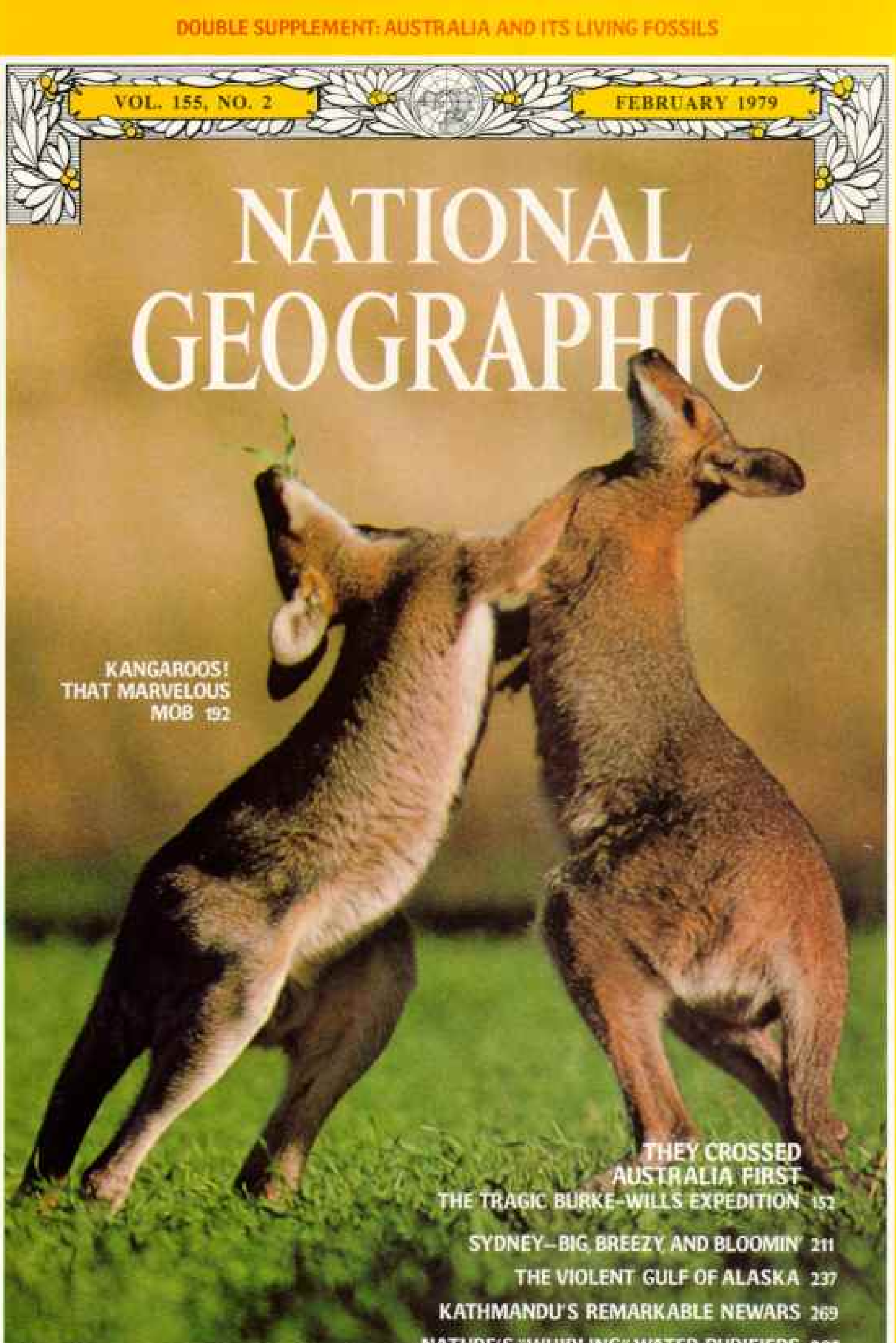
DOUBLE SUPPLEMENT: AUSTRALIA AND ITS LIVING FOSSILS

VOL. 155, NO. 2 FEBRUARY 1979

NATIONAL GEOGRAPHIC



KANGAROOS! THAT MARVELOUS MOB 192

THEY CROSSED AUSTRALIA FIRST
THE TRAGIC BURKE-WILLS EXPEDITION 152

SYDNEY—BIG, BREEZY, AND BLOOMIN' 211

THE VIOLENT GULF OF ALASKA 237

KATHMANDU'S REMARKABLE NEWARS 269

NATURE'S "WHIRLING" WATER PURIFIERS 287

OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY WASHINGTON, D.C.

IS EXPLORATION DEAD? Has every place and every thing been discovered? Have the satellite, the airplane, the transistor, the snowmobile so reduced the risk that the challenge is only a fiction?

Last year we presented the stories of Robyn Davidson, who crossed the western Australian desert by camel, and Naomi Uemura, who traveled to the North Pole by dogsled. Both were alone most of the time. But both journeyed over regions that had previously been crossed, and both relied in part on supplies delivered by truck or plane. So—what does one call what they did?

Last December's issue featured the flight of the *Double Eagle II* across the Atlantic—the first manned balloon to make that crossing. High-technology navigation played an important part in the success, as did radio-relayed weather reports based on satellite observations. Was this achievement a sporting event or an exploration? Was it what historian Daniel J. Boorstin has called a "pseudo-event"?

In the absence of overriding nationalistic or economic motivations that drove men to explore and discover and claim in previous eras, the adventure that has always been a trail mate to exploration seems still to exist for its own sake.

This issue contains the story of the first expedition to cross Australia, nearly 120 years ago. Such ultimate daring has to an extent been shouldered aside by immensely expensive and highly organized group endeavor, such as man's successful reach for the moon. Oceanographic expeditions are launched with all the resources of several institutions, and government-sponsored science has become a multimillion-dollar enterprise.

There are many who believe that exploration has only passed into a new and more meaningful phase. After all, the famous Victorian Age explorers were conquering little more than their own ignorance; the doughty Columbus "discovered" a hemisphere that was already populated and the home of high civilizations.

If we sometimes feel that the last mountain has been climbed, the last ocean crossed, the last river named, the last tribe encountered, we have only begun to understand what has been discovered. And the spirit of pure adventure survives.

Gilbert M. Grosvenor

NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 155, NO. 2

February 1979

The Tragic Journey of Burke and Wills 152

Seeking the unknown in 1860, the first men to cross Australia struggled through a vast wasteland to its northern edge, only to die during their return. Joseph Judge and Joseph J. Scherschel retrace an epic in the history of exploration.

Kangaroos! That Marvelous Mob 192

Biologist Geoffrey B. Sharman and wildlife photographers Des and Jen Bartlett report on the wondrous ways of their country's most extraordinary creatures, portrayed as well on a special map-supplement with this issue.

Sydney: Big, Breezy, and a Bloomin' Good Show 211

A visiting Yank of perceptive ear and eye, Ethel A. Starbird captures the special character—and characters—of Australia's largest metropolis. Photographs by Robert W. Madden.

Risk and Reward on Alaska's Violent Gulf 237

For those who can endure wretched weather and a rugged life-style, the Gulf of Alaska grudgingly yields great riches, Boyd Gibbons and Steve Raymer discover.

Kathmandu's Remarkable Newars 269

The rich and sophisticated culture of Nepal's capital is largely the product of a talented, enterprising people little known to the outside world. A picture story by John Scofield.

Nature's "Whirling" Water Purifiers 287

Rotifers, tiny aquatic animals that even under a microscope give an illusion of spinning, help keep the world's ponds and puddles clean. Photographer John Walsh takes a closeup look.

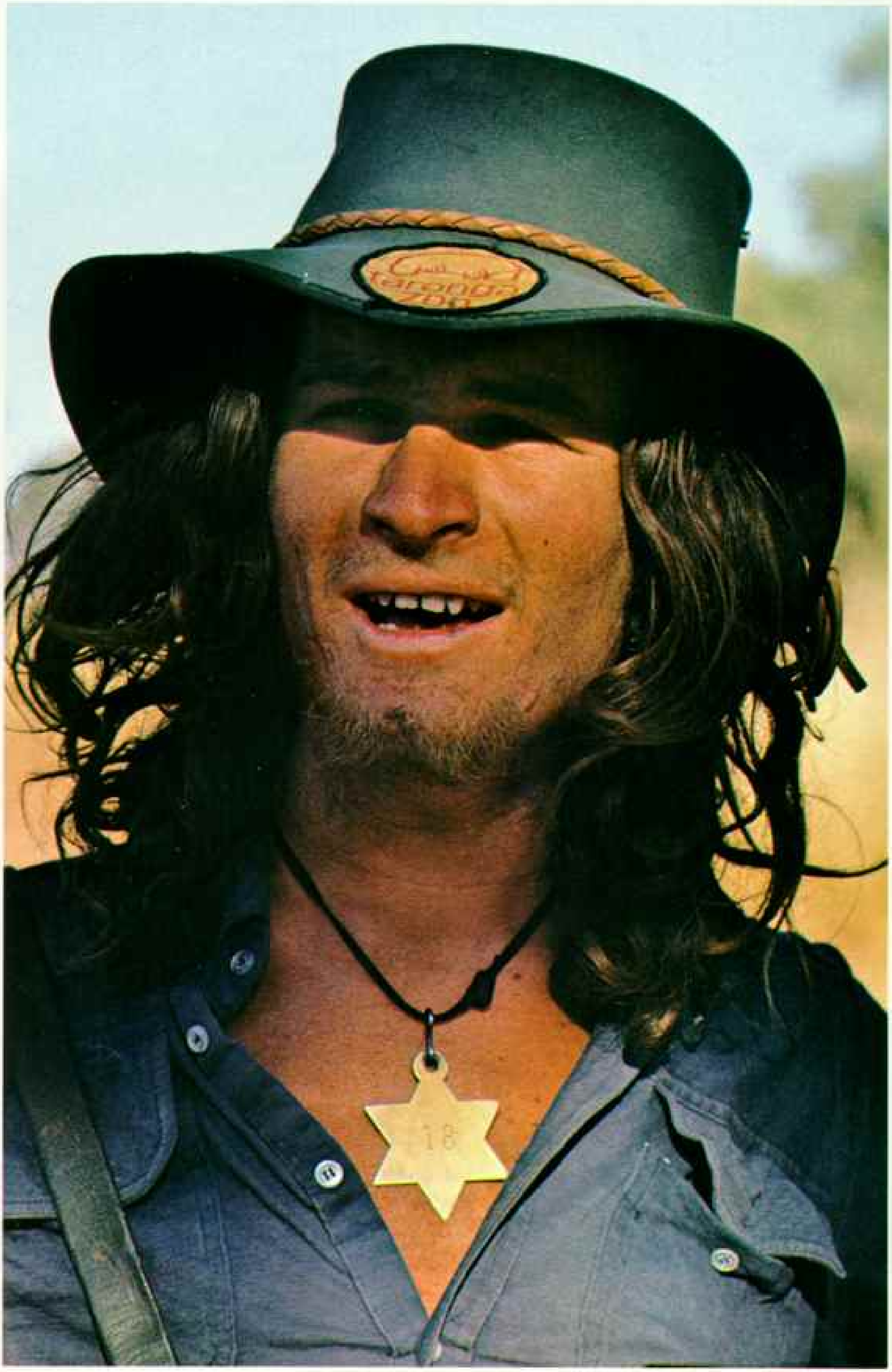
COVER: *Two red-necked wallabies, pugnacious members of the kangaroo clan (pages 192-209), square off in an Australian wheat field. Photograph by Des and Jen Bartlett.*

First Across Australia

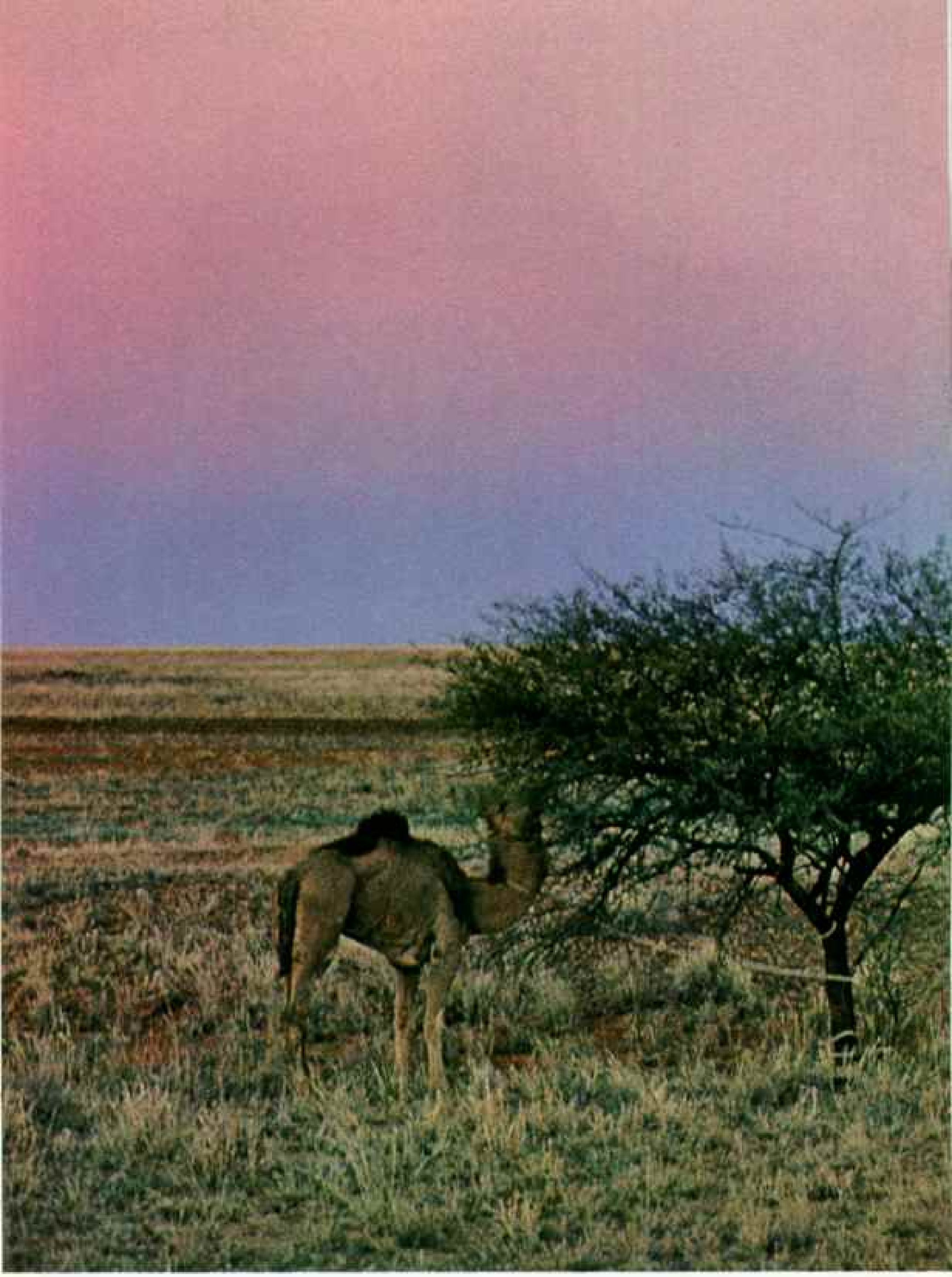
The JOURNEY of BURKE AND WILLS

"RETURN OF BURKE AND WILLS TO COOPER'S CREEK," BY NICHOLAS CHEVALIER, NATIONAL LIBRARY OF AUSTRALIA, CANBERRA

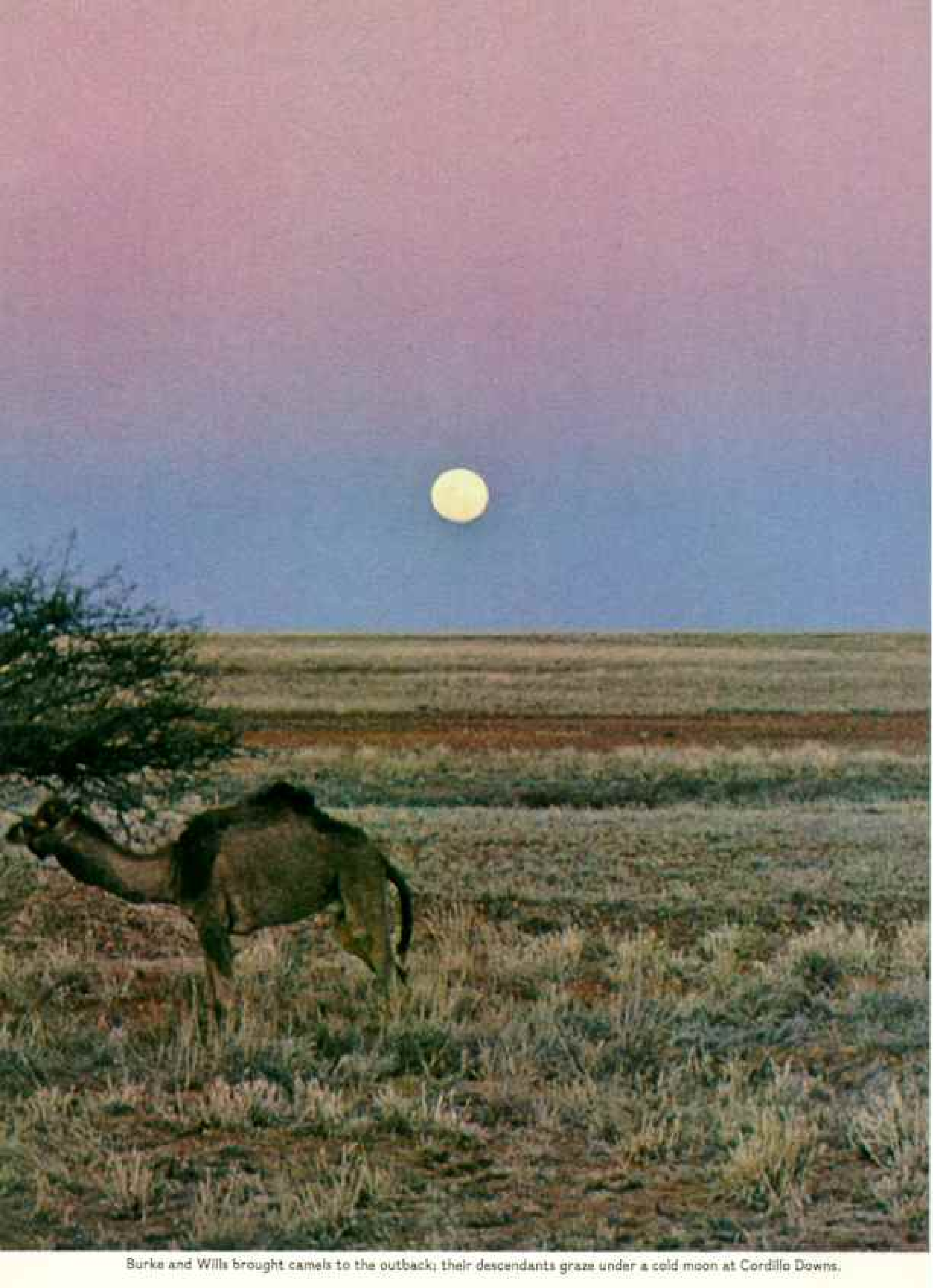
The continent's vast interior still lay locked in mystery in 1860. Under two untried leaders an expedition set out to cross the unknown. Trailed by controversy, their brave journey ended in success and tragedy—and left a challenge that beckons adventurers to this day.



Paddy McHugh, an outback cameleer, helped lead a 1977 restaging of the Burke-Wills trek.

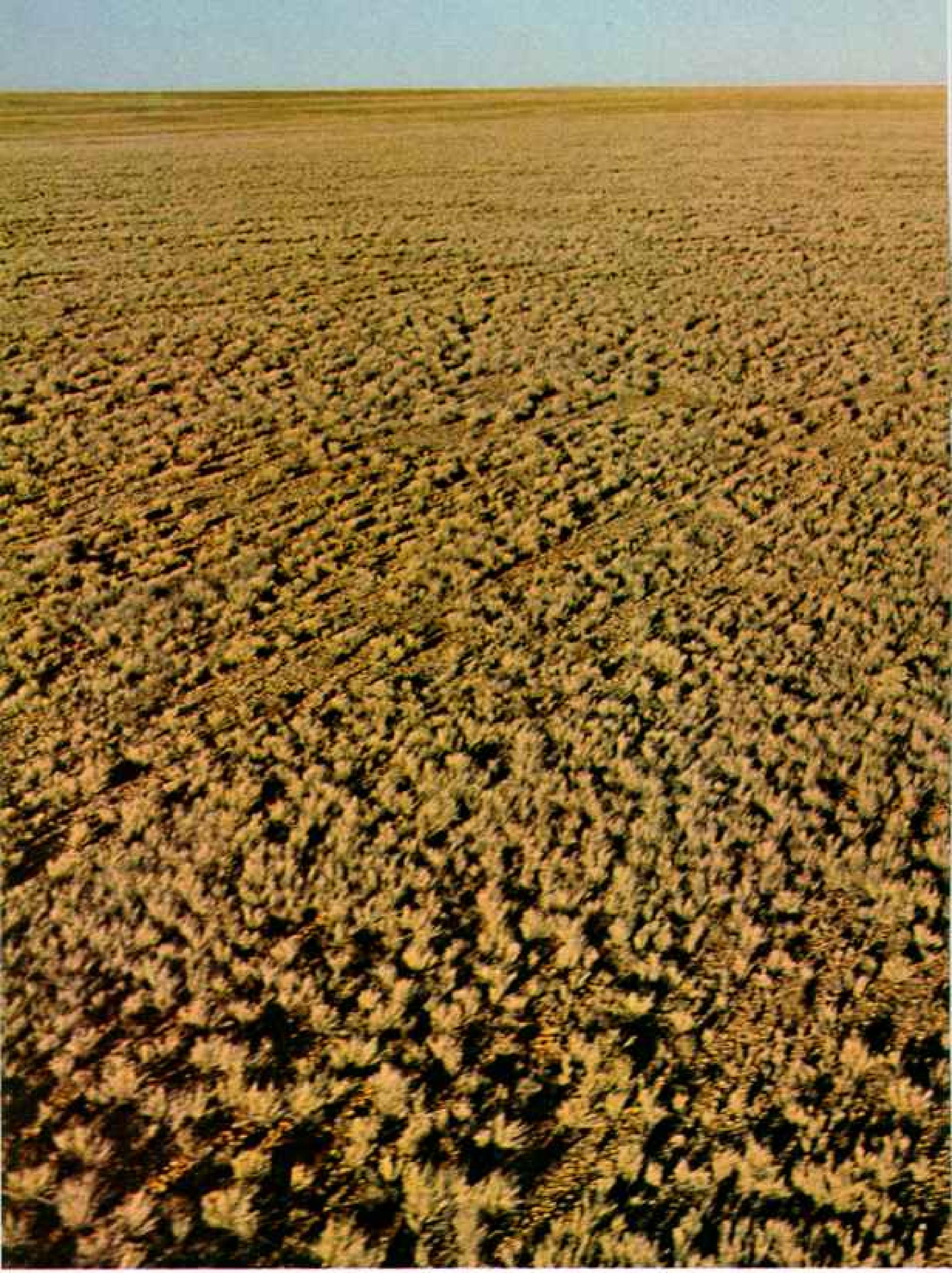


"A fearful night. . . . the cold was intense, and it



Burke and Wills brought camels to the outback; their descendants graze under a cold moon at Cordillo Downs.

seemed as if one would be shrivelled up." –WILLS



"Nothing now but the greatest good

A plane shadows the expedition route through the wide desert northwest of Tibooburra.

luck can now save any of us. . . .” –WILLS

"A large tribe of blacks came pestering us

Long before Burke and Wills passed by Mootwingee, Aborigines decorated Snake Cave by blowing red pigment around their hands.

to go to their camp and have a dance. . . ." –WILLS

THERE IS NOTHING quite like it in the history of exploration, this story of the Burke and Wills expedition of 1860. What began as a comic-opera cavalcade, hoping to be the first to cross Australia, became an epic of endurance and ended in haunting tragedy.

Some see in it a parable of the Australian's relationship with the vast, forbidding Centre of the continent. That stark, stony land lies like Lazarus through years of drought but springs to tumultuous life with the miracle of a passing rain or sudden flood.

Just so, it is unfeeling death that gives the Burke and Wills drama its special quality—and transforms the actors into legend. As photographer Joe Scherschel and I followed the explorers' track from one end of Australia to the other, from Melbourne by its shining southern sea to the tropical Gulf of Carpentaria, we found the legend still alive in the back of beyond.

Much has changed in the century since Burke and Wills played out the famous last scene. The Centre now holds cattle and sheep stations of thousands of square miles. Four-wheel-drive tourist vehicles find their way up the dirt tracks amid a maze of seismic lines where crews look for oil and gas. The most remote habitations are now linked to the world by plane and radio. (See the supplement map **Australia** with this issue.)

But much remains the same. There the weary traveler still finds the dreamlike water hole in the immense desert, its "old man" gum trees decked with screaming cockatoos and whirling parrots. There small hamlets adrift on the stony plains offer the shade of a pub, and men sit in the long shadows of afternoon, remembering. And there one can still look out over 5,000 square miles and find it empty but for dancing cyclones and mirages rimming the horizon with orange fire. Out there, it is a truly lonely man who does not meet his soul.

It began, as do so many of men's dramas, with the cry of gold . . . Gold! Lying there on the surface, in the gullies and washes of the rough country around Ballarat and Bendigo. Gold in such quantity as men only dreamed of. They came by the thousands—from Europe's battlefields and the California goldfields to this strange, southern land where Orion and Pegasus hung upside down in the sky, and a strange people seemed to exist still in the dawn of time.

Gold brought prosperity to the new State of Victoria, and with it rose an optimistic class of burghers—merchants and lawyers, landowners and professors—whose spirits turned to great schemes. They formed the Royal Society of Victoria. An exploration committee was appointed, and that committee raised a large sum to finance an expedition that it hoped would be the first ever to cross the mysterious continent.

By ten votes to five, the committee elected Robert O'Hara Burke to command. He had the not unusual combination of Galway traits—a robust, direct, brave exterior and a somewhat eccentric, somewhat dreamy interior. Well educated, he had served with the Austrian cavalry and the Irish constabulary before coming out to Australia to keep order on the raw gold frontier as a Victorian police officer. He did well at it, but had already been disappointed in both love and war—arriving too late for the action in the Crimea, where his brother James was killed, and being spurned by Julia Matthews, a handsome actress making a triumphal sweep of the gold camps.

His second was George James Landells, who had already performed a difficult service for the committee. He traveled all the way to Peshawar, in India, thence to Afghanistan, and returned with 25 camels and John King, an Irish soldier who had been through the Sepoy Rebellion and was looking for whatever else life had to offer. Landells's notion of proper camel tending was to feed them remedial rations of rum.

Other important members were Dr. Herman Beckler, botanist and medical officer,

By JOSEPH JUDGE
ASSOCIATE EDITOR

Photographs by JOSEPH J. SCHERSCHEL
ASSISTANT DIRECTOR OF PHOTOGRAPHY

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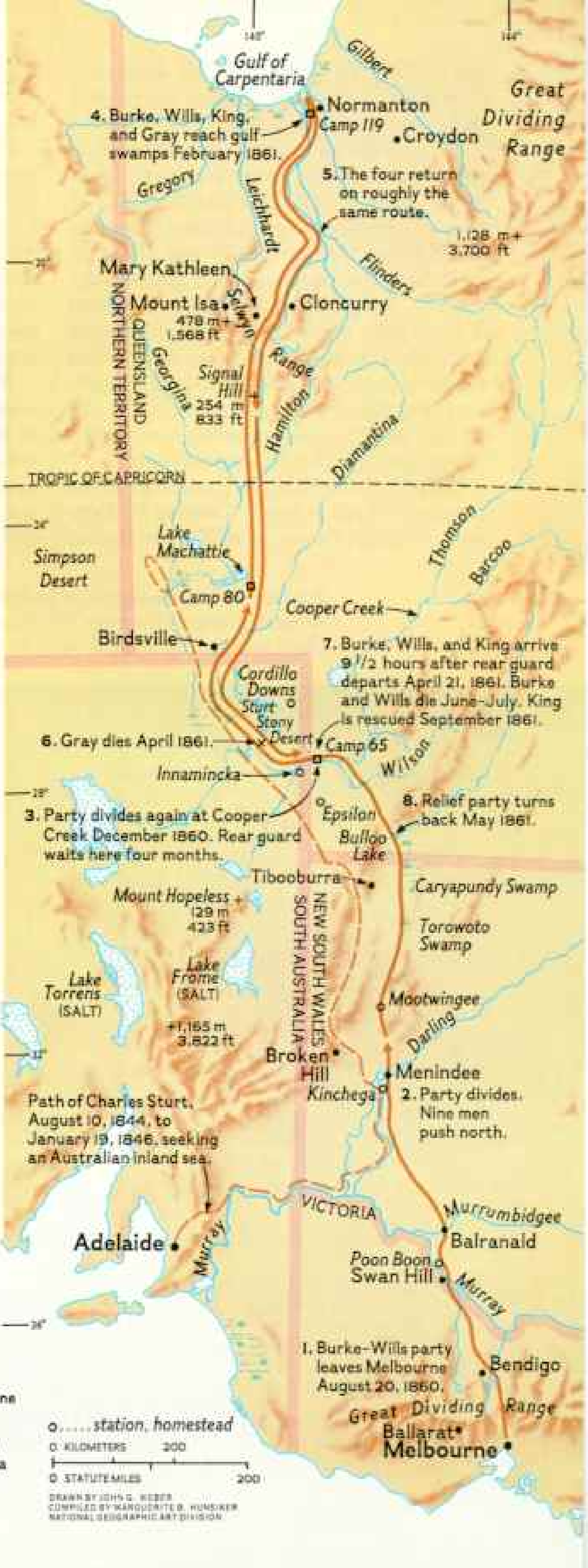
Brave explorers of the outback were selected by armchair adventurers sitting in comfortable Melbourne headquarters—scientists, doctors, and merchants of the Royal Society of Victoria. The society raised funds for an expedition. For the leader it chose Robert O'Hara Burke (**top**), an Irish policeman and soldier of fortune with little experience as a bushman. Though headstrong and volatile, Burke got on well with his navigator, William John Wills (**above**), an Englishman of quiet and studious manner whose inexperience matched Burke's.



and Ludwig Becker, naturalist and artist. Both Beckler and Becker (there were surely jokes about one having an "l" of a name) lived up to the Teutonic stereotype without effort—industrious, factual, meticulous. Becker was the more fun of the two. He had roamed wild Brazil and managed to make a living doing "likenesses" of any client he could find. But he was past 50 years of age.

Then there was astronomer-surveyor William John Wills, a thin and sandy man of a retiring disposition and a serious, patient way. His maps and notes, made in a small, unassuming hand, are pinpoint clear to this day. He was 26, employed at the local observatory, and joyful at his appointment.

Ten others were chosen from some seven hundred. Three of them, Thomas McDonough, William Patton, and William Brahe, would have important supporting roles. Two sepoys from India—Beludge and Dost Mahomet—went along to tend the camels.

On August 20, 1860, what looked like a circus assembled in Melbourne's Royal Park: 23 horses, plus 25 camels and three drays swaying under 21 tons of equipment, including the 60 gallons of rum for Landells's Cutty Sarks of the desert. They also took along 37 firearms of various kinds, expecting confrontation with the wild tribes of the interior.

Melbourne turned out in force for farewell speeches, a tremendous ovation, the waving of hats. It was hours before the cavalcade was able to organize itself and its beasts, press extra wagons into service, and move out. Long after the others had left, Wills was still carefully packing his instruments.

A land still full of emptiness confronts a camel caravan mounted by Tom Bergin, an Australian zoologist who in 1977 set out in the footsteps of Burke and Wills. Bergin's party traveled a thousand miles in an effort to prove Burke and Wills floundered

THE ROYAL PARK is there today, a greensward still, an adornment in a city of parks. Nor has Melbourne changed all that much. It is thought of as "English" and conservative; proper repute for a financial center. Much of the skyline is still Victorian.

From the park Joe and I headed a Toyota Land Cruiser northward. It would be ever north for us, as it was for Burke. His track ran out through settled country, the homesteads giving way to rough towns, like gold-mad Bendigo.

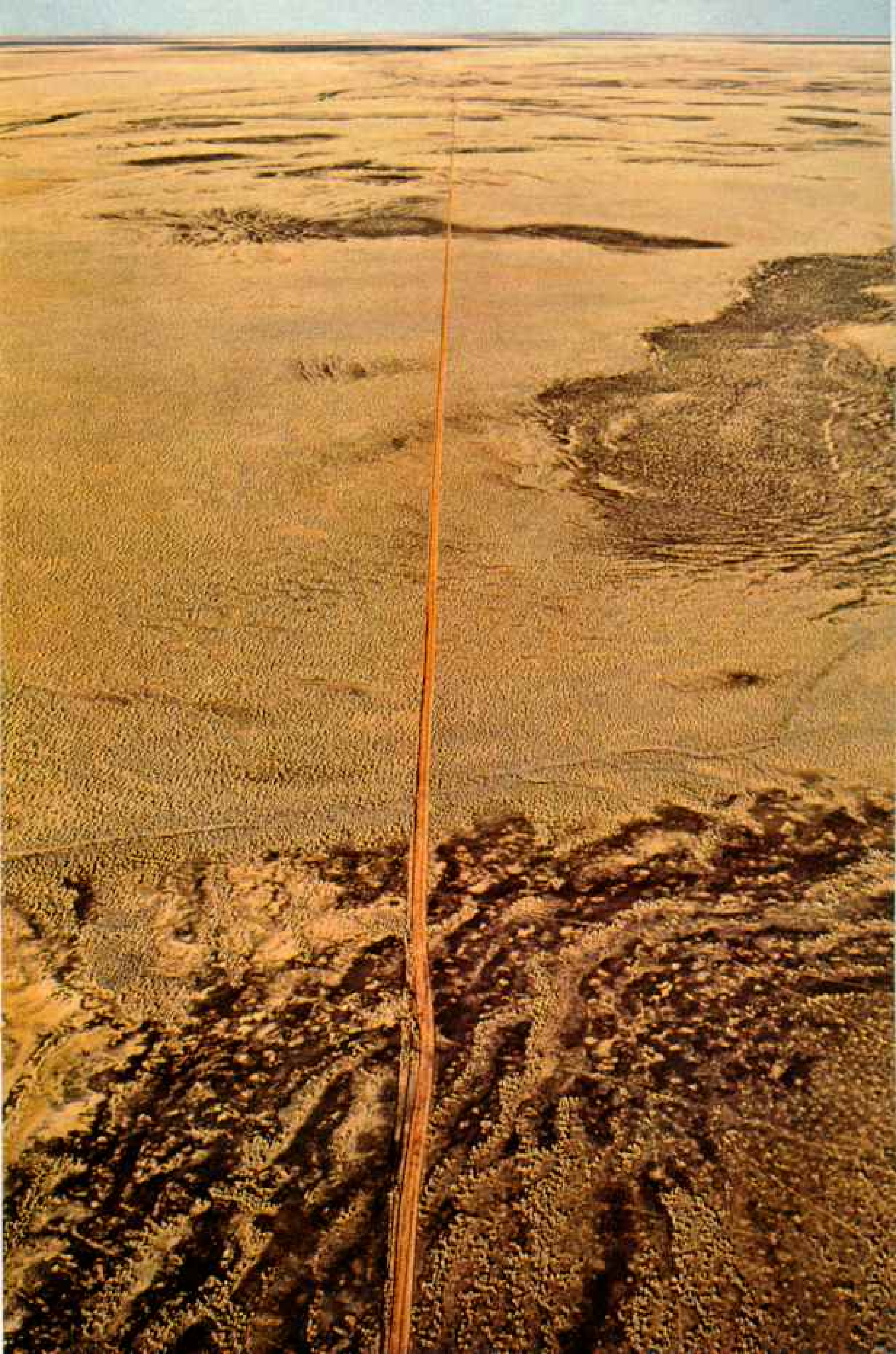
Civilization has smoothed out these first stages of the route with roads of bitumen (in Australia: BITCH-amin) and comfortable motels. The rough-and-ready towns and crossroads have become commercial centers already conscious of preserving a way of life that has barely expired. Bendigo, a set piece of grand Victorian architecture, is carefully restoring the glorious former City Hall and the old Shamrock Hotel; it mines now for the tourist dollar.

As Burke neared Bendigo, a crowd came out to enjoy the brave sight. In retrospect, that very bravery displayed the inherent weakness: overloaded with supplies, overstaffed with personnel, a grand march rather than a lean band of explorers.

By September 6, after they had crossed a hundred miles of plains to Swan Hill, Burke had decided to lighten the load and held a public auction of supplies.

The town, a few shanties in the shade of big gums along the Murray River, was a steamboat landing for sheep stations like Reedy Lake, *(Continued on page 168)*

partly because they didn't know how to handle camels. Inspired by the same 19th-century saga of incredible endurance, NATIONAL GEOGRAPHIC's Joseph Judge and Joseph J. Scherschel simultaneously retraced the expedition's route by jeep and plane.



