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TWENTY FOUR PAGES OF ILLUSTRATIONS IN FULL COLOR

Speaking of Kansas

With 38 Illustrations:

FREDERICK SIMPICH

Views and Hues of the Sunflower State

12 Natural Color Photographs

RICHARD H. STEWART

The Shore Birds, Cranes, and Rails

With 4 Illustrations

ARTHUR A. ALLEN

Feathered Foragers of Swamp and Shore

101 Portraits in Color from Life

MAJ. ALLAN BROOKS

The "Pilgrim" Sails the Seven Seas

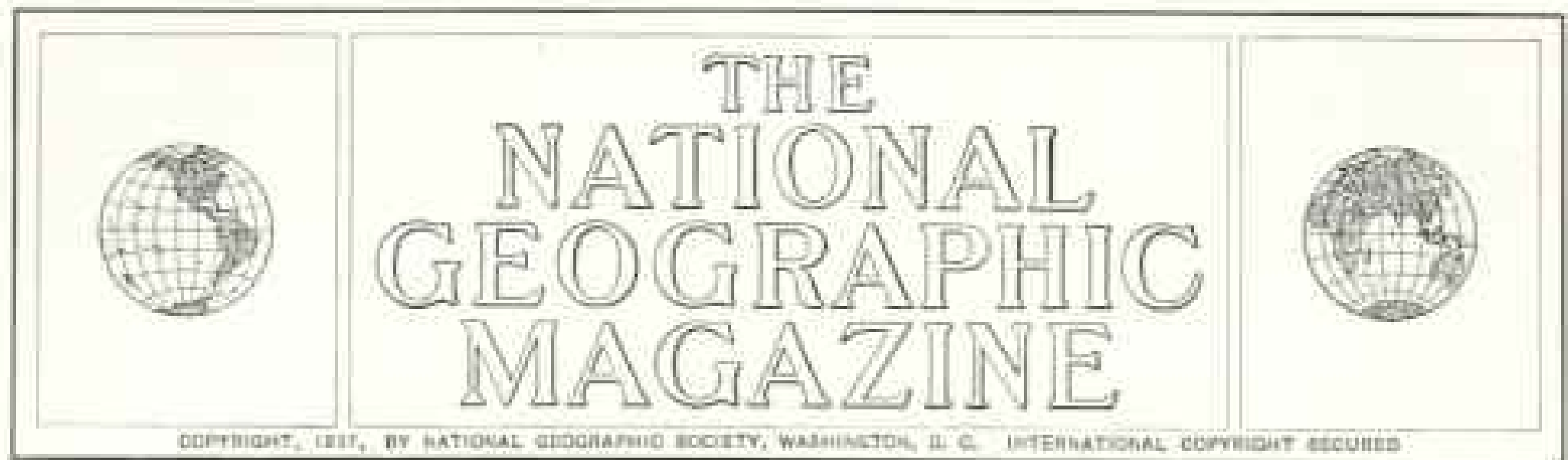
With 36 Illustrations

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SPEAKING OF KANSAS

BY FREDERICK SIMPICH

NO MATTER where a cyclone hits America, papers there call it a 'Kansas twister,' said a Topeka man. "If a Kansas corn crib blows down, we make more fuss over it here than California does over an earthquake."

In Garden City, after a grasshopper plague, a local photographer showed me 20-foot hoppers jumping over houses or sprawling the full length of railroad flatcars—on trick postcards, of which he had sold more than 60,000!

"In a storm, dust got so thick that prairie dogs dug their holes right up into the air," said a current sample of whimsical absurdity.

Similar fantastic stories of dust, drought, tornadoes, and odd human behavior for years have been sent from Kansas to eastern papers. Like Missouri and Arkansas this State, as a result of its own home-made rhymes, ridicule, and Munchausen yarns, has long been the butt of kindly but nationwide banter.

TALL TALES OUT OF KANSAS

"The best and worst jokes about Kansas originate right here," affirmed a college professor. "We always exaggerate both our blessings and our misfortunes."

Of William Allen White, famous editor of the *Emporia Gazette*, I asked why.

"One reason is that from the start Kansas has had a highly literate population," he said. "Newspaper men, not lawyers, have governed Kansas for 40 years. They have bred a lot of keen-nosed reporters who can take a few 'makings' and roll up a good story. These young fellows running country papers live in scores of county-seat

towns. Often pickings are lean, so they cook up stories and send them to metropolitan papers—stories not out of whole cloth, but based on just enough fact to get by!"

There was news even in the names of some pioneer papers: *The Prairie Owl*, *The Thomas County Cat*, *The Eye and Ear*, *The Border Ruffian*.

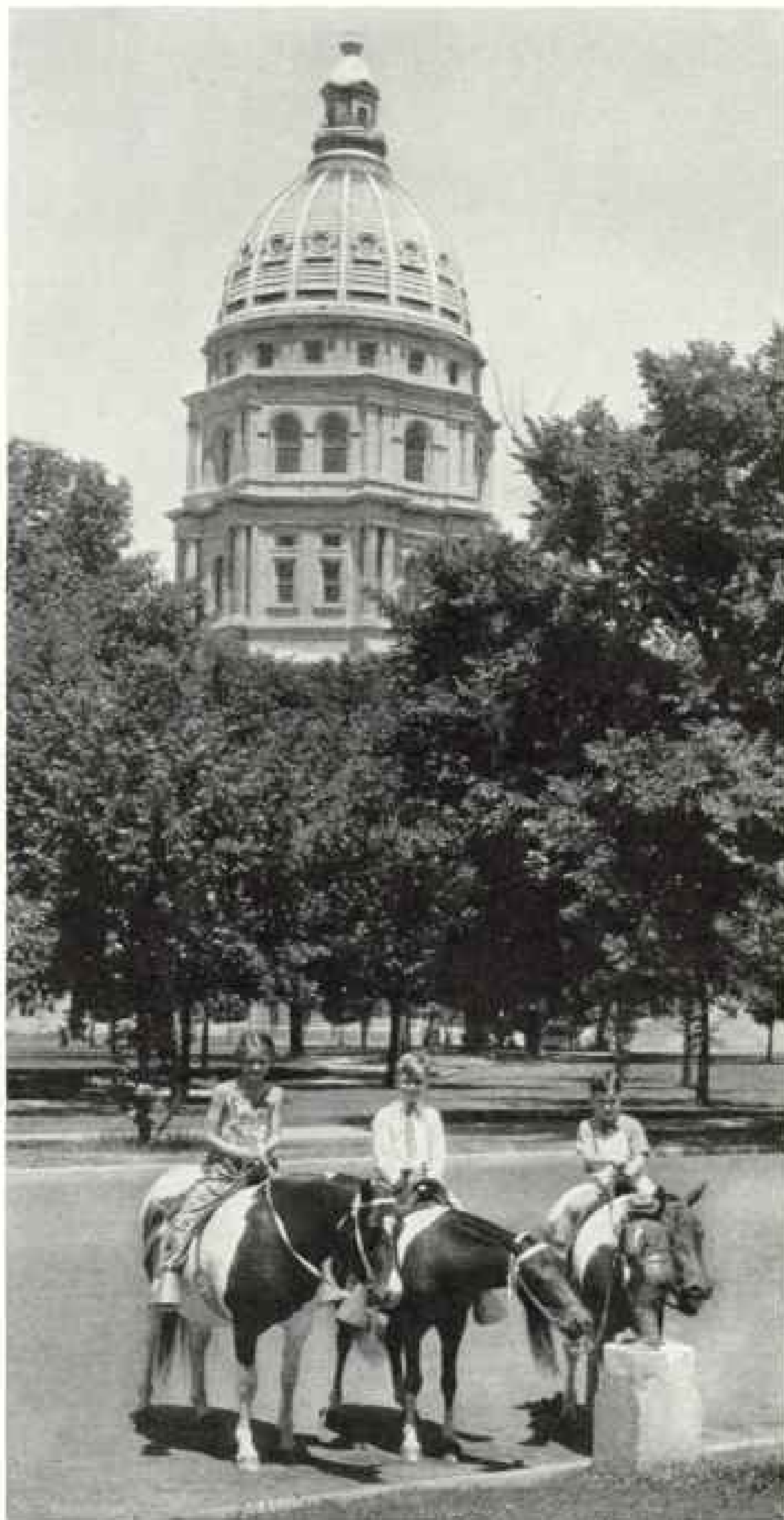
Kansas people still poke fun at their State, as even a casual look at local papers will show. But beneath this surface levity persists a fighting spirit undismayed even by dust, drought, or hard times. Visit with them, look and listen, and you find mixed with their casual banter that same grim self-reliance that sustained the pioneers.

Gabe Wade of Atchison had it. He freighted, with ox teams, across the plains to Denver. When an ox died on one trip, and left him badly needing another work animal, he lassoed a wild buffalo, broke it to drive, and kept on freighting!

Whizzing today past Kansas oil fields and model farms in high-speed streamline trains, or flying over stockyards, meat-packing plants, and giant flour mills, it is hard to realize that barely one long lifetime ago this was a raw, empty land, part of the "Great American Desert."

In fact, you can still find here many men and women who in youth ate mostly buffalo meat; who earned cash in lean years by picking up scattered buffalo bones, and who saw the advent first of rails, then of windmills and barbed wire, and then of modern farm machines that now help make Kansas the hard-wheat empire of all America.

No chapter in our western annals is more sheerly spectacular than this conquest of



Photograph by Richard H. Stewart

THE SERENE KANSAS CAPITOL, IN ITS SHADY PARK, HAS
ECHOED TO MANY STORMY DEBATES

Here at Topeka the Governor and other State officials keep office; here courts and legislature meet; here is the busy State Library, the Board of Agriculture, and numerous other boards. "We haven't room enough to turn around," crowded clerks complain (Color Plate VI).

Kansas, and many of its fantastic tales current in earlier days were based on actual episodes of Indian attacks, buffalo hunts, droughts, grasshopper swarms, bushwhacker raids, and county-seat wars.

No less astonishing is the transformation—you might say the face-lifting job on Nature herself—accomplished by the million or so "Kansas or bust" homeseekers who swarmed here in the land boom between 1870 and 1890.

As a boy in Missouri I saw some of these "movers" returning eastward; on the canvas top of one of their wagons was painted, "Busted! Going back to my wife's Indiana people."

CONQUERING THE
GREAT AMERICAN
DESERT

Agricultural explorers such as Fairchild, Swingle, and Myers have scoured the world to find useful plants and trees that would grow here.

Except for corn and prairie grass, every major Kansas crop is an agricultural immigrant. Alfalfa, oldest and most valuable of forage plants, originated in Persia (now Iran); thence it moved to Spain, to South America, and northward to California, then finally to Kansas, which now leads in alfalfa seed production (p. 164).



Photograph from *Keystone*

HEWILDERED JACK RABBITS HEAD FOR THE LAST ROUNDUP WHILE A NEWSREEL MAN AWAITS A GOOD SHOT

Crowds jam about the wire corral at this final scene in the big drive. Frightened "jacks," leaping and kicking, are fairly packed against the barrier. Men grab them by the ears, crate them, and ship them east for release in new homes (pages 143 and 167).

Land here that shook for centuries to the hammer of galloping buffalo feet trembles now under big gas tractors and combine harvesters. Today, from Boston bankers to Arizona cowboys, all America eats bread made of Kansas hard red winter wheat. Each year some 120,000,000 bushels are threshed here, and enough is ground to make about 47 loaves for every human being in the United States.

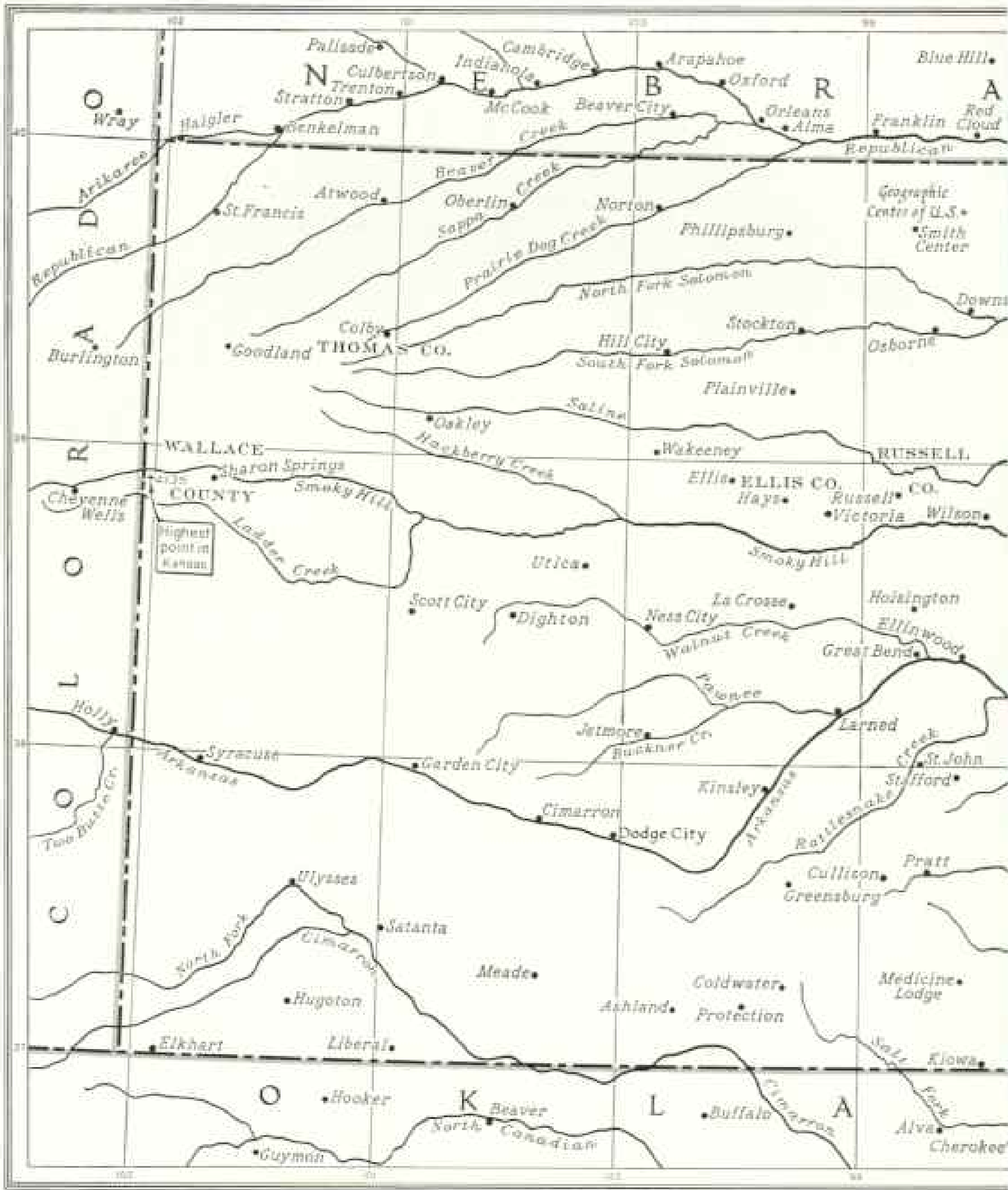
Until Memmonites settled here in 1873, little wheat was grown. From Russia, however, these immigrants brought a new variety—a red winter grain so hard that millers at first had trouble grinding it.

Since that time, the best kinds of wheat grown here have come through selection or hybridization, from Turkey, or from other imports of Crimean wheat similar to Tur-

key's. Now agents of Soviet Russia's government come here to buy seed of this improved wheat, taking it back—after all these years—to the regions it came from.

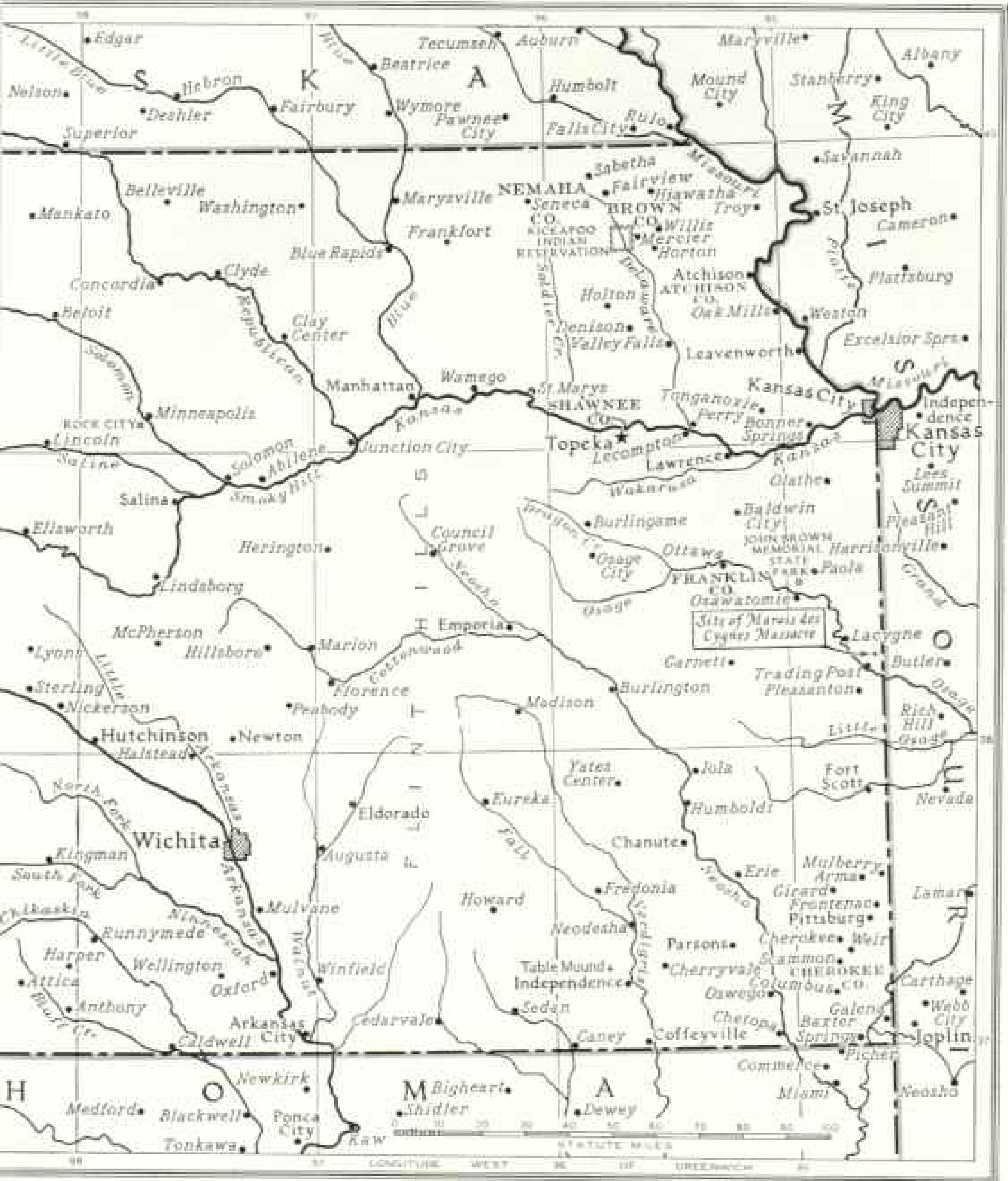
To Kansas from Asia came white blossom sweet clover; from Manchuria the soybean.

"In fact, most plants of economic value in Kansas are from other lands," said E. D. Graham, veteran writer on farm themes. "This is true of our orchards, vegetable, and flower gardens. Few plants were introduced accidentally. The pioneer's covered wagon, carrying horse feed, may have been the means of first bringing in bluegrass; influx of noxious weeds may also be traced to accident. But the spectacular change—in a few decades—in all our plant life was willfully achieved after study, selection, and scientific plant breeding."



SQUARELY IN THE CENTER OF THE UNITED STATES LIES FERTILE, SUNNY KANSAS:

"Navel of the Nation" the State was once called by Senator John J. Ingalls, for it contains—in Smith County off by the Missouri River, the Sunflower State forms a parallelogram. Many people think of Kansas as flat, but a mile, from a high point of 4,135 feet in Wallace County, on the Colorado line. In the eastern part are both Topeka, settlers, of their hopes and joys—Independence, Eldorado, Eureka. Other names carry a pioneer tang—Prairie Dog, Osawatimie, Hiawatha. And surprisingly, cheek by jowl with them, appear imported classical names—Ulysses, Attica,



Drawn by Newman Hunstead and Ralph E. McAlear

IT TAKES ITS NAME FROM AN INDIAN WORD MEANING "PEOPLE OF THE SOUTH WIND"

in north-central Kansas—the geographical center of the country. Except for the northeast corner, which is whittled actually it consists chiefly of gently rolling prairie and slopes steadily eastward, at an average of about seven feet its capital, and Kansas City, Kansas, its metropolis. Some of the place names are eloquent of the character of Kansas Creek, Medicine Lodge, Trading Post, Cimarron, Rattlesnake Creek, or the witchery of soft-voweled Indian syllables—Syracuse—or bits of Old England—Runnymede, Wellington, Oxford. To each name hangs a tale (page 150).



Photograph by J. W. McManisgal

"GRANDPA WAS SAYING LAST NIGHT THAT YOUNG FOLKS TODAY DON'T KNOW WHAT HARD WORK IS!"

In the clutter of merchandise about the country store's big, warm stove, local sages meet on chill nights to argue about religion, farm relief, tax and school troubles, and whom to vote for at the next county election. Unposed, this picture was snapped in the general store at Willis, Brown County.

To add a familiar back-east look to home-sweet-home on the plains, one trader imported a flock of common house cats and sold them at a good cash profit to early Hays settlers.

What with new animals and fowls, new kinds of trees, new crops and flowers, even new weeds, the whole aspect of Nature has changed. In my own lifetime I have seen once-forsorn, sunbaked, treeless prairie towns turn into green, well-shaded spots, with lush gardens and abundant artesian streams.

Of this, more in its place; look now at the Kansas whites first saw.

HOW WHITES CAME TO KANSAS

From Spain to Kansas was a long way—in 1541. Yet that year Coronado got here, seeking his fabled Seven Cities of Cibola.

More Spaniards came later, but they left only faint footprints in the sands of Kansas time.

After La Salle floated down the Mississippi and claimed its basin for Louis XIV, French trappers ranged all these Mid-west streams. From a trading post, built near present-day Oak Mills village, in one year (1757) they shipped 10,000 pelts to Paris, via New Orleans. Many French trappers married squaws. I met Kansans descended from these unions. Charles Curtis of Kansas, former Vice President of the United States, was proud of his Indian ancestry.

Bandiied back and forth between Spain and France, this was a little-known region even when Napoleon in 1803 sold the Louisiana Territory to the United States. It included most of Kansas, though Spain still ruled over what is now the southwest section of the State.

Rightfully, we didn't get title to all of what is now Kansas till after the annexation of Texas, which, as a republic, had owned the southwest corner of it, the same corner



Photograph by J. W. McManis!

IN SMOKE, SWEAT, AND CHAFF DUST, A KANSAS THRESHING CREW WINDS UP THE WHEAT HARVEST

Fascinated, the small boy sits on the coal-wagon tongue, watching the steam engine. Harvest hands halt at the big water can to wash dust from their throats, while the long belt drives the threshing machine, into which bundles of wheat are fed from two sides. The scene is near Mercier.

that had been first Spanish and then Mexican.

By this time a few whites were settling in east Kansas. From Missouri to New Mexico flowed that steady, two-way stream of traders, soldiers, teams, wagons, goods, furs, and treasure which was to make the Santa Fe Trail one of the most romantic and spectacular caravan roads in all history.*

Gold seekers, rushing to California after 1849, swarmed across Kansas by scores of thousands, along with outlaws, swindlers, and road agents, breaking still more new trails, including the Oregon and its branches, the Salt Lake, Mormon, and California.

Indians raided and killed. When not fighting whites, they fought each other.

News that aroused the Nation broke in Kansas in 1854, over the Kansas-Nebraska Bill. This law set up the territories named,

* See "The Santa Fe Trail, Path to Empire," NATIONAL GEOGRAPHIC MAGAZINE, August, 1929.

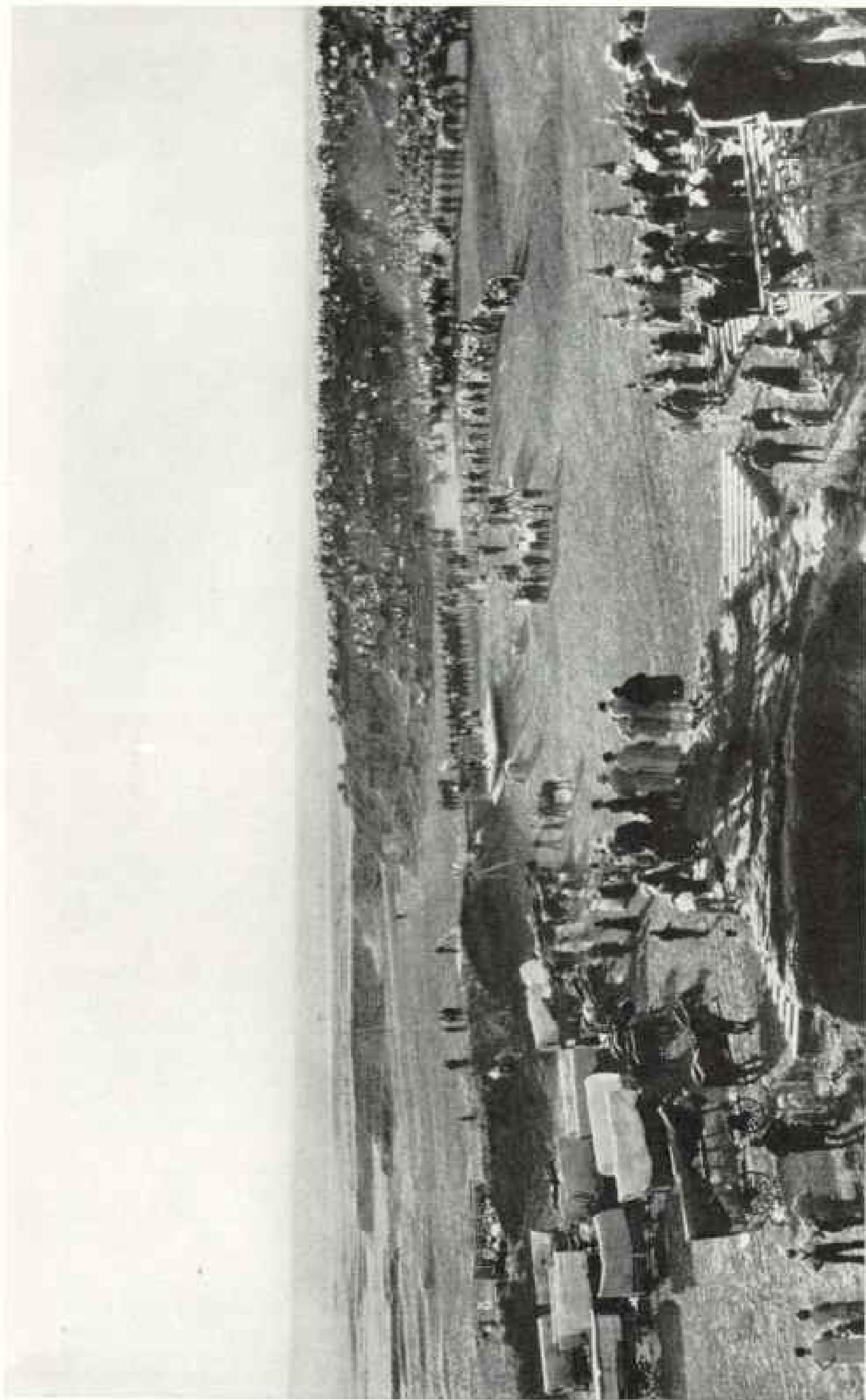
and said that when they were ready to join the Union each might say for itself, by popular vote, whether or not its citizens should hold slaves.

BORDER WAR IN "BLEEDING KANSAS"

Immediately Kansas became a battleground. From the North came colonists, sent by the New England Emigrant Aid Company to vote for "free soil." Some carried guns, called "Beecher Bibles" because paid for with funds raised by Henry Ward Beecher.

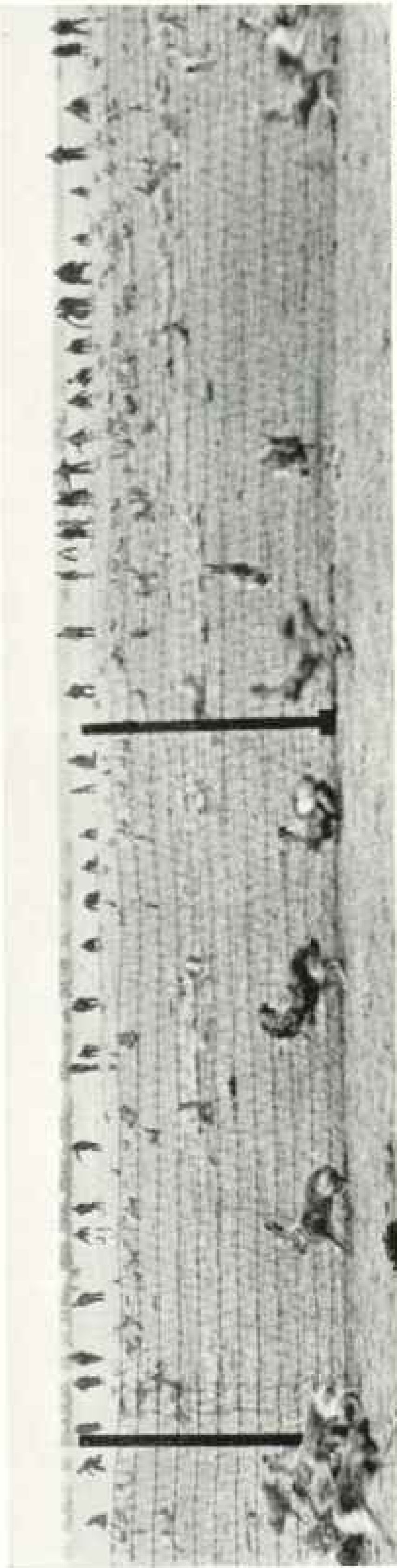
Southern States raised funds and sent armed bands of settlers to vote the pro-slavery ticket. Missourians—dubbed "Border Ruffians"—flocked over to help the slave-owning element.

Murders, raids and house burnings continued for years. At Lawrence, type metal from *The Herald of Freedom*, thrown into the river by a previous mob, was fished out and molded into cannon balls.



AT MEDICINE LODGE U. S. TROOPS AND INDIAN TRIBES RE-ENACT THE MAKING OF THE HISTORIC TREATY OF 1867

Covered wagons at the left represent those used by Santa Fe Trail freighters and California-bound emigrants. By this treaty Plains Indians were promised certain Oklahoma lands and buffalo-hunting rights in return for their agreement to keep the peace and surrender territory in Kansas.



Photograph from Keeyojona

MEN IN SKIRMISH LINE, USING NO GUNS OR DOGS, HERD DESTRUCTIVE JACK RABBITS INTO WIRE CORRALS, NEAR GOODLAND



© Paramount Pictures

LEAVENWORTH'S BOISTEROUS MISSOURI RIVER WATER FRONT IN PIONEER DAYS, AS DEPICTED IN A MOTION PICTURE, "THE PLAINSMAN."

West-bound immigrants left river steamers here for Santa Fe, for California, and for the Northwest over the Oregon Trail. Frontier shacks bear signboards of saloons, hotels, law offices, and "fancy goods"; in the square men load wagons with provisions, roll spare wheels, shoe horses, and prepare for the long trip across the Plains.



Photograph by Richard H. Stewart

TREELESS PLAINS DO NOT MAKE ALL OF KANSAS!

Some of the eastern part of the State is rolling, slightly wooded country, like western Missouri. Tree-planting, in many other spots, dots the plains with pleasant groves. Rows of graceful old elms shade this Topeka residential street.

From North and South papers sent their best reporters to cover this border war in "Bleeding Kansas." Even the London *Times* sent Thomas Gladstone, kin to the great English statesman. Books were written, and appeals made to President Pierce to quell disorder. In the end this border strife helped involve us in the Civil War.

One event in border war Kansas will never forget: that is Quantrill's guerrilla raid on Lawrence, when that Missouri hot-head sacked and burnt the town and slew some 150 citizens. History gives space to the Marais des Cygnes massacre and "Old John Brown's" historic crusade and his final execution, after his effort to seize guns at Harpers Ferry Arsenal to arm slaves.

Only lately, at Osawatomie, in a State park, a monument was built to John Brown, now grown to hero's size in Kansas memories. His epitaph says:

John Brown of Kansas:
He dared begin:
He lost:
But losing won.

"It's an odd bit of history," Ed Howe, dean of western journalists, told me, "that though Abraham Lincoln made a speech in

Atchison against the extension of slavery to Kansas and was soon after elected President, the then editor of our local paper never even mentioned Lincoln's visit, because they differed politically.

"It has long amused me that a country editor should have tried to stop Abraham Lincoln by refusing to print a personal item about him!"

RECALLING A PIONEER PAST

Even after Kansas was admitted as a free State, in 1861, and after the Civil War ended, it was plagued for years by Indian raids, county-seat fights, and bad men who rode up the great cow trails from Texas. Writers still argue as to whether Dodge City, in its wild days, was more wicked than Abilene.

Inquire closely, and you may still find patriarchal Kansans who recall those turbulent times. One is Thomas A. McNeal, who at 82 still was writing his daily stint for the *Kansas Farmer* in Topeka.

"It's error to say New Englanders predominated in colonizing here," said Mr. McNeal. "Many came, especially to Lawrence and Atchison. But other thousands



Photograph by J. Hobson Bass

DYNAMITE EXPLODES IN A HOLE TO SOUND AN ECHO FOR THE OIL PROSPECTORS'
SEISMOGRAPH TRUCK

Just as ships now use sonic sounding apparatus, measuring ocean depths by the time it takes a sound to echo back from sea bottom, so subterranean rock formations and potential oil pools are located by this method (page 147).

came from Ohio, Illinois, Indiana, Iowa, and so forth.

"My first night here I'll never forget. I hadn't learned, but soon did, that a rule in pioneer inns was that no hotel was 'full' till it had at least two people in every bed. I'd been asleep when a bearded giant in chaps, big hat, and six-shooters stalked into my room, with a lantern. He laid down his guns and hat, kicked off his boots, and ordered me to 'roll over.' I rolled!

"In Medicine Lodge, where I landed to join my ex-buffalo-hunting brother, they said, 'We don't like our editor. We will tar and feather him.' But they had no tar and feathers; so they used molasses and prairie grass instead. Then they told me to run the paper! With my predecessor's fate always in mind, you can imagine how I tried.

"Even then fantastic Kansas stories were circulating. One yarn sent east told of a small boy who foolishly climbed a corn-stalk, which grew so fast he couldn't get down.

"Founded on actual facts, however, some of the most dramatic news dispatches ever

sent from here concerned the county-seat wars, which involved voting fake names taken from eastern directories, bogus bond issues, robbery of courthouse records, and plain murder.

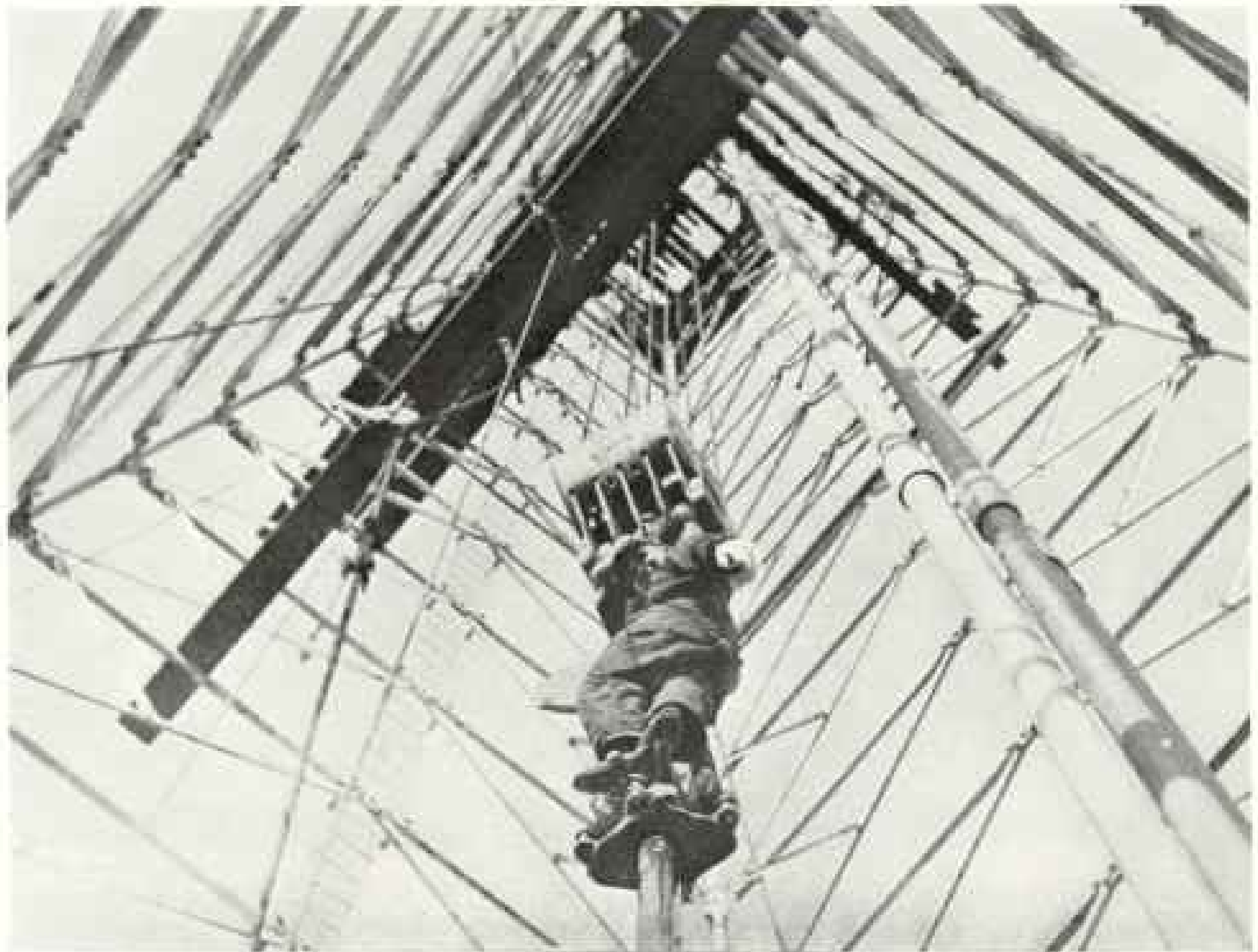
"This war here was every bit as exciting and adventurous as ancient clashes between the Scottish border chieftains. Today scores of towns, once well known, are absolutely missing, their very sites lost in the wheat fields."

EXCITING DAYS IN EARLY KANSAS

At Hays I talked with a delightful old lady whose father brought her here as a child in pioneer days.

"When I came in 1867 Indians were all about; I saw squaws with a white girl they'd stolen and couldn't understand why our soldiers here at Fort Hays made no effort to rescue the child. I knew Wild Bill Hickok. Yes, he killed some people here, but he was a brave peace officer and a fine-looking man, with long, black hair and mustache, and always wore a fancy leather suit. Calamity Jane was here, too.

"I rode a pony, chased antelope with



Photograph courtesy R. A. Bant

RIIDING THE "ELEVATOR" IN AN OIL-WELL DERRICK NEAR HUTCHINSON

This smiling "derrick hand" is on his way up to his post on the scaffolding. Upon arriving, he will attach his safety belt and "rack," or join together, sections of drill stem while workers below are changing the sharp-pointed revolving bit that bites deep into the earth. The two pipes at the right are extra line, for use as the well becomes deeper.

greyhounds for fun, and played with Army children at the post when Custer was here with the 7th Cavalry. His regimental band was the only music for miles around.

"On the stone walls of the old guardhouse now you can read the names and dates cut in the rock by soldiers stationed there long ago. Miles, Hancock, Pope, Lawton, Sheridan, and other generals served at Fort Hays; their men used to help settlers fight prairie fires.

"The outside world's first news of the Custer massacre came through our little home paper, the *Star*. You can imagine our excitement, because we knew so many of the officers and men killed and scalped.

"Once, as we were coming back from Leavenworth on a pioneer train with a wood-burning engine, buffaloes got on the track so thick we had to wait over an hour for the herd to pass. As far as we could see there was just a moving mass of buffaloes. Wild Bill Hickok was on that train

and he and others shot and shot at the buffaloes.

"All the meat we had was wild—buffalo, antelope, turkey, and so forth. When Buffalo Bill was here he took a Russian noble, Grand Duke Alexis, to hunt."

In a write-up of this, a Kansas editor said of the Duke:

Hail, son of Romanoff,
And grandson of Nicholas;
Thy coming doth mollify,
And gratify and tickle us.

PANDEMONIUM AS EARTH YIELDS OIL

Day and night, oil field bedlam, as at Russell Field near Hays, fills the air with clatter and shouts. Big strikes quickly cover empty plains with new, unpainted pine shacks, tents, new stores, lumberyards, machine shops, auto camps, big piles of new pipe, "walking beams" of working pumps, black pools, frightful-looking dense smoke clouds from burning waste, long lines of

tall steel derricks that march like big skeletons to far horizons.

You see loud, slangy waitresses at quick-lunch counters; gnomelike electric welders, in ceaseless movement, wearing odd helmets that ward off heat and blinding torchlight; and crowds of men in overalls so greasy that they seem to have just been baptized by total immersion in the smelly black oil now pumped from the world's deep, dark, greasy bowels—oil that means more cash to Kansas than her boasted wheat crop.

As you near McPherson, silvery domes of oil refineries glint in morning sun like mosques on a Babylonian plain. Heavy tank trucks, loaded with new-made gasoline, speed west for Denver.

My guide through one new field told me the dramatic story of Kansas oil, and how farmers' income from oil leases helped so many to live and pay taxes through dry, lean years.

"I'm lucky," I told him, "to be shown about by a geologist who can tell this oil yarn in a popular way, free from bewildering technical jargon."

"Geologist, my foot!" he answered. "I just learned about oil by watching drillers, listening, and writing it up for the papers. I'm no geologist. I came to Kansas playing a trombone in a circus."

"DOODLEBUGS" AND SEISMOGRAPH TRUCKS HELP HUNT OIL IN KANSAS

Luck and superstition figure in oil strikes. Many men still insist you can find water, treasure—or oil—with the witch's divining rod, or some of its metal kin, known in oil-field slang as the "doodlebug."

Kansas oil is found among buried "hills"; to locate these, which may bear no relation to surface hills, is the prospector's first step.

One of the newest scientific oil-hunting methods is use of the seismograph, which works more or less like the echo-sounding machines used by ships now to measure ocean depths (page 145).

When the oil hunters have made enough shots and got enough "echoes" in a given area, they draw a chart, based on the time in seconds or split seconds that it took echoes to bounce back at different spots on the area tested.

This contour map shows at depths anywhere from 1,000 to 6,000 feet the major underground "hills" and "valleys," just as a common topographic map shows hills, valleys, and drainage on the earth's surface. If the oil hunter's subsurface map reveals



Photograph by King Studio

A CHEYENNE CHIEF ONCE CARRIED THIS WAR LANCE

The feathered weapon is on display in the museum of the Kansas State Historical Society at Topeka. It belonged to Cloud Chief and was borne by him at the Battle of the Little Big Horn.



Photograph by J. W. McManigal

LITERALLY "MAKING HOGS OF THEMSELVES"

Grunting and sprawling in the filbert-scented pigpen straw on a farm in Atchison County, this Spotted Poland China mothers her brood—soon to join that porcine army that eats perhaps 40 per cent of all corn grown in America.

hills and valleys, or basins, a "structure" has been found that may prove to be an oil field. But the science of geophysics has not advanced to the point where proof of a commercial oil field is furnished until wells are drilled to the porous rocks and a natural oil and gas reservoir is found.

A WOOD CARVER FOR 73 YEARS

"Go and see Anna Larkins," they said in McPherson. "She's 83, but still earns her living carving wooden animals."

I found her cottage floor strewn with shavings. She was just finishing a wooden cow, with a man on a milk stool, and a cat sitting near waiting for the froth. I felt her fingers. They were supple as a child's.

"To make such a figure takes me two days," she said. "I sell some by mail to distant States. Here's my saw. I brought it with me from Sweden. I've used it 73 years, carving since I was ten. My uncle, in Sweden, was famous; he carved that beautiful race horse in that glass case. It's not for sale—it's the last piece of his work I have."

In near-by Lindsborg is Bethany College, and a Swedish choir known over Amer-

ica. It has its own fine auditorium. Each spring, at Easter, guests by thousands come to hear the choir sing Handel's *Messiah*. For 57 years it has sung oratorios; now the choir numbers 500 voices.

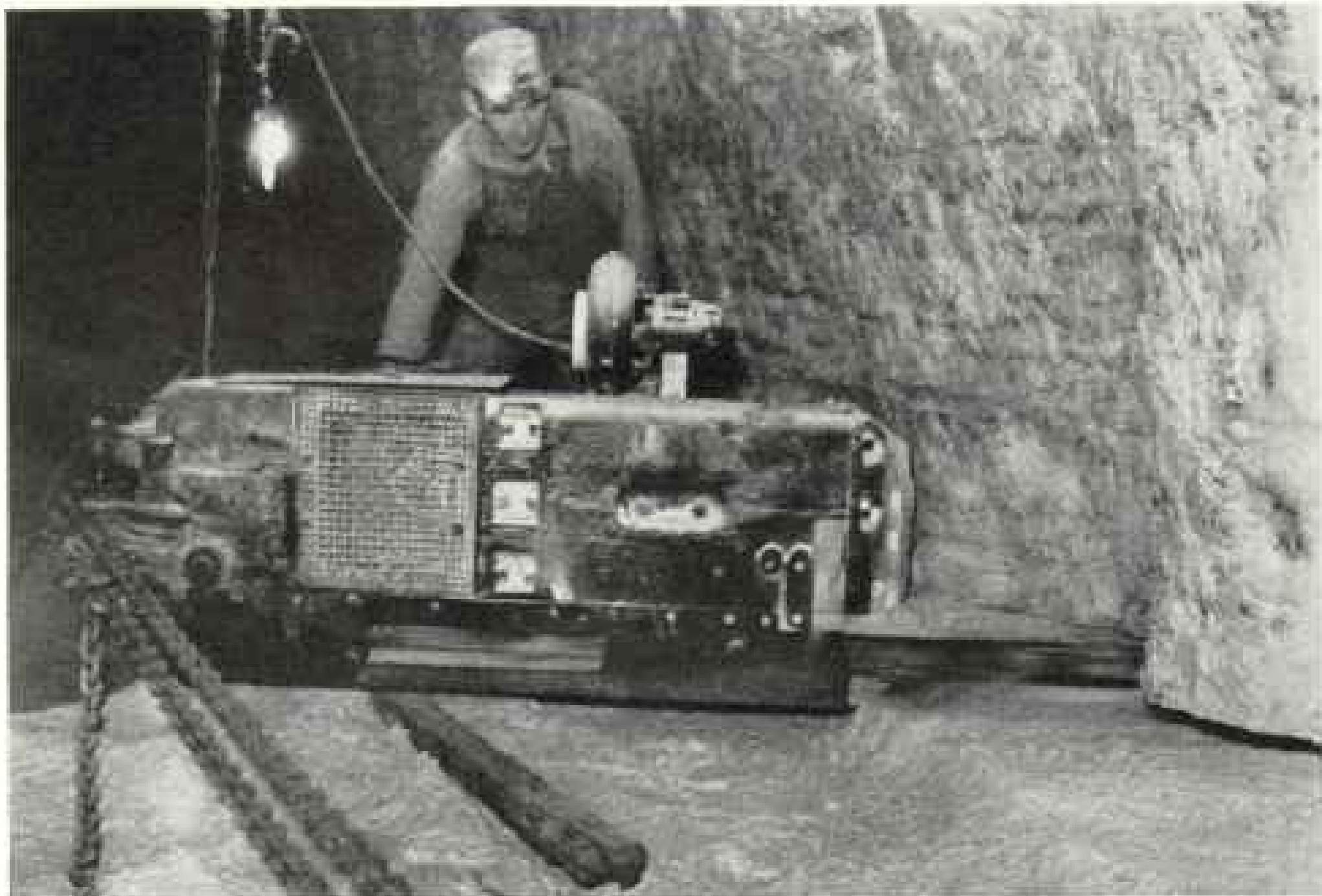
Countless sea gulls ride into Kansas on rain storms. Driving from La Crosse to Great Bend in October rain, we rode through miles of sea gulls. As far as the eye could reach, across fresh-plowed wheat fields, seas of birds moved like waves, filling the air with their odd, complaining cries.

"They come suddenly in spring and fall from the Gulf of Mexico," a farmer said. "Now they're eating hoppers, and a strange dark worm that's appeared by millions. Gulls are a blessing. They clean out these pests. We say gulls in the fall mean a wet spell and good crops."

DOWN IN A HUTCHINSON SALT MINE

Ever since Lot's wife turned to salt this mineral has been in the news.

With visiting schoolgirls I rode in an elevator down to the 641-foot level of a Hutchinson salt mine. Here half-naked men with whirling electric drills cut holes



Photograph by Richard H. Stewart

THIS MOVABLE, MOTOR-DRIVEN MACHINE SAWS A CRACK UNDER THE SALT VEIN

Afterwards, in holes bored above the crack in a Lyons mine, dynamite is exploded to break down big blocks of salt. At some other Kansas plants, the mineral is pumped up as brine, and evaporated. Enough salt underlies Kansas to last the growing Nation for thousands of years.

into the hard salt vein that glistened in floodlights like myriad diamonds.

Hither and yon darted the "powder monkeys," packing dynamite in the holes, shooting loose great masses of salt, which others broke up and loaded into trucks.

Said a guide: "Many people get scared down here. Some lose their nerve at the shaft and turn back. Once we gave a dinner in the mine, for 800 guests. While they were laughing, singing, and having a big time, all the lights accidentally went off, and left the big crowd in darkness black as the grave. In two seconds the stillness was deathlike. To be caught away down in the bowels of the earth, with no light, is terrifying to most people."

Even in bright lights, the echoing laughter of the schoolgirl horde and the scent of their perfumery seemed a bit sepulchral. Only the sweating troglodytes, wielding their drills and hammers, seemed real, matter-of-fact. To them, it was just another day's work.

Into Hutchinson, railways drain a stream of wheat from billiard-table plains, filling the futuristic-looking elevators, or "Kansas castles" (page 165). State inspectors take

samples for use on the local Board of Trade. This is the world's smallest city to have its own grain futures market; here upwards of 50,000,000 bushels a year change hands.

