new building with president Lee Brasfield.

Outside, the temperature was near 90° and still climbing. Inside, we were air-conditioned to a comfortable 74°. The fierce Texas sunlight was diffused by the roof's thousands of Lucite panes.

The Judge and I drank coffee and gazed down upon groundkeepers—"Earthmen," in Astrodome terminology—running big vacuum cleaners over the unearthly green of the field's nylon grass, or Astroturf. Since it was midmorning, the Earthmen were in plain coveralls instead of the orange space suits and plastic helmets they wear at game time (page 356).

Houston Campaigned for Both Conventions

"Sorry about the phone calls," said the Judge. "Where were we?"

"You were telling me about future plans for the Astrodome," I said.

"Yes," said the Judge, "right now we're making a pitch for the 1968 national political conventions."

"*Both?*" I asked. "Democratic *and* Republican?"

"Sure," he said. "Why not?"

I should have known his answer, for Judge Hofheinz was not exactly a stranger to me.

Back in my days on the *Houston Post*, I often worked all night. Leaving the building at four or five in the morning, I would find dozens of delivery-route carriers waiting for their bundles of newspapers.

Always among the carriers was a spindly youth

LTV EM 3

In bubble helmet and pressurized flight suit, Astronaut Edward G. Givens, Jr., (left) climbs into a mock-up of the Lunar Module (right) for one of the last pictures taken before his death in an automobile accident last June. Two Apollo astronauts hope to alight on the moon's surface in such a craft by 1970.

To evaluate placement of critical hand- and foot-holds, Astronaut William A. Anders (below) squeezes into the "Lem" with a back-pack environmental-control unit. Astronaut Edwin E. Aldrin, Jr., checks him out. NASA now plans to launch the first manned Apollo vehicle early in 1968, a flight delayed a year by the fatal fire at Cape Kennedy last January. The earth-orbit mission may last as long as ten days and will be televised. Scheduled crew: Walter M. Schirra, Jr., Donn F. Eisele, and R. Walter Cunningham.

driving a battered, topless Model-T Ford. Almost always the car bore on its side a sign advertising some event, such as "Saturday Night Dance—San Jacinto High School! A Hofheinz Production!"

The Judge, graying now, no longer spindly, and with a Cadillac parked outside, was surprised and pleased that I remembered him from those long-gone days.

"That's when I got started as a promoter," he said. "Back in those days, a fellow could hire a hall and a band, sell tickets, and make a few bucks."

He paused for a reflective drag on his cigar.

"Come to think of it," he said, "that's what I'm doing right now, in a way."

First Citizen of Extravaganza

Houston has been treated to countless Hofheinz productions since those school dances. Many citizens regard Hofheinz himself as the greatest of these extravaganzas, considering that he came to town as a penniless orphan from Beaumont. While working his way through college, he studied law at night, becoming a member of the Texas bar before he could vote. Then came dazzling real estate coups, ownership of radio and television stations, and politics. He served in the Texas Legislature, as mayor of Houston, and as county judge, the highest elective office of Harris County. Now, as boss of the Astrodome, he promotes baseball, football, soccer, bullfights, boxing, polo, rodeos, livestock shows.

"A lot of people think I own this stadium," said the Judge. "I don't, of course. It belongs to the taxpayers of Harris County and Houston, who voted two bond issues to build it. Its official name is the Harris County Domed Stadium. I just hold a 40-year lease on it, at $750,000 a year. Or rather, my company holds the lease—the Houston Sports Association, which owns the Astros."

A private elevator lowered us to ground level for a visit to Judge Hofheinz's executive quarters, probably as splendid as any on earth.

While at work the Judge uses a boomerang-shaped desk of rosewood inlaid with mottled marble. Behind him rises a wall of translucent rose-beige onyx from Mexico (page 359).

By operating a console hidden behind a desk panel, the master can, according to his mood, brighten, subdue, or mix the colors of his overhead lighting. He can press other buttons and cause wall sections to slide back and reveal three TV receivers or a movie screen.

PHOTOGRAPHS BY WILLIAM ALBERT ALLARD (ABOVE) AND JOSEPH J. SCHERSCHEL © N.G.S.

Space-suited "Earthman," a groundkeeper smooths infield dirt in the Astrodome, where baseball's Astros meet National League foes. Nylon Astroturf (below) carpets the stadium. Baseball players wear regular spikes, but football cleats slide on the turf; for home games, the University of Houston lends soccer shoes to visiting teams.

HOUSTON

Gray shading shows area officially within city limits
Tan shading shows built-up areas

Giant of the South. Houston is exceeded in urban sprawl among United States cities only by Los Angeles and Oklahoma City. Its winters are mild, and winds from the Gulf of Mexico moderate summer's fierce heat.

Galveston Bay

Gulf of Mexico

Taj Mahal of sports stadiums, the Astrodome sparkles like a jewel on onetime prairie. Paneled with 4,596 plastic skylights, the gently curving roof rises 19 stories high.

Enjoying refreshments in their Skyboxes (below, left), football fans watch the University of Houston Cougars trounce the University of Tulsa Hurricanes last November. For football the stadium can hold 52,000 in cool comfort; more than 6,500 tons of air conditioning maintains an inside temperature of 74°. The electrical system could light a town of 9,000.

Tiers of red, gold, orange, blue, purple, and black seats contrast strikingly with the bright blue-green artificial grass. Huge electric scoreboard, longer than a football field, alone cost $2,000,000 and requires five skilled operators.

KODACHROME (RIGHT) AND EKTACHROMES BY WILLIAM ALBERT ALLARD © N.G.S.

Astrodome's ringmaster, Judge Roy Hofheinz serves as president of the Houston Sports Association. His group holds a 40-year lease on the Harris County Domed Stadium—official name of the showplace—which drew eight million spectators in its first two years.

In his command post Judge Hofheinz has installed scowling Thai temple dogs, sculptures in brass and teak, richly embroidered hangings, and furniture in gilt and red lacquer—all part of a 13-ton collection assembled on a recent tour of the Far East.

In the adjoining board room a dozen big chairs surround a long coffin-shaped rosewood table. A foot or two from one end of the directors' table stands a smaller one with a thronelike chair under a scarlet canopy; the Judge sits here when presiding at board meetings.

More artifacts from the Orient fill a bedroom-bath-kitchen suite, reached by a spiral staircase. Here the Judge often spends the night rather than journey home to the suburbs after a long day.

Stunned by the visual impact of all this, many visitors have groped for words to describe the decor. Bob Hope's "early Farouk" has been quoted widely. Another suggestion was "Ringling Brothers Revival." My own offering—with a nod to the prairie setting—was "gopher baroque."

Such gibes bother the Judge not one whit. Show business, he says, needs a certain garishness.

Calf scramble for laughs, bullfight for thrills—Astrodome patrons witnessed both last year. At the Houston Livestock Show and Rodeo, 24 boys try frantically to grab by hand 12 Angus and Hereford calves. The catch becomes the captor's prize.

First formal bullfights ever held in the U. S., Houston's bloodless bouts climax with symbolic kills. As in Portugal, El Toro is spared the final sword thrust.

Matadors fare less well. Here on his knees, cape flaring, Jaime Bravo eludes one charge (right), but the beast turns quickly and horns him (below). He suffered a punctured lung and three broken ribs, but recovered to fight again.

EKTACHROMES BY TED RUSSINSKI (LEFT) AND WILLIAM ALBERT ALLARD © N.G.S.

The Astrodome has its critics, of course, and Judge Hofheinz listens to them patiently. When ballplayers complained of losing high flies against the plastic, the Judge had part of the roof painted. With the resulting loss of diffused natural light, grass would no longer grow, and this led to Astroturf.

Leo Durocher, manager of the Chicago Cubs, says he dislikes everything about the Astrodome, and the nylon grass in particular; batted balls, he says, do not bounce on it the way they should.

"I like real grass," he says.

So when the last square of real turf was removed to make way for Astroturf, it was gift-wrapped and shipped to Durocher.

Of all the Astrodome features, its mighty air-conditioning system had escaped criticism until dark suspicions were voiced by Ed Kranepool, first baseman of the New York Mets.

Somebody, said Kranepool, was manipulating the machinery in such a way that blasts of air converted well-hit Met balls into feeble grounders or pop flies. When the Astros were at bat, Kranepool claimed, the air flow was reversed and balls that would have been easy outs sailed over the heads of Met fielders.

Kranepool's complaint reached the ear of Ford Frick, then Commissioner of Baseball. Solemnly, Frick sent investigators to make a careful study. The verdict: not guilty.

Stadium Seats Far Outnumber Students

Strolling about the Rice University campus, two miles from the Astrodome, I was amazed to come upon another kind of stadium. It struck me as one of the largest I had seen, and I learned that it seats 72,000. Rice now has about 2,700 students and, with an expansion program under way, expects 4,000 by 1975. Why, I wondered, would such a small school have such a vast stadium?

I put the question to President Kenneth S. Pitzer, a distinguished chemist who came to Rice in 1961 from the University of California.

"It's very simple," said Dr. Pitzer. "Houston is possibly the most football-mad city in the United States. We need a stadium of this size to meet the demand for seats. The professional Houston Oilers also use Rice Stadium, and their games draw about 40,000. When Rice plays, it's often a sellout."

Having heard that Rice's scholarship requirements were among the stiffest in the country, I asked Dr. Pitzer about the recruiting of football players.

"We take a rather relaxed, almost Ivy League, attitude toward football here," he said. "For example, Coach Jess Neely retired last year after 26 years on the job. He never had a contract. But we do give some preference to football players. That means we admit good players who are also good students, but not necessarily top students.

"An outstanding example of what such a plan can produce is Frank Ryan—*Doctor* Ryan, if you please. Frank played quarterback and also earned his Ph.D. here. Now, when he's not playing quarterback for the Cleveland Browns, he teaches higher mathematics. He served first on the faculty at Rice, but now he's at Case Institute of Technology in Cleveland."

Rice, sometimes called the "Princeton of the South," has become deeply involved in the Nation's space program, working closely with scientists at the Manned Spacecraft Center. The center itself stands on 1,000 acres of land donated by Rice, plus an additional 620 acres bought by the Government. The land had been presented to Rice by the Humble Oil & Refining Company.

Rice's own Department of Space Science, first to be created by an

Patterned perfection of manicured hedges lines the sweeping esplanade of Rice University. Midway between the library's flag and the distant administration building sits the bronze figure of William Marsh Rice. He arrived here penniless from New Jersey in the 1830's and soon prospered. After Rice's death in 1900, his will allocated millions to found the institute for "boys and girls, struggling for a place in the sun."

Builder-to-be, Lili Milani majors in architecture. Some 2,700 students enroll in Rice's half-dozen schools, which include the Nation's first department of space science.

American university, designs and builds space instruments and satellites. Many of these, including a space-probing satellite named "Sammy" after the Rice owl mascot, have gone aloft from Wallops Island, Virginia, and Fort Churchill, Manitoba, to study near-earth phenomena.

The Texas Medical Center stands near Rice, and here the university has contributed to one of medicine's most dramatic advances. Teams from Rice and the Baylor University College of Medicine worked together to fashion the left ventricular bypass pump, popularly called the "artificial heart." Already the LVBP has been implanted in the chests of half a dozen patients by Baylor's famous Dr. Michael E. DeBakey (below) and his associates.

Watching students as they strolled past a statue of Rice's founder, I wondered how much they knew of the turmoil and tragedy that attended the birth of their university. The inscription on the statue's pedestal says "William Marsh Rice, 1816-1900," with no hint that Rice was the victim of

Open-heart surgery saves the life of a six-month-old "blue baby" at the Texas Medical Center. The infant's blood is pumped through a heart-lung machine that restores oxygen; a heat lamp keeps the fluid warm. Hunched intently over the tiny patient, Dr. Denton A. Cooley operates, assisted by other physicians. His surgical nurse Hazel Eveline (right) watches, ready to slap sterile instruments into his rubber-gloved hands.

PHOTOGRAPHS BY [illegible] (BELOW) AND WILLIAM ALBERT ALLARD © N.G.S.

Miracle man of medicine, Dr. Michael E. DeBakey daily nears a cherished goal—development of a man-made human heart. Half the job has been done. Six times in recent years he has replaced the function of the left ventricle with a plastic pump, the so-called artificial heart. The operations made world headlines. Dr. DeBakey heads the Department of Surgery at Baylor University College of Medicine, whose faculty performs many of the operations in the center.

one of this country's most notorious murders.

Rice, a native of Springfield, Massachusetts, moved to Houston about 1838 and proceeded to pile up a fortune in a variety of enterprises. By 1900 he was twice a widower, a multimillionaire, and living in New York City with a manservant, Charles F. Jones.

When the 84-year-old Rice's body was found in his apartment, his death was attributed to natural causes. Then forged checks and a bogus will came to light, part of a scheme to enrich Albert T. Patrick, a lawyer, with Rice assets earmarked for endowing a college in Houston. Investigation disclosed that Rice had been chloroformed, and the valet confessed that he had done the deed, at Patrick's behest.

KODACHROME BY WILLIAM ALBERT ALLARD © N.G.S.

Jones, having turned state's evidence, went free. Patrick was convicted of murder and sentenced to death, but won stay after stay of execution, then commutation to life imprisonment, and finally, in 1912, a full pardon.

The year of Patrick's release from prison was the same year that Rice Institute, as it was called then, was dedicated. The college opened its doors with a faculty of nine and a student body of 77.

A few years before William Marsh Rice's arrival, a couple of other Easterners had moved to Texas, then still part of Mexico. They were the Allen brothers, Augustus C. and John K., from upstate New York, and from their vision grew the city of Houston. The Allens pioneered a major Texas industry: buying and selling real estate.

First Texas Capital Honored a Hero

When colonists from the United States rebelled against Mexican rule in 1835, the Allens were busy with land speculation at Nacogdoches, in east Texas. The short-lived Republic of Texas won its freedom when Gen. Sam Houston, in a sudden attack, defeated Gen. Antonio López de Santa Anna at San Jacinto on April 21, 1836. To the Allens then came an idea no less stunning than the victory at San Jacinto. At the junction of winding, sluggish Buffalo and White Oak Bayous, they would build a city to be named for the victorious Virginia-born swashbuckler. Sam Houston, the brothers rightly predicted, would be the first President of Texas.

Four months after the battle, the Allens bought 6,642 acres for about $1.40 an acre. Less than a year later, when President Houston arrived in the mud-flat town the Texas Congress had selected as capital, lots were selling for as much as $5,000. (A hundred

years later, when a five-and-ten-cent-store chain bought a midtown parcel of the original Allen tract, the price was $3,050,000, or $2,000 a front inch.)

The Allens, eager to have settlers come and buy lots, spared no adjectives in proclaiming the glories of their new "city." Houston, they told prospective customers, was "situated at the head of navigation, on the west bank of Buffalo Bayou." Unmentioned was the fact that the bayou, a tributary of the San Jacinto River, could be navigated only by craft of very shallow draft.

Despite this drawback, Houston lost no time in officially becoming a port. Taking their cue from the Allens, owners of the small steamboat *Laura* advertised the first commercial voyage to a new inland port and seat of government of a new republic.

Heavily laden with passengers and supplies, the *Laura* sailed from Galveston and had no trouble reaching Harrisburg, a frontier village long ago swallowed by Houston. Then, threading Buffalo Bayou, the wood-burner required three days to negotiate the remaining eight miles to Houston. There were long stops while the crew cut down overhanging vines and winched logs and snags out of the way. The passengers all joined in the work.

Conquering deafness, a two-year-old in the Houston Speech and Hearing Center arranges blocks as she listens to her teacher through dual earpieces. Most of the pupils use only one aid, but this youngster's better ear has yet to be determined.

A dedicated husband-and-wife team, Doctors Jack and Tina Bangs, administer this clinic for preschoolers. Both favor the acoustic approach pioneered by Alexander Graham Bell, one of the earliest teachers of the deaf.

"Dr. Bell believed it essential to utilize every particle of residual hearing and listening skill," explains Mrs. Bangs. "We wholeheartedly agree."

The clinic's success can be measured by the fact that many of its pupils go on to regular school.

Becoming restless, some of the travelers took *Laura*'s small boat and set out to look for the town. They missed the landing altogether and headed up White Oak Bayou, until they stuck in the brush. They had to back down, this time keeping a careful lookout.

When they finally found the new settlement, it proved to be a few shacks and tents adrift in a sea of mud. Even this was welcome after the *Laura*'s trials, and the passengers hurried ashore. Most went directly to the biggest tent in town, which housed a saloon.

The Allens and their fellow townsmen, meanwhile, were pressing on to prepare their city for its new role as national capital. Hordes of carpenters hammered and sawed around the clock to complete the capitol building, a vast frame structure on the site of today's 1,000-room Rice Hotel.

An Ohioan who visited Houston in 1837 described it in a magazine of the time:

"All was bustle and animation . . . among a population of six or seven hundred persons where but one-half were engaged in any regular business . . . unless drinking may be considered such. . . . Drinking was reduced to a system, and had its own laws and regulations. The Texians, being entirely a military people, not only fought, but drank, in platoons."