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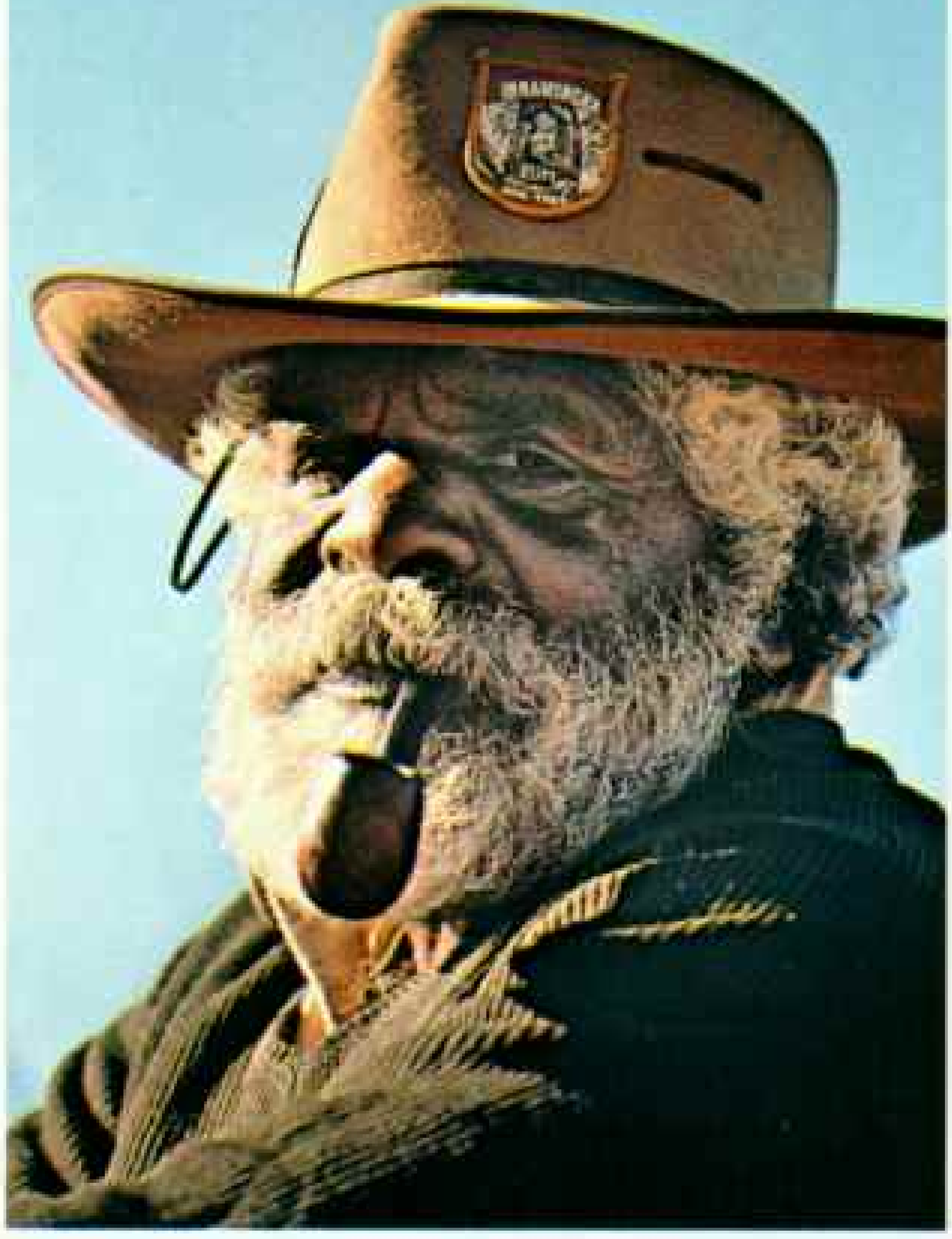
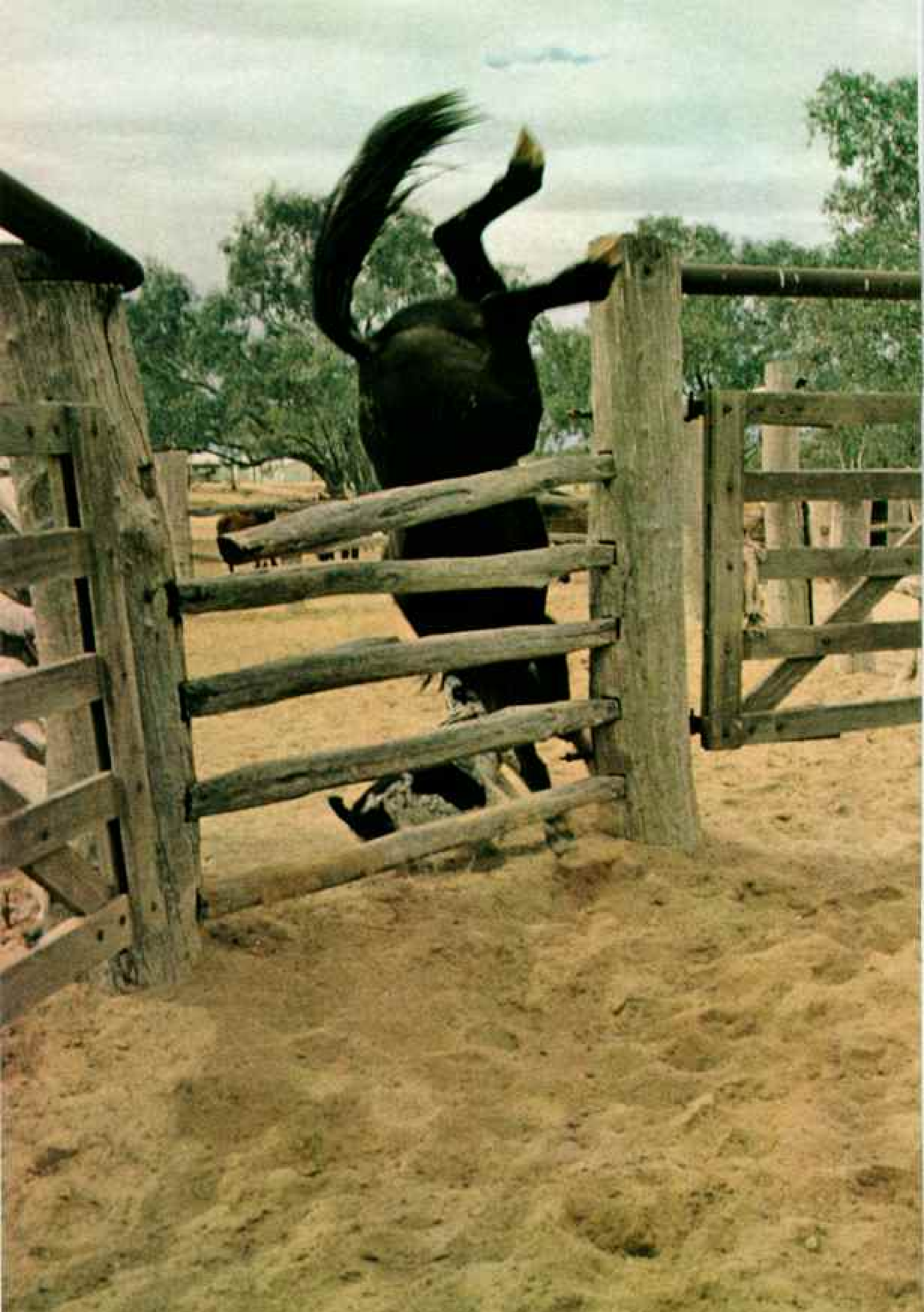
On the immense canvas of the outback, a lonesome road sketches a pencil-thin line through southwest Queensland. Burke and Wills camped in this dangerous land, alternately flooded by sudden downpours and swept by stinging sandstorms. To help the party avoid such destructive elements, the Royal Society issued Burke a detailed but flexible itinerary roughed out from knowledge gleaned by earlier, less ambitious explorations. The Royal Society estimated it would take 12 to 18 months to reach the north coast and return. Plentiful stores were packed, but when Burke realized his animals were too burdened for efficient travel, he got rid of supplies that later would be so desperately needed by the explorers.

A modern-day Aborigine guide (**right**) bears a striking resemblance to his counterpart on the Burke-Wills journey, pictured above in a sketch by Ludwig Becker, the expedition's naturalist.





FRANTIC LEAP FOR FREEDOM *ends in a fall for a wild horse eluding a cowboy's lasso at Innamincka station. The 5,500-square-mile ranch is spread along Cooper Creek, halfway point for the Burke-Wills expedition.*

(Continued from page 163) Tyntyndyer, and Murray Downs that had been carved out of the plains in the mid-1840's.

Burke's arrival and auction caused a stir. A backwoods banquet was organized in Thomas Dick's Lower Murray Inn, where Burke hired one of the inn's employees, a former sailor named Charles Gray. On September 11 the party crossed the Murray and proceeded across the plains to John Mackenzie's place at Poon Boon.

THERE IS A BRIDGE at the crossing now, and half a mile south of town, where Burke and Wills camped, stands the Pioneer Settlement, a collection of historic structures gathered from all over Australia and assembled in a village that recaptures the early days. Across the river old Murray Downs homestead preserves the frontier, and the road to Poon Boon winds away northward from the crossing. And, though the steamboats are gone, there are a few who remember them, such as 91-year-old Melina Jager.

"Father was a Norwegian sailor," she told me as we sat in the sunlight of her porch. "He was shipwrecked and somehow made his way to Poon Boon, where he hired on as a hand. But he missed the boats and the water and got a job on the steamboat *Clyde*. Later he managed to get a little boat named *Ruby*. When the river was too low for the *Clyde*, we used the *Ruby*.

"There is nothing nicer than river boating. It may be my age, but people were friendlier then. The stations would give us milk and fish and vegetables. There were no towns to speak of, and any amount of Aborigines. They camped back from the banks and cut wood for a living. That's how we fired the boats. It was a pleasant, good life, the river. It's sad they let the old boats go."

So Swan Hill was home to at least two sailors lost from the sea. The first, sailor Gray, headed north toward destiny with Burke, on a strange inland voyage in which only camels got the ration of rum.

On the map of Australia, the great bow of the Murray and the slanting Darling make a tilted Y—the Darling pointing northward toward the interior. This was long the route of exploration and development. By Burke's day, paddle steamers had pushed up the Darling as far as Menindee, and sheep runs were spreading over the land that once belonged to a people who called themselves the Barkindji. A mean skirmish of gun versus spear accompanied the frontier.

As Burke's column made north toward Balranald, the toll of travel began to tell. Becker's lovely watercolors show the party proceeding in a double column, the camels separated from the horses, which were still terrified at their sight and smell. Human emotions had also divided. Landells and Burke were bickering. The heavy drays and rented carts had fallen behind the column, and expenses mounted as they struggled through heavy sand. By the time the party reached Balranald, it was in disarray.

Balranald was a good place for a row. Just two years before, a newspaper in faraway Sydney referred to Balranald as "this obscure and miserable township. . . ." As if to secure that dubious fame, someone murdered William Graham, proprietor of the hotel, in the following year. His successor, Denis Hannan, opened a ferry that Wills called "wretched."

Joe and I found the place at the foot of Mayall Street where the crossing had been, and the campsite beside the Murrumbidgee River. A block away some men were working on the brick ruin of Cleaver's Balranald Hotel. I asked if they were restoring it.

"In a way, mate," said one. "The shire needs a place to toss the drunks. It's not far from the pub, and the cops can just walk 'em over at closing time.

"There used to be seven pubs in this town. Now it's down to one. Sheep's not good. Wheat's down. We've five hundred youngsters here, and unless the shire hires 'em, it's off to bloody Melbourne or Sydney."

Burke had a few troubles with drunks himself at Balranald. John Drakeford, the cook, became rowdy. The only American, a foreman named Charles Ferguson, left. Burke dumped off more gear—tents, weapons, and—strangely enough in scurvy country—his lime juice. Then he pushed off, still quarreling with Landells about the camels' behavior. The exit is still remembered.

"There was a paddock on the next corner," one of the workmen said, "and when the bloody camels went by, the horses spooked and broke out, and more than one

Phone calls, mail calls, and last calls can all be heard in and around this establishment, which serves as Tibooburra's switchboard and post office; two pubs lie within shouting distance. Postmistress Mavis Jackson answers the phone while her mother, Lena Kelly, fetches mail. Burke and Wills passed near here but had neither time nor inclination to look for the gold that later sparked a rush to New South Wales. Until 1977 the electricity for this isolated village of 150 came from local generators. The connection to a power-line system is proclaimed in a child's painting.

of 'em went brumby and never was found."

It was 160 hard miles from Balranald to Menindee, the horses and camels struggling alternately through heavy mud and blowing sand drifts. The weather turned wild, with thunderstorms and frost. They were nearing the true frontier. Beyond Menindee lay unsettled country, wild tribes, and enormous arid wastes.

One day Beludge, one of the sepoys, rode into camp and announced, "Camels gone! All the *datchi* [females] gone! Datchi plenty no good!" It was five days before they could be found.

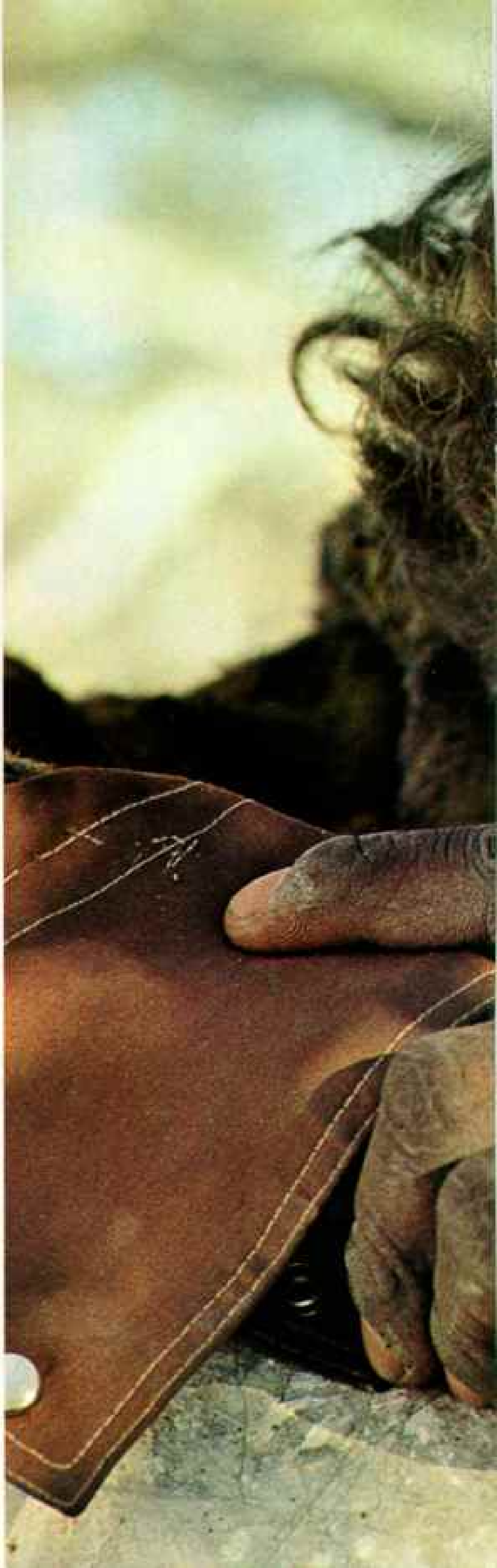
The march was a psychological watershed. When Burke told his two B's that they would have to put science aside and help load the camels, they joined Landells in discontent. Poor Becker, staggering along with a camel rope by day and trying to keep up with his journal and sketches by the campfire, was stepped on and lamed by a horse.

When they finally reached the Darling, Landells objected to Burke's order to swim the animals across, wanting instead to take them over on a barge.

The weary and disputatious party made it across the river (the camels swam) in the vicinity of Kinchega, a huge sheep station barely sketched across the wild northern frontier. It did not take long for the lonely shearers to get into the camels' rum, or for Burke to declare that not another drop would be carried onward, or for Landells to object so violently that he resigned. Dr. Beckler, in sympathy, also quit, but Burke asked him to stay on until a replacement could arrive from Melbourne.

The loss was partially offset by the gain of a new hand, one William Wright, former manager of Kinchega, who said that he knew the way north to the water holes.

At Menindee, six miles north, stood a small store, a small hotel, and two native



The outback's no stranger to Aborigines such as this teenager; his people have roamed Australia for thousands of years. Today many are on reservations. For those in the cities, integration lags and unemployment is staggeringly high. Only in recent years has the government begun a concentrated effort to improve their lot.

gunyahs, houses formed of sticks and covered by bark. The hotel is still there.

Richard Maiden, a man of some girth as befits an Australian publican, commands the bar in the old gingerbread building.

"My father had the place 57 years," he told me. "And his uncle before that. And his grandfather before that, since 1890. Before that, from 1854, it was Paines Hotel. A glass or two has been drunk here."

I asked about Burke and Wills.

"It's still here, same as it was," Richard said. "The room they had. Number 10."

He took a fistful of keys and led me to a small veranda, off which opened several rooms. Unlocking Number 10, we peered in. It was occupied. Had it been a museum, it might have been Burke's swag laying there—boots and blanket, kit and billy.

THE MENINDEE region is remarkable by any standard. In times past, the Darling in flood filled wide shallow lakes that then drained back into the main stream or a parallel course called the Ana Branch. The containment of so much water in such a desolate place provided a haven for numerous tribes and countless waterfowl, emus, kangaroos, and other wildlife. Sheepmen were attracted to the place almost as soon as it was found.

The lakes have now been organized by modern man into the Menindee Lakes Storage Scheme, which holds the floodwaters behind levees and releases them to maintain the flow of the Darling and Murray. The two largest lakes, Menindee and Cawndilla, have been embraced by 12-year-old Kinchega National Park—90,000 acres of water and 110,000 acres of red sand, dry grassland, and black floodplain.

John Eveleigh, the senior ranger, showed me the brick ruin of old Kinchega homestead, standing in a grove of black box near the banks of the Darling. All that is left is the fireplace and a piece of the chimney.

"After Burke and Wills went through," John said, "Kinchega was bought up by H. B. Hughes. The man had foresight. He put together more than a million acres, had two steamboats built in England, sank one of the first bores—you'd say wells—in the outback, and put in a telephone system before the town of Menindee had one. When the park took over in 1967, the land was still in his name. In all, Kinchega ran six million sheep through its shearing stands."

That century of sheep, along with plagues of rabbits and shepherds with guns, took a drastic toll of the once glorious fauna of the district. The numbats, bandicoots, wombats, and wallabies are gone but the big roos thrive (see pages 192-209). Most inland Australians regard them as little more than big and bothersome rats. At Kinchega there are more than 20,000, especially reds.

The lake scheme has proved to be a boon for birds, individuals almost beyond count of 180 species. They include the kookaburra, which points its big bill skyward and waggles its tail while emitting its famous raucous call: koo-hoo-hoo-hoo-hoo-hoo-ha-ha-ha-ha-ha!

Burke and Wills might have heard it as they moved north from Menindee. Burke had decided to push ahead with eight men, 16 camels, and 15 horses with Wright leading the way to water. The other six men, now joined by three recruits from the stations, would form up a depot near Menindee, wait for the supply wagons to catch up, and then follow on promptly.

> "... Mr. Burke told us that from today we had to walk, inch for inch, all the way up to the Gulf. ..." —BECKER

A few days after the advance party moved out, Dr. Beckler located the depot at Pamamaroo Creek, not far north of Menindee. It is a lovely spot where the creek joins the Darling. We camped nearby, under huge stars and with a cold wind blowing. Orion was as brilliant as a battery of searchlights.

Burke has been much criticized for dividing his party, but at the rate they were going, they would not have made it to Cooper Creek. Earlier explorers like Charles Sturt (map, page 161) had established the virtue of light, fast exploring parties operating from base camps. And with Burke, I felt that night, there was something more, something in his prophetic Galway soul that was

called out by those luminous stars, lured on across the abomination and the desolation toward a fate that had been prepared.

Between Menindee and that marvel called the Cooper lie four hundred miles of mulga and saltbush plains. This is a land that moves in secret ways and holds secret places, like the chambered valleys of Mootwingee.

Here the plains are broken by the soft contour of the Bynguano Range, in which lie hidden the sweet vales and rock art galleries of the Wilyakali tribe.

From the time of Wills, who made note of "a romantic gorge," no visitor of my knowledge has failed to remark on the haunting mood of Mootwingee. A pebbled ravine leads through the soft light of leathery-leafed beefwood, mulga, and massed pine to a dark, wind-riffled water hole held in a chalice of warm rock, where creep the painted dragon and beaded gecko.

There is silence and a sense of great age as the path winds upward toward a high amphitheater of red rock. Directly ahead rises a huge orange wall, and overhanging it a massive roof of sandstone. On the back wall of this tremendous porch, looking pitifully small, are the ochre-colored paintings of the Aborigines, made in what deep of time no man knows. A long snake, trimmed in white, wriggles forth from the dreamtime when the ancestors made all things. But mostly it is hands—outlined there by blowing a mouthful of pigment onto a hand held against the wall (pages 158-9).

Ross Johnston, the ranger who superintended this national historic site, told me that one explanation for the hands had been ascribed to an old man in Arnhem Land.

"He said they were memorials to death," Ross told me, "a place where the relatives could come and remember and mourn. Something like little painted tombstones."

BURKE'S PARTY made north past the swelling of hills of the Noonthorangee Range to the reliable water of Torowoto Swamp. Here Burke sent Wright back to Menindee with instructions to "follow me up with the remainder of the camels. . . ." He sent along with Wright a letter to the exploration committee accepting Dr. Beckler's resignation and asking that Wright be confirmed as third officer. Wills had been appointed second in command. Burke also struck off a note to his uncle in Ireland, venting his true feelings about Landells and Beckler, who "resigned . . . from *sheer cowardice* when they saw that I was determined to go on. . . ."

He then lined up his worn troops and asked if any wanted to return with Wright. To a man they stood committed to the venture and the dangers ahead.

IT WAS WELL AFTER DARK when we rolled into Tibooburra, the one-street metropolis of this part of the inland. It resembled a U. S. cow town of the 1880's—low wooden buildings with metal roofs and porches, a few trees along the road, a donkey named Nancy kicking her heels at a yapping dog.

The hamlet is now a way-stop for the huge, roaring "road trains" that carry the stock from station to market, powerful diesels that tow behind them massive trailers called "dogs," crammed with lowing cows or bleating sheep.

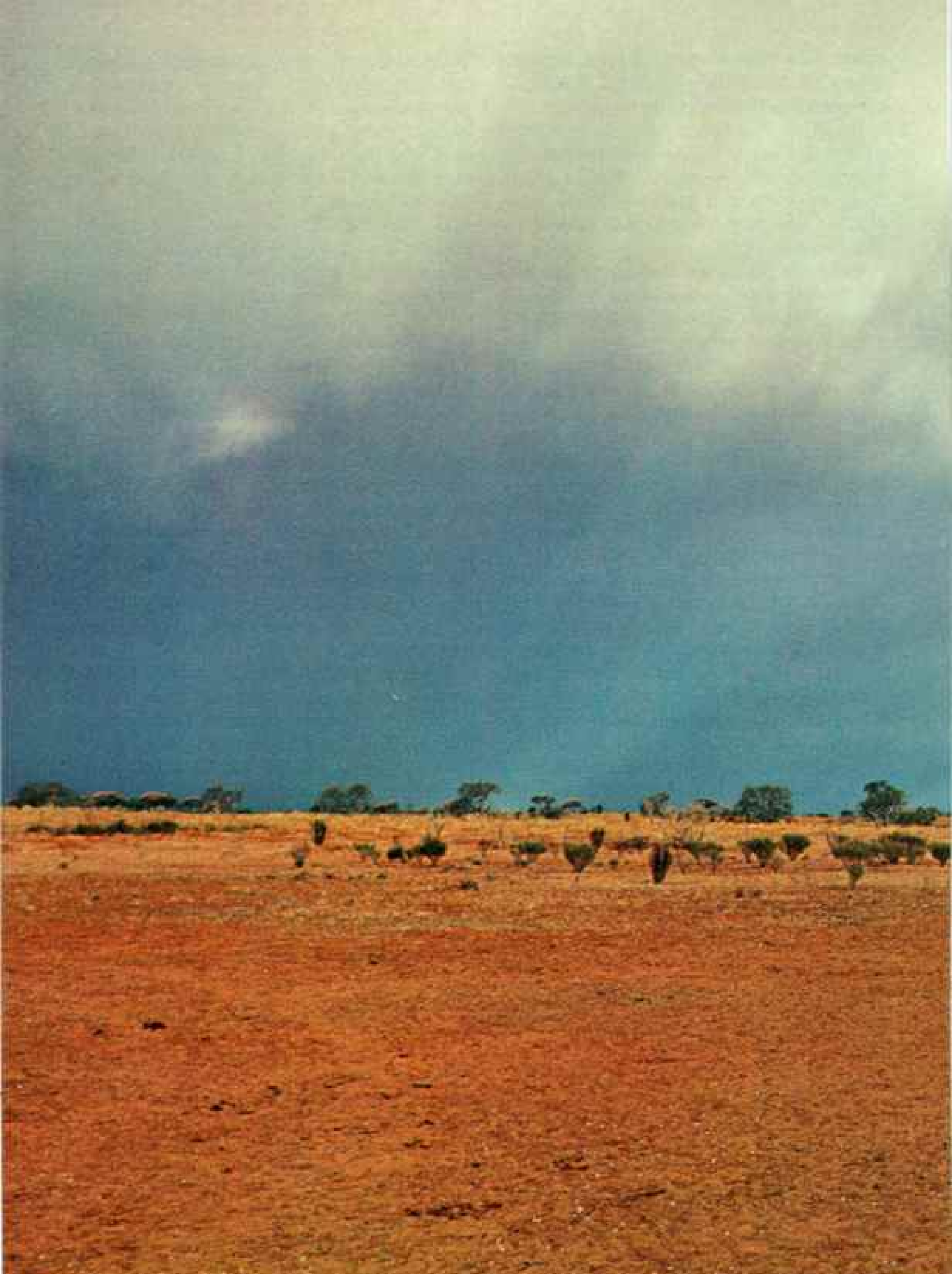
It wasn't like that when "Joss" O'Connor Davie's father came into the inland. He drove bullock teams. Joss and her husband, Barney, lead a more sedentary life as proprietors of the Family Hotel, across the street from the Tibooburra Hotel. There is considerable walking back and forth by residents and visitors during the course of an evening.

The pub at the Family Hotel included three young sheepshearers and an aged stockman with a face like the Stony Desert. I asked the veteran about overgrazing, and he nodded his head in hearty agreement.

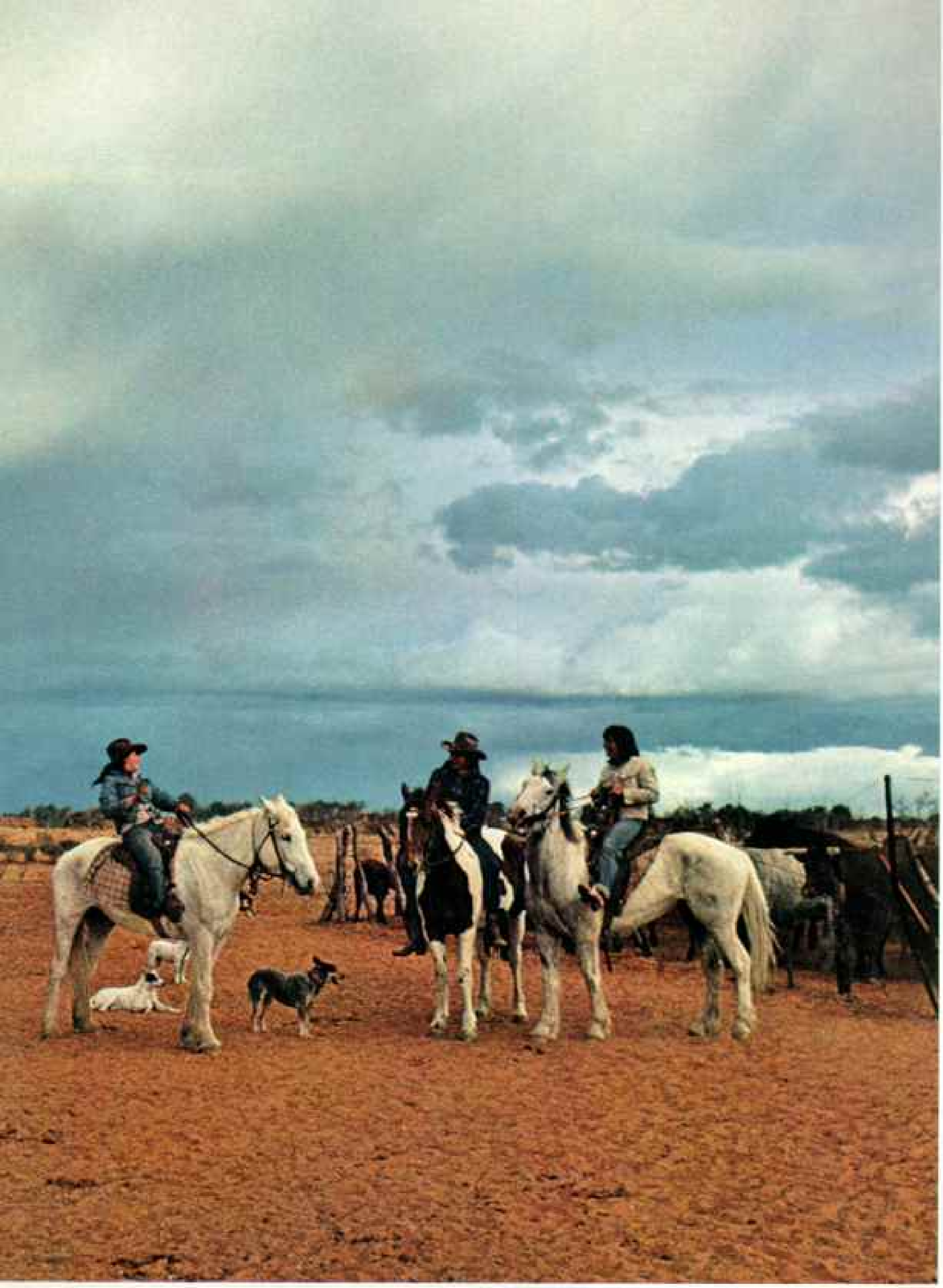
"And overstocking both," he said. "But who can afford to sell in a down market? And who knows when a long summer is a drought? Last year in Victoria they were getting fifty cents a ewe. They were shooting cattle and sheep, my oath."

He took a long swig of West End Export, one of Australia's magnificent local beers.

"In this country sheep work in pairs, you see, mate? One turns over the bloody stone, and the other licks the moss from off the bottom. It's stony downs, bluebush and saltbush, and summer storm water. It takes 35 acres to feed a *(Continued on page 178)*



High spirits beneath a lowering sky, two "jillaroos," as cowgirls are known.

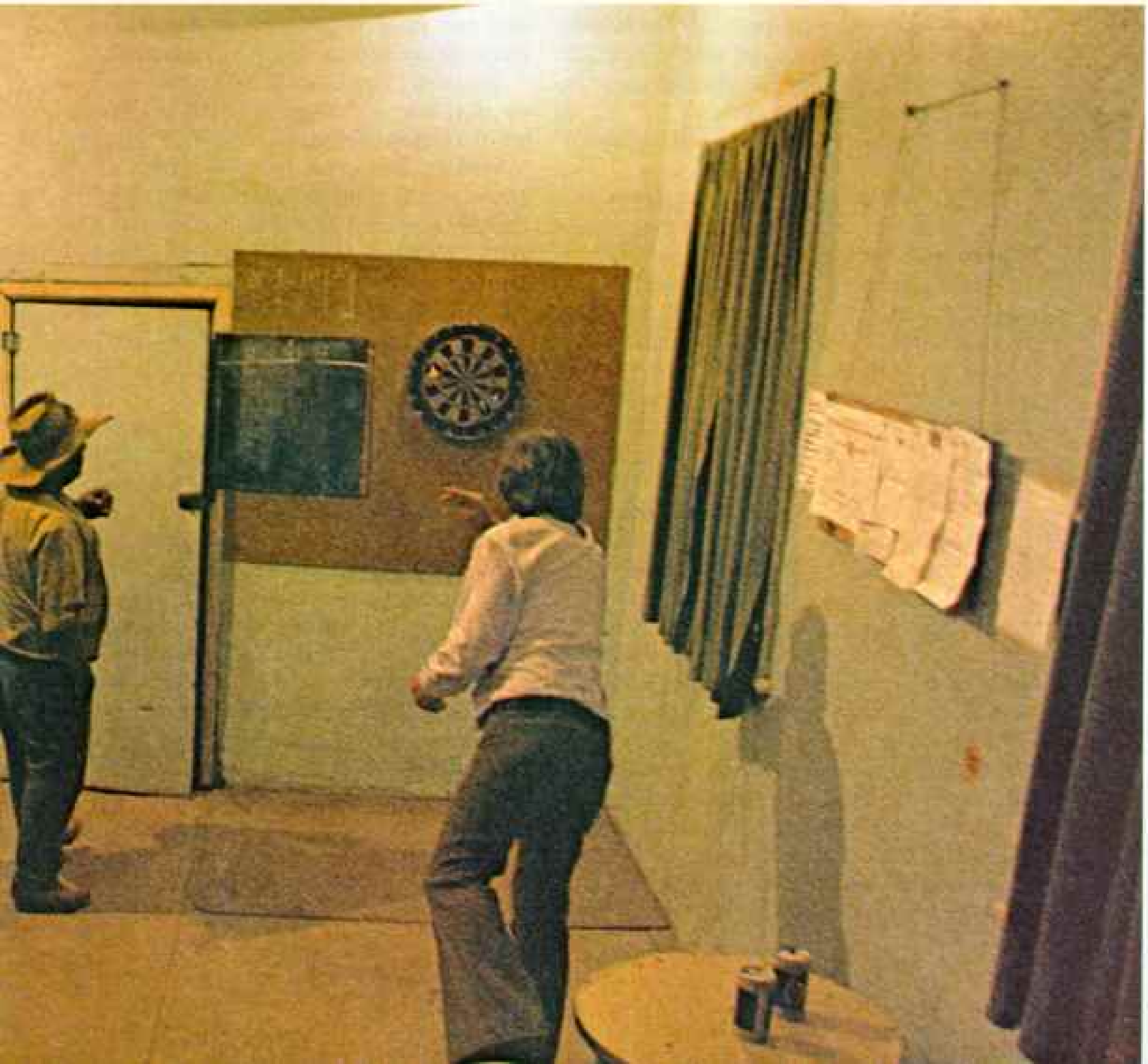


flank a "ringer," their male counterpart, as they trade banter at Epsilon station.

Arid aerie for migratory flocks of the human species, Birdsville bakes away in the treeless waste north of the Sturt Stony Desert, another roosting spot for the Burke-Wills party. The town got its name from the droves of birds that flocked there whenever torrential rains turned the countryside into a lake. Such downpours are an accepted if unpleasant fact of life in the burg of 70 souls, which is periodically marooned by floods.

Regardless of whether the birds show up, the skies over Birdsville darken each year with dozens of airplanes that swoop in for the annual horse races on a nearby track. Since the eight-room hotel quickly fills up, the overflow camps out. After the crowd roars away, life in Birdsville resumes its normal pace, which includes dropping down to the hotel where owner Raymond "Taffy" Nicholls oversees the bar as some of the boys from a nearby ranch play darts (**right**). Birdsville actually capitalizes on its desolate location and hick name: Some visitors fly in only to have a drink at the bar, just to be able to say they've done it.


HOTEL



(Continued from page 173) single sheep. The old people are ready to sell off, and the young ones aren't interested. Most of 'em aren't worth a spit anyway. You can't muster a bloody mob of sheep on a bloody motorbike."

The three young men standing at the bar did not take him up on it. They kept flipping coins—three toss until odd man wins. The tall, black-haired one, Jim Conroy, had a decided brogue.

"We sheared 150 sheep today," he said, "and the manager swore they paid for the operation of the whole station. Good wool and a good price. Don't cry your eyes out for the capitalists."

He took a long look at me over the rim of his glass. "What are you, a bloody pommy?" If there is one antipathy shared throughout the inland and in the country generally, it is toward the pommies, the English.

"No, an American."

"The bloody Americans," said his friend, a short, dark-bearded man with very thick glasses, "led us to the bloody slaughter in Viet Nam. Like the sheep here."

"He's a glass eye from Nam," Conroy said.

"He didn't get it from counting sheep if he says 150 pays a station," the old man interrupted from the corner.

"No more than a few kegs of uranium will pay out Australia either, mate," said the third shearer. "The thing is, we don't want bloody plutonium buggering up the world, and we don't want the bloody capitalists turning the world into New York City."

"'Ow about New York, matey?" said the third one. "'Ow about New York!"

"'Ow about bloody England sending all its left-wing labor leaders down here to bugger up the country?" said the old man.

"Well, if the bloody American beef lobby hadn't shut Australian beef out of the country, we wouldn't look to bloody uranium to save us now, would we?" said the tall one.

"I'll shout you a beer on that one, mate," said the old man.

I told Conroy I was on the track of another Irishman, named Burke—from Galway.

"Galway is it? Poor as church mice then. He should have learned to shear."

Around midnight the three shearers disappeared in a cloud of dust toward their camp, some sixty miles out, leaving the shadows of Belfast and Saigon behind for the incandescent stars of the outback.

ALL NORTHBOUND TRACKS lead eventually to one of the gates through the dingo-proof fence that marks the Queensland-New South Wales border, a fence that effectively separates sheep from cattle country by keeping most wild dogs to the north.

The Burke party crossed the border at Caryapundy Swamp and marched out the days of late October and early November 1860 on a track that took them through the Bulloo Lake country. They were very fortunate. The lakes can be either burning salt pans or sheets of rainwater. They found the latter, and a company of sixty or so "black fellows" camped along the shore.

