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TWENTY-FOUR PAGES OF ILLUSTRATIONS IN FULL COLOR

Penn's Land of Modern Miracles

With 28 Illustrations and Map JOHN OLIVER LA GORCE

Today in the Land of Franklin

39 Natural Color Photographs EDWIN L. WISHERD

The Penn Country in Sussex

With 33 Illustrations COL. P. T. ETHERTON

Living on a Volcano

With 18 Illustrations THOMAS A. JAGGAR

The Society Honors Byrd Antarctic Expedition

With 6 Illustrations

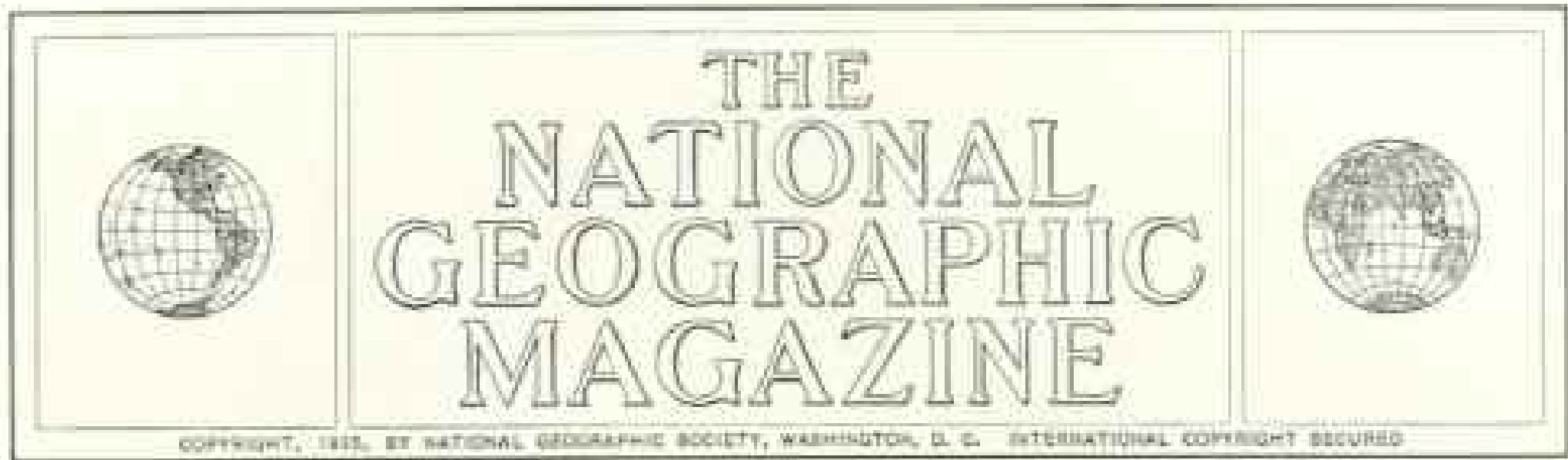
The Paradise of the Tasman

With 25 Illustrations HUBERT LYMAN CLARK

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PENN'S LAND OF MODERN MIRACLES

BY JOHN OLIVER LA GORCE

Vice President, National Geographic Society

WHEN historic Georgetown still was the metropolis of the north bank of the Potomac and the city of Washington was little more than a beautiful plan on paper, a bridge was thrown across Rock Creek to connect the two.

There were 13 stones on the face of the arch of the bridge. Upon them were inscribed the abbreviated names of the 13 States that had created and successfully defended the Union. On the keystone of that arch were the letters "Pa."

Whether that was the origin of the nickname of the Keystone State or only testimony of its earlier use remains a matter of debate, but the sobriquet was aptly descriptive of its rôle in American history and industry.

The Congress that gave America its Declaration of Independence met, deliberated, and acted on Pennsylvania's receptive soil. The Convention that forged the Nation's Constitution labored amid that Commonwealth's genial atmosphere.

The financial wizard who averted the economic disaster which threatened to overwhelm the young Nation was that patriotic Pennsylvania banker, Robert Morris.

The fine old philosopher and master of humanized science who won international recognition for the struggling child among nations, and brought us alliance with France, with history-changing consequences, was the revered and picturesque Ben Franklin.

SOME MILESTONES OF PROGRESS

So it has been through the generations. When ship sails no longer met the demands

of maritime commerce, Robert Fulton, a native of Pennsylvania, laid the foundations of steam navigation around the world.

The industries of the Atlantic seaboard became so vast that wood no longer served for fuel, and Pennsylvanians developed their coal resources.

Pittsburgh's Scotch-Irish empire builders expanded the iron industry to a point where Pennsylvania practically equipped the factories of the Mississippi Valley and produced both the rails and the rolling stock of the Nation's railways.

When whale oil and other animal fats and oils no longer yielded adequate lubricants and illuminants, it was in Pennsylvania, at Titusville, that Col. E. L. Drake drilled the first oil well, thus helping revolutionize the world's ways of living and making possible the present motorized transportation (see page 22).

Pennsylvania's industrial pioneers inaugurated the reign of steel, thus ushering in the era of skyscrapers in a thousand cities, and the speeding of traffic on the railroads of the country.

LEADER IN 17 MAJOR INDUSTRIES

To the present hour, the land of William Penn goes forward as one of the foremost industrial communities of the world. Before the depression it was making one-fifth of the world's electrical machinery, refining one-sixth of its sugar, mining a like share of coal, and producing an equal proportion of the world's steel.

The Federal Census of Manufactures shows that among the Nation's 51 major



Photograph by Altvater & Bro.

A PEACOCK'S TAIL OF GLOWING SPARKS ALMOST CONCEALS THE WORKMAN

Two joints of large pipe are electrically welded end to end in the Spang Chaffant Pipe and Tube Mills at Etna, producing a display like a huge Fourth of July sparkler.

industries Pennsylvania ranks first in 17 and holds third place or better in 15 others.

In 42 of the Nation's products its factories lead those of every other State. From artificial limbs to zinc products these wares of Pennsylvania's primacy run the gamut of the alphabet. In such diverse industries as coal mining, chocolate and cocoa manufacture, pig-iron production and silk making, steel rolling and wool pulling, cement grinding and lace weaving, coke burning and hosiery knitting, Pennsylvania is first by a wide margin.

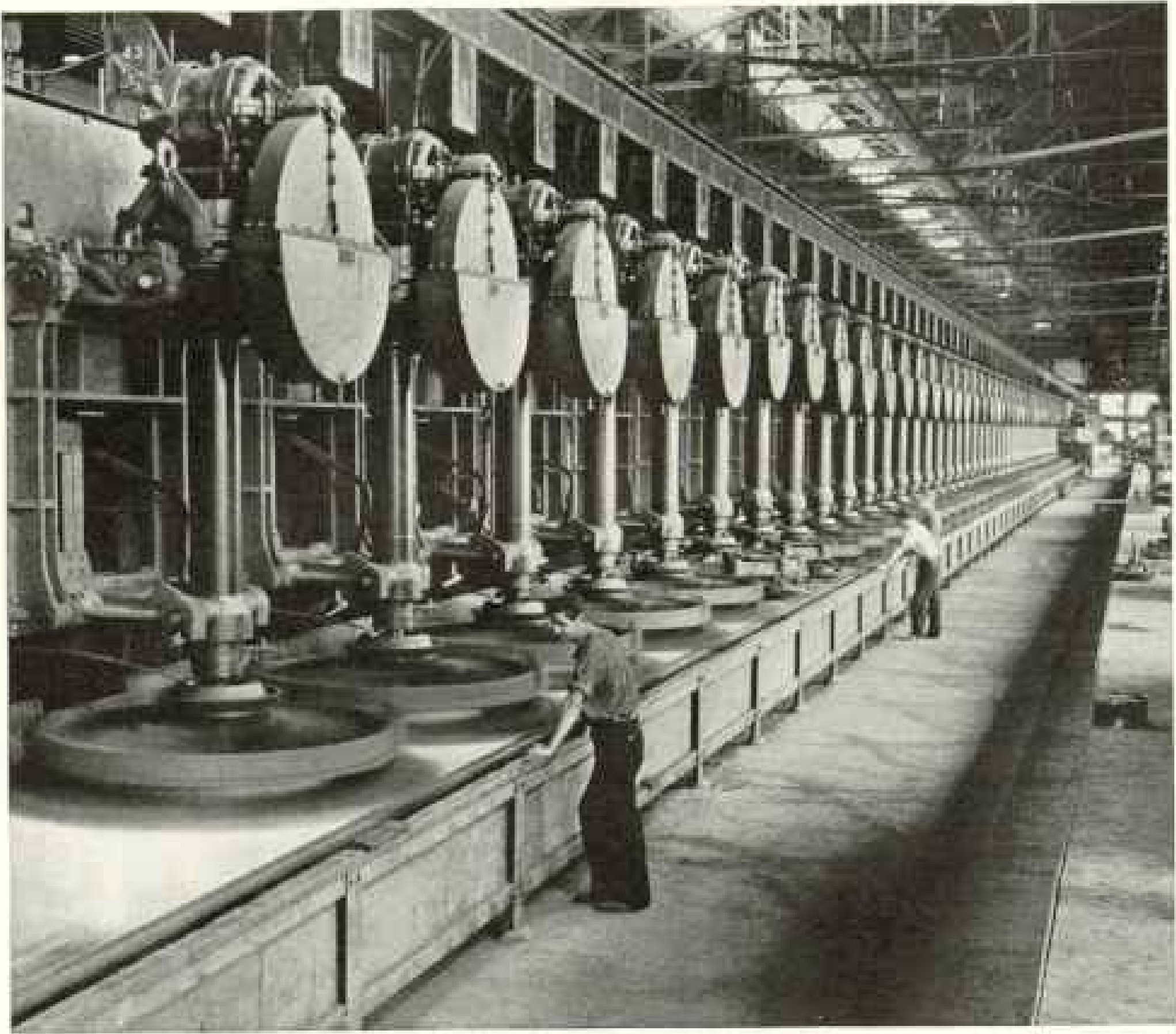
Pennsylvania's history is filled with stirring chapters. The story of its wild life, from the days of primal abundance to virtual extinction and back again to abundance under intelligent human protection, is a true romance of forest and stream. The tenacity with which the many religious sects, drawn there by the broad tolerance of the founder,

have adhered steadfastly to their centuries-old customs, and frequently their costumes, constitutes a fascinating story of quaint survivals in a progressive age.

LARGE NATIVE-BORN POPULATION

Within Pennsylvania's borders are more people born of native white parents than in any other State of the Union. It has nearly a million more than New York, its closest rival, although the total population of the Empire State is approximately three million greater. In fact, the people of native-white parentage in Pennsylvania exceed the total population of any other State, with the exception of New York, Ohio, Illinois, Texas, and California.

The Pennsylvanian's tendency to migrate is no new phenomenon. For more than a century and a half its restless citizen families have been moving from the old home



Photograph by Edwin L. Wisnerd

DOWN THIS LONG LANE, UNDER WHIRLING POLISHERS, MOVES A STEADY STREAM
OF PLATE GLASS

First sand, then emery, and finally enough rouge to fill the vanity cases of hundreds of women are fed to these machines that grind and polish the glass. A 67-square-foot crystal-clear plate is finished and stripped every one and one-third minutes in this Creighton factory (see text, page 44).

rooftree, and, with their children and their children's children, have pushed out to the changing frontiers of the country. Their first outpouring was in the colonial period, when large numbers moved down into the Shenandoah Valley of Virginia and on into western North Carolina and eastern Tennessee.

This was the migration which carried the Lincolns and the Boones, the Caldwells and the Calhouns, the Prestons and the Christians, the Rutledges and the Breckenridges, to say nothing of that large group of Lutheran, Reformed, Dunkard, and Mennonite pioneers who settled in the Virginia valley and its highlands.

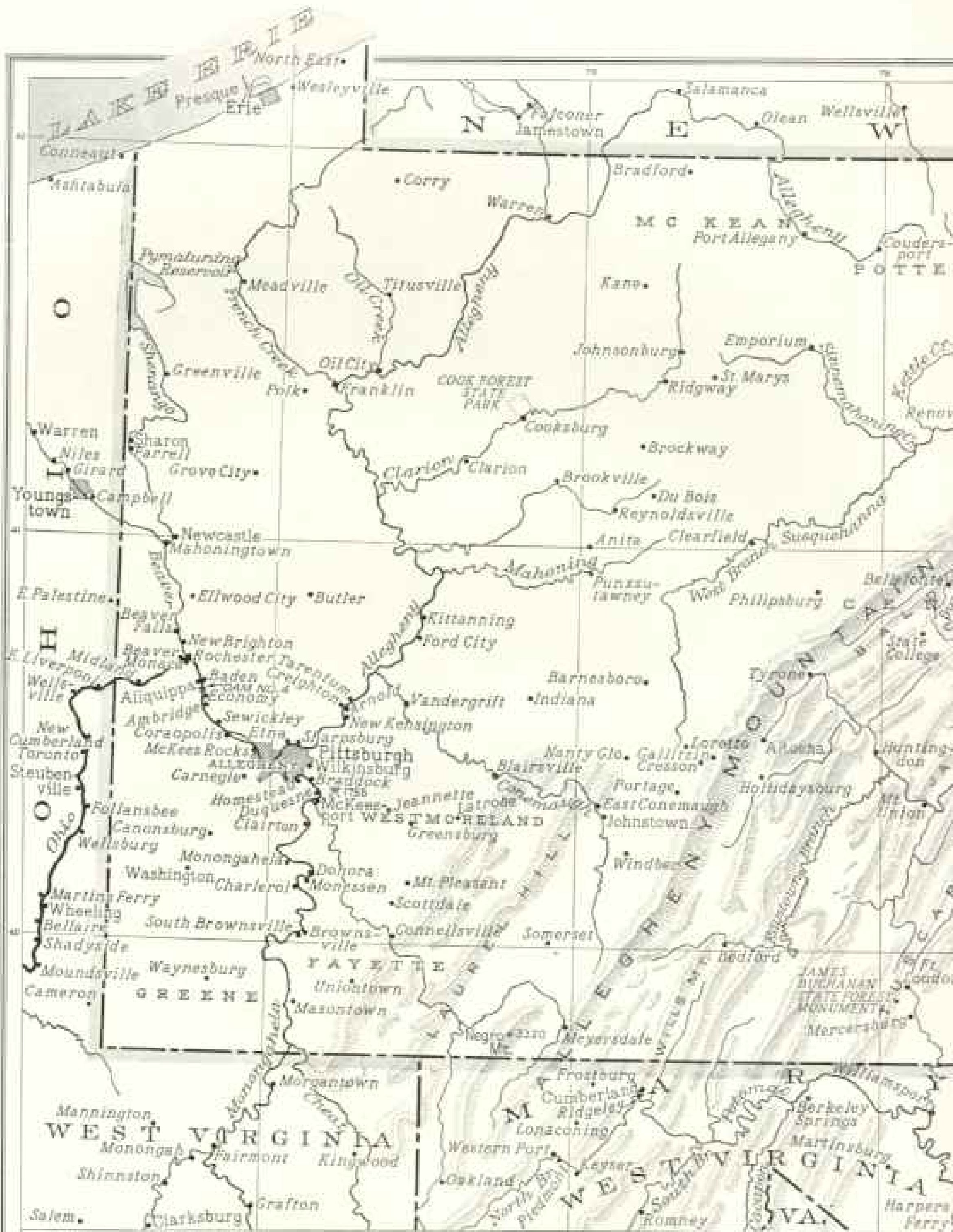
As Ohio and Kentucky and the States beyond opened up to settlement, migrants from Pennsylvania turned westward in regi-

ments; there they were joined by sons and daughters of their uncles and aunts who had so largely settled western Virginia, eastern Tennessee, and western North Carolina—ever onward to help open new areas of plenty.

HOMELAND OF MANY PIONEERS

Some day a historian will write the saga of the rôle of Pennsylvania and its descendants in the settlement of the Mississippi Valley, and America will realize the debt it owes to the fecund folk born in or descended from Penn's Land who spread over the continent and played such a vital rôle in the greatest of our valleys.

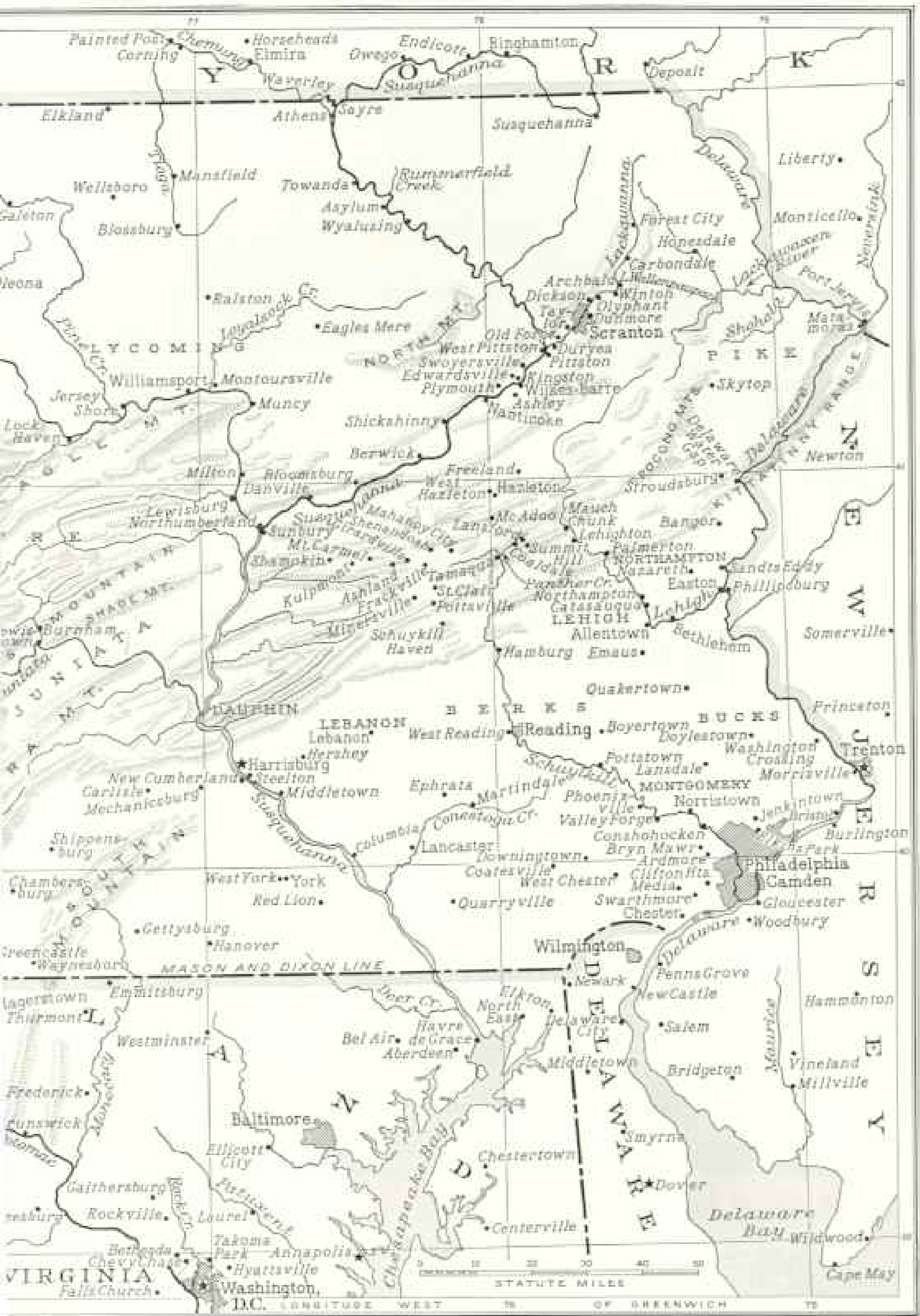
Although Pennsylvania has furnished more migrants than any other State in the Union, both in the colonial era and up to the



Drawn by Newman Dunstond

GEOGRAPHY MADE PENNSYLVANIA THE KEYSTONE OF THE NATION

The State was named, not for William Penn, but for his father. Although the Quaker leader requested that the grant be called "Sylvania" because, he wrote: "I feared lest it should be looked upon as a vanity in me, and not as a respect . . . to my father," the suggestion was overruled. Valley Forge and Gettysburg—turning points in two vital wars—both are located within its borders. Its Maryland boundary is the Mason-Dixon Line. Philadelphia was the Nation's birthplace; dynamic Pittsburgh became its forge and workshop. Boxlike in shape, the State is a treasure chest of mineral wealth, especially coal and oil.





Photograph by Edwin L. Wisbert.

SOME COOK FOREST PATRIARCHS TOWER 200 FEET IN THE AIR

Many of the white pine and hemlock trees that flourish in this State park near Cooksburg have lived 200 to 400 years. A single big tree produced enough lumber to build a six-room house. Trunks are as tall and straight as flagpoles or the masts of clipper ships. The region, once known as the "Black Forest," was heavily wooded in Penn's time. To perpetuate a portion of the original forests of Pennsylvania, the State Legislature a few years ago set aside this park of 6,055 acres and dedicated it to the recreation of its people.



Photograph courtesy Pennsylvania Game Commission

BRER FOX MUST USE HIS CUNNING THIS FROSTY MORNING

An early snowfall with cold, crisp weather makes an ideal hunting day, and huntsmen and hounds are about to start the chase. The horses, riders, and baying dogs range over a wide territory in upper Montgomery, Berks, and Bucks Counties, north of Philadelphia.

present time, the State is still America's foremost land of home owners. The last census shows more dwellings occupied by their owners than in any other State, a total of 1,198,000 owner-occupied homes. Even New York with one-third more population loses rank in this regard.

STATE FORESTS AND GAME PRESERVES

When William Penn came to America, he had title to some 28,000,000 acres of woodland, mountain, and dale. For a dozen decades these forests yielded only to the settler's ax and his new-ground ripping plow.

Then larger towns and cities began to grow and there was born an insistent demand for lumber.

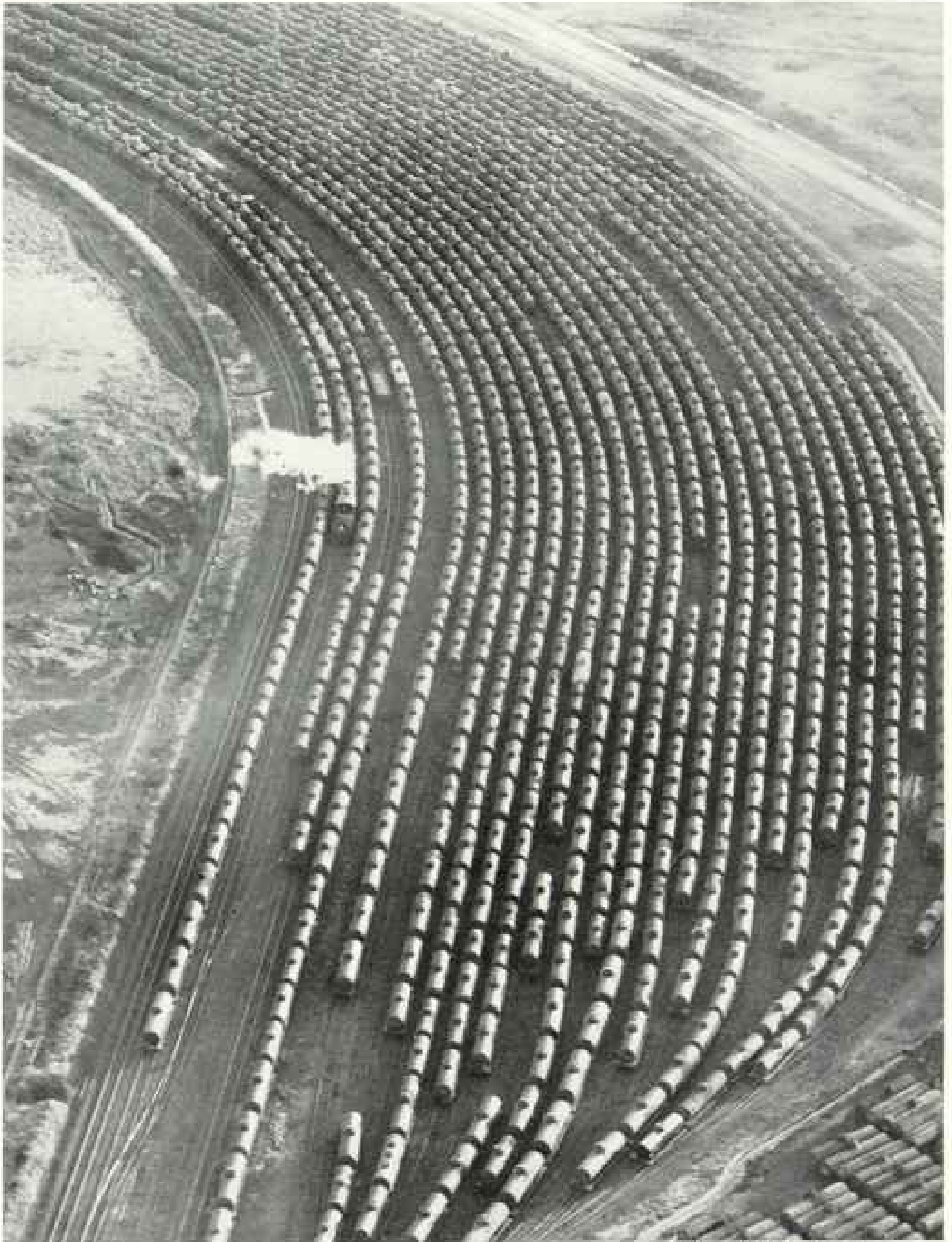
Williamsport alone had thirty-three large sawmills, and its log booms often contained

as many as 300,000,000 feet of unsawed logs, each branded after the fashion of cattle on the range. Many a millionaire was made by the industry and many a bank found its strength in the towering trees laid low for the march of building.

This havoc went on until there was left in all the 28,000,000 but a beggarly 20,000 acres of virgin timber. The lumberman had left his tree tops and his sawdust piles to make the most dangerous of fire hazards on millions of acres and to render a thousand streams unfit for fish life.

Forest fires completed the destruction, and millions of blackened, barren acres stood as mute witnesses of the profligacy of man in wasting one of the Commonwealth's principal assets.

Floods became more frequent, since barren lands cannot hold back water and give



Photograph by Wood Aerial Surveys

REVIVING BUSINESS IS EATING HOLES IN THIS MASS OF IDLE TANK CARS

The Nation's industrial depression, when this picture was taken in January, 1932, is graphically recorded by the long lines of empty carriers which crowded the railroad yards in the Point Breeze section of Philadelphia. Oil refineries now report improving conditions, with the cars finding their way back into interstate commerce. In some Pennsylvania oil fields new methods are being used, such as pumping water into the ground to force out the petroleum (see page 37).

it a chance to soak into the ground. Low-water stages of streams occurred oftener; springs in barren lands cannot collect sufficient water to keep the streams fed in dry weather. Fish by the millions perished when streams were transformed for long periods into dry river and creek beds.

Then the thinking citizens of Pennsylvania awakened to the menace the wasteful methods had wrought. State agencies and private interests joined in reforestation and in protection against forest fires.

Today one finds that thirteen millions of acres in the Keystone State are accounted to be forest land. A major portion is in young trees. Wander with me along the Delaware River, through the Poconos, follow both branches of the Susquehanna and cross their watersheds, travel the Roosevelt Highway across the State from east to west, dip down to Emporium, Williamsport, and Jersey Shore, climb Bald Eagle, Tuscarora, Laurel Hill, and South Mountain, and you will begin to understand why a friend of mine has proposed that Pennsylvania be renamed the Sapling State—because of its tremendous number of young trees (see Plate IV).

Reforestation is beginning to bear major fruit. Floods are becoming rarer and less destructive, for water is absorbed instead of rushing pell-mell riverward. Springs constantly fed by seeping water in turn fill the streams with a more constant current. Fish are accordingly increasing in substantial numbers due to steadier stream flow, seasonal restrictions, bag limits, and artificial propagation.

The reborn forest cover has stirred into being a new wild life. There may not be many 200-pound bucks or 40-pound wild turkeys about which early Quaker historians wrote so eloquently, but if you will visit around Stroudsburg or even ride on the train between Carlisle and Harrisburg about dusk in the summer you will frequently see deer browsing on the grass at the edge of the wood.

TEACHING WILD LIFE TO BE "WILD"

One often reads of tame animals heeding the call of the wild, but Pennsylvania now has many examples of wild creatures giving ear to the call of the tame, thanks to the experience of the State Game Commission in the raising of young wild turkeys.

The Commission has a large wild turkey farm in Juniata County. Wild turkey nests

are discovered in the mountains, the eggs brought in and incubated, and the young protected and hand fed until they are ready to shift for themselves.

Then they are placed in what are known as "hardening fields" and fitted out for the "wild" again.

Utmost care has to be taken to teach them to hunt for their living. Unless they are able to find food before getting too hungry and too discouraged, the lowing of cows, the barking of dogs, the crowing of roosters, and the rattling of machinery will act as guides back to civilization, and presently they will become part and parcel of some domestic flock and a Thanksgiving market victim!

Ernest E. Harwood, Executive Secretary of the State Game Commission, remarked to THE GEOGRAPHIC'S fact-gatherer: "I don't care how wild were the parents of a young wild turkey, once it has learned to depend on man for its food we have a real job to break its habit and to make it immune to the call of the barnyard.

"We have literally to wean the young turkeys by teaching them to hunt for their own food," continued Mr. Harwood. "In the place selected as a roost for them when liberated, we scatter some food. Every few days we make this food harder and harder to find, but never so difficult that real search does not reward their quest. In this way we teach them to rely on their own efforts and gradually bring them to a knowledge of where to look for natural food in true wild turkey fashion.

"We tried all sorts of plans before hitting upon this 'weaning' method. It was suggested that we turn them loose with some real wild turkeys. But these old residents of the hills would be all the way over the mountain before our neophytes would even get under way."

HUNTING LICENSES SUPPORT GAME LANDS

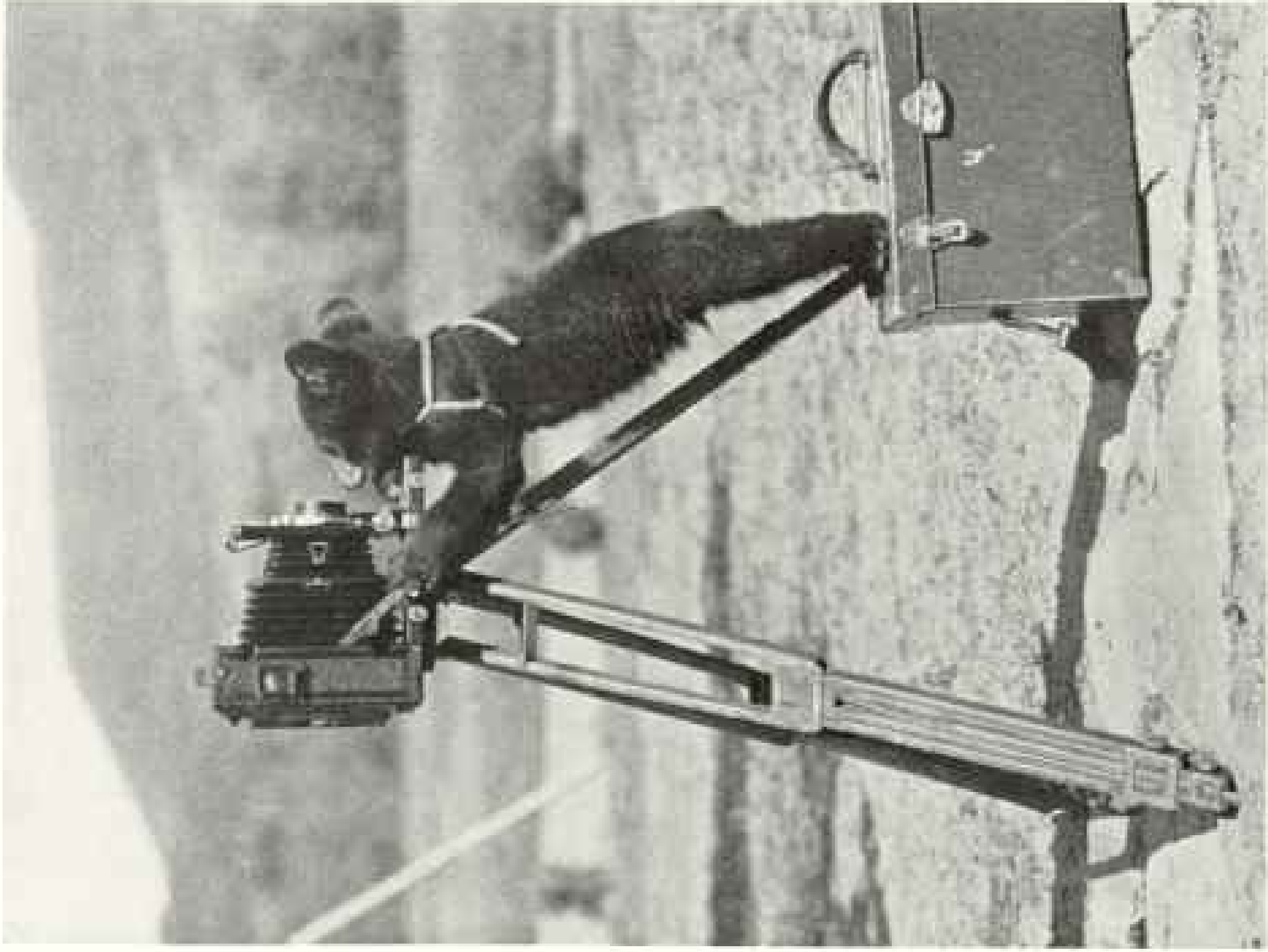
Pennsylvania is proud of its program of game protection. Its game lands and refuges have been purchased and are maintained through money contributed by sportsmen in hunting license fees.

Shortly before the turn of the century, sportsmen and conservationists became alarmed at the rapid disappearance of game and other forms of wild life in what had once been a vast natural zoo and botanic garden. They proposed the formation of a State Game Commission which the Legislature promptly created; for ten years its members



ICE FORMS IN MIDSUMMER NEAR COUDERSPORT!

On the hottest days enormous icicles festoon this "ice mine" on the Roosevelt Highway. Here Nature seems to reverse her own rules, for when colder weather arrives the ice melts. In winter cool air settles in cavellike spaces among the rocks and is stored there. When summer comes, this cold air escapes, forming ice at the mouth of the hole.



Photograph by Edwin L. Wickard

BLACKIE TAKES UP PHOTOGRAPHY, IN REVERSE

This friendly little black bear was so interested in everything that he lagged behind the rest of his family and became lost when joining a Civilian Conservation Corps camp near Montoursville. Mother failed to return for her cub, so camp members turned him over to the Fisher State Game Farm. In a recent year 586 bears were shot in the State (see page 12).



Photograph by Wood Aerial Surveys

SERENE IN A SYLVAN. SETTING RISE THE TURRETS AND TOWERS OF BRYN MAWR COLLEGE

Ivy-covered buildings are grouped around the rolling campus of this women's college where President Woodrow Wilson once taught. Katharine Hepburn, Helen Taft Manning, and Mrs. Jean Piccard are among its famous daughters. Across the foreground runs a row of dormitories. The college theater is in Goodhart Hall at the extreme left. Along the line of buildings (upper right) leads the Old Gulph Road, built by William Penn, whose coat of arms appears on the milestones. It was used during the Revolutionary War for travel between Philadelphia and Valley Forge.

served without pay or traveling expenses. Game protectors received one-half of the fines assessed against law violators when brought to justice, and of course they became as disliked by the populace as would a rural traffic officer who shared the fines a village magistrate imposed upon motorists.

Then in 1913 came the law providing for hunting licenses, the funds to be segregated from other State moneys and used exclusively for the purposes of the Game Commission, with all unexpended balances to go to the purchase, propagation, and protection of game and to the payment of bounties for noxious animals and birds. Pennsylvania thus was a pioneer in authorizing the special use of the sportsman's fees for game conservation.

In 1927 the license fee for resident hunters was increased to \$2, with the provision that 75 cents from each such fee be expended for the purchase and maintenance of game refuges and shooting grounds. This sum has grown until it totals more than \$400,000 annually.

In this way the sportsmen of the State have not only rendered immeasurable service in the protection of game and made their efforts entirely self-supporting, but they have also set a high mark in the art of eating the cake of hunting pleasure and at the same time continuing to have it in the increasing volume of game produced under protection and restriction.

In 1931, the latest year for which statistics are available, the bag of game in the Keystone State amounted to eighteen million pounds, valued at more than ten million dollars. The bag included nearly a hundred thousand deer, more than five hundred bears, three million rabbits, and nearly three hundred thousand ring-necked pheasants.

The game refuges of the State are always placed in the heart of public hunting lands, so that there may be a new crop of game each season for the free public hunting grounds environing them.

The Game Commission maintains game farms where it raises ring-necked and other pheasants, quail and other game birds, as well as wild turkeys, and from which it distributes both young birds and eggs. It annually purchases about 50,000 rabbits and large numbers of pheasants, quail, Hungarian partridges, etc. (see Plate VI).

An eminent game conservationist of the Keystone State has drawn a delightful pic-

ture of life in the forests before the white man came to upset the balance of Nature.

"In the work of policing, protecting, and preserving the forests which stood here when Columbus arrived, birds and beasts served each in his sphere, performing a useful work for which the Great Spirit created him. Bears, the white-wings of the forests, tore to pieces rotten logs in search of grubs, ants, and other insects, tore out stumps to make room for new trees, scattering the fragments on the forest floor, where they disintegrated quickly and became fertilizer.

"The deer, elk, rabbits, and other grazing and browsing animals destroyed weeds and pruned the trees, throwing the growth to the tops, making timber. Turkey, grouse, and other birds destroyed ground insects. The woodpecker family policed the trunks and larger branches of the trees, while the large family of warblers and other species of small birds cleansed and protected the foliage.

"The squirrels planted nuts and the birds distributed seeds, while the industrious beavers built dams which conserved the water. To the birds and mammals we owe our forests and to the beaver the finest meadowlands in Pennsylvania."

The return of the millions of acres of cut-over lands to forests and the fire protection Pennsylvania now throws around the wooded half of its area make it an ideal game State.

THE "COMPLETE ANGLER'S" PARADISE

The pollution of streams that accompanies wide industrialization and heavy manufacturing makes the conservation of the fish life difficult.

The State Fish Commission therefore has two problems—that of stocking streams in which limpid waters still flow, and the harder one of purifying the larger streams which are laden with the wastes of industry. Gradually sentiment is rising against pollution and more and more plants are keeping their wastes out of streams. Through legislation and law enforcement the Commission hopes ultimately to enable all streams to support fish life.

In the meantime it is busy stocking the unpolluted waters. In 1933 it released 541,000,000 fish, ranging from fry to adults, in the waters of the State. Of these more than a million were trout, all but a comparative few six inches long or more (see Plate XIX).

The Commissioner of Fisheries, Oliver M. Deibler, delighted the hearts of his

TODAY IN THE LAND OF PENN AND FRANKLIN



© Violet Oakley

IN PENNSYLVANIA MET THE FOUNDERS OF THE NATION

A mural painting by Violet Oakley in the State Capitol shows Washington addressing the Constitutional Convention. At the left are Robert Morris, the handsome Hamilton, and Gouverneur Morris. Around the table sit Madison, James Wilson, and Franklin. At the right are Dickinson of Delaware, and Randolph of Virginia, his head bowed.



VIVID FOLIAGE DECKS THE SUSQUEHANNA TRAIL

A white ribbon of concrete winds through forests touched with autumn fire in the mountains north of Williamsport. Lending their colors to the annual display are oaks, beeches, brilliant maples. Practically half the area of Pennsylvania—"Penn's Woods"—is forest covered.



© National Geographic Society

Fishy Photographs by Edwin L. Wisner

YOUNGSTERS NEVER PLAY HOOKY FROM THIS KIND OF SCHOOL

Game wardens teach novices the sporting game of catching fish on barbless hooks at the State fishing school on Spring Creek, in Centre County. In a sparkling spring at near-by Bellefonte are magnificent trout to which passers-by feed raw hamburger.

TODAY IN THE LAND OF PENN AND FRANKLIN



ITALIAN PARK AT HARRISBURG REPLACES A FORTRIDGING SWAMP

Careful landscaping and bright flower beds with thousands of bulbs turn an unsightly area into a beauty spot. Sixty-four varieties of tulips bloom in more than eleven acres of contrasting color. As many as twenty thousand persons have visited the park in a single day.

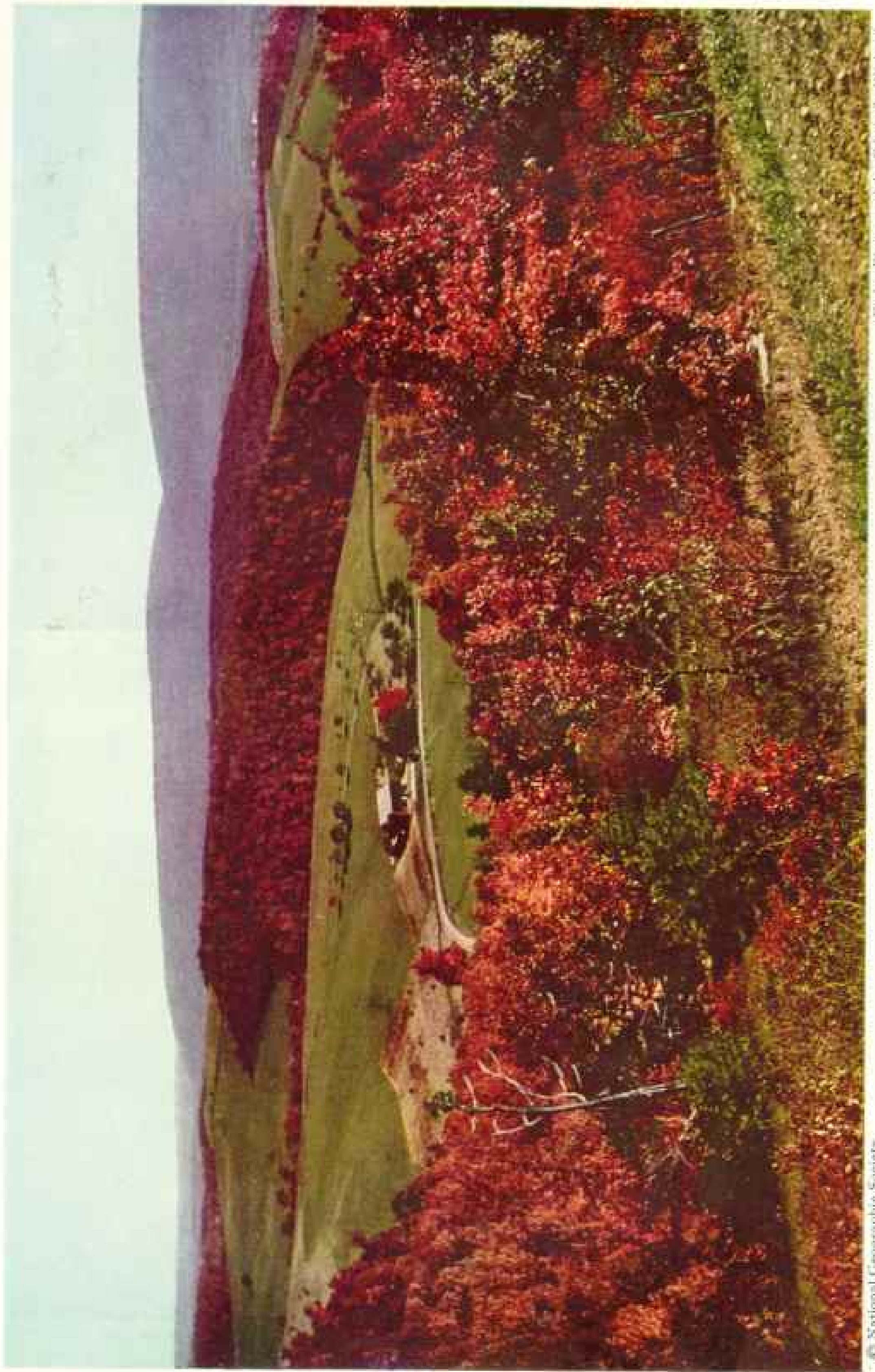


© National Geographic Society

Finlay Photographs by Edwin L. Wisner

GREEN PARKS AND PLACID RIVER FORM THE CAPITAL CITY'S SETTING

Harrisburg proudly refers to itself as a "crossroads of the East," a sobriquet justified since stage-coach days. In 1690 William Penn wrote that a city located on the Susquehanna would be "in the most convenient place for communication" (see Color Plates I, VIII, and XXIV).



© National Geographic Society

"AND NEVER MORE THE RUNNING FLAME SHALL SCAR THESE TIMMERED HILLS"

Finlay Photograph by Edwin L. Wisberd

An autumn panorama near Williamsport recalls the words of a poet, Douglas Malloch. Here conservation has met with much success, although his idealistic phrase has not been literally fulfilled. With the slogan, "Prevent Forest Fires, It Pays," the State is conducting a strenuous educational program. Among the causes of fires it lists lightning, spontaneous combustion, incendiarism, railroad operation, lumbering activities, and brush burning.



© National Geographic Society

Friday Photograph by Edwin L. Wisner

THE SUSQUEHANNA WINDS THROUGH A LAND OF FORGOTTEN DREAMS TOWARD WYALLEUNG

Near here exiled members of the French nobility and refugees from Toussaint L'Ouverture's revolution in Haiti sought to establish a new home. When the emigrants could safely return to France, they deserted their wilderness town, called Asylum. On this same river it was planned to establish a Utojan community patterned by Robert Southey and Samuel Taylor Coleridge. But, much to the latter's disappointment, funds could not be obtained to finance the project.



THE RING-NECKED PHEASANT IS AN "IMPORT"

Six years after their introduction into Pennsylvania, 250,000 of the handsome birds—British with a strain of Chinese blood—were bagged in a single season. Farmers and sportsmen raise many young birds from eggs distributed each year by the State.



© National Geographic Society

Finlay Photographs by Edwin L. Wisberd

THE WEDDING OF THE PAINTED DOLL—AT WILLIAMSPORT

Gay dolls, costumes, and favors are made in this factory to serve as colorful decorations for every festival season from Easter to Mardi Gras. The bright paper novelties, twentieth-century products of the lumbering industry, find their way into every State.



PENNSYLVANIA CHOSE THE PATRICIAN MOUNTAIN LAUREL AS ITS STATE FLOWER.

The Pocono Mountains with their flower-covered hillsides are becoming a Canterbury for modern motor pilgrims who can take vacations in the late spring. Laurel blooms luxuriantly here near Stroudsburg, although in some sections of the State hungry deer have almost exterminated it.



© National Geographic Society

Finlay Photographs by Edwin L. Wisard

TOYS MADE IN KANE GLADDEN CHILDREN'S HEARTS IN MANY LANDS

Shiny playthings are wrought from the hardwoods growing near this little "city set on a hill." It is in the heart of the "Big Woods," and atop the watershed between the Gulf of Mexico and the Atlantic Ocean. Just outside of Kane is a "big bad wolf," kept by a local doctor.



© National Geographic Society

Finlay Photograph by Edwin L. Wisberd.

SPRINGTIME BRINGS FLOWERS AND YOUNG MUSICIANS TO THE CAPITOL.

School bands which parade during "Music Week" are massed on the steps of the gray, domed building overlooking green lawns and radiant tulip beds. The capitol, dedicated by President Theodore Roosevelt in 1906, replaced an earlier structure which had been destroyed by fire. Chester, Philadelphia, and Lancaster served as early capitals of Pennsylvania; Harrisburg has been the seat of government since 1812 (see Color Plates I, III, and XXIV).

bucolic countrymen when he added the lowly sucker to the list of fishes propagated by his bureau. Speaking of the matter for the NATIONAL GEOGRAPHIC MAGAZINE, he said:

"Pennsylvania still has a lot of old-fashioned folk who find pleasure and recreation in sitting on the meadowed bank of a country creek, by a sucker hole. Give them a crony or two and their favorite pipe, and to them 'happy days are here again' as the suckers toy with the angleworms on their hooks and pull their corks under the surface. They pay just as much for their fun as the fellows who go after the gamy trout of the mountain stream or the sportive bass in the quieter waters."

The Commission maintains a fishing school at Spring Creek, in Centre County, during the trout season, where experienced wardens give lessons in casting (see Plate II). Barbless hooks are used. All but two fish caught must be put back and those two must be at least ten inches long. This is the rule for men. Special pools are set apart for the ladies, and they get an advantage of the rule in the length of the fish they may take and also in the number.

Pennsylvania is a "kingdom of contrasts" where the motorist can epitomize many aspects of the scenic beauty of America, and get a cross section of much of the life of the Nation.

KIPLING SINGS THE STATE'S VARIETY

After visiting the sixty-seven counties which constitute "Penn's Woods," trod the streets of all its teeming cities, gazed on its noble mountains, sauntered through all its glorious highland valleys, motored along all its fine rivers, traveled through its dense, young forests, inspected its finest farming areas, and studied its amazing industries, it becomes easy to understand how Kipling, after a transcontinental trip, could write:

"They are there, there, with earth immortal
(Citizens, I give you friendly warning);
The things that truly last when men and time
have passed,
They are all in Pennsylvania this morning."