Opening of the Texas Congress was scheduled for May 1, 1837, but it had to be postponed for four days because the capitol still lacked a roof. When it did convene, one of its first acts was to vote special concessions to encourage settlement of the rich Brazos River bottom lands, which already were turning out huge crops of cotton.

Houston was the seat of government only until 1839, when the lawmakers moved to another raw settlement, named for Stephen F. Austin. After Texas became the 28th state in 1845, Austin was made state capital.

Cotton No Longer Rules as King

Thus Houston, born of a marriage between a land promotion and a political maneuver, set out to prove its ability to survive as a commercial city. Cotton, grown in the black Texas soil, shipped to Houston for compressing into rock-hard bales, then forwarded to the world's textile mills, had more to do with the city's early success than any other factor.

For years cotton was truly king—but it rules no longer. Among the forces influencing its abdication were foreign competition and synthetic fibers. And new spinning techniques have caused mills to demand cotton with longer fibers, rather than the short-staple varieties grown generally in Texas.

Still, many of Houston's fortunes were made in the stuff of shirts and dresses, and one of its many cotton dealers is still among the world's largest—Anderson, Clayton & Co.

The most drastic change in the economy of Houston—and of all Texas—was heralded explosively on January 10, 1901. After years of prospecting for oil where experts said none would be found, Austrian-born Anthony Francis Lucas brought in a gusher on a salt-dome formation known as Spindletop, about

KODACHROMES BY JAMES P. BLAIR (ABOVE) AND WILLIAM ALBERT ALLARD © N.G.S.

Strength in silhouette: Shipyard worker in Houston's port pounds fittings into a half-section of a saddle destined to cradle a chemical tank on an ocean-going barge.

Lean and sinewy, Texas longhorns once numbered in the millions—a favored breed because they could live longer on less feed than any other. Now ranchers prefer Angus, Hereford, and Brahman.

80 miles east of the city. Other gushers followed quickly, and soon the wildest oil boom in history was under way. Hundreds of companies were formed, among them the Gulf Oil Corporation and the Texas Company, destined to become leaders in the petroleum industry.*

After immensely productive Spindletop came other prolific oil fields along the Gulf Coast of Texas and Louisiana, including one within Houston's present city limits. The U. S. petroleum industry, which had started with Edwin L. Drake's well near Titusville, Pennsylvania, in 1859, was suddenly a giant.

Inland City Brings the Sea to Its Door

Houston men were in the thick of these stirring events. Soon they, with others, saw the need of a deepwater port. The logical answer was Galveston, with its superb natural harbor. But the island city had not fully recovered from the disastrous hurricane and flood of 1900, and besides, Galveston was geared then, as today, for handling dry cargo rather than oil.

Thus was born a project as bold as the soldier-statesman for whom Galveston's ambitious neighbor city was named. A winding mile or two at a time, Buffalo Bayou was dredged to give access to the Gulf of Mexico, 50 miles away, and bring the sea to Houston.

The job was completed more than half a century ago, and ever since then ships of all nations have sailed into the Houston Ship Channel, to discharge and receive cargo of every description. Galveston remains a busy port, handling about four million tons of cargo annually, compared to Houston's 60 million.

Today the inland port serves 135 general-cargo and 90 tanker lines. More than three billion dollars' worth of industry crowds the ship channel's banks. The Intracoastal Waterway carries barge traffic between Houston and the Mississippi, and thus links it with river cities as far east as Pittsburgh.

To get a close look at the port, I boarded the city's sightseeing vessel *Sam Houston*, with Capt. Roy Faulkner in command. Also

*See "The Fabulous State of Texas," by Stanley Walker, NATIONAL GEOGRAPHIC, February, 1961.

Steel and cast-iron sculpture of the Lone Star State. James Love's "Area Code" symbolizes facets of Texas life: longhorn cattle, swimming pools, an "oil bird," the hammer of industry. The 39-year-old sculptor scoured junkyards for the parts of his seven-foot-high screen. The Museum of Modern Art in New York City and Houston's Museum of Fine Arts and Contemporary Arts Museum have exhibited his works; the assemblages draw praise as "classics in humor and design."

EKTACHROME BY WILLIAM ALBERT ALLARD © N.G.S.

aboard were several dozen Midwestern wheat farmers and their wives, come to inspect a new channelside cooperative grain elevator in which they were shareholders. Trucks bringing grain would return to Kansas with phosphate rock to make fertilizer, I was told by one of the farmers.

We started downstream from the Turning Basin, a wide area where the biggest ships may swing around and maneuver into their berths. Many of my fellow passengers had never before seen ships or tidewater, I learned. On this warm spring day they saw plenty.

A vessel lay at almost every berth, with booms swinging cargo ashore or into holds, and from the flagstaffs flew the colors of a dozen nations. At one wharf a Belgian ship had just unloaded a new Swiss-built railway car that would continue its journey by flatbed truck to the Pike's Peak cog railway. Waiting to be hoisted aboard the vessel were scores of olive-drab jeeps and armored vehicles consigned to NATO forces in Europe.

At another terminal we saw eight 47-foot steel-hulled shrimp trawlers waiting to be loaded aboard ships. They had been built at Freeport, Texas, for a British concern operating out of Bahrain in the Persian Gulf.

As we passed rows of refineries and petrochemical plants, Captain Faulkner pointed to a small mountain of tailings for which the best minds of industry had yet found no use. The grayish terraced mound, about 100 feet high and covering 55 acres, stood beside the Olin Mathieson Chemical Corporation's plant, which converts phosphate rock from Florida into pelletized fertilizer.

Like a racing fleet awaiting the starter's gun, European and Japanese automobiles gleam in the Texas sun after ocean voyages in dark holds. Cars and other cargo landed at Houston are transshipped by rail and truck as far north as Nebraska and west to the Rockies. Vessels docking on the ship channel, in the background, usually unload and reload in three days.

Coffee, rubber, paper, textiles—the list of Houston's imports reads like a roster of earth's products. Gasoline, grain, and petrochemicals rank high among outbound shipments that also include cotton, oil-well supplies, hides, and synthetic rubber.

Oil for the cars of the world fills cans riding a conveyor belt in Humble's huge Baytown refinery.

KODACHROME (ABOVE) AND EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

Chemically, the residue from phosphate is gypsum, closely akin to that mined from the earth. Because it contains impurities, however, it cannot be used, like natural gypsum, for plasterboard and other products.

"For years the company has been trying to figure out what to do with it," said the captain. "Not long ago I had a party of Japanese industrialists aboard and told them about the problem. They took pictures of the mound, whipped out slide rules, and talked about nothing else the whole trip. I'm sure they'll come up with an idea."

Meanwhile, the growing hill already stands twice as high above sea level as Houston, which has a mean elevation of 53 feet.

Farther downstream the skipper showed me a crumbling concrete wharf, remnant of an ill-fated scheme to produce Texas silk before World War I. Silkworms were imported from China and mulberry trees were planted for them to feed upon. The trees prospered, but the worms did not. The project collapsed, leaving investors with worthless mulberry trees, dead silkworms, and handsomely engraved stock certificates.

Battleship Guards Texas Monument

At San Jacinto Battleground we slid into a berth in the shadow of the graceful star-topped limestone shaft, 15 feet taller than the Washington Monument, commemorating Sam Houston's victory over Santa Anna at this spot. A few hundred yards away lay the decommissioned battleship *Texas*, once the pride of the United States Navy and now part of the state park (pages 372-3). A few years ago a hot-dog stand went into business on the

Hero of Texas independence, Sam Houston in bronze guards the entrance to Hermann Park. On April 21, 1836, in one of history's most decisive battles, Houston's outnumbered forces routed the more than 1,200 men of Gen. Antonio López de Santa Anna, Mexico's dictator-President, and captured him. Following the victory, Texas existed as a sovereign republic until it joined the United States in 1845.

Oaks goateed with moss frame the green reaches of hallowed San Jacinto Battleground (right), 15 miles east of downtown Houston. Here Sam Houston crushed Santa Anna.

Two symbols of prideful Texas—the San Jacinto Monument and the first battleship ever to become a state shrine—stand guard

KODACHROMES BY WILLIAM ALBERT ALLARD (ABOVE), DAVID RANCE (OPPOSITE, UPPER) AND TED ROZUMALSKI © N.G.S.

where an epochal battle raged beside the San Jacinto River. Museum at the base of the 570-foot limestone shaft depicts the region's history from Indian days. Battleship *Texas*, famed dreadnought of two world wars, finds permanent berth in a slip off the ship channel.

Houstonians tune in to today's beat

BE IT THE CHANT of a school's cheering squad, the twang of a Western band, or the blare of a juke box, Houstonians hear and heed. Avid sports fans, enthusiastic party-givers and night-club goers, they are a gregarious, exuberant people.

Kowtowing to upperclassmen, Rice University freshmen see more of the grandstand than the football game during an initiation ritual all first-year men must endure. Behind the boys, under the lights of 72,000-seat Rice Stadium, the Rice Owls lose, 14 to 6, in last October's match with their arch rivals of the Southwest Conference, the University of Texas Longhorns.

Gold-clad gunslinger, white boots stomping to rhythms of "Red River Valley," renders a Texas version of the frug at an Old West party.

Snapping fingers and clapping hands accent the music and the dance at the Athens, a Greek cafe near the ship channel, popular with sailors and young Houstonians alike.

EKTACHROMES BY WILLIAM ALBERT ALLARD © N.G.S.

Texas's afterdeck. Outraged cries of "Sacrilege!" brought hasty removal of the snack bar.

On another day I rode a small tug from the Turning Basin, the head of deepwater navigation, up the undredged stretch of Buffalo Bayou. Our goal was Allen's Landing, for years a neglected, weed-grown vacant lot under a viaduct, now landscaped into a small park (map, page 357). Here, 131 years ago, the Allen brothers launched their city.

Coiling between narrow, eroded banks, with overhanging trees forming a dark-green tunnel, the bayou looked much as it must have to the *Laura's* passengers. Spotted turtles slid off logs as we passed, and we saw a swimming snake that may have been a water moccasin. We went under freeway and railroad bridges and passed small chemical plants and cement factories where barges unloaded lime-rich oystershell from Galveston Bay.

As we rounded a bend and the viaduct marking our objective came into view, we felt a bump and a shudder. We were stuck, just like the *Laura's* boat. Reverse power pulled us off the mudbank, and we headed back to the Turning Basin. Later, I found it easier to visit Allen's Landing on foot.

Theater Group's First Endowment: $2.14

A stranger looking at the seedy buildings around Allen's Landing would find it hard to accept author James Street's words about Houston: "Her pulse beats so fast that last month already is history and last year almost is antiquity." This neighborhood reflects the blight afflicting many American cities, and an all-out rehabilitation program has begun under Mayor Louie Welch's administration.

The Houston of the racing pulse begins a few blocks away. Here, in another area once threatened by blight, rises Jesse H. Jones Hall for the Performing Arts (pages 340-43). The hall was built on city land by a foundation created by the late Jesse Jones, financier, publisher, Cabinet Member, and Democratic Party leader, and his wife.

Jones Hall has become the home of the Houston Symphony Orchestra, ranked as one of the Nation's finest. With its flexible stage and seating arrangements, the hall quickly adapts itself also to grand opera, ballet, touring Broadway musicals, jazz groups, and intimate chamber-music concerts.

By late 1968 Jones Hall's across-the-street neighbor will be the striking new home of the Alley Theatre, a professional repertory group that was founded two decades ago on an investment of $2.14. Since 1962 it has received the largest theater grants ever made by the Ford Foundation, $3,500,000 for a new building and ten years of assistance. Nina Vance, producer-director, told me how the Alley Theatre started on its way to national acclaim.

"Some of my theater-loving friends and I were sitting around one night," she said, "discussing ways and means of launching a first-rate drama group. The only way, we decided, was to enlist some of Houston's civic-minded citizens. We made up a list of prospective supporters. As it happened, I was the only one at the meeting who had any money. I had $2.14. With it we bought 214 penny postcards and sent off our appeal. It worked."

Perfume Flows From a Golden Derrick

It seemed to me that Houston had acquired, along with its affluence, a new character that was both sophisticated and gay. This impression registered strongly when I took my wife on a tour of the beautiful department stores and specialty shops along Main Street.

One big store, Sakowitz, had decked itself out in turn-of-the-century style. On the first floor we found a miniature oil derrick, a working model about two feet high covered with gold leaf. The liquid that flowed through its recirculating pump was not petroleum, but an expensive French perfume.

Soon we came to the Houston branch of Dallas's famous Neiman-Marcus. When the branch was opened in 1955, local shoppers tended to regard it as an upstart intruder—"a Dallas outfit." Then they began buying so eagerly that the firm started plans for a suburban store much bigger than the downtown one.

We went in, mainly to browse but also to buy a tieclasp to replace one I had lost. Just inside the door was the jewelry department, and here we paused to gaze at treasures a maharaja might have coveted.

An obliging clerk let my wife fondle, and even try on, a 12-carat emerald ring ($110,000), a platinum necklace with two heart-shaped diamond pendants the size of thumbtips ($117,000), and another necklace of imperial jade beads ($110,000).

I stopped at men's furnishings, rejected a gold tieclasp shaped like an oil derrick, and bought a plain silver bar for $6.50 plus tax.

With prosperity and growth, unzoned Houston has seen the spread of architectural chaos, including vast stretches of motels,

restaurants, night clubs, and the like decorated with gaudy red and green neon. The example that fascinated me most was a sea-food restaurant adorned with a giant neon shrimp wearing a ten-gallon hat and brandishing two pistols.

As for its pressure-cooker climate, Houston has partly conquered it by overcoming the seasons—billing itself as "the world's most air-conditioned city." Early in 1967 officials were considering a breath-taking scheme, advanced by the local chapter of the American Institute of Architects, to roof over and air-condition four square blocks of the central business district.

"Old Guard" Helps Create a New Houston

Watching all these happenings in bemused fascination, the city's long-established families—the "Old Guard"—live mainly in quiet, handsome suburbs like River Oaks. Many members of the Old Guard devote themselves to lifting their city's cultural level. Concrete results include the steadily increasing excellence of Houston's schools, including the predominantly Negro Texas Southern University and the small but lively University of St. Thomas.

One of my Old Guard favorites is a gentle lady with an unlikely name. Miss Ima Hogg, daughter of a distinguished Texas family, firmly shuns publicity, but the city knows of her lifelong efforts in behalf of music, painting, and other creative endeavors (page 340).

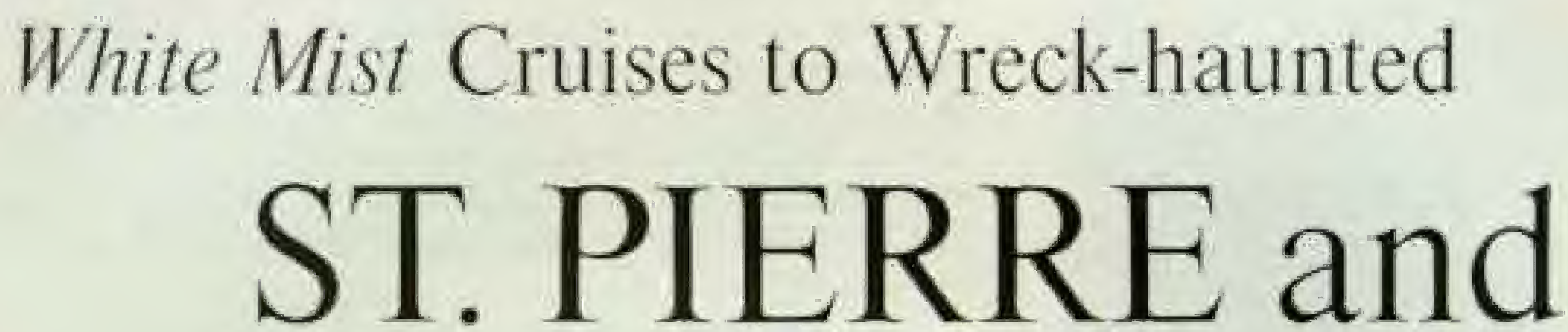
Miss Hogg's latest gift to her fellow citizens was her long-time home, Bayou Bend in River Oaks. Over the years the owner had filled its gracious rooms with one of the Nation's finest collections of American antiques. The estate, with its 14 wooded acres and magnificent gardens, has become the Bayou Bend Collection of the Museum of Fine Arts.

Miss Hogg and kindred spirits of the Old Guard look forward to the day when Houston, having shown what it can do in industry and commerce, will give the world an important writer, a brilliant composer, a daring architect. Knowing of the boundless energy and imagination on tap here, I'd say the Old Guard might not have too long to wait. THE END

Meandering across the prairie, 1,600 riders and 52 wagons follow the Salt Grass Trail from Brenham to Houston, 4 days and 85 miles southeastward. Annually, the Nation's biggest trail ride follows a century-old path rutted by ranchers when they drove cattle to winter pasturage in the hardy salt-meadow grass that names the trail.

