

VOLUME CVI

NUMBER FIVE

THE NATIONAL GEOGRAPHIC MAGAZINE

NOVEMBER, 1954

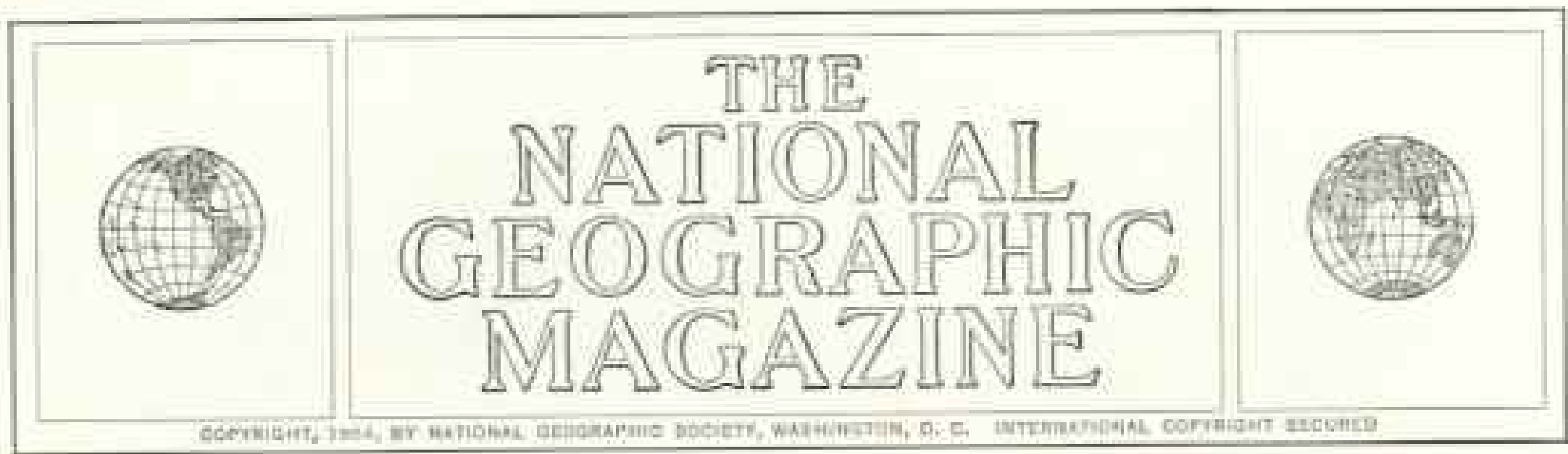
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Seventy-two Pages of Illustrations in Color

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

\$6.50 A YEAR

65¢ THE COPY



Saving Man's Wildlife Heritage

581

For Half a Century the National Audubon Society Has Fostered
Understanding of Nature and Fought for Conservation

BY JOHN H. BAKER

President of the National Audubon Society

Illustrations by National Geographic Photographer Robert F. Sisson

ONE day not long ago our National Audubon Society headquarters in New York received an unusual inquiry. "Are there any animals in my State," the writer of the letter wanted to know, "threatened with extinction?"

The staff member who handles such mail checked an impulse to reply, "Rabbits." Instead he wrote a friendly letter designed to enlist the questioner in the constantly growing army of citizens who understand the need for saving our wildlife from extinction.

Wildlife and Its Habitat Protected

Believing that human progress depends on intelligent treatment and wise use of wildlife, plants, soil, and water, the National Audubon Society never foregoes an opportunity to encourage people to help conserve all their natural resources. We know that man can no more escape from his dependence on them than from his own birth or death.

Though we long ago learned that, in the long run, we could not successfully protect birds without also protecting their habitats, some people still identify the National Audubon Society solely with bird protection.

Yet even the society's original name, which was agreed upon at a time when the members' concern was primarily with birds, included other wildlife as well. When the national society was incorporated in January,

1905, it was called the National Association of Audubon Societies for the Protection of Wild Birds and Animals, Inc. We changed it in 1940 to National Audubon Society.

People whose interest in conservation dates from little more than a quarter of a century ago can scarcely grasp the enormous changes that have taken place since 1886, when the very first Audubon Society was formed. This was a local group started by George Bird Grinnell, of New York City, the editor of *Forest and Stream*. A former pupil of Lucy Bake-well Audubon, he suggested the group call itself the Audubon Society in honor of his teacher's husband, John James Audubon (1785-1851). The famous artist-naturalist, in a period of great abundance of wildlife, had foreseen the coming need of its conservation.

Though the original society lasted but three years, it planted a seed. It soon was followed by other local societies, and finally by the national organization whose annual meeting in November, 1954, will celebrate its forthcoming 50th anniversary.

Wardens Lost Lives Defending Birds

All the early societies were courageously bent on stopping the terrible slaughter of birds that was under way around the turn of the century. Songbirds were being marketed for food as well as for caged pets. Egrets, herons, roseate spoonbills, gulls, and terns were being



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Wide-ranging Audubonites Study and Protect All Nature's Wonders

If people become interested in Nature, the National Audubon Society believes, they will want to make wise use of her abundance. Through its many activities, the society reaches some 2,000,000 people a year.

Summer camps in California, Maine, and Connecticut offer adults two-week Nature courses, including field trips.

Above: Students at the Connecticut camp visit a farm near Ridgefield to learn about fresh-water pond life. Here a class (above, right) seines to check on the fish.

← Jannie Mohr, 10, daughter of the camp director, holds bluejay and robin foundlings. Some birds follow her around for days hoping for a handout.

→ Charles Mohr, Jannie's father, explains the story of age and growth told by an oak tree's rings.

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shot down mercilessly to satisfy the craze for wild-bird feathers on women's hats (page 614).

The American and snowy egrets, whose large, lacy plumes were most in demand, were rapidly dwindling in 1902 (page 615).^{*} In that year the National Committee of Audubon Societies, forerunner of the present organization, raised money to employ four wardens to guard the major egret nesting rookeries in southern Florida. One of them, Guy M. Bradley, was appointed official game warden of Monroe County.

Two years later Bradley showed the noted ornithologist Frank M. Chapman around the rookeries. When Dr. Chapman returned to New York, he reported: "That man Bradley is going to be killed sometime."

He was—but the plume hunter accused of the shooting was, in effect, acquitted because the grand jury deemed the State's evidence insufficient to bring him to trial. Angry neighbors burned his house, however, and in New York State members and officials of the Audubon Society redoubled their efforts to save the birds.

Finally, after yet another warden, Columbus G. McLeod, had lost his life in the performance of his duty, Audubon representatives scored their first big victory in what had come to be called the "feather fight." In 1910 Gov. Charles Evans Hughes of New York signed the Audubon Plumage Bill.

The bill outlawed sale of most wild-bird plumage in New York State, where the big trade centered, but still the trade was not completely stopped. Worth its weight in gold, the plumage continued to come into the United States from foreign countries, since legal markets still existed in many States other than New York.

Once again the Audubon Society went into action, and the Federal Tariff Act of 1913 banned importation of plumes. Still, the feather fight was not over. As late as 1940 violations were so brazen that the society again had to take up the cudgel.

Education Fights Prejudice

The principal obstacles to conservation, we have found, lie in certain qualities of human nature, exemplified by such expressions as "What do I get out of this?" and "Let me get mine while the going's good!" We are not so naive as to think human nature can be changed. But we do earnestly believe that through education voting citizens realize more

and more that intelligent treatment and wise use of wildlife, plants, soil, and water are in their own best interest.

Education is, therefore, the lifeblood of the Audubon Society. We pump it through many arteries—publications, radio and television programs, movies, lectures, art, guided tours, camps, and, most basic of all, our Audubon Junior Clubs (page 586).

An adult often has prejudices to be overcome, but a child asks only to be told. He craves ideals high enough to give him the thrill of standing on tiptoe to reach them.

If a child can be introduced to a bluebird, a trillium, or a fox squirrel and led on to consider their living problems and ultimately his own dependency on his environment, we know from experience that he will think about taking care of that environment.

A Killdeer Stops a Ball Game

One spring when the boys' Audubon Junior Club of the Forman School in Litchfield, Connecticut, reported for baseball practice, they found a kibitzer squatting behind third base. There on her nest sat a mother killdeer, warming her eggs. The boys quickly set up a protective screen around the sides and top of the nest and went on to play ball.

Three weeks later, in the middle of a tense game, the mother killdeer hatched her eggs.

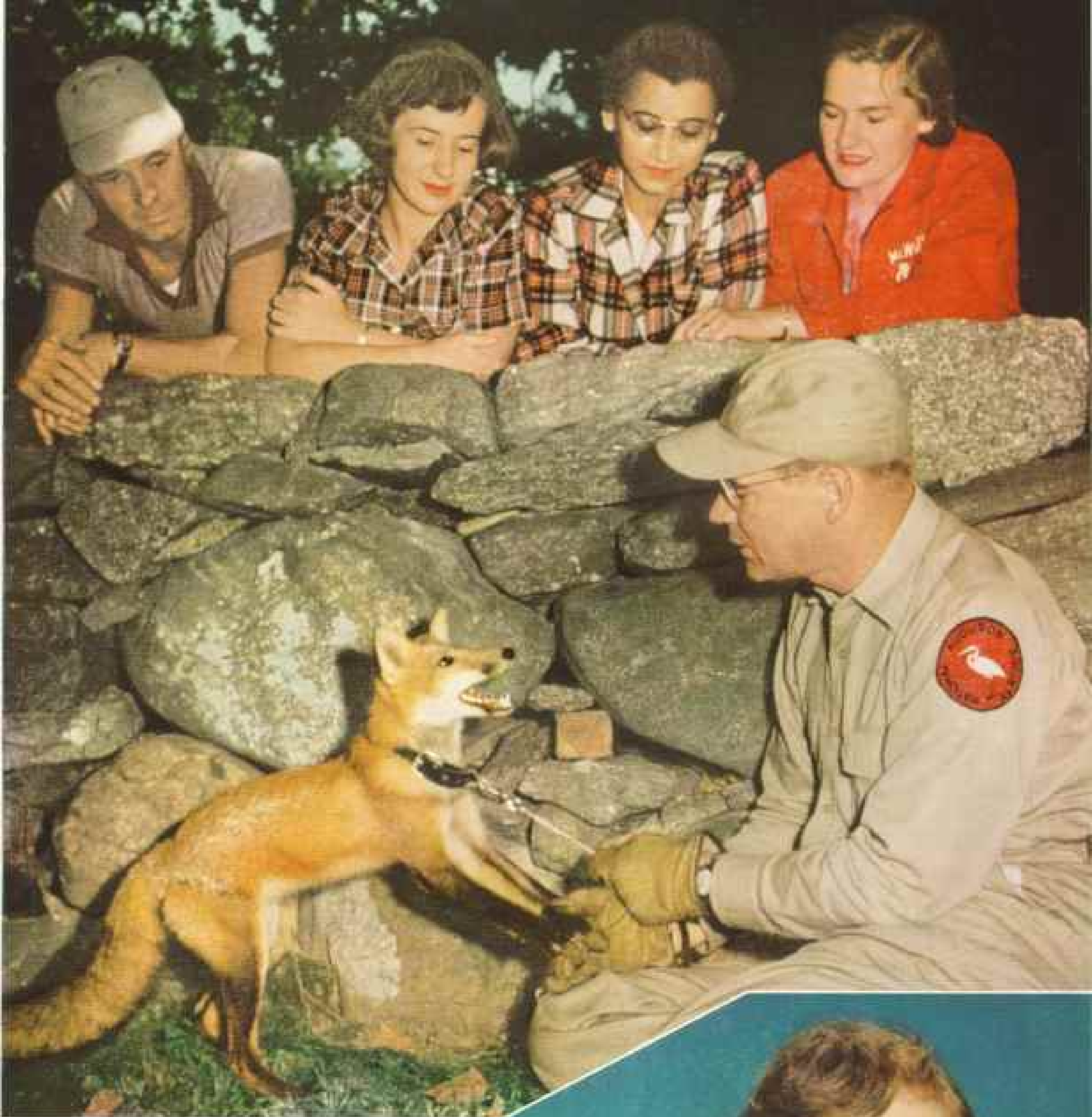
"When the four young birds came out of the spotted eggs," the club correspondent reported to the *Audubon Junior News*, "they wobbled on their feet just like the big birds do."

Last year there were 250,682 Audubon Junior members in 9,782 clubs in every State and Territory of the United States, every Canadian Province, in Central and South America, Bermuda, Australia, and the Philippines. The Crippled Children's Hospital at Richmond, Virginia, and the Minnesota Braille and Sight Saving School in Faribault have clubs.

Blind members have learned to identify trees by feeling the bark and to know birds by fingering cardboard cutouts and listening to recordings of their calls. When walking nature trails, they use their own special "radar" system to stay on the path. They snap their fingers and listen for the echo to gauge the proximity of trees or other obstructions.

Any group of 10 or more youngsters, plus

^{*} See "Large Wading Birds," by T. Gilbert Pearson, NATIONAL GEOGRAPHIC MAGAZINE, October, 1932.



Even Predators and Weeds Enjoy Audubon Society Protection

♣ Br'er Fox, living dangerously, needs all his vaunted cunning to elude his many enemies.

In the sanctuary at the Connecticut Audubon Center he receives full protection. Though the fox does eat birds, their population stays in healthy balance. He also feeds on insects and rodents. Here summer camp students admire a borrowed red fox.

➔ This student now knows the difference between goldenrod (left) and ragweed. Many hay-fever sufferers wrongly blame their plight on pretty goldenrod; its pollen is too heavy to ride the wind. Ragweed pollen, flying lightly, causes hay fever.

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School Work Becomes Fun for Audubon Juniors When Nature Is the Subject

The Audubon Society believes education is more important than restrictive laws in fostering conservation. Schools cooperating with the society shun dull tomes in bringing the conservation message to more than 250,000 junior members. These Maryland children pursue classroom projects at University Park, a suburb of Washington, D. C. One youngster peers intently into a jar containing black ants. Classmates study the structure of a wasps' nest (center) while others build birdhouses and feeding stations (background).

an adult leader, can start an Audubon Junior Club. Often it is formed in a classroom and meets on school time, or is part of a Boy or Girl Scout troop, a Camp Fire group, a 4-H Club, a Sunday school, or a summer camp. The clubs are primarily intended to be integrated into other groups and programs.

Youngsters Find It's Fun to Explore

Each club pays a \$1 registration fee and each member 15 cents in annual dues. Every youngster receives a membership pin and a 16-page booklet describing three specific habitats, such as marsh, meadow, and forest, and illustrating in color the plants and animals found there.

All clubs are given free subscriptions to

Audubon Junior News, to which the members themselves contribute. The *Nature Program Guide*, a gift to club organizers, is packed with hundreds of ideas for opening children's eyes to the world of Nature.

On one page, for example, is a simple contest to see how many animal homes can be found in five minutes. On another are instructions for setting up a soil-erosion demonstration (page 616). A whole section is devoted to a nature quiz that answers some of the inevitable questions curious children ask. A typical example:

Question: Why doesn't a bird fall off its perch when it goes to sleep?

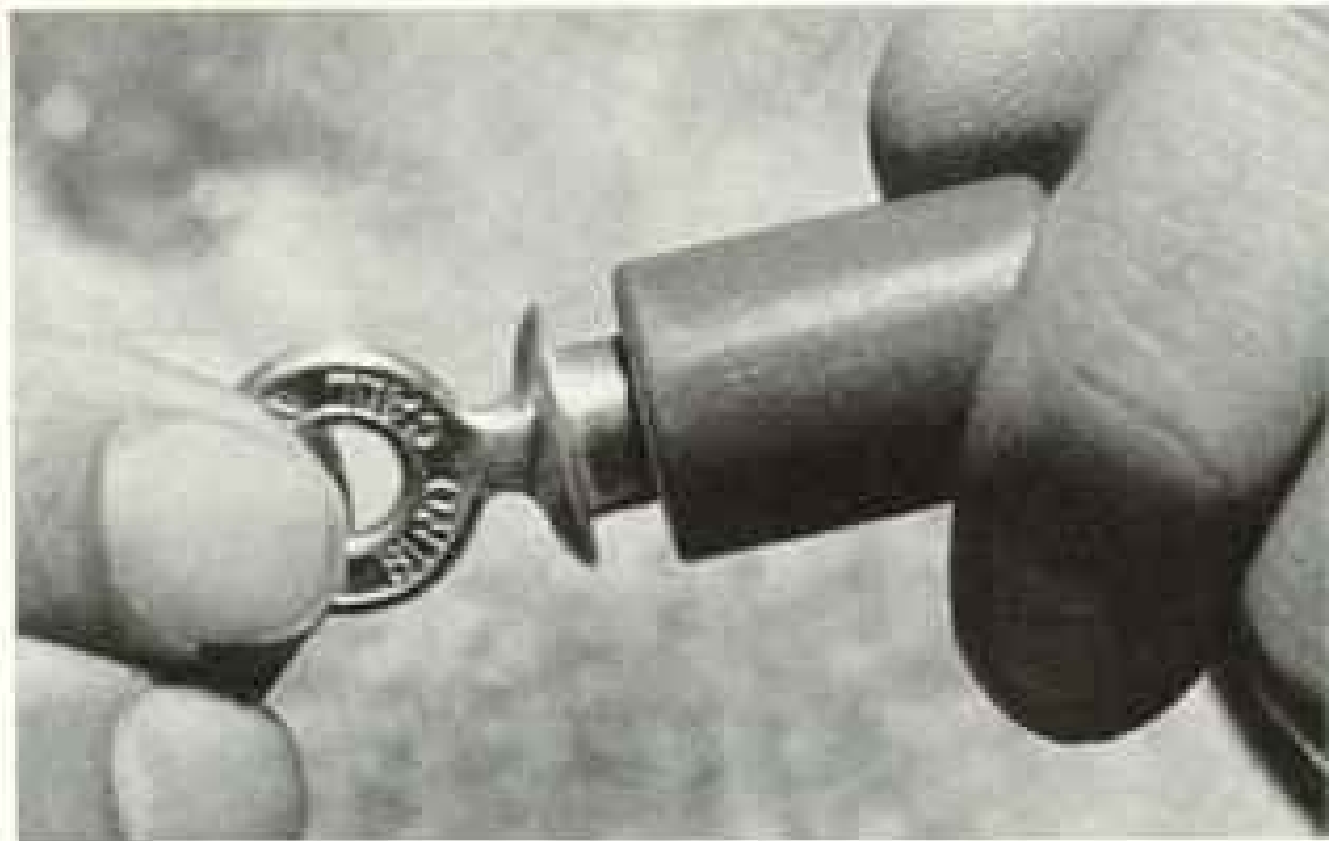
Answer: When a bird falls asleep, it relaxes and slumps down until its body rests



A Family Makes the Audubon Bird Call

Roger W. Eddy's ingenious little gadget literally charms birds from the trees. Its high-pitched squeaks and bright chirps pique the curiosity of many species. Soon a feathered audience gathers, enabling human admirers to observe the birds at close range. Eddy adapted his bird call from one used by Italian hunters. Later he obtained the Audubon Society's permission to use its name as a trade-mark for the device, turned out at the Eddy home in Newington, Connecticut. Here he and his wife (right) assemble the tiny instruments with volunteer help from children.

Right: No musical ability is required to use the bird call. Sounds are made by twisting the pewter plunger in a birch cylinder containing rosin.



against the perch. This pulls a tendon in its leg that causes its toes to clamp around the perch. The bird must straighten its legs to release this clamp.

"The prime object behind all these activities," we tell our club leaders, "is the discovery that it is fun to explore, that interesting, exciting things are all around."

Child Training Aids Conservation

Our material has won such wide acceptance that many schools now work it into their regular curriculums. Though it is probably best adapted to children between the ages of 6 and 14, many others both older and younger belong to the clubs.

Leaders also may use Audubon Nature Bulletins, whose 60 titles cover subjects as

diverse as *What Good Are Insects?*; *How to Build a Nature Trail*; *Forecasting the Weather*; *Mysteries of Bird Migration*; *The Insect Orchestra*; *Our Friends the Hawks*; *Terrariums*; and *Snakes*.

Since 1910, when the first Audubon Junior Club was started, nearly 10,000,000 youngsters have been members. This early training undoubtedly has resulted in a powerful influence on public opinion and political action in the cause of conservation in our generation. Many of these "alumni" have made careers of conservation.

Robert Porter Allen, the society's researcher, for example, became an ornithologist largely through the preparation and inspiration he received in a junior club. And the boy who succeeded him as president of the club is





Campers Study Oceanic Birds on Rocky Islands off Maine

Twice in each two-week camp session at Medomak, Maine, Audubon students take to boats and visit offshore nesting grounds. En route (above, left), a student points to a skyscape studded with gulls and double-crested cormorants.

Exploring Eastern Egg Rock, students find nests of gulls, guillemots, and Leach's petrels (page 592). These petrels, which fly as far as 100 miles offshore to feed, never come to land except to nest. Because their burrows are vulnerable to predatory animals, they avoid the mainland.

Here the class leaves the rock stuffed with new knowledge as well as a hearty picnic lunch.

← Two boatloads of students, about three-fourths of whom are teachers and other youth leaders, cruise past the camp buildings.

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Photographer Robert F. Brown



Rare California Condor Spreads Majestic Pinions Above Its Cliffside Perch

A century ago condors were seen from the Columbia River to southern California. Today they inhabit only a narrow, isolated area in the Golden State's mountain fastnesses. Slow to reproduce and extremely wary, they adapt with difficulty, if at all, to man's encroachment.

Recently the Audubon Society and the University of California sponsored a study of the huge carrion eater, whose nine-foot wingspread is larger than that of any other North American land bird (page 614). Carl B. Koford, who made the study, estimates the number of condors at 60, including young. He found that loud noises a mile distant alarm the birds, and one man in the vicinity can keep a pair of condors from the nest all night.

Entry into the birds' breeding grounds is restricted, and the heart of the area is forbidden to all.



Wood Ibises Soar with Graceful, Streamlined Ease Through Florida Skies

Awkward on land, the wood ibis becomes a ballerina aloft. Outthrust neck and streaming legs are characteristic of its flight. It enjoys aerobatics and may zigzag, spin, or dive like a falling arrow.

A gregarious creature, it feeds as well as nests in large flocks. At times such flocks gather in shallow ponds and scratch with their feet, muddying the water so thoroughly that fish rise to the surface. Having brought their dinner within easy reach, the birds gorge themselves.

Unlike herons, wood ibises do not stab their prey but seize it in powerful, nine-inch beaks. Snakes, frogs, tadpoles, insects, and an occasional young alligator are featured on their bill of fare.

The head of this superb aviator, like that of the condor, is bald. Floridians often call the birds "flintheads."



↑ Musty Odor Helps Experts Identify Leach's Petrel

At the Audubon summer camp in Maine, Mrs. Reginald Whittemore, editor of *Canadian Nature*, sniffs a petrel held by instructor Allan D. Cruickshank, well-known bird photographer.

Since this bird leaves its nesting burrow only at night, the smell is the best clue to finding it. Nosing various burrows, Cruickshank easily smelled out this adult and a newly hatched youngster.

← Holding up a young double-crested cormorant, not yet fully feathered, Cruickshank tells his students about the bird's remarkable increase along the Maine coast. In 1951 only four pairs nested in Muscongus Bay. Today more than 2,000 pairs nest there.

In Japan captive cormorants catch fish for their masters. A collar around the neck prevents the birds from swallowing their catch.

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Illustrations by National Geographic
Photographer Robert F. Brown

now one of the editors of his home-town newspaper.

"You should see his editorials on such matters as the plight of the whooping crane," says Allen. "They're splendid!"

Teachers and other youth leaders generally feel the need of more training in presenting nature and conservation from the outdoor approach. It is important that they know how to integrate these subjects effectively with others they teach. Such training, the Audubon Society feels, is essential if we are to gain conservation objectives through education. The society's summer camps were started for this purpose.

Nature the Best Teacher

We believe in showing Nature at work in her own laboratory: a robin rearing its young; a butterfly emerging from its chrysalis; a bare rock in the process of being clothed with soil; or a pond, overgrown with lily pads and pickerel weed, becoming dry land. Such an approach, we have found, interests 10,000 people for every one attracted by the indoor, laboratory approach.

If a camp instructor, leading a group of students in the field, spots a certain fern, he is apt to say, "Look, here's something interesting!" A student asks what kind of fern it is. The leader replies, "That is not what I want you to learn. Look at this."

He runs his fingers up the stem, takes off some of the fuzz, and holds it up, asking, "Do you know what uses this?"

Many guess, but no one knows.

"This is where a hummingbird gets some of its nesting material; it gathers the fuzz with its bill."

"But what is the name of the fern?" one of the students asks.

"We can look up its name when we get back to camp," says the leader. "It's more important to know something interesting about its role in nature."

Three nature camps are now operated by the Audubon Society: at the Todd Wildlife Sanctuary on Hog Island in Muscongus Bay, Maine (pages 589 and opposite); the Audubon Center in Greenwich, Connecticut (pages 582 and 585); and Sugar Bowl Lodge, 7,000 feet up near Donner Pass in the Sierra of California (pages 612 and 619). Many more such camps are needed.

The two-week course at each camp, which costs less than \$100 including tuition, meals,

lodging, and scheduled field trips, is open to anyone 18 years of age or older. Students have come from every State and Canadian Province. They have included teachers and students, rangers and naturalists of the National Park Service, scout and recreation leaders, camp counselors, members of garden clubs, and nature hobbyists. Each camp offers five sessions, most of which are booked solid far in advance.

So far, 6,608 graduates have returned to their communities filled with ideas and inspiration to do something constructive about conservation. We estimate that each one directly influences at least 30 children and adults every year after graduation. And each has done inestimable service in educating public opinion in the wiser use of natural resources, the need for better conservation laws, and vigilant public support of their enforcement.

A Wisconsin graduate of both the Maine and California camps became so enthusiastic that she began promoting a camp in her own State. As a result of her efforts, the Audubon Society has been given some 300 wooded acres and contributions of \$68,500 for building alterations, additions, and equipment. It is now believed that the camp will open in the summer of 1955.

Our Connecticut camp actually is the summer facet of the year-round program of the Audubon Center at Greenwich. This and also the Audubon Center of Southern California, on the San Gabriel River between El Monte and Whittier, as well as the Theodore Roosevelt Memorial Sanctuary at Oyster Bay, Long Island, offer visitors both nature trails and trailside museums.

Centers Serve Schoolchildren

Busloads of schoolchildren and Scouts come by appointment to the California and Connecticut centers, where their teachers or leaders turn them over to Audubon guides (pages 612 and 616). Though each center serves more than 10,000 youngsters a year, near-by schools continue to urge us to enlarge our staff and facilities to accommodate even more. Los Angeles school officials are pressing us to make room for 50,000 a year.

Such centers hold greater potentialities for attendance than any other phase of our program. At present, however, our Audubon Screen Tours attract the largest number of people.

Since 1943, when we started these movie





← **Spoonbills' Flaming Flight
Is Reward Enough for
Their Protectors**

Since 1902, when the forerunner of the National Audubon Society employed its first warden to guard egrets in south Florida, the organization has been protecting birds which nest in colonies or rookeries and are most susceptible to harm. Today 10 wardens patrol 1,000,000 acres of land and water (page 607).

Florida Bay, during breeding season, now shelters about 200 spoonbills and 60 nests. When the society started protecting them, there were but 35 birds and 10 nests. Here an adult spoonbill flies low at Stake Key, Everglades National Park. Immature birds assemble on mangrove trees.

Opposite, below: The 36-foot *Audubon*, cruising near Cowpens sanctuary in Florida Bay, takes visitors close to a group of cormorants sitting on a little key, framed above by a host of pelicans on the wing.

Below: From *Audubon's* top deck guests get an unimpeded view of flying spoonbills, egrets, herons, and other Florida birds.

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lectures, annual attendance has soared to half a million. We now have 33 naturalist-photographers on tour with some of the finest available motion pictures of wildlife and scenery. In Toronto, Canada, the lectures are so popular that each is given three times to audiences of 1,000 each.

Such lectures, five in a series, may be sponsored locally by any organization, with tickets sold to the public. Many groups have used them to finance local conservation work and provide scholarships to send youth leaders to Audubon camps. We also offer many non-screen-tour lectures, especially in schools.

Films, slides, and tape recordings of our radio program, "Explorers of the Wild," are rented to schools and community groups. Rights to reproduce color and black-and-white photographs from our library of some 12,000 subjects may be purchased.

In 1953 we set up 21 exhibits of our finest black-and-white photographs and rented them to exhibit sponsors all over the United States, mostly to public libraries. Audubon Art Tours, assembled from more than 500 of the society's bird paintings, also are available.

Making of a Naturalist

One man tells of the profound impression a picture of a bird made upon him when he was a young rural schoolteacher. He had always lived in the country, surrounded by birds, but never bothered to look at them. Then one day he happened to see a picture of a white-breasted nuthatch. The legend explained that the nuthatch was common in the neighborhood where he lived.

Next morning, on the way to school, the very first thing he saw was a white-breasted nuthatch. He saw six more before he reached school, and he has been seeing birds ever since. He has, in fact, identified more than 400 different species. His name? John Kieran, noted writer-naturalist.

The Audubon Society estimates that its programs and publications reach directly at least 2,000,000 people a year, exclusive of those influenced through radio, television, or the press. The bimonthly *Audubon Magazine* goes to all our 23,253 members, plus an additional 6,018 nonmember subscribers.

Canadian Nature, written for use as supplementary material in Canadian schools, has a circulation of some 30,000. In one province, Prince Edward Island, not a school has been without it for the past seven years.

Audubon Field Notes, the society's bird-watcher's bible, has a limited (only 2,900) but avid list of subscribers. The six issues a year, edited with the cooperation of the United States Fish and Wildlife Service, comprise four seasonal migration reports, a breeding-bird census, and a Christmas bird count, with 7,384 participants in 1953.

Once, in New Jersey, five of us, including Roger Tory Peterson, the eminent artist-naturalist and author of *A Field Guide to the Birds*, set out on a bird migration count before daylight.*

En route we stopped to listen for bird voices; if they were definitely recognizable, we could check off the species on our list.

Police Interrupt a Bird Count

While we were sitting by the side of the road, deep in a wooded ravine with all our lights out, a flashlight suddenly shone on us. State troopers!

"What do you guys think you're doing?" one growled.

Complete silence. Then Peterson, in a meek voice, said, "We're listening for whippoorwills." That did it.

We were promptly hauled into town, and there we had to wait until 7 a.m., when the local justice of the peace arose from his bed. He laughed and let us go. But the day was ruined. We were able to assemble a list of only 130 instead of our usual 170 birds.

During World War II bird watchers frequently were reported as spy suspects. It did not surprise Peterson, therefore, when he looked down from the top of a tree at Seaford, Long Island, where he was busily snapping photographs, and saw a policeman.

"What are you doing up there?" the policeman yelled.

"I'm photographing goldfinches," answered Roger.

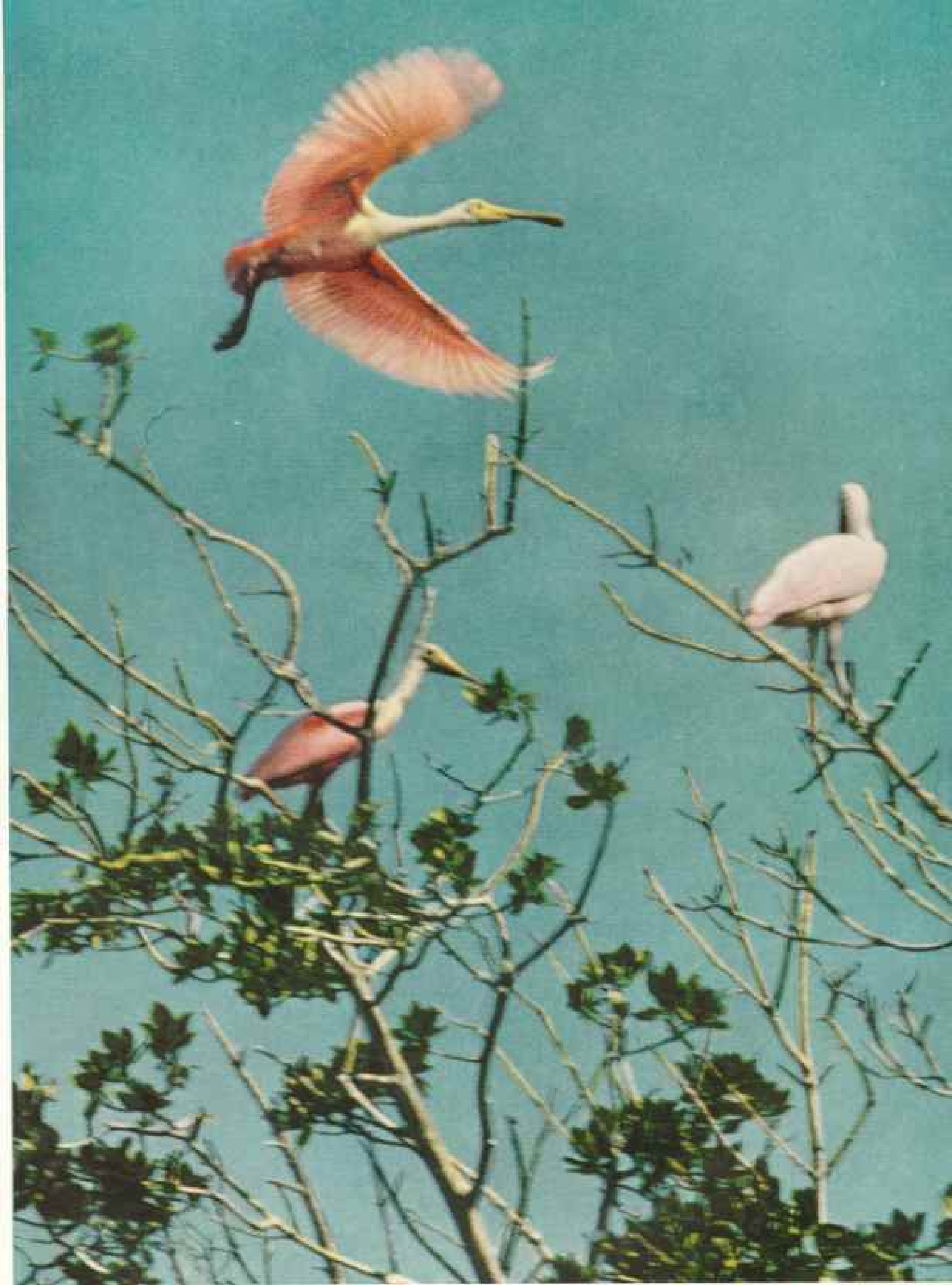
"What kind? British or American?"

"British," came Peterson's astonished reply. "But how did you know there are both kinds?"

The officer explained he had read in a book that small colonies of European goldfinches imported into America had become established on Long Island in the Seaford area. The book was Peterson's own *Field Guide*!

(Continued on page 605)

* See "A New Bird Immigrant Arrives," by Roger Tory Peterson, NATIONAL GEOGRAPHIC MAGAZINE, August, 1954.



Once Driven to the Brink of Extinction, Roseate Spoonbills Again Adorn Southern Skies

Harassed by leather hunters, spoonbills fled their Gulf Coast haunts at gun point. Audubon sanctuaries helped bring the pink water birds back. Here an adult flies over grown (left) and young birds at Stake Key, Florida.



Flame-tinted Spoonbills Nest in Faraway Seclusion

Although partial to low shrubs or trees, adults occasionally choose the top of an 80-foot cypress for a home site. Nests must always be remote, and preferably on islands. Another must is near-by shallow water, where the birds use their efficient bills to trap minnows, aquatic insects, and shrimps and other crustaceans.

In a two-year study an Audubon Society researcher found that spoonbills also will eat such foods as stale buns and sweet chocolate.

These stately birds, averaging 33 inches in length and 52 in wingspread, are the only spoonbills in the Western Hemisphere. They are also the only pink members in a predominantly white family. They breed once a year, starting at age 33 to 36 months.

Above and opposite: Both parents feed youngsters near their nest in Florida mangroves. When the bill opens, junior reaches in at the side and helps himself.

Left: On Vingtune Islands, Texas, in the largest spoonbill nesting colony in the United States, a week-old nestling gets a partly prodigested and regurgitated meal from a parent.



Preening, a Spoonbill Displays His Unique Mandibles

Though shaped like a spoon, this remarkable beak isn't used as a scoop. Instead the spoonbill swings it from side to side as he walks through water, feeling out prey. With two small "nails" on his mandibles he pins his quarry. Then he raises and shakes his head, sending his supper adroitly down his long throat.

The upper mandible showing here may be six or more inches long, an inch wide at the base, flaring to two inches or more at the tip.





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♣ **Wood Ibises Speckle a Mangrove Island in Florida**

In the Cuthbert Lake rookery wood ibises huddle by the hundreds beside their mangrove-supported nests. The birds are misnamed; actually they are storks—only North American members of that species. Great soarers, ibises ride thermal up-drafts almost out of sight (page 591). They also do expert loops.

En route from West Lake to Cuthbert Lake in Everglades National Park, an Audubon boat (opposite, below) snakes through a maze of channels.

← **Heron Keeps Eye Peeled for Poachers**

In Everglades National Park a tricolored, or Louisiana, heron perches on a sign holding bad news for human anglers.

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↑ **Purple Gallinule Gets a Handout**

Anhinga Trail boardwalk leads visitors into Everglades National Park. Audubon guide Hank Bennett attracts a purple gallinule, a noisy, fearless bird that saucily flicks its tail as it walks on floating plants in marshes or along ditches.





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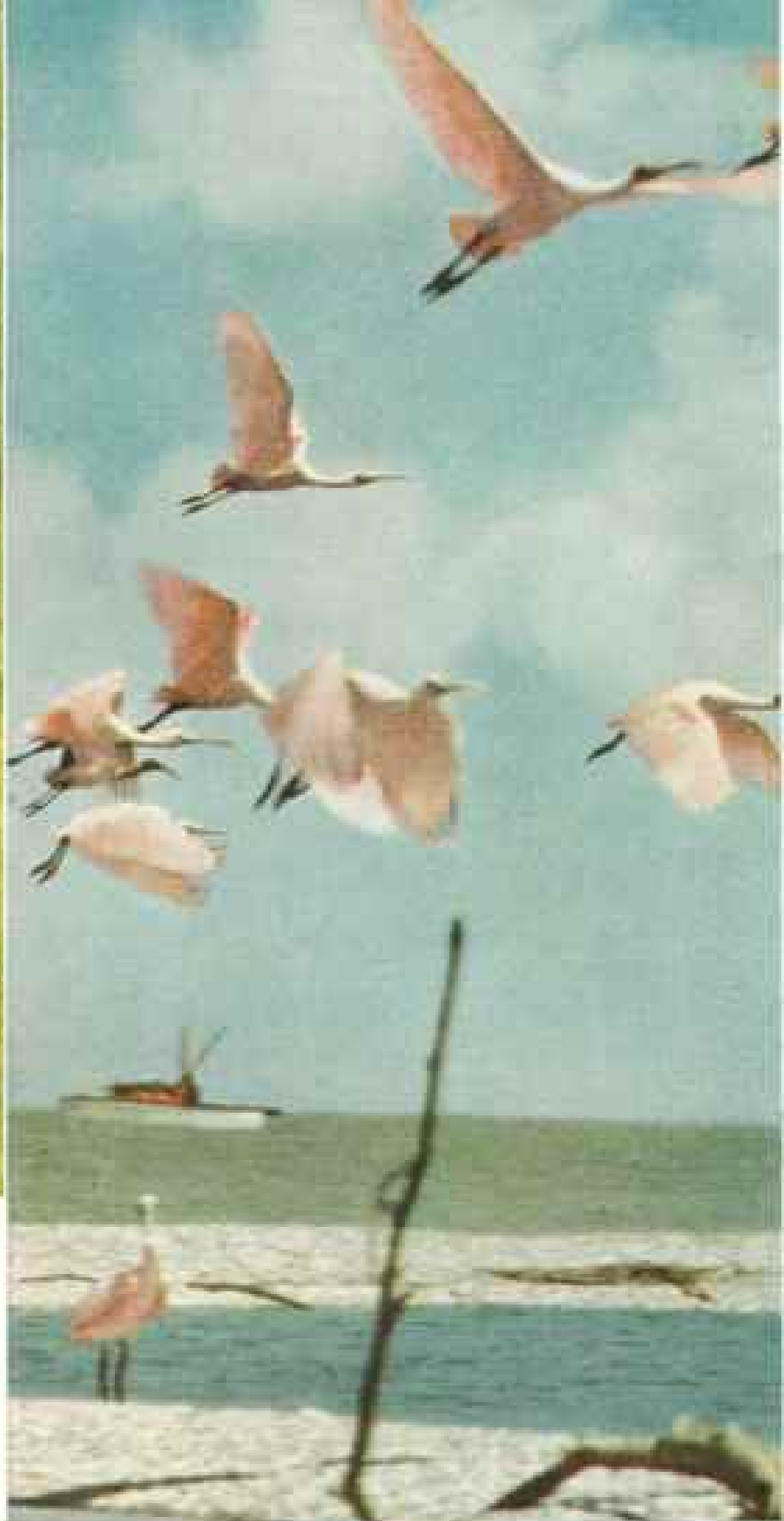
↑ Whooping Crane Has Little to Whoop About

This great bird, with a 90-inch wingspread, now numbers only 26 in the United States. All but two winter on Aransas National Wildlife Refuge, Texas.