From the heart of Market Street in Philadelphia to the famous "Point" in Pittsburgh and Logstown down the Ohio; from Easton and Bethlehem to Newcastle and Sharon; from busy Chester on the Delaware to thriving Erie on the Lake; from Matamoras, farthest east community, to Greene, the southwesternmost county; the historic, the eye-delighting, and the industrial are bound together in every prospect.

Where the commerce of Philadelphia throbs, William Penn lived; Benjamin Franklin wrought and philosophized; the Declaration of Independence had its birth; and the Federal Constitution was created.*

Where Braddock fought and was fatally wounded now lives a teeming population, and hard by are some of the principal industrial plants of the world. The Edgar Thompson Steel Mills, the Westinghouse Electric, and scores of others stand on ground that was within earshot of the fateful battle; and it is stated that a heavier tonnage moves within twelve miles of Braddock's Field than in any other area of its size.†

COAL, ORE, AND STEEL

The coal that comes down the Monongahela; the ore that moves from the Great Lakes; the iron and steel fabricated in the Pittsburgh District's scores of mighty plants; all the commodities bound east and west and north and south by rail and river—all these, the most concentrated tonnage in the world, pass by or within a dozen miles of the spot where the hostile savage turned back the English forces.

On the Ohio between Economy and Baden, where Dam No. 4 stretches across the river, is the vast plant of the Byers Company, manufacturers of wrought iron. In front of the plant offices is a marker which proclaims the site of Logstown, where George Washington, carrying the greatest "message to Garcia" of all our history, negotiated and bargained with the Half King and his confreres for an escort to Fort Le Boeuf.

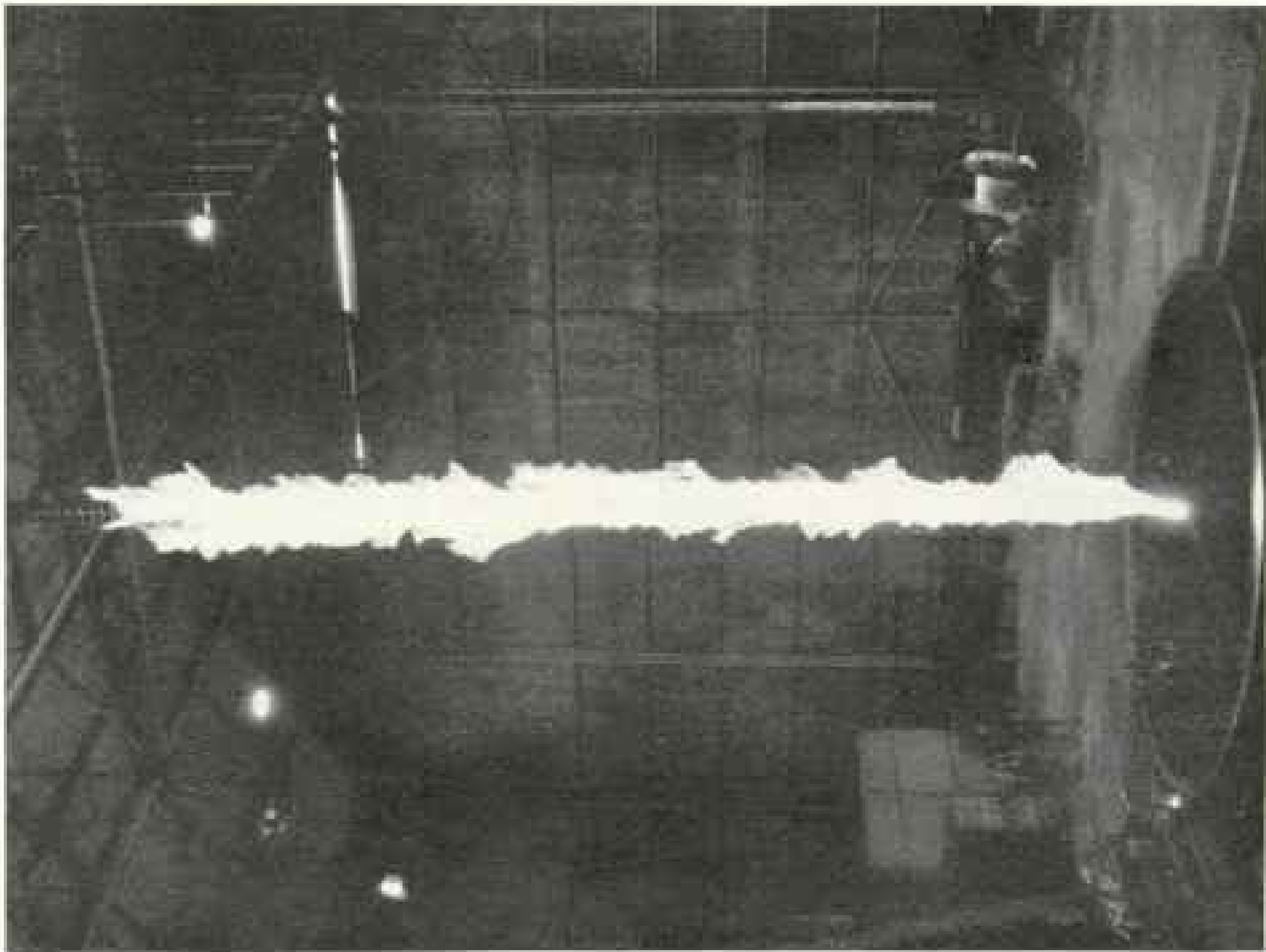
Across the bridge, a stone's throw down the highway, is a smaller marker proclaiming the site where Gen. Anthony Wayne had his winter camp during his campaign against the Indians of the upper Ohio.

In sight across the river is the factory-studded area where Queen Aliquippa had her cornfields.

Here where Indian conferences created tribal agreements and wampum belts sealed bargains between redskin and paleface, giant furnaces and mills now mix slag and purified iron and produce more than half of the Nation's wrought-iron pipe.

* See "The Historic City of Brotherly Love," by John Oliver La Gorce, NATIONAL GEOGRAPHIC MAGAZINE, December, 1932.

† See "The Travels of George Washington," by William Joseph Showalter, NATIONAL GEOGRAPHIC MAGAZINE, January, 1932.



A 43-FOOT FLASH OF MAN-MADE LIGHTNING

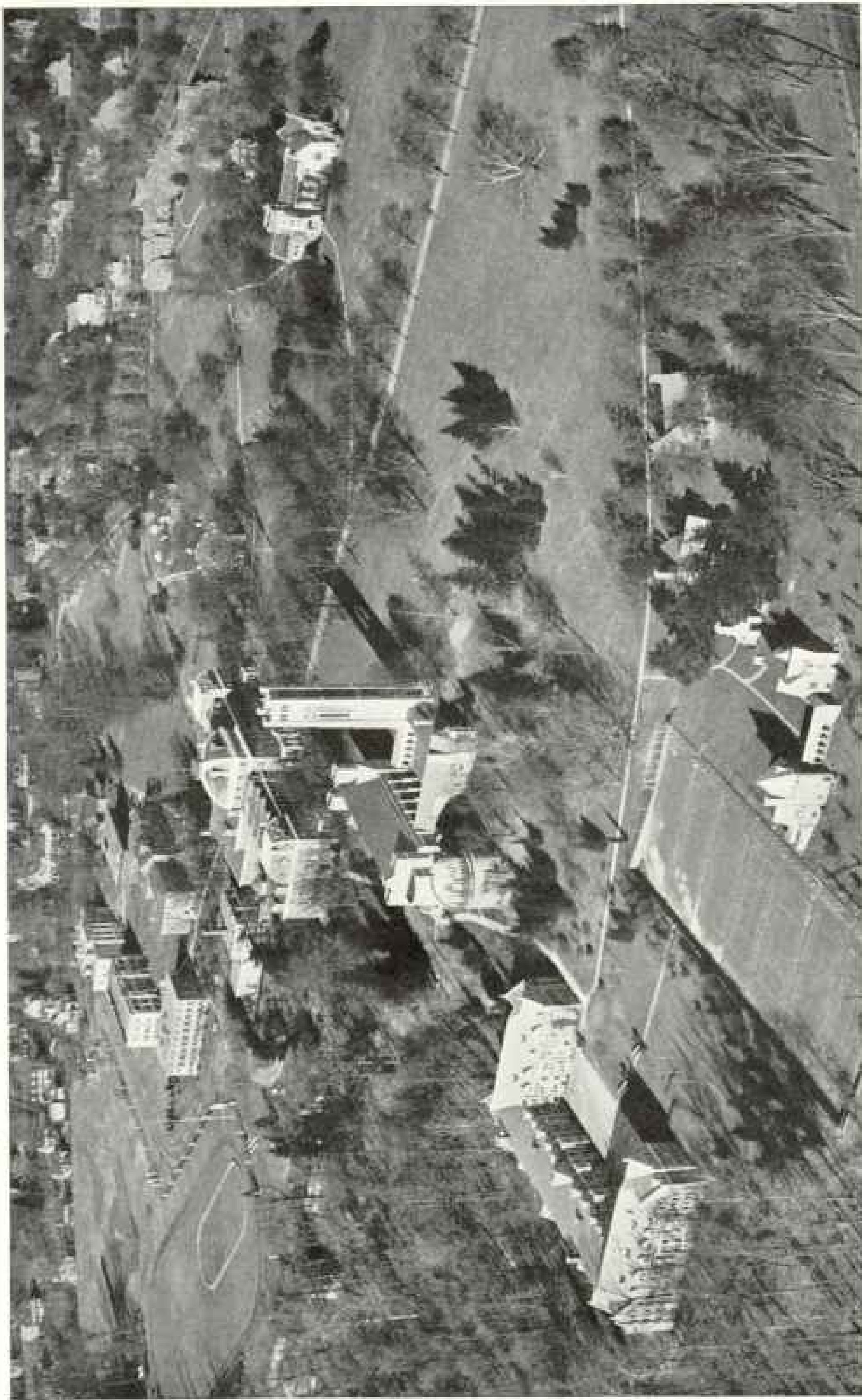
Creating lightning has become a daily routine with engineers of the Westinghouse Electric and Manufacturing Company in the high voltage laboratory at the Trafford City Works. Three million volts of electrical energy jump through space from one point to another in blinding brightness. The 60-cycle, million-volt flash, pictured, was maintained for several seconds. A real bolt from cloud to earth may be 200 times as great.



Photograph by Edwin L. Wisbard

"DRAKE'S FOLLY" LAUNCHED A MAMMOTH INDUSTRY

At Titusville a boulder marks the spot where a one-time railroad conductor, Col. Edwin L. Drake, sank the first successful oil well in August, 1859. In the year following the discovery, an oil boom began which rivaled the gold rush in the days of '49. From Drake's well only 40 barrels of oil a day were pumped, yet in the following year mushrooming shafts produced 500,000 (see text, page 57).



Photograph by Wood Aerial Surveys

SWARTHMORE COLLEGE IS BLAZING NEW TRAILS IN EDUCATION

This institution allows selected students, after two years, to do their work in small seminars without classroom tests. Swarthmore, founded by Quakers, takes its name from Swarthmoor Hall, near Ulverston, England, which was the home of Margaret Fell, the wife of George Fox who founded the Society of Friends. In the center of the picture rises the tower of Clothier Memorial Hall, with Parrish Hall, the main building of the college, just beyond it, and a group of Science and Engineering buildings near the athletic fields. At the lower left are the men's dormitory and Sprout Observatory, and at the right is the college library, with women's dormitories beyond.



Photograph courtesy Berkshire Knitting Mills

GIRLS BUSILY INSPECT STOCKINGS ON LEGLIKE FORMS

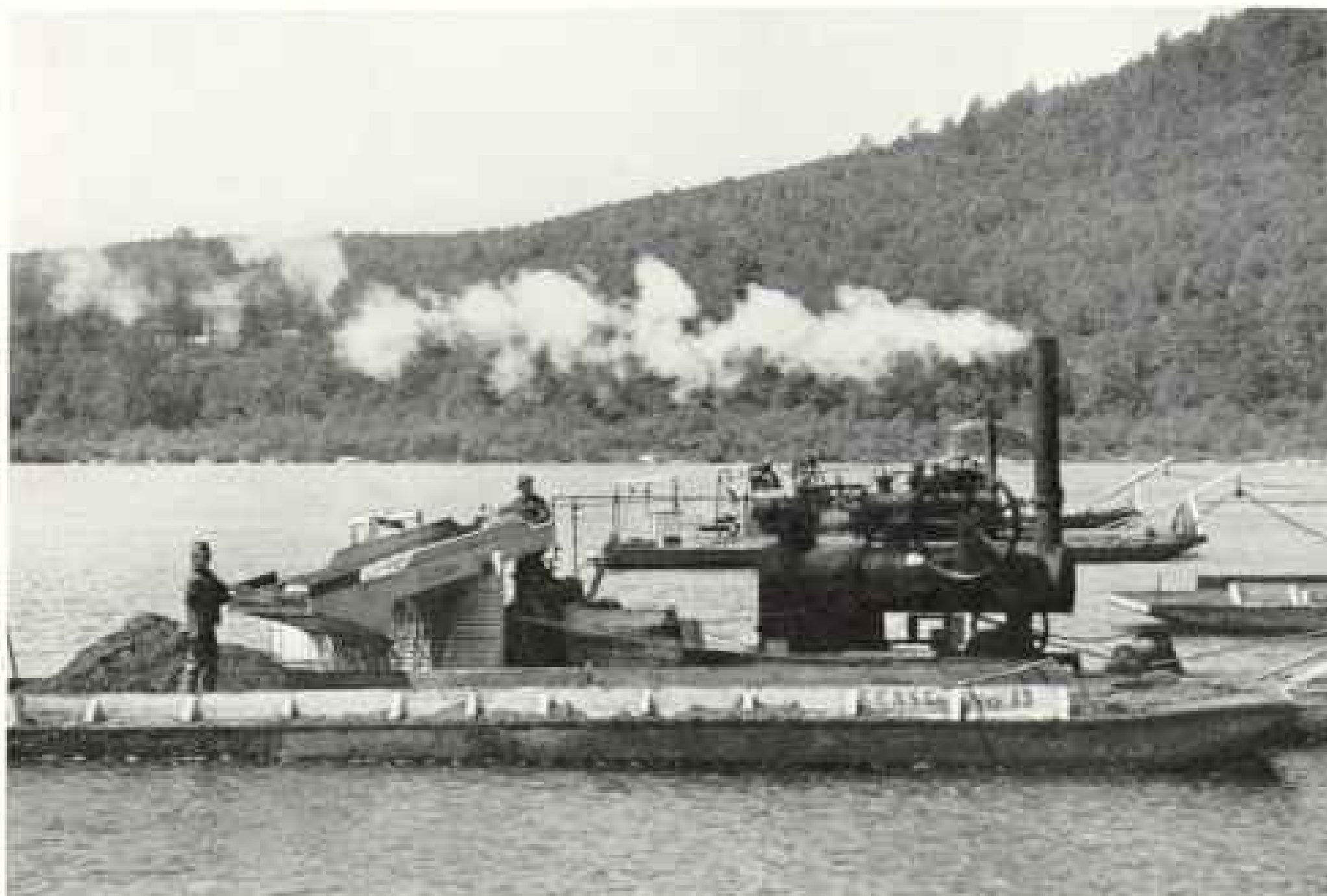
Hundreds of sharp-eyed inspectors are employed in this single examining department to insure a perfect product. Here in Reading are some of the world's largest factories for producing full-fashioned hosiery and the machinery for manufacturing it. This industrial city was founded by sons of William Penn.



Photograph by Edwin L. Wislud

SKILLED ARE THE HANDS OF THE PRETZEL BENDER

No machine has been invented which will give the pretzel its characteristic twist to the satisfaction of the owners of this factory at Reading. Dext feminine fingers do the trick. The little curlicues of dough are glazed by dipping in a hot soda solution before baking. The salty flavor of the pretzel, which stimulates thirst, comes from a surface covering of salt flakes sprinkled on.



Photograph by Edwin L. Wisard

THEY PAN THE SUSQUEHANNA FOR BLACK GOLD

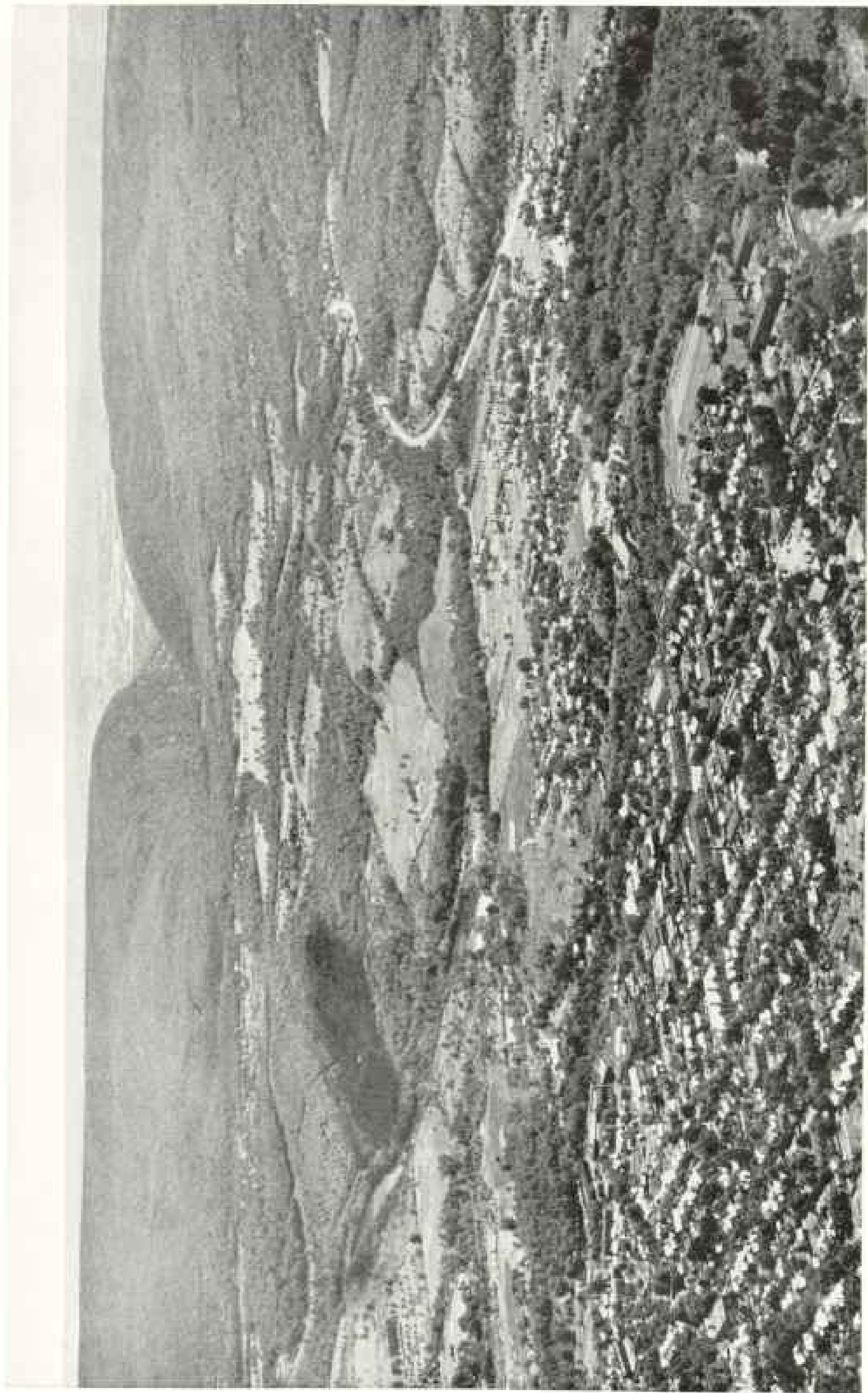
Scouring its way through the anthracite hills northeast of Harrisburg, the river brings down thousands of tons of coal as fine as rice and peas. Fleets of barges suck it up from the bottom with powerful pumps, drain off the water, screen out the silt, and carry the coal ashore to be burned at a big electric plant or to be sold locally.



Photograph by W. B. Bunnell

CROUCHING MINERS ATTACK GLISTENING ANTHRACITE WITH COMPRESSED AIR

In the Scranton region the coal lies between strata of rock after the manner of filling in a layer cake, except that the various veins and layers have been bent and twisted by ancient earth movements. Some of the danger and toil of the miner's life have been lessened in these modern times. Caps bear electric lamps instead of open flares, and power drills have superseded hand tools.



Photograph by C. S. Robinson

NEW JERSEY BECKONS TO THE AVIATOR THROUGH THE DELAWARE WATER GAP, MUTE REMINDER OF THE POWER OF RIVERS

Breaking the Kittatinny Range, the notch carved by erosion in the dim geologic past serves as a natural gateway between two great Commonwealths, New Jersey and Pennsylvania. Stroudsburg, in the foreground, once a frontier fort, lies between the Gap and the Pocono Mountains. It is here that the Laurel Queen of the Poconos is crowned (see Color Plate XX).



AIR-MINDED PITTSBURGH OFFERS A SPACIOUS HARBOR FOR SHIPS OF THE SKY

At this progressive city, where Samuel Pierpont Langley attempted a flight in a flying machine in March, 1891, the splendid Allegheny County Municipal Airport provides facilities which would amaze that courageous aviation pioneer. The field covers 470 acres. Runways are paved with slag and tar. Leveling the area entailed one of the biggest dirt-moving contracts ever let in western Pennsylvania. This modern airplane depot, with its radiating highways and parking spaces, is an aerial cross-roads between bustling Pittsburgh and other big cities, now hours and minutes away instead of weeks and days.

The main highways for the most part hark back to buffalo days. It is not too much to say that the buffalo first marked the route of the Pennsylvania Railroad's four-track system across the State, or that bison trod the first paths which eventually blossomed forth as the Lincoln Highway and the Old National Trail.

After the buffalo, came the Indian. Here and there he departed from the bison's route to suit his own needs; these departures, however, usually were mere cut-offs made where the Indian was willing to accept a steeper grade in order to make his trail a little shorter.

Then came the white man. As long as he used the pack horse, the Indian trail suited his purpose. But when he brought his wagon, grades became again as important as distances, and he followed the buffaloes more closely than he did the Indians.

OLE BULL'S PROMISED LAND

Everybody knows the stories of Gettysburg (see Plate XXIV) and Valley Forge, but how many know the story of Ole Bull and his castle in the wilds of the big woods of the Kettle Creek country? Every travel folder and historical map tell of the chief points of interest in Philadelphia, Harrisburg, Pittsburgh, and Erie, but who hears of the birth and boyhood days of Robert E. Peary spent at Cresson, of Prince Gallitzin's superb work in the heart of the Alleghenies, of Horace Greeley's Utopia, or of the French settlement at Asylum, with its Queen's Palace, whose queen never came but marched to the guillotine instead?

Likewise, everyone knows something of the oil romances of Titusville and Oil City, but how few know of the rejuvenation methods in the Bradford field now in full swing!

The story of Ole Bull's hapless adventure in the heart of the Big Woods, where the Viking virtuoso dreamed his dream of "a new Norway, consecrated to Liberty, baptized with independence, and protected by the Union's mighty flag," is one that stirs the heart of every admirer of the artist.

During his concert tours through the South, Ole Bull had encountered many of his countrymen, whose efforts to acclimate themselves in balmy areas than the vigorous lands of their birth had brought them privations, hardships, and ill health. Their appeals had touched him. Later, when touring northern Pennsylvania, he found in

the heart of Potter County a large area reminiscent of Viking land itself. He bought it and started to build there his "new Norway."

Some 800 of his countrymen flocked to his haven in the heart of the mountains. Three hundred houses, a store, and a church were built. For himself, he erected a rustic castle of unhewn, unmortared stone on a little bluff overlooking Kettle Creek.

In the intervals between concert tours, the violinist would go among his people. There he would seat himself on the ramparts of his castle, and "reproduce the rush and roar of rapid streams, the frolic of the winds through the rocky glens, and the tempest's crash on the mountain top."

To this day as one motors down the historic old Coudersport and Jersey Shore Turnpike, past the hamlet of Oleona, one may see the remains of the old castle and fancy he hears Kettle Creek and its rocky glens echoing back the music that imitated them fourscore years ago.

There is a Civilian Conservation Corps camp situated across the creek and under the bluff surmounted by the remains of Ole Bull's castle. As if inspired by the memory of the virtuoso, the boys of that camp have repeatedly been awarded the highest honors within the gift of the Corps (see page 43).

All went well with this new Norway of America until one night when Ole Bull was entertaining some friends in his castle. A messenger rode up and carried a notice from the actual owner of the property. The men who had sold it to him had no title. The real owner was a Philadelphia merchant.

For five years Ole Bull fought a losing battle in the courts against those who had sold him land they did not own, earning the costs of his suit by his concerts. In the end he got small damages. But meanwhile the colony had perished, and the ruins of the old castle, now owned and treasured by the State, are all that remain.

A CHÂTEAU FOR MARIE ANTOINETTE

Traveling up the north branch of the Susquehanna River from Wilkes-Barre to Towanda one comes, near the mouth of Rummerfield Creek, to a spot of romantic interest; for it was there that refugees of the French Revolution started a town where they would be free from the alarms of war and permitted to work out their destiny in a Nation whose battles they so recently had shared. The new settlement was called

TODAY IN THE LAND OF PENN AND FRANKLIN



ALLEGHENY OBSERVATORY WAS A PIONEER IN GIVING OUT CORRECT TIME

An accurate astronomical time service was developed by the late Dr. Samuel Pierpont Langley, who became director soon after the Civil War. By selling this information to the Pennsylvania Railroad, he raised funds for further scientific studies.



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Finder Photographs by Edwin L. Wisner

HERE WASHINGTON CAME ON HIS WAY TO WARN THE FRENCH

The young Virginian bore dispatches bidding them retire from the basin of the Ohio River, which is formed by the junction of the Allegheny (right) and the Monongahela (left). Instead, they built Fort Duquesne, close to this spot, on the site of modern Pittsburgh, and war ensued.



RED AND PINK GERANIUMS AND CANNAS BLOOM IN PHIPPS CONSERVATORY GARDENS

Henry Phipps, who made millions in iron and steel, devoted large sums to public benefactions. His gifts to Pittsburgh include playgrounds, reading rooms, and public baths. Buildings of the Carnegie Institute of Technology in the background recall another Pittsburgh industrial Titan.



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Finlay Photographs by Edwin L. Wisner

SCHENLEY PARK'S VERDURE FRAMES A MEMORIAL TO GEORGE WESTINGHOUSE

The inventor, a native of New York State, was an adopted son of Pittsburgh, which has been the scene of many scientific triumphs. At first he was laughed at for his "impossible" plan to "stop a railroad train with wind," but the Westinghouse air brake became an international safeguard of life.

TODAY IN THE LAND OF PENN AND FRANKLIN



RESIDENTIAL ELEGANCE IS EXEMPLIFIED IN FASHIONABLE SEWICKLEY

Pittsburgh's growth in population from 464 in 1760 to about 700,000 today has been accompanied by an increase in beauty as well. These landscaped grounds in a choice residential section make the beholder forget that the city was once a pioneer outpost.



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Finlay Photographs by Edwin L. Wisheerd

PRIDE IN HOME OWNERSHIP IS REVEALED BY THIS FARMHOUSE

Beds of old-fashioned flowers add color and quaintness to a front yard which is typical of Pennsylvania's rural homes. The roomy old dwelling with its rambling porch stands near Johnstown, scene of the famous flood in May, 1889.

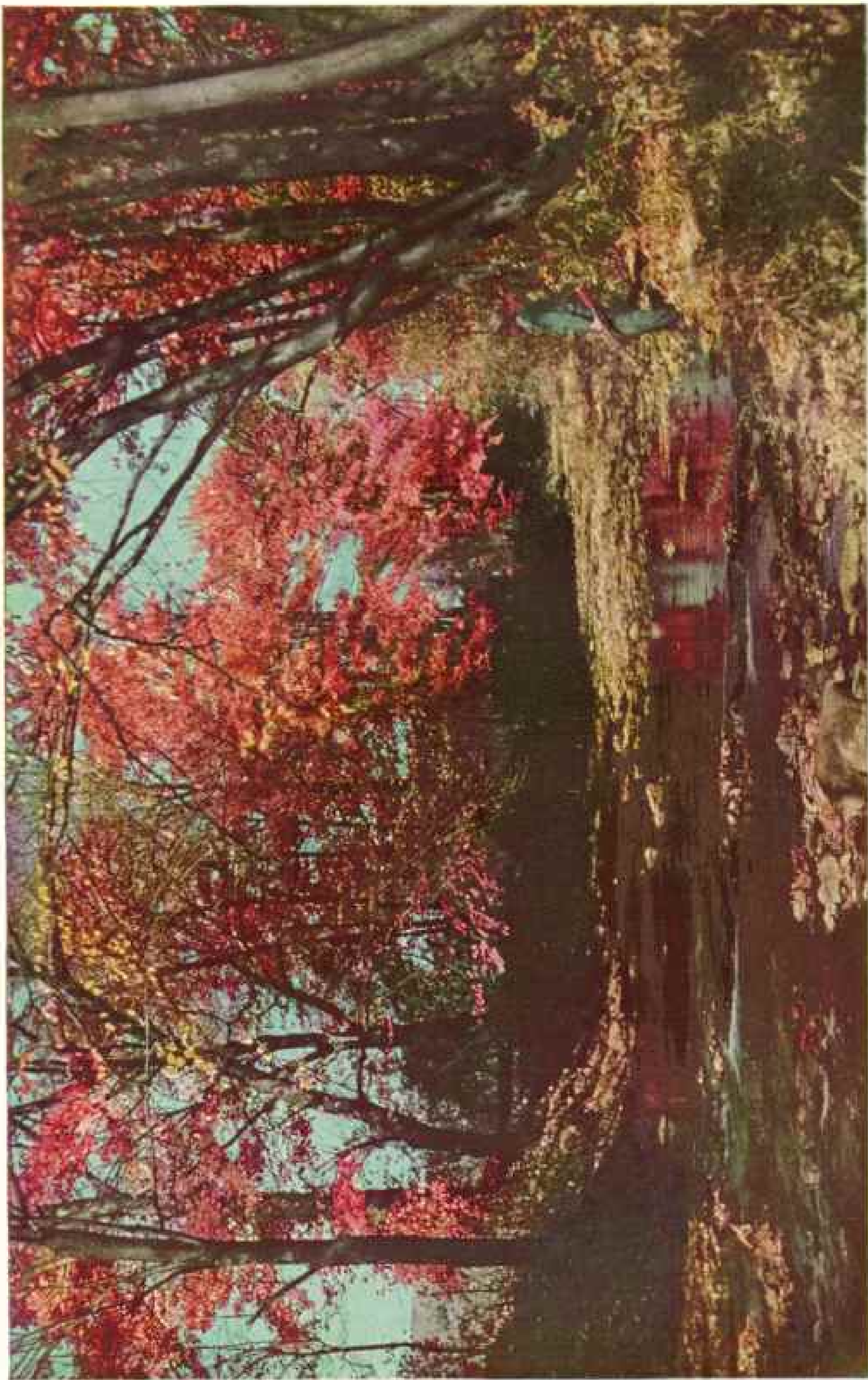


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Finlay Photograph by Edwin L. Wieherd

THE HOME OF THE UNIVERSITY OF PITTSBURGH IS A TOWERING SKYSCRAPER OF LEARNING

The new lofty structure, rising high above the lawns, trees, and flowers of Schenley Park, is impressive both for its architectural lines and its setting. Within the soaring ultra-modern walls are housed all but the medical and dental schools. Here the building is seen from the gardens of the Phipps Conservatory (see Color Plate X).



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TREES FLAUNT BRIGHT AUTUMN BANNERS ABOVE A ROCKY TROUT STREAM IN CENTRAL PENNSYLVANIA

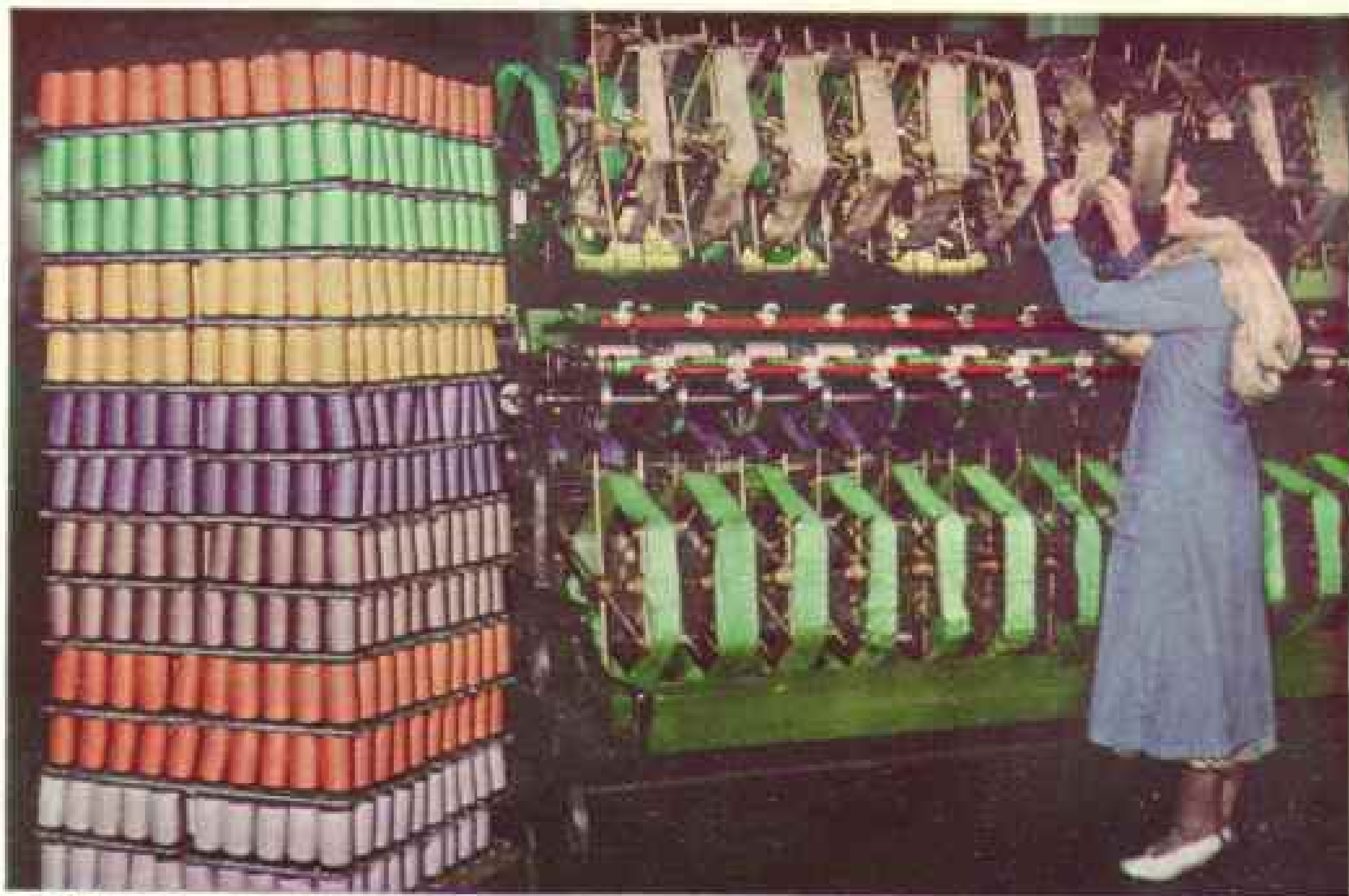
Fairfax Photograph by Edwin L. Wislizerd

The armed man is a peaceful hunter, but just so in early pioneer days a lone woodsman might have stopped to drink, his gun ready for lurking Indians. Montoursville, near by, stands on the site of a redskin village in which lived Madam Montour, half Indian, who spoke English, French, and numerous native dialects. This versatility and a reputation for wisdom and justice caused provincial officials to seek her as counselor and interpreter and to reward her with "a man's pay."



PENNSYLVANIA PLATES GRACE MANY A FESTIVE BOARD

The china potteries here at Newcastle and the glassware works at Jeannette are centers of industries for which the State has been noted since early in its history.



© National Geographic Society

Finlay Photographs by Edwin L. Wislizen

"SILK THROWING" IN A SCRANTON MILL IS A COLORFUL TWISTING PROCESS

After raw silk is degummed and dyed, it is sent to the throwers to be unreeled and twisted on bobbins. To transform a pound into warp thread requires some 264,000,000 spindle revolutions.

TODAY IN THE LAND OF PENN AND FRANKLIN



PENNSYLVANIA CONTINUES TO BE A HAVEN FOR VARIOUS RELIGIOUS SECTS
Erie now has a Russian colony of 2,000 "Old Believers," 17th-century seceders from the Russian Church, who settled here 45 years ago.



© National Geographic Society

Finlay Photographs by Edwin L. Wisberg

YOUTH AND BEAUTY MAKE MERRY IN THE ERIE COLONY

Folk songs are accompanied by the balalaika. Fasts are many and strictly observed. The men may not cut their beards and the women do not bob their hair.



© National Geographic Society

Finlay Photograph by Edwin L. Wisberd

MILES AND MILES OF COLORFUL FLOORING ISSUE FROM BIG LINOLEUM PRESSES

Linseed oil from the Argentine, jute from India woven into burlap in Scotland, rosin from the Carolinas, coloring ingredients from Africa and Australia, cork from Spain and Portugal—all meet in a modern factory at Lancaster and help make one of the world's most popular floor coverings. Here sharp-eyed inspectors examine each square inch.

Asylum. Hither came Louis Philippe, later King of France, as Duke of Orleans in 1796. Talleyrand also visited Asylum to cheer his fellow refugees, as did many other distinguished men of royalist persuasion, both from Paris and from Haiti (see Plate V).

The settlers had acquired their land from John Nicholson and Robert Morris. At last there was built a house to be the exile residence of Marie Antoinette, but before she could escape to America the French Revolutionists carried her instead to the guillotine. Today there stand many memories of the busy village.

A BENEVOLENT RUSSIAN PRINCE

In the heart of the Alleghenies, high above Johnstown and Altoona, there are markers, memorials, and institutions which preserve the memory of a prince who elected to become a pauper in order to serve the cause of Christ and to carry His message of benevolence and brotherly kindness to the humble mountain folk of the region. Prince Demetrius Augustine Gallitzin was born in Holland in 1770. His father was Russian Ambassador to the Netherlands and his mother the daughter of a field marshal of Frederick the Great.

At the age of 17 he picked up a Bible in a bookstore and began to study it, with the result that he became a convert of the Church. Later his father sent him to America for a season of travel. Once here he decided to spend a season in theological studies in Baltimore. Then, after ordination in 1795, he started out as a traveling missionary. Erecting a log church on the west slope of the Alleghenies, he traveled far and wide, visiting homes where bare floors were his bed, his saddle a pillow, and his food the coarsest mountain fare.

Prince Gallitzin lost his all. His father left what was to have been his patrimony to his sister. But he used the money his mother gave him for his mountain mission work, and at Loretto that work is still carried on in the fine missions, schools, and churches he founded.

Where the William Penn Highway starts down the mountain from Cresson to Hollidaysburg, there is a fountain erected in his memory over the spring at which he often stopped to quench his thirst as he traveled up and down the mountain in his missions of mercy and helpfulness. Nearly a century has passed since he died in 1840, but cen-

tral Pennsylvania still treasures the memory of the well-loved prince.

HORACE GREELEY'S UTOPIA

In Pike County, where Shohola Creek dances its foam-flecked way toward the Lackawaxen and the Delaware, there is not even a remnant left of Godleyville, the scene of Horace Greeley's dream of Utopia. In 1842 the famous editor decided to make a practical test of his doctrine of community ownership of property. He organized the Sylvanian Society, and built a sawmill, gristmill, social and dining hall, and all the other structures required in a village and its surrounding communal lands.

But things never went well. From the first the idea of everybody doing his or her share of the manual labor of the colony brought bickering and unhappiness. Finally on the night of July 3, 1845, there came a killing frost. Everything was black and dead the next day, and two days later Utopia was abandoned. Not a single settler had remained to lament its misfortune.

BRADFORD ENJOYS A QUIET BOOM

One who visits the Bradford oil fields in McKean County finds something new in producing petroleum. This field is one of the oldest in the entire Pennsylvania area, and until a few years ago was threatening to shut down, as it did not yield enough oil to make operation profitable.

Then came a school of engineers who believed the field could be rejuvenated by proper drilling methods. They proposed laying out oil leases in 200-foot squares and drilling a well at each corner of every square and in the center a fifth well. Those at the corners would be water wells into which water would be forced under carefully regulated hydrostatic pressure instead of being pumped out.

This pressure was to be so adjusted that it would push the water through the adjacent sands, driving the oil ahead of it and into the fifth well in the center of the square.

The plan has worked so well that the Bradford field, having only about five percent of the Pennsylvania oil acreage, is now producing upward of 50 percent of the output.

Bradford is reminiscent of the boom days of Oil City and Titusville. Wells are being sunk everywhere. There are, of course, no



Photograph by Edwin L. Wheeler

SHE TESTS THE STRENGTH OF A HAIRLIKE SPRING

Amazingly delicate instruments are employed in the Hamilton Watch Company plant at Lancaster. One such device is this hairspring vibrating tool. Another is the "time-microscope," which can detect a variation as slight as 1/8000th of a second (see text, page 55).

gushers. The spectacular has been succeeded by the steady grind. A regular yield of a few barrels a day over a period of years is much preferred to the old-time yield of hundreds of barrels a day and prompt exhaustion.

Motor oils made from Pennsylvania-grade crude oil are famous for their freedom from thinning out under heat and from thickening under cold. A trip through a Pennsylvania refinery with its bubble tower and its fractionating processes is a revelation.

In essence, refining oil is a process of heating and cooling. However, there are a thousand details involved. Filtering is also a phase of the operation, for fuller's earth

is widely used in the elimination of impurities. Dewaxing is another process—paraffin and petrolatum are the respective crystalline and amorphous waxes that are removed.

Much of the paraffin wax goes into barrels to be shipped to Europe and Asia. There it is made into candles, either to light the altars of ten thousand churches or the homes of millions who yet live in pre-kerosene times.

The old-fashioned batch method of refining is no more. Now there is a continuous flow of heated oil, and as each boiling point is reached the products vaporizing at that point go off, being conducted to condensers where they are liquefied—first as gasoline, then naphtha, then kerosene, and so on to the end.

**PENNSYLVANIA'S HOPE
DIAMOND IS BLACK**

Great events have happened and the lives of all Americans have been transformed in many ways since Obediah Gore, the Connecticut blacksmith,

moved to the Wilkes-Barre country and taught the neighborhood smiths how to fire their forges with anthracite; since Jesse Fell invented the grate for burning hard coal in homes; since Philip Ginter stubbed his toe on a piece of hard coal and thereby laid the foundations of the Lehigh Coal and Navigation system of coal mines and coal roads.

Even in the depths of the depression in 1931 the State was producing sixty million tons of anthracite and ninety-seven million tons of bituminous coal, or approximately a third of the Nation's entire coal output. When we consider how much the country owes to its vast supplies of sunshine stored



Photograph by William M. Rittase

MILLIONS OF BEANS PARADE BEFORE EAGLE-EYED INSPECTORS

Moving slowly on a brightly illuminated belt, each bean must pass a rigid inspection before reaching the giant ovens in the Heinz scientific kitchens in Pittsburgh. Absolute cleanliness is constantly stressed and the company even maintains a manicuring department for its workers (see text, page 56).

up in the earth through millions of years, we realize how great is its debt to Pennsylvania, for in service to humanity coal far outshines the magic wonders of Aladdin's legendary lamp.

Since coal was discovered in Pennsylvania, about four billion tons of anthracite and even a larger amount of bituminous have been mined and transformed into heat and light, power and wonder-working chemicals (see page 25).

As one travels through the coal fields, there are many sights reminiscent of a century of mining. But there are three scenes that will always stand out in my memory as particularly proclaiming the toil of the decades that have gone—two in the anthracite region and one in the soft-coal territory.

Driving from Tamaqua to Mauch Chunk, the motorist passes Coaldale and Lansford and then comes to Summit Hill. All through the anthracite coal country are huge culm

banks. Nowhere else do I remember seeing them as numerous or as systematized as they are down the valley of Panther Creek. In other areas many of the culm banks have been removed, but in this district the visitor seems to survey the debris of more than a century of busy mining. One wonders what the archeologist of future centuries will conclude when he comes upon the scores of hand-reared mountains in orderly array in the Panther Creek field.

Another trip I shall never forget was one made from Scranton via Shickshinny and Shamokin, Shenandoah and Hazleton, returning via Wilkes-Barre and Pittston. Mountainous culm dumps by the hundred, railroad yards by the dozen, laden cars by the thousand, big breakers by the score, strip mines by the square mile, and idle miners at every turn—here one realizes the gigantic labors that a century of operators and miners have performed since the pioneering days of coal.



Photograph from Acme

NINE-FOOT CADETS AND A FIFTEEN-FOOT LIEUTENANT STALK ACROSS THE PARADE
GROUNDS IN DADDY-LONGLEGS STYLE

Over the heads of boys of the Valley Forge Military Academy strides Lieut. Kenneth Hill, who made stilt-walking a part of the cadets' training to develop their sense of equilibrium. At Valley Forge General Washington and his men spent "the darkest winter in American history."

The third intriguing scene was in approaching Nanty Glo—a town on a byroad between the William Penn and the Benjamin Franklin Highways. As we came into the town, we read a road sign that explained the unusual name. It seems that a number of Welshmen had been attracted there by the coal supply. They wanted a Welsh name that would forever speak to posterity of the wealth of coal they removed from those mountains, and "rivers of coal" is the meaning of the town's name.

One sees in the anthracite fields every type of coal breaker, from the old dry breaker with dust everywhere and much of the coal wasted, to the latest Rheolaveur breaker where water is used from beginning to end, and where even the dust is saved.

A mixture of raw coal and slate, after it passes through the crushers, is carried down a trough in currents of water. In the bottom of this trough there are openings. Into these are introduced up-currents of water under sufficient pressure to support the coal as it crosses these openings. The slate, being heavier, sinks to the bottom of the box and on to the slate pockets. Small-sized coal goes through a succession of elevators and troughs, with the result that when it comes out it is free from impurities.

CHEMISTS REVEAL TREASURES IN SOFT COAL

Pennsylvania is the Nation's foremost producer of coke.

For generations the beehive coke oven had its day. It was a wasteful day, it is true, but the beehive oven fitted its time. It was not until the World War period that it relinquished first place to by-product ovens.

Then the cry went up for more and more of the chemicals hidden in bituminous coal to take their place in the explosives that were indeed "the power behind the gun" of war-making. Now the alchemist of coal is getting more coke out of a ton of coal made in a by-product oven than could be obtained in a beehive oven, and in addition he is able to capture enough ammonia and its compounds, light oil and its derivatives, gas, tar, fine coke, and other products to bring the total value of by-products up to \$3.86 per ton, all of which were lost in the old-time beehive oven.

Those were spectacular nights before the World War when one rode for miles through the beehive oven districts. Today those old ovens stand row after row along scores of

railroad tracks, some almost completely in ruins but others looking as if they might be fired again tomorrow.

At Clairton the United States Steel Company has built a tremendous by-product coking center whose capacity is greater than all the beehive ovens abandoned in Fayette, Westmoreland, and other southwestern Pennsylvania counties together. When one rides down through the Connellsville and Brownsville sections and notes the thousands of dismantled beehive ovens he once saw ablaze from the Pullman window at night, he feels that what the industry has gained in efficiency it has lost in picturesqueness.

ENORMOUS PIG-IRON AND STEEL PRODUCTION

Pennsylvania's rôle in the iron and steel industry is as remarkable as her position in the coal and coke industry of the Nation. In 1931 the Keystone State produced only one percent of the Nation's iron ore, but it turned out 28 percent of its pig iron and 32 percent of its steel.

With every 1,000 tons of pig iron requiring in its making about 1,800 tons of ore, 700 tons of limestone, 1,000 tons of coke, and 4,500 tons of air driven by powerful fans, one may easily imagine that its production is the Keystone State's heavy industry.