All the wide country along the Cooper is the bottom of a vanished sea, endless tan and red sand ridges crossed by thin dirt tracks that show the way to homesteads.

We found Epsilon station toward dark, a comfortable metal-roofed house in the center of a little town of sheds and bunkhouses.

Harold Betts came out to greet us—a calm, steady man with weathered features and direct eyes. The Bettses came out to Epsilon twenty years ago. "There was drought all the time," Harold recalled. "We sank a 1,300-foot bore, and it came up dry. We had a real battle, but we beat it. There are risky variables in this business. Drought. Fire. Flood. The cattle market."

"It's water in the house during flood and sand in the house during drought," Joan Betts added. We sat around the table while she prepared a mutton dinner.

"If you can get four inches of rain in the wintertime, it will fatten things up," Harold said. "From 1960 to 1967 we had very little rain. Then, in 1974, we got 42 inches, and it flooded everything. It was three months before we could get a truck out, and seven months before we could move stock.

"This year we got burned out in November and again in February. It started by lightning, a big fire that burned all the way from the Tune Gate to the Cooper."

To contend with nature on that scale requires room, and Epsilon spreads over 650 square miles of sandy, often stony expanse

where run 4,000 cattle. The station keeps 80 horses. Six bores, drilled to warm artesian water at 900 feet, help fend off drought.

All the stations in the Cooper country try to get a jump on the Adelaide market by selling off their Herefords and Shorthorns in the winter months, when prices are good and cold weather in the south retards the feed and fattening of cattle. If the season is good, they succeed. If it turns up no rain and no feed, they have to sell in the spring, in a glutted market, and take a loss.

To help with the muster, or roundup, of the wandering cattle, Harold had hired a "jillaroo," or cowgirl, Katie Coates.

"During muster," Katie said, "we do 40 to 50 miles, one horse, daylight to daylight. A lot of stations are using trail bikes now, and the big ones use airplanes."

"... I am satisfied that the frame of man never was more severely taxed." —BURKE

"It's not an easy life," Harold said. "Most kids aren't interested anymore, and the rest are on welfare."

"There's a movie in Tibooburra on Saturday night," Katie said.

"It had better be a jolly good movie," Joan said, thinking of the 120 miles to "town."

The isolation is relieved somewhat by the "galah session," named after the ubiquitous parrot, a time each day for station wives to chat over the Flying Doctor Service radio.

"Still," Harold added, as though afraid I might get the wrong idea, "a man can do well up here. We don't know if the world's been blown up or not, and that's a blessing. Out here you have the feeling of being free. Even though you're not, you think you are."

As our vehicle broke through the last of the red dune country, an immense depression opened before us, a vast landscape of gibber desert, seemingly charred from age, but in the far distance a softness of gray green that spoke of water: the Cooper, that oasis so mystical in its atmosphere, so moving in its beauty.

What is described by the term is not simply an intermittent stream of marginal dimension, but a natural phenomenon of immense size and extent, one of the miracles of nature, the breathing lungs and beating heart of the Australian outback. This miracle of the Cooper resembles the miracle of human life, moving in a vast rhythm of denial and fulfillment, of death and rebirth.

Rising in the Great Dividing Range of eastern Queensland, the Cooper's waters flow for more than eight hundred miles. Slowly, from a billion rivulets and gullies, the waters ease their way westward and southward, giving birth to rivers named Barcoo and Thomson, which tie their myriad waters together into the Cooper. During flood, its braided channels swell to a sheet of water thirty miles across.

Gently but irresistibly the sweet waters move westward toward the burning sand and rock wasteland of the interior. Their course is marked by interlaced channels, water holes and lagoons, lakes and swamps, and by the deep, sandy beds of creeks shadowed and bordered by magnificent red gum and coolibah trees.

The relentless pressure for grazing land pushed pioneers into the arid middle of the continent within a decade of Burke's trek. About 1870 young John Conrick led a mob of sheep all the way from Victoria to the Cooper and founded Nappa Merry station on eight hundred square miles. Another station nearby, Innamincka, would eventually encompass 13,000 square miles to the west. A small town was laid out near Innamincka, at a crossing of the Cooper. It finally expired about twenty years ago.

Now the tiny settlement is having an apotheosis. Long gone are the mission hospital, closed in 1951, and the police station and the famed pub with its even more famed mini-mountain of empty beer bottles. Yet up the track a bit stands a new four-room hotel, swanky by bush standards, with a pub and general store. An airstrip has been leveled on a hill not far away, and the old cattle drovers' stop has new life as a tourist center.

BURKE'S PARTY STRUCK the Wilson branch of the Cooper on November 11, and welcomed the countless corellas screaming in the trees and the crooked old coolibahs gesturing with

ancient limbs over the deep, still waters.

At their first camp a plague of rats descended on them, forcing a move downstream to the site of famous Camp 65, a scenic place near a gorgeous water hole.

After futile probes northward, during one of which three camels ran away and Wills and McDonough had to make a forced march of 48 hours, Burke decided to split the party again, take Wills, King, and Gray and make a dash north across half the continent.

He named William Brahe commander of the tiny depot and instructed him to build a stockade against the blacks and wait for his return. But how long should Brahe wait?

He later recalled his final conversation with Burke, in which he was told to wait for three months or until his supplies ran out and then to head back for the Darling. Burke was confident that Wright would be along in a few days with the rest of the party; he had no reason to think otherwise.

At daybreak on Sunday, December 16, Burke led them out. We can imagine him and Wills walking ahead to take compass bearings, followed by Gray leading Burke's horse, Billy, and King with six camels. Brahe rode along for a day. Patton, McDonough, and the sepoy Dost Mahomet stayed behind to begin building a timber fort.

Soon the travelers encountered a large group of blackfellows "pestering us to go to their camp and have a dance . . . nothing but the threat to shoot them will keep them away." After tracing the Cooper westward, past the glorious water holes of Callamurra and Mulkonbar, they turned northwest by west, toward that "iron region" known as the Sturt Stony Desert.

They were lucky in that year of 1860. The Coongie Lake district through which they passed had been blessed with rain, and the claypans had filled. They met a large party of blackfellows who gave them fish, and celebrated Christmas near "a splendid water hole." In four days they were through that dreaded region and dead on the Diamantina River, which took them north.

TODAY THE TRACK NORTH skirts and crosses dunes as solemn and vivid as those on a Christmas card toward a plain enormous even by outback standards and rimmed by marvelous mirages like blowing blue flame. In the center stands Cordillo Downs, one of the most remote of inhabited places.

We received permission from manager John Perry and his pretty wife, Lee, to camp beside the station water hole. Thousands of corellas festooned the trees like confetti and set up a thunderous squawking. Eastward, a huge white moon cleared the horizon in two minutes, so large and clear we thought we could see mountains. Against its stage-like illumination, a long line of stately pelicans moved in flotilla, coming from some secret place in the depths of the desert, proceeding in this blue-white hour to another.

A similar scene could have greeted the Burke party as it finally emerged from the Stony Desert and found that "magnificent creek," the Diamantina. Following it north, they camped near today's hamlet of Birdsville—"population a hundred, counting dogs, and seventy without," as Raymond "Taffy" Nicholls put it.

Taffy the Welshman runs the Birdsville Hotel and its pub (pages 176-7).

"But don't let it fool you," he went on as we stood in the shade of the pub, "plenty goes on here. Saturday nights the ringers come in to play darts. And there's always tourists coming through now."

Tourists? In Birdsville?

No sooner had the question been put than a plane descended from the wide, empty sky and four large people wearing big hats marched into the pub.

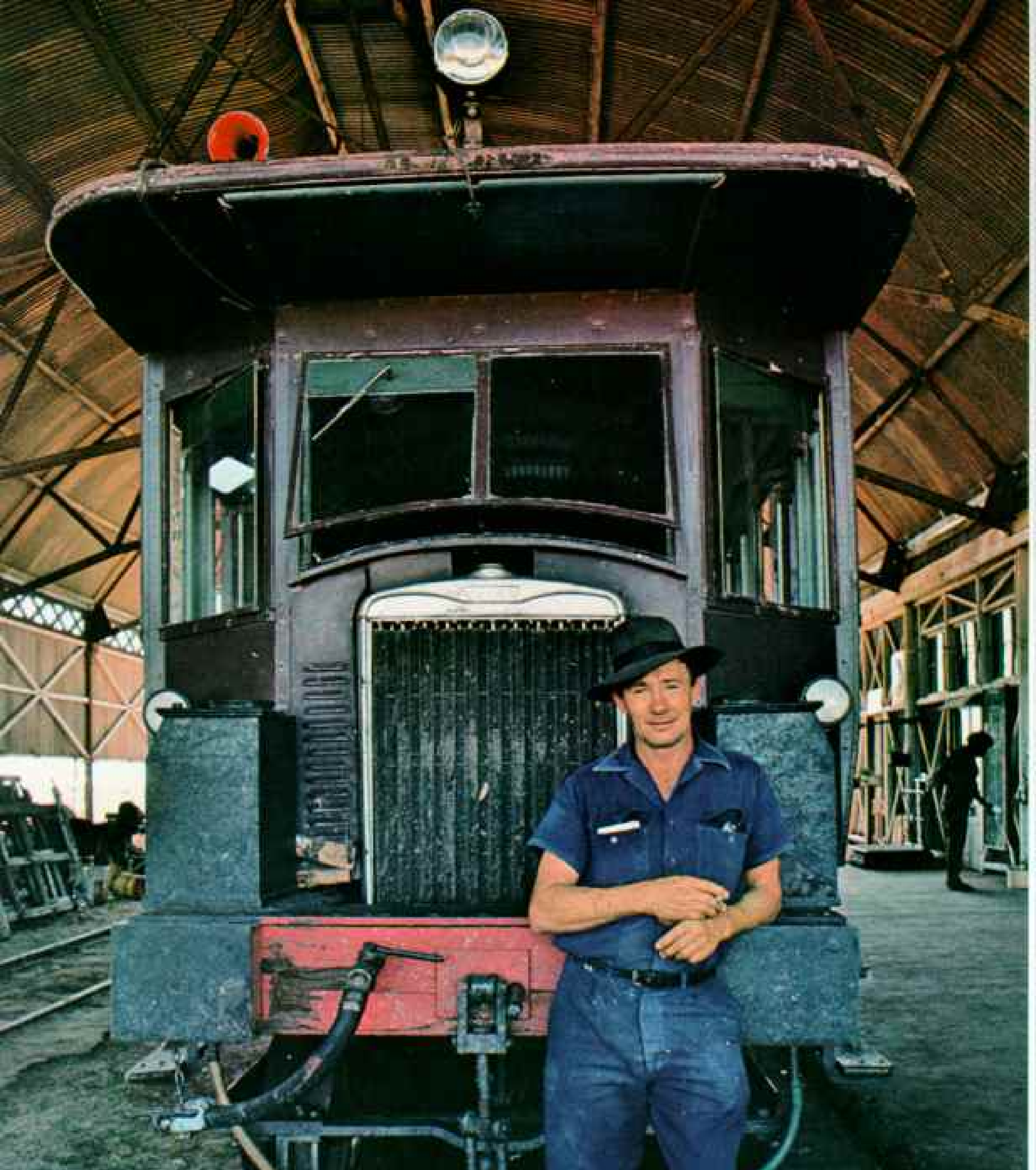
" 'Ow's it goin', mate?" said the first one. "So this is it, the bloody Birdsville pub!"

I asked him why he had come all the miles from wherever he had come.

"Why, to say I've been here, why else!"

Later I asked Bill Brook, known as "Brookie," what the attraction was. A short, strong, sandy-haired man with a forceful

If you don't like the service, you'll know who to complain to. Charles Honey served as stationmaster, conductor, and engineer on the Normanton Railway. The train connects Croydon with Normanton on the edge of the swamp whose thick forest and treacherous terrain hindered Burke and Wills in their effort to reach the Gulf of Carpentaria.



No Grand Central Station, but the train depot at Normanton is kept operating by citizen pressure, even though the railway runs at a loss absorbed by the Queensland Government. At 8:30 each Wednesday morning, the one-car passenger train leaves Normanton for the four-hour trip to Croydon, where it stays overnight, returning at 12:30 p.m. Thursday. After such a trip Honey catches up on paperwork in his office (**below, right**). On the station billboard, torn and faded public-education bulletins share space with wanted-for-murder posters (**below**).

good humor, Brookie displayed mock astonishment and a broad, freckled grin: "I'm buggered up if I know! They say, 'If you haven't been to Birdsville, you haven't been anywhere.' But when you've been here, where've you been?"

Brookie owns the station west of the town, and for all his present good humor he has known Birdsville when no tourist would want to visit.

"When I was a new chum, back in the twenties, it seemed there was a bloody dust storm every day. You couldn't see across the road for days on end, and you couldn't see five feet for hours at a stretch. In the morning you had to dig your swag out and find your horses by tying copper bells on them. More dinnertimes than dinners, my oath."

> "Both camels are dead, and our provisions are done." —WILLS

It rained scarcely at all in the Centre during the 1920's. Author Ernestine Hill, en route to Birdsville, recorded a haunting vignette: "Three hundred cattle were grouped about the borehead, in horribly lifelike attitudes, except that the eye-sockets were empty. They had been dead for three years. . . . Hides and horns were mummified in that dry air."

A friend of Brookie's, Eleanor Morton, recalls in her memoirs that her daughter Eleanor was 8 years old before she saw a drop of rain, and when the first drops fell as the terrible drought broke, her frightened children came running into the homestead, crying: "The water-hole is falling down."

Could it happen again?

"I've been expecting a drought every year," Brookie said. "I don't know when we've had so many good years. We've been too bloody lucky."

North of Birdsville the big plains rolled away beneath our wheels to absolutely clean horizons, stunning the mind with harsh emptiness. Burke, Wills, King, and Gray spent two weeks covering the ground, welcoming the New Year of 1861 at their 80th camp, just southeast of a big claypan now called Lake Machattie, and arriving square on the Tropic of Capricorn on January 7, in the maze of the lower Hamilton River.

Wills's notebook has a singing of life in these January days, mentions of pigeons and ducks and a lonely bustard. But the reality of the long walk was beginning to take its toll. On January 5 Burke had made one of the few notes he ever made in his little notebook: ". . . I am satisfied that the frame of man never was more severely taxed."

And what a feat of endurance it was. With Wills plotting the positions, they moved north up the 140th degree of longitude, from the 25th degree of latitude to the 22nd—an invisible line on the earth that they followed tenaciously, moving 12 hours and more each day in a steady, grinding rhythm. They must have seemed like men in a dream.

As January wore on, they entered rising land that Burke named the Standish Ranges after a friend. Ahead waited the higher Selwyn Range, real hills of 1,000 feet and more. When they ascended a high point, perhaps Signal Hill, and looked north to the Selwyns, Burke decided to "go straight at the ranges," though the camels were "sweating and groaning" in this high, hard country.

We have negative evidence of the toll being taken of man and beast on this remarkable forced march. Wills's diary begins to sputter and fade—seven days one week, two the following, then one, then two . . . but the camps kept ticking off sunset after sunset: 101, 102, 103, 104, 105. . . .

REST. Evening in the great space of sky and horizon that is Australia's Centre, an ocean of land moving to a ceaseless rhythm of life and death. A flight of white corellas thrown like a veil across the moon. A big red kangaroo, suddenly alert, bounds into a shadow and disappears. Silence—the silence of 100-million-year-old rocks, and water as still as a magic mirror.

In this drama this is the frame and the atmosphere of it, the silence and the age of the great earth that surrounds it. One thinks of the lonely outpost at Camp 65 on the Cooper and the four men imprisoned by duty and circumstance. They are firm and patient, each day scanning the horizon, skirmishing occasionally with the blacks, waiting.

One wonders, too, what Burke would

have done if he knew that Wright and the camels and the supplies were only now leaving faraway Menindee. They had been camped there at the Pamamaroo, on the other edge of the beyond, for nearly three months, waiting for one thing and the other: Wright's official appointment as third in command, the horses to return from a wild-goose chase after Burke by a messenger sent from Melbourne. They stood at the edge, uncertain, perhaps unwilling, but not moving. Sleeping under the same great moon, in the same silence, subject to the same ceaseless rhythm of life and death.

Despite the camels' fear, the exploring party made its way through the rough red hills of the Selwyn Range, eventually picking up a major stream that Burke named the Cloncurry after a noble relation in Ireland.

They walked not far from ground that would one day yield riches and controversy over a mineral they had never heard of, and the use of which would have staggered their minds—uranium.

The Mary Kathleen Mine, Australia's only working uranium deposit, started up in 1975 after a downtime of 11 years, and the arguments started up with it.

Denis McMahon, the mine manager, admitted he was in "a hell of a political ball game" when Joe and I called on him. Australia's leftist labor unions had allied with environmentalists to protest the production and export of uranium. The government position that the world needs power and the country sorely needed exports was countered by the claim that uranium makes bombs that can blow away mankind.

It certainly did not look that way. It looked like black talcum powder, put up in red steel barrels with white lettering—RADIOACTIVE MATERIALS—that were selling for about $20,000 a barrel.

We went on into Cloncurry, arriving on a bright Saturday morning, and found Texas. The Merry Muster Rodeo was on—a joint loosener for the Mount Isa Rodeo, Australia's largest, that follows in a week's time.

We hung on the fence at the fair grounds and watched bulldogging, calf roping, bronco busting, and dirt eating.

That night the Bushman's Ball turned out most of the residents of the Cloncurry District. It was just a country dance, with young kids sliding on the floor wax and older couples whirling, until the band played a piece of music full of the blue smoke of history and the congregation formed into the spokes of a wheel, each dancer with arms linked over the shoulders of the dancers on either side. The wheel revolved slowly, in stately fashion, stopped, moved slowly backward, flowed forward again. Of all of the lost things of the frontier, this dance had survived. For a moment they were all one people again, arms linked, moving in a graceful circle, old and young. They seemed so far from home. The tune is called "Pride of Erin," and the Lord only knows the places it has been danced to on this planet.

NORTH OF CLONCURRY, the four men of Burke's party were in the tropics, with its teeming rains and suffocating heat. And a strange enough land it is. We passed through a swarm of locusts with a pillar of wheeling hawks over it. Along the road were carcasses of dead steers, bursting with decomposition. And everywhere the white ant, a termite, has built its conical cities, giving the whole region the look of a strange graveyard.

We know nothing of the climactic week of Burke's journey except for the title of Wills's otherwise blank book:

Field Book №8
Cooper's Creek to Carpentaria
Camp CXII to camp CXIX
Southern Latitude 19¼ to 17.53 minutes
Lower part of Cloncurry.

At the last camp, 119, the water was salt and tidal flow was evident. Burke and Wills pushed on alone with the horse Billy, who quickly became mired in mud. They had to dig out a bank and push him into a creek to free him. Then they followed a path, came upon natives who fled, found others who pointed seaward, and eventually, on February 11, 1861, could go no farther. They had reached the Gulf of Carpentaria. But they were denied that most cherished sight, sunlight glinting on the waters. Burke's scant notebook says: ". . . we could not obtain a view of the open ocean, although we made every endeavour to do so."

It seems obvious they were turned back, at the last possible moment, by the wall of

mangroves that line the tidal rivers in this hot, swampy region.

No matter. They had made it. They had become the first to cross the Australian Continent. Six months and 1,650 miles out of Melbourne. Now all they had to do was get back, on four weeks' rations.

Through some miracle of perseverance, Wills kept his journal going during the long return. One by one they killed and ate all but two of the camels as the long days of February and March took them south, worn, haggard, dazed with exhaustion. The thought of reaching the depot on the Cooper kept them going, but Gray was complaining now of being ill and too weak to go on. The others thought he was shamming.

THE SUN of April 17, 1861, as it has for countless eons, paints crimson the red dunes of the Stony Desert, polishes the water holes down to a hard shine, burns like a great mulga fire in the crystal air. Three pathetic figures are digging out a shallow grave in a polygonum swamp near Coongie Lake. Gray had died at sunrise. He had not been faking after all. So exhausted are the men, despite having jerked and eaten the flesh of the brave horse Billy a week before, that it takes all day to excavate the grave. But they are only 70 miles from the Cooper. . . .

On the stony hills above the Cooper a lone horseman, William Brahe, shades his eyes and searches the horizon, north and west for four tiny figures to emerge from the shimmering waste, south and east for signs of a larger party of horses and camels. Each day for 120 dawns he has searched one horizon or the other, and each day only heat and emptiness have greeted him. Patton had collapsed two weeks before and now lay dying of scurvy, his gums too swollen to eat, and his lamentations clawing at Brahe's mind. He has already waited a month beyond the appointed time, and now he decides to abandon the depot. He rides back and gives orders to McDonough and Dost Mahomet to begin packing. . . .

Farther to the southeast by 110 miles, at Bulloo, the relief column is huddled in a miserable camp, pinned down by sickness and hostile blacks. It had taken them an incredible 68 days to reach Bulloo from Menindee (Burke went 110 miles farther in 23 days), with horses dying of exhaustion and men now too weak to move. Within 12 days the stockmen Stone and Purcell and the artist Becker will be dead; meantime there will be a nasty fight with the Bulloo tribes. . . .

Where Brahe's fort stood, on the bank of a mirrorlike water hole of the Cooper, is altogether the most serene place I have ever seen. We arrived in the golden light of evening after fording the creek, and we camped in the shade of the Dig Tree, a magnificent coolibah with widespread arms. Galahs spoke ceaselessly from the trees. Graceful herons and egrets posed on the molten water, beneath the pure silver hemisphere of a brightening moon.

With dark, the corellas set up their deafening roar as they swept in swirling clouds of white toward our sparkling fire. We sat by our steaming billy, thinking and talking of the men who had waited so long here, and of those who arrived.

By midmorning of April 21, 1861, the dying Patton had been strapped to a camel and the supplies loaded. On the wild chance that Burke might someday show up, Brahe buried a cache of dried meat, flour, sugar, oatmeal, and rice, along with a note in a bottle, and marked the place by carving on a coolibah tree the most famous notation in the history of Australian exploration:

DIG
3 FT
NW

He then led his small party out, moving slowly up the creek, making only 14 miles before camping under a brilliant moon.

By that same moonlight, and some nine hours after Brahe had left, Burke, Wills, and King staggered into the depot after an absence of 126 days from the Cooper, and an absence of eight months from Melbourne, having covered a distance of some 2,400 miles. Now they had come up short of enduring triumph and survival by 9½ hours and 14 miles.

So cruel has this seemed to almost everyone that artists have painted and writers have written about the scene as though to somehow correct it, to exorcise the injustice.

But it will not be exorcised. It will remain what it is: 9½ hours late, 14 miles short.

Brahe continued up the Cooper and

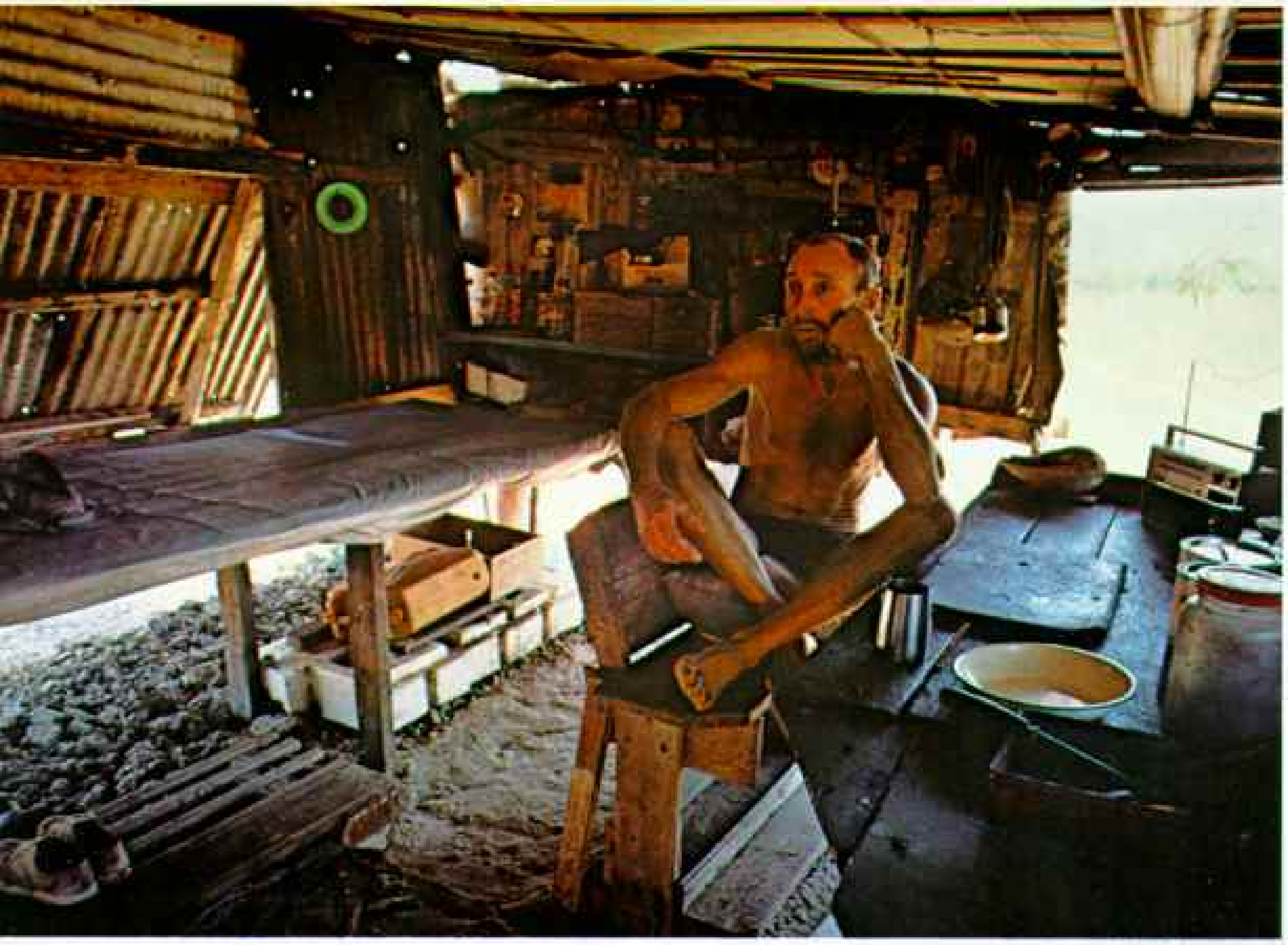
southeast across the hard country to Bulloo, where one dawn he surprised Wright's men, who had just fought off an attack. While the combined party rested, Brahe and Wright took three fit horses and made a dash back to the Cooper, on the remote chance that Burke had arrived. This was a considerable act of bravery. Burke had indeed arrived, dug up the cache—and left. But the two weary riders did not notice the few signs of his visit, and turned back to Bulloo. Then the survivors withdrew toward Menindee, leaving behind the graves of Stone, Purcell, and Becker. In early June, Patton also died.

When Brahe told his story in Melbourne, search parties were organized from all parts of Australia, and soon the bush was alive with them, from the north, south, and east.

AFTER their staggering disappointment upon digging up the cache and reading Brahe's note, written that very morning, Burke, Wills, and King regathered their spirits and decided to make for Mount Hopeless, far to the southwest of the Cooper, where they might pick up the settled districts. They concluded they could never catch Brahe.

For a month they tried to find a way out of the Cooper and across the desert. One camel became bogged in the Cooper mud and had to be shot, and then the other gave out completely and met the same fate. Packing supplies on their backs, they tried a hard, forced march but after 45 miles gave it up and retreated to the creek.

So the days dwindled down, and the men,



"**Corned Beef Freddie**" gives only that for a name. He allows even less about his past. Subsisting on a diet heavy on kangaroo and crocodile, Freddie lives alone in a shanty near the Gulf of Carpentaria, close to the area where Burke, Wills, King, and Gray camped before beginning the return trip toward Melbourne.

A final—and impenetrable—obstacle confronted the exhausted Burke and Wills party: swampy land and dense mangrove forest standing between them and

the Gulf of Carpentaria. Since the water was tidal and tasted brackish, the explorers, satisfied that they had reached the coast, turned and headed for home.

PAINTING BY M. SCOTT, LA TROBE COLLECTION, STATE LIBRARY OF VICTORIA

The ultimate price for their achievement was paid by Burke and Wills. When Gray died on the way back from the gulf, Burke, Wills, and King spent all day digging a grave. Exhausted and emaciated, the three arrived at the expedition's Cooper Creek camp only to find it had been abandoned 9½ hours earlier. Burke and Wills both died of malnutrition after two months of searching in vain for a way out. Here the body of Wills is discovered by Aborigines (**left**), who later befriended King. Today the visage of Burke stares out from an 1898 carving on a tree at Cooper Creek (**right**).

imprisoned on the creek, felt themselves fading from life. The natives taught them how to make cakes out of nardoo fern and gave them an occasional fish. But Burke at one point drove the blacks off with a gun when he caught them stealing what little the party had left.

Wills was the first to give out. Realizing that he could not go on, he asked Burke and King to leave him in a deserted gunyah. There he wrote a letter to his father:

"We are on the point of starvation. . . . We . . . made a most successful trip to Carpentaria and back, where we had every right to consider ourselves safe. . . . We got back here . . . and found the party had left. . . ."

ON JUNE 29 Burke and King left the dying Wills and started up the creek to search for the blacks, with whom their salvation now lay. After two days Burke collapsed. He, too, had jotted a final note: "I hope we shall be done justice to. We have fulfilled our task, but we were (aban. . .) not followed up. . . ."

Knowing that King was too weak to dig a grave, Burke asked to be left lying on the ground with a pistol in his hand, and so he died on the morning of July 1.

King went on to live with the tribes. On September 15, in a pitiful and dying condition, he was found by a rescue party.

"Who in the name of wonder are you?" asked the man who found him.

"I am King, sir," he replied.

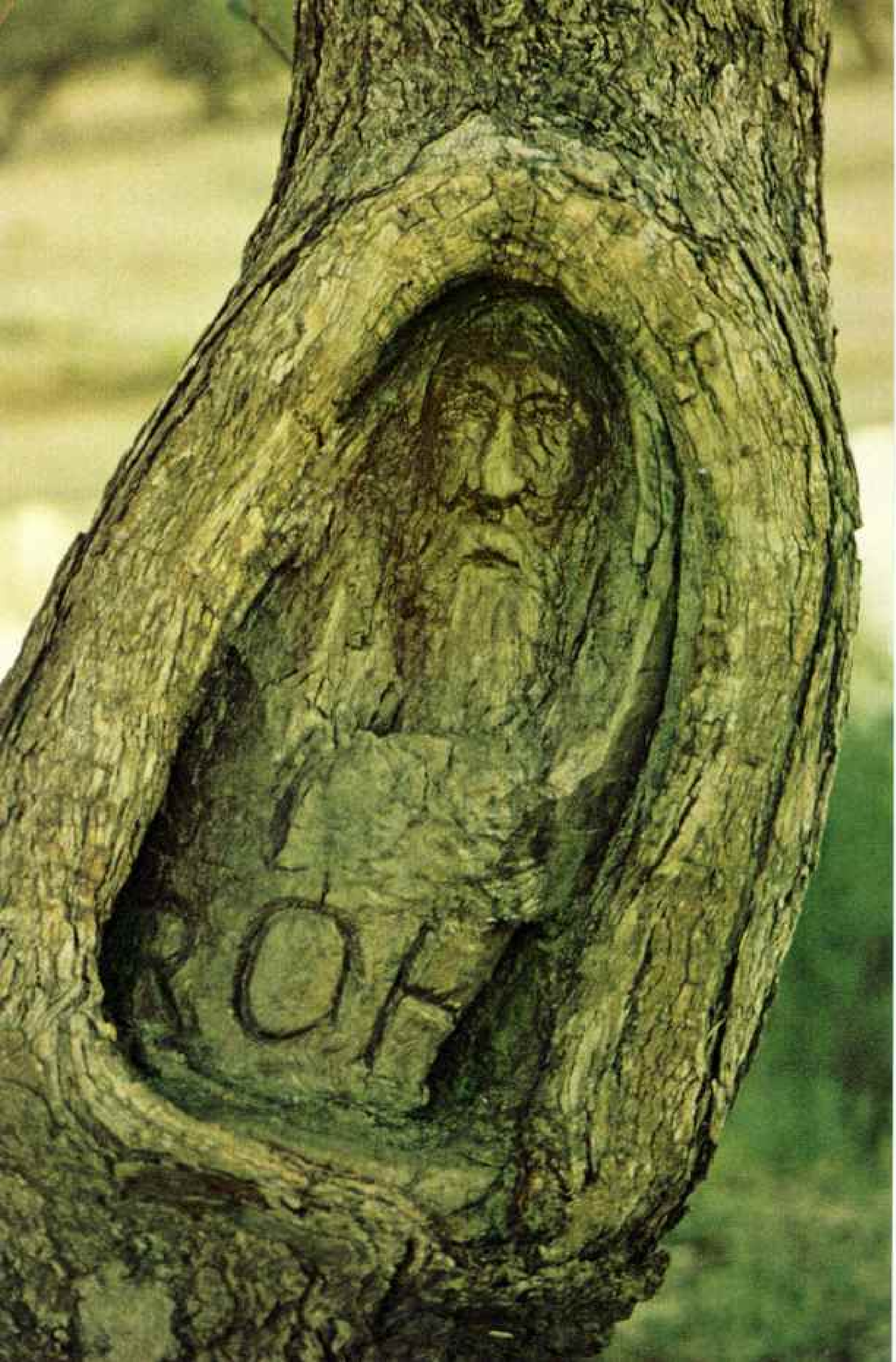
"King?"

"Yes. The last man of the exploring expedition."

The remains of Burke and Wills were later taken to Melbourne, where they rest under a granite monument. In the State Library of Victoria in Melbourne I held in my hands Wills's notebooks and Burke's last scrawled notes, a strangely moving experience. And, on an afternoon of softly falling rain, a benediction after so many weeks in the interior, I lunched with Alec Brahe, grandson of the man who had left the Cooper nine hours too early. A gentle and kindly retiree of 75, Mr. Brahe told me that his forebear had been maligned by history. Had he not waited a full month, in a hostile place, beyond his time? Was his first concern as commander not the lives of his own men? Was it not logical to assume that Burke, with only three months rations, had perished?

I agreed that those things were to have been expected, and asked how Brahe's family had come to consider the matter.

"The subject of the Burke and Wills expedition was a closed book in the Brahe household," Alec said. "There was an unwritten but well understood rule that it was never to be mentioned. And it never was." □



THEY'RE A
MARVELOUS MOB

Those Kangaroos!

By GEOFFREY B. SHARMAN
Photographs by DES and JEN BARTLETT

IN THE CATALOG of earth's more curious creatures, few are as wondrous as the kangaroos.

Benign of face, bottom-heavy of build, they outclass most of the animal kingdom in the long and high jump, boxing, and karate. Born the size of a large lima bean, they can grow taller than a man. As with most other marsupials—an ancient order of mammals—they raise their young in body pouches. And, in matters of reproduction, kangaroos hold a hidden ace: An expectant female can retain an embryo in ready reserve for months, until all the conditions are right for its continued development.

When it comes to marsupials, no place on earth can count a greater variety than my native Australia. Of 250 existing species, some 170 of them—including wombats, bandicoots, and kangaroos—live only in Australia or its immediate surroundings. All the rest, except the opossum found in the United States and Canada, are limited to Latin America.

Among marsupials, our gray and red kangaroos are the largest of the lot. Full-grown males—called boomers—may stand seven feet tall when fully erect and weigh close to two hundred pounds.

Yet, loping across the countryside on highly developed hind legs, these superb animals cruise at 12 to 15 miles an hour. If need arises, they can accelerate to more than twice that speed. While grays excel at high jumping, reds take long-hop honors. I have seen young grays clear a six-foot fence with plenty of daylight between and have measured a red roo bound of 20 linear feet on flat ground.

Though timid by nature, boomers make powerful and resourceful adversaries. Australians traditionally hunted them with huge, specially trained dogs. But a boomer at bay, his back to a tree, can wreak fearful havoc. While standing on

Berth rights belong to a joey, or young kangaroo, until it reaches 8 to 11 months of age. The rumble seat in reverse provides food, shelter, and transportation for the offspring of Australia's kangaroos and other marsupials, animals that raise their young in pouches. Indigenous only to Australia and adjacent islands, the 56 kangaroo species range in size from the one-pound musky rat kangaroo to the nearly 200-pound red.

When the first live kangaroo went to Britain from the land down under in 1791, Londoners stormed the Lyceum Theatre to see it. The animals fascinate still. Outstanding examples of adaptability to a harsh land often beset by drought, most large species have thrived—to the delight of conservationists and to the distress of ranchers who consider them pests.

the tip of his tail, he will strike eviscerating blows with the daggerlike claws of both hind feet. If water is nearby, the cornered boomer may wade in chest deep, wait for a pursuing dog, then grab it with the forepaws and hold it underwater until it drowns.

Reds and grays, those powerful jumpers, are among the most plentiful of the kangaroo species surviving in my homeland, where I made a rather big leap myself some 25 years ago when I switched my studies from grasshoppers to kangaroos.

Marsupials' Origin Uncertain

From my undergraduate days at the University of Tasmania in Hobart to my present post with the biology department of Sydney's Macquarie University, I have kept close company with both wild and captive roos in many parts of the continent. Despite this long association, I get the feeling that the roos are one jump ahead.

Who their antecedents were and how they got here are still debatable. It is generally agreed that all Australian marsupials, including kangaroos, descend from small, perhaps pouchless, carnivores or insectivores capable of bearing large litters of young—characteristics retained by some marsupials even today. (See the special supplement **Australia: Land of Living Fossils**, which accompanies this issue.)

