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NATIONAL GEOGRAPHIC

Specter from the past, a female figurehead still graces an armed American schooner found on the bottom of Lake Ontario

FOR MORE THAN A CENTURY Europeans and Americans assumed an inalienable right to hunt, enjoy, and exploit African game. White hunters, writers, photographers, filmmakers, ivory and fur traders, and tourists by the millions developed a fascination and sometimes a lifelong obsession with African wildlife.

As species became endangered from exploitation, some of the same people undertook the preservation of African wildlife. By the 1970s scores of foreign conservationists had gathered in Nairobi, Kenya, alone.

Today Africans are taking over both exploitation and conservation of their own wildlife—not always to the satisfaction of outsiders. High-powered military rifles—as familiar as spears once were—and soaring prices for ivory, fur, and rhino horn have led to unprecedented massacre of some species.

Scientist Iain Douglas-Hamilton estimates that between 50,000 and 150,000 elephants are killed each year for the ivory trade. Approximately 90 percent of the continent's rhino population has been destroyed.

Africa, the poorest continent with the fastest population growth, desperately needs both land and income. Kenya, with the highest birth rate ever recorded for a country, has 2,200 new mouths to feed every day. In the 1970s half a million Kenyans migrated into wildlife habitat to farm. People competing with wildlife for survival are not concerned about conservation.

The vast preserves such as Serengeti, where wildlife roams free today, eventually will have to give space to grazing and crops. Animals destroying livestock or crops will be eliminated, as they have been elsewhere.

The future of African wildlife lies in making it economically compatible with the needs of Africans. Some nations, including Tanzania, Kenya, and Zimbabwe, have well-established conservation ethics and experts trained in wildlife management. In other countries wildlife is still only food or money on the hoof.

In this issue, writer Douglas Chadwick and Des and Jen Bartlett, photographers and filmmakers, present the fascinating Etosha National Park—literally a zoo in the wild—fenced and managed in a manner designed to satisfy both economic needs and conservation, basic requisites if Africa's wildlife heritage is to be preserved.

Wilbur E. Garrett

EDITOR

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COVER: *Photograph by Emory Kristof.*

Hamilton & Scourge

Ghost Ships of the War of 1812

By DANIEL A. NELSON

Photographs by EMORY KRISTOF

NATIONAL GEOGRAPHIC PHOTOGRAPHER

Paintings by RICHARD SCHLECHT

THROUGH an undersea snowstorm of swirling sediment the figure slowly emerged. Hand over heart, body inclined forward, the small human likeness seemed to be taking a bow (left).

In the darkened control room some 300 feet overhead, I watched as the remotely controlled underwater TV camera explored every detail of the scene far below. After a time someone behind me remarked quietly, "Not bad for 11 years' work, Dan—seems to me you could take a bow yourself."

The remark was well meant, but if bows were to be taken they would number in the hundreds—one for every person who had helped bring that ghostly shape to the monitoring screen. The image was of a ship's figurehead, a likeness of the great British naval hero Horatio Nelson. It belonged to a United States Navy vessel named *Scourge* that sank with *Hamilton,* a sister ship, in a terrible storm on Lake Ontario 170 years ago. The story is one of violence and remarkable courage. It is best told by Ned Myers, who was there.

Myers was an able seaman in the U. S. Navy in the War of 1812, a conflict with Britain that left neither side better off. Its causes included British interference with U. S. trade with Napoleonic France and impressment of

Apparition from the deep, *the figurehead of the Scourge framed by the bowsprit and a spar is photographed by sophisticated electronic techniques in Lake Ontario. Another U. S. warship of the War of 1812, the Hamilton, was also found.*

American sailors. Armies clashed from Canada to Louisiana, navies from the Great Lakes to the high seas.

Ned Myers would doubtless be forgotten today but for two things: He was blessed with an almost photographic memory, and before the war he shared a voyage aboard an American merchant ship with a young man by the name of James Fenimore Cooper.

During the War of 1812 Myers served aboard the armed schooner *Scourge*, which patrolled Lake Ontario with a U. S. squadron that included another armed schooner, *Hamilton*. *Scourge* was originally a Canadian merchant vessel called *Lord Nelson*, which was captured and renamed by the Americans. *Hamilton* had been an American merchantman named *Diana*, which was also renamed and pressed into service for the war. The Americans added guns to the ships, making them dangerously top-heavy.

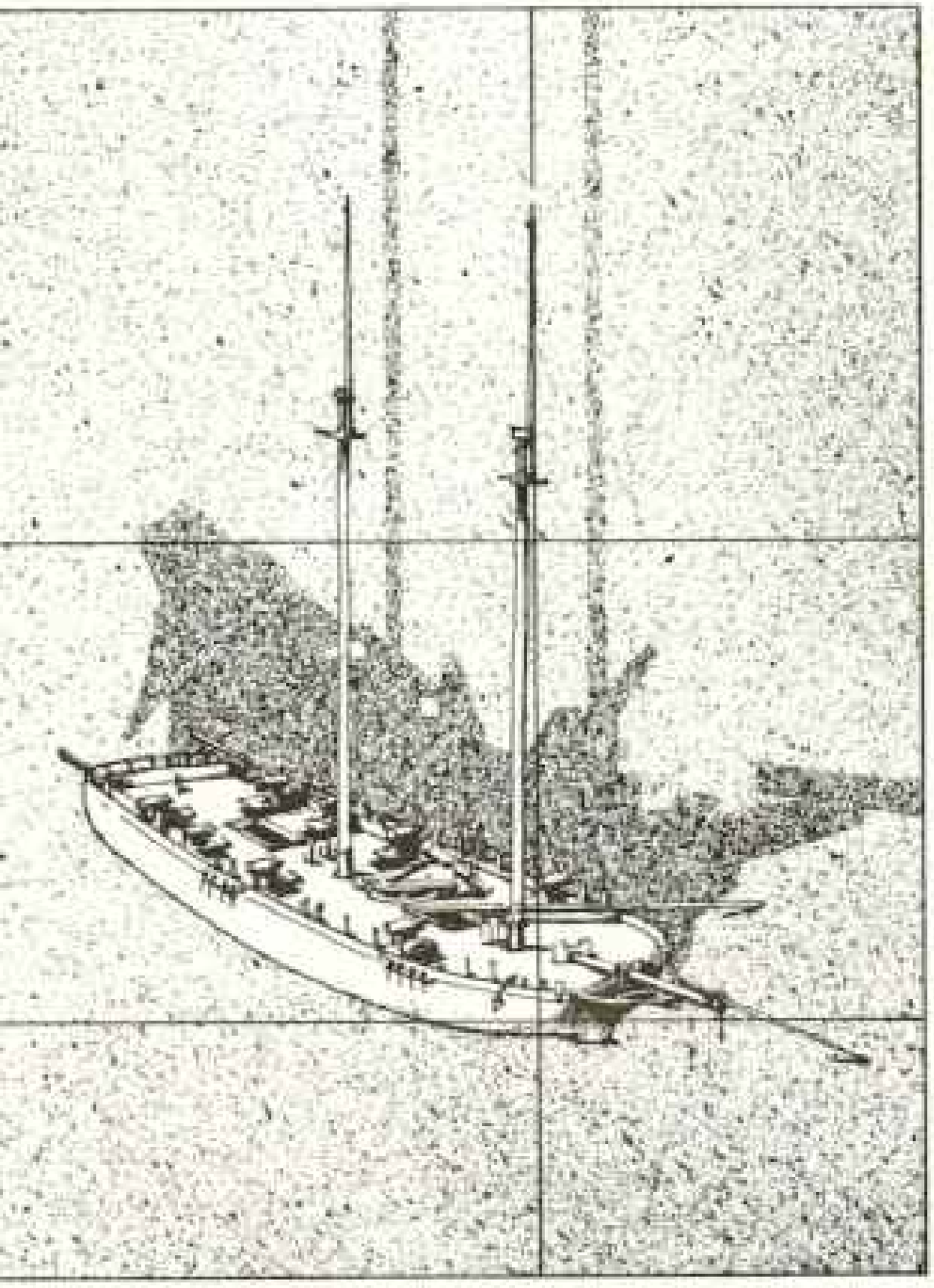
In the early hours of August 8, 1813, *Hamilton* and *Scourge* were overwhelmed by a sudden violent squall as they lay becalmed about a quarter of a mile apart and within sight of a British squadron in western Lake Ontario (map, page 299). Both ships perished almost instantly. Reeling under the lash of the squall, they swamped and went to the bottom, carrying all but eight crew members from each vessel.

One of the survivors was Ned Myers, and every detail of that terrible night remained locked in his memory over the next 30 years. In 1843 Myers contacted his former shipmate, Cooper, who by then had become one of America's leading writers.

From his remarkable memory Myers recounted his entire naval career to his old friend Cooper, including a graphic description of the night *Hamilton* and *Scourge* sank. The eventual result was a classic of naval drama: *Ned Myers; or A Life Before the Mast*, by J. Fenimore Cooper. A single passage in Ned's account details the death of *Scourge* with frightening clarity:

The flashes of lightning were incessant, and nearly blinded me. Our decks seemed on fire, and yet I could see nothing. I heard no hail, no

(Continued on page 294)



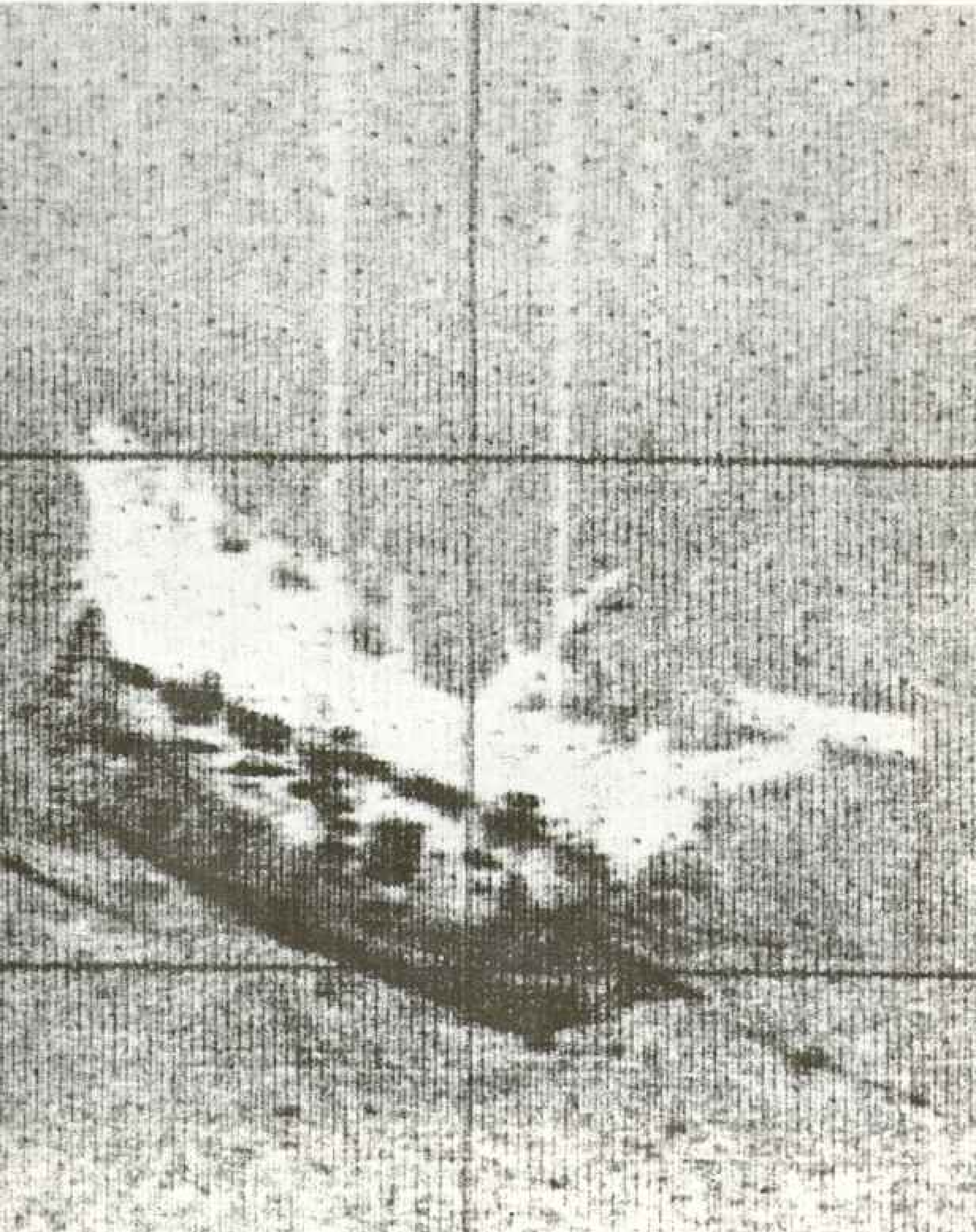
Proof positive from 290 feet

*GHOSTLY SCHOONER, later identified as Hamilton, sails again in this dramatic side-scan sonar image (**right**) made by a Canadian government research vessel in 1975.*

*Sound pulses reflected from 290 feet down show the ship in black, casting a white acoustic shadow that outlines her masts. An artist's drawing (**left**) refines the images and reverses the colors.*

A second sonar image pinpointed Scourge 1,500 feet away from Hamilton. Becalmed while attempting to engage a British squadron, both vessels later foundered during a sudden squall soon after midnight on August 8, 1813.

Directed by author Daniel A. Nelson, the search for the ships was originally sponsored by the Royal Ontario Museum, the Canada Centre for Inland Waters, and the federal and Ontario governments, with later support from the Hamilton-Scourge Foundation and the National Geographic Society.


CANADA CENTRE FOR INLAND WATERS

Scourge

HIGH-TECH EXERCISE in underwater archaeology: A remotely piloted vehicle carrying its own lights and cameras hovers over the starboard rail of the 60-foot-long Scourge. A cable connects the vehicle with its operators aboard ship.

With helicopter-like maneuverability, the

vehicle photographed Scourge section by section, in visibilities that were never better than ten feet. After poring over photographs and videotapes, artist Richard Schlecht reconstructed this view of the remarkably well-preserved vessel.

From a crew of about 50, only eight men survived. One of them, Ned Myers, recalled that the vessel "was so tender that we could do little or nothing with her in a blow. It was often prognosticated that she would prove our coffin." Myers's tale of his dramatic escape, as related by James Fenimore Cooper, *begins on page 300.*

order, no call; but the schooner was filled with the shrieks and cries of the men to leeward, who were lying jammed under the guns, shot-boxes, shot, and other heavy things that had gone down as the vessel fell over. . . .

The water was pouring down the cabin companion-way like a sluice. . . . I made a spring, therefore, and fell into the water several feet from the place where I had stood. It is my opinion the schooner sunk as I left her.

HAMILTON WENT with her, and the two lay largely forgotten over the next 158 years, with no memorial but Ned Myers's account and terse references in the U. S. naval archives.

Then in the summer of 1971 the Royal Ontario Museum at Toronto commissioned a historical research project to look for the *Hamilton* and *Scourge* in western Lake Ontario. The lake had been a major theater in the War of 1812, taking the place of roads in the movement of troops and supplies. As a result, shipbuilding on Lake Ontario had reached massive proportions. By the time the war ended in 1815, both sides had ships on the lake or on the ways as powerful as anything at the historic Battle of Trafalgar a decade earlier.

Through my friend Dr. Douglas Tushingham, then chief archaeologist of the Royal Ontario Museum, I was asked to direct the ship research project. Though my profession is dentistry—I have a busy practice in St. Catharines, Ontario—I had experience in underwater work, having spent much of my free time over the years with leading marine archaeologists in Bermuda and the Caribbean. I had also been a research associate of the museum for several years.

Lake Ontario's waters are deep and cold, with lower levels that remain forever in the near-freezing range. Unlike tropical seas with their warm temperatures and corrosive

Doing unexpected duty *for the American cause, a likeness of Adm. Horatio Nelson, one of history's greatest naval heroes, serves as the figurehead of Scourge in this montage of two photographs taken from slightly different angles.*

Originally a Canadian schooner named Lord Nelson, the vessel was captured before formal outbreak of hostilities, then armed and renamed.

Oddly enough, the sculptor carved this figure of Nelson having two arms (see also page 288), even though the admiral had lost his right arm in combat 15 years before.

At the ready *despite 170 years on the bottom, one of Scourge's six-pounders* ***(above)*** *pokes its muzzle through a gunport beneath a pair of stowed cutlasses. Numbers on the picture record time, date, and roll number—in this case, 12:10 a.m. plus 21 seconds, on the 14th (May), film roll 2. Such inserts have been cropped out of other photographs in the article.*

A spar rests between the base of the mainmast ***(facing page, top)*** *and the bilge pumps. Boarding axes* ***(facing page, bottom)*** *are stowed inside the aft bulwark, above a shot rack that still contains a cannonball.*

salts, the relatively pure, cold waters of the Great Lakes tend to preserve whatever sinks into their lower reaches. That fact was to have overriding significance in the case of *Hamilton* and *Scourge*.

Cooper's book provided a wealth of detail on the ships, and equally important, it gave some idea of their whereabouts on the bottom of Lake Ontario. No exact position was possible, of course, because the ships' logs had gone down with everything else. But in time Ned Myers was to give me an invaluable clue.

What began as a simple research project gradually assumed the proportions of an

obsession. I was no longer content merely to gather information on *Hamilton* and *Scourge;* I was determined to find and explore the ships themselves. From the beginning three very remarkable people not only tolerated my obsession but constantly sustained me in it: my wife, Nancy, Doug Tushingham, and Dr. Peter Sly, a senior scientist at the Canada Centre for Inland Waters, commonly known as CCIW. It is a federal research facility charged with investigating and protecting Canada's lakes and rivers—a mission that Peter was to interpret liberally over the years to include a prolonged search of Lake Ontario's bottom.

BUT WHERE TO BEGIN the search? Historical documents, especially those drafted in time of war, often suffer from the ignorance or the outright bias of the authors.

In my search for the two ships I needed original documents that stated simple facts, not opinions. Nothing fits that description better than a ship's log, and I felt frustrated by the loss of those of *Hamilton* and *Scourge*. I wondered if the logs of other ships in the American squadron might have survived. I wrote to the Navy Department in Washington, D. C., with the question, but the answer was negative. The National

Archives, however, had the log of H.M.S. *Wolfe*, flagship of the British forces that had been skirmishing with the American squadron the day before *Hamilton* and *Scourge* went down. Would a copy of *Wolfe*'s log be of any interest? It most certainly would.

I never found the name of the British officer who stood watch aboard H.M.S. *Wolfe* on that crucial morning of Sunday, August 8, 1813, but I feel a sense of gratitude toward him. In a careful hand he had entered the details of his watch in the ship's log:

AM: Light breezes variable, very warm weather. At 5: The 40 Mile Creek bore SSW distance about 8 miles, wind southerly. Saw the Enemy squadron bearing E & by S about 4 or 5 leagues standing to the westward on the larboard tack. At ditto made sail and stood toward him. . . .

The officer might as well have drawn a chart; 40 Mile Creek still exists by that name, and it empties into western Lake Ontario near the town of Grimsby on the south shore. On the morning of August 8, *Wolfe*'s position was eight miles north-northeast of the mouth of the creek. From that point the bearing of the American squadron was east by south and the distance was "4 or 5 leagues"—meaning 12 or 15 miles.

At last I had a search area, but with one small problem. The sighting from *Wolfe* had been made at 5 a.m., approximately four hours after *Hamilton* and *Scourge* went down. How many miles had the American squadron sailed in the meantime? It was Ned Myers who gave me the answer: None.

According to Cooper's book, Ned had been picked up after the sinking by another ship in the squadron, *Julia*. After several hours' sleep Ned came on deck around 6 a.m. and encountered a scene he was not likely to forget:

The squadron could not have moved much between the time when the accidents happened and that when I came on deck . . . for we now passed many relics of the scene, floating about in the water. I saw spunges, gratings, sweeps, hats, &c., scattered about. . . .

In other words the bearings taken by *Wolfe* on the American squadron coincided with those recorded for *Hamilton* and *Scourge*. It was time to start the search underwater.

ALLOWING a sizable margin for error, I marked off a 32-square-mile section of Lake Ontario where I thought the two ships must lie. Then I called on Peter Sly and his colleagues at CCIW for the first of many favors generously granted.

A standard technique today for locating sunken ships is to survey first with an underwater magnetometer, whose sensor can detect significant amounts of iron such as cannon at considerable depths. Once a target is located, side-scan sonar can frequently be used to determine the shape and size of the sunken object.

The CCIW had side-scan sonar and navigational and data recording systems that it agreed to make available, along with a research vessel. A more vital loan was that of Peter himself, who had become a virtual partner in our quest. Finally, with a leased magnetometer, we were in business. After preliminary trials in 1972 we began a full-scale underwater search in the fall of 1973.

The initial results were discouraging. Among the magnetometer's major contacts, side-scan sonar identified a pile of bridge girders lost overboard by a freighter years earlier and a scattering of practice artillery shells in an area of the lake used by the Canadians as a World War II firing range.

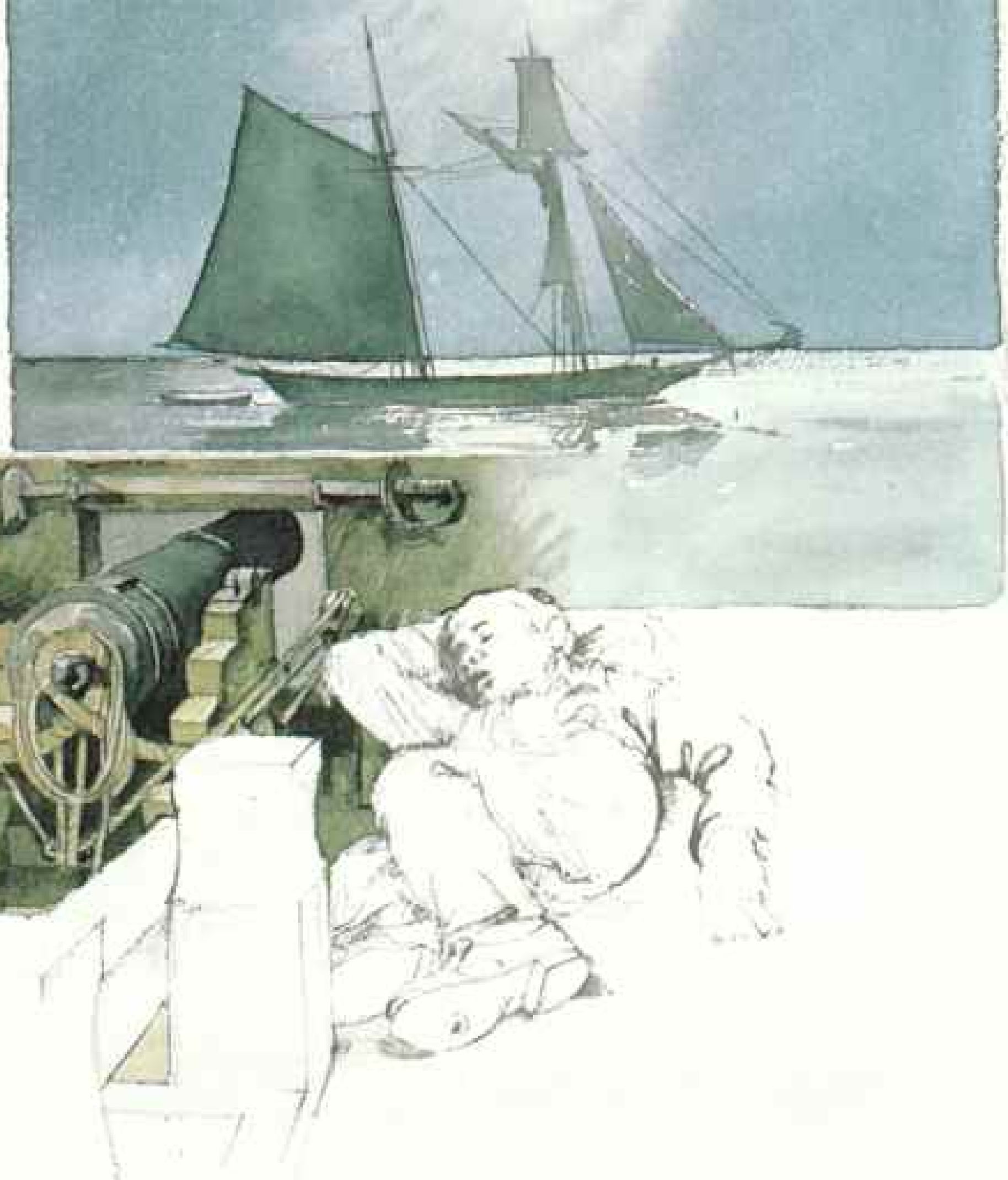
Finally, with a single day of borrowed ship time left and the initial area thoroughly investigated, I did some fast thinking. Suppose the watch officer aboard *Wolfe* had misjudged the distance to the American squadron? If the enemy ships had been a full 15 miles to the east of *Wolfe*, they probably would have slipped into the mouth of the Niagara River for the night under the friendly guns of Fort Niagara. But the Americans had remained in open water—perhaps a bit closer to *Wolfe* than the watch officer realized. The next morning I asked for a search farther to the west of our original area.

With time running out, we searched by sonar alone. During a final sweep that day the instrument recorded a solid object on the lake bottom at a depth of nearly 300 feet. With no time to investigate we marked the site on our chart and reluctantly came ashore for the winter.

It was to be two years before the search could be resumed. CCIW has heavy commitments, *(Continued on page 306)*

SAILING WING and wing with flags hanging limply, Scourge and Hamilton, trailed by part of the U. S. squadron, break out oars in a late afternoon calm. Maneuvering like water spiders on the glassy lake, the ships fail to make contact with the British. The calm continues after sunset, and crews take their rest.

In the darkness the squall bursts, sending the ships to the bottom in minutes. An X marks their resting place near Port Dalhousie, Ontario.



One of eight survivors from Scourge, Ned Myers gave a gripping account of the tragedy to author James Fenimore Cooper, who incorporated the story in his 19th-century naval classic, "Ned Myers; or A Life Before the Mast." That moment-by-moment account, beginning just before the storm, guided artist Richard Schlecht in re-creating the disaster in these carefully researched paintings that illustrate Myers's words.

The incredible crawl of Ned Myers

WE FIRST spliced the main-brace [had a ration of rum] and then got our suppers, eating between the guns, where we generally messed. . . . As all hands were pretty well tired, we lay down, with our heads on shotboxes, and soon went to sleep.

. . . I ought to have said something of the state of our decks. . . . There was a box of cannister, and another of grape, at each gun, besides extra stands of both, under the shot-racks. . . . Each gun's crew slept at the gun and its opposite, thus dividing the people pretty equally on both sides of the deck. Those who were stationed below, slept below. I think it probable that, as the night grew cool . . . some of the men stole below to get warmer berths. . . .

I was soon asleep. . . . How long my nap lasted, or what took place in the interval, I cannot say. I awoke, however, in consequence of large drops of rain falling on my face. . . . When I opened my eyes, it was so dark I could not see the length of the deck. . . .
I now remember

to have heard a strange rushing noise to windward as I went towards the forward hatch. . . . One hand was on the bitts, and a foot was on the ladder, when a flash of lightning almost blinded me. The thunder came at the next instant, and with it a rushing of winds that fairly smothered the clap.