↓ Author John H. Baker (center) leads an inspection party at the Second Chain of Islands sanctuary, Texas.

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Illustration (above) by Helen G. Crickshank
from National Audubon Society





↑ **Man's Approach Startles
Roseate Spoonbills into
Graceful Flight**

Shooting of near-by nesting egrets was sufficient to send spoonbills flying from the land. By 1890 they had disappeared from Texas and almost from Florida. Today, thanks largely to Audubon protection, they have made a strong comeback in Texas, and have increased in Florida.

A flock of nesting spoonbills frightens more easily than one or a few individuals. This group takes wing over Galveston Bay, Texas.

→ Baby spoonbills, like this one rescued by warden Robert O. Fisher, are born with bright salmon-pink skin, and wrapped in white down. At five weeks, when ready to leave the nest, they have white feathers faintly tinted with pink. The pink deepens with each of three molts, culminating at maturity in a masterpiece of color.

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Photographer Robert F. Elson





♣ **Reddish Egret Watches
Spoonbills; Heron
Stalks Aloofly**

All members of the order *Ciconiiformes*, these birds differ considerably. If their nests are approached, spoonbills are likely to fly off at once. Egrets and herons flush reluctantly and quickly return.

Spoonbills apparently have great powers to resist begging. Young herons and egrets can still wheedle a meal out of mother after fledging, but not spoonbills. This group feeds near Stake Key in Everglades National Park.

The great blue heron hurrying past in the rear towers four feet high. In flight, its powerful wings measure nearly six feet,

← **American Flamingo Rarely
Visits Mainland U. S.**

Once abundant in southern Florida, flamingos now are found in largest concentration on Great Inagua in the Bahamas. The Audubon Society helps protect the second largest colony, in Yucatán.

About the size of a great blue heron—48 inches long, 60 inches from wing tip to wing tip—the flamingo does not pull its neck back heron-style when flying. Flamingos fly like spoonbills, ibises, and cranes, with necks and legs fully extended. This pink captive posed in the pond at Hialeah Park, Florida.

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Endorsement by National Geographic Photographer Robert F. Heism and (left) Allan D. Cruikshank from National Audubon Society

Today 20 Audubon Society wardens patrol upwards of 1,000,000 acres of land and water in the United States, protecting great nesting concentrations of egrets, ibises, herons, skimmers, terns, oyster-catchers, pelicans, and roseate spoonbills (pages 603, 607, and 610). Wildlife often needs protection beyond that afforded by law and majority public opinion. Birds that nest in colonies or rookeries are especially susceptible to harm and hence in greatest need of protection.

Many of the Audubon sanctuaries are islands on the coasts of Texas and Florida, leased to the society by the States and private citizens. A sanctuary warden's main task is to prevent people from landing on the island he guards and yet retain their good will. The principal threat to the birds today is from disturbance by well-intentioned people, whether binocular fans, photographers, picnickers, or fishermen wishing to cast from the beach.

Wardens Still Face Danger

Some Audubon Society wardens still face danger. One day in 1951 a telegram was received from warden Henry P. Bennett (page 620), on duty on the southwest Florida coast where the two wardens were killed some 50 years ago.

"On Saturday, August 11, 6:15 p.m., caught three men from Chokoloskee after they fired on birds at Duck Rock, killing three and wounding one white ibis. Birds were not in their possession, but I retrieved them from under mangroves. This evidence taken from my boat without my permission when party came aboard, making several attempts to start fight, striking me three times, with no injury because I was able to protect myself. Two men were intoxicated, the other a young boy."

Later, in a letter, Bennett reported that one of the men threatened: "If you take this case into court, I'll tell everyone you have been drinking on the job."

The case did go to court, in Monroe County, and a conviction was obtained for violation of a wildlife-protection law. This bears testimony to the great change in public opinion during the five decades since Bradley and McLeod were killed.

Among the more important coastal Audubon sanctuaries in Florida are the Alafia banks, Green Key, Whiskey Stump Key, and Bird Key in Tampa Bay; Duck Rock off the south-

west coast, and Cotton Key and southern Cowpens in Florida Bay.

In Texas the Audubon Society guards the Vingtune Islands in Galveston Bay, Bird Island in San Luis Pass, the Second Chain of Islands off the Blackjack Peninsula, Lydia Ann Island near Port Aransas, South Bird Island in the northern Laguna Madre, and Green Island in the southern Laguna Madre.

Our largest and one of the most exemplary refuges is Rainey Sanctuary in Louisiana, covering some 26,000 acres of coastal marshland owned by the society. It is maintained primarily for the benefit of wintering waterfowl, including blue and snow geese and all kinds of ducks normally wintering on the Gulf coast.

Our newest sanctuary, the Corkscrew Rookery, which will embrace at least 1,600 acres at the northern end of Big Cypress Swamp in Collier County, Florida, has been, for as long as we are aware, the site of the Nation's greatest nesting concentration of wood ibises and American egrets.

It was made possible largely through a generous gift of land from the Lee Tidewater Cypress Company, a leader in the fast-growing trend toward corporate giving for conservation. The company was awarded a citation for this specific conservation action. Also, \$25,000 was contributed by corporations and individuals to purchase 160 acres of the biggest timber.

I wish that all our friends could visit these sanctuaries. Picture yourself seated comfortably in the 36-foot boat *Audubon* (page 594). We are anchored off Duck Rock. It is a July evening and the sun is setting in a burst of golden glow. Great thunderheads tinted lavender and pink tower out of the Gulf of Mexico, and rain squalls stabbed with lightning are scattered here and there. The Gulf is like a mirror.

Bird Blizzard on a Florida Key

Then suddenly we see them, thousands upon thousands of egrets, herons, and white ibises, winging in great V's and long strings, coming in from their feeding grounds in the Everglades. A hundred thousand or more will roost for the night on this tiny key.

As they pass, silhouetted against the setting sun, we hear not a sound except the mass whir of their wings. Before they settle down for the night, however, there will be great commotion in the roost, as if the birds were swapping notes on the day's events.





↑ **Protector of Birds,
an Audubon Warden Leads
a Dedicated Life**

Under a boat awning shading him from a 115° August sun, Lyle Bradley, one of 20 Audubon wardens, keeps vigil over an isolated bird island in San Antonio Bay, Texas. Back at his tent (right), where he lives four months every year, he types a report for New York headquarters. Behind him flies the Audubon Society flag, emblazoned with the American egret. The first Audubon warden was killed by an egret-plume hunter.

Above: Near-by oil drilling arouses the interest of a pair of royal terns on South Bird Island, Texas. The royal measures 19 inches from stem to stern.

Opposite: Three white ibises, 35 inches from the tips of their reedy bills to their tails, stand motionless on the Second Chain of Islands refuge off Texas. Never in danger of extinction, white ibises sometimes number half a million in one rookery.

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Kodachrome by National Geographic
Photographer Robert F. Brown

Next, imagine yourself on the milky-green waters of Florida Bay. Here the statuesque great white heron thrives under protection in its chosen habitat. Through the haze, feeding herons, scattered over the vast expanse of shoals, look like so many white sails on sloops in a race.

Here also, on a few selected keys which combine the necessary requirement of extensive marl shoals with a southwest exposure, Florida's few remaining breeding roseate spoonbills, or "pink curlews," hold sway. It is hard to picture a more beautiful sight than this magnificent pink bird with its carmine epaulets and bright-orange tail winging across a seascape of emerald-green water, dark-green mangroves, bright-blue sky, and fleecy, white clouds (pages 597 and 603).

Now come inland to the Kissimmee prairie and listen to the raucous calls of the Florida sandhill cranes reverberating across the palm-studded savannas. From river bottoms and lake edges rises the high wail of the limpkin. From a gum slough comes the cackle of the logcock—the pileated woodpecker—and, from its deepest recesses, the barks and resonant hoots of an old barred owl.*

These are sounds and sights that we of the Audubon Society strive to preserve, not only for you and me but for our children and theirs to come.

Visitors May Take Tours

Members and friends of the Audubon Society are invited to visit its sanctuaries. They have only to write to the New York office and receive written authorization. A warden will meet and guide them.

In Florida we also offer in winter conducted two-day Audubon Wildlife Tours. One, out of Miami, goes into Everglades National Park, including part of Florida Bay, and a second includes the western shore of Lake Okeechobee and the Kissimmee prairie. One-day tours are conducted to Alligator Lake on the Cape Sable prairie, starting about December 1, and to Duck Rock on the southwest Florida coast in June and July. A total of 11,244 people have taken the tours so far (pages 595, 600, and 601).

Audubon tours are much more than birding or botanizing trips. The guides not only point out wildlife and plants, but also discuss geological history, the effects of drainage, fire, flooding, roads, dams, pollution, and erosion, as well as the problems of maintenance. We

are proud of the tribute paid to our tours in 1947 by J. A. Krug, then Secretary of the Interior.

"Audubon Tours," he wrote us, "have served a very real function in spreading conservation and in publicizing the need for reservation of the Everglades area from commercial encroachments. The American people owe a debt of gratitude to the tours and to their sponsor, the National Audubon Society, as a factor in the final establishment of Everglades National Park."

How Everglades National Park Was Won

Promoting the establishment of Everglades National Park came naturally to the Audubon Society. From 1905 until 1946, when the Federal Government took over, the Audubon Society had been protecting birds in the area. Had we not done so, it is doubtful whether one of the principal reasons for which the park was set up would have survived.

In the 1930's Ernest F. Coe, originator of the idea for the park, and Dr. T. Gilbert Pearson, then president of the Audubon Society, testified so forcefully before the U. S. House Committee on Public Lands that in 1934 an authorization law was enacted.

In 1944-45, through the leadership of Gov. Spessard L. Holland, John D. Pennekamp of the *Miami Herald*, and Newton B. Drury, then Director of the National Park Service, an agreement was reached between the State and Federal Governments for establishment of the park. It was dedicated to the people of the United States in 1947 as the 28th national park.†

Governor Holland (now United States Senator) wrote a letter which was a tribute to all the members and officers of our society who had worked so faithfully to make the Everglades National Park a reality:

"May I take this occasion to thank you warmly for your own active and effective interest and participation in this long-drawn-out matter. Of course, the protection which you and your society have given to rookeries, etc., has been of tremendous value, but, apart from that, your following up the whole situation so

* For interesting accounts of these and other birds mentioned in this article, see *Stalking Birds with Color Camera*, by Arthur A. Allen, National Geographic Society, Washington, D. C.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Wildlife of Everglades National Park," by Daniel B. Beard, January, 1949; and "Haunting Heart of the Everglades," by Andrew H. Brown, February, 1948.

→ **Reddish Egrets Seem to Ask: "What Goes On Here?"**

A slight noise caused this attitude of alarmed indignation. Reddish egrets, like the American and snowy, were almost killed off because women coveted their plumes for hats. They have returned to their original abundance in Texas and are on their way in Florida. Actually herons, these birds occur in two color phases: white and the commoner bluish-slate typified by this family on Lydia Ann Island, Texas. Length is 30 inches, wingspread 46.

↓ **White Facial Fringe Sets This Ibis Apart from Others**

Except for its trademark, the white-faced glossy ibis looks exactly like its cousin, the glossy ibis. It claims one more inch in average length, 23, but has the same wingspread of 58. Both this ibis and the reddish egret (above) nest on Texas islands.

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Kodachromes by National Geographic
Photographer Robert F. Blinn and
(below) Helen G. Crutcher
from National Audubon Society

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closely and bringing together the State and Federal officials in such a way as to bring about the passage of the recent Federal amendment and the subsequent execution of the papers above mentioned has been the largest contributing factor to the reaching of the results above recited.

"I am deeply indebted to you and your organization, and in expressing my own gratitude I would like to thank you on behalf of the State and all lovers of Nature in Florida and elsewhere."

The Audubon Society's work has not always been so well received. Many local citizens protested when we established a sanctuary at Lake Okeechobee in 1939. However, after one season's experience with Audubon Wildlife Tours in the area, five of the community's leaders stated:

"We value the business which the society

brings to our community. We appreciate and believe in the work of the society and wish to cooperate with it. We believe that reasonable protection of the wildlife, as practiced and promoted by the society, helps our town economically and increases the public welfare."

An experience like this reassures us that we are right in expending only limited efforts on legislative matters. Laws not adequately supported by public opinion are seldom enforced. We therefore stress education so that there may be built up a really sound majority public opinion that will wish both to enact and to support good conservation laws.

Help for the Whooping Cranes

We of course maintain close relations with administrative officials of the Federal Government, for it is they who originate many policies and, in any event, carry them out.

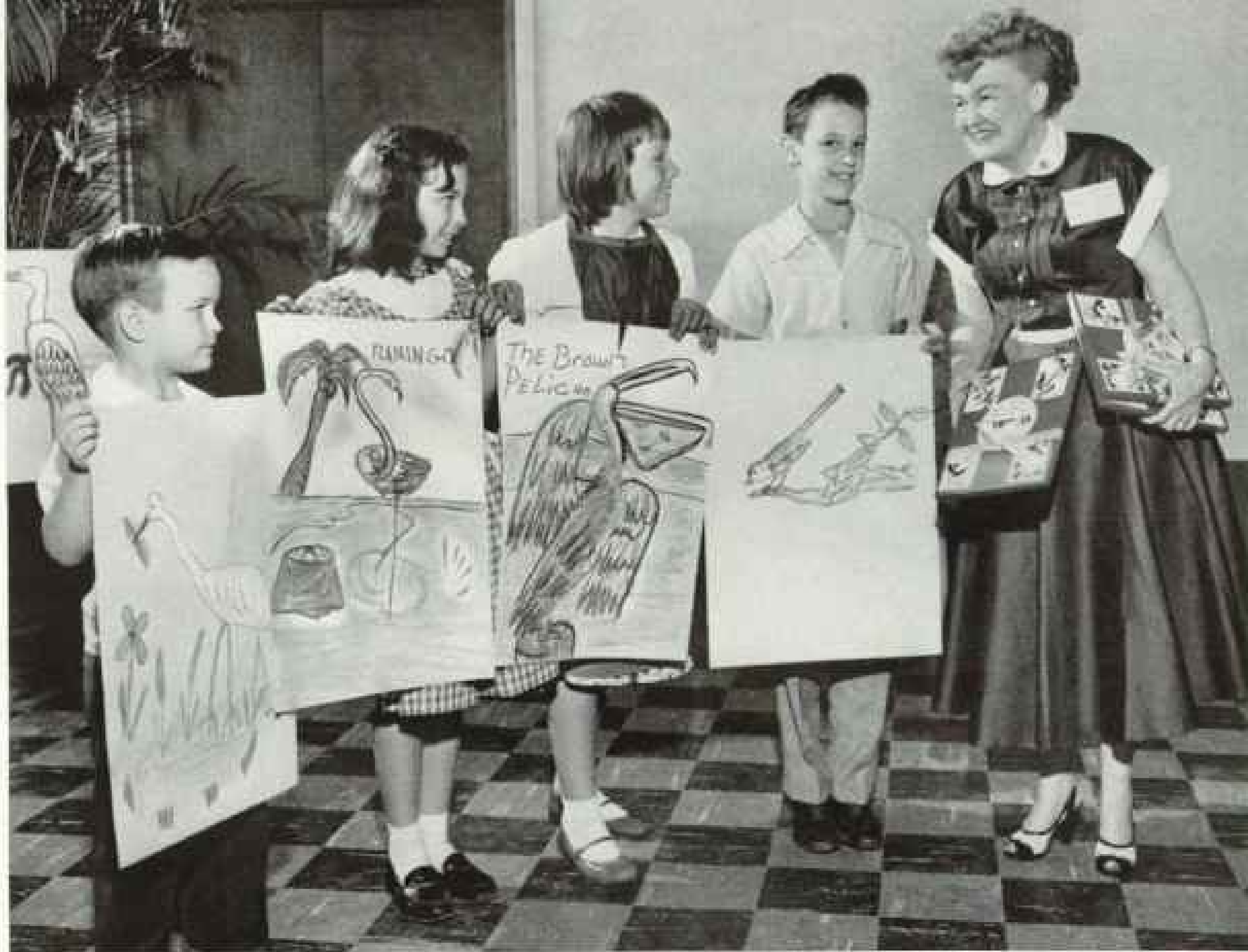
The research project on the whooping crane, one of North America's rarest wild birds, is a good example (page 602). This year there were but 26 of these birds still living. The whooping cranes winter in a small area on the central Texas coast, most of which is within the Aransas National Wildlife Refuge, and migrate to nesting grounds in north-west Canada.

Through the help of the Audubon Park Commission in New Orleans, the Gothenburg (Nebraska) Rod and Gun Club, and the St. Louis Zoological

A Good Samaritan Rescues a Heron

Audubon warden Louis Rawalt found this great blue heron floating half drowned in the waters off South Bird Island sanctuary near Corpus Christi, Texas. The bird's feathers, normally light and fluffy, were so sticky and matted with oil that they became waterlogged. Rawalt holds the heron cautiously at arm's length. It could destroy his eyes with lightning thrusts of its javelin beak.





Audubon Juniors Display Prize-winning Rapid Sketches Drawn from Memory

These school children, representing grades 3 to 6, topped 14 finalists in an Audubon bird-sketching contest at Miami, Florida. Each contestant got 10 minutes to sketch with colored chalk the bird of his choice. Earlier the youngsters had practiced at school and in their spare time. Winners display a great white heron, flamingo, brown pelican, and mockingbird. Here the proud artists receive bird games as prizes.

Garden, we brought together two wing-crippled captive cranes. We hoped they would produce young that we could add to the wild flock.

The birds were placed within a fenced enclosure on the Aransas refuge. The first year infertile eggs were laid. Then the male died and was replaced by another wing-crippled bird caught on the refuge.

The next season one egg hatched. But little Rusty, who acquired nationwide fame, unfortunately disappeared—no one knows how—when he was only four days old. The third attempt was thwarted by a flood. Then the zoo in New Orleans asked that the birds be sent to it. We are still waiting for them to build their first nest there.

It seems clear now that the whooping crane's chances of survival depend primarily on its successful breeding in the wild and that the principal hazard it faces is illegal shooting. In the summer and fall of 1953 we staged a co-

operative publicity campaign to persuade people along the birds' migration route not to molest them. It got results. All of the 21 adults that had left Texas in the spring returned in the fall, and with them they brought three young born that year.

When we learned that the Continental Oil and Western Natural Gas Companies were planning to build a loading dock with a road and pipeline crossing directly over the heart of the cranes' wintering ground, we called their attention to the harm the birds would suffer. The companies willingly moved their whole operation to the other side of the peninsula, at considerable expense. Both won our citation for a specific conservation action.

Research Gets Results

In all, the society has published four research reports: on the ivory-billed woodpecker, whooping crane, roseate spoonbill, and California condor. Staff researcher Robert Porter



↑ California Audubonites Wade Right into Their Subjects

At their camp near Donner Pass the vertebrate class seines in Van Norden creek for small fish, while the insect class scoops specimens with hand nets.

→ The Audubon Center of Southern California occupies 80 acres of woodland only 17 miles from the Los Angeles Civic Center. School children come by busloads to walk the trails and visit the museum. They respond most intensely to live specimens like deodorized skunks, harmless snakes, and the young screech owl held by Mrs. O. M. Stultz, director. Owls, hawks, and other birds of prey, she says, need protection because they help maintain Nature's balance by controlling rodents.

Opposite, above: Returning from a fishing trip with a full pouch, a mother pelican invites her offspring to lunch.

When mother thinks a youngster has had enough, she shakes her head so violently she sends him sailing. This family lives on South Bird Island, Texas, an Audubon sanctuary, and the only white pelican nesting colony on the Gulf Coast of the United States.

© National Geographic Society

Illustrations by National Geographic Photographers
J. Baylor Roberts and (top right) Robert F. Stone







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Bellman

Lacy Egret Plumes Adorn a 1910 Hat

Ruthless gunners killed egrets by the thousands prior to World War I. This photograph of the period shows why the slaughter was profitable—women were enthralled by a craze for bobbing plumes on their hats. But the Audubon Society began protecting egrets, and, in a memorable legislative battle known as the “feather fight,” it won laws banning the traffic in wild-bird plumage (page 584).

Allen is currently in the third year of a study of the American flamingo.*

The purpose of each report has been to investigate the life histories and special needs of the birds and to find ways of increasing their numbers, or at least of arresting their decline. Much of what has been learned has resulted in practical action, at times even before the report was printed.

Our findings on the flamingo, for instance, stimulated the organization of the Society for the Protection of the Flamingo in the Baha-

mas. That society now maintains wardens and equipment on the island of Great Inagua for the protection of the largest remaining nesting colony of American flamingos. The National Audubon Society protects flamingos in Yucatán jointly with salt works owners there on whose land the birds have their second largest nesting colony.

Protecting California Condors

The study on the California condor, conducted by Carl B. Koford and sponsored jointly by the Audubon Society and the University of California, revealed, among many things, that “one man can keep a pair of condors from the egg all night or prevent the feeding of a chick for an entire day merely by exposing himself within 500 yards of a nest for a few minutes at one or two critical times of the day. Loud noises can alarm condors at distances of over one mile.”

Thanks to their size—about 20 pounds with a wingspread of nine feet—Koford found no difficulty in observing the birds from a distance of several miles.

Nearly all the 60 remaining condors nest or roost in a portion of the Los Padres National Forest in California (page 590). Since their young are unable to fend for themselves for some 15 months, condors normally nest only every other year. Apparently only about five young are successfully raised each year. The number of each sex alive is unknown. About 20 are immature.

Three years ago the Audubon Society took a leading part in obtaining the issuance of a public land order greatly restricting entry into the nesting area. The heart of the area, in fact, was entirely closed to entry of any kind. A special warden, jointly

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: “Flamingos’ Last Stand on Andros Island,” May, 1951, and “The Pink Birds of Texas,” November, 1949, both by Paul A. Zahl; “Flame-Feathered Flamingos of Florida,” by W. A. Watts, January, 1941; “Hunting with a Microphone the Voices of Vanishing Birds,” June, 1937, and “Shore Birds, Cranes, and Rails,” August, 1937, both by Arthur A. Allen.

financed by the Audubon Society and the United States Forest Service, is now on duty in season.

The Audubon Society believes that facts obtainable through scientific research should form the basis for wise conservation policies. A good case in point is that of the cattle-fever ticks.

Cattlemen were demanding that the deer in southwest Florida be killed because they believed the animals were carrying the ticks. Sportsmen wanted the deer refuge continued, but asked that, if the deer had to be killed, they be allowed to do it instead of paid killers.

The Department of Agriculture had placed a quarantine on shipment of cattle out of the area and had asked the Department of the Interior to permit killing of the deer in the Hendry County Seminole Indian Reservation. The Secretaries of Interior and Agriculture then invited the Audubon Society to make an impartial study of the problem.

When our careful research showed there were no fever ticks on either the deer or the cattle, the Department of Agriculture canceled the quarantine and put a stop to



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Egrets Such as These Once Faced Extinction

American (upper) and snowy egret (lower) were the birds most sought by plume hunters, but the pillagers also shot herons, roseate spoonbills, gulls, and terns. Two Audubon wardens protecting island sanctuaries were killed. These photographs have been scaled to show the relative size of the two egret species. The larger American has a wingspread of 55 inches and a length of 39. The smaller, more dainty snowy measures 38 inches in wingspan and 24 in length.

Allan D. Cruikshank, National
Audubon Society



↑ Children Learn How a Nation Loses Its Topsoil

It takes Nature from 500 to 1,000 years to make an inch of good soil. Man can destroy it in one moment of recklessness.

To show what happens when man upsets the balance of soil, water, and plants, Mrs. M. Gertrude Woods, assistant director of the Audubon Center of Southern California, starts with two boxes of soil. One is bare as though ravaged by fire or overgrazing, the other planted. Then two children pour equal amounts of water on each. From the planted box the run-off is slight, almost clear. From the other, it is heavy and opaque with soil. The difference dramatically convinced these children of the need to plant wisely.

← Deer Live Longer with Audubon Aid

To end Government slaughter of deer in southwest Florida, believed by cattlemen to be cattle-fever-tick carriers, the Audubon Society conducted a research program. It proved that neither deer nor cattle in the area had fever ticks.

© National Geographic Society

Kodachromes by National Geographic Photographer
J. Barlow Roberts and (left) Arthur C. Twomey

the lamentable slaughter of deer in southwest Florida.

That we had powerful help on the project is evidenced by the following letter President Franklin D. Roosevelt wrote to his Secretary of Agriculture in 1942:

"Tell your Bureau of Animal Industry that I do not want any deer killed on the Seminole Reservation in Florida until this war is over . . .

"The point is that no one knows whether these unfortunate animals are hosts to cattle ticks or not. The investigation ought to teach us more about it.

"You might also tell the Bureau of Animal Industry that they have never proved that human beings are not hosts to cattle ticks. I think some human beings I know are. But I do not shoot them on suspicion—though I would sorely like to do so!"

Taking Stock at Half Century

As delegates from our 299 branches and affiliates gather in November at the Audubon Society's 50th annual meeting, we can look back on many accomplishments, some of which I have mentioned here. We can point to our high membership-renewal rate of 85 percent and to the fact that our membership has increased 543 percent during the past two decades.

In the same period, our annual expenditures have increased from \$125,000 to \$750,000. Our staff now numbers 60 at Audubon House, plus 40 in the field and, in summertime, 75 more at the camps.

In fact, we can now afford to assign one staff member solely to the job of answering innumerable questions about Nature. Some letters have arrived addressed to the Auto Bomb Society, the Ottoman Society, and even the Atom Bomb Society.

We aim never to offend a potential supporter, but it is hard sometimes not to be amused by the person who wants to know what the little gray bird was he saw in a bush last Tuesday about 4 p.m., when the wind was northwest and the temperature about 45°. Or the one who writes: "Please send me information about what to do next. I need help!"

Much more work in conservation still remains to be done.

Today we are aware that billions of tons of topsoil annually wash into the oceans; that we continue to cut our forests faster than they

grow; that the carrying capacity of our western range for domestic livestock is far below what it was in its virgin condition; that we continue to pollute our streams and rivers.

Furthermore, with better roads, cars, planes, and trains, the introduction of machinery into commercial fishing and lumbering, better guns, ammunition, and refrigeration, man today is killing more sooner and keeping it longer, whether for sport or for profit.

Still, we are not alarmists. We are optimists. We have faith in the resourcefulness and inventiveness of mankind, even though preferential interest never lays down its sword. Various groups clamor constantly for killing control over whatever they consider to be their enemies. People, for example, who are preferentially interested in worms may hate robins. Those preferentially interested in deer hate bobcats and mountain lions. Those preferentially interested in grass hate deer.

We hope to convince people that most desires for killing control are based on an erroneous assumption. For example, when our society employed men to protect the bird rookery keys in Tampa Bay, Florida, local fishermen feared any resultant increase in pelicans and other fish-eating birds would decrease the fish. The stock of fish, as well as birds, was already decidedly low.

Nature Strikes a Balance

But when the birds were restored to their former abundance, so were the fish. The aquatic plant life, the pasturage of the sea, was restored to its normal profusion and verdure by the guano of water birds. The plant life, in turn, provided food, shelter, and shade for fish and other marine animals.

One year one of the society's wardens wanted to exercise killing control on great-tailed grackles. Among other things, they sometimes feed on egrets' eggs and young. We did not permit him to kill the grackles, however, and the crop of young egrets raised to flying maturity that season was the greatest on record in that sanctuary.

The numbers of predators and prey go up and down together, granted, of course, a little time lag in the coordination.

The Virginia Commission of Game and Inland Fisheries ran an interesting experiment at its Hog Island waterfowl refuge. Here careful records were kept of a year's wheat crop in three fields with almost identical soil and commercial fertilization.



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California Offers 5,000 Flowers for Study

Of some 30,000 different flowering plants of the United States, about a sixth are found in California, more than in any other State. Only Texas and Florida boast comparable concentrations.

The flowers enlarged here are found only in the Western States.

At top is the wood lily, followed below by the yellow monkey flower, whose petals often appear to grin at the onlooker. Elephants'-heads, third from top, are readily identified by their shape. The flowers at bottom, with white edging on their sulphur petals, are tidytops.



© Kodachrome by National Geographic Photographer J. Barber Roberts

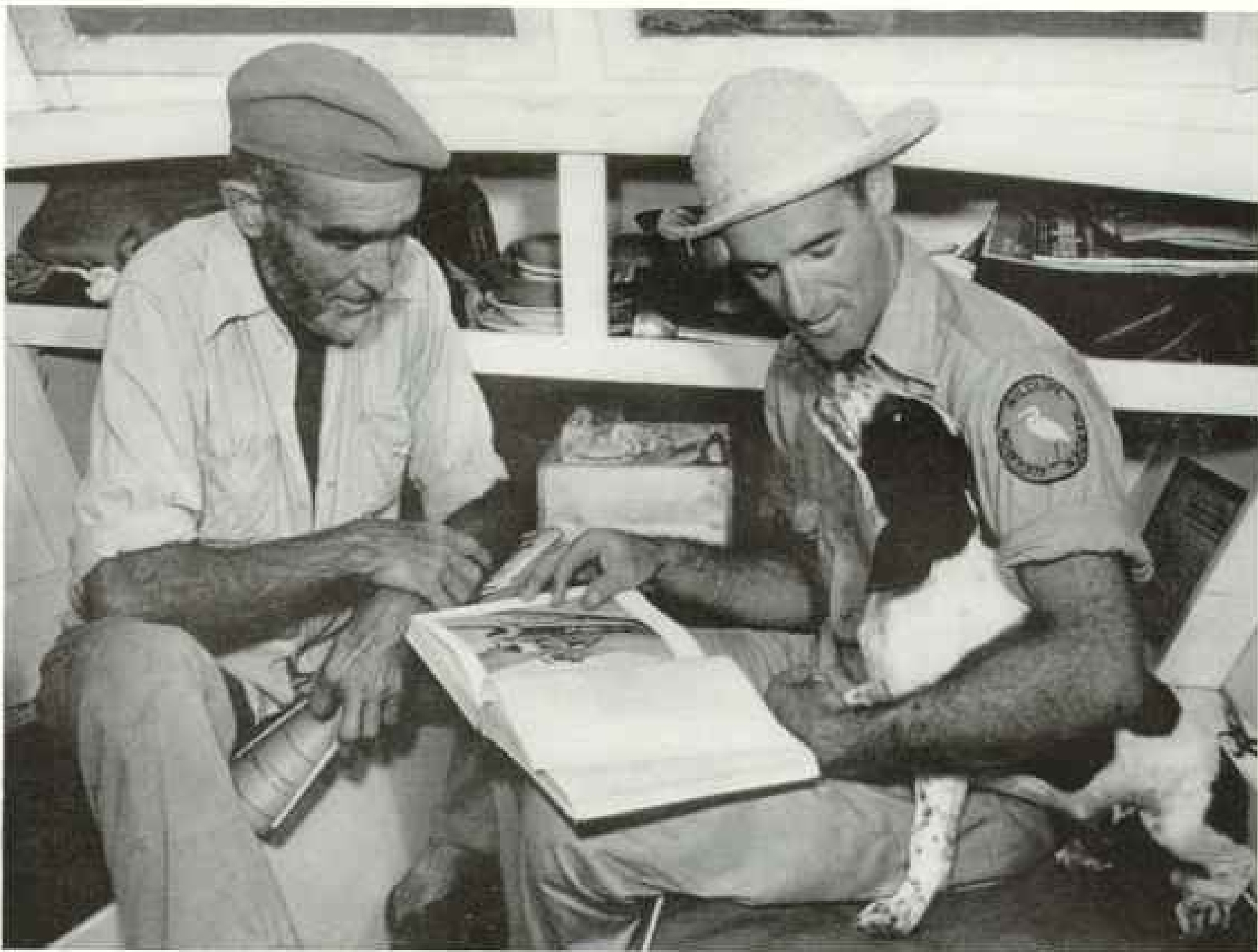
One Audubon Camp Field Supplies 250 Flowers

In his summer camp classes, Audubon-uniformed Dr. Ralph Kelting, University of Tulsa botanist, tells how plants and other natural life are related. Like all Audubon teachers, he leavens ecology with engaging bits of information and humor.

The Mariposa lily, at the top, is called sego lily in Utah, where it is the State flower. Mormon pioneers ate its bulbs on their trek across the desert. The firecracker plant (second from top) has crimson tube-shaped flowers. Third down is the pink monkey flower. Blazing star, at bottom, is a glory to see and to smell.



Kodachrome by Furr L. Baker (second right) and C. E. Ward (lower right)



Audubon Warden Henry Bennett and Friends Review Wildlife Publications

Bennett (right) has the important task of guarding wildlife at Duck Rock sanctuary off the southwest coast of Florida. In season, more than 100,000 herons, egrets, and ibises roost nightly on this tiny key. Here the warden is visited aboard his boat by Roy Omer, of Pelican Key, and Doojam, a friendly dog.

Some 2,000 wintering Canada geese fed regularly in one of the fields, a smaller number in the second, and none in the third. The yield that year—thanks to the guano of the birds—proved to be 35 bushels to the acre in the field used by the 2,000 geese, 25 bushels in the field used by the few geese, and only 18 in the one not used at all by geese.

Conservation Serves Interests of All

The Audubon Society disagrees with the idea still rampant that wildlife and plants can be classified as beneficial or harmful. Individuals or groups of a species, locally and temporarily, may be, or seem to be, harmful to the interests of people. But all wild plants and animals in their native environment have roles to play in the balance of Nature.

There has been occasional misunderstanding about the attitude of the National Audubon Society toward hunting. Hunters have always been represented on our Board of Directors,

and our society has always recognized the recreational value of field sports, legally pursued. We do believe, however, that it is essential that the hunter's take be regulated so that an adequate breeding stock may be preserved.

One hears a great deal nowadays about "management," "harvesting," and "cropping the surpluses" of wildlife. To this our answer is: It hasn't been necessary to harvest or "crop the surplus" of songbirds.

Eventually, it seems to us, we must conclude that it is not so much wildlife that requires management as it is man.

The National Audubon Society is dedicated to helping man understand that conserving our natural resources serves his own best interests. We strive to open the eyes and minds of both young and old to the wonders and beauties of the outdoor world, to make them aware of the steady stream of life going on around them, and to help them realize that they are part of this exciting pageant of events.

Decimated by Chinese Reds and the Hazards of a Hostile Land,
Nomads of the Steppes Trekged 3,000 Miles to Kashmir

BY MILTON J. CLARK

With Illustrations from Photographs by the Author

IN storied Srinagar, cradled in the Vale of Kashmir, I spent a year among refugee Kazakhs, colorful tribesmen whose forebears have roamed the steppes of central Asia for 2,000 years.

My wiry, high-spirited hosts were the remnants of hordes of saddle-bred nomads who had fled the Communist regime which Red China had imposed on their native Province of Sinkiang.

My wife and I became the good friends of a handful of tribal families, the homeless survivors of an overland journey that had been at once a triumph and a disaster: 4,000 families had set out from Sinkiang on their epic escape march; a pitiful 350 individuals reached Kashmir.

Haven in Kashmir

In a fortresslike caravansary beside the Jhelum River, Kashmir authorities had generously provided quarters for the immigrants until their fate should be decided.

The trials and tragedy of their flight behind them, the Kazakhs were not downhearted. They welcomed us warmly and with open-handed hospitality, and in time we became their confidants. I was, I believe, the first American to learn their lore in the people's own tongue.

From Srinagar, in summertime, the tribesmen fled the city dust and heat. Mounted on borrowed Kashmir horses, they were off (and I with them) to enjoy the relaxation of a summer pasturage in the mountains.

"It is like our pastures in the Tien Shan," said Kazakh chieftain Qali Beg (page 629). A sweep of one weathered hand took in the meadow with its crystal stream, the fir-clad mountain spurs, riven precipices, and, far above, the jagged, snow-streaked summits.

What a relief to the Kazakhs was this holiday encampment! Here, in a landscape and round of activities familiar to them, they came to life with laughter, games, and jests. Forgotten, momentarily, were the dark months and weary miles so recently endured.

Picture me, if you will, at the summer pasturage, sitting in Qali Beg's felt tent. On a day of lashing rain he has invited a fellow leader, Sultan Sherif, and a few tribal deputies to while away the time in reminiscence.

Around the central fire, from which not all the smoke finds exit through the smoke hole overhead, lounges a group of young Kazakh men. They wear their high-topped bonnets, lined and fringed with fur and covered with patterned blue, red, or lavender silk.

Legs thrust from beneath long wool coats display soft, gleaming black leather boots. Sitting cross-legged or reclining on the red carpets, the young heroes joke as they gnaw a joint or swallow dripping handfuls of rice.

The women bring us tea in porcelain bowls and ladle out buttermilk. (Here in Kashmir fermented mares' milk, the mildly intoxicating, universal beverage of the steppe, is hard to come by.) Before me, as the guest, they place a sheep's head on a wooden tray. After thanking Allah for his bounty, the chief cuts off the choicest bits of meat and piles them on the mound of rice in front of me.

Kazakhs a Widespread Group

Who are these people? And what political storm set in motion the wave of crisis that dislodged them from their native land?

Today the major domain of the Kazakhs, who blend Turkic stock with a mixture of Mongolian, is the Kazakh Soviet Socialist Republic. There several million of them occupy a vast territory stretching from China to the Caspian Sea.

Kazakh pastoral nomads also comprise, at present, about 10 percent of the population of Sinkiang, China's westernmost Province (map, page 625). In 1949 semiarid Sinkiang, two and a half times the size of Texas with only half as many people, came under the political dominance of China's Communist regime. Large groups of Kazakhs, their liberties in jeopardy, chose to emigrate, if necessary, from their dearly loved land rather than submit to Communist control.

I was unaware of the troubles that beset the Sinkiang Kazakhs until late in 1951. While studying at Harvard that fall, I read a news item about the appearance in Kashmir of Kazakhs who were reported to have fled the new Communist rule in western China.

I recognized in the account two opportunities: first, to visit and study these little-known Moslem people as subject matter for my doctoral dissertation in social relations; second, to hear the survivors' own story of their fabulous migration.

Just four months after the last of the refugees arrived in Srinagar, capital of Kashmir, I was sitting on a bright Khotan rug in the quarters of Qali Beg, exchanging gestures of friendliness (few words yet) with that Kazakh chieftain.*

Months of Bitter Decision

Now, in the summer camp above Srinagar, Sultan Sherif was talking as a downpour pelted the felt tent.

"Almost in the beginning—it was early in the Year of the Tiger—our leaders Janim Khan and Osman Batir called us to a great council at Barkol in the eastern Tien Shan," he said, scooping up a gob of butter which he solicitously plopped into my newly filled bowl of hot tea. "The Communists were holding the reins of government in tight check. Our chiefs and leading men had to choose which way to turn."