Biologists once thought that these early migrants arrived from North America by way of the Bering Strait and the island chain that links Southeast Asia to Australia. However, recent acceptance of the theory of continental drift suggests a more likely route: from South America, then across Antarctica, in that far-past age when the three continents were closer together and the bottom of the world a more hospitable place.

In Antarctica, where no fossil remains have yet been found, or after they appeared in Australia, where earliest evidence goes back about 25 million years, the early marsupials spun off into diverse forms adapted to a wide range of habitats. That many of the

Mob scene: Spooked roos bound off like living pogo sticks. The only large

forms are still with us stems largely from Australia's isolation, which until recently prevented competition from more advanced animals from abroad.

Of all the distinctive types of marsupials within our sphere, only kangaroos emerged as bipeds, moving more naturally on two legs than on four. Their foreshortened upper limbs terminate in clawed paws used with almost human dexterity in eating, grooming, and self-defense. But the large roo's real power in flight or fight comes from its elongated rear legs.

Tails Used for Balance

Ungainly at a four-footed walk, the kangaroo becomes as graceful as a ballerina and considerably more airborne as it shifts to a biped bounce. Along the way it must go into some kind of internal overdrive; experiments show the roo expends no more energy at high speeds than it does at slow ones.

The animal's heavy tail, long prized for soup and meat, does more than go along for the ride. On the run it bends at the end like a boomerang and acts as a counterbalance, keeping the creature on an even keel. At a standstill it serves as a sort of stool.

This distinctive three-point stance very nearly proved the undoing of a British bird-watcher I met one day fleeing the bush. Seated on a shooting stick, his body thrust forward with binoculars before his eyes, our frightened visitor had almost been shot by a hunter who mistook him for a relaxed red.

In our sparsely settled outback, it would be hard to find a spot completely free of kangaroos. For, during the course of its zoological history, Australia has produced species to fit almost every environment: scrubland, grassy plains, swamp, rock ledges, woods, brush, and even treetops. Although most present forms probably evolved only in Australia, some developed in, or have spilled over into, New Guinea and some of our smaller islands. Man himself introduced marsupials into New Zealand.

The entire *(Continued on page 199)*

mammals that hop, they gather in groups of five to hundreds, called mobs.

Pocket full of miracles, the pouch has teats that simultaneously provide different milk formulas: a high-fat mixture for a young-at-foot kangaroo (**left**) and a low-fat liquid for a newborn young (**below**), hanging next to an older sibling's food station. But even more astounding in the list of kangaroo marvels is the ability of the female to hold an embryo in an arrested state, called embryonic diapause. Should a nursing young die, the reserve embryo is jolted into continued development. If not, depending on the species, it disintegrates or awaits its turn in the life cycle.

Impending delivery is signaled by intensive pouch cleaning. A kangaroo's first and most important journey spans six inches and three minutes. Born from the urogenital opening after a gestation period of 27 to 38 days, the bean-size baby uses forearms to claw its way up the furry front of the doe to a teat in the pouch. Helped along by its sense of smell, the newborn locates and clamps onto the teat. If it loses its way, it dies. After six months or so the joey can wander around on its own, but returns regularly to the security of the pouch until rebuffed by its mother. When danger threatens, it tumbles in headfirst, somersaults around, and settles down. A 9-week-old wallaby carefully detached from the teat (**above**) shows the development of the powerful hind legs that, at the time of birth, are almost unnoticeable.

inventory, however, divides into two major groups. The Potoroinae, or rat kangaroo subfamily, is made up of nine of the smallest species, including bettongs and potoroos. The Macropodinae, or true kangaroo subfamily, encompasses all other roos, even those called wallabies, euro, and wallaroos in different localities.

Ranging in size from a three-pound rock wallaby to the imposing grays and reds, true kangaroos look and behave pretty much alike. But the "rat pack" has a few nonconformists. One of the bettongs—the burrowing boodie—is the only kangaroo that lives underground. And only the smallest of them all, the one-pound musky rat kangaroo, regularly produces more than one offspring at a time; it usually delivers twins.

Fathers Accept No Responsibility

The red kangaroos, which I have studied extensively, reach breeding age at a third to a half their ultimate size. For females this means at about two years. Males wait some six months longer, but they don't necessarily become fathers upon reaching maturity; the dominant male in any group generally fathers most of the offspring. For which he acknowledges no further responsibility: It's the non-liberated mother roo who must rear, shelter, and feed his progeny.

After a gestation period of four to five weeks, depending on species, the female produces, in normal mammalian fashion, a single, underdeveloped offspring weighing no more than a thirtieth of an ounce (page 197). She first signals her pregnancy during its closing hours when she begins licking her pouch, tidying up for the new tenant.

One of the many wonders of kangaroo life is how, within moments after arrival, a defenseless, blind infant no more than an inch long finds its way up its mother's furry front

Doubling up for dinner, a mother and offspring nibble on grass. A multichambered stomach proves a boon in times of drought by allowing digestion of dry spiky grasses and other roughage high in cellulose. Roos can share pasture with sheep since each favors different kinds of grass, but in drought the roos compete for the same forage—and win.

and into her pouch with its life-giving teats.

Firmly anchored to a steady milk supply, the baby red roo will grow two thousandfold in the six months before it ventures outside again. It then leaves the pouch for progressively longer periods until, some two months later, it becomes a permanent outsider. The joey, or immature kangaroo, will usually continue to suckle for another few months before becoming a full-time forager.

Among the larger kangaroos, such as the reds and grays, pouch and reproductive tract are seldom empty in a remarkable assembly line of life. Given this fact and favorable conditions, a mother red produces and raises an average of three young every two years.

To me, however, the most amazing feature of kangaroo motherhood is something I discovered 25 years ago. The female is able to store a dormant embryo that will resume development and be delivered if a newborn dies or is prematurely removed from the pouch. Evidently, the cessation of teat stimulation triggers this response.

With some species like the quokka, the dormant embryo is simply a spare; it degenerates if not used to replace an ill-fated

Leaping before it looks makes the kangaroo a roadside hazard, as a sign warns (**above**). Although drought remains the biggest threat, and wedge-tailed eagles and dingoes claim their share, the presence of man has spelled boom or doom for kangaroos. Destruction of habitat has rendered some smaller species rare or extinct. Yet the large roos, the reds (**right**) and grays, proliferate. Australia allows culling of larger species, but exports of meat and skins amount to less than a million dollars annually, mostly to Europe; the U. S. bans commercial imports. Such commerce has stirred controversy despite the economic potential: A roo produces more protein on less forage than domestic livestock.

pouch dweller. In others, the dormant embryo automatically awakens after the normal maturation of the preceding one.

Boss Roo Brooks No Interference

Among many species, kangaroo society appears to be a rather casual affair, with individuals drifting in and out of small groups without any long-term commitments. Thus, the old boomer who has battled his way to boss roo finds himself with an ever changing following—which doesn't reduce his ferocity, however, should another male decide to challenge his authority.

Small groups, or mobs, can collect into sizable ones, usually when they gravitate to the same sources of food and water. But even in places where the big roos are plentiful, they may escape detection. Nocturnal by nature, they prefer to bed down by day, concealed by tall grasses or the dappled shade of casuarina and eucalyptus trees.

Some kangaroos reach the ripe old age of 20, but normal life span in the wild seldom exceeds 7 years. Wedge-tailed eagles, pythons, and goanna lizards pick off small ones; man and dingo dogs kill adults. But the most devastating enemy is drought.

When streams and ponds dry up, so—too often—does the vegetation on which most species depend for an alternate source of water as well as food. Joeys in and out of the pouch die at increasingly earlier ages, and most females cease to breed.

Some years ago one of my red roo study areas in New South Wales was struck by drought. As it worsened, fewer and fewer females had joeys either at foot or as pouch dwellers; many had no young at all.

By the time conditions improved, there were no kangaroos in the area younger than 2 years, the precise duration of the drought. Every single one born during that period had died. Even after the resumption of normal rainfalls, it took eight years for the kangaroos—prolific breeders—to reach their pre-drought numbers.

Gentle of visage, vicious when challenged, a cornered roo can disembowel a dog. A young albino wallaroo's placid manner (**above**) belies its future fighting ability. Two red-necked wallabies (**facing page**) grasp one another with clawed forefeet as one playfully pummels the other's belly with both hind legs.

Diner Relishes Box Lunch

Fortunately nature has endowed the pseudo-ruminant roos with a tolerance for forage that other grazers and browsers reject. As the only marsupials with a multi-chambered stomach, they are also the only ones able to ingest large quantities of plant fiber high in cellulose, a major component of cardboard.

On Barrow, a desert island off our northwest coast, several kinds of kangaroos subsist largely on a harsh, spiky grass called spinifex. My naturalist friend Harry Butler had caught one of the smaller species of roos, intending to photograph, then release it. Once caged, the little creature looked so dejected that Harry decided to lift its spirits with something tastier than spinifex. So he offered his captive a beer carton full of fresh lettuce and fruit from his stores. The kangaroo responded with gusto: It ignored the contents and ate the box.

My wife and I raised a rock wallaby that exhibited similar tastes. Named Alvin Purple, he developed a craving for the covers of books, leaving much of our library a shambles. Even though rock wallabies have large, clumsy-looking back legs that do not move independently except when swimming, a trip to the lunch counter posed no problem to Alvin.

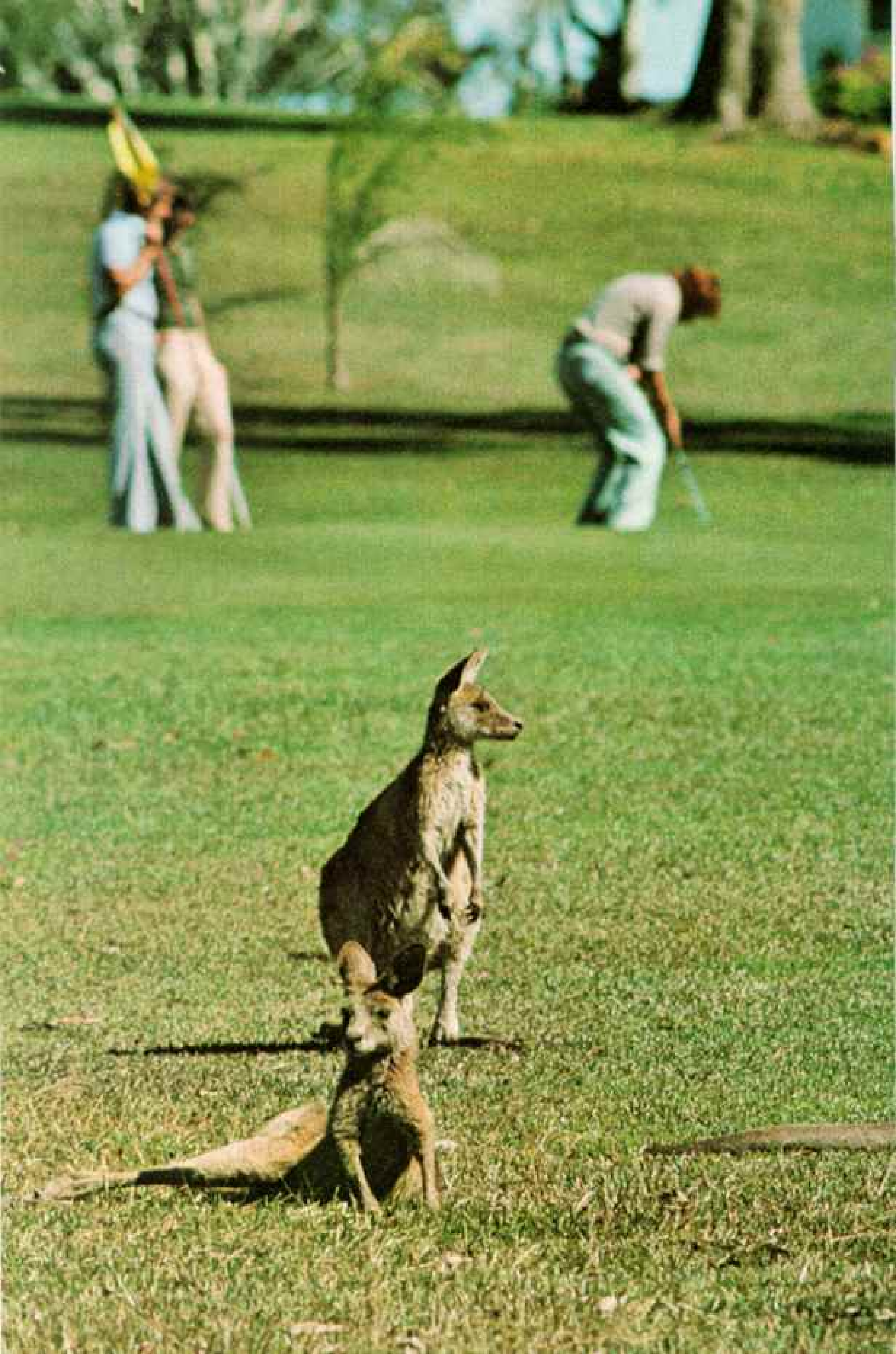
Once he learned to spring with ease onto a narrow ledge five feet above the floor, he developed the disconcerting habit of bounding across the living room via tabletop and couch back, seemingly headed for a suicidal smashup against the wall.

Hurtling through space, he always managed a last-second, midair turn, hitting feet-first and ricocheting onto the bookcase for another meal of Graham Greene or Evelyn Waugh. Put in a small room, Alvin would gain altitude by bouncing from wall to wall in an ascending orbit until he tired of the game or settled on whatever perch suited his fancy.

Climbing comes more naturally and with far less fanfare to *(Continued on page 207)*

A kangaroo for every terrain—woodland, desert, or rock—the animal has few equals in adaptability. One species can even survive by drinking seawater. From **top left**, clockwise: The spectacled hare wallaby, a jackrabbit-size roo, lives on spinifex grass-covered plains. Two prettyface wallabies stand about three and a half feet tall and roam grassy hills. A rare purple-necked rock wallaby calls stony ground home in a

limited area in Queensland. The rufous rat kangaroo, a bit smaller than a rabbit, lives in savanna woodlands in Australia's eastern coastal region. The unadorned rock wallaby (**above**) inhabits eastern Queensland and grows to a height of two and a half feet. All species subdivide into two categories: Potoroinae, or rat kangaroos, and Macropodinae, large kangaroos, wallaroos, and wallabies.



(Continued from page 202) tree kangaroos who have regained the ability to move their hind feet alternately as did their arboreal ancestors. Unlike the rest of the kangaroo clan, these brightly colored creatures, now found only in New Guinea and on our Cape York Peninsula, have front and rear legs of almost equal length and can free-fall from heights of forty feet without injury. Although they have risen above their kin in terms of habitat, they're no match in a footrace with their earthbound cousins.

Explorers Found Wallaroos Tasty

Among Australia's many kangaroos, probably the best known at home and abroad are the big ones: grays, reds, and wallaroos. A red graces our national coat of arms. English explorer James Cook, the first European to reach our eastern shores, shot a gray and a wallaroo while beached for repairs near the Great Barrier Reef. Edible portions of the kangaroos found their way to the wardroom table. Expedition scientist Joseph Banks rated the wallaroo excellent; the gray, a gastronomic failure: "Dind today upon the animal, who eat but ill, he was I suppose too old."

Other grays from the vicinity of Botany Bay became an early Australian export, and breeding colonies were already established in Britain's menageries by the end of the 1700's. By then, native Australian Aborigines had been hunting kangaroos—a major source of food and skins—for uncounted centuries without making any apparent dent in their total numbers.

Arrival of the first Europeans stepped up the slaughter but without appreciable effect on the census until sheep ranchers and cattlemen began altering the environment. Here, man proved both friend and foe.

Creating grasslands and water holes for

Roos in the rough and on the fairway are par for the course in Australia. "They graze unconcernedly, ignoring whizzing balls," say the photographers. The bipedal stance becomes a four-footed crawl when grazing; the tail serves as a support. At hopping speeds as great as 35 miles an hour, the roo springs forward on toe tips, the tail providing balance.

livestock inadvertently created a kangaroo paradise for the bigger grazers. At the same time it often destroyed the habitat of smaller ones, thus reducing and sometimes eliminating entire populations.

Grays and reds soon reached pest proportions, outnibbling sheep on improved grasslands and outliving domestic stock when long dry spells descended. Playing no favorites, the big roos invaded both acreage in use and that withdrawn from sheep to recover its growth. Fences went up, and they vaulted over them. Boomers sired progeny faster than farmers could gun them down.

We don't know exactly how kangaroos compare with sheep in total populations, but we do know that in certain areas where the bounding bipeds tend to concentrate, sheep are now far outnumbered—a problem for stock raisers.

Among the proposed solutions to this marsupial glut, some specialists recommend raising kangaroos for meat—"hopping mutton." It's true that these wild animals, many of them able to survive on less and poorer forage than domestic livestock, produce more protein pound for pound than Australia's sheep and cattle. But the meat—as scientist Joseph Banks noted long ago—has limited appeal.

Not too many years ago, anyone in Australia could kill as many kangaroos as desired. A growing fear of bringing about the extinction of species, though, gradually resulted in laws strictly curtailing hunting and banning the export of kangaroo products.

Today, in a program designed to preserve a substantial roo population while also saving ranchers and farmers from too much grief, every state in Australia has adopted a system that permits controlled destruction of the animals. Such legal culling accounts for about a million roos a year, and some exportation of by-products is again allowed.

Among the great modern debates, the one involving the fate of Australia's kangaroos is right up there with those concerning whales, seals, and other endearing—and usually endangered—creatures.

We Australians have been verbally bludgeoned, especially from abroad, for failing to protect the roos completely. But how? On preserves? Many kangaroos are roamers by nature and show no respect for boundaries. Prohibit *all* killing? Considering that the species most exploited over the years are now more common than ever, this is a rather paralyzing prospect.

Stenciled against a spotlight moon, a young gray grazes (above). Nocturnal and nomadic, a red roo (left) may range 200 miles seeking grass and water holes. Tailored to fit the land, Australia's kangaroos remain its living symbol.

On the other hand several smaller kangaroos, never extensively hunted, are now rare or extinct. Clearing the land for grazing probably spelled their doom. The animals simply could not survive without the brush they needed for food and shelter.

The boodie once roamed over more than a third of the continent; now it's found only on a few small islands. The lovely little toolache wallaby of South Australia has not been sighted for fifty years. No one has seen the brown hare wallaby for longer than that. However, the bridled nail-tailed wallaby was rediscovered and afforded protection in Queensland recently after being unobserved and considered possibly extinct for thirty years or more.

Some of the other missing species may turn up eventually. My associates and I are now surveying the rock wallaby populations; so far, we have found one new species and two new varieties.

We like to think of Australia as the "lucky country." When it comes to the wondrous kangaroos, there's no disputing it. □

Big, Breezy, and a Bloomin' Good Show

Sydney

By ETHEL A. STARBIRD

Photographs by ROBERT W. MADDEN

BOTH NATIONAL GEOGRAPHIC STAFF

SYDNEY? She's the big twist, luv. The dinkumest. A real curl-the-mo. She's beaut."

Flicking the last crumbs of a breakfast roll from his lapel, my fellow park lounger slid into a shaft of sunlight and promptly fell asleep. And I wandered off to see how Australia's first and largest city measured up to what I took as a rather remarkable set of superlatives.

"Always start at the top," I was advised by Kevin Blanch of the Department of Main Roads. Cresting the arch of that venerable symbol of Sydney—the Harbour Bridge—we watched the city consume its morning ration of commuters.

A continuous caterpillar of cars crept out of the northern suburbs, exhausting fumes and fuming drivers. Trains roared more rapidly across the span to help heartland Sydney, which covers only five square miles, expand from a full-time population of 65,000 to a workday force of more than a million. Farther below and more generously spaced, doughty and durable ferries busied themselves with a similar task.

To the east, elegant shorefront homes marched up sandstone ledges notched with inviting beaches. Westward, on flatter land drained by the Parramatta River, acres of red-tile roofs acknowledged the popularity of cottage ownership, a major reason why Sydney, in its broadest sense, blankets more than 1,500 square miles of what many of her three million people call the "slurbs."

Beyond the rolling terraces of Paddington and seaside Bondi's famous strand, highly industrialized Botany Bay was sending up smoke signals to mark the southern limits of metropolitan Sydney, where 20 percent of all Australians live.

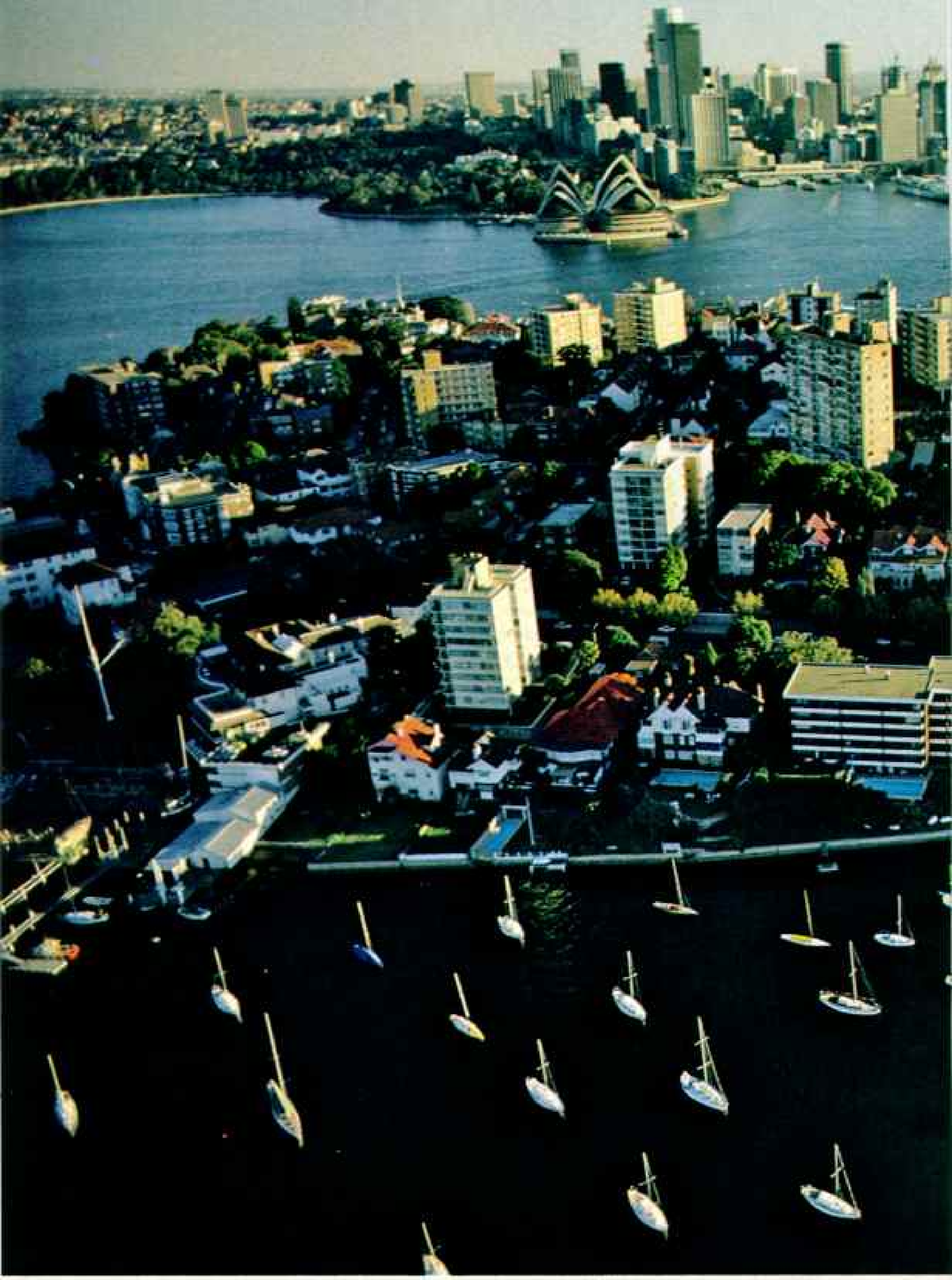
But the real stars of this superb wide-screen production lay directly beneath our feet: the city proper (which cherishes its reputation for being slightly improper in places) and the harbor that made it happen.

If James Cook had poked around a little more as he explored, he might have spoken more highly of this part of eastern Australia that he claimed for Great Britain in 1770 and christened New South Wales.

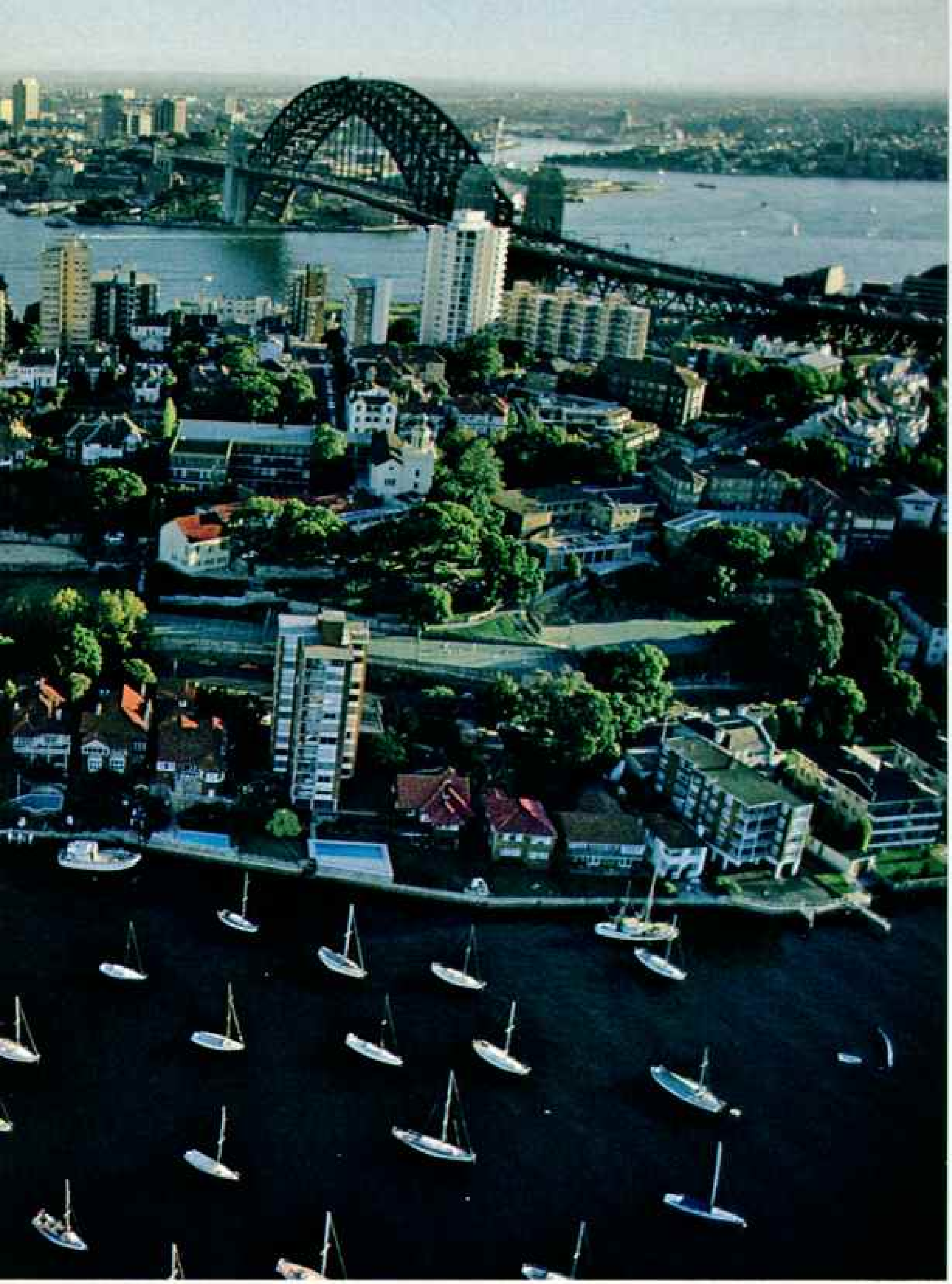
Instead, he carried home the recommendation that Botany Bay would make a dandy dumping ground for Britain's surplus convicts. In his haste he missed by several miles one of the world's most spectacular waterways and eventual site of one of its more appealing cities.

Les Ballard covers the waterfront with somewhat greater care than Cook; he captains the "dog patrol," whose boat-drawn scows relieve the harbor of six thousand tons

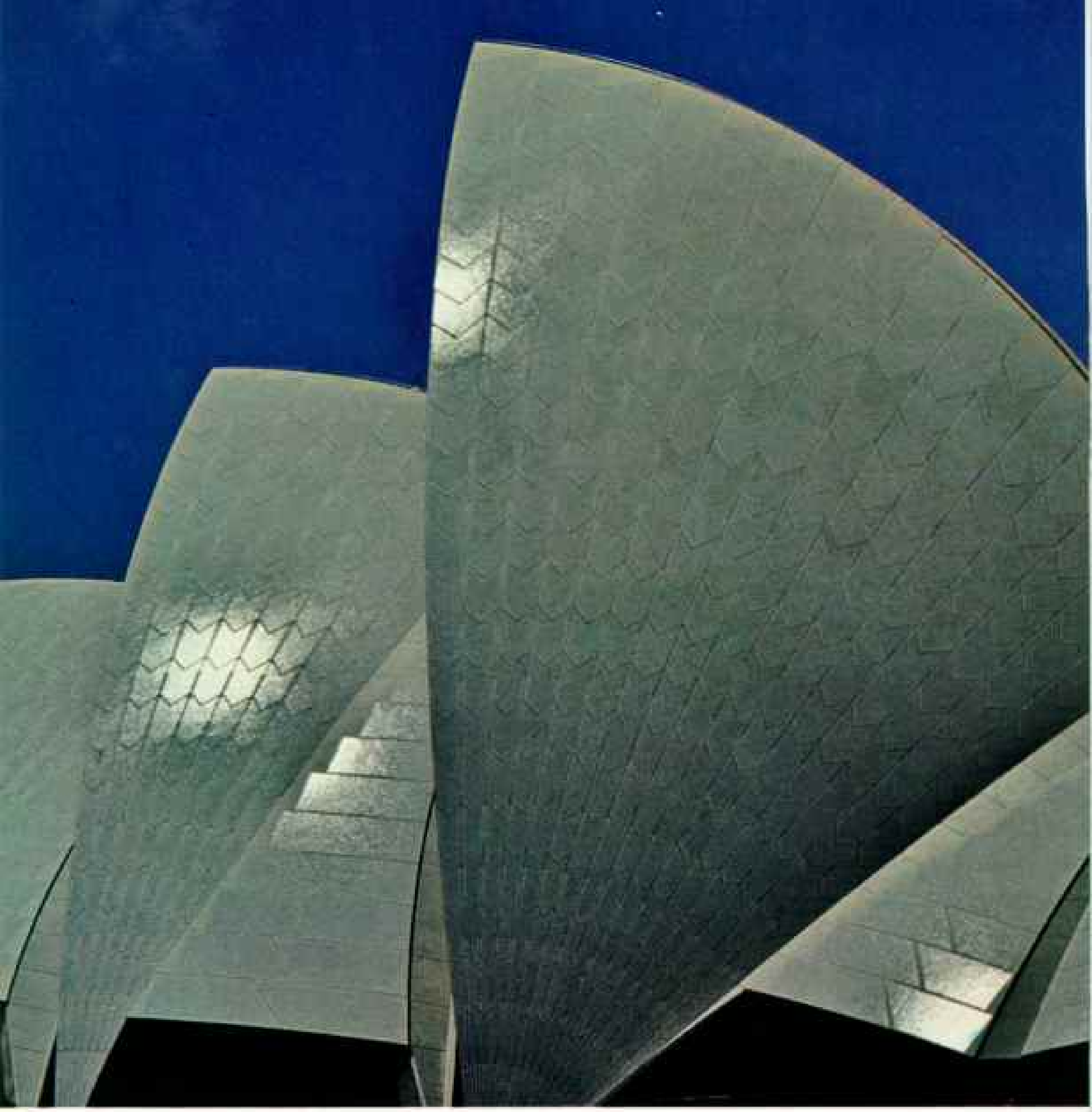
Boaters, blazers, and school ties of lads on Sydney's Oxford Street recall the British heritage of Australia's largest and most dynamic city. Tempering the ancestral stiff upper lip with a warm and ready Aussie smile, three million Sydneysiders—among them Aborigines, Europeans, and recent Asian immigrants—mingle trend and tradition, propriety and impropriety, in epic Australian proportions.



Wed to the waters of Sydney Cove on the vast bay called Port Jackson,



Sydney crowds the shores of one of the world's most beautiful harbors.



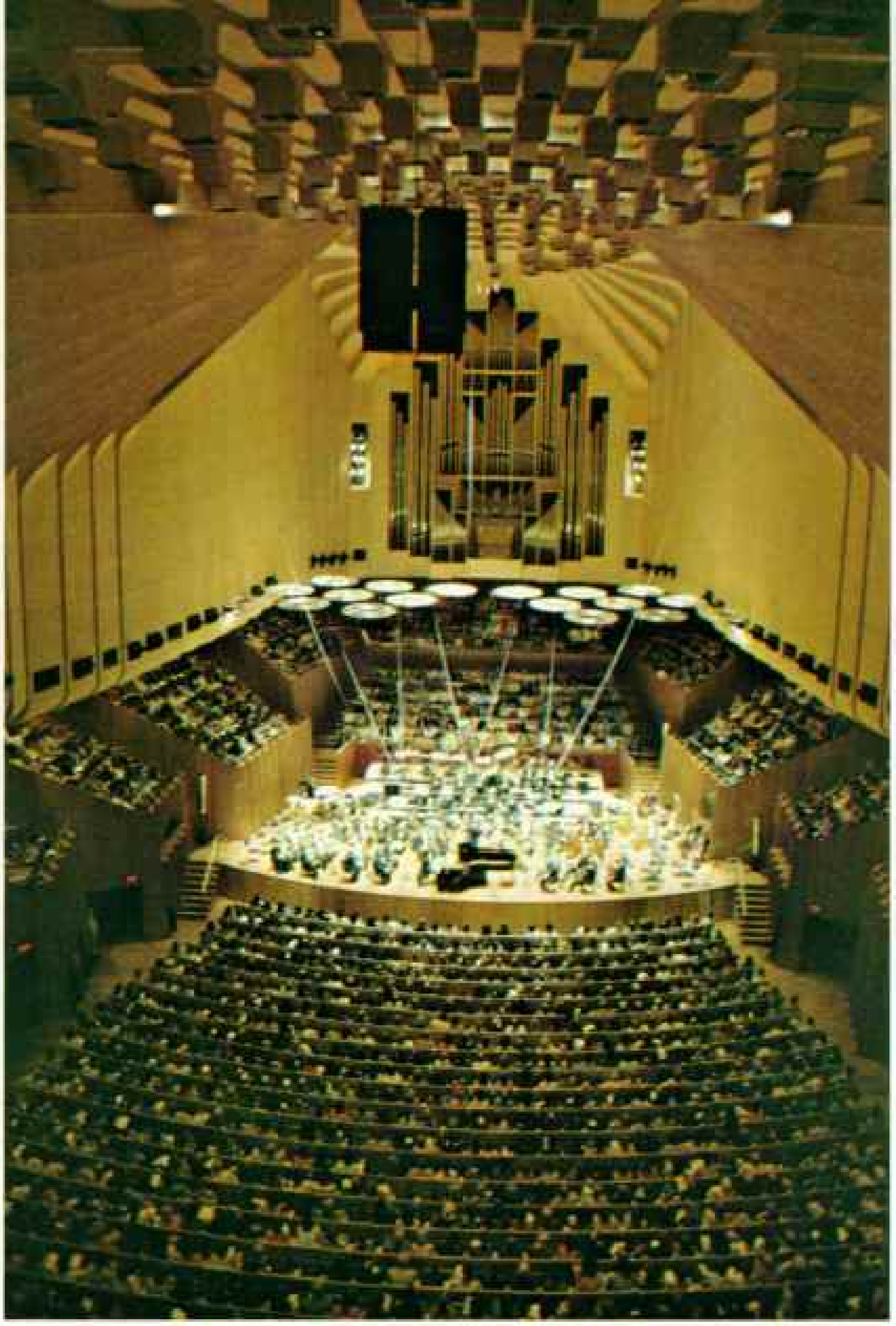
Culture sets sail beneath tiled concrete spinnakers of Sydney's Opera House, a magnificent performing-arts complex designed by Danish architect Jørn Utzon and opened in 1973. Built at a cost of a hundred million dollars—paid by proceeds from a special lottery—the building has become Sydney's most famous landmark. Beneath the cowled dome at center (**above**) unfolds the dramatic space of the Concert Hall (**right**), whose "perfect acoustics" capture the tones of the Israeli Philharmonic.

of trash each year. He let me ride along one day as guest scooper.

While my partner piled up an impressive haul, I landed little more with my king-size skimmer than a soggy mess of jellyfish. By noon he had cleared away windrows of flotsam from Sydney's busy ship channel and the waters off a dozen of her thirty harbor beaches where protective steel nets warn of the danger of sharks.

Les reeled in our towline. "Time to fang it, mates. I'm dry enough to spit chips, and we're well past due for a shout."

What I believe was meant as a lunch



break produced more shouts—rounds of drinks—than food for the fang. Beer lovers all, the crewmen quickly taught me that Tooth's Old and New had nothing to do with dentistry, and that water blokes were an extremely softhearted lot.