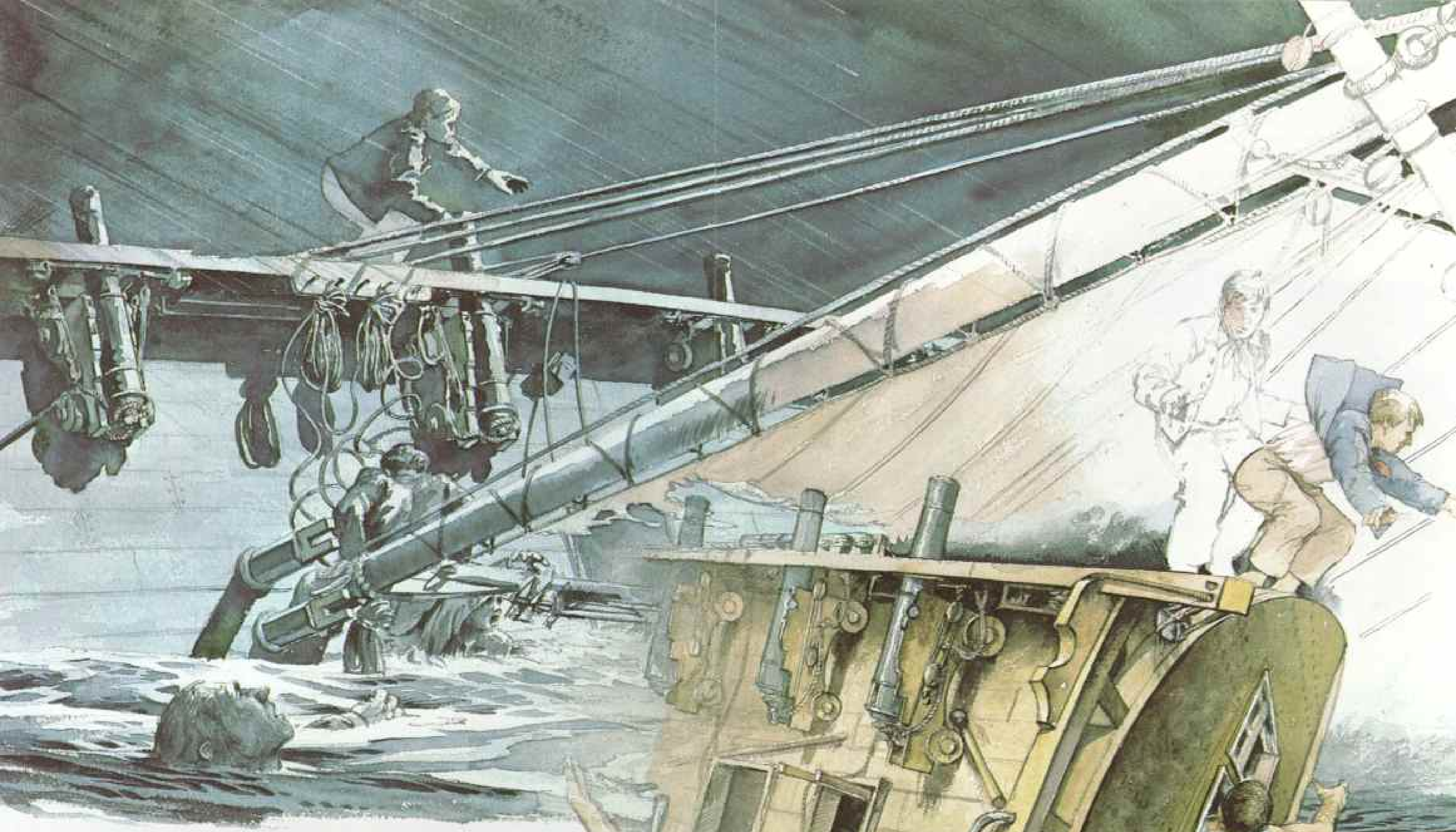
The instant I was aware there was a squall, I sprang for the jib-sheet. Being captain of the forecastle, I knew where to find it, and throw it loose at a jerk. . . . The water was now up to my breast, and I knew the schooner must go over. . . .

All this occupied less than a minute. The flashes of lightning were incessant, and nearly blinded me. . . . the schooner was filled with the shrieks and cries of the men to leeward, who were lying jammed under the guns, shot-boxes, shot, and other heavy things that had gone down as the vessel fell over. . . .

I succeeded in hauling myself up to windward. . . . Here I met William Deer, the boatswain, and a black boy of the name of Philips, who was the powder-boy of our gun. "Deer, she's gone!" I said. The boatswain made no answer. . . .

I now crawled aft, on the upper side of the bulwarks, amid a most awful and infernal din of thunder, and shrieks, and dazzling flashes of lightning; the wind blowing all the while like a tornado. When I reached the port of my own gun, I put a foot in, thinking to step on the muzzle of the piece; but it had gone to leeward with all the rest, and I fell through the port, until I brought up with my arms.

I struggled up again, and continued working my way aft. . . . I could not swim a stroke, and it crossed my mind



to get one of the sweeps to keep me afloat. . . . The water was pouring down the cabin companion-way like a sluice; and as I stood, for an instant . . . I saw Mr. Osgood [Scourge's captain], with his head and part of his shoulders through one of the cabin windows, struggling to get out. . . . I saw him but a moment, by means of a flash of lightning, and I think he must have seen me. At the same time, there was a man visible on the end of the main-boom, holding on by the clew of the sail. I do not know who it was. This man probably saw me, and that I was about to spring; for he called out, "Don't jump overboard!—don't jump overboard! The schooner is righting."

I was not in a state of mind to reflect much on anything. I do not think more than three or

◀ THIS PAGE FOLDS OUT

four minutes, if as many, had passed since the squall struck us, and there I was standing on the vessel's quarter, led by Providence more than by any discretion of my own. It now came across me that if the schooner should right she was filled, and must go down, and that she might carry me with her in the suction. I made a spring, therefore, and fell into the water several feet from the place where I had stood. It is my opinion the schooner sunk as I left her. I went down some distance myself, and when I came up to the surface, I began to swim vigorously for the first time in my life. I think I swam several yards . . . until I felt my hand hit something hard. I made another stroke, and felt my hand pass down the side of an object that I knew at once was a clincher-built boat. I belonged to this boat, and I now recollected that she had been towing astern. Until that instant I had not thought of her, but thus was I led in the dark to the best possible means of saving my life. . . .

My first look was for the schooner. She had disappeared, and I supposed she was just settling under water. It rained as if the flood-gates of heaven were opened, and it lightened awfully. . . .

I could hear many [men] around me, and, occasionally, I saw the heads of men, struggling in the lake. . . . I now saw a man quite near the boat; and . . . made a spring amidships, catching this poor fellow by the collar. He was very near gone; and I had a great deal of difficulty in getting him in over the gunwale. . . .

I now looked about me, and heard another. . . . I caught him by the collar, too; and had to drag him in. . . .

I kept calling out, to encourage the swimmers. . . .

As the boat drifted along, she reached another man, whom I caught also by the collar. . . .

We had now as many in the boat as it would carry, and . . . it would not do to take in any more. . . .

The lake had swallowed up the rest . . . and the Scourge, as had been often predicted, had literally become a coffin to a large portion of her people.

* * *

(Continued from page 298) and ships and sonar equipment were to be used only on an opportunity basis.

One afternoon in July 1975, as I was treating a patient in St. Catharines, a call came through from Peter Sly. His tone was casual, but I sensed the excitement behind it.

"Rich Thomas aboard R. V. *Limnos* has been investigating that sonar target you recorded in 1973. The ship has come in and is tied up below Lock No. 1 on the Welland Canal. We've got something that might interest you. Can you get away?"

The CCIW ship had turned out to a man for my arrival. As I reached the gangway, I found Rich and the entire crew lined up at the rail, grinning like an assortment of Cheshire cats. Without a word they ushered me up to the wheelhouse and led me to the chart table, where a number of sonar recordings had been laid out.

And there were the ships. Not miniature impressions or indistinct shadows but beautifully defined silhouettes of 19th-century schooners (pages 290-91).

"Well, Dan," Rich asked, still grinning, "was it worth the ten-mile trip?"

It was worth not only that but also all four years of effort and frustration, plus the even bigger job I knew was to come. We still had no proof that the ships were actually *Hamilton* and *Scourge*, and if they were, they

belonged not to us but to the United States Navy. For all their magic, sonar recordings could never identify the ships; sooner or later we would have to inspect them at close range through the use of divers or a submersible, either manned or remotely controlled.

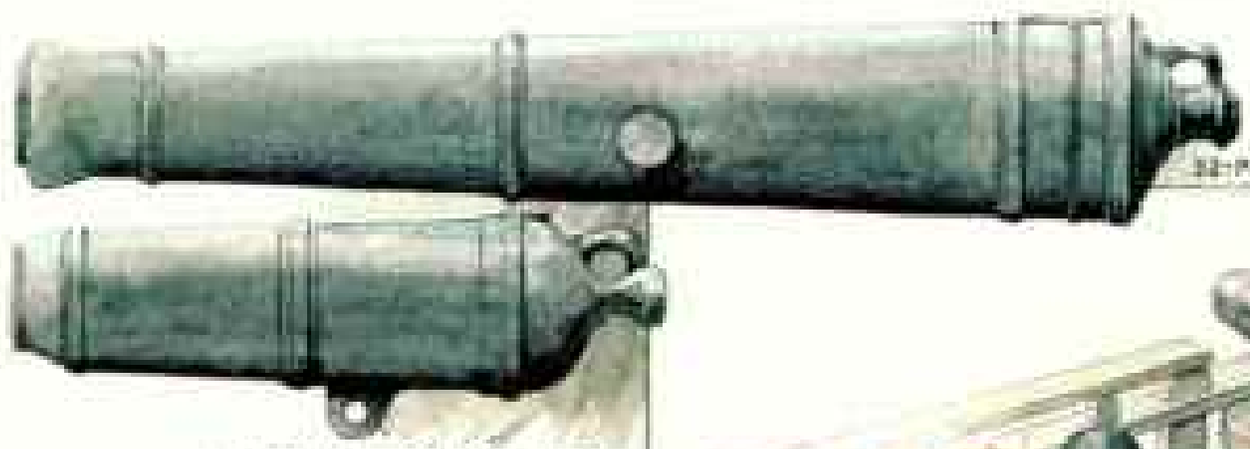
An opportunity came the following November, when CCIW ran tests on an experimental diving device with the inevitable acronym TROV—for tethered remotely operated vehicle—built by International Submarine Engineering of British Columbia. TROV carried a television camera and managed to train it at close range on what later proved to be the stern area of *Hamilton*.

As we sat transfixed before the screen,

Hamilton

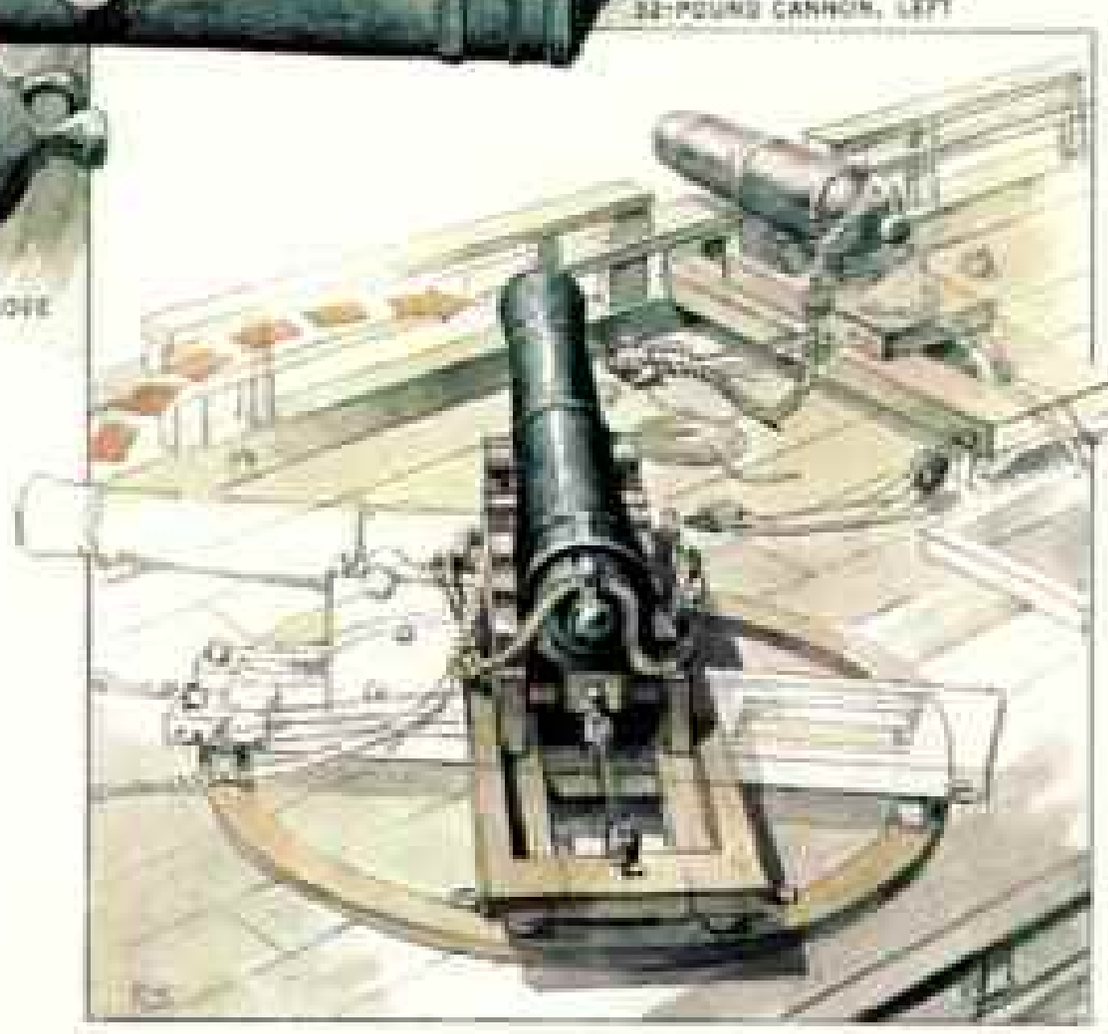
*INCHING ALONG Hamilton's starboard rail, the remotely piloted vehicle's claw (**left**) is positioned above two deadeyes and points toward one of the vessel's eight 18-pound carronades. The ship's 32-pound cannon rests with its muzzle down on the deck (**below**).*

Fate that day denied Hamilton and Scourge the opportunity for ship-to-ship combat, but both vessels had earlier participated in successful assaults on York—now Toronto—and Fort George.



32-POUND CANNON, LEFT

18-POUND CARRONADE, ABOVE



For close-range punch, *Hamilton used a short-barreled, low-muzzle-velocity carronade (**above**). A conventional cannon was mounted on a pivot amidships (**right**).*

Hanging by a fluke, *Hamilton's port anchor remains in its stowed position* ***(left)****. The line that secured the anchor to a bitt next to the fluke has rotted away. Prior to stowage, the anchor was raised clear of the hull by passing its line through a cathead* ***(below)*** *that protrudes from the ship's bow.*

TROV panned slowly across spars, a rudder, the ship's gig, some remains of human skeletons, and—most revealing of all—an open box of cannonballs.

When the latter appeared on the screen I couldn't help applauding, and Jack Roe, TROV's operator, looked puzzled. "What's so special about cannonballs?" he asked.

"A cannonball or a cannon—it makes no difference," I answered. "Either one is proof that we're looking at *Hamilton* or *Scourge*. After the war, in 1817, Britain and the United States signed the Rush-Bagot Agreement. In effect it disarmed shipping on all the Great Lakes with only minor exceptions. So any sunken vessel that's carrying guns or cannonballs had to have gone down no later than the War of 1812. What you're looking at is an armed schooner, and only two of those were lost in this area during the war, *Hamilton* and *Scourge*. This has to be one or the other."

The remarkable thing about the ship was its excellent state of preservation. Through TROV's video system, it was obvious that the hull, fittings, and various items of equipment were little damaged by immersion in cold fresh water for 160 years. As we later confirmed, the ship lay just as she had in the moments before her death—cannon at the ready, cannonballs stacked nearby, cutlasses and boarding axes stowed in easy reach.

Historically the ship was an archaeologist's dream. During the pioneer era in which she had served, little was recorded, including ship design and construction methods. Shipwrights and sailmakers trusted more to instinct than to the drafting board, and little of their knowledge ever found its way onto paper.

As a result, *Hamilton* and *Scourge* are three-dimensional blueprints of their time, containing a wealth of historical detail on a period as important as it was poorly documented. Peering through TROV's constantly shifting camera lens was like looking through the window of a beautifully furnished naval museum devoted to the 19th century.

FOR THE MOMENT we had no right to enter that museum, for the United States Navy still held title to *Hamilton* and *Scourge*. In order for us to explore or salvage the ships, title had to be transferred to a responsible Canadian institution.

Grim evidence of the doomed men's fate, a sailor's bones rest near Scourge ***(below)****. It is likely that many more remains lie entombed in the hulls. When the ships are raised, a project that may take years, the dead will be returned to the U. S. Navy for burial with military honors. The city of Hamilton, Ontario, has set aside a site on the lakeshore where the ships can be displayed indefinitely.*

Meanwhile, to safeguard the ships from adventurers or thieves, project supervisors keep the wrecks under constant surveillance by electronic and other means.

Negotiations began, and with help from the National Geographic Society they were finally completed in 1979. Thanks largely to John A. MacDonald, then mayor of Hamilton, Ontario, and William M. McCulloch, an alderman with a keen sense of Canadian history, title to *Hamilton* and *Scourge* was eventually transferred to the city of Hamilton, which lies near the wreck site and which had shown great interest in the ships. The city later provided generous funds for further exploration and video documentation of the ships. The city also designated an attractive lakefront site where *Hamilton* and *Scourge* will one day be displayed if they are brought to the surface.

Meanwhile, through the help of Doug Tushingham, the Royal Ontario Museum and agencies of the Canadian federal and provincial governments supplied funds to assist CCIW in the sonar mapping of the entire wreck site. Our experience with TROV had shown the water on the lake bottom to be so clouded with sediment that photographic or video surveys had to be limited to close range. That fact almost cost Albert Falco and me a unique view of *Hamilton*.

Falco is the pilot of *Soucoupe*, the familiar diving saucer featured in the films of French underwater explorer Jacques Cousteau. In the summer of 1980, while we were still mapping the site by sonar, Captain Cousteau began work on a film that included the Great Lakes. He had heard of *Hamilton* and *Scourge* and asked to see sonar images of the ships. When I showed him several he exclaimed, "We must have this!"

AS A CONSEQUENCE one September afternoon I found myself stretched beside Falco within the narrow confines of the diving saucer, searching for a glimpse of *Hamilton*. At last by luck we made contact, and Falco guided the saucer along the ship's hull from the stern toward the bow.

Peering through the view port, Falco suddenly found himself face to face with a beautiful woman—the figurehead of *Hamilton*. The ship was originally christened *Diana*, and I saw a likeness of the goddess in the carved figure beneath her bowsprit. Falco was instantly smitten.

"Ah, la, la, magnifique! Charmante! Fantastique!" The Gallic compliments simply bubbled out of him. "In 30 years of diving,"

he told me later, "I have often dreamed of seeing something so beautiful. Thank you, *mon ami*, for realizing my dream."

THOUGH I NEVER VISITED the wreck site after my dive with Falco, I have since inspected both *Hamilton* and *Scourge* as closely as if I had walked their decks. Thanks to the National Geographic Society and to a 29-year-old genius in electronics design named Chris Nicholson, I sat last spring before a video monitoring screen while the extraordinary pictures accompanying this article were taken.

It was Chris's remarkable underwater probe—made by Benthos, Inc., and dubbed RPV, for remotely piloted vehicle—that pierced the cloud of underwater sediment and focused a National Geographic camera on the heroic figure of Lord Nelson.

From there RPV and the camera proceeded to survey *Hamilton* and *Scourge* from bow to stern. We now have perhaps the most detailed portraits ever made of ships lying as deep as 300 feet. The citizens of Hamilton can take particular pride in those portraits, for their city and the government of Ontario contributed most of the operating funds for the project.

What the portraits tell us is that the hulls of *Hamilton* and *Scourge* are completely intact, with no visible damage to keels, frames, or planking. *Hamilton* is slightly longer than *Scourge*—75 feet as compared to 60. The rigging of both ships has been swept away and the spars lie scattered on deck. But three of the four masts remain upright, as do most of the topmasts. It is almost as though with a little refitting the two ships could sail again.

In any case the story of *Hamilton* and *Scourge* is far from complete. There is a great deal more to come, and as my old friend Ned Myers put it: "The past, I have related as faithfully as I have been able so to do. The future is with God. . . ." ★ ★ ★

Upswept hair *and a rose below the bodice of Hamilton's figurehead recall the ship's former duties as an American schooner named Diana. The vessel was purchased by the Navy in the fall of 1812 and refitted for combat.*

Almost the same as being there

*MAGNIFICENT underwater machine, a remotely piloted vehicle or RPV (**left**) put mobility, versatility, and virtually unlimited endurance at the electronic beck and call of its operators aboard ship. The RPV carried two black-and-white television cameras and one still camera with a 16-millimeter lens. Altogether, 1,500 still pictures and 23 hours of videotape were made during the six days that the vehicle explored the Hamilton and Scourge.*

*An umbilical cord (1) carries electrical power for the RPV, relays instructions from above, and transmits video images to the surface. Four quartz iodide lights (**2**) provide general illumination for the television cameras, while a more powerful light (**3**) serves as a spotlight for the vehicle's "eyes," a television camera used by the controller or pilot to position the RPV.*

*An electronic strobe winks white (**4**) to provide light for the 400-exposure still camera (**5**) that took the pictures for this article. Another television camera (**6**) just above the still camera functioned as the underwater eyes of the photographer.*

*A shaft of bubbles (**7**) issues from the vertical-thruster engine, which combines with four horizontal thrusters—only one is visible (**8**)—to give the vehicle omnidirectional mobility and the capacity to make very small corrections. A mechanical arm with a claw (**9**) enables the vehicle to perform manual tasks or to clear itself of a fouled umbilical cord.*

*Additional electronic and camera gear were mounted on the RPV's launcher, a wire cage (**above right**) in which the vehicle was stowed during raising and lowering. National Geographic Special Project Engineer Alvin M. Chandler (**left**) attaches a bracket to the launcher's rim for mounting another still camera. A sector-scanning sonar seen above Chandler's wrists enabled operators to surmount the barrier of ten-foot visibility by providing an acoustical picture of a wreck from as far away as 300 feet.*

Another black-and-white television camera on the launcher's rim, here wrapped with tape, functioned at extremely low light levels to keep track of the vehicle once it had departed the launcher.

RPV designer Chris Nicholson piloted the

ALVIN M. CHANDLER, NATIONAL GEOGRAPHIC STAFF

*vehicle, built by Benthos, Inc., of Falmouth, Massachusetts. From a shack on deck, National Geographic Photographer Emory Kristof (**above,** with blue jacket) and project director Daniel A. Nelson kept a close watch on television monitors as the RPV cruised around one of the wrecks.*

"Chris is in another shack on deck," explains Kristof. "We're in radio contact at all times. Here the vehicle is moving in close, and I am giving Chris minute corrections—up a little, down a little, pivot just a bit. We can make adjustments to a half inch. When the picture on the monitor looks right, I just press the shutter release button." At times the vehicle hovered just inches off the bottom without churning up silt as a human diver would have done.

Deepwater photography and archaeology by remote control offer scientists new access to the depths at levels of cost, efficiency, and safety that promise to make the human diver and even the manned submersible obsolete, many experts believe.

"There's only one real area of exploration left," says Kristof, "and that's the world's great deeps." Designer Nicholson, a self-taught engineer who built his first RPV for a high-school science fair, agrees. "Though this vehicle is limited to a depth of 2,000 feet," he says, "the technology is available to go to any depth. And 20 years from now with direct control of the vehicle through the human brain and stereovision through advanced color television, we can achieve telepresence, the same thing as being there." □

They'd Rather Be

By ETHEL A. STARBIRD NATIONAL GEOGRAPHIC SENIOR WRITER

THE Rittenhouse Square regular tossed the last of his soft pretzel to the park's plethora of pigeons. His duties to birddom done, he considered his benchmate—me. In a city that shuns instant intimacy, it seemed inappropriate to introduce myself. Given my companion's avian interest and my last name, he wouldn't have believed me anyway.

Taking an informal approach, I asked a few questions, mostly about what lay beyond the park's perimeters. He replied readily enough: I was obviously an outsider who needed proper guidance.

His final words on the subject of our surroundings: "You know what's the trouble with Philadelphia? It's one of the best kept secrets in the world. You know what else? I think most people here prefer it that way."

After two months in residence, I'm inclined to agree that it is and they do. (Also, that the "best kept secret" business is practically a local cliché.)

Philadelphians admit they're slightly provincial. A little defensive, perhaps, about the failure of strangers to appreciate their city's attractions. But seriously change this place? Never! Hadn't a recent survey rated it one of the most livable cities in the land?

It actually always has been. In formulating his grand design, founder William Penn sited his "greene Country Towne" on a wasp waist of land between the Delaware and Schuylkill Rivers that drain the eastern edge of present-day Pennsylvania.

By the time he put into port in 1682, his advance men were already putting his plans

Formality parades *before an informal trio of spectators in Philadelphia's Rittenhouse Square. Propriety and unpretentiousness meld in a city where the past is an honorable estate.*

in PHILADELPHIA

Photographs by TED SPIEGEL BLACK STAR

The crisp geometry *of South Philadelphia emerged in the 19th century with the construction of row houses for immigrants. Today's city, the nation's fourth largest, holds 1.67 million, but population has declined 14 percent in the past*

12 years with the shift to suburbia. Loss of some 150,000 jobs in the 1970s, mostly in manufacturing, further hamstrings the economy, though the city's Philadelphia Industrial Development Corporation tries for a turnaround.


SHOPLIFTING
CAN GET YOU
KILLED

to work, laying out widely spaced streets, large building lots, ample set-asides for parks and plantings. Among original features surviving to this day: the grid pattern of major thoroughfares and four pedestrian squares that anchor the old city like weights on a picnic cloth.

The commitment of Penn and his pioneering Quakers to religious tolerance was soon filling the settlement with artisans from abroad, thus launching Philadelphia's long career as a manufacturing center. As industrialization gained momentum, the city added other trump cards to its commercial deck: railroads, coal, iron and steel, shipyards, textile and apparel making, and food processing. (See **Atlantic Gateways**, a historical map supplement with this issue.)

Most of these are gone now, victims of relocation, changing tastes, and obsolescence. In ten years the manufacturing work force has shrunk from 250,000 to 130,000, introducing many of the problems associated with diminishing opportunity and income. Today the financial health of the city's 1.67 million residents depends largely on government, education, medicine, and those mainstays of Philadelphia fortunes: insurance, banking, money management, and law.

Penn's long absenteeism and the changing character of incoming settlers led to the termination in 1776 of his family's power and proprietorship. But the mark it made had far more staying power.

The British-born Friends movement was less than 35 years old when Penn arrived in the new colony. Earlier practitioners, attempting to pioneer the faith in Puritan New England, had met with abuse, even execution. But here, the Quakers were on friendly soil, free to advocate—well before their time—such anti-establishment ideas as the abolition of war and slavery, and equal rights for women.

Quaker domination of the commonwealth began to wane around 1754, when members split over preparation for and participation in the French and Indian War. Opposition to armed conflict is still a major Quaker cause; in 1947 the American Friends Service Committee, headquartered in Philadelphia, shared with London's Friends Service Council the coveted Nobel Peace Prize. The committee and Friends in general continue the deep commitment to nonviolence, more recently by taking a leadership role in the nuclear-freeze movement.

ALTHOUGH QUAKER influence diminished steadily after Penn's departure, a Quaker bough on the family tree is still a point of pride in these parts, even among those whose forebears left the fold six or seven generations ago.

Certain Quaker-inspired traditions survive, and no other U. S. city I know can upstage Philadelphia in the richness of its heritage, the solidity of its institutions, the stratification of its society.

And perhaps no other can induce more nostalgia without even trying. Here, in the heart of the nation's fourth largest city, I had heard in a single day train whistles blow, trolley bells clang, and the hooves of mounted police horses go clop in the night. These sounds of an earlier age are alive and well in Philadelphia, and still gainfully employed.

