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NATIONAL GEOGRAPHIC SOCIETY

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-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, 1939, 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, 291 B. C. (Spinden Correlation). It antedates by 200 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 72,395 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.

The National Geographic Society-U. S. Navy Expedition camped on desert Canton Island in mid-Pacific and successfully photographed and observed the solar eclipse of 1937. The Society has taken part in many projects to increase knowledge of the sun.

The Society cooperated with Dr. William Beebe in deep-sea explorations off Bermuda, during which a world record depth of 3,028 feet was attained.

The Society granted $25,000, and in addition $75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.

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THE NATIONAL GEOGRAPHIC MAGAZINE

Bombs over Bible Lands

BY FREDERICK SIMPICH AND W. ROBERT MOORE

EVER since the Bible story of how God banished Adam and Eve from the land we now call Iraq—reputed site of Eden—all the Near East has loomed large in tradition and history.

From present-day Damascus, Jerusalem, and Baghdad, as in ancient Tyre, Nineveh, and Babylon, comes news of fighting—fighting now with tanks and airplanes where once it was camels, catapults, and Roman chariots.

Like the Rhine Valley, the Near East, stretching from the Mediterranean to the Persian Gulf, seems one of those strategic map spots where something always happens that shakes the world (map, pages 144-5).*

This land saw the Flood; it saw Moses hand down the Ten Commandments. It saw the handwriting on the wall that foretold the doom of Babylon; it saw the Crucifixion, the Resurrection, and the Ascension into Heaven.

Across this old land swept the armies of Alexander, Augustus Caesar, Cyrus, Xenophon, and Xerxes, the Saracens and the Crusaders. Into it, in the First World War, came the armies of England, to wrest it from the Turks and Germans.

It took the Children of Israel 40 years to walk from the lower Nile Valley up to the Land of Canaan, now modern Palestine; today British planes, coming from Egypt to bomb Syria, make it in one or two hours!

In Abraham's time the march across Babylonia took weeks. In May this year the British flew big cannon north from Basra to Lake Habbaniya near Baghdad (page 171). There they beat off attacking Iraqis, picked up their women and children from that besieged air base, and flew them back to safety on the Persian Gulf coast—all in a few hours!

Storm centers in this Near East now are Syria, Palestine, and Iraq.

These three new States were set up in 1919 from the Turkish Empire, of which they had been a part for 400 years.

Look at the map, and you see that the first two border on the Mediterranean; Syria lies north of Palestine and south of Turkey. Iraq, which was known as Mesopotamia till after the First World War, lies east of Syria and adjacent to Iran (Persia).

All these at heart are Mohammedan Arab countries, even if 425,000 Jews do live in Palestine, which, on paper at least, is their new Zion (page 149).

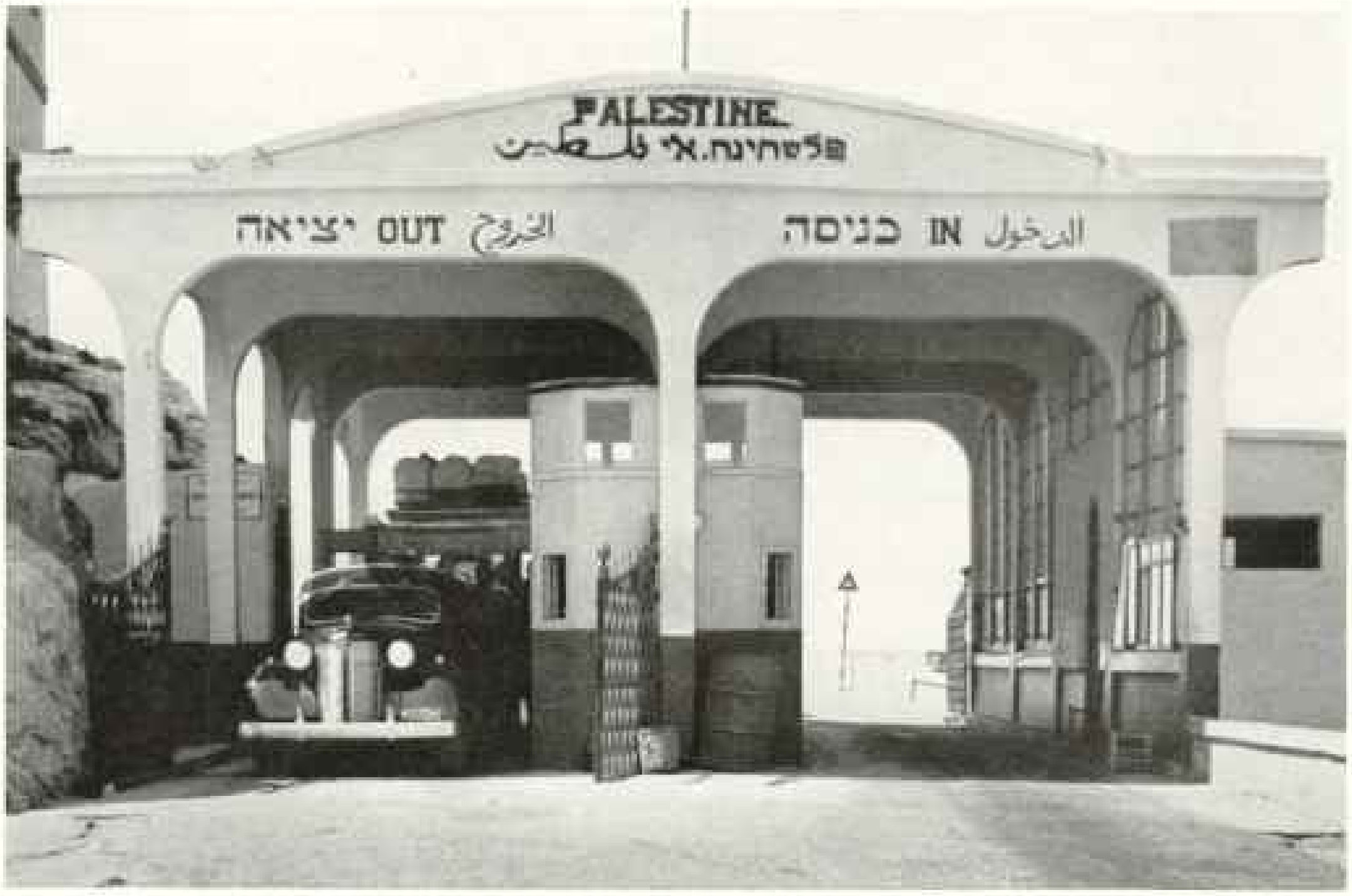
Trade and cultural relations are close, despite occasional disputes between Arabs in Cairo, Jerusalem, and Haifa and those in Aleppo, Damascus, Mosul, and Baghdad. Prominent families intermarry, so that royalty of Hejaz or Egypt may be kin to others of high rank in Iraq or Trans-Jordan, which is another small Arab state east of the Dead Sea.

All these Arabs are warlike. Over and over, in the past, they have helped Mars rock this cradle of civilization. But they didn't start today's fight. It spread here, from Europe, as Germany sought control of Iraq's oil fields and the Suez Canal.

England's land link with India is the same old caravan trails that for centuries have stretched from the Mediterranean southeast to the Persian littoral. Railroads, buses, and airplanes use these routes today, but the routes themselves and their important functions are unchanged.

Water route to India, for England, is of course the Suez Canal. Through it moves her Navy and her ships trading with China,

* See "Change Comes to Bible Lands," by Frederick Simpich, and Map Supplement "Bible Lands and the Cradle of Western Civilization," December, 1938, NATIONAL GEOGRAPHIC MAGAZINE.



Staff Photographer W. Robert Moore

Customs and Immigration Men of Syria and Palestine Control Border Traffic at This Gate

Early on the morning of June 9, 1941, British and Free French mechanized units rolled through this frontier gate at Naqura to occupy Syria. It stands on the coast road between Haifa and Beyrouth. When the authors' car passed, inspectors examined even the spare tire for contraband opium.

Australia, etc. Even with her Near East land link cut, Britain might use this Red Sea route for both planes and ships.

Suez Canal Vital to Britain

But with *both* her land link and the Suez in enemy hands, and all her Far East traffic routed around the South African Cape of Good Hope, her main arteries of Empire would be severed.

Also, Britain's Navy and her motorized army in Egypt, the Near East, and India depend enormously on Iran (Persia) for gasoline and lubricating oil.

Near Basra, in south Iraq, is an island named Abadan. Oil from Iran is piped down to it. Here the Anglo-Iranian Oil Company operates one of the world's biggest refineries. It has handled more than 10,000,000 tons of oil in a year (page 175).

At Bahrein, on the Arab seacoast south of Basra, is yet another great oil field, owned in part by Standard Oil of California. It, too, is highly important to the British, as a secondary source of fuel supply. British tankers by scores flock here for oil fuels and grease.

No wonder the British are moving heaven and earth to hold the Near East, to protect these oil fields, and keep the Suez Canal open!

What kind of country, then, is this Near East, where so much happens?

Syria, Iraq, Palestine—who lives there, and how?

Holy Land's Place in Today's Struggle

Writing jointly, we set down here observations made during many years of residence and travel in the land.

First, look quickly at Palestine's place in today's trouble. Jerusalem, her capital, is the seat of British rule, under a mandate from the League of Nations (page 148).

Palestine's big worry, as these words are written, is the geographic fact that she lies on the road from Syria down to the Suez Canal. Already Haifa, her highly modernized Mediterranean seaport, has felt the impact of bombers' blows (pages 150-1).

Near by rises the startling new all-Jewish city of Tel Aviv—a phenomenon of the Near East. Here, as at Haifa, the contrast between Bible-time ways and ultramodernity is almost incredible.

Soap, cement, cigarette, perfume, candy, and soft-drink factories, movie shows, printing shops, radio stations, and Berlin-style tourist

hotels rise on spots famous in Holy Writ.

Jerusalem itself, booming like a Florida resort, bursts from its old walls now, with modern suburbs spreading over its ancient hills.

Jitney buses run to Bethlehem, and to Jericho; seaplanes land on the Sea of Galilee, and pilgrims for Mecca carry portable radios to hear war news or the latest popular Arab songs from some Cairo cafe.

Railroad trains shuttle between Palestine and Egypt; army trucks and tanks use highways that stretch now from Cairo to Jerusalem, north through Syria to Turkey, and east to Iraq.

So much for Palestine, the Holy Land over which men have fought since Jericho's walls first fell. From here, protected by a British armored car, because of Arab-Jewish riots, we drove north to see Syria.

Syria Is a French Mandate

After the First World War, France got the mandate over this once Turkish province. That's why French troops and airdromes were found here when today's great war started.

On the Syrian coast at Tripoli is the French sea terminus of the pipe line from Iraq. The British shut off this oil, which had been going mostly to France, when France yielded to Germany in June, 1940 (page 153).

Through northeastern Syria cuts the Baghdad Railway on its way from the Bosporus to Basra, Iraq's port near the Persian Gulf (pages 175, 176, 180).

From Palestine two main roads cut north through the country. One mounts a rocky headland, the Ladder of Tyre (*Scala Tyriorum*) of the ancients, and continues along the coast. The other, quitting the Sea of Galilee, passes east of Mount Hermon and the Lebanon (Liban) Mountains and links Damascus, Homs, Hama, and Aleppo.

We chose the coastal route, the world's oldest Main Street, through Jaffa, Haifa, Beyrouth, Tripoli, and so to the Turkish frontier.

Toward Sour (Tyre) and Saïda (Sidon) the roadside is deep with the dust of history. Shattered columns, the remnants of aqueducts, and walled-in fountains strew the countryside.

Rock tombs gape wide where wealthy Phoenicians were buried. Hundreds of the limestone sepulchers have been cut away to provide rock ballast for the highway.

It is difficult to picture that Tyre once was "Mistress of the Seas." In Sidon's shallow harbor we saw two tiny sailing boats unloading Palestinian melons. "Egyptian Harbor" of old, on the south, is choked with sand and the debris of stone docks and fallen marble palaces. You can see fine old columns lying under the harbor waters.

From these havens sailed the Phoenician merchant craft to trade and colonize all over the Mediterranean, to venture out beyond the Pillars of Hercules, and to bring back cargoes of tin, possibly from Cornwall or the Scilly Isles of Britain.

An Inventory from Ezekiel

More graphically than would any trade report, the prophet Ezekiel (Ezekiel 27) listed the riches and commerce of that wealthy city. So far has Tyre since been humbled that cheap German lamp chimneys and glassware fill bazaar stalls where the art of blowing glass was first practiced.

Sidon has fared little better. Midst broken fragments of ancient power we watched "the last Phoenician" working on the hull of a small sailboat designed for coastal fruit trade.

Between Sidon and Beyrouth our road led through mulberry groves, and past silk factories where women were sorting cocoons fresh from hot-water vats.

Beyrouth is Lebanon's capital and a French naval station. It is a rich, busy port on this coveted coast, gateway to the Near East. To this ancient Phoenician city the 20th century brought the first boom in 2,000 years. Over its hills new houses spring up as around Washington, D. C.

Most of Syria's modern trade moves in and out of this port, as here is afforded the only good anchorage for modern shipping between Alexandretta and Haifa's man-made moles.

Carved on the cliff walls north of Beyrouth is a series of inscriptions and sculptures that record for a span of 33 centuries the passage of armies along the coast of Syria.

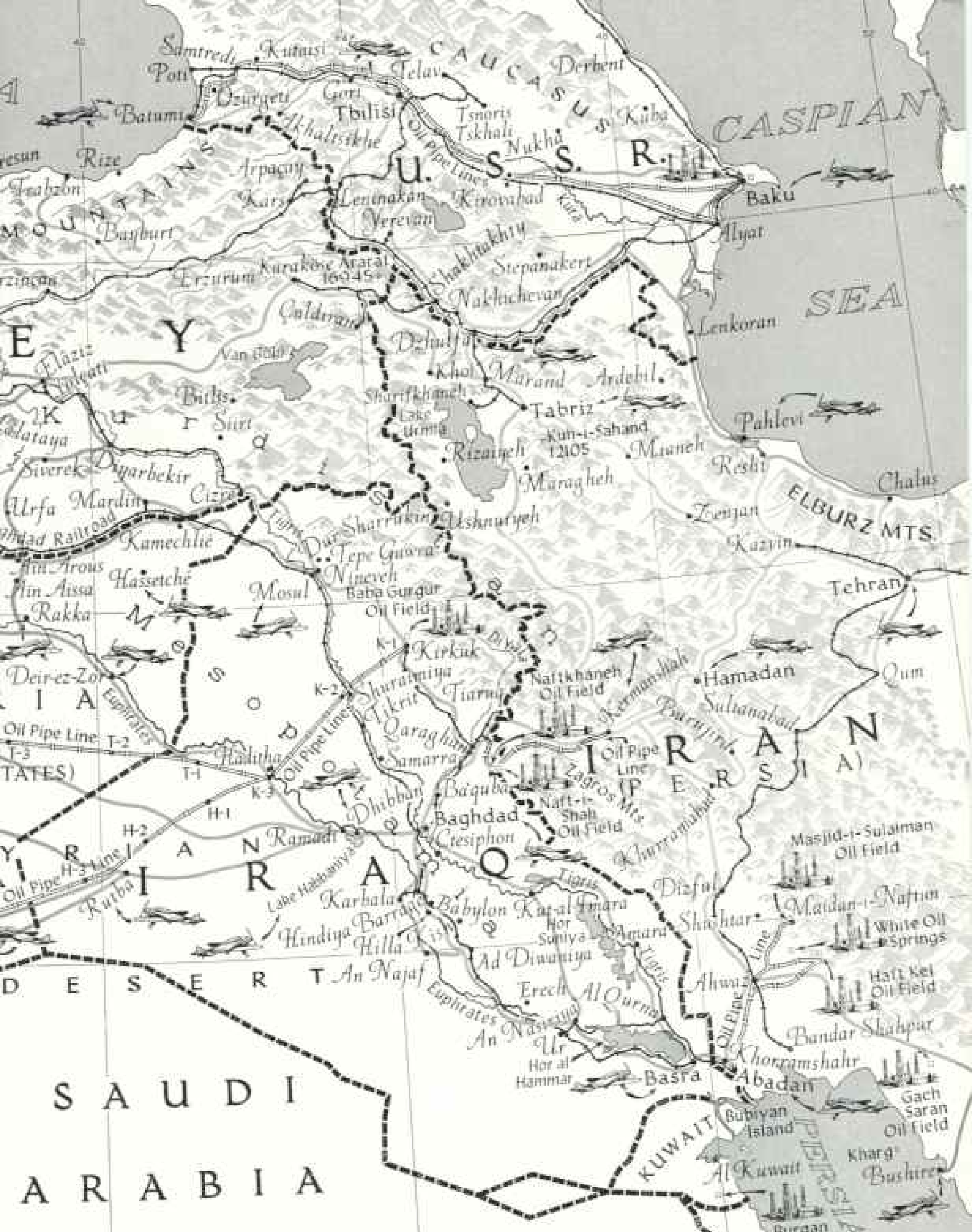
They begin with the exploits of Rameses II of Egypt, range through the conquests of the Assyrians, Romans, and Napoleon III, and include the occupation of the district by British and French forces in 1918.

Here, too, are inscribed countless hasty triumphal conquests such as that of one W. Klaberg, who took time only to scrawl in pencil his name and the date 17/3/'38!

Modern ideas have been molded in the American University, where students of various nationalities gather to study medicine, commerce, and science. Everywhere throughout the Near East these University-trained men fill responsible government and business positions and heal the sick.

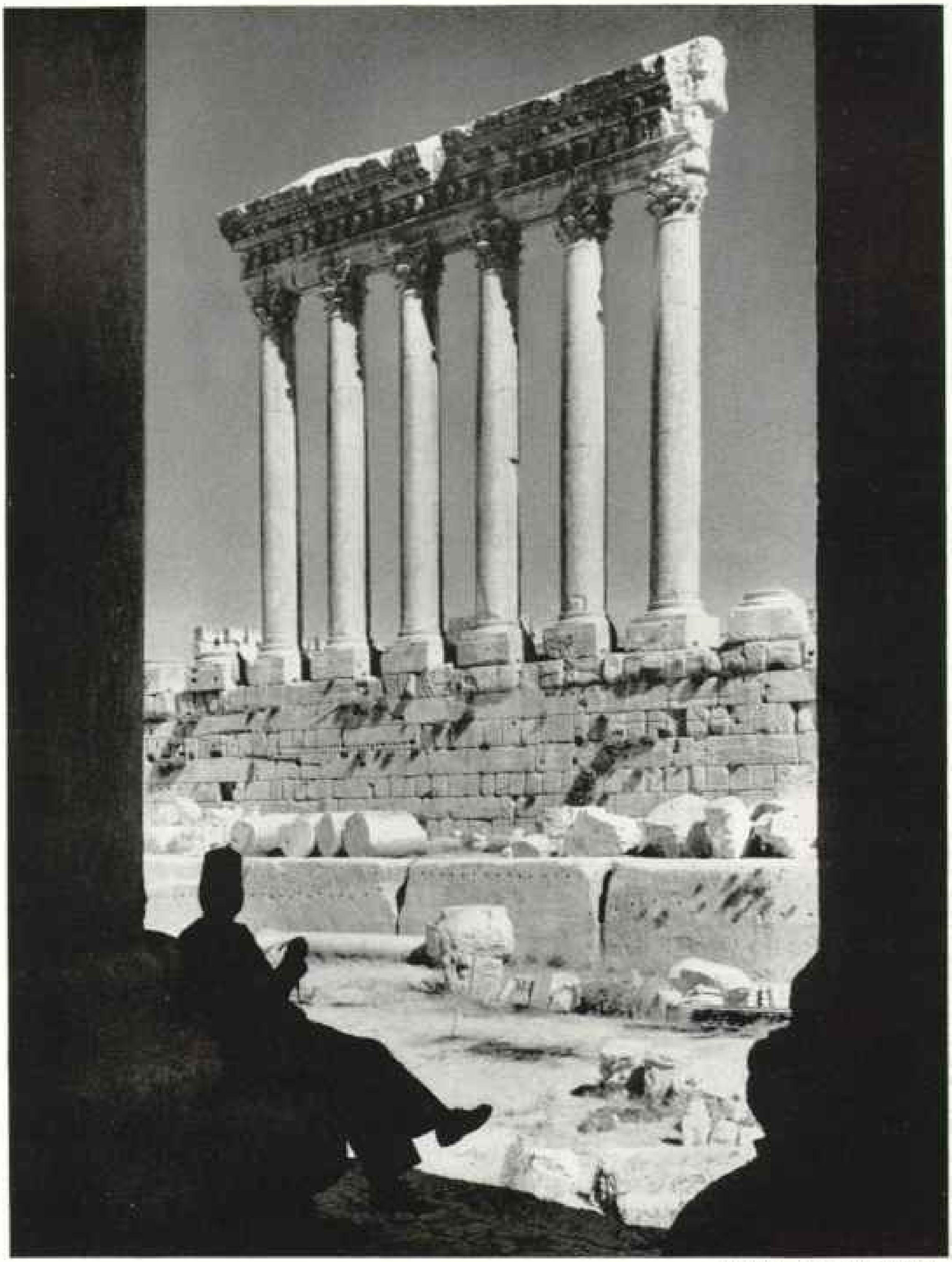
We saw an American-educated Syrian doing a thriving business dispensing ice-cream sodas and "cokes" to students and thirsty townsmen. Jazz bands wailed in night clubs till

BULGARIA
Alexandroupolis
Thasos
Samothrace
Lemnos
Gelibolu
Dardanelles
Çanakkale
Mustafa Kemal
Edremit
Bandırma
Sea of Marmara
İstanbul
Boğaziçi
Üsküdar
Haydar Paşa
İzmit
Mudanya
Bursa
İnegöl
Kütahya
Ada pazarı
Bolu
Karabük
Eskişehir
Ankara
Çankırı
Kastamonu
Tosya
İskilip
Merzifon
Amasya
Çorum
Zile
Tokat
Ordu
Samsun
Çarşamba
Bafra
Yozgat
Sivas
Kırşehir
Kırıkkale
Kayseri
Develi
Afyon
Karahisar
Akşehir
Tuz Gölü
Aksaray
Konya
Niğde
Ulukışla
Karaman
Antalya
Burdur
Aspendos
Eğridir
Beyşehir
Göl
Isparta
Turgutlu
Akhisar
Manisa
Odemiş
Aydın
Söke
Denizli
Çivril
Mugla
Milas
Bodrum
Lesbos
Mytilene
Bergama
Chios
İzmir
Andros
Tênos
Samos
Karia
Lero
Coo
Simi
Rodi
RODI
Castelrosso
Heraklion
Hag Nikolaos
Sfakia
SCARPANTO
Islands of the Aegean
KRÊTE
(CRETE)
Cyclades
Syros
Naxos
Thera
Morphou
Evrykhou
Famagusta
Larnaca
Limasol
CYPRUS
(Great Britain)
Tripoli
Beyrouth
Saida
(Tyre) Sour
Acre
Haifa
Tulkarm
Tel Aviv
Jaffa
Lydda
Gaza
Jerusalem
Amman
Nablus
Jenin
Deraa
Soueida
Damas
(Damascus)
Rayak
Baalbek
Hama
Homs
Lattaquie
Tartous
Adana
Ceyhan
Iskenderun
(Alexandretta)
Antakya
Mersin
Fevzi Paşa
Maras
Gazi Antep
Kilis
Aleppo
Idlib
Afrin
Jisr esh Shughur
Tadmor
Deir ez Zor
Euphrates
Tigris
Kirkuk
Abu Durba Oil Field
Ras Gharib Oil Field
Gulf of Suez
Gulf of Aqaba
Aqaba
Strait of Tiran
Strait of Gubal
RED SEA
SINAI
Hurghada
Safaga
Qena
Luxor
Esna
Edfu
Aswan
Nile
Asyût
El Minya
Beni Suef
El Faiyûm
El Wasta
Giza
Cairo
Suez
Ismailia
Benha
Tanta
El Qantara
Suez Canal
Bîr Hooker
El Imayid
Damanhûr
Alamein
El Daba
Fûka
Matrûh
Sîdi Barrâni
Buqbuq
Alexandria
Rosetta
Baltim
Damietta
Port Said
El 'Arish
Gaza
Ras
Dead Sea
El Kerak
Ma'an
Aqaba
SAUDI ARABIA
LIBIAN PLATEAU
QATTARA DEPRESSION
Qara
EGYPT
MEDITERRANEAN SEA
ARABIAN DESERT
Naval Bases
Airports
Highways
Railways
Oil Pipe Lines
Oil Pumping Stations H-1, T-1, K-1 etc.
H for Haifa, T for Tripoli, K for Kirkuk
STATUTE MILES
Drawn by N. Bomford and H.E. Eastwood



Men Have Fought over This Area since History's Dawn

The year 1941 sees British, French, Germans, and Iraqis fighting where Greeks, Romans, Persians, Babylonians, Hittites, Assyrians, and Egyptians clashed many centuries ago. Today, oil has come into the picture. Germans covet Iraq, especially the port of Basra. From Kirkuk, in the Iraq oil fields, a pipe line runs southwest to Haditha on the Euphrates where it forks, one branch going to Tripoli and the other to Haifa, both on the Mediterranean (pages 142, 143, and 175). In Germany's drive against Russia, a major objective is control of the Caucasus oil fields, particularly the ports of Baku on the Caspian Sea and Batumi on the Black Sea. Oil pipe lines connect these ports.



Staff Photographer W. Robert Moore

World Architects Bow Humbly before Baalbek's Classic Pillars

Exactly when, or by whom, the first temples were built at Baalbek, in the Lebanon, is not known. Vast ruins scattered here include hewn stone blocks as large as freight cars. On the sites of former pagan structures Greeks and Romans built temples. Here stand the pillars of Jupiter's Temple, as seen from the Temple of Bacchus. At the small village of modern Baalbek the French normally keep a garrison, and Rayak Airdrome lies near by.

four in the morning. Syrian girls in scant bathing suits, their permanent waves tucked in tight caps, lolled on the beaches. Shiny automobiles scattered dust over bread in open streetside bakeries.

In summer sea breezes weaken, and the place is like a Turkish bath. But the cool crests of the Lebanons are only a short distance away. Hundreds of the residents resort to these hills.

Airplanes Roar Above Shepherds Like Those of Twenty-third Psalm

Motoring up over the range, we passed crowded vacation hotels and summer homes. Twisting down the eastern slopes, we came upon sunburned Bedouin shepherds leading their flocks as in Bible days. In barley fields camels complained and bit viciously as farmers tied mountainous loads of grain sheaves on their backs for transport to the threshing floors. Boys tended goats on plains over which French military planes then wheeled and spun in practice flights.

Ptx

Benign Though He Seems, This Mufti of Jerusalem Is a Problem to All British Statesmen

As chief judge or expounder of Mohammedan law, Haj Amin Al-Husseini has actively headed all Arab agitation against making Palestine a national Jewish home.

Swift air-conditioned buses and heavy freighting lorries sprayed clouds of dust over the camel caravans that plodded along.

Near fertile Litani Valley, between the Liban and Anti-Liban Mountains, stands ancient Baalbek. Miles before we reached it we could see the golden columns of the ruined temples pointing into the cobalt sky.

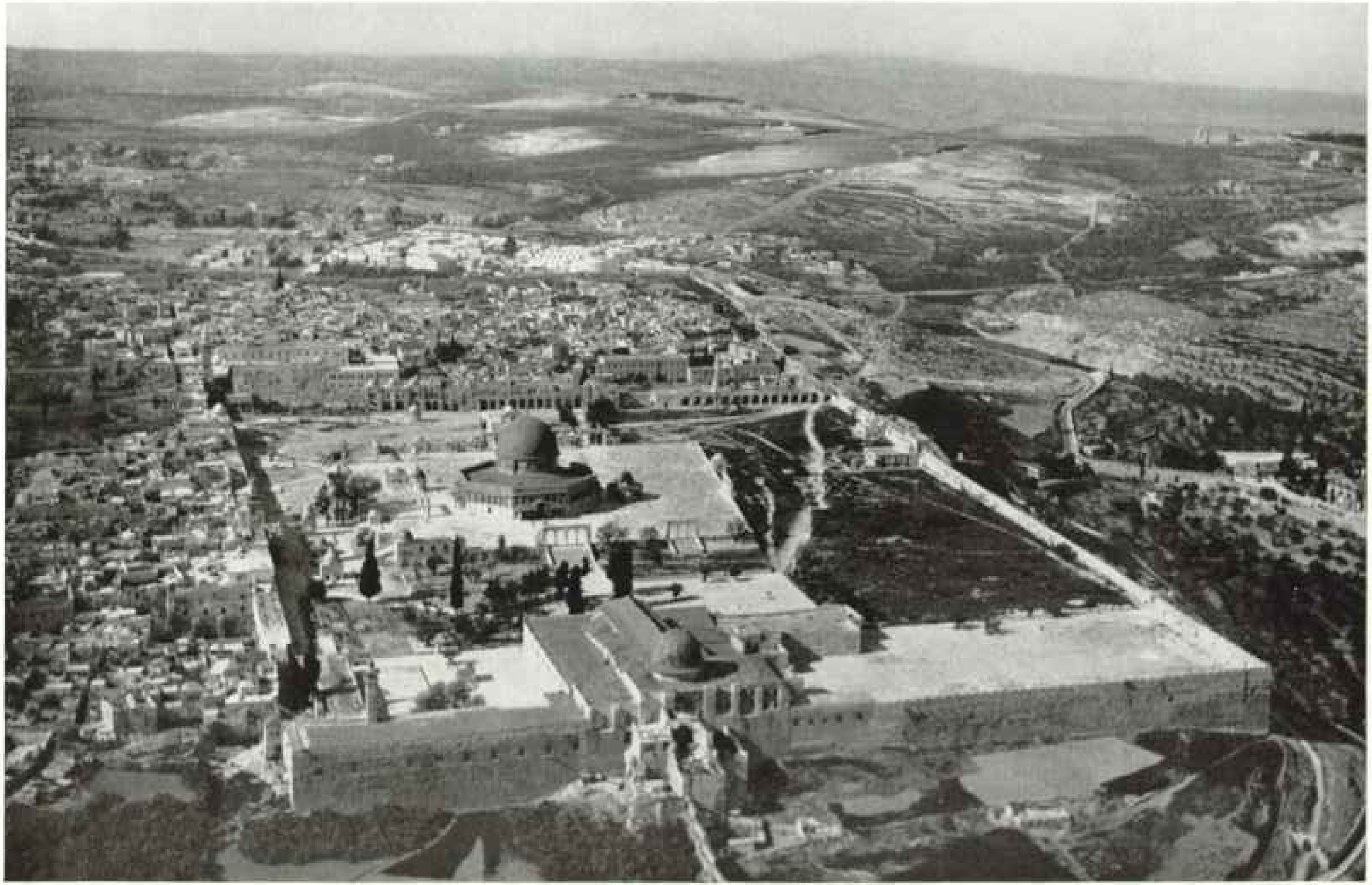
Records do not reach back to Baalbek's founding. To the Phoenicians it was a sacred city. They embellished the temple of Hadad-Baal, their Sun God, and offered sacrifices before its altar.

When the Greeks came, they changed the name to Heliopolis (City of the Sun). Roman empire builders followed in the first century and established their garrisons—where now the garrison is French (opposite page).

Despite conquest, pillage, fire, and earthquake, six of the 66-foot high columns of the peristyle in the vast Temple of Jupiter-Helios rise to full height. The smaller Temple of Bacchus has lost only its roof and some of the pillars in front of its entrance.

How the early engineers moved some of the building stones is as interesting as *when*. In the west wall, twenty-odd feet above ground level, are three mighty blocks each approximately 64 feet in length, 13 feet high, and 10 feet thick.

Outside the town in the quarries is one stone even larger—70 feet long, 14 feet high,



G. Eric Matson

Modern Jerusalem Overflows Its Ancient Walls as New Structures Rise on Adjacent Historic Hills

The magnificent Temple Area, elevated and walled, occupies the center of this air view. In the middle of the 35-acre plaza rises the Dome of the Rock, often called the Mosque of Omar. Solomon's Temple stood here. On the far right, in Kidron Valley, is the new Church of Gethsemane (page 142).

Fix

Tree Rows Are Spokes in a Bicycle-wheel Pattern Whose Sprocket Is the Circle of Houses—The Village of Nahalal

Jews reclaimed waste swampland and built up this thriving fruit-farm area of Emek Jezreel in Palestine. Driving past the many such citrus-growing colonies in western Palestine suggests a trip through southern California or Florida's orange belts. Jewish migration to Palestine, in the last generation or more, has built up a population of more than 425,000. Few old people arrive. Immigrants have come largely from Poland and Germany.

J. Lane Miller from Black Star

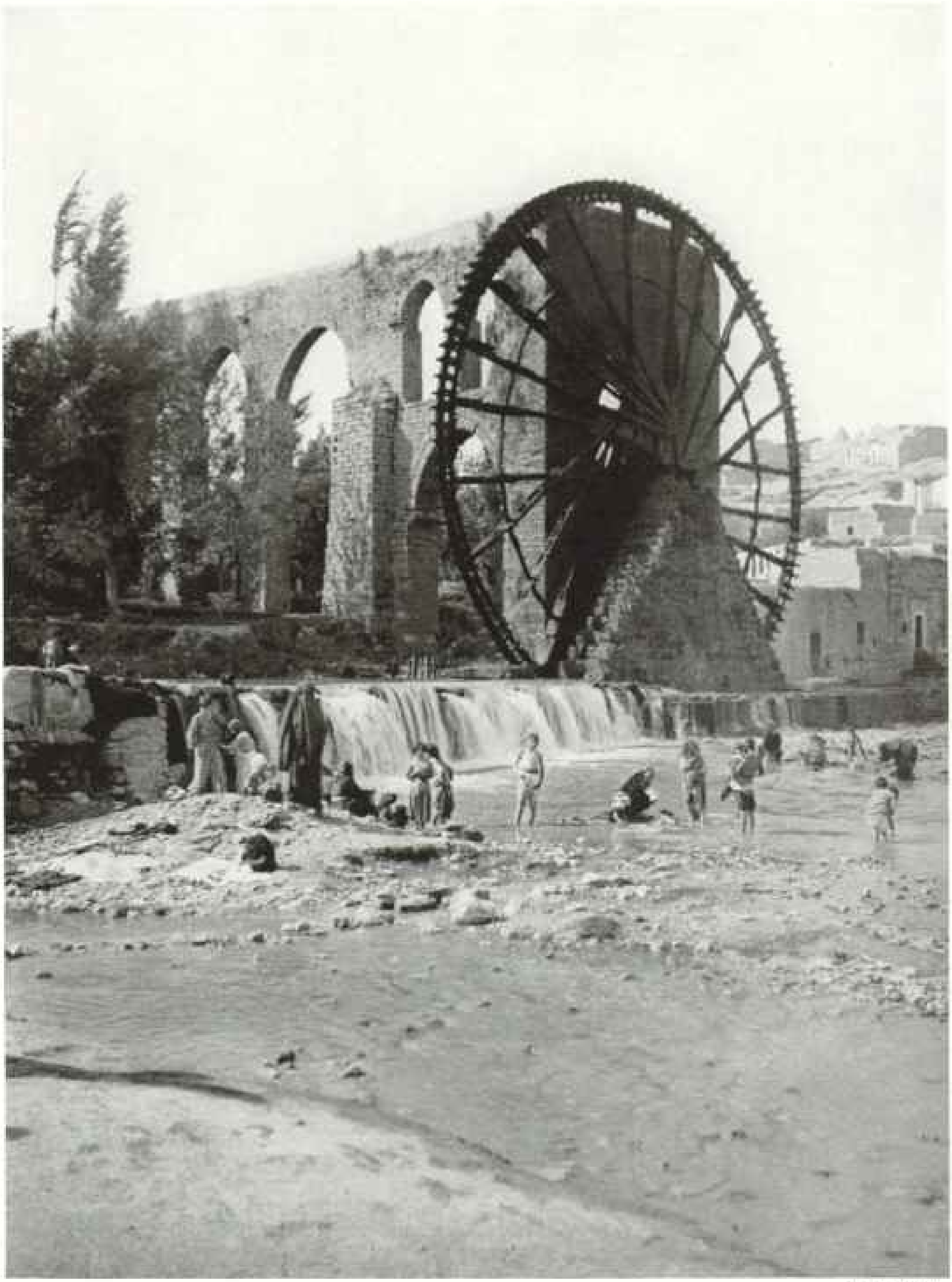
British Seaplanes and a Destroyer Rest in the Port of Haifa

Haifa stands on the old Main Street of the Near East, the ancient military road that follows the coast from Turkey south to Suez. This land path would be the natural route for any force striking at the Canal via Palestine (pages 142, 143, and opposite).

Staff Photographer W. Robert Moore

Strangers Visiting Haifa Gaze in Astonishment at Its Modernistic Shopping Districts

Some of these luxurious shops, cafes, and movie theaters are the work of German Jews. Much German is spoken all through the British mandate of Palestine.



G. Eric Matson

Big Wheels Lift Water to Syrian Fields and Towns

The current, flowing against paddles, turns this wheel at Hama. Buckets on its rim lift the water. Many such wheels are used along Syrian streams. They creak and groan with a sound mournful to strangers, but soothing to people who have heard it all their lives and who know that when that sound stops the water stops.

and 13 feet wide. For some reason this block, though shaped, was never fully cut away from the mother rock under one end. Its weight is estimated at more than 1,000 tons!

The odor of fruit, not sacrifices or incense, now fills the air about the Acropolis. Orchards of apricots, peaches, and other fruits form an oasis of green surrounding the town.

"Rugs" of Apricot Jam

In gardens below Baalbek's north wall we saw what appeared to be small orange- and henna-colored oriental rugs spread out in the sun. They were sheets of apricot jam!

Villagers grind the fruit to pulp and spread it thinly over cloths. Dried in the sun and coated with olive oil, it is folded for marketing.

Less than 25 miles north of Baalbek, high on the slopes of the mountains, are trees that are left of the famed Cedars of Lebanon. Four hundred trees grouped on a hill comprise the most famous of the historic forests whence King Solomon got timbers for his Temple at Jerusalem. Biggest tree is a grizzled giant 47 feet in diameter.

A few men carve cedar souvenirs now where the thousands of hewers for David, Solomon, and Hiram, King of Tyre, carried on the world's most publicized logging industry.

Town That Gave the Bible Its Name

Down winding mountain roads, past terraced farms and ravines, we rode to the coast at Batroun, which the Phoenicians founded as a frontier post back in the days of Nebuchadnezzar.

Djebeil, a few miles south, was the Byblos of the Greeks. Tradition says it gave its name to the Bible. Yet it was also sacred to the cult of Adonis and scene of orgies connected with his worship.

North of Batroun, on a cape, sprawls Tripoli. Multihued homes, domes, minarets, and gardens mount the hillsides. Two outstanding features of the town, however, are a Crusader castle and some shiny oil tanks.

The oil tanks are linked directly with the Iraq wells 532 miles away! Because Tripoli lacks adequate docking facilities, tankers load from flexible underwater hoses out in the open roadstead, a mile offshore, when the oil is running (page 143).

North of Tripoli there is a procession of Crusader castles. Most of them are but piles of rubble now, though the Gothic church at Tartous is well preserved. So is the Krak des Chevaliers. The morning we motored up the steep path to where this vast castle crowns a hill on the Tripoli-Homs highroad, a group of horsemen cantered up to the entrance, their long robes flying in the wind. You could imagine they were Crusader guards returning from early patrol.

This proud stronghold of Crusader engineers long guarded the pass to the coast. From the parapets its occupants could look west to the Mediterranean in one direction, and eastward over the plains (page 160).

From here we headed east toward Homs, rail junction for the Tripoli and Beyrouth-Aleppo lines. It is also a farming town and Bedouin trade center.

Sun-bronzed Arab hillbillies wander among sheep, asses, and camels in the livestock market and squat beside noisy coppersmiths to buy cooking bowls and coffeepots, while their womenfolk finger bracelets or bright cotton prints in the cloth stalls.

We chatted with families from barren western hills, passing through with their creaky wagons filled with grain.

Water, scarce in much of Syria, is plentiful here. Southwest of the city is a large lake. Through it, and twisting northward past Hama and Antioch, flows the Orontes River, watering a fertile region.

A dam blocks the lower end of the lake, whence French engineers were threading the countryside with a system of irrigation canals.

Quick contrast to these new concrete-lined ditches are the groaning water wheels about Hama. These colossal wooden wheels, the largest more than 60 feet high, turn slowly in the current, lifting water to homes, mosques, and gardens along the banks. To the boys they make exciting diving boards to catch a ride upward before leaping off.

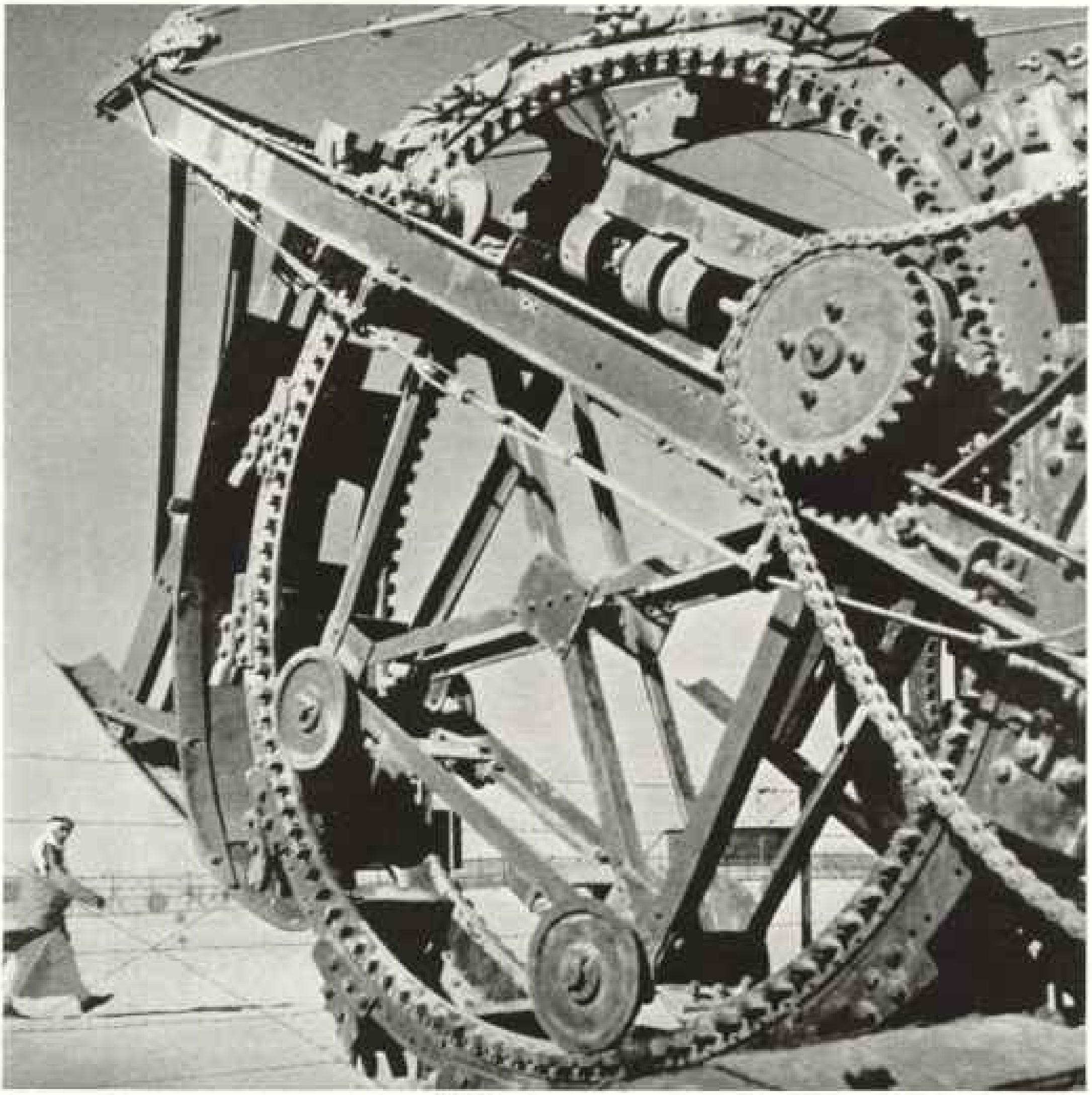
On the Map 50 Centuries

For more than five thousand years Hama, or Hamath, has been on the map. Once it was an ancient Hittite center, powerful capital of a kingdom of the same name which formed the northern boundary of the Promised Land, a prize for Sennacherib's armies. Since the Crusaders and Saracens fought for it, the tenor of its life has been geared to the creaking of water wheels and Bedouin trade.