Wharfies Harbor Hearts of Gold

"Some takes on rough 'n' tough, but come to a chuck-in, none's dead sweeter. Wharfie we know put inniz ticket 'while back 'n' we got up 385 dollars for the widow first pub we 'it. Only one drongo in the place wudden give. So we're collectin' for '*is* widdy now."

Sometimes it's hard to believe English is the official language here; so many speak, from habit or choice, a delightful, distorted form called Strine. It comes out as a colorful combination of cockney and unadulterated Australian. Words may emerge in a rush, or be foreshortened beyond recognition. Thus, "How much is it?" sounds like someone named Emma Chizzit, and to "do a uey in a ute at the uni" really means making a U-turn in a utility truck at the university.

When table talk switched to sports, I had to admit that Yankee speech takes strange turns, too. Otherwise, Les asked, why

Home to one in five Australians, Sydney—capital of prosperous New South Wales on the continent's southeast coast—spills beyond its five-square-mile limits to encompass a greater metropolitan area of more than 1,500 square miles. In 1770 explorer James Cook, sailing from Botany Bay just to the south, bypassed Port Jackson. Eighteen years later Capt. Arthur Phillip—after finding Botany Bay unhealthful—explored the more hospitable Port Jackson and discovered the magnificent anchorage of Sydney Cove. On its shores he founded the convict colony that would ultimately burst its chains to become Australia's greatest metropolis.

didn't I know a hooker was a footy player? Rugby footballer, that is.

Like Les and company, a sizable bloc of Sydneysiders earn their living on and around the water. Among them: three thousand merchant seamen and some ten thousand landlocked workers who handle the heavy harbor traffic or cater to dockside needs of cruise ships and cargo carriers.

Endowed with a deep, rock-bottom channel, little tide change, and a heavily indented shoreline, Sydney developed into a port of international importance. Growth of the city, now slowed by a nationwide recession, continues to enlarge and improve shipping facilities. But new controls are designed to preserve and expand selected stretches of the harbor's scenic shoreline.

Continent-size Prison for "Pommies"

What explorer Cook overlooked, Capt. Arthur Phillip found when he brought his convict-carrying First Fleet into Botany Bay and decided the spot was unsuitable for settlement, even for POME's—Prisoners of Mother England. The word "pommy," still in general use, possibly came from these initials. It was defined for me by one slightly biased source as "any Brit who doesn't have the wit to move to Australia."

Sailing on up the coast, Phillip nosed into a narrow passage between two lofty bluffs and discovered the cove he named for British Home Secretary Lord Thomas Townshend Sydney. On January 26, 1788, he landed at what is now Circular Quay.

On adjoining ground shadowed today by the Harbour Bridge, the town of Sydney took shape. Century-old bond houses and wool stores of the Rocks area, where clippers docked and Jack London caroused, have been rescued by the recent awakening of Sydney's "roots" consciousness. Aided considerably, I suspect, by the economic slump that automatically curtailed the biggest building binge in city history.

Given this breather, Sydneysiders have redirected redevelopment plans, sparing a great deal of what otherwise might have been destroyed. This includes the Rocks, where renovation has run heavily to artsy outlets and flossy pubs of feigned antiquity.

Folks only a few blocks west largely ignore such pretensions. These are Miller's

Pointers, a down-to-earth breed. Most belong to wharfie families who have lived for generations in their own private world of quiet streets and balconied row houses—known locally as terraces.

Extremely protective of their villagelike community amid Sydney's concrete towers, Pointers are proud of the close ties—often one of relationship—that bind them all together. In one frill-free pub, a middle-aged woman collected a bet from a shifty-eyed bookie as he left the bar, then sat down to count her winnings.

"Stone the bloody crows! That cheatin' bludger shortchanged me."

While a daughter-in-law at one elbow tried to console her, a brother at the other confirmed the larceny. "But what about that crooked bookie?" I asked the short beer next to me. "Isn't anyone going after him?"

"It'll all come right, luv. 'E's 'er cousin."

War Brought Fleeting Prosperity

On the opposite side of the city, glary, blary Kings Cross couldn't care less about lasting ties; it lives on transients and tourists. A major drop zone for free-spending servicemen on furlough from Viet Nam, the Cross has become a bit shoddy with age.

On Darlinghurst Road, hand-scrawled Biblical quotes vie for wall space with weathered signs announcing massage and snooker parlors, striptease joints, bars, and boutiques where bargain prices, as advertised, are anything but that.

Visitors window-shop and ogle the outdoor art of X-rated attractions. But few leave money here. Revitalize Kings Cross? "It'd take another war to do that, luv."

Not far away, the Reverend Ted Noffs runs what he calls a "message parlor," where dialogue prevails over dogma. His Wayside Chapel, a multiservice center compacted into three modest row houses, attracts both prominent Sydneysiders and many others who prefer anonymity: alcoholics, drug addicts, runaways, and delinquents from various levels of life.

Slight, bespectacled, and impeccably groomed, Ted looks more like a bank teller than a street-schooled missionary who practices, as he says, "Christianity with its sleeves rolled up." Or, putting it another way: "Christ would be a forgotten man if His disciples had waited around for someone to set up the pulpit and pews."

Working out of Wayside Chapel, volunteers of its soup patrol comb the Cross and adjacent Woolloomooloo during early weekend hours to feed a shadowy army of derelicts. Packing a flashlight and loaded thermos, I followed a young printer named Joe through the 'Loo's deserted and decaying terraces, where only feral cats and forgotten men now dwell.

"The best we can do is listen if they want to talk and coax them into taking a little nourishment to soak up all that plonk."

Old-timers Sink Their Roots Deep

Once a lively enclave of Italian and Maltese fishermen, the 'Loo still bears the scars of a battle that pitted lifelong residents determined to hold their ground against developers equally determined to convert the property into a profitable extension of high-rise, high-cost downtown.

Principal casualties: about 6,500 people forced or frustrated into vacating rented flats and terraces. Anita, a stubborn homeowner of Irish origin, has logged most of her 80 years in the 'Loo. "A lot's tried to move me out, too. 'Go boil yer 'eads,' I sez. 'And if y'need 'elp, you c'n use me cookstove.'"

Perhaps a thousand holdouts stayed and won. Now a government commission has taken over rejuvenation of the area, largely with low-income housing much like that already demolished or ruined beyond repair.

The lush acres of Hyde Park, the Domain, and the spacious Royal Botanic Gardens separate Woolloomooloo from skyscraper Sydney. The "Dom," usually a cushion of quiet in the cacophony of city life, hits full volume on Sundays when soapbox orators invade its grassy sweep (following pages).

Among the regulars: John Webster, alumnus of London's Hyde Park and undisputed dean of the Domain. John has a fine sense of theater, excelling in the not-too-gentle art of put-on and put-down. "Webster is not here to persuade; Webster is here to make you think—as an in-dee-vid-ual. I don't believe in survival of the strongest; I believe in survival of the slickest.

"I'm against socialism, Commonwealth, royalty, women's lib, and everything else that doesn't pay me a profit."

The voice of the people, with a distinctly Australian twang, rings out on Sundays in the Domain, a downtown park where freedom of speech meets all comers.

Trash can is a soapbox for a proponent of male rights (**above**). One speaker (**above, left**) uses ear shields to shut out hecklers.

Undeterred by a downpour, a marcher in a rally downtown (**left**) focuses on two vital issues: the export of Australian uranium and native landrights—causes that have intertwined because much of Australia's uranium underlies Aboriginal land.

He gave three pasty-faced hecklers a withering look. "Behold, if you can stand the sight, our local toughs in action—all mouth and no mind. Together, they couldn't knock the skin off a rice pudding."

Mutiny Without the *Bounty*

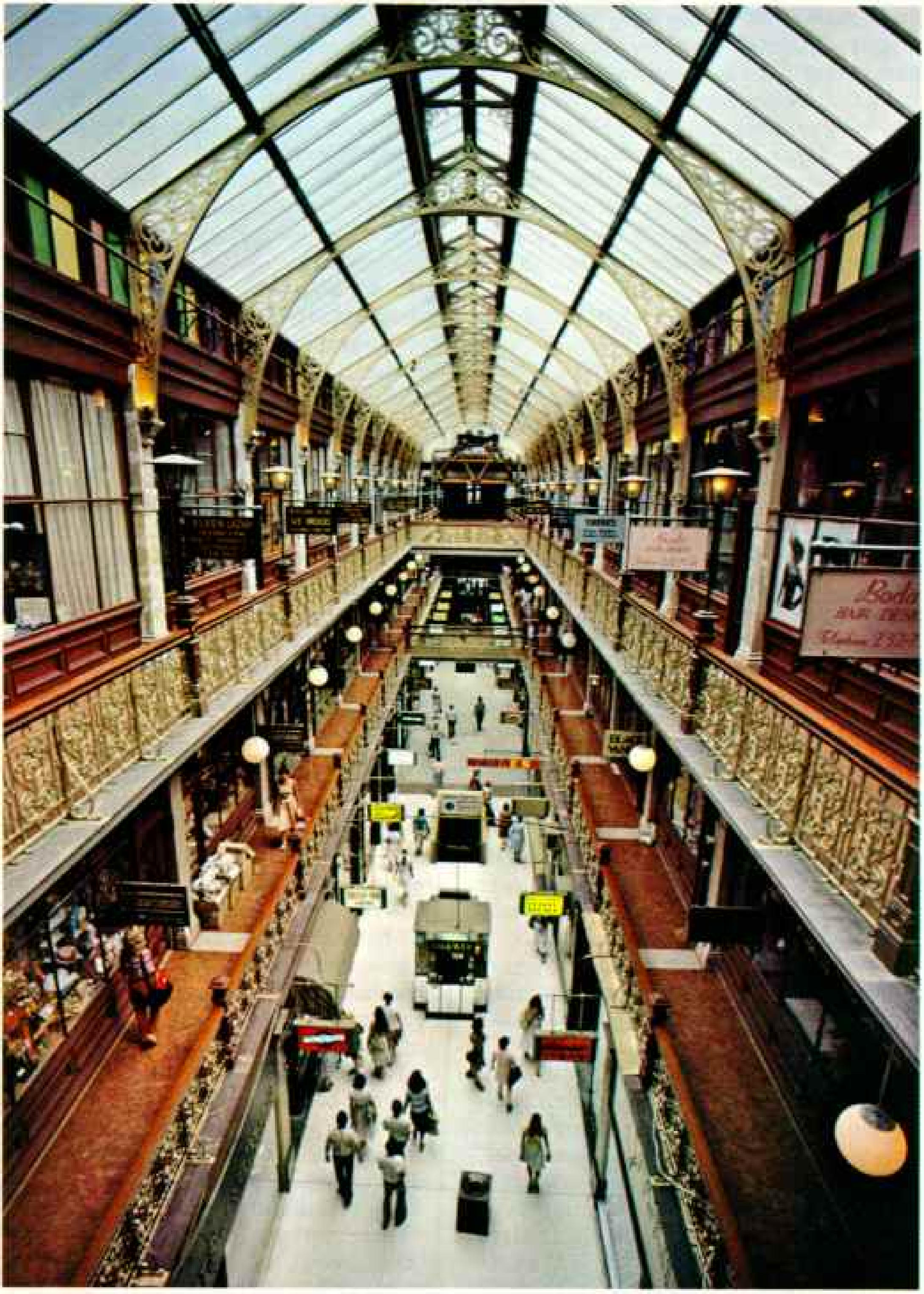
Fortunately the Dom and the rest of inner Sydney's generous expanse of parkland have survived the city's two-way stretch, a situation early planners would applaud.

Phillip, as first governor, envisioned an orderly growth pattern but returned to England in 1792 before his dreams came true. For the next 14 years, the colony—now reinforced with free settlers—suffered from severe mismanagement by a ruling military clique primarily concerned with enriching itself on trade and rum monopolies.

Sent out in 1806 to curb abuses, Governor William Bligh—he of *Bounty* fame—managed to get mutinized again. Imprisoned by those he sought to discipline, he was later banished from the colony.

Bligh's successor, Lachlan Macquarie, had better luck. As governor from 1810 to 1821, he soon put Sydney's house in order, establishing a monetary system and promoting agriculture to overcome food shortages. This energetic Scot also pushed settlement across the Blue Mountains and set up an ambitious program of public works that cost so much it finally helped cost him his job.

Macquarie, a lenient man with convicts



Life in the "slurbs"—as residents refer to Sydney's suburbs—has the sameness of bedroom communities elsewhere (**left**). Red-tile roofs were long de rigueur. Today red is becoming passé, and new homes proclaim their individuality with roof tiles of white, blue, and various pastel hues.

At the Strand shopping arcade (**above**), boxy modernity has failed to oust old-time graciousness. Ravaged by fire two years ago, the mall was lovingly restored to its turn-of-the-century ambience.

and emancipists—those who had served their time and stayed—chose a talented prisoner named Francis Greenway to help with his grand design. Some of the most impressive old buildings still around—St. James Church, Hyde Park Barracks, and the ornate Government House stables among them—reflect Greenway's contribution. So, too, does Australia's ten-dollar bill, the only currency I know that carries the portrait of a convicted forger.

Lest anyone forget his accomplishments, Macquarie fixed his name or sometimes that of his wife, Elizabeth, to a multitude of local landmarks. One is Mrs. Macquarie's Chair, a rocky resting-place overlooking the Opera House, whose seats are not much softer.

As a billowing piece of sculpture put to practical use, few modern works can match this eye-catching center for the performing arts or the 16 years and one hundred million dollars required to complete it. With a unique roofline variously described as clamshells, full-blown sails, or a huddle of nuns in a high wind, this is, indeed, a magnificent architectural achievement (pages 214-15).

Sometimes the Natives Return

Regardless of its artistic and acoustical merit—subjects continually under dispute—the Opera House managed one undisputed coup. It helped lure back home two long-absent Sydneysiders of world renown: coloratura Joan Sutherland and her husband, conductor Richard Bonynge.

Both began their distinguished careers in Sydney, leaving their native land, as many other gifted Australians have, to seek greater opportunity elsewhere.

"Our Joan" must be one of the most agreeable and unaffected of all superstars. Sinking into an easy chair in the Opera House Green Room, she kicked off her shoes, pushed a wandering wisp of red hair out of her eyes, and apologized for being late.

"I've been rehearsing a few dance steps for a charity show. Making me into an instant chorus girl took longer than expected."

At 5 feet 8½ inches, Miss Sutherland enjoys a decided edge over most divas in vitality as well as voice. Moving about stage in costumes weighing as much as ninety pounds, she performs under conditions that would buckle the knees of lesser women.

"After years of travel, Richard and I realize what a paradise Australia is. As for Sydney, I know of no other place with such a marvelous climate, harbor, and coastline, wrapped up in one package. We're spending more and more time here."

Sydneysiders welcome this news; not many of their talented exports ever return.

As for the Opera House itself, critics find it both lavish and lacking. There is, for example, no patron parking, a deficiency caused by the refusal of building laborers to work on an underground garage beneath the Botanic Gardens. Their reason: The facility would destroy three historic fig trees.

Citizens Keep Rein on Growth

This was the second victory for the Green Ban movement, a strange-bedfellow alliance between trade unionists and conservatives to prevent questionable alterations in the Sydney scene.

It all began when residents of Hunters Hill, an affluent inner-harbor suburb, failed to halt development of a bosky piece of waterfront called Kelly's Bush—even when local ladies lay down on the job to halt the bulldozers. They appealed to the New South Wales Builder's Labourers' Federation.

"Once we were convinced the protesters weren't just pushing their own barrow, we simply boycotted the project." Jack Mundey, a muscled 44-year-old, looks like the rugged rugby footballer he once was. In 1968 he became the chief elected official of the powerful federation. Under his leadership, local labor made an unprecedented leap into the field of environmental involvement and social action.

"The Kelly's Bush campaign really lit up when the builder said he'd go ahead anyway—with nonunion workers. So we got ready to walk off one of his other projects he couldn't afford to have closed down."

Kelly's Bush still stands.

"There's building that needs to be done; a lot that doesn't. I don't want my son to accuse me of helping to destroy Sydney. Our generation has options; his should too."

Acting only when asked by those most affected, the federation imposed Green Bans at 42 sites, including one that blocked high-density redevelopment of the Rocks. But with Mundey now out of office and

unemployment a severe problem, there's no telling how many will last.

Harry Seidler, a widely acclaimed architect who designed some of Sydney's most impressive new projects, has no serious quarrel with Mundey even though Green Bans have curtailed his efforts at times.

He would like to see a balanced cityscape—"one rising from the shore in ascending levels so as many people as possible could enjoy our fantastic views. Curtaining the waterfront with lofty construction is not the way to do it."

During the prosperous 1960's and early '70's, thousands of terraces—in Ultimo and Glebe as well as Woolloomooloo—were leveled, over resident resistance, to make way for blocks of faceless flats.

Lord Mayor Leo Port, who died in 1978, is remembered for shifting Sydney's gears: downward, to slow destruction of established neighborhoods; upward, to accelerate creation of an airier-looking city.

"For years we had a frontier philosophy; growth meant the good life, so grab it," he told me. "Now we know its negative side; we want a mixture of compatible uses with all things built to human scale."

Unless the economy improves, Sydney may look much the same for some time.

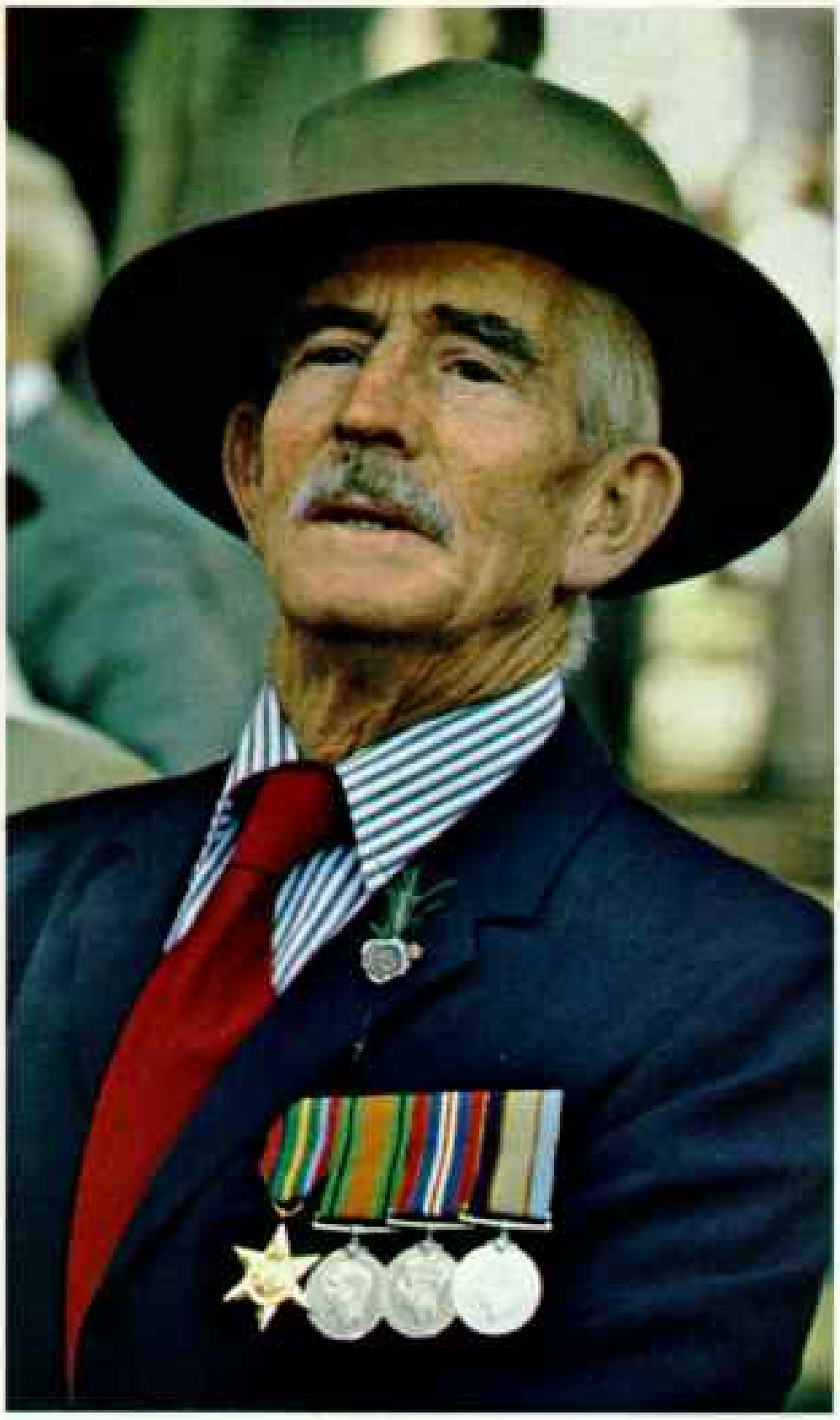
Uranium: Bane or Blessing?

Thought to possess vast untapped riches in minerals, Australia entered the 1960's as the darling of foreign investors. And Sydney, already Australia's commercial giant, expanded rapidly to accommodate an era of great expectations. Goods and services multiplied; so did population. European migrants flooded in to ride the boom.

When few of the reported mineral reserves materialized, overseas interest and capital dwindled. Coupled with other causes—such as soaring inflation that closed some enterprises and drove others out of Australia altogether—Sydney's skyrocket lost momentum.

"Just a temporary lull," one business executive assured me. "How can a country sitting on so much of the world's uranium be in serious trouble?"

A lot of Australians, however, not only oppose the export of "yellow cake," they want it left in the ground forever. When I



Yesterday's warrior, bemedaled veteran at the Anzac Day parade in Sydney joins a throng of 20,000 commemorating Australian and New Zealand war dead. The term Anzac originally denoted the Australian and New Zealand Army Corps in World War I, famed for their bravery in the ill-fated battle of Gallipoli. In World War II and again during the Korea and Viet Nam conflicts, the term was applied to all Australian and New Zealand fighting men. This old campaigner's hat tags him as a "bushy"—a rural Australian.

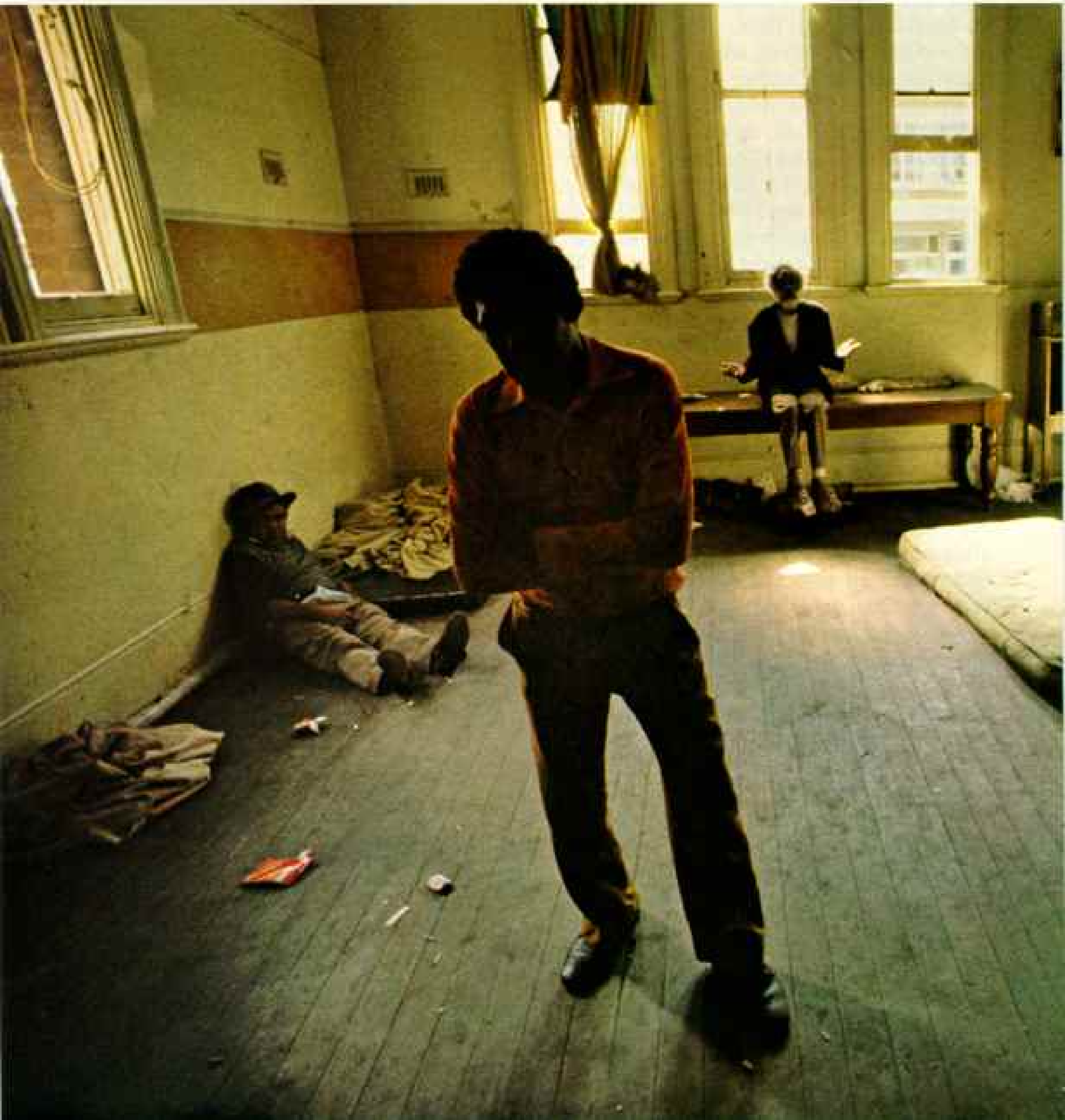
had originally gone looking for Jack Mundey, he was in jail on charges arising from his efforts to halt the first shipment of uranium to leave Sydney in five years.

More than a century ago another ore was giving Sydney headaches. Already plagued by a serious depression, the city lost most of its able-bodied men in 1849 to the California gold rush. Two years later it suffered another mass exodus when high-yield diggings were discovered close to home. Whaling ships stopped putting into port for fear their crews would join the stampede.

By the time prospecting lost its glitter, wool prices had rebounded, and Sydney's fortunes were again "riding on the sheep's back." The area remains Australia's largest woolgatherer: An average 2,070 tons are sold each auction day at the huge government exchange in far-out Yennora, now the center for operations long located in town.

The great municipal markets of Sydney's Haymarket district have also been forced to move on; lack of space has driven them to Flemington, a half-hour train ride away. Only sparrows and an occasional plonk tippler shelter in the sprawling brick sheds where produce, fish, and fowl dealers once hawked their wares.

Names of departed banana merchants



decorate deserted loading docks: Sing Wa, Wing On, Hop Lee. All probably once lived nearby, for Sydney's Chinese citizens were long concentrated in the Haymarket, where many of their food stores and restaurants still lend an Oriental appearance and essence to the neighborhood.

Vendors Brighten Old Neighborhood

Every Saturday, Hay Street returns to its boisterous ways when more than six hundred vendors swarm beneath a single, 4½-acre roof. There they stage one of the best shows in town—Paddy's Market.

President Cliff Hulme of the Stall Holders Association has been dispensing low-cost confections at his Candy Corner for more than a quarter of a century. "Some blokes been here longer, but the old-timers, they have a habit of dying off. Not really a habit, I guess: They only do it once.

"Try these coconut-covered marshmallows. Only four calories in the whole bag. No, no, luv, not the half kilo's worth; I mean the *bag*."

Down the hall Lockey Druce deals in all manner of pets—from guppies to puppies. I watched him line a box for a just purchased pooch with back issues of the *Sydney Morning Herald*. "I would never," he said to

Matron saint of the more than 5,000 Aborigines in Sydney, "Mum Shirl" (**above**) is an almost legendary spokeswoman for her people—most of whom remain at the bottom of Australian society. The church where Mum has her headquarters operates a refuge (**left**) for "goomies," or "spirits"—down-and-outs addicted to cheap, poisonous wood alcohol.

Australia's oldest neighborhood rings with good cheer during an annual parade celebrating the election of the honorary Governor of the Rocks (**left**). Here, on the rocky shore of Sydney Cove in 1788, the British founded the convict colony that was their first settlement in the Antipodes. The wharfside neighborhood called the Rocks, where it all began, suffered long decades of decay before being stylishly renovated and revitalized in the 1970's. After the parade, celebrators on a pub crawl (**below**) demonstrate the art of prodigious beer consumption—at which Australian elbow benders excel.

its owner, "ever sell a dog without papers."

Milling through an endless jumble of merchandise, Paddy's customers mirror the ethnic origins of Sydney's population, 65 percent of it foreign-born or only one generation removed.

Until World War II ended, this was—in terms of people and customs—very much a British outpost. The postwar era, however, called for more muscle than the pommy pipeline provided. First to respond: well-educated, skilled Polish and German refugees. But they were not enough.

By 1948 the federal government was actively recruiting manpower from abroad, scoring heavily with economically disadvantaged Greeks, Italians, Yugoslavs, Maltese, and Turks. Southern Europeans came in droves, and the inevitable chain migration of families followed. After Middle Easterners and South Americans were admitted in 1966, New Australians were settling in Sydney at the rate of 30,000 a year.

Some Hopes Become Tarnished

Congregating for the most part in ethnic enclaves, they brought a new look and life to the city. For some, this became the promised land; for others, a disappointment.

Gennaro Abignano arrived from Italy in 1957 with twenty dollars. Starting as the lowest-paid laborer, he now owns a construction business worth ten million dollars in equipment alone. "Christmas, 1960, I got only ten dollars. So I buy my papa back in Napoli a bottle of the best wine. He thinks I do real well, so he stops saying come home."

Home is where a number of transplants would prefer to be. A young Greek summed it up: "The work here is not much, and everything costs big. The people, they do not mix well; too many do not want us here at all. I save now to leave *syntoma*—soon."

Greeks, Turks, and Yugoslavs give the fringe precinct of Newtown a delightful international flavor. As regional officer for the Good Neighbour Council, Margaret Helman helps newcomers adjust.

We strolled a street filled with the fragrance of exotic cooking and the babel of many tongues. "Most Newtown migrants fall into a classic mold. Husband and wife take factory jobs, buy a house, fix it up, sell it for a profit. *(Continued on page 231)*

Games are serious business in sports-minded, betting-mad Sydney. Especially fashionable are associations, or clubs, that sponsor teams, while also catering to members' gambling and drinking instincts.

In a town where pleasure boats number 50,000, sailing races—particularly with superfast 18-footers (**above**)—have a keen following. On weekends, special ferryboats conduct mobs of bettors from Sydney Cove for a close-up of the day's sailing races; so many rabid fans crowd the rails at times that the vessels list noticeably toward the action. No less popular is Rugby League football (**right**), where raucous fans with well-stocked "eskies"—beer coolers—scream and swill and brawl with Sydneyesque abandon.


PEPSI


CAGA

Saturday-night fever is contagious at Maxy's Manhattan Disco, a premier downtown night spot. Dancers (**above**) gyrate to the big beat of the Bee Gees, an Australian export who made the sound track for the movie *Saturday Night Fever*. The album topped last year's rock-music charts in the U. S. and Europe, catching on as well—though a touch belatedly—in Sydney. But Sydney remains a domestically oriented city. At workday's end, most Sydneysiders head back to the slurbs or private clubs, and downtown streets empty abruptly. By 6 p.m., lonely office cleaners become temporary lords of high-rise castles of commerce (**left**).

Then, they buy a small business, living upstairs so they can keep long hours and make more money. They've finally arrived when they can afford to move away.

"There really isn't much mingling among nationality groups. Break down ethnic barriers and look what can happen." Margaret pointed to a storefront. "A café featuring shish kebab and pizza made by a Greek."

Saintly "Mum Shirl" Leaves Mark

The feeling of optimism that lightens the mood of Newtown runs out of steam before it reaches Redfern a short distance away. Here, some five thousand Aborigines—the original Australians—view the future as they do their past, as hopeless. Alcoholism is rampant; so, too, are malnutrition, social isolation, resentment, and despair.

Probably the greatest single force in minimizing their misery is one of their own—an amazing self-starter named Shirley Colleen Smith, affectionately known throughout Australia as "Mum Shirl" (page 225).

"T'irty-five year ago, I start in makin' prison visits, first to see my brudder, den udder convicts. When guards ask was I related, I always say—for black or white—'I'm der mum,' and I get in."

Having raised seven children of her own, this ample, able 56-year-old currently cares for an extended family of hundreds: imprisoned lifers, neglected kids of alcoholic parents, unwed mothers, ex-cons, and young probationers remanded to her custody. These juveniles soon learn that Shirl's no pushover; I heard her blister the ears and threaten the bottoms of three who had strayed beyond authorized limits. Their swagger dissolved; they apologized.

The range of Shirl's activities is staggering. Her small dormitory room in Redfern's St. Vincent's Catholic Church—also involved in easing the Aborigines' plight—overflows with used clothes and donated food she collects for her people.

A white man tapped on her door and asked for money. Shirl handed him three dollars. "It's his. But we both know he can't hold on to any large sum. So he gives me everyt'ing he gets, and I let him have it back a little at a time." She emptied a sack of bankbooks onto the bed. "Dere's about fifty here I keep for udders like him."

It's the patrician life for department-store heiress Lady Lloyd Jones and her son Charles Lloyd Jones—pillars of a mercantile aristocracy founded on Sydney's position as prime conduit for the vast wealth of Australia's interior. The colony's first aristocracy was composed of "exclusives"—settlers untainted by convicts' blood. In today's democratic society, a drop or more of convicts' blood in one's past is often considered downright chic.

Mum made no mention of a document she has tucked away among her sparse belongings: It names Mrs. Shirley Smith a Member of the Order of the British Empire, by appointment of Queen Elizabeth II. Thus, Mum Shirl became one of the first Aborigines so honored, and possibly the first MBE anywhere who can neither read nor write.

On the whole, recognition comes slowly to the women of Sydney and Australia, although they have voted since 1902—18 years before the United States franchised its

females. Their advancement in government, business, and the professions lags far behind their sisters across the sea.

In this macho, male-oriented society, many pubs and clubs still exclude women (except as escorted guests); coeducation in private schools is rare. But I admit to enjoying one aspect of Sydney's separate-and-not-equal system: Schoolboys in blazers and boaters always gave me a seat on the bus.

Youthful chivalry lives, I thought, until one driver set his brakes and the record

straight: "On yer feet, mates. And that means alla yer. This bus don't move one hinch till every sheila 'ere's sittin' down."

Anytime Is Playtime

Equal status rates more tolerance in the world of sport to which Sydneysiders are fanatically devoted. Give them a winner, and gender doesn't much matter.

Here, plentiful sunshine and the absence of seasonal extremes stimulate outdoor exertion year round. So does Sydney's geography, with its sheltered coves and ocean swells a boon not only to sailors but also to surfers in their quest for the "big curl."

What nature hasn't provided in playgrounds, the people have; theirs is an impressive inventory of man-made facilities—from Thoroughbred tracks to bowling greens. Sydneysiders consider work an annoying break between weekends.

Rugby League football, probably the most punishing sport for both fan and player, has spawned Sydney's most popular social institution—the leagues club. Almost every suburb has one, formed to raise funds for the home team. Which it does—and more—with proceeds tallied almost entirely from slot machines called pokies.

Good times or bad, Sydneysiders will bet on just about anything.

TAB—the Totalizator Agency Board—handles more than five hundred million dollars a year in legal racing bets and soccer pools; some 40,000 telephone accounts encourage even shut-ins to play their hunches. Until recently, illegal casinos operated here with open doors, a full house, and apparently little interference.

Lines for lottery tickets are as long as the odds against a payoff, but no one worries about averages. "So what else can you do with a dollar, luv? And *someone's* got to win." The biggest winner of them all was the Opera House; its hundred-million-dollar cost was paid by a special lottery.

Probably the surest bet in any season is that most Sydneysiders spend a good share of their playtime in, on, or around the water. Nineteenth-century citizens were more restricted. In the 1830's public bathing so offended some of the prim and powerful that beaches were closed during daylight hours —a ban that lasted more than sixty years.

But they should see the old place now!

Beating around South Head before winter's raw westerlies, Mike Nicholas coasted close to the tiny cove called Lady Bay. Perched like plucked chickens on its ledges, a flock of nude sunseekers were turning, I am sure, much more blue than brown.

Swinging back between the Heads, Mike maneuvered his racing sloop through the harbor's polyglot pleasure fleet that counts among its fifty thousand craft every type of boat from sail-rigged surfboards to multi-masted schooners.

Plenty To Do, and Time To Do It

Getting about by water means nothing to the city's vast army of shore fishermen. Nor do the signs at almost every ferry stop that warn "Fishing On This Wharf Prohibited." Mae, 82, has been sitting on the same carton in the same corner of the Cremorne landing for a decade of Sunday afternoons.

"Takes 'most two hours to get 'ere from me flat out Parramatta way. But fishin' sure beats lookin' at four walls."

She whittled a slice from a small shrimp of unhealthy hue and baited her handline. "Put 'em in a plastic bag with a little saltpeter, they keep in the fridge for weeks. Leatherjackets love 'em."

A solid tug confirmed her wisdom.