During the fall and winter of 1949-50 the Kazakhs had dealt with the Communists, asking guarantees of religious freedom, preservation of tribal customs, and liberty to travel at will within Sinkiang. But the new regime let it be known that *it* would set the terms of Kazakh "cooperation."

Many of the Kazakhs made long journeys to reach the Barkol council. Then a winter storm killed much livestock; the sheep, which were lambing, could not be moved to shelter. It was the kind of time of which the Kazakhs say, "Ice is our bed and snow our blanket."

By March of 1950 the panorama at the rallying place must have been cause for pride and even reassurance. Kazakhs by the thousands populated the broad valley, still white with snow. Tents were strewn for miles across the landscape, the sons' placed around those of the fathers.

Within sight of Sultan Sherif's tent door were assembled at least 15,000 people, 60,000 fat-tailed sheep, 12,000 horses, 7,000 head of cattle, and more than 1,000 camels.

On March 28 in that Year of the Tiger a



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A Kazakh Twangs a Plaintive Tune...

Strumming a guitarlike *dombra*, he sings high yodeling-type songs not unlike cowboy ballads.

congress of 1,000 Kazakh leaders and family heads cast their vote to leave "the golden cradle of their birth" and make for the southern passes that led toward India.

A week later the council set up an autonomous Kazakh government, naming Janim Khan governor and Osman Batir commander in chief of the fighting men. Neither leader

* See "The Idyllic Vale of Kashmir," by Volkmar Wentzel, NATIONAL GEOGRAPHIC MAGAZINE, April, 1948.



...Man and Horse Alone in a Vale Call to Mind the Life of an American Cowboy

Both Kazakh herdsman and cowboy wear leather pants, high-heeled boots, and high-crowned hats. A Turkic and Mongolian blend, Kazakhs claim descent from the hordes of Genghis Khan.

survived long to exercise his new authority.

At Barkol the threat of tribal destruction hung, like the Damoclean sword, over every tent, every horseman, every mother, every infant heir. Yet the Kazakhs clung stubbornly to the customs and ritual of daily life. The herders' work, the elders' prayers, the children's play—all went on as usual.

In mid-April the Communists swept down in a surprise attack on the Barkol encamp-

ment. Brief warning by outpost sentries scarcely gave women and children time to strike tents and head for the hills, driving flocks and herds before them.

Puppet troops in quilted drab poured into the valley in trucks, armored vehicles, and on horseback, heavily armed and plentifully supplied with ammunition.

For the spirited Kazakhs, used to unequal odds, even such formidable armament held

no new terrors. Shouting battle cries and riding at full gallop, the warriors struck hard in righteous anger. "One shot, one dead enemy," states the Kazakh standard of marksmanship. But against an enemy equipped with modern arms, there could be no hope of victory. Kazakh fighting men died by the hundreds.

"Janibeg!" called out the chiefs at last, using one of the war cries that are old-time heroes' names. "Break off battle and flee!" Southward streamed the shocked, enraged, depleted company of tribesmen.

Sultan Sherif told me that 12,600 of the more than 15,000 of his people assembled at Barkol were killed, captured, or dispersed. Many fled to the hills, where some groups still may be precariously hiding out.

At the head of one of these groups Janim Khan, the new Kazakh governor, rode off—to disaster. In a skirmish with Chinese Communist attackers in the Pei Shan (North Mountains) he was taken captive. Promptly hauled off to Urumchi, he was executed in February, 1951. Two months later the life of Osman Batir, the Kazakhs' second in command, was to be snuffed out in the same manner and for the same "offense."

Colt Stomach Used as Poultice

From this encounter only seven escaped, including two of Janim Khan's sons, Mezhit and Delil Khan. In the fighting Delil Khan was wounded and became separated from the others. At last Mezhit and the renowned warrior Nurgojai Batir found him in the mountains.

"My brother was badly hurt," Mezhit told me, "so Nurgojai Batir killed a colt and removed its stomach. This he wrapped around Delil Khan's wounds, for a colt's stomach is very fat and absorbs bad blood. To give us new strength, we all ate the flesh of the colt, which is the greatest delicacy to a Kazakh."

The survivors managed to rejoin the main body of organized refugees. Under the leadership of Osman Batir, Sultan Sherif, and Delil Khan, this group pushed southwest through Singsingsia and crossed out of Sinkiang into Kansu Province near Khara Nor.

They passed the sacred Caves of the Thousand Buddhas, 12 miles from the thick-walled city of Tunhwang. There 500 caves honeycomb a cliff for more than a mile, sheltering scores of sculptures and thousands of delicately frescoed figures.*

South of Tunhwang the refugees from Barkol split up: Osman Batir and the riddled family groups that remained with him chose to hole up in the mountains near Khanambal.

"Here we shall wait, hoping that some of those who have become separated will find their way to us," he said.

Sultan Sherif and Delil Khan urged their high chief to keep moving south with them to the foothills of the Kumlun, whence flight into Tibet was feasible in an emergency. But Osman Batir declined. It was the last time his fellow chiefs saw him.

Flocks Slowed Escape Trek

Mile after mile the tribesmen plodded on, across steppes both green and sere, over stony mountain passes, through desolate valleys. Slowed to the speed of their flocks and herds, they could not outrun their pursuers. Small Communist bands attacked them at intervals. Only superb horsemanship and sharpshooting saved even the dwindled remnants of the tribes.

Sometimes, in a protected, grassy spot, the procession would halt for several days to restore strength and the will to go on. The routine of life then differed little from what the steppes have seen enacted generation after generation.

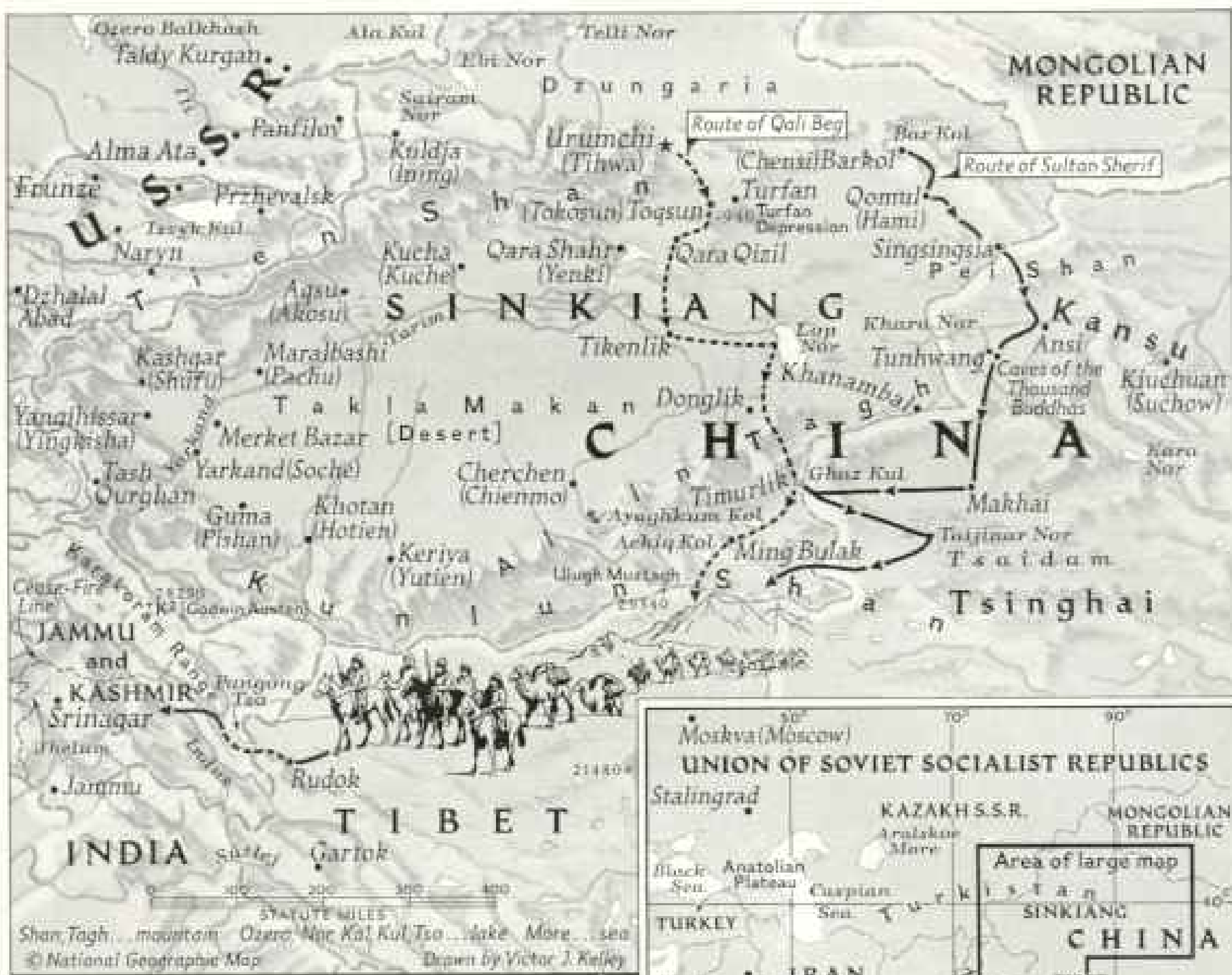
Women and girls off-loaded the pack animals, Bactrian camels and small, sturdy horses. On a dry piece of land not far from water the felt tents, or yurts, would go up (page 632).

The Kazakh yurt is perfectly adapted to the steppes. It sheds the heaviest rain and turns aside the bitterest gale, is cool in summer and cozy in cold weather, and insulates its occupants from outside temperatures that may vary 50° in a day.

Curtains partition the tent inside, allowing privacy. A chief, such as Qali Beg, reclines at night on a layered bed, a felt undermat overlaid with a bearskin and two wool-stuffed quilts covered with patterned cotton. A large pillow supports his head.

Moslem custom normally restricts Kazakh patriarchs to a maximum of four wives; however, men of lower station usually can afford only one. Qali Beg had three wives, while his deputy had but two. Sultan Sherif also seemed content with two. Children, of course,

* See "The Caves of the Thousand Buddhas," by Franc and Jean Sbor, NATIONAL GEOGRAPHIC MAGAZINE, March, 1951.



Fleeing Communist Rule in Sinkiang, Kazakhs Trekked 3,000 Miles to Kashmir

When the Communists seized their home pastures in Chinese Turkistan, 15,000 Kazakhs left for sanctuary in Kashmir. On the epic 2-year march, only 150 survived Red attack and hardships. One meaning of the word "Kazakh" is "one who has left his people." The refugees left behind some 400,000 of their tribesmen in Sinkiang and several million in the Kazakh Soviet Socialist Republic.

were born during the 2-year escape march of the Kazakhs (page 633).

So, despite suffering and dejection, the little nation, shriveling in battle, enlarged by birth, made its way south. With summer came blowing sand, intense heat, and a terrifying water shortage.

They pressed on to Makhai, then west to Ghaz Kul and Timurlik. The chiefs sought out the tents of Hussain Taiji, a Kazakh leader who had lived there with his people for many years. They knew he would replace from his still-intact flocks as many of their lost animals as he could.

Meanwhile, to Timurlik had come another group of fleeing Kazakhs, perhaps 50 families,



under Qali Beg, the chief who became my special friend. Pasturing among the mountains near Urumchi (Tihwa), Sinkiang's capital, these Kazakhs had heard of the disaster at Barkol. Leaders at once marshaled their families and got them under way southward through the Tien Shan. Their objective also was a rendezvous with Hussain Taiji's people.

Running the gantlet of enemy attack and natural obstacles, Qali Beg's skeleton "horde" endured even harsher trials than had the easterly tribes under Sultan Sherif and Delil Khan. My notes record reminiscences of Hamza, Qali Beg's deputy, about their anxious crossing of the exposed Lop Nor desert, eastern reach of the dreaded Takla Makan.

"Lacking maps, we followed a river to the salt Lop Nor," Hamza said. "Hillocks we passed were strewn with bones of men and animals. Many among us thought the same fate awaited us, but I spoke what I believed: that death would be the destiny of our oppressors, not the Kazakhs. 'Let us follow our future,' I said, 'and trust in Allah.'

Water Holes Avoided as Traps

"Crossing the wintry desert," Hamza went on, "we huddled among our livestock as black sandstorms and snow squalls swept over us. We had to avoid known water holes, for the Communists would use them as lures, drawing us into ambush. Smaller water holes were frozen over. We broke the ice loose and carried it with us for melting as we needed it.

"Some became separated, lost their way, and couldn't even find ice. The need to keep moving made them sweat, even in the cold. First they drank the milk from their animals. Some slaughtered their cattle and sheep and quaffed the blood. Still many perished.

"At last, after seven days, we met Hussain Taiji's people. Our men and women danced and hugged one another and exchanged presents to celebrate their survival."

While at Timurlik, Qali Beg and the other newly arrived chiefs gratefully accepted from Hussain Taiji whatever horses, camels, sheep, and cattle he could spare. Qali Beg, however, was unwilling to take all these replacement animals as gifts. For a few of Hussain Taiji's good horses and camels he insisted on trading some of his remaining sheep.

Kazakh horse trading follows a prescribed ritual. Hussain Taiji and Qali Beg inspected the animals up for exchange, then agreed on a middleman. This entrepreneur sat down between the principals, holding the left hand of one and the right hand of the other hidden within their long, loose coat sleeves.

By bending and gripping certain fingers, Qali Beg stated his offer, which the middleman repeated to Hussain Taiji in the same manner. The seller, in his turn, likewise made known his approval or amendment of the terms. And so the bargaining went on, the three men expressionless, preoccupied.

The Kazakhs say this silent, cryptic method of barter avoids friction and obviates the usual exaggerated praise of animals offered in trade.

Horse trading over, Qali Beg and Hussain Taiji took their prayer rugs and, facing Mecca,

joined the older men in afternoon prayer. The young men, meanwhile, readied their brass-embossed saddles for riding and sport.

In a few moments one group on horseback was playing a wild game in which they fought for possession of a sheepskin, charging back and forth as they tussled. Off to one side youngsters played "crack the whip," in which a boy wearing a wolflike headdress tried to catch the last child on the line.

By the time a Kazakh boy is six or seven he is playing hide and seek, blindman's buff, or a hand-slapping game called "Is the khan well?" He shoots mice with a bow and arrow. By this age too the youngster (boy or girl) has learned to ride horseback, secure in a small-size saddle.

The refugees under Sultan Sherif and Delil Khan moved on for the winter of 1950-51 to Taijinar Nor. Qali Beg and his people remained near Timurlik.

"Summer is like Heaven, and winter is like Hell," says a Kazakh proverb. When the devastating *jut*, or winter storm, sheathes natural forage with an unbreakable crust of snow and ice, great numbers of livestock perish.

At one time during the winter at Taijinar Nor such an ice coating forced the tribesmen to slaughter many sheep from their already reduced flocks. Suddenly meat was overabundant. Hungry horsemen ate two to four pounds every day for a week. Family heads went from tent to tent jovially dispensing handfuls of fat.

Famine Follows Feast

Thin times followed again all too soon, when the people had to fast resignedly on tea and dried curds, with perhaps an occasional bowl of powdered millet.

Feast or famine, gorge or starve—such always has been the lot of a Kazakh. Alternating good and bad times color his whole attitude toward life, instilling a psychological dualism in which high spirits and low follow each other in almost rhythmic succession.

To lessen the frequency of famine, the Kazakhs in Sinkiang practiced agriculture on a limited scale. But they remained predominantly herdsmen, moving about in seasonal migration with their grazing herds.

Winter quarters usually lay in a sheltered valley or a forested area at the foot of the mountains. As the snows thawed with spring, the Kazakhs rode up to spring pasturage in



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Already a Veteran of Years in the Saddle, a Kazakh Maiden Rides with Skill and Ease

Like all tribal youngsters, this young girl began training for horseback riding as a toddler clinging to backs of sheep. At three she straddled cows, secure in a small wooden saddle. At five she was ready for horses.

alpine meadows and from there moved on gradually to summer pastures.

In August or September family groups herded together their livestock. After shearing the sheep, preparing dried-milk products, and selecting the animals to be killed for smoked meat, they returned by easy stages to winter quarters. There, giving up their tents, they lived in log cabins close to their corrals.

While frozen in at Tajinar Nor the Kazakhs took advantage of idle hours by striving to foresee what eventual fate awaited them.

Although they are Moslems, the Kazakhs still cling instinctively to superstitious practice and belief. During that nerve-racking winter of 1950-51 they often sought a "reader," who burned the shoulder blade of a sheep and forecast coming events from the heat cracks in the bone.

The tools of divination include hard pellets of sheep's dung. Men lay them out in nine piles in three parallel rows to learn through the "crystal ball" of second sight what visitors to expect, what events lie ahead along the trail, who has delayed their messengers, and

so forth. These forecasts usually are made with a shrewd foreknowledge that ensures their accuracy!

The crowning act of Kazakh superstitious life, the exorcising of evil spirits by a shaman, is partly surreptitious. Devout Moslems among the tribesmen deride these "dark" goings on. Moslem religious leaders deplore them. But they still express an almost obsessive aspect of the people's spiritual-imaginative life.

In Kashmir one of the most popular Kazakh heroes was Nurgojai Batir. I found him a cheerful, even jocular, man, even-tempered and well-balanced, the life of the party and friend of all. He was also a relentless warrior in battle, with a fox's cunning and a lion's strength.

Yet Nurgojai Batir was a highly revered shaman. "Was" until a few months before I met him, when he gave up the role, largely, I suspected, for fear of ridicule by the city Moslems of Kashmir.

Calling the Wolf Jinni

But once, in a remarkable performance at the summer pasturage above Srinagar, I watched Nurgojai Batir re-enact the freeing of a young boy from the evil jinni of illness that possessed him. (The Kazakhs are most reluctant to reveal the actual ritual to an outsider.)

The patient was laid on a felt mat near a log fire surrounded by his family and interested spectators. Nurgojai Batir rode up on a horse, strumming on a *dombra* (page 622). After two or three circuits of the assemblage he jumped down from his mount, flung aside his *dombra*, and began to invoke the blue-wolf jinni, one of his other-worldly "correspondents," which inhabits the sick:

I'm calling, calling, calling blue wolf.
When I call, come!
Great mountain come to the bottom
of little mountain,
Put your tongue in and out,
Move your two eyes all about.

Dombra players kept up a syncopated tempo specially reserved for this ceremonial, increasing in intensity with the mounting excitement of Nurgojai's mood. When the jinni's presence was acknowledged, two assistants sprang up and wound a rope several times around Nurgojai's belt line. They thrust a stick inside the loops, twisting them until Nurgojai's waist was constricted to half its usual circumference.

By then, Nurgojai seemed in a kind of hypnotic trance. After an interlude of prancing about and shaking his head he stretched out his arms. Two men hung on each arm, and he whirled them round, mumbling incoherently as he bargained with the evil spirit.

Dancing now in a frenzy, the shaman picked up an ax, struck at his patient with it, narrowly missing with the blows. Then he turned the blade flat to his own body and beat violently on his chest. Dropping the ax, he snatched coals from the fire and popped them into his mouth. He licked a red-hot iron; his eyes rolled and his shoulders twitched. All these actions were intended to imitate those of the invisible jinni.

The audience meanwhile chanted the battle cry, "Shaqabai, Shaqabai, Shaqabai!" in time with the shaman's dance. (Shaqabai was Nurgojai's hero ancestor.)

Now the shaman filled his mouth with water from a kettle. Seizing a hot frying pan, he blew the liquid across its bottom. The water went up in a puff of steam, symbolizing the banishment of the jinni from the boy's body. Then the spirit doctor collapsed.

I learned that after the shaman has driven out an evil jinni in an actual ritual, he falls into a long, deep sleep. Friends rub his head and massage his stiff body. After the ceremony he must drink a quart of oil rendered from sheep's fat; otherwise, they believe, he may bleed dangerously from the bowels, because of the strain of the ceremony.

Certain Ages and Days Unlucky

The superstitions of generations still color everyday life. The Kazakh divides his life span into periods of 12 years, each year bearing the name of an animal. He considers the ages 25 and 37 especially hazardous and unlucky. If a man gets past both these landmarks, he gives away his clothes, so that he may face the future in fresh raiment.

In every family one day each week is unlucky; the man of the household would never think of suggesting a move on such a day.

At the first sound of thunder in spring women go out and beat around the edges of the family tent with wooden spoons to seal it against the evil spirits muttering in the sky.

Early in the Year of the Hare (1951) the Communists swept down on Qali Beg near Timurlik. Routed by modern arms, he and his people fled for their lives into Tibet.

(Continued on page 637)



Robed in Magnificent Snow Leopard, a Kazakh Chief Proudly Rides into Exile

Deadly sharpshooter and superb horseman, Qali Beg led one of the three Kazakh bands escaping from Sinkiang to Kashmir. Crowned with fox and booted in soft leather, he sits on velvet atop a silver- and gold-embossed saddle.



Mare-milking Time: Kazakhs Tether Colts near Their Mothers

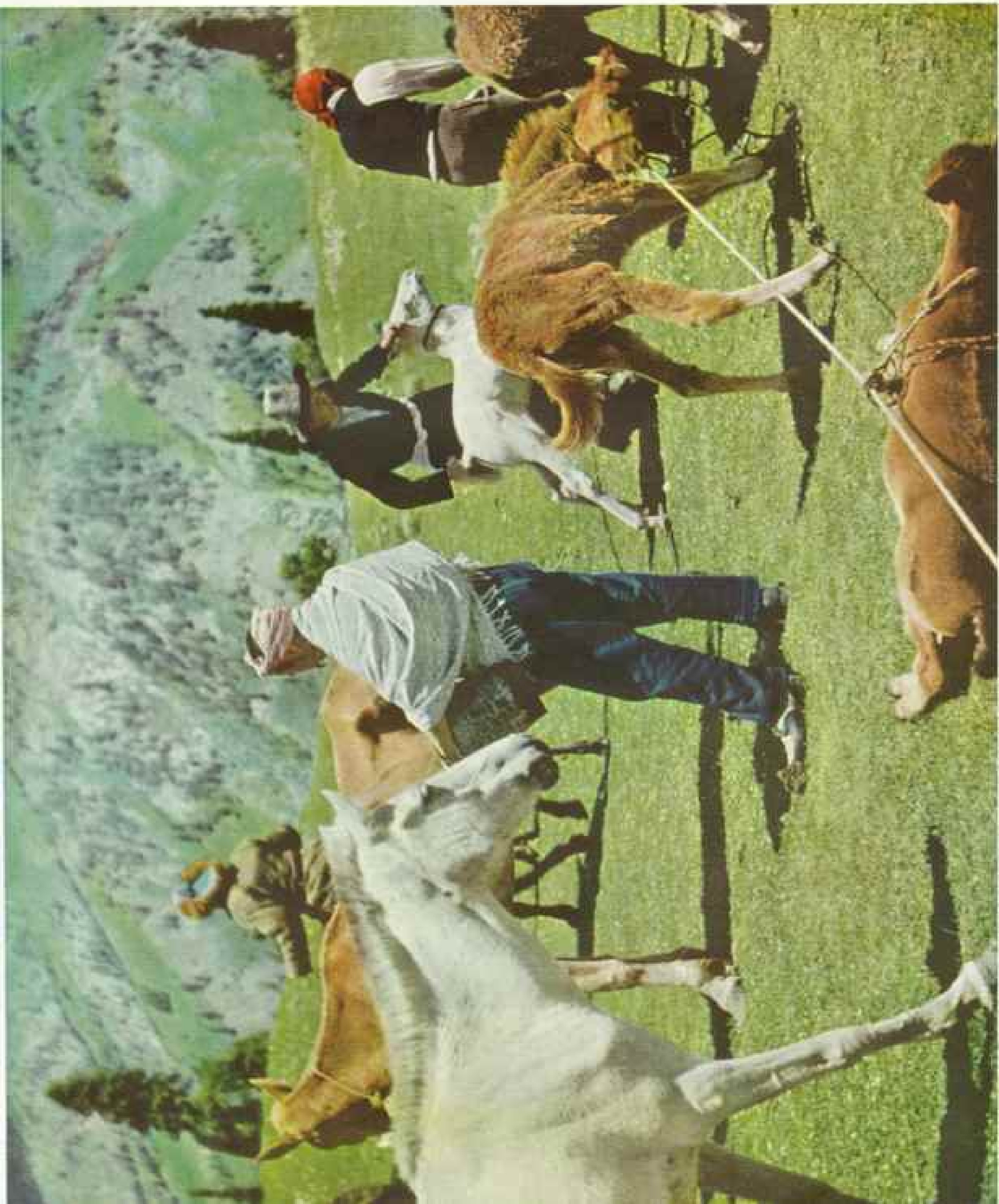
The saddle-bred Kazakh sees his horse as a nearly human friend, priceless servant, and money in the bank. With it he buys his bride, pays his debts, transports his family, makes his living as a herdsman, and fights his enemies. As endorsement, the nomad calls his baby "coltling." Dancing, he imitates the movements of a horse (page 634). In epic poetry he lauds the animal's good sense.

The flesh of the colt is the Kazakh's supreme delicacy, *Kumiss*, the fermented milk of the mare, is his favorite drink (page 644).

These tribesmen know that it helps for two to milk a mare: a colt to begin the flow, a man to fill the bucket. Here they rope down frisky youngsters alongside milking mares.

White horses such as these are highly prized. In sealing treaties, Kazakhs clip their hands in the blood of a white horse and swear by it.

Asian Color by Mithou J. Clark





Setting Up a Domed Tent, Nomads Start Housekeeping Minutes After a Halt in the Trek

The circular yurt answers the Karakhs' need for a house that packs on horse or camelback and moves with the family. Its light willow frame can be taken apart easily. Walls and roof roll up compactly. Made of felt three-fourths of an inch thick, the tent shuts out the heaviest rain and bitterest gale and insulates against temperatures that may vary 30 degrees in a day. Woven bands lace this structure, which housewives helped to make.



All the World Over, Baby Captures the Center of the Stage with Cries at Dinnertime

This youngster spends his first year in a willow cradle, snuggled under blankets and Turkistan rugs. Mother breast-feeds him until he develops a full set of baby teeth. Already he wears a leather pouch containing a prayer from the Koran to protect him from the evil eye. Later, like his sisters', his clothes will jingle with silver coins and buttons. Deer's teeth talismans will ensure him the grace of a deer.

The Referee Waves His Flag; Wrestlers Lock Heads in Combat

Officials of Kashmir quartered the refugee Karakhs in Srinagar, but with the topping of summer many fled the restrictions of the city for the freedom of a *jailao* (summer pasturage) in the mountains near by. Camped in yurts, these warriors, their wives, and children turn with zest to a *foi* (celebration). Wrestlers began their match on horseback. Here pulled to the ground, they continue the struggle. Referee waves flag until one man wins.

→ Here young Jaxai Qan, accompanied on the *dombra*, shyly moves into a characteristic tribal dance, the *Kura Jurga*, or Black Ambler. Sliding her feet in shuffling steps, she interprets the movements of a fine horse ambling along the mountain trail or treading the rich grass of the plains. As the dancer mounts to a climax, the audience claps and sings in rhythm.

© National Geographic Society



Female Troopbadoors Sing of Heroes and Life on the Steppes

Unlike many women of Moslem faith and settled habit, Kazakh wives and maidens hold a prominent place in the community. They assume heavy responsibilities—tending the children, maiting felt, weaving wool, cooking and serving the food, milking sheep, washing garments, fetching water, and collecting and drying the camel dung that is the primary fuel of the nearly treeless steppes.

In battles with Communist troops women fought side by side with husbands and brothers, some giving their lives.

Welcomed at group celebrations, Kazakh women show skill in playing the *dombra* and singing native melodies. These three resemble the ladies of medieval Europe with their nunlike headresses of white cotton. The design of the embroidered *dickiey*, worn with brilliant silks and printed cottons, once identified the tribe to which a woman belonged. Taste dictates the choice today.

© Kolubenski (top) and
Aasen (over) by Milton J. Clark





↑ **Kazakh Chiefs Give a Party, Enforce Hospitality by Law**

A friendly stranger nearly always finds welcome within a Kazakh yurt. If rebuffed, he can demand and receive a horse or a colt in restitution. In best tribal tradition, Sultan Sherif (center) invited the author and his wife to share his commodious yurt during their visit to the summer camp. At night silken curtains partitioned the guests' fur and felt pallets from their host's.

The young hostess, capped in the embroidered pillbox of a maiden, sits by to ladle buttermilk from the large bowl. Chunks of fried bread serve as appetizers.

← This Kazakh bride, pouring fermented mare's milk from a coltskin flask, wears the red *sali* (shawl) until the birth of her first child. Then she dons and wears for the rest of her life the white headdress and embroidered dickey of the matron (page 635).

It was February when a mounted messenger brought to the Kazakhs at Taijinar Nor the word that Osman Batir had been captured and that the Communists had routed Qali Beg. Quickly the chiefs broke camp and led their people over the rugged Kunlun passes, then turned westward across Tibet. With the help of Allah they might reach Kashmir.

Even beyond the stormy Kunlun grass for the flocks and herds was hard to find. The animals grew thin, and many perished. Fortunately game—"by the hundreds and thousands," the chiefs told me—was there for the shooting. The men killed antelope, deer, and ibex; what was not eaten was smoked or frozen. Dung of the wild animals provided fuel in a land devoid of firewood.

Horses Taught to Eat Meat

The "manna in the wilderness," however, was the small, dun-colored horse known to the tribesmen as *qulan*. The Kazakhs hunted it from horseback, killing scores for the flavorful, nourishing meat.

One of the young leaders, Mezhit, told me the men roped surplus horse meat to their saddles on breaking camp in the morning. One day, as he rode along the trail, Mezhit noticed his mount turning its head frequently, obviously drawn by the odor of the meat. Knowing the hunger of his steed, whose fleshless ribs daily rubbed the calves of its rider's legs, Mezhit dismounted and held out to it some of the meat. When the horse tossed its mane in refusal, Mezhit forced the meat into its mouth.

"So I taught my horse to eat this food," Mezhit said. "When I told my brother this, we tried it on the other horses and the camels, and we made them eat it for the great strength it gave them."

Mountain illness, the bleeding death called *is*, was a special scourge during this part of the heroic trek. It killed or incapacitated the physically depleted Kazakhs by the dozen, especially while they were crossing the mountain passes into Tibet.

First symptoms of the disease often were a bad headache, dizziness, and nausea. In many cases treatment was in vain; futile even were the shaman's efforts to exorcise the evil spirits believed to be causing the sickness.

Drastic treatment was sometimes followed by recovery. One victim told me of beseeching a shaman to free him from the misery of this illness. The shaman took a sharp

knife, placed it against a vein in the man's temple, and flicked it to slit the blood vessel. He let the blood, very thick and black, fill three cups. Then he applied some herbs and a bandage. In two days the patient was well again.

After 10 days' travel the Kazakhs' outriders caught sight of a straggling band of men and animals quartering into their trail from the north. It was Qali Beg and the remnants of his group! Joyful was the reunion, calling for singing, wrestling, and dancing.

For safety, the united groups presently split again. Delil Khan and his people joined forces with Qali Beg, but Hussain Taiji and Sultan Sherif remained together, heading the other section.

Qali Beg told me his people suffered seven armed attacks during the ensuing crossing of Tibet, a portion of the trek that cost his families alone 42 killed in action, 22 dead of mountain sickness, and nine missing. Between the Tien Shan and the Kashmir border they lost in addition 3,000 sheep, 200 cattle, 73 horses, and 145 camels.

Relief from Migration Hardships

Births, deaths—weddings, too—provided intimate landmarks on the bitter trek out of Sinkiang. Sad or glad, these events gave relief from the ruthless, never-ending struggle for survival.

A Kazakh marriage may be contracted for before the promised boy and girl can even walk. This practice tends to stratify the classes; seldom will a chief marry his son to any but the daughter of a chief.

Unlike Western society, where a wedding's heaviest costs are borne by the bride's parents, Kazakh custom dictates that the father of the groom must pay a "bride price" to the bride's father. This dowry-in-reverse may relieve him, in the case of a rich man, of a sizable part of his property.

Horses are Kazakh gold. Nevertheless, even in the case of a subleader, the bride price may include as many as 40 horses. Therefore a man is glad to have pretty daughters as well as handsome sons, for what he pays out when his sons get married will probably come back to him in the bride's price for his daughters.

If a brother and a sister of one family group marry a sister and brother of another, no one has to exchange anything but smiles, though the families symbolically transfer a camel



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Girls in Tandem Haul Water to Camp

Kazakh custom decrees these 13-year-olds ready for marriage. Boys wait until 15 years of age.

or a horse, each owner promptly leading his ritually proffered animal back home.

If a promised son or daughter dies before the wedding, Kazakh law requires that the relatives of the deceased provide a substitute from their own kinship group. (There must be no blood ties between bride and groom closer than seven ancestors back.)

When a wedding was celebrated during the migration, much of the traditional ritual and adornment had to be dispensed with. But the bride was bedecked in whatever finery remained. As tradition demanded, the women threw pieces of bread at the groom, who placed in his tall hat the owl feathers symbolic of good luck.

A mullah married the young people in a simplified ceremony, reading prayers from the Koran. Filling a bowl with water, he placed in it some silver trinkets, blew over the bowl, and passed it to bride and groom, who drank from it in turn, an action symbolizing completion of the wedding. Relatives from both families then drank from the bowl.

A customary fixture of wedding entertainment is a singing contest opposing a pair of women and two men.

"My hero, you are strong and tall," sings a woman.

"You, sweetling, are loveliest of them all," replies a man.

"Your feet and ears are bigger than your wit," the second woman mocks.

"Your eyes are twisted and your nose is split," adds the other man.

So, switching nimbly from flattery to ridicule, the battle of nasal yodeling continues until one contestant fails to invent a rhyming rejoinder and the competition breaks up in laughter.

Wrestling matches, games of tag, horse races, and dancing to the twanging *dombiras* round out the wedding festivities (page 634).

During the flight from Sinkiang the defending warriors were not the only heroes.



Kazakh Women Sun and Air Their Bedding by Taking the Roof Off the House

Lattice-work walls fold like an accordion. Leather thongs strap together four sections to make the frame 20 feet in diameter, girdled by woven bands. Roof "rafters" peg into a ceiling hoop, through which smoke escapes.

One day in the summer encampment above Srinagar, while we sat cross-legged in conversation, some of the young women were kneeling at the fringe of the group raptly engrossed in the men's talk. Suddenly Milya, Qali-Beg's newest wife, turned to him saying, "Erim (my husband), do you remember the day the enemy came to the encampment when the men were away?"

A Woman's Deed of Valor

Qali-Beg's eyes lighted up and, at his urging, Milya told the tale, flushed with pleasure as all eyes sought her out.

"My husband and his men were off fighting the enemy," she began, as her companions replenished the empty tea bowls. "Suddenly we saw troops galloping toward our camp. The women snatched up their young children and ran for their horses.

"I was last in the stirrups, and my horse balked, badly frightened. A Communist bullet grazed the animal's leg, and he bolted forward.

"I saw a child crying in front of a tent," Milya went on, helping break the round loaves of unleavened bread and spreading the chunks before us. "Slowing my horse, I leaned from the saddle and picked up the child, with the enemy close behind. Four bullets pierced my clothes, and I was much afraid. Luckily my horse was swift, and I lost my pursuers in the mountains.

"Soon I met Suleiman, a young man from our tribe who was herding sheep. I told him what had happened, and together we raced back to the camp by a short cut. We knew the enemy would return to loot the tents. We found two machine guns and lay in wait.

"As we expected, they rode up unsuspecting. We could see their startled looks when Suleiman commenced firing. I loaded one machine gun while Suleiman fired the other.

"We held off the foe for five hours, until my husband and his men returned and drove away the enemy. My husband told me I was very brave and that I had saved the camp. *Oi!* I shall never forget that day!"

Even by forced marches the cruel 700-mile trek across Tibet consumed three months. To reduce the chance of attack, the ragged columns bypassed settlements that might harbor spies.

As for the Tibetans, they let the Kazakhs cross their land unopposed. The emigrants, in fact, hired willing shepherds as guides. Tibet at that time was in the throes of "adjusting" to the new Chinese Communist regime that was seizing their country, too.

There were streams to cross, and many Kazakhs cannot swim. Men and women rode the rivers tandem on the horses, infants in their mothers' arms. Young shepherds plunged into icy water and were swept across, clinging to the necks of two sheep.

Hope Appears on the Horizon

At last, in the distance, rose the jagged, ice-draped Karakoram Range. To the weary pilgrims, by then nearly drained of hope, the mountains must have seemed a mirage.

Near Rudok, the last Tibetan village short of Kashmir, the Kazakhs pitched camp and courteously invited the headman of the town to a meager "banquet." They gave their Tibetan guest a rifle; he reciprocated with salt, flour, and brick tea, showed the way to the border, and wished them well.

Crossing into Kashmir near Pangong Tso, the weary refugees surrendered to the frontier guards and gratefully let their feet fall on the soil of sanctuary.

Miraculous it was that any had won through; yet, for the successful few, personal tragedy leached almost all joy from the achievement. There was none who had not left behind—dead, captured, or a hunted runaway—husband, wife, child, or dearest friend.

The ensuing months in Kashmir inevitably brought Kazakh affairs to a new crisis, though not, like that they had just survived, one of life and death. With Kashmir's mountain pastures already held by local sheepherders, there seemed no promise that they would be able to continue in their traditional way of life.

Civilization's conveniences and restrictions in a sizable city like Srinagar imposed a hardship of adjustment on the Kazakh. After all, on his native steppes a tribesman might easily have lived and died without ever sitting in a chair or riding in a bus and with scant knowledge of electric lights, faucets, and telephones.

The Republic of Turkey came to the rescue, matching the generous hospitality of Kashmir and India—hospitality that the Kazakhs never can forget. Turkey offered to resettle the fugitives on the Anatolian Plateau, a region whose steppes closely resemble those of Sinkiang. The Turks, furthermore, speak much the same language as the Kazakhs and share a common ancestry and history.

In November and December of 1952 about 200 Kazakhs left Kashmir in two groups and made the long journey by land and sea to Turkey. Eighty-five more joined them later. All have successfully put down new roots in their adopted land.

Qali Beg and about 60 others chose to remain in Kashmir for another 18 months. In June, 1954, they, too, left for Turkey.

Our year in Kashmir ebbed away. My wife and I packed to leave. Kazakh friends begged us to remain, but when we explained that the land of our own people called us back, it was a motivation whose power they knew all too well.

The chiefs—young Mezhit, stolid Sultan Sherif, lively Qali Beg—invited us to farewell feasts, all on the same day! They were full banquets, and etiquette compelled us to eat what each host offered as if with hearty appetite.

Parting Makes Hosts Wistful

We ended up in Qali Beg's room on the second floor of the Srinagar caravansary. The setting was long since familiar: fire glowing in the corner, bright rugs and mats on the floor, coiled whips, belts, and hats hung on the walls. We did our best with rice pilau, mutton soup, fried bread chunks, and a kind of triangular dumpling filled with chopped mutton and vegetables. And there was tea, cup after cup after cup.

Other chiefs and their wives joined the party. My wife gave the women costume jewelry. Sultan Sherif's wife took off a cluster of silver coins and presented them to her. One of Qali Beg's wives pulled a silver ring from her finger and placed it on her hand.

Usually stoic, our Kazakh friends broke down in tears. But I recalled, as we shook hands and left them, the proud defiance of Qali Beg in scorn of those who now arrogantly bestrode his native pastures: "He who tastes a spoon of Kazakh blood will burn his tongue for 40 years."

A Singing Kettle on a Stove of Stones Calls Teatime.

To withstand jolting hauls on horseback, cooking and eating utensils come in unbreakables such as iron, tin, wood, and skin. Kazakh taste for tea keeps this pot on the fire most of the day.

On the steppes, tribesmen use rocklike bricks of black tea, breaking off each day's supply with hammer or stones. The drink is usually brewed with milk and laced with butter and salt.