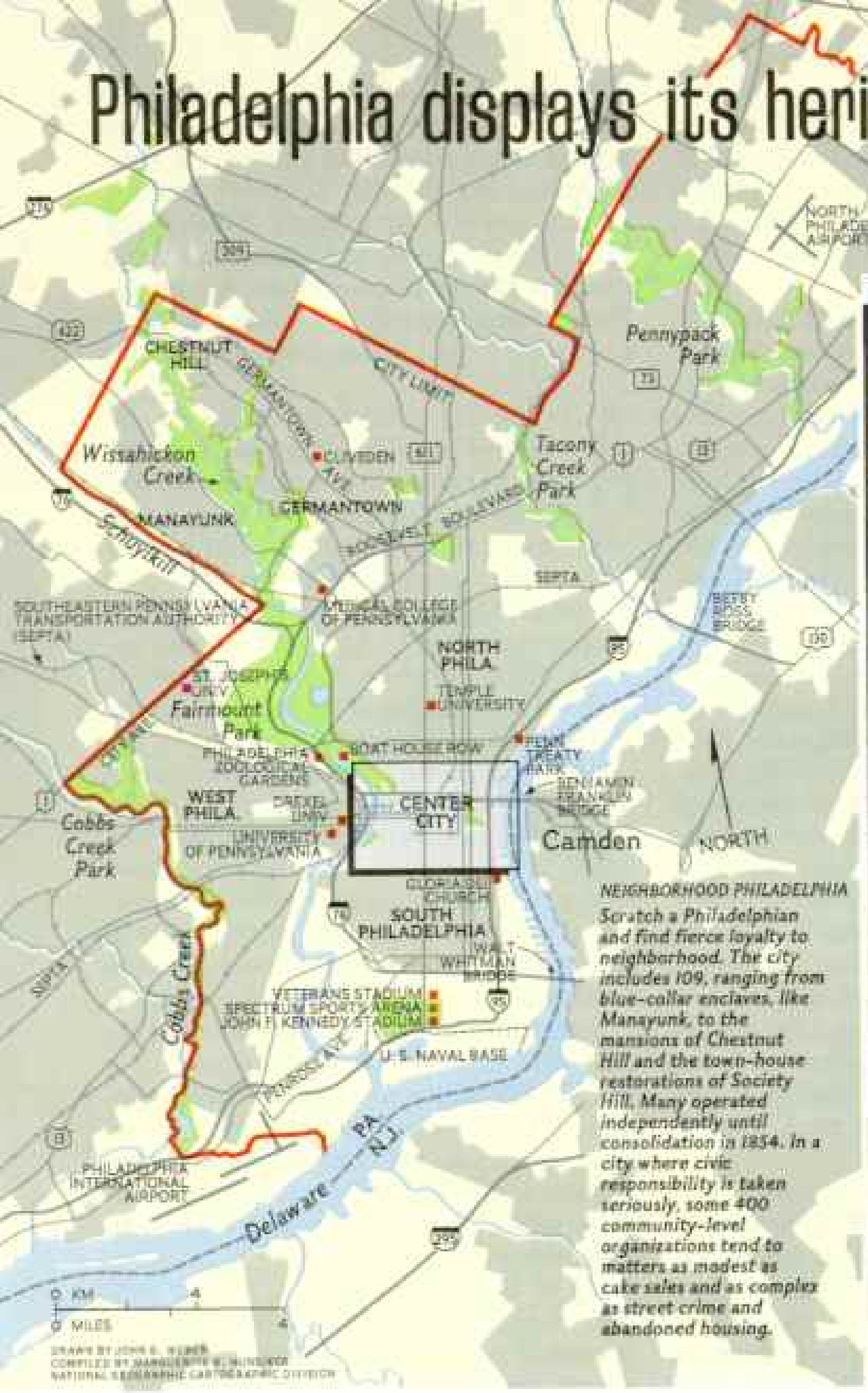
Some say old ways linger in Pennsylvania's first and foremost city because of a built-in resistance to change. Others disagree: "We're just not trendy types. We've seen no reason, for example, to abandon streetcars as a means of public transport. Some who have are now wondering how to switch back."

Up in North Philadelphia, a bony cart horse named Bob never realized he was hopelessly out of date hauling a produce wagon. We met on the steps of Philadelphia Soft Pretzels, Inc., where he regularly paused in passing for a handout from owners Jeanne and Daniel Sidorick.

"He won't budge till he's downed at least two dozen of our soft pretzels. Plain, though, not slathered with mustard the way most people like them."

Say cheese *at Claudio's in South Philadelphia's Italian Market, and confront an array of 375 varieties, including the melon-size provolones suspended above a customer. Passionately ethnic, the city includes enclaves of blacks, Jews, Poles, Irish, and Asians, but Italians constitute South Philly's largest settlement group.*

Philadelphia displays its heritage



NEIGHBORHOOD PHILADELPHIA

Scratch a Philadelphian and find fierce loyalty to neighborhood. The city includes 109, ranging from blue-collar enclaves, like Manayunk, to the mansions of Chestnut Hill and the town-house restorations of Society Hill. Many operated independently until consolidation in 1854. In a city where civic responsibility is taken seriously, some 400 community-level organizations tend to matters as modest as cake sales and as complex as street crime and abandoned housing.

Philadelphians have other homemade tastes—like snapper soup and scrapple—but none more popular than the soft pretzel. The Sidoricks' quality bakery cranks out about 40,000 each morning to help satisfy the city's craving—close to a quarter million a day. "It's an early-bird business. Our ovens go on just after midnight so street vendors will have their supplies before traffic builds up downtown. No way to accumulate an inventory; these pretzels can harden and become jawbreakers overnight."

While Bob whinnied for service outside, I was inside trying to learn the twist—how to convert an 18-inch rope of dough into proper shape. In the process I was making a mess of the conveyor belt, where four experts were each turning out 25 perfect specimens a minute. They were too polite to say I showed absolutely no bent for pretzel bending.

As with the trolley and old Bob, going slow in Philadelphia has proved the saving grace for hundreds of vintage buildings that reflect its era of elegance and its long reign.

FOUNDED ON A DREAM of religious tolerance, Philadelphia was established by William Penn, an English Quaker, who arrived at the site of his "holy experiment" in 1682. Penn's design remains imprinted on the old city: a grid with four spacious green squares. By the start of the Revolutionary War, it was the world's largest English-speaking city outside Britain. The U. S. capital from 1790 to 1800, Philadelphia boasts many of the nation's firsts, including its first bank, hospital, and zoo.

from the late 1600s to the early 1800s, as queen of the English-speaking New World. By 1774 it was one of the largest English-speaking cities in the world.

Crown jewels from those days of glory: Independence Hall and its satellite shrines, where men of goodwill and uncanny wisdom forged 13 loosely linked Colonies into these United States and in so doing created the most enduring democracy on earth.

Here our Founding Fathers hammered out our three most important documents: the Declaration of Independence, the Articles of Confederation, and the Constitution. Here, too, some of the most revered names in our history had their finest hours.

As the country's capital from 1790 to 1800, the city flourished like no other in the land. George Washington served six years of his Presidency here; his successor, John Adams, spent three. For men of influence and enterprise the mainstream of America was at its full in 18th-century Philadelphia.

That many of the landmarks they knew

City of sisterly love too: *"People who have a problem have a solution somewhere," says Sister Falaka Fattah* ***(left)****, shown meeting with residents of her House of Umoja, "unity" in Swahili. Problem: gang wars, which from 1964 to 1974 claimed more than 300 young lives. Solution: a youth shelter based on the extended-family concept. Since 1968 she and her husband, David, have helped restructure the lives of more than 500 youths.*

Sharing his own vision of love, a sidewalk evangelist ***(above)*** *preaches in a section of depressed North Philadelphia. Despite caring touches, the grim reality of a 57 percent unemployment rate among young, black males remains.*

still stand owes more to happenstance than good intentions. For as Philadelphia grew, so did its boundaries: There was no good reason to tear things down. Sprawled over 130 square miles, its generous dimensions help preserve its lived-in antiquity.

While some of the handsomest facades date from before the American Revolution, it was the industrial revolution a century later that made much of the city what it is today—a vast brickyard of modest row houses interspersed with abandoned mills and factories that once supported a huge army of wage earners. In those times workers tended to congregate near their jobs and each other. Thus evolved a lasting local phenomenon: the neighborhood.

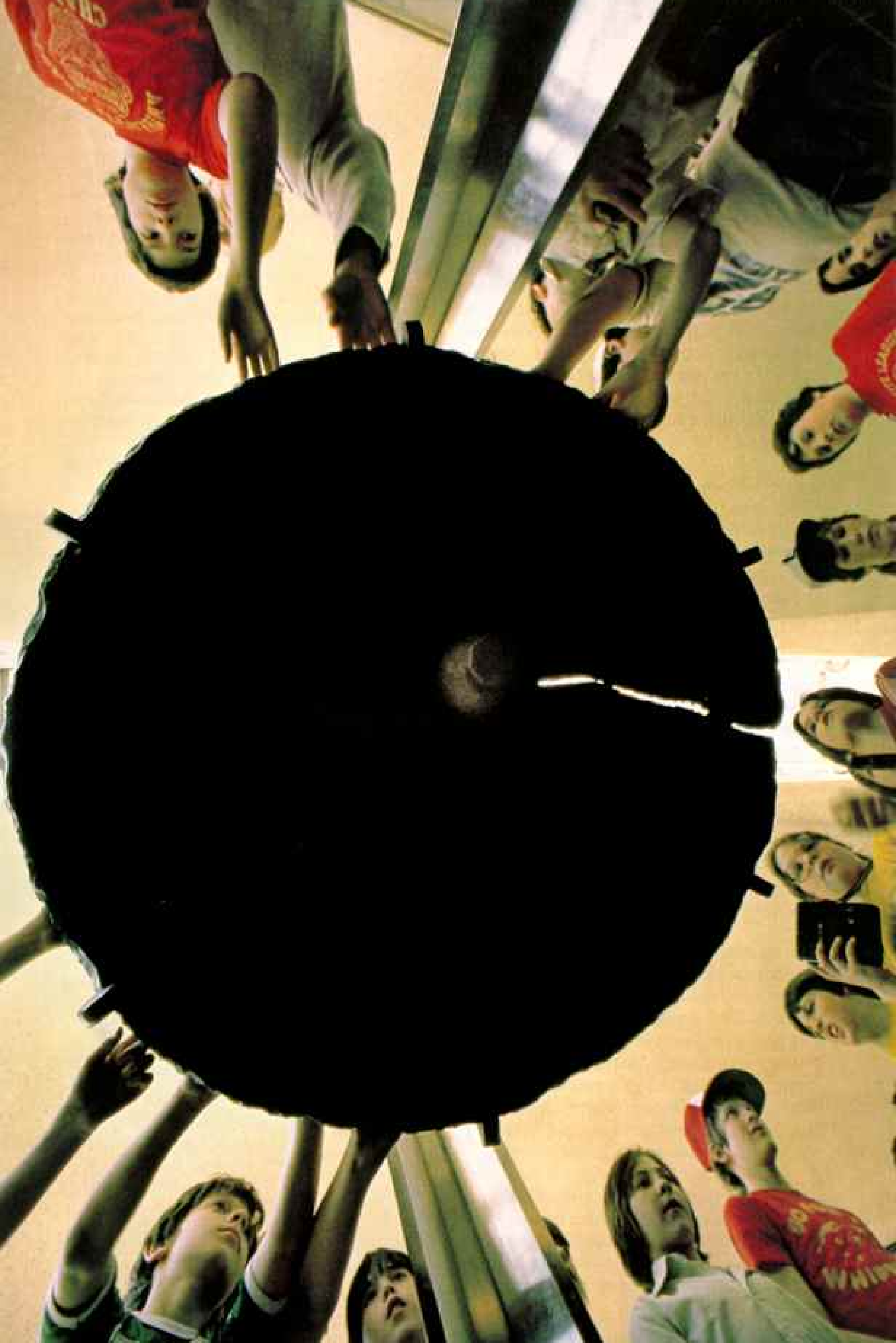
Ask a native where he's from and chances are he won't say Philadelphia. Instead, it's Kingsessing, Northern Liberties, Strawberry Mansion, Brewerytown, or any of the 109 distinct communities, many with strong ethnic ties, that segment his city.

Many were independent villages, happily minding their own business, until Philadelphia consolidated the lot in 1854. Bringing them into the big-city fold did not necessarily bring them into the big-city mold. To this day many consider metropolitan matters minor to those down the block.

ONCE CALLED the Manchester of America, Manayunk is one of these. Founded as a textile town, it still looks the part with its canal-side setting, long-silent mills of solid stone, and steep-pitched terrain—an unusual feature in flat-faced Philadelphia.

A few newcomers—mainly artists and designers—have begun filling up Manayunk's empty lofts and storefronts. But the population remains as ethnic as it has always been: Italian, Irish, Polish, German, and combinations thereof. For Sale signs are scarce, making serious change unlikely, and the topography prevents expansion. Which suits Manayunkers just fine.

Affable John J. Willard arrived thirty years ago to fill his current post: director of the North Light Boys Club. But he's become an able ombudsman for the entire community. "I intended to stay maybe a coupla years to get my feet wet in this kind of job. Now they're so well watered, I've put down roots.



"This is a village, really: 15,000 people, a church on every corner, a bar in every block. Gives you some idea of priorities around here. Center city's only eight miles away; it might as well be as many light-years."

One old-timer made the trip downtown "about 12 years back. Don't see no reason to do it again."

In its own way Manayunk is as exclusive as upper-crust Chestnut Hill north of Wissahickon Creek. It certainly has greater stability than many other blue-collar neighborhoods now suffering severely from an exodus of industry and a rising ratio of low- and no-income residents. Familiar problems along the eastern seaboard, perhaps, but in Philadelphia they seem to show more.

Empty factories hump above the horizon like beached whales, too outmoded to attract new tenants. Only cats and an occasional squatter now shelter in blocks of deserted and decaying housing. The city has an estimated 20,000 to 30,000 abandoned properties; as many more that should be.

James Bodine spearheads the private sector's Greater Philadelphia Partnership in its push to put old homes back in circulation with new owner-occupants of limited means. "They'll receive one of these places practically free, with grants and loans for fix-up. We hope to rehab a thousand homes in the next three years, and five hundred a year after that. Doesn't sound like much, considering our backlog, but it looks like a good start to us."

Believers in the traditional—buildings as well as behavior—many Philadelphians feel as Bodine does: Rehabilitation is better than knockdown renewal to reduce the blight. The most publicized success story so far: Society Hill in the old quarter just south of Independence Hall. Once a shabby pocket of poverty, its restored properties now find a ready market at top prices.

In a rather convoluted way, the city's politics—not always its proudest heritage—launched the move to dress up downtown. A one-party Republican stronghold from the Civil War to the early 1950s, Philadelphia was controlled for most of that period by perhaps the most corrupt municipal government in the country. Yet few questioned its power and privileges; times were good, so why worry about what went on in City Hall?

Disenchantment developed with the Depression, but no major counteroffensive was mounted until the late 1930s, when a coalition of 80 reform-minded young professionals decided to look into local problems and come up with some practical solutions.

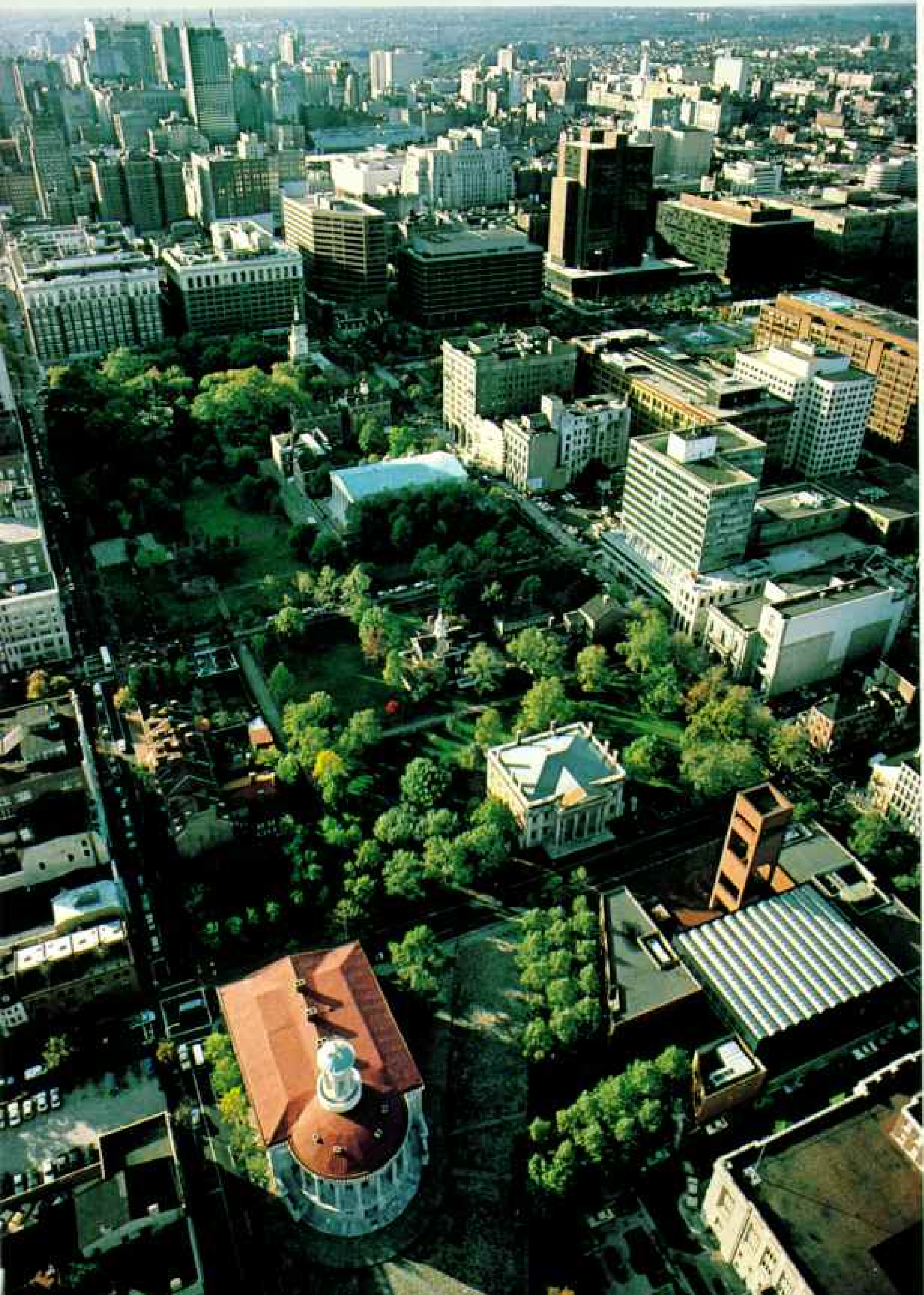
WHEN THE OLD ORDER finally collapsed in 1952, Mayor-elect Joseph S. Clark tapped this knowledgeable nucleus for key jobs in his clean-up administration. So, too, did his like-minded successor Richardson Dilworth, who further demonstrated his faith in the ailing center city by building a new home right in the middle of it.

Among other positive projects the new breed of public servants set about reversing the westward migration of commerce and reviving core communities. None did more to stimulate today's new look than Edmund N. Bacon, native-born city planner of international renown.

"My first big job here was Penn Center, a commercial complex designed to keep business offices from straying away from midtown," Bacon told me. "Next came the sprucing up of the historic section. Then we created a merchandising magnet in a rundown area—our showcase shopping mall called the Gallery. Add these facilities to existing cultural attractions, a vast inventory of reworkable residential property, and we'd found a formula we felt couldn't fail.

"Cities like Chicago have tried to revitalize piecemeal, with scattered projects. Ours is a carefully conceived, cohesive, and functional plan where everything fits together. We want a city not only *of* but also *for* people—just as Penn did. In fact we're getting

The irresistible touch of history *lures hands to the Liberty Bell, cast in London in 1752, recast in Philadelphia to repair a crack, and hung in the State House—now Independence Hall—to commemorate the 1701 Pennsylvania Charter of Privileges. It was moved to a nearby pavilion in 1976. Tradition holds that the bell cracked again tolling Chief Justice John Marshall's funeral in 1835.*



back to his original concept. And it's working just fine."

Now 30 years old, the Democratic regime rightfully claims credit for getting Philadelphia moving again. But it has had some uncomfortable moments.

Crusading against crime, hard-line police chief Frank Rizzo took over the mayor's office in 1972. His eight-year tenure (the limit for continuous service) was noted for tough and sometimes questionable law-enforcement tactics, an increased public debt, a highly critical national press. Whether his record made him more friends than enemies may be decided at the polls this year, since he is again running for mayor.

Meanwhile, the current itch to spruce up run-down real estate is spilling over into other near-in neighborhoods. Sometimes with startling results.

Close to Society Hill, Philadelphia's once thriving port has fallen on hard times. Among the reasons for its decline: the city's reduced industrial output, competition from overland carriers for intracoastal cargoes, an upriver location that adds mileage to overseas trade routes.

Although the port still handles significant tonnage, primarily in petroleum imports and coal exports, there's little likelihood that heavy ship traffic will ever again crowd its 25-mile waterfront. But redevelopers may soon start converting its sagging finger piers and unused wharves to condominium and commercial space.

KENNETH PARKER set his sights a good bit higher—on a monstrous grain elevator, long empty and unloved, that towers over the upwardly fashionable Fairmount section.

Applying the flair that has earned him national fame and considerable fortune as an outstanding interior designer, Ken converted the two lower floors into spacious, light-filled offices for his firm.

Atop the remaining ten stories he concocted with great good taste and more than a little whimsy a stunning bachelor pad fit for a pasha. Outside and in, his croft aloft is bowered with fruit trees; shrubs; vegetable, flower, and strawberry beds—even a grape arbor that provided the squeezings last year for 20 pints of jelly.

"Getting all this gardening going was no easy task. At first I couldn't see any way to

Landmarks of history

DEMOCRACY'S SHRINE, Independence National Historical Park, designated by Congress in 1948, encompasses 42 acres of American history's most revered ground. On these sites our Founding Fathers worked and lived. Here great minds like Benjamin Franklin, Thomas Jefferson, and James Madison helped forge the documents of our political heritage: the Declaration of Independence, the Articles of Confederation, and the Constitution. Last year, the park attracted more than four million visitors. Buildings pictured are: Philadelphia Exchange (1); First Bank of the United States (2); Bishop White House (3); Pennsylvania Horticultural Society (4); Todd House (5); Carpenters' Hall (6); Marine Corps Memorial Museum (7); Army-Navy Museum (8); Franklin Court (9); Second Bank of the United States (10); Library Hall (11); Philosophical Hall (12); Independence Hall (13); Congress Hall (14); Old City Hall (15); Liberty Bell Pavilion (16)—not visible in photo.

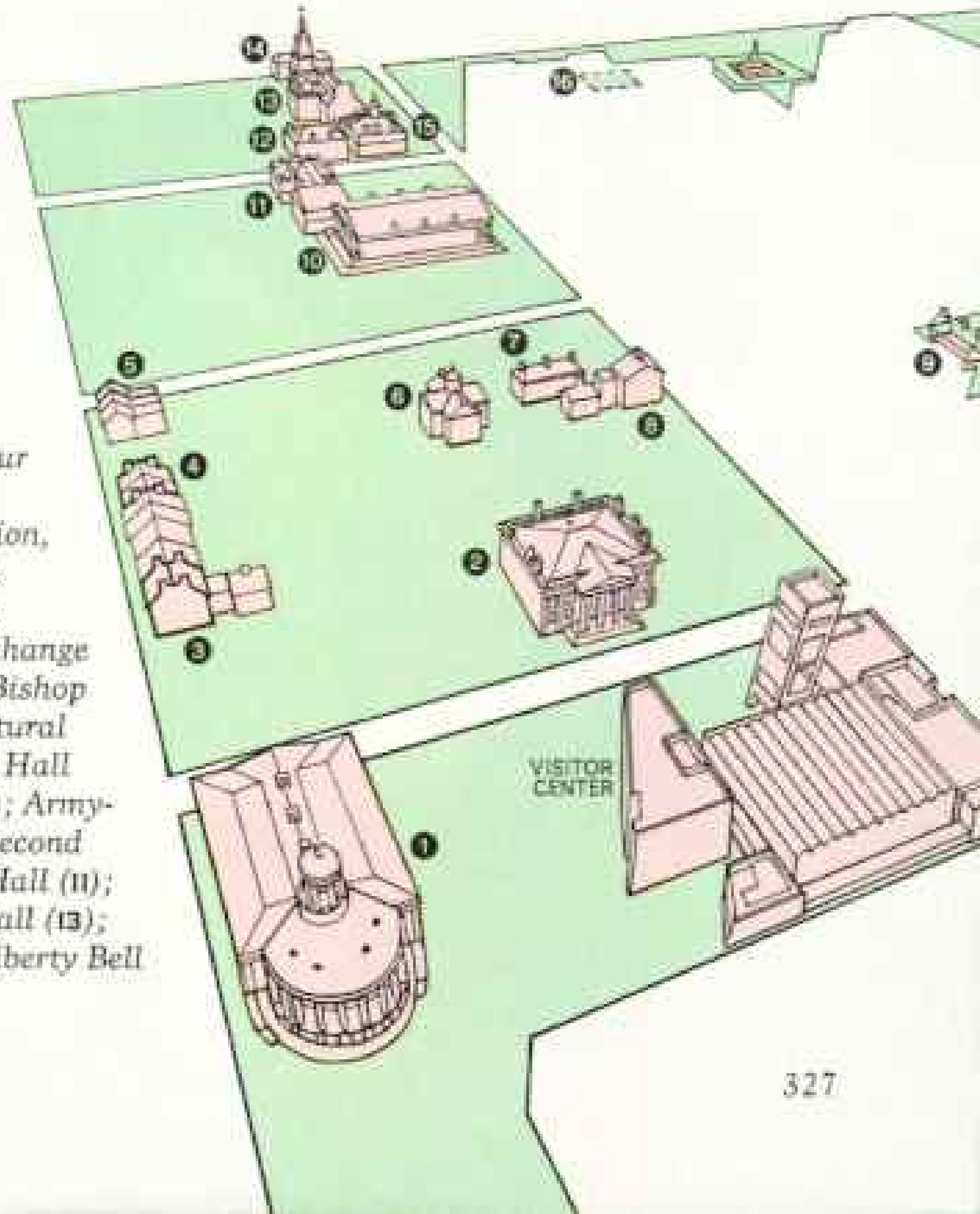


DIAGRAM BY DOROTHY MICHELE NOVICK
NATIONAL GEOGRAPHIC CARTOGRAPHIC DIVISION

haul enough dirt up here for what I wanted to do. I hired a bunch of brawny neighborhood lads to help out. Would you believe, those guys hoisted up 110 tons of soil. It took them eight weeks. They still drop in to see how the crops are coming."

Dropping in is dropping up in Parker land. Once there, where only birds and an occasional helicopter pass by, Ken can skinny-dip in his greenhouse Jacuzzi without worrying what the neighbors will say.

No perch around commands more spectacular wide-angle views of his favorite city: the broad sweep of Benjamin Franklin Parkway disappearing into the lush greenery of Fairmount Park, the nation's largest municipal playground; the Philadelphia Museum of Art squatting like some massive, misplaced Grecian temple on its personal hilltop; the organ-pipe silhouette of center city; scullers on the serpentine Schuylkill. And, everywhere, the flat roofs of row houses, emblematic of Philadelphia life.

Ken never wearies of his private panorama. "That's a vital place down there, though it doesn't always come across that way. But we're beginning to lose our 'loser' image. Talented youngsters aren't leaving like they used to. I think that's helping."

So is the growing popularity of intown living. The new urbanite who wants somewhere to go after the sun goes down poses no problems for Steven Poses.

"Came here to college from Yonkers, New York, back in 1964. Philadelphia had a few terrific traditional restaurants then, but the industry had been at a standstill for years. I decided there might be a lot of people like me looking for something new. I had no experience or money. But I liked to cook and eat. So I went into the food business." Steve has opened five successful restaurants in as many years.

The city has sprouted at least 475 new eating places in the past decade. Once a silent, expense-account desert after sunset, Philadelphia is beginning to bustle long after major cultural attractions like its grand old Academy of Music empty for the evening.

The staidness implanted here in the age of Penn has not completely disappeared—nor, probably, will it ever. But the age of Ben began smoothing off some of its keener edges.

