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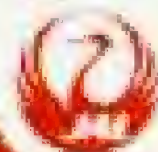
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AS IF IGNORING visitors from another world, an Easter Island colossus gazes landward while scuba-clad scientists explore coastal shallows. Aided by a National Geographic Society grant, Dr. John E. Randall, left, chief ichthyologist at the Bernice P. Bishop Museum of Honolulu, and associates Gerald R. Allen (center) and Dr. Bruce A. Baker recently surveyed waters ringing the remote Pacific isle. Of 107 species of fish recorded, 47 occur nowhere else, and 32—including a still unnamed fish of the genus *Goniistius* (right)—proved new to science.

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Fish men land a bonanza for science



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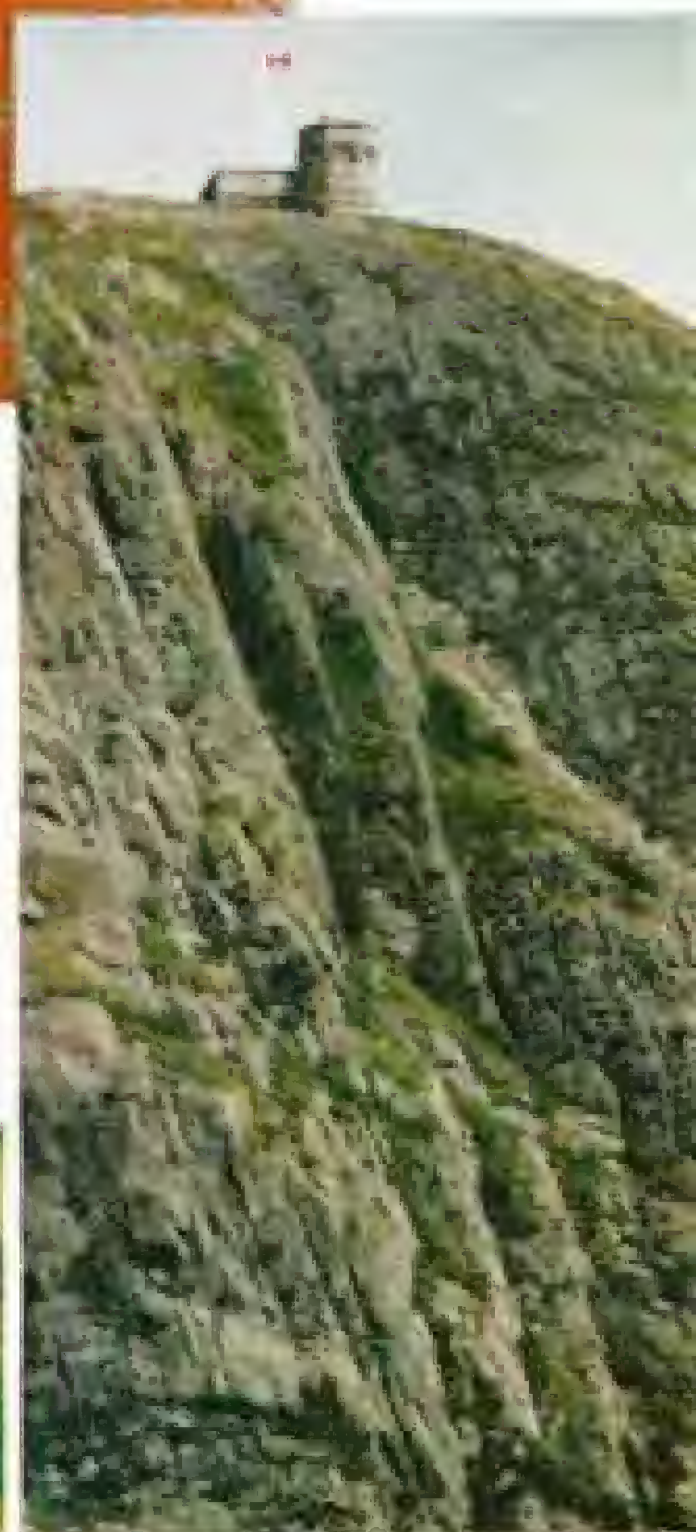


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1692 must have been a "horrible vintage year!"

It was, in fact, a dreadful year for the thirsty owner of an onion-shaped wine bottle like this one, retrieved unopened from the sea bottom after almost 300 years. Its contents, said an inquisitive diver, "tasted like strongly salted vinegar."

Nor was it a good year for the prosperous citizen whose handsome brass watch fixed for eternity the moment of disaster, or for the hungry patrons of James Littleton's tavern, whose savory lunch of beef-and-turtle stew remained forever in its copper cook pot.

For it was in 1692 that Port Royal, Jamaica, a roaring, wide-open seaport, hub of New World commerce, pirate headquarters known far and wide as the wickedest city in the world, shuddered delicately, lurched, heaved, and slid majestically into the blue-green Caribbean.

Two thousand persons and a way of life perished with the drowned city—entombed in an instant of time against the day when other men, seeking to reconstruct an era or to

find rumored treasure, might lift Port Royal again from the sea.

Nearly three centuries passed before *Sea Diver* anchored over the spot where Port Royal had settled. The incredible ship was designed especially for underwater archeology by Edwin A. Link, famed inventor of aviation's Link Trainer.

Equipped with powerful suction hoses to scour the silted sea bottom and with modern echo-sounding devices to "see" below the water, *Sea Diver* proved uniquely able to unlock the secrets of the drowned city.

Working with yellowed records to pinpoint landmarks long buried in the sea, the Link expedition, sponsored in part by the National Geographic Society, first went about preparing a map of the city as it stood before the quake.

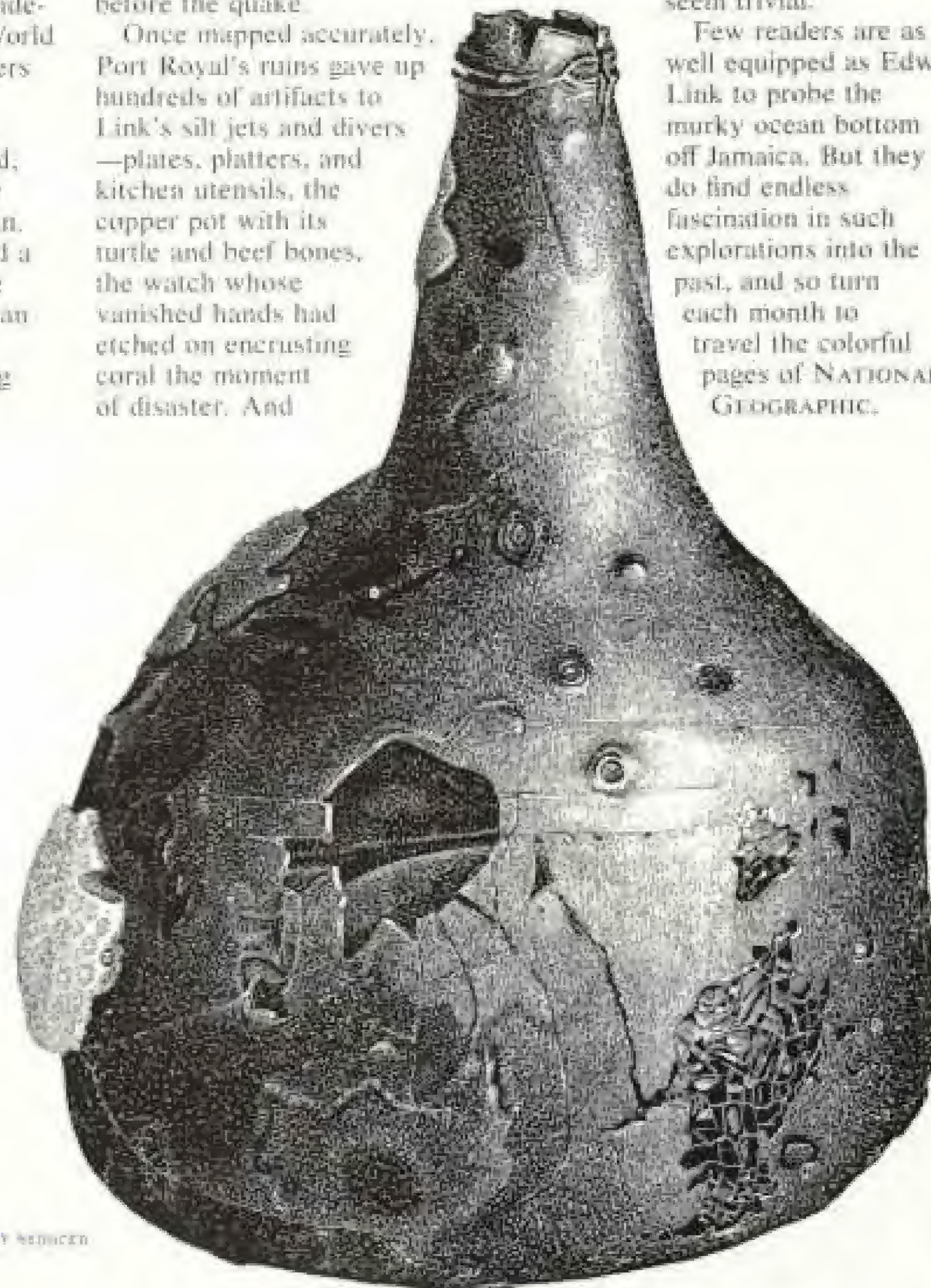
Once mapped accurately, Port Royal's ruins gave up hundreds of artifacts to Link's silt jets and divers—plates, platters, and kitchen utensils, the copper pot with its turtle and beef bones, the watch whose vanished hands had etched on encrusting coral the moment of disaster. And

clay pipes and rum bottles enough to indicate that the chief occupations of the wicked old city must have been smoking and drinking.

As the Caribbean hurricane season came on, *Sea Diver* pulled away to safer waters with a wealth of information on the life and times of the old pirate haven where one of history's immortals, Horatio Nelson, had once served a hitch as a young lieutenant. But, as Mr. Link summarized it, this was "only a beginning."

"Think of the houses," he said, "the shops, the King's storehouse, warehouses, ships which sank at the docks. Somebody will go back there and be rewarded with such an array of artifacts and riches as to make our effort seem trivial."

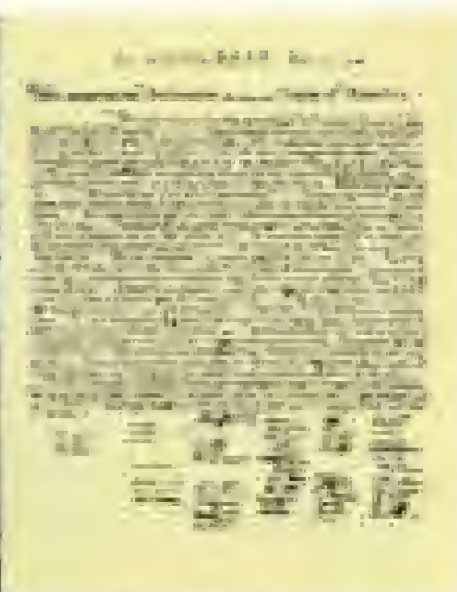
Few readers are as well equipped as Edwin Link to probe the murky ocean bottom off Jamaica. But they do find endless fascination in such explorations into the past, and so turn each month to travel the colorful pages of NATIONAL GEOGRAPHIC.



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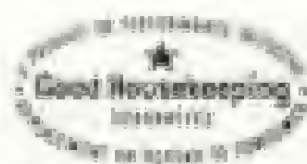
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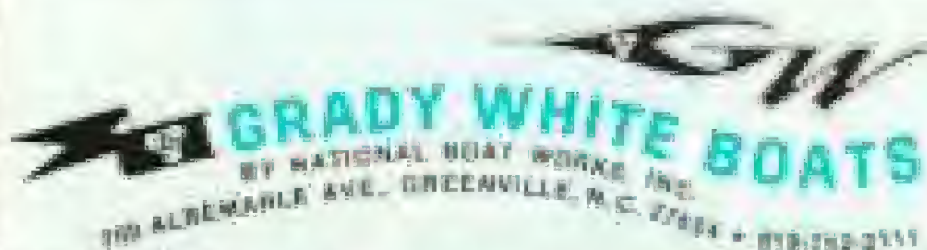
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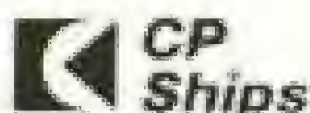


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May 1970

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YUGOSLAVIA Six Republics in One

By ROBERT PAUL JORDAN

Senior Editorial Staff

Illustrations by National Geographic Photographer

JAMES P. BLAIR

AT FIRST GLANCE, the Socialist Federal Republic of Yugoslavia makes a Westerner blink. Automobiles clog the streets of this Communist state. Shoppers throng stores. People invite you to their weekend villas. Students prefer English to all other foreign languages.

The national economy booms. Within a limited framework, private enterprise flourishes in its pursuit of profit. And housewives complain about the rising cost of living.

At second glance, another paradox startles you: A peaceful political revolution accompanies the clamor for material goods. Centralization of government lessens, by design, ripping the fabric of conventional Communism. Power filters to Yugoslavia's six equal republics: Serbia, Croatia, Slovenia, Macedonia, Montenegro, and Bosnia-Herzegovina (map, pages 592-3).

I have traveled thousands of miles through them all, relying heavily on a dozen-odd interpreter-guides to help sort out this amazing variety of peoples and cultures. Language barriers separate many Yugoslavs. But the differences run deeper. The first interpreter I hired tried to set me straight.

"My friend," he declared, lifting a tot of *šljivovica*,* the fiery national drink, "you will learn that Yugoslavs hold few things in general esteem." He ticked them off on his fingers. "Freedom . . . President Tito . . . and this." My guide gulped his plum brandy.

I thought he jested. On the contrary, I soon saw, he hit the mark. Yet the web of union remains tough and resilient in this young and kaleidoscopic nation. The Kingdom of the Serbs, Croats, and Slovenes (later the Kingdom of Yugoslavia) emerged from the shambles of World War I and lasted only 23 years—until Nazi Germany carved it up. When World War II ended, Communist Yugoslavia was born, the man who had led Partisan resistance forces to victory, Josip Broz Tito, continued as leader of the new federation.

History and geography have always conspired cruelly against the Balkans, and Yugoslavia lies at their heart. A natural route between Europe and Asia, for centuries this land has felt the heel of invaders: Illyrians, Celts, Greeks, Romans, barbaric tribes from

*Yugoslavs pronounce š like the "sh" in should, č is "ch," ž compares to the second "g" in garage. Č equals "ch" and đ is pronounced "dj," as in edge.



Shouting their approval, soccer fans in Belgrade's Red Star Stadium roar tumultuously as a Yugoslav team scores against Northern Ireland. Flags and caps identify members of a sports club. The same vibrant spirit animates life throughout the "Land of the South Slavs"—a rapidly developing nation proud of its diversity. Yugoslavia embraces not one republic but six—



REPRODUCED BY JEFFREY P. BRADB © N.C.S.

Slovenia, Croatia, Serbia, Bosnia-Herzegovina, Montenegro, and Macedonia—a composite of fiercely individualistic ethnic groups and widely differing landscapes. This mosaic of peoples, tongues, and cultures was forged into a nation in 1918, ripped asunder by the Axis in World War II, then re-welded into a Communist state by wartime guerrilla leader Josip Broz Tito.

the steppes, Slavs, Turks, and Europeans from many countries. Peace has never presided for long over these rich plains and thick forests, these green and flowered valleys and soaring mountains without end. Freedom has played the stranger.

Today 20 million Yugoslavs use two alphabets, embrace three religious faiths, speak three main languages and numerous other tongues. A melange of minority groups spices the potpourri of republics: Shiptars (Albanians), Hungarians, Turks, Slovaks, Bulgarians, Czechs, Rumanians, Gypsies, and still others.*

"How do you make a whole out of all these parts?" I once asked a high official.

"It is a miracle," he answered, with only a trace of a smile.

There is another answer. Yugoslavia means "Land of the South Slavs." The South Slavs always conquer their conqueror. They love their homeland beyond price, having paid dearly for it.

Freedom Lost—and Freedom Regained

Recently, in the autonomous Serbian region of Kosovo, I climbed a tall monument's dark and winding steps. Finally at the top, I met an aged peasant who told me his name was Risto Mišljen. His hair and mustache were white; his eyesight, he said, was failing. Yet there he stood, leaning on his cane and peering out at bleak Kosovo Polje, the Field of the Blackbird.

"Why have you come here?" I asked, knowing him for a pilgrim but wanting his own words. Across the broad plain before us, on a bloody day in 1389, Serbia had died, her heavily outnumbered defenders crushed by the invading Ottoman Turks. Through much of Yugoslavia people today still talk about "five centuries of enslavement."

"We all come to Kosovo when we can," he replied. "We lost our freedom here, and learned what freedom means."

In springtime wild poppies flame on the battleground, but now October yielded to November and an edged breeze searched our clothes. Slowly Mr. Mišljen disappeared down the stairs, carrying his 85 years proudly. "Živeli!" he called to me. "Long live!"

Far off I could see a flock of sheep flowing over the sere earth. Soft to my ears sailed the shepherd's thin and lilting song, a fantasia out of time unrecorded.

*Staff writer George W. Long described "Yugoslavia, Between East and West" in NATIONAL GEOGRAPHIC for February 1981.



Yugoslavia

HISTORIC HOME of many cultures, Wyoming-size Yugoslavia has a landscape as varied as its people and its past. It turns a mountainous face to the Adriatic, where



Dalmatia's coast falls precipitously to an island-strewn sea. Inland, the Danube meanders

through the country's northeast corner, cradling fertile farmlands and rapidly industrializing cities. Through lofty valleys of central and southern Yugoslavia, streams tumble to azure lakes on the borders of Albania and Greece.

GOVERNMENT: Socialist Federal Republic. **AREA:** 98,766 sq mi. **POPULATION:** 20,256,000; Slavic stock, many minorities. **LANGUAGES:** Serbo-Croatian, Slovenian, Macedonian. **RELIGION:** Christianity (Orthodox and Roman Catholic) and Islam. **ECONOMY:** 30 percent agricultural; mining, manufacturing. **CITIES:** Belgrade (pop. 583,000), capital; Zagreb, manufacturing.



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Larisa

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Larisa

Larisa

How extraordinary, I thought, suddenly understanding. These long-beset people really do not lament at Kosovo, scene of defeat. They look out on eternity and proclaim their indomitability. Long live, indeed.

Into our day, time has proved the South Slavs' best ally. Belgrade—White City—provides a hardy example. Celts founded it, centuries before Christ, on the hill where the Sava River empties into the Danube. Warring armies have destroyed Belgrade many times; just three decades ago Nazi bombers smashed it.

I flew in from cosmopolitan Paris anticipating the leisurely flavor of an Eastern European city—and abruptly found otherwise. My taxi held me prisoner in a traffic snarl. Presently we pulled up in front of my hotel. I paid the fare and offered the driver a tip.

"Ne," said that independent businessman, a friendly, husky Serb who identified himself as Bora Joksimović. "No. What you have given me is enough."

Then and there I knew that *something* was different.

In Bora's well-kept Mercedes-Benz cab I subsequently toured
594 the White City, a throbbing metropolis of more than 580,000

A swamp once oozed where the modern complex of New Belgrade blooms on the outskirts of Yugoslavia's capital. Government buildings, apartments, hotels, and sports facilities make it a city in itself.

Ratno Island, in background, splits the Danube. Old Belgrade crowds the smoggy horizon upstream from the strategic confluence of the Danube and Sava Rivers.



Volunteer power clears ground for a landscaped park in New Belgrade. Members of this inter-republic youth brigade come from Montenegro, Macedonia, and Serbia. Such youthful muscle and enthusiasm have built much of the burgeoning city. Beyond the group towers the nation's Communist Party headquarters—also visible at upper right of the aerial panorama below.



people that serves as capital both of Yugoslavia and of Serbia. We passed miles of new high-rise apartment and office buildings looming above reclaimed marshland in the suburb of Novi Beograd (Serbo-Croatian for New Belgrade); more were rising (preceding pages). Crossing the dun-colored, polluted Danube, I watched a Russian-built hydrofoil passenger boat ski gracefully past rusty deepwater freighters. In the distance, switch engines chuffed impatiently in busy rail yards, and smoke cascaded from industry's stacks.

Downtown, pedestrians jaywalked. Tires screeched. Traffic policemen exercised prodigious sufferance. And Marx-Engels Square functioned as a parking lot.

In truth, Belgrade rang with the powerful, cacophonous, and Westernized music of hope. But White City it proved not to be. As I sipped Turkish coffee at sidewalk cafes, my eyes smarted from exhaust fumes. From my hotel room I could barely distinguish the city's spires in the darkling smog.

Hailing a little Fiat taxi one Saturday afternoon, I told the driver, "Football." We careened across town to a stadium above the Danube. Soon I cheered and raged like everyone else as tireless athletes kicked a soccer ball—and often each other—up and down the field.

An English-speaking spectator beside me kindly proffered a handful of pumpkin seeds. I munched away and wondered aloud why so many crash-helmeted policemen stood about. My neighbor pointed to the roaring crowd. "Look at their faces. We unwind at soccer games. Too much, at times" (pages 590-91).

Movies, Discotheques, and High Fashion

Peace prevailed this time, and I departed. A little later, at swank Hotel Jugoslavija, I nibbled caviar and hors d'oeuvres and drank champagne at a fashion-show cocktail party. Presently slab-thin models tripped along the runway displaying Paris fashions, including see-through blouses. Chic matrons applauded genteelly.

That evening I walked through the business district. Window-shoppers jammed sidewalks and crowded into department stores, smart shops, and arcades. A Dean Martin movie played at one theater, *Gone With the Wind* at another. Long-haired students gyrated in psychedelic *diskotekas*; music blared from striptease cabarets and Gypsy street bands. Western periodicals sold briskly at newsstands. Lines formed at telephone

booths. "I've had the government helping me for a year," a journalist told me later, "and I still can't get a phone in my apartment."

Yugoslavs showed me quite another picture when the American astronauts of Apollo 11—Neil A. Armstrong, Edwin E. Aldrin, Jr., and Michael Collins—came to town. I joined the thousands lining the long parade route.

Overhead fluttered red banners emblazoned with a five-pointed star, sickle, and hammer and the words "PROLETARI SVIH ZEMALJA, UJEDINITE SE!—Proletarians of the world, unite!" No one seemed to notice the banners. Little boys perched on their fathers' shoulders, waving miniature U. S. flags. People jammed balconies and office windows. As the moon men sped by, all applauded and cheered. President Tito saluted them at a lunch in the White Palace, a building used for official receptions.

"Let me address a few words," he said, "to our dear guests, the astronauts, who conquered the moon and with their great feat put mankind into debt. I do not like conquerors on the earth, but hold in high esteem conquerors of celestial bodies. . . ."

Everyone's a Newcomer in Belgrade

One morning in this land of first-generation motorists, I donned the typical Yugoslav driver's blank face and pulled away from the curb. Pedestrians gave way with alacrity as my rented Peugeot bulldozed in accepted fashion through a glutted crosswalk. Then I plunged into the maelstrom of Volkswagens, Fiats, Volgas, and shiny Mercedes-Benzes on Revolution Boulevard.

Abreast of City Hall—once the home of kings and queens—I darted into a parking place on the sidewalk, scattering more pedestrians. Everybody parks on sidewalks.

Approaching the erstwhile royal palace along a flower-bordered walk, I recalled that in the old days all was not pomp and circumstance. On a rainy spring night in 1903, conspirators stole into the palace and horribly murdered Alexander Obrenović, King of Serbia, and his wife Draga.

Inside, I admired City Hall's ornate marbled, high-ceilinged rooms, regal as ever though proletarians glided through them now on rich red carpets. Upstairs, seated at an oval conference table in the onetime ballroom, City Assembly President Branko Pešić outlined Belgrade's facts of life for me.

A deep-voiced man who turns a neat phrase, he put the matter succinctly. "Things

are worse today," he intoned wryly, "than they were yesterday, but better than they will be tomorrow."

Like most Yugoslav mayors, Mr. Pešić guides a city that grows faster than housing, jobs, facilities, and services can be provided. At the end of World War II, he pointed out, 280,000 persons scraped a living here amidst devastation; bombs and fire had leveled more than a third of the houses and half the industry. Fewer than 3,000 vehicles operated.

In 25 years, he continued, the population has swelled nearly fourfold; industry has multiplied 12 times. More than 100,000 apartment units have been built, and 130,000 cars, trucks, buses, and trams choke the streets.

"We are all newcomers here," Mayor Pešić observed. "Belgrade is a vast village in great flux. Peasants stream in faster than we can make room for them."

Yet nearly half of all Yugoslavs—about 10 million—still live on the land. Of these, one out of five works on a modern mechanized farm. The rest, like their ancestors, rise before dawn and toil into dusk on their little plots; they walk behind ox-drawn plows, cut hay with a scythe, grub up new potatoes by hand.

The economy needs time to absorb them, needs more capital to build more factories to provide more jobs. In fact, many trained persons, including university graduates, cannot find suitable work, and in some parts of the country a surplus of medical doctors exists. Half a million Yugoslavs have found better-paid employment in West Germany, Austria, Italy, and other lands.

A Serb Sketches the Slavs

With six republics and even more nationalities to write about, I needed help. I called on a hard-driving, forthright journalist who covers Yugoslavia for an international wire service. How do the people differ?

"We're all Slavs," he said, speaking fluent English, "shaped by time and place. Slovenes and Croats are industrious, methodical, reserved. Macedonians are poets at heart. Montenegrins make better warriors than workers. Bosnians and Hercegovinians are more stubborn."

And the Serbs?

"Ah!" exclaimed this Serb, revelation upon him. "We are short-tempered, rude, and spiteful. We mind our neighbor's business. We yell and curse and make jokes, and our critics call us uncouth."



EPSTEIN/RETNA
Toughness and gentleness of the Yugoslav character show in the face of steelworker Ibrahim Mešinović. The mesh mask protects him while he tends searing blast furnaces at Zenica in Bosnia. Here Yugoslavia's largest iron- and steelworks produces a million tons a year.

His quick smile reappeared. "Yet they envy us for our pride and independence. We have spirit. We know how to live."

I headed out to see for myself. In the weeks that followed I found refreshing courtesy and a friendly welcome everywhere. And some of that Serbian spirit overtook me at the outset.

It happened this way. Speeding along a lonely mountain road, I came upon a woman who flagged me down. She had been stranded when the overcrowded bus in front of me failed to pick her up. I stopped at her signal—hitchhiking carries no onus in Yugoslavia.

She spoke little English, but enough. Her name, she said, was Vera; she was 25, blond.



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Belgrade beauty peers at her beau—or someone else's—at an outdoor cafe. Life among Yugoslavia's youth pulses with a Western beat; latest fashions parade the streets of Belgrade and Zagreb shortly after appearing in Paris, London, or New York. But despite a debonair veneer, many young urbanites have only recently arrived in the city—part of a wave of job-seeking migrants from the hinterlands.

Half a world off Broadway, the U. S. rock musical *Hair*, translated into Serbo-Croatian and acted by a Yugoslav cast, shocks and delights Belgrade theatergoers. The tuneful satire aims its blasts at a caricatured Establishment—which audiences in each country see as their own. In this scene, cast members singing the title number extol the virtues of long hair to two “square” tourists who have made scornful remarks about their unshorn locks.

pretty, a high-school biology teacher, and a Party member. Vera expressed some pungent thoughts about the United States as we drove toward her home.

“You Americans live in a shell!” she stormed. “You think that Yugoslavia is a police state, yes?”

“Well,” I answered, “is it?”

“Ne!” she protested. “No, we have no police state. We go where we want. We say what we think.”

On the first part I could agree. I had detected no signs of Big Brother watching me or anyone else. Yugoslavs move about freely, in and out of the country. People attend the church of their choice, or none, as they please.

What of free speech? Yugoslavia's only political parties, the League of Communists and the Communist-dominated Socialist Alliance, oversee the nation's affairs from grass roots to Parliament. A little more than a million Yugoslavs, about one in twenty, belong to the League. They manage things with a light—though firm—rein, permitting “constructive” criticism and criticizing one another. I had heard many Yugoslavs inveigh against unemployment, dead-weight bureaucrats, and the like. Non-Communists sometimes run for office, and occasionally win.

But limits *do* exist, and my outspoken teacher-hitchhiker admitted it as we cruised along. Writers know it also, because someone oversteps the line now and then and is reprimanded or, rarely, sent to jail. One does not speak harshly against the political system itself, or its brightest star, President Tito (page 610).

“Life Gets Better Every Day”

One of 15 children born to peasant parents in Croatia, Tito embraced Communism as a young man and was imprisoned several times because of it. In World War II he led the Partisans against the Germans and their collaborators. Ultimately his troops, with limited Allied aid, drove the Nazis from Yugoslavia. At war's end, Tito stood at the nation's helm.

Today one encounters President Tito's unwavering gaze on walls of homes, offices, shops, and cafes throughout the land. He will be 78 this month. When he yields power, a 15-man executive bureau will take over direction of the League of Communists, and Parliament will elect a new president.

I dropped Vera off in the town of Kladovo, near where the Danube cleaves the Transylvanian Alps at the Iron Gate. Men were building a huge hydroelectric dam here, one that will link Yugoslavia and Rumania and furnish 10½ billion kilowatt hours of electric power a year to both countries.*

“Just look at that!” Vera exclaimed as she left, pointing at the far-flung construction. “Life gets better every day. We remember how it was. We see the improvement. Someday....”

*See “Americans Afoot in Rumania,” by Dan Dimăncescu, NATIONAL GEOGRAPHIC, June 1969.





Someday, I suggested to people in all the republics, might not Soviet Russia invade with tanks and guns as she had that other free-wheeling Communist land, Czechoslovakia, in 1968?

An implicit answer popped up wherever I traveled. Though I saw no bristling militance, fresh-faced soldiers—jaunty in gray-green uniforms with a red star on the caps—hitched rides on all the roads, spent liberty hours lolling in village cafes, ambled along city streets.

I requested an interview with an Army spokesman. Col. Pajo Samardžija, a graying, bespectacled veteran of Partisan warfare,

seated me in a small anteroom, ordered coffee, and summarized in three blunt words what everyone else had told me: "We will fight."

All Yugoslav men from 18 to 65 are required to serve a tour in the armed forces, he informed me. Additionally, a new law directs that every able-bodied man up to 65 and every woman from 18 to 40 be trained in civil defense.

"For us," the colonel said, "war is terrible. But we will defend ourselves against any aggressor. National defense involves everyone, from President Tito to children in elementary schools, who are taught first aid."

