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RIVER-ENCIRCLED PARAGUAY

By HARRIET CHALMERS ADAMS

AUTHOR OF "MADRID OUT OF DOORS," "CIRENAICA, EASTERN WING OF ITALIAN LIBYA," "BARCELONA, PEARL OF THE CATALANS," ETC., ETC., IN THE NATIONAL GEOGRAPHIC MAGAZINE

IT IS four days by steamer from Buenos Aires to Asunción, the capital of Paraguay. We might have made the journey by rail in 52 hours, on a train that crosses the Paraná River by ferry from Zárate, 56 miles from Buenos Aires, to Ibicuy; passes through the fertile Argentine Mesopotamia, between the Paraná and Uruguay rivers, to the Argentine frontier; recrosses to the Paraguayan shore on another ferry, and continues through undulating grass and woodland to Asunción.

However, remembering with pleasure our first voyage up the Paraná 14 years earlier, we chose the steamer to carry us to this remote, river-encircled country, so rich in dramatic history and so little known to North Americans.

For three days after sailing we had Argentina's richest agricultural provinces on either side. The river, at first gulflike, narrowed between low-lying islands fringed with feathery pampas grass.

On our former voyage, at flood season, I had seen the shore villages nearly submerged, the stream strewn with floating islets, known as *camalotes*, formed of earth, weeds, and roots, upon which carpinchos, or capybaras, snakes, and other upriver creatures were borne seaward. The harbor of Montevideo had been so choked at that time with these strange floating islands that traffic was seriously hampered.

Our present voyage was in the floodless month of July, midwinter at this end of the hemisphere.

Fortunately, each day brought us nearer a mild climate. Our fellow passengers were mostly home-bound Paraguayans. There were several Argentine families escaping from cold weather and a few commercial travelers. All spoke the musical tongue of Cervantes, the speech of some 100,000,000 people to-day.

The man next me at table declared he thought English a brutally harsh language. "Imagine," he said, "trying to say *shrimps* when you mean *camarones!*"

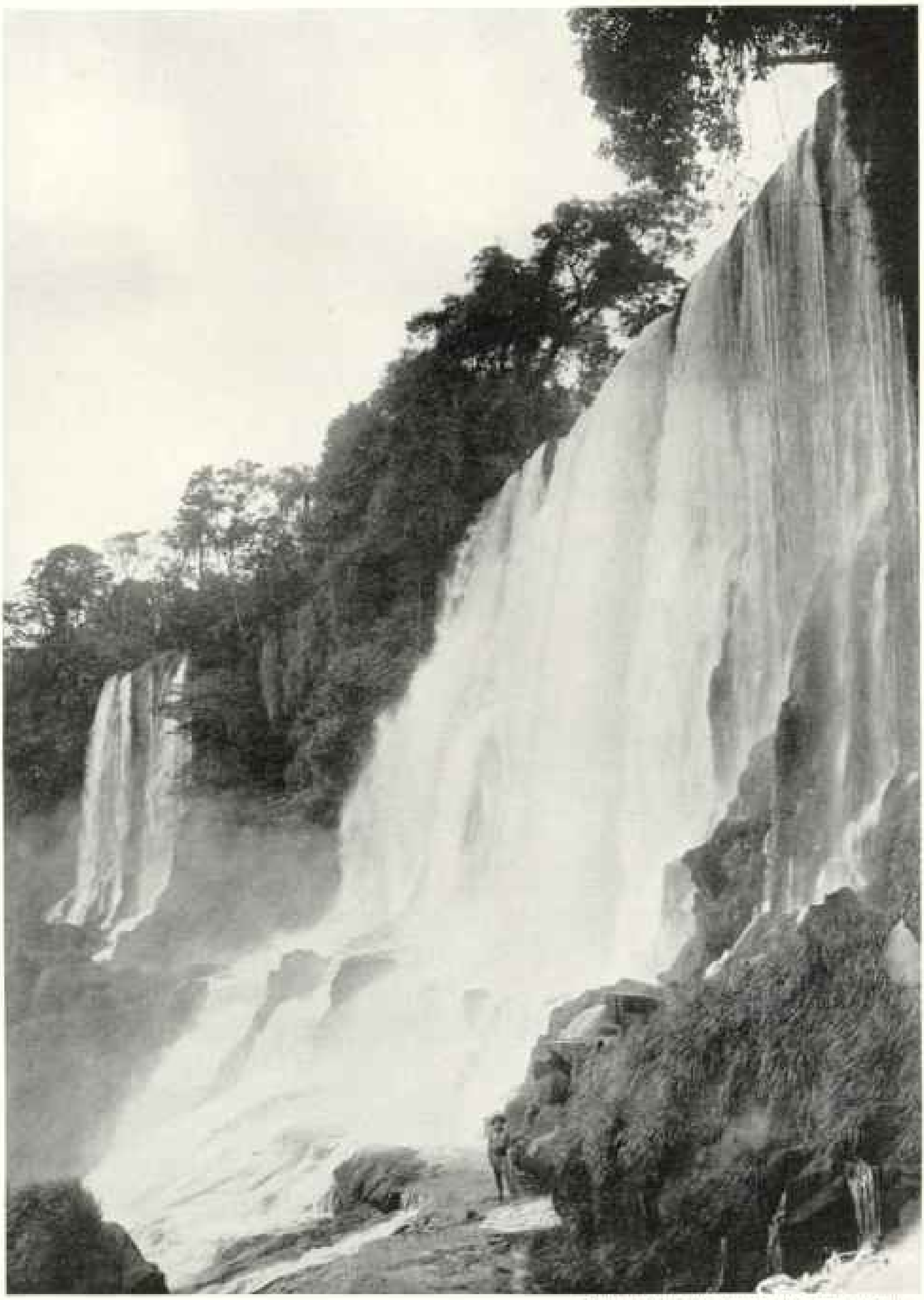
NO MEAL FOR A VEGETARIAN

Dinner, an elaborate seven-course meal, was not planned for vegetarians: thin soup of meat stock, cold meat and salad, thick soup of meat and vegetables, meat and greens, cheese and fruit paste, bananas and mandarin oranges, coffee, liquors.

That instrument of torture, the river-steamer piano, sounded far into the night; but it seemed not to disturb the card and domino players, who gathered in the saloon under a placard announcing that gambling was strictly prohibited.

There are travelers who always wear an historic lens. I confess to an unflagging interest in the old *Conquistadores*. We followed in the wake of Sebastian Cabot's sturdy caravel, plowing its way up the uncharted waters of the Plata to the Paraná (Mother of the Sea), and on to the Paraguay, at the gates of the Tropics.

It was in 1526 that Cabot, a Venetian pilot in the service of Spain, followed the lead of Juan de Solis and Magellan, and



Photograph from Harriet Chalmers Adams

THE IGUAZÚ DISPLAYS A MASTERPIECE OF WATERFALL LAND

The cascade area lies along the Iguazú, or "Big Water," and the Alto Paraná near the point where they unite. On the former stream 273 separate cataracts, interspersed with patches of forest, have been counted at times of low water (see text, page 410).

headed his caravel up the great muddy tide which he called the Rio de la Plata, River of Silver. The British have simplified this to "the River Plate." Americans stutter slightly in calling it "the La Plata," for, since *la* is "the" in Spanish, we say "the the Plata."

Asunción, 1,000 miles upriver and an equal distance from the Brazilian seacoast, is an old city, dating from 1536. Asunción babies of Spanish and aboriginal blood had become grandparents when the Pilgrims landed on Plymouth Rock.

The first American of European blood to hold office, Hernando Arias de Saavedra, governor of Paraguay in 1591, was born here. By 1600 the city was the metropolis and only important town of a vast territory that comprised the entire southeastern portion of South America, the region occupied to-day by parts of Argentina, Uruguay, Paraguay, western Brazil, and eastern Bolivia.

Buenos Aires was founded at a later period, as a subsidiary settlement nearer the river's mouth, a convenience to the Asunción colonists on their way to and from Spain.

RIVER GEOGRAPHY AT FIRST HAND

I like learning fluvial geography at first hand. We came to the meeting of the Paraná and the Uruguay rivers, which form the Plata; up the Paraná we steamed to the junction of the Alto (Upper) Paraná and the Paraguay.

The Paraná is 2,000 miles long, the Paraguay 1,800. When South America was young the basin now cradling these rivers was a vast inland sea, known to geologists as the Pampean Sea. When the Plata took form it was mightier than the Amazon. To-day it drains less than half as much territory as that drained by the King of Rivers.

It was not until the fourth day that we reached the point where the clear waters of the Alto Paraná mingle with the Paraguay's amber tide. Palm-studded fields now lay on the eastern shore. We passed a village of one-story, buff-colored adobe buildings with red-tile roofs and moss-covered gateways of unmistakable Spanish design. An archaic oxcart jogged across the flower-carpeted green. Flocks of white aquatic birds winged up from the shore. We had reached Paraguay.

Drawn by James M. Darley

PARAGUAY AND ITS RIVER AND RAIL APPROACH FROM BUENOS AIRES

A part of the Chaco area, now in dispute between Paraguay and Bolivia, is shown.

Until the Pilcomayo River is reached, at some distance up the River Paraguay, the western shore is Argentine territory. Beyond this point lies the region known as the Chaco, now disputed territory between Paraguay and Bolivia.*

* Paraguay and Bolivia have for some months been carrying on military operations in the Chaco region, and hostilities are taking place there despite the fact that neither State had made any official declaration of war up to early in March. A commission of neutrals, made up of representatives of the United States, Mexico, Colombia, Uruguay, and Cuba, has been seeking to arrange a basis upon which the dispute between the two countries might be settled.—Editor.

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A PARADE OF CADETS IN ASUNCIÓN

When the Paraguayan Congress issued recent general mobilization orders to prepare for the event of hostilities with Bolivia over the disputed Chaco territory, streets of the capital city rang to the tramp of marching youth.

Photograph by Harriet Chalmers Adams

MANY MOUNTED POLICE PATROL THE STREETS OF THE CAPITAL

In times of peace young men may choose patrol service instead of army enlistment. They present a fine appearance, since every Paraguayan boy learns to ride at an early age and Paraguay breeds spirited horses.

Photograph by Ewing Galloway

PASSENGERS FOR ASUNCIÓN LAND AT THE CUSTOMHOUSE

Like other important buildings in the city, this structure is areaded. The shade afforded is welcome in times of tropical heat. Some years ago an American expert was employed to revise the Paraguayan tariff, and the schedules he recommended are still in force.

The Pilcomayo, rising in the mountains of southern Bolivia, was long the river of mystery. For some years its upper and lower reaches have been known, but its middle course has only recently been traced. Almost opposite its mouth lies the colorful city of Asunción.

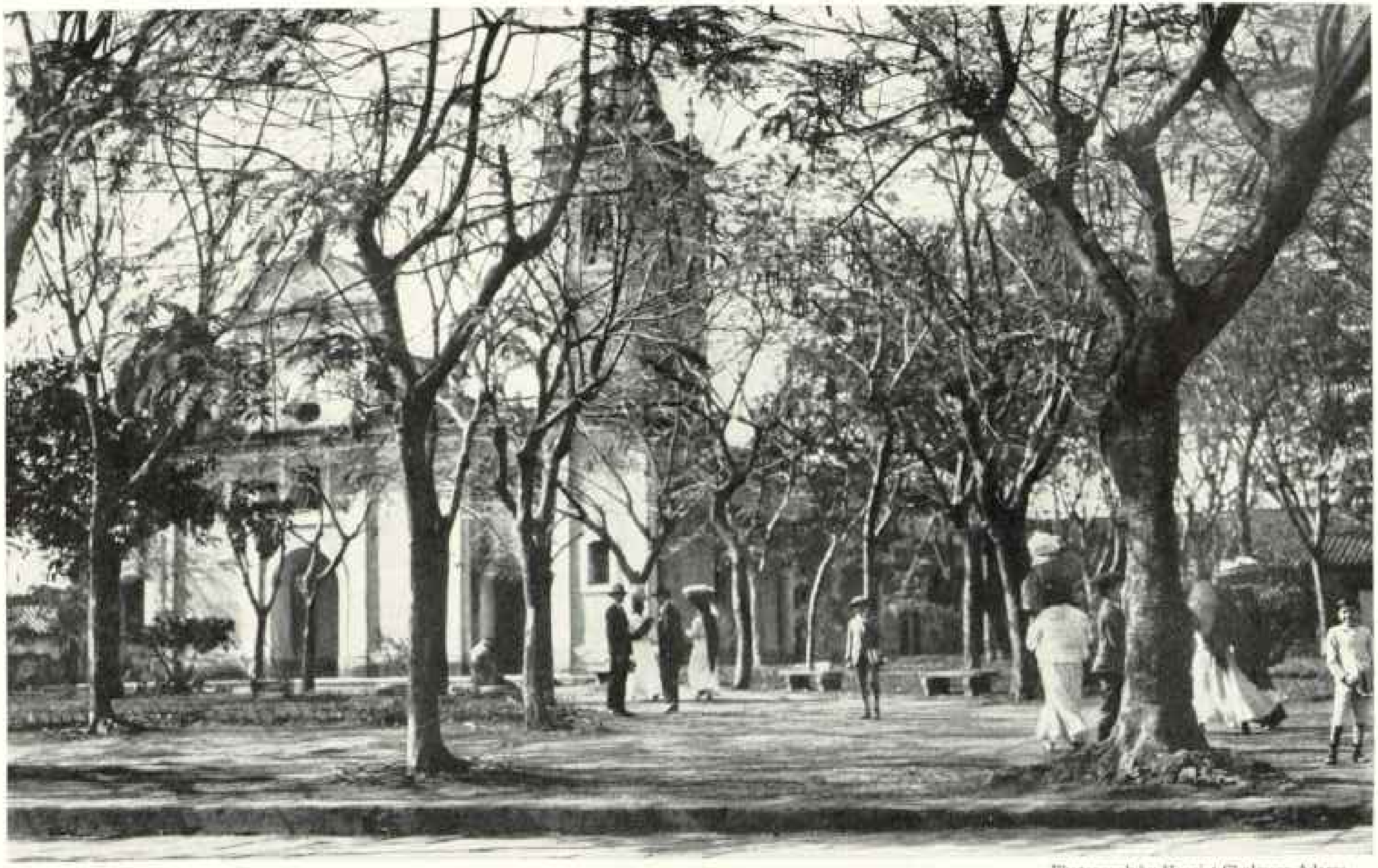
The colonial Spaniards showed rare judgment in selecting their sites for cities. Here they chose a high bank of the river, safe from the floods, at a point where a peninsula, jutting out into the wide stream, forms a little bay. Because of sandy soil and natural drainage, the city is healthful and is becoming a winter resort for down-river people. The winter climate is not unlike that of southern California.

"The only time we ever had a hail-storm," a Paraguayan told me, "some folks thought the gods were sending down rice."

We found many changes in Asunción. The city now has about 143,000 inhabitants. Belgian blocks replace cobblestones on the main thoroughfares and automobiles jostle bullock carts. Fattening after its big sisters downriver, Asunción is gradually destroying its dignified old buildings and erecting highly ornate structures in their stead.

It has not yet dismissed the *sereno*, or night watchman, but he no longer prowls about with a lantern, enveloped in a big black cape. He is just a plain policeman in khaki and brown puttees. His reassuring whistle, answered by the nearest watch, is a feature of Asunción nights.

The modern villas of the residential section are charming. Pink and buff are the prevailing tints. Flaming poinsettias peep



Photograph by Harriet Chalmers Adams

SAN ROQUE CHURCH BREATHES THE SPIRIT OF COLONIAL PARAGUAY

The venerable walls and corridors, worn by the feet of generations of worshipers in Asunción, recall tales of the country's romance and tragedies.

Photograph from Harriet Chalmers Adams

BECAUSE OF FLOODS IN THE RAINY SEASON, ASUNCIÓN SITS HIGH ABOVE ITS WATER FRONT

A peninsula thrusts out into the Paraguay River in front of the city. Small river craft and ocean vessels are in Asunción's harbor. The low Chaco on the farther shore is often flooded, but the river does not reach the levels back from the wharves.

over the vine-clad garden walls; purple bougainvillaea and all manner of colorful climbing plants gladden the doorways.

Every garden has its jasmine, roses, and begonias; its vivid hibiscus, stately palms, and fragrant orange trees. When the gorgeous poinsettia reaches the end of its bloom, the flamboyant tree comes into blossom.

ROMANCE LINGERS IN OLD ASUNCIÓN

The Cathedral, near the river, beautiful old church of the conquistadores, is the heart of the old town I love. About it are low, one-story houses of massive walls, cool, dim corridors, vine-hung patios, and moss-grown roofs of weather-beaten reddish-brown tile. These are distinctive buildings, enveloped in the glamour of a romantic past, reminders of Asunción's heroic days.

One of them is the house where, in 1811, the Declaration of Paraguayan Independence was signed. The ceremony occurred either late in the night of May 14 or early in the morning of May 15. Since no one is certain of the exact hour, both dates are celebrated as a national holiday.

When the colony had freed itself from Spain, Dr. José Gaspar Rodriguez de Francia,* a native Paraguayan, put aside others appointed with him as a governing board and named himself supreme dictator for life. As El Supremo Perpetuo, 1813-1840, he isolated his people, ruling them with a rod of iron. Paraguay became the Robinson Crusoe of nations. Although a despot, Francia did much to improve the condition of the country.

His reign was followed by that of two other dictators, Carlos and Francisco López, father and son.

At the death of Carlos López, in 1862, Paraguay, despite the continued policy of isolation and one-man control, had become rich. It had advanced in military importance to become one of the strongest republics on the continent. But the Nation suffered supreme tragedy in the reign of Francisco Solano López, when its manpower was practically exterminated.

During the Five Years' War, 1865-1870, one of the most sanguinary conflicts in history, known to the Paraguayans as the War of the Triple Alliance, this inland nation fought its three more populous neighbors—Brazil, Argentina, and Uruguay. The Paraguayan proved his valor. When the tide of aggression turned, he battled like a tiger in defense of his homeland. It is doubtful that a nation has ever fought more absolutely to a finish.

In the course of the long struggle, all lads over 15 were called to the colors. Even boys of 10 entered the army. As the men fell, the Spartan women took up the fray.

Paraguay's fields lay waste; most of the herds were killed; industries were ruined. Poverty and disease stalked the land. The population was reduced to a fifth of its pre-war numbers. The proportion of men to women was one to seven. The land ceded to the allies totaled 56,000 square miles. In passing judgment on this country, we must start with 1870 on a foundation of ruin.

NO INVALIDS WANTED IN ONE HOTEL

A friend in Buenos Aires had suggested we try the French hotel in Asunción. "The best cooking in town," he assured us, "but an awfully hard place to get into. The old chap who runs it is mortally afraid of sickness in any form. His guests must have ruddy complexions or bring health credentials. If he finds a medicine bottle among your belongings, you'll be thrown out, bag and baggage."

We put up at our old rendezvous, the hotel with the splendid view.

The Paraguay was rising and the peninsula, stretching out into the river, was nearly submerged. It is of interest to geographers to note that the seasons of high and low water in the Paraná and the Paraguay rivers are reversed.

In Asunción's harbor were vessels flying Argentine, Uruguayan, and Paraguayan flags. Steamers under the Brazilian flag were making their 3,050-mile voyage from Rio de Janeiro to Corumbá, a river port in the vast inland province of Mato Grosso.

Across the river, which is a little more than a third of a mile wide at this point, we could see the shores of the Paraguayan Chaco. This is the greater but more sparsely settled portion of the country. All but 50,000 of the 800,000 inhabitants of Paraguay live on the eastern, or Asunción, shore, where the land is slightly rolling,

* See Thomas Carlyle's essay on this remarkable man in his "Critical and Miscellaneous Essays"; also, "El Supremo," an American historical romance, by Edward Lucas White.

Photograph from Harriet Chalmers Adams

GIRLS LEARN FEATHERWORK AND OTHER CRAFTS AT SCHOOL

In contrast to the language of the masses, the tongue spoken by the students is Spanish, and young women of the educated classes also learn French. Their instruction is not only literary, but includes various domestic science and artistic activities.

savannas mingling with forests, the tree-clad hills rising to perhaps 1,500 feet altitude (see illustration, page 391).

West of the river, in the Chaco, the country is altogether different in character, low-lying, swampy, given over for the most part to primitive nomadic tribes, but fast being reclaimed as a cattle country. This is the region of the present conflict between the Bolivians and the Paraguayans.

Chaco (corrupted from Chucu) means "hunting ground" in Quichua, the language of the Incas of Peru. Perhaps the ancient Peruvians hunted in this remote region beyond the Andes. Perhaps Incan tribes, fleeing from Spanish invaders, settled here, mingling their blood with that of the original inhabitants.

As early as 1537 the intrepid colonists who founded Asunción plunged through the trackless Chaco in an unsuccessful attempt to reach Peru, where there was a Spanish viceroy, superior officer to the *Adelantado* of Paraguay. By 1548 a party actually succeeded in reaching the Pacific and returning to Asunción, taking two years for the round trip.

By the 17th century 12 different expeditions had crossed this wilderness lying between the Paraguay River and the Peruvian coast. When we recall that expeditions of the present century have been wiped out by Chaco Indians, and realize how inadequate was the equipment of these early Spaniards, we honor their courage and fortitude.

QUAINT AND MODERN COSTUMES MINGLE

Asunción's streets are rich in local color. As in other South American capitals, the upper strata look and dress like Americans or Europeans of a similar class; but, to the delight of the traveler, the masses are still distinctive in costume and customs. In summer the white-garbed women of the market place look like orientals in their long, sheetlike garments draped over head and body. The dress underneath is simple—a long, full petticoat and a low-necked, sleeveless blouse. The feet are bare.

This costume has changed little in the three centuries since the Jesuit missionaries came to lead these Guarani people from savagery to civilization.

Photograph from Harriet Chalmers Adams

"TIME OUT" FOR A ROADSIDE CHAT

Guaraní women are hard-working, frugal, good-natured. They add to family incomes by weaving hammocks and molding pottery in their homes. The grandmother (left) carries a package on her head, freeing her hands for other tasks.

Photograph by W. L. Schurz

WHERE A GOOD CIGAR IS A SMOKE FOR WOMEN AND CHILDREN

At the markets in Paraguayan towns the Guaraní natives of both sexes and all ages smoke incessantly (see text, page 401). Tobacco is a principal source of revenue in a large portion of the interior.

IF THEY ARE LATE FOR SCHOOL THE PHOTOGRAPHER'S TO BLAME

Opportunities for education now are offered throughout Paraguay. A national university is located at Asunción, and the Republic has several large normal colleges which are sending teachers to remote villages.

Photograph by Harriet Chalmers Adams

THE "OSTRICH-BRUSH MAN" CALLS AT ASUNCIÓN DOORS

Flocks of rheas, the native ostriches, once abounded on the pampas of Paraguay and Argentina. Few of the giant avians remain in the region of the capital, but household articles fashioned from their feathers are sold on the streets (see text, page 415).

On reaching Paraguay the Spaniards found a peaceful, contented people who belied their name of *Guaranis* (warriors). They formed the southern branch of the powerful Tupis, who, at the time of the Conquest, dominated a vast territory between the Amazon and the Plata, even extending their influence to the forest dwellers of eastern Peru. Guaraní, generally spoken to-day in Paraguay, is still, except for slight modifications by the missionaries, the same language as that used by untutored Tupi tribes throughout the hinterland of Brazil.

In Paraguay, as in some of the other Latin-American countries, people of pure European blood are in the minority. The Nation is Hispano-Guaraní, with its roots in those tawny sons and daughters of the soil born from the union of adventurous Spaniards and docile Guarani women. While Spanish, used by the educated class and in the schools, is the official language, Guarani is the speech of the masses. Among the innumerable tongues of aboriginal America, this tongue ranks with the Quichua of Peru and Bolivia in importance and vitality.

The élite of Asunción lead quiet, pleasant lives, passing a part of each year on their country estates. Living is cheap and there is no servant problem. Our national American custom of dining as the day wanes, when all outdoors calls us to the most beautiful hour of the twenty-four, is not in favor among Latin Americans. Late afternoon finds the *Asuncenos* in the park by the river, where the band plays.

SOCCER HAS BECOME A NATIONAL SPORT

Drinks popular with the fair sex are iced cane juice and iced water sweetened with grenadine or raspberry syrup. Dancing is the chief diversion, and there is a growing interest in sport.

The British have given to South America's southlands a national game, soccer, or association football. Originally introduced into Argentina, it spread to Uruguay, Brazil, and Chile, and finally to Paraguay. To-day it is undoubtedly the leading sport in these five countries. Stadiums have been erected for it in the larger cities. While Paraguay has not been long at the game, its progress has been astonishing.

The Paraguayan is a superior oarsman. With the magnificent stretch of river available at Asunción, it is little wonder that regattas are frequent and that interest in boating is general.

In former years Paraguayan women of the upper class trimmed their gowns with a beautiful native lace, unlike any I have seen in other parts of the world. It is called *ñanduti*, or spider-web lace. Every day a woman merchant came to the patio of our hotel with a basket filled with this lace. She had brought it, she said, from a country village some miles from the capital, where all the women made ñanduti.

"Do you think they would let us photograph them?" I asked, after we had become friendly through the purchase of innumerable collars and doilies. The vender thought they would, and next morning we were on our way to the ancient village of Itauguá.

ON THE TRAIL OF A LOVELY LACE

This lovely, filmy ñanduti is an evolution from needle-point lace, which came into Spain from Flanders in the 16th century and on to Spain's colony on the Paraguay. Here, through the years, an original type of handiwork has developed.

Between Asunción and Patino-Cué, our starting point by saddle for the lacemakers' village, we traveled on one of the oldest railroads in South America, a road begun in 1854, during the reign of López I, and opened to service in 1861. It now is a link in the Asunción-Buenos Aires line.

The name Patino-Cué means "The Patino family formerly lived here." We put up at the home of an English friend. His charming villa, embowered in tropical verdure, looks out on Lake Ipacarai, where there is a prosperous German colony.

Next morning we were in the saddle on the ñanduti lace trail. Paraguay is a most delightful country for horseback riding. The ruddy soil, free from dust, the emerald woods, and the turquoise sky make it a rider's paradise.

I was astonished to find the coconut palm so far from the sea. There were miles of the fiber plant called locally *caraguatá*, which looks much like the pineapple. From it the people make ropes and fishlines. Its roots hold water for the thirsty traveler. Tall trees, interlaced with vines, arch the highway. Now and then we had a glimpse of brick-colored adobe walls and palm-thatched roofs back

CRUDE "MILLS" BREAK THE ROSELLE STALKS

In rural Paraguay grow several kinds of fiber plants which are used in native industries. Men do the heavy work, but women are the strippers, spinners, and weavers.

Photographs by Ewing Galloway

PARAGUAYAN WOMEN STRIP ROSELLE FIBER FOR WEAVING

The plant is broken up, stripped, and soaked, and the pulpy substance removed. The finished product is a very coarse fabric. Jesuit missionaries arrived in Paraguay in 1607 and, before their expulsion, 160 years later, taught thousands of Indians to till the soil.

Photograph from Harriet Chalmers Adams

WATER PLANTS FRINGE THE LOW SHORES OF THE ALTO PARANÁ WHERE THE RIVER SEPARATES ARGENTINA AND PARAGUAY

Photograph by W. L. Schurz

CATTLE-RAISING HAS BECOME THE CHIEF INDUSTRY OF THE COUNTRY

Some of the animals with traces of a hump show the zebu strain brought to Brazil from India, and thus introduced to South America (see text, page 400).

Photograph by Burton Holmes from Galloway

STEAMBOATS CARRY IMMIGRANTS AND CARGOES FAR INTO THE UNSETTLED REGIONS

This stern-wheeler is puffing up the Alto Paraná, through jungle country. Its passengers, mostly from Germany and Italy, are bound for trading posts and depots for settlers. Argentina (on the farther shore) and Paraguay have vast areas awaiting immigrants fitted for developing virgin country.

Photograph from Harriet Chalmers Adams

WOMEN ARE THE HAPPY STEVEDORES OF MANY RIVER PORTS

With their consummate skill at balancing heavy loads on their heads, these native matrons and belles are loading the delicious oranges which form a major crop of Paraguay. Jesuits introduced the trees, birds scattered the seeds, so that oranges grow wild in the forests (see text, page 402).

from the road. The sky at sunset was unbelievably beautiful, Joffre-blue and flamingo-tinted clouds drifting across the western sky.

ALL FEMININE ITAUGUÁ MAKES LACE

Nearing Itauguá we met girls carrying lace frames. Women and children, from great-grandmothers of 90 to girls of 9, were on the doorsteps hard at work at their craft. They spoke Spanish as well as their native Guaraní. The young women, each with abundant black hair in two long braids, looked attractive in their simple white gowns. Stockingless, they all wore sandals.

The lacemaker outlines her pattern with charcoal on the cotton, linen, or silk fabric. After days and weeks of toil, the design becomes as filmy as a cobweb. As many as 12 different patterns, each having its Guaraní name, are sometimes introduced into one piece. The women are imitative, working intricate scrolls and floral designs. Their labor and patience bring little in compensation, for a collar, a week's continuous work, sells for a dollar, and a parasol cover that requires months of toil brings less than $25 (see page 410).

Cattle-raising is Paraguay's chief industry, meat products leading among its exports. The Chaco, with its high native stock grasses and ample water supply, is a most promising cattle country. There is probably no stock-raising region in the United States possessing such fine natural grazing lands, in spite of the Chaco's handicap of occasional inundations. As the vast plains of Argentina are more and more given over to the cultivation of cereals, the cattle ranges are bound to creep north to the grasslands of Paraguay and eastern Bolivia.

As early as 1554 cattle were brought to Asunción from the Portuguese colony at São Vincente, near Santos, Brazil. In the same century cattle, sheep, and goats were brought overland across the continent from Peru. In the south, imported Argentine breeds are now seen, but the old stock is still in evidence in the heart of Paraguay. As we travel north we find

Photograph by Harriet Chalmers Adams

PARTS OF VILLARRICA MIGHT BE MISTAKEN FOR NEW ORLEANS

In the heart of southern Paraguay is the second city of the Republic. Although on the main railroad connecting Asunción and Buenos Aires, it clings to colonial types of homes. It is the trading center of a fertile region devoted to tobacco raising and general farming.

long-horned zebu cattle from Brazil, introduced into that country from India by the Portuguese. This hardy zebu stock defies the tick.

The Paraguayan cowboy is known as the *chacrero*. Although usually smaller in stature than his cousins, the Argentine *gaucho* and the Chilean *huaso*, he is muscular and hardy, a typical roughrider. On a saddle trip we met a group of cowboys driving a band of cattle from the *rodeo*, where the herd is rounded up, to the river. I can still hear their ringing cattle call, "Co-co-coa! Co-coa! Coa! Coa!"

There were a number of young calves in the herd. When a stream was reached the mother cow entered the water and the calf jumped in after her, placing its head upon her rump.

"It's not all easy sailing," a cattleman told me. "Snakes are a menace; their bite kills many animals every year. Then there are jaguars which attack the herd. We lose a few by drowning when the Paraguay shifts its banks; but the river's rise is usually gradual, and we have time to drive most of the cattle to higher ground."

Guarani women are most accomplished head-balancers. At the market I saw a bronze Hebe with a basket on her head filled with five struggling turkeys and a chicken. Under one arm she held a husky youngster; under the other a large bundle of firewood. At the same time she directed the progress of three children, led a stubborn, heavily laden donkey, and smoked a long, black cigar.

While I was still marveling as to how this was done, a woman passed me with a small envelope poised gracefully on her head. They never think of carrying anything in their hands.

The market women smoke big native cigars. The mayor of the city issued an edict that no woman could smoke on the street or walk on the sidewalk with a bundle on her head. This meant that she walked in the middle of the street and hid her cigar when she saw a policeman. I saw youngsters puffing like steam engines. In the country the people grow and roll their own leaf. We bought homemade cigars for seven cents a dozen. Cigarettes are not popular and pipes almost unknown.

Photograph by Harriet Chalmers Adams

THE CAMERA CHANGED A SMILE TO TEARS

In days of going about among the country people near Asunción, the author caught only one child in an unhappy mood. The youngster wept, not because of the weight of the headload of oranges, but for fear of the "black box."

Production of tobacco is an old industry, dating from the early years of the 18th century. The plant is grown mostly in the hills east of Asunción.

In an interior town we visited a warehouse where more than 2,000 tons of tobacco were stored. The dried leaf comes in from February to May, in oxcarts, by saddle, and on the heads of women. It is stored, sprayed with water, dried, tied into bundles, sorted, pressed, and packed for shipment in 220-pound bags. The Government inspects and grades all tobacco for export, thus raising its prestige in foreign markets. In recent years cotton has become tobacco's rival among agricultural crops.

ORANGE GROVES 300 YEARS OLD

Huge golden mounds of oranges are the most attractive feature of every Paraguayan market. Jesuit missionaries planted the first of these trees three centuries ago and the birds scattered the seeds. Now the orange grows everywhere, even in the heart of the forest, far in the interior.

There is a legend that Francia (see text, page 392) gave the orange culture a lift by requiring all landowners to plant and rear at least 20 orange trees around their homes, and hanging to the tallest trees grown all who failed to raise this number.

The fragrant, thin-skinned, flat-topped mandarin orange, prized from earliest times in China and Cochinchina, was brought to Paraguay by an English friend of ours some 40 years ago.

There are two varieties of the bitter orange. From the leaves of one of these the oil known as the essence of petit-grain is distilled. Petit-grain is a basis of perfumery and is also used in flavoring extracts. A popular American toilet water has this oil as its base. About 600 pounds of leaves are required to produce one quart of unrefined oil.

We went to a town 60 miles from the capital to see the crude process. There was a small still in a palm-thatched hut. Leaves were piled into a vat above the steam, and the vapor was carried off through a pipe to coils where it condensed and cooled. The

oil on the top was skimmed off, the still producing about a gallon a day.

VILLA HAYES NAMED FOR A PRESIDENT OF UNITED STATES

About nine miles above Asunción, on the Chaco side of the river, is a settlement of some commercial importance known as Villa Hayes (pronounced "Ve-ya Eyes" in Spanish). It was named after a President of the United States, Rutherford B. Hayes, who, acting as arbitrator in determining the limits between Argentina and Paraguay, rendered a decision highly favorable to the latter. Ironically, this town, named for an ardent prohibitionist, is surrounded by canefields whose product is distilled into a very powerful rum.

A modern link between the United States and Paraguay is the library of 2,000 volumes by American authors presented some years ago by the American Association for International Conciliation to the Instituto Paraguayo.

Photograph by Harriet Chalmers Adams

THE ITAUGUÁ DILIGENCE IS THE MOTOR BUS OF DIRT ROADS

Metaled highways have been laid near Asunción and other cities. Traffic in parts of interior Paraguay still follows trails that are muddy in the rainy season. Even on paved thoroughfares automobiles often pass the queer three-horse vehicles of the Guaraní people.

The unique feature of this private institute, founded about 30 years ago by a group of scholarly men for the development of arts and sciences, is that the instructors are Asunción men of affairs who teach without compensation, after business hours.

The "International," bound for Buenos Aires, leaves Asunción twice a week at 7 a. m., and reaches the frontier, at the Alto Paraná River, at 9:30 p. m. The route lies through the most populous region, giving the traveler who stays with the beaten path a glimpse of country towns and exquisite landscapes. Our trail was by saddle over the sun-drenched plain, where islands of palms sway in a sea of grass. It was on this journey that we came to know the people of the soil, so contented and hospitable.

UTOPIA IN THE GRASSLANDS

They are, for the most part, small farmers and stock owners who live simply and comfortably on their own products. Their implements are the ax and the hoe, the machete and the lasso. They have a delightful climate and a fertile soil, plenty

Photograph by W. H. Caddow

WITH CRUDE TRAPS INDIANS WADE THE SWAMPS FOR FISH

They press the bottoms of these hollow truncated cones of wicker into the mud so that the open tops are submerged. The peculiar shape of the baskets prevents the escape of any quarry that swims inside.

to eat without hard work. Nearly every farmer has his cattle and fowls; his garden patch of maize, beans, sweet potatoes, and manioc; his tobacco plants, bananas, and orange trees. He needs only to buy *yerba mate*, Paraguay tea, the national beverage.

Each house has its covered lean-to with brick-paved floor, where the hammocks are swung. The roofs are more often of palm thatch than tile, quite impervious to rain and lasting many years.

The palm trunk is split and the fibrous material taken out, leaving half trunks from an inch and a half to two inches thick. These are dried until hard and flinty. The slabs are then laid side by side, curved surface up, from pitch to eaves, and a second overlapping layer is placed over the joined edges to give the effect of tile.

The countrywomen are more industrious than the men. During the Five Years' War (see text, page 392) they became the merchants and farmers of the country. Full of fun and talk and much given to gossip are Suplicante, Rosaria, and the others, and so kind!

I recall a day when I was photographing in one of the villages and tore my skirt on a cactus plant. While I was appraising the damage a woman ran out of a near-by house with a needle and thread. Kneeling beside me in the road, she deftly mended my gown.

SOLICITOUSNESS MAY BE EMBARRASSING

One act of courtesy proved disconcerting. On an upriver voyage we were presented with a huge cage containing six big, black birds.

"They are wonderful birds," said the man who gave them to us. "If you'll cut their tongues, they'll talk better than parrots."

We accepted them trustfully, with no thought of tongue-cutting, of course. They turned out to be wicked birds. They scratched, pecked, and shrieked. We decided to get rid of them. On the evening of our arrival at a river port we carried the cage into the moonlit patio of the hotel and liberated the birds, telling them to fly north to their home forest. A peaceful night ensued.

Next morning several hotel servants, with smiling faces, greeted us.

"We've been so fortunate," said the spokesman. "Your birds escaped. At dawn we saw them in that big tree. They are fine birds, so tame. We caught all of them for you."

All the Paraguayan villages looked alike to me. They more or less follow the form prescribed by the Jesuit missionaries—a roomy, level plaza with buildings on three sides. For 160 years, 1607-1767, the Jesuits worked among the Guaranis, transforming prowling savages into prosperous farmers. In leisure hours the newly made farmer was entertained by dances, songs, and pageants.

© Ewing Galloway

LENGUA CHILDREN LOVE PETS

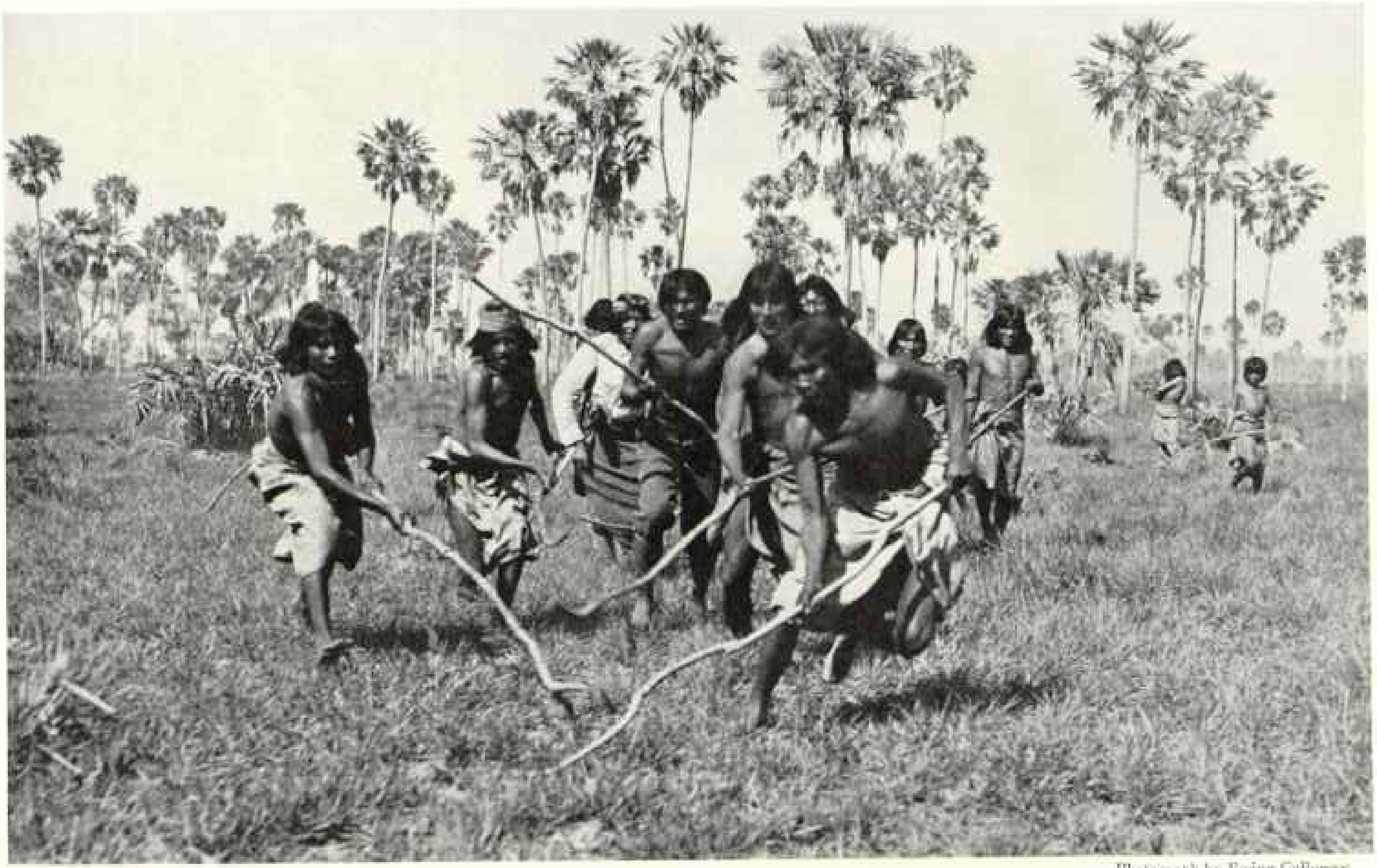
A young peccary shares favor with a puppy. The tribe to which these youngsters belong lives in the Chaco west of the Paraguay River. These people were led out of savagery by a heroic missionary, and today find employment in forest industries.

JESUITS WORKED WONDERS AMONG THE TRIBES

About 150,000 Indians were gathered in 30 or more settlements on both sides of the Alto Paraná River, the missionaries having complete dominion over a territory as large as France. In time the fields were covered with herds of cattle, horses, and sheep. Orange trees were planted in every town; craft laden with yerba mate, hides, linseed, sugar cane, wheat, maize, and tobacco floated down the river highway.

The amazing feature was the development of art among these simple natives, who erected imposing churches with elaborately carved façades and altars. Great blocks of Tacurú stone were used. This stone is comparatively soft when taken from the earth, but it hardens on exposure to the air. When the Jesuits were expelled from all Spanish possessions, their flock scattered, and churches, schools, and hospitals fell into decay. We saw the ruins of several of the fine old churches, nearly smothered by the tropical forest. Around them are clumps of golden orange trees and groves of stately palms. Though in a sadly battered condition, the carving of stone and wood is most impressive.

Even before the coming of the Jesuits, the Guaranis drank tea brewed from the leaves of the wild yerba tree. To-day millions of South Americans drink this Paraguay tea. Among the gentry of the larger cities, Asiatic tea is now supplanting the native beverage, but in the country yerba mate holds its own.



Photograph by Ewing Galloway

LENGUA INDIANS PLAY A GAME RESEMBLING FIELD HOCKEY

The sport was in vogue long before the arrival of white men. Heavy branches of hardwood used as sticks become rough weapons at the cry which is equivalent to "Shinny on your own side."

Photograph by W. H. Caddow

THE "COVERED WAGON" OF THE PALM FOREST

Large-wheeled oxcarts are adapted to hauling through the Chaco, where pools of water and mud during the rainy season make travel with ordinary vehicles virtually impossible (see illustration, page 416).

© Ewing Galloway

OXEN HAUL SQUARED LOGS FROM FOREST TO RIVER

In the Alto Paraná region are valuable varieties of hardwood. Some kinds are so heavy that cedar trunks have to be attached to keep them afloat when they are rafted downstream.

Photograph from Harriet Chalmers Adams

THESE LOGS HELP TAN THE LEATHER FOR AMERICAN SHOES

Its tannin content sets men to cutting the quebracho tree, with wood so hard it won its name, meaning "ax-breaker," and so heavy that it must be lashed to other kinds of wood to float. From wilderness camps the timbers are hauled by oxcart to the Paraguay River or to the railway.

Photograph from Harriet Chalmers Adams

THE WILDERNESS HAS RECLAIMED MANY JESUIT MISSIONS

This ruin of an old library, attached to the church at Trinidad, southern Paraguay, is a reminder of the missionaries who founded 30 towns and taught the Indians simple principles of agriculture.

The tree from which the leaves are obtained is an evergreen of the holly family, somewhat resembling the orange tree in appearance, but taller and less bushy. It is indigenous to Paraguay, southwestern Brazil, and the northern province of Argentina, and was transplanted to other parts of South America and to the East Indies.

The yerba gatherers strip the smaller branches from the tree and pass them over a blazing fire. For a second toasting over a slow fire, the cuttings are then carried to a crude platform erected in the forest. After scorching for a day or more, the leaves, now thoroughly dry, are beaten into bits and packed into hide bags for shipment by bullock cart or river craft to the nearest warehouse, where they are cleaned and sorted (see page 412).

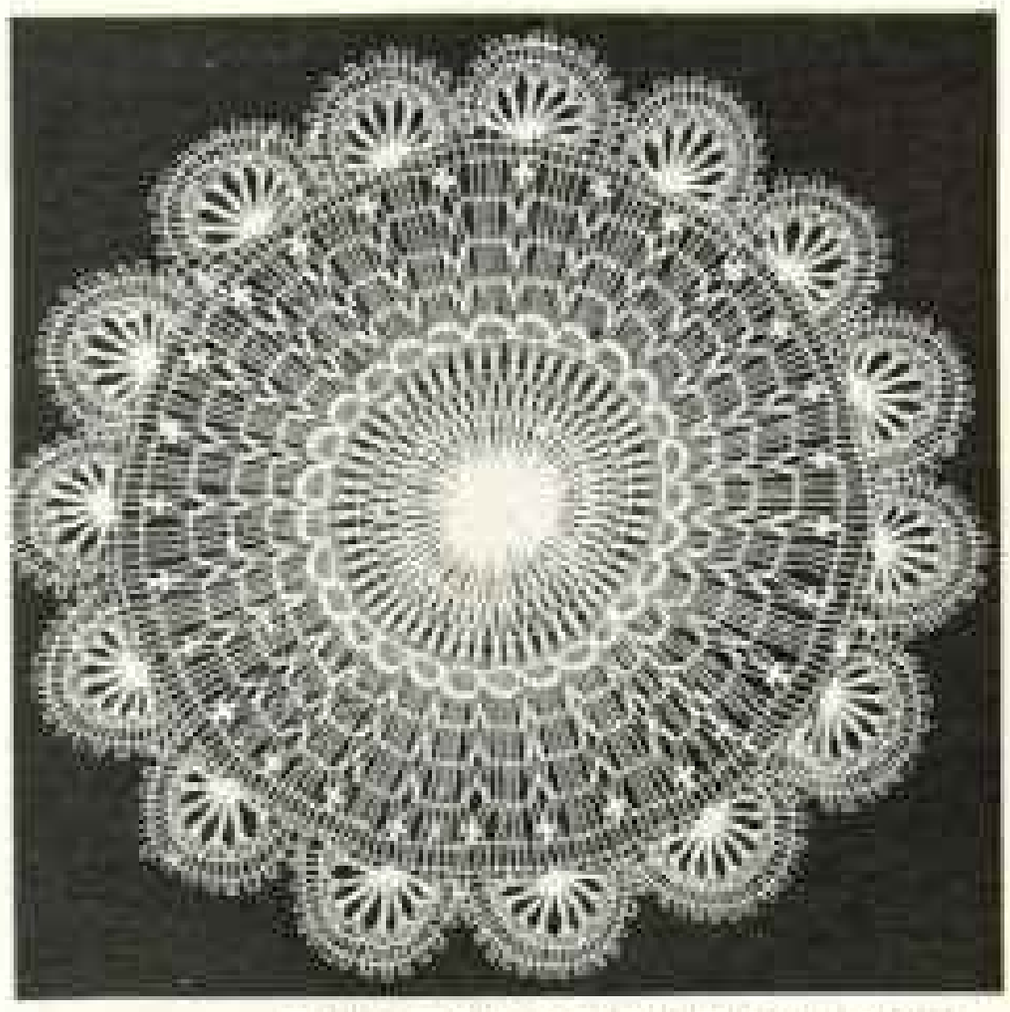
The dried leaf from which the tea is prepared, the drink itself, and the hollowed gourd which serves as a cup are all known as *mate*. A metal tube called the *bombilla* (little pump) is used instead of a spoon. At one end it has a strainer through which tea is sucked. Some of the gourds are carved and ornamented with silver.

The tea is prepared by pouring boiling water over a spoonful of leaves. The good old-fashioned way of drinking it is to pass the mate around the circle like a loving cup, every one taking a sip (see page 413).