↓ Though the outdoor kitchen lacks modern work savers, a Kazakh housewife rarely has to tackle a meal alone. According to Moslem custom, her husband is permitted four wives. Only the wealthiest can afford the limit, but some have two spouses and usually a mother or sister sharing yurt and work.

These women prepare a wedding feast of cabbage, carrots, potatoes, mutton, and soup.

© Asian Color by Milton J. Clark



Warriors Ride → into the Mountains for a Day of Sport

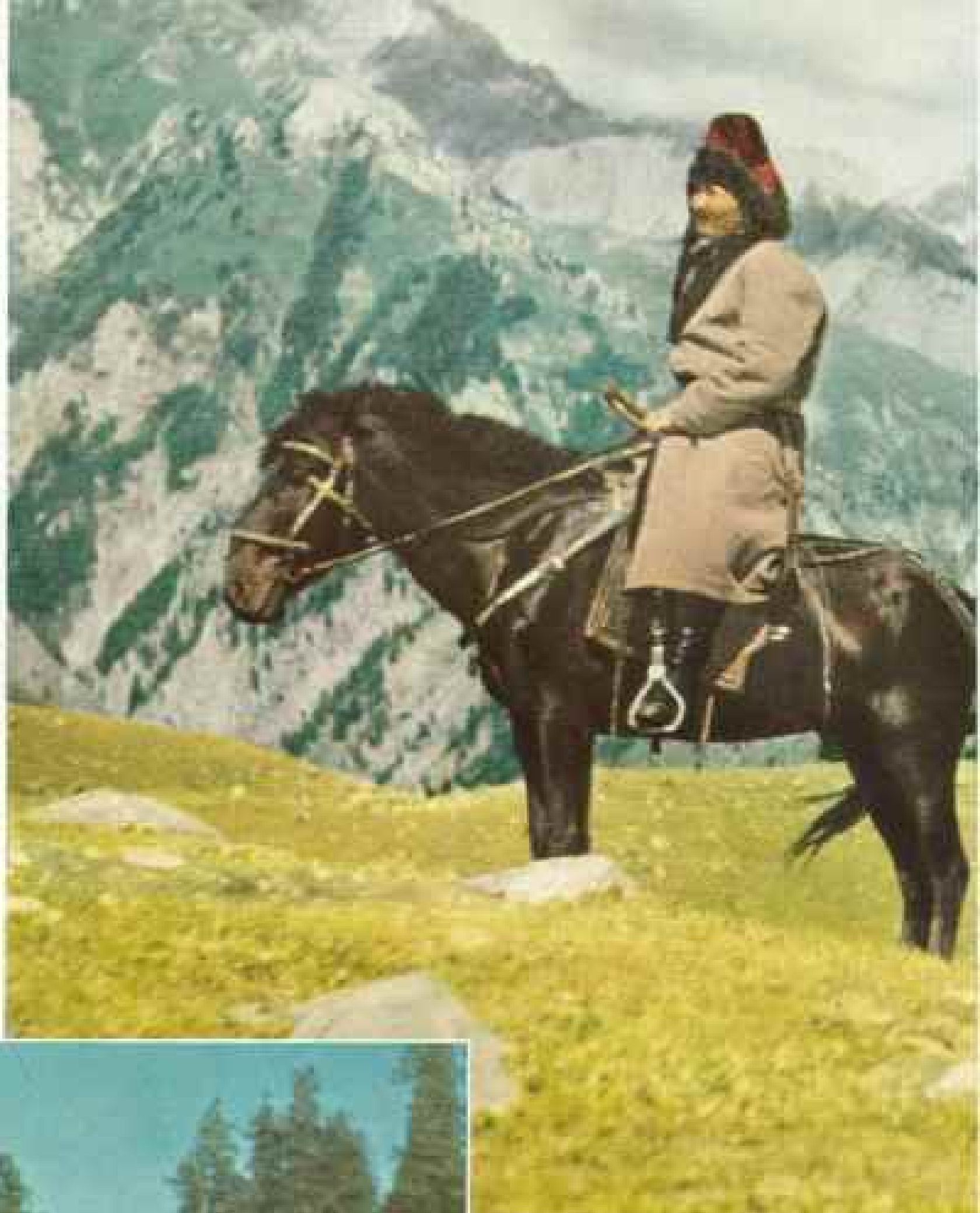
On the march from Sinkiang the tribesmen faced incredible odds: continuing Chinese Communist attack, desperate food and water shortages, mysterious illness, and untracked mountain and desert wilderness. Yet they heroically fought through to freedom.

These men, mounted on Kashmir gift horses, ride amid peaks and alpine meadows reminiscent of the Tien Shan (Celestial Mountains).

On the steppe Karakh horses live in family herds. Each stallion protects from wolves and other dangers a harem of about nine mares and some 30 offspring.

The last rider appears to have scooped up a pint-size passenger. Loving children dearly, even the fiercest fighters find time to play with and fondle their youngsters.

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Summer Encampment → Makes a Picnic of Every Meal

Kazakhs normally eat with fingers out of a community dish. Plates and silverware at this dinner were provided for the author and his wife in deference to Western custom. Tribesmen brought the prized porcelain cups from China. This family cleans hands after eating. Fried bread is left over.

The head of the household wears a high-topped bonnet, fringed with fur and covered with patterned silk. A tassel of owl feathers, symbol of good luck, waves from the crown. Believed sacred, owls are captured alive, stripped of the downy feathers under the tail, and released.

← A mountain stream serves as sink in the Kazakh "kitchen." These women draw clear, fresh water for their teapots.

Arms Color by Milton J. Clark





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Artes Color by Milton J. Clark

† Women Embroider Hangings for Yurts

Needlewomen draw inspiration for their stylized designs from Nature—flowers, leaves, sheep horns. Girls wear their wealth: silver coins jingle as they walk. Bonnets worn by the men hang on the yurt.

‡ Men Draw Mare's Milk for Kumiss

Slightly alcoholic, the beverage tastes like sour wine. Fermented in coltskin, it is preserved in flasks made of the same leather. Kazakh women perform most household tasks; men usually milk the mares.



For His City-bred Youngsters a Fond Father Creates Miniature Ponds and Woodlands, Tropical Lagoons, and Deserts Teeming with Life

BY PAUL A. ZAHLE

With Illustrations from Photographs by the Author

THE first intelligible word spoken by our son, then approaching two, was "cah"—meaning any one of the never-ending stream of automobiles he could see as he sat at his playroom window overlooking a busy New York City thoroughfare.

To celebrate the blossoming miracle of speech, I hurried to the nearest variety store and purchased the gaudiest miniature car I could find. The gift was accepted with eager recognition, and for days the word "cah," gradually corrected to "car," echoed through the apartment, together with the unmelodious wheeze of the toy's mechanism.

Before long a second word burgeoned. That word was "more." Soon it was linked with the first to yield the verbless imperative "More car!"—a demand that was vehemently and repeatedly directed at me as the hapless supplier of the original toy. I duly purchased a second toy car and presented it to my son: instantly the old one was tossed unwanted into a corner.

Thus was an unfortunate precedent established. On my arrival home from work each evening I would be greeted now not with some baby variant of "Hello, Daddy," but with a resounding "More car!" I reacted typically to the beseeching quality of that 2-word vocabulary. Additional cars were dutifully purchased and, as the days passed, more cars—and more cars.

Goldfish Start a Nature Hobby

Finally, when the shelves in the playroom were stocked with battered chassis of tin, rubber, and plastic, row upon row, my wife took me aside. Not only was I throwing money to the wind, she complained, but surely I was spoiling the child. I heeded the admonition, agreeing wholeheartedly that the car fixation had gone far enough.

Next evening, arriving home, I carried no new car, but instead a glass bowl and a waxed carton in which swam two small goldfish. The strategy worked beautifully. The two chil-

dren (there was also Eda, age 5½) were entranced. Together we filled the bowl with water and into it ceremoniously poured the contents of the carton.

Both children were delighted by the golden creatures seen through the glass, and my wife and I exchanged glances of satisfaction. Here was an approach that would certainly have received the sanction of educational authorities. Best of all, there was no further mention of cars.

"More Fishies" Follow the First

Freshly inspired now, the baby came forth with his third word, "fishies," followed almost immediately by "More fishies!" Being unable there on the spot to fill this new order and sensing the onset of tears, I hastened to a closet where some little Chinese figurines had been stored. These were washed and then placed neatly on the bottom of the goldfish bowl.

True, these colorfully enameled pieces were not fishies, but sitting submerged there in solemn oriental contemplation they somehow were impressive and novel enough to satisfy, at least for the moment, the child's psychological need. Thus, shrewdly, was an outbreak of tears prevented.

But fear of a relapse to the earlier menace of cars led me to take no further chances. Regularly I pass a small pet shop on my way home from work, and the next afternoon found me there buying a little green turtle for a quarter. My anticipation was justified, for at our apartment door I was immediately confronted with "More fishies!"

The turtle, quickly unpackaged, was clearly a "fishie," and peace, not to mention my previous hero status, was preserved. A saucepan from the kitchen served as temporary housing for the beguiling reptile (page 656).*

Next day's present was a small rectangular aquarium tank, together with some colored

* See "Nature's Tank, the Turtle," by Doris Cochran, NATIONAL GEOGRAPHIC MAGAZINE, May, 1952.



pebbles, to provide the turtle with a permanent city home.

With the introduction to our apartment of two goldfish and a turtle, a new train of events was initiated. Eda, being far more interested in live creatures than in cars or even dolls, and having discovered the sensitive spot on her father's heel, joined little brother in demanding that I produce daily some additional small pet or pet accessory.

My wife was not at all displeased. Her thoughts seemed to be: "Children in the city live such restricted lives. Without some effort on our part, how will they ever learn about Nature? By all means, let's have more pets."

But alas! Months passed, and by mid-winter my wife had reason to reconsider her attitude. Now gracing the living room were five small aquariums and a large one, together housing many varieties and innumerable specimens of tropical fish; there were two terrariums stocked with ferns and mosses

and inhabited by newts, salamanders, and chameleons; there was a desert vivarium bristling with miniature cactus; there were lizards, two baby alligators, several frogs, and an assortment of moth cocoons, among other odd items (page 651).

I had become acquainted with nearly every commercial menagerie in town, was a regular customer at several, and had a stack of well-thumbed catalogues from mail-order biological supply houses.

And therein lies the tale of how two small children, bound by circumstances to a life in the big city and aided and abetted by two fond parents, came to learn something of the creatures that inhabit those faraway places referred to in storybooks as meadows, creeks, ponds, and woods.

When natural history studies are being conducted in collaboration with a 2- and a 5-year-old, the approach must obviously be on an elementary level. A home aquarium for tropical fish, for example, can scarcely be evolved in



terms of, say, hydrogen ion concentration or oxygen balance. One is concerned mainly with setting up an aquatic display that will delight young eyes and provide a healthy and comfortable environment for the fish.

A Green Thumb Helps

However, as many aquarium enthusiasts will testify, to achieve even these simple ends is not always easy. Keeping fish as pets is more than just adding water, sand, plants, and specimens to a tank. Many a person has watched his aquarium, for mysterious reasons, irreversibly go to seed and become an eyesore rather than an attraction.

On the other hand, the fact that so many people, wholly without knowledge of the biochemical principles of the balanced aquarium, can set up and maintain beautiful and healthy aquariums, is an indication, perhaps, that common sense and a "green thumb" are actually more important than detailed technical knowledge.*

At any rate, such was the attitude I adopted as the children and I graduated from that first simple goldfish bowl to a series of 2-gallon aquarium tanks. The first tank had guppies, perhaps the hardiest of the scores of "tropicals" available for home culture but not necessarily the most elegant.

* See "Tropical Toy Fishes," by Ida Mellen, NATIONAL GEOGRAPHIC MAGAZINE, March, 1931.

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Famous Skyscrapers Flank the Zahls' East River "Zoo"

For seven years Dr. Paul A. Zahl, distinguished biologist and physiologist, has resided with his family in the heart of Manhattan. Their apartment, in a 3-story building overlooking Franklin D. Roosevelt Drive, lies but a few blocks north of United Nations Headquarters (left) and northeast of the Chrysler and Empire State Buildings (above).

The Zahl children, Paul and Eda, have known no other home. The parlor menagerie was conceived by their father to permit the youngsters to study Nature firsthand, an opportunity usually denied city dwellers.

From rocking chair and horsey-seat (right) they look on fascinated as father performs "Operation Siphon."



The second tank held zebra fish, a very active species smartly decorated with horizontal stripes; the third had golden-scaled platys; the fourth, black tetras; and the fifth, a population of handsome swordtails.

But it was on the sixth tank that we splurged. By now our experience had grown to the point of encouraging bigger and better displays. One day I brought home a 20-gallon tank, with a shiny stainless-steel frame and heavy slate bottom. It was set up to command a dominant position in the living room, close to the main window area but not so close as to be in direct sunlight.

The children gaily joined me in carrying water from the bathroom. To make it a family undertaking, they were allowed to use their beach pails to augment my large bucket. We walked from bathroom to living room on a lane of newspaper quickly improvised by my wife. When the aquarium was about two-thirds full of water, I called a halt to the bucket brigade, for now was the time to proceed with step number two.

This involved adding coarse white sand received from a mail-order house in Chicago. This sand, first washed under a tap, was dumped into the aquarium. Into it we maneuvered slabs of red shale, then piled piece upon piece to simulate a rocky underwater bank rising about eight inches above the bottom of the aquarium, with burrs and spikes arranged picturesquely to protrude into the viewer's field of vision. Finally, now, we were ready for the plants.

Tropical Wonderland in Manhattan

This phase of our preparation called for a special trip downtown, which from our location in mid-Manhattan entails a 25-minute taxi ride.

The shop we visited, two blocks from City Hall, was a wonderland to the children, and by comparison could well have put our little home effort to shame. But young children, happily, are not inclined to be so critical or comparison-minded as their parents. And although they gasped at the thousands of rare tropical fish on display there, and at the huge 50-gallon tanks lush with exotic plants and aerated with complex pumping and filtering systems, their interest in our own humble enterprise did not lag.

We selected a large Amazon sword plant to serve as our centerpiece and several bunches of *Vallisneria* for background foliage. Then

we hurried home. The purchase of the fish themselves would have to wait until our tank had stood for several days so that chlorine and other factors in city water noxious to delicate fish would have become neutralized.

Back in the living room, with sleeves rolled high, I reached into the water, holding a plant securely by the roots and at the same time asking little Eda to step back and advise me where the plant should be stabilized. I must admit that I did not always follow her advice, but that did not seem to reduce her ardor.

Murky Water Clears Slowly

The baby, on the other hand, unappreciative of the practical problems involved in setting up an aquarium, would at intervals put his nose close to the glass front of the tank, but, seeing no fishies, would skeptically wander off.

The planting finished, more water was added until the aquarium was full to within an inch of the top. I turned on the overhead lights, newly affixed to the tank. There were no "Ah's" or "Oh's" from the young. My wife, who had been supervising from a comfortable chair, commented dryly: "Not very pretty, is it?"

My feelings were not unduly hurt; the cloudiness of the water, I explained, was only temporary. "Let it stand a few days," I added, reassuringly, "and it will match any sea garden you've ever seen from a glass-bottomed boat."

Within two days the tank had indeed cleared, which was my cue to return to the pet shop. This time I made the trip alone, aware of my wife's last-minute words of caution that while choosing the fish I keep the family budget in mind.

I was looking especially for two species: angelfish and neon tetras. It was in regard to the latter that my wife's point of economy was especially well taken, for a neon an inch long usually costs a dollar, and it would require at least 50 such neons to give our tank proper balance (page 653).

Shopping around was indicated, and I visited four pet shops before finding one where I could buy neons at three for a dollar—neons less than an inch long, to be sure, but they would grow.

Thus I acquired my 50 little creatures of fluorescent blue-green and red for about \$16. This did not seem a violation of the



Parlor Serves for Planting as Well as Display in a Space-precious Apartment

Preparing a woodland terrarium for salamanders, newts, and chameleons, Mrs. Zohl spreads a base of rich soil and adds ferns and mosses. Glass plates on slanted front and top will enclose it after occupancy.

budget, considering that we intended our aquarium to be a dominating feature of the living room.

Angels for Fifty Cents Each

At the same shop I bought 20 angels at 50 cents each, a price that seemed appropriate, since each fish was just about the size of a half-dollar piece. And last, for a quarter, I bought a few thousand live *Daphnia*, tiny crustaceans considered to be among the most nutritious of foods for small tropical fish.

With my purchases swimming in waxed cartons, I was off for home where the children were waiting. It was a cold day, and I clutched the packages close to my body, for if the water in the cartons got as cold as the atmosphere, the fish would die in a matter of minutes.

From the way in which the children received me at the door and eyed the packages, you

would have thought I was bringing home the Thanksgiving turkey. My wife seemed eager too; she would ask about the price later.

Illuminated by the two shielded lights overhead, the aquarium was now crystal clear and, to us, fully as beautiful as the professional ones in the downtown pet stores. Without further ceremony I emptied the contents of the two cartons into the aquarium; the children's heads were close to the front glass, their eyes watching with rapt intensity.

For a few long seconds there was no reaction, for the fish had sped immediately for the cover of rocks and plants and into whatever crevices they could find. Then abruptly there was a triumphant cry from Junior:

"Fishies! Many fishies!" A brand-new word had at that instant swelled our son's vocabulary! It was certainly being used correctly, for the 50 tiny neons had suddenly appeared from their hide-outs and were schooling



At Home in Manhattan: The Zahls Shut Out the City Hubbub and Relax in a "Tropical Garden"

When Dr. Paul Zahl arrived at his New York apartment one evening with two small goldfish, he had no plans for a full-scale parlor menagerie. A few months later, however, the living room bulged with six aquariums of tropical fish; two terrariums of salamanders, chameleons, frogs, and lizards; two baby caymans, an iguana, turtles, hamsters, white mice, and moth cocoons.

In the shadow of the Queensborough Bridge biologist Zahl created a living wonderland for his city-bred youngsters.

Amid moist ferns and mosses in the slant-topped glass terrarium on a radio console (left), salamanders and tree frogs feast on worms and tiny morsels of beef. In the 30-gallon tank atop the radiator cover (right) graceful angelfish (insert, below), fluorescent neons, red platys, swordtails, black tetras, guppies, and other varieties of tropical fish weave through greenery. Immediately above, a pair of caymans (alligators) recline in the shallow water of a smaller aquarium. A desert terrarium for lizards stands at left of the large tank. Behind it on the window ledge a bog terrarium holds insect-eating plants like the Venus-flytrap, sundew, and pitcher plant.

Mrs. Zahl stitches while young Paul and Eda watch their father "dress" a small tank. The ornamental porcelain bridge in his hand will be deposited on the sandy bottom. Water plants spread out in foreground await rooting.

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Kodachromes by Paul A. Zahl

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now in exquisite formation close to the front glass. In another group, somewhat more loosely schooled, the angels drifted by.

So blissfully glued were the children to the aquarium's ever-shifting sights that my wife that night prepared a little table close to the tank, serving our offspring their dinner within touching distance of the front glass. Their meal was eaten in the soft glow of an "undersea" garden.

Amphibians from Jersey and Carolina

One week end while visiting friends in rural New Jersey across the Hudson River, I walked through the dank woods, turning over stones and small logs along the way. There in the soft mud or humus I saw during the course of about an hour some 20 salamanders of various species and succeeded in catching eight or so merely by cupping my hands over them.

These amphibians I deposited in a small jar with a perforated cap, which I had brought along for the purpose. The jar and its occupants, together with a large paper bag carefully packed with mosses, ferns, humus, and fragments of rotting logs, were on the train with me that evening when I returned to the city.

Next morning a special-delivery package marked "Living Material—Rush!" arrived at the apartment; it contained a number of additional salamanders, ordered earlier from a biological supply house in North Carolina. That evening the job of setting up comfortable quarters for this assemblage of Jersey and Carolina amphibians was undertaken, a job for which I had prepared myself.

Household or classroom terrariums fall, chiefly, into four different types: woodland, desert, bog, and semiaquatic. A woodland habitat is obviously the appropriate one for land-phase salamanders; accordingly, it was this type of terrarium that I had in mind as I spread protective newspaper on the living-room rug.

Almost any kind of aquarium tank or large glass container may be used for a terrarium, although most satisfactory as well as most attractive is a special type of glass case sold in some pet stores and advertised in nearly all biological supply-house catalogues. The shape of such cases may vary; mine was 15 inches high, 18 inches long, and 10 inches deep, with plate-glass sides and a slate bottom; the upper half of the front panel slanted inward in the manner of a merchandise display counter.

The slanted surface was adjustable so the relative humidity within the container could be controlled, at least to some extent. I had bought two such cases, one of which now stood empty and uninteresting on the floor, waiting to be furnished for my salamanders; for the second I had other plans.

The foundation comes first in the construction of any substantial abode. Accordingly, for this woodland terrarium I laid down a 1-to-2-inch layer of coarse sand. Next I added loam and humus to an additional height of two inches, banked somewhat to the rear, and in this soil base I rooted five or six of the small ferns dug up the day before in New Jersey.

After arranging a few rocks and fragments of rotting logs in and on top of the soil, I covered the remaining space with patches of various types of woodland moss. With a fine-spray hand sprinkler, enough water was added to give the foliage the look of having been recently rained on, and also to allow the sand underlay to become thoroughly saturated.

Shady Nook under Glass

When I stepped back to examine my work, I saw that the glass box, previously characterless, had now begun to take on the appearance of a shady nook of the kind seen along the banks of a woodland stream. Before placing the glass front and top in position, I bent down to smell the wet moss and the freshly turned soil; here was the pungent aroma of the deep forest.

The salamanders were still in their small jars, where they appeared as anything but suitable candidates for a parlor menage. Viewed laterally through the walls of the jars, with legs and heads inside the coils of their bodies, they seemed more like worms than amphibians.

But these were not worms; they were true vertebrates of ancient and honorable lineage.

Exotic Fish Parade in Review → Before Enchanted Spectators

Swept-back fins of the silver-and-black angelfish exceed its body length. Many experts rate it king of the aquarium world. Eye-appealing red platy (extreme upper right) won early popularity in American tanks following its importation from Mexico in 1910. Tiny neon tetras, at bottom of tank above and close-up in lower picture, were discovered in the Amazon in 1936. Red coloring and luminous blue-green stripe lend beauty to a body that seldom exceeds 1½ inches.





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Horned "Toad" Looks Angry Enough to Squirt Blood from Its Eyes—and It Can!

Blood, pressurized in the head, can be ejected through a thin-walled membrane edging the eye; if annoyed, the bizarre creature may shoot its red fluid to a distance of several feet. Despite the squat, toadlike body, *Phrynosoma cornutum* is a lizard. The Zahl specimen appears about five times natural size.

Indeed, paleontology indicates that the first backboned animals that left the water for a life on land more than 300 million years ago resembled in form and general structure these very salamanders now to become members of my household (pages 662, 663).

Such first terrestrial vertebrates are thought to have arisen more or less directly from an ancestry of fishes, a view supported by the fact that the larvae of most present-day amphibians are aquatic and breathe by means of true gills, which in adulthood are usually replaced by lungs.

Although there are exceptions, most salamanders lay their eggs in pond waters in early spring. Upon hatching, young "tadpole" salamanders have tufts of gill filaments flowing out like whiskers on either side of the head. Thus, during the aquatic phase of their lives, salamanders live the life of fishes.

Metamorphosis from the state of a water breather to that of an air breather among such amphibians is initiated by the action of the thyroid gland. If, as has been done in experimentation, this gland is surgically removed from a larval amphibian, metamorphosis does not occur and the salamander remains a "fish." If thyroid extract is added to the animal's diet, metamorphosis occurs prematurely to produce a midget adult.

Some species of salamanders remain water-bound throughout life, actually breeding while in this "immature" larval condition; when this occurs, the word *axolotl* (derived from the Aztec, meaning, appropriately, "servant of water") is used in certain instances to describe the creature.

"Monsters" Glow, Then Disappear

Whatever their evolutionary past or their present peculiarities, the salamanders in the two jars on our living-room floor were transformed into monsters of rather striking beauty as I dumped them on the terrarium moss.

Now the red dots on the backs of the land-phase newts glowed with scarlet brightness; the orange-yellow spots and black pigments of the tiger salamander gave reason for its name; and the black and silver skin of the marbled salamanders did indeed resemble the mottlings on a piece of polished marble.

One by one the creatures sought out crevices between stones, space under the fragments of rotting log, depressions and fissures in the moss carpet, until before long the terrarium's population had disappeared.

With some difficulty I lifted the now heavy terrarium and placed it near the east window panel, next to the large aquarium. There it would receive mild sunlight for a few hours each day, but most of the time it would be shaded as such a moss and fern bank normally would be in a deep forest.

In subsequent days we learned how to feed these new pets. The newts would help themselves to small worms placed in a dish of water. The other species had to be fed with forceps at first; later they helped themselves to tiny pieces of hamburger.

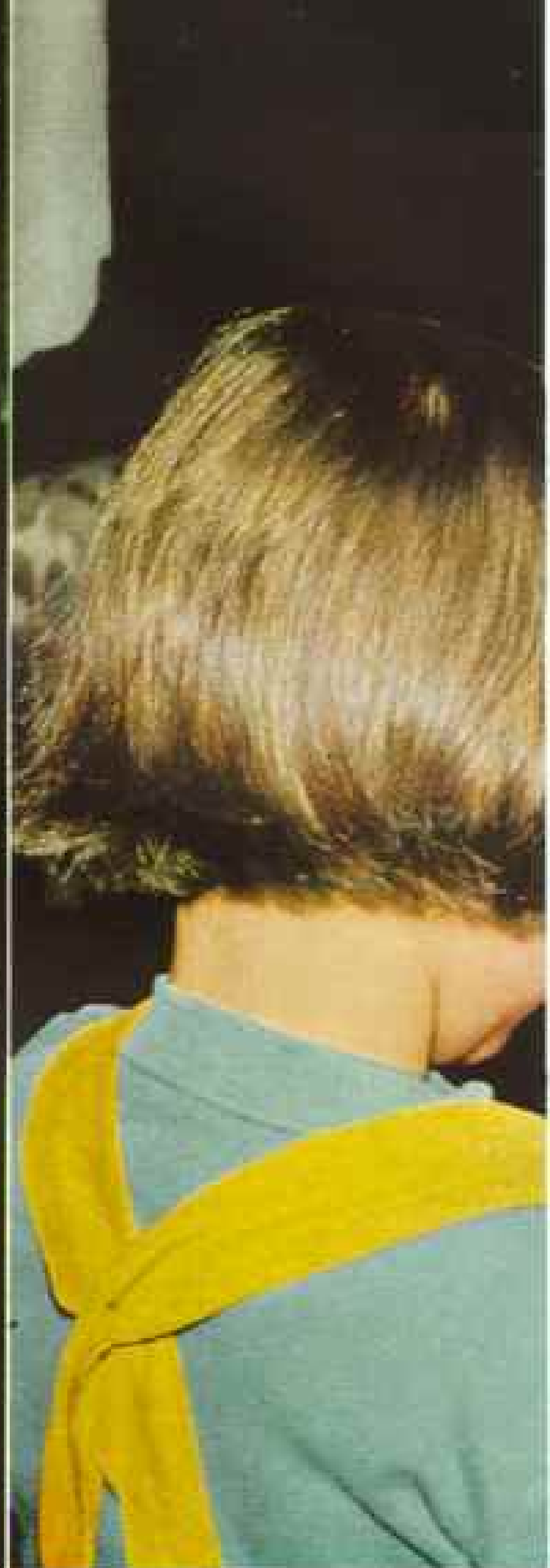
Our woodland terrarium was kept planted and populated thus for many months, the mosses and ferns prospering and the salamanders seeming to enjoy a half-hidden life in the quiet shadows of their urban home. Later I added several tree frogs. Often these distant relatives of the salamanders could be seen sitting on fern fronds or clinging to the terrarium's glass sides.

Killer Plants Snare Insects

Generally we regard green plants as receiving their energy via photosynthesis and additionally from chemicals absorbed from the soil. That certain plants supplement their diets by capturing and digesting animal organisms seems almost like an idea out of an Oz book. Actually, scattered in bog and swamp throughout the world, there are some 400 plant species whose leaves are so modified as to permit the snaring of insects and the digestion and assimilation of their proteinaceous parts.

I have always thought of these so-called carnivorous plants as among the most remarkable in the botanic world. It was therefore with some anticipation that I decided to set up our second slant-topped terrarium as a home garden for certain members of this bizarre group. I was aware that, in Nature, insect-eating plants generally prefer an acid soil of the sort found in bogs and water-leached flats; also aware that botanists relate the evolution of the carnivorous habit among such plants to the scarcity of nitrogen in bog soil.

From a biological supply house in North Carolina I ordered three different types of carnivorous plants; also 10 pounds of strongly acid bog soil. When these items arrived, I had my terrarium all ready, with a layer of coarse sand spread on the bottom as in the woodland setup. Over the sand I poured the newly acquired bog soil, then turned to open the other packages of the shipment.



← If Looks Could Kill . . . !
 Ferocious Stare Belies
 His Half-dollar Size

Pet stores stock and sell the young of many species of common pond turtles. This beady-eyed youngster (7 times natural size), now in its second year, should span 5 to 8 inches at five years. It thrives on a varied diet of meat, fish, worms, insects, water plants, and fruits. A turtle has no teeth; bites of food, sheared off by sharp-edged jaws, are swallowed whole. Turtles, though able to taste and smell, lack external ears; they "hear" by feeling vibrations through ground or water.

Swimming vertically at upper left, a specimen (enlarged 3 times) displays an artistic pattern on the under shell.



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↑ Learning Can Be Fun: Young Paul Zahl Matches Pets with Portraits

Walter Weber's turtle paintings in the May, 1952, NATIONAL GEOGRAPHIC MAGAZINE reveal the boy's specimens as *Pseudemys scripta*. Subspecies inhabit the Atlantic coast from Virginia to northern Florida and from Lake Michigan south to the Gulf and west to Mexico.

Turtles, like other reptiles, have lungs and breathe air. Their ancestors first appeared some 200,000,000 years ago, long before the dinosaurs. The creatures' long survival may be due in large part to their unusual skeleton; the top shell, or carapace, formed from overgrown, widened ribs, affords excellent protection from predators.

© Kodachromes by Paul A. Zahl



Each of the three plant species was hermetically sealed in a plastic bag, along with a plaque of root-bearing soil just as the collector's spade had removed it from the bog. I opened the first bag; this one contained a sundew (genus *Drosera*), somewhat battered from the journey but otherwise healthy.

On close examination, what a remarkable plant it turned out to be! The whole specimen was no larger in diameter than a 25-cent piece, and its radially arranged green leaves were not of the conventional variety but would be more aptly described as flattened stalks, each about half an inch long, growing out from the center of the plant. Each stalk terminated in a sunburst of minute filaments, and on the tip of each filament was a nublike, nearly microscopic swelling covered by a droplet of glistening fluid.

Plant That Acts Like an Octopus

With the point of a needle I touched one of the shiny droplets—and comprehended something of the method by which this plant captures its insect prey. What I saw was perhaps the original application of the flypaper principle, for the fluid droplets were viscous, stickier than molasses, and came away in a long thread as I removed my needle tip.

Later I learned that the sundew has gone a step further and improved on flypaper, for when a small insect gets stuck in the mucilage of one or more of the many filament tips, other filaments slowly bend toward the prey, eventually encompassing it like an octopus. The tissue nub comprising the end of each filament secretes not only mucilage but enzymes as well, which aid in the digestion of the insect victim.

I pressed the clod of soil containing the roots of the sundew into the soft soil of the bog terrarium and directed my attention to the second plastic bag. It held the Venus'-flytrap (genus *Dionaea*), perhaps the best-known of the carnivorous plants (page 665).

Despite the vicissitudes of travel, several of the plant's leaf traps were open. With the aid of a small magnifying glass I could easily make out on the inner surface of one of the leaf halves three tiny, erect bristles, triangularly arranged. From my previous reading I knew their purpose, although I was eager for a real-life demonstration. This, indeed, was worthy of a full-dress family show, so I called the children from their playroom and my wife from her reading.

"Look," I said, handing my wife the magnifying glass. "See those three hairs? According to the books, if an insect brushes across one of them the jaws of the trap will snap shut."

Springing Venus' Trap

The jaws to which I referred were two leaf halves, open and spike-fringed, suggestive of two clutching hands hinged at the base of the palms. When the leaf halves come together, their opposing lines of green spikes intermesh, making an escape-proof prison for anything caught between.

My wife watched through the lens, and the children were alert as I eased the tip of my needle toward one of the trigger hairs.

"This needle," I imagined out loud, "is a fly. Now observe what happens when the 'fly' touches the trigger."

At length the point of my slowly moving needle rested ever so lightly on one of the bristles. Immediately the two halves of the leaf swept together and the two arcs of spikes intermeshed. Had I not quickly withdrawn it, a length of my needle would have been caught in this botanic vise.

My wife and I were far more impressed than the children. The child's mind, it is said, often sees the highly unusual as commonplace. But to the adult, whose expectations in regard to natural phenomena are usually well fixed, the sight of a plant thus engaging in a relatively violent act of aggression may indeed seem little short of miraculous.

The demonstration over, the Venus'-fly-trap was placed in the bog terrarium a few inches from the sundew and arranged to rest properly in the soil.

Pitcher Plant Drowns Its Prey

The third plastic bag contained a pitcher plant (family *Sarraceniaceae*), the last of my botanic carnivores. This curious specimen has long, hollow, trumpetlike leaves arising centrally at soil level. In Nature, a pool of watery liquid fills the bottom of each leaf.

Lining the inner leaf walls of this particular species are hundreds of closely set and inwardly pointing barbs designed to function as ratchets. Any crawling insect attempting to explore the entrance of such a leaf well might easily find itself on a path of no return. Progressing, the insect would eventually fall into the fluid at the bottom, drown, and be digested by enzymes in the fluid.



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Swaying on Slender Fern Fronds, "Chameleons" Perform Like Circus Aerialists

Rapid color changes give *Anolis carolinensis* the title of American chameleon; actually, the playful lizard (enlarged twice) is not a true chameleon, but it is by far the most common reptile pet in the United States.

Like the other two carnivores, the pitcher plant was transferred to the terrarium with the acid soil.

The planting operation completed, the terrarium was placed where only a limited amount of direct sunlight would strike it. In ensuing weeks each of the plants grew vigorously, adding new leaves as the old ones withered; the Venus'-flytrap even bloomed.

I placed a number of living fruit flies in the terrarium, and although I cannot say for sure whether the plants captured and "devoured" them, I know that the flies soon disappeared. Guests in our home never failed to be amazed at the Venus'-flytrap's response when I would touch one of its trigger bristles with the point of a needle.

The children, in general, found the fish, salamander, and turtle inhabitants of our living room far more interesting than the bog terrarium. Movement and obvious animation seem more likely to spark a small child's interest than sedentary organisms of the sundew, Venus'-flytrap, and pitcher plant variety, regardless of their unexpected botanical ferocity.

Nature's Food Chain: Big Eats Small

The principle of the food chain may be seen at work everywhere in open Nature—a small animal is eaten by a larger one, which is eaten by a larger one, which in turn is eaten by a still larger one. At the zoo, of course, this principle is not much in evidence, nor



Among American Household Pets, the Hardy Goldfish Still Holds High Rank

As with countless other families, the Zahls' first pets were goldfish. *Carassius auratus*, a member of the carp family and a native of eastern Asia, has been introduced into virtually every country in the world. The United States today numbers some 50 goldfish farms, with a combined annual output of approximately 100,000,000 fish per year.

Centuries of crossbreeding, led by Orientals, have produced such fancy species as the fantail, Japanese fringetail, Chinese telescope, lion-head, and shubunkin. The weird celestial telescope, perhaps the most unusual creation of all, has pupils atop the eyeballs.

Goldfish prefer live food, such as flies, earthworms, mosquito larvae, and daphnia, a minute crustacean, but they readily consume scrambled egg, chopped lettuce, boiled spinach, and even ground dog biscuit. Above, young Eda Zahl treats her pets to crumbled rice-flour wafer.

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Reproduced by Paul A. Zahl

was it in our home menagerie—with one conspicuous exception.

Small living crustaceans, purchased once a week at a pet store, were fed to our tropical fish. Of these fish, the guppy species alone increased abundantly—in fact, so abundantly that we had to discard the excess ones periodically or find a useful purpose for them. That purpose presented itself shortly after the caymans arrived.

The two baby alligators (genus *Caiman*; range, Central and South America) I had come across in the shop of an animal importer in downtown Manhattan. As to their previous history, I could obtain no specific information. But this I do know: of all the animals I brought home, these two ugly little reptiles made a more immediate and lasting hit with the children than any of the others.

Alligators in the Bathtub

These creatures (the baby alligators, not the children) looked fierce and forbidding (page 663). Actually, they were gentle and harmless—at least while thus in their infancy. No animals, except domesticated cats and dogs perhaps, like to be handled very much, and on the whole we did not encourage the children to handle the members of our parlor menagerie. But occasionally, when the children took their evening baths, they would be allowed to take the caymans into the tub before the soaping began.

I have no way of knowing whether the animals enjoyed this experience as much as the children, but judging from the fact that these two caymans grew and prospered, I assumed that their occasional bathtub experiences had no lasting ill effects.

The reptiles were more normally housed in a small aquarium with shallow water, sand, and a rich culture of *Salvinia* and duckweed. During the months of their stay with us we did our best to keep the living-room temperature close to 76°—a level satisfactory for caymans and tropical fish. To any member of the household who complained of the heat, there was always this answer: many people long to spend the winter in Florida.

We now come back to our food chain, for in setting up a home for the caymans I dipped water out of the somewhat overstocked guppy tank and poured it into the aquarium being prepared for the reptiles. A few guppies inadvertently came with the water.

Some hours later, after the reptiles had been

placed in the aquarium, I observed rapid intermittent movements at the surface of the shallow water. I noticed, too, on closer examination, that the guppies had disappeared. I dropped in a few more guppies and again noted quick head jerks on the part of the caymans. Watching carefully now, I saw that the reptiles, with heads mostly submerged, would lie very still as the fish swam close; then suddenly they would lash their heads laterally, with jaws momentarily ajar, and snap—and there would be one less guppy in the tank.

Crustaceans, guppies, caymans—that, happily, was as far as our parlor food chain went.

The only mammalian species, other than ourselves, that for a time claimed membership in our household were a pair of golden hamsters and a pair of white Swiss mice. The former came from a pet store, the latter from my New York laboratory where large stocks of mice are regularly maintained for biological and medical research.