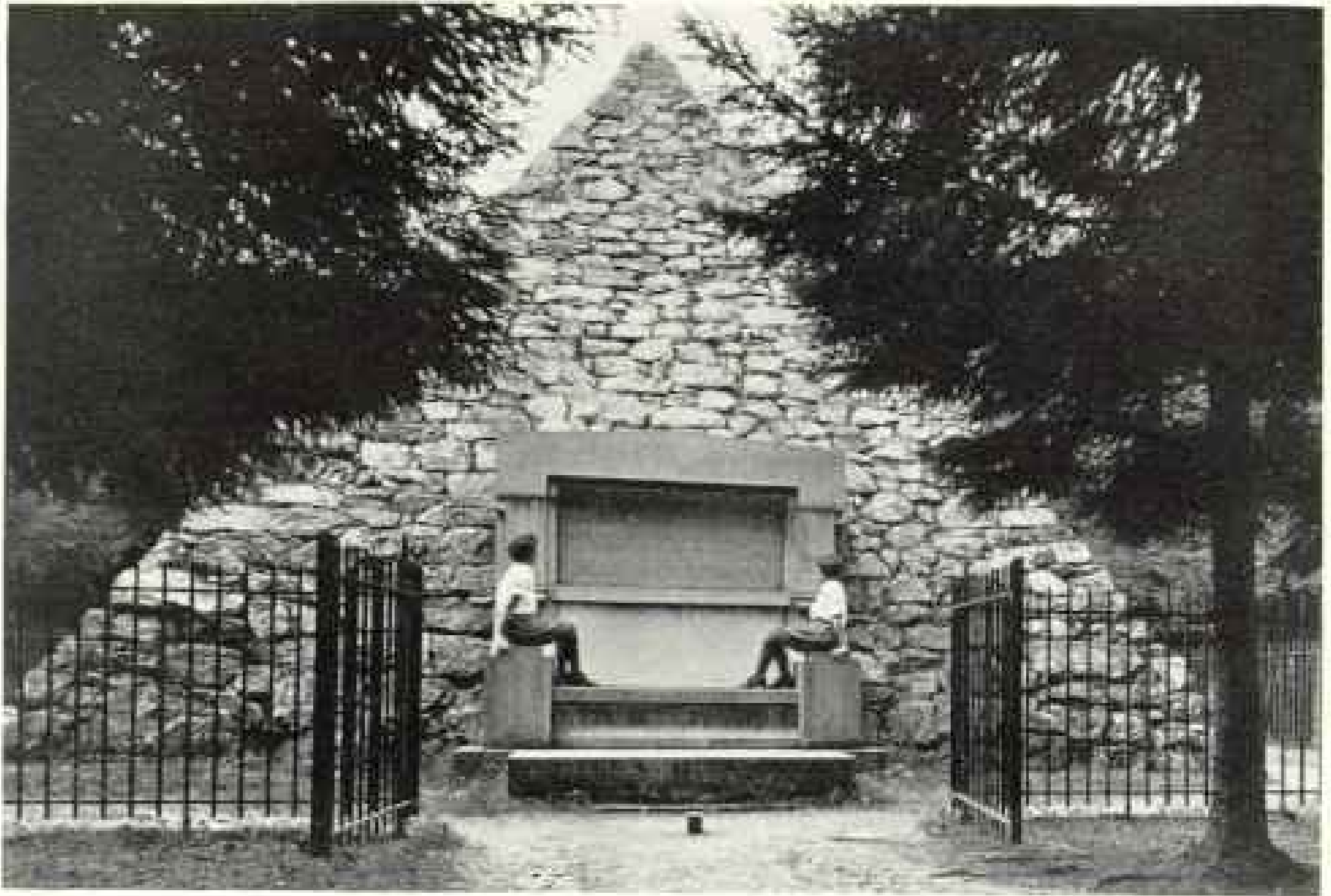
There was in the days of peak production no more inspiring night sight than the view from a high hill at Pittsburgh, looking down the Ohio and up the Monongahela and the Allegheny Rivers, beholding Titan at work, transforming ore into pig iron.

The era of the Bessemer process in converting pig iron into steel is largely gone in the Keystone State. No longer do these huge metallic eggshells send their streams of fiery sparks heavenward. The awesome "spitting" of the spectacular converter during certain periods of the blowing of air through its molten contents has given place to the open hearth.

Here enormous jets of gas flame are played over the molten pig metal, producing iron oxide which combines with added iron ore to form a basic slag—the "skim-mings" of the fiery caldron.

In 1931 Pennsylvania made 89.5 percent of her steel by the open-hearth process. Allegheny County alone produced 50 percent of the State's pig iron and 40 percent of its finished rolled iron and steel.

Nowhere in industrial Pennsylvania does one discover more progress in processes



PRESIDENT BUCHANAN ROAMED HEREABOUTS AS A BOY, WITH A BELL JINGLING FROM HIS NECK

The stone pyramid in the James Buchanan State Forest Monument near Fort Loudon marks the birthplace of the Nation's fifteenth chief executive. The house itself has been moved to near-by Mercersburg. To keep tab on the future statesman, his parents made him wear a turkey bell.



Photographs by Edwin L. Washed

ROBERT FULTON'S BIRTHPLACE SEEMS AS ENDURING AS HIS FAME

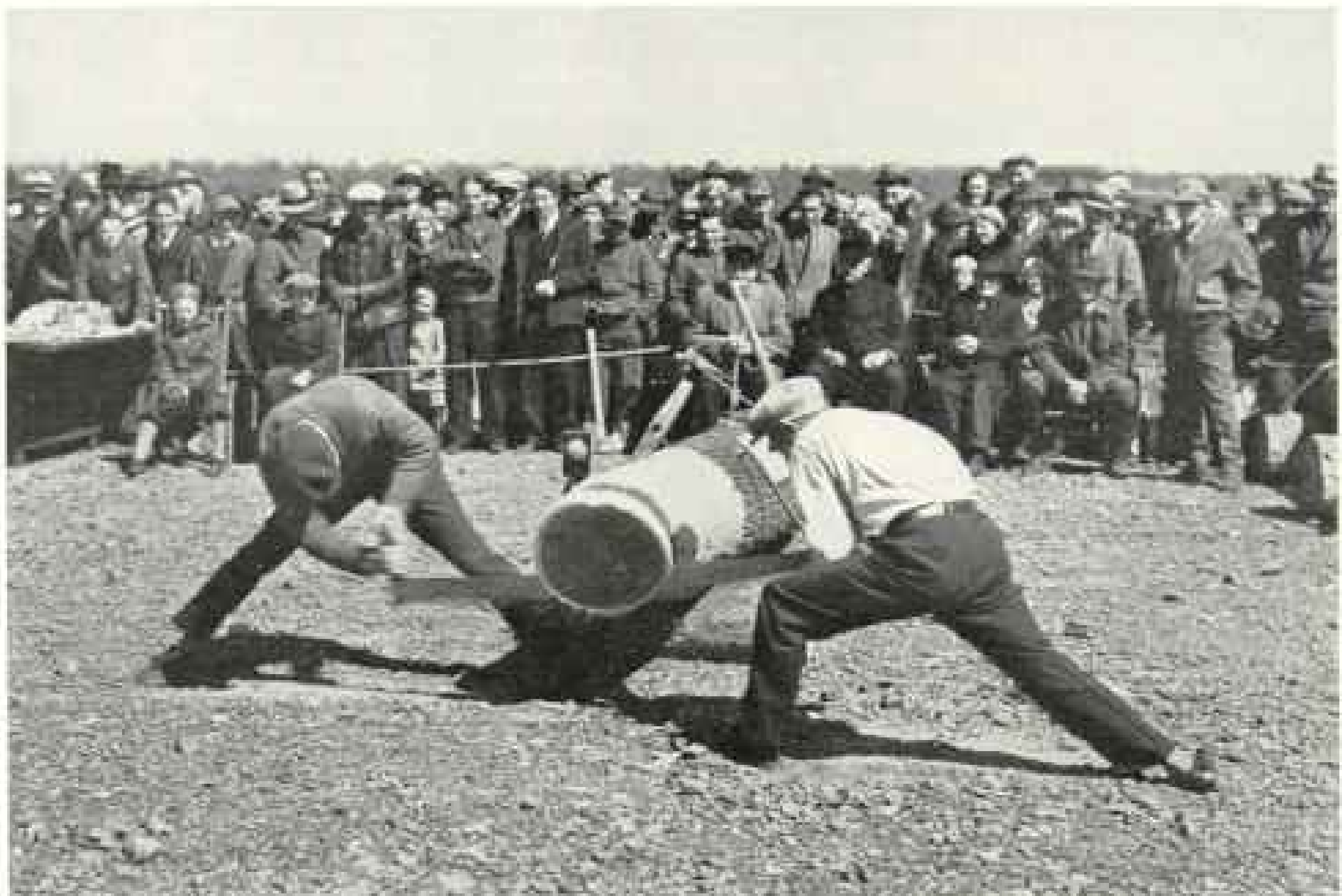
A century and seventy years ago the builder of the steamboat *Clermont* was born in this farmhouse near Quarryville. The comfortable old dwelling with its venerable trees has been in the possession of the Swift family for more than a century.



Photograph by Edwin L. Wisler

IN THESE WOODS OLE BULL FOUND MUSIC IN STREAMS, THE WINDS, THE TEMPEST'S CRASH

Grinning youths wave a welcome to this Civilian Conservation Corps camp near Oleona, named after the famed Norwegian violinist who tried to establish a New World refuge in Pennsylvania for his compatriots. The flag of Norway flies above the near-by ruins of his castle (page 28).



Photograph by D. Anthony Stewart

SAWING THE LOG IN 27 SECONDS WON A CHAMPIONSHIP

High up in the Poconos lumbermen grasp a saw or ax handle with the same enthusiasm as that with which a golfer grips his favorite club. At Skytop spirited contests are held and the contestants draw big galleries.

than in the cement industry. A pilgrimage through a cement plant 20 years ago was like working at the "bung-hole" of a threshing machine before the days of the straw blowers. There was dust everywhere. As one surveyed the horizon of Lehigh and Northampton Counties, it seemed that there were a hundred whirlwinds perpetually blowing and marking the sites of the cement plants scattered over the countryside.

Today it is different. Now the rock is crushed under streams of water and the final powdering of the stone produces a sludge of about the consistency of mush. This is introduced into the big rotary kilns—some of them as much as 120 feet long and 15 feet in diameter.

Here it meets a stream of powdered coal under a flame that gives a temperature of from 2,500 to 3,000 degrees Fahrenheit. The coal has been so finely ground that 95 percent of it will pass through a screen that has 10,000 meshes to the square inch. When the powdered coal, the sludge, the fiery heat, and a regulated amount of air meet, glass-hard clinkers are formed.

These clinkers in turn are the intermediate materials between cement rock and the finished product. They are mixed with heavy steel oval-shaped globules and conveyed into rotary grinders. Round and round these big machines turn hour after hour until all the clinkers have been ground almost to impalpable dust, in which form it is Portland cement.

Some of these big plants bag and load 40,000 sacks of cement a day, and yet the air around them is so free of dust that the flower gardens adorning the homes of the employees and the lawns of the company's plant match those of many a city park. The Lehigh Portland works at Sandts Eddy is one of the many modern cement plants in the vicinity of Easton.

GLASS MAKING IS A "HEAVY INDUSTRY"

Among all of Pennsylvania's dramatic industries there is none possessing greater fascination than plate-glass making. Such opaque substances as salt cake, pure limestone, and quartz sand go into a furnace in 3,500-pound batches, become liquid, and then pass out as a continuous sheet of plate glass which is cut, ground, and polished until it is as transparent as thin air.

Up the Allegheny River from Pittsburgh stands the little village of Creighton. On its outskirts is the largest plate-glass plant

in the world. The company owns at its back door the coal mine that supplies its fuel, for coal is used in such quantities that such a plant is always located near its fuel supply rather than close to its raw material.

Here are huge bins for storing salt cake, soda ash, glass sand, limestone, and other ingredients.

There is the giant furnace that holds 1,200 tons of molten glass. Come with me and, with a colored glass shield before your eyes, have a peep into this fiery furnace. Here are little hills and tiny mountains, survivals of the last 3,500-pound mouthful of material dumped in. There you see a miniature lake of incandescent molten mixture. Between the little hillocks of unmelted batch run rivulets of white-hot glass.

Over all roars a tremendously hot flame of 2,700 degrees Fahrenheit that melts sand and limestone and salt cake about as fast as a July sun would melt snow.

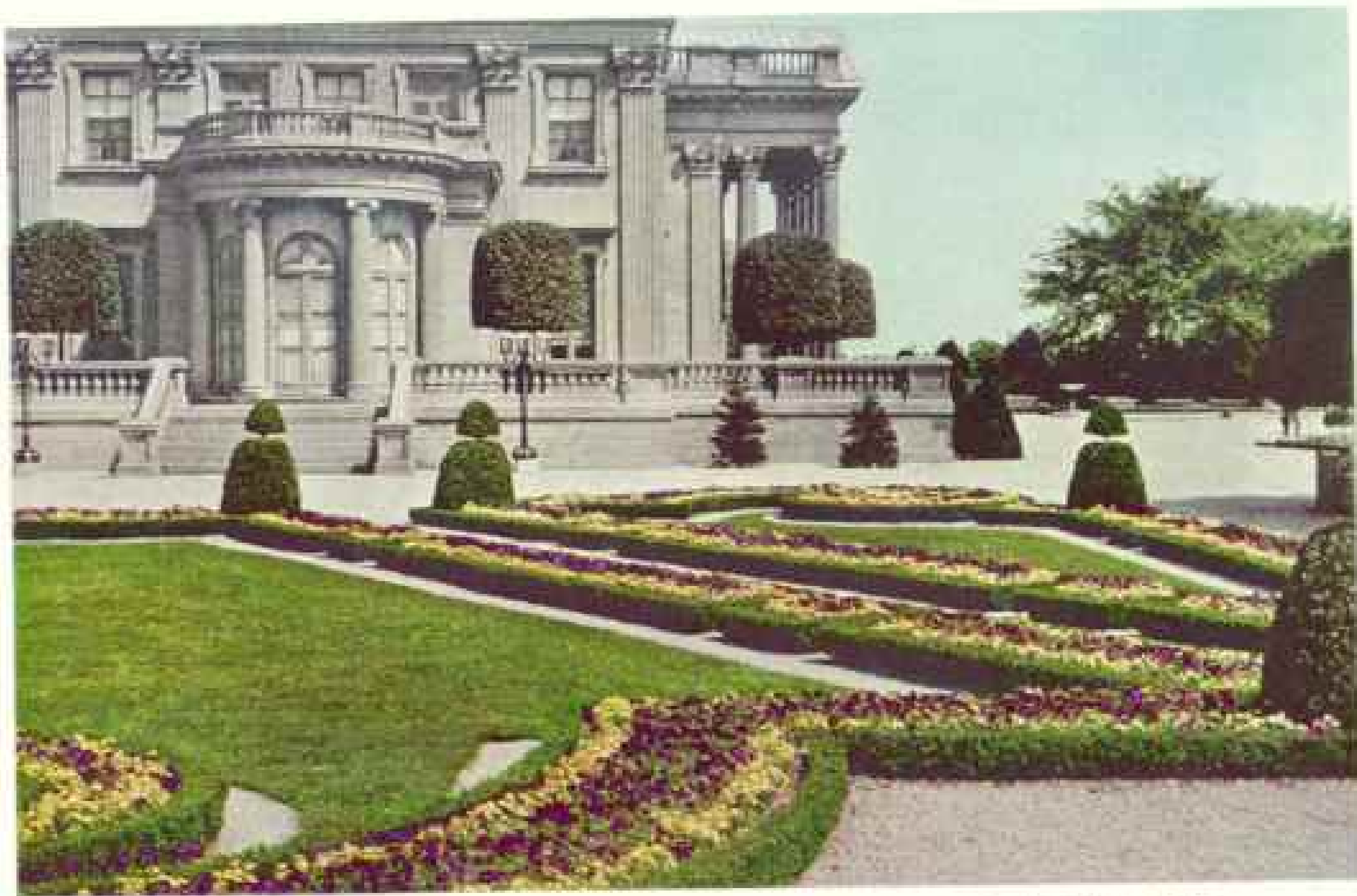
Twenty-one days of warming are required to bring the temperature of the furnace up to operating requirements. The marvel is that its linings can be made heat-resistant enough to stand temperatures that convert sand and limestone into liquid and to take that punishment for months on end.

At the rear of the furnace is a giant lip out of which the molten glass flows. Glowing hot, of doughy consistency, it passes under tremendous rollers, which convert it into a ribbon about 7 feet wide. Along this it travels through an annealing lehr for 400 feet. By now it is cool enough for the cutters who trim off the edges, cut it into lengths, and mark the defective spots.

Then a sort of mechanical spider with vacuum-cup feet swoops down on each piece, lifts it high overhead, and deposits it in a plaster-of-paris film on the six-ton cast-iron car that is to be its bed while passing under the grinding machines, where sand and emery smooth it down. From these grinders the plate passes under the felt-footed polishers where enough rouge to color the lips and cheeks of an army of women is used to produce that perfection of smoothness which gives perfect vision through your motor window (see page 3).

After the glass has traveled 125 feet in the fiery furnace, 400 feet on the cooling lehrs, 400 feet under the grinders, and 400 feet under the polishers, it is ready for its trip through the Duplate works where two pieces are cemented together with a Du Pont product and become safety glass.

TODAY IN THE LAND OF PENN AND FRANKLIN



CLIPPED BAY TREES ADD FORMALITY TO A GARDEN AT ELKINS PARK

Pennsylvania's wide variety of architecture is reflected by this Italian villa. In the 17th century shrubs would have been trimmed in the shapes of birds and animals; now a garden in the "grand style" requires only symmetrical designs.



© National Geographic Society

Finlay Photographs by Edwin L. Wisner

AN OUTDOOR LIVING ROOM DELIGHTS MODERN SUN DEVOTEES

Twentieth-century landscape architects have developed a distinctive style which avoids both the over-formal and the too crudely "natural" garden. In this tempting retreat hidden away in the Philadelphia suburbs, dark foliage has been used to heighten the effect of pink blossoms.



HARVEST TIME LEAVES LITTLE LEISURE FOR VIEWING THE SCENERY'

Long before the white man came to Lycoming County, Indians planted corn, cultivating it with crude hoes made of a sharpened stone or the shoulder blade of a moose.



© National Geographic Society

Finlay Photographs by Edwin L. Wisberd

INDIAN SUMMER COMES TO PENN'S LAND

Late autumn foliage forms the setting for a modern Lycoming County barn, which, true to Pennsylvania tradition, is painted red. Many old barns are still decorated with elaborate colored designs, although their owners have lost faith in the power of these symbols.

TODAY IN THE LAND OF PENN AND FRANKLIN



"OVER THE HILLS AND FAR AWAY"

Near Ralston, in Lycoming County, stream, road, and railroad wind through a narrow valley hemmed in by forest-clad mountains.



© National Geographic Society

Finlay Photographs by Edwin L. Wisard

TRYING FOR SPECKLED TROUT BELOW A WATERFALL NEAR STROUDSBURG

This solitary fisherman may learn anew that "There's no taking trout with dry breeches." Pennsylvania's Board of Fish Commissioners is effectively combating overfishing, deforestation, and water pollution.



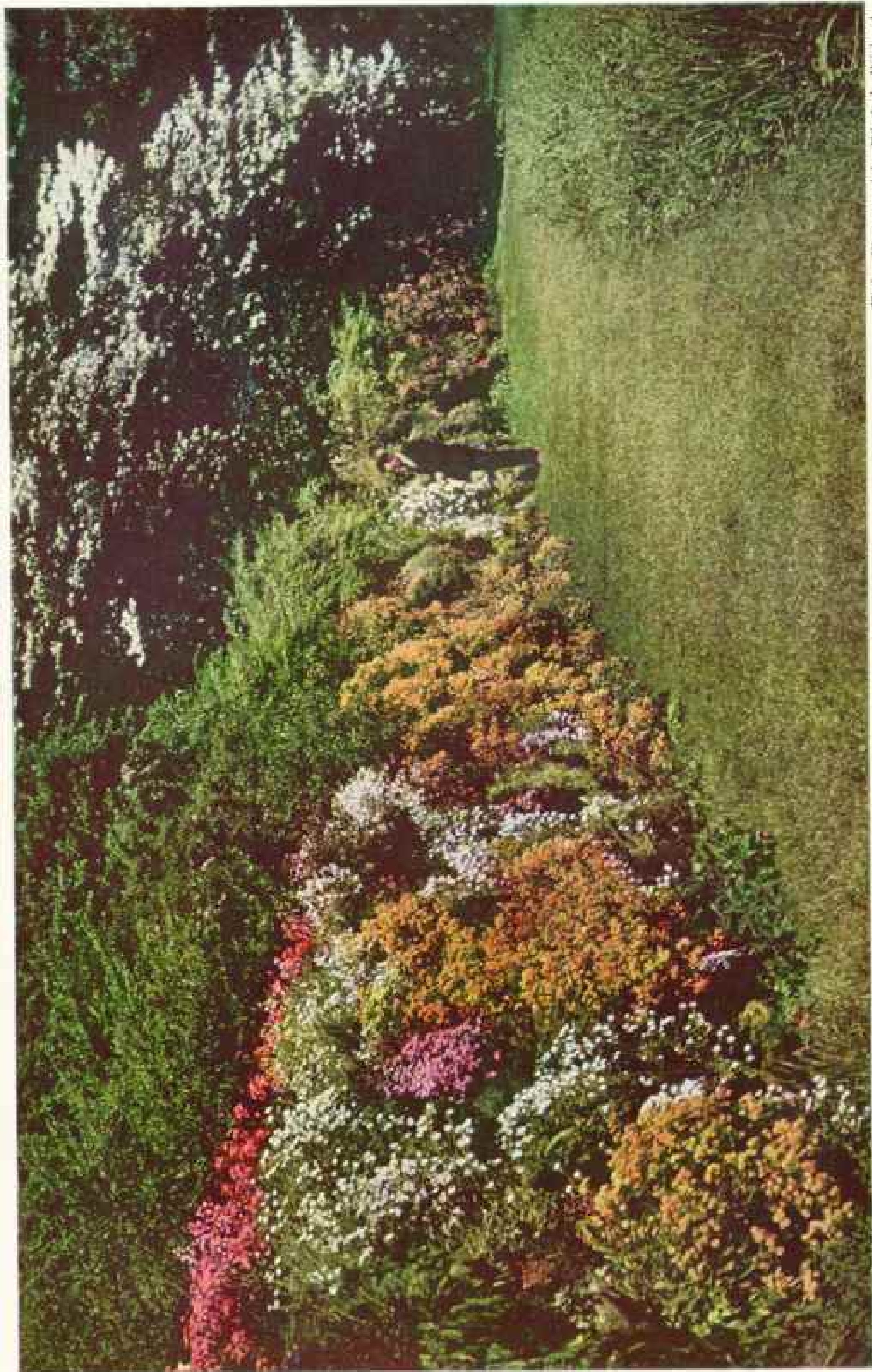
© National Geographic Society

A TERRACED POOL FORMS A THEATRICAL BACKGROUND FOR TULIPS
 Fish ponds, such as this one in a garden near Philadelphia, trace their ancestry to those maintained by medieval monks to supply them with food for fast days. Nowadays some owners with a taste for rustic melody keep bullfrogs in their gardens.



Finlay Photographs by Edwin L. Wisberd

WHEN THE LAUREL BLOOMS, THE QUEEN IS CROWNED
 Stroudsburg, in the annual festival held by cities of the Poconos, makes a major event of her blossoming (Plate VII). Similar fêtes in other parts of the country celebrate the flowering of the azalea, rose, rhododendron, apple, peach, Japanese cherry, and Chinese tung tree.



Floral Photograph by Edwin L. Wisford

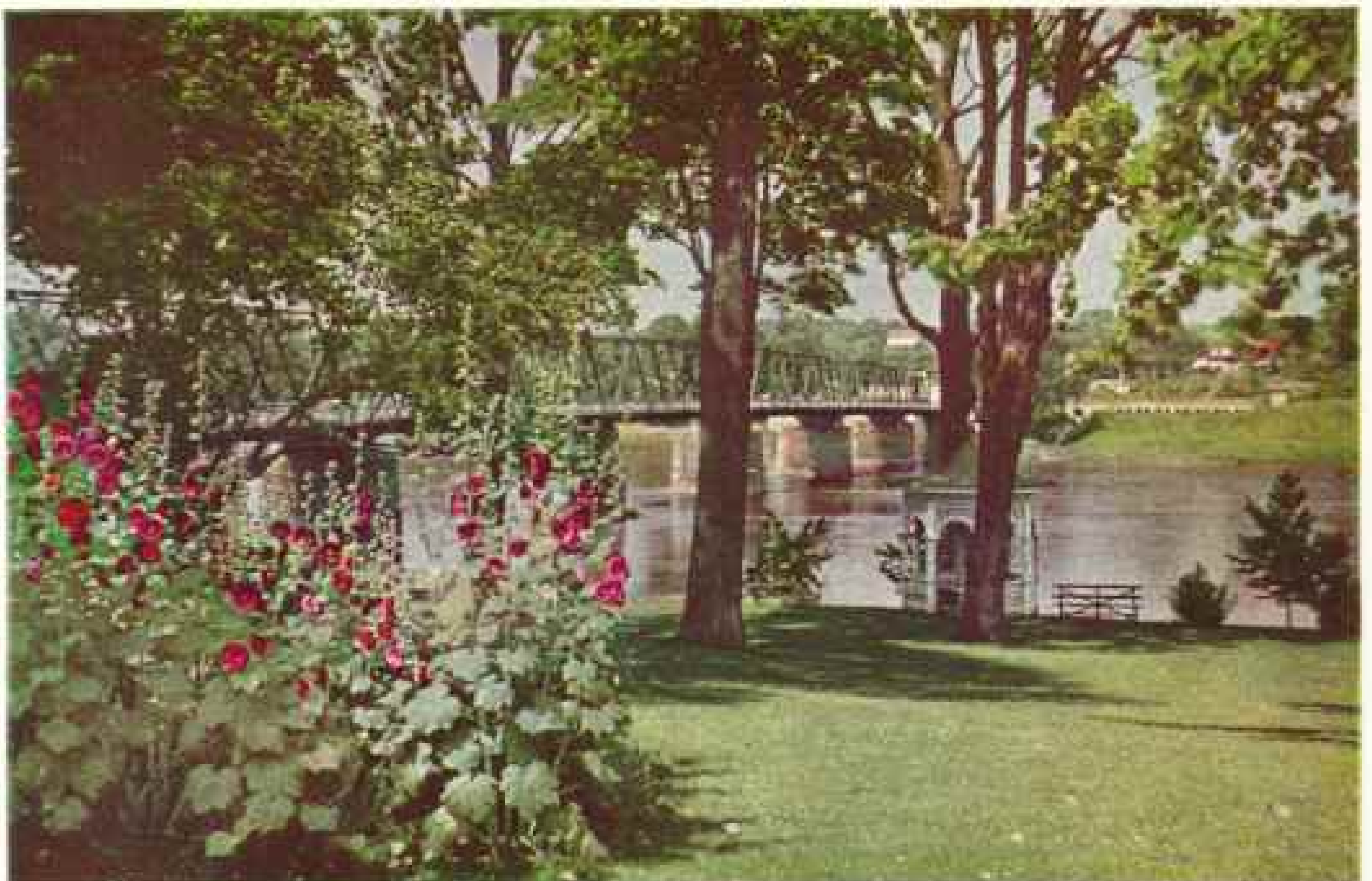
LUXURIANT BANKS OF FLOWERS RISE HIGHER THAN A MAN'S HEAD IN A PHILADELPHIA SUBURBAN GARDEN

In creating such a horticultural triumph, due attention has been paid to the familiar couplet: "This rule in gardening ne'er forget, to sow dry and set wet." Pennsylvania takes scientific as well as esthetic pride in her delightful gardens. In Philadelphia in 1728 the first botanical garden in North America was founded by John Bartram, who has been called the "father of modern botany." He traveled through Georgia and Florida as a botanist to King George III of England.



SCRANTON'S EVERHART MUSEUM OVERLOOKS THE LAWNS OF NOY AUG PARK

The handsome building houses an excellent collection of natural history material. A recent addition is an art department whose sculptures and paintings contribute to the cultural life of the "Electric City." Industrially, silk mills and cigar factories keep step with the coal output.



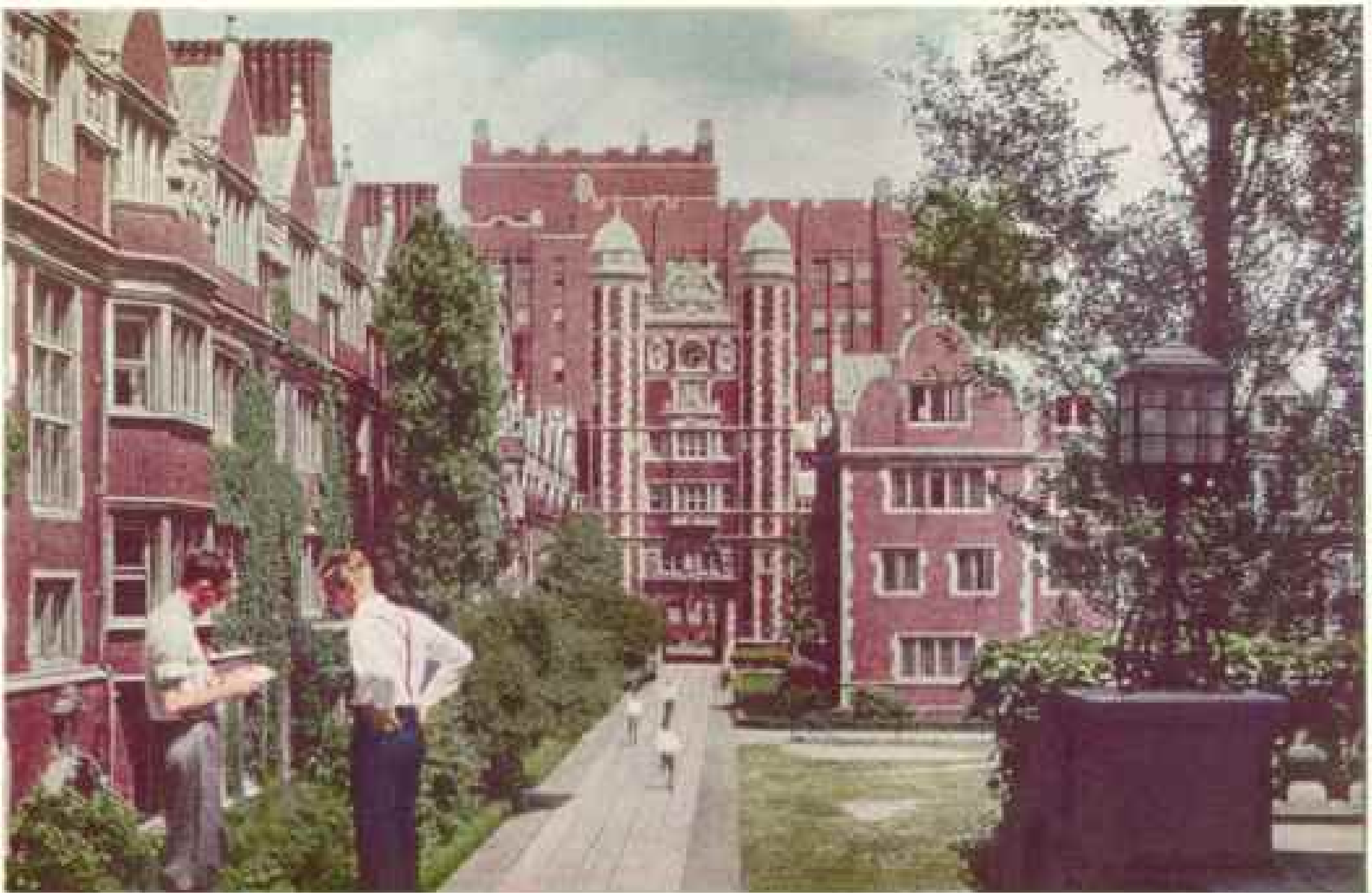
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Finlay Photographs by Edwin L. Wisberd

WHERE WASHINGTON CROSSED THE DELAWARE NOW STANDS A STURDY BRIDGE

Here in green, tree-shaded Washington Crossing Park in Bucks County, Pennsylvania, one can imagine the Continental soldiers making their slow and silent way across an ice-choked river to the New Jersey shore, to fall upon the holiday-making Hessians. The bridge connects two State parks.

TODAY IN THE LAND OF PENN AND FRANKLIN



THE UNIVERSITY OF PENNSYLVANIA PIONEERED IN AMERICAN EDUCATION

Some of the earliest courses of instruction in law, medicine, engineering, and music were given at the old Philadelphia institution, which began as a small "Publick Academy" founded at the instance of Benjamin Franklin. Today its student body totals 7,430.



© National Geographic Society

Finlay Photographs by Edwin L. Wisnerd

ENGLAND'S CHARM IS PORTRAYED IN THIS PHILADELPHIA GARDEN

Cypress, cedar, hemlock, and yew all find their way into landscaped grounds, but few evergreens are more pleasing than the bronze-tinted, cone-shaped arborvitae shown here. Later in the season other flowers will replace the flaming tulips.



© Violet Oakley

WHEN LINCOLN SPOKE AT GETTYSBURG

Upon the ears of the soldier, widow and orphan, politician, common citizen, fall the solemn, inspiring words of the Great Emancipator, speaking on Pennsylvania's historic battlefield. In this mural painting in the State Capitol at Harrisburg, Violet Oakley depicts the aspirations and fears written on the faces of a war-torn people (see Color Plate 1).

The final word in safety glass is the bullet-proof kind that is now being put in some banks and many armored trucks.

The artisans take five layers of glass, the first layer thin, the second one a little thicker, the third or middle one half an inch thick, and the fourth and fifth corresponding in thickness to the second and first, respectively. These they carefully cement together with a Du Pont product.

When an associate of mine visited the Duplate factory, one of its men set a piece of this glass on a heavy easel and provided him with a 45-caliber Colt revolver containing cartridges filled with powder 75 percent higher powered than ordinary small arm ammunition. He fired at twenty paces. The impact was so tremendous that the remains of the bullet were nothing more than little masses of white powder, with touches of black where its striking surface had been.

But the glass—it was still intact—shivered a little but shattered not at all.

HERSHEY, SPIRITUAL DESCENDANT OF PENN

In Pennsylvania philanthropies flourish as they do in few other areas upon the earth. The altruistic spirit of William Penn and Benjamin Franklin started an era of consideration for the unfortunate, and this spirit has borne fruit in every section.

Stephen Girard's college, whose story was told in "The Historic City of Brotherly Love," in the December, 1932, number of the NATIONAL GEOGRAPHIC MAGAZINE, is now finding a counterpart at Hershey, in Dauphin County.

Milton Snavely Hershey, born on a humble farm, justified the proverb of Solomon that a man diligent in his business would come to stand before kings. The farm on which he was born and on which he "hopped clods" many a dreary day lies within the chocolate empire he has built up.

Before he had finished the graded schools, young Hershey found employment as a printer's devil. At 19 he went into the candy business with a caramel wagon in Philadelphia. But a car collided with his wagon and ruined this enterprise. Then, with money a good old aunt gave him, he set out for New York. Failure pursued him there, and he went bankrupt. In 1886 he went back among his own people and established a caramel business in Lancaster.

In 15 years he built it up to a point where he sold it for a million dollars—at the age of 43.

He decided to retire and travel around the world. He and his wife got no farther than Mexico, where, tired of travel, he again felt the urge to go into active business.

He determined to return to the soil on which he was born and build a factory in which he would mix the pure milk of the great herds of Lebanon Valley cows with the fine flour of the roasted cacao bean and the sweet sugar of Cuba and make a milk chocolate bar that could be sold for five cents. In addition to this, he would make an almond bar.

ORPHAN HEIRS TO MILLIONS

By 1909 the idea had brought him so much money that his task thereafter became one of disposal rather than accumulation. He had no children—the orphans of Pennsylvania would become his future care.

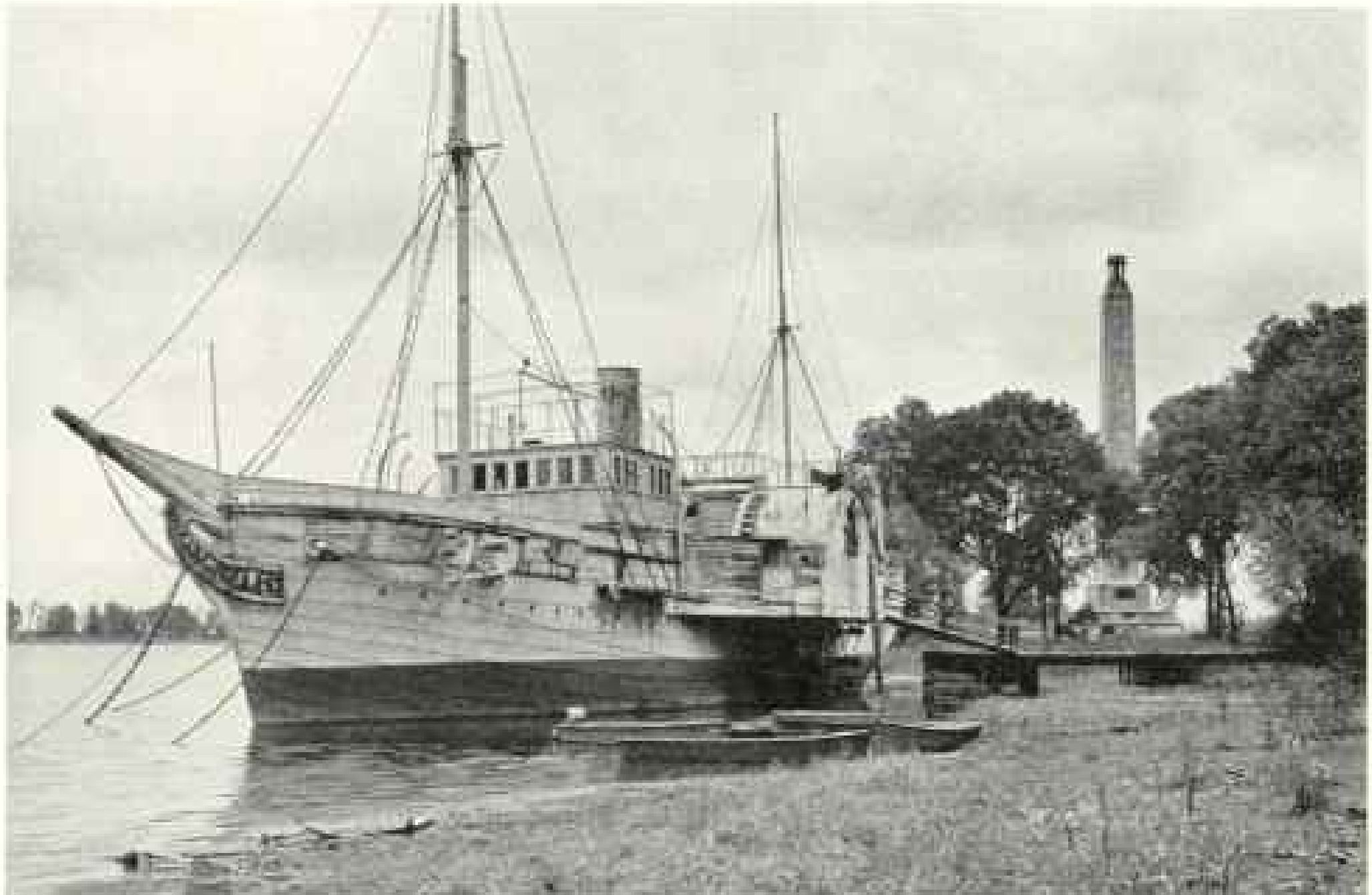
Today the vast estate is in the hands of the trustees for those orphans, and the Hershey Industrial School has property and endowment of \$65,000,000. The trustees for the orphans own 500,000 out of the 729,000 shares of the chocolate company. In addition they own a \$30,000,000 sugar plantation in Cuba, one of the finest suburban hotels in America, a 21-section department store, and vast community properties in the town of Hershey.

The chocolate factory uses 240,000 quarts of milk, three carloads of sugar, and several carloads of chocolate to make 625,000 pounds of chocolate products each day, and ships some forty carloads of sweets every twenty-four hours.

There are 9,000 acres in the Hershey holdings in Dauphin County. The 800 boys are scattered about over the countryside in 40 separate houses. Ten are cottages, each with a capacity of 30 boys, cared for by three house mothers. The other 30 are farmhouses for the boys over 12 years of age. Each is occupied by a farmer and his wife, who take their quota of boys to care for and to train in the art of doing chores. During the school year they go to school and at vacation time work on the farm.

As they grow older, the boys are permitted to choose whether they will fit themselves for college or learn a trade. The majority elect the latter, and whatever their bent, there is equipment in the school and work in the town to meet it.

At the age of 18 they are given \$100, clothes to last them a year, and the blessings of the school.



U. S. S. "WOLVERINE"—OUR NAVY'S FIRST IRON SHIP

Home at last after 83 years' service, the old side-wheel steamer was moored in 1917 near Commodore Perry's Monument on Presque Isle, opposite Erie. This valiant veteran bore the name *Michigan* until 1905, when she was rechristened with the State's nickname, *Wolverine*. Hull and engines were made at Pittsburgh and shipped overland by oxcart to Erie, where the novel craft was built and launched nearly 20 years before the Civil War.



Photographs by Edwin L. Wisheed

BEWARE—IF THESE FELLOWS HAVE CAUSE TO BE ON YOUR TRAIL

Members of Pennsylvania's famous State Police sharpen their aim and skill in a shooting match at Hershey. Here the State maintains a school for training its constabulary in marksmanship and in crime detection.

It is a matter of less than an hour's ride through a fascinating countryside from Hershey, the chocolate capital of the world, to Lancaster, the linoleum metropolis of America and the home of the famous Hamilton watch.

One sees shipments from all parts of the world being received at the plant of the Armstrong Cork Company—linseed oil from Argentina, burlap from Scotland woven of jute from India, gums from Africa and New Zealand, cork from Spain and Portugal, and rosin from the Carolinas and Georgia. And out of it comes carload after carload of floor covering of wear-ever type with destinations as remote as the sources from which the raw materials were gathered.

Let us watch the strange wedding of the ends of the earth in a floor covering.

Here in giant tanks the oil is boiled to remove all its impurities. Then it is conveyed to another building where it meets festoons of scrim cloth. Drop by drop it seeps through holes in the trough that carries it, and flows down over the top of each section of the big festoon. This continues for from six to ten weeks until every bit of the cloth is covered with a half-inch-thick layer of rubberlike oxidized oil. It is then cut in sections and ground up, after which it goes to other giant kettles where it is seasoned with gums, rosins, and other materials, and boiled again.

After this, the residue is poured out on the concrete floor and allowed to solidify. It is then cut into squares a foot to the side and stored away to "cure" for three or four weeks.

While all this has been going on, cork scraps have been converted into cork flour ground so fine that all of it would pass through a screen having 2,500 meshes to the square inch, 60 percent of it through bolting cloth having 10,000 meshes to the square inch, and about 30 percent through cloth having 40,000 meshes to the square inch.

Strange to say, this fine grinding does not rob the powdered cork of its resiliency, but rather gives it more of that property.

After the chunks of "beef" (as the cut-up slices of oxidized and rosin- and gum-impregnated cakes are known) are properly cured, they are ground again and then mixed with powdered cork and color pigments. Time after time the mixture is ground again and remixed.

Then it reaches the big calender presses where it falls on the carefully treated Scotch

burlap, into whose meshes and fibers it is pressed with such force that all the king's horses and all the king's men could not pull it apart.

From the big presses it moves into very tall, narrow stoves where it is hung in festoons again and baked until it is done to a turn, when it is neither too brittle nor too spongy.

Scores of amazing processes have been devised to inlay, print, and marbleize it, until today's linoleum patterns rival the art of the Persian rug, the handiwork of the tilemakers of Spain, and the product of terrazzo layers of Italy (see Plate XVI).

"THE HOME OF THE HAMILTON WATCH"

As the westbound traveler on the Lincoln Highway passes through the city of Lancaster and leaves behind the historic square where the capital of the United States stood for a single day, he comes to a large building set in the heart of a beautiful park. At first he concludes it is a woman's college of the old-time single building type. As he approaches, however, he reads a sign—"The Home of the Hamilton Watch."

For sixty years that company and its predecessors have been making watches whose accuracy as time-recorders has been famous in America and throughout the civilized world (see illustration, page 38).

It is amazing to see automatic machines turning out watch screws so small that they look only as large as an ordinary speck of dust, but when put under a microscope are seen to be real screws with perfect slots in their heads and accurate threads on their bodies. These little automatic lathes are given a long piece of wire and plenty of oil and then left to themselves. Hour in and hour out they work, cutting the wire into the proper lengths, machining each length until it takes the shape of a screw, making a slot in the head of each screw, and putting the threads on in exactly the right place.

There are a thousand delicate and exacting operations in the making of a Hamilton watch, from the enameling of the face of a tiny wrist watch to the making of a balance wheel that divides a day into 432,000 parts and does such a good job that its total error in the 24-hour interval may be much less than one-fifth of a second.

The Hamilton Watch Company has developed a new apparatus for checking the performance of its watches. This is known as the "time-microscope." It can detect



Photograph by Edwin L. Wiskard

HORSES, BUGGIES, AND "GO-TO-MEETIN'" BONNETS, YET THIS PICTURE WAS TAKEN IN 1934!

Here in a quiet corner of Pennsylvania among the Mennonites the automobile age seems to be ignored. More than a hundred horse-drawn carriages bring members to the Martindale Mennonite church every Sunday morning. Historic Christian ceremonies, such as the kiss of peace and foot-washing, are still preserved in a number of congregations.

variations of time down to 1/8000th of a second. It multiplies the accuracy of timing 1,500 times, and enables a watchmaker to determine its rate as accurately in one minute as he formerly could in 24 hours.

He who visits Lancaster's big watch factory gets a new picture of the pains that go into the transformation of raw material into fine timepieces.

THE MAGIC NUMBER—"57"

On the north side of the Allegheny River, in the heart of Pittsburgh, is a spotless town in the vast plant where the famous "Heinz 57 Varieties" come in as raw vegetables and meats and go out as canned and bottled soups, pickles, condiments, and other foods in amazing variety and palate-tickling excellence.

It is rare that one can find a private kitchen where cleanliness is as near to godliness as it is in Heinz's great food manufacturing plant. Washed air, dustless floors, immaculately scrubbed ovens and kettles, cooks and food handlers with manicured

hands—everywhere one discovers the last word in food preparation on a large scale.

It is a far cry from a little kitchen boasting two women and a boy to the 15-block plant in Pittsburgh alone, and the 222 acres of floor space in all its plants manned by 12,000 employees. But it is an exemplification of the old story of the world making a beaten path to the door of the men who make the best things—including ketchup and pickles.

The products which come from Heinz require 200,000 acres of the best gardens and truck lands in their growing and employ 200,000 hands in their harvesting.

A journey through the spacious food plant is a lesson for the market basket carrier. Go down where pickles are bottled. From the ends of the earth come the spices, from golden grainfields the vinegar, from a thousand gardens the cucumbers. The odors that arise from the giant kettles are as delectable as those said to sweep over Ceylon's fragrant seas.

When the pickles come to be bottled,

every one has its own particular place and position in the bottle.

Miles and miles of beans travel on endless belts and pass the eagle eyes of inspectors before they move into enormous ovens where they slowly bake into mealy goodness (p. 39); rice flakes traverse long belted ways from the ovens to the packers, past girls who use little vacuum cleaners to lift out every charred particle, so that the flakes are untouched by human hands from the moment they begin their journey as washed rice until they reach the ultimate consumer; spaghetti, made from flours that have been ground from the best wheat the earth produces, comes out of powerful presses and is hung on high frames to be put in large driers; sterilizers that make every bottle and can absolutely sterile before filling—these are some of the high spots in one of the world's largest and cleanest kitchens, which is otherwise the Heinz plant at Pittsburgh.

THE BIRTHPLACE OF MIRACLES

The name Westinghouse is one to conjure with in Pennsylvania, for it "brakes the trains of the world"; the sun never sets on the motors, electric lamps, mine machinery, well drills, radios, and the like which it builds (see Plate X).

My little party visited the Westinghouse Air Brake plant while the Spanish War Veterans were holding their annual encampment in Pittsburgh. On the main floor there is an installation of the newest development in brakes for a train of an engine and 150 cars. With this visiting engineers can play to their hearts' content. A big Arkansas engineer who was a Spanish War veteran had played hooky from the convention and had come up to toy with the air-brake layout of a mile and a half long train, and was having the time of his life manipulating it.

He marveled at the ease with which the brakes were applied and released and the shortness of the time required to put the pressure on every wheel in the train.

One turns away from Pennsylvania's stirring story of industrial achievements with the consciousness that only a few of the high points have been touched and they in a necessarily sketchy fashion. We must leave unvisited the magnificent aluminum research laboratory at New Kensington, which has been such a success in making aluminum alloys as strong as steel and only one-third as heavy. Under studies made at

that laboratory aluminum is coming to do about everything that steel has been doing and others that steel never has done. The newly designed flyers of the Union Pacific and the Burlington get their lightness from the use of aluminum alloys.

I would like to take my readers to the seamless steel tubing plant of the National Tube Company, at McKeesport, the big wrought-iron pipe plant of the Byers Company, and then give them a peep into the lace mills of Scranton, the hosiery mills and pretzel factories of Reading, and the "silk throwing" plants of Allentown and Scranton (see Plate XIV), to mention only a few of the big industries of Penn's Land.

From the days when the University of Pennsylvania's foundations were being laid in the establishment of "The Academy and Charitable School" down to the present hour, the Keystone State has always been a leader in education. In appealing for financial aid for this little school, Benjamin Franklin, the chief among its founders, stated that "as the country is suffering greatly for want of competent school masters," the proposed Academy would be able "to furnish a supply of such as are of good morals and known character."

From that time forward, teacher training has stood at the forefront in Keystone education. There are now 16 State and municipal normal schools and teachers' colleges, whose graduates form the teaching staffs of all the grammar schools and many of the high schools that care for the nearly 2,000,000 boys and girls who attend the public schools.

From the massive halls of the University of Pennsylvania that environ historic Franklin Field (see Plate XXIII), to that towering skyscraper which constitutes Pittsburgh's cathedral of learning and the home of the University of Pittsburgh (see Plate XII), there stretches across the State a veritable galaxy of institutions noted for their fine student bodies and for the standing of their alumni in the professions. Fifty-four such institutions are recognized by the State Council of Education.