He put down his cigarette and looked me



REINCHING, (LEFT) AND REINCHING BY JAMES P. BLAIR © U.S.A.

Workers run their own show

VOTING AYE OR NAY as each sees fit (left), members of the central workers' council of a Belgrade factory function as a board of directors. Elected by fellow employees, they set production quotas, decide on marketing techniques, hire and fire managers, and even raise—or, on occasion, slash—their own salaries.

Behind them hangs a portrait of President Tito, the guiding force behind the policy of decentralization and self-management, which gives much of the decision-making power to the workers.

An apprentice (above) learns wiring at a television factory set up in the small Croatian town of Slunj—another aspect of decentralization. Corn picker (below) receives finishing touches at a factory in Zemun. The workers themselves decided that this would be a profitable item for sale on the open market.





Carpets of corn—a hybrid U. S.-Yugoslavian strain—pattern the Danube plain of Vojvodina, the nation's granary. Villagers cooperate in farming these fields as a profit-making business. Such horizon-to-horizon farms are the exception in predominantly mountainous Yugoslavia. Only about a fifth of the land lends itself to modern, large-scale cultivation.

Saving every ear, gleaners gather corn left behind by self-propelled mechanical pickers. Here they throw their harvest into a combine for husking and shelling. After work, they will tend backyard gardens of vegetables for home use.





© MICHAEL O'NEILL



in the eye. "You know," he said quietly, "we have a lot of experience to draw upon."

The Yugoslav Army did me a personal favor a few days later when I arrived in Ljubljana, the capital of Slovenia. It freed 23-year-old Mihael Nonne at the conclusion of his 18-month tour of service in time for him to guide me around Yugoslavia's northernmost republic.

Often I had heard prosperous Slovenia referred to as "the United States of Yugoslavia." Mike showed me why.

Slovenia's sister republics envy her affluence as the most industrially advanced of the country's six republics. Her workers take home about \$120 a month—about 50 percent more than the national average.

Slovenes learned industriousness and how to pinch dinars, they often told me, from centuries of Teutonic example. Hearing elder citizens converse in German, I recalled that the Habsburgs and other rulers had held sway off and on for a millennium, up to 1918.

Children's Thrift Makes Banker Beam

The value of a dinar—now eight cents—is inculcated in childhood. At the Kredita Banka in Ljubljana, youngsters have deposited their savings for 80 years. Mike and I strolled over and watched them do it: emptying piggy banks and small purses on miniature tables with parents at their elbows, sorting the coins into little trays, handing their deposits to a teller, and chewing candy while the transaction was completed.

I thought it charming. "A fine public service," I ventured, "but perhaps it costs the bank money?"

A bank officer smiled broadly. "Not at all. It's very good business. We visit nearly 200 schools twice a year and show Walt Disney films and cartoons. And we collect deposits from 20,000 pupils."

How much money do they have in their savings accounts?

"Around 35 million dinars," the banker replied. "That's almost 3 million dollars. We pay 6 $\frac{1}{2}$ percent interest."

Slovenia shows other signs of foreign influence besides thrift. In remote Alpine villages hard by Austria I saw occasional peasants wearing Tyrolean knickerbockers. They stacked their scythes inside tidy restaurants to drink beer and play polkas on jukeboxes.

When Mike and I drove to the coal-mining and factory town of Velenje, 55 miles north-east of Ljubljana, I stared in astonishment.





ANNOUNCER © W. G. B.

Setting for a fairy tale, Lake Bled nestles at 1,640 feet between the Karavanke and Julian Alps, which tumble into Slovenia from Austria and Italy. Spring skiing on the snow-scarfed peaks around Bled lures enthusiasts like this Slovenian lad.

Pagan ancestors of today's Slovenes worshiped a Slavic goddess of love on the islet in midlake. Their successors, converting to Christianity, toppled her idol and, in the 11th century, raised the Church of St. Maria. Its bells later won renown because of a belief that their ringing made wishes come true. So often did they peal for visitors—jangling the nerves of lakeside residents—that authorities finally stilled them in 1947.

Atop a 460-foot cliff beyond the church broods medieval Bled castle, where the bishops of Brixen once ruled; today it houses a museum and eyrie-like restaurant.

Here, in a remote mountain-rimmed bowl, stood towering apartment buildings, broad streets and sidewalks, wide-windowed stores and offices, a modern hotel, and a contemporary-style auditorium.

"That's how we attract miners," explained an official, "and keep them. We've built 1,700 family flats, and a hundred more are going up. There's no problem about material; they're built of blocks of compacted coal dust."

Visiting a muscular veteran of 33 years in the pits, I relaxed over coffee in Edo Žagar's comfortable living room. "My wife's away," said Mr. Žagar in some embarrassment. "Please excuse how the flat looks."

It looked fine to me—like almost any two-bedroom apartment in the United States: radio blaring, refrigerator and electric stove dominating a pleasant kitchen, sewing machine, overstuffed furniture, television, all the conveniences and comforts.

"I work 42 hours a week," the miner said. "My pay comes to around 1,500 dinars [\$120] a month. I own an automobile, and it takes me hunting and fishing in my spare time." He glanced out beyond his balcony at low gray mountains. "In a few years I will retire on full pension. It is enough. I am satisfied."

Edo Žagar and nearly 3,500 others toil at the pit. One of the largest lignite mines in Yugoslavia, it yielded 240,000 tons a year before World War II. Now annual volume ranges around 3,300,000 tons.

Consumer Demand Outpaces Production

Nearby, the spick-and-span Gorenje factory worked around the clock turning out gleaming refrigerators, ranges, and washing machines. It also was tooling up to begin assembling TV sets. "We're running at full capacity," a factory executive observed as we toured the plant, "but we can't meet the demand."

It wasn't for lack of trying. Men and women in blue smocks pieced appliances together like automatons, hands flying, eyes empty—another brigade caught in the universal tyranny of the production line. Few paid our party any attention.

My escort, neat in a business suit, white shirt, and tie, saw them differently. "The more they produce," he remarked, pleased, "the more they earn." He explained that every Yugoslav enterprise with more than five employees is operated by the workers themselves, through an elected workers' council. The central government no longer sets quotas and directs production.

The Gorenje enterprise employs 2,500 persons, two-thirds of them women. The refrigerator they make costs about \$140; their washing machines range from \$208 to \$236.

Such price tags seemed steep for a nation whose per capita income averages only around \$750 a year. I sought out Dr. Dušan Anachioski, an official of Yugoslavia's Federal Planning Bureau. Thumbing through charts and graphs in his pleasant office, he explained.

Folkways are alive and well in Slovenia. Each May betrothed couples, folk dancers, and musical groups converge at a wedding festival in Ljubljana from all over Yugoslavia and from as far away as Scandinavia and Tunisia. Brilliantly decked out in their native costumes, the participants revel for four days.

This Czechoslovakian couple whirls to the rhythms of their homeland. At festival's end all the nuptial couples take their vows in a stirring mass ceremony—an old Slovene wedding custom.

Slovenia sponsors such fetes in a double-barreled effort to lure tourists and to help preserve old customs threatened with extinction.



"Often both husband and wife work," the balding, gray-suited economist said. "And many people moonlight—hold down two jobs. Of course, we can buy just about anything we want on the installment plan. Easy credit is a way of life in Yugoslavia."

In 1965, he pointed out, President Tito stripped all enterprises of government subsidies. Ever since, business has competed unaided on both home and foreign markets.

"Either an enterprise makes money, or it merges with one that does, or it goes out of business," Dr. Anachioski said. "In 1967 a total of 10,500 products were abolished. They

couldn't find a market or were uneconomic. In 1968, we got rid of 6,500 more. We upgrade constantly to compete with the West.

Industrial Revolution, Yugoslav Style

"Ours is a young nation industrially, and we're trying to develop a modern technological society," he added. "We need more capital and skilled workers. Half of Yugoslavia remains agricultural.

"How do we close the gap? We're attracting foreign partners in all kinds of economic relations, including joint ventures and trade cooperation. We're opening more factories.



PHOTOGRAPH BY JAMES F. BLAIR © NATIONAL GEOGRAPHIC SOCIETY

Educated young men and women are streaming from our universities; as they gain experience, they spread it to others."

The official rubbed his hands and frowned at the same time. Industrial production was running almost 12 percent higher than a year ago, he told me. Exports had jumped nearly 17 percent over 1968, and the cost of living was up 6 percent from that year.

"We need time," he said. "The average wage is 1,000 dinars a month—only \$80. Of course, our prices are very low. I myself pay \$30 a month for my four-room apartment—workers pay much less. Fifteen years from

now, our standard of living will be about where West Germany stands today."

It sounded to me as if Yugoslavia's drive into the mass consumer's world was propelling her headlong toward the capitalistic West.

"We are a Socialist and nonaligned nation," Dr. Anachioski responded softly. "We want to be friends with everyone."

All the same, after I thanked my host and departed, I bumped into several capitalists without even trying.

I halted when a shoeshine boy beat briskly on his stand—a young businessman drumming up trade. For three dinars my shoes





Serenity and strength radiate from the figure of a meditating woman by Croatian-born Ivan Meštrović, Yugoslavia's best-known sculptor. The statue graces a museum in Zagreb. A voluntary exile after World War II, Meštrović died a U.S. citizen in 1962, but was buried, at his own request, near Split.

Second city of the nation, Zagreb hums on a Saturday morning. Traffic pauses as knots of shoppers flock across the Trg Republike—Republic Square—to a rooftop market (left). Comely passer-by (right) draws a once-over from two schoolboys.

The sophisticated hub of Croatian culture, finance, and industry, Zagreb has been called "the New York of Yugoslavia." Twin 344-foot spires of the Cathedral of St. Stjepan dominate the skyline of the predominantly Roman Catholic city.



PHOTOGRAPHS © N. G. L.

shone as brightly as his smile. Then I flagged a privately owned taxi, which carried me to a privately owned restaurant. On the way I passed shops, rooming houses, car-wash and trucking establishments—none, of course, with more than the permitted five employees.

I moved on. North of Kranj, another industrial city in Slovenia, I pierced deeply into the soaring ramparts of the Julian Alps, and presently pulled up beside the glacier-carved blue jewel known as Lake Bled. Out of it grew an island on which a red church steeple stood scepterlike, and high overhead on its own crag a gray and ancient castle mounted guard (page 604). After years of roaming the earth, I had come to fairyland.

All Europe for years has fancied this mountain resort, and more tourists today are admiring nearby Lake Bohinj as well. Vacationists swim, boat, fish, and play miniature golf in one season, skate and ski in the other.

"Mountain gems," people call these lakes. But the men and women who labor nearby find little time to admire them. One morning in the gentle foothills above Lake Bohinj, a tanned peasant named Franc Cvetek spoke to me of a changing way of life.

Countrymen's Sons Drift to the Cities

We sat in strong sunlight outside the house where he had lived all his 66 years, and his people for three centuries and more before him. In the orchards around us, whole families picked apples and pears; they knelt in fields to harvest vegetables. Corn sagged heavily on the stalk, and logs awaited the ax; winter approached with its brutal cold, occasionally 30° F. below zero.

The annual Kravljci Bal—Cow Dance—celebrating the cows' return from high summer pastures—had just ended. Mr. Cvetek, who is regularly the principal speaker for

Rival suitors—the United States and the Soviet Union—woo Yugoslavia with technological triumphs. At last September's International Fair in Zagreb, President Tito and his wife (in pink) inspect the historic Apollo 8 command module, sent here after U. S. astronauts made the first manned orbit of the moon. The Soviets countered with a model of their sleek supersonic transport, the



the colorful occasion, leafed through his text and recited part of it to me.

"When day starts," he read, adjusting his glasses, "the peasant already feeds the cows to get the good milk. All day long he cuts the grass, he rakes it, for winter food. He logs timber in the steep, snow-covered mountains, hauls it down with horses and oxen, and prays that the brakes hold. He works into the night. . . .

"But our young people no longer want to work in the fields or go up in the mountains. They prefer the towns and cities. Living conditions are better. Wages are better. There is a time for work in the factory, and after the working hours there is fun. . . ."

Franc Cvetek's voice softened. His own son, he went on, had gone to Ljubljana to study at the university. "How can I say to him not to do that? I want him to have a better life than I have had."

As I rose to leave, I noticed a little white

automobile in the barn. "Yours?" I asked.

"My son's," he answered. "He can't find a place to park it in Ljubljana."

I headed south, running before the onset of cold weather, and within a few hours made an inauspicious debut in bustling Zagreb. My car ran out of gas on one of the busiest thoroughfares in the capital of Croatia (map, pages 592-3). A traffic policeman quickly enlisted a couple of passers-by and pushed me onto the sidewalk. The flow of vehicles resumed, led by a sooty chimney sweep scooting past on a shiny motorbike, brushes upthrust.

Zagreb is like that. Its old Upper Town goes back to the 11th century, when a feudal and ecclesiastical enclave rose on a hill above the Sava River; on a neighboring eminence burghers and artisans built their own community (pages 608-9).

Down the hill spreads the Lower Town, a beguiling bit of old Central Europe with

Tupolev 144 (right). Preferring his own brand of Communism to Moscow's, Tito split with the Soviet Union in 1948 and assumed a policy of independence and nonalignment. His bold move gave Yugoslavia a significance in world affairs out of all proportion to its size. Today, beholden to no one, 78-year-old Tito holds his country to a middle-of-the-road course between East and West.





Grapevines frame a vineyard worker on Yugoslavia's famed Dalmatian coast. Once a playground for Rome's patricians, the magnificent littoral fringes more than 300 miles of the sun-blessed Adriatic. The same dreamlike beauty that lured the Romans today attracts legions of tourists from Western Europe and the United States. Vine-clad slopes of the



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Dinaric Alps, here silhouetted at sunset, leap steeply from the Adriatic; in places, passing pleasure boaters can all but pluck grapes directly from the vine. The Dinaric range, paralleling the coast, raises a formidable barrier between Dalmatia's golden coast and central Yugoslavia. Seaward, hundreds of islands, spurs of the Dinarics, hark at eternal anchor.



"Not for gold would we sell our liberty!" Thus proclaimed the proud citizens of Ragusa—today's Dubrovnik—from the late Middle Ages through the post-Renaissance period, when their tiny city-republic on the Adriatic stubbornly maintained its independence and vied with Venice as a maritime power. Its cargo-laden argosies—literally, "ships of Ragusa"—plied as far as India and the Americas, amassing immense wealth which the Ragusans used to embellish their walled city.

Jeweled reliquary holds part of the head of St. Blaise, the city's patron. The enameled-gold Byzantine masterpiece sits on a massive silver processional platter in Dubrovnik's cathedral. Such glittering reminders of bygone times abound in local museums and churches.



EDUCATED BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES F. BLISS © N.G.S.

manicured parks, baroque palaces, and public buildings. Beyond, as in Belgrade, stand block after block of sleek new city-government structures and housing developments—gaudy, glassy-eyed warrens of concrete.

Comparisons with Belgrade, however, are unpopular in Zagreb. Yugoslavia's second city—with some 430,000 residents—is one of the nation's chief industrial centers, home of a world-famous trade fair (pages 610-11), and a major hub of commerce and tourism. Croats regard their capital as Yugoslavia's cultural and intellectual leader. Belgrade? A shrug. Who needs her?

Behind this attitude lie ancient animosities stemming from political, religious, and cultural differences. Yugoslavia's split personality was born in A.D. 395, when the Roman Empire divided. From Constantinople, By-

zantium brought Eastern ways. Gradually the Orthodox religion and Cyrillic alphabet spread through the south and east (today's Serbia, Macedonia, Montenegro, and part of Bosnia-Herzegovina). The north and west (now Slovenia and Croatia, with Dalmatia) adopted Latin alphabet and church.

Today, though their parents may cling to timeworn grudges, more and more young people call themselves Yugoslavs first and Serbs, Croats, Slovenes—whatever—second.

In the universities throughout the country, such youths have complained and demonstrated, protesting excessive bureaucracy, lack of leadership, paucity of good jobs.

When I visited Dr. Ivan Supek, Rector of Zagreb University, he pointed to the crush of students in the halls.

"They see plenty of problems that must be



Glow of ambition lights the face of Dalmatian fisherman Ante Stipković (left). Over an after-dinner glass of dry red wine from his native isle of Korčula, he describes long-range plans to modernize his fishing boat, *Raža*, with a sonar fish-finder. Until such time, the captain and his crew will continue in the old ways—putting out at dusk, setting lights to attract fish, and seining until dawn.

Crewmen load the night's haul of sardines into boxes as *Raža* chugs home after sunrise (right). Skiffs towed behind help lay the nets and serve as platforms for the kerosene lamps used as lures.

The capitalist instinct burns strong in many Yugoslavs. Individuals like Captain Stipković may operate private businesses with no more than five non-family employees.

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solved," he declared. "They will not accept the world as the old people are giving it. What republic a person comes from makes no difference. Our young people are very democratic. They want a say in their own future. It is all to the good."

What, then, was his biggest problem?

The tall, genial administrator shook his head wearily.

"Very simple," he replied. "Money. Today we enroll 30,000 students—three times as many as before World War II. We must provide more teachers, classrooms, and facilities."

In her young people resides Yugoslavia's strongest hope for the future, but talented artisans also strengthen the nation's fabric. Just west of Zagreb, at the Kristal glassworks near the medieval town of Samobor, I watched

men and women create exquisite pieces of lead crystal by hand. The factory exports about a fourth of its output, all to the West.

Here beauty flows not only from great skill but from dedicated drudgery. I watched Kristal's perspiring glass blowers making their old magic in the hellish heat of roaring furnaces. They strained at their long pipes until veins threatened to burst.

"Their lungs can stand this job only five years or so," remarked the factory's *direktor*, Josip Cvetković. "Then we give them other work."

We contemplated Kristal's patient glass cutters. Sitting at their grinding wheels, painstaking beyond measure, they sometimes make thousands of cuts to complete a single tray. I am fortunate enough to own a lovely example





of their art, the cutting took thirty hours.

In the Croatian village of Hlebine, close to the border with Hungary, I met an artist in a different medium—wood. By day, said Martin Hegedušić, he works in his fields; by night he carves with knife, chisel, and mallet. Self-taught, he takes two months or more on a figure, and for each he composes a song.

I passed a long afternoon in the 45-year-old artist's living-bedroom, enthralled as he held his two- and three-foot-high pieces on his knee and softly sang.

"Tonight he will feast," he crooned, and his triumphant "Fisherman" with his fine catch bespoke all fishermen.

"They are afraid of their wives," he recited; and so his wine-bibbers were, caterwauling bravely as they lurched.

And the mother ringed by her brood of seven children? "She will do anything for them; she will beg if she must. . . ."

Where man's art ends, nature's begins. If any one thing spells Yugoslavia to a grateful world, it can only be the Dalmatian littoral

(pages 612-13). Mostly in Croatia, this blessed and smiling strip of land more than 300 miles long nestles between the warm Adriatic and an awesome backdrop of spectral limestone mountains.*

Tourists Flock to Dalmatian Coast

Yugoslavs have always looked to the sea. They build ships in Pula, Rijeka, and Split, and set their nets for sardines and tuna in the azure coastal waters. Today the long Dalmatian seashore has become an international playground; tourists find it a vacation bargain. Nearly five million visitors—175,000 of them Americans—filled fine new hotels last year all along the spectacular coast. Like me, they paid the equivalent of a mere \$8 or so a day for an oceanfront single room, with shower and breakfast, and enjoyed full-course dinners, with wine, for only three or four dollars.

I often heard a tribute, ascribed to George

*Gilbert M. Grosvenor wrote of "Yugoslavia's Window on the Adriatic" in *NATIONAL GEOGRAPHIC* for February 1962.



Big-sky country of the Balkans: "It looks like Wyoming!" says photographer Blair of this spacious sheep-speckled valley in Bosnia, home of the farm lad below. Snowy cliffs barricading the horizon are part of the same 350-mile limestone massif that soars into the Dinaric Alps. From such ramparts, during World War II, Yugoslav guerrillas raided enemy installations on the nearby Dalmatian coast.





Bernard Shaw, about the coast's most famous attraction: "Those who seek earthly paradise should come and see Dubrovnik."

Sun-washed, somnolent Dubrovnik, pearl of Dalmatia: red-tiled roofs girdled by massive stone walls (pages 614-15). Men called her Ragusa in days of old, and knew her treasure-laden galleys as "argosies." Five hundred years ago the city-republic maintained trading outposts from Asia Minor to London.

Dubrovnik lies serene now, caressed by time. Tourists spend hours poking about in the ancient cathedral and churches, nobles' houses, and fortresses. In a 14th-century Dominican monastery, they pause in the cloister while sandaled monks pad noiselessly past. From somewhere deep in the recesses, ghostly organ notes resound. In the 15th-century Rector's Palace, visitors ponder a Latin inscription above the entrance to the Great Council's meeting room. "*Obliti privatorum publica curate,*" it admonishes. "Subordinate your own interests to the public good."

Dalmatians Crowd an Emperor's Palace

One never stays long enough in such a place. I drove slowly up the coast 145 miles, past modern resorts, sun-bleached fishing villages, and forested islands, to the busy port of Split. I found a city rapidly expanding with industry—shipyards, plastics, cement—and with 115,000 people.

"Ten years ago," said my handsome guide, Vladimir Sunko, "you could hardly find a car. Now you can hardly find a parking place."

The Roman Emperor Diocletian, of humble Dalmatian origin, built a palace in Split and retired to it in A.D. 305. The palace stands today, still in the heart of town, still vital. And I think that Diocletian would fall upon his dagger at the sight.

Down the ages people have taken shelter within the palace walls. Now houses cling to its granite columns for support. Open-air cafes, stores, and ice-cream stands nest cozily

amid Roman arches, Corinthian columns, and fortified towers; centuries of rubbish clog some cellar rooms. More than 4,000 persons dwell in the house that Diocletian built.

To amiable, even-dispositioned Dalmatians, tomorrow is usually soon enough. Inland, mercurial Serbs look at life differently. History has been fickle. If they taste vinegar in freedom, so their proverb goes, it is sweeter than honey in slavery.

Turks Brought Minarets to Serbia

In the Middle Ages Serbia flourished as an independent kingdom. The Orthodox religion took root under the Nemanja kings; many churches they built still stand. By the mid-1300's, ruled by Stefan Dušan, the empire included today's Serbia, Macedonia, Montenegro, Albania, and half of Greece. Soon the oncoming Turks changed all that at Kosovo, and minarets began piercing the sky.

Today, Serbia's eight-million-plus people and 34,000 square miles make her the nation's largest republic. North of Belgrade sprawls Yugoslavia's breadbasket, the vast Danube plain that comprises the autonomous Serbian region of Vojvodina (pages 602-3). Once, on its flat, intensively cultivated reaches, I pulled up at a roadside stand to buy some grapes with the warmth of the vineyard still in them. A cheerful, kerchiefed peasant weighed my purchase on an ancient hand scale.

"Stand on a pumpkin," she said, sweeping a plump arm, "and you can see the whole province."

South of Belgrade, Serbia changes into a land of wooded mountains and rolling valleys stippled with orchards, fields, vineyards, and meadows. As I drove here, horse-drawn carts frequently slowed traffic to a crawl on the narrow highway. I didn't mind: police on this road were using radar to catch speeders, fining them on the spot.

In the town of Arandelovac, at one of Yugoslavia's many spas, people still take the

Deft as a barber, a hatmaker in Prizren shaves nap from a white-felt skullcap, the traditional trademark of the Shiptars, Yugoslavs of Albanian ancestry. He himself wears a *fez*, popular among other Moslem groups. Meeting place of many faiths, Yugoslavia mixes adherents of Christianity—largely Roman Catholic and Orthodox—and Islam.

Each flower bespeaks a martyr at Jasenovac in Croatia (next pages), site of a World War II concentration camp where 700,000 died. Daisies of a fleeting springtime ring a four-story-high flower of concrete—symbol of life's triumph over evil. Unlike other East European lands, Yugoslavia was liberated not by the Russians but largely by its own guerrilla forces.







mineral waters, as they have since the early 1800's. I tried a tumblertful from one of the springs myself, reasoning that this sparkling "cure" for respiratory, heart, digestive, nervous, and other ailments surely contained preventive qualities as well. It tasted like tired soda water, slightly alkaline.

A few miles distant, I came upon several thousand Serbs paying homage to another liquid: The town of Topola was observing its annual wine festival. Suckling pigs roasted on spits. Half a dozen bands blared while rosy-cheeked girls swirled in brilliant national

costumes and a Gypsy's trained monkey danced a jig. Women in colorful aprons sold grapes, apples, pears, stout homemade wine, and—yes—cotton candy.

Topola has special meaning for all Serbs. From here, in 1804, Karađorđe (Black George) led Serbia in revolt against the oppressive Turks. Though the uprising failed, a second succeeded. As the 19th century advanced, Serbia achieved total independence.

Yugoslavs love festivals. But none evokes the poignant mixture of bitterness and joy they feel each October 21 in Kragujevac, an



Death arrived before breakfast

5:17 A.M.—JULY 26, 1963. As many of Skopje's 200,000 citizens were stirring from their beds, the morning calm suddenly exploded. A massive earthquake struck directly beneath them. Within 20 seconds, 80 percent of Skopje lay in ruins (left).

Only the early work hours of summertime—most of the people, already awake, reeled out of their homes before the roofs and walls collapsed—kept the death toll down to 1,070. Many late sleepers never awoke.

From around the world relief soon poured into the devastated city, capital of the Yugoslav republic of Macedonia. Almost immediately a new two-billion-dollar "earthquake-proof" Skopje began to rise from the rubble of the old town. Modern apartment complexes (below right) give a Western stamp to the new city, previously noted for its markedly Turkish aspect.

Beyond a construction worker (above right) stands a remnant of the former railroad station, preserved as a reminder of those fateful 20 seconds in 1963.



MAN: MICHELA LOPPAFFO; REMAINS: BY JERRY F. BLAIR © U.S.S.



industrial center in central Serbia. On that date in 1944, Partisan and Russian troops liberated the city—thus the joy.

But on that same date three years earlier, German SS troopers had lined up 7,000 men and boys of Kragujevac and massacred them in reprisal for guerrilla activities. For all its enormity, the event remains little known outside the country.

Žika Jovanović was 39 then, and strong. Now he is 67, a retired accountant who keeps brandy in hand when he talks about it.

"It helps," he says, eyes straying beyond

the room where we met to the rolling hills of tragedy beyond. His words tumble out.

"On October 20," he begins, "they collected all men between 16 and 60—about 10,000 of us. They herded us into a field just west of town. At 7 a.m. on October 21 they started shooting—a group here, a group there—and the killing lasted all day. Some men were spared: a few butchers and bakers and doctors, the collaborators, and those who had to dig the trenches to toss in the bodies."

Field of Sorrow—and Optimism

He grinds out his cigarette, lights another. "I lived because I broke and ran. They recaptured me in town. I begged for my life. 'I have a mother,' I said. 'I have a wife and children.' They shot me in the back and shoulder, and left me for dead."

With another survivor, Živojin Zimonić, now head of the Kragujevac Tourist Association, I walked over the flowered field of death. Among 33 monuments here, one depicts a bird with a broken wing. Beside it rest 300

schoolboys, marched there from class carrying their bags and books, and slain.

Mr. Zimonić pointed to a memorial stone on which a few words were carved in imitation of a childish hand. He said: "The lad wrote them in his notebook. Someone found it later. It says, 'Dear Daddy and Mommy Greetings last time Ljubiša.' He never knew that his father was shot the same day."

My host surveyed the tawny slopes, daubed with brilliant patches of begonias and daisies. The annual observance was only a few days away.

"We expect more than 100,000 people," he said quietly. "We do not forget. We show our respect. But we celebrate also. They would want us to. Three years to the day after they died, we regained freedom."

Not fatalism but optimism, I knew by now, lies at Yugoslavia's wellspring. Moving south to Macedonia, one of the poorer republics in material goods but rich in spirit, I found that her shining new capital city of Skopje stands as a testimonial to faith and hope.



Citadel of the spirit, the Church of St. John Bogoslav crowns a height above Lake Ohrid in Macedonia, southernmost of Yugoslavia's republics. Albania's hills ring the far shore. This area, peopled by farmers and fishermen, abounds with medieval monasteries whose walls harbor a treasure-trove of religious art.

The 25-foot-high, 11th-century fresco of the Madonna and Child (right), at the church of St. Sophia on Lake Ohrid, lay concealed by another painting for 700 years, until discovered during recent restoration.

The historic region of Macedonia—fought over by Balkan powers in both world wars—today lies partitioned among Yugoslavia, Greece, and Bulgaria. Alexander the Great, a native son, stretched his conquests from here to the Indus River in the 4th century B.C.





Early on July 26, 1963, an earthquake leveled the awakening city, killing 1,070 citizens and injuring some 3,000 (pages 624-5).