Among the ruins of Jesuit churches I saw 17th-century dates cut on beams exposed to tropical storms and burning suns, seemingly as strong and durable as when erected. These beams were hewn from the urundeymí, one of the forest giants, but a little brother when compared with the towering petereby, cedro, and lapacho.

Our saddle trips took us into the heart of the forest rich in these hardwoods. The logs are dragged through the woods by oxen and rafted downstream. Three logs of a lighter hardwood, like the Spanish cedar, are used to one very heavy log, like lapacho or jacarandá.

In the spring the lapacho is a glorious sight, with its variegated rose and gold flowers. The jacarandá is loaded with large panicles of purplish-blue blossoms of rarest beauty, resembling the flower clusters of the wistaria. Jacarandá wood



Photograph by Harriet Chalmers Adams

EVEN A SPIDER MIGHT COPY ÑANDUTÍ

This filmy lace is typically Paraguayan. Hours of patient toil go into each delicate design (see text, pages 396, 400).

makes the finest and most durable of furniture.

Two distinctive trees of the Alto Paraná basin are the araucaria, a variety of pine with tall, branchless trunk and flat top, resembling an open Chinese umbrella; and the samuhú, or silk-cotton tree, with its lacy, daintily tasseled branches. With the silky strands of the samuhú's flower the Guaraní women stuff their pillows.

PARAGUAY PALMS YIELD MANY USEFUL PRODUCTS

Palms are a feature of the Paraguayan landscape. Oil is obtained from the nuts, which are also used in fattening stock. Hats, hammocks, ropes, and cloth are manufactured from a textile made from the leaves. A forest creeper growing 50 to 60 feet long is used for rope.

One of my pleasantest remembrances of travel in any part of the world is of our voyages up the Alto Paraná. Few rivers in tropical America rival it in beauty—a clear, swift stream in these upper reaches, bordered by high wooded cliffs, where bamboos 60 feet in height wave like titanic plumes. Trees ablaze with scarlet blossoms flare from the dense verdure. White butterflies, like a shower of snowy confetti, drift over the steamer's prow. Ruby-winged birds flit by. A pre-Columbian canoe, hewn from a tree trunk, glides out from the shore. The steamer's shrill toot, as we near a landing, is a discordant note here in Arcadia.

Huge rafts of linked logs pass us on their way downstream. At one of the logging camps an exquisite waterfall 50 feet in height is utilized to hurl down timber from a branch stream. Behind this waterfall swallows dart, and below, in the foam, whirls the body of an unfortunate tapir which ventured too near the brink.

We pass fire-scarred clearings on the face of the cliff, where mate bags slide streamward through long bamboo chutes. On our ship is a party of yerba gatherers bound for an upriver port. At night, under the starry canopy of the southern heavens, they bring out their guitars and we listen to the sweet and minor notes of old gaucho melodies.

On the west bank is Paraguay; on the east, Argentina. Now we reach the point where the Iguazú River, border line between Argentina and Brazil, joins the parent stream, and where three republics can be seen from the steamer's deck. Twelve miles above its junction with the Paraná, the Iguazú River adventures its mighty leap. Both Brazil and Argentina claim one of the most beautiful of the world's waterfalls (see page 386).

About 120 miles above this point we reach the head of navigation on the Alto Paraná. Here boiling whirlpools and cross-currents tell of some of the mightiest of all cascades, 30 miles upstream—the 18 smoking cataracts of Guairá, shared by Brazil and Paraguay.

Niagara's average flow, above the falls, is estimated at 12,500,000 cubic feet a minute. Guairá's is estimated at 13,000,000 cubic feet a minute in normal flow and double and treble that amount in annual flood season.

THE WATER GIANT ROARS BETWEEN CLIFFS

The total fall from the upper to the lower river is 310 feet. At one point the cliffs are only 200 feet apart, and the whole mighty impact, backed by the reserve power of countless tributaries, roars through this narrow gateway.

Only from an airplane could a view be obtained of cataracts covering so vast an area and so closely framed by virgin forest.

It was on the Alto Paraná River, at the meeting place of the three republics, that

we made the acquaintance of "Bichy Mosquit." She was a little grison, a wild animal unknown in North America, related to the tayra and the marten. Perhaps Father and Mother Grison were killed by an evil-eyed rattler. An Indian picked up the furry little creature and carried her to the river, where he traded her to the steamer captain for a bottle of rum. The captain gave the baby grison to me, and for a year and a half she was a part of our caravan.

In some parts of South America animals are called "bichos." Perhaps the 57 varieties of mosquitoes and sandflies suggested her second name; anyway, she became "Bichy Mosquit."

She was about the size of a squirrel, with a squirrel's long, fluffy tail. In coloring she was silver-gray on top and seal-brown underneath, with a ferret's head, bright little eyes, flat ears, and very sharp teeth. I did not know, until I reached Washington and consulted a book on mammals, that the grison is "very savage and troublesome, with beady eyes and a malignant, bloodthirsty face."

Photograph by Harriet Chalmers Adams

EXQUISITE LACES, NOT SANDWICHES, ARE OFFERED TO PARAGUAY PASSENGERS

Women venders from the streets of ancient Asunción go down to the stations at train time with trays of the cobweb ñanduti, product of the Itauguá lacemakers' art.

THE END OF A PERFECT PET

Eventually she and I were poisoned in French Guiana by a decidedly passé toucan stew. She died and I survived. She was buried in the forest, which was her rightful home. If she had lived to reach New York, she would have been the only one of her kind in North America.

After the voyage to the falls, we visited a number of towns in the interior of Paraguay, this time by motor bus, remaining for some time in Villarrica (formerly called Villa Rica). This city, second in size in Paraguay, is charmingly situated among the hills (see page 401).

At the market, women carried their babies on their hips, as mothers do in the Philippines. We bought fig bananas, which were excellent. Many are shipped to Argentina. Wild doves, caught in traps, sold for five cents each.

In one of the parks we saw a statue to a famous son of Villarrica, Silvio Pettirossi, the aviator who held San Francisco crowds enthralled at the Panama-Pacific

VERBA IS DRIED AND SMOKED ON RACKS OVER SMOLDERING FIRES

Near the Alto Paraná River the tree that produces the leaves for the popular native tea grows wild from 10 to 24 feet high. It resembles the laurel, having glossy, dark-green foliage. Harvesters of the crop go into areas known as *yerbales* and strip the branches.

Photographs from Harriet Chalmers Adams

NATIVES BEAT YERBA MATE LEAVES WITH HUGE WOODEN PADDLES

After being pounded, the leaves and branches are put on racks to be smoked and dried (see page 405). There are now plantations devoted to growing the trees which yield the native tea, but the Guarani people obtain most of their supply from natural forest tracts.

Photograph from Harriet Chalmers Adams

NATIVE TEA IS SIPPED FROM THE "MATE" BY MEANS OF THE "BOMBILLA"

At a Guarani "tea party" the chopped leaves are put in a gourd and hot water is poured over them. Sugar, lemon, and sometimes honey, are added. Each person takes a drink by sucking through a tube, then more hot water is added and he passes the apparatus along to his neighbor (see text, page 409). Both the gourd and the drink are called "mate."

International Exposition. He was killed on a cross-country flight in Argentina, and his body was brought back with pride and sorrow to the land of his birth.

Many agricultural colonies of natives and foreigners are scattered throughout the country. In Asunción the Government maintains an immigrant hotel. The Banco Agricola, a Government institution devoted to the promotion of agriculture, does valuable work, especially in encouraging diversified crops.

"AX-BREAKER" TREE, RICH IN TANNIN, LURES MODERN CHACO EXPLORERS

Having crossed the country and trailed its eastern and southern boundaries, we voyaged up the Paraguay River to the northernmost limits of the Republic and on into the Brazilian territory of Mato Grosso. This was the route followed by the Roosevelt Expedition.

The Indians we came most in contact with in northern Paraguay were the Chamacocos. The men painted their faces and wore blue and white bead necklaces and primitive homespun garments. The women wore even less.

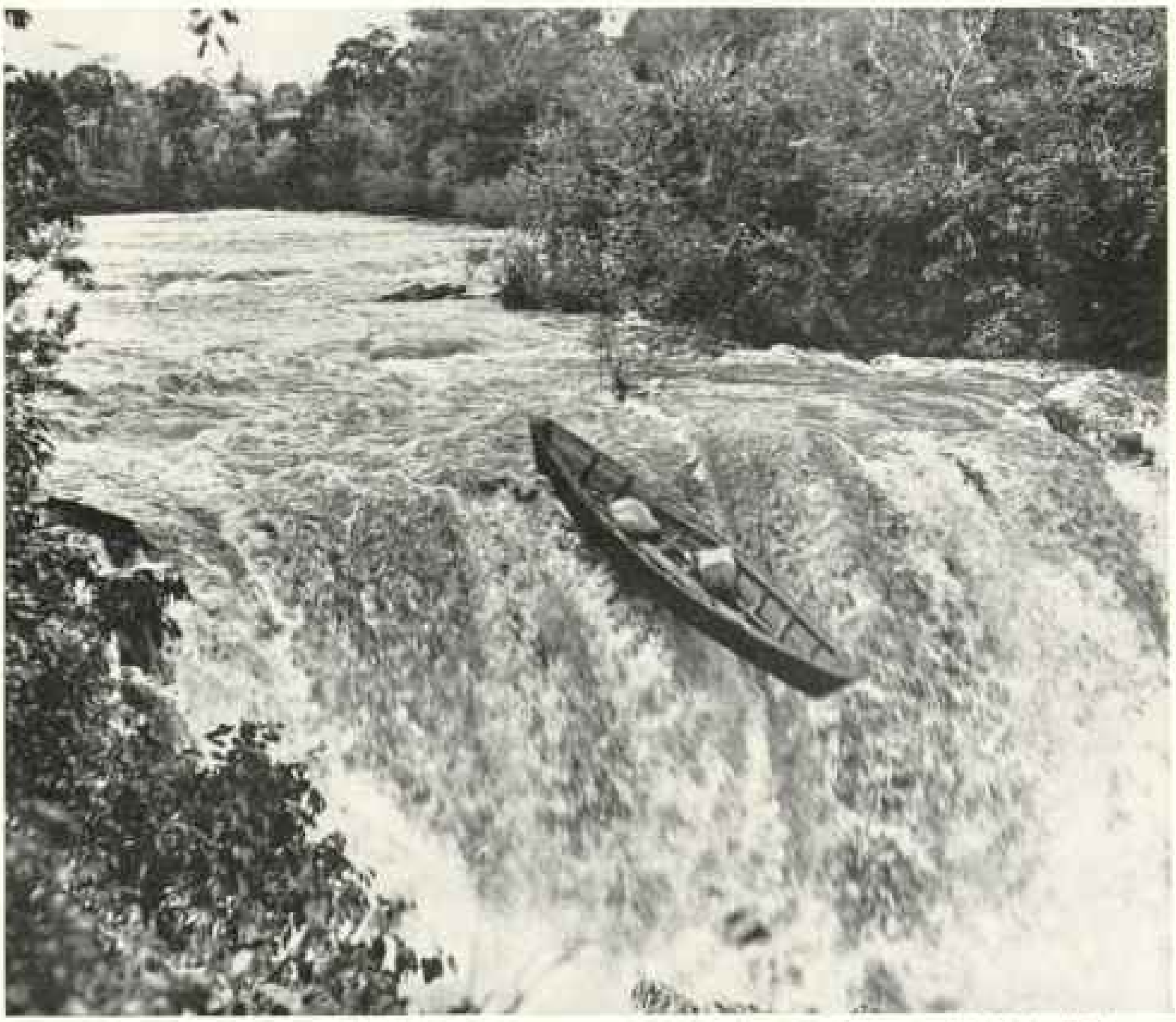
The modern explorers of the Chaco are the men engaged in the quebracho industry. It developed with the expansion of the Argentine railways, when quebracho logs were found to be just the thing for railway ties and for fence posts on the extensive Argentine ranches.

Quebracho (the word means "ax-breaker") is a hardwood so durable that logs cut and left in the forest for 25 years have been found sound.

The tree, which is native to the Paraguay and Paraná drainage basin, is scattered throughout the Chaco. Its gleaming, bright-green foliage somewhat resembles that of the mahogany of more northern forests.

There is an American quebracho and cattle company's plant at Puerto Pinasco, two days' steamer trip above Asunción. After the jungle is cleared of quebracho trees the cattle are turned in.

Of the two species, the red variety of quebracho is far the richer in tannin. In



Photograph by Ewing Galloway

IGUATIMI FALLS, ONE OF GUAIRÁ'S CATARACTS, TOYS WITH A BOAT

The volume of the 18 cataracts, known as the Falls of Guairá, is estimated at normal flow to be greater than that of Niagara (see text, page 410). During floods the amount doubles and even trebles.

the United States we obtain tannin from the bark of the oak tree, but the whole trunk of the quebracho is utilized.

While logs later to be converted into tanning extract are still shipped, several factories in Paraguay manufacture the extract. This extract is not used alone, but is combined with that of the chestnut, oak, hemlock, mangrove, or some other material to hasten the tanning process.

The quiet backwaters of the Paraguay River are gemmed with sweet-scented Victoria regia lilies. In May and June these most gorgeous of all waterlilies are in full bloom, white with a pink rim when first opened, the pink spreading and deepening with the passing days until the flower is of reddish tinge. Later in the season, myriad waterfowl glean the seeds. The Indians gather these seeds for the mealy substance encased in the thin shell; from it they make a nutritious bread.

One of the forest trees has a beautiful white flower resembling the orange blossom. On its twigs are lumps of wax deposited by a species of ant. The natives collect this wax and mold it into candles.

BEAN USED FOR FOOD AND BEER

The nourishing bean of the algaroba tree, pounded into flour for cakes, forms an important article of Chaco Indian diet. Brewed into native beer, it is accountable for much drunkenness.

I can never forget the sky scenery on the voyage up the Paraguay—the lovely starry nights; the flamingo-tinted dawns when we watched for jaguars, which at this hour

sometimes swam across the river; the evening hour when the sun, like a great ball of fire, went down in the Chaco, and the aërial squadron of the gods, in multicolored glory, drifted across the sky.

The river's eastern bank is alluringly beautiful, at times like the parks bordering English rivers; again, heavily wooded, it is an impenetrable wall of vines and creepers.

WILD BIRD LIFE ABOUNDS

At high water we overlooked, on the Chaco shore, vast areas of carandai fan palms set in a carpet of thick, spiny grass three or four feet high. This type of country is known as *palmar*, or palm grove, and teems with bird life.

The jabiru stork, standing five feet high, lives on the margins of Chaco lagoons. It is a brave, intelligent bird, very savage in the wild state, but friendly if domesticated. An acquaintance of ours has one as a pet.

Photograph from Harriet Chalmers Adams

MANIOC HAS BEEN CULTIVATED SINCE PRE-COLUMBIAN DAYS

This shrub of the euphorbia family is indigenous to tropical America (see page 404). Tapioca (the pure fecula) is made from its roots. Cassava, or manioc flour, is used much in Brazil and along the Alto Paraná. Care must be taken to remove the outer skin of the root and to crush or pound it to express the poisonous juices.

The rhea, the South American ostrich, is called the *ñandú* by the Guaranis. It is a relic of those long-ago days when giant avians as well as giant mammals roamed these far southern plains. It differs a little from its Argentine neighbor. Both are smaller and less showy as to plumage than their African cousin. The rhea has three toes, the African ostrich two; the rhea's head and neck are covered with short feathers, the African's is bare. The rhea's plumage is best known through the old-fashioned feather duster.

The Chaco is uniformly flat, its climate one of the extremes. It is a land of heavy rainfalls and long-continued droughts. Animal life is abundant.

"The Chaco is the sportsman's paradise," a British enthusiast told me. "From May to August is the best season, freer from insect pests. We go duck-shooting in flat-bottomed boats on a chain of smaller rivers and lagoons."

Besides duck, quail, and snipe, there is a native "turkey of the mountain," with a black head, black head tufts, and a yellow and black beak. Tapir, deer, carpincho, otter, and coypu abound in the marshy regions. Coypu skins are exported from the lower Plata to the United States, the

Photograph by W. L. Schurz

PALMS GENTLY WAVE THEIR FAN LEAVES OVER THE WATER-LOGGED CHACO

The carandai palm is as important to Paraguay as the nipa is to the Philippines. It provides material for fences, buildings, and roofing. The riders among the trees are cowboys on their way to round up stock, for this is the heart of the cattle country. It will present a different aspect in the dry season (see illustration, page 407).

hair to be used in the manufacture of felt hats for men. In the woods are the jaguar, puma, anteater, armadillo, the maned wolf, and the peccary, the latter always one of a troop. On the eastern shore I saw monkeys disputing with the birds the possession of the tallest trees.

The males of the howling-monkey family, most powerful but dullest of the South American apes, have a curious hollow organ in the throat enabling them to emit a roar which can be heard a mile away.

Chaco swamps teem with fish and eels. Fishing forms one of the chief means of sustenance of the Indians. The sting ray, with the sting rising like a fin from the base of its tail, lurks in the mud to retaliate if trodden upon by the fishermen. A common foe is the carib fish, with a bulldog jaw and triangular, razor-sharp teeth which can tear the flesh. It makes river bathing unpopular.

The Indians spear alligators, but the passengers on our steamer shot constantly at the beasts with indifferent success. We saw water snakes 15 feet long. They coiled among the waterlilies which clogged the paddle wheels when the steamer tied up.

At ports we saw for sale snakeskins nearly 20 feet long, and suspected that they had been well stretched by the natives, since the price advances with the length. Poisonous snakes, including rattlers, are a menace to the naked feet of the Indian. Snakeskins, egret skins, hides, rubber, and ipecacuanha formed the down-river cargo.

We were five days on the way between Asunción and Corumbá, a Brazilian port on the Upper Paraguay. A Brazilian railroad connects this portion of the river with the Atlantic coast. North American travelers bound for Asunción can, if they like, take this route via Santos, São Paulo, and Porto Esperança, on the Paraguay.

We returned by boat to Asunción and boarded the train for Buenos Aires. Among my most vivid memories of Paraguay are scenes on its two great flowing highways; and the exquisite coloring of terra-cotta earth, chrome-green forest, and rainbow-tinted sky.

THE BEAUTIES OF THE SEVERN VALLEY

By Frank Wakeman

"OH, LONDON Town's a fine town," sings John Masefield. But, after paying generous tribute to its fine qualities, he gives the reverse of the picture and concludes his verse, "And London Town of all towns I'm glad to hurry by." This attitude, no doubt, is resented by all Londoners, who are proud of the metropolis of the British Empire, and who feel that he treats it too much as a mere "town on an island off the coast of France," as a schoolboy once unhappily defined it.

We can appreciate the poet laureate's attitude if we visit his birthplace, Ledbury. Our approach most probably would be from the Severn at Worcester, over the picturesque Malvern Hills, following the road to Hereford, through hopyards and orchards, with the mystic mistletoe growing on the apple trees, till we reach a quiet little market town with a wealth of fine old half-timbered dwellings (see map, p. 421). In the center of the town is a market house, consisting of a half-timbered council chamber supported on 16 pillars of chestnut wood over the open market beneath.

When the charm of this countryside has captured our affections, we can understand the relief with which the poet leaves busy London and can join him in singing his glad refrain:

> Then hey for croft and hopyard, and hill, and field, and pond,
> With Bredon Hill before me and Malvern Hill beyond,
> The hawthorn white i' the hedgerow, and all the spring's attire
> In the comely land of Teme and Lugg, and Clent, and Clee, and Wyre.

And if we have the good fortune to be natives of this countryside, we welcome the wanderer back to "the hearty land where I was bred, my land of heart's desire."

In any case we cannot hope for a better marching song for our Severn pilgrimage, as we fare forth to see his

> Tewkesbury inns, and Malvern roofs, and Worcester chimney smoke.
> And the apple tree in the orchard, the cattle in the byre,
> And all the land from Ludlow town to Bredon church's spire.

An old legend gives in picturesque guise the character of the three rivers which arise out of the peat bogs of one Welsh mountain. Old Father Plynlimon told his three daughters that on a certain day they were to run a race for a prize, the inevitable handsome prince for a husband. The prize would be won by the one who reached the sea first. On the appointed day the eldest daughter, Sabrina (as the poets call our Severn), was up with the sun. Having the long summer's day before her, she decided to take the easiest route, although this involved a long sweep northward before she headed for her goal in the south.

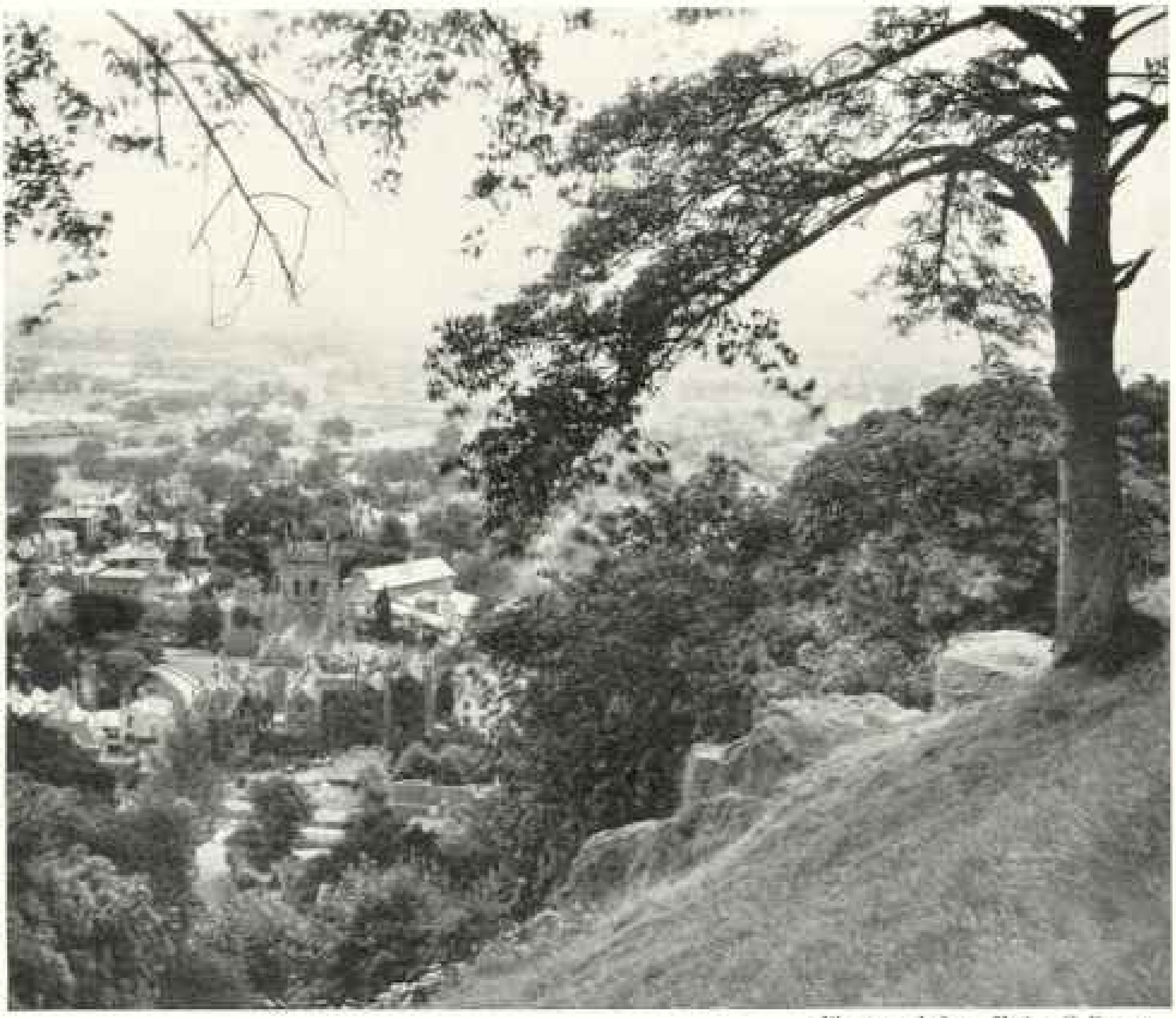
Her sister, Wye, found early rising disagreeable, and by the time she was ready to set out her elder sister had several hours' start. Wye decided to take the more direct route. She made good progress over the harder road, caught up with her sister just before she arrived at her goal, and they reached the sea together.

"Sluggard River" Reaches Goal First

The youngest sister, Rheidol, was a champion sluggard, and before her father had persuaded her to rise and set out on her journey the sun had already reached its zenith. To attempt to overtake her sisters would be a hopeless task. There was only one chance. Her bedchamber was the only one facing westward, and sometimes she had caught a distant gleam which looked like sunshine on far-away waters. Rushing down the precipitous side of the mountain, she found a much shorter route and arrived on the seashore before her more virtuous sisters had reached their distant goal, and so she gained the prize.

The geologists give a more prosaic reason for the upper Severn's northward flow. In early times it was a tributary of its neighbor, the Dee; but when glacial deposits blocked this outlet it joined the present middle section of the stream and found its way into the upper Thames. The phenomenal tides in the Bristol Channel, however, cut back up the bed of a small river and stole the waters, finally forming a river that disputes with the Thames the title to England's longest stream.

The first town on the infant river is Llanidloes, and here we see the first and one of the quaintest of the old market halls which we shall encounter in our pilgrimage, and one, moreover, which still treasures its curfew bell. This reminds



Photograph from Ewing Galloway

MALVERN FROM ITS STORIED HILLS

These celebrated heights rise sharply from the flat plain of the Severn. Along their base is a series of villages known collectively as Malvern. In the foreground is the Priory Church (see Color Plate VII and text, page 447).

us that even the Norman Conqueror could introduce "grandmotherly legislation" to prevent his subjects burning their wooden houses over their own heads by leaving their open fires alight when they slept.

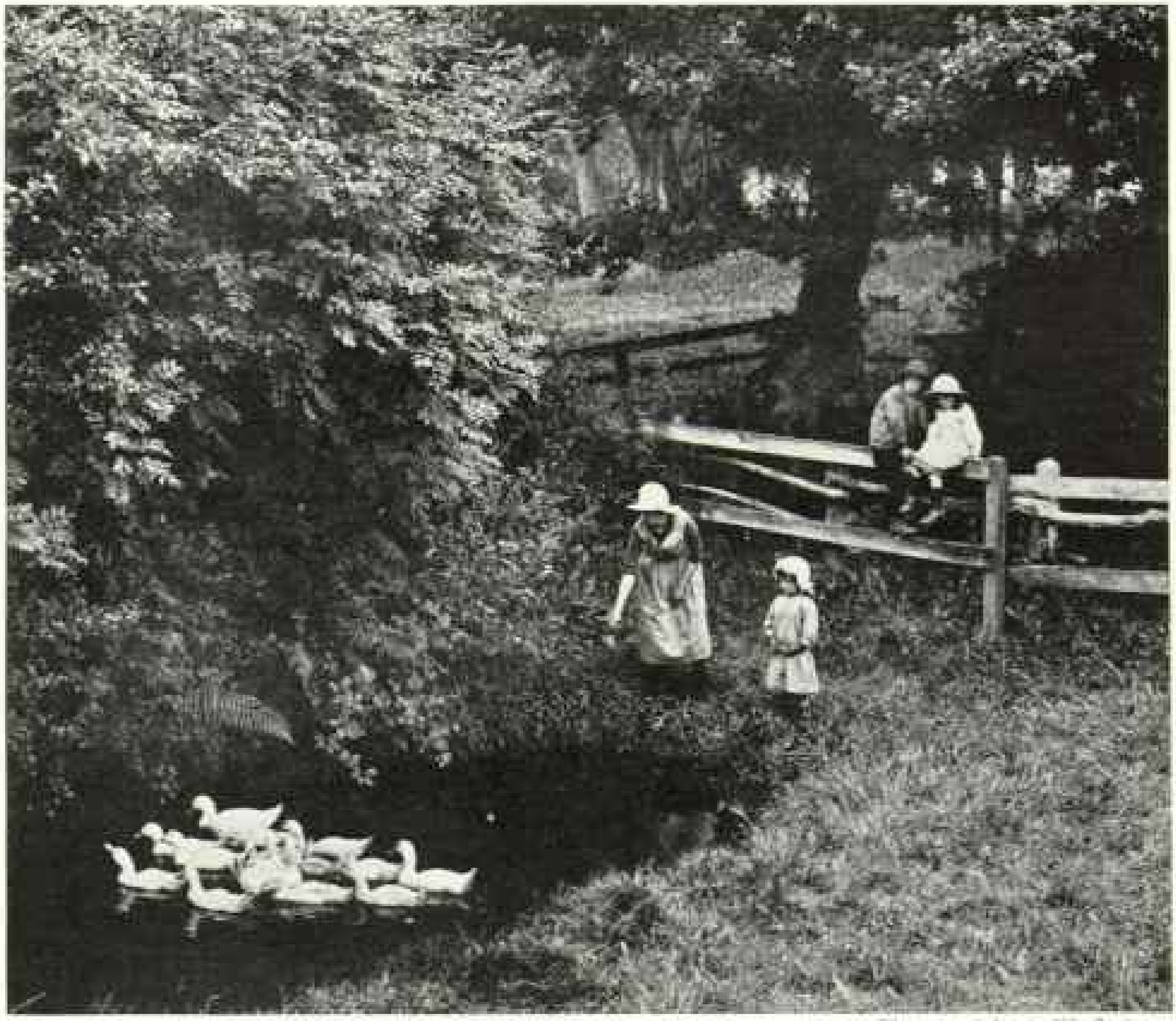
Although the market hall is sadly in the way of modern traffic, making the approach from the upper Severn bridge to the main street narrow and dangerous, the adjacent streets are of ample width and pleasant with avenues of trees. On market days, no doubt, the traffic is congested enough, for Llanidloes cattle and sheep markets are still important local events.

THE EISTEDDFOD—WALES'S NATIONAL FESTIVAL

Farther down the valley, on the outskirts of Newtown, a large wooden hall by the roadside attracted attention. It was too large for the needs of a town of some 5,000 inhabitants and too far from the center of the town for everyday use. There was only one notice board to be seen, and that said, "Choirs only this way." Obviously, for choral festivals.

Even a small town like this can hope for the honor of staging the national festival, the Eisteddfod. Sometimes, as in this instance, it means providing a hall capable of accommodating an audience larger than the entire population of the town which builds it; but it is done. The ceremony of the crowning of the bard takes place on an open hillside, for no building could accommodate the immense concourse of patriots who gather for that event.*

* See "A Short Visit to Wales," by Ralph A. Graves, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1923.



Photograph by A. W. Cutler

A CHANCE ILLUSTRATION OF AN OLD NURSERY RHYME

"Dilly, dilly, dilly, dilly, come out and let me kill."
"Thanks, miss, thanks, miss, we'll be hanged if we will!"

The ducks, or "dillies," are in the Forest of Dean, an ancient woodland which extends north from the junction of the Wye and the Severn.

The most famous son of Newtown was Robert Owen, pioneer of coöperative stores. Born in 1771, he was also a pioneer, from the masters' side, of more humane factory legislation, at a time when the industrial revolution was at its most ruthless stage. He spent some time in the United States and worked to promote Anglo-American friendship. His birthplace has been pulled down, but the bank which now occupies the site provided compensation by forming a memorial museum and library, including a reproduction of the room in which Owen was born.

Newtown has also the most important woolen mills in North Wales. Yorkshire has captured the bulk of this trade, and most Welsh wool is now sent there in its raw state.

Montgomery, the capital of the county of the same name, through which the Severn flows in Wales, lies a short distance away from the river, almost forgotten by the rush of modern life, dreaming peacefully of its troubled history. Its neighbor, Welshpool, takes the busy current of the present-day traffic and was a complete contrast to it on the Whitmonday when we visited them. Market day and Bank Holiday had combined to attract to the latter a surging crowd.

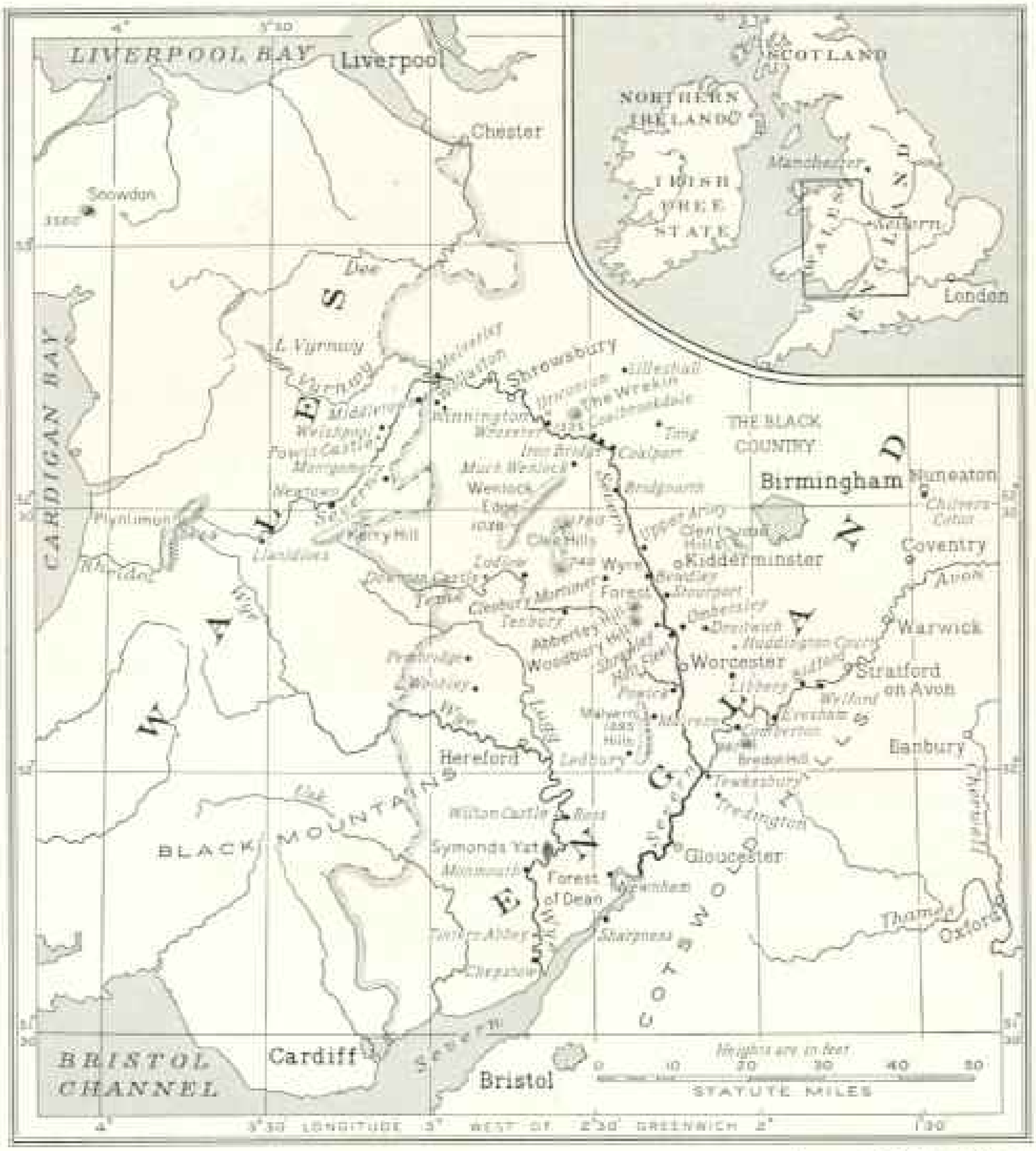
We soon turned aside from this bustle to where the Red Castle of Powis overlooks the town. We wandered through its peaceful grounds, where the tame deer gazed at us with mild curiosity. This castle had been one of the storm centers of Wales for centuries, and Sir Walter

WHERE THE WOMENFOLK WATCHED FOR THE CONSPIRATORS

A window at Huddington Court, home of the Winter family, conspirators with Guy Fawkes in the Gunpowder Plot. The anniversary of the discovery of the plot, November 5, is known as "Guy Fawkes Day," and still serves English youth as an excuse for fireworks.

HUDDINGTON COURT FIGURED IN THE GUNPOWDER PLOT

A moat surrounds the half-timbered manor, which remains much the same as it was in the days of Guy Fawkes and the other conspirators.



Drawn by C. E. Riddiford

A MAP OF THE SEVERN'S WINDING COURSE FROM MOUNTAIN TO SEA

Scott has a fine description of its banqueting hall in his novel, "The Betrothed."

OLD PARR, THE CENTENARIAN

On the hillside near Middletown is Old Parr's cottage, where Thomas Parr lived in the reign of ten kings and queens of England. At the age of 152 he was taken to London to be exhibited to the King, Charles I, but died a few months later. The doctors, after a post-mortem examination, attributed his untimely death to this removal, for they reported: "In short, his inward parts appeared so healthy that if he had not changed his diet and air, he might perhaps have lived a good while longer." He continued his work as a farmer till he was 130 years old. He was buried in Westminster Abbey (see p. 424).

A few coracles, of a type familiar since the days of the ancient Britons, are still used by local fishermen. These oval boats are very light to carry, but clumsy to handle in the water. They are composed of a frame of wickerwork covered with skins or, nowadays, with oilcloth (see page 452).

Photograph by A. W. Cutler

"THE COMELY LAND OF TEME," IN HEREFORDSHIRE

A scene on the seat of Downton Castle, on the Teme River near Ludlow. In the pasture graze some Hereford cattle, a breed familiar on the cattle ranges of America's Far West, and also in South America, South Africa, and Australia.

© Central Aérophoto

FOR 900 YEARS CHEPSTOW CASTLE HAS DOMINATED THE CURVING WYE

Its oldest part, the keep, dates from Norman times, for Chepstow was the earliest and most important base from which the Normans set out to conquer South Wales. A steep ravine separates it from the town on the hill. Chepstow is a center for excursions to Tintern Abbey (see illustration, page 450).

Photograph by A. W. Cutler

A COMMEMORATIVE TABLET TO "OLD PARR"

This tribute to Shropshire's famous centenarian, whose life of 152 years spanned the reigns of ten kings and queens of England, is in the parish church at Wollaston (see text, page 421). He was buried in Westminster Abbey, having died in London when he was taken there to visit King Charles. The word "Salop" on the tablet is another name for Shropshire.

The Severn still yields salmon to its fishermen, but not in such abundance as in days gone by, when an apprentice's indentures often contained a clause to prevent his master economizing by feeding him on fresh salmon more often than twice a week!

From Welshpool to Shrewsbury the country is very flat, so the Severn is here remarkable for nothing except its windings. Its first important tributary, the Vyrnwy, joins it as it enters England, in Shropshire. Near the junction is a village so subject to floods that it was called locally "Melverley, God help 'em."

Since the Liverpool Corporation turned Lake Vyrnwy into a reservoir for part of their water supply, the floods have been to some slight extent under control.

SHREWSBURY THE ANCIENT

In one of the loops made by the Severn several miles farther down stands Shrewsbury, a town full of varied interest. There has been a settlement here at least since the sacking of the Roman city of Uriconium, six miles to the southeast, in 584. Pengwern, as it was called, was for some time the capital of the kings of Powis, before the castle at Welshpool was built (see text, page 419). The Saxons called the town Scrobbesbyrig, which time has mellowed into the present Shrewsbury.

When the Normans came they recognized what an ideal spot it was for defense, surrounded on all sides by the river except where a steep rock closed the gap. The Conqueror entrusted the building of the castle to his kinsman, Roger de Montgomery, and this building has been restored recently and presented to the town out of the profits made by Shrewsbury's famous flower show—the arts of peace thus rescuing a relic of war.

Shrewsbury, like Banbury, is also noted for its cakes, and one shop owes its fame to the mention of its name by a minor poet. In "The Ingoldsby Legends" the story is told of a local Bluebeard. The heroine gets past the ferocious dog who guards the chamber of horrors by feeding him on the contents of her basket. "She

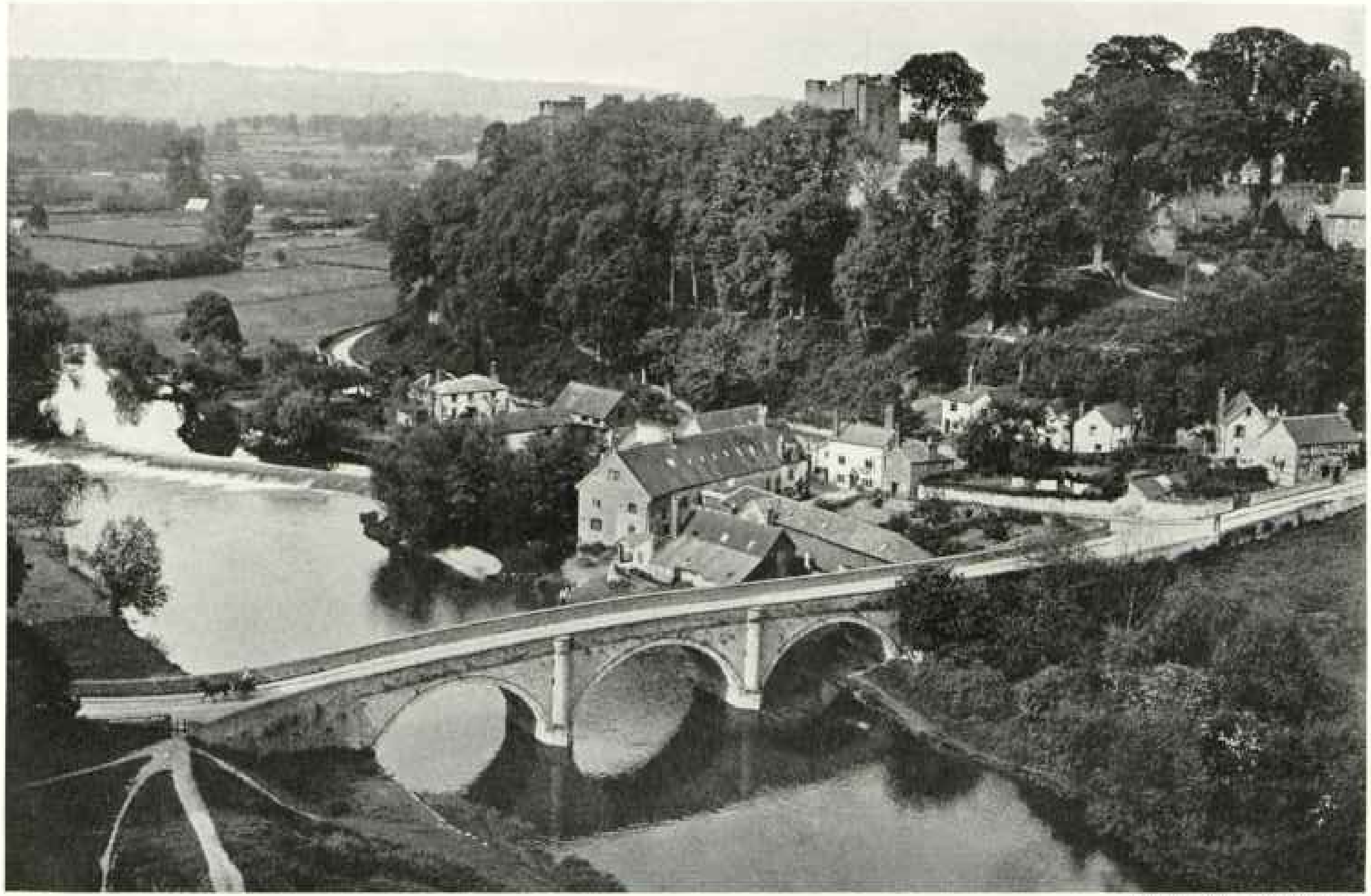
THE COTTAGE OF "THE OLD, OLD, VERY OLD MAN"

Thomas Parr was born at Winnington, near Wollaston (see illustration, opposite page). In these rural scenes his remarkable vigor flourished almost unimpaired for more than a century and a half.

Photographs by A. W. Cutler

SOME ONE IS ALWAYS COMPLAINING ABOUT THE RAINS—BUT NOT THE FARMER

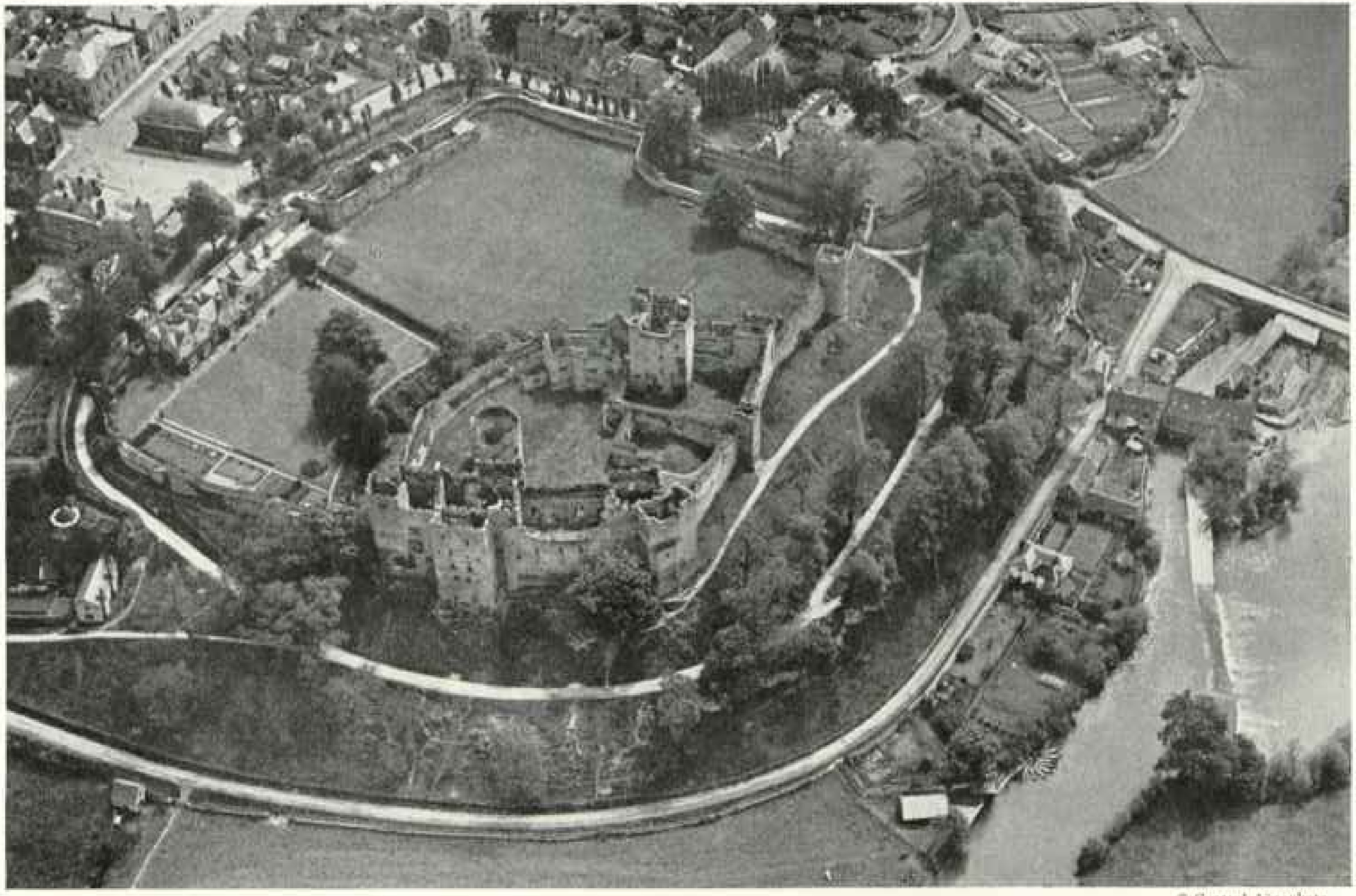
Worcestershire's humid climate makes it one of England's foremost areas for produce and cattle.



Photograph by A. W. Cutler

LUDLOW'S SITUATION RESEMBLES THAT OF HISTORIC HARPERS FERRY

The River Teme flows through the arches of the long stone bridge, and the old castle (see illustration, opposite page) looms through the trees to the right. Ludlow and the region roundabout are celebrated in A. E. Housman's book of poetry, "A Shropshire Lad."



© Central Aerophoto

GRIM BORDER CASTLE SAW "FIRST NIGHT" OF MILTON'S GAY "COMUS"

The father of Sir Philip Sidney once was the warden of the Ludlow stronghold (see text, page 428). In the castle area in the foreground the circular structure left of center is the Norman chapel; in the left corner are the rooms occupied by the youthful sons of Edward IV, who later were murdered in the Tower of London. It was in the Council Hall (center foreground), now roofless, that Milton's masque of revelry was performed. Around the castle's base flows the River Teme. In the right foreground is a semicircle of punts moored at a river landing.

Photograph by Robert Reid

FISHING, NOT SHAKESPEARE, IS THE SMALL BOY'S INTEREST IN STRATFORD'S AVON

England has other rivers of this name, but the foremost in fame is the Warwickshire tributary of the Severn, forever linked with the life of the bard. From the pastoral beauty of the country through which it flows the poet drew inspiration for many passages in his plays.

has given him a Shrewsbury cake of Pailin's own make," and the successor of that worthy confectioner still finds that line his own best advertisement.