Lafayette, Lehigh, Franklin and Marshall, Haverford, Swarthmore, Bryn Mawr, Dickinson, Drexel Institute, Allegheny, Bucknell, Carnegie Institute of Technology, State College, Muhlenberg, Gettysburg, and Temple University are a few of the institutions that keep step with the University of Pennsylvania and the University of



Photograph by Willard R. Calver

PENNSY'S NEW ELECTRIC TRAINS SLASH THE RUNNING TIME BETWEEN
WASHINGTON AND NEW YORK

One of the latest-type stream-lined locomotives, bearing the familiar red keystone insignia, glides into Broad Street Station, in the heart of Philadelphia, where William Penn surveys his City of Brotherly Love from atop the City Hall. How this modern electric speedster would have interested Franklin, who brought down electricity from the sky by flying a kite in a thunderstorm! Power is transmitted by overhead wires; there is no "third rail." In the industrial development of the Keystone State, the Pennsylvania Railroad has played a major part.

Pittsburgh in setting the standards that have made the State's colleges famous.

A LAND OF OPPORTUNITY FOR PAINTERS

Pennsylvania has given impetus to the artistic life of the Nation since the days of Benjamin West and the Peales. Women have been especially fortunate in finding opportunity for the expression of their creative gifts, and Mary Cassatt, Cecilia Beaux, and Violet Oakley have brought the State renown.

Miss Oakley has done three series of mural paintings for the Capitol at Harrisburg: "The Founding of the State of Liberty Spiritual," in the Governor's Reception Room; "The Opening of the Book of the Law," in the Supreme Court Room, and "The Creation and Preservation of the Union," in the Senate Chamber (see Color Plates I and XXIV). In addition to this

remarkable representation of one artist's work in a single building, Miss Oakley has painted murals for public buildings, designed stained-glass windows, and done portrait work of a high order. Her drawings of famous personages at assemblies of the League of Nations are especially spirited.

The Keystone State has a wealth of fascinating history with roots running back into scores of nations—for Pennsylvania from the beginning was a polyglot land; a variety of religious denominations unrivaled anywhere else—for Penn's Land was the haven to which the founder threw open wide the doors of religious tolerance (see Plate XV and page 56); customs galore, striking and peculiar, that have survived the centuries—for settlements large enough to resist the leveling influence of the decades have continued here and there throughout the State.

THE PENN COUNTRY IN SUSSEX*

Home of Pennsylvania's Founder Abounds in Quaker History and Memories of Adventurous Smugglers

BY COL. P. T. ETHERTON

ENGLISHMEN as well as Americans honor the memory of William Penn and all that is linked with his name is revered. More and more Americans, in their visits to England, make the pilgrimage to the County of Sussex, where the founder of Pennsylvania lived so many years, preached, and gathered some of the band who helped make American history.

Penn's immediate ancestors were seafaring men of distinction: his father was an admiral in the British Navy, and Charles II knighted him for his services.

In due course the son, William Penn, who was born in 1644, went up to Oxford. He was already a devoted Quaker, and the disapproval of the college authorities only served to fan the flame of his sincerity.

Finally he incurred the violent displeasure of the college governors because he had written a book stating his religious views, and was expelled. His father sent him to France, but upon his return to England he carried on with added enthusiasm the gospel of Quakerism.

The specter of religious persecution was abroad; dissenters and those of new faiths were driven out, and hundreds of clergy with their families were without home or even bread. The gaols were full of those who refused to recant; Penn himself languished in the gloomy cells of the Tower of London, from which he was released by Charles II, and of Newgate, where he served two sentences.

A PERILOUS VOYAGE

Equipped with a charter from the King to take over a large territory in the New World, Penn set out on his mission in 1682. He crossed the tempestuous Atlantic in a 300-ton ship which carried 100 colonists in addition to the crew, and the voyage lasted two months! Smallpox broke out and a third of the devoted little band perished on the high seas during that terrible voyage.

Their leader had proposed to call the promised land Sylvania, but the Court of St. James's added the word Penn, in honor of his father. The Quaker chief modestly wished to eliminate the family name, but

Charles declined, so he gained further fame through the obstinacy of a king.

Penn made two trips to America, but could not remain long either time. He felt his presence was necessary in England, where there was a constant struggle for liberty of conscience. Nobly he fought and well, and before he died in 1718 he saw the young colony blossom out, and knew that his party at home had weathered the storm.

Pilgrims to the Penn country in Sussex have a choice of headquarters. They can take London, Brighton, or other large county towns, and will enjoy a tour such as even England at its best offers in few localities.

Life in this Old World corner remains fundamentally undisturbed, and if Penn could come to life again he would find conditions little altered (see map, page 63).

THE BIRTH OF ENGLAND'S NAVY

On these shores Romans landed; they established a capital at Chichester, and constructed roads, marvels of engineering skill, that exist to this day. Then came the Saxons, who planted the banner of Christianity, and after them the Normans, under William the Conqueror.

The story of Sussex is also linked with the sea and sea power; Alfred the Great became the advocate of an increased navy,

* For some years THE GEOGRAPHIC has been printing a series of articles on the British Isles, its counties and cities. Among these are: Counties: "Down Devon Lanes," May, 1929; "A Char-à-banes in Cornwall," December, 1924. Special Districts: "Between the Heather and the North Sea," February, 1933; "Beauties of the Severn Valley," April, 1933; "Vagabonding in England," March, 1934; "Through the English Lake District," May, 1929; "A Tour in the English Fenland," May, 1929; "Through the Heart of England in a Canadian Canoe," May, 1922; "A Short Visit to Wales," December, 1923; "Ireland—The Rock Whence I Was Hewn," March, 1927. Islands: "The Channel Islands," August, 1920; "England's Sun Trap Isle of Wight," January, 1935; "Feudal Isle of Sark," July, 1932; "Timeless Arans," June, 1931; "Orkneys and Shetlands," February, 1921. Cities: "Edinburgh, Athens of the North," August, 1932; "London from a Bus Top," May, 1926; "Some Forgotten Corners of London," February, 1932; and "Oxford, Mother of Anglo-Saxon Learning," November, 1929. Others will be published in early issues of THE GEOGRAPHIC.—The Editor.



Photograph by W. J. Drewett

STOUT OAK BEAMS FROM SHIPS' TIMBERS SUPPORT THE STONE ROOF OF THIS BARN

It is on the grounds of the Blue Idol, the Quaker meeting house near Coolham. William Penn drove here four miles by oxcart on Sunday mornings from his home, Warminghurst, to speak to his congregation. Many of his followers, and a son, now lie in its orchard in unmarked graves.

and the Navy, which loomed large in the history of England, depended much upon the ordnance cast in Sussex ironworks.

Sussex was the Black Country of Elizabethan days, and the county, one of the best wooded in England, was a main supply ground for the wooden walls of Old England. It still abounds in magnificent oaks, of the kind from which the frigates, cruisers, and line-of-battle ships were hewn. The same forests provided the fuel for the ironworks, of which there are still extensive traces.

Penn came to the fine old estate of Warminghurst, in Sussex, toward the end of 1676. The great house no longer exists.

After Penn left Warminghurst, shortly before his second trip to America in 1699, the manor house underwent alterations, and the estate was turned into a deer park. Later it came into possession of the Duke of Norfolk, who had the house pulled down because of the story that it was haunted. The park, however, remains much as it was and has many beautiful walks known only to the traveler off the beaten track.

An old-time link between England and

America is the Friends' Meeting House at Coolham, near by. It is an ancient, timbered building, standing in an orchard surrounded by woods and pastures. There is a stretch of flower garden dotted with fruit trees between the house and the quiet lane; honeysuckle and rambler roses climb over the walls of the dwelling, and garden seats carved from wood taken from ships are there beneath the eaves and the trees.

When Penn first came to Warminghurst the meetings were held at the house there. Quakers were not in favor with the authorities, and the little band of devotees was forced to move to a quieter and more isolated spot. So in 1682 a farmhouse was chosen and adapted to Quaker needs. Very soon Penn's influence and presence made it a center of Quaker activity (see above, and 67).

The meeting place is known as the Blue Idol. Some say it derived its name from a figurehead taken from Penn's ship; others say that there was a quaint blue ornament standing in the garden; still others declare that the color of the interior walls was blue, and that the house stood empty for some years, giving rise to the name.



Photograph by W. Robert Moore

HERE THE FAMILY OF PENN'S FIRST WIFE, GULIELMA, WORSHIPED

The peace-loving Quaker married the lovely only daughter of a gallant Puritan who died shortly before her birth (see illustration, page 65). His monument in this church at Ringmer reads: "HERE LYETH THE BODY OF SR. WILLIAM SPRINGETT, KNT: . . . HE HAD ISSVE BY: MARY HIS WIFE ONE SONNE JOHN SPRINGETT AND ONE DAUGHTER GVLIELMA MARIA POSTHYMA SPRINGETT: HE BEING A COLLONELL . . . AT Y^e TAKING IN OF ARVNDEL CASTLE (page 70) IN SVSSEX: THERE CONTRACTED A SICKNES WHERE-OF HEE DIED BEING: 73 YEARES OF AGE. . ."

It was a glorious summer day when I walked up the grassy path to this haunt of ancient peace; in the doorway reclined a black cat which greeted me affectionately. A knock brought the caretaker, a Quaker of quiet mien, who invited me within. The house is just as charming inside as it is without; the rooms are long and low, the ceilings supported by heavy oak beams. By the wide hearths, with their settles, you can smoke a pipe and watch the leaping flames gleaming on the fireback of old Sussex iron.

Nearly 250 years have passed since Penn spoke from the tiny platform, which remains just as when he poured forth words that held his audience spellbound. Penn has gone, but his spirit is there, and the Friends still gather to cherish his memory and carry on the faith that he labored for with such ardor and sincerity.

Out in the orchard, where pears and apples hang invitingly, where the birds are giving out notes as sweet as those from a heavenly choir, and bees are humming in

the hives, is the last resting place of several Quakers, among them one of Penn's sons. Most of the graves are nameless, but some are still distinguishable by their plain headstones, from which one gathers that they died for the faith within the gloomy walls of Horsham gaol, six miles away.

A BRAVE OLD HOUSE

The Blue Idol is tended with loving care; the last caretaker had been in charge of the hallowed spot for more than eighty years, his father having preceded him for an almost equal number of years. Evidently the district is wondrously healthful. The lane wherein the Blue Idol lies sheltered is difficult to find, but those who discover it are fascinated with the fine old house that has stood through the centuries.

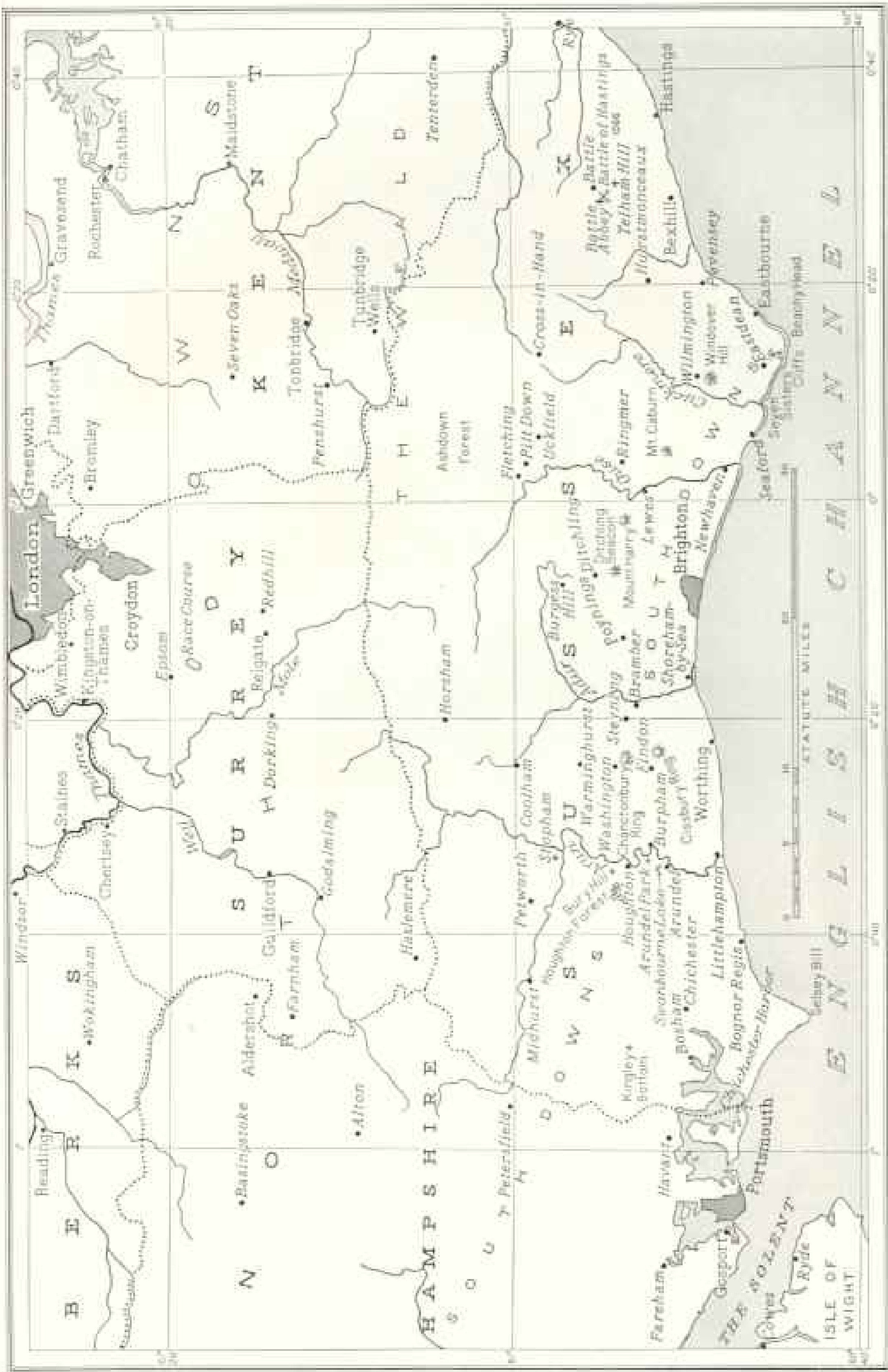
There are few visitors in winter; then the caretaker has only an occasional Friend who looks in to sit the evening through round the blazing log fire and dream of those days long past, so full of history and



Photograph by W. Robert Moore

BEACHY HEAD BREASTS THE SEA WITH A GLEAMING WHITE WALL HIGHER THAN THE FAMOUS CHALK CLIFFS OF DOVER

At their western end the rolling South Downs break off and drop 500 sheer feet to the Channel. Jackdaws and gulls swoop noisily from the dizzy heights. Here would have been a fit setting for Edgar, when he cried in the Shakespearean tragedy, "King Lear": "I'll look no more, lest my brain turn, and the deficient sight topple down headlong." The headlands that loom in the distance are the Seven Sisters, familiar to passing voyagers. The Belle Tout Lighthouse atop the cliff has been abandoned recently (see illustration, page 68).



Drawn by Newman Bunstead

THE COUNTY OF SUSSEX, LYING BETWEEN THE ENGLISH CHANNEL AND LONDON, WAS A GATEWAY FOR MANY INVASIONS OF BRITAIN



Photograph by W. Robert Mours

IVY WEAVES A DECORATIVE MANTLE ABOUT "LAVENDER COTTAGE"

From this intimate Tudor garden porch, the American-born owner looks across to the weathered pile that was Brambor Castle (see illustration, page 66). A building adjoining the house, where "free traders" once stored their smuggled goods, now serves as garage for her car.

romance. They will enjoy a frugal supper of home-made Sussex bread and cheese, with perhaps some of the boiled pork for which the county is famous.

Soon after 10 o'clock the caretaker speeds his visitor on his homeward way; he will heap up the embers of the fire and finish his pipe. Then he lets in the cat, bolts the doors, blows out the ancient oil lamp, and "so to bed."

Through the lovely lanes and fields we can go back to Warminghurst.

From here there is a road due south, over moorland bright with heather in the summer time, to Washington, at the foot of a pass

through the Downs leading to the sea, a few miles away. Washington was once a Saxon settlement, and during the late 18th and early 19th centuries a happy hunting ground of highwaymen. A hundred years ago smugglers used it in the transport of bales of silks and kegs of wine and brandy, landed from the luggers offshore.

These bands of hearty ruffians knew every inch of the ground and often gave battle to the King's men. Those days saw the coast guardsman with his cutlass, the gay musketeer, the starlit night, and the lantern man signaling from the shelter of a rocky cove to the lugger lying just offshore; the landing on the beach, the frequent fight for possession, and the dash up the cliff path. It was a time of ambushes and desperate fights, of carousing in quaint inns, a time to read about rather than to live in.

The scenes where all this took place are still replete with charm and

simplicity. Charles Lamb once said that he liked a smuggler, for he was the only honest thief. Everyone was interested in smuggling; even Pope wrote to a friend, whose house was in this district and adjacent to the haunts of the smugglers, requesting a small favor. It was to intercept a barrel of good French wine whenever it came his way, whether it fell from the skies or whatever element paid no duty, and pass it on to the poet at the best bargain price.

These "free traders," as they styled themselves, had a sense of humor and a forgiving spirit. They took a keen delight in hoodwinking the law. In a church-

yard at Hastings is an epitaph typical of the jovial lawbreakers. It was on the grave of a smuggler who had been killed in an affray with the customs men.

May it be known, tho'
I am clay,
A base man took my
life away;
But freely him I do
forgive,
And hope in Heaven
we shall live.

The wars with France favored the smugglers, the gangs were well organized, and the most part of the four million gallons of brandy distilled annually at Schiedam, in the Netherlands, was brought into Sussex without a penny of duty being paid.

During wanderings last summer, through all this fascinating district, I learned much of smuggling, which the Sussex men from Penn's day onward found such a profitable industry. The trade has gone, but the story remains and is worth the telling.

CONTRABAND STORED IN CHURCHES

The coast line south of Washington and Warminghurst is a pocket history of the smugglers; the white cliffs, and behind them medieval villages hidden away in the folds of the Downs, are full of memories of smuggling days. In one hamlet the Saxon church has an altar tomb that the "free traders" used as a receptacle in which to conceal their kegs and bales when hard pressed by the King's men.

In another they still tell of the local parson of that day, who came to church one morning to find the pews and pulpit crammed with contraband. The parson sensed a situation that must be handled with care and circumspection, or all sorts



Photograph by W. Robert Moore

THIS LITTLE CHURCH IS TWICE LINKED TO AMERICAN HISTORY

Both William Penn and John Harvard found wives at Ringmer (see illustration, page 61). The latter wed the vicar's daughter and took her to New England. When he died "of a Consumption" in 1638, at Charlestown, Massachusetts, he left half his fortune and his books to the infant college which thereafter bore his name.

of complications would ensue, and he might even be involved in the vengeance resulting from betrayal or discovery.

So he returned to his vicarage and sent out a tactful notice that, owing to indisposition, he would not be able to hold service that Sunday!

MEMOIRS OF THE "FREE TRADERS"

You can follow the smugglers' paths, and learn from the descendants of those rascals all about those stirring times.

In one cottage, just the sort we read of in the story books, with tiny windows,



Photograph by W. Robert Moore

THE "FORGOTTEN TOWN" OF ITS PARLIAMENT MEMBER STILL IS SECLUDED

Today gentle Bramber scarcely bespeaks a warlike past. The clash of many battles rang around the walls of Bramber Castle from Norman times until the days of Cromwell. Its loopholed towers, now in ruins, hidden by the trees, loom above the village (see text, page 74).



Photograph by Edward J. Jacob

OLD TRADES DIE HARD IN SUSSEX

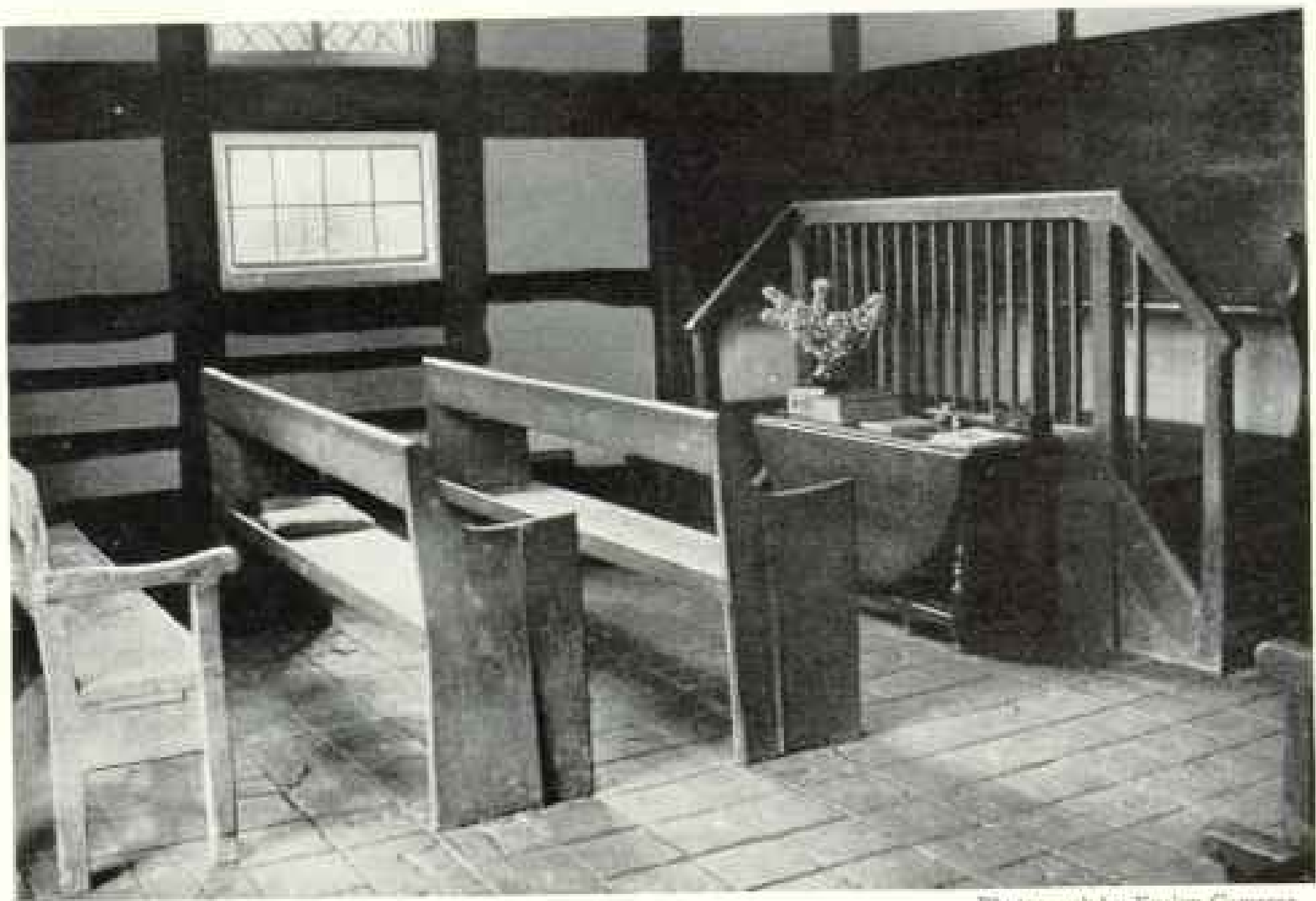
Craftsmen fashion timber for wagons, barns, and household use. Spokes and rims are hewn from solid English oak, once the source of the "Wooden Walls" of old England's navy (see text, page 74).



Photograph by W. Robert Moore

THE SPIRE OF CHICHESTER IS A LANDMARK FOR SAILORS

It can be seen from the Channel. A local saying that when there is no spire at Chichester there will be no King in England was fulfilled when the pinnacle fell in the reign of Victoria. It was rebuilt five years later. On market days farmers bring produce in tilt carts to this quiet cathedral town.



Photograph by Ensign Camera

FROM BEHIND THE OAK RAILING PENN ADDRESSED HIS FOLLOWERS

The planks that form the pews and the paneling in this Blue Idol meeting house at Coolham once sailed the seas as ships' timbers (see text and illustration, page 60).



© A. W. Kerr

BEACHY HEAD TOWER RISES FROM A SILVERY SHEET, AS A GUSTY WIND HAMMERS
THE SEA

Formerly, a light marking this headland was located on top of the cliff, but it was so high that ships close on the rocks at night could not see the beam (see illustration, page 62). To build this structure in deep water off the point, all materials were lowered down the cliff's face by cable.

old oak beams, a garden full of scented flowers, and a background formed by the forest-clad slopes of the Downs, I was told the tale of a windmill that stood on the hills, in full view of the coast line.

The miller was a jovial smuggler who used the sails to signal far out to sea to the fast-sailing lugger when safe to come in-shore, and when to remain in the offing. The mill has been the scene of many a scuffle, and none can tell the amount and variety of the goods that have lain within its walls, or the strange and stirring events it has witnessed. It is even said that a fugitive king once hid there when seeking to get away to safety in France.

The mill sails were operated by an elaborate system of signals; when warnings were unfavorable the goods were sunk, the kegs put overboard and fastened to floats for landing when the coast was clear. During the miller's absence he kept in touch with the course of events, for the sails told him if danger was nigh or whether all was right for a landing.

Once the preventive men paid a surprise visit to a farmhouse which I came across hidden away in a fold of the Downs.

Within the quaint interior, with its solid oak table, its rush-seated chairs, and the inglenook, sat the farmer looking out over the wide stretch of downland. What he saw gave him a start; the preventive men were within a hundred yards, and the room was full of bundles of rich silk just landed from Flanders. At this critical moment the only hiding place was the huge oven, forming one side of the inglenook. Into this, hot though it was, he cast the goods in the nick of time.

The farmer rearranged the rough furniture as the King's men came in. But they suspected nothing and were merely seeking information that perhaps he could give them.

The revenue men stayed long, enjoying the home-made wine the farmer provided, and which his descendants make to this day, talking of the war, of the fight to death with Napoleon, and of how George IV had driven a coach-and-four down the steepest street in the neighboring town of Lewes, a feat that no man before or since has attempted.

The farmer longed to get rid of his guests, but they stayed on. As a result, the silks were ruined in the hot oven.

The smugglers were a law unto themselves; in several districts they defied the

King's men for years. Great deference was paid to the "free traders," who were always referred to as the "gentlemen." Their descendants treasure the old doggerel that warned citizens not to look out of the window if they heard the noise of passing convoys in the night. Indeed, it was a canon of the smuggler's creed, and mothers imparted it to their children after the evening prayer when they went to bed.

If you wake at midnight and hear a horse's feet,
Don't go drawing back the blind or looking in
the street.

Them that ask no questions isn't told a lie,
Watch the wall, my darling, as the gentlemen
go by.

None would dare protest the rattling of stable doors or sound of horses being taken out at night.

In the morning a keg of brandy would be found in the manger, and the horses would be unusually tired that day, for during the night they had accomplished a forced march, transporting the fruit of the smuggler's trade inland. There would be no clue to tell who had commandeered the horses, and certainly none so daring as to inquire. Discretion ruled, for tales had been told of mysterious fires at night. Crops suffered, and horses were lamed in the apparent security of a stable.

THE GHOST DRUMMER OF HURSTMONCEAUX

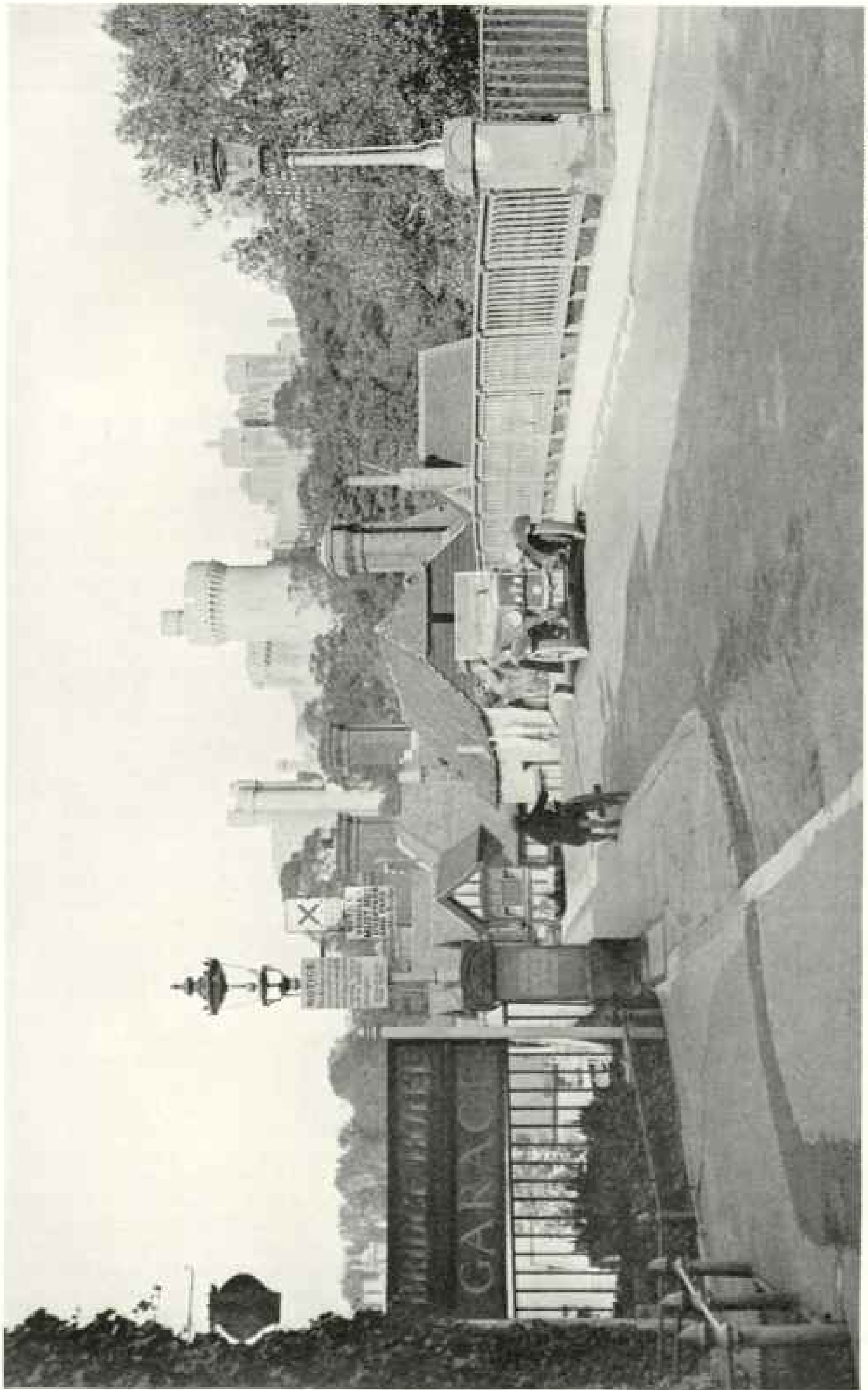
Ghosts and even demons were conscripted by the smugglers to help their unlawful cause. Fearless themselves, they realized the value of a wholesome terror for other people, and played upon the superstition and credulity of the district.

In this way grew the legend of the ghost drummer of Hurstmonceaux, a man of mighty frame, 12 feet tall, with a terrifying voice.

As he strode at nights near the coast line, he drummed, and in many a little cottage there were fear and trembling at his frequent marching. His thunderous notes would ring out over the marshes, and at times he could be heard drumming from the lofty battlements of the old castle.

He was a useful ghost as well, and struck no fear into the hearts of the "free traders," waiting for the signal that all was clear. No doubt the ingenious smuggler who impersonated the ghost found the whole performance highly satisfying to his sense of humor.

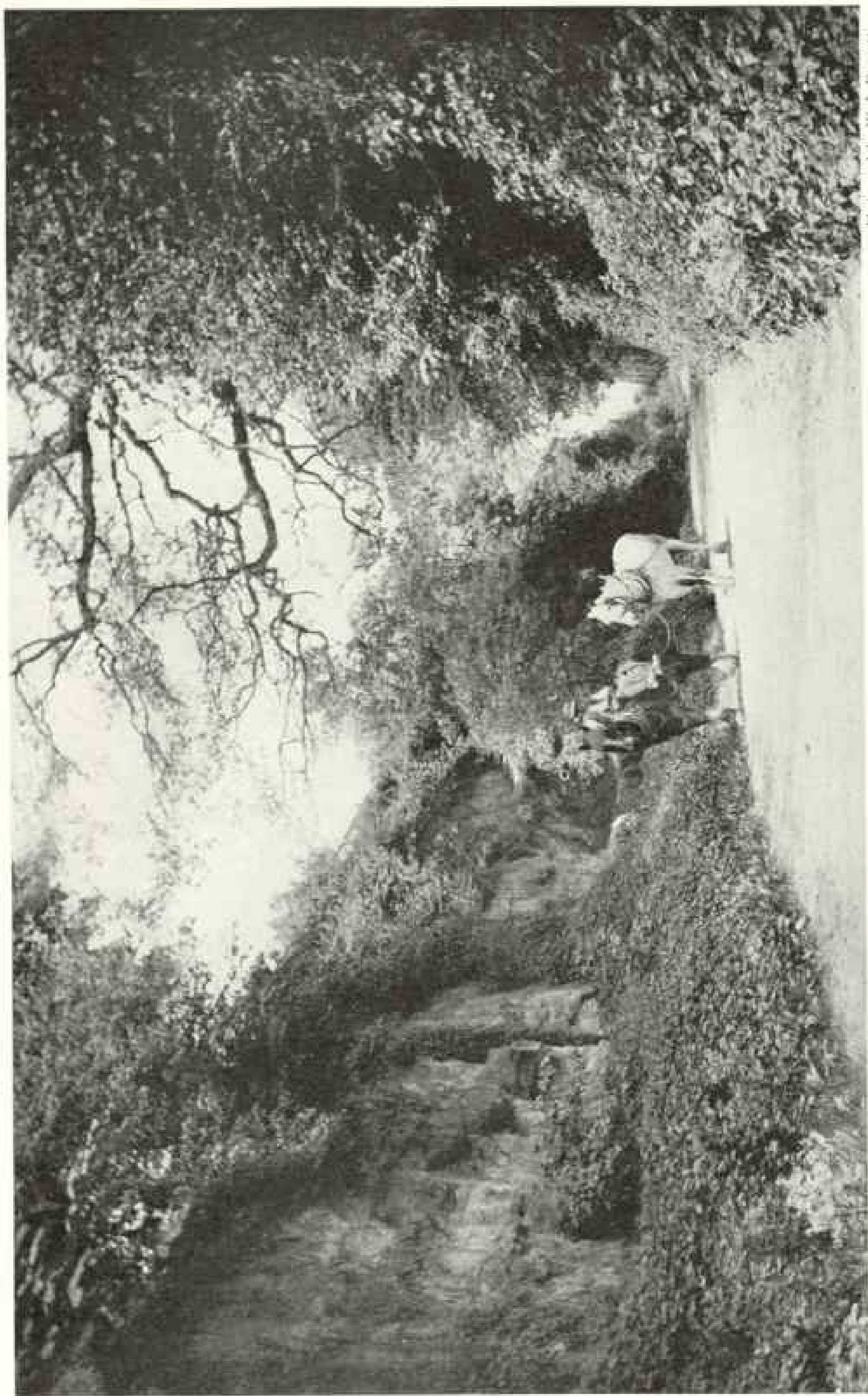
In Penn's time, and even down to the



Photograph by Eosight Camera

ARUNDEL CASTLE, TURRETED AND GRIM, DOMINATES THE OLD TOWN CLUSTERED AT THE FOOT OF ITS WALLS

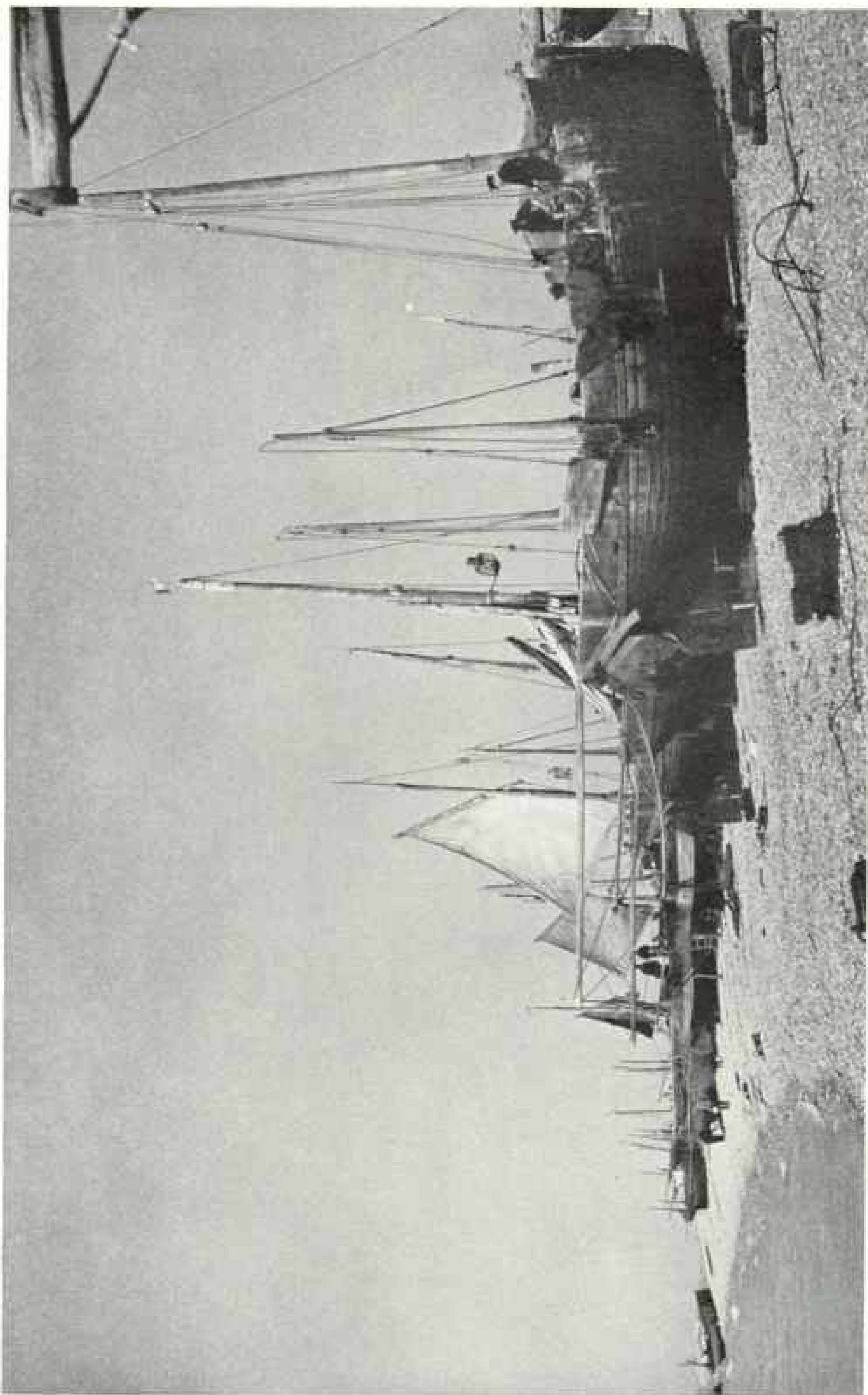
The story of the massive stronghold and seat of the Dukes of Norfolk is a pageant of siege and battle, of dukes beheaded, and royal plots. The Norfolk family has been powerful for centuries and its history is closely bound to the lives of the Kings and Queens of England (see text, page 77).



Photograph by W. J. Bennett

"THE PLOWMAN HOMEWARD PLODS HIS WEARY WAY" NOW AS HE DID IN PENN'S TIME

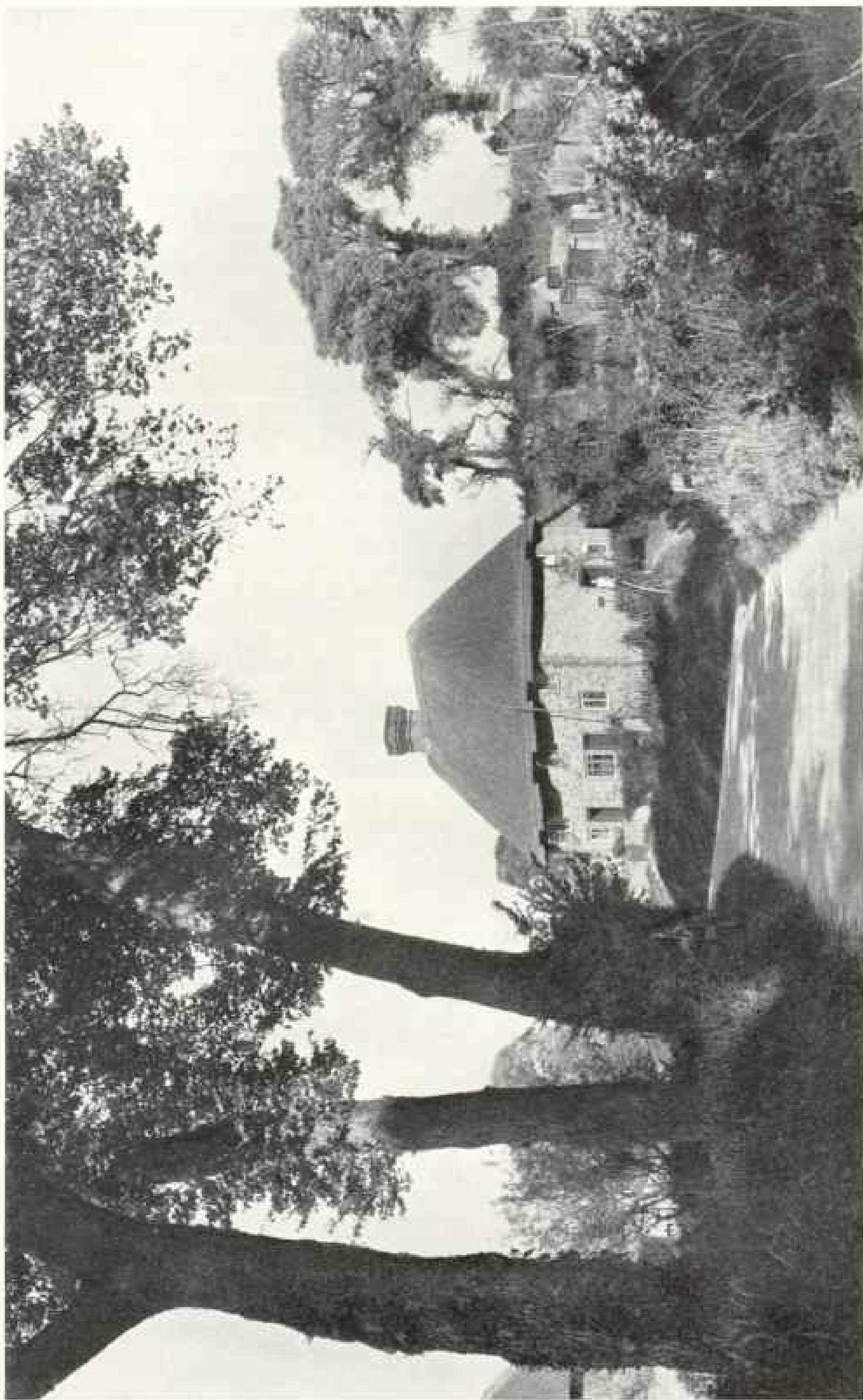
Many words of Saxon, Danish, and Huguenot origin, lost to the body of the English language, still survive in the speech of the Sussex rustic. He swears by Job (Anglo-Saxon *Juplter*), divides his country into "rapes" (probably Icelandic *hræppir*), and calls untidiness "dishabit" (Huguenot). Castles, churches, roads, and other remains remind the visitor of the many invaders of England since Paleolithic man inhabited these warm sunny slopes.



Photograph by Maynard Owen Williams.

THESE FISHING SMACKS WERE NOT WRECKED ON HASTINGS' SHINGLE BEACH, BUT WERE HAULED THERE BY WINDBLASSES ON A FLOOD TIDE

Although William the Conqueror landed at Pevensey, 10 miles away, and was victorious at Battle, 7 miles from the Channel, Hastings gets the credit for both (see illustrations, pages 79 and 88). It was one of the original Cinque Ports, which from the Norman Conquest to the time of Henry VII were granted special dispensations in return for furnishing and manning fighting ships for the King's service. It is a growing shore resort, and has a subway garage capable of handling many motor cars.



Photograph by W. Robert Moore

THE CROOKED LANES OF SUSSEX WIND QUIETLY THROUGH THE COUNTRYSIDE

From the doorway of her cottage near Burpham a housewife keeps an eye on what passes. Many kinds of reed and straw are used for roofs, but thatchers consider the former strongest and best. Because machine reaping and threshing spoil straw for thatching, rye is sometimes grown especially for this purpose and harvested by hand.

late Victorian era, the roads of Sussex, over which visitors motor so smoothly now, especially in this neighborhood, were notorious for mud and deep ruts. A famous wit of the day attributed the long legs of the Sussex men and women, and of the cattle as well, to the constant pulling of the feet out of so much mud that the legs thereby became lengthened.

Once, when the King of Spain visited Petworth Park, it took him six hours to do nine miles, and the royal carriage was prevented from toppling over only by the Sussex men supporting it with their shoulders. George IV experienced similar difficulty in his visits to Brighton. Once the coach containing his equerries came to grief and they were shot out into the mud.

All this accounts for the excellence of the work of Sussex wheelwrights, among the best of Britain's wagon builders. Near Washington village I came across one of the last of the old wheelwrights, a past master at his trade, with a skill handed down through successive generations, for son follows father and time brings perfection to the art.

The hauling of the timber for the iron-works required vehicles of great strength and rigidity, and their reputation lives to this day. Despite the advent of motor lorries and tractors there is still a demand for their predecessors, the cart and farm wagon, for in Sussex old ways and usages die hard (see page 66).

WHEN QUEEN ELIZABETH RODE BY

Long before Penn's time Queen Elizabeth was a frequent visitor to the county; she liked to do herself well, and so the people, when she passed their way, took care that she was provided with sound carriages to keep her in good humor. Had she been let down she would have sworn her celebrated oaths, and all and sundry would have been drawn into the vortex. Fortunately the Sussex chassis stood the strain, which may account for the frequent tours of Good Queen Bess.

The roads had another effect; they made the Members of Parliament shy of visiting their constituencies, not wishing to get hopelessly bogged. At Bramber, a few miles from Washington, which returned two Members to the House, although the population was less than a couple of hundred, they still tell you of the famous Wilberforce, he who liberated the slaves. He was

a Member for Bramber, and when he was passing through the village he asked its name. "Why, that must be the place I'm Member for!" he exclaimed (see page 66).

The finer part of Sussex, those delightful villages lying secluded among the Downs, is to be seen only by walking or climbing. Adventure and romance greet you at every turn. Continuing westward, our journey leads among many scenes which must have been familiar to William Penn, and we pass within hail of the village of Bosham, at the head of a creek of Chichester Harbor.

There probably is no village in Britain that has more picturesque history than Bosham. Perhaps its greatest fame is its connection with King Canute, who had a palace here.

Tradition says that it was here the Danish king tried conclusions with the tide (see illustration, page 81). To the occasional visitor it always seems to be low tide at Bosham; the retreating waters expose large stretches of mud, the craft in the harbor assume all sorts of angles, and the tidal waters appear to have a preference for going out rather than coming in. Who knows but what this may have helped Canute in the choice of time and place of his sporting effort with the waves!

VESPASIAN HAD A PALACE AT BOSHAM

Long before Canute appeared the Romans had a camp at Bosham; by this route the Emperor Vespasian brought into Britain his stolid and orderly legions, who subdued the hordes of woodmen, broke up their forts, and established discipline, culture, and, above all, peace. The Britons, reassured, came out of the woods and forests and mingled to some extent with the Romans, whose capital was at Chichester, four miles away. Of Vespasian's palace at Bosham there are only a few remains, but they indicate that it was extensive and fulfilled the Roman idea of pomp.

Bosham's finest gem is its church. The structure is certainly of venerable age, and the tower, which has figured in many Royal Academy exhibitions, is said to be the original Saxon. It is represented in the famous Bayeux tapestry, which shows Harold on his way to embark at Bosham for Normandy, where he met the duke of that province, afterwards William the Conqueror. The visit finally led to the Battle of Hastings, the defeat of Harold, and a momentous change in English history.