"What makes a small town like Hutchinson such a big wheat market?" I asked a broker.

"Its location in the midst of the Great Plains wheat country, and easy rail connection. Also, with huge storage facilities, it is a convenient point for the mills; here they can find just the right type of wheat as to test weight, protein for mixing, and thus keep their flour output uniform."

Oil, with wheat, makes this a crowded, excited town when markets are jumping. Over waving fields of yellow grain, once swept only by fleeting cloud shadows, now race the motorcars and seismograph trucks of the oil hunters, a noisy element in laced boots and greasy overalls.

SHADES OF CARRY NATION, JESSE JAMES,
AND OTHER COLORFUL CHARACTERS

"I was on the *Wichita Eagle* when Carry Nation went into a saloon and threw a rock through a painting of 'Cleopatra at the Bath,'" said David Leahy, a veteran Kan-

sas journalist. "Though Queen Victoria was dying then, and eastern papers were full of news about her, I wired 6,000 words to Chicago, and for months Mrs. Nation and her hatchet made America's front pages. Later, I gave her my scrapbook, with all the clippings about her. That's the little house where she lived, with the brass tablet put up by the Woman's Kansas Day Club," he added, as we rode about once-tumultuous Medicine Lodge (page 142).

A BIT OF ENGLAND IN PIONEER KANSAS

"Now, where is the site of old Runnymede?" I asked my companion.

"Right in these wheat fields—near this newer town of the same name," he said. "The true story of Runnymede is one of the most fantastic in all Kansas' curious history.

"I migrated from Ireland on the same ship with Ned Turnley, founder of the colony, so I'm one of the few still alive who know the facts. But the whole tale sounds so incredible that if it weren't confirmed by reliable histories, some might doubt it.

"All this land about here was bought cheap by Turnley and an Irish partner, Charles O'Connor. On it they formed a colony of wealthy young Englishmen who wanted to learn the cow business. In time Populist laws were passed, forbidding foreigners to own Kansas land, but while it lasted Runnymede was the sensation of the Southwest.

"To Kansas prairie life these rich, reckless youngsters brought monocles, flat saddles, pedigreed race horses, tallyho coaches with a man in a cap to blow a long horn, and coyote hunting to hounds, with gentlemen riders wearing pink coats.

"Some brought wives and butlers. In a big clubhouse that stood out where that wheat field is, they held balls and sumptuous feasts, and everybody always dressed for dinner. John L. Sullivan visited them and they all liked him, because they liked sporting life.

"Once about 40 of them coached in to Harper. At night, in their top hats and white ties, they caused a near riot among cowboys when they attended a pioneer theater. One of them boxed in a match with a famous Irish pug, who knocked the Englishman out. Then the Englishman gave the pug a gold watch, simply because he had 'boxed so beautifully.'

"When the colony broke up, most of them

returned to England. Several went to the Boer War. All that's left now is that one lone tombstone out in the wheat."

On it I read:

Thomas Sharp Hudson,
Born 1817,
Died 1890.

Farewell, vain world;
I've seen enough of thee,
And careless am
What thou canst say of me.

Cruise slowly north to busy, boisterous Wichita and you see one of the West's finest airports, with airplane shops that build planes for our Army and Navy, and some for export.

Pictures taken in my lifetime show Wichita as only a sprawling plains village of pine shacks, covered wagons, cowboys, Indians, and a muddy main street.

Now, supplanting its pioneer fires of buffalo chips, a gigantic factory here makes oil stoves and lamps that are sold to world's end. Tall flour mills pierce the skies, and crowded stockyards, noisy with bawls, grunts, squeals, and bleats, handle train-loads of meat-bearing animals.

WICHITA'S BUSY MULE MARKET

From all over the South buyers flock to Wichita's busy mule market. "Missouri mockingbirds," they nickname these agile, shapely, but sterile hybrids, whose quick heels pack a lot of dynamite. To defend yourself, mule dealers give you a heavy hickory stick to carry when you walk among the animals in the sales lot.

In a cowboy's hotel set opposite the large Stockyard's Exchange, smug plaster faces of fat farm animals smile at you from lobby walls. Men in big hats play pool at tables in this same lobby, and shout bantering wisecracks through an open door to pretty girls working in the dining room. Dogs sleep, or wander freely about, and breezes through open windows bring final olfactory proof that Wichita is a cow town.

Now cowmen, noted for carnivorous discrimination, always dine where beef is best; that's why Wichita's Country Club gourmets, despite cow-lot, pigpen, and muleyard zephyrs, flock here after foursomes, swims, and balls for juicy, sizzling steaks, or an English mutton chop that is a chop!

"I sneak down there myself," admitted a leading hotel manager, "because those greedy buckaroos won't sell us their best cuts."

VIEWS AND HUES OF THE SUNFLOWER STATE



A RURAL MAILBOX CATCHES THE SPIRIT OF COVERED-WAGON DAYS

Onward plod its wooden oxen, on a farm near Junction City, keeping alive the memory of pioneer trails. Before postal service existed, letters were often "mailed" in wayside tree forks or in rock nooks, to be picked up by the first travelers going in the right direction.



© National Geographic Society

Finlay Photographs by Richard H. Stewart

MEN KILLED IN FIGHTS, WITH THEIR BOOTS ON, WERE BURIED ON DODGE CITY'S "BOOT HILL"

With its crude monuments to Angelface Kid, Two Gun Haney, and the rest, this spot remains a link with the wild, wicked past, when millions of longhorn cattle were driven up Texas trails and sold here.

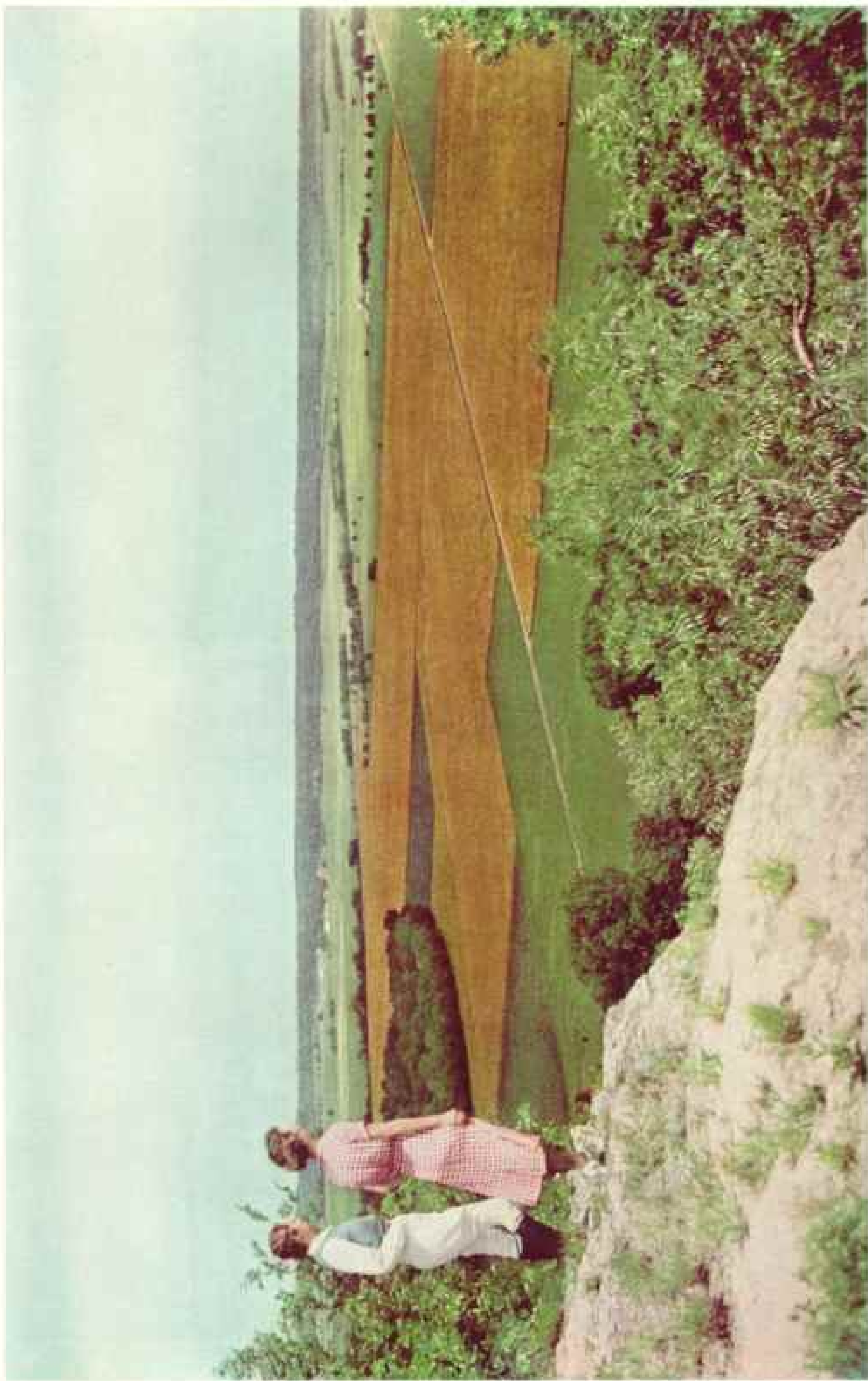


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Fielder Photograph by Richard H. Stewart

IN GAGE PARK, TOPEKA, 20,000 HYBRID TEA ROSES AND OTHERS BLOOM TILL LATE IN THE FALL.

Probably the most photographed spot in Kansas, these rose and rock gardens—a memorial to the botanist E. P. A. Reinisch—are illuminated by floodlights and visited by thousands on warm evenings.



© National Geographic Society

Fieldy Photograph by Richard H. Stewart

KANSAS "BLOCK FARMING" AS SEEN FROM TABLE MOUND NEAR INDEPENDENCE

By crop rotation a block, or square, may be planted, for example, to wheat one year and to corn the next, or it may remain in alfalfa several seasons. Thus intelligent rotation rests the land.



WICHITA HIGH-SCHOOL STUDENT CANOES RIDE THE ARKANSAS RIVER, OLD HIGHWAY OF INDIANS AND FUR TRADERS

This long, wide-valleyed river, whose subterranean streams supply pure well water to thousands in drier western Kansas, has been conspicuous in history since the Spanish Conquest.



© National Geographic Society

Finlay Photographs by Richard E. Stewart

PRIZE-WINNING WHITE-FACED CATTLE ON THE ROBERT HAZLETT RANCH NEAR ELDORADO
Since Coronado in 1541 found these plains covered with "crooked-backed oxen" — meaning buffalo—
Kansas, with its vast wild-grass areas and crops, has been a prodigious producer of beef cattle.

VIEWS AND HUES OF THE SUNFLOWER STATE



THE WICHITA ART MUSEUM IS A COMBINATION OF MAYAN, PUEBLO INDIAN,
AND MODERN AMERICAN ARCHITECTURE

Designed to harmonize with Kansas plains, this building is part of a project by the Wichita Art Association, housing its permanent collection, works of nationally known artists, and an art school.



© National Geographic Society

Finlar Photographs by Richard H. Stewart

ACROBATS WITH FOUR HANDS AND A TAIL ENTERTAIN CROWDS AT TOPEKA

On Monkey Island in Gage Park (Plate II), a miniature "City Hall," with trapeze performers' gear rigged overhead, permits monkeys to stage both comedy and circus acts.



© National Geographic Society

AT TOPEKA A CROWDED CAPITOL HOUSES NUMEROUS OFFICIAL ACTIVITIES OF HARD-WORKING KANSAS

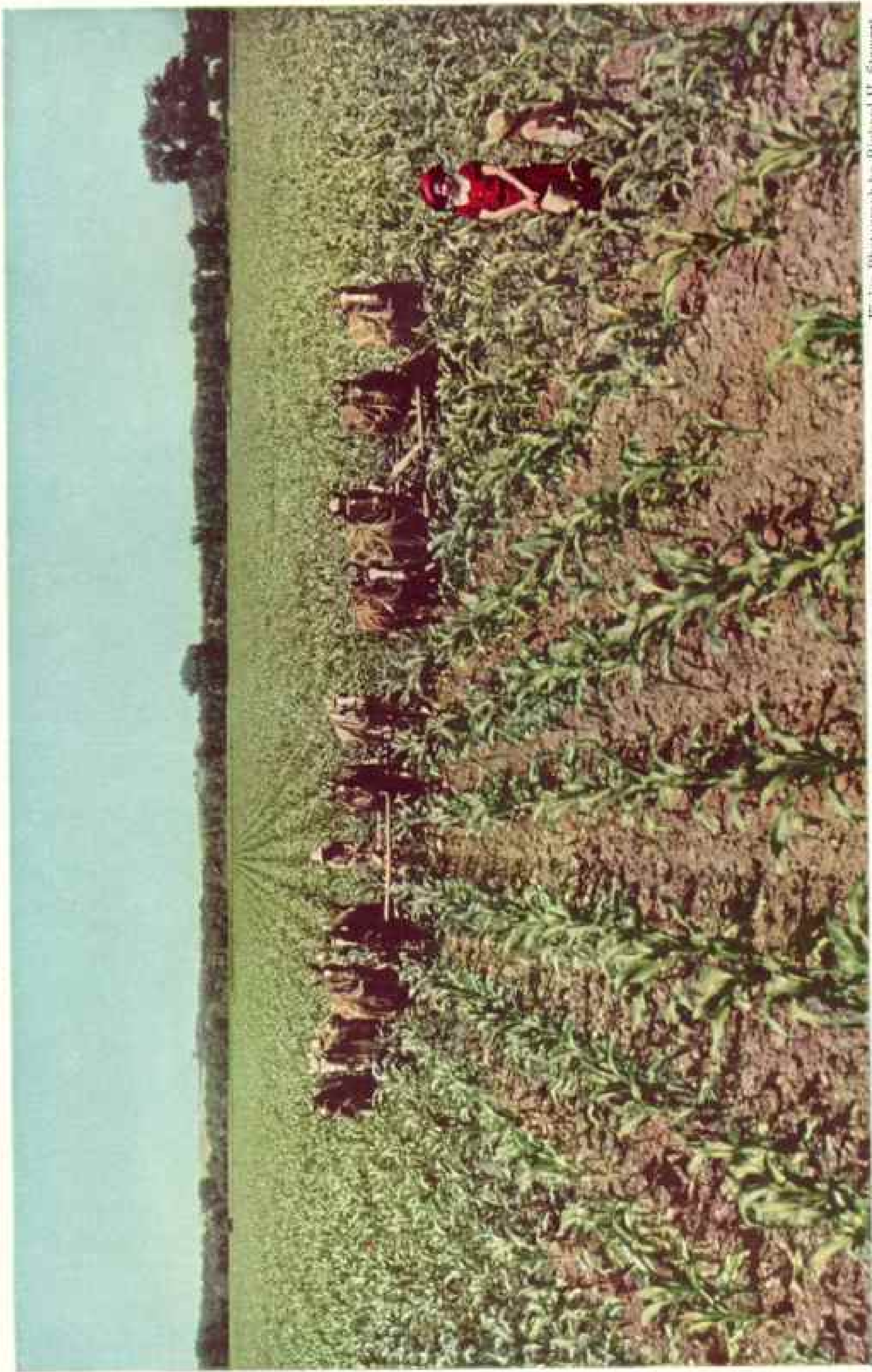
During pioneer political storms the capital moved from Leavenworth to Lawrence, then back again. Now, vanished Minnola, in Franklin County, once barely missed the honor; buildings were erected where today are fields;



Enlay Photographs by Richard H. Stewart

"MADONNA OF THE TRAIL"—A PIONEER MOTHER WITH RIFLE IN ONE HAND AND BABY IN THE OTHER

This monument to the women of covered-wagon times was erected at Council Grove by Daughters of the American Revolution. Under the oaks of this town on the Santa Fe Trail whites and Indians held powwow.

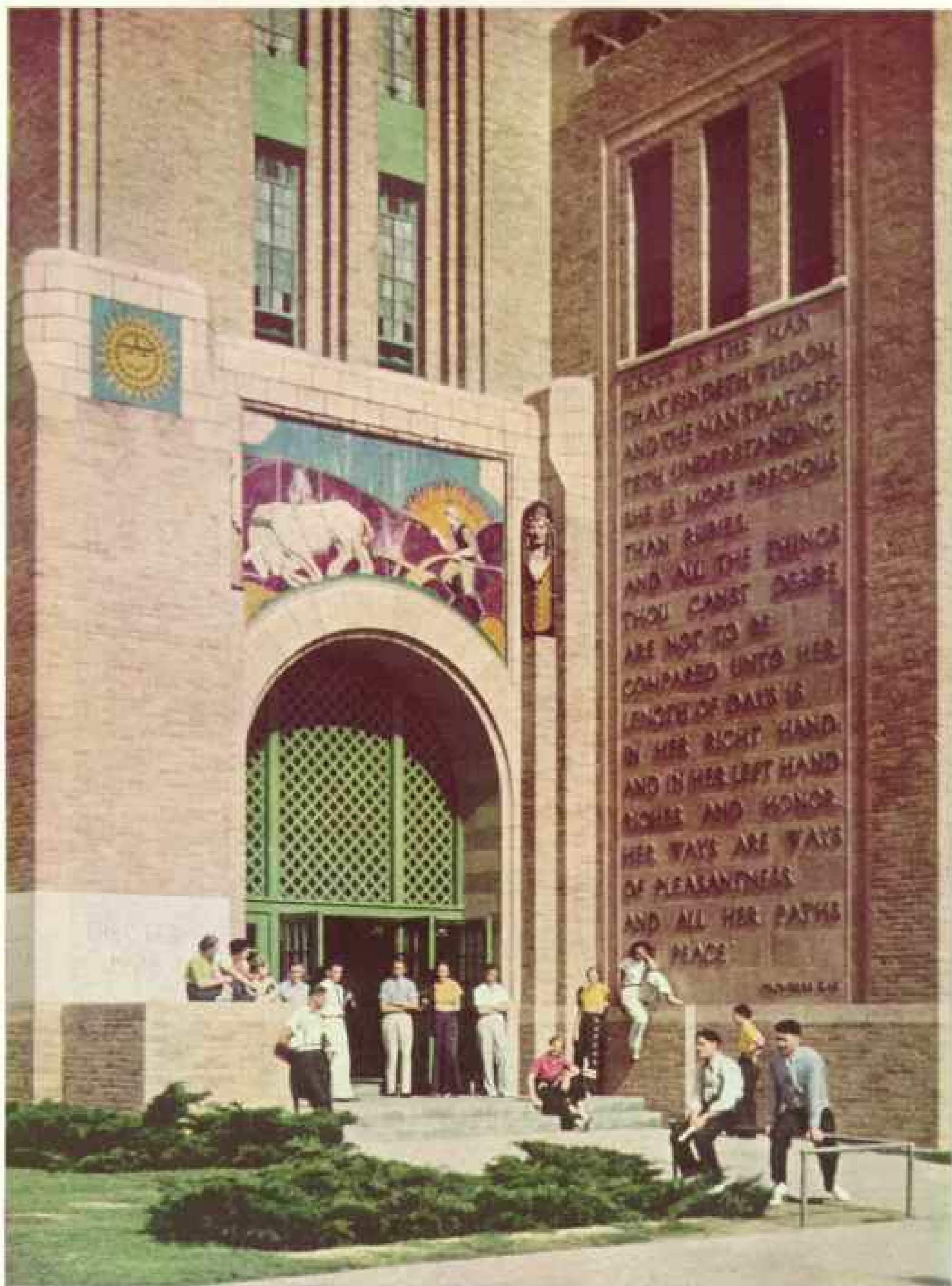


Finlay Photograph by Richard H. Stewart

THE STATE'S HUGE CORN HARVEST IS MOSTLY SOLD IN THE FORM OF MEAT

Farmers realize a higher price per bushel by fattening livestock on corn than they would by selling the ears for cash. Some corn goes also into sheep, poultry, and dairy cattle; hogs eat perhaps 40 per cent of all corn grown in America.

© National Geographic Society



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Flinty Photograph by Richard H. Stewart

THOUGH THERE MAY BE NO ROYAL ROAD TO LEARNING, THE MAIN PORTAL OF WICHITA'S NORTH HIGH SCHOOL IS A GATEWAY OF MAJESTIC BEAUTY

Sunflower, plowboy, and Indian, symbols of Kansas, adorn the entrance, while on the wall, at right, are those words from Proverbs (3:13-17), beginning: "Happy is the man that findeth wisdom and the man that getteth understanding . . ."

Long before we reached the open pit coal mines, near Pittsburg, we could hear the hoarse, menacing roars of the giant shovels—such terrifying growls as might come from lions big as battleships. It was dusk; in the lonely, quiet countryside, smelling of dead ragweeds, dog fennel, and burnt straw, the hideous noise seemed even more unearthly.

Coal veins here lie only 20 or 30 feet below ground. Leviathan shovels, scooping up twenty-one and a half tons of dirt at a mouthful, dig their wide trench as they crawl, leaving the clean, black vein exposed on the trench floor. Other machines follow, pulling up the coal and lifting it out.

You see few men; only two or three to drive the colossal electric crab that crawls irresistibly along, grabbing in one big bite, and then spitting out, dirt enough to load ten or fifteen wagons (page 176). For rods away the earth fairly trembles. As a war weapon, what a wilderness path such a mechanical behemoth, a super tank, might cut through defenseless towns!

Ruin lies in the wake of strip mining, a tumbled, scarified, useless world of wasted fields.

To see, again, what desolation man can accomplish when he turns mole or prairie dog, look at the "Jack mine" dumps, and the rubbish mountains that mar old zinc and lead fields about the tottering town of Galena. Shell-torn villages on the World War's Western front come vividly to mind. Even city streets have been undermined, and buildings have caved, from predatory man's ruthless quest for minerals.

Here, literally, he has turned his earth upside down, just as a careless child, seeking a toy, turns a drawer's contents topsyturvy. And away to the west of Galena, along the Oklahoma border, march miles of still more lonely, grayish dumps—some sharp like pyramids, some rounded by winds, like the Sahara's bare, burning dunes.

Between Fort Scott and Kansas City lies an old haunt of French trappers, scene of the Marais des Cygnes (Swamp of Swans) massacre. I saw no swans, but many black crows, cawing, glistening in morning sun, and a pack of hounds that stood on their hind legs and howled, and tried to get out of their chicken-wire pen.

Here an old village is still known as Trading Post. Near it is a tall monument to men killed in 1854, during that guerrilla

border war between Kansas free-soilers and proslavery raiders from Missouri. Lines on it read:

On the lintels of Kansas
That blood shall not dry,
Henceforth the bad angel
Shall harmless go by,
Henceforth to the sunset,
Unchecked on her way,
Shall liberty follow
The march of the day.

Metropolis of this State is Kansas City, Kansas. On the Missouri side: shops that sell boots, big sombreros, and horse gear; on the Kansas side: a big, busy town of mills, packing plants, soap factories—and the fine homes of many who ride over to daily affairs in the big Missouri town across the river. Shaded by great modern buildings, in the heart of the Kansas city, is an old Indian burying ground, long a bone of contention between sentimentalists and municipal builders.

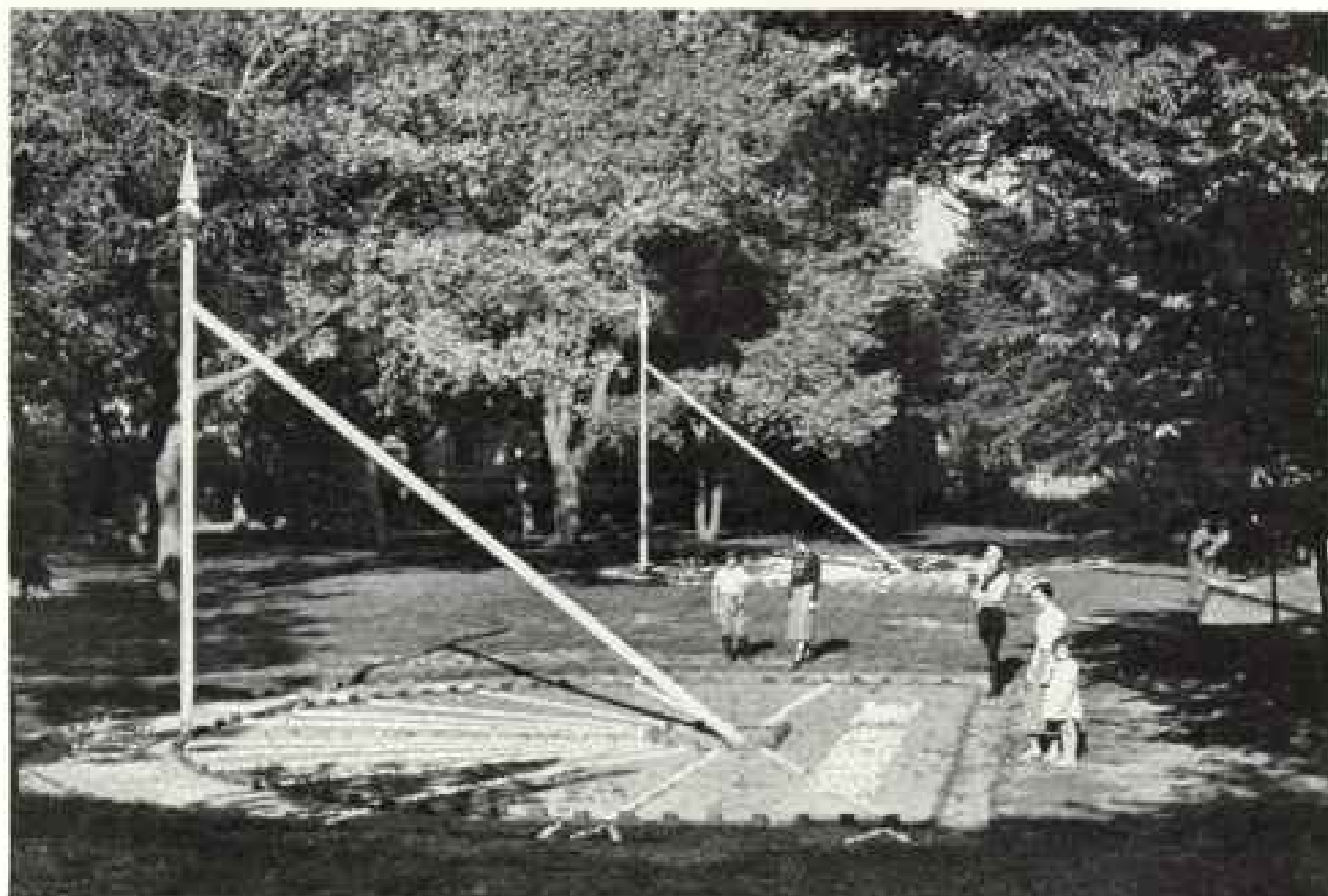
"IN HIS STEPS," BY A TOPEKA MAN, HAS SOLD MILLIONS OF COPIES.

"Modern men don't look up at the sky often enough," said Dr. Charles M. Sheldon at Topeka. "That's why I like Kansas. Here everybody looks up at the heavens every morning, to see how the weather is. Enough rain, at the right time, means crops, and crops mean life out here."

In His Steps, by Dr. Sheldon, has probably sold more copies than any other book ever printed, except the Bible. Gilbert Seldes, writing in the *Saturday Evening Post*, estimates its sales, in English alone, at about 20,000,000. It has been translated and pirated in a score or more of foreign languages, and Dr. Sheldon himself says he has no exact estimate of his book's total distribution.

"I didn't begin *In His Steps* as a book. I simply wrote a bit each week to read to my young people's group on Sunday nights. Though it's been published all over the world—even in Japanese and Persian, as you can see by that bookcase full of translations—I never made more than a few hundred dollars from it. I've written about 40 other books, often doing from 6,000 to 8,000 words at night, in longhand. Come on; I'll drive you about Topeka."

In sheer size, colossal Santa Fe shops and offices easily dominate Topeka, almost obscuring even the Statehouse. Brisk industries abound, ranging from meat products and flour to the printing and metal trades.



Photograph by Richard H. Stewart

FOR FORTY YEARS THESE TWIN SUNDIALS HAVE ENTERTAINED PASSENGERS AT THE SANTA FE RAILROAD STATION IN DODGE CITY

Time changes one hour here, so one dial registers Central, the other Mountain time. As sun time varies from watch time at different seasons of the year, a correction diagram is set between the two dials to simplify computation.

Curious among industries is one which packs horse meat for export to France.

Hub of the State's highway system, served by four railways and by ample water and power plants, Topeka is a good example of a well-balanced, mature American provincial city. Almost every one attends some one of its sixty or more places of worship. Many businessmen still go home to lunch and street dogs bark at guests returning late to the Jayhawk Hotel.

Fascinating above all is the highly instructive museum of the State Historical Society. Would you like to see an old vest worn by Pat Garrett, who killed Billy the Kid? It's here. So is the tombstone of David G. Buffum, "born at Salem, Massachusetts, November 11, 1822," on which is written: "I am willing to die for the cause of Kansas."

Wood from that Virginia gallows where they hanged John Brown is also shown, along with such things as Kit Carson's ax, Arapaho arrows, Cheyenne medicine bonnets, Pawnee flutes, pioneer printing presses, high-wheeled sulkies, and leather-sprunged stagecoaches.

Relics of New England settlers are spinets, four-posters, 200-year-old guns and powder horns; older still is an ancient Spanish sword, inscribed, found in southwest Kansas where a certain Gallego of Coronado's expedition may have lost it.

Infinitely more important, to readers, is the Society's astonishingly complete library of works on Kansas, and its vast file of documents, manuscripts, maps, photographs, and Kansas newspapers.

TRICKS OF KANSAS CLIMATE EXAGGERATED, SAYS THE WEATHER MAN

This State is like a big, dusty blotter, 200 by 400 miles in size. Countless tons of rain water fall on it every year; but, as some complain, "The rains don't stick," so it has had floods. It also has drought and dust, and of its climatic vagaries one hears endless odd tales.

"Once huge hailstones fell during a rain on my place," a farmer said, "and the creek rose and washed chunks of hail downstream into a drift of old straw and brush, and that ice didn't all melt for two or three weeks." Hail insurance, agents say, shows that loss



Photograph by Richard H. Stewart

FROM ALL OVER AMERICA AND FROM NEARLY TWO SCORE FOREIGN LANDS,
STUDENTS CHOOSE KANSAS STATE COLLEGE FOR ITS FARM COURSES

Thirty-eight German millers came to inspect the miniature flour mill used at this Manhattan, Kansas, institution to teach students how best to make flour. Since 1873 the college has taught home economics. At first, demand was chiefly for teachers. Later it came to include dietitians, nutrition specialists, managers of food-serving institutions, and allied occupations.

from falling ice is five times worse in western Kansas than in the eastern part. Such hail kills chickens, small pigs, and many, many birds.

Riding over Kansas, I saw more cyclone cellars, too, in central and western Kansas than in its east, and heard tales of wind pranks—of feathers blown from fowls and water from wells. Finally I hunted up the weather man.

"Freak stories about tricks of Kansas climate give the State a bad name," said S. D. Flora, U. S. meteorologist at Topeka. "The fact is that tornadoes are not more frequent here than in several other Midwest States where storms have killed more people and destroyed more property than they ever have in Kansas.

"One flood, in 1935, caused more damage than have all the Kansas tornadoes in history. The chart of a tornado's trip across Kansas is no larger than a pin scratch on its map, while floods may injure vast areas.

"Droughts, in the Kansas corn lands, are no worse than they are generally over the Corn Belt of the Midwest. Eastern Kansas

has a combination of sunshine and normally abundant rainfall during the growing season that is probably not equaled anywhere else in our country; the west portion is drier, yet during the six warm months of the year it receives on an average about three-fourths as much rainfall as Iowa.

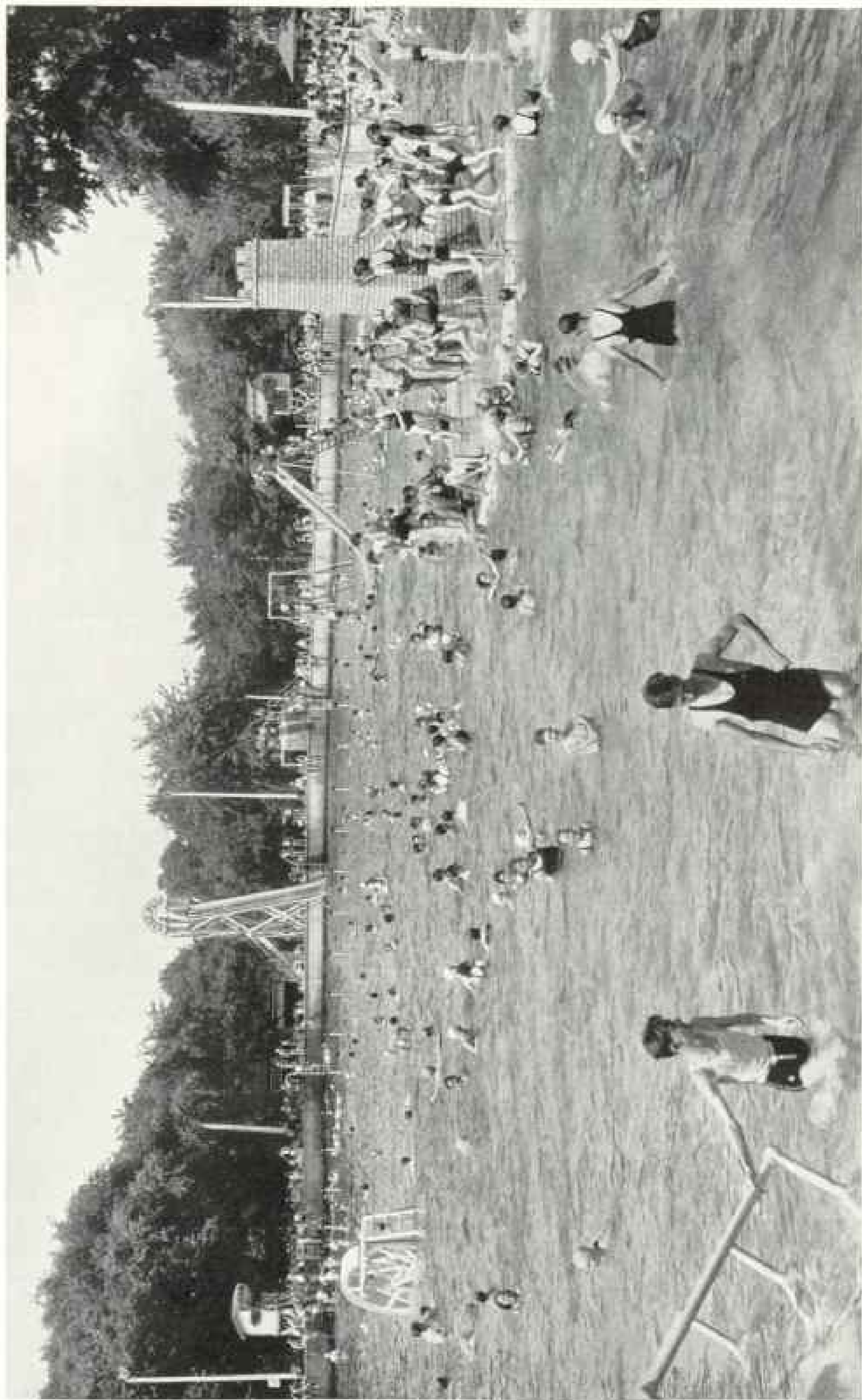
"Our hot spells are more frequent than in most States, but the heat is dry, endurable.

"Dust storms hit Kansas hard in the last three or four years; but old records show that this State has had many such storms in the past, and that in due time a wet cycle will put an end to them for a while."

GRASS, DUST, CATTLE—AND SWINE THAT
WADDLE WITH FAT

All over the West you hear talk about dust storms. Some are merely western sand blasts of the same kind that have blown from time immemorial; in others, men say, the material that moves through the air is not sand, but good, honest dirt—fine soil from their fields (page 170).

It all started from plowing up buffalo grass, that great natural carpet that used to



Photograph by Richard H. Stewart

JAYHAWKERS SHOUT, SPLASH, AND FROLIC IN TOPEKA'S GAGE PARK SWIMMING POOL, ONE OF THE NATION'S LARGEST

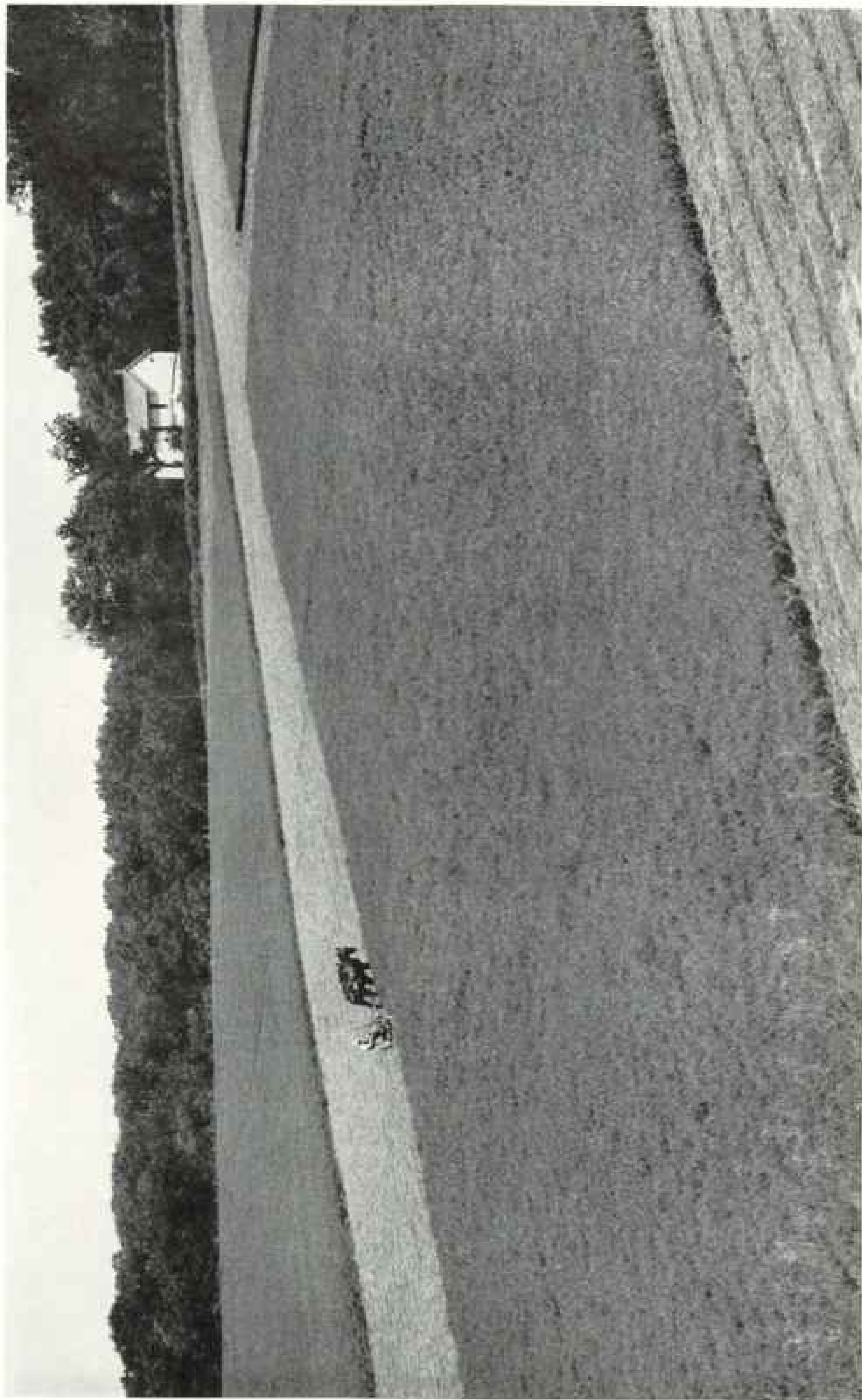
Though part of Kansas is often short of rain, the State provides an astonishing number of artificial ponds, lakes, and pools. Some are for irrigation, some for fishing, and many for boating and bathing, or the mere beautifying of landscape (Color Plates II and V).



Photograph by Richard H. Stewart.

BOWLING-ALLEY BALLS BIG ENOUGH FOR A PAUL BUNYAN CLUTTER UP THE COUNTRYSIDE NEAR MINNEAPOLIS, KANSAS

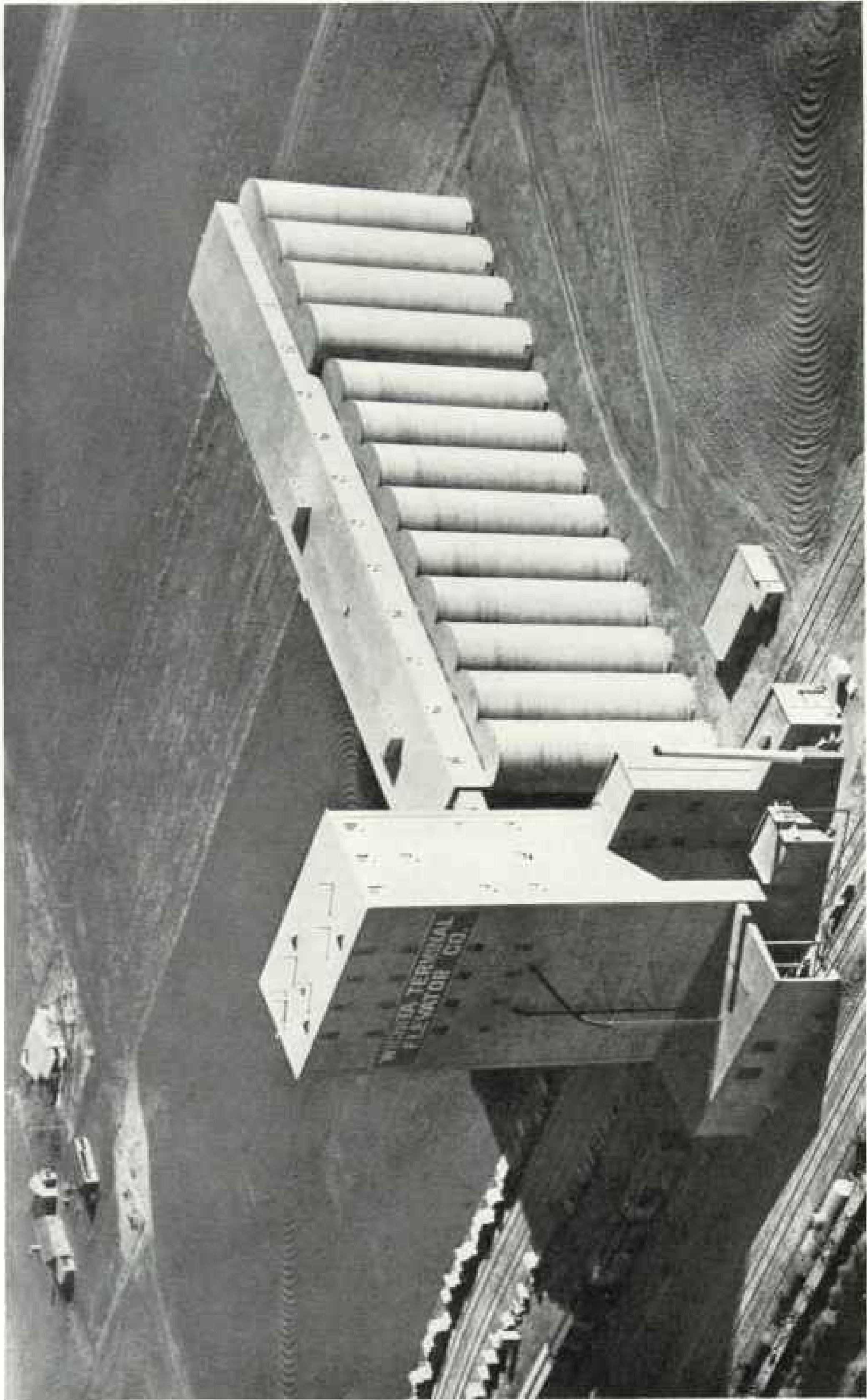
Wind and water, plus the patience of Father Time, whittled these big marbles from Dakota sandstone, the dominant bedrock in north-central Kansas. Few cross-country riders see these curiosities, since they lie off the main highway.



Photograph by J. W. McManis

CUTTING A HEAVY STAND OF ALFALFA IN A THREE-BORDERED KANSAS FIELD

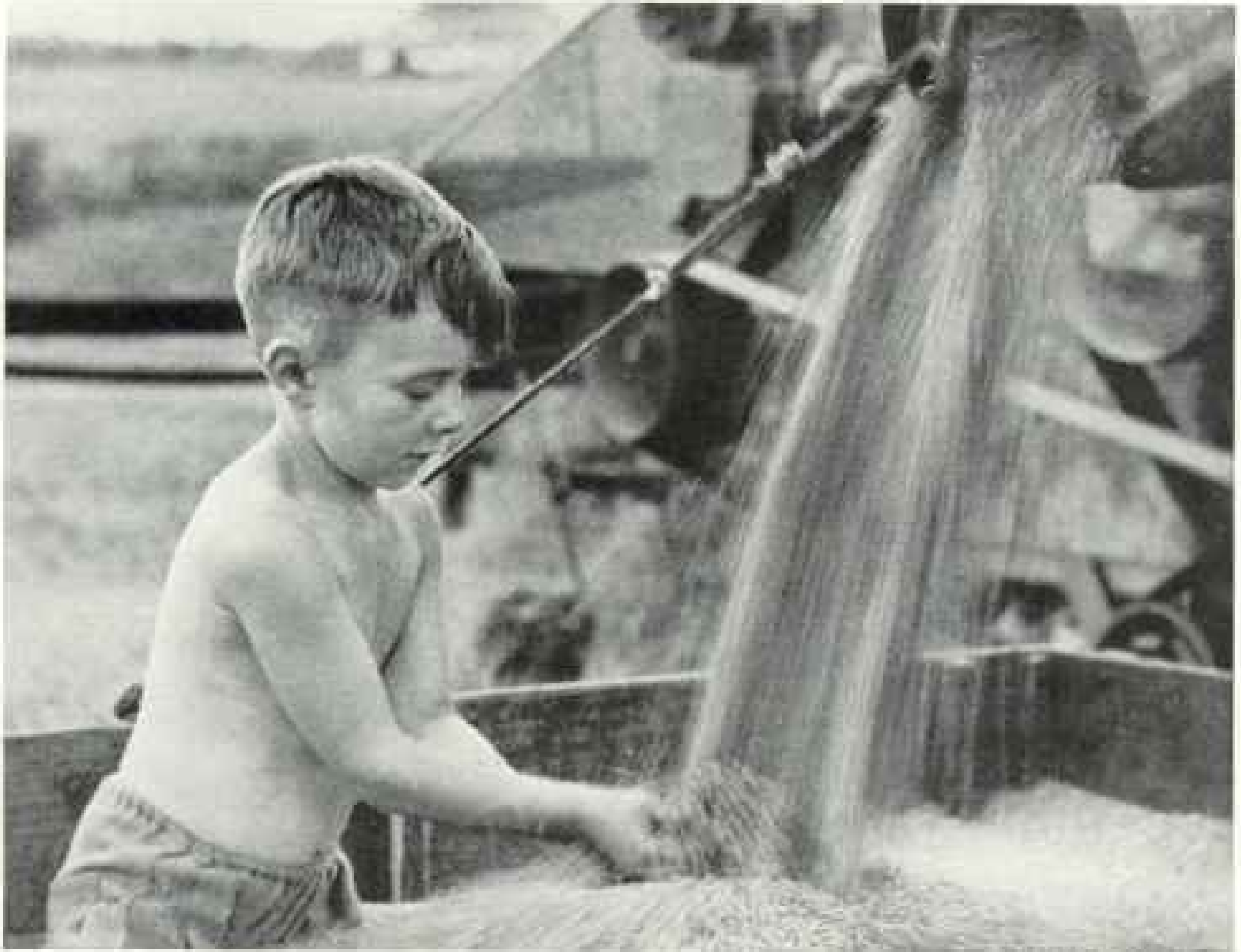
Often three and four crops are cut in one year, and sometimes such heavy cuts pay for a farm in one or two seasons. Alfalfa came to Kansas from Persia (Iran) via Chile and California. Photographed from a windmill, this bucolic scene shows a farm in Shawnee County, a few miles north of Topeka.



Photograph by Bureau Flying Service

GIGANTIC GRAY CEMENT CYLINDERS FORM THIS CAPACIOUS WHEAT ELEVATOR, OR "KANSAS CASTLE"

These striking architectural patterns originated in the Midwest Wheat Belt. This one stands at Wichita, and many others dot the Kansas plains. Grain is pumped through the pipes which emerge from the left side of the structure. Millers from other States come here every year and buy millions of bushels.



Photograph by J. W. McManigal

STRIPPED TO HIS WAIST ON A HOT DAY, A FUTURE FARMER LETS NEW-THRESHED WHEAT TRICKLE THROUGH HIS FINGERS

Instinctively, from time immemorial, man has performed this gesture with his grain. He likes to feel it! Into the humming thresher wheat in the head has been fed, and here, on a farm near Mercier, the clean grain stream pours out, reddish brown, nutritious, and fragrant.

spread over so much of the West, curing in the fall to make good winter forage.

"Today not much of the land in west Kansas is left in buffalo grass," said Dr. A. E. Aldous, of the Kansas State College. "The plowing up of that sod covering, together with some improper tillage and the abandonment of large acreage, has added to dust-storm troubles during very dry years."

"Can you plant grass again where it used to be, and check these dust storms?"

"There is a popular demand for such restoration," answered Dr. Aldous, "and the State is working hard on the problem of re-sodding.

"Certain grasses, of both native and foreign stock, seem to offer possibilities. Grasses such as blue grama and western wheat grass, for example, can be collected without too much cost.

"In our program of breeding and selection it is expected to get better grass for all sec-

tions of the State; both imported and native varieties are being used as parent stock.

"In a reasonable time this work should provide us with grass species for use all over Kansas. But the natural revegetation of land in west Kansas will take 25 years or more, depending on seasons, erosion, and the distance seeds must travel from other natural grasslands."

Grass, from time unmeasured, has made this a cattle country. "The plains are full of crooked-backed oxen," noted Coronado—meaning the bison. They roamed America with a head count no other animal of such size ever approached. You get some idea of how many lived in Kansas and drifted across it when you read that between 1868 and 1881 the bones of some 31,000,000 buffaloes were picked up and hauled out on trains. This is Henry Inman's estimate in *The Old Santa Fe Trail*.

With mere words and figures no man can tell all the buffalo truth. Some say that

100,000,000 or more buffalo once lived in the Midwest. Nobody knows. Today people look curiously at them in the zoos.