Misty breeze of February forces one fair dude to veil hat and head (top). But at sunset around the campfire, banjos plink and guitars strum as camaraderie chases the chill. Trail's end: Houston on the eve of the livestock show and a welcome from golden girls (above).

KODACHROMES (OPPOSITE) AND EKTACHROMES BY WILLIAM ALBERT ALLARD © N.G.S.



White Mist Cruises to Wreck-haunted ST. PIERRE and

ISLES LOST IN FOG: *A ghostly lighthouse guides mariners past Pointe aux Canons, whose batteries guarded St. Pierre and Miquelon in the 1700's. Dorymen ply the harbor roadstead, bound for the cod-rich grounds off Newfoundland. Standing in with his yawl* White Mist, *the author and his crew landed on islands as Gallic as France itself.*

By MELVILLE BELL GROSVENOR, LL.D., Sc.D.
President and Editor, National Geographic Society

MIQUELON

WHITE MIST MOVED through pea-soup fog; we could barely see the bow. Right on schedule we had picked up the outer beacon on Bertrand Rock—but, curiously, found it unlit. Now as dusk closed in, we groped our way into the harbor of St. Pierre, a spot famed for its shipwrecks.

Suddenly the lookout shouted, "Land ahead! *Rocks!* Spin her!"

I put the helm hard down. *White Mist* slowly turned, and as we came abreast, we could see, sure enough, rocks—a breakwater running right across our path! Yet, oddly, there in the gloom just beyond this wall, flashed the harbor buoy we were aiming for.

What had gone wrong? A 15-foot-high fence of boulders across the entrance? Confused, but sure of our piloting, I quickly re-checked our charts.

Like chips of old Brittany, the French islands of St. Pierre and Miquelon float in the mouth of the Gulf of St. Lawrence, only

12 miles from Newfoundland (map, page 396). Our charts, supposedly updated a few months before, had come direct from Paris.

Had we overshot our mark? Could this be the sea wall at Pointe aux Canons on the port's far shore? There, I knew, the schooner *Harmony* had come to grief in a storm in 1914.

Or had our compass gone astray? Our Atlantic Coast Pilot warned that iron ore on the nearby island of Grand Colombier did strange things to magnetic compasses.

In the gathering darkness we steered southwesterly away from the sea wall, thinking this would lead us into harbor. But no! The water shoaled quickly, and we saw rocks and houses dead ahead.

We turned back and followed along the wall, poking in now and again like a blind man trying to find a door with his cane. Half a mile farther the wall ended, and we stopped. A voice came out of the gloom:

"*À gauche! À gauche!—Okay!*"

We slowly swung left around the mole as directed by our unseen Frenchman. Then the channel lights opened up, and we motored right into St. Pierre (pages 384-5).

Fair Wind Speeds Yawl From Bermuda

No sooner was our anchor down off the brightly lighted quay than a small boat approached and a young man called, "Welcome to St. Pierre. What boat is that? Can I be of any help?"

"*White Mist* from Bermuda!" we answered.

"But you're not due for three days—and how did you get through those new breakwaters in the fog and darkness? I am Jean-Pierre Andrieux."

We had engaged this alert lad to be our agent and guide while exploring these islands.

"Yes, we had a fast run. Seven days. In fact, we never tacked—winds astern all the way."

Jean-Pierre had been recommended by a good sailor friend, Wright Britton, who had cruised his *Delight* here many times and knew these waters like the palm of his hand. Son of a sea captain, Jean-Pierre was only 18 years old, yet already he had built a fine reputation as a ship's agent. He quickly explained that new breakwaters were being built across the harbor mouth—and should have been indicated on our "updated" charts.

"But you've been on sea rations long enough," he said. "Why don't you come ashore to eat? I know just the place for a good dinner. Come as you are—this is a sailor's town."

We piled into his small dory and rowed

Timeless adversaries—fisherman and cod. Ernest Derouet hefts the quarry that lured Europeans here perhaps 500 years ago and is still an island mainstay. The weathered St. Pierrais belongs to a breed now slowly vanishing—men who each day slide tiny dories into the sea and go forth to fish with handlines (pages 406-7).

KODACHROMES BY BRUCE DALE (BELOW) AND W. E. GARRETT © N.G.S.

Peering over their neighbors' roofs, homes and shops of St. Pierre climb to the snowy foot of "the mountain," a nameless ridge behind the town. The capital of the territory shelters 4,600 islanders—90 percent of the population. Doggedly brushing on coats of durable boat paint, the St. Pierrais see their comfortable homes quickly peeled bare again by the wind and corrosive salt air.

Red-bottomed trawler, damaged on the blustery Grand Banks, awaits repairs on one of the island's two slipways.

ashore. From the dock, old salts wearing Basque berets looked us over and wondered what the sea had thrown up. And so we stepped ashore on one of the last bits of North America that still fly the French tricolor.

St. Pierre and Miquelon share with Canada's Sable Island, 250 miles southwest, the grim title "Graveyard of the Atlantic." * More vessels have perished on these French isles than on Sable—easily 600 since 1816 (map, page 396).

We scanned St. Pierre's Place Général de Gaulle, its lights glowing fuzzily through the fog. Typically French buildings stared out over the quay. The post office stood tall and black, its hunched roof a sinister silhouette.

"This port surely looks the part," said Stanley Judge, of Gorham, New Hampshire, our engineer, as we followed Jean-Pierre up drizzle-slick streets. "Seems haunted by the ghosts of drowned sailors."

But the brightness of Madame Dutin's restaurant dispelled the gloom of the outdoors. Sturdy furniture and homey ornaments gave us the feel of a French *pension*.

"Could we start with a glass of Pernod?" asked able seaman George Beck, of Philadelphia. We warmed ourselves with a sip of the cloudy, anise-flavored apéritif. Meantime, Jean-Pierre had ordered a St. Pierre repast. And what a feed for storm-tossed sailors!

We began with *escargots*, enriched with butter, inspired with garlic, each one in its own swirling snail shell. We dipped up the sauce to anoint the crusty French bread.

Next came voluptuous Chateaubriands. The steaks arrived sliced, with French fries and peas. Our goblets were filled with ruby Beaujolais. Then a light tossed salad of tender local lettuce—"a rare delicacy on St. Pierre," Madame Dutin commented. Only the hardiest of us went on to flaky pastries, fruit, and Camembert cheese.

No doubt of it: St. Pierre is a part of France.

Green Bananas Fly in the Rigging

Over coffee and old cognac, Jean-Pierre questioned us about our voyage from Bermuda. Now that we were full and warm, the beginnings seemed as distant as the Odyssey.

Our passage had begun, as it had just ended, in the dark.

Most landlubbers start a trip in early morning, but for *White Mist* night would do just as well. Once clear of St. George's, she would be on her own, rolling along in the broad Atlantic with watches set. Besides, we needed every daylight hour to stow gear and supplies for eight hungry men—enough to last four to five weeks in an emergency. On my last look around I saw in the rigging a stem of tiny Bermuda bananas (right). They were green and hard as rocks.

"An old trick of my father's," said watch captain Bill White, from Stonington, Connecticut. "He always hung green bananas in the shrouds whenever he left Bermuda. As the ship rolls, they turn in the sun, slowly ripen, and make free snacks for the watch."

We all laughed because they were so green, they'd never ripen.

Fireworks Salute *White Mist*'s Departure

After a big dinner with our families and friends in the White Horse Tavern in St. George, we strolled down to the dock, made our farewells, and piled aboard *White Mist*.

"Let go fore and aft!" I called. Lines slipped from bollards. We shouted goodbye and *White Mist* moved.

Dazzled by lights of the dock, our eyes were momentarily useless in the sudden darkness as we followed the cut in the coral to the ocean. Moonlight flooded St. David's Head when we hoisted sail off this point, finish line for the biennial Newport-Bermuda race.†

Then the sky caught fire with spangles of rockets and flares. "Fourth of July fireworks of our U. S. friends at Kindley Air Force Base," said my son Gil, navigator for the voyage. "How's that for a parting salute!"

"With fair winds we may reach St. Pierre and Miquelon in time for Bastille Day," I predicted. That became our goal: to celebrate July 14, their national day, on French soil.

Out of respect for St. Pierre's shipwreck history, we had installed a new Fathometer. Now, fascinated, we watched the fast drop-off of the bottom. With a little imagination, *White Mist* became an airplane sailing off the mountaintop airfield that is Bermuda.

Our logbook turned lyrical. 2141: "Beautiful moonlit night.... 0015: Big rolly swells. Moon!... Flying fish sailed down hatch, hit Stan on back of neck.... Mother Carey's chickens dip and dart around us—five hit mizzen, drop at Tom's feet—identifies them

*Dr. Grosvenor wrote of *White Mist*'s "Safe Landing on Sable, Isle of 500 Shipwrecks," in NATIONAL GEOGRAPHIC, September, 1965.

†In "To Europe With a Racing Start," in the GEOGRAPHIC of June, 1958, yachtsman Carleton Mitchell described this famous ocean contest.

Sandstone keyhole frames *White Mist,* flying the Cruising Club of America burgee at main masthead and French tricolor at the starboard spreader. Waves and currents gnawed the 20-foot-high arch in Cap Percé on the island of Langlade. "The journalist in me whispered 'veer closer,'" recalls the author, "but my sailor self warned 'stand off!'"

Jade-green bananas, lashed to the rigging in Bermuda by watch captain Bill White, turned in the sun with each roll and slowly ripened, until they disappeared as snacks.

Spray sweeps the bow as *White Mist* drives toward Miquelon. Navigator Gil Grosvenor, center, the author's son, pilots the yawl; crewmen Stan Judge and Tom Beers, right, share the watch. The 46-foot craft sped the 1,120 miles from Bermuda to St. Pierre in seven days—three ahead of schedule.

ST. PIERRE

New harbor structures
Lighthouse
Beacon
Anse — cove
Barachois — harbor
Rade — roadstead

Charolais quarantine station
Post Office and Customs
American House
Le Barachois
Place Général de Gaulle
Ice-hockey arena
Firehouse
Hospital
Church
Square Joffre
To fish freezer plant, 0.4 mile
Pointe aux Canons
Anse à Rodrigue
To Galantry Head light, 0.6 mile
Airfield
Breakwater
Le Rade
Small craft opening
ROUTE OF WHITE MIST (July 11, 1966)
N
Anse à l'Allumette (Match Cove)
La Pointe
Île au Massacre
Rocher à Bertrand (Bertrand Rock)
Not operating
Passe du Sud-Est
Pointe Lecomte
Not operating
Île aux Marins (Sailors' Island)

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KODACHROME BY DAVID S. BOYER © N.G.S.

SLOOP · BRIG · SCHOONER · SCHOONER-BRIG · THREE-MASTER · STEAMER

1. MARIE, FRENCH, 1816
2. DEMOISELLE BECTICK, BRITISH, 1816
3. SAINT HONORÉ, FRENCH, 1827
4. L'HIRONDELLE, FRENCH, 1833
5. ZOÉ, FRENCH, 1835
6. PACKETT, BRITISH, 1846
7. BOIS ROSE, FRENCH, 1853
8. CLYDE, BRITISH, 1853
9. EAGLE, BRITISH, 1855
10. ESPÉRANCE, FRENCH, 1858
11. TRASQUITA, FRENCH, 1860
12. FEARLESS, AMERICAN, 1864
13. COURRIER-DE-MORLAIX, FRENCH, 1866
14. LAURA A. DODD, AMERICAN, 1867
15. AMIRAL DESFOSSÉS, FRENCH, 1871
16. COURRIER-DU-GOLFE, FRENCH, 1872
17. BELAIR, FRENCH, 1875
18. BACAIERE, FRENCH, 1876
19. BOUNDING WAVE, BRITISH, 1878
20. HÉLÈNE, FRENCH, 1879
21. GRAND MASTER, BRITISH, 1885
22. HARENG, FRENCH, 1887
23. SAINTE CLAIRE, FRENCH, 1889
24. MOUNTAIN KING, BRITISH, 1890
25. CAROLINA, FRENCH, 1890
26. MISTRAL, FRENCH, 1894
27. HATTIE D. LINNELL, AMERICAN, 1895
28. MATOISE, FRENCH, 1897
29. LIBERTÉ, FRENCH, 1899
30. ADÈLE ET ROSE, FRENCH, 1900
31. FRILEUSE, FRENCH, 1904
32. ÉGALITÉ, FRENCH, 1907
33. WALKYRIE IV, FRENCH, 1907
34. CANOPUS, BRITISH, 1907
35. HARMONY, AMERICAN, 1914
36. MONTANA, BRITISH, 1918
37. ELIZABETH D., BRITISH, 1922
38. LA PARISIENNE, FRENCH, 1928
39. ADMIRAL DEWEY, BRITISH, 1932
40. CLARA F., BRITISH, 1932
41. MARJORIE AND EILEEN, BRITISH, 1932
42. SHIRLEY C., BRITISH, 1951

Once a rock-jawed trap for sailing ships, St. Pierre's harbor lies strewn with the wrecks of centuries. Today breakwaters shelter craft; map at left shows the newest moles in buff. Before France built the barriers, gales howling in from the northeast (right) caught ships like lobsters in a pot.

On its fog-blinded entry into St. Pierre, *White Mist* groped along the new uncharted sea wall before breaking into the inner anchorage. Even inside, danger lurked: When a south wind blew up, *White Mist* dragged anchor on the kelp-lined bottom and drifted close to another vessel, moored where *Égalité* (32) was wrecked. Crosses mark other wrecks in the harbor; list and symbols give a sampling of ships lost.

as Wilson's petrels from Geographic's *Water, Prey, and Game Birds* book."

Then: "Hoisted big radar reflector." We were taking no chances. The reflector, raised between masts, would give steamers something to "see" on their radar screens during fog, darkness, or squalls.

We were sailors glad to be under way and freed from the turmoil of life ashore.

"I'm laying a course to give Sable Island a wide berth," Gil announced. "When we pass to the east, I want to be a good 100 miles off." We recalled the ten miles of breaking shoals on the East Bar and the bones of lost ships.

Two days later squalls made up at dusk. We thought it wise to reef the mainsail before night set in. So we luffed up into the wind and were lazily putting in a reef.

Suddenly I looked up. Out of the mist came a great steamer, moving fast. She passed us not 300 yards to windward. We could see people with glasses looking us over, wondering, I suppose, if we could be in trouble with our sails slatting.

"A Russian," Gil said, and plotted her track on his charts. "Those barrels on deck must be molasses—she's evidently homebound from Cuba."

We were embarrassed. If only she had seen us a few moments before—roaring along in the fresh breeze at 8½ knots.

White Mist continued northward. Her log recorded many exciting moments. "Instant squall, douse main... Rammed monster broadbill swordfish, 3 shakes of his dorsal fin and he was off... Three big sharks follow

EKTACHROMES BY EDWIN STUART GROSVENOR; DUFFCOLOR BY JEAN BRIAND © N.G.S.

Moored to history: *White Mist's* lines loop bollards made of cannon that once guarded the island. High out of water, the French ketch *Pen-Duick II* replaces a rudder lost in a transatlantic race. With an oar strapped in its place, she limped 450 foggy miles to St. Pierre. Repaired (left), she sets sail for France.

St. Pierre Mayor Joseph Le Huenen, visiting *White Mist* in Basque beret, holds the author's article "Safe Landing on Sable, Isle of 500 Shipwrecks," published in the September, 1965, GEOGRAPHIC. It describes an Atlantic graveyard 250 miles to the south.

Thicket of rigging tangles the quays in 1909, heyday of the cod fishery: schooners and square-riggers take on provisions for *la campagne*—the annual assault.

ship ... Bill's bananas still hard green ... Keep bright lookout at 2 a.m. for steamers, will cross Cape of Good Hope-New York ocean track—Navigator."

I joined the midwatch for this important crossing; visibility was good. Sure enough, over the horizon came a big ocean liner aglow with lights. She tore by, a mile or two astern. We imagined passengers dancing in the ballroom, perhaps couples on the boat deck looking at the lights of this funny little boat bobbing in the ocean—and perhaps pitying us.

It's a wonderful feeling, after sailing for days on an empty sea, to come suddenly upon big ships like that, steaming on great-circle routes as well defined as freeways on land.

Five days out of Bermuda, Gil picked up a *dot-dot-dot dot-dash* on the radio.

"That's our old friend Sable!" he reported triumphantly. "Strong signal, too. Remember how weak it was two years ago? Now we're 120 miles away—and listen!"

Could *White Mist* have helped strengthen that radio signal? In our article we had mentioned the weakness of the signal; later the Canadian meteorological office advised us the beacon had been made one of the most powerful on the Atlantic coast.

As we approached the Grand Banks, the log grumbled: "Beginning to get cold ... *Colder* ... George expects to sight iceberg." Then: "Fog on horizon ... checked radar reflector. Miserable, wet fog."