In the stirring days of border warfare, Shrewsbury held the responsible office of the northern Warden of the Marches, with Ludlow, on the tributary Teme, taking equal responsibility at the southern end.

An interesting link was formed between the two when Sir Philip Sidney (whose death on the field of Zutphen is well known to history) was a scholar at the old Grammar School while his father commanded Ludlow Castle. The young knight afterward became a great favorite with Queen Elizabeth, but she did not extend this favor to his father, for after 30 years of faithful service, partly in Ireland, and partly at home as Warden of the Marches, Sir Henry Sidney, shortly before his death, writes pathetically to a friend:

"The Queen will not be moved to reward me. I have now not so much ground as will feed a mutton. My lady is gone with the smallpox. I am now 54 years of age, toothless and trembling, £5,000 in debt, and £30,000 worse than at the death of my dear King and master, Edward VI."

WHERE FALSTAFF BOASTED

Besides its border warfare, Shrewsbury witnessed one critical fight in English history, the battle which is familiar to all lovers from Shakespeare's description of it in "Henry IV." The turning point in this conflict was the death of Hotspur, which Falstaff himself claimed to have encompassed after a duel lasting "a long hour by Shrewsbury clock."

Photograph from Wide World

COVENTRY'S ANCIENT LEGEND COMES TO LIFE

The story of Lady Godiva, who, clothed only in her long, flowing hair, rode through the streets to gain a remission of heavy taxes imposed on the town, is reënacted. Tradition has it that a tailor who disobeyed her command to stay indoors was struck blind.

Shakespeare permits himself almost as much poetical license as he allows his mock-valiant knight, in giving the glory to Prince Hal. The prince was but fifteen at the time, and although he came fresh from helping to defend his title of Prince of Wales, and not from tavern revelry, and although he fought bravely in this, his first pitched battle, he would have been no match for his doughty opponent, a tough veteran of 39. Sober history records that Percy Hotspur was not slain until he was completely surrounded by his foes.

As the rebels proposed to divide the kingdom into three parts, their victory would probably have put back the clock of English history for at least a century.

Shrewsbury's most famous son, Darwin, began another kind of battle—a battle of ideas—with his theory of evolution; and, although the battle ground is changing, the fight he commenced still goes on. A statue to his memory stands in front of the old Grammar School, now the Public Library.

LORD CLIVE A SON OF SHROPSHIRE

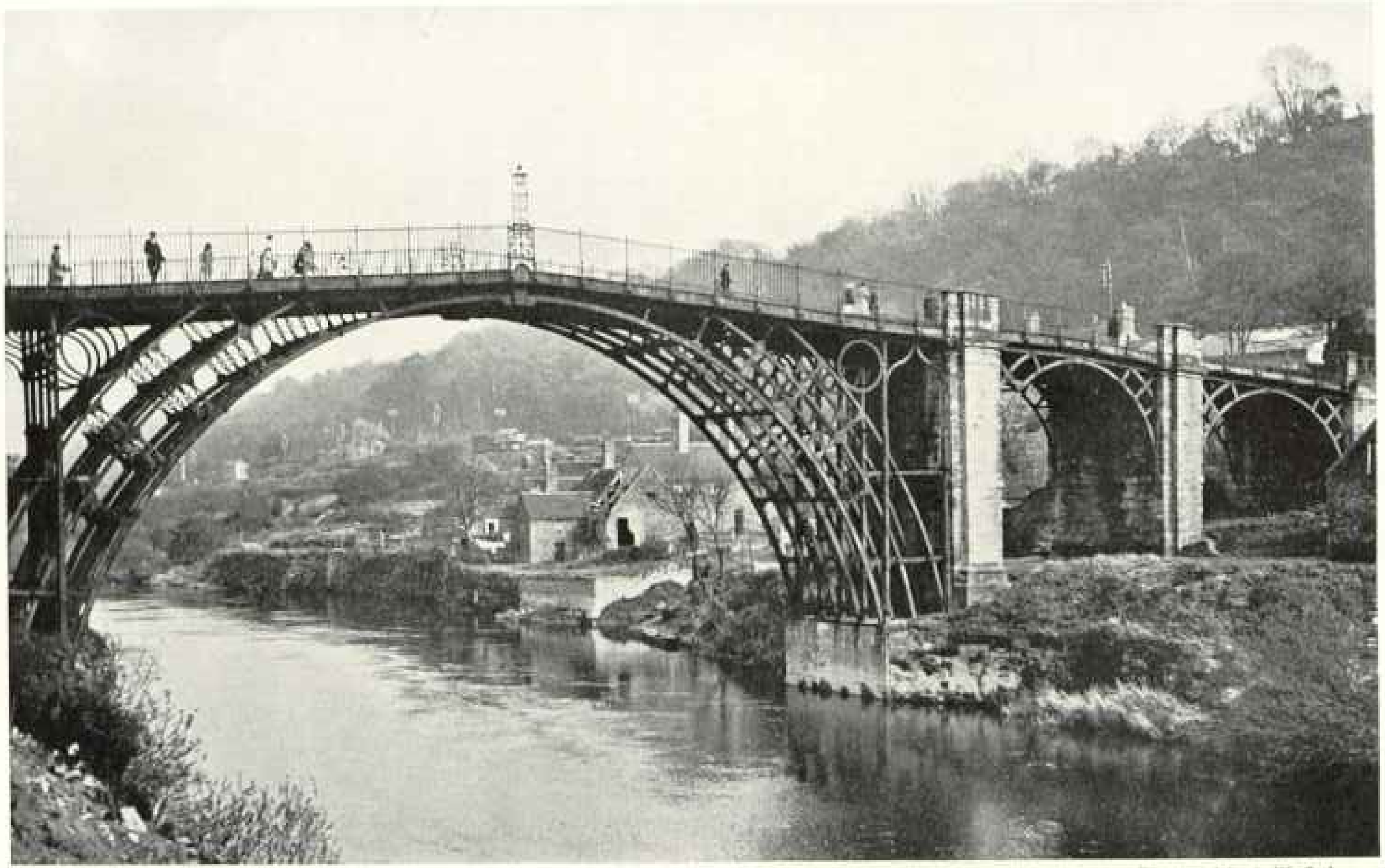
Near the Old Market Hall stands a statue to another famous son of Shropshire, Lord Clive, who helped to lay the foundations of British rule over India.

The old Roman road, Watling Street, crossed the Severn a few miles lower down, near Wroxeter, and turned southward, toward South Wales, another branch running northward to Chester. Just behind Wroxeter are the ruins of the important Roman city, Uriconium, or Viroconium (see text, page 424). The excavations prove it to have been of

Photograph by Ewing Galloway

THE WATER MILL AT TEWKESBURY IS A LITERARY LANDMARK

This town, at the junction of the Avon and Severn (see map, page 421), is the "Norton Bury" of "John Halifax, Gentleman," in which Abel Fletcher, owner of the mill, is a character.



Photograph by A. W. Cutler

THE "BROOKLYN BRIDGE" OF THE SEVERN

Built in 1779, this span was the first iron bridge of any size. As the manipulation of cast iron was then in its infancy, a bridge of such dimensions was a bold undertaking. It gave its name to the modern town of Iron Bridge. The span of the arch is 100 feet; the width, 20 feet (see text, page 439).

considerable size, larger than Pompeii, though not as rich in treasures.

Although no coins later than the fourth century have been found among the ruins, it is generally thought that it long survived the withdrawal of the Roman garrison and was only sacked and burned during the Saxon advance up the Severn, which commenced A. D. 577. A British bard, who escaped and viewed the flaming ruins from the summit of the lonely Wrekin, thus laments his fallen chief:

> The town of white stone gleaming among the green woodland;
> The hall of its chieftain left without fire, without light, without song;
> The silence broken only by the eagle's scream,
> The eagle who has swallowed fresh drink, Heart's blood of Kyndylan the fair.

South and west of Wroxeter rises the long slope of Wenlock Edge, celebrated in song, with the delightful ruins of Wenlock Abbey nestling beneath it. To the east of Wroxeter, the Wrekin, 1,335 feet high, gains by its solitude a dignity to which its height alone would not entitle it. Remains of a British camp can be clearly traced on its summit, and the panorama it commands is a fine one.

On the west the Severn winds like a silver thread through the landscape, with Wenlock Edge and the Welsh mountains beyond. On the other side much of the fair County of Shropshire can be seen, marred in some places by the smoke from its coal and iron fields, but overlooking fine old mansions like Lilleshall Hall.

THE GRAVE OF LITTLE NELL

Among the villages well worth a visit special mention should be made of Tong.

Its church has been aptly called the "Village Westminster" on account of the variety and splendor of its monuments. It is also the village which Dickens admitted he had in mind when writing the closing scenes of "The Old Curiosity Shop," and in the churchyard is the grave of the original of Little Nell, so the townfolk say, on which may be seen fresh flowers the year round, provided by an admirer of our great novelist. The third attraction is the castle. But most of its glory is gone, for the interior has been dismantled and only the shell remains (see Color Plates II and IV).

The Severn now enters a narrow gorge which Nature made the prettiest in the whole course of the river. Unfortunately, in her bounty she made it rich, also, in mineral wealth.

As early as the 13th century, Wenlock Abbey was drawing royalties from the coal raised in Coalbrookdale, on the opposite side of the river. Clay is also abundant here, and the pottery made was very varied, coarse ware, encaustic tiles, churchwarden pipes, and Coalport ware being the leading types. Clay pipes have lost favor, and the china works have been transferred to the Potteries district of North Staffordshire. Early Coalport ware is now in demand by collectors.

FIRST SIZABLE IRON BRIDGE

One of the difficulties of the pottery works was that the coal they needed in such large quantities was mined on the opposite side of the gorge, and the detour necessary to cross the river made carriage expensive. It was resolved in the 18th century to construct a bridge over the Severn here, and the ironworks at Coalbrookdale decided to build it entirely of cast iron. It has a single arch of 100 feet span, with 378 tons of iron in its composition (see illustration, page 431).

Built in 1779, it was the first iron bridge of any size, and the famous engineer, Robert Stephenson, pays it a well-deserved tribute when he says: "If we consider that the manipulation of cast iron was then in its infancy, a bridge of such dimensions was doubtless a bold as well as an original undertaking." It is still in use and claims our tribute, also, at the rate of one halfpenny per person crossing it. To it the dingy town of Iron Bridge owes its name and existence.

Having thus made its sacrifice for Art and Science, the Severn quickly shakes itself from its brief orgy of industrialism and before Bridgnorth is reached is its own smiling self once more.

The red sandstone which is such a picturesque feature of the Severn Valley is here seen to best advantage. The High Town is built on a huge bowlder of this sandstone.

The highest point of the High Rock is known as the Tailor's Stone. The story runs that a tailor bet he would make a coat complete without stirring from the stone.

DAFFODILS' GOLDEN GLORY HONORS SHRAWLEY'S GALLANT DEAD

Beyond the village shrine is the school which many of the war heroes attended. The crescent-shaped field with semicircle rows of daffodils gives the suggestion of an amphitheater.

 Natural Color Photographs by Bernard Wakeman

A CORNER OF THE ESTATE WHERE GEORGE ELIOT WAS BORN

In this building of Arbury Hall, at Chilvers Coton, tenants transact their business and pay their rent, and in it they hold their annual ball. The sundial bears the inscription, "Life's but a walking shadow." The doorway below was designed by Sir Christopher Wren.

Natural Color Photograph by Bernard Wakeman

FLANKED BY FIELDS OF GRAIN RISES BIRMINGHAM'S MODERN UNIVERSITY

Chamberlain Tower, 325 feet high, is a memorial to Joseph Chamberlain, first chancellor of the University. The institution's charter prescribes courses that shall be "of service in the manufactures, commerce, and industrial pursuits of the Midlands." The buildings, three miles from the city's center, escape much of the smoke of its busy factories.

Natural Color Photograph by Frank Wakeman

GOING FOR THE MAIL MEANS SEEING A FLOWER SHOW

Tiny Tong's post office, nestling in a clump of trees, is gay with rambler roses climbing over its brown stone walls. Golden holly contrasts with a hedge of the ramblers.

THE GLORY OF THE FAITHFUL CITY

Worcester's principal building is the cathedral. After the Norman Conquest, the saintly Wulfstan, Bishop of Worcester, was the only English prelate left in possession of his See. He adopted Norman customs and undertook the building of a church of stone according to the Norman pattern. Traces of his work remain.

 Natural Color Photographs by Bernard Wakeman

WILTON CASTLE FORMERLY GUARDED A FORD

Trees tower over the ruins of the once stately stronghold, built during the reign of King Stephen. A bridge now carries traffic across the narrow Wye.

Natural Color Photograph by Frank Wakeman

WHERE LITTLE NELL AND HER GRANDFATHER FOUND REST

Lovers of Dickens have identified Tong as the village Dickens had in mind when he wrote the closing chapters of "The Old Curiosity Shop." Villagers even point out the second cottage from the left as the heroine's last home; though the present structure is of a much later date.

Natural Color Photograph by Bernard Wakeman

EVEN THE WYE VALLEY RAILWAY STATIONS KEEP "IN CHARACTER"

The neat stone structures harmonize with the architecture of the region. The station masters from Hereford to Chepstow take pride in their flower gardens, which afford brilliant splashes of color, conspicuous amid the prevailing green of the tree-clad hillsides.

Natural Color Photograph by Frank Wakeman

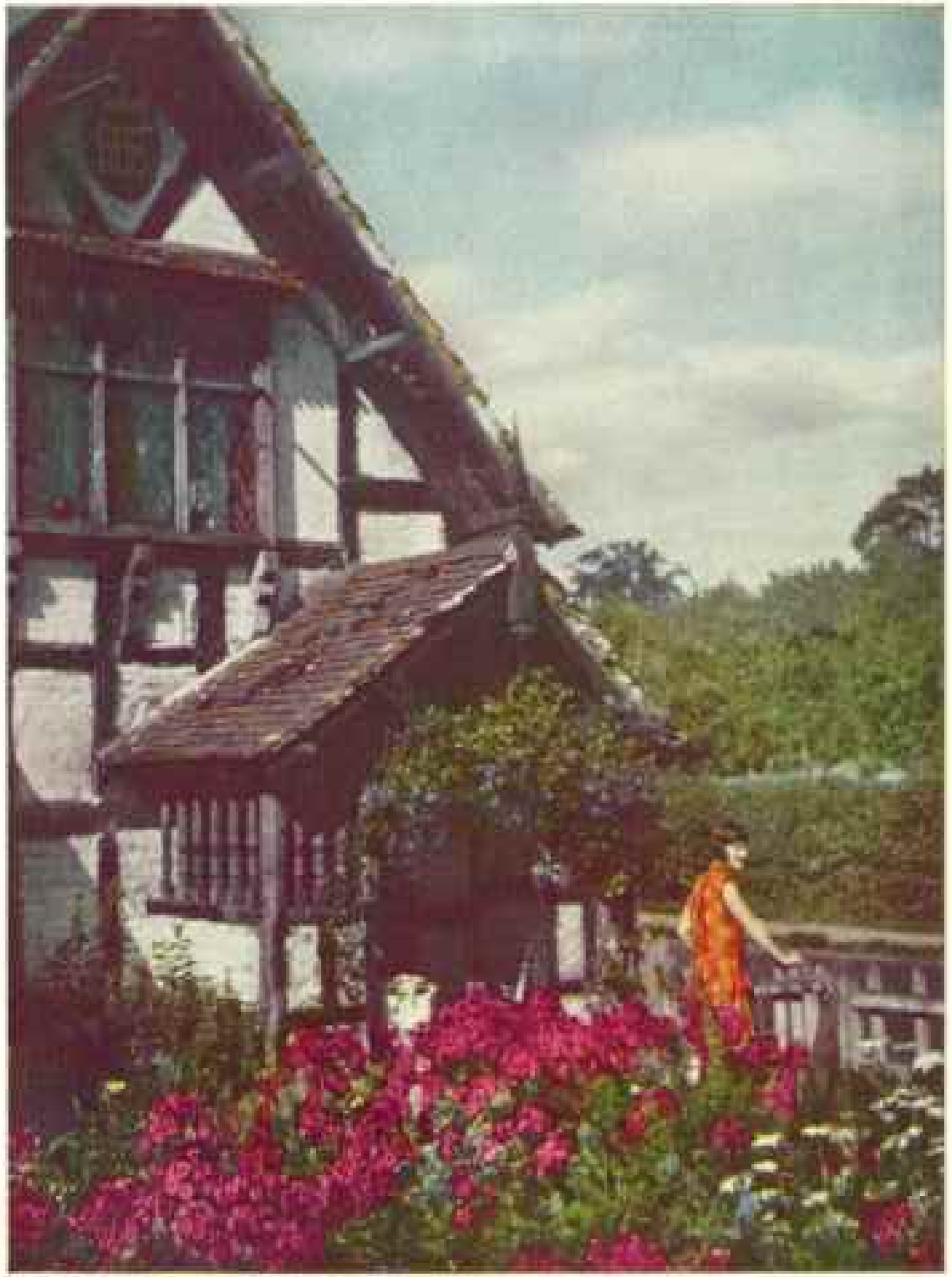
WELFORD-ON-AVON LIES OFF THE BEATEN TRACK

The main stream of travel flows only four miles away, where pilgrims from all parts of the world throng to the shrine of Shakespeare, at Stratford. To this quiet backwater come only those who have discovered for themselves the Old-World charm of the village.

Natural Color Photograph by Bernard Wakeman

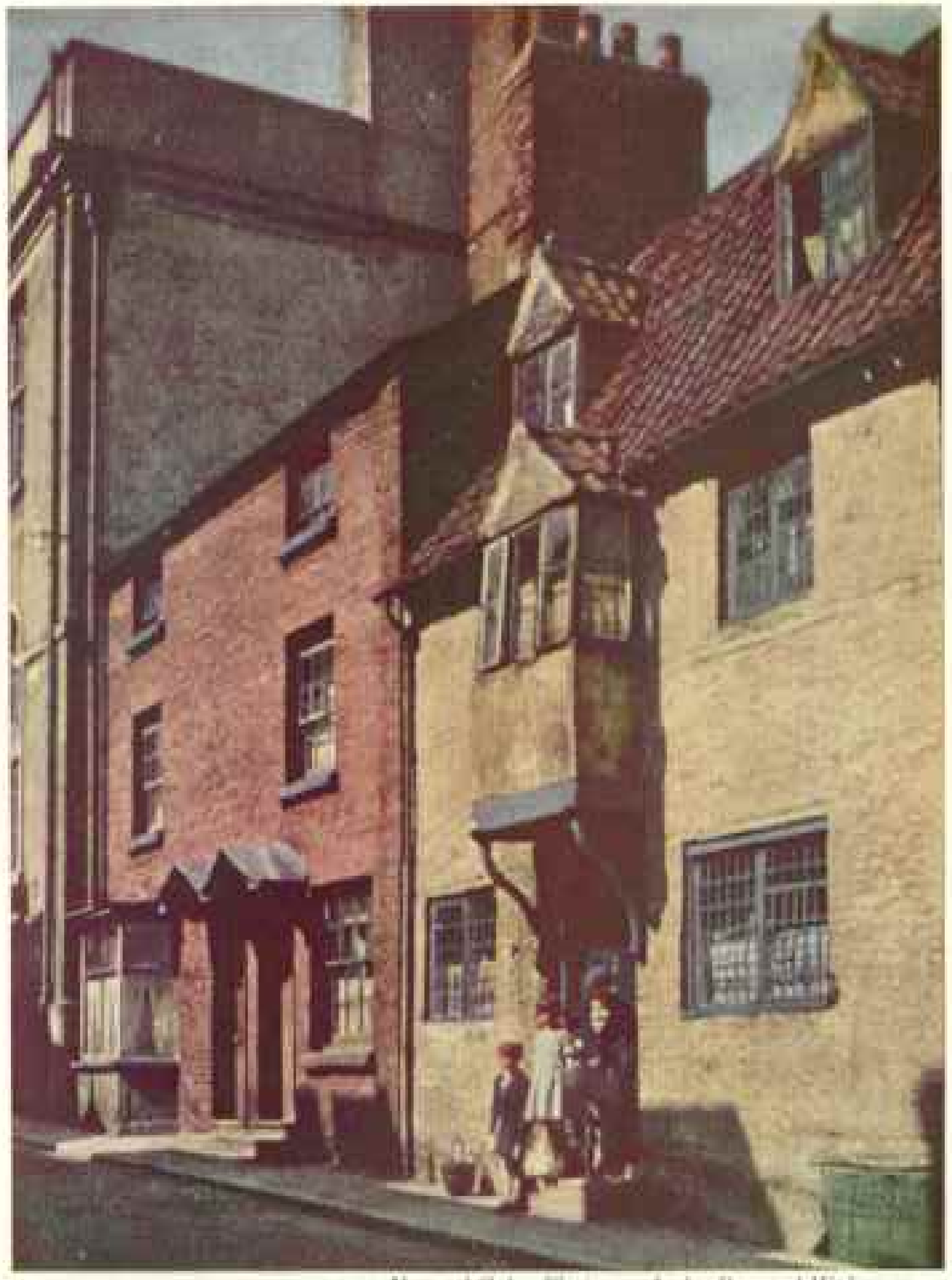
KINGS AND QUEENS HAVE WALKED IN LILLESHALL'S GARDENS

King Edward VII, when Prince of Wales, and continental monarchs have known these quiet nooks. Flanking the formal gardens, beyond a long pergola of roses and apples, stretches a smooth glade with herbaceous borders. The gardens are surrounded by a buttressed wall.



"THE LAST HOUSE IN THE VILLAGE"

Almost any cottage in Ombersley, center of a rich farming area, makes a picture. Most of the yards are wholly given over to flower beds.



Natural Color Photographs by Bernard Wakeman

A CORNER OF OLD MONMOUTH

The "Triangular House" is one of those bits which the color photographer recognizes with heartfelt joy. No amount of "reading up" can guide him to such gifts of chance.

Natural Color Photograph by Frank Wakeman

FROM PIERS PLOWMAN TO JOHN MASEFIELD, POETS HAVE SUNG THE PRAISES OF MALVERN HILLS

Traces of British occupancy testify to their importance in the defense of the country against the Roman invaders. The ruins of the Priory, dating back almost 900 years, attest the part they played in religious history. St. Ann's Well is a reminder of the medicinal value of their waters, while the panoramas from their summits attract many visitors. This view is on the Herefordshire side of the hills.

CANAL FOLK TAKE PRIDE IN THEIR FLOATING HOMES

Though their work is in the iron and steel district of South Staffordshire and vicinity, their boats are gay with paint, and the cabins, with their tiny curtains and polished brasswork, are models of cleanliness and neatness.

© National Geographic Society Natural Color Photographs by Frank Wakeman

SPLASHES OF COLOR FROM THE BLACK COUNTRY

The prosaic duty of these canal boats is to haul heavy fuel oil from dockside tanks at Manchester, for delivery to a depot just outside Birmingham. Their home is alongside a tar distillery, with two chemical works in the rear darkening the sky with smoke. Yet the boats make a brave show with their brightly painted cabins, ornate tillers, masts, and water cans.

Just as he was sewing on the last button he dropped his thimble and, making an unguarded attempt to catch it, fell and broke his neck.

For its owner's loyalty to his King, Bridgnorth Castle was "slighted" by Cromwell's troops. This seems an altogether inadequate word for the complete destruction achieved, which left nothing but a huge fragment of the tower, leaning 17 degrees out of the perpendicular, in which apparently insecure position it has remained for nearly 300 years. Before its capture one of the garrison achieved the remarkable feat of firing a shot into the mouth of one of his opponent's cannon below, bursting it and killing the gunner.

Bridgnorth returned two members of Parliament from 1295 to 1867, and one until 1885, when it was merged in a county constituency. One local family, the Whitmores, supplied its representatives for so long that the whole district still has a definition in common use for anything very unbalanced: "It is like Bridgnorth election, all on one side."

The Market Place retains a charming Old World air, with one entrance through the North Gate, part of the original fortifications. The half-timbered Town Hall, restored in 1887, when so many things were done to commemorate Queen Victoria's Jubilee, looks very dignified on its stone arches, even if it did begin life as a barn.

Two notices on it have an amusing touch. The street on either side of the Town Hall is narrow; so the first notice requests motorists to proceed "Through the arches, please." Some one then realized that this request, if taken too literally when the market was in full swing under those same arches, would lead to disaster, so a separate notice has been thoughtfully added: "Except Saturdays."

GOOD WORDS FOR THE ENGLISH CLIMATE

Below Bridgnorth the river winds its way through pleasant meadows. Their never-failing greenness is a source of delight, especially to exiles returning from foreign lands, and is one of the results of our humid English climate. Many have railed at the climate, from the Romans who cursed its fogs and mists to the witty Frenchman who defined an English summer as "Three fine days and a thunderstorm."

William Cobbett, the 18th-century radical, defends it in his praise of the Severn and Avon valleys, saying: "We complain of the drip, but it is the *drip* that makes the beef and the mutton." The esteem in which English pedigreed cattle are held all over the world powerfully reinforces this argument.*

Arley (Upper Arley) is a delightful village, about nine miles below Bridgnorth. The castle on the hill is a modern structure and is used as a school.

RIVER CURRENT HELPS OPERATE FERRY

A large ferryboat is in constant demand. After calling it across the river for my young niece and myself, I remarked that it seemed a big boat to bring across for two little ones like us. "It is less trouble than bringing a little one across," was the ferryman's retort. He was correct, for the method of manipulation of the big boat was simplicity itself.

A rope has one end anchored in the river upstream and the other attached to the mast; two loops are arranged to hold the tiller full over to the right or left, as required. To cross the river, the ferryman merely changes the tiller from one loop to the other, and the stream does the rest.

Below Arley the Wyre Forest extends to the bank of the river. Formerly one of the largest in this region, it has never fully recovered from the depredations made among its trees to feed the iron furnaces before Dud Dudley, in the Black Country (a name for the iron and steel district of South Staffordshire), and the Darbys, of Coalbrookdale (see text, page 432), had made a full success of smelting with coal. As early as the reign of Good Queen Bess, laws were passed endeavoring to limit the use of wood for this purpose.

Black butterflies may be seen in the forest, and in the wilder parts a few alpine plants remain, relics, possibly, of an ice age.

The name of the next town, Bewdley, is a corruption of Beaulieu, or Beautiful Place. Its glory has departed with the declining importance of its river traffic. It received much Welsh produce and shipped it down the river to Bristol, bringing back products from overseas in exchange.

* See "The Taurine World: Cattle and Their Place in the Human Scheme," by Alvin Howard Sanders, in the NATIONAL GEOGRAPHIC MAGAZINE, December, 1925.

© Donald McLeish

TUDOR ENGLAND LIVES ON IN SHREWSBURY'S HILLY STREETS

Modern water hydrants and sidewalk displays of goods mark ancient Wyle Cop, a thoroughfare where many buildings date back to the Plantagenets and early Tudor kings. The architectural style of the half-timbered houses, with areas of window space that ultra-modern architects attempt, was prevalent in England about a century before the Pilgrims landed at Plymouth Rock, and Shrewsbury has some of the finest remaining examples.

At one time the making of cloth caps was the most important trade at Bewdley. The town fined all its citizens who failed to wear them 3/4*d*. and resisted by force the efforts of the men of Bridgnorth to share in the trade. To-day it is a holiday resort for the busy industrial district stretching back as far as Birmingham.

Below Bewdley is Blackstone Rock, which, despite its name, is of red sandstone. In the rock is a hermit's cell.

Tradition tells that the hermit who cut it in the rock came originally from Stratford-on-Avon and was in love with a daughter of the famous Clopton family. One night she was seized by a rival who fled with her on horseback. Our hero pursued them and was rapidly overhauling them, when the villain, to lighten his horse's load, flung his fair burden into the River Rea (near the village of Birmingham, as it then was). Her lover, delayed by a vain attempt to save her life, failed to overtake the miscreant again, and, abandoning the chase, became the hermit of Blackstone Rock.

Many years afterward a penitent came one night to confess the sin which burdened his conscience, and told the tale of that night's ride. Instead of absolution, he received the long-delayed punishment. Two minutes later a dark form might have been dimly seen carrying a burden to the top of the rock. There was a splash; the deep pool below received its dark secret. From that night the cell has been empty.

BIRMINGHAM OWES MUCH TO CANALS

In the 18th century a canal was proposed from Birmingham to Bewdley. But the inhabitants of the latter place contemptuously refused to have this "stinking ditch," so the outlet was diverted to the Severn four miles downstream, giving rise to the modern town of Stourport.

Although the canals were small, carrying boats of but 30 tons burden, they played an important part in developing trade before the coming of the railways. Bringing cheap fuel from the Black Country at incredibly low cost for transport, they gave a start to its remarkable growth in the past century and a half, from little more than a village to a city of more than a million inhabitants, "the city of a thousand trades," with a flourishing university.

As we near Stourport, the absence of shallows proclaims our approach to the first of the surviving locks on the river, and a very fine stretch of the river leads down to Shrawley, behind which are the hills of Woodbury and Abberley, the scene of one of the strangest encounters in the annals of English warfare.

HISTORIC MEMORIES HAUNT WORCESTER

In the reign of Henry IV a combined Welsh and French force invaded England and plundered and burnt Worcester. On the approach of the King, they retreated to Woodbury Hill and awaited him there. Henry and his army occupied the opposite height of Abberley. For a week they remained thus, while impatient spirits played "David and Goliath" in the valley between. At the end of that time Owen Glendower found the truth of the dictum that "an army marches on its stomach," and, being unable to fill that stomach, he retreated, quarreling with his French allies. The English army "saw them off the premises" without getting close enough to invite a conflict.

Just below is the bridge at Holt Fleet, where the road from Herefordshire crosses on its way to Ombersley, a village noted for its wealth of half-timbered houses. Beyond this is the town of Droitwich, famed since Roman times for its salt springs. Of late years, in order to conserve the supply, the commercial trade has been left to a neighboring town, and the Droitwich springs have been reserved for medical use, being especially beneficial for sufferers from rheumatism.

A former owner of Westwood Park, a country mansion near by, is said to have been the original of Sir Roger de Coverley. There are also many local associations with the Gunpowder Plot, which still serves the youth of England as an excuse for fireworks on November 5 (see p. 420).

We are now approaching the cathedral city of Worcester, and the small Bevere Island, about two miles above, recalls the first sacking of this city. In the reign of Hardicanute, the citizens, exasperated at their taxation, murdered two of the Danish tax collectors. When soldiers came to exact vengeance, they fled to Bevere Island and defended themselves, but returned later to find their homes a heap of ruins.

Photograph by A. W. Cutler

WHERE KING CHARLES I MADE HIS OWN MONEY

Harassed by the need of funds, after exhausting every source of taxes, the monarch visited loyal Shrewsbury at the beginning of England's Civil War. He had a mint set up to melt down silver plate into coins. The ancient copper utensils used in reducing the metal still are exhibited inside the building.

Again, in 1113, the whole city, castle, and the cathedral, which was in course of erection, were burned to the ground. In 1139 another fire was the work of the troops of the Empress Matilda, and King Stephen's men followed their example in 1149. The next disaster was to the cathedral, where the central tower fell in 1175, wrecking the nave (see Color Plate III).

In spite of these interruptions, the cathedral was finally completed and rededicated in 1218, and its original builder, St. Wulfstan, reburied there with ceremony. A neighbor of his in the tomb is a man of very different character, King John of evil memory, who had a pathetic faith in the prayers of the monks of Worcester and their efficacy in warding off the consequences of his misdeeds.

After these early misfortunes Worcester was left in comparative peace until the Civil War, when it saw both the beginning and the end of the struggle and much fighting in between.

TEME SAW CLASH OF THE CAVALIERS AND ROUNDHEADS

The first skirmish of the war was at Powick Bridge, over the River Teme, just below the city. The Roundheads were advancing on Worcester to intercept a consignment of plate destined for the King's mint at Shrewsbury.

Prince Rupert was resting in a meadow near the bridge he was guarding when he was surprised to see Roundheads already crossing the bridge.

Jumping on his horse and calling his men to follow, Rupert rode impetuously at the Roundheads, and with two or three other Cavaliers, expert swordsmen, held the bridge till his troopers came up and routed the enemy.

Although the Cavaliers were hopelessly outnumbered, the surprise of the onslaught completely unnerved the Parliament men, some of whom threw up their service and carried such a tale of woe to London that

recruiting slumped severely, and it was a long time before the Roundheads would face Prince Rupert's cavalry with any confidence.

THE WASHINGTON FAMILY PLAYED A PART AT WORCESTER

At the end of the first struggle Worcester was the last city to hold out for the King, under Colonel Washington, of the stock from which America's national hero sprang. His grim defense, after everyone else had counseled surrender, was in the best tradition of the family. The battle of Worcester, in 1651, Cromwell's "crowning mercy," was the finish of the second part of the Civil War, and was followed by the flight of the King.

Many other memories crowd Worcester streets, historical and, to the writer, personal memories also of 14 months spent there, beginning in the glorious summer of 1911, when raincoats hung unwanted in the hall week after week, until November; memories of the early spring which followed the hot summer; of the wealth of fruit blossoms in the workhouse yard; of the scent of hawthorn blossoms on the river on Mayday itself.

There are memories of the Three Choirs Festival, when it was Worcester's turn to entertain Gloucester and Hereford in the unique musical festival which has been held for over two hundred years; of a lantern lecture on "The Flight of the King"; of a slide of the Guildhall doorway, over which is a stone with a head of Cromwell nailed by the ears; of a Cornishman's shrewd interjection, "Aye, but he's the keystone of the arch, after all"; and of many other things which made my life in the "Faithful City" full of interest.

Photograph by A. W. Cutler

LUDLOW'S FEATHERS HOTEL STILL HAS ITS SIGN OUT

The framework of the half-timbered houses consisted of beams cut and trimmed beforehand, then numbered to fit their places, as is done with steel girders and stone parts of modern buildings. The timbers were mortised with wooden pegs, and the interstices filled in with plaster after the woodwork skeleton was in place.

As we cross the River Teme, let us pause for a rapid survey of this most charming tributary.

Rising in the Kerry Hill, famous for its sheep, it flows through a beautiful valley under the shadow of the brown Clee Hills (see map, page 421, and page 422).

Its most famous town, Ludlow, has already been mentioned (see text, page 428).

Photograph by Donald McLeish

THE HOSPITAL OF QUEEN ELIZABETH'S FAVORITE, AT WARWICK

The institution was established by Robert Dudley, Earl of Leicester, in 1571, as a refuge for 12 old soldiers, or other needy men, and a master. They were instructed to wear "Liveries of blew cloth, with a Ragged Staff embroydered on the left sleeve, and not to go into the Town without them." Over the gateway is a Bear holding a Ragged Staff, the badge of the Earl of Warwick, mentioned in Shakespeare's "Henry VI."

It is a lovely old town, with its two fine bridges, one leading up Broad Street, cut in two by the narrow archway seen in the distance, and its famous old castle, where Milton's masque, the dramatic "Comus," was first performed (see illustrations, pages 426, 427).

Tenbury is a quiet little town farther down, where people go for the waters, some to drink them, some to fish in them.

LANGLAND AND HIS VISION OF "PIERS PLOWMAN"

Cleobury Mortimer, whose second name reminds us of the Norman family so powerful in this district, lies off the river, a pretty town whose church has a crooked steeple, because of the warping of its old timbers. It is the reputed birthplace of William Langland, the poet who wrote "The Vision of Piers Plowman," a landmark of early English literature.

Langland appears to have been a "clerk," or scholar, in the Priory of Malvern before he went to London, where he made a scanty living. Like the modern poet first quoted (see page 417), his mind goes back to the beloved Malvern Hills (see Color Plate VII).

The Malvern Hills, although they are only about 1,400 feet high, afford a magnificent prospect over the level plain of central England on the one side and across to the Black Mountains in Wales on the other (see illustration, page 418, and map, page 421).

Photograph by A. W. Cutler

AN OLD HOMESTEAD OF WORCESTERSHIRE

For nearly 40 years this patriarch of Comberton has worked on the roads. His eyesight is dim, so occasionally a neighbor comes in and pens a few lines to his children, who have gone to the cities after being reared in the simple dignity of the rural English countryside.

The Malverns are among the oldest hills in Europe and were set in a thick chase until the beginning of the 17th century, when they were disafforested.

There were two opinions about the advantages of the forest. The affirmative was taken by a bishop of Worcester, who wrote to his brother prelate at St. Davids to remind him of a promised "six brace of excellent hunting dogs, the best I have ever seen. Let them come, O Reverend Father, without delay; let my woods re-echo with the music of their cry, and the cheerful notes of the horn, and let the walls of my palace be decorated with the trophies of the chase."

The reverse of the picture is given by a vicar of Malvern, who exhorted his parishioners:

A chace for royal deer
  Round doth beset thee.
Too many do I fear,
  For aught they get thee.
Yet tho' they eat away
  Thy corn, thy grass, thy hay,
Do not forget, I say,
  To praise the Lord.

The River Avon is now rapidly approaching the Severn. There are several rivers in England bearing this name, which is merely a corruption of the old English word for river, Afon, still used in Wales with this meaning. Among these Avons, pride of place must be given to the stream which flows through Stratford, forever linked with the name of Shakespeare.*

It would be as well in passing to mention another literary shrine within easy reach of Stratford, the George Eliot country. In the beautiful grounds of Arbury Hall her birthplace may be seen, while Chilvers Coton Church is full of memories not only of her family, but of the characters in her "Scenes from Clerical Life," and the neighboring town of Nuneaton has many interesting associations with her and her novels (see Color Plate I).

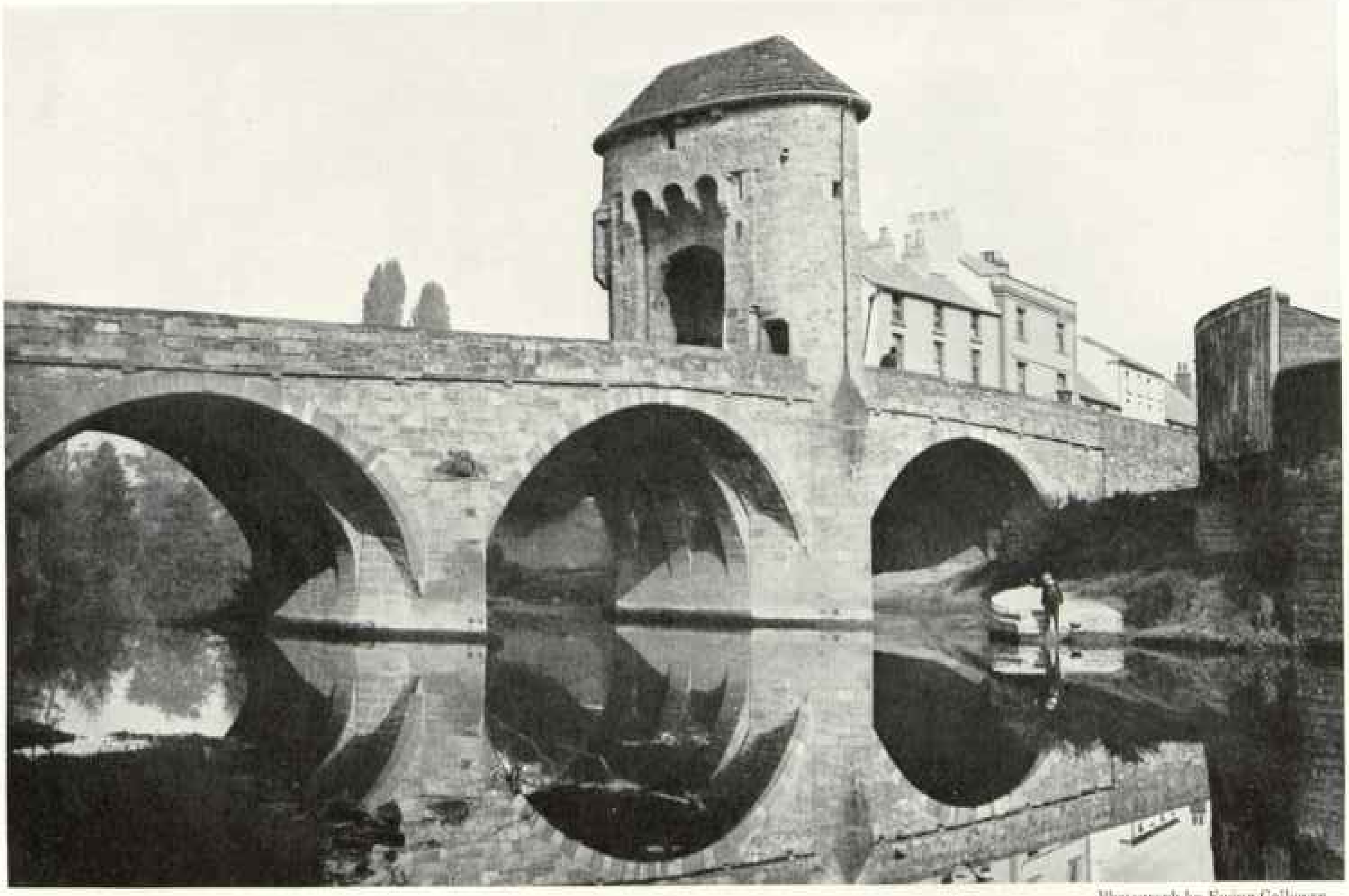
The Avon has on its banks Warwick, with its wonderful castle, and the magnificent Beauchamp Chapel in St. Mary's Church. Evesham, lower down, linked in

* See "Through the Heart of England in a Canadian Canoe," by R. J. Evans, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1922.

Photograph by Robert Reid

"UNDER THE GREENWOOD TREE"

A glimpse of Gloucestershire's rural beauty at Tredington, near Tewkesbury, where horse-drawn vehicles and cyclists still form the principal traffic.



Photograph by Ewing Galloway

"WATCH OUT FOR BOILING WATER AND MOLTEN LEAD!"

The Monmouth visitor feels time roll back to the 13th century when he views this gateway in the center of the bridge, which was furnished with portcullis, eyelets for archers, and apertures for pouring liquid on the heads of enemies. Little remains of the castle where "Harry of Monmouth," future hero of Agincourt, was born. Another famous son was Geoffrey of Monmouth, whose "history" was mostly folklore, but such splendid folklore that it threads through many gems of English literature.

© Central Aërophoto

TINTERN ABBEY, BESIDE WORDSWORTH'S "SYLVAN WYE"

These Cistercian ruins are inseparably linked with the famous poem with a very cumbersome title, "Lines Composed a Few Miles Above Tintern Abbey, On Revisiting the Banks of the Wye During a Tour, July 13, 1798." This poem contains many oft-quoted lines, including the epitome of the poet's philosophy, "Nature never did betray the heart that loved her."

history with the name of Simon de Montfort, the Father of the English Parliament, slain in battle here, is now better known as the center of a fertile vale, visited by thousands every spring, when its huge orchards make a fairyland with their blossoms. Besides these well-known towns, there are delightful villages like Welford and Bidford, with whose Falcon Inn Shakespeare seems to have been well acquainted, and a score of others.

After a final sweep round Bredon Hill, which stands almost as solitary as the Wrekin itself, the Avon joins the Severn at Tewkesbury. Here is an unspoiled Old World town with many claims on the sympathy of the visitor, with its memory of an old battle, one of England's finest abbeys, the literary associations of "John Halifax, Gentleman," and fine half-timbered inns, including one where Mr. Pickwick stayed to refresh the inner man and replenish the case bottle, the latter point being one which Bob Sawyer made sure was not forgotten.

We are now in the very center of Masefield's "Land of Heart's Desire." With all the delectable Cotswold country on the one hand and the vales of Hereford, with the beautiful Welsh border mountains beyond, all beckoning the wayfarer, it is with difficulty we turn down the river again, though Gloucester itself beckons.

The first coming of Christianity to this country is wrapped in mystery, but there is an interesting illustration from Gloucester of how quickly it must have reached us. The Romans established Glevum at

this important crossing of the Severn, on the site of the British Caer Glow, or Fair City, A. D. 43. A Roman officer named Pudens married a British Christian named Claudia, and their son was christened Linus. Afterward they returned to Rome and St. Paul passes on their greetings to Timothy in his Epistle of that name.

With such an early beginning to the religious history of Gloucester, we expect many old memories to cluster round its fine cathedral.

In the dark chapter house William the Conqueror, tradition says, gave instructions for the compilation of Domesday Book. The last Abbot of Tewkesbury was appointed first Bishop of Gloucester, when the monasteries at each place were abolished, Tewkesbury being purchased by the citizens for use as the parish church and Gloucester being converted to a cathedral. There is a suspicion that the Abbot gave Henry VIII no trouble and was given the bishopric as the reward of his complaisance.

Being the lowest point at which a road bridge crosses the Severn, Gloucester has always been a busy center for traffic, and to-day long-distance motor buses from London to South Wales, and from Lands End to, if not John o' Groats, at least to Glasgow and Edinburgh and many other distant places, are always passing through. It is an important railway center and is planning to be as useful to air lines. It is the head of the Severn navigation for ships up to 1,200 tons burden, thanks to one of the oldest ship canals in the country, which avoids the treacherous sand banks just below the city.

Below Gloucester the river is crossed twice by the railway—by a bridge almost a mile long, at Sharpness, where the ship canal begins, and by a tunnel under it near the mouth, over four miles in length.

THE SEVERN BORE

In the tidal reaches the river is not so interesting. Having one of the highest tides in the world, it can, however, be exciting on occasion. Every spring and autumn crowds assemble at vantage points to see the Severn Bore. A Gloucester citizen reporter, who went out in a boat to observe it, says: "The spectacle viewed from the water level was magnificent. Half a mile away, we could see a majestic wall of water rolling relentlessly down on us, spray flying high in the air where it dashed against the banks. I breathed a pious hope that the boat would rise to the occasion in more senses than one. . . . The Bore was upon us. We lifted easily in the first long swell, and then, in a long swift glide, and we had hit the Bore.

"Events happened so quickly afterward that it was difficult to sort out impressions. Instead of the usual three waves, there appeared to be at least half a dozen, and the third of these offered a magnificent sight. Some five feet high from trough to crest, it curled over threateningly into white foam. Had we cut this in the center, it would have been, to put it at its lowest, a matter of extreme difficulty for us to weather it in our boat. We were tossed about like a cork and had to paddle like heroes. This was the climax. I was able to testify that there is no lack of excitement, and those in search of a new thrill will find it while meeting the Severn Bore."

Another version of the legend regarding the routes chosen by Plynlimon's three rivers (see text, page 417) says that the Rheidol chose the shortest, the Wye the prettiest, and the Severn the one which passes through the largest number of towns famous in the annals of their country. Let us, in conclusion, take a hasty glance at least at the lower stretches of the Wye, the prettiest of the sisters.

Hereford, its most important city, is not only a delightful cathedral town, the birthplace of David Garrick and Sweet Nell Gwyn of Old Drury, but it has around it many pretty villages like Weobley and Pembridge, full of Old World charm.

The next town of importance is Ross-on-Wye, which keeps green the memory of John Kyrle, "the man of Ross," so called because his long life was devoted to the welfare of his fellow citizens and the beautifying of his beloved town.

Across the river at Wilton is the ruin of a 12th-century castle, another example of the destruction wrought by the Civil War, but by the Royalists on this occasion. It is probably the only castle owned by a hospital, for the founder of Guy's, in London, gave it as part of his endowment of this famous training ground for England's doctors (see Color Plate III).

The Wye passes through its deepest and most winding gorge at Symonds Yat, a spot whose beauty can move even a prosaic

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SEVERN RIVER DWELLERS STILL FISH FROM CORACLES

The Roman invaders found the ancient Britons fishing from this type of boat. Two men, each in his own boat, hold a net between them with one hand, and with the other manipulate the paddle. When a fish enters the net, each man pulls up his end of the net until the coracles touch and the fish is captured. This photograph was taken under the famous iron bridge shown on page 431.

railway guide to almost lyrical raptures. "People come from all over the world to see Symonds Yat, strung to the highest pitch of expectancy by countless enthusiastic descriptions penned by inspired writers and unbelievably lovely pictures painted by the wizard cunning of famous artists, and not one of these eager sightseers goes away disappointed," etc.

MONMOUTH THE ANCIENT

Monmouth, the old county town just below, has its roots buried in antiquity. It was the birthplace of Shakespeare's "only hero," Henry V. Nelson was made a Freeman of the town, and his memory is kept alive by a museum which boasts one of the finest collections of his relics. The bridge retains its Old World character (see page 449), and there are many curious old houses, including one which is triangular in shape. A modern touch is added to the town by a statue to the memory of a pioneer aviator, Hon. C. S. Rolls.

We will bid good-bye to the river at Tintern, lingering only to read Wordsworth's poem where it should be read—that is, where he wrote it—with the wonderful Abbey ruins in the beautiful valley below (see page 450).