Domestic cattle came here with whites, following covered wagons.

After Lawrence, Leavenworth, and Atchison were laid out in 1854, settlers began to swarm in; besides such needed tools as axes, saws, hoes, and plows, they brought their livestock. When the territory's first railroad track was laid in 1860, already about 100,000 cattle had reached Kansas.

Now was to come up from Texas that incomparable bovine parade that filled Kansas for years with thundering herds of longhorns, and some of the toughest two-legged characters that ever coughed over bad whiskey or died with their boots on.

Until the Civil War, when gunboats patrolled the Mississippi River and stopped the herds, Texas cattle used to be driven overland to New Orleans and Mobile. After the war, they started north. From Abilene, Ellsworth, and Wichita in a few years, more than four million cattle were sent by train to eastern markets.

That's a lot of beef; but look at Dodge City's record. By the early 1880's it had become the greatest cattle mart in history. More than 7,000,000 animals walked up the long, long trails from Texas and boarded cars here for eastern butcher shops.

Cattle still come up from Texas and the Southwest to be fed here, and then sold. But now they ride in trains or trucks.

Kansas still has more cattle than people. But advent of slow, lazy, purebred stock, heavy with fat, has meant the end of the old wild "hoofs, horns, and tails" that shouting, shooting, hard-riding cowboys used to drive up the trails (Color Plate IV).

Go to the American Royal livestock show at Kansas City. Sleepy, lying down most of the time in luxurious stalls, over-stuffed bovine aristocrats from Kansas can hardly claim the pioneer longhorn even as a poor relation. So coddled are they that I saw a mechanical back-scratcher, under which pampered bulls might stand and rub to their heart's content, just as wild buffaloes rubbed against the first telegraph poles!

Down southwest, between Medicine Lodge and Liberal, you may see a cowman driving a roadster and hauling a trailer. In it rides his horse, all saddled and bridled. When the man gets to that part of his ranch too rough for motoring, he changes to horse-

back, and goes on to inspect herds, fences, and windmills.

But the cowboy, as such, is passing. "With purebred stock and motorcars and college, the cowman has gone from spurs to spats in three generations," is a Flint Hill aphorism.

Round, fecund earth knows no better corn land than east Kansas. Most corn is not sold for cash; it is turned into money through the alimentary canal of livestock, particularly pigs. Greedy, beady-eyed, sagacious swine crunch the yellow corn to gustatory satiation. Waddling with fat, grunting prize pigs are shown at fairs by Four-H boys. One lad I saw had oiled his black pig's hair, combed it, and then was rubbing it to a gloss with a polishing cloth. Swine-land swank—but it got the ribbon. To such animal fanciers farming is a joyful way of living, more than a road to fortune.

CHASING ACROBATIC JACK RABBITS

"In years when crop damage from rabbits is worst, there are from 200,000 to 400,000 jacks in every one of our thirty-odd western counties," said Professor F. L. Timmons of Kansas State College.

"Three jacks can eat as much as one sheep, and 25 can eat as much as a steer. Often you'll see whole wheat fields eaten off, right down to the ground.

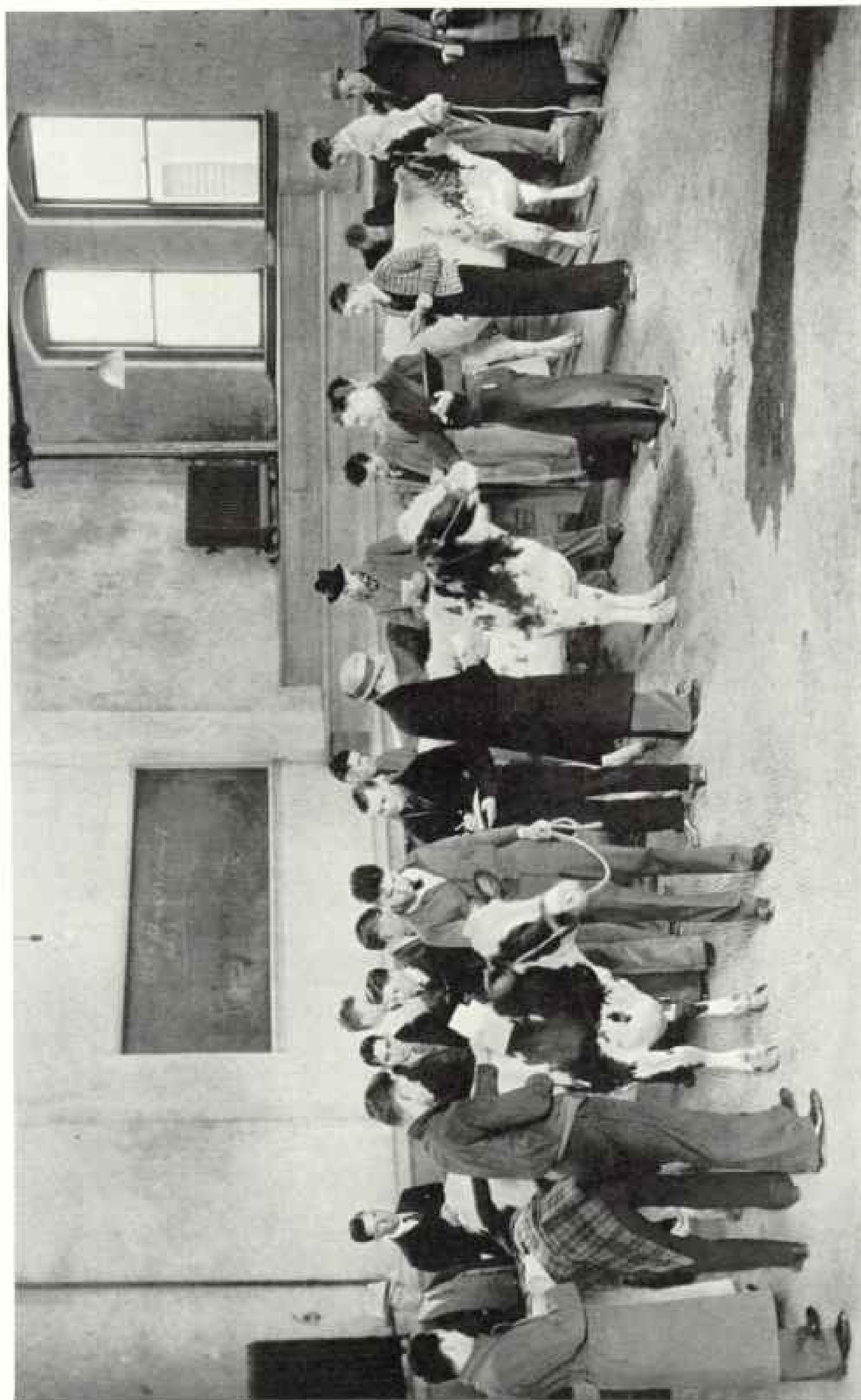
"No wonder farmers gang up to save green crops and forage!"

After such a drive—and a single hunt has "liquidated" 50,000 animals—carloads of jack rabbits have been shipped to the Salvation Army in New York City.

At Abilene's annual meet of the American Coursing Association, when 1,000 or more greyhounds are brought here for the autumn racing, captive rabbits are chased by the hounds. After the races, dog auctions are held, at which good hounds may bring from \$100 to \$400. Trapping jacks, and selling them in the East to greyhound fanciers for use in training hounds for the chase, earns good money for certain Kansas farmers.

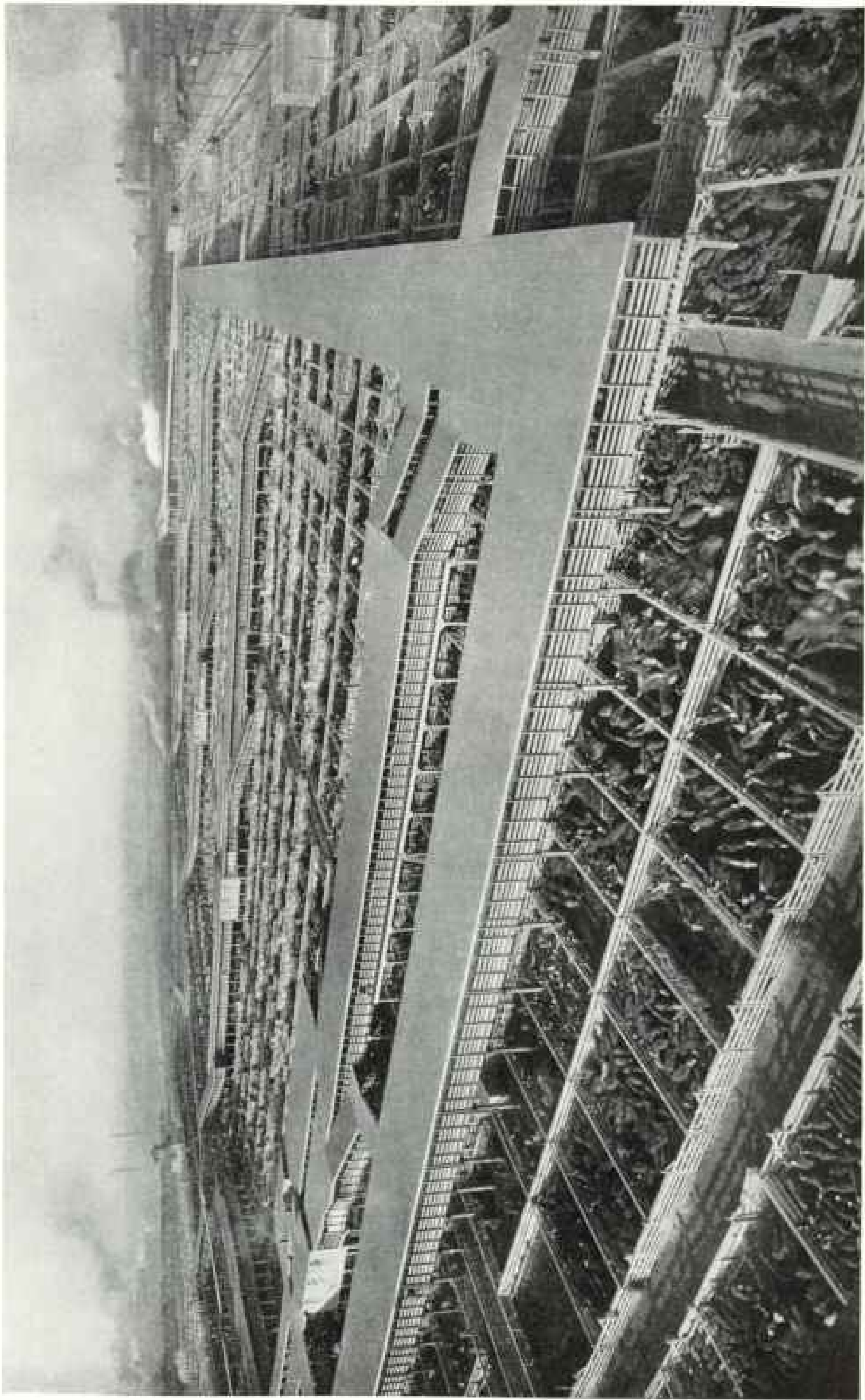
News dispatches from Kansas, as I write, tell of wolf drives—with a Lawrence airplane to guide the hunters—and yet more war on the coyotes, sly thieves of the farm woman's poultry.

English settlers introduced the greyhound to Kansas, partly for the sport of coyote coursing (page 171). From Garden City two bankers took me far back into the open sage hills to chase coyotes. On this trip we



COWS ARE BROUGHT INTO THE CLASSROOM WHERE STUDENTS JUDGE THEM

Here, at Kansas State College of Agriculture at Manhattan, are both practice and theory. On a modern, highly organized farm, as well as in the classroom, students learn the dairy business; in the same pragmatic way other branches of agricultural, horticultural, and domestic science are taught.



Photograph by Anderson

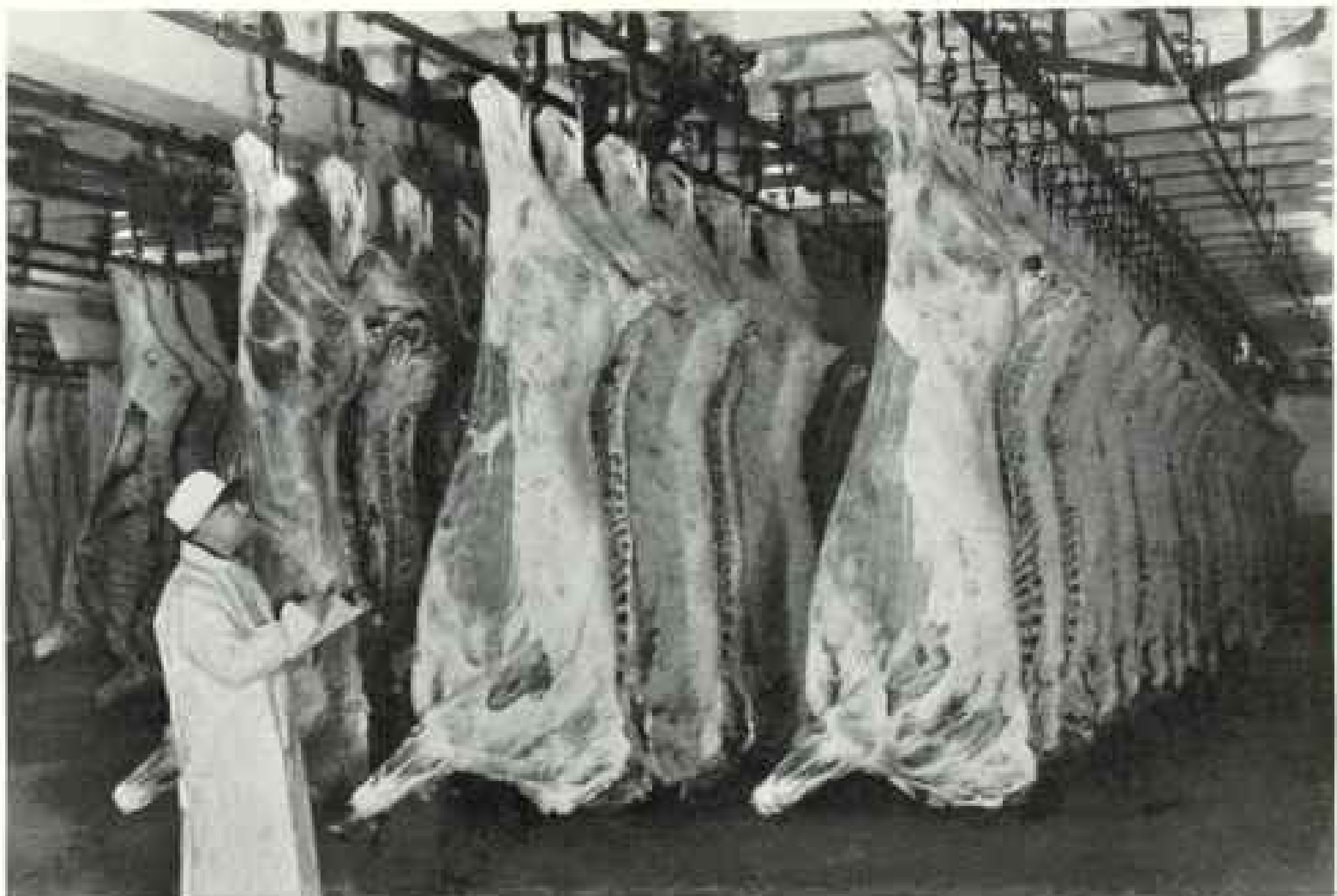
THINK WHAT YOU PAY FOR ONE GOOD STEAK; THEN FIGURE THE MONEY CROWDED IN THESE KANSAS CITY PENS!

Millions of Texas cattle were driven "up the trail" to Kansas in the old days. They still come, by rail now, to fatten here, along with millions raised in the State. In Kansas City, Kansas, vast stockyards crowd the Missouri line.



NEITHER FLOODS NOR SHOVELS BUT DUST STORMS BURIED THIS FARM TRACTOR.

Sand storms always blow, in parts of the West. But what you see here at Utica is topsoil—some from fields in neighboring States. Destruction of buffalo grass, drought, improper tillage, and farm abandonment all contribute to cause these recurring disasters (page 161).



Photographs by Richard H. Stewart

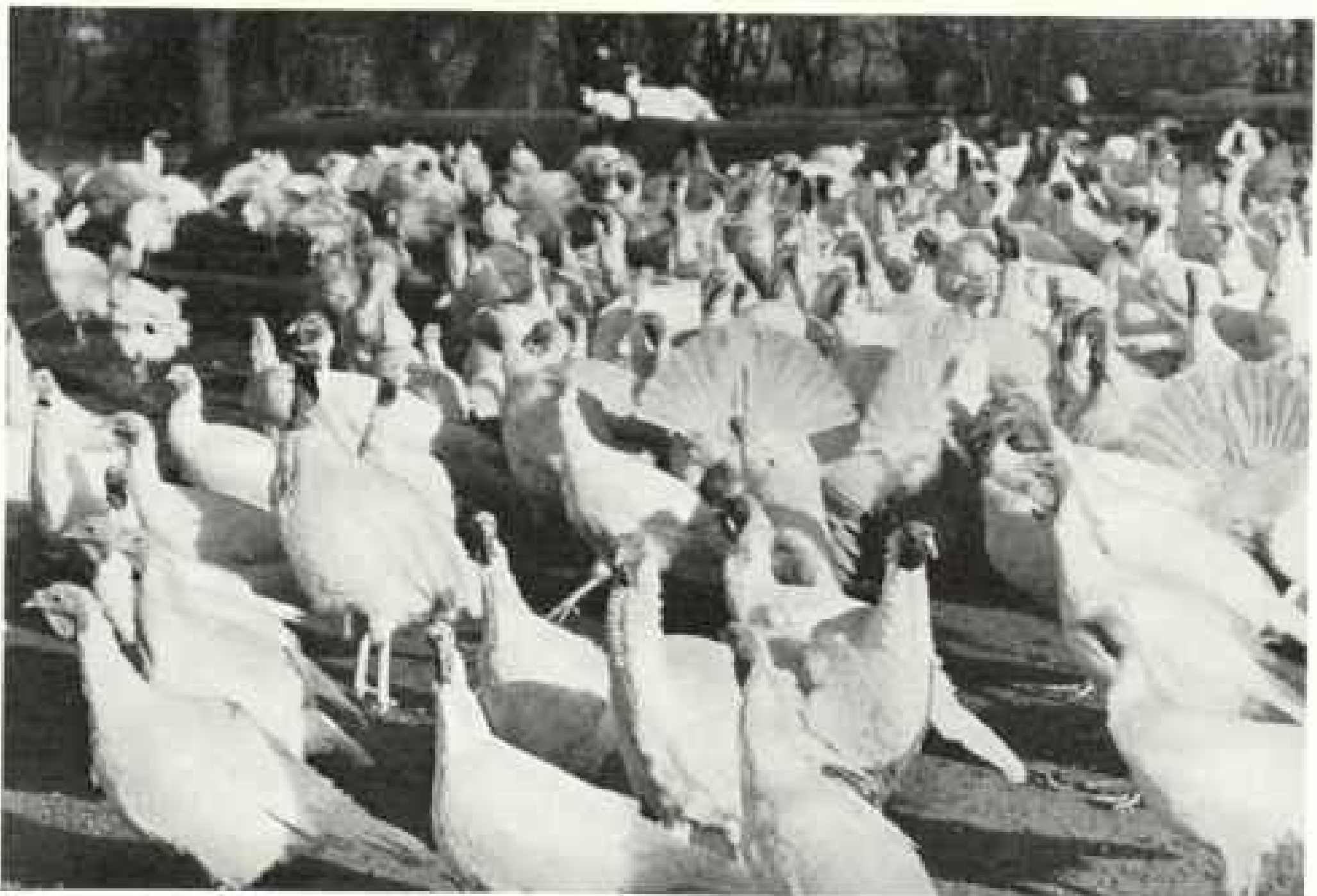
FLAVOROUS KANSAS-GROWN BEEF HANGS IN THE COLD ROOMS OF THE CUDAHY PACKING PLANT AT KANSAS CITY, KANSAS

From the "crooked-backed oxen" (bison), seen by Coronado, to Texas longhorns, to Herefords, shorthorns, polled Angus, and other pure breeds is the Kansas bovine cycle (Color Plate IV). Greatest beef-raising States are Texas, Iowa, and Kansas (page 166).



HE'S NOT TRYING TO LASSO THE HOUNDS—HE'S "SLIPPING" THEM IN A RACE

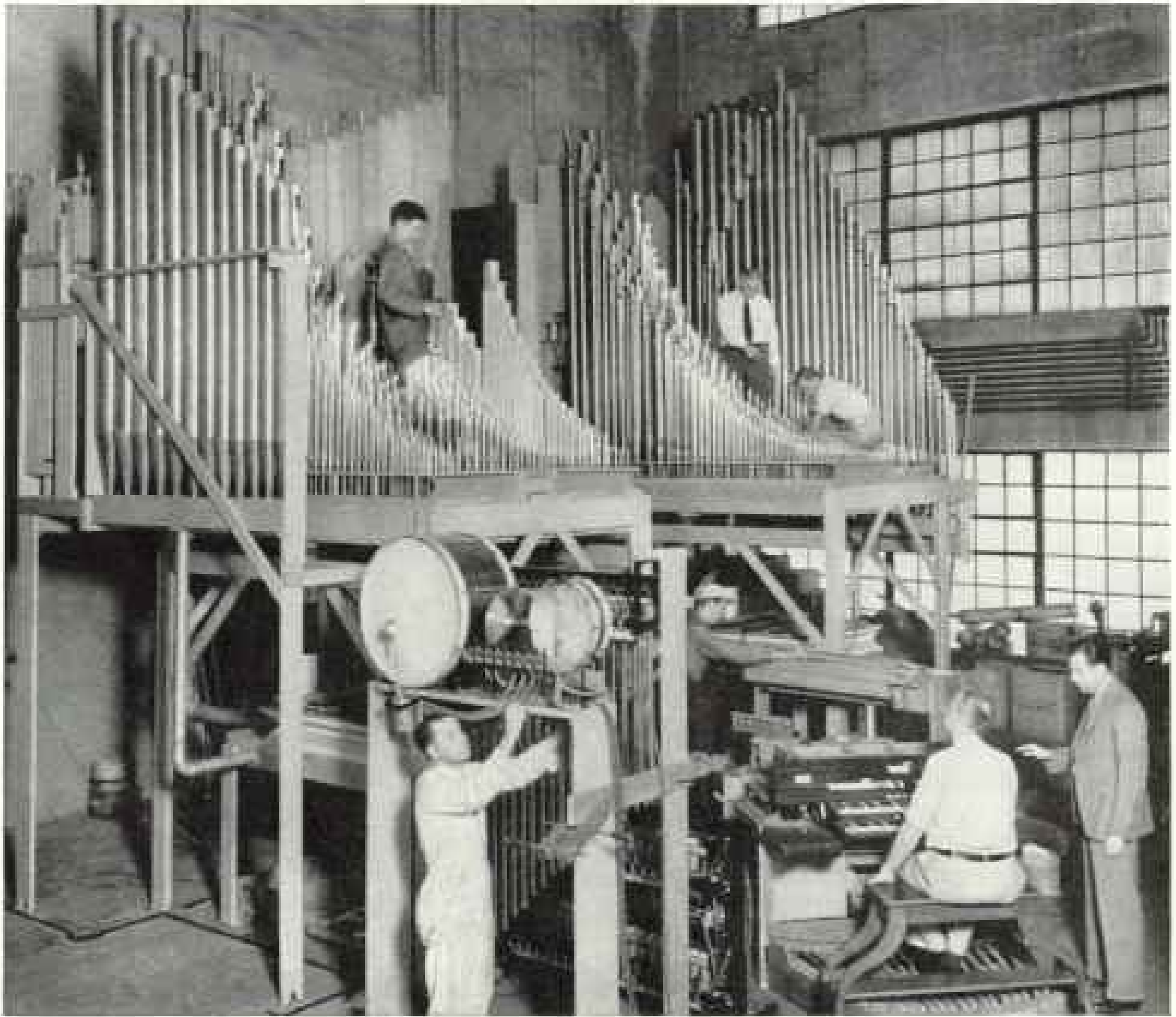
From all over the Nation hundreds of greyhounds come each year to race at Abilene in the National Coursing Association's meets. Fleet-footed jack rabbits are chased by dogs in these races, and "slipping" or releasing the hounds calls for skill and experience (page 167).



Photograph by J. W. McManis

TURKEY: ROAST TURKEY, COLD TURKEY, TURKEY HASH, TURKEY SOUP—EVERY AMERICAN FAMILY KNOWS THAT GASTRONOMIC CYCLE!

These White Hollands, near Denison, are part of a flock of about a thousand birds. They like grasshoppers; during the last plague, farmers hired turkey raisers to drive their flocks through hopper-infested fields, to help fight the pest.



TESTING AN INSTRUMENT WITH 1,200 PIPES IN A LAWRENCE ORGAN PLANT

Most of these pipes are of metal, the rest of wood. Besides various "orchestral voices" suggesting strings, wood winds, and brasses, there are typical "organ voices" which have no orchestral prototypes. Percussions on this Reuter Company organ, which is a residence and not a church instrument, include chimes, *céleste*, vibra-harp, drums, and cymbals. Churches buy most pipe organs, though many go to theaters and homes all over the United States.

met Uncle Billy, who bobbed up like an apparition from the sagebrush. "He used to be a slack wire performer with Ringling's," they said.

"How'd you ever get away out here in western Kansas, so far from the circus?"

"Maybe I walked out on the telegraph wires," chuckled Uncle Billy.

Our hounds, since they run by sight and not scent, mistook a stray yellow country dog for a coyote, and caught and slew him before we could interfere.

Garden City's ditches and hundreds of electric pumps—it once used steam engines—irrigate a vast, lush, Nilelike region where a heavy sorghum crop of one good year has been known to pay the cost price of the farm that grew it. Here is the center of the State's beet-sugar industry, and home

of one of the best-edited country dailies in the West.

MARKET DAYS LIKE OLD-WORLD FAIRS

"How much for this million-dollar shoat?" shouts a comedian auctioneer at a community sale.

"Four dollars!" yells a bidder, as the pig grunts.

"That bid disgusts even the pig," jeers the auctioneer. "Who's got five? . . . You, Ed—up there in the back row."

"Yes, Ed, you need a pig for company," gibes a man in the audience.

"Five," bids Ed promptly, secretly grateful to be singled out by name before the crowd. More such banter and the pig's owner gets a fair price.

Besides all kinds of farm animals, you



Photograph by Richard H. Stewart

"IF I COULD GET HIS MOUTH OPEN AND SEE HIS TEETH, I COULD TELL HIS AGE"

This baby jackass is one of the hundreds of jacks and jennets bred on the Hineman stock farm near Dighton. Mules, agile and shapely, born of mares and jacks, are sold by thousands through Wichita's livestock market.

see a heterogeneous variety of other things—from jam and seed to farm machines and vehicles—put up at these auctions.

RAILS SPREAD A STEEL NETWORK

"We built our first track out of Atchison," said President Bledsoe of the Santa Fe Railway system, which now covers more than 7,000 miles and employs about 50,000 people.

"Those first rails were laid on solid walnut logs, cut in eastern Kansas. Imagine what that much walnut is worth now! It's a curious fact that though our line is named the Atchison, Topeka & Santa Fe, none of our fastest trains now go through any of those cities. Across Kansas we parallel the old Santa Fe wagon trail."

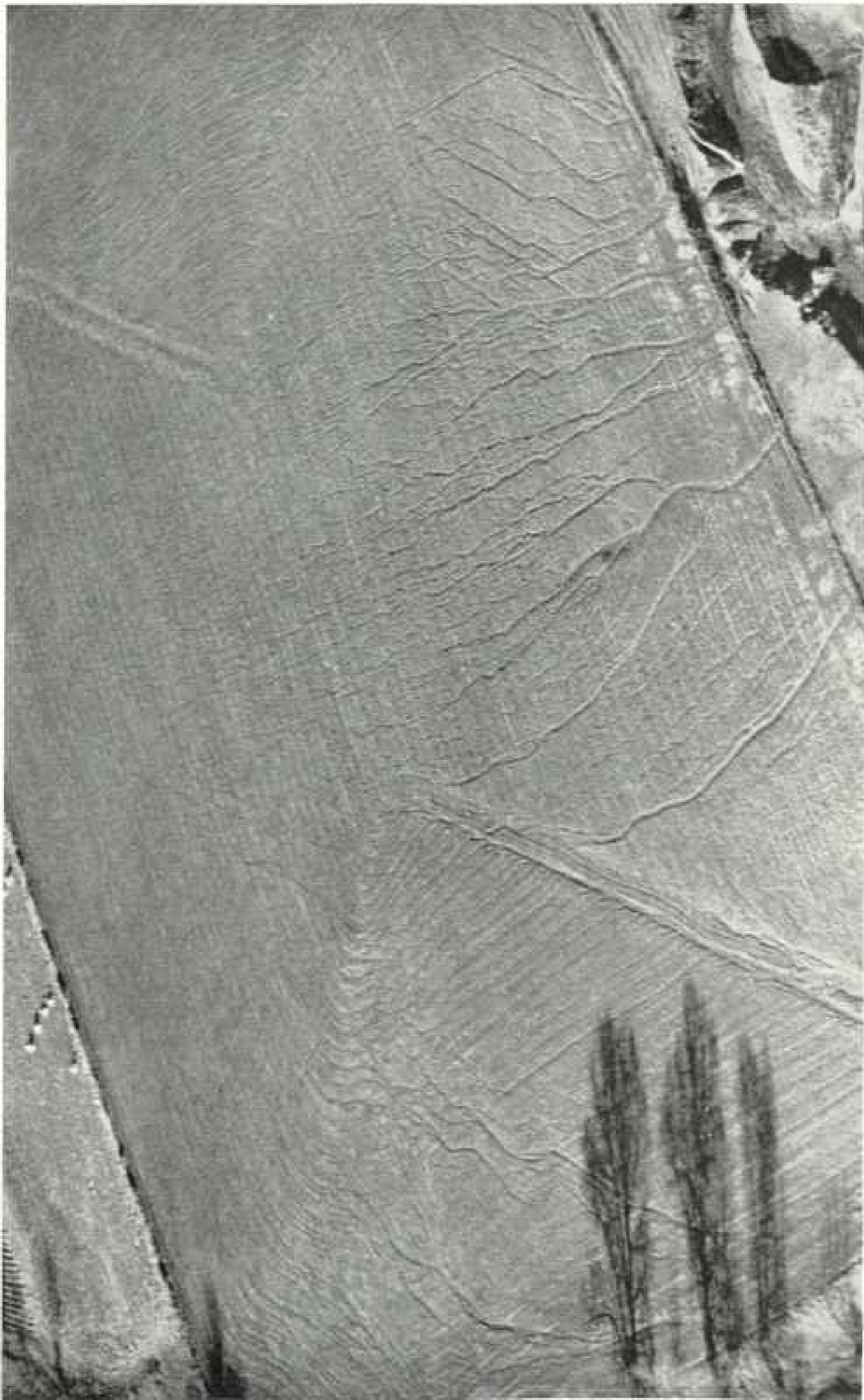
One night I rode in a Santa Fe locomotive cab with the engineer and fireman.

You could sense the rate at which we

whizzed over the prairie by the suddenness with which night birds or fluttering moths appeared in the long, bright headlight ray that pierced the black, and then shot swiftly back toward us. Scared jack rabbits, racing beside, seemed to be slipping backward.

Today Diesel-motored streamline trains streak across Kansas at 100 miles or more per hour. With this speed and comfort, we forget the trials of pioneer track builders until we stumble on such a reminder as a stone set up by the Union Pacific at Victoria. Beneath it sleeps a squad of American tracklayers, killed by Indians in 1867.

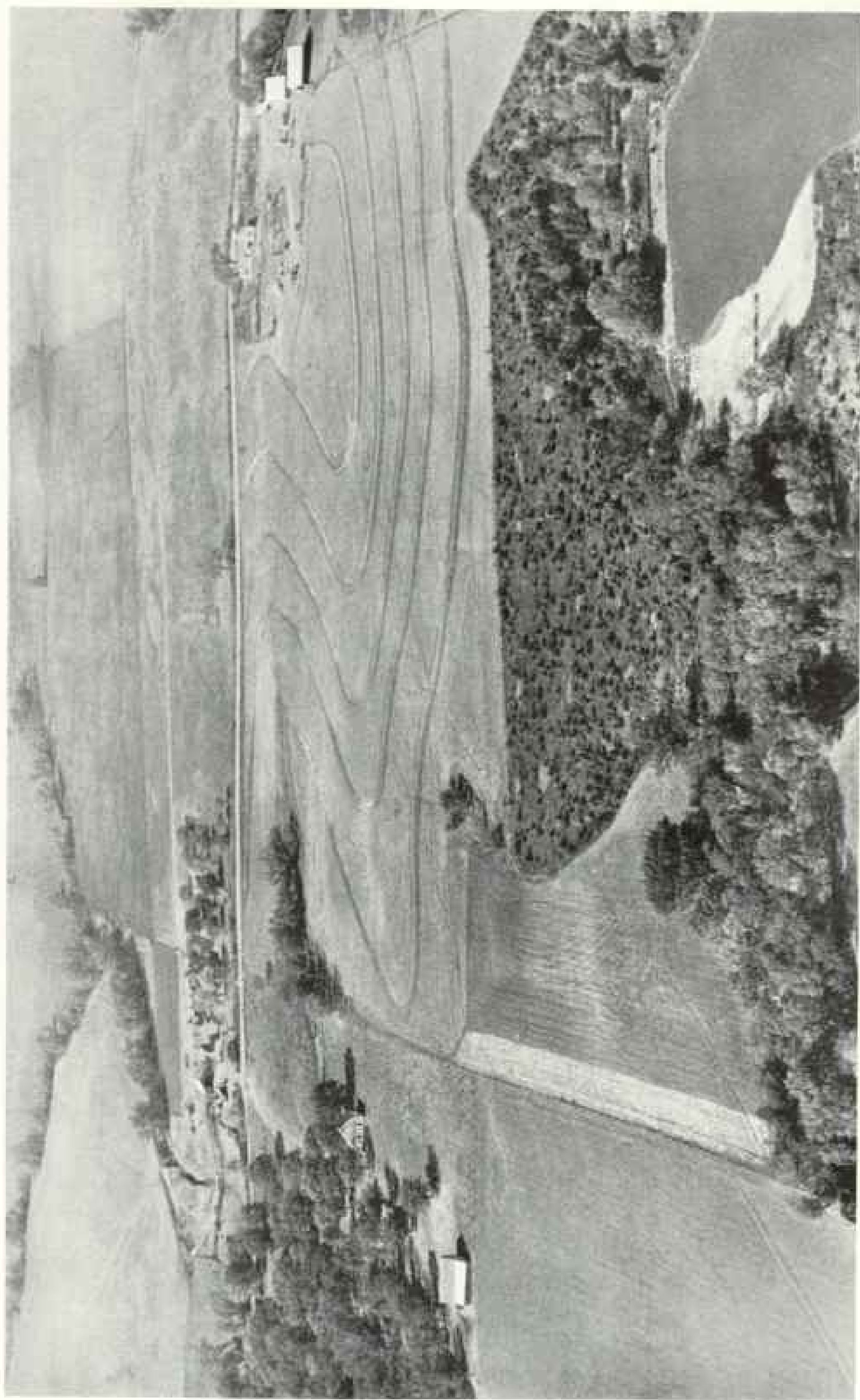
Trying to stop the white man's "fire horse," Kansas Cheyennes once stretched a long rope across the track. As a train approached, crowds of redskins took hold of each end and pulled the rope tight. When the speeding engine hit that rope the air was filled with flying Indians.



Photograph by J. W. McManis

HOW A ONE-INCH SHOWER MAY DAMAGE A HILLSIDE WHEAT FIELD IS SHOWN BY THIS AIR VIEW: NEMAHA COUNTY, IN EARLY OCTOBER

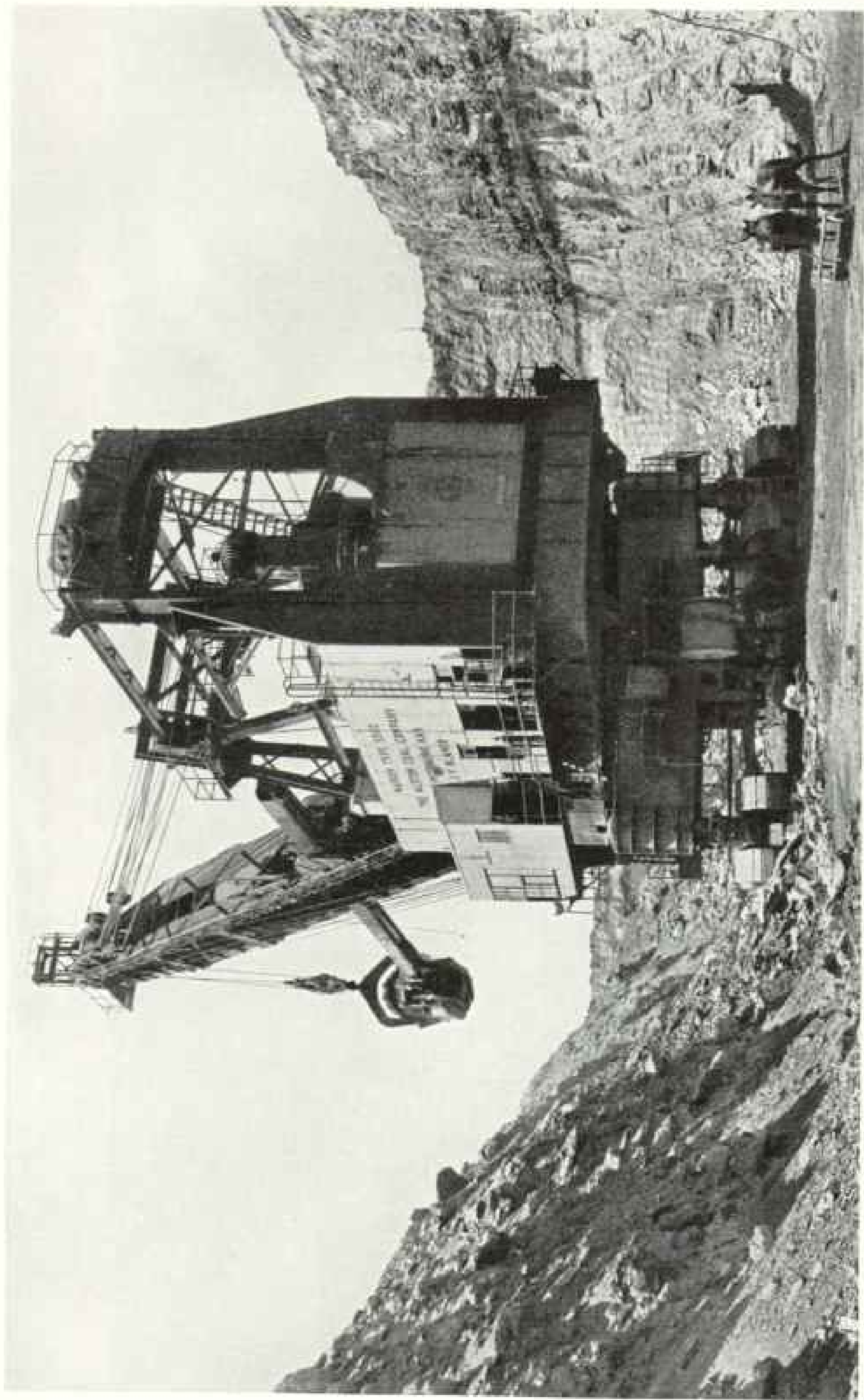
To avoid such loss of topsoil during gully-washing heavy rains, wise farmers now resort to contour plowing, which means circling longitudinally about slopes so that rainfall may run off more slowly. Though the land looks flat from the air, its sharp inclines are indicated by the trend of the fresh washes. In the upper left are blocks of wheat.



Photograph by J. W. McManis

CONTOUR FLOWING ON THE HENDERSON FARM NEAR HORTON, TO SAVE TOPSOIL FROM EROSION DURING HEAVY RAINS

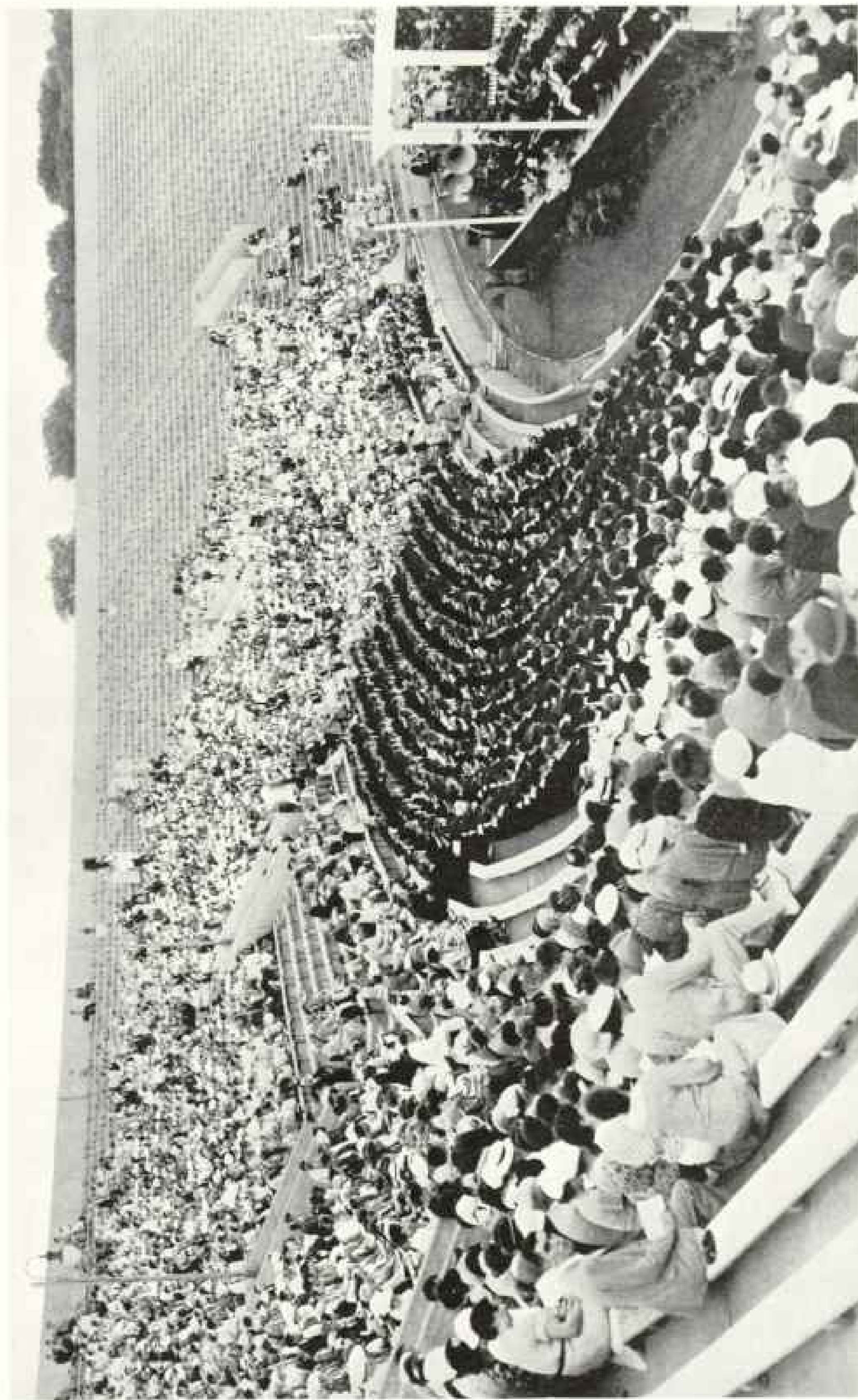
In this terraced field, pictured from an elevation of about 1,200 feet, rain water, instead of rushing downhill and washing gullies, is held back so that much of it soaks into the ground. Riding through east and central Kansas, one sees many such contour plowings, as well as numerous ponds formed by damming small ditches—all to hold rainfall. Patches of woods are a frequent landscape feature in east Kansas.



Photograph by Richard H. Stewart

THE SHOVEL OF THIS BIG COAL-STRIPPING ENGINE HAS MORE THAN FOUR TIMES THE BUCKET CAPACITY OF THE PANAMA CANAL'S LARGEST EXCAVATING MACHINE.

Intricate but flexible, the crabbie monster bites twenty-one and a half tons of earth at a mouthful. It crawls along, making its own ditch, stripping earth and shale from the coal vein below. A smaller machine, following, digs up the coal which this giant uncovers in southeast Kansas (page 159).



LIFE BEGINS AT GRADUATION FOR 900 UNIVERSITY OF KANSAS SENIORS

Gathered at Lawrence to hear the baccalaureate address is an audience of some 3,000, in addition to the cap-and-gowned graduating class. As many as 6,000 sometimes attend the commencement exercises proper, sound amplifiers making it possible for all to hear. Hardest-fought athletic battle known to this stadium is the Jayhawk football team's traditional struggle with their friendly pluckin' enemies from the neighboring University of Missouri.



Photograph by Richard H. Stewart

FENCE POSTS OF HEWN STONE ARE USED IN TREELESS PLACES

Many trees are found in the eastern section of the State, but except for rheumatic-looking cottonwoods near streams, scattered groves and windbreaks nursed by settlers, and shade trees in towns, they are few in western Kansas.

"No use to build a telegraph line through this wild country," affirmed early critics. "The Indians will steal all the wire; and buffaloes, scratching their sides, will push down the poles." All that was long ago. But it's part of western railway history, as were some adventures of Carl Gray, long President of the Union Pacific Railway. He joined thousands of others in that historic run for free land in the Cherokee strip, just below the Kansas border. From Arkansas City, Kansas, he rode on top of a crowded train. He says:

"At the line soldiers held the crowd back. Promptly at noon Army officers fired

their pistols into the air, and we all started.

"Our train had orders not to outrun galloping horses. Men rode in all kinds of odd conveyances. One drove a racing sulky, with his horse's tail under him. Another started on a high-wheeled bicycle, but soon fell off.

"Driving an ox team hitched to a plow, a farmer started right off the Kansas line and plowed a furrow about the piece of land he wanted.

"Time and again, as we rode deeper into the strip, some man, liking the looks of the spot we were passing, would jump or fall from a car window, hitting the ground with a clatter of tin camp pans. Then he would jump up, fire his six-shooter, and start running for his chosen site.

"Near what's now Perry, I too got a lot in this Promised Land. But I didn't keep it. I was young, and went mostly for the excitement. So when a disappointed, tired, and dusty girl appeared—a girl who had failed—I gave her my claim. The last I ever saw of her, she was sitting on a camp stool, on that free lot, holding up an umbrella."

Kansas, with no large cities, is a State where neighborhood events, as well as local philosophy and natural phenomena, are copiously recorded in the press. Some such items reflect Kansas energy, behavior, and human interest:

After a community wolf drive, church women serve supper to tired hunters.

Rubber boots for horses are made at Junction City: one kind to protect their feet in jumping, another to save their shins from polo-mallet blows.

At a Kansas editors' golf tournament, first prize was a carload of gasoline.

Some rural schools still have only one pupil, despite much consolidation. Reports for 1936 showed 105 schools had only two pupils each; 210 had three; 353 had four.

Here, too, "exams" bring queer answers: "Mark Twain was our greatest pony express writer. . . ." "The best part of wind is fresh air. . . ."

"The Melting Pot is when all the farmers get together. . . ."

Kansas makes many things, from pipe organs in Lawrence to toy trains in Abilene. Carloads of pressed-metal streamline trains come from Abilene's busy toy shop; production has sometimes reached 7,000 trains daily, some for export to England.

In Olathe a shop has made fancy cowboy boots for President Coolidge, Will Rogers, Tom Mix, Jess Willard, Ruth Roland, Buffalo Bill, Buck Jones, Pawnee Bill, Ken Maynard, and Pat Hurley.

Like some castle on the Rhine, the Benedictine Monastery at Atchison towers above the muddy Missouri.



(Photograph by J. W. McManus)

SHE IS ONLY 13, BUT HER STRONG HANDS FILL THE BIG PAIL SWIFTLY

Well-equipped and prosperous is her father's farm near Horton. But farm life now, as in pioneer days, tolerates no drones. Everybody works, though the advent of gas, electricity, and washing machines lessens the drudgery.

Settled three or four generations ago, Atchison seems more mature, more leisurely, than newer Kansas towns like boisterous Wichita and Hutchinson.

Yet here is activity unsuspected by travelers hurrying through. One machine shop making locomotive parts and other things fills orders from lands as far away as the Netherlands Indies.

Atchison's streets smell of alcohol. These fumes are from the Bailor plant where fuel alcohol is made from corn. "We can make it from wheat, potatoes, artichokes, from many grains and vegetables," said a chemist. "In fact, we are examining all kinds of



Photograph by J. W. McManis

KICKAPOO INDIANS, NOT PLOTTING AGAINST THE WHITES, BUT PROBABLY ARGUING OVER WHAT MODEL OF FLIVVER TO BUY "THE WIFE."

In town from their reservation near Horton, the men wear Government-issued clothing. Squaws and young girls adopt white women's ways and dress, even to cigarettes and lipstick. Many Indian tribes were moved to Kansas by Congress years ago.

farm crops to see which ones may yield ethyl alcohol economically.

"When America's oil supply begins to decline, fuel alcohol made from surplus farm crops and other sources may keep our motors running."

This new industry was born the afternoon I saw the plant. That day it made 10,000 gallons, its normal capacity, and trucks hauled the new fuel away to dealers in Nebraska and the Dakotas. Known as Agrol, the new fuel being made under the guidance of the Chemical Foundation of New York is, when used in cars, a mixture of cheap gasoline and ten per cent of ethyl alcohol. Similar fuel is widely used in the British Isles; motorcars in Europe and Brazil have long burned alcohol.

SAYINGS OF A KANSAS SAGE

If this experiment proves the economic soundness of ethyl alcohol as a motor fuel constituent in America, it will not only help

solve our eventual diminishing-oil problem, but will provide a market for many kinds of surplus farm products.

From the mill I went to see Ed Howe, the "Sage of Potato Hill." As I climbed the long flight of steps up to the big house where the journalist has lived so long, some of his sayings came to mind:

"Watch the flies on a cold morning. That's how you will act when you are old. . . ." "What people say behind your back is your standing in your community. . . ." "A really busy person never knows how much he weighs. . . ."

He wrote *The Story of a Country Town* long years ago, and all over the English-reading world critics still count this melancholic volume among the classics of frontier literature. His *Plain People* is a saga of the Middle West in the days of mover wagons, sooners, and homesteaders. Now, at 84, he was hard at work on *Final Conclusions*.