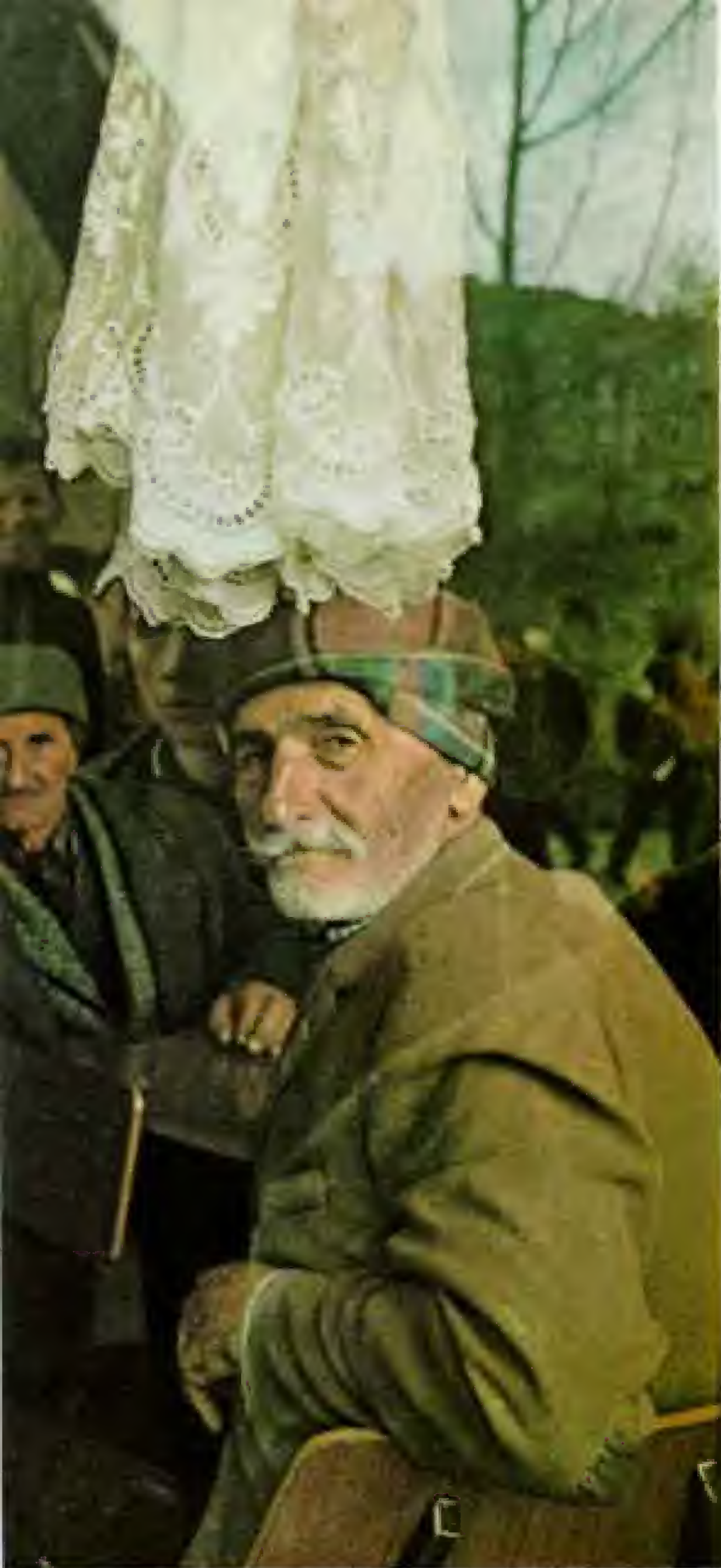
Help soon flooded in from throughout the world. Skopje began rising from the rubble. Today the city's new iron- and steelworks, chemical plants, and other industries hum day and night; students throng its university, and Macedonian painters, poets, writers, and musicians win international acclaim.

And Skopje continues to grow and build. I watched work start on a huge shopping center with two floors of underground parking. By 1981, I was told, 100,000 flats will have been constructed.

"We're creating a totally new and extremely modern city," asserted Risto Galić, the city's energetic planning director. "It will cost two billion dollars."

Autos Crowd a Reborn Skopje

Macedonian President of Government Dr. Ksente Bogoev thinks in even larger terms. Formerly professor of public finance at the University of Skopje, he heads a republic of 1½ million people living on a mountainous, semi-arid land the size of Vermont (map, pages 592-3). Over coffee in his office, the personable president drew the picture of a have-not republic upgrading itself.



STEFANOVIC © R. S. S.

"Before World War II," he told me, "we had only a handful of small industries. Today our factories hire 90,000 workers. Before the earthquake there weren't a hundred cars in Skopje, against 26,000 now. We've had television for more than four years."

He tapped the table emphatically. "Macedonia remains about a third less developed than Yugoslavia as a whole. But now we grow faster than any other republic. In 20 years we'll catch up. Discontent makes progress."

Dr. Dimitrije Stefanović, of the Serbian Academy of Sciences and Arts, traveled with me through southern and central Yugoslavia. An engaging, hearty man of 40 with a Ph.D.

Forbidden alcohol by their religion, Moslem Shiptars enjoy a soft-drink break in the Montenegrin village of Gusinje, near the Albanian border. The photographer, shooting through the cafe's lace-draped window, caught his own reflection (left) and that of grinning boys in the village street.

Many Shiptars adopted the faith of Mohammed during nearly 500 years of Turkish rule. But their Montenegrin neighbors of the Serbian Orthodox rite bitterly resisted both Islam and the invaders who brought it. Centuries of almost ceaseless guerrilla resistance by Montenegro's fierce warriors preserved their homeland's independence.

from Oxford; Dr. Stefanović is among the handful of scholars in the world who search out long-forgotten music in isolated monasteries and restore it to life. In my case, it was his knowledge of English rather than music that prompted him to volunteer as guide.

Often, as we toured, the continual balancing act between Middle Ages and 20th century startled both of us. North of Macedonia one morning in Serbia's autonomous region of Kosovo, we watched formidable machines rip coal, lead, and zinc from the ground in huge tonnages (though never enough to satisfy the demand).

Then, a few miles later, I stopped to photograph a peasant woman leading a brace of oxen up and down a field while her husband walked behind guiding a wooden plow. Across the road a tall, leather-faced Shiptar led a sheep to a wall, drew a long knife, pulled it swiftly across the animal's throat, and hung the carcass head down to drain.

Presently, near the small city of Peč, we paused at the richly frescoed 14th-century Orthodox monastery called Dečani, resting in a forested valley with rugged mountains towering overhead.

"May I sing for you?" asked Dimitrije.

He crossed himself and filled the church with the music and words of "A Hymn in Honor of King Stefan of Dečani"—an ancient and forgotten tribute he had discovered in a secluded monastery in Greece.

My companion had brought the song home, for Dečani is King Stefan's own church. Before us, at peace in his ornate sarcophagus, reposed that illustrious king, father of the mighty Tsar Stefan Dušan, who ruled all Serbia at its zenith 600 years ago.

I left reluctantly. As we approached the deep and forbidding Rugovo Gorge, whose



narrow corkscrew road would lead us from Serbia into Montenegro, a policeman halted our taxi. Methodically he checked it, stem to stern: engine, lights, brakes, horn, tires.

"The gorge is no place for a breakdown," explained our driver, 27-year-old Slobodan Popović, shifting into gear. "Hang on."

For the next three hours we labored upward through one of Yugoslavia's wildest and grandest regions. Frequently we halted for flocks of sheep, and hugged sheer cliff walls to let oncoming trucks and buses ease past. Thousands of feet below raced the angry, foaming River Pečka Bistrica, which had cut this chasm.

At the summit, looking out from 6,066-foot-high Čakor Mountain; Montenegro's craggy roofs peaked and sloped in all directions, and the wind nipped at us. We lunched in a roadside cafe on thick slabs of coarse bread, zesty white cheese, and sour sheep's milk so heavy with curds that we ate it with spoons.

Montenegro: Changeless—and Changing

Dimitrije studied the soaring panorama about us. "We have an old saying," he told me: "'God didn't know what to do with some extra rocks, so He made Montenegro.'"

With half a million people in an area slightly larger than Connecticut, this republic ranks as Yugoslavia's smallest—but stands second to none in pride, spirit, and beauty.

Sheep bells tinkle on the lofty slopes (following pages), loggers send timber crashing down mountainsides, the harsh and dry land yields a reluctant harvest, life is hard. "What of this?" asks the Montenegrin. "We have freedom; we have always fought for independence. No one has ruled us for long."

To this day the warrior tradition lingers. I met old heroes with sweeping mustachios in cafes and heard them boast of battles won and valor nonpareil; middle-aged veterans of World War II told me, eyes flashing, how they struggled against the Fascist invaders. No wonder that in such a patriarchy the birth of a son signals a rousing celebration; a daughter's arrival evokes a calmer response.

Traveling in southern Montenegro, I felt oddly grateful for this citadel of happy warriors. Across Lake Skadar's shimmering waters I gazed into Albania's forbidding, lowering mountains.

In a world of hostile borders, few are touchier than this one; in Albania an iron-fisted regime—perhaps even harsher than that of mainland China—views Yugoslavia's "deviationist" brand of Communism as a kind of infectious disease. "Do not stray close to the frontier," I was warned. "They might shoot."

I did not stray, but instead turned north again. And above Titograd, in the high village of Velika, I caught another glimpse of the future Yugoslavia.

In this place, where winter stays six months, I stopped for directions at the steep-roofed house of Dragiša Knežević, a sheepman. He immediately left off cutting firewood, ushered me inside, and produced homemade cheese and throat-searing šljivovica. His attractive wife Milijana nursed their 8-day-old son; their 3-year-old boy hugged his father's knee.

"Perhaps our new one will become a doctor," said Mr. Knežević. "He can look after us when we are sick. I don't want my sons to work on the land. It is better to live in the city and earn a salary."

Sarajevo Blends Two Cultures

Now my days in the Land of the South Slavs grew short. To fit in the remaining pieces of this great mosaic, Dimitrije Stefanović and I flew to mountain-rimmed Sarajevo, capital of Bosnia-Herzegovina.

Here, at the center, Yugoslavia came together for me. Here I saw East and West meet and mingle as nowhere else. In Bosnia-Herzegovina, descendants of the original Serbs and Croats—some of them Moslems, some Roman Catholics, others Orthodox—make common cause as Yugoslavs. And time runs up and down the ages like wild notes dancing from a shepherd's flute.

One morning, in the narrow and twisting streets of the bazaar in Sarajevo, we admired the artistry of coppersmiths hammering out

Village swinger gets an assist from a friend in Gusinje. Like so many young Yugoslavs, even here in Montenegro's hinterlands, they have adopted Western styles and outlook—often to the frowns of village elders. For modesty's sake, this mini-skirted lass has wrapped a tablecloth around her legs; a tree limb above supports her. With little to keep them in the tradition-bound villages, increasing numbers of the region's young people migrate to Titograd, Montenegro's booming capital, and other cities to the north.





To the summer pastures: A Montenegrin shepherdess and her son guide their flock to mountain meadows—a journey made each year as spring passes into summer. Autumn's first cool breezes will bring them to their valley again, completing another seasonal cycle in this remote fastness.

BOURCHONNE © P. S. S.

trays and coffee pots, while Moslem women in colorful, billowing pantaloons slipped silently past with averted faces. In tiny shops, red-fezzed merchants beckoned with knowing eyes and inbred patience. For more than four centuries Bosnia bowed to Turkish rule.

Not far away the Roman Catholic cathedral's spires reached heavenward. Close at hand rose the graceful minaret of the mosque of Gazi Husref-bey—a 16th-century Turkish governor. Beneath it, in the courtyard, I beheld scores of Islam's faithful, washing hands, arms, and feet. Soon the muezzin would call them to prayer.

A little farther on, Dimitrije and I entered the 16th-century Orthodox Church of the Archangel Michael. This was a feast day; worshipers crowded the small church to its utmost capacity. They lit candles until the dark smoky interior flickered like a thousand fireflies.

Street-corner Tragedy Triggers a War

Emerging, we moved on a few blocks to an infamous street corner by the Miljacka River. Here, on June 28, 1914, a teen-age Bosnian Serb named Gavrilo Princip shot and killed the visiting Austrian Archduke Franz Ferdinand and his wife—and touched off the catastrophe of World War I.

Suddenly, while we stood in the small museum that recounts the event in all its macabre detail, another disaster struck. The room rocked gently, light fixtures swayed, and lights went out.

Earthquake!

We were lucky. Sarajevo escaped damage. But the industrial city of Banja Luka, 90 miles northwest, took the quake's full force. Two tremors, 17 hours apart, cost 18 lives and left many of its 60,000 people homeless.

Once again, as at Skopje in 1963, all Yugoslavia pitched in to help. As I write, Banja Luka struggles to its feet.

I have no doubt of the outcome. Already the cry has rung out, as it has so often in this troubled yet indomitable land:

"Živeli!—Long live!"

THE END

Businessman in the Bush

THE PRESSURE had been building up for a long time. Four telephones on my desk. Nine plants to help manage—one of the country's major manufacturing corporations, with thousands of employees. Dozens of labor unions! Ever-changing government regulations! One day I felt so tired I could hardly make it back home. My old family doctor said, "Get out of the rat race, or I won't have anything more to do with you."

I was 53 and completely exhausted, consigned to complete rest. I didn't know it then, but I was also on the threshold of a new and no less absorbing career:

the photographing of wild animals, primarily birds, to record their ups and downs as they



TRUSLOW'S SUBJECTS INCLUDE BIRDS, FISH, AND INSECTS IN WOODS AND FOREST AREAS OF FLA.

Audubon of the camera. Fred Truslow scans Everglades skies for a bald eagle. To catch the king of birds in action, the photographer focused in advance on a favorite perch. Homing in on the target, the eagle rotates wings in reverse to reduce speed, extends tail like an aileron, braces feet as shock absorbers, and thrusts head forward for balance.

By studying his subjects, anticipating their actions, and keeping out of sight, Mr. Truslow has amassed a unique photographic record of the secret lives of wild creatures.

Heterospylus heterospylus, length 25-30 inches.



live uncoerced and unrestrained in their natural habitat.

In the 14 years since then, this task has taken my wife Mildred and me to the four corners of the United States. I have huddled in concealment for thousands of hours, in swamps and in trees and on mountains, making tens of thousands of color photographs.

But quantity has never been my aim, nor merely pretty pictures. My focus is on behavior—the prenuptial dance, say, of the rare whooping crane in Texas (pages 650-51); or the morning routine of those largest birds of the North American continent, the condors of California, whose wingspan sometimes reaches almost 10 feet. As the sun rises higher, the condors get warmer, and put down their black feathery hoods (pages 664-5).

Wife's Concern Opens New Vistas

It was thanks to my wife that I got started on my picture-taking career. After I was allowed to leave my bed, but still not permitted to go to the office in New York, I prowled around our home in New Jersey week after week, anxious to get back to the job. She said, "Why don't we take a trip somewhere? You have often talked about the Everglades. Let's go down and look around."

We bought a station wagon, and when we got to Cocoa Beach in Florida, Mill mentioned that the Cruickshanks lived close by. Why not spend the evening with them?

I knew of Allan and Helen Cruickshank as a noted team of wildlife photographer-writers. Allan often lectured for the Audubon Society.

"But they live in Rye, New York," I said.

Mill said they had moved down here.

How did she know? She said, "I didn't tell you, but I went to the Audubon headquarters and found out a lot of things. The Cruickshanks will be glad to see us."

It was a wonderful evening, full of talk about wildlife photography—and, as it turned out, a decisive turning point for us. The next

day, when we rolled into Miami, Mill announced that we would stop and pick up some photographic equipment at the first camera store we saw.

I said, "I've got a Brownie and three rolls of film. What more do we need?"

She opened her purse. "Helen Cruickshank gave me this list," she said.

After four hours in the store, we emerged loaded down and drove on to Key Largo, to a motel serving as a center for Audubon bird-watching trips. Mill had found out about that, too.

There we learned that the glorious "pinks"—more formally known as roseate spoonbills (pages 656-7)—fed in a pond just down the road, not far from Cowpens keys, which was then one of the main rookeries in the East.

I sat up most of the night trying to fathom all that camera equipment, and left at dawn for the pond. I had never seen a pink before. Now I saw 135, feeding in the marshy waters. But when I set up my tripod and the rest of my gear, I still didn't know how to work it.

Chance Meeting Unlocks Another Door

An old pickup truck stopped and a man in outdoorsman's clothes got out. This was something Mill hadn't planned; it was just my own good luck. The stranger was Robert Porter Allen, the National Audubon Society's research director, also charged with supervising all the Audubon bird refuges in the United States. Now, during the nesting season of the pinks, he was keeping an eye on their rookeries in Florida Bay.

We became friends, and this great naturalist took me in his patrol boat for my first field trips with a camera. Until he died, seven years later, we traveled together a lot and collaborated on several GEOGRAPHIC articles.*

*Mr. Allen wrote and Mr. Truslow illustrated "Whooping Cranes Fight for Survival," November 1959; "Roseate Spoonbills, Radiant Birds of the Gulf Coast," February 1962; and "Our Only Native Stork, the Wood Ibis," February 1964.

Nuptial finery of the common egret, worn by both sexes, nearly doomed the species in the early 1900's. Hunters slaughtered thousands for their plumes, then worth twice their weight in gold. For an entire summer, Mr. Truslow was an unseen visitor at a nursery of egrets in the Vingtune Islands of Texas, sweltering in a blind where temperatures ranged as high as 138° F. Back-lighting enhances this beauty, which wears full nuptial plumage only while courting and nesting.





Actitis macularia, length 5-6 inches

New arrival, a spotted sandpiper chick makes his debut in a ground nest near Ithaca, New York. Pipping the egg (top), the hatchling struggles free. Then the mother covers him with her wing (above), a protection during drying out. She seizes the shell in her beak and hurls it well away from the nest. Half-hour-old chick (right) walks all over his mother on feet nearly as big as an adult's. For two weeks the parents watch as their offspring learn to run, hide, and sometimes swim; then they are on their own.

"Luck has little to do with making pictures like this," says Mr. Truslow, whose infinite patience through two weeks of observation rewarded him with a complete family album. His hundreds of shots taken in sequence provide a definitive account of how the spotted sandpiper replenishes its kind.



Bob Allen and I had been working the pinks for a couple of weeks when I heard that Mrs. Lucile White in Homestead, Florida, had put up a feeder that attracted an incredibly beautiful little bird, the painted bunting. With her permission, I brought a stool to sit on and focused my two-foot-long lens on the feeder.

Female buntings are green and not conspicuous. Several came and fed frequently. But I was after the brilliantly colored male—a fashion plate in blue, green, and red (page 659)—and he wouldn't come out of the bushes.

I sat there all day and never got a chance at the male. I sat there all the next day too. Mill brought me a sandwich for lunch.

On the third day, a big man with a Western hat stepped up and said, "I am Mrs. White's brother; may I speak to you?" He had already scared off the buntings, so I said go ahead.

He said, "In the morning, when I shave, you sit out there. I have breakfast, and you're still there. I go for a walk, I have lunch and a nap, and you still haven't moved."

I told him that this is what you have to do to get the picture you want.

"Well," he said, "I am a doctor back home, and I'm here to rest my nerves. But seeing you sit there motionless all day long for two and a half days has got me all upset. For gosh sakes, will you move just once in a while? Or haven't you any nerves in your body?"

I wondered what he would have said if he had seen me jumping three months earlier in New York. But it was quite true; what I was doing now was having a wonderfully calming effect on me.

Bird Behavior Fills a Boy's Notebook

This life was renewing interests that had absorbed me in my youth. Then I would often get up at four in the morning and go out into the fields, looking for birds and writing down what they did. I'd come back just in time for breakfast, and then walk a mile and a quarter to school. I still have some of those old field notes. Here is an entry made when I was 15.

"March 2, 1918. Wondering how he would 639



eat it, I watched a white-breasted nuthatch carry off an acorn. . . . First he took the nut to a neighboring tree and, climbing about five feet, stuck it in a crevice formed by the bark. Giving it a few taps to lodge it firmly, he removed part of the shell. Then came the feast; hanging first head down and then up, he enjoyed his meal. Once it fell to the ground but he patiently replaced it and finished at his leisure, hanging head down."

Until I left home, I spent more and more time in the woods, observing, but then I went to college and to work—as a lumberjack in Maine, as a 65-hour-a-week operator in a southern cotton mill, as a cotton broker in New York, and then, in the big manufacturing corporation. There was no more time for birds, except on an occasional day off, and then I couldn't really relax because I always knew how soon I would be back under pressure again.

But it's somewhat like having learned to ride a bicycle—you may not have done it in years, but you can still get on one and ride. My early field experience, the sense of pleasure in observing patiently, came back to me—just like that.

Everglades Visit Stirs Memories of a Youthful Crusade

The setting of the Everglades also brought back strong emotions of my boyhood. I had been appalled at the slaughter of egrets there. During courtship and nesting, they sport magnificent back feathers, long and snowy-white (page 657), and this was their misfortune. Men came to club and shoot them, and then literally tore them to pieces, the dead and the wounded alike—to take their plumage, which brought high prices as decoration for ladies' hats. Young egrets were left helpless, to starve or be eaten by predators.

I wrote an essay about that when I was 13, and it won a Junior Audubon prize and was published in my hometown weekly. Titled "A Tragedy of the Twentieth Century," it was a passionate plea to the ladies to stop wearing white plumes before all the egrets were wiped out. The situation really was as dismal as I painted it, but my description of the Everglades—the Spanish moss, the slimy mud, the lurking crocodile—sprang mainly from my reading and my imagination. I had never been there.

Now, so many years later, I found the reality unimaginably more compelling. Egrets were thriving—thanks to a change in ladies' fashions; to state and federal laws enforced by diligent wardens provided by the Audubon Society; and to the prohibition of hunting in what had become the Everglades National Park. The crocodile had become a rarity, but there were still quite a few alligators (pages 670-71). They helped to hold down the numbers of raccoons and other predators that might otherwise decimate the egret nests.

All around me I could sense what a challenge it would be to

Unzipping a lake, a black skimmer

fishes. Lower bill slices the water of Coot Bay Pond in the Everglades as the bird plows a furrow—as long as a hundred yards—to attract minnows to the surface. On a second pass, it snaps them up; the bill closes almost automatically on contact. To portray the speeding skimmer, only bird to feed in this manner, Mr. Truslow prefocused on a leaf along the line of flight.





Dryocopus pileatus, length 15-19 1/2 inches

STUDIOSHOWS (C) W.P.A.

Mrs. Woodpecker moves her eggs

Observing a pair of pileated woodpeckers nesting in a dead tree in the Everglades, Mr. Truslow turned an unlucky break into a photographic triumph. As he watched from his blind, the rotted top of the tree broke off, leaving the nest roofless, its eggs exposed. Immediately the female grasped an egg securely in her beak, and flew off with it, vanishing among the pines. She returned for the second egg, then the third—all within 16 minutes. "What an achievement!" wrote famed German naturalist-photographer Heinz Seilmann of this picture, which proves the bird's surprising action beyond question.

Zonotrichia querula, length 12-14 inches



What makes bitterns blush?

"Could be love," Mr. Truslow jokes after observing and photographing this nesting pair of least bitterns on Howland Island, New York. The birds take turns incubating eggs and brooding chicks, and meet at nest changes, about every hour. Then, as here, both "blush," the neutral-colored flesh of their faces turning red for a few seconds. When Cornell University ornithologist Dr. Arthur A. Allen reported the phenomenon, he encountered some skepticism. But Mr. Truslow's unique photographs document this behavior pattern.

Switching mothers in midstream

"Inexplicable behavior often comes to light through wildlife photography," notes Mr. Truslow. This series, filmed in Bear River National Wildlife Refuge, Utah, illustrates the point. The stars: two female Western grebes and their broods.

Mother number one cruises along (top) with three big chicks about two weeks old. One rests on her back; she tows two others, who hang on by their bills.

Along comes mother number two, with two little chicks riding her back (center foreground). In background, mother number one paddles by, with one chick still hanging on and the other two trailing her (one not shown).

Shortly thereafter, but unseen here, the last chick of mother number one dropped off her back, and her entire brood swam over to mother number two and climbed onto her back.

Everybody sank!

After bobbing to the surface, mother number two swims away (lower picture) with her own two offspring still on her back and two adopted chicks gamely hanging on. Her pecks discouraged the other would-be family member, who followed at a distance.



Ardeopharus occidentalis, length 14.75 inches. PHOTOGRAPHS © N.A.S. 643



photograph so much fascinating fauna, to be seen if one had the patience. The anhinga, or snakebird, slipping quietly into the water; suddenly he uncoils his long, slender neck, shooting his needle-sharp beak forward, skewering a fish (page 673). Or the osprey, diving in, and with his talons carrying off a fish—nose forward, like a torpedo.* I was thoroughly intrigued.

Later that spring, when the heat began to beat down on the Everglades, we went north to Bonaventure Island, in the Gulf of St. Lawrence, where the great white sea geese, or gannets, are as dense, in the words of a 16th-century explorer, "as any field or meadow is of grasse" (pages 646-7).

By now I knew it for sure—I would never want to go back to the office again. Taking pictures in the wild was the life for me, and Mill agreed.

Dr. Craighead Suggests the GEOGRAPHIC

As to my color slides, I thought some were pretty good, and I projected these for friends. One who saw them, Dr. John Craighead, a veteran contributor to the NATIONAL GEOGRAPHIC, told the magazine's editors in Washington, D. C., and they invited me to bring my slides to their offices. An office was the last place I now wanted to go to, even if only for a visit. On the other hand, I had grown up with the magazine, as had my father and grandfather; two of our grandsons are fifth-generation members of the National Geographic Society. Its people, I knew, were pioneers in color photography, and I could certainly benefit from their advice.

Edwin L. (Buddy) Wisherd, then chief of the Society's photographic laboratory, took one look and said, "Throw all these pictures away and start using the right film for your purpose."

I asked what was wrong with my film.

He brought out two similar slides of a woman's head, for me to examine with a five-power magnifying glass. The picture on the type of film I had been using melted into fuzziness. The other, on Kodachrome, was sharp.

"The next thing to do," said Buddy, "is to throw out all this stuff. You're ready for better equipment." He took me to a camera store, and after three hours I had a new collection of lenses and gadgetry. I also had stimulating words of encouragement from Dr. Melville Bell Grosvenor, then the Society's President and Editor and now its Board Chairman and Editor-in-Chief.

Mill and I headed back to Florida, where we had acquired a winter home just outside Everglades National Park, and settled down to work the elusive limpkins. These long-legged water birds get their name from their peculiar

*Mr. Truslow photographed the bird's fishing techniques to illustrate "The Osprey, Endangered World Citizen," by Roger Tory Peterson in the July 1969 *Geographic*.

Amorous moose stands eyeball to eyeball with the naturalist-photographer, who surprised him and a cow in Isle Royale National Park in Lake Superior. The 1,600-pound male, attracted by the clink of a tripod, charged Mr. Truslow, who barely had time to scramble into a nearby campground lean-to. With only wire-screening for concealment, he waited for 15 heart-pounding minutes while the enraged beast snorted and pawed the ground in front of him.

Finally the cow diverted the bull's attention, and Mr. Truslow inched out the screen door, shooting pictures all the way—this one from only 34 feet. "I was so scared I felt there was a lead ball in my stomach," he recalls, "but I didn't get the shakes until it was all over."

Over his shoulder (right) of the individual is less 7 inches. © 1982 National Geographic Society







Gannets fight for living room

On Bonaventure Island, off the Gaspé Peninsula, nest thousands of these large birds, each family within pecking distance of its neighbors. They must land unerringly on their own tiny territory or risk trouble. One (upper right) misses its mark and suffers head pecks from three neighbors. It finally reaches home, bearing bloody wounds (lower).

While her husband photographs gannets, Mildred MacCutcheon Truslow, a skilled artist, creates beauty on canvas (left). "With my painting," says Mill, "I can be content while Fred's in a blind."

Morus bassanus, length 31-40 inches.





Limpkins at Fort Pierce, Fla., 1961. © J. A. S.



limping gait. Their favorite food is the fresh-water apple snail, and I wondered: How do they extract the snail without breaking its shell, and despite the tough trap door that protects it against the outside world?

The limpkin wedged a snail into a crack in a log. He waited until the snail relaxed and the trap door opened slightly. Then he darted his bill inside and jerked out the meat. My report of this appeared in my first GEOGRAPHIC article.* But far more frequently, the trap door stays tightly shut. Then the limpkin forces the lower point of his bill between trap door and shell. Steadying the shell with the upper bill, he uses the lower bill like a can opener—twisting and prying until the trap-door muscle is cut.

It is surprising how many people take a deep interest in wildlife behavior after reading about it in the GEOGRAPHIC. Three retired

lady teachers from Toronto wrote me that they wanted to come and see those limpkins. Sure enough, they did.

In a later article my pictures showed the home life of bald eagles—how they raise two young, with the eaglets first trying to walk in the nest and falling on their beaks, starting to preen, and finally, at the age of 3 months, learning to fly.† When a lawyer in Detroit read this, he turned over his cases to partners and drove to Florida to see the eagles.

An article about the Everglades, and the wildlife problems caused by disrupting the water supply, appeared in an October issue.‡ I couldn't work along the major trails that

*"Limpkin, the 'Crying Bird' That Haunts Florida Swamps," January 1958.

†"Eye to Eye With Eagles," January 1961.

‡"Threatened Glories of Everglades National Park," October 1967.

winter because so many people asked the park rangers to point me out and then stopped to ask questions. I finally moved far out into the mangrove wilderness.

Two prominent surgeons from Washington, D. C., came down to visit us. They didn't know much about photography, but soon fell under its spell. Now one of them goes out year after year to photograph wild flowers in the Rockies. The other takes an hour off, whenever he can, to make pictures at the National Zoological Park in Washington, and photographs everything from spiders to birds on weekends at his farm in Virginia.

This is an activity that these doctors, and I, can heartily recommend—not only to people more or less close to retirement but to anyone, at any age. You can adjust it to fit your schedule and your circumstances; you can spend a few hours on weekends at a bird feeder in your backyard, in a park, or at any place that attracts birds.

Plenty of Subjects Close to Home

In short, you don't have to travel all over the world, or all over the country, to do good wildlife photography. Nor is this something only a few experts can do. You don't need an awful lot of high-priced equipment either.

Let's be specific. Besides film, you need just four items: a camera body, a lens, a tripod, and a blind to hide in. Then it's up to you.

The camera body I use is a 35-millimeter reflex type. You needn't buy an expensive one, just a good one. The camera I used for five years can be purchased for about \$130 (the camera body alone, without lens).

Good lenses are expensive, but fortunately you don't need a whole lot of them; one will do—a 16-inch, or 8-power, telephoto lens, called a 400-millimeter. I do 90 percent of my work with this lens. There is a lot of turnover in lenses, and if you are not in a hurry you can pick up a top-notch secondhand 400-mm for about \$300, or less than half the original cost.

By the way, mention a telephoto lens and a lot of people get the idea that you can just sit in your living room and photograph what's going on far, far away. You could try, but you wouldn't get much; your birds would show up as tiny specks. But you want the frames of your pictures pretty much filled with your birds, to get all the detail you can, for enlarging. Thus the four spoonbills on pages 656-7—big birds, about 30 inches in length—were shot at 25 feet. The barred owl

feeding her young, on pages 668-9, was taken at 15 feet, and the nest full of little Trail's flycatchers on page 658 at six feet—all with a 400-mm telephoto.

Buy a good tripod, sturdy and easily adjustable. That might cost about \$45. For a blind, I use a Pop Tent, made for hunting, with extra zippers sewn in. It costs somewhat less than \$60, or you can make your own.

You can get pictures without a blind, but you have to be extremely lucky or you'll never catch truly relaxed, natural action while your subject watches your movements. Once you enter the blind and stay in there long enough, you are completely outside his mental picture, and he will relax and act naturally. I have photographed an adult eagle dropping off to sleep only 35 feet from my blind; without a blind you couldn't get within half a mile before he would take off.

The cost of all this equipment adds up to less than \$550, the price of a mediocre second-hand car. You'll have to buy film, of course, as you go along, but this will hardly be more of an expense than gas and oil would be for the car. If you can't afford that, you'd better forget about serious work.

