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Republican Indonesia Tries Its Wings

With 43 Illustrations and Map
32 in Natural Colors

W. ROBERT MOORE

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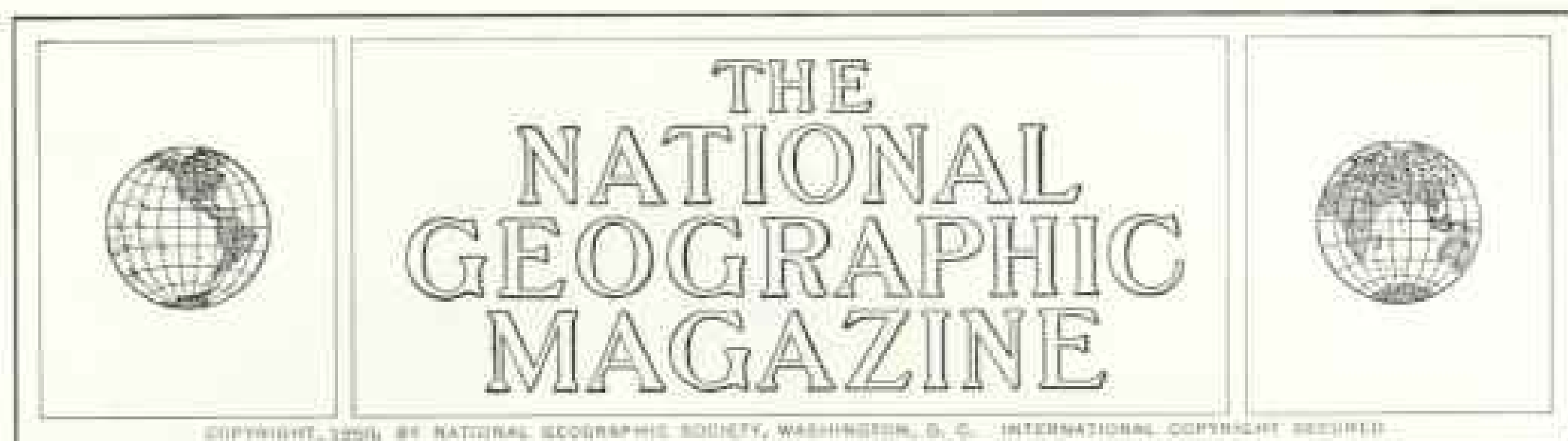
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Republican Indonesia Tries Its Wings

BY W. ROBERT MOORE

With Illustrations from Photographs by the Author

THE NEW Republic of Indonesia has spread fledgling wings—the wings of a Garuda.

The Garuda is a mythical golden bird of ancient Oriental legend, but, as portrayed on Indonesia's new national coat of arms, it looks remarkably like our own American eagle. It carries in its talons, rather than its beak, the motto *Bhinneka Tunggal Ika* (Many Remain One), which has almost the same meaning as our *E Pluribus Unum*.

The similarity is hardly a coincidence, for Indonesia's leaders like to compare their five-year struggle for independence with our American Revolution. Many of their slogans have been taken from words of George Washington and Abraham Lincoln. The Republic's constitution, in part, is patterned after ours.

80,000,000 People on 3,000 Islands

Physically, Indonesia bears little resemblance to the United States. Somewhat smaller in land area than our Thirteen Original States, Indonesia consists of a chain of 3,000 lush volcanic islands strewn along the Equator all the way from the mainland of Asia to the northern tip of Australia, a span of 3,000 miles (map, page 6). On these islands live 80,000,000 people, nearly as many as in Japan.

Twice in the last five years, while in the Far East, I had made tentative plans to visit the islands. Both times heavy fighting had broken out to halt my going. Last May, in Bangkok, Thailand, I received a cable that my application for a visa was approved, provided I made my own arrangements for accommodations.

"That may mean sharing a room with others

or staying with friends," said the genial consul with whom I talked. "Our hotels are crowded, but I believe that such a condition is not restricted to my country."

I agreed.

"Have you visited Indonesia before?" he asked, without looking at the multiple copies of the entrance form I had filled out.

I mentioned that I had been in Java and Sumatra many years ago and had done articles and color photographs on both islands.*

"Then you are familiar with my country, but you will find many changes now," he said.

Indonesians Hail *Merdeka* (Freedom)

One of the first changes I found when I reached the islands was in the place names. Dutch names, many of which existed during the 300 years of colonial rule, are gone. Indonesian ones have taken their place.

Flying to Java, I landed at Djakarta, new name for old Batavia. Buitenzorg, formerly the residence of the Dutch Governor General, inland in the mountains, now is Bogor. Government offices and streets bear Indonesian names.

The big rectangular greensward in the center of the modern section of Djakarta, once known as the Koenigsplein, has become Lapangan Merdeka (Freedom Place).

Merdeka (Freedom), a key word among the Indonesians ever since they announced their independence immediately following the capitulation of the Japanese in World War II, is

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Among the Hill Tribes of Sumatra," February, 1930, and "Through Java in Pursuit of Color," September, 1929, both by W. Robert Moore.



Java's Batik Artists Create Designs on Cotton with Wax and Dye

Protective wax, applied to the fabric, prevents the dye from penetrating noncolor areas. After dipping, the wax is boiled off. For each fresh color, the process is repeated. Women (above) outline designs with tiny tubes of wax. Men use large brass stamps. The pair on the right cover one area in two stampings.



Horse Bristol, Black Star

Strung on a Roasting Spit, This Suckling Pig Soon Will Become a Barbecue Dinner

The laughing Balinese gives assurance that roasting will be done to a turn, for his job is to rotate the pig over a charcoal fire. The girl ladles in stuffing made of chopped herbs and condiments. Roast pigs are offered to gods at temple festivals, and eaten later by the people.

seen and heard everywhere. There are Merdeka streets, squares, and hotels; "Merdeka" also has become a formal salutation.

Today Djakarta, capital of the Republic, is busy and congested. In hotels I shared rooms with as many as five other persons. Houses are at a premium.

"Band Music" for Pedal-cab Riders

Among the motorcars, trucks, and squadrons of bicycles that crowd the streets, I saw only a few of the old familiar two-wheeled pony carts. Most of them have given way to the *betjaks*, three-wheeled bicycle-rickshas in which the rider sits precariously facing traffic while a man pedals from behind. Gaily painted, and labeled with equally colorful names, they are the poor man's taxis.

In some I heard odd musical humming sounds as I rode. Finally I located the source; between supports underneath the chairs pedalers stretch long rubber bands which vibrate

in the wind when the *betjaks* are in motion.

Djakarta's streetcars seem always jammed to capacity. I was advised to shun them, for fountain pens and pocketbooks are apt to disappear. During the recent years of strife many lawless persons have gravitated to the cities, where they can "pick" an easy living.

Many streets in old Batavia are unsafe to travel at night. By day, however, I roamed narrow lanes in the old section, saw the numerous Chinese shops, and watched Javanese womenfolk washing clothes, vegetables, their youngsters, and themselves along the canals.

I priced black-market American cigarettes sold by street hawkers and found that, at the bank rate of exchange of roughly $7\frac{1}{2}$ rupiah (guilders) to one United States dollar, they cost 90 cents a package.

One popular local brand of cigarettes which in Djakarta cost me the equivalent of 40 cents, I bought later in Djokjakarta and Bali for 33 cents; in Sumatra they were 80 cents.

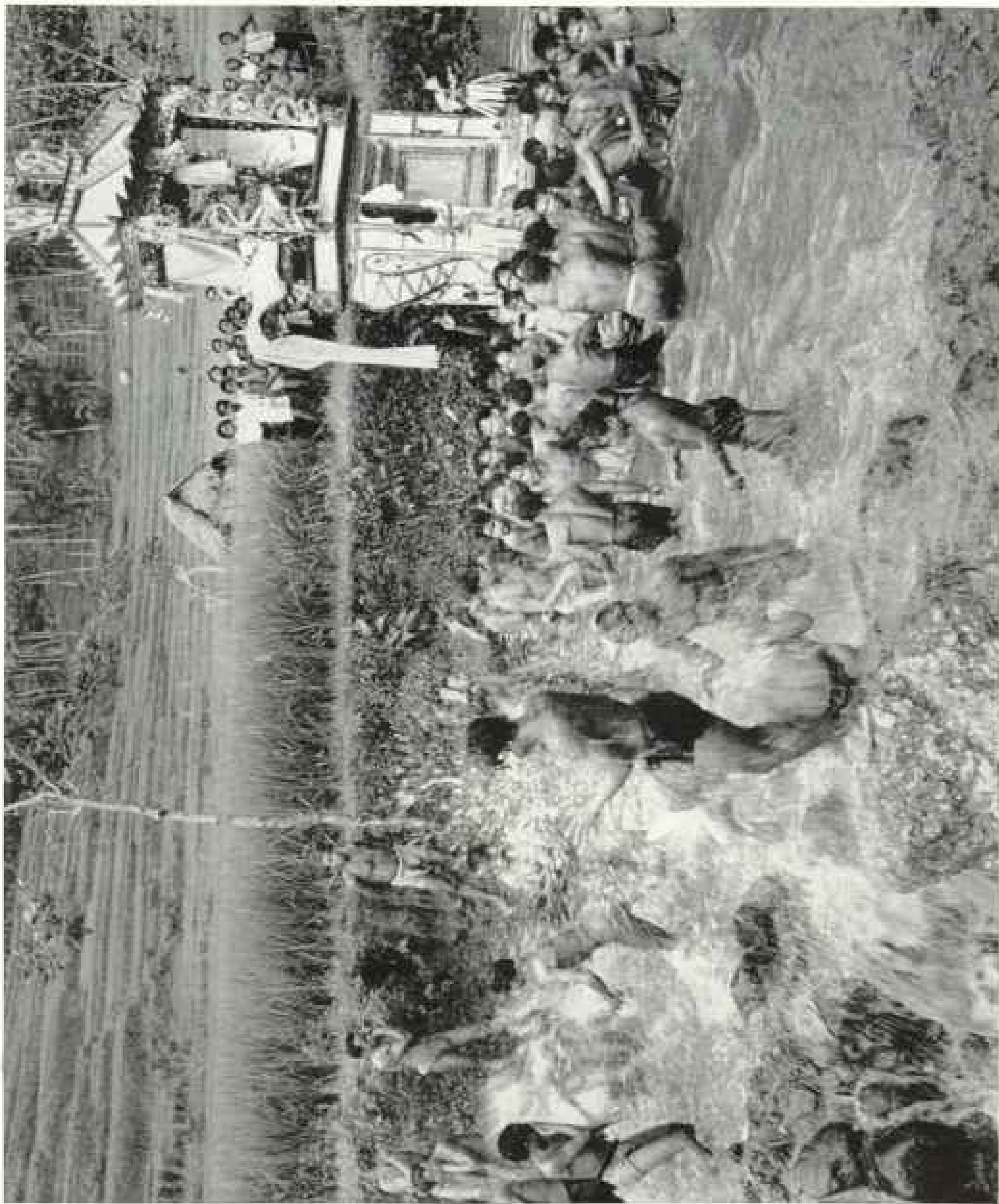
Festive Balinese Mourners Carry a Bier Across a Stream to Confuse Water-hating Demons

These villagers gaily splash one another to demonstrate happiness over a friend's release from earthly cares. At road intersections they thrice turn the funeral carriage around to prevent evil spirits returning to the family home. Finally they give bier and body to the cremation pyre.

Balinese spend much money and elaborate effort on cremations; some families save for years to raise funeral funds. During such long waits the body remains buried until cremation honors can be paid for. Meanwhile, additional deaths may occur in the family. In such cases all the dead are cremated in a single ceremony.

At one Balinese home the author saw mourners making a bier of bamboo and paper. A coconut-oil lamp burned at the gateway and food offerings were spread around the coffin.

Dancer frolics, Black Star





Continental Photo & Advertising Co., Inc.

Indonesians, Shouting "Merdeka!" (Freedom), Throng Around Their First President, His Car Barely Moves Through Djakarta
Fifty-year-old President Soekarno, son of a Javanese father and Balinese mother, is the infant Republic's George Washington. His left-hand companion (in military uniform) is Vice-Premier Hamengkou Bowono IX, Sultan of Djajakarta, Java. During Indonesia's fight for freedom, the Sultan led anti-Dutch forces.



Drawn by H. H. Kesteven and Irvin H. Alliman
 The New Indonesian Republic Is the Old Netherlands Indies Minus New Guinea

The black-market exchange on smuggled American dollars, I was told, was anywhere from 25 to 30 rupiah for a dollar.

Leaving Djakarta I took to the wings of the Garuda—the Garuda Indonesian Airways—to see other parts of Indonesia. The Garuda airways form an elaborate network throughout the island chain, linking the larger cities.

Formerly operated by the Dutch, the airline now is owned by Indonesians; management is jointly controlled. The pilots are Dutch, the office force Indonesian.

I flew first to Djokjakarta (usually abbreviated to Djokja), capital of the old sultanate of central Java, and for a time center of the Republican movement.

It was late May and the dry season supposedly had begun. But the night before I left it rained heavily. The morning dawned clear, and, as was often the case while traveling in Indonesia, I saw dawn from the airport.

Rains had washed the sky clean of dust and smoke. Below us spread the island's sparkling, gardenlike plains; steep volcanic mountains were sharply etched on the horizon to the south. Rice fields formed vivid green-and-gold patches or shone like silver where diked plots had just been flooded for a new crop.

Terraces stairstep every ravine and riverbank and contour the gullies. Other terraces clamber up the steep sides of the mountains (pages 28 and 29). Farm villages cluster in groves of coconut palms and other trees beside the open plains and deeper green plantations.

Plumes Curl from Brooding Volcanoes

Less than an hour out of Djakarta we came abreast of Tjareme volcano, passing so close that our left wingtip seemed almost to brush its wooded slope. Although we were flying at 8,000 feet, the upper part of its cone towered 2,000 feet above us.

Soon we passed still higher Slamet. Second highest peak in Java, it rears to 11,247 feet.

As we neared Djokjakarta, a row of sharp peaks loomed before us. From one of them, Merapi, issued a curling white plume of smoke (page 27). In all, some 300 volcanoes form a knobbed backbone the length of the Indonesian archipelago. Sixty are active. Some are fire-breathing monsters, but the island soil is rich from the ashes, mud, and lava that have poured from their craters.

At Djakarta we had passed through customs before we boarded the plane. When we arrived at Djokja, we had to go through customs again. Health authorities checked our vaccination certificates to see that we were immune to smallpox. Those without

certificates and those who left them behind had to roll up their sleeves and be vaccinated by the doctor.

Throughout my tour in the islands I found customs counters at almost every airport. Now that Indonesia, since August 17, 1950, is reorganized into a single unified Republic, rather than a federation of States, such formalities may eventually be abandoned.

Since the country has gained independence and its capital is now Djakarta, Djokja no longer is so active as when it was headquarters of the Republican forces. Comparatively little damage was done to the city when the Dutch, in 1948, moved in during their second police action.

Art of the Batik Makers

While wandering about the city I saw the world-famous batik makers at work. Both with metal block stamps and by hand they applied wax to the cloth to cover it for the various stages of dyeing. Managers complained that they were forced again to use native vegetable dyes instead of synthetic dyes from Europe, but the sarongs and scarfs they produce are softer in tones for the shortage (page 2).

In other shops I found silversmiths hammering and polishing pieces of silver. Handicraft workers also cut beautifully filigreed fans; *wayang* (shadow play) puppets, and dancers' headdresses and neckpieces from goat skin and buffalo hide.

The large array of buildings of the Kraton, or Sultan's palace, seemed almost deserted. Batik-turbaned retainers who showed me around wore wavy-bladed *krises* tucked in the back of the belts girding their long sarongs.

Hamengku Buwono IX, the Sultan of Djokjakarta, is absent from his palace much of the time, but he returned briefly during my stay. Young and progressive, he had commanded the anti-Dutch Republican forces and is now Vice-Premier (page 5).

Traditional Javanese dances are rarely given at the palace now, but one of the scholarly princes, Tedjakusuma, conducts a school to train young students in the classical art. When I visited his school youngsters no more than 7 or 8 years old were learning difficult postures, how to move arms and legs in proper rhythm, and how to flutter their fingers.

Later I had opportunity to photograph mature dancers enacting episodes drawn from ancient Indian epics, the *Mahabharata* and *Ramayana*,* while rich mellow gongs and

* See "Pageantry of the Siamese Stage," by D. Sonakul, NATIONAL GEOGRAPHIC MAGAZINE, February, 1947.

drums of the gamelan (orchestra) furnished the music (page 31).

Out in the countryside around Djokja men and women worked in the rice fields. Every stage of rice growing can be seen within the radius of a few fields, for tropical Java has no well-defined seasons (page 35).

In some fields harvesters nipped the ripened heads with small knives held in the palms of their hands.

Elsewhere groups of farmfolk waded nearly knee-deep in water and mud, transplanting young rice seedlings. Farmers scratched dry soil with primitive ox-drawn plows or churned the mud with wooden-toothed harrows.

Centuries-old Farming Methods

When the huge stone Buddhist temple of Borobudur and the Hindu temples of Prambanan were built on the central Java plain some 1,100 years ago, farmers were probably using the same methods as now.

To get to Borobudur, some 20 miles northwest of the city, I had to take the long way around. A bridge was under repair. Along the way we met many oxcarts coming to market. Sides of the cart bodies and their big woven canopies are decorated with vivid painted patterns (page 32).

At Magelang I saw dramatic results of the 1948 fighting. Most of the large buildings in the city had been damaged or completely wrecked, either in military operations or in the scorched-earth tactics adopted by the Indonesians. En route we also saw a large sugar mill that had been smashed and burned into a junk heap of twisted girders and broken machinery.

I had seen ancient Borobudur before, but again it was a thrill to swing around a curve in the highway and see its terraced pyramid and stone dagobas rising above a low hill against a backdrop of higher green mountains.

Trying my legs on its steep stairways and walking around its carved-wall terraces, I appreciated how grandly the 9th-century Buddhist artists built. They encased a whole hill-top with stone, pictured the life of Buddha in deep carvings, and climaxed the temple crown with numerous Buddhas set in latticed stone shrines (page 30).*

Apparently early Buddhists and Hindus dwelt peacefully side by side, for only a few miles eastward from Djokja are the extensive ruins of Hindu-built Prambanan (page 27).

Despite the rebuilding necessary to erase recent war destruction, I saw workers busily reconstructing the fallen stones of ancient Prambanan, a task begun by the Dutch. The job is like trying to piece together a colossal

jigsaw puzzle, for within its walled enclosure stands the large shrine to Siva, seven smaller shrines, and scores of small cell-like buildings.

Though Indonesia now has its independence, the country is plagued by many problems in its return to peace. There is still unrest among some dissident groups. When I asked to go to Surakarta (Solo), seat of the second sultanate, just northeast of Djokja, I was advised not to go. Some young hotheads had taken to stoning cars on the highways.

Supporters of the *Darul Islam* (World of Islam) in the mountains around Garut, in the southern portion of western Java, are unreconciled. Many young men who fought with the Dutch also roam the countryside, using their weapons to compensate for their unemployment.

In the vicinity of Surabaya, chief city and important naval base in eastern Java, bands of guerrillas were active.

During the three years of Japanese occupation there was considerable dislocation of agriculture. Food was not allowed to be transported from one district to another; each district had to become self-sustaining. Consequently, lands which grew such export crops as sugar, tapioca, and Sumatran tobacco were turned to raising food.

The subsequent struggle between local and Dutch forces not only delayed the return to normal but added to the destruction. However, the 1949-50 rice crop of about 6,500,000 tons is almost up to prewar levels. Native rubber production is above prewar years, but plantation rubber is about 70 percent of its normal amount.

Because of large postwar investments of foreign capital to rebuild oil installations in Borneo and Sumatra, oil output is the highest ever.

In 1949 the yield of crude oil was 43,206,000 barrels, and refineries, importing some crude, produced 47,531,000 barrels.

Bali Seems a World Apart

It is a flight of only 1½ hours from Surabaya to Denpasar, on the island of Bali. Most of the flight is over land, for, geographically, Bali has escaped being attached to Java by only a little more than a mile-wide span of sea.

This has been an important, if narrow, water gap. Crossing it, I felt I had reached a distant land and a different age.

From the 15th to the 16th centuries, when Islam swept over Sumatra and Java, its influ-

* See "Postwar Journey Through Java," by Ronald Stuart Kain, NATIONAL GEOGRAPHIC MAGAZINE, May, 1948.



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Endochrome by W. Robert Mann

Balinese Dancers, Faces Intent Beneath Sunburst Crowns, Await Their Cue

Bali's colorful dances, interrupted by the Japanese, have resumed as happily as ever. Indonesia's independence struggle left the blissful island undisturbed. These girls wear the *djanger* headdress at a Denpasar temple.



Bali Dancers Make Up Their Faces with Powder, Lipstick, and Grease Paint

Some Balinese dances are reserved for religious ceremonies; others are given for sheer entertainment; but all are community enterprises.

Most popular of the island's dances is the *legong*. In it two or three young girls enact legends with rapid, angular movements while a reciter off stage intones the words (opposite page).

Right: the legong dancer's gilded filigree neckpiece, waist and arm bands have been tooled from hide. White facial dots are beauty marks.

Left: A make-up artist has darkened the dancer's eyebrows and painted an artificial hairline for the dancer head-dress (page 9). She has shaped the long hair into a round and topped it with flowers. Now the dancer herself applies the finishing touches. Ear lobes are pierced and stretched to accommodate cone-shaped, golden plugs.

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Illustrations by W. Robert Moore



Heads Jerk, Eyes Flash, and Arms Twist in Angular Postures. Ten-year-old Legong Dancers Are Professionals

Musicians in the gamelan (orchestra) play gongs, drums, cymbals, and xylophone-like instruments (page 12). Elaborate carvings, a fine art in Bali, ornament their instrument stands. These girls were trained as toddlers. When they reach teen age they will retire from the legong.

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Redrawn by W. Herbert Moore





Xylophone Players, Using Only One Hand, Tap Tinkly Notes on Bronze Keys



© National Geographic Society

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Kudachimmes by W. Robert Moore

♣ **Bali Girls, Dressing for a Dance,
Wrap One Another Like Mummies**

First a whirling, toplike motion clothes the body in two strips of cloth. Next a purple brocaded band is fastened on. High djanger headdress and a flowery crown complete the costume.

♣ **Agile Fingers Ply Many Threads
Weaving Patterned Cloth**

Graceful Pollok, formerly one of Bali's leading dancers, is the wife and model of Adrien-Jean Le Mayeur, a Belgian artist who has depicted Indonesian life some 18 years. Here she works beneath a frangipani tree.



Ripened Rice Gilds Bali's Valleys; Poinsettia Turns the Wilds Aflame

A successful rice harvest, answer to the country's prayers, is an occasion for rejoicing. Men and women go about their work singing, chatting, and exchanging banter.

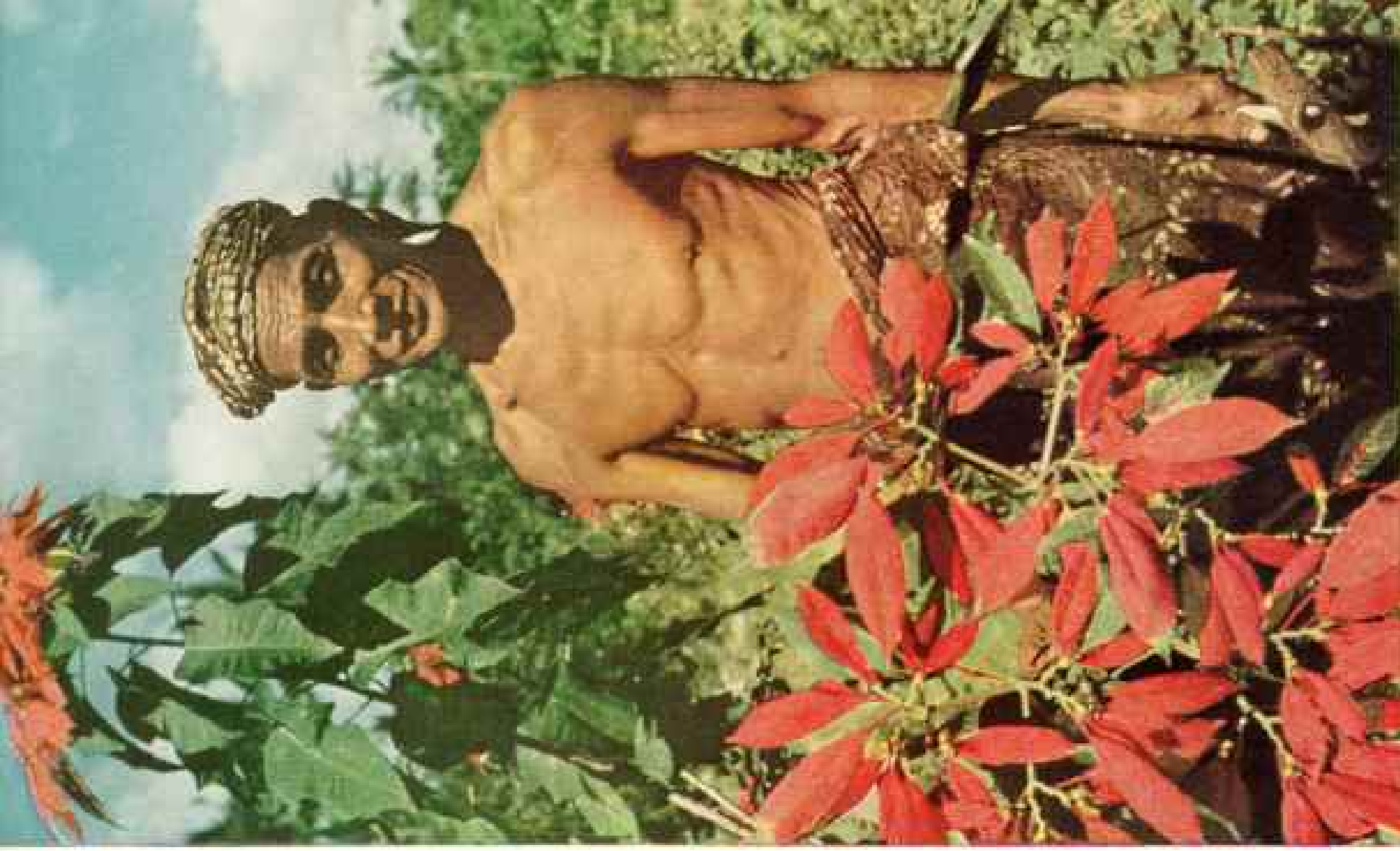
Meanwhile, children, following the harvesters, pursue a sport unknown to the Occident. Swinging slender poles coated with sticky resin, they cast for dragonflies on the wing, not unlike fishermen casting lines for trout. "What do they do with their catch?" the author inquired. "Fry and eat them," replied his guide. "They are good."

This girl carries a sheaf of rice, which one of the men will haul to the village for threshing. Straw will be cut and bound later.

Poinsettia, a florist's item in the Temperate Zone, grows wild on Bali's volcanic slopes. Many a cattle pasture has a poinsettia hedge.

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Reprinted by W. Robert Moore



Rice Springs Green from Bali's Ooze; Tiny, Watery Fields Mirror the Palms

Stair-stepped terraces, descending out of mountains and covering plains, offer one of Bali's most impressive sights. The people long ago learned how to harness mountain streams, leading water down the diked fields with canals, bamboo poles, and rock-hewn tunnels.

Two and sometimes three crops a year grow on such plots. So even is the climate that planting and harvesting often proceed simultaneously. Between these two operations the Balinese watch over fields with all the tender care of parents raising children. Rice to them means food and comfort; they pity the eaters of corn and sweet potatoes.

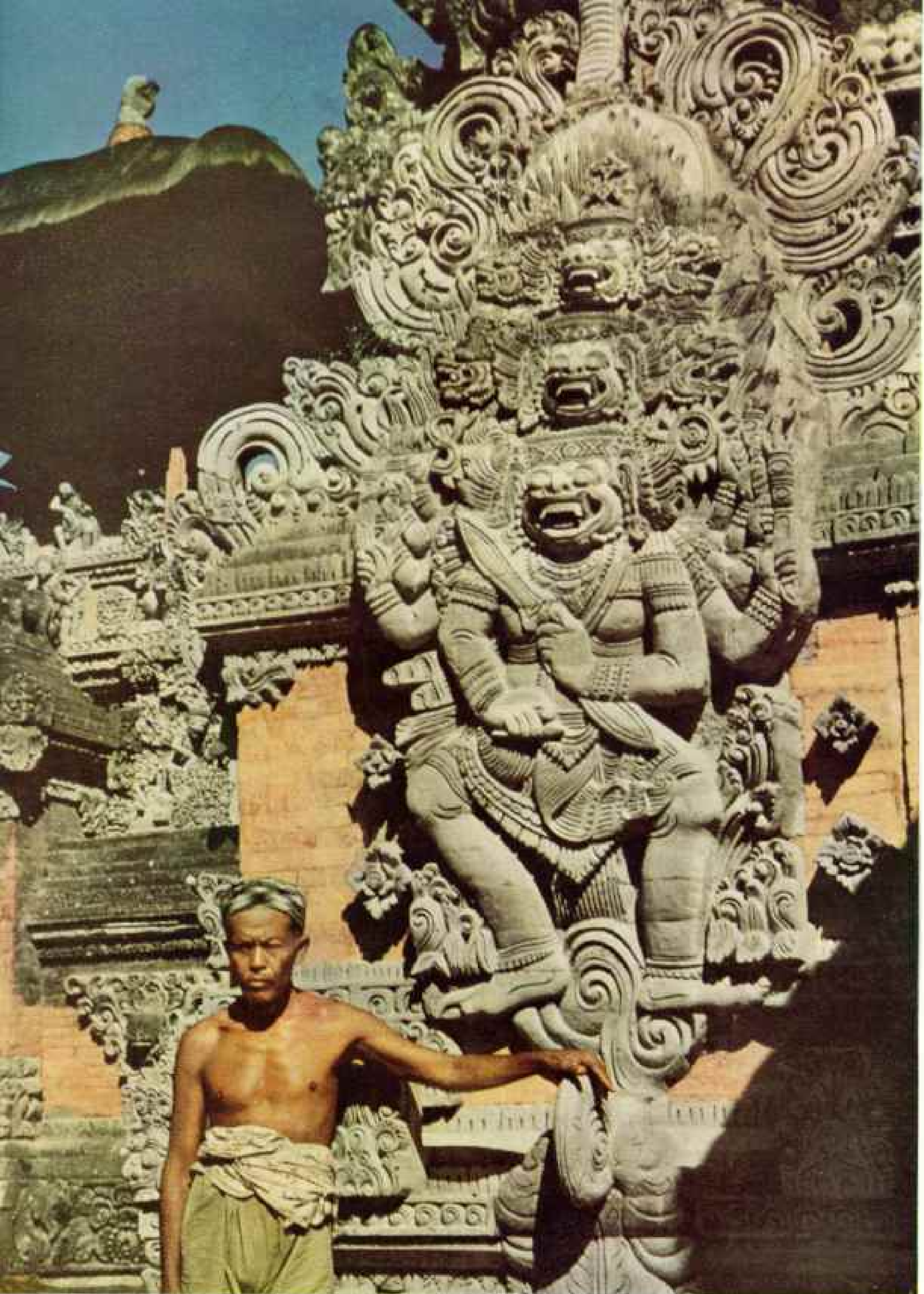
Not unnaturally, a religious cult has grown up around this life-giver. Legend says the compassionate gods bestowed rice on man (just as Prometheus gave him fire). And so the grateful people make sacrifices to the rice goddess (page 23) and practice magic rites to increase the yield.

These terraces, some barely a few yards square, rise above Singampin. Straight green blades shoot up a hand's span apart. Dikes are studded with areca palms, source of tooth-staining betel nut. Southeast Asia's favorite chew. Banana plants in the ravine stretch long leaves toward the sun.

© National Geographic Society

Kodjathron by W. Robert Moore





ence halted at the shores of Bali. Instead of raising mosques to the Prophet, the Balinese continued to build elaborate stone and brick temples to their Hindu gods—and still do.

While Java, Sumatra, and other islands bear new war scars, in Bali it seems almost as if war never had been.

The Japanese, I was told, had halted dances and large temple feasts, but again communities have organized troupes of dancers, and the rhythmic gamelans seem not to have missed a single beat of their gongs.

Hindu temples, feasts, glittering dances, rippling music, weird stone gods, graceful golden-bronze bodies, cockfights, lofty volcanoes, and spectacular rice terraces—all are here. Bali is unchanged, unspoiled.*

I traveled anywhere I chose and encountered only smiles and cordiality.

The Balinese love their island and their gods. Tilling the plains and steep mountain terraces, they build temples to their rice goddess (page 25). Growing coconuts, coffee, fruit, and other nonirrigated crops, they dedicate a temple to that agriculture. Dancing, they entertain their gods and at the same time entertain themselves.

Many photographs and much copy have been made of the bare breasts of Balinese women. Balinese in turn are shocked at the revelation of legs by Western women wearing shorts and abbreviated bathing suits.

Bali's civilization is ancient, its traditions and practices tested by time; their customs suit the Balinese, so why change?

Twins of Different Sexes Bad Luck

At a crossroads near Denpasar I saw a small temporary shack with matting side walls and a thatch roof, set near a grotesque stone god. I inquired what it was for.

"It's a house for a woman who has given birth to twins," said the islander who was accompanying me. "A woman who has twins, a boy and a girl, has to move from her own house and stay at a road crossing or a cemetery for 42 days."

"What if the twins are both boys or girls?" I asked.

"That's all right; it's bad luck only when they are a boy and a girl."

I asked if the youngsters were well and who took care of the mother and children.

Yes, the babies were doing well. Relatives and the husband took care of the mother and brought her food.

"Let's go in and see them," the man suggested.

We went to the flap entrance, announced our presence, and were immediately invited

inside. The father was there, fondling his young son; the mother, nursing the girl. Both babies were healthy and alert.

"They have to stay here eight days more," the father said.

When the 42 days are up, the thatched hut is burned and the mother has to go through a purification ceremony before she can return home; the dwelling in the meantime is rebuilt.

Teeth Filed as Mark of Maturity

Farther along the road, as we passed through a small village, we saw several people carrying gifts into a mud-walled enclosure. Inquiry revealed that they were going to a tooth-filing ceremony.

In the courtyard of the household a raised pavilion had been built. In it was a bed, a man seated at the head. On either side of the pavilion were racks filled with offerings of fruit, meats, rice, and flowers, built into tall brilliant cones. Long decorative streamers hung from the pavilion.

Over at the side of one of the houses a tall thatch-roofed platform of bamboo had been erected. On it sat a wispy-bearded Brahman priest, alternately chanting prayers and tinkling a small bell.

Two youths in their early teens were to have their teeth filed as a symbol that they had reached maturity. The "dentist," who sat at the head of the couch, had the boys bite into a piece of sugar cane. After studying the "bite," he evened off the irregularities of the points of their teeth.

The boys' teeth showed little difference after the filing, but they had attained mature position in the eyes of the community.

As I drove about the island, I saw a fantastic number of temples—village temples, family temples where members placed offerings to their ancestors, and personal temples, shrines to Siva, Vishnu, and Brahma. Tiny spirit shrines dot the rice fields.

Many of the large brick-and-stone structures seemed hoary with age, but on their gateways and walls carvings pictured bicycle riders, policemen on motorcycles, a goggled airplane pilot zooming down among sculptured demons and gods, and a Dutchman drinking beer!

The gray volcanic building stone is so soft that it weathers quickly in Bali's moist climate. "Ancient" shrines may be no more than 30 or 40 years old.

I watched workmen carving gods, demons,

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Bali and Points East," by Maynard Owen Williams, March, 1939; and "Artist Adventures on the Island of Bali," by Franklin Price Knott, March, 1928.

and flower decorations on two unfinished temples. Details took shape rapidly under their knives and chisels. The stone is little harder than sun-dried clay and can be scratched with the thumbnail (page 16).

Looping through villages on the plains north of Denpasar, we came upon busy markets where district folk congregated with grains, fruits, vegetables, and other wares. Women filed along the roads balancing heavy burdens on their heads (page 25); men carried produce on shoulder poles (page 32) or walked along unencumbered.

In some villages home workers shaped clay rice pots on hand-turned potter's wheels and stacked the "green" pots in kilns for firing. Elsewhere carvers chiseled and polished beautifully fashioned heads and figures of wood, or etched delicate designs on bone, horn, and coconut shells.

Lazy sway-backed pigs grunted in courtyards of family dwellings. Fattened, they are toted to market in big openwork bamboo baskets, often piled into trucks like cordwood.

Along the roads we saw countless fighting cocks sunning in wicker cages or being groomed by their masters (page 26). When the Dutch were here they frowned upon Balinese cock-fighting, but often turned their heads when men got together for a lively cockfight in some inconspicuous place.

One day we saw carts parked by the roadside and people slipping off into bushy village paths. We decided to follow. A cockfight was in the offing.

Under a thatched pavilion competitors were matching up birds of equal size and weight. Opponents selected, the men attached sharp metal spurs to the cocks' legs. There was a flurry of feathers as the first two birds clashed. Evenly matched, they struck no lethal blow and were later separated. Some fights to the death last but an instant.

"Fishing" Food from the Air

In fields we passed gay throngs of reapers making a picnic of rice harvesting. Several women and children who accompanied the harvesters mystified me. They were carrying long slender reed wands like fishing rods, but they certainly were not fishing.

Although I have seen people catch fish in flooded rice plots, these fields were dry. Furthermore, the rods had no lines. Yet the women and youngsters seemed to be intently casting. So I stopped to find out what they were doing.

They were catching dragonflies! The wands were smeared with sticky gum, and dragonflies disturbed by the harvesting were lured to

alight on the sticks. Some "casters" also flicked their poles at the winging flies and snatched them from the air (opposite).

"What do they do with them?" I asked my companion.

"Eat them," he answered. "They are good."

Like most visitors to Bali, I went to see the centuries-old tombs at Tampaksiring, near the center of the island. Some ruler had ordered elaborate monuments hewn for himself and his wives in the solid stone walls of the canyon.

Not far distant another early monarch, warring with his neighbors, had a poison spring pour from the ground to poison his enemies. But the gods intervened. A sparkling spring of pure water now gushes in its place and is piped into a large community bath. One outlet is dry as proof of the tale of the poisoned water.

In the sacred forest of Sangeh we bought peanuts and corn for troops of greedy monkeys. When the *pala* (nutmeg) trees of the forest fall of their own accord, they are used to build temples.

Three main roads cut across the island to its northern coast. The more easterly one winds over the mountains almost in the shadow of Agung, also called the Peak of Bali, for it is the island's highest. Its sacred symmetrical cone towers to more than 10,000 feet (p. 26).

Twisting up the highway to the mountain saddle, we came to Kintamani, a corruption of Tjinta Mani, meaning "Beautiful Ring." The ring is the rim of a huge volcanic crater within which is cupped Lake Batur.

On the western side of the crater rises a volcanic peak, also called Batur. Several times in earlier Balinese memory it erupted. Once its lava flow halted at the very gateway of the village temple on the plain below. In 1926 it erupted again. The Dutch had difficulty evacuating the people when it became evident that the lava stream was not going to stop as it had before. The abandoned village was completely engulfed.

Batur's slopes and the old crater floor bordering the lake are blackened with the lava flow. Near its summit two or three vents emit small clouds of smoke.

The mountain range extends east and west the full length of the island. Three other lakes somewhat smaller than Batur are cradled in the hills near the central cross-island road.

Scarlet poinsettias, growing wild in the cooler highlands, splash the green slopes (page 14). In places they are planted as hedges around pastures where graze Bali's dainty-boofed cattle. Famous throughout the archipelago, Bali cows are raised for slaughter rather than



"Fly Rod" in Hand, a Balinese Woman Fishes for Dragonflies

In this harvesttime sport, flies flushed by the reapers are enticed to alight on the sticky wand or are trapped on the wing by a deft cast. Later, they are fried and eaten.

for milk. Because of heavy depletion of stock during the war, the number for export is still low.

On the northern slopes of the mountains we wound through coffee plantations and amid a magnificent array of rice terraces (page 15). Diked rice plots mount the steep hillsides like gigantic staircases, but up these no giant could climb without getting his feet wet!

Singaradja and its adjacent port of Buleleng bear a strong imprint of the Dutch. Many of the buildings are Western style, and the palace of the district raja is decidedly modernistic.

Girls Wrap Like Mummies for a Dance

Returning to Denpasar late one afternoon, I saw people carrying offerings to a temple and learned there was to be a *djanger* dance in the evening.

Later I watched village girls transform themselves into glamorous dancing queens with grease paint and resplendent garments.

Those who believe the girls of Bali never wear blouses should see how they gird themselves for the dance. Above long sweeping sarongs they wrap their bodies from armpits to hips like tightly encased cocoons (page 13).

Eyebrows are darkened, then shaped with a razor, and a new hairline is painted on the girls' foreheads to fit their sunburst crowns (pages 9 and 10). A gem-studded neckpiece, armbands of gilded filigreed buffalo hide, and fresh frangipani flowers in the hair complete the costume. White dots added between eyebrows and at the temples are special beauty marks of the dance.

Although the *djanger* is primarily social entertainment, no participant would think of beginning a performance without first touching her lips to a cup of holy water and dropping a blossom as an offering on the shrine.

A dozen girls and an equal number of less ornately dressed young men seated themselves in an open square, girls occupying two facing sides, boys the other.

A Sumatran Bride Gets a Rice Blessing; the Bridegroom Rides Pickaback

Malay marriage customs vary, but usually the vows are simple. The Mohammedan priest makes a statement of the union and the bridegroom acknowledges acceptance. Man and wife feed rice to one another; they may dip hands into a common bowl of water. The wedding feast usually lasts a week.

On the day before her wedding in Medan, this Malay girl, head bowed and eyes closed, sits on a flower- and net-decorated chair while guests sprinkle rice in her cupped hands.

Seated on a friend's shoulders, the bridegroom wears a costume so elegant that he is sure to hand it on as an heirloom. Here he arrives at his intended's home. At the door his prospective father-in-law will halt him and demand token payment.

In some Malay weddings the bridegroom's party must engage the bride's protectors in mimic battle and pay mock ransom. Sometimes the bride's female relatives take part in the fray. These customs survive from the times when men captured their brides.