Well before the end of the Penn period, a Boston-born printer named Benjamin Franklin wandered into town; he was soon charming—and sometimes alarming—Philadelphians with his wit and pungent prose. During some 67 years of in-and-out residency, the many-faceted Franklin started more balls rolling for the lasting enrichment of his adopted city than anyone before or since.*

Among Franklin-inspired institutions still going strong: the Library Company

*Alice J. Hall described the life of this versatile elder statesman of the American Revolution in the July 1975 NATIONAL GEOGRAPHIC.

***Philadelphia sounds** flow from practice at the Curtis Institute of Music, where violin professor Felix Galimir urges students through a Bach quintet **(left)**. Curtis, tuition free for its select body of 166 students, has graduated such musicians as Leonard Bernstein, Gian Carlo Menotti, and Gary Graffman.*

*With professional polish, music director Riccardo Muti **(above)** rehearses the Philadelphia Orchestra. In 1980 Muti succeeded Eugene Ormandy, who held the post for 44 years.*

(1731) with the Colonies' first circulating book collection; the American Philosophical Society (1743), the country's oldest think tank; Pennsylvania Hospital (1751), its first medical center; the Philadelphia Contributionship (1752), its first successful fire insurance company (where visitors still sign in with a quill pen).

("Firstmanship" is something of a fetish in Philadelphia. Taxi drivers to tycoons tout the city's primacy from A-art schools to Z-zoos. Mentioning the lack of competition when most were established seldom slows the recitation.)

DEEPLY INVOLVED in publishing, politics, and diplomacy, Franklin yet found time to invent bifocals, lightning rods, and the stove that bears his name. He may also have invented the University of Pennsylvania by opening the Academy of Philadelphia (1751), from which it is said to descend.

Since then, higher education has expanded into a major force in the city's cultural and economic life. Some 150,000 full- and part-time students attend a score of specialized schools as well as colleges and fine universities such as Pennsylvania, Temple, Drexel, and St. Joseph's.

Penn's medical school, one of the nation's most prestigious, pioneered the city's preeminence in the healing arts by having on its faculty the fathers of American psychiatry, anatomy, and surgery: Drs. Benjamin Rush, Caspar Wistar, and one prophetically named Philip Syng Physick. Today a significant portion of U. S.-educated doctors get some or all of their training in Philadelphia.

Perhaps as a logical spin-off, three of the nation's largest pharmaceutical firms—Smith Kline & French; Merck Sharp & Dohme; and McNeil—grew out of local apothecary shops.

For all its excellence in education, Philadelphia has gotten poor grades lately with its public-school system, on strike for 72 days in slightly more than a year. When classes resumed in 1981 after a 50-day shutdown, 10,000 of the system's 214,000 students had vanished—shuttled off by fed-up parents to private schools, bootlegged into suburban ones, or enrolled in other states.

Those unable to afford an alternative simply dropped out, increasing unemployment, especially among young blacks where it has already reached a staggering 57 percent. Sister Falaka Fattah knows the dangers of idleness. She lives in a black ghetto of West Philadelphia where about the only way a youngster can make a name for himself is to spray-paint it on a wall.

Affecting a name and dress that proclaim her African ancestry, Sister Fattah speaks in quiet tones of the House of Umoja—Swahili for "unity"—which she and her husband, David, started 14 years ago to help salvage some of the local young toughs.

"Gang warfare was at its peak; 46 kids were killed by their peers in a single year. When we discovered one of our six sons was involved with a gang, we knew we'd better get involved too. After a truce was negotiated among the warring groups, we asked my son's whole gang to move in with us and we'd try to work out a better way for everyone. Fifteen of them accepted."

SINCE 1968 the Fattahs have cared for more than 500 troubled teenagers, restructuring attitudes and aptitudes along constructive rather than destructive channels.

"We only take 15 at a time, but even that's a pretty big family. The first few years were lean ones; we never had enough of anything but love. After that, what these kids really needed was jobs."

And the Fattahs are determined they shall have them. With recent help from outside funding, they have purchased 23 dilapidated row houses along their street that "family" members and alumni are turning into small businesses the House of Umoja will operate. A training school for security guards as well as a construction and hauling

***A high note** of the social season, the Academy Anniversary Concert and Ball sounds off with a performance at the Academy of Music (**above**) and whirls on to a white-tie gala. Formal headgear awaits owners in the cloakroom (**right**). The affair benefits the 19th-century academy, rivaled by few halls for acoustic perfection.*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Philadelphians by choice

*"PHILADELPHIA WOULD DO," jibed the comic genius W.C. Fields of his hometown, when a lynch mob in "My Little Chickadee" didn't accept his last request to see Paris. His grandson W.C. Fields III (**right**) also has called Philadelphia home since 1970.*

*Shooting star in the 76ers galaxy of basketball luminaries, Julius Erving (**left**), known as "Dr. J," ices down his knees after practice to prevent swelling. "We're a winning town," he says. In the championship seasons of 1980 and 1981, the city's four pro teams—baseball's Phillies, football's Eagles, hockey's Flyers, and the 76ers all reached the play-offs.*

*In a Philadelphia story of triumph, John B. Kelly, Sr., an Olympic-champion sculler, was barred from England's gentlemanly Henley Royal Regatta in 1920, because as a bricklayer he had worked with his hands. His son John B. Kelly, Jr. (**below, foreground**)—a competitive rower still—raced at Henley in 1947 and 1949 and won. He heads the family's construction firm and is a brother of the late Princess Grace of Monaco.*

FLO SPIEGEL WITH KEITH A. MCDONOUGH, NGS STAFF (BELOW)

company have already opened; a photography shop, snack bar, bookstore, and a publishing house will be phased into the system as space becomes available.

"This will give us a working population of about 200, but only our family and its revolving batches of boys will live here.

"No, we don't intend to parachute our program all over the place. Different situations call for different approaches. This just happens to be ours."

In the high-crime area of north-central Philadelphia, a tiny black enclave with the king-size name of the 2000 Block West Hagert Street Neighborhood Council and Affiliates has "circled its wagons" to protect its eight square blocks from the difficulties that surround them. Like the House of Umoja, the people here are a family too—a family of 233 families dedicated to each other and their particular plot of Philadelphia.

Despite a physical handicap that keeps her pretty much housebound, council president Mrs. Dorsha Mason nudges her neighborhood into ever greater accomplishment. "Our motto is: 'It's not where you live, but how you live where you live.' We're trying to bloom where we were planted."

AS SPRING APPROACHES, everything blooms—little sitting parks, backyards, window boxes, and curbside planters in such profusion that the community of West Hagert has earned special recognition for its success from the Pennsylvania Horticultural Society.

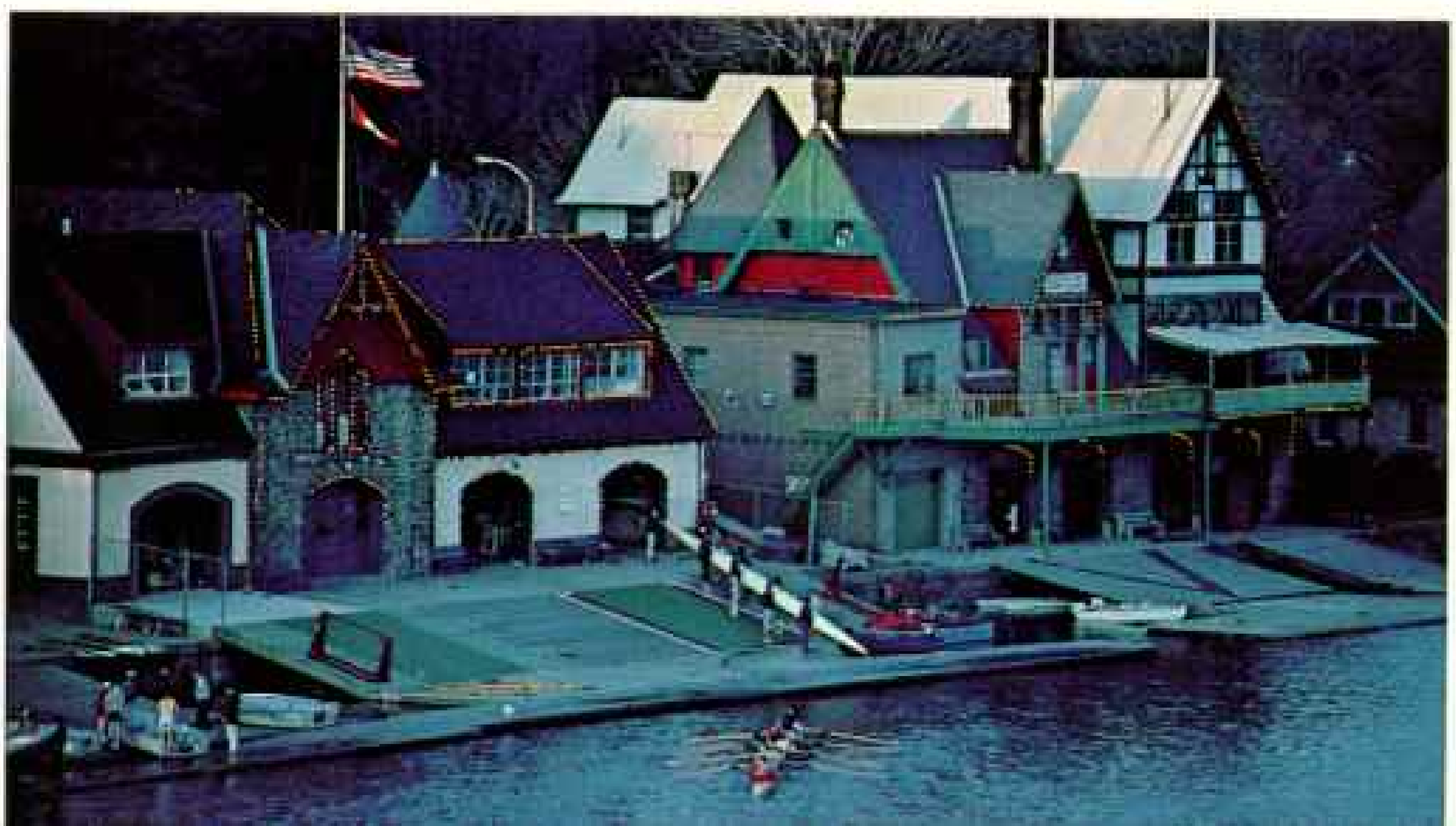
"It's a sweat equity effort; it works because everyone's in it, even the little kids," Mrs. Mason says. Residents offer each other a multitude of volunteer services—from transportation to adult education. And a great deal of compassion.

"When we first got together, almost 25 years ago, we agreed to keep our row homes on this block in conventional red and white. Then the city came along and sprayed our few public-housing units with stucco and yellow-tan paint. We got that changed in a hurry—it was like branding the poor."

While West Hagert enjoys a oneness of people and purpose, Germantown a mile away suffers from a split personality. To the west of Germantown Avenue great gray mansions of local stone attest to the wealth

Patrician tastes *rule at the State in Schuylkill, a social club founded in 1732 to "promote geniality." Here two of its 30 members and a guest prepare lamb* ***(above)****. Club regulars meet 13 times each summer to cook a feast that may include planked shad and terrapin stew but always features a heady brew called fish house punch.*

The well-bred sport of sculling is launched from light-festooned Boat House Row ***(right)****, whose rowing clubs and university crews compose the Schuylkill Navy.*



Bracketed between rivers, *the Schuylkill, right, and Delaware, top, Philadelphia encompasses 130 square miles. The Philadelphia Museum of Art, foreground, crowns Fairmount hill. Beyond, Benjamin Franklin Parkway sweeps to the spired City Hall.*

once found here. To the east and south some 19th-century sections look like they'd been blitzed by the British back in 1777.

One of Philadelphia's oldest outlying neighborhoods, Germantown was settled by immigrants from the Rhineland almost as soon as Penn penned his open-door policy. By the mid-18th century wealthy city dwellers with a yen for country living were building handsome Georgian homes on the borough's healthful heights.

MANY of the present galaxy of venerable houses were in place in 1777, when George Washington's Revolutionary Army tried in vain to dislodge the occupying forces of Britain's Gen. Sir William Howe at the Battle of Germantown. Cliveden, ancestral home of the Chew family, carries a souvenir of the scrap—a cannonball hole in the study wall.

The outcome of the battle delighted many Philadelphians, Whig and Tory alike. Especially the ladies. The gracious Howe and his staff had perked up a war-weary social season with some of the liveliest, most lavish entertaining the old city had ever known.

John L. Asher, Jr., a third-generation Germantown candymaker, can recite his neighborhood's rich history and the problems it now encounters. "We bottomed out here about three years ago. Big trouble came when Germantown was redlined for mortgage money. A lot of impoverished renters moved in with no stake in the community. Businesses began closing; our commercial center was sliding downhill as fast as some of our badly neglected residential streets.

"Then things began turning around; all factions started working together to sell our basic strengths: good transportation, good homes in a variety of values, good people. We've got a terrific housing stock and services and greenery Society Hill couldn't begin to match. Now black leaders and white have a common goal: Make Germantown the finest subdivision of any U. S. city."

As one businessman said to me, "It's all in whether you see the glass as half empty or half full."

Convinced that Germantown's glass was filling up, I trolleyed ten miles southeast to the opposite end of the city.

This is home base for Philadelphia's impressive lineup of major league pros: Flyers (hockey), Eagles (football), Phillies (baseball), 76ers (basketball). And this is where fickle local fans boo and cheer the home team with equal fervor. Whatever the formula for sports success, Philadelphia has in recent years posted a better all-round attendance and performance record than most

four-franchise cities on the continent.

A few blocks north in the precincts of South Philadelphia is another fast-hustling team called the Giordanos. They've been minding the store for three generations at the corner of Washington and Ninth Streets, hub of the open-air Italian Market. At curbside stalls and under cover, five brothers, three sisters, and myriad relatives parlay a thousand crates of fresh, cut-price produce a day into handsome profits for the family and one of the most entertaining free shows in town for everyone else.

"You gotta be a real huckster to keep things moving at that rate. I guess I'm a born ham, and this is one helluva stage to perform on." Joe, oldest of the second generation, has the rolling gait and muscled build of a prizefighter, which he started out to be. "I was maybe 16 and looking pretty good. Went into my first bout thinking the prize was a watch. I won all right—a lousy bunch of hot dogs. You ever hear of paying an Italian kid with food? I quit then and there."

Even today nobody messes with Joe.

"If you ever go into business, go where there's plenty of competition. Keeps you hopping. See someone getting the edge, you find out why and do it better."

There's no shortage of competition in the five boisterous blocks inundated by the Italian Market. Here, the wares of some hundred small merchants—basically Italian with a recent input of Asians—clog sidewalks, even spill into the streets in an unrestrained riot of color and clutter.

TED SPIEGEL WITH LARRY G. KINNEY, HIS STAFF (BELOW)

Law and genial disorder *mix at the Mummers Parade on New Year's Day, when a policeman's lot turns to good-natured crowd control* ***(above, left)****. Tipsy revelers sometimes jump barriers and join marchers, only to be politely escorted back to the sidelines. The bash begins at 7:45 a.m. as the first of some 20,000 mummers struts up Broad Street. It ends that night with a reprise down "Two Street" in South Philly* ***(left)****, where the spectacle was spawned.*

Other staples of city life, pretzels and politics, meet in front of City Hall ***(above)****, where mayoral candidate Frank Rizzo, at left, presses the flesh. As mayor from 1972 to 1980, Rizzo battled crime but reaped criticism—and an unsuccessful recall attempt—for his controversial tactics.*

At 84 and lamed by a broken hip, family matriarch Frances Giordano still makes the street scene—and earlier than most. She opens up well before six each morning, makes sure all hands are at their battle stations before she returns upstairs, where she has lived since she and her late husband first set up shop 60 years ago.

"They got a nurse for me days, but I sneak out before she comes; once she gets here, I can't make a move without her. Look around, nothing but Giordanos. They come up for coffee, but I'm not feeding them. No, sir. I'm still working for a living.

"Paul, the youngest, he went to college; lives with the swells on Society Hill. How come he stays in the business? He's my son, isn't he? He belongs here."

Also native to the neighborhood, the mummers' movement got its start only a few blocks away—as a small but noisy local affair on South Philly's Second Street more than a century ago (though its ancestry is far more ancient).

And that's where it still ends—in a raucous finale after some 20,000 performers, ornately costumed in feathers and finery, have pranced, danced, and sometimes romanced up two and a half miles of Broad Street in a New Year's Day extravaganza even Flo Ziegfeld wouldn't believe.

After comics, string bands, and fancy brigades have strutted their stuff for twelve hours "going up Broad," hard-core mummers do an encore down "Two Street" to vie for neighborhood honors almost as coveted as the cash prizes the city awards for winners of the big show. "Now I'm not saying we

Modern medicine *worked miracles for a 14-year-old girl born with a severely malformed face* ***(above left)****. Plastic surgeon Dr. Linton Whitaker of the Hospital of the University of Pennsylvania restructured her face and skull with dramatic results* ***(above)****. He dictates notes after the nine-hour operation* ***(left)****. Philadelphia trains more doctors yearly than any other U. S. city except New York and Chicago.*

officially rate such things as drinking beer and playing the bass fiddle at the same time," one judge told me. "But such virtuosity does not go unnoticed."

Comic high jinks, elaborate costuming, and spectacular floats make the Mummers Parade as eye filling as New Orleans' Mardi Gras. But the string bands, ripping through rousing favorites from minstrel-show days, rank as the greatest crowd pleasers.

Which is just another manifestation of Philadelphia's consuming passion for music. Marian Anderson is a South Philly native; so, too, was Mario Lanza. A heap of homegrown headliners from Eddie Fisher to Frankie Avalon share this origin.

But the city's longest playing star never left home. It's still drawing sellout crowds to the corner of Broad and Locust Streets—the justly famous Academy of Music. Acclaimed as one of the most acoustically superb concert halls in the world, the academy remains as opulent today as at its opening in 1857. A cherished Philadelphia institution, it has housed the city's outstanding symphony orchestra since 1906.

Until the baton of leadership passed in 1980 to Riccardo Muti, the academy's podium had been occupied by only two resident conductors since 1916: the late Leopold Stokowski and the great Eugene Ormandy, who lives in anything but retirement only a few blocks away.

"I'm still on the road much of the year, making guest appearances. But my wife and I never intend to leave Philadelphia permanently. The people here are extremely responsive. And no one could ask for a better place to perform than the academy. The slightest sound carries clearly from the stage to the back of the top balcony; there are no dead spaces.

"Some say the excellent resonance results from an open well under the flooring; or perhaps it's because the building remained roofless for a year after construction to let the timbers age naturally.

"It's been a joy to conduct here. Philadelphia has been wonderful to me."

Mr. Ormandy need only open his windows to hear other maestros in the making practicing next door at the Curtis Institute of Music, which counts Josef Hofmann, Efrem Zimbalist, and Rudolf Serkin among its past directors; Leonard Bernstein and Gian Carlo Menotti among its former students. Today some 300 Curtis graduates belong to major orchestras; about a third of these are principal players.

As music director for 44 years, Mr. Ormandy became a willing captive of Philadelphia's job-for-life syndrome. So did Cornelius McGillicuddy—the Connie Mack who managed the old Athletics baseball team for a record 50 years. (That he was part owner of the team might have helped.)

CAPTAINS OF INDUSTRY also seem content to stay with the same ship throughout their working careers. Many are names long linked with the interests they represent; some descend directly from early community leaders and businessmen—Biddles, Cadwaladers, Ingersolls, and Chews.

A business aristocracy, they have a tremendous influence on the Philadelphia image. For they provide the major support with donated time and dollars for the city's impressive network of cultural institutions. Few realize the local Pew family—of the Sun Company oil fortune—endowed a group of philanthropic trusts that are second in the nation, after the Ford Foundation.

Philadelphians don't need a U. S. President to teach them about volunteerism; the concept has been deeply ingrained here since Quakerism first showed up to show the way. Among its faithful practitioners: Henry P. McIlhenny and his sister Mrs. John Wintersteen, who inherited a taste for art and the means to acquire it from their parents, both avid collectors. Mr. McIlhenny, a live-in Philadelphian, has donated many fine paintings from his priceless personal collection of 19th-century French masters to the Philadelphia Museum of Art; his name appears regularly as patron and director of many cultural causes. He's also a keen and candid observer of the local social scene.

"It's a pleasant place to live, but a bit stuffy. Old Philadelphians shy away from new blood; it makes them nervous. They're much like peas in a pod: same schools, same summer places.

"We probably suffer from our proximity to New York City; it's easy to get there to fill the void of what's lacking here. Businesses

that once brought in newcomers—advertising and publishing, for example—have all left town. We're not even a provincial capital like Pittsburgh and Boston, which both enjoy rather large areas of influence.

"All these universities, yet there's little rapport between our social and academic worlds. I once remarked to a Penn professor that he was the only faculty member I knew. 'That's because,' he said, 'I married a wealthy Philadelphian.'"

Perhaps no one is more widely quoted on the subject of Philadelphia—especially among those unfamiliar with the place—than its native son William Claude Dukenfield, who, under the bobtail name W. C. Fields, quipped his hometown's bone-corseted conservatism to lasting fame via the vaudeville circuit.

The great comedian died and was buried in California in 1946, where, rumor to the contrary, his headstone did *not* read: "On the whole, I'd rather be in Philadelphia."

However, that's where California-born

The pursuit of happiness *peaks for students of Hallahan Catholic Girls High School on the last day of class with a dunking in the Kennedy Plaza fountain (**right**). Two bikers enjoy a moment in Fairmount Park (**above**). Such easygoing vignettes belie a city image pigeonholed as stodgy. Stodgy are those who've missed the city loosening up and stepping out.*

W. C. Fields III prefers to be, having returned 13 years ago to the scene of his grandfather's lines.

"W. C. would get a chuckle out of how this happened. One of his most hilarious films was *The Bank Dick*, and that's pretty close to what I was when I came here—as an FBI agent pursuing bank robbers. It's one way to get to know a city in a hurry.

"I've probably poked through more derelict buildings than the housing authority; know as many neighborhoods as any politician. Sure, there's a seamy side to Philadelphia as in any major city—London, Paris, Rome, you name it.

"But there's also plenty of beauty here. And a sense of proportion that will never permit compulsive change, like turning center city into a cubist horror.

"It's certainly true that our leisurely tempo has helped to perpetuate some of W. C.'s witticisms. But the last laugh, really, is on those who never bothered to find out what this city is all about." □

Etosha: Namibia's

By DOUGLAS H. CHADWICK

Photographs by
DES and JEN BARTLETT

African roundup roils the dust of Namibia's Etosha National Park as plains zebras are herded for sale to ease grazing pressure

Kingdom of Animals

on an overcrowded range. In this harsh, semi-arid reserve, dedicated professionals balance the needs of a veritable arkful of animals while charting a course of survival in the face of increasing human demands.

THROUGHOUT THE NIGHT a dry wind blew while the black-and-gold lion slowly circled camp and roared. I wasn't sure of all he was saying but understood that this place was his. As the eastern horizon decanted its first pale light across the thorn scrub and brittle grass stubble of the veld, the cat finally went quiet and moved off. Now he was the last thing his chosen prey would hear.

It was November in Namibia, neighbor and ward of South Africa. Seven cloudless months had passed since the end of the 1981 rainy season—a season that failed to deliver even half the expected precipitation—and summer was upon the semidesert countryside of southwestern Africa.

Today the sun and the heat would roar until the land itself began to evaporate in mirages and towering dust devils. Sooner or later nearly every big creature in this one small section of Etosha National Park would come to drink at the water hole I was watching.

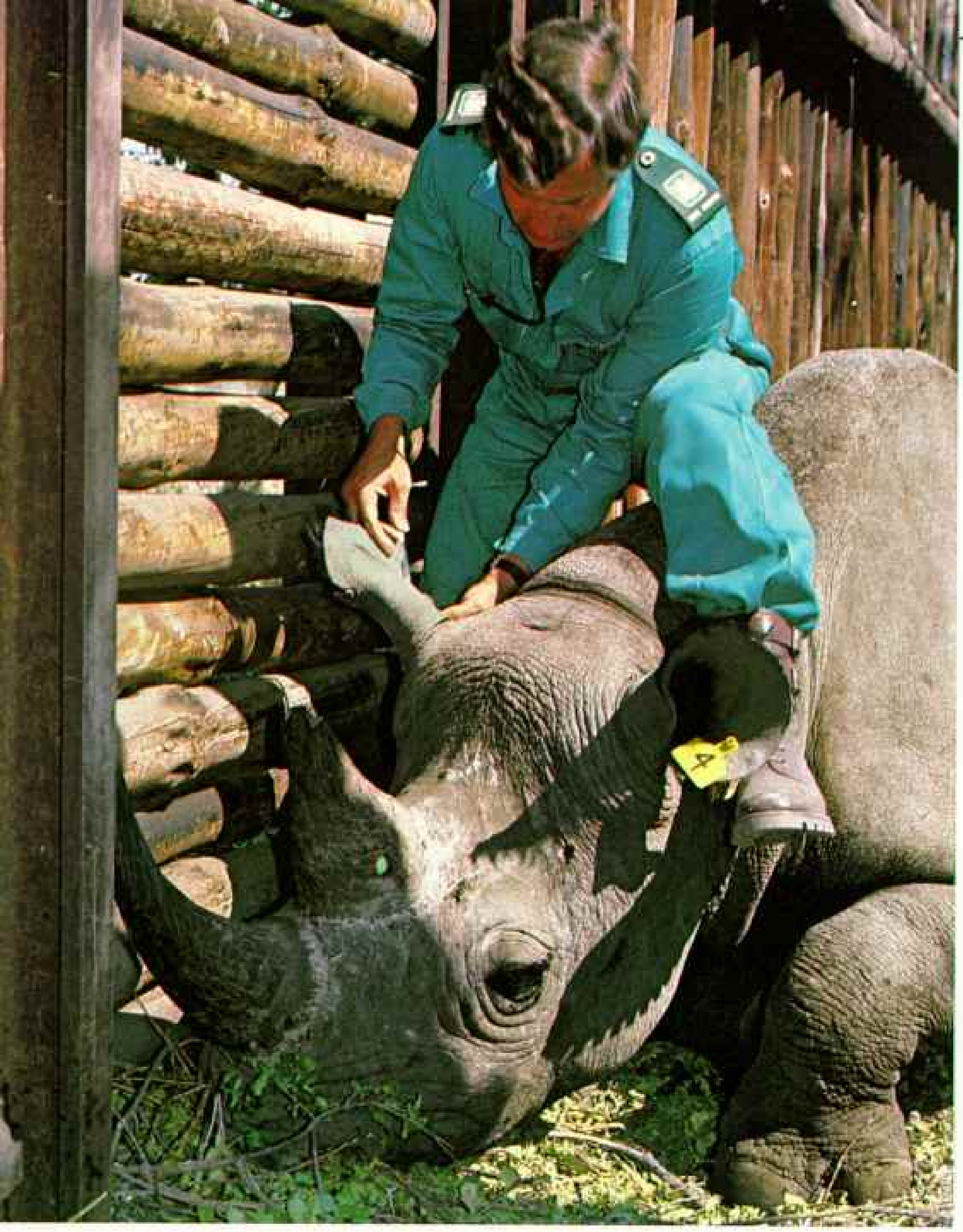
The lion knew that. He—or maybe others of Etosha's lion population, numbering about 500 and believed to be the densest in proportion to prey in Africa—would be waiting for them here.

Etosha is one of our world's largest national parks. Its concentration of wildlife is extraordinary, and the dependence on water holes throughout so much of the year makes the wildlife readily visible. In fact it may just be possible to enter the lives of a more spectacular array of creatures with greater ease and intimacy here at Etosha than anywhere else on the globe.

Close to 175 miles across from east to west and 8,598 square miles overall, this immense reserve varies no more than 900 feet from its highest point to its lowest. Soils run thin and sandy or rocky. In an average year the eastern end of the park receives 18 inches of rainfall, the west end only 12, most of it falling during the January-through-April wet season, when temperatures hover around 105°F (map, page 354).