In Latakia we chatted with French army officers while awaiting permits to enter the Turkish Sanjak of Alexandretta * and Antioch, now Antakya. Dispatches told how German troops and tanks landed at Latakia.

Antioch! It was built beside the Orontes back in 301 B. C. by Seleucus Nicator when the flight of an eagle guided him there. The frivolous, pleasure-loving Greco-Syrian city turned night into day and the worship of its

* The Sanjak of Alexandretta (the Hatay) was ceded to Turkey in June, 1939.



Rene Rabier from Leonhardt

Such Mechanical Moles Dug 1,000 Miles of Pipe-line Ditches over Near East Plains

Made in Findlay, Ohio, these Buckeye excavators, digging a trench two feet wide and up to six and one-half feet deep, can move ahead at rates up to 20 feet a minute. Some of the line lies above ground. Contrary to popular belief, Britain's Mediterranean navy has never depended on Iraq oil, which formerly went mostly to France (page 171 and opposite page).

gods and goddesses into sensuous celebrations.

It was third city in importance under the Roman Empire, with magnificent palaces, pillared streets, mosaic baths, theaters, and a hippodrome where General Lew Wallace's hero, Ben Hur, rode in a chariot race against the Roman Messala. Rich and wicked, it shocked even Rome.

Yet here followers of Christ were first called Christians, Paul and Barnabas began their missionary trips, and the Crusaders gained their first foothold in the Near East.

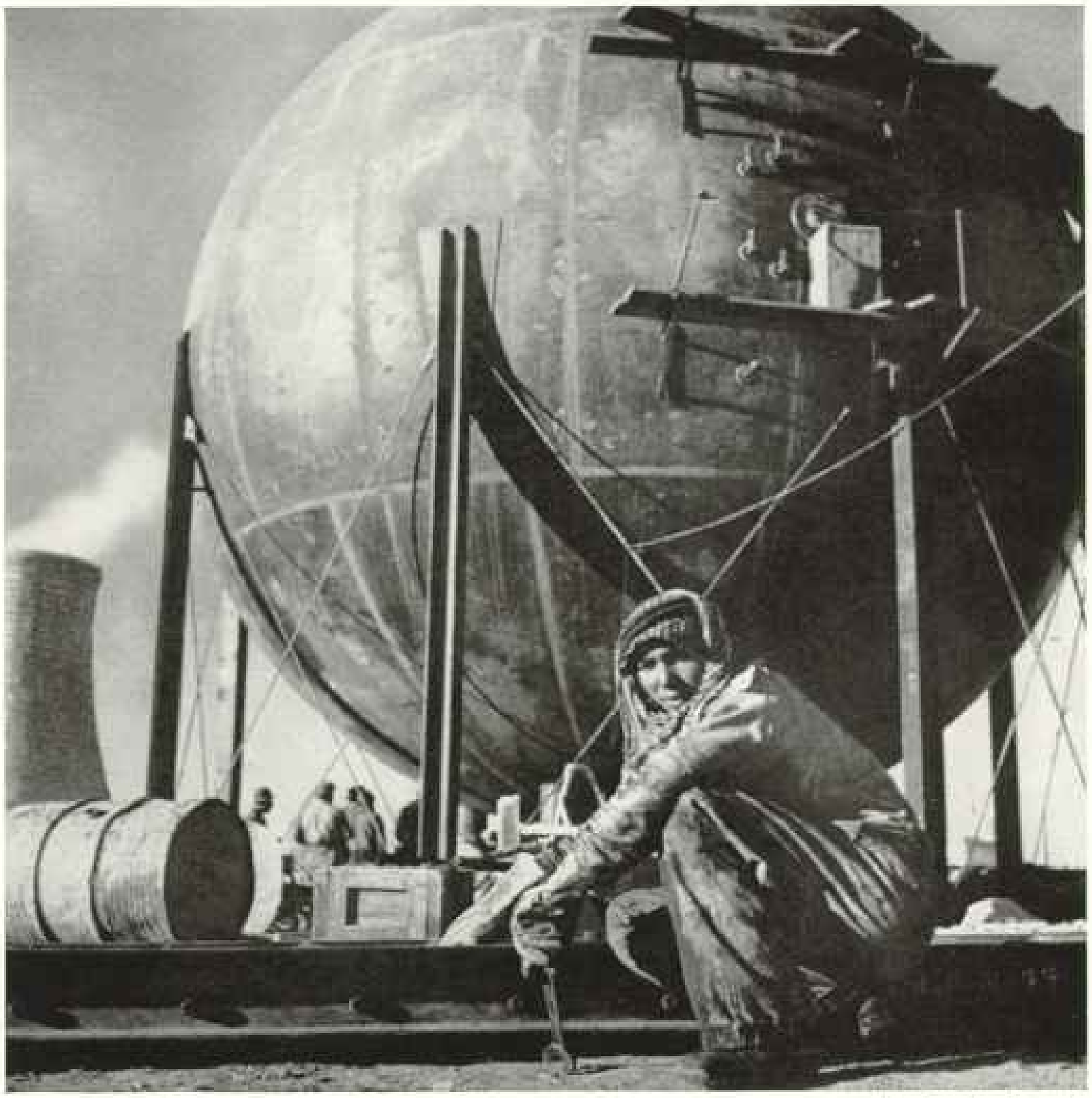
How different is Antioch now! Its glories are mainly for archeologists' spades.

In the time that it takes to walk around the ancient walls one can see all of modern Antioch, including its soap factories, and still have time to taste a dish of its noted eels from the Orontes.

In front of a "Roxy sinemasi," or movie, a placard announced "Janet Makdonald in Roz-Mari"!

A Hero of Musa Dagh

And so on to the towering Musa Dagh, or Jebel Musa. Here, during the First World War, was the scene of a Turkish siege against the Armenians, so brilliantly and dramatically



Rose Zahn from Leonhardt

Use of Spherical Storage Tanks, in Iraq's Blistering Summers, Reduces Evaporation Loss

But for his Arab headdress, this Kirkuk worker, with his greasy gloves, overalls, and heavy shoes, might have stepped right out of an Oklahoma field. Though American and British engineers, well drillers, and mechanics brought Iraq fields into production, built all plants, and laid pipe lines, routine work is now done by native Iraqis (opposite page).

described in *The Forty Days of Musa Dagh*. One man who had been through those days of massacre offered to show us the road up the mountain.

As we climbed the steep slope, we pried out his story:

"I was only 12 years old at the time, but our people thrust an old muzzle-loader in my hands and told me to use it. With its aid I soon got a good Turkish rifle and some shells.

"The French finally sent a ship to rescue us and took us to Egypt, where we camped on the sands for four years. But we got back again, and rebuilt our homes."

Midst cool green hills of terrible memories they now run several vacation inns and make charcoal in the forests.

Passing back through Antioch, we toured north around its wide, reed-fringed lake, where water buffaloes bathed with only their horns and noses above water.

Turkish soldiers camped on hilltops overlooking the plains and roads, where peasants dug licorice root.

From the crest of the range here one can look north to the Plains of Issus where Alexander the Great broke the power of the Persians under Darius, 333 B. C.

Army

Again Today, as for 4,000 Years, the Near East Echoes to the Tramp of Marching Men

Until the Iraq revolt in May, 1941, these French soldiers were on duty under the Vichy regime in Syria. When fighting spread to the eastern Mediterranean, they marched down into Palestine to join the Free French forces of General Charles de Gaulle. Joined with the British troops under General Sir Henry Maitland Wilson, they occupied Damascus, June 21, 1941.

Cover from Black Star

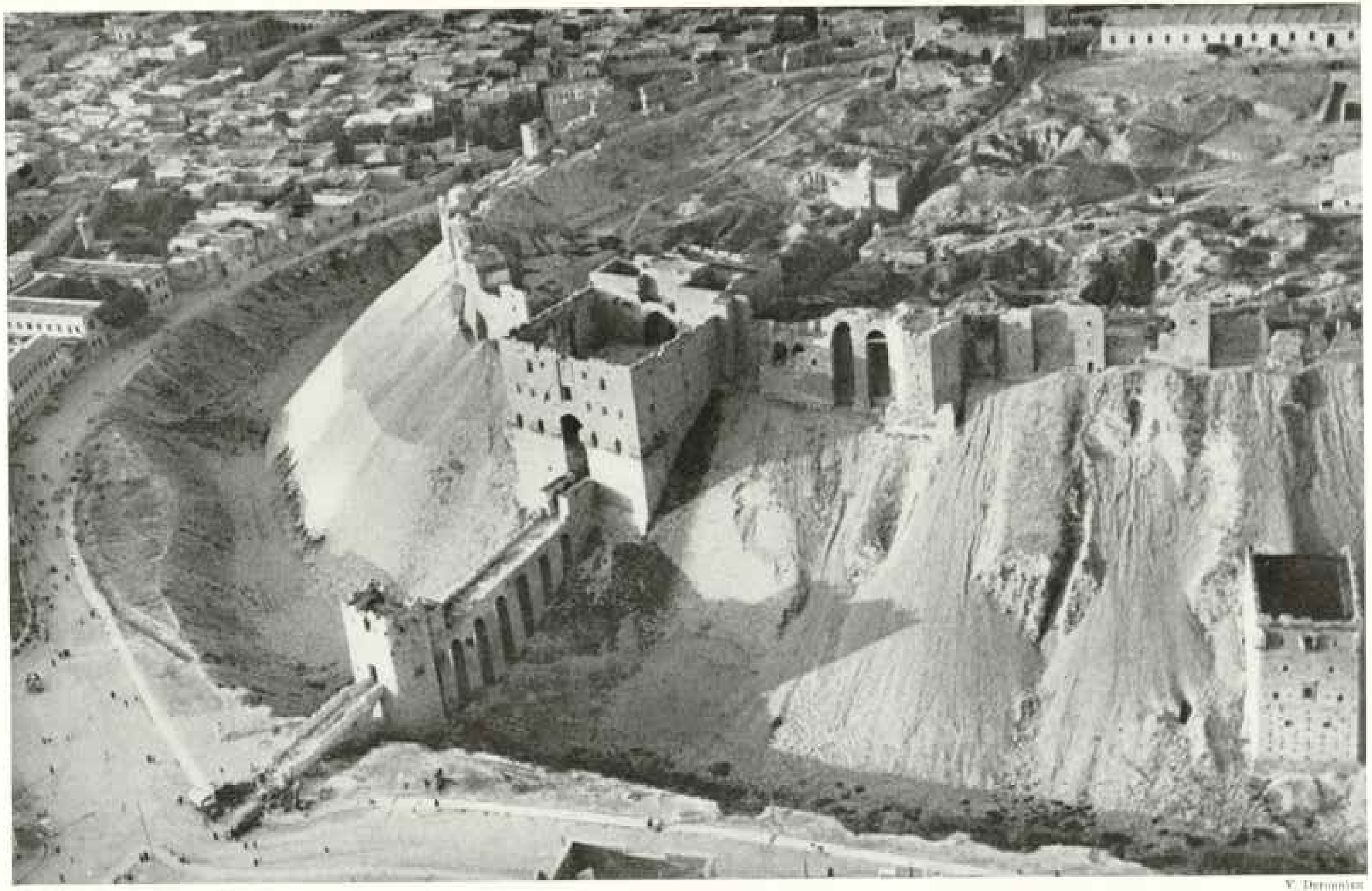
Air-cooled American Buses Roar across Deserts from Baghdad to Damascus near the Same Path Abraham Took Long Ago

Even in normal times, danger lurks along this lonely trail from Iraq to Syria. Nomad bandits are a menace; so are sandstorms, which have mysteriously engulfed more than one automobile party. Airplanes, following the trail, also must contend with sandstorms. By bus one can make this run in a few hours. By camel or carriage, via Aleppo, it used to take two weeks or more. Alexander the Great passed this way; so did the Citroën-Haardt Trans-Asiatic and Thaw Expeditions—see NATIONAL GEOGRAPHIC MAGAZINE for October, 1931, and October, 1940.

Three Lions

Like a Singing Quintet from Some Popular Musical Show, French Soldiers Swing Through a Syrian Bazaar

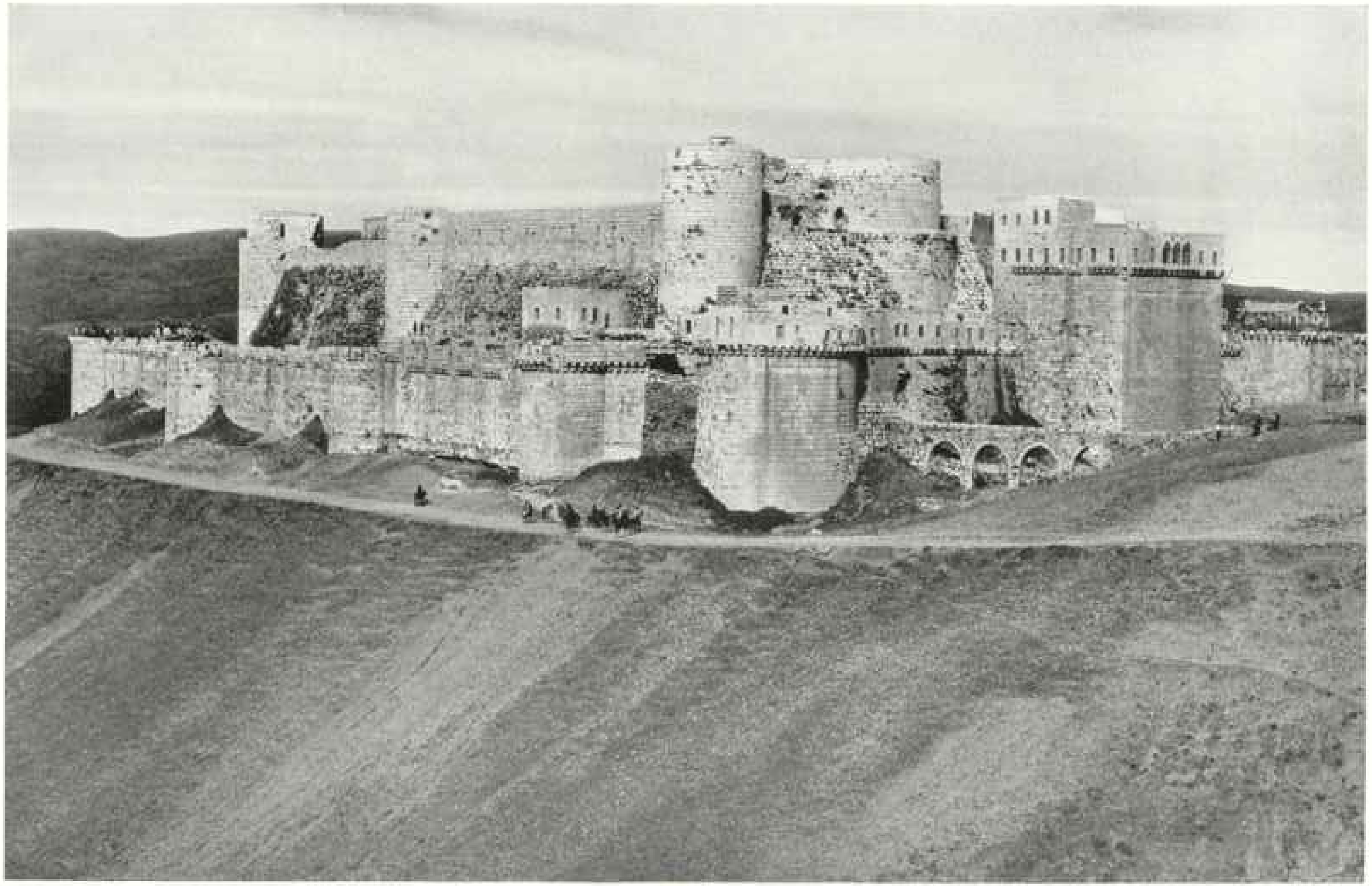
France, Africa, the Arab lands, all are represented here. Look at the campaign medals on the veteran, second from left, and at that boyish adventurer, second from right.



Y. Dmonides

Aleppo's Ancient Citadel, atop a Mountain, Has Withstood Many an Assault

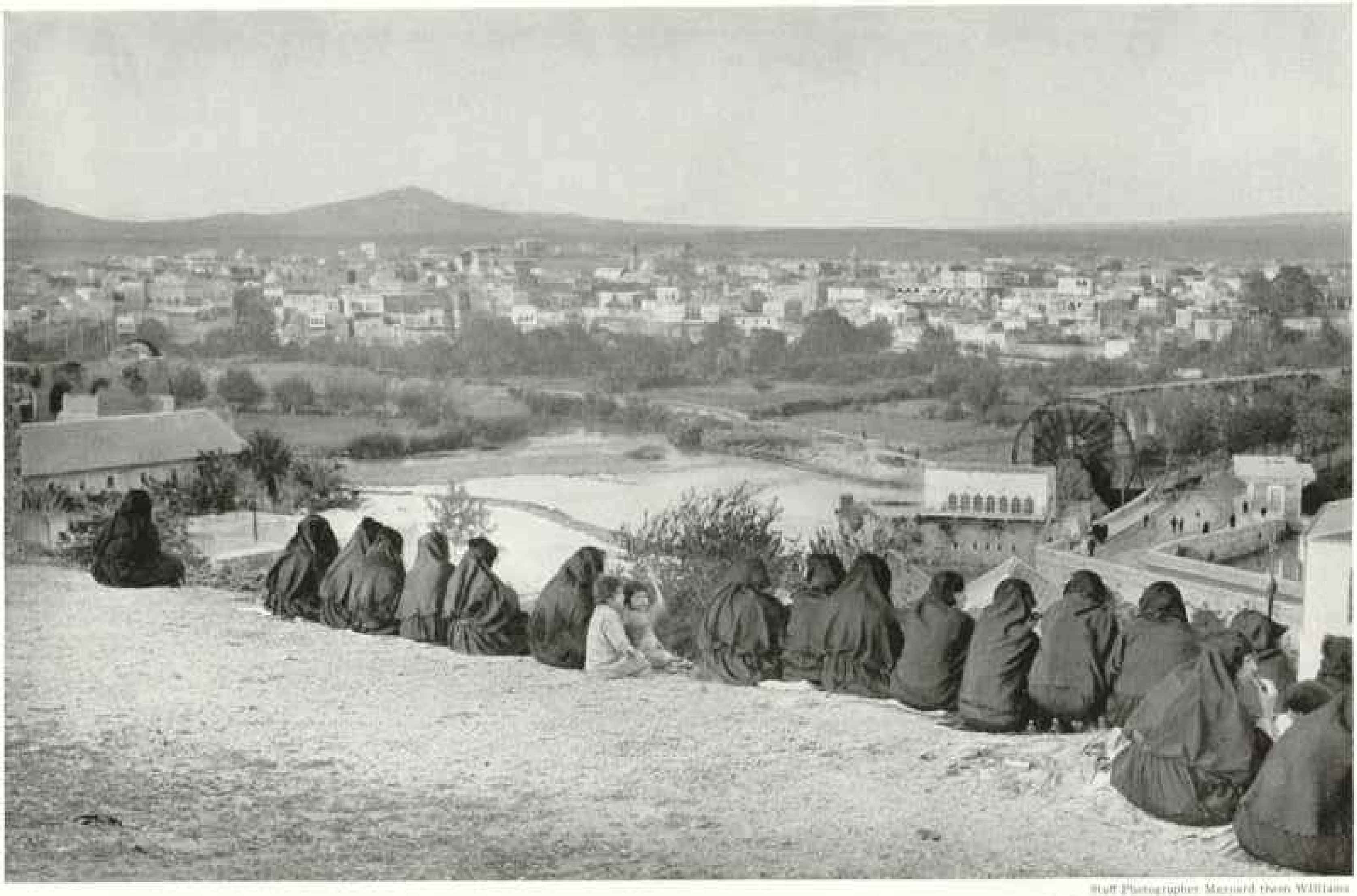
Spectacular this famous fortress is, and, before the days of planes and modern artillery, most difficult to capture. In vain the Crusaders besieged it. Since the days of Hittites and Egyptian Pharaohs, men have fought for Aleppo, whose dramatic history of feuds, massacres, plagues, and earthquakes runs back 4,000 years. French soldiers bugled from these heights and gazed through field glasses at Syrian maids promenading far below the day the authors explored the fort (page 163).



Staff Photographer Maynard Owen Williams

The Krak des Chevaliers, Symbol of Crusader Might, Now Extends Moslem Hospitality to Christian Visitors

From this twin-walled town, north of the pipe line to Tripoli, a thousand knights once rode. When the Crusades ended, Moslem sultans held the castle. Now travelers of all faiths are welcomed to the height-cooled guest rooms. Arab horsemen stand below the walls (page 153).



Staff Photographer Maynard Owen Williams

Above Orontes Valley Gardens, Syrian Women with Lifted Veils Watch Hama's Water Wheels Refresh an Oasis

Day and night, awkward water wheels protest with groaning axles at their endless toil. Day and night, high-lifted water nurtures lush greenness against the Syrian plain. At twilight, black-robed women, like a flock of crows, come out to sit and "smell the breeze" (pages 152, 153).

G. Eric Matson

About 150 American and British Oil-field Men Live at Kirkuk in Iraq

Discovery of near-by oil fields lifted this long obscure pastoral town to fame and affluence. Its bridge spans a dry river bed which, after heavy rains, turns quickly into a roaring torrent. At near-by Tikrit the valiant Saracen leader, Saladin, was born (page 171).

G. Eric Matson

Jets of Iraq's Natural Gas Rise from Fissures and Burn Indefinitely

"Eternal fires" in Zoroastrian temples were fed by escaping natural gas. In the oil fields near Kirkuk (opposite page) are the supposed tombs of Shadrach and Abednego, who, according to the Bible story (Daniel 3:26), were thrown into the "fiery furnace." Perhaps burning gas heated the furnace "seven times more than it was wont to be heated." Superstitious Arabs say that when these fires go out disaster will smite the locality (page 171).

Past windowless beehive villages, we rode to Aleppo (page 159).

A Main Street of the Ancients

Old almost as time itself is this route. At one spot the modern metaled road cuts across and for a short distance runs parallel to a Roman highway whose stone blocks are almost perfectly in place. That, in turn, was laid over a still earlier pavement, with deep ruts which may have been worn by the wheels of the Hittites.

Wander through Aleppo's miles of tunnels, or arched *souks*, lighted only by shafts of sunshine that stab through small holes in the roofs, and you turn time back to the Middle Ages. Your only traffic problem is how to flatten yourself against a wall to avoid a string of camels with bulging saddlebags.

From rich carpeted halls of the Great Mosque comes the chant of a religious leader lecturing to a class on the Koran. High on a near-by minaret a muezzin calls the faithful to prayer.

Some houses have gaily painted doorways, attesting that their masters have made the pilgrimage to Mecca. The driver of a caravan feeding cucumbers to his camels had just returned that morning from the trip to the holy Kaaba.

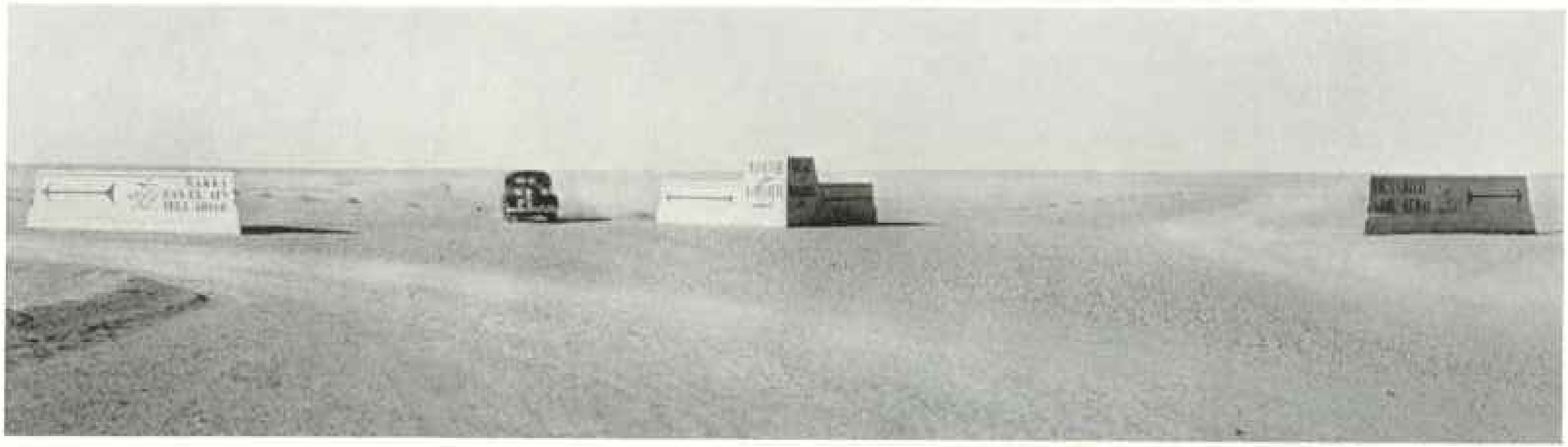
Dozens of the old open-air coffee places survive, where men sit idly sipping drinks, playing backgammon, and smoking their water pipes. Except for ourselves, there wasn't a man wearing European clothes.

Here, indeed, in the old quarter of Aleppo are all the sights, sounds, and smells of an oriental bazaar. You almost forget that it has a newer section with wider thoroughfares, motorcars, trams, modern shops, cafes, movies, and newspapers, and that there's an airport outside of town which has been bombed by the British.

Aleppo lost much of its rich transdesert trade when European merchant vessels found a route around Africa. The opening of the Suez Canal sped its decline. Then, when the Baghdad Railway was built, it looked like better days for Aleppo (page 172). How the present holocaust in Syria may affect it, nobody yet can tell.

We journeyed on to Rakka, Harun-al-Rashid's summer home.

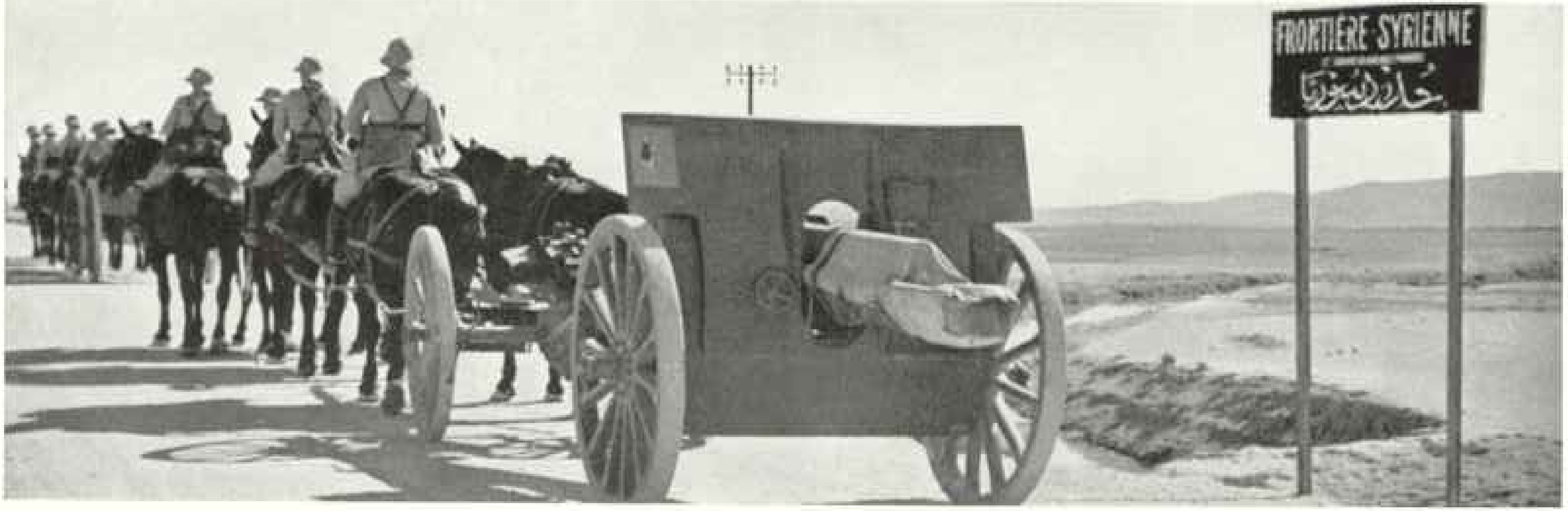
Crossing the Euphrates just before we got



Staff Photographer W. Robert Moore

Desert Road Markers at the Parting of the Ways, outside Deir-ez-Zor on the Euphrates

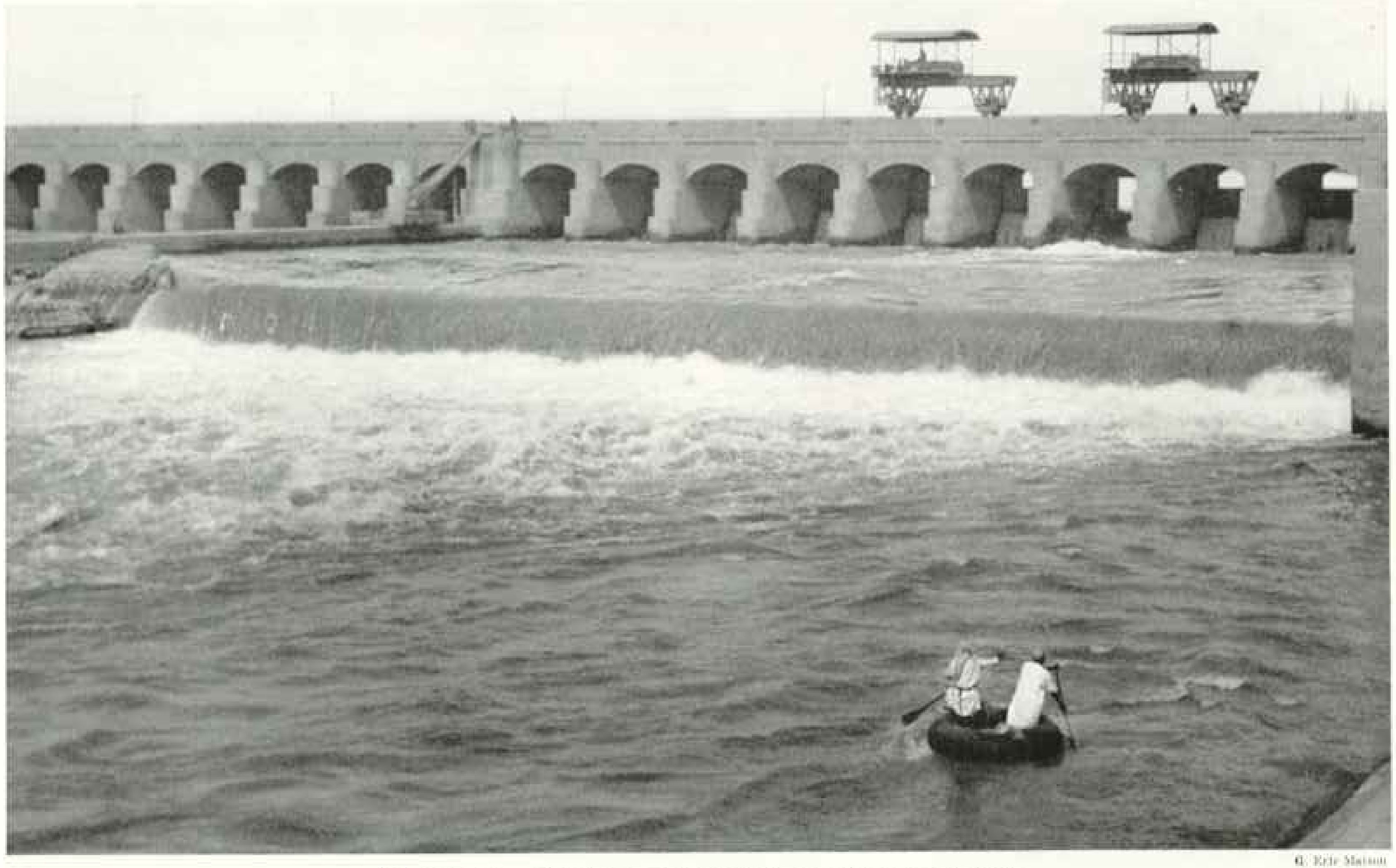
Desert road signs: Left, to the Mediterranean coast; center, to Turkish frontier; right, to Iraq.



Three Lions

French Artillerymen Haul Their Guns across the Syrian-Lebanon Frontier; Observe the Smooth, Hard-surfaced Road

Built by French Army engineers, narrow but speedy highways suitable for tanks, trucks, and heavy guns connect all strategic cities in Syria.



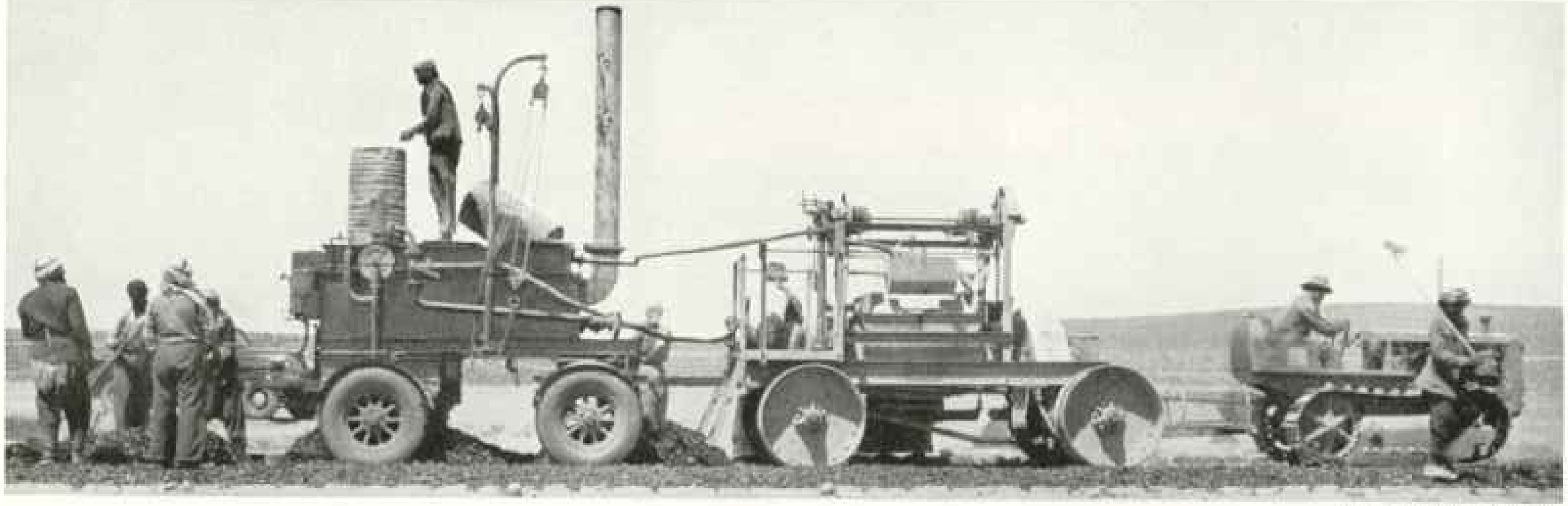
© Eric Mattson

Upstream from Babylon a Barrage Dams the Historic Euphrates

That noted irrigation engineer, Sir William Willcocks, began this Hindiya Dam in the last years of the Ottoman Empire. It controls river flow and waters near-by fields where once Nebuchadnezzar "did eat grass as oxen" (Daniel 4:33). Just after the camera snapped, two men in the *gufa* cast their net and made a big haul of fish. More than once in Iraq history, invaders have starved out the defenders by shutting off their ditches. This spring Iraqis flooded the plains west of Baghdad, seeking vainly to stop British forces advancing from Lake Habbaniya.

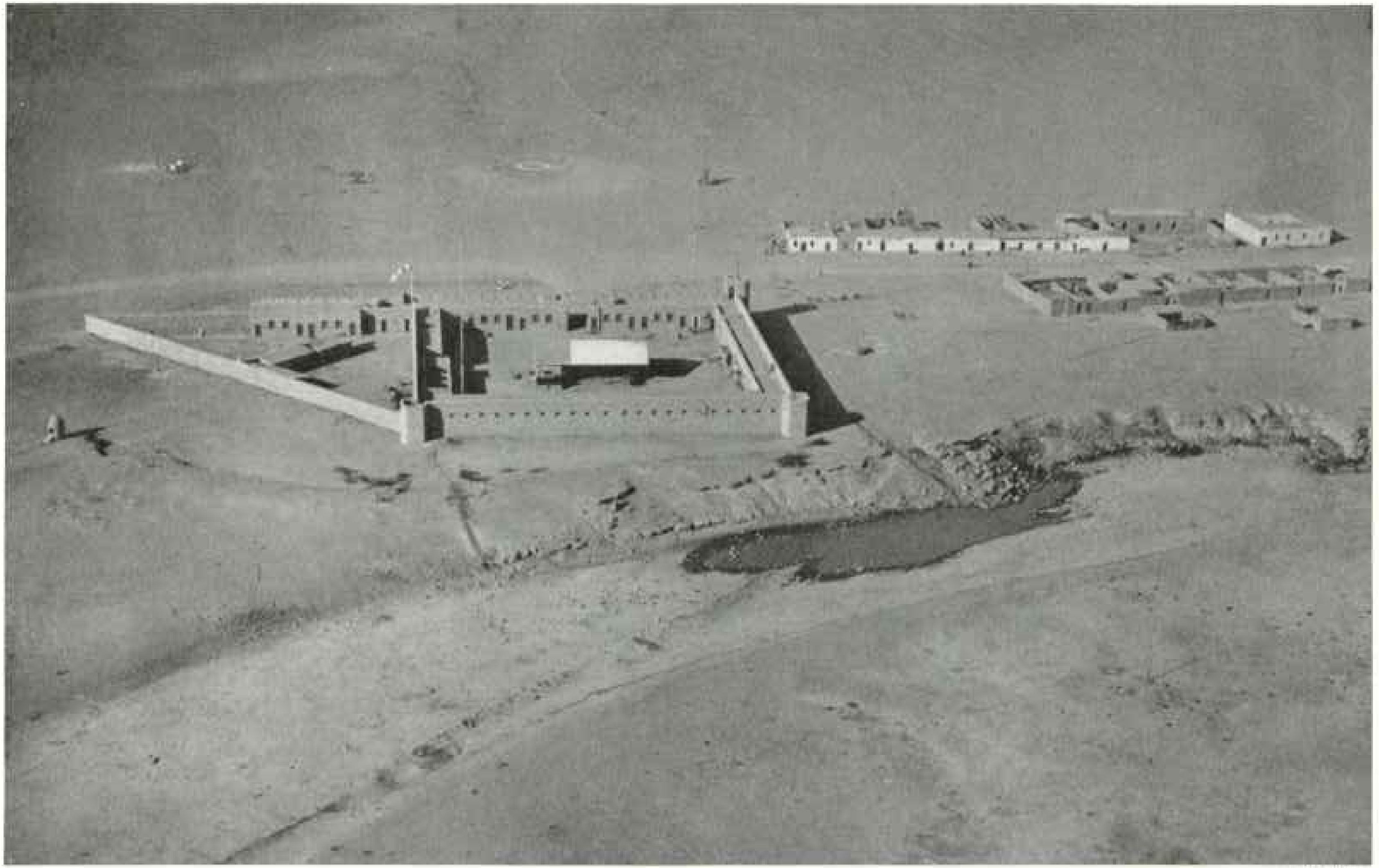
Courtesy Caterpillar Tractor Co.

A Grading Crew Builds a New Roadbed for an Iraq Stretch of the Baghdad Railway



Courtesy Caterpillar Tractor Co.

American-made Machines Lay a Road in Trans-Jordan; Asphalt Has Been Used in Near East Public Works since Noah's Time



© Fox Photos

Rutba, Overnight Stop on the Baghdad-Damascus Trail, Lies Near the Transdesert Path of Iraq Oil Pipe Lines

Medieval in aspect, this British post was originally fortified against nomad raids. In 1941 it was attacked by Iraq troops. Here the authors rested, on a flight from London to the Near East. To pool's right are low, black goat-hair tents of wandering desert tribes. From a plane you see camel paths converging here, like a map of railroads entering St. Louis or Chicago (page 171). This important post owes its position to the wells under the white roof.

Post from Three Lions

Even in Iraq, Road Markers Must Be Stout, Lest Small Boys Tear Them Down

Roads in Mesopotamia run now about where they did 3,000 years ago. Of good and bad roads Iraq has some 6,000 miles. At Ramadi, west of Baghdad on the Euphrates, British and Iraqis fought in May, 1941.

there would have been a delicate problem had not some French soldiers flashed a message across saying that the captain was sending the military ferry.

A Summer City of Goat-hair Tents

An agent for the Emir Mijhim accompanied us to the Bedouin encampment at Aïn Aissa.

On the unending plains, quivering with heat, hundreds of camels and sheep grazed on sparse, brittle grass. Flocks moved slowly in the direction of the springs for evening watering.

A short time later we came within sight of the low, black goat-hair tents. Upwards of 2,000 of them were pitched beside small patches of verdure about Aïn Aissa, where a cool stream emerges from a cleft in the rocks. Each summer the Anazeh establish camp about this small desert oasis (p. 174).

In the midst of this movable town stood the long white reception tent of Emir Mijhim, where soon we sat cross-legged on rich rugs with cushions propping our elbows and drank tiny ceremonial cups of bitter coffee with the chieftain and his sons. Dozens of bearded men lounged or stood about talking. In one end of the tent—shades of the famous Arab horses!—were several new automobiles.