Sumatran Workers Transplant Tobacco to Terraced Niches on Mountainsides

Sumatra tobacco leaves are so delicately veined, and hence so flexible, that many cigar makers use them to wrap coarser filler grown in other parts of the world.

European planters cleared the first Sumatran tobacco fields in 1863. By 1940 some 50 big estates had turned their attention to the crop. Sumatra, together with other Indonesian islands, raised 100,000 tons a year. The entire crop was shipped to Amsterdam and Rotterdam for auction. American buyers took big lots.

Production tumbled in World War II. Japanese, occupying Sumatra, enforced the growing of rice on tobacco lands.

The four-year fight for freedom limited tobacco's post-war recovery. Workers, tractors, fertilizers, and trucks remain in short supply.

At harvesttime laborers cut the leaves and carry them to huge thatch-roofed sheds for sorting and drying. Some large estates maintain teak groves just to supply termite-proof poles for their drying sheds.

Small pools in this ravine store water for moistening tender young transplants.

Ad Van Bommel



For two hours a circle of hundreds of intent Balinese and a few foreign visitors watched fluttering fingers and sinuous arms and bodies as singing and acting alternated between the young men and girls, while a small gamelan played from the banyan tree "wings."

The djanger, I learned, began as the "be-bop" of Balinese entertainment some years ago, after a Malay theatrical troupe visited the island. Today it has attained dignity and even at times includes episodes of classical folklore.

Perennial favorite of Balinese dances, however, is the *legong*, performed by two or three young girls to the accompaniment of a large orchestra of brass gongs, cymbals, drums, and metal-keyed xylophones (page 12).

In quick-changing tempo the girls move with angular motions of arms and swaying bodies or in smooth gliding steps (page 11). Their necks jerk from side to side and eyes flash. A reciter tells the legend they portray.

Legong Dancers Trained from Childhood

These young girls are no amateurs. They train almost from the time they are babes; their careers end before they reach their teens.

Deeply exciting, too, were the massed chants of the men in the *ketjak*, or so-called monkey dance, I saw one evening at Bona. Two hundred men, bare to the waist, sat in concentric circles about a light standard upon which coconut-oil flames burned. Their voices rose and fell; as notes trailed off in one portion of the circle, they were caught up in another.

One moment the bronze-bodied players were in sitting position, in another they had thrown themselves back, circle against circle; then suddenly arms and fingers fluttered skyward as voices excitedly cried "Ke—tjak—ke—tjak—ke—tjak."

Northeast of Bali, in Makassar and Amboina, disturbances had broken out; instead of going there I flew back to Djakarta and thence to Sumatra.

Sumatra is big and, as we flew diagonally across its southern half to Padang on the west coast, it seemed almost uninhabited. Forests cover its plains and its rugged backbone of mountains. In only a few places did I see rice fields and plantations.

About $3\frac{1}{2}$ times the size of Java, Sumatra has less than a fourth the population of that crowded island.

Padang nestles amid coconut palms beside the sea. Its harbor, Telukbajursumatera, some three miles away, formerly called Emma-haven, is an outlet for coal and for farm produce of the fertile Padang Highlands.

At Padang I shared a hotel room with a young Dutch agriculturist who maintained

large truck gardens and a dairy in the Bandung district in the hills of west Java. He had built up a sizable business furnishing Djakarta hotels with safe fresh vegetables, sanitary milk, and butter. Quantities of vegetables, especially lettuce and cauliflower, were also shipped to Singapore.

Now this enterprising man was waiting for a ship bound to Sibolga, where he was going to investigate the Tapanuli district south of Lake Toba (page 40). Batak village headmen there had offered him as much land as he wanted. The plan was to put hundreds of acres under mechanical cultivation to supply vegetables, beef, and pork to Southeast Asia markets.

Except for its sunny beach and sea breezes, Padang's attractions are few. Close behind it, however, rears the mountain range into which twists a delightful highway that mounts to the Padang Highlands.

Through the kindness of Padang's mayor, I found an interpreter companion and off we started in a midget car for Padangpandjang and Bukittinggi (formerly Fort de Kock).

The road twists and squirms through the hills and up Anai River gorge, through which also climbs a cog railway. Luxuriant tropical trees and thick twining vines mantle the steep cliffs. At one bend in the highway a waterfall leaps from a cliff and plunges into a pool so close to the road that it spatters spray on windshields of passing cars.

At Padangpandjang we saw a number of the strange upturned roofs of the Minangkabau homes. Hornlike gables rise so high above the middle of the roofs that the ridgepoles look like a broad U.

Moslems Feast Before They Fast

Mosques dot the highlands, for the Minangkabau people are strict Moslems. Many women dressed in their holiday best walked along the roads, carrying trays balanced on their heads. Brilliant handwoven cloths covered the contents of their head burdens.

"They are taking foods to relatives," said my companion. "Young wives especially go to visit their mothers and mothers-in-law just before our holy month of Ramadan. Our fast month begins day after tomorrow and we do not eat during the day. Feasting and weddings come before or after our holy month."

We found the menfolk enjoying themselves in a different manner. Along the highways we passed scores of them with dogs trotting at their heels. Some carried guns. They were returning from a wild pig hunt; muddy and frayed clothes bore witness to the roughness of the countryside. Sometimes several hundred men of the district go on these pig hunts.



Sheets of Raw Rubber Demonstrate the First Stretch Between Trees and Tires

First the milklike latex is coagulated with chemicals; then it is squeezed through corrugated iron rollers. Here it is dried. Later it will be smoke-cured, baled, and shipped. This Sumatran operates a small plantation.

Some 2,000,000 people of Sumatra belong to the Minangkabau tribal clans. They trace their descent through the maternal side of the family, and a young man must marry outside his or his mother's clan.

Through a gap in the hills near Padang-pandjang we could see a portion of Lake Singkarak, a broad expanse of water locked in green hills. A road and a branch of the railway skirt its shores through picturesque Minangkabau villages and extend to the Umbilin Coal Mines 65 miles away.

Monsoon clouds clung to the tops of the mountains, denying us a view of the crests of Singgalang and smoking Marapi, between which the road passes before reaching Bukittinggi. Green fields climb high on rich volcanic slopes and terrace the valleys.

The hotels were among the buildings destroyed in Bukittinggi during the fighting, so I searched elsewhere for lodging. I finally found a place in a family dwelling.

That evening I was introduced to some of

the highly spiced dishes in a local restaurant. Before I had progressed far in the meal, I found the coolness of the city's 3,000-foot elevation had suddenly vanished. The peppery mixtures made tropical monsoon tears roll down my cheeks! And I learned caution.

Next day I roamed the market and saw by the number of red peppers and other spices on sale how popular "hot" foods are among the people. I discovered the variety and wealth of produce grown in these uplands (page 36).

Colorful Crowd Throgs Market Place

Red peppers, yellow bananas, purple eggplant, green vegetables, and big golden carp swimming in the fish tubs are no more colorful than the gay sarongs, patterned blouses, and headcloths worn by the women who tend the stalls and spread their wares under wide oilpaper umbrellas in the open market squares.

Bukittinggi youngsters were enjoying their

last day of school before the Ramadan holidays by going on a picnic hike along the rim of the Kerbauwengat (Buffalo Gorge), a deep ravine carved in the volcanic earth at the edge of the town (page 38).

Mapwise, Sumatra is almost perfectly balanced across the Equator. The line lies only a few miles north of Bukittinggi, but the condition of the road northward discourages travel.

Years ago when I visited Sumatra I rode by bus from Bukittinggi to Sibolga, around Lake Toba and to Medan. This time I had to return to Padang and fly across the island.

It was a clear morning when we took off. Not a cloud covered the mountains, and, as we flew northward, I had a splendid view of the volcanoes.

It was still clear when we crossed straight over the middle of Lake Toba. One can best gain an idea of the geography of the lake from the air. It reminded me of a Pacific atoll in reverse. Instead of being a ring of land surrounded by water, with a central lagoon, Toba is an oval of water surrounded by land, with more land in the middle (page 39).

Though the lake is more than 50 miles long and a third as wide, it probably has a smaller water area than any lake of its size, for in its center rises Samosir Island, itself some 27 miles long and nearly half as wide (page 34).

After reaching Medan, I motored back to Toba to see some of the Batak tribesmen who live in the region.*

Most of the interesting old *kampongs* (villages) of the Bataks have vanished in recent years. But a few of the huge communal long houses still exist. They have tall thatch roofs, uptilted at the ends, and carved wooden gables. Buffalo horns decorate gable peaks of the houses and pavilioned outbuildings.

It was Saturday, market day, when we visited Prapat, on the east shore of Lake Toba. Hundreds of Tobanese thronged into market, afoot, by bus, and by boat (page 33).

Medan, administrative center for eastern Sumatra, is a spick-and-span modern town. Even the Chinese shop signs on many of its buildings fail to give it an Oriental appearance.

The acres of tobacco (page 21) and the oil-palm and rubber plantations have made this portion of Sumatra highly prosperous.

Elephant Shoves Truck off Road

Northward from Medan are oil wells. Oilmen searching for new sources in the wild Achin district in the north sometimes find more than just oil.

On the trail one day a truckload of drillers sighted an elephant and stopped. The elephant also sighted them and came up to investigate. Apparently disliking the idea of the truck blocking the road, he began pushing on the front bumper and skidded the heavy vehicle backward.

He then decided upon a new approach. Walking around to the side of the truck, he calmly shoved it off on the roadside and walked on! Fortunately, the car was not overturned. Unharmed, but with nerves a bit shaken, the drillers drove into camp.

Tigers also roam Sumatra's northern bush trails.

Pipe Lines Bring Oil to Palembang

Leaving Medan, I flew southward to Palembang, Sumatra's "oil capital," near the southern end of the island.

Though the west coast of Sumatra is mountainous, its east coast is a low plain, trailing off into mangrove swamps. A fleet of islands lies off the coast, and on Bangka, particularly, are extensive tin mines.

Palembang lies far from the coast, but it seems almost an aquatic town. Part of it stands on stilts along the banks of the broad, muddy Musi River; a sizable portion also floats on its waters (page 37).

Innumerable floating houses are anchored near the banks by poles, so that they rise or fall with the stream but cannot drift away. Small sampans, houseboats, cargo boats, and big barges are legion. Plying up and down stream are ancient stern-wheelers.

Big freighters and oil tankers likewise anchor in the river, for only a short distance outside town are two large refineries, one operated by Standard-Vacuum and the other by Shell. Oil is piped in from wells in the interior.

Both refineries are virtually cities in themselves, for, although many of the workers live in town, hundreds of others live in trim compounds. They have their own shops, markets, recreation centers, and schools.

Palembang, like the Medan district, has oil-palm groves and rubber plantations. While roaming outlying roads, I saw workmen collecting oil-palm seeds and "milking" the rubber trees (page 23).

In my trip through Java, Bali, and Sumatra I found that the "wealth of the Indies" is no obsolete phrase. The new Republic feels that with the reins of government in its own hands Indonesia will continue to prosper.

* See "By Motor Through the East Coast and Batak Highlands of Sumatra," by Melvin A. Hall, NATIONAL GEOGRAPHIC MAGAZINE, January, 1920.



↑ **Women Carry Cooking Pots on Heads;
Men Stagger under Shoulder Poles**

Entire Balinese communities specialize in making these clay vessels, potters turning the wheels by hand in their workshop homes. As market days rotate among a region's scattered villages, the pottery porters appear ever on the move.

✧ **Sangsit's Ornate Temple Is Dedicated
to the Rice Goddess, Bali's Ceres**

Here the author saw harvesters deposit sheaves of rice as sacrificial offerings. As Bali grows rice under water, this shrine is often called the Temple of Irrigation. A Temple of Agriculture near by is devoted to nonirrigated crops.





Balinese Sportsmen Pit Fighting Cocks for Exercise. Death-dealing Steel Spurs Are Detached

Three rugged volcanoes rise in the background. The tallest, peering the clouds, is 10,308-foot Agung, often called the Peak of Bali. Along occupies the center; Batur, the smallest, is blackened by a 1926 lava flow; on occasion it still smolders. Two birds sit in wicker cages.

Java: The People Are Moslems, but Many Ruins Are Hindu. Prambanan, a 9th-century Temple, Is Being Restored. Archaeologists identify, number, and sort the fallen stones. The conical monument (right), its stones assembled, will crown a shrine now being re-erected. Merapi (background) is one of Indonesia's 300 volcanoes. Smoke from its 9,550-foot crest mingles with the clouds.

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Java Is Often Called the Garden Isle. An Air View Shows the Reason

Fifty million people, some 1,000 to the square mile, crowd Java and adjacent Madura. To feed them, the steepest mountain sides must be tilled intensively. Trees here conceal homes of the cultivators.



Terraced Rice Fields, Every Inch Graded, Contour Hills and Ravines

Java cleared its jungles so many centuries ago that history does not remember when. Ancient irrigators, working by eye, leveled mountain slopes so perfectly that engineers with theodolites can scarcely improve them.



Buddhists Abandoned Borobudur to the Jungle Centuries Ago, Sir Stamford Raffles Uncovered It, the Dutch Restored It

Javanese Dance More with Arms and Hands than with Legs

Indian classics, a heritage from the Hindu era, provide themes for many of the island's *wayang wayang* plays. A prince of the old Sultanate of Djokjakarta maintains a training school for the dancers.

Here make-believe princes and prince enact episodes from the Mahabharata, a series of epic poems consisting of nearly 100,000 couplets. Hands fluttering and scarves swirling, they perform stylized movements while gamelans beat time and reciters tell the story.

At intervals the dancers stage mock duels. For such a battle, the princess carries dagger in belt.

The prince wears wings of gilded, filigreed leather. His mustache is painted on.

As ancient as this show is, still older spectacles go on without live actors. Javan's shadow players create illusion by manipulating carved figures so as to cast dark images on a transparent screen. Puppets are controlled by sticks attached to the arms.

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Kasturanto by W. Robert Moore





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Kodichirum by W. Robert Moore

♣ **Baskets and Hats Weigh So Little
that Boys Can Carry Big Loads.**

Java welcomes its peddlers, their bamboo shoulder poles laden with every conceivable want. Ironworkers, mat sellers, grocers, sandal makers, and mattress vendors carry wares door to door. Here rattan for weaving occupies the rear pile.

♣ **Central Java's Painted Ox carts
Rumble Along Motor Highways**

Progress toward motorization received severe setbacks during the Japanese occupation and the republicans' fight for independence. Consequently, bullocks haul much produce from farm to market. Everywhere they drag plows and harrows across muddy rice fields.





Sumatra: Long Dugout Canoes Ply Lake Toba, a Giant Oval Rimmed by Volcanoes

Sails furlled, the boats dock at Prapat, a popular resort 3,000 feet high in the hills (page 34). Bamboo flooring protects passengers and cargo from leaks in the hulls. One craft carries a black tasseled bowsprit (right).



Toba Lake People Flock to Market in Prapat by Bus, Boat, and Foot

Prapat, weary of war and hardship, prospers with peace. Roads once more are safe; resort hotels are reopening. These vendors offer everything from fruits to fish. Many come from Samosir, the lake's large island (background).



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Illustrations by W. Robert Moore

▲ Golden Sheaves of Rice Heads Go to the Threshing Mortars

Indonesia's annual rice crop, about 6,500,000 tons, has almost regained its prewar level. Oil production shows remarkable recovery, although more than 50 percent of the industry was destroyed. Native-gathered rubber is above average, but estate rubber is still low.

▼ Ankle-deep in Mud and Water, a Sumatran Weeds His Rice

Rice is weeded until the shoots grow high. Roots are watered, ducks using the fields as ponds, till the crop matures; then fields are dried for harvest (above). This farmer picks snails and insect pests as well as noxious plants.





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Kidachrummi by W. Robert Moore

Market in Bukittinggi Is a Feast of Color; Sarongs and Fruits Compete in Eye Appeal

Bukittinggi lies only a few miles from the Equator, but a 3,000-foot elevation tempers its climate. Its soil is lava-rich. Two volcanoes, one still smoking, tower near by.

Crowds of 20,000 or more visit the town's twice-a-week market, where saleswomen, spreading their wares upon the ground, offer such items as bananas, beans, onions, eggplant, and peppers.

Peppers! The author, tasting highland Sumatra's peppery dishes, wept tears of hot distress. He wondered if even Mexico liked spicier food.





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Kodjehamies by W. Robert Moore

✦ **Pony Taxis Awaiting Fares Crowd Market Plaza in Bukittinggi**

A few buses transport country folk to town, but private cars are scarce. Two-wheeled carts carry the well-to-do up and down the hilly streets; poorer folk walk. Hard-to-pronounce Bukittinggi is the Fort de Kock of the Dutch colonial era.

✧ **Palembang Boats Resemble Rooftops; Their Sterns Are Gaily Painted**

Hundreds of native craft swarm the muddy Musi. Old stern-wheelers beat the river to a froth. Floating houses and shops, anchored to poles, rise and fall with the tides. Other homes perch on piles beside the stream. Two big oil refineries offer contrast.





Bukittinggi Children Celebrate School's Last Day with a Picnic Stroll along a Ravine's Rim

Elsewhere the Sumatran scene offers tobacco plantations, rubber estates, oil wells, tigers, elephants, rhinos, and orangutans. This gorge drains a volcano's slopes. As Islam rules this part of Sumatra, school vacations begin with Ramadan, the Moslem month for fasting.

Happy Farmwives, Their Produce Sold, Hoist Purchases on Heads and Trot Home Beside Lake Toba

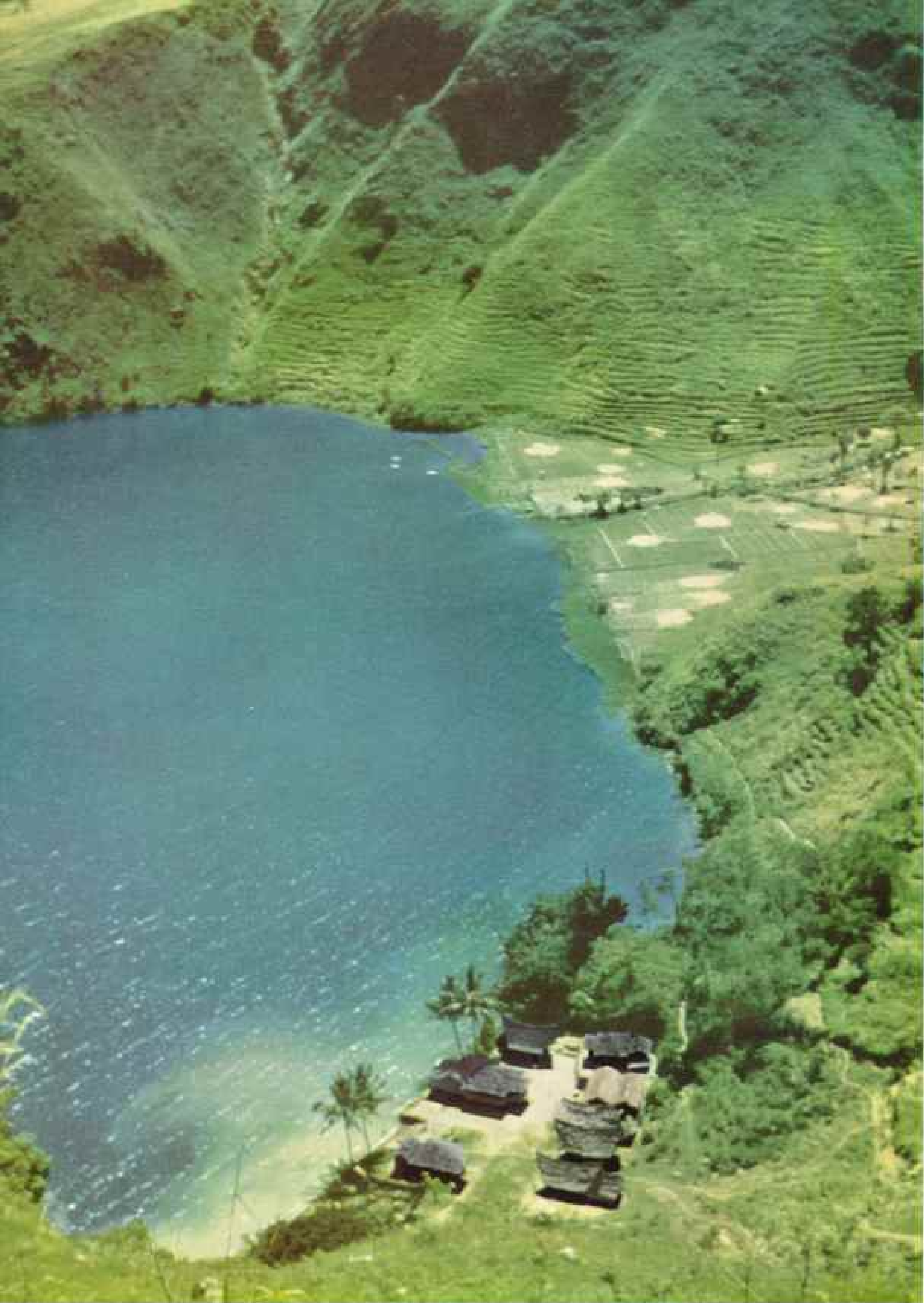
Once Samatun's Batak tribesmen considered the lake so sacred that they slew a French-American discovery expedition. A Dutch party in 1863 was the first to reach these shores. Toba's depth in places is 1,500 feet.

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Keokuchama to W. Robert Moore





Toba's Staircase Terraces Climb Mountains with Giant Treads and Risers

Ancient Mesopotamia: A Light That Did Not Fail

By E. A. SPEISER

Formerly Director of the American School of Oriental Research in Baghdad; Chairman of the Department of Oriental Studies, University of Pennsylvania

MESOPOTAMIA, the historic land between the Tigris and the Euphrates, has meant many different things (map, page 45).

For readers of the Bible, the name—or any one of its synonyms or near synonyms—may conjure up a picture of the Garden of Eden, the Tower of Babel, or the Great Flood; or it may call to mind the story of the patriarchs, of Daniel and Nebuchadnezzar, of the hand-writing on the wall.

To some the name has associations with the Code of Hammurabi (page 85), the death of Alexander the Great, the exploits of Harun al-Rashid. Others will think in this connection of Chaldean astrology, the Royal Tombs of Ur, or the fabulous oil deposits of the Middle East.

Mesopotamia gives tremendous perspective to our modern civilization. In common with the rest of the ancient Near East—Egypt, Palestine, Syria, and Iran—Mesopotamia had put in more time on the progress of mankind, before the rise of Greece and Rome, than has elapsed between the Homeric age and our own times. When Rome, founded, according to tradition in the 8th century B. C.,* was less than a hundred years old, Nineveh in Assyria had come to the end of a 4,000-year career.

Yet what Mesopotamia achieved during several millenniums of steady progress did not come to an abrupt close when the Greeks took over.† Through one channel or another, the fruits of that accumulated experience had already spread to Europe, to enrich the classical world and to be passed along eventually to our own culture as a living and tangible force.

Stored-up Evidence

Civilization is basically the sum of man's answers at any given stage to the problems of society and the universe. Until man had begun to live in settled communities, after learning to sow as well as to harvest, there was little real opportunity to do much about such questions.

Ancient urban centers, however, leave remains that may be reconstructed into a meaningful record long after the cities themselves ceased to exist.‡

The Near East was the place where the first

urban centers emerged. To retrace our present civilization to its roots and see it as a growing organism, we must go back to the Near East, the cradle of Western civilization.

Over much of its total course to date, the story of mankind was but the story of cultural progress along the Nile, the Tigris, the Euphrates, and the immediately adjoining areas (pages 51 and 58). Each of these ancient lands thus has something significant to relate.

If the testimony of Mesopotamia has fewer blurred passages than that of its sisterlands, its clarity is due chiefly to two factors: one, the vast amount and the astounding variety of written records that have come down to us from that country, a full and eloquent commentary on more than 2,000 years of pre-classical history; the other, the number and nature of the ancient Mesopotamian sites.

These sites contribute their share to the material illustration of historic times, but are especially valuable as witnesses of cultural progress in the prehistoric age. In other words, the ancient mounds of Mesopotamia have proved to be buried treasures in more ways than one.

How Mounds Grew

Ancient mounds, to be sure, are not restricted to the watersheds of the Tigris and the Euphrates. Mesopotamia, however, exceeds the neighboring lands in the number of artificial hills that go back to the early stages of settled occupation. Since Egypt did not encourage to the same extent the building of cities in successive levels, that country is less well suited than Mesopotamia to take us down, rung by rung, through the centuries that precede written history.

Let us take as an example the site of Tepe Gawra, which is situated 15 miles northeast of modern Mosul and ancient Nineveh (pages

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "The Roman Way," by Edith Hamilton; "Ancient Rome Brought to Life," by Rhys Carpenter, with 32 ill. in color from paintings by H. M. Herget, all November, 1946.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE: "The Greek Way," by Edith Hamilton; "Greece, the Birthplace of Science and Free Speech," by Richard Stillwell, with 32 ill. in color from paintings by H. M. Herget, all March, 1944.

‡ See "Archeology, the Mirror of the Ages," by C. Leonard Woolley, NATIONAL GEOGRAPHIC MAGAZINE, August, 1928.

60-63). I use this instance for two reasons. For one, as the discoverer and first excavator of Tepe Gawra I am necessarily better acquainted with it than with any other ancient mound; for another, there probably is not in any case a single illustration that could be used to greater advantage as an index of mankind's gradual emergence from the obscurity of prehistoric times.

As recently as 25 years ago very little was known about the prehistory of Mesopotamia. Inscriptions and monuments had told us a great deal about the Assyrians of the first millennium B. C., the Babylonians of the second millennium, and the Sumerians of the third millennium. When we had worked back, however, to about 4,500 years ago, reliable information all but ceased.

Yet it was perfectly clear that even that remote stage was far from the beginnings of settled occupation. The only trustworthy guide to the farther and deeper past would be a site consisting of many successive prehistoric levels, to disclose in orderly sequence the gradual progress of man since the beginning of agriculture. Such a site might do for science infinitely more than could thousands of documents and roomfuls of objects from periods already known.

In 1926 I had the good fortune to obtain a Guggenheim Fellowship for study in Mesopotamia, coupled with the post of Annual Professor of the American School of Oriental Research in Baghdad. A small grant from the Dropsie College of Philadelphia left me free to examine hitherto unexplored regions without the usual pressure to bring back something spectacular. With that combined support I devoted six months to an archeological survey of northern Iraq, concentrating chiefly on prehistoric sites.

First Sight of the Great Mound

In April, 1927, when I was covering the area to the north of Mosul, my eye was attracted from a distance by a tall mound which rose some 75 feet above the surrounding plain.

My first thought was that the mound would prove to be an example of Assyrian occupation, if not of later date. But a preliminary examination of the surface remains—broken sherds and fragments of stone implements—promptly disclosed that this was no routine site. Only its upper third bore signs of historic occupation, while the remaining two-thirds appeared to date from prehistoric times.

In other words, unless surface appearances were wholly misleading, we had here a long and hitherto missing record of virtually unknown times, a record piled up at least 50 feet

high. The near-by villagers called the place Tepe Gawra, or "The Great Mound," because of its height. But if actual digging should bear out the surface estimate, the world of science would have a much more valid reason for applying that name to the mound.

Systematic excavations were begun in 1927 and carried on through eight separate campaigns, four of which I had the opportunity to direct in person. The final results exceeded our greatest expectations. Tepe Gawra proved to contain 26 individual occupation levels, yet only the upper six of these fell within the historic age (page 50).

Light on Prehistory

The long period prior to the introduction of writing, reaching back to the fourth millennium B. C. and beyond, was no longer obscure; for it was now illuminated by a full score of successive settlements, one on top of the other. The continuous account of early man could be pushed back by perhaps 20 centuries.

The unfolding picture yielded a pattern of steady advance in pottery and in architecture, in religion (page 60) and society, in work and in play. Other sites of comparable age have since been uncovered, each adding something that the others lacked, each helping to place some new detail in sharper relief.

Why did the ancient Near Easterners in general, and Mesopotamians in particular, continue to build on man-made hills when space—excepting in Egypt only—was certainly not at a premium? The reasons are simple. The first settlers would choose a site which had a good water supply, and whose location was convenient for agricultural and commercial needs. The initial advantages of environment remained attractive after the first town had been destroyed—by fire, floods, or war.

To level a place built of sun-baked bricks was not a great problem; the upper sections of walls still standing might have to be torn down and some dirt might need to be added to fill the openings that the fallen debris had not covered up. In this process a few feet of the old occupation were sealed up and the next settlement was that much higher above ground level.

But the main reason for continuing on the old site was not alone the ease with which this could be done. More important was the desire to follow, wherever possible, the outlines of the old buildings, particularly temples, in order to earn the protection of the gods and spirits that the previous town had propitiated (page 47).

Here is tradition at work from the ground, so to speak. As occupation followed upon occupation, the site grew not only in height



Sargon II's Colossal Winged Bulls Shed the Assyrian Dust of Centuries

Assyrian Kings of the first millennium *b. c.* erected monstrous human-headed figures as gateway guardians of their temples and palaces. The Oriental Institute uncovered these mythological twins at Khorsabad (Dur Sharrukin), Sargon's capital (page 98). (For Sennacherib's colossus, see page 101.)

but also in prestige and defensibility. With this growth there came also a proportionate rise in the influence of tradition upon each successive occupant.

Small wonder, therefore, that a storied site like Tepe Gawra was not finally abandoned—to the oblivion of time and the eventual ministrations of archeology—until its summit had become too small and inaccessible for all practical purposes.

Nearly 5,000 Years of Pioneer Work

The time covered by the history of Mesopotamia is more than twice the length of the present era—some 2,000 years of prehistory and more than two and a half millenniums of historic progress. The scene shifts constantly and there is a bewildering variety of actors who speak many tongues and represent various peoples, some of whom will be described later, a Tower of Babel transposed from parable to fact.

It is indeed this varied background as much

as anything else that helped to make the resulting civilization a cosmopolitan and lasting factor, in contrast to provincial achievements of brief duration. But because progress can be traced only against the framework of time, a rough chronological outline must be provided and the principal characters identified.

A few of the many pertinent details are given in the brief historical introductions that accompany the descriptions of each painting in this series. Inasmuch as the paintings have been arranged in chronological order, the descriptions add up to a short but comprehensive account of cultural progress as seen in a definite time sequence.

The initial stage lasts roughly until about 3000 *b. c.* Specific dates for that period are not available because absolute dating requires written records, whereas the period in question was preliterate.

This was the last prehistoric phase in the evolution of mankind, starting with the end of the Stone Age and continuing through the

many centuries in which copper was used sparingly with stone, but real metallurgy had not as yet been introduced.

In other words, the first phase in the career of Mesopotamia takes in the last Neolithic settlements and the whole of the Chalcolithic, or Copper-Stone, period.

That this was not, however, a primitive phase is clear from numerous facts. We find here several distinctive and individual cultures, each of which has perfected its own special type of painted pottery and maintains lively relations with the neighboring cultures, the combined territory involving a considerable portion of western Asia.

The advance is recorded plainly, in material remains if not in actual words, in the successive occupations which the mounds of Mesopotamia have preserved, layer upon layer, for our own age to decode.

The number of such prehistoric levels varies from site to site. In each instance there may be a time lag of varying duration between two given strata. Nevertheless, we have seen that some sites may contain as many as a score of successive prehistoric settlements. The total length of this phase cannot have been less than 2,000 years.

The Third Millennium

The historic age is ushered in by the two revolutionary factors of metallurgy and writing. The first of these, which had begun well back in prehistoric times, brought a profound change in the old concept of space; it stimulated geographic exploration by forcing man to look for new and ever more distant sources of the precious metal (page 64). The other, and this time specifically Mesopotamian development, revolutionized the existing idea of time by forging indestructible links between the past and the present and between the present and the future (page 66). History can now embrace faraway lands and ages.

The principal actors now come to be known by name as well as by deed. In Lower Mesopotamia, the region at the head of the Persian Gulf—which at that time reached much farther up the valley than it does now—the dominant ethnic group used the Sumerian language and called its land Sumer (Biblical Shinar; Genesis 10:10).

Although this language has disclosed the secrets of its structure to the patient efforts of modern scholarship, no relative of it, either ancient or modern, has yet been discovered. Its users were evidently a people apart, in an ethnic no less than in a linguistic sense; we shall see presently that they were also highly distinctive in culture.

The most plausible way to explain this situation and account for the absence of kindred elements is by assuming that the Sumerians had come a considerable distance, having left their immediate relatives somewhere in farther Asia. Be that as it may, the particular gifts and abilities of the Sumerians blended so well with the other cultures of Mesopotamia that the resulting product was to have a decisive bearing on the evolution of civilization in general.

The eastern neighbor of Sumer was the Iranian land of Elam. To the north dwelt numerous mountain peoples who appear to have been akin to the Elamites (Genesis 10:22). Adjoining Sumer in a westerly semi-circle were the Semites; their contacts with the Sumerians were to become ever more close and intimate.

The earliest representatives of the Semitic family of peoples are known in Mesopotamia collectively as the Akkadians (Genesis 10:10). Later on they come to be distinguished in the south as the Babylonians, in the northwest as the Assyrians, and in the west as the Amorites.

The greater part of the third millennium was under the political and cultural domination of the Sumerians. It constituted the brilliant Early Dynastic period. This phase is featured by written and material illustrations from Ur (of the Chaldees),* Lagash, Uruk (Biblical Erech; Genesis 10:10), Khafaje (the ancient name of this site is in doubt), and Eshnunna, among others (pages 68, 70 and 72).

Following this long phase of Sumerian ascendancy came the first period of established Semitic supremacy, under the vigorous dynasty founded by Sargon of Akkad. Sumerian and Semite might contend interminably with each other for political leadership in the land, but the prevailing culture was very much of a joint effort.

Toward the end of the millennium there was a brief resurgence of Sumerian dominance, under Gudea of Lagash (page 78) and the founders of the Third Dynasty of Ur.

This last assertion of Sumerian political power is known as the Neo-Sumerian period. The people responsible for it soon disappeared as a distinctive ethnic element.

The Second Millennium

The culture of which the Sumerians had been the prime catalysts spread, however, to more and more distant reaches. Their lan-

* See "New Light on Ancient Ur," by M. E. L. Mallowan, NATIONAL GEOGRAPHIC MAGAZINE, JANUARY, 1930.

A Forgotten Race Built a Village Citadel on This Hilltop Some 8,000 Years Ago

Archaeologists in recent years have noted that, no matter how deep they have dug into civilization's cradlelands, the beginnings of settled life still seem some distance away.

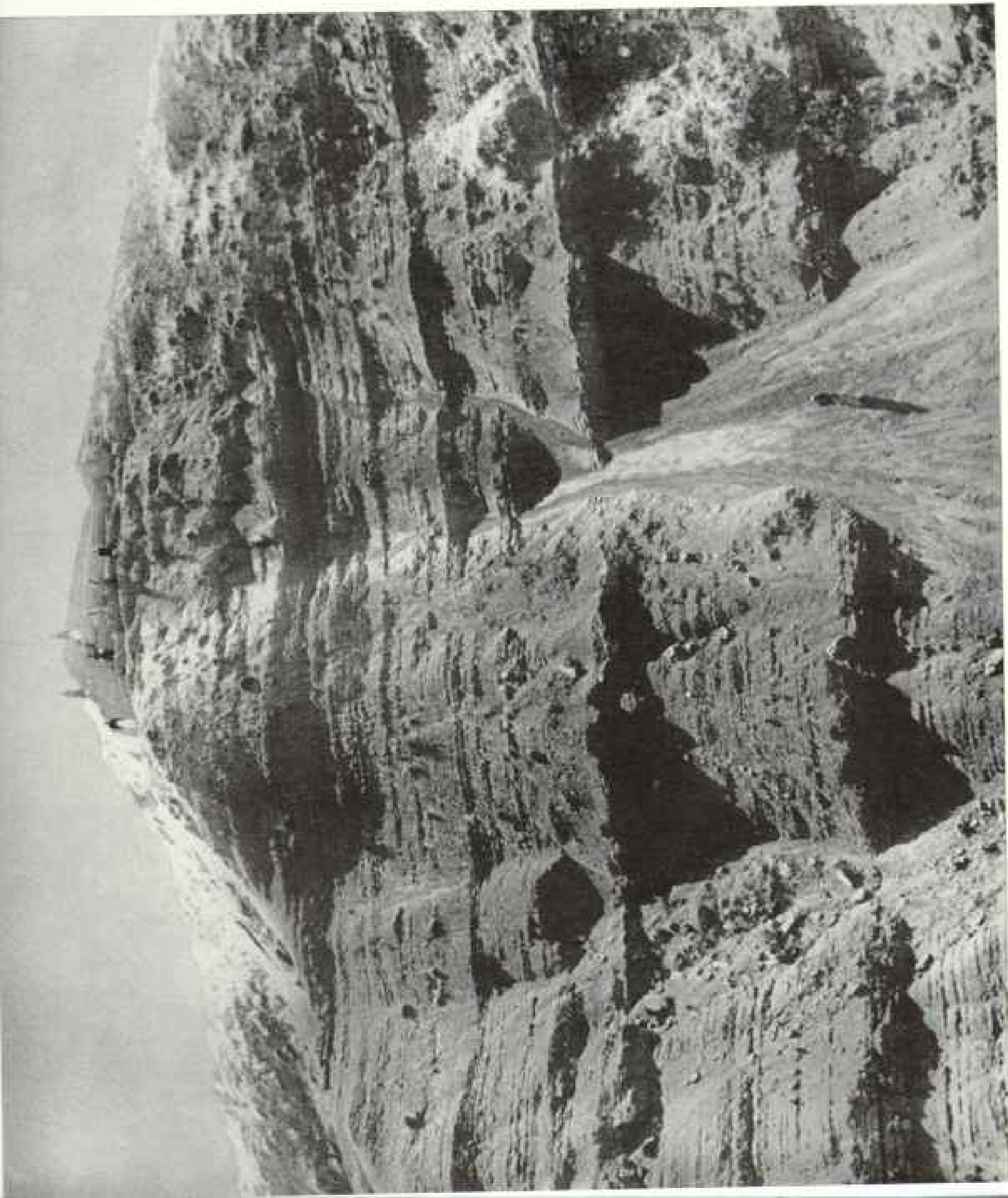
Tepe Gawra's lowest level, for example, was already a few rungs up the ladder of mankind's progress in settled communities (page 42). The bottom layer at Hassuna, south of Mosul, pushed prehistory back a little further.

But the absolute beginnings of settled occupation, which mark man's divorce from nomadic existence, are believed to have been found only in 1948 with the discovery of this primitive site in Iraqi Kurdistan.

Expedition members of the Oriental Institute of the University of Chicago here stand at the top of Jarmo, civilization's oldest known village.

Dr. Robert J. Braidwood, head of the expedition, has reason for dating the settlement between 5000 and 6000 B. C. Its ruins stand 30 miles east of Kirkuk, the Iraqi oil center.

World World



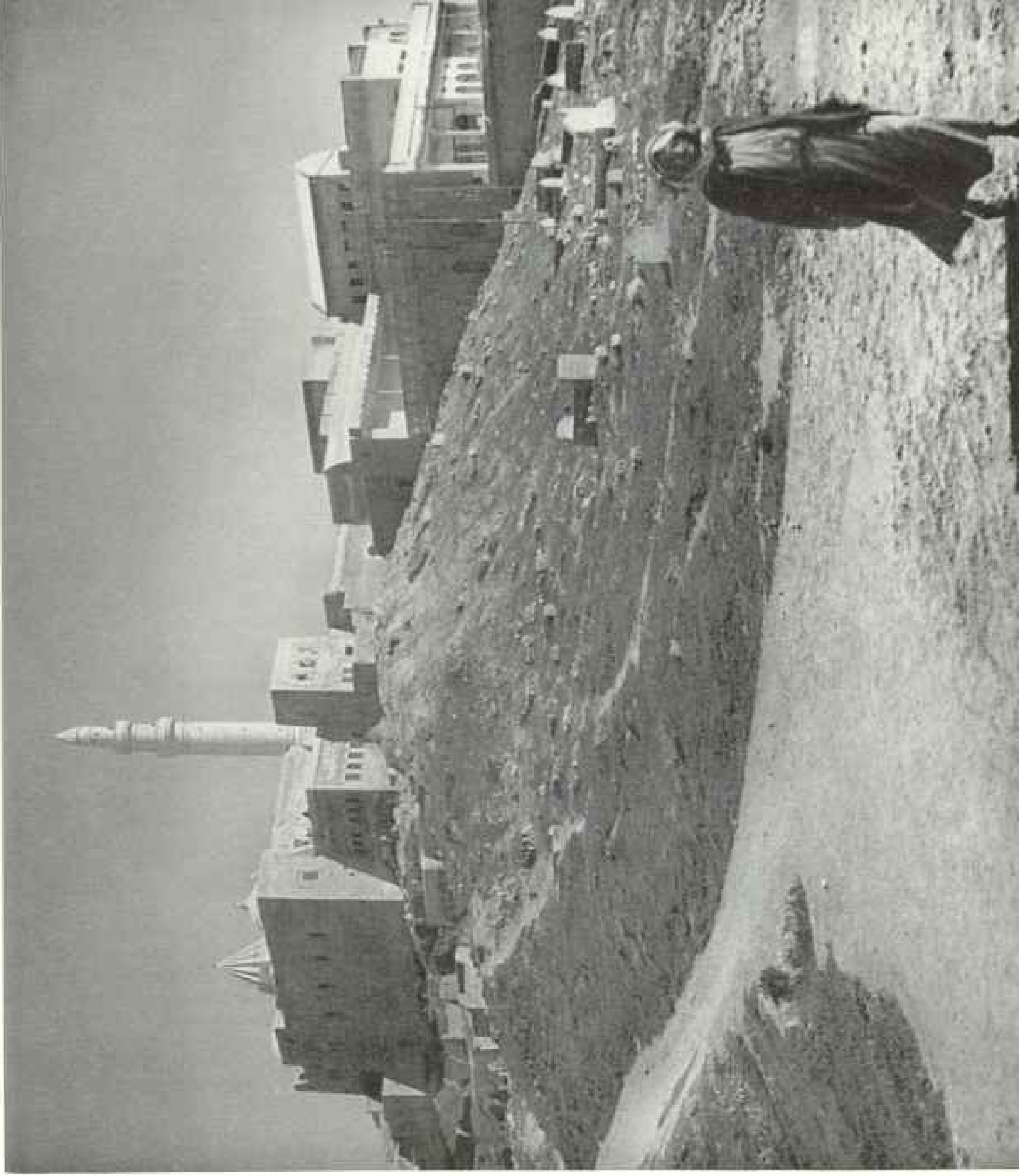
**"Jonah's" Tomb
at Nineveh Swallows
Older Assyrian
Remains Beneath**

Nineveh's sprawling ruins lie just across the Tigris River from Mosul. Excavations in the ancient city have given us a rich picture of Assyria's life, religion, history, and literature (page 100).