I had driven to the water hole with Jen and Des Bartlett, the expert naturalists and photographers who guided me during much of my two-month visit. We found the animals starting to arrive before the sun flamed

An abundance of lions, *the result of man-made changes in the environment of Etosha National Park, led chief research biologist Dr. Hu Berry to experiment with time-release contraceptives for females. Dr. Berry (**top,** right) helps gynecologist Dr. Jock Orford implant a capsule in an*

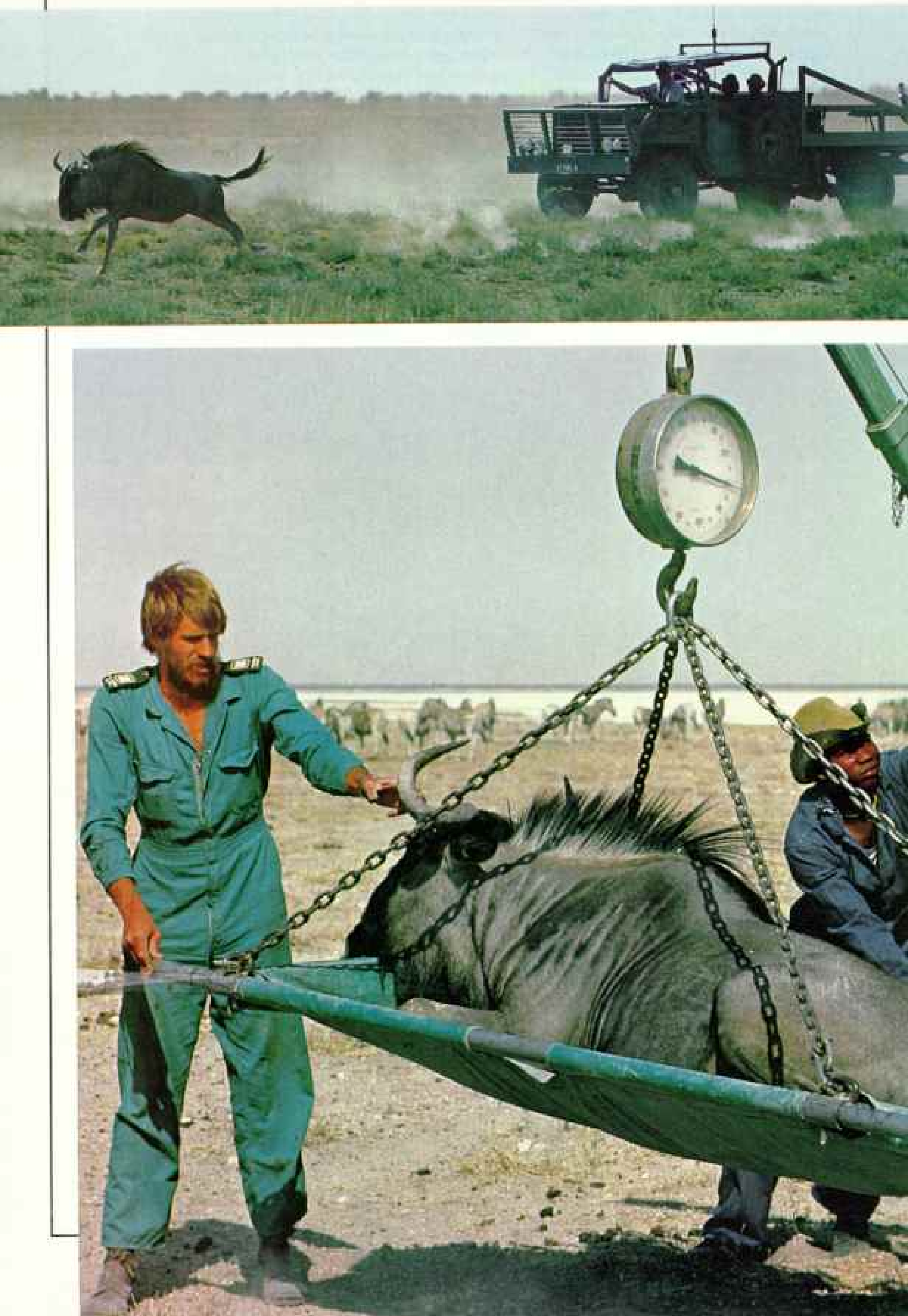


*anesthetized lioness's neck muscle. As wife Conny and son Paul look on, Berry brands a blindfolded lion for future field identification (**middle**).*

*Here listening to a lion's heartbeat, park veterinarian Dr. Ian Hofmeyr (**bottom**) has both monitored and manipulated park wildlife. Black rhinoceroses—this one (**above**) tagged with a reflective green horn plug—were once scarce within Etosha's boundaries but have increased to about 350 through capture elsewhere and careful relocation. "Our long-term goal," says Dr. Berry, "is to maintain the greatest diversity of species possible."*

At the edge of immensity, *giraffes and springbok come to drink at Ondongab water hole beside the tabletop flatness of 1,800-square-mile Etosha Pan. All but the northern rim lies within the park—at 8,598 square miles, larger than New Jersey, but only a quarter of the area originally set aside by German colonists as a game preserve in 1907. A vast prehistoric lake, abandoned by the river that once fed it, evaporated to leave the pan's alkaline clay. Today only torrential*

rains, years apart, fill more than a small part of the pan via rivers. That water, too, disappears within a few months. Yet along its southern edge, year-round natural fountains, such as Ondongab, provide the key to Etosha's thriving wildlife. Seeps, called contact springs, also fill pools in wetter months. Ondongab attracts less wildlife than some others because nearby brush easily conceals lions—the constant specter of the water hole.



Hot pursuit *brings Dr. Hofmeyr, perched forward on a custom-fitted capture vehicle, to within dart range of a blue wildebeest* ***(left)****. An expert in anesthetizing and tranquilizing animals for capture and transport, Dr. Hofmeyr, along with assistant Jahobus Kaipumu, in hat, and nature conservator Mike Heywood, weighs the odd-looking antelope* ***(below)****. This study of wildebeests, prompted by declining numbers in the park, pointed out three human-related causes: restricted migration, man-made breeding grounds for anthrax, and increased lion population.*

above the horizon. And they kept arriving, beasts of every strength and stripe, alone and in families, troops, converging files, each one seeming to ask the same question with flaring nostrils and quick, tense steps: Where is the lion this morning?

"Namaqua sandgrouse will start flocking to water sources all across the park soon," Des told me. "The peak of their flight comes at a precisely timed interval after dawn. This week it has been 8:16. You could set your watch by it."

As promised, the sweep of my watch hand past 8:16 brought more than 2,000 of the pigeonlike birds curving in around us to land and sip. Many of the cocks busied themselves soaking their breast feathers to carry some of the liquid back to the young.

At 8:20 a lanner falcon, close relative of the rare peregrine falcon, which I was also to see in the park, rifled down to take a namaqua. Six thousand wings grabbed for air as crowned guinea fowl, Cape turtledoves, red-billed queleas, and spotted sandgrouse swirled up in the storm of namaquas.

Suddenly, startled bands of spiral-horned greater kudus and phalanxes of spear-horned gemsbok, which had waded in to drink, were heaving shoreward in a froth of water. Whirling away from the pond's edge, roan antelope rapid-scanned the bushes with their long ears, then panicked as red hartebeests dashed past. Warthogs sprang up from wallows while the high-pitched braying of Burchell's zebras seesawed above a growing avalanche of hoofbeats.

A black-backed jackal sprinted past, followed by a troop of rare Hartmann's mountain zebras. As a herd of Cape elands pounded by, a bull that must have weighed 1,800 pounds bounded six feet off the ground. Springbok hung in the air beside it. Giraffes rocked away in fast slow motion. Ostriches pedaled toward 40 miles an hour. . . .

IT IS 8:20 plus 15 seconds, Etosha time: Only muddied water and settling plumes of dust remained. And the lion, after all? He was not to show himself until later, after the first elephants had rumbled in to shower and quench their thirst, along with about 400 hoofed companions.

At park headquarters Dr. Hu Berry, chief

Seasons of fat and lean *impose an unyielding regimen on Etosha's wild denizens. In a good year the Indian Ocean monsoon brings continual rains from January to April. They fall first and heaviest—an average 18 inches—on the park's eastern end. The western section, 175 miles away, receives only two-thirds of that amount. Most species give birth during the rainy season, when they fan out across the park to drink from rainwater pools and feed on rich vegetation. Zebras with a two-month-old colt graze in a field of Tribulus terrestris* ***(below)****, impervious to sharp spikes among the blossoms.*

As dry months follow, animals are drawn to permanent water holes. There they congregate in spectacular numbers, attracting an annual 50,000 tourists—and lions. At Kapupuhedi, springbok, zebras, gemsbok, and a lone wildebeest gather to drink and share the watch ***(above right)****. Dependence on these springs limits grazing range to what the animals can reach before they must return to drink again, causing overgrazing and, in bad years, starvation. A dry cycle began in 1979. In January 1982, two years after the top photograph was made, Kapupuhedi offered only sips for blue cranes* ***(right)*** *before late rains finally arrived.*

To aid the animals, park officials since the 1950s have drilled 55 artificial wells, most of them in the desiccated west. But herds there grew beyond what surrounding forage could sustain, forcing officials to close some wells and hope for the cycle to complete itself.

The two worlds of Etosha

***World's** largest corral holds an estimated 80,000 mammals—jackal-size and up—within a 500-mile-long fence (**below**). While barring some migration routes, it also helps prevent animals from being shot for straying onto surrounding farms.*

research biologist at the Etosha Ecological Institute, handed me a list of park mammals. I counted 38 species up to about Cape hare-size, plus 55 species of larger mammals. Hu pointed out that Etosha can also claim more than 300 feathered species, some of them, such as the savanna-striding kori bustard and the secretary bird, conspicuously large in their own right. Without going on to reptiles, I think the point is clear: Etosha, where the landscape is so lean and level, seems truly a kingdom of animals.

Each year as the natural history of animals is encroached upon, at an accelerating rate, by the machinations of man, the role of parks in protecting wild species and all they represent grows more essential. These life forms are not only sources of splendor and inspiration but also raw material for medicine, improved livestock production, genetic engineering, and purposes as yet scarcely guessed at. (For example, which of our fellow creatures do you suppose will prove most valuable in the exploration and colonization of space?)

THE QUESTION REMAINS: How does a wildlife reserve best fulfill its role? I had always leaned toward a hands-off approach—maintaining parks as pristine sanctuaries in which nature could take its course. But as I was to learn from Etosha conservators (rangers) and biologists and other members of Namibia's Department of Nature Conservation, preservation can involve far more than simply setting animals aside someplace and guarding them. Etosha is definitely a hands-on kind of place, working hard to ensure the proper abundance and maximum diversity of the animal kingdom within its artificial boundaries, and suggesting important paths toward the future.

The park takes its name from the Etosha Pan, variously described as the "great white place," "place of mirages," "place of dry water." Once a great lake lived in north-central Namibia. Some 12 million years ago a drying trend in the climate along with continental uplift deprived the lake of its tributaries, and it slowly died. The remnant of its bleached carcass lies in the eastern half of the park, an 1,800-square-mile expanse of clay saturated with highly alkaline mineral salts. It felt to me like the edge of the world. Yet the most luxuriant wildlife assemblages of all paradoxically surround, and are bound to, the pan.

The adjoining terrain is built of calcrete, a limestone deposited through evaporation of subterranean water underlying this part of Namibia. Garth Owen-Smith, then one of the park's nature conservators, led me across the whitish pan edge to examine plant growth.

"These are halophytic—salt-tolerant—grasses," Garth explained. "They grow remarkably well on this poor soil, and their foliage turns out to be rich in protein."

Sweetveld, a stockman would call such pasture. Most important, there is water—laden with mineral nutrients—to go with it. Though precious few permanent natural springs are to be found elsewhere in the region, dozens of natural fountains and seeps recur at or near various points of contact between pan and calcrete. Thus offering high-quality food and oases of drink, the wide-open savanna around the pan supports grazing animals by the tens of thousands, notably gemsbok, perhaps the most specialized for arid environments, and three particularly compatible species.

The first and heaviest of them is Burchell's zebra, the pony with the zithering double-striped flanks. It tends to mow down the coarse upper stalks of grasses, its digestive system being designed to process bulk quantities of forage.

Blue wildebeests, also known as brindled gnus (Africans describe the critter by its snort: t'gnu), then select the more palatable lower grass blades that have been exposed. Their four-chambered ruminant stomachs enable them to extract greater nourishment from less fodder.

Last of the three, the small springbok antelope snip new grass shoots as they reappear in closely cropped areas. When grasses cease sprouting, the springbok browse low shrubs and dig for roots.

The park closes at the end of October to give tourists a break from the incendiary summer heat and the wildlife a break from tourists over the toughest weeks of the dry-season food scarcity. In rainy mid-March, after the animals are past their season of dispersal, seclusion, and birth, the park opens

again. One by one the rainwater pools dry out. Soon the grazing multitudes of the pan-edge savanna find themselves joined at the springs by swelling crowds of mixed feeders like springbok and browsers like kudus from neighboring thorn-scrub and mopani woodland habitats. These in turn attract an increasing force of predators—as well as 50,000 tourists a year.

AT THE TIME of my stay the reserve was being squeezed by a drought cycle, and some artesian springs had shrunk to trickles. But once or twice in a decade prolonged hard rains send rivers to the north and east coursing along their channels and into Etosha. Then the sun-cracked pan partly fills with water and becomes, however shallow and alkaline, however briefly, a lake again—the grandest water hole of all.

This happened in 1971. As Hu Berry recorded each stage of the lake's resurrection, more than a million flamingos turned acres of its waters pure breeding-plumage pink. Where they came from, no one knows for sure; the flocks seem to belong to Africa as a whole. Here they paused to join hosts of water birds from plovers to pelicans, taking advantage of an exploding food web of plankton, insects, barbel fish, and frogs.

As we drove over the plains one afternoon, Hu recalled that teeming season of '71. "The greater flamingos [which live on zooplankton—microscopic animals] scooped together mud platforms and successfully reared young on the flooded pan from February through May. Next the lesser flamingos [which eat phytoplankton—algae and diatoms] had their turn. But by August the lessers were in trouble." Water was evaporating fast, the lake edge drawing away from the breeding colonies. With it went the birds' food supply. Soon, four-footed predators would be prowling the mud.

Hu prepared for what he dubbed Operation Flamingo—a repeat of a park project two years earlier, when thousands of stranded chicks had been rounded up and trucked to water.

"In my plane surveys this time, though," Hu said, "I noticed that large groups of parents and pulli [young] had left the nesting sites and were walking—trekking day after day—across the pan."

About 30,000 chicks began this odyssey. A month later 25,000 reassembled at water lingering near the Ekuma Delta 50 miles distant. In their own version of Operation Flamingo, the young birds—except for a yard full of stragglers hand-raised by Hu and his wife, Conny—had marched every step of the way.

The earliest written account of the pan came from a Swede, Karl Andersson, who ventured through the region in 1851 accompanied by the English scientist Francis Galton, Charles Darwin's cousin. As late as 1876 the American Gerald McKiernan could still count himself among the few white men ever to have glimpsed Etosha. He described it with an American's enthusiasm as a sight "all the menageries in the world turned loose would not compare to."

McKiernan was a trader, though, and the trader is a harbinger of change. Before the century turned, Boers, Germans, and other whites had begun to settle around the area, introducing high-powered rifles and expanding numbers of domestic livestock.

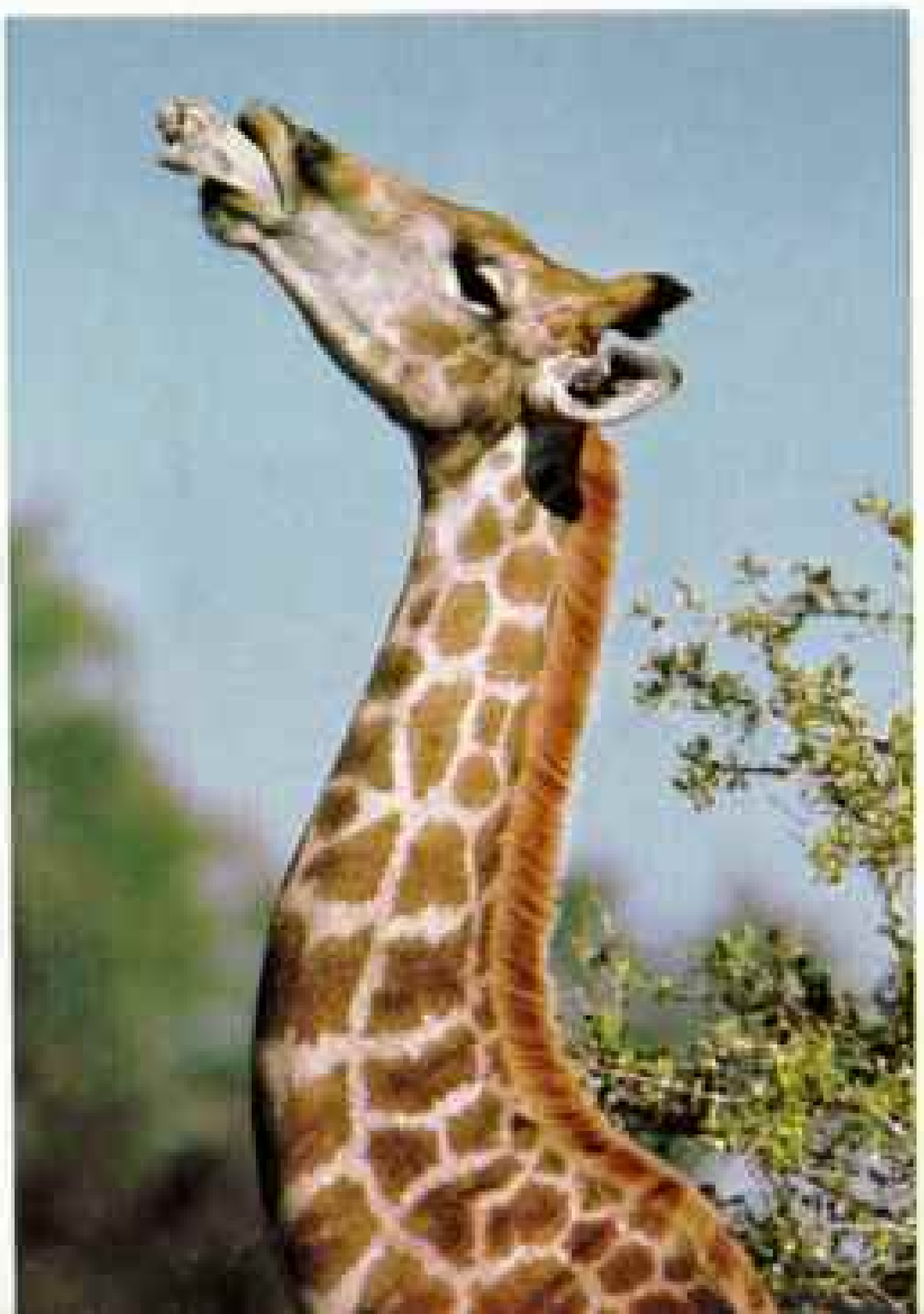
Among the first to feel the impacts of European colonization were Etosha's only indigenous human inhabitants, Stone Age hunter-gatherers of a Bushman race called the Heikum. They were never very populous, and some succumbed to diseases that the white men brought. Others were absorbed by neighboring Ovambo, Herero, and Damara tribes, all semi-nomadic cattle herders and themselves shifting to accommodate Europeans.

The last Heikums were to become employees of the Etosha reserve. They worked there as trackers and laborers, and a few of their descendants still do, though intermarriage has essentially erased the bloodline.

WILDLIFE populations too were dwindling when in 1907 the German government of South-West Africa, as Namibia was known until recently, proclaimed three vast game reserves. The largest was Game Reserve No. 2, Etosha. At 36,300 square miles, about twice the size of Switzerland, it was far and away the most enormous on the globe. From east of the pan it extended westward through the desert-colored mountains of Kaokoland to the Atlantic Ocean.

Life and death in a perilous Eden

HUNTER'S GAZE reveals the intensity of life in a place where man's protective efforts have largely precluded his interference with rhythms of predation and survival. Bearing a dik-dik to feed two cubs, a leopard pauses to consider photographers Jen and Des Bartlett, chroniclers of Etosha for more than four years.



Frantically competitive, *a black-backed jackal fights a losing battle against white-backed vultures crowding in on a wildebeest carcass* ***(above)****. Absence of wounds suggests that the wildebeest died of anthrax. Like most predators and carrion-eaters, jackals and vultures are less susceptible to the disease but spread the bacterial spores through wastes and saliva at water holes.*

Over a zebra's remains, a spotted hyena shows dominance with erect tail and ears, upright stance, and extended neck ***(right)****. Bones that escape the viselike jaws of hyenas are often gnawed by giraffes* ***(left)****, behavior that may add minerals to their diet. This is the first such photograph published. "He worked this bone in and out like a sword-swallower," says Des Bartlett.*

En route, however, it cut across sparsely inhabited but nonetheless traditional tribal territory. The native peoples' opposition to the far-flung boundaries was unrelenting and cattle trespass inevitable.

The white ranchers were not happy either. They suspected that diseases such as rinderpest and hoof-and-mouth were being transferred from the reserve's wild herds to their domestic ones. Ranger manpower was stretched so thin that predators slipped out of the reserve to poach livestock as easily as human poachers slipped in.

The situation improved, though conflicts continued, when Etosha was declared a national park in 1958 and opened to tourism. In 1973 Etosha's boundaries finally solidified in unmistakable fashion. By then Etosha had returned three-fourths of its former acreage, including its Kaokoland connection with the sea, to the tribes. But in place of lines on a map now stood a wire game fence 8.5 feet high and 500 miles long. Though completely encircling the park, the fence is repeatedly punctuated by breaks.

Even as Etosha shrank, the number of animals within its remaining acreage multiplied tremendously. How? That part was easy. Just add water.

Many of the smallest antelope, such as steenbok, gray duikers, and eight- to ten-pound Damara dik-diks, seem able to extract essential liquid from the digestion of favorite food items: leaves, buds, tubers, and fruits.

But the bigger mammals must drink, most of them at least every other day during the dry months, which means their range in that period is restricted to within a day's travel of a water hole. This had always set a strict limit on wildlife density in park segments remote from the pan, especially in the sere western third of Etosha.

NEARLY 50 windmill-powered wells and eight artesian wells with drinking troughs and overflow ponds have been distributed throughout the park's parched reaches. If anything, this program was too successful. Which brings up the time-honored question of whether there is really such a thing as a free drink.

With senior ranger Trygve Cooper I visited a water hole named Kameeldoring, whose windmill had recently been turned off. Trygve explained why. "Our last good rain year was 1978.

"All those herds that built up and remain because of new drinking sources are finding little new grass growth now. They are hammering what vegetation is left, particularly around water holes. So we are opening and closing water points in sequences that we hope will encourage small-scale migrations across the dry veld and allow overused range to restore itself. We must gradually cut down on the number of wells going at any one time. That way the next drought will not catch us with an overabundance of game."

Artificial water holes were a vital ingredient in the establishment of the Kaross, a 37,000-acre projection from the park's dry southwestern corner, fenced off as a separate breeding farm for rare species in the 1970s and cleared of lions.

YOU KNOW about rhinos: shortsighted, shorter tempered, armor wrinkled, disposed to meet problems head-on. But 52 black rhinoceroses from Kaokoland and Damaraland staggered into the backs of waiting trucks bound for the park, testament to the effectiveness of new tranquilizing compounds. From outside the park boundaries came 250 black-faced impalas, also awake but chemically calm, in more trucks.

Similarly, 74 big roan antelope arrived in three flights of a giant Hercules cargo plane from a riverbed airstrip in the Bushmanland wild. One roan gave birth the week after this precedent-setting trip, and 26 more produced calves within three months. Tsessebe and sable antelope touched down on later flights from Namibia's Caprivi region.

These animals had three things in common. First, all were considered endangered in Namibia, and some in other parts of Africa as well. Second, most were under the care of a doctor whose 18-foot-high laboratory door was designed with giraffes in mind—Ian Hofmeyr, Etosha's veterinarian and a leading authority on game capture and transport. Third, they were to illustrate how a park can preserve gene pools and share its biological wealth with landscapes beyond its own borders.

No holds are barred *as plains zebra mares fight to establish dominance* ***(above)****. Kicking and biting, they often attack their opponent's underbelly, and go down on their knees to protect themselves. Fighting stallions observed by the Bartletts were so engrossed that two lions, stirred by the opportunity, charged and killed one despite panicked flight by animals around them. Large and fairly abundant, zebras appear to be among Etosha lions' preferred prey—many bear wounds from near escapes* ***(right)****. When claw wounds heal, stripes are often misaligned at the scar.*

"Corps de ballet," a troupe of ostriches dances across the pan. The

Following a period of captivity for readjustment and reproduction, the translocated rhinos, roans, and impalas were released into the park proper to join the scattered few of their kind found there naturally. Each population flourished, and before long surplus roans and impalas were being shipped off to other parks, refuges, and game ranches in Namibia. Black rhinos, all but exterminated by poachers elsewhere on the continent, currently number about 350 in Etosha and stand ready as well to be used as seed stock.

Because Etosha has little of the habitat preferred by tsessebes and sables, they were eventually passed along to other Namibian preserves. Finally, elands, which were in the Kaross when it was enclosed, multiplied so well they too were used to populate Namibia's Waterberg Plateau Park, for this species is scarce over much of Africa.

The work in the Kaross embodies the concept of increasingly intensive management by game parks. As the human tribe mushrooms from four billion to a predicted six billion in the next few decades, the endangered-species list appears destined to read like a tally sheet for Noah's ark. Two by two or two hundred by two hundred, earth's creatures are going to have to be: whisked here, away from certain oblivion; whisked there, to counter the harmful effects of inbreeding; shipped here, to replace a missing link in a food chain; shipped there, to a zoo or game farm—and shipped *out* if they jeopardize the ecological balance in a disturbed homeland.

For example, the year before I arrived, a massive game-capture operation had subtracted 1,500 Burchell's zebras from western Etosha to ease grazing demands on the drought-stricken range. Most of the captives were sold to South African farmers, who then sell hunters the right to stalk and shoot the animals.

"People are used to seeing biologists on television with their dart guns chasing and handling big game," Ian told me. "The part not everyone knows about is capture myopathy, and the animals that die from drug overdoses, shock, panic-caused injuries, overheating, and so forth. With some species, it's not unusual to lose one or two in ten before the job is finished."

Ian's efforts to improve these odds keep him moving at a headlong pace between his laboratory and the bush, where I met up with him one dusty morning. Anthrax, an infectious disease that most often strikes down plant-eating animals, had shown up

desert-hardy fowls nest far from water holes to avoid predators.

in Etosha elephants. So far 60 carcasses had been located and decontaminated by burning. (It takes 11 dump-truck loads of wood to make a proper funeral pyre for a full-size pachyderm.) Ian was eager to check the blood of live free-roaming elephants and rhinos for the disease and to inoculate some of them with an experimental vaccine.

"This is the most potent, yet relatively safe, immobilizing drug I've worked with so far," he said, holding up a vial of carfentanyl, a morphinelike compound recently developed in Belgium and sent to him for field testing. I watched as he put ten drops in each of two darts.

Twelve minutes after the darts hit, two bull elephants lay sleeping at our feet, and my hands were exploring the geography of their trunks and feet. Five minutes after Ian completed his vaccination and injected an antidote to the carfentanyl, these two of our largest land mammals rocked up and walked away as though they had never broken stride.

"If I had wanted to move them somewhere," Ian went on, "I would have partially revived them with a smaller dosage of antidote, then injected a long-acting tranquilizer. After that they might have gone along under their own power."

THIS is exactly what a herd of Asian elephants did recently when Etosha's veterinarian was called upon to help rescue the animals from a Sri Lankan forest fast becoming farmland and take them to a national park.

Having removed a lot of the risk from certain wildlife tasks, Ian has a knack for putting it back into others. On the moonlit night we spent censusing rhinos at a water hole, he kept creeping closer to identify individuals by scars, horn length, tattered ears, and other characteristics. Fine. Except that suddenly, from an unexpected direction, a cow rhino with a calf entered and charged him before he realized they were there.