The Emir was most hospitable. His oldest son, Emir Nurie, devoted his full time to our entertainment.

As evening came, more men drifted into camp. Many had brought their sheep and camels in from the desert pastures. Half of the flocks return every day for watering.

We moved to a mud-walled courtyard and sat in the cool evening breezes while one by one the Bedouins spread rugs and faced Mecca to say prayers. Dinner followed shortly.

Huge trays of mutton and rice, slabs of thin bread, curded milk, and vegetable marrow were set before us.

Beneath low-hanging stars we talked horses, camels, sheep, and automobiles—for Emir Nurie had the same kind of new car as we. It had been a good year for the flocks. Many of the sheep had borne twins. The tribe possessed more than 100,000 sheep and between 10,000 and 20,000 camels.

At dawn the next morning, after having slept under gold-and-silver-embroidered coverlets, we had breakfast of tea, a mixture of dates and butter, bread, and honey. Then we visited

tents of other members of the tribe and were served rounds of bitter coffee.

Blood Money Paid in Installments

Before our visit the son of one of the men had been killed, and the murderer had made his escape. Now the relatives had come to effect a settlement and pay blood money so that the escaped person might return.

The father of the murdered man had agreed to accept payment, but had to produce a guarantor to satisfy the other's family and clan that no revenge would be sought.

The blood money is always spoken of as 50 camels, and payment is divided into three installments. Usually the first of 15 camels are turned over upon coming to the agreement. The second, paid after two years, may consist of 20 sheep instead of 20 camels. After two more years the final installment of 15 camels is paid.

After living for ages solely upon their herds and flocks and bartering camels, lambs, wool, and goat hair in the city markets, these nomads have now acquired an interest in agriculture.

When we departed, Bedouin courtesy demanded that we be escorted away from the camp. Emir Nurie, two of his brothers, and a cousin would not listen to our protests that it was unnecessary. Speeding ahead of us, they drove all the way to Aïn Arous, 20 miles distant. Far be it from us to hint ulterior motives, but two minutes after their arrival they were swimming about in the large crystal-clear pool of the springs!

"The loveliest spot in all Syria," was the description given us of Aïn Arous.

International News

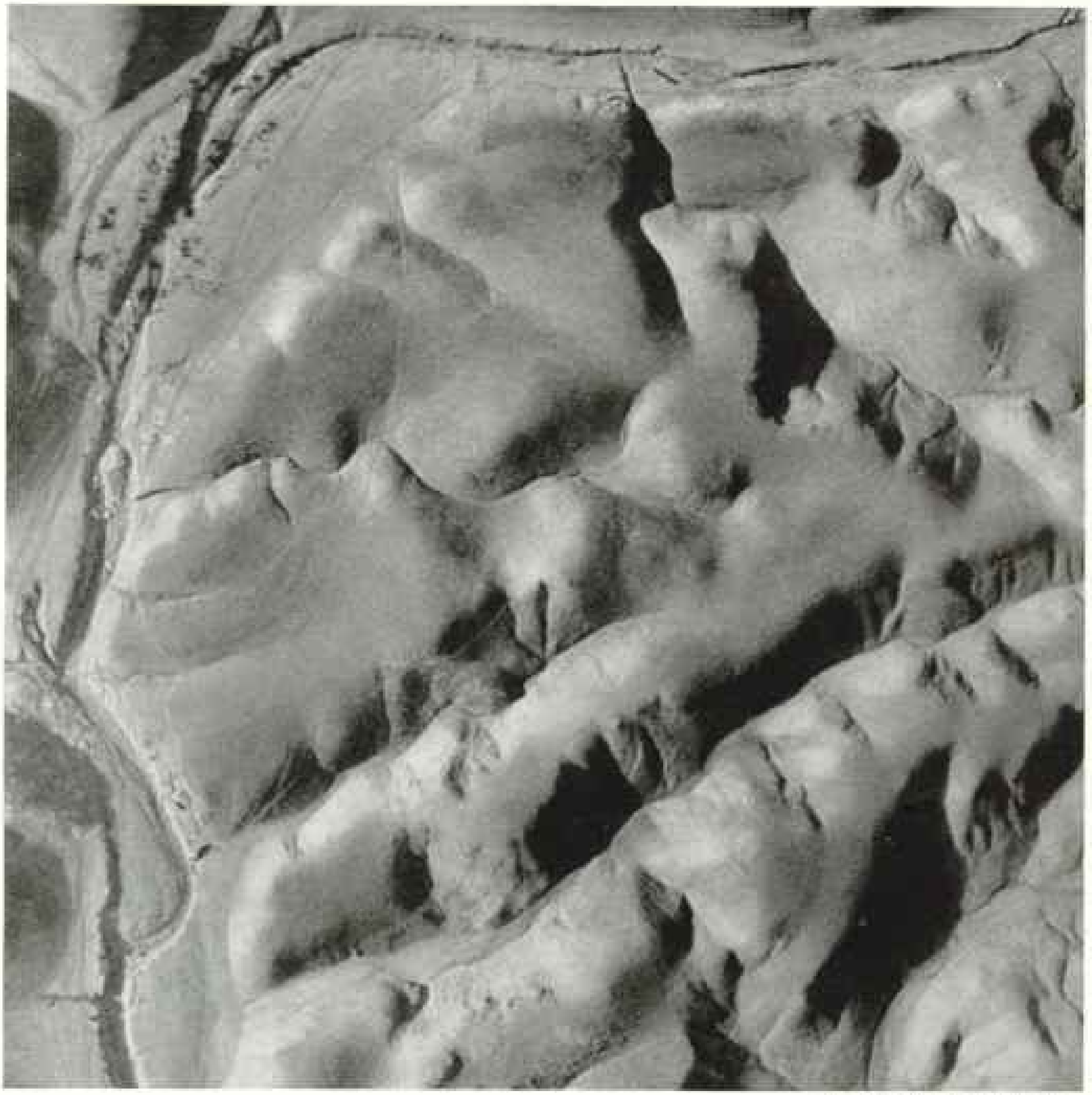
Uneasy Lies the Crown of Feisal II, Boy King of Iraq

His young Harrow-schooled father, King Ghazi, was killed when his American-made racing car crashed into a telephone pole. This lad then ascended the throne of Iraq. He rules with a regent, but what a troubled life! On his sixth birthday, May 2, 1941, insurgent Iraqis were shelling the British at Lake Habbaniya, barely 60 miles away from Baghdad. He's already a horseman, and to his miniature royal coach is hitched a team of tiny ponies (p. 179).

After days of traveling the glaring desert, we thought so, too. Here water gushes up in the center of a big pool and tumbles down into a gorge which links with the Euphrates. Trees and green grass were never more delectable.

Turning eastward again, we cruised the dusty desert track to Damascus.

When Abraham "followed the course of the sun into foreign lands," Damascus was already a busy town. Often it has been called "the world's oldest city." Most of the shifting events of Near Eastern history have touched its life, yet Damascus still keeps shop at the



© C. Anders and Co. to Rose Zubey

As Elephant Hide Must Look to a Fly, So Iraq Appears to a Flyer

Look closely, and you may see the paths worn by goats and camels over this empty land. In most of Iraq today, Noah would have to hustle to find wood enough to build his Ark. All lumber for building must be imported. Even firewood for Baghdad must be floated downstream from Tigris sources. Whatever forests once existed were wasted centuries ago. Today, along the lower Euphrates and Tigris, only date palms grow. Turn this odd picture sidewise and look at the faces—like men in a moon.

old stand. Its population is second only to that of Aleppo.

Successively a Roman temple and a Christian church (built by Theodosius I) occupied the site of the Omayyad Mosque. Bits of the earlier structures form part of its outer walls. Inside, supposedly, still rests the head of John the Baptist.

Not far away, in a peaceful garden, stands a domed building wherein lies the tomb of the famous Saracen leader, Saladin.

As when Ananias sought Paul by going to the Street Called Straight, you would have fair chance of finding anyone by doing the same, for it is even today one of the city's busiest thoroughfares. People will point out the home where Ananias lived and show you the place on the wall where Paul was let down in a basket.

Looms that gave the world "damask" are still functioning, as also are metalworkers who produce "damascene."

With equanimity people of venerable Damascus watch airplanes land or step aboard an air-conditioned bus that will keep them at a cool 76 degrees on the burning desert road

to Baghdad! While some live in famed old homes where fountains play in courtyards and have rooms walled with inlay of mother-of-pearl, others have erected modernistic bungalows on the near-by hills.

At midday men sleep in cubicle shops and along shady streets. Late in the afternoon women enveloped in black gowns and veils sit like rows of crows in gardens and along the river to cool off. Hundreds of Damascenes go to open-air cafes up the Barada (Abana) River to sip cold drinks, eat ice cream, and smoke their water pipes under the trees. Yes, Damascus is old, wise, and has learned how to live.

To this "world's oldest city," war is war—the will of Allah! From here motor roads and airplane lines take off east, into Iraq, where the oil comes from.

Iraq is smaller than New Mexico. When lulls in shooting permit, it's the stopping place for competing east-west commercial air lines of Italy, France, England, Germany, Egypt, and the Netherlands.

East of Baghdad, Iraq's capital, rise the hills of Iran—long named Persia—now grown enormously rich from oil and living in mortal fear of Moscow. Brooding Russia looms to Iran's north: to the south, Iraq has an outlet to that fragrant Persian Gulf which has tantalized the nose of "the Bear that walks like a man" since Peter the Great warned his people they must never rest till they'd gained a seaport on warm salt water.

"My Fat Breast Is My Misfortune"

And there are the oil fields! From them, fat taxes flow into Iraq's treasury, and vast sums are spent on oil-field wages and supplies.

Yet rich wells are a mixed blessing. For they are coveted. An Arab proverb makes a partridge say: "Alas, my fat breast is my misfortune." It may be that these fat oil fields will prove tiny Iraq's misfortune.

Iraq itself, then named Mesopotamia, was the most easterly section of Turkey, until the First World War dismembered that old Ottoman Empire. Over it Britain then took a mandate, and Iraq became an independent state in 1932. By treaty, however, certain English troops were to remain.

Iraq's Mosul oil fields * center about the old pastoral town of Kirkuk. Some 70 miles southwest of it, Saladin was born. "Honoring the Faith," his name means. With him Richard the Lionhearted made the treaty, in 1192, when the Third Crusade ended.

Something happened at Kirkuk, when drillers from California were helping on these wells, that made men think again of Saladin, to whose wounded Saracens the Crusaders more than once gave chivalrous aid. Overcome by gas, two American well drillers lay suffocating near a well mouth. Three Kurds, descendants of the Saracens, rushed to their aid, only to die with them.

Oil Town of Iraq

Kirkuk, reached by rail and motor road 145 miles north of Baghdad, is the boom oil town of Iraq (pages 162-3). Gas makes so much pressure that men compare the field to a giant soda-water siphon, with the cork at Kirkuk.

How 15,000 men, lugging 123,000 tons of pipe, dug 1,000 miles of ditch over deserts and mountains and laid the pipe line underground and at places above ground from Kirkuk to the Mediterranean in 18 months is among the great feats of engineering annals.

Americans own 23½ per cent of the stock of Iraq Petroleum Company, Ltd. British, Dutch, and French own most of the rest.

Since the pipe line was finished, each year it has carried about 31,000,000 barrels of crude oil to the sea. They say when oil was first started through this pipe, a crowd gathered at the Haifa end to see the first gush come through. It came—pushing ahead of it two big lizards!

Easiest, quickest route to Baghdad from Palestine or Syria is by plane or bus. Both go via Rutba, a fortified desert post set at ancient water holes on a caravan trail from Damascus to the Euphrates. These motor roads have great military importance. British troops from Baghdad moved over them in June, 1941, to invade Syria.

Since antiquity, men trudging across the hot sands have depended on Rutba for water (page 167). Abraham's emigrant train no doubt stopped here.

Riders in buses and private cars, driving between Baghdad and Syria or Palestine, eat lunch here or stay overnight. A walled rest house, guarded by troops, saves you from being robbed or killed by nomad bandits. They shot through one of our wings when we flew over, but happily missed our gas tank.

Sometimes, when tribes are on the march, thousands of camels and hundreds of tents of desert folk descend on Rutba. About the older wells camel dung, piled up for centuries, is many feet deep.

This Damascus-Baghdad road runs past Lake Habbaniya and the near-by British air corps post, Dhibban, so much in the news.

The lake is the stopping place for seaplanes of British Overseas Airways on the London-Australia run.

* See "Today's World Turns on Oil," by Frederick Simpich, National Geographic Magazine, June, 1941.

Dhibban, British flying field, is a model post. It has hundreds of new brick buildings, its own "Piccadilly Circus," a church, a club, polo fields, swimming pools, movie theater, hospital, etc.

About the whole camp runs what the British call a "dacoit," or bandit-proof fence; this barrier, with blockhouses, protects the camp against sudden assaults.

As you near Baghdad, flying the last 50 miles from Habbaniya, you look down at your right on Iraq's Royal Palace and its landscaped gardens. Here young King Ghazi kept his American racing car, his polo ponies, his private gilded plane with golden crowns on its doors. Here, too, is now the home of the infant King, Feisal II (page 169).

On this plain, gazelle traps are sometimes visible from the air. Arabs build these hairpin-shaped, half-mile long corrals, into which they try to drive a whole herd of wild gazelles, whose meat is good.

"Berlin-to-Baghdad Railway!"

Abdul Hamid, "sick man of Europe," gave the Kaiser a concession for this line, part of Germany's *Drang nach Osten* (Push toward the East), away back in 1902.

Not till July 17, 1940, was this road finished. Then it wasn't Germans who finished it. On that day its first train left Baghdad—but not for Berlin; only for Istanbul. When that train puffed out, it marked the last act in a historic drama of European financial and political rivalry.

No railroad ever built is more interesting. It runs from Turkey through Bible Land Syria; through the wild Toros (Taurus) Mountains to Mosul; past ruined Nineveh and Samarra, whose ancient, roofless walls stretch 20 miles across the desert; past Al Kadhimain, its domes sheathed in golden plates (177), and so into mysterious Baghdad, in whose gilded palaces of romance and intrigue the enchantress Scheherazade unfolded her "tales of marvel."

There its standard gauge changes to meter gauge, and south it goes again, past Babylon, past Ur, past Al Qurna (which they say was part of the Garden of Eden), and so into Basra, port of Sindbad the Sailor. In three days crews on these trains plow through 6,000 years of history! Think of a Pullman conductor saying "All out for Nineveh, or Babylon!"

From the Bosporus to Basra, as the road runs, is 1,989 miles, or as far as from Boston to Denver.

Through Iraq this train has the familiar European wagon-lits, with the blue and white chinaware, and the stuffy compartments, but it's a more leisurely train.

When war cut off our traffic with the Mediterranean, this Baghdad Railway suddenly assumed great importance; despite the long haul, delay, and high freights, goods actually moved even from Bulgaria all the way down to Basra, by rail, then by boat for New York all the way around the Cape of Good Hope!

Germany's 1941 strangle hold on southeast Europe starts diplomats to thinking new, fresh thoughts about this Baghdad Railway.

Iraq's Ancient Ruins Lure Explorers

Lively trade moves in normal times between Iraq and the United States. But it wasn't oil, railroad rights, wool, or dates that first lured inquisitive men from the United States to explore this strange land. These pioneers came to dig in the ruined cities.

Such ruins abound here, not only because Iraq lies right in the historic paths of roaming Assyrians, Persians, Greeks, and Romans, but because fine civilizations flourished here long before their days (opposite page).

From the air now you see Babylon only as roofless palace walls. There the scientists found a stone duck used as a standard of weight. On it was carved a warning saying anybody who tampered with the stone duck, trying to falsify its weight, would be executed.

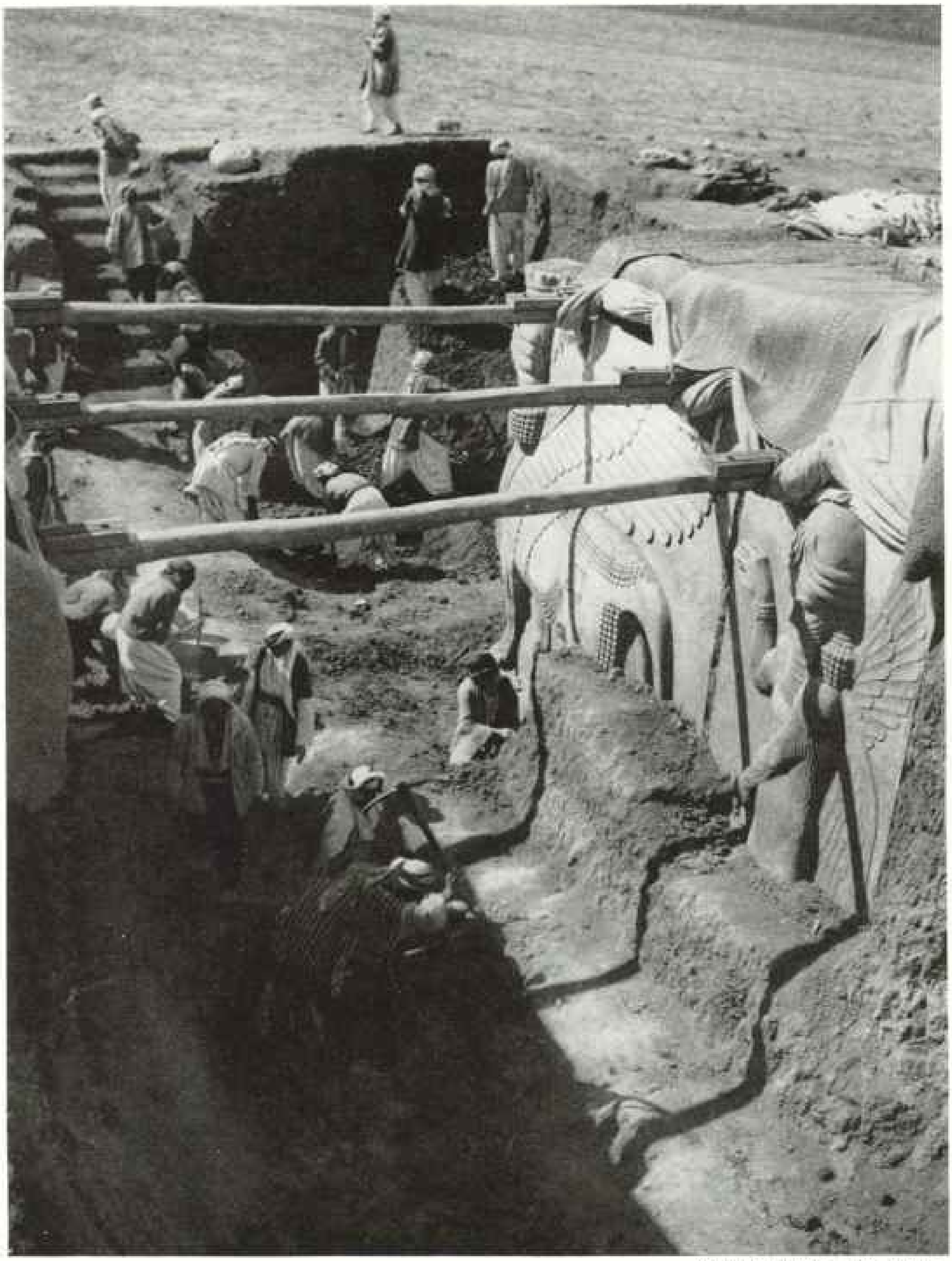
Up at Nineveh, on the Tigris near Mosul, ruled such powerful Assyrian kings as Sennacherib and Ashurbanipal. They had their gold-standard troubles, too; on Nineveh's walls was carved a text that showed the legal ratio between gold and silver!

Tablets found here excited the Christian world. They confirmed, almost word for word, the story of the Flood as told in the Book. Known as the "Gilgamesh Epic," these cuneiform texts are now owned by the British Museum. In them a "Noah" named Utanapishtim tells how he built the Ark, into which he loaded "the seed of all living things"; how the floods came, how he sent forth the dove, how the Ark finally came to rest and they all gave thanks.

Baked clay tablets, found at Babylon, show how close its business relations were with Nineveh. Produce dealers even complained, in one letter, that a shipment of chickens arrived in bad condition! Not Chicago, in 1941, but Nineveh—5,000 years ago!

These people baked bread just as modern Arabs do; they had toilets of carved marble, bathrooms, sewers, and kitchens so built that smoke wouldn't bother people in other parts of the house.

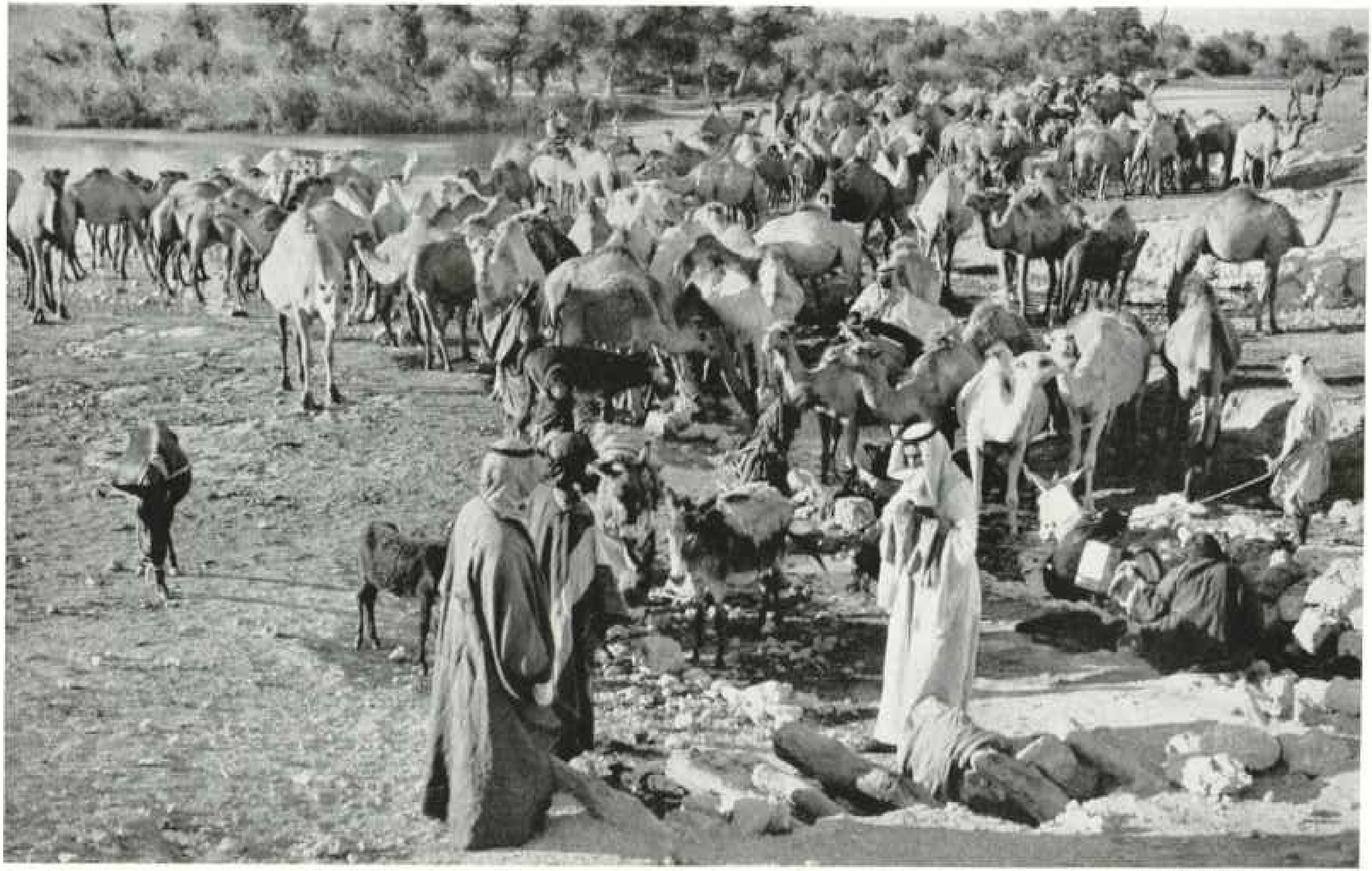
Old-timers in Baghdad still talk about the boys from Cornell, who came here "grave-robbing" years ago. One week end they forgot



Oriental Institute, University of Chicago

Human-headed Winged Bulls Guard Palace Portals Built More Than 2,600 Years Ago

Covered by sands, this palace at Dur Sharrukin (Khorsabad) was built by King Sargon II of Assyria. Here workmen of the Oriental Institute carefully remove earth so as not to injure the figures, carved in soft alabaster. For decades archeologists have excavated in northern Iraq. Nineveh yielded tablets telling, in almost the Bible's words, the story of a great flood (opposite page).



Staff Photographer W. Robert Moore

Bloated from Big Drinks of Welcome Water, These Camels Now Bawl, Grunt, Wheeze, and Sneeze in Satisfaction

Camels are strangely articulate. They bite and protest audibly when overloaded. After gorging with food or after a long-wanted drink, they gurgle with guttural delight, emit odd body squeaks and gastronomic rumblings. Arabs, with a hundred names for camels, know the herd feels good when at nightfall they hear a thousand camel stomachs growling all at once. These animals belong to the Anazeh tribe, in summer camp north of Rakka near the Syrian-Turkish border.

archeology and threw a party in the bazaars. Till then, Baghdad had never heard an American college yell. Given at midnight, from the flat roof of a pilgrim inn, this strange, barking war cry was mistaken by the Arabs for our national anthem!

Restoring the Garden of Eden

Iraq's desert, centuries ago, was the granary of the world—a sea of verdure from end to end. So wrote Herodotus, rambling reporter of long ago.

Herodotus was a good reporter. You see that, as you fly now up the Tigris-Euphrates basin toward Nineveh. On the plains below, you see outlines of sand-filled canals which, in their day, comprised a perfect gravity system watering millions of acres.

Slowly, today's Iraqis are building dams, digging ditches, and buying pumps to restore an agriculture burnt up when, centuries ago, invading enemies destroyed their canal systems.

King Ghazi cut the ribbon that officially opened a great dam completed at Kut-al-Imara in 1939. In his party that day were the American Minister to Iraq, Mr. Paul Knabenshue, and Dr. W. C. Lowdermilk of the U. S. Soil Conservation Service.

"This may open a new era in this old plain where almost a dozen empires have risen and fallen in the last 7,000 years," said Dr. Lowdermilk.

"What impressed me was the huge banks of silt which ancients had scraped from their irrigation ditches, now mostly dry and abandoned. Some silt banks formed miniature mountain chains 50 feet high. This shows that keeping mud out of these canals was even a bigger job than digging them."

Basra, Where the Dates Come From

Iraq's gate to salt water is Basra, Shatt-al-Arab delta town spurred to tremendous air, sea, and railroad trade activity in the last 20 years (page 180).

Basra, scene of struggle between Iraq and British troops in May, 1941, may be Iraq's most strategic city.

Fly over Basra, and you see miles of date orchards, part of which belong to Hills Brothers (Dromedary Dates), an American firm. Large orchards are Arab-owned.

For years Basra trade was embarrassed because of contention between Iran and Turkey, then Iran and Iraq, over sovereignty of the Shatt-al-Arab. Now, by treaty, the boundary line has been adjusted to rectify this unhappy situation.

Nearly all the world's date trade stems from here. Dates used to be picked and thrown in piles on straw mats, exposed to dust and flies. Now the American operators have installed clean, sanitary packing sheds, with air-cooled storage (page 176).

Astonishing to newcomers is the huge airport of British Overseas Airways. It stands at Margil, a garden city suburb of fine bungalows about a mile upstream from Basra's business center. Besides its shops, weather and wireless stations, this airport has its own hotel with some 50 double rooms and baths, a fine restaurant, and a ballroom where official Basra gives its parties.

Here, too, is the terminus of the Baghdad Railway, from whose sleepers in normal times travelers may take planes for India, Singapore, China, Manila, and Australia.

Second world wonder near Basra is the colossal refinery of the Anglo-Iranian Oil Company on Abadan Island. This island city, in the Shatt-al-Arab, lies downstream from Basra. Crude oil comes down to it by pipe line from fields on the upper Karun River, in Iran.

War Sends Freight around Robin Hood's Barn

This Abadan, though even its name is almost unknown, is hugely important to Britain; in fact, she might lose the whole Iraq field, pipe line and all, and yet with Abadan safe and the Suez Canal open, her Navy would have all the fuel it needs.

War's closing of the Mediterranean to commerce has boomed Basra's sea trade in an odd way.

"Normally," said Mr. Marcel E. Wagner, President of the American Eastern Corporation, "we ship steel, tires, motorcars, pumps, airplanes, etc., from New York to Egypt at about $17 a ton. But when President Roosevelt closed the Mediterranean and the Red Sea to American ships, we had to send our goods by the Isthmian Steamship Lines clear around the Cape of Good Hope, up the Indian Ocean to Basra, up to Baghdad, then by rail or truck to Turkey or Syria, and then by boat again, across the Mediterranean to Alexandria.

"This multiplied freight costs ten times. Naturally, some cargo couldn't finish the trip, because it wasn't worth $170 a ton, but some went all the way.

"Here was another odd fact of commercial geography. You don't think of American ships making money hauling goods from Egypt to Iraq. But, as agents for the Isthmian Lines, we saw them do just that; we collected over a million dollars for such freight in less than one year. A lot of that money was paid for hauling iron bedsteads made in Egypt and

Air John Ward, B.E.O.

Millions of Date Palms Spread over the Shatt-al-Arab Delta about Basra and Its International Airport

Most dates in world trade move from here. Planes from London to India and Australia use this highly modernized airport. Flying boats alight in the channel between long Coal Island and the landing field. Here you see the river flowing south, out of the picture's top, toward Abadan Island's oil refineries. The steamer in midstream lies just off Basra's water front. Old Basra proper lies to the right, inland from the water front (pages 175, 180).

B. J. Becker

Looking Down on the Golden-domed Mosque of Al Kadhimain, near Baghdad, One of the Most Sacred Moslem Centers in Iraq

Pilgrims rest in the small cells inside the walls which enclose the historic mosque and minarets. No Christians may enter here. Cameras, even in the hands of Moslems, are forbidden. Karbala and An Najaf are other holy cities of Iraq visited annually by thousands.

Royal Air Force Crown Copyright

Baghdad, Ancient Seat of the Caliphs, Sprawls along Both Banks of the Tigris

Here, in the spring of 1941, Iraqi insurgents overthrew the infant King's government and made war on the British. After a short, sharp struggle, the British, advancing north from Basra and east from Lake Habbaniya, routed the rebels and occupied Baghdad.

sold to Arabs who for centuries have slept only on rugs or skins in their desert tents."

Through Basra this year, America-bound, have come 20 millions of dollars' worth of Turkish and Bulgarian tobacco, fortunes in wool, skins, licorice root, poppyseeds, and opium. Worth $120,000 a ton, this opium from Turkey had to be escorted by armed guards all the way across the desert.

Oil of Roses at $8,000 a Quart

Among out-shipments for America were five quarts of oil of roses from Damascus, invoiced at $8,000 a quart!

"I battled for one order for 15 Douglas fighting ships," said Mr. Wagner. "But the Italians, French, and British were also after the same order. To clinch it, I told the Iraqis that I'd pay the expenses of four of their best airmen to the United States and back, to inspect these planes; that if they weren't just what we said they were, the whole round trip would be on me. But if, on inspection and test, they found the planes to be as represented, they had to buy them and pay their own way. Well, they came, saw, and bought. But that's not the whole story.

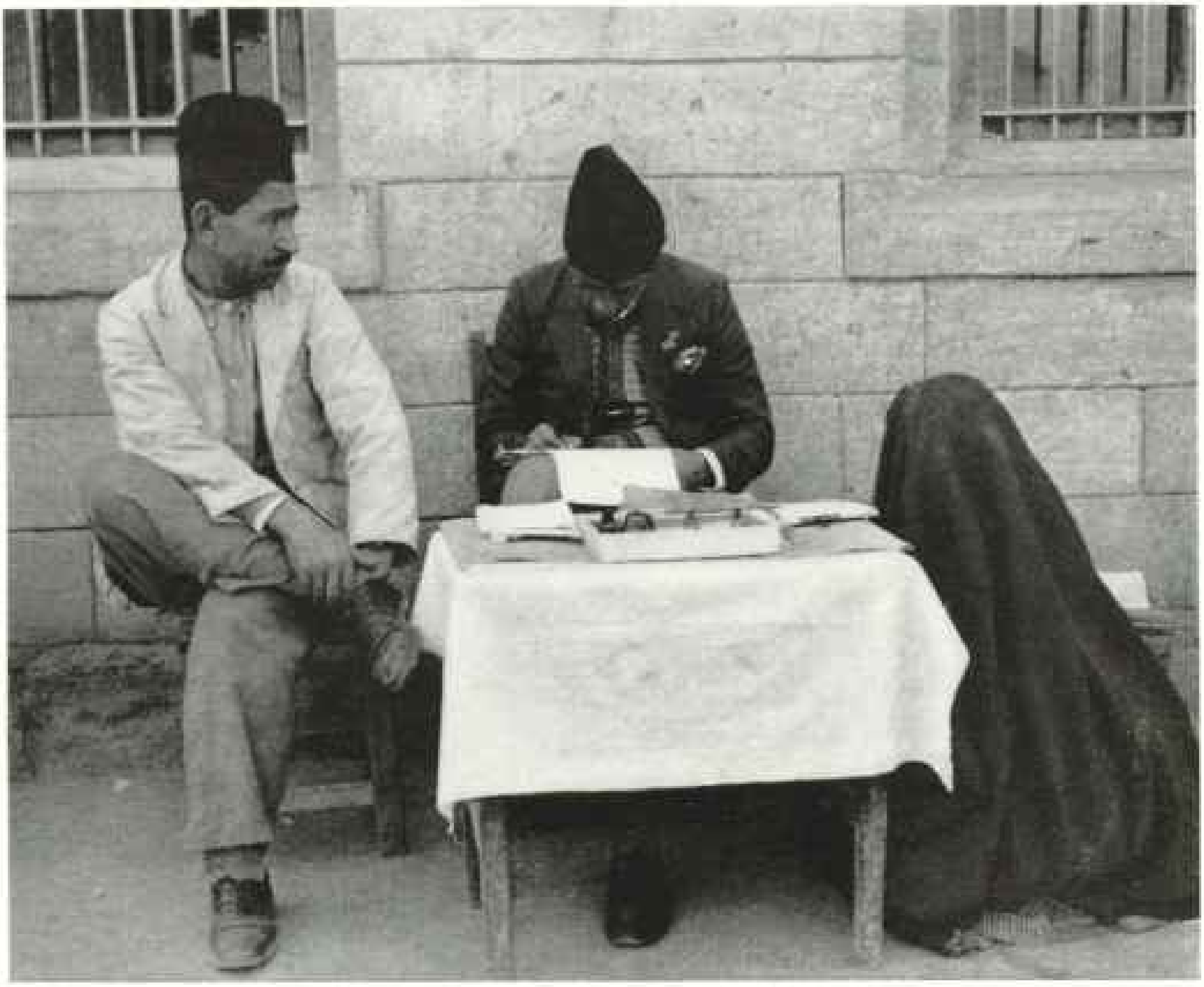
"Baghdad also likes American motion picture films.

"The four flyers who came with me had just seen Victor McLaglen in a picture shown at Baghdad. So, when we were at the Douglas plant in southern California, they said they wanted to go to Hollywood to meet these movie people.

"That was arranged. We took them to a lot where McLaglen was working. When the actor met the Iraqis, to their delight he spoke to them in Arabic.

"'Where on earth did you learn that?' I asked.

"'In Baghdad,'" he said. "'In the First World War I was in the British Army and for months was a military policeman in the



Edwin W. Gordon

Squatting beside the Nineveh Public Scribe, a Woman Dictates a Love Note—or Maybe She's Writing Home for Money!

bazaars of Baghdad. I just had to learn it!"

Arab printers set type in Baghdad on linotypes made in Brooklyn. One paper, the Iraq Times, is half English, half Arabic.

Local advertising is unique. One rug dealer uses a catch line, "The Writing on the Wall." His "copy" says the king of Babylon was to blame for the collapse of his empire; that he should have covered his palace walls with rugs and hangings, and then there would have been no bare space for the warning words!

Front page, first column, records the doings of the Royal Court. What with war, usurpers, and intrigue, these are rough days for six-year-old King Feisal (page 169).

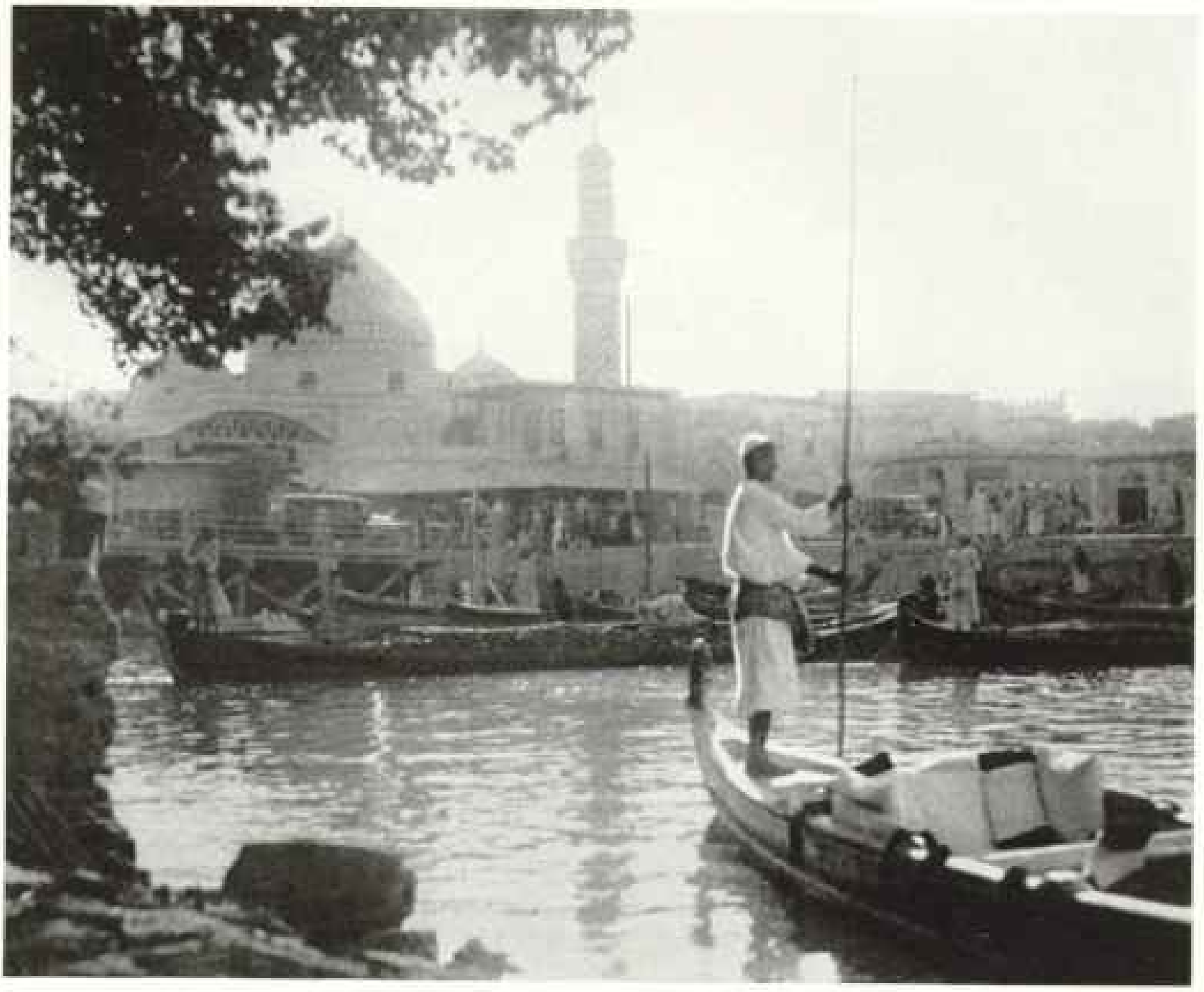
Ruling passion of this youngster, says one item, is riding. Horse-breeding is a veritable tradition here in Arab lands. When the young King galloped into the ring at Baghdad's annual horse show, thousands cheered. He has an English nurse—or did before the shooting started—and speaks English fluently. When his mother told him he ought to tip his grooms, he gave largesse and said, "I suppose that's what kings do."

Baghdad peasant women, when a son is born, set a lighted candle in a tiny boat after sundown and watch its course down the Tigris. If it sails smoothly away, burning brightly, the course of the baby's life will be bright and smooth.

Tigris floods drown out thousands, says another item; so the Iraq army distributes tents and food. Sounds like the Mississippi or the Ohio.

We slept on the roof by night and spent the summer days in our *serdab*, a cellar with open windows stuffed with camel's-thorn on which servants splashed water to cool any air that moved. You may find the temperature to be 120° Fahrenheit, even at sundown.

Today's Baghdadis can escape from all this; by train and motorcar now they can in a few hours reach the cool, green, well-watered summer resorts of northern Iraq. In some Baghdad buildings, such as the American Legation, banks, and some government quarters, air-cooling systems are used.



Courtesy Mills Brothers Co.

Basra, Iraq's Persian Gulf Port, Stands in the Delta of the Shatt-al-Arab, amid Vast Date Groves

Busy Basra, long an obscure river town, now is to Iraq what New Orleans is to the Mississippi Valley. London-Australia planes stop overnight here. Tremendous freight moves through. With the Mediterranean closed to sea trade, freight between New York and Turkey goes around the Cape of Good Hope, through Basra, and by rail or truck across Iraq (pages 175, 176).

Even in an Iraq war there's humor. It is recorded that a British officer came upon a band of Arabs digging vigorously into a shell hole.

"Does your sheik know what you are doing?" he asked.

"Not yet," they said. "We'll tell him, when we get him dug out!"

Wise Old Mule Not Fooled by a Mirage

Iraq's mirages are incomparable. Vividly one of us recalls how he was fooled. Returning by mule from a hunting trip up the Diyala River, he stopped to chase a flock of desert sand grouse and got separated from the pack train. Over low hills, he distinctly saw the domes and minarets of Baghdad—or thought he did!

So he headed that way, though his mule objected. In a minute, however, the phantom city faded; ahead lay only the heat-wiggled horizon. The wise mule, which couldn't appreciate or maybe even see a perfect mirage, turned in another direction and soon overtook the pack train, Baghdad-bound.

Mirage; mystery; tradition. How little we know this Arab world, ancient earth spot where, peradventure, man first walked!

Today it fights with modern bombers and searchlights; yet keeps the old desert law of hostage, the covenant of bread and salt, and slays sheep to seal vows.

From today's rising battle smoke, Baghdad lifts its battered head, and licks its wounds. But for it there's nothing ominous in the fate of Babylon, Kish, Nineveh, and Ctesiphon, which died by the sword. Let Allah's will be done. War is no disaster; it's a man's game, like falconry and horse racing. They always fight in Iraq.