But all of this eloquent evidence has come from the site's main mound, which bears the modern name of Kouyunjik. It is to this section that we owe the remains of Assyrian temples and palaces, with their impressive yield of sculptured monuments and written documents. Here, too, deep below the Assyrian levels, five layers of prehistoric Nineveh have been found.

A short distance south of Kouyunjik another tall mound rises. Though attached to the original city compound, it has remained intact. This history-rich mound cannot be disturbed because it bears the mosque of Nebi Yunus, which, according to Moslem tradition, contains the tomb of Jonah, who foretold Nineveh's doom (Jonah 3:4).

Dorion Leigh Ltd.





E. A. Hyster

Ceremonial Wrestlers, Jars on Heads, Struggle in Bronze

Wrestling and boxing, both of religious significance in ancient Mesopotamia, were depicted on monuments dating from the first half of the third millennium *b. c.* Battles between heroes and demons were often portrayed. One wrestling bout involved the great Gilgamesh and his one-time opponent, Enkidu, who later became the hero's inseparable companion. This bronze cast came from an Early Dynastic level at Khafaje, east of Baghdad. Archeologists do not know why jugs were balanced on heads unless they constituted an extra hazard (page 69).

remained just as resentful for psychological reasons. Before the second millennium was half over, however, both Babylon and Ashur were to be subjected for long stretches of time to foreign rule.

In each instance the conquerors were outsiders; they had no family connections either with the Sumerians or the Semites. Their cases were similar, however, in two respects. Both conquering groups were attracted by the civilization that had evolved and matured in the fertile valley; and both descended from the same long chain of mountains which form the northerly boundaries of Mesopotamia,

Babylon was conquered by the Kassites (page 87), a people whose home lay in the Iranian highlands. Their victory had been all but assured by an earlier crushing raid at the hands of the Hittites (Genesis 15: 20), a people of Indo-European stock, settled in Asia Minor.

The paralyzing effect of these twin blows did not wear off fully until some 400 years later, in the 12th century *b. c.*, when Babylonia was at last restored to native rule. Ashur, on the other hand, found itself under the influence of the Hurrians—the Horites of the Old Testament (Genesis 14:6)—a people from the region of Armenia (page 89).

By the middle of the second millennium this exceptionally active group had made its presence felt all the way from the borders of Egypt to the foothills of Iran, leaving substantial traces of its influence, in the form of cultural elements, in Palestine, Syria, Asia Minor, Assyria, and the districts to the north of Babylonia. Much of

what they contributed was merely a new version of old traditions, which the Hurrians had acquired from the Sumerians and Akkadians in the third millennium. Thus Mesopotamian civilization was now active on a broad front, in the manner of a chain reaction, propagated by collateral as well as by lineal descendants.

The Concluding Phase

But the political power of the Hurrians was not equal to their culture. Assyria, at all events, managed to emancipate itself as early as the 14th century. Thereafter, this vigorous

state based on the middle Tigris experienced a long period of steady growth and expansion, which was not checked for nearly 800 years.

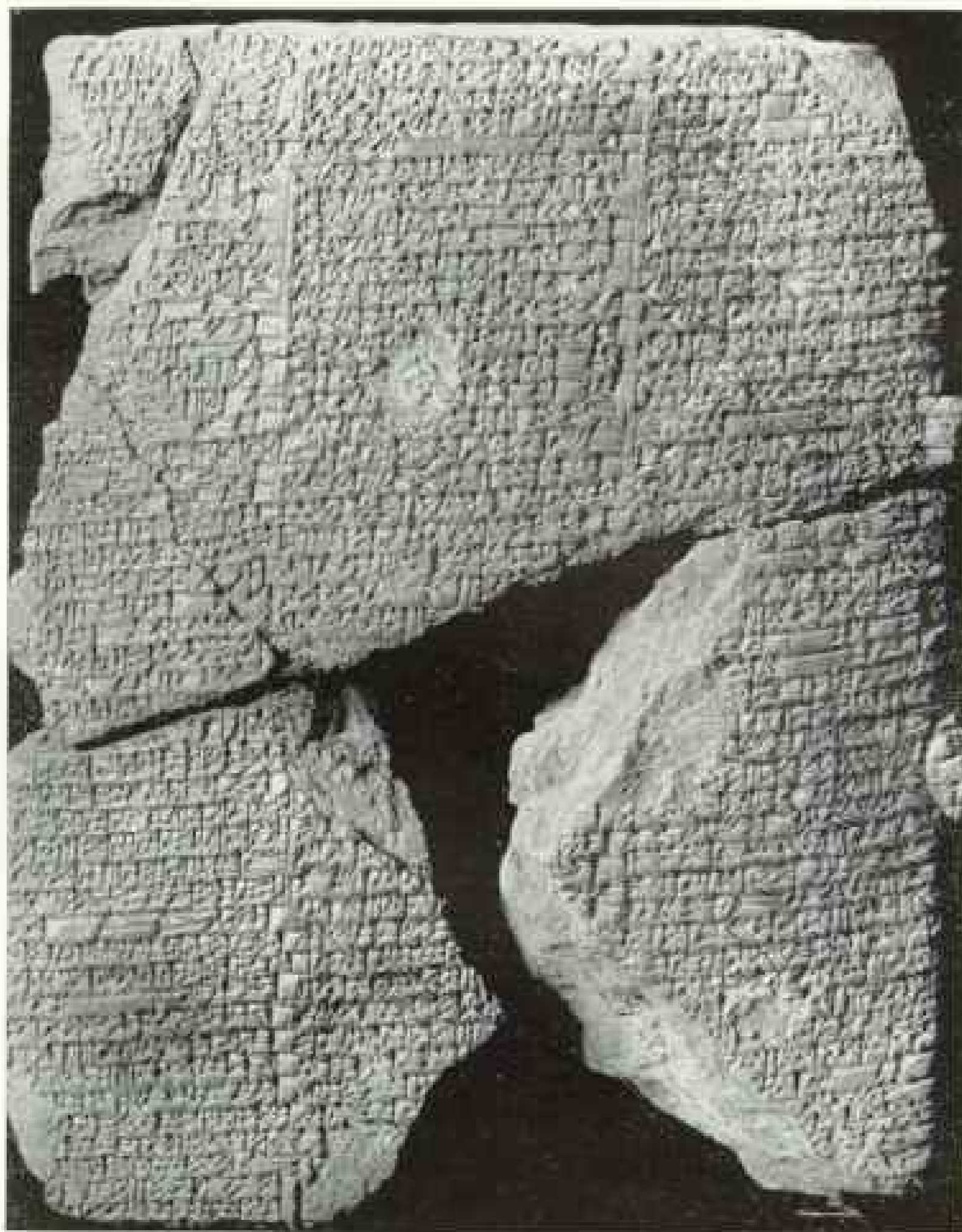
The first millennium B. C. sees first one and then the other branch of the Mesopotamian family attaining a height of power never hitherto equaled, only to be followed in rapid order by a decisive and permanent decline.

Assyria enjoyed its greatest expansion in the middle of the 7th century B. C., when its kings established themselves in Egypt, the cultural rival of Mesopotamia since remote prehistoric times.* It was, however, a case of fatal overexpansion. Before the century ended, the capital at Nineveh succumbed to the combined assault of the Medes and the Babylonians, in 612 B. C. (Zephaniah 2:13).

The last king of Assyria was able to maintain himself in a western province a bare half dozen years longer. In 606 B. C. the might that had been Ashur was extinguished for all time.

Babylon continued for a few decades on borrowed time. Under Nebuchadnezzar II, the city displayed all the outward signs of the world's leading center, which indeed it was (page 105). The golden age of Hammurabi appeared to have returned—with modern improvements. But just as that age had been only decades away from alien domination, so was the reign of Nebuchadnezzar the last but one under a native ruler of Babylon.

Once again the rude awakening stemmed from Iran. This time, however, the victors were neither Kassites nor Medes. The conqueror, in 539 B. C., was the great Cyrus at the head of the upsurging Persians.



Albert T. Clay

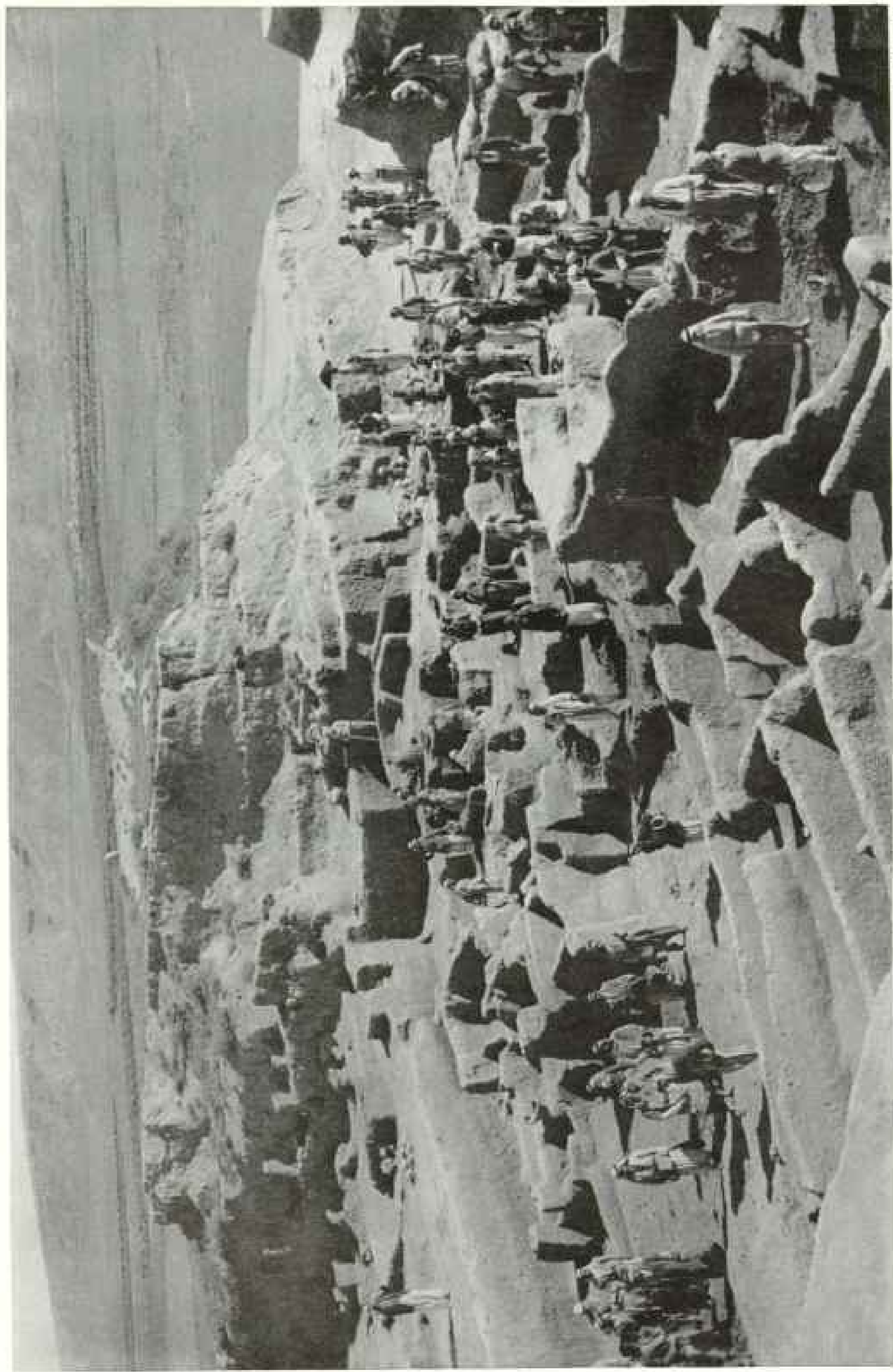
The Heroic Epic of Gilgamesh Is Written in Clay

The world became acquainted with the Gilgamesh Epic through a version discovered in the Library of Ashurbanipal (668-626 B. C.) at Nineveh. This Babylonian fragment, now in the Yale Collection, is at least 1,000 years older. The Nineveh relic's Eleventh Tablet tells the story of the Great Flood (page 76).

Ironically enough, the strength of the Persians, like that of the Medes and the Kassites before them, flowed in large measure from the pervasive cultural influence that Mesopotamia had been exerting on its neighbors ever since the third millennium.

The Persian conquest did not in itself bring an end to the cultural career of Mesopotamia. Two centuries later, Alexander the Great was to make Babylon his own and the world's capital—a telling tribute to the country's prestige throughout the civilized world.

* See "Daily Life in Ancient Egypt," by William C. Hayes, with 32 ills. in color from paintings by H. M. Herget, NATIONAL GEOGRAPHIC MAGAZINE, October, 1941.



Excavators Reach a Point More than Halfway down Tepe Gawra's 3,000 Years

Discovered by the author in 1927, Iraq's "Great Mound" has been explored in eight digs, four of them under his direction (pages 42 and 61). Each of its 26 levels represents a century or more. Counted from the top, this is Gawra XVI. Ten levels exist beneath it. Olive groves stand in the background.



31

MATP, official.

Southern Mesopotamia, as in Antiquity, Is an Immense Network of Irrigation Canals Fed by the Euphrates River

In the days of the Sumerians and Babylonians the river's low banks made irrigation easy (page 59). Rain was scarce; but the alluvial soil, when watered by artificial means, proved enormously fertile. Floods and Mongol invaders destroyed the ancient water systems; Iraq now tries to restore them.



The Oriental Institute

A Lowly Dog Left His Signature Beside That of a Powerful Assyrian Emperor

Sargon (II) was the first Mesopotamian emperor to enjoy the fruits of the conquest of Israel. Khorsabad, his capital, has yielded many impressive sculptures and wall paintings (pages 43 and 98). It also contained many small inscriptions. One of these has an added, unscheduled touch. Before the clay was dried and baked some 2,670 years ago, a stray dog trod upon it, leaving his paw prints.

The death of Alexander the Great in Babylon wrote an end, at long last, not only to that city's hopes and ambitions but also to the individual existence of the country and to its age-old independent culture. Mesopotamia, as such, ceased to be.

Its inner vitality, however, was far from spent. Sundry elements of the civilization that had grown up in Mesopotamia continued to live on and blend with other notable achievements of mankind, under Hellenism and its successors. And thus they survive to our own day, in common with other Mesopotamian contributions that had found their way in the meantime to Palestine and Asia Minor, and thence had entered the main stream of western civilization.

A Way of Life Endures

What then are the enduring cultural values that make of Mesopotamian civilization a light that did not fail with the collapse of the political structure? A full list would take us too far afield. Nor is an exhaustive tally needed. For nearly all of the region's achievements that time has been unable to obliterate are grouped into a harmonious pattern which adds

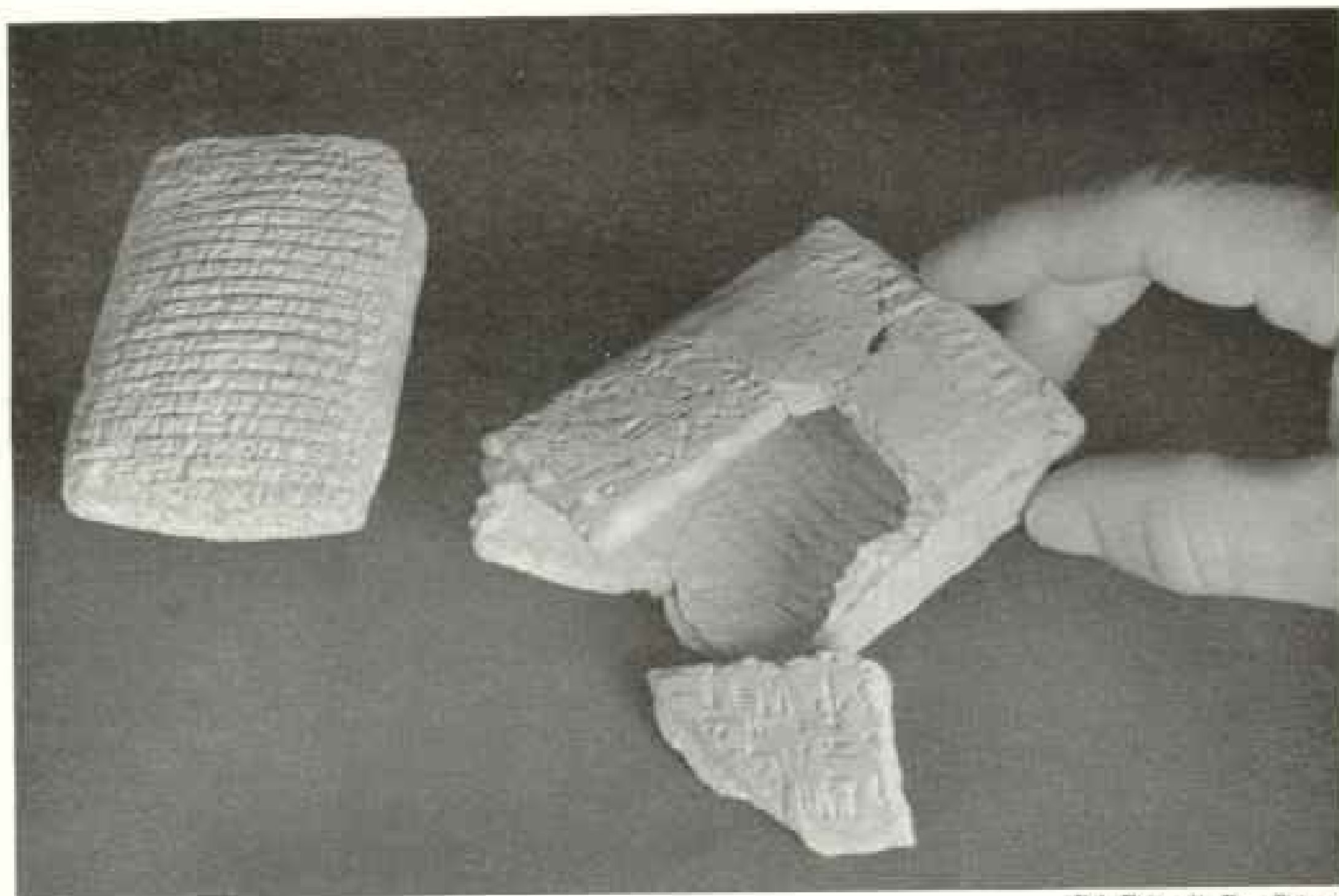
up to the Mesopotamian way of life. Once that pattern has been outlined, the main details will fall readily into place.

If civilization is largely a way of fixing man's place in Nature and society, how did the ancient Mesopotamians make these all-important adjustments? Very briefly, Nature was to the thoughtful inhabitant of the Tigris-Euphrates Valley a combination of capricious and violent forces, each personified by one or more gods.

The gods' actions were unpredictable; hence life on earth was ever restless and uncertain. Man must be everlastingly at pains to please and appease the gods, so as to influence his own fate for the better.

This requirement applied to the mightiest king no less than to his lowliest subject. The king was no supernatural being, as in Egypt, but a mortal, abject in his submission to the powers of Nature. To this extent, at least, all men were equal.

The place of society in Nature becomes ultimately a matter of the rights and responsibilities of the individual—any individual. Here we have the essentials on which democracy is founded.



Yale University News Bureau

Lettered Clay Sheaths Ensured the Safety of Important Clay Documents

Mesopotamia sometimes inscribed legal matters on so-called case tablets (page 66). The inside tablet carried the text. The outer envelope, protecting and identifying the enclosure, usually was limited to an excerpt.

The fact that a rudimentary form of democracy was the keynote of the Mesopotamian way of life is abundantly clear from countless details involving government, religion, law, literature, and art. Since the king was just as fallible as the next mortal, he must maintain constant vigilance to avoid upsetting the precarious balance between Nature and society.

A person in authority could best guard against a fatal misstep in a major undertaking by seeking the advice and approval of other heads than his own. The necessary powers came to be lodged in a constituted assembly. They formed an effective check against authoritarianism.

Assembly approval came to be regarded as an integral part of the Mesopotamian way of life, so much so that even the gods were subject to it in their celestial setup (page 74). And government by assembly means parliamentary democracy.

Equality of individuals before the laws of gods and men implies, furthermore, a measure of personal dignity and security. This encourages in turn a sense of personal property. In Egypt, where the Pharaoh was god and absolute master of all he surveyed, the individual technically could call nothing his own. In

Mesopotamia it was the natural thing for a ruler to pay the current price for anything he wished to acquire.

All things considered, the Egyptian way led to a sense of resignation; in Mesopotamia, anxiety pointed a way to hope.

How well the Mesopotamian system worked can best be judged by its broad appeal to various ages and to widely differing peoples. It was viewed as the essence of civilized life. Because it was effective, it was an influence for general progress in fields of human endeavor not directly connected with government and society; particularly so in literature and the natural sciences.

The Key Position of Writing

The common denominator in all these incidental advances was writing. The local philosophy of life had led to the discovery of writing in the first place. Writing promoted progress on a broad front, making life fuller and richer and causing the whole system to be widely copied by others. The borrowers, for their part, were often able to make further contributions of their own.

The earliest inhabitants of Mesopotamia in times approaching the historical period are known as the Sumerians.

Sumerian culture, itself a composite product, gradually developed into a cooperative civilization embracing the whole of Mesopotamia. The basic social, intellectual, and material attainments of that broader civilization appear eventually as the common property of the larger section of western Asia known as the Fertile Crescent.

They spread also to other adjoining areas, and in course of time crossed over to Europe. Like bread cast upon the waters, they proved amply rewarding, in that Mesopotamian civilization lived on after the mother country had fallen under foreign domination. By then the foreign conquerors had become in many ways the disciples and the zealous guardians of the Mesopotamian way of life.

It remains only to show how the separate cultural elements relate to one another as parts of a harmonious and living pattern. If the entire system got its start from the local concept of the individual in relation to society and of society in relation to Nature, it was writing that emerged first as that system's most notable by-product, and later as its very nerve center.

The strongly developed sense of private property which characterized the Sumerians led them to identify their possessions—notably those that were presented to the gods as offerings—by means of personal markers engraved on their cylinder seals. The seals were rolled out on soft clay and the impressions could then be attached to the given object as labels (page 66).

Similar identifying markers were used for temples and cities. As such, they were more than just pictures to be seen; they were at the same time names to be pronounced. From proper names the notations extended to objects of importance to contemporary economy, finally to words in general.

At the same time, means were devised to express not only entire words but also component syllables, the development proceeding from the concrete to the abstract. It was a decisive step forward; for it marked a genuine liberation from mere word painting, a step, incidentally, made possible largely by the peculiar characteristics of the Sumerian language. Thus we soon have a flexible medium for recording speech and thought.

It is tempting, but vain, to speculate on how much longer man might have taken to discover writing without the favorable background of the Sumerian social system and of the Sumerian language. The fact is that the earliest Sumerian written records are also the oldest forms of actual writing from anywhere. Moreover, the complicated process,

from concrete symbol to abstract syllable, takes place, step by step, before our very eyes, as it were.

The possibility that the entire procedure was repeated independently elsewhere is extremely remote. It is true that Egypt constitutes the other great cultural center whose antiquity is comparable to that of Mesopotamia. We know, however, that Egyptian writing appears after the Sumerians had perfected their medium, and that it is full-grown virtually from the moment of its appearance. The preliminary experimental stage is lacking.

Since Egypt and Mesopotamia are known to have maintained close cultural contacts with each other in the centuries prior to the advent of writing, particularly so after the coming of copper, the means were there for the idea of writing to be readily communicated from one to the other. For all these reasons many scholars are now agreed that Egypt took over the basic idea from Mesopotamia, but employed its own specific symbols to put that idea into effect.

Achievements of this magnitude are difficult and rare. Even though the basic problems had been overcome, it required more than 1,000 years before the next great stride was taken—this time from syllabic to alphabetic writing.

That secondary discovery, which was to prove of inestimable value to all mankind, was likewise the contribution of the Near East, worked out somewhere along the eastern shores of the Mediterranean.* This achievement would not have been possible, however, without the underlying labors of the early Mesopotamians.

Mesopotamian Words Still in Use

Writing by means of separate signs for words or syllables is a complex procedure. It calls for a key if it is to be used with speed and precision. Since the symbols are based on models found in daily life, the key takes the form of lists of things and beings systematically catalogued.

Even the earlier Sumerian documents contain lists of birds, fishes, domestic animals, plants, implements, and the like—all intended as aids to writing and reading. Such groupings imply careful observation and organization. They are in fact the first steps in a scientific approach to zoology, botany, mineralogy, and so on.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Secrets from Syrian Hills," July, 1933; and "New Alphabet of the Ancients Is Unearthed," October, 1930, both by Claude F. A. Schaeffer.

It should not surprise one, therefore, to learn that we still use botanical terms which first appeared in cuneiform records—that is, in the wedgelike script into which Mesopotamian writing developed (pages 52 and 53). Words like cassia, chicory, cumin, crocus, hyssop, myrrh, nard, and saffron are all borrowed from Mesopotamia.*

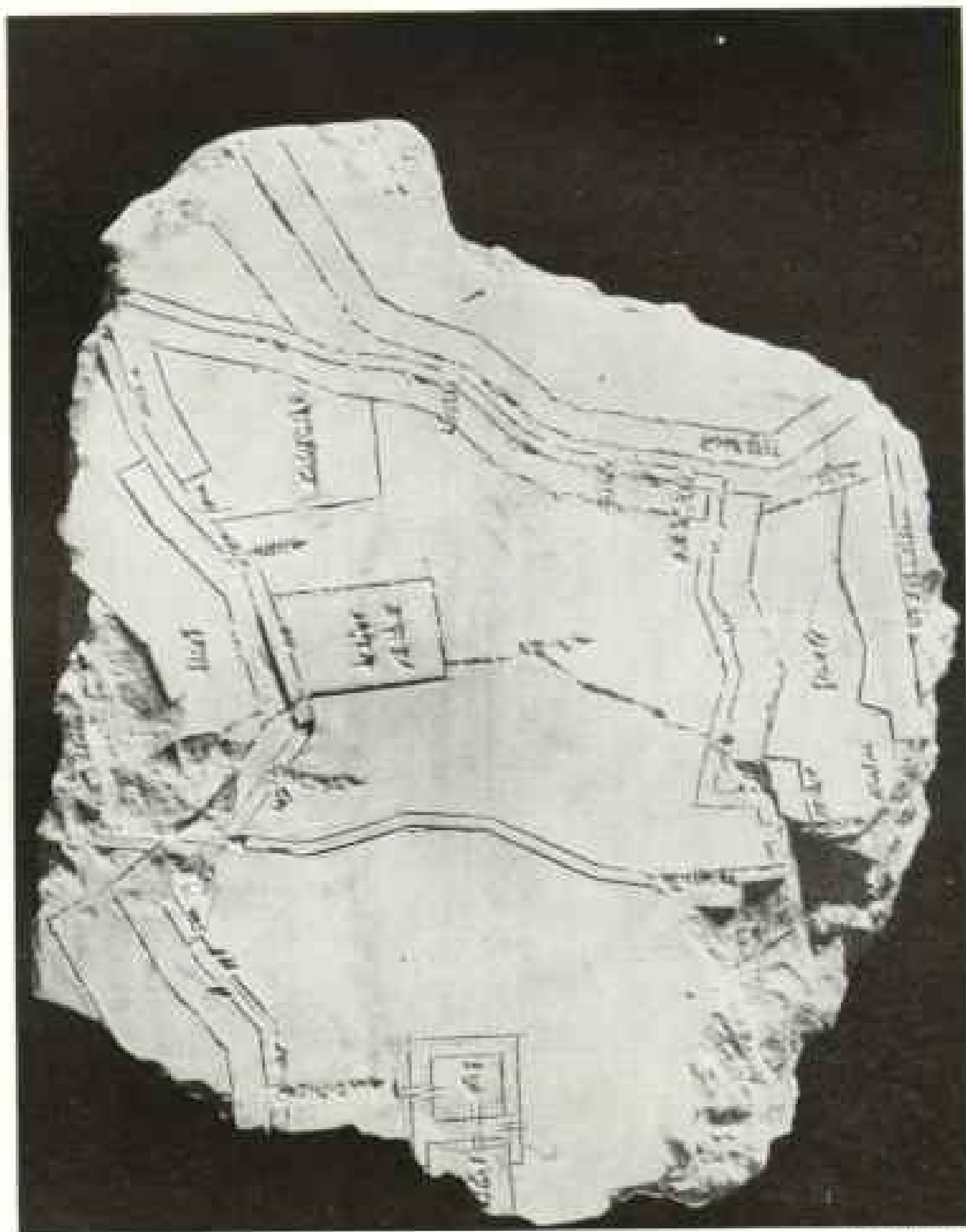
Among the other fields of culture which writing helped to promote or stimulate are linguistics, mathematics and astronomy, law, and literature (page 49).

The study of language was a subject of immediate practical importance to Mesopotamian society because the cultured stratum of that society had to be bilingual. Together with the vernacular Akkadian one had to be versed in the totally dissimilar Sumerian.

To meet this need, local scholars had produced by the end of the third millennium such seemingly modern manuals as grammars, lexicons, and commentaries; they compiled numerous bilingual texts, occasionally with interlinear translations.

Mesopotamian mathematics made many contributions which it takes an expert to appreciate. But all of us have had ample proof of the vitality of its sexagesimal system—in the division of the circle into 360 degrees and the division of the hour into 60 minutes and 3,600 seconds.

The allied discipline of meteorology was so proficient that Babylonian weights and measures spread to neighboring centers, and beyond these to the Hebrews and the Greeks. Progress in mathematics encouraged advances in astronomy, a field of many applications, some



Albert V. Clay

Builders of Ancient Nippur Had a Clay Blueprint to Guide Them

Nippur was the religious and scientific center of ancient Babylonia. From its libraries, which were uncovered by the Museum of the University of Pennsylvania half a century ago, have come collections of religious, literary, and historical masterpieces, as well as elaborate grammars and dictionaries. Small wonder, therefore, that building, too, proceeded according to careful plans. This city map was first published by H. V. Hilprecht in 1904.

practical, as in the case of agriculture and fiscal organization (page 85), others quite abstruse. The astrological lore of the Chaldeans, a late name for the inhabitants of Babylonia, has remained proverbial to this day.

Law and Literature

Law was accorded a place of special honor and prominence in the cultural structure of Mesopotamia (page 78). It was indeed in many ways the keystone in that structure. The legal code was the charter and the con-

* See "The World's Words," by William H. Nicholas, NATIONAL GEOGRAPHIC MAGAZINE, December, 1943.



Boat and Donkey Have Complemented Each Other since Prehistoric Times

Modern Iraq has had railroads for more than 30 years, and its oil deposits help run the world's communications, but the ever-present donkey remains unimpressed; he is just as important as ever. These river boats, tied up near a Baghdad bridge, are successors to the primitive, round *gafar* of the past (page 64).

stitution that guided the ruler and safeguarded the subjects—a charter of human rights.

Even though the king became the head of a vast empire, he was still the servant, not the source, of the law and was responsible to the gods for its enactment. Such divinely guaranteed protection of the individual's vital rights probably meant more to the average citizen than any other boon. This helps to explain the countless thousands of legal documents which have been dug up from the mounds of ancient Mesopotamia; it accounts also for the series of law codes from that area.

The framework and the practice spread to the Elamites and the Hurrians, the Syrians and the Hittites, each of whom employed the given local language or dialect for the purpose, but retained the Babylonian cuneiform and the Babylonian clay tablet.

The huge stele on which the Code of Hammurabi was inscribed (page 84) was not recovered from its home site in Babylon but from the Elamite capital at Susa. Obviously

a priceless war trophy, it was deemed worth all the effort that its transportation must have entailed. And well it might be, for this code was not only a general charter of human rights but also a precise book of instructions concerning the family, the society, and the government, as well as commerce, the arts and crafts, and the professions.

For similar reasons, the cuneiform script and the Akkadian language were studied in the second millennium throughout the western civilized world. Some of the finest epics of Mesopotamia are known to us today not in Mesopotamian copies but in cuneiform transcripts made in Egypt for the training of that country's scholars and diplomats.

Various forms of Mesopotamian literature were taken over, either directly or in some adaptation, by other peoples near and far. Ritual and omen texts (page 87) became an important feature of the Hittite archives in central Asia Minor. The epic literature in particular enjoyed great popularity abroad.

The immortal tale of Gilgamesh (pages 49 and 77) appears by the middle of the second millennium in as many as four different languages—Hittite and Hurrian, in addition to Akkadian and Sumerian.

It has been pointed out frequently that the *Odyssey* has various points of contact with this great literary achievement of Mesopotamia. And even though Homer stood in no need of outside assistance, the literary form which he employed was originated in Sumer. The legend of Uranus and Cronus is traceable, through Hurrian channels, to a Babylonian source.

The influence of Mesopotamia on the Old Testament cannot be indicated within the limits of a brief article. It was inevitable, for the simple reason that the patriarchs came originally from the Euphrates Valley and were thus automatically ambassadors of Mesopotamian civilization. Viewed in this light, the supreme place of the law in the Bible assumes added significance.

When the Bible uses the incident of Egyptian bondage as a recurring refrain, it would seem to allude to much more than the rela-

tively brief period of Egyptian oppression. Rather it appears to stress the fact that the Egyptian way was abhorrent, incompatible with its own way and hence also with that of Mesopotamia.

The ideals that have sustained mankind to this day are in many ways the same ideals that were tested and refined in the magnificent laboratory which Mesopotamia maintained during the thousands of years of its historic progress. In a final survey, therefore, it will not be the sundry survivals of that civilization which call for our close attention.

Not the wheel and the true arch, the razors and cosmetic sets and frying pans; neither will it be shepherd's pipes or the princely harps, nor yet the dials on our clocks, or the astrological charts that constitute our greatest debt to Mesopotamia.

What are really vital are law and writing, and beyond these the abiding sense of the rights and obligations of the individual in a changing and dramatic world—pointing a way to hope in man's struggle for civilization. We are only beginning to appreciate the role of Mesopotamia in this epic struggle.*

How the Herget Paintings Were Composed

IN efforts to present, in collaboration with the artist, the basic features of a great civilization of antiquity, the archeologist dealing with Mesopotamia is less favored by circumstances than were his colleagues representing Egypt, Greece, and Rome.

We know that the artists and artisans of Mesopotamia were no less accomplished than their contemporaries in the Nile Valley. Climate and soil, however, combined to preserve the products of the one center and to destroy those of the other. In Mesopotamia woodwork and textiles simply disintegrated and wall paintings did not fare much better.

Fortunately, the cylinder seals from Mesopotamia are a source of information that is practically inexhaustible. Sculptures in the round, and more especially the vast number of reliefs in stone and bronze (pages 43 and 48), contribute their share of vivid and vigorous representations.

Within the last two decades chance and the refinements of archeological methods have preserved for us several important examples of local frescoes—at Til Barsib and Mari, Khorsabad and Nuzi, Dur Kurigalzu, and 'Oqair on the Arabian coast of the Persian Gulf—so that we are no longer reduced to guesswork when it comes to the question of color on anything other than pottery.

In the following paintings by H. M. Herget the facts about a complex civilization that lasted several thousand years, including nearly three millenniums of historic progress, have been compressed into 24 subjects, arranged in chronological sequence from remote prehistoric times down to the middle of the first millennium B. C.

Each picture stands for a whole age, or for a significant phase of the given age. The episodes, based on fact or on imagination, may be descriptive of a moment in history or of a whole era.

The archeologist has invented an incident if the texts did not furnish him with something better and stranger than fiction; but he has sought to be true to the spirit of the time. Details rest on a solid foundation.

This need for highlighting a composite and dynamic civilization by instilling life into each individual painting, imposed an added strain on the artist. Mr. Herget's experience and interest proved to be a unique combination. He faced the problem, delighting in its challenge. It is a source of deep regret that he did not live to see his last major project published.

* For additional articles on Mesopotamia, see "NATIONAL GEOGRAPHIC MAGAZINE Cumulative Index, 1890-1950."



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Painting by H. M. Hergott

Fourth Millennium B. C. "He Created the Grass, the Growth of the Marshes, the Reeds, and the Forest . . . A Swamp He Made into Dry Land"—Eridu Creation Story

Man Helps Build Southern Mesopotamia

“**N**O SIRUP of the field was yet in the earth, and no herb of the field had yet sprung up” (Genesis 2:5).

This sentence might well apply to southern Mesopotamia—the traditional region of the Garden of Eden—at a time when the surrounding lands had already been long established. The land here had to be built up slowly, by the silt brought down from the mountains of Armenia by tireless rivers. And man had to do his share in making the ground firm.

Northern Mesopotamia is hilly and old; the south is flat and relatively recent. Lower Mesopotamia owes its very ground to the unceasing activity of the Tigris and the Euphrates. Their silt is constantly adding to the land surface and cutting down the water area at the head of the Persian Gulf.

What had been seaports even in comparatively late prehistoric times are now modern towns or ancient sites lying hundreds of miles inland.

The first settlers arrived in Lower Mesopotamia from neighboring and long-established lands.

They were real pioneers, working with the reeds that grew from the marsh bottom and matting them into a cover over the slime. The land which they helped to form with their own hands was new, but their civilization was old and mature. What they achieved in the course of the first few centuries was a blend of the old and the new, a blend of discoveries and experience imported from neighboring centers but adjusted to the new surroundings and materials.

It was on this truly flimsy foundation that a new civilization was to emerge in course of time, one which was to develop into a dynamic force

crossing barriers of language, race, and political boundaries, and becoming in many important respects the cradle of modern civilization.

While Lower Mesopotamia was gradually drying out, there developed in the highlands to the north and northeast three distinctive cultures, each of which was typified by a particular kind of painted pottery. The latest of these three painted pottery cultures is often called El Obeid (page 63), after a small site near Ur.

All three phases were well acquainted with animal husbandry and enjoyed well-developed forms of agriculture, architecture, and religion. Their pottery served primarily a variety of domestic uses, but the best pieces were reserved for ceremonial and religious purposes.

The pottery soon develops local characteristics and acquires the features which are sampled on this plate. The same is true of the architecture. Alongside the temples which are known to us from the north there develops also a special local style which features the reed as the basic building material.

A bundle of reeds tied near the top yields the graceful curves which come to be associated with the mother goddess, since art, architecture, and religion are already in intimate association.

The plate seeks to compress several centuries of development into a single scene. The men in the painting are stamping down the ground and laying mats over the slowly drying marsh. A patch previously wrested from the marshes already bears the cult but whose goddess will be implored to protect man and beast as she receives offerings from the treasured pottery vessels assembled for the purpose.



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Fourth Millennium B. C. "That City Was Ancient, and So Were the Gods Within It"—Epic of Gilgamesh

Painting by H. M. Forest

This Northern Acropolis Was Buried Under 12 Settlements

WHILE most of the south of Mesopotamia was still a steaming marsh, the north had been climbing steadily up the ladder of prehistoric progress—a fact about which even the specialists were vague as recently as 30 years ago. Since then, however, excavations in the area of ancient Nineveh—modern Mosul—have helped to fill huge gaps in our knowledge of the past.

Perhaps the single site which has told us more about these lost ages than any other mound has been Tepe Gawra, 15 miles northeast of Mosul, discovered and first excavated by the author in 1927. Subsequent excavations, largely under the author's personal supervision, have not only confirmed but exceeded his original estimates of the promise of the mound.

By 1936 Tepe Gawra had become a landmark in Mesopotamian archeology, duly marked on the National Geographic Society's Map of Bible Lands. This plate and the next are based on the work at Tepe Gawra.

Of the 26 levels uncovered at Tepe Gawra the first 20 deal with prehistory, that stage in the progress of man which extends from the end of the Stone Age to the beginning of the Copper Age proper.

This period, in which copper was used sparingly together with stone, lasted perhaps 2,000 years, down to about 3000 B. C. It saw great improvements in pottery techniques and decoration, steady growth of architecture, the invention of the wheel, and the introduction of the stamp, or button, seal as a magic link between the individual and the powers of Nature.

All of this stage was experienced in the north of Mesopotamia, whereas the south was in a position to enjoy the fruits of this progress only toward the end of the period.

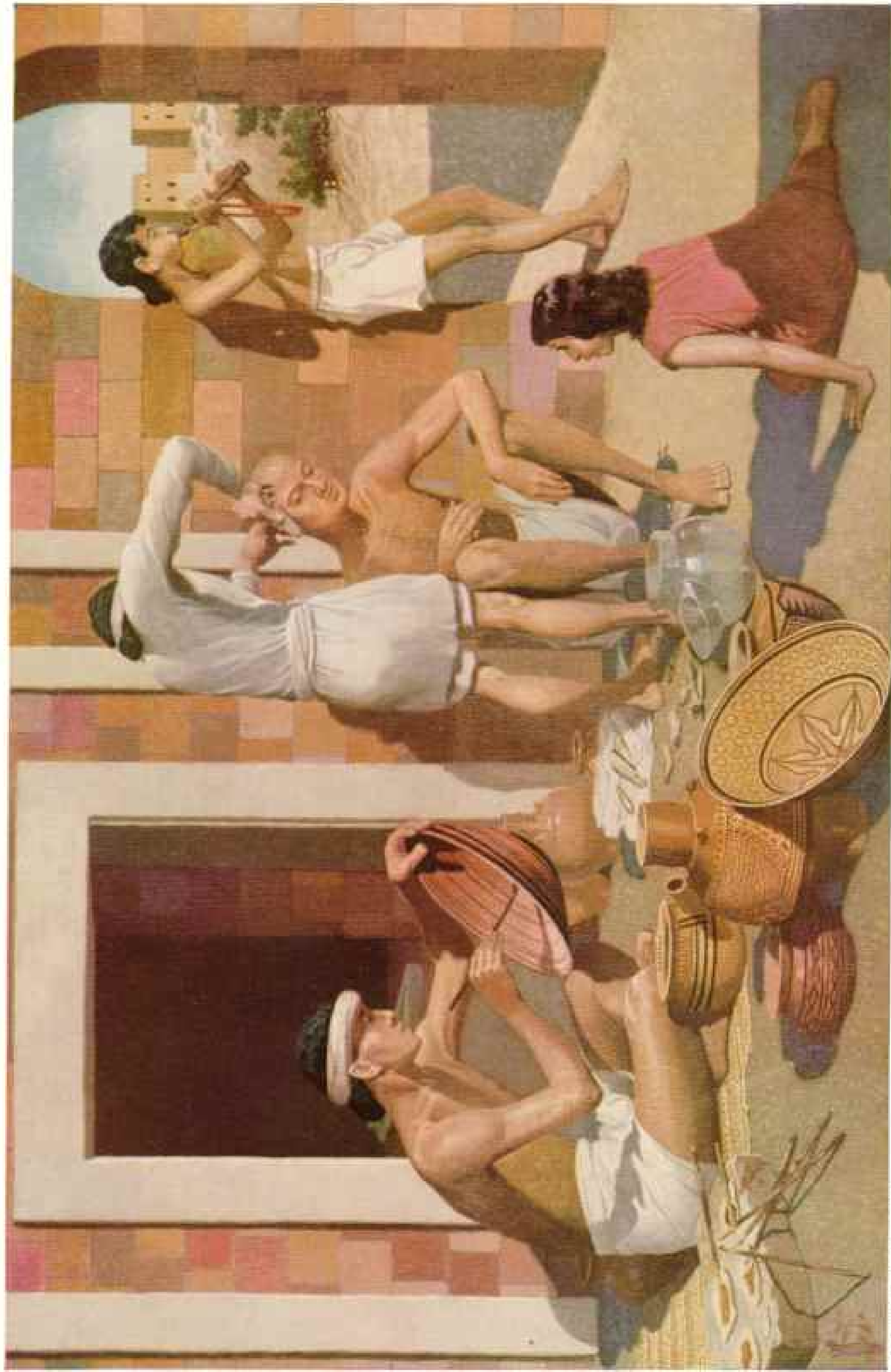
The dominant theme of the Stone-Copper Age was religion. The principal buildings in most of the levels of Tepe Gawra were the temples.