Photograph by Maynard Owen Williams

GOOD WIVES OF RYE CHAT ABOUT THE "ENGLISH WEATHER"

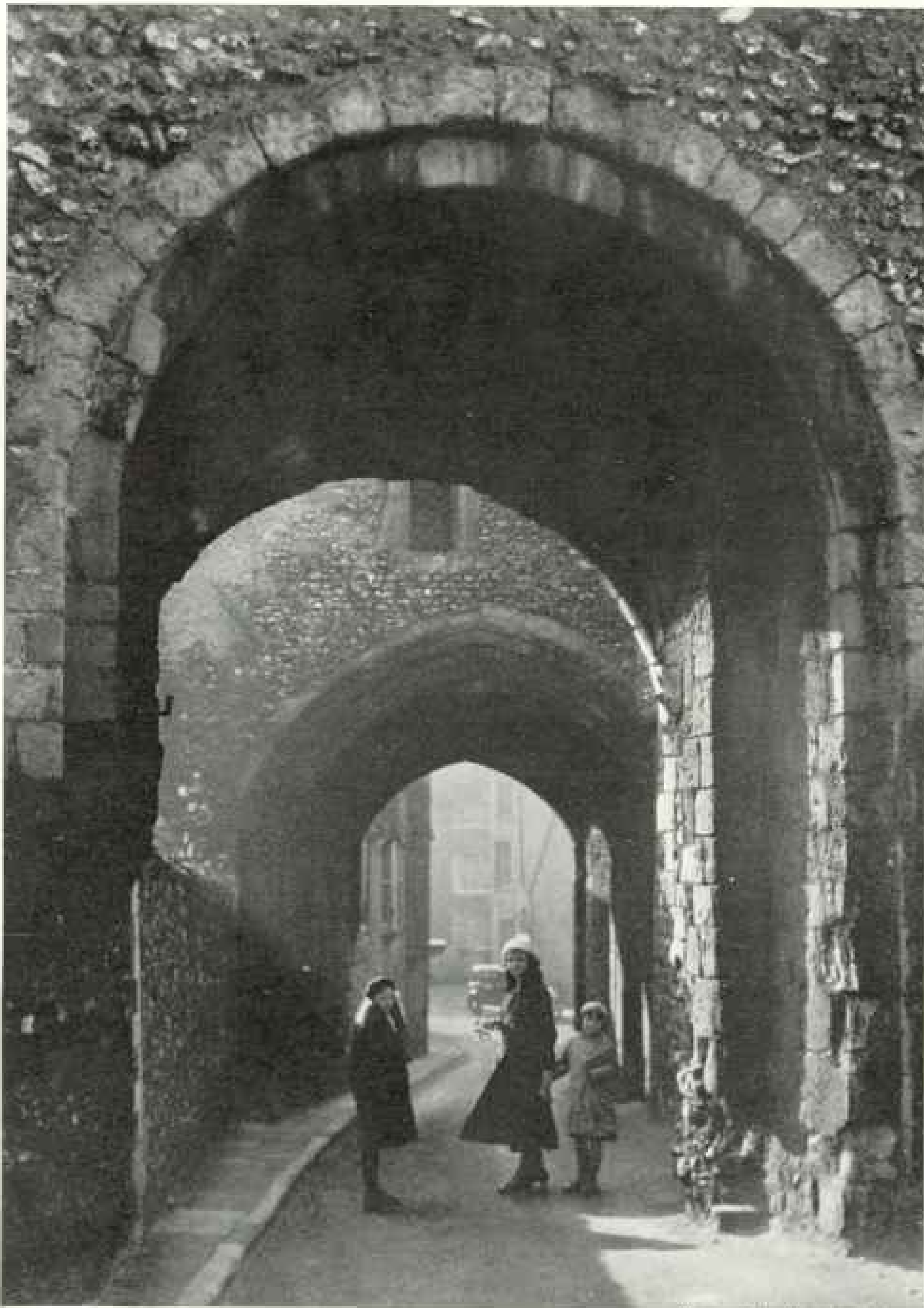
This market town climbs an isolated rock set in wide-spreading marshlands and meadows. Numberless herds of sheep now graze over lush pastures where Vikings sailed before the sea retreated from the coast (see illustration, page 84).



Photograph by W. Robert Moore

FISHERMEN PLAY CARDS IN THE LEE OF THEIR BOAT ON HASTINGS' BEACH

To such Channel ports fleets of "toshers," "hogboats," and trawlers bring in tons of prawns and oysters, cod and turbot.



Photograph by W. Robert Moore

THE CLANG OF ARMORED KNIGHTS ONCE ECHOED THROUGH THESE BARBICAN ARCHES

The gate is much better preserved than is the castle, crowning a hill in Lewes, that it was built to guard. Here the rebel Barons under Simon de Montfort defeated and captured King Henry III in 1264. The next year their leader summoned a national assembly which was the direct forerunner of Parliament.

Bosham church had a fine collection of bells which excited the envy of the Danes, who came over on one of their periodical raids and carried them off. But they evidently miscalculated the weight of the bells, as well as the capacity of the ship that took them. On the way down the harbor the craft sank, and to this day, when the existing bells sound forth, the old-time sunken peal seems to ring out in sympathy from its watery grave a few miles down the Channel. At least, that is the local story.

Near Bosham is Kingley Bottom, with its grove of giant yew trees. Tradition has it that the Druids held human sacrifices here, the victims being enclosed in wooden cages and placed upon the flaming altar. Later, Saxons and Danes met in Kingley Bottom in a terrific battle, the number of slain being so great that the barrows constituting their last resting place cover the crest line of the hill above the vale. I counted more than twenty in about three acres.

The Bottom is a beautiful but somber spot, its bowl-shaped hollow running deep into the hills above it. The latter are thickly wooded, the trees being overhung with wild clematis. The central area is a carpet of lawn grass, and affords one of the most exquisite pictures of a Sussex summer.

By night the moon casts slinking shadows that fill the walks and pathways, and a wan light invades the central grove of yews. From such silhouettes it would not be surprising if a Druidic procession stepped out into the light.

"A COUNTRY WORTH FIGHTING FOR"

Almost within rifle shot of the Bottom is a hill which affords a magnificent view seaward to the Channel and the Isle of Wight, and northward over The Weald of Sussex to the Surrey hills, the North Downs, such a panorama as compelled the admiration of King Charles II, who exclaimed, "*This is a country worth fighting for!*"

On a summer's day the Downs lie dreaming in sunshine; you can walk along their grassy ramparts high up in the most winelike air, alone with the butterflies and humming bees, who are keen on the thyme; wooded plain and hills to the north, the blue sea to the south, with no harshness to offend the beauty of Nature.

Let us follow on eastward from Kingley Bottom, still traversing the Penn country. The forests, the pastures, and by-lanes are

Nature's still. Elsewhere the touch of time is upon the land, but here it has not penetrated beyond the main roads.

Finally we come to Houghton Forest, one of the best examples of the forests of medieval England, resplendent with oak and beech trees, and still open for all to wander in, thanks to the generosity of its owner, the Duke of Norfolk.

Here it was in 1651 that Charles II, who was making for Shoreham-by-Sea, whence he escaped to France, had his dramatic encounter with Captain Morley, the fanatical Cromwellian governor of Arundel Castle. Morley, a notorious martinet, who had been placed in charge of Arundel and district, was conducting the most rigorous search for the vanished monarch.

We can picture the little party making their way stealthily through the dense forest. The King's guide and faithful benchman, Colonel Gunter, went ahead, followed by Lord Wilmot, and then the King, who was disguised as a Roundhead groom. Suddenly the colonel pulled up his horse; a cavalcade was moving toward them through the woods. "We are undone!" whispered Gunter. "It is Captain Morley, the governor of Arundel Castle."

Aghast at the critical situation, he was about to turn around, when the King urged, "Let us go boldly forward and they will not suspect." So on they went, with the thrilling sense of a beast of prey moving toward them, and imagination conjuring hope and fear. Suspense must have gripped them when the truculent governor hailed the party and commanded them to his presence.

Gunter was chief spokesman, and, in answer to the governor's inquiries about their business, replied that they were out coursing, the lucky presence of a couple of greyhounds with them giving color to the statement. Awkward questions on the composition of the party were successfully combated, and with a curt nod the governor allowed them to proceed. Gunter records in an old manuscript which I read that, when they had passed out of hearing, the King simply remarked, "I didn't like the look of his mustachios!"

A FAMOUS FAMILY SEAT

Emerging from Houghton Forest, we are close by the summit of Bury Hill (see page 89), and the crossroads at the entrance to Arundel Park, the home of the Duke of



© Photochrom Company

A CENTURY AGO OLD WASHINGTON WAS A CENTER FOR "FREE TRADERS"

Wars with France favored the activities of the "gentlemen," as the smugglers were called (see text, page 64). Many a bale of silk and keg of brandy were secreted in this village after a stealthy trip in the dark of night across the Downs from the sea. Historians are unable to trace any connection between this Sussex village and the family of George Washington.

Norfolk, passed by scores of motorists daily. We may follow the route that King Charles and his party took, down the northern slopes of the hill, along an unfrequented lane, which even now is known only to the shepherd and the toiler in the fields. It will take us to an old inn at Houghton.

Here the King and his companions halted for a flagon of ale, and to munch some bread and a deer's tongue which the thoughtful Gunter had put in his pocket. Then they continued down the valley, to the Arun, which turns here from west to south on its way to the sea at Littlehampton. The river is crossed by an ancient stone bridge, one of the oldest in Britain. The massive stone arches supporting the structure testify to the skill of those early builders.

Beyond the bridge we again climb up the Downs, a mile or so farther on descending them to see Burpham, one of the loveliest villages in England. Nestling in a glen of the Downs, the only sign of a village is the church spire peeping from a clump of trees. It stands on a low promontory looking out over the marshes of the Arun to Arundel Castle, the river wind-

ing along the base of the castle, beneath the shade of trees, where the colorful kingfisher pursues his prey.

The view across the valley of the Arun to Arundel Castle, the ancestral home of the Dukes of Norfolk, is impressive beyond words. The grand old pile stands out in splendid relief; its history is bound up with that of England and its kings, and thrice it has sustained a strenuous siege (see page 70).

No family in English history has a more romantic and stirring record than the Norfolks; none can lay claim to greater prominence in the life of English rulers than this ancient clan.

They were warlike and independent, they had vast wealth and feared no man. They did as they liked and were ever ready to uphold the splendor of their name.

A DUKE MAY DRESS AS HE PLEASURES

They could be independent beyond the ordinary. The late Duke of Norfolk, who died in 1917, was a famous character, who, despite the wealth of his estates, usually dressed as he pleased.



Photograph by W. Robert Moore

BATTLE ABBEY IS A VICTORY MEMORIAL TO THE NORMAN CONQUEST

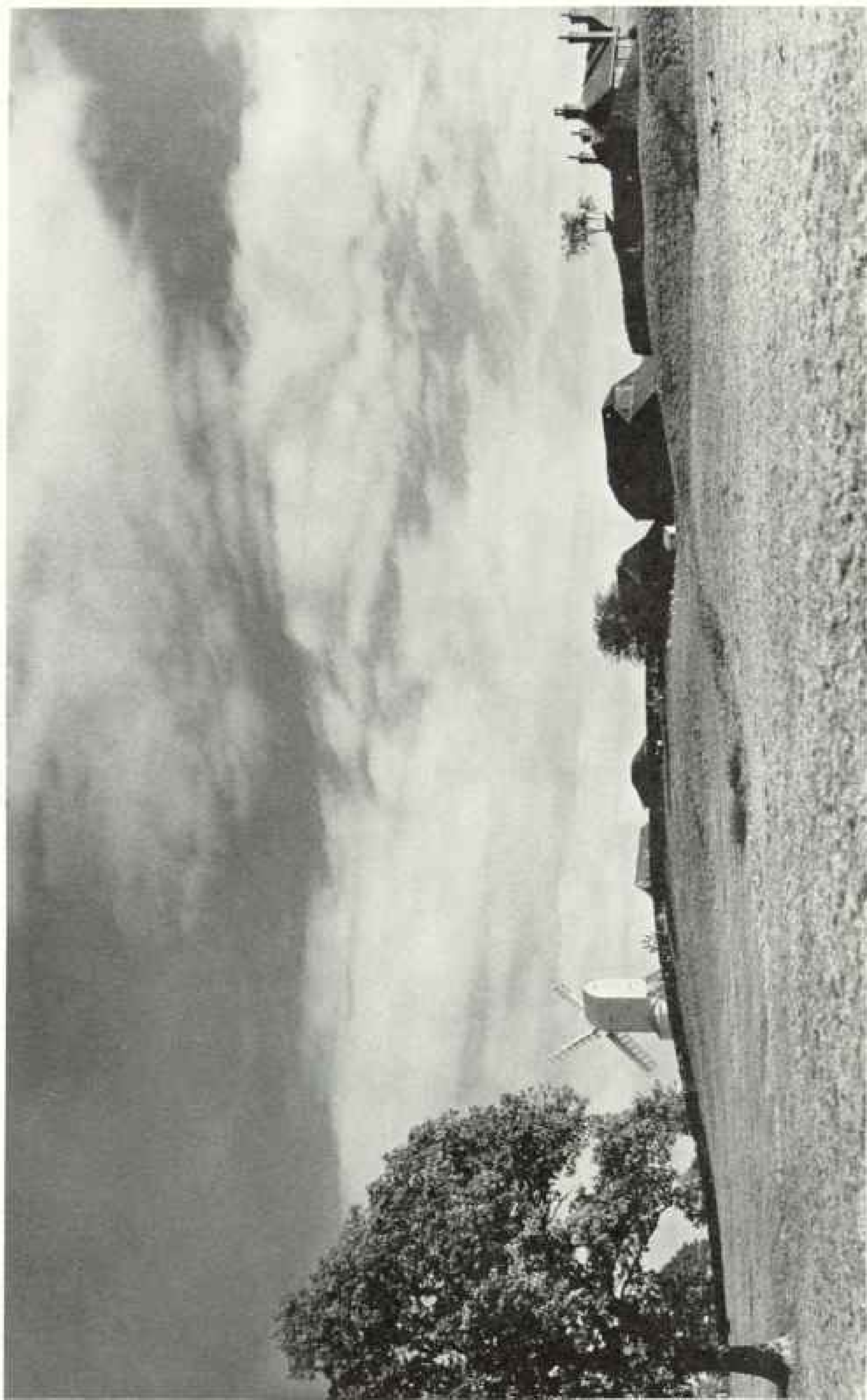
William the Conqueror built it to fulfill a vow made on Hastings battlefield. The high altar rested above the spot where Harold fell fighting vainly to defend his realm against the invaders. The abbey was despoiled, as were many others, in the reign of Henry VIII. The smoldering bonfire is a morning-after remnant of a Guy Fawkes celebration (see text and illustration, page 88).



Photograph by Clifford Adams

HANDED DOWN FROM FATHER TO SON IS THE ART OF MAKING TRUGS

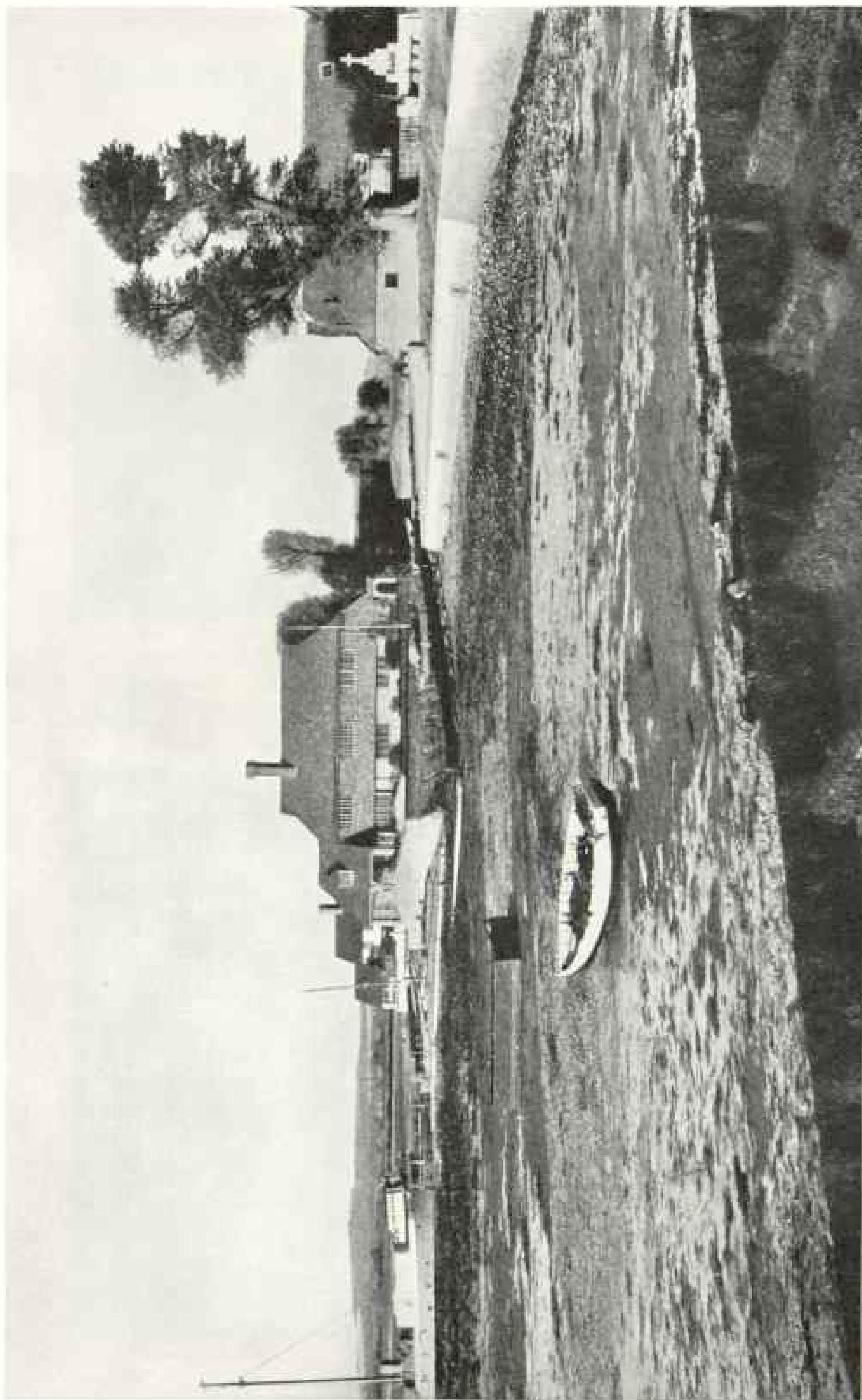
These coarse baskets made near Hurstmonceaux of thin strips of wood are convenient for marketing, especially for carrying grain. Trug is an old English measure for wheat and makes about two-thirds of a bushel. In recent years some of the baskets have been exported to the United States.



Photograph by W. Robert Moore

WHITE WINDMILLS, THEIR ARMS RAKING THE SKY, CATCH EVERY BREEZE THAT BLOWS ACROSS THE ILEA

One by one these old landmarks are falling into disuse. Sussex is occupied with farming, tanning, and brewing, but once it was the "Black Country," or iron-producing district of England. Relics found at Mount Caburn indicate that crude iron smelters flourished here before the Romans reached Britain's shores. When the industry was at its height, in the 17th and 18th centuries, the forests of The Weald fell as fuel for the hungry furnaces. Old Sussex iron is unusually resistant to rust.



Photograph by W. Robert Moore

ON THE BEACH AT BOSHAM, KING CANUTE HAD HIS FAMOUS ENCOUNTER WITH THE SEA

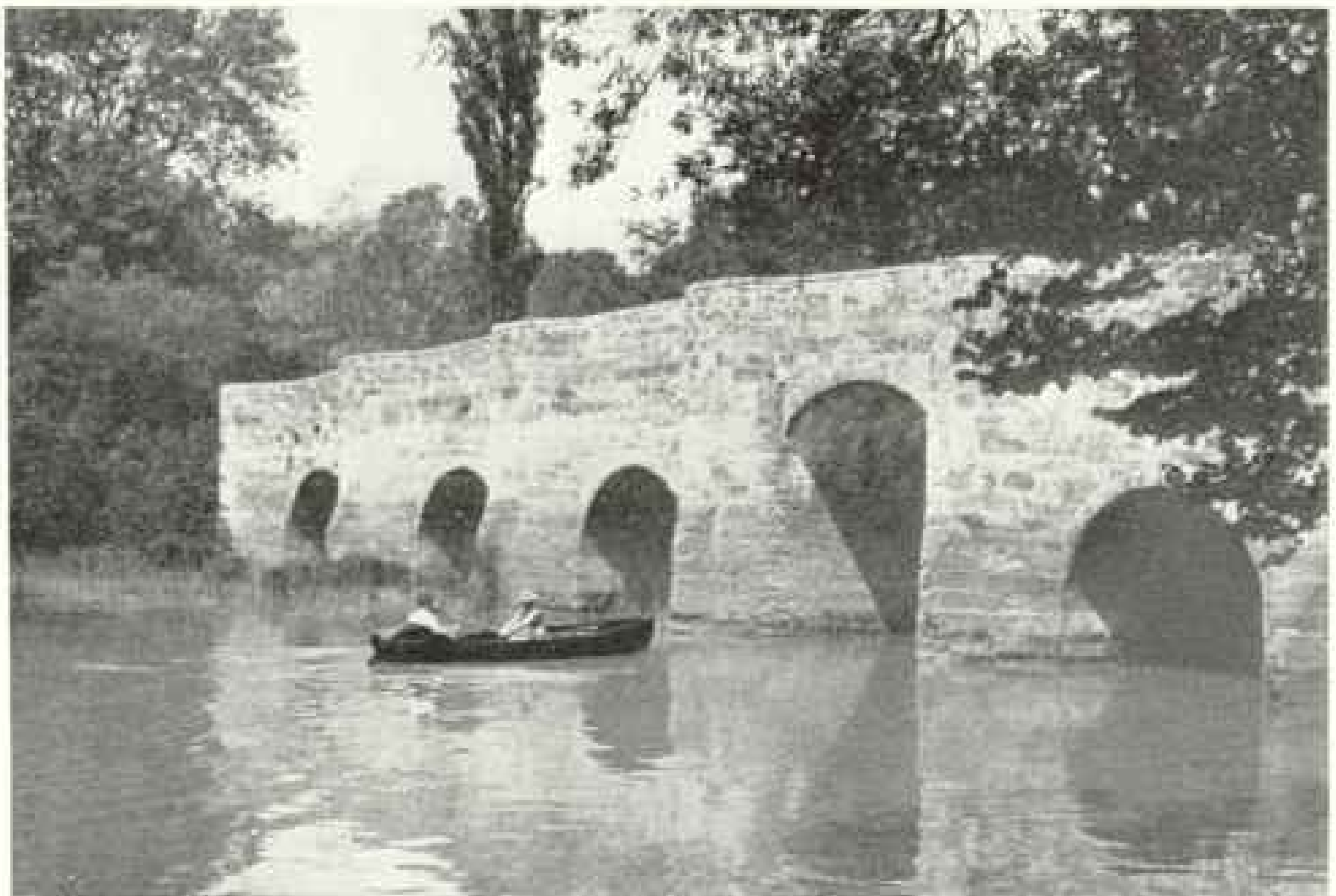
According to historical legend, the wise King, disgusted with the extravagant flatteries of his courtiers, had his throne placed before the advancing waves. He commanded, "Ocean! The land on which I sit is mine, and thou art a part of my dominion; therefore rise not—obey my commands, nor presume to wet the edge of my robe." When the water broke around his feet and wet his garments, he turned to his fawning minions and said, "Confess ye now, how frivolous and vain is the might of an earthly king compared to that great Power who rules the elements . . . ?" At low water a road runs along the shore, but at flood tide it is covered by the sea (see text, page 74).



Photograph by W. Robert Moore

THIS TUDOR HOUSE AT DITCHLING WAS ONCE OWNED BY ANNE OF CLEVES

Shortly after her arrival from Germany to be his fourth bride, King Henry VIII annulled his marriage to the Princess, of whom he said, "She was no better than a Flanders marr." She lived happily in England afterwards, sometimes visiting the court. The old house, with its stacked, brick chimneys, sloping outside stairway, and gabled roofs, is a focal point for visitors.



Photograph by Edward J. Jacob

THE ARUN FLOWS GENTLY UNDER STOPHAM BRIDGE, A POCKET HISTORY IN ITSELF

To allow barges of hay to pass beneath, the builders of this 14th-century span designed a high central arch. The rounded bastions offer pedestrians a niche of safety from speeding motor traffic now, as they did from thundering stagecoaches a hundred years ago.

Head of the English Catholics, Premier Duke and Earl Marshal of England, Chief Butler of England, and lord of the historic castle of Arundel, he wore clothes that were an infallible disguise for his dignities.

He was once ordered off his own lawns, in the grounds of his magnificent castle, by some women visitors, and a woman outside a station told him not to loaf around, but to get to it and fetch her a cab! She gave him sixpence, and he told her it was the only money he had ever earned. Afterwards he wore the sixpence on his watch chain.

King Edward VII, shrewdest of monarchs and beloved of all classes, liked the genial and unconventional duke. When the peer had to attend a levee, or a Privy Council, he would appear in the streets of London walking alone in his usual clothes and carrying his gorgeous uniform in a brown paper parcel under his arm. At the funeral of Gladstone they mistook him for the verger, and how he enjoyed it!

Once he was stopped by a policeman from entering his own carriage; the coachman was temporarily absent, gossiping with cronies, but England's foremost duke was content to await his return. He was a friend of monks, but once, when he went to a Sussex monastery, he was directed to the mendicants' door.

"I'm a duke, so I can dress as I like," he once said, such was his psychology of life.

CHARLES II AND A SMITHY

Burpham is famous, for the good people tell you that King Charles II halted at the



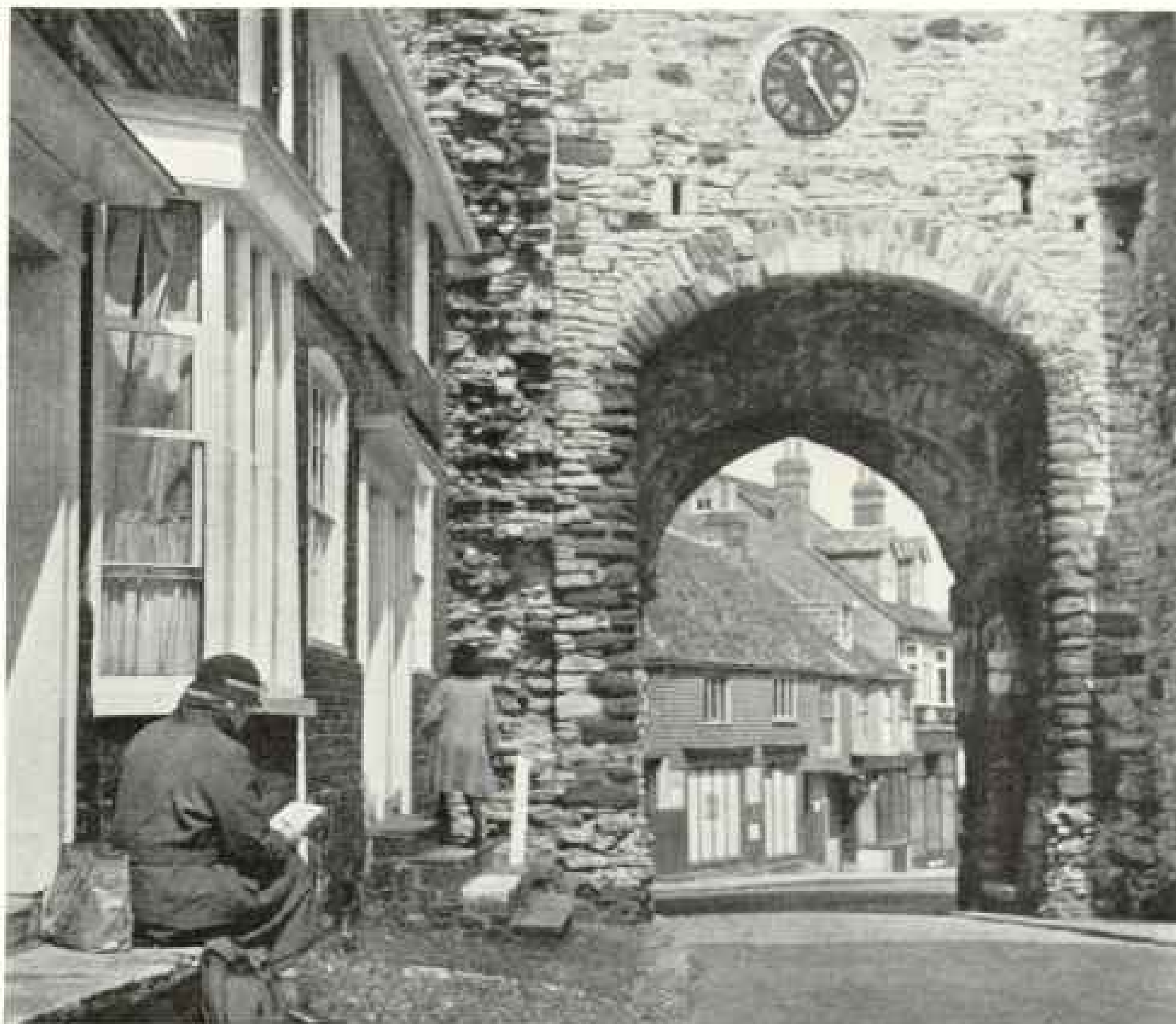
Photograph by Eulign Camera.

A SUSSEX FISHERMAN BINDS HIS LOBSTER POT WITH TWINE.

Lobsters, crabs, and prawns abound along the coast south of Washington. In the old days, when smugglers were too closely pursued, they sank the contraband overboard, marking it with a small float resembling a lobster buoy.

smithy there. His horse had cast a shoe up on the Downs, and therefore his party had to descend to the village. The smith could distinguish one shoe from another, for the pattern at that time varied in different counties, and he was interested to see that two of the shoes were not of Sussex make! This awkward observation was adequately explained by the customer and the conversation then turned on the subject of King Charles and the strenuous search being made for him, the smith remarking with some heat that he would like to hammer the King as hard as he did the nails of his customer's horseshoes.

Quitting Burpham we ascend the Downs



Photograph by Maynard Owen Williams

AN ARTIST SKETCHES RYE'S LAND GATE, LAST RELIC OF ITS ANCIENT WALLS

Once this town was a member of the Cinque Ports, but long ago the sea receded and now its former harbor is two miles inland. Golfers come to play on neighboring links, and visitors revel in the charm of its old streets and buildings.

once more, heading for Findon and the old encampment on Cissbury Ring, and so past Chanctonbury Ring, down into the valley at Bramber. Here we are once more in the heart of the Penn country. There is a castle at Bramber built in the reign of the Conqueror, and near by, scattered at intervals over the district, are old fortified manors and farms built by men who had acquired wealth during the Hundred Years' War in France (see page 66).

THE STORY OF THE "KING'S HEAD"

Through lanes that are narrow and fragrant with wild flowers we go on to Poyning, on our way to Ringmer. Ringmer prides itself on having provided William Penn with his first wife, Gulielma Springett, daughter of Sir William Springett, a Puritan, whose bust is to be seen in the little

church and who died during the third siege of Arundel Castle (see pages 61, 65).

There is much to be seen on the road to Ringmer. Above Poyning you can view the Channel and the mighty area of Brighton, or "London-by-the-Sea." The records of the 17th century tell us that its vast expanse was then a collection of fishermen's huts and a quaint, gabled inn known as the George. The inn has gone, but its story remains. It sheltered King Charles II on the final stage of his flight from England after his defeat at Worcester. It was the rendezvous for the master of a small brig which was to take the fugitive monarch to France. As Charles and his companions filed into the oak-paneled parlor a shock awaited them. No sooner had the landlord appeared with the flagons of foaming ale than he exclaimed, on seeing



Photograph by W. Robert Moore

BY THIS COZY FIRESIDE IN THE BLUE IDOL PENN DREAMED OF HIS COLONY IN AMERICA (SEE PAGE 60)

The tract of land which became Pennsylvania was granted to the Quaker leader in payment of a £16,000 loan which his father had made to King Charles II. William Penn made two trips to America to found and supervise the new settlement; but he lived only four years in all in his colony. To the end of his days he hoped to go back permanently, but the needs of his followers kept him in England.

the dark and good-looking groom, "It is—the King!"

Fate was kind to Charles, for the landlord was a staunch royalist. Rushing forward, he dropped to his knees, seized the King's hand, and declared that it should never be said that he had not kissed the hand of the best man in England.

Still going eastward, we pass Ditchling Beacon, 815 feet high, with the village nestling at the foot where lived Anne of Cleves, fourth wife of Henry VIII. The house is practically intact, a marvelous example of the architecture of the period, retaining its medieval simplicity (page 82).

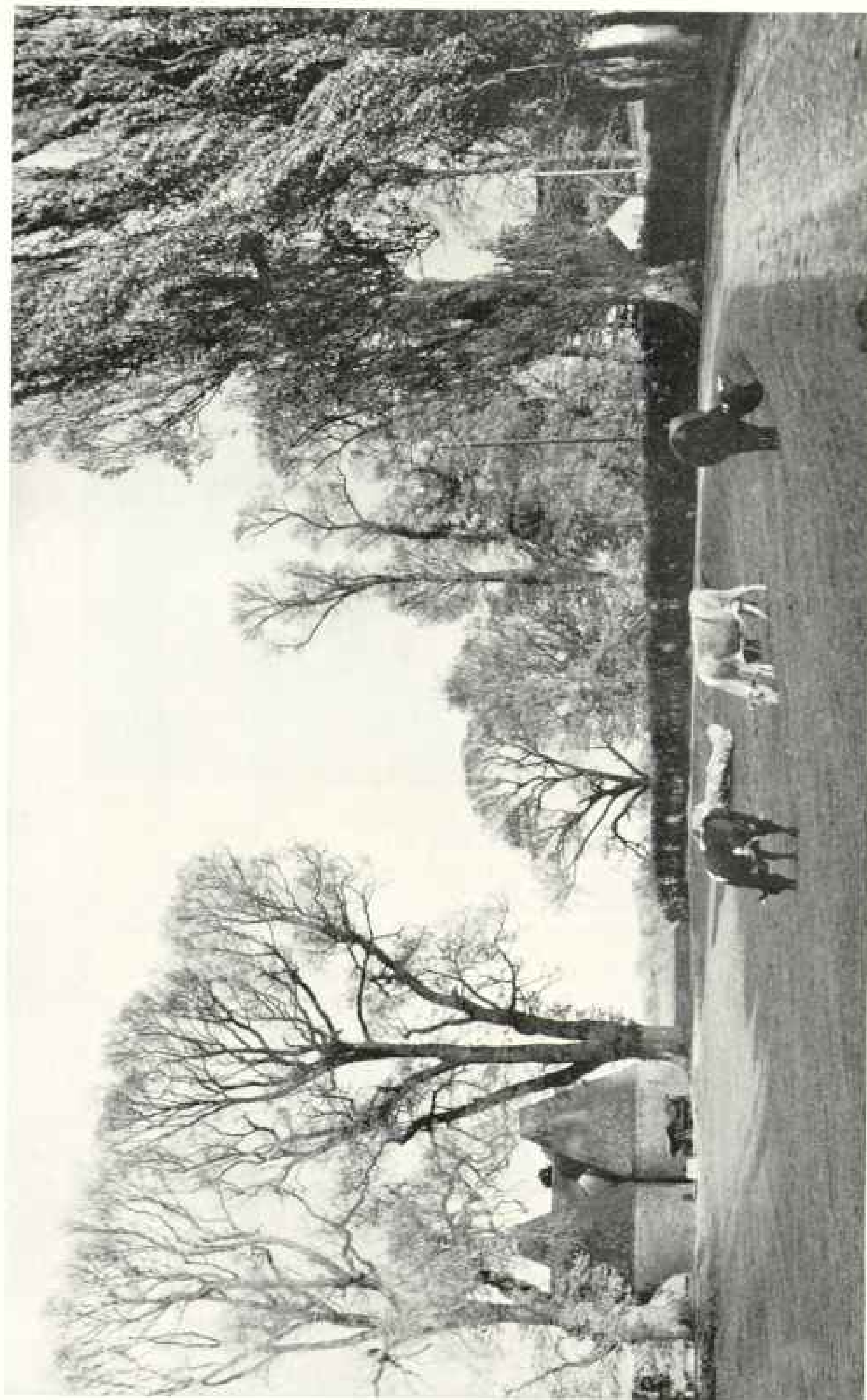
It must have been a haven of peace for Anne after the atmosphere of uncertainty as Henry's wife. She was the victim of

circumstances. Thomas Cromwell, the chief minister, wished to conclude a league with the Protestant princes of Germany and so he chose this Protestant princess of Cleves as the King's next wife.

Poor Anne was plain and awkward and Henry liked her so little that he sent her away. Furious with Cromwell for his indifferent choice, the King had him arrested in the Council Chamber and, when he protested, a charge of high treason was lodged, with the result that Cromwell was executed on Tower Hill.

BONFIRE SOCIETIES OF LEWES

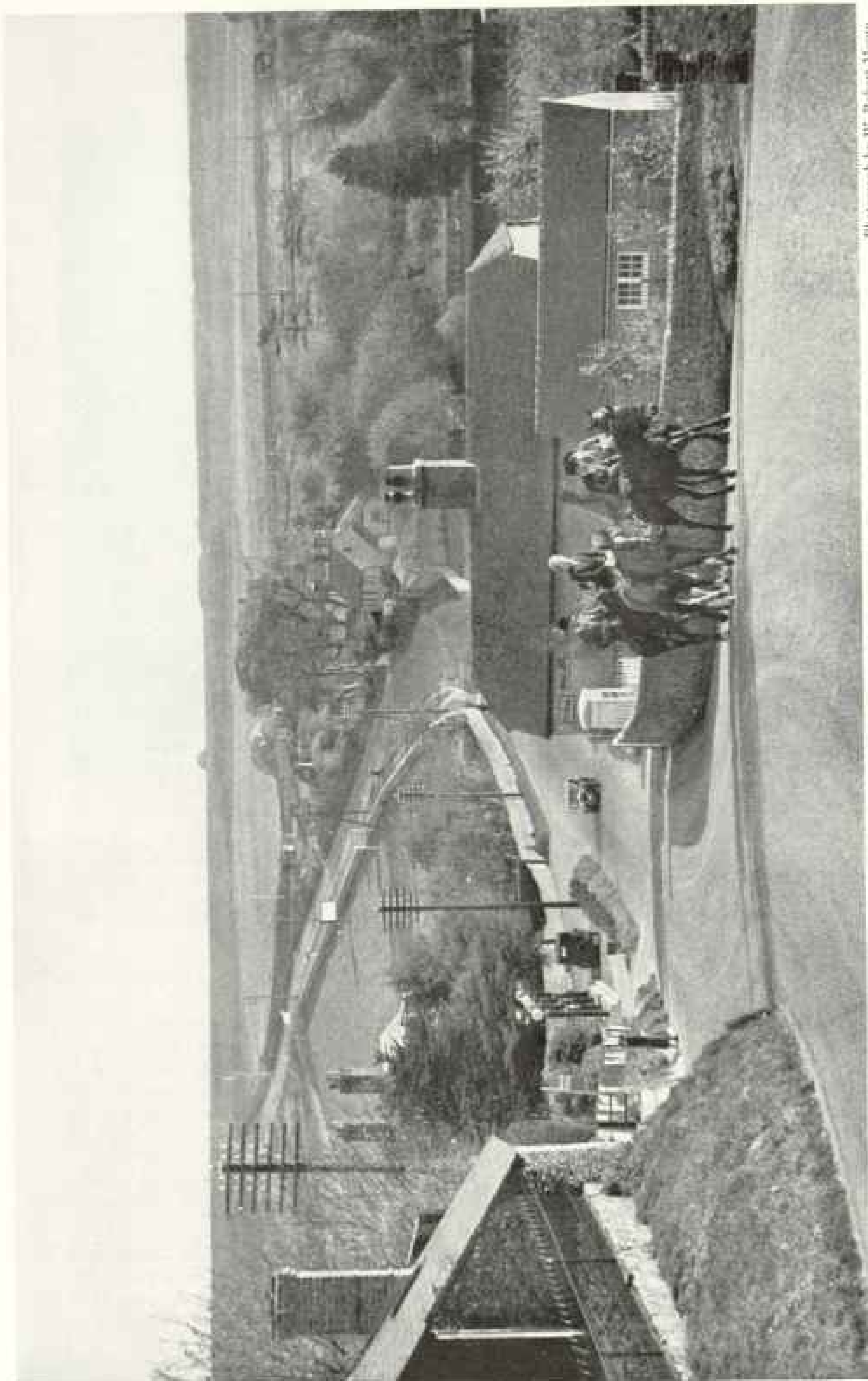
From Ditchling the highway to Ringmer is a glorious one to follow. For part of the distance you traverse the road that Cæsar's



Photograph by Maynard Owen Williams

THE LATE SUN CASTS CREEPING SHADOWS ACROSS A QUIET ENGLISH FARMYARD NEAR EYE

An oasthouse with a two-peaked roof stands beneath the tall trees. In its kilns newly picked hops are laid on a horsehair cloth to be dried by hot air. Such lanes, where the peace of the English countryside has not met the changing times, make Sussex beloved of artists and writers. The southern counties have a climate warmer and drier than that of most other parts of the British Isles.



Photograph by W. Robert Meade

THE ROAD SWINGS AWAY OVER THE DOWNS NEAR EASTDEAN

The South Downs are popular with horsemen and hikers, for the turf is springy and pleasant underfoot. The driver of the car pausing at the filling station may pick his favorite petrol, for large stations usually sell all the standard brands, thereby doing away with numbers of rival distributors side by side. This town is near Eastbourne, popular as a summer seashore resort.



Photograph by Ewing Galloway

THIS GREEN MEADOW WAS DRENCHED WITH SAXON BLOOD IN 1066

The cavalry of William the Conqueror retreated across Hastings battlefield, luring the Saxon infantry down from their vantage point on Senlac hill. Then the invaders surrounded and slaughtered them. According to tragic legend, Editha of the Swan Neck, wife of King Harold, wandered through the bloodstained grass after the battle until she came upon the body of her husband. Falling on the corpse, she prayed to the victor for permission to bury it, which he granted (see illustrations, page 22 and page 79).

legions made to link the fortified points along this "chain of majestic mountains."

We drop again into the valley at Lewes, the county town, with its massive Norman castle and narrow streets, which are the scenes of annual revelry. Lewes is quiet and homely, with little hurry and bustle except on market days, but on November 5 it takes on an entirely different aspect and emerges as a bacchante robed in fire and flame. Half a dozen bonfire societies flourish in the town and on the great day they combine for a carnival in which the principal figure is Guy Fawkes.

So at nightfall, after weeks of preparation, the mighty procession forms, the figures to be executed are arrayed with

much ceremony, the "Lord Bishop" appointed delivers his sermon with eloquence and force, the sentences are passed, and the procession proceeds on its way to the burning place, where an immense bonfire is in full blast. There more eloquence follows and the effigies are duly sacrificed.

THE SPARKS OF THE "ROUSER"

With them is burnt the effigy of anyone who is in the public eye at the moment as a miscreant. Jack the Ripper, President Kruger, and the Kaiser, each in his time has been thrown into the fire amid tremendous cheers and loud detonations from the Lewes "rouser," a firework peculiar to the town.



Photograph by Topical Press Agency

BURY HILL COMMANDS A SWEEPING VIEW OF THE SOUTH DOWNS

The tops of many small English closed cars open so that the occupants may stand and enjoy such magnificent panoramas of rolling fields and villages.

The "rouser" is the principal item in the carnival. It flies through the air by the force of its escaping sparks, bursting with a terrific report, and, to safeguard themselves from its ravages, householders and paraders wear wire-netting glasses, windows are covered with planking, and wet straw is laid thickly over gratings.

DEFOE'S NOTES ON A ROAD

Ringmer lies a couple of miles northeast of Lewes and was long famous for its bad roads. Defoe, the chronicler of *Robinson Crusoe*, who traveled through Sussex, thus relates how the oak trees for the wooden walls of Old England reached the naval dockyard at Chatham: "I have seen one tree on a carriage drawn by twenty-two oxen; and, even then, it is carried so little a way and thrown down, and left for other tugs to

take up and carry on, that sometimes it is two or three years before it gets to Chatham. For, if once the rain comes on, it stirs no more that year; and sometimes a whole summer is not dry enough to make the road passable.

"Here I had a sight which, indeed, I never saw in any part of England before—namely, that, going to a church at a country village, not far from Lewes, I saw an ancient lady, and a lady of very good quality, I assure you, drawn to church in her coach by six oxen; nor was it done in frolick or humour, but from sheer necessity, the way being so stiff and deep that no horses could go in it."

The ancient dame was not alone in her glory; Sir Herbert Springett, father of Penn's father-in-law, was himself conducted to the little church at Ringmer in a carriage



Photograph by W. Robert Moore

THE BOYS OF LEWES BURN EFFIGIES AND SET OFF "ROUSERS" ON GUY FAWKES NIGHT

Several bonfire societies led by "Bishops" celebrate on November 5 the foiling of the Gunpowder Plot to blow up Parliament in 1605 (see text, page 88). Members are not all as young as the title "boy" would suggest. The fires may be a survival from the 16th century persecutions, when, in one day, ten men and women were burned at the stake.

drawn by eight oxen. Sir Herbert was determined, at all costs, to get to his pew; so he reinforced his team and, by pulling mightily, they deposited him at the door. In Ringmer the knight was known, so the epitaph states, "as a true Sonne of the Church of England," and his faithful adherence led to the following verses being composed in the village:

Although they drew so light a load,
(For them!) so heavy was the road,
John Grigg was buoy with his goad.

The cottagers in high delight
Ran out to see the startling sight
And make obeisance to the knight,

While floated through the liquid air,
And o'er the sunlit meadows fair,
The throbbing belfry's call to prayer.

At last, and after many a lurch,
That shook Sir Herbert in his perch,
John Grigg drew up before the church.

The old church at Ringmer stands gray and noble beneath the shadow of the Downs, a beautiful structure with a porch that seems as old as the hills themselves.

Penn often went there; his wife and her parents and their ancestors before them were well known to it.

PENN'S EPITAPH FOR HIS WIFE

When Gulielma Penn died at the age of 50, her Quaker husband wrote the following appreciation of her: "She was a Publick, as well as Private Loss; for she was not only an excellent Wife and Mother, but an Entire and Constant friend, of a more than common Capacity, and greater Modesty and Humility; yet most equal and undaunted in Danger. Religious as well as Ingenuous, without Affectation. An easie Mistress, and good Neighbour, especially to the Poor. Neither lavish nor penurious, but an example of Industry as well as other Vertues: Therefore our great Loss tho' her own Eternal Gain."

Here, in this part of Sussex so easily accessible from London, Brighton, or Worthing, are memories of the great Quaker whose name, both in England and America, will always be honored.

LIVING ON A VOLCANO

An Unspoiled Patch of Polynesia is Niuafoō, Nicknamed "Tin Can Island" by Stamp Collectors

BY THOMAS A. JAGGAR

AUTHOR OF "MAPPING THE HOME OF THE GREAT BROWN BEAR" AND "JAPAN'S GREATEST VOLCANIC ERUPTION,"
IN THE NATIONAL GEOGRAPHIC MAGAZINE

With Illustrations from Photographs by the Author

ALTHOUGH the South Sea island of Niuafoō is the top of an active volcano that erupted in 1929 and destroyed a village, it remains the happy home of some 1,100 of those superb Polynesians, the Tongans.

Dwelling for untold generations on this remote crater in the sea, they have learned to act quickly and shrewdly in volcanic emergencies, and in recent years there has been little loss of life.

How they behave was dramatically illustrated at 4 a. m. on July 25, 1929. A hundred or more villagers, the entire population of Futu, on the northwest coast, were awakened by a rumbling and saw fire breaking out in the hillside less than two miles to the southeast.

No time was lost. The alarm was spread in the village, and the babes in arms, the sick, and the aged were hurriedly carried off along a good road that led to the northern village of Angaha. All realized that safety lay in reaching there or the high ground of the island's circular ridge.

From three vents on a fracture that opened northward, the molten rock descended upon Futu. By 8 o'clock in the morning most of the abandoned buildings were consumed by fire and buried under floods of heavy basaltic lava. Pouring into the ocean, the hot flows killed fish, sent up clouds of steam, and heaped enormous quantities of black sand along the water front.

Fringing the shore were patches of cultivated land that remained uninjured among the lava streams. In one of these the returning villagers found a few of their horses, pigs, and chickens still alive. Thanks to the prompt exodus, every one of the human inhabitants escaped.

When I first saw Niuafoō it reminded me of a hat with a hole in the crown. At the bottom of the hole is an islet-dotted lake of fresh water, with its bed some 200 feet below sea level, its surface only 70

feet above. The wide "brim" has been formed by lava flows.

So nearly perfect is the ring which Niuafoō forms about its lake-enclosing crater that at first sight it appears to be a coral atoll. The island's highest point is about 800 feet above the waves, but the volcanic cone it crowns thrusts itself up some 6,000 feet from the ocean floor (see map, page 95).

This detached bit of the Tongan archipelago is a straggler from the line made by those islands north of New Zealand. It lies near the center of the ocean triangle formed by Samoa, Tonga, and Fiji.

I went to Niuafoō as a guest of an eclipse expedition sent out by the United States Naval Observatory, under command of Capt. C. H. J. Keppler, and stayed there for two months, studying the geology of the volcano and becoming acquainted with the natives.

SHARKS INTERFERE WITH MAIL

Lacking harbors, the island is utterly isolated. Our heavy and precious scientific equipment had to be loaded in skiffs from the expedition's two small vessels anchored offshore, and landed on a natural rock platform at the foot of the high cliff that walls the island. From there a derrick swung the boxes up to where their contents could be unloaded.

Far more precarious was the regular carrying of mail to and from the island, up to the time of our visit. The monthly mail steamer *Tojua*, unable to anchor, stopped about a mile off the northern landing at Angaha. Natives, fortified with log floats, swam out to it, regardless of sharks, holding above the water brown paper-wrapped packages of outgoing letters tied to the tops of sticks.