Tarheelia on Parade

Versatile and Vibrant, North Carolina in a Generation Has Climbed New Economic Heights

By Leonard C. Roy

NORTH CAROLINA is a land of amazing variety.

Look at its map. One end is washed by the Atlantic Ocean. The other meets Tennessee amid the highest mountain peaks east of the Mississippi River.

Between these extremes the State falls into three natural divisions: the level Coastal Plain of rich farmland, the gently rolling hills of the Piedmont where swift streams form the basis of great industrial development, and the Western Highlands, so long a mountain playground and health resort.

Life in these divisions is as varied as their topography (map, pages 184-5).

The flavor of the Old South prevails on the Coastal Plain. Venerable plantation mansions recall gay gatherings of "before the war" beaux and belles. Invited to dinner, you may be served with country ham, chitterlings, diamondback terrapin, wild duck in season, a choice of fresh-caught fish, barbecued pork, or chicken; or "fish muddle" (a fish stew), turnip greens, and "dodgers" (corn-meal dumplings) cooked in "pot likker." On village streets "cousin," "uncle," and "aunt" are often used without regard for kinship.

In the Piedmont speech and step are livelier. More men work here by the clock than by the sun. Busy factories abound.

The difference stems partly from pioneer days. English and Scottish settlers in the Piedmont lived by the work of their own hands. Germans who migrated from Pennsylvania did the same. The plantation system never developed in the Piedmont on a large scale.

Isolation bred a distinct type of North Carolinian in the Western Highlands. Remote from government and with their nearest neighbors often several miles away, the highlanders became self-sufficient and independent, even suspicious of strangers. Slavery meant nothing to them. Many were Union sympathizers during the War between the States.

Here Cotton and Water Power Meet

After Appomattox, education and industry were hard hit. Not until the eighties did reconstruction really get under way. Homespun then was giving way to "store cloth," cloth of North Carolina cotton woven in New England and returned to the State for sale. Here were cotton, abundant water power, and a market, men observed. New mills were built, and more and more cotton remained here.

The big move forward in North Carolina, however, started only a generation ago when huge power plants elbowed mills from stream banks in the Piedmont. Industries no longer required direct water power. They could be operated as far away as wires could deliver electric current.

Then came good roads in the early twenties to lend vigor to the industrial rally. Gone were the days of dusty lanes and mud ruts. In a few years North Carolina ranked high in the Nation in road building. Today hard-surface highways link every county seat of the 100 counties that make the State resemble a huge jigsaw puzzle.*

Virginia Dare Trail to Roanoke Island

I chose romantic Roanoke Island, scene of the first white settlement in North Carolina, as the starting point of my 10,000-mile tour of the State.

Roanoke nestles behind the Outer Banks, the chain of sand-swept islands paralleling the North Carolina coast. In slightly more than a decade, it has moved from the oxcart to the automobile age. At Manteo staff photographer J. Baylor Roberts sought in vain an ox-drawn cart to photograph amid the maze of automobile traffic in the town's busy shopping center.

Along with rubber tires has come concrete street paving to replace crushed oystershells as a top dressing. The old rambling general stores, where you can still buy things from hairpins to harness, now vie with modern specialty shops.

The Virginia Dare Trail on the Outer Banks has made the island accessible since 1931 to fishermen and hunters seeking sport in the near-by sounds, sea, and marshes.

But *The Lost Colony*, colorful pageant by Paul Green, native of North Carolina, of the fate of Sir Walter Raleigh's colonists here, has been Roanoke's chief lure since the summer of 1937 (Plate XII).

Old residents recall that the Outer Banks once were covered with forests. Today trees survive only on the inner, or Sound side. To

*See "Motor-coaching Through North Carolina," by Melville Chater, National Geographic Magazine, May, 1926.

Staff Photographer J. Baylor Roberts

College Songs Ring from the Bell Tower at Chapel Hill

The University of North Carolina is the oldest State university in point of operation. Opening its doors to the first student in 1795, it has operated since except for five years following the War between the States. Although its first duty is to the State, it seeks to improve economic and social conditions in the whole South (page 197).

save these from sand suffocation, brush fences have been built along the Atlantic beaches, and dunes have been planted with grass.

A few years ago old Cape Hatteras Light was abandoned because the encroaching sea washed against its very base. Dunes built up by the fences and held fast by grass have literally pushed the sea back several hundred feet.

To see a typical Banks village, I planned to drive to Ocracoke. I found the "highway" mere hub-deep sand ruts, so I took to the air. My Ocracoke taxi bore no license tags, for the State does not contribute to highway maintenance on this stretch of the Outer Banks.

Ocracoke is a jumble of small frame houses with sandy lanes winding among them. Many natives trace their origin to shipwrecked sailors who, thankful for their rescue, settled hereabouts for life.

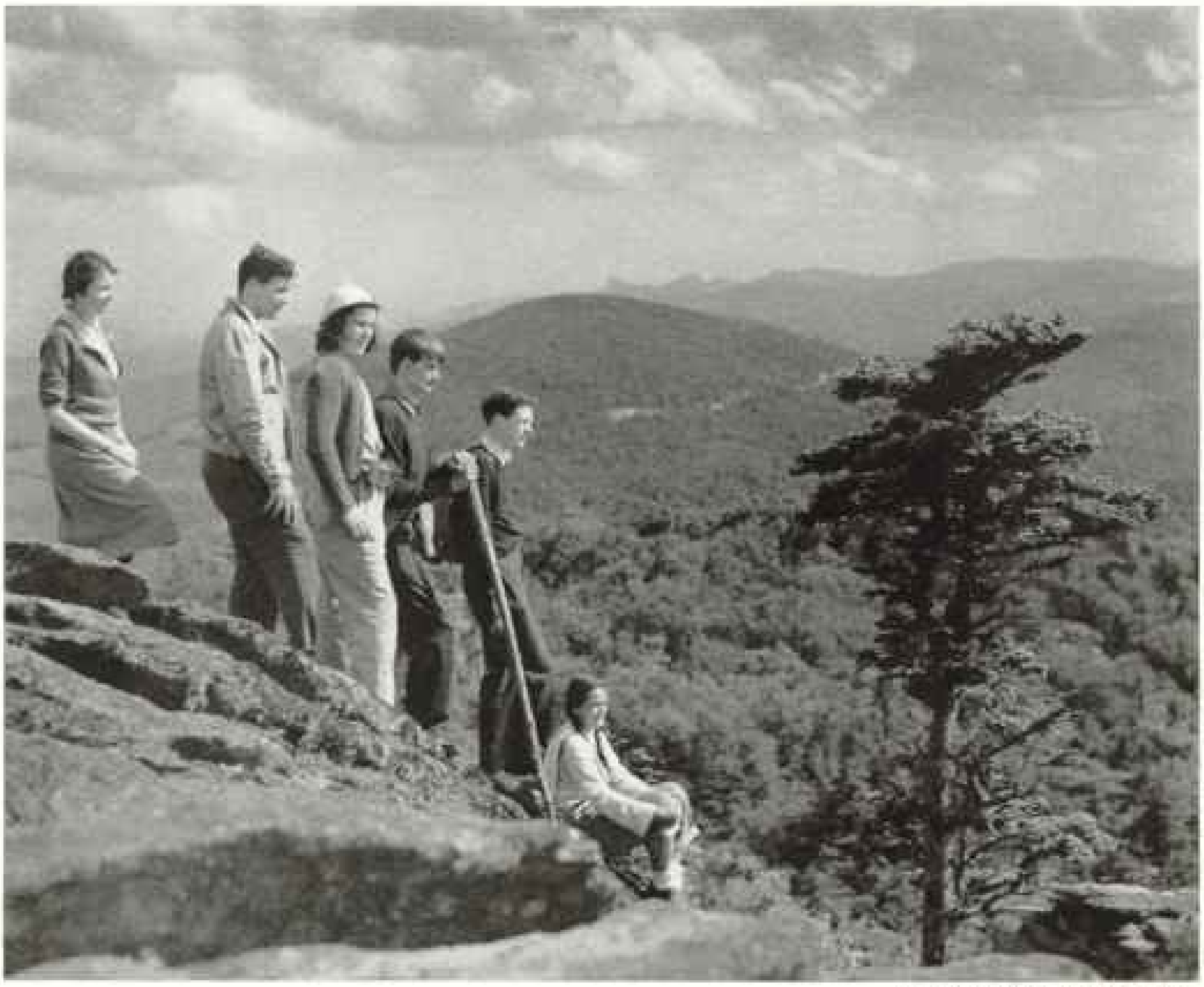
Once the villagers lived by salvaging cargoes of ships which, legend says, they purposely lured to destruction on the Banks. Sons and grandsons of those salvagers today are performing heroic service as Coast Guardsmen.

Frequent ferries now reach Ocracoke from the mainland, and two years ago a group of artists established a colony there. Yet you still hear natives say "hoigh toid" for high tide, "foine toime" for fine time, "fitten" for fit, and "turkles" for turtles.

Life is governed by the tides. You are born here on flood tide and die on ebb tide. Underground vegetables are planted only in the dark of the moon; others in the light of the moon, or they will not thrive.*

I crossed the three-mile-long Wright Memorial Bridge spanning Currituck Sound to reach

* See "Bit of Elizabethan England in America," by Blanch Nettleton Epler, National Geographic Magazine, December, 1933.



Staff Photographer J. Baylor Roberts

Hikers Scan the Northern Carolina Highlands from Rugged Grandfather Mountain

A French botanist stood near this point in 1794 and sang the *Marseillaise* because he thought Grandfather (5,964 feet) topped all American peaks. But many others even in eastern ranges are higher. Below is the village of Linville set in a 16,000-acre natural park studded with rustic houses, and beautiful Linville Falls. A highway scars the mountain in the background (page 221).

the North Carolina mainland. A toll bridge? No. North Carolina has none.

At Elizabeth City you see patrol planes streaking across cement runways of the new Coast Guard air base and heading for duty on the most dangerous stretch of the Atlantic coast, the stormy seas off Cape Hatteras (page 224).

Northern yachtsmen sailing the Intracoastal Waterway to Florida stop at Elizabeth City to rid their craft of barnacles and to undergo general repairs. On the walls of a yacht-basin office hang scores of rectangular shingles bearing the names of craft that have put in here, names familiar in nearly every port along the Atlantic seaboard.

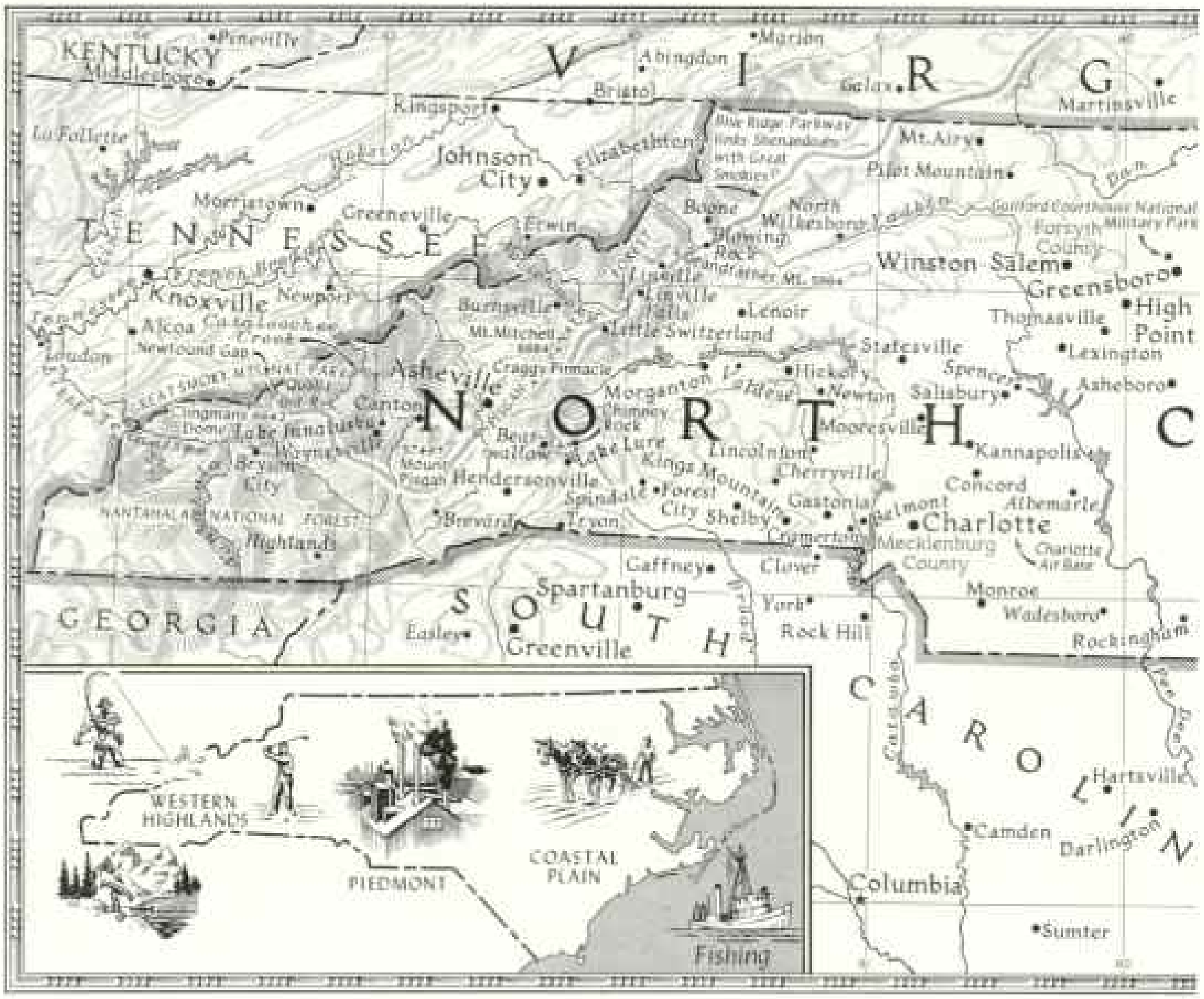
Less than an hour after leaving Elizabeth City, I was driving through Edenton along streets laid out in the early 1700's and bearing their original names.

Founded by settlers from Jamestown, Virginia, Edenton is one of the oldest permanent settlements in North Carolina. Its courthouse, a church, and several residences have withstood nearly two centuries of weather, wars, and local growing pains.

Citizens like to tell you about the famous Edenton Tea Party. It differed from the Boston Tea Party, a few months earlier, in that it was wholly a women's affair. They resolved to destroy their tea supply and to buy no more until the British tax was lifted.

Peanuts Polished with Talcum Powder

Peanuts thrive in twelve counties of northeastern North Carolina. Two million dollars' worth are sold in the Edenton market each year. Some of the "peas," as they are locally called, remain in the State to feed baseball, carnival, and circus fans, but most of them are hulled and shipped elsewhere to become peanut butter, ingredients of candy, or to be



From the Crest of the Great Smokies, North Carolina Slopes 500 Miles

processed for oil widely used in cooking. Hulls are ground to help make fertilizer, wall board, floor-cleaning compounds, and dynamite.

At Williamston you see peanuts direct from the farm deposited in a machine that cleans and polishes them with talcum powder. Another machine hulls and grades the nuts. As many as eight carloads of peanuts a day are shipped from Williamston to midwestern and northern customers.

Port of the "Fatback" Fleet

North Carolina leads the South Atlantic States in commercial fisheries.

Menhaden account for the major portion of the annual catch. More than forty vessels operate out of Morehead City in search of "fatback," as these fish are locally called (page 205). From April to June and October to January the boats cruise along the coast.

"Lower away!" shouted from the crow's-nest, means a school has been sighted. Boats are lowered. The school is circled with a purse net. Meanwhile, the mother ship moves in to receive the catch. Menhaden boats hold up to three-quarters of a million fish weighing about one pound each.

In seven plants in Morehead City and Beaufort the menhaden are steam-cooked and passed through hydraulic presses. Their oil is used as a substitute for linseed oil and in the manufacture of linoleum, paints and varnishes, water-proof fabrics, artificial leather, and insecticides. The residue becomes fertilizer.

New River oysters from North Carolina won honors at the World's Columbian Exposition at Chicago in 1893. North River oysters were popular then, too. Oysters from Long Island Sound and Chesapeake Bay, however, now are better known in the State than even the local bivalves. State officials are planning a comeback with promotion of oyster "farms" in vast acreages of local sounds and rivers.

At the U. S. Fishery Biological Laboratory at Beaufort, Dr. Herbert F. Prytherch is

Industrial Piedmont Merges into the Coastal Plain of the Atlantic

operating a fish farm in a near-by marsh. He has already proved that fish will thrive in lakes in salt marshes of the State under conditions at Beaufort.

In an outdoor pool here I saw several hundred of the 16,000 diamondback terrapins raised at the laboratory each year. When the young are one year old, or about the size of a half dollar, they are dispatched to wildlife refuges from Maryland to Georgia.

Wilmington Helps Build "Bridge of Ships"

Wilmington's water front once reeked with turpentine, and harborside terminals bulged with cotton. Its exporters were known to shipping men in Liverpool and Yokohama. But look now. Turpentine barrels vanished with North Carolina pine forests, and exportable cotton bales became scarcer with the growth of the cotton-textile industry.

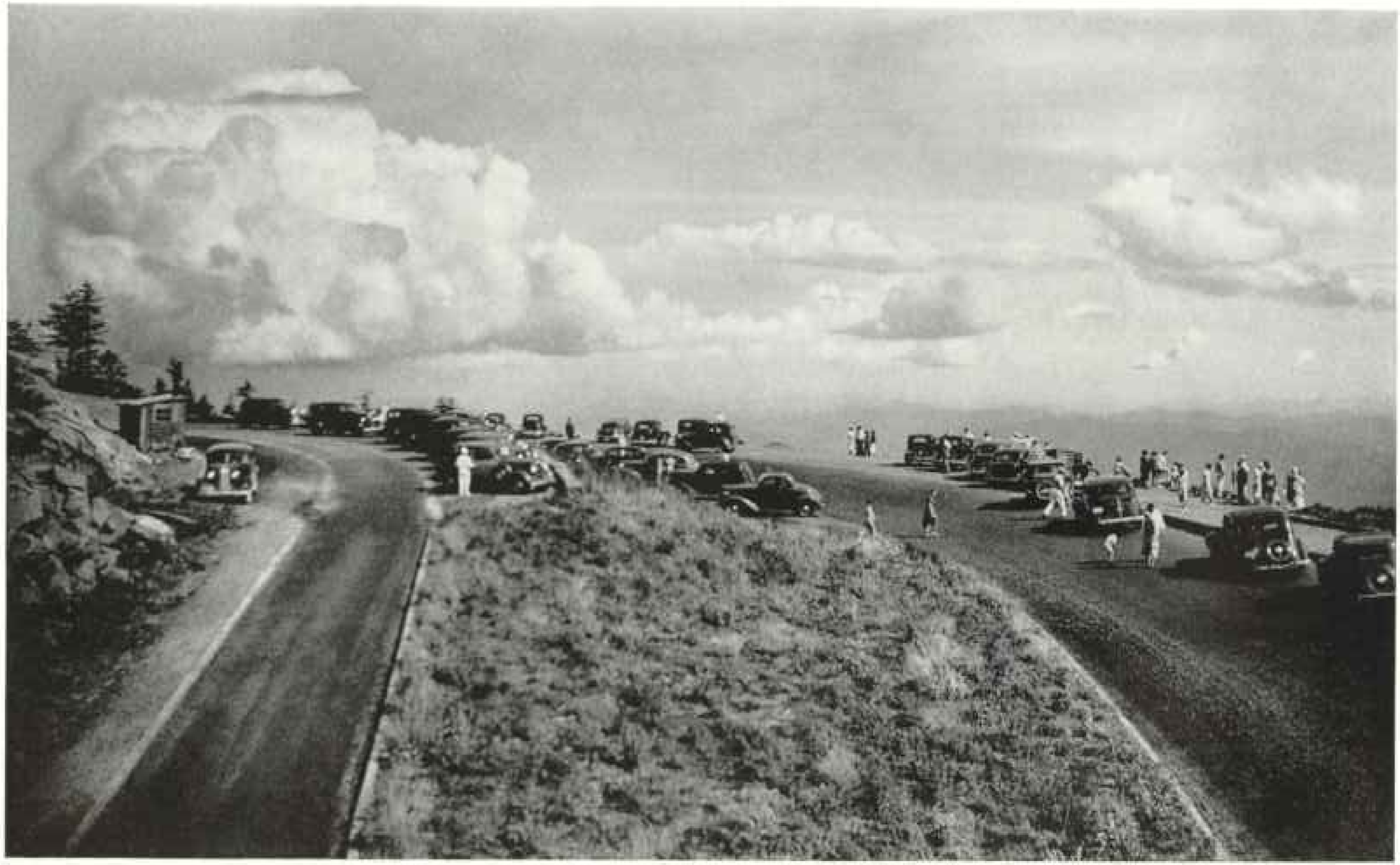
The bulk of Wilmington's sea-borne trade now is gasoline from Texas. More than one hundred silvery tanks holding 65,000,000 gallons spread along the Cape Fear River bank in and below the city.

Six years ago demand for antiknock gasoline brought a new industry here. Engineers of the Ethyl-Dow Chemical Company sought a site near an unlimited supply of clean sea water with high content of bromine, an element required in the manufacture of tetraethyl lead.

They found the site below Wilmington on a peninsula flanked by the ocean and the river.

Water is pumped from the ocean into the plant for treatment and then discharged into the stream. The treated water has to flow a dozen miles to the ocean, thus preventing dilution of the water on the sea side of the peninsula.

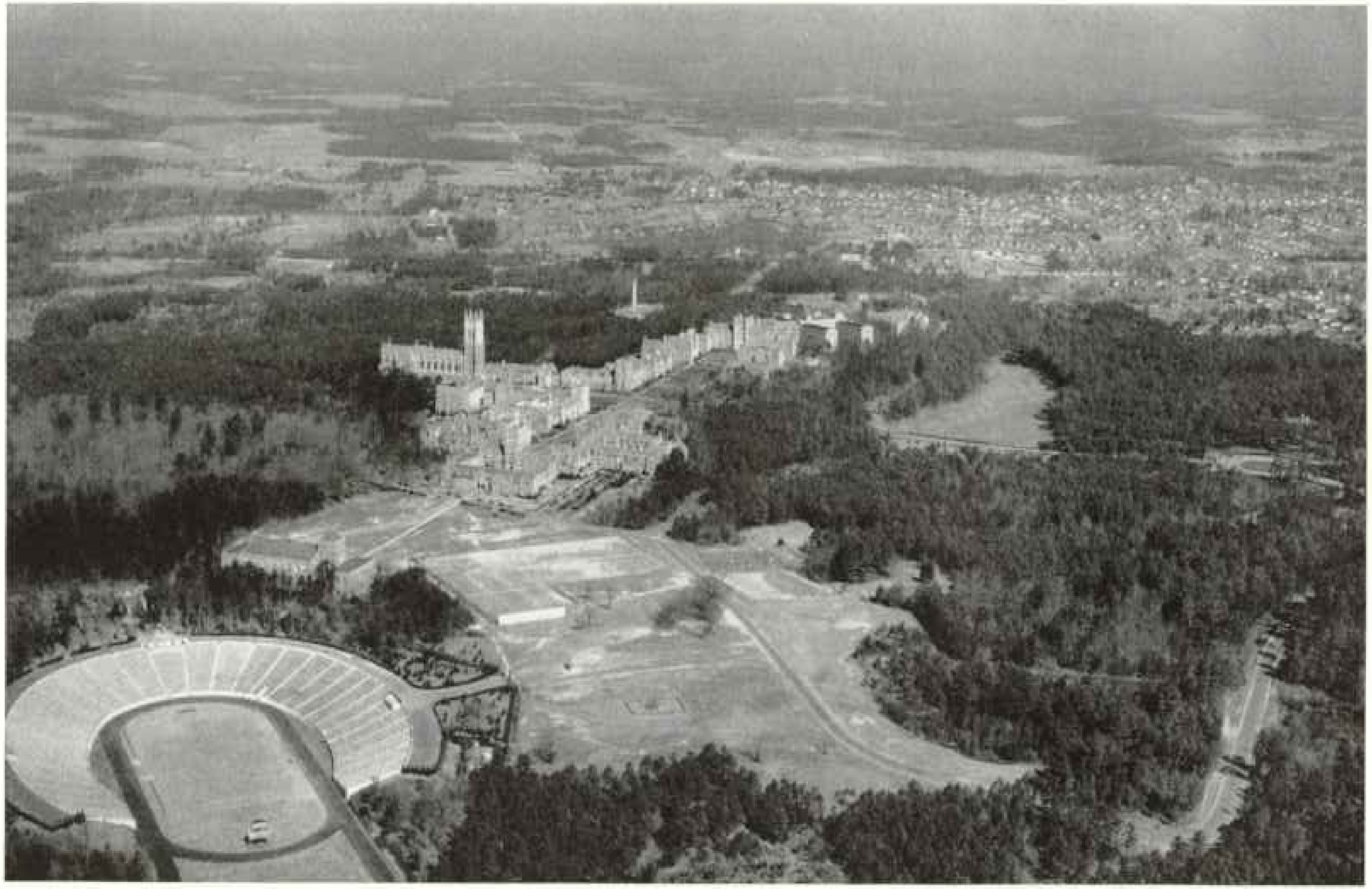
Wilmington built ships for the World War and is playing a similar role in the defense program. On a 70-acre site nine ways have been built where 37 steel cargo ships of 7,500 tons each will be assembled by 1943.



Carlisle C. Campbell

The "Roof Tops of Eastern America" Spread as Far as You Can See from Clingmans Dome (Page 224)

Below this grandstand of the Great Smoky Mountains National Park sweep the mountains of Tennessee and North Carolina. The dividing line between the States crosses the Dome (6,642 feet), second only to Mount Mitchell in height east of the Mississippi. This parking place is 300 feet below the summit, reached by a foot trail.



Fairchild Aerial Surveys

Suggesting an English University Town, Duke University Nestles among Wooded Hills

Grouped around the Chapel tower are the men's dormitories and classrooms. At the upper end of the quadrangle is the Medical School and Hospital, one of the largest in the South. The stadium seats 40,000. Durham sprawls in the background. Not shown here is the women's section, including old Trinity (page 197).

Early spring brings throngs of garden visitors here. Near-by Orton Plantation is a riot of colors in April when azalea trails in its spacious gardens burst into color. The display makes a striking foreground for the graceful colonial mansion house that has stood since 1725.

Unique among experiments in modern colonization in this country is that in operation at Castle Hayne. Thirty years ago a Wilmington business man, Hugh MacRae, divided a large tract into ten-acre plots and invited men of foreign birth to settle here. A Hollander told me he bought a ten-acre plot in 1920. Now he owns outright 100 acres.

"We raise 24 different crops, and ship as many as 10,000 dozen daffodils, 5,000 dozen irises, and 2,500 dozen gladioli in a day," he said. "We also produce a quarter of a million bulbs over those used for next year's crop."

As I drove northwestward, the Coastal region seemed one big farm generously dotted with villages, towns, and small cities. In every county there are patches of corn, cotton, and tobacco, just three of more than a score of general crops that thrive here.

Produce is often sold at auction, as is tobacco. At Faison I saw buyers from northern cities bidding on corn, cantaloupes, string beans, and cucumbers while an auctioneer chanted. A buyer from a Washington, D. C., grocery chain showed me a day's order for 5,000 dozen ears of corn.

One hundred and fifty thousand bushels of cucumbers grown in this region move direct from vines to a local pickle plant.

A New Building Every 32 Minutes

A year ago Fort Bragg was called a military suburb of Fayetteville. Its population was 5,000; Fayetteville's about 20,000.

Last winter 24,000 workmen began thrusting roads through pine forests and flanking them with buildings at the rate of one every 32 minutes. The military population has swelled to more than 65,000.*

But the fort can easily accommodate these and many more. It is the largest military reservation in the United States—about 25 miles long and 10 miles wide.

Within a half hour's drive of its western extremity lie Southern Pines and Pinehurst (page 201). Here in spring and fall, amid the longleaf pines of the Sandhills, vacationists "shoot" tennis and golf balls while their military neighbors are schooled in shooting more lethal objects of lead and steel.

* See "Around the Clock with Your Soldier Boy," by Frederick Simpich, National Geographic Magazine, July, 1941.

More tobacco grows in this State than in any other. Soils and climate here promote the growth of both the bright-leaf and burley varieties (Plate XIV).

Croppin' Time in Tobaccoland

The heart of the Coastal Plain has earned the right to the name "Tobaccoland." Before spring comes, the tobacco farmer clears a virgin patch of ground for a seed bed. Cheesecloth shelters young plants until they are about six inches tall. Then they are transplanted in the open fields.

In July "croppin'" time begins. Mule-drawn dry-land sleds and tiny-wheeled cropping trucks with burlap sides move through the fields as farm hands gather ripe lower leaves. Under a near-by shelter, men, women, and children tie the leaves on long sticks.

In the flue-curing process the sticks hang in curing barns for about four days and nights while wood fires are tended to keep the heat "just right."

One hundred and twenty thousand tobacco farms in North Carolina employ half a million people for the greater part of the year. By the time the leaf has been put into cans, cigarettes, plug tobacco, snuff, or insecticides, almost one-third of the people of the State receive some income from its production, handling, selling, and manufacture.

Nearly 200 auction warehouses dispose of the tobacco crop. Wilson leads in sales. Early in September trucks rumble into the city from tobacco plantations. Leaves are piled on wicker trays in rows on warehouse floors. A ticket on each pile bears the name of the owner and the number of pounds in the lot (page 204).

A warehouse official examines each pile and by a signal to the auctioneer sets the starting price for the auction. The chant of the auctioneer rings through the warehouse as he moves from pile to pile. The buyers are silent. Acceptance of a price is by signals, perhaps a mere glance at the auctioneer.

A farmer is not bound by the auction price. He may move his tobacco to another row for resale, or even to another auction house.

In some markets four sales a minute must be made. In this way each year 90,000,000 pounds of tobacco are sold in Wilson warehouses.

Wilson calls its warehouse district "jungletown." Farm families are joined by venders of a strange assortment of merchandise, from snake oil to trinkets. To attract purchasers, some venders hire pickaninnies, dress them ridiculously, paint their faces, and train them to arouse human interest.

 Kodachrome by J. Baylor Roberts

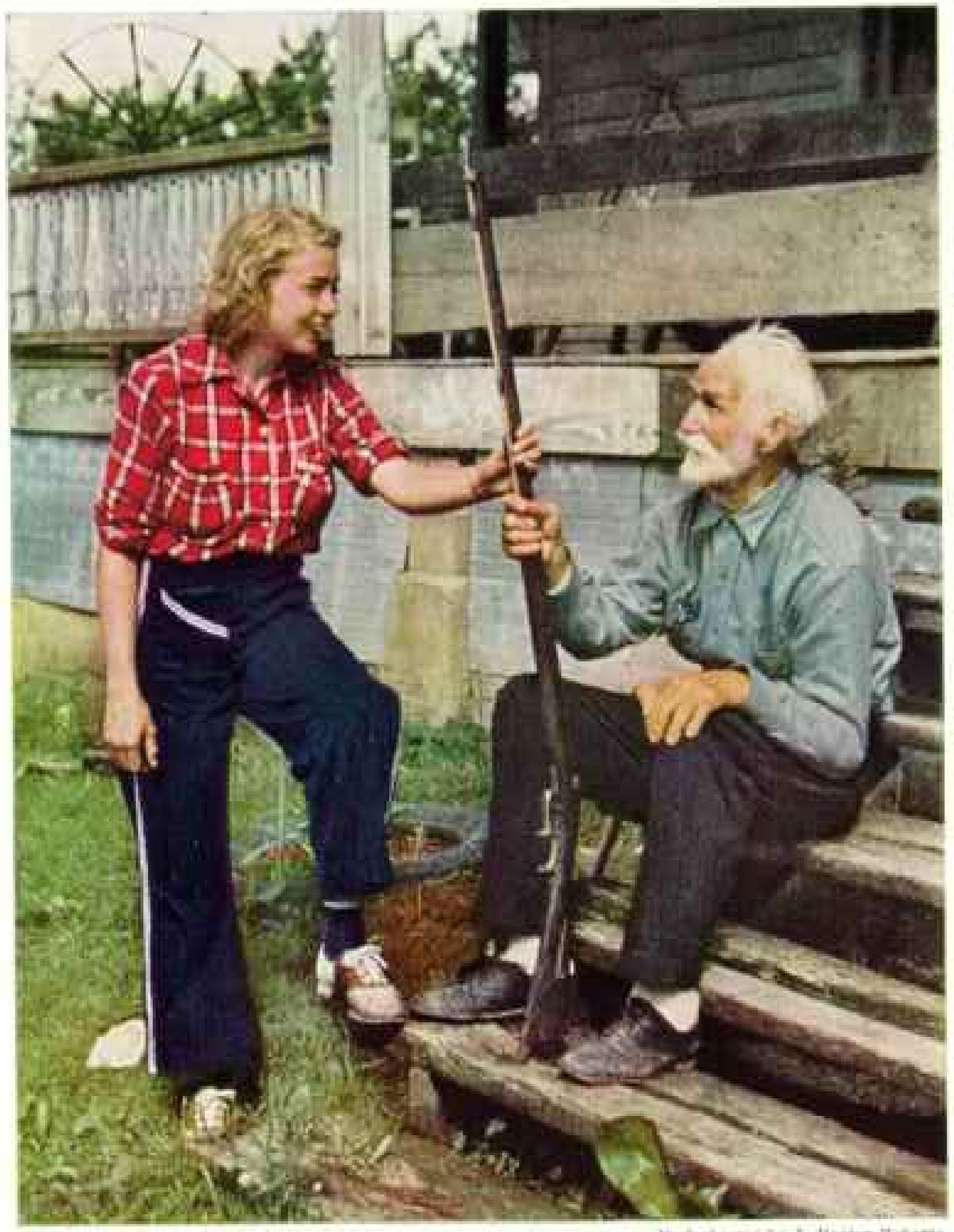
Royal Smiles Give the Cue for Asheville's Gay Festival Week

Each year in June a King and a Queen of Rhododendron are crowned at a colorful ceremony (Plate II).

Kodachrome by J. Baylor Roberts

In Craggy Gardens Near Asheville the Rhododendron Blooms in Wild Profusion

Thousands climb the steep half-mile trail to reach these natural gardens in Pisgah National Forest. More enthusiastic climbers hike to the summit of Craggy Pinnacle (left background) to get an eagle's-eye view of the floral mantle.



 Kodachrome by J. Baylor Roberts

"Take Keer, Datter, She's Aloaded"

When this resident of Cataloochee Valley was as young as the girl, his rifle meant more to him than money. It brought wild game to his table, helped clothe him, and kept marauders out of his vegetable patch.

Kodachrome by R. E. Schmidt

With Forsythia Comes the Call of the Outdoors

Blossoming in the first warm days of March, the golden spikes signal the passing of the "melancholy days" of winter. Long stretches of North Carolina highways are bordered with flowering shrubs and trees.

 Kodachrome by J. Baylor Roberts

Kilted Lads and Lassies Relax in a Fayetteville Churchyard

The group is attending the annual Cape Fear Valley Festival commemorating the settlement in North Carolina of Scottish people in 1739. This First Presbyterian Church was built more than a century ago. Fayetteville was the capital of the State from 1788 to 1793. North Carolina ratified the Federal Constitution there.

Currituck Truck Farmers Have Evolved This Big-wheeled Cart to Ride the Deep Sands of the Coastal Region

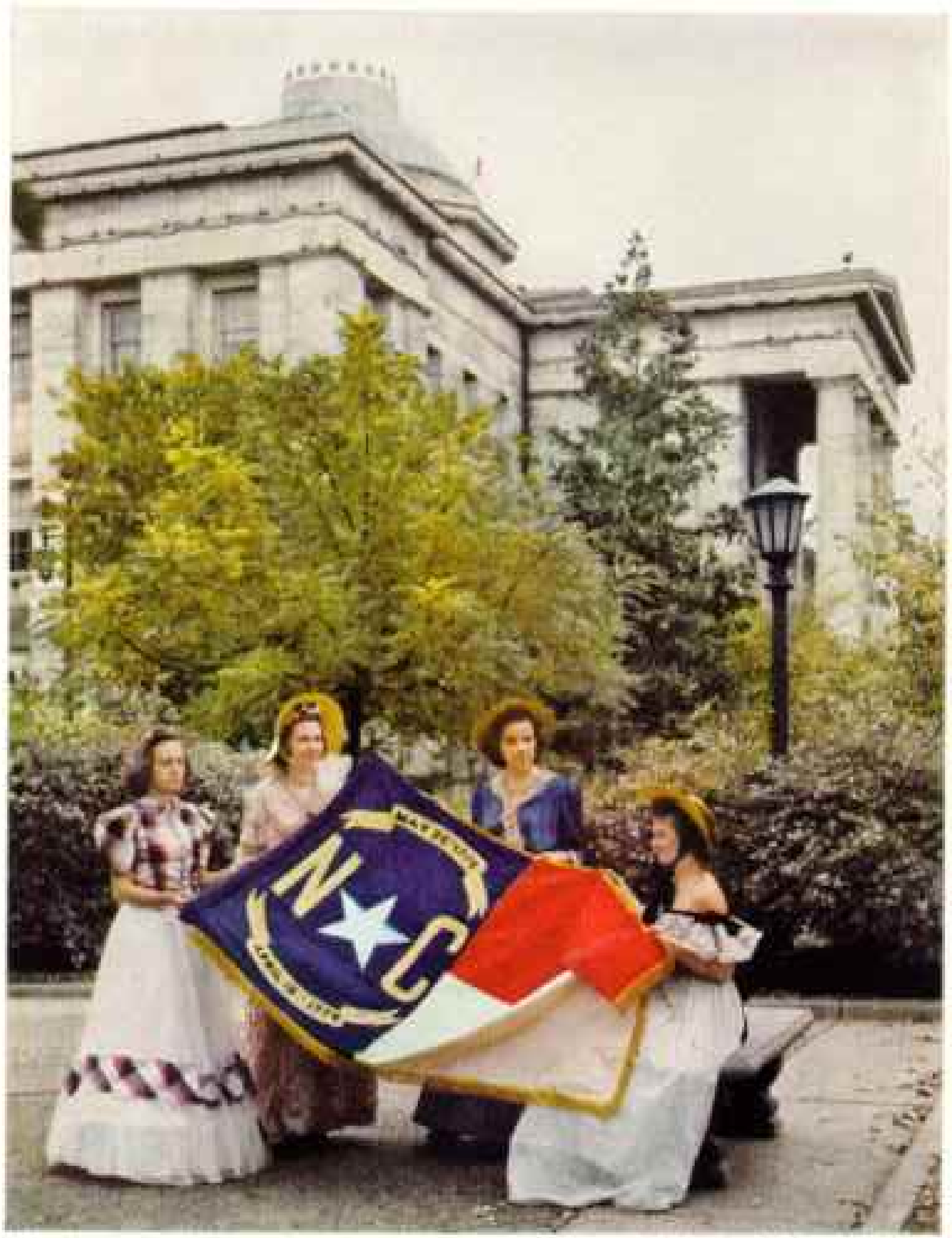
Kodachromes by J. Baylor Roberts

Gay Designs Shown Here Have Served Four Generations of This Family at Bearwallow

The six-year-old already is proficient with the pistol-shaped "needle" which "shoots" yarn into the burlap.

By Their Plaids Ye Shall Know Them

Every October more than forty clans meet in Fayetteville at the Cape Fear Valley Festival. *The Highland Call*, a historical drama by Pulitzer Prize winner Paul Green, portrays the rivalry between Scottish loyalists and colonial patriots.



Kodachromes by J. Baylor Roberts

Two Historic Dates Adorn the North Carolina Flag

On May 20, 1775, Mecklenburg declared its independence of Great Britain. April 12, 1776, a convention at Halifax empowered State delegates to the Continental Congress to vote independence. The capitol at Raleigh (background).

Kodachrome by J. Baylor Roberts

Lofty White Columns Link Charlotte's Country Club to the Traditions of the Southland

 Kodachrome by Charles Martin

Frederick Law Olmsted Planned the Spacious Biltmore Estate

Sargent's portrait of the famous landscape architect hangs in Biltmore House among the priceless array of paintings, tapestries, wood carvings, and sculptures. The estate, with drives winding through an amazing variety of trees and shrubs, is a monument to this genius of landscape art.

The raucous cries of venders, the chant of auctioneers, and the strains of spirituals flowing from a near-by tobacco plant where 500 Negroes are employed compose the Wilson jungletown medley daily until Christmas.

Wilson-made bodies for school buses take to the highways of many Eastern States in the fall (page 223).

Buses have nearly made the little red schoolhouse a thing of the past in North Carolina. Vocational training, home economics, agriculture, and many other subjects heretofore untaught because of poor facilities are now available to students in large consolidated schools.

More than 4,500 State-owned buses transport 331,000 children over 143,000 miles each school day.

I talked with one student who made a daily 40-mile round-trip bus ride—and enjoyed it.

Rocky Mount Claims First "Tarheels"

The origin of "Tarheel," the nickname for North Carolinians, is debatable, but residents of Rocky Mount say it started there. When citizens of this town learned Cornwallis was confiscating supplies of tar on his northward march from Wilmington to Virginia, they emptied their supply into the Tar River before his arrival. The tar remained soft on the river bed. Soldiers bathing in the stream were annoyed when the tar clung to their feet.

From that time on, when a British soldier encountered a North Carolinian he called the native a "Tarheel."

Sun followers going south in winter and north in summer speed through Rocky Mount's Main Street on sleek streamliners of the Atlantic Coast Line. Meanwhile, citizens of this city are preparing for, or just recovering from, its two big annual celebrations.

In May there is a week of gaiety, a celebration of "nothing in particular; just a week of letting our hair down," as Editor Josh Horne explained. The festivities are patterned after the Mardi Gras at New Orleans, but Rocky Mount calls it "Gallopade."

Then comes the June German, a colorful ball, with music by a popular orchestra. As many as ten thousand people have jammed the huge tobacco warehouse where it is held (210).

Rocky Mount, however, has no corner on fun.

From early April to late October there is hardly a week in North Carolina without a festival for something. The tulip, rhododendron, mimosa, gladiolus, cotton, potato, tobacco, strawberry, and peanut evoke days of parades and pageantry (Plates I, IV, VI, IX, and XIV).

When I drove into Raleigh, I had crossed the imaginary line dividing the Coastal Plain and the Piedmont.

The capital city is a smaller edition of Washington, D. C. It is a made-to-order city of government and education. Industrial figures have little to do with the pay checks of its 47,000 residents (page 200 and Plate VI).

Merchants of Fayetteville Street, main business thoroughfare, have adopted all the tricks of modern merchandising. But onyx fronts and eye-luring signs and window displays do not disturb the cultural aspect of Raleigh. From the south façade of the weather-toned Doric capitol, the street's busiest mile offers a broad vista of the new Memorial Auditorium, also of Greek design.

Although Andrew Johnson went to the White House from Greeneville, Tennessee, he was born in Raleigh. Andrew Jackson and James K. Polk also were elected to the Presidency from Tennessee, but North Carolina claims them, too, as native sons. Jackson, however, was born so near the border of North and South Carolina that the latter disputes his Tarheel nativity.