WOODPECKERS, FRIENDS OF OUR FORESTS

By T. Gilbert Pearson

President of the National Association of Audubon Societies

With Paintings from Life by Maj. Allan Brooks

The Geographic *presents in this issue the fourth of a comprehensive series of paintings descriptive of all the important families of birds of North America. The first (Hummingbirds, Swifts, and Goatsuckers) appeared in July, 1932, the second (Ibises, Herons, and Flamingos) in October, 1932, the third (Crows, Magpies, and Jays) in January, 1933. The fifth of this series will be published in an early number of the* National Geographic Magazine.—Editor.

ONE sunny morning in late autumn, I pushed through a growth of briers and entered a small wood in search of any birds which might be abroad. My footsteps rustled the newly fallen leaves and made a quiet advance impossible, so I sat down on a fallen tree, hoping that soon some kind of bird might come my way.

I had sat there only a minute or two when the sounds of repeated tappings from some near-by point reached my ears. They seemed to come from a decayed tree stub, about 20 feet away. Shifting my position, I could see in the stub a small round hole 12 feet from the ground. Just then a downy woodpecker appeared in the entrance and dropped a billful of small chips. Seeing a man so near, he uttered a sharp note and flew to a near-by tree.

Woodpeckers excavate holes in trees for their nests, but as everyone knows, birds lay their eggs in the spring, and here this little workman was digging a hole late in October. It was to be his winter bedroom, where he could pass the nights, shielded from winds and sleet and safe from the claws of hungry owls that haunt the shadows of the woodlands. One evening a little later I saw him enter the hole, and on another occasion in the twilight I was rude enough to disturb his privacy by tapping on the stub, which caused him to fly away.

When winter approaches, the downy does not migrate as do so many other birds. Any day, when the weather is not too inclement, he may be found not far away. He is often in company with a number of chickadees that are traveling about among the tree tops. The *yank* of a white-breasted nuthatch announces his presence, and now and then a quiet brown creeper joins the troop, all of them hunting for insect eggs tucked away in crevices of the bark.

The downy is a valuable bird among the orchard trees, where he destroys innumerable insects, their eggs and larvæ. As a rule he is unsuspicious and will come readily to the garden or lawn to secure the suet wired to a limb for any winter bird guests which may appear.

In rural districts this bird, along with the somewhat larger hairy woodpecker, is generally called sapsucker, and is often shot with the mistaken idea that a noxious bird is being killed. Like every creature, he of course has his natural enemies. One day, while watching the activities of various birds in a small strip of woods by a country roadside, I heard the startled alarm notes which birds give when sudden danger breaks upon them. A jay dashed headlong into a cedar, and a robin, too frightened to fly, stood erect and rigid on a limb. Then a sharp-shinned hawk swept past, seized a downy woodpecker from the side of a tree, and carried away his shrieking victim.

THE WOODPECKERS BEAR MARKED FAMILY RESEMBLANCES

There are few birds that so satisfactorily reveal their family connection as do the woodpeckers. The beginner in bird study may learn that the meadowlark belongs to the family *Icteridæ*, but he may be excused if he does not learn at once that the bobolink, the oriole, and the red-winged blackbird, all strikingly different in habits and color, belong to the same family. He may study the wood thrush, and be surprised to find later that the robin and the bluebird bear to it a close family relationship. But if he becomes

Photograph by George Shiras, 3d

Drawing by Hashime Murayama

THE "BILLWORK" AND THE "FOOTWORK" OF A WOODPECKER

At the left are some of the workings of a pileated on a dead tree near Whitefish Lake, in Michigan. The powerful birds use their chisel-like bills to make large, deep cavities in decaying trees and logs in search of larvæ. In the ordinary form, as with the hairy woodpecker shown in the upper figure of the right-hand picture, there are two toes directed forward and two behind, forming a yoke, with the claws curved and sharply pointed. The bird indicated at the side illustrates the position of the feet in climbing. The inner toe is reduced in size, and in the specialized foot of the peculiar three-toed woodpeckers, illustrated in the lower figure, is entirely lost, so that there is only one toe behind. Both feet shown are from the left side and are drawn natural size.

thoroughly familiar with the appearance and activities of just one woodpecker, he will thereafter be able to recognize at once any other member of the family *Picidae* which he may encounter.

Woodpeckers are of wide distribution. They inhabit all the countries of the globe except Madagascar and the Australian region. More than four hundred species are known, and many geographical races of these have been described.

In North America the family is represented by 10 genera, classified into 22 species, several of which in turn are divided into subspecies or geographical races. In all, 64 kinds of woodpeckers are recognized in continental United States, Canada, and Baja California.

Woodpeckers give the impression of being practical, sensible birds. Under ordinary circumstances, they do not show a hysterical fear of man; they are wary, but

Photograph by Stanley W. Cosby

Photograph by Dr. A. A. Allen

CALIFORNIA WOODPECKERS USE OLD FENCE POSTS AND TELEPHONE POLES AS STOREHOUSES

The energetic birds collect acorns from valley and live oaks and wedge them into holes which they have cut for the purpose and in which they are preserved for later use. At times, thousands of acorns are stored in the trunk of a single large tree. Occasionally, the food-storing instinct goes astray and the laboriously made holes are stuffed with pebbles or other inedible objects. At the right a downy woodpecker clings to an apple tree, beside the small oval hole which it has made, to reach in with its barbed tongue and extract a borer.

do not let that interfere with their work. They are very busy birds and most of the time are absorbed in climbing about tree trunks and limbs. They get along together fairly well. I have seen few serious combats among them.

They do not possess the stately dignity of the heron, the singing powers of the thrush, or the graceful flight of the swallow. Woodpeckers do not stir the imagination to thoughts of distant lands, as does the wild goose when far overhead we see him leading his flock toward the frozen pole. The woodpeckers are known rather as hard-working, substantial citizens of the bird world, rendering service which could ill be spared.

These birds possess highly specialized equipment for their business of getting a living. They are the only birds in our country that can dig holes in solid trees. As a group they pass most of their days pecking decayed trees or stumps for ants or the larvæ of wood-boring beetles.

No other bird leaves behind such striking evidence of its presence. A hundred

Photograph by Dr. A. A. Allen

ALMOST READY TO LEAVE HOME

These young yellow-shafted flickers were raised in the bird house. Unlike most birds, young flickers resemble their fathers instead of their mothers. Note the black mustache on each bird, a mark of the male in grown individuals, as adult female flickers do not possess it.

thousand warblers may migrate through a small region, and many may remain for the summer and rear their young. When they have gone, little sign of their former presence is left behind, but a half dozen woodpeckers in the same community will leave very definite evidence of their occupancy. Numerous holes in dead trees; with here and there an entrance to a nesting cavity, will all bear convincing testimony that these birds have been in the forests and the orchards of the neighborhood.

Woodpeckers nest in hollows which they dig in trees, and all of them lay white eggs on a bed of fine chips at the bottom of the cavity.

Their toes usually number four, two of them pointing forward and the others backward (see illustration, page 454). This arrangement enables the birds to grasp firmly the side of a tree, and especially is this the case when they brace themselves with their 12 long, stiff tail feathers.

ONLY ONE SPECIES OF WOODPECKERS IS A MENACE TO TREES

It was one morning early in spring that I found a mourning cloak butterfly stupefied with drink. It flew sluggishly from the side of a tree and sprawled on the ground not four feet away. With wings distended it lay as if all ambition for movement had departed. A moment later I discovered that at least 20 others were likewise prostrate on the ground, and that fully a dozen were still on the side of the tree.

They were drinking their fill of sap that flowed from many small holes which had been drilled through the bark. A yellow-bellied sapsucker had been here and I hoped that it might be found somewhere in the neighborhood. In five minutes I located it hanging quietly to the side of another tree, and all about were little holes from which oozed sap twinkling in the sunlight.

The sapsucker is looked upon with serious disfavor by foresters and orchardists, some variety of it being found in nearly every part of the country. This dislike arises from its universal custom of pecking holes in live trees. The bird does this chiefly to get the sap which flows upward through the soft cambium, lying just beneath the bast, or inner bark, and it also eats the cambium and bast. To get this food the sapsucker drills holes in rings around the tree or, at times, in rows on the trunk, or along a limb.

As the sap collects in the openings, it is consumed by the bird until the little springs begin to fail, when another series of holes is made near the first one. Thus the work continues, until large areas of the tree may be covered with these perforations.

In North Carolina I had opportunity to watch the work performed by a sapsucker on a small balsam growing on a college

campus. The tree had been used by sapsuckers for some years, and numerous partly-healed scars were in evidence. I first saw the bird pecking a fresh hole one day in autumn. Probably it had just arrived from its northern summer home. Only a few wells were sunk through the bark at this time, but I saw the bird on the tree at intervals throughout the winter.

When spring came and the sap began to rise, the sapsucker became very busy, and worked industriously every day until March 29, when the bark showed 671 openings which had been made since the previous autumn. As a rule the holes were about as large around as a lead pencil. Some were smaller, and others were of much larger size. One that I measured was an inch and a quarter long by three-quarters of an inch wide.

Some of the openings were at a distance of less than a foot from the ground, and they extended upward over much of the surface of the tree for 20 feet or to a point about two-thirds of the way to the top. The branches of the tree began 12 feet from the ground, and three of these contained a sprinkling of sapsucker holes. I kept a watch on this tree and examined it at intervals for the next 15 years. I believe that a sapsucker came here for its food every winter and spring throughout this entire period.

The tree became much swollen, as Nature struggled to overcome the damage done to it by the birds. When it finally died, the diameter of the tree at a height of seven feet was 25 per cent greater than it was seven inches above the ground. There were other trees near by, but this balsam was the only one in the vicinity for which the sapsuckers seemed to care.

SAPSUCKERS LEVY TRIBUTE ON MANY TREES

Elsewhere I have watched sapsuckers feeding on the sap of many kinds of trees, and have seen the holes or swollen rings produced by their drilling. They will take the sap of maple, mountain ash, pear, plum, apple, cherry, oak, peach, spruce, and ironwood trees, and of almost all species of pines, firs, hemlocks, cedars, cypress, or cottonwoods.

In the northern forests, where many sapsuckers spend the summer, numerous birch trees are killed annually by them.

Photograph by Dr. A. A. Allen

RESTING BETWEEN DRINKS

This yellow-bellied sapsucker is pausing for sap to accumulate in the pits he has dug in a sugar maple tree, or perhaps is merely awaiting a return of appetite after his last tipple. Although cosmopolitan in its tastes, the sapsucker is especially fond of conifers, maples, and apple trees.

In the Northwest, where at times sapsuckers are unusually plentiful, whole apple orchards have been destroyed.

In some trees, such as maples, walnuts, and hickories, their holes often pierce the sap wood beneath the cambium. In the subsequent growth of the trees, these wounds sometimes cause curly or bird's-eye wood well known to lumbermen. More often, however, this exposure of the wood allows insects, fungi, or bacteria to enter. These cause blemishes or decayed

Photograph by Lynwood M. Chace

POSING WITH A FRIEND

This family of yellow-shafted flickers are too young to have yet developed a definite sense of fear and are quite willing to accept the boy's friendly advances.

areas, which reduce in value the lumber which later may be cut from the tree.

About the rings of holes made by these birds in locusts and sycamores, shoots often sprout from adventitious buds, and thus the symmetry of the tree is marred. Not only are hundreds of thousands of trees injured by sapsuckers, but a considerable proportion of those that are attacked die either the same year or subsequently.

There is much testimony to this effect. Dr. Hoy, of Wisconsin, wrote on one occasion: "There is not a garden or orchard of any size in the vicinity of Racine that has not lost trees killed by the sapsucker." However, the bird has its value and is protected by Federal law.

The woodpeckers do not confine their attentions wholly to trees. They make their explorations for sap through the bark of various large vines, such, for example, as the Virginia creeper, poison ivy, rattan, and trumpet creeper.

Close about the nesting tree of the sapsucker there are various trees where the old birds go for their sap, and where they take their young when they leave the nest. Here the family spends the summer with an abundance of normal food supply at hand. At this season they eat also ants, flies, beetles, and various other insects which are drawn to the flowing springs of sweet sap. Other woodpeckers come to these little fountains, as well as humming birds, warblers, and at times red squirrels.

Among the woodpeckers the flicker is a bird of distinctive personality, and it attracts universal attention. Undoubtedly it is known to far more people than are the other woodpeckers. Its local names are numerous. "Wilkrissen," the people of Cape Hatteras call it. I have heard it spoken of as the "yucker bird," "golden-winged woodpecker," "high-holder," and "pigeon woodpecker." One very popular name is "yellow-hammer."

OUR STATE BIRDS

Of late years the custom has developed of adopting a "State Bird." Already choice has been made by the organizations of 43 States, and in Alabama, not long ago, the question of which bird should be chosen

created hot discussion. In the end the "yellow-hammer" was decided upon. The fight for its name was led by a women's patriotic organization, members of which called attention to the historic fact that a company of Alabama youths had placed the bird's feathers in their caps and, designating themselves "yellow-hammers," had marched away, singing, to the Civil War.

Other States have chosen representative birds as follows:

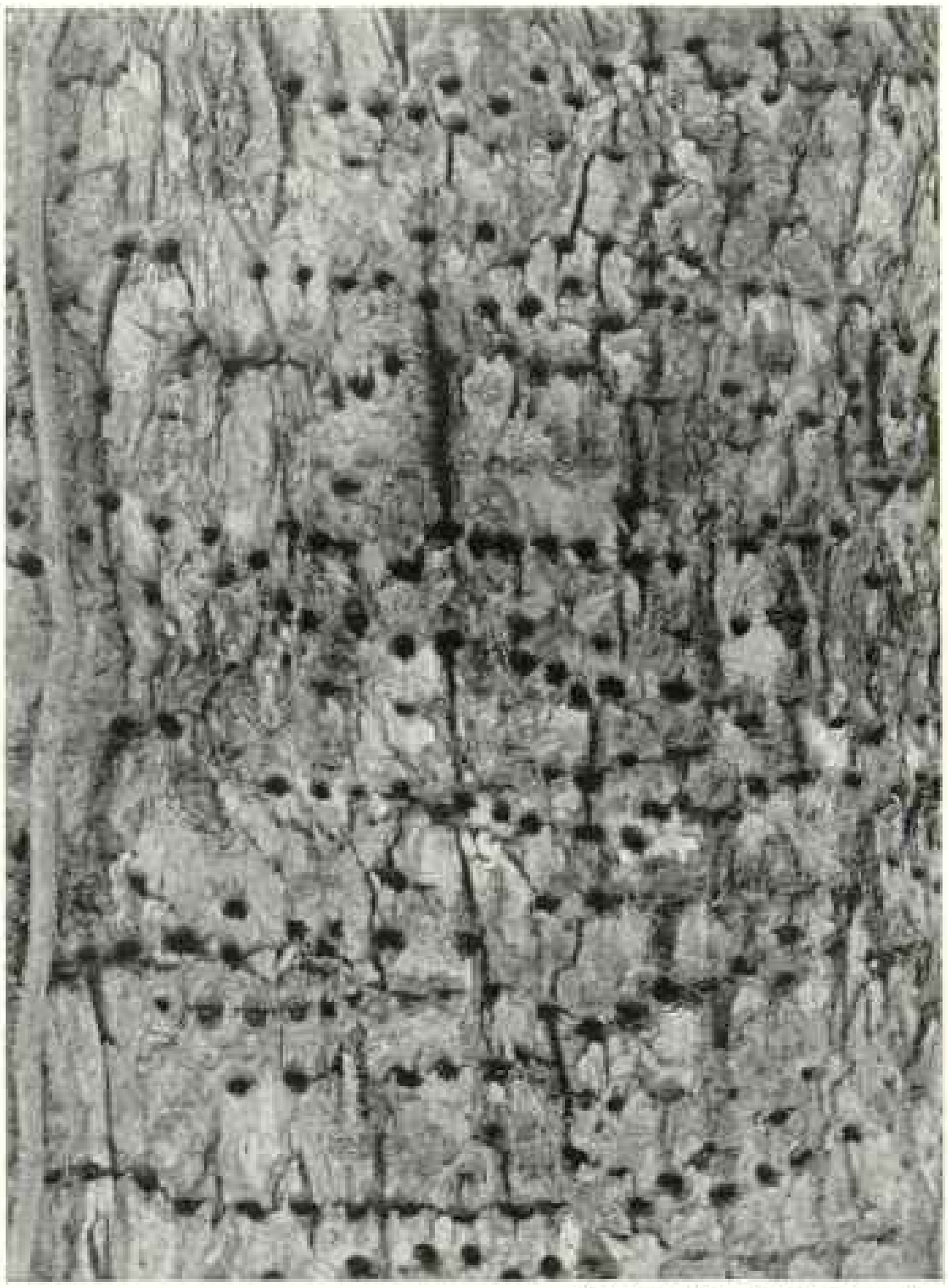
Arizona, the cactus wren.
Arkansas, the mocking bird.
California, the California quail.
Colorado, the lark bunting.
Delaware, the cardinal.
District of Columbia, the wood thrush.
Florida, the mocking bird.
Georgia, the brown thrasher.
Idaho, the mountain bluebird.
Illinois, the cardinal.
Kansas, the western meadowlark.
Kentucky, the cardinal.
Louisiana, the brown pelican.
Maine, the chickadee.
Maryland, the Baltimore oriole.
Michigan, the robin.
Minnesota, the goldfinch.
Mississippi, the mocking bird.
Missouri, the bluebird.
Montana, the western meadowlark.
Nebraska, the western meadowlark.
Nevada, the mountain bluebird.
New Hampshire, the purple finch.
New Mexico, the roadrunner.
New York, the bluebird.
North Carolina, the Carolina chickadee.
North Dakota, the western meadowlark.
Ohio, the house wren.
Oklahoma, the bobwhite.
Oregon, the western meadowlark.
Pennsylvania, the ruffed grouse.
Rhode Island, the bobwhite.
South Carolina, the Carolina wren.
South Dakota, the western meadowlark.
Texas, the western mocking bird.
Utah, the sea gull.
Vermont, the hermit thrush.
Virginia, the robin.
Washington, the willow goldfinch.
West Virginia, the tufted titmouse.
Wisconsin, the robin.
Wyoming, the western meadowlark.

Many people in Massachusetts regard the veery as their State bird, but this has not been officially recognized. In some cases the choice of a bird has been made by legislative or executive authority, but more often by State federations of women's clubs or Audubon societies.

Photograph by Frank N. Irving

MRS. FLICKER CLEANS HOUSE

This female "yellow-hammer" is about to depart from the nesting cavity with excreta from the young held in her bill. She flies away some distance before dropping it. This picture was obtained by means of a blind set up within a few feet of the nest hole.



Photograph by L. W. Brownell

SAPSUCKER HOLES IN THE TRUNK OF AN APPLE TREE

The sapsuckers as a group cut pits in the bark of trees to obtain the sap that exudes and is caught in these depressions. They also eat the many insects that are attracted to the flowing sap.

The red-headed woodpeckers and others of the family will now and then dart down to a road or to the lawn to capture an insect, or to pick up an acorn, but when the flicker drops to the ground he remains there for some time, often until frightened away. In the woods, the field, or the garden, we may come upon him hopping awkwardly through the grass.

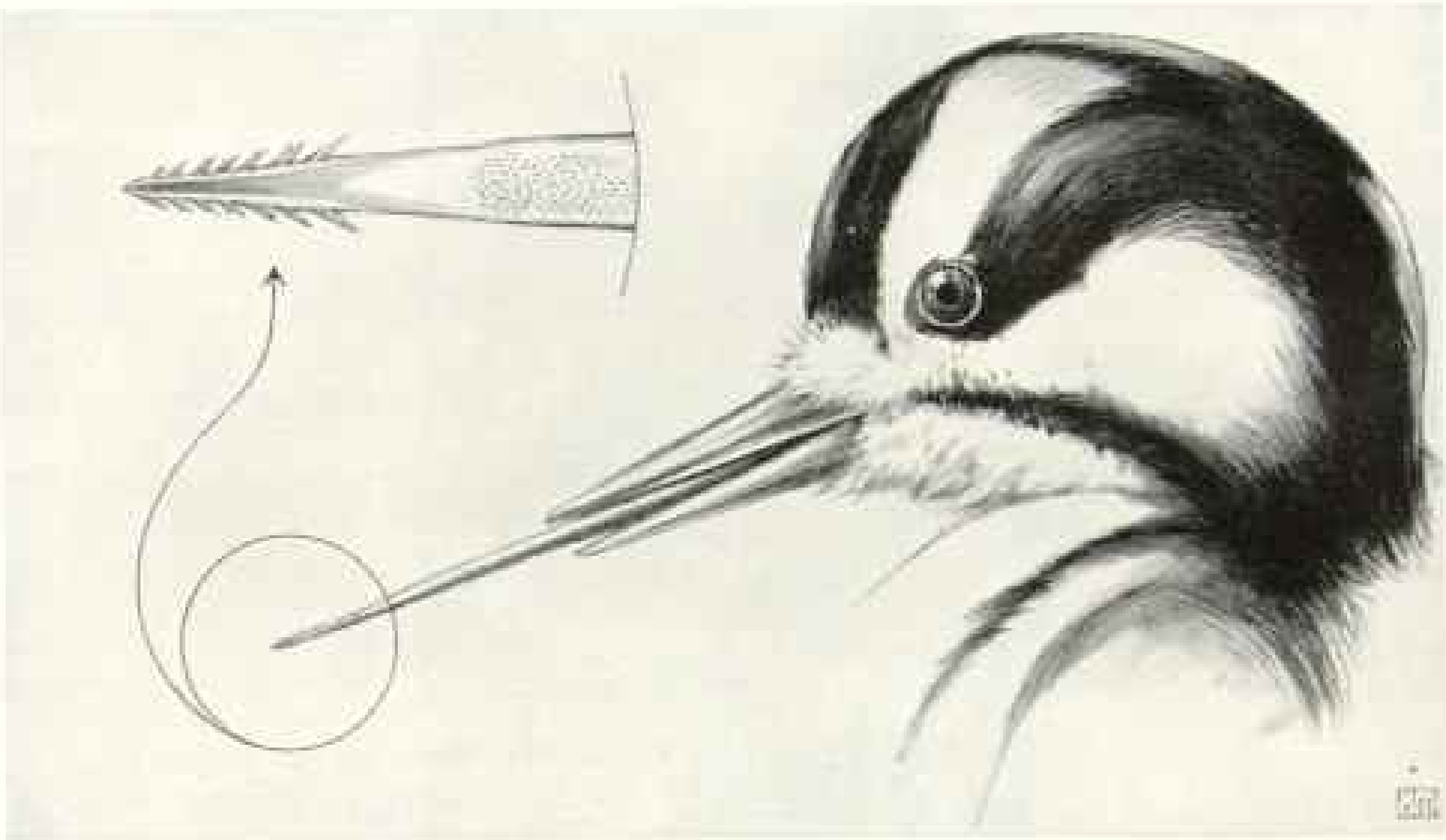
His chief interest at such times is ants, which constitute 50 per cent of his food. He secures them by use of his remarkable tongue, which can be thrust outward two and a half inches or more beyond the end of the bill. His tongue is at all times covered with a sticky saliva, which catches and holds the ants as they rush forward to attack what appears to be a long worm that has crawled across their path or entered their burrow.

This tongue is a very wonderful organ. In the mouth it branches, and the two horns pass up the rear of the skull. On top they meet, and close together the two parts run forward and downward over the right eye to the right nostril, which they enter, and extend onward to the end of the bill.

Flickers often associate with robins, and in the northern part of their range they may accumulate in considerable numbers during the time of migration. A few years ago, while inspecting the city park properties of Baltimore in an effort to decide what should be done there to attract wild birds, I found flickers, robins, and purple grackles to be the most common birds. All of these are ground feeders and all were much in evidence.

In the mating season flickers are very noisy, and their antics, as they dodge about the trees or bow to each other, are most amusing. They keep up a great fuss and produce a greater variety of sounds than does any other bird of my acquaintance. More than 40 different notes have been recognized.

Like other woodpeckers, these birds feed their young by regurgitation. When the little ones are old enough to come to the mouth of the nesting hole to be fed, this operation may often be observed. The parent puts its bill into the mouth of a nestling, and repeatedly stabs downward in a most alarming manner.



Drawing by Hashime Murayama

A WOODPECKER'S TONGUE IS A FORMIDABLE CONCEALED SPEAR

The free end is armed with spines, so that wood-boring larvæ may be impaled as on a spear, and so be drawn from their hidden tunnels in the trunks of trees. This illustration of the hairy woodpecker shows also the spiny tip as seen from above, enlarged four times. The slender bones that support the greatly elongated tongue slide in a sheath that extends around the back of the head and over the crown.

Some flickers have the curious habit of continuing to lay an egg daily if, before the clutch is completed, all the eggs except one are taken. Being careful always to leave one nest egg, Joseph Armfield, of Greensboro, North Carolina, was the cause of one of these birds laying 32 eggs in 35 days. Ordinarily a flicker lays four or five eggs.

Flickers frequently enter barns, unused schoolhouses, or deserted buildings of various kinds. To get in, they will, if necessary, drill entrance holes through the weatherboarding. In the woods on Roanoke Island, North Carolina, there stood, some years ago, a small wooden church which contained several of their holes that had been made through the weatherboards just under the eaves.

There were four hollow wooden pillars supporting the roof of the veranda, and I found in them no less than 10 holes. The flickers had been at work for some time, for I noticed tin tacked here and there on the pillars where the caretaker had covered old openings. Sometimes these birds cut holes through the sides of ice-houses, throw out some of the hard-packed sawdust, and lay their eggs in the cavities thus formed. In a hundred ways, flickers adapt their habits to their environment, and are one of the marked successes of the woodpecker tribe.

FEW LIVING MEN HAVE SEEN AN IVORY-BILLED WOODPECKER

The supreme moment of my life as a bird student came in May, 1932, when in a great primeval forest in northern Louisiana, I saw, for the first time, a living ivory-billed woodpecker. Many ornithologists have sought this bird during the past 40 years, but few have succeeded in their quest. My own expeditions to discover the rare species began in 1891, when I traversed the lonely stretches of the great Dismal Swamp that lies spread across the boundary line of the States of Virginia and North Carolina.

Trips with the ivory-bill especially in mind have since been made in the swamp lands of various Southern States, but all of them ended in disappointment. The opportunity finally came through the kindness of members of the Louisiana State Conservation Commission.

Photograph by Dr. A. A. Allen

THE PILEATED IS SECOND LARGEST OF OUR WOODPECKERS

In size it ranks next to the great ivory-bill, and, like that bird, is an inhabitant of the wilder woodlands, and disappears with too much human encroachment on its haunts. Most birds have strong neck muscles, as the bill must serve in picking up and carrying comparatively weighty objects, having in a way the function of the human hand; but in the woodpeckers the neck muscles are especially developed, as these birds are engaged constantly in the hard labor of digging in wood with their bills. The steady and continued motion with which they work is remarkable. Compensation to absorb the shock of the impact from the repeated heavy blows of the bill is highly perfected, as otherwise there would be definite injury to the brain, the eyes, the ears, and other delicate parts of the head.

A male bird 21 inches in length had been sent to the Commissioner's office. I was invited to New Orleans to go as the guest of the State in search of any living specimens that might be left in the neighborhood of where this one had been shot. With Ernest G. Holt I journeyed south, and a week was spent in search of the birds. We found them, only half a dozen, to be sure, but the satisfaction of seeing even this small number of a species that appears to be on the verge of extinction was great indeed.

The ivory-bill is decidedly larger than the pileated, and this difference in size is very apparent, as we had ample opportunity to observe, when by chance birds of both species fed at the same time on a tall decayed stump within 80 feet of our hiding place.

The note of the ivory-bill is not so loud as that produced by various smaller woodpeckers. It might be described as a nasal *kent* repeated continually as the bird feeds. We heard nothing resembling the *pait, pait, pait*, a monosyllable three times repeated, as described by Audubon a hundred years ago and subsequently mentioned by various other writers.

Its flight, so far as we observed, is not of the typical galloping woodpecker variety, but is more direct, and reminded me of the movements of a crow or a cormorant.

The birds were found feeding on the dead upper limbs of gum trees, or on decayed stumps and snags. Everywhere the forest was filled with evidences of the work of large woodpeckers, for there was hardly a dead tree that had not been stripped of its bark, and subsequently perforated with numerous holes of various sizes and shapes. How much of this was attributable to the ivory-bills could not be determined, since many pileated wood-

peckers were present, and we did not discover any particular difference in the signs left on the trees by the two species.

What caused the disappearance of the ivory-bill woodpecker throughout its former range, from Texas and Illinois to North Carolina and Florida, is a question that may never be answered with entire satisfaction. Many great swamps with large trees still exist where the ivory-bill lived at one time, and where the large pileated is still plentiful. However, it is known that Indians often use the bills as ornaments, and many white people and negroes have killed these birds for food.

In Louisiana we found them not particularly shy, and fully as easy to approach as were the numerous pileated woodpeckers of the territory. Perhaps some unsuspected natural cause has been accountable, in part, for their disappearance—perhaps man alone is to blame.

Photograph by Dr. A. A. Allen

A PILEATED WOODPECKER APPROACHING ITS NESTING TREE

The cock-of-the-woods, as this handsome bird is known in the Northeastern States, like the rest of its kin, nests in holes cut in trees. Its striking wing pattern is clearly pictured.

The Louisiana Department of Conservation has entered heartily into a plan to preserve this little colony of ivory-bills. In future no permits will be issued for collectors to kill them, and a special guard has been employed to range the forest which they inhabit and to protect from gunners these few remaining representatives of a vanishing race.

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 June number, The Society should be notified of your new address not later than May first.*

DOWNY WOODPECKER

(*Dryobates pubescens*)

The downy woodpecker, in its various races, inhabits most of the timbered country of North America, from Alaska to Florida. It lives in more or less open woodlands and is a familiar species that comes regularly to orchards, wood lots, parks, and the shade trees of our dooryards.

When approached, instead of flying away, it often works around to the other side of the tree or limb up which it may be climbing. Remain quiet for a few minutes and it will peep around to see if you are still there and may then continue its search for food, or, if alarmed, may fly to a near-by tree. It is one of our most useful woodpeckers, eating the larvæ of bark and wood-boring beetles, insect eggs and ants.

In spring the downy woodpecker mates and chisels out a nest cavity in a dead tree where the wood is not too hard. In this hole from three to six glossy white eggs are laid with no other nesting material than a few chips left from the work of excavation.

The old nest holes are used as sleeping quarters, but the birds are solitary for most of the year and must therefore often dig winter nests in which to sleep, as there are not enough old nest holes to go around. The location of these and of the nest holes may sometimes be detected by seeing bits of wood lying on the ground near the selected tree.

The ordinary call of the downy is low and rather harsh. In addition it utters a rattling call.

The northern downy woodpecker (*Dryobates pubescens medianus*) ranges from southeastern Alberta to Newfoundland and throughout the country southward to eastern Kansas, Tennessee, and Virginia.

Gairdner's woodpecker (*D. p. gairdneri*), also illustrated on the plate, is a form of the humid coastal area from southern British Columbia to northern California. It is darker below than the other forms of downy woodpeckers and has little white on the wings. It is found in willows and other timber along the streams and comes also into orchards.

There are four other geographic races of the downy in addition to the two just mentioned, differing slightly in size and color, that are found within its range.

HAIRY WOODPECKER

(*Dryobates villosus*)

The hairy woodpecker closely resembles the downy in appearance, but is larger, some of its geographical races being as many as three inches longer than its smaller relative. When in doubt as to which of the two species you are watching, focus your attention on the tail when it is spread, as is often the case when feeding. The outer white tail feathers of the downy bear black spots; those of the hairy lack such markings. I have never found the hairy as abundant as the downy. Furthermore, it is more of a woodland bird and hence is less often seen than is the downy which so frequently comes to the trees about houses.

BIRDS THAT BEFRIEND THE FARMER

Hairy woodpeckers are destroyers of insects, many of which are injurious to mankind, and wise is the farmer or fruit-grower who never kills them through the mistaken belief that their pecking is detrimental to his trees. Much of the food is composed of wood-boring larvæ that the woodpecker secures by drilling holes into the trunks of trees. The grubs are drawn from their tunnels by means of the extensible barb-tipped tongue, which can reach far beyond the end of the bill and is a remarkable organ.

The hairy woodpecker builds its nest in holes cut in tree trunks, often on the underside of limbs. The nests may be found in upland forests, along the borders of swamp lands, in the cottonwood groves of the West, or in the chinaberry trees of southern plantations. From three to five glossy white eggs ordinarily make a set and one brood is the usual number for the season. Fourteen days of incubation are required for the eggs to hatch.

These birds are widespread throughout North America, where ornithologists have recognized no less than 21 climatic varieties or geographical races.

Harris's woodpecker (*D. v. harrisi*) is found in the humid coast country of southern British Columbia and northern California. The white spots on the wings are much less noticeable than those of the eastern form, and the feathers of the throat, breast, and belly are brownish instead of white.

The figures are approximately one-third natural size

NORTHERN DOWNY WOODPECKER
Male, left; female, right.

HAIRY WOODPECKER
Male

GAIRDNER'S WOODPECKER
Male

HARRIS'S WOODPECKER
Male

Approximately one-third natural size

TEXAS WOODPECKER
Male, right; female, left

RED-COCKADED WOODPECKER
Male

NUTTALL'S WOODPECKER
Male

ARIZONA WOODPECKER
Male

TEXAS WOODPECKER

(*Dryobates scalaris symplectus*)

This particular form of the ladder-backed woodpecker is found in southeastern Colorado, central and western Texas, and adjacent Mexico.

Throughout a large portion of Texas it is by far the most abundant woodpecker, and, like the downy of the Northeastern States, is the best-known of its family in the region it chiefly inhabits. It frequents the post-oak and chaparral country, and where trees are scarce it perches in bushes and feeds about the cacti.

It comes into the towns and into parks or yards with trees, there to be seen diligently at work gathering its food. Living, as it does, mainly in regions where large trees are absent, one need not be surprised to find its nest within a few feet of the ground. The hole is often excavated under the curve of a limb on an oak or mesquite tree.

Fifteen races of this species are known, of which three others occur in the United States and Baja California.

RED-COCKADED WOODPECKER

(*Dryobates borealis*)

This bird is a resident in the yellow-pine country of the South Atlantic and Gulf States, and northward to southeastern Virginia, Tennessee, and southern Missouri.

The large white cheek patch, untraversed by any suggestion of a black stripe, at once identifies it as not being a downy or a hairy woodpecker, both more or less common in the red-cockaded's range.

This is a bird of the open pine woods, and is rarely seen except among pine trees and seldom alone. All through the winter months I have found them, sometimes four or five, or even six, feeding together.

When feeding they call frequently, in a sharp and strident voice that has a very noticeable carrying power. Often they are seen in the tops of the tallest long-leaf pines, industriously searching for food on the limbs or the terminal twigs. When thus occupied they do not mind hanging head downward if the exigencies of the moment require such a position.

The nest is made in a large living pine tree, the heart of which is more or less decayed. The white eggs range in number from three to five.

NUTTALL'S WOODPECKER

(*Dryobates nuttalli*)

Nuttall's woodpecker is found from southern Oregon to Baja California, but occurs only west of the southern Cascades and the Sierra Nevadas. It is about the size of the Texas woodpecker and, except for the little black area on the forepart of the head and the somewhat lighter breast, varies little in appearance from that bird.

It is a noisy, naturally suspicious bird and is very likely to announce its presence upon seeing a visitor approaching the tree which it occupies. In an effort to refer descriptively to its notes, one Nature student mentions the "rattling staccato cry."

This woodpecker nests in dead or in living trees of many varieties, and digs a hole from 3 to 60 feet above the ground. The male helps incubate the four to six white eggs, and is very solicitous about them and the young, which appear after a two weeks' period of incubation. Nuttall's woodpecker is usually found in openly wooded areas or groves, often where trees are of small size.

ARIZONA WOODPECKER

(*Dryobates arizonae arizonae*)

The Arizona woodpecker ranges throughout the mountains of southeastern Arizona and southwestern New Mexico and across the Mexican border in suitable mountain regions as far south as Durango.

It is a bird of the mountains, being found in foothill areas in rocky canyons or again in more open localities in groves or regions of scattered trees. It is particularly partial to oaks. In summer it is widely spread, but on the approach of winter it leaves the higher altitudes for lower levels. Less common than most species of the family, its habits are not so well known.

It is quiet and inconspicuous, climbing over tree trunks like other small woodpeckers in its search for food. Though it eats many insects, it can thrive well on a diet composed largely of acorns.

Occasionally these birds are found in bands, but more often are encountered alone and are shy and retiring.

The nests are placed in holes cut in dead trunks or branches and the white eggs usually number three or four in a set.

An allied race is found in southwestern Mexico.

SAPSUCKER

(Sphyrapicus varius)

The sapsucker as a species ranges throughout the wooded regions from Alaska to Panama. The yellow-bellied sapsuckers (*Sphyrapicus varius varius*), a race illustrated on the opposite plate, is the most migratory of all our woodpeckers. In the breeding season it occupies many localities from Alberta east to Cape Breton Island, and south to central Missouri and northern Ohio; also from western Massachusetts to the mountains of North Carolina. In autumn this bird leaves Canada and spreads over the eastern United States from Iowa and New England southward to the Gulf of Mexico. Some even travel to Cuba, Jamaica, Haiti, Mexico, and as far as Panama.

As implied by the name, birds of this group are fond of sap. To secure this, much time is spent in pecking holes through the bark of trees. Often these are small, round punctures, and again the bark is removed in little squares, sometimes half an inch or more across. The holes are made in rows about the trunks or the larger limbs.

When the soft cambium layer of the bark is reached by the industriously working bird, it is eaten as it is picked from the hole. As drops of sap accumulate they are sucked up and the hole is wiped out by the tongue, which is tipped with a little brush instead of the dartlike point that terminates this organ in the typical woodpecker. They also eat many of the insects attracted by the exuding liquid.

The nests of sapsuckers are dug in living or dead trees and contain four to seven white eggs.

The manner in which the amazingly rapid tattoo beat of the courting sapsucker comes to an end quickly acquaints the experienced ear with the fact that one of these birds is abroad in the land.

The extremely handsome northern red-breasted sapsucker (*S. v. ruber*), found in summer from southern Alaska to western Oregon, is illustrated on the plate.

The southern red-breasted sapsucker (*S. v. daggetti*), a close relative, breeds in the mountain country of California.

Another race, the red-naped sapsucker (*S. v. nuchalis*), occurs from British Columbia and northeastern California to Wyoming, New Mexico, and west Texas.

WILLIAMSON'S SAPSUCKER

(Sphyrapicus thyroideus)

This handsome species ranges in the western mountains from southern British Columbia and Montana to central Arizona and New Mexico. In winter it migrates south as far as northern Baja California, Texas, and Jalisco, in Mexico.

In the case of most North American woodpeckers, the sexes so closely resemble each other that even when there is a difference in their plumage the careful observer has little difficulty in determining that they are of the same species. The male and the female of Williamson's sapsucker are so dissimilar in appearance that, when the bird was first discovered, for many years they were supposed to be different species.

The female was described by Cassin in 1851 and became known as the brown-headed woodpecker. In 1857 Newberry described the male and believed it to be a distinct form. It was not until 1873 that Henshaw discovered the true relationship of these supposedly separate species.

PINE SAP CONSTITUTES THE FAVORITE FOOD OF THIS SPECIES

Like other sapsuckers, this bird pierces the bark of trees for much of its food. However, it prefers the sap of pines and is inclined to neglect the deciduous trees of the regions it inhabits. It enlarges its area of feeding pits steadily, so that on the trunk of a yellow pine these may occupy a space a foot or more square.

The call note is low and complaining, being somewhat stronger than that of the other sapsuckers. The drum of this sapsucker also resembles that of the other species. The nest may be in a dead pine or a living aspen; the white eggs number from four to six.

The birds sometimes nest at high altitudes, even to 10,000 feet. The site may be in dense or open woodland and at times the sapsuckers may have hole-nesting wrens and swallows as neighbors in other cavities in the same tree trunk. The young resemble the female when they first leave the nest, the males changing later to the brighter plumage.

Another race, Natalie's sapsucker (*S. t. nataliae*), breeds in the Rocky Mountain region from Montana to New Mexico.

Approximately one-third natural size

RED-BREASTED SAPSUCKER
Male

YELLOW-BELLIED SAPSUCKER
Male, above; female, below

WILLIAMSON'S SAPSUCKER
Male, left; female, right

 Approximately one-third natural size

WHITE-HEADED WOODPECKER
Male

AMERICAN THREE-TOED WOODPECKER
Male

ARCTIC THREE-TOED WOODPECKER
Male, above; female, below

WHITE-HEADED WOODPECKER

(*Dryobates albolarvatus*)

The range of the northern white-headed woodpecker (*D. a. albolarvatus*) extends from Washington through the Cascades and Sierra Nevadas to Kern County, California; also in western Nevada and Idaho. A few have been found across the Canadian line in the Province of British Columbia.

Another geographic race, the southern white-headed woodpecker (*D. a. gravirostris*), ranges through the mountains of San Gabriel, San Bernardino, San Jacinto, Santa Rosa, and Cuyamaca, in southern California.

This is another of the numerous varieties of woodpeckers that inhabit the States bordering on the Pacific Ocean. Incidentally it is one of the easiest to describe. It is "a black woodpecker with white head and a white wing patch." Its plumage bears no longitudinal bars and no spots. All except three of our North American woodpeckers are characterized by such markings, either in the adult or in the immature stage of plumage. There is a red stripe across the nape of the male, but at a distance this is not distinguishable, and the female is without this decorative marking.

This species makes its home among the coniferous trees of the mountains. The bark of the pines is very rough, with cracks and fissures checkering its surface. Furthermore, it consists of many layers, the outer scales of which warp, and thus make fine hiding places for spiders and small insects. To secure these the woodpecker pries off fragments of bark, using his bill as a crowbar rather than as a pick, and his gleanings are abundant. The birds are a protection to the forests, for in many places their numbers are legion and the quantity of injurious beetles they consume must be truly enormous.

The nest is made either in a dead or a living tree. In California I have watched them visiting their nests that had been dug in the bark of sequoia trees. As the bark of these ancient forest giants is from one to two feet thick, it serves a useful purpose for the woodpeckers when the season comes to assume their domestic duties. Three to seven white eggs are laid.

ARCTIC THREE-TOED WOODPECKER

(*Picoïdes arcticus*)

This species is found somewhat regularly in northern California, Montana, Wyoming, Minnesota, Michigan, New York, Vermont, New Hampshire, and Maine; north to northern Quebec, Mackenzie, and central Alaska.

Here is a bird that loves the evergreen wilderness and rarely wanders far from it. Deciduous trees are not to its liking. Along the northern border of our States and in Canada, when floods or fires kill the coniferous trees, look for the three-toed woodpeckers. From far and near they gather to feed upon the wood-borers that assail the lifeless trees. Very quietly, with only an occasional call, they go about the business of collecting food. Stripping off the bark, they seize the grubs that are lurking beneath it and explore the burrows of those that have entered the wood.

This bird excavates its nest in either dead or living coniferous trees and four or five white eggs are deposited.

AMERICAN THREE-TOED WOODPECKER

(*Picoïdes tridactylus bacatus*)

This bird ranges from northern Labrador and Mackenzie to our northern tier of States from Minnesota eastward. It measures from eight to nine and three-quarters inches in length, thus being about one inch shorter than the species just discussed. The best way to distinguish it, however, is to look for the pattern of numerous bars of white that traverse its back, and to remember that the back of the Arctic three-toed is solid black.

In general habits the two birds are much alike, both feeding largely on an insect diet, but eating also nuts, acorns, wild fruit, and the cambium layer under the bark of trees. The nesting habits are like those of the related species.

There are two other geographic races of *Picoïdes tridactylus* in the United States, the alpine three-toed woodpecker (*P. t. dorsalis*), ranging from Montana and Wyoming to Arizona and New Mexico, and the Alaska three-toed woodpecker (*P. t. fasciatus*), which inhabits forests from Oregon and Montana northward to Alaska and western Mackenzie.

RED-HEADED WOODPECKER

(*Melanerpes erythrocephalus*)

The range of the red-head extends from southeastern British Columbia, Ontario, and New York to New Mexico, central Texas, the Gulf coast, and southern Florida. It is irregularly migratory in the north.

These woodpeckers are very handsome birds and are so conspicuous in their red, white, and bluish-black attire that they are known to nearly everyone throughout much of North America. In many sections of the Eastern, Southern, and Middle Western States they are abundant. One sees them along fence rows, or lines of telephone posts, or clinging to the sides of trees. They come to the lawn, the orchard, the wood lot, or to isolated trees in the fields, preferring at all times open, or semi-open, country. Often they are very noisy and especially in spring and summer chase each other about as if bent on fierce combat.

They feed on acorns and beechnuts, also on a great variety of fruits, and consume large numbers of insects, many of which are harmful to the interests of mankind. Fortunately their value is legally recognized, and, like all our woodpeckers, they are everywhere protected by State laws.

The nests are made in tall stumps or dead trees. The white eggs are usually four or five in number. The young upon leaving the nest appears with a brownish-gray head and neck, and it is not until the molt of the next spring that the red feathers on the head appear. Naturalists visiting this country in colonial days reported the young red-head as a distinct species.

CALIFORNIA WOODPECKER

(*Balanosphyra formicivora bairdi*)

The species to which the California woodpecker belongs (*Balanosphyra formicivora*) is distributed from southern Texas, Arizona, and California south into western Panama. The California woodpecker ranges over much of the Pacific coast region from southern Oregon to southern California.

A few miles from Santa Barbara I came upon an oak tree which California woodpeckers had selected as a storehouse for acorns. The tree was forked and beginning two feet above the point where the branches separated, and thence upward for more than fifteen feet, the bark was everywhere studded with acorns. Holes had been pecked and the acorns driven in point first. Every acorn fitted its hole perfectly and had been pounded home by the bill of the bird. So tightly did they fit their cavities that I found it impossible to remove one, except by cutting it with my knife, or by removing some of the surrounding bark. Many thousands have been found in the trunk of a single tree. At times this curious storing habit goes astray and the birds place small stones in the holes instead of nuts.

Half the food of this bird consists of acorns. It also eats flies, beetles, and insects picked from the bark of trees, or seized, flycatcher fashion, while on the wing.

California woodpeckers have eyes that are noticeable because they are generally creamy white. The nest is in a hole and the four or five eggs are white. There are four additional geographic races within our limits.

LEWIS'S WOODPECKER

(*Asyndesmus lewis*)

This species ranges from southern British Columbia and Alberta to New Mexico, and from the mountains of California to South Dakota and Kansas.

This remarkable bird was one of the ornithological discoveries made during the exploring expedition to the Northwest by Captain Meriwether Lewis and Lieutenant Clark in the years 1804-1806.

This bird does not excavate in dead wood for its insect food, but catches it in the air or from the bark and leaves of trees, or descends to the ground for this purpose. It eats many acorns and some fruit, such as wild strawberries, and now and then cherries, pears, and apples. Like the California woodpecker, this species at times stores acorns and other food for future use.

Other woodpeckers have a bounding flight, but the present species flies as directly as a crow, a peculiarity that distinguishes it at a glance from any of its kin. At times the birds are found in bands and their handsome colors may then be appreciated to the utmost.

The nest is placed in holes excavated for the purpose, as usual, and at times is very high above the ground. The white eggs number from five to nine.

Slightly less than one-third natural size

RED-HEADED WOODPECKER
Adult, right, and flying; immature, left

CALIFORNIA WOODPECKER
Male

LEWIS'S WOODPECKER
Male

Slightly more than one-fourth natural size

RED-SHAFTED FLICKER (UPPER)
Male, left; female, right

YELLOW-SHAFTED FLICKER (LOWER)
Male, right; female flying

RED-SHAFTED FLICKER

(*Colaptes cafer*)

The red-shafted flicker dwells in that vast region lying westward from South Dakota and western Texas and terminating only with the shores of the Pacific Ocean. It is not found in quite all sections of this territory, but in thousands of localities its rolling drumbeat and clamorous calls are known to every boy of the countryside. The flashes of the red feathers which line the wings and the underside of the tail are among the well-known bits of color that catch the eye as one travels through fields and forests or by tree-bordered streams.

Few birds so well adapt themselves to every environment. Not only are they found in regions where man is seldom seen, but they dwell in the towns, and collect ants and other insects on the lawn, the college campus, and in the open sections of parks. Although more or less common in the semi-desert regions in winter, they usually are not found in such places during the heat of summer. They inhabit the mountains to the tree line.

As a rule their nesting cavities are dug in dead trees, but sometimes live ones are selected for this purpose. They will use bird boxes, and if they find the entrance hole too small for their liking they will enlarge it to suit their needs. At times they cut holes through the weatherboards of a house and lay their eggs on the horizontal beam beneath the opening. They have also been known to dig burrows for their nests in banks of earth after the manner pursued by bank swallows and kingfishers.

Here and there we find a species of bird that has the habit of beginning to incubate as soon as the first egg is laid. This flicker is one of them. Bendire found a nest in Oregon which, he stated, contained five fresh eggs, two that were pipped, and three newly hatched young. Ten seems to be the greatest number of eggs laid. The clutch ordinarily consists of six or eight.