I was on deck one night, commiserating with the watch, when a howl came from the bow lookout. A ship or shoal ahead?

I sprang forward. The lookout—Duncan Henderson, of New York City—stood there in his dripping oilskins waving a banana.

"They're ripe!" he yelled. "They're wonderful!" From then on, the bananas gradually turned golden. Each watch tested them with a pinch—and harvested a snack.

Duncan prepared a surprise. Out of scraps, he fashioned a flag. And so the log took note: "Have reached French waters; broke tricolor at the starboard spreader. All hands salute!"

So, with proper colors flying, we picked up in the fog the welcome horn of Galantry Head Light and groped past the unexpected breakwater into the Port of St. Pierre. Now, with fine French food under our belts,

Glassy wall of surf topples into Anse à l'Allumette—Match Cove. Dorymen net spawning capelin, a six-inch smelt prized as both table fare and fish bait. Behind the boat lurk low black rocks called La Pointe. Hulking gray in the distance, a Roman

we could swing at anchor and sleep in peace.

A summer dawn breaks before 4 a.m. at the 47th north parallel; so daylight woke me early next morning for my first good look at St. Pierre. Fog was rolling in, and everything—the rocks of Île aux Marins, or Sailors' Island, sky, sea, fishermen's homes—lay gray as driftwood.

Without waiting for breakfast, we raised anchor and brought *White Mist* to the dock.

"Strange sort of bollard," said Tom Beers, of Potomac, Maryland, as he threw a line over a cannon standing in concrete. Moored to local history, we looked around the waterfront.

Gift to the Mayor: a Sun-ripened Banana

Beyond the masts of fishing trawlers rose the Brittany-like port: boxy warehouses, shops of ship chandlers, and frame homes of fisherfolk climbing steeply up a hill and blurring away in fog. Early-morning sounds carried clearly: chatter of townsfolk hurrying to the bakery for hot bread, clink of wine bottles about to be filled with milk, beep of motor scooters, rasp of a carpenter's saw, waves lapping in the inner harbor, Le Barachois—and over all the distant groan of Galantry's horn.

Two stocky old salts in berets bobbed their heads, strolled over for a look at *White Mist*, and one commented, "*Bonjour. Quel joli bateau. Tiens! Des bananes!*"

"Yes," I said. "Bananas all the way from Bermuda. Have some." And I handed them two of the last on the stem.

Our visitors turned out to be Mayor Joseph Le Huenen (page 387) and a friend, whom I welcomed aboard. They exclaimed over the seaworthiness of *White Mist*, the roomy cabin with its glowing stove, our comfortable bunks, galley, and head. They knew the way to a sailor's heart.

After a week at sea our galley needed supplies, so we stopped by American House to shop and see Jean-Pierre. Grandmother, mother, and he were already up, tending shop.

"Yes, American House is a kind of museum from the clipper-ship days," said Mme. Jeanne Norgeot, Jean-Pierre's spry blue-eyed grandmother, as she filled our order. "Two Boston merchants built the place back in the 1840's."

We poked into the storerooms behind the shop. With hand-hewn timbers and sturdy

Catholic church crowns Sailors' Island, ghostly and abandoned except in summer when a handful of fisher families arrives. Bertrand Beacon, on a rocky islet, guards the Southeast Pass, now closed to all but dories since the new breakwaters were built.

EKTACHROME BY JANE NARCUS © N.G.S.

fittings, the big old structure seemed as much like a ship as like a warehouse. Sailors' old block-and-tackle hoisted the primitive dumbwaiter that lifted merchandise three floors. The storage area still smelled of hemp, tar, and canvas from the days of the sailing ship. And we found stacks of seamen's boots, oilskins, strong black rum, and all the oddments that have forever comprised ships' stores.

"Now let's see what's left on your shopping list," said Jean-Pierre. "We'll take it with us—that's a good way to see the town. St. Pierre, you know, is virtually a free port."

Bright Colors Combat Winter's Gloom

We climbed narrow streets, stopping at typically French shops. Shelves were crowded with luxuries—cheeses and wines from France, vegetables from Nova Scotia, canned goods from Canada and the United States.

"Except for fish, we produce almost none of our food," said Jean-Pierre. "Our islands do have some dairy farms. But for crops the soil is poor—very thin glacial earth—except for plots of good French soil brought over years ago as ships' ballast!"

St. Pierre has no downtown shopping center. We passed a bakery, then a private home, next a restaurant that served part time as the family's own dining room. Net curtains framed displays of handmade French dolls just in from Paris. Everyone waved greetings from each neat parlor. Every frame building wore a different color scheme (pages 380-81).

We noticed lampshades and ornaments of bright red. "A fiery color to keep the spirits up during the dark winter," said Jean-Pierre.

At the butcher shop we waited our turn, while the proprietor, M. Georges Dugué, carefully rolled a roast of beef for a housewife. M. Dugué squinted through tinted spectacles. He had injured an eye in World War II when he fought with the Free French against the Nazis. But his good eye sparkled with all the friendliness of two.

When our turn came—though not a moment before—he greeted us warmly: "You are from the American yacht! Of course, some

KODACHROMES BY BRUCE DALE © N.G.S.

Snowy path to the sea. Rue du Maréchal Foch climbs past a medley of St. Pierre houses and stores. International road signs say "One Way"; with no stop signs, drivers beep twice at every intersection, serenading the city with a distinctive chirping. Beyond a knot of men who chat at the corner, the trawler *Savoyard II* revictuals.

Bread by the bagful: A buyer from the Hôtel Île de France shops at one of the city's two bakeries. Ranks of plump loaves baked fresh each night line the shelves; oval three pounders, round "English bread," rich orange-and-rum-flavored *brioches*, and slender *baguettes*.

EKTACHROME (LOWER RIGHT) AND KODACHROME (BELOW) BY W. E. GARRETT

Wrapped like an Eskimo, a baby snoozes in its sledlike *traine* while mother shops inside. Fair weather or foul, women daily stroll their pink-cheeked *poupons*.

Milk fills wine and whiskey bottles for the thrifty St. Pierrais. Twice each day a dairyman drives a laden horse cart from his small farm into town, where women greet him with their assortments of empty containers. Abundant imports of canned and powdered milk supplement the home-produced supply.

Bearded with rime, the Danish trawler *Vagbingur*, out of the Faeroe Islands, ties up at St. Pierre's fish plant. Her slowly building shroud of ice posed a grim threat at sea. Too much frozen spray topside could flip her bottom up before her crew could radio for help—fate of many a fishing boat.

EKTACHROME BY BRUCE DALE © N.G.S.

aged steaks. And pork chops." M. Dugué moved down our lengthy list. "Yes, I import about 200 cattle on the hoof each year and some good Western beef," he said.

We stopped to see Madame Ella Girardin, proprietress of L'Escale, the salmon-pink pension and sailors' tavern near the docks. A smartly dressed blonde with grown children, Madame Girardin works hard in summer, saves her money, and goes off on holiday to France or Tahiti almost every winter.

Flamenco on a French Isle

"*Lo mismo,*" said a swarthy man at the bar of L'Escale. Madame Girardin instantly brought her client another beer.

"He is a Spaniard," she explained. "Two of their trawlers are in port. Good people."

The Spanish sailor was a homesick Galician high in his praise for the hospitality of St. Pierre. "Look," he said, pointing first to his ear and then to a radio behind the counter. Spanish flamenco music was making the bar glasses bounce.

"That's our local station," said Madame Girardin. "We have a program for the Spanish fishermen four times a week. Music from home. News in their language. They like it."

The St. Pierre hospital treats crewmen of the 140-ship Spanish fishing fleet when necessary; a doctor from Spain, José Luis Alarcos, is stationed in St. Pierre during the three fishing campaigns each year.

"Perhaps we'll have four deaths a year," said Dr. Alarcos. "Fishing is not an easy life."

Near the hilltop we examined gleaming trucks of the volunteer fire department and got into lively talk with engineer Maurice Derrible.

"Our last serious fire came in 1939," he said. "We lost 17 houses

In the relentless duel with ice, a wrench-wielding seaman frees a winch cable on the Spanish trawler *Urdiain*. At St. Pierre's Stella Maris Club for seamen, a hand of rummylike *tuté* entertains crewmen from one of the 140 Spanish trawlers that make the isles a port of call. To help the fishermen feel at home, the radio station schedules Spanish music, news, and religious programs.

PHOTOGRAPHS BY DAVID S. BOYER AND BRUCE DALE (UPPER) © N.G.S.

in a night. That awful fire began in a cinema."

"Yes," interrupted a bright-eyed lady standing nearby. "He saved me from that fire."

M. Derrible laughed. "Then I married her. May I present my wife?"

Throughout its history the wood-built port has burned time and again. Britain took the island from France three times in the 18th century, deporting the entire population and in 1778 reducing the town to ashes. In 1796, in return, French Adm. Joseph de Richery put St. Pierre to the torch.

Peace proved equally dangerous after the French returned permanently in 1816. The wooden houses and shops went up in smoke in 1865; and two years later, after hard-pressed citizens had rebuilt the town, St. Pierre burned again.

"Now we stand ready," said M. Derrible, pointing to two fire engines and a tracked vehicle for use in deep snow.

But fires continue to take a costly toll; after our visit a bad one destroyed a friend's home and the radiotelephone station.

Rollingest Ship on the North Atlantic

A boat whistle interrupted our tour. "That's the *Miquelon*," said Jean-Pierre, "our ocean link with Nova Scotia." We moved toward Place Général de Gaulle and watched a squat tuglike vessel—a former U. S. Army craft—loom out of the fog and ease toward the customs-house dock. On the afterdeck we spotted a wooden pen.

"It's a fence—a barnyard on deck," said Jean-Pierre. "The *Miquelon* brings cattle for our butcher shops."

But the M. S. *Miquelon* brought more than beef. Coming down the gangway was a familiar lanky, camera-laden figure. "Hey! Dad!" he called. It was my 15-year-old son Edwin, and behind him came another deckhand for *White Mist*, our friend Bart McDowell, of Fairfax County, Virginia.

"We were expecting you to fly in on Air St. Pierre," I said.

"Fog socked us in at Sydney," Bart explained. "And the *Miquelon*'s 25 berths were full. So we came along as mixed cargo."

"Really mixed," said Ed. "Excuse me, but I want a picture of those sailors pitching hay." Ed was off with camera clicking as the crew unloaded Nova Scotia hay and 15 wobbly-legged steers.

"That's nothing," said John Brennan, agent for the ship in North Sydney. "Sometimes the *Miquelon* looks like Noah's ark. On one trip we had 300 pigs, 1,000 hens, and some geese—and also the wife and daughter of the governor of St. Pierre.

"But I guess our wildest crossing was the time the *Miquelon* was chartered by Navy researchers for your National Aeronautics and Space Administration," John said.

A scientist telephoned Mr. Brennan from Pensacola, Florida, in early 1964. "We're studying motion sickness," he said, "and the *Miquelon* is reported to be the rollingest ship on the roughest water in the North Atlantic." Therewith, the group engaged the ship to study the reactions of 10 volunteer deaf students—"people we can't make seasick," the scientist explained. "Some problem of the inner ear, the balance sensor."

Mr. Brennan, a man with good sea legs and lots of curiosity, went along on that trip.

"The sea was rough, all right," he recalled. "This was February. Even in St. Pierre's harbor, the lines parted at the dock! We must have had 20-foot waves.

"Our cabin served as a laboratory for psychologists, medical doctors, and all kinds of experts. The whole experiment succeeded only too well. As expected, the volunteers didn't get sick—but the doctors were too ill to complete all the tests."

Now a much bigger packet, the green-hulled *Île de St. Pierre*, shuttles the 195 miles between the islands and North Sydney.

"I found that she rolls less and goes faster—nearly 12½ knots," reported fellow Marylander Tom Canby. He rode the rugged *Miquelon* on her last scheduled run, and later returned to North Sydney on the maiden voyage of the *Île de St. Pierre*.

Sea Winds Buffet Knee-high Trees

Ed brought a yen for exploration. The fog had lifted, so we hired an ancient car and a young guide, Laurent Briand, for a tour of St. Pierre, smallest of the three principal islands—only three and a half miles across.

The road wound past strange little rain ponds and knee-high Christmas trees, dwarfed by St. Pierre's impoverished soil and constant winds. The whole landscape seemed miniaturized. We came to the colorful village of Savoyard, perched on a cliff overlooking the sea and cobbly beach. No place for a home, I thought.

"These are summer cottages of people who

(Continued on page 401)

Grave of 600 ships

LIKE MOTHS drawn to a flame, vessels wrecked on the archipelago strew their remains on every cape and cove. St. Pierre archives and diaries, meticulously sifted by GEOGRAPHIC staff members Dorothy A. Nicholson and Marie L. Barnes, cite a total of 674 ships grounded since 1816.

Rich fishing banks lured many of the victims. Others swept near as they plied Canada's coast and the Gulf of St. Lawrence. The islands greet all comers with hazards: smothering fogs, bitter Atlantic gales, powerful currents, and everywhere stiletto shoals and capes to snag a vessel's belly.

Main cemetery of ships lies along the sandy Isthmus of Langlade. Old-timers still recall a farmer with a team of oxen who gained renown pulling grounded vessels free.

Mute memento of the sea, an anchor fluke thrusts from wind-swept snow near Galantry Head, where a lighthouse and foghorn warn seamen of perils.

Bleached and broken, the carcass of the *Kathleen C. Creaser* forms part of a fence for Langlade farmer René Olivier. Thudding ashore in a 1943 fog, she disgorged a cargo of coal that her insurers sold by the doryload to islanders.

DUOTONE BY JEAN BRIAND; EKTACHROME (RIGHT) BY GILBERT M. GROSVENOR; KODACHROME BY BRUCE DALE © N.G.S.

Battered by a northeaster, schooners trapped in St. Pierre's harbor shudder aground in a 1932 gale that islanders still remember. The *Admiral Dewey*, right, carries coal from Sydney, Nova Scotia; a man with a wheelbarrow salvages pieces washed ashore. The nearby *Marjorie and Eileen* bears only rock ballast. Almost hidden behind her lies yet another victim whose anchor dragged in the storm, the *Clara F.*, a tiny schooner that peddled herring along the coast. Motorized trawlers scurried seaward to ride out the storm; today a new breakwater protects this shore of Anse à Rodrigue (map, page 384).

Death of a schooner: Awash and lifeless in freezing seas off Newfoundland, the *Maureen and Michael* slips stern-first to the bottom. Caught last February in a Grand Banks gale that claimed two other ships, the Nova Scotian fishing boat tossed in 40-foot waves. "Lost her sails and leaking," blared a distress call as the eight-man crew bailed and pumped. The U. S. Coast Guard cutter *Castle Rock* raced to her aid. At last the *Maureen and Michael*'s pumps failed, water gained on the weary fishermen. Frantically, Coast Guard men clawed a life raft to the fishing boat, taking off the crew two at a time. A minute after the raft rescued the last two, lower right, the sea swallowed the schooner.

Resolute helmsman in Square Joffre honors those lost at sea. Islanders erected the monument after a trawler vanished in 1962 without a trace of her 15-man crew, now known as the *disparus*—"disappeared ones."

Square-rigged sails askew, the Norwegian *Inger* dies at Langlade's Cap Coupe in 1916. A tug tries unsuccessfully to pull the lumber-laden barkentine free.

Shattered hulk of the Londoner *Bosworth* reels in the surf of Galantry Head. During a 1965 storm, her cargo of Sydney coal shifted, and the listing ship went out of control.

OIS THOMAS (RIGHT); KODACHROMES BY DAVID S. BOYER (UPPER RIGHT) AND BRUCE DALE © N.G.S.

Behemoths of the range roam a postage-stamp ranch—the quarantine station on St. Pierre. Stocky, sturdy, and easygoing, creamy-white Charolais cattle brought from France await entry into Canada. Until recently the United States embargoed them completely in fear of dread hoof-and-mouth disease. Cattlemen of both nations esteem the Charolais; they gain weight quickly and may grow to 3,000 pounds. A handful that reached the United States from Mexico in the 1930's has increased to about 50,000 scattered across the Nation. A registered Canadian bull sold this year in Houston for $45,500.

STUART GROSVENOR AND MELVILLE BELL GROSVENOR (LOWER LEFT); EKTACHROME (BELOW) BY JANE MARSTON © N.G.S.

Burst of bloom rewards hardscrabble gardening for the Ernest Autin family. Fortifying the island's glacial earth with organic fertilizers from nearby stables, they grow phlox, nasturtiums, dahlias, lupines, pansies, and peonies. Some homeowners proudly till plots of soil brought from France as ballast in the days of sail. Each year the Autins' birdhouse attracts a family of sparrows. TV antenna receives programs in English from Newfoundland and in French from a new station on St. Pierre.