State College, agriculture and engineering arm of the University of North Carolina, here works hand in hand with North Carolina farmers. A few years ago local strawberries spoiled in shipment. The college has developed three varieties that now are sent to distant markets. A new variety of smut-resisting wheat, and a new high-yielding Irish potato, resistant to blight and insects, also were developed.

Because there are five distinct types of soil in the State, the college operates six widely separated experimental farms.

One building of the college is a complete textile mill where 300 students learn to weave.

141 Years of Education at Chapel Hill

The first student walked 170 miles to Chapel Hill from Wilmington to enter the University of North Carolina in 1795.

The university has been open since, except for five years during Reconstruction. That makes it America's oldest State university in point of operation (page 182). This year 110 students from seven South American countries chose this institution for a summer school course.

At near-by Durham the gray stone Gothic buildings of Duke University rise on a beautifully landscaped campus (page 187). Duke was Trinity College before it was named in honor of James B. Duke, whose generosity during his lifetime has been perpetuated since his death through the Duke Endowment Fund.

The university is at present the only institution in North Carolina conferring the M. D.

Staff Photographer J. Baylor Roberts

Huck Finn of the North Carolina Mountains "Totes His Turn"

Once nearly every stream turned the wheels of a gristmill to which mountaineers carried their corn for grinding. Customers took turns; hence the word "turn" for a sack of corn. Except in remote regions, mills now lie abandoned and meal is purchased at crossroads stores (page 221).

degree. Duke Hospital is one of the largest and most modern in the South. Operating rooms are equipped with ultraviolet-light lamps to sterilize the air, thus reducing postoperative infections.

One hundred Duke scientists are at work in many fields. Extensive studies are being made in the treatment of pellagra and hookworm. Dr. Joseph W. Beard developed here the use of the chick embryo to produce a vaccine which has saved thousands of horses suffering from sleeping sickness.

The rivalry between Duke and North Carolina on the athletic field is keen. But while athletes are being drilled in plays to defeat one another, faculty members from Duke are lecturing in the University of North Carolina, and vice versa.

Also leaders in North Carolina education are Wake Forest College, whose new medical school opens in Winston-Salem this fall, and Davidson College, which Woodrow Wilson attended.

State-supported teachers' colleges, distributed over the State, produced graduates who have done much to reduce white illiteracy in North Carolina from 19.5 per cent in 1900 to less than five per cent in 1940.

Durham, easternmost of the large industrial cities of the Piedmont, thrived in its infancy on tobacco manufacturing, and tobacco production in many forms is its chief industry today. Nine years before the city was incorporated in 1867, a tobacco factory was operating.

When Washington Duke was mustered out of the Confederate Army, he began manufacturing and selling the leaf. His company installed the first cigarette machine in North Carolina. It turned out 100,000 a day. Only about 2,000 could be made by hand.

Electric Fingers Inspect Cigarettes

In a plant of the Liggett and Myers Tobacco Company in the shadow of Durham's downtown skyscrapers, I saw hundreds of machines each producing more than 1,200 cigarettes a minute. Other machines packed them at the rate of 120 packs a minute.

A guide broke a cigarette in two and placed a half in a packing machine. Soon the machine expelled a pack. It contained the half cigarette. An electrical detector "discovered" the imperfect pack when its twenty electrically charged fingers automatically "ex-

amined" each cigarette and one finger detected the fault.

Three tobacco companies operating large plants in the State each use more than a quarter of a million dollars' worth of revenue stamps every working day. Do you wonder that North Carolina is the fourth ranking State in the payment of taxes to Uncle Sam?

Insurance to Overalls

As you drive deeper into the Piedmont, cities and towns become larger and nearer. They cluster in the north-central Piedmont where lie Greensboro, High Point, and Winston-Salem.

Greensboro is a "Hartford of the South," with headquarters of four insurance companies. The 17-story Jefferson Standard Life Insurance Company building dominates the city.

From its upper stories you see, spread before you, the vast Cone Mills. Caesar and Moses Cone sold spices in North Carolina for a Baltimore house. They abandoned their horse and buggy in the nineties and entered the textile industry. Today the Cone Mills are one of the world's largest manufacturers of denim, normally producing 100,000,000 yards a year, and half as many yards each of flannel and cotton print and piece-dyed fabrics.

Staff Photographer J. Baylor Roberts

Corner Windows Keep Devils Away, Boone Mountaineers Say

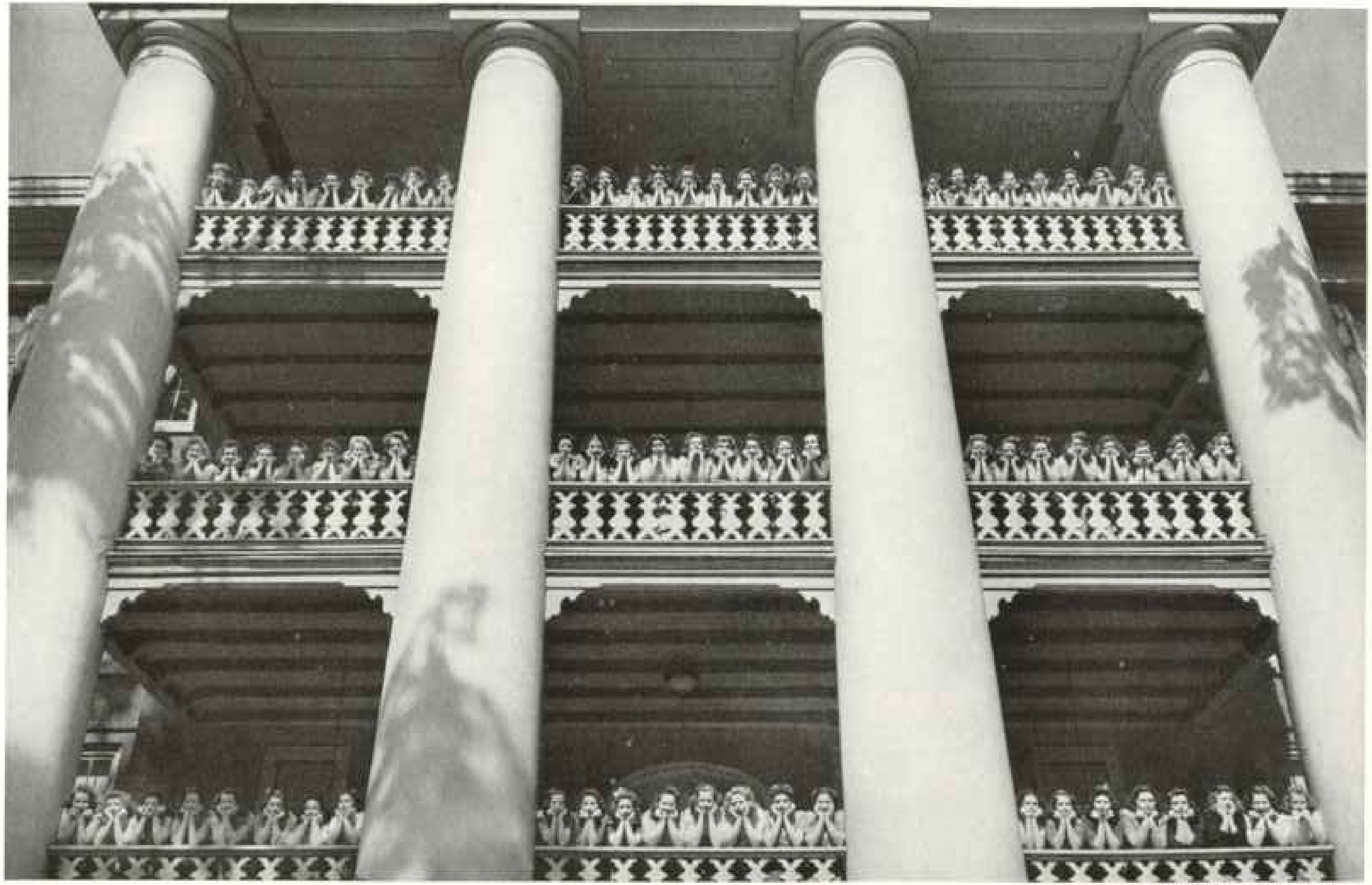
In a mill of a leading manufacturer of denim overalls you see garments of all sizes in the making at the rate of more than half a million a month. One machine cuts 50 patterns at one time.

A hosiery manufacturer from Pennsylvania opened a small plant here in 1927. Now each year it makes 600,000 dozen pairs.

A chemical company plant here is topped with a sign reading, "Over 53 million packages used yearly." A Greensboro drugstore where "O. Henry" once was a youthful clerk was the birthplace of Vick products. Now the company's publicity folders are printed in 14 languages, and plants normally operate in England, Ireland, Mexico, Chile, Brazil, Argentina, Spain, Australia, New Zealand, and South Africa.

Six miles north of Greensboro, I drove through Guilford Courthouse National Military Park. General Nathanael Greene's American army was defeated here, but Cornwallis' forces were so crippled in a fierce two-and-a-half-hour battle that historians say the engagement paved the way for the British surrender at Yorktown.

Ten years ago, someone, perhaps an admirer of Greene, felt that the weathered bronze equestrian statue of the general had been neglected. One morning neighbors awoke to find



Staff Photographer J. Baylor Roberts

Smiling Students of Peace College Pose Where Wounded Soldiers of the Confederacy Convalesced

This building, with its big arches and carved balustrades, was built before the War between the States. Like the Nation's Capital, Raleigh is a city of education and government, rather than industry. Four of its main streets are named for North Carolina's former capitals: New Bern, Hillsboro, Halifax, and Fayetteville (page 197).

"Hey, Piggie, Come This Way!" But Grunts and Squeals Drown the Pleas of These Girl Racers at Pinehurst

George H. Copeland

Most of the 8,000 Greater Snow Geese Left in the World Fly Past Bodie Island Light

Strict conservation has preserved this one group. Mild climate and abundant food in the coastal marches, lakes, and sounds of North Carolina attract millions of birds each winter. While the lighthouse was being rebuilt after destruction in the War between the States, five sailing vessels were wrecked on the coast near by.

At Mount Airy, Granite Is Hewn from Vast Surface Deposits Instead of Pits—Some 3,000 Carloads Are Shipped Annually (Page 212)

John Hamelton

In Independence Square, Charlotte's Traffic Hub, North Carolina History Was Made

At the intersection of Trade and Tryon Streets a circular plaque marks the site of the log courthouse where, according to local history, the famous Mecklenburg Declaration of Independence from Britain was signed May 20, 1775. The date is a State holiday and appears on the State flag and great seal (Plate VI). The city and county were named for Queen Charlotte of Mecklenburg-Strelitz, wife of King George III (page 212 and Plate VII).

Staff Photographer J. Baylor Roberts

Setting the Stage for a Tobacco Auction at Rocky Mount

Wrapped in burlap, the leaf will be placed in shallow baskets (right) in rows just far enough apart to permit the auctioneer and buyers to pass. In some warehouses sales are made at the rate of four a minute (page 188).

it adorned by a bright coat of gilt. Bits of the gilt still can be seen in its deeper recesses.

High Point, with more than 30 furniture factories, is the unofficial capital of the North Carolina furniture industry. Furniture manufacturing centered here some fifty years ago because of the forests in this vicinity.

Only low-priced furniture was used in the homes of tenant farmer and mill worker, so early manufacturers catered to their demands. Those who could pay more purchased in northern markets.

"Human Scratches" on Furniture

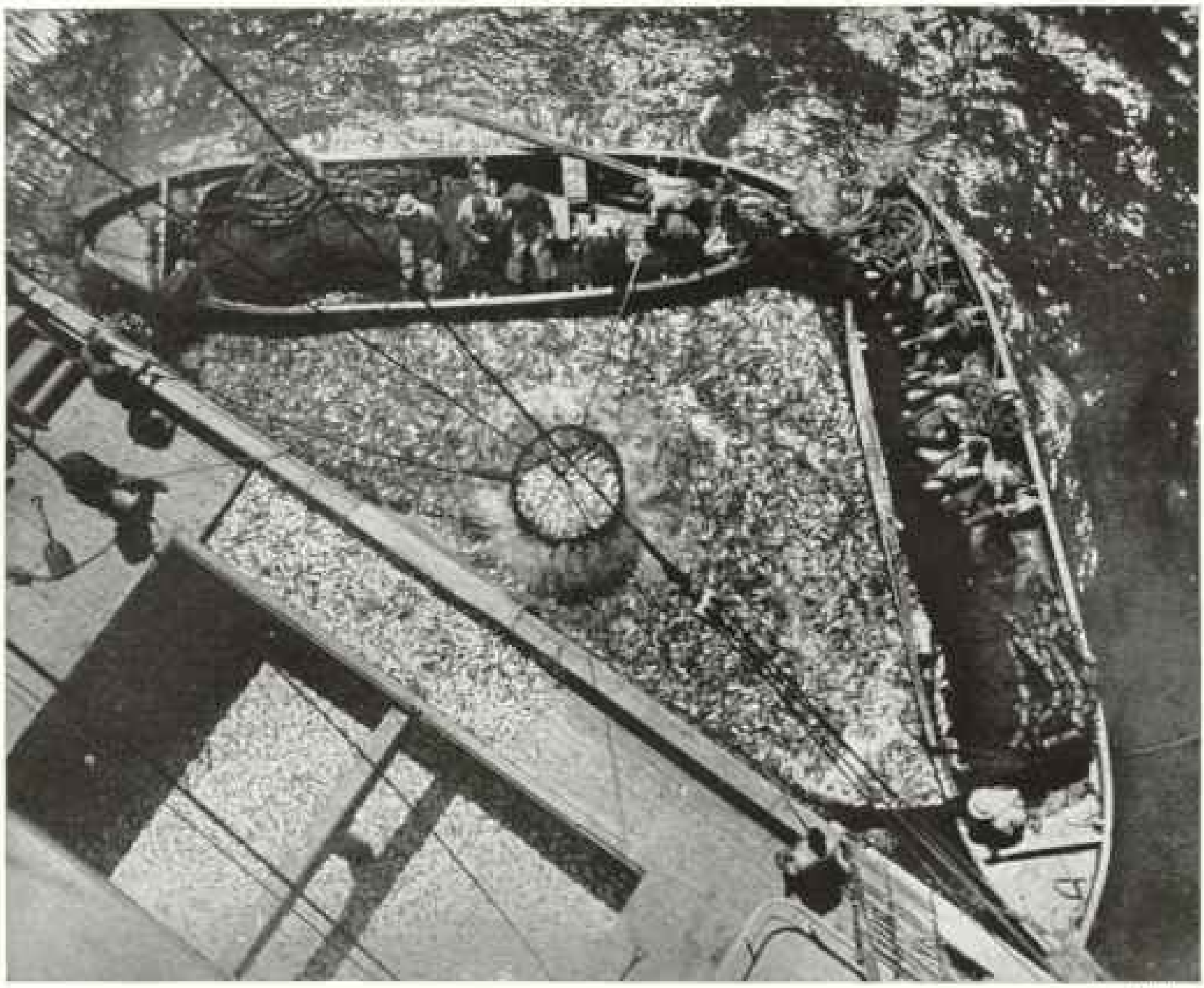
To broaden the market manufacturers studied styles and improved quality and finish. By 1918 North Carolina furniture was sold throughout the United States. North Carolina leads all other States in production of wooden household furniture.

At the Tomlinson plant, mahogany from Honduras, the Philippines, and Cuba, and many domestic woods are fashioned into scores of furniture patterns. I saw a workman putting "human scratches" on a piece of furniture, a copy of a popular French provincial style. The scratches were made by the deft handling of a mallet.

In the pounding surface several nails were driven halfway and bent so that the nail heads would produce scratches resembling those made by pins, buckles, or other adornments on women's costumes. Other workmen in the plant were shaping copies of furniture used in colonial Williamsburg, Virginia.

In January and July, at the 14-story Southern Furniture Exposition Building here, some 200 manufacturers display their wares.

At near-by Thomasville a kitchen-chair factory opened in 1907. Now you see nearly 2,000 workers turning rough lumber into more than 300 living-room, dining-room, and bedroom suites each day. Table legs and panels are carved 18 to 24 at a time. The cutting devices on the carving machines are guided by the contours of a hand-carved model (page 223).



Bob Richards

Fishermen Transfer Their Catch of Menhaden from Purse Net to Mother Ship

Twice a year "fatback," as the oily fish are locally called, migrate along the North Carolina coast. Single catches of half a million fish are often brought into Beaufort after 24 hours at sea. Belts convey the cargoes from ships to ovens for cooking. The oil extracted is used in making linoleum, paints and varnishes, waterproof fabrics, artificial leather, and insecticides. The residue becomes fertilizer (page 184).

This year the Moravians of Winston-Salem are celebrating the 175th anniversary of the founding of Salem by settlers from Bethlehem, Pennsylvania. When Forsyth County was formed, Salem's central location made it a natural choice for the site of a county seat. The Moravians sold land adjoining their town for the purpose. The new town was to become Winston. In 1913 Winston and Salem were consolidated.

"The Moravians live here as one big family," said a resident of Salem. "The troubles of one family are the troubles of all. When a family is overcome by illness or death, neighbors hurry to their aid."

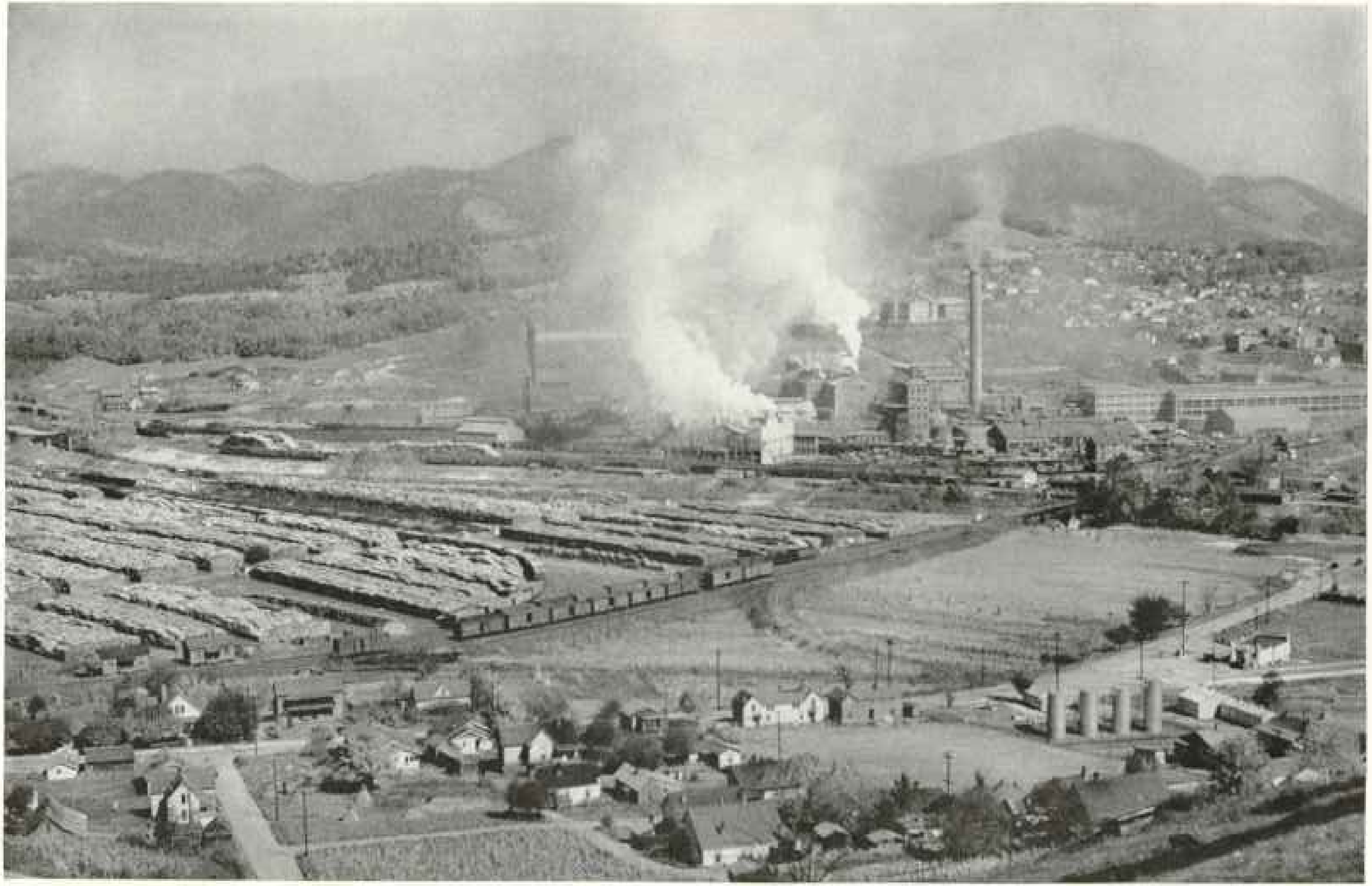
Winston-Salem Rings with Moravian Music

Moravians love music. Each of eight churches in Winston-Salem has a band, and one man told me his greatest wish was to live to hear his son play an instrument. Individual bands play at funerals, but all bandsmen and former bandsmen, some 400 of them, get together for the famous Moravian Sunrise Easter Service held since 1773 in God's Acre, the Salem cemetery.

In Winston you drive between the lofty brick walls of tobacco factories and under corridors that link buildings overhead. R. J. Reynolds, a native of Virginia, set up his first tobacco factory in a small frame building in 1875.

Today 47 plants of the company he founded occupy ten city blocks. Thirteen thousand people are employed and a hundred freight cars are required weekly to distribute 99 brands of Reynolds Tobacco Company products alone. In a recent year more than 43 billion cigarettes were manufactured by it.

A single machine in one plant makes 110 tobacco cans a minute. Another packs tobacco in them at the rate of 62 cans a minute.



Staff Photographer J. Baylor Roberts

Pulpwood from Florida to Canada Is Converted into Paper in This Canton Plant

The Champion Paper and Fiber Company makes more than thirty kinds of paper, including stock for the official one-cent postal card. Cardboard, caustic soda for soap, turpentine, and tanning extracts also are produced. One thousand cords of pine, poplar, hemlock, chestnut (stacked at left), gum, and cottonwood are used each day.

Staff Photographer J. Baylor Roberts

Towels, Miles of Them, Are Edged Each Day in This Room Before Cutting and Hemming

Five hundred bales of cotton daily move into the Cannon Mills at Kannapolis to emerge as tiny baby bibs, towels, bath and beach robes, sheets and pillowcases, etc. While machines here turn out finished products, an artist in New York draws new patterns. The "glamour period" of towels came in 1928 with pastel shades (p. 221).

Staff Photographer J. Baylor Roberts

"Home on the Range" in the Cataloochee Valley of the Great Smokies

Staff Photographer J. Taylor Roberts

"Come and Get It!"—This Time Chops, Onions, Beans, and Mashed Potatoes at Charlotte's Fresh-air Camp

Five hundred underprivileged boys of North Carolina's largest city spend two happy weeks at this camp, sponsored each summer by the Charlotte Observer. During a recent summer the boys gained an aggregate of 1,743 pounds. One boy blushingly admitted adding 13 pounds in 14 days.

Staff Photographer J. Baylor Roberts

If You Think You Deserve a "Good, Swift Kick," Turn the Handle!

This kicking machine has proved so popular that eight pairs of shoes have been worn out since it was installed four years ago by a filling station operator at Croatan.

The Rocky Mount Evening Telegram

Behind the Scenes at the June German, Rocky Mount

Spectators are listening to Kay Kyser, a native of the city, and his orchestra, at the annual ball held here for more than sixty years. Ten thousand people jammed a huge tobacco warehouse (page 197).

© F. S. Lincoln

Atop Kill Devil Hill, a 60-foot Monument Marks the Spot Where Man First Flew

From a lofty dune on the Outer Banks, Wilbur and Orville Wright launched their clumsy plane, the forerunner of modern-day Clippers and bombers. Four flights in all were made in 1903, the first 120 feet in 12 seconds, and the fourth and longest 852 feet in 59 seconds. A steel map showing notable flights of the first twenty-five years of aviation is displayed inside. Floodlighted at night, the beacon is an impressive sight among the dunes.

Vast underwear and hosiery mills are here, too. So is the Nissen wagon plant, which began operation in 1787. Many of the prairie schooners used by the forty-niners were Nissen-made. Even in this day of motive power, this Winston-Salem plant produces some 2,500 wagons a year.

Mount Airy Granite Spans the Potomac

I passed Pilot Mountain, famous Indian signal "tower" in colonial days, to visit the surface granite quarry at Mount Airy. Quarrying began here in 1889, and for many years some 3,000 carloads of granite have been dispatched to all parts of this country. The deposit resembles an 80-acre clamshell. Huge blocks of granite are delivered by gravity on cables to mills at the lower end of the workings (page 202).

The Arlington Memorial Bridge spanning the Potomac River at Washington, D. C., the depository for gold bullion at Fort Knox, Kentucky, the Wright Memorial at Kill Devil Hill (page 211), and private buildings and monuments in many States owe their strength and beauty to Mount Airy granite. At the present rate it is estimated that there is sufficient stone to last more than 500 years.

Driving southward in the Piedmont from the quarry city near the Virginia border, you pass through many cities and towns each with at least one textile mill or furniture factory.

In the southern Piedmont you are in the land of cotton. Gastonia specializes in combed yarn—yarn machined so that short fibers are removed before twisting into fine thread. This assures quality textiles. There are 43 textile mills within the city limits (Plate IX).

At the Firestone Tire and Rubber Company plant each year 90,000 bales of cotton are made into tire cord. Amid the whir of acres of machinery at another plant you see cotton from the bale move through a battery of machines and emerge as spools of colored thread—more than two million yards of it each week.

In a building on the edge of the city I visited a leading source of labels for garments, rugs, mattresses, etc. To me the interior of the plant was a maze of cotton and rayon thread, miniature looms, and noise, but out of it come each year enough labels to supply one each to nearly every man, woman, and child in the United States. "Yesterday we shipped a million labels to 35 customers," an official said.

Six miles east of Gastonia you drive through Cramerton, home of nearly 2,000 employees of the Cramerton Mills. Residents pay 30 to 60 cents per week per room. Fuel is supplied at cost and forty kilowatt hours of electricity per month are supplied free. Two-thirds of the tenants of the houses pay no electric bills. Resident golfers pay only 50 cents a month to play on the Cramerton course.

Production figures at Cramerton Mills read like national defense appropriations. Enough rayon is produced annually to make a million women's dresses, enough cotton gingham for a similar number of frocks, and enough khaki cloth for nearly as many soldiers' uniforms.

Charlotte Goes Over the 100,000 Mark

Charlotte, largest city in the State, went "over the top" in the 1940 United States census. Officials had sought for years to boast 100,000 residents, and the count was 899 above the goal (page 203 and Plate VII).

As a rule, however, North Carolina does not encourage the development of large cities. There are only five with more than 50,000 in the State.

"If a plant is ten miles outside of a city," said a State official, "the city will benefit as much from the payroll as if it were within its limits. The policy discourages the transplanting of many workers from rural homes to crowded cities. In spite of the growth of industry in North Carolina in the past few decades, eighty per cent of our workers live in rural areas."

Charlotte is one of the South's leading trading centers. One of its department stores has on its customer list five nonresidents of Charlotte to one resident.

Four hundred and twenty-five national concerns have offices and representatives here to handle their business in the Charlotte trading area, which spreads over a vast region of the Southeast.

You see the Charlotte Observer, one of the State's leading newspapers, in nearly every town and village. The central location of Charlotte, and its radiating highways, railways, and airways reaching even the remotest regions of North Carolina, aid distribution.

The press of the State is pleasingly informal. Local expressions are generously used. The slogan of a Jacksonville weekly is "The Only Newspaper in the World That Gives a Whoop About Onslow County." A semi-weekly paper carried a headline, "1940 Termed Screwiest Year." The Chapel Hill Weekly is famous in the State for its "over the back fence" chatter.

When Josephus Daniels was editor of the Raleigh News and Observer, he wrote his

© National Geographic Society Kodachrome by J. Baylor Roberts

Her "Ermine" Wrap Is Cotton, Her Scepter a Bobbin

Here reigns Miss Freida Myers, Queen of the Gastonia Cotton Festival, enthroned amid a display of spools and skeins of colored yarn. The wavy white background is the opened end of a 500-pound bale of raw fiber. Gastonia, noted for combed yarn, has 43 textile mills within its corporate limits.

Kodachrome by J. Baylor Roberts

Hold Tight, Girls! The Lure of Lake Lure May End in a Splash

For more than half a century western North Carolina, widely known as the Land of the Sky, has been a popular playground and health resort. There are lakes for sail and speedboat fans, swift mountain streams for anglers, and foot and bridle trails for hikers and horseback riders.

Kodachrome by J. Baylor Roberts

Like a View from an Airplane Is That from Chimney Rock, Perched 1,200 Feet Above Lake Lure

Far below winds a highway ribbon along wooded shores. Paved roads now penetrate nearly every valley and ascend the lofty peaks in North Carolina's mountains. Even Mount Mitchell (6,684 feet), highest east of the Mississippi, and Clingmans Dome in the Great Smokies can be reached by automobile.

Kodachrome by J. Baylor Roberts

As of Old, Sir Walter Raleigh Presents Tobacco, Potatoes, and Two Indian Chiefs to Queen Elizabeth

On Roanoke Island, where Raleigh's colonists first settled and mysteriously vanished, islanders now produce a colorful play, *The Lost Colony*. Founding of the colony in 1587, birth of Virginia Dare, the first child born in America of English parents, and other historical high lights are included in the pageant. Of the cast of 100 players, only five are professionals. The actor with the red-feathered hat (right) is a young captain of a fishing boat.

Kodachrome by J. Baylor Roberts

Fun? Yes! But It Is Work for These Girls in Training as Swimming Instructors and Lifesavers

They are attending a school near Brevard sponsored by the American Red Cross for students from North Carolina and near-by States. A ten-day course in water safety includes coaching in aquatic sports. The girls were given class credit for performing this maneuver for the National Geographic photographer.

Kodachrome by J. Baylor Roberts

Wearing Bright-leaf Costumes, Maids of the Annual Tobacco Festival at Wilson Adorn a Giant Corncob Pipe

Perhaps your "smoke" came from these leaves, for Wilson, near by, is the world's largest bright-leaf tobacco market. Most of the well-known brands use tobacco grown in this State. The "weed" has been cultivated hereabouts since Indian days.

Sister Tends a Cherokee Papoose—Qualla Indian Reservation

Kodachrome by J. Baylor Roberts

Mountain Laurel Frames a Carolina Belle on Yonahlossee Trail

Biltmore Industries of Asheville Foster Highland Handicraft

For 24 years Mr. F. L. Seely has managed the looms where this homespun was woven from the finest wool.

 Kodachromes by J. Baylor Roberts

Waldensian Matrons Cling to Continental Costumes at Valdese

Fifty French-speaking families, followers of the reformer Peter Waldo, came here from the Italian Alps in 1893.

copy by hand with great rapidity and rarely bothered about revision. Substance, he held, was more important than form.

Thirty-five years ago the site of Kannapolis, north of Charlotte, was farmland. Now it holds an unincorporated town of 25,000 people, built around one of the world's largest household-cotton textile mills (page 207). One plant of the Cannon Mills here consumes 500 bales of cotton daily. Towels are the principal product, but you see machines turn out a wide assortment of cotton goods, from tiny baby bibs to sheets and pillowcases.

The highlands of western North Carolina rise sharply out of the Piedmont. Some 80 peaks are more than 5,000 feet. More than 40 top 6,000. Highways have made them accessible to the motorist, while hiking trails and bridle paths plunge even deeper into their forested heights.

The mountain cabin is rapidly disappearing from the valleys and coves. Many mountaineers who eked out a living on their corn and "tater" patches have gone to the mills in the Piedmont. Others are supplementing their incomes working on the highways or setting up makeshift roadside shops where they sell gay hand-hooked rugs, hand-made chairs, and antiques (Plate V).

Now and then you see a mountaineer carrying a sack of flour on his shoulder in true mountain style (page 198), but more often now meal is bought at a crossroads store.

Asheville is the only city of more than 50,000 population in western North Carolina. Highways radiating from here reach every village nestling in the hills (Plate I).

Vacationists and health seekers have sought Asheville's bracing climate for more than a century, but the real development of the city was inspired by two "furriners," as the mountaineers called lowlanders or natives of another State. They were George W. Vanderbilt, a New York capitalist who arrived in 1889, and E. W. Grove, St. Louis manufacturer, who came a year later.

Vanderbilt founded Biltmore Village, one of Asheville's lovely residential districts, and developed Biltmore Estate, which was opened to the public in 1930 (Plate VIII and p. 222).

The house covers four acres. Inside its hand-tooled Indiana limestone walls is an array of art objects collected from five continents. Halls and rooms are adorned with priceless tapestries, paintings, and engravings. On the ceiling of the walnut-paneled library is a canvas by Tiepolo, the last outstanding artist of the Venetian school.

Above a hand-carved black marble fireplace hangs an Italian tapestry of the 17th century. The dining-room walls are of tooled Spanish leather. Chests, vases, works in ivory and bronze, and wood carvings also are among the gems of the art world on display.

Chessmen Used by Checkmated Napoleon

The chess table and set of chessmen are said to have been owned by Napoleon and used by him during his exile on St. Helena. The graceful grand spiral stairway of the mansion, with its hand-wrought bronze railing, fits the grandeur of the Biltmore interior.

Five hundred people are employed here, most of them at the Biltmore dairy farm. The Biltmore herd of 1,000 purebred Jerseys is one of the largest in the United States.

Grove developed the other side of the city. He built the residential section bearing his name and Grove Park Inn on the slopes of Sunset Mountain. The inn's massive walls are of native boulders rising to a red-tiled roof. Two fireplaces reach from the floor 35 feet to the ceiling and are 30 feet wide at their bases.

I drove over the Blue Ridge Parkway from the North Carolina-Virginia border to Little Switzerland, except for a short detour. Averaging more than 2,500 feet above sea level, it is largely a mountain-crest highway, but now and then it sweeps around the higher peaks, thus avoiding steep grades.

The parkway offers every type of eastern mountain scenery. There are numerous lookouts overlooking the Piedmont, where verdant forests and the clustered rooftops of villages and towns fleck the checkerboard of rolling farmlands. At times, however, you are completely surrounded by mountains rising and falling as far as you can see.

Crossroads go over or under the parkway. Trucks are banned. There are no roadside signs. Service stations and other accommodations will be available at frequent intervals but invisible from the right-of-way.

Grandfather Mountain is so beloved by the natives of the mountains that children will tell you they have three grandfathers (page 185).

Seen from the parking area near its summit, from the veranda of an inn at Little Switzerland, or from the garden of a cottage at Linville, the panorama of the western Carolina mountains is a challenge to any writer. Shifting clouds and shadows often change the view with every tick of your watch. As the natives say, "The mount'ns is never the same."

In ten minutes I have seen Grandfather in many moods. Momentarily his smile changes to a frown, low-hanging clouds supply him with a set of chin whiskers, cover his pate with a shock of hair, or completely hide him.

Fairchild Aerial Surveys

Biltmore Estate—a French Château on the Asheville Landscape

Set in 12,000 acres, the imposing mansion faces a broad esplanade flanked by gardens and a swimming pool. Hothouses and gardens keep the vases filled with fresh flowers. Frederick Law Olmsted laid out the spacious grounds. (Plate VIII and page 221).

On Mount Mitchell (6,684 feet) you figuratively look down on every earthly thing in the United States east of the Mississippi River. Its summit is accessible by a toll-free highway through Mount Mitchell State Park. Driving the last six miles of the route to within a few hundred feet of the summit is an adventure. The tortuous highway is wide enough for one car only, and passing must be done at turnouts. But the views of lofty peaks and green valleys from the highway and from the 30-foot tower atop the mountain more than compensate for the arduous drive.

Little Switzerland, mountain-top village of Swiss chalets, has been a popular resort for thirty years. As you scan majestic peaks from its new tower, you are unaware that hidden in the near-by valleys men are blasting, drilling, and digging into the sides of the mountains, extracting feldspar, kaolin, kyanite, and other minerals used in the ceramics industry, and mica. North Carolina normally supplies about sixty per cent of the mica produced in the United States.

Some 300 minerals are found in the State, including gold. Before the California gold rush North Carolina was a leading gold-producing area of the Nation.

Skyway Tops the Great Smokies

The southwestern mountains constitute a resort area, too, with Lake Lure (Plates X, XI), Lake Junaluska, Hendersonville, Tryon, Waynesville, Bryson City, and a score of other vacation spots enjoying temperatures seldom above 85 degrees while lowlanders swelter.

Lofty Mount Pisgah is a popular grandstand from which to view the mountains of the southwest. Nantahala Gorge long has been called one of the most beautiful valleys in the East. The Qualla Indian Reservation, home of several thousand members of the eastern band of Cherokees, has attracted visitors for decades, especially children, many

With This Master Carver, One Man Does the Work of Twenty-four

It used to take a wood carver ten hours to make one table leg. This machine, guided by the contours of a master leg, completes two dozen in the same time. The Thomasville Chair Company produces more than 300 living-room, dining-room, and bedroom suites each working day (page 204).

Staff Photographer F. Taylor Roberts

To a Picnic? NO! To School!

This bus, one of North Carolina's 4,500, is operated by a senior girl student and transports 48 children to and from school at Four Oaks. Buses have made modern schools available to nearly all North Carolina.

U. S. Coast Guard

Wings of Mercy—a Coast Guard Ambulance Plane

From this new air station at Elizabeth City, seaplanes patrol the treacherous North Carolina coast. Landplanes use concrete ribbons, while the Pasquotank River forms the runway for seaplanes.

of whom have seen Indians here for the first time in their lives outside of a circus tent.

Upwards of 860,000 people visited the Great Smoky Mountains National Park last year. Straddling the North Carolina-Tennessee line, the more than 400,000 acres of the park are evenly divided between the two States.*

Here are 600 miles of trout streams for anglers, 500 miles of graded trails for hikers and horseback riders, and splendid highways through gaps and gorges for motorists. Here is a forest of more than 140 different species of trees, including the largest stand of virgin red spruce in the southern Appalachian region. Deer, bears, and birds are again becoming abundant under careful management of the National Park Service.

From Newfound Gap, the Skyway, highest mountain-top highway east of the Rockies, leads to Clingmans Dome, second only to North Carolina's Mount Mitchell in height among eastern peaks of the United States (page 186). Recently, dude ranches have given the region a touch of the West (page 208).

Industry has moved into the mountain area, but not to such an extent that it has seriously impaired its natural beauty. At Canton, amid pungent fumes, I visited one of the world's largest pulp and paper mills (page 206). In normal times its products are shipped to every continent.

Near Brevard, a cigarette-paper factory was established three years ago, making this State almost independent of other regions of the world in the manufacture of cigarettes. Before the plant was erected, much of the paper was imported from France.

Although the vast area of farmlands has cut deeply into North Carolina forests, and furniture and other woodworking industries and paper mills have been taking their toll of trees, the State still has 20,000,000 acres of forests. To conserve forest resources and watersheds the United States Forest Service is acquiring over 3,000,000 acres, from the pines of the coastal marshes to the spruces that shade the western border of this varied and vital State.

* See "Rambling Around the Roof of Eastern America" (Great Smoky Mountains), in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1936; and "Highlights of the Volunteer State," May, 1939, both by Leonard C. Roy.

Our Insect Fifth Column

Alien Enemies Take Steady Toll of Food, Trees, and Treasure by Boring from Within

By Frederick G. Vosburgh

THE man in the blue sedan was indignant. Here he was, breezing along on a nice Sunday afternoon when all of a sudden a fellow in uniform had to stop him with the query, "Any plants or flowers in the car?"

What possible difference could it make, fumed the motorist. What if he *had* bought a little shrubbery a few miles back and let the kids pick a handful of wild flowers. A potted plant wasn't a bomb and a bouquet of black-eyed-susans never killed anybody. . . .

True, there was no danger of fatal results. Yet that harmless-looking plant or handful of flowers might harbor an insect pest that would kill more trees than a forest fire or destroy more food than a whole "stick" of bombs.

Committing their ceaseless sabotage in several States are such dangerous insect "fifth columnists" as the gypsy moth, European corn borer, and Japanese beetle, whose spread into distant areas would be a major calamity.

The object of the roadside inspections is to stop or slow the advance of alien insect enemies that have gained a foothold in this country. These foreigners are often most damaging because they have left behind their natural foes and can reproduce in tremendous numbers.

Nine species alone, pictured here in color, affect the food, clothing, shelter, and incomes of millions—including the man in the blue sedan, whether he knows it or not. Other insects strike at man's health or attack his domestic animals.

Government entomologists figure that insects cost the country over $1,600,000,000 a year, or the equivalent of the services of a million men.

Mosquitoes head the list, with the cotton boll weevil second. Then come the versatile corn earworm (page 234), the housefly, and the rice weevil which spoils cereals.

An annual tribute of over 22 million dollars is exacted in the United States alone by the cosmopolitan clothes moths, and nearly double that sum by our native termites.

Land of Opportunity—for Insects, Too

Of the fifty worst insect pests in the United States, about a third have come from other countries, for human immigrants are not the only ones who have found this broad, rich nation a land of opportunity.

Despite the most careful quarantine, several new pests have entered in recent years and others have greatly extended their range.

For example, when the first World War broke out the United States had not yet known the attack of the destructive Japanese beetle (Color Plate IV). The corn borer, now as far west as Wisconsin, was getting a foothold in fields around Boston, its presence not even suspected (Plate III).

Newest major menace is the South American white-fringed beetle, first discovered in this country five years ago and now attacking crops in four Gulf States (Plate VII).

Spreading with the slow, persistent patience of Mother Nature herself, mere fluttering moths, feeble flies, and beetles that crawl but a few yards in a lifetime have crossed the widest oceans. They come as stowaways on ships; nowadays even in airplanes.* They ride here hidden in straw, in a cargo of bones for fertilizer, in plants or flowers which seemed so harmless to the man in the blue sedan.