Soon afterward he was back at poolside, just a couple of impala leaps away, when another cow rhino with calf challenged an incoming elephant over rights to a drinking spot, stamping, snorting, and making bluff rushes. The elephant—a young male—fortunately called her bluff by reaching his trunk into the water and proceeding to hose down the apoplectic mother rhino.

Every water hole around the pan sorts the rhythms of Etosha life a bit differently, for no two pools reflect quite the same contours (concealments for the hunters) or vegetation (food supplies for the hunted). The fountain

Breeding herd of elephant cows and young drink at Agab water hole.

Fleeing human encroachment, elephants have flocked to Etosha.

Danger from above *nearly ended a bat-eared fox kit's experience of the world beyond its den on one of its first days out of the burrow. Left briefly in the open while its parents were moving dens, the kit—whose folded-down ears show its extreme youth—was attacked by a pied crow that lifted it a few inches* ***(top right)*** *but found it too heavy. When dropped, the five-inch-long fox turned on its attacker* ***(right center)****. Whenever it fled, the crow would again try to lift it, and the kit, when freed, would chase its assailant* ***(above)****. The vixen's return ended the contest in the kit's favor* ***(right)****.*

called Klein Namutoni, filled with Egyptian geese and egrets, flows near Namutoni, once a colonial army outpost, the easternmost tourist camp. Because it also borders a forest of tall tambotie and *Terminalia* trees, it is a favorite of the leaf- and twig-eaters, especially ballets of giraffes.

IN THE COMPANY of Jen and Des Bartlett I saw my first leopard there at dusk. "Can you make out the necklace shape of her neck markings?" Jen asked. "She's the one we've watched stalk dik-diks with her cub by the loop road through the woods."

Toward noon the next day, I pulled in past groups of kudus and impalas to Chudop, where the turtles snatch doves as the birds wade in to drink. Above the tall reeds that form an island in the center of this pool, the yellow-billed kites hover, catching flying insects, while someplace in the depths of those reeds an 18-foot python waits for bulkier prey.

"Keep a sharp eye out for a hunt by Miss Koinagas," Des instructed as I was leaving for the spring of that name. "Even working together, the big lion prides only average about one kill for every twelve chases. Miss Koinagas lives apart with her three young cubs for company. But she hauls down one out of every three animals she goes after."

The Bartletts' lifework of portraying nature on film has taken them from Arctic tundra to tropical forests, and finally brought them to Etosha in mid-1978. They planned to stay four months; they never left, nor do they intend to for some time.

Among other projects, their photographic interest in lions developed into a detailed study of this predator's movements and social relationships. Over the years Jen and Des and their daughter, Julie, have assembled sketches and notes that identify the individual physical features and behavior of some 200 different Etosha lions.*

Equally fascinated by the smaller beasts, Jen and Des gave me directions to the best tree for viewing a family of elephant shrews. I met the trunk-nosed insectivores in a copse of thorny acacias on the plains not far from

*These wildlife photojournalists reported on four and a half years of fieldwork among Namibian lions in the December 1982 NATIONAL GEOGRAPHIC.

the twin hills of Halali, where a second tourist camp is located, 35 miles southwest of Namutoni.

The last of the three Etosha tourist camps is situated by park headquarters at Okaukuejo near the southernmost tip of the pan. A short commute from Okaukuejo along the western edge of the pan took me to a water hole that would become one of my favorites, Okondeka.

Okondeka had the only shade trees for five miles and legions of gemsbok and springbok. These antelope never used the shade; 14 to 18 lions with golden gazes did.

Just as Namibia's elephants are thought to be the tallest in Africa, the lions here outweigh most others, and the Okondeka pride has probably the largest lions in Etosha. On the other hand I would see a dozen of the huge Okondeka cats disappear completely among water-hole-bordering rushes I might have sworn couldn't hide a young jackal.

Here, then, were a dozen excellent reasons the park requires visitors to stay in their cars, particularly since the Okondeka pride is descended from a gang that ate several people years ago.

It was to the shade of the same tree where the lions had caught their human prey that I helped Hu Berry and four assistants carry a 570-pound male he had just darted. Hu intended to mark the lion for identification with an unobtrusive brand as part of his wide-ranging study of Etosha's lions, whose population in proportion to prey is three to four times as dense as on the savannas of a typical East African park such as Serengeti. Had he darted a female, she might have become one of those he is putting on the pill—as everyone here calls it. Actually, Hu at first used injections of Depo-Provera, the same six-month contraceptive millions of women have used. Recently he changed to a capsule implanted under the skin; its slow release of synthetic hormones may prevent pregnancy for several years.

I wondered whether birth control didn't go too far in tampering with the "wild" in "wildlife," particularly with the lions, the queen and king of beasts. Hu reminded me of another highly unnatural intrusion in the natural pattern—the fence. In 1973 it cut off most of the Andoni plains, the northern rim of a wheel involving the annual migration of tens of thousands of wildebeests, zebras, and springbok. Blocked, the grazers cropped the same pastures at least twice a year along the eastern and southern pan-edge sweetveld, causing partial replacement of perennial grasses by thorn scrub. Springbok could exploit the invading shrub. Zebras and wildebeests could not, and started to decline. Their problems were intensified by the park's former practice of suppressing wildfire. Too late, the managers realized the importance of natural blazes in burning back woody plants while recycling nutrients that stimulate grass growth.

Even as zebras and wildebeests became less abundant, lions found them easier to kill; because of the fence they no longer roamed as far or as often. Moreover, during

Masterful craftsmanship *goes into the masked weaver's nest building* **(above)** *as it plaits fresh, pliant blades of grass during the rainy season. "We'd have a job doing with two hands what he does with one beak," says Des Bartlett. But the artistry was to no avail at another nest when a boomslang, a poisonous tree snake, ate one chick in the nest and emerged with another* **(right)**. *Only minutes before, the Bartletts had watched the mother feed the chicks praying mantises.*

Menagerie in the wild: *A gallery of Etosha portraits suggests the park's great variety of mammals.*

A nocturnal insect hunter, the big-eyed bush baby ***(clockwise from left, below)*** *rarely leaves the trees in which it lives. This African representative of the lemur family makes astonishing leaps through the branches.*

A colony of ground squirrels stands alert to watch a jackal pass their burrows. Plains animals, they shade themselves with their tails while foraging for seeds, plants, and bulbs.

The diminutive dik-dik stands scarcely higher than a hare and depends on woodlands for both cover and shrubbery on which it browses. The little antelope rarely needs to drink, getting moisture from food.

Spiral horns of a greater kudu shine from sharpening on bushes. Another woodland dweller, it does not migrate.

Yellow mongooses at times share burrow systems with ground squirrels. Returning from an overnight hunt, a father is greeted by three youngsters at their burrow entrance.

The epitome of speed,

cheetahs may be dwindling in numbers within the park, largely because they cannot compete with lions. The cheetahs can also be driven off kills by hyenas.

Horns serve as a back scratcher for a gemsbok, most desert oriented of Etosha's antelope. Found throughout the park, gemsbok range the pan to feed on islands of grass.

First act and last rites *counterpoint the life-and-death drama of the young in a pitiless environment. Fresh from the womb, a baby springbok instinctively nurses after gaining its feet (**facing page**). In just a short time, the pair will rejoin the relative safety of the herd.*

*When drought killed a three-month-old elephant, its mother tried for hours to rouse it (**above**). Its family stayed behind as the herd headed for water. Standing with her back to the sun when the heat grew too great, the mother touched the calf with her hind foot at all times. "She'd turn and roll it as if to say, 'Come on, get up,'" says Jen Bartlett.*

the wet season when herds disperse from water holes and lions used to have their leanest times, anthrax provides fresh carcasses to scavenge. After the park graveled tourist roads to keep down the fine Etosha dust, anthrax spores became concentrated in rainwater-runoff-filled gravel pits. The pits serve as major water holes during the dry season. Predators and scavengers spread anthrax further through their droppings and by dragging about infected carcasses.

Between the fence, anthrax, and lions, wildebeests have dropped to around one-tenth their pre-fence numbers, zebras to one-half. Springbok continue to proliferate, making use of the encroaching shrubs in dry months, then grazing down new sprouting grasses so heavily that the pastures have little chance to restore themselves. Lion prides still prefer to hunt the bigger grazers, but are fleshing out their diet with springbok, formerly left largely to cheetahs. And since lions drive off or kill competitive cheetahs, those sleek carnivores, which are also hard-pressed to defend their meat from anthrax-increased numbers of scavenging hyenas, seem to be growing scarcer in Etosha.

TO SWING the complex balance of this plains ecosystem back toward zebras, wildebeests, cheetahs, and perennial grasses, obviously the northern section of the old migratory wheel should be reattached.

But this region, Ovamboland, is in political turmoil, poised between the South African-backed government of Namibia and Angola-based Marxist-oriented guerrillas of SWAPO (South-West Africa People's Organization). The park is not pressing the Ovambos to cede or sell land.*

A more immediate solution would be to cull (read: remove by shooting) springbok. The meat could be distributed to nearby tribes. Another possible solution would be to cull lions, as was tried in South Africa's Kruger National Park—without success; more cubs than ever survived to compensate.

Or you could put lionesses on the pill, if you can stand some controversy. Biologist Hu Berry, who is trying that, carefully qualifies: "I have to *(Continued on page 380)*

*Namibia's struggle for independence was reported by Bryan Hodgson in the June 1982 GEOGRAPHIC.

Jumping for joy, *a springbok "pronks" in stiff-legged leaps (**left**), behavior that sometimes signals alarm but also seems to express exuberance, often observed in the cool of evening or after a rainstorm. "It seems a fun thing to do," says Jen. "Makes you want to do it too."*

*The favorite prey of cheetahs, springbok are among the world's fastest animals, reaching top speeds of more than 40 miles an hour (**below**). Well suited to desert conditions, they outnumber all other park mammals, with a population perhaps as high as 30,000. In rut, males tangle in rough-and-tumble sparring (**bottom**).*

Lethal game *of touch-tag explodes as lionesses spring from a horseshoe-shaped ambush upon fleeing springbok* (**above**). *After feeding overnight on a kill, another pride lines up to drink with still bloody faces at an Etosha*

water hole. Limitations on their prey's migration range, man-made water holes, and the carcasses of anthrax-killed herbivores to feed on have caused Etosha's lion population to swell to about 500.

Hoodwinking *would-be predators, the Cape penduline tit performs an elaborate charade in a nest ingeniously designed to protect its young. Upon arriving at the nest—a waterproof sack woven from plant fibers and spiderwebs—a parent bird goes into what appears to be the entrance (***left***). Soon, however, it looks out and, seeing no danger, reaches up to tug at what seems to be an awning over the entrance (***below left***). This opens to reveal a hollow tube: the real entrance to the nesting chamber (***below***). In theory, at least, snakes and other predators will investigate the false chamber through the dummy entry and, finding it empty, leave eggs and chicks safe in their concealed compartment above it.*

*After feeding its young, the parent peers cautiously from the tube (***right***) before flying out to land on the lower entry and push the tube back into place with the top of its head. Sticky spiderwebs hold the flexible entrance shut until the parent returns again.*

Direct hit snares a grasshopper meal for a chameleon. In the micro-second

(Continued from page 372) emphasize that we are not really attempting to control the lion population at this stage. Only testing a few lionesses to determine if contraception is a realistic tool to apply together with our long-term efforts to control anthrax and burn sections of the veld each year. We may need every tool we can find."

ETOSHA'S ELEPHANT population has also been soaring. Badly overhunted before the turn of the century, Etosha elephant herds were not commonly seen again until the 1960s. Biologist Pete de Villiers, then with the Etosha Ecological Institute, told me the park is now home to 2,400 elephants.

Some of these broke down fences to get into Etosha from faraway ranges where they were harassed and fired at. They are a smart race and seem to have figured out that the park is a haven. They also appear to know where they can successfully raid the park's immediate neighbors.

To hold its elephants in, Etosha is building the "fence of fences" along its eastern boundary and short segments of other borders so frequently broken by pachyderms that rangers couldn't keep up with repairs. How do you elephant-proof a fence? With

Telltale trophy: *At a burrow system shared by mongoose and bat-eared fox families, both one day were gone. Instead, a honey badger emerged gripping a severed length of python* ***(left)****. The Bartletts surmise that the snake invaded the burrows and remained, engorged by its prey, while survivors fled. The badger, legendary for its strength and ferocity, chanced upon the snake, killed it, and remained to feed.*

Threatening only to the ants and termites that it eats, a well-armored pangolin ***(right)*** *flicks water with its wormlike tongue.*

of impact, the lizard's sticky tongue stretches out longer than its six-inch body.

two railroad rails welded together for posts and anchored in concrete, stout logs for inner posts, and thick braided-steel cables strung between them. It costs about $20,000 per mile, but the payback is continued good-neighbor relations and the worth of the elephants themselves, which would otherwise be shot.

Ironically, the park will end up shooting its own elephants. The better the park protects and confines these long-lived giants, the more they threaten the reserve with forest-mashing overpopulation. The solution, culling, is a bitter one for Etosha, since most of its elephants have grown so tame. I spent hours close enough to them that they shaded my car.

One duty of Etosha rangers is to saddle up horses and round up escaped elephants to bring them home to the park; also to escort native cattle back through elephant tears in the old game fence. The horse I rode through roadless mopani woodland east of Halali with rangers Trygve Cooper and Mike Heywood was named Blitz. He had been raked once by a lion, but Mike had since taught him and Naughty Boy, his own mount, to stand and keep their heads if they chanced on a big cat. Trygve and Mike were just looking over their area this day, noting the

Called by rains, *flamingos from throughout the continent descend on the pan by the tens of thousands when it partially fills with water. In years of heaviest rainfall, flamingos build raised mud nests on the pan. When waters recede before*

young mature—as happened in 1969 and 1971—disaster threatens. In 1969 park staffers mounted Operation Flamingo, trucking thousands to other water holes. In 1971 the unfledged chicks trekked 50 miles to survival.

Catch-as-catch-can *is Etosha's fundamental law. Primarily carrion-eaters, marabou storks have been known to prey on flamingos, but one at Ombika water hole learned how to go after large doves—behavior never before reported. The Bartletts conclude that it was triggered by the abundance of doves following a rainy season when the birds raised several broods under unusually favorable conditions. "When you get a plentiful food supply, something will learn how to exploit it," says Des. Some doves escaped (***above***). Some did not (***right***). A guinea fowl looks on with disinterest. In this enormous piece of Africa, carefully managed to remain wild, survival is the only occupation.*

direction of new elephant trails, checking scrapes left by rhinos as territorial markers, and counting animals in a hidden meadow around a lovely natural water hole called Tsam. From what I could see, it takes long hours of patient bushcraft as well as innovative technology to run a zoo this huge.

Even without its cagelike fence, Etosha would still be only a sample—huge but nonetheless incomplete—of the old ecosystem. For when nature truly took its course here, the elephant, lion, zebra, eland, and other species often swung far out from the pan toward Angola, Botswana, and South Africa, avoiding drought. They were spurred onward by wet years, breeding with groups rivers and mountains away, which in turn bred with groups even more distant, moving freely, endlessly, until gene pools swirled across the continent like pollen. Today most of Africa's communities of creatures are nearly as solidly bounded by crowded human development as Etosha is by wire. Many parks suffer outright invasion by livestock, subsistence farmers, and armed gangs of poachers, which make Etosha's ecological problems almost enviable.

It is much the same across the planet. The era of earth's history dominated by great, wide-ranging mammals has come to a close. The shape of the era to come depends on how we manage—or mismanage—our wildlife heritage. If we are to preserve a world of humans and animals, each adjusting to the other's needs, each necessary for the continued well-being and wholeness of the other, we must learn the best ways to reconstruct nature's vital system, refuge by refuge.

Someplace like Etosha—on the African Continent, where evolution has been fine-tuning the animal communities within a mosaic of woodlands and savannas for more than 50 million years, where the antelope family alone has some 70 separate kinds of living members, where our own family began to rise—would be a good place to start. I hope. But, lately, terrorist activities and skirmishes between South African and SWAPO troops have grown more frequent near Etosha's borders—a reminder that no one can be certain what form the government of Namibia will assume, much less what its commitment to wildlife will be.

THE DROUGHT in Etosha wore on beyond the last days of my trip. A few quick showers left a sprinkle of green here and there. The real rain hung back to the east—jealousy rain, everyone called it, falling on your neighbor.

It was the middle of the night of December 21 when a deluge, harbinger of the drought's end, finally came. At first light it was still pouring. I danced in the only soft air I had felt in Etosha. Fog lay over the plains, and game trails turned into ribbons of water.

I passed tortoises suddenly on the move. The springbok were sodden; their white rump patches stood flared to dry. The females were swollen with soon-to-be-dropped young. Zebra stallions, yearlings, and heavy-bellied mares were sweeping southward with the wildebeests toward dark cloud banks and new pastures. It was a fine morning for man and beast. □

HERBS

For All Seasons

By
LONNELLE AIKMAN

Photographs by
SAM ABELL

A *RENAISSANCE* is blooming across the United States and around the world. You read about it in multiplying numbers of books and magazines on how to grow and use seasoning herbs; how to make herbal teas for pleasure and health, and how to treat sickness with once scorned folklore plants.

You can sense—and sometimes sniff—this back-to-nature trend in health-food stores and supermarket displays. They feature herbs not only for cooking but also for cosmetic use in lotions, lipsticks, shampoos, hair conditioners, and similar products that woo buyers with fragrances and promises of everlasting beauty.

Industrial chemists, too, are discovering unsuspected natural resources in many common herbs. From the brown berries of the wild jojoba comes a waxy oil with properties similar to the far more costly sperm whale oil prized for lubricants.

One species of the *Euphorbia* genus is a weed known as the gopher plant, but it has earned a new name as the gasoline plant. It yields a milky latex containing hydrocarbons that can be refined into substitutes for crude oil and gasoline.

Such varied contributions from the many-sided kingdom of herbs raise a perennial question. What *is* an herb?

The dictionary says that this class of plants dies down after a growing season and does not develop persistent woody tissue. But that definition does not take into account the many plants universally recognized as herbs—the lavender shrub,

say, or even trees, like the "green bay tree" of the Bible, whose leaves give a unique pungent flavor to soups and stews.

MANY herbalists consider any useful plant to be an herb—a suggestion that opens the door to an endless maze among hundreds of thousands of species.

I like best the definition given me by John MacGregor, the dedicated horticulturist at the Huntington Botanical Gardens in California. Together with the Huntington Library and Art Gallery, these famous gardens draw half a million visitors a year.

"In everyday usage," said John, "herbs have traditionally come to include any plant valued for its flavoring, aromatic and medicinal qualities, or, in the case of one used as a dye, for its coloring matter."

I once attended a Greek-style dinner whose every course was enhanced by herbs picked from our hostess's garden. For hors d'oeuvres we had a red caviar dip, blended with cream cheese, lemon juice, minced chives, and chopped parsley. Then came other cheeses, combined with dill, parsley, and oregano and folded into Greek pastry.

The lamb shish kebab had been marinated in olive oil, wine, and lemon juice, plus rosemary, oregano, thyme, garlic, and marjoram. With it went rice pilaf under a yogurt sauce containing spearmint and dill.

Our Greek salad was seasoned with sweet basil, thyme, oregano, garlic, parsley, and spearmint. And for dessert, honeyed butter cookies were topped by crystallized rose petals.

In this single meal I counted a dozen major herbs whose aromatic trails have wound in and out of human history since early recorded time. Chives, the mildest member of the onion family, still grow wild on the mountainsides of Europe. Because chives stay green most of the year, they have been cultivated for countless centuries in kitchen gardens.

Parsley, a source of iron and vitamins A, C, and E, is a common herb of the Mediterranean area and was well known to the ancient Greeks, who thought it too sacred to eat. Romans did serve it as a garnish and to improve the taste of food. They believed it would keep them sober. Henry VIII thought there was nothing like parsley sauce to accent the flavor of fish.

"Rosemary, that's for remembrance," wrote Shakespeare in *Hamlet*, referring to the custom of decorating weddings and funerals with the fragrant sprigs of this evergreen symbol of never fading love.

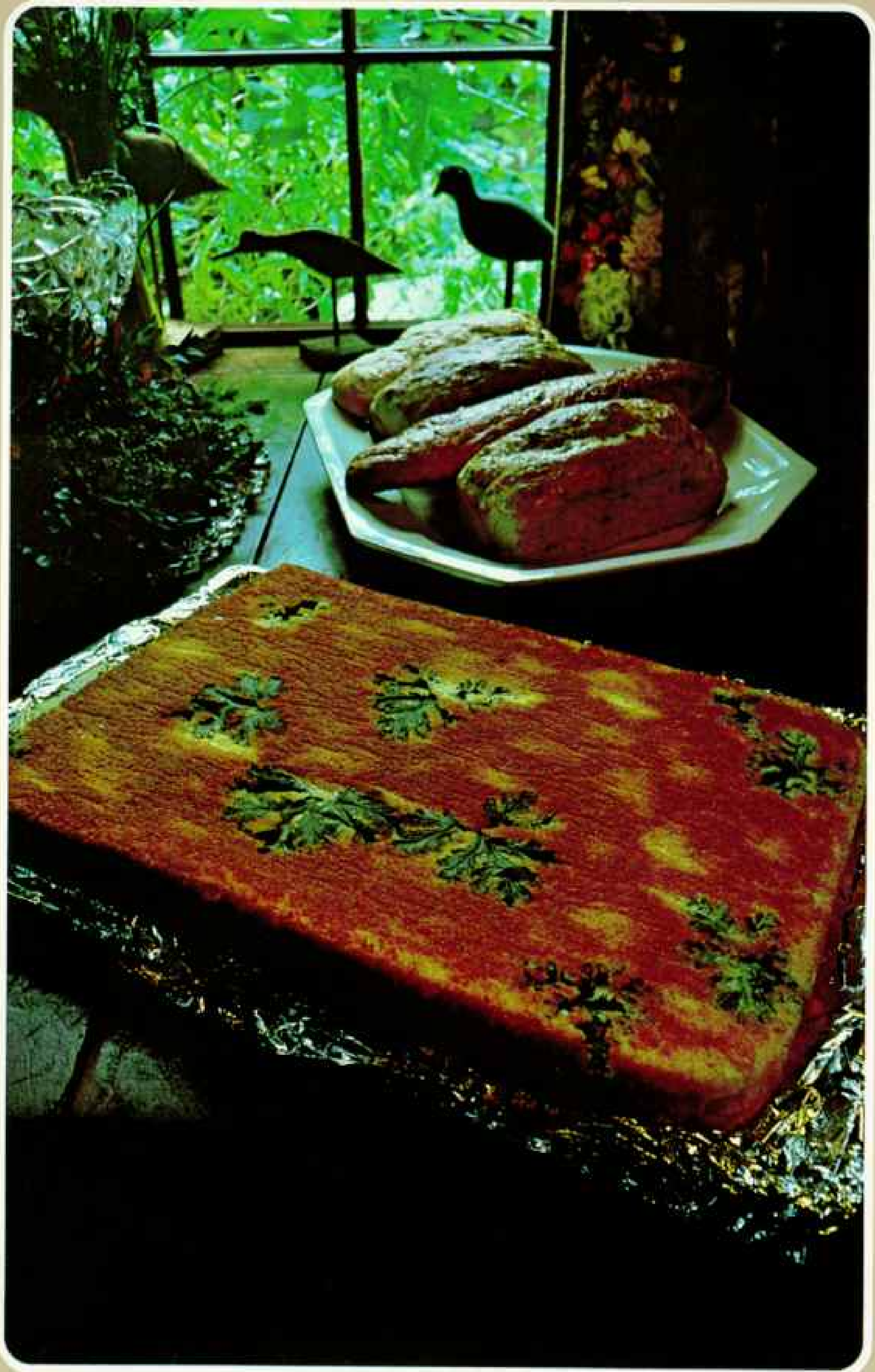
Herbalists regard rosemary preparations in warmwater baths as invigorating and helpful in easing painful joints. "Smell it oft," went a suggestion in *Banckes' Herball*, printed in London in 1525, "it shall keep thee youngly."

Basil, whose tangy essence has made it one of the most popular of all-around seasonings, has a controversial history in other respects. A sacred plant in ancient Hindu religion, it was handled warily by European herbalists of the Middle Ages, who feared it as a scorpion breeder.

Some herbs, pungent sage and dill, for example, do not mix well. But the companions of our dinner menu—thyme, parsley, rosemary, and marjoram—are often combined in a bouquet garni that gives a mellow glow to roasting meats, fowl, stocks, stews, and other fare.

Considered individually, every herb has its own biography, its distinctive characteristics, cultivation

Busy herbalist Adelma Simmons (above) covers the field. At Caprilands, her 50-acre herb kingdom at Coventry, Connecticut, she rises at dawn to write books on herbal fact and lore. Noon finds her giving lectures to herb devotees before an herbal luncheon including such fare as rose-geranium cake and herb bread (right).



needs—and partisans.

"To me, thyme is the queen of herbs," remarked chef Henry Haller of the White House, when he showed me around the Jacqueline Kennedy Garden, which was conceived soon after President Kennedy's Inauguration. "Thyme is good for all kinds of meat and stuffings. I use rosemary for chicken and pork," he added, "and we get tarragon for vinegar and French sauces."

THOUGH THE ROSE is not generally regarded as a culinary plant, its alluring scent puts it well within the herbal definition.

The ancient Greeks and the imperial Romans made perfumes and medicines from petals and other parts of the rose. With the modern discovery of the rich vitamin C content of rose hips, we know now that their medical pioneering was rooted in sound pharmaceutical principle.

Our own rose-petal dessert recalled the apothecary's rose of the medieval town of Provins, France. The name hints at the delicious fragrance—and the sweet smell of success—that this rose gave to the town's dual industries—apothecary and confectionery—that lasted from the 13th century almost up to the present. According to town records, many famous characters, from Joan of Arc to Napoleon I, enjoyed the apothecary's honey-treated concoctions.

Every age has produced a particular herbal culture and reflected it in religious rites, superstitions, and daily tasks of cooking and medication.

Some nations, notably China, have never lost faith in herbal remedies. Along with contemporary methods of Western medicine, they still use traditional prescriptions known for centuries, even for millennia.

As interest in herbs spreads worldwide, scientists of both industrial and developing countries are looking back to folklore's raw-plant materials for clues to more effective and safer drugs of the future. In fact, nature's handouts provided virtually the only drugs available to any physician before 19th-century chemists began isolating and analyzing the healing properties of medicinal herbs. From these models came much of today's pharmaceutical industry.

As chemical science advanced in 20th-century laboratories, man-made synthetics and semisynthetics were gradually developed from plant blueprints. Then came mass-produced, purely chemical copies. Often simpler and more precise than mother nature's compounds, they now flood commercial markets.

Even so, it is estimated that roughly 50 percent of the millions of prescriptions filled in the United States still contain some natural products. Of the 25 percent extracted solely from plants, many remain surprisingly important.

Morphine, whose crude substance was scraped from opium-poppy heads at least 5,000 years ago, has never been profitably synthesized. And no other drug has been more precious for pain control, though sometimes at high cost in addiction and misery.

The garden plant called purple foxglove, or digitalis, holds in its leaves the formula for drugs widely prescribed for heart failure and other cardiac ills.

One of the most successful treatments yet developed against childhood leukemia and Hodgkin's disease was launched in the 1950s after a minute amount of the cancer-fighting principle was isolated from the leaves of the Madagascar periwinkle.

East Indian snakeroot was dried and powdered more than 2,000 years ago and fed to mentally ill people struck with "moon madness." In natural and synthetic form, its derivatives now supply physicians with a leading drug to reduce high blood pressure.

Common aspirin is totally synthetic today, but its natural ancestor was an active compound found in the drooping willow tree studied by the first-century A.D. pharmacologist-naturalist Pedanius Dioscorides.

Traveling extensively along the Mediterranean shore, Dioscorides managed to collect hundreds of plant, mineral, and animal specimens. He then illustrated and described them in a massive medical work that became the respected pharmacopoeia of the profession for the next 1,600 years. In it Dioscorides noted that juices from the bark and leaves of his white willow eased aches related to colds and fevers treated now by the small white tablet familiar around the world.