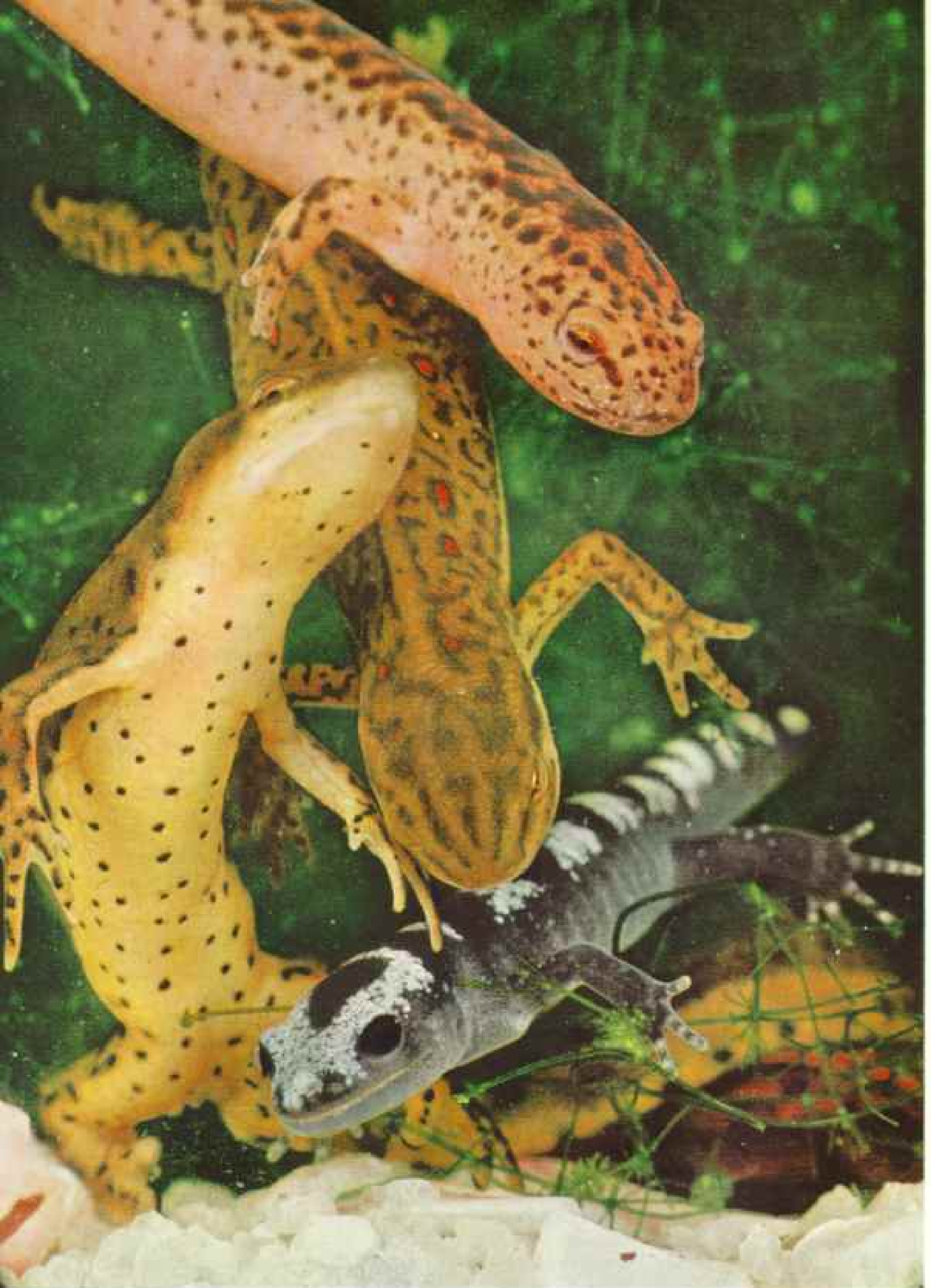
From the laboratory I borrowed two metal cages with screened lids, water bottles, shavings, and food pellets.

That such paraphernalia made no esthetic contribution to our living room is only incidental. The cages were in fact much welcomed, and except for my having to clean them out every three or four days and add new shavings, they were little trouble to maintain. Their furred and frisky inhabitants seemed to give balance to a zoo whose other members were of the scaled or naked-skin variety (page 672).

Stork Visits the Parlor Zoo

Assurance that the new creatures found our home to their liking came one morning when we looked into the mouse cage and beheld eight tiny pink newcomers competing voraciously at the maternal larder (page 668). A few days later, not to be outdone by a mouse, the hamster delivered a litter of her own.

The Zahl children were of course delighted by this unexpected turn of events; but the Zahl parents took a somewhat dimmer view. A little unorthodox arithmetic ($1 \times 1 = 8$; $8 \times 8 = 64$; $64 \times 64 = 4,096$; etc.) led me, rather soon after these stork visits, to whisk both cages of proliferating mammals out of the house and, after a short cab ride, to deposit them at the downtown laboratory where in a properly air-conditioned animal room they



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"You're It!" Frolicking Salamanders Appear to Be Playing Underwater Tag

The first backboneed animal to leave water for a life on land more than 300,000,000 years ago resembled the present-day salamander. These Zahl pets, shown $3\frac{1}{2}$ times natural size, thrived in a woodland terrarium.



↑ **As Long as It's Shady, Land or Water Suits the Versatile Salamander**

Unlike lizards, these tailed amphibians (twice natural size) lack scaly skin and claws. Shunning sunlight, they seek out mossy places often under logs and rocks. Lungs replace gills in adulthood in most species. Coral-red *Pseudotriton ruber ruggosi* from New York to Georgia.

↓ **Baby Caymans Squint at Intense Camera Light, but Revel in Its Heat**

Members of the alligator family, caymans inhabit the warm rivers of Central and South America. This pair of 8-inch specimens made an immediate and lasting hit with the Zatl children. Gentle and harmless, they even joined the youngsters in the bathtub.



would be well cared for and even encouraged.

That night there were tearful objections, but new acquisitions of a less fecund variety soon compensated for the loss.

Perhaps because they are reptiles and have some facial resemblance to snakes, lizards are regarded by many people as creatures to be observed from as great a distance as possible.

That such a feeling is not inherent to human nature, but is rather one of association, was demonstrated the day I brought home the "Chinese dragon," a creature nearly 24 inches long from tip to tip. Few animals have a more forbidding look than this species of green iguana, whose native range extends from Mexico southward.

"Dragon" Makes a Docile Pet

At the importer's shop I had to be shown that the "dragon" in the cage could be handled safely, noting with satisfaction that no fire was coming out of its nostrils. Actually, this tropical iguana proved to be as docile as a stuffed teddy bear (pages 666, 667).

Upon first sight of the animal my wife shrieked and retreated; but the children, as yet unconditioned, immediately came close. They studied and touched the iguana's long claws, its bristling dorsal spines, its wicked-looking scaled face, its long tapering tail; then they vied as to which would first be allowed to give the monster a pickaback ride around the house.

A box with a screen top became the iguana's regular quarters; but later, in the evening when the family was sitting at leisure in the living room, we often removed him from the cage and allowed him to perch on the edge of a chair or on the glass shade of a little Victorian lamp whose warmth seemed to be especially pleasing to him. There he would perch for hours if left alone, his eyes shut, perhaps dreaming of his original home in the branches of a tree in the faraway Tropics. When we made ready to retire on such nights, my wife would not say, "Have you put the cat out, dear?" but rather, "Have you put the dragon away?"

It may have been this success with the iguana that led me to branch out to other lizards. This was preceded by the construction of a desert terrarium. One of the supply houses advertised, mostly for school use, all the makings of a miniature desert habitat: cactus from Arizona, a bed of true desert sand, and several small desert lizards.

I ordered such a set and found it to be all the dealers had promised. The red sand actually seemed to radiate heat; the little heads and fingers of cactus were characteristically shaped and bristled; and the lizards, although not nearly so colorful, large, or disposed to petting as the iguana, were certainly apt inhabitants for the cactus terrarium I had soon set up in a medium-sized glass case.

The Living Desert at Home

So naturalistic was the final result that, by concentrating on what I saw there through the glass (even in the absence of the Southwest's dazzling sunlight or the howl of a distant coyote), I could easily get a feeling approaching that of actually being in the desert.

And so, as the months passed, the wilds of our city parlor became wilder and wilder—horned "toads" came (page 654); so did a skink (a kind of lizard), leopard frogs, "chameleons" (page 659), moth cocoons, more turtles, and additional fish. Also, as we lost our amateur status, thermostats could not be resisted, nor heaters, chugging aerators, special foods. Finally my wife called a halt.

"Don't you think," she pleaded, "that zoos and biology classrooms are somewhat more suited than our living room to an elaborate project of this sort?"

For a while longer I hesitated. But eventually I had to admit that parlors are designed more specifically for human comfort than for animal and plant habitation. A few potted plants, a cat or a dog, perhaps an aquarium or two—but there are limits.

Liquidating the Home Zoo

Agreeably enough, neither the children nor I will be called upon to define these limits for our particular parlor. At the moment of this writing, circumstances call for a family trip to the west coast. Our New York apartment will be closed for a few months, and we have no choice other than to liquidate our bio-accumulation—that is, to give the pets and plants away to friends.

Soon all that will remain with us of our parlor wilds will be many fond zoological and botanical memories and some photographs. It is these photographs, together with a few of the memories, that we now share with readers of the NATIONAL GEOGRAPHIC MAGAZINE.*

* For other articles by Dr. Zahl on a variety of nature subjects, see the NATIONAL GEOGRAPHIC MAGAZINE Cumulative Index, 1899-1953.



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Illustrations by Paul A. Zahl

↑ "Come into My Parlor": The Venus'-
Flytrap Entices an Unwary Victim

Sensitive hairs on the inner surface of each lobe trigger the remarkable *Dionaea muscipula*, a bog product of North Carolina. Touched by a wandering insect, the lobes swing swiftly shut, and spiked prongs on the outer edges interlace like fingers of clasped hands.

↓ The Trap Snaps Shut; Locked in a
Barred Cage, a Fly Faces Death

A digestive fluid secreted from the plant's glands helps to disintegrate the insect and absorb it. Within 10 days the lobes open again, ready to catch new prey. Each leaf can repeat the devouring process two or three times before it reaches maturity and dies.





← The Latest in Lamps: Flowered Globe Capped with Green Iguana

Eda Zahl's bright young face reflects the delight of a child with a toy both new and alive.

Few animals appear more forbidding than the iguana, but this pet—nicknamed the "Chinese dragon"—proved as docile as a stuffed teddy bear.

Allowed to run free from his screen-top cage at evening, he preferred to perch atop the Victorian lamp. Eyes shut, basking in its warm rays, he remained motionless for hours. On such nights, Mrs. Zahl's bedtime reminder to her husband was not "Have you put out the cat?" but rather, "Have you put the dragon away?"

Kissing Kin →

Fear of reptiles is not inherent in human nature, but is acquired, says biologist Zahl; and Eda and Paul offer graphic proof. The trio formed an instant friendship.

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"Chinese Dragon" → Daydreams on a Conch Shell

In its native habitat of southern Mexico, Central America, and tropical South America, the common iguana grows to a length of six feet, and its delicate flesh is esteemed as food. When perched in a jungle tree, the agile creature balances a stout body on a slender branch; hind legs sprawl nonchalantly downward. Insects, worms, snails, fruit, leaves, and small rodents comprise its diet.

The Zahl's young specimen measured nearly 24 inches from tip to tip. A crest of soft, leathery spines ridges the back. In adulthood, bold black bars will mark sides and tail. A well-developed comb-like pouch hangs loosely from the throat (opposite page).

Kodachromes by Paul A. Zahl









"Hickory, Dickory, Dock..."

The mouse didn't actually scale the smooth mahogany, however, and the venerable grandfather's clock struck seven-times-one; author Zahl placed the pet on the ledge to illustrate the nursery rhyme for his ready-for-bed youngsters.

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↑ Midget or Giant, Cacti Look Alike, a Child Discovers

Paul and his father compare miniature plants in their desert terrarium with pictures of the 25-foot saguaro in the September, 1953, NATIONAL GEOGRAPHIC MAGAZINE, pages 374-375.

Terrarium's inhabitants, two horned toads and a skink, hide behind plants or under sand.

← No Nap for Mother Mouse with Eight Squirming Babies

Mice are born blind, deaf, and hairless, some weighing a fraction of an ounce and small enough to fit into a thimble. Weaned in 12 days, they mature in three months.

The Zahls' pair of white Swiss mice came from the author's research laboratory in New York.

Illustrations by Paul A. Eklit



Hollywood's Newest Horror Monster? No, Merely a Tiny Tree Frog Magnified Eight Times Life Size

Preferring a secluded life among the reeds and lily pads of ponds and swamps, tree frogs are rarely seen, although they are common in most parts of the United States. Smooth green skin, long, slender legs, and pointed snout distinguish *Hyla cinerea*. A band of pale gold or silvery white stripes each side. An adhesive pad or sucker at the end of each finger enables the amphibian to cling fast to almost any perch; the Zahly' specimens favored their terrarium's glass sides.

Seen through the magnifying glass at left, a tree frog appears about twice its natural size.



**"Come On In—
the Water's Fine..."**

One of the most common American frogs, *Rana pipiens*, ranges the entire United States, excepting the west coast. It boasts many names, including meadow frog, leopard frog, water frog, and grass frog.

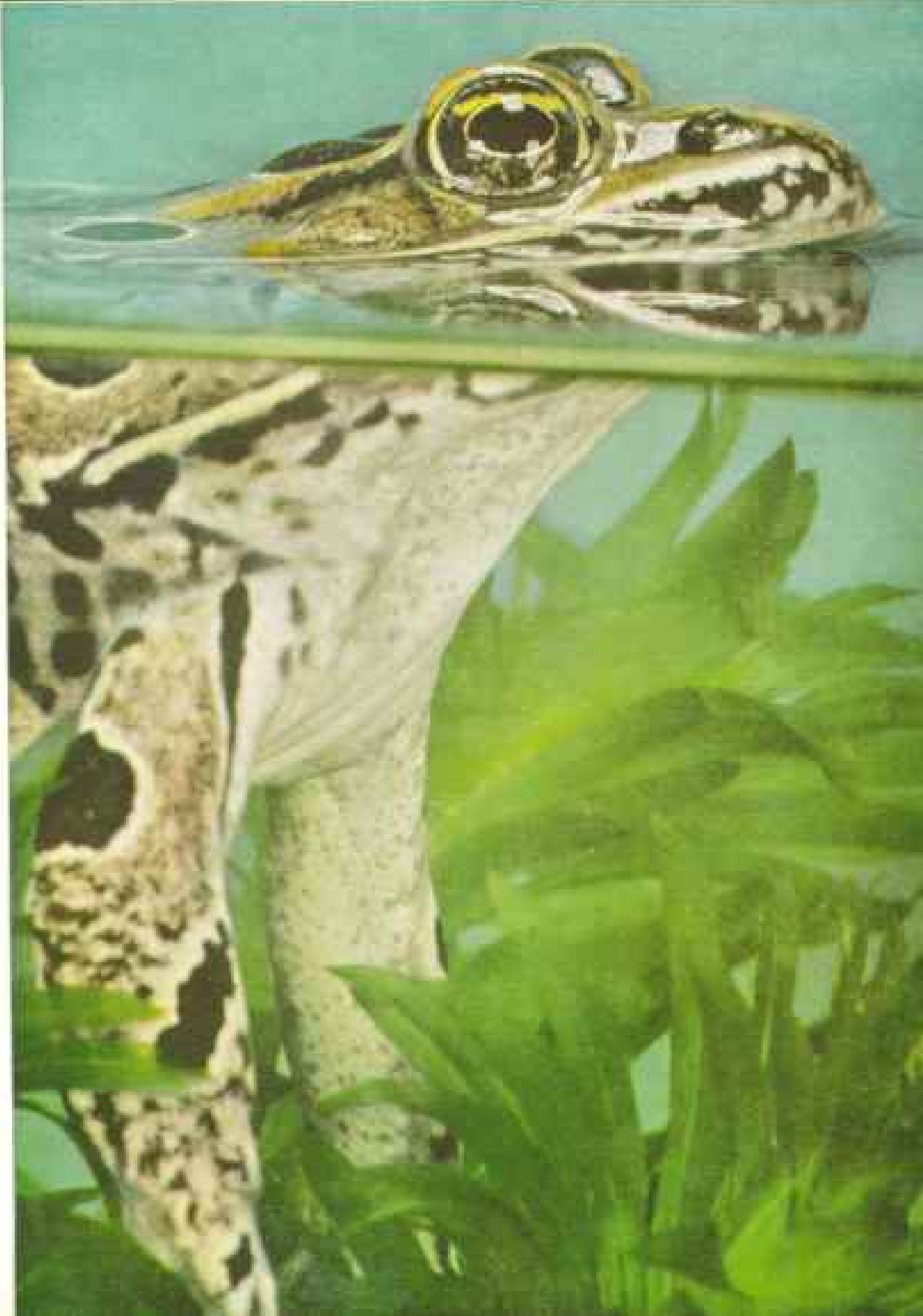
Two to four inches long, the sleek green-gold creature hibernates throughout winter in colder regions. Burrowing in mud beneath the water, it remains dormant for months; the hardy amphibian can survive even in a frozen pond. Except during hibernation when respiration slows markedly, frogs cannot remain under water much more than an hour. Salt water is deadly poisonous to them.

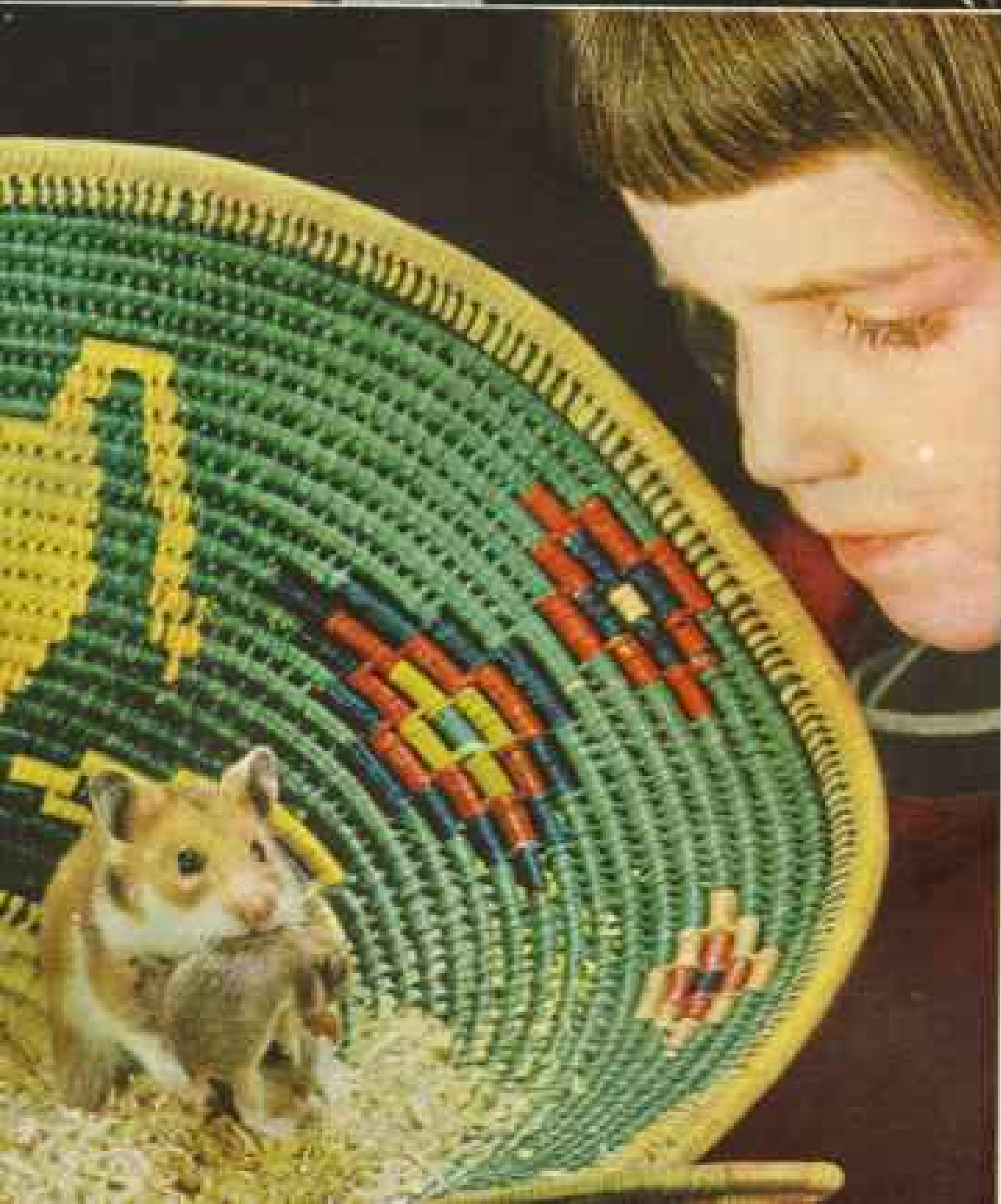
In springtime *Rana pipiens* is one of the first frogs to venture out of seclusion. Its croak is a long, low guttural note, followed by three to six short notes. Eggs are usually laid in March in shallow-water pools. Hatching in nine days, they fill the area with wriggly tadpoles.

A double or triple row of olive-green spots edged with yellow runs down the back; burnished-bronze bars streak the legs. Under-skin glistens white.

These specimens from Louisiana were housed in an aquarium with a sloping sandbank, several large rocks, and generous sprays of *Anagallis*, a fast-growing water plant whose long strands sprout as much as an inch a day.

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↑ **In Holiday Mood, Lively Hamsters Romp Atop a Jack-o'-Lantern**

Although they were recorded in the Near East a century ago, the millions of golden hamsters in captivity today all stem from a single litter of 12 dug from a burrow near Aleppo, Syria, in 1930. Eight years later their descendants comprised the first group of these playful rodents to be imported into the United States.

Fully grown, *Cricetus auratus* looks like a cross between squirrel and mouse. About six inches long, it has a luxurious coat of reddish-gold fur, stubby tail, and beady black eyes. Roomy cheek pouches extend back half the body's length. Crumming them with food reserves, hamsters resemble mumps victims.

← **Eda Zahl Dares Make No Sound: Frightened Mother Might Devour Her Brood!**

The hamster is one of the most prolific of all mammals. Because it is also extremely susceptible to contagious diseases, it has proved invaluable to laboratory researchers seeking cures.

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Kodachromes by Paul A. Zell

Off Sun-drenched Shores the Author Helps Reap the Sea's Harvest
in Ways Little Changed Since the Days of the Phoenicians

BY ALAN VILLIERS

With Illustrations from Photographs by the Author

IF I were a fish, I would keep away from the golden beaches of Iberia!

Especially would I avoid, like the plague, the whole of Portugal's spectacular coast. Beautiful its beaches might be, but not to a poor fish.

All along that sun-swept, picturesque littoral—from Caminha in the north, past Costa Nova and Nazaré and Costa da Caparica and round to Ponta de Sagres and beyond, all along the shimmering gold of the flower-drenched Algarve right to the very borders of Spain, and beyond that, too—40,000 patient, skillful fishermen take toll of the sea, as they have been doing from time immemorial, hunting fish for food (map, page 677).

It has been that way since man began. The sea yields an abundant harvest that requires no seed sown by man. All he needs is the tools to work with, the skill to know where the fish are, and the patience to wait for them.

Down through the ages man's tools for reaping the harvest of the sea have been developed until today, in many places, their efficiency is almost frightening. What with electronic devices to find the fish, underwater television to watch them, fine-mesh trawls to drag them in by the million, the fish stand little chance.

You will find these latest methods of fishing in use off the ports of Portugal, too, if you want to look for them. But after my voyage with the dorymen to the Grand Banks and Greenland I was not interested so much in the scientific slaughter of fish in the mass.*

Men Against the Wild Sea

My friends the dorymen had told me that here and there along the Iberian shore men still pit their skill and naked strength against the sea. Using methods handed down from the Phoenicians, rowing with huge sweeps, these offshore fishermen go out into the stormy Atlantic with high-prowed boats that look as if they had sailed straight out of the mystic past.

The fishermen continue to use such methods, the dorymen said, because they yield enough fish and do not seriously deplete the stocks.

Modern methods are all very well, but the skilled old fishermen think of them as murder and fear for their ultimate effect on fish stocks. Banks can be fished out, they say; so it is better to keep at least some of the ancient, well-tried methods going. Then, at any rate, there will be fish enough to eat and a continuance of the breed.

Where the Centuries Bring No Change

The dorymen told me of golden beaches in the north of Portugal where every able-bodied man in town, and all the oxen they can muster, launch huge Biblical fishing craft through the wild surf. The men casting nets upon the waters are dressed in much the same kind of garments, intone the same age-old chants, work in precisely the same ways that have been handed down from father to son for generation after generation.

They told me of famed Nazaré, with its half-moon curve of shining beach almost covered in bad weather with queer little fishing boats, some dhow-rigged, some propelled by oars, with a wonderful old-shoe shape, great high prows, and a big beam to keep them from overturning in the surf (pages 685, 686, and 689).

They mentioned also beaches in the Algarve, such as the one at Albufeira, where I would find engineless little dhows still painted with an eye at either bow, so that they can "see" (page 676). They spoke of the great tuna run, the mad rush of the fat fish inward-bound for the Mediterranean to spawn, when men put down a giant corral in the sea to stop the finny hordes as they have been doing since ancient days (page 691).

Rights in the tuna fishing once belonged to Prince Henry, Henry the Navigator, who traditionally established a pioneer navigation school close by on Ponta de Sagres.

I found the dorymen had told me the plain truth. I began in the north at a place called

* See "I Sailed with Portugal's Captains Courageous," by Alan Villiers, NATIONAL GEOGRAPHIC MAGAZINE, May, 1952.

Moledo, in the Province of Minho, where whole villages of shouting men and singing women and children join in harvesting seaweed from the surf to fertilize provincial fields. They harvest the weed with long push nets and, rushing into the retreating surf, scoop up all they can, working all day to make one fair-sized heap (pages 678 and 687).

The harvesters usually work in white clothes, though not always. "Why wear white?" I asked. "Because we always have," they said.

Though most of the men wear white clothes, or mainly white, the women may be a little more gaily dressed.

Brawny-limbed, carefree, sun-browned people, they all rush into the surf as if they were children on an endless holiday.

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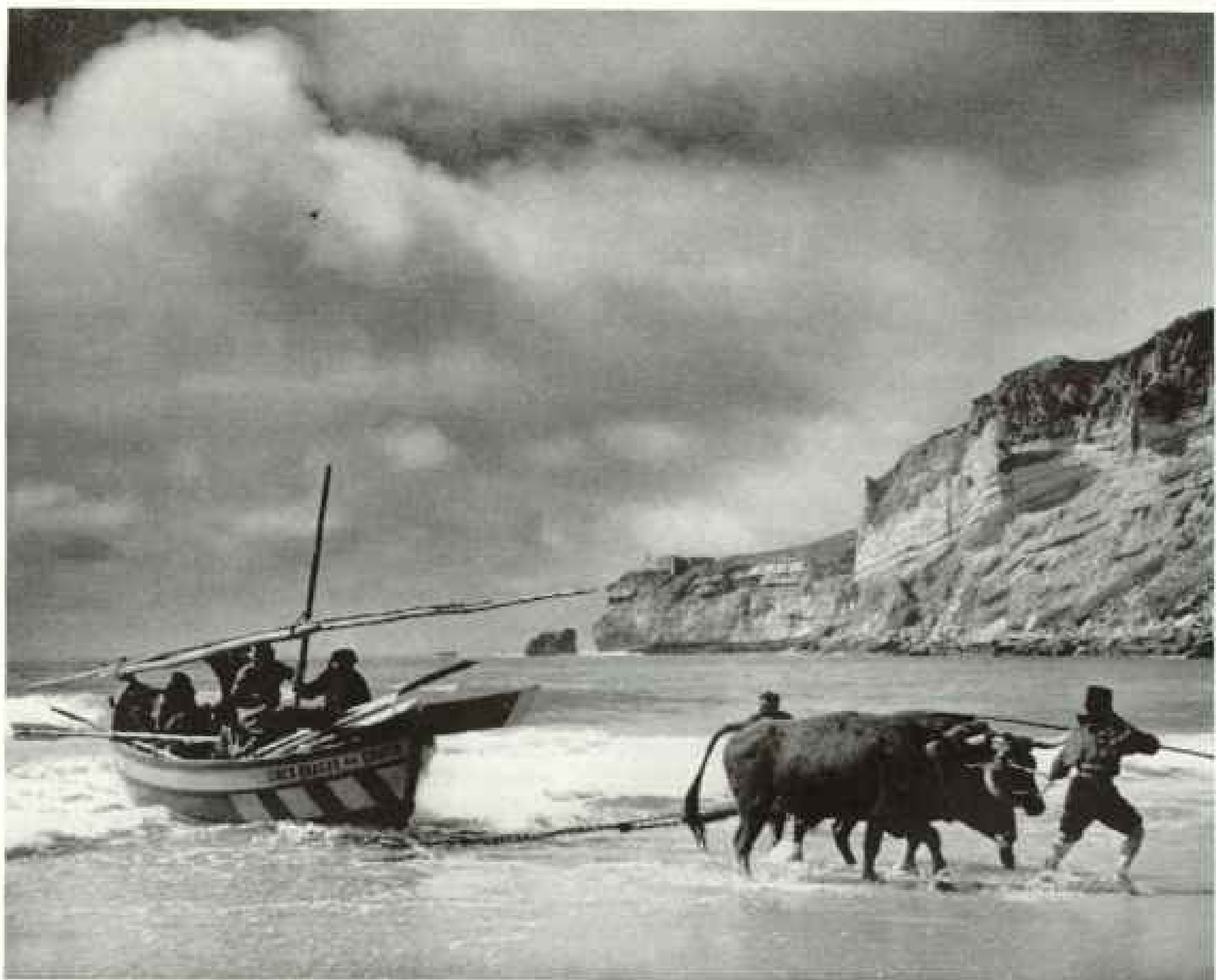
Surf Thunders on a Golden Beach → as Men of Mira Put to Sea

Portuguese "Companions of the Fishery" man a high-prowed boat whose style derives from Phoenician galleys (page 681).

✦ A thundersquall threatens: oxen drag the *Five Wounds of Christ* to safety on the sands at Nazaré.

André de Barros

Edo Martins





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The warm sun quickly dries loose clothing wetted in the surf. Rich country wines wash down good meals of fish and the produce of their well-tilled fields.

What more has life to offer, I pondered as I sped away to see the high-prowed Phoenician craft, the original landing ships of amphibious warfare, ply through the pounding surf from the beaches of Mira and Costa Nova and Vieira de Leiria.

I spent several days along these beaches and at a place called Leirosa. I was lucky, for the fishing was going well and men were launching the boats three and four times a day.

Gales Keep Boats Ashore

Sometimes the Atlantic, whipped up by a sudden gale, hurls in such surf that the big boats cannot fight against it, and there is no fishing then. Sometimes for days they cannot go out while the ocean rages. No matter. The true fisherman is a philosopher. The fish, he reasons, must have some time off, too.

Fascinated, I watched this ancient fishing. The method is always the same, though from beach to beach the boats may vary slightly. They all have towering upswept prows carried to a high point from which, usually, hang garlands of flowers. They have big, fat hulls, deep to carry nets and all the necessary line,

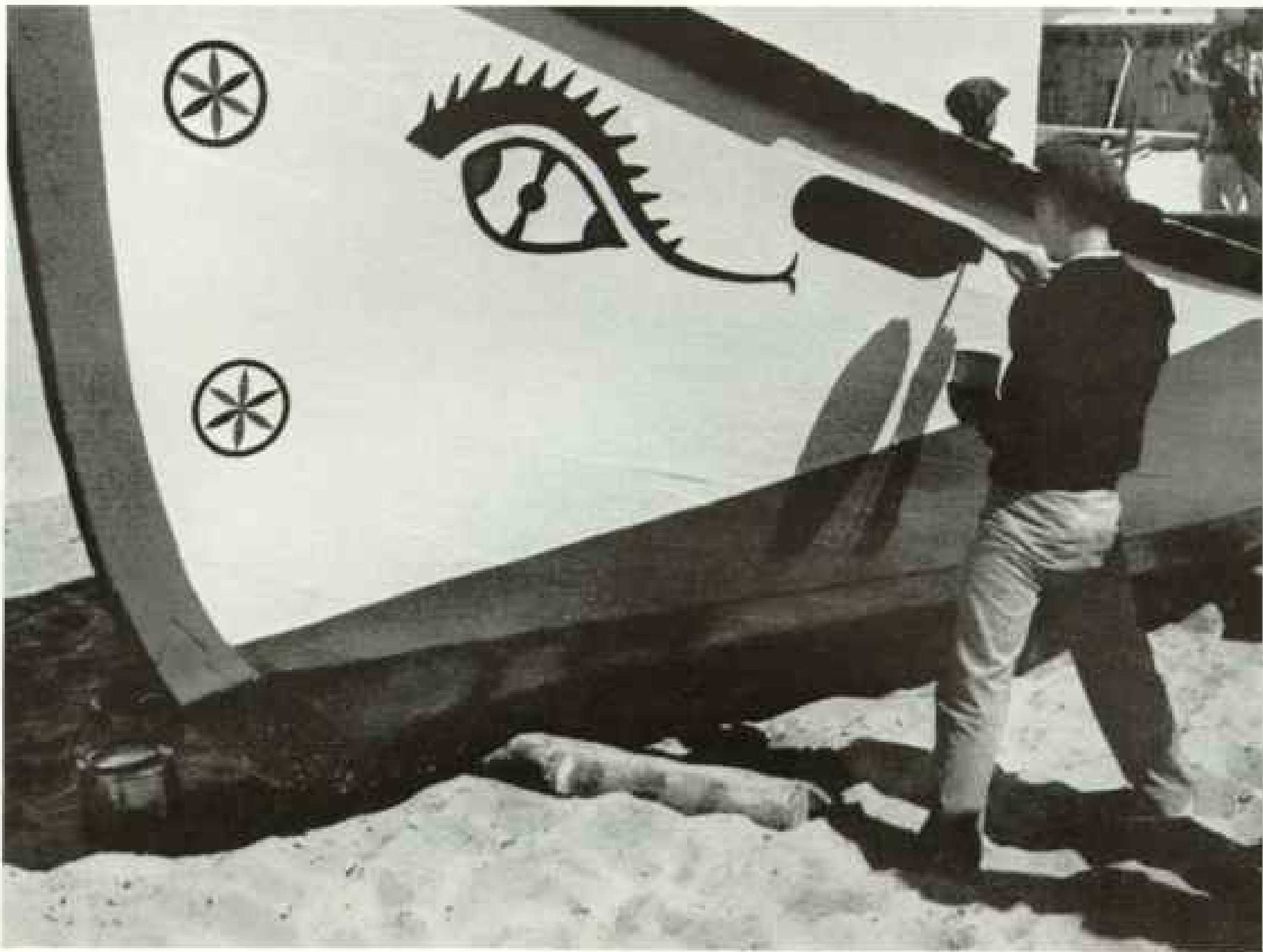
beamy to have a good grip of the sea and not capsize easily.

The boats have well-rounded, comfortable sterns to give them a good displacement in the

↓ Stocking Cap Marks a Fisherman and Also Serves as a Pocket

Furrowed face and battered coat bespeak the rugged, oftentimes dangerous, life of sea and sands.





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This Albufeira Fisherman Painted an Eye on the Boat so She Can Find Her Way at Sea
The craft was built on the beach, shelters there, and—if the sea does not claim her—will one day leave her bones on the same sands. Intensive offshore fishing threatens the future of such boats.

sea so that, when the surf is running at them as they come in to beach, the snarling sea may find plenty to lift and so carry them safely along instead of breaking over and filling them.

Huge sweeps propel the craft, each sweep made from a single pine tree. These big boats have no sails, no engines, no power of any kind save the muscles of their crew. They must be beached after each casting of the nets, and a propeller would soon be chewed to pieces. Besides, it would take a heavy engine to drive such big hulls against surf and sea. Why waste time and money on things like that? The sweeps do the job very well, and their use is thoroughly understood.

I went out in these boats whenever I could, aware that I was stepping back perhaps a thousand years in history and delighted, too, to be with these cousins of the Grand Banks dorymen, who also fish with skill and without fear.

At first I couldn't understand how such seemingly unwieldy vessels could be propelled through the surf at all, for they were all of 60

feet long and beamy enough for 10 men to stand at a sweep. The usual surfboat is long and slim, like an old Yankee whaler's boat—graceful and slight and with a great sheer, and yet not so slight that it lacks strength enough to survive almost anything.

Men and Oxen Launch Craft

I climbed aboard my first *barco do mar* at Palheiros de Mira, as she stood on rough rollers facing seaward at the surf's edge. Two sleek oxen, yoked together, stood placidly by either quarter, hitched to short ropes which were secured to ringbolts on the sides of the boat.

The animals stood sometimes to their knees in the surf, though it was not running badly that day. But they seemed well used to that kind of thing and paid no attention to it. By each pair stood a man with a prodding stick to control them.

There were other pairs of oxen stationed along the beach, a dozen or more, and the boat itself was surrounded (except for the bow) by about 40 men, all in gay-checked shirts with

trousers rolled up well over the knees. The tide was making. The men waited until the sea washed around the bow and lifted it.

"Now! Now! All together! Let's get her afloat!" roars a giant of a man who is master of the nets.

"Now! Now! All together!" shout the 40 men, and the oxen strain at their yokes, tossing their soft nostrils free of the surf and spray and stamping into the soft sand until they sink in it above the fetlocks and the surf laps at their massive shoulders.

The boat lurches and rumbles. A mate in the bow shouts to a gang of women ashore holding a stout line, telling them to keep the bow facing seaward, so the vessel will not broach to. The 40 men shove with all their might, and small boys run to push fresh rollers in place beneath the hull again as the surf recedes. The big boat has moved a good 15 feet, but still the wide stern is well aground, and she is far from afloat.

Another wave rolls in, and another. Farther out the breaking crest of one larger than the rest shows a good chance.

"Now! Again, my sons! All together!" shouts the master.

One More Pull—She Floats!

Again the animals strain and their owners shout encouragement to them, and the men push with rhythm and strength, up to their thighs in the boiling sea, spray in their faces, and the warm sun beating down.

Ah, now she comes! From my vantage point on the little deck below the high prow I feel the whole boat afloat. A big sea, running in to break on the beach, hits the heavy cutwater and bursts into flying spume.

"Let go the line!" shouts the mate to the women ashore. "Let go!"

They drop the line, and the oxen are unhooked from the ringbolts. The men make a wild rush at the boat; laughing and splashing, they leap over the high wooden sides, each making at once for his place on the giant sweeps, standing perched on a thwart rather perilously above the big hold full of nets and rope.

"Heartily! Pull heartily! Backs into it!" shouts the master, for a receding sea can still leave the big boat aground, and there is always the danger she might swing around and pitch them out.

In bad weather such a mishap could end in drownings. In any weather it is a muffed launching and bad for boat and gear. But now 40 strong backs strain with a will at the



Sea and Spain Border Sunny Portugal

Fishing furnishes a livelihood for 40,000 Portuguese men. From Moledo to Vila Real de Santo António the author watched the beach fishermen at work and went with them to sea in their colorful craft.



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Everyone Big Enough to Handle a Wooden Push Net Helps Gather Seaweed

The author saw whole laughing, singing villages at work in the surf. This group disregards Minho tradition, else the man and boy would wear white and the girls dresses instead of shorts (page 687).

big sweeps, and 80 brown arms pull with all their strength.

The sweeps work with the rhythm of an Oxford eight, and the power they impart to the long hull pushes the boat steadily seaward. She leaps and jumps in a boil of surf, for the seas break well out from the beach, and she jumps again as she rides the seas swirling sulkily round an offshore sandbar.

Now the boat is properly afloat, free of the sand. Already the oxen and the drivers grow small in the distance, and the line of women who held the bow line has broken. The women and girls have picked up their fish baskets again and are waiting for the catch to market.

The master, a grizzled sea dog who wears an old soft cap, keeps his still-sharp eyes out to sea, watching for weather signs. All the treacherous North Atlantic stretches before

him, open to America. Now it is smiling, and the unbroken swells shimmer and rise lazily in the heat of a summer's day. But it can blow up a gale at almost any time.

Beaching, a Tricky Maneuver

Under the master's eye two older men tend the paying out of the net line. One end was left ashore; the boat runs out three miles, then drops an elaborate net designed to scoop up carefully all sea life which comes in its path. The net is all paid out while the boat runs abreast of the shore; then she turns inward again and runs in another line. When she comes in to beach, both ends of the net can be hauled in simultaneously.

It took us the better part of an hour, I should think, to drop the lines and net, and another to run in for the beach again.

Beaching is a maneuver to be managed



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Bound for Fishing Grounds, Brawny Oarsmen Bend to Their Task

Boats are so heavy that up to 10 men handle a heavy sweep. The uniformed collector of revenue usually stays ashore, but on this calm day he went along for the ride.

carefully, too, just as launching is, for the dangers are even worse. The light boat, caught in a roll of surf, can more easily be swept over. But the patient oxen stand waiting, and the shoreside gang of men and the fish-selling women are ready to put down rollers and to take steadying lines.