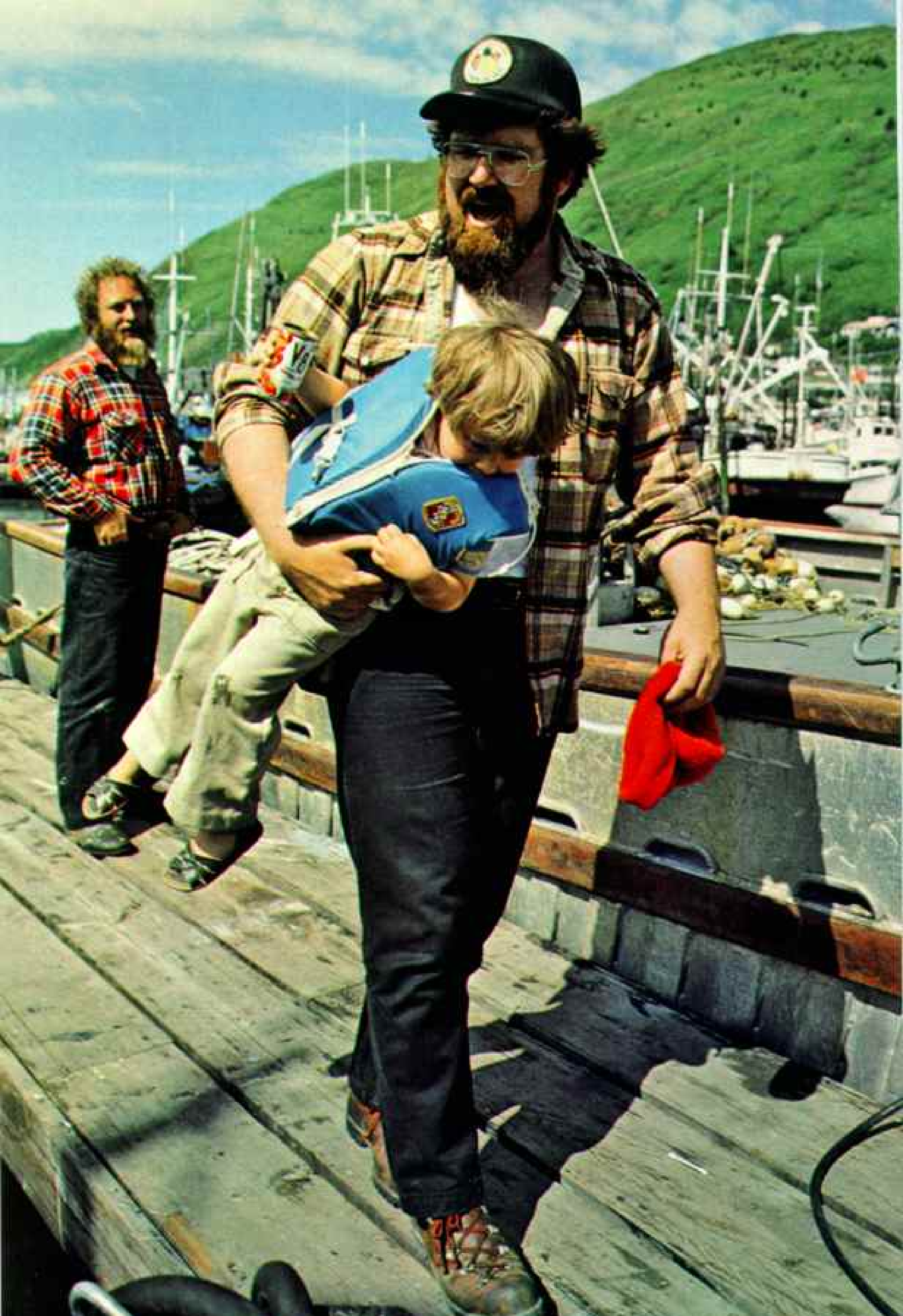
Fred, Mae's Cremorne crony, already had a leatherjacket in the bucket. His wife, Thelma, who prefers to knit and watch, napped to the gentle rock of the landing raft.

Low-income pensioners, their entertainment budget allows for little more than weekly ferry fare and another small package of shrimp. Yet, when lunchtime comes, the three climb to a sunny spot above Cremorne Point Light and picnic in a setting more glorious than any millionaire could afford.

"Howyalike Sydney?" Fred asked me.

"She's the big curl, Fred," I answered honestly. "She's beaut." □

Shootin' the tube, a surfer threads the eye of a breaker off Little Avalon, northeast of Sydney. Paradise for surfboarders, Sydney is blessed with pleasant weather year round, endless breakers, and a wide-spirited people to whom every wave is a new challenge. BILL MCAVELAIRE



Risk and Reward on Alaska's Violent Gulf

By BOYD GIBBONS

Photographs by STEVE RAYMER

BOTH NATIONAL GEOGRAPHIC STAFF

THE GULF OF ALASKA is a wilderness on the edge of a wilderness, remote by water, remote by land, rimmed by ice fields, glaciers, and the second highest coastal mountains in the world. The people live in a few small towns and a scattering of cabins. Bob Lochman, a state trooper on Kodiak Island, patrols a beat about the distance from Kansas City to Burbank and back—by boat.

Like the rest of Alaska, the gulf is a harsh place to live, attracting young people who are disposed toward sweet liqueurs, an absence of society, and an abundance of money.* The fortunes here are in fish, for the few who are lucky and resourceful, who survive the storms and can afford Alaska. A new house in Kodiak, if you find one, costs about $80,000, but then you don't have to mow the gravel.

At a basketball game in Hoonah I met a 15-year-old Tlingit Indian from Yakutat who in six weeks helping to gillnet salmon cleared about $14,000. College kids on the top seine boats may quadruple that. In a good season the best king and tanner crabbers—the highliners—gross in the millions, some of their exhausted crew staggering back to Seattle with $140,000 and visions of early retirement in a Porsche.

Word of this kind of money (and little of the risk) races among the vans of the West Coast, swelling Kodiak and Cordova in summer with the naive, who rap on the cabin doors of seiners. Most of them end up in canneries pulling insides out.

It is midsummer, and the salmon are in from the sea, swirling up the rivers of alder-green Kodiak Island. The canneries and fishermen have not agreed on price, so the men are on strike. In evening the harbor of Kodiak is limpid and still, a forest of radar scanners on hundreds of idled boats.

Night after night the fishermen have voted to reject the canneries' offers. The stakes are high. Of the one and a half billion dollars' worth of fish caught in 1977 by Americans in United States waters, 20 percent came out of Alaska—salmon, crab, shrimp, halibut, herring, cod, and sablefish. Kodiak landed 72 million dollars of this, second only to San Pedro, California.

*Joseph Judge described "Alaska: Rising Northern Star" in the June 1975 NATIONAL GEOGRAPHIC.

In the politics of fish, few can match Kodiak's Tom Casey, a boat-rocking economist from back East, here roughhousing with young Justin Everman. In nearby waters Casey salted his education by long-lining for halibut. He now advocates maximum American harvests from the new 200-mile fishing zone. In this land of big risks and big profits, Casey epitomizes the tough breed who have answered its call.

DAVID DOUBILET (LEFT)

The pot at the end of the rainbow for a few hardy and persistent Alaskan fortune seekers is often a crab pot (**left**). Not pots at all, the huge steel cages are used for hauling in king, tanner, and Dungeness crabs—after salmon, Alaska's most lucrative marine crop.

From a boat in Kodiak harbor—center of the gulf's fishing industry—cannery workers unload 250,000 pounds of tanners (**above**). Crew members, who worked around the clock for ten days in icy winter winds, will share in the estimated $108,000 catch. Then out to sea again. By season's end many crabbers will have made $100,000. But the work is backbreaking and the stakes high: Some boats find few or no crabs, and some don't return.

Salmon-net permits now sell for as much as $70,000.

Meanwhile, pinks, reds, chums, silvers, kings—literally fortunes in fish—are escaping upstream to spawn and rot. Tonight in the hall the men will vote again. Tempers and beer are beginning to spill over. Thomas Aquinas Casey, head of the fishermen's association of Kodiak, posts the latest cannery offer and claps chalk dust from his hands.

"Tom," someone asks, "are we ahead of where we started?"

"Yes, this offer is considerably better than the other bids and last year's price." Tom reviews the economics of salmon, alluding to the relative values of the dollar and the yen. The Japanese buy a lot of Alaska's salmon and roe, and their ships account for about two-thirds of the entire foreign catch in U. S. waters, almost all of that in pollock from the Bering Sea and the Gulf of Alaska.

But with U. S. fisheries jurisdiction now out to two hundred miles, the foreign catch has fallen 27 percent. Once Americans start hauling in the pollock that the Japanese have been catching, Alaska could account for billions of dollars in fish sticks. The Japanese are wisely investing in processing plants—about half the capacity on Kodiak.

Rugged Men for a Rugged Land

Among Kodiak fishermen—sweat shirts stretched by muscle, in black cannery boots, deck slippers, folding knives in snap scabbards—I feel like a poodle among huskies. I would give a great deal to have spent a lifetime lifting boxcars off their tracks, for the tension is palpable, and in my imagination chairs are about to fly.

During the strike Tom has received several threats and admits to sleeping with a revolver. But he appears confident, comforted, no doubt, by his formidable size. His plaid shirt has reached its tensile limits. He is in his late 20's and charged with enough energy to light the town. Tom's degree is in economics from Boston University, but his flat "a's" are not incongruous here among the accents of Norway, West Germany, Japan, the Philippines. In dialect the Gulf

# of Alaska

Cut by massive glaciers—two larger than Rhode Island—Alaska's coastal mountains form a crucible for savage storms that have been testing the mettle of pioneers since Russian fur trappers first colonized the coast in the late 1700's. The peaks also present mighty roadblocks, forcing the coast-hugging population to travel by sea or air. Sheer distance dictates likewise: Sitka to Kodiak is 630 miles.

of Alaska leans toward early Ellis Island.

Tom came here one summer to supplement his university scholarship, wandered the piers for days, poking his head into wheelhouses, inquiring about work, finding none. When a crewman floated up dead in the harbor, Tom applied to his boat, a halibut schooner, and went to sea.

It is difficult to land a job on any gulf boat, let alone a halibut long-liner. This has less to do with reward (halibut have been in decline for years) than with the skills required by the Norwegian-American skippers to handle the gear and the fish. Most salmon are netted near shore, but halibut are fished by hook and line out in the gulf, where there is nowhere to run from storms that peel deck plating as if it were foil.

The gear is a "skate," 1,800 feet of nylon line and 90 gangions and hooks, laid on the bottom in "sets"—18 miles of halibut bait. It must be skillfully coiled as each fish is gaffed. A two-hundred-pound halibut flopping loose on deck can snap legs like pencils.

After moving to Kodiak, Tom fished for shrimp, crab, and salmon, but in time his inclination toward politics drew him from the water and to this meeting where now he hands out ballots. "If the motion passes," he says, "the season will open at noon tomorrow." The fishermen drop their ballots in a shaving kit and go to their boats. The harbor is soon clearing its diesel throat, and blue smoke hangs in the air.

Jumpers Signal Silver Lode

Out in Shelikof Strait the wind is shredding the waves, but we are well inside Uyak Bay, sheltered by the lush mountains of Kodiak. The pink salmon are silver. When they jump, they flash like mirrors, even in this overcast. Glen Suydam watches them, estimating the size of the school: One jumper can mean 200 fish. Glen's *Alaska Warrior* is too big for the shallows where salmon are gathering, so he launches the "jitney," nudging it forward, laying the net in an arc, so that it drapes like a fence from its floats.

The salmon swim parallel to the beach, searching for *(Continued on page 245)*

Thunderclaps split the air when the mighty Columbia Glacier calves icebergs from its 300-foot cliffs. Though its offspring could threaten oil tankers in Prince William

Sound, passing tourist boats try to trigger a blessed event by blowing their horns. Ice at the base of its face fell as snow hundreds, perhaps even thousands, of years ago.

BOLLIE OSTERWICK (ABOVE)

Gentle in repose, an Alaska brown bear nurses her three yearling cubs near the Alaska Peninsula's gulf coast. If she is threatened, however, maternal instincts could turn her into 500 pounds of galloping, slashing fury. The world's largest land carnivores, Alaska brownies range much of the southern coast. On a wildlife refuge on Kodiak Island, they have been known to weigh 1,400 pounds. There, especially when salmon runs are poor, island cattle may suffer the effects of their appetites.

A feast for bears and humans alike, salmonberries (**left**), blueberries, and scores of others offer sweet summer pickings all along the coast.

familiar streams. They reach the seine, follow it out to the jitney. To hold the fish, Joe Moser jabs a long aluminum pole, its end flared like the bell of an oboe, deep into the water. Muffled "whumps" and clouds of white bubbles turn the salmon, and the seine closes around them.

Salmon hatch in fresh water and go to sea, the pinks immediately and the kings in about two years. They roam for two to five years and thousands of miles and finally return to their home streams to spawn and die. Out of a hundred eggs, maybe two complete the cycle as adults. Dolly Varden trout suck up the fry emerging from their beds. Other fish, killer whales, and seals take them at sea. Sea lions prowl among the boats at the mouths of streams—the neck of the funnel—where the salmon, awaiting the tide, stack up by the thousands.

Earlier that morning Glen and I had gone up in a cannery Cessna to look for salmon. The plane fluttered over grass flats where streams braided into a lagoon. Dozens of bald eagles squatted in the shallows, screwing their white heads from side to side like senators in debate, hopping on salmon so thick in the stream that the eagles seemed capable of crossing without wetting a talon. Gulls waddled among the struggling fish and picked out their eyes. We startled two feeding brown bears, which whirled and galloped alarmingly fast across the flats, scattering eagles and gulls.

Back at the *Alaska Warrior*, the net is pursed and the salmon are trapped, then scooped into the hold. A beautiful silver falls flopping upon the deck. In its side is a pink elliptical bite where a seal has taken a divot.

Crabbers Trap Six-foot-wide Prey

In the early 1950's king crabs—some spanning six feet—gathered by the thousands in the gulf in mauve shoals the size of city blocks. (The Bering Sea catch now eclipses that of the gulf.) Joe Kurtz made his first crab pots out of the frames of army cots. After years of storms, Joe is content to let Bart Eaton, his partner, skipper their boat.

Like many modern Alaskan crabbers, the *Amatuli* is a hundred-plus feet of steel out of the shipyards of Mobile, Alabama. The pots —no longer of bed frames—are steel cages as big and heavy as Victorian wardrobes.

The *Amatuli*'s loran-C computer records the position of each pot and automatically steers her back to the inflated mooring buoys, dancing on the swells like big pink beach balls. When discarded, the buoys are hung by ropes from spruce, and from them children swing into the mist.

With a ten-pound king crab worth more than $16, highliners often "turn over gear" for 72 hours with no rest and little food. A season on the crabbers, like work in the woods, is dangerous and punishing, so Joe and Bart prefer loggers for their crew. "I can teach you how to fish," Joe tells them. "Hell, there's nothing to that. But I can't teach you how to work."

When Bart Eaton came to Kodiak from California after college, he made barely three hundred dollars in his first four months crewing on crab boats. Now in his 30's and up in the wheelhouse, he is among the top crabbers of Alaska. "You know," he told me, "for three months I'm on that boat and my whole vocabulary is 'move your tail' and 'move it faster.' I'm a predator in the ocean. But at the end of the season I don't even want to *see* a king crab. I just want to lie on the sofa and know it won't sink."

Bart picked at his sautéed king crab legs, caught, processed, and frozen in Alaska, freighted to Seattle, merchandised, shipped back across the gulf and up Cook Inlet to this restaurant ten floors above the gravel of Anchorage. Three thousand miles frozen stiff. Fifteen dollars in inflated Alaska.

Almost everything Alaskans use comes up from Seattle. What goes back is about a third of a billion dollars of fish and shellfish. Unless you catch it yourself, the fish you eat on the gulf is likely to be about as fresh as a frozen fillet in Peoria. In Kodiak a waitress set before me the largest fried prawns I had ever seen. They were from the gulf all right, but not the one outside the door. I was eating prawns from Texas.

Storm Brings Night of Terror

Spring on the gulf, and the *Master Carl* was sinking. The gale had flexed into a killer storm—winds of a hundred miles an hour, seas of thirty feet, tossing the boat about like a bottle in rapids. In the dark the frightened crew struggled into survival suits, without which in these frigid waters they would become hypothermic in a few minutes, lock up, and die.

The *Master Carl*, out of Seattle, sank off Cape Yakataga. The four men hoped their raft would wash ashore near help. Along the 250 miles of coast between Yakutat and Cordova where the *Carl* went down, there are not enough people to fill a school bus. The skipper and one crewman drowned in the surf. The other two washed up on Kayak Island. Before being rescued by a Coast Guard helicopter, they spent a harrowing night trying to keep from being eaten by three aggressive brown bears.

Living With Nature's Awesome Power

The gulf is said to have a moderate climate. Unlike the interior of Alaska, it has no engine-cracking winters of minus 60°F, and summer days rarely see 75°. In Yakutat, however, the Tlingits have no word for blue sky; ten feet of rain falls each year, fifteen inches in a single day. Kodiak seems to be in perpetual rain or mist. Last winter five feet of snow fell on Valdez in five days.

There is nothing moderate about the winter storms of the gulf. When the air is still in Arctic Alaska, winds of 120 miles an hour are tearing the gulf into spray, the spray into smoke, the boats into pieces.

Fifty-foot waves rip wheelhouses from decks, then crush the hulls. The oil companies drilling in the gulf are nervously aware that these storms have produced waves of a hundred feet, and their scientists fear the potential for a giant of almost two hundred.

The spray chills, turns to ice on all that it clings to. Fishermen desperately beat on the ice with axes and baseball bats. Looking like the inside of an overfrosted refrigerator, the boat soon weighs more than the water it displaces. It rolls over and sinks like a stone.

The storms are detonated when chilled continental air passes over the gulf's high mountains and ice fields, and is suddenly moistened and heated by the warmer Alaska Current. The heated air rises, expands, releases more heat through precipitation, giving off energy in a huge vortex of wind. The barometer drops. The winds build into a hurricane, though no one up here calls it that. To them it's a storm, which will influence the winters in Kansas and as far away as Europe.

Normally radio chatter on the gulf ceases just before 6 p.m., but this cold night two skippers are hogging the frequency. A third breaks in angrily. "Hey, come on, we want to get the weather!" In her home on Kodiak, Peggy Dyson leans her elbows on a single-side-band radio. Her thousand-watt transmitter is the size of a small refrigerator. Microphone in hand, she waits, an attractive woman of middle age, brunette, hazel eyes sparkling with tints of brown. "Hey, dammit, get off so we can hear Peggy." Peggy clears her throat. The radio falls silent.

"All mariners, all mariners, this is WBH 29 with the Alaska marine weather." Peggy's voice is a pleasant, reassuring alto. "There is a 987-millibar low 140 miles southeast of Kodiak. . . ." Ships off Japan, off San Diego, hear her. So does her husband, Oscar, crabbing from the *Peggy Jo*, and, on other boats, both her sons. She is talking to her family, and her extended family. Completing the weather, she seeks out the boats.

"WBH 29 calling the *Peggy Jo*."

"Evening, babe. Snowing a little, some winds of thirty, but OK." A long-liner out of Petersburg is clearing the Fairweather Grounds. "Ah, good evening, Peggy. Da vind is turtee knots. Da svells is running nortvest to turteen feed."

Peggy passes their observations on to the National Weather Service. Each morning at eight and each evening at six, she reads the forecasts. She is the wet-bulb thermometer of the gulf, often its wet nurse.

"Oh, my God, this is my wife's birthday! Peggy, would you mind getting a dozen roses. . . ?" She has paid electric bills to keep food from spoiling in refrigerators. She once received a postcard from a skipper she knows by voice and name but has not met. Printed on the card was: ATTN, POSTMASTER . . . HAVE NO ADDRESS . . . BUT EVERYBODY KNOWS WBH 29 PEGGY.

Ceilings Low, Hazards High

"The gulf is an unforgiving environment," Tom Casey had told me. "You get maybe one chance, if that." That has been on my mind this morning. Jim Metheny is flying me from Cordova to the cabin of Les New, a trapper at Katalla, on the toe of the Chugach Mountains. Below us, spreading for fifty miles, is the Copper River Delta,

Mining Alaska's green gold, a timber cutter prepares to trim a freshly fallen spruce on Afognak Island, westernmost of the gulf's timber stands. Along the southeastern panhandle, the nation's largest national forest yields most of what has become Alaska's third most valuable natural resource after oil and fish. About 70 percent of the timber is exported to Japan.

green, gray, and flat. Green is the marsh grass, willow, and alder. The river is gray, of glacial till, about as clear as flowing cement. It is shredded into innumerable mud shoals with ponds and swans and beavers among them—an astounding expanse of glacial sediment that plugs the horizon.

Below is a moose bedded down in willow, like a cow in statuary. To the left, somewhere in the soup, are the mountains. To the right is the gulf in a froth. Our windshield is beaded with rain, and the wind slaps the Cessna around like a finch. If my fingers were talons, my knees would be pulp, for we are just above the flats and barely under the ceiling—a tube to Katalla.

Gulf Flying Not for the Fainthearted

Jim Metheny is a capable pilot and an engaging companion, but my flying experience has not prepared me for the gulf. I have had time enough in lightplanes, but mostly with pilots who avoided clouds like muggers in a park. If you wait for good weather over the Gulf of Alaska, you'll mold in your bunk.

The few roads tend quickly to go nowhere. Airlines and ferries take you to the main villages, but there is much distance between them. And separating the ferry circuit within southeast Alaska and the one connecting Kodiak to the Kenai Peninsula and Prince William Sound is not only the high cordillera of the St. Elias Mountains, but a gap in ferry service so vast you could wedge in Montana with just the edges curled up.

So up you go in Otters, Gooses, Beavers, and Cubs, up fjords, over ice fields and fangs of rock, jammed in with anchors, generators, sacks of mail, cases of whiskey, and, you hope, a pilot wired to the Second Coming. Snow and rain blow around you, and below, from time to time, you see a door off a floatplane, the carcass of a helicopter, a bear on its kill—headstones all, helping frame in your mind this question: Just what in the hell am I doing up here? What I am doing, before the warden raps on the bars, is

Panama bound, the *Overseas Ohio* steams out of Valdez Narrows. Its cargo of Alaskan crude—more than half a day's pipeline supply—will be shipped via the canal to southern and eastern U. S. ports.

Collision course for ice and oil? Close to shipping lanes for Valdez, the Columbia Glacier's summer spawn of icebergs poses a potential threat to passing oil tankers and thus to the gulf's fishing industry. Using a 65-foot tug, Coast Guardsmen test their ability to maneuver an 80-foot berg in Columbia Bay (**above**). Though southeasterly winds usually keep present icebergs from drifting into tanker lanes, geologists fear that the Columbia, like Alaska's other sea-facing glaciers, may

soon begin to retreat—a process that could increase calving dramatically.

Nature's own coast guard, sea lions—such as these pursuing a school of herring in Icy Strait (**below**)—often accompany coastal fishing vessels.

gobbling my last meal, my emergency ration of chocolate, in flight.

Katalla once had oil derricks, 13 saloons, thousands of workers, and the hope that the nearby coalfields would attract a spur of the Copper River railroad then being built from Cordova to the copper mines in the Wrangell Mountains. Copper made it to Cordova, but the coal stayed in the ground. The refinery went up in smoke in 1933, and so did Katalla's future. All that remain are a few old buildings, roofs collapsed from snow, an arrow showing lost pilots the direction to Cordova, and Les New in his cabin.

Life in the Bush at 70

We bounce on the gravel and stop. Les steps out of the brush. "Hello, you bear hugger," says Jim. Les says, "I was beginning to think you'd left the country."

Les is tall, angular, a weathered 70. He and Jim are partners during the hunting season—Jim the guide (bears, goats), Les the cook. Their clients come from Dallas, New York, Osaka. Jim's business card is in English and Japanese. Irregularly he flies in to Katalla, bringing Les his mail, some staples, a touch of V.O. We carry that now to the cabin through fireweed and a jungle of dripping alders and spruce. It is August and around noon, but the sun could be over Cameroon for all I can tell in this wet gloom.

Inside, Jim begins pulling provisions from the boxes. "You got a roast here if you want it," he says to Les. "When you're out, you'll like anything," says Les. "I've been living on fish." He breaks the seal of the V.O. and takes a generous sample.

One day in 1954, after twenty years of bucking logs in Oregon, Les had walked out to the airstrip at Coos Bay. "Where do you want to go?" asked the agent.

"North, to Alaska."

"Where in Alaska?"

"Hell, I don't care. I got a hundred-dollar bill. As far as it'll take me."

It took Les to Cordova. He cooked on fishing boats, worked on oil rigs in Icy Bay, hunted seals in the Aleutians. He has been here trapping for the past 15 years. Until emphysema interfered, Les had been going into the mountains on skis to check 140 miles of trapline—wolverine, lynx, wolf. He is still after the big wolf that got Rufus, his beagle.

Les's cabin is tongue and groove, two rooms and a pantry, under a heavy patina of woodsmoke and grime. Rain runs off the roof by the acre-foot and into a barrel. The water bucket rests on a gravestone by the stove—a 55-gallon oil drum. The coffeepot is low, the bottle lower still. We fry hamburger over a drum of roaring spruce.

Taking No Chances With Old Brown

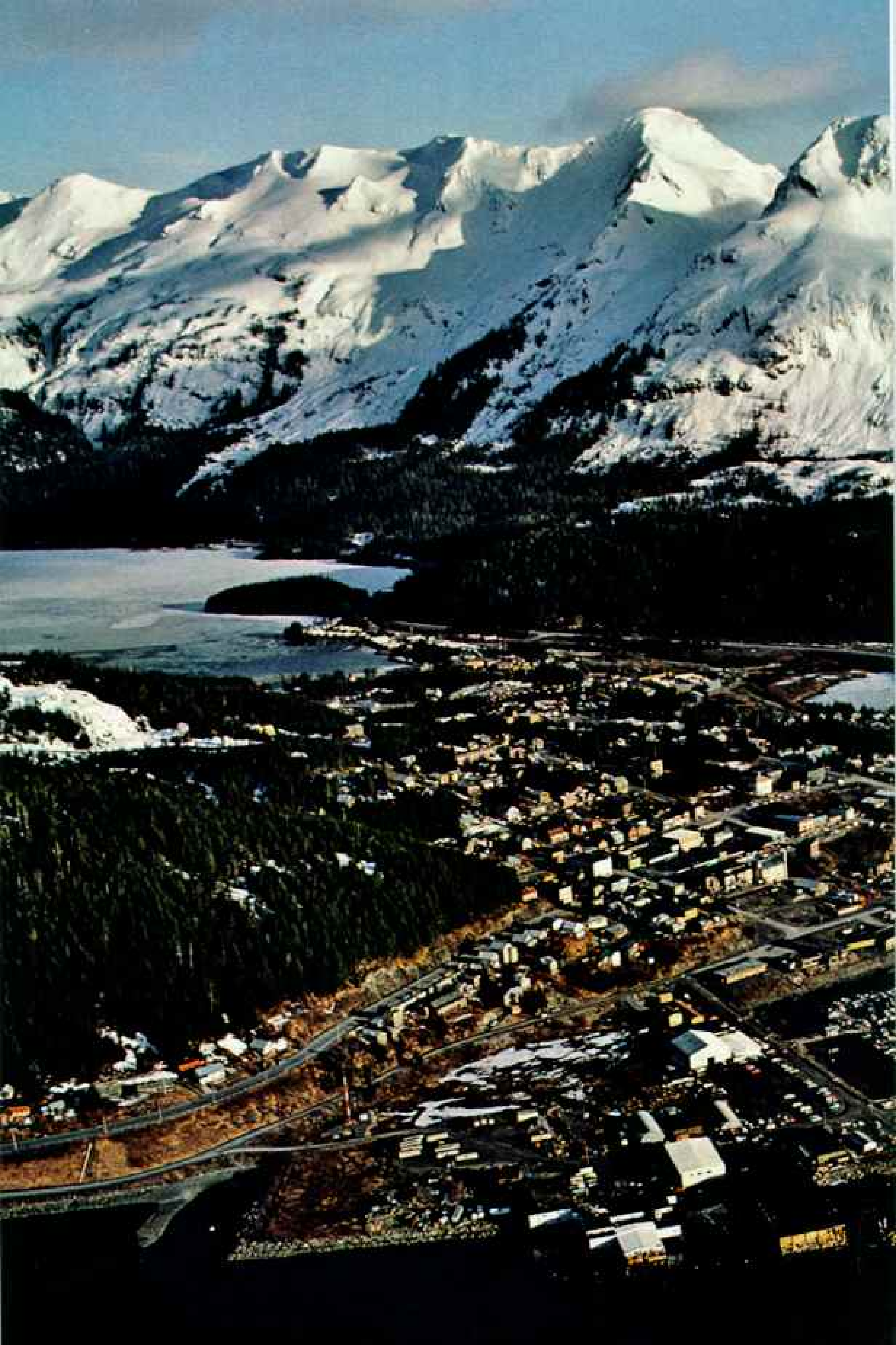
Sometime in the night I awake to the moaning wind. My flashlight illuminates a sign nailed to the door: PLEASE DON'T FEED THE BEARS. I open the door and stand for a moment under dripping eaves. The spruces are whipping about. Having lived among and hunted bears for years, Les doesn't step out the door without his magnum revolver or .30-'06 rifle. "I admit it," he told me. "I'm afraid of old brown. You can't see him, and that's when he's dangerous." At the moment I would be hard put to see old brown from a helicopter with searchlights. I shut the door and jump back in my bag.

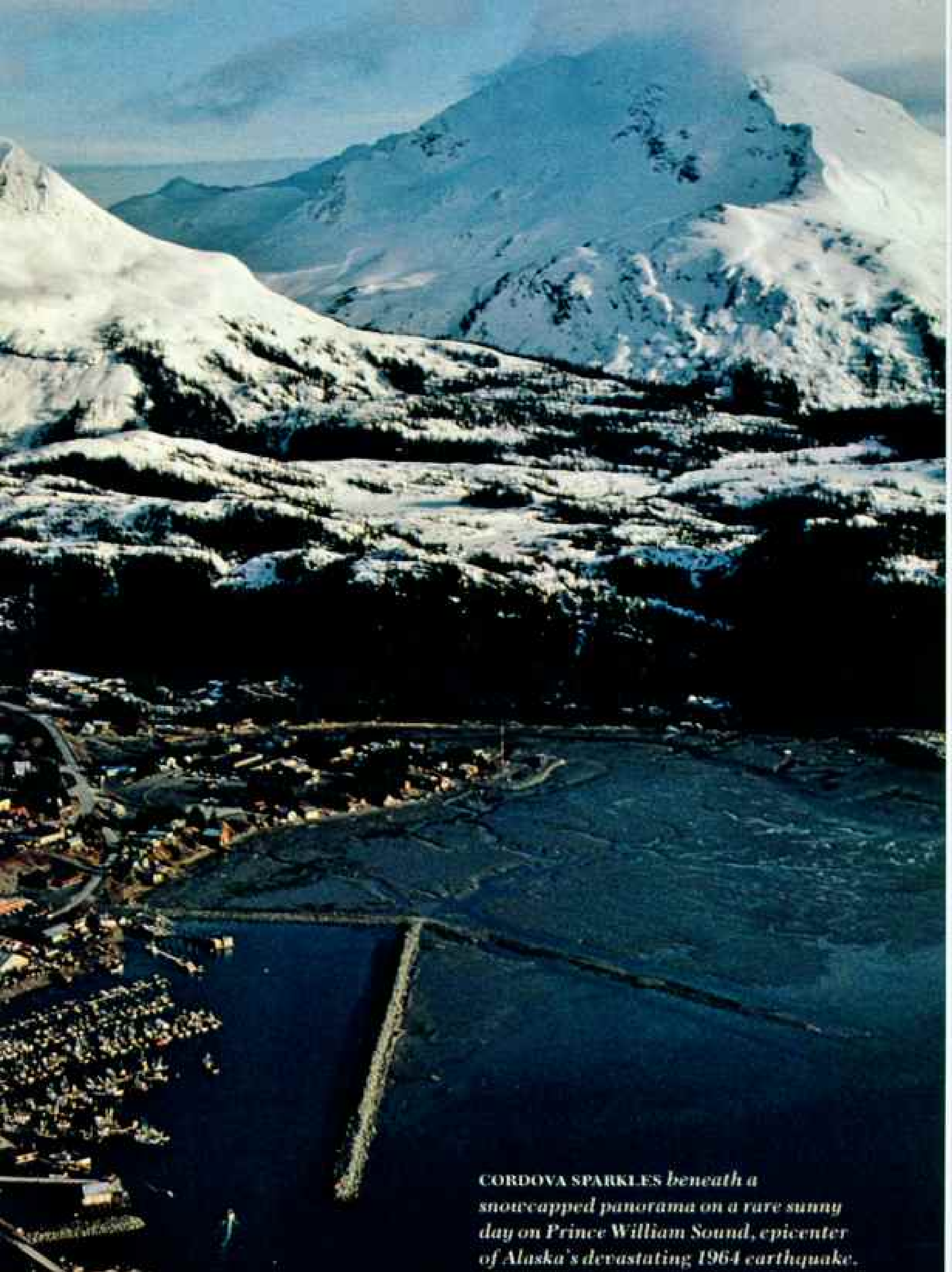
The bears of coastal Alaska are blacks and big browns, and in this country they are everywhere.* Big Kodiak brownies may stand nine feet, their claws like pitchfork tines. High-powered bullets have ricocheted off their thick skulls. Intelligent, agile, masters of stealth, they can easily run down a man. Fishermen have come upon browns in Shelikof Strait swimming for Kodiak, miles away. Browns will kill and eat black bears. The blacks on occasion move up with the mountain goats, and have been known to slap them off ledges.

For every account of an attack on humans, there are hundreds more of bears going about their *(Continued on page 256)*

*See "Among Alaska's Brown Bears," by Allan Egbert and Michael Luque, GEOGRAPHIC, Sept. 1975.

Caviar for the Orient, tons of fresh salmon roe are packaged for Japan in the New England Fish Company cannery at Uganik on Kodiak Island (**left**). Brought to Alaska for the six-week salmon season, Japanese technicians (**below**) assure that workers—many of whom are college students from Seattle—grade and pack the eggs properly. Cured and preserved with salt (**above**), much of the roe is airfreighted to Tokyo, where it is a delicacy retailing for as much as $32 a pound. As in the Alaskan lumber industry, the Japanese control a significant share of the gulf's fish-processing industry, including more than half the capacity on Kodiak Island.





CORDOVA SPARKLES *beneath a snowcapped panorama on a rare sunny day on Prince William Sound, epicenter of Alaska's devastating 1964 earthquake. At the height of the summer fishing season, the town's population nearly doubles.*

PHIL SCHERMEISTER (ABOVE AND FACING PAGE)

Watch guards of Alaska's fertile fishing grounds, Coast Guard officers return from a Japanese trawler (**facing page**) after enforcing the 200-mile fishing limit that became law in 1977. Aboard a Taiwanese ship, they examine the log (**above**) for restricted species, which include salmon, halibut, and all shellfish. Foreign vessels are now permitted only certain bottom fish, such as a Japanese ship's catch of sole and already filleted pollock (**below**).

business, making only false charges, running off. Of course, the bluff in such charges may become apparent only after half a ton of muscle and claw has roared through the brush, its great teeth clacking, skidded to a stop, risen over you, and woofed in your face a breath of foul carrion.

If the bear is a dominant boar, a sow with cubs, wounded, guarding a kill, or simply hungry, there may be no counterfeit to the charge. Jim Metheny's hunting partner was ambushed and killed by a bear he thought he was tracking. Ignoring advice, a photographer camped beside a salmon stream used by feeding bears. A bear came through his tent, tore him apart, and ate him.

Understandably, such terror is remembered up here. Stranded for a while on Hinchinbrook Island, a couple of Seattle barge hands encountered two Indian boys rattling pebbles in beer cans.

"Where's your beer can?" the boys asked.

"Huh? What for?"

"Bears. Nobody walks around here without their beer can."

"You wouldn't happen to have an extra?"

"Nope."

Bears Are Bad News for Ranchers

Most of Kodiak is bear refuge—at least it was until the Koniag natives began shrinking it with their land selections. The bears, however, have never been picky about jurisdiction; when the Russians introduced cattle in the late 1700's, the bears promptly introduced themselves to the cattle. For all the abundant grass, ranching here, for many reasons, is still a lean existence. A few years ago when salmon runs were low, bears butchered more than a hundred of the Burtons' Herefords. Kathy Burton keeps a diary:

July 22 . . . "found two dead yearlings. Bear kill." July 29 . . . "another kill in holding pasture. Bear hunting." July 30 . . . "Bill found two more kills." August 2 . . . "The guys fenced and bear hunted."

Matt Rockwell, the Burtons' hired hand, asked if I wanted to help him recover a bear trap near a recent kill. Thinking the trap was probably at the end of the hay meadow in which we were standing, I agreed. We were soon beyond the meadow and well up the side of a mountain choked with alders. What Matt yearned for on his imaginative


DAVID

horizon was fur in his gunsights. "Man," he kept saying, "would I like to see a bear right now." He was shirtless, a teenager from Anchorage aiming an invisible rifle. "Just one big bear. *Pow!*" He would stop, turn, go up the mountain for a short distance, searching, then put his fist to his forehead and disappear again into the grass and alders. My adrenaline was pinging.

We finally found the trap and the kill, or what was left of it—a jaw, hooves, a shadow of flies. Matt assured me that Bill had shot the bear that had done in the heifer. I assumed nothing. Had he cleared his throat, I would have leaped off the mountain.

Fifty Feet Wasn't High Enough

A sign on my motel door in Cordova reads: "If you hear a continuous series of short blasts on the siren, this means that Cordova has received warning of a possible tsunami (seismic sea wave)." The sign then instructs me to get to high ground fast. No vacuous euphemisms minimizing danger. Not in blunt Alaska.