English Sparrows Come Before Eagles

After your initial investment you need time, patience, and, above all, experience. For the beginner, it's best to start at a bird-feeding station, or at a place where birds come to drink. You'll learn to manipulate your equipment fast, until you do this almost automatically, without worrying about it at all. You must also learn all you can about your subject's behavior, so that you can anticipate what he is likely to do; otherwise—except for a case of sheer luck, which doesn't happen often—the action you want to photograph will be over before you can squeeze the button.

To improve your timing, you can't do better than to focus on common birds, say ordinary English sparrows at a feeder. After all, you can't expect to work eagles the first day.

Eagles don't come to feeders, of course, nor do any of the big predators, nor the trumpeter swans or whooping cranes. These are among the wariest of birds, and must be approached most carefully. The first time, don't go directly toward them. Head for a point nearby and sit a while. Or just walk away, come back later, and go a bit closer.

Before a bird flies off, he will start to fidget, a tip-off that he is becoming agitated and may take off in a rush. You don't want to reach

that point, but rather watch for signs that he is getting uneasy, then withdraw and try again. The idea is to condition him gradually, without ever pushing him over the line between disturbance and fear.

Some people think a camouflage suit helps, but it really doesn't matter what you wear. I think it does help a lot, though, to have on the same kind of clothes every day. The best camouflage is to wear something the birds have become used to. With some, to be sure, that can take quite a while. After four weeks of working golden eagles on a 500-foot cliff near Livingston, Montana, I still had to get into my blind at 3:30 every morning, before there was any light, so that they couldn't see me at all.

The ones least likely to become disturbed are sea birds living in colonies, such as gannets and boobies. You can approach close to them almost as soon as you arrive. The problem may be how to keep a lot of them out of the picture, so as not to get more than the limited number that makes for good composition.

Secret of a Puffin Portrait

Before setting up any equipment, I observe each new subject until I have its behavior pattern pretty well roughed out. I learned early in the game that such patterns can vary considerably, even within the same species—and make all the difference in the world to the photographer.

Consider some puffins I have worked. On Matinicus Rock, about 40 miles east of Boothbay Harbor, Maine, they have to put up with a lot of gulls that sit on the rocks, hungry for baby puffins. And so the puffin parents, about to bring home a bill full of fish, circle the island in a traffic pattern, like airliners stacked over New York's busy airports. One by one, the puffins will drop out, each bird swooping down between the rocks and making straight for his nest, hidden in a crevice or in a burrow in the ground. He hurries to minimize the chances of giving away the location of his young.

A hundred miles away, on Machias Seal Island, I found that the gulls had been driven off by a compassionate light keeper. Puffins landed leisurely, each on a rock near his nest, then they stood there, looking about and resting. After a while, still without haste, they marched down to their homes.

On Machias Seal Island I photographed a puffin to show how neatly he had arranged his catch of fish in his bill (right). I couldn't



Fregata aetiva, length 11½-13 inches. COURTESY © B.S.A.

Packed by a puffin, fish

dangle in orderly array. The incredible happens and a picture of a common puffin on Machias Seal Island, off the coast of Maine, records it. The bird, whose bill grows large only during courtship and nesting, fished underwater in rough seas, gathering these Atlantic needlefish to feed its young. Somehow it manages to keep the catch carefully arranged, often alternating heads and tails.

How does the puffin do it? It keeps its secret well.

have done it with any of his harried kind on Matineus Rock.

This points up a central problem of photographing wildlife in depth. In addition to the blind you need a gimmick—something that you know the animals will come to, so that you don't have to chase after them. On Machias Seal Island, a rock above a puffin's nest served as such a gimmick. From observation I knew that he liked to rest up there, and that's what I zeroed in on, waiting for him.

In the case of the little foxes friskily brawling on pages 652-3, my gimmick was their den in the frozen tundra. From a shack on Cape Thompson in northwestern Alaska, some 100 miles north of the Arctic Circle, I had spotted them with binoculars, down in a valley on a

pile of glacial gravel. They stayed in their den most of the time, and I in my nearby blind, until the right moment in the bright Arctic night when they came out to play.

Enamored Moose Resents Distraction

The biggest thing I ever tackled, and vice versa, was a bull moose on an island in Lake Superior, in Isle Royale National Park, Michigan (pages 644-5). It was the mating season, in October, and the park was closed to the public. The district ranger, Roy Stamey, took me to a clearing near a creek. He said it was a favorite spot for a pair of mating moose—a promising gimmick indeed.

That big fellow came on the third day and was about to mate with a cow when I shifted



my tripod. There was a clinking of the tripod's legs. The bull heard that—and charged.

I dashed for a lean-to 25 feet away, as planned. Luckily he had farther to go because his antlers wouldn't let him pass between some of the trees. He galloped with such momentum that he shot 40 feet past the lean-to, so I had time to hop inside. Between us there was only a wire screen that covered the front of the lean-to. He couldn't see me because the sunlight was reflected by the netting. But he could smell me, and so he stood out there, pawing, grunting, and tossing his head. I didn't make a sound.

While jockeying for a look at me in the lean-to, he scratched his shoulders on the eaves. Finally he went back to his cow.

Great egret, length 40 1/2 inches. © 1992



When both were gone, Roy and I measured the height from the ground to the eaves. It was 8 feet 2 inches, and Roy said the moose must have weighed about 1,600 pounds. As I remember him, he was twice that big.

"You don't care what you do to get a picture," said Dr. Arthur A. Allen when I told him about this. He was the first professor of ornithology in the United States. He had the widest experience in observing bird behavior in the field of anyone I ever knew, and I was privileged to learn from him. For seven years he let me join him for a month each summer in Ithaca, New York, where he had established the famous Cornell University Laboratory of Ornithology.*

In winter Dr. Allen and his wife Elsa would visit us in the Everglades. There, as we watched an anhinga fishing, he gave me one of my most memorable lessons.

Unlike ducks, anhingas have no oil in their feathers, and so they must dry out frequently—in my experience, every 15 minutes or so—lest they become waterlogged. This anhinga kept coming back to the same rock to dry. She had just gone off again when a two-foot-long soft-shelled turtle lumbered up on the rock. The turtle seemed to doze there in the sun.

Doc said, "There'll be trouble when the

*Dr. Allen wrote "Sapsucker Woods, Cornell University's Exciting New Bird Sanctuary," in the *NATIONAL GEOGRAPHIC* for April 1962.

Whoops, my dear! In a pre-nuptial dance—a rite of spring—a male whooping crane jumps as if in joy, then bows and pirouettes before his mate, left, and offspring.

Parents intent on starting new families chase away the young birds, who join other whoopers for the journey north—a 2,500-mile flight from the Aransas National Wildlife Refuge in Texas to their nesting grounds in Canada's Wood Buffalo National Park.

For seven months during 1958-59, Mr. Truslow and naturalist Robert Porter Allen haunted the Texas refuge, frustrated by rain in their efforts to photograph the last colony of whooping cranes on earth. Finally, at dawn on April 7, skies cleared. Mr. Truslow entered his blind and did a season's work in three hours.



Fox cubs frolic
under the midnight sun





Foxes John, shoulder height 13.58 inches. © 1978 NATIONAL GEOGRAPHIC SOCIETY

AT CAPE THOMPSON in northernmost Alaska, Mr. Truslow spied a family of red foxes—father, mother, and four cubs—living in a den of glacial gravel. “I set up a blind nearby, but it wasn’t necessary,” he recalls, “since these animals seldom see humans and had little fear of me.” The result: a sequence of carefree play that ends in a moment of motherly solicitude.

Two of the cubs—both cross foxes, a color phase of the red fox—discover a piece of old caribou hide and start a tug of war (top left); the game turns into a boxing match (center left). Wrestling comes next (above) with the winner up, the loser down. Feelings hurt, the defeated youngster seeks out its mother, also a cross fox, who gives comfort with tender licks about the face and ears (lower left).

Vying for a mate, female yellow-shafted flickers square off on a pine stump (below), on a vacant lot near Mr. Truslow's Florida home. Ritual battle ends when the winner flies to the tree of her intended spouse, who works on the nest (center), tossing chips over his shoulder. The loser follows, peering down from behind the trunk. The victorious female and her mustachioed swain at once spread golden tails in courtship ritual (far right). After mating, the bride sets about improving the nest—leaving the groom to his leisure.

Colaptes auratus, length 12-14 inches



anhinga gets back. Keep focused on the turtle." He called this a pregnant situation.

Sure enough, the anhinga popped up and found herself facing the turtle's tail. Quick as lightning she shot her bill across the top of the turtle, straight at the back of his head. In that fraction of a second the turtle had lowered his head slightly, and so the anhinga's strike missed. The turtle scabbled down into the water, hotly pursued. And after a while the anhinga was back, once more drying out on her rock in peace.

Thanks to Doc's foresight, I had a picture series to show what had happened. And I had dramatic proof that in wildlife photography the recognizing of pregnant situations is one of the secrets of success.

Once during a visit to Doc Allen in Ithaca, an unexpected opportunity arose to learn something about *human* behavior.

We spotted a red-headed woodpecker's nest in a maple right alongside a golf course. It offered a chance for some good bird behavior photography, so Doc's son David, a fine field man in his own right, helped me build a 16-foot tower of two-by-twos, about 15 feet from the nest, and I put my blind up there. The setup looked ideal, except that the maple and my tower stood in a clump of trees that stuck out into a fairway, and the next day was the Fourth of July.

The golf course was crowded. A lot of the golfers tried to drive over my little patch of woods, and many didn't succeed. Golf balls hit the trees, dropping at the base of my tower, and people came to look for them, disturbing the birds.

A little boy with a bow and arrow came along just after a ball hit my tower. I opened the zipper in my blind and asked him to throw



REPRODUCED BY FREDERICK KENT THURLOW © 2008

the ball onto the fairway. Instead he picked it up and walked off with it.

Soon a man came after his ball. He looked and looked, and I got impatient. I said, "Mister, you'll never find your ball here."

He never looked up; he just said, "Why not?" I said, "A boy picked it up and went up the hill with it." He muttered something to himself and then hollered to his partner, "Hey, a little boy got my ball!" The other man called back in salty disbelief. How did he know? This was no way to get out of a penalty stroke!

The first man said, "A voice in the tree told me. Come listen." His partner ran over. I said loudly, "I told you a boy took it; now will you get out of here?" The second man didn't look up either, but he was convinced.

Soon a lady came looking for *her* ball. I stage-whispered, "Lady, this place is full of poison ivy." She jumped and ran.

Finally a man came and found his ball, in a position that made it difficult to play the next stroke. Without his partner's seeing him, he crouched down to move it to a better spot. I gave a loud screech. He bounded away, abruptly turned honest.

"I was in an unplayable lie," he told his partner. "I'll take a penalty stroke."

That whole day, the little boy was the only one to look up. Everybody else accepted me blindly, as the authoritative voice in the tree.

Catching a Skimmer in the Act

Doc Allen was an optimist who wouldn't take no for an answer. He felt, like Sherlock Holmes, that one can solve any puzzle posed by a subject's behavior if one is observant and ingenious enough. One recent winter, when he was no longer around to meet us in the Everglades, I wondered what he would

have said about the problem of the black skimmer.

This bird is about eighteen inches long, with a three-foot wingspan and a curious bill—the lower mandible is much longer than the upper. He fishes in flight—opens his bill wide, sticks the long lower mandible straight down into a pond, and skims along swiftly, plowing the water. Small fish come up in his wake, attracted by the disturbance. After a hundred yards or so, the skimmer makes a U-turn and plows right back. When his immersed lower mandible strikes a fish, the short upper mandible clamps down, to trap it. The problem was, how could I focus on him, flashing past so fast?

Let me point out here how precisely you must focus to get a sharp picture. Given the properties of color film and of the natural light available, even the best long lens—once you have adjusted it—can catch with true sharpness only those things that happen to be, say, between 25 and 26 feet away from your view finder. These 12 inches are called your depth of field. Whatever is even an inch closer to you than that, or just an inch farther away, is already somewhat out of focus.

You can shift focus, of course, by re-adjusting the lens with a tiny twist. But if your subject moves rapidly, there won't be time for that—which is why you want to be pre-focused on a spot where you know he will be. But how could I tell just where in the water my skimmer would be skimming?

This puzzle, moreover, presented a peculiar aspect to deepen the dilemma.

Because the skimmer shoots along only a few inches above the surface, his wings can't make a full beat. He can only make half-beats, from the vertical down to the horizontal and

(Continued on page 661)

Spoon-fed spoonbills make dinner a frantic affair. The growing youngsters can't wait for the meal. Here, as fellow nestlings beg with bobbing heads, a young "pink" reaches into its mother's throat to feed on regurgitated food, bulging her gular pouch with its bill. The action came at the populous spoonbill rookery in the Vingtaine Islands, Texas.





Alcinx agilis, length 32 inches — photo © Natural Science Society



Женская мушкетёрка, длина 4%—5%, пухом. Фотография И. Жидкова. Географический музей



Passerina ciris, length 5.5% inches — ROBERTSON © A. S. S.

Family burdens tax the talents of a mother Traill's flycatcher. Instinctively she tries to cover everyone with her feathers, but her half-grown chicks stick out on every side. Her oldest and largest, who just got a handout, nods off to sleep, but three others keep mouths wide, chirping constantly.

The family nests in Ithaca, New York, where Mr. Truslow used to spend a month each summer with Cornell's Dr. Arthur A. Allen, of whom Mr. Truslow writes, "Through his unique skill and experience, he taught me more about bird behavior than any other man."

Bounty of beauty distinguishes the male painted bunting, one of the most colorful birds in the United States; another name is *nonpareil*—French for "without equal." This bird appeared on a window feeder at Mr. Truslow's Florida home.

"Every wild creature has a scare point," he says, "reached by repeated actions that he considers disturbing. At the first sign of nervousness in a subject, I always stop and try again later. But next time I am even more careful, for the bird hasn't forgotten that other encounter. Once you arouse fear in a wild creature, you may as well quit."



Feathered warrior, a reddish egret defends her territory on a small offshore island of the Aransas, Texas, refuge, where bird traffic is heavy and nesting space dear. A Louisiana heron, out of the picture, landed on this egret's territory and triggered a ritual defense (left), then a bristling intimidation (lower left), and finally a no-nonsense charge with head down and wings outspread (below right).

"You can't tell when the bird will start attacking," Mr. Truslow points out. "The action goes so fast that as soon as her head started lowering, I hit the button."

"Fred has an uncanny sense of timing," says ornithologist Roger Tory Peterson.



no farther, lest his wings go into the water. And so, to keep up speed, he has to flap his wings faster than he would if he were up higher in the air.

Now note what this extra-fast movement means to the photographer. To avoid having those wings appear in the picture as just a blur, one must use a faster shutter speed. Thus less light will come in through the shutter; to compensate, the diaphragm of the lens must be opened wider. But, for inescapable optical reasons, as you open your lens wider, your depth of field decreases. To sum it all up—instead of having a one-foot depth of sharpness available, I'd have three inches!

The key to the solution was a leaf.

I threw the leaf into the water near the shore where the skimmer had been going back and forth. I focused on the leaf—know-

ing that if he passed immediately next to it, I'd have him in focus too. Now the challenge was to get him into my view finder while he was still a considerable distance from the leaf; to keep him in the view finder by swinging my camera to keep up with his flight; and then, when I could see in the view finder both the skimmer and the leaf, shoot!

Marksman's Reflexes Prove Helpful

Or rather, shoot if he seemed to be in line with the leaf—in the same plane with it, so to speak. Otherwise wait for another pass. What was needed was a quick eye, and timing, timing, timing.

For 11 years I had taken part in firearms competitions, winding up as a team member and coach in international pistol matches. My eye was still fairly good. After two days



Libellula telyphina, length 27 inches

© NATIONAL GEOGRAPHIC SOCIETY





immortalized when, long after I had left, it was discovered by a fisherman. © 1998

and some 150 skimmer passes I had eight satisfactory slides. The best of these—the payoff of the gimmick of the leaf—is reproduced on the cover and page 641. If you look for the leaf in that picture you won't find it; in the split second that passed between my deciding to press the release button and the subsequent opening of the shutter, the skimmer—and my lens tracking him—had left the leaf too far behind for it to appear.

In my code of ethics, the leaf was an acceptable gimmick because the skimmer came close to it without being coerced. Such a gimmick is a natural thing: a favorite perch or feeding place of a bird, a yarding place in the case of a deer, a pond in the case of alligators—whatever situation a wild animal will go to naturally, of its own volition. Putting a wild animal into an enclosure would be an unnatural gimmick.

Under some circumstances, say when your subjects are fish and you can't possibly get satisfactory results in the ocean, it is perfectly legitimate to put them in a tank, provided you tell your audience that these fish are captive; certainly, though, pictures made in this way will not represent the true behavior of a wild animal.

Often one can pick out a contrived or humanly controlled picture right off the bat, simply because the subject's behavior isn't natural. Say you see a photograph of a falcon or a hawk perching right up against a background of dense foliage. You can be pretty certain that this bird is either trapped or drugged or stuffed, or else a pet. Why? Because no healthy wild falcon would voluntarily get himself into such a position—he

Egrets battle over fishing rights

In the Everglades some rocks prove more desirable than others—at least to these common egrets, which favor certain ones as prime spots for fishing. This hassle arose when egret number one, lower, was occupying a rock wanted by egret number two. Charging, the aggressor chased the other bird into the air. The attacker pummels with his feet; the defender counterpunches with his bill. Although the photographer was busy recording this split-second action, he still noted who won—the bird on the left.



Gymnogyps californianus, length 43-55 inches *amasceners* © K.C.C.

Riding air currents on wings that span almost ten feet, the continent's largest bird circles above the Sespe Condor Sanctuary of the Los Padres National Forest (above). In early morning, two other California condors wait for the warming sun before taking off (right). The one at left still keeps up its parkalike ruff of feathers, raised to protect its bald head against the cold of night.

The Sespe preserve harbors some fifty of the great birds—the last remnant of the species. One contributing factor to the birds' increasing rarity: A mating pair produces but one egg every two years and, if it hatches, the offspring remains in the nest for 18 months. Easily frightened, parent birds have been known to abandon eggs and nestlings.

Mr. Truslow, one of a survey team on a National Geographic Society-sponsored study of the birds, never worked within a mile of a nest and was careful to avoid any chance of disturbing breeding pairs. He discovered this dead pine tree with fresh droppings, however, and set up a four-and-a-half-week watch, hiding in a hole dug into a nearby mountainside. This extraordinary color picture of two of these rare birds off guard was shot from 50 feet away. Soon afterward, the heavy birds took off on the thermal updrafts they need to gain altitude.







DETROIT: BY EDWIN L. WOODS, NATIONAL GEOGRAPHIC MAGAZINE

Mother owl attacks!



After 2000, length 17-24 inches. PHOTOGRAPH BY EDWIN L. WOODS, NATIONAL GEOGRAPHIC MAGAZINE © N.G.M.

After a barred owl family set up house-keeping on the ground below an Everglades fire tower, Mr. Truslow put up a blind nearby. Soon the brooding mother seemed to accept him, letting him pat her head and check the eggs. When a rainstorm threatened to drown the two chicks that had hatched (left), the mother even allowed the photographer to move them to safety. Danger past, he returned them to the nest.

"But the next day, for some reason, she changed completely and swooped at me, raking her claws across my scalp." Hastily covering his head with an aluminum pot—kept handy against the chance that the male bird would strike—he suffered a second attack and, knees buckling, went down (above). He fell beneath a bird house hung by the fire warden in a vain hope that the owl family might move in, out of reach of predators.

wants to be up high, or at least way out, where he can see all around him.

On the other hand, I believe that there is nothing wrong with giving a bird a helping hand, if such help will in no way change his natural behavior. Such an effort once made my behavior look exceedingly odd to a number of people.

Flicker Faces a Knotty Problem

I sought to make life easier for myself and for a female flicker, one I had seen fighting another female over a male (pages 654-5). Before the mating, the male was busily pecking out a nest in the stump of a dead slash pine. As soon as they had mated, he quit working, and she had to do the job by herself.

She had a good part of the work done when she ran into a hard knot. I could tell by the difference in the noise, and I saw that she was making practically no progress. I wanted her to get finished quickly because I would have to leave in a few days and had my heart set on some nesting pictures. So I thought that after she stopped pecking at dusk, I would get a hammer and chisel and cut the knot out for her.

I came back in the dark and started to

work: chisel in my left hand, hammer in my right, and a flashlight held in my mouth—aimed at the nest hole, which was face-high.

Twenty-five feet from the tree stump was a road—one of the main intersections, in fact, near Homestead, Florida—and people stopped their cars to see what I was doing. Traffic backed up and a police car drew up near me. An officer got out, walked over, and stood with his hands on his hips, staring.

I couldn't think of anything to say, so I kept on chiseling, with the flashlight in my mouth. The officer turned and I heard him tell his partner in the patrol car, "This guy is crazy as a bedbug. But harmless, I guess. Let's get out of here."

With the knot cut out, the flicker finished her home the next day, and I got my nesting pictures without ending up in the hoosegow.

The main point in my code of ethics is that the welfare of the subject must come first, and getting the picture second. What if, for example, I would have to seriously disturb a bird's nesting routine in order to get the picture? I faced such a situation in Red Rock Lakes National Wildlife Refuge, Montana, where I had gone to photograph trumpeter swans, the world's largest waterfowl. They

Safer headgear protects Mr. Truslow while setting up lights around the nest. To get the correct exposure, he uses a metal tape to determine the exact distance from the lights to the 14-day-old owlets.

PHOTOGRAPHS BY J. TURNER REUTER © R.C.S.



are wary in the extreme. I approached several incubating pairs as carefully as I could, but they wouldn't tolerate my blind, even at a distance of 150 feet. They flew off and stayed away. If they didn't come back, those eggs would be lost. And so I packed up my blind.

But I noticed several muskrat houses sticking out of the marshes. Seen from the outside, they are simply bulky piles of sedge; with the help of the refuge biologist, Dr. Charles Hansen, I piled enough sedge on my blind to make it look like a muskrat house. By moving this contraption gradually, and only while the swans were away on feeding trips, I was able to come within 80 feet of a nest without arousing fear.

Of course I had to get in at about 4:30 a.m. and stay in until late afternoon, sitting up to my waist in icy water. Once, after 13 hours of this, I found myself temporarily paralyzed from the waist down. I had to call Chuck Hansen on my walkie-talkie and ask him to pull me out. But I was happy with the results.*

People ask me why I put up with this sort of thing. Or with mosquitoes so thick that it's difficult to breathe without sucking some in. Or climbing down to a blind on the sheer face of a cliff in the black of predawn. And during those thousands of hours in the blind, without room enough to stand up—doesn't one get bored, just sitting there hour after hour, when nothing is going on?

I think, first, that the challenge makes up for the discomfort and danger. That goes for the song and garden birds, or dickey birds, as I call them, as well as for the big predators and wading birds.

With the more wary predators, 90 percent

* "Return of the Trumpeter," by Frederick Kent Truslow, NATIONAL GEOGRAPHIC, July 1960.

Loving care nurtures a 7-day-old barred owlet, whose mother shields it with body and wing. She feeds it a morsel of a rat (foreground, with tail visible at right) brought by her mate. For the first two weeks after her babies hatched, she rarely left them. This Everglades mother nested on the ground—a practice never before reported in a land of many trees—and reared four sets of young despite the presence of raccoons, possums, wildcats, and alligators.







© NATIONAL GEOGRAPHIC SOCIETY





Alligator mississippiensis

of the challenge lies in figuring out a setup. The action will be relatively infrequent because they feed their young only three or four times in an 11-hour day. But when action comes, it's sudden, and you must react immediately. You must be alert all the time, but not tense; if you are tense all the time, you wear yourself out.

With the dickey birds the setup usually is no problem; you can set up your blind and go right to work. But the action is faster and almost constant, because they feed their young every few minutes, all day long.

Always New Acts in Nature's Drama

Even during the long waits between predator feedings, I am never bored. While keeping an eye on an eagle's nest, say, I'll see a sparrow hawk diving down on a field mouse 25 feet from the eagle's nest. Or a hundred feet away an osprey, carrying a fish, crosses another osprey's territory and is chased. Something is always going on.

From time to time there are surprises. When I was working whoopers in the Aransas National Wildlife Refuge in Texas, a four-and-a-half-foot water moccasin came into my blind. I suppose the cottonmouth wanted to get out of the terrific sun. But what was he doing here on high ground, nearly 400 yards from Aransas Bay and the Gulf of Mexico?

I wore sneakers and had no protection on my legs. I got my feet up on my campstool and waited. He coiled up leisurely and showed no inclination to leave. Finally I picked up the tripod and, very slowly, nudged him out. Since then my equipment box, in which I also keep chewing gum so that I won't cough at the wrong time, always contains a .22-caliber pistol when I am in snake country.

Once in the Everglades I found that a pair of pileated woodpeckers had pecked out a nest, about 18 feet up, inside a dead tree—a 30-foot pine. One afternoon the female sat inside, on her eggs, and I sat outside, in my blind atop a 12-foot tower I had built. Without warning, the whole top of the old pine broke off at the nesting hole. It crashed to the ground, leaving the nest roofless. And then I could hardly believe my eyes. The female took an egg in her bill (page 642) and flew off with it. She returned, and carried away a second egg. Then a third.*

*Mr. Treadow's complete word-and-picture account, "When Disaster Struck a Woodpecker's Home," appeared in the December 1966 NATIONAL GEOGRAPHIC.

Alligator's giant jaws show the ravages of hard times. When periods of low water reduce the garfish supply in the Everglades, this 12-foot male eats turtles; his lower lip shows a cut and white scars left by their sharp shells. Huge muscles at either side of the jaw supply the tremendous pressure needed to crush the creatures into pieces he can swallow (left). When grasping prey underwater, he can close off his throat with the muscular valve visible above. The valve also vibrates when he roars; with his jaws nearly closed, he convulsively ejects air from his fully inflated lungs, producing reverberating bellows that carry farther than those of the largest domestic cattle.

Now a portion of that broken pine stump with the woodpecker's nest in it stands in a corner of my study in New Jersey as a symbol of the totally unexpected.

Perhaps I should also keep there an old aluminum cooking pot, as a reminder of my most stunning surprise. This came from a barred owl I had been working for four consecutive seasons as she nested on the ground, against a concrete slab at the bottom of a fire tower in the Everglades.

In the beginning, if anybody got close while she was on the eggs, she would start snapping. I sat twenty feet away at first, and each day moved a bit closer until I could sit right by the nest and she wouldn't snap. Then I tried petting her on the head. At first she fussed a little, but then she got used to that. Finally I could tip my finger under her bill and lift her up and look at the eggs, and it didn't seem to bother her.

Good Deed Has an Astonishing Sequel

One day in the fourth year there was a terrible storm, ten inches of rain in four hours. Now as a rule I never interfere—unlike some people, who see a young bird in the bush and think it has been deserted, so they take it home and try to feed it. Often that's the worst thing you can do, because the mother is in the next bush, waiting for you to go away.

But in this case the nest was in a shallow hole and filling up with water. The little fellows were about to drown. I got a box, picked up the two young and put them in it, and the old owl too. I took them inside a nearby quonset hut until the storm was over and there was no more water in the nest. Then I put the whole family back. The mother never batted an eye.

The next day I sauntered over to the nest, slowly as always. The mother owl was perched in a tree about ten feet away. I took a good look at the young—and wham! That old owl

Skewering a sunfish with her sharp-as-a-needle bill, an Everglades anhinga comes ashore to dine. She will toss it into the air and catch it headfirst, a technique that keeps scales and sharp spines safely folded back while she swallows. A bubble of air goes down ahead of the fish, conveniently enlarging her gullet for easier passage of the meal.





Pelecanus erythrorhynchos, length 34 inches. Photographed by Lawrence S. G. Brown. © 1964



Porphyrula martinica, length: 13-14 inches

Cameraman's assistant, a friendly purple gallinule accepts a peanut. This meeting, which occurred 12 years ago, near the beginning of Mr. Truslow's photographic career, shows the rapport he establishes with many of his subjects. The next season, on his first day of field work in the Everglades, this same bird flew out of the willows, landed on his shoulder, and immediately stuck its bill into his left shirt pocket, where he had carried the peanuts.

Highly acclaimed by experts in the United States and abroad, Mr. Truslow especially treasures an accolade from the dean of American ornithologists, Dr. Alexander Wetmore of the Smithsonian Institution. Said Dr. Wetmore: "Fred is a man of great capacity and understanding, who applies his experience from other fields of endeavor—to plan ahead, to be in the right place, and to stay there until he gets outstanding photographs. I consider his work, especially with birds, an amazing accomplishment."

Hungry hawks wait open-mouthed as a parent circles their nest in Montana with a meal of ground squirrel. "Their heads," recalls the photographer, "swiveled back and forth as if watching a tennis match."

Sharp-shinned hawk, *Buteo swainsoni*, length of adults 27½-31 inches



hit me in the back of the head and dragged her claws all the way across, slitting my scalp from back to front. She took off, made a circle, and attacked again. By that time I had grabbed a cooking pot that I kept handy for just such an occasion and put it on my head for protection. Nevertheless, the second blow sent me sprawling. Buddy Wisberd, down from Washington to join me on field trips, photographed that (page 666).

Why this switch in behavior? I am not sure. But until the day of the storm the young had never been out from under their mother. After I carried them to safety, they got away from the idea of staying in the nest; they wandered in the grass, and she perched in the tree. Her routine of four years' standing had been upset. She found herself in an unfamiliar situation; she was all shaken up, and so she attacked. From that time on I wore a head guard

whenever I went near her nest (page 667).

Wild creatures, in short, are in many ways unpredictable. That's why it makes me sick to see people fooling with an alligator or a bear, or any animal whose teeth or claws are potentially dangerous. They may be gentle as can be a hundred times, but the hundred and first time something different is in their minds and they'll go after you.

As for me, there's always something new to go after. A flock of white hummingbirds has been reported from a ranch in the Southwest. Are they albinos, or a true species? I have not found them yet. The ivory-billed woodpecker is widely believed to be extinct, but tales drift back of supposed sightings in Texas, Florida, and South Carolina. To wildlife photographers—to me and perhaps to you someday—the world of nature will never run out of challenges and rewards. THE END



ISLES ON THE EDGE OF THE SEA

Scotland's Outer Hebrides

Lonely their hills, sea-racked their shores, yet these wind-swept isles off northwestern Scotland shelter a people whose ways are warm and winning. Here on the Isle of Lewis, a few villagers still cling to the traditional houses of stone and thatch.