The net line still being paid out astern helps keep the big boat straight, and this time she rides in like an LST coming in at some Pacific wartime landing.

As soon as she touches, the 40 crewmen leap ashore, the bow is swung seaward again, and the oxen are hooked to the ringbolts. Then the animals begin at once to heave the 60-foot boat up out of the surf.

All the crew and the waiting men and boys take their places at stout ropes that lead from the boat across the beach. Then men, boys, and oxen pull away mightily until the craft

is high and dry, out of reach of the surf. There she is left, for she will be going out again as soon as she is loaded with fresh line and net.

Oxen Haul Miles-long Net

There was a fixed pattern to all this work. As soon as the boat touched down, five pairs of oxen began to tramp across the beach, across and across and across again, hauling in the end of the net line.

Along the beach, at the place where we had launched—three-quarters of a mile away—five more pairs of oxen had begun to haul in the net line there; so the miles-long net was being pulled in steadily toward the beach by the ropes attached at either end.

Time after time the animals struggled through the sand as far as they could go and then, swiftly unhooked from the net line, came

hurrying back to the water's edge to haul in again at a fresh place.

The day grew hotter and hotter, but the oxen and men worked steadily on, half-hour after half-hour, for it is a long job. Meanwhile, other men hauled a dried and repaired net to the big craft and began to stow it carefully aboard with its attendant lines, preparing the boat for going out again.

A mile away, another vessel was just going out—another boat with another crew of 40 men, and 18 or 20 pairs of oxen to help launch and beach and haul back the net, and more men and boys as a shoreside gang.

Afar off, in the haze, I could see yet another big boat, and I knew that beyond that there were more, wherever the shelving sands off the golden beaches keep the surf quiet enough for the craft to survive. From before dawn until after dusk, all day long, whole villages of fishermen work in the age-old manner, bringing in the harvest of the sea.

Sometimes the Catch Is Small

Not that there is much of a harvest, some days. Often when the last pair of oxen has hauled in the end of the line and the huge semicircular net, narrowed to a long, wet, pulsing wind sock, is at last hauled up on the beach, there is a pitifully small lot of fish in it. A few barrels of sardines, a flapping hake or two, some small sharks, a few squid, some mackerel, perhaps a dozen or so flounders, and a few larger fish—this may be all.

On such hauls the fishwives sit disconsolately on the sand and wait for the next haul. But they're a sunny lot, and soon they are smiling and chatting, while the children romp around them. What cannot be had today may come tomorrow. Why worry? While the sun shines, there is enough to eat, and around them is the panorama of the golden beaches and all the beauty of Portugal.

The fishermen are philosophers, too. They do not own the big boats or the nets with which they work. They are formed into "companies" perhaps 80 men strong, and the "companions" (as the members of a company are called) have the right by ancient custom to fish enough to keep their families going and get a share of all profits on the catch. If there are no profits, they still eat. And if there be no profits today, tomorrow may lead to fortune.

Sometimes the great net comes in bulging with fish, and the trucks are summoned from

towns and villages for miles around to carry the catch inland, where it brings a good price.

Boats and nets are owned by individual citizens, more affluent than most, or by small groups. The rule is that the owner takes a certain percentage, the companions take theirs, and the State gets 12 percent for policing, marketing, control, and making better citizens of the younger generation.

I could have stayed for weeks at Mira or Leirosa or Furadouro, a lovely spot indeed; or at Costa Nova, where I saw smaller boats that are owned by the fishermen themselves (page 692). But there was much else yet to see. I spent a week end at Ofir, a pleasant place to stay while eating giant lobsters fresh from the sea and visiting the near-by and very interesting city of Viana do Castelo.

Nazaré, where I stayed a week, is a glorious gift to artists and anyone with an eye for color, with its simple, carefree life. There fisher children dance upon the strand on a Sunday morning to the music of age-old airs.

It is a grand beach at Nazaré. There are boardinghouses and hotels, and tourists come by autobus from as far away as Paris. The beaches look as if they were designed to be as attractive as possible, and the Nazarenes have added to the shore's natural advantages.

Nazaré, to the fisherman, is an open bay beyond a high point, with a safe beach to haul boats out and good marketing and distributing facilities.

There I saw hundreds of gay little high-prowed craft, flat-bottomed to slide upon the sands and beamy to take their loads.

Families Named for Fish

Family life at Nazaré centers around the boats and beach. Before dawn I listened to the soft padding of barefooted fishermen making for the beach. Always they were man and wife, the man carrying a doryman's small basket containing food and water, a pipe and whistle, without which he never goes to sea, the woman with a fishwife's basket on her head. The man fishes and the woman sells, and fish are so much a part of their lives that their very surnames come from fish. In Nazaré it is Mr. Bonita, and Mrs. Bream, young Master Codfish, and his cousin Miss Haddock; nor does it strike anyone that there is anything incongruous in the names.

I noted the well-planned homes where the fishermen live in a settlement of their own,

built for them by the Government with part of the 12 percent it takes on the fishing. I saw the nursery for their little ones, and the well-stocked dispensary, the hospital, and the cooperative store where the womenfolk buy the material to make the colorful checked shirts and stout woolen underwear. There are such settlements by almost every fishing beach.

You can buy good stocking caps at Nazaré for very little, provided you rate as a seagoing fisherman. The caps are good, for a man can keep his stock of tobacco out of the spray while it is stowed in the bottom of a snug stocking cap—and maybe a few *escudos*, too, that his wife doesn't know about (page 675).

Oxen help with the work of launching and beaching the fishing boats at Nazaré, too—long-horned, contented beasts that find the warm sand pleasant to lie upon when no work offers. The Nazarenes fish by net cast from their small shoelike boats, by hand line and long line, and by small net run out from the beach. But they do not have any of the big surf-riding craft of the wilder beaches. The headland at Nazaré lets smaller boats ride the surf and keep the sea. Those other beaches are quite open.

Boats Rigged Like Arab Dhows

My favorite Province in all the Iberian Peninsula is the Algarve, sun-drenched and flower-laden, where almonds grow and white cottages cluster among green valleys.

The mark of the Moor is clearly seen in the Algarve even today, though it is centuries since the last followers of Islam left this area, which was to them a real paradise.



Sturdy Women Peddle the Harvest of the Beaches

Lisbon's strong-minded fishwives went barefooted for centuries. Today the law says they must wear shoes, and this pair obeys. But some do not; let the police turn their backs, and into the basket go their shoes.

Signs of the Arab are plain along the beaches at places like Albufeira, which clings to its bold cliffs, or at flat Quarteira, where every boat drawn up along the sands is almost pure Arab. Lateen-rigged, sweet of line and sturdily built, eyes painted at the shapely prows, not an engine in the lot of them, they stand in long irregular lines gazing out to sea. The beach is their harbor, and they know no other (page 695).

Some of these craft go to sea just before sunset, others before dawn. Some fish all night out in waters leading to the Strait of



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↑ **Toiling Men Beach Their Boat Through White Surf. Their Fishery Is Ancient**

Since dawn these Mira fishermen have labored at the trade their fathers and grandfathers plied. For their labor they take two-thirds of the catch (after the State has deducted its 12% tax), dividing it among the 80 men, half shore-based, in their company. The boat's owner gets the rest. No sails aid the fishermen who pull the giant sweeps hewn from pine logs. At ropes' end 22 oxen help drag this heavy craft out of the Atlantic surf.





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Kodachrome by Alan Villiers

✦ **A Huge Net Moves Like an Undulating Serpent. Another Dries on the Beach**

Fishermen row far to sea, paying out the net on the end of a long line. When all the seine has been cast, they bring back to shore a second long line on the other end. Then men and oxen haul in both ends together, and the net sweeps up everything in its path—small sharks, sting rays, a few of the larger fish, and the sardines for which the cast is made. The man in the foreground patches a hole.



Gibraltar. Others fish by day, and I have seen them there—always in small groups of fantastically small vessels, just little open boats—when I have been going past in powered vessels. I have watched dawn and sunset launchings at Albufeira, too, when the men and women of the town come down to help, though many of them may have no direct connection with fishing themselves.

Albufeira, I think, would make a good artists' town, like Nazaré. It is a picturesque place, standing mostly on hills atop a cliff facing south toward Africa, which here is not so far away. Its sturdy citizens are good types; its attractive streets offer variety and color.

Fishing boats from Albufeira are gaily colored, and not one among them is without grace of line. The fish are sold in a market as they are brought in, and one morning I counted more than 80 of the little craft landing their silvery cargo near by.

Men Who Fish by Night

At Quarteira, farther east toward Faro, the boats are of the same type as at Albufeira. The average crew is 8 or 10 men to a boat. Most put out to sea an hour before sunset and return an hour after dawn. Some fish in pairs, with nets. Some use long lines, with their many hooks lying baited on the sea floor. Some catch sardines in nets; some hook scabbard fish, a long thin member of the snake-mackerel family (page 696).

The beach at Quarteira is flat and good to use. No cliffs bar the exits, and the rise from the surf is shallow and long, so that the boats may be easily handled without need of oxen.

All the villagers turn out to help the recovery of the fleet each day—old women, children, everyone. Especially do they hurry to the beach and bear a hand if a sudden squall blows up and the little vessels come rushing in under their high-peaked lateen sails in desperate need of shelter!

Then the work is fast, almost breath-taking. The surf soon runs high and breaks along the beach in roll after foaming roll. Villagers run from boat to boat, hauling at the recovery lines hooked to ringbolts on the small prows.

The wind begins to howl. More and more boats rush for the beach, some running into the surf with their sails still aloft, dashing at the beach with full way on to ride up out of the reach of the breaking water.

Sometimes the beaching craft do not get

away with it. Boats overturn. In sudden squalls some founder. The churches are full of the offerings of those who were saved, often miraculously. Some are not saved. It is the way of the sea.

I watched a fish auction along Quarteira's colorful beach, while scores of little craft dried their sails and hundreds of far-from-small families crowded round. Children, screaming happily, run and scamper on the boats all day long.

The fish, graded according to type by the fishermen and their families, were auctioned in heaps on the sand. The auctioneer went from heap to heap, standing by each and chanting in a high voice.

This is a curious chant—just a string of numbers. The auctioneer begins high and works low in a long singsong, and the fish go to the first buyer who stops him. Such auction sales go very quickly; then—and only then—do the fishermen go off for a rest.

It was the tremendous run of tuna that interested me most, and I hurried past the pleasant fields of the Algarve to Faro, provincial capital and headquarters for the tuna fisheries.

I knew that any time after mid-May tuna by the thousands come in from the distant, mysterious depths of the sea, making their landfall somewhere on the Portuguese coast near Cabo de Santa Maria and striking from there for the blue Mediterranean to spawn. Conditions in the Mediterranean must be ideal for young tuna. Just why, no one knows.

The Moors may have been the first to notice this tuna migration, for some of the songs the tuna men chant have Arabic words, and some are pure Arabic. More likely, however, the Moors only adopted the methods of trapping they found when they swept through the Iberian Peninsula.

Tuna Corralled Like Cattle

Along the coast of Sicily and here and there off North Africa you will find these huge tuna traps, corrals where migrating tuna are caught for canning. But the best corral of all is that off Faro, for this captures the tuna first, fresh from the sea. Some of the other traps take them when they are bound out from the spawning, when they are thin and tired.

I went out to see the tuna traps off Faro, going with the owner, Senhor Manuel Francisco La, and my friend the ubiquitous Senhor Joaquim Maia Aguas.



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Kodachrome by Alan Yilliers

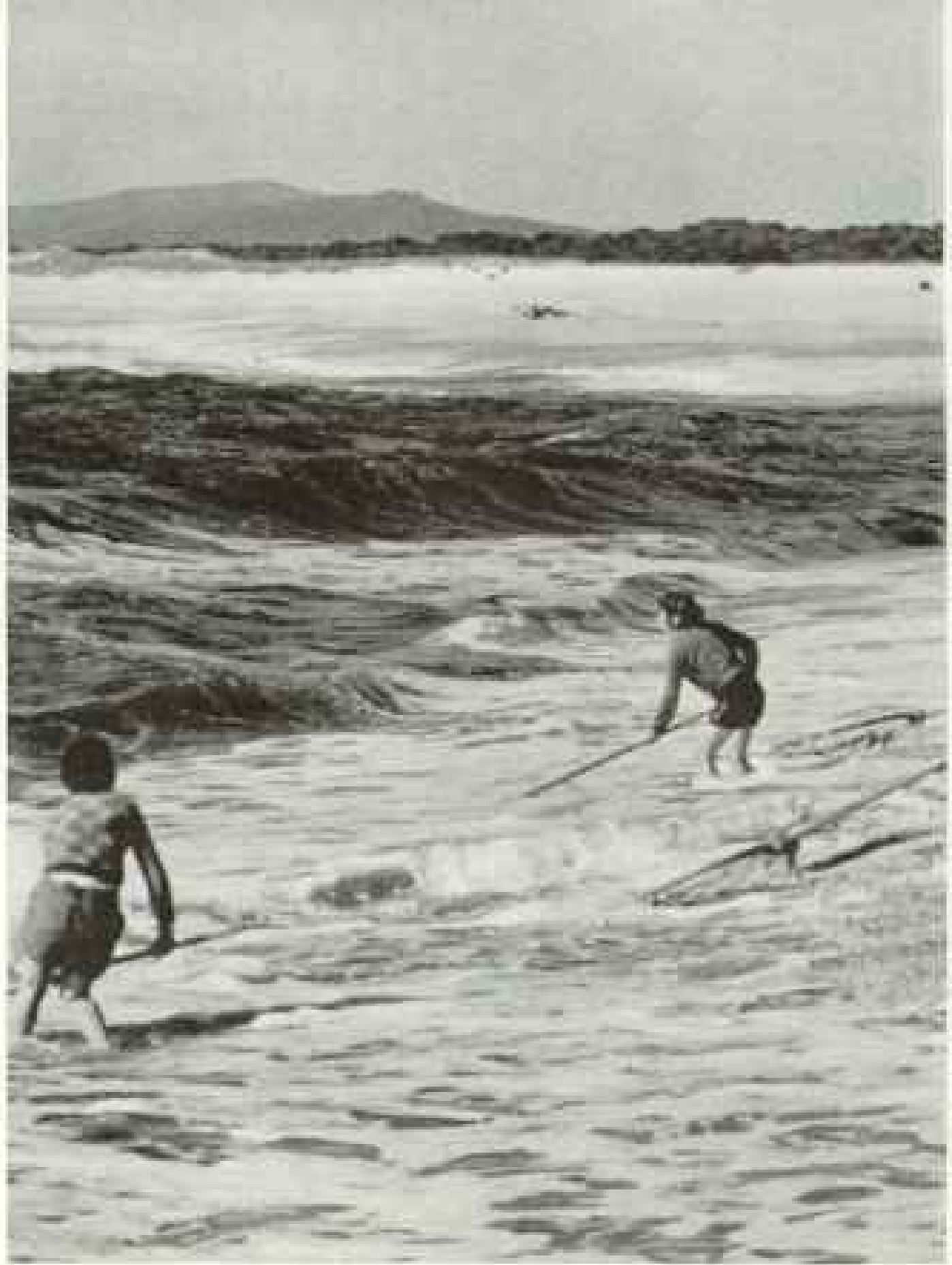
† Fishers' Children Dance of a Sunday
by the Beach of Nazaré

So dependent is Nazaré on fishing that many family surnames are those of fish. Here boys and girls whirl to old Portuguese airs played by an orchestra of strings and accordions. This group, unusually skillful, journeys to France and Italy for exhibitions.

‡ Drivers and Oxen Rest on the Beach
Until the Next Boat Comes In

Nazaré men and boys wear gay checks and plaids reminiscent of Scotland's. Women (sitting in the sand) prefer shawls of funereal black. A dark stocking cap is the badge of a fisherman, though many of the men, like these ox drivers, are partial to cloth caps.







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↑ Armed with Push Nets, Minho's People Gather Driftweed for Fertilizer

Above, left: A fisherman of Nazaré lounges before his home. His wife made his colorful clothes. The Government built the house for him out of proceeds from a fish tax.

↙ Nazaré basks beside the sea, overlooking part of its fishing fleet drawn up on the strand. The establishment at left offers "Hot Baths." Crowd in background gathers at a fish auction.



Several miles offshore, out in the unprotected sea, I saw what at first seemed to be long lines of bobbing corks, miles and miles of them. Senhor La explained that the body of the trap is a great barrier shaped like the letter L, with each of its arms some 3,000 yards long. The nets are supported by corks, and the whole thing is kept in place by a series of carefully placed moorings, which include 600 big bower anchors.

At the point of the L there is a sort of gate in the nets, and the tuna, which seems nervous and can be turned by a shadow when on its spawning run, strikes the net and turns inevitably toward the gate. The arms of the L are laid so that there are pockets here and there, designed to turn the tuna in that direction.

Once a tuna enters the corral, it is done for.





← Four Straining Bullocks Drag a Boat Out of the Surf on Rollers

Some days no boat can breast the thundering breakers, so the fishermen stay home and mend nets. Today the sea is calm. The men work fast to hook up the oxen and put rollers under the boat, for the surf's pounding may damage the hull. The trick is to keep her from falling broadside as she takes the ground. High prow and stern help this surfboat to weather cresting seas.

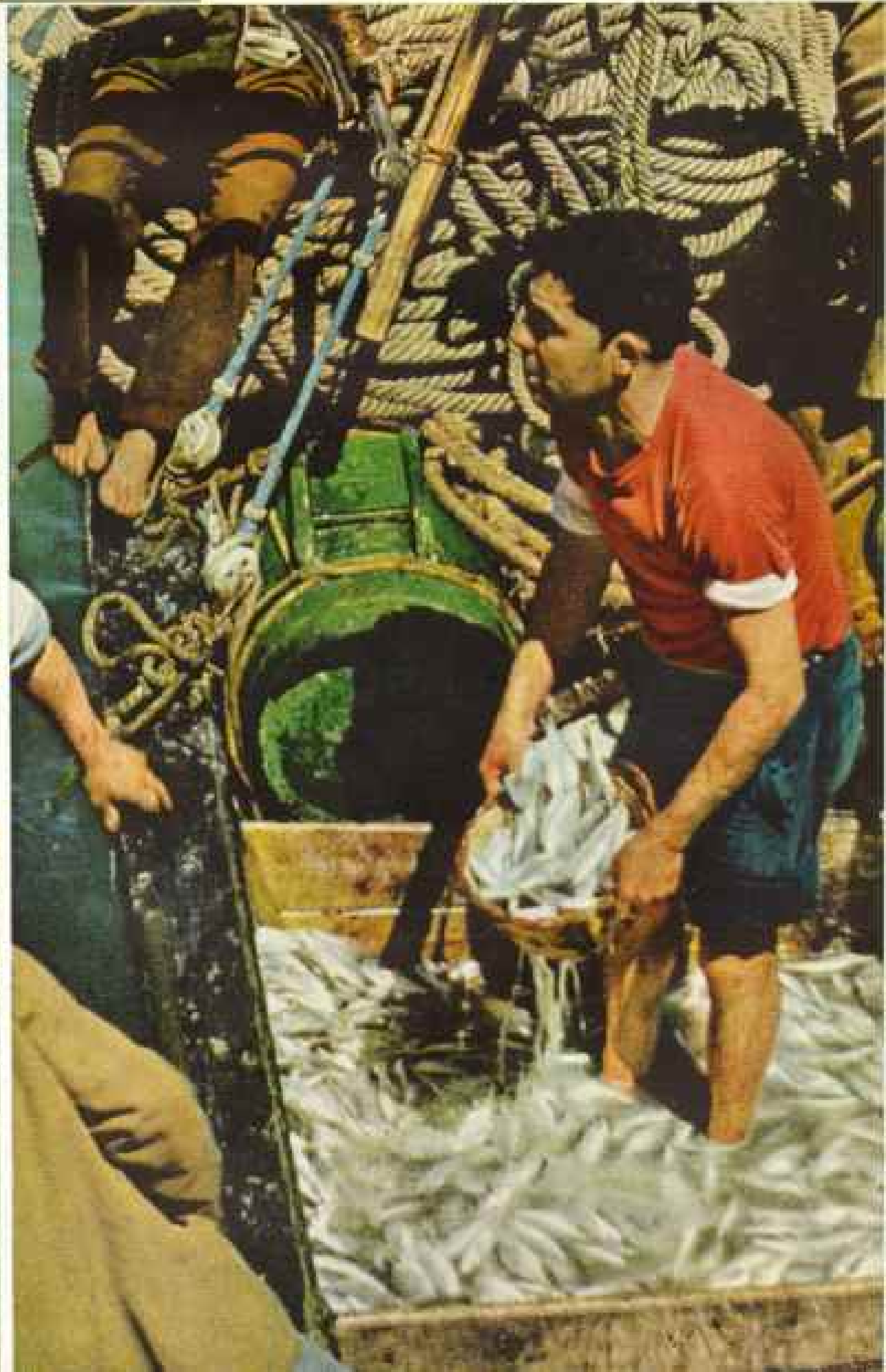
Lower left: It is Sunday on Nazaré beach. Little boats—seiners, druggers, and those that fish any way they can—lie idle this one day of the week. One has a big funnel, but that is only vanity: the tiny gasoline engine that helps the sail is not very strong. An oxcart hauls a net away for retarring. The uniformed revenue collector (lower left) sees that fish taxes are paid.

↓ A sardine catcher retails his wares in Lisbon.

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Eschschmuss by Alan Villiers

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The gate is so designed that it casts shadows across the entrance. The tuna swims in but will not go back again. The gate does not have to be closed unless the catch is very heavy.

The corral itself is a space enclosed by heavy nets, about 400 yards long by 50 wide. A lot of tuna can crowd in there. They come in schools of 60-odd to 1,000, sometimes as many as 2,000. They swim deep, and no one knows how many are in the corral until the bottom net is raised and the fish are forced to the surface. If one tuna is seen in the corral, it is known that a school is there. No lone tuna comes while the run is on.

"Idlers" Keep Watch for Fish

All around the corral hob long black boats, almost sinister in appearance, which are moored there in April and stay for the season. In these men watch. There are special watchers, too, who are called "idlers"—a libelous name, for they are anything but idle—who sit in dinghies, watching the depths all day long.

The tuna is very difficult for the unskilled eye to see, for he swims far down with his blue back uppermost. I couldn't see a thing but water, though after a while the chief idler reported very quietly that a school was in. I looked and looked and saw nothing at all—only the lines of yellow corks bobbing quietly, and the black boats, and the anchored dhows which would take the tuna to market once they were caught. All this, and far off, maybe 10 miles or so, the sandy shore of the Algarve and beyond it Faro, Portugal's southernmost city and capital of the Province, shimmering in the morning heat.

Immediately there was subdued excitement, though the idler merely whispered his news to the veteran master of the nets, who came to greet Senhor La.

"Fish," he said, pointing. To him and to La the word "fish" means tuna—at any rate in May and June.

Until then, all had been silence. Not more than three or four men had been in sight, in all the boats. Now, without another sound, figures began to show from the boats grouped round the corral until there were 100 or more men with determined, sun-tanned faces. Quietly they went about the work of throwing a mobile net across the corral to pen the tuna in and drive them along toward the "cup" at its farther end.

Once in the corral the tuna swim round and round. The master of the nets, taking charge, gave the word to throw the net as soon as he



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saw—I could still see nothing—that the tuna were headed for the cup end. Down went the net like a flash.

Then there was sound enough! The men believe the tuna can hear them and that, if there is a startling noise before the net has trapped them, the fish may break through. Until then, the mesh of the barrier nets is big enough to allow the tuna to swim through. It isn't until the fish reaches the cup that it is really trapped.

Killer Whales Start Stampede

But the tuna doesn't know that. Its only hope of freedom lies in being startled, and what frightens it most of all is the killer whale—the dreaded *roaz*, which preys upon fat tuna and knows about the run, too.



Doomed Tuna Churn the Waters of a Deathtrap into a Welter of Foam

Bound for the Strait of Gibraltar and their spawning grounds in the Mediterranean, giant Atlantic tuna blunder into a trap Portuguese fishermen tend each May off Faro. Herded into a killing corral at the corner of a long L-shaped net, the fish struggle vainly to escape the sharp curved gaffs of the fishermen.

If roaz comes near the nets—and sometimes he does—the tuna are maddened and break out anywhere, doing thousands of dollars' worth of damage in their panic. Then the nets must be raised again and the whole trap laboriously relaid.

Once the driving net is cast, the men make all the noise they can to drive the tuna farther into the cup, for the cup is of net so stout that roaz himself cannot break it, though a bigger whale might. (Once in a while big whales do come in, too, and a great nuisance they are.)

As soon as the tuna are in the cup, the men

begin to raise the bottom net, chanting an age-old song, melodious and with perfect rhythm. It reminds me of the chants I heard the Arabs use for heavy jobs when I was sailing in their dhows along the coasts of Africa and in the Persian Gulf.*

The bottom net is heavy and there is much of it. Still I can see nothing—no sign of a fish anywhere! But I know quite well that men did not begin to raise the bottom net or to make any noise at all until one of the idlers,

* See "Sailing with Sindbad's Sons," by Alan Villiers, NATIONAL GEOGRAPHIC MAGAZINE, November, 1948.



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Colorchromes by Alan Villiers

† **Nazaré Girls, Copying Grandmothers' Styles, Wear up to 9 Petticoats Each**

Voluminous clothing does not keep fishermen's daughters from scrambling like kittens over boats drawn up on the sand. These craft wear registration numbers. Some carry a sign of the cross. The devout Portuguese frequently name their boats for saints.

‡ **Bringing In the Boat End to Sea Means No One Goes Home Drenched**

The cockleshell riding the surf near Costa Nova can make a living for a dozen men. Crewmen fish with nets or hand lines. They need no bullocks for beaching. Boys (left) bring rollers for the keel; a man wades out with a hauling rope.



watching in a dinghy above the cup, reported that the fish had entered.

I watch and watch, from the vantage point of one of the black boats. Around me, men stripped to the waist wait tense and eager, flexing great curved hooks at their right wrists, watching the surface of the water in the cup for the tuna to break.

Mystery of the Flying Fish

Still I look, with my cameras ready. Senhor La watches beside me.

"Watch for flying fish," says Senhor Aguas. "They always come first."

Flying fish? I see no flying fish. Whatever would such fish be doing with the tuna? For the big tuna, I knew, chase flying fish and eat all they can catch. I had seen them from the big sailing ships coming from Australia, out in the northeast trade winds.*

Aguas's strange words soon take on meaning. There is a flurry at the surface, then another and another. A flying fish breaks, one of the biggest I have ever seen!

More flying fish break, flying wildly, dropping into the water again before the advancing wall of men in the net-hauling boats. The flying fish swim round and round, their wide eyes staring, looking for a way out of the trap. They fly out in a body, only to fall into the surrounding boats.

Now there is a wild flurry of the waters, first broken by a great dorsal fin or two, then by 20 fins, 50 fins, a hundred!

All at once there is a wild thrashing of the waters as the bottom net is pulled inexorably upward, and the huge bodies of the magnificent tuna hurl themselves round and round and round.

The wild tuna beat and thrash together, and the surface of the water is tormented as if a hurricane had struck it. Spray flies high as the tuna thrash, and still the net raisers sing their exultant chant and the sinister black boats advance slowly, steadily.

The Tuna's Last Roundup

Now the tuna are on the surface. Huge blue bodies, gloriously symmetrical, powerful and swift, swim frantically—this is their last roundup! They swim in clockwise circuits, faster and faster, looking for a way out, frantic to reach the spawning grounds that now they will never know.

The foam is beaten to a froth already tinged with blood, for the tuna men are taking toll

now. As the big fish dart by in ever-narrowing circles, men gaff those nearest the boats, taking them skillfully. They lean over the swirling waters; always they gaff in the gills with one swift, sure stroke.

Two men gaff the same fish if they can, and then, at once, they propel it up over the side of the boat, where it falls thrashing and trembling with its immense strength into the bottom.

I notice that the men cannot hope to lift the tuna in, for its average weight must be more than 180 pounds, and some weigh as much as 600. The men *guide* the monsters aboard, for the tuna's own terrific strength sends it into the boat, its tail beating the water violently as the men wrestle with the head.

The men are experts at getting the hook in just by the gills and flicking the tuna's head toward the listed gunwale of their boat, so that his own strength dooms him. Poor tuna! He doesn't know that strength. He had no need to be in the corral at all.

Now the water is red with the blood of struggling fish, and the surface of the cup is drawing narrower and narrower. Men flail at the last tuna with long gaffs, forcing them to the side. The long black boats hum and thrum with the wild beating of the doomed and dying tuna.

Wild Bullfight of the Sea

Still the net haulers chant, chant, chant. The sun streams down. Some tuna break from the gaffs. One swims round and round with a long gaff streaming from a wound behind its gills. A man leaps in to recover the instrument and lead the tuna to the side. Another leaps astride the fish in the moment of victory. The "tuna bullfight" they call it, and it is a wild and bloody business while it lasts.

Then the flurry dies. The last tuna, thrashing, thumping, vibrating with its immense pent-up and dying power, lies gasping aboard. The flurried water subsides again. For a while, a long while, the tuna thrash and beat where they lie, and the sides and thwarts of the boats shake and tremble.

Then it is over. The net haulers slip quietly away, the chanting stops, and the bottom of

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, by Alan Villers: "Last of the Cape Horners (*Pamir*)," May, 1948; "Cape Horn Grain-Ship Race," January, 1933; and "Rounding the Horn in a Windjammer," February, 1931.



Cliffside Albufeira Watches Its Fleet Come Home

The sun-drenched town lies in southern Portugal's Algarve Province, not far from Ponta de Sagres. The port has no big surfboats, only tiny craft lateen-rigged like the invading Moorish dhows of long ago.

Launching in the evenings, villagers fish all night with long lines off the approaches to the Mediterranean. Dawn finds them running home to sell their catch.

"Every boat drawn up along the sands is almost pure Arab," writes Villiers the sailorman. "Sweet of line and sturdily built, not an engine in the lot of them, they stand in long irregular lines with their painted eyes gazing out to sea."

← Merry children throng the golden beaches, but, says the author, "I never saw one swim." Daughters of fishermen, these little girls will marry fishermen, and their sons will be fishermen.

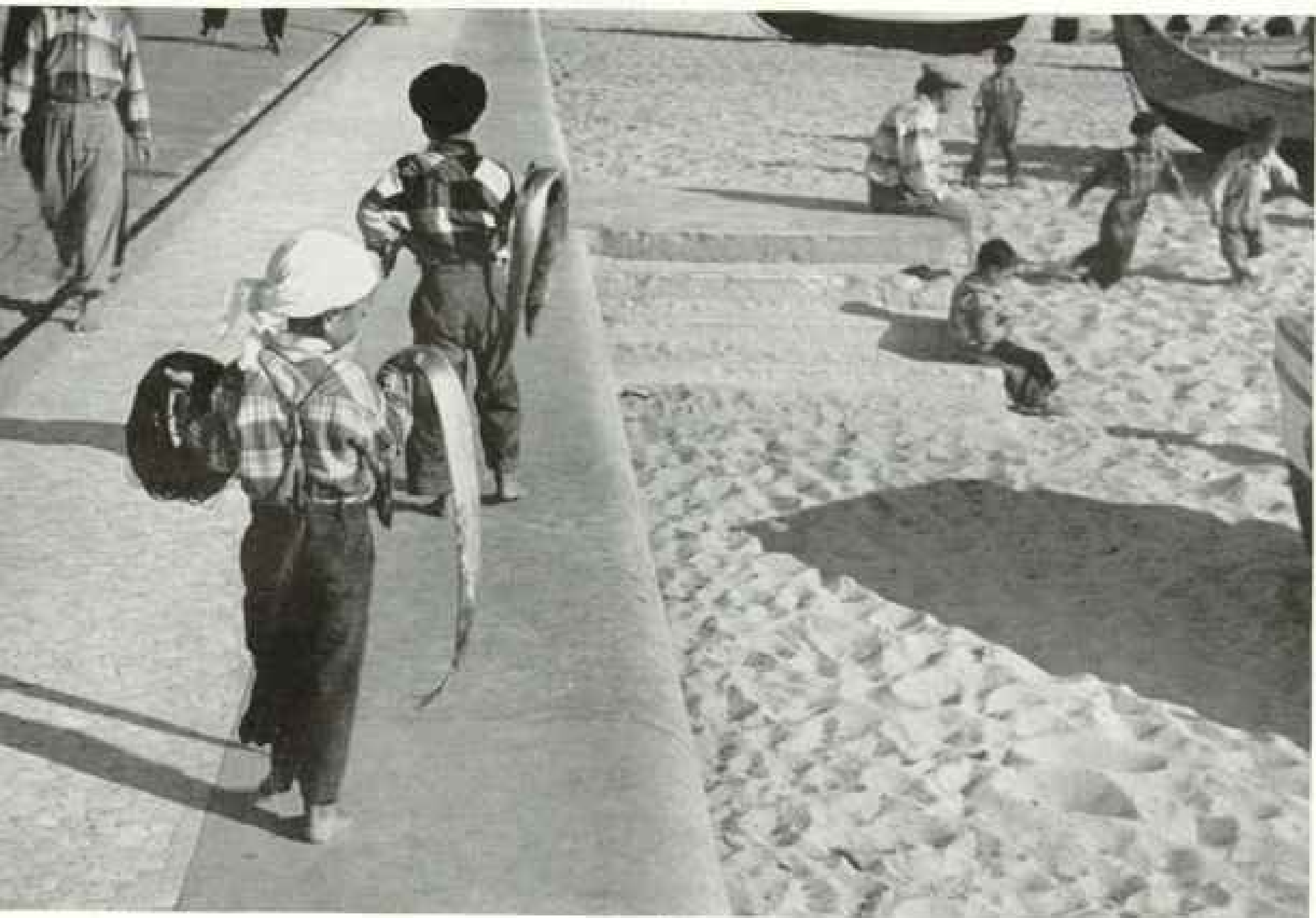
© National Geographic Society



↓ **Afloat, This Dhow-rigged Boat Can Beat to Windward Like a Yacht**

Sudden storms sometimes overpower Albufeira's keeled boats despite their seaworthiness. Then the fishermen drown. One such boat bears the name *Deus Ajuda Quem Trabalha* (God helps him who works). Fleece on the stemhead keeps the sail from chafing. Clothing wet by spray at night dries in the morning sun. The weather is peaceful, and the men have given the sail a snug turl before hauling up the boat.





Sons of Nazaré Fishermen Trudge Homeward with Scabbard Fish for Supper

By old custom, Portuguese fishermen may keep enough fish for their families to eat even if the catch is small and the owner of boat and gear gets none to sell. The tasty scabbard fish, a ribbon-shaped member of the snake-mackerel family, is hooked at great depths.

the cup is dropped again. The mobile net is recovered from the corral. The master of the nets sets his idlers to watching again, for perhaps more tuna are already approaching the corral.

The run is on; now they will be coming by the thousands.

The catch I saw that morning totaled about 150 big tuna. After each catch a flag is hoisted to indicate to watchers ashore how many were taken, in order that the canneries at Vila Real de Santo António may be informed. The fish are transferred to waiting dhows, which hoist their lateen sails and skim away before the morning wind.

But I am left with a thousand questions. Why the flying fish? Are they pilots? Are they counselors of the tuna, and friends? But the tuna eat them—I know that.

"There are always the flying fish. We see them first," says La. "But why? No man can say. It is—well, just another mystery of the sea."

I was lucky to see the tuna fishing. Sometimes the men stand by in their boats for days and days, and there are no fish at all. But eventually they always come, sometime between May 15 and June 20 each year. Just how they navigate, or how they know when to come—these, too, are mysteries of the sea.

Tuna Roundup Centuries Old

But there must still be great tuna in untold thousands somewhere in the depths of the sea, for although this roundup of the run has been going on—off Faro, off Tavira, off the Moroccan coast, off Sicily—for untold centuries, the Mediterranean is a big sea, and the Strait of Gibraltar is wide.

The nets are turned the other way and the tuna are taken on their return trip, too, at many places. But not off Faro. There they like their tuna fat and full of nourishment, and the thin ones they allow to pass unmolested on their way back to the deep and mysterious sea.

Founded 71 Years Ago, the National Horse Show in Madison Square Garden Climaxes Some 1,500 Smaller Shows Across the Nation

BY WALTER B. DEVEREUX

President, National Horse Show Association

IF New Yorkers hear the hollow clip-clop of horses' hoofs today above the screaming whine of tires, it's only a faint echo of a day long past on the city's streets. But each fall, for eight action-packed days and nights, the horse reigns again.

Seventy-one years ago, if you had stood in Madison Square, you would have been literally surrounded by horses. Perhaps you would have been one of a throng of excited, smartly dressed persons crowding into the original Madison Square Garden, on that blustery October night, to witness the launching of the first National Horse Show. In the minds of many, the event ranked in importance with the opening of the Brooklyn Bridge that same year.

New York City, proudly boasting nearly 2,000,000 people, was far from a one-horse town. Hoofed horsepower drew creaking horsecars, swaying hansom cabs, rumbling drays. In fact, if you did not walk or trust yourself to the then comparatively new smoke-belching, steam engine-powered Third Avenue "el," you rode on or behind a horse to get to the Garden to see the show under the sputtering arc lamps of the era.

"Hotels" for Horses in Manhattan

Today the horse has virtually vanished, not only from New York's humming avenues but from nearly every American street. The horses outside the present Madison Square Garden are limited almost entirely to those of mounted police keeping the crowd in order. And yet the same National, still dedicated to the improvement of the equine breeds and just as thrilling, hard-fought, and glamorous, is going more strongly than ever at more than the Biblical threescore years and ten.

Few Broadway extravaganzas cost more to produce than the National Horse Show (\$300,000). Nor do they entail any more feverish labor; almost as soon as one show ends, preparations for the next begin. Invitations are sent, via the Department of State, to foreign jumping teams, and negotiations for special exhibitions get under way.

One problem is arranging for stable space for some 500 horses in the middle of almost horseless Manhattan Island. Since the basement of Madison Square Garden has space for only 394 stalls, some of which must be reserved for tack and groom quarters, 90 more are set up in a National Guard Armory 50 blocks away, and still others in tents on a near-by parking lot.

After the stalls are brought in from a Bronx warehouse, it takes 50 men three days to put them up. By Sunday night, before the Tuesday-morning opening, all the stalls are ready and a welcome mat of straw lies waiting for each horse. Under the straw, to keep the animal from slipping on the concrete floor, is a layer of heavy building paper.

Nail-free Straw, 900 Tons of Earth

No detail important to a horse's comfort is overlooked. Last year, for example, when Brig. Gen. Alfred G. Tuckerman, the eleventh president of the National (page 714), went to give the stalls a final check, he chanced on a nail in some of the straw. Forthwith he had all the straw removed and inspected; nails and horses' hoofs are bad company. Not before every nail was gone would he allow a single horse to come down the ramp.

Early Monday morning, while the grooms are busy feeding, watering, or rubbing down their horses in the basement, a fleet of dump trucks and 25 men go to work upstairs, moving in 900 tons of earth.

A mixture of loam and clay, the dirt makes a springy, shock-absorbing carpet 10 inches deep. It's the same dirt, incidentally, that is used at the Garden by the rodeo and circus and it is stored on a lot between times. A special crew sprinkles and harrows the dirt carpet before each performance and combs it for stray metal with a magnet.

Finally, at 6 p.m. Monday, when the dirt has been rolled to a smooth finish, the arena is opened to the horses for exercise. Starting at 5 o'clock the next morning, they work out in turns, so that by show time they are in top form, ready to go.



Horse-loving America Welcomes a Brilliant Spectacle: the National Horse Show

Riders compete before a glittering crowd of 14,000 in New York's Madison Square Garden. Here officials and riders salute, and the audience stands, as the First Army Band plays national anthems of countries represented.

At 11 a.m. Tuesday (November 2 this year) red-coated, top-hatted "Honey" Craven, ring-master for 18 years, walks to the center of the arena, blows a long blast on his 52-inch brass coach horn, and another National Horse Show is under way (page 702).