Four geographical races of this flicker are recognized. There is not space here to discuss these in detail. In fact, the distinguishing differences in size and color are so slight that an observer in the field would hardly be able to detect them, as they may be recognized only with the birds in the hand. All are red-shafted flickers.

YELLOW-SHAFTED FLICKER

(*Colaptes auratus*)

Among the dozen best-known birds of eastern United States is the flicker widely known under the name of "yellow-hammer." Its rapidly repeated calls in spring and summer are heard on all sides, whether it be in a forest, orchard, park, or among trees bordering the highway. Where little disturbed and accustomed to see people pass to and fro, this bird loses much of its natural suspicion of man. Hence in towns one may usually approach much closer to a flicker than in the country districts.

Near my home in New York City, there is a college campus containing a few dozen large trees and numerous small trees and shrubs. Two pairs of flickers have made this little grove and the surrounding lawn their home for several years. The past summer I again saw them when the young of the two families had left their nests and were being fed on the ground. They would allow me to come within fifteen or twenty feet before exhibiting any concern at my presence. Occasionally one would pick at the ground in a tentative, inquiring manner, but for the most part they hopped about after their parents, begging for food in quarrelsome, fault-finding tones.

BIRDS PAID LITTLE ATTENTION TO TRAFFIC

One spring I visited frequently the scene of operations of a pair of these campus flickers while engaged in excavating their nest in a dead tree from which the upper two-thirds had been broken. The stub stood on the side of a slope about sixty yards from the Hall of Fame, along the open corridor of which many people wandered daily. Within forty feet of the nesting site was a road over which automobiles and motor trucks roared almost continually. The flickers dug their nest in the side of the tree facing both the road and the Hall of Fame, apparently oblivious to the crowds and the noise, and I am glad to say that in time they successfully brought off their brood.

The northern race of this species (*C. a. luteus*) breeds in Alaska, through much of southern Canada, and south to the Gulf of Mexico and central Texas. The southern race (*C. a. auratus*) breeds from North Carolina and southeastern Kansas to the Gulf of Mexico and central Texas.

RED-BELLIED WOODPECKER

(*Centurus carolinus*)

This species is confined to eastern United States and lower Ontario. Its northwestern limits are southern South Dakota and southeastern Minnesota.

Among woodlands of deciduous trees in the Southern States the red-bellied woodpecker is a common bird. Indeed, in the swamp lands bordering some of the rivers in the Carolinas and in Mississippi I have found them so abundant that they outnumbered all other kinds of woodpeckers two to one.

They are sometimes called "zebra woodpeckers" or "chads," the latter name evidently derived from one of the common call-notes. Many people merely call them "sapsuckers," as they do the downy and all other small woodpeckers. Although possessed of a certain habitual wariness, they do not hesitate to approach the home of man if they have any special reason for venturing from the forest.

This bird possesses a strong, musky odor, more pronounced than that of other woodpeckers. Also this body aroma is of a character different from any other bird with which I am acquainted.

The nesting hole is excavated in dead trees. The site is sometimes at considerable distance from the ground. Many years ago I climbed a living long-leaf pine and took a clutch of four red-bellied woodpecker's eggs from a nest that had been made by a red-cockaded woodpecker. The pair of feathered intruders enlarged the entrance hole to enable them to pass through the doorway made by the smaller birds.

GOLDEN-FRONTED WOODPECKER

(*Centurus aurifrons*)

In the United States we find this bird only in Texas, but it ranges southward to the Valley of Mexico.

In the parks and among the shade trees of San Antonio, Texas, I have found the golden-fronted woodpecker as common as the red-headed woodpecker is in the streets of Gainesville, Florida. In general appearance and in movements, the golden-fronted closely resembles the red-bellied woodpecker, to which it is in fact closely related. It nests in trees, posts, and telephone poles.

GILDED FLICKER

(*Colaptes chrysoides*)

This flicker inhabits southern Arizona, southeastern California, northeastern Baja California, and Sonora.

Take an eastern flicker and transfer the feathers of the throat and top of head and nape, then give him a red malar stripe instead of a black one, and you will have a gilded flicker. I found them very common in all the country around Tucson, Arizona, during the month of November. Especially were they numerous between the town and the mountains lying to the northward, where the giant cactus grows in such profusion. Among the foothills and along the dry stream beds where trees were growing, the bird was often seen, but its favorite haunts were the scattered groves of the tree cactus. They eat its fruit and capture insects drawn to its flowers. In its trunk many of them build nests and lay their glossy white eggs.

Three geographical races are recognized: Mearn's gilded flicker (*C. c. mearnsi*), the San Fernando flicker (*C. c. brunnescens*), and the Cape gilded flicker (*C. c. chrysoides*). This last-named bird inhabits a rather restricted region in Baja California from Cape San Lucas northward for about 425 miles.

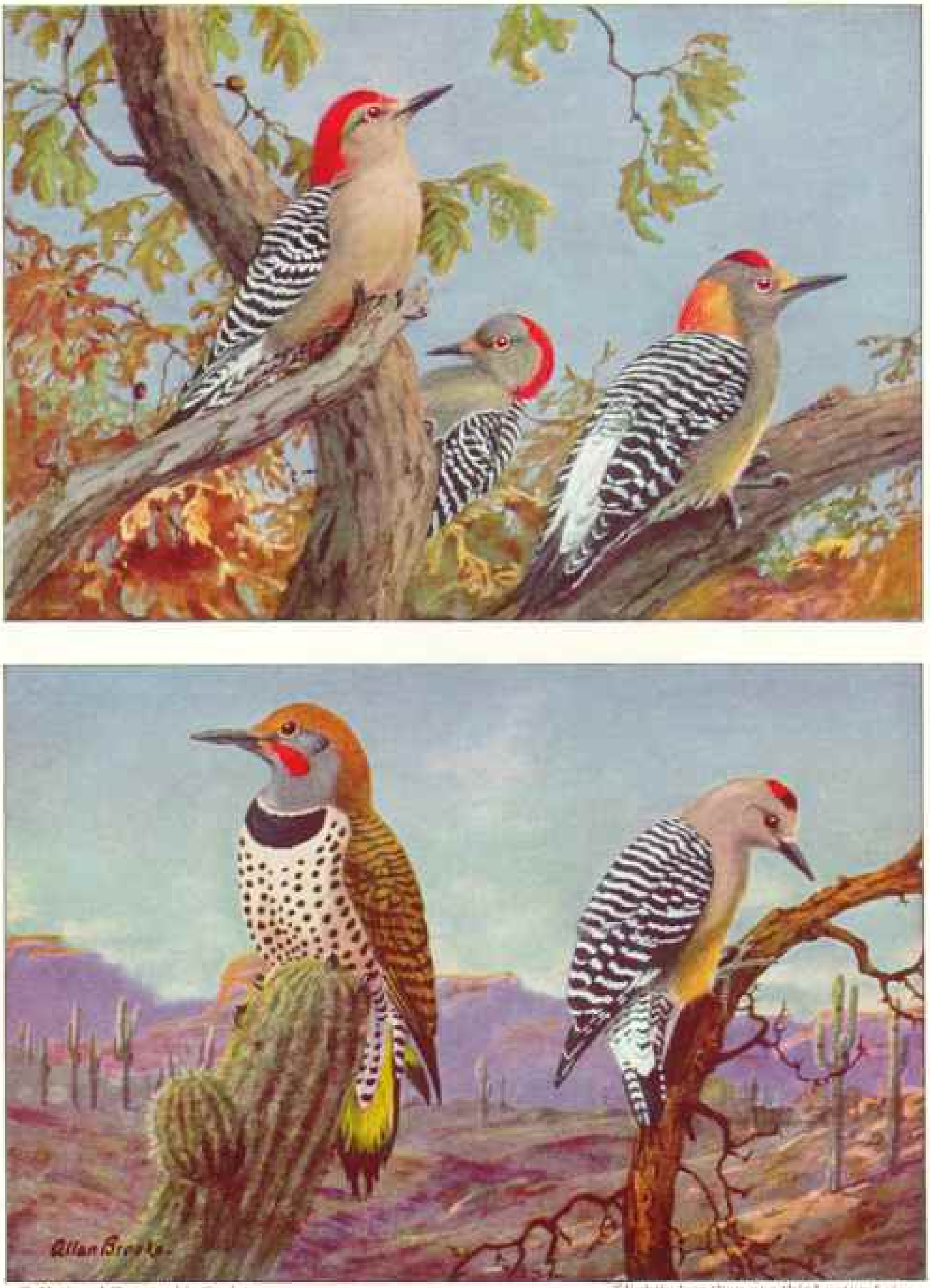
GILA WOODPECKER

(*Centurus uropygialis*)

The Gila woodpecker inhabits southeastern California and eastward to southwestern New Mexico; through western Mexico to Jalisco.

This woodpecker often comes to ranch houses and Indian pueblos for scraps of meat, kernels of corn, or other titbits of food which are to be found in such places. It nests often in the giant cactus trees. When the nesting hole is dug, the juice of the plant exudes, and, upon drying, forms a hard, smooth lining for the entire cavity.

Three races of this species are known. They are the Cardón woodpecker (*C. u. cardonensis*), which ranges throughout the northern half of Baja California; Brewster's woodpecker (*C. u. brewsteri*), which ranges a limited territory in southern Baja California, and the true Gila woodpecker of the southwestern United States and Mexico.



Slightly less than one-third natural size

RED-BELLIED WOODPECKER
Male, left; female, right

GILDED FLICKER
Male

GOLDEN-FRONTED WOODPECKER
Male

GILA WOODPECKER
Male

Less than one-fourth natural size

IVORY-BILLED WOODPECKER (UPPER)
Male, left; female, right

NORTHERN PILEATED WOODPECKER (LOWER)
Male, left; female, right

PILEATED WOODPECKER

(Ceophloeus pileatus)

This bird is found throughout a great part of temperate North America from Mackenzie and Nova Scotia to California and Florida. It is the largest of all the woodpeckers commonly seen in the United States, being almost the size of the common crow, although individuals vary considerably. Some are 15 inches long, while others attain a length of fully 19 inches. From tip to tip of wings, the span varies from 25 to 30 inches. It is a great black bird with much white flashing conspicuously on the wings, as it flies through the heavy forest or swamp lands, which it chiefly inhabits. Sometimes it comes into the outskirts of quiet towns if large forest areas are situated near them.

Pileated woodpeckers eat many ants, especially the carpenter ants which attack trees, beginning their burrows at the base and working upward; also such other insects as they may happen to come upon from time to time. Wild fruit and berries attract them and they are particularly fond of wild cherries. However, they rarely, if ever, disturb cultivated fruit.

This bird mates in the early spring, and the arduous task of excavating a nest is soon begun. In some of the Southern States, particularly in northern Louisiana, I have noted a great many of their holes in living trees, gums seeming to be the ones generally chosen. Often, apparently the same pair returns to a favorite nesting tree year after year and each season makes a new nest. I have counted as many as four of their holes in one living gum, and once I saw six of them in a dead tree. The nest is excavated to a depth of from one and one-half feet to three feet or more, and the eggs vary from three to five in number.

The pileated woodpecker has been separated into four geographical races. The northern pileated (*C. p. abieticola*) inhabits Mackenzie, New Brunswick, and Nova Scotia, and southward to Pennsylvania and Indiana; the southern pileated (*C. p. pileatus*) ranges from southeastern Pennsylvania, Illinois, and Oklahoma to northern Florida and central Texas; the Florida pileated (*C. p. floridanus*) is found only in Florida from Orange County southward; the western pileated (*C. p. picinus*) ranges from southern British Columbia into California and Idaho.

IVORY-BILLED WOODPECKER

(Campephilus principalis)

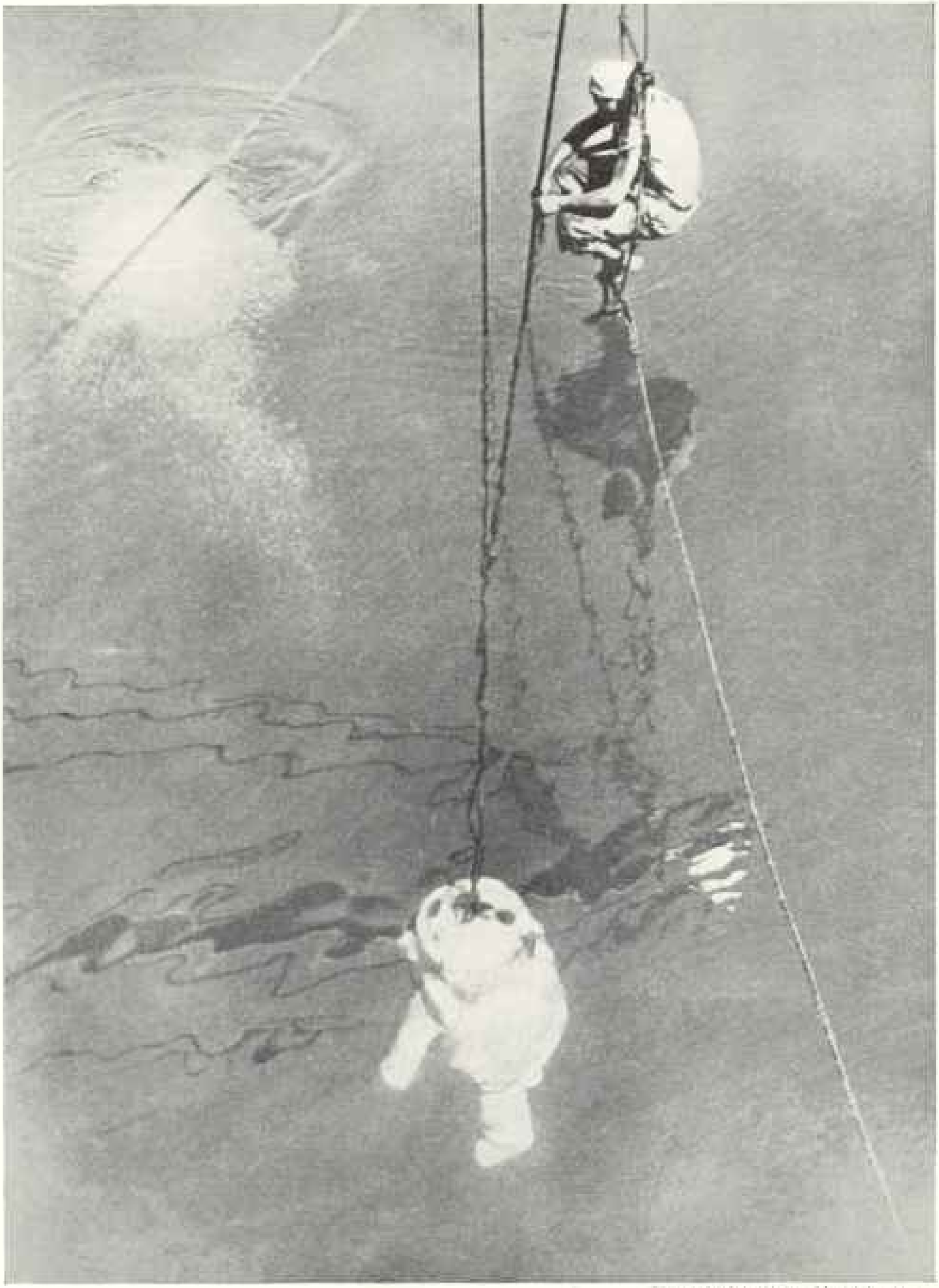
This magnificent bird is by far the largest of all our woodpeckers, being from 19 to 21 inches in length, with an expanse of wings of from 30 to 33 inches. It is today one of the very rarest birds on the continent. Possibly the names of all living ornithologists who have ever seen one could be counted on the fingers of two hands.

So far as is known, its range was formerly confined to the Southern States. Its territory may be described as extending from southern Illinois and eastern North Carolina southward to eastern Texas and southern Florida. There are, I believe, no records of its ever appearing in the southern mountains. It prefers the low country.

From nearly all this vast domain it has disappeared. We know of a very limited number in Louisiana, and there still are some in Florida. Possibly a few may still lurk in the larger swamp areas of northeastern Texas, in Arkansas, southern Missouri, and southern Mississippi, although there have been no well substantiated records of their having been seen in these States for a number of years.

Ivory-bills are said to dig holes for their nests at a great distance from the ground. I have never seen but two of these, and I had to take the word of my native guide for the statement that the holes he showed me were made by this species. He undoubtedly knew well the difference between the pileated and the ivory-bill, and went to much inconvenience to take me through an unpleasant county of southwestern Florida to show me the sites where he had seen the birds occupying their nests. One nest was in the tall stump of what had been a great tree. The hole I judged to be 45 feet from the ground. The other was in a living cypress at an elevation that must have been fully 70 feet in the air. From three to five eggs constitute a set and but one brood is reared each season. The eggs are pure china-white in color and are so glossy as to appear enameled.

The reduction in abundance in this species is due most probably to persecution by man, as the species has been shot relentlessly without particular cause except curiosity and a desire for the feathers or beaks.



Photograph by Acme Newspictures

LIKE SOME STRANGE WHITE SEA MONSTER, A DIVER ASCENDS FROM THE WRECK OF THE "EGYPT"

This ill-fated British liner, carrying many millions of dollars' worth of bullion, sank in 396 feet of water off the coast of France, not far from Brest, in 1922. The lines shown are attached to the salvage vessel, *Artiglio II.*

MEN AND GOLD

By Frederick Simpich

Author of "Ontario, Next Door," "Smoke Over Alabama," "So By Texas," etc., etc., in the National Geographic Magazine

GOLD coins brought from the wreck by Robinson Crusoe were worthless to him. On his island, nobody was in sight from whom he might buy.

"I would give it all," Defoe made Crusoe say, "for sixpenny-worth of turnip and carrot seed out of England, or for a handful of pease and beans and a bottle of ink."

But when Crusoe was rescued and could mingle again with other men, then his gold would buy anything he wanted. What a simple lesson in the power of gold!

"Over a man, gold has greater power than ten thousand arguments," wrote Euripides. Along with his religion and love of family, man's quest for gold and his use of it as money have been prime forces in civilization. It has been the lure that led men to discovery and to conquest. Throughout history gold has been a fruitful cause of war.

Lust for gold, and the power it wields, recast Old World geography in the plundering raids of Alexander the Great. It brought changes to Europe's map in the Punic Wars, and in the campaigns of Marius, Pompey, Paulus Æmilius, and Julius Cæsar.

Leaping the Atlantic in the wake of Columbus, it was again the gold fever which led the conquering hordes on those long explorations which not only wrecked and robbed the Aztec and Inca empires and slew or enslaved whole tribes of Indians, but laid the first lines of what is now the map of the Western Hemisphere.*

Yet a third geographic chapter in man's world-wide gold quest dawned when the trail wove back and forth across the Pacific, from California to Australia, back to Alaska, then away off to South Africa. Always, on the cultural map, the gold-seeker left his mark. Consider California. The Forty-niners' rush to its rich placers started that western migration which was to build railways and new cities, found industries, and cover the West with farms, sawmills, and schoolhouses. Gold strikes, in the same way, swelled the human tide to Australia and hastened its settlement and growth.

When gold mines of fabulous wealth opened in South Africa, they put the Dark Continent in the world's eye and led, indirectly, to the Boer War. Cripple Creek, the Klondike, northern Ontario, now the greatest gold area in the Western World, all have had their profound effects on human progress.†

GOLD AS A YARDSTICK OF TRADE

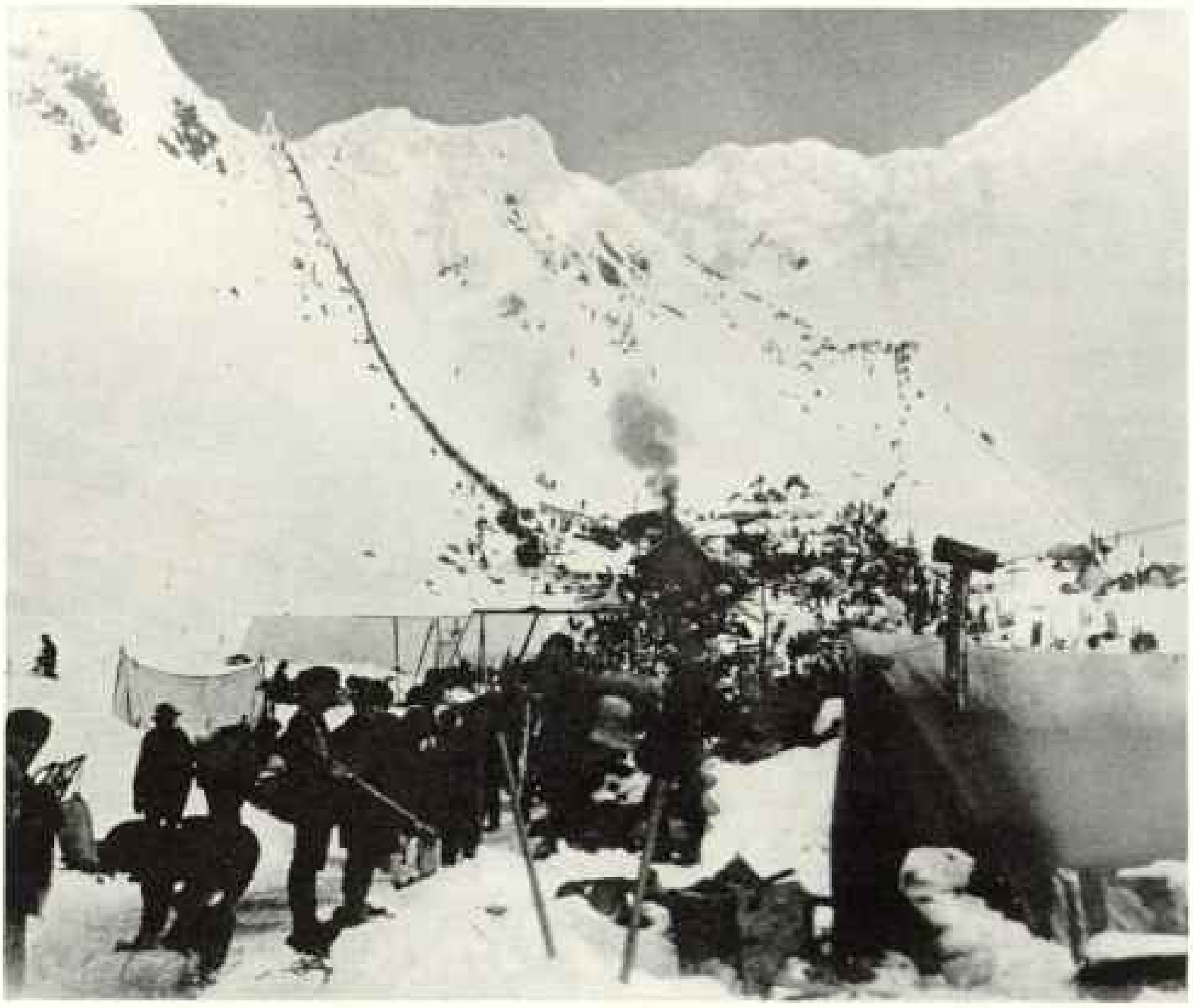
When gold was used merely as personal adornment, in plate, or in the decorative arts, it swayed the destiny only of those who possessed it, as in Peru and Mexico, or when Rome paid chariot loads of it to the barbarians to save herself from being sacked. But when gold came into wide use as money, to measure wages, prices, and the cost of living in all nations, then it began to influence the whole world. Tariffs, the gold standard, foreign exchange and debts, arbitrage—gold brings them all into the picture of international relations.

You think of all this when you walk through the United States Mint in Philadelphia and see the shiny new gold coins come tumbling out; or when you explore the vast, silent vaults of the Federal Reserve Bank in lower New York City, sunk far below the Hudson River level, with their stacks of gold bars and bags of coin worth billions. High above you, in the busy street, armored trucks and armed guards come and go with still more gold, the gold that is forever crossing and recrossing the oceans, the gold of Paris and London, of Tokyo and Buenos Aires. For gold is never static; incessantly it changes form and place, and yet endures.

Look at your own gold watch and think. Some of its gold particles might conceivably have come even from the gold of

*See "The Story of the Map," in the National Geographic Magazine for December, 1932.

†See, in the National Geographic Magazine, "Out in San Francisco," by Frederick Simpich, April, 1932; "Ontario, Next Door," by Frederick Simpich, August, 1932; "Under the South African Union," by Melville Chater, April, 1931; and "Lonely Australia: The Unique Continent," by Herbert E. Gregory, December, 1916.



A SHIVERING ARMY OF GOLD-SEEKERS MARCHING OVER ALASKA'S CHILKOOT PASS

Adventurers from many nations braved the Klondike snows in the 1898 gold rush. Many perished from cold, exhaustion, starvation, and scurvy. At the foot of the pass is Sheep Camp, where 70 men were buried in a slide.

Solomon's Temple; from an old treasure ship plundered by buccaneers of the Spanish Main; or, again, from new gold mined only last year in Arizona.

GOLD USED IN ARTS FOR MANY CENTURIES

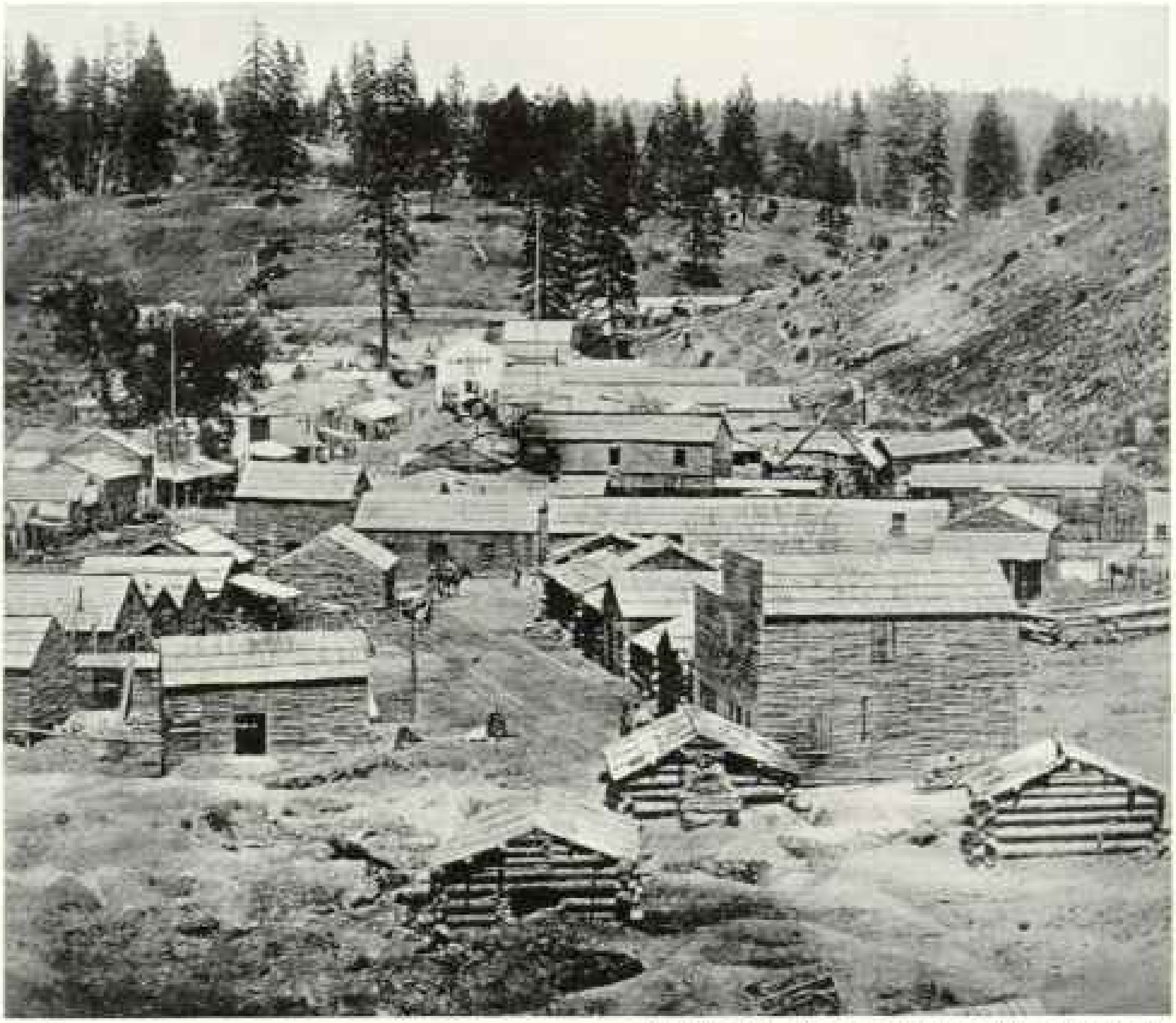
Look at the motley heaps of second-hand gold jewelry in any pawnshop window. Visit one of the great factories in New England or around Manhattan, where costume and other jewelry is turned out by the carload, and you see again why industry uses so much of all gold produced. Or consider the fortunes in gold leaf laid on the crosses and domes of churches, such as St. Paul's Cathedral in London, the mosques of Meshed and An Najaf, such structures as the Woolworth and American Radiator Buildings in New York, or the fortunes in gold worked up every year in the dental and sign-painting trades.

Since the Bronze Age gold has been man's favorite ornament. Gold-washing is shown on Egyptian monuments carved in 2900 B. C. From an adventure to seize the gold which Armenians washed from streams with the aid of sheepskins originated the legend of the Golden Fleece.

King Tutankhamen's tomb in Egypt, Ur of the Chaldees, and other ruins in Bible lands have yielded many golden objects of antiquity.*

From Ireland, Scandinavia, and France have come ancient gold collars, gold-handled swords, vessels, beakers, bangles, pins, rings, and earrings, showing how exten-

*See "At the Tomb of Tutankhamen," by Maynard Owen Williams; "Archeology, the Mirror of the Ages," by C. Leonard Woolley; and "New Light on Ancient Ur," by M. E. L. Mallowan, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1923; August, 1928, and January, 1930, respectively.



Photograph by McCarty from Keystone-Underwood

"HANGTOWN" OF GOLD-RUSH DAYS: NOW PLACERVILLE, CALIFORNIA

This picture is from a daguerreotype taken in the early fifties, when Whiskey Bay, Hell's Delight, and Gouge Eye were appropriate place names. Placerville, incorporated in 1854, now is a peaceful, attractive town of nearly 3,000 people.

sively gold was used in the arts before it circulated widely as money.

The Bible abounds in stories of gold and its uses. In Exodus the Hebrew women, leaving Egypt, were to "spoil the Egyptians" by taking their golden jewelry. "They came, both men and women, . . . and brought bracelets and earrings, and rings and tablets, all jewels of gold: and every man that offered, offered an offering of gold unto the Lord." This gold was for the Ark of the Covenant and for the dishes, bowls, spoons, pillars, and images of cherubim for the Tabernacle.

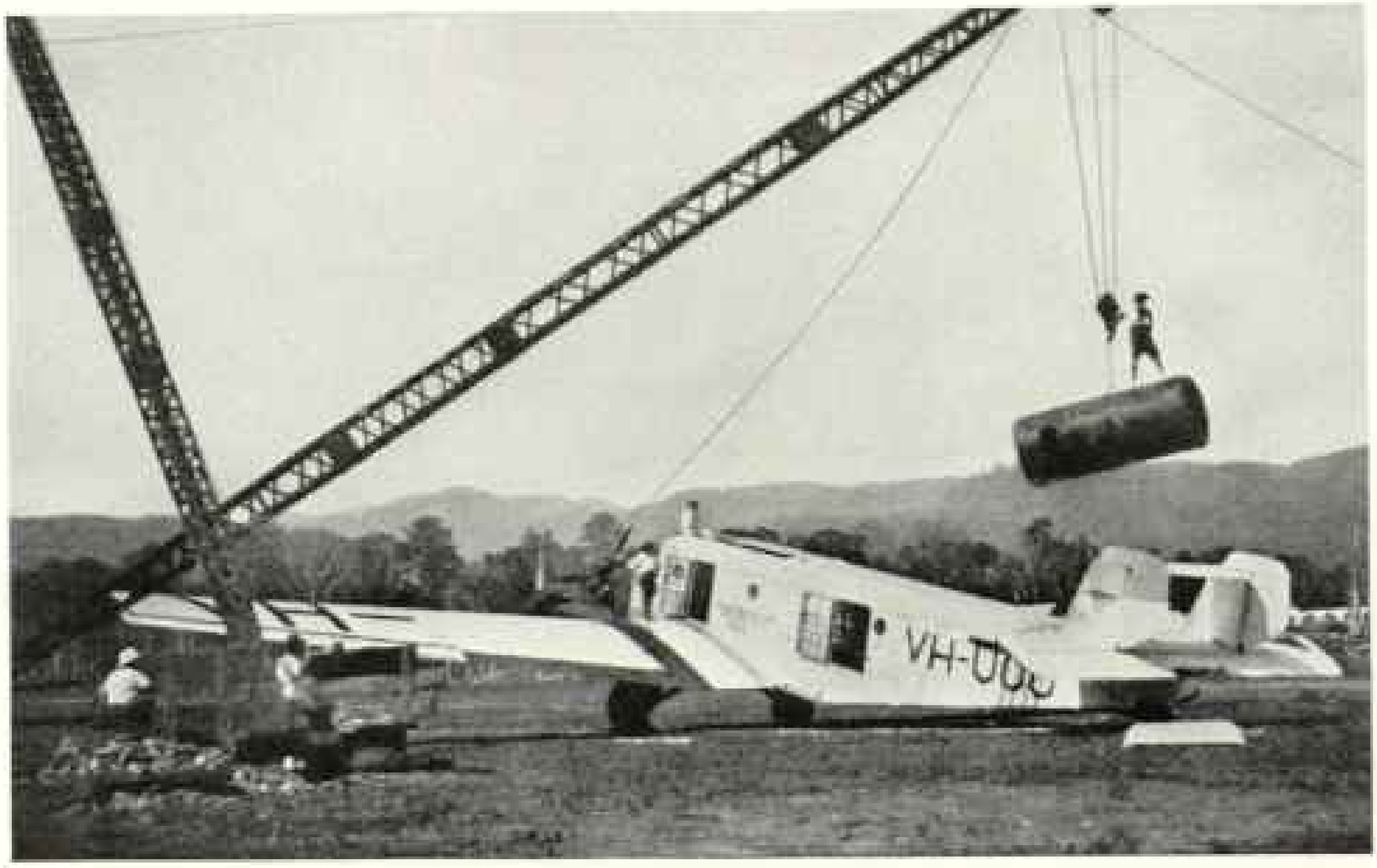
In the Temple of Solomon, gold was used in even greater profusion. All its lamps, tongs, and hinges were pure gold. Its very walls were overlaid; so was Solomon's throne, to which Sheba's Queen came, bringing him yet more gold talents to be made into targets and shields of beaten gold.

When Pizarro conquered the Incas of Peru he found their goldsmiths making pitchers, plates, jewelry, and miniature figures of llamas, frogs, lizards, and beetles. Such objects comprised the "roomful of gold" which Atahualpa, captive Inca, offered Pizarro for freedom.

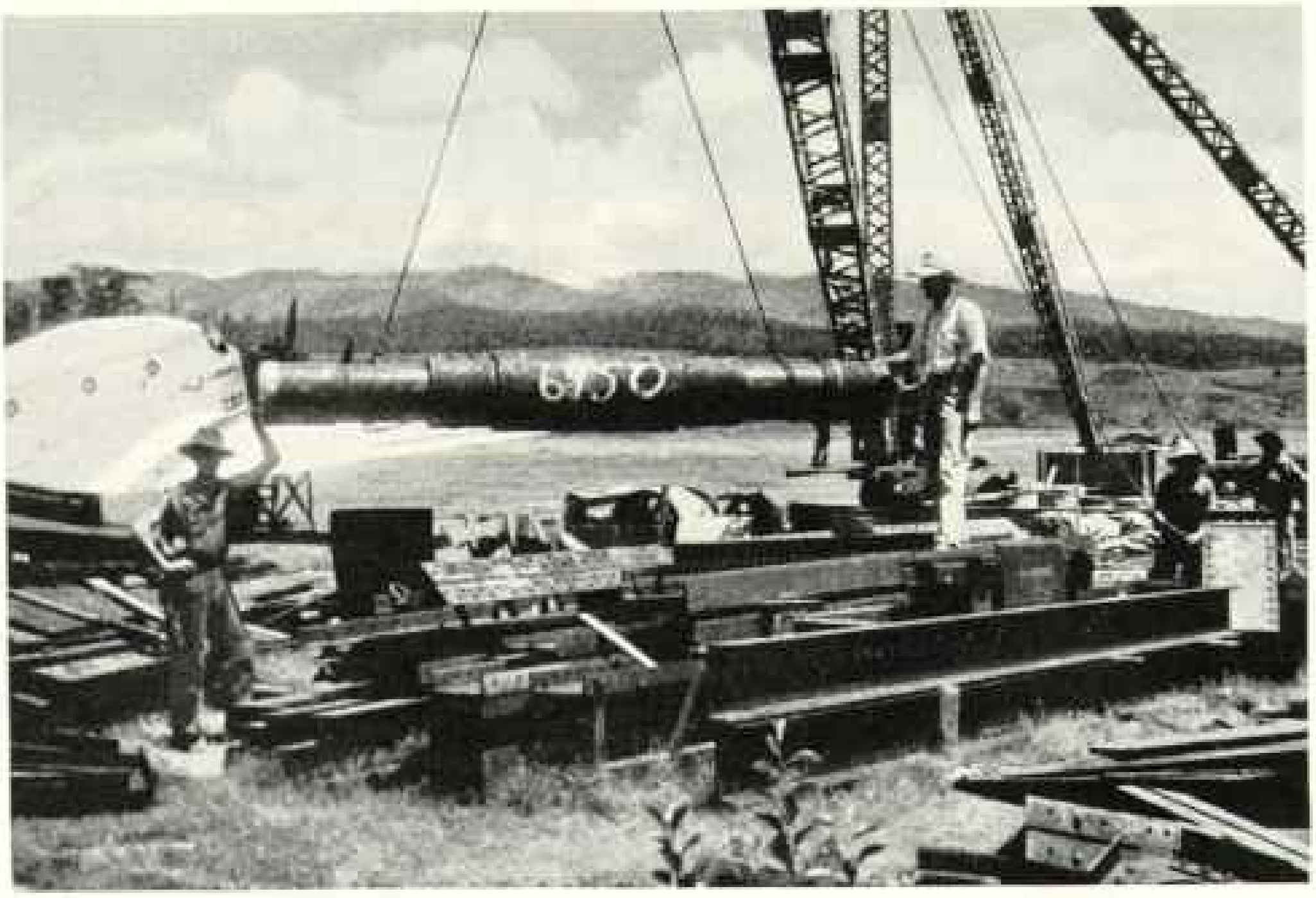
Only about half of the world's gold production since the discovery of America can now be definitely located, says the Director of the United States Mint.

Since 1492 the world has mined $22,413,757,117, as officially reported. Of this, about 80 per cent was produced since 1860.

But to-day the world's nations hold, as monetary gold stock, only about $11,940,000,000.

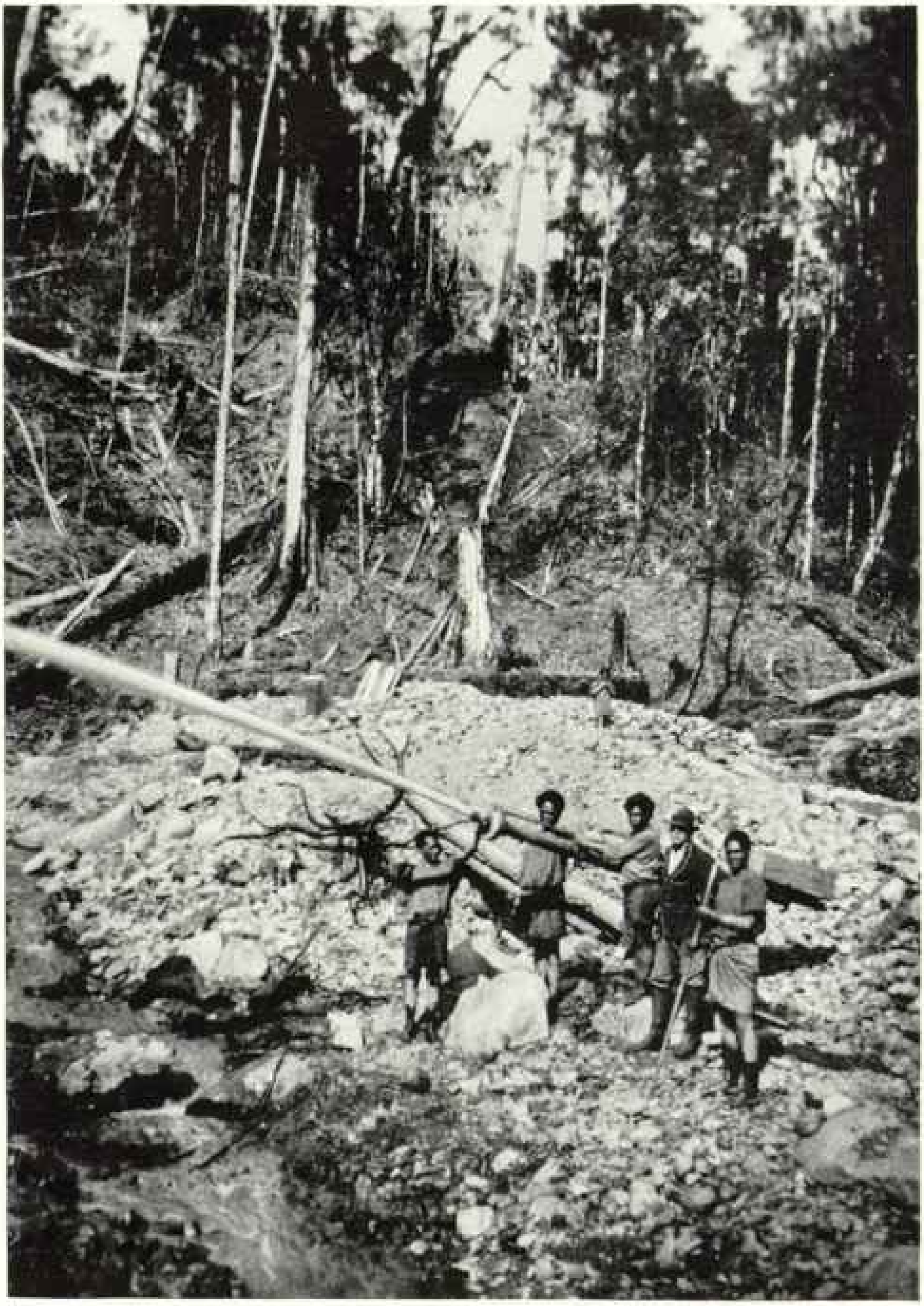


THE AIRPLANE EXPRESS UNLOADS A THREE-TON BOILER AT THE BULOLO GOLD FIELDS, IN NEW GUINEA



THIS 6,950-POUND STEEL SHAFT WAS FLOWN INTO THE NEW GUINEA MOUNTAINS

The roof was cut from the cabin of a giant Junker passenger plane, and a special hatch put in, to facilitate the loading of such large sections of heavy machinery (see text, page 497). All the heavy iron girders shown in the picture were brought to the gold field by plane. Carrying this cargo was an outstanding feat in aerial transport.



Photograph from Dr. E. W. Brandes

REFORMED CANNIBALS AID HYDRAULIC GOLD MINING IN A MOUNTAIN CREEK

A white foreman directs tamed natives in handling a nozzle amid primeval mountain forests of New Guinea. The gold fields are located 55 miles inland from Lae, on the northeast coast of the island, at the mouth of the Wussi River. To reach the gold mines from Lae, across five ranges of intervening mountains, requires two weeks or more by trail, but airplanes make the trip in 75 minutes.

THE BULOLO RIVER, NEW GUINEA, AFTER SEVEN MONTHS OF GOLD DREDGING

The dredges and camp are seen at the upper left. The whitish appearance of the stream bed and banks is due to tailings on the dump, the waste mud and gravel from which gold has been recovered.

A GOLD DREDGE AND ITS AIR FLEET AUXILIARY

When the Bulolo River valley gold field of New Guinea was discovered, it was overgrown with dense jungle. All the machinery, equipment, and supplies used by the Bulolo Gold Dredging, Ltd., were flown over the mountains. The three planes seen in the background are used in moving heavy freight (see illustration, page 484).

What, you ask, has become of the rest of it? Where are the missing ten billions or more?

It went, much of it, just as in olden times. In 1931, for instance, of, roughly, $49,000,000 of gold mined in the United States alone, about $29,000,000 was consumed in industry.

To understand gold's place in the world to-day and how it affects our well-being, we must first swiftly trace its use through other times.

WHERE EUROPE GOT GOLD BEFORE THE RUSH TO CALIFORNIA

Europe's gold when Columbus first sailed westward amounted to less than some present-day family fortunes. Part of this Europe had mined, part she had plundered from other lands. Cadmus, a Phenician, opened a gold mine in Thrace about 1594 B. C., and "carried thither the alphabet and other germs of civilization." Jason, on his piratical gold quest to Argos in 1263 B. C., gave the name Argonauts to gold-seekers. Cræsus gained wealth from ancient placer mines of Smyrna; so did Midas of the legendary golden touch, who turned his own daughter into gold.

Darius of Persia looted Asia Minor, Greece, and Egypt, and levied gold and silver tribute. Part of this Alexander retrieved when he in turn plundered Babylon and other lands of enormous sums.

Holes dug by Harun-al-Rashid when he worked the gold veins of what now is Hejaz were recently seen by a contributor to this Magazine. Diodorus tells in dramatic detail how naked slaves, with candles tied on top of their heads, worked the hot tunnels of Egyptian gold mines in the cruel days of the Pharaohs.

Some of early Europe's gold came from Siberia. Gmelin, the German traveler, says the tunnels were so small that men had to crawl on their bellies to get at the quartz, from which they picked gold filaments with tools pointed with boars' fangs.

Egyptian kings worked their gold mines with slaves, and Carthage not only enslaved people in what is now Spain, but also brought hordes of African slaves to help work these mines. This horrid traffic, says one authority, so augmented the flow of metal as to influence the whole commerce of the world.

From the Imperial Roman era to Columbus, Europe's limited gold production forced nations to war and pillage. Some of her gold so gained was drained off in trade to India and the Orient.

India, in time, became the world's greatest gold hoarder. "The treasure sink of the world," she has been called. Just how much gold is still hidden in the secret vaults of her princes, nobody knows; from 1873 to 1930, however, the records show that India imported about $2,800,000,000 in gold.

Even after America was discovered, Europe, though her own gold supply was increased, continued to obtain less by mining than by conquest and plunder. Cortez and Pizarro robbed in the New World as Scipio and Alexander had done in the old.

Few books record the fact, yet Japan in the 17th century supplied Europe with an important stock of gold. The Portuguese and Dutch managed this, beginning generations before the American Commodore Perry opened Japan's ports to world trade.

Fernão Mendes Pinto, a pirate from the Portuguese colony at Ningpo, China, was driven upon the Japanese coast during a storm in 1545. When he returned to Ningpo with tales of much gold in Japan, other Portuguese fitted out ships and began trading.