By KENNETH MACLEISH
Senior Assistant Editor

Photographs by THOMAS NEBBIA



THERE HAD BEEN RAIN during the night. Now the empty pavements and slated roofs of Oban glistened in the newly risen sun. Gulls, roused by the dawn, hung kitelike in the bitter breeze, watching, searching, shrilly screaming. Of people the streets held none; but out on the docks a slow swirl of activity centered on the mail steamer *Claymore*, bound for the islands called the Outer Hebrides: Barra, the Uists, and Lewis.

It is at the dock of Oban that a visitor first tastes the flavor of that ocean outpost the raiding Norsemen once called "West-over-Sea." It is here that he first hears the soft Gaelic of the islands. A pretty, well-protected port snuggling near the mouth of Scotland's

Great Glen, Oban is the anchor to which the islands ride, and its piers are their gangway to mainland life.

I found a crewman balanced on the edge of the *Claymore's* hold, shouting in Gaelic to a crane operator. He switched to English at my approach.

"Is it yourself that's bringing a car across?" he asked. I told him it was and asked how the car might come aboard. "Ach, well, we'll just be putting it in the cargo net and swinging it up on deck. At your risk, of course. But I doubt we'll be keeping it safe."

As I pondered this curious intelligence (as yet unaware that Gaels often say "doubt" when they mean "believe"), a rich smell of

FRANCIS & TAYLOR NATIONAL GEOGRAPHIC SOCIETY



In this article the GEOGRAPHIC is privileged to publish a new poem by one of America's most distinguished men of letters, Archibald MacLeish, former Librarian of Congress and winner of Pulitzer Prizes for both poetry and drama. Indeed, this story on the Outer Hebrides is the work of two poets—or three if one includes poetry by camera.

Not all members will agree with the elder MacLeish's conclusions about modern technology and the quality of life outside the Western Isles, or with the last line of his poem (pages 692-3). But then, not all of us have been to the Hebrides—or lived for 77 years. And that haunting phrase "perfect indifference." Is he saying that God is indifferent to man—or to the cattle, or to the dispossessed crofters? And indifferent in what sense? Perhaps only the poet knows. Meanwhile his words serve the true purpose of poetry by bringing the joy of a thing of beauty and challenging mind and soul.

—THE EDITOR

grilling bacon wafted up to us from below.

"Fair makes your teeth water," he commented. "You could just go down and see will the cook be giving you your breakfast."

I did that, and he was. By the time I'd put away this first and best meal of Gaeldom's day and regained the deck, the *Claymore* was gliding out of Oban harbor toward the mass of Mull, the nearest of the Hebrides.

My own destination, known variously as the Outer Hebrides, the Long Island (for it is a tightly knit archipelago), and—most properly and poetically—the Western Isles, lay 90 miles away. Geologically different from anything else in Europe, these islands originated at least 30 million years ago. Their rocks are related to those of the Laurentian Shield of North America and could have been separated from it when the continents drifted apart.

Perhaps the name Hebrides was theirs exclusively in ancient times. It may derive from the Norse *Hav Bred Ey*, "isles on the edge of the sea," and certainly no islands but these bulwarks against the wild North Atlantic deserve that definition. They are the breakwater of the Highlands (maps, page 681). Other islands, mantled in layers of volcanic

rock, lie close along the coast. These are the Inner Hebrides, stretching from Islay northward to splendid Skye.

Two hours' steaming along Mull's coast brought us to Tobermory, a trim village set upon the slopes of a deep bay. Another two got us into low and level Coll where a fine new dock permits the shipping out of beef cattle. From there a short southwestward run put us in Tiree, flat, too, but rich in earth and good for the growing of grain.

Then, clear of the Inner Isles, we steered toward Barra near the Long Island's southern tip, forty open ocean miles away.*

I found refuge from the sea wind in a wood-walled bar where three men in formal and obviously unaccustomed dress sat in deep enjoyment of their pale ale and congenial Gaelic conversation.

During a pause in their recollections I asked, "Would you be Barra men, yourselves?"

"Indeed, we do belong to Barra," said one. "We are seamen, coming away home from the ships." The English they spoke for my benefit was not only as fluent as that of anyone to whom the tongue is native, but—perhaps for the very reason that it was an acquired language—more precise and agreeable than that of many Americans and Englishmen.

"Do Barra men go to sea by choice," I asked, "or have they none?"

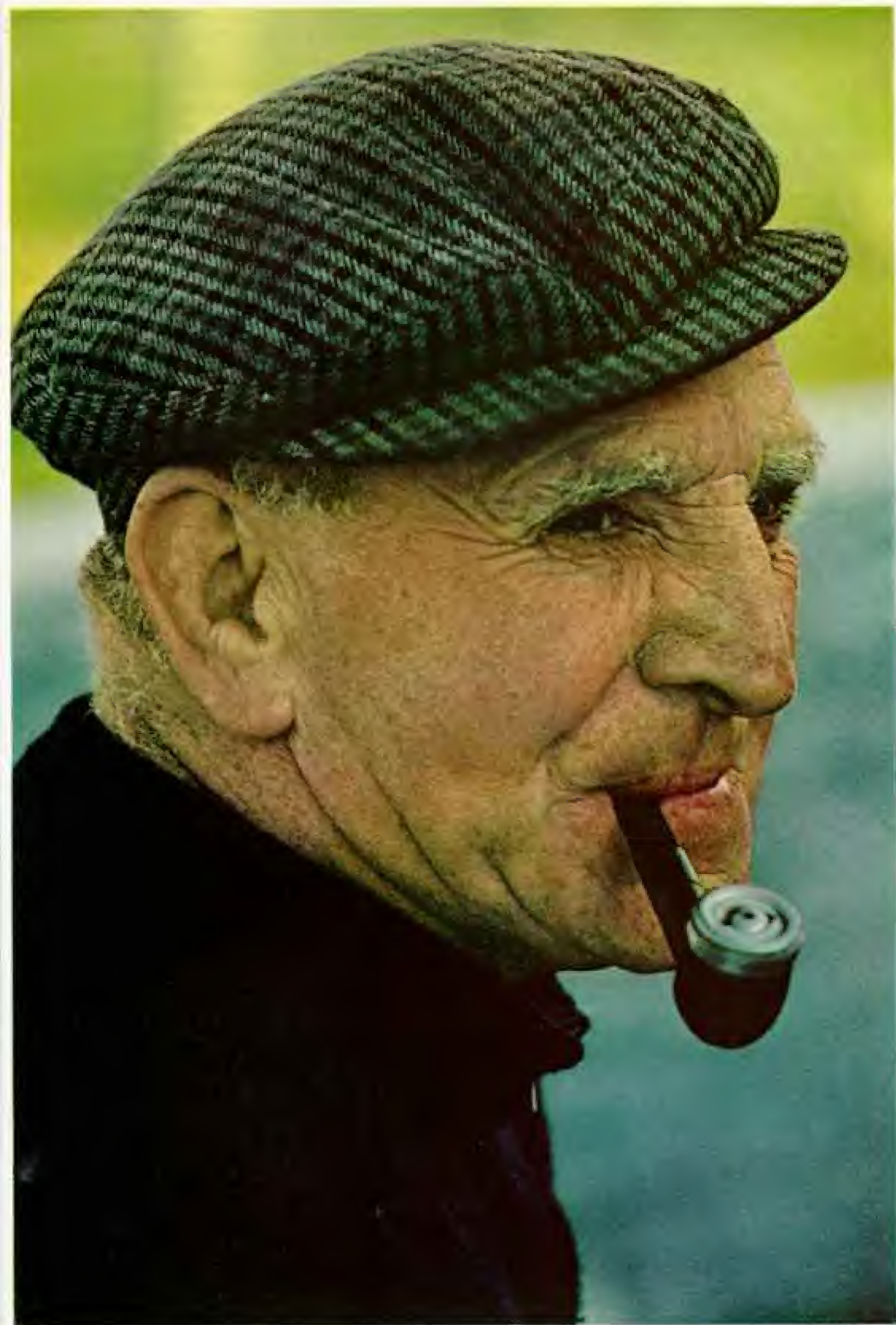
One spoke for all. "It is a good living. But if there were work for us at home, we would not be going."

THE HILLS OF BARRA loomed ahead, dark, back-lit by the lowering sun. Off the port bow, islets rose, cliff-flanked, from pedestals of foam. The *Claymore* slipped into the harbor of Castlebay, past the stronghold of the Macneils of Barra which, riding and hiding its low sea crag, seemed to float upon the water. We docked to the sad laughter of gulls.

I drove around to the home of Mrs. Donald Sinclair, where I would lodge during my days on Barra, and was welcomed with a high tea and a dram against the chill of the evening.

*See "From Barra to Butt in the Hebrides," by Isobel Wylie Hutchison, NATIONAL GEOGRAPHIC, October 1954.

"Indeed a happy race," wrote a mainlander of the Hebrides Gaels, whose native tongue sounds like "a series of chuckles." Independent, sociable, and courageous, they generally eke out a living as crofters—tenants of small acreages—earning cash as part-time fishermen, tweed weavers, or gatherers of seaweed. Men of Eriskay island, like Stephen MacIsaac, descend from stouthearted folk who considered the sea more blessed than the land.



Teatime, the equivalent of U. S. dinnertime, does not mark the end of the day on late-to-bed Barra. Here, at the latitude of Labrador, spring twilight can last until ten at night, and in midsummer darkness never really comes at all. Evening finds anyone who has the time for it visiting with anyone else who is not too busy to talk. It was appropriate, then, that Reg Allan—once a mainlander, now a devoted and articulate islander—should pick these quiet hours to take me for a tour of the island.

Barra's naked hills have lovely lines. Age has rounded them, ice has smoothed them. A soft, thick pelt of sheep-cropped moss and turf and heather clothes their venerable bones

(page 687). Along the east coast the sea thrusts possessive fingers of clean green water past the gnarled rock of the headlands. Along the west, dunes like snowdrifts back exquisite empty beaches facing the open ocean.

Now, in April, thickets of gorse blazed yellow in sheltered gullies, and the seaside pastures wore constellations of primroses and daisies as thick as those with which the sky of advancing night would soon eclipse them. New lambs, white as sea foam, cuddled against their gray recumbent dams.

Barra's physical beauty, like that of the other Hebrides and the northwestern Highlands, is stark and strong, never pretty and soft. It is the special beauty of ocean and land,



Shaggy good looks of a Highland cow bemuse island cattlemen and bidders from the mainland at a spring auction on Grimsay. The buyers carry canes for turning the animals.

Outposts of Scotland, the 130-mile-long Outer Hebrides (maps, right) endured invasion a thousand years ago. Land-hungry Vikings settled the coasts and intermingled with local Celts, or Gaels. Today crofts cluster along the shores; the islands' largest town, Stornoway, supports a population of 5,400.

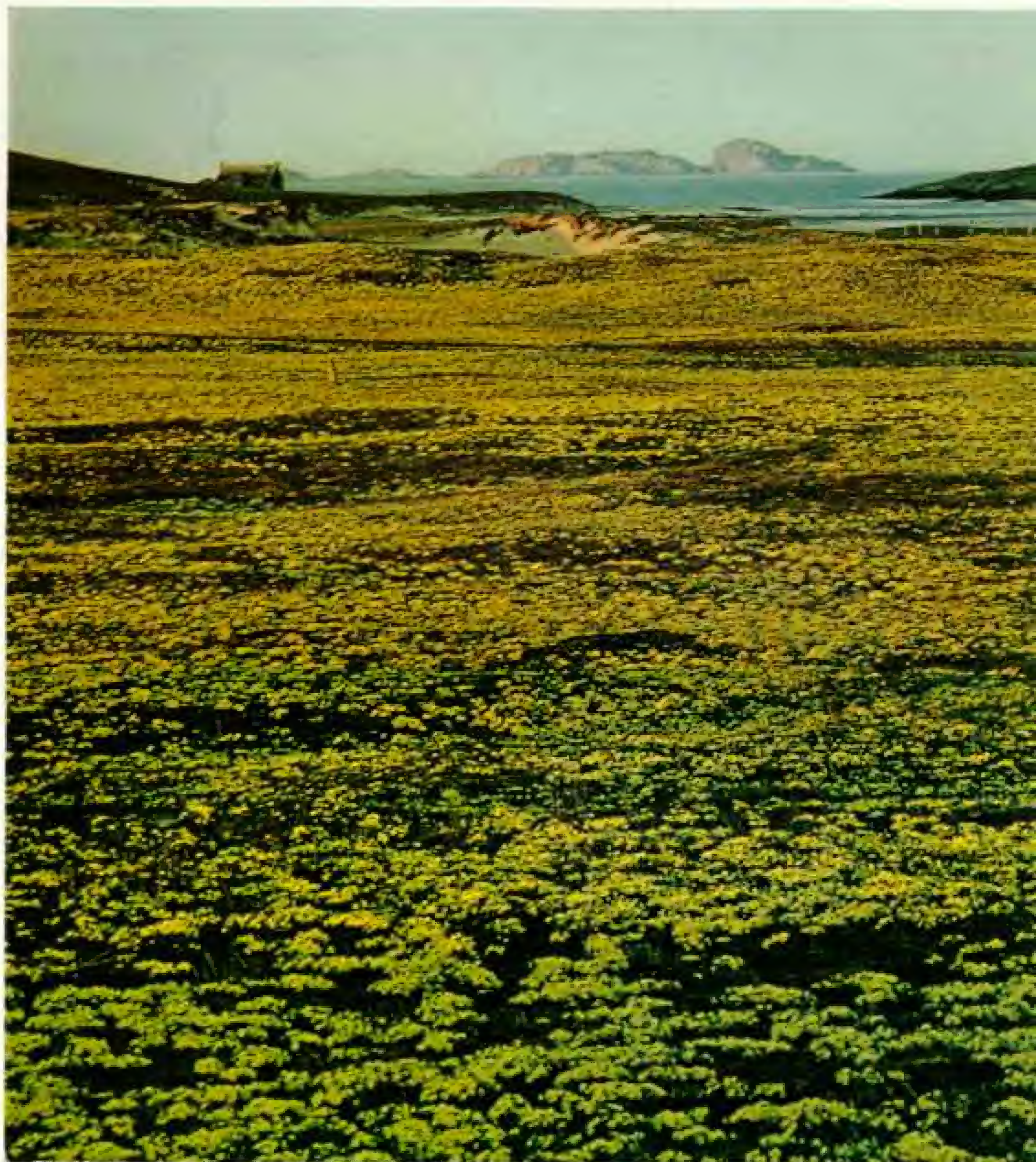


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ILLUSTRATION BY KENNETH MACLEOD © N.A.S.



MAP BY JEREMY BOND
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Primroses for the picking mantle a meadow of Barra. Their fragile beauty belies a hardiness demanded of everything that lives in the teeth of the relentless sea wind. At low tide, the shallow flooded inlet in the distance drains to become a landing field of smooth rockshell sand for flights between Barra and Glasgow five days each week.

made of the magic each works upon the other. Alone, it might be awesome and overwhelming, for it exists apart from man and is indifferent to him.

But if Barra's land lacks warmth, Barra's people do not. They are of different types, some short and dark, some tall and fair, carrying on the bloodlines of Stone Age settlers, of later Celts, and of the medieval Norse who ruled the Hebrides from the 9th to the 13th century.* They have known poverty, even hunger; yet, for all their past sorrows and



SCOTLAND BY DONALD REID © N.Y.S.

present problems, they have the serenity of people in a classless society where no man commands another. They can risk friendliness, and they do.

"They're a grand lot," said Reg. "Courteous, courageous, independent to a fault. Economically, they're badly off. But in education and experience they're far ahead of most urban mainlanders. They admire knowledge, and they seek it. A man who plows three acres

and keeps four cows on the hill may have a son in a great university, and have been himself more than once around the world.

"They have the sense of humor and sense of language that are born of intelligence. They are gay people, full of song and poetry; if the proverbial dour Scot exists, he is a Lowlander.

"Just now," and he darted into a driveway, "I'd like you to meet a fine man of these parts, Father Callum MacLellan."

Father MacLellan was concerned about Barra's shrinking population.

¹Howard La Fay wrote of "The Vikings" in NATIONAL GEOGRAPHIC for April 1970.



Screaming scavengers follow the *Braes-of-Garry* as she sails homeward to Stornoway after trawling in the rich waters of the Minches, the channel between islands and mainland. The crew clean their catch of white fish and dump the refuse overboard, attracting sea gulls to the wake. In the early 1900's, Stornoway ranked as one of



© KODAK/PHOTO © N.C.S.

the world's most important fishing ports, berthing a thousand vessels in 1912. But the industry languished when foreign fleets intruded and local men died in two world wars. Today outsiders are banned from trawling in the Minches, and the Highlands and Islands Development Board makes loans to encourage local men to fish full time

"There were 2,600 people here years ago, when people raised and made most of what they needed. Money didn't matter much then. Now it does, and we're down around a thousand. A crofter can live cheaply, and he has security so long as he pays his tiny rent. But he must have a few pounds coming in. All he needs is part-time work; and now, for the first time, a mainland agency—the Highlands and Islands Development Board—is trying to provide such work. They're investing in us as no mainland agency has ever done." *

WHEN THE REMAINDER of the nominal night had passed and morning came bright and breezy, I drove off for a look at the board's investments in the island economy. These were three small factories established by mainland businessmen with the board's help: one operating, two a-building. The first produced spectacle frames. The other two would make perfume and electronic controls. In each case the chosen product was small and light to avoid the high freight costs that threaten any island enterprise.

At the spectacle-frame plant, established in an abandoned schoolhouse, I found half a dozen girls working over shaping machines.

"It's woman's work here, and only a few jobs," said the foreman. "It will be the same at the other places. But if even twenty lassies earn wages on the island, that's twenty families that may not be having to leave. For the men, it's fishing that'll be bringing in the money, I know that fine. Barra was rich, once, with the fishing, then lost the way of it. Why? Ach, you'd best be asking an older man. He'd mind better how it was."

Archie Beg MacDonald, he said, remembered the old days as we ourselves might remember the one just passed. He lived at Borge, on the west coast.

Archie Beg was tending an injured lamb which he'd placed against the sun-warmed stones of his croft house. As he rose, the reason for his nickname (Archie Beg means "little Archie") became clear. He stood a good six-foot-three.

"How are you keeping?" he asked politely, and added, as Gaelic ritual requires, a comment on the weather. "I do not like this dry east wind. It brings dirt from the mainland and is unhealthy. We are made to live in moisture and do not care for the cold, bright day." Then he ushered me into his kitchen without asking my name or business. Once seated by the peat-fueled stove I stated them. He considered my questions, his long, gentle face turning thoughtful.

"I will tell you how it was," he said, "and how it is. Barra was a heaven of a place, with big handsome families, a father and six sons with a boat of their own. If something is not done to keep the people, then soon there will not be men who can go anywhere in a boat, in any weather. Or men who know how to work the land, or do whatever needs doing. Then Barra will just be a lonely island, without people on it, no more a lively place.

"But I remember when three hundred boats were here, working the herring. That was before 1914. Then, in one evening, 150 Barra men enlisted in the Royal Navy. Many never came back.

"The boats were beached, and rotted. After the war, a depression in Germany ruined our best market. Then sail went out and power came in. What fisherman could afford a power-driven boat?

"The curing of the herring was going scant, and there was no work at all for women and old folk. The fishermen themselves were breaking stone for the roads. So the people began to go away, as they had in the flitting, a hundred years before, when the landlords were taking land from the crofters and putting sheep on it."

"Could the fishing be brought back?" I asked him.

"Aye, it could be, now that grants and loans can be had. But for so long there was always the talking and the waiting and the losing of time, and the promises not kept."

At this poignant moment, the kitchen door

*The author described the board's activities in his article "The Highlands, Stronghold of Scottish Gaelism," NATIONAL GEOGRAPHIC, March 1968.

Where the surging sea weaves through the rocky shore, like a shuttle in slow motion, Ewen MacNeil hoes potatoes at Northbay on Barra. On the loch-riven islands, crofters plant narrow strips called "lazy beds," covering them with sods dug from trenches alongside, and fertilizing them with seaweed gathered at low tide. Such techniques create well-drained plots where islanders also grow oats, barley, and rye.



banged open and in walked a large ewe. Archie Beg leaned back and relaxed.

"It is the pet sheep, that was a bottle-fed orphan. She has come to be let in to her twin lambs, that shelter with us. She will not stay with the other sheep. She is friends with her dog, and he will not drive her. She thinks she is a person."

I left him laughing, which is a common condition for a Gael, and went on to look for Ian MacIntyre, a crofter-fisherman who is living proof that fishing can be brought back. Ian lives in Eoligarry, on a peninsula that juts north from the bulk of Barra, bounded on its east side by broad tidal strands. The greatest of these, Traigh Mhór, exposes a square mile of hard and level sand at low tide. Beneath its silver surface lie countless millions of cockles, which connoisseurs

once reckoned to be the finest in Europe.

Writing in 1549, Donald Munro, High Dean of the Islands, reported the local theory that cockles came out of the ground in embryo form in a fresh-water well above the strand and were carried by "ane litle strype [stream] downwith to the sea . . . and after ther coming to the saidis [said] sandis growis grate Cokills alwayes. Ther is na fairer and more profitable sands for cokills in all the world."

The "grate Cokills" are still there, as I proved with the toe of my boot; but Barra has never proved them profitable. Ironically, transport problems have hindered their exploitation—ironically, because this same cockle strand is Barra's airport (pages 682-3). It is probably the only commercial airport in the world that is submerged twice daily. As I watched, a four-engine British European



Airways Heron settled upon the shell-sand surface. In a little while it would leave again, bearing passengers and mail and light, high-value freight, but no such cumbersome cargo as cockles.

Ian was at home, looking to his livestock after a day at sea. After the required comment on the weather, he ushered me into his clean and comfortable parlor where his wife served us a *strupach* (tea and snack) and his little daughters surveyed me in fascinated silence. Flora Claire, the baby of the family and already bilingual, presented so sweet a smile that I could not help holding out my arms to her. To my surprise she trotted over and sat dutifully on my knee.

"See that, now!" I exclaimed proudly.

"Ach, aye, Flora Claire doesn't care who it is she goes to," said her mother, as proudly.

Another child came close, looked up into my face, decided that I was apparently no more than human, and began to sing to me. No wonder, I thought, that the Gaels are the warmest of hosts and most sociable of people when they are brought up to like strangers rather than to fear them.

Ian talked about fishing. "My father was a fisherman, so I've always known something about the work. Now the board has given me a loan to buy a boat, a 35-footer with a good diesel engine.

"I have a partner, and we lift 100 creels [lobster pots] each day. Just now, people are waiting to see how well we succeed. When they see that we have, they will follow."

For a few days longer I roamed this peaceful place, stopping often along the way. I sampled the shops, searching for a new razor



"They exercise themselves with amazing alertness and spirit," a visitor wrote of Hebridean dancers in 1793, and love of music still prevails. As an accordion plays, couples foot an intricate reel in the village hall at Daliburgh on South Uist. Each summer many youngsters take part in dance competitions at the island's Highland Games.



PHOTOGRAPHS BY THOMAS STONE © A.P.A.

Gale of giggles sounds through a lunchroom at Eoligarry School as Barra girls share secrets in their Gaelic tongue. At the primary school they learn English as a second language. Some go on to Inverness to high school, many of them never to live again on their isle of limited opportunities.

in the variety store, whose owner referred me to the c  fey (cafe), where I was urged to see would I find one at the butcher's. (I didn't.) I crossed to nearby Watersay island on Hector MacLeod's 20-foot *Island Monarch* to visit old Nan MacKinnon, whose marvelous memory contains five hundred Gaelic songs and twice as many proverbs, including admonitions against eating an egg before going to sea and mentioning rabbits while fishing.

One Sunday, sitting on a hilltop fort built before the coming of Christ, I heard an organ from below and recalled that among the music-scorning Calvinists of the north the instrument was known as "a kist of whistles," as ungodly as the bagpipes, those "black sticks of the devil." When I got home for lunch I asked Mrs. Sinclair about that.

"Why, my dear, it's just that they're terribly holy in the northern islands. Terribly holy, altogether; stricter than we Catholics here in the south. They won't even go out at all on Sunday, except to church of course, unless they need to."

Before I said goodbye to Barra, my father came out from the States to join me. Son of a Glasgow-born Gael of Highland ancestry, Archibald MacLeish knew the Highlands well, but had never seen the Western Isles. I had promised that these bleak bare islands, and the people they've created, would stir his poet's soul. They did (pages 692-3).

We walked the lonely beaches, took tea in cheery parlors, sensed the sad memories in the roofless croft houses, and, at evening, watched cattle cross the cockle strand.

THEN CAME THE *CEILIDH* (kaylie), the most touching of social experiences for those who love words and music; for the Gaels love both, and it is in the ceilidh that they show their love best. The word means a visit. A dozen people or more meet in someone's home to enjoy stories, songs, and, with luck, piping.

Our luck was good. We went ceilidhing first to Callum Johnson's house, and Callum, 80 years old and one of the finest pipers of the Hebrides, played a *pibroch* for us. When he was done, my father said, "What a great pleasure you've given us. What a great and sad pleasure."

"Ach, well," said Callum, "it's become my whole life, you see."

Then he added, one strong, straight-standing old man to another, "You're a very fit man yourself, for your age." And the two

bent close, taken with quick affection, and discussed the excellences of the eighth decade of a man's life. From beyond the eddying conversation around me, I heard Callum saying that the amount of money he'd spent on doctors wouldn't take him "from here to Castlebay"—a 5½-mile walk.

We had a dram all around, to celebrate the warm occasion, and more piping. Then Mrs. Johnson brought in a sumptuous strapach, telling us in a laughing voice that "although you've had a drop of the creature [she meant whiskey], you'll surely be wanting your tea."

BEFORE WE TOOK UP our northward travels, our friends Reg and Pat Allan laid on the last ceilidh for us, and no finer farewell could have been offered. Father MacLellan was there, and the island doctor, and a teacher and a crofter and a fine young piper just back from away, and two young ladies who sang like angels.

We left in the small hours, full of haunting tunes and curious tales, telling each other what a proud thing it was to share the bloodline of such people.

The *Claymore* brought us from Barra's Castlebay into Lochboisdale, a village built around a perfectly protected natural harbor on South Uist. Lochboisdale boasts an admirable hotel in which the first fly-fishermen of the season were already lodged. We were asleep before the thrushes on the chimney pots had ended their evensong.

In the following days we explored the mid-section of the Long Island, that is to say, the Uists, North and South, with little Benbecula as the steppingstone between them. Once separated by shallow waterways that could be forded only at low tide, they are now united by bridge and causeway.

Uist, as the three are sometimes collectively called, consists of three distinctly different kinds of country. Its east coast is hilly, rocky, and pierced by deep sea lochs. Its center is boggy moorland, covered with heather and fresh-water lochans. Its west coast, wide open to the full force of the Atlantic, consists of beaches beyond compare, shifting dunes, and, behind them, a smooth coastal plain called "the machair." This machair land, formed by lime-sweet shell sand blown inland from the dunes, produces the bulk of the islands' crops.

The machair will grow little in its natural state. But the ocean itself solves that problem by providing seaware (as seaweed is eupho-

Like magic from a fairy wand, tulips bloom at Palble, on North Uist. Encouraged by the Highlands and Islands Development Board, a British firm raises bulbs as a cash crop on "the machair," a belt of limey shell sand made fertile with seaweed.



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niously called) with which the soft pale soil can be made fertile.

Machair and seaweed have bestowed a special blessing on South Uist. Said John MacInnes, the district clerk, "We are the only island in the Outer Hebrides that has not lost population lately. That is because we have more machair land than the others, and a plant that dries and pulverizes seaweed for use in everything from jellies to welding rods. A lot of crafters earn money by gathering seaweed. Besides that, we still have a small British rocket range. And fishing boats and skilled men to crew them."

Such a man is Murdoch MacKinnon. I found him at the southern tip of the island—a lithe young seaman, pleased with his lot.

"I am a fisherman," he told me. "That is my life, and it is a good one. I work on a 57-foot trawler, the *Ave Maria!*, anchored just over there [he pointed southeast, out the window] on Eriskay, two miles away. The Eriskay folk have never lost the habit of fishing, nor the knowledge of it."

For a while we discussed the techniques and economics of fishing. "In winter, when the herring is in, the boats work in pairs. You see a spot of herring and you shoot your net. The other boat picks up the end, and he steams with you. Then he joins you, making a ring of the net, and his lads come aboard to help haul up and brail out.

"Then the fish go wild. It is only due to the sheer good nature of the herring that you get it at all. If it all headed for the bottom at once, it would pull too hard altogether. There would be no holding it. But as it is, we do well enough. We might get 300 cran of herring [a cran is about 370 pounds] in one ring. But even 20 is not bad, if you need it."

As I left, Murdoch's pretty wife came in with three black-haired, blue-eyed children.

"This youngest lad," said Murdoch, touching an upturned face, "he says he will be a fishing man. I say, 'In that case, you are very stupid, then.'" He laughed, enjoying his joke.

South Uist's one main road runs straight
(Continued on page 695)

THE THRUSH
ON THE ISLAND OF
BARRA

By the sea-loch Island cattle,
auctioned off for overseas,
shriek in their frantic pens in the
late
light and the thrush answers
them . . .

I am remembering something—
No,
not remembering: it was told to
me:

some terrible aching thing that I
was told of the
old time, of the poor crofters

cleared from the Highland glens,
from the Hebrides.
The landlords wanted the land for
sheep, not Gaels.
There were sails on the grey sea
and voices calling
landward over the surf: the
thrush answered.



Archie Beg MacDonald told it:
a man could walk from Northbay
over Barra
clear to the other side and the
doors open,
the dogs running in and out of
the open doors

and the un milked kine at the
gates—that moaning:
only the un milked kine and the
dogs and afterward
evening and the thrush above the
thatch.

I am remembering something—
No,

not remembering. My father's
father
spoke the tongue—not I—that
can remember.
Nevertheless I hear the Island
cattle
shriek in their frantic pens. I hear
the thrush answer them: pure
song,
perfect indifference
like the will of God.

ARCHIBALD MACLEISH

KERETH MACLEISH
TOOK THIS PICTURE
OF HIS FATHER
ARCHIBALD MACLEISH
ON THE ISLAND OF BARRA





(Continued from page 691)

north across the central moor. Here is boggy land, almost uninhabited. Yet under a lowering sun that turns the lochans from dark depths to sapphire surfaces, the moors have their own somber loveliness.