That night a show within a show takes place in the Eighth Avenue entrance lobby of the Garden as thousands of people, in the words of one society reporter, "who love horses, who know horses, who love to be seen and who know where to be seen" push their way in.

Resplendently attired, leaders of New York society wade through a sea of celebrity fol-

lowers, program hucksters, pencil-pushing reporters, and flash-popping photographers. Inside the Garden, waving and nodding politely to friends, they file in leisurely fashion to their seats in the "golden oval" of boxes. The procedure has hardly changed since 1885 when a reporter for one of the New York papers noted: "Everyone seemed to know everyone else, and all were continually bowing like a lot of toy Chinese mandarins."

This automatic nodding once developed into a comedy. Robert Bacon, a high-ranking member of President Theodore Roosevelt's administration, having been detained one evening, turned his box over to his butler, maids,



and footmen. Not until after some of the passers-by had bowed low to the Bacon box, however, did they behold a whole retinue of servants, perplexed but respectfully nodding in return.

Enter: Spirited Horses

When people finally have been seated, the "neck-and-necklace" race for the spotlight begins. For now come the horses. A ray of light glances off a diamond eardrop, a top hat shimmers, and an



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Wide World

Lariat, a Champion Chestnut Gelding, Clears the Bars

Here ridden by William McKinley ("Linky") Smith, Lariat took some 40 blue ribbons in shows in 1952 and also became the National's jumper champion. In 1953, despite a slug near his brain, he won the National's reserve jumper title. A vandal shot the horse in his Maryland stall.

orchid bobs as the First Army Band plays a brisk march and the glistening, spirited mounts of the international teams enter.

Escorting each team of three are two New York City mounted policemen, one bearing the orange and black colors of the National Horse Show, the other the team's own national flag.

The riders wheel their horses into the center of the arena and line up before the president of the Horse Show and his guest of honor who is to accept the salute of the teams. Then, as the band plays each country's national anthem, its team moves forward one pace (page 698). The military members salute smartly, male civilian riders doff their caps, and the women present their crops in a saber salute. At the end, the standing audience responds with ringing cheers and claps.

The international parade is repeated at the last performance, to end the show. But this time, when the teams line up, they face the opposite side of the arena, so that the other half of the ticket holders will get their full money's worth.

People with the higher-priced seats have an opportunity to get close to the horses—or to the debs, postdebs, and their families in the boxes—by joining the crowd in the 7-foot-wide promenade which encircles the ring. Sometimes the push is so great that overcoats and programs spill over the rail, and the announcer asks people to move back.

Boxes are rented for the entire eight days. Some have been held by the same families for as many shows as can be remembered, and there is a long waiting list.

No Mules or Donkeys Now

At the end of that "First Annual Show of Horses, Ponies, Mules and Donkeys" in 1883 one newspaper reported: "Horse show and opera, then opera and horse show, and you know how the world and his wife, his daughters, his sisters, his cousins and his aunts have passed the time this week. It is wonderful with what ease the versatile young lady of the present day changes from talking horse slang all day to the most impossible nonsense in the evening."

Today, 71 years and 66 shows later (five shows were skipped during the wars and while the first Garden was being razed), many of the early-day attractions have disappeared. Gone are the jackasses, or "jacks" (slang for donkeys), the stylish coaches and drays, and the fire horses that could be harnessed in as

little as two seconds after the bell clanged.

Now instead there are competitions for men, women, and children in a wide variety of classes, many of which never appeared on the early programs. So diversified and numerous are today's classes that when Ned King, manager of the past 18 shows, plots out each session, he must consider many factors.

King maintains a record of every class in every show, including the number of horses in it and the precise time each class took to perform. With this schedule in one hand and a list of entries for a new show in the other, he can lay out a program that is timed to the split second.

Other factors include the time the judges take to make up their minds and the time it takes the jump crew to set up the course before a class and to remove the jumps afterward.

"Timing," King says, "is the most important part of it all."

Next Group Tensely Awaits Its Turn

Any observer would quickly agree if he stood near the "In" gate during a National Horse Show. From there he would see simultaneously one class being judged in the arena and the next group of horses and riders gathering tensely in the cluttered aisle outside.

Every now and then the observer would hear announcer Otis H. Trowbridge send a curtain call—"Get ready for Class 68"—to the stalls below. An intercommunication set keeps Trowbridge in constant touch with the stables, with the ringmaster and judge in the arena, and with the real nerve center of the show, the president, manager, and secretary, directing from the north side of the ring.

The goal in planning is to make each program as representative as possible of all six divisions shown at the National: the harness ponies, fine harness horses, saddle horses, hunters, jumpers, and the pony and equitation divisions for juniors. (A seventh division, the heavy harness horses, has been dropped from this year's program.)

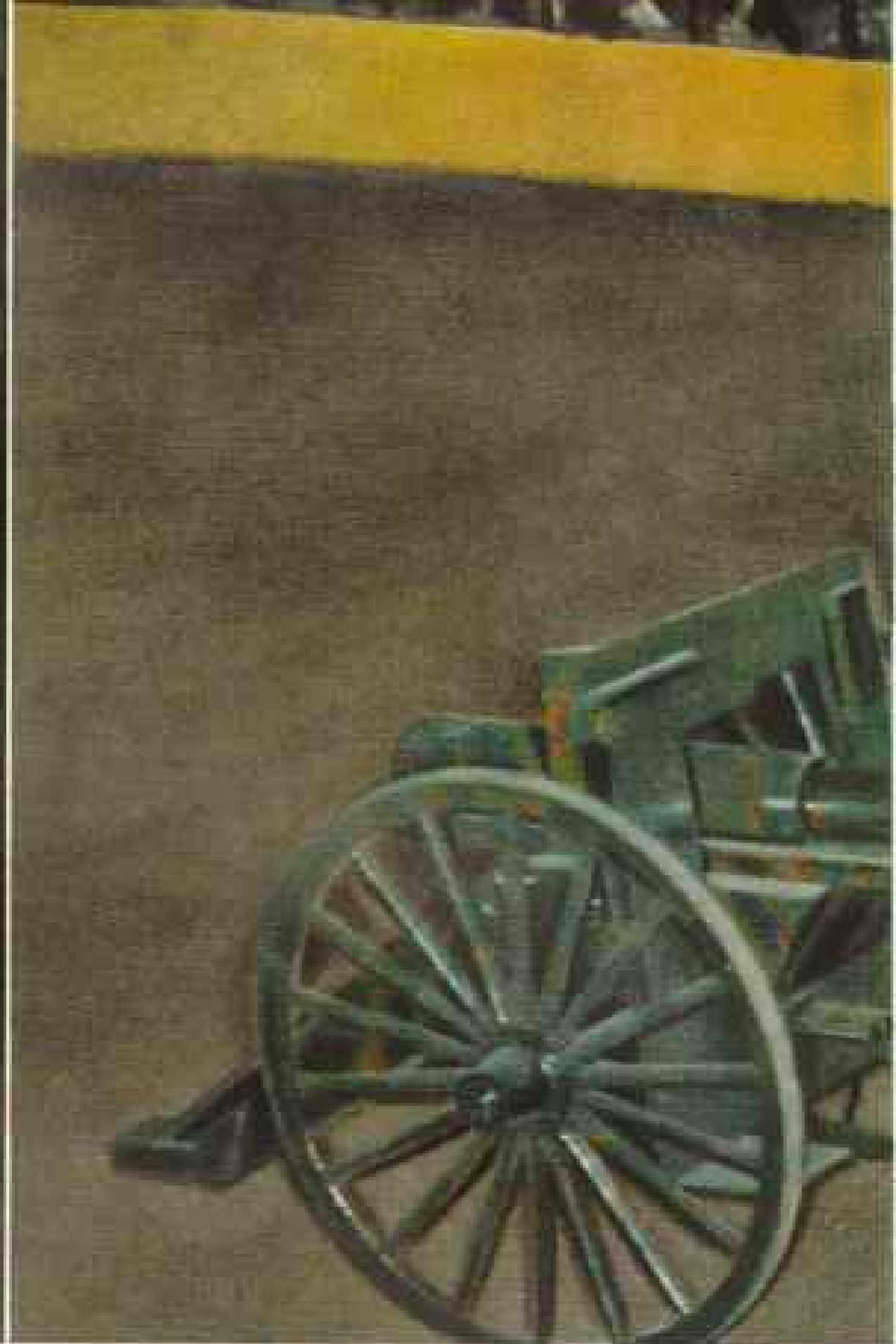
Within each division are many different classes (or competitions). The harness pony division, for example, includes a class in which a lady drives, another in which the pony does not exceed 13 hands (or 52 inches, a hand equaling 4 inches). In still another the pony is to be "over 13.0 and not exceeding 14.2." Above 14 hands 2 inches an animal is considered to be a horse. The height is measured

(Continued on page 705)



Up and Over! English Rider and Mount Take a Jump at New York's National Horse Show

Prince Hal, ridden by Patricia Smythe, easily clears a 4-foot pole-and-palmetto imitation of a country hedge. Felt "boots" around horse's forelegs support jump-strained tendons. Miss Smythe, one of Britain's outstanding women riders, took second place in the 1953 competition for the International Good-Will Challenge Trophy donated by Brig. Gen. and Mrs. Alfred G. Turkerman. Winner was Shirley Thomas, of Canada.





703

↑ **Forelegs Lifted High,
a British Entry Clears
the Artillery Jump**

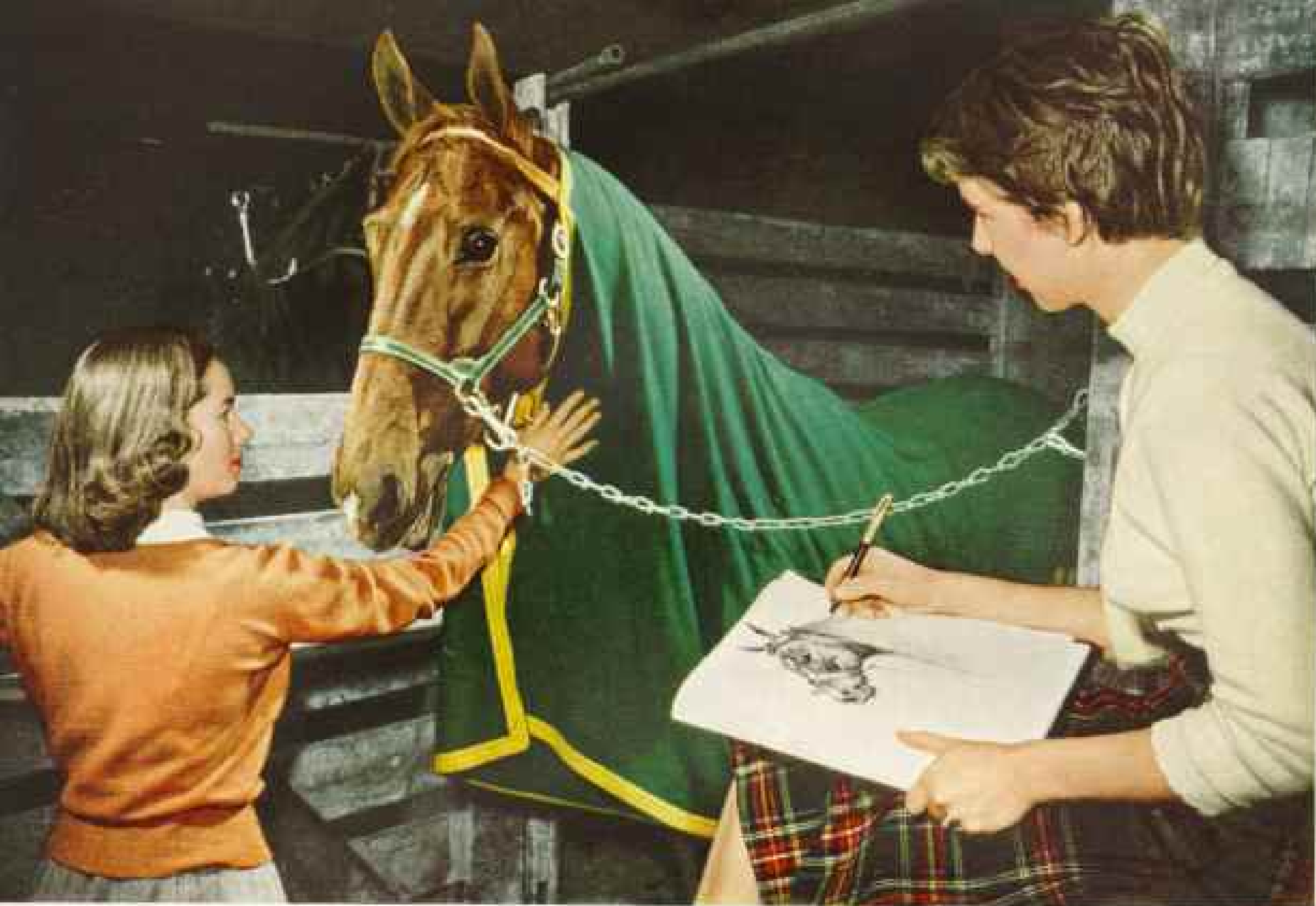
In hunting pink, Lt. Col. Harry M. Llewellyn puts his mount through its paces in international competition for the West Point Challenge Trophy. The cannon is a wooden model of an old artillery piece that once belonged to the New York National Guard.

Ringmaster Clarence L. Craven (above, left) summons each class to the ring by blowing old coaching calls on a 52-inch horn.

← Conformation hunters with braided manes and glistening coats vie for points. Exhibitors take their horses over a course simulating hunting field conditions; then, as here, submit their mounts to judgment for build and shape.

© National Geographic Society

Illustrations by National Geographic Photographers
Kathleen Davis and (lower) Robert F. Simon
and Donald McBride



↑ Art Students Pose a Willing Model

Horse-loving artists find ample material for sketches in the temporary stalls located in Madison Square Garden's basement. There stabling facilities for 300-odd mounts are erected. Overflow is billeted at a distant armory and in near-by tents.

↓ Small Fry Smiles Spell Big Victories

Teams of juniors under 18, each from a recognized hunt club, compete as enthusiastically as their elders over a course with jumps adjusted to the pony hunters' diminutive size. One winner here wears hunting pink; the other, a boys' school uniform.



from the ground to the animal's withers, the highest part of its back between the shoulder blades.

Saddle horses are considered the "peacocks" of the show. Either three- or five-gaited, they bring their feet up high in front in an exaggerated action largely induced by placing heavy shoes on their hoofs. The extra effort involved in lifting the heavier shoes produces a movement that is at once neatly performed and spirited.

A three-gaiter shows the natural gaits of walk, trot, and canter. The five-gaiter also does the slow gait (a sort of shuffle between a walk and a trot) and the rack, an elastic 4-beat movement in which each foot strikes the ground in rhythmic sequence. When ringmaster Craven transmits the judge's order to "Rack on," the audience shouts. This is top speed for a saddle horse.

To distinguish between the two types of saddle horse, the three-gaited has a roached mane and clipped tail. The five-gaited wears a plumed tail and flowing mane tied with ribbons (page 706). Once, during the first telecast of the show, the manager's office received a telephone call from a viewer who asked, "Are the tails on them trotters real or phony?"

Long-maned saddle horses also compete in the fine harness division. Here, however, they are shown to 1-passenger 4-wheeled show wagons (page 715).

Vehicles from Another Century

According to David S. Boyer, Donald McBain, Kathleen Revis, and Robert F. Sisson—staff photographers sent by the National Geographic Society to last year's show to make the color pictures reproduced here—nothing was more exciting than seeing the flashy harness horses perform.

"They're so high-strung," said McBain, "and yet in such fine control of themselves. You don't often see such horses these days."

He was right. Nor does one see the kind of vehicle—such as gig, phaeton, and viceroi—to which some of the harness horses are shown. They belong to the days when people took afternoon rides around Central Park and along the Hudson River.

Driven singly, in pairs, or in tandem, these well-schooled horses behave as smartly as they are appointed. Some of the heavy harness classes, which emphasize appointments, have been called the "dress suits" of the show ring.

In the lady's phaeton class, for example, the

color of the footman's livery must match exactly the color of the cushion on which the lady sits. The rules also require that there be a lash whip, lap robe, two raincoats, wheel wrench, and cover for the servant's hat.

Sartorial elegance is no less a feature of the junior classes. Young people from 8 to 18, wearing black riding coats with collars trimmed in the colors of their hunt, black caps, and all the other regalia that belong to the formal habit of the adult, throng the arena during the day on Saturday and Sunday.

Their biggest events, however—the equitation championships—are judged solely on rider performance. Having come through one or more elimination shows in order to qualify for the National, the youthful competitors are understandably keyed up for a chance at the coveted junior championships. Losers sometimes weep uncontrollably, but in general they behave with admirable restraint.

Youngster Wins with Broken Arm

Juniors make good riders largely because of their supple bodies and apparently limitless reservoir of nerve. Two weeks before the opening of the 1952 National, 9-year-old Barbara ("Bobbie") Gardner, a horse-show veteran who has been riding since she was three, fell from her horse and broke her arm. She was determined nevertheless to ride in the National. With her arm in a cast, her sleeve slightly lengthened to cover it, and her pigtails flying, Bobbie took her mounts over the jumps to win two firsts, one second, and a fifth.

In addition to the big equitation events, there are several pony classes—such as pony hunter, pony working hunter hack, and pony Corinthian hunter—in the last of which the judging is based 50 percent on performance, 25 percent on conformation, and 25 percent on appointments. It's quite a sight to see an 8-year-old, in top hat and shadbelly coat, take his Lilliputian mount over the fences.

Some of the ponies are so small they look as if they could easily be picked up by an adult. A few, indeed, ride to the Garden in standard-size station wagons.

Many of the juniors' horses are stabled at the armory at Madison Avenue and 94th Street. Transporting expensive horseflesh by van through the complexities of New York traffic is no small job. Only through a split-second timetable, rigidly adhered to, is it possible to deliver the animals on time and in



High-stepping Saddle Horses Proudly Circle the Ring

Manners, brilliance, and fine appearance mark these mounts. Flowing manes and tails identify them as five-gaited saddle horses.

the proper sequence 50 blocks away at the Garden.

The gain in junior entries in shows around the Nation holds promise for the future. Even more than the increase in the number of shows (up this year 7 percent from last year's record-breaking total), it presages a bountiful crop of competitors at coming Nationals.

One lamentable fact to be noted about juniors is that 85 percent of the 117 taking part last year were girls. Males, fortunately, do catch up eventually. Among adult participants, the ratio between men and women runs about 50-50.

First Woman to Ride Astride

There was a time when women were not even allowed to compete in the show. The first program of 1883 listed exhibitions by three female professional riders. But feminine riders were not really accepted until 1913, when Mrs. J. Marion Edmunds became the first woman to ride astride and Miss Loula Long (now Mrs. R. P. Combs), driving *Aspiration*, became the first to win a blue.

A consistent winner ever since, Mrs. Combs, the undisputed "empress dowager" of America's horse shows, still participates. At the National in 1952 she won the phaeton class.

By 1950, horsewomen had performed so well that no one was surprised to see Mrs. Carol Durand of Kansas City, Missouri, selected for the U. S. Equestrian Team.

Again, in the 1953 Na-

tional, two young feminine riders took first and second places—over male competition—in the Good Will Challenge Trophy, one of the international jumping classes (page 701). At the next Olympic equestrian events to be held in Stockholm in 1956 (a 6-month quarantine on horses prevents their taking place in Australia with the other Olympic events), women will be permitted for the first time to compete in the Prix des Nations, an especially grueling contest.

Women seem most partial to the hunter division at the National. Hunters and jumpers (which usually draw more men) are the two biggest divisions. In both, the horses are taken over a series of obstacles. Those for hunters, however, are lower and specially designed to simulate hedges, stone walls, post and rails, and other obstacles found in the hunting field when following a pack of hounds.

Hunter classes are judged on more than one count. The Corinthian hunter class, as colorful as it is rigid, is judged not only on the con-

formation and performance of the horse but also on the equipment and dress of the rider. He must wear the colors of the hunt to which he belongs; Meadow Brook Hounds' colors, for instance, are "pink"—the universal term for scarlet—with light-blue collars. He must carry rain gloves, a whip, a sandwich case, and a flask.

No Sandwich, No Blue Ribbon

The sandwich case is strapped to the right side of the saddle behind the rider's leg, the flask in front of it. A rider not infrequently is disqualified for lack of a sandwich in his case or a drink in his flask.

Jumper classes are judged solely on performance. It matters not what the horse looks like or how he is ridden, so long as he takes his fences cleanly. The classes are divided according to the type of course, each of them different, and horses are scored according to a table of faults.

A typical course has 10 obstacles, each

Hibernian Skill, Not the Luck of the Irish, Conquers This Jump

Irish Army Capt. Michael G. Tubridy (left) takes Ballynonty over the hurdle beside Capt. Colm O'Shea, up on Kilcarne, in the Low Score event. Captain Tubridy died in Ireland last spring after a riding accident.

Currier Press



rarely higher than 5 feet 6 inches, sometimes even broader than it is high.

Paradoxically, the bigger and more formidable an obstacle appears, the better the horse performs at it.

Plow Horse Becomes a Show Star

So much training is required to develop a jumper that he is apt not to be a standout until he is six or more years old. At that, his training will have served only to perfect his inborn bounce. As any horseman knows, "You can't put a jump in a horse. It's either there or it isn't." And if it's strong enough, it apparently can't help revealing itself.

When exhibitor Steven Budd found Sir Gilbert on a farm in the early 1930's, the old hackney had been pulling a plow for years. The farmer told Budd, however, that the horse was forever jumping over paddock fences (minus the plow, of course) and giving every sign of enjoying the experience. Within a very short time after that, Sir Gilbert was recognized as one of the greats of the horse-show world. He sired many jumping champions, including Brookside, who defeated his father on one occasion only after repeated jump-offs to break a tie.

Much less willing than Sir Gilbert was a surly-dispositioned Army horse named Fitzrada. Kicked from post to post, he had ended up at Schofield Barracks in the Hawaiian Islands. There a colonel's daughter, Jane Pohl, took a liking to him. He bucked and threw her, but still she begged her father to buy him.

The colonel did, for \$163.87, and the Army thought it had done well!

Army Castoff Wins a Blue

The next time Army officers saw Miss Pohl and Fitzrada was at Madison Square Garden. There in the National's tense knock down and out class (one rail down spells elimination) Fitzrada outjumped 49 other horses, many of them ridden by Army officers, and won the coveted blue.

Fitzrada did even better another time when he cleared a fence 6 feet 10 inches high (the record is 8 feet 1 13/16 inches). He was then 19 years old, about the equivalent of 60 in humans.

Many of the most famous jumpers have reached their peaks at ripe old ages. In the 1952 National, Democrat, a 19-year-old cavalry horse, won every class in which he was

entered. Now retired, he is knee-deep in clover at a Charlottesville, Virginia, farm, only a 10-minute trot away from Monticello, the home of Thomas Jefferson.*

Arete, a blind-in-one-eye gelding from Mexico, was 18 when he was entered in the National in 1951. He skimmed over the jumping obstacles to win the most blue ribbons ever collected by an international jumper at the show. His rider, Brig. Gen. Humberto Mariles, bought him originally from a farmer for the equivalent of \$80.

One of the greatest jumping performances ever seen at the National was made by the U. S. Army team in 1940. On the final night, Captains Frank S. Henry, Franklin F. Wing, Jr., and Marshall W. Frame made three complete rounds of the arena's course without a single fault to win the International Perpetual Military Challenge Trophy.

High Jumps, High Tension

Competition among international jumpers often gets so keen that when a horse on a favored team knocks down a rail, a groan rolls through the audience.

Since 1909, a total of 16 foreign nations have sent their best horsemen to the National. In the past they were all military men. Now, however, many foreign teams include civilians, and women as well as men (pages 701, 703, 707, and 714).

After the Army had gradually mechanized its cavalry units out of existence by 1948, the United States was left without a team to represent it in international competitions. As a result, in 1950 a group of citizens got together and established the U. S. Equestrian Team, Inc.

Wholly supported by contributions collected from all over the United States, the new team entered the 1952 Olympics and won two third-place medals. It has competed at every National since 1950 and last year won the highest honors against Canada, Ireland, and Great Britain.

The British provided the first foreign team to come to the National. That was in 1909, and they defeated the Americans.

Many notable military riders, foreign and American, have appeared at the National. One of the most memorable was Col. Pierre Cavaille, captain of the French Army team.

(Continued on page 717)

*See "Mr. Jefferson's Charlottesville," by Anne Revis, NATIONAL GEOGRAPHIC MAGAZINE, May, 1950.

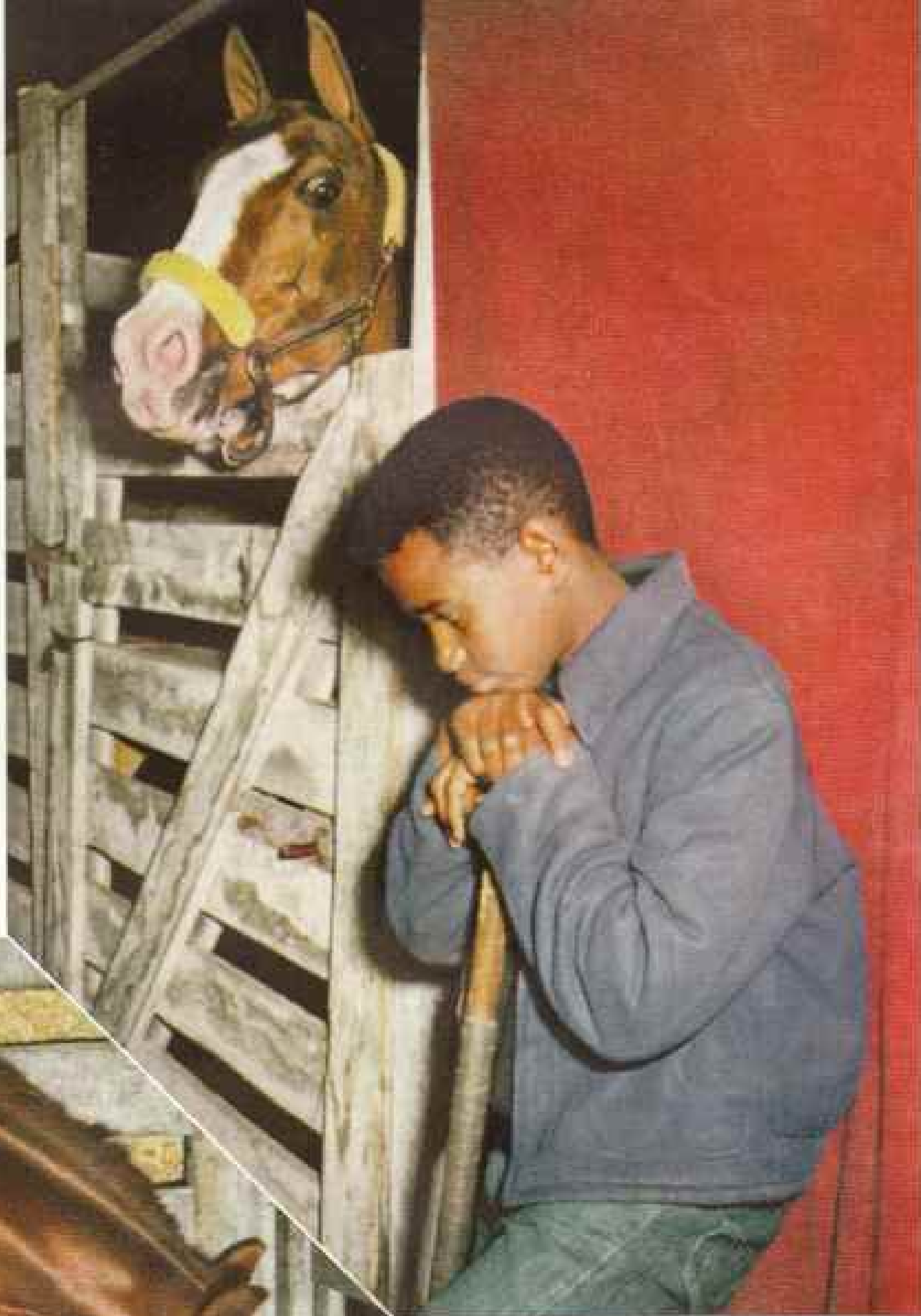
→ "When Do I Eat?"
A Hungry Mare Fixes
a Limpid Eye on a
Tired Groom

This 8-year-old chestnut mare needs a good supply of oats to keep her 15-hand frame in good condition—another problem for show officials in horse-shy Manhattan.

Almost as soon as one National Horse Show ends, the job of organizing next year's begins. The New York event climaxes some 1,500 horse shows held throughout the country earlier in the year.

Arrangements include trucking 900 tons of earth into Madison Square Garden to provide good footing.

New York's "First Annual Show of Horses, Ponies, Mules and Donkeys" got off to a colorful start in 1883. From this it has grown into the modern 8-day equine extravaganza.



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← A Girl Needs a Friend
When She's Far
from Home

This 3-year-old filly from Canada's Quebec Province mopes and broods unhappily if sent on the road without her goat stablemate.

Sicilian donkeys, roosters, goats, and dogs often accompany show or race horses and polo ponies on their trips. Thoroughbreds become fast friends with the smaller animals. Trainers say the mascots exert a quieting influence.

This filly won third place in the class for lightweight green hunters. Such classes are open only to horses of limited show experience.



Royal Canadian Mounted Police Add Scarlet Pageantry to Complicated Precision Drill

The Mounties maneuver under the flags of the United States, Canada, Ireland, and Great Britain, competitors in the 1953 International Jumping events. France's Cadre Noir and other famous troops exhibited in past Nationals.



Converging Files of Black Mounts, Riders and Lances Erect, Form a Column of 4's

Queen Elizabeth II's Coronation featured performance of the "Ride" by the Mounties. Lances, no longer weapons of war, remind onlookers of less prosaic times. Inset: Constables stencil Canada's maple leaf on horses' rumps.





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↑ Split-second Timing Makes Intricate Maneuvers Look Easy

The Mounties' complex moves find the troop walking, cantering, and trotting at a pace regulated by the changing tempo of the Horse Show band's music.

This 32-man troop was drawn from every Province and Territory of Canada.

←Horses in a circle, with riders raising lances, form the "Dome."

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Robert F. Dixon and Donald McEline



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↑ **Scarlet Coats Brighten the National's Audience Before the Horse Show Ball**

About 550 horse lovers went from Madison Square Garden to the grand ballroom of the Hotel Waldorf-Astoria for the 1953 party. Gentlemen's collar and lapel color combinations identify their hunt clubs.

← Ceremonies last year included presentation by Mrs. Whitney Stone of the International Military Special Challenge Trophy to Lt. Col. Charles Baker, Jr., of the Canadian Equestrian Team (left). Colonel Baker also won the West Point Challenge Trophy. On Mrs. Stone's left is Brig. Gen. Alfred G. Tuckerman, president of the National Horse Show from 1948 through 1953.

↓ **Beribboned Mare and Flowing Tail Add Beauty to the Fancy Gait of a Fine Harness Horse**

Parading Lady, owned and driven by Mrs. Josephine E. Abercrombie, took first-place honors and the \$1,000 prize in the 1953 Fine Harness Horse Champion Stake. The 8-year-old chestnut mare pulls a 4-wheeled show wagon. In such events horses wear heavy shoes to make them lift hoofs high.





Championship Performance Earns a Serenade for a National Winner

Sun Hazard, two-time first-place winner, enjoys his groom's song. On the chair rests the Working Hunter trophy won by the 5-year-old gelding. His other ribbons attest to additional Horse Show honors.

Jumping one dangerous fence after another, he always managed to keep a shining monocle screwed in one eye.

Others, like Gen. Jonathan M. Wainwright, hero of Bataan, have taken part as judges. It is considered a high honor to be asked by the National's board of directors to serve in this capacity. Judges are selected from the list maintained by the American Horse Shows Association, the parent organization of all horse shows in the United States, and they are required to use its rule book for all except the international events.

Among the show's most popular participants, in most years, are Army equestrian teams sent by the Irish Republic (page 707). These teams enjoy a large and fiercely partisan following in this country. The Irish riders usually have appeared earlier in the famous Dublin Horse Show.*

People sometimes forget that it was Alfred Gwynne Vanderbilt, the second president of the National, who brought the first foreign team to the National. He is better remembered for what he did for Cabby.

Cab Horse Leads a Winning Team

It was in 1906. Mr. Vanderbilt was in Syracuse, New York, and in a frantic rush to catch his train back to New York City. Hopping into a cab, he told the driver not to spare the horse. The animal showed such speed and grace that Mr. Vanderbilt stopped then and there to buy him. That fall he entered Cabby as the lead horse in his four-in-hand at the National, and Cabby and his teammates trotted off with the blue.

In addition to the various competitions, each National program features one or more special dramatic exhibitions. Last year it was the Musical Ride presented by 32 Royal Canadian Mounted Police. At each performance the scarlet-coated horsemen put their sleek black mounts through much the same precision maneuvers they had performed in London for the Coronation of their new Queen (pages 710 and 712).†

Though the group gave the impression of having ridden together for years, every man was only temporarily assigned to the ride. All were regular working constables, recruited from all sections of Canada. Although Mounties work more often in cars or on motorcycles nowadays, new recruits still receive three months of equestrian training. For the Coronation Ride, a hand-picked group was brought

to Ottawa and schooled there for five months.

Transporting the 38 men (six spares) and 36 horses to New York required two Pullman cars, a baggage car, and two special horsecars.

Notable exhibitions in other years have included the Cadre Noir, 10 crack French cavalry riders, and the magnificent white Lipizzan stallions from the Spanish Riding School of Vienna (page 718). Descended from Spanish horses of a type known to Julius Caesar, some of the ancestors of present-day Lipizzans were brought to Vienna from Spain in the late 1500's.

Famous Lipizzan Horses Repay Debt

Lipizzans were brought to the National to repay a deeply felt debt to the late Gen. George S. Patton and the United States Army. Forcibly removed by the Nazis to Czechoslovakia, the school found itself in Communist territory at the war's end. Col. Alois Podhajsky, the director, escaped with the stallions but had to leave the mares and foals behind.

The colonel appealed for help to General Patton (himself once a participant at the National). The General saw the stallions perform their ballet and quickly dispatched a force of tanks and trucks to bring back the mares and foals.

The ballet—horses danced it long before humans—is so taxing that Lipizzans do not start training until they are four years old. After that it takes them several years to master such intricate movements as the croupade, the courbette, and the capriole. Of the 14 prime stallions appearing at the National, only four could execute the capriole, a giant springing leap in which the horse kicks its rear legs straight out behind.

Special Exhibitions Add Variety

Impressive in its own way was the 8-horse hitch of Clydesdales that came to the 1952 National from St. Louis. Averaging a ton each in weight and wearing shoes twice the normal size, these enormous dray horses performed graceful figure eights and other complicated maneuvers under the expert guidance of their driver.

At this year's show E. Ashton Priestley of Britain puts his highly trained Scottish shep-

* See "Dublin's Historic Horse Show," by Maynard Owen Williams, NATIONAL GEOGRAPHIC MAGAZINE, July, 1953.

† See "In the London of the New Queen," by H. V. Morton, NATIONAL GEOGRAPHIC MAGAZINE, September, 1953.



Spotlight Turns a Lipizzan into a Porcelain Statue

Lipizzans, which perform to music, belong to Vienna's centuries-old Spanish Riding School. General Patton's tanks rescued the mares and foals after the fall of Austria in World War II.

herd dogs through their paces. And Mrs. Lis Hartel of Denmark, winner of the Silver Medal at the 1952 Olympics, presents her famed horse Jubilee in exhibitions of dressage.

Without any perceptible use of her hands, reins, or legs, Mrs. Hartel puts her horse through as many as 25 different movements. Signals are transmitted mostly through the calves and thighs of the rider and through shifts in weight.

Though the horse's response in dressage is clearly a matter of memory training, some horsemen claim that there are indeed times when horses act from reason. Arthur McCashin, a member of the U. S. 1952 Olympic team, says that when a proven horse refuses a jump, it's his reason that is at work. "If he's too far away from a jump, or too close, he knows it."

Not everyone agrees with McCashin. All horsemen do agree, however, that a horse, just like a human, has his "off" and "on" times. There was once a horse at the National that resolutely refused to go through the "In" gate. The only way his owner could get him in was by throwing a blanket over his head.

Some Horses Are Prima Donnas

Sometimes an "ouchy" horse (stable boy slang for lame, nervous, or high-strung) reacts so strongly to band music that his ears have to be stuffed with cotton. Others may show temperament by chewing at straw bedding; then it sometimes becomes necessary to substitute peat moss. The National does whatever is necessary to keep a horse happy.

Twice a day stalls are cleaned out, and feed, which exhibitors buy at market prices, is supplied. Oats, bran, and hay are standard fare, but a special order of carrots was once rushed in for a group of Chilean horses that wanted a varied diet.

Two veterinarians and one

blacksmith serve the National, and a horse ambulance, used only once, stands ready at the gate.

In these days of penicillin, horses rarely develop any serious maladies at the show. Once, however, a stable boy came running to tell a show official about a sick mare. Her groom had gone out and she was flat on her back, he reported, moaning and groaning as if she were going to die. By the time the official and the stable boy reached the mare, her groom had returned.

"Oh," he said to them, "don't pay any attention to her. She acts up like this after every class she's in. Just a habit."

Puldoka Orphan Provided a Laugh

In theory, anyone can enter any horse in the various divisions, without regard to bloodlines or ability. Puldoka Orphan, an old horsecar nag, was bought for \$11.50 and entered as a select saddle horse in one of the early shows. Although she failed to win a

ribbon, she did give people a good laugh when they realized that her name was a variation of "pulled a car often."

Entries at the National vary from people with means who maintain large stables with several grooms to those who enter one horse they care for themselves. Exhibitors from all over the United States and Canada ship and board their horses entirely at their own expense.

Mascots Keep Show Horses Happy

A typical exhibitor sends five horses, a manager, groom, rider, and sometimes a mascot (page 709). The mascot is usually a dog, sometimes a cat, goat, donkey, or even a monkey. A goat belonging to Col. Robert M. Guggenheim once got loose, scampered up to the arena, and nibbled at the name placards on the boxes.

Mrs. Combs, the "empress dowager" from Lees Summit, Missouri, for years brought two Boston terriers to ride with her in her phaeton.

A Young Rider Clears a Jump as Her Pony Balks

Sue Archibald and Little Britain reached this difference of opinion in the Pony Corinthian Hunter event. Miss Archibald escaped injury.

Carl Klein





"You Can Win." A Girl Kisses Her Entry

But one year she surprised everyone by turning up with a deodorized skunk named Gardenia.

Exhibitors like Mrs. Combs, who once sent a complete outfit of fire engine and horses to a show in England, think little of costs. It may actually cost an exhibitor more to show his horses at the National than the total of all the cash prizes offered—\$30,000. But this is the price he willingly pays for the

chance to win one of those small strips of blue ribbon.

The National, moreover, offers several additional enticements not generally found at horse shows. Here the exhibitor is entertained at a daily luncheon and at a nightly party at the Waldorf-Astoria and feted at the exclusive Friday night Horse Show Ball (page 714).

Horatio Alger Hero Among Horses

Even the finest entertainment pales, it must be admitted, when compared with the thrill Mr. and Mrs. Leon S. Haymond experienced in 1952 when they entered The Angel in his first National. New to the Haymonds, The Angel by that time was already an old horse with a long history.

A thin, leggy colt, he was discovered by a milk-truck driver on a dirt road in upper New York State. For \$10 the animal changed owners. Finally he found himself in Mrs. R. B. Taylor's stable in Buffalo, where he acquired his heavenly name, much loving attention, and good food.

Three years later, as handsome a bay as ever stepped out of a stable, he went off to his first show. Then the Haymonds bought him and entered him in the National. There The Angel won the reserve championship in the conformation hunter section, proving that even a horse with an undistinguished beginning can rise like the hero of one of Horatio Alger, Jr.'s old novels and that anything can happen at the National.