Photograph by J. W. McManis

"HOW MUCH AM I BID FOR THIS FINE YOUNG WORK ANIMAL? GUARANTEED NEITHER LAME, BLIND, SWAY-BACKED, NOR WIND-BROKEN!"

Crowds flock to these periodical neighborhood public sales, where everything from foxhounds to flivvers is sold. Wisecracking auctioneers work on a commission, and many country people come not only to bid, but to greet neighbors and hear community gossip. Typical is this scene at Horton.

"It takes more than hoppers, drought, and cyclones to kill a Kansan," he said.

"I've watched this State develop for 60 years. We moved West, in a covered wagon, from Indiana. My father was a preacher, so we always camped along the road over Sunday. Often we'd stop in a stream, to soak our tires—that was pioneer tire trouble.

"You ask if Kansas is improving. Our machines are, our roads, communications, and so forth, but I don't see much change in the behavior of the people. They act about as they always did."

Deeds of men from Kansas hint at qualities that being born or raised here may impart. I can still see the twinkle in the bright eyes of tiny General Fred Funston as he told me one night on the Mexican border of certain adventures with Cuban filibusters, an exciting chapter in his eventful career before he captured Aguinaldo.

When a circus camped in Wellington 50 years ago, a village boy climbed up and

walked the clown's tightrope. The circus owner saw him and gave him a job. That boy was Fred Stone, later famous in the "Wizard of Oz," "The Red Mill," and other plays.

And there was the gifted John J. Ingalls, than whom few other western members of the U. S. Senate ever gained more influence.

Jack London advertised for a cook to go with him on a South Sea cruise, and hundreds answered. One was a lad named Martin Johnson, of Independence, who couldn't boil an egg. You've seen his amazing pictures in *THE GEOGRAPHIC*. A mighty hunter he was, with the camera, until his recent lamented death in an airplane crash. He knew nearly every African wild animal by sight. Mrs. Johnson continues his work.

In a Topeka coffee shop, elbow to elbow with bus drivers, oil men, and salesgirls, you may see a "meek but stubborn" little man with amazingly bright eyes, quietly eating his poached egg. That is Senator



Photograph from Conrad C. Durant.

LIPTING LIVE RABBITS FROM SAGEBRUSH WITH A DIP NET LOOKS EASY AS SHOOTING FISH IN A TUB—BUT IT ISN'T!

"The country is so rough the car shakes the living stuffing out of you." The outfit, though photographed in daylight, actually operates at night, when jack rabbits, bewildered by the searchlight, can be scooped up in the net. Captured "jacks" are sent east for stocking estates and for training coursing dogs.

Arthur Capper. Years ago, his pockets loaded down with \$1.50 and a Waterbury watch, he came to Topeka from a Kansas farm and got a job setting type. In time he bought a moribund weekly, and, having not even a horse and buggy, he used to push his whole edition to the post office in a wheelbarrow. Today the joint circulation of the Capper publications is more than 4,000,000.

Once a boy wrote Capper, "Please help me buy a pig." Capper chuckled and sent the boy a check. "It's a loan," he wrote. "Pay me back when you fatten the pig and sell it." That was the beginning of a singular adventure—the Kansas boys' pig-and-chicken clubs, founded by Capper. To date he has loaned them more than \$100,000—and *not one* has failed to pay him back.

Behind such leaders are 1,800,000 more Kansans, known and unknown. They grow wheat and grind the flour; mine the coal and salt, and drill for oil; fatten the cattle and hogs and pack the meat, and herd the turkeys and chase the coyotes, wolves, and jack rabbits. They also pass the odd laws

that forbid men to eat snakes or that regulate the lengths of shirttails—and still tell the fantastic stories about Kansas that help keep it in the news.

KANSAS NO JOKE WHEN OTHER STATES NEED FOOD

Significant words, at the end of this Kansas sojourn, came from an old farm-paper editor.

"Few Americans realize that, of our 48 States, less than a dozen produce any great surplus of human food. One of these is Kansas.

"Against heavy surplus food States west of the Mississippi are set some twenty-odd States east of that river, smaller in area and denser in population, that do not produce large surpluses.

"This makes Kansas a big shelf in the national pantry of our West; it has to help feed Uncle Sam's big dining room in the East. That's why Kansas, with all its flour, meat, poultry, and butter, in spite of all the jokes the East pokes at it, is really far from a joke, especially at mealtime."

THE SHORE BIRDS, CRANES, AND RAILS

Willetts, Plovers, Stilts, Phalaropes, Sandpipers, and Their Relatives Deserve Protection

BY ARTHUR A. ALLEN

Professor of Ornithology, Cornell University

FIVE hundred miles due north of Winnipeg one leaves behind the last outpost of the spruce forest and for a few miles travels the open tundra before approaching that great expanse known as Hudson Bay. It was a sea of ice when we arrived the first of June, with no cracks or other evidence of weakening, though spring had already arrived on the tundra and back home, in the northern United States, summer was not far away.

We had journeyed thus far to study ptarmigan—those Arctic grouse whose periodic epidemics we hoped might throw some light on similar cyclic mortality in our native ruffed grouse. The ptarmigan, all about us, were now in their spring garb, with white bodies and red heads, and dotted over the tundra as far as the eye could reach were white wings and scattered feathers, bespeaking a high death rate during the winter and early spring.

STRANGE BIRD CALLS A MYSTERY

But even more impressive than the ptarmigan were the strange sounds that filled the air. I counted myself fairly familiar with the songs and calls of North American birds, but here was bird music I had never heard before, and all of it apparently coming right out of the sky.

When I pictured to myself the thousands and thousands of square miles of the Arctic tundra that no civilized man ever sees, and thought of the tens of thousands of vibrant throats pouring forth their melodies for ears not akin to man's, I realized how insignificant an atom I really was in this great Northland I had come to study.

Here were dozens of new songs being poured out by birds that in my country are nearly mute, for at last I had come, not only to the home of the ptarmigan, but to the breeding ground of the Hudsonian curlew, the golden plover, the stilt sandpiper, the lesser yellow-legs, the northern phalarope, and many more of those alluring shore birds whose very names had always thrilled me; birds whose nearly silent, ghostlike forms frequent our shores and

mud flats for brief intervals on their journeys between their mysterious Arctic breeding grounds and their glamorous South American wintering resorts. For the shore birds are our greatest travelers.*

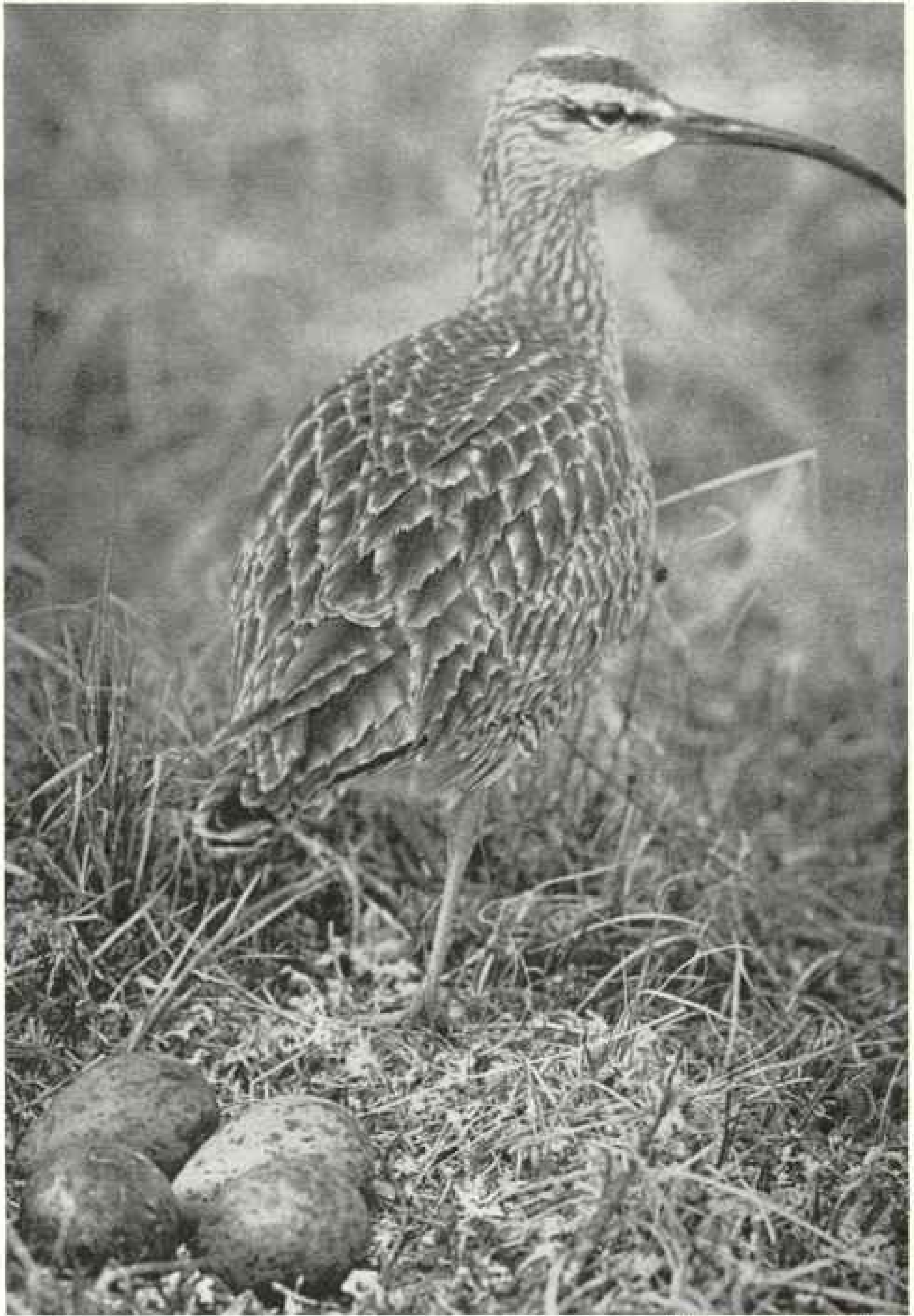
Many a time in years gone by, on stormy nights in September, I had awakened to the mellow whistles of the greater yellow-legs and black-bellied plovers as they hurried southward ahead of the approaching winter, and at daybreak I had hastened to the lake shore expecting to find it teeming with the graceful waders, but I usually had arrived just in time to see the last flocks heading south, leaving only a few stragglers behind them.

Very gradually I had become familiar with the simple little whistles uttered as they took flight, and I had learned to recognize the several shore birds at sight, even in their obscure winter plumages. But here at last was something different. Here on the tundra at Churchill on Hudson Bay I could stand in one place and have shore birds all about me—here, there, and everywhere, but mostly in the air.

Some on vibrating wings were hovering over definite spots on the tundra, giving vent to their passions in loud, buzzing sounds like swarms of bees; others were chasing each other about in crazy courtship flights, and still others were flying in great circles, uttering the strangest notes I had ever heard.

One that I finally identified as our demure little stilt sandpiper was braying like a jackass as he circled about overhead. *Wheep! Wheep! Wheep! Hee-haw! Hee-haw! Hee-haw!* The notes rolled across the tundra as if our Democratic emblem had suddenly taken wings and gone in search of Santa Claus.

* This is the sixteenth article, with paintings by Major Allan Brooks, in the important GEOGRAPHIC series by outstanding authorities on the bird families of the United States and Canada. The entire series is now available in The National Geographic Society's new two-volume "Book of Birds," together with other notable articles, full-color portraits of 950 birds, 633 "bird biographies," and more than 230 photographs and bird migration maps.



Photograph by Arthur A. Allen

WORN AWAY AT THE EDGES, THE FEATHERS OF THIS HUDSONIAN CURLEW SHOW THE EFFECTS OF THE LONG FLIGHT TO SOUTH AMERICA AND BACK

Amazing travelers are the shore birds, which fly thousands of miles in an annual round trip between their Arctic or subarctic nesting grounds and their winter resorts in the Southern Hemisphere (opposite page). In a few weeks the travel-worn bird will molt and don a new flying suit. Its four large olive-green eggs, spotted with brown, lie unconcealed in a mere depression in the ground near Churchill, on Hudson Bay (page 200 and Color Plate V).

There was the lesser yellow-legs cavorting in the same way and, instead of giving the two or three little whistles that we always associate with him on migration, he was vocalizing the syllables *keep-a-going! keep-a-going! keep-a-going!* as if he were the official traffic policeman of those vast Arctic prairies.

THE RAILROAD UNLOCKED SECRETS

Before the Canadian Government extended its thread of steel from Winnipeg to Churchill on Hudson Bay and built the gigantic grain elevator that stands as the last outpost of civilization at the mouth of the Churchill River, this springtime orgy of the shore birds was a closed secret. It was practically impossible to reach the Northern Plains by the first of June when the courtship of the shore birds is at its height, unless one started the year before and passed the winter in the Arctic.

Consequently the songs of these northern breeding sandpipers, which are restricted to the nesting period, are practically unknown. Certainly they came as a great surprise to me.

The courageous engineers who conceived the railroad to Hudson Bay to shorten the route to Liverpool from the Great Northwest, and succeeded in laying a thousand miles of rails over ice and muskeg, little dreamed of this boon to ornithologists or of the thrills they were to provide for bird lovers when this easy access to a formerly almost forbidden land should become available.

Among the Arctic birds that chased the flies and midges about the lagoon near the grain elevator, however, there were certain ones that were almost silent. There were pectoral and white-rumped sandpipers, there were black-bellied plovers and turnstones that never produced any notes other than those we hear in the United States.

Very soon I began to realize that even though I had come 2,500 miles I had not traveled far enough to reach the breeding grounds of all the shore birds. Some there were, like the white-rumps and turnstones, that would not be satisfied until they had crossed Hudson Bay, at least to Southampton Island, while still others, like the knot, would continue on to Baffin Island and Ellesmere Island and even to the very edge of the polar ice sheet.

Homogeneous as the tundra may seem to us, apparently it is not so to the birds, for they recognize various degrees of "Arctic-

ness" just as other birds farther south, when nesting time arrives, seem to recognize certain life zones in the more temperate regions. Thus along our Atlantic beaches the Wilson's plover is found nesting from Florida to Virginia, the smaller and paler piping plover from North Carolina northward to Nova Scotia, and the semipalmated plover from Nova Scotia to the Arctic coasts.

As I stood there on the rock ledge overlooking the vast ice sheet of Hudson Bay to the north, and listened to the varied notes of the courting shore birds behind me, I could see flocks of turnstones resting on the rocks of the lagoon or flicking over pebbles and bits of drift in their search for food, and flocks of white-rumped sandpipers circling about. Both were awaiting sufficient impulse to start over the great sea of ice that separated them from their nesting ground 300 miles to the north.

GOLDEN PLOVER A MIGHTY FLYER

A single golden plover flew over, heading northwest as if bound for Alaska, calling *to leel* as he passed, and I thought of what a year and what a journey he had before him (Color Plate II).

Somewhere between Churchill and Alaska he would stop for the summer and raise his family during the few short weeks of July and August. For less than two months would he know the anchorage of home and family before it would be time to start back, and by the first of September we might see him flying southeasterly over Churchill, with others of his kind, headed for the great tidal flats of James Bay.

There he might play around for a week or more before undertaking the next lap of his journey to the berry-covered tundra of southern Labrador or the shrimp-strewn beaches of Nova Scotia. In such surroundings he would feed and rest and store up energy for the 2,500-mile flight due south over the Atlantic for South America.

High over the Bermudas and the Bahamas and even the mangrove-fringed coast of South America he would wing his tireless way, until he could see below him the llanos of Venezuela, 150 miles inland, with grassy plains and mud-fringed estuaries.

There he could stop, feed, and rest for perhaps a couple of weeks before starting off again—this time over the 1,500-mile forest of the Amazon, heading for the pampas of Bolivia or Argentina. With shorter flights he might proceed into Patagonia.

But the year is short and already he



Photograph by Arthur A. Allen

WARV SANDHILL CRANES GUARD AN EGG AND A NEWLY HATCHED YOUNGSTER IN A BLUE FLAG MARSH, FLORIDA

Unlike herons, which they resemble in form, sandhill cranes are landlubbers. They usually choose a shallow pond overgrown with marsh vegetation as a site for their bulky nests (p. 221). Their food includes roots, bulbs, grains, and corn, of which they are especially fond, as well as insects, small reptiles, and rodents. Herons prefer a fish diet.



HOW CAN SHE COVER THOSE FOUR LARGE EGGS?
 A. still sandpiper at Churchill, on Hudson Bay, undertakes her task (p. 209).
 The eggs of all shore birds are very large compared with the size of the parent.



A MALE WILSON'S PHALAROPE GETS BACK ON THE JOB
 Photographs by Arthur A. Allen
 In all phalaropes the males do the work of hatching the eggs and rearing the young (p. 188). This henpecked citizen was photographed in Manitoba.

would sense the urge to turn about and start northward. He would not, however, retrace his flight over the Amazon to Venezuela. Instead he would head northwestward over the Andes of Peru and across one corner of the Pacific for the high plateau of Guatemala.

Then his course would lie due north across the Gulf of Mexico, never faltering, for Louisiana and the mouth of the Mississippi where in days gone by thousands of his kind were shot for the market.

Happily, this practice is now forbidden by law, and by easy stages the golden plover could proceed up the Mississippi Valley, arriving in the vicinity of St. Louis by the last of March or early April.

There would be no rush then to the nesting grounds, for these would be ice-bound for another two months, and in this interim the bird must change all its body feathers from the gray winter plumage to the variegated gold and black of summer.

By the first of June, once again, he might be winging his way over Churchill; that is, provided he escaped the perils of the 12,000 miles over mountains and sea and successfully passed the barrage of gunners who have little thought for anything save the sport of marksmanship and the savory bit of breast muscle that propels those tireless wings.

BUSY LITTLE BEACHCOMBERS

There is a fascination in the study of shore birds which lays hold of one as knowledge of them increases—an allure-ment that spreads a charm wherever ornithological opportunity offers. The debris-littered mud flats exposed by the receding waters of late summer and strewn with dead and dying fish might well cause my over-sensitive nose to revolt, but when my ear catches the mellow note of a semipalmated plover, I am transported in thought to the rock-ribbed shores of Labrador.

Salt air stings my cheek; there is a lifting fog; the yelping of gulls, the screeching of terns, and the wailing of red-throated loons fills my ears. Long black and white lines of eider ducks wing past, ungainly murre and curious puffins circle close, and the surf pounds on a rocky reef where harlequin ducks are playing preparatory to their flight inland to their nesting grounds. Sticky mud and odorous fish are forgotten as I visualize the little plover among its Labrador associates that I learned to love.

Perhaps I spy a solitary sandpiper jerk-

ing his head at the water's edge, and I am reminded how for years, despite its abundance, its home life remained a mystery, until finally Evan Thompson discovered its eggs in an old robin's nest in a tamarack bog in Saskatchewan. A trim little stilt sandpiper, resembling very closely in its fall plumage a lesser yellow-legs, takes me back once more to Hudson Bay and a train of recollections of most pleasant experiences with the Arctic birds.

UTAH PROVIDES A SUMMER HOME

Lest it seem that all shore birds belong to the Northern Plains, and before we consider them individually as Major Brooks has brought them to us so realistically in the following plates, let us take a short trip to the Cache Valley of Utah, or a few miles farther westward to the Bear River Marshes, just north of Great Salt Lake. Here is an area where vast numbers of migratory waterfowl of all kinds assemble and where, after the Arctic species have gone north, other species equally interesting are content to pass the summer and rear their young.

One need not even leave the car to watch by the roadside the strikingly marked avocets and stilts, with their long legs, wading in the shallow pools, or the long-billed curlews, with their sicklelike bills, circling overhead and waiting to fly at the intruder who leaves his car and tries to catch their ungainly youngsters. The snowy plovers and the widely distributed killdeers sometimes nest in the middle of the gravel roads.

Western willets, with their black and white pinions conspicuous in flight, fade from sight even in the open when they fold their wings, but they continue to call attention to themselves with their loud cry of *pilly-willy-willet* until they decide to sneak off to their nests by the side of some pond near by.

PITY THE HENPECKED PHALAROPE!

Graceful little Wilson's phalaropes, jerking their heads as they swim about like miniature ducks, whirl around in circles and stir up the bottom of the shallow pools so that midge larvæ are brought to the surface in the vortex created and they can pick them up without having to submerge their dainty heads.

The phalaropes are remarkable among all birds in that the coloration and the respective duties of the sexes seem to be reversed. With most birds, if the sexes are

different in color, the males are the brighter in plumage. This is not true of the phalaropes, however, for the females in all families are brighter than the males (Plate XI).

It is likewise the female phalarope that is the aggressor in the courtship, while it is the male that builds the nest and incubates the eggs. Once the eggs are laid, the female seems to lose all interest in home and family and sports about with others of her kind in scattered flocks, leaving the luckless male to hatch the eggs and raise the children.

SOME GET NEW FINERY, OTHERS DON'T

One of the most difficult avian phenomena to explain is the difference between closely related birds in the matter of changing their garb in the course of the breeding season. Among the plovers, for example, the killdeer wears the same colored feathers winter and summer, and the young resemble their parents. The golden and the black-bellied plovers, on the other hand, are so different in summer from their appearance in the fall as to seem to be of entirely different species.

Indeed, the same holds true for all of the shore birds that are brightly colored in breeding dress; they have a winter plumage that is distinctly different, and the immature birds resemble their parents in winter.

The majority of shore birds, as the name implies, frequent only the most open places, away from trees or concealing vegetation of any kind. The Wilson's snipe, however, prefers grassy marshes; the solitary sandpiper prefers woodland pools; and the woodcock selects alder thickets and seldom ventures into the open fields except at dusk.

The real marshes of cattails and sedges are shunned by the shore birds, except where mud flats become exposed in the shallow ponds. Marshes are preferred, however, by the rails and gallinules.

It was after midnight on the last day of May when I stood knee-deep in one of these swamps in central New York State. Before me on a tripod stood a parabolic reflector, three feet in diameter, with a microphone hung at its focal point.*

We were recording the calls of the marsh birds, photographing the sounds on motion-picture film so that they could later be transferred to phonograph records or made available to bird students in other ways.

* See "Hunting With a Microphone the Voices of Vanishing Birds," by Arthur A. Allen, in THE NATIONAL GEOGRAPHIC MAGAZINE, June, 1937.

The redwings had long since ceased their scolding; the liquid notes of the bitterns no longer rolled across the marsh, though the cuckoolike notes of the least bittern occasionally sounded from a clump of cattails. The marsh wrens, however, had been roused to new activity by darkness, and the explosive notes of gallinules, and the wails of the pied-billed grebes vied with those of the bullfrogs for ascendancy.

It was my job to get the sound reflector pointed directly at the spot where the bird was calling and tell my colleague, Paul Kellogg, in the sound truck, when to start the film running through the recorder. We had already recorded the notes of the grebe, the gallinule, and the wren, and what we wanted most was to catch the whinny of the sora or the *ticket-ticket* call of the Virginia rail. Both were calling intermittently about the marsh, but apparently never twice from the same spot, so that I was beginning to despair of ever getting one directly in the sound beam.

LOOKING FOR "DICK MCGREER"

Suddenly came a strange call, the like of which I had never heard before. *Dick-Dick-Dick McGreer!* it seemed to say, over and over again, and very insistently.

"Here is a new bird," I whispered to Kellogg through the microphone. "Catch its voice and we will find out later what it is."

The film started running through the recording camera and each time the call struck the microphone it set the galvanometer with its little mirror to vibrating in the truck and sent light messages to the edge of the film. Thus "Dick-Dick-Dick McGreer" was duly set down in sound-recording history.

The next task was to find the author of the call. One after another I thought over the various calls of all the marsh birds with which I was familiar and eliminated them one by one until only the tiny black rail and the small yellow rail remained. These two I had never heard call, and one of them, I was sure, must be our "McGreer" bird.

But to sneak through a sedge marsh after midnight and hope to find a rail the size of a sparrow has its difficulties. There were ditches and bottomless holes to be avoided, and the sound of my approach must not alarm the bird which was calling a hundred yards away. Step by step I edged toward the sound, expecting momentarily to slip

into some black hole, for I didn't dare use my flashlight for fear of alarming the owner of the voice.

Halfway to my quarry I stumbled into a flock of immature redwings and starlings that had been asleep in the cattails for four hours and they went up with such a roar of wings that I was sure they would alarm the rest of the marsh. But my little bird went right on calling as if nothing had happened.

A little farther on, a great, lumbering bittern got off the roost he had made for himself by twisting together the tops of the sedges with his long toes; but his going did not alarm my bird either and he kept right on calling for Dick McGreer.

Finally he was calling not six feet from me and I flashed my light on the spot. So dense were the sedges, however, that the light did not penetrate, and I could see nothing. I waited a moment to see if he would call again, but in vain.

I rushed toward the spot to flush him—and up he went, but not from the exact place where he had last called. I heard him leave and I heard him drop back into the marsh ten feet away, but my light flashed in the wrong direction and I did not see my bird.

ONLY THE VOICE RECORDED

Thus we have recorded the voice of a rail that we have neither seen nor identified. Diligent search by day failed to find the bird, though examination of ornithological literature seems to point to its having been a yellow rail.

Similarly, to many of my readers who may become interested in marsh birds, the voices which emanate from the cattails during the day and far into the night may long remain unidentified. So seldom do the rails venture into the open where we can see them, even where they are common, that we can only guess at the authors of many of the mysterious sounds that issue from a cattail marsh.

There are two calls, however, made by members of this group that would be difficult to confuse, especially since the birds themselves are quite conspicuous. One is the rolling *garoo* of the sandhill crane, which, like the honking of wild geese, can be heard after the birds themselves have disappeared in the clouds. The other is the *aw* of the limpkin in certain Florida swamps, which calls to mind quite unmistakably the full-toned exclamations

one sometimes hears from a dentist's chair and which may well be responsible for some of the ghost stories that center about these cypress and saw-grass glades.

SHORE AND MARSH BIRDS AS GAME

During the early history of this country any bird or animal that was good to eat was considered legitimate game, and the more food a species supplied, and the less effort required to procure it, the more highly it was esteemed.

Quite naturally the deer and the turkey received the most attention. Gradually, however, they became scarce, and the attention of those who supplied food to the ever-increasing populace turned toward the smaller species, such as the grouse, the heath hen, the wild pigeon, and waterfowl.

All kinds of devices were employed for harvesting these cheaply and in great quantities. The heath hen and the wild pigeon, unable to withstand the slaughter, were exterminated; the whooping crane is so near the precipice of extinction that it is apt to topple over any moment; the Eskimo curlew, Labrador duck, and great auk are gone forever, and perhaps 75 trumpeter swans are left in the entire United States.

Gradually we have come to our senses. Let us hope it is not too late. We no longer feel that a bird is fair game just because it is good to eat; we no longer offer strings of robins and meadowlarks for sale in the market just because they make good potpies.

Today, if a bird is to be considered game it must serve its best function as game; it should not have greater value as a destroyer of insects, nor should it have greater esthetic value, and it should be prolific so that its numbers can withstand the added strain of hunting. Any bird, like the crane, that lays only two eggs, or like the shore birds that lay only four, or the swans that do not breed until they are two or three years old, will never again be considered a satisfactory game bird.

Furthermore, to be really suitable, a game species must render the greatest amount of sport for the number killed. Tame, trustful species, like the shore birds, which can be easily approached or decoyed, and which travel in compact flocks, making it possible to kill large numbers at a single discharge of the gun, will never be satisfactory game birds. We might just as well accept as permanent the temporary removal of all these species from the game list.

FEATHERED FORAGERS OF SWAMP AND SHORE



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LEARN THEIR NAMES BY WATCHING WHAT THEY DO

The **American Oyster-catcher** (lower left) and the **Black Oyster-catcher** (lower right) clip the muscles of partly opened oysters so that they cannot close again. The smart birds then feast at leisure. In the search for insects and tasty crawling morsels, the **Ruddy Turnstone** (right center pair; adult in summer garb above young in fall plumage) continually flips over shells, stones, and debris, a habit shared by the Pacific's **Black Turnstone** (upper left pair, in winter and summer plumage). The **Surf-bird** (upper pair, in winter and summer dress) spends most of the year close to the pounding breakers.

American Oyster-catcher

Haematopus palliatus

Average Length, Nineteen Inches

Formerly found all along the Atlantic shores as far south as Brazil, and on the Pacific coast from Mexico to Colombia, the American oyster-catcher has been greatly reduced in the northern part of its range, so that although Audubon found these birds a century ago in southern Labrador, they are today rarely seen north of Virginia. The subspecies found on the coast of Baja California and adjacent Mexico is called Frazar's oyster-catcher (*Haematopus p. frazari*).

The oyster-catcher breeds locally throughout its range, laying two or three large ovate eggs, buff in ground color, sparingly blotched with black or dark brown. The nest is a little depression, usually on a low mound above high tide on the broad beaches of small coastal islands or reefs. There is usually no nesting material, although some "nests" seem to be decorated about the rim with pieces of shells.

The oyster-catcher derives its name from its habit of flying to the oyster reefs at low tide to feed. Inserting its flattened bill between the partly opened shells, the bird deftly cuts the adductor muscles so that they cannot close, and then feeds on the oysters at leisure. It likewise feeds on other mollusks, shrimps, sea urchins, and small creatures of the shores or tidal pools, sometimes thrusting its long, red bill full length into the sand.

Black Oyster-catcher

Haematopus bachmani

Average Length, Seventeen Inches

This black counterpart of the American oyster-catcher is found from the west coast of Baja California northward to the Aleutian Islands in summer and often winters as far north as southern Alaska. In all its habits it is similar to the American oyster-catcher, though perhaps less wild and more sluggish.

When approached, it often squats in a depression in the rocks or stealthily creeps to the top of some large boulder, where, if alarmed, it utters a piercing chatterlike note, somewhat similar to a policeman's whistle. Other birds near by answer, and the din is ear-splitting.

The black oyster-catcher nests the last of May in California and ten days later in Alaska, often lining a depression in the gravel or rocks with fragments of stone and occasionally even with grasses or seaweed. Both species of oyster-catchers wear the same colored plumage winter and summer, and the sexes are indistinguishable. The eggs hatch in a little more than three weeks, and the downy young, which are grizzled and protectively colored, run from the nest almost as soon as hatched, and start searching for food.

(See Color Plate 1)

Ruddy Turnstone

Arenaria interpres morinella

Average Length, Nine and One-half Inches

The ruddy turnstone never tires of trotting along the beach, flipping over shells, pebbles, and bits of seaweed that might give shelter to a scud, a beetle, or a worm. What a life it must lead, starting from Alaska or Baffin Island in August and flipping stones all the way down to central Chile or southern Brazil, only to turn and flip them all the way back again!

Turnstones are found throughout the Arctic regions during the summer. The Old World birds, since they are a little larger and darker than those in the New World, are considered subspecifically distinct. They nest chiefly north of the Arctic Circle, laying their four large olive-buff eggs, boldly marked with brown, in a well-lined depression in the tundra.

They seem not to indulge in flight songs even on their nesting grounds, but perch on a hummock and sound not unmelodiously their rapid challenge of *bye-ute cat-lut-tah*.

Black Turnstone

Arenaria melanocephala

Average Length, Nine Inches

The black turnstone is a bird of the Pacific coast, rarely, if ever, found in the interior, for it prefers the coastal islands to the mainland. In summer it nests along the coast of Alaska from the Bering Strait south to the Sitka district and in winter it wanders as far south as Baja California.

On migration it often associates with the ruddy turnstones, but is not so much a wanderer and never visits the Pacific islands.

In its summer home, instead of singing from the ground, it mounts high into the air and, like the Wilson's snipe, produces a curious winnowing sound—perhaps with its tail feathers.

Its nest is only a little depression, without lining, near the water's edge. Often the eggs are discolored by the mud on which they rest.

Surf-bird

Aphriza virgata

Average Length, Ten Inches

For 46 weeks of the year the surf-bird frequents the rocky coasts and islands from Alaska to the Strait of Magellan. Then for six weeks it disappears.

The species was first described by Gmelin in 1789, but it was not until 1927 that its nest and eggs were found in the Mount McKinley area on a rocky ledge a thousand feet above timberline. Unlike all others of its family, when it arrives in Alaska it deserts the sea-coast and flies scores of miles inland to nest on the tops of the mountains.

The eggs of the surf-bird resemble in color those of a falcon, with a buff ground color heavily marked with reddish brown.

Black-bellied Plover

Squatarola squatarola

Average Length, Eleven Inches

The black-bellied plover is one of the few birds found over almost the entire world. It nests in Arctic Russia, Siberia, and North America, and winters as far south as Africa, India, Australia, and South America. Wild and sagacious and not given to traveling in such dense flocks as some of the other species, it has met more successfully the inroads of the gunners, though always much sought after as a game bird.

The black-bellies in their striking breeding dress begin to appear on our southern beaches in March and April. Indeed, many pass the winter on our Gulf coast, but they do not reach the Northern States until late May, June, and most of July, they pass on the Northern Plains in and about the same region as the ruddy turnstone, but not so far south as the golden plover. By the last of July some of the old birds, still in full dress, appear on our New England beaches, but the main flight passes through in August and September, the young birds apparently leaving later than the adults.

In nesting habits the black-belly is similar to the golden plover, but the eggs are paler and more evenly speckled. Its courtship is largely aerial, the birds flying at great speed.

The loud whistled *whe-or-ee* call of the black-belly is easily imitated, and the birds decoy so readily to it that I have frequently brought specimens down from so high in the sky or so far away that I could not see them when the call was first made.

Males and females both wear the showy plumage during the breeding season, the males being perhaps a little brighter. Both molt in August and September into the dull winter plumage in which they are scarcely distinguishable from the immature birds.

Golden Plover

Pluvialis dominica dominica

Average Length, Ten and One-half Inches

In the fall golden plovers are seen along the Atlantic coast, chiefly during September after strong easterly gales, when they are blown in from the sea. In the spring they frequent ploughed fields and old pastures in the Mississippi Valley, feeding on grubs and crickets. They scatter while feeding but usually rise in a body when alarmed and soon gather in a compact, swiftly moving flock (page 185).

The first birds seen in the fall still retain some of their old breeding dress, and the last ones to leave in the spring have started to regain their new nuptial plumage, but for the most part birds seen in the United States are in the dull winter plumage.

The nest of the golden plover is a shallow depression in the reindeer moss of the tundra,

scantily lined with fragments of moss, and the four buff eggs are heavily marked with brownish black. The downy young are thickly covered with a marbled black, golden, and gray down, and like other species of plover leave their nest at hatching and find their own food, being dependent on their parents only for brooding.

The golden plovers which nest on the Bering Sea shores of Alaska and thence westward along the Arctic shores of Siberia are somewhat smaller and more brightly colored than the more eastern birds, and have been separated as a subspecies called the Pacific golden plover (*Pluvialis d. fulva* Gmelin). The European golden plover, however, breeding from Great Britain and central Europe to Iceland and northwestern Siberia, is a distinct species. The Pacific golden plover makes a direct flight from Alaska to Hawaii for the winter.

Killdeer

Oxyechus vociferus vociferus

Average Length, Ten and One-half Inches

The killdeer is as well known to the school-boy of California as to the golfer on Cape Cod, and its vociferous cries are heard in summer on the tundra near Hudson Bay and on the shores of Lake Okeechobee in Florida.

In the Northern States during March, and earlier in the South, the male makes the air resound with loud-whistled *kill-deer—kill-deer* cries as he circles a wide area with a curious erratic flight. In no uncertain terms he proclaims his presence to the female and tells her that he will soon scratch out a little depression in a suitable gravelly spot where she can lay her four large, tan, spotted eggs, and that he will gladly do the lion's share in hatching those eggs and protecting the family.

If one comes suddenly upon the sitting bird, which is scarcely possible until the eggs are nearly ready to hatch, the killdeer will dramatize a feigned decrepitude and flutter along the ground with tail spread and wings drooping, leading the enemy away from the nest.

Male and female and immature killdeers look exactly alike winter and summer, and even the downy young resemble their parents except for having only a single black band, instead of two, across their breasts.

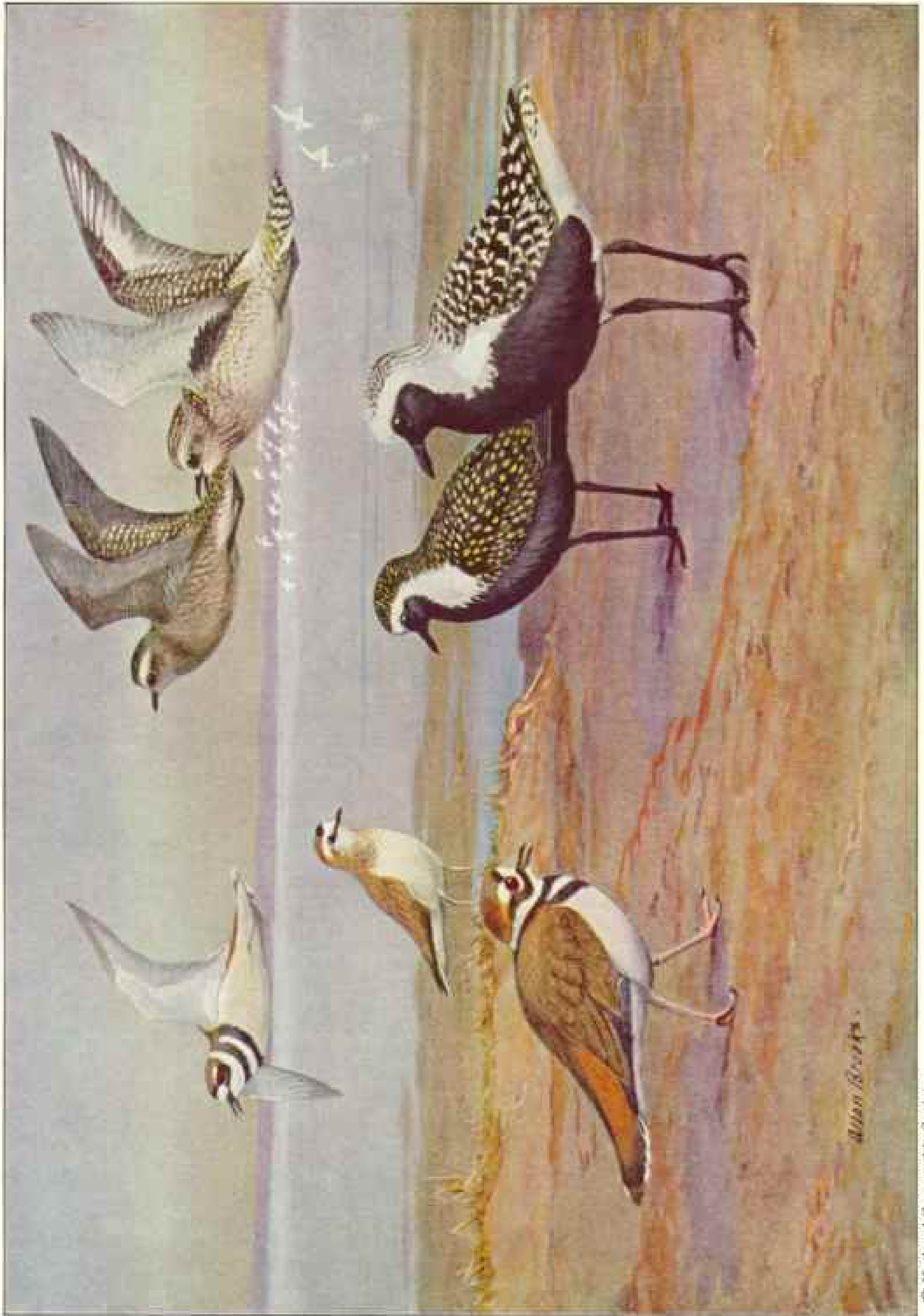
Mountain Plover

Eupoda montana

Average Length, Eight and Three-quarters Inches

The mountain plover is not very appropriately named, except in that it is confined to the Rocky Mountain region, for it inhabits only the semi-arid plains from northern Montana and western Nebraska south to western Kansas, northern New Mexico and northwestern Texas. In winter it moves to the border States and Mexico, and avoids the lakes and shores sought by other shore birds.

(See Color Plate II)



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FEATHERED COSMOPOLITES OF TWO AMERICAS MEET ON A NORTHERN BEACH

Unlike the **American Golden Plover** and the **Black-bellied Plover** (right foreground, left and right, in summer plumage; young of each flying above), the **Killdeer** (left foreground and flying bird above) wears the same costume winter and summer. In the center background stands a western **Mountain Plover**.



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MILD-MANNERED LITTLE BEACHCOMBERS OF NORTH, SOUTH, EAST, AND WEST

Usually silent and unobtrusive, the Semipalmated Plover (right background, young alighting) swoops and sings ecstatically in its Arctic nesting grounds. The South's Wilson's Plover (foreground pair, female and male) skillfully decoys intruders from its nest. The Piping Plover (left-hand figure with yellow legs) frequents eastern beaches, while the Snowy Plover (adult and young, extreme left) abounds on southern and western shores.

Semipalmated Plover

Charadrius semipalmatus

Average Length, Six and Three-quarters Inches

The semipalmated plover breeds throughout Arctic North America, and as far south on the Atlantic coast as Nova Scotia, and winters from the Gulf coast to Chile and Patagonia. It has a wide migration route through the interior as well as on both coasts, so that in suitable places along lake shores and mud flats one can expect to see this species almost anywhere in North America during its migrating periods of August, September, and October and again the following May.

In flight its long, pointed wings give it an apparent size quite at variance with its tiny body, and many a sportsman, in the old days when all shore birds were considered game, was disappointed at the tiny morsel of meat afforded by what seemed a good-sized target.

On taking wing these birds often utter a melodious *cher-nee*, especially when coming in to join a flock of other shore birds, but on migration they are regularly so silent and unobtrusive that I was amazed upon visiting their Arctic nesting ground to see the male birds dashing around on wild, erratic flights, voicing their feelings in loud, harsh, whinny-like songs.

To see two of these gentle creatures face each other, puff out their feathers and crouch low with spread tails, and then jump into sharp combat like a couple of gamecocks was even more amazing, but such is the keen and determined competition for nesting territory and mates on the Labrador coast.

The nest is a mere hollow in the sand or gravel, like that of a killdeer, and the eggs, too, seem like small models of the killdeer's.

Piping Plover

Charadrius melodus

Average Length, Seven Inches

Forty years ago this dovelike little plover was almost exterminated by gunning, but now, after 25 years of protection, it has come back to much of its former range and is locally common, especially on Long Island and New England beaches beyond the reach of dogs and summer boarders.

On some of the beaches of our Great Lakes and westward even to southern Alberta it occurs locally in summer and as far south as North Carolina. In winter it retires to our southern beaches from South Carolina to Texas and northern Mexico.

Being just the color of the sand, it escapes detection by the casual observer, and it often relies upon running rather than flying to avoid intruders, speeding along with such rapidity that one scarcely notices its swiftly gliding legs. It nests like Wilson's plover, but the black-speckled tan eggs are somewhat smaller.

(See Color Plate III)

Snowy Plover

Charadrius nivosus

Average Length, Six and One-half Inches

We were driving one June day to the Bear River Marshes north of Great Salt Lake in Utah. Suddenly, a few feet in front of the car, a queer-looking pebble rolled off to the side of the road. I stopped the car as quickly as I could and watched my rolling stone turn into a pale, graceful little snowy plover—now much perturbed.

It was not until after a half hour of diligent search that we found the protectively colored eggs, among stones of about the same size and color, halfway between our front wheels. The bird was nesting in the middle of the road.

The real center of abundance of the snowy plover is the sandy beaches of California and southern Washington, where it takes the place of our eastern piping plover. These birds are really the western snowy plover. An eastern form called the Cuban snowy plover (*Charadrius nivosus tenuirostris*) is found along the Gulf coast from Florida to Texas and on the salt plains of Oklahoma and Kansas.

Wilson's Plover

Pagolla wilsonia

Average Length, Seven and One-half Inches

It was on the beach at Ponce de Leon Inlet on the east coast of Florida that I first became acquainted with the Wilson's plover. I had been watching a flock of black skimmers hollowing out little depressions for their nests by twisting and turning their plump breasts in the sand. Farther from the water's edge, where the dunes began, I had noticed this little plover behaving somewhat nervously.

Whenever she seemed to realize that I was watching her, she would trot a few paces and busy herself twisting and turning in the sand like the black skimmers, as if she were just beginning to think about building a nest. Knowing from experience that this is often a misleading trick of the plovers, I withdrew and watched her through binoculars.

No longer did she seem interested in building a nest, but trotted to one particular spot about fifty feet away and settled down. I soon realized that she was incubating eggs.

There was no nesting material whatsoever, and the eggs were half buried by the drifting sand. I later learned that if the little bird remained away from her eggs as long as 30 minutes they would be almost completely covered, and she would have to excavate them.

The Wilson's plover is found in summer as far north as Virginia and south only to the Gulf coast of Texas. In winter many remain from Florida to Texas, but some wander to Brazil. They sometimes live in scattered colonies, but more often are found singly or in pairs. Belding's plover (*P. w. beldingi*) ranges from Baja California to Peru.

American Woodcock*Philohela minor*

Average Length, Eleven Inches

The American woodcock, which is somewhat smaller than the European species, enjoys all the fame and mystery of its cousin: its nocturnal habits, its curious courtship flights, the fable of the carrying of its young, its erratic migrations, the sport of hunting it, and its savoriness upon the table.

Woodcocks move northward early in the spring and often are overtaken by late freezes and snowstorms. Indeed the birds are sometimes found incubating early in April in New York and New England and at times are covered with snow while on the nest. The eggs hatch in three weeks and the young grow so rapidly that they attain their full size in 25 days. They sometimes eat twice their own weight of earthworms in a day.

This species nests from Manitoba and Nova Scotia to northern Florida, wintering south of the lines of winter ice.

Wilson's Snipe*Capella delicata*

Average Length, Eleven and One-quarter Inches

Of all the shore birds that were formerly on the game list, the snipe and the woodcock are the only ones for which there is still an open season and for which there is no immediate danger of extermination thereby.

The Wilson's snipe has a very extensive breeding range—most of which has not been at all affected by the march of civilization. In summer it is found nesting on the tundra as well as in suitable grassy marshes from western Alaska to Newfoundland and south as far as California and Pennsylvania.

These birds never travel in the compact flocks of the other shore birds, and seldom is more than one bird killed at each discharge of the gun. They frequent grassy marshes, where they are usually invisible until flushed; then they rise with a startling bleat and fly swiftly on a zigzag course.

The bill of the snipe, like that of the woodcock, is covered with soft skin rather than horn, and upon drying, in a mounted specimen, it reveals small pits in the bone underneath. In these lie the tiny sense organs which enable the bird to locate worms in the soil.

The snipe builds a grass-lined nest in a tussock, often surrounded by water, and lays usually four olive-buff eggs marked with dark brown or black.

The courtship "song" of the male is one of the mysteries of the bird world that have never been fully explained. Flying in great circles high overhead, he sets his wings, spreads his tail, and pitches slightly toward the earth, producing a winnowing sound that gradually grows louder and then dies away.

Upland Plover*Bartramia longicauda*

Average Length, Eleven and One-half Inches

Formerly abundant from northwestern Alaska to northern Virginia during the summer, and wintering on the pampas of Brazil and Argentina, the upland plover is now a rare bird through much of its range. Some 25 years ago it was thought to be on the verge of extinction, but it was placed on the protected list in 1916, and has staged a gradual comeback.

Even in well-settled country where there are pasture lots, we can still hope to hear again the eerie whistle *whip-whip-who-ee-ee-oo-oo* of this gentle bird as it sails in great circles. We may find its grass-lined nest in a bed of clover or wild strawberries or see its downy young once more tottering across the road.

Long-billed Curlew*Numenius americanus*

Average Length, Twenty-four Inches

The history of the long-billed curlew, our largest shore bird, parallels that of the bison, the prong-horned antelope, and the trumpeter swan. Until the middle of the last century it was a common wintering bird on our South Atlantic coasts; on migration it occurred frequently as far north as Massachusetts; it nested as far east as Ohio and throughout the prairies of the Mississippi Valley and the Rocky Mountain country.

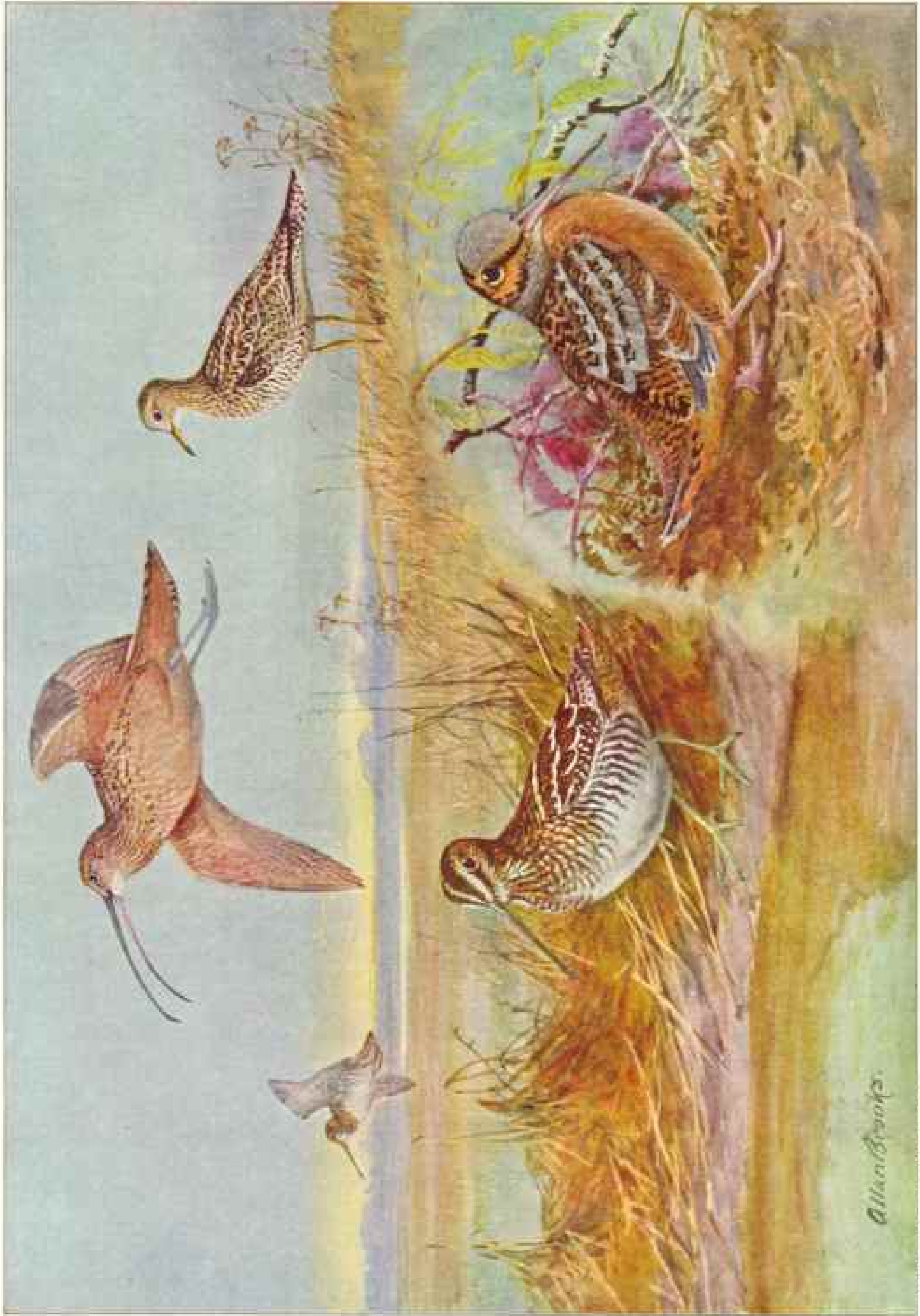
Today it is greatly reduced, except in a few favored localities, and it has not been seen east of the Mississippi for a great many years. You can imagine my delight, therefore, to find it still a common nesting bird in the beautiful Cache Valley of Utah, about the edges of the Bear River Marshes, and again in southeastern Montana.