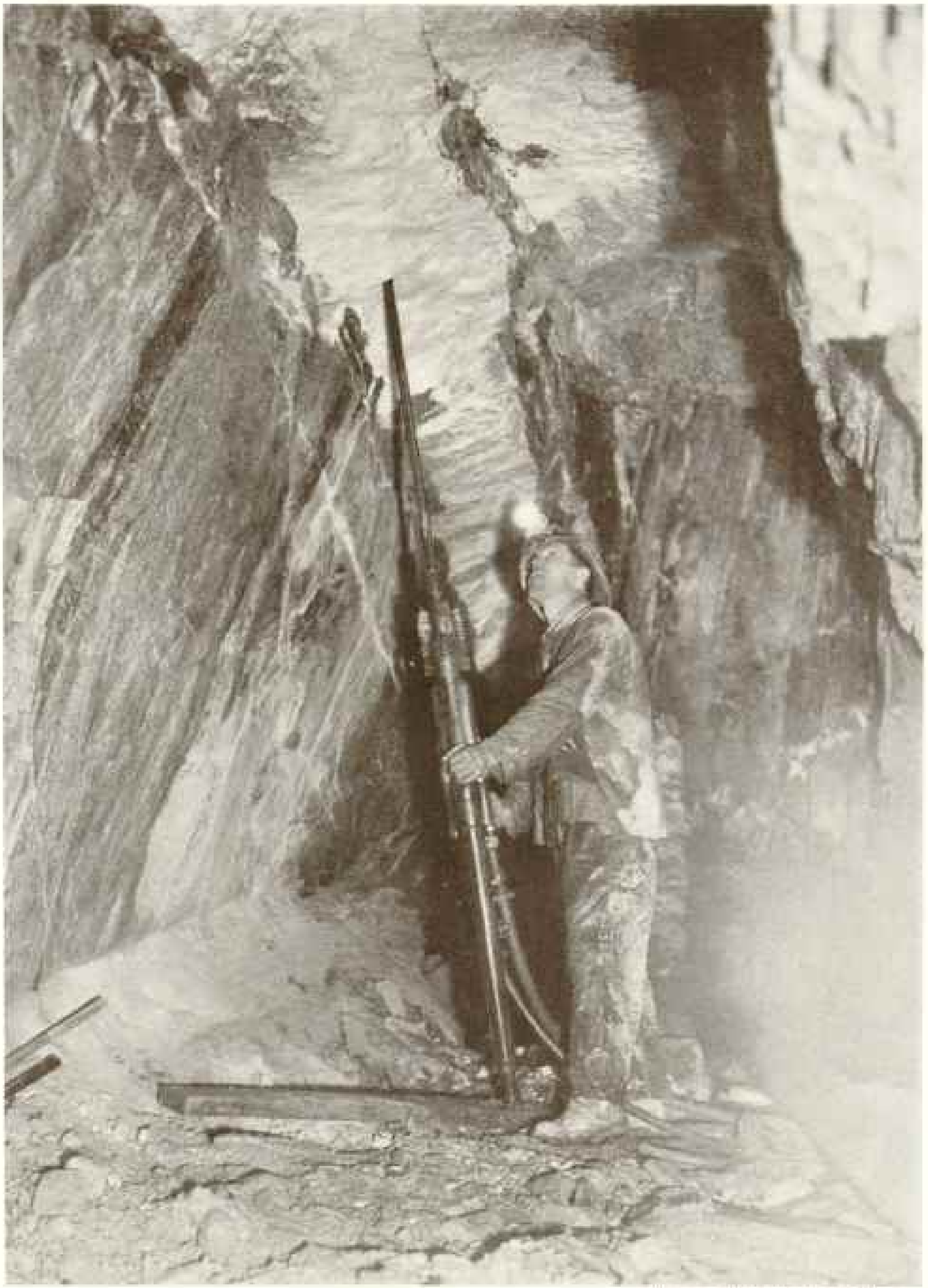
JAPAN EARLY USED GOLD IN BARTER WITH EUROPEANS

Though Japan then coined no gold as money, her people amassed it as wealth and traded it freely for weapons, drugs, and dress stuffs brought by the Portuguese and later the Dutch. When the stock began to wane, the Portuguese hatched a plot to overthrow the Shogun, and to work the mines with enslaved natives; this project led finally to their expulsion.

The Portuguese, however, had actually contrived to have the mines worked, and thus secured treasure which was shipped to Europe.

The part of the Dutch in this was small, though from 1624 to 1853 they were the only Europeans permitted to trade, even under the most humiliating terms, with the Japanese, and their trading posts were limited to a small island near Nagasaki.

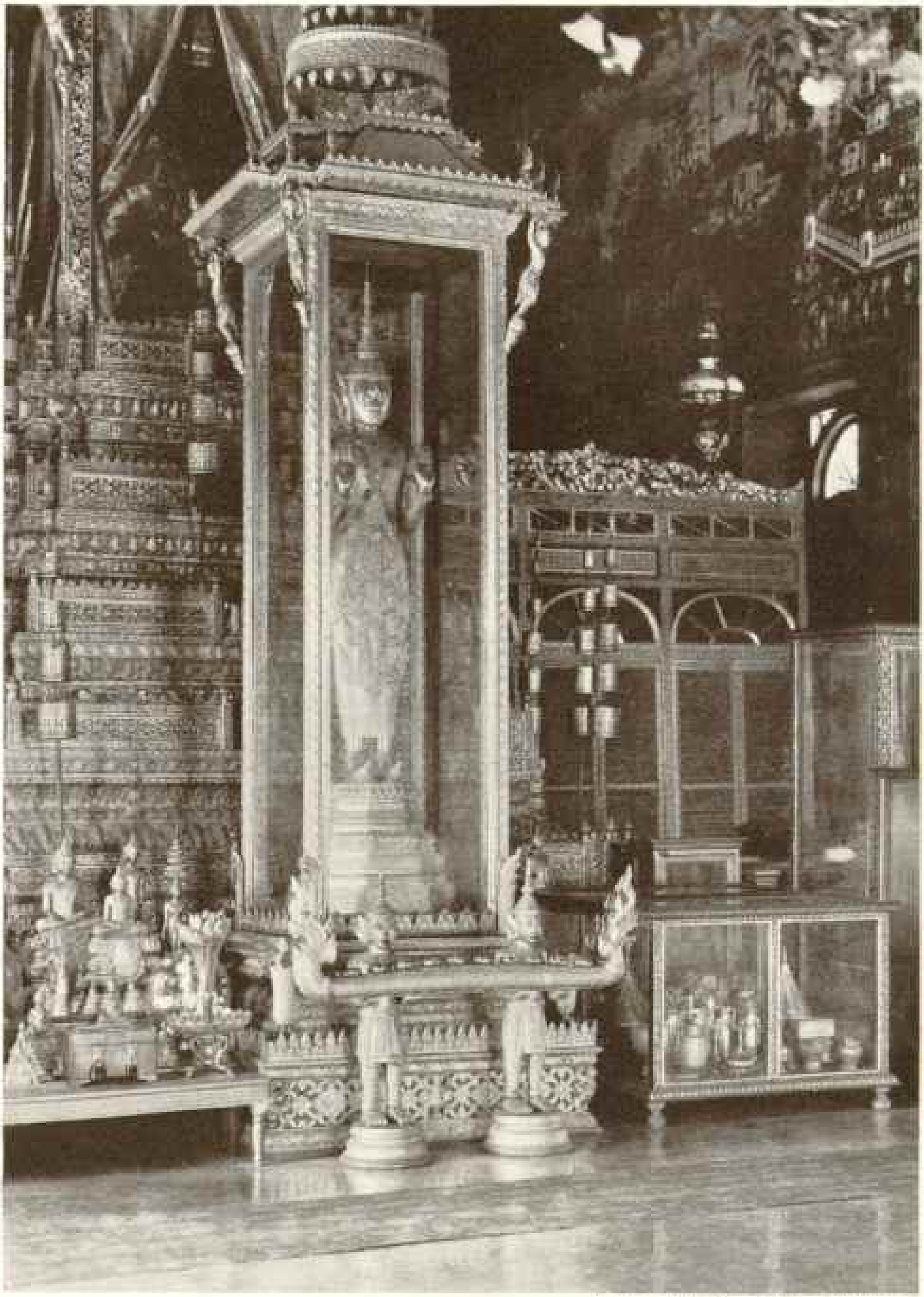
Von Humboldt estimates the Brazilian gold output from 1680 to 1803 at more than $800,000,000. From 1803 until California and Australia came to yield rich treasure, some 50 years later, Brazil continued to produce enormously. Her gold



Photograph from Ewing Galloway

A MINER THRUSTS HIS AUTOMATIC DRILL INTO A VEIN OF QUARTZ

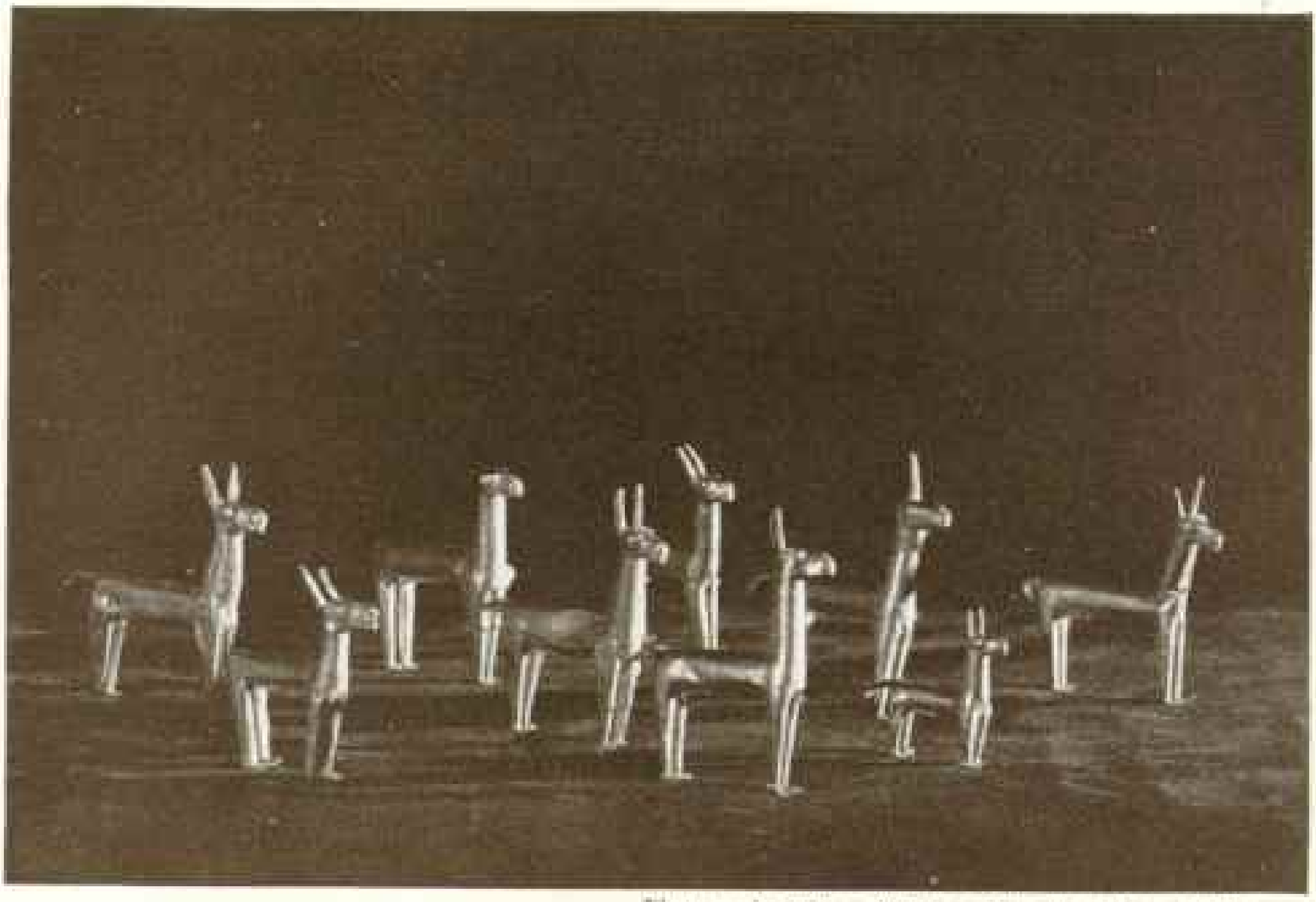
Before compressed air became a miner's first aid, handwork with picks on such hard veins was slow and tiring. This one is in the Golden Horseshoe Mine at Placerville, California.



Photograph by Maynard Owen Williams

A GOLDEN BUDDHA OF CAMBODIA IS SET WITH DIAMONDS

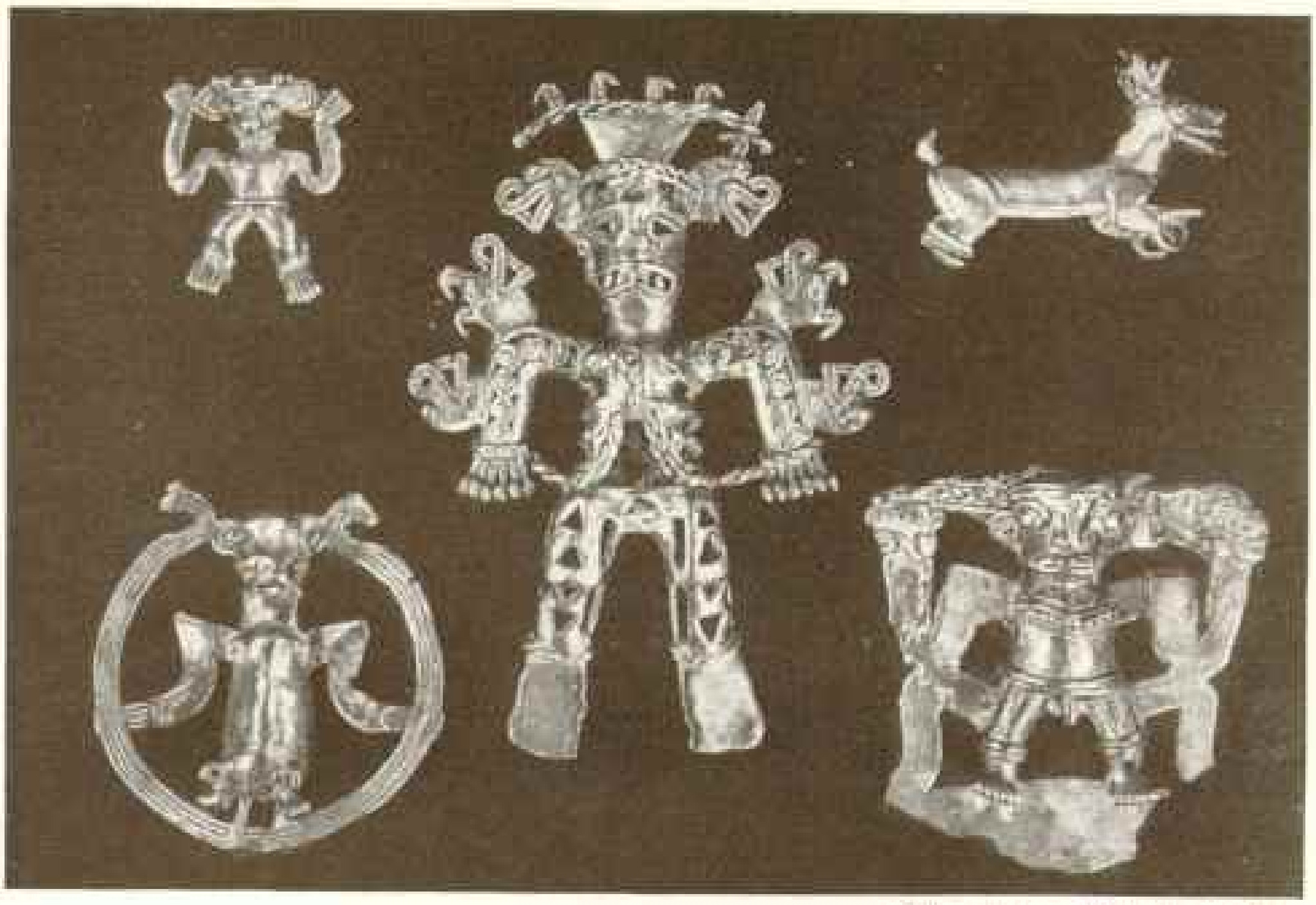
This figure in the royal temple at Pnom-Penh, six feet tall, dominates the Silver Pagoda, which takes its name from the silver tiling on the floors. Vivid frescoes, showing scenes from the life of Buddha and dire punishments in store for the wicked, decorate the walls.



Photograph courtesy American Museum of Natural History

ANCIENT INCA ARTISTS MADE THESE GOLDEN LLAMAS

From the highlands of Costa Rica down to Peru, tombs and ruins have yielded astonishing examples of pre-Columbian goldsmith art. The llama, domesticated by the Incas and providing wool for their weaving industry, furnished a fitting model for gold ornaments.

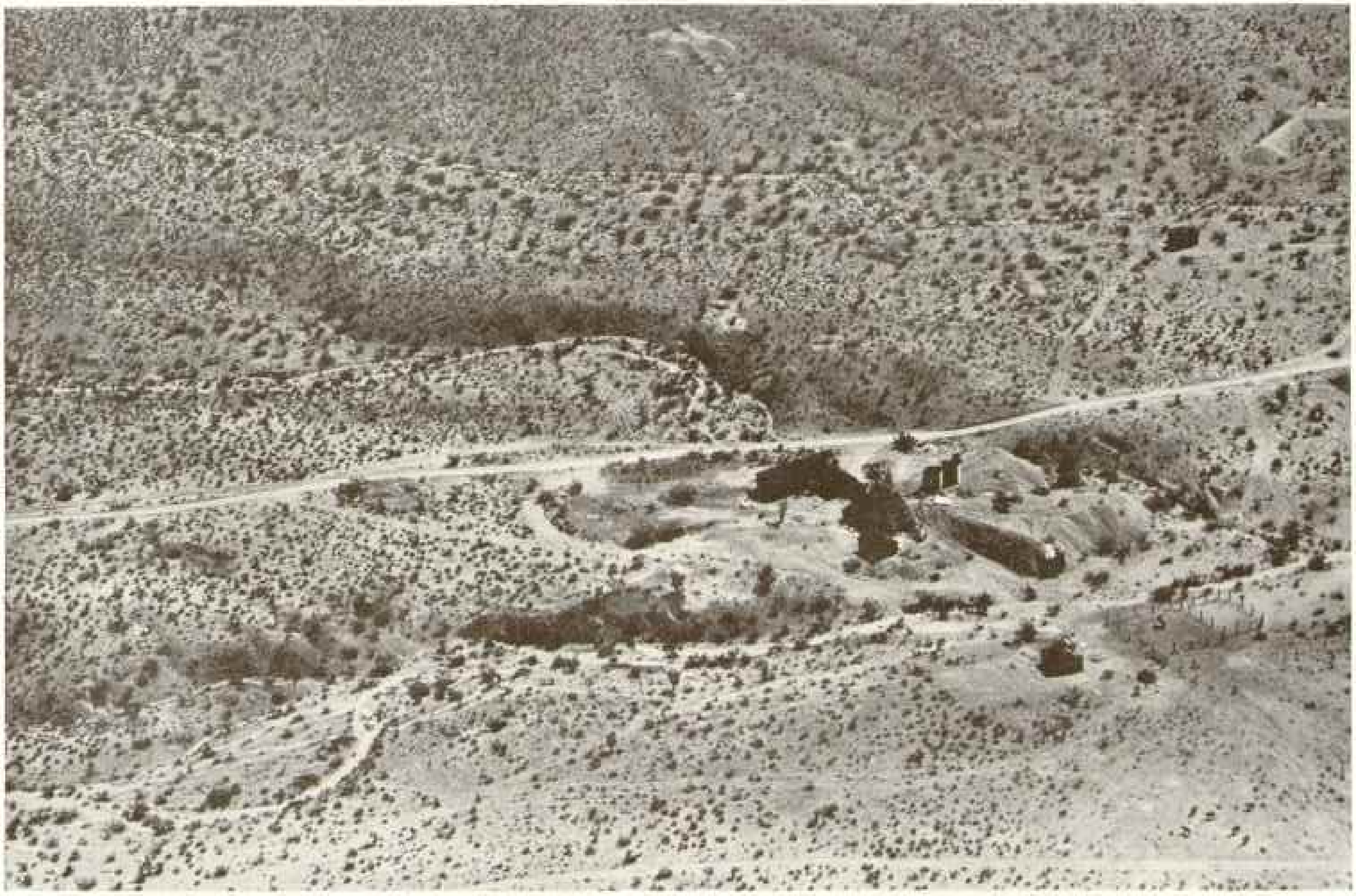


Photograph from Walter L. Bensley

COSTA RICA GOLDSMITHS FASHIONED THESE ORNAMENTS BEFORE COLUMBUS CAME

AIRPLANES AND DOG SLEDS ARE USED FOR TRANSPORT AMONG THE GOLD FIELDS OF NORTHERN CANADA

Miners, tools, supplies, dogs, and even the sleds are often carried by air. These planes have landed on a frozen lake, whence dog teams set out. Then the planes are left behind, motors are drained of oil and covered with tarpaulin. They are anchored by pouring water on the skis and freezing them to the surface. Before starting again, oil is heated and poured into the motors.



Official photograph U. S. Army Air Corps

COUNTING GOLD MINES MIGHT BE AN AIRPLANE DIVERSION IN SOME WESTERN AREAS

Hundreds of small mines, such as this one near Searchlight, Nevada, are scattered over the gold States. The total sum spent in the quest of gold is estimated to be far more than the worth of all the gold ever mined.

Photograph by Clifton Adams

A GOLD NUGGET AND TWO MODELS OF NUGGETS IN THE NATIONAL MUSEUM AT WASHINGTON, D. C.

At the left is a model of "The Welcome," found near Ballarat, Australia, in 1858, and one of the largest ever unearthed. On the scales is an 81-ounce nugget found in Plumas County, California. On top of the scales cabinet is a model of a 25-pound nugget found in North Carolina.

Photograph from Ewing Galloway

AMERICANS WORKING A GOLD PLACER IN PERU

The veteran gold-seeker is a citizen of the world. The man bending over the sluice box in the Andes is an American miner who was once known in Alaska as Swift-Water Bill.

Photograph by Clarence Back

GOLD-SEEKERS TAKE THE TRAIL IN DEATH VALLEY, CALIFORNIA

Hour after hour the wandering prospector, marching dreamily behind his burro, sees before him that animal's swinging tail. That is why, in western mining parlance, the burro's tail is called "the prospector's compass."

Photograph by Burton Holmes from Galloway

VETERAN PROSPECTORS OF NOME

Men from all walks of life rush to each new gold strike. Few amateurs stick to mining, yet now and then emerges a natural-born prospector, who spends his life searching for gold.

Photograph by Keystone-Underwood

A PORTION OF THE RUSSIAN TSAR'S VANISHED SPLENDOR

This golden dinner service, for sale in an American department store, is part of a million-dollar display of jewels and art objects from former royal palaces.

stream was so rich that in time it affected Europe's level of wages and prices.

Yet, to slaves and even free whites, life in the jungle gold fields of Brazil was hell on earth. The miners' only food was a few deer and wild fruit. At the mines it took a pound of gold to buy a bushel of corn. Once this price was paid for a pound of salt!

A herd of cattle which some adventurer drove to the mines of Goyaz and Mato Grosso sold, flesh and bone together, for an ounce and a half of gold, or about $30, per pound. Starvation and leprosy took heavy toll of life.

But Brazil's fabulous gold stream was to make economic history. The world's stock of gold was then still comparatively small. Taxes on this gold brought Portugal, which then owned Brazil, a fat revenue and gave rise to another measure which was profoundly to affect the world's monetary arrangements. Portugal, in 1688, changed the ratio of silver to gold in her dominions to 16 to 1. Later she coined enough gold to effect a similar change in the coinage laws of other trading nations. In 1747 Portugal entirely demonetized silver and set up a single gold standard. Then England and other nations adopted it.

MAN FINDS HIS GOLD IN VARIOUS WAYS

In painstaking plans and sheer boldness of execution, few feats of transport can compare with the work now being done by a British gold-mining company on the cannibal island of New Guinea.* Here, piece by piece, heavy machinery is flown by airplane from Lae, on the coast, to the Bulolo River gold fields, high up in the mountains.

No road exists. To have built one, what with wild, broken country, tropic heat, and heavy rains, would have cost enormously in time and money.

Now, with two trimotored Junker passenger planes making five round trips a day, the company in good weather can ship freight from the coast up to the mines at the rate of about 42,000 pounds a day (see illustrations, pages 484-487).

With all seats removed from the cabin and a large hatch cut in its top, cranes can load the plane in a few minutes.

Into one plane a shaft weighing 6,950 pounds was loaded and successfully flown over mountain tops at a height of 6,000 feet and safely landed at the mines. By carefully dividing, balancing, and lashing all machinery and supplies and making hundreds of trips, a complete mining camp has thus been flown into the heart of New Guinea. This camp includes dredges that weigh 1,200 tons, a complete hydroelectric plant, machine shops, sawmills, steam engines, tractors.

AIRPLANES AID MEN IN THEIR SEARCH FOR GOLD

In the wild and frigid regions of Canada's Far North airplanes, as well as dog sleds and snowshoes, aid men in their quest for gold (see Duotone Plate IV). To-day, incidentally, Canada has surpassed the United States in gold production and is second only to South Africa.

Many foothills and valleys of California still carry the giant scars of hydraulic gold mining. In this work streams of water from a higher level are turned against the gold-bearing soil with such force as to wash away hills, choke near-by streams, and cover fields for miles below with débris. Along the Bear, Yuba, and Feather rivers, thousands of acres of farm land were ruined for agriculture by "hydraulicking," as miners call it.

Crawling like colossal crabs, huge dredges, of the endless-chain bucket or steam-shovel patterns, are also used to wash gold from auriferous river beds. They plow along, rooting in the mud and gravel, rolling big bowlders about and spouting streams of murky water, like hungry monsters digging for food. Such dredges, as made in California, are used now in New Guinea, the Malay States, Nigeria, Siberia, and other gold countries.

Miners find gold both in veins and placers. In vein mining of gold ore and quartz, methods are similar to those used in extracting other minerals from rocks.

A good example of modern quest for gold in rock is the Rand. Since it was discovered, in 1885, some of its mines have ceased operation; others have been opened, and some have gradually reached a great depth. By 1930 a maximum depth of 7,640 feet had been reached. But at such depths the problems of hoisting and of the increasing heat from the rocks, as

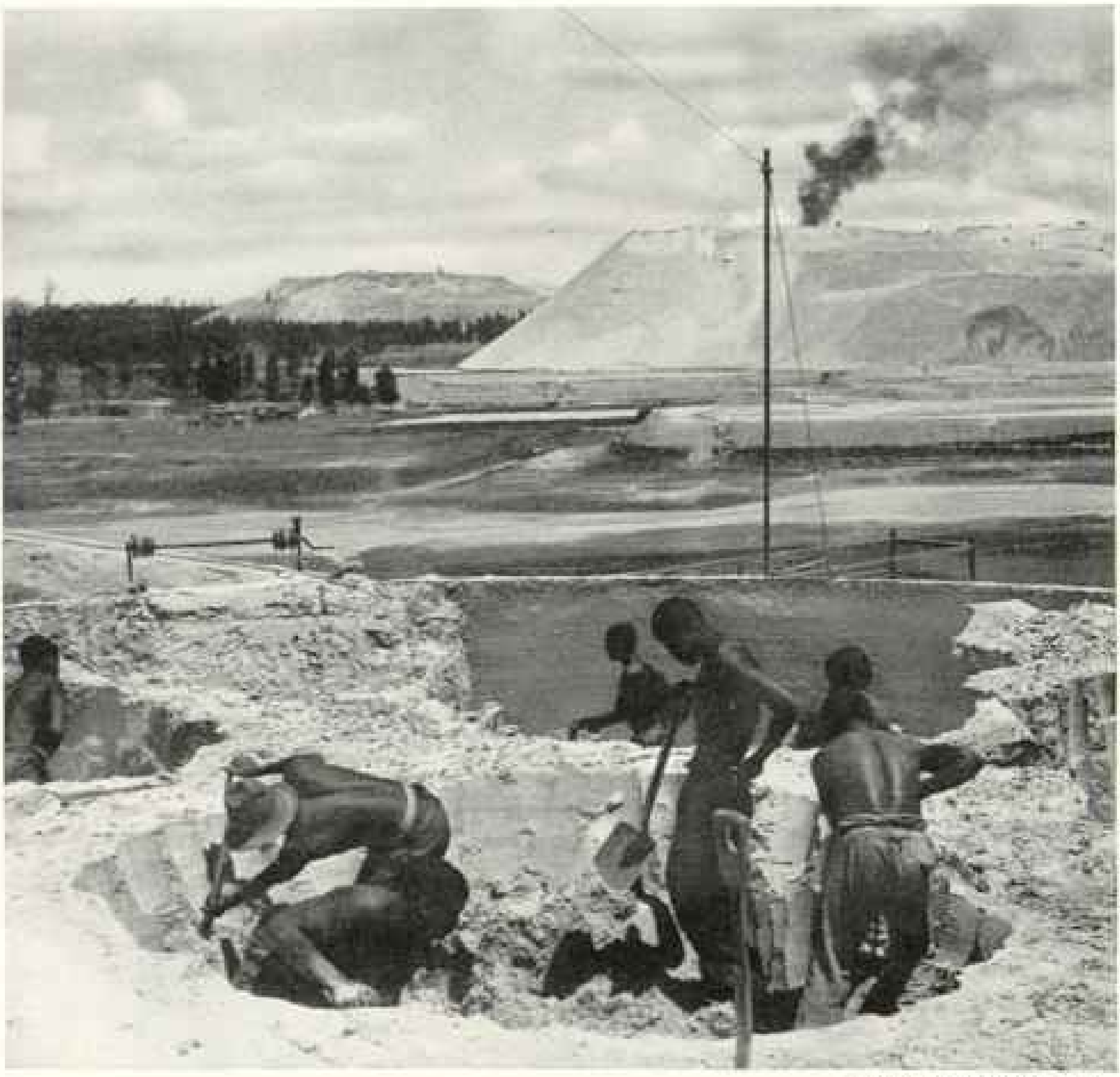
*See "Into Primeval Papua by Seaplane," by E. W. Brandes, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1929.

Photograph by Melville Chater

NATIVE MINERS OF JOHANNESBURG STAGE A COSTUME DANCE

These South African workmen, to keep them happy, are encouraged by mine owners to perform their tribal war dances. They carry spears such as their fathers used to fight the whites, have oxtails on their knees, and modern striped sweaters on their backs.

ZULU GIRLS IN THE REGION OF JOHANNESBURG DO A WAR DANCE TO ENTERTAIN THE MINERS



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NATIVES AT WORK ON A DUMP IN THE RAND GOLD FIELDS

Gold mining has added ranges of low hills to Transvaal geography. White mounds in the background are dumps of waste white sand from which gold has been extracted. Approaching Johannesburg, one sees miles of these man-made hills.

well as the rock pressure, make the work more and more difficult. Engineers state that the temperature in the Rand mines rises at the rate of 1° Fahrenheit for every 254 feet of vertical depth.

More excitement attaches to placer mining. By it the miner simply washes bright bits of gold from sand and gravel. He can see at once, in his pan or sluice box, how much gold his labor yields. Since the world depression, thousands of men and women have begun work along streams in our Western States, panning for dust and nuggets (see page 510).

It was beanlike nuggets, found in a stream where James Marshall was digging a mill-race, that started the California gold rush of '49. There, as in the early days of the Australian excitement, when rich alluvial deposits were common at the surface, most gold was first found by washing. The search for veins or ore and the use of stamp mills and other machines came later.

Bits of gold in a creek bed were the clue to the Klondike. Weary from chasing a moose, an Indian hunter lay down to drink from a Yukon tributary and saw the stream bed glittering. Thus "Skookum Jim," with two white men, Carmack and Henderson, started the historic Klondike rush. Later, on the beach at Nome, it

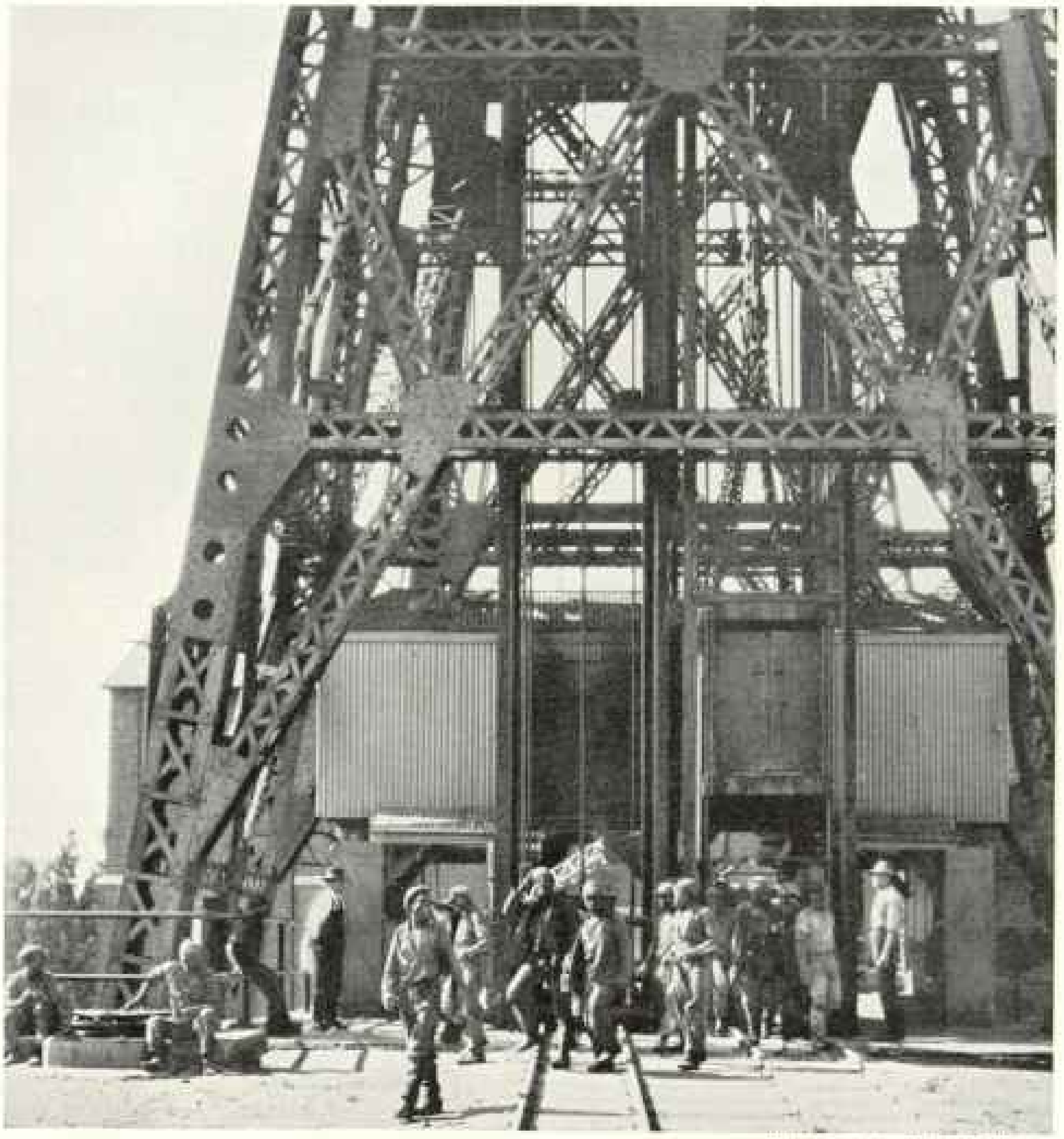
Photograph from Melville Chater

FIRST AID FOR A GOLD-MINE WORKER

All officials of the Rand mines must know how to treat cuts, scratches, bruises, and other minor injuries suffered by men at work. Many South African native miners are themselves members of first-aid classes.

Photograph by Ben Ali McAfee

VISITORS VIEWING BARS OF NEW GOLD AT THE CROWN DEEP MINES, TRANSVAAL



Photograph by Melville Chater

"UNDERGROUND COMMUTERS" EMERGING FROM THEIR DAY'S WORK AT A MILE BELOW GROUND

Cables for hoisting steel buckets run over large wheels in the top of this Eiffel-like tower at a Witwatersrand mine, Johannesburg. Such bucket elevators convey both men and ore from depths, in some Transvaal mines, of about 7,000 feet.

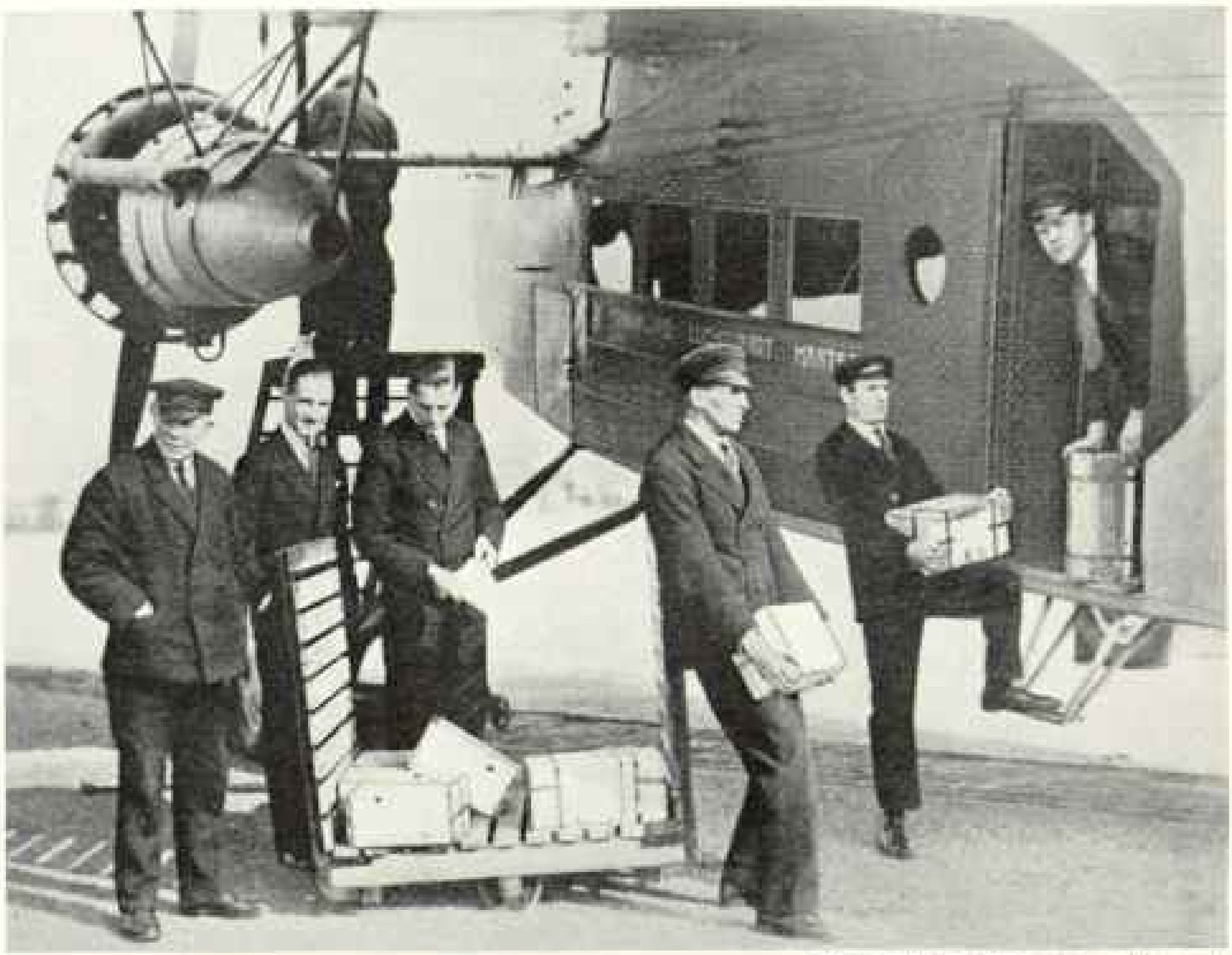
was found that the very ocean sands were impregnated with gold, and undreamed-of millions were recovered.

HOW SOME FAMOUS NUGGETS WERE FOUND

Nothing stirs man's imagination more than tales of huge nuggets. Small ones have appeared in the craws of chickens and turkeys; children at play have found others. A 14-year-old California boy named Perkins, playing with a toy water wheel in a Calaveras County creek, picked up a nugget worth $1,800.

Near Dutch Flat, in the same State, an old miner, Dan Hill, stooped to wash his hands in a brook and saw in the water a chunk of gold as big as his head. He got $12,300 for it.

North Carolina does not come to mind first as a gold State. Yet records in the United States Mint show that it mined gold as early as 1793. From its old Reed



Photograph from Keystone-Underwood

LOADING GOLD AT CROYDON AIRPORT, ENGLAND, FOR SHIPMENT TO AMSTERDAM

Risks make it costly to move valuable cargoes of gold. In international transactions, nations sometimes avoid such cost by "earmarking," which means that a definite quantity of gold in one country's vaults is labeled and set aside as the property of another. Actual delivery is not always made. In further transactions, perhaps involving a third nation, the earmarked gold may be "paid out" again by another book entry.

Mine, in Cabarrus County, came a veritable stream of nuggets that ranged from bean-size up to gold chunks of 28 pounds. A Montgomery County mine belonged to Thomas Faney, a deer hunter, whose favorite pastime was "to go hunting with bullets run from pure gold." Old residents thereabout tell of a buck killed long after Faney's death, in the shoulder of which was found a piece of gold. It was assumed that this was one of Faney's bullets, with which he had wounded the deer some time while hunting.

A 7-pound nugget found in South Africa was shaped like a human hand, fingers and all. Near Dolores, Mexico, an Indian found a nugget which was a perfect corn husk in shape.

The Ural Mountains of Russia have yielded nuggets up to 50 pounds and over. Three convicts found one worth $30,000. It is written that the Tsar freed the convicts but kept the gold!

A strange story attaches to the "Oliver Martin," largest nugget found in California. Two men, Martin and Fowler, were asleep one night in a canyon when a mountain storm sent a sudden flood rushing down upon them. Fowler was drowned. Next morning Oliver Martin took his pick and shovel and started to bury his dead friend. Hardly had he begun the grave when he struck a nugget. It sold for $22,700, after Martin had first earned $10,000 by exhibiting it.

The list is long and exciting. No part of the world has been so prolific as the Victoria fields of Australia. From here have come big nuggets literally by the score. One famous Ballarat nugget, the "Welcome," brought $52,500 (see illustration, Duotone Plate VI).

Photograph by Keystone-Underwood

GOLD BARS BEING WEIGHED IN THE UNITED STATES ASSAY OFFICE, NEW YORK CITY

Each of the small bars at the right is worth $5,000. This is the minimum amount of gold sold by the Government to bullion brokers, jewelers, gold-leaf makers, and other customers. These huge scales are so delicately balanced that they will weigh a human hair, or even the amount of lead or ink it takes to write your name! (See text, page 512.)

In New South Wales was found a record nugget, measuring 4 feet 9 inches long, which sold for $148,000.

"The true standard of value," said Sir Isaac Newton, "consists in a definite quantity of gold bullion." But to-day gold coins are seldom seen. In many lands they do not circulate at all.

GOLD IN OUR MONEY SYSTEM

In the monetary system of the United States the gold dollar, though not now made, is the unit of value; it weighs 25.8 grains and is 0.900 fine.

Our gold and other coin is made in the United States mints at Philadelphia, Denver, and San Francisco; paper money is made at the Bureau of Engraving and Printing at Washington.

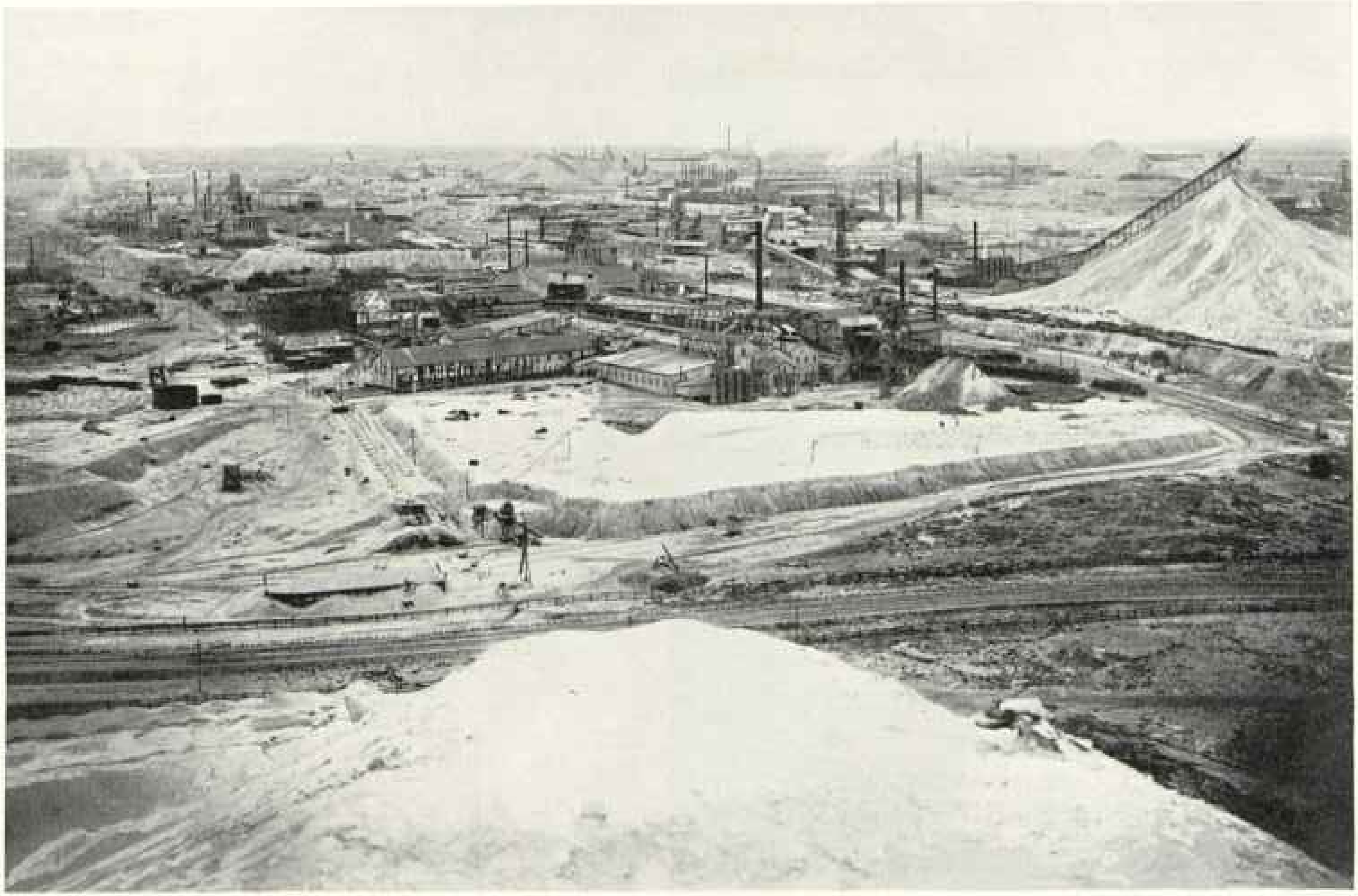
Gold coins of $5, $10, and $20 are now minted, known as half eagles, eagles, and double eagles. Among workers in the mint, the eagle's picture is always called "The Goose." One thousand dollars of United States gold coin weighs just 3.685 pounds avoirdupois, and at the mint I found it, in bar form, an easy handful.

As this is written $450,000,000 of gold money is theoretically in circulation in the United States. It does not really circulate, because most people prefer the more convenient paper dollar, substituted by the Government for the gold which it holds in the Treasury.

By law the Treasury must keep the buying power of our silver and paper money equal to that of gold, by buying or borrowing more gold if needed.

In his address at the Lincoln Day dinner in New York, February 13, 1933, President Hoover said:

"Gold is the most acceptable of all commodities in international payments. Even the nations that have abandoned the gold



Photograph from Charles F. Baldwin

WHERE HERBERT HOOVER ONCE WORKED AS A MINING ENGINEER

Formerly a producer of fabulous wealth, the famous "Golden Mile" mine at Kalgoorlie, Western Australia, still is in operation. It is surrounded by the stark skeletons of once active smelters and by the gaping mouths of old pits.

Photograph by Willard Price

AN ITALIAN WORKER WEARING A GOLD EARRING "FOR LUCK"

In Bavaria a farmer sowing wheat sometimes wore a golden ring so the corn would have a rich color. Pliny tells of the gold stone said to be a cure for jaundice; and in Sumatra spirits were thought to guard the treasure of the gold mines. As with certain precious stones, so with gold: about it man builds his superstitions. Many people still carry a gold coin to insure their health or fortunes.

Photograph by Acme Newspictures

RAISING THE CAPTAIN'S SAFE FROM THE SUBMERGED "EGYPT"

Held like a huge lump of sugar in a pair of giant tongs, the safe is lifted aboard the Italian salvage ship *Artiglio*. This vessel was blown up during a later salvage operation, and *Artiglio II* was then fitted out to resume work on the *Egypt* (see illustrations, pages 480 and 516). A one-man diving chamber was devised with windows and telephone, from which a foreman directed the dynamiting and lifting of the treasure boxes.