Notice of change of address for your NATIONAL GEOGRAPHIC MAGAZINE should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your February number, The Society should be notified of your new address not later than January first. Be sure to include your postal-zone number.

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In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus. By dating the ruins of vast pre-Columbian dwellings in that region, The Society's researches solved secrets that had puzzled historians for 300 years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest dated work of man in the Americas. This stone is engraved, in Mayan characters, November 4, 201 a. c. (Spinden Correlation). It antedates by 200 years anything else dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1933, the stratosphere flight of the world's largest balloon, *Explorer II*, sponsored by The Society and the

U. S. Army Air Corps, reached a world-record altitude of 72,385 feet. Capt. Albert W. Stevens and Orvil A. Anderson took aloft a ton of scientific instruments and obtained results of extraordinary value.

A notable undertaking in the history of astronomy was launched in 1949 by The Society and Palomar Observatory of the California Institute of Technology. This project will photograph the vast reaches of space and provide for observatories all over the world the most extensive sky atlas yet made.

In 1948 The Society sent seven expeditions to study the sun's eclipse on a 3,320-mile arc from Burma to the Aleutians.

A Greek cargo ship sunk in the Mediterranean 2,200 years ago was found and investigated in 1952-54 by the National Geographic Society-Calyx Marine Archeological Expedition led by Capt. J.-Y. Cousteau of the French Navy.

The National Geographic Society and the Royal Ontario Museum in 1951 explored and measured newly found Chubb meteor crater, 11,300 feet in diameter, in northern Quebec.

The Society and individual members contributed \$100,000 to help preserve for the American people the finest of California's sequoias, the Giant Forest in Sequoia National Park.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration in 1938.

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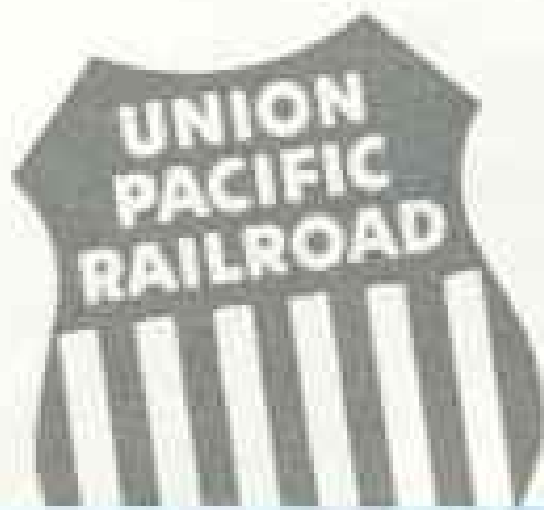


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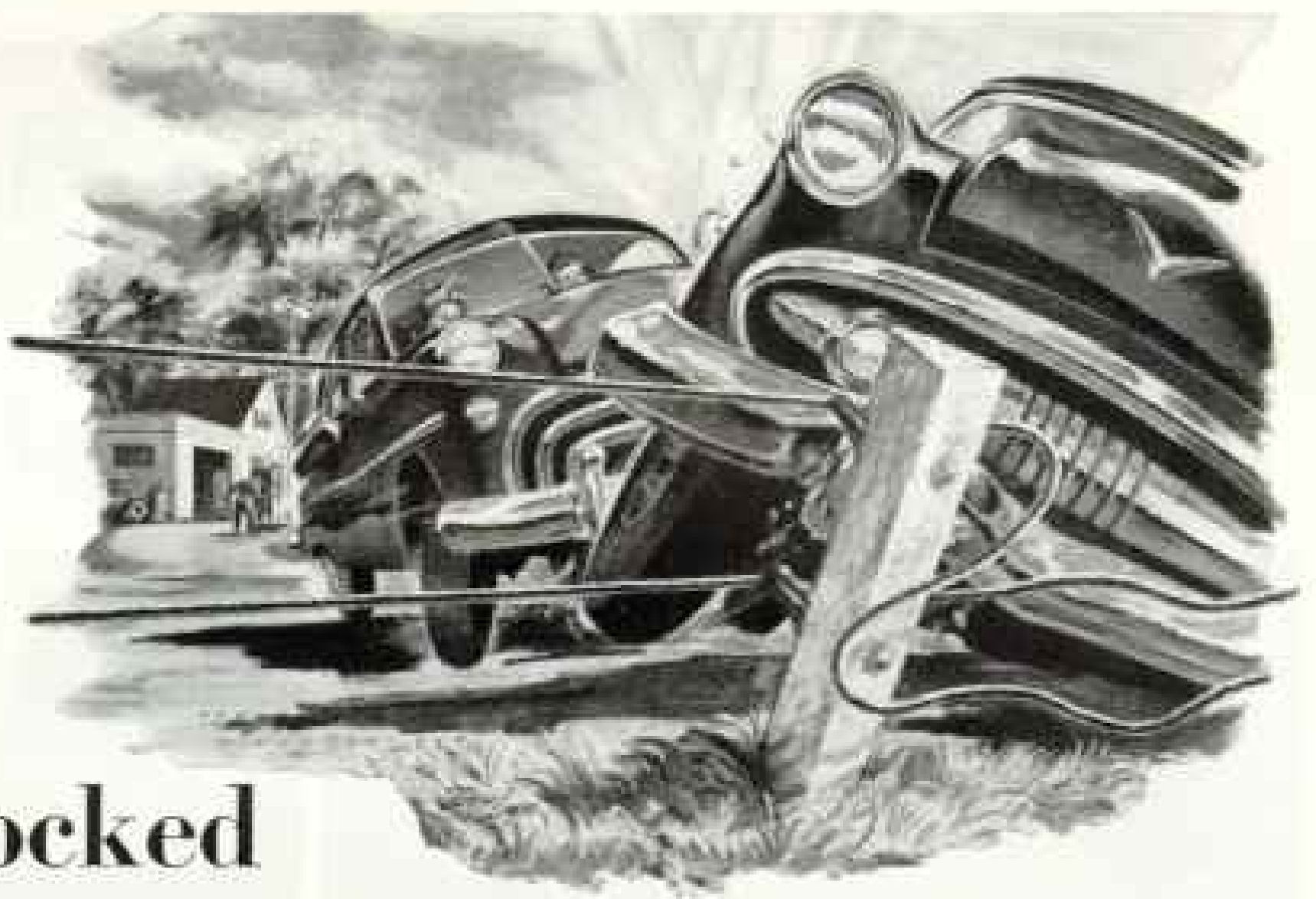
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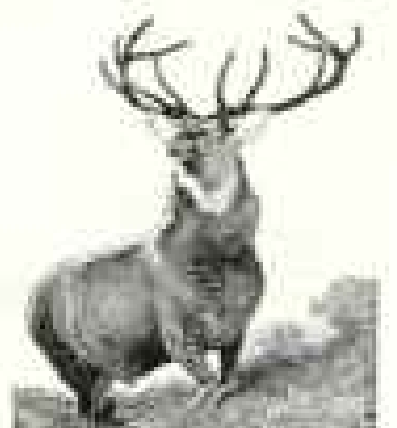
was glad to do him a favor. Certainly having his willing help was a break for me!

In a couple of days, I had another car. The agent helped get it, and the Hartford Fire Insurance Company paid for it under my Collision Insurance. My doctors' bills were covered by the Medical Payments section of my Liability Insurance in the Hartford Accident and Indemnity Company.

This experience certainly opened my eyes to something I had never thought of before—the importance of insuring in a company that delivers good agency service. When you run into trouble you find out that the cost of your policy isn't as important as what you get in the way of help—the considerate, all-out kind I was given by that Hartford representative. And from what I'm told, over 15,000 Hartford Agents from coast to coast pride themselves on being helpful.

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TRAVEL QUIZ (FOR NOVEMBER)



Where is volcanic steam used commercially?

- Italy Mexico Hawaii

When visiting Italy, you'll probably use some electricity derived from volcanic steam. Almost 1/10 of their electric power is produced this way. You'll use First National Bank of Chicago Travelers Checks, too, if you're a wise traveler. They're safe and convenient. Only you can cash them. Prompt refund if lost or stolen.

Where is the oldest church in the U. S.?

- Virginia New York New Mexico

San Miguel in New Mexico, about 650 years old, is believed to be our oldest church still standing. It's an old favorite with tourists. Another old favorite among travelers is First National Bank of Chicago Travelers Checks. Each denomination (\$10, \$20, \$50, and \$100) is a different color to prevent mistakes.

Which is the world's largest island?

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Passenger Traffic Manager, Great Northern
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or call on your local ticket or travel agent.



The G-E Blanket doesn't sleep a wink ...

BUT OH HOW YOU DO!

All night long a G-E Blanket is on the job, *automatically* providing just the warmth you need for perfect comfort.

No need to get up for extra blankets if the night turns colder. Your G-E Blanket will adjust itself to changes in temperature, while you snooze on peacefully!

More than 2,000,000 users have enjoyed the comfort of G-E Automatic Blankets.



One G-E takes the place of 3 ordinary blankets. Warmth without weight.



Easily washed either by hand or in your own washer. Just follow simple directions.



Six high-fashion colors: Dresden Blue, Rose Pink, Garden Green, Citron Gold, Flamingo Red, Turquoise. Luxurious Chatham fabrics, bindings by Skinner. Single- or double-bed sizes. Manufacturer's recommended retail or Fair Trade prices, from \$44.95.

Progress Is Our Most Important Product

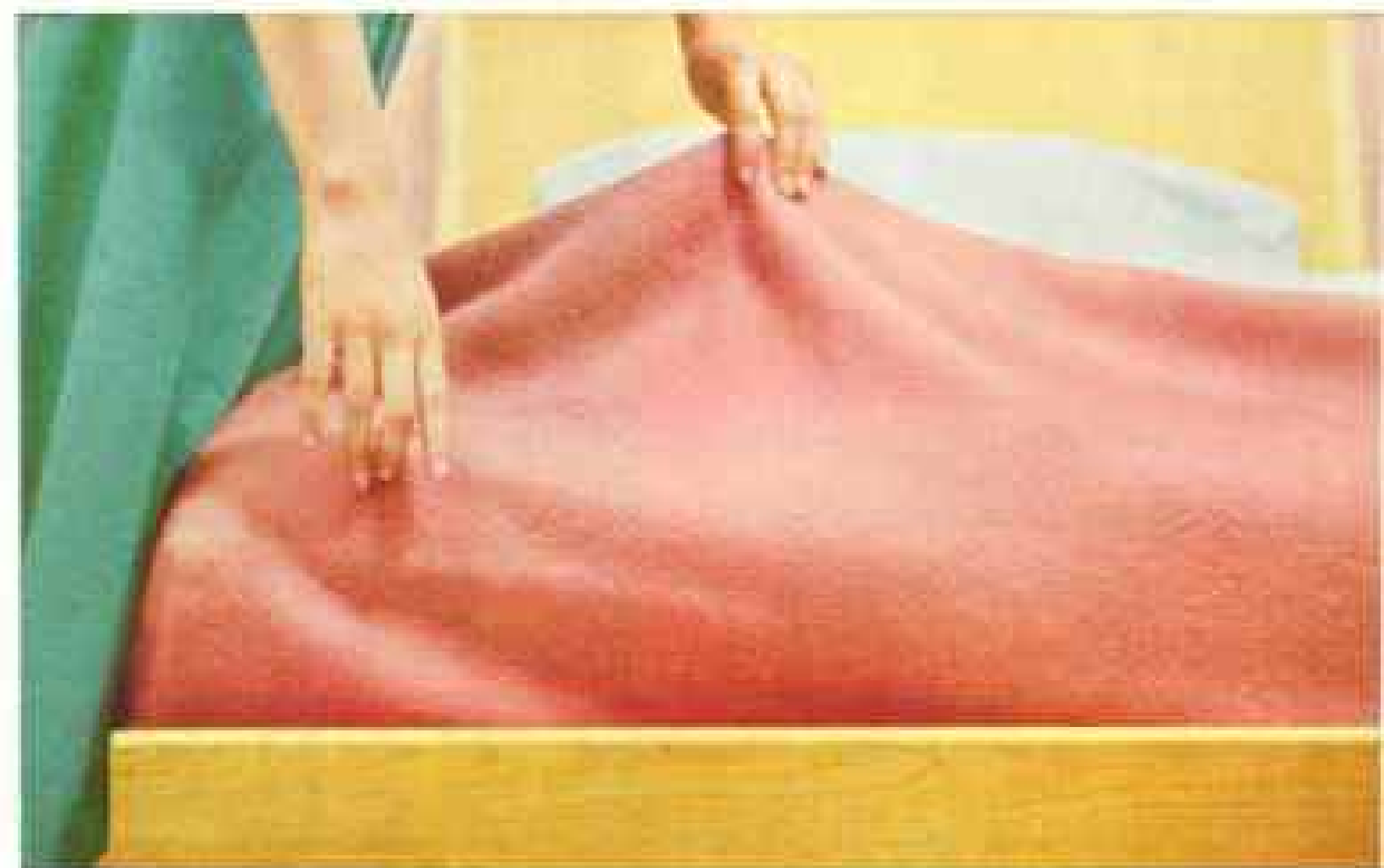
GENERAL  ELECTRIC



Choose the **warmth** you want on the *Sleep-Guard Bedside Control*. *Sleep-Guard* keeps you that warm all night, automatically providing more, or less, warmth as needed. Note: only G-E Blankets have *Sleep-Guard*.



A G-E Blanket creates your own little world of comfort, warming the entire sleeping area, so your whole body can relax. Ordinary blankets do not produce warmth, merely hold in body heat. In effect, you must warm an ordinary blanket.



Custom-Contoured corners, specially designed for plenty of foot room, allow ample "give" in the center, keep the G-E Blanket neatly in place. General Electric Company, Small Appliance Division, Bridgeport 2, Conn.

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for the "Eye-Comfort Picture"

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Capehart 

CAPEHART-FARNSWORTH COMPANY, Fort Wayne 1, Indiana
A Division of International Telephone and Telegraph Corporation



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Big 24-inch Diamond Brilliant Picture in handsome cabinet of mahogany Flotalone Balsa. With exclusive Capehart Polaroid® Picture Filter and Universal "All-Channel" Tuner at slightly higher cost. (Wrought iron legs optional.) \$299.95*

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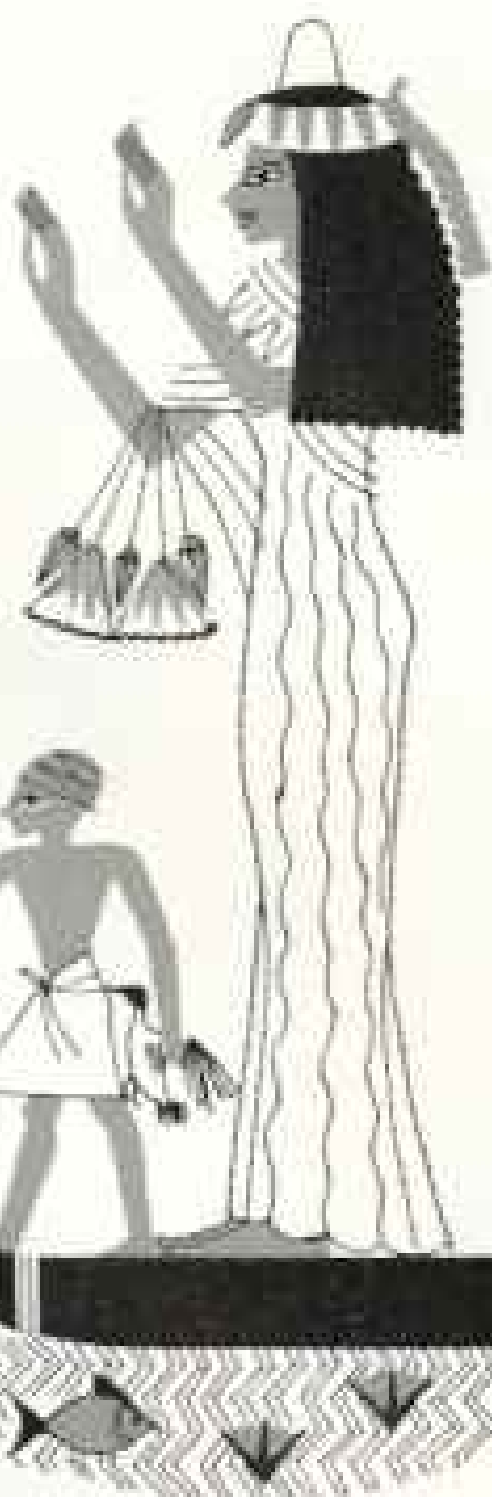


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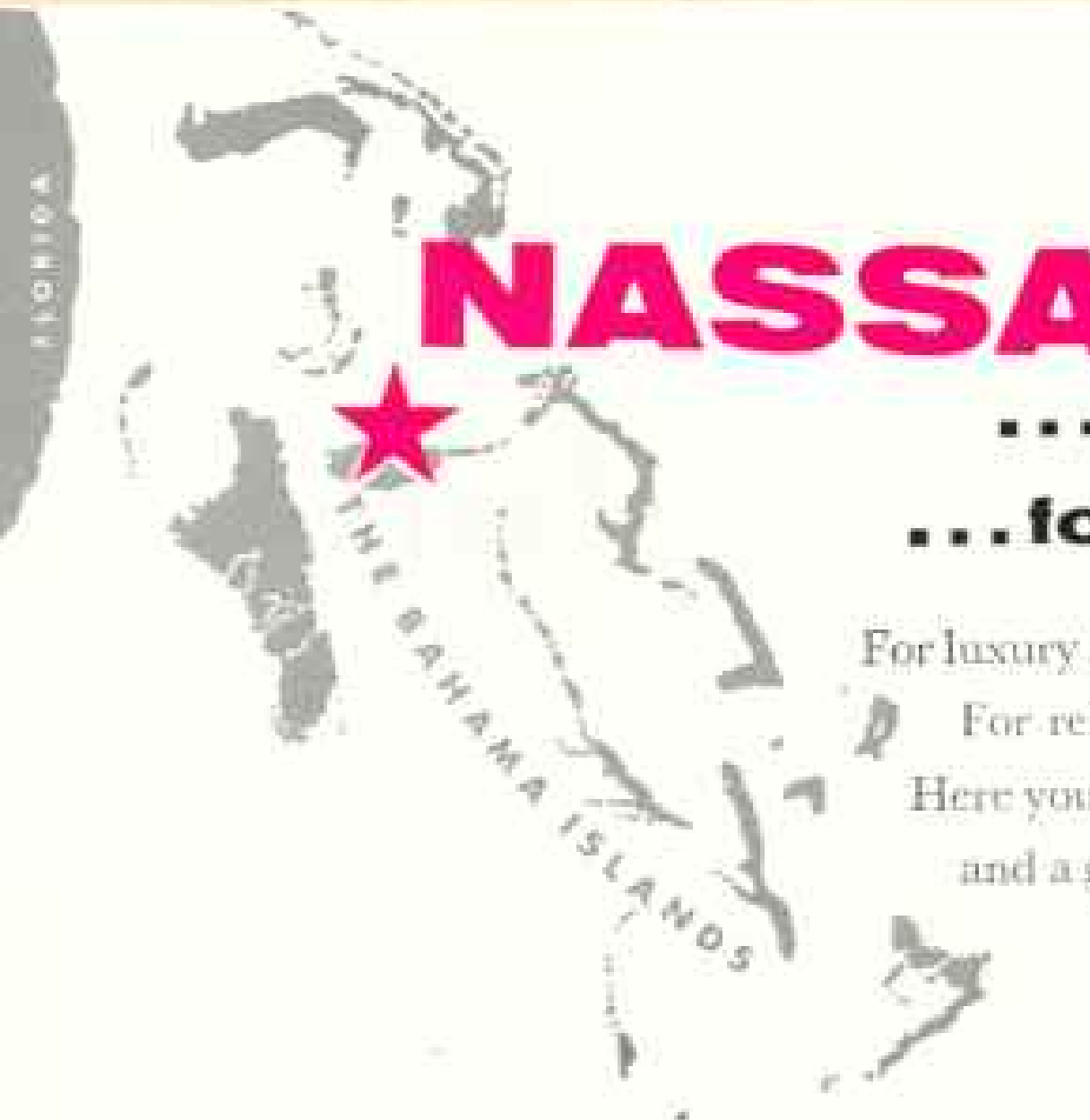
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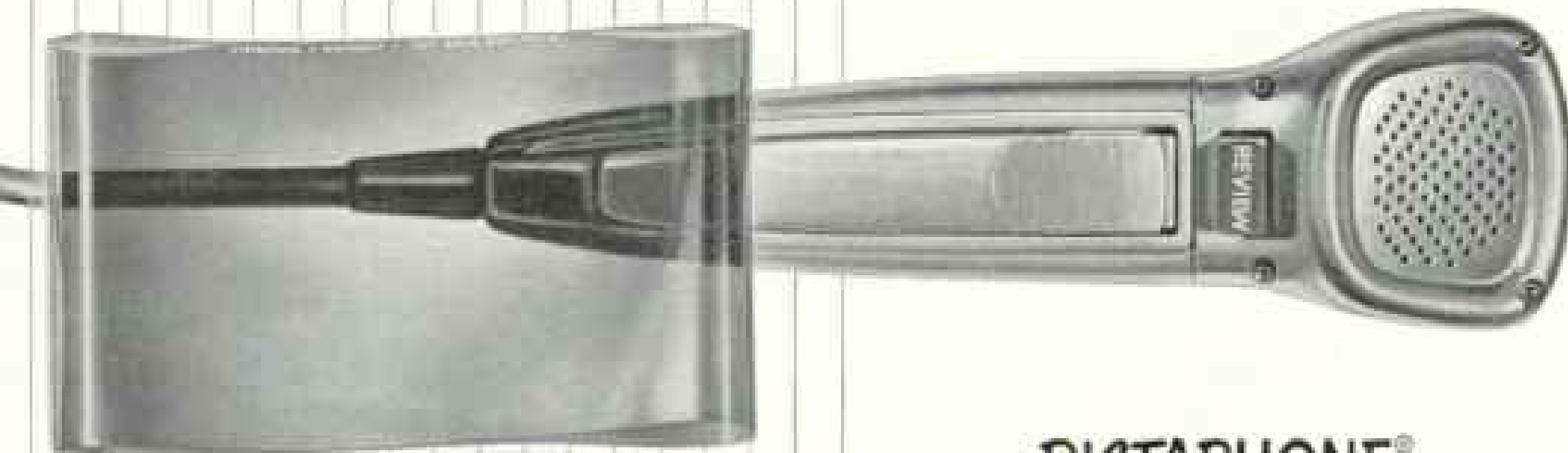
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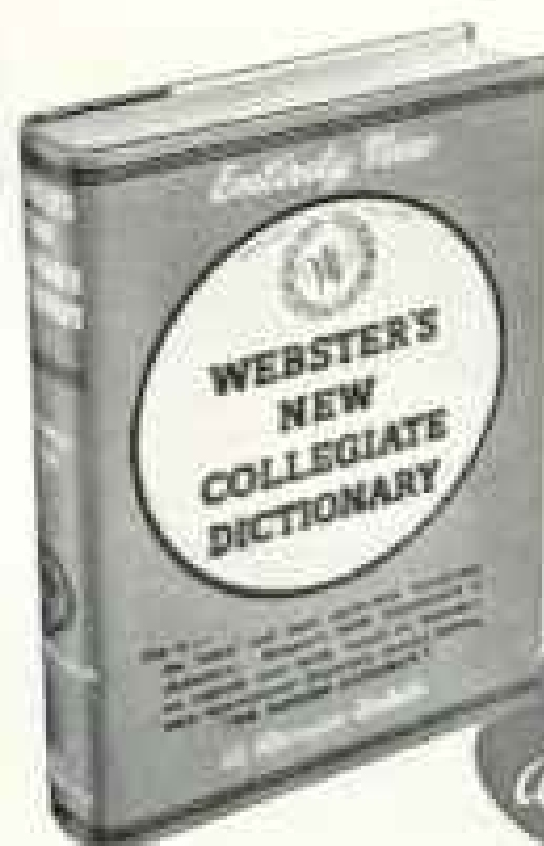
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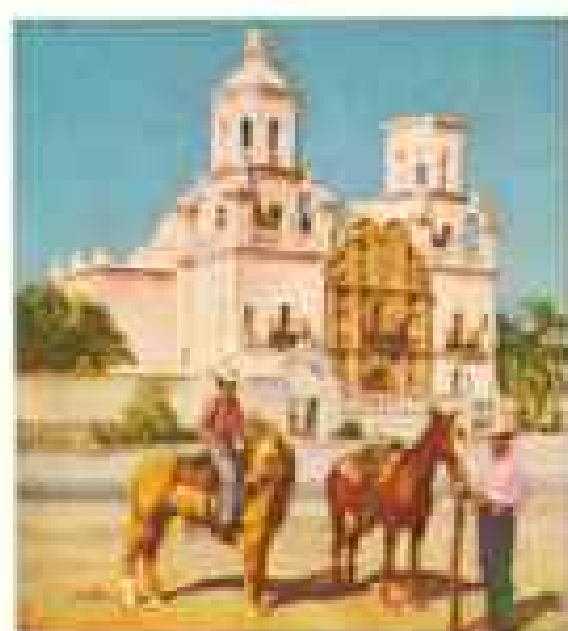
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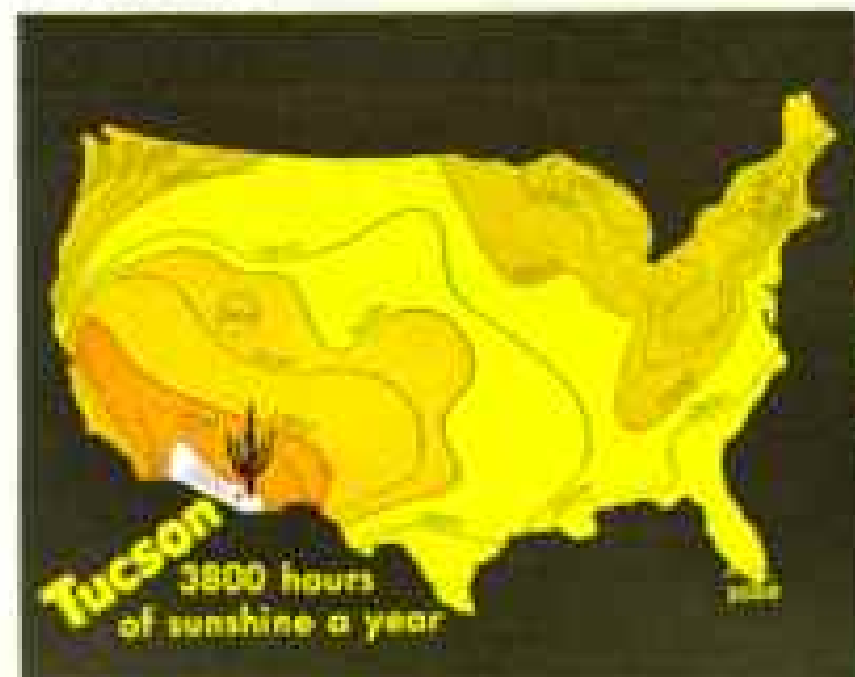
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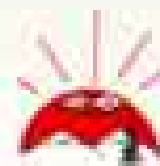
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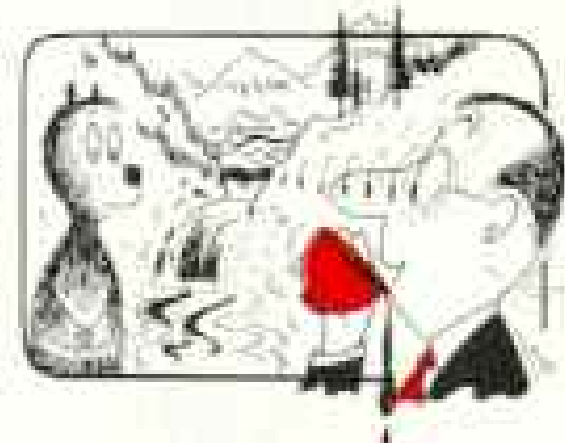
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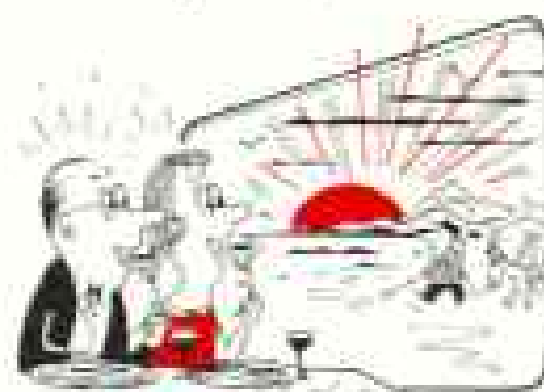
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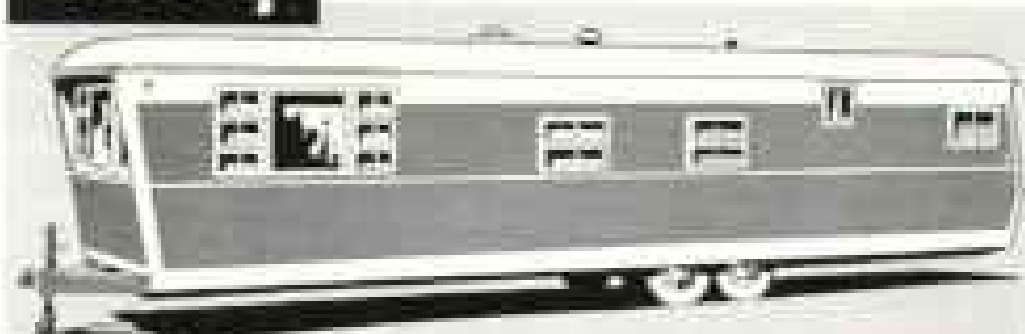
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tant to know the following facts:

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 - a. the disease has occurred in your family
 - b. you are middle-aged and overweight.
2. *You should suspect diabetes if . . .*
 - a. you notice weight loss despite constant hunger and high food consumption
 - b. you feel constantly fatigued, thirsty, or urinate excessively.

Diabetes may cause no early symptoms but may progress and damage your health silently. This points up the necessity of regular medical examinations. The earlier diabetes is discovered and treated, the better are the chances to bring it under control.

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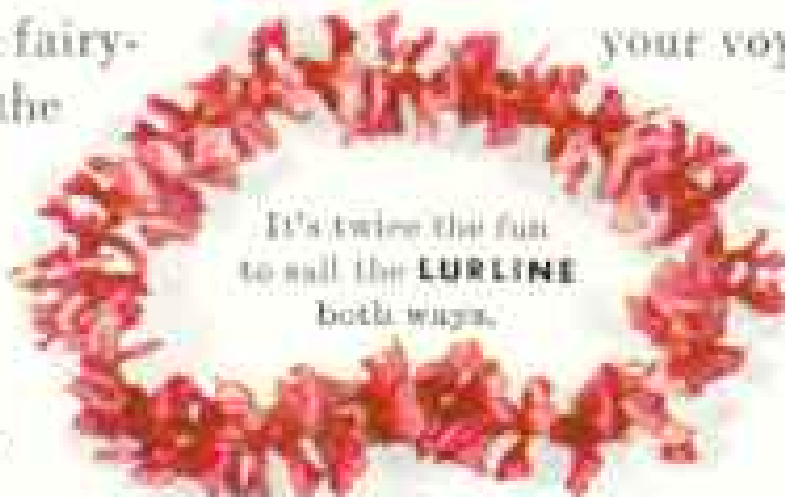
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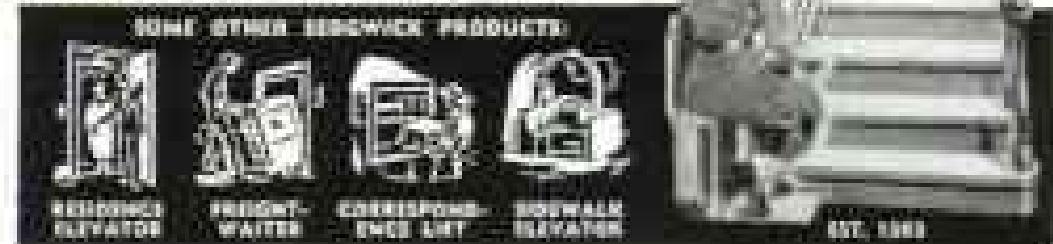
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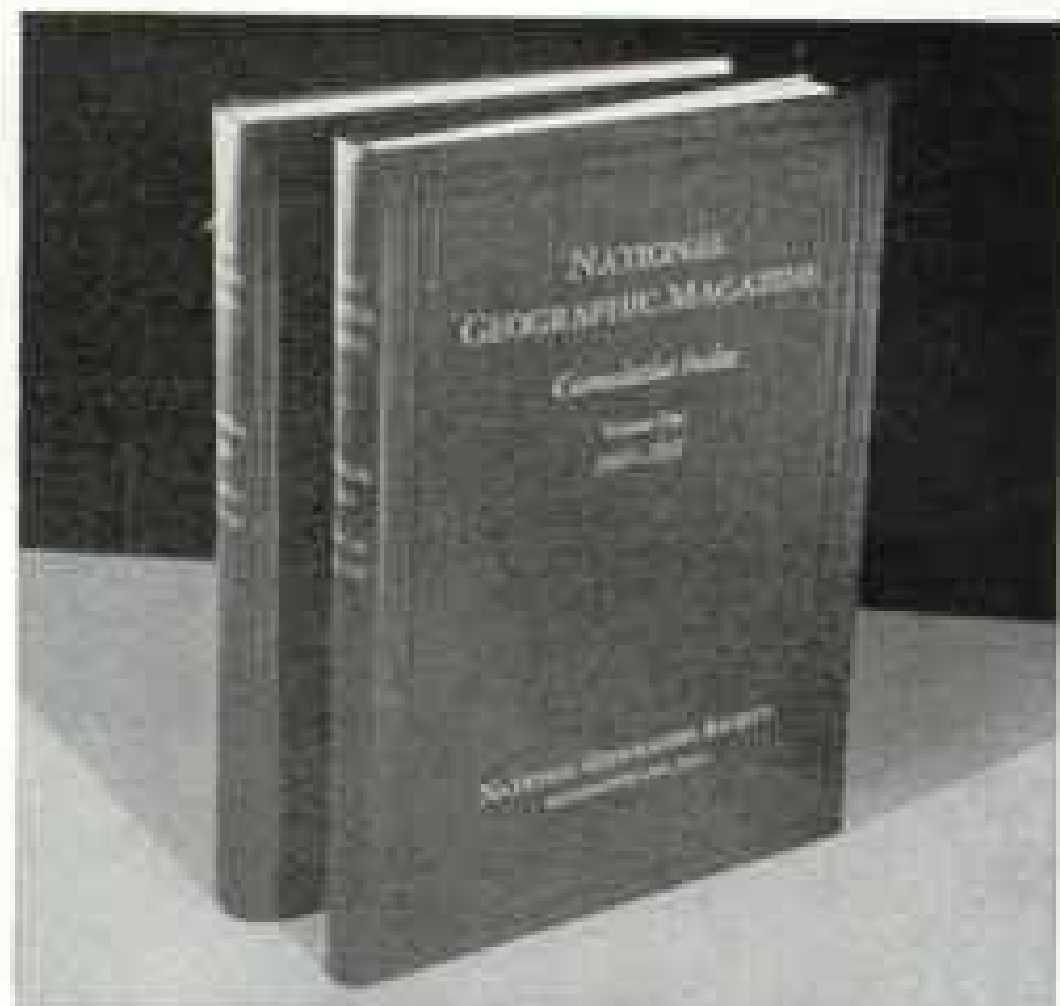


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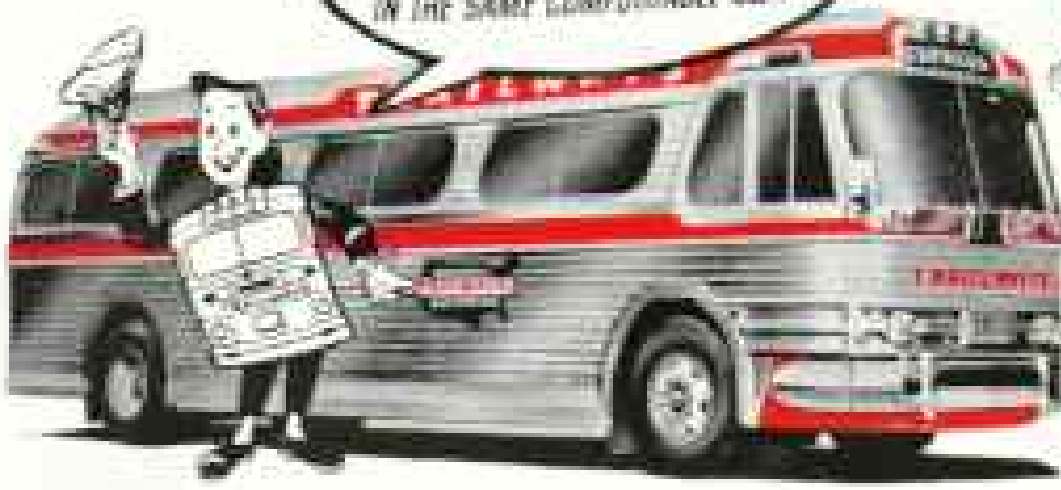
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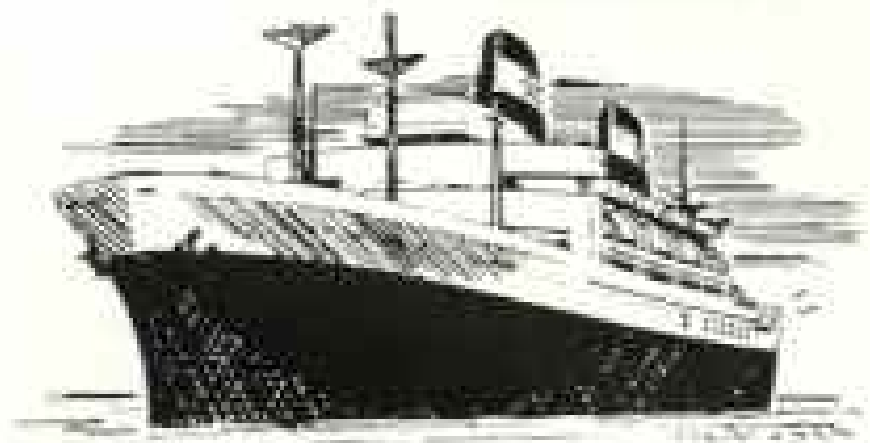
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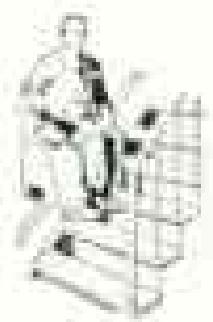
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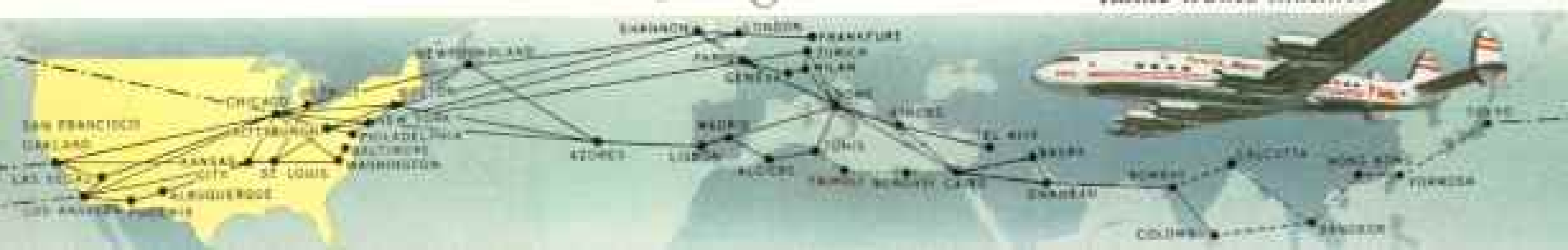
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