The sailors on the steamer lowered a bucket and collected these parcels. In exchange they dropped into the water the more bulky mail from the outside world,



IT IS STEAMER DAY FOR THE "TIN CAN MAIL"

Choppy seas prevented these Niuafoō postmen from discharging the outgoing mail on this trip, yet they have a much easier task than the swimmers who once brought it out attached to long sticks, a practice abandoned because of fatalities from sharks. Mail from the ship is cast overboard in sealed cans and then picked up for delivery to the islanders or for reposting (see illustrations, pages 102, 106).



Photographs by W. Robert Moeck

BOATS REPLACE SWIMMING POSTMEN, BUT THE MAIL STILL GOES IN TIN CANS

With their outrigger canoe half filled with water, these sturdy Niuafoō islanders are straining at paddles and line from a halting steamer to bring their craft alongside. Letters, prized by collectors, are carefully sealed in the can in the center of the canoe.



NIUAFU FURNISHES A TROPHY FOR A STAMP COLLECTOR

The unique postal dispatch system employed by Niuafu has given the island wide recognition among philatelists. This letter, mailed by a GEOGRAPHIC staff member, reached The Society's headquarters approximately five months after it was dropped overboard.

soldered in large biscuit tins. The athletic villagers towed these tins ashore and thus completed delivery of the mail.

An unfortunate encounter between a swimmer and a shark finally caused a suspension of the swimming mail service, and native canoes now collect the tin cans. It is easy to understand why Niuafu, called "Good Hope Island" on some charts, has become known also as "Tin Can Island."

While my companions were observing and photographing the eclipse with what looked like a weird anti-aircraft battery, I tramped all over the island, which is only five miles across. The sons of one of the traders went with me as interpreters.

On the west side is a desert of new lava flows, but on the east is a tropical glory of coconuts, ironwoods, mangoes and pandanus, yams, taros, papayas, sweet potatoes, pineapples, bananas, melons, and manioc.

Although the island lies some $15\frac{1}{2}$ degrees south of the Equator, the trade winds give it a delightful climate, much like that of Hawaii.

Explosive volcanic eruptions around the lake, I found, have occurred about 72 years apart, and lava outbreaks in the western

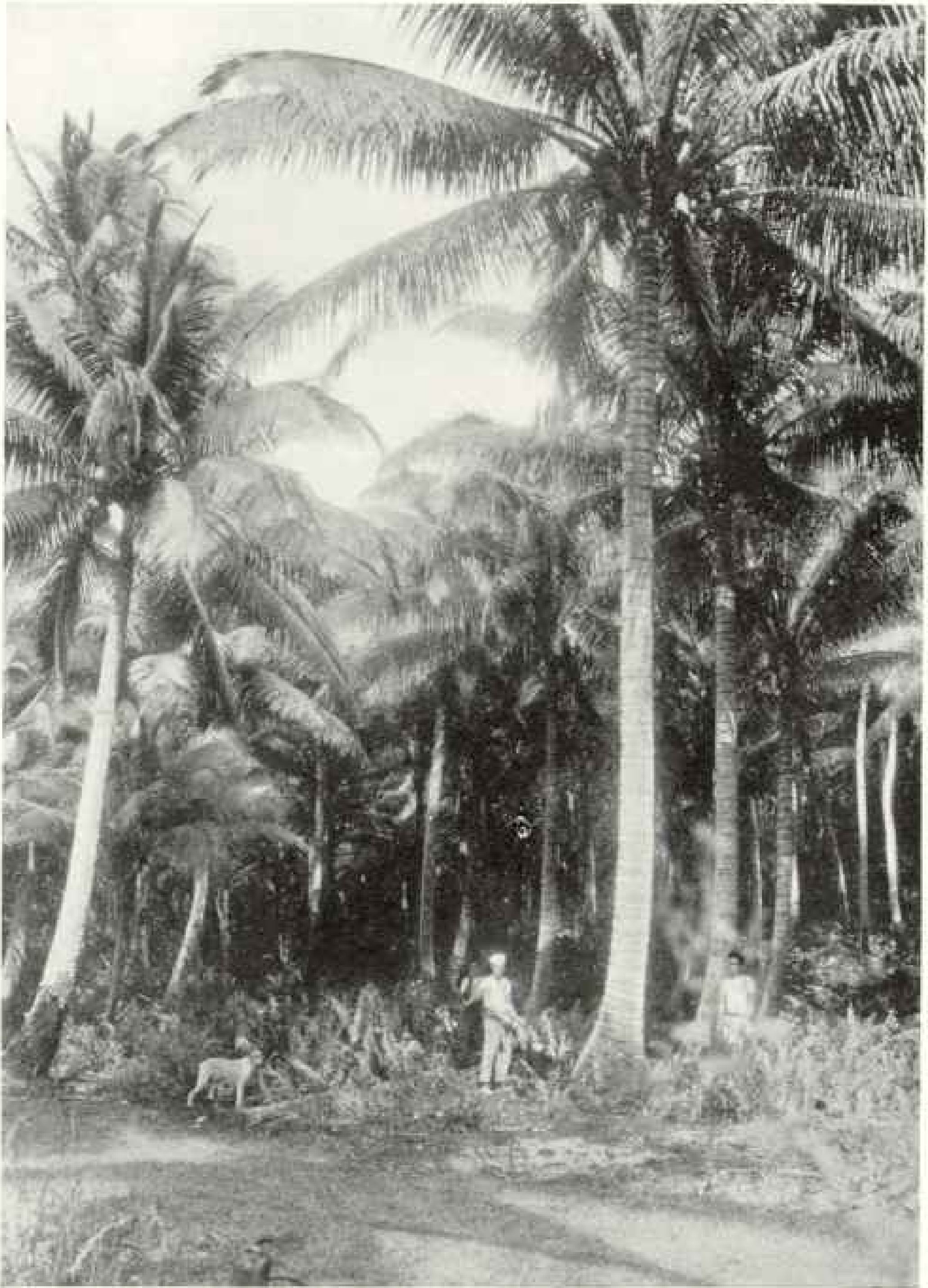
deserts have come at intervals of approximately 16 years.

THE VOLCANO PUFFED STEAM HARMLESSLY

The last steam-blast eruption, which occurred in 1886, was a major event in the history of Niuafu. There was no loss of life, for the trade wind forced the huge cauliflower clouds of sand and dust westward, away from the settlements. The site of this eruption was near the northeast corner of the big lake, where large blocks of cliff rock were engulfed, and heaps of sand were piled 200 to 400 feet high. Ponds were left where the explosive craterlets had formed. About three feet of ash fell on the settlements.

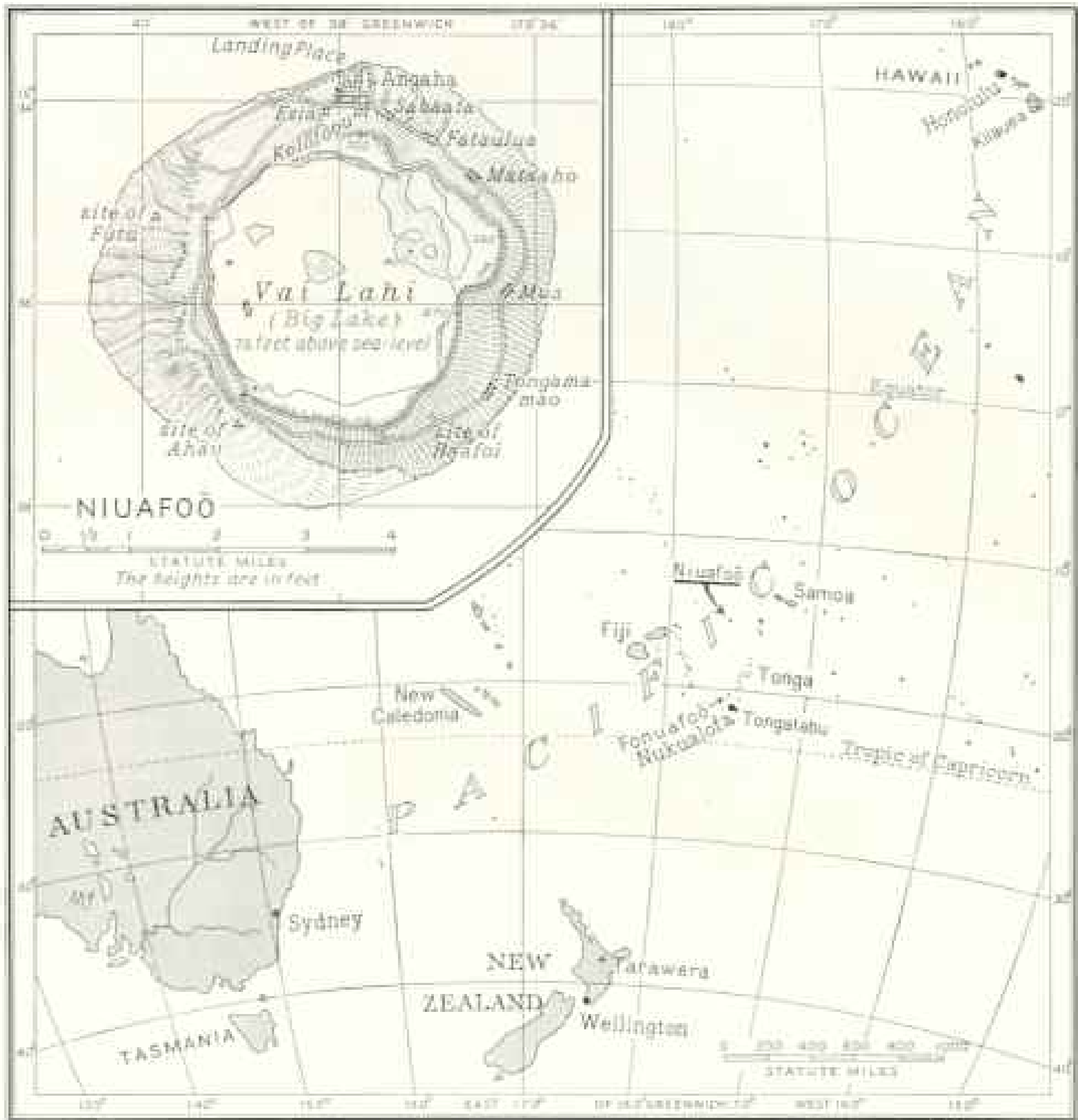
The story goes that an earthquake shook the island with a gentle swaying motion at 7 p. m. on August 31, 1886, and smaller shocks continued till midnight, causing alarm. Then came a detonation, a "rocket" ascended 3,000 feet above the lake, and the quaking ceased. Violent thunderstorms developed, and lightning struck in many places.

A blizzard of black dust and sand weighted down the vegetation during a



FOREST GIANTS, LIKE THE PEOPLE, ARE VIRTUALLY FREE FROM DISEASE

A magnificent grove of coconut palms along one of the avenues is always kept open by the Government. Among these trees travelers need not carry canteens, for the boys run up them like monkeys, hack off young coconuts with copra knives, and with a few strokes open the end of the coconuts for delicious drinks of the cool, clear milk inside.



Drawn by C. E. Riddiford

RESTLESS NIUAFOŌ LIES HALFWAY BETWEEN SAMOA AND FIJI

An eruption blew off the top of a volcanic peak and left its base protruding above the Pacific. Around the outside a lava platform, partly covered with tropical foliage, slopes toward the sea. The inset shows Niuafoō as it would appear from the air, a giant floating hat, the lava shell being its brim, the crater its crown, and the lake a hole in the top.

night of inky darkness. On the leeward side of the island, broken fragments of rock and pumice, along with sand and fine dust, piled 20 feet deep. The eruption continued in spasms, geyserlike, for 18 days, with recurrences of terrifying clouds of dust that shut off the light of day.

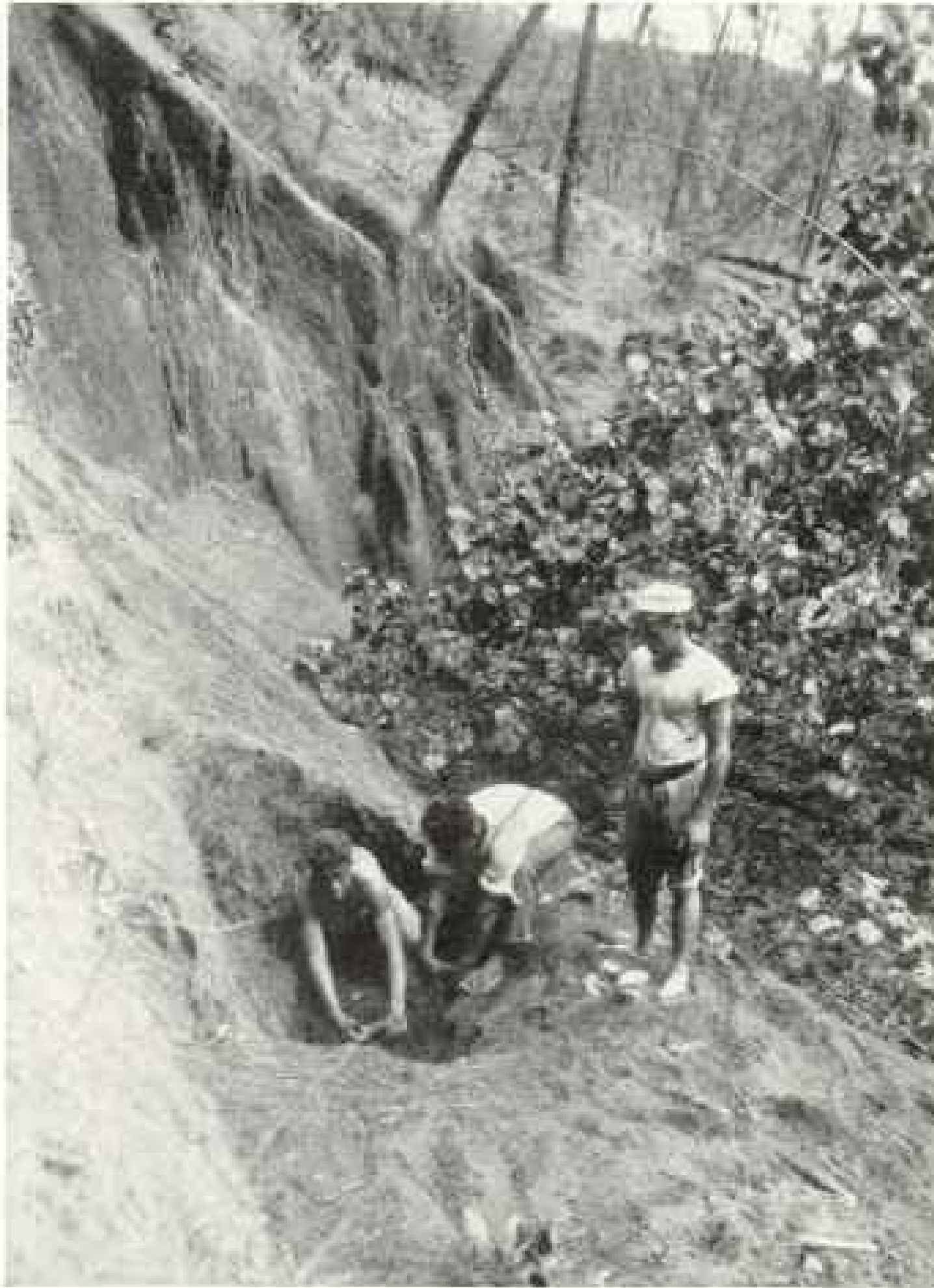
Only two months before, Tarawera Volcano had erupted disastrously in New Zealand, indicating volcanic sympathy between two craters hundreds of miles apart on the same general rift in the earth's crust; and Fonoafu (Falcon Island), nearer to Niua-

foō, had begun eruption in October, 1885.

Destruction of property by hurricanes and eruptions on the northern and western sides of the island have been lamentable during the last century. The story of the village of Ahau in the southwest is reminiscent of that of Sodom and Gomorrah.

CALAMITY AND A HEADMAN'S PRAYERS

Ahau, legend says, was founded by men and women who, refusing to conform to the laws governing legal marriage, rebelled against the strict High Chief at Angaha.



THE MALAU BIRD USES A NATURAL INCUBATOR

This big-footed bush hen, a species of megapode, digs her way into the soft slopes left by old volcanic eruptions, and lays a big pinkish-brown egg underground. She buries it in sand as she retreats from the hole. The sun does the hatching in due time, and the young bird digs its way to the light of day and immediately flies to cover. The natives often find the scratching left by the mother and dig up the egg for food.

They founded their village purposely on the side of the island most remote from Angaha, and their headman denounced with impassioned oratory the taxes imposed upon them by the High Chief. He called upon the gods to send a sign from heaven to destroy all his people rather than permit them to submit to such oppression.

Whatever the truth of these stories, certain it is that on June 24, 1853, the ground rifted and lava spouted up directly under the village headman's house. Such destruction of human life by a sudden lava flow is unusual in volcano annals, for lava is usu-

ally so slow-moving that people have time to flee from it. There were earthquakes and rumblings, the crack extended itself north-westward lengthwise of the village street, and the fiery slag spouted up and flowed down to the sea. Presumably the eruption was at night, for the headman and many of the natives were trapped and burned, and the village was destroyed.

I talked with an aged woman who recalled the frenzied flight of those inhabitants who escaped and the gossip about the village. She said that two-thirds of the population, possibly 60 or 70 people, were killed.

When I visited the site of this village I found the lava flows covered with a moderate growth of ironwood, somewhat resembling a pine forest with its small cones and long needles. Not a trace remains of the village green or native huts.

There is a 50-foot double spatter cone of black lava at the place where the headman's house is said to have stood. From this hill all lava channels radiate to the south and west, passing into tunnels far down the flow in the direction of the seashore. On the uphill side the lava gives place abruptly to a luxuriant growth of coconuts and fertile plantation lands on the slope of the circular ridge.

ERUPTION CAN BE PREDICTED BUT NOT FORECAST

A study of the eruptions and the dates when they have occurred provides some basis for predicting, roughly, when future outbreaks may occur.

We may consider that Niuafoō is continuously erupting, and that these lava flows and explosive engulfments are merely punctuation marks in a continuing process.

After an explosive eruption in 1814, the intervals were 26, 13, 14, and 19 years. From the 1886 explosive eruption to the present time the intervals were 26 and 17 years. Considering the average lava interval of 16 years, we have reason to expect another lava eruption about 1945. Adding the average explosion interval of 72 years to 1886, we estimate that the next explosive eruption will occur about 1958.

These expectations are not accurate forecasts, but merely suggestive experiments in volcanologic reasoning. It is probable that the explosive eruption about 1958 will break down the very high cliffs to the southeast of the lake, and that opposite this the lava flow, about 1945, will extend the crack of 1929 along the north-west shore of the island, in the direction of the village Esia, near Angaha, where the Eclipse Expedition landed.

ISLANDERS WEAR "TOGAS"

The sovereign of Tonga is Queen Salote (Charlotte), who, from her capital Nukualofa, on Tongatabu, in the southern part of the archipelago, governs the islands under a British protectorate. The currency used is English money. In language and customs, the Tongans are like the Maoris of New Zealand and the Samoans. Being Polynesians, they differ decidedly from the Fijians, who are mostly Melanesians.

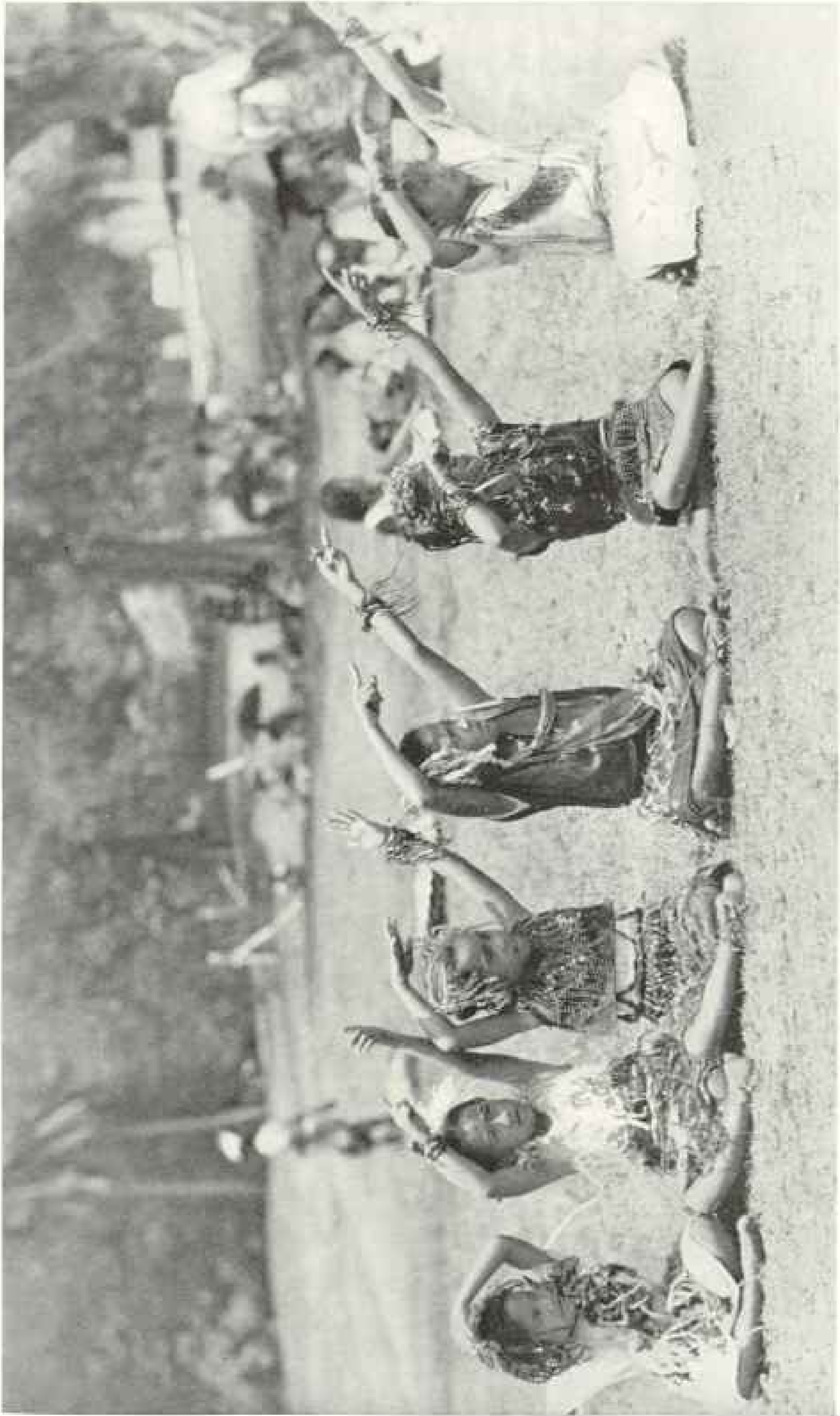


THE CONQUERING LAVA HOLDS UPRIGHT A PALM IT ENGULFED

Such spatter heaps tell the story of periodic eruptions which have ruined some of the best agricultural land on Niuafoō.

Tongan society is distinct, with hereditary lines of chiefs, and Niuafoō has its own peculiarities of culture. The people are entirely civilized and Christian; they are strictly governed by a High Chief, a magistrate, and police service. There are usually seven or eight Europeans at Angaha.

Wesleyan churches with native ministers and elders are conspicuous in all the villages. On Sunday, services start before daylight, with crowded congregations singing choral music in parts without any organ. The rhythmic and harmonious blending of the deep bass voices of the men and the soprano of the women is pleasing. The music has a quality quite unlike Hawaiian



GRACE IS INHERENT IN NIUAFOʻU NATIVES, WHO DANCE SITTING DOWN

Little girls take part in the ceremonials, decked in their finery of *ʻūū*, as the garlands of beads are called. Some of these are made of shells and beams of different kinds.



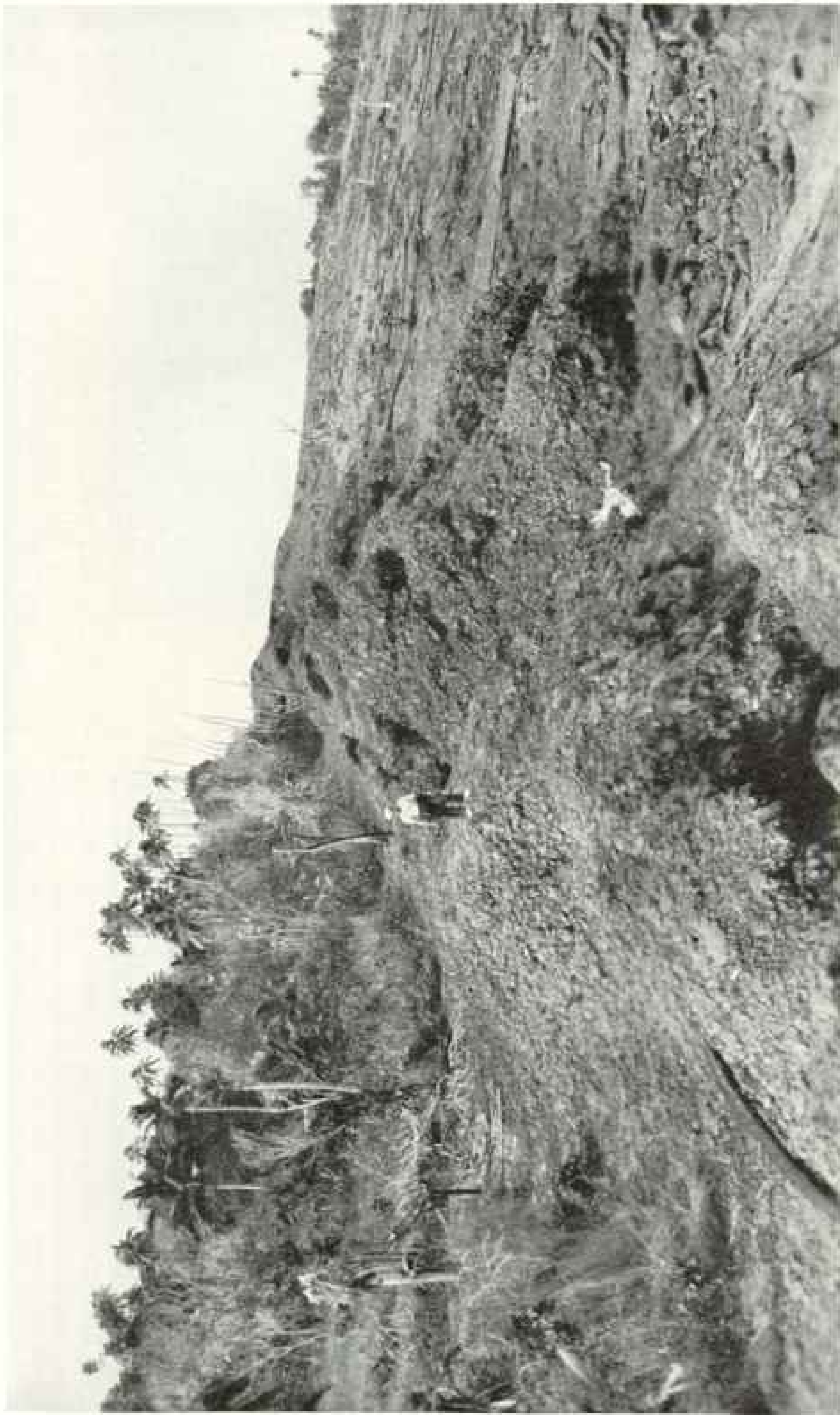
ATTRACTIVE ON SHORE, SHE WAS A NYMPH IN THE WATER

Josephine, senior pupil and assistant in the Government school at Angaha, is a daughter of the headman of Futu, the village destroyed by lava in 1919. This happy refugee, when she plunged into the waves at the new beach at Futu, became a bewitching mermaid.



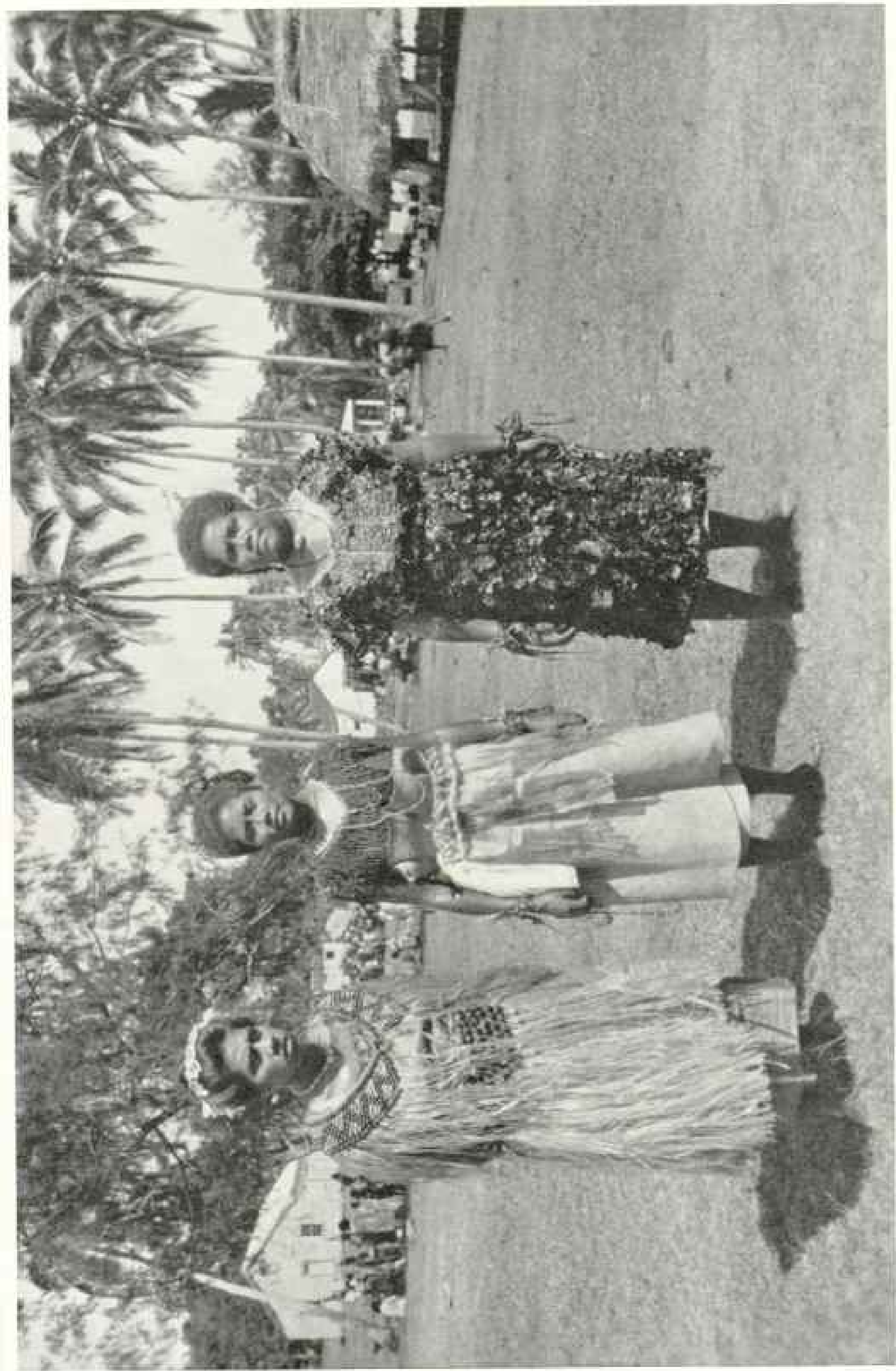
TONGA "PEAS" INTERESTED U. S. MARINE RADIO OPERATORS

Many strange plants are found in the luxuriant tropical vegetation, but none is more remarkable than the *boanga* with its giant pods. Protected by a hard, crescent-shaped, fibrous coating, seeds have floated thousands of miles across the Pacific Ocean.



FIRES OF THE UNDERWORLD HAVE DEALT SAVAGELY WITH NIUAFOO

A line of small craters extends north and south on the west side of the island, where the lava flow of 1929 welled up a crack and poured off to the right. On the left is shown the unaltered jungle. The molten rock spouted and sprayed into the air along the crack so as to build up the spatter heaps where the boy is standing.



AN ELABORATE, ANCIENT COSTUME FOR A MODERN CEREMONY

The women kinsfolk of a chief put on all their finery for the tribal dances, which were held at Angaha, Niunofu, in celebration of the opening of the Government radio telegraph station (see text, page 105).



THUS NIUAFOŌ GOT ITS NICKNAME, "TIN CAN ISLAND"

An aquatic postman is approaching the rocks with two large tin cans of incoming mail in tow. These were soldered by the engineer of the departing ship before they were cast overboard to be taken ashore by the swimmers.

music, and the Sunday services were to me an endless delight. There was no need for a pipe organ.

One evening service in the dimly lamp-lit church at Angaha consisted of a musical competition between the choirs from the nine villages. The choirs, each usually composed of eight persons, men and girls, would rise in turn in their places and sing. When a song was finished a reverent chorus of bravos, or the equivalent in Tongan, would go up from the congregation.

The dusky faces in the lamplight, many of them beautiful; the splendid figures of the men draped in spotlessly clean *valas*, which suggest a Roman toga; the minister exhorting his flock, and elderly patriarchs and matriarchs rising at intervals to make confessions of faith, made the scene one never to be forgotten.

The Tongan race is dominantly agricultural, with copra as the leading product. At Niuafō intervals between shipments of copra are long, for the bad anchorage and landings make visits by even tramp steamers rare.

The four villages immediately around Angaha represent half the population of the island. Each family lives in an elliptical, thatched house, with woven matting for the walls, but these curtains do not lift up as in the Samoan houses. There are doors in the ends and sides (pages 104-5).

NATIVE WEALTH MEASURED BY MATS

Wealth consists of land, plantations, mats, and tapas. The owner of many and fine mats is respected for his prosperity and thrift. Numerous silver shillings circulate from the traders in return for copra and



A VOLCANIC CUP HOLDS A LAKE 270 FEET DEEP, ITS BOTTOM 200 FEET BELOW SEA LEVEL.

The shore is littered with limestone deposited from the water, which has receded during recent years. Among the slabs live thousands of black crabs no larger than a dime.



A FAU LOG AND WATER SPECTACLES ARE STANDARD EQUIPMENT FOR ANGLERS.

These Niuafoō fishermen bait their bone hooks, float face down beside the log, and jerk in the fish, which take the bait between the swimmer and the bottom. They watch the hook through their water-glasses. Their fiber lines are tied to a float, and their catch is strung on a small stick.



THE ANGAHA POLICEMAN HAS A FINE FAMILY AND A TRIM HOUSE

The building is of native construction, with tied posts and beams, wattle sides and thatched roof (see opposite page, and text, page 102). These sturdy Polynesians somewhat resemble the Samoans. Having had little contact with the outside world, the islanders are stalwart, without tuberculosis, leprosy, or elephantiasis.

back to the traders' stores for shirts, cloth, and chewing gum.

Of native markets I saw no sign. Each adult male has his own eight and a quarter acres of plantation lands assigned to him by the Government. He is required to cultivate this ground and plant a certain number of coconut trees.

Men and women work hard, subject to the orders of the Government, on the roads and cisterns and other structures required for the progress of the community. Pigs and chickens are abundant, but there are few cattle. Each householder has his truck garden in the hills. To this he goes, leading an old pack horse, and gathers what is needed of yams, taro roots, sweet potatoes, oranges, breadfruit, or the like. The girls think nothing of trudging miles to wash the family clothing at the lake. All are free,

happy, and smiling, and all are fine specimens of muscular humanity, leading a natural life of cultivation of the soil.

Some specialize in fishing and collecting shells where waves pound on rocky shores; and to see a group of women with the trade-wind surf dashing over them on the slippery rocks, utterly regardless of splash and undertow, makes one wonder whether more sheltered civilizations are not sinking into weakness.

FISHERMEN WATCH HOOKS, NOT BOBBERS

Like other Polynesians, these people have a fine dignity. Their own customs are regulated by the dictates of a host of ancestral traditions which center about the guilds of the craftsmen, the requirements of the family, and the orders of the chieftainship.

The fishermen use canoes of hewn and



INSIDE, THE POLICEMAN'S HOME IS INVITINGLY CLEAN

The beams are tied together with coconut fiber cords, the pattern being highly distinctive in different Polynesian islands. The door shown came from a wrecked ship, and the abundant mats and tapas represent the chief product of the women's work. A fine meshed mat, as soft as a piece of cloth and as large as the quilt of a double bed, made from split pandanus leaves, occupies a woman weaver a year and a half.

pegged timbers and also a log device of the light wood of the *fau* (same as the Hawaiian *hau*, a species of hibiscus), to which a splinter rod is lashed tightly lengthwise, with one end free for the purpose of stringing fish by the gills. Hooks are made from pieces of bone attached to short shanks of wood. The fishline is a *sennit* (a braided coconut fiber), fastened to the log.

Wearing water spectacles, two plain glass windows in wooden cups held by string around the head, the fisherman swims out with his arm across the log, his face plunged beneath the water, so that he may watch fish come to his hook.

After a capture, he removes the fish from the hook and strings it on the splinter rod. He then swims away slowly with the floating log. Two or more baits may be operated

at the same time; and two fishermen may work from a single log. The fish are small and not abundant, and many of the species found in these seas are said to be inedible. With the canoes large sharks are occasionally taken.

NATIVE DANCES MARK OPENING OF RADIO TELEGRAPH STATION

It happened that the Government radio telegraph station was finished and put into operation while we were on the island, and in celebration of this event the command went forth that native dances, or *laka-lakas*, would be in progress for a day. On the appointed feast day each village was to furnish a certain quota of baskets of food, and in the evening there would be a European dance.



MAIL WENT OUT THUS TILL SHARKS PUT AN END TO THE SERVICE

The swimmers of "Tin Can Island," with their fau pole floats and the outgoing mail done up only in brown paper on top of short sticks, would plunge into the ocean and swim a mile out to the waiting steamer. They would get the more bulky incoming consignment and tow it ashore in floating tins (see text, page 91, and illustration, page 102).

During the morning the clans began to gather, young and old, dressed in the costumes of their forefathers, with garlands of shells; beads, beans, and flowers; head-dresses of many kinds; and skirts. Some of these last were tapas covered with scarlet berries cemented in place in elaborate designs with native gum; others were very old and fine mesh mats, prized as relics of antiquity.

At the appointed hour, the High Chief, Fotofili, emerged surrounded by functionaries, and seated himself on the veranda of the radio building. Clan after clan came forward, each representing a village, the headman and warriors flourishing spears for war dances.

The women and girls formed another line, bringing forward the baskets of food,

placing them on the ground in a straight line, and singing and dancing with the stately steps and graceful motions of the arms that told a story of bygone days. Some of the dances are entirely hand and body gestures of girls seated cross-legged. There were vigorous applause and beating of drums as each village completed its *laka-laka*.

The beating of the drums is one of the characteristic noises of the country. At all hours of the day the sound can be heard by one wandering in the jungle. The beating means something with reference to village timekeeping, or signifies special orders to the people. The islanders guide their lives by the sound of the drum, on the one hand, and the clangor of the church bell on the other.



NATIONAL GEOGRAPHIC SOCIETY HONORS BYRD ANTARCTIC EXPEDITION

A BRILLIANT audience of National Geographic Society members, in Washington, on the evening of May 10, welcomed home the Second Byrd Antarctic Expedition. On their behalf Dr. Gilbert Grosvenor, President of The Society, presented the leader an illuminated scroll setting forth the important contributions to geography made by his various expeditions.

Rear Admiral Richard E. Byrd, U. S. N., Retired, acknowledged the greetings and gave a brief summary of the explorations and 22-point scientific program which, he reported, had gathered four times as much data as his first expedition.

The interesting exercises were broadcast over 67 stations of the Columbia System and 20 stations of the National Broadcasting Company so they might be heard by The Society's million member families in the United States, Canada, and Central America.

Admiral Byrd has started writing the first complete narrative of his expedition and an account of its extensive discoveries and new scientific studies, which will appear in an early issue of The Society's NATIONAL GEOGRAPHIC MAGAZINE.

To the stirring music of the United States Marine Band the entire personnel of the expedition marched on the platform. Then followed Admiral Byrd, escorted by Dr. Grosvenor and George W. Hutchison, Secretary of The Society. As they entered, a huge American flag was lowered from the ceiling of the auditorium and the distinguished audience stood in tribute to the heroes of Little America.

WORLD MAP REVEALS EPIC ADVENTURES

Dr. Grosvenor said: "Members of the National Geographic Society, Admiral Byrd, and members of the Byrd Antarctic Expedition:

"To many, a map of the world is the greatest of all epic poems.

"The map's lines and colors show the realization of great dreams: Marco Polo's dream of the riches and wonders of China; Vasco da Gama's dream of a sea route to India; Magellan's dream that he could sail around the world; Columbus' dream of sailing westward, which added a hemisphere to the known world.

"Of all living explorers, he who has seen most of his dreams come true is Rear Admiral Richard E. Byrd, whom we honor tonight.

"Experienced men said his dream of exploring far northern lands with airplanes was visionary. But the National Geographic Society believed in him and sponsored the first attack by air on the Arctic regions suggested by him. The United States Navy agreed to cooperate, and at The Society's request assigned to organize and lead the naval contingent of that expedition—the Macmillan Expedition—Commander Byrd, already famed in the Navy as a leader in every effort to advance aviation and as the inventor of important instruments and methods for navigating planes.

"On this Greenland Expedition he flew many thousands of miles over the ice, proving the practical value of airplanes in polar exploration, and also acquiring his polar wings.

NEW EXPLORATION METHODS

"Admiral Byrd's first Antarctic expedition carried the American flag 1,500 miles farther south than it had been before. In the lowest temperatures and fiercest winds of our globe he flew airplanes more than 7,000 miles, making camera surveys of expanses larger than the area of all our Atlantic Seaboard States from Canada to the Potomac. He was first to maintain a large personnel in good health, with flying machines through a rigorous polar winter.

"Now he returns with records of even more extensive and important flights and surveys over the vast Antarctic plateau.

"Again he has developed new technical methods, such as the use of airplanes to measure surface altitudes, executed by his skilled and courageous pilots, who touched the skis of their planes to the ground every 20 miles to record surface heights by the altimeter.

"Admiral Byrd, we welcome you as the pioneer of a new era of exploration—as one who has utilized the airplane, the radio, and many other inventions of American genius to study myriad problems of many branches of science. We further acclaim you as a gallant leader of men whose ability and concern for their safety have won their admiration and their loyalty and ours.

"We are gratified to have with you on this platform, and to honor with you, your entire personnel—scientists, airplane pilots, dog-sled drivers, seamen, and all your aides, who have shared in one of the most comprehensive, efficient, and fruitful expeditions of modern times.

"Admiral Byrd, in 1926 the National Geographic Society conferred upon you its highest award, the Hubbard Gold Medal, granted to only nine other persons. In 1930 our Society was under the pleasant compulsion of devising for you a special gold medal of honor, five inches in diameter.

"The most enduring testimonial to you will be the record of your discoveries upon The Society's new Map of the World and upon all subsequent maps.

"Tonight we desire to present you with a citation of your memorable contributions to geography. It reads:

THE SOCIETY'S RESOLUTION

To Rear Admiral Richard Evelyn Byrd, U. S. N., Retired: On the tenth anniversary year of your first association with the National Geographic Society in aerial exploration, The Society's officers and trustees, on behalf of its million members, desire to present this official expression of recognition and appreciation of your unparalleled achievements as an explorer.

In 1925 you first flew airplanes successfully in exploration of the Far North.

In 1926 you were the first and only man to command a flight by airplane over the North Pole.

In 1927 you flew an airplane across the Atlantic, making many observations of high scientific value.

In 1928-1930 you organized and led an expedition which spent 14 months in Antarctica, there discovering and naming new areas and making scientific studies in many fields. You were the first and only man to command a flight by airplane over the South Pole.

Now you have returned from a second successful expedition to the Antarctic, again without the loss of a man, bringing final proof that the South Polar lands form a continent, and other geographic data of great importance.

Our Society is proud to have been associated with you upon these expeditions. You have submitted to us your reports and findings, to be passed upon by com-

mittees of scientists, and you have written the first comprehensive accounts of your explorations for The Society's NATIONAL GEOGRAPHIC MAGAZINE.

All these expeditions have been noteworthy for your skill in organization, for your splendid leadership, for your choice of scientific personnel, and for your adaptation, often for the first time, of new methods and instruments for the study of diverse problems.

Thus you have added immensely to man's knowledge of, and interest in, world geography.*

"This citation is signed by each member of THE GEOGRAPHIC staff and Board of Trustees, excepting only one whom we both love, our distinguished Vice President, John Oliver La Gorce, who landed last night in San Francisco after long and arduous travels for The Society, who sends his congratulations and will soon be back to complete the roll."

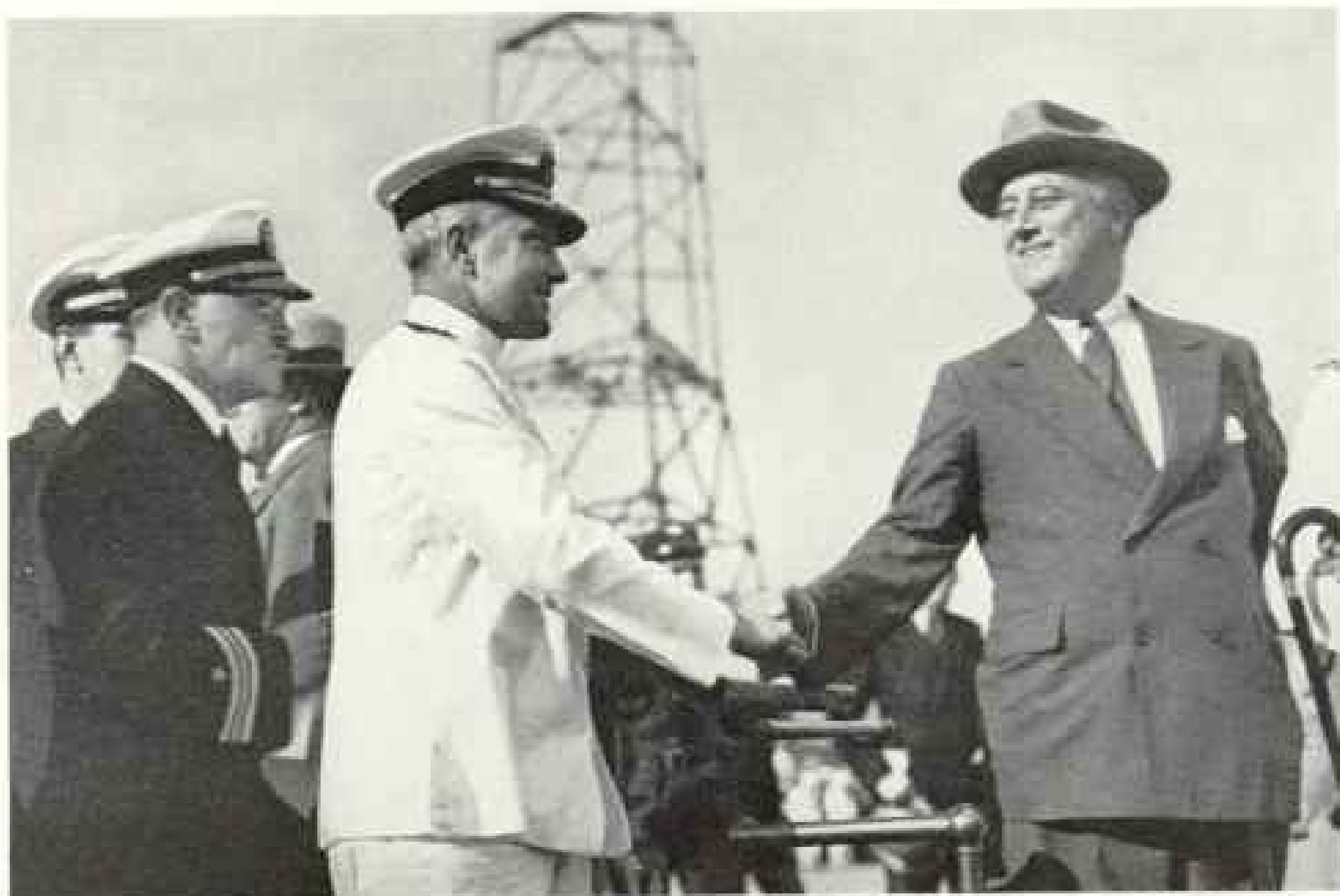
ADMIRAL BYRD'S ADDRESS

Admiral Byrd replied: "Dr. Grosvenor, my fellow members of the National Geographic Society, and guests: Dr. Grosvenor, I want to thank you for my men as well as for myself, because they deserve equally with me. I am proud to be a member of this Society and to have been so closely associated with its President, Dr. Grosvenor, and also with Dr. La Gorce and the staff.

"You may be interested to hear that I have found copies of The Society's magazine in the most distant and inaccessible spots in the world. It was common to find it on the tables of houses in New Zealand. I have even found a copy in that mysterious island called Easter Island, which is so far off the beaten track.