The birds breeding in Wyoming and South Dakota north into Manitoba and Alberta are somewhat smaller than the Utah birds and have been separated into a distinct subspecies called the northern curlew (*Numenius americanus occidentalis*). The curlews winter in the Southwestern States, especially Texas and California, and thence to Guatemala.

The curlew's long curved bill is very efficient in fishing fiddler crabs and even crayfish from their burrows at its Texas wintering resorts, but in summer a large part of the bird's food consists of grasshoppers, crickets, and other insects.

The curlew lays four large eggs, resembling those of gulls, in a poorly lined depression on the prairie where the grass is not high enough to obscure its vision. The birds seem to nest in scattered colonies, and when the young have hatched they bring them together in a more or less communal manner.

(See Color Plate IV)

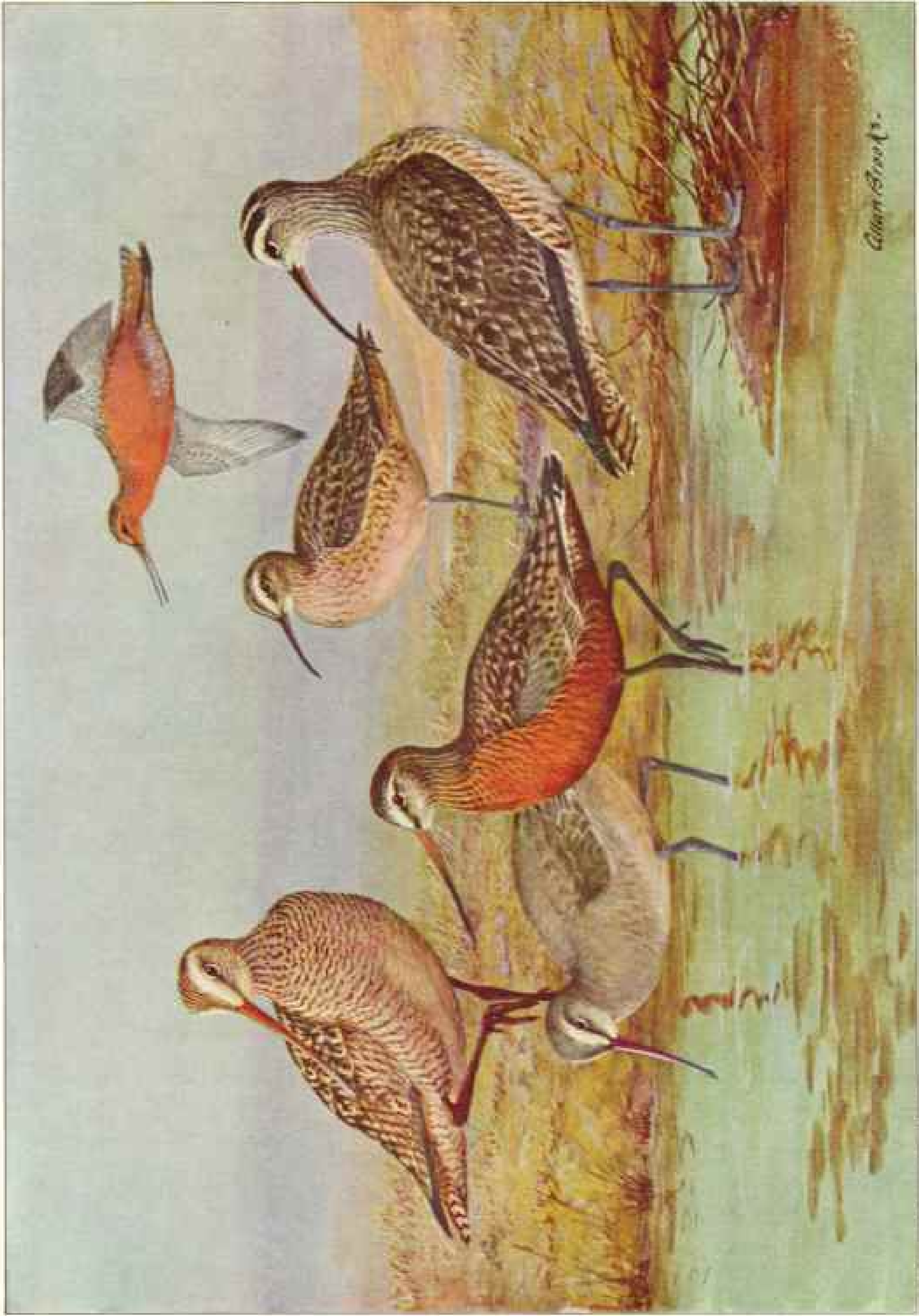


Allan Brooks.

ELUSIVE SNIFE AND WOODCOCK TEST THE SHOOTER'S SKILL.

The early-migrating American Woodcock (lower right) sometimes incubates under a blanket of snow. Still fairly abundant in the widely distributed Wilson's Snipe (left foreground and distant flying bird). The Upland Plover (upper right) and the Long-billed Curlew (flying center) are both rare except in favored places.

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Allen Silliman

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NO REASON HAS BEEN FOUND WHY GODWITS' BILLS TURN UP WHILE CURLEWS' CURVE DOWNWARD

The once abundant **Eskimo Curlew** (on one leg, center background) is now apparently extinct. The **Hudsonian Curlew** (extreme right) and the **Hudsonian Godwit** (wading pair, in winter and summer plumage) nest on Arctic tundras. Two others are the rare **Marbled Godwit** (extreme left in summer costume) and the **Pacific Godwit** (flying).

Hudsonian Curlew

Phaeopus hudsonicus

Average Length, Seventeen Inches

If we can judge from the accounts of such ornithologists as Audubon and Wilson in the early part of the 19th century, the Hudsonian curlew has increased in numbers during the last hundred years, while every other species has been on the downgrade. This species still holds its own on the tundra from Hudson Bay to Alaska, and both the Atlantic and Pacific coasts know it as a regular migrant on its way to the west coast of South America for the winter, although it is rather uncommon in the interior of the United States.

To the wariness of this bird I can personally attest from trying to find its nest on the tundra near Hudson Bay. The birds would come flying to meet me half a mile away, and when I concealed myself and watched them through binoculars it was almost impossible to determine in which direction they went when they finally decided to return to the unconcealed nest depressions in the moss. The four large eggs are brown-spotted olive green.

Eskimo Curlew

Phaeopus borealis

Average Length, Thirteen and One-half Inches

The Eskimo curlew, or "dough bird" or "prairie pigeon," as it was called by the gunners, apparently rivaled the passenger pigeon in numbers prior to 1885. At that time as many as 2,000 were reported killed in a single day by a party of 25 or 30 men, and it was no uncommon experience to shoot a wagonload in a day during their migration through the Mississippi Valley in April. In such compact flocks did they fly that as many as 28 were brought down by one shot from an old muzzle-loader.

The last Eskimo curlew to be taken was killed in Argentina January 11, 1925. Since then there have been a few possible sight records, but the species is in all probability extinct. It once flew to Labrador and then directly south 2,000 miles over the Atlantic, except when easterly storms drove it to the New England shores. It wintered in Argentina where it was a favorite game bird, and in sadly reduced numbers it returned to its summer home by way of the Mississippi Valley where the greatest carnage of all took place.

In general appearance the Eskimo curlew resembled the Hudsonian curlew but was smaller, weighing only about a pound when fat, and it had a shorter bill. An immature Hudsonian curlew might easily be mistaken for an Eskimo curlew except that its primaries are barred beneath and its axillars are pointed.

The nesting habits of the Eskimo curlew were apparently similar to those of the Hudsonian curlew, but its calls were distinctly different—one a melodious whistled *bee, bee* and one a blackbirdlike chatter.

Marbled Godwit

Limosa fedoa

Average Length, Eighteen Inches

Next to the long-billed curlew this is our largest shore bird and its size, along with its limited breeding range and the encroachments of agriculture, has caused its near extinction. One hundred years ago it was not an uncommon migrant on the Atlantic coast as far north as New England, and it wintered in large numbers in Florida and on the Gulf coast.

Today, if it occurs at all east of the Mississippi, it is the rarest straggler. At present the relatively few birds that remain nest in North Dakota and central Saskatchewan, with a few in western Minnesota and other prairie country as far south as South Dakota.

Its name comes from its call *god-wit, god-wit, god-wit*. In habits it is like the curlews, lining a depression with grass and laying four greenish-drab spotted eggs.

Hudsonian Godwit

Limosa haemastica

Average Length, Fifteen Inches

For some unknown reason the Hudsonian godwit has apparently never been a common bird, and since it follows the golden plover in its migration directly from Labrador to South America, it is seldom seen in the fall on the Atlantic coast. It is still less frequently seen during the spring when it returns from Argentina by way of the Mississippi Valley. Audubon himself never saw one of these godwits alive. The nest and eggs, as discovered by Roderick McFarlane around the mouths of the Mackenzie and Anderson Rivers, are apparently similar to those of the Hudsonian curlew.

The female Hudsonian godwit is somewhat larger than the male, with lighter barrings on the breast, and in flight both appear very dark, with conspicuous white rumps. In winter plumage they somewhat resemble willets, but lack the conspicuous wing pattern.

Pacific Godwit

Limosa lapponica baueri

Average Length, Fifteen Inches

This eastern representative of the European bar-tailed godwit will remain unknown to the American bird-lover unless he journeys to northwestern Alaska, where it is a common summer resident. In migration it cuts southwestward to Japan and the Philippines, and winters in the Malay Archipelago, Australia, and New Zealand.

According to Herbert Brandt, who has studied them on their nesting ground, they are very conspicuous and noisy in their courtship flights and in defense of their young. Their nesting habits are not very different from those of other godwits and curlews, the birds preferring dry ridges on the rolling tundra and placing their nests between clumps of bunch grass.

(See Color Plate V)

Eastern Willet

Catoptrophorus semipalmatus semipalmatus

Average Length, Fifteen Inches

The willet is one of the characteristic sights of the tidal marshes of our southern coasts. In March or early April the larger, longer-billed birds start northwestward for Utah and points north, for they represent a western subspecies (*Catoptrophorus s. inornatus*), and some of the others move up the coast as far as New Jersey. Still others jump over Long Island and New England, from which willets were long since extirpated, to form a summer colony in Nova Scotia.

Those that remain on our southern coasts about the same time become much noisier, calling their name *pilly, willy, willet* over and over again as they circle overhead or dart at any intruder who dares to approach the nesting territory. In May they scoop out hollows in the sand above high tide, especially on coastal islands, often lining them well with grasses, and lay four large olive-buff eggs, boldly and irregularly marked with dark brown. Some of the western birds wander to Peru and some of the eastern birds to Brazil.

Greater Yellow-legs

Totanus melanoleucus

Average Length, Fourteen Inches

The greater yellow-legs is found in summer from Newfoundland to southern British Columbia, northward to central Alberta and southern Ungava, but it seems to shun the Prairie Provinces, which are favored by so many of the other shore birds. It does not extend its range so far north as the lesser yellow-legs, but stops far short of timberline. In winter some birds remain as far north as South Carolina, but others wander southward, even to Patagonia. This species moves northward earlier than others and sometimes appears on the New England coast and the shores of the Great Lakes by the last of March.

It nests on the ground, but seems to prefer gravelly ridges among scattered trees and fallen logs rather than open muskeg and tundra.

Lesser Yellow-legs

Totanus flavipes

Average Length, Ten and Three-quarters Inches

This smaller edition of the greater yellow-legs resembles it so closely that when there are no other birds about with which to compare the size, it is difficult to identify it with certainty unless one has had considerable experience or unless it takes wing and calls. The two-syllable note of the lesser yellow-legs is much more like that of the solitary sandpiper than like the longer series of its larger cousin.

Like the larger species, it occurs singly or in flocks of as many as a hundred, though small groups are the rule. It goes farther north for

the summer, even to the limit of trees, and seldom winters north of South America. It avoids the Atlantic coast in the spring.

In nesting habits it resembles the greater yellow-legs and is equally noisy, having a remarkable territorial song resembling the syllables *keep-a-going, keep-a-going* (page 185).

Solitary Sandpiper

Tringa solitaria

Average Length, Eight and One-half Inches

Here is another relatively small-size species whose solitary habits have preserved it in undiminished numbers, although it has never been so abundant or widespread as the spotted sandpiper.

Passing the summer from the limit of trees southward to the northern United States east of the Rocky Mountains, and wintering from Texas to Argentina, it goes through most of the United States during April and May and again from July to September, when it is often seen about the edges of woodland pools.

The solitary sandpiper is the only North American shore bird that regularly nests in trees. Relatively few of its eggs have ever been found, however, and these have always been placed in old nests such as those of robins and rusty blackbirds, from five to twenty feet from the ground in larches and firs usually standing in or near water. A western form (*T. s. cinnamomea*) breeds in Alaska.

Spotted Sandpiper

Actitis macularia

Average Length, Seven and One-half Inches

This is our most ubiquitous and best known species of shore bird. From the Atlantic to the Pacific and from Alaska to South Carolina nearly every pond, stream, or lake shore has its "tip-up" or "teeter-tail," as it is familiarly called. Though it occasionally wanders into barren fields or pastures, it is best known as it flies up along the lake shore with short, quick strokes of the wings, skimming just above the water.

Spotted sandpipers never assemble in large flocks and during the winter they are scattered along the streams of South America as far south as southern Brazil, Bolivia, and Peru. I have seen them along the Cauca River in Colombia behaving exactly as they do along the Potomac or the Hudson River at home.

When nesting time comes, they frequently move back a considerable distance from the water, line a little depression with bits of grasses and weed stems, and lay four large tan eggs heavily spotted about the large end with black. The downy gray youngsters follow their parents to the shore on wobbly legs as soon as hatched.

During the courtship period the male bird responds very quickly to a whistled imitation of its call—*sus-a-weet, sus-a-weet, sus-a-weet, weet, weet, weet, weet, weet, weet*.

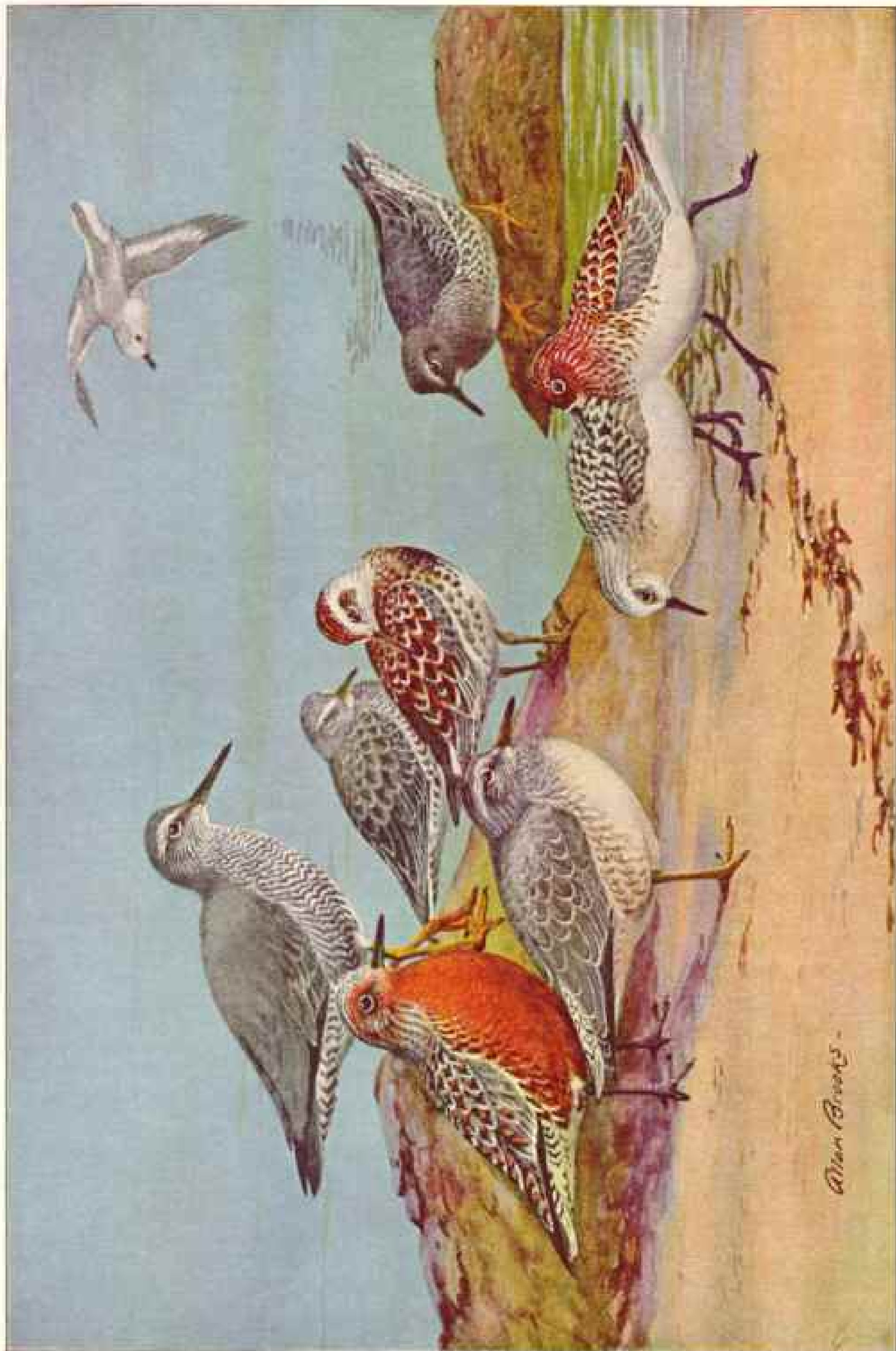
(See Color Plate VI.)



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THE UBQUITOUS "TIP-UP" GREET'S FOUR LONG-LEGGED COUSINS

The teetering **Spotted Sandpiper** (lower left, adult in summer plumage above young in fall garb) bobs a welcome to the summer-clad **Lesser and Greater Yellowlegs** (center), the tree-nesting **Eastern Solitary Sandpiper** (right foreground), and the **Eastern Willet** (behind, with extended wings).



THEIR ASTONISHING TRAVELS MAKE UP FOR CONSERVATIVE APPAREL

From South Sea lagoons, the **Wandering Tattler** (upper left) makes an annual cruise to Alaska. The **American Knot** (lower left, adult in summer finery left, young right) nests within a few hundred miles of the North Pole. In winter, the **Aleutian Sandpiper** (center pair, in winter and summer plumage) resembles the hardy **Purple Sandpiper** (on rock, right). A notorious gypsy is the **Sanderling** (lower right pair, young left; also flying bird).

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Wandering Tattler

Heteroscelus incanus

Average Length, Eleven Inches

From the coral-fringed South Sea islands most of the wandering tattlers start northward over the 2,500 miles of open sea in March to the rocky headlands of California and Washington. Some, however, remain in the Hawaiian Islands until April or May; indeed yearling birds may remain there all summer.

By the last of May the tattler reaches northern Alaska, but for more than 150 years after the bird itself was known, no one had ever seen its eggs. It was not until July 1, 1925, that Olaus J. Murie made the important first discovery of a set of eggs. The nest was on a gravel bar of the Savage River. Rather well-built and about five inches in diameter, it contained four greenish-gray eggs irregularly spotted with dark brown, chiefly about the larger end.

Aleutian Sandpiper

Arquatella pilocnemis couesi

Average Length, Nine Inches

Three varieties of this little sandpiper inhabit the Pribilof Islands, the Aleutians, and the Komandorskie Islands, respectively. In winter they so resemble the purple sandpiper that at one time they were thought to be subspecies of it. In summer plumage, however, they are more suggestive of red-backed sandpipers.

The Aleutian sandpipers build their nests in little hollows in the tundra moss, and the males have a charming courtship performance—rising 30 or 40 feet in the air, then fluttering down with a delightful twittering song. They likewise produce a loud "bleating" call from the ground, so similar to that made by the Wilson's snipe in the air as to convince Dr. Leonhard Stejneger that the sound of the snipe is also produced vocally instead of with its tail feathers, a belief commonly accepted.

American Knot

Calidris canutus rufus

Average Length, Ten and One-half Inches

When Admiral Peary returned from the North Pole to his winter base near Cape Sheridan in northern Ellesmere Island, about 500 miles from the Pole, he announced discovery on June 27, 1909, of the first authentic nest and eggs of the knot. The species is circumpolar in its summer distribution.

The knots leave the Arctic in July, appear on our coasts in August, move gradually southward, and leave Florida by November for Argentina and other points south. In the fall and winter they wear white underparts, but in April the adult birds once again have red breasts, and the sexes are alike.

In the old days the knots passed down our coasts in enormous numbers, flying in close

formation and making easy targets for the market hunters. By 1916, when the treaty with Canada was signed giving them complete protection, they were much reduced, but since then they have increased considerably.

Sanderling

Crocethia alba

Average Length, Eight Inches

From its nesting place on the northernmost Arctic islands on both sides of the world, the sanderling wanders southward in August and September until it has visited nearly every beach from Patagonia and South Africa to Australia and the Polynesian islands, including Hawaii.

In their pale winter plumage these birds are the whitest of our small sandpipers, with large white patches in their black wings, nearly white heads and pure white underparts. In the spring their heads and throats become suffused with cinnamon brown, and they appear much darker.

Sanderlings usually travel in small flocks, frequenting the sand beaches where they pursue the receding waves to snatch tiny mollusks and shrimps from the seething waters and trot back just in time not to be overtaken by the oncoming line of foam.

The sanderling returns to our northern beaches between the middle and the last of May, and arrives on its nesting ground the first week in June. The nest is a hollow in the tundra, often in the center of a recumbent plant of the Arctic willow or dryas, and the eggs vary from pale yellowish white to olive buff in ground color, with small, often inconspicuous spots of brown or black.

The courting male is said to have a flight song, but he does not rise high into the air and his notes are described as a "snarling or slight neighing sound."

Purple Sandpiper

Arquatella maritima

Average Length, Nine Inches

The purple sandpiper is perhaps the hardiest of the whole tribe, passing the winter even as far north as southern Greenland; only a few venture south of Montauk Point, Long Island, no matter how severe the winter. These birds do not generally appear on the reefs and rocky ledges off the New England coast until November or December, and they usually leave again by March for their nesting ground on Baffin Island and in Greenland.

The species has a very limited range in North America and is not ordinarily seen except by bird-lovers who make a special trip to its inhospitable haunts. It has a somewhat wider range in the northern parts of the Old World.

Its dark bluish-gray color is rather unusual among shore birds, but hardly merits the designation of purple which has given it its name.

(See Color Plate VII.)

Red-backed Sandpiper*Pelidna alpina sakhalina*

Average Length, Eight Inches

During the late fall when this species is migrating from its Arctic breeding ground west of Hudson Bay, and during the winter months when it is feeding along our coastal beaches from New Jersey and Washington southward, one looks in vain for its red back or any other distinguishing characteristic except its rather long and slightly decurved bill. During March and April, however, a complete molt of the body feathers produces a striking breeding dress.

The red-backs are hardy little birds, slightly larger than spotted sandpipers. They travel in rather compact flocks, which, although apparently leaderless, show remarkable unity. They migrate later than most other shore birds, and I have seen belated individuals wandering around on the ice at the head of Cayuga Lake when a November freeze had closed all the shallow water.

At the eastern edge of the breeding range, at Churchill on Hudson Bay, I found these birds nesting very similarly to the northern phalaropes in tussocks of sedges more or less surrounded by water. Like most shore birds, the males indulge in a flight song, a musical trill of a peculiar liquid quality which suggests the ordinary call of a common toad.

Our red-backed sandpiper is the New World representative of the Old World dunlin (*Pelidna alpina alpina*), which is a familiar bird on the moorlands of the Netherlands, northern Germany, the British Isles, Norway, and Russia. The two subspecies are almost indistinguishable.

White-rumped Sandpiper*Pisobia fuscicollis*

Average Length, Seven and One-half Inches

After nesting from northern Alaska to Baffin Island, the white-rumped sandpiper migrates for the winter to Paraguay, southern Patagonia, and the Falkland Islands. As it follows the route of the Baird's sandpiper down the Mississippi Valley, it is therefore rather uncommon on the Atlantic coast. It migrates somewhat later than the other small species, most often being seen in October.

The call of the white-rumped sandpiper reminds one more of some sparrow's song than of the note of a shore bird. As the bird hovers on rapidly beating wings over its tundra home, its flight song can scarcely be heard.

Mr. J. Dewey Soper, who heard the song of the white-rumped sandpiper on Baffin Island, writes concerning it: "Given in a very low tone and slow tempo, the notes are weak and inclined to be squeaky, with a weird, dripping quality like the sound of water oozing and dripping in a small cavern."

(See Color Plate VIII)

Baird's Sandpiper*Pisobia bairdi*

Average Length, Seven and One-half Inches

Baird's sandpiper is more a bird of the interior than of ocean beaches. It nests along the Arctic coast from western Alaska to Baffin Island and migrates directly southward to Chile and Patagonia, using the Mississippi Valley as its highway both fall and spring. It is thus comparatively rare on the Atlantic and Pacific coasts.

In appearance it resembles a small pectoral sandpiper, but has black instead of greenish legs. Since the latter species varies considerably in size, the bird student often overlooks the Baird's sandpiper. It more often associates with least and semipalmated sandpipers than with pectorals, so that, by contrast, it appears larger than it really is. Indeed, when seen in the company of "sandpeeps," it looks like a large, light-colored least sandpiper, with the streaked breast characteristic of the breeding plumage of that species.

Least Sandpiper*Pisobia minutilla*

Average Length, Six Inches

The least sandpiper is the smallest and one of the most abundant of our shore birds, nesting throughout the Arctic from northwestern Alaska to Newfoundland, and known as a migrant throughout the United States and Canada. Collectively with the very similar but somewhat grayer semipalmated sandpiper, least sandpipers are commonly called "sandpeeps" or just "peeps." They sometimes occur in flocks of hundreds on our shores and mud flats.

They are confiding little birds as they trot along the shore, probing in the ooze for midge larvae and the like, and sometimes they will allow one to approach within a few feet of them without taking alarm. At such times it is easy to distinguish them from the semipalmated sandpipers, even when the color difference is not so apparent, because the least has greenish legs instead of black and its bill is more slender.

The two birds are not so closely related as one might think from their similarity of appearance, but they are always associated in nesting as well as in migration except that the least sandpipers extend their nesting somewhat farther south. Together they continue their migrations southward, even to Patagonia, though many remain as far north as our Gulf States.

On the Northern Plains both species indulge in flight songs, hovering fifteen or twenty feet over the tundra and voicing a curious buzzing sound. The nests and eggs of the two species are practically indistinguishable, although the eggs of the least are perhaps somewhat grayer and more heavily marked with reddish brown.



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TRIM SANDPIPERS FOLLOW THE RECEDING TIDE, PROBING FOR LARVAE IN THE OOZE

Present are: **Baird's Sandpiper** (left center in summer plumage, young on wing); the abundant **Least Sandpiper** (left foreground; adult in summer plumage left, young in fall feathering right); the **Red-backed** (center pair and distant flying bird; winter-clad left and on the wing, summer style right); and the **White-rumped Sandpiper** (right-hand pair; young in fall dress below adult in summer plumage).



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BETWEEN PRODIGIOUS FLIGHTS, THEY SPEND MOST OF THEIR TIME ON THE GROUND

A giant among his small neighbors, the **Bristle-thighed Curlew** (center) commutes between Tahiti and central Alaska. The **Sharp-tailed Sandpiper** (right foreground; young left, adult in summer plumage right) is the Old World representative of our grass-loving **Pectoral Sandpiper** (left left, adult left, young right). **Market hunters** once nearly exterminated the confiding **Bull-broasted Sandpiper** (upper right; young left, adult in summer plumage right).

Pectoral Sandpiper

Pisobia melanotos

Average Length, Nine Inches

The pectoral sandpiper usually frequents the grassy parts of marshes and shores. To the gunners it was formerly known as the "grassbird." While it generally travels in more or less compact flocks, it scatters while feeding and often lies close upon approach like a snipe, rising with a harsh call that has given it the name of "krieker."

It nests on the Arctic coasts from Siberia eastward to Southampton Island and winters in South America from Peru to Chile and central Patagonia. It seems to avoid the Pacific coast in its travels and also the Atlantic coast in the spring, and the Mississippi Valley is its favorite route through the United States.

When the pectoral sandpiper arrives on the nesting ground, the male, which is appreciably larger than the female, develops a large sac on the throat by the dilation of the gullet. This he fills with air as a sounding board for his call, a prairie-chickenlike *tōō-ū, tōō-ū, tōō-ū, tōō-ū, tōō-ū, tōō-ū, tōō-ū, tōō-ū, tōō-ū, tōō-ū*.

Upon filling his gular sac until it is fully as large as the rest of his body, he may call from the ground, run about the female with his bill horizontal and the sac pendent, or fly 40 feet into the air and sail to the ground on set wings, jerking his head as he gives the call.

The nest is built of grass and is usually placed in a tussock of grass in a fairly dry situation.

Sharp-tailed Sandpiper

Pisobia acuminata

Average Length, Eight and One-half Inches

This Old World representative of our pectoral sandpiper nests in eastern Siberia and winters in New Guinea, in New Zealand, and in Australia, where it is especially abundant. Our only claim to birds of this species lies in the fact that before their long migration southward many of them take a little jaunt over to Alaska and even to the coast of British Columbia. The nest and eggs apparently have never been found.

Buff-breasted Sandpiper

Tryngites subruficollis

Average Length, Eight and One-half Inches

This is another bird of the interior of North America with a comparatively limited breeding range in northern Alaska and northern Mackenzie, a migration route through the Prairie Provinces of Canada and the Mississippi Valley, and winter quarters in Argentina and Uruguay. On the Pacific coast of the United States it is unknown, and on the Atlantic coast it is very rare.

Despite its limited range, it formerly occurred in countless thousands, but so confiding was its disposition and so closely massed were

the flocks, with the unfortunate habit of returning time and again to wounded companions, that it was nearly exterminated by hunters.

In general habits and appearance the buff-breasted sandpiper is a small edition of the upland plover (which is really a sandpiper), and like that species it frequents the prairie far from water.

Professor William Rowan has observed an unusual nuptial display by these birds during their migration through Alberta. In the most characteristic and amusing performance both wings are raised, with the under surfaces facing to the front but with the primaries perpendicular and the tips practically touching each other over the bird's head. The body is held absolutely vertical, the legs are stretched to their uttermost, and the tail is cocked out horizontally, while the call *tick, tick, tick, tick* is sounded at top speed for about a second. A bird may suddenly stop in its hunt for food in order to go through this ridiculous feat and then proceed as if nothing unusual had happened.

The nest and eggs of the buff-breasted sandpiper on the tundra are similar to the golden plover's but considerably smaller.

Bristle-thighed Curlew

Phaeopus tahitiensis

Average Length, Seventeen Inches

When Dr. George Sutton discovered the first authentic nest and eggs of the Harris's sparrow at Churchill on Hudson Bay in 1931, he left only two birds of our north whose eggs have never been seen by man—the Ross's goose and the bristle-thighed curlew.

This curlew was first described from Tahiti in 1785 and is best known from that and other islands of the South Pacific group where it passes the winter. Until 1869 those islands were thought to be its summer home as well, but now ornithologists believe the species goes for the summer somewhere into the interior of northern Alaska.

Toward the last of May it makes the long 2,500-mile flight from the South Pacific over the open sea to the Kenai Peninsula of Alaska, the majority of birds not even stopping there, but continuing on into the interior. Again in August they appear on the coast with their young fully grown, but where they have been in the meantime is still a mystery.

The bristle-thighed curlew derives its name from the lengthened shafts of some of the flank feathers, which are without barbs and project like bristles or stiff hairs from its sides.

On Laysan Island, where Dr. Alexander Wetmore and Donald R. Dickey made observations, these birds were remarkably tame and had developed the strange habit of stealing and eating the eggs of terns and frigate birds—an unusual habit for a shore bird, but one shared by the turnstones on this island.

(See Color Plate IX)

Eastern Dowitcher

Limnodromus griseus griseus

Average Length, Ten and One-half Inches

Wintering from Florida and the West Indies south to central Brazil and Peru, these dowitchers or "red-breasted snipe," as they are sometimes called, move northward during April and May, especially along the coasts, to their breeding grounds. Sooner or later they have to cut northwestward, for they pass the summer from central Alberta to the west side of Hudson Bay and northward.

The birds which nest from the delta of the Yukon to Point Barrow and northwestern Mackenzie have somewhat redder breasts and longer bills than the eastern birds, and have been separated as a distinct subspecies called the "long-billed dowitcher" (*Limnodromus griseus scalopaceus* Say). There seem to be many intermediates, however, and the long-billed birds are sometimes seen on the Atlantic coast. They regularly winter in Florida and Louisiana with their shorter-billed cousins, as well as in California and points south.

On the nesting ground dowitchers are noisy, one of their chief call notes sounding somewhat like "dowitch." At times they strut like woodcock and at other times they indulge in pursuit of the female and give a musical flight song on hovering wings.

Nests of typical eastern dowitchers have not yet been found, but birds of intermediate characteristics in central Alberta, and long-billed birds in Alaska and Mackenzie, place their eggs in slight depressions in hummocks of moss, through which sedges are growing and around which water is standing. The eggs are olive or bluish gray strikingly marked with dark brown.

Stilt Sandpiper

Micropalama himantopus

Average Length, Eight and One-quarter Inches

To be able to distinguish the stilt sandpiper in its fall plumage from the lesser yellow-legs, and the western sandpiper from the semipalmated, requires a keen eye. In spring plumage, however, the species are distinct.

When A. C. Bent published his monumental work, *Life Histories of North American Shore Birds*, in 1927, he wrote that he had never seen a stilt sandpiper alive. He could find only three definite nesting records for it and these in northern Mackenzie about the middle of the last century.

At Churchill on Hudson Bay in 1934, however, I found the stilt sandpiper fairly common and discovered nearly a dozen nests (page 187). Its curious courtship song was a familiar sound all about us, and nearly every shallow pond had at least one of the conspicuously barred birds feeding along its margin.

The species probably nests all the way from Churchill to Mackenzie, just beyond the limit

of trees. The nests which we found were shallow depressions in the tundra with scarcely any pretense at nest building; and the large eggs were olive, boldly marked with black.

Western Sandpiper

Ereunetes mauri

Average Length, Six and One-quarter Inches

The western sandpiper, which passes the summer in Alaska from the Yukon Delta to Point Barrow, regularly makes a long flight southeastward in the fall to our Atlantic coast on its way to South America. In winter plumage it closely resembles the semipalmated sandpiper and is easily overlooked. It is told mainly by its longer bill.

In the spring it seldom ventures up the Atlantic coast beyond North Carolina before cutting northwestward to its breeding ground. At this time of the year its upper parts are considerably brighter than are those of the semipalmated sandpiper.

A considerable number of western sandpipers winter on our Gulf coast, though the majority continue on to South America. The largest number migrate down the Pacific coast and winter from Washington to Peru.

In courtship and nesting habits the western is very similar to the semipalmated sandpiper.

Semipalmated Sandpiper

Ereunetes pusillus

Average Length, Six and One-third Inches

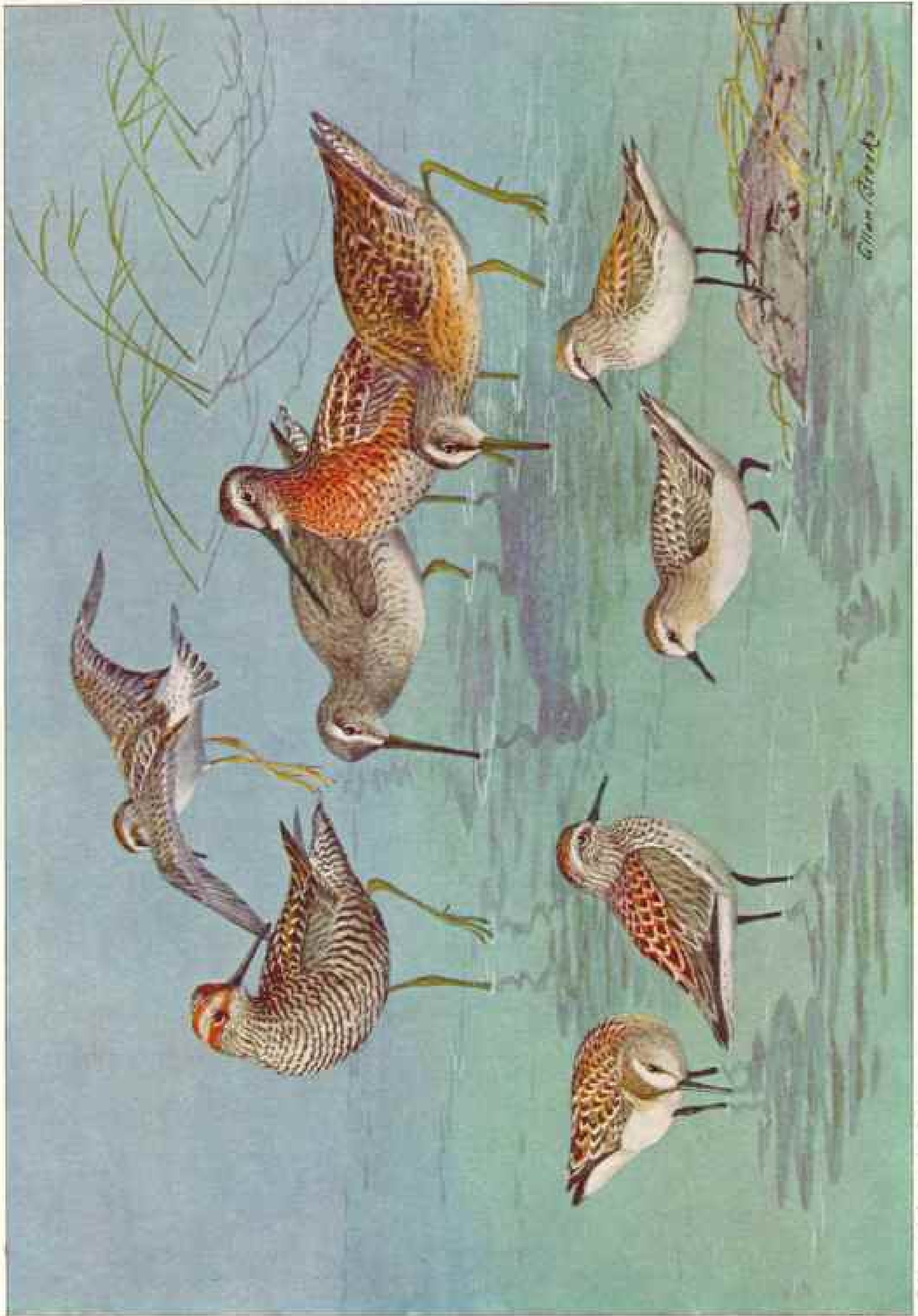
This most abundant species of the shore bird group passes the summer throughout the Arctic from northeastern Siberia to northern Labrador; it winters from South Carolina and the Gulf States to Patagonia, and migrates through the United States and Canada mainly east of the Rockies.

Very often associating with the least and western sandpipers and together with them being known as "peeps," they are the most numerous sandpipers on our coasts and mud flats during August and September and again during late April and May. They often assemble in suitable places in flocks of hundreds or even thousands, and usually are very tame.

It was once considered legitimate sport to fire into these enormous flocks, killing dozens at one discharge of the gun and crippling many others for the sake of a none too savory potpie of tiny breasts. Fortunately that day is gone, and the little sandpeeps will continue to grace our shores and inspire such poems as that by Celia Thaxter, "One Little Sandpiper and I."

The call of the semipalmated sandpiper is somewhat hoarser than that of the least sandpiper, but its courtship and nesting habits are similar. Over the tundra at Churchill early in June dozens of these little birds could be seen hovering in the air, voicing their amorous feelings in loud buzzing sounds more like those of cicadas or bees than of birds.

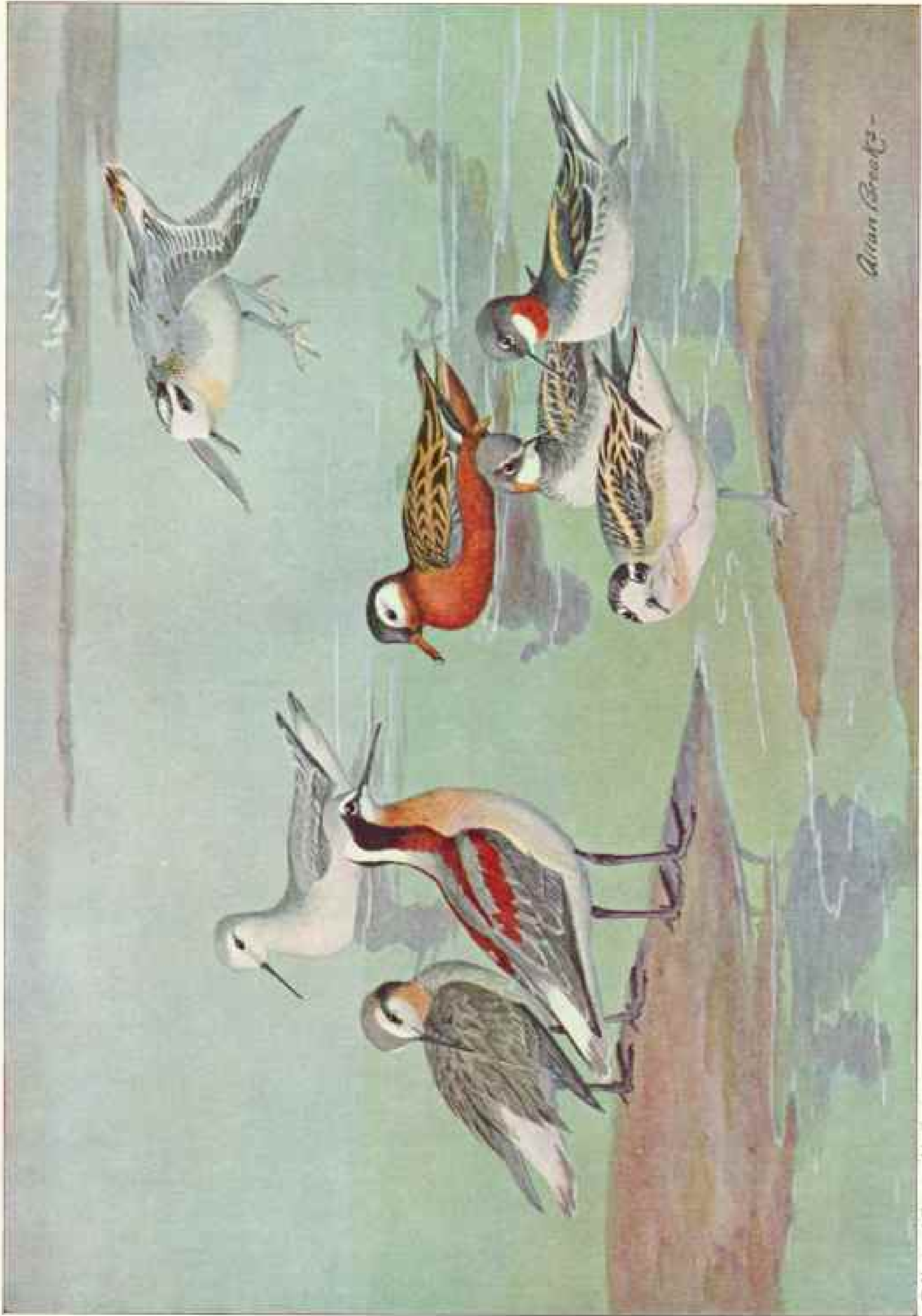
(See Color Plate X.)



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ON THEIR NORTHERN NESTING GROUNDS, AMOROUS HOVERS GIVE VOICE TO BUZZING, INSECTLIKE LOVE SONGS

Above are two **Stilt Sandpipers** (left, young alighting) and a trio of the **Eastern Dowitcher** (adults in winter and summer plumage, young in fall dress). The **Semipalmated Sandpiper** (two lower right, young left) often associates with the **Western Sandpiper** (lower left-hand pair, young left).



Alan Beckett

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FLAINER AND SMALLER THAN THEIR MATES, MALE PHALAROPES BUILD THE NESTS AND INCUBATE THE EGGS

The trio at the left are the **Wilson's Phalarope** (female in summer plumage right, male left, young in winter garb above). At the right are the **Red Phalarope** (showy female in center, winter-clad young alighting) and **Northern Phalarope** (young on one leg in front of male and female in summer plumage).

Wilson's Phalarope

Steganopus tricolor

Average Length, Male, Eight and Three-quarters Inches; Female, Nine and One-half Inches

Phalaropes are swimming sandpipers whose toes are lobed rather than webbed. They can swim like miniature ducks and do not hesitate to do so. Indeed, two of the three species making up the family pass the winter months largely on the open sea where their dense breast feathers and undercoating of down are fully as waterproof as those of ducks.

Female phalaropes are bigger and brighter than the males; and they do not build the nest, they do not incubate the eggs, they do not even care for the young (p. 187). Indeed the female is the aggressor in the courtship, and it is a common sight over the prairie sloughs to see one small male pursued by two large, brightly colored females which swell out their necks and fill the air with curious grunts.

After the eggs have been laid and the males are doing the work of incubation, the females gather in flocks by themselves. They do not entirely lose the maternal instinct, however. I learned while studying a colony of Wilson's phalaropes in western Manitoba that whenever any disturbance flushed the males from the nests, the females would come flying in from the sloughs to learn the trouble.

At one nest where I had my photographic blind this seemed to irritate the male, and whenever the female approached within five or six feet he would set upon her, pound her head with his bill, and drive her away.

The Wilson's phalarope is the only one of the three species that is restricted to the New World, wintering in southern Chile and Patagonia and passing the summers from central California to central Manitoba, where it is found about grassy ponds and prairie sloughs feeding almost entirely on aquatic insects. It has longer legs and a longer neck than the other species, and its toes are less broadly lobed, no doubt in consequence of its more terrestrial habits. The only call I have ever heard it give is a little grunt or quack.

Northern Phalarope

Lobipes lobatus

Average Length, Seven and Three-quarters Inches

One morning early in June, 1935, we peered over an embankment to the surface of a reservoir near Denver, Colorado, and to our amazement found it covered with what looked like tiny ducks all heading into the wind, except for a few near the shore which were whirling about in a dance, almost like whirligig beetles.

There were several thousand of these little birds, northern phalaropes, on their way to their Arctic breeding ground. They had been wintering off the coast of Peru and had just completed one leg of their 3,500-mile journey.

(See Color Plate XI)

They seemed in no hurry that morning, despite the fact that some of their kind had probably already reached their Hudson Bay nesting ground; indeed a year before, almost to a day, I had watched the first arrival of their kind at Churchill on Hudson Bay.

However, the birds I saw near Denver all were gone the following day. Probably they had been resting preparatory to their next night's flight of some 840 miles to Lake Winnipeg. All the shore birds are primarily night migrants.

These phalaropes are found throughout the Northern Hemisphere, nesting on the Northern Plains, and wintering on the open sea off the coasts of South America and Africa. Their stopping places in the interior of the country are rather local, but one often meets with flocks of them out of sight of land, resting on the sea or flying in close formation just above the water—a strange environment for a shore bird.

The northern phalarope is similar to the Wilson's in the reversal of the sexes as to size, color, and domestic relations; and the grassy nests and buff, spotted eggs placed in grassy hummocks, usually surrounded by water, are likewise common to the two species.

The only note I ever heard from this species was a simple *cheek* of alarm as the birds took flight. Their courtship pursuits are usually silent.

Red Phalarope

Phalaropus fulicarius

Average Length, Eight Inches

This is the most boreal of the three phalaropes, pushing even further north than the northern, and is seldom found south of the delta of the Yukon or Southampton Island in summer. It is likewise equally abundant from Iceland to eastern Siberia, and in winter is plentiful off the coasts of South America, Africa, and Arabia. It is the most maritime of the three phalaropes and is seldom found on our coasts or inland except when driven in by heavy storms at sea.

In winter plumage it is much grayer than the northern phalarope and is sometimes called the "gray phalarope." It is likewise easily distinguished by its much broader bill. In breeding plumage all three species are so distinct that there is little danger of confusing them. This species with its red underparts and white cheeks is particularly distinctive. Its simple note is the most metallic of the three, sounding like the striking together of two bits of steel.

The reversal of the coloration and marital relationships noted with the other species is even more pronounced with the red phalarope. The female, obviously head of the house, is much more showy in appearance than her consort, and she proves her authority by driving the male around to suit her pleasure.

Avocet*Recurvirostra americana*

Average Length, Sixteen and One-half Inches

On September 15, 1909, I leveled my glasses on a distant flock of shore birds at the head of Cayuga Lake and there, among a variety of smaller sandpipers, I espied my first avocet. Likewise it was the first avocet to be recorded from New York State.

Four years later, in October, on the same shore, I recorded the second avocet for New York State, but never since have I seen one east of the Mississippi River.

In the early part of the 19th century Alexander Wilson reported them as breeding on the New Jersey salt marshes, but such a striking bird is the avocet that apparently all eastern breeding colonies were extirpated and today there are none east of northern Iowa. From there westward to California, northward to southern Alberta and Manitoba, and southward to southern Texas and New Mexico, the avocet is not uncommon in suitable places, such as shallow marshes and flooded fields.