MODERN HERBS find increasing use as substitutes for salt and sugar, for synthetic sleeping pills and energizing

drugs. Instead of table salt, some doctors prescribe—and herb fanciers prefer—dried and ground herbs to add interest to food. Combinations may include winter and summer savory, cumin, coriander, sesame and mustard seeds—or whatever pleases taste.

For patients denied refined sugar, there are alternatives in many kinds of herb honey. Weight-watchers can make desserts with herbs such as sweet cicely or licorice. Herb-book recipes recommend grinding leaves, blooms, stems, or roots to sprinkle over nonsweet desserts or to cook into cakes, pies, and preserves to satisfy a sweet tooth.

From time beyond memory, herbal teas have been brewed as sedatives, on one hand, and to promote alertness on the other. Herbalists consider tea made from valerian root to be one of the best tranquilizers known.

As a coffee substitute to keep awake for an exam or to finish an office job, herb lovers suggest drinking a tea from ginseng, ginger, or borage, the "happiness plant" of the ancients. But health authorities caution against careless use of any herb.

Long before advertising copywriters linked romance to fresh breath, the lovelorn chewed aromatic herbs with similar notions. Some herbalists are returning to the old ways, forsaking the bottle in the cabinet for such aids from nature as wintergreen, anise, or one of the many scented mints.

Gardeners who worry about side effects from synthetic pesticides also are turning to natural products—to pyrethrum from chrysanthemums, or rotenone from derris roots and stems. A new and more potent insecticide is now being developed from the garlic-smelling seeds of the neem tree, native to India and anathema to bugs.

"We've just planted neem seedlings in our industrial plot at the New York Botanical Garden," said Eleanor Gambee, past president of the Herb Society of America. "Researchers report that the insect-repelling extract is nontoxic to warm-blooded animals, and thus an environmentally safe pesticide."

Where do all the herbs come from to meet this surging demand? The answer lies in countless gardens, from apartment window boxes and backyard experiments to the huge commercial enterprises that supply world markets.

"We sold more than a million plants last year," said Kent Taylor when I visited his farm-and-factory operation in Vista, California. "We ship wholesale orders, up to 50,000 plants each, in multiple sets of boxes."

Virtually every state in the Union lists other big and little

Living geiger counters, the stamen hairs of spiderworts change from blue to pink when exposed to radiation and air pollutants.

herb gardens and nurseries. The hostess at our Greek-style dinner owns one of the small herb-growing farms springing up everywhere.

Maria Price promotes her Willow Oak Flower and Herb Farm at Severn, Maryland, by talks at garden clubs and craft fairs, and by "festivals" in her barn, where she sells such things as herb perfumes, teas, seasonings, antimoth bags, and tussie-mussies. Small posies of mixed herbs, tussie-mussies have been known since the Middle Ages, when people carried them to ward off disease.

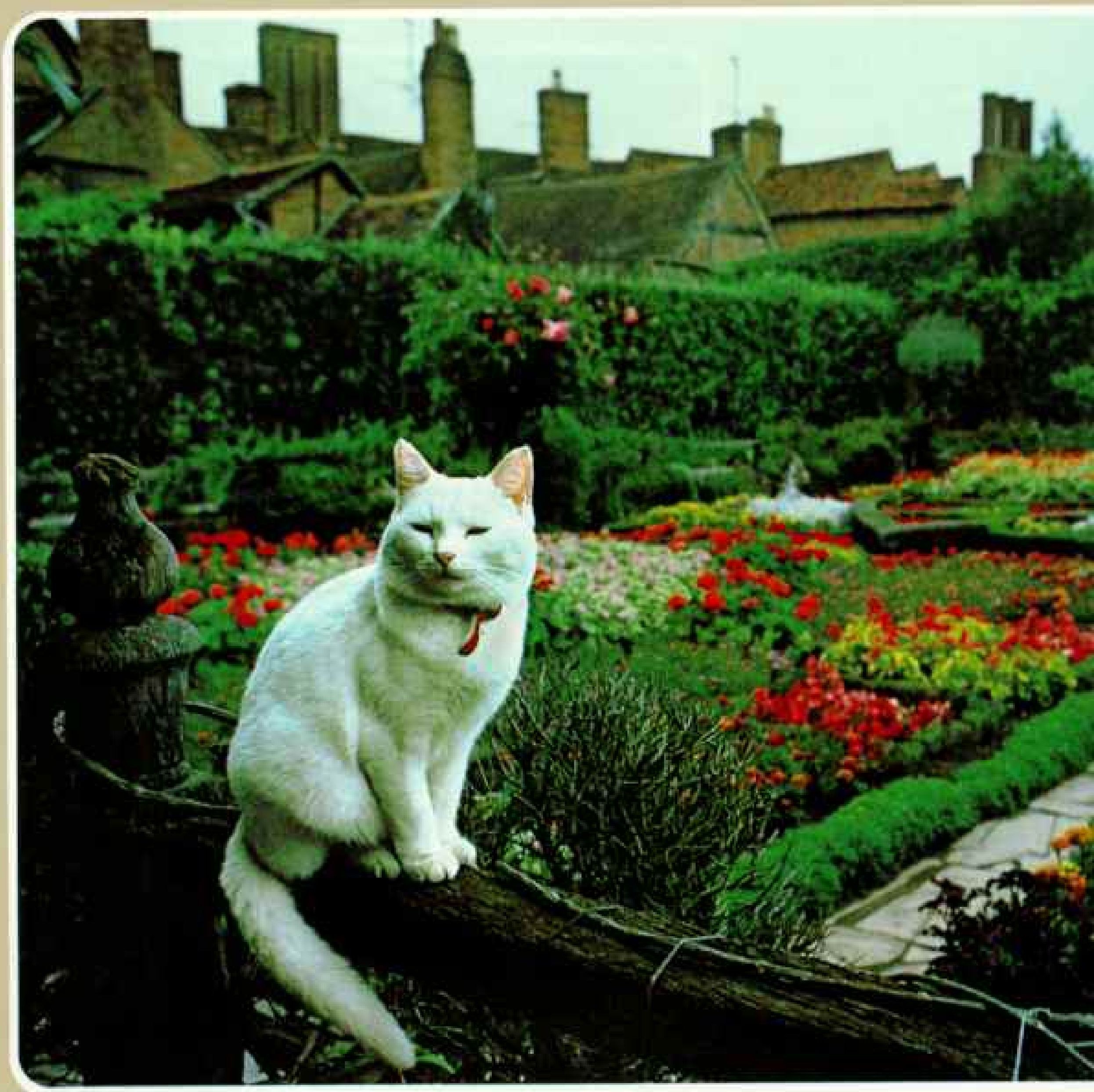
NOWHERE is popular fascination with herbs more evident than in the public gardens of the United States and England.

At Colonial Williamsburg in Virginia, tourists flock to re-created gardens where men and women in period costume demonstrate how medicinal and household herbs were used.

In restaging scenes our ancestors knew, the actors dip skeins of yarn into dyebaths of marigold orange, day-lily yellow, and walnut brown, and make candles from boiling beeswax redolent of bayberry.

To this herb seeker the Williamsburg experience came full circle in the great exhibits and historic gardens of England. That nation's oldest botanical garden, founded at Oxford University in 1621, is still a center for plant science and education.

So is the Chelsea Physic Garden, born 50 years later, and active ever since in



medicinal-plant studies. "A current program," curator Allen Paterson told me, "involves the rye ergot fungus, long used to aid childbirth and recently to ease migraine."

There are the Royal Botanical Gardens at Kew, on the Thames, whence for two centuries plant explorers have gone out to change medicines and economies of the world.

The gorgeous displays planted for kings and queens at Hampton Court Palace lure visitors from everywhere. And the lovely Elizabethan garden at Shakespeare's home has imitators but few equals.

In the United States an ambitious newcomer has joined leading botanical institutions. The National Herb Garden, dedicated in June 1980 at the U. S. National Arboretum in Washington, D. C., is devoted exclusively to herbs. The largest of its kind, it is Uncle Sam's bid for a place in the international sun.

"Doctors come here to study drug plants in the medicinal garden, one of our ten specialty sections," said curator Holly Shimizu. "Historians check herb species in our colonial and American Indian plots. Businessmen inquire about the future of promising industrial herbs and new perfumes, beverages, and dyes to be extracted from still unexplored plants."

In the hidden treasures that lie within the herbs pictured on the following pages, nature speaks to us not only of beauty and history but also of hope and progress. * * *

"I know a bank whereon the wild thyme blows"

A MIDSUMMER-NIGHT'S DREAM, ACT II, SCENE I

Shakespeare garnished his plays and sonnets with herbs, and "Shakespeare Gardens" abound throughout the world. Thousands of visitors every year see the real thing at the bard's home in Stratford-upon-Avon (left).

An abiding tradition begun in medieval times to ward off the plague, herbal bouquets known as tussie-mussies, or nosegays (above), are still carried by English judges.

The National Herb Garden

GENTLE TOUCH befitting a true herb lover was but one qualifying credential of the National Herb Garden's 27-year-old curator, Holly Shimizu (***above***), here at the garden's dedication in June 1980. Her experience included three years at great arboretums of Europe.

Administered by the U. S. National Arboretum in Washington, D. C., the two-acre garden represents a dream fulfilled for the Herb Society of America. Some 1,500 members, celebrating the society's 50th anniversary, raised $500,000 for its construction.

Fringed by small herbal trees, the National Herb Garden's two acres are divided into three "rooms." A brick terrace overlooks a Knot Garden (A), fashionable in Elizabethan England. Dwarf evergreens form the knots in this version, ivy and crushed brick provide the fill. Next, visitors pass through the Historic Rose Garden (B), with species long used for medicine, perfume, food, and pleasure. In May and June, French, damask, alba, cabbage, China, and rugosa roses are in full blossom. The third area (C) holds nearly 1,000 species in ten specialty gardens:

1 Dioscorides' Garden includes medicinal herbs from the pharmacopoeia compiled by the Greek physician around A.D. 60.

2 The Dye Garden is planted with herbs that are still used for coloring.

3 The Early American Garden contains both New and Old World herbs.

4 The American Indian Garden features herbs native to the U. S.

5 Plants in Medicine is devoted to medicinal herbs.

6 The Culinary Garden holds a collection used for both food and flavoring.

7 The Industrial Garden is planted with sources of fuel, oil, pesticides, fibers, and other industrial products.

8 The Fragrance Garden has plants historically used for natural scents.

9 The Oriental Garden contains herbs that come primarily from Japan, China, and Korea.

10 The Beverage Garden holds plants used for teas, liqueurs, and other drinks.

Necessities of a colonial garden

RETURNING to colonial roots, a group in Camden, Maine, listens intently to Connecticut herbalist Joy Logee Martin (***right***). To ease wilderness life, colonists placed almost as much faith in herbs as they did in God, harvesting for teas, tonics, dyes, insect repellents, deodorants, and medicines. A lucky mother would have at hand a leading herbal—such as that written in 1597 by John Gerard. If not, she might mix several herbs, trusting that at least one would cure her sick child.

Native plants, like bloodroot and goldenseal, whose secrets were learned from the Indians, made welcome additions to the backwoods pharmacy. Likely named for the vestments it resembles, the cardinal flower (***below right***) was used to treat cramps and fever.

But many of the herbs were themselves immigrants, carried as seeds in the hems of women's garments. Love-in-a-mist (***below***) boasted both medicinal benefits and a seed for nutmeg-like flavoring. Tansy (***middle***) satisfied a host of needs. A natural insect repellent, it was rubbed on meat to keep flies away and also used as a strewing herb on floors, an embalming agent, flavoring, tonic, and yellow-green dye.

One of the world's best known dye plants, the saffron crocus (***far right***) was imported for both its culinary and medical uses. Gerard wrote: "The moderate use of it is good for the head, and maketh the sences more quicke and lively."

NIGELLA DAMASCENA

LOBELIA CARDINALIS

TANACETUM VULGARE

CROCUS SATIVUS

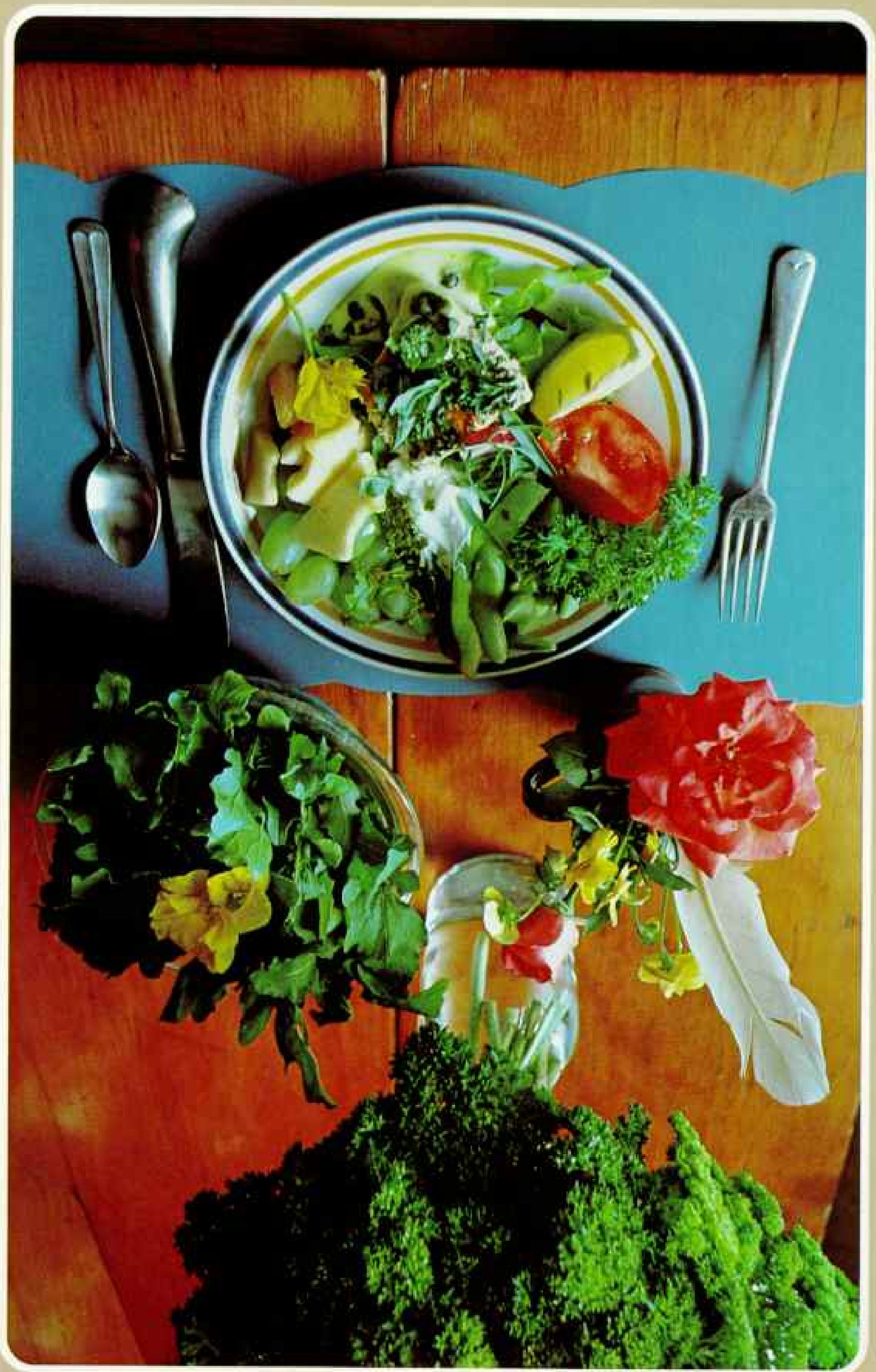
A flavorful bounty

THE CULINARY arts that distinguish one nation's cuisine from another's are based largely on the wise use of herbs. More than just embellishment, they heighten the senses of smell, sight, and taste, thus stimulating appetite and aiding digestion.

Though some plants—like peppers and onions—are eaten as garden vegetables, their virtues as flavor enhancers qualify them as herbs. Valuable addition to any herb garden, the Welsh onion (***lower left***) provides good salad makings practically year round. Two onion relatives are joined by nature in garlic chives (***top right***), whose growth is encouraged by nipping the flowers. Like all chives, they are used uncooked, chopped in salads, dips, or vegetable dishes. Known as *herbe royale* in France, sweet basil (***top left***) improves almost any dish. But its affinity for the tomato and its key role in pesto sauce make it indispensable to Italian cooking.

Equally important to Mediterranean cuisine is thyme. Many relatives of the hardy lemon-scented species (***lower right***) grow wild on the heaths of both northern and southern Europe. Staple of the "French method" of cooking—a pinch of this, a pinch of that—thyme is almost always present in a bouquet garni, a small bundled mixture of herbs simmered in stews, soups, and sauces.

Fresh is best when it comes to herbs, as their increasing presence in produce bins and natural-food restaurants attests. At the Golden Lamb Buttery in Brooklyn, Connecticut, whose owners, Bob and Virginia Booth, specialize in herb cookery, freshly harvested plants add zest to the fare. This meal (***right***) includes a salad of garden rocket with dill dressing, crab meat garnished with fresh tarragon, and liberal doses of garlic. "I use more garlic in a month than most small restaurants would use in a year," says Virginia, who is also a proponent of the herb's acclaimed healing qualities.



ALLIUM SCHOENOPRASUM

POTERIUM SANGUISORBA

Spicing up vinegar

SUN AND HERBS add a golden touch and gourmet taste to vinegar, here flavored with chive (***left***). Familiar sight in the backyards of herb lovers everywhere, corked bottles of vinegar slowly absorb the unique flavors of individual herbs. In the garden of California herbalist Mrs. Norma Jean Lathrop (***right***), bottles of wine and cider vinegar contain sprigs of savory, chive, fennel, and marjoram. After three to seven days in the sun, depending on the desired strength, they will need a month's storage in a dark, cool place to reach perfection. "Metal caps must be avoided," warns Norma Jean, "since they cause an adverse chemical reaction."

Any culinary herb will add character to vinegar. Each lends its own taste, suitable for special dishes. Salad burnet, for example, imparts a cucumber flavor especially desired by salad lovers who suffer digestive upsets from real cucumbers. It is most effective when its leaves are young and flavorful (***left***).

Lemon-thyme vinegar adds a subtle touch to mayonnaise. Tarragon goes especially well with poultry or fish. For a colorful gift of vinegar, try purple basil, which lends a rich burgundy color. Chervil, mint, savory, garlic, horseradish, nasturtium: The list is endless.

By transferring their oils and nutrients to vinegar, herbs are preserved for winter use.

Farms meet growing needs

PLOTS ARE SMALL, but the cast is large in the production of herbs for sale. At Taylor's Herb Gardens in Vista, California (**above**), 25 acres sustains 130 varieties. Taylor's ships a million plants a year—wholesale to groceries and nurseries, but more and more directly to mail-order customers. Herbalist Larry Andrews (**left**) waters some of the 100,000 plants kept ready to ship, including hummingbird flower, caraway thyme, and pineapple sage.

While herbs may have acquired a certain trendiness, the religious community of Shakers in Sabbathday Lake, Maine, has been in the business since 1799. Mints are favorites among the 70

varieties grown, and employee David Tedford (**right**) sets out spearmint on a drying rack. Behind him, pivoting racks originally used to dry clothes are now adapted to plant drying. Herbs, largest source of income for the community, are sold in local shops and by mail.

On a larger scale are dried herbs sold in supermarkets, many harvested from wild plants around the Mediterranean basin. For example, 1,500 metric tons of sage were imported in 1981.

Herbs for All Seasons

Brews of another taste

FORTUNES in tea leaves are changing with the use of stimulating or soothing herbs. On a tray with peppermint tea and bees, was a favorite tea for patriots after the Boston Tea Party. In addition to leaves for a traditional tea, angelica (***left***) yields seeds to flavor gin. Once used to scent linens with its smell of new-mown hay, woodruff (***above***) makes a delicious stomach-soothing tea, say herbalists.

Owner of Celestial Seasonings in Boulder, Colorado, Morris Siegel (***right***) and other herb entrepreneurs are making inroads into a domain still dominated by caffeine-laden black-leaf teas.

MONARDA DIDYMA

ANGELICA ARCHANGELICA

ASPERULA ODORATA

are (***left,*** counterclockwise from bottom left): chamomile, lemon eucalyptus, lemongrass, and a garnish of citrus peel.

Bee balm (***top***), whose flowers draw hummingbirds

Herbs for All Seasons

Medicinal herbs

THE HERB REALM is a living drugstore. Before the 19th-century discovery that plants contain active chemical elements capable of being reproduced artificially, herbs were exploited for both good and ill. The narcotic jimsonweed (***far right***) was used to treat epileptics—and to drug victims for murder and robbery.

An ancient science practiced by the Greeks, medicinal herbalism was kept alive by Arab scholars and later by Christian monks of the Middle Ages, whose physic gardens were the apothecaries of the day. With the invention of printing, herbalism enjoyed its golden age, as plant scholars produced lengthy herbals.

In the 1600s herbalism began to decline into the arcane realm of astrology. Yet the use of healing herbs endures—particularly simples, used to treat mild ailments. Rose petals, for example, make a soothing compress for tired eyes. Rose hips (**top**) are a source of vitamin C, which has acquired almost cult status as a medical panacea.

Really potent—and potentially dangerous—medicinal herbs are now subjects of research and control. Foxglove (**center**) yields digitalis, vital in the treatment of heart disease. The Madagascar periwinkle (***right***) contains a cancer-fighting substance now used against leukemia and Hodgkin's disease.

ROSA RUGOSA

DIGITALIS PURPUREA

CATHARANTHUS ROSEUS

DATURA STRAMONIUM

Oils for flavors and fragrances

PELARGONIUM

NATURE'S deodorizers, aromatic herbs were near necessities in the malodorous days before modern sanitation. In the home, herbs ameliorated the presence of rotting meat. On the street, pomanders, sachets, and snuff masked foul smells.

Today aromatics fuel a burgeoning fragrance industry. Destined for the world cosmetic counter, fields of clary sage in North Carolina (***top right***) will be processed for their oil (***facing page***).

Financially sweeter scents are rose geraniums (***above***) and English lavenders (***right***). A favorite oil in the public baths of Greece and Rome, lavender fell from favor in the early Middle Ages. In Tudor England it regained its place among the multitude of pleasures we call herbs. □

Text by LARRY KOHL
NATIONAL GEOGRAPHIC EDITORIAL STAFF

LAVANDULA ANGUSTIFOLIA

THOUSAND-MILE RACE TO NOME

A Woman's Icy Struggle

By SUSAN BUTCHER

Photographs by KERBY SMITH

TEKLA lay beside the sled, too tired to go on. I looked down at my most experienced lead dog and cursed the luck that had befallen me.

A wrong turn in a heavy snowstorm the first day of the race had taken me 20 miles out of my way. The four precious hours lost in regaining the trail had put me far behind the front-runners in the world's longest sled dog race—the Iditarod—which crosses Alaska from Anchorage to Nome. More important, I had lost Tekla for the remainder of the course.

The grueling route, altered slightly from year to year but always more than a thousand miles long, has taken from 12 to 32 days to complete. It approximates one blazed in the early 1900s between the gold-rush towns of Iditarod and Nome and the ice-free port of Seward. The race itself recalls a heroic dash by a relay of dogsled drivers in 1925 to bring to Nome lifesaving serum that staved off a diphtheria epidemic.

This was the 1982 running of the Iditarod, held annually since 1973. One of the principal organizers was Joe Redington, Sr., who felt Alaska was losing its sled dogs to snowmobiles and only something the size of the Iditarod would keep interest in them alive.

A year earlier and thousands of miles away, I was getting my first taste of what such a race entails.

Call of the wild *lured the author from the lower 48 to a Spartan life of raising huskies in Alaska. Her high-spirited team mushed through storms during the Iditarod Trail Sled Dog Race, world's longest at more than 1,000 miles.*

ANCHORAGE TO NOME
1,131 MILES

Hairpin turns *alternate with straightaways as the trail traces a thin line over the frozen Innoko River (**above**). Susan Butcher and her team have rounded the bend at right, closely followed by another team sprinting for Cripple Landing (**map**). There, the incentive for arriving first at the halfway point—$2,000 in silver—had already been claimed, for misfortune had struck Susan early.*

Only an hour after the start of the race, her sled hit a tree, bruising her and injuring 4 of her 15 dogs. Later the same day a storm drove her ten miles off course, throwing her farther behind the pace. Such hazards are common on a trail that cuts through wind-whipped

National Geographic, March 1983

mountain passes and crosses the edge of the frozen Bering Sea. Though sometimes discouraged, Susan persevered and began making up time.

The annual competition was begun in 1973 by enthusiasts dismayed by the decline of sledding as the use of snowmobiles increased. Roughly following a trail first blazed during the gold rush to send mail and supplies to the mining town of Iditarod, the race evokes memories of the heroic efforts of sled teams that carried serum through a blizzard to Nome in 1925 to prevent a diphtheria epidemic.

Months before the start on the first Saturday in March, mushers begin assembling equipment and training their dogs with runs as long as 60 miles a day. All sleds must carry snowshoes, a sleeping bag, ax, booties to protect the dogs' feet, and food for the driver and team. Additional food is forwarded to checkpoints, where veterinarians stand by to assist sick or injured dogs. Radio-equipped pilots help monitor the route to spot teams in trouble.

Lack of snow in Anchorage last year led officials to move the starting point 54 miles northeast to Settlers Bay, where 54 mushers, driving teams of from 8 to 18 dogs, set out for a piece of the $100,000 purse shared by the first 20 finishers.

I was born into a comfortable family life in Cambridge, Massachusetts. During childhood summers on the Maine seashore, I spent every waking hour learning and loving the outdoors. Of my many pets, the favorite was my dog.

As I grew older, I yearned for a life that would put these two together—dogs and the outdoors. After moving to Colorado in 1972, I found an ideal match—sled dog racing. Here I competed and handled racing dogs for three years. But deep inside I still had this feeling that there was a place where I could breathe more freely and where my own hard work would be the measure of my success and the source of my existence.

I came to Alaska in 1975, still hoping to find my dream. Today, from my cabin door 140 miles northwest of Fairbanks and four miles from my nearest neighbor, I look at my team and know my dream is as real as Mount McKinley far beyond. And as challenging as the Iditarod.

For three years after my arrival I lived in the wilderness, building and training a team for my first Iditarod in 1978, which I finished in 19th place, barely in the money. Only the first 20 into Nome share in some $100,000 in cash prizes. (I would come in ninth the next year, fifth in 1980 and '81.)

Preparations for each year's race, held in early March, begin as soon as the last one is over—with careful review of any mistakes. Excitement begins to build in August, when the dogs and I feel summer coming to a close with those first cool nights; when we again see darkness instead of constant daylight. Harnesses and sleds come out of storage; many hours of work lie ahead to make them ready.

In early September the dogs begin pulling a wheeled cart over bare ground for short-mileage training runs. This helps build their wind and endurance until the first flakes fall and we switch to sled travel.

My training days often begin at 5:30 a.m. with a quarter-mile trip—at times in 30°-below-zero weather—for water from the nearest running creek. The sheltered site I have chosen for my cabin has no closer source. I feed my dogs a meat broth and vitamins, and we're ready to hit the trail well before the sun peeks over a nearby ridge. Of the 50 dogs I own, I race only 15, but more are always being trained so as to keep this number at full strength.

Good racers must be able to trot at 12 miles an hour, lope at 18. Mine are Alaskan huskies, descended from old-time Eskimo and Indian dogs, bred for stamina and good feet that won't be cut by ice or form snowballs between the pads. They average 50 pounds and have long legs and slim builds. The dogs must have an inherent love of running and a never-say-die attitude.

However, each has a distinct personality. Every evening, after training runs of as much as 60 miles, I invite some into the cabin for a treat and a discussion of the day's workout. Copilot voices her opinion with a loud howl when I commend her performance. The others thump their tails as their names are mentioned. When it's time to check paws for possible injuries, Tekla and Daiquiri roll on their backs, feet in the air, begging for my immediate attention.