Because venerated religious centers found eager builders after each destruction, whatever the cause, the mound witnessed many successive occupations, layer upon layer. With each new stratum the area at the top became more and more restricted, until at last it would no longer support any kind of structure worthy of the site's tradition.

By 1500 B. C. the place had to be abandoned, and within a century or two it was worn down to a tall, cone-shaped hill. The three temples illustrated on this plate were built by the people of Gawra XIII, after the site had already gone through 13 earlier occupations.

The shrine to the left retained the natural coloring of its light-brown, sun-baked bricks. The central shrine was decorated with white plaster, and the building on the right bore traces of vermilion decoration. Each shrine used bricks of a special and exclusive size, but all three employed piers and pilasters which yielded niches and gave the whole a sophisticated appeal.

At the time of its discovery (1937) the Gawra acropolis was the oldest example of monumental architecture in the world. It still remains an eloquent witness to the great strides which prehistoric man had made since his emergence from the obscurity of the Stone Age.



© National Geographic Society

Painting by H. M. Bergt

Fifth-Fourth Millenniums B. C. "The Labor of Them Brought Sighs to Every Craftsman"—Building Inscription of Sennacherib

Prehistoric Man Had Much to Occupy Him

THIS PLATE seeks to highlight several of the most interesting achievements of Mesopotamian prehistory. It is a composite picture in more ways than one. The features here illustrated could not be found together in any single level, but each is authentic for a particular occupation; and all date from an age prior to the beginning of history, that is, from before 3000 B. C.

At Tepe Gawra, however, the prehistoric period is represented by as many as 20 individual levels; and a similar time span is required by the evidence from other sites.

With so much ground to be covered, it was necessary to compress into a single composition here, and in the two preceding plates, the story of several centuries. Some of the pottery, for instance, belongs to Gawra XX (counting from the top) and below; the arched doorway, on the other hand, is a product of Gawra VIII, or very close to the beginning of history proper.

The painted pottery of prehistoric Gawra falls into two main groups; the earlier of these bears the name of Halaf, and the later of El Obeid, a relative of the earliest pottery from the Elamite capital at Susa. The Halaf pottery is celebrated for its high firing, its glossy polish, and especially for its extraordinarily intricate decoration in more than one color. The El Obeid pottery from Gawra is often decorated with naturalistic designs—plants, birds, animals, and even landscape composition.

The potter by then had discovered the closed kiln, which enabled him to control his temperatures. The painter ground his materials on stone palettes and used them with infinite

skill and patience. The stonecutter, too, left us fine examples of his work, ranging from weapons to engraved stamp seals.

None of his masterpieces, however, can match his best efforts in translucent obsidian, such as the spouted bowl depicted here beside the pottery. When it is borne in mind that this volcanic glass cracks rather easily under pressure, that the whole bowl had to be ground, spout and all, out of a single core, and that many a piece must have been nursed along to the last stage only to collapse under the finishing touches, the work of these nameless artists of some 5,000 years ago will stand out as incredible.

The barber used straight razor handles made of slate and furnished with obsidian blades which were attached to the holder with bitumen. The author can testify from experience that these razors were efficient and convenient to handle.

The playing pipes were made of bone. They occur as early as Gawra XII. One of the best preserved specimens was found in the grave of a young boy, the right hand still clutching the instrument.

Gawra VIII produced the first known example of a true arch, made of sun-baked bricks. This level contained another acropolis different in details and general design from that of Gawra XIII (page 60), but no less impressive.

The new architectural features are sufficiently distinctive to suggest that a change in population had taken place after Gawra XIII. But who these newcomers were, and who their predecessors may have been, will probably never be known. It is true of the prehistoric peoples more than of any other, that only by their works shall they be known.



© National Geographic Society

Painting by H. M. Herzog

End of Fourth Millennium B. C. "The Steadfast House the Pickax Builds . . . the Steadfast House It Causes to Prosper"—Sumerian Myth about the Creation of the Pickax

The Introduction of Copper Ushers In a New Era

THROUGHOUT the Chalcolithic, or Stone-Copper, period the metal was used sparingly and, what is far more important, was treated in much the same way as stone.

The real age of copper could not set in until the discovery of the basic principle of metallurgy: that by smelting the ore one could make the metal pliable and cast it into any desired shape. Only then could the flexibility of the material be fully utilized and a variety of shapes achieved that could never be forced out of the resistant stone.

Once discovered and perfected, metallurgy became responsible for a revolution in the life of the ancients that remained without parallel until the advent of the Steam Age. In industry and in warfare, the users of stone could not compete with the handlers of copper. Acquisition of the new technique became literally a matter of life and death.

Since the known sources of supply were limited and widely scattered, control of the supply routes gained an importance never hitherto experienced, and peaceful commercial intercourse became an international concern. The tempo of life had been vastly accelerated.

Level VII of Tepe Gawra, which represents the last Chalcolithic occupation, and which yielded a few hammered copper objects, had the rich brown color of the earth in which these objects were embedded. But Gawra VI, the first witness of the Copper Age on the mound, only a few feet above Level VII, was literally green with the patina of copper.

In the south of Mesopotamia the coming of copper was accompanied by a number of other drastic changes. Some of these suggest strongly that a new element had been added

to the population. In the early historic period the resulting new features—in dress, physical type, the substitution of the cylinder for the stamp seal, and the like—come to be associated with a people whom we know as the Sumerians.

It is reasonable, therefore, to assume that the Sumerians arrived in the country in the latter part of the prehistoric period, after painted pottery had given way to undecorated wares. If this assumption should prove right, it would not be out of order to go a step further and identify the Sumerians with the group that introduced metallurgy into Mesopotamia. In this they might be compared to the Biblical Philistines whose familiarity with iron was to give them a monopoly in Palestine nearly 2,000 years later (I Samuel 13:19-20).

This composition reflects the view that the Sumerians brought the new technique to the country. A group of them have arrived on boats, landing near one of the settlements which were to become inland towns later on. Their larger vessels are tied up alongside the circular local *gufa*.

The newcomers are a squat type, compared with the slender-waisted natives, and they wear flounced skirts which contrast with the shorter tunics of the local inhabitants. The copper wares the outsiders offer are spread on the ground.

The headman of the village examines an ax, while his wife divides her admiration between a cosmetic set and a frying pan. Behind them stand other villagers, including a mother with a child on her shoulders. A boy looks wistfully at the shining objects on the ground, whose excellence is brought into relief by the few stone pieces behind him. The Sumerian boy holds ancestors of our modern dice.

How Seal Engraving Led to the Invention of Writing

OF THE MANY contributions of Mesopotamia to the progress of mankind, no other can compare in importance with the achievement which was to result in the introduction of writing to the world. It was a discovery that literally made history, for no true history is possible without the help of written records.

Today many scholars consider it certain that the idea of writing was first developed in southern Mesopotamia, among the Sumerians of the late prehistoric period.

Other peoples, near and far, soon came to appreciate and put to use the fruits of this discovery; and systematic progress in various sciences, particularly in language and in the natural sciences, received a powerful stimulus.

The mainspring in this development was the strong sense of private property, which was particularly characteristic of the Sumerians, and with it their use of the cylinder seal to identify such property for temple and private economy.

The cylinder seal was to the Sumerians what the stamp seal had been to their predecessors. The gradual spread of Sumerian cultural influence, as far as Egypt and the Aegean, can, in fact, be gauged by the appearance of the cylinder in other countries.

Significantly enough, when the cultural heirs of the Sumerians—the Assyrians and the Babylonians—succumbed at length to conquerors from the east, in the first millennium B. C., the stamp seal came back with the invaders. By that time, however, writing had long been established, not only in Mesopotamian cuneiform and in Egyptian hieroglyphs but also in the form of several alphabets developed in Syria

and Palestine, the forerunners of our own alphabetic writing.

Some time before 3000 B. C. the Sumerians made the discovery that the same symbols which could be used to identify persons, cities, or gods when engraved on cylinders, could also serve the same purpose when impressed on clay tablets. Once that transition had been made, the rest was largely a matter of time. When the scribes had progressed from the expression of names to the expression of words and sentences, full-fledged writing appeared.

This plate seeks to emphasize the close connection between the cylinder seal and the beginnings of writing. The scene is laid in a temple yard of ancient Uruk (Biblical Erech), inasmuch as it is this site that has provided us with the earliest known forms of actual writing. The time is that of Uruk IV—that is, four main occupation levels before the first historic stratum on that site.

An old seal cutter is completing his newest piece, while a young apprentice has been rolling out on clay some of the seals already finished. To point up the details, the seals have been made slightly larger than natural size.

Near by is seated another seal cutter, working with a stylus on clay. The stylus he is using is designated for the writing of numbers. To judge from later illustrations of the Assyrian period, the stylus was not held between the fingers but under the thumb in an otherwise closed fist.

In the background are seen several attendants who look after various commodities that have been brought to the temple. One is pouring water into a fish bowl, and the scribe is listing the fishes just delivered.



Painting by H. M. Hergot

End of Fourth Millennium B. C. "The Art of Writing Is the Mother of Orators and the Father of Artists"—Sumerian Proverb

© National Geographic Society

The Temple Courtyard Was the Scene of Varied Pursuits

THE discovery of writing came toward the end of the prehistoric age in Mesopotamia. It did not require many generations to perfect this amazing new tool and make it available for the use of the individual, the temple, and the state. Side by side with this development came an increasing mastery over metals.

By the beginning of the third millennium *b. c.* the land emerges into the full glare of history. No longer are we faced with a series of cultures that are impressive but nonetheless inarticulate.

The principal actors on the stage are now plainly identified. We are confronted with specific languages and peoples, cities, and city-states. We know by name many of the individual kings and some members of their families; we are able to follow their successes and their setbacks, their problems, achievements, and occasionally even their dreams.

The first historic phase is a long one, extending down into the second half of the third millennium. In the south, which by now calls itself Sumer, there arise from anonymity several prominent cities, such as Ur and Uruk, Lagash and Umma, Kish and Eshnunna.

Methodical and painstaking excavations have given us a fairly clear picture of peacetime life in those days. The sum of the many scattered reports emphasizes that the economic and social life of the period centered about the temple.

The Early Dynastic period reveals itself to us in more than one type of temple. The one chosen for illustration here has been recovered from the oblivion of nearly 5,000 years by the excavations of the Oriental Institute of the

University of Chicago conducted at Khafaje, some 10 miles to the east of Baghdad.

The general arrangement of the enclosure is that of a temple oval, and we have chosen to compress several features of the everyday life of the times on the upper platform of the oval, which was crowned by the temple itself.

The economy was essentially rural and agricultural, with sheep breeding and dairy farming playing important roles. The cows were milked from behind. The attendants are often portrayed wearing a curious feathered headdress not otherwise in common use, the normal type being a cloth turban.

The typical male garment was the flounced skirt, which varied in length according to the owner's prosperity and station in life. The upper part of the body was often left bare. Women's skirts appear to be less elaborate in cut but more varied in color than those of the men.

Except for the days given over to stated major festivals, which were numerous and solemn, the temple courtyard could be the scene of considerable gaiety and social pastimes. The visitors might be entertained by an occasional musician strumming on a lyre.

Wrestling and boxing were recognized forms of skill, but they were obviously associated also with the religious and mythical lore of the age. This pair of wrestlers, copied from a contemporary bronze composition which was discovered in a dig under the author's direction, portray the match of semidivine beings, such as the combat between the hero Gilgamesh and his rival Enkidu, which is celebrated in one of the great epics of Mesopotamia (page 76).



© National Geographic Society

Painted by H. M. Dreyer

Early Third Millennium *n. c.* "Cow and Calf He Caused to Multiply, Much Fat and Milk He Caused to Be Produced"—
From a Sumerian Myth about the Farmer-God

“Modernized Warfare” Was Known 45 Centuries Ago

ONE OF THE best known centers of Early Dynastic Sumer (third millennium B. C.) is the city of Lagash, modern Telloh. Excavated by the French in the course of 20 archeological campaigns, Lagash has revealed itself brilliantly to our own age, thanks to the artistic merit of its remains as well as the eloquence of the written accounts left us by its rulers.

Some of these so-called priest-kings—older books refer to them as *patris*, but the correct title is *ensi*—managed at times to overthrow powerful cities like Ur, and even to make their own might felt outside Mesopotamia, in the country of Elam to the east.

Our illustration has drawn upon the combined evidence of written and material remains and has utilized not only the monuments and smaller objects from Lagash itself but also the existing finds from Ur.

The scene depicts a battle between Lagash and its traditional rival, the neighboring city-state of Umma. The victorious leader of the charge is Eannatum, one of the early rulers of Lagash, who in his celebrated Stele of the Vultures left us a record that is significant for both its historical and its artistic content.

The king's chariot and equipment are based partly on the so-called War Standard from Ur and partly on the finds from the Royal Tombs at that site. The city emblem of Lagash was a lion-headed eagle sinking his claws into the bodies of two animals, usually lions standing back to back.

A beautiful example of this emblem has been preserved on the famous silver vase of Entemena, nephew of Eannatum.

This symbol may never have been used to identify chariots, as has been done here, but the slight liberty taken by archeologist and artist in making the illustration serves a good purpose.

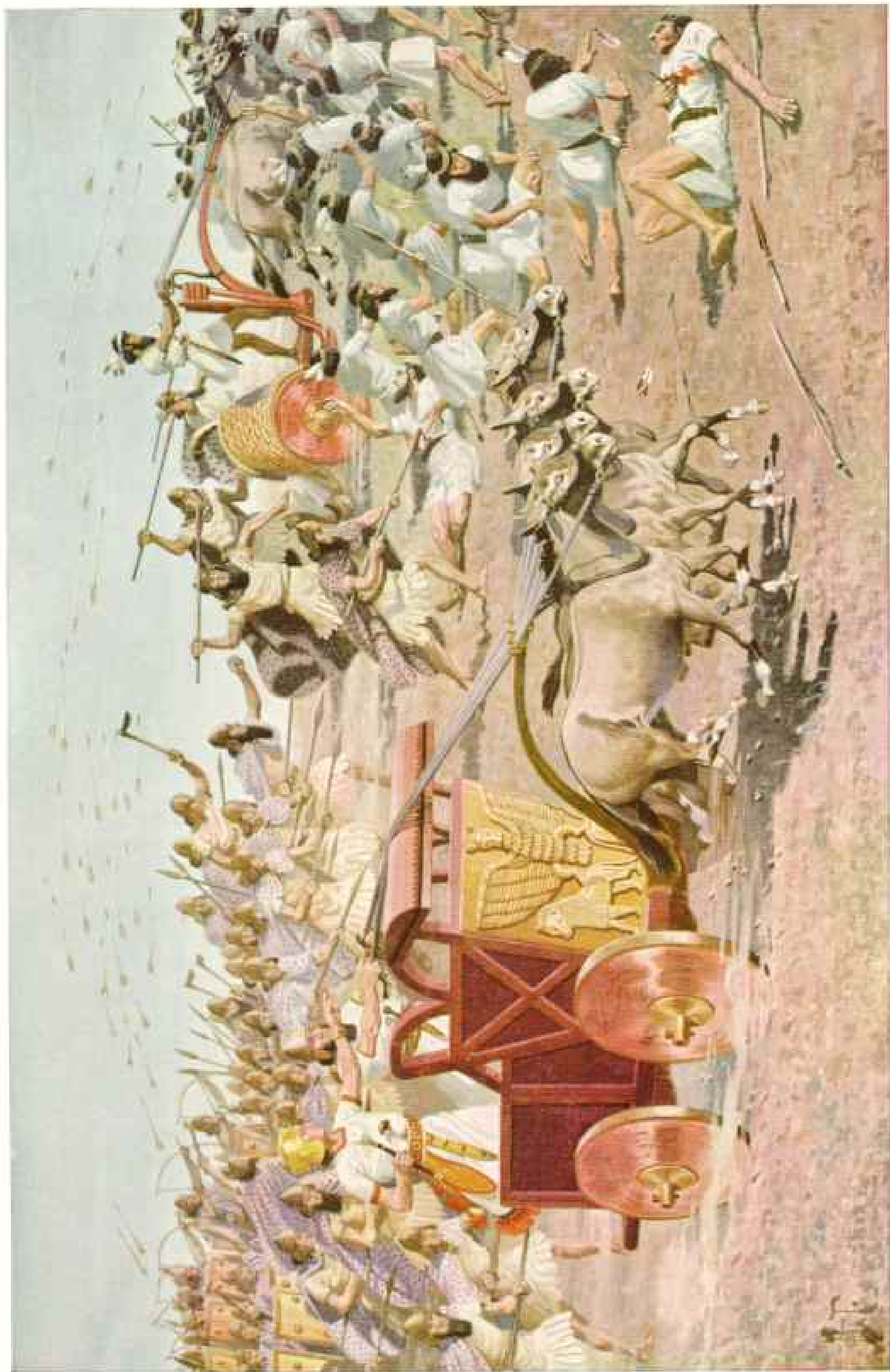
The animals which are drawing the chariots are not horses, but onagers, or wild asses. For the sake of contrast, the chariots of Umma have been copied from the smaller of the two known types of that period.

It should be added, to supplement the illustration, that at this particular time stout collars kept the steeds hitched to the pole. Some 2,000 years later, in Assyrian times, three straps passing under the forepart of the animal's belly hitched harness and pole together.

The foot soldiers include lancers and archers. The headgear consists of a helmet, of leather or metal, depending on the soldier's rank. The heavy cloaks are joined only at the neck to allow greater freedom of movement. The members of the massive phalanx, which anticipates the classical phalanx by 2,000 years, are protected by curved shields.

Victory was usually celebrated by a sumptuous banquet, such as is depicted on the Peace Standard from Ur. The festivities were followed by more constructive occupations: repair of the damage caused by the war, the building of temples, and the extension of irrigation works.

The desert must forever be kept from encroaching on the sown land, and constant attention to irrigation was thus the most effective guarantee of prosperity. Modern Iraq has a long way to go to match the industry and the perseverance of its inhabitants of 45 centuries ago.



© National Geographic Society

Painting by H. M. Thayer

Middle Third Millennium B. C. "I, Eannatum, in Umma Wrought Destruction Like the Whirlwind"—Eannatum, Stele of the Vultures

The Royal Tombs of Ur Hide a Grim Secret

EVER SINCE the discovery of the great death pits at Ur by C. Leonard Woolley, who excavated the site on behalf of the British Museum and the University Museum of the University of Pennsylvania, the meaning of these mass burials has posed an acute problem. The best preserved of the tombs are specially built chambers with human victims in each, sometimes 70 or more.

The wealth of the funerary furnishings and the title "King" which is inscribed in connection with one of the principals entombed in this unusual fashion have caused the excavator to regard these particular interments as Royal Tombs.

That is why the names of King Meskalamdug and Queen Shubad have become familiar terms to all those who have had the opportunity to view the many beautiful objects that have been recovered with these burials—in museums of Baghdad, Philadelphia, and London, or in the marvelous publication of the finds. The mass deaths of the attendants have been explained as more or less voluntary acts on the part of the faithful followers of the royal dead.

This theory is attractive but not entirely free from doubt. A king by the name of Meskalamdug is not known in the official lists. Neither is there anything in Sumerian literature or religion to account for such a frightful aftermath of the normal death of a ruler. Others have tried, therefore, to explain the practice as a barbarous survival from more primitive times when the all-important rites aimed at ensuring fertility may have required large-scale human sacrifice.

Still others would look for an explanation to the Mesopotamian custom of setting up substitute kings at

the time of the great drama celebrated annually in connection with the New Year, or at times of some overwhelming national calamity (page 80). Such ritual kings might eventually be put to death. In the Early Dynastic period the practice may well have entailed the death of many attendants.

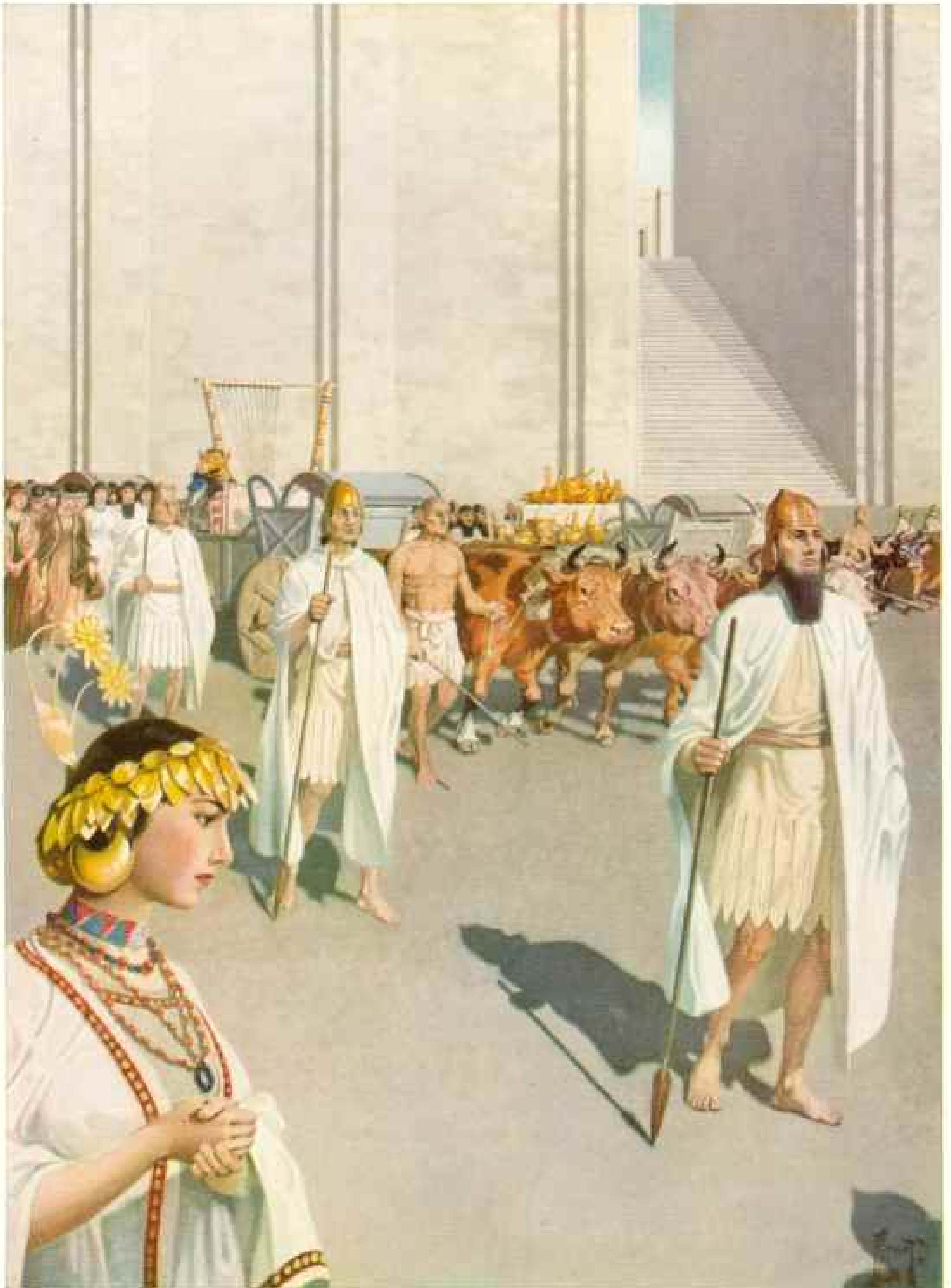
Not to decide among the theories, but to direct attention, however, to the existence of such a practice and to some of its details, we have introduced a picture of a procession on the way to a death pit.

Some of the victims may already have "gone to their fate"; or the death scene may yet have to take place, so that only the rich furnishings are being transported slowly in the melancholy procession. The lances of the warriors point down as a symbol of ill fortune.

These attendants may be among the designated victims, or they may merely reflect their genuine dejection at the calamity that has already overtaken their peers.

The same would apply to the young girl in the foreground, who is pictured as wearing decorations recovered from the burial of Shubad and now displayed in the University Museum in Philadelphia. She might be Shubad herself, or she might be a mourner close to the dead lady.

One thing is certain. The dramatic conception of the universe to which the Sumerians and their cultural successors subscribed did not in later times exact a toll on such a heroic scale. The Early Dynastic age boasts many notable achievements in more than one field of human endeavor. The periods that follow may not match this one in sheer exuberance of effort, but they reflect steady gains toward a more humanized view of life.



© National Geographic Society

Painting by H. M. Herget

Middle Third Millennium B. C. "The Anunnaki, the Great Gods, Foregather. Death and Life They Determine; but of Death, Its Days They Do Not Reveal"—Epic of Gilgamesh

Even the Gods Were Guided by Democracy

THE ANCIENT Mesopotamian made his gods much in his own image. He portrayed them as subject to all the ordinary human emotions—love and hatred, good will and ill, moderation and excess. Life among the gods was merely an idealized reflection of life among men.

The basic feature of Mesopotamian society was a profound regard for the rights of the individual. The king was no supernatural being, no god like the Egyptian Pharaoh. Because he lacked autocratic powers, he was dependent in matters of consequence upon the favor of his gods and the consent of his Council of Elders.

This emphasis on consultation and council approval is met with throughout Mesopotamian history. And it is this same essential democratic feature that gave Mesopotamian civilization its dynamic drive and carried its benefits to many lands and peoples.

Since the gods of Mesopotamia were little more than idealized mortals, we expect the ideal of rudimentary democracy to be evident among them. That such was indeed the case is shown with rare simplicity and charm by the main religious work of Mesopotamia, the Creation Epic.

This epic concerns itself largely with the battle which the benign gods wage against the powers of chaos, who are led by the destructive goddess Tiamat. None of the opposing gods had the courage to face her.

In desperation, shrewd Ea designated young Marduk as the leader most likely to succeed. Marduk was resolute, but his price was staggering. If he was to champion the fight, he must be rewarded with the permanent chieftaincy of the gods.

There was no alternative but to accept Marduk's terms. Yet no act

of such importance could be valid unless approved by the full Assembly of the Gods.

Foreseeing objections from the old guard, Ea first entertained the parliament at a banquet. When at length he broached his plan, his guests were too far gone in their cups to demur. The motion was carried unanimously.

Armed with his new authority, Marduk vanquished Tiamat and remained supreme forever after.

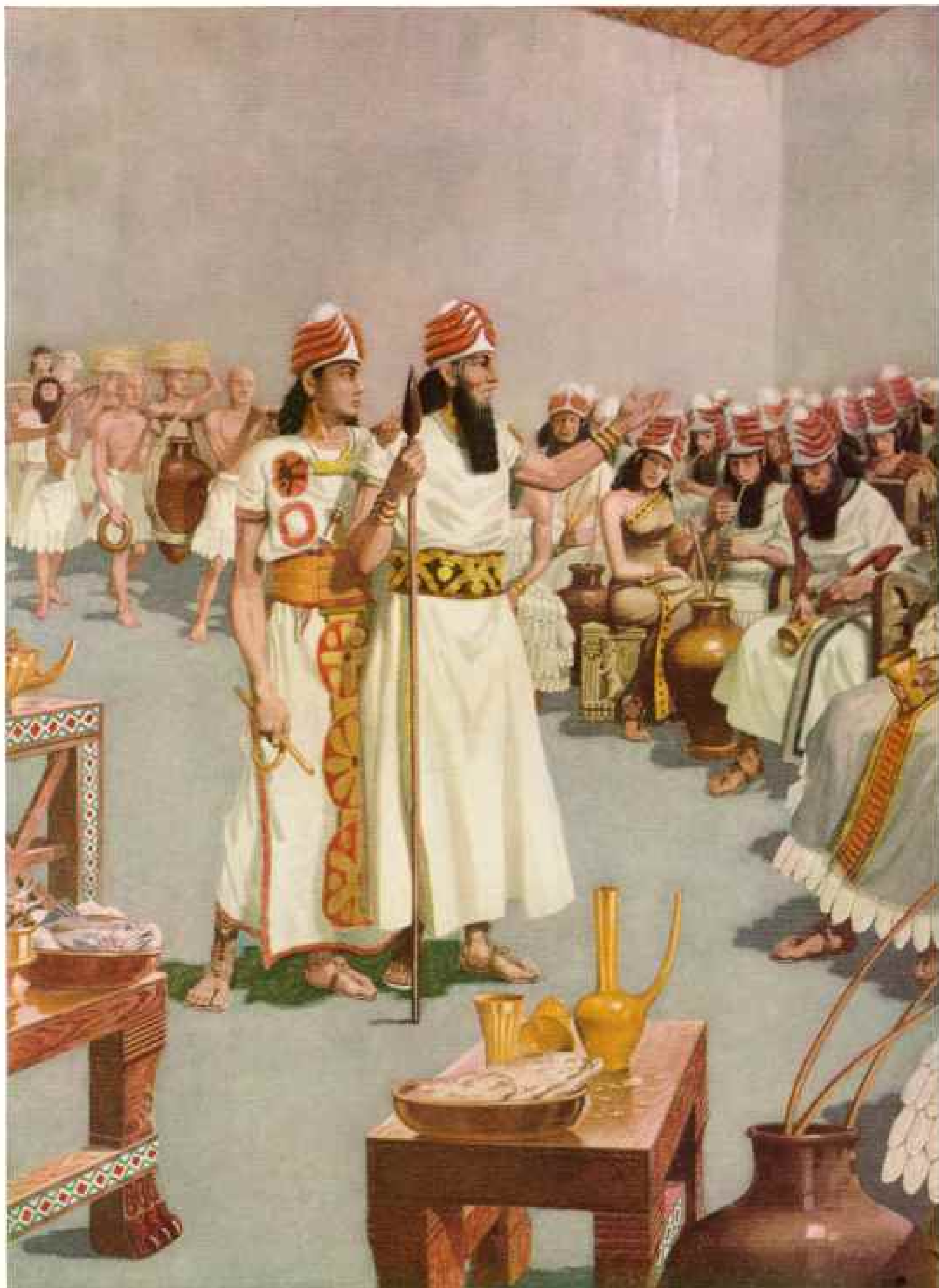
The scene before us is the divine banquet of the epic. All the attendants have been transferred from reliefs of the Early Dynastic period: the men carrying the heavy jars of beverages; the pottery stands for the jars; the servants bearing mounds of pancakes on their heads; the musicians; and the boy with the sheep.

The divine guests are distinguished chiefly by their horned miters, four horns for the leading deities and two for the minor gods in the background. The drinking is done through tubes, as frequently shown on cylinder seals.

The older of the two standing gods is Ea, explaining his plan. He is identified by his favorite symbol of the vase with the flowing waters, which we have taken the liberty of depicting as embroidered on his waistband.

The youthful god behind him is Marduk. He holds the ring-and-rod symbol, and his saw-toothed dagger is in his belt. His robe is decorated with starlike rosettes, a feature of Marduk in Assyrian times.

The significant thing about this scene is, of course, not how consent was obtained, but the fact that consent was necessary even among the gods. Representative authority, not autocracy, was the foundation of Mesopotamian society.



© National Geographic Society

Painting by H. M. Herbert

Third Millennium Background. "As They Drank the Strong Drink, Their Bodies Expanded; They Became Languid as Their Spirits Rose"—the Creation Epic

The Mesopotamian Noah Paints an Appalling Picture of the Great Flood

THE EPIC tale of Gilgamesh is one of the great creations of world literature.

In his struggle against the fate of all mortals the hero seeks out at long last the survivor of the Great Flood, in order to learn from him the secret of immortality. The quest proves unsuccessful, but the end finds Gilgamesh at peace with himself and his surroundings.

The impact of the epic may be gauged by the fact that as early as the second millennium B. C. it was known in at least four languages. Its influence on art and thought spread to many lands and cultures.

Because of its close Biblical associations, the episode chosen for illustration has been taken from the epic's account of the Flood. After a long and fateful journey, Gilgamesh is at last in the presence of Utnapishtim, Mesopotamia's counterpart of Noah. Utnapishtim has just reached that point in his tale which finds the Ark come to rest on Mount Nisir, while the slowly receding floodwaters present a picture of bleakest desolation.

To be sure, the distance between Mount Nisir—an 8,489-foot peak near modern Sulaimaniya, 175 miles north-east of Baghdad—and the place of Utnapishtim's permanent retreat "in the faraway" was imagined to be far too great for compression into a single picture. But so vivid is the tale which is being unfolded to Gilgamesh that the reader should have no more difficulty than did Gilgamesh himself in seeing the distant outlines of the Ark with his mind's eye.

The Ark is described as a perfect cube consisting of seven stories, each divided into nine compartments. Since the

description in the epic is quite specific, our modern notions as to what is seaworthy had to be discarded. Nothing is said, however, about the appearance of Utnapishtim, and the artist re-created him according to his own inspiration.

As for the figure of Gilgamesh, no Mesopotamian monument is definitely known to depict him. We have chosen as a prototype the supernaturally conceived figure of Naram-Sin, one of the kings of the dynasty of Akkad, as portrayed on that ruler's celebrated Stele of Victory.

The dynasty of Akkad, founded by the great Sargon of Akkad, flourished toward the end of the third millennium B.C. It marks the end of the Early Dynastic period and the beginning of a new era in Mesopotamia.

The Akkadian age accomplishes the gradual integration of the new elements, which are predominantly Semitic, with the inherited culture as developed by the Sumerians. It is a period of rapid political and geographic expansion, tremendous vigor, and bold adventure.

Naram-Sin pictures himself on his great stele as a warrior clad in sandals and knee-length garment, and armed with bow and quiver, a battle-ax, and a mace. But it is no ordinary warrior that he affects to be, nor even just a regal hero. His horned crown marks him as a divine being.

If we look for a worthy superhuman model that this king would be likely to copy as his counterpart, we could scarcely suggest a better one than the epic hero Gilgamesh, "two-thirds of whom was god and one-third man." It was he "who scaled the mountains and crossed the seas" in search of the life that he was not to find.



© Salim al-Dabbas/Alamy

Painting by H. M. Hayes

Late Third Millennium Background. "I Looked at the Weather; Stillness Had Set In, and All of Mankind Had Returned to Clay"—
From the Flood Tablet, Epic of Gilgamesh

The Law Protects Zealously the Institution of Marriage

THROUGHOUT the 3,000 years of its historic progress Mesopotamian society was noted for the supreme position which it assigned to law. The law guided the ruler and safeguarded his subjects. It penetrated every walk and phase of life: the family and the state, commerce and industry, science and religion.

In the last analysis, it was interest in the law that had led to the introduction of writing. Because of the confidence and sense of dignity that it inspired in the individual and in society, Mesopotamian law became the model for similar institutions among other peoples who at one time or another came within the orbit of the civilization of Mesopotamia. Among them were the Elamites and the Hurrians, the Hittites and the Hebrews.

Until recently, the distinction of having been the first to assemble the existing laws into a systematic code was generally ascribed to Hammurabi (page 85), the greatest king of the First Dynasty of Babylon, who is now dated to the end of the 18th and the beginning of the 17th century B. C. Within the last two years, however, two new codes of law have been discovered, each older than the Code of Hammurabi.

One of these turned up at the University Museum of the University of Pennsylvania. Its text is Sumerian and it has been published by Dr. Francis R. Steele. The other contains the laws of the city of Eshnunna, in an Akkadian formulation published by Dr. Albrecht Goetze.

Even these two pre-Hammurabi collections are not likely to have been the first codes used in Mesopotamia. The inscriptions of Urukagina, the last of the early rulers of

Lagash, at the end of the Early Dynastic period, already imply the existence of established legal norms.

It is therefore a reasonably safe assumption that by the turn of the third millennium—that is, in the so-called Neo-Sumerian period which followed the dynasty of Akkad—the land enjoyed the security of broad legal protection. It is in that period that the accompanying scene is laid.

The scene depicts the sealing of a marriage contract in Lagash, at the time of Gudea. The father, having received the stipulated bride price, indicates his readiness to give away his daughter by affixing his personal seal to the required document, as the betrothed couple respectfully watch.

The impression is larger than normal size, since otherwise the detail would be impossible to follow. Dress and furniture are based on monuments from the time of Gudea, whose statue occupies a place of honor on the right. The bride's mother is modeled after the famous representation of a "spinning woman."

For the sake of directing attention to another important feature in the life of Mesopotamia, we have chosen to make the bride's father a physician to the king. The inscription on the seal, copied from a real cylinder, says so explicitly.

The design, however, has not been found with this inscription. It was taken from a carving on a contemporary vase because of its significance to the medical profession. The motif is that of entwined serpents. It was to become known as the caduceus, a symbol of medicine and, in modern times, a mark also of the barber profession, whose incidental association with the art of healing, however, still is remembered,



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Painting by H. M. Hargrett

Twentieth Century n. c. "If a Man Takes to Wife a Man's Daughter Without Asking Her Father and Her Mother and Without Executing a Sealed Marriage Contract . . ."—Laws of Eshnunna



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Early 18th Century B. C.

“That the Dynasty Might Not Come to an End, King Erra-Imitti Placed the Gardener Enfil-Bani as a Substitute Figure upon His Throne”—Chronicle of an Old Babylonian King

Painting by E. M. Bergiel

A Mock King-for-a-Day Stays On to Rule for a Lifetime

IN DESCRIBING an earlier plate (page 72), we mentioned that one possible explanation of the so-called Royal Tombs at Ur was that those mass burials were due to awe-some rites connected with the death of a substitute king.

At any rate, there is no doubt that Babylonia and Assyria, the twin heirs to the Mesopotamian civilization of the third millennium B. C., knew the institution of a substitute ruler. The practice was designed to weather particularly acute periods of crisis. And since each New Year was regarded as a fateful period, the crowning of such a king-for-a-day appears to have been also an annual occasion.

The Mesopotamian New Year, which was normally celebrated in the spring, was a highly dramatic festival reflecting man's constant dependence upon unpredictable Nature. Anxiety over the disposition of the gods gave way at long last to uninhibited joy (page 104).

The substitute king seems to have been a feature of the concluding celebration. The person selected for the unwanted privilege of appeasing the gods while amusing the uproarious populace, by paying with his life for his brief occupancy of the throne, may have been a prisoner, political or otherwise, who had already run afoul of the laws.

A Babylonian chronicle states laconically that King Erra-Imitti of Issin, member of an early second millennium royal family which followed the Third Dynasty of Ur but preceded the First Dynasty of Babylon, set up the gardener Enlil-Bani as substitute ruler.

Things did not go off at all according to plan, however. The all too brief statement goes on to say that, after the

crown of royalty had been placed on the substitute's head, "Erra-Imitti died in his palace while sipping a hot brew. Enlil-Bani, he who was on the throne, did not arise [from it] but was himself installed as king."

In other words, the victim who had been set up as a mocking stock seized upon a rare prank of fate and went on to rule, very capably, as we know from independent sources, for no less than 24 years.

The scene takes place in front of the royal palace. A ziggurat, or stage tower, modeled after the nearly contemporary structure of the Third Dynasty of Ur, is seen in the background.

The victim, decked in royal garb, is seated upon a throne which has been placed in the center of the square. An official bows before him in mock adoration, while others in the riotous gathering give vent in various ways to their long-pent-up emotions.

Dancing and singing girls—note the two with hand on throat to obtain the desired effect—dressed in colors prescribed on an Egyptian painting which depicts contemporary Asiatics, do their best to follow the music; and a pair of boxers has attracted a masculine group of spectators to another section of the square.

Enlil-Bani has just removed the mask which was given him for the occasion, to glance anxiously at the noose that an attendant is fastening to the top of the palace wall. At that moment a servant bursts out of the palace with the startling and sobering news that the legitimate king has died. Enlil-Bani's resolve will not be found wanting at this juncture.

A Prosperous Babylonian Matron Shops for a Slave Girl

BABYLONIAN LAW, as represented by the famous Code of Hammurabi, recognizes slaves as the third class in contemporary society, together with the two upper groups who correspond to the patricians and plebeians of the Romans. Always an economic asset under that system, slaves were the victims of capture in war or of hopeless indebtedness in their own community. They could also be acquired through purchase in the open market.

Especially sought after for servitude were the men and women from the mountains to the north and northeast of Babylonia, the region of ancient Subartu and Lullu. Numerous letters and business documents of the second millennium make special mention of Subarian and Lullu slaves, a tribute to the sturdiness and other desirable qualities of these mountaineers, though one hardly enjoyed by the victims.

So widespread was their reputation that the cuneiform symbol for "male slave" is made up of the signs for "male" and "eastern mountains," while the symbol for "female slave" is similarly composed of the signs for "woman" and "eastern mountains." Clearly, then, this situation is as old as cuneiform writing itself.

Interestingly enough, the highly competent porters of modern Baghdad are members of a special ethnic group, not Arabs or Kurds, but Lurs, from the Iranian district of Luristan—an area adjacent to that which provided the favorite slaves of the third and second millenniums B. C. Possibly the Lurs are descendants of the ancient Lullu.