Like the stilt, the avocet protests loudly when its nesting grounds are invaded, circling about with an oft-repeated *yip-yip-yip*.

These showy birds feed peculiarly in shallow ponds. Singly, in pairs, or in flocks, they stalk through the water, swinging their heads from side to side in unison, as if they were mowing hay with a scythe. The flattened, thin-edged tips of their curiously upcurved bills are swung laterally through the surface film of water, or through the silt at the bottom, and mosquito wigglers, midge larvæ, and the like are sorted out with scarcely a ripple.

The avocets build nests similar to those of the stilts—depressions in the ground lined with grasses. Like the stilts they sometimes build up their nests when the waters rise.

Male and female avocets are alike in plumage and share the duties of incubation. One of a pair that I was photographing was much more timid than the other and always waited for its mate to go to the nest in front of the blind before it would dare to go itself. It always felt the urge to incubate, however, after its mate became settled on the nest and would come up to the brooding bird and bump it with its head until the latter gave way.

In winter plumage the avocets lose the cinnamon on their heads, which is partly replaced by gray. They migrate to southern Texas, Mexico, and Guatemala.

Black-necked Stilt*Himantopus mexicanus*

Average Length, Fifteen Inches

My first experience with black-necked stilts was unfortunate. I had been instructed by Dr. Frank Chapman to collect for the American Museum a few specimens of a rare duck

(*Marila nationi*) which had been lost to science shortly after its discovery and which he had reason to believe could be found in the Cauca River marshes of Colombia. After numerous failures I had finally located a small flock of these ducks on a marsh near Cali and was sneaking down to the shore to stalk them when a pair of black-necked stilts spied me.

Then and there I might just as well have packed up my belongings and gone home. The deafening racket of the stilts was taken up by the jacanas and the whole marsh was soon in a clamor. Up went the screamers, then the Muscovies, then the tree-ducks, and finally the scaups; and I left without obtaining the coveted specimens. Thanks to the stilts I was forced to return another day, and I have never felt quite the same toward them since.

The stilts are wide-ranging birds, for they nest all the way from Peru and Brazil through Mexico and the West Indies to northern Utah and central Colorado, wintering in the southern part of their breeding range.

In Florida when I was trying to find their nests, I searched for several hours before I discovered that the birds had flown a quarter of a mile to meet me and were diverting my attention from their home by making a big fuss a couple of hundred yards away. The nests, I finally realized, were in a rather scattered colony on an adjacent flooded field, the light olive-brown, heavily spotted eggs being inconspicuous on thin, flat beds of broken grasses.

In Utah when I was trying to find the nest of a long-billed curlew, the stilts, which also nested there, were trying to frustrate my purpose by spying on me and telling the curlews of my hide-out and how long I was going to stay.

In addition to their loud cries the stilts have other amusing tricks to attract one's attention to themselves and thus protect their eggs or young. As if not striking enough in their black and white plumage on their long, pink, stiltlike legs, they run out into the open water where there will be nothing to conceal them and then start bobbing, suddenly bending their legs and then straightening them again so that each time their snowy-white breasts strike the water.

If this trick is not sufficient to divert one's attention, they begin waving their wings, sometimes one at a time, sometimes in unison, and then go hobbling off in pitiful decrepitude. Meanwhile, to accompany these incidents, there is such an uproar from all the other stilts of the vicinity that one is thankful to be able to leave the locality.

Occasionally heavy rains cause the water to rise about their nests on mud hummocks and then they are busy pushing straws and sticks and weed stems under the eggs until sometimes they raise them six or eight inches—ludicrous Noah's arks when the waters again recede.

(See Color Plate XII)



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THEY WALK ON STILTS ALONG THE SHORES OF WESTERN LAKES

The handsome Avocet (right in summer finery above downy chick, bird in winter plumage flying) shares marshy western bottom lands with the Black-necked Stilt (left, adult male and young female), a widely ranging species that postures and screams to divert attention from its nest.



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"MUD HENS" AND "WATER CHICKENS" CACKLE AND SPLASH AMONG THE RUSHES

"Mud hen" is only one of the nicknames of the common **American Coot** (left, with a downy chick, and running over the water in background). The **Florida Gallinule**, or "water chicken" (center, young in background), frequents extensive marshes from Ontario to Panama, Southern States are usually "farthest north" for the black-necked **Mexican Jacanna** and the tropical **Purple Gallinule** (right).

Mexican Jacana

Jacana spinosa gymnostoma

Average Length, Eight and One-half Inches

This curious little tropical bog-trotter is really more closely related to the shore birds than to the rails, but in its appearance, habits, and environment it is more like the gallinules. It gains admittance to consideration here among the birds of the United States and Canada because of its occasional wanderings from Mexico into the lower Rio Grande Valley of Texas near Brownsville. Its real home is in Mexico, with closely allied subspecies in Central and South America.

Its four brownish, glossy eggs are laid in floating nests of debris. Scrawls and pen-like black scratches all over the surface make them unique though inconspicuous.

American Coot

Fulica americana americana

Average Length, Fifteen Inches

"Half duck and half chicken" well describes this clown of the rail family, which in many places is still very abundant and is known by such familiar names as "mud hen," "blue peter," "puldoe," and "crow duck."

It is widely distributed during the summer, from central British Columbia to New Brunswick, and south regularly as far as New Jersey in the east and Mexico or even Nicaragua in the west. In winter it often stays as far north as it can find food and open water. In California, Texas, and Louisiana it is locally extremely abundant in winter about lakes, ponds, and marshes, and wherever protected becomes so tame as to be almost a nuisance.

The coot ordinarily gleans along the shore or "tips" in shallow water to feed on many kinds of leaves, buds, seeds, and aquatic insects, but it may dive to depths of 10 to 20 feet.

On Cayuga Lake in winter I have seen individuals diving with the canvasbacks to get the buds of wild celery, and one cold season a flock massed like scaups over the weed beds and apparently had little difficulty in procuring a livelihood even when marshes and countryside lay deep under ice and snow.

During the nesting season coots are noisy, giving vent to their feelings in a variety of explosive cacks, clucks, coos, and wails, to the accompaniment of much splashing, chasing, and wing waving. Their rather deeply hollowed nests of dried rushes are built at the edges of ponds, sometimes concealed in the reeds, sometimes quite conspicuous in the open, and anchored to only a few bulrushes.

Their eggs are light tan in ground color with numerous pinhead black specks. They lay from 6 to 15 eggs, and like the gallinule start incubating after laying only a few, so that at hatching time the male has to take the first comers off into the marsh to feed while the mother continues her duties as incubator.

Florida Gallinule

Gallinula chloropus cackinnans

Average Length, Thirteen and One-half Inches

The Florida gallinule or "water chicken," as it is sometimes called, is found in summer in most of our large marshes from Minnesota to southern Ontario and New England, south to the West Indies, Panama, and even the Galápagos Islands. Like the coot, however, it is somewhat local and may be scarce over considerable areas.

It is similar to the coot in most of its habits, though because its toes are not lobed it does less swimming and diving and seldom ventures very far from the protection of the cattails or rushes. Its long toes act like snowshoes in distributing its weight, and it is able to run over the lily pads almost as well as the jacana.

It derives the name of "water chicken" not only from its bantamlike appearance but also from its variety of barnyardlike clucks and cackles, many of which are almost indistinguishable from those of the coot. It likewise has a co-co-co-co-co call that suggests the notes of the pied-billed grebe.

Its nest, built of dead cattails or rushes with a runway of the same material leading up to it from the water, is similar to that of the coot, but it is usually placed farther back from the open water. Its eggs are similar in ground color, but the spots are larger, browner, and less regular. The downy young are black, with a few gray whiskers on their chins.

Our gallinules are the New World representatives of the Old World "moor hens," which are found throughout Europe.

Purple Gallinule

Limornis martinica

Average Length, Thirteen Inches

This tropical representative of the gallinule tribe has extended its range from the South American marshes as far north as Texas, Louisiana, and South Carolina, and in some of the marshes it is an abundant bird. It is somewhat smaller than the Florida gallinule and frequents more open places, where its brilliant plumage and bright yellow legs present an attractive picture among the deep-green "bonnets" or lily pads. In South America I have seen these birds sunning themselves on the tops of bushes at the edge of a marsh, but in Florida or Louisiana they seem to like to have their feet wet most of the time.

The only nests I have found were in rather open places such as coots select, especially among the pickerelweed, but this species is reported to nest sometimes several feet above the water in cattails or saw grass.

Though this bird normally is not found north of South Carolina, it is apparently given to wandering or is picked up by tropical storms, for there are many records of it as far north as Quebec, New Brunswick, and Nova Scotia.

(See Color Plate XIII)

California Clapper Rail

Rallus obsoletus obsoletus

Average Length, Seventeen and One-half Inches

In the salt marshes of San Francisco and Monterey Bays, in a habitat that is being rapidly restricted, lives the California clapper rail. Two hundred miles down the coast is found a subspecies, the so-called "light-footed rail" (*Rallus o. levipes*), named by Bangs, and still farther south, in the mangrove swamps and salt marshes in the cape district of Baja California, is found still another variety, the Belding's rail (*Rallus o. beldingi*).

Farther east in the marshes of the lower Colorado River north of Yuma is still another variety, the Yuma clapper rail (*Rallus o. yumanensis*), a form which has the distinction of being the only clapper rail inhabiting a fresh-water marsh.

These clapper rails differ somewhat from those of our eastern coastal marshes. They get their name from calls which resemble the *cock-cock-cock* of old-fashioned clappers.

Their nests are built of dead vegetation; their eggs are much paler than those of the eastern birds and less heavily marked.

Virginia Rail

Rallus limicola limicola

Average Length, Nine and One-half Inches

The most satisfactory way to get acquainted with rails is to find their nests in late May or early June and then stand quietly by, with or without a blind, and wait for the birds to appear. Sometimes they lose all fear in the presence of their eggs or young and I photographed one Virginia rail that would actually attack my hand if its eggs were touched.

The nests are built of dead rushes, rather deeply hollowed, and are placed just above the water. From 5 to 12 eggs of a cream-buff color with spots of reddish brown are laid, and occasionally two birds lay in the same nest. Almost before the Virginia rail starts her nest, she begins pulling down the tips of the surrounding sedges or rushes to make a roof over it, and she keeps this shelter always in place.

Male and female Virginia rails are practically indistinguishable and they take turns incubating, but, as in gallinules, the young may be hatching over a period of several days. When danger threatens, it is apparently the adults' common practice to pick up the youngsters in their bills and carry them to safety.

The Virginia rail is found in summer in suitable marshes from southern British Columbia to New Brunswick, south to Baja California, Utah, southern Ohio, and eastern North Carolina, wintering from the southern part of its breeding range south to Florida, Mexico, and Guatemala. It is more numerous in the interior, while the sora is more abundant in New England and the Atlantic States.

(See Color Plate XIV)

Sora

Porzana carolina

Average Length, Eight and One-half Inches

The sora and the Virginia rail are our best known and most widely distributed marsh birds, their ranges being almost identical, with the exception that the sora seems not to nest south of Maryland on the Atlantic coast. It extends its migrations somewhat farther, however, and regularly crosses the Caribbean to winter as far south as Venezuela and Peru.

Male and female soras are alike in appearance. In juvenile plumage the soras lack the black face markings, and are paler and yellower in general color, so that they are sometimes confused with the smaller yellow rail.

A loud whinny that is frequently given by the sora I have never heard the Virginia imitate, and, vice versa, a call of *ticket-ticket-ticket* or *racket-racket-racket* I believe is given only by the Virginia.

Yellow Rail

Coturnicops novaboracensis

Average Length, Seven Inches

So mouselike is the yellow rail in its habits, and so difficult to flush, that no one really knows the limits of its distribution. It doubtless ranges widely over North America, for there are scattered summer records for it from California to northern Manitoba and eastward to Nova Scotia and New England, but the only nests found are one in California, one in Michigan, and a number in North Dakota. In winter the bird has been taken throughout the Gulf States and many have been caught alive by bird dogs because they refused to fly.

Nests of the yellow rail have been found in grassy marshes and were like the sora's, only smaller; the eggs were whiter with a capping of brown spots at the large end.

Black Rail

Crecisus jamaicensis stoddardi

Average Length, Five Inches

Despite its diminutive size, elusive habits, and limited distribution, the black rail is gradually becoming better known than its yellow cousin. In summer it frequents grassy marshes from Massachusetts to Florida and westward to Iowa, Kansas, and Minnesota, being most regular, however, in the coastal marshes where fresh and salt water mingle. In winter it usually goes south as far as Guatemala, though sometimes it remains in our Gulf States.

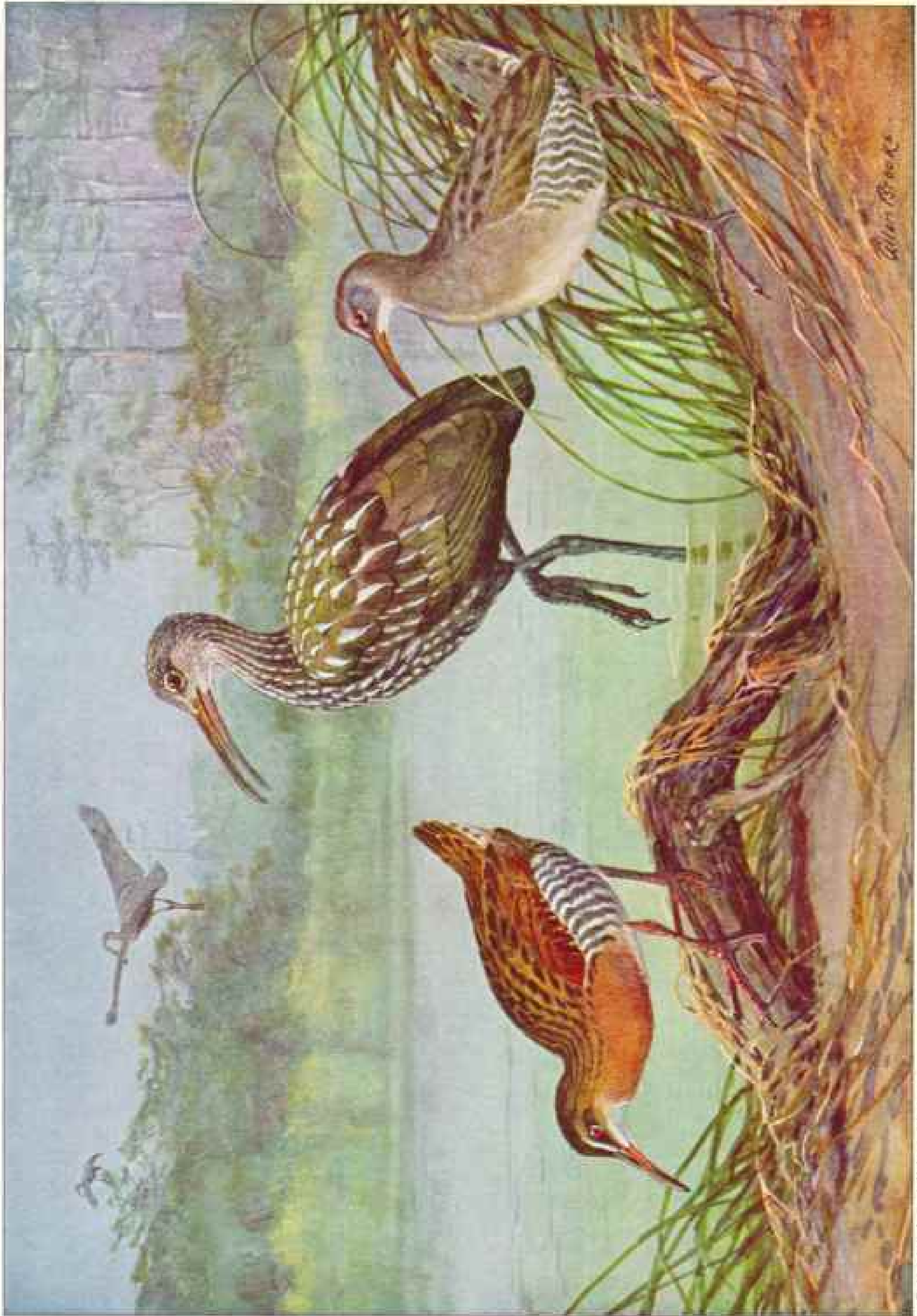
It is ordinarily as silent and elusive as a mouse, but during the breeding season the male calls *kik, kik, kik* or *kuk, kuk, kuk*, and the female answers *croo-croo-croo-o*, like the beginning of a song of a cuckoo. Its nest, like that of a meadowlark, is partly roofed over, and its 5 to 10 eggs are pinkish white, speckled with brown and gray.



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STUBBY-TAILED MARSH DWELLERS SELDOM FLY, BUT SNEAK SWIFTLY THROUGH SHELTERING REEDS AND GRASSES

The big California Clapper Rail (adult and downy young, upper right) keeps company with four other rails—the well-known Sora (adult and immature, right foreground), the Black Rail (dark, speckled bird), the almost flightless Yellow Rail (left foreground), and the Virginia Rail (left background).



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DESOLATE WALLS OF THE "CRYING BIRD" ECHO WEIRDLY OVER SOUTHERN SWAMPS

The tropical Limpkin, or "crying bird" (center and flying), ranges as far north as Florida and Georgia. The King Rail (left), a "large edition of the Virginia rail," is mainly a fresh-water species, while the Clapper Rail (right) clings to the salt-water marshes.

King Rail

Rallus elegans elegans

Average Length, Fifteen Inches

This large edition of the Virginia rail is found throughout the interior of the United States and southern Ontario from southern Minnesota to Massachusetts, southward to Florida and Texas and intermediate points. It winters in the southern part of its breeding range from New Jersey southward.

The king rail mainly is restricted to fresh-water marshes as the clapper rail is to the salt water, and since the birds are about the same size and decidedly similar in color and markings, one can be almost as sure of one's identification by the type of marsh in which the rail is found as by the markings of the bird itself. The king rail ventures into the open a little more than the Virginia rail and is more given to wandering, so that it is sometimes seen about dooryards or in hayfields at some distance from its home marsh.

The king rail usually arranges the vegetation over its nest in a canopy. The eggs are paler than the clapper rail's or the gallinule's and are rather sparingly spotted with brown.

The downy young are covered with thick, coal-black fuzz like young Virginia rails, with no particular ornaments such as are worn by soras or gallinules.

The calls of the king rail are a loud *brip, brip, brip, brip*, of about five seconds' duration, and a grunting *ump, ump, ump, ump* given more deliberately.

Clapper Rail

Rallus longirostris crepitans

Average Length, Fourteen and One-half Inches

A person living long enough in one place isolated from the rest of the world develops certain peculiarities, and the same holds true for nonmigratory birds. Sometimes these peculiarities appear as slight differences of color or length of bill, so that we can tell at a glance whence the birds have come. At other times the distinction may be only in insignificant differences of voice or mannerisms.

The clapper rail lives much to itself in a peculiar environment, the salt marsh; and south of New Jersey it is nonmigratory.

Little differences in the darkness of the upper parts or paleness of the under parts have developed locally, so that now we recognize four subspecies in addition to the northern birds. These are Wayne's clapper rail of the salt marshes from North Carolina to New Smyrna, Florida; the Florida clapper rail from Jupiter Inlet southward and on the Gulf coast of Florida; the mangrove clapper rail of the Florida Keys; and the Louisiana clapper rail of the rest of the Gulf coast.

In former years clapper rails were extremely abundant on our coastal marshes, and Audubon speaks of a commercial egger on the New

Jersey coast collecting as many as 100 dozen eggs in a single day.

In favored spots clapper rails are still common and their loud rattling calls are familiar sounds toward evening or on moonlit nights and off and on in daytime. Any sudden sound like the discharge of a gun is likely to start them cackling.

Their nests are placed in clumps of sedges and are usually arched over like the Virginias'. Their large eggs vary greatly in ground color and spotting, but are normally darker and more heavily marked than those of the king rail. The downy young are uniformly black.

Limpkin

Aramus pictus pictus

Average Length, Twenty-eight Inches

Never shall I forget the voice of the limpkin. One night when I was floundering in a Florida swamp it crashed on my ears in the most dumbfounding, hair-raising, heart-thumping wail that I had ever experienced: *Aow, aow, aow, aow, aowoooooow!*

The sound reverberated from cypress to cypress and out across the marsh and back again as if an alligator had suddenly seized some wandering spirit by the leg and were pulling him under. Again the weird howl and the wail sent shivers along my spine.

This time it was answered across the lake by another seemingly lost spirit—a call like the voice of a wolf baying the moon. Others took up the cry until the din was deafening. It was as if I had suddenly been plunged into bedlam. Needless to say, all this clamor did nothing to help me out of my confusion.

Since then I have heard many limpkins and have enjoyed their concerts at Wakulla Springs clear through the night when they joined the serenade of the barred owls. We have photographed their voices on film, but never have I received such a thrill from any voice of the wild as I did that evening near Puzzle Lake.

The limpkin, or "crying bird," as it is sometimes called, is a tropical species that finds the northern limit of its breeding range in Florida and southern Georgia where its distribution corresponds with that of a large snail (*Pomacea*) upon which it feeds almost exclusively. Since the snail is largely nocturnal, coming out of deep water at night, the limpkin has adapted its habits accordingly. The limpkin is also found in Cuba, and allied forms occur in Mexico, Central America, and Haiti.

In most of the localities where it is found the limpkin builds a nest of rushes in the saw grass, but along the Wakulla it makes its nest of twigs and Spanish moss in the dense myrtle bushes and lower branches of the moss-laden cypress trees growing in the river. It lays from four or five to eight light-brown eggs that are rather obscurely spotted. The young limpkin is covered with smoky-gray down.

(See Color Plate XV)

Whooping Crane

Grus americana

Average Length, Fifty Inches

Today the total number of whooping cranes seen each year by the army of observers interested in this noble bird is few in the limited range left to these cranes. Each year a few are reported wintering in Texas or Louisiana, and an occasional bird or small group is seen migrating with sandhill cranes in Nebraska or Saskatchewan, going to or from their nesting ground in northern Saskatchewan or Mackenzie. But their days are numbered, and like the trumpeter swan and the ivory-billed woodpecker, unless they can have more real protection they will soon follow the passenger pigeon and the great auk into extinction.

Recent nests of the whooping crane described in print were found by Neil Gilmore and Fred Bradshaw in Saskatchewan in 1922. They were built in the center of large marshes with open water all about them and nothing to obscure the vision of the wary birds. The nests were 4 or 5 feet in diameter, made of rushes and sedges pulled up or nipped off near the nest, built up 15 or 18 inches above the water, and lined with dried grasses. The two oval eggs are about four inches long and somewhat darker and more heavily spotted than those of the sandhill crane.

Young whooping cranes are covered with buffy down and follow their parents from the nest to drier land soon after hatching. For the first year they are more or less mottled with cinnamon brown and white. Just how long it requires for them to attain the snow-white plumage of the adult is not known.

Sandhill Crane

Grus canadensis tabida

Average Length, Forty-four Inches

We are now faced with the near extinction of another species that formerly abounded from Alaska to Florida: the sandhill crane, which has been reduced to a pitiful remnant of its former population even in the far corners of its once extensive range.

The northern birds that formerly nested in great numbers from Alaska to Hudson Bay and wintered from California to Texas and southward into Mexico are considered a separate subspecies called the little brown crane (*Grus canadensis canadensis*) because of their smaller size and somewhat browner back.

The birds which are permanent residents of the Florida Peninsula and southern Georgia are likewise smaller and darker gray, and are recognized as a distinct race—the Florida crane (*Grus canadensis pratensis*).

The rest of the birds which formerly nested from British Columbia and Manitoba southward to California, Colorado, Nebraska, Illinois, and Ohio are the ones commonly called "sandhill cranes," and these have suffered most

from the encroachments of civilization. In former years they wintered commonly from California to Louisiana and were numerous on migration along the Atlantic coast as far north as New England. Today they are extremely rare east of the Mississippi, except for a few nesting in Michigan, and they are extinct as breeding birds in the south half of their former range.

All three forms of sandhill cranes are so similar in appearance and habits that they cannot be distinguished in the field and they may, therefore, well be considered together.

In flight cranes differ from great blue herons, which are sometimes called "cranes," in that they carry their necks straight out instead of folded, their wing strokes are shorter, and their flight feathers are more spread. They are, in reality, much larger also, though size is deceptive in a flying bird when there is no means of judging distance. In migration they fly in long lines or in V's like geese, calling loudly *gar-oo-oo-oo*, *gar-oo-oo-oo*, a cry heard even farther than the honking of similar flocks of geese. At times, when not migrating, they may circle higher and higher like turkey buzzards or wood ibises, seemingly just for the enjoyment of it, or to await the passing of some enemy on the prairie below.

One of the most distinctive habits of all members of the crane family the world over is their habit of dancing during the breeding season. These dances are occasionally indulged in during the fall and winter, and their actual relationship to the procuring of mates is not well understood, for, even after they are mated and have their nests built and eggs laid, the giddy birds are sometimes seen bowing and hopping in a none too domestic manner. In the mating season several flocks of six to eight each will gather on a bare hilltop for what resembles an old-fashioned barn dance.

The nests of the sandhill cranes are usually large affairs of dead rushes and the like, resembling low nests of muskrats or alligators (p. 186). Four or five feet in diameter, the nest is built up a foot or more above the surface of the surrounding water in the center of a more or less extensive marsh. The two eggs are pale brownish, rather obscurely marked with darker brown. The newly hatched young are thickly covered with golden-brown down, and are capable of following their parents to dry land about the edge of the marsh where they spend most of their time until grown.

The cranes are perhaps our wariest birds, but even so they respond to kindness and lose their fear of man at times. A friend of mine, W. E. Browne, at his home called "Manywings," between two small lakes in northern Florida, has not only tamed most of his small bird neighbors, but has so beguiled a pair of wild Florida cranes that they bring their youngsters up to his back door for corn-bread, which he cooks especially for them.

(See Color Plate XVI)



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TO THE ILL-FATED WHOOPING CRANE—HAIL AND FAREWELL!

Apparently a doomed species, the towering Whooping Crane (right) is seldom observed today even in regions where, a century ago, its legions flew past by the hour. The ranks of the smaller Sandhill Crane (left, adult and young) have also been so seriously depleted that extinction threatens that species, too. Two subspecies, the northern Little Brown Crane (flying above) and the Florida crane, have been persecuted less than the true sandhills.

THE "PILGRIM" SAILS THE SEVEN SEAS

A Schooner Yacht Out of Boston Drops In At Desert Isles and South Sea Edens In a Leisurely Two-Year Voyage

BY HAROLD PETERS

AN OBSERVER on the end of Pier 14, Balboa, Panama Canal Zone, at 8 a. m. December 31, 1932, would have seen the schooner yacht *Pilgrim* making a desperate attempt to get away on her voyage around the world.

While sailing down from Boston that summer, the vessel had sprung a leak, the complications of which had held us in the Canal Zone until this last day of the year.

There were eight of us aboard. A ninth member, "Francis," had just deserted. Francis was technically a coati and resembled something between a raccoon and a very small bear with a long tail (page 227). As he suddenly left us for the jungle, we suppose he feared the effects of a long voyage.

SUPPLIES INCLUDE AN EXTRA LEG

When the last of our Panama friends had been shooed onto the wharf, we dropped down the harbor and were soon roaring south under square sail and raffer before the first norther of the dry season, bound for the Galápagos Islands. Stowing our supplies, we found a particularly unpleasant-looking wooden leg, with a boot on it, which "Doc" Durant had seen fit to include in his medical stores.

It is about 980 miles in a straight line from Panama to the Galápagos Islands, but a sailing vessel, especially at this season, does better to run due south to about two degrees from the Equator and then stand for the islands on the port tack.*

Following this route, the *Pilgrim* had exceptional luck, and we fetched Tower Island in the Galápagos on the seventh day out.

It helps to establish friendly relations if you fly on the foremast the flag of the country whose port you are entering. The Galápagos belong to Ecuador, but the flag

we had hastily purchased turned out to be that of Colombia. There is a light-blue stripe in the flag of Ecuador, so Joe Ekeland, our rigger, was detailed to obtain some cloth of this color.†

The way Joe prowled around the cabin caused considerable nervousness among the wearers of light-blue pajamas. Donald Starr, the *Pilgrim's* owner, finally contributed a discarded shirt of the proper shade and we anchored in Puerto Chico, San Cristóbal Island, January 8, with a particularly trim Ecuadorian flag at the foretruck.

Progreso, the largest town in the Galápagos, is located on San Cristóbal and has more than 400 Indianlike inhabitants. The military governor of the group and a prominent rancher did their best to show us a good time. Iguana pie, delicious avocado pears, pineapples, horses to ride—they gave us everything and we had hard work to get them to accept money for eggs and other articles which we wanted for the voyage.

SEA LIONS—AND SEA TIGERS

Next port was the uninhabited island of Santa Fé, or Barrington. (All the Galápagos have both English and Spanish names.)

Sea lions swarm around the island; every evening they hauled out for the night among the rocks astern of us. Big sharks are numerous, and one sea lion crawled out of the water with such a large section of his body bitten off that we shot him.

Then came the sharks. They lunged half out of the water onto the rocks, trying to pull in the dead lion, and Joe beat them with a short club without producing the slightest effect. They soon had the body in the water and devoured.

With an outboard motor on our big dory, we trolled outside the harbor and caught all the fish we could eat.

Each night we were here, just at dark, our rigging was filled with small owls—a hundred or so, black and brown mottled.

Having heard at Progreso that there were wild goats on Santa Fé, Starr, the

* To follow the *Pilgrim's* route, see the Map of the World issued as a supplement to THE NATIONAL GEOGRAPHIC MAGAZINE, December, 1935.

† See "Flags of the World," in THE NATIONAL GEOGRAPHIC MAGAZINE, September, 1934.



Photograph by Harold Peters

"PILGRIM'S" OWNER AND COMMANDER LOAFS AT THE WHEEL, LONGING FOR
A BREEZE

Donald C. Starr, young Boston lawyer, sailed from the United States in June, 1932, with five friends: Horace W. Fuller of Milton, Massachusetts, engineer, known to his mates as "the Chief"; Richard C. ("Doc") Durant of Hartford, Connecticut, ship's doctor; C. B. G. Murphy ("the Harpooner") of Detroit, Michigan; Joseph K. McCammon 3d ("the Trader") of Washington, D. C.; and Harold ("Skipper") Peters of Boston, captain-navigator and author of this article. Two paid members brought the crew's total to eight. Girdling the globe from east to west, the *Pilgrim* arrived back in Boston in July, 1934, after a voyage of 28,533 miles.

Doc, and I started after some fresh meat. After walking over lava and through dry bushes for half a day, in the course of which we saw a light-green iguana, Starr shot a goat the size of a large cat. Boiled, it tasted like pretty good mutton.

A BARREL AS A POST OFFICE

A run of 35 miles from Santa Fé took us to Santa María, or Floreana or Charles Island, where we anchored in Post Office Bay, famous crossroads of old whaling days. The ancient barrel in which the whalers put letters to be picked up later by homeward-bound vessels is still there.

Sea lions were everywhere and very tame. Horace Fuller, our engineer, known as "the Chief," picked up a baby lion on the beach. The mother rushed up, grabbed the baby out of his hands, and swam off with it.

Our next anchorage was Tagus Cove, on the volcano-studded island of Isabela, or Albemarle, largest of the Galápagos.

Three miles across the strait is Fernandina, or Narborough, a hunk of ragged lava 3,700 feet high, rising indescribably sad and silent out of a smooth ocean.

On Fernandina, where we saw some flightless cormorants and thousands of marine iguanas, the walking was like climbing up and down large piles of broken bottles.

PEA SOUP RECORD AT STAKE

On the long run of 5,300 miles across the South Pacific to the Marquesas we had a fair wind, the southeast trade, and a current that sometimes helped us more than 30 miles in a day.

We lived well. The log for January 30 records: "Pea soup today. Joe has the record of 3 bowls in 5 minutes. The Capt. can handle 3 bowls also, but takes longer." And on February 2 the Harpooner (Mr. Murphy) was reported sitting up to curried chicken (canned) with rice and chutney for 46 minutes.



Photograph by Richard C. Durant

A FRIENDLY PANAMANIAN TREATS THE CHIEF AND JOE TO THE NATIVE
"BOTTLED" DRINK.

Dispensing coconut milk in Nature's container, the dresy host receives informally garbed yachtsmen in front of his hut at a little settlement on the Pacific coast a few miles west of Balboa. Indians here grow rice and yams on small farms cleared from the jungle, and sometimes weave hats or carve gourds to be traded for supplies in the nearest town.

Husky Joseph K. McCammon 3d, of Washington, D. C., had now become known as "the Trader." About six feet tall and pretty stout, he had a tendency to burst clothes and with a new beard he began to resemble exactly the typical South Sea trader of story and song (page 239).

Despite generally light winds, we made a fair passage of 20 days without once using the engine, and daylight of February 8 found us close in with what Stevenson, who came here in the yacht *Casco* in 1888, called the "great cannibal isle" of Hiva-Oa, in the Marquesas.

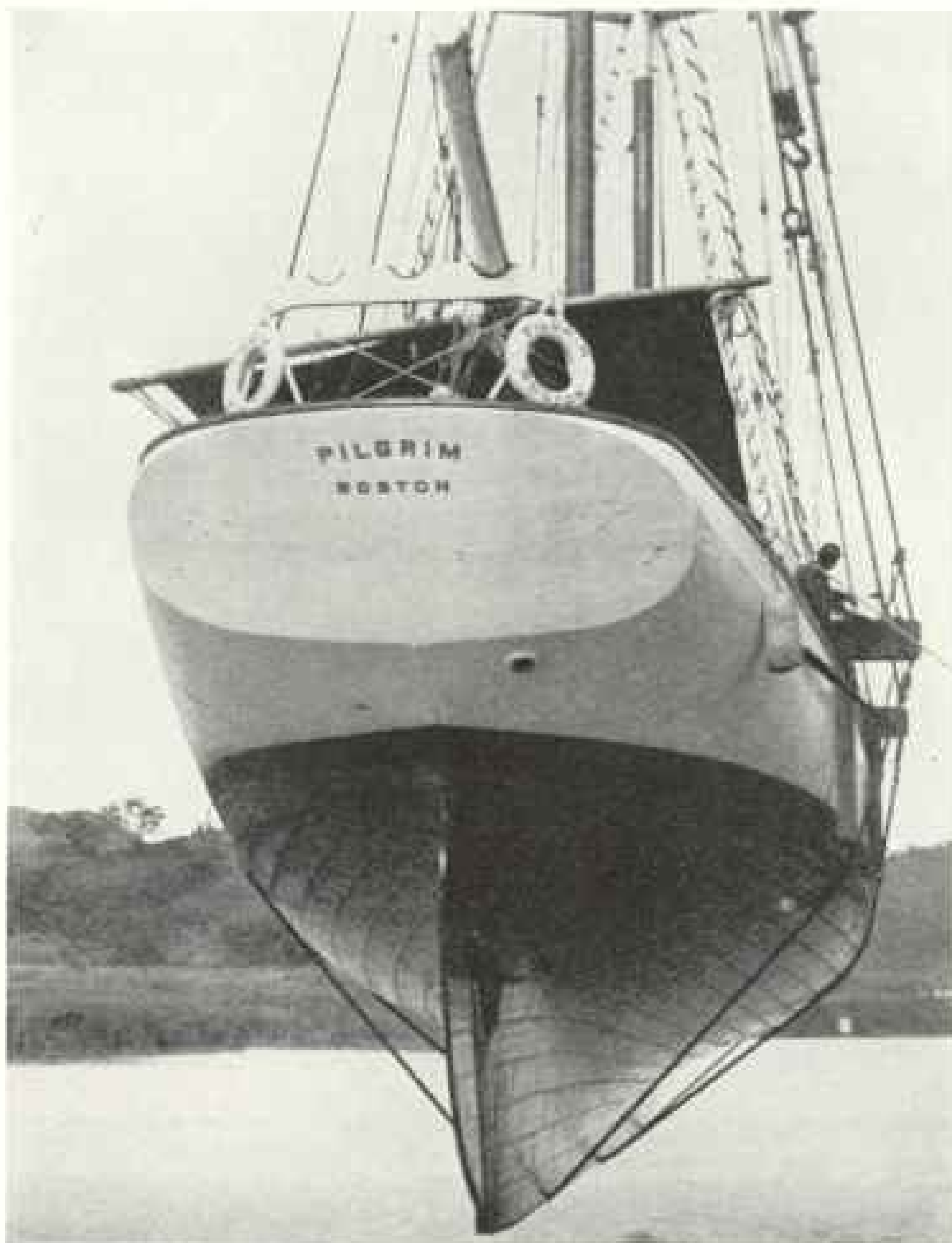
The trade was blowing fresh and we roared along past some of the most magnificent scenery in the world up into Vipi-hai, or Traitors Bay. After sailing 3,300 miles, it is a little disconcerting to find yourself running dead before a big sea at a perpendicular wall of cliff, but at the last moment the little bay of Taahuku opened up and we let go our anchor in the same spot the *Casco* had occupied 45 years before.

High, rocky shores crested with coconut palms and a beach of fine black sand are backed by precipitous mountains, of which Stevenson says: "They are reckoned at no higher than 4,000 feet: but Tahiti with 8,000, and Hawaii with 15,000, can offer no such picture of abrupt, melancholy alps."

CANNIBALS SURVIVE—IN IMAGINATION.

Here lies the little town of Atuana, where we met the two white men of the island, the French administrator and the trader. Through the latter we hired horses and penetrated the island plateau. A small remnant of natives, many of them half-castes, survives of the 20,000 or so husky cannibals that peopled the islands a hundred years ago.

There is an eerie spookiness about these silent ravines, where it is easy to imagine the spirits of the old warriors glaring hungrily at you from behind the coconut trunks or the overhanging crags. As dusk falls over the black beach at the head of Taahuku Bay, you can practically see the



Photograph by Joseph Ekeland.

A CRANE HOISTS THE "PILGRIM" ASHORE FOR REPAIRS

On heavy steel cables, the dripping ship is swung onto the bank of the Panama Canal at Paraiso to locate a leak (page 223). Copper sheathing on her bottom keeps destructive teredos, or shipworms, from burrowing into the wood. The small two-bladed propeller was designed "more with the idea of not being a drag when under sail than of pushing the vessel." *Pilgrim's* overall length is 85 feet; beam, 20 feet 8 inches; draft, 11 feet; gross tonnage, 73.

cannibals yelling down the valley on the heels of some white fugitive, while a ghostly whaleboat lies on her oars just beyond the surf.

A sail of 91 miles to the northwest brought us to the magnificent Bay of Tai-o-Haé, on Nuku-Hiva, best known of the Marquesas (page 228). Everywhere in the group there seem to be abundant breadfruit, mangoes, bananas, and other fruits of which the scanty population can use but a fraction.

Visiting Taipivai, or the Vale of Typee, scene of Melville's famous book, we found it still as lovely as ever but inhabited by a mere handful of people.

GIFT FROM PRESIDENT LINCOLN

In the little village of Haka-hetau, on the rock-pinnacled island of Uapu, we met Samuel Kekela, about 73 years old. His father in the early sixties had saved the mate of an American whale-ship from being eaten by the cannibals on Hiva-Oa. President Lincoln had presented him with a telescope and a gold watch.

The son showed us the telescope, a fine instrument, evidently much cherished. It was inscribed "From the President of the United States," dated 1864, and contained a long inscription in Polynesian.

The trading schooner *Tercora*, of Papecte, which had been precariously boating off copra from a small cove farther south, anchored near us one evening and Captain Alec Doom brought an ancient Marquesan aboard. He was old enough to have tasted "long pig" (human flesh) in his youth and looked as if he would enjoy it now. His face, including the eyelids, was covered with delicate tattooing.

The morning of February 23 found the trade wind in full operation and the



Photograph by Joseph K. McCannon

PILOT HONO TAKORA COLLECTS HIS FEE—A CARTON OF CIGARETTES

The merry old Polynesian boarded the *Pilgrim* from an outrigger canoe and skillfully maneuvered her into the dangerous channel through the reef at Takarua Atoll in the Tuamotu Archipelago (page 131).



Photograph by Richard C. Durant

"FRANCIS," PET COATI, PUTS HIS FOOT ON THE RAIL AND CALLS FOR BEER

Extremely fond of the beverage, he visited the yacht constantly while she was being repaired in the Panama Canal Zone. Francis jumped ship, however, and deserted into the jungle just before the *Pilgrim* sailed from Balboa (page 223). The coati takes its name from Indian words meaning "belt nose"—a reference to its sleeping with the long flexible snout held against the belly.



Photograph by Alfred T. Palmer

"LOVELLIEST VIEW I EVER BEHELD"—THUS HERMAN MELVILLE DESCRIBED THE BAY OF TAÍ-O-HAÉ NEARLY 100 YEARS AGO

Anchoring under the high green peaks that form a horseshoe around the palm-fringed harbor, the *Pigge's* crew stocked up on water and tropical fruits in the now almost-deserted settlement, former French administrative center of the Marquesan Islands (page 236). The yachtsmen visited Taipi-Vai, or Vale of Typee, scene of Melville's South Sea classic *Typee*, where natives held the author of *Moby Dick* in friendly captivity on Nuku-Hiva Island.



Photograph by George Stone

ONLY SEAGOING LIZARDS IN THE WORLD ARE THE BIG MARINE IGUANAS OF THE GALAPAGOS

The *Pilgrim's* crew saw thousands of these fierce-looking but inoffensive reptiles (*Amblyrhynchus cristatus*), which feed on marine algae in rocky places like Tagus Cove on Isubela (Albemarle) Island. Swimming with the long flattened tail, they are at home in the surf and travel from island to island. Some reach a length of about four feet and weigh as much as 20 pounds. A pile made from another kind of iguana was offered the yachtsmen as a special treat (page 223). The name Galapagos comes from a Spanish word meaning "tortoise," for here dwell the famed giant species that reputedly live 300 to 500 years.



Photograph from Paul J. Nordman

IT'S NOON BY NATURE'S CLOCK WHEN PALM TRUNKS STAND IN THE CENTER OF THE FLOWERLIKE SHADOWS

Copra is "big business" in Tahiti and other islands of French Oceania. From this dried coconut meat oil is extracted for the manufacture of soap, margarine, and candles. Nearly all of the islands' output goes to France. In wartime copra is a source of glycerin for explosives.



Photograph by E. Ripley Edson

MOANA PADDLES HER OWN CANOE

Garbed in a bright, flowered *pareu*, this wavy-haired Tahitian paused in her Sunday hilarity long enough for the photographer to snap her in the stern of her outrigger. Moana loves to dance, and excels in the weird contortions of the famous *upa upa* (page 233).

Pilgrim, under five lower sails, was off for the island of Takaroa, in the Tuamotus, or Low Archipelago, about 480 miles to the southwest.

Two days of this, plus the usual westerly current, brought the welcome hail of "Land ho" from the foremast head, where the Doc had picked up the ragged fringe of Takaroa's coconut trees on the horizon.

THROUGH THE JAWS OF A REEF

We were boarded offshore by a grinning old Polynesian in an outrigger canoe. Scrambling over the side, he announced, in what John Vranken, our steward and cook, said was French, that his name was Hono Takora and that he was the pilot (p. 227).

With sails furled, using our Diesel engine, we started into the narrow entrance. We anticipated a simple job, but as we entered the jaws of the reef, each embellished in characteristic South Sea style with a wreck, the pass disclosed itself as scarcely 200 feet wide, with a strong current pushing us along.

Holding to the forestay and giving his directions by signs, the old fellow suc-

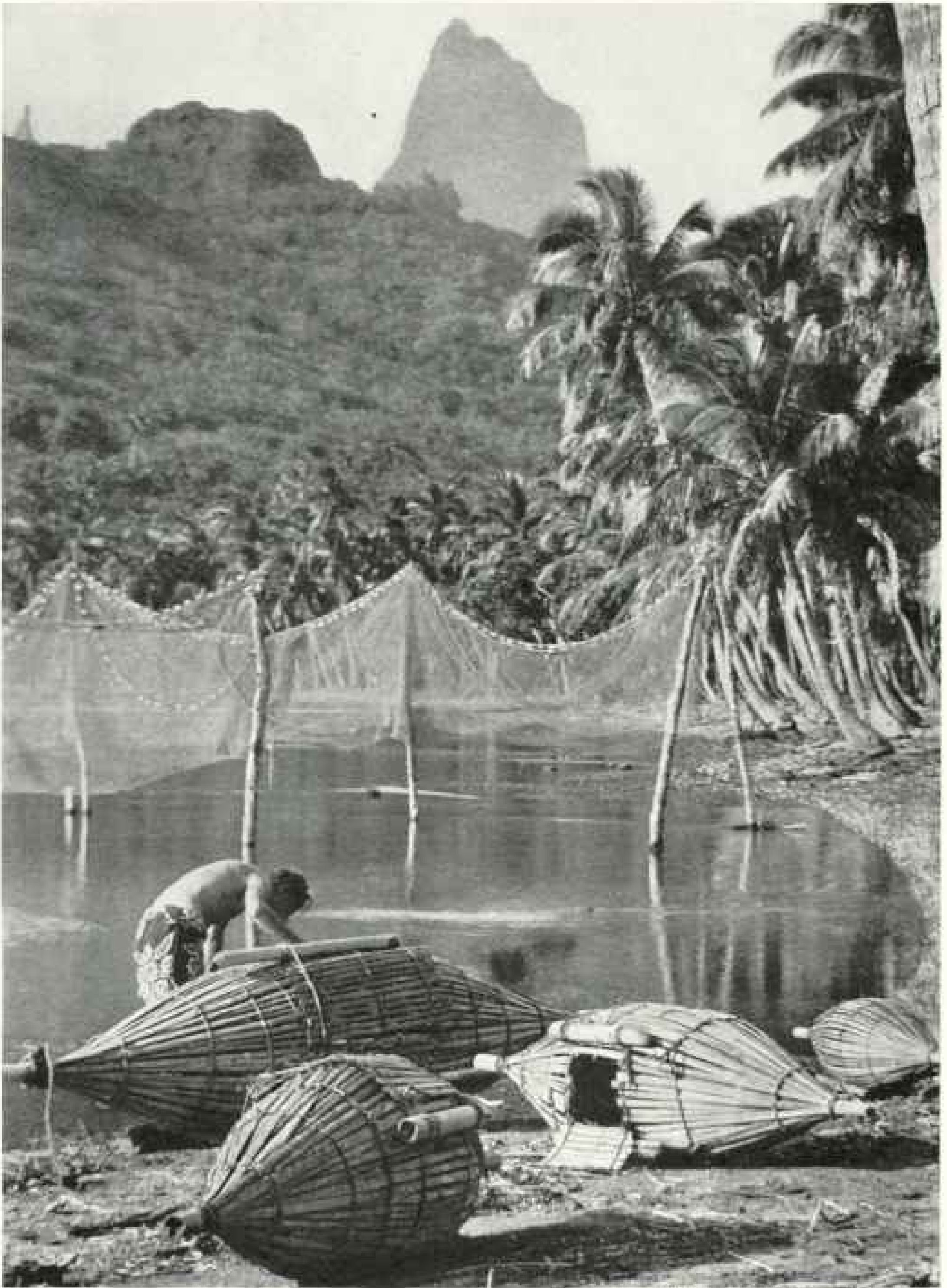
ceeded in turning the vessel around in a space I had thought impossible, and we suddenly found ourselves breasting in sidewise at a tremendous clip right at the rough coral wall. It looked as if our starboard side would be stove in.

Indeed, I think this must inevitably have occurred had not the entire population of the village collected. As we drove in, about twenty of them simply leaned against our rail, elbows touching, and eased us alongside without a scratch.

Mr. Takora having been suitably rewarded—his efforts appeared to have produced an amazing thirst—the Commander (Starr) and I accompanied him to call on the chief of the village.

The chief's wife, a stout lady taking a nap on the floor, routed out her husband, who donned a pair of dungaree trousers, a white French naval mess jacket, and a pith helmet, and came down to look at the *Pilgrim*.

A handsome old chap with a beard, very dignified, he examined everything with keen interest and profound silence. Finally, seated in the cabin, he made a short speech



Photograph by Frederick H. Simpson

FISH ARE KEPT FRESH IN BAMBOO "TRAILERS" TOWED BEHIND CANOES

Paddling from net to net, the fisherman collects his catch and drops it into the tamale-shaped cage to bring ashore. Two koa-wood floats keep the door always at the surface of the water. Long nets dry on poles in this quiet shallow under a massive jutting peak on the island of Moorea, near Tahiti. The *Pilgrim* sailed here from Papeete with some thirty seasick guests bound for a wedding (page 234).

which Mr. Takora interpreted in French something like this:

"The chief says that the vessel, her gear, cabins, equipment, and fittings are all in accordance with the law of the Mormon Church, which is good."

The swimming here was fine. Sharks rarely entered the pass, and the water was full of queer-shaped fish, some bright yellow and blue. The Chief and the Harpooner caught a few tuna from the dory just outside the pass, and with these, a delicious young Takaroa pig, baked breadfruit (from Ua-pu), and plenty of coconuts, we continued to live well.

When we got two of the notorious Tuamotu squalls, rather tremendous affairs, black and desperate-looking, that blew hard, we were glad to be tied up in such a snug berth.

ISLANDS OF ROMANTIC NAMES

Sailing from Takaroa one afternoon we passed Takapoto — aren't these lovely names?—the next day Aratika and Fakarava, and that afternoon, with a perfect trade on the quarter, mainsail, topsail, foresail, fisherman staysail, raffer and balloon jib all pulling hard, we cleared the squally Tuamotus and bore away southwest by west for Tahiti.

Although this famous island is more than 7,300 feet high, 20 miles wide, and visible nearly 100 miles away in clear weather, the western horizon was smothered in such a heavy pall of cloud that we sailed to within 15 miles of it before sighting land.

After dark the clouds gradually dispersed and midnight of March 2 found the *Pilgrim* hove to under Point Venus waiting for daylight.

Dawn over Tahiti discloses one of the world's most beautiful scenes: high mountains, including the "Crown" or Diadem, their slopes covered by tropical vegetation; tall coconut palms along the beaches; deep-blue waters of the South Pacific tumbling heavily on the encircling coral reef.

A pilot appeared, took us through the pass into Papeete Harbor, and we were soon tied up, anchor ahead, stern to the bank, with a gangway ashore and our lines fast to a couple of old cannon embedded in the ground. Our stern with "*Pilgrim*—Boston" emblazoned thereon was, of course, presented to a considerable crowd collected on the bank and whenever I hear the word "anticlimax" I think of the hail

which greeted us, "Is there anyone on board from Revere?"

We were told that the word Papeete (pronounced Papayti) is composed of two words meaning "basket of water" and this describes the harbor.