Photograph by M. E. L. Mallowan

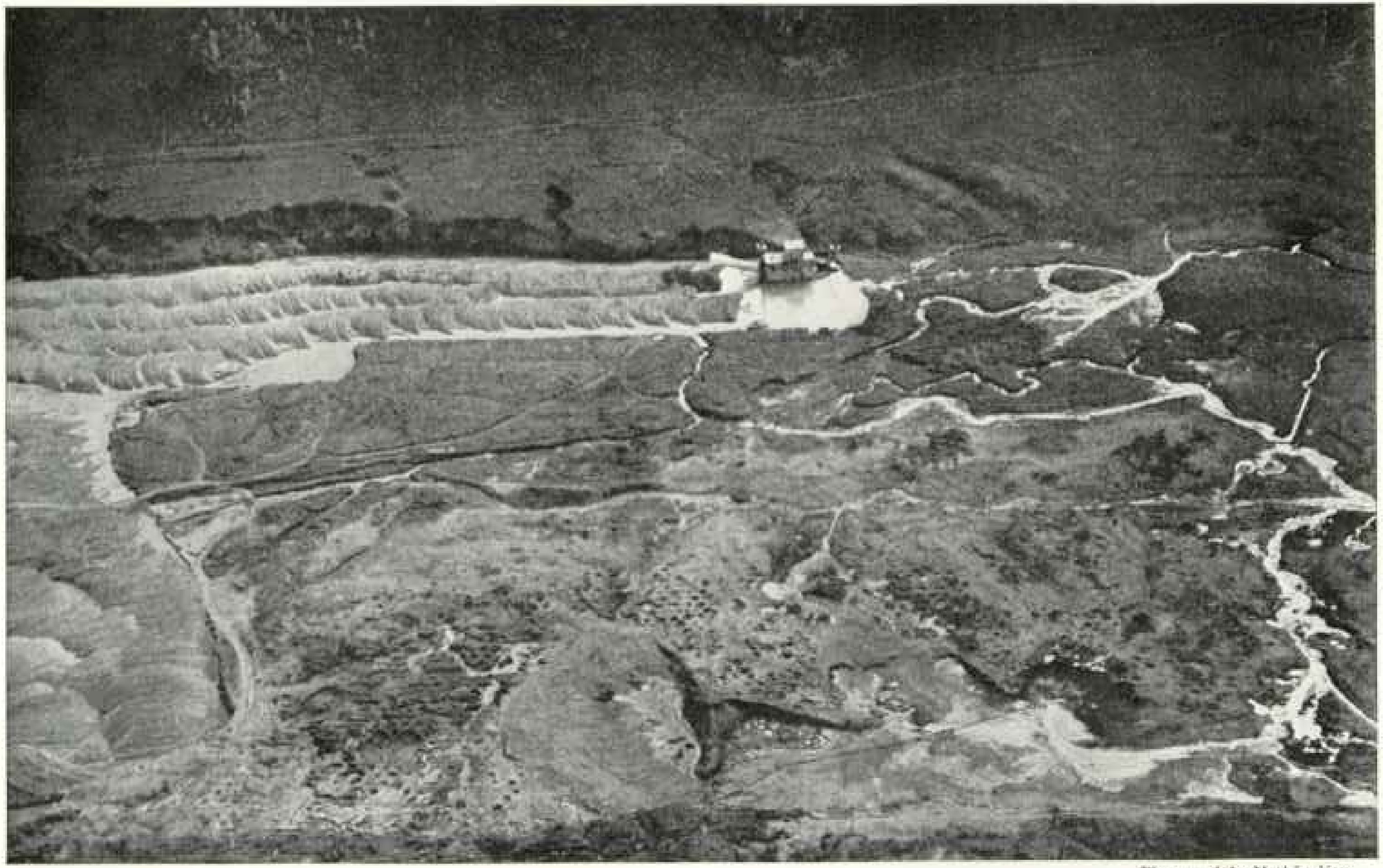
IN IRAQ EXPLORERS FOUND THIS BULL'S HEAD OF GOLD

During the excavations at Ur, city of Abraham, which carry authenticated Bible history back to the time of the Flood, this golden bull's head was discovered. The beard, hair, and horn tips are of lapis lazuli.

Photograph from Maj. C. Leonard Woolley

AN ANCIENT GOLD DAGGER FROM THE RUINS OF UR

This delicate weapon, more than 5,000 years old, with its handle of lapis lazuli studded with gold, was discovered near an excavated tomb. The tomb revealed the skull of a king and remains of 60 human sacrifices.



Photograph by Merl La Voy

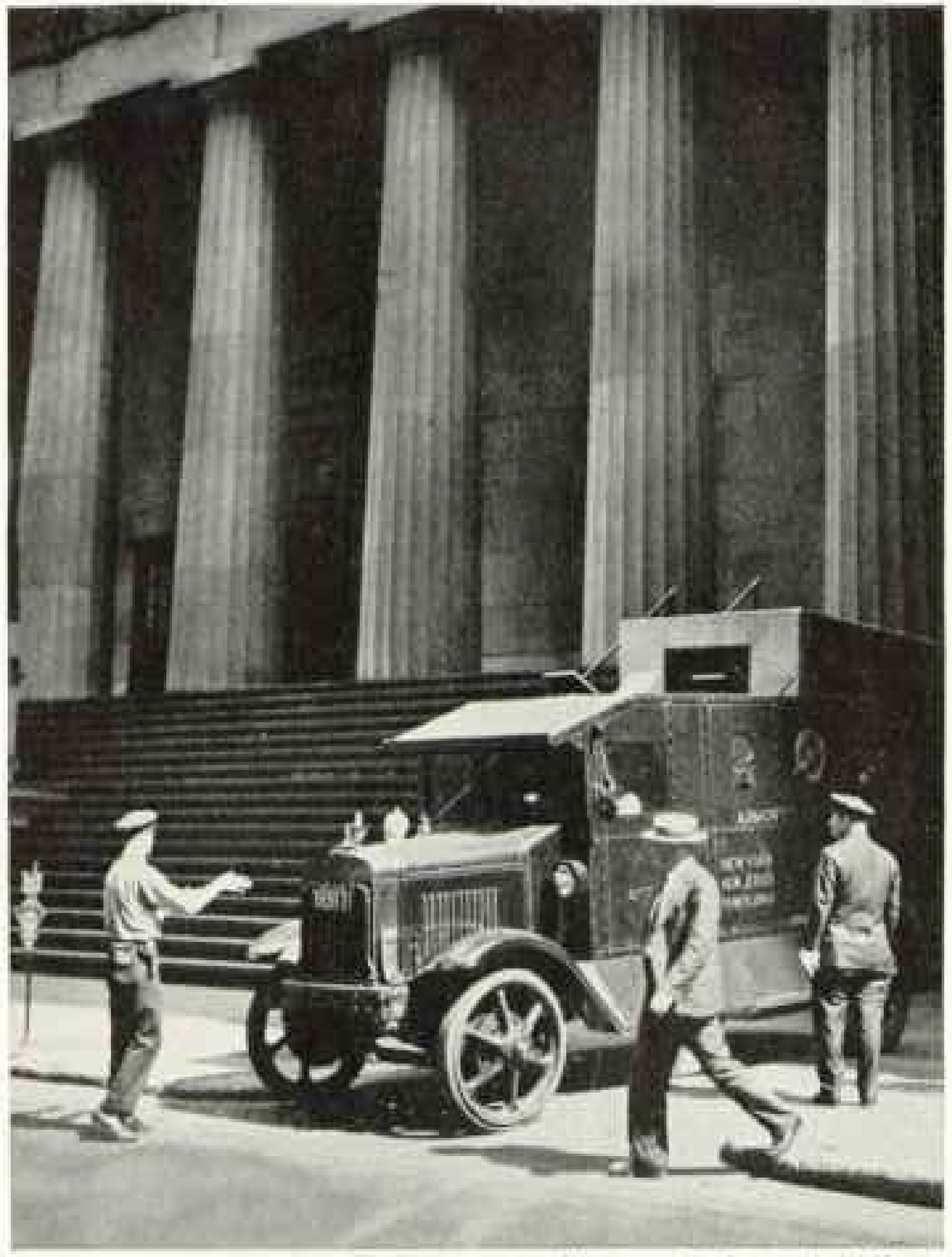
A GOLD DREDGE AT WORK ON A CREEK NEAR FAIRBANKS, ALASKA

It takes up the gold-bearing gravels in bucket scoops at the bow, extracts the gold by means of devices in the central portion of the boat, and discharges the residue, or "tailings," at the stern. The motion of the dredge, as it swings back and forth across the valley and moves slowly forward, accounts for the ridgelike formations left behind. In this operation the dredge must handle about 56 tons of dirt to extract gold to the value of a twenty-dollar gold piece.

Photograph from Hastings and Co.

POUNDING THIN GOLD SHEETS INTO THINNER GOLD LEAF

Machines are sometimes used in the preliminary pounding, but the last few hours of work, when gold is reduced to transparent thinness, must be done by hand. Even atmospheric conditions may cause the gold leaf to break. Gold may be beaten so thin that a pile of 1,200 sheets of gold leaf is thinner than a sheet of ordinary writing paper.



Photograph by International News

MOVING DAY FOR A PART OF UNCLE SAM'S GOLD STOCK

Nearly two billion dollars' worth of gold, with some silver, comprising about 1,000 such truck loads, was transferred from the United States Subtreasury in New York to the new Assay Office. Each truck was manned by seven guards; each guard carried a riot and machine gun, besides his side arms. The route was heavily patrolled.

Photograph by Burton Holmes from Galloway

RUNNING GOLD-BEARING GRAVEL THROUGH SLUICE BOXES NEAR DAWSON, IN THE CANADIAN YUKON COUNTRY

Sluicing is a miner's word for working placers where gold-bearing gravel is carried to the head of a sluice box by shovelfuls, or in wheelbarrows or small tramcars. Here a mountain stream is diverted through riffled sluice boxes, into which gravel is being shoveled. As the water carries the gravel along the sluice box, the bits of gold in this gravel lodge against cleats or riffles in the bottom of the long trough (see text, page 497).

Photograph by Merl La Voy

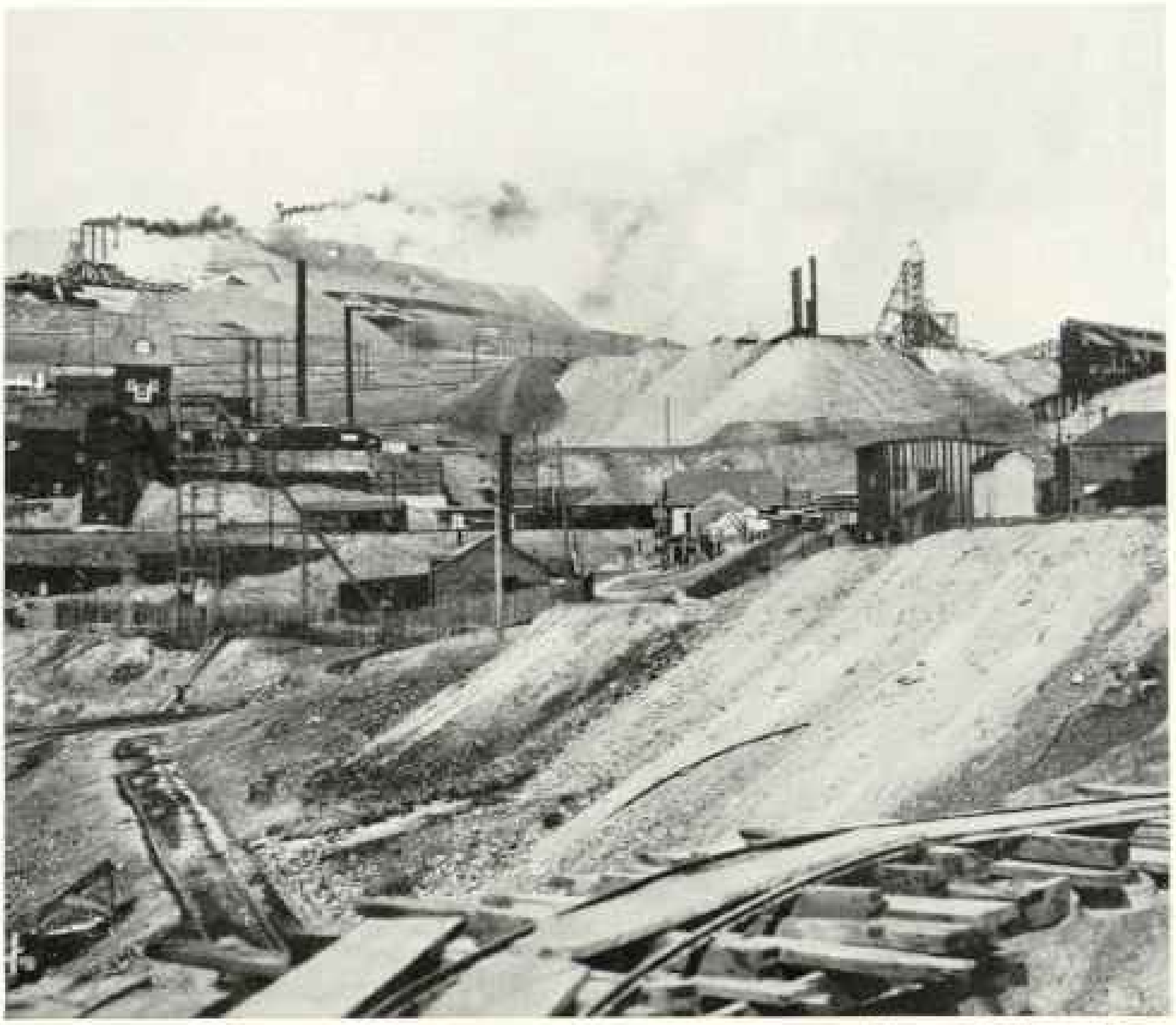
DREDGING FOR GOLD ON THE KLONDIKE RIVER

Hungrily digging and clawing their way, like monster crabs, these dredges of the steam-shovel or endless-chain bucket type are most useful where large masses of gold-bearing gravel must be washed. Many are built in California and exported to gold fields in foreign lands.

Photograph by Ewing Galloway

STAGING A MAKE-BELIEVE GOLD RUSH TO TRAIN WOULD-BE MINERS

This school held sessions in a river bed near Denver. It was organized to help relieve unemployment. Experienced miners were engaged as teachers. The school trained several hundred men and sent them to the Colorado hills to hunt gold and other minerals.



Photograph by Stewart Bros.

PORTLAND MINE AT VICTOR, COLORADO, HAS BEEN ONE OF THE RICHEST PRODUCERS IN THE CRIPPLE CREEK DISTRICT

With an ore zone proved to a depth of 3,000 feet, Cripple Creek District has produced about $400,000,000 worth of gold. A curiosity near by is a stretch of highway surfaced with crushed phonolite ore from the Portland Mine dumps. Though a mile of this surfacing would assay about $12,000 in gold, the cost of extraction makes it more profitable to sell the rock to road-makers.

standard must still depend upon gold for this purpose.

"It is true that nations must in the long run balance their international trade by goods, services, or investments, but in the intermediate ebb and flow balances must still be settled by the use of gold.

"It is noticeable that most of the nations off the gold standard are even to-day seeking to increase their gold reserves."

To see how paper money may sink, with no adequate gold or silver reserves back of it, one need but recall the Mexican fiat bills of Carranza's time, or the collapse of the German mark in 1923. In Berlin the cost of a man's hat mounted to 275,000,000 marks, nominally about $68,000,000!

You feel a vague sense of the Nation's power as you walk through vault after vault at the Philadelphia Mint. Tiers of gold bars and bags of gold coin are piled ceiling high. There is so much gold that no one man could even count it; he wouldn't live long enough. Farther along, in the big minting room, you stop beside a coining machine. From it flows a bright stream of "Balboas," which are being minted for Panama. The 27 machines in that room, in an eight-hour day, can stamp 1,260,000 coins.

From one machine I saw a man moving a half-bushel box of 20-dollar pieces. "Your nerves," I asked, "your emotions, are they ever upset?"

Photograph by Acme Newspictures

CUTTING SPOOLS OF GOLD INTO SQUARE SHEETS

These sheets, which look like rolls of photographic film, are cut to uniform size, laid one on the other, separated by a "skin," or parchment, and then pounded by the goldbeater. Since ancient Egyptian days, goldbeaters have used the same methods and implements. After hours of beating, the gold leaf becomes so thin that, if crumbled in the hand, its particles disappear in the pores of the skin (see illustration, page 508).

"One or two men here have gone crazy; not me. I've handled billions; but this money is Uncle Sam's. To me a peck of his gold coins is no more than so many potatoes."

In this mint are gold scales so delicate that a half-inch-long human hair moved the balances and weighed one-ten-thousandth of a gram! You can even weigh your own name by first weighing a blank bit of paper and then weighing it with your name written on it!

From far and near people bring or send scrap gold, literally bushels of it, for the mint to melt down and buy. Payment is made by a check drawn on the United States Treasury. On one worn wedding ring I read, "John to Mary 1873."

"Every conceivable kind of old gold finds its way here," said a mint official: "polo and tennis cups, medals for school oratory or athletics, lodge pins and badges. We even bought the gold ornaments from John L. Sullivan's world championship belt!"

Counterfeit coin, also, goes there for examination and delivery to the Secret Service, and much coin willfully mutilated, such as one-cent pieces pounded to fit slot machines and public telephones.

HOW GOLD IS HANDLED BY THE UNITED STATES ASSAY OFFICE

Our Government's head gold buyer is the Federal Assay Office, on the lower end of Manhattan Island, New York. It takes the crude wealth of gold mines and the gold that other lands send us, assays, refines it, and pays the sender its value in dollars; also by check drawn on the Federal Treasury.

This office does a "cash and carry trade" and seeks no customers. Those who would buy or sell gold must come to it. Bars, nuggets, dust and amalgam, old jewelry, or coins from abroad find a

© Keystone-Underwood

BUSHELS OF OLD JEWELRY COME TO MARKET FOR THEIR GOLD

In the United States and throughout the world itinerant buyers are canvassing the countryside for old rings, pins, chains, bracelets, medals, emblems, plate, and other objects of gold. Through jewelers, bullion brokers, and pawnshops, this metal, melted and refined, finds its way back to the gold stocks of governments. This pile was brought to a bullion broker's office in London.

market at all Federal assay offices and mints.

"Some odd and interesting treasures have been packed up and tossed into our melting pots," said the superintendent of the New York office. "From a complete dinner set of gold, including every dish used at a formal dinner, we got twenty-eight thousand dollars' worth of pure gold. But all is not gold that glitters, even here. To our testing laboratory came one day two bright yellow bricks for which a Harlem doctor paid $23,000. When our assay showed they contained not one ounce of gold, the doctor collapsed."

To ship bullion, even silver, is, of course, expensive. Seeking to beat high transport rates, a South American who wished to send the assay office a large quantity of silver had a foundry cast it into wheels, shafts, and gears, and so forwarded it as ordinary freight.

Hard times and scarce gold make the quest for scrap keener to-day than ever in our history. In many city streets you may see modern "gold-seekers" ringing bells from door to door, or driving automobiles carrying the sign, "We buy old gold." One wide-awake buyer telegraphed the Government and asked for the name of a good gold-bearing town that had not been canvassed! Toward the end of 1932 old gold was brought to the Philadelphia Mint alone at the rate of about one million five hundred thousand dollars' worth a month.

MUCH GOLD IS RECOVERED FROM OLD PLATE AND JEWELRY

Stand by the receiving clerk's window at the mint or at the assay office and you see this gold scrap and jewelry brought in for redemption by the bushel basketful. You are astonished at the number of medals and emblems; also at the golden cups

Photograph from Keystone Underwood

HYDRAULIC MINING FOR GOLD IN BRITISH COLUMBIA

A stream of water, under pressure, carries the gold-bearing gravel into a sluice box. Mud and coarse gravel wash away, but the gold particles, being heaviest, lodge against riffles in the bottom of the box. Hills have been washed down, streams diverted, and valley farms and orchards invaded by hydraulic mining in some regions of the American West.

and goblets. Even church plate from Latin America has been brought in.

At the feast of Belshazzar, says the Book of Truth, men drank from golden vessels. They still do. Gold tea sets are not infrequently purchased and used in preference to those made of silver. This is also true of dinner sets, toilet sets, coffee cups, cigar boxes, bowls and goblets. Naturally, these things in gold are not so prevalent as they are in silver, owing to their very much higher prices.

Platinum has supplemented gold in much so-called "gem jewelry," as it is considered more effective in showing up the brilliance of some precious stones. But gold is still conspicuously used in jewelry wherein design is the chief interest. Such articles are rings, bracelets, brooches, cuff links, vest buttons, lockets, charms, watches, chains, cigarette cases, and mountings for ladies' handbags.

When you look at some of the exquisitely designed jewelry now being melted up merely to recover its gold content, you think of what John Ruskin wrote: "True goldsmith's work, when it exists, is generally the means of education of the greatest painters and sculptors of the day."

Ghirlandajo, teacher of Michelangelo, and Verrocchio, master of Leonardo da Vinci, were goldsmiths (see illustration, page 517). So was Ghiberti, who fashioned the bronze gates that Michelangelo called fit for gates of paradise.

ASTONISHING SKILL OF PREHISTORIC GOLDSMITHS IN LATIN AMERICA

From many lands, in ancient and modern times, have come rare and distinctive contributions to the goldsmith's art. Much of it has been melted and lost.

American aborigines were clever goldsmiths long before Columbus came.

© Planet News, Ltd., from Acme Newspictures

UNLOADING GOLD BARS FROM INDIA AT THE TILBURY DOCKS IN LONDON

Though India has for centuries been known as the "treasure sink of the world," hoarding stupendous fortunes in gold, enormous quantities of the precious metal are now moving to London. One reason for this is the depreciation of the silver rupee, India's unit of exchange, normally worth about 33 cents. Since the Indian's hoarded gold will now buy more rupees, he is impelled to make the exchange.

No one can even imagine the variety of golden jewelry and tiny figures of men, beasts, birds, and reptiles found in Costa Rica. In amazement you stare at these gold tapirs, jaguars, lizards, turtles, crabs, crocodiles, monkeys, gulls, parrots, spiders, armadillos, and dogs shown in the American Museum of Natural History in New York City (see Duotone Plate III).

From Panama and Colombia come still more examples of this ancient craft. In these golden birds and men, as in the golden llamas of Titicaca Island and the bowls and jars from what is now Peru, we see again the enduring beauty and indestructible quality of gold. And you are reminded that man, since remotest antiquity, has found it beautiful and adorned himself with it. Examine some of these early American trinkets and you see one side is worn smoothly away, where it may have rubbed, like a lodge emblem, on the ample waistline of some prehistoric city father.

In America to-day, it is the goldbeaters and the dentists who eliminate much gold from circulation.

Street-name signs in Washington, D. C., are of cast iron, with raised letters in gold leaf. In the shopping districts of any city you see gold lettering on windows and advertising signs; on side streets three big gilded balls hang over pawnshop doors: even red police cars and fire trucks are all aglitter with gold-leaf trimmings.

On one New York skyscraper $28,000 was spent for gold-leaf decoration. In gilded ballrooms, on furniture, picture frames, in the lettering on railway coaches and the delivery trucks of fashionable shops, fortunes in gold leaf are wearing away—gold that is forever lost, for leaf cannot be scraped off and reclaimed.

© Planet News, Ltd., from Acme Newspictures

GOLDEN TREASURE FROM THE SUNKEN LINER "EGYPT" BEING UNLOADED AT PLYMOUTH, ENGLAND

A salvage company of Genoa sent its divers down 400 feet to seek 119 boxes holding 1,689 bars of gold, 37 boxes containing 164,979 sovereigns, and 1,229 loose bars of silver, insured for the equivalent of $5,156,740.73 at the normal rate of exchange. Up to November last, when operations ceased during bad weather, gold and silver worth about $3,555,100 had been recovered. This included 865 bars of gold, five and a half tons of silver, and 83,300 sovereigns (see pages 480 and 505).

This beating of gold is one of the world's oldest trades (see page 508). The Egyptians made gold leaf centuries before Christ. Mummy cases were often gilded; sometimes the body itself was covered with gold leaf.

"In my home," said Pliny, "a single ounce admits of being beaten out into 750 leaves 4 fingers in length by the same in breadth." To-day, with better tools, modern goldbeaters pound the leaf even thinner. They pound it so thin that, if crushed in the hand, its particles disappear in the skin. It is so thin you can see through it. Gold leaf can be pasted over a camera lens, yet permit a fairly clear picture to be taken. That trade-mark stamped in your hat or shoes may be of gold leaf beaten 1,200 times thinner than a sheet of paper. An ounce will spread to 175 square feet. But how, you ask, is gold actually beaten?

"We buy a gold bar, 999.9 fine, from a United States mint," explained one of the craft. "This we alloy slightly with silver and copper for the shade desired. The standard color is 23 carats fine.

"Our gold is then cast into a long bar, run through a wringerlike machine, which rolls it out into a long, thin ribbon. We cut this into inch squares, lay it between parchment, and beat it for 20 minutes on a marble slab with a heavy hammer. When duly thinned and extended, we again cut the leaf into sheets, and lay it between 'goldbeater's skin.' This fine pellicle is a skin from the intestines of cattle. This second beating takes two hours.

"Again the leaves are cut and beaten between pieces of the skin. But the leaf has now become so thin that much care is needed to keep from pounding holes in it or breaking it. Even a change in weather

Photograph from Metropolitan Museum of Art

WHEN FRANCIS I SAID "PLEASE PASS THE SALT"

This famous gold saltcellar was fashioned by the Italian artist Cellini for the King of France during his exile in that country. It is now in the Museum of Vienna. The versatile Cellini wrote treatises on the goldsmith's art, on sculpture, and on design, and practiced all these arts.

may now affect it. This last beating takes four to five hours."

I talked with the goldbeater as he worked. "I really lift my 12-pound hammer only once," he said. "After that it bounces back up, and I just pull it down—all power in the shoulder, like a golf swing."

I timed him—68 blows a minute, and then a breathing spell. In all, about 14,000 blows given in the leaf's last hours of beating.

"We'd lose money if we didn't save all scrap," he said. "We burnt the wood floor of a tiny room where we pack leaf and got back three hundred dollars' worth. One of our beaters paid $1.50 for a pair of work pants; two years later he burnt up his pants and got $3.40 in gold. The firm let him keep it.

"We get our skins from England," he continued. "That big hare's foot, for cleaning and dusting a selenite powder on the skins so the gold won't stick, comes from eastern Europe. Somehow, the hair on the American rabbit foot seems too short. Our parchment comes from a French firm. Its founder was a Crusader and learned his art centuries ago. These wooden pincers for handling leaf are made to-day just like those you see pictured on monuments of old Egypt.

GOLD TEETH FROM ANCIENT DAYS

"Few people walking the streets realize that gold letters in the signs over cigar, grocery, and other stores may be 22- or 23-carat gold. Sign painters are our best customers."

Pagan dentists of Etruscan days used gold on teeth, as museum exhibits indicate. In Rome, about 450 B. C., it was forbidden by law to bury gold in any form with the dead, probably because of a gold shortage,

except "the gold with which the teeth may perchance be bound together."

To-day dentists use up fortunes in gold every year—in crowns, plates, fillings, and bridge work. In fact, so much gold is thus used that some refiners specialize in this class of gold product.

Since Etruscan times a prodigious lot of gold has been thus lost. Some is recovered, of course, some in ways not pleasant to think of. Through the mails, gold dental work that once belonged to departed relatives is often received by the United States Treasury from families in need of money.

That "a mine is a hole in the ground" is an old Western saying. While some mines have paid enormously, it is an economic truism that gold, as a whole, costs more to mine than it is worth.

Yet gold's value to man, as a basis of exchange in facilitating commerce, exceeds all reckoning. While some say, for example, that California's gold yield has cost several times its money value, the mining industry it created of course helped and hastened the development of that State's many other resources.

Since the World War began the world has swiftly increased its effective stock of gold. This has, in fact, grown by about $6,800,000,000, or 140 per cent, in the last 19 years. More gold being mined, less used recently in the trades, and the surrender of private hoardings in India are the chief causes of this increase.

Growth in the world's gold since 1922 has been largely due to increased output in South Africa and Canada. Since 1929, however, our own gold-mine yield has slightly increased. All gold mined in 1932 is estimated now at $460,000,000.

HUGE VAULTS OF BANK OF FRANCE

France, with a stock of about $3,250,000,000, or more than twice what she held in 1929, has the world's largest concentration of gold. America's stock is larger, but so is our country, and our stock has not increased so fast as that of France.

France guards her vast treasure, incidentally, by a method almost spectacular. Neither burglars nor enemy armies using bombs or poison gas would find it easy to get at these billions held by the Bank of France. Its great vaults are beneath the city of Paris, 200 feet down, protected by 50 feet of solid rock and a subterranean lake deep enough to float a ship.

To reach these vaults one descends by elevator, then through six steel towers with steel doors that revolve by electric motors. In case of danger, a thousand bank employees could descend this passageway and flood it behind them. Once in the huge treasure chamber of two and a half acres in extent, inclosed in walls of steel and concrete 20 feet thick, this army could live indefinitely, almost in comfort, with kitchens, dishes, linen, and beds. There is food enough on hand to withstand a long siege. Fresh air, too, is supplied by a secret means. Even if intruders could bore their way through the solid rock and conquer the waters of the Seine, dammed up here by the bank chamber, there would still be other ways of protection, known only to a few. Love may laugh at locksmiths; but there is no joke about the insurmountable barriers, which took nearly 1,500 workers three years to complete, behind which France guards her gold stock.

A WALKING "SAFE-DEPOSIT VAULT"

With few banks and no safety boxes, middle-class natives of Iraq, India, and Persia usually hoard their wealth in gold coins and jewelry. In these and other eastern lands the rich also often keep much of their wealth in jewels and gold plate.

My washerwoman at Baghdad jingled like sleigh bells when she walked, for on her wrists and ankles she wore all her life savings, gold worth two or three hundred dollars. When she needed cash to help bury a relative or buy her daughter a wedding outfit, she sold or pawned some of her trinkets.

Most of the great gold strikes, say mining engineers, have probably been made. The world has been more thoroughly prospected for gold than for any other metal. It may be vain, then, to hope for another series of gold finds as rich as was Cripple Creek, the Lena, the Rand, or the Klondike.

Yet from year to year gold strikes of varying importance are constantly recorded. We read to-day of new gold finds in Canada, Australia, and elsewhere; and news from Johannesburg reports that the sub-outcrop of the main reef of the vast Witwatersrand gold fields is now believed to extend approximately another 40 miles.

Exciting tales of rich strikes, of dazzling fortunes exposed by one lucky stroke of the pick, the spirit of adventure and romance that clings to the gold hunter's career, leave man indefatigable in his search.

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

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

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed $5,000 to Admiral Byrd's Antarctic Expedition.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society's notable expeditions to New Mexico have pushed back the historic horizons of the Southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region The Society's researches have solved secrets that have puzzled historians for three hundred years. The Society is sponsoring an ornithological survey of Venezuela.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated $65,000 to enable the Smithsonian Institution to establish a station for six years on Mt. Brukkaros, in South West Africa.

Announcing a New

10★GENERAL ELECTRIC

"TEN STAR FEATURES!"

★ *New Monitor Top* of striking beauty.

★ *New All-Steel Cabinet,* porcelain inside and out.

★ *New Sliding Shelves, Adjustable in Height.* More storage space.

★ *New Stainless Steel Freezing Chamber.* Cannot chip or rust.

★ *New Semi-Automatic Temperature Control* for fast or slow freezing. Equipped with new G-E cutrosers.

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★ *New Foot-Pedal Door Opener.* Door swings open at touch of toe on pedal.

★ *New Hardware with Semi-Concealed Hinges.*

★ *Completely Equipped with Food Containers* of covered glass, Chiller Tray, and Vegetable Pan.

★ *Carries Unparalleled* **4-YEAR SERVICE PLAN**

We urge comparison of the G-E Junior with any other flat-top refrigerator carrying a 5-Year Warranty. Prices as low as

$99.50

Plus Tax and Delivery

AGAIN General Electric sets new standards in electric refrigeration! New beauty—new styling—new features—more value per dollar. The new 10★ G-E freezes more ice faster—consumes less current—operates so quietly you scarcely hear it. New *all-steel* cabinets are gleaming porcelain inside and out.

● No other mechanism has matched the Monitor Top record for dependable, trouble-free service. Within walls of ageless steel every moving part is *sealed* against air, dirt, moisture; safe from neglect or abuse; requiring no attention, not even oiling. ● 1 out of 3 electric refrigerators in use today is a G-E Monitor Top.

There's a G-E model and price to exactly meet your requirements. Terms as low as $7 down, $7 a month.

General Electric Company, Electric Refrigeration Department, Section R4, Hanna Bldg., 1400 Euclid Ave., Cleveland, Ohio.

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ALL-STEEL REFRIGERATOR

Enjoy the

FREEDOM

of SPACE

TO EUROPE

The Empress of Britain has more space for First Class passenger than any other ship.

Those long, high vistas of spacious lounges . . . that feeling of unhurried leisure and dignified living in the private apartments . . . that smooth, silent, easy service . . . that steady speed . . . all those things which travellers hailed in the Empress of Britain . . . are not new to Canadian Pacific. ¶They are chatacteristic of the fleet . . . of the great "Empresses," the smart "Duchesses," the democratic home-folks' "Mont-ships." Learn how pleasurable Trans-Atlantic travel can be. Book by Canadian Pacific. ¶From Montreal and Québec to British Isles and Continental ports. Your first 2 days on the smooth St. Lawrence Seaway. Only 3 to 4 days open ocean. ¶Travel-time map, information, reservations, your own agent, or any Canadian Pacific office in New York, Boston, Chicago, Philadelphia, Montreal and 30 other cities in U. S. and Canada.

CANADIAN PACIFIC

St. Lawrence Seaway

LEADERSHIP RESTS ON ACHIEVEMENT

Cadillac WAS FIRST WITH SYNCRO-MESH TRANSMISSION

It was a significant day, indeed, when the Cadillac Motor Car Company announced that it had perfected a non-clashing transmission—one that would enable the driver to shift without reducing his speed, and without noise or grinding of gears! . . . This great advancement, called then and now the Synchro-Mesh Transmission, has resulted in a complete transformation of the act of gear-shifting—and made motoring infinitely safer and more enjoyable. . . . The same spirit of pioneering which enabled Cadillac to produce the Synchro-Mesh Transmission is kept resolutely alive in the Cadillac laboratories, and is evident everywhere in the new Cadillacs and LaSalles. In fact, among many other advancements, these new cars reveal an improvement in the transmission itself, for the Cadillac-LaSalle Synchro-Mesh is now silent in operation in *all* forward speeds—low, second and high. . . . This constant pioneering has caused many persons to hold to Cadillac and LaSalle during year after year without so much as considering the purchase of other cars—for they know that every practical advancement will be given them in these two distinguished creations. . . . Your Cadillac-LaSalle dealer will gladly acquaint you with today's Cadillacs and LaSalles—now, as always, foremost examples of the finest automotive craftsmanship. LaSalle for 1934 starts at $2345, Cadillac at $2695, f. o. b. Detroit.

The Synchro-Mesh Transmission, one of the great developments in the history of the automobile, was introduced by Cadillac in August, 1928. It was, and is, a marked example of Cadillac's leadership in the fundamental advancement of the motor car

THE CADILLAC V-12 ALL-WEATHER PHAETON

Two Weeks Away $192

REALLY POSSIBLE BY THE

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The two fastest liners in the world bring the short European vacation within the reach of your time and your pocketbook . . . 17 days away from home with a week in London and Paris for $204, including all expenses afloat and ashore . . . Longer tours at both lower and higher rates by Lloyd express and cabin liners in First, Cabin Class, Second, Tourist and Third to England, Ireland, France, Germany. Write or ask for further information.

The North German Lloyd Information Service, 57 Broadway, New York City, will be glad to refer you to an experienced steamship agent in your neighborhood who can be of real assistance.

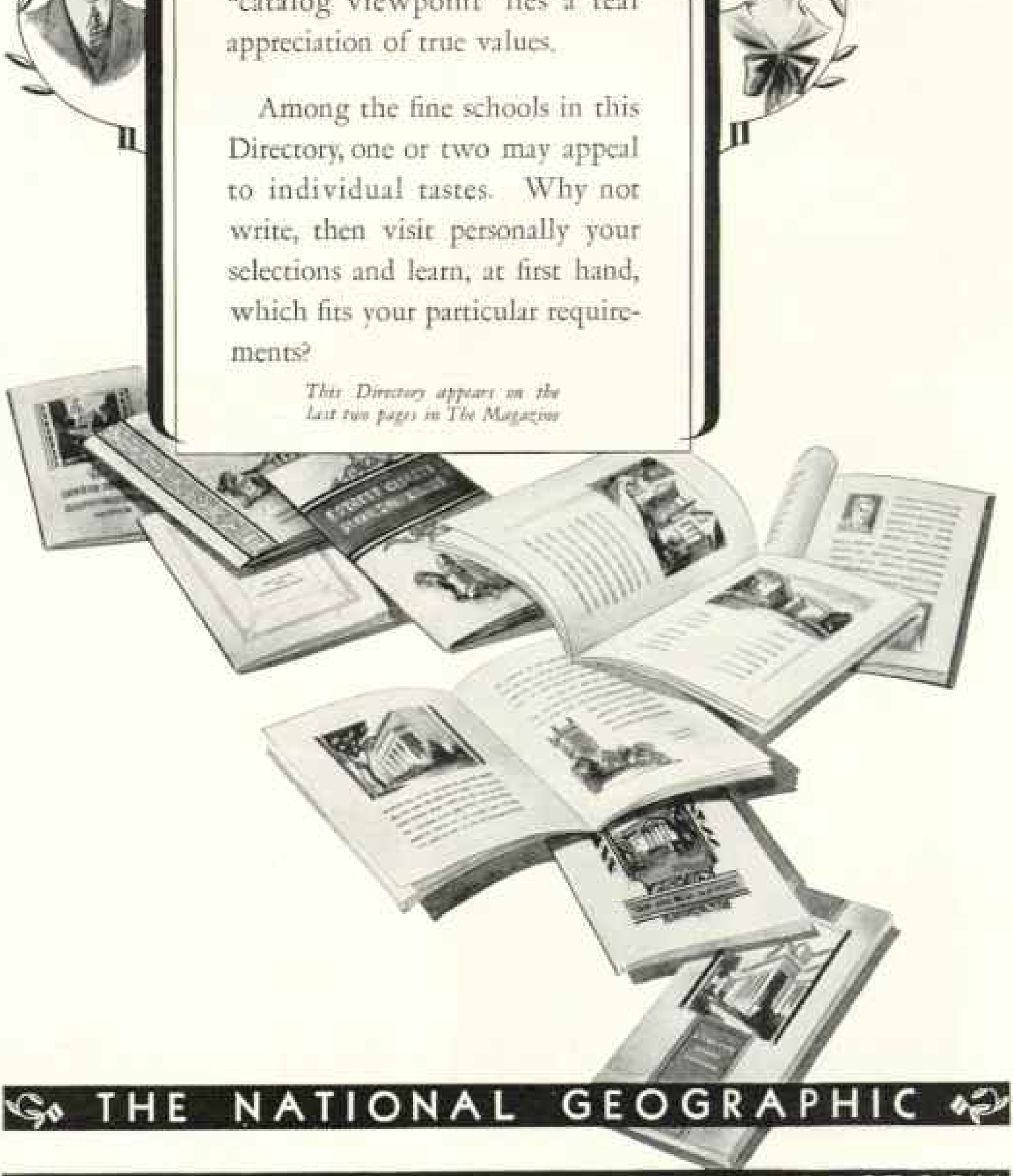
NORTH GERMAN LLOYD

Beyond the catalog viewpoint

Discriminating people do not choose a school as they would order merchandise. Beyond the "catalog viewpoint" lies a real appreciation of true values.

Among the fine schools in this Directory, one or two may appeal to individual tastes. Why not write, then visit personally your selections and learn, at first hand, which fits your particular requirements?

This Directory appears on the last two pages in The Magazine



THE NATIONAL GEOGRAPHIC

COLLEGE SCHOOL AND CAMP DIRECTORY

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HEINZ Tomato Juice has the tempting, natural flavor and color of big, luscious, sun-ripened tomatoes right off the vine. Its quality is unvarying—unsurpassed. And everytime you drink this refreshing, ruddy beverage you know it is the finest you have ever tasted.

Heinz Tomato Juice is pressed from prize, Heinz-bred tomatoes the very day they are picked. You get the undiluted, unspiced juice with only a pinch of salt added.

You will never tire of Heinz Tomato Juice. Let every member of your family enjoy the uniform quality and unmatched flavor of this rich, full-bodied, wholesome drink the year around.

Heinz Tomato Juice is sold in both tin and glass containers at good grocers almost everywhere.

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Let us send you this remarkable *new*

FREE VACATION BOOK

Before you make plans for this summer

ONE of the most timely books ever published is yours for the asking. Timely, because in this year of all years when you need a *real* vacation, it describes just such a holiday in Southern California, and tells how you can easily make it yours, even in two weeks away from business, *for the lowest cost in fifteen years!* Don't fail to get this book before making any plans for this summer. Just send the coupon, today.

What It Contains

Its 72 fascinating pages include 150 interesting gravure photographs, itemized figures on costs, map, information about routes, day-by-day sightseeing itineraries and the answer to almost every question you might ask about a Southern California vacation.

It takes you, in word and picture, through this whole playground, from nearby glaciers to Old Mexico's border, from mile-high mountain lakes to the broad Pacific's lazy surf and emerald islands. Pictures golden orange groves and gardens . . . ancient Spanish Missions and famous resort cities like Pasadena, Glendale, Beverly Hills, Santa Monica, Pomona, Long Beach; portrays the gay night life of Hollywood and cosmopolitan Los Angeles; shows you why sports of every kind are more thrilling here, and why this glorious vacationland is *cool* and *rainless* all summer long.

Send Coupon Today

Here you escape the "peak prices" necessary in one-season resorts. Costs, *normally* about 16% under the U. S. average, have now been further drastically reduced. Send the coupon today. Start planning this great adventure now!

Come for a glorious vacation. Advise anyone not to come seeking employment, lest he be disappointed; but for the tourist, the attractions are unlimited.

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Send me *free* illustrated book giving complete details (including costs) of a Southern California vacation. Also send *free* booklets about the counties checked.

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NEW YORK LIFE
INSURANCE COMPANY

51 MADISON AVENUE, NEW YORK, N. Y.

A MUTUAL ORGANIZATION, FOUNDED IN 1845 — INCORPORATED UNDER THE LAWS OF THE STATE OF NEW YORK

88TH ANNUAL STATEMENT, DECEMBER 31, 1932

BOARD OF DIRECTORS
DECEMBER 31, 1932

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Treasurer, Cabot Manufacturing Company (Textiles)

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President

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*CALVIN COOLIDGE
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Retired

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President, Chemical Bank & Trust Company

WILLARD V. KING
Retired

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Deering, Milliken & Company

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Chairman of the Board, Continental Illinois Bank & Trust Company

J. BARSTOW SMULL
Vice-President, J. M. Winchester & Company

JESSE ISIDOR STRAUS
President, R. H. Macy & Company, Inc.

RIDLEY WATTS
Director, Chemical Bank & Trust Company

*Died January 5, 1933

Elected January 11, 1933, to fill vacancy caused by the death of Darwin P. Kingsley:

ROBERT E. DOWLING
President, City Investing Co.

To the Policy-holders and the Public:—

During the year 1932 the New York Life Insurance Company paid to its living policy-holders and to the beneficiaries of those who died the sum of **$255,200,187.69**

It met every obligation from its current cash income, made new investments during the year amounting to **$46,623,111.32** and closed the year with a larger amount of cash in bank than at any other year-end in its history.

The assets of the Company amount to **$1,974,076,041.43**

The total liabilities of the Company amount to **$1,860,106,133.54** included in which are policy reserves calculated upon the most conservative basis used by Life Insurance companies; a provisional apportionment of **$52,059,288** for 1933 dividends to policy-holders, and a special reserve, not required by law, of **$36,630,709.74.**

Its unassigned funds (surplus) over all liabilities amount to **$113,969,907.89**

New paid for insurance effected during 1932 amounts to over **$521,000,000**

At the close of 1932 the Company had outstanding insurance in force of over **$7,300,000,000**

The total income of the Company during the year was **$407,235,904.31**

The following table shows the assets of the Company under various headings and the percentage of each to the total:

Description of Investment	Asset Value	Per Cent to Total Assets
Cash on Hand or in Bank	$27,697,604.76	1.40
United States Government Bonds	56,009,519.74	2.84
State, County and Municipal Bonds	129,486,343.11	6.56
Public Utility Bonds	147,550,734.61	7.47
Industrial Bonds	19,187,336.83	.97
Railroad Bonds	376,878,012.42	19.09
Canadian Bonds (Dominion, Province, City, etc.)	38,847,205.78	1.97
United Kingdom of Great Britain & Ireland Bonds	4,987,377.90	.25
Other Foreign Bonds	2,359,029.10	.12
Preferred and Guaranteed Stocks	80,883,896.00	4.16
Real Estate Owned (including Home Office)	48,146,598.73	2.44
First Mortgages on City Properties	529,478,296.81	26.82
First Mortgages on Farms	22,451,275.96	1.14
Policy Loans	419,798,911.98	21.27
Interest and Rents Due and Accrued	36,168,670.83	1.83
Other Assets	34,145,227.67	1.73
Total	$1,974,076,041.43	100.00

(In this statement, bonds not subject to amortization and all Preferred and Guaranteed stocks are valued on basis prescribed by the National Convention of Insurance Commissioners.)

Thomas A. Buckner

President

"What can I do to fight film—and save my teeth?"

FILM is ever present—in every mouth—on every tooth—constantly accumulating. Sometimes it is invisible—more often it forms a yellow, ugly mask.

Film is soft and sticky. Food particles cling to it. The mineral salts in saliva combine with film to form hard, irritating tartar. This causes gums to bleed and lays them open to infection.

Film leads to decay

But film's greatest damage is done through tooth decay. In film are tiny, rod-shaped germs . . . *Lactobacilli.* This germ throws off *enzymes* which, in turn, produce strong acid. This acid eats away tooth enamel just as other acids burn holes in cloth or wood. Deeper and deeper goes the acid. Bigger and bigger grows the cavity. Finally the nerve is reached . . . the root canal infected . . . and unless repaired in time, results may well prove tragic.

"What can I do to fight decay?"

To fight decay use Pepsodent *instead* of ordinary tooth pastes. Why? Because Pepsodent contains a special film-removing agent.

This film-removing material in Pepsodent is one of the great discoveries of the day. Its power to remove every trace of film-stain is revolutionary! Its notable distinction of being twice as soft as other materials in common use has gained wide recognition.

And so, when tempted to try cheap and ineffective tooth pastes, remember the one safe way to fight film is to use the special film-removing tooth paste—Pepsodent. Use it twice a day and see your dentist at least twice a year.

See how rapidly film forms on teeth!

These teeth were absolutely free of film at 8 a. m. **At noon**—the film detector* solution was applied and this is how they looked.

At 8 p. m.—the film detector* shows still heavier deposits of film. Two-thirds of the tooth's surface is covered.

At 10 p. m.—these same teeth were brushed with Pepsodent. Note how thoroughly film has been removed.

* A harmless fluid, used by dentists, which stains film so that the naked eye can see it.

Pepsodent—is the special film-removing tooth paste

HAWAII
IN SUMMER • • •

More than you've ever dreamed for LESS *than you've ever paid!*

•

Giving lavishly, asking little, Hawaii wins your endless devotion. Her favorite word is "Aloha" (welcome).

She's a hundred vacation spots, all in one. Gathered here the swimmer and the mountaineer—the yachtsman and the polo star, the explorer and the student.

The FOUR Pacific sovereigns of sea-luxury, the "Mariposa," "Monterey," "Lurline" and "Malolo," with express speed and LOW fares co-operate with time and budget to make this holiday possible.

Plan a vacation THIS summer in Hawaii measured to YOUR idea of what a holiday should cost—*but exceeding every idea you ever had as to what a vacation should be.*

•

NEW ZEALAND and AUSTRALIA

Set your compass by a star hung high in Southern skies. Let it guide you coolly, gaily, luxuriously, to the South Seas, now brought so near by the swift super-liners "Mariposa" and "Monterey." 16 days to New Zealand! 19 days to Australia!

THIS SUMMER low-cost-tours provide maximum economy—in actual expenditure, in conservation of time, in concentration of enjoyment.

Intriguing details at your travel agency or our offices

MATSON LINE • OCEANIC LINE

New York • Chicago • San Francisco
Los Angeles • Seattle • Portland

Shut your books and open your eyes

You remember how Mr. Pickwick, when he was after Jingle, got into a mess about rescuing a schoolgirl and was locked up in a cupboard—well, that happened at Bury St. Edmunds, near Ipswich. Wouldn't you like to see the quaint old town of Great Yarmouth where Peggotty's boat was beached? From there step back three hundred years to Stratford and the house where Shakespeare was born. See the Bronte Country and famous York itself. A little further and you're in the Lake District with its memories of Wordsworth, Coleridge, Ruskin. Then over the Border to the land of glens and woods and waterfalls, where Burns wrote his songs and Scott his romances.

A wonderful schedule! An unforgettable trip! Fast, luxurious trains take you everywhere.

Illustrated Pamphlets from T. R. Deuse—Vice-President, Passenger Traffic, (Dept. A. 34.) L.M.S Corporation, 200 Fifth Avenue, New York City; or H. J. Ketchum, (Dept. A. 34.) General Agent, L. & N. E. Railway, 11 West 42nd Street, New York City, or from your own ticket agent.