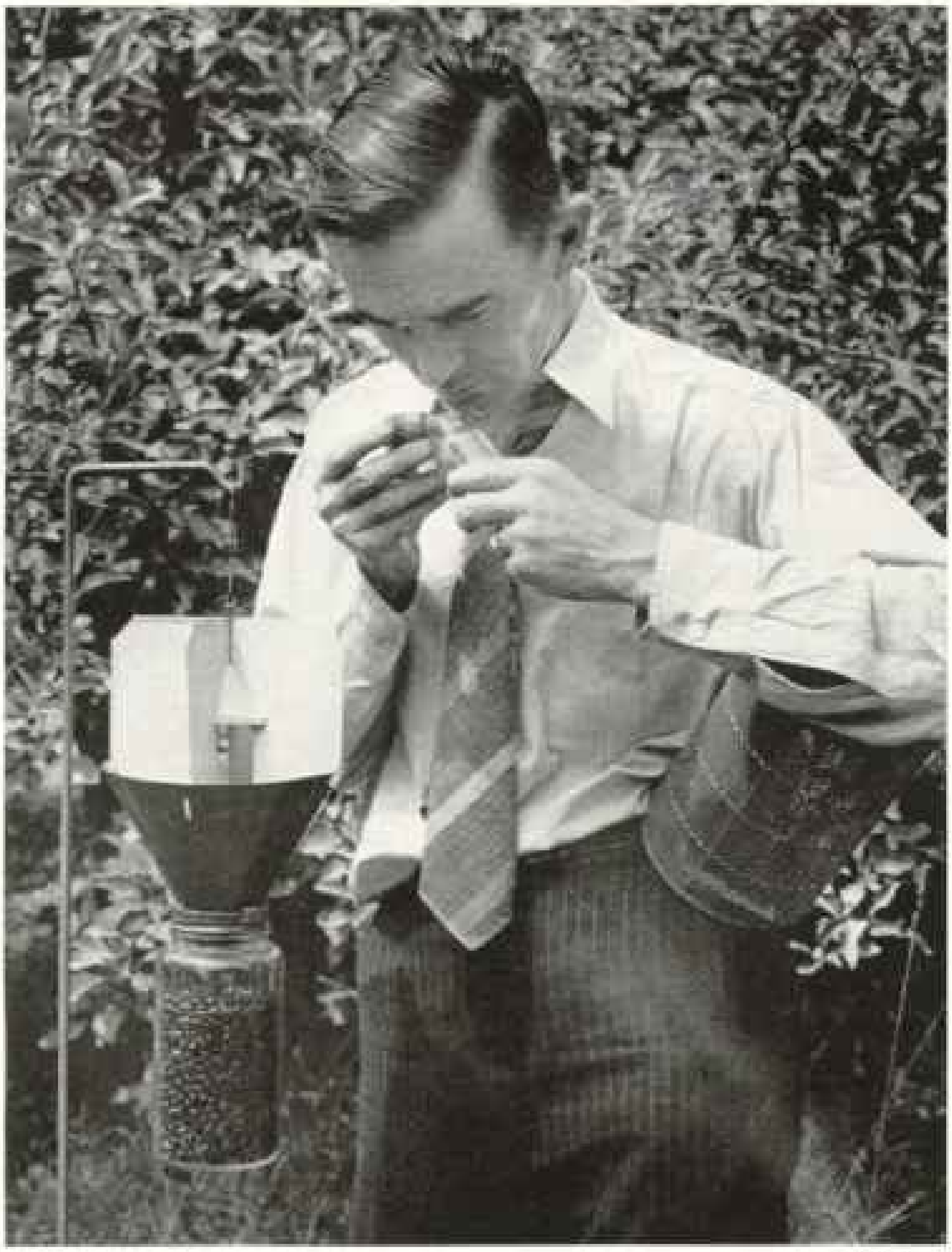
"Plant Ellis Island" Bars Undesirables

At the "plant Ellis Island" in Hoboken, New Jersey, and forty other stations on our sea and land borders, thousands of undesirables are constantly being intercepted (pages 230, 233, and 248). They range from the tiny worms called nematodes to a two-foot snake which slithered out of a case of South American orchids last October.

Exotic pests turn up where least expected. Alert inspectors of the Bureau of Entomology and Plant Quarantine found elm bark beetles, which carry the dread Dutch elm disease, in the wood of a crate containing English china. Larvae of a small injurious moth were found in a string of beads made of seeds from Italy.

Against the country's quarantine wall beats a heavy tide of potential invaders, for there are estimated to be in the world some 20,000

* The malaria-carrying mosquito *Anopheles gambiae*, recently discovered in Brazil, is believed to have reached there in an airplane or fast ship from Africa. It is a particular menace because it lives close to man and makes a most effective carrier. Mosquitoes, not included in this article, will be the subject of a later color-illustrated presentation in the National Geographic Magazine. Another will include locusts.



Paul Pyron

For Some Reason a Yellow Trap Will Catch More Japanese Beetles Than One of Any Other Color

But this trap, of old-fashioned green and white, has caught several hundred in Maryland near the Nation's Capital, and now the trapper makes sure his bait has not lost its magnetic perfume. Best lures are geraniol, made from oil of citronella, and eugenol, from oil of cloves. Hungry beetles, catching the scent, fly upwind in quest of dinner and hit the four-winged baffle. Before they can catch their balance, they have slid down the funnel into the jar. The opening is small enough so they cannot fly out again.

harmful insects not yet found in the United States.

Some foreign pests came early, long before the Nation was born.

One, the Hessian fly, "fought in the Revolution." Discovered in 1779 on Long Island, it was believed to have arrived from Europe in straw used as bedding by Hessian mercenaries. Today its larvae raid fields of winter wheat all over the United States. Though a frail little gnat about a tenth of an inch long, the Hessian fly has done far more damage than the Hessians did themselves.

Many of the insect immigrants are strange and wonderful in their ways. An example is the so-called Argentine ant, which probably rode here on coffee boats from Brazil. In time of floods, such as those of the Mississippi, these ants swarm together, form a living ball, and float safely ashore.

In fighting many a foreign pest, entomologists comb the earth for its enemies, nurture them with tender care, and bring them thousands of miles to fall upon their old prey.

One deadly nemesis was a species of the gentle-seeming ladybird, or lady beetle, brought from Australia many years ago to combat the cottony-cushion scale in California's orange and lemon groves. Reared in large numbers, it gobbled scale insects all day long and so did its ugly, hungry little larvae. Within two years the cottony-cushion scale had been virtually wiped out and today it is no longer a menace, thanks to her ladyship.

In the last fifty years, 500 kinds of insects have been brought to the United States to attack pests and about 85 are now permanent residents.

But often in this world of bug-eat-bug, such helpful hunters themselves are hunted. Wrote Jonathan Swift 200 years ago:

> So, naturalists observe, a flea
> Has smaller fleas that on him prey;
> And these have smaller still to bite 'em;
> And so proceed *ad infinitum*.

Most of the beneficial insects imported are little parasitic flies or wasps which lay their eggs on their prey. To make sure that these

in turn do not have "smaller still to bite 'em," they are held in air-conditioned chambers at Hoboken until all hyperparasites —which might greatly reduce their usefulness —have hatched. Sometimes a parasite living upon another is itself the host of a third, which in turn is parasitized by a fourth.

Pest travel has not been entirely one-way. Many a strictly American insect has found its way to other lands. Among them is the grape phylloxera, a tiny root aphid, which spread havoc through the vineyards of France. Another is the Colorado potato beetle, or common potato bug, which is now settled on the Continent, especially in France and western Germany.

On far-flung fronts the war goes on, the never-ending world war of men against the insects.* Man's tiny six-legged rivals for supremacy have lived on this earth far longer than he has—there are fossil cockroaches millions of years older than the earliest known prehistoric man. And though insects are hardly noted for their brains, they have other sources of strength, including enormous powers of reproduction.

Consider, for example, the gypsy moth, which in New England merits the title of public enemy No. 1.

Experimenter Brought in Gypsy Moth

In a little home laboratory in Medford, Massachusetts, some 72 years ago, a Frenchman named Leopold Trouvelot peered eagerly into one of his cages where a horde of exotic insects crawled and spun (Color Plate I).

The tireless experimenter had brought the creatures from Europe in the hope of crossing them with silkworm moths to get bigger and better silkworms.

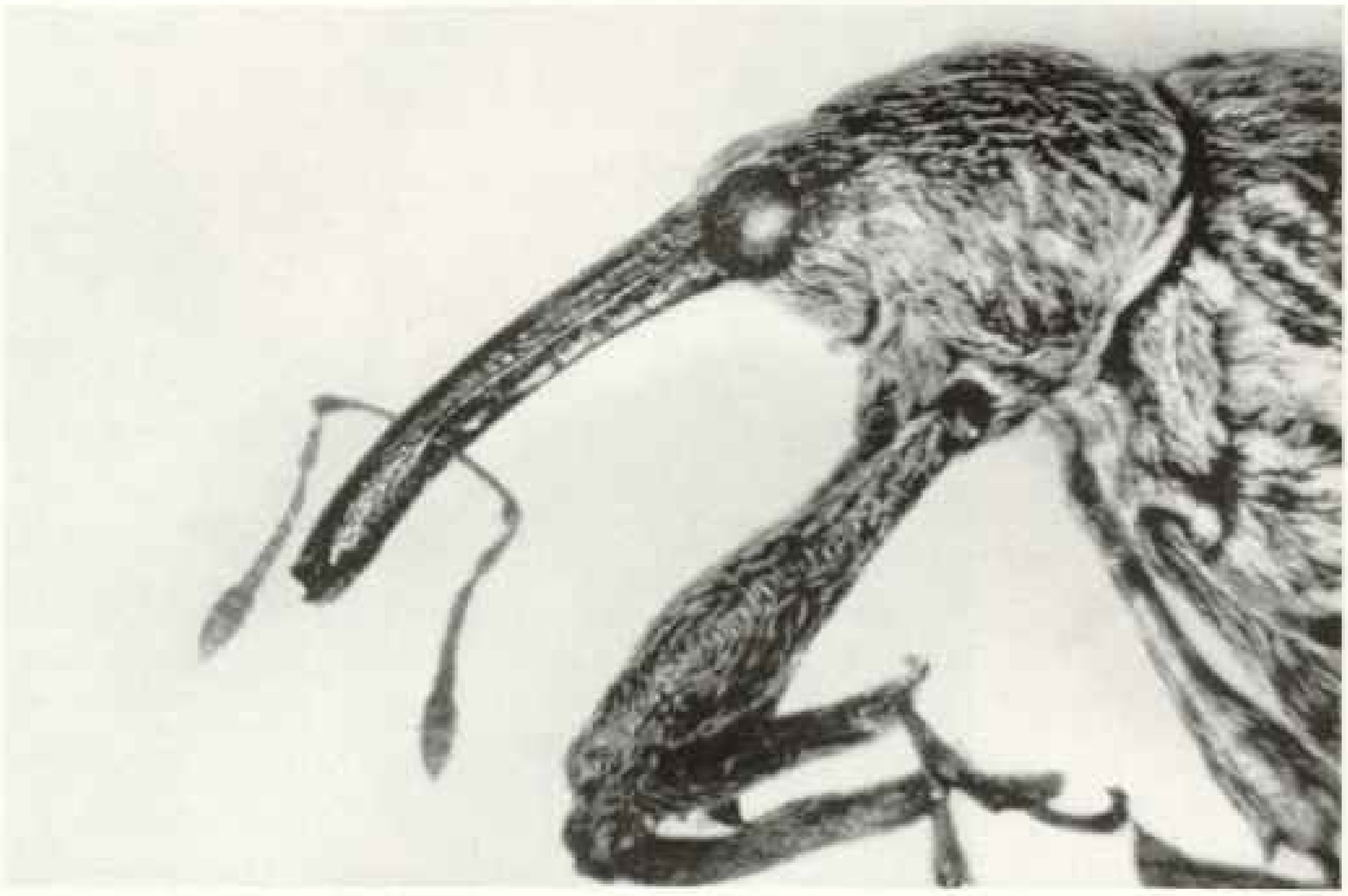
One day in the midst of the Frenchman's experiments some of his treasured specimens escaped. Trouvelot was horrified. He knew that he had released the whirlwind, that the results of his unwitting act might be robbing

U. S. Dept. of Agriculture

This Luckless Japanese Beetle Has Suffered a Dozen Direct Hits by Dive-bombing Centeter Flies

Unlike bombers, these parasites do not drop their death-dealing eggs but attach them with a lightninglike stroke of their ovipositor (Plate IV). Any one of the eggs would be fatal, for the maggot bores through the armor of chitin and kills the host. The reason this chap bears so many is that the Centeter fly, from Japan, is not well synchronized with the appearance of the beetle in this country. The flies are most numerous when the beetles first appear; so early arrivals, like this one, are sometimes thoroughly peppered.

* Information concerning methods of combating specific pests may be obtained by writing the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture at Washington, D. C.



U. S. Dept. of Agriculture

Hardly Handsome, a Boll Weevil Has a Snout Half as Long as Its Body

With its oversized proboscis, which has a mouth at the end, the South's archvillain eats holes in the "square" (bud) and boll of the cotton plant (Color Plate II). Eggs often laid in these holes become the fat larvae which cause millions of dollars' worth of damage (page 231).

Staff Photographer Willard R. Culver

Shooting a Million Disease Spores into a Japanese Beetle Grub

Its skin is pierced by a hollow needle, and into its body at the press of the button pours a potent dose of "milky disease" bacteria. The grub then gets fatally sick. In 11 days it is nearly dead and is ready for the next step in science's novel disease-germ war upon the Japanese beetle (opposite page).

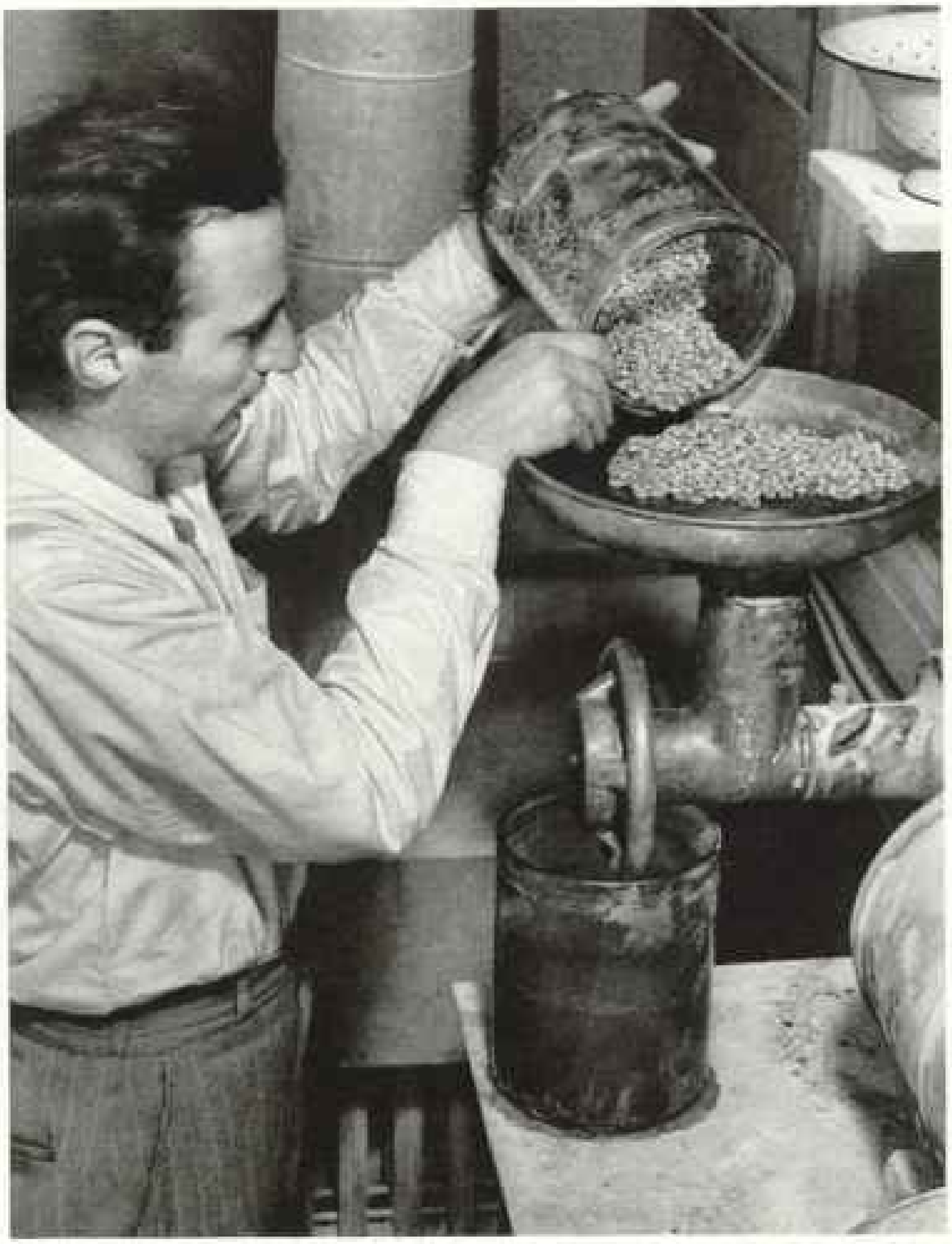
the Nation of trees and treasure long after he was dead. He promptly spread the alarm—the gypsy moth was at large!

In Europe the Hun-like onslaughts of the armies of gypsy moth caterpillars had been known and feared for centuries. In badly infested areas they stripped every tree, killing or stunting whole forests or orchards, wiping out the green glory of graceful shade trees.

But nothing like this happened in Medford—yet. For ten years after the release of the moth in 1869 its presence was hardly known. The few that had suddenly found themselves free in a paradise of juicy-leafed trees were busily and quietly reproducing. In the second decade they caused some damage.

Then at last came a major outbreak, in June, 1889. Medford residents awoke to discover that a crawling army was taking over their town. Dark hordes appeared as if by black magic. In millions they attacked the trees, leafed out in new and tender foliage, and left them stark as winter. Then they moved on to other trees, in dark purposeful rivers of destruction.

Caterpillars were gathered and killed by the bucketful, yet without any apparent effect upon their swarming numbers.



Staff Photographer Willard R. Culver

Grinding Up Dying Grubs, He Makes a Witches' Brew of Germs

Dried and mixed with chalk and talc, the liquid will become a powder in the Federal Japanese Beetle Laboratory at Moorestown, New Jersey. This is distributed as widely as possible to blight future Japanese beetle generations with the fatal milky disease. Birds help spread the bacteria, which do not affect warm-blooded animals (opposite and pages 236, 245).

Chewing Hordes Sound Like Scissors

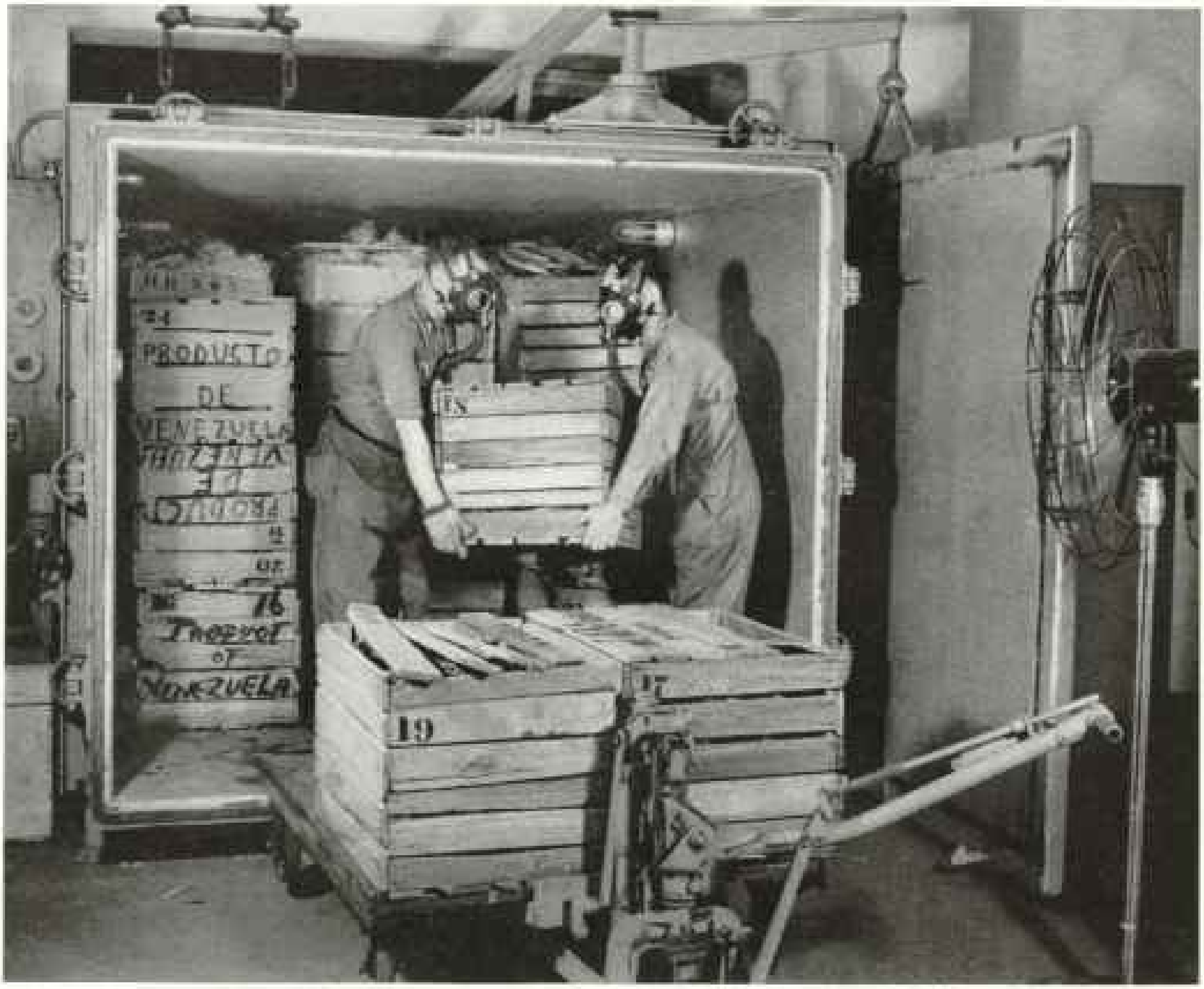
As the stillness of evening fell upon a weary town, its dismayed inhabitants could actually hear the hungry hordes chewing in the branches overhead. Millions upon millions of busy jaws made a sound that some residents likened to scissors and others to a gentle breeze.

"The caterpillars covered one side of my house so thickly that you could not have told what kind of paint was on it," recalled one veteran of that gypsy moth war.

"We found them . . . even under the pillows," said another.

Today the war still goes on, a war which has cost more than 57½ millions of dollars and involves the annual expenditure of about two million dollars of State and Federal funds just to keep the moth under control. These figures do not include the untold damage done to forests, orchards, and shade trees.

The gypsy moth now occupies an area of 35,820 square miles, largely in New England



Staff Photographer Willard R. Culver

Masks Guard Them against Hydrocyanic Acid Gas as They Fumigate Orchids

Growing plants are examined, and gassed if necessary, at this Department of Agriculture station at Hoboken, New Jersey, but forty other stations around the Nation's borders also help keep out insect enemies. All cotton entering the country must be fumigated lest it bring the dreaded pink bollworm. So must all broomcorn, believed to have brought the European corn borer to America before quarantine was established (page 234).

but with a 1,000-square-mile "island" of infestation in northeastern Pennsylvania and occasional scattered colonies in extreme eastern New York State. In some New England towns at times outbreaks are about as bad as they were in Medford in 1889.

"Parachutists" Land behind the Lines

From Canada to Long Island Sound, through western New England and eastern New York, the entomologists have drawn a "barrier zone" 20 to 35 miles wide—a "no-moths-land" which the insect fighters strive to keep constantly clear of the crawling armies or their wind-borne parachute troops.

Young caterpillars on their silken threads may be caught by the wind and blown 15 or 20 miles. The long hollow hairs on their bodies give buoyancy, and the caterpillars float through the air at heights often ranging to a quarter of a mile, sometimes considerably more. One has been caught on a screen of an airplane flying at over 1,800 feet.

A sudden westward jump in gypsy moth infestation in 1939-40 is attributed by some to wind spread of small caterpillars and to the New England hurricane of 1938.* The hurricane came in September at a time when no adults or larvae were about, but broken egg masses on pieces of bark and other debris were whirled aloft and borne long distances.

Female gypsy moths are so heavy with eggs that they cannot fly, but males wing in zigzag flight to catch the faint scent of the female. Entomologists trap them, using as bait this scent secured from virgin females.

Most spectacular of the imported insect

* See "The Geography of a Hurricane," by F. Barrows Colton, National Geographic Magazine, April, 1939.

enemies of the gypsy moth is the big metallic-green tree-climbing beetle *Calosoma sycophanta* from Europe, which hunts them through the branches as a leopard stalks an ape. Less dramatic but heavier execution is done by small flying parasites.

Powerful pumps shoot arsenate of lead and fish oil into the treetops through hoses sometimes two miles long, and an autogiro dusts the poison on forests. Men destroy egg masses with creosote or trap larvae under burlap tied around trees. Yet still the gypsy moth thrives.

Where practicable, whole forests are being thinned out to reduce the proportion of favored food trees. Gypsy moth larvae will feed on most kinds of foliage, but prefer oak, willow, apple, and related species.

A forester and an entomologist who recently made a special study of the gypsy moth for the Bureau of Entomology and Plant Quarantine indicated in their report the danger to the "vast oak forests to the west and south if the gypsy moth were allowed to spread to the central hardwoods, southern Appalachian, and Piedmont regions. . . . No climatic or other natural barrier is known to exist."

A single careless motorist could carry the spark, an innocent-looking chamois-colored patch of eggs.

Brown-tail Moth Strafes Man with Poison

An even less attractive character is another European, the brown-tail moth, which turned up in Massachusetts in 1897. Though it covers a much smaller slice of New England than the gypsy moth, and accordingly strips far fewer trees, it is more obnoxious where it occurs because it is poisonous. The shorter hairs of the caterpillars and moths are barbed, hollow, and poisoned. When they touch human skin they cause "brown-tail rash," with intense irritation, blisters, and swelling.

Where the pests are numerous the minute poison hairs float in the air, irritating the eyes and noses of persons many yards away.

Thus a moth fights man with air-borne poison, a weapon which strangely parallels man's own use of poison from the air for "strafing" the gypsy moth and the South's bane, the cotton boll weevil.

"Little Black Bug" Is Scourge of Dixie

Oh, de boll weevil am a little black bug,
Come from Mex'co, dey say,
Come all de way to Texas,
Jus' a-lookin' for a place to stay,
Jus' a-lookin' for a home, jus' a-lookin' for a home.

So goes the "Ballad of the Boll Weevil," heard in all the Cotton States, for the ill-fame of that little outlaw is sung to the strains of plaintive strings, much as other American balads sing the misdeeds of Captain Kidd or of the Devil himself (Plate II and page 228).

To the southern sharecropper, fighting this foe, the boll weevil seemed superhuman. In the ballad, the farmer puts him in hot sand and in ice, yet still the weevil survives—and gets half the cotton. The farmer's wife is left with only one old dress, "an' it's full of holes, an' it's full of holes." The farmer has a "Fohd machine" but "can't buy no gasoline."

In less than fifty years this small winged beetle from Mexico has invaded all the cotton-growing territory of the United States except California, Arizona, New Mexico, and western Texas.

Boll weevils lay so many eggs and have so many generations a year that one pair in a single season could produce some 12,755,100 descendants, if none was killed by man or Nature. Actually, they have numerous enemies, chief of which are winter cold and blazing summer heat.

Winter Kills 94 out of 100

Cold is the greatest killer. Along the northern fringe of the Cotton Belt a winter of unusual bitterness may wipe out every weevil. For the country as a whole, an average of 94 out of 100 are killed each winter by cold. The remaining half-dozen keep from freezing in varied hide-outs—in woods, hedges, cornstalks, and outbuildings, in cracks in the ground, in Spanish moss high on trees. In spring and summer they build up their numbers anew.

It is lucky for the cotton farmer that the boll weevil is a tropical or semitropical insect from Central America and Mexico. If it were not for the yearly winter-killing of myriads, the growing of cotton in the weevil area would be practically impossible.

As it is, the farmer's best course is to make the cotton mature so fast that the crop can be gathered before the weevils have remultiplied their numbers. Every cottonfield is the scene of a race between the rate of reproduction of the weevils and the rate of the cotton's growth.*

Though the weevil still costs United States cotton farmers an estimated $121,000,000 a year, its toll has been greatly curtailed as men have learned the best ways of fighting it.

Calcium arsenate dust is spread over fields, sometimes by "hedge-hopping" airplanes (page 232). Cotton stalks and other hibernating quarters are destroyed so the weevils will freeze to death. They are attacked by 45

* See "Cotton: Foremost Fiber of the World," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, February, 1941.

U. S. Dept. of Agriculture by Wilgustick

All-out War on the Boll Weevil—by Airplane, Mechanized Units, "Cavalry," and "Infantry"

Six different ways of dusting cotton with poison are shown here in a single picture: right to left, by hand; from the back of a horse or mule; by horse- or mule-drawn machine (two kinds); by power-driven machine; and by hedge-hopping airplane. For large farms the aerial method has proved highly effective.

U. S. Dept. of Agriculture by Pratt

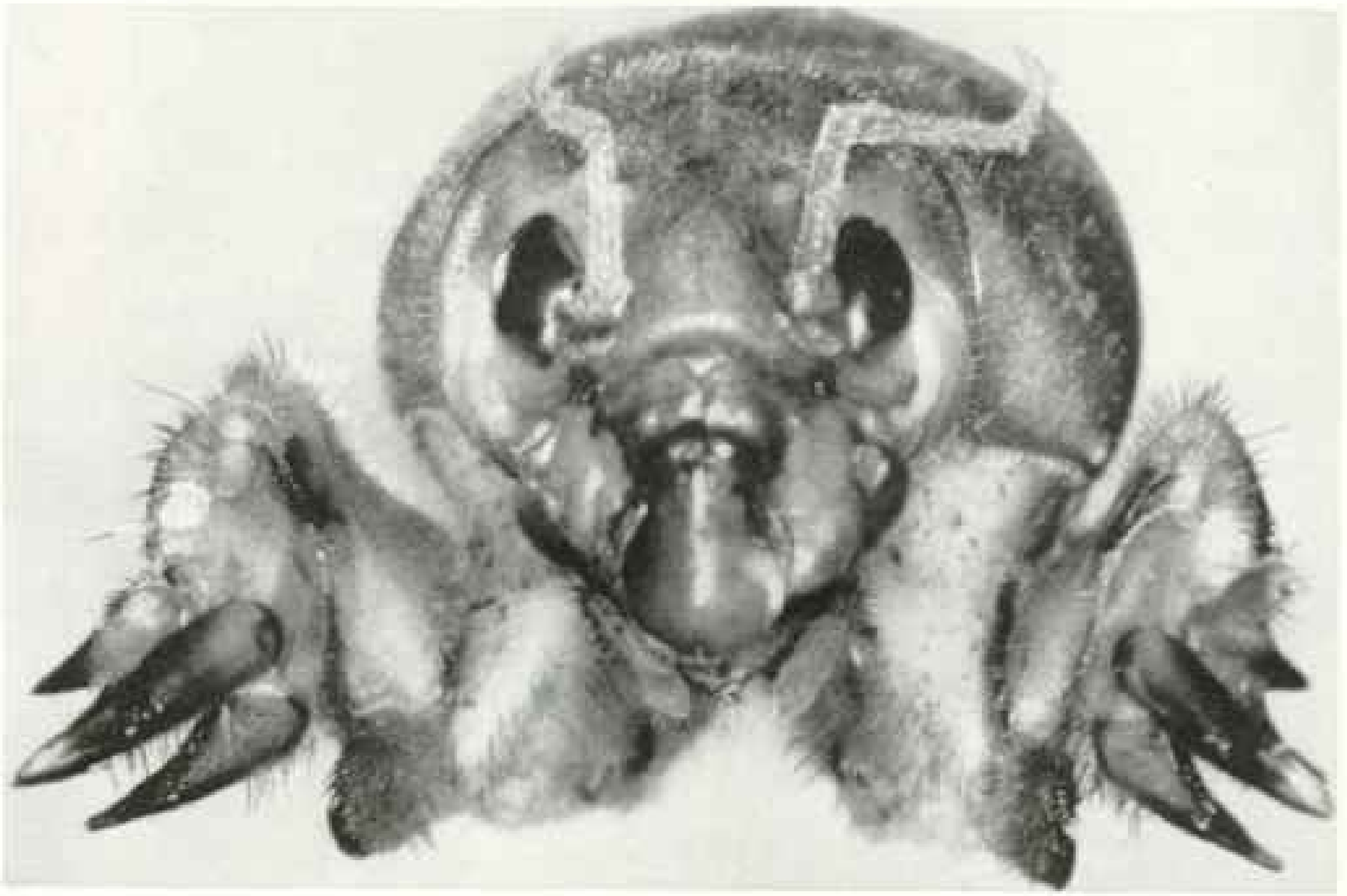
Miss White-fringed Beetle Will Never Have a Husband

She reproduces by the "virgin birth" process known as parthenogenesis. No males have been discovered. Since all are egg-laying females, and each is capable of starting a new colony, the danger of spread from the infested area in four Gulf States is ever present. A strict quarantine is enforced (Plate VII).

Staff Photographer Willard R. Culver

Even the Exotic "Live-forever" May Hide a Hitchhiking Bug

Prized by Chinese as a cure-all are these Aglaonema canes, known as "Chinese evergreen." Like all plants entering eastern ports, they went to the new and splendidly equipped Federal quarantine station at Hoboken, New Jersey, so sharp-eyed inspectors with lenses could see if they carried any insect stowaways.



U. S. Dept. of Agriculture by Pratt

Legs of the Puerto Rican Mole Cricket Serve as Spades, Oars, and Scissors

As this strange inhabitant of the insect underworld tunnels through the earth with its Nature-made tools, it uses them occasionally as shears to snip off roots. In water they serve as oars. Strangely, the mole cricket wears its ears on its legs, in a slit in the skin. In the fall of 1940 the creatures caused considerable damage to truck crops in parts of Florida by cutting roots and uplifting young plants. On the coast of Georgia and the Carolinas they often uproot tobacco seedlings. Farmers fight them with poisoned bran bait which the crickets come to the surface to eat.

kinds of insects, and a dozen species of ants prey upon their young. The pests are eaten by many birds, and drought destroys large numbers. But still the weevils "increase and multiply."

Pink Threat from Down Mexico Way

Today the cotton farmer who has learned to live with the boll weevil sees a new danger looming from down Mexico way—the pink bollworm, a native of India or Africa, which reached Mexico from Egypt and invaded Texas.

In some years this pink menace—larva of a moth—has destroyed more than half of the crop in certain fields in the Big Bend area of the Rio Grande. In the United States a rigid quarantine at present confines it to parts of Texas, New Mexico, and Arizona, and to wild cotton in the Everglades of southern Florida.

The pink bollworms in the Everglades are believed to owe their presence to parent moths which have flown or blown in from the West Indies; long strides toward their extermination in Florida are being made by a vigorous campaign of wild cotton destruction.

Not to be confused with the pink bollworm is a native insect, the bollworm, which possesses a versatile appetite and several aliases, depending upon what it is eating at the moment. It is variously known as the bollworm, tomato fruitworm, one of the tobacco budworms, and the corn earworm.

Corn Borer Swept into the Country

Latest attacker of American corn, however, is a foreign insect which was figuratively swept into the country, in raw material for making brooms.

Shortly before the first World War there arrived in Boston from Europe a shipment of broomcorn, the stiff-stemmed plant which sweeps our floors. Repercussions were to be felt hundreds of miles away on farms in the distant Corn Belt. Generations of hard-working Americans were to have less cash and more worry because of what it brought.

In 1917 farmers around Boston found that something was eating their corn. First, the tassels broke off; then the whole plant seemed to lose all interest in life. Investigation showed it was full of "worms"—dark-headed,

U. S. Dept. of Agriculture by Peter Killian

Center of All This Maze of Machinery Is One Lowly Cockroach

There it lies in the miniature bathtub, serving as a guinea pig for science. Nicotine is being dropped on the heart of the cockroach, kept alive in a salt solution. Heartbeats are recorded by mechanocardiograph. Such experiments at the National Agricultural Research Center at Beltsville, Maryland, develop better insecticides.

ugly little larvae that weakened the tassels till they drooped at half-mast, that ate the heart out of the stalks, tackled the kernels, and bored lengthwise through the ear. Badly infested fields looked as if a troop of cavalry had charged across them.

The culprit was soon identified as the European corn borer, the world's worst menace to Indian corn (Color Plate III). Strong though circumstantial evidence points to its arrival in broomcorn from Hungary or Italy before the "coast defense" quarantine inspections and fumigations were authorized by law.

Great Lakes Water Hazard Crossed

As the summer days passed, the "worms" took wings, for the borers are but the larval stage of a strong-flying moth. With the aid of the wind they drifted deeper into this vast land of promise, the females finding plenty of corn on which to "shingle" their flat little eggs. Even the Great Lakes failed to stop them; the flyers alighted on the water, rested, and then flew on again.

Now, in 1941, the advancing hosts of the corn borer harry the tasseled fields of Wisconsin and Illinois.

This lowly insect which once fed humbly on the wild hops of Central Europe now stands, billions strong, well within the eastern borders of the greatest corn-growing region on earth, the middle-western Corn Belt. South and north it extends to North Carolina and deep into Canada. Besides corn, it tackles potato plants, the dahlias in flower gardens, and even the notorious drug plant marijuana.

But the pest is not having things all its own way. With the wise counsel of the Bureau of Entomology, farmers are keeping cornfields clean—cutting stubble short, destroying or shredding stalks, or plowing them well under.

Borers winter in stalks where most birds cannot reach them, but the little downy woodpecker plucks them out like plums from a Christmas pie.

Parasite hunters, prowling Europe and Asia, have brought back several of the borer's worst enemies (page 246). One, a delicate, light-brown parasitic fly from Europe and the Orient, is now more abundant in southeastern Massachusetts than anywhere else on earth.

Corn borers are subject to a fungous disease, but their life inside the corn plant makes it hard to use this weapon as the "milky disease" is being used against Japanese beetle grubs.

Japanese Beetles, Gems of Ill Omen

Over an ever-widening eastern territory which now includes the Nation's Capital, gardeners and golfers, farmers and fruit growers are getting a forceful introduction to the Japanese beetle. Often it appears in huge numbers, as many as 296 on one apple, like an incrustation of evil little gems (Color Plate IV).

Unless protected by poison sprays, a whole crop of fruit may be eaten or damaged. Corn, vegetables, and shade trees are attacked. Rose bushes and other plants fade as leaves and petals are consumed. In spring the larvae, eating grass roots, turn lawns and golf greens brown.

"How did they get here and what's being done about 'em?" wonders the average suburbanite, laying about him with his spray gun.

To get the best answer I went to Moorestown, New Jersey, where the Federal Japanese Beetle Laboratory carries on one of the fiercest wars ever waged against an insect.

Five miles away, near Riverton, New Jersey, the Japanese beetle was discovered in 1916 by H. B. Weiss and E. L. Dickerson of the State Department of Agriculture. It probably arrived in the larval stage, in soil around the roots of a Japanese iris or azalea. Weiss and Dickerson found several beetles on a hawthorn bush and by careful searching collected a dozen. Today in a badly infested orchard one man could shake off a ton.

Many parasites have been imported, and five of these little policemen are now on regular duty here. Best are *Tiphia vernalis* and *Tiphia popilliavora*, small digger wasps which lay their deadly eggs on the larvae in the soil. These wasps are now abundant in many places. Each year the entomologists bait them with honey, catch the females, and establish new colonies where needed.

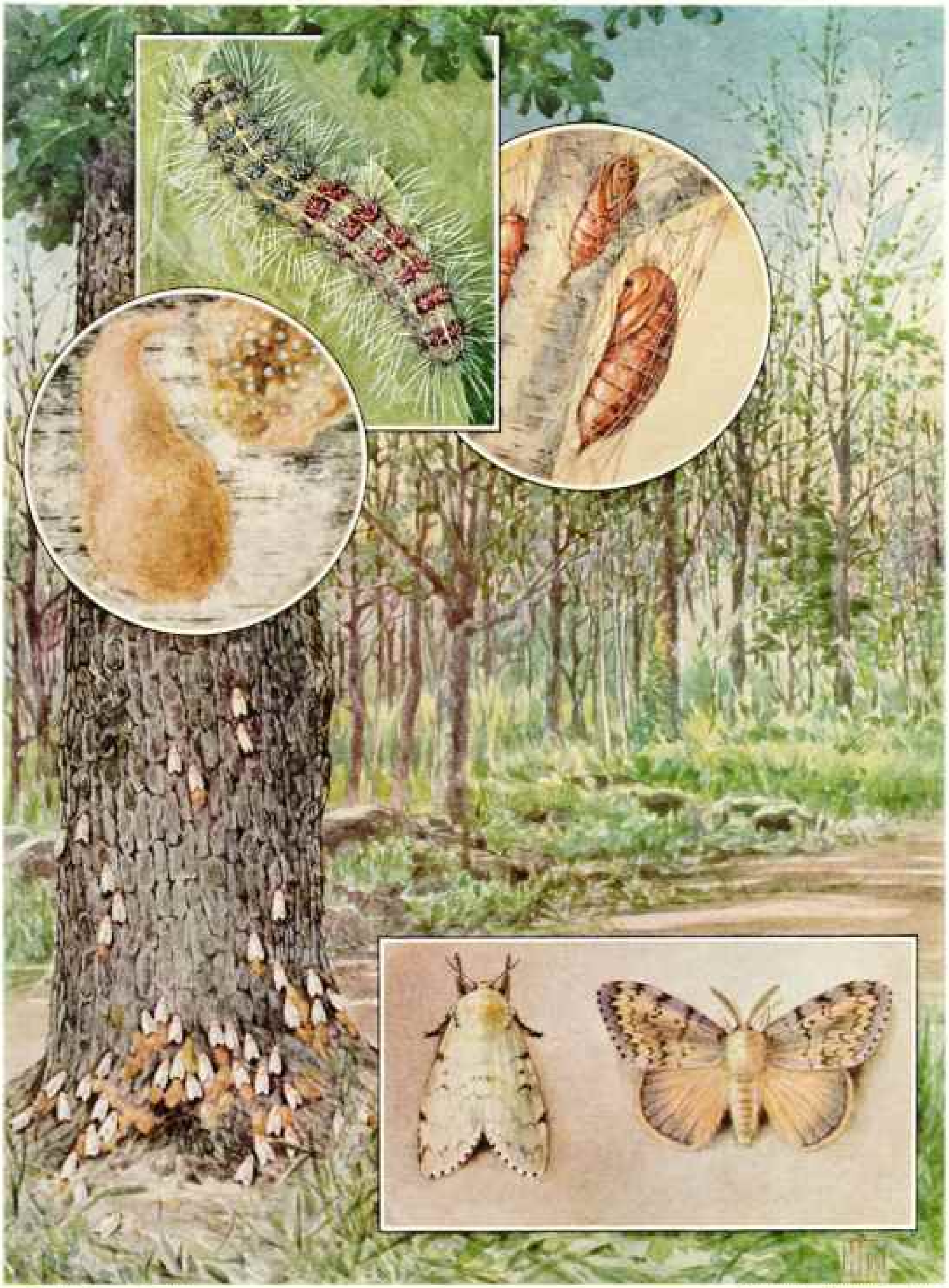
A third parasite, *Centeter cinerea*, is a tachinid fly which deposits its egg upon the adult beetle with a dive so quick the eye cannot follow (Plate IV and page 227).

Billions of beetles are caught in traps (page 226) and turf is grub-proofed with poison.

Against such weapons the beetles pit their vast reproductive powers and their wings. Good flyers, they are spreading north, south, and west at five or ten miles a year. Broad Delaware Bay proved no barrier, for one beetle out of five that fell into the water was still alive when washed up on the other side.