TAHITI STILL A LOTUS LAND

Like nearly all the Society Islanders, the natives are jolly, handsome, and friendly. More advanced than some inhabitants of Oceania in what we call civilization, they have adopted European dress in the larger towns and for formal occasions. They are extremely clean and it is considered a disgrace for a girl to appear in public unless she has just had a bath and wears a freshly laundered dress.

Many of these natives are accomplished guitar players, and the girls' songs have a lively rhythm and haunting melody.

Harrison W. Smith (Harvard 1895), who has done so much for Tahiti, entertained us, and Charles B. Nordhoff, who had recently published, with J. N. Hall, *Mutiny on the Bounty*, brought copies of the plans of the famous ship aboard. She was only a few feet longer than the *Pilgrim*. No wonder they had a mutiny with so many people in such a small vessel.

Being captain of the *Pilgrim* and enormously interested in the whole nautical life of the islands, I found the captains of the trading schooners fascinating.

Captain Doom, in from the Marquesas with a load of copra in the *Tereora*; Captain Thomson of the *Tagua*; Captain Winnie Brander; Captain Viggo Rasmussen of the *Tiaré Taporo*; Captain Laurent of the *Vaiti*—she's 34 years old and sound as a nut; old Captain Larsen—he came to the islands as a sailor with Stevenson in the *Casco* in 1888 and has stayed ever since—where can you find another such group?

As Papeete is the core of the real South Sea, so Bohler's Bar, in many ways, is the core of Papeete. Sitting at a table there over a glass of rum punch, listening to these men, was a rare privilege.

One morning the schooner *Manureva* arrived from the Tubai (Australes) Islands and berthed alongside us. She is owned in small shares by many Austral Islanders, who take their dividends in a semiannual trip to Papeete. Smaller than the *Pilgrim*, she carried some forty natives of all ages and a cargo which included three cows, a bull, many pigs, and many crates of fowl.



Photograph by Florio Verger

A YOUNG TRANSIENT PUTS UP FOR THE NIGHT IN PAPEETE

Natives from other islands need no hotel when visiting the Tahitian capital. They spread a mat of plaited pandanus leaves and a pillow under a balcony and sleep in the mild open air. So rare are thefts that bedding may be rolled up and left unguarded all day on the sidewalk.

Copra, vegetables, and fruit were stowed in every possible cranny, strings of dried fish hung from the end of the bowsprit, and high in the main rigging were lashed two bicycles.

Since the Chinese to whom she was consigned had died the previous night, there was a day's delay before the cargo could be sold. The cows and the bull were staked out on the bank under our stern, and local buyers, mostly Chinese, commenced to attend.

At close range for nearly a week we could see the most tremendous negotiations being carried on, punctuated at frequent inter-

vals by the piercing squeals of the pigs as they were dragged ashore. Occasionally a victim escaped and one of my most vivid recollections is that of a big black porker being chased by three Chinese up the main street of the town. He was heading about south and seemed to hold a better breeze than his pursuers.

We made an expedition to the neighboring island of Moorea, with its spectacular peaks, to attend a wedding and carried about thirty seasick wedding guests. I married a couple myself on the "high seas," after which Joe wanted to know if I had put in "a splice that wouldn't draw."

Completely confounding shore opinion, which held that the *Pilgrim* would never be able to

collect her crew sufficiently to make a start, we sailed from Papeete early in May for Raiatea, in the Leeward Group of the Society Islands, a group officially described as the "Iles Sous le Vent."

Although family affairs had called the Harpooner home to Detroit, we had been lucky enough to ship in his place Charles J. Lipscomb of Easton, Maryland, a yachtsman and a jolly soul who played the guitar (page 237). Wilfrid O. White of Boston, maker of our fine spherical compass, returning from a visit to relatives in Australia, joined us for the run to the Leeward Group.

Eight o'clock next morning found us running the Teavarua Pass under the square sail, with the beautiful mountains of Raiatea sweeping up ahead, and soon we tied up at the little wharf of the town of Uturoa.

CANOES MAKE HIGH SPEED

Raiatea is noted for the speed of her outrigger sailing canoes, fabulous accounts of which are circulated in Papeete. The native owner of the champion canoe took me for a sail on the lagoon and it seemed as if I had never rushed through the water at such a tremendous rate before.

Our departure was delayed a day by a case of illness in which the local physician requested the assistance of our doctor. Despite everything that could be done, the poor native woman, who weighed 250 pounds, finally succumbed to the simultaneous afflictions of childbirth and elephantiasis.

The neighboring island of Tahaa is enclosed by the same coral reef as Raiatea and we passed along it in a winding channel through the lagoon, piloting from the mast-head and assisted by a couple of old French charts presented by a friendly resident of Uturoa. Although rats had eaten off substantial portions, they fortunately seem to have preferred the mountains to the water,



Photograph by Pierre Verger

AN AQUATIC LANCER EMERGES, GURGLING CRIES OF TRIUMPH

Wearing diving goggles, this "merman" of Mooraa swam under water till he spied the fish, then with unerring aim impaled it on his spear. Pearl divers in the islands tie a weight to their feet to help them descend quickly to the bottom.

so we got safely out through Paipaï Pass and that afternoon anchored under the mighty peak of Bora-Bora, off the little village of Vaitape.

All these islands, Raiatea, Tahaa, Bora-Bora, are beautiful, with their high mountains, coconut trees, beaches, lovely lagoons, and coral reefs. The mountain of Bora-Bora, 2,579 feet high, dominates the anchorage.

Foremost of events during our stay were the capture by the Chief and the Trader of a giant barracuda, with teeth like a wolf's, and the arrival from Papeete of the

little 50-foot trading schooner *Vahine Tahiti*, commanded by our old friend, Captain Winnie Brander. She was under charter to pick up copra at the neighboring island of Maupiti and then at Mopéhia, where a German raider was wrecked during the World War.

Her charterer was on board, Pedro Miller, an amazing person with experiences in every island and sea in the eastern Pacific. Captain Brander, whose family once owned interests in Easter Island, was just as entertaining. They both insisted we ought to visit the island of Maupiti, plainly visible some 30 miles west of Bora-Bora.

MAUPITI IS A CLOSELY GUARDED GEM

So far as I know, there is no large-scale chart of Maupiti, and the narrow, crooked entrance has such a bad name that we had never considered going there. When the trade wind blows fresh from the southeast, it is often absolutely unnavigable for many days at a stretch.

With calm weather and a good pilot it is quite another story, and noon of May 20 found the *Vahine Tahiti* bucking the current in the pass, followed at some distance by the *Pilgrim* with the redoubtable Miller waving directions from her buffalo rail.

I was steering and we could just stem the current, crawling along so close to the reef that I hated to look at it and then twisting and turning through the coral heads of the lagoon. Here we had no current to contend with, but it was hard over wheel, first one way and then the other, for about half an hour, before we anchored under the cliffs of Maupiti (page 242).

Of all the lovely tropical islands I have seen, Maupiti is the gem. The blue is bluer around Maupiti than anywhere else; the green trees are greener, the beaches whiter, and the coconut trees grow at more extraordinary angles.

FIRST VISITORS IN SIX MONTHS

The natives boarded us. English is of no use on Maupiti, nor is French, at least the kind I speak. One must speak Tahitian to get the best out of any of these islands, so our two friends from the *Vahine Tahiti* came to our rescue. We were the first arrivals in six months and except for one memorable occasion when the Government schooner *Zelée* had succeeded in getting inside the pass, the *Pilgrim* was the largest vessel ever to reach Maupiti.

Next day the hospitality of the natives became organized and so did the southeast trade. After several days of faint airs and calm, which had produced the smooth chance we had to enter, the wind blew up hard, making the pass unnavigable for five days and preventing the departure of the *Vahine Tahiti* for Mopéhia. The natives invited us to a feast in her honor, at which Captain Brander was proclaimed "king" of the island for the duration of his visit.

The affair was held in the community house, a long, low building with a thatched roof, and with the sandy ground for a floor.

We sat on benches ranged along one wall, the food and a couple of kerosene lamps were placed on the table before us, and as many of the population as could squeeze into the building—perhaps 200—sat cross-legged on the ground, following our every move with breathless interest and occasionally bursting into song.

Polynesian food is delicious. Pig, chicken, breadfruit, taro, and a particularly succulent green, something between spinach and broccoli, all cooked together in the ground on hot stones covered with many layers of palm leaves, make a characteristic meal. The meat falls from the bones and its juice flavors the vegetables. And, of course, there was coconut in various forms.

The chief, a jolly old soul we had entertained on board, made a speech of welcome. Captain Brander made a speech; so did Miller; and after each one the natives sang. Then came the "frigate bird" dance, performed by five Tuamotu sailors from the *Vahine Tahiti* to guitar music from the same vessel—an amazing performance which brought down the house, as it would in New York or anywhere else. Then there was more singing and dancing.

Once we were invited to dinner by one of the leading families, where we sat on the floor and ate a marvelous meal out of leaf dishes without knives or forks or spoons. It was delicious, and everything about the place, including our host and his two wives, was as clean as could be.

Since Maupiti is so isolated it sometimes runs out of what we regard as necessities, and the people still make fire by rubbing one stick against another. Though we tried to imitate them exactly, we could never quite manage to get the flame.

We always returned from these entertainments crowned and garlanded with flowers and festooned with shell beads.



Photograph by Harold Peters

"O, I LEFT HER ON THE BEACH AT HONOLU-U-U-LU!"

Rollicking Charles Lipscomb, whose repertory included native Tahitian songs, joined the *Pilgrim* at Papeete to replace one of the original crew who had been called home. A South Sea skipper of long experience told the author that whenever he signs up sailors for a voyage he sees to it that some are good guitar players. The tanks along the side of the ship contain kerosene for the galley stove and running lights.

Once I found myself wearing three wreaths, one on top of the other.

LADIES' DAY ON THE "PILGRIM"

Of course, we tried to reciprocate all this hospitality. One of our greatest efforts was "ladies' day," when all the women of the island were invited aboard the *Pilgrim*. I counted seventy at one time, each dressed in her immaculate best.

The chief's wife, who seemed to occupy a position resembling that of president of the sewing circle, carried a parasol of flowers and cheerfully sat beside me on the weather rail of the sailing dory as we beat out to the vessel against the choppy little seas of the lagoon. She was a small, refined-looking native, and displayed not the faintest trace of annoyance when, despite an old raincoat and my best efforts at the tiller, substantial quantities of spray wetted down her finery.

The Doc, a fine pianist, had a small portable organ, well known in all the ports as "Oscar"; together he and Oscar greatly diverted the ladies of Maupiti.

Meanwhile, the pass continued impossible—a mass of high breakers. It didn't seem as if anything except a fish could possibly leave the lagoon for at least a week. But Miller was not discouraged.

"You can't buck the elements," he remarked, "and, anyhow, we've got our guitar players. Whenever Winnie and I ship a crew we always make sure there are two or three good guitar players among them."

RUNNING A GANTLET OF REEFS

The morning of May 26, the wind having backed to about east and moderated considerably, Captain Brander and Miller boarded us to say they considered the pass navigable and would start at noon. They gave careful directions for the ticklish entrance, which we must cope with alone, as it was far too rough outside to transfer a pilot.

Our intention of following close behind them was thwarted by having to say good-bye to half the population. By the time they had pumped in our anchor chain and piloted us through the coral heads of the lagoon,



Photograph from Francis Hubbard Fabery

BABY SISTER MAY CRY, BUT A CHIEF'S SON MUST BE STOICAL

A blossom in his ear, he tries to comfort the little girl, who loudly disapproves of being photographed in the hot sun. Their father, an eloquent orator, is one of the chiefs holding office under the Governor of American Samoa, who is also Commandant of the Naval Station. The latter makes all laws, interfering as little as possible with native customs. "Samoa lands for Samoans" is the Government's policy.

the *Vahine Tahiti* was some distance ahead.

The heavy seas of the last few days, piling over the barrier reef, had increased the amount of water in the lagoon and it poured out through the narrow entrance in a swift torrent. As soon as the *Pilgrim* began to feel the current's grip, our native friends had to leave, jumping into their canoes or diving overboard.

The place is dreadfully narrow and the roar of the breakers outside sounded singularly unattractive. There was just time, if we

acted instantly, to buck the current back before it got too strong and anchor inside the lagoon.

The Commander and I looked at each other. We decided to risk the passage. This decision was based on the knowledge that Miller and Captain Brander were too experienced to try this sort of thing if they considered it dangerous, but as the *Pilgrim* passed the last islet and headed down the race track along the inner edge of the reef, it occurred to me that we had not made them fully aware of the difference in power between the two schooners.

The *Pilgrim's* 85-horsepower Winton-Diesel, handled by the Chief, was plenty powerful, but our propeller was a very small two-bladed affair, designed more with the idea of not

being a drag when under sail than of pushing the vessel, and particularly futile against a head sea (page 226).

With this scarcely comforting reflection, I steered the *Pilgrim* along what we fervently hoped was the channel. We were going at a tremendous clip with the full force of the current behind us.

"Keep the edge of the reef six feet from your port side," Miller had directed, and I tried to do so, glancing out of the corner of my eye at the horrid brown ribbon with

a feeling of intense dislike. There was about two feet of water washing over it.

Soon the Commander and I were heaving the wheel hard over as the bow swept up and over the first big sea in the jaws of the pass, with the edge of the reef still approximately six feet from our port quarter. We made the turn and faced out to sea, but were barely moving, while close aboard, on both sides, closer than I like to think of even now, tremendous breakers fell with a shattering crash.

Ahead, every other part of her hidden in the trough, the mastheads of the *Vahine Tahiti* reeled across the sky as she staggered through the big seas in front of us.

The engine held us bow into it, and the tremendous current, although it made the seas higher and steeper, squirted us out to a point where we could set, with some trouble, the foresail and jumbo. This steadied her and increased the speed.

"POSITION DOUBTFUL" CAUSES WORRY

Half an hour after weighing anchor we stopped the engine, made sail, mainsail, topsail, fisherman's staysail, and balloon jib and squared away for the Tongas, some 1,500 miles westward. We soon overtook the *Vahine Tahiti*, swarming with



Photograph by Harold Peters

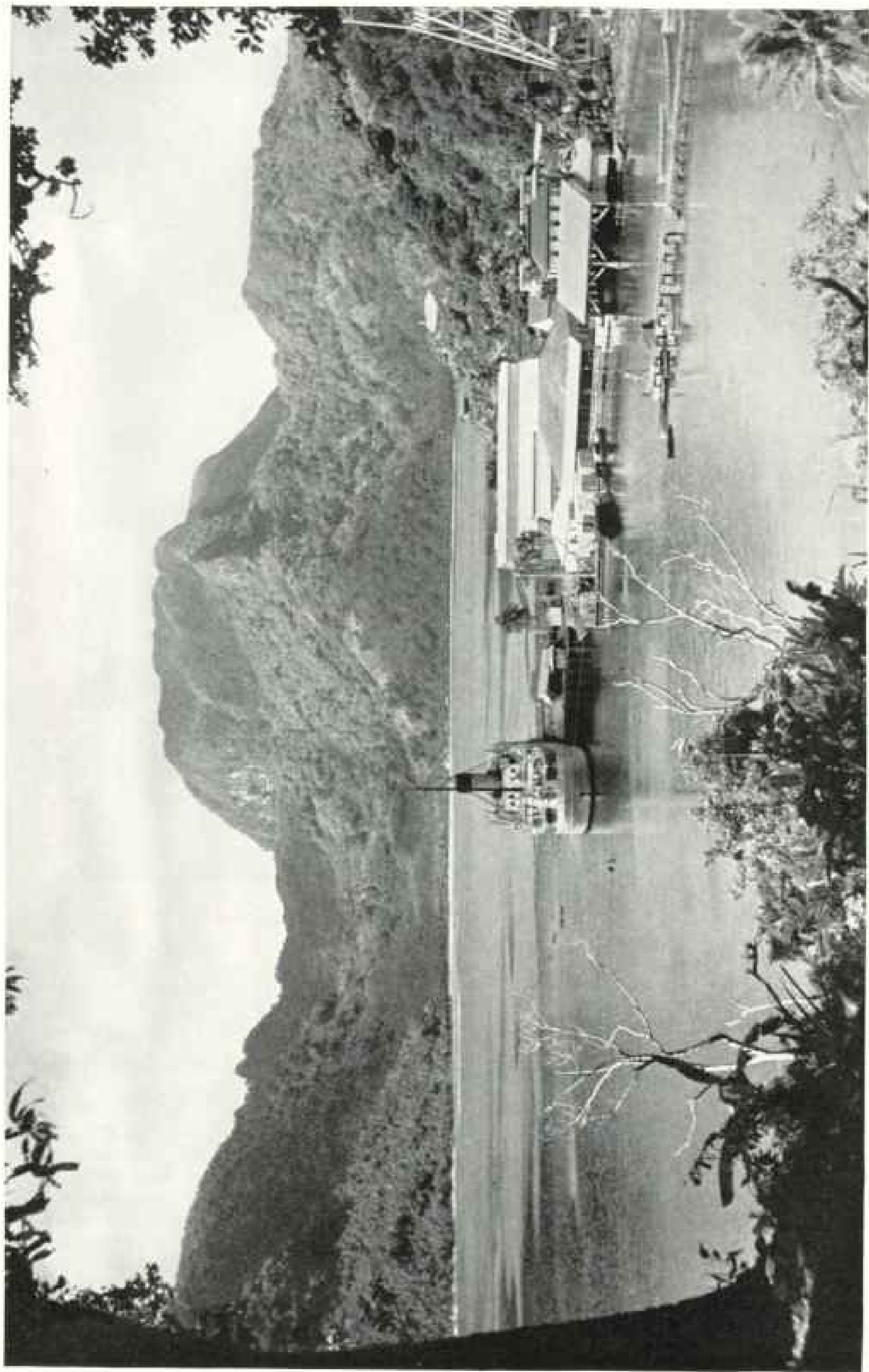
"THE TRADER" EXHIBITS A BARRACUDA

A colorful *pareu*, or Tahitian loincloth, comprises the informal attire of Joseph K. McCammon, known to his shipmates as "the Trader," because with a beard and deep tan he resembled exactly the typical South Sea trader of story and song (page 225). The yachtsmen often towed a feathered hook astern and landed some good-sized fish.

people, and exchanged frantic farewell salutes.

The weather continued lovely all the way to the Tongas, but after the first day the trade wind fell very light and we made a slow passage. On the 30th we passed close to Aitutaki, in the Cook group, an extremely pretty, typical tropic isle, but with no harbor, and shortly after were confronted with our first "P. D." reef.

On charts of the South Pacific are a few small circles with the letters "E. D." or "P. D." in the center. "Existence doubtful"



Photograph by Dotus Dickason from Calloway

AT PAGO PAGO, THE "PILGRIM" SALUTED THE STARS AND STRIPES FOR THE FIRST TIME SINCE LEAVING THE PANAMA CANAL

The yacht was assigned a berth at the wharf of the United States Naval Station here on the island of Tutuila, American Samoa. Pago Pago Harbor, one of the finest in the South Sea, lies in a huge volcanic crater that nearly cuts the island in two. Ships enter from the sea at the right of the flat-topped peak of North Pico, called "the Rainmaker" because it precipitates moisture from every passing cloud. Somerset Maugham was inspired to write *Rain* in a Pago Pago rooming house.



Photograph from Paul J. Sordana

SPEAR POISED, A TAHITIAN FISHERMAN STANDS TENSE AS A BRONZE STATUE ON A GNARLED TREE PEDESTAL.

To scare up flying fish at night, spearmen carry flaming torches into shallow places like this reef, where the surf has deposited the dead tree trunk washed from some hurricane-swept island. In the lagoon that rings the island between shore and reef, natives know just where to look for certain species of fish at different times of year. Offshore, in launches, sportsmen seek big-game fish like the 1,000-pound mahi, more than 14 feet long, caught by the novelist Zane Grey off the south end of Tahiti. Natives tell of giant swordfish twice this size!



Photograph by Charles J. Lipscomb

THE "PILGRIM" ANCHORS IN "THE WORLD'S FINEST SWIMMING POOL"

The author thus designates the bright-blue lagoon surrounding Maupiti, about 200 miles northwest of Tahiti. The American yacht, with a trading schooner which it accompanied, were the first arrivals in six months, and their crews were royally feasted by the jolly old chief. Beyond the tall palm at the base of the cliff looms an islet of the reef enclosing the lagoon. Negotiating the only pass through this barrier was one of the most thrilling episodes of the voyage (page 237).

can probably be safely disregarded, but "Position doubtful" is more annoying. We got a vague inkling of the troubles of the early navigators in clumsy square-riggers, with no charts or modern equipment, to whom every foot they covered had been "E. D." before.

It was good weather for haircutting. Earlier in the voyage the Harpooner had volunteered for this duty, but after he had sliced a piece off one of the Commander's ears the job had been turned over to Joe,

who continued to handle it to the satisfaction of the customers.

It got so smooth that the Trader and Doc launched the "pea pod" and took some snapshots of the vessel with most of her finery on and just enough air to fill it (page 261). But eventually we reached Tongatabu, and anchored off the town of Nukualofa.

We had taken 13 days to sail 1,580 miles.

This was winter in the Southern Hemisphere, and here in 21° South Latitude it felt almost cold. The Kingdom of Tonga is under British protection and ruled by a queen, who, with all her subjects, was now in deep mourning for the death of a princess. The English colony was extremely hospitable.

One of the bad aspects of long voyaging is that just when you're

having a good time you've got to move along; and move along we did to Vavau, a 190-mile run from Nukualofa.

On the way we passed near the actively volcanic Fonuafoō, or Falcon Island, which has literally had its "ups and downs" in the last fifty years. It was now about a hundred feet out of water.*

* See "Falcon, the Pacific's Newest Island," by J. Edward Hoffmeister and Harry S. Ladd, in *THE NATIONAL GEOGRAPHIC MAGAZINE*, December, 1928.

After tearing ourselves away from Vavau, we headed for Pago Pago (Pango Pango it is pronounced) on the island of Tutuila, Eastern Samoa, with a cracking good trade on the starboard quarter. At dawn next day we were scrutinizing, in a drizzle, the high coast of Tutuila, trying to find Breaker Point Light, and shortly after swept grandly into the harbor of Pago Pago under the square sail and tied up in our first United States port since the Panama Canal (p. 240).

Governor G. B. Landenberger and the officers of the Naval Station outdid themselves in entertaining us. We were introduced to the native *siva* dance and a sort of Samoan imitation of the Society Island hula.

One day the Commander and I climbed the little mountain back of the town, where we fell in with three or four natives and had a chance to admire the best Samoan tattooing. It took the form of a pair of short pants tattooed in fine scrolls and with much artistic dash on one of the chiefs.

PRESENT-DAY PERILS OF THE FIJIS

In Pago the *Pilgrim* lost her last Yale man—the Harpooner was the other—when Doc departed to start his final year in medical school. We left him on the dock July 27 when we sailed for Suva, in the



Photograph by Randolph A. Christie

A PAPUAN VERSION OF "TOP HAT AND TAILS"

Off to a dance in Port Moresby goes this young blood with the shark head-dress. Other revelers in weird costumes bring up the rear. The *Pilgrim's* crew saw one of the curious native dances at a coastal village (page 247). Festivities often start in the evening and last till sunup, with scores of men and women capering wildly in the torchlight.

Fijis, with a freshening breeze from southeast.

Although cannibals are no longer found in the Fijis, they have modern terrifying successors, such as the Department of Agriculture. The *Pilgrim* had no sooner tied up alongside the wharf than she was boarded by a representative of this branch of the Government, who pleasantly remarked that he understood we had just come from Eastern Samoa.

"Yes. And in four days," we answered with some pride. This was a mistake. Our visitor commenced to talk about



Photograph from London News Agency

HIS ROYAL HIGHNESS DIVES IN TO HELP FIJIANS ROUND UP FISH

The Duke of Gloucester (right), now third in line of succession to the British Throne, joins native fishermen at the island of Mbengga, near Suva. Throwing stones and beating the water with sticks and canoe paddles, the Fijians drive fish into their net, held in place by floats (foreground). Added excitement is sometimes provided when a shark turns up inside the ring of men as they close in on their prey. The *Penguin's* visit to Suva was marked by a humorous encounter with a Government Inspector who searched the yacht for stowaways in the form of Samoan beetles (page 743).



Photograph by Erasmus De Cou from Galloway

ALL ABOARD ON THE PAPUAN 'RUMBLE SEAT'

The youngster rides precariously on the narrow "bustle" formed by the mother's voluminous grass skirt as she ambles along a road near Port Moresby, New Guinea (347). Boys here wear nothing until they are about ten years old.



Photograph by Joseph K. McCammon

"VAIINE TAHITI," SEID'S CAT, SHARES HER MEAL

The white cockatoo with a yellow crest came aboard in the Bantia Islands, but was dishonorably discharged at Bali because of its habit of chewing the ship's ropes.



Photograph by Harold Peters

A NICOBAR ISLANDER REACHES FOR A PADDLE TO SWAP FOR A YACHTSMAN'S SHIRT

The primitive "Nicobarbarians," as the author calls them, were delighted to trade spears and paddles for worn-out garments with which to supplement their customary attire of grass belts. The *Pilgrim's* cook made the best bargain, exchanging an old shirt for four fat ducks (page 253). Only the men came alongside in outrigger canoes; women and children were sent into the bush to be safe from the whites.

Samoaan beetles. The horrid situation was this: Samoaan beetles are so dreaded in Fiji that every vessel which has spent the night at a wharf in Samoa and then come direct to Fiji is compelled to go three miles to sea every night and can't return until daylight. We were appalled.

"But we haven't seen any beetles," we insisted.

"They're nocturnal," said the Department of Agriculture. He lit his pipe and repeated with a sort of gloomy satisfaction the dreadful remarks of the captain of a Scottish tramp who had managed to locate the Suva pass in a thick gale of wind, got in about an hour before dark, and had to turn around and go to sea again immediately for the night.

The Department of Agriculture representative was really most agreeable. He weighed about 200 pounds, not fat, but very able looking.

"What's that?" he suddenly asked.

"That" was a cockroach, which fortunately kept in view long enough to be unquestionably identified. It was a close call.

I don't know now why we eventually escaped. Possibly the Department of Agriculture realized what we are convinced was the truth—that there were no beetles on the vessel. Anyway, he inspected everything, sealed up our sail locker, told some really interesting yarns, and finally departed.

Then Charley Lipscomb came down with jaundice and had to be left in Suva. So when the *Pilgrim* stood out of the pass into a whistling trade on the Chief's twenty-fifth birthday, bound for Port Moresby, New Guinea, her complement was reduced to six.

On the long runs the *Pilgrim* never got enough wind and this passage was no exception. Here it was August, the middle of winter, when the southeast trade is supposed to blow fresh, and miserable, piddling little airs persisted for much of the passage. According to the log:

"Rain, and wind very variable. Some slamming of boom in light spells. Cold and gloomy. . . .

"'Vahine Tahiti,' our fine cat, is having



Photograph by Diana Goch

FAMILIAR TO PHILATELISTS IS THE CRAB-CLAW SAIL, DEPICTED ON PAPUAN STAMPS.

Plaited leaves form the peculiar sail of the *lakatoj*, a native craft consisting of two or three canoes lashed together and covered with a deck. The *Pilgrim* passed many of these trading vessels in the Gulf of Papua, where they carry cargoes of clay pots and sago. Natives steer by the stars when out of sight of land.

a time with the flying fish. Several of these have come aboard recently. She can eat about six at a sitting. All but the tails. . .

"Took a good roll for herself from time to time, but kept going under square sail and raffie. . .

"Running up the Coral Sea before a strong trade. Fine night. Considerable following sea. . . Steering W X N $\frac{3}{4}$ N to clear a shoal called 'Nellie' (P. D.)."

Fourteen days out of Suva, when we were nearing New Guinea, the trade wind suddenly changed its tactics and blew up to about forty miles an hour, with a heavy sea, weather thick and hazy, like a Cape Cod southwester.

Next afternoon we anchored under the bare brown bluff at Port Moresby, 2,300 miles from Suva. As in every British colony visited, the little group of whites were extremely hospitable and helpful.

This is wild country, and even around Port Moresby the native men wear only a loincloth and the women a grass skirt (page 245).

At a little village some distance up the

coast, where we arrived one day at sunset, they were having a dance. There were about eighty men and women, resembling exactly the cannibals of story and song. Painted, heavily tattooed, and tricked out in feathers, with fancy headdresses and topknots, with skewers through the noses of many of the men, and brandishing spears and clubs, they were a desperate-looking crowd (page 243).

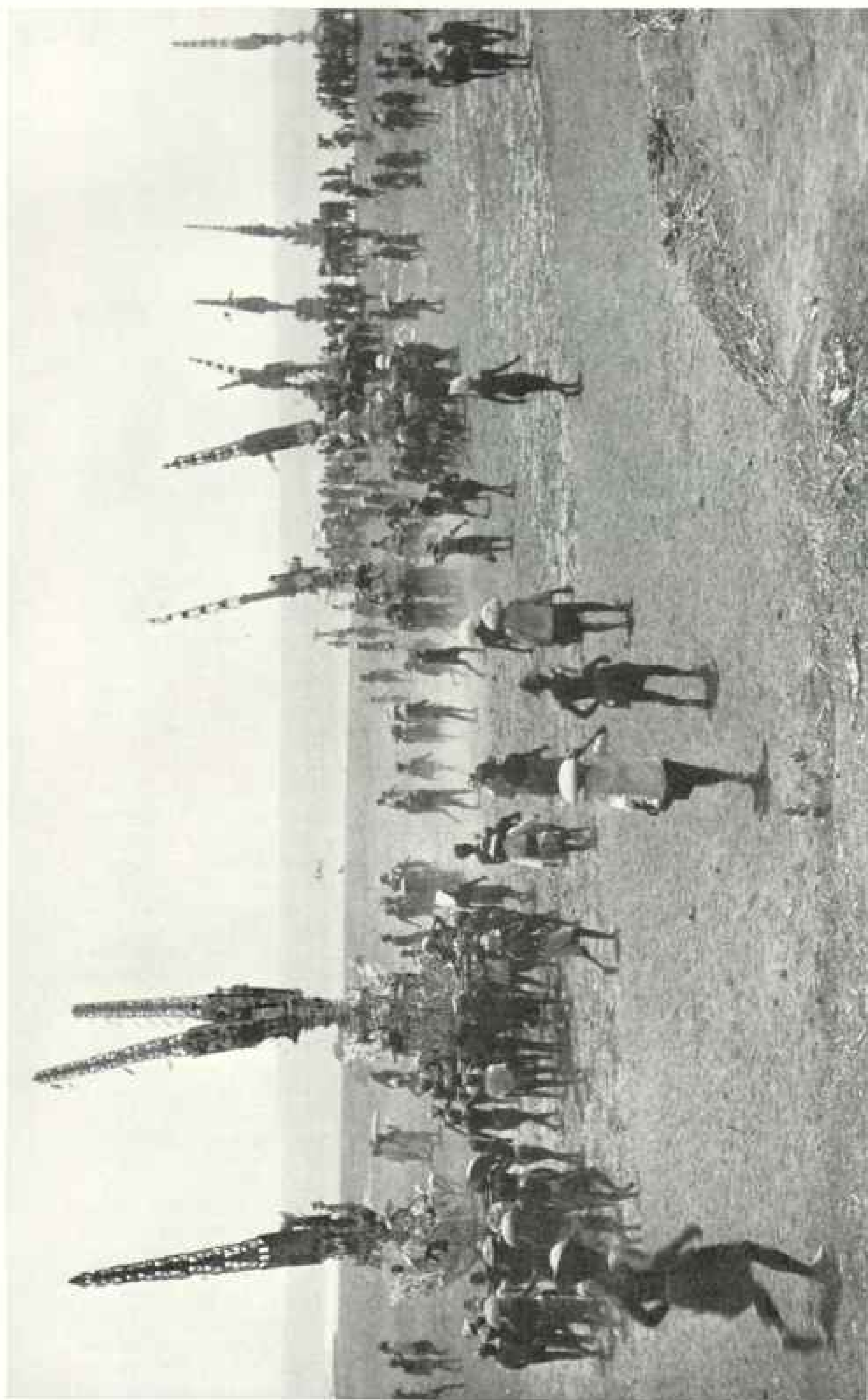
TWO GENUINE CANNIBALS ARE CAUGHT

At Yule Island, about 65 miles northwest of Port Moresby, where the *Pilgrim* lay a few days, the resident manager of the district, who was also the lone Englishman, showed us a couple of "certified" cannibals his native police had captured.

Objecting to the attentions of a certain man to their sister, these two had killed him and eaten his leg. They had just commenced the regular penalty for this offense—one year in jail for murder.

The jail, a little frame building, looked rather attractive. The cannibals did not.

Now came Torres Strait, the passage through the islands and reefs between New



Photograph by Andre Reinhold

LIKE ANIMATED OIL DERRICKS, BALINESE HEARSEs ARE BORN TO THE CREMATION GROUND AS NATIVE ORCHESTRAS PLAY

Built of bamboo and elaborately ornamented, the hearses are crowned by many-storied pagodas, the height of each tower depending on the importance of the dead. The body is placed in a small cupola at the top of the strange conveyance, which is carried by about 50 men. At the cemetery, the remains are transferred to coffins shaped like lions or bulls. These are burned and the ashes cast into a river to be carried to the sea. Feasting and merrymaking accompany the lavish cremation ceremony of Bali.



Photograph by Margaret Owen Williams

SAMPANS AND LAUNCHES SKIM LIKE WATER BUGS TO AND FROM VESSELS ANCHORED IN SINGAPORE'S BUSY HARBOR

A sampan owner named Ng was hired to row the *Pilgrim's* crew ashore. Unable to pronounce this Chinese name, the Americans christened him "O'Brien" (page 252).

Guinea and Australia. We sailed from Yule Island on September 3 and that night we were visited by a flock of monstrous and—to us—unknown sea birds. There was a full moon; it was pretty rough, and these great birds, sweeping across the vessel, hovering close over our heads and casting gigantic shadows on the deck, recalled the old deep-water superstition that certain sea birds are the spirits of drowned sailormen.

But in the jumble of a cold and drenching northwest squall that hit us at 5 a. m.—“You never get the wind northwest at this season,” we had been assured—we forgot about the birds.

We spent the next night anchored at Cocoanut Island, about halfway through the strait, a lovely little place with plenty of coconut trees. There we obtained another cat, Tom, as company for our little black Tahitian lady, and they promptly set up housekeeping in the vegetable bin (245).

Once through Torres Strait, the *Pilgrim* entered the smooth waters of the Arafura Sea, and all the way to the Tanimbar Islands, about 700 miles, she had beautiful sunny weather and, until the last day, a fairly good little breeze astern.

SEA IS DOTTED WITH WATER SNAKES

The Tanimbars, outpost of the Netherlands Indies, are on the edge of nowhere. As we approached them, this impression was increased by the presence of many big, brown, banded water snakes with knobs on the end of their tail.

The question as to whether these snakes could get aboard via the bobstay was rendered more interesting by the fact that our medical book listed them with the king cobra among the most poisonous known to science.

September 12 we picked up the island of Jamdëna, or Timor Laut, largest of the Tanimbars, ahead and steered in for the village of Saumlakki. When we anchored off a trim stone pier, the town disclosed several little frame dwellings and a large church. We were received by a young Dutch-speaking Malay, a sort of deputy port officer.

The island is moderately high and covered with vegetation, including, besides the usual coconut palms, some large and fairly stout trees. Three miles across from Saumlakki, on the east coast, is the village of Oelilet where I saw two fine anchors, weighing about 1,500 pounds each. These

belong to the village and came from some vessel wrecked long ago. The natives are primitive and eke out their larder by hunting birds by means of bows and arrows. We saw some pretty red and blue parakeets and I got a dead bird of paradise from a Chinese.

West of the Tanimbars is the Banda Sea, where we had one of the best sails of the voyage. With the big jib topsail and fisherman's staysail set, we averaged $7\frac{1}{2}$ knots for the 286 miles to the Banda Islands.

IN THE HOME OF THE NUTMEG

The Bandas, chief of the Moluccas, or Spice Islands, were at one time the only source of nutmegs. The harbor is good and dominated by the 2,159-foot volcano of Goenoeng Api, which did not smoke for us, although it is active. The town of Banda Neira is very old, with a fort built in 1611, and contains some ancient nutmeg buildings and innumerable thatched huts.

The controller was most cordial. He used to be stationed in Netherlands New Guinea, where the cannibals ate three of his policemen. A planter entertained us and showed us through the old nutmeg groves. The New Guinea natives once tried to buy his wife for 100 pigs. I didn't blame them; she was very attractive.

The *Pilgrim's* good luck in the Banda Sea continued and we held a fine easterly breeze all the way to Dili, in Portuguese Timor, some 400 miles to the southwest.

At Timor we lost the wind completely. It was stark calm when we left Dili on September 22 and stark calm it remained. It was up to the Chief, and he certainly did a good job. For four hot days the Diesel pushed us to the westward along the string of islands that extends from Timor clear to Java—Alor (Ombai), Pantar, Lomblem, Flores, all mountainous, with some of the peaks rising more than 7,000 feet. We passed south of them.

Some 440 miles of this brought us to the island of Komodo, home of the giant dragon lizards.*

After a long, hot tramp up a dry river bed and over some plains covered with bushes, we scared up one of the lizards about seventy feet away. He was a grand

* See, in THE NATIONAL GEOGRAPHIC MAGAZINE, "Stalking the Giant Lizard on the Island of Komodo," by W. Douglas Burden, and "Modern Dragon Hunt on Komodo," by Lady Broughton, August, 1927, and September, 1936, respectively.



Photograph by Joseph Kikeland

A COBRA, HOOD EXPANDED, WANTS TO FIGHT, BUT RIKKI-TIKKI-TAVI BACKS OUT

The mongoose, familiar character of Kipling's *Jungle Book*, is noted for its fearlessness in attacking venomous reptiles. This particular animal, however, refused to perform for the snake charmer who holds it by a leash aboard the *Pilgrim* in Colombo. A second cobra lies coiled in a basket. Leaning over to watch the show is S. C. M. Cutting (left), the Englishman who joined the yacht's crew at Penang (page 252).

lad, perhaps ten feet long, and scuttled out of sight with amazing speed.

"BALI OR BUST"

The calm continued after we left Komodo. When asked if he wanted to stop the engine and rest, the Chief said, "Bali or bust." So we kept plugging along at four or five knots and two days later dropped the hook in the protected harbor of Benoea, near the south end of the fascinating island.*

In our nine-day stay we attended a religious festival at Bésakih, part way up the 10,308-foot Peak of Bali (Agoeng), saw monkeys, cockfights, countless rice terraces,

* See "Artist Adventures on the Island of Bali," by Franklin Price Knott, in *THE NATIONAL GEOGRAPHIC MAGAZINE*, March, 1928.

gorgeous costumes. Best of all was the exquisite dancing of some little girls, apparently about twelve years old, in blue and silver dresses and tall headgear.

At Bali we lost our little black cat Vahine. She had accepted everything cheerfully—the pass at Maupiti, the Trader's purple pajamas, and, if there were no flying fish, she would take what was offered. It was a real sorrow to lose her.

From Benoea we bucked a terrific head current through Badoeng and Lombok Straits around the east end of Bali, from which point we found enough wind to sail at a slow pace through Sapoedi Strait into the Java Sea. Robert L. Hoguet, Jr., a friend of the Chief at Harvard, had joined us in Bali for the run to Batavia.

For six days we flapped along, usually

in sight of the coast of Madoera and then Java, where we could sometimes see the high mountain peaks over the clouds. The sea was smooth. There were plenty of water snakes, and as we got to the westward the queer native craft of all kinds increased.

The names changed. We passed Tandjoeng (Point) Boegboeg, and Boompjes Island. After narrowly escaping being run down by a steamer in the middle of the night, we reached Batavia and were given a fine sheltered berth off the yacht club in the inner harbor of Tandjoengpriok.*

As we left Batavia calms continued and we churned north through Gaspar Strait into the China Sea without a breath of wind. We carried a shotgun handy to the wheel now, which took care of the snake question, at least during daylight. They were pretty thick sometimes. Occasionally a Chinese junk would appear, and the *Pilgrim* passed close to one, a big three-master, completely becalmed.

Five days from Batavia—610 miles—we anchored at Singapore.†

The harbor was filled with craft, from big steamers hailing from all parts of the globe down to junks, proas, and queer lateen-rigged affairs, manned by crews of desperate and piratical appearance (249).

The Commander hired one of the myriads of sampans to attend the *Pilgrim* and ferry us to and from the shore. The proprietor's name, unlikely as it may seem, was Ng. You can pronounce this if you know the language. We couldn't manage it, so substituted "O'Brien," a name to which Mr. Ng, as a special favor to us, was obliging enough to answer.

A "WANT AD" GETS RESULTS

Just why the Commander chose the middle of a voyage to get married is a question he has never satisfactorily explained. Cables flashed, the future Mrs. Starr and her mother left Boston for Italy, and in an atmosphere of deep gloom we saw the Commander off on a steamer bound for the same place. He did not leave until a substitute had been shipped.

"Yachtsman desirous free passage to England in return for services on voyage please apply . . ."

* See "Through Java in Pursuit of Color," NATIONAL GEOGRAPHIC MAGAZINE, September, 1929.

† See "Singapore, Crossroads of the East," NATIONAL GEOGRAPHIC MAGAZINE, March, 1926.

This notice in a Singapore paper produced Mr. S. C. M. Cutting, an English civil engineer and yachtsman who was bound home and who arranged to join the *Pilgrim* at Penang, about 440 miles up the Strait of Malacca, on December 4.

The *Pilgrim* left Singapore November 27 with her company reduced to five. It was usually flat calm and the Diesel pushed us most of the way.

The coast of the Malay Peninsula is generally featureless, low mangrove swamps with mud banks extending one to twelve miles offshore. After spending a day watching a gorgeous and incredible Chinese procession in the old town of Malacca, we passed through Klang Strait and anchored at the Dinding Islands off the village of Pangkor. Thatched huts on piles extended over the water and several big junks and dugout canoes with carved ends indicated a certain amount of commercial activity. There wasn't a white man in the place.

There were two Chinese traveling salesmen at Pangkor whose line was medical supplies. Having attracted a crowd by a short speech and the simple expedient of laying a cloth over the bare earth and extracting a live hen from beneath it, one of the salesmen swallowed (so far as I could see from a distance of ten feet) a handful of tacks, and relieved the ensuing distress by pouring down the contents of a small bottle of his medicine.

The other man shoved eight or ten spikes about eight inches long through the skin of his cheeks until the ends stuck out and his face resembled a pincushion. When the spikes were withdrawn and a healing ointment applied, no wound was visible.

The Chief, whose untiring attention to the Diesel had pushed the *Pilgrim* so many miles in these calm eastern seas, kept his machinery turning, and eventually, after drenching rain, head currents, and under appalling clouds, which never seemed to have wind in them, shoved the vessel into Penang, where we anchored in the midst of about fifty junks. Cutting joined us here and proved just the right man for the voyage.

Running before a light easterly breeze, on the fourth day out of Penang the *Pilgrim* raised the murky hills of the Nicobars through the mist and anchored in a landlocked harbor off a lovely sandy beach.

Immediately outrigger canoes appeared from behind a point and surrounded us at

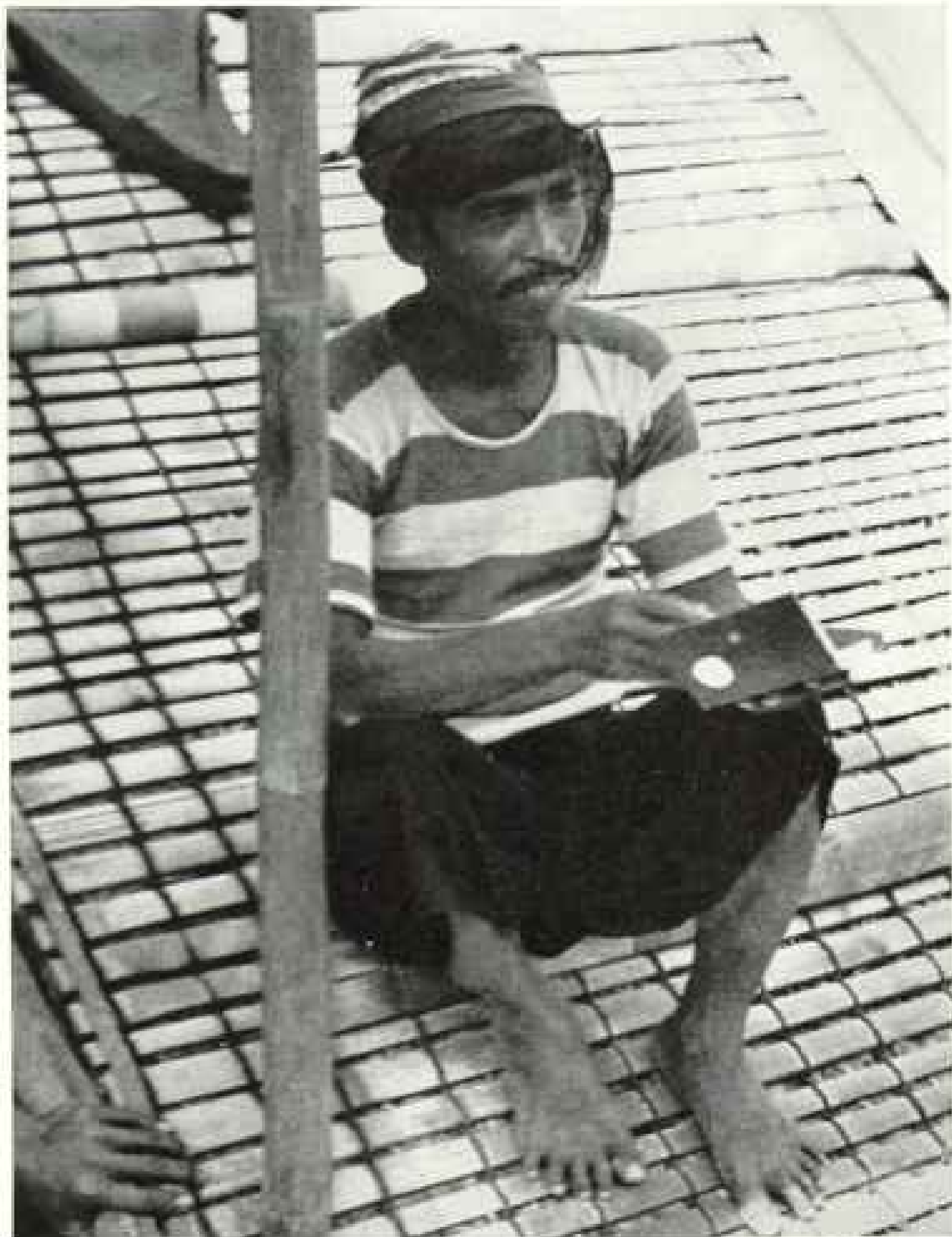
a short distance. Each contained three or four men, attired in a grass belt with a tassel falling down behind. They seemed a bit fearful, but very curious. Contact having been established by means of an old shirt, one of the canoes ventured alongside, revealing its occupants as medium-sized, well made, and wiry, with what we thought a resemblance to the Polynesians of the eastern Pacific.

Although the *Pilgrim* was pretty full of curios by now, we exchanged old clothes for paddles, spears, and other objects. We saw no firearms. The most popular bargain aboard the *Pilgrim* was put through by John when he swapped an old shirt for four fat ducks (page 246).

We saw no women or children; they were invariably rushed back into the bush whenever we came ashore.

FRIDAY SAILING PROVES A JONAH

Although the superstition that it is unlucky to sail on Friday has no scientific basis, we had a miserable passage from the Nicobars across the Bay of Bengal to Ceylon. Calms, light shifting airs, torrential rains, and mixed cross seas plagued us for most of the passage. It was Christmas morning when we finally tied up in the harbor of Colombo—1,040 miles in 10 days!



Photograph by A. P. H. Lant

NO PIRATE, JUST A SAILOR FROM MADAOERA!

His seat is the bamboo cover protecting the cargo of his swift, double-ended outrigger canoe or proa, which he has just moored in the harbor of Batavia, capital of Java.

We were soon boarded by natives who camped on deck with three cobras and a mongoose. The mongoose wouldn't fight, but the cobras performed perfectly (page 251).

On New Year's Day, 1934, the *Pilgrim* sailed from Colombo, and from noon that day to noon on the 2d she covered 217 miles of Indian Ocean, the best run of the voyage. January 4 we passed close to Minicoy Island, where we met a brigantine and saw a large steamer piled up on the reef near the lighthouse—the result of a long, thick squall.



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BULLOCK CARTS ARE THE COVERED WAGONS OF CEYLON

The rumbling two-wheeled vehicles are often decorated with colored tassels hanging from the palm-thatched hood. Drivers shout explosive reproaches at the ponderous beasts as they haul boxes of tea and other merchandise through the Pettah, native quarter of Colombo.

When we were well into the Arabian Sea, the regular northeast monsoon settled in, and for eight successive days the vessel averaged 171 miles with this fine cool breeze on the starboard beam. Flying fish came aboard in whole squadrons, and one night we collected a bucket of them in half an hour, giving all hands a breakfast.

Rounding Socotra on January 11, we squared away up the Gulf of Aden, arrived off the Rock of Aden early on the 15th, and tied up in the harbor fourteen days from Colombo—2,440 miles, a very decent passage. If you like plenty of hot bare rock and sand, you'd like Aden and its environs.* There are camels and goats and dust and beggars.

Sailing from Aden on January 20 with a good easterly breeze, next morning we rounded the island of Perim, which lies in the middle of Bab el Mandeb, the strait at the southern entrance to the Red Sea.

From this point, driving before a strong south-southeast wind under square sail and

* See "Rock of Aden," by H. G. C. Swayne, NATIONAL GEOGRAPHIC MAGAZINE for December, 1935.

raffee, the *Pilgrim* ran 90 miles in ten hours and entered a group of high, desolate, sun-dried islands: Jebel Zuqar, 2,047 feet high; Quoin Island, Jebel Teir. I doubt that even a lizard could exist on any of them. Jebel Teir, about 300 miles from Aden, suggests an enormous clinker, picked out of a furnace and stuck in the Red Sea.

FOOT BY FOOT UP THE RED SEA

We had scarcely passed it when our southerly breeze, which had been gradually dropping, disappeared entirely and was succeeded by a moderate wind from north-northwest, dead ahead, accompanied by a high, short, steep sea into which the *Pilgrim* plunged to her buffalo rail.

We could not make headway, under sail or power, or both, and the moon looked nearer to me than did Suez, a thousand miles dead to windward.