The cost of slaves was subject to variation from place to place and from period to period. Prevailing political and

economic conditions also had their effect on the slave market. The average price was between 30 and 40 shekels of silver, or as much as the cost of three or four ordinary bulls.

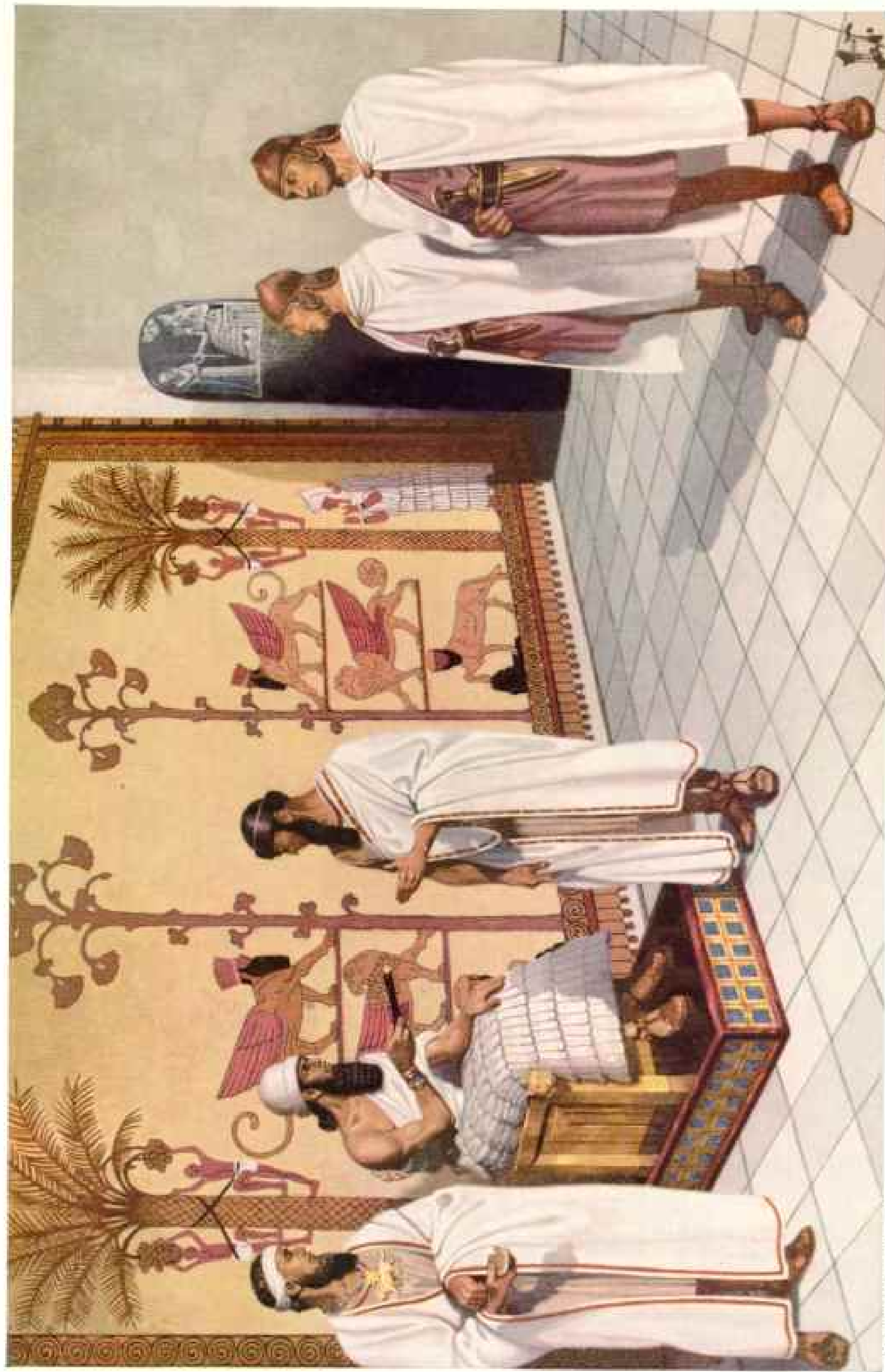
The Code of Hammurabi allows surgeons for a serious operation, successfully performed, 10 shekels from a patrician, five from a plebeian, but only two from a slave. In Hammurabi's times (end of the 18th and beginning of the 17th century B. C.), one of the best known slave centers was based at Eshnunna, about 20 miles northeast of modern Baghdad, between the important cities in the south and the hill country. The background of our scene is a section of that city, reconstructed by the American excavators from the Oriental Institute of the University of Chicago.

The prospective buyers include one (with the grooved cap) from as far west as Mari. To the left is seen a prosperous slave merchant extolling the qualities of a Subarian girl to an even more prosperous Babylonian woman.

The letter from which the quotation under the picture was taken was addressed to a woman. That the women of Mesopotamia often achieved considerable success in business is indicated by records dating from the third millennium.

To the right, a male Lullu slave is made to display his strength by carrying on his back a trussed-up bullock. This particular demonstration may never have been attempted in ancient times. Modern counterparts of the Lullu, however, have transported grand pianos in the same fashion.

It is doubtful whether their prodigious feats of strength will remain on display much longer, for not a few of the Lurs of Baghdad have been sending their sons to Oxford.



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Early 17th Century B. C. "The Present Year Is a Leap Year. The Coming Month Shall Therefore Be Recorded as Elul II"—
Administrative Correspondence of Hammurabi

Painting by H. M. Howard

The Great Hammurabi Keeps an Eye on Taxes

INTENSIVE cultural progress had characterized most of southern Mesopotamia for several centuries prior to the accession of Hammurabi, greatest ruler of the First Dynasty of Babylon. Great strides had been made not only in the study of law but also in language, literature, music, and several of the physical and natural sciences.

Among these was the science of astronomy, even in those days a close relative of mathematics, in which the Babylonian was especially adept. Astronomy had an important bearing on religion, agriculture, and, as we shall see presently, on administration. It is the notable achievement of Hammurabi that he knew how to consolidate and promote these manifold cultural gains and to employ them in the service of the state as a whole.

For the art of Babylon at the time of Hammurabi we have to look outside the capital, because at Babylon itself the Euphrates has proved a serious barrier to the recovery of the early levels. We have now, however, a brilliant illustration of contemporary painting, thanks to excavations by the Louvre Museum on the site of ancient Mari, on the Euphrates, about halfway between Baghdad and Aleppo.

Since Mari was strongly influenced by Babylon, with which it maintained close contact, we have used a portion of one of the Mari panels, as published in the French journal *Syria*, for the background of our illustration. Some such scene might well have adorned the throne room of Hammurabi, in which our subject has been placed.

The painting shows two symmetrical groups of three mythical animals each—a sphinx, a griffon, and a human-

headed bull—arranged between a palm tree and another tree of more stylized design. Attendants are picking dates, while a goddess is advancing toward the center.

The king, seated on the throne, is giving instructions to his vizier. The reason for the audience is the court astronomer, who stands beside the throne. He can be identified by pendants representing Venus and the constellation Leo.

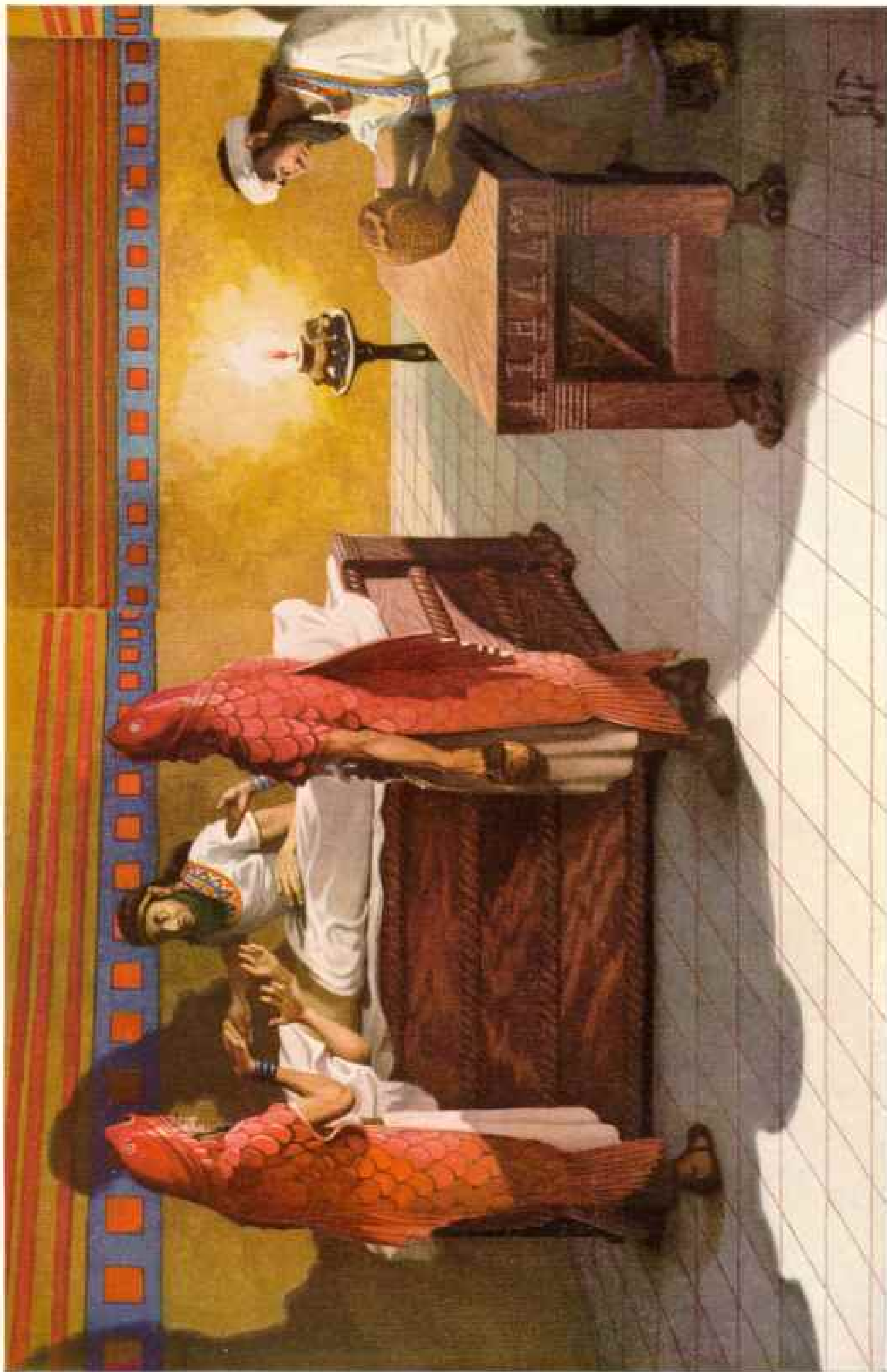
The king has been informed that the time for an intercalary month is at hand. Hammurabi orders the next month to be not Tishri, the seventh month of the Babylonian calendar, but the sixth month repeated, that is, Elul II.

The king makes plain to his vizier what this will mean administratively: "Instead of being due on the 25th of Tishri, as announced, the taxes shall be delivered in Babylon on the 25th of Elul II."

The order, translated from the same document from which the citation in the title of the plate was borrowed, will be promptly relayed to the two couriers standing by the massive stele on which the law code is inscribed. The couriers, in turn, will relay the message to others who will finally carry it to all the provinces of the realm.

The inscription on the stele is in shadow except for a few lines of the column at the top. Closer inspection would show that the discernible signs say "whose foundations are as firm as heaven and earth."

The sculptured part depicts Hammurabi receiving from the sun-god the rod-and-ring—twin symbol of authority. The facial features of Hammurabi have been copied from the stele and from other contemporary representations.



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Sixteenth Century B. C. "Come In, Guardian of Health! Go Out, Guardian of Evil!"—Inscription on the Arms of an Assyrian
Terra-cotta Figurine

Painted by H. M. Bennett

Medicine Teams Up with Religion and Magic

THE SUBJECTS here illustrated are not peculiar to one particular period in the history of Mesopotamia. They could be made to apply readily, and with only minor modifications of detail, to virtually any period.

Our scene has been laid in the 16th century B. C., in order to preserve a regular chronologic sequence and to record, at the same time, the presence of the Kassites in the country. This people from the Iranian highlands, who brought with them a language neither Semitic nor Sumerian, overran Babylonia shortly after the Hittites, another people neither Semitic nor Sumerian, had made a paralyzing raid on the capital and put an end to the First Dynasty of Babylon.

Weakened by these combined blows, the country remained under foreign rule for some five centuries, until about the middle of the 12th century B. C. But, as has happened so often in history, the conquering barbarians were soon vanquished in turn by the superior native culture.

The Kassites took over all the significant features and practices of the Babylonians, and even carried some of these to lengths not previously known. This applies particularly to magic and divination.

In this picture the painted wall decoration is based on the recent discoveries made by the Iraq Department of Antiquities in the Kassite center of Dur Kurigalzu. The same is true of the standing figure with back to the wall, and the seated figure with the liver model. Other details are derived from Kassite and Assyrian sources long known.

An anxious father stands by the sickbed of his son. Two priests dressed to resemble fishes—for symbolic association

with the water god Ea—seek to expel the demons suspected of having caused the malady. One of the priests is seen holding a bowl which, no doubt, contains some magic fluid.

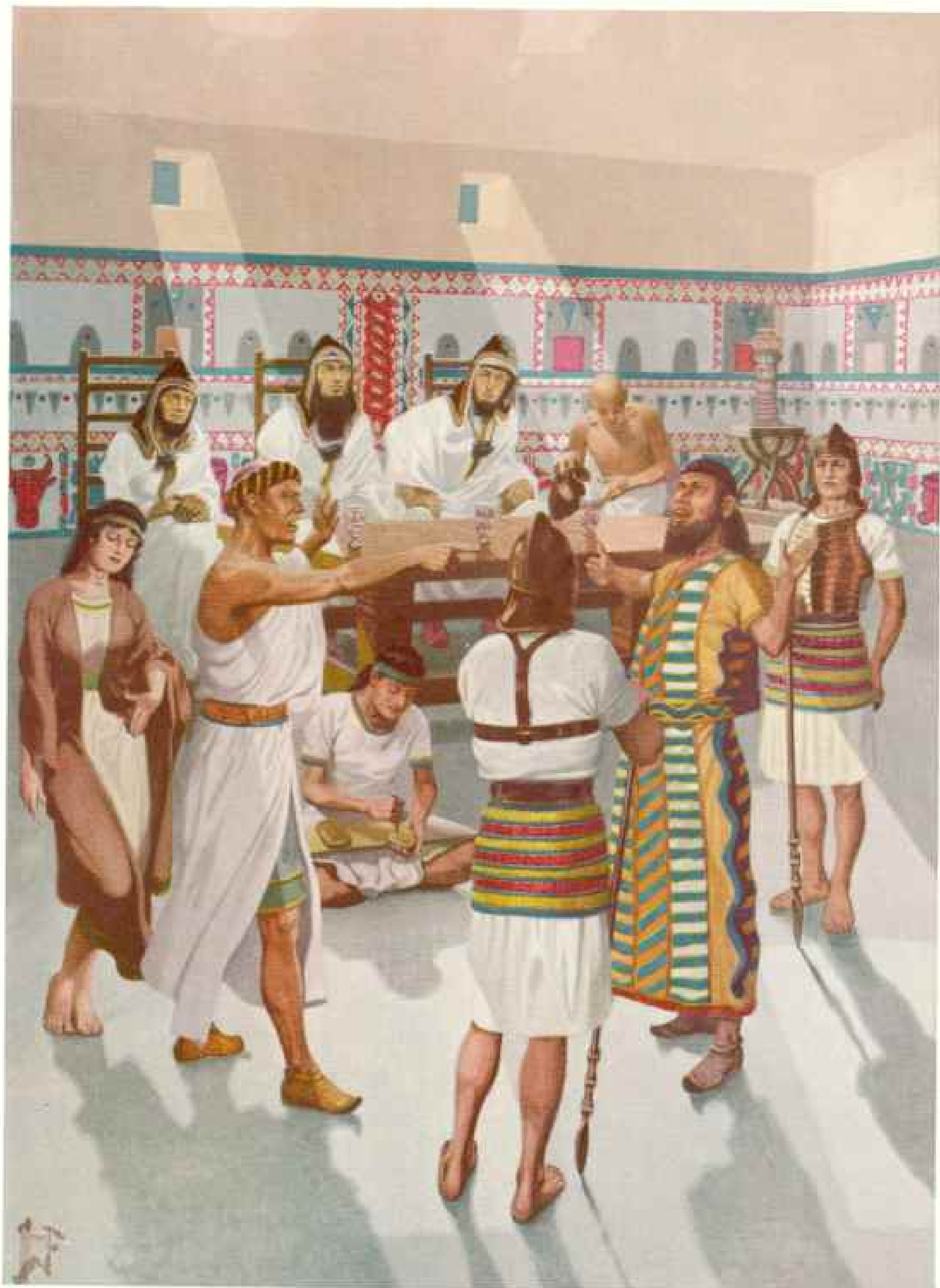
The boy's hands are held open, in a gesture of supplication, as are also the right hands of the fish-garbed priests; but the head is hidden by one of the standing figures. This bed scene, incidentally, is modeled after a section on a frequently reproduced Assyrian bronze relief which depicts in several registers the exorcism of a female demon.

At the table to the right, an amen priest is hard at work on an inscribed model of a sheep liver. It happens to be an authentic old Babylonian piece now in the British Museum. The inscriptions on this model list the diagnoses based on the livers of real sheep slaughtered in the past for purposes of the omen lore.

The shape of each minute detail on the fresh liver was linked by the omen experts with some memorable event of the past—say, a ruler's victory over his enemies, another ruler's death from an infected toe, or a king's sad fate after a ladder had fallen on him. Each of these instances, by the way, was actually recorded.

The right link furnished the prognosis for the problem at hand; for instance, "If the right lobe (of the liver) is carved out like a purse, it is an omen of (King) Ibbi-Sin, indicating disaster." The priest in our case appears to have discovered a startling answer.

The sides of the ceremonial table are decorated with carvings of symbols of various gods as they appear on numerous boundary stones of the Kassite period.



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Painting by H. M. Bennett

Fifteenth Century B. C. "No, No, Not a Word of It Is True!"—From the Records about the Trial of Kushshiharbe

Justice Catches Up with a Corrupt Magistrate

MESOPOTAMIA from remote pre-historic times was a magnet for many races and peoples. The story about the Tower of Babel could hardly have been inspired by any other country.

Previous scenes and their descriptions have dealt with proto-Sumerians and Sumerians, Semites and Elamites, Kassites and Hittites. Another significant element, different in linguistic stock and in much of its culture, is represented by the Hurrians, the Horites of the Bible.

Members of this group played important roles throughout the ancient Near East in the second millennium *b. c.* Hurrian influence on the Hebrews is now known to have been especially significant. In Mesopotamia the Hurrians were thickly settled in the region of the modern oil center of Kirkuk.

These settlements have yielded a distinctive type of painted pottery, a repertory of new designs on cylinder seals, a novel type of painted wall decoration, and a rich collection of written records which afford a vivid picture of Hurrian society and of individual Hurrian personalities.

The most productive Hurrian site known to date is that of Nuzi, 10 miles southwest of Kirkuk, excavated by a joint expedition of the Iraq Museum of Antiquities, the American School of Oriental Research in Baghdad, and the Harvard Semitic Museum.

The present scene takes place in the Nuzi courthouse, whose walls are adorned with brilliant frescoes of a type not previously found in Mesopotamia. A painted incense burner in the corner and painted goblets on the table provide additional examples of Hurrian forms and decoration.

Seated at the table are three judges, their heads covered with austere hoods, each man equipped with the individual cylinder seal with which he will certify his verdict. They listen attentively. A scribe is at pains to record the testimony.

The accused is the mayor of the city, who is to become notorious in the local annals as the corrupt Kushshiharbe. He is flanked by two constables who wear copper coats of mail recalling the scale armor of Goliath. The excavations have yielded one such armor in a good state of preservation, and many scattered metal scales from other similar pieces of equipment.

The mayor's accuser is one of his former henchmen turned state's witness. The charges include various instances of malfeasance in office: bribery, intimidation, kidnappings; and the mean magistrate had even caused water to be mixed with milk.

Most of the testimony of this and of previous witnesses had left the accused impassive. He is aroused, however, by an allegation involving the comely girl Humerelli, who stands demurely by. Against her will, it is charged, the girl had been dragged to the private residence of the mayor.

Kushshiharbe is vehement in his denial. But his words appear to have fallen on deaf ears, for generations later the trial of Kushshiharbe was still mentioned as a significant turning point in the history of the city.

That the chief magistrate of a city intrusted to his charge some 3,400 years ago should have been guilty of corruption and excesses is scarcely surprising. What is highly significant, however, is that he was tried and made to pay for his misdeeds. The nature of the penalty is not recorded.

Assyria Gains the Upper Hand over Babylonia

WHILE SUMER and Akkad and Babylon were making history in Lower and in Central Mesopotamia, a city on the middle Tigris was rising slowly to ever increasing prominence. Its name was Ashur, as was also the name of its chief god. The state that city came to control—one which developed eventually into a far-flung empire—is known as Assyria.

About the time of Hammurabi, Ashur enjoyed sufficient independence and power to make its influence felt in distant Cappadocia, an easterly area of Asia Minor. Later in the second millennium the city came under the domination of the Hurrians, but the relative balance of power which prevailed in western Asia in the 15th and 14th centuries B. C. gave the resolute native rulers of Ashur their chance to gain complete freedom.

From then on it was a story of constant rise, with the kings of Ashur becoming the equals of other monarchs. From the end of the second millennium down to almost the middle of the next they were leaders and finally masters of the Fertile Crescent.

Ashur's closest neighbor of any prominence was Babylon. The relations between the two were much like those that many centuries later characterized Greece and Rome. Babylon was the cultural center, but no match for its northern neighbor in war and politics. Ashur, on the other hand, was keenly resentful of its inferiority in culture. The resulting rivalry was acute and bitter.

Our scene seeks to capture that moment in history when the political tide had swung for the first time decisively in favor of Ashur. This occurred during the reign of the vigorous Assyrian king Tukulti-Ninurta I.

The words which he uttered on humbling the captured Babylonian king, Kashtiliash IV (opposite page), were to become symbolic of the future status of these two states.

Tukulti-Ninurta I transferred his capital from Ashur to a near-by site, to which he gave his name. It was excavated by a German expedition under Walter Andrae, and the results of that work are ample for a reconstruction of the life of the period.

The great hall focuses upon a niche containing a sculptured stand bearing the statue of the chief deity, who holds in his left hand the rod-and-ring, used as a symbol of authority.

The king, clad in a rich fringed garment, has been copied from one of his reliefs. His sandaled right foot is placed on the neck of the Babylonian. In his right hand he holds the scepter with which he touches the skull of his prisoner, while his left clutches the ring, this time separated from the rod. The garment of Kashtiliash has the vertical folds which often distinguish the Babylonian dress from the Assyrian.

The scene is witnessed by the vizier, beside whom stands a Syrian emissary with an Anatolian observer wearing the typical pointed shoes.

The decoration has been selected from among the scenes uncovered on the walls of Tukulti-Ninurta's palace. One of these paintings has been utilized for a valance of woven material placed over the side door flanked by two soldiers. The design shows two mythological figures, back to back, one on red and the other on blue.

The left hand of each holds a basket or bowl of gold, with some substance which the right hand now places on the conventionalized palm to lend it greater fertility.



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Painting by H. M. Berges

1243-1207 B. C. "His Royal Neck I Trod with My Foot, Like a Footstool"—Annals of
Tukulti-Ninurta I

The Assyrian Military Camp Was No Place for Idlers

FOR ALL ITS youthful vigor, Ashur required several centuries to consolidate the position which had been carved out for it by Tukulti-Ninurta I and his predecessors. Then came a period of gradual expansion, principally toward Syria-Anatolia, Armenia, and Iran. The mountain districts in particular presented a constant threat and challenge.

The Assyrian state was forever at war, forcing a mounting burden on the people, conquerors and conquered alike, to support a military establishment. The ceaseless campaigns were successful, however, in terms of political and geographic expansion. With these successes came also advances in art, and especially in sculpture, which in some aspects attains a vigor never hitherto achieved and seldom equaled since.

If the vitality of a state may be measured not so much by its size as by its principal artistic expression, then the height of Assyrian power was reached in the first half of the 9th century B. C., under Ashurnasirpal II.

The present painting is laid against a background of war and chase, respectively the principal occupation and pastime of this king. Details are abundant, and they are derived not only from the numerous reliefs but also from the painted ceramics of the period. By using the device of a military camp, a common one on the reliefs themselves, it was possible to bring in a number of separate scenes which combine into a characteristic and authentic picture of the age.

The center of the camp is taken up by the royal canopy. Under it the king is seen performing his daily sacrifice. The king's face is known to us from the reliefs, as is also his sword with the double volute near the end.

The colors of the cloth cover on the table and the dark blue of the headdress are based on contemporary painted work; the same is true of the detail on the silver incense stand. Attention should also be directed to the chevron motif on the canopy, which is typical of Ashurnasirpal's age. The typical chariot of this period was mounted on six-spoked wheels; later Assyrian wheels sported eight spokes.

Against the camp wall, to the left, an attendant is filtering and cooling water, employing the same system used by the servants in the author's archeological camp 10 years ago.

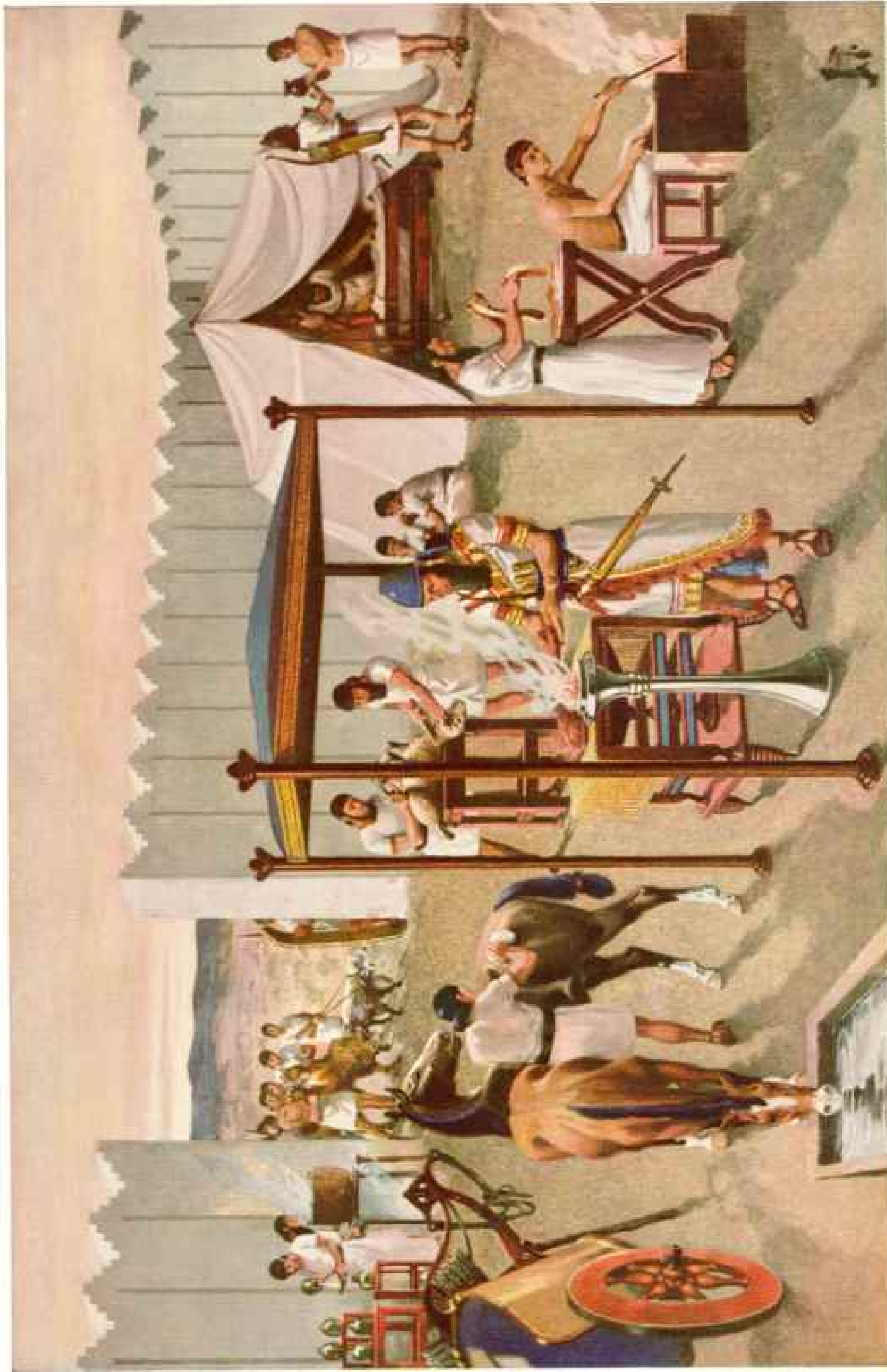
Behind the water boy stands the camp's baker. In the corner to the right an orderly is busy in an officer's tent making up his master's cot. Another servant is helping a warrior to a drink of water.

The remainder of the crowded interior of the camp is given over to a groom and his horses, a slaughterer, two soldiers at their meal, and two cooks.

The entrance to the camp is guarded by armed soldiers. One of them can be seen behind a tall shield held on the ground by the left foot inserted in a notch. The footgear consisted of sandals, which contrast with the half-boots used by the Assyrians of later periods.

Approaching the entrance is a group of men carrying a slain lion. They are accompanied by a boy with two thoroughbred hunting dogs straining at the leash.

Because lions did not disappear from this area until much later, we can obtain fine representations of these beasts from the sculptors of Ashurnasirpal and their disciples under Ashurbanipal, some two-and-a-half centuries later.



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883-859 B. C. "Nimurta and Nergal, Who Love My Priesthood, Intrusted to Me the Wild Creatures of the Field, Commanding Me to Follow the Chase"—From an Inscription of Ashurnasirpal II

Painting by H. M. Herzog

A Dead Assyrian Is Furnished with Provisions for the Beyond

BURIAL CUSTOMS in Mesopotamia differed widely according to period and the particular cultural group involved. Bodies might be extended or flexed and put to rest in jars, wooden caskets, stone sarcophagi, or ordinary cloth wrappings.

The burial place might be a hole in the ground, a tomb lined with sun-baked bricks, or a large chamber with vaulted ceiling. Finally, throughout much of Mesopotamian history, burials took place in special areas set aside for cemeteries. In some instances, however, there were no formal cemeteries outside the inhabited section. The dead were interred within the residential precinct, on a mound that may have gone through numerous previous occupations, and frequently inside the property of the deceased.

The Assyrian graves of the first millennium B. C. reflected the view that the dead belonged inside the house which they had occupied during their lifetime. In this manner the spirit could remain close to the family and receive from the bereaved the care without which it would be doomed to restless wandering. Where the decedent had been well to do, his body was not placed directly under the floor, but was laid instead in a vaulted chamber, sealed off by a sturdy door that could be reached through a steep shaft.

Our scene depicts the interior of the house of an Assyrian nobleman just "gone to his fate." The details of the room are based on Walter Andrae's reconstruction of the so-called Red House in Ashur.

The solid wooden doors swing in; the poles rest in sockets lined with metal and are surmounted by ornamented knobs.

The niche with the sacrificial table and an opening for a figurine of the house god is a place suitable for private devotions.

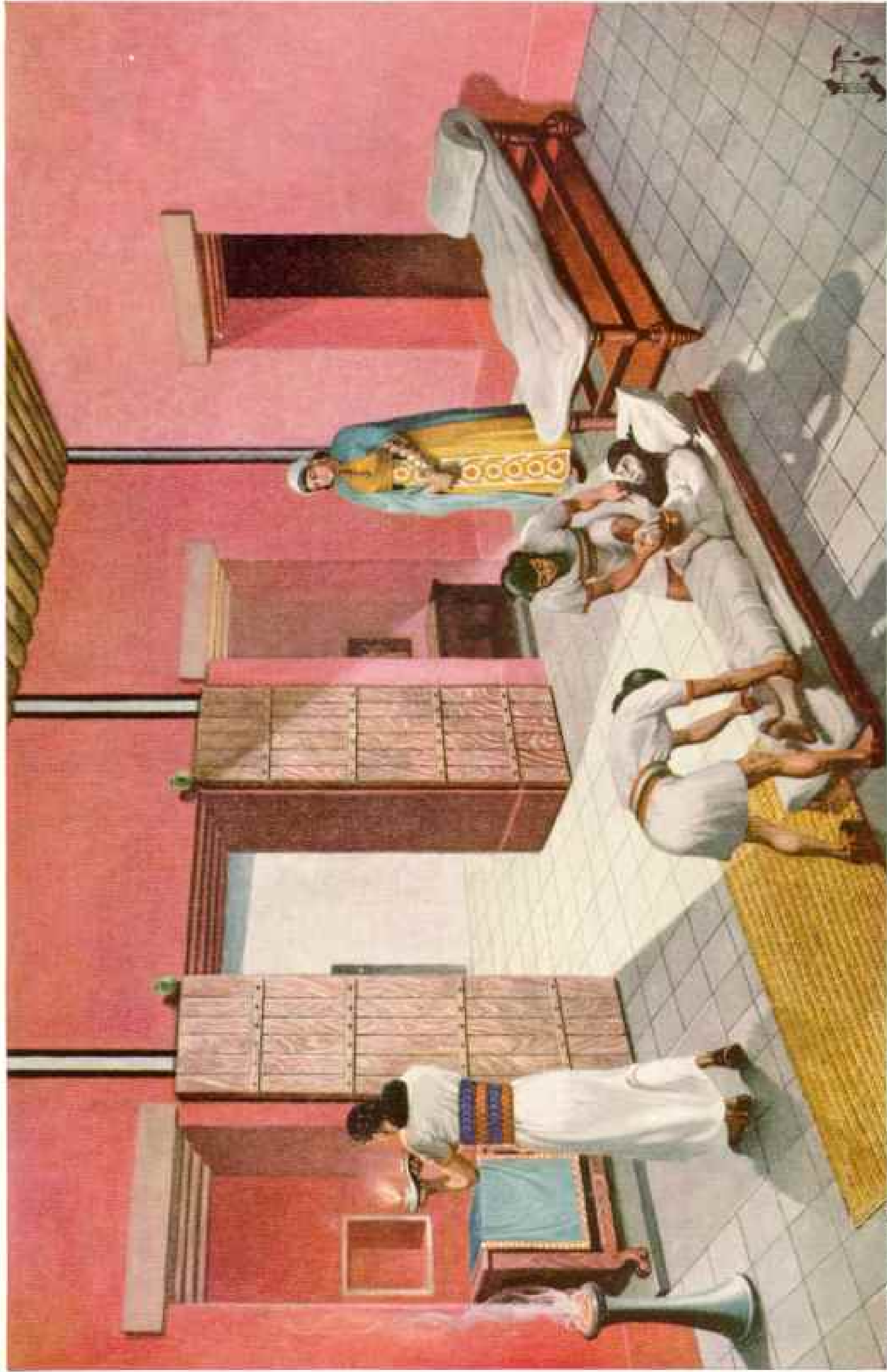
A service for the dead is being performed by the eldest son of the house. The master has just been removed from his deathbed and placed on the stretcher, on which he will be borne to his grave, his right hand resting on a plate filled with the food he will need in the hereafter. The widow's grief will probably not become vocal until the body has reached the vaulted tomb for the last rites.

The excavators of Ashur fortunately uncovered the burial vault of Ashurnasirpal II, together with his huge stone sarcophagus.

The floors were paved with large dolerite slabs, and the walls rested upon three layers of the same type of slab engraved with an inscription of the king repeated 18 times. The dolerite sarcophagus was about 12 feet long and some 6 feet in height and in width. It, too, carried on three sides an engraved inscription of the monarch.

Of special interest is the two-inch round opening in the massive lid of the sarcophagus. The Epic of Gilgamesh tells us that the hero's departed friend, Enkidu, appeared to Gilgamesh through an aperture in the earth. The opening was for the use of the spirit of the dead.

In addition to the plate with food, the body was buried with all the personal belongings of the interred: ornaments, weapons, favorite vessels. A small niche in the wall was for an oil lamp, to be left burning after the lid had been fastened down and the door of the chamber had closed forever.



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Painting by H. M. Heron

Ninth Century B. C. "The Canals Wail, the Watercourses Echo Them, Of Trees and Fruit the Face Is Darkened"—From an Assyrian Funeral Text

To the Victorious Assyrians Belong the Spoils

THE expansion of Ashur northward brought with it successive transfers of the capital of Assyria, from Ashur to Calah (Nimrud), and later to Nineveh, where it was to remain till the fall of the empire, save for a brief interlude at Dur Sharrukin (modern Khorsabad).

These northward moves were already in evidence under Ashurnasirpal II (page 92). Yet throughout Assyrian history it was the city of Ashur that remained the religious capital of the state, the place where the rulers wished to be buried and where they sought the favor of the gods and protection from foes by building temples and fortifications.

Shalmaneser III, son and successor of Ashurnasirpal, was no exception to this trend. The exhaustive German excavations on the site have disclosed many phases of this king's care in keeping the whole city in good repair, and especially in strengthening its western portions, a section that until then had been particularly vulnerable to attack.

Our scene takes place before the west gate of Ashur, now a strong link in the massive chain that ringed the city from all sides. The spacious but well-protected interior of the gateway was broken up into two large halls with room for three pairs of heavy doors. These halls afforded ample space for guards. In one of these stood a large basalt statue of the king seated upon a cube-shaped throne.

No distraction must interfere with the brief intervals that were suitable for plowing. And the women might take a little time out from their daily chores and enjoy a quick bath—as they do in that district to this day—in a secluded spot where water had been left from the spring rains.

An Assyrian general has just returned from a successful campaign in the west. He stands at the foot of the ramp, ready to review his troops and survey the spoils.

Behind him stands an official dictating an account of the results to two scribes. One of these writes in cuneiform with stylus on clay, and the other, in Aramaic with pen on parchment. Both procedures have been recorded for us on the wall paintings uncovered by the French at Til Barsib.

The column is led by a horseman followed by three tribute bearers, one carrying a monkey and two others burdened with bows. Next comes an armed soldier escorting a group of women, Anatolian girls in embroidered coats and a desert woman in a fringed dress and with a shawl over her head. Following these are a battering ram, a detachment of the Assyrian infantry, and the first of a long procession of war chariots.

Shalmaneser III recorded his exploits and activities not only in the official annals of his reign and on reliefs of stone and bronze but also on the famous Black Obelisk of alabaster found at Calah. Fragments of another obelisk of the same ruler were recovered in Ashur.

Of the scenes depicted on this large monument, which stands well over six feet in height, perhaps the best known is the one that deals with the tribute of "Jehu, son of Omri," king of Israel. The monument was a record, in word and relief, of the king's military achievements down to the thirty-first year of his reign. But his account was not precise by modern standards; Omri was not the father of Jehu, but an Israelite king of another dynasty.



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858-824 B. C. "To Rule and Subject in Anger the Foes of Ashur, He Sent Me Forth"—Annals of Salsmaneser III

Painting by H. M. Herzog

The Ambassador from King Midas Marvels at the Wealth of Sargon's General

ALL THE Assyrian rulers mentioned so far had been members of a single dynasty. The task of gradually raising the country to the status of a world power had apparently absorbed all the energies of its leaders and left little room for internal intrigue and revolt.

Toward the end of the 8th century B. C., however, the ancient dynasty had lost its grip on the land. Discontent was rife, especially in influential Ashur.

This was the juncture at which a forceful general stepped in to seize the reins and establish himself as king and head of a new royal house. Respecting tradition, he tried to make his subjects forget that he was a usurper. He manipulated his genealogy and took the name of Sargon (11), "The King Is Legitimate."

He sought to give his rule a fresh start by founding a new capital, about 12 miles north of Nineveh. He called the place Dur Sharrukin, or "Fortress of Sargon," Sargonburg.

Fate was kind to Sargon at first. In the year 721 B. C. had come the surrender of stubborn Samaria, the capital of the Kingdom of Israel. The land was converted into an Assyrian province and its name was to disappear as a political designation for nearly 27 centuries, until A. D. 1948.

The restless Sargon lacked the temperament to derive lasting enjoyment from his new title and his magnificent new capital. Within less than a score of years he was killed in battle, far from his native land.

He had managed in that short time to carry the might and the fear of Assyria to distant places which none of his predecessors had ever seen. Among these were the mountain

fastnesses of Urartu, or Armenia, and the districts of Phrygia, ruled over by King Midas. Midas had to send a delegation to Assyria begging for peace.

Thanks to the recent excavations by the Oriental Institute of the University of Chicago at Khorsabad, the site of Dur Sharrukin, we now have many details from that impressive center unknown to the earlier excavators.

Of great importance are the wall paintings that were found in a residential building. The one here reproduced as the background for our composition is based on a reconstruction by the Oriental Institute. The residence in question was neither a part of the palace nor even the home of the vizier. It was merely the house of a high official.

The Assyrian's dress is amply attested on contemporary monuments, but the visitor's garb had to be pieced together from a number of scattered sources. He holds a straw fan in his right hand and a partly folded "foreign" cap in his left.

The painting that the Phrygian will talk about when he gets back home shows at the top a giant triad which consists of a god with rod-and-ring, receiving the homage of Sargon attended by one of his officials. The right hand of the king is raised and the forefinger extended in a characteristic gesture of supplication.

Winged genii of fertility form the inner border of the triad panel, much in the manner of borders on old Persian carpets. The same genii, but this time in kneeling position, fill two of the three registers in the lowest of the three friezes.

The middle register of the decoration is given over to representations of stylized animals.



© National Geographic Society

Painting by H. M. Herzog

721-705 B. C. "The Gods Who Dwell in Heaven and on Earth . . . Granted Me the Eternal Boon of Building That City and Growing Old in Its Midst"—Inscription of Sargon II

A Huge Guardian Statue Is Hauled Up the Slopes of Nineveh

Sargon's son and successor, Sennacherib, left a record of a vivid, versatile, and vindictive personality. Many proud cities felt the curse of his wrath, among them Babylon and Jerusalem. The echo of his Judean campaign still rings in our ears, thanks to the eloquence of Isaiah.