"The help the National Geographic Society has given to explorers has been very

* The illuminated scroll containing the resolution was signed by Gilbert Grosvenor, John Oliver La Gorce, George W. Hutchison, John Joy Edson, Walter S. Gifford, David Fairchild, C. Hart Merriam, Lyman J. Briggs, George R. Putnam, Theodore W. Noyes, Charles Evans Hughes, John J. Pershing, William V. Pratt, Raymond S. Patton, Alexander Wetmore, J. Howard Gore, Frederick V. Coville, Charles G. Dawes, A. W. Greely, George Otis Smith, O. H. Tittmann, Robert V. Fleming, George Shiras, 3d, J. R. Hildebrand, Melville Bell Grosvenor, McFall Kerbey, Leo A. Borah, Frederick Simpich, William Joseph Showalter, Albert H. Bumstead, E. John Long, Franklin L. Fisher, Maynard Owen Williams, Charles Martin, Leonard C. Roy, Herbert A. Poole, Thomas W. McKnew.



Photograph by Rollins. Courtesy The Washington Post

"ONE THING MORE FROM THE HEART—DICK, I SALUTE YOU"

After Admiral Byrd's brief report to President Roosevelt at the Washington Navy Yard and the President's reply, formality was laid aside for a personal greeting. Lieutenant Commander George O. Noville, U. S. N. R., executive officer of the expedition, stands behind his chief.

great. I happen to be one of those explorers, and I am glad to acknowledge that without the help of The Society I have had in connection with all of my expeditions there would have been a very different and less successful story to tell. The Society's encouragement has sustained me many times when we were having a tough time in the field of operations.

"Dr. Grosvenor has told you of our scientific program. We accomplished our mission, due to the good work of my men. They are volunteers, but that didn't keep them from putting all they had into their jobs. My own contribution was small, just as one of the fifty-six, so I don't deserve to be singled out. It is hard for me to praise my men to their faces, for we men on expeditions don't pay each other compliments, so I am handicapped; but I will say that they have stuck by me through thick and thin, whether I have been right or whether I have been wrong, and I have often been wrong, and I wouldn't be human if I didn't feel very keenly about that.

"Though I had hoped to, it will not be possible tonight to tell the work each man

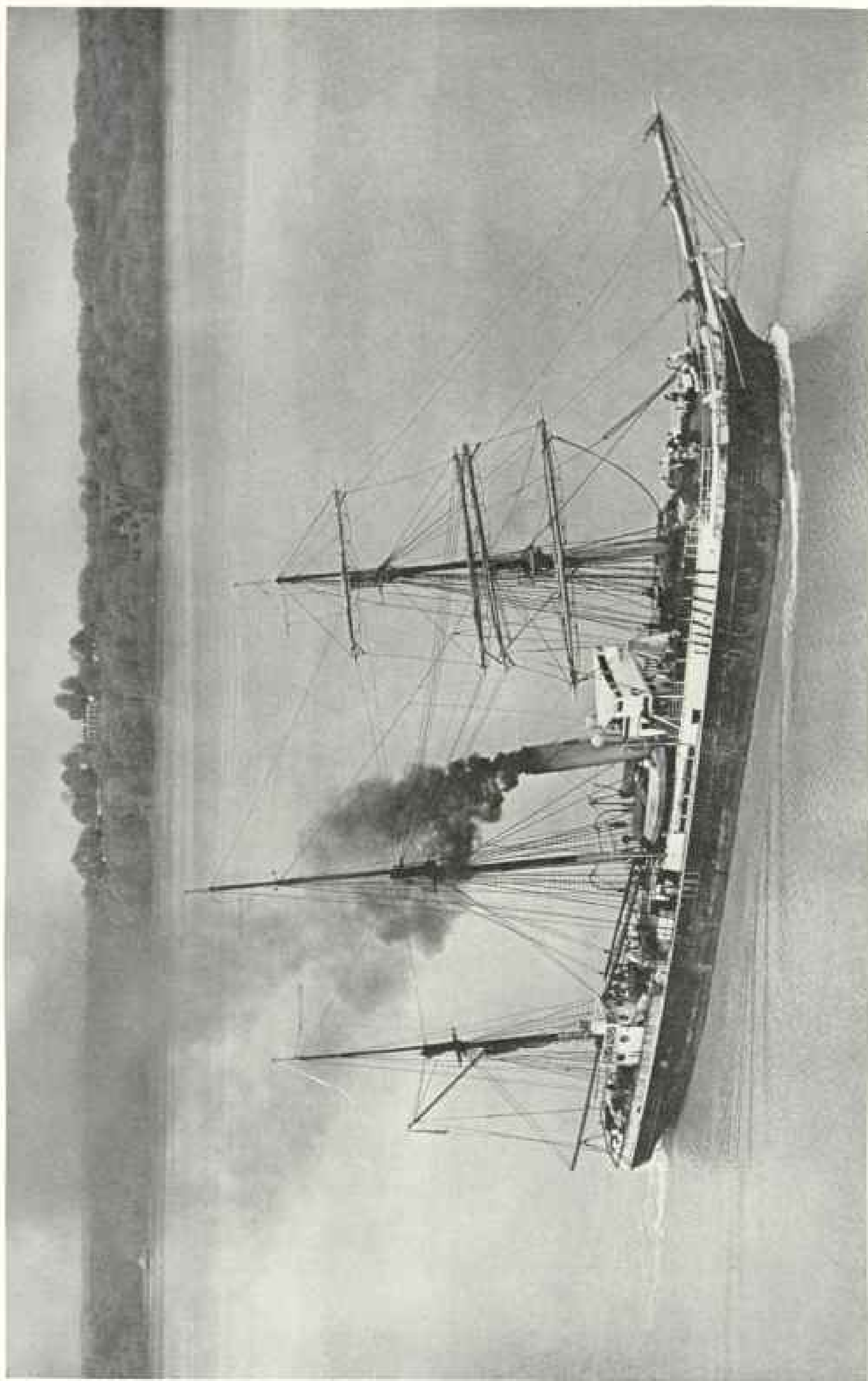
has done for the expedition, because my time is limited. Therefore, in the mention I am going to make of scientific work I am leaving out the names. I shall in due time record the work of each man.

"A great deal of our scientific data is very dry and interesting only to the scientists, but some of our work has, I believe, a real human interest.

"The Antarctic, as you know, has an ice age going on which is in its full flood tide, such an ice age as existed at the top of the world 30,000 years ago. It has been to me a very fascinating thing to live under the snows in an ice age and to be able to study it at first hand. We have often wondered how thick the ice sheet covering a continent in the clutches of an ice age is.

MEASURING ICE WITH DYNAMITE

"Now Dr. Poulter, our senior scientist, has actually measured this thickness by exploding dynamite, using an echo-sounding device. This is the first time in history this has been done. The figures will soon be worked out. The ice sheet down there varies probably from about two miles thick to a



Photograph by Willard R. Coburn

THE "BEAR OF OAKLAND," WITH MEMBERS OF THE BYRD EXPEDITION ABOARD, STEAMS UP THE POTOMAC PAST MOUNT VERNON

Adventure is written large in the logbook of this former United States revenue cutter, for not only Admiral Byrd, but Greeley, Stefansson, Amundsen, and Captain "Bob" Bartlett have paced her staunch decks on polar voyages. She was built in Scotland in 1874 for the whaling trade. Later she was chosen by the United States Government to bring Lieutenant A. W. Greeley from the Arctic and was first to reach his marooned party. Her crew maintained law in frozen outposts during the Alaskan gold rush. Whalersmen loved her for the times she rescued them from icy fastnesses. Reconditioned as the *Bear of Oakland*, the barkentine was flagship of Byrd Antarctic Expedition II.



Photograph by Willard R. Culver

LITTLE AMERICA BEHIND HIM, AND 4,000 GEOGRAPHIC MEMBERS BEFORE, ADMIRAL BYRD TOLD THE WORLD OF ANTARCTICA

The words of his modest report to the National Geographic Society (see text, page 108) were carried to millions of listeners over a national radio hook-up. Later Lieutenant Commander George O. Noville, U. S. N. R., introduced every man of the expedition personnel. Constitution Hall, the magnificent Daughters of the American Revolution auditorium, has been the scene of few more brilliant spectacles. Flags of the several States flanked the stage, at the back of which were Old Glory and the emblem of The Society. As the United States Marine Band played "See! The Conquering Hero Comes," the monster Star Spangled Banner fluttered down from the ceiling.



Photograph by Luis Mandel

"WE HAVE DISCOVERED FOR THE UNITED STATES A LAND AREA AS LARGE AS THE ATLANTIC SEABOARD STATES FROM MAINE TO GEORGIA"¹²—BYRD

President Grovernor holds the illuminated scroll which he later presented to Admiral Byrd, who is already the recipient of the two highest awards that The Society can bestow, the Hubbard Gold Medal and a Special Gold Medal.

few feet. Therefore, we think that hundreds of thousands of years ago the ice that covered many States of this country probably was as much as two miles thick.

"As to geography, we have discovered and taken possession of for the United States a land area as large as the combined Atlantic Seaboard States from Maine to Georgia. There can be no controversy concerning the ownership of this land, for it is beyond the British claims, and no human eye other than that of American citizens has ever looked down upon this land.

"There are other interesting changes in

the map. For example, the National Geographic Society's Map of Antarctica shows a great white unknown blank space about 150,000 miles in area north of the 75th parallel of latitude and between longitude 120 and 60 west. By ship and airplane we wiped that area off the map and put it into the column of the known by proving it to be a part of the great Pacific Ocean. We carried on cosmic ray investigations 2,000 miles farther south than has ever been done before. This ray, as you know, is a powerful and exceedingly penetrating radiation impinging upon the earth from remote space. Eight hundred hours of observation were made at Little America at regular intervals, and further analysis of this data must be obtained before we are ready to announce our results.

"The airplanes flew a total of 26,000 miles without accident under the leadership of June, due to the remarkable record of the aviation personnel. As our Condor plane, the *William*

Horlick, penetrated into various areas never before seen, the area was mapped, while the plane sped along at 125 miles an hour, with the great mapping camera. This to me has always been a romance.

"Tractors proved successful in polar regions for the first time, covering a total of 12,000 miles. Dog men did superbly a total of 7,500 miles. Dogs are still the infantry of the polar regions.

SHOWERS OF METEORS

"In the field of astronomy an astonishing discovery was made, namely, that many thou-

sands more meteors strike the earth's atmosphere than was formerly suspected. This find was made possible because of the clearness of the bitter cold atmosphere down there. Watch was held during the long night and many times the visible meteors averaged more than one a second. More meteors were counted during the four months than in all the other stations of the world for a period of two years.

"In the field of meteorology, our weather men got thousands of ground and upper-air observations, and I mention Haines and Grimminger because they live here in Washington. They certainly did a splendid job with us.

"An airplane got weather data aloft at fifty-five degrees below zero. On various dates we had a temperature as low as eighty degrees below zero, 110 below freezing.

"We were fortunate enough to settle the much-talked-of geographic question as to whether there were two continents or one at the bottom of the world, and by aviation it was proved that there is only one. A great controversial question as to whether or not there existed a passage between the Ross and Weddell Seas was thus settled.

"I could talk many hours on the scientific end, but, as I say, my time is limited. There are a great many subjects I have not covered which lie in the field of geology, hydrography, oceanography, terrestrial magnetism, glaciology, biology, bacteriology, botany, and so forth.

"I think I have taken enough time, and again I want to thank Dr. Grosvenor and to



Photograph from Keystone-Underwood

NATIVES OF LITTLE AMERICA VISIT BIG AMERICA

Emperor penguins, the first to be brought alive to the United States, stroll with Admiral Byrd on the deck of the *Bear of Oakland* at Quantico, Virginia. These "little men" of the Antarctic ice lands have pink mouths, canary yellow necks, paler yellow bodies, and black heads and wings. Of some 15 kept in an iced compartment, only 10 arrived safely in Washington, the rest having perished of colds. Since they cannot endure a mild climate, a special glass box supplied with cool, dry air has been constructed for them.

extend to him and through him all the members of the National Geographic Society from the members of this Expedition our deepest thanks. Thank you."

After Admiral Byrd's response the Marine Band played "Anchors Aweigh" and Lieutenant Commander George O. Noville, U. S. N. R., second in command, presented each of the Expedition members to the audience. These were:

The "Little America" Detachment: Clarence A. Abele, Jr., Charles F. Anderson, Clay Bailey, Richard B. Black, William H. Bowlin, Vernon D. Boyd, Ervin H. Bramhall, Alphonso Carbon, LeRoy Clark, Stevenson Corey, Edgar F. Cox, Francis S.



Photograph by Leroy S. Zider

FOR THE THIRD TIME THE SOCIETY HONORS ADMIRAL BYRD

While the United States Marine Band plays "The Star Spangled Banner," the intrepid explorer stands between President Grosvenor and Secretary George W. Hutchison of The National Geographic Society with his Expedition members massed behind him. The first officer in uniform, standing at the left of Mr. Hutchison, is Harold I. June, Chief Pilot of the Expedition, who was in charge of two exploring flights over Antarctica.

Dane, Jr., E. J. Demas, Fred G. Dustin, John N. Dyer, Albert M. Eikelsen, George Griminger, William C. Haines, John L. Herrmann, Joseph Hill, Jr., Guy C. Hutcheson, Harold I. June, Walter P. Lewishon, Alton A. Lindsey, William S. McCormick, Linwood T. Miller, Edward L. Moody, Charles G. Morgan, Charles J. V. Murphy, George O. Noville, David I. Page, Stuart D. Paine, Joseph A. Peltzer, Earl B. Perkins, Carl A. Petersen, Thomas C. Poulter, Kenneth L. Rawson, Finn Ronne, Richard S. Russell, Jr., Isaac Schlossback, Paul L. Siple, Ralph W. Smith, Olin D. Stancliff, James M. Sterrett, Paul C. Swan, John H. Von Der Wall, F. Alton Wade, Amory H. Waite, Jr., Harry R. Young, Arthur A. Zahn.

The crews of the *S. S. Bear of Oakland* and the *S. S. Jacob Ruppert*: Leland L. Barter, Glenn H.

Bryant, Joseph A. Callahan, Andrew Christensen, Louis P. Colombo, Thomas J. D'Amico, Octavius E. Davis, Gordon B. Desmond, W. H. Dornin, R. A. J. English, Gordon H. Fountain, Robert Fowler, George J. Frizzell, Philip M. Gargan, William P. Gaynor, James M. Gillies, Frank W. Giroux, Joseph D. Healy, Dr. William B. Highet, Hjalmar Fr. Gjertsen, Bendik K. N. Johansen, Thomas E. Litchfield, Wilfred H. Lowd, Peter J. MacCurach, John McNamara, Walfred Miller, Gilbert M. Mitchell, John J. Muir, John Murphy, Victor G. Niewoehner, Irving S. Ortiz, Bert W. Paul, Seth A. Plakham, William A. Robertson, S. Edward Roos, Stephen D. Rose, Cornelius P. Royster, Walter C. Stewart, Emerald L. Tigert, Thomas Van Keen, Rudolph A. Van Keen, Fred C. Voight, Richard D. Watson, Max R. Winkle.

Personnel aides to Admiral Byrd: Victor Czegka, John McNeil, Leo MacDonald, Donald Shook.

The following members of the ice party were not present: Quin A. Blackburn, Bernard Fleming, Alan Innes-Taylor, Dr. L. H. Potaka, B. Skinner.

Only five hours before The Society's reception, Admiral Byrd and his Expedition members stepped from the historic *Bear of Oakland* at the Washington Navy

Yard, where they were greeted by President Roosevelt and members of a Committee of Congress, on behalf of the Nation, and by Governor George C. Peery, for the explorer's native State of Virginia.

Preceding the reception, Admiral Byrd and his entire personnel were guests of the National Geographic Society at a dinner at the New Willard Hotel. Back of the explorer was displayed an enlargement of an aerial photograph of the *Bear of Oakland*, which was taken by one of The Society's photographers as it passed Mount Vernon on its way to Washington (see page 110).

THE PARADISE OF THE TASMAN

A Pacific Island Provides the Palms Which Decorate Hotels, Churches, Steamships, and Homes

BY HUBERT LYMAN CLARK

With Illustrations from Photographs by W. Robert Moore

“DECORATED with palms”—how often the phrase occurs in descriptions of social events! Wherever florists ply their trade and have a hand in beautifying public occasions, palms play an important part. Without them hotel lobbies, steamship saloons, dance halls, and churches would lack their refreshing greenness.

Often referred to as just “florists’ palms,” they are taken for granted, like many of our common blessings. In reality, they belong to a small group usually called *Kentia* palms, found only in remote islands of the Coral Sea, and their present widespread use throughout the civilized world is one of the romantic tales of horticulture. A little more than half a century ago they became an important article of commerce, and few people even today realize from what a tiny bit of the earth’s surface that particular commerce originates.

ITS NAME A LINK WITH AMERICAN COLONIES

In 1788 Lieut. Henry Lidgbird Ball, en route from Sydney, New South Wales, to Norfolk Island, discovered a remarkable pyramid of volcanic rock rising straight out of the Tasman Sea to a height of 1,816 feet. He descried land to the northwest, which further investigation revealed as an island of unusual conformation and striking beauty.

In honor of Richard Howe, the British admiral who played an important part in the war with the American Colonies, Ball called his contribution to the British Empire Lord Howe Island. His own name was given later to the massive rock which first attracted his attention, and Balls Pyramid is his enduring monument.

Lord Howe Island lies 360 miles east of Australia and 480 northeast of Sydney. It has the form of a boomerang, with its length extending nearly north and south, the concave side facing Australia and the precipitous eastern coast arched against the surging Pacific. In an air line the northernmost

part of the island is only seven miles from its southern tip and the greatest breadth is but a mile and a half (see map, page 118).

The northern half is hilly, but the highest point is only 700 feet above the sea. The southern half is mountainous, rugged, and wild. Two peaks occupy most of this area, the southernmost, Mount Gower, rising directly from the sea to 2,840 feet, while its fellow, Mount Lidgbird, is but 300 feet lower. The mountains are thickly wooded, so far as their precipitous sides permit, and are separated from each other by a lush valley into which man rarely penetrates. Between the northern hills and Mount Lidgbird is rolling country with fertile soil and a plentiful water supply (see page 122).

Extending from the northwestern tip of the island straight south to below Mount Lidgbird is a broad coral reef, notable as the southernmost coral reef in the world. Between this reef and the island itself lies the lagoon which it protects, its eastern side bounded by a bathing beach of clean white sand some two miles long. The reefs prevent vessels from approaching close; they must anchor about a mile offshore, and passengers and freight are then landed, by means of motor-towed barges, at the jetty near the northern end of the lagoon.

When Ball first landed on the island there were no signs of the genus *Homo*; he and his men were the first human beings who ever set eyes on its beauties. The richness of the vegetation, the abundance of birds, and the numerous rivulets of clear, cold water indicated plainly, however, that here was a little paradise awaiting settlers. Nevertheless, for many years the island lay neglected.

ISLAND “CATERERS” TO AMERICAN WHALERS

About 1833 or 1834 a small company from New Zealand, including several Maoris, were brought to Lord Howe, but in two years they were so discontented that they were taken back to their old homes



HOMEWARD BOUND WITH BAGS OF PALM SEEDS

Lord Howe islanders are taking the seeds, gathered from a near-by plantation, to the motor boat for transport to the community shed. There they will be packed in moist earth for shipment. The northern tip of the curving island juts out in the distance beyond the lagoon.

in New Zealand, and Nature once more was left in untroubled possession.

But not for long! American whaling vessels, scouring the southern seas, found that Lord Howe Island was an excellent place to replenish their water supply. There were no government officials to deal with, no distractions to tempt desertion, and no natives with whom the sailors could get into trouble. By 1840 reports of these numerous visiting whalers reached Sydney, and two families established themselves on Lord Howe to grow fruit and vegetables for the crews. So well did the settlers prosper that others followed, and by 1850 a small community was well rooted on the island.

The climate is delightful, with much bright sunshine, yet a plentiful supply of rain; abundant breezes, but no cyclones; never a trace of frost, but very little excessive heat. The soil is fertile, and nearly everything which grows in warm temperate or subtropical countries can be grown on Lord Howe. The island has such a tropical appearance and there are so many palms that the entire absence of coconuts is striking. The explanation is that the mean an-

nual temperature is not high enough for that heat-loving palm.

With the discovery of petroleum the decline of the whaling fleet began and hard times came to Lord Howe. Without the whalers, there was no market for the produce, both Australia and New Zealand being too far away.

But necessity often leads to discoveries which prove epoch-making, and so it proved in this case.

A NATURAL MONOPOLY OF A POPULAR PLANT

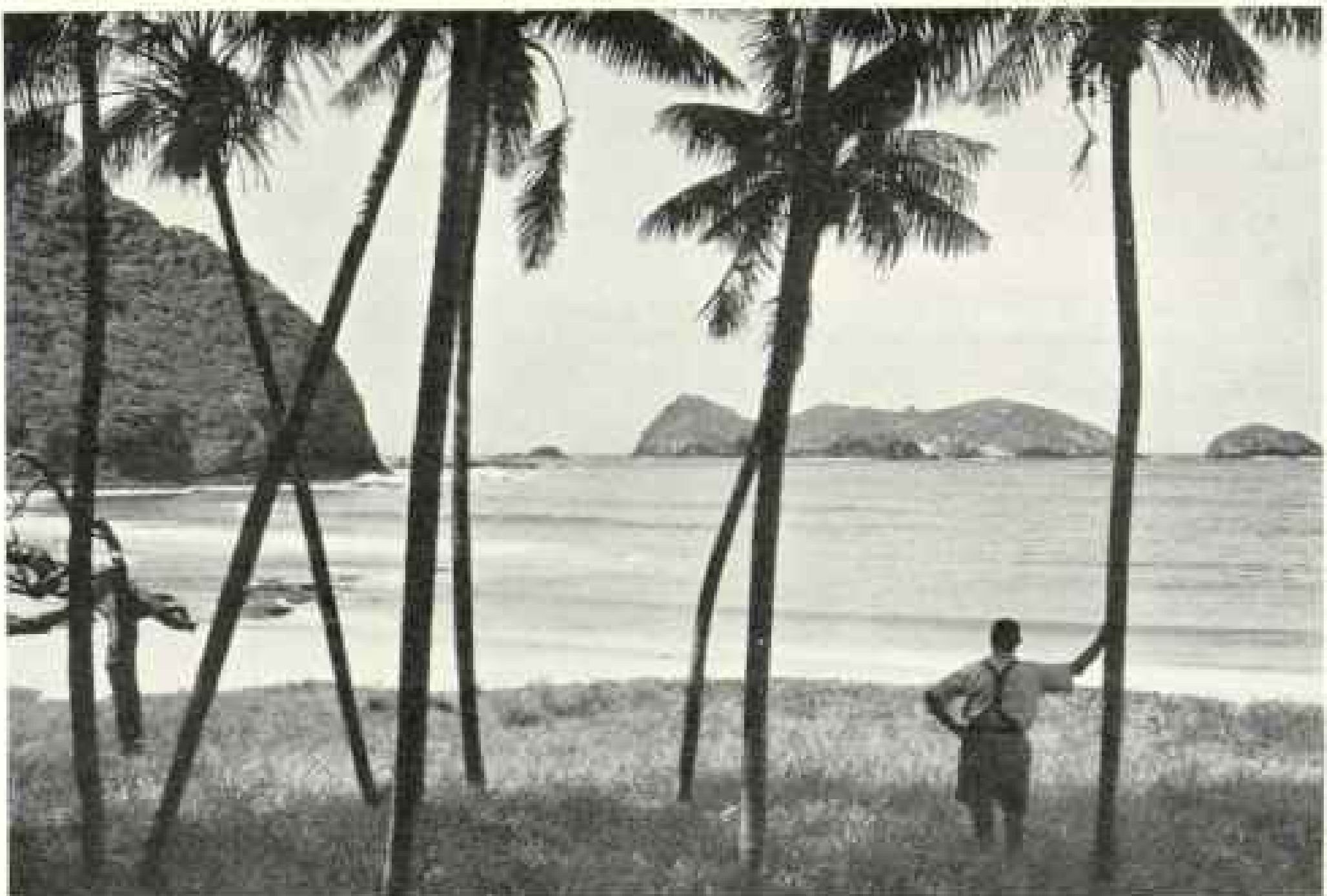
There is no record of who first noticed the unusual hardiness of the palms growing so abundantly or who was first to offer them for sale. But a demand for the palms from Lord Howe gradually developed, and long before the 20th century dawned they were in use all over the world wherever there were florists. They were at first called *Kentia* palms, a name they still bear in horticulture, but botanists say they are different from the true *Kentia* palms of New Guinea, and have given them the name *Howea* in honor of their island home.



Photograph from Hubert Lyman Clark

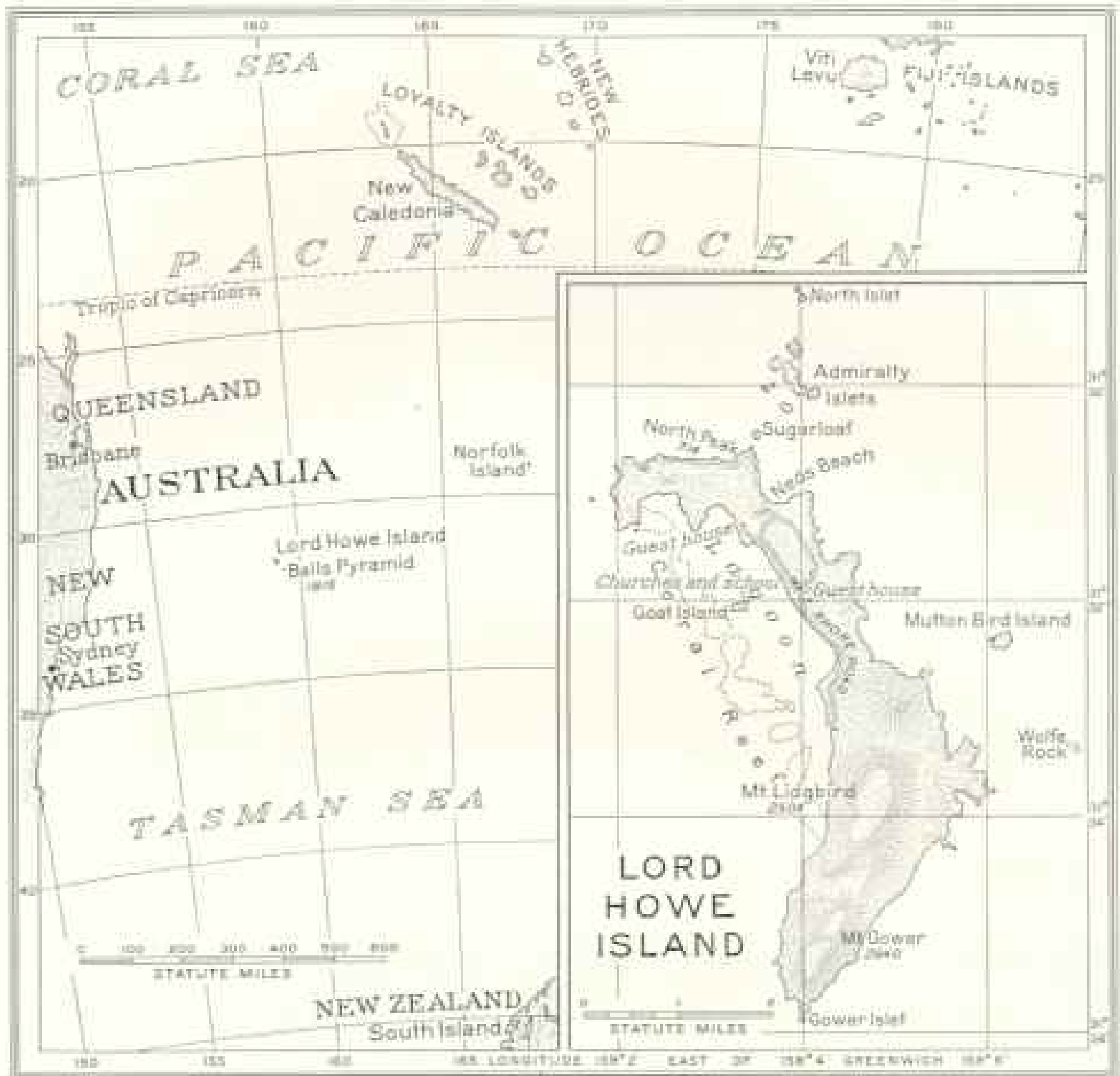
AQUAPLANING ON THE LAGOON HOLDS MANY THRILLS AND SPILLS

Protected by the coral reef, the waters of the lagoon are sufficiently calm for this sport. On the opposite side of the island a heavy surf often rolls in and crashes against the rocky promontories and on the sandy beaches.



NEDS BEACH COMMANDS A VIEW OF THE ADMIRALTIES

The Admiralty Islets are nesting grounds for countless gannets, wide-awakes, and mutton birds (see page 131). On this eastern side of the island bathers often enjoy good surfing as high waves come crashing in on the sandy shores.



Drawn by Albert H. Dumstred

TO REMOTE LORD HOWE ISLAND THE WORLD GOES FOR SEEDS OF THE "FLORISTS' PALMS"

Situated 360 miles off the east coast of Australia, Lord Howe once served as a whaling station. When whaling declined there developed the unique trade in seeds from the *Howea* palms. The island was named for Richard Howe, the British admiral who played an important part in the war with the American Colonies.

A few of these palms have begun to fruit in the coast belt of California. But still the world looks to Lord Howe Island for its most popular and universally used palm, and the demand for the seed is so great that the income derived from its sale maintains the entire population.

This dependence on a natural monopoly has led to an interesting social organization and a community life of unusual charm. The fundamentally important basis of the community is good, clean, human stock—homogeneous, healthy, and harmonious. About 150 permanent residents make their homes on Lord Howe, and for their income

are dependent, directly or indirectly, on the sale of the palm seeds.

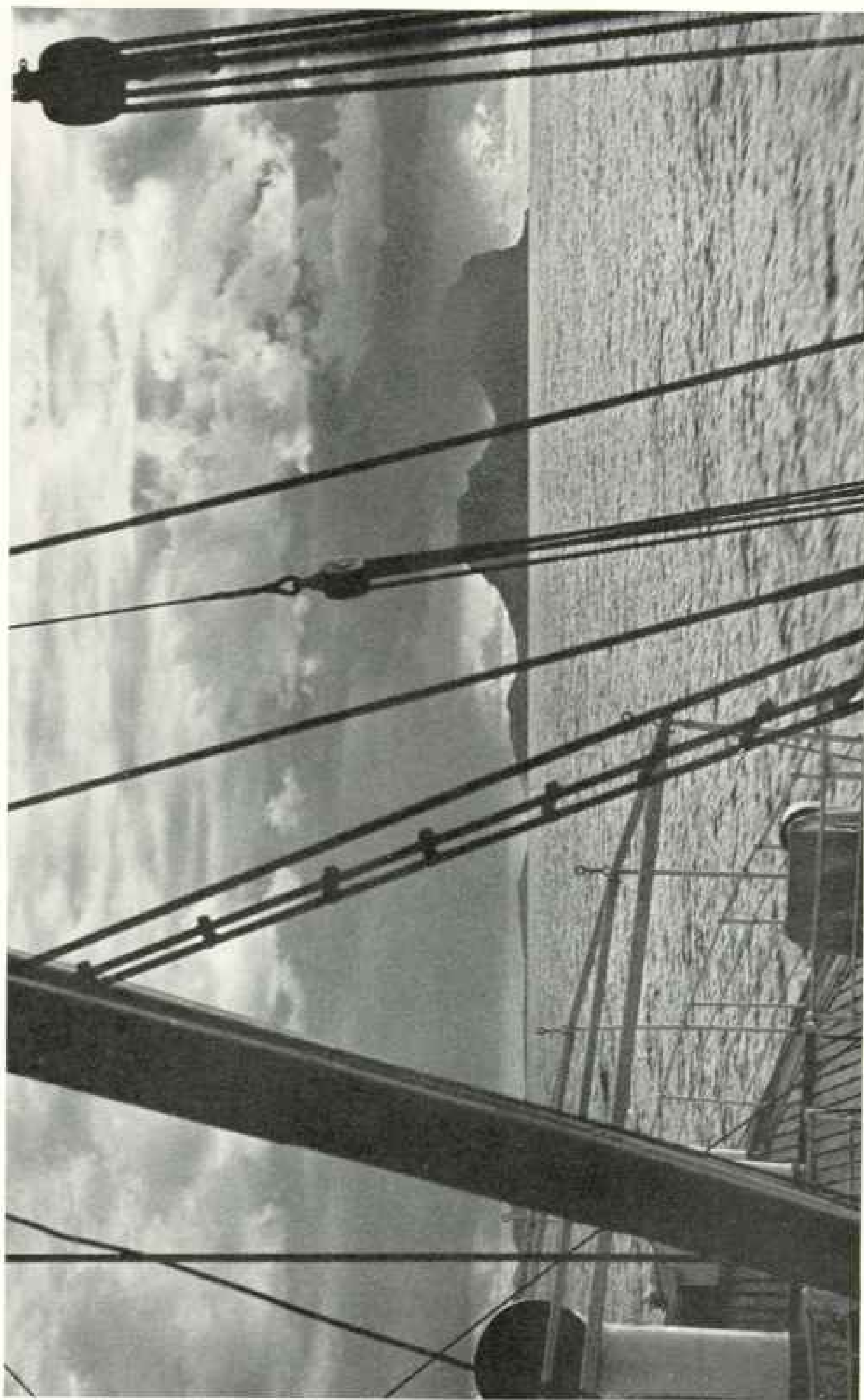
Governmental machinery is simple. Local affairs are handled by a Local Committee of three, chosen by the islanders themselves. The marketing of the palm seeds and relations with the Australian Government are handled by the Lord Howe Island Board of Control, composed of three New South Wales officials in Sydney, the island being politically a dependency of that State.

The residents on the island are divided by two lines of cleavage into four natural groups; one line separates those born on



GATHERING PALM FRUIT IS A TALL TASK

After the ripe seeds of these *Howea* palms are picked, they are stripped from the stalks and then shipped in moist earth to many parts of the world. Islanders climb rapidly by means of a strap looped about the feet to give better leverage when placed against the trunk. During the World War some attached to the Australian Signal Corps won admiration, also many wagers, by their skill in climbing poles.



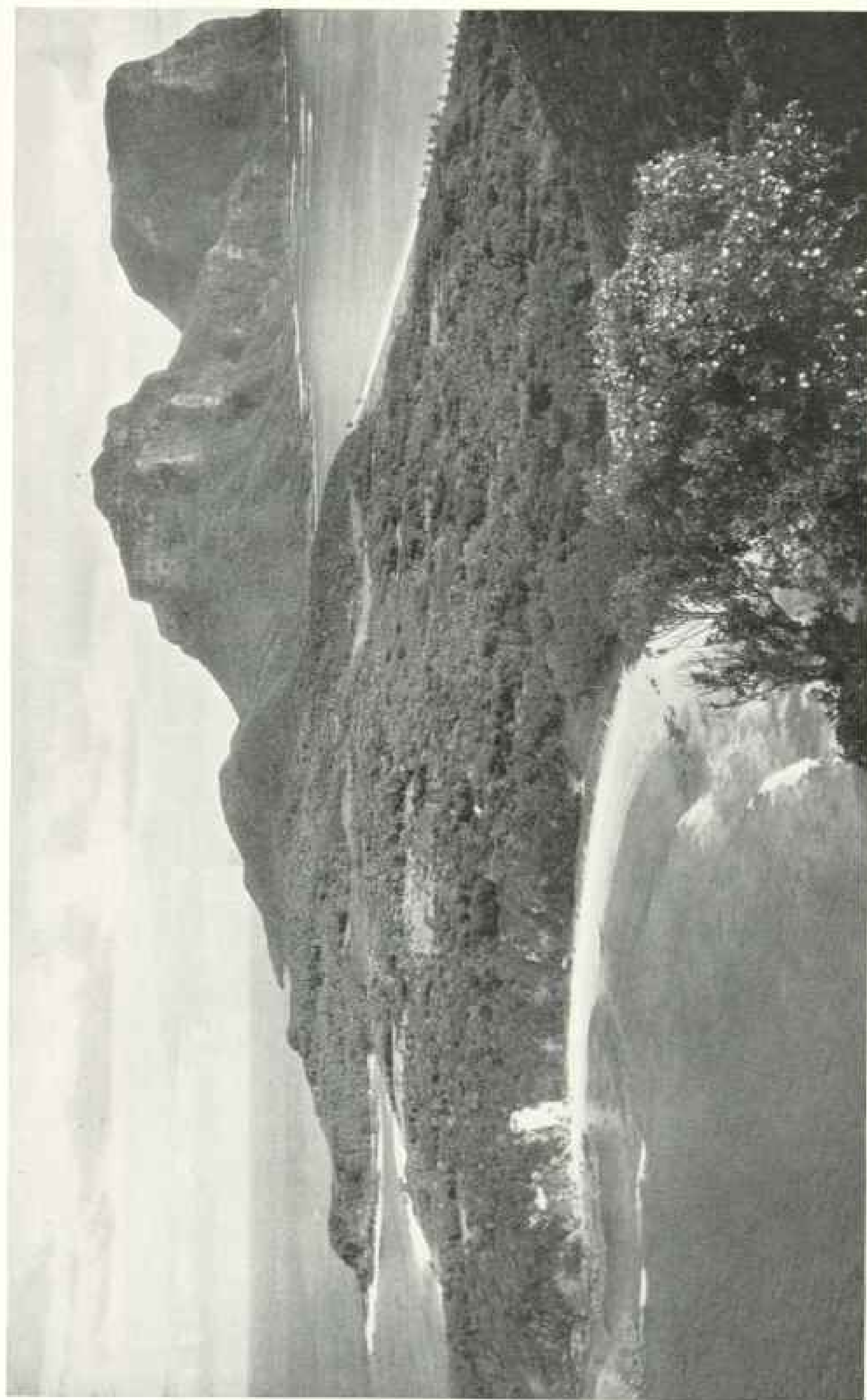
AN EARLY MORNING LANDFALL OF "THE PARADISE OF THE TASMAN," 40 HOURS OUT OF SYDNEY

Practically all of Lord Howe Island is seen here through the rigging of the *Morrinda*, the little 2,025-ton steamer that maintains the only regular connection between the island and the Australian mainland. The north end (left) of the island is about 700 feet high, while its southern end culminates in Mount Lidgbird, 2,504 feet, and in the sheer cliffs of Mount Gower, 2,840 feet.



THE CHRISTMAS MAIL BOAT IS IN!

The little *Morinda*, outward bound from Sydney, anchors just outside the most southerly coral reef in the world, over which giant rollers break. To the right of the breakers is a quiet strip of water, the northwest passage, by which launches and barges bring in passengers, mail, and freight. The 1934 Christmas mail and supplies are being drawn ashore on the wharf "railway," while vacation guests and island residents look on.



LIKE A GIANT BOOMERANG, HURLED 300 MILES OUT IN THE TASMANIAN SEA FROM AUSTRALIA, IS LORD HOWE ISLAND

Amid the trees and in small clearings on this low, palm-studded "waist" are scattered the homes of the residents, connected by paths. Below is Neels Beach, and on the right is the sweeping curve of the lagoon, protected by a coral reef. Just beyond the low hill in the upper middle distance, to the left of Mounts Gower and Lidghard, is the faintly perceptible blur of Bull's Pyramid, a bold rock named after the discoverer, Lieut. Henry Lidghard Ball (see text, page 115). All but a small portion of the hilly northern tip of the island is shown in this photograph, taken from the side of North Peak.



AMID WAVING FLORESTA'S PALMS ISLAND HOMES ARE SET

Bungalow-type houses are usually secluded in a cleared plot among the trees, with just space enough for a garden. The surrounding palms serve as a windbreak against the breeze that at times sweeps across the island.



JUST WHERE IS THE ROAD?

Many of the "roads" on the island are only obscure paths, which when little used are soon covered with fast-growing vegetation. This is a seldom-frequented portion of the "back blocks" road (see text, page 134).

Lord Howe, and hence known as "islanders," from those born elsewhere, and so known as "non-islanders."

This cleavage is not the basis of a social distinction; if the islanders look down on the non-islanders they conceal their feelings perfectly. But the line may be of convenience in various ways. In the bowling on the green at the club the opposing teams are commonly made up from the two groups.

Bowling, cricket, tennis, swimming, surfing, and fishing are the chief outdoor sports, and the green is an active social center on Saturday and Sunday afternoons (p. 132).

The second line of cleavage separates "participants" from "non-participants," an economic division of fundamental importance. A participant is one who shares in the annual division of the island's income from the sale of the palm seeds. To be a participant one must be an islander, or else married to an islander, and a resident for ten years or more.

The degree of participation depends on age and sex. All males 21 years of age or more have 25 shares in the allotment. Women of like age have 10 shares, but on marriage their holding is increased to 25 shares. A married couple will thus have 50 shares when starting their home. For each child born to them 10 additional shares come to them, with a maximum of 35 shares for children.

Upon reaching the age of 31 years, married islanders, male and female, receive an additional 25 shares each, thus giving each 50 shares in his or her own right.

When a male islander becomes of age, he is allotted 25 shares in the palm-seed industry, and the 10 shares previously allowed his parents for his upkeep are canceled, in so far as the parents are concerned. A girl on becoming of age receives her 10 shares, but nothing additional, for it is assumed that she will continue to live at home if she does not marry. If a participant dies or leaves the island for a period of six months, his shares lapse, and so the total number of shares varies from year to year. Should a former participant return to the island, he or she may become a participant once more after residing on the island two months for every year of absence.

At the present time the population of the island is less than 150 and the number of participants scarcely half that. The non-participant group consists partly of non-

islanders employed in various occupations, partly of islanders who have been away and are not yet restored to sharing, and partly of more or less permanent "guests" who are attracted to the island as a delightful place to live.

Some of the latter would gladly build homes of their own and become permanent residents, but the Board of Control wisely foresees that any increase of permanent residents might be a serious burden on the economic resources of the island. Children born to such residents would be islanders and hence participants; so any increase in the number of participants is considered undesirable, since the market for the palm seed is definitely limited.

The systems of land tenure and of taxation are closely bound up with the social organization. No one owns any land; the whole island belongs to the people. The Board of Control assigns land in accordance with the needs and desires of the islanders. Farms and other land may pass from one generation to another, as long as they are occupied and used, but they cannot be sold.

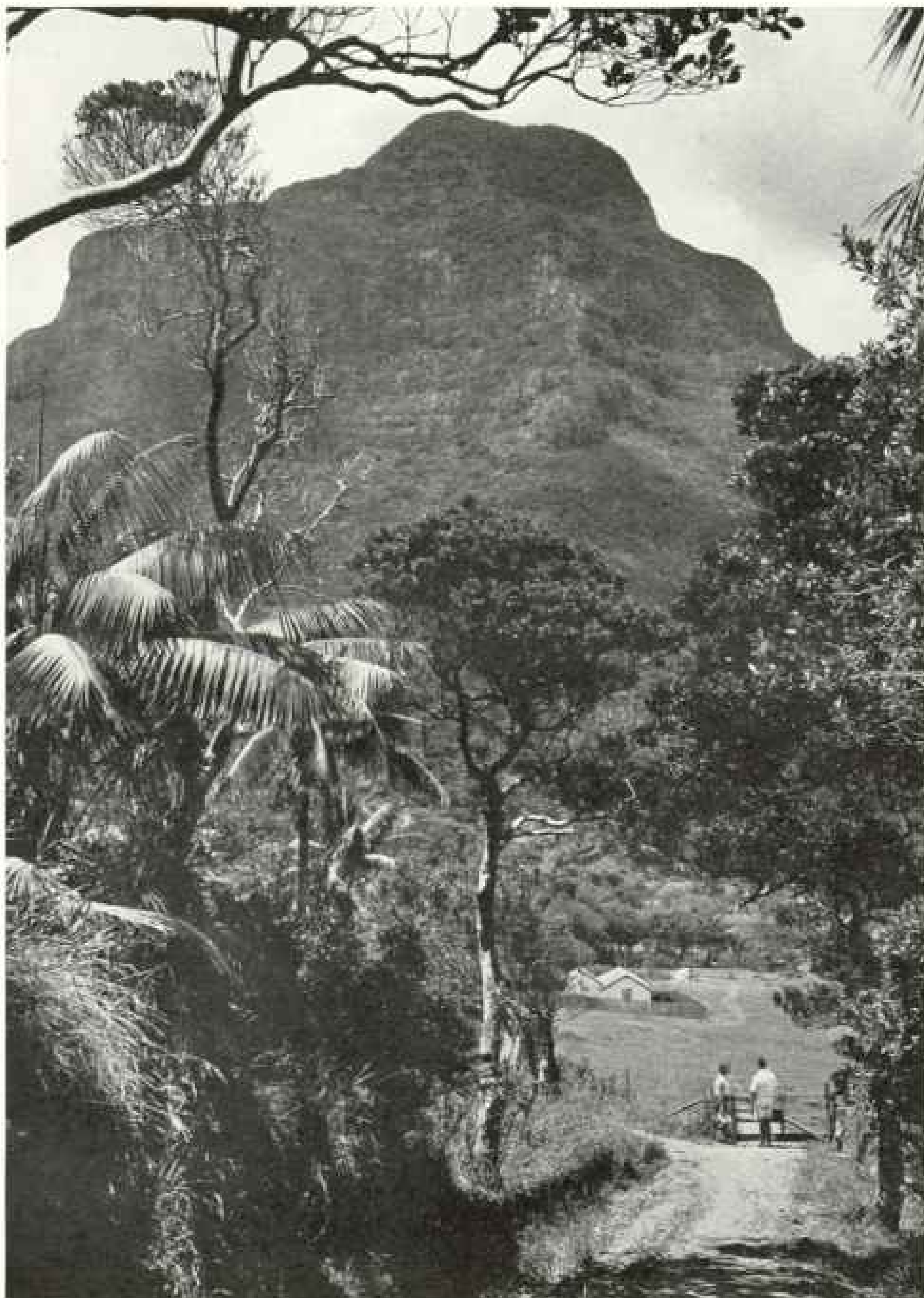
BOARD CONTROLS HOME BUILDING

If a young man wishes to marry and establish his own home, he notifies the Board of Control, which assigns him a block of land on which to build a home and to use for gardens, pasturage, or cultivation. Before erecting a house, however, he must submit plans and particulars to the Board for approval.

As the land is made available only on a "permissive occupancy" basis, the islander legally has no claim to it or to the buildings he may erect thereon. This tenancy at will, however, is not as severe as it may sound, and the Board has never yet evicted a person!

The system of taxation is unique. Non-islanders who stay on the island for lengthy periods are obliged to contribute at the rate of £5 (normally \$25) per annum to the island funds. Participants in the palm seed industry pay no taxes on property, but those who earn an income from any other source than the community fund are taxed by the reduction of one share in eight of their holdings for all earnings over £24.

Such income necessarily comes from one of two sources—salary or wages paid for labor or income from invested capital. The



MOUNTAINS, TREES, AND PALMS—SUCH IS THE IDYLIC CHARM OF LORD HEWLE

Walking southward along the "shore road," midway of the island, one comes upon this delightfully framed view of Mount Lidgbird. It was Lieut. Henry Lidgbird Ball who first brought to the world a glowing account of this seven-mile-long strip of land that he discovered on his voyage to Norfolk Island in 1788 (see text, page 115).



A FAMILY EAGERLY SCANS THE MONTHLY MAIL.

Among the collection of letters, papers, and magazines brought in by the infrequent arrival of the *Marindu* is the familiar yellow cover of *THE GEOGRAPHIC*. On this remote island, with less than 150 population, there are two National Geographic Society members.



A LIVELY MOMENT IS IN STORE FOR MR. RAT.

A wrecked ship left many rats, which threatened to overrun the island and destroy the palms. Now, ratting has become a major industry and the people get a bounty for each tail they turn in. Islanders catch as many as a thousand in three months. Sometimes the tails are used for currency, but the Lord Howe story that one was put in the collection plate at a church is perhaps exaggerated! The terriers are waiting patiently for the smoke to rout the pests from their underground burrows.