Preparing for the Long Haul

February has arrived, and I face my greatest pre-race task. I must put together 1,500 pounds of food and equipment to be stashed at 24 checkpoints along the course: 75 burlap sacks to be filled with lamb, beef liver, beaver meat, lard, commercial dog food, fish, booties to protect paws, extra batteries for the headlamp I will use along the trail.

Meat must be cut into chunks for easy feeding en route. Honey balls must be made of ground beef, honey, vegetable oil, and vitamin and mineral supplements. Sewing the thousand dog booties I might require will take about three weeks even with the help of a lot of dedicated friends.

Sleds are fitted with new plastic runner materials, bolts, lashings, and supply bags. My dogs require new custom-fitted harnesses and gang-line tether. And I need new racing attire: hand-sewn parkas, snow pants, and sturdy boots.

The dogs and I arrive in Anchorage the first week in March to join an eventual field of 54 mushers and 796 dogs. We hear talk of an icy trail with dangerous turns. This only adds to the severe butterflies I already have.

Now there is only one day left; one more day before I am out on the trail alone with my dogs and the life I love.

There is so little snow in Anchorage this

year that our start has been moved 54 miles northeastward to Settlers Bay. The teams will go off at three-minute intervals; I have drawn the 26th starting position.

I know my dogs well and harness them in pairs where they are best suited. Ali and Tekla go into the lead followed by my spare leaders—Copilot and Beaver, Stripe and Dandy. Next come my strong young males—Screamer with Taboo, Jimmy with Ruff, Cracker with Daiquiri, and Cord running alone. Last into line are my two most powerful wheel dogs—Ivak and his son Ivar.

They're all so anxious to get going that it takes ten people to hold them as the earlier starters move out. My friend Kathy Jones, who helped raise money for my racing expenses, tucks herself onto the sled, which already weighs 150 pounds fully loaded. This year the rules require each musher to carry a passenger for the first eight miles in case of early trouble. Kathy fits herself in amid the gear that every contestant must carry for survival: snowshoes, ax, and sleeping bag.

As my countdown begins, I see that Screamer has chewed the rope connecting Daiquiri's collar to the gang line. Too late to correct . . . we're off! Daiquiri becomes entangled with the dogs behind her, but there is no stopping the team now, frantic with the thrill of charging after those in front of us.

A mile out Kathy corrects Daiquiri's problem, fortunately in less than 30 seconds—that's as long as I can restrain my eager dogs. Ahead lies an icy hill terminating in a 90-degree turn. We go into a slide, hitting a downed tree. Kathy, the dogs, and I roll over it. She and I feel only a few aches and pains, but it's apparent that the team has suffered more damage. Cracker, Ruff, and Screamer are running off pace.

Even so, we're making good time. "Gee, Tekla," I cry. She pulls to the right, and we pass not one but two teams.

Kathy leaves us at Knik Lake, tired and sore but full of well-wishes for me. And I continue on, finally alone. Miles peel away, and it begins to snow as darkness falls. One by one, I overtake 22 teams; only three are ahead of me now.

Along the Yentna River—60 miles and eight hours from our starting point—we four mushers lose the trail, now hidden by fresh-fallen snow. But each of us, zigzagging blindly from bank to bank, finally finds it again. Headlights behind us grow dim as other teams search for the trail.

I follow the tracks made by the three sleds in front of me. The teams move along at a rate that I feel should soon bring us into Skwentna, the third checkpoint.

Cracker, Ruff, and Screamer quit pulling and begin to limp. As much as it will slow me, I load them onto the sled to prevent further injury. They add 150 pounds for my remaining dogs to pull.

Mile after mile I ride behind them on the runners; I should have seen Skwentna by now. I sense that something is wrong. At dawn I see that the river I'm on is too wide. Soon a musher approaches from the opposite direction and hails me with, "We're at least ten miles off course."

I turn my team around. My misery cannot be expressed. All year I have nurtured but one thought: to win. Now—after a useless 20-mile detour—my hopes are dashed. With three injured dogs aboard I cannot possibly make up for lost time. I hate every bone in my body.

Could things get worse? They soon do.

Tekla's All Is Not Enough

Tekla starts to limp. The strain of those extra miles without any rest has pushed her past her limit. I take her out of the lead and put Copilot up with Ali.

At 6:55 a.m. we straggle into Skwentna, a full four hours behind schedule. Checking in at trapper Joe Delia's cabin, I am like a robot; my dogs are played out. I feed them, then take Cracker, Ruff, and Screamer to a drop area where they can be flown home. I massage Tekla's shoulder. I can't afford to lose her this early in the race.

We push on. Forty-five miles farther, at Finger Lake, I know my limping Tekla has reached her limit. Tears roll down my cheeks. Together we had learned how to mush. Together she as a pup and I as a 20-year-old novice in the Alaska bush had encountered our first moose, caribou, and wolves. She led my team all the way in my first three Iditarods. In a joint effort of Joe Redington's and mine, she led the only sled-dog team ever to reach the summit of 20,320-foot-high Mount McKinley. She, who has saved my life more than once, who can even

Voracious appetites, *honed by runs of eight hours and longer, demand frequent and generous feedings for the dogs. Using a white-gas stove she carried throughout the race, Susan heats lake water* ***(below right)*** *to make a stew of beef, beaver, liver, salmon, bacon, and seal blubber. Later she treats Copilot, one of her strongest lead dogs, to a snack of lard* ***(right)****.*

Keyed up by the race and preoccupied with caring for their dogs, mushers often skimp on food and sleep for themselves. Volunteer hosts help out by taking in trail-weary drivers for a sit-down meal. At the home of Clara Saccheus ***(below)****, 120 miles from Nome, Susan feasts on reindeer steak, moose stew, and sourdough pancakes before a much needed rest.*

Race rules require that each team take a 24-hour layover sometime during the event to ensure that both the drivers and dogs get at least one prolonged period of rest and recuperation.

read my mind, now has to be left behind. Her sorrow seems as great as mine as she watches me from where she's tied under a tree, awaiting a flight home.

With only 11 weary dogs left, I head out again for Nome, still 938 miles away. After just ten miles, I know we have to stop. I lie in the snow next to Ali and Copilot, now in the lead. They cuddle up against me, and I massage their shoulders and legs. I feel the strength I have worked to build in them since September.

Other teams flash past me; friends yell out that they're sorry I got lost. I'm sure the best I can do is come in in 20th place. My resolve is shaken, but I'm not ready to give up yet.

On the move again, I think only of reaching Rohn checkpoint, where I will spend a compulsory 24-hour layover that the race committee requires of all mushers at the checkpoint of their choice. This rule gives both dogs and drivers a long, much needed rest. In these first two days on the trail, I have had a total of only four hours' sleep. Unfortunately, I know this situation will not improve as we progress.

As we climb into Rainy Pass to cross the Alaska Range in the dark, my mind is not fully focused on what I am doing. I let go of the sled so the team can clamber up a steep bank unencumbered by my weight. I have badly misjudged the energy of my dogs; they shoot away and are out of sight before I reach its top.

For six miles I pursue them, fearing the worst: that the unguided sled will overrun and injure my wheel dogs, that my team may encounter and be trampled by a moose. Around one more bend and there they are, the sled on its side but intact. They bark and wag their tails as if to say, "Where the hell have you been?"

I know this close call was the result of my defeatist attitude, and I resolve to have no more of that. We arrive at Rohn at 5:01 p.m., now two days out of Settlers Bay, and find shelter in a spruce grove where I bed down with the dogs on its fragrant boughs.

J. SCHULTE (BELOW)

Strain of the battle *against a tenacious storm shows on Susan* ***(left)*** *and rival mushers Jerry Austin, center, and Rick Swenson as they take refuge at White Mountain. Wearing a headlamp used for night driving, Susan kneads warmth back into her feet.*

Shoulder injuries, fatigue, and sore feet suffered by five dogs had forced Susan to leave the animals at earlier checkpoints, and they were flown back to Anchorage. At White Mountain ***(above)*** *she decides to drop Taboo, exhausted from mushing through deep snow.*

Though the fierce storm continued with winds as high as 40 miles an hour, the mushers and their dogs pressed on ***(left)****, with Emmitt Peters, far left, following Susan, Austin, and Swenson. Competition sometimes turned to cooperation as drivers took turns at the demanding task of breaking trail.*

Rohn, with no running water or electricity, is like several of our checkpoints. These include many native villages where the overwhelming hospitality more than makes up for the lack of conveniences.

After our 24-hour rest and four hot meals, my team is yowling and barking to be off, and my determination to stay in the race is firmer than ever. Even Jimmy is running hard despite a case of sore feet, which I have been treating with medication prescribed by the race veterinarian at Rohn. Other vets are available at most checkpoints to assist mushers in doctoring a dog's injuries and determining its fitness to continue.

Night has fallen as we head into the "burn," a 40-mile stretch of charred and fallen trees gutted by fire in 1977. Descending snow grows heavier, wiping out the trail. But I manage to keep going, catching up with the leaders who have lost their way and are waiting for daylight.

To this point we have raced as individuals, every musher for himself. But now we must work together, taking turns at trail breaking through the deep, soft snow. Strange as it may seem in some competitive circles, this does not diminish our race instincts. As soon as circumstances permit, we're off again on our own.

We travel in this tedious and time-consuming manner for four and a half days and 353 miles. At the Indian village of Ruby, perched above the Yukon River, the weather improves—but only temporarily.

I switch to a lighter sled, cached in Ruby, with slicker runner material, better suited to the less hazardous terrain ahead. Skies are clear, but temperatures drop to 45 degrees below zero as I start out alone down the frozen Yukon. If I stay too long on the sled, I risk serious frostbite. Too long jogging behind it can impair my lungs. So I alternate between running and riding.

With the added speed of a new sled on a harder trail, Jimmy's foot problem worsens, so I'm forced to drop him at Galena. Another 94 miles along the Yukon and I'm into a 90-mile stretch across the Nulato Hills to Unalakleet and the sea.

A raging storm moves in, burying the trail. Those of us in the lead bunch up again to break trail. But after some 50 miles we're forced to take refuge in a trapper's tent for the night.

Another day's travel brings us to Unalakleet. Only 271 miles to Nome! Four hours later I leave the village alone, making slow progress along Norton Sound to the beach ten miles from Shaktoolik. The weather worsens; winds rise to 60 miles an hour. Visibility drops to near nothing. My eyelashes and those of the dogs freeze shut, and I stop often to clear their eyes and check their feet.

Cheering throngs *break the long agony of the trail as Susan crosses the finish line (***above***), then hails a fan (***facing page***). Her time of 16 days, 4 hours, and 43 minutes was bested only by Swenson, who arrived less than four minutes earlier.*

Following previous placings of 19th, 9th, and 5th, her runner-up showing brought $16,000, the pride of accomplishment, and renewed hope of someday being the first to Nome.


HOME CITY HALL
24

It is midnight. Even with my headlamp on, I cannot see the driftwood tripods set out to mark the trail across these miles of flat, featureless country. Fellow mushers Emmitt Peters and Herbie Nayokpuk join me, and though we space our teams only two feet apart, we cannot see to follow each other. We become separated. Groping from tripod to tripod, I finally reach Shaktoolik alone and with a frostbitten face.

Lucy Sukpelik welcomes us to her home. Even the dogs. It is too cold outside for them to rest easy. And I can't feed them outdoors because their pans blow away.

By morning, winds are gusting up to 80 miles an hour, piling up 30-foot drifts. Splitting wood for Lucy's stove becomes a challenge: Someone must stand downwind to catch the chunks as they fly by.

With so many delays my dog-food supply has run out. I restock as best I can with fish and frankfurters from the local store, and dried salmon from a fisherman.

The village network of CB radios circulates disturbing reports of mushers stranded back in the foothills. And, later, of the unknown fate of our experienced Eskimo musher Herbie Nayokpuk, who had already left Shaktoolik to cross 58 miles of frozen sea to Koyuk in the hope of getting a good lead on the rest of us. The try was daring but it didn't pay off. Thirty hours later he returned to Shaktoolik badly frostbitten.

I wait 52 hours in the village. The storm lets up a little. All the mushers there resume the race with new strength and spirit. Only 231 miles to go, but the going is tough. We push through the continuing storm to White Mountain, seven lead teams still traveling close together.

Taboo, completely worn out from punching too long through heavy snow, must drop out, leaving me with 9 dogs of my original 15. Emmitt is now running 10, Rick Swenson, 12, and Jerry Austin, 14. Even so, I feel this is still a wide-open race. Thoughts of winning again consume my mind.

Forty miles from the finish line we run into winds as strong as those we experienced at Shaktoolik. For the next seven miles—from the foot of the Topkok Hills along the beach to Nome—we try each team to see which lead dog can cut a straight path through the tremendous side wind. Finally, Rick puts up his Andy who has led him to victory three times. Andy proves up to the task and brings us all through the storm.

By the time it has died away, Ali, my best command leader, is tired of taking orders. So I put Copilot up front with Stripe. The new pairing pays off. Both dogs drive hard, and the whole team picks up its pace.

I am now in fifth place but only a short distance behind Rick, Jerry, Emmitt, and Ernie Baumgartner. The final push is on; 30 miles to go. My adrenaline is pumping.

Sprinting to the Finish

I pass Ernie and pull away. I pass Emmitt, but he stays right on my tail. Through the last checkpoint we dash; only 22 miles now. Someone yells out that Rick and Jerry are just two minutes ahead of me. Emmitt remains close behind.

Stripe begins to falter. I need Ali up there. But has he rested long enough from his earlier lead duties to take them up again? I have to take the chance.

The change is quick—40 seconds to switch Ali and Stripe. Emmitt is halfway by me when I holler at Ali and Copilot: "Go! Go! Go!" The instant I feel my dogs diving forward, I know I have done the trick. I soon outdistance Emmitt.

Ali has raced with me to Nome before and senses he's into the homestretch. He knows his job and gives it his full measure. The other dogs respond to his leadership.

Jerry and Rick round Cape Nome, running strong. I chase hard for eight miles to pass Jerry. But there's still Rick, barely visible in the distance.

My dogs and I try with all the energy we can muster to overtake him, but he still beats us into Nome by three minutes and 43 seconds in a race that has lasted more than a thousand miles and 16 days.

Cheers ring out around me. I gratefully accept my $16,000 second-prize money. While my thoughts have already turned to next year's race, the remaining mushers are still concentrating on this one. The last will not cross the finish line until ten days later.

The wilderness is my life now, and the Iditarod its ultimate experience. I love Alaska and the opportunity it has given me to realize my dreams. I have only one dream to go. Next year I'll be number one. □

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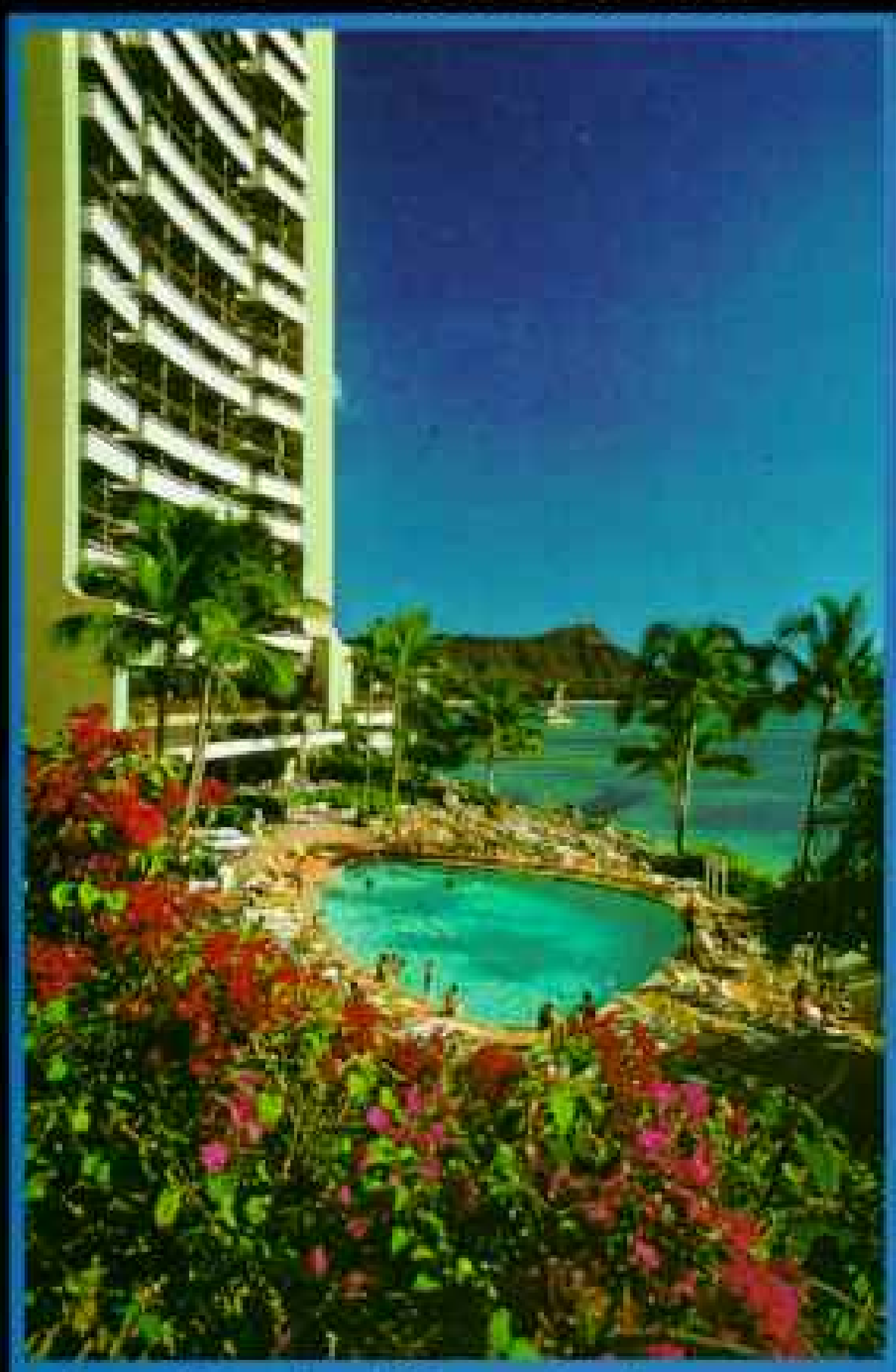

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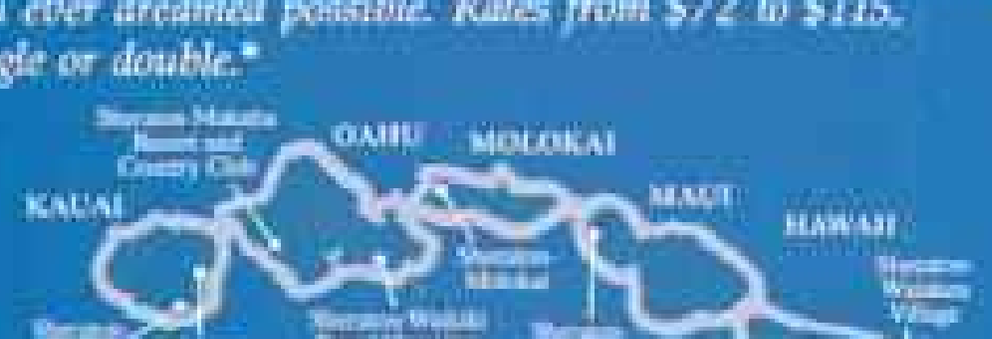

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LIONS

The photography in Lions (December 1982) was awesome. The moments captured radiated each lion's personality. Thank you, Des and Jen Bartlett, for your unerring patience that made those powerful pictures possible.

Prisana Impson
Denver, Colorado

Thank you, many times, for choosing that wonderfully expressive lion photograph on pages 800-801. Every time I see it I have to laugh. Forty years of my life were devoted to the care of a masculine family—an opinionated father, an amiable husband, and three obstreperous little old boys. Most of the time I was able to love them dearly, but—once in a while—I wondered about a loud YELL. This cheers my female soul.

Mrs. A. A. Archibald
Gibsonia, Pennsylvania

I am confused by an apparent contradiction. The Bartletts state that three lionesses and three cubs died of starvation during a drought, unable to compete with the males. Yet, later on they state, "The lionesses, being leaner and swifter, are better hunters than the males. . . ."

L. M. Criddle
Tarrytown, New York

The females usually do the killing, but the males eat the lion's share.

MEDITERRANEAN MAP

The Society's new map "The Historic Mediterranean" (December 1982) is a cartophile's delight, a veritable treasure chest of historical facts.

David M. de Herrera
Eagle Rock, California

I was sorry to notice an error in the text on your Mediterranean map. It was printed: "Seljuk Turks . . . took Constantinople in 1453. . . ." However, the Seljuks never took Constantinople. Nor did the Seljuk Empire exist in the 15th century. Constantinople was taken by the Ottoman Turks, who still possess it.

György Ozoray
Edmonton, Alberta

Error, unfortunately, often arises from condensation. We were correct in saying the Seljuks resisted the Crusaders, but the feat of taking Constantinople belonged to the Ottomans.

NEW HAMPSHIRE

The picture of the two Berlin smokestacks says it all about New Hampshire (December 1982). The smoke from two chimneys blows in different directions. I suspect that the smoke blowing against the wind is Yankee smoke, going that way simply because it always has and, by golly, always will.

A. Stevenson
Epsom, New Hampshire

The telephoto-lens illusion of a Seabrook Station looming over the New Hampshire shoreline grossly misrepresents reality. And the caption "explanation" merely reinforces my belief that the editors know just as well as I do that far more people will be merely impressed by the photograph than those who also read the caption.

Roger T. Patterson
Bristol, New Hampshire

EL CHICHÓN

A single-handed sailor has a lot of time to observe the weather, the ocean, and the sky. Sailing the Pacific Ocean on a small sloop, I was surprised by the lack of star-filled skies, gorgeous sunsets, and heartwarming sunrises. When, after 50 days of loneliness and sailing 5,000 miles, I returned home, I grabbed the November NATIONAL GEOGRAPHIC. I found the explanation for the strange gray skies, cold sunrises, poor sunsets, and few stars in the Pacific in "Fire and Ash, Darkness at Noon."

Andrew Urbanczyk
Montara, California

ANASAZI

The excellent article "The Anasazi" (November 1982) tells of photographs made by William Henry Jackson in Chaco Canyon that were lost because of problems with his film. Photographic film had not yet been invented. Mr. Jackson used large view cameras, making negatives on glass plates by the wet-plate, glass-negative process. From these large glass negatives, solar prints were made by exposing the negative in contact with the photographic paper in sunlight. This method was used until the 1890s.

Hugh S. Espey, M.D.
Quincy, Illinois

Jackson noted of his 1877 expedition to Chaco Canyon: "Dry film was beginning to come in. . . . I ordered a supply of 'sensitive negative tissue, supplied in bands.'" Not exactly what we today call film, but it was similar.

Your very interesting article on the Anasazi posed the question, "Why did the Mesa Verdeans of Colorado tuck their pueblos in lofty cliffs?" On a trip to Montezuma Castle National Monument the naturalist on duty gave these answers: The overhanging cliff protected them from attack from above. The height from the valley floor enabled them to draw up their ladders to prevent attack from the valley floor. During the summer months with the sun high overhead the overhang shaded the pueblos to help keep them cooler. During the winter months, the sun's being closer to the horizon enabled its rays to shine directly upon the structures, thus helping to heat the dwellings.

John P. Wand
Atascadero, California

Yet another suggestion is that they needed the arable land on the mesa for crops.

Arizona is taking strong measures to prosecute pothunters and protect sites such as Homolovi, pictured in your November issue. Your splendid essays on Southwest archaeology greatly assist these preservation efforts by reminding the public of our rich Southwest heritage.

Bruce Babbitt
Governor of Arizona

THE CHIP

Your enthralling article "The Chip" (October 1982) finally spurred us to the decision of buying a personal computer. On page 439 you state that the electrical pulses in chips travel nearly at the speed of light. Then, on page 443, you say that wafers sheeted with certain compounds "conduct electricity ten times as fast as silicon." The author seems to imply that electricity travels at nearly ten times the speed of light in specially treated wafers.

Wendelin Sachtler
Oldenburg, West Germany

The article should have made clear that electrical impulses pass through the chip's metal circuitry at nearly the speed of light. Signals travel much slower through the chip's silicon layers. Tests show that waves transmitted through gallium arsenide attain speeds ten times faster, yet still do not attain the speed of light.

The article on the chip contained an error in its reference to the micron. One micron equals one twenty-five thousandth of an inch and *not* one 39-millionth as stated. A bacillus bacterium as shown in comparison to a chip is 2/25,000 of an inch (2 microns), not 79 millionths, as simple arithmetic will show.

Robert L. Moyer
Professor of Microbiology
Massachusetts Bay Community College
Wellesley, Massachusetts

Here is a case where numerals might have been preferable to words. We stated that one micron equals thirty-nine millionths (39/1,000,000, not 1/39,000,000) of an inch, which is indeed approximately 1/25,000 of an inch.

AVALANCHE!

Our foundation appreciated very much "Avalanche!" by David Cupp (September 1982). Unfortunately, in the section dedicated to the activities of our foundation and its origin, there is one statement that is not true. The spark plug of the protracted search effort for my nephew was not me but my husband, Gino Eigenmann.

Ruth Eigenmann, President
Vanni Eigenmann Foundation
Milan, Italy

COAL VS. PARKLANDS

How was the fate of Allen-Warner Valley, Utah, decided two years ago? I came across "Coal vs. Parklands" in NATIONAL GEOGRAPHIC (December 1980) and realized that you had not reported on the end of the affair so far.

Milan Macháček
Pardubice, Czechoslovakia

The project is currently on hold. The California utilities withdrew their application for the power plants in 1981. Nevada Power and Light in conjunction with several California municipalities may build a 1,000-megawatt Harry Allen plant. But the Warner Valley project seems to have been abandoned.

EDITOR'S COLUMN

On page 553 of the November issue you say Jodi Cobb "collected a spent cartridge that fell nearby." I think you must mean "bullet." If I'm wrong, so is Webster's unabridged. Take it from an old soldier.

J. S. Vanderploeg
Toronto, Ontario

Jodi Cobb, not an old soldier, confirmed that she picked up an ejected cartridge, not a spent bullet.

Letters should be addressed to ***Members Forum,*** *National Geographic Magazine, Box 37448, Washington, D. C. 20013, and should include sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted.*

On Assignment

"AS CLOSE TO NATURE as you could ever be," says ***Des Bartlett*** of the almost five years that he and wife ***Jen*** have spent in Namibia's Etosha National Park. The photographers lived mostly in tents, immersing themselves in their subject with a wholeheartedness characteristic of nearly 30 years of partnership recording wildlife for books, articles, and award-winning films. "Living that way," Des says, "no matter what happens, you're ready to cover it."

The Bartletts have peered inside a beaver lodge in the Rockies and dived into chill Patagonian waters with penguins and right whales. While preparing an Emmy-winning film and a GEOGRAPHIC article about snow geese, the couple adopted a gaggle of orphaned geese that traveled with them as they traced migration routes from Hudson Bay to the Gulf of Mexico and back. Released from the Bartletts' van at the U. S.-Canadian border, the geese demonstrated their duty-free status as wild migrants by flying over the boundary, then returned jabbering to the van.

At a water hole in Etosha, Jen photographed a bull elephant from a blind disguised as a termite mound (***below***). Three years after the blind was built, elephants accepted it so completely they would lean over it to drink.

BOTH BY JULIE BARTLETT BRUTON

"We came almost to feel a part of the herd," Jen says. She also admits, "It's a little difficult to hold the camera 100 percent steady when a trunk is, say, a foot from the lens."

A boyhood in Queensland's rain forests kindled Des's love of nature. He joined forces with Sydney-born Jen in East Africa.

Now self-described "professional nomads," they call wherever they are home. "We do exactly what we want to do," says Des. "We're among the few who don't envy anyone." "We always say the most interesting place we've worked is where we are at the moment," Jen adds. "Or," Des muses, "the next place."

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