Because his relations with his stern father had been less than cordial, Sennacherib lost little time, on receipt of the news of Sargon's death, in abandoning Dur Sharrukin and erecting a new capital at Nineveh.

The result was a spacious center in which temples and palace were flanked by exotic parks. Although the Tigris flowed by the walls of Nineveh, Sennacherib got a steady supply of fresh mountain water for his capital by having his engineers construct an aqueduct from mountain springs 30 miles away.

The monumental buildings of Assyria were often guarded by gigantic sculptured demons. Set up in pairs against the side walls of the main entrance, these figures protected the building from all manner of evil influence.

Earlier types, from Ashurnasirpal's time to Sargon's, were shown in two views; from the front they appeared to be standing, but the side view showed them in motion. This dual position was achieved by means of a fifth leg.

Sennacherib's demons, as depicted on contemporary reliefs, reflect for the first time a more realistic treatment in dispensing with the fifth leg. Our scene attempts to sum up the story told by these reliefs.

At the foot of the Nineveh mound, near the confluence of the Khosar and the Tigris, is a large raft fastened to the

right bank by long ropes. A sledge supporting a human-headed bull is being moved off the raft and up the slope.

Men standing on the raft pull at a huge wooden lever. Its lower end is wedged under the sledge by large rollers which are constantly being adjusted. The sledge itself is also on rollers. A bucket gang keeps the track wet.

Four long chains of captives are pulling the monstrous load of 40 tons up the slope. Each chain gang is directed by a supervisor and goaded by a man with upraised whip.

From the front of the raft the workers are urged on by one officer who claps his hands rhythmically, and another who employs a sort of speaking horn. The rich garb of the Assyrians contrasts sharply with the dress of the chain gangs.

Near the top of the slope stands the wheeled throne from which Sennacherib watches. The movable throne, held up by two beardless servants, is protected from the sun by a richly embroidered parasol attachment. A bearded official stands on one side, as two attendants with flywhisks are ready to act. All the Assyrians wear laced half-boots.

The king's guard consists of Greek shieldmen who can be identified by their helmets. They are armed either with lances or with bows and arrows. The lancers wear half-boots, but the archers have the sandals of earlier times.

Along the upper part of the slope moves a line of carts carrying props, spare rolls of rope, and other towing equipment. Down by the riverbank, water for the bucket gang is supplied by irrigation engines of a type still common.

The entire operation has attracted visitors from the opposite bank, who are using inflated skins to get across.



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704-681 B. C. "White Limestone . . . the People of Enemy Lands . . . Quarried. I Turned It into Protective Bull Colossi for the Gates of My Palace"—Annals of Sennacherib

Painting by H. M. Bryant

Queen Mother Naqiya-Zakutu Nips a Revolt in the Bud

IN 809 B. C., when Shamshi-Adad V was as yet too young to discharge his duties as king of Assyria, the Queen Mother took over as regent for four years.

So impressed were her contemporaries with the performance of this woman—a feat unprecedented in the notably masculine social order of the Assyrians—that the fame of this queen, Sammuramat by name, eventually spread to distant lands. The Greeks made of her a composite character of some fact and much fable and handed her name down to posterity as Semiramis; but even their ready inventiveness failed to endow Semiramis with achievements equal to those of a later Assyrian queen, Naqiya-Zakutu.

We can tell from her name that Naqiya-Zakutu, one of the wives of Sennacherib, was of Canaanite origin, a native apparently of Palestine or Phoenicia. It may have been this marriage to an outsider that was responsible for Sennacherib's estrangement from his father Sargon. At any rate, Naqiya-Zakutu caused her royal husband to by-pass his older heirs by another wife, and appoint her own son, Esarhaddon, as crown prince.

For this favoritism Sennacherib paid with his life. His mother's counsel, however, helped Esarhaddon to crush the rebellion and later to extend Assyrian influence into another continent, by subjugating Egypt.

Nor did her amazing exploits cease with the death of her son. Her power reached down into the third generation, when her favorite grandson, Ashurbanipal, ascended the throne, once again ahead of an older heir apparent. It is tempting to speculate on what the matchless portrayer of

Israelite King Saul or a Greek writer of genius might have done with a history of Naqiya-Zakutu's life and times.

Our scene brings together four members of the royal family in the palace garden, a place made familiar by the reliefs. The seated pair are Shamash-Shum-Ukin (the Saos-duchin of the Greek sources), regent of Babylon, and his sister, the Princess Sherua-Eterat. They have been surprised by their grandmother, who is followed by their brother, King Ashurbanipal, as they were plotting the murder of their hated sovereign. The dowager queen will know how to put an end to such schemes.

Ashurbanipal is well known to us from his major reliefs, but there is also a less familiar plaque which shows us the two brothers together. The king's dress displays the rich embroidered folds of the north, whereas the regent wears the plainer garb of the Babylonians, characterized by its straight lines.

Both men have mustaches, following a fashion established in the preceding century. Their earrings, as well as those of the women, have been selected from among the many specimens of that period, for these ornaments changed with the times no less than other items of dress.

The attire of the women has been pieced together from sundry monuments. The features of the dowager queen had to be derived from imagination, which cannot but be stirred and stimulated by the fantastic career and the evident power and personality of the foreign-born queen, who could assert herself over three generations of kings that rank among the most illustrious monarchs of history.

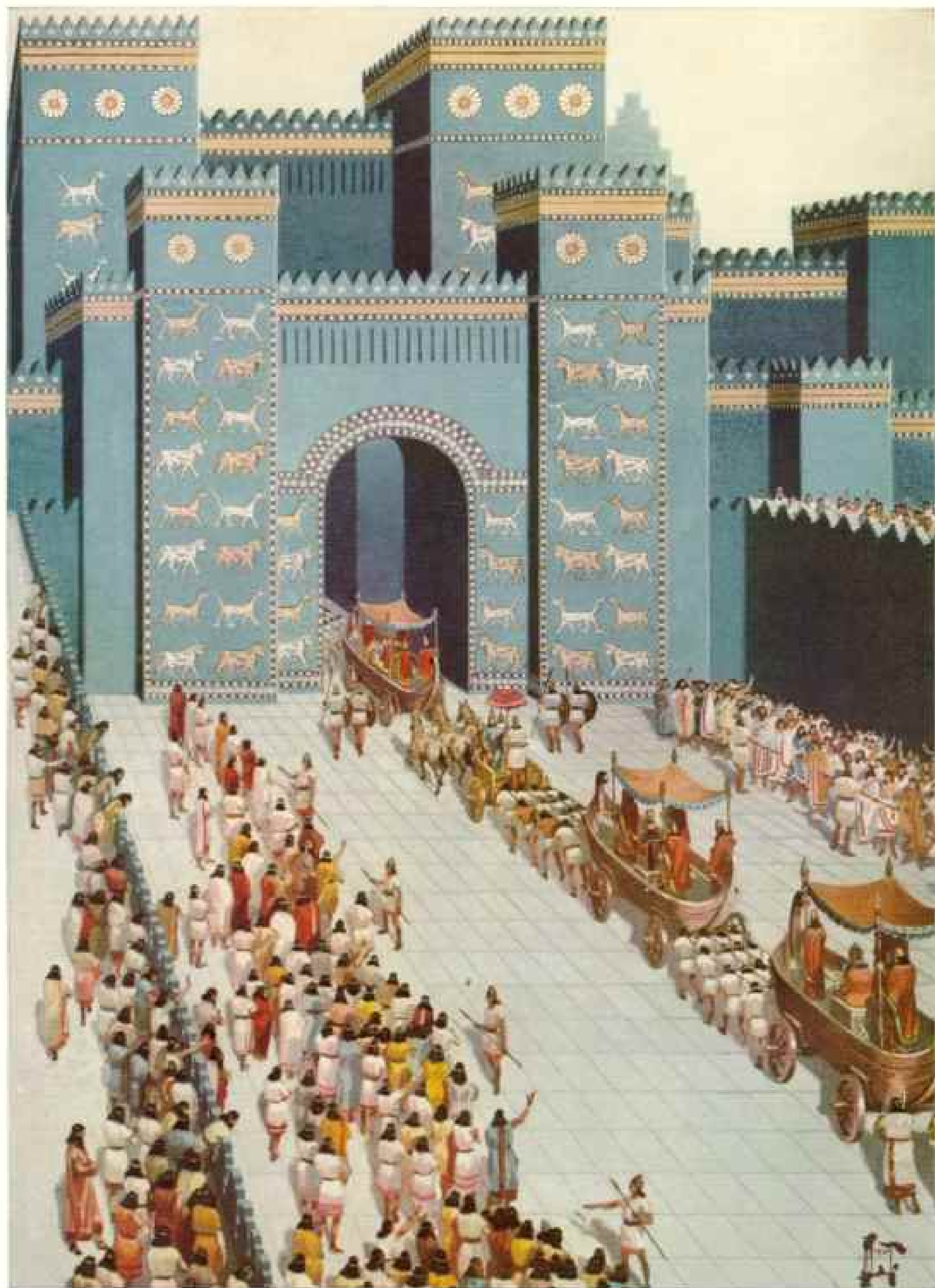


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Time of Ashurbanipal, 668-626 B. C. "You Who in Your Heart Are Hostile to Me, You Who Counsel and Discuss a Wicked Scheme . . . Concerning the Murder of Ashurbanipal!"—From an Assyrian State Letter

Painting by H. M. Fereid

11



© National Geographic Society

Painting by H. M. Bennett

Time of Nebuchadnezzar II, 604-562 B. C. "By the Side of Ishtar of Babylon . . . All Babylon Goes Exultant"—A Babylonian New Year's Text

A Babylonian Procession Greet the New Year

WITH ASSYRIA crushed and Nineveh razed to the ground, Babylon had at last the opportunity to regain the prominence and prestige that had been its lot more than a thousand years earlier, during the golden age of Hammurabi. Its fondest hopes were realized under the long and able rule of Nebuchadnezzar II.

The Old Testament remembers this king as the ruthless conqueror who destroyed Jerusalem in 586 B. C. Babylonian history, however, celebrates him primarily as the conscientious administrator and tireless builder who made his capital the greatest city of that time in the world.

To be sure, this brilliance was to be only temporary. Just as the end of Ashurbanipal's reign at Nineveh was separated by only a few years from that city's destruction, mainly at the hands of the Medes, so was Babylon's glory under Nebuchadnezzar to be followed by the triumph of another Iranian army, led this time by the great Persian king Cyrus, who occupied the ancient metropolis in 539 B. C.

The Babylon whose praises Herodotus sang was the Babylon that Nebuchadnezzar had fashioned. Among its many outstanding attractions was the famous Procession Street which passed under the unforgettable impressive Ishtar Gate. South of the Ishtar Gate, and along the west side of the great avenue, could be seen the fabulous "hanging" roof gardens and the seven-staged temple tower, the Tower of Babel, some three hundred feet tall.

The Procession Street got its name from the annual procession of the gods in connection with the New Year's festival. Assembled from all the provinces of the kingdom, the

statues of the principal deities were first moved with solemn ceremony and in a rigidly observed order of precedence through the Ishtar Gate and out to the northern outskirts of the city. There they were transferred to boats and taken to the Garden Temple up the river.

Then followed the most dramatic part of the entire cycle, the consummation of the sacred marriage of the principal god and goddess, on which depended the fertility and prosperity of the whole land.

Our scene witnesses the joyous return of the procession, on the eleventh day of the month of Nisan, through the north side of the Ishtar Gate. The beautifully enameled decoration speaks for itself. The approximate dimensions of the north side of the Gate are 70 feet for the height of the towers and 35 feet for the height of the vaulted passageway; the width of the entrance was about 15 feet. The south end was considerably taller.

The gods are placed in so-called carriage boats, each decorated with gold, lapis, and carnelian. On the first boat rides Marduk, attended by four priests, one at each canopy post. Behind the first boat is the royal chariot drawn by three steeds; on it ride the driver, the king, and the parasol holder.

The second boat carries Marduk's consort, whose crown is surmounted by an eight-pointed star. Next comes a boat with the seated figure of the sun-god, Shamash. Hidden from view is a seemingly endless procession of other deities, whose name and rank are supplied by the texts.

The illustration is based on the carvings from Malatya, far north of Babylon. Each major city celebrated the festival in much the same way.

The Merrimack: River of Industry and Romance

BY ALBERT W. ATWOOD

With Illustrations by National Geographic Photographer B. Anthony Stewart

THOUGH born of scenic lakes amid majestic mountains, the Merrimack becomes, before it reaches the sea, one of the hardest worked rivers in the world, a veritable slave in the service of industry.

True, it no longer makes its once proud boast of turning more spindles than any other river, or of being the "most noted water power stream in the world." But its banks, in city after city, are still lined with miles of monster mills, busy, if ancient and somewhat grim, and still a major factor in the sum total of America's productive effort.

But it would be a mistake to think of the Merrimack, past or present, as only a workaday river. Not only does it present a kaleidoscopic physical diversity, but it brings to mind many of the most romantic aspects of Colonial and early American history; of the struggles of the first settlers; of fierce, bloody Indian warfare; of the almost unbelievable wealth of its shad and salmon fisheries; and of shipping and shipbuilding in its lower reaches.

Moreover, the very industrialization of the Merrimack stems from the constant, unfailing supply of water which New Hampshire's mountains, forests, and lakes make possible. These at the same time constitute one of the country's foremost vacationlands.*

River Born in Profile Lake

In the heart of this land the Merrimack has its beginnings in the tiny Pemigewasset, which flows out of Profile Lake at the foot of the Old Man of the Mountains in Franconia Notch, New Hampshire (page 134).

On one of my visits to Franconia Notch highway crews were clearing the road of boulders, uprooted trees, and earth. These were the remains of a huge landslide which, loosened by a cloudburst, roared down the steep slopes of Mount Lafayette and Eagle Cliff and buried Route No. 3, one of the most important in New England.

The most famous previous slide was that which killed the Willey family—father, mother, five children—and two farm hands in the Crawford Notch in 1826.

It was Nathaniel Hawthorne who gave fame both to the Willey Slide and the Old Man of the Mountains.† Thousands go to Profile Lake not to see the source of the Merrimack or the lovely little lake itself but, fascinated at finding a human face in an inanimate thing, to gaze 1,200 feet upward at the several layers

of granite ledges which, especially in the late afternoon light, give the appearance of the profile of a great human face (pages 124-125).

Daniel Webster is supposed to have said that a shoemaker hangs out a shoe, a jeweler a watch, and a dentist a gold tooth, "but in the mountains of New Hampshire God Almighty has hung out a sign to show there He makes men." Hawthorne wrote: "It seemed as if an enormous giant, or Titan, had sculptured his own likeness on the precipice."

After leaving Profile Lake the Pemigewasset is a swift little stream, plunging down the steep mountain notch over falls and cascades.

Thoreau's Description Still True

More than a century ago Henry David Thoreau, author and naturalist, spoke of it as it first comes "murmuring to itself by the base of stately and retired mountains, through moist primitive woods whose juices it receives, where the bear still drinks it, and the cabins of settlers are far between and there are few to cross its stream."

Except for an almost complete absence of wild animals and for the fact that at certain points there are many persons indeed to "cross its stream," Thoreau's description still holds good.

South of the great mass of the White Mountains lies Lake Winnepesaukee, by far the largest of New Hampshire's 1,300 lakes and ponds (page 127). Its outlet, the Winnepesaukee River, joins the Pemigewasset at Franklin, 16 miles to the southwest, to form the Merrimack (map, page 109).

Winnepesaukee has nearly 300 islands and many and deep indentations; the extreme irregularity of its shape is especially evident from an airplane or from the tops of surrounding hills.

It is so extensively used for recreation that it boasts a registration of nearly 2,500 motor-boats. The first intercollegiate eight-oared boat races in the United States, between Harvard and Yale, took place here on August 3, 1852.

When the water in Lake Winnepesaukee is low and quiet, and atmospheric conditions fa-

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Skyline Trail from Maine to Georgia," by Andrew H. Brown, August, 1949; and "Skiing Over the New Hampshire Hills," by Fred H. Harris, February, 1920.

† See "Literary Landmarks of Massachusetts," by William H. Nicholas, NATIONAL GEOGRAPHIC MAGAZINE, March, 1930.



Miniature Wagon and Homemade Rug Exemplify New Hampshire Handicrafts

The League of New Hampshire Arts and Crafts helps handicrafters sell their products (page 108). "Many know how to make things," says director David Campbell (center), "but need marketing outlets. Our state-wide shops and annual fair attract purchasers."

avorable, traces may be seen of the large granite boulders on the lake floor near the outlet, remains of the very extensive fish traps, or weirs, which the early settlers—and the Indians long before them—maintained to gather their winter supply of shad. Originally the boulders were connected with a net or matting of twigs to make a trap.

The near-by bustling, crowded pleasure resort, with main north-and-south highway, railroad, steamboats, motorboats, and even a unit of a nationally-known restaurant chain, is known as "The Weirs," although Indians and shad have long since disappeared.

But the stone portions of the Indian traps

are not the only remains of an ancient past. Close to the outlet at The Weirs stands the Endicott Rock, submerged for nearly two centuries in the bed of the stream. One of the oldest public monuments in New England, it bears an inscription that was legible to scholars when it was raised, and is still discernible.

The charter of Massachusetts Bay Colony granted it land stretching as far as "three miles north of the Merrimack River," the presumption at that time being that the river ran only east and west.

Pushing his claims as far as possible, Gov. John Endecott (Endicott) sent surveyors to find the source of the river, and on August 1,



Native Granite Frames New Hampshire's Domed Capitol: Concord

Daniel Webster stands above the walk. Statues not shown honor four other native sons—President Franklin Pierce, Gen. John Stark, abolitionist John Hale, and Commodore George Hamilton Perkins. Farragut said of Perkins, a Civil War naval leader, "No braver man ever trod a ship's deck."

1652, they marked the boulder at the outlet to Lake Winnepesaukee. However, in the next century the British Crown refused to support such presumptuous land grabbing on the part of Massachusetts at New Hampshire's expense.

Country's Largest Maker of Skis

The trade center of the New Hampshire lake region is a busy little industrial city, Laconia, which boasts one of the world's largest manufacturers of circular knitting machines, Scott & Williams, Inc. (page 112), and the country's largest maker of skis, C. A. Lund & Company. That company supplied the Allied armies in World War II with large quantities of skis, and also makes toboggans, snowshoes, and hockey sticks.

In the hills near Laconia I visited the annual fair of the League of New Hampshire Arts and Crafts (page 107). New Hampshire

was the first State to give legislative support to the arts and crafts movement, under the late John G. Winant as governor, the work being part of the State's vocational education program.

The chief aim of the movement is to augment the income, often of elderly persons and of those physically handicapped, who in this rigorous northern climate cannot earn a full income, from farming or otherwise, in the remote rural locations in which so many live.

In an article on New Hampshire in the NATIONAL GEOGRAPHIC MAGAZINE, the late Senator George H. Moses tells how a Franklin urchin when asked by his teacher, "Where does the Merrimack rise?" promptly answered, "Back of Uncle Warren Daniell's barn." *

When I visited the quiet confluence of the

* See "New Hampshire, the Granite State," by George Higgins Moses, NATIONAL GEOGRAPHIC MAGAZINE, September, 1931.

No Steamer-laden Old Man River
Is the Merrimack—It Turns
the Wheels of Commerce

From Franklin, New Hampshire, where two confluents form the main stream, the Merrimack flows only 110 miles before it empties into the sea just beyond Newburyport, Massachusetts. In that short span waterfalls and rapids drop its waters 269 feet and halt navigation beyond the last 18 miles.

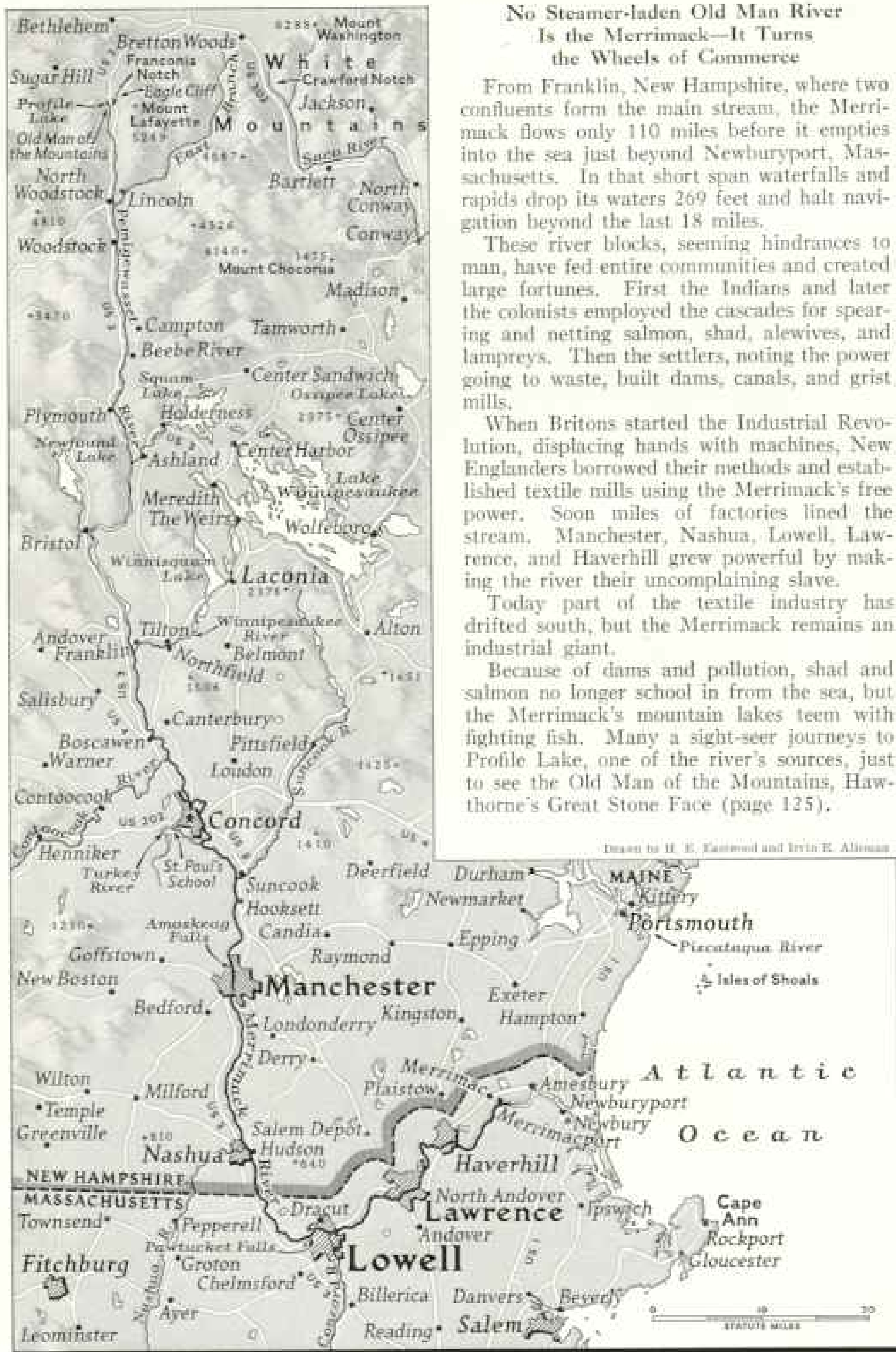
These river blocks, seeming hindrances to man, have fed entire communities and created large fortunes. First the Indians and later the colonists employed the cascades for spearing and netting salmon, shad, alewives, and lampreys. Then the settlers, noting the power going to waste, built dams, canals, and grist mills.

When Britons started the Industrial Revolution, displacing hands with machines, New Englanders borrowed their methods and established textile mills using the Merrimack's free power. Soon miles of factories lined the stream. Manchester, Nashua, Lowell, Lawrence, and Haverhill grew powerful by making the river their uncomplaining slave.

Today part of the textile industry has drifted south, but the Merrimack remains an industrial giant.

Because of dams and pollution, shad and salmon no longer school in from the sea, but the Merrimack's mountain lakes teem with fighting fish. Many a sight-seer journeys to Profile Lake, one of the river's sources, just to see the Old Man of the Mountains, Hawthorne's Great Stone Face (page 125).

Drawn by H. E. Eastwood and Irvin E. Alliman





Merrimack Water Diverted by the Great Dam Helps Drive Lawrence's Mammoth Textile and Paper Mills

Century-old granite blocks of the great dam (center) raise the river 37 feet. Sluiceway on left conducts water to the Pacific Mills and (beyond third bridge) the Champion-International Company (pages 132 and 133). Canal on right flows to American Woolen Company's Wood Worsted Mill (page 120).

Manchester Mills Tell the Story of the City That Refused to Die

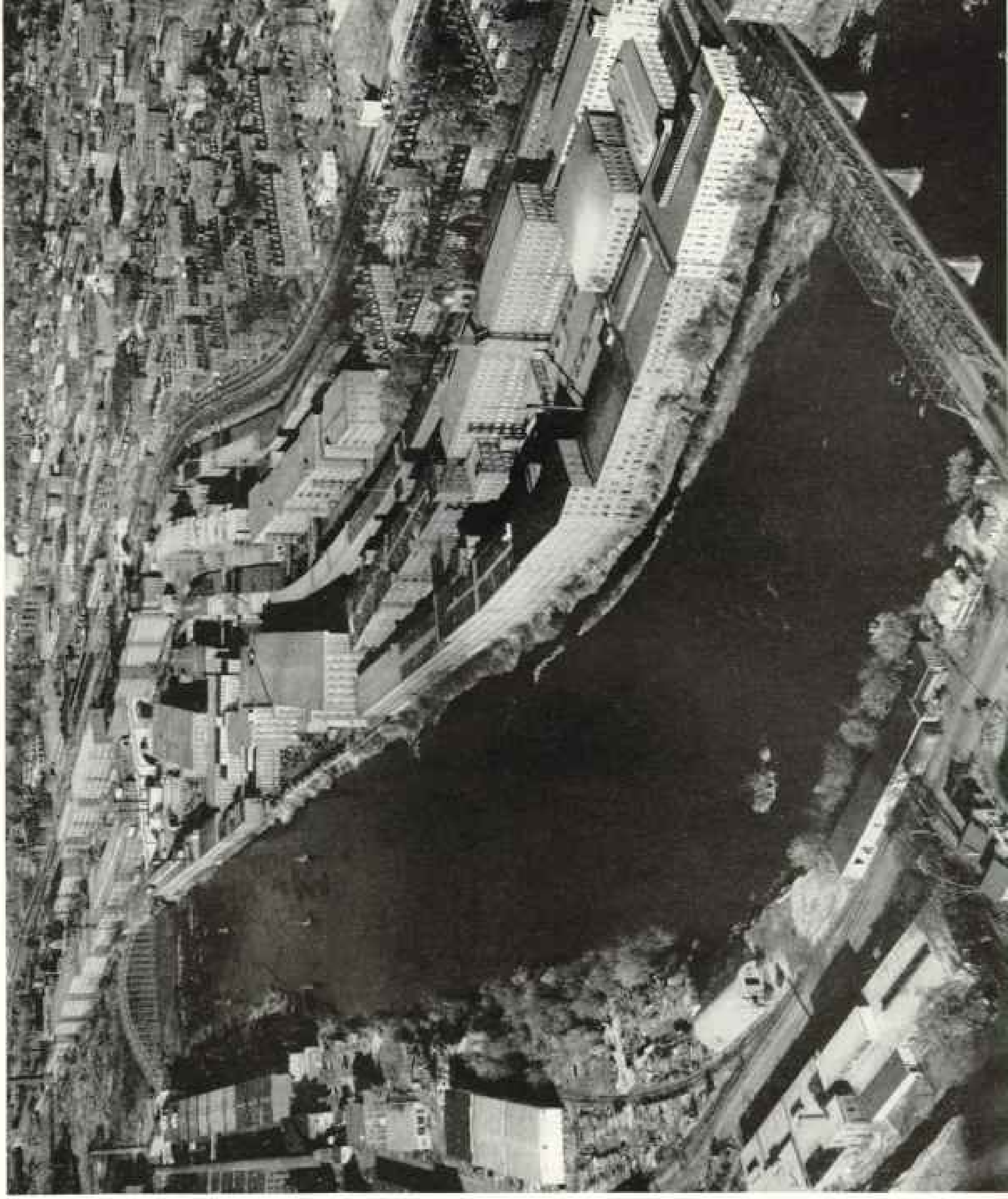
Began in 1810, the Amoskeag Manufacturing Company became the world's largestingham mill. Soon after World War I silk and rayon captured the market and women refused to wear king-ham. Amoskeag failed to convert. Then labor troubles developed. Finally, the market crash and depression finished off the company.

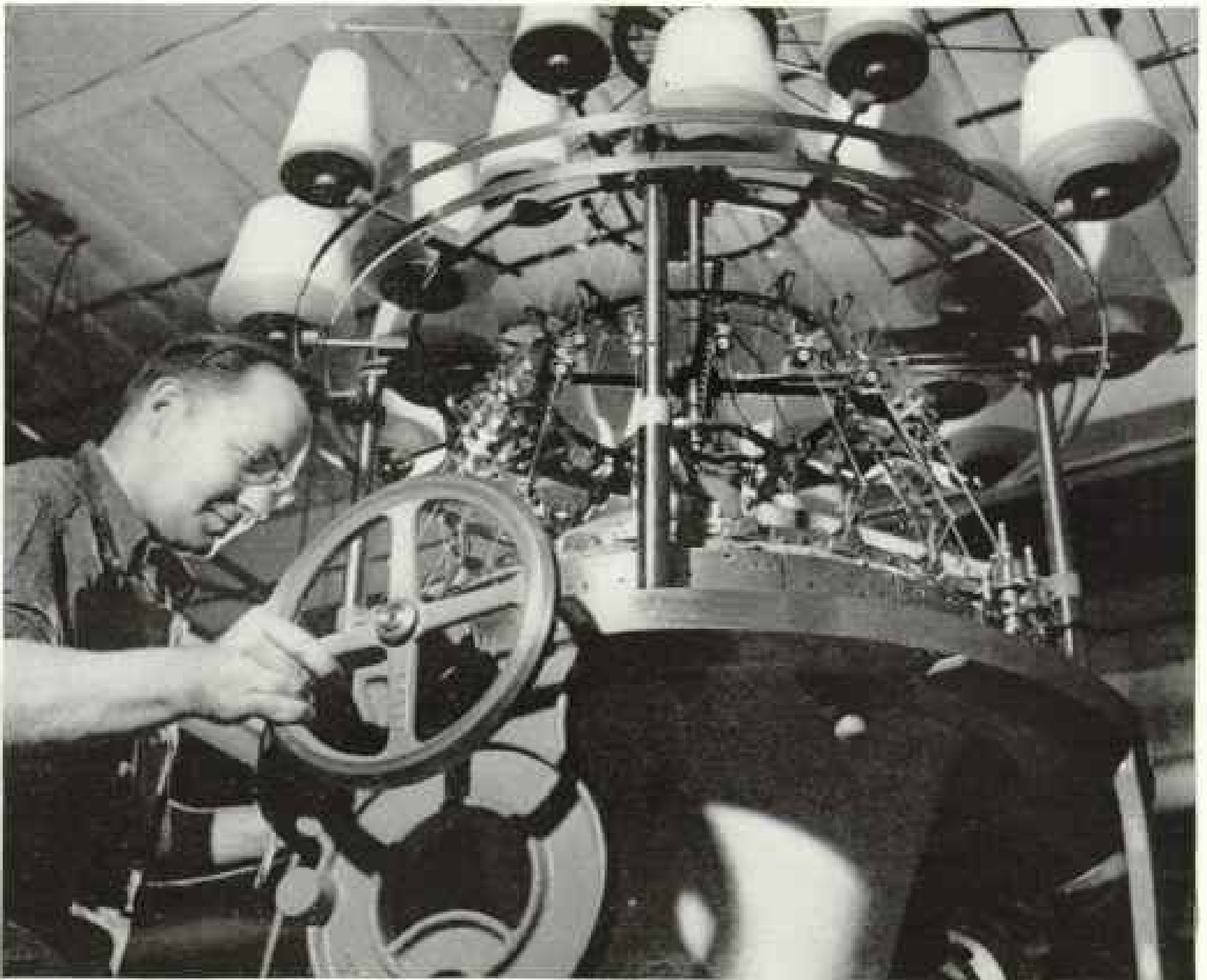
Manchester, New Hampshire, thousands of its wage earners out of jobs, faced ruin. A citizens' committee, raising funds, bought the enormous property, split it into smaller enterprises, and saved the city's economy (page 116).

Today some 120 businesses occupy floor space in the old buildings. They make everything from soup to worsteds. Rayon, too, has now come to Manchester.

This air view shows the enormous mills stretching out of sight along the Merrimack. Canals that formerly brought water power still thread between the plants, but electric current is now more important. Quadrangles of company dwellings (right) today are private housing.

In pioneer times Amoskeag Falls (out of the picture at upper left) drew through of Indians and settlers every spring to spear or net salmon, shad, sturgeon, alewives, and herring. Dams and pollution long ago drove migratory fish from most of the river.





Two Thousand Pairs of Hands Could Knit No More Fabric than This Steel Automaton

Knitting tools from the factory of Scott & Williams, Inc., Laconia, New Hampshire, go to all parts of the world (page 108). This machine turns out fabric in the form of a seamless tube. Manufacturers later split the tube to make such garments as underwear, sports shirts, and play suits.

turbulent Pemigewasset and the milder Winnepesaukee the barn had long since disappeared; but I stood on land which belonged to the estate of Warren Daniell, and I had been taken there by one of his nephews.

In early days both shad and salmon went up the Merrimack as far as Franklin, but parted company there, the shad going up the Winnepesaukee and the salmon up the colder Pemigewasset to lay their eggs.

In Franklin the owner of a seamless hosiery mill (page 115), whose company is one of the oldest, told me of his grandfather's association with Walter Aiken, of a famous local inventing family.

Walter not only improved knitting machines and invented a shower bath, a propeller, a vacuum cleaner, and a very profitable machine for making wooden screws, but designed a locomotive and other equipment and helped in the construction of the cogwheel railroad which first climbed up Mount Washington

in 1869, and has been doing so ever since.

Daniel Webster, New Hampshire's most famous son, was born in Franklin, lived there as a boy, and had a law office in Boscawen, 10 miles to the south. His birthplace, open to visitors, is in an isolated spot several miles from the city of Franklin proper.

The house in which he lived as an older boy is close to the main north-and-south highway, No. 3, and is part of a State home for children (page 126). Daniel's cousin, Worcester Webster, was postmaster in Boscawen. In 1846 he issued a 5-cent stamp, one of the great American philatelic rarities.

At that time there were less than a dozen post offices in the country that issued or used postage stamps. It is not known how many Worcester Webster issued or where they went; the known existing specimen is now valued at \$6,000.

Proceeding down the Merrimack Valley we come to Concord, State capital, with its air



Stout Oak Timbers of "Francis's Folly" Twice Saved Lowell, Massachusetts, from Flood

Derisive townspeople dubbed the floodgate a folly when engineer James B. Francis built it in 1848. Four years later they ceased laughing when the barrier stopped the Merrimack's swollen waters. During the record flood of 1936 the gate again saved the city (page 170). A larger canal now by-passes the gate.

of orderly, prosperous well-being, befitting a city which is the State's governmental, railroad, and transportation center. It is reasonably industrialized, has numerous private institutions—religious, educational, and fraternal—and is a trading center as well.

In Capitol Square there is a simple and comfortable yet dignified grouping of public and semipublic buildings; the Capitol itself (page 108), a State office building, the State library, city public library, New Hampshire Historical Society, city hall, post office, and churches.

New Hampshire Legislature Country's Largest

The fact that New Hampshire's population is small and its legislature by far the largest in the Union means that during the session Main Street and the Eagle Hotel, the "Pelican" of Winston Churchill's novel, *Coniston*, take on the aspects of old home week.

Even now the lower house runs to 400;

before the constitutional amendment of 1941 it totaled 455, as compared with 100 to 200 in the majority of States. This is because New Hampshire retains the township as a political unit, and there are more than 220 of these towns.

Further efforts to reduce the unwieldy size of the General Court meets with opposition from the cities, which do not wish to lose their enormous number of representatives, and from the little towns, which do not wish to lose their one member.

This peculiar feature of New Hampshire government is both good and bad. It brings government close to the people, but on the other hand it brings some not too highly educated persons into the lower chamber.

Concord has one claim to fame of which, in the opinion of this writer, it does not make enough. New Hampshire inaugurated the most important government of modern times, because it was the ninth State to ratify the



Miners, Bandits, Stage Beauties, and Royalty All Rode the Concord Coach

From 1826 until about 1900, the firm of Lewis Downing and Stephen Abbot built more than 3,000 coaches in Concord, New Hampshire. Strength, lightness, and elegance made their stages world-famous. Records show orders from Peru, Mexico, Australia, and South Africa. Concord vehicles in the West carried passengers and freight for Wells, Fargo & Company. Buffalo Bill Cody's Deadwood Stage Coach was a New Hampshire product (below). This survivor stands in the Boston and Maine Railroad Station, Concord.

Constitution of the United States, and only nine were required. The provincial congress met first in Exeter, but adjourned to Concord where ratification, 57 to 46, took place June 21, 1788.

The largest industry in Concord is the Rumford Press, which prints some 50 magazines, including the *Atlantic Monthly* and half of the American edition of *Reader's Digest*. It is unusual for a printer in a small city, remote from metropolitan centers, to have nearly 1,000 employees, but the Rumford Press has naturally grown with the *Reader's Digest*.

"Ancestors of Railway Carriages"

A former large Concord industry, in fact one of the great pioneer industries of America, was the building of stagecoaches, which continued until after the Civil War (above).

Lewis Downing, a wheelwright, went to Concord in 1813 and became America's fore-

most coach builder, as described in detail in a publication of the New Hampshire Historical Society:

"No American product ever gained a wider patronage or ever gave better service than this Concord Coach. . . . To him (Downing) we may well look back with pride, for out of his labor and skill were wrought the direct ancestors of railway carriages, motorcars and aircraft."

These coaches were used by Wells, Fargo & Company to carry the overland mail and helped to open up the West. Most famous was the Deadwood Stage Coach, which Buffalo Bill later exhibited throughout the world.

An interesting Concord institution is St. Paul's School, affiliated with the Episcopal Church, and one of the best known preparatory schools for Harvard, Yale, and Princeton. It occupies 1,500 acres of woods and open country, two miles from the city, with



Nylons Take Shape on High-speed, Steam-heated Legs

Nylon stockings come off Sulloway Hosiery's knitting machines as shapeless tubes with half-formed feet. Under heat they become pliable. Cooled, they set permanently and without wrinkles. This Franklin, New Hampshire, plant can produce 1,200,000 pairs a year.

the little Turkey River flowing through the property to the Merrimack.

Concentration in athletics is upon outdoor sports, especially hockey, the school's first team having invariably stood at or near the top among hockey teams of American preparatory schools (page 135).

Mary Baker Eddy, founder of Christian Science, was born five miles from Concord and later lived in the capital for a number of years. Her birthplace is marked by a small pyramid on which this inscription appears:

"The Baker Homestead. Around the memories thereof clusters the golden days of my childhood. Mary Baker Eddy."

Fifteen miles below Concord, at Amoskeag Falls on the Merrimack, has developed New Hampshire's largest city, Manchester, containing one-sixth the population of the State.

John Stark, famous Indian fighter and hero of the battles of Bunker Hill and Bennington, was born on a commanding bluff over-

looking the falls. The site of his birthplace, the house in which he lived for a number of years, and his grave are relatively close together.

Stark lived to the age of 93, and was one of the last surviving American generals of the Revolution. He had the gift of incisive speech; asked once for a message to a patriotic celebration, he replied, "Live free or die."

He called people by any name that came into his head. His wife's name was Elizabeth, but she has come down in history as Molly Stark, because in addressing his troops just before the Battle of Bennington he is supposed to have said of the enemy, "They are ours tonight, or Molly Stark sleeps a widow."

In the library in the little town of New Boston, 12 miles west of Manchester, is the famous Molly Stark gun, a cannon surrendered to General Stark at Bennington. Cast in Paris, it was captured from the French by the British, recaptured by them from the



Fingers Reweave Errors of Mechanical Looms: Pacific Mills, Lawrence, Massachusetts

Fluorescent tubes lit this sewing room so brilliantly that the photographer took the picture without auxiliary lighting. These highly skilled operators, catching up threads, make invisible repairs.

Americans in the War of 1812, retaken by the Americans later in the same war, and turned over to the New Boston Artillery Company (page 135).

This company now meets once a year, and exists to protect and preserve the cannon. Its captain told me he had fired it on V-E Day.

Valley Towns Once Indian Settlements

All the larger communities in the Merrimack Valley are imposed on Indian villages or fishing stations, the more important ones near falls in the river. It is estimated that eight to ten thousand Indians lived in the valley prior to the smallpox epidemics of the early 17th century. They and the white settlers who displaced them depended to a large extent for food upon fish caught at the falls.

As late as 1760 2,500 "odd shad fish" were "caught out of the River Merrimack" in a single draught, according to a local newspaper.

An early name for what is now Manchester

was Derryfield, and it was said that at one time enough lampreys, known as "Derryfield beef," were salted down in a single season to equal 300 head of cattle.

But as the various falls on the Merrimack were turned to the use of industry, alewives, eels, shad, and salmon disappeared.

At Manchester we begin to encounter those giant mills that have so long characterized the lower reaches of the river valley.

On both sides of the river for one and a half miles are several score mill buildings, often several rows deep (page 111). Until its collapse in 1936, these were owned and operated by the Amoskeag Manufacturing Company, at one time the largest textile plant in one concentration in the world.

Entirely aside from its manufacturing plants, the company owned \$2,000,000 of assessed property, including 721 tenements. It owned water rights far up the river, a steam system, a power system, and a water system.



Where Pawtucket Falls Once Roared, Flimsy Boards Hold Back the Merrimack

Diverting water into canals, a wooden wall at Lowell, Massachusetts, turns rapids into puddles. Iron bars support the flashboards, but in floodtimes they bend, releasing planks and averting dangerous backwaters. Boatmen here plug leaks with a straw-and-cinder mixture held in place by water pressure.

Financial complications and inability of the giant organization to adjust its operations when women stopped wearing gingham and took up silk and rayon threatened it with sale at public auction. The company had 16,000 employees at its peak, and paid a large proportion of the city's taxes.