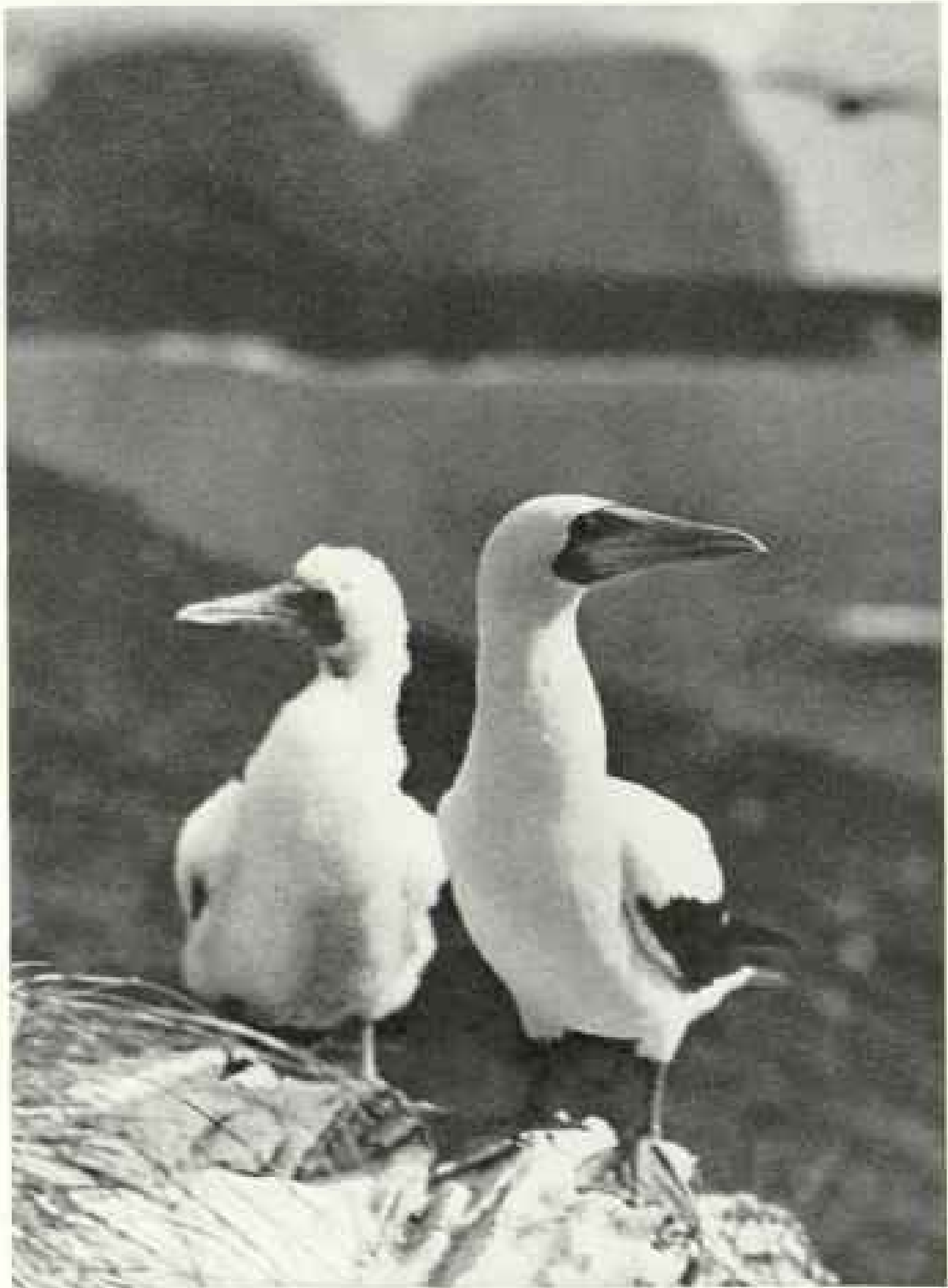
latter is heavily taxed, on the theory that those who have it do not need as much as those who are wholly dependent on the sale of the palm seeds. By contributing thus, its recipients help to equalize the incomes of all islanders, and thus prevent any development of classes who might be called rich or poor.

So with the income from labor. Since the amount of work on the island for which wages might be paid is small, few can share in it; hence, those who do have work contribute a portion of their wages to the community fund.

Human nature is very much the same, however, on Lord Howe Island as it is elsewhere. Even in so small and homogeneous a population we find at one extreme those who are unambitious, if not actually lazy, and at the other those who like to work to improve their condition, and desire luxuries as well as comforts. As a consequence two interesting and rather amusing labor conditions have developed to complicate the problem of the ambitious.

The first concerns continuous labor, what we often call "service." Life on the island is so pleasant, so relatively carefree, and so simple that it does not require steady work to live comfortably. Few, if any, islanders are willing to engage in work by the month or week. They are not necessarily lazy; they just don't care to be exploited by other islanders for personal gain. Hence the proprietors of the two lodging houses, who must have "service," have to secure their help in Australia.

The labor problem is also complicated by rats!



MOTHER AND CHILD ARE "ON THE OUTS"

Besides these sleek gannets, countless wide-awakes and mutton birds also nest on the Admiralties. So thick are the nests in the grass that visitors cannot walk across the tiny island without crushing many eggs (see illustration, page 117).

Somewhere around twenty years ago a vessel was wrecked on Lord Howe and rats came ashore, found local conditions to their taste, and multiplied excessively. Today they are not only a nuisance but a menace, and the islanders wage relentless war upon them. Aiding in this campaign are the dogs of the island, a breed of short-haired terriers (see opposite page).

A bounty of fourpence a rat is paid from the community fund; so many thousands of rats are killed annually. Since the bounty is paid from the community fund, it is not subject to the income tax, and hence becomes a profitable side line. Some diligent rat hunters turn over as many as a thousand



SEED COLLECTING FOR FUTURE FLORESTA'S' PALMS IS A COMMUNITY AFFAIR

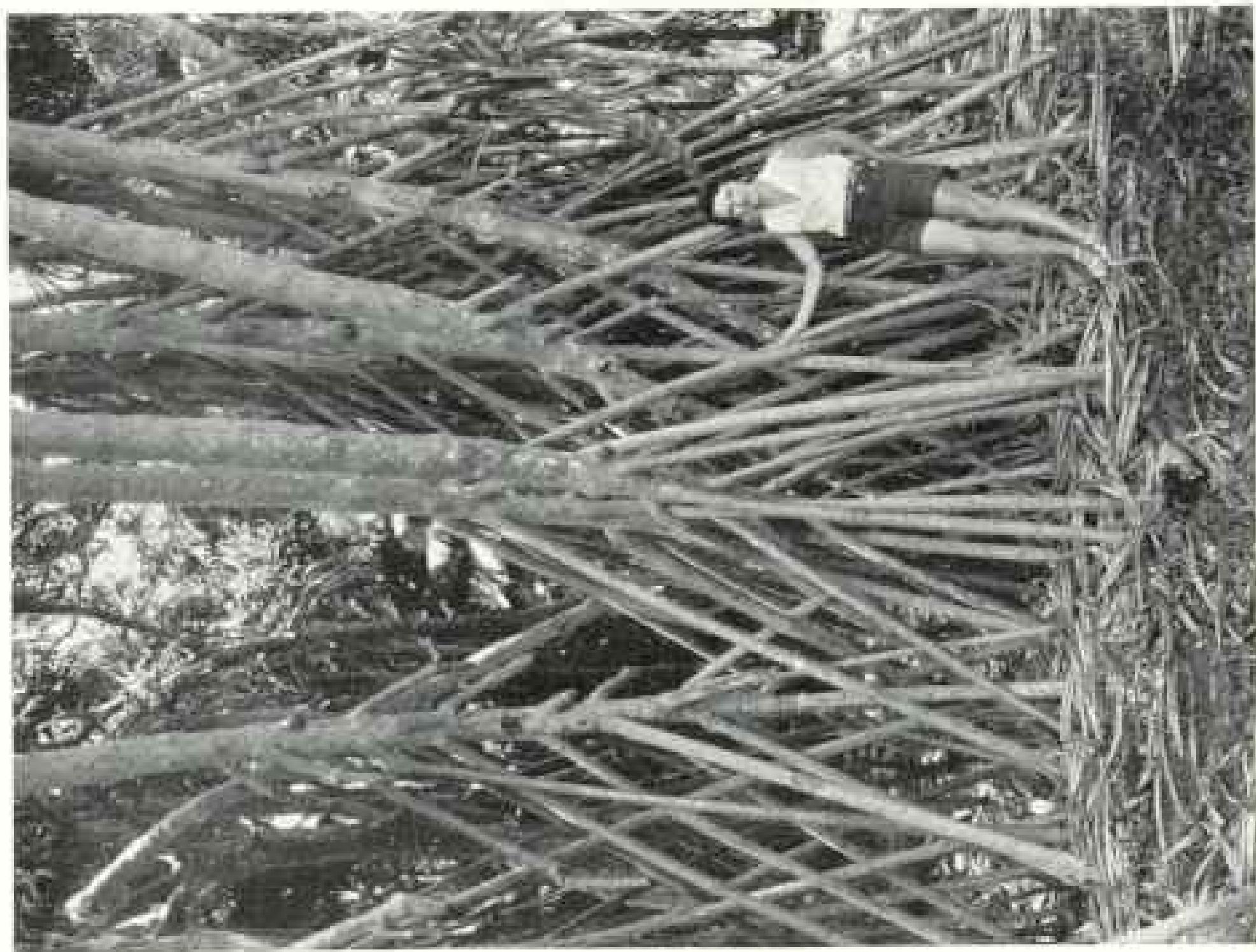
The revenue from the sale of the Howea palm fruit is placed in the common fund and eventually divided in accordance with the curious share system that prevails on the island (see text, page 124). Here, several of the "participants" are shelling, or stripping, the seeds from the stalks, while others are agilely climbing to gather still more of the ripened clusters.



Photograph by Robert Lyowai Clark

EXPLORING THE MARINE WONDERLAND OF LORD HOWE

Here at the reef near Mount Lidgbird, the wife of the author and a scientist from the Australian Museum, at Sydney, collect marine animals at low tide. Because of the coral reefs, fish abound around the island.



PANDANUS TREES HAVE CENTIPEDELIKE PROPENSITIES

Many of the trees grow on Lord Howe Island, especially along a stream in the lower portion of the island at the base of Mount Lidgbird. The sun-tanned young lady is a visitor to the island from Sydney.



CATCHING FISH BAIT—YOUNG MUTTON BIRDS!

Thousands of these shearwaters nest on Lord Howe at the bottom of such holes. In some places the ground is actually honeycombed with tunnels. Years ago the residents used the mutton birds for food; now they find the young make excellent fish bait. At night the winging hordes sweep in from the sea to roost, and the island is noisy with their cries. When dawn comes, they fly out again over the ocean on fishing expeditions (see text, opposite page).

rats every quarterly period. When a man wants to build a house, cultivate a field, or do other things which require assistance, he finds that some of his neighbors say: "I'd like to help you, but I'm going after rats this week. Twelve a day will net me four shillings." Furthermore, it is fun to hunt rats!

Besides the income from palm seeds, money comes to the island with visitors from Australia or, very rarely, from other parts of the outside world. Such visitors are necessarily limited in number, for there is only one boat which visits Lord Howe Island regularly, the steamer which plies between Sydney and the New Hebrides. She is a little vessel of some 2,025 tons, with accommodations for about 40 passengers, and many of these are bound for Norfolk Island or the New Hebrides.

Moreover, this boat usually runs but once in five weeks; hence visitors are not only restricted as to numbers, but as to the time of their visit and the length of their stay. Twenty-two days after leaving her passengers at Lord Howe, the boat returns

from the islands to the north and picks up those who are ready to return to Sydney. Those who are not ready must stay five weeks, or some multiple thereof, before they have another chance to return to the mainland. Only at periods when the steamer journeys just to Norfolk Island and back, instead of making the full run to the New Hebrides, can the visitor enjoy a shorter sojourn on Lord Howe.

The scenic beauty of the island and the fishing lure visitors, as do the thrilling mountain climbing and the enjoyment of sea and shore. The lagoon is unsurpassed for bathing and the excitement of surf bathing may be found on the beaches of the eastern coast. The climbing of Mount Gower is arduous enough to satisfy even seasoned mountaineers; the ascent of Mount Lidgbird is seldom made because of the real danger involved. Numerous walks about the island and wandering through the woods serve to unfold the wealth of trees, shrubs, ferns, and flowers.

Many islanders cultivate beautifully foliaged plants and brilliant flowers, and the



LUSCIOUS STRAWBERRIES GROW IN THE ISLAND GARDENS

Islanders grow vegetables for their own needs and for the two hostels where visitors to Lord Howe stay. Fruit for Australian markets could be raised in the rich soil, should the revenue from the "borists' palms" fall off.

gardens are worth going far to see. Begonias grow to enormous size and are often of extraordinary color. The palms are everywhere, and there are numerous other trees, notably the Norfolk Island pine, which grows to large size, and the banyan, closely related to the banyan of India.

BIRDS USED AS FISH BAIT

Perhaps because of the coral reefs, there is an extraordinary abundance of fish about the island and many of these are game fish of fine quality. They may be captured directly from the shore as well as from a boat, and both methods are in constant use to add variety to the sport.

Perhaps the most notable and edible of these fish is called "salmon," but the flesh is pure white, and neither it nor the fish itself recalls the salmon of the Northern Hemisphere. The Lord Howe variety reaches a

length of three feet, and, once hooked, is a valiant fighter. The labor and excitement of landing one make a thrilling experience.

In addition to the salmon, the waters of the island are noted for the beautiful bluefish which abounds there. It grows to about four pounds, is also a good fighter, and makes a splendid meal.

An unusual feature of this ocean fishing is the bait used—not a fly, or a worm, or any artificial device, but a young bird! Fortunately this shearwater occurs in such numbers that there seems to be little danger of its being appreciably decreased. It is locally known as "mutton bird." As it feeds far out at sea, it is rarely seen except at a distance, in the late afternoon or very early in the morning.

This bird nests on the heights of Lord Howe, particularly around the summit of Mount Lidgbird, in incredible numbers. It



BOWLING ON THE GREEN IS A FAVORITE ISLAND SPORT.

Cricket, tennis, swimming, surfing, and fishing are other popular outdoor recreations. In making up bowling teams, islanders and non-islanders (those not born on Lord Howe but now residing there) form opposing sides (see text, page 124). Norfolk Island pines (right background) grow to large size.



IN LIEU OF HOTELS LORD HOWE FURNISHES GUESTHOUSES.

Back of the tennis court is Pine Trees, one of two hostels for visitors. Since the community revenue from the palm industry is limited, newcomers are forbidden to become residents and enter into the sharing system. Visitors are called "temporaries"; a few have even become "permanent temporaries."



THE PHOTOGRAPHER WAS ABLE TO PICK THESE WIDE-AWAKES OFF THE NEST

Walk across Admiralty Islets and the sky quickly becomes filled with these crying and screaming terns. The speckled birds are wide-awake offspring. Gannets and mutton birds may also be observed at close range.



LORD HOWE'S LINK WITH THE WORLD—THE POST AND TELEGRAPH OFFICE

Mail comes to the island about once every five weeks, except during periods when the *Morinda* makes additional round trips between Sydney, Lord Howe, and Norfolk Island, rather than the full voyage to the New Hebrides. Shorts and summer clothes are popular most of the year because of the mild climate.



LORD HOWE ISLAND KNOWS NO TRAFFIC PROBLEMS

Motor vehicles are prohibited. Only two or three wheeled carts and crude sleds serve as conveyances on the island, but usually people walk. Passengers, mail, and freight are landed at the wharf in the background (see illustration, page 121).

excavates burrows in the soil, in which the female lays her single egg. After hatching the young, the parents bring fish to the burrow at the close of the day. During the night the birds remain in the burrows, but leave at break of day to fish far out at sea. Fortunately for the fishermen, they are so numerous that some are forced to breed in easily accessible patches of woodland, so it is not necessary to go far afield for the bait which the salmon seem to prefer above all else (see page 130).

Transportation on the island is chiefly on foot, for there are few wheeled vehicles. One is the two-wheeled dump cart belonging to the community; the others are home-made structures, simple platforms mounted on two axles, each with a 12-inch wheel at either end and with boxes nailed on for seats. There are also sleds, with low but

stout runners, for freight and baggage. Good-looking and not overworked horses provide all necessary motive power.

The roads are merely broad paths made by the passage of the sleds. One, called the "shore road," extends from the few dwellings north of the jetty southward near the lagoon beach for about three miles. A second, known as the "back blocks road," starting at the post office near the jetty, turns inland and gives access for a couple of miles to the higher ground along the central ridge of the island. There are numerous woodland paths which connect these roads with each other and with the shore at various points (see pages 123, 125, 135).

Social life on the island is simple and pleasant. Hospitality and friendliness are universal. If there are cliques or family quarrels, they are well concealed. Honesty



THESE HIKERS ON THE "SHORE ROAD" HAVE NOT CLIMBED MOUNT LIDGBIRD!

Few people, in fact, attempt the ascent of the mountain, here capped in clouds. While it is some 300 feet lower than Mount Gower, at the right, it is a much more dangerous climb (see text, page 130).

is so universal and expected that property is seldom locked and theft is virtually unknown. If there is another place in the world where the innkeeper says to his departing guest, as was said to us (and to others): "If it isn't convenient to pay your account before leaving, you may deposit it to my account in Sydney next week," that spot isn't advertised as it should be!

NO CRIME WAVES

As a law-abiding community, the island easily ranks high on the list. There is no jail or courthouse, no sheriff or constable, no official who can legally make an arrest. There isn't even a lawyer! When we asked the chairman of the Local Committee what they would do in case of a serious crime, theft or assault, he replied they never had such troubles. It was suggested that a

criminal or drunken rowdy might come over from Sydney, but he said they didn't worry, for "the steamship company is pretty careful who it brings over." And when we insisted that a troublesome person might appear, he thought the Local Committee would be able to handle the case, and they'd ship the troublemaker back to Sydney by the first boat!

As already explained, there is no problem of poverty; every one has a home and an income. Some have finer homes than others, but the difference rests more on the diversity in ambition and taste than on opportunity.

A BETTER THAN 30-HOUR WEEK FOR "LABOR"

The gathering of the palm seeds is apportioned among the participants by the

Local Committee and each one is called on to provide his share of the estimated total at such times as the Committee directs. As the palms grow wild everywhere, practically no time or labor is required for their cultivation. It takes about an hour to gather a bushel of seed, when the trees are handy and the seeds abundant.

Even if we allow two hours for a bushel, it will mean only 3,000 hours of labor in a year for a group of thirty or forty men—or about two hours a week, which is far ahead of the 30-hour week. Lord Howe Island has no unemployed and it has no over-employed.

More remarkable than the absence of a lawyer on Lord Howe is the absence of a doctor. Visitors are often aghast when they learn that the nearest physician is in Sydney, and the islanders have suggested to the Board of Control that it provide a doctor to be paid from the community fund. But the Board members and many islanders hold that there is so little call for a doctor's services that they would not be warranted in paying one to reside on the island. Instead, they do provide a resident trained nurse, whose skill and experience enable her to handle satisfactorily the small amount of illness and the infrequent accidents. Then, too, doctors are often found among the visitors from Sydney: so that medical advice in serious cases is frequently available.

A teacher is also maintained from the community fund. The schoolhouse is an attractive building, set among trees and surrounded by a pleasant garden, while close at hand is an ample playground, where cricket seems to be the favorite sport. The school carries the children through the grades prior to high school; but ambitious boys and girls who wish further education must go to Sydney, and not a few do so.

The island's religious life centers around two churches, which stand side by side on the shore road, close by the lagoon. Since

they are embowered in trees and shrubbery, one comes upon them rather abruptly, as one follows the road, and they are scarcely visible from the beach. They are modest buildings, with no towering spires, but they are neat, well kept, and peaceful. In one of them, on Sundays, worship the islanders who belong to the Church of England; in the other, on Saturdays, are found the rest of the people, those affiliated with the Seventh Day Adventists. There is every indication of friendly cooperation.

A DISTANT OUTPOST OF "THE GEOGRAPHIC"

There are no movies and no film stars; no automobiles and no traffic "cops"; no liquor problem and no bootleggers; no newspapers or tabloids; no smoke or soot to befoul the air; no sounds of motors or machinery to offend the ear. Life moves evenly and serenely, without noise or haste. The outside world intrudes only by wireless and radio. Several times a week the postmaster, who is also wireless operator, types out a few sheets of paper containing the news of the world as he has heard it, and these are posted at the two boarding houses, Ocean View and Pine Trees (see illustration, page 132).

Once in five weeks the *Morinda* arrives from Sydney with freight, mail, and passengers. The freight includes flour and sugar, dry goods and shoes, stationery and various odds and ends for the two stores, the only places on the island where one can "spend money," and gasoline for the few motorboats and motor engines the island boasts. The mail includes many magazines and weekly papers. The NATIONAL GEOGRAPHIC MAGAZINE is a regular arrival. There are two members of The National Geographic Society on the island. The passengers include many a weary Australian seeking rest or recreation, or both, among the palms or along the shores of this happy isle, the Paradise of the Tasman.

Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your September number, The Society should be notified of your new address not later than August first.

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TO carry out the purposes for which it was founded forty-seven 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.

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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.

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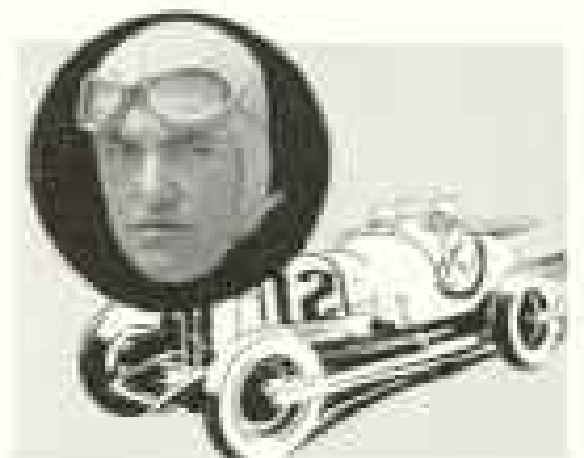
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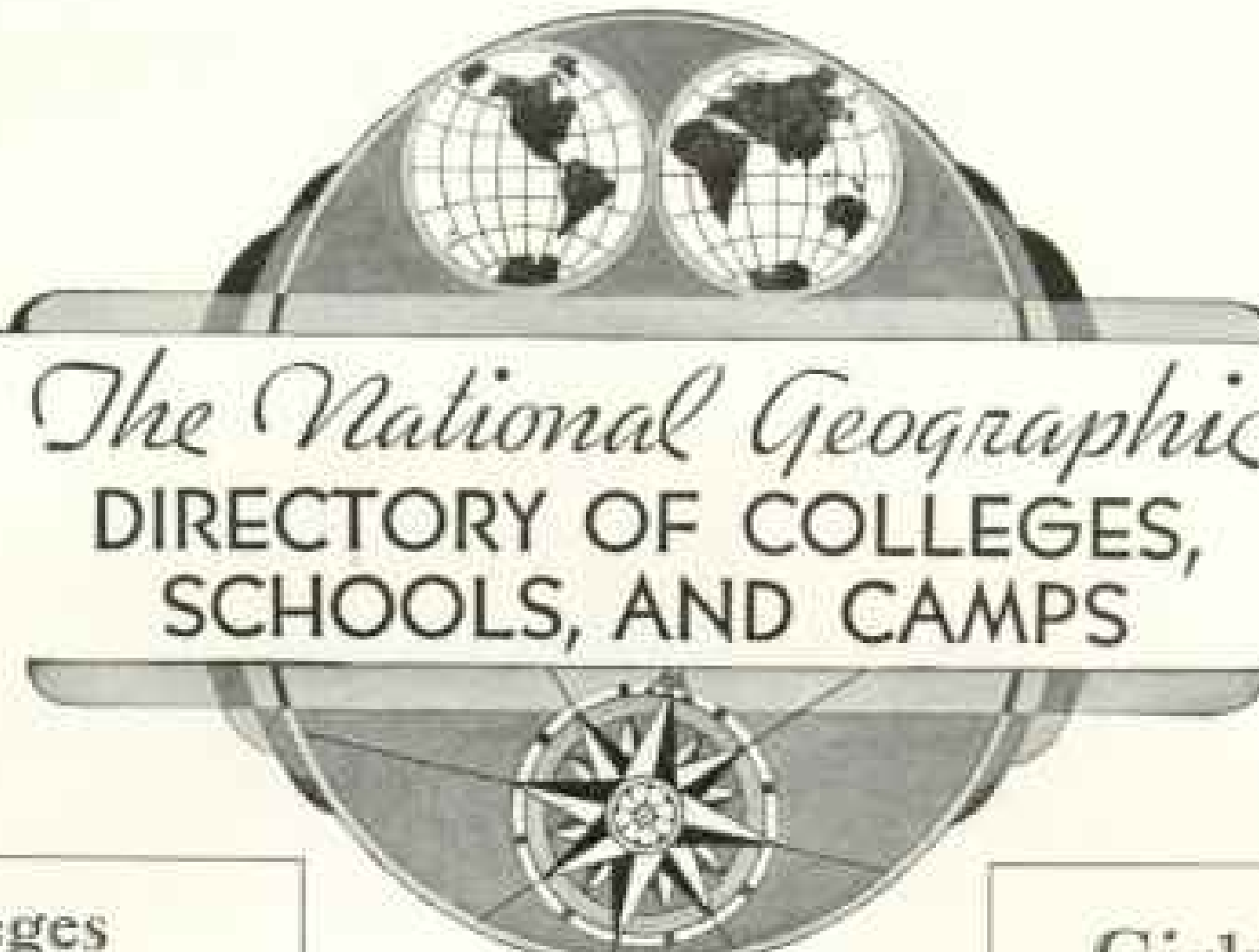
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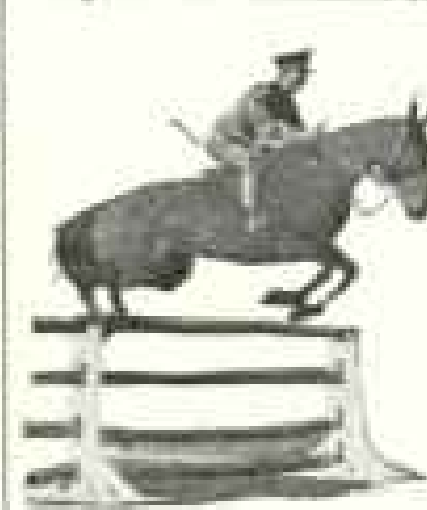
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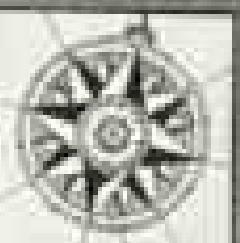
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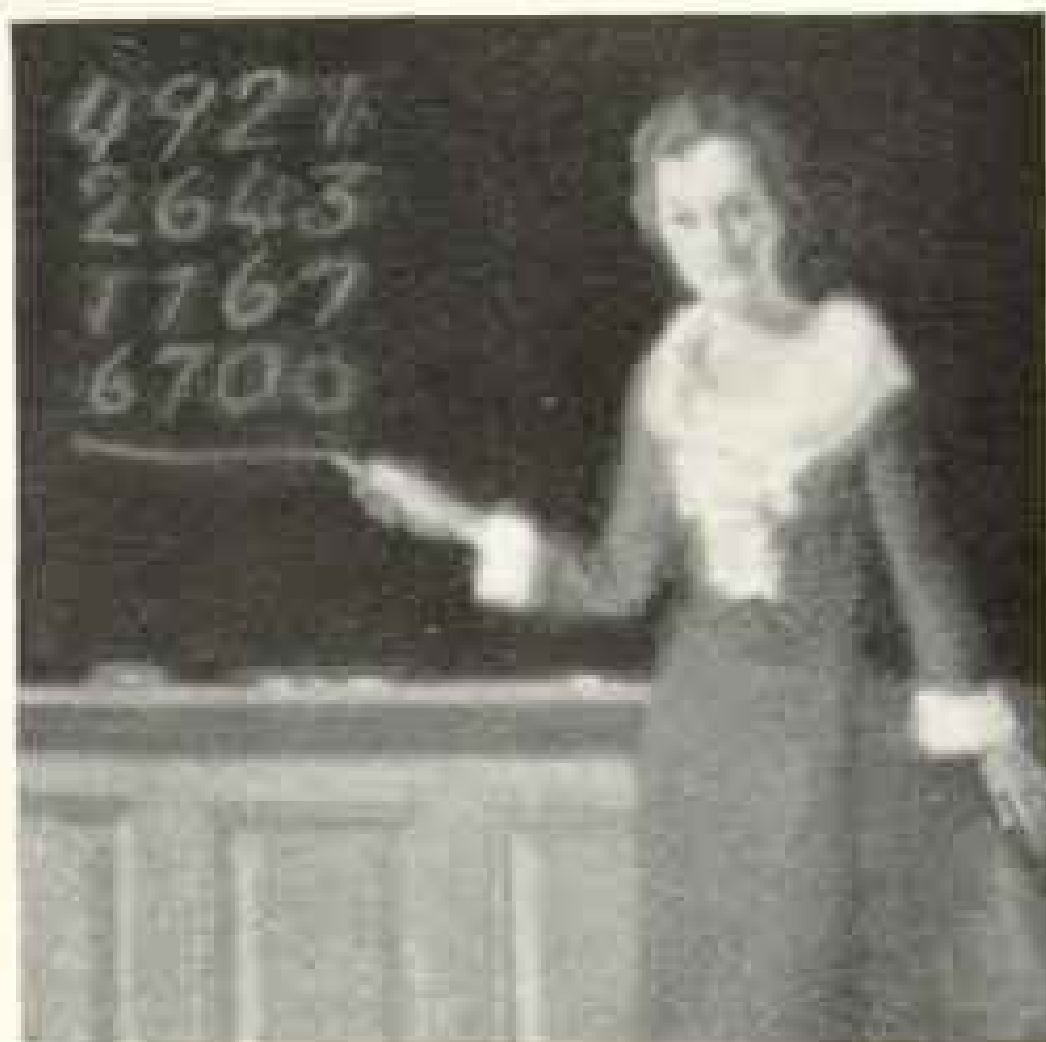
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Test Eyesight Regularly



The Blackboard Problem—as it looks to Jim and as it looks to Bill

BILL failed in arithmetic. He couldn't add blurry figures that wouldn't stand still. Poor vision is a tough handicap to a child in school. At least one in every ten has some form of defective eyesight.

Many of these uncorrected defects are progressive and cause increasing eye-strain and impairment of vision. Eye-strain may lead to severe recurring headaches, nervous exhaustion, hysteria, insomnia, dizziness and other disorders.

In older people there are other conditions of the eyes which are far more serious than imperfect vision. If untreated, they may eventually lead to blindness. Glaucoma and cataract can be present and in the first stages give little indication of their threat to your sight. Recognized early, glaucoma may be successfully treated; a cataract may be removed by an operation.

Good reading habits of young and old

A Special Warning

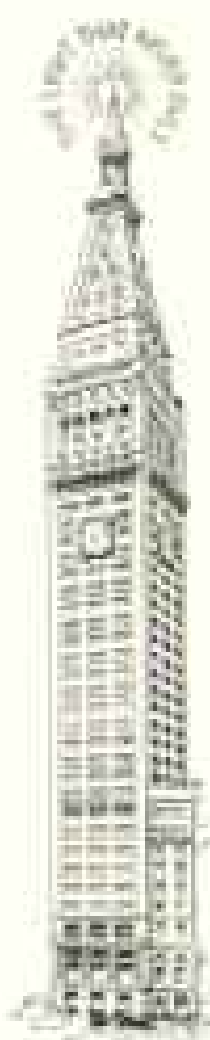
Contrary to a widespread idea that the Fourth of July has been made "safe and sane," the National Society for the Prevention of Blindness states that the toll of accidents from fireworks was greater last year than in many previous years.

prevent many eye troubles. Have your eyes examined regularly, even though they seem to be normal. Never wear glasses which have not been prescribed. Don't read

with the light shining into your eyes, or without your doctor's consent when recovering from serious illness, or when lying down—unless your head and shoulders are propped up and the page is held at right angles to your eyes below the line of vision. Hold your work or book about 14 inches from your eyes.

Don't use public towels or rub your eyes. Conjunctivitis and other communicable diseases may follow. Do not use any medication for diseases of the eyes unless it has been prescribed for the purpose.

Make sure that no member of your family is endangering his sight. Send for the Metropolitan's free booklet "Care of the Eyes." Address Booklet Department 735-N.



METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKER, PRESIDENT

ONE MADISON AVE., NEW YORK, N. Y.

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THE SEARCH FOR SECURITY

Across the great prairie a wagon train wound slowly onward into the setting sun.

In one of the wagons were John Duncan and his wife . . . leaving behind them the rocky, stubborn hills of their fathers to make a new home amidst the promise of the West . . . seeking fertile lands to give them and their sons after them the riches, the security they dreamed of.

But the Duncan family had to struggle many a year to wrest this security from the soil. They had many a danger and hardship to face in their new-found home. And before they were able to enjoy the fruits of their toil, the best years of their lives were gone.

Today, the search for security still goes on in every corner of the land. But now the Duncan descendants, and many another family, achieve with a single stroke of the pen what once required a generation of toil. Through the modern miracle

of insurance, they enjoy security from youth to their sunset years.

Life insurance creates estates for them at once, which could otherwise only be obtained by a lifetime of persistent saving. Accident insurance sets up immediate reserves to pay bills that follow in the wake of injuries. They drive, covered by automobile insurance that protects what they own against damage claims. Other forms of policies provide education for their children, pay off mortgages, guard against adversities.

Thanks to insurance, they are able to take care of the future and still enjoy many of life's comforts and luxuries today. Thanks to insurance, the search for security is ended for many a family. Moral: Insure in The Travelers.

The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, Hartford, Connecticut.



**BUT THE GOVERNMENT
HAS A BETTER METHOD**

You can feel, or taste, or see the differences in value between most of the things that you buy . . . clothes, food, automobiles . . . but when it comes to gasoline you WONDER???

You notice that your engine seems to know the difference but you're not quite sure that you do.

It may help you to know how the U. S. Government buys its gasoline . . . millions of gallons a year.

The Government buys on scientific tests . . . tests of starting and tests of acceleration. No guesswork.

Now here is a significant fact: The regular Texaco Fire-Chief gasoline, for sale everywhere, meets the Government specifications . . . not only for ordinary gasoline, but for *emergency* gasoline.

This means that you can have in your tank, at no extra cost, the same emergency starting power, the same emergency speeding power that the Government requires for its important emergency vehicles.

That is a fact . . . not a claim.

TEXACO FIRE-CHIEF

Meets U. S. specifications* for emergency gasoline

*Federal Specification VV-M-571

Her Guests **COULDN'T BELIEVE IT**



*... when she explained
that the soup they praised
came out of a tin!*

★

DID it actually come out of a tin? Many a dinner guest has asked. It is hard to believe—that such soup—soup that anyone would say issued from the kettle of a well-trained home cook, is really canned soup.

But that is the kind of soup Heinz makes—the homemade kind—the kind now served regularly by many a hostess who not long ago scoffed at the “canned soup” idea.

No run-of-market ingredients enter the Heinz kitchens. Heinz chefs follow treasured home recipes and use table-grade ingredients. They brew meat stocks from cuts such as better butchers carry. They select only the finest vegetables. They concoct Heinz soups in small batches, simmer them long and patiently in individual open kettles, stir in the proper seasonings just as your own cook would do. Then they seal their fresh, fragrant flavor into stout tins.

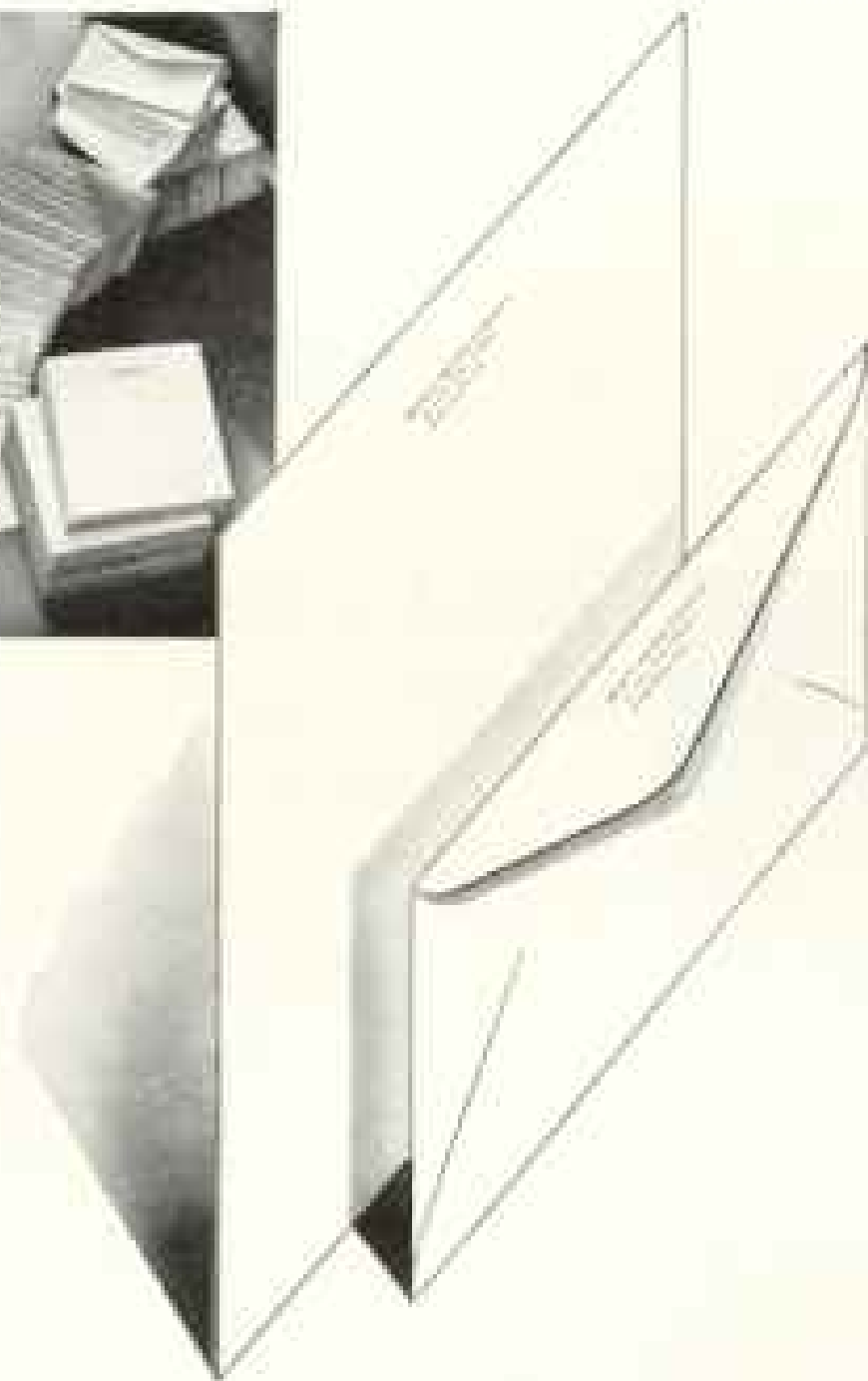
And so Heinz Home-Style Soups come to your table precisely as when they are poured from kettles. Try Heinz Onion Soup tonight, or Heinz Gumbo Creole, or Heinz new Cream of Spinach. They are *finished* soups, requiring merely heating and serving. Ask your grocer.



HEINZ *homemade style* **SOUPS**

57

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GUMBO CREOLE • CLAM CHOWDER
SCOTCH BROTH • MOCK TURTLE
VEGETABLE • CREAM OF SPINACH
CREAM OF MUSHROOM • CREAM OF
OYSTER • CREAM OF ASPARAGUS
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Michigan

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By City, Michigan | <input type="checkbox"/> SOUTHEAST Michigan Vacation Directory
Book Building, Detroit, Michigan |
| <input type="checkbox"/> WEST Michigan Vacation Directory
Grand Rapids, Michigan | <input type="checkbox"/> CURE of the Land of Huckleberries
Marquette, Michigan |



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Telephone service like this is the result of years of co-ordinated effort by the Bell System. Bell Telephone Laboratories contribute their research and engineering. Western Electric its manufacturing, purchasing and distributing. The 24 regional telephone companies, with the assistance of the American Telephone and Telegraph Company, see to it that the latest improvements in the art are made available to all.



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Which School?

29 schools for girls, 24 schools for boys, 4 colleges, 13 vocational schools, are listed in the three-page School Directory in the front advertising section of this issue of THE GEOGRAPHIC.

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full-fledged movie camera, beautifully made. Fits the pocket. Simple to use as a Brownie. Price only \$34.50. See the Ciné-Kodak Eight at your dealer's... Eastman Kodak Company, Rochester, N. Y.... *Only Eastman makes the Kodak.*

* Ciné-Kodak Eight makes 20 to 30 movie scenes—each as long as the average scene in the new reels—on a roll of film costing \$2.25, finished, ready to show.

Ciné-Kodak **EIGHT**



"I Want to Take a Sea Trip"

CRUISES IN AMERICAN WATERS, JULY 10 TO AUGUST 9

This Sailing List is published by the Advertising Department of The National Geographic Magazine as an aid to readers contemplating a sea voyage. Routes as well as sailing dates are subject to change and can not be guaranteed. Before plans are concluded a travel agent should be consulted for latest authentic information. Consult the agent also for booklets and tickets. The National Geographic can NOT supply them.

* The star denotes a steamship line whose advertising appears in the May, June or July issues of THE GEOGRAPHIC. † Leaves Boston. ‡ Leaves Philadelphia. All others leave New York.

Leave NEW YORK	DATE	STEAMSHIP LINE	ROUTE (See list below)	SHIP	Leave NEW YORK	DATE	STEAMSHIP LINE	ROUTE (See list below)	SHIP
July 10	11	Southern Pacific	22	Dixie	July 15	17	United Fruit	4	Quirigua
July 11	11-18	Columbian	13	Haiti	July 16	19	*Gruen	5	Santa Rita
11	17	*Dollar	2	President Hayes	July 18	24	Royal Netherlands	26	Acra
11	22	Furness West Indies	13	Domitria	July 20	20	Canadian National	21	Lady Somerset
11	1-20	New York & Cuba Mail	11	Turstan	July 21	22	*Canard	22	Frederica
11	11	New York & Porto Rico	12	Borinquen	27	28	Furness Prince	18	Western Prince
11	17	United Fruit	7	Peten	27	27	Munson	3	Munargo
July 12	20	*Gruen	5	Santa Just	27	27	New York & Cuba Mail	4	Oriente
12	24	Royal Netherlands	26	Medea	7-15	8	*Panama Pacific	4	Virginia
July 13	20	Canadian National	21	Lady Rosbey	27	27	Standard Fruit	17	Castilla
20	20	Furness Prince	18	Northern Prince	27	27	United Fruit	8	Cabamates
12	12	Munson	3	Munargo	July 28	18-28	Canadian National	21	Lady Hawkins
12	7-17	New York & Cuba Mail	4	Oriente	July 29	17	Standard Fruit	25	Granada
12	8	*Panama Pacific	4	California	July 31	21	Red "D"	8	Lara
12	12	Standard Fruit	17	Castilla	Aug. 1	12-18	Southern Pacific	22	Dixie
12	18	United Fruit	7	Tibia	1	1	Columbian	13	Haiti
July 14	14-28	Canadian National	21	Lady Nelson	1	1	*Dollar	4	President Cleveland
July 15	15	Standard Fruit	25	Granada	1	1	New York & Cuba Mail	11	Turstan
July 18	11-18	Columbian	13	Patrons	1	1	New York & Porto Rico	12	Cosmo
18	18	*Dollar	2	President Taft	1	1	United Fruit	7	Peten
18	8-20	New York & Cuba Mail	11	Oriente	Aug. 1	20	*American Caribbean	23	Haiti
18	11	New York & Porto Rico	12	Cuma	1	1	Royal Netherlands	26	Flores
18	17	United Fruit	7	Veragua	Aug. 2	24	Canadian Pacific	28	Duchess of Athol
July 19	22	*American Caribbean	23	Scamora	2	2	*Canard	22	Olympic
19	17-28	Royal Netherlands	26	Van Rensselaer	2	2	*Gruen	5	Santa Maria
19	24	Royal Netherlands	26	Amor	2	2	*Gruen	18	Santa Elena
July 20	12	*Canard	22	Olympic	2	2	Munson	28	Pan America
20	12	*Gruen	5	Santa Clara	4-21	19	New York & Cuba Mail	4	Oriente
20	17	*Gruen	18	Santa Rosa	2	2	Standard Fruit	17	Atlantida
20	24	Munson	28	Southern Cross	2	2	United Fruit	8	Tibia
20	7-24	New York & Cuba Mail	4	Oriente	Aug. 4	21-29	Canadian National	21	Lady Drake
20	12	Standard Fruit	17	Atlantida	Aug. 5	4	*Canard	22	George
20	18	United Fruit	7	Tibia	Aug. 15	15	Standard Fruit	25	Caston
July 22	8	*Canard	22	Gatin	Aug. 1	21	Red "D"	8	Carabobo
July 27	12	Standard Fruit	25	Gatin	Aug. 8	12-18	Columbian	13	Patrons
July 28	8	*Canadian Pacific	28	Duchess of Athol	8	8	*Dollar	4	President Monroe
July 28	21	Red "D"	8	Carabobo	8	8	Furness West Indies	11	Domitria
July 30	11-18	Columbian	13	Colombia	8	8	New York & Cuba Mail	11	Oriente
30	17	*Dollar	2	President Johnson	8	8	New York & Porto Rico	12	Borinquen
30	12	Furness West Indies	13	Serbia	8	8	United Fruit	7	Veragua
30	8-28	New York & Cuba Mail	11	Sibony	Aug. 9	17-21	Royal Netherlands	16	Oranle Nassau
31	11	New York & Porto Rico	12	Borinquen	9	9	Royal Netherlands	26	Lara

ROUTES

1 Bermuda.	15 Port au Prince, Curacao, Puerto Cabella, La Guaira, Guanta, Puerto Suora, Paramaribo, Curacao, Trinidad, Demerara, Paramaribo.	21 Bermuda, St. Kitts, Nevis, Antigua, Montserrat, Dominica, St. Lucia, Barbados, St. Vincent, Grenada, Trinidad, Demerara.
2 Havana, Panama.	16 Rio de Janeiro, Santos, Montevideo, Buenos Aires, Trinidad.	22 St. Thomas, St. Croix, St. Kitts, Antigua, Guadeloupe, Martinique, St. Lucia, Barbados, Trinidad, Paramaribo, Demerara, Grenada, St. Vincent, Dominica.
3 Panama, Guayaquil, Callao, Valparaiso.	17 Santiago, Kingston, La Ceiba.	23 New Orleans.
4 Havana.	18 Cartagena, Puerto Columbia, Panama Canal, La Libertad, San Jose, Maratun, Los Angeles, San Francisco.	24 St. Thomas, St. Croix, St. Kitts, Antigua, Guadeloupe, Martinique, St. Lucia, Barbados, Trinidad, Paramaribo, Demerara, Grenada, St. Vincent, Dominica.
5 Nassau, Miami, Havana.	19 Kingston, Panama Canal, Bocasayton, Guayaquil, Salaverry, Callao, Valparaiso, Havana.	25 Bermuda, Nassau, Kingston.
6 San Juan, La Guaira, Puerto Cabella, Curacao.	20 Bermuda, Rio de Janeiro, Santos, Montevideo, Buenos Aires, Trinidad.	26 Key West, Proctora.
7 Havana, Kingston, Cristobal, Port Limon.		27 Haiti, Venezuela, Curacao.
8 Kingston, Cristobal, Cartagena, Puerto Columbia, Santa Marta.		28 St. Thomas, Curacao, La Guaira, Kingston.
11 Havana, Progreso, Vera Cruz, (Mexico City).		29 Quebec, Montreal.
12 San Juan and Santo Domingo.		30 Quebec, Funchal, Meyer Bar, Gode, Nova Scotia, Bermuda.
13 Haiti, Jamaica, Colombia, Panama.		31 Halifax.
14 St. Thomas, St. Croix, St. Martin, St. Kitts, Antigua, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados, Trinidad, Demerara.		

REGULAR SAILINGS FROM AMERICAN PORTS

(From New York unless otherwise indicated.)

*Alaska Line	8- to 12-day cruises from Seattle to Alaskan ports.
American Export Lines	45- to 75-day cruises to Mediterranean ports.
American Mail Line	16- and 69-day cruises from Seattle to Japan, China and the Philippines.
*American Scenic Line	Weekly to Sweden, Poland, Russia, Denmark, Finland.
*American South African	Monthly sailings to South Africa.
*Anchor Line	To Ireland and Scotland.
Baltimore Mail Line	From Baltimore and Norfolk to England, France and Germany.
Arnold Bernstein Line	To England, France and Belgium.
Canada Steamship Lines	Summer schedule via Great Lakes, St. Lawrence and Saginaw to September 4.
*Canadian Pacific	Round-the-world sailings . . . From Montreal to England, Scotland, Ireland and France. . . . From Vancouver to Alaska. . . . From Vancouver via Hawaii to Japan, China and the Philippines. . . . From Vancouver to New Zealand and Australia.
Clyde-Mallery Line	To Charleston, Jacksonville, Miami and Galveston.
*Canard White Star Line	To England, Ireland and France. (Also sailings from Boston and Montreal to Great Britain.)
*Dollar Line	Around the world. Also from San Francisco via Hawaii to Japan, China and the Philippines.
Eastern Steamship Lines	Summer schedule, New York and Boston to Maine, New Brunswick, Nova Scotia.
*French Line	To England and France.
*Furness Bermuda Line	To Bermuda.
*Gruen Line	From New York, San Francisco and Los Angeles to ports noted on routes 2, 14, 15.
Hamburg-American Line	To England, Ireland and Germany.
North German Lloyd	To England, France and Holland.
Holland America Line	New York and Boston to Gibraltar, French Bitter, Naples, Genoa and Trieste.
*Italian Line	From San Francisco and Los Angeles to Hawaii, Samoa, Fiji, New Zealand and Australia.
*Malton Line	From Seattle and Vancouver to Japan and China.
*Nippon Yusen Kaisha	From San Francisco and Los Angeles via Hawaii to Japan and China.
*Panama Pacific Line	Via Panama to San Diego, Los Angeles and San Francisco.
Red Star Line	To Southampton and Antwerp.
States Steamship Line	From Portland, Oregon, to China and the Philippines.
*United States Lines	To England, Ireland, France, Germany.

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