Tin-can windbreaks protect young cabbage plants from gales that sweep the islands. Because of the short growing season, the St. Pierrais start their plants indoors. Coaxing everything possible from their skimpy soil, they raise little patches of onions, carrots, endives, beets, parsley, leeks, and succulent lettuce.

live in St. Pierre all winter. It's good for children to have fresh air," M. Briand said. Tiny firs gave the houses a curious scale.

Ed climbed to the top of Cap à la Vierge for a view—"Just like a relief map," as he put it. And certainly, on a clear day, this point offers a vivid spread of geography.

Three sizable islands and a handful of rocks comprise the 93 square miles of this French territory. Most populous, with 4,600 residents, is the capital, St. Pierre.

Across the choppy four-mile strait at our feet loomed Langlade, green and tall, the largest island, with most of the territory's farms. Fishermen who know and dread the treachery of this channel—La Baie—call it Gueule d'Enfer, "Mouth of Hell."

Beyond, and connected to Langlade by a sand strip, stretches the northernmost island of Miquelon, where 600 fisherfolk live beside an unprotected crescent port (map, page 396).

Murder on Île aux Marins

"When you sailed into St. Pierre, you passed Île aux Marins—Sailors' Island," said M. Briand as we drove toward the fish-freezing plant. "Good view of it from here."

"Spitting image of Île de Sein, the little fishing island off Brittany," I remarked. "It, too, is famous for its shipwrecks, but those go back to Phoenician times."

Years ago the island had hundreds of year-round residents. Now it's only a convenience for the 40-odd people who summer there. Fishermen can always launch dories from Sailors' Island—even in storms when St. Pierre harbor is too rough.

M. Briand's eyes narrowed. "Have you ever heard about the murder we had on Île aux Marins?" We had not.

"In 1898 a fisherman named Néel killed a friend there with a fish knife! A savage thing!

Néel was sentenced to die. St. Pierre had no guillotine, so Martinique sent one by ship. Néel was put to death, and the guillotine is now stored with our archives. But don't believe the story you may hear that this guillotine is the same that beheaded Marie Antoinette in the French Revolution!"

Winter Rules a Ghostly Island

"Once in forty years St. Pierre harbor freezes over and men can walk to Sailors' Island," M. Jean Legasse put in. "We even took horses across the ice in the big 1923 freeze."

Intrigued by stories of the hard winters in St. Pierre, Bart McDowell returned with GEOGRAPHIC photographer Bruce Dale in midwinter of 1967.

"Sailors' Island may seem gloomy on a summer's day," Bart told me on his return, "but when it's buried in snow, it's a real ghost town."

"The last year-round resident, an old man named Alexis Nouvel, had just moved back to St. Pierre," Bart wrote in his notes, "so I saw the island deserted. Shared an open dory with Jacques-Philippe Vendroux, St. Pierre's deputy in the French National Assembly. Vendroux, by the way, is a nephew of Mme. Charles de Gaulle.

"Crossing over, we almost froze. Terrible wind whipped up icy spray. Snow drifting in the strawy grass—very brittle underfoot. Whole of Sailors' Island was a drab gray—houses, church, everything. Only spots of color were plastic flowers sticking up through snow in cemetery. Sinister setting. Easy to recall that old murder, since wind cuts like a fish knife."

Dories were returning in the summer sun when we reached the fish-factory pier. The boats had been out since 4 a.m. Now it was afternoon, and the dorymen were pitching

...CHROME AND KODACHROME (BELOW) BY DAVID S. BOYER © N.G.S.

EKTACHROME BY DAVID S. BOYER

"*Oh, je me suis trompée!* —I was mistaken!" says nine-year-old Marie-Claire Hayes after computing that 4×4=15. A third-grader, she and her schoolmates go to class on Saturdays, with Thursdays off for a mid-week break.

Pram-pulling mother passes a scene from the sea reflected in the window of a quayside store. Flags salute a visiting French official. Harbor ships also dress in their bunting for the Blessing of the Fleet early each May, and for a rollicking celebration centered on July 14—Bastille Day, birthday of the French Revolution.

EKTACHROME BY BRUCE DALE

Snow-flecked trucker Bernard Leboloch delivers fuel oil to island furnaces and diesel-powered boats. When a blizzard strikes, a bulldozer clears his path. About three-fourths of St. Pierre's 1,000 homes have converted from coal to oil. After five years as a trawler fisherman, M. Leboloch quickly responded to the none-too-frequent offer of steady work ashore.

Gendarme from France, Gérard Maligny heads the immigration squad of the 20-man police force, sent from the home country. Informal agreements settle most legal scrapes.

KODACHROME BY W. E. GARRETT

"Best food in the world," say St. Pierrais of their restaurant fare. Here Madame Josephine Dutin, proprietress of Chez Dutin, serves *poulet chasseur*—chicken baked with white wine, tomato sauce, mushrooms, and ripe olives.

For dessert, St. Pierrais make *babas au rhum*—sweet muffins drenched in a heady brew of rum, butter, and raisins.

their cod up into carts on the dock (page 408). In the strong south wind, the fins of the fish blew and shimmered like things still alive. We asked one man what his catch would weigh.

He shrugged. "Maybe 500 pounds," he said. "Some days we get 1,800 pounds. The record is 4,000 pounds in one day." He would be paid four cents a pound for his catch.

Whether a man is a fisherman, tourist, or visiting sailor, one geographic feature dominates St. Pierre: the lighthouse on Tête de Galantry. At night its beacon tosses a periodic flash into his bedroom. By day a glance measures the height of a cloud against the tower. In fog Galantry's hoarse horn barks continually, like a noisy watchdog. But its sound, light, and radio beacon are lifesavers to the sailor groping through the fog.

Naturally we wanted to see tall Galantry, so one afternoon we drove over to explore it. On the rocky shore surf was bursting over a rusty ruin—the hulk of a 1965 shipwreck, the freighter *Bosworth* (page 399).

"She was 865 tons," said our young agent, Jean-Pierre. "Ran aground here at night—on January 19." We were all impressed with his memory. "It's my hobby," he explained. "And besides, I did a term paper at St. Dunstan's University on Prince Edward Island about St. Pierre shipwrecks." Therewith he produced a neatly typed and bound theme, complete with photographs, footnotes, clippings, and compliments from his professor.

Islanders Warmed by Coal From the Sea

Bosworth was five miles from shore that grim night when a big wave lifted her suddenly, shifting her cargo—1,000 tons of coal. She was thrown into a 45-degree list. For three tense hours her veteran captain steered desperately for port through towering seas. The engines stopped just 200 feet from the

Head. Momentum and currents did the rest.

"It was an act of God that saved my nine men from drowning," the captain told Jean-Pierre. "If the freighter had gone aground even a few feet distant, we would have all perished in the breakers."

A pleasant old gentleman with a stubble beard joined us. He exclaimed over pictures of the *Bosworth* and introduced himself as M. Armand Cormier, age 72, a fisherman.

"Yes, I saw the *Bosworth* come ashore," M. Cormier remarked. "Right at dinner time. It took three or four hours to save all the men by *va et vient*—going and coming. Since I could help little, I went home and built a fire to thaw the survivors. They were grateful to be alive. For days my neighbors and I gathered coal that washed up from the wreck. *Bosworth* coal warmed us all that winter."

We visited with many old-timers, all with yarns to spin. Up the hill overlooking the harbor sits the shipshape home of Capt. Maurice Rebman, who has commanded nine St. Pierre ships and still sails as master of the cable patrol vessel *Cedar Wood*, chartered by American Telephone & Telegraph Company.

"No, I was never shipwrecked," he said proudly. "But of course I know the waters. I went to sea—in the fishing dories—when I was 12, and have spent only one year ashore since. The first ship I sailed in was the 22-ton *Philosophe*, which my father owned."

Simply, he talked of monstrous seas and 120-mile-per-hour winds and the brave art of salvage—pulling wrecks off the rocks. When we asked about the danger, he looked blank. I am not sure Captain Rebman understands the meaning of the word in any language.

One time he came close to sentiment: "For three years I was captain of the old three-master *Armoricain*, but she was sold to a man from Halifax. Then, two years later—I recall exactly—on the 18th of August, 1951, when I was captain of the *Miquelon*, I got a call that my old schooner was on the rocks. For six hours I stood alongside, trying to save the *Armoricain*. But finally her crew quit the pumps and abandoned her." Then he added quietly, "I stayed with her until the last."

Wind and Current Churn Cabot Strait

But sea tales are not for Captain Rebman. He prefers talk of local winds and currents, and few men can match him. "No doubt of it, some of the roughest water in the North Atlantic lies between St. Pierre and Sydney. There is a northwest-to-southeast current in the Cabot Strait. It varies. Usually two or three knots—but sometimes it's five. When a southwest wind strikes such a current, it makes a bad sea.

"And our wind travels all around the compass! It may start from the southeast, shift suddenly to southwest, then to west and to northwest. It can be very troublesome."

Jean-Pierre's research intrigued us into collecting shipwreck stories. In the dusty archives of the port we discovered that some 200 ships had been sunk in St. Pierre's roadstead itself (pages 384-5). When terrible

Hockey under the lights: Boys improvise a nocturnal game. Making the most of long winters, St. Pierre youths sled on "the mountain," skate on island ponds, and hurl snowballs, a pastime forbidden downtown to protect windows. Local hockey teams meet those of Newfoundland and Nova Scotia in St. Pierre's indoor rink. In summer the islanders turn zestfully to soccer.

northeast gales struck, seas roared through the breakwaters and dashed ships on the rocks, sometimes even against the piers.

One captain reported that when his schooner *Sainte Claire* dragged anchor in such a gale in 1889, he let go a second anchor, then another and another, until, even with his ninth and last, his ship dragged and smashed to kindling on the harbor shore.

Another report told of the *Mistral*, "lost in the shock of the windstorm of the 9th and 10th of October, 1894," within this harbor, "at the Pointe aux Canons." Cannon from those old batteries now served *White Mist* as bollards at the dock.

That night *White Mist* sampled the hazards of this shipwreck-prone harbor. We shoved off from the dock and anchored out in the harbor, where the breeze was fresher and *White Mist* could comfortably swing from her anchor.

Next morning at sunrise I was awakened by a heavy squall and rain beating noisily on the deck above my head. I checked

In dawn's purple calm, Roger Derouet helps launch a dory, the rugged boat of the handliner. A single-cylinder engine carried Roger, his father Ernest, and GEOGRAPHIC staff man Bill Garrett out to fish. "Our dory would climb the side of a huge Atlantic swell, perch for an instant, then crash down, smacking its flat bottom in the trough," recalls Mr. Garrett. "Ernest and Roger put out two lines apiece, one over each thumb, and jiggled them constantly to make the baits dance like marionettes." Flinging aboard cod after cod (lower), the fishermen slowly piled the floorboards; by late afternoon nearly 1,000 pounds weighted the dory, and they chugged homeward.

Warm in the family kitchen, the Derouets enjoy fruit after an ample steak dinner. A widower, M. Derouet lets daughter Françoise, 12, fill a mother's role. Above the radio's murmur and the peep of their caged Bengali finch, father and sons talk of the day's fishing.

EKTACHROMES AND KODACHROME (OPPOSITE) BY W. E. GARRETT © N.G.S.

our bearings on shore to make certain we were not dragging, and turned in again. My sleep was troubled by dreams of the *Mistral*, the *Sainte Claire*, and other ships lost so near us.

Then, over the tumult, I heard voices calling: "*White Mist*, you're dragging! Come on deck quickly!"

Looking out, I saw we were drifting sideways to the wind, down on the Newfoundland ferry *Langlade* lying at the customs dock. Stan Judge, my son Gil, and I dashed on deck in our pajamas, started the engine, and slowly got *White Mist* under way against wind and rain. Our stern was only a few feet from that black hull when we started to move away.

"Here's the trouble," said Stan as he got the anchor up. It was one huge ball of brown kelp, sinewy strands wedged between the flukes. I never felt safe anchored in St. Pierre harbor after that.

Tied up again to the dock, we thanked our benefactors, two doctors from Sydney, Nova Scotia—skipper Chris Quaade and Douglas Mackenzie. They had come over in their powerful cruiser *Osprey*, bound for a week of salmon fishing in Newfoundland rivers. How thoughtful of those two sailors to launch their small boat in the rain and wind to row out and alert us!

The next morning I called on Governor Georges Poulet. "I was surprised to hear that *White Mist* made her landfall from Bermuda through St. Pierre's

KODACHROME (ABOVE) BY GILBERT M. GROSVENOR; EKTACHROME BY DAVID S. BOYER © N.G.S.

Flying cod pile up in a barrow as doryman Georges Jackman delivers his catch to the Frigorifique, St. Pierre's busy fish plant. He and three brothers serve in a fleet of 40 St. Pierre dories that still fish offshore.

Eye on each ounce, Marie-José Légasse packs haddock fillets at the Frigorifique. When scales in front of her signal a pound, she pushes the filled box onto a conveyor. Bulwark of the islands' economy, the "frigo" last year quick-froze 2,231 tons of cod, ocean perch, flounder, sole, ray, and haddock for shipment to France, Canada, and the U. S. In years past, island beaches whitened each summer as vast sheets of cod were spread to dry in the sun.

Southeast Pass," he said. We admitted to a few surprises ourselves.

"Yes, yes! Bertrand Beacon is unlit, and the outer bell buoy not on station. You see, that channel is closed until our new breakwaters are finished."

The governor told us that close to one billion St. Pierre francs (four million U. S. dollars) were being spent to improve the harbor, help the fishing industry, and attract more tourist ships. (Fifty St. Pierre francs equal one new French franc, or 20 cents.)

"Here is a chart of the new harbor," he said. "The National Hydraulic Laboratory at Chatou near Paris tested working models, trying different designs. This plan proved the most efficient to cut down sea surges, especially during our notorious northeast storms. The harbor should be safer now, and it is larger."

Storms Claimed Hundreds of Islanders

Though many of St. Pierre's old records have disappeared in fire and gale, our *White Mist* researchers found two crates of yellowing papers in the old maritime office. Together they poked through the past.

"Hey!" Jean-Pierre shouted in surprise. "This is my great-grandfather's boat *Quatre-Frères.*" He read on and learned of a heroic rescue by its crew, saving 34 men from the doomed French sloop *Hélène,* which sank from an iceberg gash. Jean-Pierre had never heard of this heroism.

Nor had he known of St. Pierre's greatest single disaster, the storm that took 216 local lives on August 24, 1873. Seventeen ships from St. Pierre and two from the northern isle of Miquelon were lost *"corps et biens*—bodies and goods."

Perhaps the most moving shipwreck stories come from lips of St. Pierrais themselves. Take my friend M. Jean Légasse, whose fishing firm is one of the largest.

"I come of a Basque family," he said. "Our population here is about a third from Normandy, a third from Brittany, and the rest from the Basque provinces. What a formidable language is our Basque! We have a saying: 'It took the devil seven years to learn one word.' So in the old days when we sent cables on ship movements and business matters, we didn't use code: just Basque.

"Now, about shipwrecks. The captain of one schooner was a Basque named Dufau. During a big gale on the Grand Banks in the 1900's, his ship capsized *and turned keel up!* Captain Dufau was caught inside. He took his knife and carved his way out through the hull! I heard that yarn when I was seven."

It was a nine-year-old boy named François who first told us about "the disappeared ones." Strolling along the waterfront past flower-bedded Square Joffre, we admired a granite statue of a sailor in oilskins, honoring all St. Pierre sons lost at sea (page 399).

"But it really honors the *disparus*—the disappeared ones," said young François. "They were the crew of the *Ravenel.*" That fine new trawler radioed St. Pierre one Sunday morning in January, 1962, that she expected to arrive by 10 o'clock. Nothing more was ever heard from her. She simply vanished, taking 15 men from St. Pierre. Perhaps heavy ice topside and in her rigging caused her to turn turtle suddenly.

"Children of the disappeared ones are many—more than 50 orphans," whispered young François, his eyes growing very large. "Some say the ship didn't sink, and that at night the disappeared ones return to watch over their families."

Language No Barrier to a Waltz

Bastille Day was approaching, and a party spirit took over the town; young people were everywhere, crowding cafes, strolling streets, besieging the bakeries whenever they smelled French bread. Many looked like Canadians or Americans. But in all the noisy conversation, I didn't hear a word of English.