Fighting an Insect with Bacteria

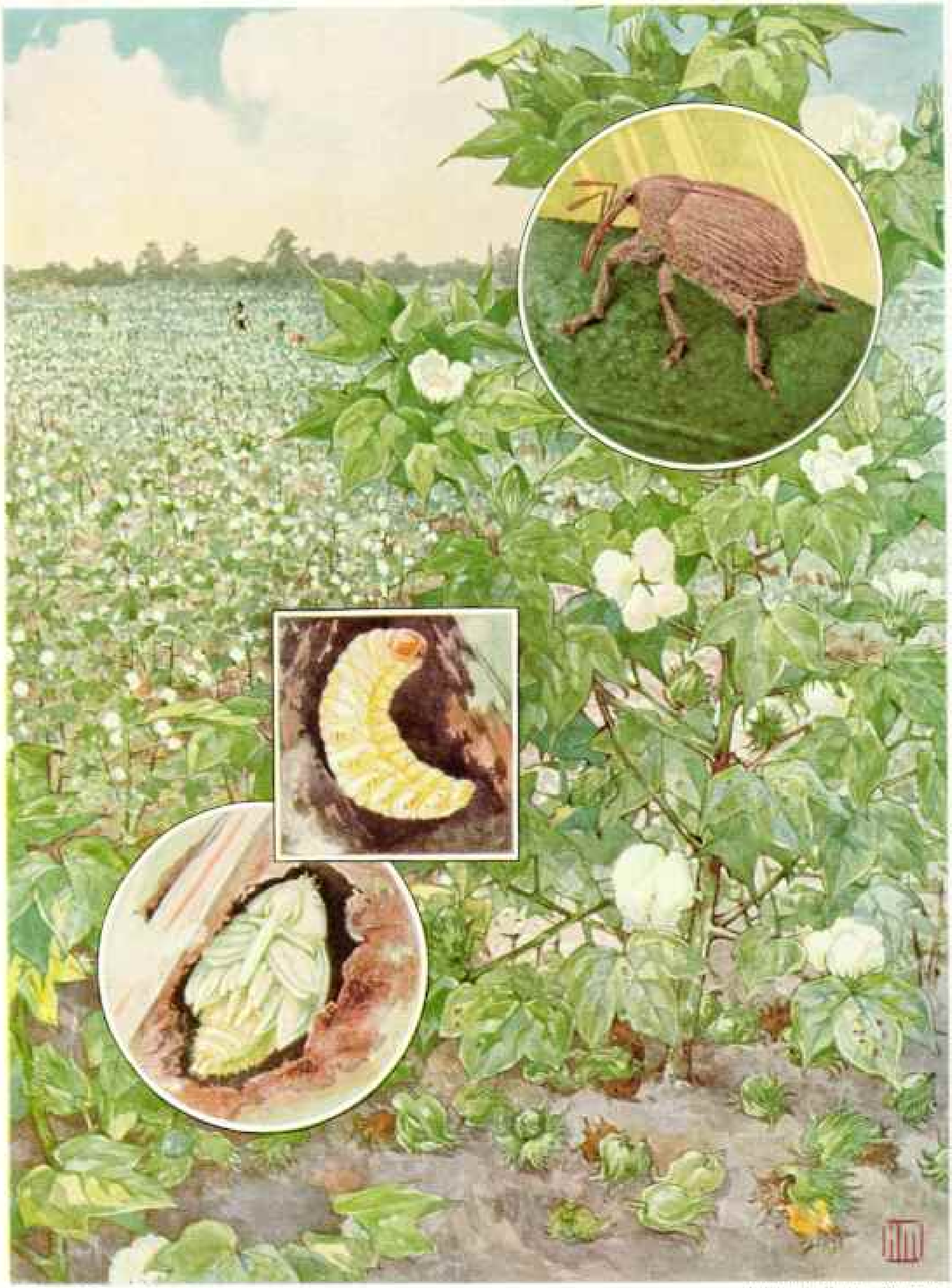
But meanwhile the Government scientists had discovered a vital fact. In rare instances the grubs in the ground were attacked by diseases. One especially seemed promising. Microscopic spores, multiplying by the billions in their bodies, turned their blood, or lymph, from a watery to a thick milky fluid and caused death in about 12 days.



© National Geographic Society Painting by Hashime Murayama

New England's Insect Enemy Number One Is the Tree-killing Gypsy Moth

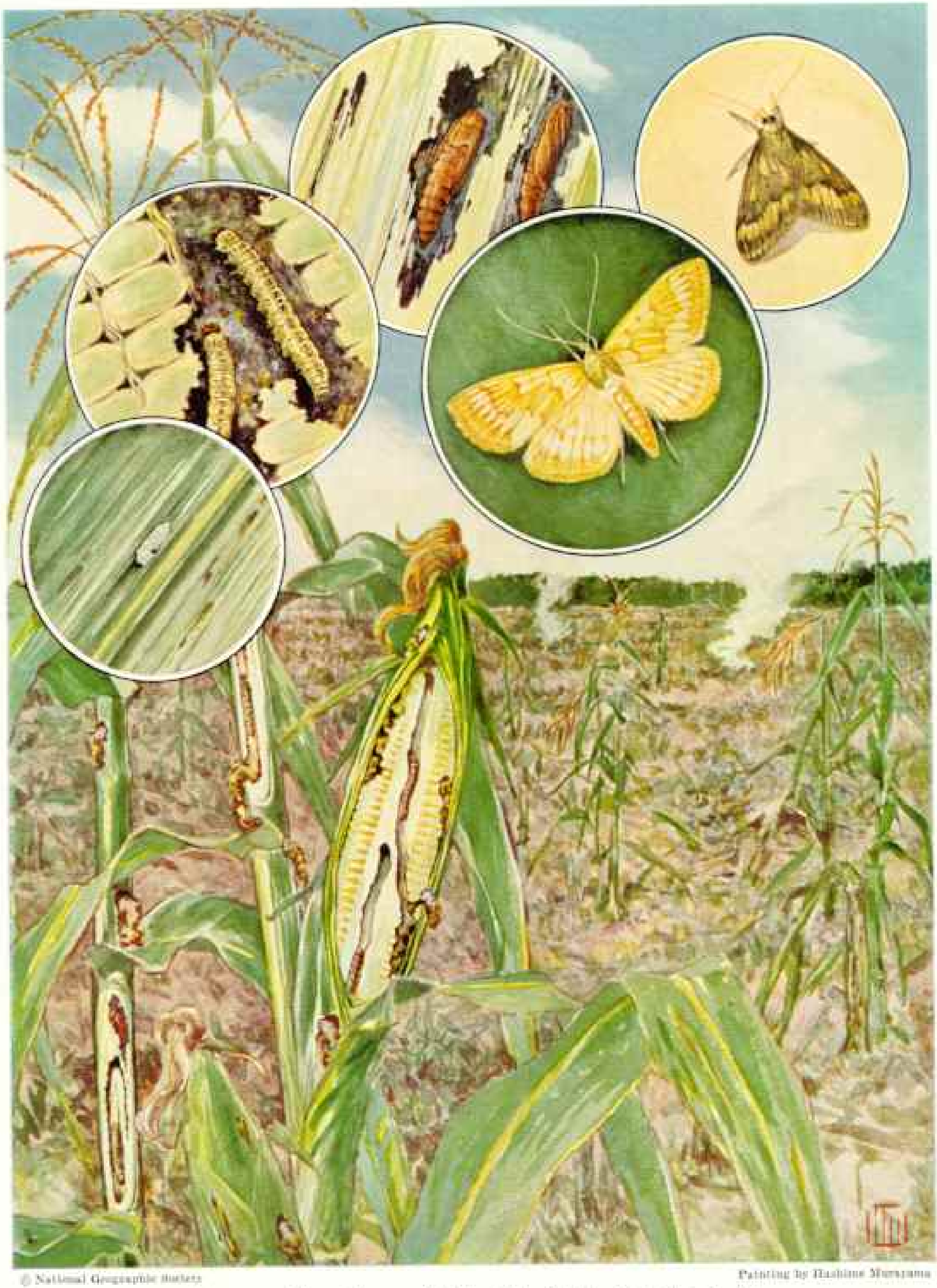
An experimenter breeding silkworms imported gypsy moths from France 72 years ago. Some escaped, and now hordes of caterpillars strip the leaves from hundreds of thousands of acres of forest, shade, and orchard trees. Here females deposit egg clusters (left). Caterpillars become pupae in silken hammocks, then moths (male, right).



Painting by Ralphine Munsterus

"De Next Time I Seen de Boll Weevil, He Had All of His Fam'ly Dere"

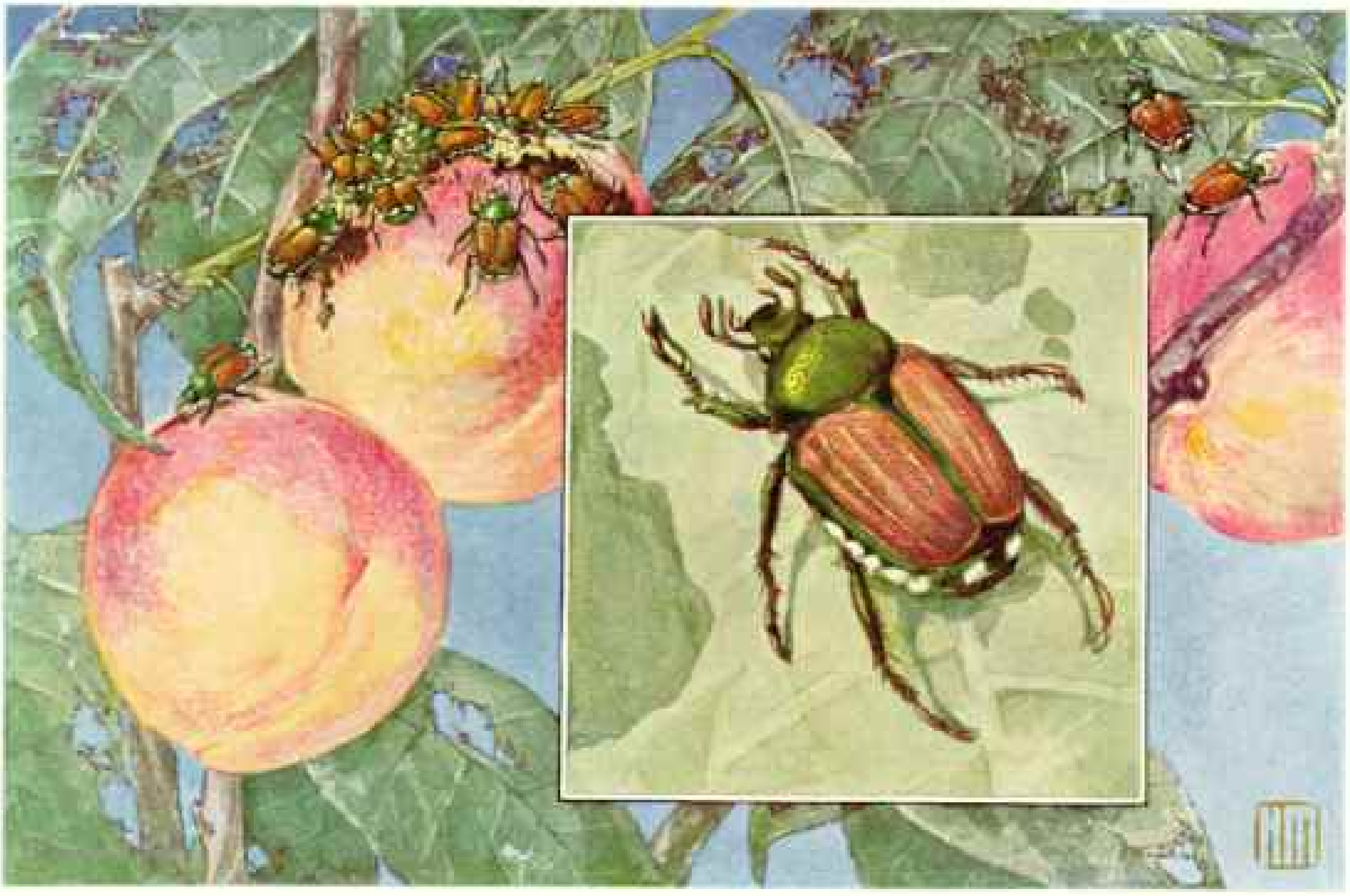
In the folk song, "Ballad of the Boll Weevil," awed tribute is paid to the archvillain of the South. Above, "de little black bug" from Mexico drives its snout into a boll for feeding or egg laying; older weevils are darker. Below are members of its infamous "fam'ly"—the legless larva which ruins bud or boll, and the ghostlike pupa.



Painting by Rashima Murayama

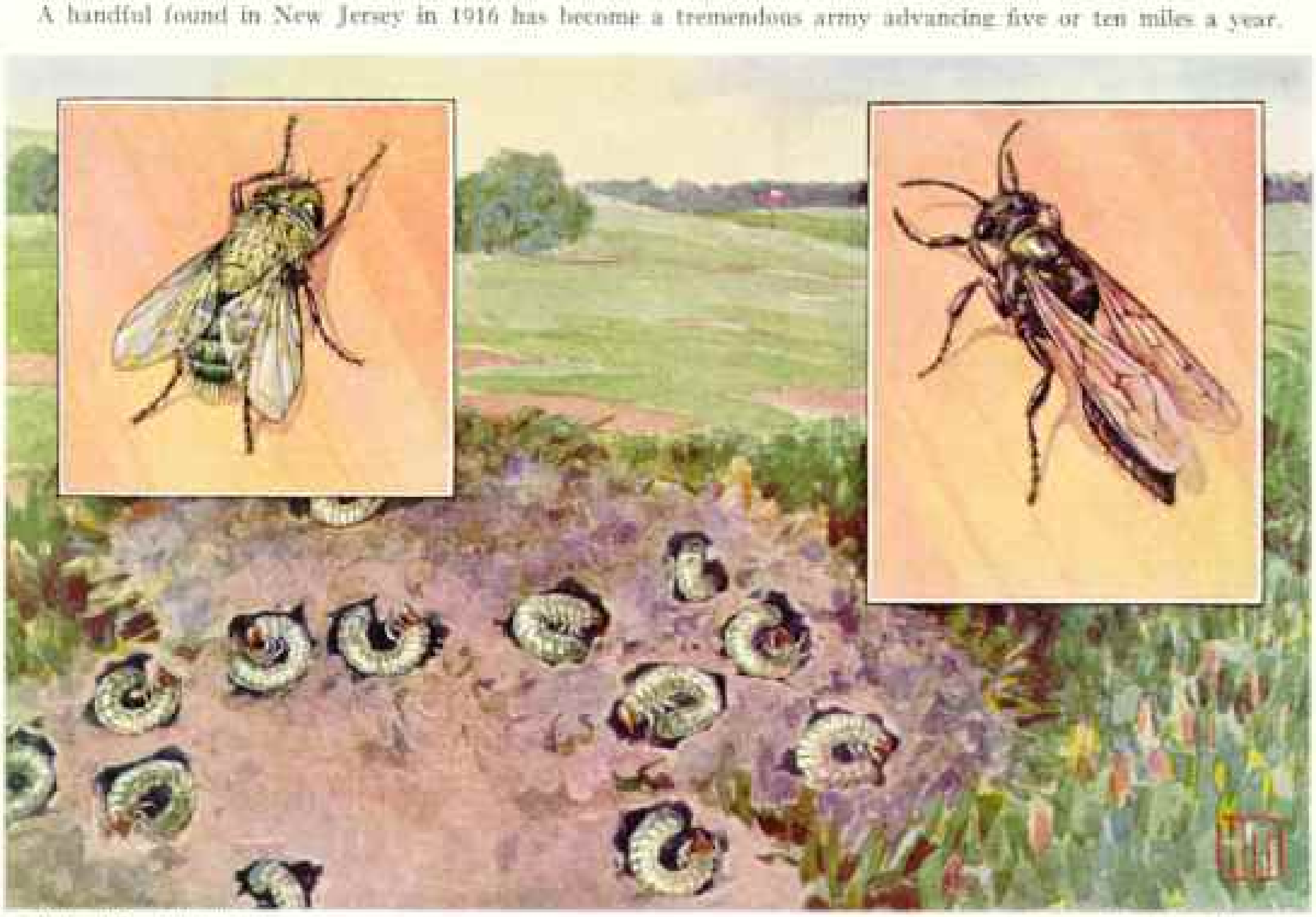
European Corn Borers Riddle Cob, Stalk, Tassel, and All

Brought to America probably from Hungary or Italy in corn used for making brooms, this costly moth has reached the eastern portion of the vast midwestern Corn Belt. Cross sections and close-ups show the larvae at work, the eggs, pupae, and moths (female larger). Burying, shredding, or burning stalks kills many borers.



Japanese Beetles, Sociable, May Cluster in Hundreds on a Single Peach

A handful found in New Jersey in 1916 has become a tremendous army advancing five or ten miles a year.



Paintings by Hashime Murayama

Little Winged Policemen from the Orient Kill Myriads of Japanese Beetles

The parasitic fly *Centeter cinerea* (left) lays its egg on the adult beetle. The digger wasp *Tiphia popilliavora* (right) attacks the larvae, here eating grass roots on a golf course. Bacteria are the latest weapon (see text).

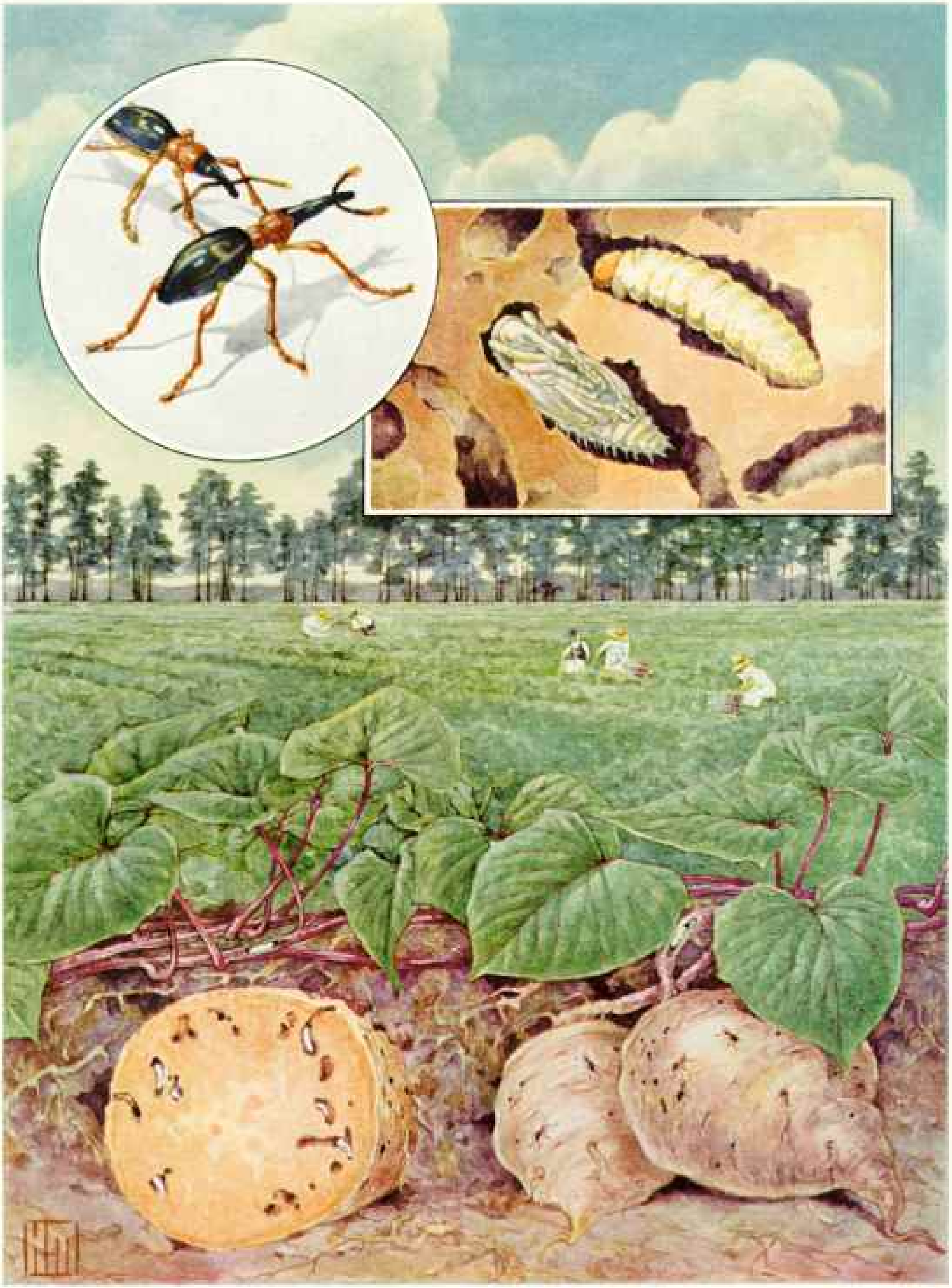
Mexican Bean Beetles Spread in Recent Years All the Way to Maine and Canada

Bean leaves turn to filmy lace under their mass attack. Circle shows life cycle—eggs, larva, pupa, gluttonous beetle.

Paintings by Hashime Murayama

How Innocent-looking Butterflies Affect the Cost of Cabbage

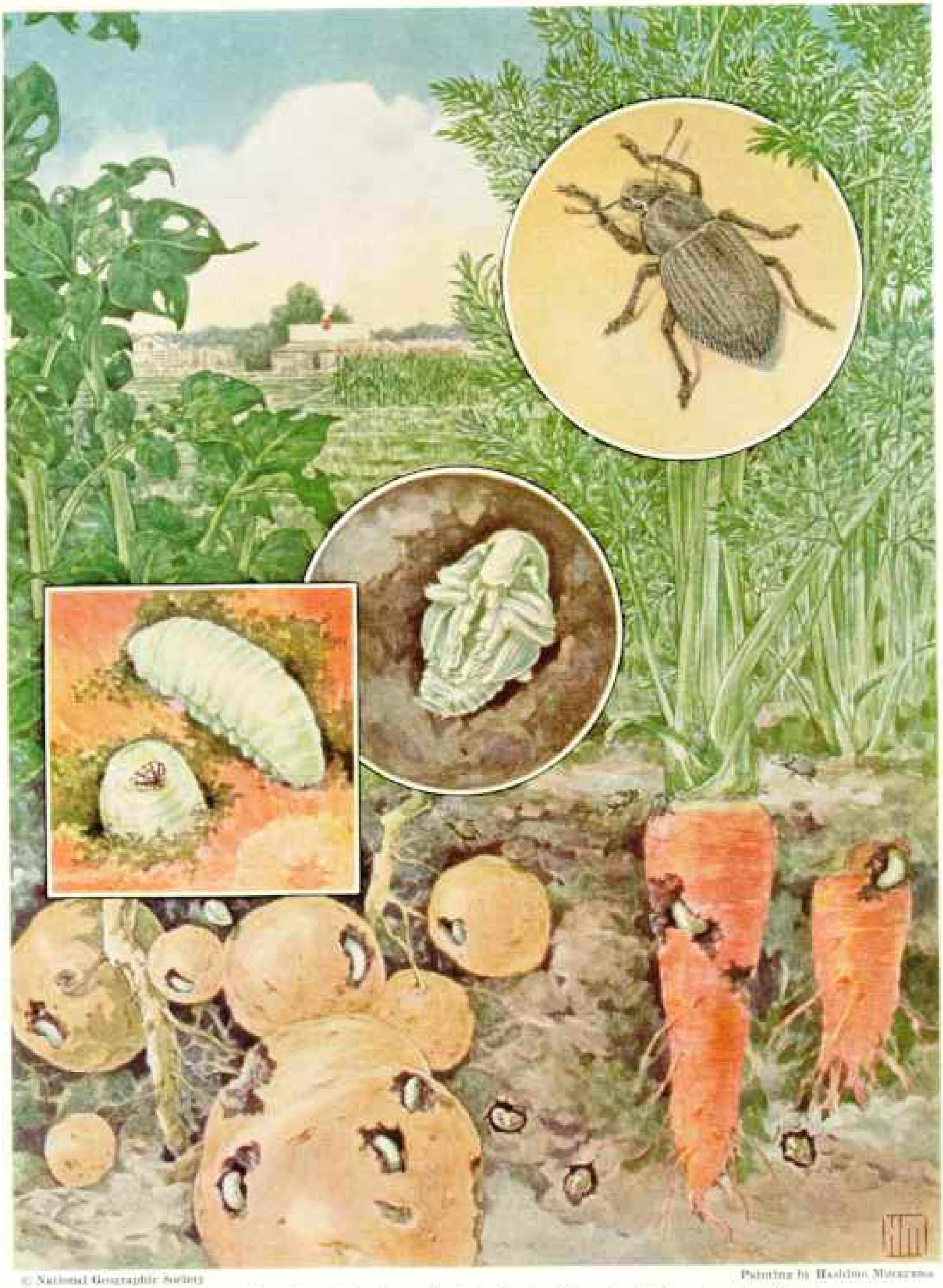
Parent of the notorious green cabbage worm is the European cabbage butterfly, which gained entry at Quebec and New York in the 1860's and has spread from coast to coast. Tied-down mummies are the pupal or pre-butterfly stage.



Painting by Hashime Murayama

Lesser of Two Weevils That Harry the South Is This Vivid, Antlike Eater of Yams

Sweet potato weevils are believed to have originated in Cochin-China or on the Indian Ocean island of Mauritius, but long ago they spread to the Caribbean area and thence to the Southern States. Like its cotton-boll counterpart (Plate II), this little snout beetle does most damage in the larval stage (upper right, lower left).



Painting by Hashimo Murayama

White-fringed Beetles Rank as the Nation's Newest Major Insect Menace

These gray-haired South Americans turned up in 1936 in four Gulf States—Florida, Alabama, Mississippi, Louisiana. The larvae (left) tackle carrots, potatoes, peanuts, cotton, and 200 other plants. In spring the buried pupa (center) crawls forth as an egg-laying female beetle; no males have been found (see text).

Painting by Hashime Murayama

Tiny Thrips of Mysterious Origin Now Attack the Stately Gladiolus

They appeared suddenly near Cleveland in 1929 and soon were found at many points; they gained notoriety in Australia about the same time. Gladiolus thrips are only 1/25th to 1/16th of an inch long. Shown 15 times actual size are adults (top), short-winged pre-pupa, long-winged pupa, and larva; damaged flowers at right

Here at last was a chink in the beetle's armor. Now, how could the "milky disease" be spread widely among the ranks of the pest? After months of work and study a way was evolved. Thousands of healthy grubs were dug and into each was injected a drop of blood from a sick one (pages 228 and 229).

Each drop contained roughly a million spores, but they multiplied so rapidly that by the time the grub was almost dead its body contained from three to nine billion, in some cases as many as 20 billion.

Just before death these artificially diseased grubs were ground up, dried, and mixed with chalk and talc to make a potent powder.

The next step was to spread the spore-containing dust where larvae would get it into their bodies as they fed or moved through the soil. Since the spores cannot be produced in unlimited quantity, the powder ordinarily is spread by hand over only two half-acre plots to a square mile, although this year in heavily infested parts of Maryland that dosage was increased fivefold.

But how are the spores distributed outward from these comparatively small spots? Breezes help. So do flying beetles. But birds are the principal answer. Besides the many species that feed on full-grown beetles, there are several that feast on the grubs. Starlings, grackles, crows, and other birds dig them out of the sod as they near the surface in spring. Diseased larvae are seized as readily as healthy ones and are carried off or consumed.

The spores do not affect warm-blooded animals, and they pass unharmed through the bodies of birds, or of skunks, field mice, and moles. Wherever they fall, the spores form another fatal focus of milky disease. They keep their potency for years.

One of the newest advances in entomology is the recent development of this method of fighting an insect pest with bacteria.

Bean-eater Extraordinary

Black sheep of a fine and friendly family is the Mexican bean beetle (Color Plate V). It belongs to the tribe of the lady beetles, most of which are a big help to man by their eating of aphids and scale insects (page 226).

Unfortunately, this copper-colored beetle with the 16 black dots on its back happens to like beans—the leaves, even the stems and pods, of snap beans, lima beans, any kind of beans.

The bean beetle's pursuit of its favorite food has been phenomenal. Until 1920 it was still in the West, whither it had advanced from Mexico. Then it crossed the Mississippi and reached Alabama, supposedly in baled hay. Today the Mexican bean beetle covers the entire East, all the way to Maine and Canada. The specimens used by Mr. Murayama in making the painting (Plate V) came from a garden in a Maryland suburb of the Nation's Capital. "Take all you want," said the gardener. "I wish you could take them all!"

One reason the beetles have spread so rapidly is because they have what military men call "control of the air." Since they fly freely they spread at will. Kill them off in your own field and more fly over from your neighbor's beans.

Wise growers protect their crops by spraying or dusting the undersides of the leaves with poison. After harvest they plow the vines under to a depth of at least six inches, thus giving any beetles therein a fatal burial.

A Butterfly and Its Problem Child

Little white butterflies dancing in the summer sun—what have they to do with the cost of cabbage? Plenty. Some of them are doubtless *Pieris rapae*, the European cabbage butterfly, which came to America in the 1860's and has since spread to almost every field in the land. It has the doubtful distinction of being the most injurious of the country's butterflies (Color Plate V).

Actually, the butterfly is not directly guilty, but what the lawyers would call "an accessory before the fact." The picture of innocence, it lives delicately on nectar from flowers and eats no cabbage at all. The female, however, lays her eggs on cabbage, cauliflower, or related plants, and the result is a living appetite, the velvety-green cabbage worm.

Luckily many parasites, most of them native, attack this butterfly's problem child.

Another of Nature's deadly efficient little specialists is the sweet potato weevil of the South (Color Plate VI).

Small and antlike, this red and blue-black creature has traveled by ship all over the world. It is believed to have come originally from Asia or the island of Mauritius in the Indian Ocean. It has wings but rarely flies except on the warmest days.

Eggs are laid in punctures made in sweet potatoes or vines, and the developing larvae, if abundant, ruin both.

Best control measures are the simplest: turning pigs into the fields to eat the vines after harvest, and planting weevil-free sweet potatoes, fumigated if necessary.

In the summer of 1936, farmers in western Florida and southern Alabama found a sinister stranger on their premises. It was a beetle about half an inch long, gray-haired with a dirty-white fringe (Plate VII, and pages 233

Staff Photographer Willard R. Culver

Pull the Trigger, and into the Gun Shoots Just the Bug You Want

The entomologist's "vacuum-cleaner" device makes insect-catching easy. Two kinds of small parasitic wasps are intermingled here in one of the rearing chambers of Moorestown, New Jersey, laboratories of the Department of Agriculture. The darker ones are *Tiphia vernalis*, a parasite of Japanese beetle grubs; the others are *Inareolata punctoria*, which parasitizes the European corn borer. Attracted by light, they collect on the window, where the air gun soon picks them up.

and 247). When disturbed it dropped off and "played dead."

What was the interloper? Where had it come from? Specimens were sent to Washington, and back came the answer from the Bureau of Entomology and Plant Quarantine: the white-fringed beetle from South America.

White-fringed Beetle a New Menace

How had the newcomer entered the country? No one knew. Anyway, here it was and it had to be fought. Already it was causing serious damage. Complaints were pouring in from four Gulf States—Florida, Alabama, Mississippi, Louisiana.

Most destructive of all was the larva, a fat insatiable worm which fed chiefly on fleshy roots, killing or badly damaging peanuts, cotton, and velvet beans, riddling carrots, Irish potatoes, and yams, tunneling into corn roots.

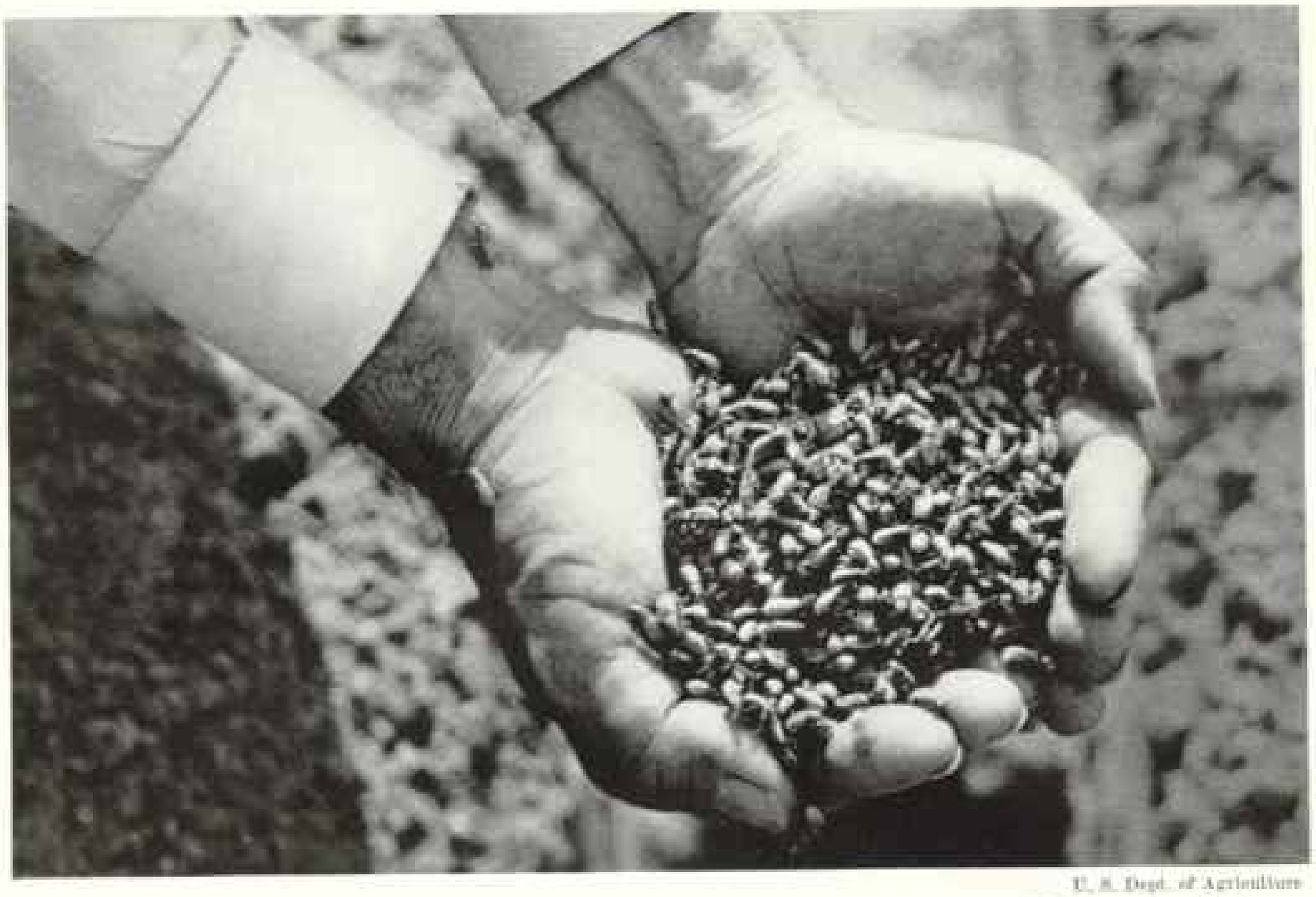
After an average of over ten months in the larval stage the fat feasters made nests in the ground, became pupae, and emerged in the spring as full-fledged beetles. These likewise tackled the nearest tasty foliage, though not so voraciously.

Now the investigators made a startling discovery: every one of these beetles was a female! Each was equipped to produce fertile eggs entirely under her own power by the "virgin birth" process known as parthenogenesis.

This meant a grave danger in the fight to keep the pest from spreading out through the country, for a single beetle could start its own colony. Since a beetle spent much of its nonfeeding time in laying eggs—an average of over 800—the progeny of a lone beetle could soon run into billions. If only one-fifth the offspring of each beetle survived, the number at the end of five years would be 104,857,600,000 beetles, all from a single ancestor!

Another danger lay in the fact that both the egg and the adult in the pupal cell could lie dormant for months if dry, their presence unsuspected. Then at the touch of moisture they sprang to hungry life.

On the infested farms in the Gulf States the spring rains soaking into the soil struck enormous numbers of the buried pupae—in some places several hundred to the square yard—and brought them forth as beetles. A



U. S. Dept. of Agriculture

Double Handful of Trouble—White-fringed Beetles Scooped from a Single Post Hole

Fifteen hundred of these comparative newcomers from South America were caught within 24 hours in a hole in one of the many barrier trenches in the infested region of Alabama. They were killed with kerosene. Back home in Chile, Argentina, Brazil, and Uruguay, this insect appears in no such numbers and causes far less damage (Plate VII and page 233).

day or two after a heavy shower they clung to the plants in clusters, as if they had fallen with the rain.

One trait caused the investigators some glee. The larvae were so pugnacious that when two of them met they sometimes bit each other savagely with their stout black mandibles, occasionally with fatal results.

But it didn't happen often enough. Other measures were needed. The pests were attacked by poison, by gas, and by stripping the worst infested fields so the beetles would die of heat and starvation.

Strict Federal and State quarantines were applied. White-fringed beetles cannot fly and they crawl less than a mile away in a lifetime, but they could cross the whole country in an unfumigated potted plant.

No one knows at present whether the white-fringed beetle can be stamped out in the Gulf States and kept from spreading. Not long ago it turned up in Australia. Two U. S. Government entomologists, no alarmists, recently reported that it "constitutes a menace to the agricultural resources of the South," if not the entire Nation. "Its climatic limitations are not known."

Most insects spread like an army, taking over new territory and steadily conquering more. But not so the gladiolus thrips. It spread by a process of "explosion," as if someone had loaded an immense shotgun with thrips and fired it over the country. They first appeared in 1929 near Cleveland, Ohio, and soon were found in widely separated parts of the Nation, to the consternation of those who grow the stately gladiolus (Color Plate VIII).

Thrips are so small that you have to look closely to see them. There are many kinds. The ones that specialize in the gladiolus eat the corms, or bulblike stems, the foliage, and flowers, reducing the value of the commercial crop by about 20 per cent. The reason for their sudden simultaneous appearance in many parts of the country was that they rode unnoticed on infested corms shipped out for planting. Now these are fumigated.

Whence or how the gladiolus thrips came to America is still a mystery.

Other Raiders of the Nation's Purse

High on the list of insect pests are many additional foreigners, often wholly unsuspected by the man in the blue sedan. Every time

U. S. Dept. of Agriculture by Kostinch

Some Smile, Others Sputter with Rage, at a Mexican Border Plant Inspection

At the El Paso, Texas, end of the International Bridge from Mexico, the search for plants, fruits, and anything else that might carry a pest continues on into the night. Last year a total of 70,622 interceptions of insects and plant diseases was made by the Bureau of Entomology and Plant Quarantine at its numerous inspection stations. Its agents even watch the mails, with the aid of postal inspectors. One interception was a moth larva, mailed by a Japanese to a friend in this country with the advice that he swallow the caterpillar as a cure for tuberculosis!

he buys and eats an apple he pays his share of the cost of controlling the codling moth, parent of the country's most costly and obnoxious apple worm. Its ancestors arrived from Europe in the 18th century.

Another taker of heavy tribute is the San Jose scale, which probably came from north China and was discovered near San Jose, California, about 1870. It now attacks fruit trees throughout the United States and southern Canada. The female insect, though smaller than a pinhead, bears hundreds of living young.

Still other imported pests include the oriental fruit moth, the red and black scales, the alfalfa weevil, and the European spruce sawfly, which destroyed much of the spruce in Canada's Gaspé Peninsula.

Federal foresters have estimated that insects and tree diseases in certain stands cost more timber than forest fires.

The vast "mass-production" one-crop farms of America are particularly vulnerable to pests from abroad. Here they find endless acres of their favorite foods, as if planted for their special benefit. But today, with food needed by a warring world, there is none to spare for insect gullets, and on the trail of these borers-from-within are some of the best scientific sleuths in the business.

Once in a Lifetime

Black Bears Rarely Have Quadruplets, But Goofy Did—and the Camera Caught Her Nursing Her Remarkable Family

By Paul B. Kinney

With Illustrations from Photographs by the Author

NOW I can understand how Dr. Dafoe must have felt at the birth of the Dionne quintuplets. He could hardly have been more thrilled, and I hope he was not more nervous, than I was when I had the good fortune to photograph an equally rare occurrence in the animal kingdom—an American black bear nursing her four cubs.

For fifteen years I have studied and photographed bears in Sequoia National Park, California. Bears I knew to be unpredictable, but I thought I had seen everything they had to offer. Then, in May, 1939, it was reported that a bear in Sequoia had been seen with quadruplets!

Though the report was verified by the park naturalist, it seemed almost unbelievable. The average litter of the American black bear is two, with singles and triplets now and then. Four have been recorded, but such an event is most unusual.

Not until July, after much patient watching and scouting, could I confirm the phenomenon with my own eyes. Even when I saw this rare bear group I was skeptical. I was not entirely convinced that it was all one family until I saw the mother stop in the trail, sniff each cub, and send them up a tree.

A Sight Few Eyes Have Seen

Mother bears while nursing their young are cautious and elusive. They want to be alone. Few humans are permitted to get close enough to watch such domestic scenes, and photographs are correspondingly rare. The nursing takes place almost invariably in a secluded, shady spot in the forest, usually screened from prying eyes by dense bushes.

Time after time I attempted to follow the mother and her four cubs, at a respectful distance, and saw her start to nurse. Time after time, whenever I came close enough to get a good view, the mother would jump up, scattering cubs right and left, and take off over the hills. Too winded and fatigued to follow longer, I knew full well that as soon as she went over the next hill the scene I wanted so ardently to photograph would be enacted.

Although I did manage to watch the nursing six different times, only twice was light suitable for photography. On these two occasions I shot films in feverish haste, once changing film packs in the midst of the proceedings.

In my haste I dropped the used pack into my shirt front and when I removed it later I found it wet with perspiration. Such is the thrill and excitement of photographing bears! I was thankful to find later that only one film of the dampened pack was damaged.

Experience has taught me the futility of trying to stalk a bear without its being aware of my presence. Neither has the ruse of hiding or the use of blinds proved successful. I am willing to admit the obvious: the bear is smarter than I, or I am a clumsy stalker.

A Lunge May Be Bluff—or Business

Since I do not have a telephoto lens, it is necessary to approach closely. Here the curiosity of the bear is a great aid. Cautious, unhurried movements and a calm voice—I talk constantly to the animal—often make it possible to get within range.

More often than not a bear will snort and puff, chop his jaws, and even make an incomplete lunge toward the intruder. Only experience will tell whether the bear is bluffing or whether he means business.

When his bluff does not work, the bear will do one of two things. He will run off, or he will tolerate the intrusion and resume his activities. Only then is it safe to bury one's face in the hood of a camera, for on the ground glass distances are deceiving and it is extremely disconcerting to raise your eyes suddenly and stare into the face of a large bear. Long claws and halitosis make him a most unpleasant companion.