On Good Friday, 1964, fifty feet above sea level was not high enough on Chenega Island. Two tsunamis, minutes apart, roared over Chenega, crushing the village. An earthquake, its epicenter in upper Prince William Sound, had suddenly heaved up the gulf floor as much as fifty feet, lowering, uplifting, and shaking the land for 550 miles from the Wrangells to Kodiak, triggering submarine slides—and tsunamis.

The powerful waves whipsawed the harbor of Kodiak for hours, crashing boats into town, pulling the downtown down. The ground under Anchorage shook like jelly. Cordova's port, and that of nearby Valdez, went out with the waves. The delta in front of Seward fractured. Parts of it slid into Resurrection Bay. The first tsunami ruptured tank cars, spilling and igniting oil. Twenty-five minutes later, the second one arrived, a thirty-foot wave. The wave was aflame.

The violence of 1964 was not uncommon to the gulf. An earthquake in 1899 uplifted the shore near Yakutat 47 feet. Farther south, in 1958, an earthquake dumped a mountain of rock into Lituya Bay, producing a wave so huge—the highest in history—that it ripped out trees growing 1,740 feet above the bay.

Beneath the ocean, the Pacific plate creeps northwestward an inch or so a year, grinding past California along the San Andreas Fault, eventually nosing into the Aleutian Trench and under the American plate, rumpling coastal Alaska, shoving the mountains up—Kodiak, and the Kenai Mountains. And up—the Chugach. Higher still—Mount St. Elias, 18,008 feet. Where there is resistance, pressure builds for centuries as the upper plate compresses, until finally it slams seaward—66 feet in the 1964 Alaska earthquake.

Along the zone of friction deeper beneath Alaska, pressure and heat melt the rocks. Magma rises through the crust. Boom! Mount Katmai volcano, 1912. More than a foot of ash smothers Kodiak, caving in roofs, clouding the sun around the world.

Birth of a Glacier

Snow buries the mountains. The crystals in the lower layers compact, become granular: firn. Under the weight of new snow the firn packs tighter, squeezing out the air, becoming ice. Beneath the pressure of hundreds of feet, the layers of ice act like soft plastic, begin to flow down the mountain. A glacier. The largest glaciers and ice fields of North America are along the Gulf of Alaska. The Bering and Malaspina Glaciers are each larger than Rhode Island.

The calving, or tidal, glacier pushes before its face a terminal moraine of earth and rock. The tide and waves work at the face, causing it to calve chunks of ice into the water. Eventually enough gives way to expose a new face to the erosion of the waves. The glacier now loses its grip on the moraine. Shrinking back up the fjord, it chokes the bay with icebergs. Reaching equilibrium, it advances again.

All the tidal glaciers of North America have so retreated, all, that is, but one: the Columbia, near the port of Valdez, where supertankers hook into the trans-Alaska

◀ **Rusty reminder** of Alaska's strategic role in World War II and the U. S. expulsion of Japanese forces from the Aleutians, an old army vehicle entertains children near Yakutat. After the war, many veterans stayed to settle on the gulf coast.

pipeline.* The Columbia in places is 3,800 feet thick. It is so big that Washington, D. C., could comfortably fit on it. When the Columbia eventually backs off its moraine, it might shrink thirty miles, calving mountains of icebergs into the tanker lanes.

Growlers Kept Halibut Fresh

One day I flew to the Columbia to talk with Austin Post, a glaciologist aboard a boat of the U. S. Geological Survey. Austin was monitoring the changing thickness of the Columbia, hoping to predict its retreat.

Floating all about us were small chunks of the Columbia—brash—and larger icebergs—growlers—that fizzed and crackled in the still, cold air. Within recent memory, growlers were towed into villages and longliners stuffed halibut with their shavings.

Resting in what appeared to be most uncomfortable positions, hundreds of harbor seals were taking the sun, curled up on the growlers like tilted parentheses. On the flight, I had seen black blobs of schooled herring on the blue sound below, and sea otters floating on their backs, paws entwined, looking up through bristles of mustaches like kaisers in a spa.

The U.S.G.S.'s *Growler* bumped forward toward the glacier. The seals slid off their sun decks, surfaced, and blew their noses. The Columbia's face rose three hundred feet above the water, reaching across the valley two and a half miles—a wall of ice of incredible presence, of black against white and shadings of rich indigo blue. Chunks of ice that looked the size of the Waldorf Astoria began to pitch off the face, sending huge geysers of gray water skyward. The air thundered with cannonade.

I had heard of tourist boats blowing whistles to activate calving. I asked Austin how effective this was.

"Doesn't affect it at all," he said. "Nothing but the movement of the ice does that. A glacier is amazing, though. It can move twenty feet a day without a sound."

In an hour the calving ceased, and as we turned away, a charter boat of tourists pulled up, a whistle shrieking. The Columbia just sat there, pregnant with ice, refusing to calve on command.

I couldn't get a room in Valdez when the North Slope oil arrived in the pipeline, so Cal Cary, skipper of the tug *Sea Swift*, put me up. The food was excellent, confirming a maxim I had been formulating that the better cooks on the gulf work not in restaurants but in the galleys of boats.

In its way, the town celebrated. Some women competed in an oily T-shirt contest, and a lot of people slopped around in the mud, eating salmon and getting sloshed on free beer, trying to reassure themselves that the boom days had not dissipated.

Valdez is surrounded by vaulted mountains in a setting that rivals the fjords of Norway. Before it was destroyed in 1964, old Valdez still suggested the frontier. New Valdez appears to have been conceived by a hamburger chain and unloaded one night from flatbed trucks.

A few days later the *Sea Swift* helped pull the first tanker of crude away from the terminal. As the *Arco Juneau* slid toward the narrows, the tugs, to lend some pizzazz, squirted their water cannons high in the air. Standing at the stern, Bill Hardman, the *Swift*'s chief mate, caught the deluge, and the air turned blue with his commentary.

Gunk Sparks New Exploration

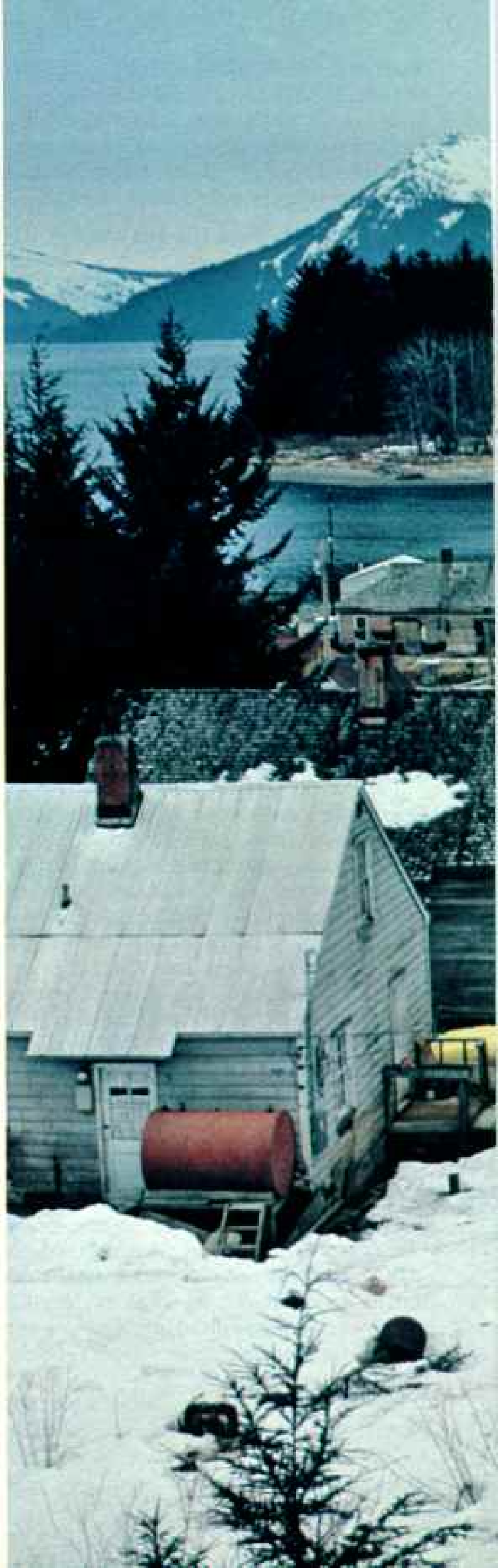
In 1896 Tom White, hunting bear near Katalla, found a pool thick with black gunk. He lit a match. The pool burned for a week. Aside from such natural seeps, oil companies have hoped for bigger finds under the continental shelf. In 1976 the first federal offshore leases were issued in the northern gulf, and recently in lower Cook Inlet. The shelf off Kodiak may be next.

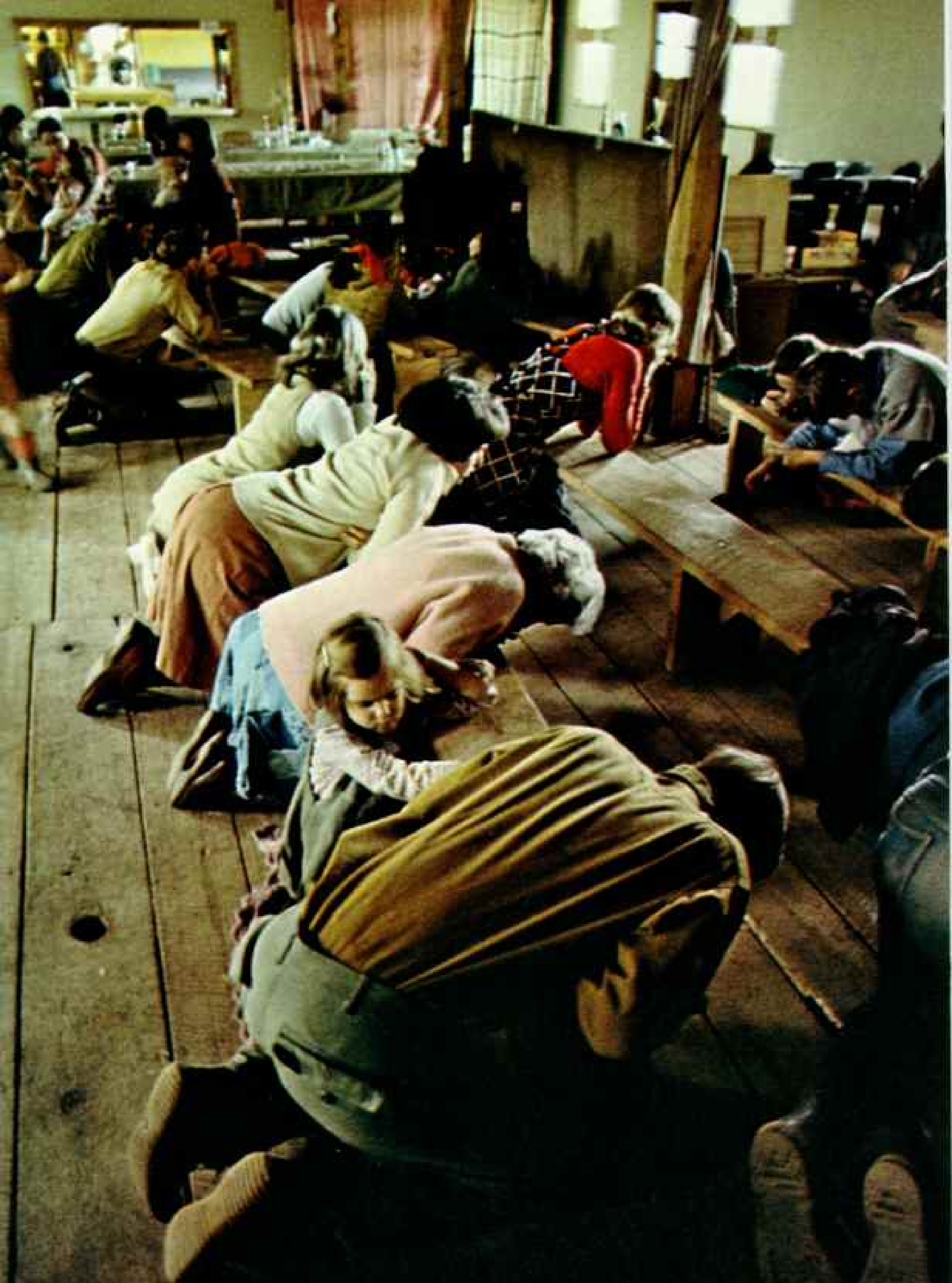
The oil companies have brought some mammoth equipment up here. I had always imagined a drilling rig to be a cramped platform on which a bunch of muddy roughnecks tried to keep from hipping one another into the sea. The SEDCO 706, a semisubmersible that ARCO and Shell were leasing, was a floating colossus. The interior of its computerized wheelhouse resembled the control tower at Dulles airport. A steward in a white jacket was pushing a vacuum down a carpeted hallway.

No one knows whether the gulf has oil in commercial quantities, if at all. This is wildcat country. *(Continued on page 267)*

*See Bryan Hodgson's article on the pipeline in the November 1976 issue.

Boardrooms behind him for the moment, Byron Mallot, the young Tlingit Indian who heads Sealaska Corporation, relaxes at home in Yakutat with his son Joey (**above**). The largest of 13 corporations created by the Alaska Native Claims Settlement Act in 1971, Sealaska manages investments for the Indians of Alaska's timber-rich southeast region. In the fishing village of Hoonah (**right**) live 875 of the state's 60,000 native shareholders—all heirs to nearly a billion dollars and forty million acres granted through the settlement act.





Called by a different drummer, members of the Farm (**left**), a religious community on Chichagof Island, seek not Alaska's wealth but its purity. From bank manager to hard hat, most are urban refugees who have forsaken creature comforts; they happily scrub clothes by washboard (**above**) and till fields with horses (**top**). Odd jobs in the nearby town of Hoonah supplement sales of produce (**right**) for farm income.

A harsh taskmaster for those who would reap its wealth, Alaska's storm-whipped waters extract heavy tolls in property and life, with the highest sea-related death rate in the nation. Off Kodiak Island, Jim Toffee, Jr., of Washington State, tries in vain to toss a towline (**above**) to his father's salmon seiner, which washed ashore when its seine became tangled in the propeller. Twelve hours later, after an Alaskan state trooper in scuba gear swam through the bone-numbing water with the towline, Jim

manages to pull the boat free through crashing surf (**below**). Such hazards increase dramatically in winter, when storms are more violent and crew members struggle to keep ice from sinking their boats and livelihoods.

(Continued from page 261) Drill and find out. Yvonne No. 1: dry hole. Salome No. 1: dry. Twenty thousand feet into the earth. Twenty million dollars a hole. After two years, 11 dry holes.

"The onshore geology doesn't agree with what we're finding out here," Richard Knowles, ARCO's drilling superintendent, told me. "The oil-bearing Miocene shale is flat gone. We have no idea where it went. We haven't found enough oil to boil a pot of coffee."

In the view of some Alaskans, particularly fishermen already nervous about the tanker traffic out of Valdez, an absence of oil would be just fine. If a supertanker breaks up in one of these storms, currents could take the oil into the estuaries, where crab and shrimp larvae live and salmon commute. A few years ago the state sold oil leases in fertile Kachemak Bay, then, because of the protests, bought them back. Oil rigs have now moved onto federal leases just outside the bay. The fishermen shake their fists, gas up, and go.

Winter Mellows Frantic Pace

Despite the storms, I prefer the gulf in winter. The pace is slower, and the crowds of fortune hunters, summer romantics, and misfits have thinned, helping to soften the greed and the friction over growth, oil, land, and race, which have put an edge on Alaskan temperament. But I do miss the wild nagoonberries.

The freighter I have ridden here to Kodiak is now being unloaded of its cargo vans—five tons of ice cream, the Burtons' cattle feed. We had been delayed in Anchorage while men with axes tried to remove a two-foot glaze of storm ice, one man hanging from a rope ladder probing for the foremast light with an acetylene torch.

Tim Murphy, the local manager for the shipping company, has invited me to a dinner party. While we search among the vans (the food is in one of them), I try to control an impulse to hope for king crab legs, kippered salmon, smoked butter clams. Tim leaps over a snowbank, unlocks a van, and steps in. "It's here!" he shouts, tearing open a cardboard carton. "You can't get this in Kodiak." He holds up tubs of Colonel Sanders' Kentucky Fried Chicken. □

KATHMANDU'S REMARKABLE NEWARS

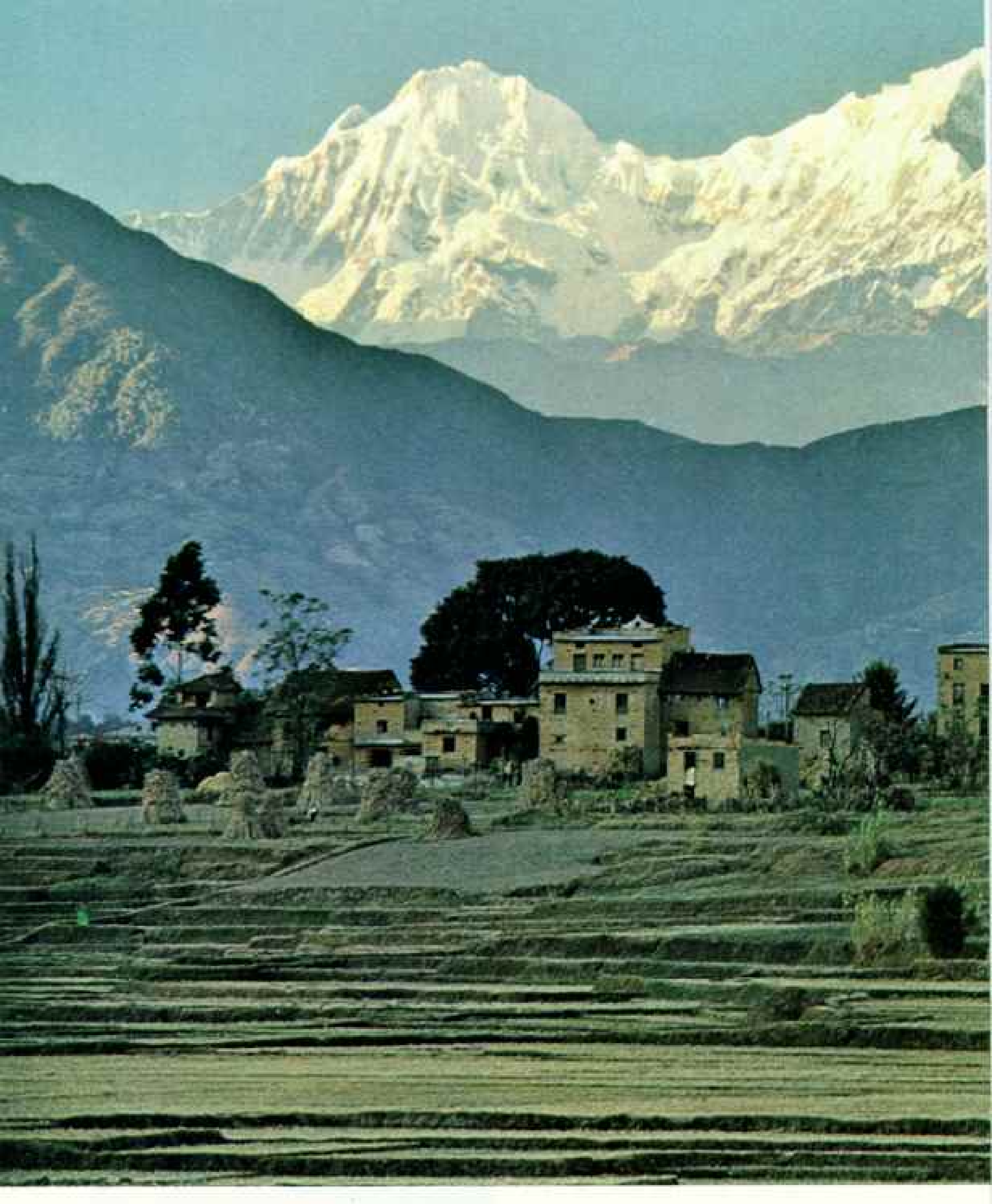
PICTURE STORY BY JOHN SCOFIELD

Still the world is wondrous large—
seven seas from marge to marge—
And it holds a vast of various kinds of man;
And the wildest dreams of Kew
are the facts of Khatmandhu. . . .
RUDYARD KIPLING, "IN THE NEOLITHIC AGE," 1895

EVEN NOW, after five journeys to the sequestered kingdom of Nepal in the past twenty years, I marvel at the truth of Kipling's words. While people everywhere are familiar with the nation's Sherpa mountaineers and knife-wielding Gurkha warriors, they hear little about the Newars, the talented townspeople and farmers of the Kathmandu Valley. I have come to know these friendly folk as the creators of Kathmandu's sophisticated urban culture, with its compact city design and thousands of elaborate shrines crowded with superb sculptures.

Descended from Mongol peoples, the Newars are believed to be the original inhabitants of the valley, which has become a catch basin of many Asian groups. Rival Newar kingdoms held sway in valley cities until 1769, when Prithvi Narayan Shah, a leader of hill tribes from the Gurkha region, conquered the valley and made Kathmandu his capital. Despite losing their independence two centuries ago, the Newars have stubbornly clung to their identity, language, and the rituals that are a conglomerate of Hinduism, Buddhism, and animism.

One age-old belief has it that the goddess Kumari temporarily resides in the bodies of selected Newar Buddhist girls. Nearly a dozen Newar communities have Kumaris, worshiped with offerings of ornaments, food, and money. Even the king of Nepal, the world's only Hindu monarch, pays homage to the royal Kumari of Kathmandu. The living goddesses, considered omniscient, receive neither formal education nor doctor's care. They usually give up the post at puberty, but the principal Kumari of Patan (**facing page**), though past 20, holds to her role. Since her feet should not touch ground, she rides in the arms of a relative to her throne, while all around her, other Newars enjoy the motorbikes, educational opportunities, and treats of normal childhood (**below**).

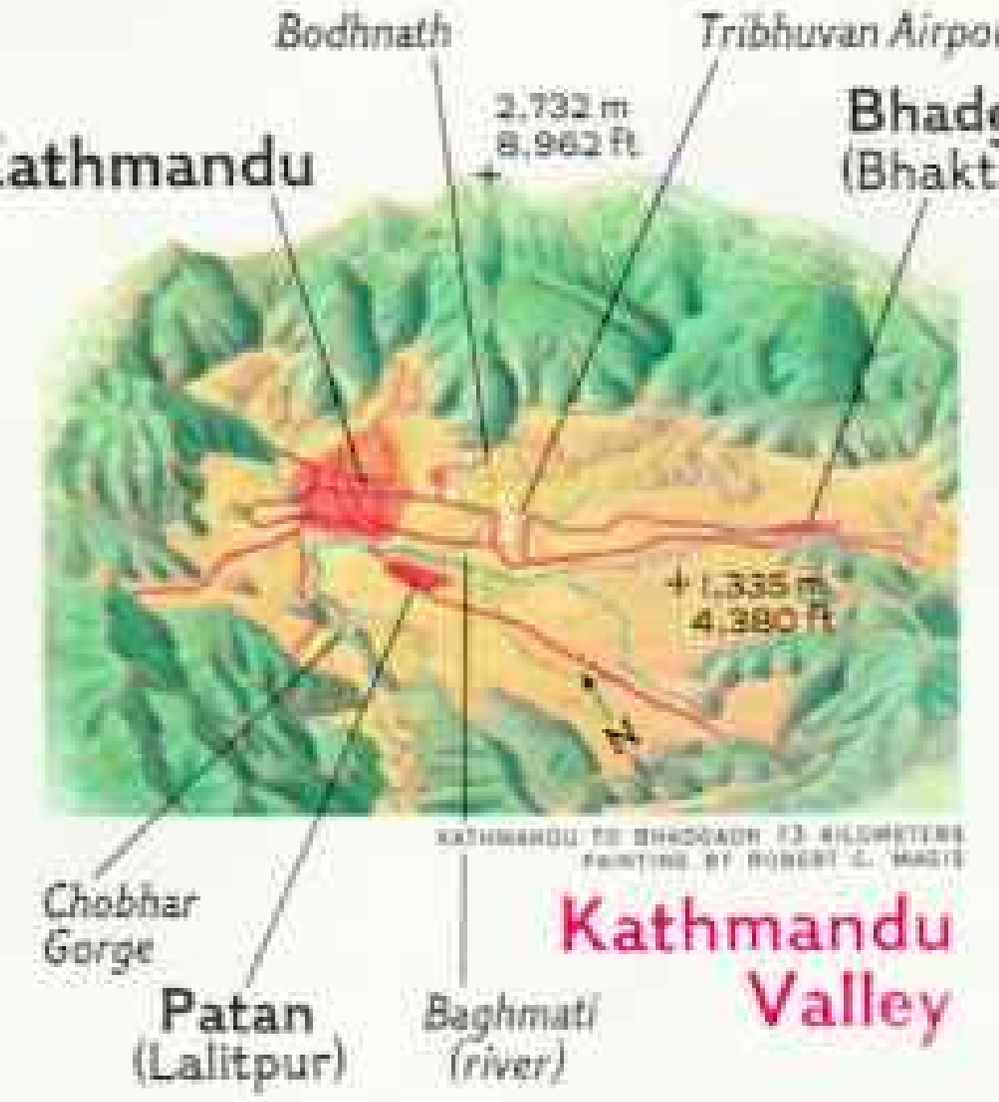


LOFTY ABODE of the gods, Himalayan peaks rise more than 23,000 feet above sea level some forty miles north of the Kathmandu Valley. The productive basin—4,400 feet in elevation and at the same latitude as central Florida—basks in December sunshine. In summer, monsoon clouds bring heavy rainfall that permits extensive irrigation.

To the Newars, every mountain, tree, and stone harbors a spirit that must be honored. Their tradition says that the valley

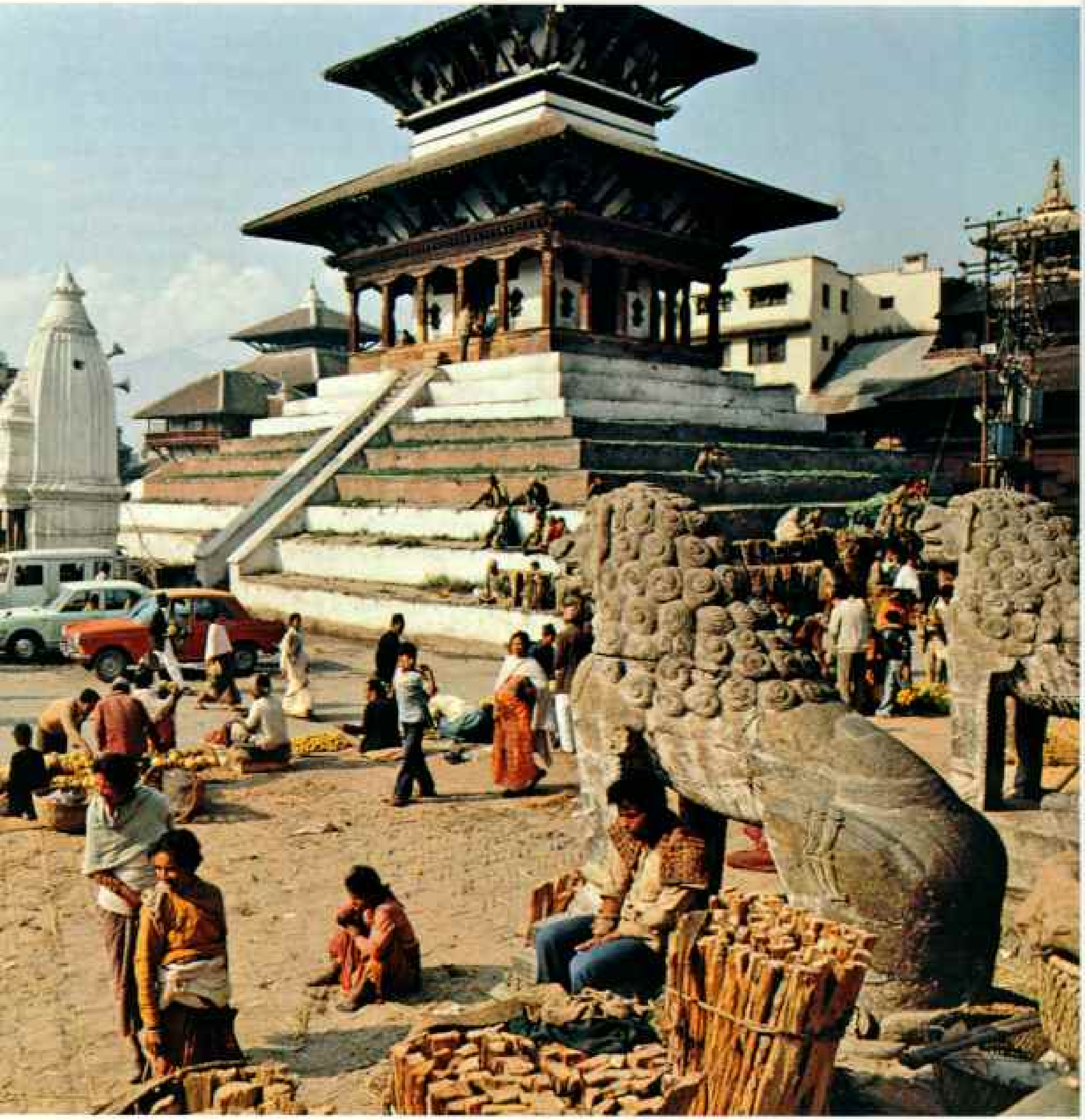
was a deep lake until the god of learning swung his mighty sword to create a huge cleft in the circling mountains—the Chobhar Gorge. Geology supports this creation myth; once the valley *was* a lake. To this day Newar farmers dig up the rich subsoil and spread it on their fields like fertilizer.

The fertile valley has always attracted hill tribes. Some constructed their scattered thatch-roofed houses, at right, near the multistory brick compounds of the Newars, at left.



Kathmandu Valley

SACRED AND PROFANE mingle in the main square of Kathmandu, one of the least modernized city centers I have seen in Asia. Newars make up at least half the population of about 200,000, and some—Buddhists as well as Hindus—pay daily respects at these pagoda-roofed Hindu shrines, as if visiting old friends. Travelers from all corners of the world must dodge around residents who dry laundry and watch children play on the street. Newar



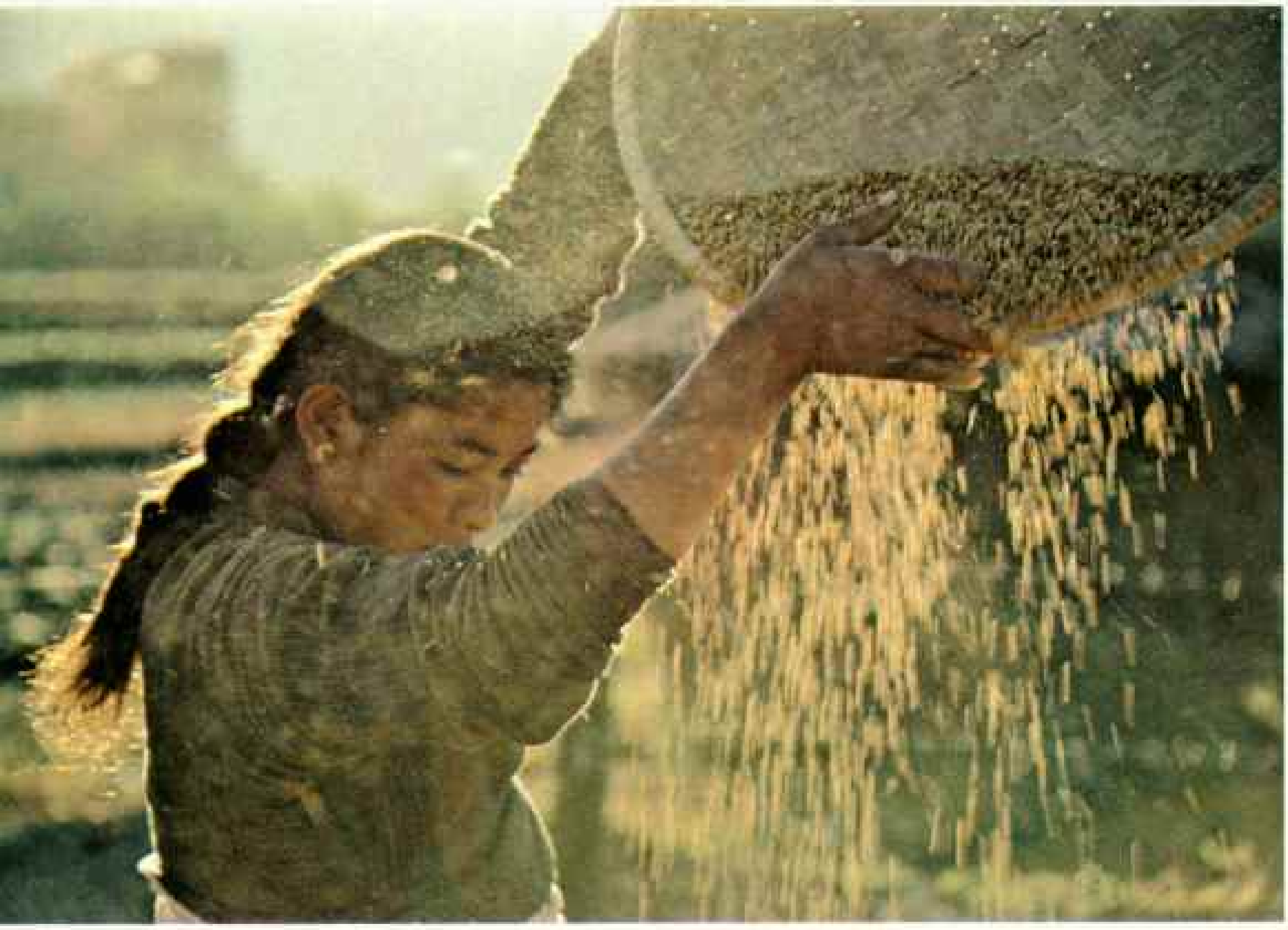
women hawk produce while a woodseller sets up shop beneath a stone lion, guardian of yet another temple.

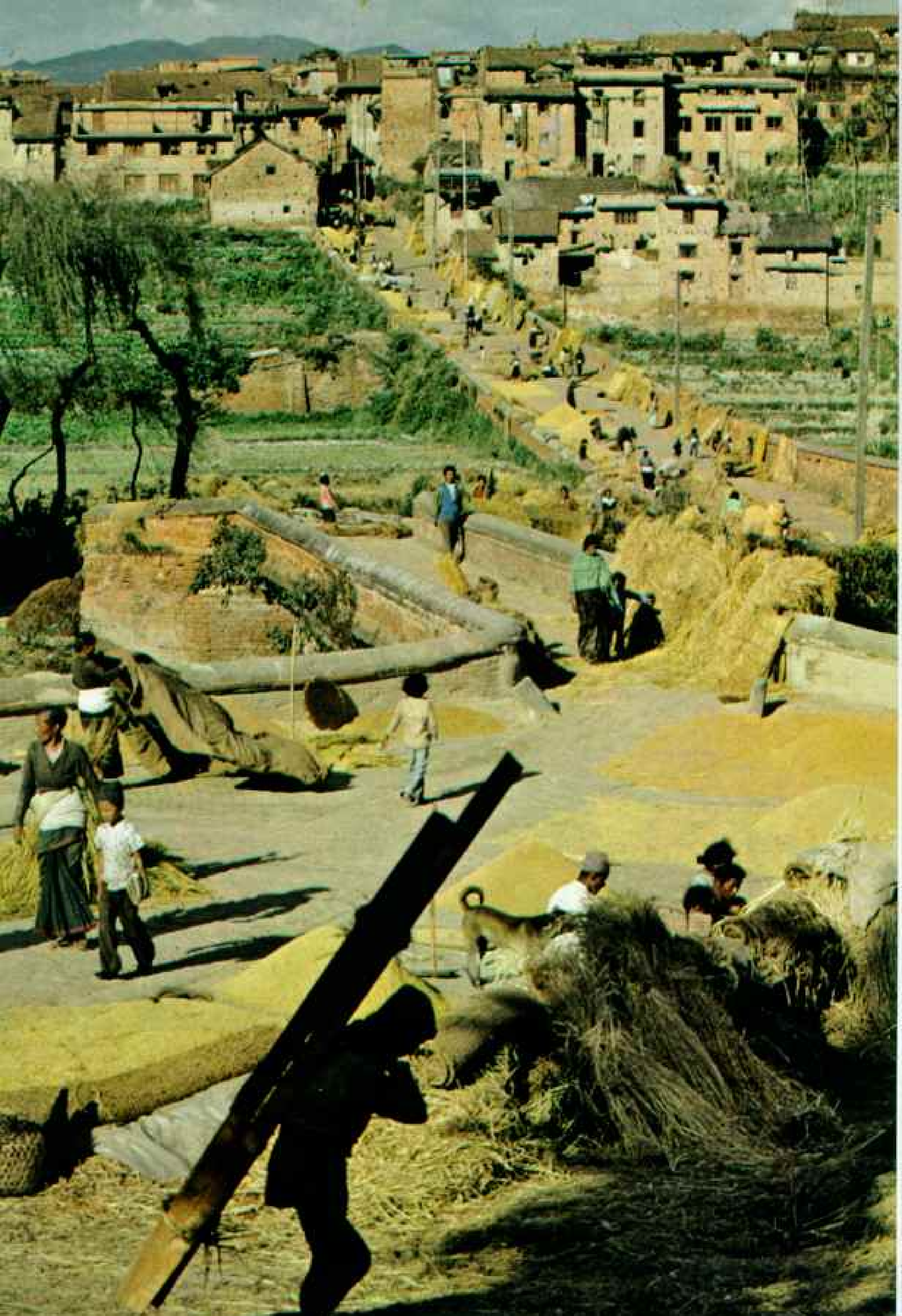
Newars have always been Nepal's leading traders, once sending basket-carrying porters and packtrains over passes to India, Tibet, and China (**map**). So esteemed was Newar craftsmanship (pages 282-3) that a Newar was appointed artistic adviser to the court of Kublai Khan. Profits and people came back to enrich valley cities. Such commerce continued even after Prithvi Narayan Shah closed Nepal to Westerners, explaining his fears, "First the Bible, then the trading stations, then the cannon." In 1951 Nepal opened its doors to the West and began a program of modernization. Yet Christian proselyting remains forbidden.