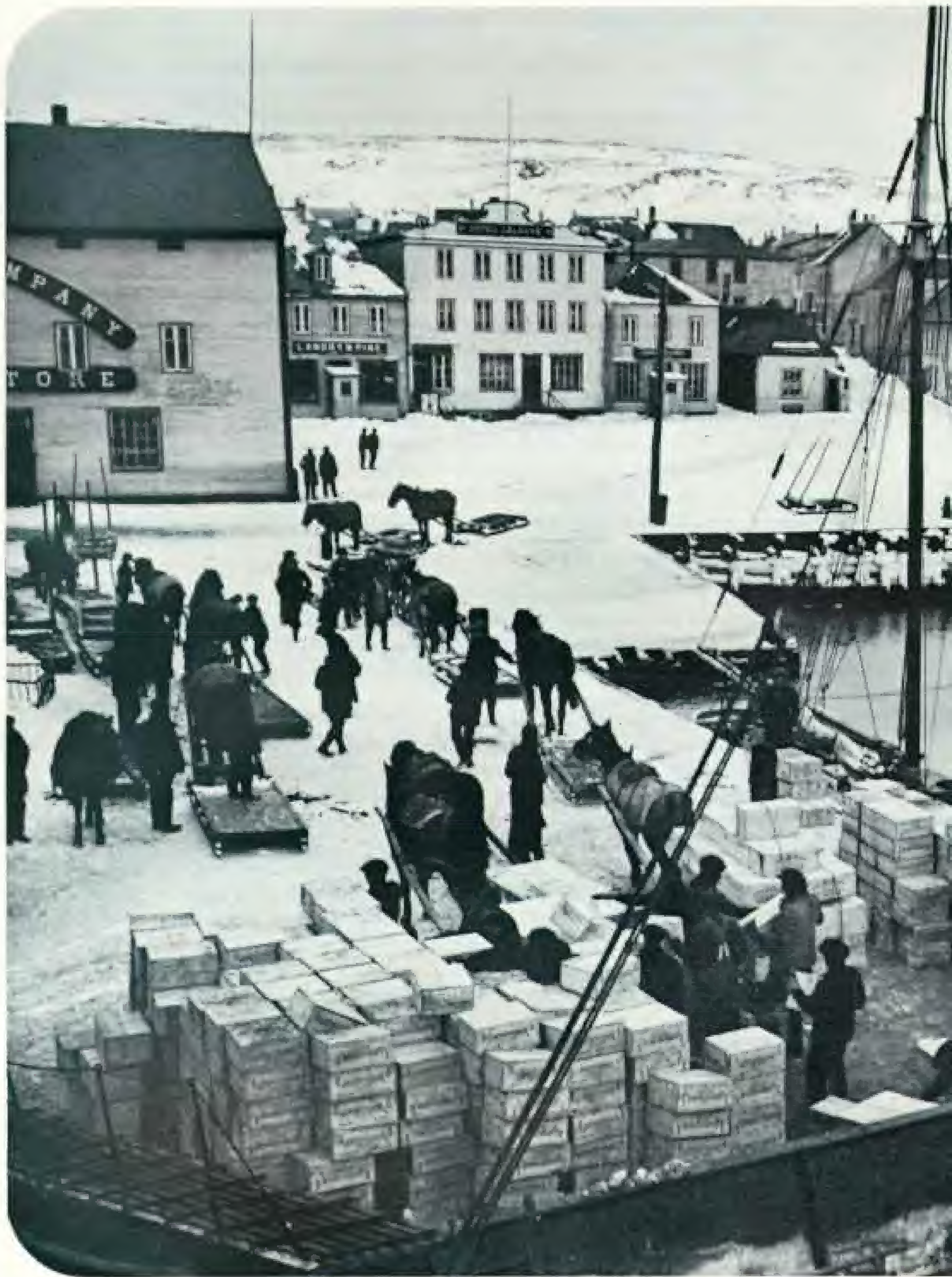
"Yes, we have 90 students here," explained Professor C. R. Parsons, of the University of Toronto. "And they must speak only in French to earn their credits." Seven summers the professor has directed this program. Students come from all parts of Canada and even the U. S. They live in homes of local people.

"What about the quality of local French?" we asked the professor.

"Excellent—just like France itself," he said. "But of course I am from St. Pierre."

The youngsters happily sang French songs like "Alouette" and "Frère Jacques." The whole town danced with accordion music.

"Wonderful people, the St. Pierrais!" said W. S. Glidden, from Springfield, Massachusetts. "My wife and I have come here for 15 summers. We love it. Here, look at this." He whipped out a picture of a cemetery plot with a tiny American flag on it. "It's in St. Pierre," he said. "If anything happens to us here, we'd just like to stay."



"Whiskey time!" the St. Pierrais call the lusty era when Prohibition "dried up" the United States and parts of Canada. Here cases of Scotch stack the quay. Horsedrawn sledges haul the liquor to a complex of warehouses that sprang up when St. Pierre served as one of the great transshipping depots for European distilleries. Smugglers in speedy powerboats whisked the contraband to conspirators waiting on U. S. and Canadian beaches. Fortunes accumulated, and fishermen abandoned their boats for work ashore. When a French decree

Innocent cargo of oil drums strews the same quay that groaned with Prohibition whiskey. Across the Place Général de Gaulle, the *pension* l'Escale wears a coat of pink paint; the earlier picture shows it at far right as the Télégraphe Français, a relay station for the transatlantic cable.

Former rumrunner Henri Moraze for 20 years headed the Administrative Fleet, government ships serving the islands; today he is a leading St. Pierre merchant.

"At 16, I bought a schooner," he recalls of Prohibition's halcyon days. "She was so old you could read a newspaper through her sails. I took her to the Caribbean, bought rum for 25 cents a gallon, brought it back, and sold each gallon for $12.50. Not bad for age 16."

choked off the exciting traffic, a depression struck, for during the decade and a half of whiskey time the islanders had all but forgotten how to fish. Two Boston merchants built the general store at left; today its façade bears a big carved eagle and the name American House. Inside sit dusty relics of Prohibition: a foot-powered corking machine and piles of whiskey, rum, and cognac labels that the St. Pierrais affixed in their island bottling operation.

Snug outlooks on a windy world: Solitary sentinel at her shingled post (right), a pensive *jeune fille* on Sailors' Island gazes seaward. To conserve heat, few windows cheer the isle's drab, gale-exposed homes.

With snow banked high outside, two Miquelon youngsters man a favorite vantage point of islanders marooned indoors much of the year. Beyond a weathered picket fence on Miquelon, a lacy peacock perches.

"*Papa* and *Maman*, we call the Gliddens," a gendarme fondly remarked. "They are honorary 'first tourists' of St. Pierre."

The Gliddens, tourists, students—and everyone else—gathered that evening for the Bastille Day dance in Savoyard. An amplified accordion blared music with a twirling beat.

The party was a great success, and I was amused to watch *White Mist*'s dashing bachelor, Duncan Henderson, cut a wide path across the floor. When the accordion began a limping, peg-leg waltz, a pretty little brunette came demurely to our table.

"*Voudriez-vous danser?*" she asked me in charming French. I would have felt a bit more flattered if I hadn't seen Duncan—the obvious arranger—grinning from the stag line.

"Delighted," I said. "It is brave of you to ask." She seemed not to understand.

I tried to waltz across the language

KODACHROME (ABOVE) BY W. E. GARRETT; EKTACHROME (OPPOSITE, UPPER) AND KODACHROME BY BRUCE DALE © N.G.S.

barrier. In my rusty French, I learned that her name was Louise Durocher, that she came from a Montreal suburb, and that she taught school. I was beginning to feel quite proud of my linguistic abilities—until I recalled that Duncan speaks no French at all.

Bastille Day itself is a movable feast on St. Pierre. If weather permits, people cavort in the streets, throw confetti by the bushel (snowplows scrape it up), hold fairlike contests, parades, and, at night, fireworks and more dancing. Weather was adverse for us; outdoor fetes were put off until the next clear Sunday. A soccer game was postponed—the field was too foggy for spectators to see the ball. So we celebrated two Bastille Days!

"More tourists than we can accommodate want to come for July 14, so we invented another holiday for August," said Jean-Pierre. "We call it 'Jacques Cartier Day,' the first Sunday in August, in honor of the French explorer who came here in 1536."

The night before *White Mist* sailed for Miquelon, we saw how St. Pierrais respond to a distress call. We were strolling along the dock after toasting Jean-Pierre's birthday.

"Listen!" he said, cocking his head at a small plane circling overhead. "That pilot is buzzing us. He must be lost."

"What are all those cars doing?" asked Ed. Perhaps two dozen cars in single file were rushing toward the airport.

"They must be going out to light the field with their headlights so the plane can land," said Jean-Pierre. "Let's join them."

Headlights Guide Lost Pilot to Safety

We jumped into his car, tore out to the field, and lined up our lights with the rest.

Time and again the plane dipped almost as low as Galantry Lighthouse, then lifted off and circled again.

"Has the radio station asked for help?" I wondered.

"Possibly," said Jean-Pierre. "But everyone can hear the plane. No one needs to be called."

A friend hailed Jean-Pierre and explained. "The plane has no radio—and perhaps little

After a blizzard's fury, Langlade farm boy Robert Olivier and his setter stride an ice-paved path. Photographer Bruce Dale was marooned on the island with the Olivier family for three days while winds raged up to 132 miles an hour. "The farmhouse pitched like a ship," he noted. "Outdoors, the wind spun me around like a top."

gasoline. Everyone who is here is worried."

The pilot seemed nervous. He kept on circling and dipping low, his tires almost touching the runway. Then he would pull up again.

Came a pass lower than the others, and we all shouted, "This is it!" Wing-tip lights wavered, the engine sputtered, and the plane swept safely to earth. Auto horns serenaded the victory. The helpful folk of St. Pierre had again rescued a man in distress.

"A lost pilot from Newfoundland in a land plane," a gendarme explained, with a Gallic shrug. "The chap is most embarrassed."

Just before dawn *White Mist* shoved off for Miquelon. Even at that early hour, friends in berets waved to us. Squadrons of dorymen put-putted beside us on their way to the fishing grounds. It was like a boat parade, with *White Mist* the flagship.

Our crew now included Neil Bell from Washington, D. C., Jean-Pierre, and St. Pierre naturalist Michel Borotra, who came along to show us bird life on the other islands. Using the new harbor map Governor Poulet had given me, we eased past the breakwaters with no trouble at all and then along Sailors' Island.

Balmy Sail Through the "Mouth of Hell"

Abreast of Petit St. Pierre, Gil set a course for Pointe aux Soldats, Miquelon's northeast tip (map, page 396). He laid it through Passe à la Goëlette, or Schooner's Passage, inside menacing rocks a mile and a half offshore.

I was steering, and for the first time in memory, Gil's course didn't seem accurate. Instead of clearing the island of Grand Colombier, we were headed right into it. Naturally, I altered our heading. I confess that there was some argument between skipper and navigator at this point. But I was not worried; the air was clear as a bell and Soldats, 18 miles away, stood out like a rampart.

"It's the compass!" exclaimed Gil when he checked our course against his eyesight. "The ore on Grand Colombier has certainly deflected our compass. It's easy to see how skippers could hit that rock in stormy weather. But if it had been foggy today, I'd have given it a wide berth."

In contrast to our murky arrival, we now enjoyed a beautiful day. The infamous passage, the Mouth of Hell, was calm with only a slight swell—and though we put on heavy jackets, we had a most pleasant sail.

Off to port the steep bluffs of Langlade rose sheer hundreds of feet from the sea and looked inviting through the glasses. So we changed course, heading in to Pointe à Bigué. Since the water was deep and our charts showed no rocks, we coasted close under the magnificent

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

barren cliffs (page 418). I could imagine monster seas during northeast gales dashing waves against the rocks and shooting salt spray high up to kill all vegetation.

On the ridge grew trees and green grass far different from austere St. Pierre. We slipped past Anse à Ross and admired a cluster of houses nestling at the water's edge, with dories drawn up on the cobbly beach. The settlement was cut off completely from the rest of the island except for mountain paths.

White Mist rounded another point to Anse aux Cormorans—"Cormorant Cove," Michel translated. Tom Beers, our sailor ornithologist, reached for binoculars as Michel pointed out colonies of birds. The rocky face was a pattern of yellow and green lichens speckled with white birds. We cut the motor, and in the silence heard a choir of young gulls harmonize with the waves beating on resonant rocks.

"Birds live in layers here," said Michel. "Kittiwakes and black guillemots nest on the

Second city of the archipelago, with 600 people, Miquelon rims an unprotected cove. A fog bank hovers on the horizon. One of the island's 50 dories, with its characteristic tiny cabin amidships, unloads its catch into the coaster *Marguerite H.* for relay to the freezer on St. Pierre.

Snipe hunter Joseph Poirier and his Gordon setter Dicky return from Miquelon's marshes with two in the bag. A wrecked schooner's nameboard adorns the barn.

lower level. Then herring and black-backed gulls. And on top perch the birds that give the cove its name—cormorants. In woods beyond are warblers and sparrows."

"Look at that arch!" Ed exclaimed. "We've got to get pictures!" At the end of the point stood a natural stone arch, a massive formation with an arm of the sea swelling through it.

"Cap Percé," said Gil. And with that I lost him and most of my crew in our tender.

"Let's get pictures of *White Mist* framed by the arch. Come in close," directed Gil from the tender by walkie-talkie.

Rocks make dramatic pictures, all right (page 383). But they also make shipwrecks. Skippering *White Mist*, I was divided against myself. As a journalist, I wanted to oblige Gil and sail in close. But as a sailor, I didn't want to wreck my lovely *White Mist*.

I circled, reassured that the Fathometer read a full 45 feet. *White Mist* was not more than two lengths from the arch itself when the Fathometer dial suddenly flashed 25 feet. I turned hard to starboard. Even as she jibed around, the reading dropped again to 45. We had found a lonely underwater pinnacle.

Warily, I circled for one last pass. Again the Fathometer recorded that curious peak.

"Enough," I called over the radio. "Come back. We're heading for Miquelon."

Studying our shipwreck map, we found a dot at the very spot where the Fathometer had blipped its abrupt reading. The *Iona*, a British schooner, had gone down near there

on December 12, 1889. "The six men in its crew reached shore," said the official report.

Perhaps, in the storm, the *Iona* had struck these rocks. "Or who knows?" Ed suggested. "Maybe we found the *Iona* herself!"

A squall came in fresh with rain as we rounded Pointe aux Soldats and headed in for the little port of Miquelon. For the first time since leaving Bermuda, *White Mist* now was hard on the wind, foaming along at 8½ knots. We fetched in to the unprotected port and anchored off its single pier.

The sun came out as our liberty party reached shore for lunch and a peppy serenade of French accordion music.

Sand and Shipwrecks Link Twin Isles

The village of Miquelon, population 600, is considered provincial by the more urbanized people of St. Pierre. Here most fishermen still work in dories. And the clapboard houses are spread farther apart on flat dunes (above). Still, Miquelon was urban enough to provide two four-wheel-drive jeeps—"Essential," Michel explained, "to cross the sandspit between Miquelon and Langlade, our trans-Miquelon freeway."

The shore party went in several directions to see all we could of the island. Near the port the tundralike landscape was spongy wet, covered with grass and pocked with ponds —"The southernmost nesting spot of the red-throated loon," Michel said proudly.

The loons were in hiding that day, but ponies were plentiful. "We have more than 60 ponies on Miquelon," said the driver, "but all of them are half wild."

Gradually the road veered toward the sea, rimming a cliffy sandbank. We stopped, and Jean-Pierre pointed out a rusting hulk beached below. "That's the *Blue Comet*, a Newfoundland trawler that stranded here in 1954."

For those who went even farther south, the island lifted out of the bog, dried itself, and swelled into rolling hills covered with purple iris and other wild flowers. The road curved, and beyond Pointe au Cheval (Horse Point), we found ourselves on a working dairy farm. Typically, milk pails were sunning on the barnyard fence; yet even here the sea seemed close. The fence was of driftwood, and on the barn hung an old ship's nameboard, salvaged from the *Daphne and Phyllis* (opposite).

"I remember seeing that very ship in Halifax years ago," said our Canadian shipmate, Comdr. Robin Hayward, RCN (Ret.).

As we continued south, the hills flattened again and turned to grassy dunes. We had reached the end of Miquelon; our jeeps now toiled across the sandy isthmus to Langlade.

"The two islands were separated by shoals until 200 years ago," said Jean-Pierre. "Ships with old charts, mistaking this passage for La Baie between St. Pierre and Langlade, would run aground in the shallows. The wrecks lodged and collected sand. Now the islands are joined. And we still have wrecks."

We could see them, the ribs of long-dead

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ships still protruding through ripples of the beach. But the most romantic, the wooden hulk of the *Kathleen C. Creaser*, lies where the isthmus joins Langlade. A cattle raiser uses her as a corner fence post (page 397).

"Look at her pegs and fittings," said Stan Judge. "She was a beautifully built vessel. And she has resisted the storms since 1943."

A herd grazing beyond the wreck reminded Jean-Pierre of the British freighter *Monterey*, stranded on Langlade in 1903 with 1,600 head of cattle aboard. "The animals stumbled ashore, and these cows may be their kin."

Family Tale of Mutiny and Treasure

Miquelon boasts a story of buried treasure.

"You have heard about the *Fulwood*?" asked Jean-Pierre. "She was a three-master bound from Canada to Liverpool in 1828, and she supposedly carried chests of gold. The treasure tempted the crew to mutiny, so the story goes, and they murdered the officers and two passengers. But they were poor navigators, and the ship struck Langlade.

"The mutineers carried the chests ashore and buried them in the sand. Well, they were caught—and hanged in England. Talk of gold continues to this day."