People think of the Red Sea as calm, smooth, and hot. But for every hour of calm we had two hours of strong head wind. Without the engine we'd be there yet. It was rough most of the time and as we



Photograph by Maynard Owen Williams

MEN LOAF, BLACK-ROBED WOMEN PROMENADE, AT THE NORTHERN END OF SUEZ CANAL

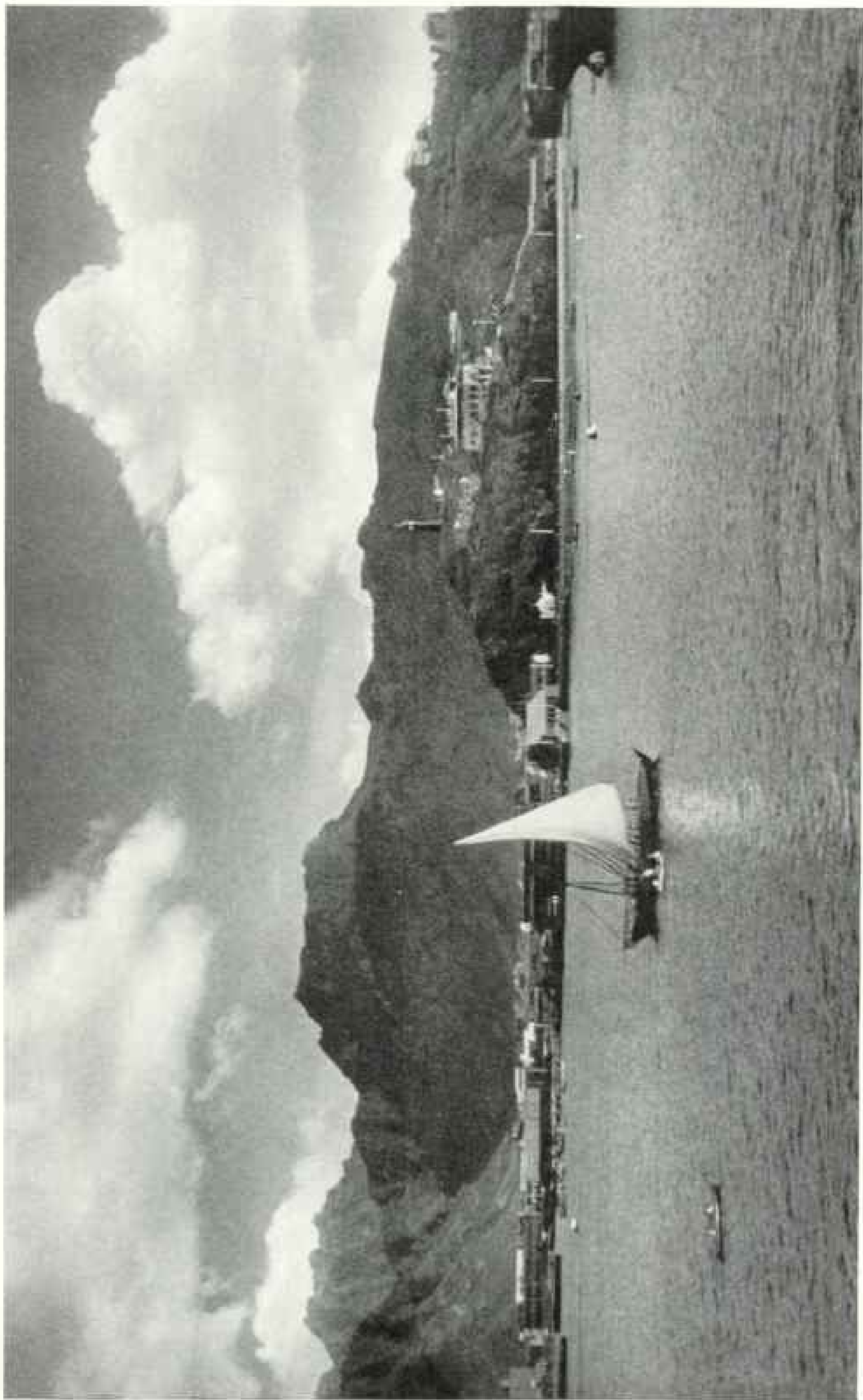
Off the west jetty at Port Said, two native fishing bouts sweep in with their net between them, while a small steamer enters the Canal from the north. After weathering tremendous squalls in the Gulf of Suez, the *Pilgrim* "motored" through the 100-mile ditch in two days (page 260). Without this canal, Britain would be some 5,000 miles farther by sea from her Indian Empire.



Photograph by Filippo Cuccinella

ITALY'S "BOOT TOE" LOOMS ACROSS THE STRAIT OF MESSINA FROM SICILY

As if poised for a drop kick, the toe of the Italian mainland seems on the map to be aimed at its island football. The harbor of Messina, lying near the imaginary point of impact, nestles within a sickle-shaped peninsula that makes this one of the safest havens in the Mediterranean. Off the end of the "sickle," where a Madonna stands atop a column, is a whirlpool that terrified ancient Greek sailors, who personified it as a female monster called "Charybdis" (page 261).



Photograph by Missy Charles Cullen

SIZZLING ADEN HELPS GUARD THE "LIPE LINE OF THE BRITISH EMPIRE"

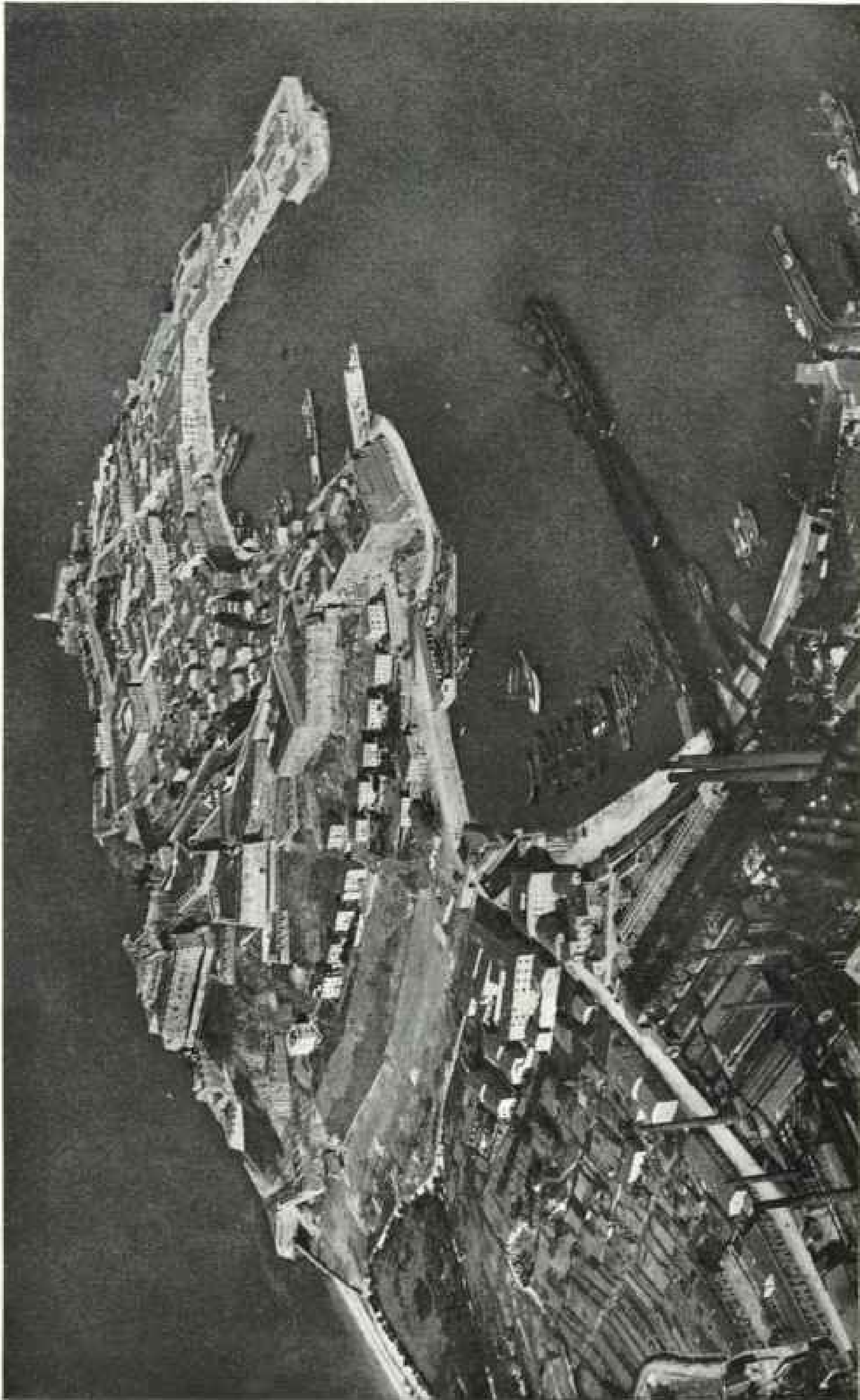
The sun-baked rock-fortress stands on an extinct volcano at the southern exit of the Red Sea, a strategic post on Britain's sea route via the Mediterranean and the Suez Canal to India. A clock tower on the hill overlooks the roadstead, where an Arab dhow with laden sail recalls the days when such vessels piled these waters with cargoes of slaves from Africa. Nowadays, steamers call here to coal and load coffee, gum, sheep and goat skins, and ostrich feathers. So scanty is the rainfall, averaging about three inches annually, that drinking water for the white population is mostly obtained by boiling sea water and condensing the steam.



© Charles E. Brown

LIKE SILVER SARDINES AS VIEWED FROM A SEAPLANE, BRITAINNA'S WARSHIPS STAND GUARD IN THE SHADOW OF GIBRALTAR

Since 1704 the mighty rock, one of the ancient Pillars of Hercules, has been Britain's stronghold at the gateway to the Mediterranean. The huge white patches on the rugged slope are concrete catchment areas which collect rain water for the military garrison and naval crews to drink. A sandy isthmus two miles long connects Gibraltar with the Spanish mainland (right). Africa lies 13 miles south of Europa Point (left).



Photograph by Deutscher Arm Lloyd, A. G.

AT PORTOFERRAIO, ENTLED NAPOLEON RULED HIS MINIATURE KINGDOM OF ELBA FOR TEN MEMORABLE MONTHS

The dethroned Emperor of the French reigned over the tiny domain like a comic opera monarch from May, 1814, to February, 1815, when he escaped to France and launched the comeback that ended at Waterloo. His "palace" stands on the capital's heights among larger buildings behind the lighthouse and old fortress (upper center). Elba's present sovereign is King Victor Emmanuel III. Its mines, celebrated in ancient times, produce a large part of Italy's iron ore. The Greeks called it "Soot Island" because of the smelting furnaces that belched smoke over the harbor, as modern chimneys do today.



Photograph by Donald C. Surr

JOE EKELAND REINFORCES A PIECE OF RIGGING WHILE "THE CHIEF" LOOKS ON

To "serve" the rope, he holds it in a vise and winds wire tightly around it so that the fibers will not chafe or become weathered during the long voyage. An expert rigger, Joe was one of the two paid members of the crew; the other, also of Boston, was John F. Vranken, steward and cook. The bronzed chief engineer, Horace W. Fuller (right), nursed the *Pilgrim's* Diesel through many a long, hot run when sails were useless. On deck, the 14-foot "pen pod" boat fits into one of the larger Swampscott dories. Aft, at the wheel, the helmsman eyes his compass.

approached the northern end the thermometer fell at night to the forties.

It is about a hundred miles through the Suez Canal to Port Said, and we took two days to pass through, spending the night at Ismailia, on Lake Timsah. The view along here was just sandy desert, with an occasional glimpse of wild dogs.

WHO SAID "SUNNY" MEDITERRANEAN?

It was 46° Fahrenheit on deck when we left Suez, and when we arrived at Port Said, in a penetrating rain driven by a strong west wind, it was 42°. After a day or so the rain stopped, but the cold westerly continued and kept our decks and everything not shut tight filled with sand off the desert.

The *Pilgrim* sailed from Port Said on February 18 bound for Nice, on the French Riviera, where the Commander and his bride awaited her, and for five miserable days was unable to make any westing.

This spell of desperate westerly weather culminated, near Cyprus, in an exceptionally heavy northwest gale which compelled

us to heave to. Occasional crests of seas came aboard and got through skylights, tarpaulins, and everything.

On the evening of the 23d it fell calm. For four days there wasn't a breath of wind. The engine was getting worn and once the Chief had no sleep for 23 hours. With frequent stops for repairs, the *Pilgrim* crept to the westward and at dawn of the 26th raised the snow-covered mountains of Krētē (Crete) above the horizon.

Passing through Kasos Strait, we cruised along the precipitous north side of the island where at times a light breeze off the land enabled the sails to help the engine. We were now in the Sea of Candia; the weather was fine, and at 8 a. m. on the 27th we anchored in the protected harbor of Suda Bay.

It had taken us nine days to cover the 550-odd miles from Port Said!

The surroundings of Suda Bay are barren but picturesque. Back of the little village rocky slopes soon merge into a mountain that sweeps up 8,000 feet into



Photograph by Richard C. Durant

ALL KITES FLYING, THE "PILGRIM" ROLLS LAZILY BEFORE A LIGHT BREEZE

With barely enough air to fill her sails, the ship was making so little headway here on her run to the Tonga Islands that two of the crew put off in a boat to take pictures. Built in Maine and specially designed for this round-the-world voyage, the schooner yacht was powered with a Diesel auxiliary engine that could give her a speed of about five knots in calm weather.

the sky. At this time it was covered with snow and ice to within a few miles of the village. About three miles west of Suda Bay lies the capital and chief seaport, Khania, or Canea, a fascinating old town where we spent several hours.

Repeating a mistake made earlier in the voyage by leaving port on Friday, the *Pilgrim* cleared the northwest corner of Crete at dusk on March 2, picked up a fair wind from the northeast, and headed for Sicily. But the weather was gray and gloomy, with a falling barometer, and the second night out we hove the vessel to in another northwest gale, identical with the one off Cyprus, except that it lasted longer.

Head winds, squalls, and the peculiar short, steep sea from the westward that seems to characterize the Mediterranean at this season held us back, and it was not until the morning of the 10th that we entered the Strait of Messina, where it fell flat calm, with the snow-capped volcano of Mount Etna belching smoke in front of us.

We moored in the little port of Mes-

sina with our stern fast to the shore, as in Papeete, but instead of lovely tropical scenery for a background, we now had a freight train (page 256).

BETWEEN SCYLLA AND CHARYBDIS

On the 13th we rushed out of the Strait of Messina at a great rate with a fair wind, getting a good look at Scylla (a rock on the Italian shore) and passing through Charybdis (marked on the chart as a whirlpool) without noticing any disturbance. Passing Stromboli and the Lipari, or Aeolian Islands, we ran into more bad weather in the Tyrrhenian Sea, illuminated at night by plenty of lightning.

But the wind providentially held abeam and we made fair time up to the barren 2,116-foot island of Montecristo, where the northwester jumped on us again with its usual violence. With the snow-covered mountains of Corsica in sight to the west, we made a lee under the island of Elba and finally dragged the *Pilgrim* into Porto Longone, on the east side of Elba, where we anchored in a rattling deluge of the biggest hailstones I ever saw.

The *Pilgrim's* anchors weigh 400 pounds each and it took both of them with 50 fathoms of chain apiece to hold the vessel against the tremendous williwaws that roared out of the harbor. It was desperately cold. We had crossed 40° North Latitude coming up from Messina and it felt as if we were inside the Arctic Circle.

Down below, with the galley stove going and plenty of hot buttered rum circulating around the table, we listened to the roaring of the wind and the hailstones rattling around the deck, and the toast, "She's howling for somebody else tonight," was never drunk with more enthusiasm.

This blow lasted two days. We walked around the barren country where people were gathering sticks for firewood, and also looked over the town.

When the northwester let go, we left Porto Longone and found a flat calm and mixed cross sea outside, the Mediterranean alternative to a gale of wind. The *Pilgrim* weathered bleak Cape Corse, the northern tip of Corsica, on the first night out, and, finally, on March 21, tied up in a little pool in the inner harbor of Nice. We were more than a month out of Port Said!

The Commander was on the dock and boarded us. The log does not say that we turned in early that night; and we didn't.

At Nice we said good-bye to Bill Cutting. Our "lime juice" shipmate had been with us four months and had battled out the desperate weather with unvarying cheerfulness. I doubt that he will ever forget the time he signed on in the "Yankee hell ship" out of Singapore for a winter voyage up the Red Sea and the "sunny Mediterranean."

OFF AGAIN, ON A FRIDAY!

April 20 saw the *Pilgrim* leaving Cannes—again it was Friday, despite our previous resolutions—bound for the port of Mahón, in the Balearic Islands. She was manned by the original six, for the Commander had joined his vessel again, to the intense satisfaction of the rest of us. And we had a Siamese cat, which had instantly retired to the depths of the lazaret.

A light, fair wind gradually increased and the next night we were driving before another gale from north-northwest, across the notorious Gulf of Lions. Except for the lightning, it was as black as the inside of a cow and water poured over everything. If we didn't like it on deck, we could go below and read the Pilot Book:

"Northerly winds prevail at Menorca for two-thirds of the year and at times blow with such force as to carry the spray across the island, covering the ground with a slight coating of salt."

I don't know if there was salt on Menorca that night, but there was certainly enough of it on the *Pilgrim*.

The next night we reached Menorca and anchored away up in the port of Mahón. This is a very long, narrow arm, winding between high, bold shores, on which various houses sit at the water's edge. Of course, it is quite well known now, as is Palma on Mallorca, or Majorca, where we stayed several days, enjoying the first real warm sunshine in months.

From Palma we beat and steamed and clawed along, wind often dead ahead, once getting close in with the desert coast of Africa, but usually in sight of the sweeping hills and mountains of southern Spain, and finally dropped anchor under the Rock of Gibraltar.

After loading stores and seeing "Aussie," the boxing kangaroo, at the theater, we pulled out of Gibraltar with a "black levanter" astern and sailed down to Las Palmas, in the Canary Islands. Here we loaded fuel, which proved a long job.

Sailing from Las Palmas on May 25, the *Pilgrim* had practically nothing but fine weather all the way across the Atlantic. One night, though, I was hit in the mouth by a big flying fish going at a tremendous rate.

AN ADDITION TO THE CREW

The Siamese cat seemed to take an unduly long time to get her sea legs. As Joe said, "These parlor cats are no good aboard a vessel. A good barroom or alley cat does much better."

On June 6 I was painting my stateroom when the cat, which had not been seen for two days, stalked out of my clothes locker looking strangely slab-sided. Investigation revealed the presence, on my best white duck coat, of three kittens, one dead, two alive; and while I was cleaning the coat the cat ate a piece out of my Panama hat. Although the hat had to be discarded, the coat survived, as did the kittens, and we landed them in Boston in good condition.

The *Pilgrim* had been away two years, thirteen days, and had covered 28,533 miles.

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded forty-nine years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material which The Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

Immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

The Society cooperated with Dr. William Beebe in a deep-sea exploration of undersea life off Bermuda, during which a world record depth of 3,028 feet was attained August 15, 1934, enabling observations of hitherto unknown submarine creatures.

The Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed \$100,000 to Admiral Byrd's Antarctic Expeditions.

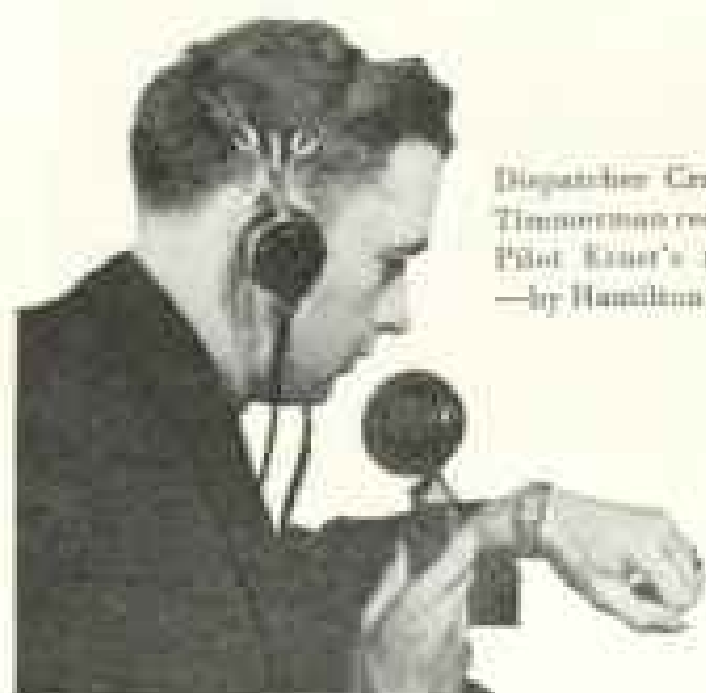
The Society granted \$25,000, and in addition \$75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

The Society's notable expeditions to New Mexico have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches have solved secrets that have puzzled historians for three hundred years. The Society is sponsoring an ornithological survey of Venezuela.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to an officially recognized altitude record of 72,392 feet. Capt. Albert W. Stevens and Capt. Orell A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

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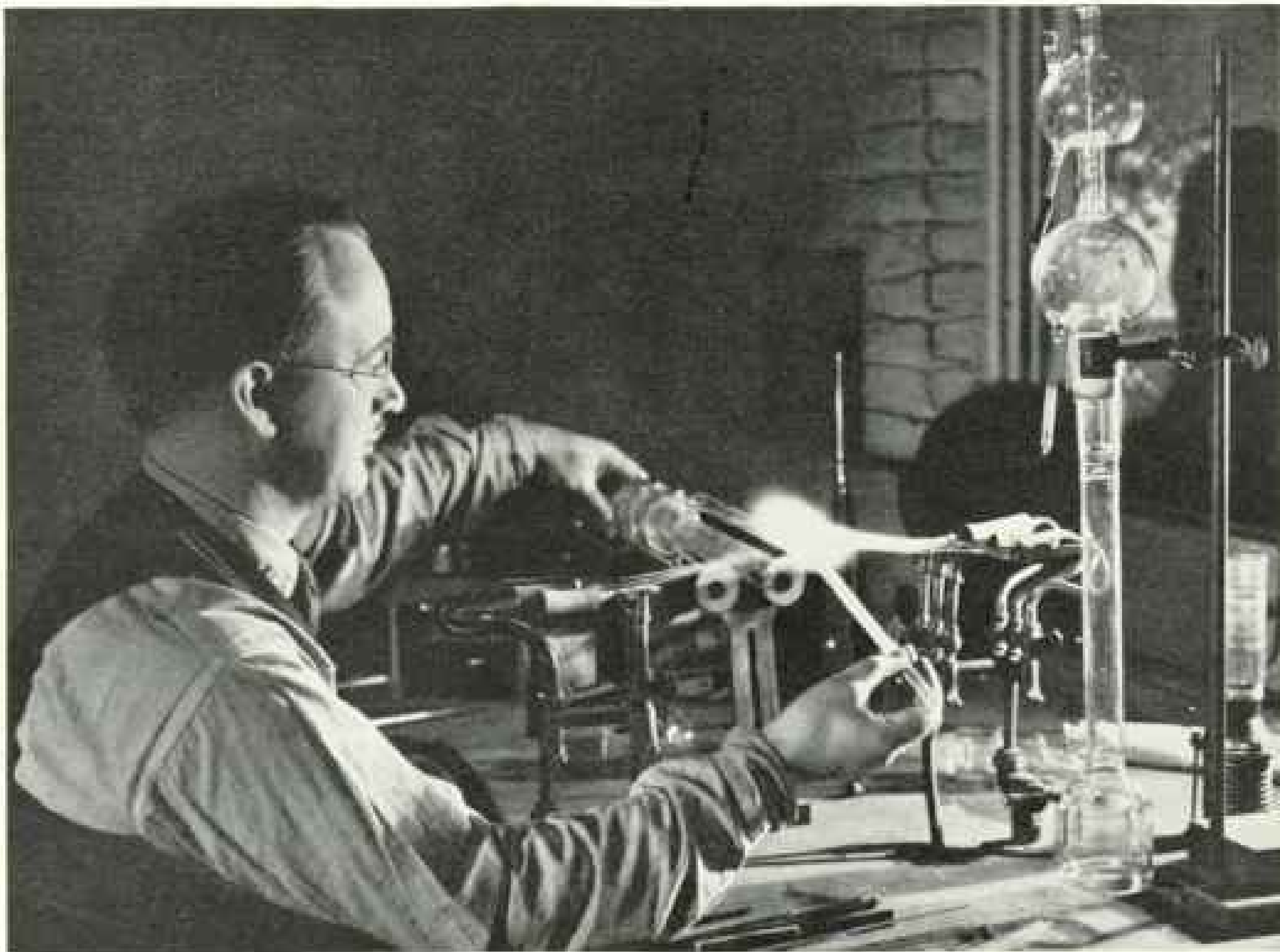
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GRANTLAND RICE REPORTS:

**OFF THE ROAD THEY SHOT AS
AN UNSEEN DEMON THREW
THEIR CAR OUT OF CONTROL**

GRANTLAND RICE Describes The Unhappy Ending To A Seattle Motorist's Week- End Trip To Mt. Baker

THE STRAINS of "When We Come To The End of A Perfect Day" seemed to fit the mood of Mr. Jack Davis of Seattle, Washington, and his party of four, as they motored down from Mt. Baker that Sunday afternoon. And when the familiar Everett highway finally was reached, they were still recounting the experiences of that care-free week-end.

Then, with startling suddenness, the scene changed. BANG! The left front tire had blown out with the noise of a thunderclap! A terrible drag set in. The steering wheel jerked itself right out of Mr. Davis' control. Down went the brakes. But too late. Off the road they shot. Luckily the blow-out had not occurred when they were up in the mountains. As Mr. Davis walked a mile for a towing truck, it's a safe bet that he resolved *never again to take his tires for granted.*

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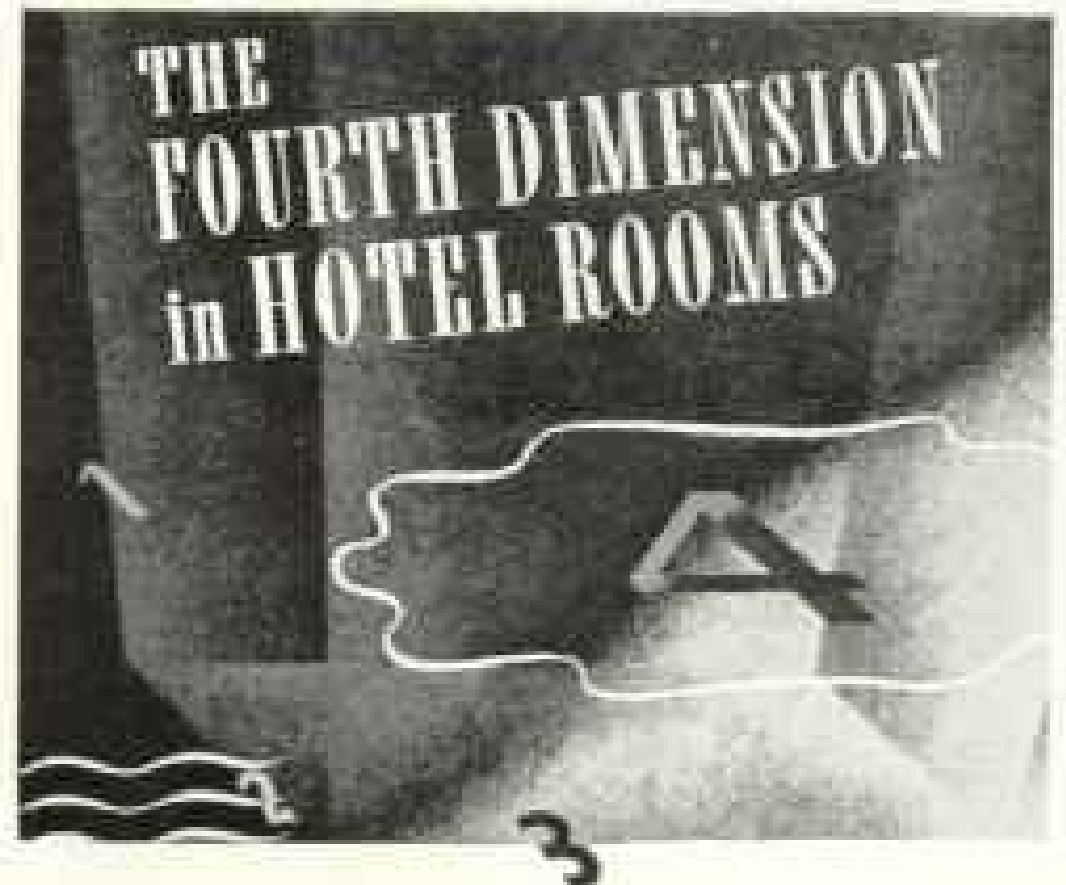
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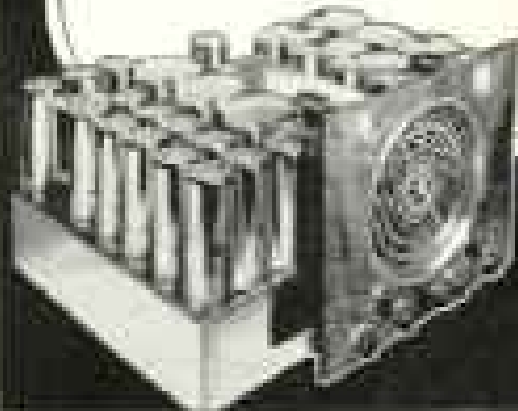
The Progressive

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Britain**
4-MONTH World Cruise



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January 8, 1938

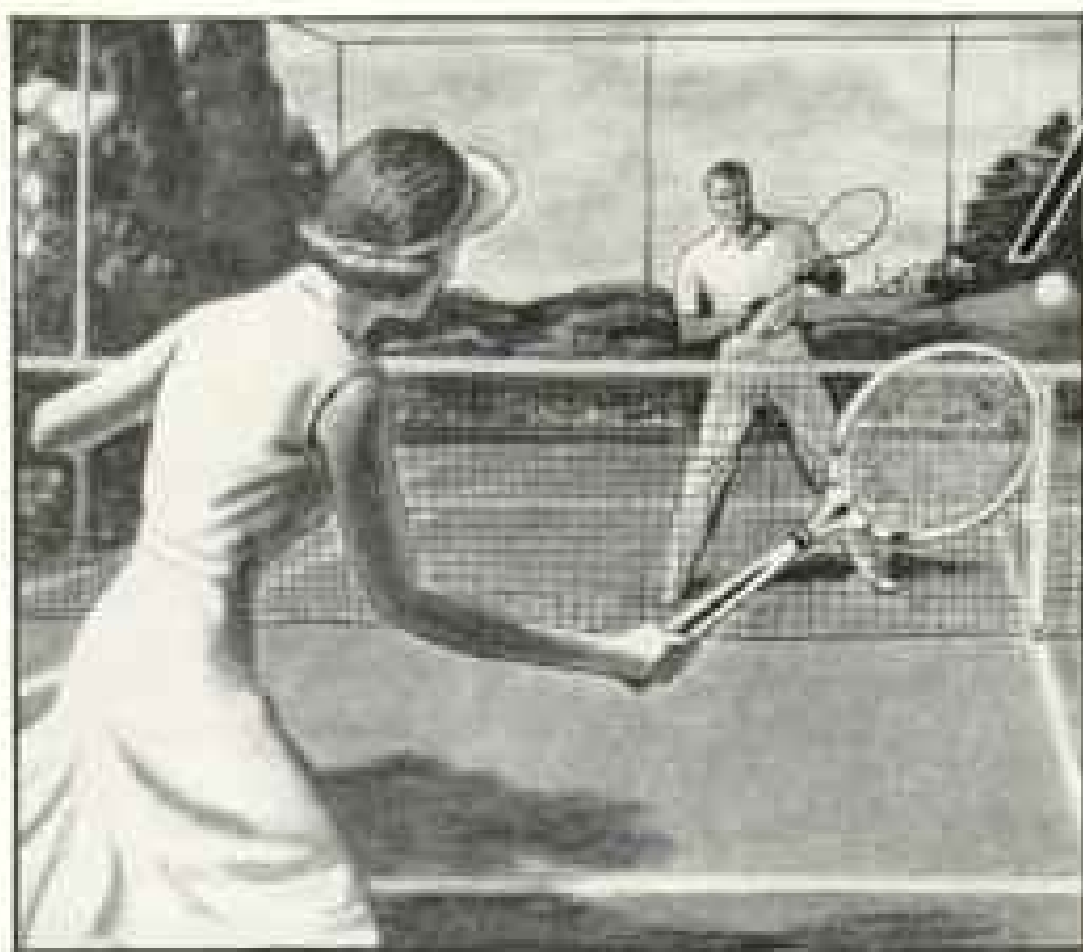
Four full months of the most luxurious vagabonding that the world can offer! 108 places . . . 57 days in port . . . and the best of more than 20 countries. Join the spacious *Empress* on her "royal progress" round the world.

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Canadian Pacific

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Exercise which is taken too strenuously at the beginning may strain the heart. The chances are that your heart is good for all the reasonable exercise you will want on vacation. But why guess about it? Let your doctor examine you before you go away on your summer holiday.



Some hearts, even in younger people, are dependable for the usual routine of life but do not stand up under unusual or prolonged effort. The cause may be a previous infection which has been entirely forgotten. Rheumatic fever—"growing pains" in childhood—may have left the heart permanently impaired. In middle-aged persons, particularly those who are overweight or who have a tendency to high blood pressure, important changes often occur in the arteries of the heart which definitely limit its endurance.

A heart that is somewhat below par, if used with care and discretion, may outlast a much stancher one that is abused. Each year many people die of heart disease which might have remained just a heart "condition" if they had realized the need for caution. Sometimes indigestion, nervousness or lung ailments are mistaken for heart trouble, causing needless alarm and anxiety.

Drop in to see your doctor before you go away. Be prepared to get all the enjoyment and health you should out of your vacation. *Know your own heart.* The Metropolitan booklet "Give Your Heart a Chance" contains much valuable information that you should have. A post card will bring you a copy. Address Booklet Department 837-N.

Keep Healthy—Be Examined Regularly

METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKEN
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Only the best, fresh, plantation-grown rubber is used in the manufacture of the General Tire. And there's a big difference between fresh, resilient rubber and reclaimed rubber made from tires that have run out their span of life. Using only the best is the reason General keeps its position as America's Top Quality tire, year after year.

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The change-over plan also makes full allowance for all the unused tire mileage on your present car with equally convenient arrangements for paying the balance.

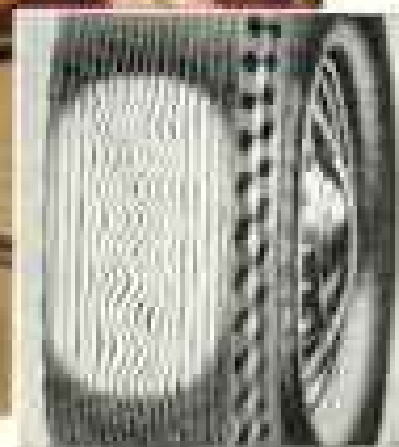
See the General Tire dealer and find out how little it costs to be safe instead of sorry for ever after.

The General Tire & Rubber Co.,
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FREE BOOKLET: "Instructions to Prevent Skidding," fully illustrated, will be sent on request.

• When you apply the brakes flexible ribbons of rubber wrinkle into squeegee-like action—provide positive traction on any road, wet or dry. Stops without side swerve or tail spin.



THE **GENERAL** *Dual 10*



So cool . . . so cooling

“The north wind doth blow and we shall have snow”—next winter. Meanwhile, when it’s awfully, awfully hot, just pick up a frosty bottle of ice-cold Coca-Cola and you’ve got the weather situation well in hand—for this is *the pause that refreshes . . . and cools.*



LOOK FOR THE FAMILIAR RED COOLER

"Wrap up a billion dollars' worth!"



THERE'S a big story in the stupendous shopping list of the world's finest transportation system . . . a yearly bill of goods so huge it makes the American railroads one of the largest and steadiest customers the people of this country have.

This star customer buys in practically every manufacturing city and agricultural county throughout the land—enormous orders of almost everything we as a nation produce.

Imagine, for instance, what it takes to cook and serve twenty-five million meals—meals remembered among the finest a traveler anywhere eats.

Consider the single item of choice meats—more than fifteen million pounds! Or eggs—two million dozen! Or potatoes—nine million pounds of them, purchased by the railroads every year.

Bread and butter? Thirty million crisp rolls—thirty-five million slices of new bread—two million pounds of butter.

And, just to touch on desserts, enough ice cream to treat every child in the country, in the first, second and third grades, with a nice big ice cream cone!

But even the whole great grocery bill, fabulous

as the figures are, is only a minor part of what the railroads need and buy.

Last year they bought more than \$800,000,000 worth of fuel, materials and supplies for their operations. And put another \$300,000,000 into new equipment and improved facilities.

Altogether these purchases were more than *one billion dollars* in 1936! That was one-third greater than total railroad buying the year before; almost twice as great as in 1933.

It is plain that such huge-scale buying benefits business in general and, directly or indirectly, the whole country. But that is only incidental to the really *big* benefit the railroads give America: the transportation upon which American agriculture and business are based—always safe, swift, dependable.

These are interesting figures to everyone in America. For the benefits of this buying spread into almost every county of the land. As the railroads go ahead, business goes ahead.

The railroads have been doing a good job. To do a better job, all they ask is a fair opportunity to get business—and handle business—on an equal basis with other forms of transportation. That's fair to all.

SAFETY FIRST—
friendliness too!

ASSOCIATION OF
AMERICAN RAILROADS

WASHINGTON, D. C.

The Lost Colony



Thirty-three years before the Pilgrims landed at Plymouth Rock, the first English colonists, under the sponsorship of Sir Walter Raleigh, settled at Roanoke Island, North Carolina. Here was the birthplace of the first child born of English parents in America—Virginia Dare. The fate of this Lost Colony (every one of the 100 men, 12 women, and 9 children completely disappeared) is one of history's most romantic mysteries. The 325th anniversary of the Lost Colony will be commemorated in a series of notable celebrations this summer and fall at Roanoke Island, North Carolina.

Discovered!

Your most delightful Vacation
... at sensible cost

NORTH CAROLINA



STEEPED in romantic history from earliest Colonial times, North Carolina holds an irresistible appeal for vacationists and tourists today. From cloud-capped mountains in the "Land of the Sky," where the cool, invigorating air is like sparkling wine—to broad sandy beaches; North Carolina offers an infinite variety of vacations to suit every taste and pocketbook. All outdoor sports. Famous golf courses. The angler's paradise—mountain streams and woodland lakes—rainbow trout, black bass, muskullunge. Inlet and ocean fishing. Riding, swimming, boating, motoring. Scenic highways of breath-taking grandeur through the highest mountains in Eastern America. (Visit the Great Smoky Mountains National Park.) Splendid accommodations—hotels, inns, cottages, camps. Come now—or during the mellow Indian Summer—September and October are two of the loveliest months of the year. Mail the coupon today.—Dept. of Conservation and Development.

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105 Agricultural Building, Raleigh, North Carolina
Gentlemen:

Please send me your official booklet,

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Name _____

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HAIR GROWTH
Improve
CIRCULATION

• with MECHANICAL,
ALTERNATE VACUUM
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TREATMENTS

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THE vacuum created in the X-ER-VAC helmet by the compressor mechanism

draws the blood into the deep network of capillaries that nourish the hair cells. The following cycle of pressure forces the blood out of the capillaries and into the veins. This continuous action sends a nourishing blood supply to the hair cells, thus stimulating normal hair growth. See your barber, beauty shop operator or local Crosley radio and refrigerator dealer . . . or write direct to

THE CROSLY RADIO CORPORATION

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"Stands for Safety"



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WITH KODACHROME**

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**ONLY
\$34⁵⁰**

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NEW BOOK OF BIRDS

Just off the press, this 738-page Book of Birds in two volumes, edited by Gilbert Grosvenor and Alexander Wetmore, has been published by the National Geographic Society as a colorful and useful album of bird portraits and a veritable encyclopedia of bird lore pertaining to all the North American Continent north of Mexico.

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.....\$5 THE SET.....

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Dept. V V, Washington, D. C. _____ 1937

Enclosed please find \$_____ for which send me
_____ sets of the new Book of Birds in two volumes.

[*\$5 the set, postpaid in U. S. and Possessions; else-
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In the 738 pages, there are 231 photographs, 17 migration maps, and 204 pages of full-color plates showing 950 birds painted by Major Allan Brooks. Adding to the permanent reference value of these vivid paintings, biographies and identifying legends set forth distinguishing characteristics of each species of bird, its range, breeding habits, and other features of behavior. Six hundred and thirty-three species and scores of subvarieties are thus described.

These volumes are published by The Society as another contribution to its educational purposes. The fact that initial cost of plates and text has been assumed by THE NATIONAL GEOGRAPHIC MAGAZINE makes possible the low price of \$5 per set, postage prepaid in U. S. and Possessions. Each volume is bound in green cloth covers, 7 x 10 $\frac{3}{4}$ inches, embossed in gold. Further details sent on request. The volumes are sold together as a set, and are obtainable only from The Society.



Photograph by A. A. Allen
A FORTUNATE CHILD WINS THE CONFIDENCE OF WEEWINDS

NATIONAL GEOGRAPHIC SOCIETY, DEPT. V V, Washington, D. C.

DADDY WILL
COME BACK

Safe and Sound



He's Going by PULLMAN

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Managing Director of
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IN THE

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Connecticut, Mississippi—these and various other places and regions will be mirrored in "on-the-spot" photographs taken for THE GEOGRAPHIC. • As a member of The Society, you and yours can look forward to many pleasure-filled hours with coming issues of The Magazine. Your friends would also like to share in The Society's educational "dividends." Will you give them the opportunity by nominating them for membership? They will appreciate your thoughtfulness as they receive each new GEOGRAPHIC and enjoy The Magazine's illustrated narratives and such valuable supplements as the new Wall Map of South America in full color now being prepared. • Members are invited to use the convenient form below in submitting their nominations. No financial obligation is involved.

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DETACH HERE—OR YOU MAY NOMINATE BY LETTER IF YOU PREFER NOT TO CUT THIS PAGE

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Secretary, National Geographic Society,
Sixteenth and M Streets, N. W., Washington, D. C.

_____ 1937

I nominate for membership in the National Geographic Society:

DUES: Annual membership in U. S., \$3; Canada, \$3.50; abroad, \$4; life membership, \$100. Please make remittances payable to the National Geographic Society. Please remit by check, draft, postal or express order. The membership fee includes annual subscription to THE NATIONAL GEOGRAPHIC MAGAZINE.

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Arlington Hotel and Baths. Arthritis, circulatory benefits. Waters owned and recommended by U. S. Govt. Golf, Fishing. Write for folder.

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Arrowhead Springs Hotel. Beautiful 1800-acre spa. Hotel bungalows. Mineral water post, steam rooms, sports, 15-18 hrs. Los Angeles. H. B. Ward, Mgr.

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The Belvedere. Outside the business district, yet convenient to all the city's activities. Every modern comfort and luxury. Rates begin at \$4.00.

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The Farragut. American plan. Thoroughly modernized and refurbished. All popular sports. Sea-birds and country. Write for booklet and rates.

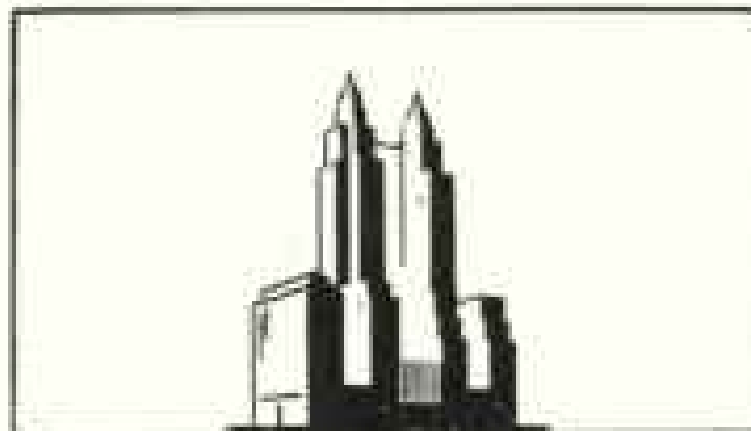
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Not size, but solitude for its patrons, make The Waldorf-Astoria preeminent. The greatness of a hotel is measured, not by its height, but by its heart. Park Avenue, 40th to 60th Streets, New York.

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Battery Park. Five excellent golf courses. Many scenic places to visit. Entrance Great Smoky National Park. A Knott Hotel. Request folder "D".

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Mulhannoh. A nationally famous hotel. 60 rooms. From \$2.00. Three to four blocks leading stores and banks. Time tables. Famous food.

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Crestmont Inn.—200 ft. elev. Lake, sandy beach, swimming, sailing. Fishing, golf, hiking, tennis. Children welcome. American plan. June 15-Sept. 30.

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SEND FOR CATALOG—40-page de-luxe catalog. Tell how to select a binocular. Describes 11 Bausch & Lomb models, \$45 to \$131. Free on request, Bausch & Lomb Optical Co., 440 Lenox Park, Rochester, N. Y.

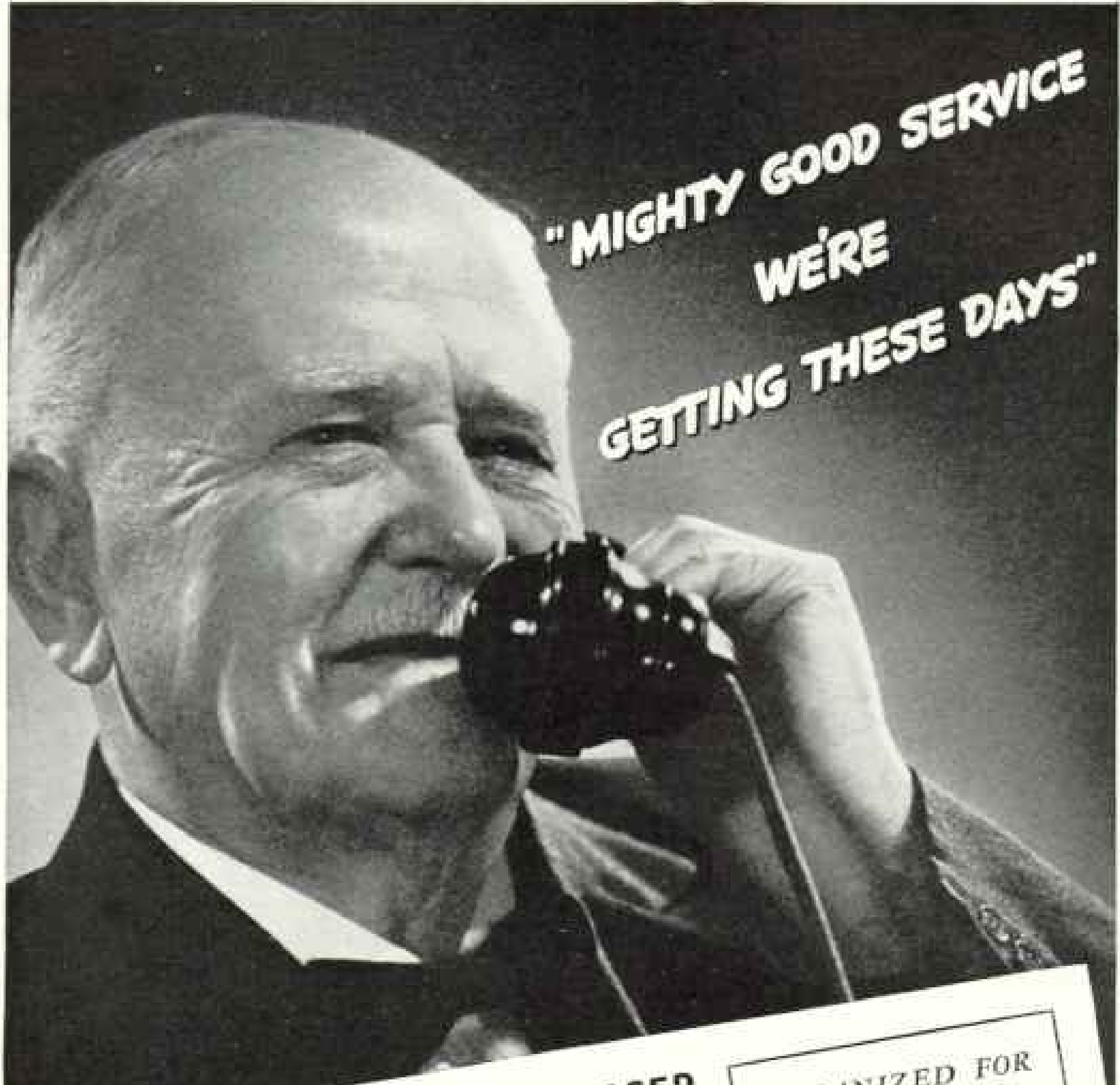


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"Mention the Geographic—It identifies you."



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GETTING THESE DAYS"**

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The name "Western Electric" on telephone equipment means high quality at low cost. Your Bell telephone company, and every other Bell company, shares the benefits of its centralized manufacturing.

This has brought constant improvement in the speed, clarity and efficiency of the telephone—saved millions of dollars for Bell telephone users—and helped to give this country the best telephone service in the world.

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BELL TELEPHONE SYSTEM



nature located things badly for making aluminum in America



SOME OF OUR aluminum ore (bauxite) is mined in Arkansas. Some of it comes from Dutch Guiana. But neither in Arkansas nor in Guiana are the rest of the raw materials handy which are needed for the difficult job of getting metal out of the ore.

First the ore must be refined. So we must transport it to a location where other necessary materials are



within convenient distances. But refining merely produces a whitish powder called alumina (oxide of aluminum) which is a long way from being metal.

To get the metal out of this powder requires an enormous amount of electrical energy. Again it becomes necessary to transport the unfinished product to distant places where great rivers run steep.



In these locations, away from industrial centers, where there has been little demand for power, we must build great dams, reservoirs, and powerhouses to make the essentially low-cost electricity which produces the virgin metal.

The molten aluminum slowly pour-

ing from a reduction pot at Massena, New York may already have journeyed as much as 5,000 miles just to arrive at the beginning of more stages of alloying and forming into useful shapes for industry. All this



transportation is necessary because we cannot make aluminum cheaply wherever we would like to make it.

These limitations imposed by geography have another aspect. We cannot always increase our capacity for making aluminum as fast as we please. Economical production requires large units. Adding new units involves not merely heavy investment of capital, but years as well.



In planning the program to make aluminum available at the lowest possible price, it is our endeavor to have available a producing capacity which will, as accurately as we can gauge it, satisfy the increasing needs of industry. But it must not be so large that the investment will overburden the cost of the metal, remembering that the investment cost per ton produced is many times larger for aluminum than similar costs for other metals.