We went northward slowly, sampling the island's center and its sides. In the bogs, crofters carved out sopping slabs of peat which, once dry, would serve as next year's fuel (opposite). In the sea lochs behind the naked gneiss of the eastern hills, boatmen harvested seaweed. On the machair plowmen turned their sandy soil, followed by white whirls of clamoring gulls.

As my father noted: "In the Hebrides, what is most striking is not the mountains or the heather moors or even the sea (though the sea is everywhere), it is the people. And not the people one by one, but together, in their rela-

tion to each other. They say of themselves, 'I belong to Garrynamonie, or lochdar, or Kilpheder.' They mean they belong to the people there. And they do. An old woman living alone in a house by the sea a good quarter of a mile from another home is not 'alone' and certainly not lonely. She 'belongs' to her land, her people. She feels it."

HE COULD HAVE been writing about Mrs. Flora MacPherson of lochdar at the north end of the island. She was coming back across the crofts in her Wellingtons and heavy tweed skirt when we arrived. She brought us in and took our coats and put us in her polished parlor, apologizing for an untidiness that was nowhere to be seen.

There were pictures of relatives everywhere and a little glass closet full of bric-a-brac. But the absence of sacred statues showed

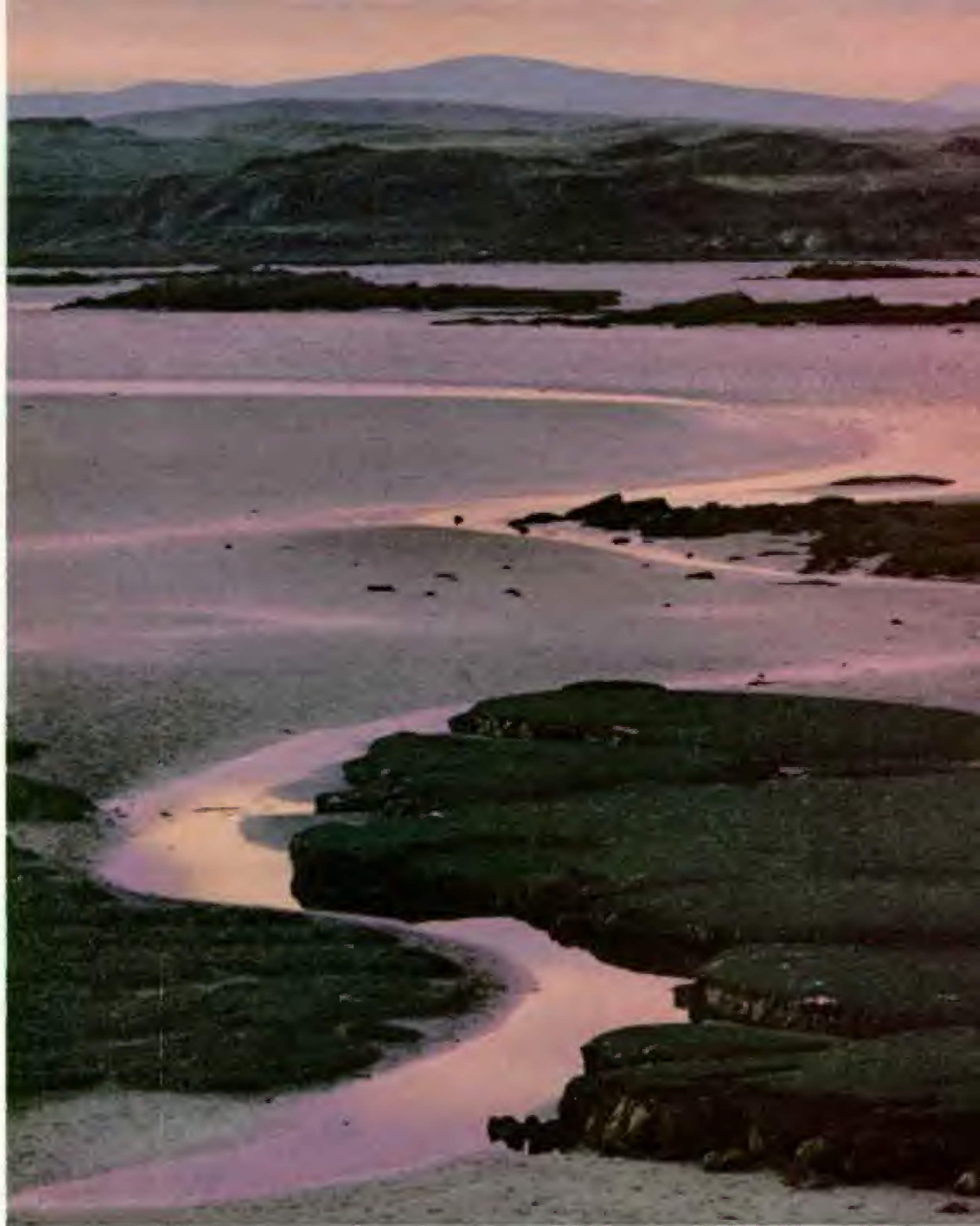
Food for winter fires:

Cutter and lifter team up on South Uist to harvest a thousand chocolate squares of peat a day. The soggy carbonized turf, which has accumulated in bogs over the past 7,000 years, hardens and shrivels in the warm June sunshine. After the peats dry for about a month in the open air, wives and daughters will help the men stack them like firewood beside croft cottages.

"Abodes of happiness and contentment," a minister called the simple cottages of the Hebrides in 1836, and little has changed. Cozy as a cat, Peggy MacLeod knits before a peat fire in her neat living room-bedroom. The blaze warms a kettle of water so Miss MacLeod can offer a *strupach*, tea and a snack, to wayfarer or friend.



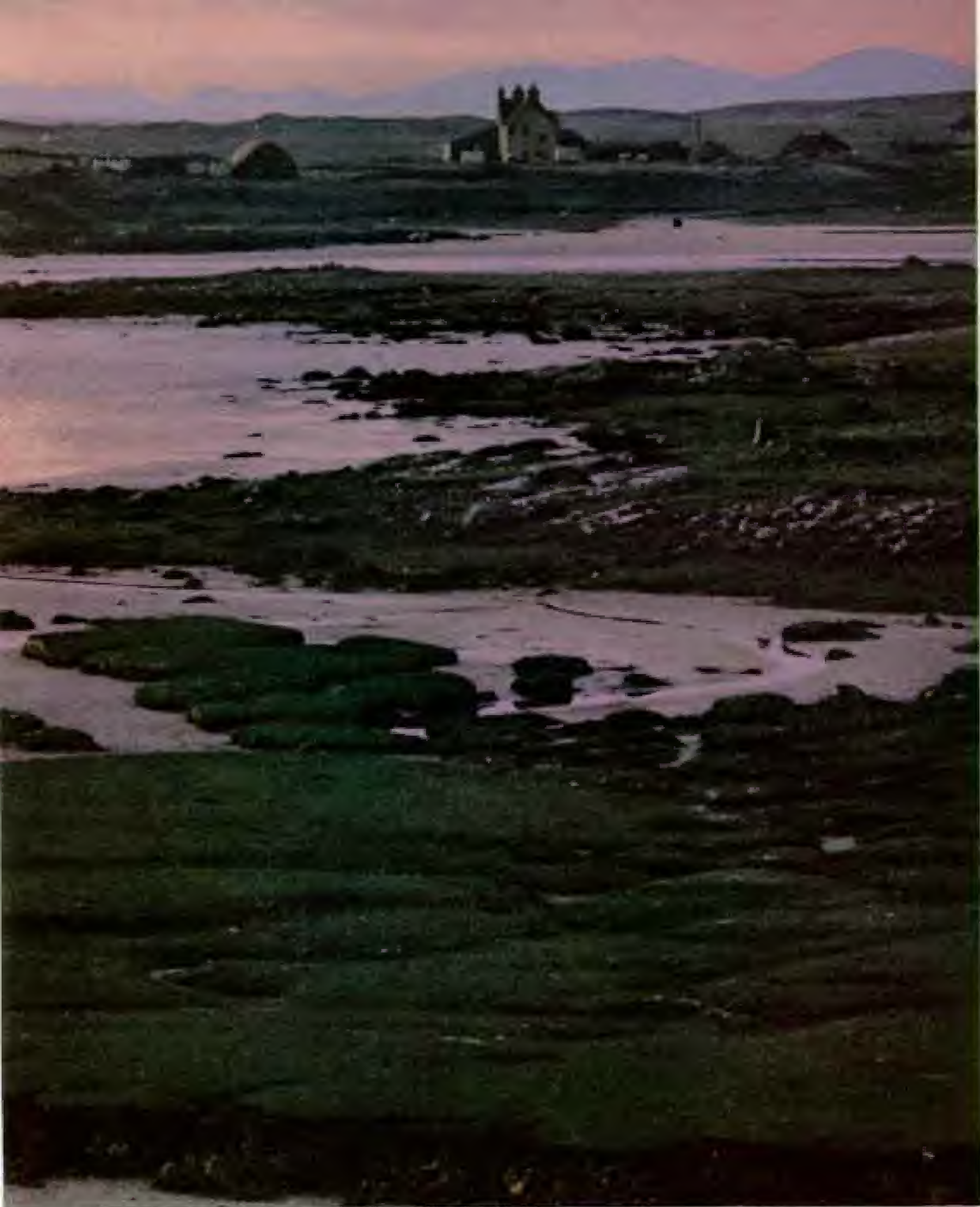
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"And we in dreams behold the Hebrides," wrote an exile of his beloved isles. He may have had in mind a scene like this on the scalloped coast of North Uist. In this northerly latitude daylight lingers until 10 p.m. in late spring. Light reflecting from the sea gives the low-set Hebrides their special luminous quality.

that this was a Protestant home, one of the few in the strongly Catholic southern islands. Mrs. MacPherson did not concern herself much with the subdivisions of Christianity.

"It's no use at all to go crackers worrying about other people's beliefs," she said, "the way some Protestants do up north. My husband was always saying that we should be helpful to each other and friendly to any sort of people, supposing they were decent. And I



ASTORHORN © NATIONAL GEOGRAPHIC SOCIETY

mind he always was polite to the wee mannie that came with his cases to sell things—a Pakistan, I believe he was. Well, he was human too, d'ye see. And when my husband died, the Pakistan was coming by to tell me he was sorry. Wasn't that nice of him?"

We left Mrs. MacPherson waving by her gate, regained the main road, and crossed the bridge into Benbecula. Nothing about the looks of its land distinguished it from the

Uists, which it interconnects. Its special character derives from its population, which offers living proof that harmony in human relations does not require homogeneity of background and belief.

Benbecula is the buffer zone in which Catholicism and Protestantism overlap. The island's people are almost equally divided between the two faiths. Yet there is wonderfully little discord between them.

Working as one, painters apply wood preservative to low-rent housing erected on Lewis by the Ross and Cromarty County Council. Living in the isolation of the Outer Isles, the people make teamwork a tenet of faith. Thus a chore comes easier and lighter, be it the building of a house, the rowing of a boat, or the raising of livestock.



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"We are a mixed lot here, right enough," said the Reverend Angus Smith of Griminish, "and not only in terms of religion. There is a British rocket range just over the way on South Uist, and its military personnel are quartered in Benbecula. They are very decent folk, but English speaking, of course. This cannot but concern us, for we love our Gaelic language and the traditions that will die with it if ever it is lost to us. And we cannot but wonder why the government will not spend a small fraction of the money that will go toward enlarging the base to develop our island. Are rockets so much more important than human dignity?"

"Strangely enough, the religious division of the island causes fewer problems than this cultural confrontation. There is tremendous toleration here; you accept your fellow men, and you are accepted by them. It's as simple as that. The Long Island is clearly divided, Protestant in the north, Catholic in the south, and we can be proud that in our time no one is trying to unify it."

Except, of course, for the engineers, whose causeway now conveyed us quickly to North Uist, surely one of earth's most inundated islands. From the top of 1,138-foot Eaval, its highest hill, North Uist is a filigree of land inlaid with polished plaques of water, fresh

and salt, of every size and shape. On the low-lying land it would be almost impossible to move a mile in any direction without swimming part of the way (pages 696-7).

A few narrow roads leave the central highway to weave their way through this maze of ponds, lochs, and fjords. One of these makes the circuit of Grimsay (until 1960 a separate islet) and passes by one of the Long Island's newest business ventures, a large lobster pound. Built by a venturesome young mainland named Duncan Erskine and backed by the Highlands and Islands Development Board, these holding tanks help free the Uist and Barra lobstermen from the tyranny of a wildly fluctuating mainland market.

"We can hold 15,000 pounds of lobster for a couple of months," Duncan told us, "and three times that for a couple of weeks. In summer we can fill two DC-3 airplanes each week for the French market."

WE WENT ON UP THE ROAD to Lochmaddy, a fine natural harbor tucked into the eastern side of North Uist, which possesses a deepwater dock and a pleasant hotel. There we established ourselves in great comfort for a few days while we continued to explore the island. Our targets each day were geographical, inanimate things such as can be marked on maps: beaches, headlands, hills, ruins. None of these was ever a disappointment, but the living scenes we saw along the way provided the most memorable moments.

Take the dogs, for instance: The Uists are full of them, and almost all are nimble black-and-white border collies. My father watched one of these at work and said:

"You know, you can tell a settled people by their dogs. When these dogs are working, they ignore you. When you're a guest in their homes, they're mannerly, but you see their devotion to their masters; they look up often into their faces. There's a true relationship between master and dog. The stranger exists only if he enters that relationship. Whereas in a less settled society, in suburbia, say, a dog will attack you because you're a stranger."

Take the birds: We found them in great numbers on the machair and in the small ponds. Lapwings swooped and whirled in joyous aerobatics or dived at the flinching heads of egg-stealing hooded crows. Curved-bill curlews patrolled the turf. Snipe whirred overhead on short, noisy wings. Gulls and exquisitely graceful terns sailed the sea wind.

Swans—ghosts of landlords past, it's said—paddled in their personal patches of water, or nested, obvious as ostriches, in wispy grass. And above all these, often invisible, larks hung fluttering and sang their heart-breaking song.

Take the youngsters: My father wrote of them: "The children! Who can be indifferent to the children? Their complexion is rose, white, and gold. Their reticence is also a kind of innocence: the innocence children ought to have to be children and with us so rarely do, being made at once too much of and too little."

Take the old arts. Lachlan MacDonald of Grimsay designs his own tweeds, weaves them on his own loom, and sends them to far-off places. He showed us the making of cloth, his feet and hands moving about tasks too quickly accomplished to be observed. My father complimented him and he said, "Ach, well, we've all a brain for something. Now, I'd not be worth much in your line of work, teaching and writing poetry. But there's Mary MacLean down the way, she's a bardess. . . ."

We sat in Mary's thatched cottage, a dollhouse, dim and cozy, while she spoke poems in Gaelic, lovely to hear even without understanding. We listened by the peat fire while Winnie the collie watched her mistress with steady eyes, and a cat no bigger than a kitten suckled kittens no bigger than mice.

The spring cattle sales were under way and the crofters were counting their money or anticipating it (pages 680-81). These sales produce the cash returns for all the crofter's work with his cattle and in his fields, for he grows little but fodder; he plows for his cows.

I dropped my father off to watch the sale at Lochmaddy, and drove over to Paible on the west side to hear about a new project which involved the growing of flower bulbs in the clean, disease-free sand of the machair (page 691).

"It was the board's idea," said John MacDonald, the resident overseer. "They brought in a British bulb firm, with experts from Holland, and tried six acres. The results were fine. They plan to plant 50 acres this year.

"But the best thing is that the bulb company can teach each crofter how to grow the bulbs on his own bit of machair. He could make a thousand pounds profit out of an acre. It's a grand plan. If I'm spared, I may live to see crofting come back into its own."

All that night the cattle lowed in the pens at Lochmaddy's dock. The hotel dining room was full of buyers and sellers, speaking in the



low, easy voices of men who have something to say—so unlike the shrillness of those who feel they must say something. In the morning a boat came for the cattle. The drovers left for the mainland, and we for the last and largest of the Western Isles.

Lewis and Harris are a single island, divided by high, wild hills that for centuries made travel between the two difficult. United as they are, the two differ in almost every particular. Lewis is low and wet, the black bog that blankets most of its surface all but uninhabited, yet it boasts a population of 15,800 around its shores, and Stornoway, the largest town in the Long Island. Harris is magnificent with the beauty of ice-sculptured stone and radiant sea lochs and small

hidden dells where there is earth and life.

The people formed in these deeply differing molds differ too. The Lewis man is shrewd and practical, "He goes in hard," said a Uist friend, "and he keeps on going." He works faster and he dances quicker, grim Calvinist though he may be on the Sabbath day. The Harris man speaks softly, gently. He smiles more and requires less of himself or of others.

Despite their difference from Lewis people, the Harris folk share with them medieval origins in the Norse clan Leod. Two sons of Leod—therefore named MacLeod—each founded a tribe: Torquil, the MacLeods of Lewis; Tormod, the MacLeods of Harris and Skye. They were good lairds in their fashion—rogues and pirates, perhaps, but considerate

Small hands try to help. A little girl holds the horn of a burly Blackface ram as her father, a Harris man, clips his flock in a communal pen (right), shared by other crofters near the village of Leverburgh. Factories at Stornoway process island wool and then deliver it as yarn to some 1,200 crofter-weavers throughout the islands. Working at looms in their cottages, the weavers fashion the famous Harris Tweed, known in Gaelic as *Clo-Mór*, or "great cloth."





of their tenants, who were, after all, their kin.

We found memories of the old MacLeods in the village of Rodel at the southern tip of Harris, where the fine square-towered 16th-century St. Clement's Church shelters three of their tombs, marked by recumbent knights carved of glittering black stone.

Families were working pockets of fertile soil as we drove by. Spades were the cultivators' tools; there is no need of plows in a land without fields. But despite the startling lack of arable land, the houses were bigger and better kept than some we had seen in the machair-rich Uists. District clerk Donald MacDonald told us why.

"We have men in the merchant navy, sending home all they can, and girls with jobs in Glasgow helping out, never forgetting where home is. There are older people at work on the mainland who keep up the family place here; waiting for the day the children will have the means to come back and stay."

Mr. MacDonald went off to cut peats and we along a well-surfaced but challengingly narrow ribbon of road toward Drinesheader, where, we'd heard, homespun tweed was still made. I had the name of Mrs. Alex Macdonald, who had been away to London and had made a length of tweed for the Queen. We found the lady who might, after a fashion,



Parceling out a bit of gossip with the goods, storekeeper Donald Macdonald waits on customers in Tarbert, largest village on Harris. The Clan Donald, which means "noble house" in Gaelic, takes its name from Donald of Islay. For 500 years its chiefs functioned like sovereigns, as they negotiated treaties with England, Ireland, France, and Scotland.

Apprentice weavers on the Isle of Lewis assist their father by rewinding Sarnoway yarn (following page) onto spindles that fit inside the bobbins of a loom. In many a crofter's cottage the music of the loom resounds: "Click-clack, click-clack, click-clack." In a week an industrious weaver can produce $2\frac{1}{2}$ tweeds—strips of cloth 80 yards long by $28\frac{1}{2}$ inches wide.

call herself "weaver to Her Majesty" shoeing a hen and her chicks out of the weaving shed. She showed us the working of her old wooden loom, explaining that "the modern steel foot-powered looms that most weavers use go faster, but when they have to be fixed, it's a spanner you are needing and I am that awkward with tools and machines. So I got this one. But I cannot get parts to it. The place that was making it is under-takers now."

She showed us a lump of pure indigo and told us of other dyes. Peat soot, she said, makes a mousy brown; iris root





makes pale yellow, bog myrtle a deeper one; heather tips give a light green, crotal, a rock lichen, a rusty orange.

We ordered a length of cloth each, to be made in summer when the dye plants could be gathered, and offered to pay in advance.

"No, no," she said. "I'd rather not, no. If I would be getting the money before I was earning it, I would be dreaming about it."

The principal village of Harris is Tarbert, one of the prettiest in the islands, with its string of small stone houses facing on a fine sea loch where ferries and small freighters dock. Across the water from Tarbert is Scalpay, a prosperous little island famed for its skillful fishermen. In the hills behind it are stretches of boulder-strewn bedrock which, to my father's eye, "looked like God's workshop after creation, where the leftover pieces of the world were kept."

SURROUNDED by impersonal, elemental wastes, Tarbert warms itself in its own human closeness. We spent the night in its excellent hotel, where a convocation of particularly accomplished thrushes sang the long evening away to the accompaniment of a tumbling burn. When we left in the morning to work our way north through Lewis, I took with me a copy of a valuable, out-of-print book pressed upon me by a gentleman of Tarbert who did not even know my name. It would interest me, he said, and I could send it back sometime.

We followed what roads there were, finding our way to crescents of silver sand in the west and somber glacier-gouged valleys inland near the 2,622-foot Clisham, father of Hebridean hills. Folk were few in the interior, and shops fewer. As lunchtime approached, we stopped by a croft and asked where we might be able to buy a bit of bread and cheese.

"Well, it is a very nice day," said the lady of the house, reminding me that civil conversations should begin with a reference to the weather. "You will not be finding food hard by, I am thinking, but I could be making you sandwiches myself. It is no trouble at all, I have five sons to feed as it is." Then, looking

up the road, whence came a creaking and rattling sound, she added, "Ach, but you are in luck. Here comes the store!"

And indeed, along came a van crammed with assorted groceries. After a greeting and an acknowledgment that the day was warm, if cloudy, we laid in supplies and made for Stornoway (following pages).

The bustling, striving capital of Lewis seems a metropolis after the dank desert of the interior. It contains specialized stores, amenities of every category, and two secondary schools. One, the Nicolson Institute, has placed more boys in universities than have many richer and more renowned mainland schools. The other, Lewis Castle College, offers practical courses for lads whose bent is toward the trades rather than higher education (page 709).

We settled into the Crown, took a high tea of banquet proportions, and went our separate ways: my father, dressed in what he called his professor suit, to visit the schools, and I, booted and besweatered, to prowls the docks.

Stornoway's safe harbor attracts ships of many kinds. Along the quay lay Norwegian long-liners, an inter-island steamer, a fisheries research vessel, a submarine, a patrol boat, and some twenty to thirty double-ended trawlers, back from the Minches with prawns and white fish—bottom-feeders like cod, whiting, and ling.

Between them, the Lewis trawlers and Harris herring-netters each year take in some half a million dollars' worth of sea food (pages 684-5). Fishing, once a moribund industry, is now an economic mainstay, second only to the making of tweed.

As I watched the evening fish auction, a tipsy islander, with less English than most, undertook to identify for me the several species displayed.

"Them iss cots," he said, and cod they were. "Those iss lings, ant yon iss plaice, ant here, congerss. Ant haddichs ant skates. Ant these here iss dockfish [dogfish]." He grinned with sudden recollection. "I haf a friend who hates dockfish. He iss saying they would make him sick, supposing he ate one. Well, latterly a

Virgin wool dyed a golden yellow goes into a carding machine at Stornoway's Kenneth MacKenzie mill. Other machines will spin it into yarn for shipment to crofters who return bolts of tweed to the plant for finishing. Then, bearing the highly prized oob trademark—which attests that the cloth was "spun, dyed, and finished in the Outer Hebrides and hand-woven by the Islanders at their own homes"—Harris Tweed, worth more than 10 million dollars annually, moves to markets throughout the world.

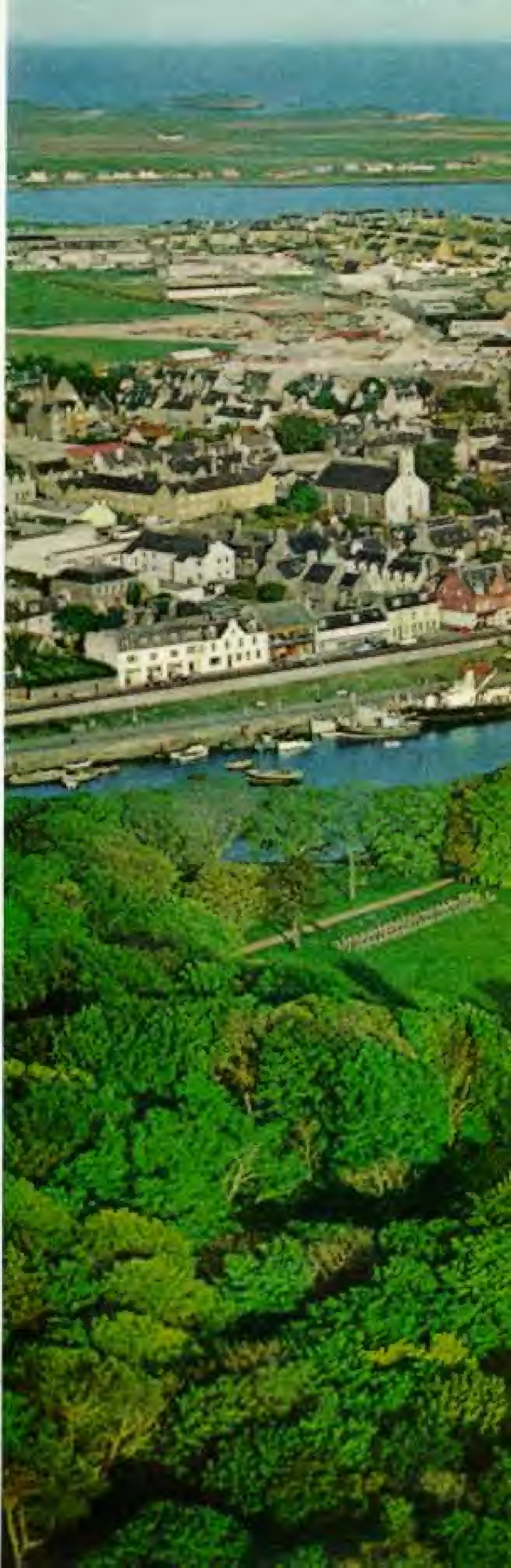
lady was giving him some nice fillets. 'How did you like the fish?' she says: 'Lovely,' he says, 'terrible lovely.' 'Them iss dockfish,' she says. So he was getting sick."

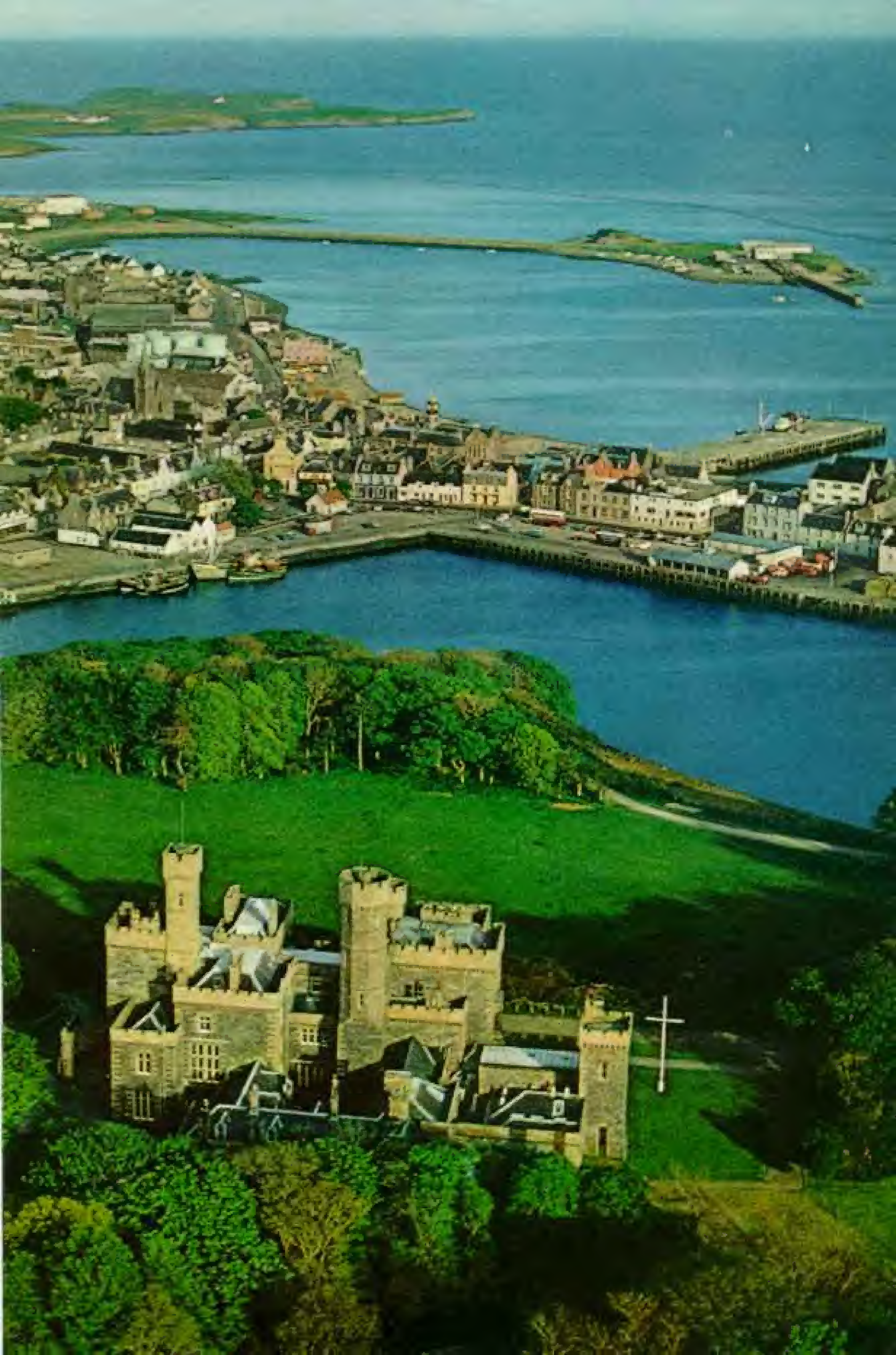
Across the harbor's busy waterway loomed the imposing imitation-Gothic castle of the last of Lewis's great lairds (opposite). It stood proudly in a park decorated with—of all things—trees. It is no more Hebridean in appearance than its masterful tenant, William Lever, was in manner; and, like him, it symbolizes wealth, power, and urgent creativeness. The castle was built by Sir James Matheson, an earlier businessman and visionary who, like Lever, tried unsuccessfully to enrich and modernize Lewis.