Newars enter government service, but they still are chiefly tradesmen, importing most goods from India, such as aluminum ware in a Kathmandu shop (**left**).

SUPERB CULTIVATORS, Newar farmers with rudimentary tools have transformed the Kathmandu Valley into a nourishing rice bowl. This man turns the soil after fall harvest using a handmade hoe, or *ku* (**left**). In spring he spreads manure—and, increasingly, chemical fertilizer—and floods his small plot with water channeled from a stream or hillside pond before planting rice. Now he will plant wheat to dry-farm through the winter months. Newar women share the backbreaking tasks of field work and winnowing (**below**).

Grain dries in the sun on an ancient entry into the Newar city of Bhaktapur (**right**). Farmers crowd together in towns and villages and cultivate every possible inch of surrounding land. Despite the availability of ready-made cloth, farm women spin cotton thread and weave their black skirts with red borders—characteristic female dress of the Jyapus, the Newar farmers' caste. Such garments reveal tattoos on their lower legs, decorations they believe they can sell in the afterworld to buy food.

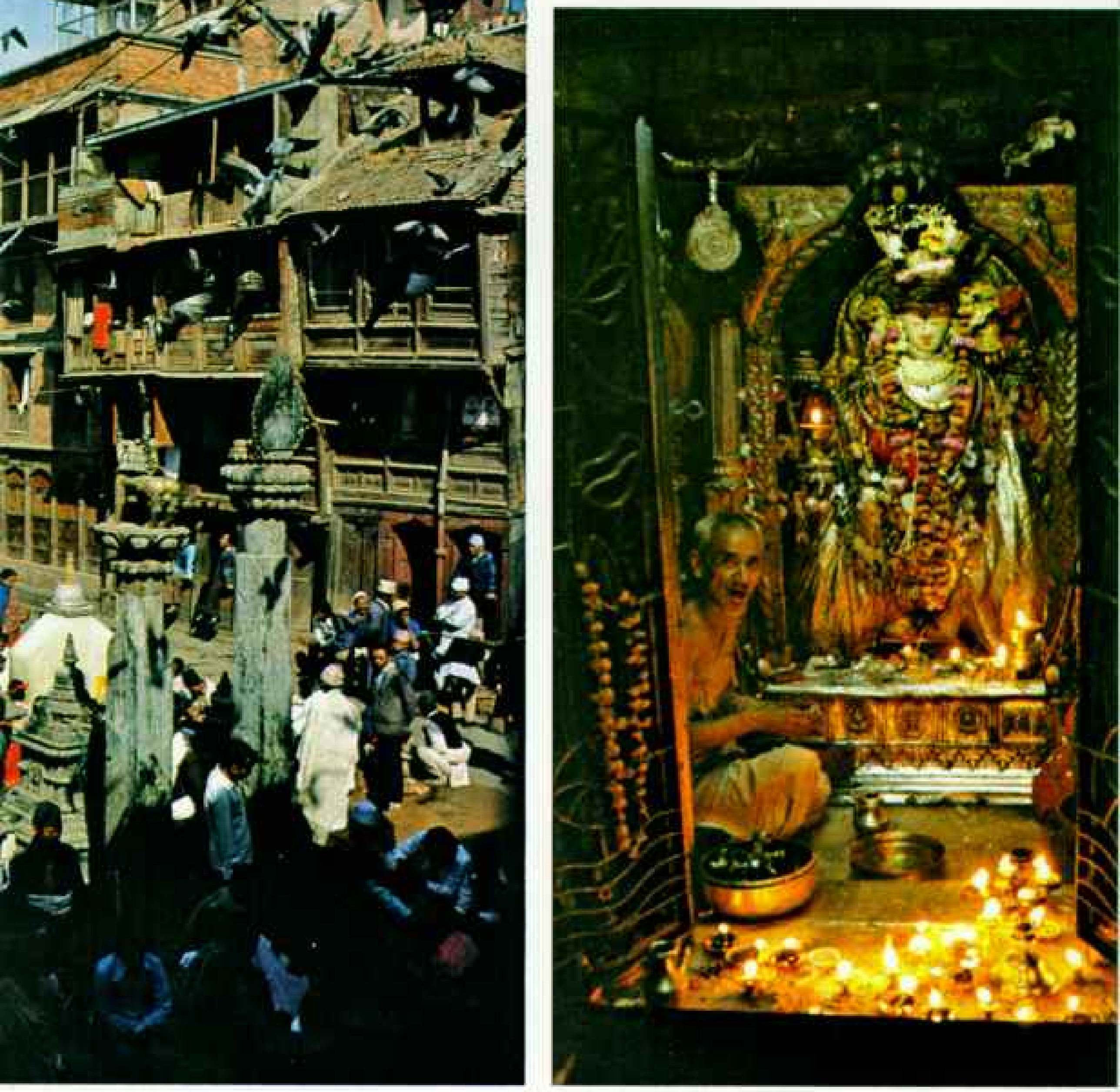




CROWDED into a downtown city square and surrounded by the wood-balconied Newar homes of Kathmandu, a richly decorated temple shelters an image of the White Machhendranath, god of compassion and a favorite deity of Newar Buddhists.

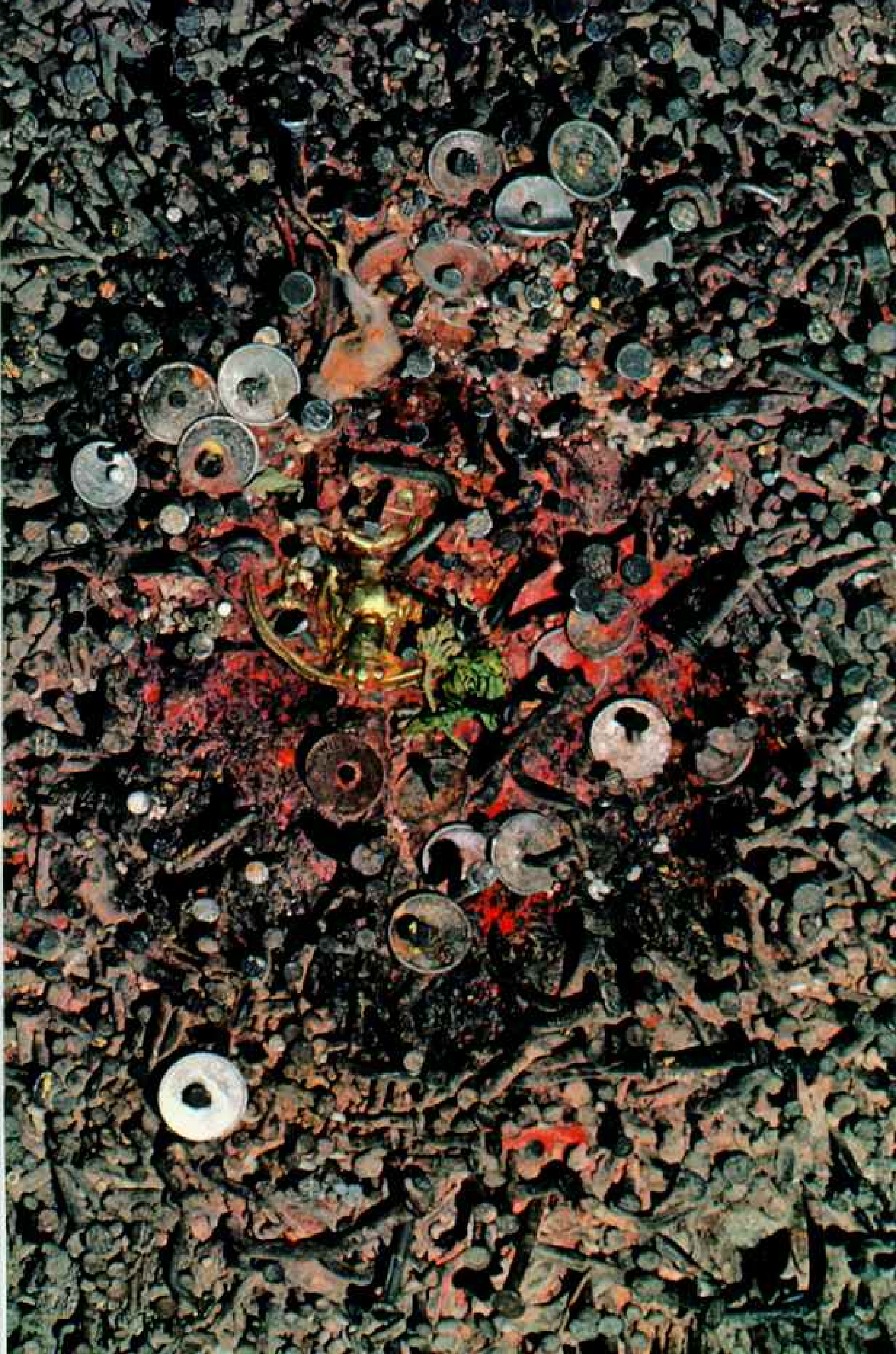
I joined one celebrating farm family, a hundred strong (**above**), meeting after the harvest to make a fire offering by burning such foodstuffs as rice, mustard oil, butter, and yogurt. As priests chanted, we milled around statues of Buddhist deities, donated by the wealthy to accrue merit for both their loved ones and themselves.

Usually the Machhendranath is secluded



inside the temple in the glow of oil-lamp offerings (**right**); the priest places each lamp beside the god's figure to assure individual recognition for the worshiper. But once a year the deity is carried outside for an elaborate ritual bath, a popular festival drawing both Hindus and Buddhists.

Buddhism, which developed out of Hinduism, has so melded with practices of the older religion that Newars today are hard pressed to say they are of one faith or the other; only outsiders try to make such distinctions. Like most Nepalese, Newars observe a constant round of rituals in worshiping the dozens of deities who control every aspect of daily life.



NEWAR ARTISTRY handcrafted the gilded copper decoration, or *torana*, over the entrance of a shrine to the Hindu goddess Kali (**above**). A worshiper attaches offerings of greenery. Thieves had stripped a similar torana (**below**) of its central figures for sale to collectors, although the government tries to block the export of antiquities. No one is likely to carry away another Kathmandu shrine (**left**), a massive block of wood reputed to cure toothaches if the sufferer simply drives a nail into it. Some add vermilion powder and coins. The tiny golden image is the toothache goddess. Passing Newars, I noticed, touch the sacred block without pausing or looking, as a sign of respect and for luck.

GLEAMING LODESTONE, the great stupa at Bodhnath (**left**) has drawn Buddhist pilgrims—mostly from Tibet—for many centuries. Under the stupa's guardian eyes, worshipers circle clockwise, spin prayer wheels, and donate prayer flags. To cater to the pilgrim trade, Newars built the encircling shop-homes. Similarly in Lhasa, capital of Tibet, Newar merchants and craftsmen prospered. After Tibet's unsuccessful revolt against tightening Chinese control in 1959, many Newars and Tibetans found new homes in Nepal. At Bodhnath, lamas built new monasteries, such as the large one in the background, thus helping revive Nepal as a center of Tibetan-Buddhist learning.

As if contemplating the strange ways of the world, a copper monkey guarding a Buddhist temple in Patan studies a fruit (**above**). A convenient post for chains that cordon the courtyard, he has lost part of his skull to the caresses of passing worshipers.

RELIGIOUS MOTIFS still dominate Newar crafts. A wood-carver (**facing page**) repairs a palace-roof strut bearing the Hindu god Vishnu on horseback. Another strut bears the beloved god in a more traditional pose. Wood carving was a declining art when a UNESCO project located some thirty carvers among the stonemasons' caste in Bhaktapur to train in restoration.

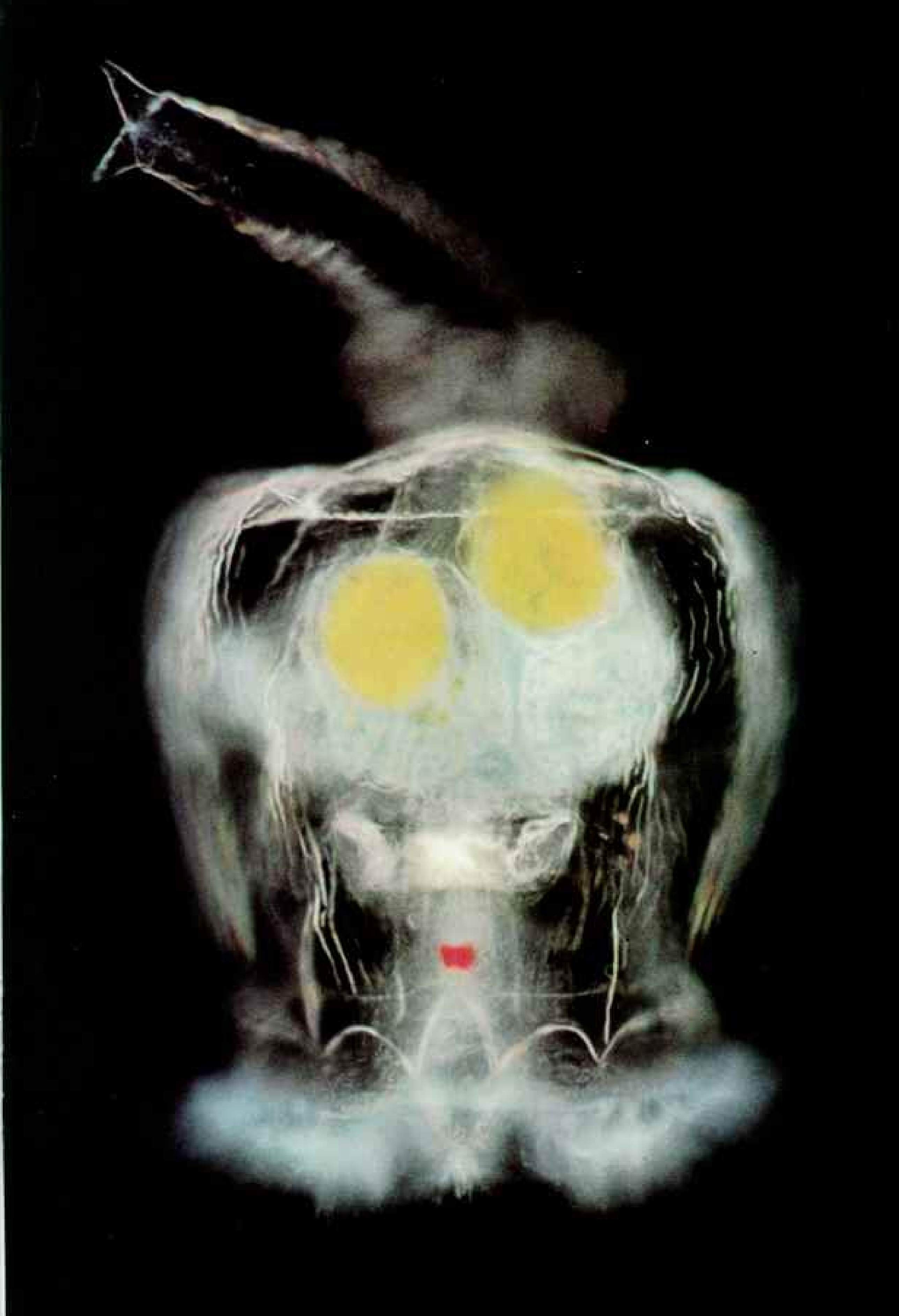
In Patan, metalworker Dhan Bahadur Sakya finishes a bronze Buddha (**left**) that he molded by the lost-wax process.

While his mother and child warm themselves at a charcoal brazier, Bhai Krishna Kulu (**above**) makes drums for temple rites. Animal skins are considered unclean, so his leatherworkers' caste is deemed untouchable. Newars long ago adopted the Hindu caste system, which ranks hereditary occupations according to ritual purity.

RITES centering on the home appease Yama, god of death, during Tihar, the Nepalese version of the Hindu festival of lights. I joined the Manandhar family for the fall holiday, which for Newars marks the New Year. Days are spent honoring the crow, messenger of Yama; the dog (**lower left**), guardian of Yama's gates; and the sacred cow (**right**). Kept for milk and dung, the beast personifies the goddess Lakshmi, and here on her day is treated to fruit and grain. Lights in the window will please Lakshmi as she circles the earth at midnight to bless family money boxes and grain stores. The green grapefruit-size *bel* reminded me of another Newar custom: Little girls are first married symbolically to Vishnu, represented by the fruit. Since women are thus "married" for life, they never have to suffer the stigma of widowhood or divorce.

On another day of Tihar (**above**), sisters worship brothers, who in old age are often their only benefactors. Brothers seated behind mandalas, decorative symbols of the universe, receive a red forehead mark and the blessing: "I plant a thorn at the door of death; may my brother be immortal."

The festival highlighted my trip, for this family had accepted me into their home and had shared their celebration of life and death—something of the Newar world I shall carry with me wherever I go. □



ROTIFERS

Nature's Water Purifiers

PICTURE STORY BY JOHN WALSH

ASPECT PICTURE LIBRARY, LTD.

A WHIRLING BLUR of "wheels" emerges within the decaying matter beneath my microscope. Like precision-tooled gears, the wheels spin at the head of a creature slightly larger than a hair's breadth, creating a vortex to trap food particles. The rotation is a marvelous illusion caused by cilia, hairlike structures that beat sequentially together. No wonder 17th-century microscopists such as Anton van Leeuwenhoek gave the name "wheel animalcules" to the endlessly fascinating organisms known today as rotifers.

Dip into any green puddle, birdbath, or roof gutter after a rain, and you're almost sure to find rotifers. About 1,800 species of these multicellular aquatic animals are spread throughout the world.

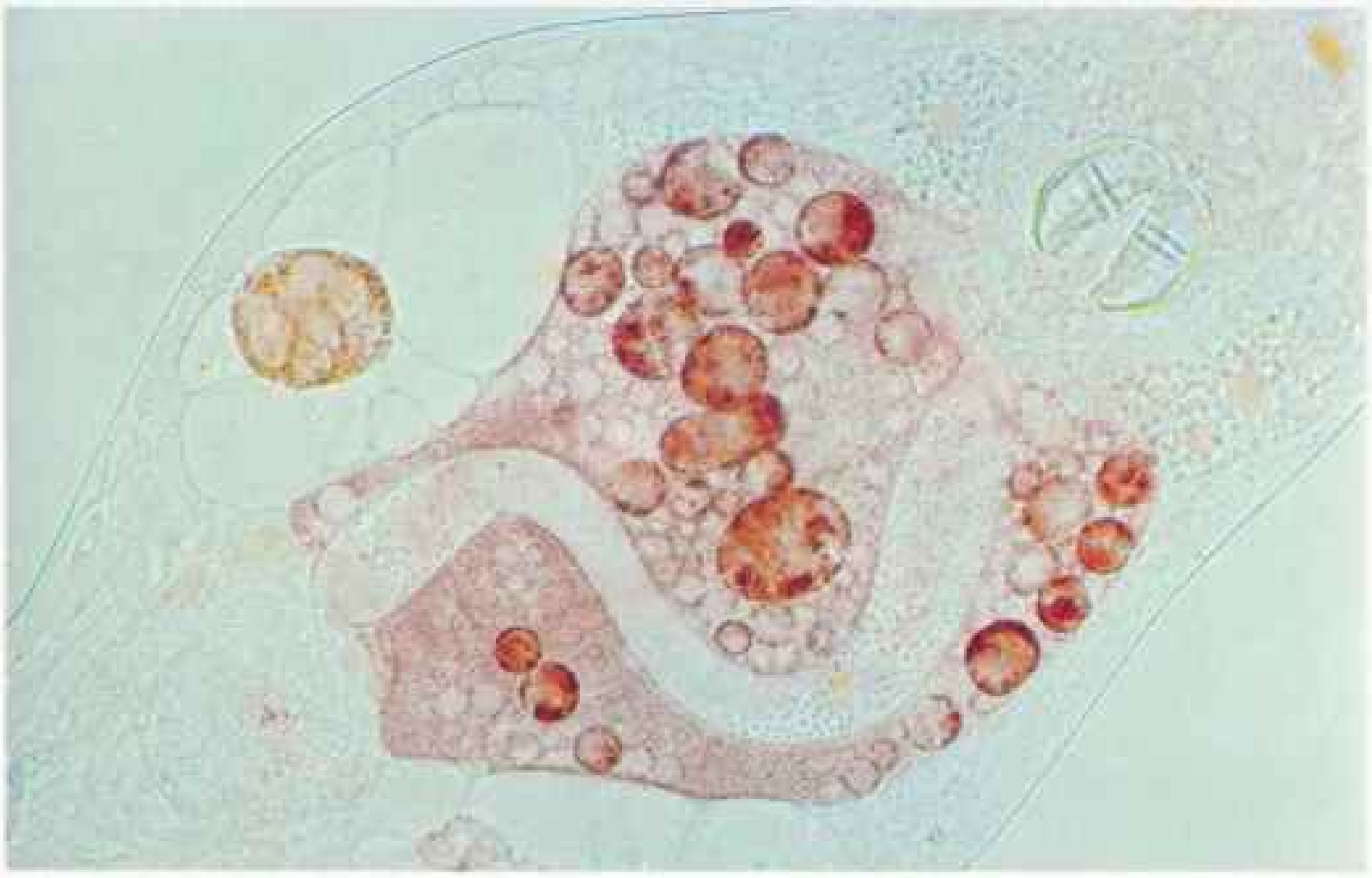
For the past three years I have haunted ponds and lakes around London to collect, study, and photograph these diverse creatures. One, *Brachionus* (**left**, 520 times life-size), wears a transparent, vaselike lorica, or shell, which reveals its internal organs and a vivid red eyespot; it trails a long, twin-toed foot. A pair of soft-bodied *Philodina* rotifers (**right**, 260 X), their cilia churning on their two-lobed coronas, browse near an oval alga and, above it, the maturing egg of another rotifer.

These incessant hunters perform an important cleanup service in the still or slow-moving waters they inhabit. Most species feed on algae populations, which under certain conditions can increase rapidly and turn a lovely pond into a stagnant morass. Furthermore, rotifers' waste products, bound together in a sticky mass, attract and settle other organic particles to the bottom.

Perhaps rotifers' most amazing trait is an extreme tenacity to life. James Murray, a biologist on a 1907-1909 Antarctic expedition, collected and dried rotifer specimens that revived when moistened a year later. Others have remained in suspended animation while frozen, waiting for a thaw to set their wheels spinning again.

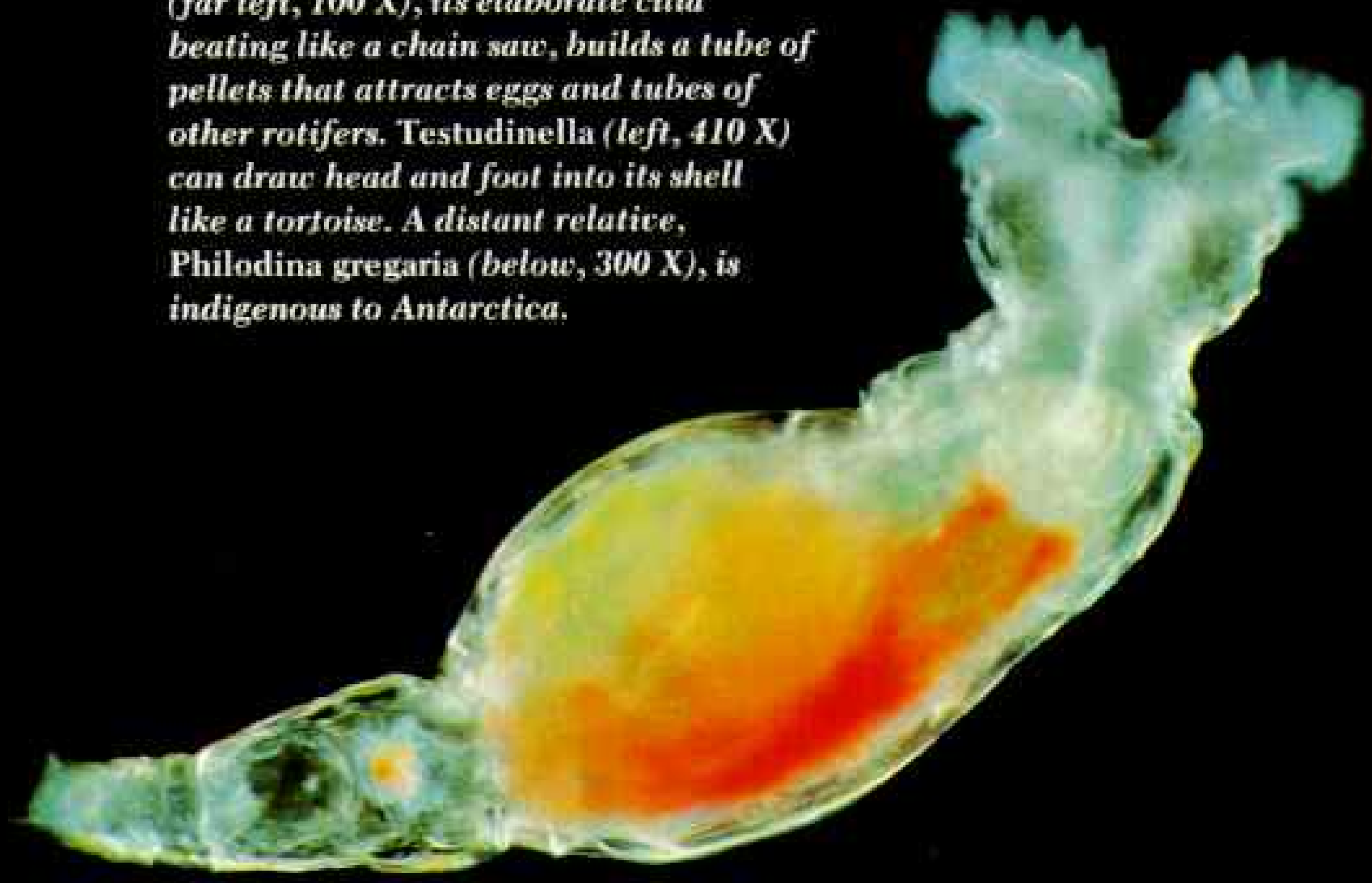
INSIDE a see-through skirt of mucus outlined by bits of debris, a *Collotheca* rotifer harbors an egg (**left**, 600 X). When it hatches, the young will squeeze out between the top of the skirt and the parent's body. Almost all rotifers are females and, through parthenogenesis, usually produce female offspring. But if food runs short or the temperature drops, some give birth to short-lived males that fertilize their eggs.

A simple digestive system (**below**, 460 X) processes rotifers' meals of algae and small protozoans, finely ground by the trophi, or jaws, marked with parallel lines at upper right. A *Trichocerca* rotifer (**bottom right**, 190 X) nips busily at cell walls along a filament of an alga, sucking out the contents. Rotifers also feast on each other (**bottom left**, 160 X). Here one soft-bodied rotifer, at right, methodically cannibalizes a sister who makes no attempt to escape during the ten-minute ordeal. I discovered another danger one day when a *Trichocerca* in my prepared specimen turned up missing. I searched in vain, mystified, until I focused on a small worm. In its transparent stomach lay yesterday's *Trichocerca*. I felt as if I had lost an old friend.



MIKE WELLS, ASPECT PICTURE LIBRARY, LTD. (ABOVE)

A SEA OF JEWELS *from Hampstead Heath near London fills my collecting net (above).* **A Filinia** *rotifer (upper left, 520 X) with a large egg in tow can use its appendages to flip away from predators.* **Floscularia** *(far left, 100 X), its elaborate cilia beating like a chain saw, builds a tube of pellets that attracts eggs and tubes of other rotifers.* **Testudinella** *(left, 410 X) can draw head and foot into its shell like a tortoise. A distant relative,* **Philodina gregaria** *(below, 300 X), is indigenous to Antarctica.*



LIKE A PERISCOPE jutting from a bed of decaying algae, a *Ptygura* rotifer (610X) unfolds its cilia from its protective tube. A fussy eater, *Ptygura* can balance above its head an alga it rejects as too large for a meal, rolling it over like a seal with a ball. This rotifer's vivid illusion of rotation recalls the delight of an artist employed by Leeuwenhoek, who wrote, "The draughtsman, seeing the little wheels going round . . . could never have enough of looking at them, exclaiming, 'O, that one could ever depict so wonderful a motion!'" I share that dream. Working with an electronics engineer, I hope to make motion pictures of rotifers, and I've already chosen my star. She's on ice in a fridge, awaiting her cue. □

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Dr. Thomas MacDonald, 65, maintains an active veterinary practice. Some 15 years ago he bought a Honda Step-thru. Today, he still regularly makes his rounds and answers late-night emergency calls, like the one to deliver this colt, on it. The busy work schedule causes him to jokingly wonder aloud about which will wear out first—Dr. MacDonald or his Honda. However, Honda's commitment to total quality helps assure both will last a lot longer. Because original designs are precision-engineered into Honda products using original technology. The process begins with developing original machine tools to achieve the highest accuracy. Honda dedication to creating superior total quality results in unsurpassed reliability and long life.

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"DON'T GO NEAR THE WATER" is the usual rule for owners of the 35-mm single-lens reflex camera—a wonderfully convenient instrument but, alas, not waterproof. Since such a camera is usually the choice of NATIONAL GEOGRAPHIC photographers, Luther E. Dillon (**right**) and other staffers in our Custom Equipment Shop devised a watertight raincoat for it that weighs just 18 ounces and tucks easily into a camera bag. A vinyl lens jacket allows change of focus and exposure right in the water. The design is based on an existing patent owned by the Society. Unencumbered by a heavy housing, Australian photographer Bill McCausland (**below**) handles an otherwise almost impossible surfing shot (see pages 234-5 for results). Support such Society innovations; nominate a friend or relative for membership.

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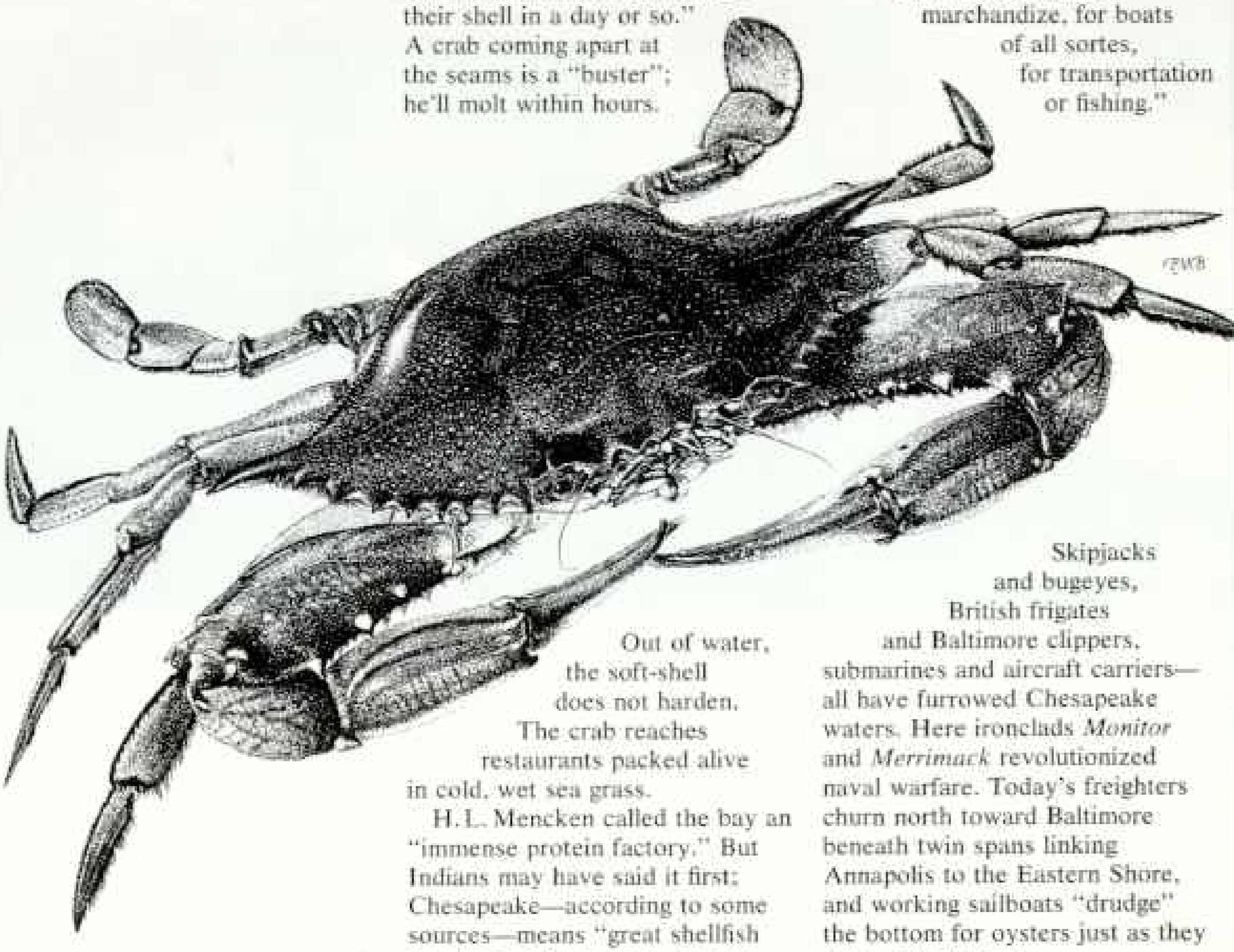
Blue crab: main cog in an "immense protein factory"

Chesapeake Bay watermen annually harvest millions of pounds of the blue crab *(Callinectes sapidus)*. The succulent crustaceans will be steamed, stuffed, deviled, shredded into salads, patted into crab cakes, and, in their soft-shell state, eaten whole.

Baymen keep a sharp eye out for crabs about to shed their exoskeletons. A Tangier Island packer can spot a peeler by its paddlelike backfin: "Crab with a white edge to his paddle, he's got about a week to go. Pink rim, he'll shed in three days. When they gets red in the paddle, they'll shuck their shell in a day or so." A crab coming apart at the seams is a "buster"; he'll molt within hours.



Out of water, the soft-shell does not harden. The crab reaches restaurants packed alive in cold, wet sea grass.

H.L. Mencken called the bay an "immense protein factory." But Indians may have said it first: Chesapeake—according to some sources—means "great shellfish bay," and it is that yet. Despite the overfishing that depleted the world's finest natural spawning beds, the bay still leads the country in oyster production.

Clams and crabs abound. To hear a waterman talk, it's a good thing only two or three crabs survive from the million or more eggs a female carries. Otherwise, "the world'd be et up by crabs."

Some 150 rivers, branches, creeks, and sloughs bearing names such as Crab Alley, Ape Hole, and Bullbegger flow into Chesapeake Bay. From the mouth of the Susquehanna to the Virginia capes, the bay washes more than five thousand miles of shoreline.

Capt. John Smith observed in 1612, "the waters, Isles, and shoales, are full of safe harbours for ships of warre or marchandize, for boats of all sortes, for transportation or fishing."

Skipjacks and bugeyes, British frigates and Baltimore clippers, submarines and aircraft carriers—all have furrowed Chesapeake waters. Here ironclads *Monitor* and *Merrimack* revolutionized naval warfare. Today's freighters churn north toward Baltimore beneath twin spans linking Annapolis to the Eastern Shore, and working sailboats "drudge" the bottom for oysters just as they did a century ago.

The Chesapeake Bay waterman is but one of the unique people readers meet in the wide-ranging pages of NATIONAL GEOGRAPHIC.

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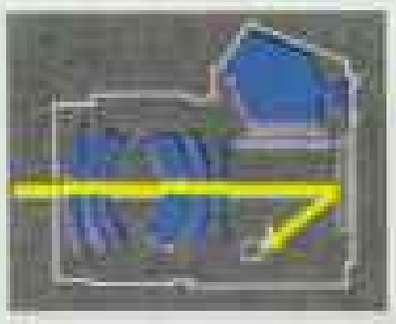

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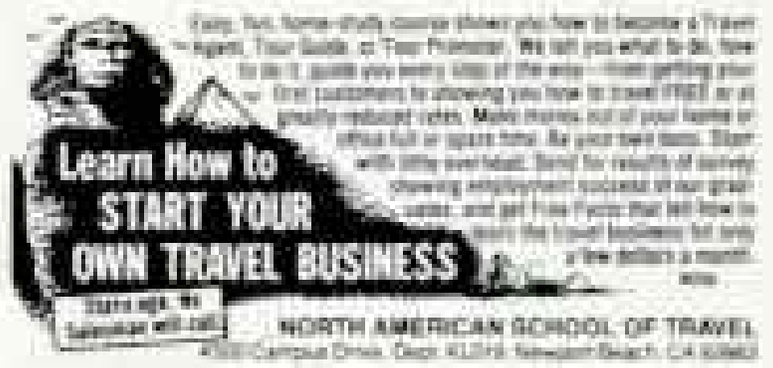

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