L M S
LONDON MIDLAND & SCOTTISH RAILWAY OF GREAT BRITAIN

LONDON & NORTH EASTERN RAILWAY OF GREAT BRITAIN
L·N·E·R

THE VACATION YOU'VE DREAMED OF COSTS LESS THAN EVER THIS YEAR IF YOU SPEND IT IN CANADA

JASPER PARK

in the

CANADIAN ROCKIES

Here's a vacation of a thousand thrills: Maligne Lake whose waters offer the finest brook trout fishing on this continent and mirror mountain scenes of almost incredible beauty! The famous drive to Mt. Edith Cavell with its dazzling Angel Glacier . . . The Pocahontas Highway where mountain sheep and goats, deer and black bears often pose for camera hunters . . . Golf on a championship course with breath-taking views from every fairway. Swimming in a warmed outdoor pool . . . tennis . . . trail riding . . . mountain-climbing with Swiss guides.

The friendly hospitality of Jasper Park Lodge is as much a part of this perfect vacation as the mountains themselves. Luxurious accommodations. Perfect food. Rates from $7.00 a day, Canadian funds, for room and meals (10% discount for two weeks or more). Season June 1-September 23. Booklets, travel films and all information from any office below.

1933 SPORTING EVENTS
Riding, swimming, hiking, mountain-climbing with Swiss guides and every vacation sport. July 1 — The Rodeo. September 2-9 — Totem Pole Golf Tournament.

Low round trip fares permit a wide diversity of routes as well as convenient stopovers. Unexcelled service on the Continental Limited that follows the picturesque Jasper Park Route to the Pacific Coast.

CANADIAN NATIONAL

To Everywhere in Canada

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BUFFALO
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CHICAGO
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CINCINNATI
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DETROIT
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DULUTH
428 W. Superior St.
KANSAS CITY
705 Walnut St.
LOS ANGELES
607 So. Grand Ave.
MINNEAPOLIS
634 Marquette Ave.
NEW YORK
673 Fifth Avenue
PHILADELPHIA
1422 Chestnut St.
PITTSBURGH
355 Fifth Ave.
PORTLAND, ME.
Grand Trunk Ry. Sta.
ST. LOUIS
314 No. Broadway
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83 East Fifth St.
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648 Market St.
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Everybody's Happy in Maine

There's something about a stay in Maine that brings happiness and contentment. Come and enjoy outdoor sports or quiet rest and relaxation.

Seacoast, mountains, woods or lake country—Maine has the widest choice. There is much of historic and scenic interest in Maine. Don't miss the glorious view from the new Cadillac Mountain Drive in Acadia National Park.

Hotels, inns, camps and farm homes provide comfortable accommodations at reasonable rates. You'll like Maine. Plan now—mail the coupon today.

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MAINE PUBLICITY BUREAU

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France

for new scenes and new interests . . . not the usual faces and amusements of your favorite resort . . . but PARIS ▲ Your aperitif at a tiny sidewalk table, a book mart along the Seine, Versailles and its glamorous past . . . Le Touquet and La Baule for week-ends ▲ Rouen with its blue roofs massing under pointed Gothic towers and silver-toned bells . . . the fashionable seaside resorts of Deauville, Dinard and Biarritz . . . curious Carnac of the Druid stones ▲ Down the Loire to Chambord, an architectural marvel of the Renaissance . . . Orleans, of the time of Caesar, the capital of the Carnute people where centuries later Jeanne d'Arc met her King ▲ Renew your strength and youth at the Spas of Vichy, Aix les Bains and Vittel . . . the majestic forests of the Vosges . . . Alsace, land of storks ▲ Cannes, Monte Carlo flaunt a luxurious sub-tropical beauty along that Azure Sea with Corsica sitting under a cloudless sky . . . and far above, rugged mountains tower into sparkling Alpine glaciers ▲ The finest and fastest trains with tariffs of less than two cents a mile through roads our ancestors traveled when the middle ages were young . . . hotels and pensions cheaper than ever before . . . villas, garlanded with roses and honeysuckle ▲ Your travel agency has brochures that are little journeys in themselves.

RAILWAYS of FRANCE

1 EAST 57th. STREET NEW YORK

Saved . . . from the menace of a 'lopsided' diet

Every time you fill your canary's cup with ordinary bird seed, you risk his song and health. He may get plenty to eat, and yet be undernourished because of a 'lopsided' diet.

Feed your canary French's Bird Seed and know he will be getting a full share of proteins, minerals, vitamins and carbohydrates—a perfectly balanced food mixture of choice, wholesome seeds.

French's Bird Seed is clean seed, too—air-washed to remove the "diet of dust" menace.

EXTRA VALUE—*a French's Bird Biscuit—an important factor in a balanced diet—FREE in every package of French's Air-Washed Bird Seed.*

French's Bird Seed

FREE ONE WEEK'S BIGHT FEEDING

The R. T. FRENCH COMPANY
2105 Mustard St., Rochester, N. Y.

Send me sample package of French's Bird Seed and French's Bird Biscuit—FREE.

Name_____

Address_____

City_____ State_____

If you want Free "Canary Book" check here ( )

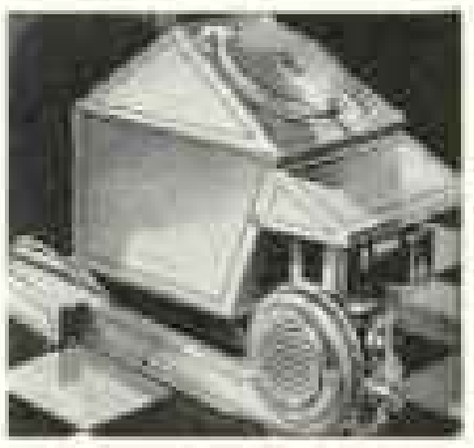
It now costs 62% less to heat Mr. Witham's home *automatically*

Iron Fireman automatic coal heating is an economy!

● Last year W. Stuart Witham, Jr., Vice-President of the Georgia Savings Bank & Trust Company, Atlanta, heated his home automatically with an Iron Fireman for $104.00. The year previous the cost of hand-fired coal was $276. In one year Iron Fireman made an actual fuel saving of $172.00, or 62 per cent. Writes Mr. Witham: "Iron Fireman has performed perfectly—has cut my fuel consumption about half, in addition to giving an even temperature—100% satisfied."

Iron Fireman fuel *economy* comes from its ability to burn the smaller, cheaper sizes of coal in a scientific, wasteless way. *Better heat* is secured from this inexpensive fuel because it gives off a steady flow of mellow warmth that penetrates the whole house, and eliminates the *too hot* or *too cold* experience that comes from the "pop on" and "pop off" types of automatic firing devices.

Investigate Iron Fireman now. Ask your dealer to make a survey of your heating plant and give you facts on Iron Fireman's economies and advantages. Don't endure another winter with present firing methods when Iron Fireman can give you so much better heat for so much less money. Iron Fireman can be installed in your present heating plant, and can be purchased on easy monthly payments. Use the coupon.



Iron Fireman is made in a range of sizes for homes and commercial boilers up to 250 horse power.

IRON FIREMAN

Automatic Coal Burner

IRON FIREMAN MANUFACTURING COMPANY
3170 W. 106th Street, Cleveland, Ohio

☐ Send Literature ☐ Please survey my heating plant
☐ Residence Type of Business_____

Name_____

Address_____ NG-2

Glacier Park

1933 Rates Reduced

● This is the year to see the Alps in America —Glacier National Park. Great Northern train fares are greatly reduced for the summer and so are the rates at hotels and chalets within the Park. Write A. J. Dickinson, P.T.M., 705 Great Northern Railway Bldg., St. Paul, for particulars. Ask about low-cost all-expense tours.

GREAT NORTHERN

What this country needs is a <u>different</u> hot cereal!

Here it is. Flavory flakes of real whole wheat. Cooks done in 3 to 5 minutes. Tastes like a million dollars.

YES, SIR. That's the only thing that'll save this country! A *different* hot cereal, by gum! One that'll make you feel like there's somepin' to get up for. . . . And here it is! Pettijohn's! It gives you pep, vigor, *optimism.* It gives you the rich, health-building elements of *natural* whole wheat. Tones your system. Braces you up. Yes, a different hot cereal will keep this country from going to the dogs. Try Pettijohn's tomorrow!

Pettijohn's

Rolled Wheat with All the Bran

A Radio GUARANTEED *to give* WORLD-WIDE RECEPTION *every day!*

SCOTT ALLWAVE DELUXE
15-550 Meter Superheterodyne

Receives broadcasts from Europe, the Orient, Australia—almost anywhere on the globe you choose—*direct!* This new, laboratory-built instrument of precision engineering is guaranteed to tune in foreign stations 10,000 miles or more away, with full loud speaker volume and natural tone fidelity, at all seasons. What a way to broaden your world-culture! Hear press dispatches from England's stations . . . typical national music from Spain—symphonic music from Germany . . . opera from Rome . . . other fascinating programs from the ends of the earth. Superb on domestic broadcasts, too! Costs no more than many less efficient models of ordinary receivers. Send for details, specifications and performance proofs.

USE THIS PROOF COUPON

E. H. SCOTT RADIO LABORATORIES, INC.
4450 Ravenswood Ave., Dept. GN-42, Chicago, Ill.
Send me full particulars regarding the SCOTT ALL-WAVE DELUXE, 15-550 Meter Superheterodyne Radio Receiver.

Name _____

Street _____

City _____ State _____

Equal to extra help without its cost

Now only

$18.75

Complete with juice extractor, two jade green bowls, automatic mayonnaise oil-dropper.

MIXMASTER

Does all the tiring arm-work of preparing meals and in a small fraction of usual time. For complete food mixer service ask for **MIXMASTER**—it does more things better. Sturdier, easier-to-use, finer attachments, more powerful. PORTABLE—use either on or off the stand. Self-turning bowls, tilt-back motor, 3 speed control. **The only mixer that will not interfere with radio reception.** Chopper-grinder, power can opener, silver polisher, potato peeler, etc., attachments at small extra charge. If not at your electric light company or dealer's, write Chicago Flexible Shaft Company, 5611 Roosevelt Rd., Chicago. 45 years making QUALITY products. **MIXMASTER is one of**

THE Sunbeam BEST ELECTRIC APPLIANCES MADE

Mixes
Mashes
Whips
Shreds
Juices
Grates
Chops
Grinds
Beats
Slices
Peels
Potatoes

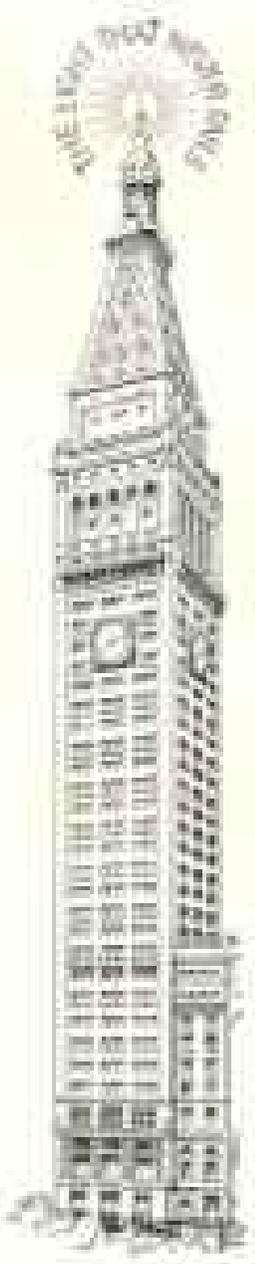
Keep Them Husky

IF YOUR child has never been brought into close contact with anyone who has tuberculosis, you can count yourself lucky because boys and girls are more susceptible to the disease than grown people. Most children who pick up tuberculosis germs get them from someone who has an active although often an unrecognized case of the disease.

Whenever a child is found to be infected, there should be an immediate search for the source of the infection. A child may be in daily association with an older person who is entirely unaware of the fact that he or she has tuberculosis which can be transmitted to others. The condition is probably thought to be chronic asthma or bronchitis.

However, why guess about possible infection? You can almost always find out by the simple tuberculin test whether or not your child has picked up any germs of tuberculosis.

If he has become infected, you will want to take the next step — have an X-ray examination to learn whether or not any harm has been done or is being done. Even though the germs are lying dormant, an infected child ought to be under medical care and carefully watched.



Many tuberculosis experts are of the opinion that the majority of the active cases of tuberculosis in adult life are partly or largely traceable to infection in childhood.

Despite all the progress that has been made in fighting the disease, it still causes more deaths and more invalidism between the ages of fifteen and forty-five than any other disease. Be on guard. Use all the help afforded by science to protect your children.

If detected in its earliest form, most cases of tuberculosis can easily be controlled and arrested. But if cases are permitted to develop to the point where the familiar first signs appear—loss of weight, lack of appetite, indigestion, fatigue and a persistent cough — there comes a long battle which can be won only with expert medical care, proper food and rest.

Remote Control
PHILCO LAZY-X

$18.75 to $250
Federal Tax Paid

Change Stations Adjust Volume Control Tone
WITHOUT MOVING FROM YOUR CHAIR !

Here's something really new in radio—PHILCO Lazy-X! A radio that you can listen to in absolute ease and comfort. A radio that doubles the number of stations and variety of programs you enjoy—by making it so easy to change from one to another.

PHILCO Electrical Remote Control is simple—convenient. From the beautiful Control Cabinet right beside your chair, you select the program you want and bring it in just as you want to hear it. You change stations—adjust volume—control tone by a mere flick of your finger.

All the glorious beauty of PHILCO tone—the tone quality only the patented inclined sounding board makes possible—comes to you at its best from the beautiful Sound Cabinet across the room.

Lazy-X is complete. There are no extras to buy. It is PHILCO'S supreme achievement in producing Balanced Unit Radio.

PHILCO offers the great, new Lazy-X in two models—both with electrical remote control—the superb 14 Lazy-X at $150—and a smaller 19 Lazy-X at $100 for those who do not require quite so much power and distance. The height of radio luxury at less than half the previous cost of *mechanical* remote control.

Lazy control with built-in speaker in the 19 Lazyboy at $65.

See Lazy-X at the nearest PHILCO radio dealer's store or, better still, try Lazy-X for 2 or 3 days in your own home. Hear it. Buy it. Relax and enjoy the last word in radio performance and convenience.

The glorious tone of the PHILCO Inclined Sounding Board "X" Models is available also in these conventional cabinets.

15DX	. . . . .	$250
23X	Radio Phonograph	$195
15X	(Illustrated) . . .	$150
91X	. . . . .	$100
43X	All Wave . . .	$100
47X	Direct Current . .	$100
71X	. . . . .	$ 80

Prices Slightly Higher Denver and West

PHILCO TRANSITONE
AUTOMOBILE RADIO

As true and clear as the PHILCO in your home. All-Electric (No Extra Batteries) $59.50 and $89.50—Complete and Installed.

PHILCO · PHILADELPHIA · TORONTO · LONDON

ROAKE CARTER—the newest sensation of the airwaves—PHILCO'S news commentator and editorialist daily from Monday to Friday 7:45 P. M. (E.S.T.) over the following Columbia stations, WABC, WNAC, WCAO, WGR, WBBM, KMBC, WCCO, WCAU, WJAS, KMOX, WJSV, WHK, CKOK, WHAS, WBT.

PHILCO REPLACEMENT TUBES IMPROVE THE PERFORMANCE OF ANY SET

PHILCO

A musical instrument of quality

Don't Wear A TIRED THIRSTY FACE

Refresh yourself
Bounce back to normal

You look the way you feel. • Refresh yourself with an ice-cold Coca-Cola, and bounce to a happy normal. • An ice-cold Coca-Cola is more than just a drink. It's a very particular kind of drink—combining those pleasant, wholesome substances which foremost scientists say do most in restoring you to your normal self. Really delicious, it invites a pause, a pause that *will* refresh you.

The most popular and famous soup ever made!

21 kinds to choose from..

Asparagus
Bean
Beef
Bouillon
Celery
Chicken
Chicken-Gumbo
Clam Chowder
Consommé
Julienne
Mock Turtle
Mulligatawny
Mutton
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Pea
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Printanier
Tomato
Tomato-Okra
Vegetable
Vegetable-Beef
Vermicelli-Tomato

10 cents a can

EAT SOUP AND KEEP WELL

The overwhelming favorite today and for three and a half decades—Campbell's Tomato Soup! Its popularity is unrivalled, its flavor has never been equalled. The tomatoes are sun-sweetened and vine-ripened — the luscious kind which make the finest soup. The recipe belongs exclusively to Campbell's. Chefs famous in the culinary world. Glistening kitchens which are the greatest of their kind in existence. And Campbell's Tomato Soup is the logical result — a soup of such splendid quality that it immediately becomes your appetite's standard of delicious flavor. Enjoy it today — and often!

LOOK FOR THE RED-AND-WHITE LABEL

Campbells' Tomato Soup

The Colored Pencil with the "needlepoint lead"

SHARP—that's the word for the new Colored Mongol! Why, you can drive it right through cardboard without breaking the point! Not that you want to use a colored pencil as a stiletto—but it's a great convenience and economy to have one with a strong, thin lead that stands the gaff.

Yes, the new Mongol takes the colored pencil out of the "crayon" class and makes it just as efficient and reliable a writing instrument as any good black lead pencil. Its lead is hard and slender—not fat and soft. It won't crumble and break under writing pressure. It can be sharpened to a needle-point with a knife or machine sharpener. It writes smoothly—wears down slowly.

That's why more and more modern executives are using vivid, eye-catching color for their office memos, O. K's and notations these days. How about you?

The new Mongol is sold by up-to-date stationers everywhere—10¢ each.

FREE—*Artists, Designers, Statisticians—anyone using color at home or in the office—write for Folder telling how YOU CAN PAINT with Mongol Colored Pencils, brush and water. Address Eberhard Faber Pencil Co., Dept. G334, 37 Greenpoint Ave., Brooklyn, N. Y.*

write, draw or paint with

MONGOL
COLORED
Indelible
PENCILS

Made in 24 colors. Sold singly or in assortments. Round and Hexagon shapes.

EBERHARD FABER

BERLIN SAYS "WACHSAM"

Paris says "Chic"

LONDON SAYS "CLASS"

and America Makes It!

This interesting new Kodak, though costly abroad, has quickly won the picture-making world.

EUROPEAN capitals are taking half the output of Kodak Six-16.

For good reasons. It's the smallest roll film camera for 2½ x 4½ pictures. Trim—smart—modern—richly fitted.

With Kodak Anastigmat lens, *f*.4.5—so large that it admits plenty of light for snapshots in dull weather—this beautiful Kodak costs but $30. With *f*.6.3, $17. With other equipment, $13.

A similar Kodak, the Six-20, takes 2¼ x 3¼ pictures. With Kodak Anastigmat lens *f*.4.5, $28; with the *f*.6.3, $15; with other equipment, $12.

For a special gift, or for yourself, see the new Kodak—at your dealer's. Eastman Kodak Co., Rochester, N.Y.

KODAK SIX-16

IF IT ISN'T AN EASTMAN, IT ISN'T A KODAK

Across the miles comes a WELCOME VOICE

IT MAY be the voice of a son or daughter away at school. Of a mother or father in a distant city. Of a friend or neighbor who is wondering how you are. Of a business associate upon whose words some great decision rests.

Across the miles, the telephone brings those voices to you and carries your voice in answer. A bell rings and you reach out your hand, knowing that somewhere—near or far—another hand is reaching toward you.

The telephone enlarges the lives and opportunities of all who use it because it enlarges the power to communicate through speech. Contacts with people, ideas exchanged, words spoken—by these are our minds stimulated and the entire business of living made more pleasant and productive.

Because the telephone is so important to so many people, the Bell System strives to make its full usefulness available to every one, everywhere, at all times. Always it tries to emphasize the close contact between each telephone user and the unseen men and women who make good service possible. Always it aims to serve with courtesy, dispatch and sympathetic understanding.

Your telephone offers you the service of a friend. At any hour of the day or night, you have but to turn to it to command as many as you need of the Bell System's army of carefully trained workers.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

"All Set" for the WEST

*The Union Pacific West! What a glorious land of snow-capped mountains, crystal lakes and sandy beaches awaits her! Go West this year! Rail fares were never lower. Fill in the coupon below. Get the facts. You'll be surprised.

*Includes Zion-Bryce-Grand Canyon, Yellowstone-Grand Teton, Rocky Mountain National Parks; Colorado, California, Pacific Northwest and Alaska; Western Dude Ranches, Hoover Dam.

UNION PACIFIC

W. S. Basinger, P. T. M., Room 406
Union Pacific Railroad, Omaha, Nebr.
Please send information about:

Name .....

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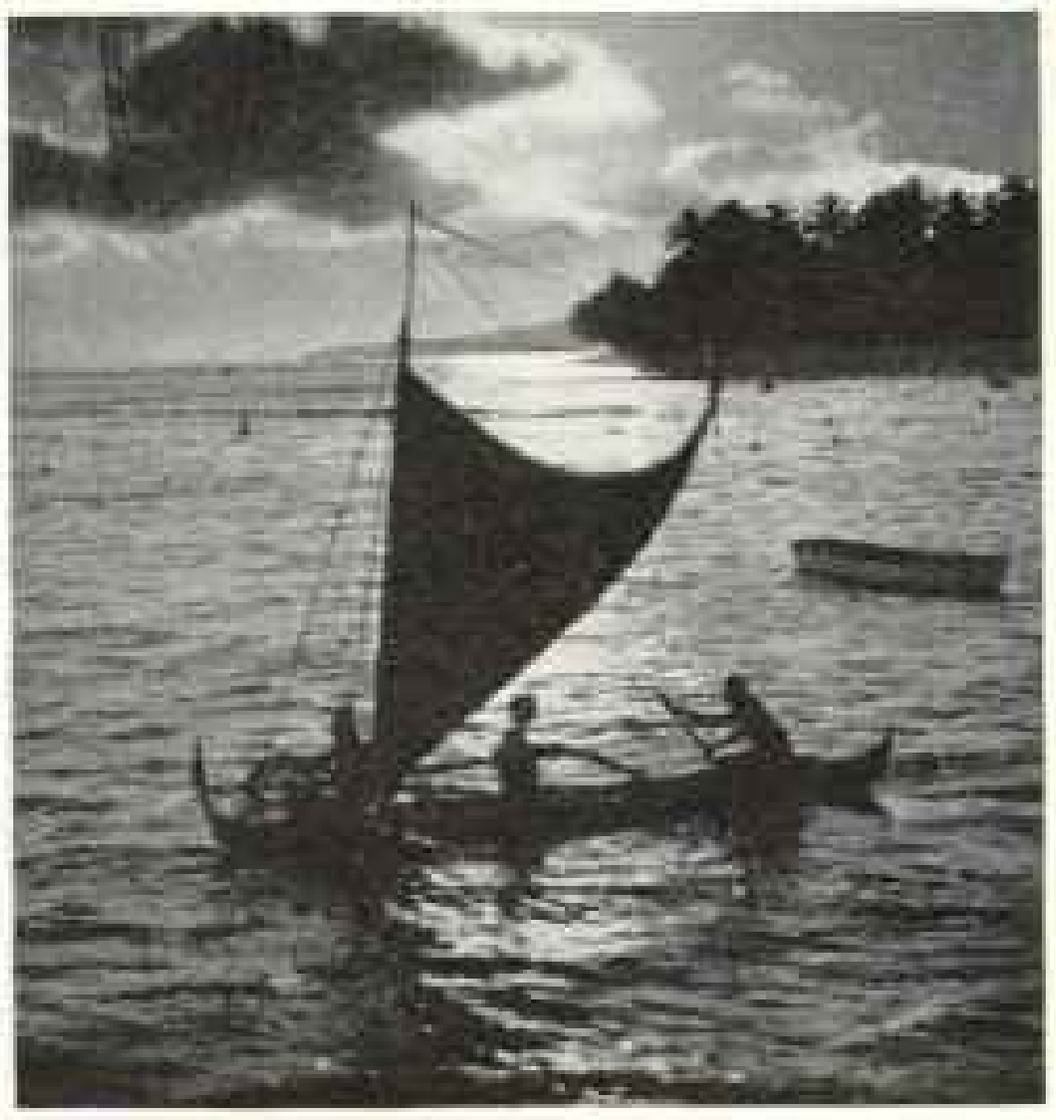
City ..... State .....

☐ Also tell me about all-expense escorted tours.



If we were in Hawaii Tonight..

If we were in Hawaii tonight, looking from the balcony of our room, across the rustling top of a kukui tree perhaps . . . Looking across the bay the lights of cars streak through the darkening green of Diamond Head. Surf puffs white, out there by the coral reefs . . .

We would have dinner near the sea, in that cafe under a banyan tree. There would be papaia, and pineapple cut long. There would be our friends we met on the boat. Girls coming in radiant. Sun-bronzed skin, evening dresses, necklaces of real flower leis—gardenias, perhaps. And there would be native music and the unending murmur of the tropic sea . . . so easy to get there . . .

We'd learn . . .

That there are modern steamers and passenger airplanes to take us from Honolulu to the interesting, exciting isles of Kauai, Maui and Hawaii. ¶ Comfortable touring cars with driver-guides to escort us over the hundreds of miles of billboardless highways on all these islands. ¶ "Air—76°, Water—78°" is a typical July reading on the Waikiki Surf bulletin board.

$220 Roundtrip—First Class. Spacious Cabin Class, $150 roundtrip. See your local travel agent.

HAWAII

HAWAII TOURIST BUREAU
(HONOLULU, HAWAII, U. S. A.)
1523 RUSS BLDG., SAN FRANCISCO

The Hawaii Tourist Bureau will on request, mail you rates, authentic information about the Islands. For a special booklet on Hawaii, with picture maps, send 10¢ to defray cost of handling.

In the children's playroom on the Ile de France

INNOCENTS ABROAD

CHILDHOOD is the one time we are completely carefree; the one time we have months of leisure; and *the best time in life* for European travel.

There is nothing so broadening or so character-building, so stimulating to youthful imaginations, so satisfying to insatiable curiosity. Travel is good for children . . . especially when it is as secure and attractive as on the French Line.

Here are dozens of friendly, well-bred young-sters. They have a special playroom, full of intriguing games, presided over by a nurse who speaks English. Every day, there is entertainment particularly designed for them: a new game, a trick-man, or a Punch-and-Judy show. There is a gymnasium on board, for the older boys and girls. "Four-footed guests" are welcome on the French Line. Pets receive expert attention in clean, snug quarters. The French Line is well known to travelers for its kindness to animals.

Children have their own dining-room on the French Line. The most simple, wholesome foods are served, with plenty of *fresh, pasteurized milk*. Competent medical service is an added safeguard. There are sun-decks with ample space for play . . . and with security, far from the sea-rail.

This is an ideal year to give the children the permanent advantage of a trip to Europe. Any travel agent near you will (without charge) gladly arrange a French Line trip for your family. . . . French Line, 19 State Street, New York City.

French Line

ILE DE FRANCE, April 20, May 27, June 17 • PARIS, April 15, May 19, June 10 • CHAMPLAIN, April 22, May 13, June 3 • LAFAYETTE, May 6, June 8 • DE GRASSE, June 20 • ROCHAMBEAU, May 16

A Treasure-House of Scenery Behind the Towering Alps

Switzerland—fairyland of azure lakes, snowy peaks and quaint century-old villages. Every golden hour spent in this fascinating land remains a precious memory throughout a lifetime. Visit it NOW . . . such an opportunity may never come again. Costs everywhere are sweepingly reduced. Swiss thoughtfulness provides a unique railroad ticket on which you travel as you please—change your route at will—with rates adjusted to suit all tastes.

You will include in your trip the famous St. Gothard route with ZURICH and lovely LUCERNE, cradle of the Swiss Confederation and unique spot for excursions by Boat and Rail. LUGANO-LOCARNO, floral paradise of the Swiss Italian lake district and on the Simplon line distinguished LAUSANNE-OUCHY, international center for education and travel . . . the LOETSCHBERG line to the BERNESE OBERLAND, with the quaint old towns of BERNE, capital of Switzerland . . . and THUN-INTERLAKEN, for that spectacular trip . . . to the JUNGFRAUJOCH.

Write for Packet NG-1 to the Official Agency of the SWISS FEDERAL RAILROADS, 475 Fifth Avenue, New York City.

SWITZERLAND

GO SANTA FE

SEE IT ALL

You will be amazed how much you can see in so short a time for so little money—this summer.

- **World's Fair**—Chicago
- **California**
- **Colorado Rockies**
- **Grand Canyon** National Park
  Santa Fe Pullmans to the rim
- **Indian-detours**
  by motor in New Mexico
- **National Parks**

SANTA FE'S NEW VACATION FARES

CUT THE COST

All-Expense Tours on certain days this summer.

clip and mail this coupon

W. J. Black, P. T. M., Santa Fe System Lines
1158 Railway Exchange, Chicago

Send booklets and NEW vacation fares Leaflet.

Name .....

Address .....

TROPICAL AND FANCY

GOLDFISH

WATER LILIES

and everything for the lily pool. ✦ Our large catalogue displays over eighty fish and many water lilies in gorgeous natural colors. Also contains much valuable information. Kindly request this free book. Mailed to foreign countries only on receipt of 50 cents.

BELDT'S AQUARIUM

2149 Crescent Avenue, St. Louis, Mo.

Wren House
$1.00

DODSON BIRD HOUSES

THE FINEST HOMES *for* YOUR BIRDS

This genuine Dodson Redwood Bird House, perfectly ventilated, delivered for $1.00. Send 10c for catalog illustrating complete line of Dodson Houses.

Attract the cheery song birds to your premises. Joseph H. Dodson will help you. His Houses, Shelters, Feeding Stations, and Baths are the result of a life time of bird study. Dodson Houses are distinguished by their beauty and sturdiness . . . they offer welcome shelter year after year to the desirable birds.

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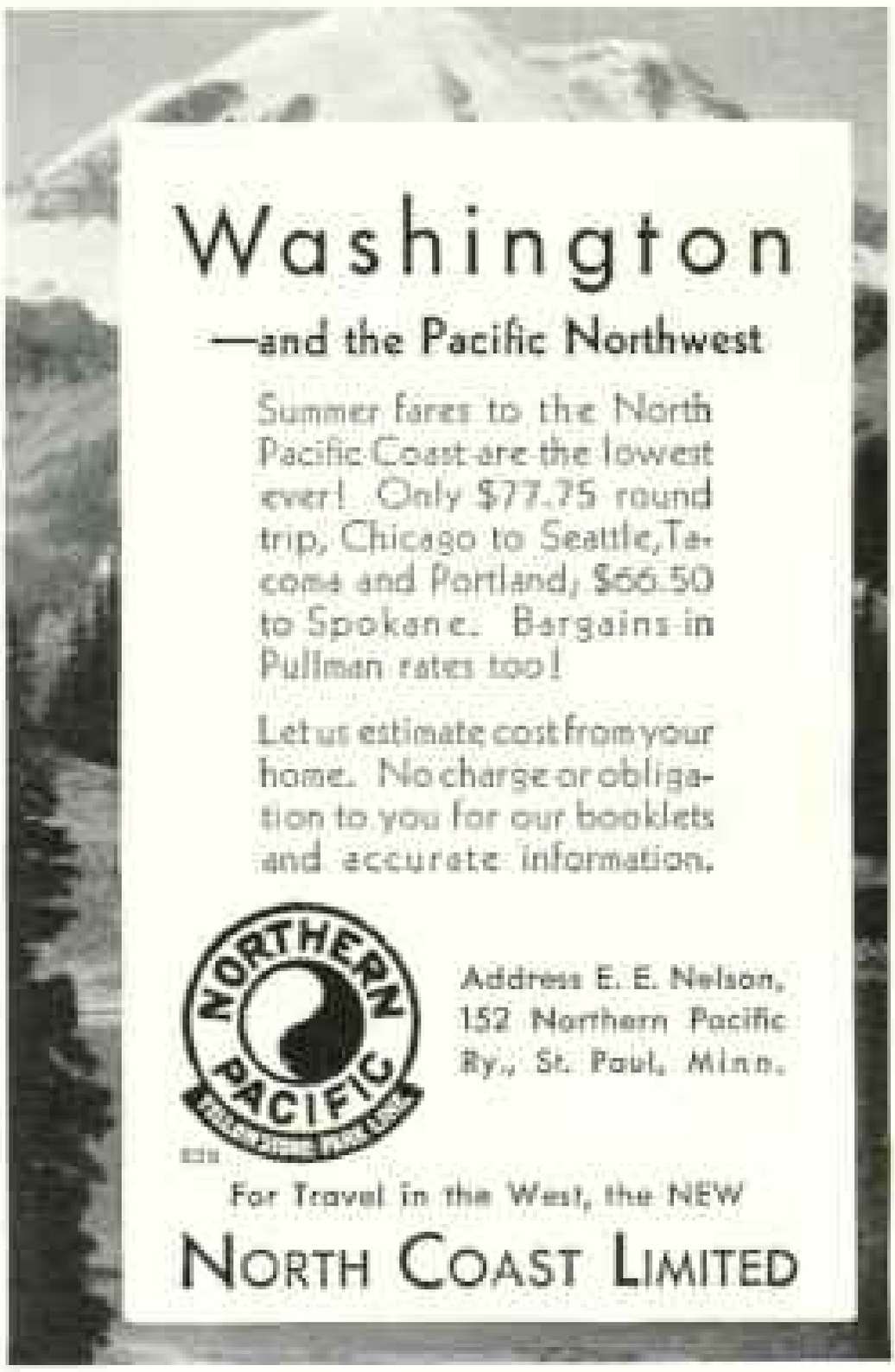

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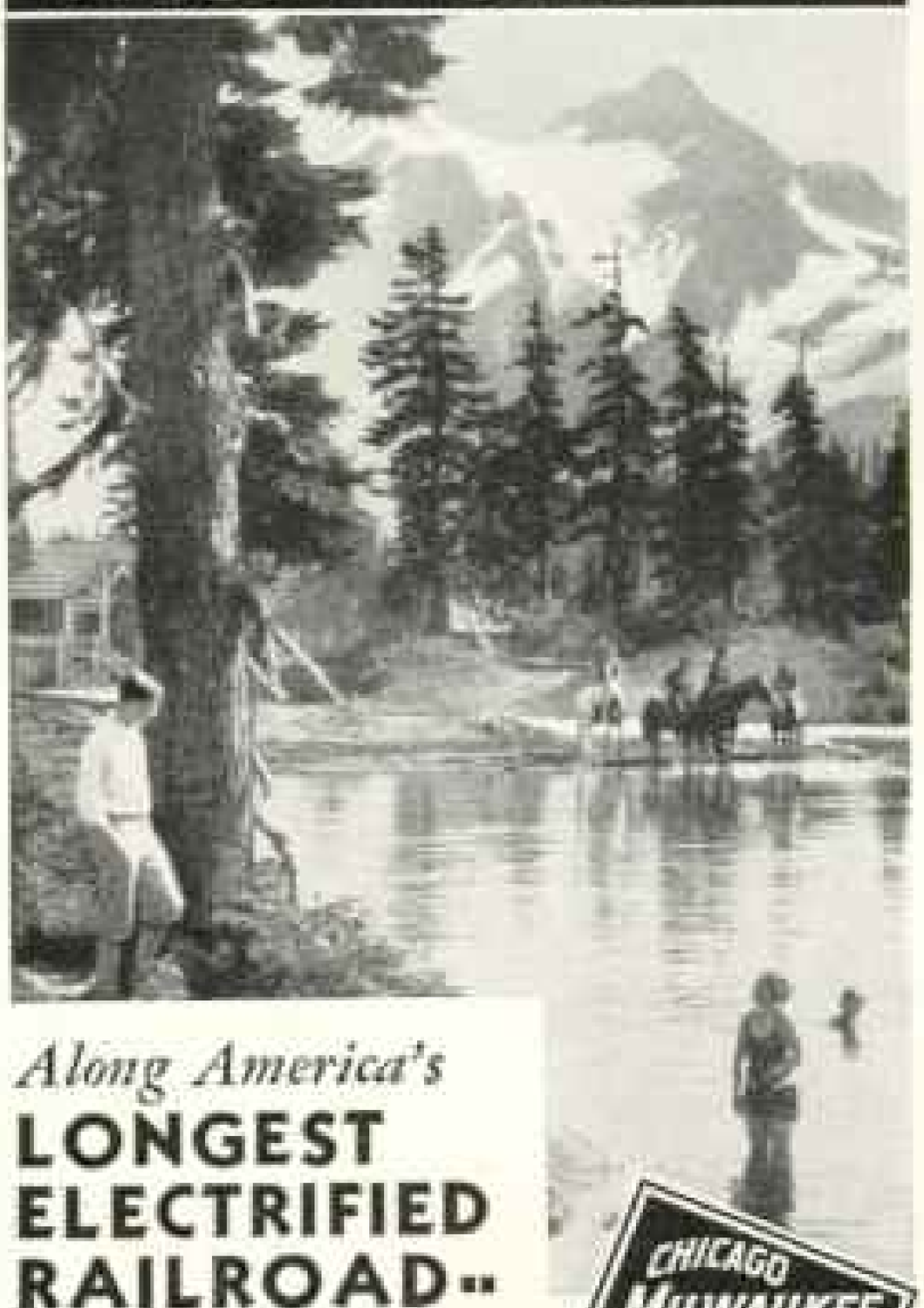

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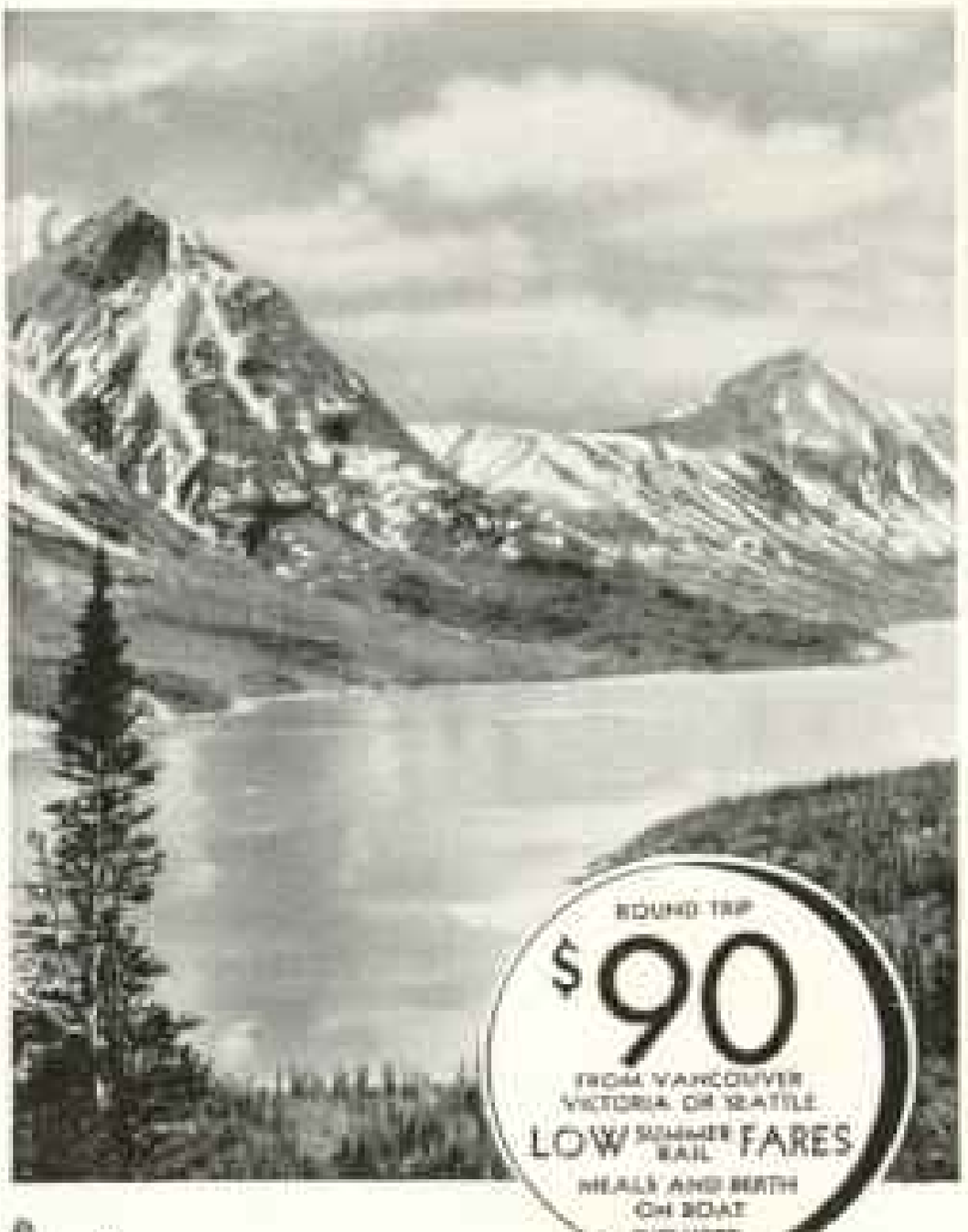

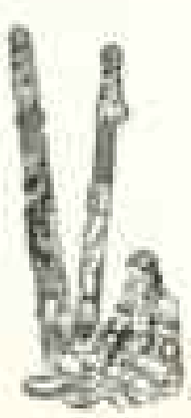

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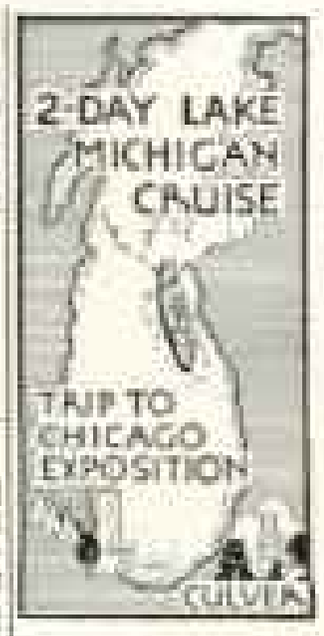

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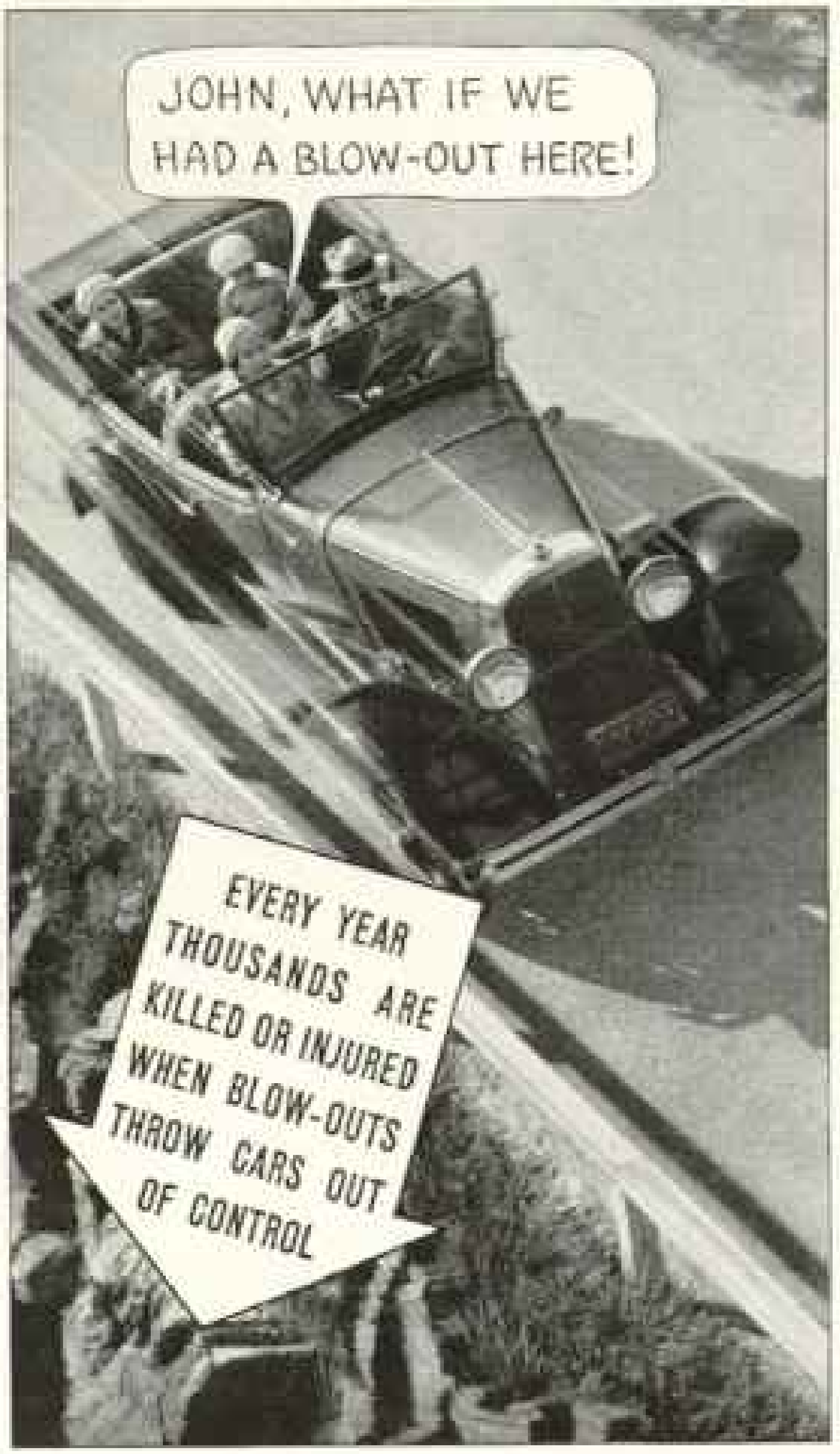

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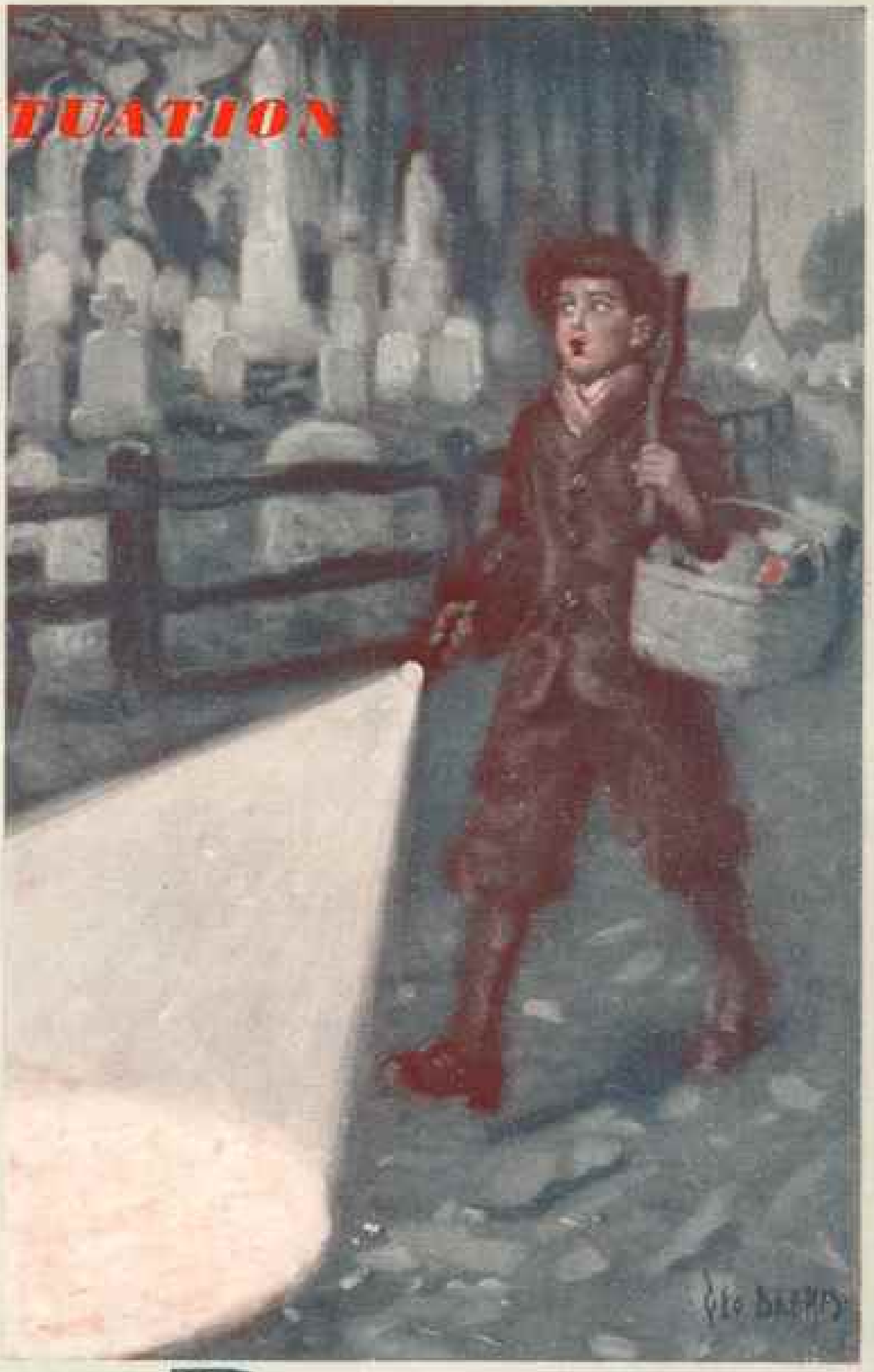

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