Details of the *Fulwood* mutiny may be fiction, but the ship and its beaching are a matter of record. And in a simple Miquelon cottage Mme. Emilien Perrot recalled a fascinating family story that seems to confirm the tale. On a trout-fishing trip, her great-uncle and a friend found a brick wall protruding from a sandy embankment. They dug—and unearthed a great quantity of gold.

"My great-uncle left soon for Canada, and when he returned, he built a fine house," said Madame Perrot. "These paintings came from his home." They were two elegant oval oils framed in Victorian style.

The crew of *White Mist* wanted to stay and dig, but our memories of these French islands would be a more certain treasure. Now, as shore parties returned, we readied the ship for her long voyage home. First we would head for Newfoundland and some fine salmon fishing, then sail across the Cabot Strait of stormy reputation and cruise in the lovely Bras d'Or Lakes of Nova Scotia. When *White Mist* reached the Chesapeake in the fall, 4,000 miles of ocean would have passed under her keel.

"Anchors aweigh," sang the crew, and in the late amber sun we headed out. The evening wind picked up, we set the No. 3 genoa, reefed mainsail and mizzen, and made good speed. Rounding Cap Miquelon, I took a last good look: The cape was isolated, bleak and high—500 feet straight out of the deep sea.

"What a terrible place to be shipwrecked," said Gil. "How could anyone be rescued there?"

Out of habit, I checked our shipwreck map. There on the very tip of this gunsight, we saw the dot of a wreck. She had gone down on December 1, 1890. And her name was enough to haunt any homebound crew: We were passing the watery grave of the schooner *Sailors Home*.

THE END

Sheer face of Langlade towers over *White Mist*, wafting like a butterfly close inshore. The mossy 200-foot-high cliff hosts nesting gulls, guillemots, and cormorants.

Oilskins and safety harnesses protect the author, left, and Comdr. Robin Hayward as *White Mist* crosses Cabot Strait. Here colliding winds and currents kick up some of the Atlantic's roughest seas.

Sharing the Lives of Wild Golden Eagles

By JOHN CRAIGHEAD, Ph.D.

Photographs by CHARLES and DEREK CRAIGHEAD

AT FIRST ONLY A SPECK in the sky, the male golden eagle seemed to grow as he plummeted earthward in a vertical dive. Like a missile he dropped, wings closed, homing in on the great brown female that spiraled upward from the cliff below us.

Spellbound, bracing ourselves against the chill March wind on a rocky crag near Livingston, Montana, we were watching the courtship ritual of the king of birds.

On collision course with the ground, the plunging eagle suddenly spread his wings, pulled out, and shot upward past his soaring mate. He brushed her wing tip, sideslipped into another dive, and broke off into a spectacular series of rolls and loops, his golden hackles catching the sun.

Now the female nosed over into a sequence of dives, rushing so close to us that we could hear the whine of the wind through her feathers.

With my son Derek, I had come to this rugged, almost inaccessible cliff to confer with Jerry McGahan, an enthusiastic student of mine who was conducting a population study of the golden eagle, *Aquila chrysaetos*. The three of us watching the eagles' nuptial flight were held entranced by a predator that has fascinated man through the ages. Paradoxically, this magnificent bird is today fighting for its very existence, though laws now try to protect it from the most versatile predator of all—man.

To describe the golden eagle, no word is more apt than "majestic." Among wild creatures admired by man the world over, perhaps none has fired the imagination or stirred the heart so deeply as the spirited bird that Shakespeare called a "feather'd king."* Its image led Roman legions and Persian hosts into battle. American Indians and Scottish Highland chiefs have worn its flight feathers as symbols of courage

*See "The Eagles," by Frederick Kent Truslow, in the National Geographic Society's book *Water, Prey, and Game Birds of North America*, 1965.

Vaulting skyward with its prey, a young golden eagle clutches a ground squirrel with one powerful foot. Student researchers, ranging the rugged Montana country north of Yellowstone National Park, study the life cycle of majestic and gravely threatened *Aquila chrysaetos*.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Globe-girdling domain of the golden eagle shrinks under the impact of civilization. Hunters in the U. S. depleted the raptors, often shooting them from airplanes. Since 1962, federal law has protected the great birds. In Montana, right, researchers over several summers counted an average of 18 nesting pairs in a 1,260-square-mile area.

Like a conquering monarch, a young eagle guards its kill, whose blood stains the perch. Jess, or leg strap, marks this bird as a trained hunter, captured for use in the research project under a federal license. Wild golden eagles feed on a wide variety of small animals, birds, and snakes. A survey revealed only two lambs as victims in a Montana area that supports 30,000 sheep.

KODACHROME BY CHARLES AND DEREK CRAIGHEAD © N.G.S.

and rank. In falconry's heyday, the privilege of training and flying the golden eagle was traditionally reserved for emperors and kings.

The skill and nobility of these winged hunters have been extolled by falconers since ancient times. Conversely, the bird has long been cursed by livestock breeders. The Lapps accuse it of slaying reindeer calves. U. S. sheepmen claim that it kills enough lambs to threaten their livelihood. But much of what has been said or written about the golden eagle is merely legendary.

Provable fact, however, is its wide distribution. Scientists now recognize six races, or subspecies, of this handsome bird of prey, ranging over the mountains and high plains of the Northern Hemisphere (map, above).

Dr. Walter R. Spofford, nationally known authority on the golden eagle, has estimated that no more than 10,000 of these slow-breeding birds remain in North America. Hence their future appears in jeopardy.

We had climbed to the nesting cliff near Livingston that windy day to help in a nationwide effort at understanding the biological and economic role of the golden eagle. This objective, which had motivated Jerry McGahan to spend four summers gathering data, also had inspired Derek and my brother Frank's son, Charles, to log some 600 hours in blinds photographing eagles. Highly specialized camera work, it required shooting from vantage points that often were perilously perched on cliffs or in treetops.

As a boy Jerry had acquired a passionate attachment to the golden eagles that nested near his home in Livingston. A high school science-fair project won him an award, which he received in a ceremony at the University of Montana, where I am on the faculty as Professor of Ecology. Back he came the next year as a freshman, assured that he could keep a pet eagle on campus.

Eagle's Dive Halts Football Practice

At first Jerry and his eagle, a handsome female named Tory, did not attract undue attention. But one day, out for exercise near the stadium, Tory left her master's wrist to stoop, or dive, for a football that was being used in practice. Her fierce possessiveness discouraged recovery of the ball until her breathless owner arrived to take it from her.

In his sophomore year, Jerry volunteered for an eagle-research project, which I supervised for the U. S. Bureau of Sport Fisheries and Wildlife, with support from the National Audubon Society and the American Museum of Natural History. After graduation in 1964 he continued his study, earning credit toward a master's degree.

His task was a formidable one—to locate, climb to, and gather information on most, if not all, golden eagle nests within 1,260 square miles. This primary research area lay in the rough foothill country of southern Montana, a piece of ranchland more than a third the size of Yellowstone National Park.

(Continued on page 429)

Cliff-hanging from precipices 36 stories high poses a daily problem for University of Montana student researchers, who belay a companion down the butte overlooking ranchland near Livingston. About 25 feet below the dangler, a nest of gray sticks overspreads the ledge. More than half the aeries studied clung to such sheer cliffs.

Powerful enough to pierce a man's hand, this female eagle's taloned foot measures 7½ by 5½ inches. The needle-sharp weapons grow to full size before the bird's first flight at 10 to 12 weeks.

KODACHROMES © N.G.S.

One-ounce radio transmitter, developed by the author's brother, Dr. Frank Craighead, Jr., traces the hunting and seasonal movements of the eagle. Strapped to the bird's leg and sealed with plastic, the set can send a signal for two miles. By tracking birds known to have ingested pesticides, the naturalists hope to determine effects of poisons on the eagle population.

Dodging a sharp beak in a cliffside nest, Harry Reynolds holds a 10-week-old fledgling while Jerry McGahan clamps a numbered aluminum band on its leg. The students banded more than 100 birds; one turned up 1,275 miles away in western Texas.

KODACHROMES © N.G.S.

Hurtling down on an unsuspecting victim, a golden eagle attacks, kills, and begins to feast on a ground squirrel. The dramatic sequence, caught by a motorized camera, lasted only seconds. Other eagles so harassed this year-old intruder, introduced into their territory as an experiment, that his hunting area covered less than a square mile. To feed a family, golden eagles may range over 100 square miles. Montana's birds usually dine on rabbit; an adult may eat a pound of meat a day.

Bringing home a jack rabbit, a mother eagle swoops in, spreading her three-foot wings to brake for a landing. Ten-week-old eaglets wait out of sight in the nest. This female keeps her aerie tidy and lined with fir boughs; some sloppy housekeepers allow uneaten prey to pile up and putrefy. The male parent generally feeds his mate during incubation, spells her at brooding the young, and later helps with hunting chores. Adding to the same nest year after year, the eagles may build a home weighing a ton or more.

KODACHROMES © N.G.S.

All-seeing eyes of a four-week-old golden eagle possess vision that is telescopic, microscopic, monocular, binocular, and about eight times finer than man's. Mature birds can spot a rabbit at half a mile. Eaglet's nictitating membrane, a translucent shield flicking sideways across the eye (lower), cleans and moistens the cornea without blocking vision.

The rugged region, hemmed in by the Bridger, Crazy, Absaroka, and Gallatin Mountains, is a jumble of escarpments, buttes, and rock ridges that exceed 11,000 feet above sea level (map, page 423). Towering Douglas firs relieve the harsh landscape, and lush stream valleys lie green and groomed with hay and alfalfa fields. Here is the heart of Montana's feeder-calf industry, as well as the birthing grounds for approximately 18,000 lambs each year.

Hot in summer and bitterly cold in winter, the region supports such predators as bobcats, coyotes, mountain lions, great horned owls, and many species of hawks.

After intensive searching, Jerry discovered that the area also harbors an annual average of 18 pairs of nesting eagles, a pair for every 70 square miles.

Counting the number of nesting eagles, he worked to determine their reproduction rate and the causes of their deaths. Such facts, once established, would be compared with records of other eagle populations throughout the country. Eventually we and other researchers would learn if the golden eagle is increasing, decreasing, or just holding its own.

Jerry's enthusiasm infected everyone around him. My son Derek and his cousin Charles, accomplished falconers, were inspired to help by photographing eagles during the nesting cycle. The National Geographic Society furnished film and photographic equipment. Thus one youth's labor of love burgeoned into a golden-eagle task force.

Eaglets Pinion an Uninvited Caller

The search for eagle nests was only the beginning. Individual eaglets, all claws and beaks, had to be banded for identification (page 425). Frequently, young birds would flee when humans approached and try their wings by gliding to the far side of a canyon. At the Duck Creek nest, near Livingston, Jerry stationed Mac, his younger brother, a quarter mile across the valley to capture the eaglets if they should fly when Jerry tried to band them. Fledglings are good gliders but poor fliers. Unable to take off from the ground, they can be run down and caught by hand.

Unhappily, on this occasion the strategy backfired. When the young climber reached for a fledgling female in the nest, she sank her talons into his right forearm. Simultaneously her nest-mate, a partly grown male, clutched his left wrist. Jerry found himself painfully and effectively pinioned.

"First I felt foolish," he said afterward. "Then I hurt from my fingertips to my shoulders. I couldn't free myself. And who yells 'Help!' to a younger brother? I did, finally, loud and clear. Mac pried me loose—half an hour later—after he had scrambled back across the valley."

Eagles nest in the same area, often at the same site, season after season. Over the years, therefore, Jerry could revisit each pair of eagles repeatedly to count eggs, learn how many hatched and, finally, how many eaglets lived to fly from the nest. Gradually the vital statistics accumulated.

Meanwhile Derek and Charles met the challenge of eagle photography with all the youthful fervor of their 16 years. The boys set out at 3 a.m. to be on hand for early feedings. They often spent a full day crouched—and sometimes dozing—in sun-baked blinds (page 436). They helped find tree nests

Trained to hunt, a golden eagle rides its master's fist in the Kirgiz Soviet Socialist Republic. A leather hood calms the bird until its release to fly down game. When the horseman tires from holding the eagle, he may rest his arm on the forked stick fixed to his stirrup.

Striking a hapless fox, the eagle sinks deadly talons. The falconer gallops up to assist in the kill. He will reward the bird with a bit of raw meat. As recently as 30 years ago, the Kirgiz hunted deer with eagles and sold the antlers to Chinese for medicine. They still gather periodically to pit prize eagles in contests. A wild golden eagle seldom attacks livestock; it cannot carry off quarry much heavier than itself.

that could be reached only by using climbing spurs; they conquered sheer 400-foot cliffs.

Often hungry themselves, the youths tightened their belts and kept score of the kinds and quantity of food in the eagles' diet. Once they considered pilfering a fresh grouse from the eaglets for their own supper.

The boys endured discomfort, disappointment, and discouragement. But when an eagle parent swooped in with food and the light was right, unforgettable moments of discovery rewarded them.

For two summers Charlie and Derek camped in eagle country, hiking or driving over bone-jarring wilds to reach remote nests. Occasionally I visited the boys to offer advice on photography, camp neatness, and the nutritional value of cooking a few good meals. I checked them out, as I had Jerry, on the use of ropes and dangers of cliff climbing. Once, when their meat supply had spoiled, I treated them to five pounds of steak.

Frank and I were proud fathers, during the boys' second summer with the eagles, when our sons handed us a letter from Bates Littlehales of the NATIONAL GEOGRAPHIC's photographic staff:

"Dear Charles and Derek,

"I received rolls 61 through 71 of your last shipment. You now have a magnificent series on the golden eagle. It far surpasses our highest expectations. There are some great dramatic portraits beautifully handled, and the flight shots are fine."

Bully's Role Played by Big Sister

Daily notes taken by the boys at their six blinds give an interesting account of eagle behavior. Charles recorded the aggressive conduct of a female fledgling in the nest.

"The female is always first to claim the food. She generally bullies her smaller brother. This morning the adult male eagle brought a jack rabbit and dropped it off as he flew by. The young female immediately grabbed it and covered it with her wings.

"The male fledgling squawked at the edge of the nest, but did not attempt to claim the food. After a few moments the adult female arrived and looked the situation over. She knocked over the young female with a stroke of her wing, tore up the rabbit, and divided it equally between both young."

Another day, Derek wrote:

"This morning we spotted the mother returning with food. She flew upwind to within a few yards of the nest, then rolled over on her side, exposing her prey. The hungry young female, who had already made her first flight, watched intently, and as the adult turned away she flew from the cliff, maneuvered alongside her mother, and attempted to snatch the food. The adult, being annoyed, made a strong downstroke of her wing that sent the young eagle head over tail and forced her to crash-land on the slope below. Later in the day the mother twice repeated her performance of flying close by the nest with food, apparently to entice the young male that had not yet flown."

Jerry, meanwhile, continued to amass figures that we hoped would tell a more general story. He learned that 45 pairs of golden eagles laid an average of two eggs per nest over a two-year period, and hatched an average of 1.8 eaglets. Eighty-seven percent of those that hatched survived to leave the nest. However, when six unsuccessful pairs were included, the average of fledged eagles dropped to 1.4 per nest.

These studies, comparing the young researcher's Montana figures with productivity records from other parts of the country, showed that Montana eagles were producing enough young to maintain their present numbers. Jerry compiled statistics on mortality of eaglets in the nest and, by recording the fate of banded eagles, on causes of death after the eagles left the home aerie.

He found proof that fledglings took fatal tumbles from their nests. He also noted that men, for one motive or another, destroyed nests and young. Banded eaglets, off on their own, sometimes were shot or poisoned, or were struck by cars while eating carrion on the highways. Hunters and other people often returned the victims' numbered bands.

Interpreting these records, Jerry learned that at least half the eagle deaths in his area were caused by man and his lethal agencies.

But the study raised a nagging question: Does man have a case against the eagle?

To learn the makeup of the golden eagle's diet, Jerry painstakingly identified remains of

Perilously cantilevered 400 feet above a valley floor near Brackett Creek, Montana, an eagle's nest supports researchers Reynolds, right, and Jack Seidensticker. During a six-week period the students often made this risky climb to measure the young birds' growth with a spring scale. ▶

KODACHROME BY CHARLES AND DEREK CRAIGHEAD © N.G.S.

KODACHROMES BY FREDERICK KENT TRUSLOW (ABOVE) AND CHARLES AND DEREK CRAIGHEAD © N.G.S.

980 prey animals from 38 aeries. He found that white-tailed jack rabbits made up about 37 percent of the birds' bill of fare, with desert and mountain cottontails furnishing another third. Various species of birds accounted for an additional 12 percent. The remaining 18 percent, though diversified, showed that domesticated sheep were very rarely the eagles' victims.

Thirty-two different species of prey, ranging from young deer to ground squirrels and from great horned owls to rattlesnakes, succumbed to the eagles' appetite. However, in an area producing 18,000 lambs a year, the remains of only two lambs were found in nests, and these could have been carrion. None of our researchers ever saw eagles attacking sheep.