William Lever was a well-to-do Lancashire wholesale grocer who became a multimillionaire through the manufacture and marketing of soap. Lux and Lifebuoy are among his creations; Lever Brothers and Unilever perpetuate his name in the stock markets and supermarkets of the world. Ennobled for his efforts, he combined his wife's name with his own and, as Lord Leverhulme, bought Lewis, then Harris, in the seventh decade of his life. He was determined to guide the islanders to a better life, and to make a profit in doing so. He might have succeeded had his Gaelic tenants reasoned wholly along economic lines. Many did, and applauded his projects. But others loved their land, and such liberty as their poverty permitted them; they wanted to be crofters, not renters of company houses.

Leverhulme proposed to establish industries and offer good wages to those who would become his employees. But the Lewis veterans,

Rarities on the Western Isles, trees ring Lewis Castle at Stornoway, capital of Lewis and economic hub of the entire archipelago. Today the 19th-century structure, overlooking a deepwater harbor, serves as a school, but half a century ago it housed a remarkable Englishman, William Lever, a multimillionaire manufacturer of soap. Lever bought Lewis in 1918, and Harris the following year. He was prepared to spend 25 million dollars of his personal fortune to convert the remote region into a thriving commercial center. But some island crofters preferred the traditional way of life and refused to cooperate; Lever's ambitious plan collapsed—the only defeat of his astonishing career.





back from the battlefields of World War I, wanted land, not wages. The government backed them, and Leverhulme gave up his projects. He died in 1925, bitterly aware that logic in Gaeldom cannot always triumph over tradition.

There is still industry in Stornoway, of course. Tweed mills operated there before Leverhulme's day, and they have multiplied since. We went round to the Harris Tweed Association offices, where Callum MacDonald told us something about the manufacture of that famous cloth.

"The mills spin the wool and send it to crofters to be woven," he said. "A man can earn from 10 to 25 pounds per week with his loom, and there are 1,200 home weavers on the islands. Nine hundred more work in the mills.

"Depopulation goes on—we lose a family a week—but think what it would be without the tweed! It's big business. More than five million pounds' worth of cloth goes out each year, using a third of the Scottish wool clip."

Mr. MacDonald took us to the Kenneth MacKenzie mill, where wool becomes yarn and where the cloth home-woven of that yarn is finished (page 704). Later we talked to a weaver, alone in his shed, pedaling away with his feet as his shuttle shot back and forth automatically, propelled by the mechanism. He gave us a sardonic smile and said, "Stupid, isn't it? A motor would be running this loom just as well as my tired old legs. Ach, but then it would not be the Harris Tweed."

INDEED, IT IS JUST THAT LACK of motor power that permits the tweed to bear the precious name "Harris." That, and being made in the Outer Hebrides. Similar cloth could be machine-woven in the Midlands mills and sold for half as much as Harris Tweed. But it would only be similar, not the same. The trademark preserves both the fine fabric and an essential island industry.

To see Lewis, you must leave Stornoway, for the town has a life very much its own. We crossed the great bog—stripped in spots of its peat as a whale is stripped of its blubber—to the west coast and worked north toward the end of the Long Island, the Butt of Lewis.

We paused first at the great stone circle of

Callanish, second only to Stonehenge among Britain's megalithic monuments. The stones are rough and untrimmed, immensely heavy. They are eerily impressive, particularly from a little distance, when they seem to stand like unearthly sentries upon their low mound. But what is most curious about the stones is their arrangement, for they stand in the form of a cross with a circle at its juncture—that is to say, of a Celtic cross. Yet they were set up 2,000 years before the cross became a symbol of Christianity (pages 710-11).

The practical explanation may be that markers in the form of a cross and a circle allow observations of the positions of the sun and moon around the year, so that men without written almanacs might know the procession of the seasons. If so, Callanish is simply a great stone calendar.

Dun Carloway, six miles up the coast road, is one of the best preserved of the Pictish *brochs*, a broch being a double-walled fortress tower dating from the first to the fourth century. "Dun" means "fort," and there are duns all over the islands. Once abandoned, they become the homes of the Little People, and must be treated with respect.

The Little People—fairies, brownies, elves, what will you—are neither omnipotent nor always malevolent, and they can be got around by a clever mortal. But they have large and dangerous friends: their fairy dogs, big and black, with blazing eyes; and water horses. These last inhabit dark pools from which they emerge in equine form to pursue and injure humans, or in human form to mix with and even marry them.

Noon, the hour at which we got to Dun Carloway, is not a good time for fairies, and we were not surprised that there were none about. But a cuckoo, that fairy bird, called from out on the moor, where cuckoos do not live. And when we left I saw, chancing to glance back, a stooped dark figure scamper out from the base of the dun, reach out an arm twice as long as itself to seize a new lamb by the neck and retrieve it, bleating and struggling, into its black embrace. Ach, well, I thought, even trolls and kelpies have got to eat. I glanced back once again and saw the shepherd prop his crook against the ancient

Peering into the hold of a model cargo ship, students at Lewis Castle College in Stornoway learn a lesson in loading from Capt. John R. McKenzie (upper right). Paradoxically, though Lewis men are among the most home-loving of people, they willingly pull up roots and replant them in the farthest corners of the earth.



Looming like a petrified forest, the gneiss megaliths of Callanish on Lewis stand second only to Stonehenge among Britain's ancient monuments. The giant circle of stones on a peninsula thrusting into East Loch Roag may be a prehistoric calendar, or may mark the site of a temple where early Celts worshiped Bel, the sun god. Just as the stones have survived, so does Celtic culture in this sea-lashed stronghold.

wall and mark the lamb with colored dye.

Beyond the last houses and fields and provident peat stacks of the west coast is the cliff-edged Butt of Lewis, the northwesternmost corner of Britain. Here the pulse of the ocean pounds, even on quiet days. The swells beat the gnarled bedrock of the land with immense unhurried violence, falling back with a patient sigh to rise and strike again.

We ate above a caldron of cliffs where the cold sea boiled, and felt the rhythmic shudder of the earth and air. We sensed the conflict of



land and sea that every island is, a conflict that shapes it, and its people. We left in silence.

LATER, AS A LIGHT PLANE flew us south to Glasgow along the length of the Long Island, my father took out his notebook and wrote this:

"To me, the great importance of the Western Isles is not to the understanding of the past—not to myth, or to curiosity, or to the traveler's itch—but to our lives now. We

inhabit (we do not *live* in it) a deteriorating society which is falling apart because it is ceasing to be a society and becoming an economic arrangement held together by a romantic awe of technology. If we are to recover our lives we must recover our sense of society, and how are we to recover our sense of society unless we have a touchstone—an example—to show us what a society would be in human terms if we were to achieve it? The only touchstone I have seen in this century is here in these islands." THE END



In Search of Man's Past at Lake Rudolf

By RICHARD E. LEAKEY

Administrative Director
The National Museum of Kenya

Photographs by GORDON W. GAHAN

IN FAIRNESS, I must give credit for the dramatic find to a camel—a large ungainly beast who had already won my affection with his deep brown eyes. I called him George.

We had hoped to reach Kenya's frontier with Ethiopia by dusk, Dr. Meave Epps and I, in our exploration last August of this vast, virtually trackless region east of Lake Rudolf. It was the second season of our survey to learn the nature and extent of the area's fossil deposits.

Had we been traveling in the relative comfort of a Land-Rover, no doubt we would have dismissed a small rocky outcrop some two miles east of our course as not worth investigating. But we were already three days' tiring march inland by camel from our base camp at Koobi Fora, on Lake Rudolf's eastern shore, where we had left the rest of the expedition. George was complaining noisily; he had carried me far enough that day. And frankly, I welcomed relief from his jolting gait.

"Let's have a look at that exposure and make camp," I said. "Another day to the border won't matter." Meave, a zoologist on our expedition's staff, offered no objection, nor did the other two members of our camel party, Nzube Mutwiwa and Kamoya Kimeu (foldout, right).

The grayish-brown ledge of sediments, sliced open by centuries of erosion, proved far more extensive than it had first appeared. As we approached it, Nzube and Kamoya circled out in one direction, Meave and I explored the other. Almost immediately we found fossils—heavy, bleached bones of ancient elephants, pigs, and other animals of the late Pliocene or early Pleistocene epochs, two to three million years old.

We hobbled the camels and made camp. In the morning, after tea,

Pilgrimage into prehistory: Camels carry the 25-year-old author, left, and his party along Lake Rudolf in northern Kenya. With Richard Leakey ride Dr. Meave Epps, a zoologist with the National Museum at Nairobi, and assistants Kamoya Kimeu and Nzube Mutwiwa. Exploring a vast desert often too broken for motor vehicles, the expedition mapped areas for later study. Its remarkable discoveries to date: two skulls from man's dimly understood past and what may be the oldest known stone tools, fashioned some 2.6 million years ago.







INTRODUCTION BY DR. MEAVE SPEKE © N.G.S.

"I could hardly believe it," says the author, recalling his discovery of this skull of an *Australopithecus*. The primitive creature, with physical characteristics of both ape and man, lived about 2.6 million years ago. Here the skull rests exactly as found in a dry stream bed, exposed by infrequent gully-washing rains.

Flat facial bones and a crest atop the cranium identify it as belonging to one of the long-extinct near-men. A decade ago, at Olduvai Gorge in Tanzania, Richard Leakey's famed parents, anthropologists Mary and Louis S. B. Leakey, discovered the only other nearly complete skull of this type. They named the species *Zinjanthropus boisei*; today scientists know it as *Australopithecus boisei* (page 730).

we split up to explore the rest of the exposure.

I was walking along the dry bed of a small stream that had carved open the fossil-bearing strata, when my heart suddenly leaped.

"Meave!" I shouted, so sharply that she ran a few steps in alarm.

"What is it—a snake?"

I pointed. There on the sand 20 feet ahead, in full view beside a thorny bush, lay a domed grayish-white object. Halfway to it I sat down stunned, incredulous, staring. For years I had dreamed of such a prize, and now I had found it—the nearly complete skull of an early hominid (above).

The bony sagittal crest atop the skull, together with enormous brow ridges, flat face, and small brain case, marked it clearly as an *Australopithecus*, a primitive manlike creature whose fragmented 1.75-million-year-old remains had also been found at Olduvai Gorge in Tanzania by my parents.

The one I had found, intact except for teeth and lower jaw, closely resembled the Olduvai specimen of *Australopithecus boisei*, formerly called *Zinjanthropus boisei*. Mine was the first to be discovered in Kenya. And later study would indicate that it is perhaps 850,000 years older than the Olduvai skull!

In the strata of sandstone and clay beside the fossil I found a perfect partial cast of the skull. From here, probably only in recent months, it had weathered and tumbled out.

Carefully we photographed everything, built stone cairns to mark the place, and packed the skull. The four of us hastened back to base camp in triumph.

*The author's father, famed anthropologist Louis S. B. Leakey, has described his and his wife's discoveries in "Finding the World's Earliest Man," NATIONAL GEOGRAPHIC, September 1960; "Exploring 1,750,000 Years Into Man's Past," October 1961; and "Adventures in the Search for Man," January 1963.

This fossilized cranium is only one of the achievements of two seasons of hard work in this largely unexplored stony desert of Kenya's Eastern Province. Our team has also found a collection of what we believe are the oldest stone tools ever unearthed, and a fragmented, yet-incomplete skull that puzzles and excites me, for it seems much more manlike than any australopithecine's.

But perhaps most significantly, we have traced the outlines of what may be the richest and most extensive Pliocene-Pleistocene fossil region known in all Africa. Here lie more than a thousand square miles of sediments possibly as old as four million years, bearing countless bones of extinct animals—and, we now know, creatures akin to man.

Lake Rudolf, sometimes called the "Jade Sea," lies in the northern reaches of Kenya, in the Great Rift Valley system (maps, below).

In a fossil-rich but forbidding land, Richard Leakey's two expeditions crisscrossed more than a thousand square miles along Lake Rudolf near the Ethiopian border. Supplies trucked to Ferguson's Gulf were ferried to Allia Bay and Koobi Fora.

File of stones marks a promising study site for expedition members surveying the East Rudolf area, where erosion bares



THIS PAGE FOLDS OUT

Its opaque green waters stretch nearly 155 miles from north to south, and 35 miles at its widest. The lake teems with fish and crocodiles, and herds of animals live here, concentrated along the almost uninhabited eastern and northern shorelines, where goats and camels have not stripped the soil of vegetation.

About 10,000 years ago, the level of Rudolf stood some 200 feet higher than today. Once it connected with the Nile, and even now its waters contain Nile perch, sometimes weighing 200 pounds and more (page 721). But then it shrank drastically, like other Rift Valley lakes, perhaps as climatic change altered the rainfall pattern.

In prehistoric times, great quantities of ash, and sometimes lava, erupted from volcanoes surrounding Lake Rudolf. The ash, together with soil and sand washed into the lake, built up thick sedimentary deposits

the chronicles of time. Supported by the National Geographic Society, Leakey's group braved the threat of armed bandits to explore these remote, wind-swept plains.



Strangers amaze a young Gabbra woman north of Marsabit. En route to Lake Rudolf, the expedition hired camels from her tribe.





As the lake level rose and fell through millenniums of torrential rains and prolonged drought, layers of silt and clay covered the remains of lakeside animals; their bones, thus protected, fossilized. The sediments along Rudolf's eastern shore are littered with such bones, some of them perhaps as old as four million years. And I was sure that where large herds of animals lived, man's ancestors also lived, hunting them for food.

And that, in essence, is why we were there.

Stone Tool Confirms Rudolf's Promise

In 1967, I had been co-leader of an international expedition to explore the Omo Valley, north of Lake Rudolf in southwestern Ethiopia. Teams from the United States and France, and my own party from Kenya, were given permission by the Ethiopian Government to investigate rich Pleistocene formations along the lower reaches of the Omo River, which drains into Lake Rudolf. My group located animal fossils older than four million years at the north end of the valley. So our season proved quite worthwhile. We also collected two magnificent skulls of *Homo sapiens*. They suggest that modern man's species may be as much as 100,000 years old.

Nevertheless, several tantalizing glimpses from the air had led me to suspect that even richer fossil ground lay to the south, along the

ancient shores of Lake Rudolf itself. The American party, led by Professor F. Clark Howell of the University of Chicago, allowed me to lease its helicopter for a brief sortie down along the Ethiopia-Kenya frontier.

We had flown forty or so minutes over increasingly dry and broken terrain when I selected a promising-looking ridge of stratified sediments.

The helicopter's rotor had scarcely stopped when I stooped to pick up a primitive stone tool—a chopper distinctly like many found in the earliest levels at Olduvai Gorge!

With greater hopes than ever, in February of 1968 I approached the Committee for Research and Exploration of the National Geographic Society. To my delight, I was granted funds for a preliminary exploration of "East Rudolf"—actually, the area along the lake's northeastern shore.

It would be a formidable undertaking. The terrain itself was forbidding—nightmarishly broken, parched, sparsely inhabited. Worse, the district for years had been notorious for fierce bands of armed raiders who preyed on local livestock herds. The Kenya Government provided a platoon of police to escort our exploration parties.

At the end of May 1968, I left Nairobi with five vehicles and two trailers. Our party included Dr. Paul Abell, professor of organic

Arid sea of raw earth and desert scrub offers tall, graceful Rendille tribesmen few spectacles to match that of the Leakey caravan motoring to Lake Rudolf. Bearing spears and herding sticks, the nomads seek water and grazing for their goats and camels. Peaks of old volcanoes jut above the horizon.

Baubles, bangles, and bleats: A Turkana girl milks a goat held by gripping one of its legs between her own. On a brief side trip west of Lake Rudolf—also called the "Jade Sea"—expedition members met this desert dairymaid.





chemistry at the University of Rhode Island; John Harris, a paleontology student from Bristol, England; and Dr. Bernard Wood, who specializes in anatomy.

After two and a half days our column reached the dusty little village of Loiyengalani, where the road ceased to exist. Here, in the great Rudolf basin, we were still 100 miles from our primary goal—an uninhabited spot on the map called Allia Bay, about half-way up Lake Rudolf's eastern shore. For two more days we inched through dry stream beds and over sand and rocky landscape. The trailer carrying our outboard-powered launch hung up time and again. We welcomed the added manpower of our police escort.

"Do you think the tents will stand it?" Paul Abell asked anxiously as we struggled to stake them down on the rocky shore at Allia Bay in the face of a keening gale. Wind was to be our frequent companion here. But somehow our tents held.

That same day we had found fossils embedded in nearby sandstone outcroppings—remains of ancient hippos, antelopes, elephants, and other animals. I soon found

myself in the ironic position of having to urge my colleagues not to spend too much time collecting specimens.

"We've got to cover as much ground as possible," I reminded them regretfully.

Our main object in 1968 was to determine the nature and scope of the sedimentary outcrops. We would merely sample fossils from different localities in order to draw comparisons with other African sites.

Mapping Parties Explore by Boat

Our motor vehicles, we knew, would be sorely handicapped in this terrain. And exploring any great distance on foot was impossible. We simply couldn't carry enough water to cope with desert heat that often exceeded 110° F.

For the first half of the season our motorboat was the answer. We made frequent trips up and down the coast and walked as far as 10 miles inland, making sketch maps of promising deposits and returning to Allia Bay each evening.

After six weeks we had reached the limits of our exploration by boat. We would have



Fleeing human intruders, a spooked zebra splashes past an unruffled ibis in shallows near the Koobi Fora camp.

Prowling lions often threatened the expedition camels; one night a pride killed a zebra less than 15 yards from the author's tent.

Fossils prove that game animals abounded in the basin throughout the Pleistocene Epoch. Their presence convinced the author that man's early kin must have also lived and hunted here.

Giant of the Jade Sea, a 180-pound Nile perch offers evidence that Lake Rudolf once was linked with the Nile River. Pilot Keith Mousley, right, and camp assistant Edward Kandindi hoist the prize, caught by the flier after he brought supplies to Allia Bay. The lake teems with fish, but its remoteness discourages commercial exploitation.

IBIS: GORDON W. SEAMAN; PERCH: BOB CAMPBELL (1) S.C.S.

to shift our camp to reach exposures too distant from the shore. We viewed this move with mixed feelings.

"Crocodiles or not, I will miss a swim after a hot day," said Paul. Many of these great reptiles, some 16-footers, lounge along the lake edge, but they never molested us while we bathed.

None of us would miss the snakes, however. Our camp at Allia Bay had proved to be a favored gathering place for carpet vipers, *Echis carinatus pyramidum*, probably the worst-tempered venomous snake in Africa. Although small—averaging 15 inches or so in length—they are aggressive, particularly at night. In six weeks we clubbed or stoned more than fifty of them in and around our tents. Fortunately no one was bitten during the season. But on two occasions Bob Campbell, assigned by NATIONAL GEOGRAPHIC to photograph our activities, narrowly missed putting his hand on the deadly brown reptiles near the entrance to his tent.

We set up our second camp 20 miles inland at a little oasis named Derati, a seldom-visited group of 10 wells scattered through



Late nights, long days

TREASURES FROM PRIMEVAL SANDS prompt a late-night session (below) at Koobi Fora. In a shelter of canvas and grass lit by kerosene lanterns, the author and Dr. Epps examine the *Australopithecus* skull, right center. A nearby tray of primate bones holds a second skull found by an assistant, Mwangela Muoka. Dr. Paul Abell of the University of Rhode Island and Leakey's deputy leader Kamoya Kimeu catalogue animal fossils. At the near end of the table, teeth from *Elephas recki*, an elephant that lived 2½ million years ago, lie half-framed by the animal's five-foot tusk.

Wan light of dawn finds the same four resuming study, sorting and filing (right). As the expedition explored the region, fossils within sight lay in such abundance that the author had to restrain his colleagues from collecting too many, lest the mapping suffer.

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a small forest of shaggy doum palms. We pitched our tents in a glade surrounded by the swaying trees. There was a stark beauty about the place, surrounded as it was by rugged volcanic peaks that subtly changed colors as the sun moved across the sky. Here we spent six more weeks, exploring where possible by Land-Rover, and pushing beyond on foot.

By the end of the first season we had found exposed sedimentary deposits along the eastern shore of Lake Rudolf over an area of more than 1,000 square miles. In three months we had traversed it several times and had located dozens of sites at which fossils abound.



Comparing our specimens with those from other African sites that have been dated, we can say that our earliest fossil evidence—remnants of extinct pigs and elephants—is probably about four million years old. Most of the fossils appear to be older than those from the lowest levels at Olduvai Gorge.

Before closing out our 1968 season, three members of my staff—Kamoya, Nzube, and Mwongela Muoka—made separate and tantalizing discoveries: Each found jaw fragments of australopithecines. Although poorly preserved, these fragments indicated to me that near-man had lived along the eastern shore of Rudolf between two and three million years ago—in Pliocene-Pleistocene times. Further work, I felt certain, would turn up additional evidence of man's ancestry, and on this basis I reported to the Society at the end of

1968. Generously, it responded with support for another expedition to East Rudolf in 1969. A contribution from the William H. Donner Foundation, Inc., of New York City, enabled us to incorporate important aerial mapping of the Rudolf area into our plans.

We set out again for Lake Rudolf in late May, 1969, heading for a new base camp at Koobi Fora—a shallow cove sheltered by a long sandy spit some twenty miles north of Allia Bay (map, page 716).

The problem of getting about in this rugged country during our first field season had led me to consider another means of transportation: camels. We hired them—four riding animals and eight pack beasts—near the outpost of Marsabit among the villages of the Gabbra people (page 717).

As during the previous year, the bandits

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ILLUSTRATION: (BELOW) AND PHOTOGRAPHY BY SCOTT W. BARNES (P. 723)





EXHIBITION © S. G. S.

Cleaning prehistoric molars of the ancient elephant, *Elephas recki*, expedition members make a preliminary identification in the field. Don Siegel, a graduate student at Pennsylvania State University, chips at age-hardened sediment with a knife, while Harvard graduate student Kay Behrensmeyer picks the ridged crowns with a punch. She carried out a geological survey of the East Rudolf area that was essential in estimating the ages of fossils by the strata in which they were found.

Some of Africa's early Pleistocene mammals have survived in similar form to the present day—including rhinos, pigs, baboons, antelopes, and elephants.

again joined us, with his 16-year-old daughter Susan.

Meave Epps, of the National Museum in Nairobi, and I planned to continue the exploration of exposed sediments. Kamoya, my deputy expedition leader, would assist us, along with Nzube and Mwongela. These three, although lacking formal training, are among the most skilled field paleontologists I have known.

Kay's geology program was fundamental to our other work, for fossils collected from sites whose geological story is not fully documented lose much of their value as study material.

From specimens collected the previous year, I had estimated the age of most of the East Rudolf beds at more than two million years. Olduvai Gorge in Tanzania, where my parents have been working since 1931, has yielded a vast collection of artifacts dated at 1.75 to 1.85 million years. These stone implements, to my mind, show a degree of sophistication which implies that our ancestors began making tools well before that time. If so, I felt certain we would find them at East Rudolf.

"If you don't find something where you think it should be, don't assume that it's not there," my parents had taught me since childhood. "More likely you're simply not looking hard enough!" I was determined that we should look harder.

I had flown down to Nairobi for several

who frequent the northern frontier left us alone; we went without police escort in 1969. But often at night we had to persuade lions not to eat our precious transport animals, usually by firing a rifle into the air or by tossing out a "thunderflash"—a loud firecracker.

By the second week in June our camp had been set up on the grassy lakeside plain at Koobi Fora, and we had cleared an airstrip to link us quickly with Nairobi.

Our teams set to work promptly. The primary objective was a preliminary geological survey of East Rudolf, headed by Kay Behrensmeyer, a cheery, indefatigable graduate student in geology at Harvard University. Donald Siegel, who is studying for his master's degree in geology at Pennsylvania State University, was her assistant (above). Paul Abell

days to attend to museum matters, and on my return to Koobi Fora, Kay rushed up with dramatic, if cryptic, news.

"You were right—they *do* exist, and we have them *in situ*," she said excitedly. "What's more, there's good tuff directly on the site!"

We leaped into the Land-Rover and bounced along the rough track to her discovery. My excitement quickly turned to elation. Even on the basis of a first quick look, I felt sure Kay *had* found tools—choppers and sharp-edged flakes of basalt, chipped by hand in a dim, distant past. The flakes had eroded from the face of a low, barren knoll; one still lay embedded in a deposit of gray volcanic ash—the "good tuff" over which Kay had been so exultant.

The precept of "look again if you don't find it the first time" had proved itself. We stood less than 400 yards from a hollow where, the year before, we had discovered a number of well-preserved fossil hippos!

Tests Establish Age of Finds

The fact that the tools were embedded in tuff was of the utmost importance, for volcanic ashfalls can provide minerals suitable for dating by complex laboratory techniques. Kay and her team selected samples to be flown to the University of Cambridge for dating by Dr. J. A. Miller and his colleague Dr. F. J. Fitch of Birkbeck College in London.

While awaiting their report, we began an exploratory trench into the tuff (pages 728-9). The site eventually yielded 60 specimens: four chopping tools, numerous flakes, and a dozen-odd animal bones, principally antelope remains, that may have been cracked open to extract the marrow.

Excitement reigned in camp when a preliminary report came back from the University of Cambridge. Our tools were a minimum of 2.4 million years old! The plane that brought this news also delivered some fresh Kenya strawberries. We broke out a bottle of wine and dined in sumptuous celebration.

The authors of the report have since visited the tool site at East Rudolf and, after exhaustive tests of additional tuff samples, have established a more accurate date of very close to 2.6 million years, plus or minus less than 260,000 years. Thus, if further study verifies that these, indeed, are tools, we will have pushed back the horizon of the earliest tool-maker some 850,000 years beyond

the oldest previously known—at Olduvai.

Work progressed well through July and into August. Kay's team continued mapping strata, and fossil hunters found interesting specimens almost daily. Sue Abell one day brought in a beautiful jawbone of a *Cercopithecus* monkey between two and three million years old—the first of its kind found in East Africa. She was awarded a bottle of wine.

A new member joined the expedition: Libby Nesbit Evans, a zoology student from Cambridge, whose special interest is taphonomy—the study of what happens to organisms after death. Knowledge of how carcasses are scattered and buried, and how they deteriorate and fossilize, is particularly useful to paleontologists.

Libby staked out her province a few hundred yards from camp, for Koobi Fora abounds in game, including lions, hyenas, and crocodiles, and animal kills occur frequently. Her study area, with its odd crop of meticulously numbered bones, was promptly dubbed "Libby's Cabbage Patch." A handsome wild topi, a large member of the antelope family, formed a curious attachment to her, and it was a charming sight to watch the 300-pound animal follow her as she worked beside the lake.

Wilderness Drama Takes Place in Camp

Our expedition's taphonomist might well have conducted her bone count even closer to camp. One windy night I awoke to a brief commotion outside, but since no human voices were involved, I went back to sleep. Arising before dawn, I found the torn carcass of a zebra, killed by lions, less than 15 yards from my tent. Upon questioning, I found that several people had walked by during the night, totally unaware of the drama.

Lions often prowled around the thornbush *boma* that fenced in our camels at night. On our exploratory trips a determined lion could easily have taken his pick of our transport. Upon making camp for the night, we herded the camels together and tied up one foreleg of each, loosely tethering ankle to knee to discourage wandering. We then bedded down at strategic points around the herd. In theory, one of us could then head them off should a stalking lion launch a stampede.

The theory, I regret to say, broke down. One night I awoke suddenly to find a herd of three-legged camels bearing down on me at phenomenal speed. To avoid being trampled,

I flung off my blanket and took to my heels. Fortunately the beasts quickly came to a halt—astonished, no doubt, at the spectacle of a human leading them in flight!

We traveled on these reconnaissance trips with Spartan simplicity in order to cover as much territory as possible. We rose at dawn, and a cup of tea sufficed for breakfast. At midday we stopped to roast a few potatoes and chew a couple of strips of sun-dried antelope meat.

It was late in the day on one such trek that my own mount, George, began complaining and we made the fateful decision not to push on to the Ethiopian frontier, but rather to make camp and investigate that insignificant-looking outcrop off to the east. Our reward

was the magnificent *Australopithecus* skull that sent us racing back to Koobi Fora.

"That looks like nothing I've ever seen in this world," Paul said when he spotted four distant figures on camels loping in toward camp. "Don, maybe we'd better get the gun."

Kay told us the story later. We hadn't been expected back for another week, and I suppose there was a certain raffish look about us. The turbans we had improvised to ward off the desert sun flapped wildly about our heads, and the approach of any strangers in this area was cause for alarm.

Among the first to recognize us was my mother, who had flown up from Olduvai to examine the artifacts from our tool site.

After an excited exchange of greetings, I



lifted the precious skull from its packing box and carefully removed its paper and sheepskin wrappings.

Mother gazed at it quietly. Perhaps she was thinking back to her first glimpse of two huge hominid premolars embedded in a bank at Olduvai. It had taken 19 days of delicate digging and sifting to recover more than 400 scraps of fossilized bone; she and my father had then worked patiently for 18 months assembling and reconstructing the fragments into the first *Australopithecus boisei* cranium ever found (page 730). And here I was, holding an almost identical skull—considerably older, almost intact, and stumbled across on open ground out of sheer luck.

"It's beautiful, Richard," my mother said.

"Absolutely magnificent!" Then it occurred to me that I had made my find 10 years after hers, almost to the day.

Our party lost no time in getting back to the skull site—a 60-mile trip—with a sieve, in the hope of recovering a few fragments of the missing teeth or lower jaw from the deposits. But nothing more was found.

It was at this point on our expedition that I had our only encounter with one of the armed bands that roam this desolate region near the Ethiopian frontier. While I was leading two of our camels to a water hole about five miles from camp, a large bush ahead suddenly seemed to explode with people. Dark, wiry, and clad in loincloths, they carried knives, spears, and rifles. I counted 18 men as



PREPARING LEAVES AND SADDLINGS BY GEORGE W. SMITH (C) W. H. F.

Water break on camelback eases the thirst of Dr. Epps, who wears an improvised burnoose against the 110° F heat. The expedition had to rely on camels, since members on foot could not transport enough liquid for far-ranging explorations.

Teeth and tempers show at saddle-up time. The author tries to restrain a camel resisting riding gear handled by Kamoya. A balky mount, tired from a day's march, later forced a stop that led to the expedition's most dramatic find.



Tantalizing puzzle absorbs the author and Nzube Mutwiwa, who piece together the shattered cranium of what Richard Leakey believes may be a form of early man. It lay with sediments and fossil fauna similar to those in the tool strata (below) a score of miles to the south. Though face and jaws are missing, the curvature and volume of the cranium will provide evidence for eventual reconstruction of the skull.



Chip off an old, old block: A rock flake perhaps left by a prehistoric tool-maker gets a protective coating of plastic before its removal from volcanic ash. One of man's ancestors may have squatted here to make an implement with which he could cut meat from animal carcasses.