To avoid the calamity of closing, a group of local citizens raised \$5,000,000, half a million of it within a few days, through a new company, Amoskeag Industries, Inc. The wealthiest citizen, nearly 90 years old, took \$100,000 in stock, the local fire insurance company the same amount, the local banks took a mortgage of several million dollars, and the local power company took \$100,000 in stock and also bought the water rights.

The stockholders expected to lose half their investment, and the going was not too easy for a while; the percentage of families on relief in Manchester in 1937 and 1938 was ex-

ceedingly high. But gradually the manufacturing space was sold to many diversified industries. With the war's arrival such space became valuable, and today it is nearly all taken up by approximately 120 different concerns.

As I stood on a street corner and looked at one of the very long buildings, I could see that it houses concerns which manufacture or deal in electrical instruments, machinery, sheet metals, potato chips, roofing, building materials, wholesale drygoods, and a sign service. Inside the yard there are manufacturers of wooden heels, soap, knit goods, surgical dressings, men's clothes, suitcases and trunks, toy suitcases and toy trunks, and laundry mailing bags.

Far from losing their investment, stockholders in Amoskeag Industries, Inc., have profited, and, although practically liquidated out of the yard itself, remain actively in busi-

ness; a civic-minded group ready with their capital to promote the interests of the community.

Manchester a Shoemaking Center

One of the country's chief shoemaking centers, in addition to its other manufacturing interests, Manchester is essentially an industrial city. Yet it strikes the observer as clean, orderly, and law abiding. Much of its population is of French-Canadian descent, and many of the city's mayors have been from this group.

Fifteen miles south of Manchester, on the west bank of the river a few miles from the Massachusetts line, is Nashua, second ranking industrial city of New Hampshire. As in Manchester, approximately half the population is of Franco-American stock.

One modern descendant of an early effort of several Nashua residents to supply the California gold miners of 1849 with playing cards is the Nashua Gummed and Coated Paper Company, known locally as "The Card Shop."

It is among the country's large converters of cellophane, cloth, and paper into a wide variety of products for packaging, box making, and paper specialties. One of its chief products is waxed paper, of major importance, however, only since the invention of the bread-wrapping machine.

At one time the Nashua Manufacturing Company was the largest maker of blankets in the world, giving employment to one-fifth of the city's workers; but a few years ago new owners closed down much of the 125-year-old Nashua operation, thus presenting the city with a problem not unlike the earlier one in Manchester.

Local business, industrial, and labor leaders organized the non-profit Nashua-New Hampshire Foundation Trust to take over the old buildings, and have succeeded in leasing or selling much of the space to manufacturers of various products, such as shoes, hardware, and textile machinery parts.

Across the river, three miles from Nashua, near Hudson, New Hampshire, is Benson's Wild Animal Farm, combination circus, zoo, and amusement park. Roadside zoos have become an important industry, especially in Florida, but this particular one is of metropolitan size, despite its rural location.

The late John T. Benson was American agent for the German animal firm of Hagenbeck. He started the farm as a health resort for show people, but changed it over into a quarantine station for bringing animals into the country from Hagenbeck and selling them.

Curiosity on the part of passing motorists and neighbors early led to charging admission, and the place has long been primarily a commercial show (pages 130 and 131). I visited it on a Monday and learned that 12,000 persons paid admission the day before.

A few miles below the point where the Merrimack enters Massachusetts it turns eastward toward Pawtucket Falls (page 117), one of the first water powers in America to be used on an extensive scale to operate power looms.* Below the falls it is joined by the Concord River.

At this site was built the city of Lowell, first instance in America of the deliberate creation of a city primarily of the industrial type, although there are others with older established mills.

Miles of canals, which divert water from the dam to factory mill wheels, crisscross the city. The chief business district lies within a belt of factories which almost encircles it.

The century-old mills, with their cupolas and towers, and the simple but well-proportioned tenements and boardinghouses have about them an architectural dignity that fits into the original ample city plan.

Beginnings of Cotton Manufacture in America

Francis Cabot Lowell, among whose descendants were the famous Amy and Percival, went to England in 1810, and, impressed by manufacturing as a source of wealth, returned to this country to give tremendous impetus to cotton manufacturing in America.

It was illegal to export models, parts, or even drawings of textile machinery from England, and Lowell had only imperfect recollection of what he had seen. But in Waltham, Massachusetts, he established the first mill in this country in which cloth was completely manufactured under one roof. Since more water power was needed for the operation, the Pawtucket Falls on the Merrimack were selected, and the new city built and, nine years after his death, named for Lowell.

Household spinning and weaving were no longer adequate to clothe the American people, the Merrimack had plenty of water power, Boston merchants had ample capital, and an enormous supply of labor was available in the daughters of Massachusetts and New Hampshire farmers.

Francis Lowell had been so shocked by the poverty of English mill labor that he instituted a system of community, paternalistic, com-

* See "Massachusetts—Beehive of Business," by William Joseph Showalter, NATIONAL GEOGRAPHIC MAGAZINE, March, 1920.



Woman Scalps Indians: Hannah Duston Made News in Haverhill, Massachusetts

Indian raiders abducted Mrs. Duston in 1697. While her captors slept, Hannah, another woman, and a 14-year-old boy killed 10 and escaped. To prove her exploit, Hannah scalped the Indians. Her descendants preserve the original tomahawk and knife. The statue stands in Haverhill's Grand Army Park (page 138).

pany-owned housing and supervision of the daily life of the mill hands that worked admirably for several decades.

But gradually the happy farmer's-daughter mill hands married or migrated west with their families. The great mills along the Merrimack fell into absentee ownership, and today Lowell's population is predominately foreign born or second generation.

Lowell reached its peak as one of the world's great textile centers just after World War I. Each Merrimack Valley city is now struggling mightily for diversification in industry, but the region as a whole continues to hold important segments of the textile industry, the

original Merrimack Manufacturing Company still being Lowell's largest.

The most dramatic event in the history of Lowell can be visualized by seeing the Francis Floodgate, or so-called "Francis's Folly," built more than a century ago by the then youthful chief engineer of the Proprietors of the Locks and Canals on Merrimack River (page 113).

To prevent the recurrence of damage such as was caused by early floods, James B. Francis built this gate in 1848. It is a huge affair of solid oak, as heavy, massive, and strong as if in a medieval castle. It slides up and down in grooves cut in solid blocks of granite, and is suspended by a single chain.

On a near-by beam Francis placed a box in which he put cold chisels and hammers to cut the link so that no time would be lost if catastrophe struck.

Unfortunately many of Mr. Francis's contemporaries did not appreciate the wisdom and foresight of their local genius, and his gate was greeted with scorn and derision. By some his work was called "Francis's Folly."

"Francis's Folly" Saves Lowell

But the engineer was vindicated in 1852 when the gate helped save the city from flood.

Then in March, 1936, nearly 90 years later, the treacherous Merrimack went on its worst rampage, the gate was lowered and, together with other protective works, held back a 20-foot wall of water, thus saving the city.

In the old office of the Locks and Canals, reminiscent of Dickens's description of London of long ago, I looked at portraits of Mr. Francis and of another chief engineer of the company, George W. Whistler, father of the famous artist, James McNeill Whistler, whose birthplace, a block away, is open to the public.

On a high bank overlooking the rapids of Pawtucket Falls stands the Lowell Textile Institute, a growing institution, for while old textile mills may close down in certain localities, the industry as a whole is constantly broadening its sweep, with new materials, new products, and new uses.

The Institute's reputation brings it students from as far away as China, India, Turkey, Greece, Egypt, and South America. With extensive pilot plants for vocational training, there is also emphasis upon the fundamental background of the basic sciences, and stress upon textile engineering and chemistry.

Lawrence, 9 miles beyond Lowell, is another city which wealthy Boston merchant families, headed by a Lawrence rather than a Lowell, made to order, for here was another site where the river could be used over and over again to run the mills. Newer than Lowell, it is a century old at that, but the huge granite blocks of its great dam seem as firm as ever.

Lawrence Country's Foremost Worsteds Center

Lawrence is the country's foremost worsteds manufacturing center, retaining its predominance in this field to a greater extent than other New England cities have kept their cotton textile position (page 110).

The Essex Company originally bought the land, laid out the streets, and built the dam, canals, and many of the houses and mills. It still bills a number of the great manufac-

turing concerns for the rent of so many "mill powers for one year at 260 ounces of silver at 900 fine, or the equivalent."

In other words, silver was regarded as the one stable form of payment a century ago, and water power is still being paid for in Lawrence by a number of users in the equivalent of silver.

The Wood Worsted Mill of the American Woolen Company is the largest mill in Lawrence and the largest worsteds mill in the world. Although only one of more than 20 mills of the American Woolen Company, it uses the annual clip of 200,000 sheep a week, covers 68 acres, employs 7,000 persons, and produces 6,000 miles of cloth a year, as well as providing yarn and top for other mills of the company.

But the mills of the American Woolen Company are not the only monsters of their kind in Lawrence; the Pacific Mills (page 116) and the Arlington Division of William Whitman Company, Inc., are large producers of worsteds. In fact, the Arlington mills use the fleece of 28,000 sheep per day.

Lawrence has had its tragedies. On January 10, 1860, the Pemberton Mill, with 900 employees, collapsed without warning, killing 88 outright and injuring many.

Since the far-famed and disastrous strike of the Industrial Workers of the World in 1912, labor conditions seem to have been peaceful, and the Americanization of Lawrence's enormous foreign population has gone on apace, members of second generation Italian stock occupying high positions in the professional and business life of the city.

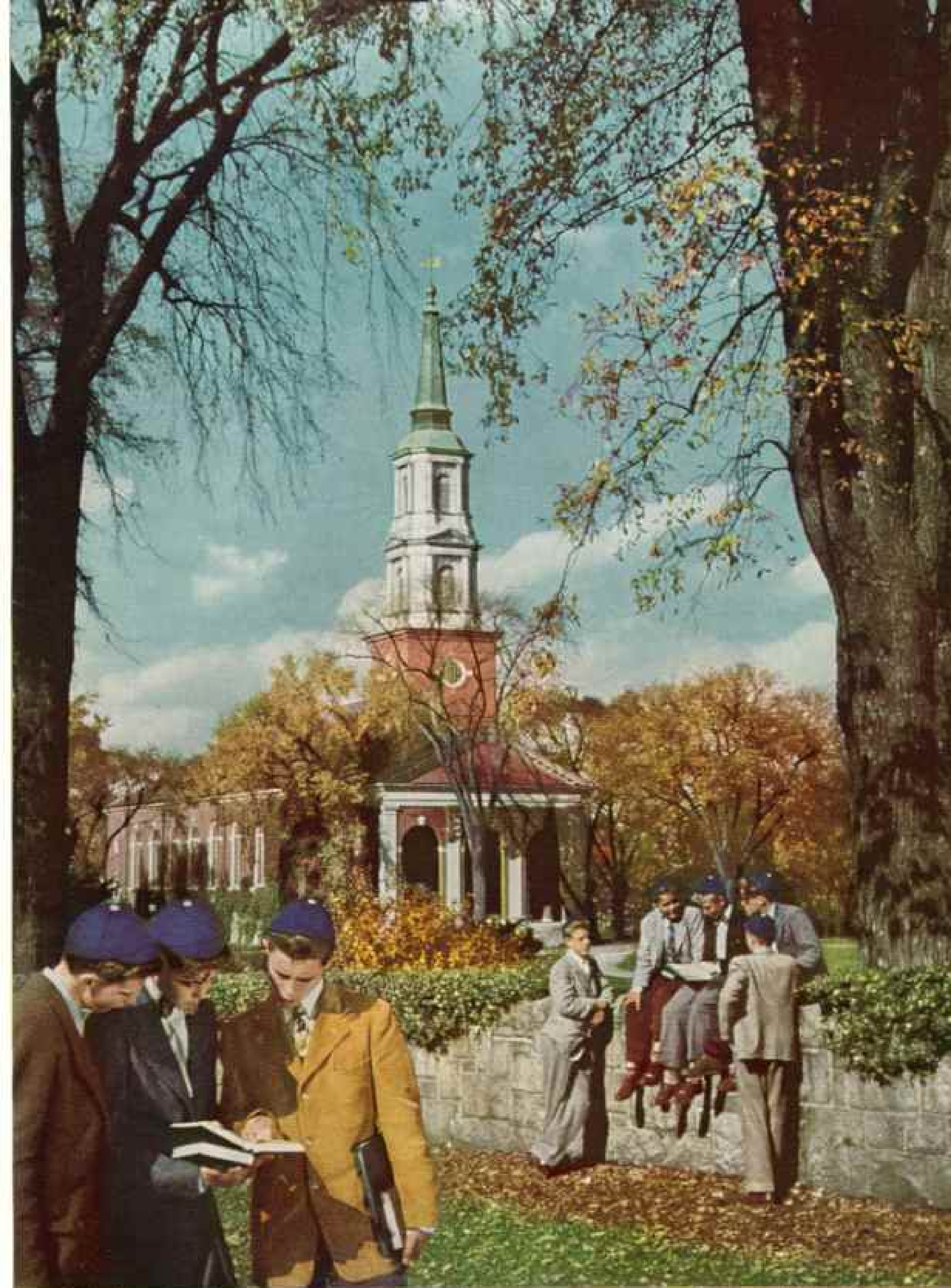
Despite its large industries and population, Lawrence covers a very small area. Fortunately many of the mill workers live in rural or semi-rural surroundings in near-by towns.

Maker of NATIONAL GEOGRAPHIC Paper

An important Lawrence industry is the Champion-International Company, which long has enjoyed the reputation of making the highest quality of coated paper (pages 132 and 133). Among its customers is the National Geographic Society, which uses upwards of 320 freight carloads a year, or nearly 11,000 tons.

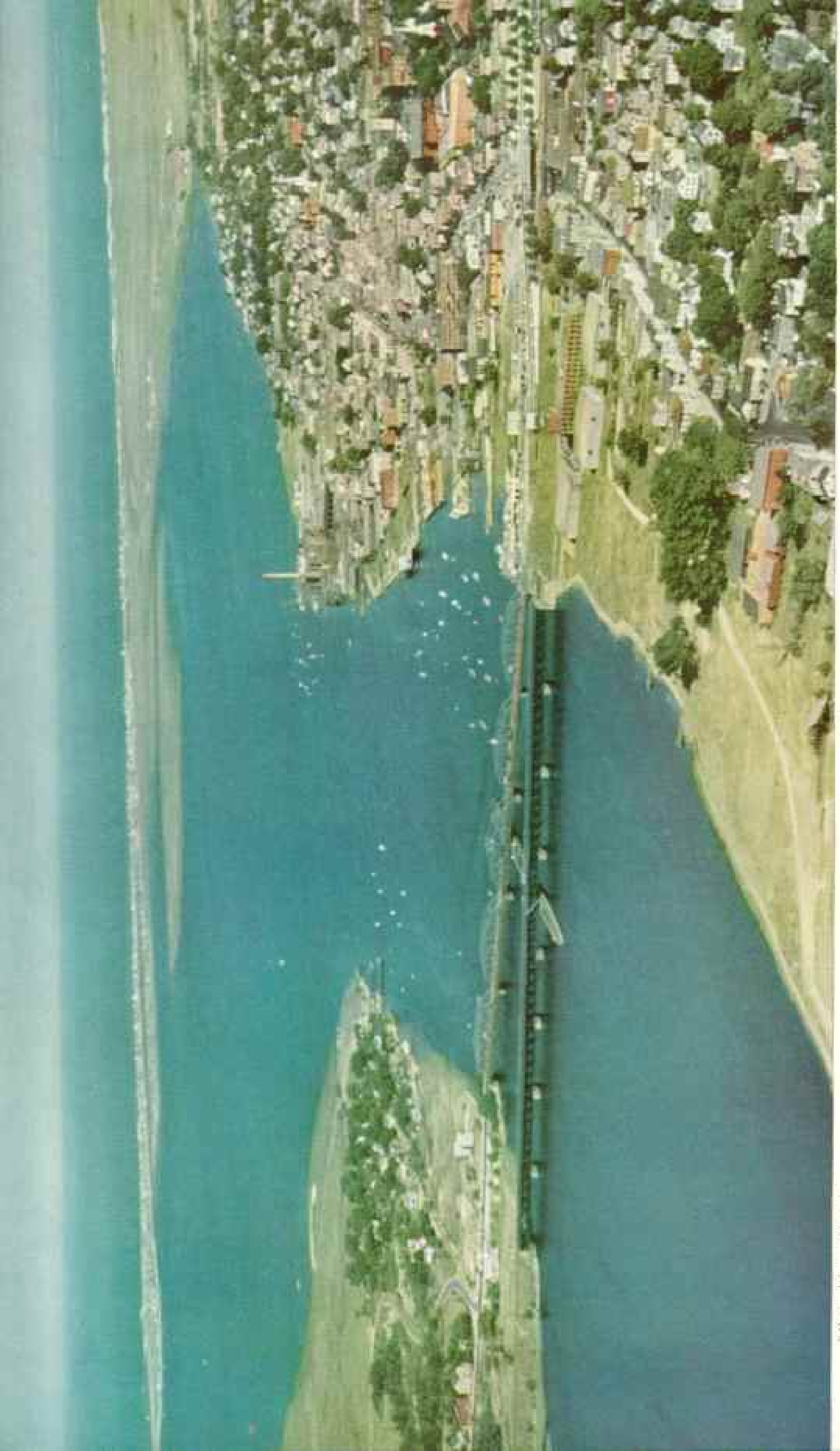
The NATIONAL GEOGRAPHIC MAGAZINE was one of the first periodicals to use a superior quality of coated paper, and such paper has contributed largely to the unsurpassed reproduction of its illustrations in color and black and white and to its typographical appearance.

In fact, the NATIONAL GEOGRAPHIC pioneered in the use of fine coated paper for every



Phillips Andover Academy's Elm-shaded Campus Has Welcomed 173 Classes of Freshmen

These boys, newly enrolled in the United States' oldest incorporated boarding school, wear blue caps as recognition signals. Their spire-crowned chapel stands in Andover, Massachusetts, a few miles from the Merrimack River.



© National Geographic Society

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Reproduction by John E. Pletcher

Where Whittier's River Meets the Sea. The Merrimack Ends Its 110-mile Race at Newburyport, Massachusetts

Long ago Newburyport's ships "whitened the sea." Today pleasure and fishing boats bob in a sand-clogged harbor. But miles of mansions built by 18th-century skippers and shippers make the city a show place. Boston and Maine Railroad and U. S. Highway 1 here leap the Merrimack side by side.

Putting Aside Textbooks and Blackboards, Concord, New Hampshire, Students Study Nature on the Merrimack's Bluffs

Trees, flowers, birds, rabbits, even rattlesnakes are laboratory subjects for these biology students. It's not all fun; later they will have to prepare papers. Their instructor, Charles G. Meloon, lectures to one group, while another dips for Indian relics. Concord appears on the left.

© National Geographic Society

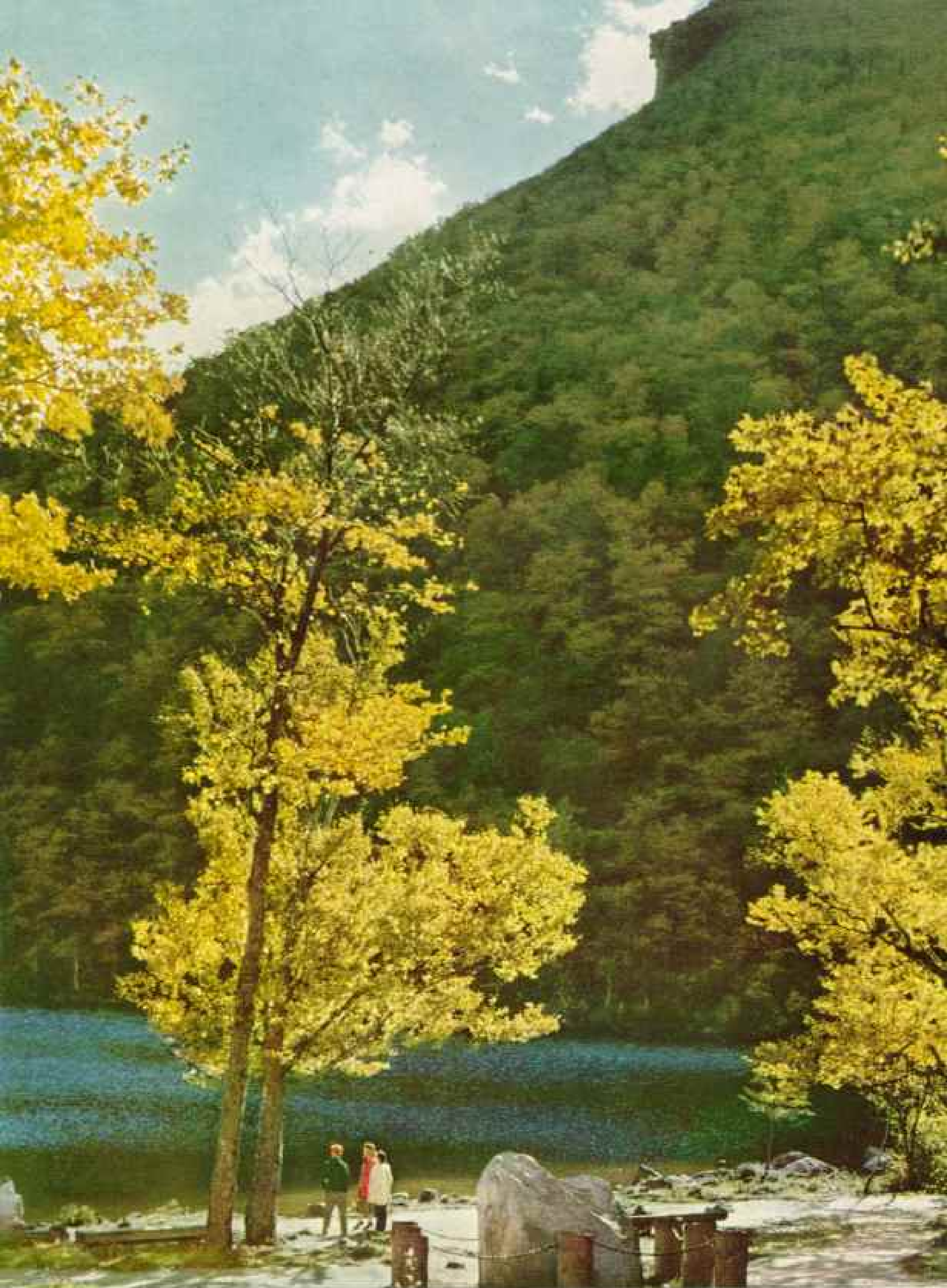
121

Modernity by B. Anthony Stewart





From Profile Lake, "the Old Man's Washbowl," Flows One of the Merrimack's Arms
In 1805 two surveyors, washing in the lake, looked up and discovered an enormous silhouette (upper right).



Stern and Silent, New Hampshire's Old Man of the Mountains Stares into Eternity.
Nature carved forehead, nose, lips, and chin from three layers of granite. Man holds the brow stone with anchor irons.

Happy Children Picnic at Daniel Webster's Boyhood Home

Webster Mansion Home stands not far from the point where the Winnepesaukee and the Pemigewasset, uniting, form the Merrimack. Settlers, observing the water power going to waste, started a sawmill in 1764. Other mills followed, making Franklin, New Hampshire, the industrial city it is today.

Franklin claims a renowned son, Daniel Webster (1782-1852). Actually, Webster was born in nearby Salisbury, but a change in town lines in 1828 awarded his birthplace to Franklin.

Daniel was still an infant when his farmer-parents took him to this frame house. Here the boy later demonstrated interest in the Federal Constitution, whose eloquent champion he became. A copy of the Constitution printed on a cotton handkerchief came his way, and New Hampshire folk say that he studied the document while resting on this shady lawn.

Webster served his country as Representative, Senator, and Secretary of State, but glory in Washington, D. C., did not turn his head from his humble beginnings beside the Merrimack. Between sessions of Congress he loved to return to his farm home.

Daniel Webster Home for Children maintains the mansion as an administration building. Here its wards eat baked beans and brown bread.

© National Geographic Society

Redeforino by B. Anthony Stewart
and John E. Fletcher



Give Father a Gas Range—He Won't Touch a Pan. Give Him an Outdoor Oven—No One Else Can Do the Cooking

This pine-shaded picnic ground faces New Hampshire's Lake Winnepesaukee, a Merrimack headwater. To red and white men alike the shore has ever been a popular camping spot. Motorboats in summer; portable shelters in winter dot water and ice. Salmon, trout, and bass entice fishermen.

© National Gas Range Society

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Illustrations by B. Anthony Stewart and John E. Puchner





Hiram Lowell & Sons for Seven Generations Has Built Boats Beside the Merrimack
Amesbury, Massachusetts, which used to launch tall-masted ships, here sees a Grand Banks fisherman's dory emerge from the loft. Stacked boats are specially built for Boy Scouts. The rowboat's sides are drilled for oarlocks.



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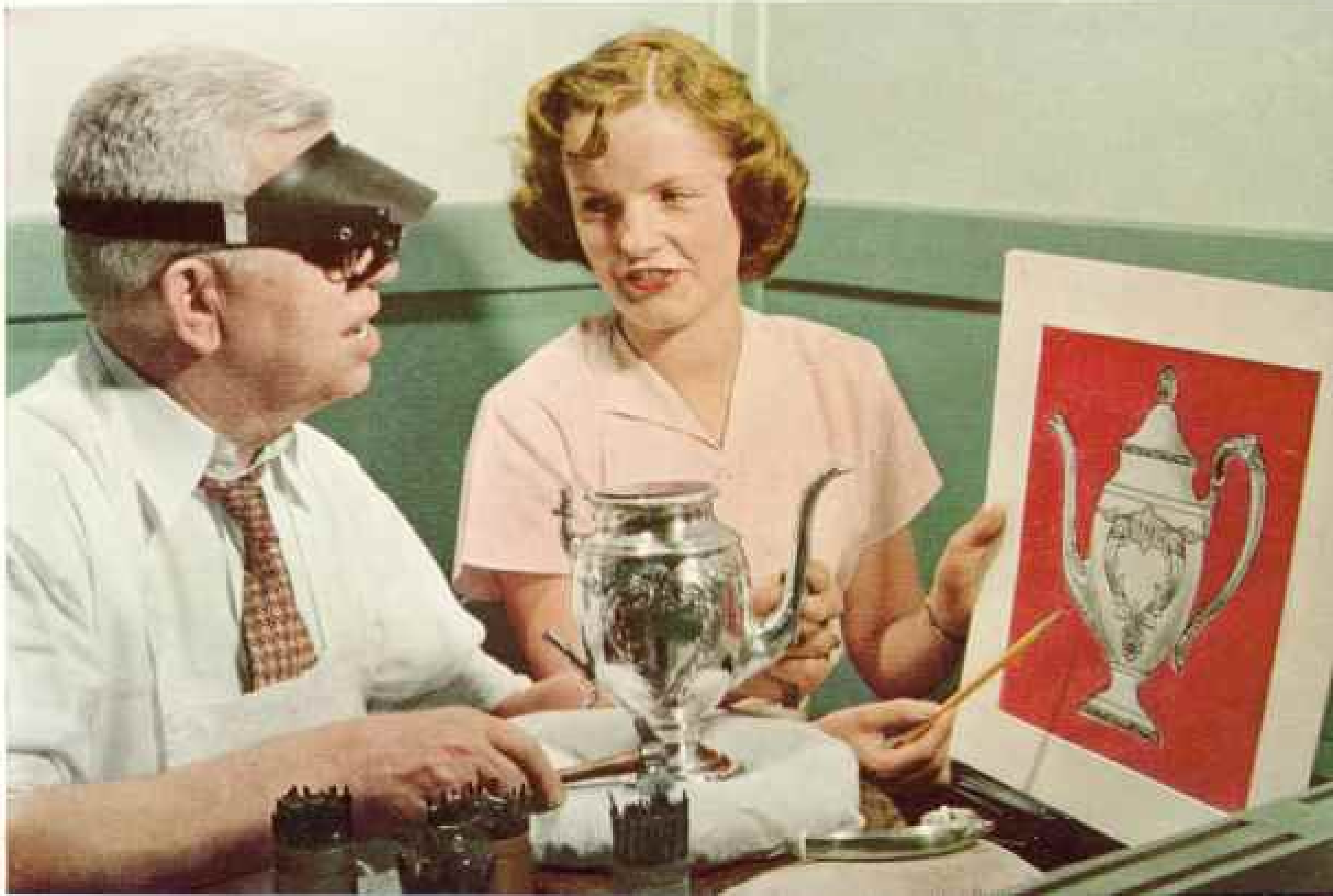
Kodachromes by D. Anthony Stewart and John E. Fletcher

↑ Merrimac Hat Corporation Manufactures 12 Million Hat Bodies a Year

This Amesbury plant shapes and cuts the oversized felt on oscillating double cones (center). It dyes them various colors (stacks, left). Finished hats come from another factory which buys Merrimac's foundations.

✧ A Silversmith's Pot, First of Its Kind, Is Not for Coffeemaking, but for Study

Towle Manufacturing Company's prototype of any design is made in its chasing (engraving) room at Newburyport. A bag of sand below and a mass of pitch within brace the pot against hammer and graving tool.





© National Geographic Society

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Contributions by E. Anthony Stewart and John E. Floteller

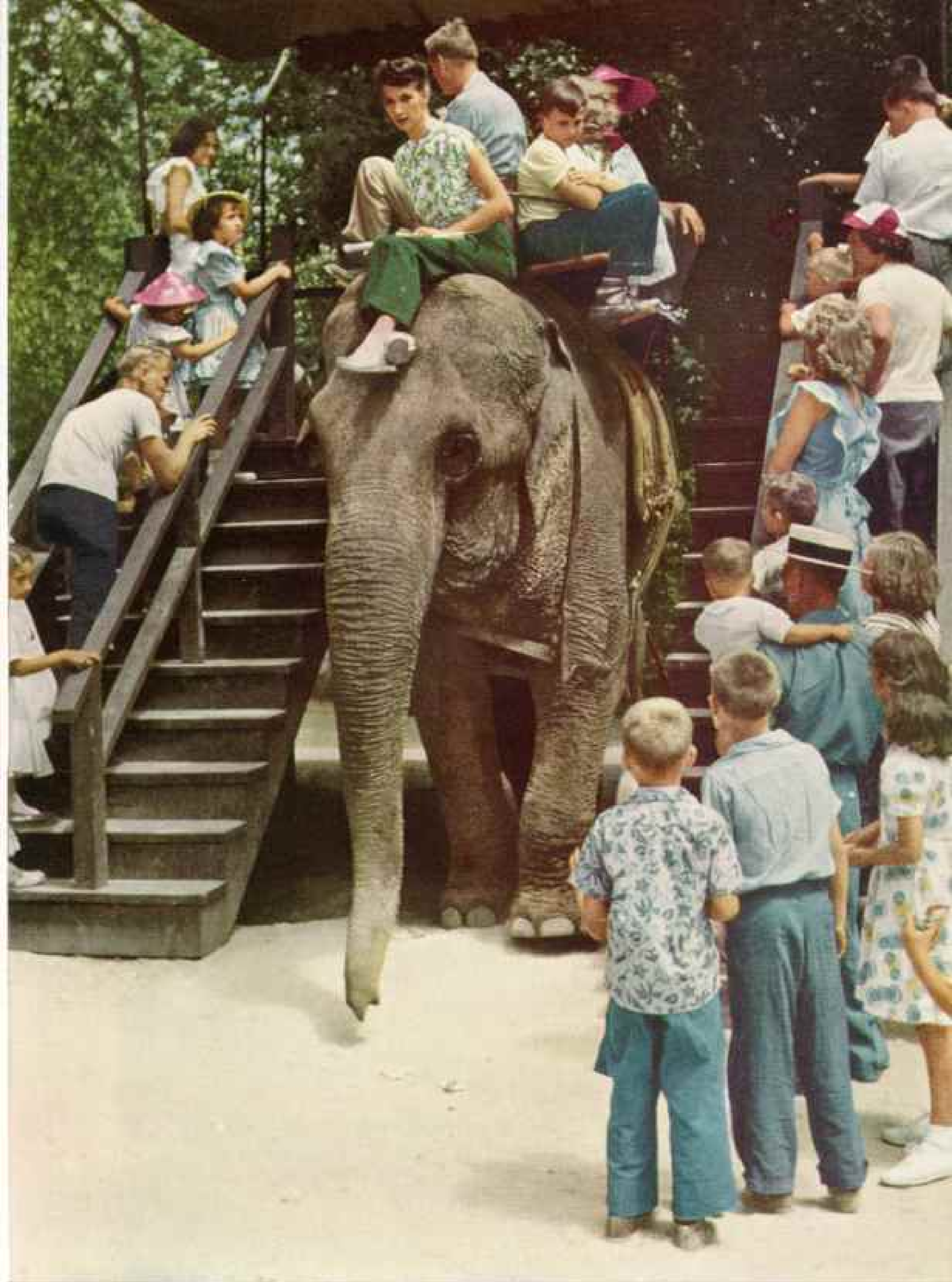
↑ **Furry Pilot, Using Hand-rope as Motor,
Flies Between Supporting Trees**

Jimmie entertains visitors at Benson's Wild Animal Farm, Hudson, New Hampshire. When a peanut is held aloft, he grabs the rope and scoots into reach. He likes the ride but hates flashbulbs, hiding his face when they go off.

↓ **"Can We Have Apple Pie Tonight, Mom,
Can We?"**

New England's sons claim no sun-kissed winters, but for apple-red and pumpkin-yellow autumns they yield to no section. Their ambition is to be home for Thanksgiving. Mrs. Mary Glines Fife and her son Peter live in Canterbury, New Hampshire.





Who Enjoys an Elephant Ride the Most—Gentle Beast, Scared Kids, or Venturesome Papas?

Betsy earns 25 cents a ride at Benson's Wild Animal Farm. Sometimes spectators, surprised by her soft-footed approach, scream and run. Zeaskolen Walch, her trainer, is the wife of the lion and tiger trainer.



© National Geographic Society

Thump!—Thump!—Thump! Go the Tossed Logs. This Very Page May Have Come from These Peeled Poplars

For 38 years the Champion-International Company, Lawrence, Massachusetts, has made the NATIONAL GEOGRAPHIC MAGAZINE'S fine coated paper (opposite page). All bark is removed to prevent dirt getting into the paper. A conveyor (left) carries logs to chipper room.



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Illustrations by Robert F. Blount

Beater Engineer Adds a Dash of Color . . . Cutters Sheet Paper

Champion-International's high-speed, ten-blade chipper chews the logs (opposite page) into chips. Then huge chemical digesters, breaking up the wood with steam and caustic, turn out a pulp of cellulose fibers. Mechanical beaters work the stock to its proper consistency and engineers pour in color to make the paper more uniform in appearance (left).

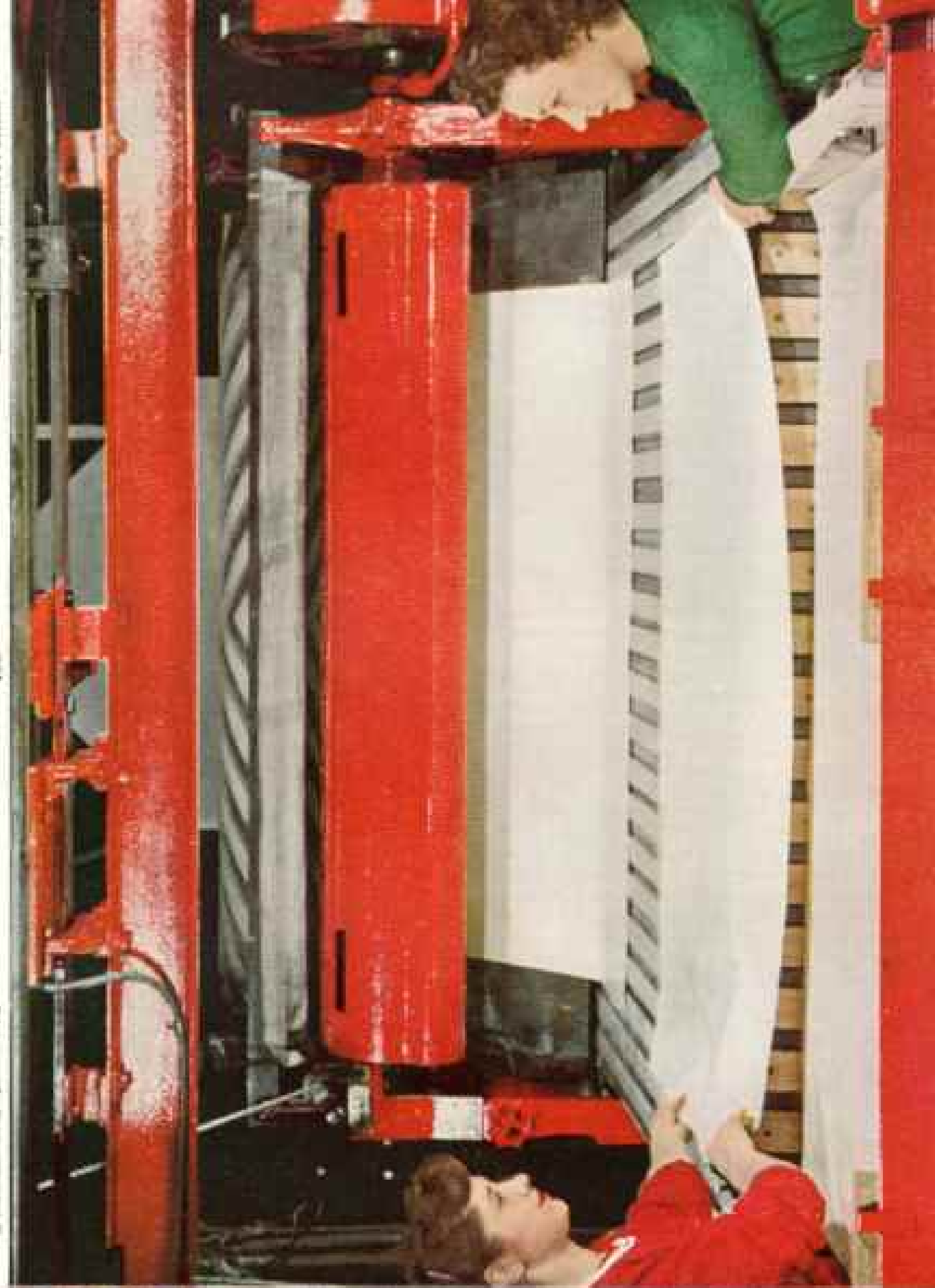
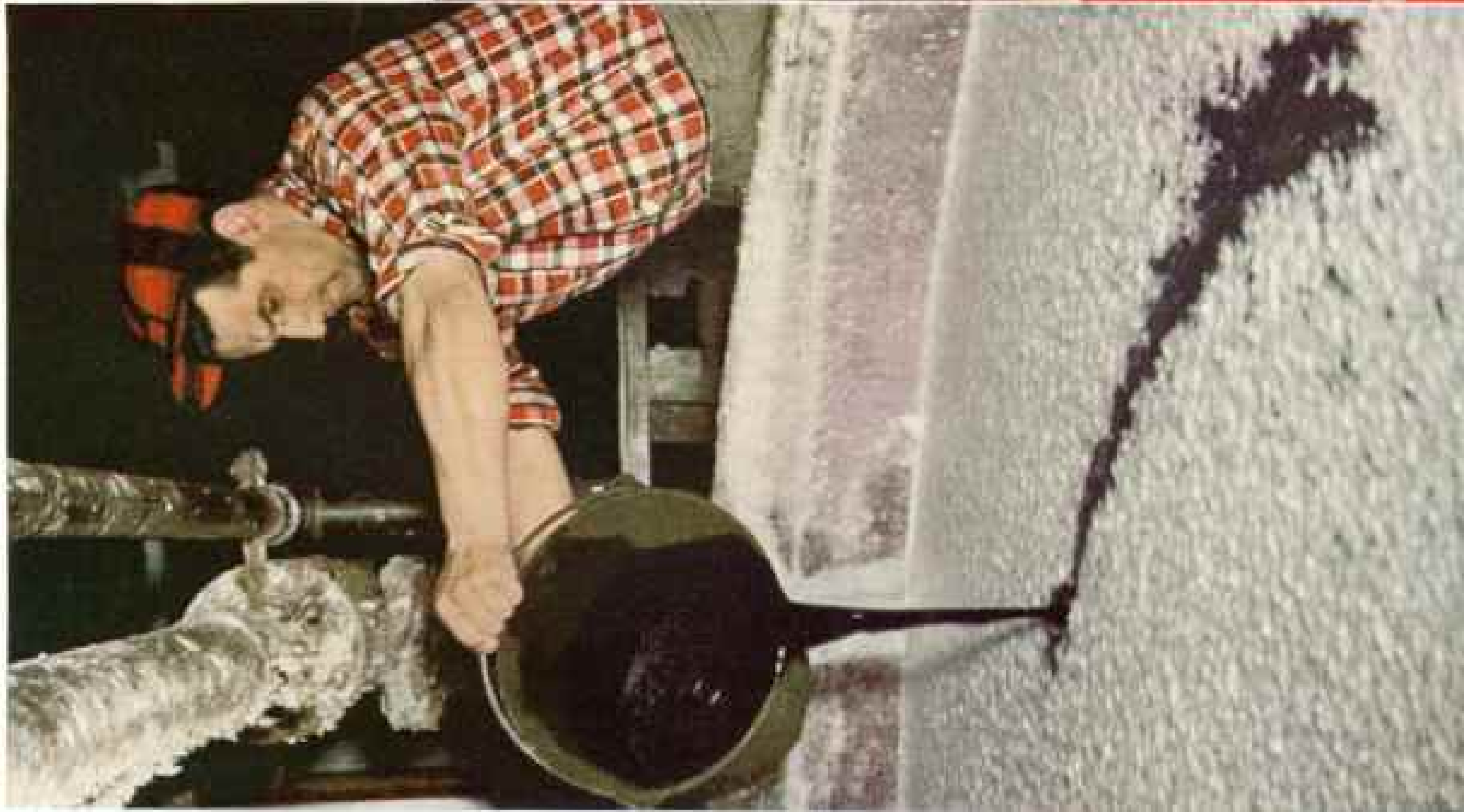
Next the stock is refined and pumped to the Fourdrinier, where it starts on its way to become a roll of paper at the end of the machine, some 300 feet from its source. Surplus water is extracted as the paper, in an endless sheet, threads its way over and under 48 steam-heated dryer drums.