Clearly, a case could not be made against these Montana eagles. Nor has significant evidence of livestock depredation been found elsewhere.

Golden eagles have been known to kill such substantial quarry as coyotes, foxes, cats, dogs, wolves, and large predatory birds. They have even attacked adult mule deer, pronghorn antelope, caribou, and reindeer.

But taking such large prey is the exception, an act often occasioned by a scarcity of the staple diet of rabbits and rodents. Food-habit studies by S. K. Carnie in California, Y. V. Labutin in the Soviet Union, and J. D. Lockie in Scotland show golden eagles not to be serious predators of sheep. Lockie observed an area that supported 1,000 breeding ewes and in five years produced about 4,000 lambs, 520 of which died in infancy. Of these deaths, only seven were traced to eagles.

Students have been observing golden eagles since Aristotle's time. Like other raptors, or birds of prey, these regal fliers establish a nesting territory which they fiercely defend against other eagles and lesser birds. The hunting range may vary from 25 to 100 square miles, depending on terrain, abundance of prey, and density of the eagle population. Within this area the pair may build one or more nests, but will use only one each season unless disturbed.

Ball of fluff, a two-day-old eaglet (top) waits for a nest-mate to hatch from a three-inch-long egg. Eagles usually lay two mottled eggs and incubate them for about 35 days. Four-day-old hatchlings (center) watch for their mother's return with food. Feathers replace down on the wings of the eaglet (left). Only five weeks old, it claws dangerously when at bay.

Burly little prince, an eight-week-old eaglet sports juvenile plumage mixed with a collar and cap of down.

We believe that pairs mate for life. A "homeland" may be held by the same pair of birds for many years. If one dies, the survivor soon finds a new mate, and the continuity of occupancy remains unbroken. One nesting site in southern Montana has been used for 30 years. Another, according to a rancher who lives near it, has been occupied for nearly half a century.

Female Larger and More Deadly

Equipped for a predatory life, the eagle has a strong hooked beak and large feet armed with long curved talons. The female grows nearly a third larger than the male. Her foot, which may cover an area as large as a man's hand, wields talons that can drive through a careless handler's palm (page 424).

The strength, courage, and powerful flight of the golden eagle have benefited man since the time of Kublai Khan. Marco Polo wrote, "There are also [in China] a great number of eagles, all broken to catch wolves, foxes, deer, and wild goats. . . ." Hunters still train and fly golden eagles in some parts of China and the Soviet Union (page 430).

Close relatives of the golden eagle live in Europe, Asia, Africa, and Australia. The wedge-tailed eagle of Australia and Verreaux's eagle of Africa are fearless hunters. On the other hand, the imperial, steppe, and tawny eagles of Asia rarely attack large prey unless trained to do so. They habitually steal food from smaller birds of prey, and Indian falconers easily decoy them into captivity.

When Frank and I visited a maharaja years ago, his huntsmen pinioned the wings of a luggar falcon so it could fly only a few hundred yards. They tied a ball of feathers to its talons, together with many hair nooses. When an eagle, soaring several thousand feet above, spotted the falcon carrying what appeared to be food, it hurtled down to steal a meal. The smaller bird rolled over and threw its feet up to protect itself, and the nooses effectively snared the eagle's talons. The falcon's spread wings acted as a drag, pulling the larger bird to earth, where hunters easily captured it and retrieved the falcon unharmed.*

In the Western Hemisphere golden eagles range chiefly in Canada, Alaska, and the Rocky Mountain States. Favorite nesting

KODACHROME BY CHARLES AND DEREK CRAIGHEAD © N.G.S.

Hot vigil over, Charles Craighead clambers stiffly from a cramped cliffside blind. He and his cousin Derek often spent 18 hours spelling each other in such twig-and-burlap hideaways, waiting for the right moment to photograph their wary subjects.

On the threshold of independence, two 13-week-old fledglings in the Brackett Creek nest still receive an occasional handout, such as this ground squirrel, from a fierce-eyed mother. Parents first coaxed them from the aerie to try their wings two weeks earlier. Still poor fliers, the birds will remain nearby for several more months. Material used in the nest includes sticks and a mule-deer antler, lower left. White band at the tail and golden hackles at the neck help distinguish the young golden eagle, but even so it is frequently confused with the juvenile bald eagle. Birds reach adulthood at about five years, when they mate, probably for life. Eagles have been known to live for 30 years, but their maximum life span has not been conclusively established. An adult male weighs approximately nine pounds, and the larger female 13 pounds.

*John and Frank Craighead described "Life With an Indian Prince" in the February, 1942, GEOGRAPHIC. They also told of their own earlier experiences "In Quest of the Golden Eagle" in the May, 1940, issue.

areas include California, Idaho, Montana, and Wyoming. The largest number of these birds, it is believed, winters in Texas and New Mexico. Once they were common throughout the continental United States.

In Great Britain scientists tend to blame pesticides for the decline of the golden eagle, as well as the peregrine falcon and other hawks. In Scotland recent three-year observations showed a 60 percent decrease in the number of aeries containing young.

Among 56 dead bald eagles analyzed in 1963 by the Bureau of Sport Fisheries and Wildlife, all but one harbored pesticide residues. It has been established that a DDT and DDT-derivative accumulation in the brain of only 58 to 86 parts per million is lethal to bald eagles. Even lesser amounts may cause adverse behavioral changes and metabolic disorders. Researchers fear influences on fertility, but more work is needed to determine effects. The presence of the same poisons in golden eagles gives us cause for concern.

Both British and U. S. biological scientists have recognized the dangers to wildlife of long-lived chlorinated hydrocarbons, and are attempting to find poisons that will kill insects but not other forms of life. I am encouraged by a trend toward the use of short-lived pesticides, whose poisonous properties soon deteriorate, but until this becomes general practice, the danger is significant.

The pesticide poisons are absorbed by soil organisms, plants, herbivores that feed on plants, and the carnivores that feed on herbivores. At each step in this biological food chain, the poisons are further concentrated.

A single golden eagle feeds on hundreds of rabbits. Poisons, even if dilutely applied to the vegetation these animals eat, are concentrated in the eagle. If concentrations become high and persistent, they can be lethal.

Biologists know that pesticides have killed

captive eagles. But to obtain such evidence in a state of nature is difficult.

As students, Harry Reynolds and Jack Seidensticker had worked with me in Yellowstone park radiotracking grizzly bears.* Now eagle enthusiasts, Harry and Jack, supported by the Research Division of the Bureau of Sport Fisheries and Wildlife, are taking part in a national effort to determine the effect of poison residues in eagles and their eggs.

No one has presented scientific evidence

*See "Trailing Yellowstone's Grizzlies by Radio," by Frank and John Craighead, GEOGRAPHIC, August, 1966.

Screaming as she circles her nest, a female golden eagle protests the researchers' presence, but does not attack. She will relentlessly defend her territory against intrusion by rival golden eagles and other birds of prey. As

EKTACHROME BY CHARLES AND DEREK CRAIGHEAD © N.G.S.

scientists learn more about the golden eagle's habits, they increase the regal bird's chances for survival

that pesticides are thinning the ranks of golden eagles. But there is reason for suspicion.

Little doubt exists about the gravity of other threats to the species. Many golden eagles migrate south for winter, congregating where prey is abundant in western Texas and New Mexico. Sheep ranchers accuse the birds of taking a heavy toll of lambs, and until an Act of Congress in 1962 forbade it, they reduced eagle numbers with traps, firearms, and poison.

The same law banned hunting from airplanes, a "sport" that had multiplied the slaughter. Reporting to the National Audubon Society, Dr. Walter Spofford stated: "The number shot each year from airplanes is not accurately known but quite certainly it was regularly more than a thousand. . . . There is every reason to believe that something like 20,000 golden eagles were shot in the southwest in the last 20 years."

There is, however, occasion for optimism. Recently the Audubon Society, National Wool Growers' Association, and Bureau of Sport Fisheries and Wildlife agreed to support a cooperative golden-eagle study and learn the facts.

Bald Eagle Often Killed by Mistake

Such cooperation should ensure the intent of Congress in its 1962 statute, which provided for complete protection of the birds. Public Law 87-884 declared that the golden eagle "should be preserved because of its value to agriculture in the control of rodents," and because such action "will afford greater protection for the bald eagle, the national symbol of the United States of America." Shielded by law since 1940, young bald eagles had often been killed by persons mistaking them for golden eagles.

The golden may not now be hunted, sold, bought, or transported in any form. Even its eggs and nests are protected, and those who break the law run the risk of a $500 fine or six months in prison, or both.

However, "on the request of the Governor of any State," the law adds, "the Secretary of the Interior shall authorize the taking of golden eagles for the purpose of seasonally protecting domesticated flocks and herds in such State. . . ."

To date, the governors of several western ranching states, including Montana, New Mexico, Texas, and Wyoming, have asked for and been granted authorization to take golden eagles, though hunters may not use poison or shoot from airplanes. The governors respond to ranchers' claims of losing lambs to eagles, but the birds are sometimes falsely accused, as when they are surprised feasting on a lamb that died at birth.

If legal hunters would report their kills and turn their quarry over to the Bureau of Sport Fisheries and Wildlife for study, scientists could accurately record mortality and check the birds for pesticide levels. From banded birds killed, they could trace migratory movements and determine feeding habits on a national scale.

Then an individual eagle, guilty or not guilty of livestock depredation, would by its death contribute to an honest evaluation that might help assure the future of one of our most magnificent birds. THE END

Opening day for the past: Russell Cave National Monument and its Visitor Center, named for the Society's late President and Editor (portrait), welcome visitors to dedication ceremonies. The Society gave the Nation the Alabama cavern, oldest known home of early man in the southeastern United States. Before an exhibit showing layers of man's occupation from 7000 B.C., Society President and Editor Melville Bell Grosvenor (hands folded) talks to Harthon L. Bill, Deputy Director of the National Park Service. To their left: Dr. Leonard Carmichael, Society Vice President for Research and Exploration; Trustee Conrad L. Wirth, and Mrs. Grosvenor

Russell Cave Dedicated; New Visitor

TWO THOUSAND YEARS before the world's first great civilization flowered in Mesopotamia, Stone Age Americans huddled over smoking campfires in a damp, drafty cavern in what is now Alabama. Generations of primitive hunters who sought its shelter, beginning about 7000 B.C., left an imperishable record of their daily life before vanishing into the shadows of prehistory.

The cavern, now known as Russell Cave, revealed its secrets during three years of excavation sponsored by the Smithsonian Institution and the National Geographic Society.

To preserve the priceless site for the Nation, your Society purchased the cave and the surrounding 310-acre farm, and in 1961 turned the property over to the United States Department of the Interior. On May 7, 1967, it was officially dedicated by the National Park Service as Russell Cave National Monument, and its Visitor Center was named in honor of the late Dr. Gilbert H. Grosvenor, former President and Editor of the Society.

"We don't know when the flickering flames

Center Named for Gilbert H. Grosvenor

went out for the last time in the cave," said Melville Bell Grosvenor, delivering the principal address as President and Editor of the National Geographic Society, "but the bright rays of scientific knowledge still emerge from its dark recesses."

Harthon L. Bill, Deputy Director of the National Park Service, presided at the dedication before a thousand guests in the high school auditorium at Bridgeport, Alabama.

"We accept with gratitude all that the National Geographic Society has done to make this fine monument possible," Mr. Bill said. "We accept Russell Cave on behalf of the people of the United States so they may know and understand better the story of man."

Man's oldest known habitation in the southeastern United States, the cavern lies in a wooded mountainside near Bridgeport in northeastern Alabama. Its past is portrayed in the Visitor Center, a one-story structure of rough oak, native stone, and hand-split cedar shingles. A dramatically lighted diorama shows a family of 6,000 years ago: father,

Skeleton of a Stone Age American, buried more than 4,000 years, came to light during painstaking excavations. Carl F. Miller, right, led the digs, sponsored by the Society and the Smithsonian Institution.

Fishhooks from deer bones—one rough-carved, the other completed—turned up in artifacts sifted from tons of cave debris. Said the President and Editor at the dedication, "Here the past lives again as archeologists re-create the life of primitive man in Russell Cave and in the forests of this beautiful countryside."

KODACHROMES BY BROOKS HONEYCUTT © N.G.S.

mother, and children warm themselves by a fire. "Fortunately for archeologists," Dr. Grosvenor observed, "the women in Russell Cave were terrible housekeepers. The litter they left built up in layers as easy to read as tree rings."

"Gilbert Grosvenor was a pioneer in advocating national parks," he pointed out, "so it is appropriate as well as gracious that this handsome Visitor Center is named for him." He recalled that his father half a century ago had pledged the Society to cooperate with the Government in preserving parks for coming generations.

Vow to Aid Parks Prompts Wide Service

"We have kept this pledge," Dr. Grosvenor continued, "and I greatly prize the opportunity of serving as Chairman of the Secretary of the Interior's Advisory Board on National Parks, Historic Sites, Buildings, and Monuments.

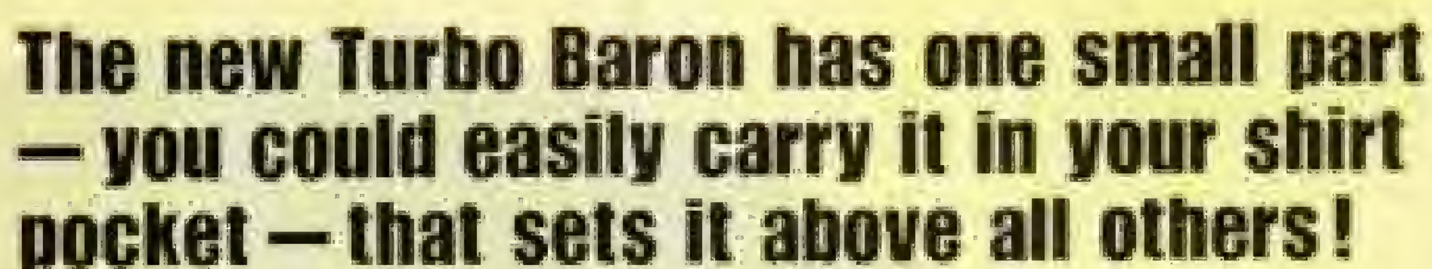
"Our Society has contributed to the National Park System in many ways: the discovery of the Valley of Ten Thousand Smokes in Alaska; the first expedition to explore another cave, Carlsbad Caverns in New Mexico; the unearthing of Pueblo Bonito in New Mexico; the sponsorship of the recent ecological study of the giant coast redwoods in California; and the excavations at Wetherill Mesa in Colorado."

The Society's President paid tribute to those present who played key roles in exploration of the cave: archeologist Carl Miller, now retired from the Smithsonian, and his wife Ruth; Dr. Leonard Carmichael, former Secretary of the Smithsonian Institution, now a National Geographic Vice President; Dr. Melvin M. Payne, Executive Vice President and Secretary of the Society; Conrad L. Wirth, former Director of the National Park Service, a Trustee of the Society; Dr. Matthew W. Stirling of the Smithsonian, who serves on the Society's Committee for Research and Exploration; and the members of the Chattanooga Chapter of the Tennessee Archeological Society who first probed Russell Cave in 1953: Paul H. Brown, J. B. Graham, LeBaron W. Pahmeyer, and Charles K. Peacock.

"Because amateur archeologists had an unquenchable curiosity about the things they found in that cave and reported their find to the Smithsonian in Washington, D.C.," Dr. Grosvenor concluded, "one of the most important early-man sites in America has been preserved for all time."

SIX-MONTH INDEX AVAILABLE

As one of the benefits of membership in the National Geographic Society, an index for each six-month volume will be sent, upon request, to members who bind their GEOGRAPHICS as works of reference. The index to Volume 131 (January-June, 1967) is now ready.



The plane working below is the world's fastest light twin. It outcarries all other light business twins as well. It has a built-in oxygen system, optional refrigerated air conditioning, and room for full instrumentation. It is, in short, the very finest corporate light twin airplane your company can buy.

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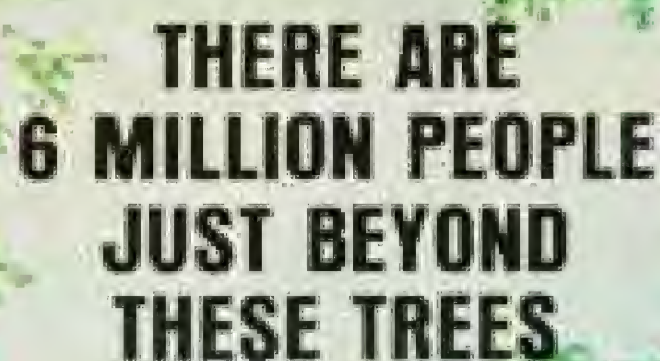

"No small-hearted city…could have established it or made the sacrifices necessary to maintain it." That's what Frank Lloyd Wright said about the vast and wonderful system of forest preserves now bordering the city of Chicago.

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