Staff members probe rock-like soil at different depths. Here, 15 miles northeast of Koobi Fora, Kay Behrensmeyer found what the author identifies as crude cutting and chopping tools of basalt.

Their bed of volcanic ash was dated by an argon-analysis technique, which measures radioactive change to determine the ages of geological strata. Laboratory tests showed that the tools were buried some 2.6 million years ago, 850,000 years before those at Olduvai.



they ran off to a low ridge, where they stopped to watch me. They had been resting in the shade, and we had taken each other completely by surprise.

Several of them raised their rifles. I let them see my own—and ruefully fingered the two rounds of ammunition in my pocket. There was little to do but proceed with my business as though totally unconcerned.

The strangers followed me to the water hole, always at a distance, and watched as I filled the water tins. Then they followed me a few miles back toward camp before dropping off my trail. I never saw them again.

The following day was even more eventful. We spent the morning exploring the area

around the skull site for animal fossils that might prove useful in dating the deposits, in case age determination by other methods should fail. Meave and I chose one direction, Nzube and Mwongela another.

Shortly, Meave called to me, pleased and excited. "Richard, come have a look!"

She had discovered the broken skull and jaw of a saber-toothed cat—one of the finest specimens ever found in East Africa. Under a broiling sun we collected the pieces and retreated to the lacework shade of a thornbush to fit them together.

We had almost finished the job when I heard Nzube and Mwongela returning, chattering and laughing. They bounced over a



Early branches on a family tree



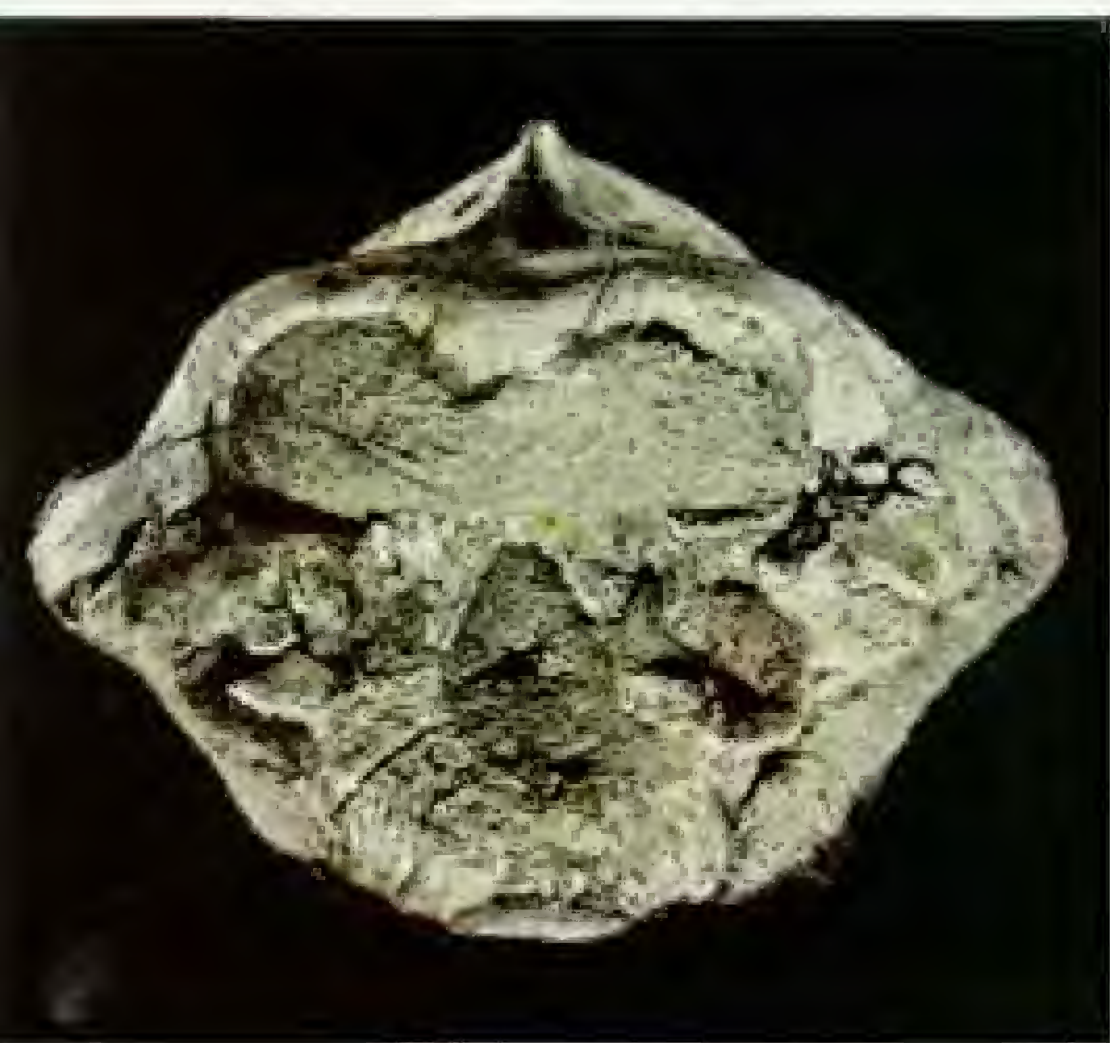
STRIKING SIMILARITIES exist between Richard's discovery (below, left) and the skull his parents found at Olduvai (left), although the creatures lived thousands of years and hundreds of miles apart.

Richard's specimen may predate his parents' by some 850,000 years, but he believes that, despite some differences, both were *Australopithecus boisei*. Less than five feet tall, with bulging brows and low forehead (artist Jay H. Matternes's conception of the Olduvai near-man, above), these creatures possessed powerful jaws, brains only slightly larger than those of the average-size gorilla, and molars twice the width of modern man's.

Anthropologists disagree on the role australopithecines played in the story of man. Many think they were primarily vegetarians, some of whom died out as climatic changes dried up food while others survived by becoming tool-makers and hunters. The author theorizes that australopithecines reached an evolutionary "dead end," while a contemporary—a species of *Homo*—supplemented his diet with meat by making and using stone tools.



ANALOGOUS SKULL BY JAY H. MATTERNES, AMANDA LEWIS PRODUCTIONS



Mystery skull (right) may be closer to man's direct ancestry, says the author, than the australopithecines. He hopes this year to unearth other fragments which will permit reconstruction. The find appears here from the back.





DETAILS: LEVEY AND KUMUCHOKI BY GORDON W. SAKER © R.O.S.

Sharing their knowledge, Dr. Leakey and his son study the fossil skull of a monkey. The elder Leakey flew to the Koobi Fora camp to observe his son's progress and to see the new finds.

ridge wearing broad grins, oblivious of the vicious noon heat. I strode out to meet them.

"Another hominid skull?" I shouted to Meave, and we all began examining Mwon-gela's discovery (opposite and page 728), found protruding from a low bluff. It was in fragments: three major pieces and several smaller ones. The face and jaws were missing, but the rest of the cranium bore few of the characteristics of an australopithecine. I felt, with mounting excitement, that a search for additional fragments and further study might show this to be no near-man, but perhaps even a species of the genus *Homo*.

When Mwon-gela led us to the site of his fossil discovery, I was sure from the slope and

the erosion course that we would be able to find additional fragments—but, unfortunately, not in 1969. It would require a major excavation, and our time had all but run out.

After performing a sieving operation at the site, we loaded our camels and trekked back to base camp. The closing days of any expedition are always hectic, and the end of August at Koobi Fora was no exception. Specimens had to be prepared for shipment, field notes completed, photographs taken.

When the others had departed, I remained behind with a few of our staff to close down the camp. These few days of relative calm gave me an opportunity, when the late afternoon sun burnished the surface of Lake

Rudolf, to ponder our two seasons of work.

With Kay Behrensmeyer's well-drawn stratigraphic sections, we could tentatively correlate the strata at the tool site with the two skull sites to the north (map, page 716). Fossil fauna at all three sites agree with this correlation. Both skulls appeared to come from horizons below the accurately dated tool-site tuff. Thus these hominids were very likely to be a minimum of 2.6 million years old.

There were our tools, the oldest ever found. Who had made them? Not *Australopithecus boisei*, I felt.

While the first skull found by our expedition displays certain differences from the Olduvai specimen, these, I suspect, are minor

Rudolf basin at the same time, one involving a more intelligent creature, perhaps of the genus *Homo*?

I believe that such a situation existed at Olduvai 1.75 million years ago. *Australopithecus boisei* lived there then. So did *Homo habilis*, a more advanced creature discovered in 1960 at Olduvai. We now credit *Homo habilis* with tool-making ability.

Was *Homo habilis* making tools at East Rudolf 850,000 years before he hunted game at Olduvai? If so, we have not found him, for I feel the skull discovered by Mwangela bears little resemblance to that of *Homo habilis*.

Perhaps an answer may lie with still another early man—*Homo erectus*—whose



REPRODUCED BY KINDNESS OF GILMAN © N.G.S.

In a shimmering twilight, expedition members relax on the edge of Lake Rudolf after a day in the field. Sue Abell, daughter of scientist Paul Abell, trims Kay Behrensmeyer's long tresses, while Don Siegel strums his guitar.

Sun sinks on a giraffe whose kin shared Lake Rudolf with man's early ancestors. Locked in the rocks of this remote basin, the hominid and animal remains help modern man piece together a picture of the world of his prehistoric forebears.

enough for it to be classified as the same species, though it is likely to be some 850,000 years older. Teeth and jaw fragments found by the French and U.S. teams in the Omo Valley confirmed that these near-men were an established group more than 2.6 million years ago.

This lack of change over such a long period indicates very clearly, I think, that these creatures had reached an evolutionary "dead end." Such failure to evolve would not, to me, seem characteristic of an intelligent tool-maker. Furthermore, *Australopithecus boisei* possessed a massive jaw and huge grinding teeth, implying that he had adapted to suit a predominantly vegetarian diet. He would have had little need to devise cutting tools.

If he was not our tool-maker, who, then? Was there a contemporary line evolving in the

remains have been found at Olduvai Gorge as well as near Peking and in Java. The earliest specimen is about half a million years old. But he is quite distinct from both of Olduvai's other forms of primitive man, suggesting to me that the *Homo erectus* lineage had been evolving for a very long time—perhaps at least as long ago as 2.6 million years, the era we are working with at East Rudolf.

Could Mwangela's puzzling find be a prototype of *Homo erectus*, then? It is much too early to say, but I believe this is quite possible.

We will find the answer, I am sure. For among the strata of the East Rudolf desert lies a fascinating volume of prehistory, holding untold chapters of the origins of mankind.

In two years we have scarcely turned the first page, and I am eager to get on with the reading.

THE END





Bikeway to adventure: Cyclists stream through grass-anchored dunes of

*Family fun and discovery fill Geographic's eye-opening
new guide to* ***Vacationland U.S.A.***

By MELVILLE BELL GROSVENOR, LL.D., Sc.D.
Editor-in-Chief and Chairman of the Board, National Geographic Society



PHOTOGRAPH BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES P. BEALE © N.G.S.

Cape Cod National Seashore, one of the hundreds of recreation areas portrayed.

STANDING ON DECK in mask, wet suit, and flippers, a heavy tank strapped on my back, I anxiously watched my companions add weights to my belt. As if I didn't already have enough on to make me sink like a stone! "Good heavens," I thought, "they're trying to drown me."

With family and friends, I had sailed my yawl *White Mist* up the Hudson, off to explore northeastern America by water. Lake Champlain offered unexpected adventure: a chance to join in a search for sunken Revolutionary War ships. But I am not a strong swimmer, and besides, I had never mastered

scuba diving. The desire to find something new, however, won out, and I followed the experts over the side.

Strange. Instead of plummeting to the bottom, I felt an extraordinary lightness, and I could breathe quite normally. It seemed so effortless to descend and rise. A wondrous realm opened before my eyes.

Yes, I had the thrill of surfacing with a plank pried from an old wreck. From 1776? No, but I treasure the joy of that quest, and the discovery that at 67 I was still ready for the challenge of a new vacation adventure.

Challenge. Quest. Discovery. Joy. No longer are most Americans content to vacation in a hammock. This past year forty million pitched a tent or parked a trailer at one of

him to the John F. Kennedy Space Center, and give him a look at moon rock in the Smithsonian Institution, Washington's show-place of marvels. Sis wants to be a star. We'll give her a Hollywood studio tour, and top it off with Disneyland (right). The whole family will relish a swing through San Francisco, New Orleans, San Antonio at fiesta time, candlelit Williamsburg at Christmas.

Iron-shod hoofs and wheels make xylophone music on the timber floor of a covered bridge near Lancaster; a horse and carriage emerge, beckoning us into yesterday's simpler life among the Pennsylvania Dutch.

We see other faces of America as we tour Cajunland amid Louisiana bayous, or canoe in the Ozarks, where mountain craftsmen



PHOTOGRAPHS BY GEORGE WOLFF (HORSE) AND DEAN LINDER (© N.Y.S.)

Part-time wranglers play tug-of-war with a balky donkey at the Seven D Ranch near Cody, Wyoming. The 255-acre spread is one of thousands of ranches and farms that offer urbanites the flavor of rural America.

Disneyland's dreamworld enthralles a boatload of visitors. This vacation magnet in southern California welcomes ten million delighted people each year. As the Pirate Ship heels to port, gondolas skim along the Skyway toward the 146-foot Matterhorn in background.

the Nation's 500,000 campsites. Millions more are hiking, biking, skiing, spelunking, trail-riding, fishing, bird-watching, clambaking.

Now your Society has prepared an exciting new book, *Vacationland U.S.A.*, to guide you to the action—on your doorstep, or 2,000 miles away. Here's a year-round panorama of vacation activities, from snowmobiling in New Hampshire to surfing in Hawaii.

How would you like to have a cabin and a wilderness lake all to yourself for a few dollars a day? We wing you to one in the Alaska panhandle by floatplane.

Or ride with the cowhands at your vacation home on the range? Or raft the rapids in mile-deep Grand Canyon? Or laze along on a Mississippi houseboat?

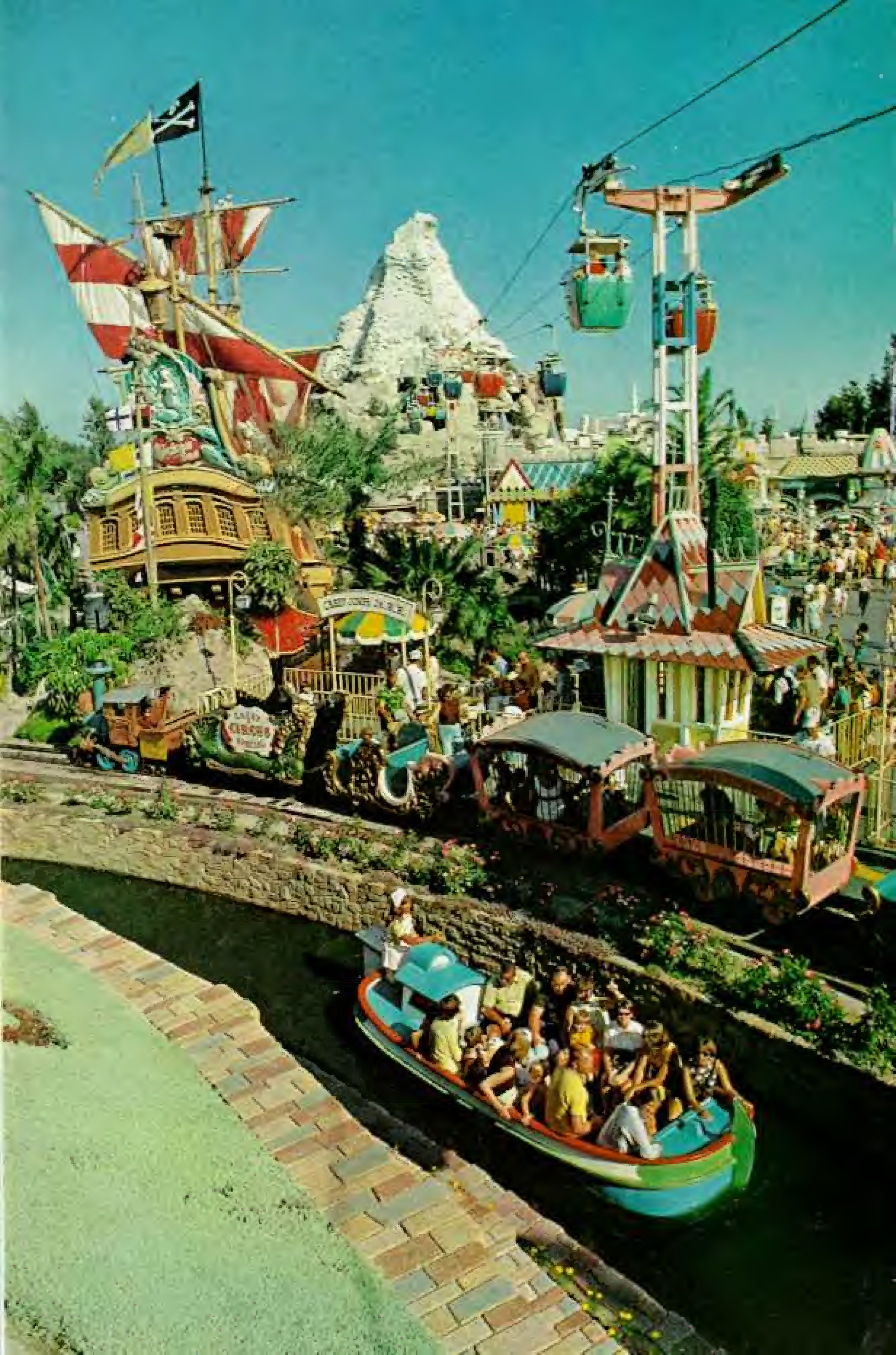
Junior wants to go to the moon. We'll take

weave and whittle. With a Navajo at the wheel, we jeep through Monument Valley, where red sandstone slabs march across a burnished desert beneath a turquoise sky.

Our choice is wide. We can clack up a crazy little mountain-goat railroad to the top of Mount Washington, or glide past alligators in the black waters of Okefenokee Swamp. Look! A cloud of egrets rises from floating meadows in this strange place Indians called "land of trembling earth."

Winter brings the thrills of hobsled, ice-boat, and snowmobile. In summer's green or autumn's gold, let's take a hosteler's holiday, pedaling through Massachusetts' literary past.

Our Space Age vacations reflect an old tradition. Westering pioneers conquered their wide-open spaces with the live-in prairie



schooner. Today we're rediscovering the land in camper, trailer, or motor home.

"Why do we do this?" questions an Adirondack camper struggling to secure his tarpaulin in a night thunderstorm. Why paddle or backpack into the woods? Why sleep under the stars on the lip of a still-active Hawaiian volcano? Why trailer to a Michigan lake owned by bears and mosquitoes?

"To get *back* to it all," the camper concludes. "To meet a storm, a living creature of body and voice and brute force. To learn respect for fellow creatures who camp out summer and winter without all the stuff I think I need."

And to see clearly. Just as astronauts on the moon look back to earth with new perspective, a change of scene enables us to examine our own lives with fresh eyes.

Pit your wits against a trout in a sparkling mountain stream, and cares fall away. Relaxed, re-created through challenging activity, I've often come up with solutions to problems that had plagued me.

A do-it-together vacation is an investment in family strength—and in America's future. I've found that hiking, climbing, horseback riding in the Tetons provide a shared experience and open young eyes to nature's wonders. Let the boys set up camp for the night. Let



Balancing beagle and pack, a hiker fords a Virginia torrent on the Appalachian Trail. Strung from Maine to Georgia, this longest continuous marked path offers 2,000 miles of beauty and challenge.

Pursued by plumes of powdery snow, ski instructors cut turns beneath a lift on Colorado's Aspen Mountain. Warming to skiing, snowmobiling, sledding, and skating, more and more Americans scorn hibernation. Nearly a third now take winter vacations.



EDUCATED BY MICHAEL DEBRILL (ABOVE) AND DON SHERRARD II (R) W.A.S.

the girls do the cooking. It channels young energies, gives the children a lifelong interest in their land.

We're a nation of city dwellers—70 percent of our population squeezed onto less than 2 percent of our land. But the wilderness stands there waiting. For each of its 203 million citizens, the U. S. has set aside more than an acre of public playland, much of it surprisingly accessible. In the East, 2,000 miles of Appalachian Trail (above) skirt the great cities. In the West, the Pacific Crest Trail links Mexico and Canada, traversing national parks and forests. Our largest state park, New York's Adirondack Forest Preserve, laced with hundreds of miles of trails, lies within a four-hour drive of Manhattan's teeming streets.

Our new Interstate Highway System, new access roads, new facilities speed you to places you had to mount an expedition to get to a few years ago. By helicopter from Aspen you can alight atop a 13,561-foot Colorado peak, Mount Hayden, to ski in breathtaking solitude. You can put your boat in recently created Lake Powell, as I have, cruise and water-ski amid the grandeur of Glen Canyon, and

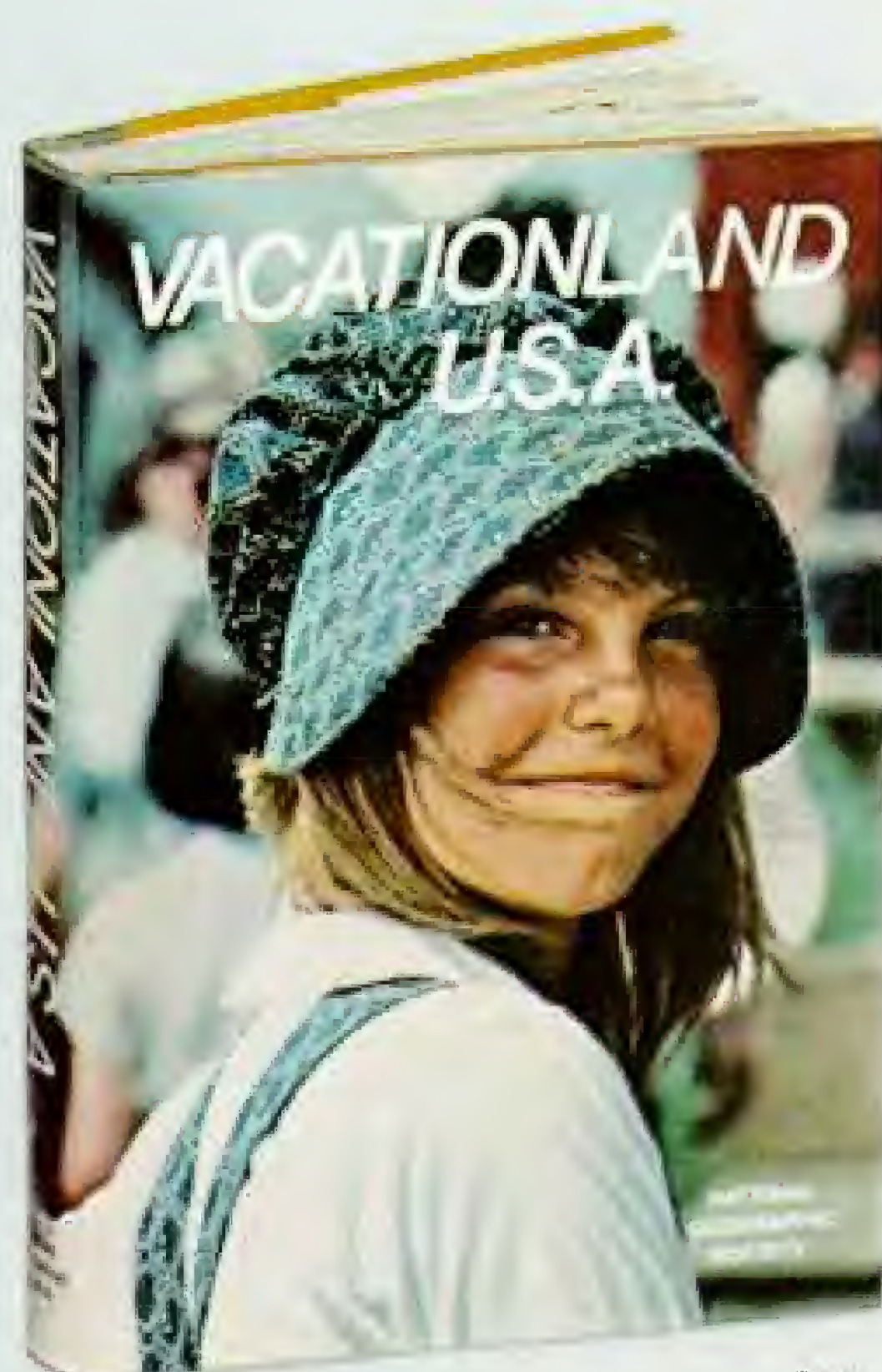
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At home in an alien realm, visitors prowl a thicket of elkhorn coral at John Pennekamp Coral Reef State Park, the Nation's first undersea preserve. Here, in a 121-square-mile marine playground off Key Largo, Florida, skin-divers and passengers in glass-bottomed boats can explore a fantasy world of weird corals and richly hued fishes.

visit Rainbow Bridge, world's largest natural arch. Such opportunities exemplify a new concept in our National Park System—recreation areas to challenge the athletic and to take pressure off the crowded national parks.

Vacationland U.S.A. portrays the wealth of holiday dividends to be gained in new national recreation areas, the national seashores, lake shores, and wild rivers. It presents the spectrum of our wildlife refuges, national forests, our 3,000 state-park areas. It guides you to trails, waterways, Indian reservations, and four seasons of fun: fairs, pageants, music festivals, regattas, derbies, rodeos, powwows, winter carnivals.

In its pages you watch Thoroughbreds training in Kentucky's blue-grass country; board a square-rigged whaler at Mystic Seaport in Connecticut to relive the days of *Moby Dick*; follow the footsteps of cutthroats and heroes along the Natchez Trace; go underground with spelunkers who probe the Nation's estimated 50,000 caves.

To bring you *Vacationland U.S.A.*, our Book Service team explored a nation alive at work—and purposeful play. In ghost towns

of the Old West, David Robinson dug up prizes of handmade glass and mined a rich lode of lore. Ross Bennett's youngsters watched wide-eyed as men made planes and cars, and saw the skills that can fashion a Louisville Slugger or 76 trombones. Project editor Tom Allen savored the quiet joys of a seashore treasure hunt for shells on Florida's Sanibel Island, a nature sanctuary.

Father and Sons Span Generation Gap

The book's managing editor, Seymour Fishbein, wondered whether he could make it to the top of Rainier, snow-crowned monarch of the Cascades. With sons Joe, 15, and Jeff, 14, he joined other tyros training with ropes and crampons, sharing the cold, discomforts, and camaraderie of a mountain hut at 10,000 feet. Then came the challenge of glacial chasms, the agony of the final ridge.

Achieving the summit, body drained, spirit soaring, he found something more. "For this priceless moment in our lives, the boys and I have reached across the perilous chasm between our generations and found ourselves together. What more can a summer do?"

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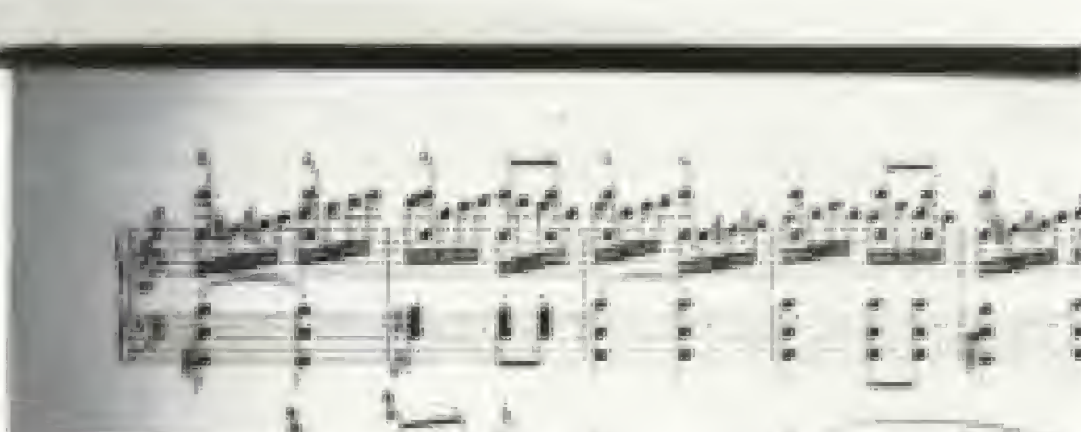
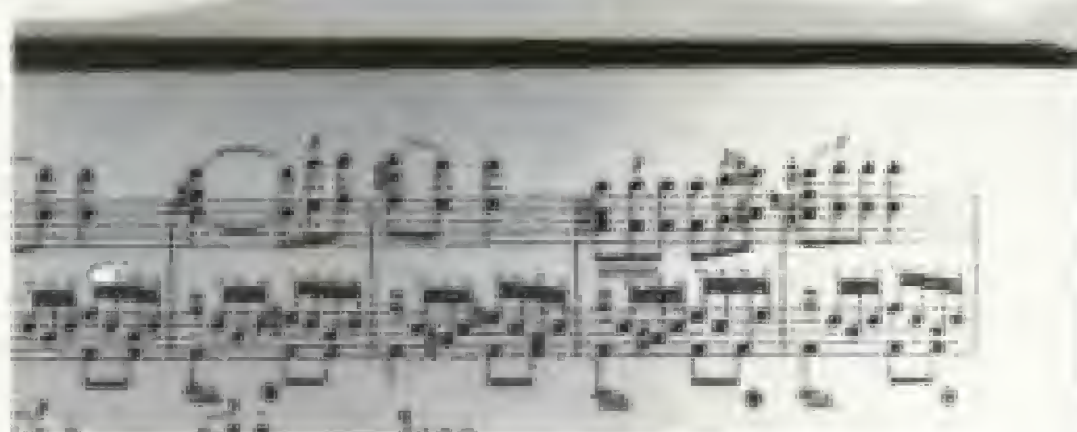
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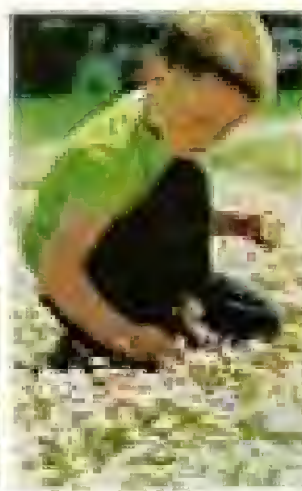
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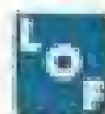
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