The roving mill applies a surface and polishes it to a glossy finish. Sheets are then cut (below) and sent to the trimmers.

More than one-third of Champion-International's output is taken by the National Geographic Society for its *MAGAZINE*. Superior paper, together with quality engraving and printing, account for the fidelity of the *MAGAZINE*'s illustrations.

© National Geographic Society

Illustrations by Robert F. Brown





Red and Ivory Are the Birches in Franconia Notch. Autumn's Air Is Winy.



© National Geographic Society

Illustration by R. Anthony Barnett

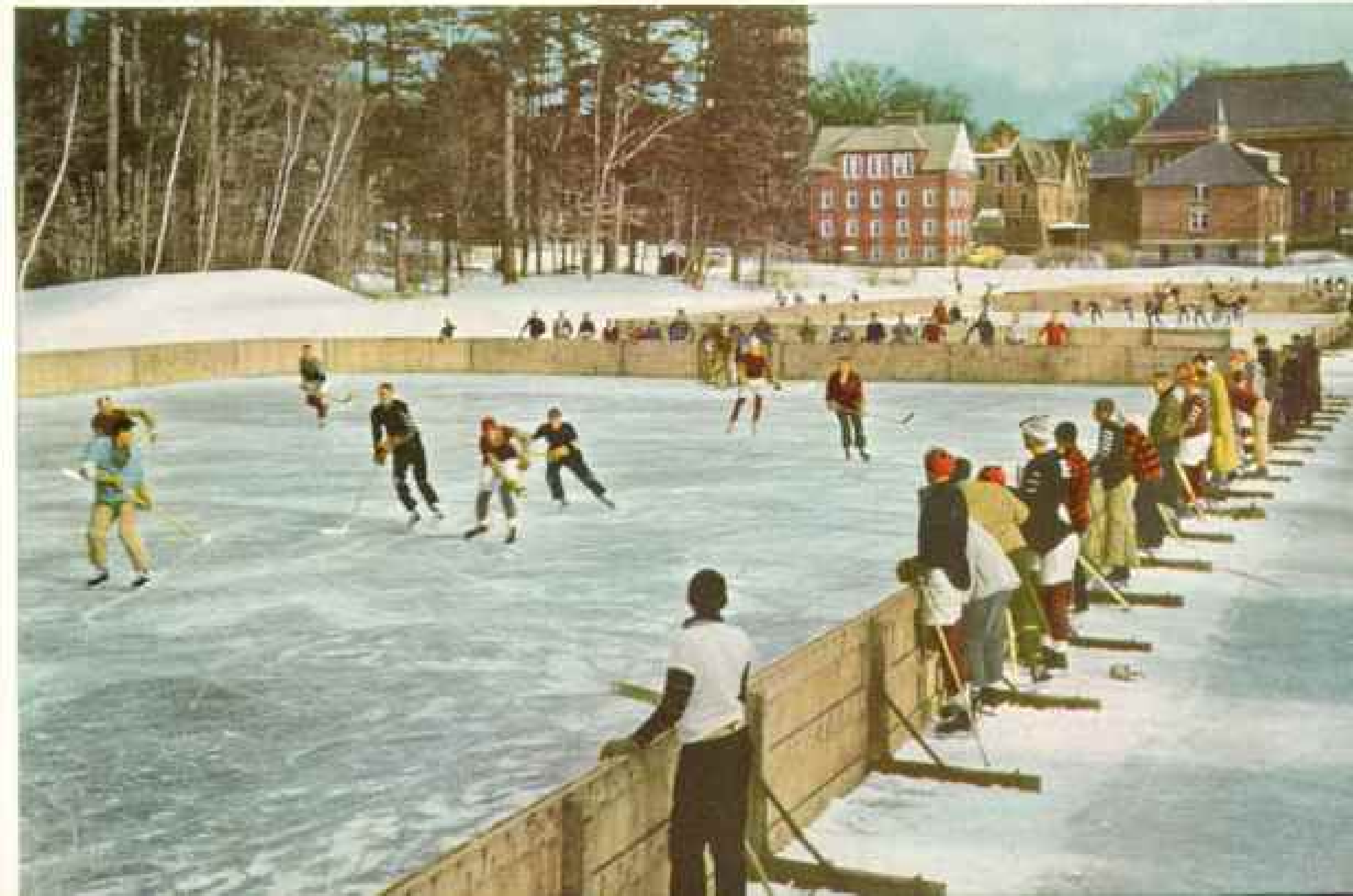
↑ **Molly Stark Cannon, Four Times a Prize in Three Wars, Gets an Overhaul**

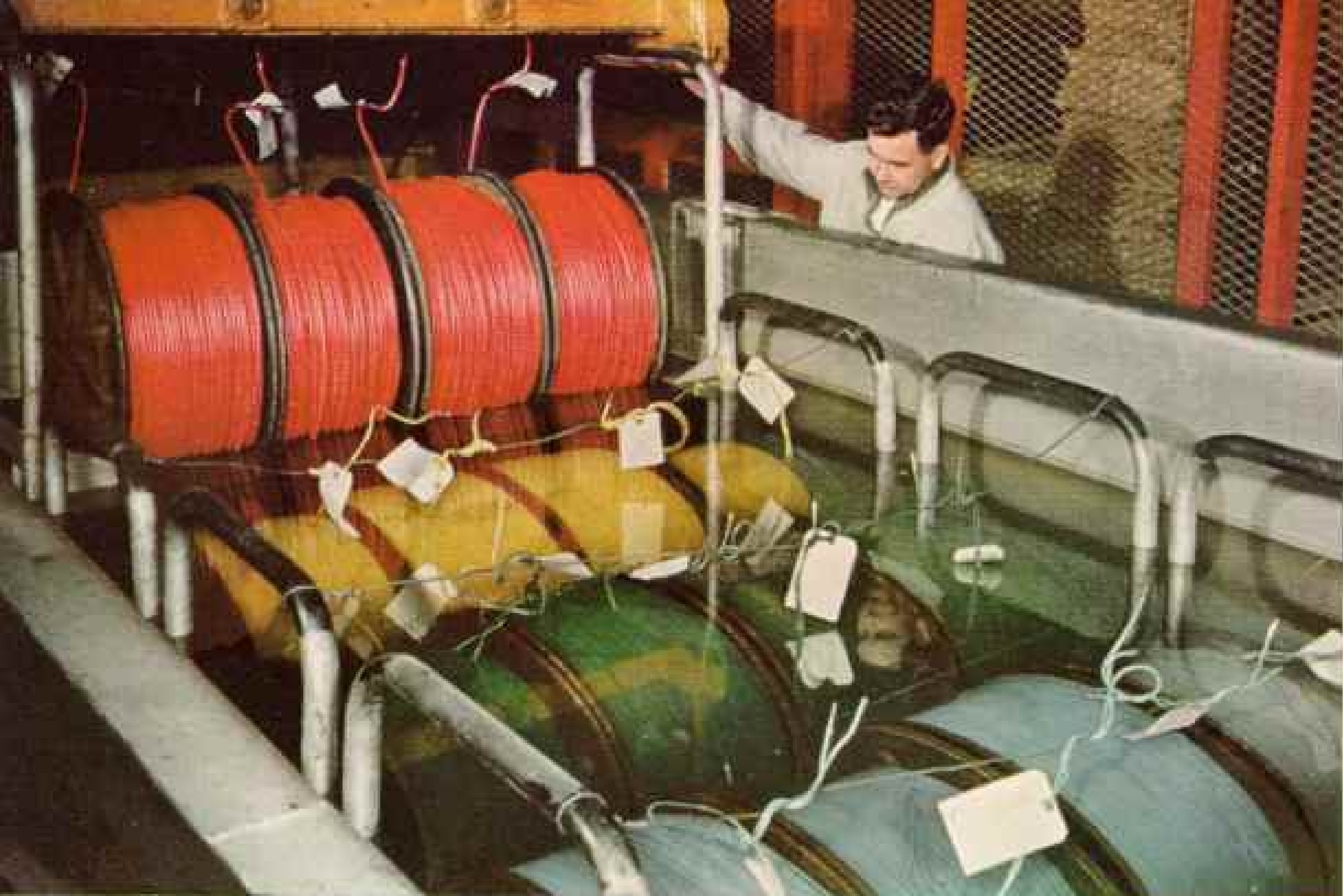
Frenchmen cast the brass gun in 1743. British took it from them at Quebec, lost it to Americans at Bennington, regained it at Detroit, and yielded it again at Fort George. Now New Hampshire's New Boston Artillery Company safeguards the relic.

↘ **The Harder the Winter the Better St. Paul's School Players Like It**

This Concord, New Hampshire, school opened in 1856 with a class of three boys. Today it limits attendance to 440; some candidates are nominated at birth. Twenty-five club teams train hockey players on the Pond. The best make the school team.

Illustration by Robert F. Dixon





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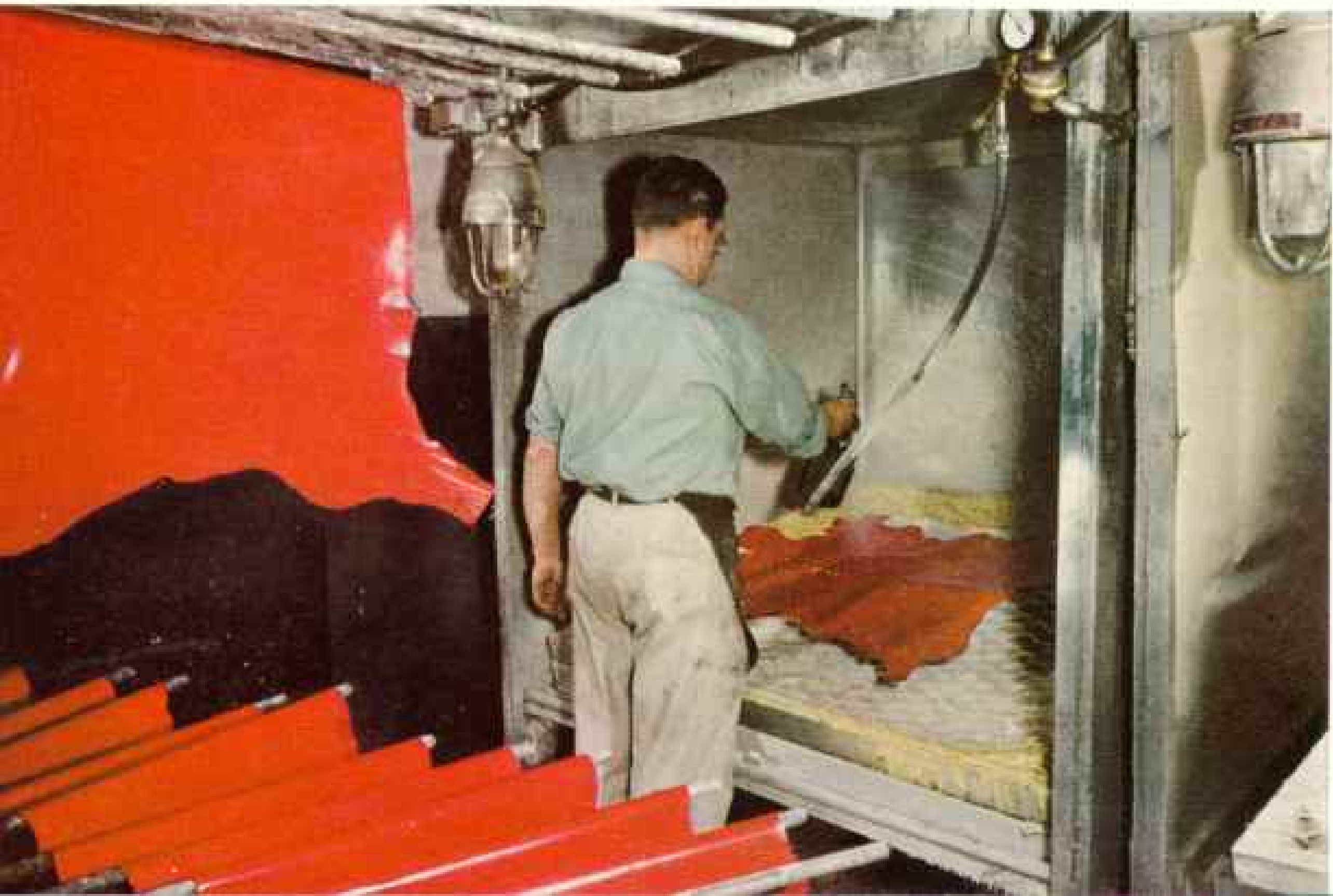
Rephotomas by Robert F. Stone

⤴ **Wire Gets the Shock Treatment;
Insulation Is Tested Under Water**

As the operator dips each reel into the tank, he turns on a 1,500-volt current. Any fault in the insulation is automatically revealed by the short circuit's bubbly hiss. In this manner General Electric Company tests wire at its Lowell plant.

⤵ **For a Pair of Flashing Red Shoes,
Kidskin Takes On a Deep Dye**

L. H. Hamel Leather Corporation, Haverhill, Massachusetts, carries on a pioneer industry. Haverhill tanners bought pelts from Indians as long ago as 1643. By 1951 the city's shoe factories had grown to 45. Today Lynn and Brockton dispute its shoe supremacy.



page—text, illustrations, and advertisements.

The National Geographic Society has bought its paper from the Champion-International Company since 1913.

Across the river in near-by North Andover I called on two granddaughters of Capt. Nathaniel Stevens, who started a woolen mill there in 1813. In fact, fourth and fifth generation descendants of Captain Nat now run the successor company, J. P. Stevens & Company, Inc., which operates more than 30 woolen, worsted, cotton, and rayon mills in different parts of the country and is one of the largest textile manufacturing companies in the world.

Between 1800 and 1815 many woolen mills were started as family enterprises. Each depression took its toll; owners did not have sons to follow them, or the sons went into other occupations. By 1918 only three families, one of them the Stevens, carried on mills their forebears had started. Since then the Stevens have bought out the other two family interests.

Andover, which adjoins North Andover, is the seat of one of the two Phillips academies, which have played such a notable role in American life, the other being at Exeter, New Hampshire, 10 miles north of the Merrimack.

Phillips Academies Founded During Revolution

Both schools were founded during the American Revolution by the wealthy and patriotic Phillips family. Andover, slightly the older of the two, was founded by Samuel Phillips and his brother John, largely at the instance of Samuel Phillips, Jr., then only 26 years old and one of the few original minds in American education. John Phillips founded Exeter.

The two schools have a few slight differences and many striking similarities. Andover has a headmaster, Exeter a principal. Andover "hill" tends toward a dignified, elegant beauty (page 121); Exeter's beauty partakes more of the quiet, homey simplicity of a small, elm-shaded New England town.

But the buildings of both schools are finer and the campuses more extensive than those of many colleges and universities. Both have had great benefactors and each has a large endowment, low cost of tuition, many scholarships, large alumni body, large student body, and each draws from a broad section of the population, socially and geographically.

Both also have had many famous graduates: Oliver Wendell Holmes and Samuel F. B. Morse went to Andover; Daniel Webster's father took him to Exeter on horseback. Each

prepares for substantially the same universities, Yale and Harvard.

Used now as the Andover dean's house is the long-time home of Harriet Beecher Stowe, author of *Uncle Tom's Cabin*. On Main Street is the house, also the property of the Academy, in which a theological student, Samuel F. Smith, wrote *America*.

Young Smith earned his way by translating poems and songs. A musician sent him a patriotic song, accompanied by the music. While humming over the music Smith decided to write a patriotic song of his own, and dashed off the verses of *America*, virtually as they are now, in less than half an hour.

Seven miles from Lawrence is another industrial river city, Haverhill, shoe manufacturing center for 150 years, and still a center for women's shoes, especially the inexpensive, novelty type—a highly competitive, fluctuating business (opposite).

This is a very old settlement. The original Indian deed of 1642 may be seen in the archives of the Haverhill Historical Society; also the Haverhill petition of 1842, asking for the dissolution of the Union, this having been a short-lived attempt to meet Southern secessionists on their own ground.

R. H. Macy, who founded the great New York department store, began his business in Haverhill in 1851, and at that early date advertised bargains.

For more than half a century in early days Haverhill settlers tilled their fields with muskets always handy and a wary eye for attacking Indians; there was even talk of abandoning the settlement.

On March 15, 1697, Thomas Duston was working on his farm when hostile Indians attacked. His wife, Hannah, had given birth to a child only a few days before and lay in bed. He tried to rescue her, but the Indians got between him and the house. Exchanging fire with them, he shepherded his other seven children, two to seventeen years old, to the nearest garrison.

The Indians went off with Hannah, her nurse, Mary Neff, and the infant, whom, however, they quickly killed. Hannah and Mary were taken to a small island in the Merrimack River, a few miles north of Concord, where there were 12 Indians and a young captive, 14-year-old Samuel Leonardson, who had learned to speak the Indian dialect. Hannah instructed him to find out from the Indians the easiest way to kill and scalp a person.

One night the three captives, led by Hannah, killed and scalped 10 of the Indians, escaped, and eventually reached Haverhill. Considered by many an improbable tale, the story has



A New Hampshire Adam Offers an Apple to an Eve

New Englanders say early frosts give flavor and firmness to their McIntosh and Baldwin apples. Their apple cider is famous. Farmers sometimes make applejack by freezing jugs of hard cider; the unfrozen core becomes the potent liquor. This boy's father grows McIntoshes near Andover.

much evidence to corroborate it. Thomas promptly took the two women and the boy to Boston to claim a reward. Within a few days Hannah told her story to the Rev. Cotton Mather, who at once wrote it down and published it in one of his books.

Still better evidence is the fact that the General Court almost at once granted 25 pounds to Hannah and 12 pounds 10 shillings each to Mary and the boy, this fact appearing in the archives of Massachusetts.

First American Monument to a Woman

What is thought to be the first monument to the fame of a woman erected in this country is the one to Hannah in the park at Haverhill (page 119); another commemorates her in the little island in the river.

Interesting relics of Hannah Duston may be seen in the Historical Society in Haverhill, where the Duston-Dustin Family Association has held more than 40 annual meetings.

After the Merrimack turns east at Lowell the boundary line between Massachusetts and New Hampshire is three miles north of the river, and in this narrow strip the Quaker poet John Greenleaf Whittier lived practically all his life.

His birthplace is an ancient farmhouse on the outskirts of Haverhill, where he went to school and later edited a newspaper. Thereafter he bought a house in Amesbury, 9 miles away, where he did most of his important literary work and retained his legal residence for 56 years.

These two houses should be visited by anyone interested in the background of American history or literature. Although close to a main highway, the birthplace and its farm surroundings are as quiet and peaceful as when Whittier was born there in 1807. Here, too, are the scenes of such poems as *Snow-Bound* and the *Barefoot Boy*.

The Amesbury house is plain and simple,



They Made the Fair, but Not the Prize Winners' List

These youths drove to Deerfield, New Hampshire, from Candia, a near-by village. They watch prizes being awarded to owners of the most original conveyances and costumes.

looking much as it did during the poet's lifetime. Whittier bought it because of its nearness to a severe, unadorned Friends' meeting-house. As I sat in the meetinghouse, there came to me insistently two lines of the poet's famous hymn:

Drop Thy still dews of quietness,
Til all our strivings cease.

As a matter of fact, it is only his semiretirement, especially after the Civil War, that gives us the picture of the "good, gray poet," an old man with a long, white beard. In his younger years Whittier was the supremely restless, tireless, and effective antislavery editor and agitator. He exerted an influence upon American history of which it is difficult to find a comparable example among poets.

In colonial days such superb pine and oak forests lined the Merrimack that "masting" became a major industry. The great logs were floated down the river. The British Crown marked the finer pines for the use of its navy, to the intense annoyance of the colonists, and

the so-called "pine tree laws" were a contributing cause of the Revolution.

So valuable were some of the logs for masts that the loss of a single one could almost ruin its owner. At any rate Haverhill, at the head of navigation, and Amesbury, and Newburyport, near the mouth of the river, constituted in and after Revolutionary times one of New England's chief shipbuilding centers. At least 1,115 vessels were built in these three communities between 1793 and 1815.

Birthplace of Frigate *Alliance*

The most famous ship built in the area was the Continental frigate, *Alliance*, which took part in the last sea fight of the Revolution. A few hand-built small boats are still made in shops in the vicinity (page 128).

At one time great numbers of carriages, noted for style and finish, were built in Amesbury and near-by Merrimac. Automobile bodies were made for a short time, but that industry came to an end in 1929,

One of Amesbury's old industries has continued and grown. Here is the headquarters of the Merrimac Hat Corporation, whose plants in Amesbury and elsewhere turn out 12 million hat bodies and trimmed hats in a single year (page 129).

Late in summer I rode along the unfrequented River and Pleasant Valley Roads between Merrimacport and Amesbury, both shores of the river ablaze with purple loosestrife and goldenrod.

The river is, beyond question, seriously polluted by chemicals from hundreds of mills, but the banks, even near the great industrial cities, are singularly green and unspoiled. Whittier, who looked askance upon his valley's rapid industrialization, would be happy to know that this much, at least, is saved.

Newburyport, three miles from the mouth of the Merrimack, is long and narrow and runs parallel to the river. Those who lived in the northwestern portion of this historic strip long were known as "upalongers" and those who lived in the other direction as "downalongers."

When it was separated from ancient Newbury in 1764, Newburyport was the smallest town in area in Massachusetts; indeed the jocose saying went that there was no place in the city "from which a strong runner cannot reach the river in three minutes."

Along the entire length of High Street, which runs several miles from one end of the city to the other, is perhaps the largest and most notable collection of square, well-proportioned, three-story 18th-century houses to be found anywhere in the country (page 122).

Similar houses are to be found elsewhere, but nowhere else are they more beautifully on parade, with their deep lawns and many trees. At any rate, the city maintains an unmistakable flavor of long-gone maritime greatness, perhaps because much of it is so well preserved that memories of the "wealth, taste, and elegance" noted by famous early visitors still linger.

Famous Sons of Newburyport

Boston drew several of its great families, including the Lowells, from Newburyport, and numerous famous men were born, lived, or died there.

Among these were William Lloyd Garrison, the abolitionist; Maj. Gen. A. W. Greely, distinguished Arctic explorer, one of the founders of the National Geographic Society, and for 47 years a member of its Board of Trustees; and Dr. Edwin A. Grosvenor, historian, linguist, archeologist, author, and poet, and father of Dr. Gilbert Grosvenor,

President of the National Geographic Society.

In a vault under the First Presbyterian Church are the remains of George Whitefield, who ranked close to John Wesley as a proponent of Methodism. He preached 18,000 sermons, and the founding of such colleges as Princeton, Dartmouth, Brown, and Rutgers was partly due to the "Great Awakening" he inspired.

Age has its place in Newburyport. I called on Henry Bailey Little, then 97 years old and for 50 years president of the Newburyport Institution for Savings. Asked if it were true that he goes to the bank every day, he replied in rather a huff, "I can only come five days a week because the bank is closed on Saturday, a great mistake."

Silver Company Descended from Blacksmith

The little old city has one very large and active industry near the river, the Towle Manufacturing Company, with 900 employees, engaged in making sterling silver (page 129). This business has increased several fold in the last 10 years as larger and larger segments of the feminine population buy fine silver, sterling being as nearly solid silver as will stand wear and tear.

There are some 80 processes in the long operation of making a knife, fork, or spoon. The first is to cut blanks from great slabs of silver, and the last is naturally the final polishing.

The Towle Manufacturing Company is the direct successor of one William Moulton, who in 1690 set up as a black-and-white smith in Newbury, which means that in addition to the usual blacksmith work he fashioned metals, including silver.

For more than a century the Merrimack has been the very symbol of a prosaic, hard-working river, the drudge of industry. Yet much of its course, from mountain to sea, is marked by charm and actual beauty, now even as in the days of the early settlers.

Passing Newburyport, the river broadens out, and before it flows between two breakwaters into the sea, it is flanked by far-flung salt marshes, on the north and south shores alike.

Whittier spoke of seeing "The far, low coastline stretch away to where our river meets the sea," and as the last few months of his long life neared their end he gazed more and more upon the serene beauty of these great salt marshes.

For additional articles on New Hampshire and Massachusetts, see "NATIONAL GEOGRAPHIC MAGAZINE Cumulative Index—1899-1950."

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To carry out the purposes for which it was founded sixty-three 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 The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1929, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 301 B. C. (Spinden Correlation). It antedates by 100 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,305 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

A notable undertaking in the history of astronomy was initiated in 1949 by The Society in cooperation with the Palomar Observatory of the California Institute of Technology. This project will require four years to photograph the vast reaches of space, and will provide the first sky atlas for observatories all over the world.

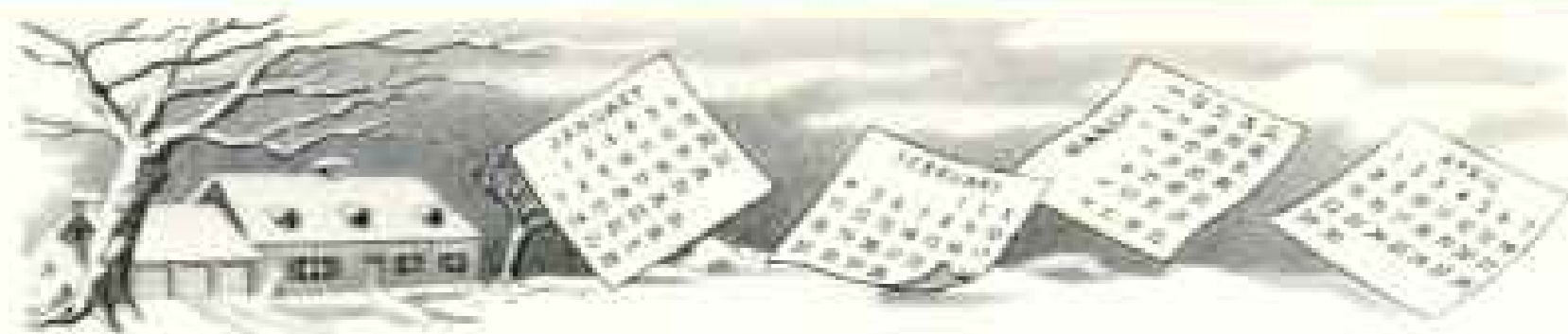
In 1948 The Society sent out seven expeditions to study the eclipse of the sun along a 5,120-mile arc from Burma to the Aleutians. The fruitful results helped link geodetic surveys of North America and Asia.

The Society granted \$25,000, and in addition \$75,000 was contributed by individual members, to help preserve for the American people the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California.

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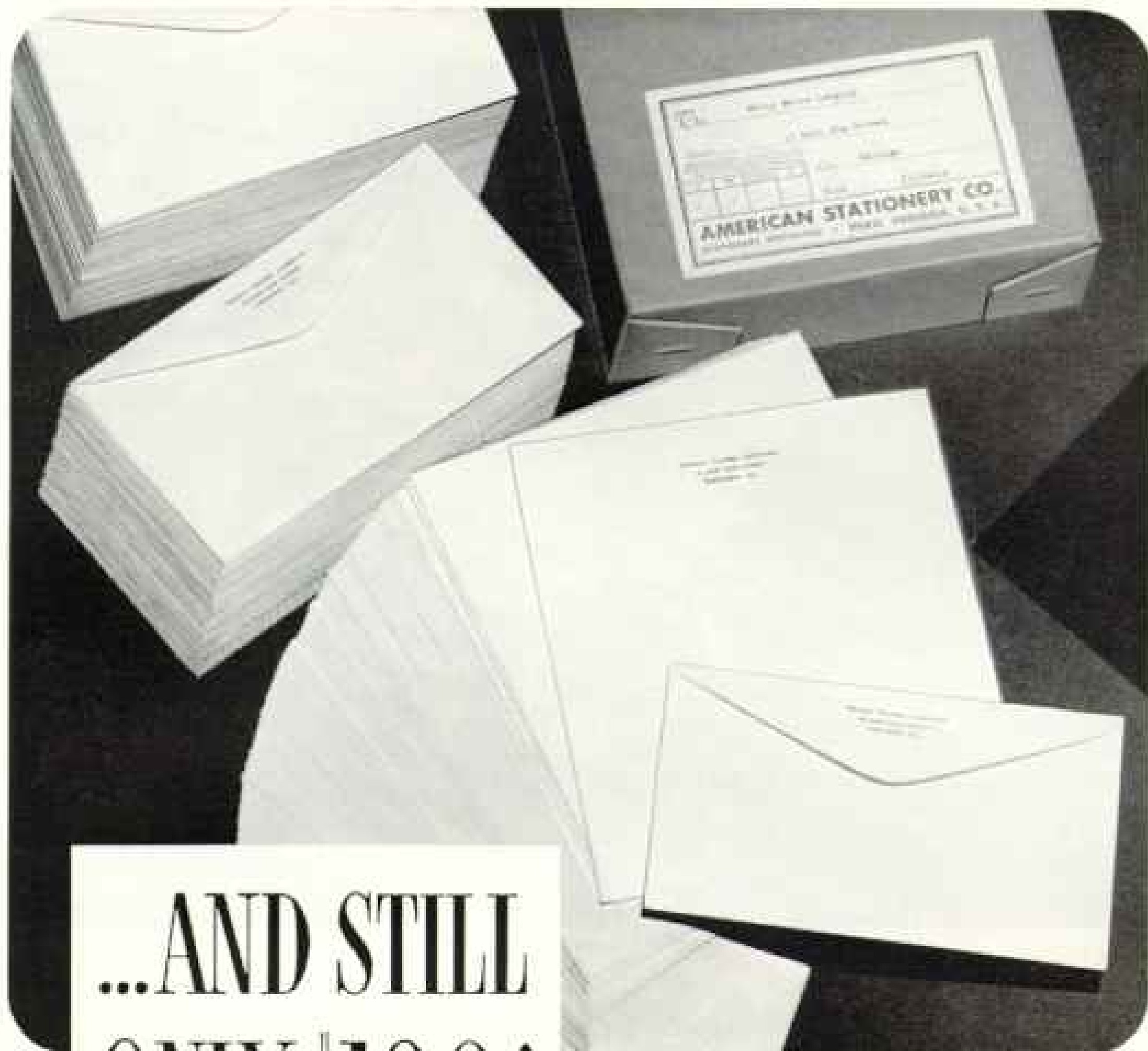
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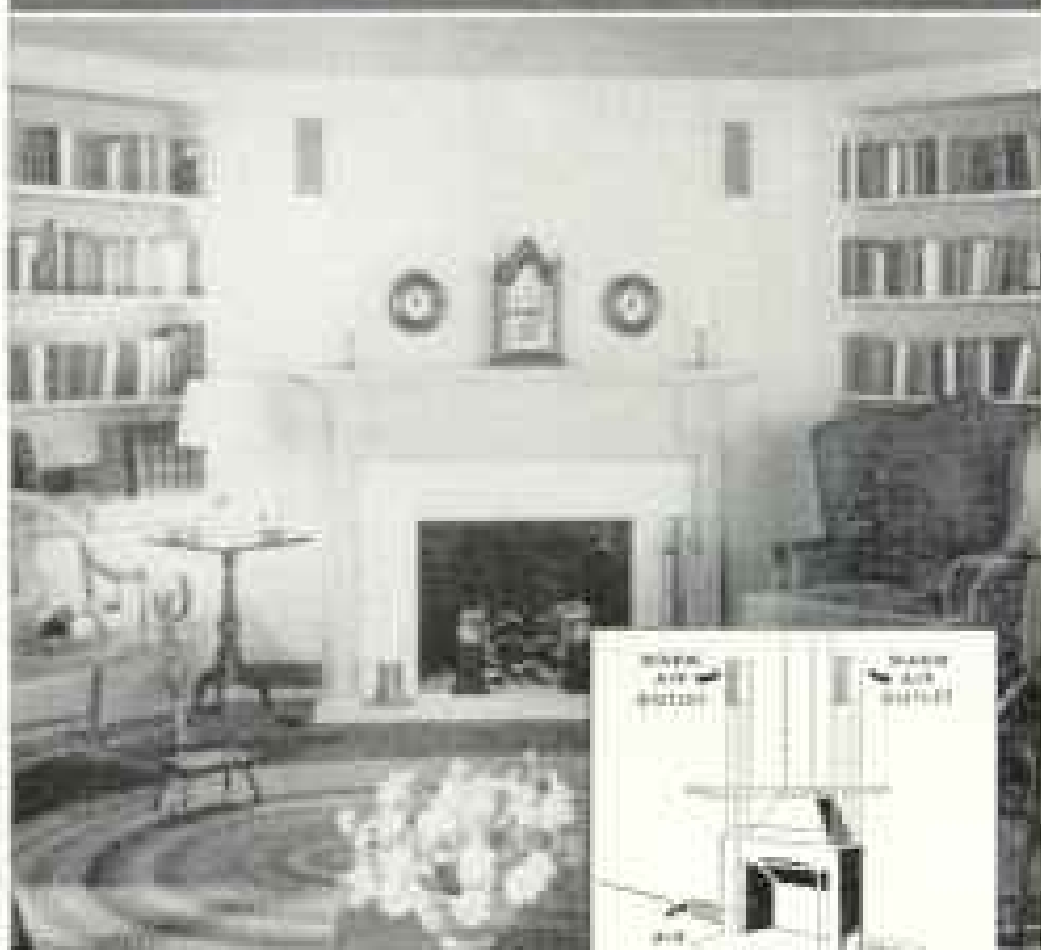
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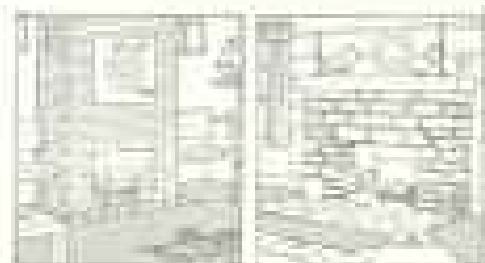
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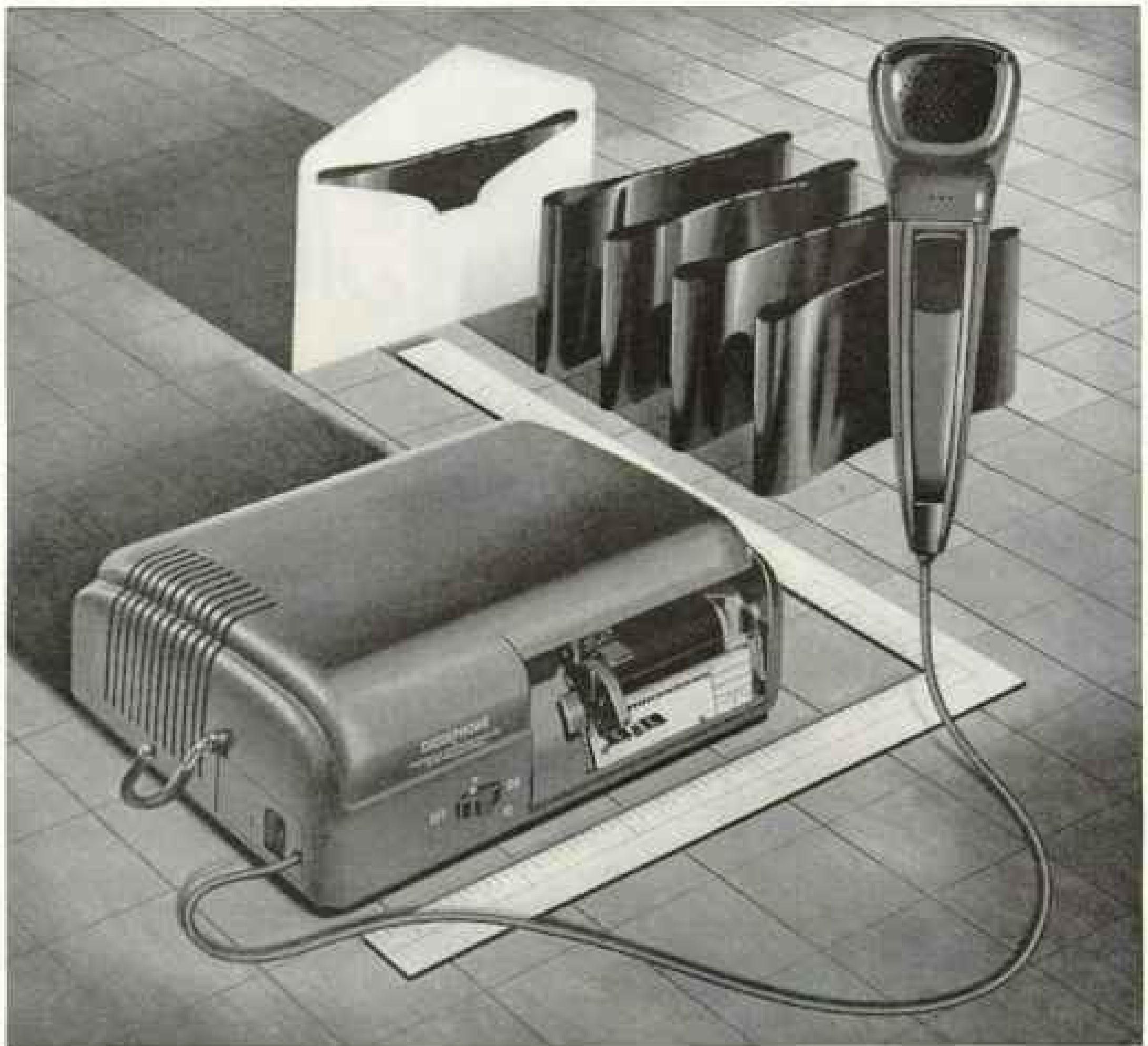
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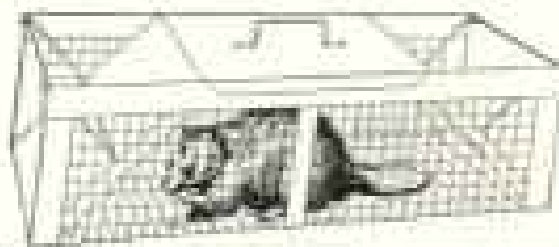
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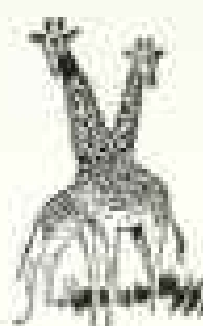
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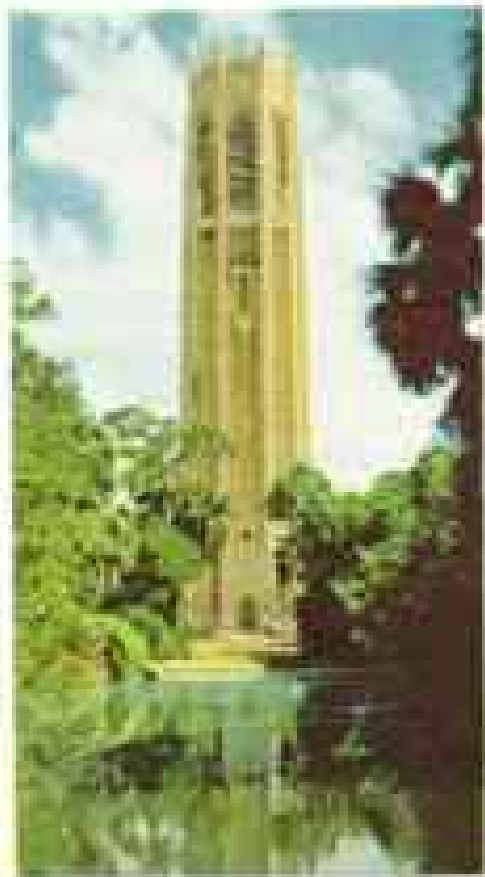
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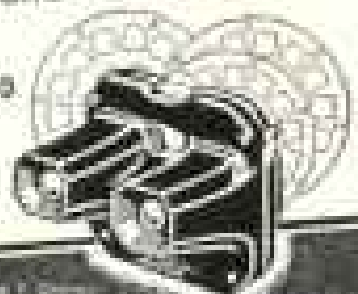


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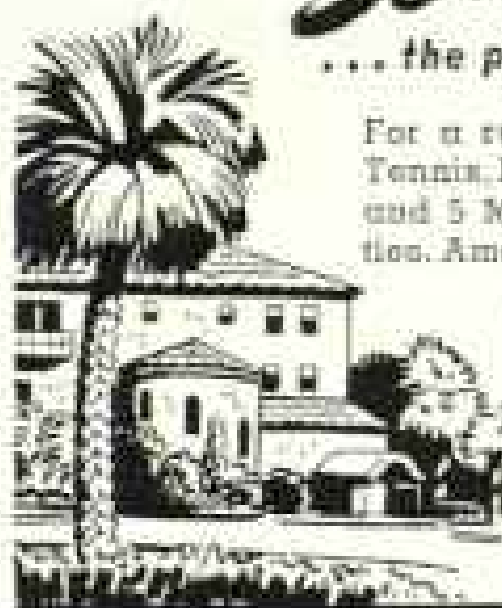


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Pneumonia, especially, is likely to strike when a person is tired or run-down because of a persistent cold. In fact, it has been estimated that colds are the starting point for nine out of ten cases of pneumonia.

Although the death rate for pneumonia has been greatly reduced, this disease—and its ally, influenza—still claim about 50,000 lives each year in our country. Authorities say that the toll from pneumonia could be reduced still further if everyone would call the doctor immediately if any of these symptoms appear:

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Always take care of a cold promptly . . . if fever develops, call a doctor at once.

Keep physically fit, particularly during the winter months.

Get sufficient rest and sleep and eat a balanced daily diet.

Dress warmly when going out-of-doors, especially during damp, inclement weather.

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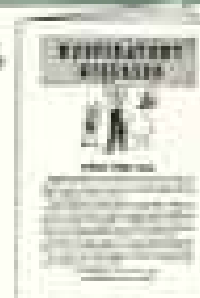
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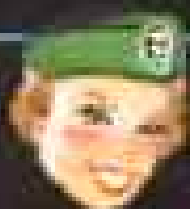
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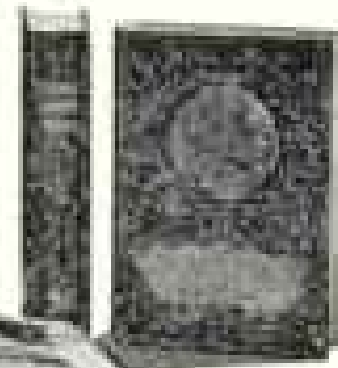


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