Goofy, the mother of the four cubs, I have known since 1931 when she herself was a cub. The name, with all its implications, suits the actions of the bear. George Wright once called the American black bear "the Happy Hooligan of the woods." Goofy is just that; she is a clown among clowns.

I have seen Goofy, trying to get beans out of a can, sit on the ground and lose the can under first one leg and then the other. I have seen her hold a bottle of honey between

"Last One Up's a Sissy!"

A moment later tree-climbing was abandoned in favor of a lively family squabble among these bear quadruplets of Sequoia National Park. All four are here, though the runt is almost hidden behind the cub at the right. Usually their series of pranks ended with the quartet high in a tree. Then, when they became hungry, the youngsters bawled and complained until Mother Goofy called them down to earth and nursed them (pages 252 and 255).

her paws and attempt to drink the contents. Before the honey runs down the bottle neck, she invariably kicks the bottle with a hind foot.

Often Goofy sits with a bewildered expression on her face and the honey bottle resting precariously on top of her head. I have seen her pick up the bottle, stand erect, and fall flat on her back. Yes, "Goofy" is an appropriate name.

Cubs at Birth Weigh Half a Pound

Bear cubs are born during hibernation, probably in late January or early February. They are blind, almost hairless, and tiny mites whose average weight is around half a pound.

The smallness of cubs at birth surprises many persons, particularly when they learn that the mother bear weighs 250 or 300 pounds. It is not surprising, however, when one recalls that the mother is securely locked in her den by deep snow and that often she must nurse those cubs three or even four months before she can get a mouthful of food or water.

If bear cubs were proportionately as large as human babies at birth, they and their mother would starve in the den and the race would be extinct.

Imagine Goofy's surprise and bewilderment when first she viewed four whining babies cuddled close to her side. Fortunately Nature had provided amply, and meals were served regularly to all four. Nevertheless, lying there in that den in the fire scar of an old Sequoia, Mother Goofy might well have wondered how in the world she could protect four cubs and supply their growing demands for food.

It is no small problem to raise a family of cubs. There are no nursemaids to look after the cubs, no kindergarten or school teachers

"Go Slow—Babies Playing Here"

Dinner for her four cubs is over (page 253), and the mother is flying her danger signals as she approaches the photographer, ruff bristling, ears laid back. "This is no bluff," says Dr. Kinney. "One might argue the point with a male bear, but it would be rank folly to attempt to bluff a mother bear." He did not use a telephoto lens. Though deadly serious here, this Sequoia Park mother is a natural clown; hence her name "Goofy" (page 249).

to supervise their education, and no delivery boy to bring groceries to the door.

Father Bear, if he enters the picture at all, does so as a menace. He, like all other big bears, might kill the cubs if they got in his way; so upon the shoulders of mother falls not only the burden of providing for and educating the cubs, but also the task of protecting them when danger threatens.

No wonder that a mother with cubs is short-tempered and likely to attack with little provocation. Cares and tribulations of two bawling, mischievous, irresponsible cubs would try the patience of a saint. But here were four!

Cubs Slapped When They Disobey

About forty days after birth the quadruplets' eyes opened. But it was not until they were over three months old, in May, that Mother Goofy proudly introduced her unusual family to the big forest which was to be their home. That day their education started and mother's problems multiplied.

Goofy, like all wild mothers, was a devoted though strict parent. Her life, for the year her cubs remained with her, was devoted to the children. She educated them in the ways of the forest, played with them, fed them, and fought bravely for their protection.

At times Goofy disciplined them severely with swings of her heavy paws, for prompt obedience is demanded by all wild mothers. However, through it all she showered upon them the affection and adoration of her big heart made tender by maternal instinct.

The first lesson the youngsters learned was to climb. Only in the lofty branches of trees can cubs escape their foes (pages 256-7).

By August the four were eating solid food —grubs, ants, berries, sweet roots, and tender

On Long Rambles Through the Forest, Mother Goofy Teaches Her Four Cubs to Fend for Themselves

Picture of a Lifetime—a Wild Bear Nursing Four Hungry Youngsters

Instead of sitting or half reclining, as bears usually do when they suckle their young, Sequoia National Park's Goofy, mother of quadruplets, was completely floored by her oversize family whenever she rang the dinner bell. She served meals while flat on her back, almost completely covered with a furry mass of cubs. Each took its regular place at mealtime—the runt across its mother's neck, the two brown cubs on her left side, and the husky black on the right (page 258).

Plotting the Fate of a Luscious Fat Grub

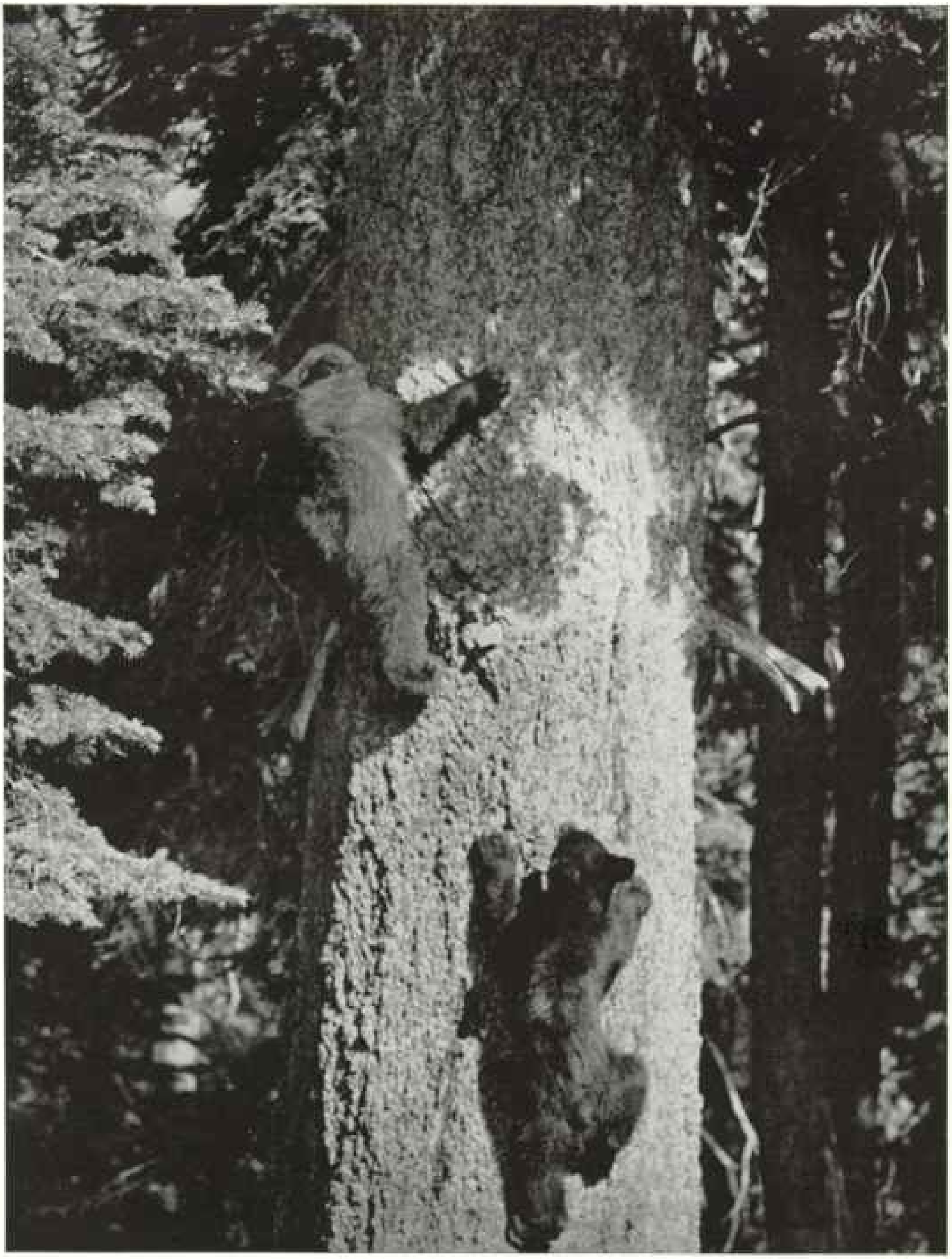
Mother Goofy soon taught her four young conspirators to tear the bark from old logs in search of welcome titbits.

Mother and Cubs Gave Big Males Like This a Wide Berth

Father Bear, if he does appear, may try to kill the cubs (page 251). Although he had slept all winter, this male in mid-May was still sleepy, almost sluggish, as if afflicted with spring fever.

"Ready! Catch-as-catch-can and No Holds Barred"

Little bowlegged Blackie and bigger, equally bowlegged Brownie square off for a scuffle. Wrestling matches were only one of many pastimes for Sequoia's bear quadruplets. By midsummer the cubs had learned to steal sugar pine cones from the squirrels, who were busily harvesting them. The youngsters also liked to dig bulbs and sweet roots, and eat tender grasses in the meadows. By autumn millions of ants and other insects, big acorns, and late berries fattened the quartet and made their fur luxuriant.



Only in Lofty Branches of Trees Can Black Bear Cubs Escape Their Foes

Speed in the ascent is often the difference between life and death when a big bear attacks. The first lesson Mother Goofy taught her quadruplets was to climb. Although the youngsters scaled the trunks instinctively, they were fearful and timid, and had to learn by experience to climb quickly and expertly. They discovered that dead trees are unsafe and liable to fall. Mother sometimes combined schooling with comfort for herself, sending her very active charges skyward when she wanted to be rid of them for a while.

In the School of Hard Knocks, Acrobatic Cubs Learn Which Trees Are Safe

When the youngsters tried to scale a Sequoia or an incense cedar, they soon fell in bewildered heaps, for their claws pulled out of the soft bark. Mother Goofy was not content until her quadruplets were as much at home in trees as they were on the ground. Here a cub on a lofty swaying limb eats the young needles of a fir, while another hunts insects in the bark. The little fellows, like their parents, climb with their claws, not by hugging the trunks. Sliding down, they "put on the brakes" with the sharp nails of their hind feet.

"Stand Fast, Men. Looks Like a Thimbleberry Bush Down There"

Mother Goofy's quadruplets, born in early spring, still depended on her for regular dinner in midsummer, but they began to take an interest in the solid foods Sequoia National Park provided. The entire family enjoyed the palatable thimbleberries, but they ate bitter cherries, which taste like a combination of quinine and alum, with just as much apparent relish.

grasses. Other mothers had almost weaned their cubs, but Mother Goofy continued nursing hers until well into September.

I have been fortunate enough to watch mothers with one, two, and three cubs nurse their young. Those I have seen have nursed in a sitting or semireclining position.

Often a mother will lean against a log or a tree trunk, or at times against the branches of a bush. Not infrequently she will support the cubs on her "arms" while she sits with a most benevolent and motherly expression on her face.

Nursing Cubs "Sing" as They Feed

For their part, the nursing cubs hum and sing a strange song of contentment. It starts softly and gains volume as stomachs fill, until it sounds like a swarm of bees and can be heard thirty or forty yards off. I have often located a mother and her cubs by following this "song of the full stomach."

After the first time Goofy allowed me to watch the four cubs nurse, I could understand why she was even more reluctant than most bears to allow one to come close. Goofy was at a distinct disadvantage when she nursed her cubs, for they were so numerous she could not assume the conventional sitting position.

Poor Goofy was forced, by the overwhelming number of her children, to lie stretched out flat on her back. The cubs literally swarmed over her, and at times I was not at all certain that I could see any part of Mother Goofy. Usually all one could see was a mass of fur which squirmed and buzzed like swarming bees (page 253).

I did note that each time she nursed them the cubs took the same relative positions. The runt lay across mother's neck from left to right, the black cub nursed from the right, and the two brown cubs from the left side.

The days I photographed Goofy and her cubs, dinner was over when Mother Goofy thought the cubs had nursed long enough. When that time arrived, although the cubs were still singing and nursing lustily, Goofy, without so much as a warning grunt, rolled over and stood up.

Then, with no snort or jaw chopping, no bluffing lunge, Goofy walked straight toward me. Her look was serious, and there was none of the bluster so commonly seen in the American black bear. Goofy meant business.

Dinner was over. So was photography, and my business speedily took me elsewhere.

Lisbon—Gateway to Warring Europe

By Harvey Klemmer

FEW cities have had a more tempestuous history than Lisbon, colorful capital of the little Republic of Portugal.*

Today Lisbon stands once more at the threshold of great events.

It takes a rash individual to discourse upon Lisbon and Portugal with conditions as they are at the moment. Before these lines appear in print, Portugal may be only a memory and Lisbon a ghost town of the Second World War. There is a special risk in attempting to write about a small neutral possessed of rich territories, owning strategic islands, and lying on the flank of a continent in flames.

Lisbon's present position is unique in several respects. It is the only major gateway between warring Europe and the world outside. It is the one convenient link between the belligerents. It is the only hope of escape for thousands of refugees. It is, with the exception of Stockholm, the only great capital of Europe that has not as yet been darkened by the clouds of war.

Slender Threads of European Traffic

There is an occasional ship to Petsamo, in the north of Finland, and the Swedes are attempting to maintain an Atlantic freight service of sorts. The United States Lines operate a small service to Spain. The Spanish manage to maintain some sort of communication with North and South America.

Lisbon, however, is the principal gateway through which people and goods must pass to enter or leave embattled Europe. This is especially true of traffic to and from the United States.

There is only one American-flag service now operating to Portugal. That is the American Export Lines, which maintain weekly sailings between New York and Lisbon. On this slender thread hangs the bulk of our traffic with the once great markets of Europe.

The Export Lines formerly served the Mediterranean. Company officials adopted Lisbon as a terminus when they were forced out of the Mediterranean by the Neutrality Act. They have done a good job of maintaining a vital service despite tremendous difficulties. There are occasional foreign vessels, but the responsibility for maintaining sea communications between the United States and this last outpost rests primarily on the American line.

Lisbon has been the eastern terminus for Pan American Airways since the beginning of the war (pages 262-3). The company is now maintaining a thrice-weekly service which, it is hoped, can be stepped up to six planes a week in the near future.

The difficulties besetting Pan American have been even greater than those faced by the Export Lines. To make the long flight from Lisbon to New York, it has been necessary to make stops in the Azores and at Bermuda.

Clippers Exercise Extreme Caution

The Azores landing, which is at Horta, must be made in the open sea. The company has pursued a cautious policy and has not allowed its planes to land in rough water. That has meant long delays. Passengers have been held up, eastbound at Bermuda and westbound at Lisbon, for as long as two weeks or more, while the company's meteorologist watched the waves at Horta.

I have made the Clipper crossing three times, and I can testify to the extreme precautions the Airways people exercise at Horta. Planes are not supposed to take off if the waves are more than 30 inches high.

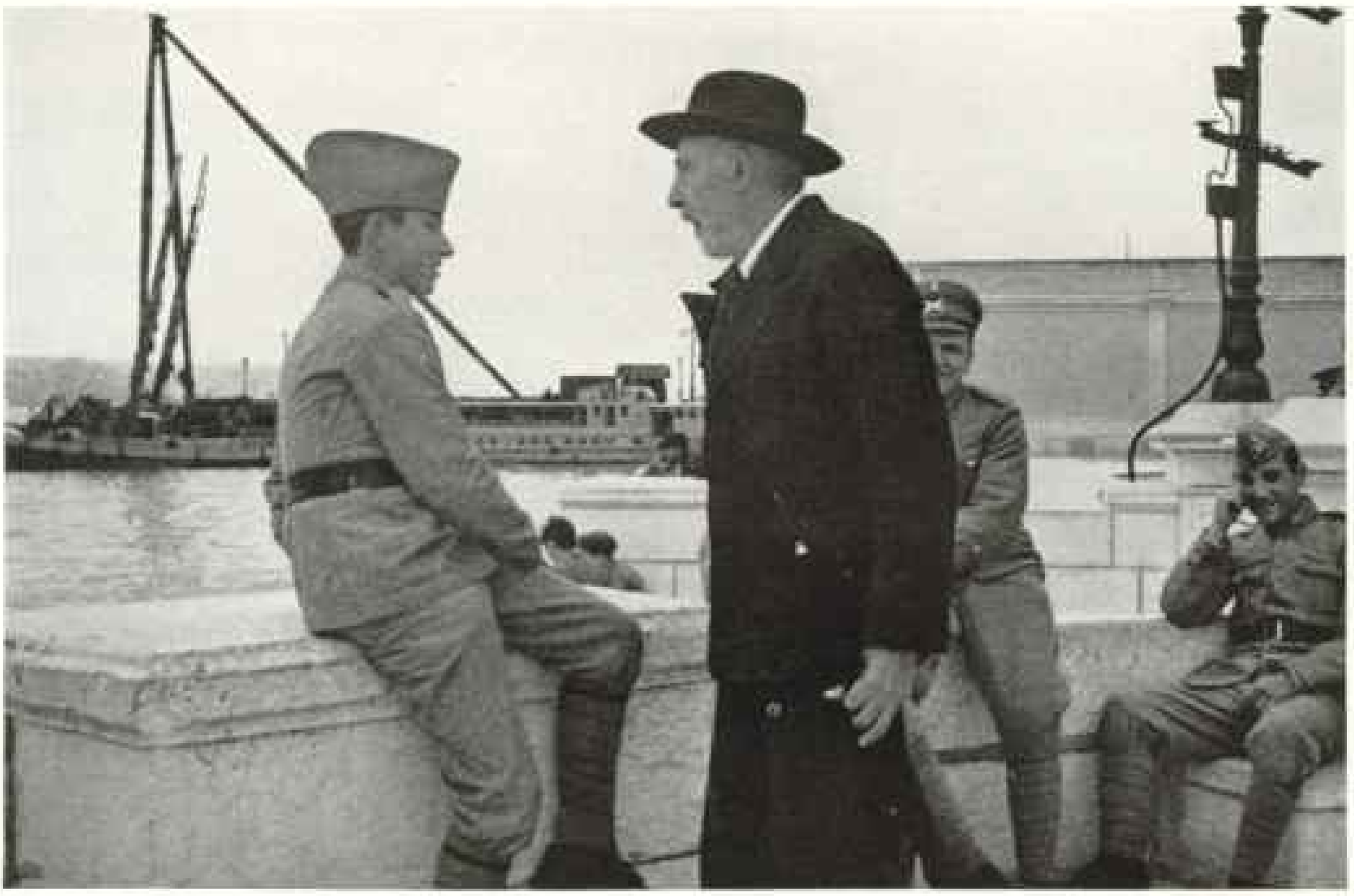
I remember one trip when we plowed, at 100 miles an hour, through waves that looked twice that high. We all held our breaths as the great ship tore the waves to tatters and finally leaped from the sea to shave the side of a cliff and spiral off into the dusk on the long hop to Bermuda.

On my last trip, in April, our skipper executed a maneuver which I have never before seen. He took off on a curve. He started behind a breakwater, gave her the gun as we reached the open sea, and, swinging wide to avoid the cliff, took off on an arc. It was a beautiful job of piloting. Let me hasten to add that to date the company has a perfect safety record on this service.

Pan American is experimenting with various measures to reduce the delays caused by bad water at Horta. New planes have been engined, and old planes re-engined, to enable them to fly nonstop now from Bermuda to Lisbon. During the past winter, ships flying west came home by way of Africa and South America. This meant a journey of 8,000 miles to reach a point 3,000 miles away, but, regardless of that, it was found to be quicker than the old route.

In addition to being the last air and water link with warring Europe, Lisbon is also an important cable terminus.

*See "Castles and Progress in Portugal," by W. Robert Moore, National Geographic Magazine, February, 1938, and "Altitudinal Journey Through Portugal," by Harriet Chalmers Adams, November, 1927.



Barrett Klumm

"It Wasn't This Way When I Was a Boy"

The elderly gentleman expresses himself freely before the unimpressed Portuguese soldiers on the Lisbon water front. Here, as nowhere else on the Continent, the right of free speech survives. Mail is uncensored and photographers are unrestricted (page 275).

The amount of mail passing through Lisbon is tremendous. It would, no doubt, be even greater were it not for the British censorship at Bermuda. Here British censors catch everything crossing the North Atlantic, whether by boat or air. Hamilton is in a fair way to becoming a city of censors. There were 900 on duty there when I passed through the last time.

Besides keeping America in touch with Europe, Lisbon serves as a link between the belligerents. Nations at war like to have a pipe line into each other's territory. They need a way of getting their agents back and forth. They like to get each other's newspapers. It is also convenient to have a means for the exchange of prisoners and for the passage of civilians which neither side wishes to hold.

If Portugal is not drawn into the war, it will be because of the desire of both sides to preserve a gateway not only to the outside world but between each other.

The best connection between Lisbon and the belligerents today is by air. The British maintain a first-rate service of both land planes and seaplanes. The Germans, Italians, and Spanish also maintain services. They all use the same airport.

Sintra Airdrome, outside of Lisbon, is undoubtedly the most international airport in operation anywhere in the world today. When you enter the office, you see five signs:

Aero Portuguesa
Tráfico Aéro Español
Deutsche Lufthansa
British Airways
Ala Littoria.

You get even more of a shock when you go on the field and see English, German, and Italian planes drawn up together. It would make a better story if I could report that the crews mingle in Lisbon's bars. But they don't. Each group keeps to itself and, so far as I could see, pays no attention to the others.

Lisbon Crowded with Refugees

Neither side, it appears, makes any effort to molest the planes of the other. The British take extreme precautions in the maintenance of their service, but, so far as I know, have not been troubled by the enemy. A sort of gentleman's agreement prevails. Anyway, no planes have been lost on the Lisbon service. This is also true, I believe, regarding the German and Italian services. In short, nobody seems anxious to close the Lisbon gateway.

Harris Ewing

Windjammers Berth in the Tagus with Cargoes of Cod from Newfoundland

In no European fish market can more varied catches be found than in Lisbon. Cod, tunnies, and sardines are the most important. A substantial part of Portugal's national revenue comes from the export of fish. Even fishing schooners now carry their names and country painted on their sides.

Most of the refugees are waiting for transportation overseas. There is not an apartment to be had and the hotels are packed. The situation became so acute that the Government was compelled to forbid the entrance of additional refugees into the country. Visa applications are now scrutinized very closely and only those who have a definite steamship or plane booking are allowed to enter.

The hotel lobbies in Lisbon swarm with these refugees of many lands, and the conversation is a babel of tongues. They talk about many things, but mostly they talk about boats and planes. Boats and planes—instruments which we take for granted in time of peace—have suddenly become possessed of magical powers in time of war.

"There's a Basque fisherman who, for 20,000 escudos, will run passengers to North Africa. You had better get friendly with him, in case the Germans come."

"Have you heard about the Greek passenger ship, going to New York?"

"My brother knows a man at the American Express; he says the Portuguese are going to put on another boat."

"My hotel porter says a Spanish freighter is in port, loading for South America."

So it goes—gossip, and rumor, and hope, and despair, running through the life of Lisbon like some restless refrain out of the city's fevered past.

Racketeers, unfortunately, have got loose among the refugees. There has been some traffic in visas, and steamship tickets have been known to change hands—for a consideration. There have even been examples of refugees giving their all to secure passage on nonexistent vessels.

The toughest job in Lisbon, and one of the toughest situations anywhere, is handling visa applications at the American Consulate. Our officials have naturally been swamped by people wanting to go to America. Under the law, they are able to grant visas to only a small proportion of those who apply.

America Land of Hope to Stranded

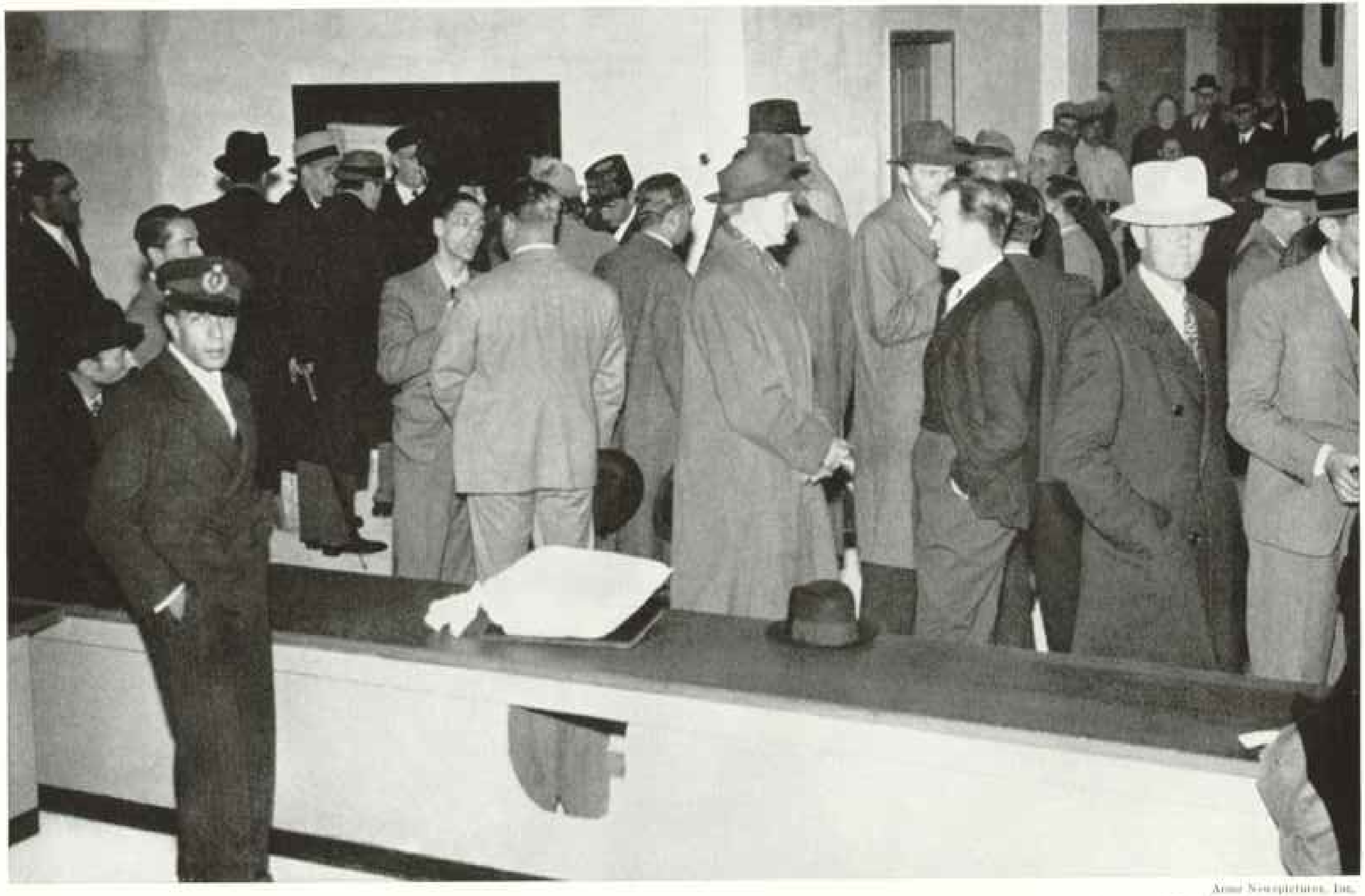
I asked one of our men how many refugees he thought there were in Portugal waiting to go to the United States.

"Estimates vary greatly, but I would say there are 40,000 refugees here," he replied. "If we could go out on the front steps and announce that everyone who wanted to could go to America, I think we would get about 40,000."

Pan American Airways

Air Travelers from America Arrive on the Fringe of the War Zone—from New York to Lisbon in 20 Hours

The State Department acts as clearinghouse for prospective passengers wishing to fly to and from Europe, since they far outnumber available seats. Preference is given diplomats, military observers, and other Government representatives. Second in priority are war correspondents and others on urgent missions.



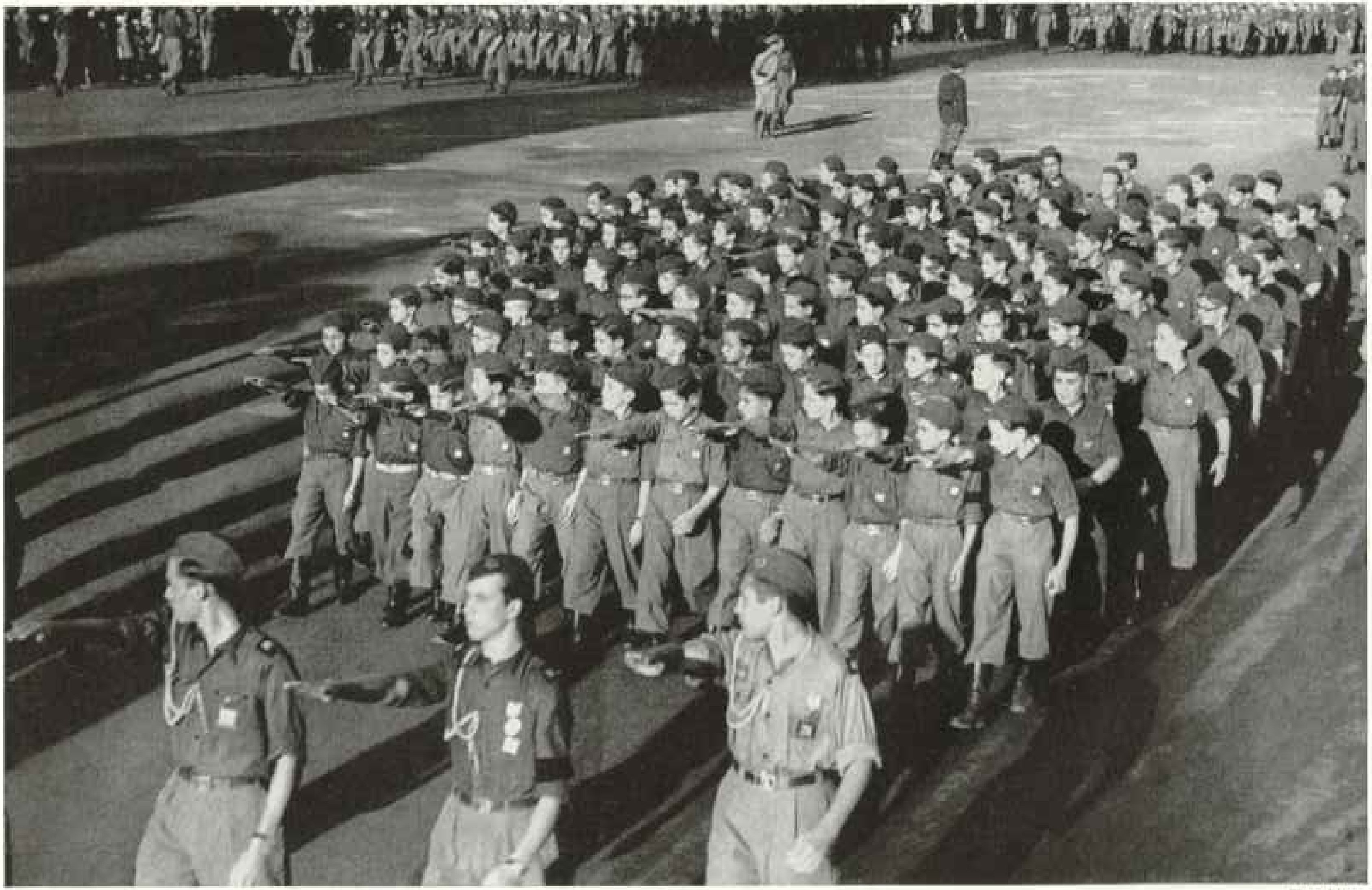
Acme Newspictures, Inc.

Men from Many Lands Seek Coveted Clipper Tickets to the United States in Lisbon's Pan American Airways Waiting Room

Thrice weekly a giant flying boat takes off for New York. Soon the company will be equipped to double the number of flights. Before hostilities broke out, the Clippers flew to Southampton, England. Now they stop in the Portuguese capital. Passengers for London transfer to planes of the British Overseas Airways.

Three Lions

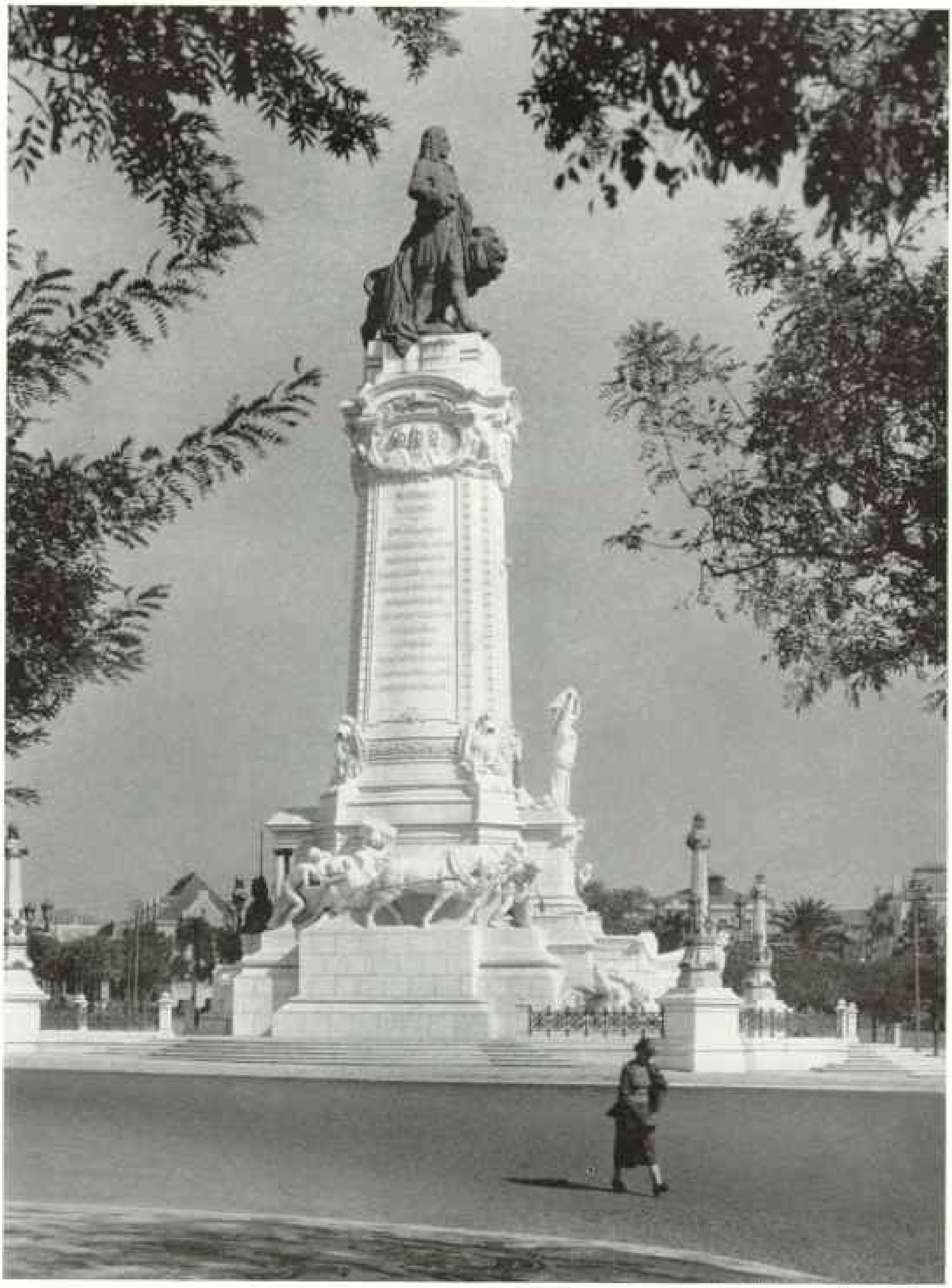
Lisbon Turns Out to See Youth Movement Marchers Circle Portugal's Independence Memorial in the Praça dos Restauradores



Three Lions

"Eyes Right"—Boy Paraders Salute with Precision as They Pass in Review along Lisbon's Avenida da Liberdade

They are members of the Youth Movement, set up by the Government five years ago. Purposes of the nation-wide organization are to promote physical fitness, form character, and inculcate respect for law and discipline.



Staff Photographer W. Robert Moore

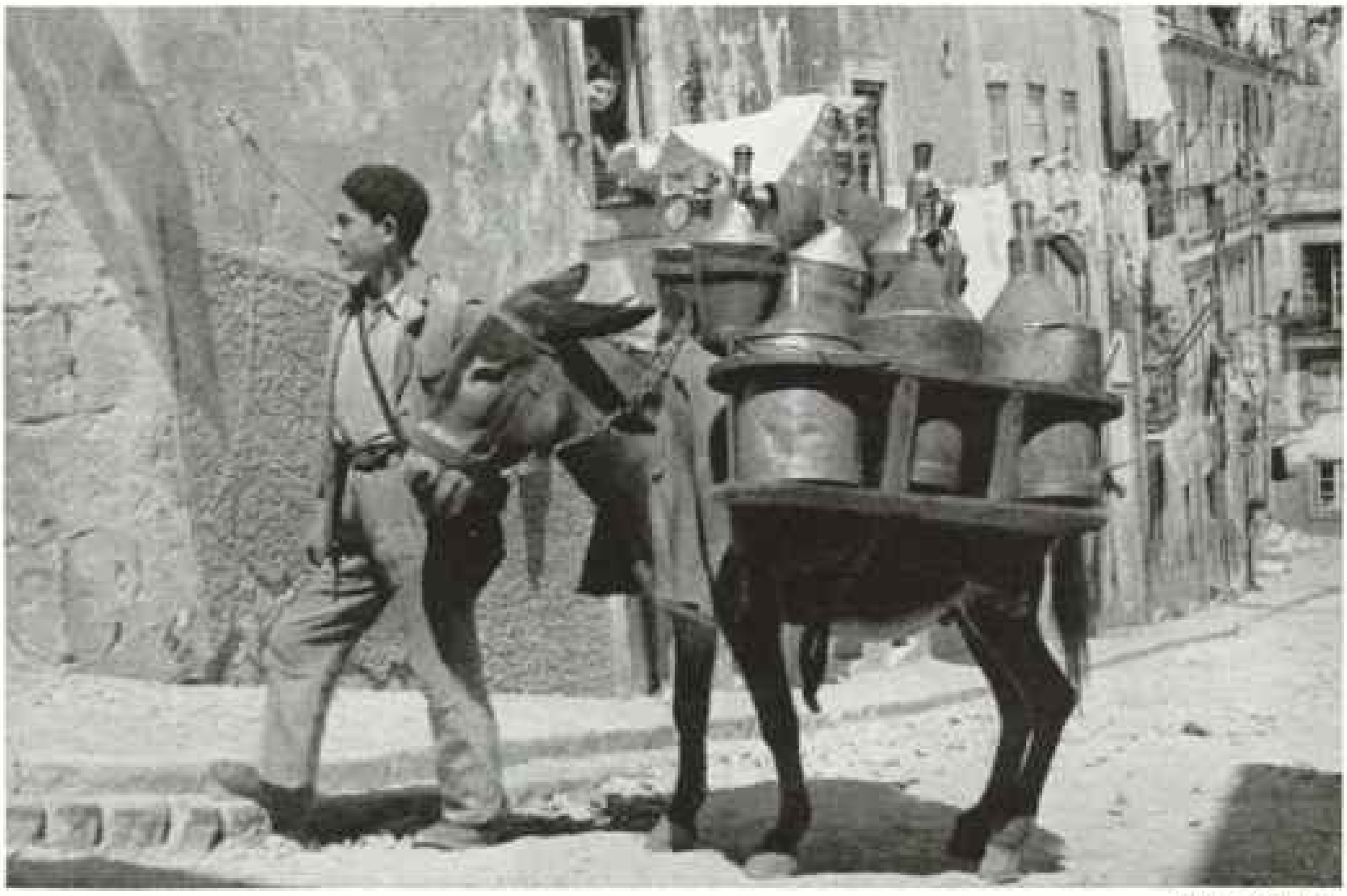
Grateful Citizens Raised This Memorial to the Restorer of Lisbon

After an earthquake destroyed the lower part of the capital in 1775, the Marquis de Pombal planned and supervised its rebuilding. His statue stands at the head of the Avenida da Liberdade, one of war-ravaged Europe's few remaining gay and brilliantly lighted promenades. The boulevard extends for a mile through the city (p. 276).

João de Freitas Martins

Lisbon's *Varinas* Clean Their Fish for Market

The feminine peddlers buy their supply from boats along the Tagus River, and then sit along the bank while they prepare it. Soon they will trudge barefooted through the streets of Lisbon, looking for customers.



Harvey Klemmer

Olive Oil and Vinegar Come to Lisbon Housewives by Burro

Without these ingredients, Portuguese cooks would be almost helpless. Most popular form of transportation on the narrow, hilly back streets is the donkey.

Staff Photographer W. Robert Moore

Raking Masts of Fishing Craft Line Up in Sloping Ranks across the Lisbon Water Front

Even these boats of Phoenician type, with brightly painted, upturned prows, are considered by luckless war refugees, anxious to flee Europe. Many homeless Europeans long to meet a skipper willing to risk his tiny craft in a dash for the North African coast. The few ocean liners which still link Portugal and the Western Hemisphere moor at the city's new docks, in the distance at right. Every Friday an American Export Lines ship departs from here, bound for New York.

Harvey Klemmer

Will Europe's War Lords Permit Her to Live in Peace?

Patience and dignity are reflected in the features of this typical woman of Lisbon. Thus far, she and her fellow citizens have been unmolested by bombs or shells. To her blackouts and battlefield casualties are unknown.

Harvey Klemmer

Lisbon Lads Simply Go Downtown to Cast Their Lines

The capital fronts on the Tagus River near its outlet in the Atlantic Ocean. When the boys grow up, they may become members of the sardine fleet, which normally exports annually more than $6,000,000 worth of hors d'oeuvres.

Harvey Klemmer

"Good-bye, Now. Alfredo Is Waiting for His Artichokes"

Food shortage is not a worry for these Lisbon housewives, who still carry their market baskets on their heads. Sugar is rationed and purchases of butter are limited, but nearly all other food products are plentiful. Menus in Portuguese hotels dazzle arrivals from other European countries. "I suppose," writes the author, "that, outside of Sweden, here is found the last good food in Europe" (page 273).

Which is, I suppose, as eloquent a way as any of describing the plight of European refugees and the hope with which they view the United States.

Many refugees are Jews from Germany and the conquered countries. Several hundred English are stranded there, waiting for repatriation. There are 1,000 more English subjects awaiting visas in Unoccupied France.

Seven thousand Americans have been evacuated through Lisbon, including 900 repatriated from France by the American Government. Those who remain are now being brought home at the rate of more than 100 a week.

Americans are being given priority on both ships and planes, but the transportation companies are obliged to honor tickets purchased by foreigners as they come due. The booking of additional foreigners, however, has been suspended pending the evacuation of the remaining American citizens.

There is usually an American naval vessel lying at Lisbon. In case of extreme emergency, the Navy could no doubt remove to a place of safety those of our people who were still there.

Those refugees who can, go to the United States; the others go wherever they are able to go. They will sail on anything that floats, and they will go anywhere on earth except back to Europe. Some of them go to Cuba, some to Central America, some to South America. A few have gone on to the Orient.

Last of the Gay Capitals

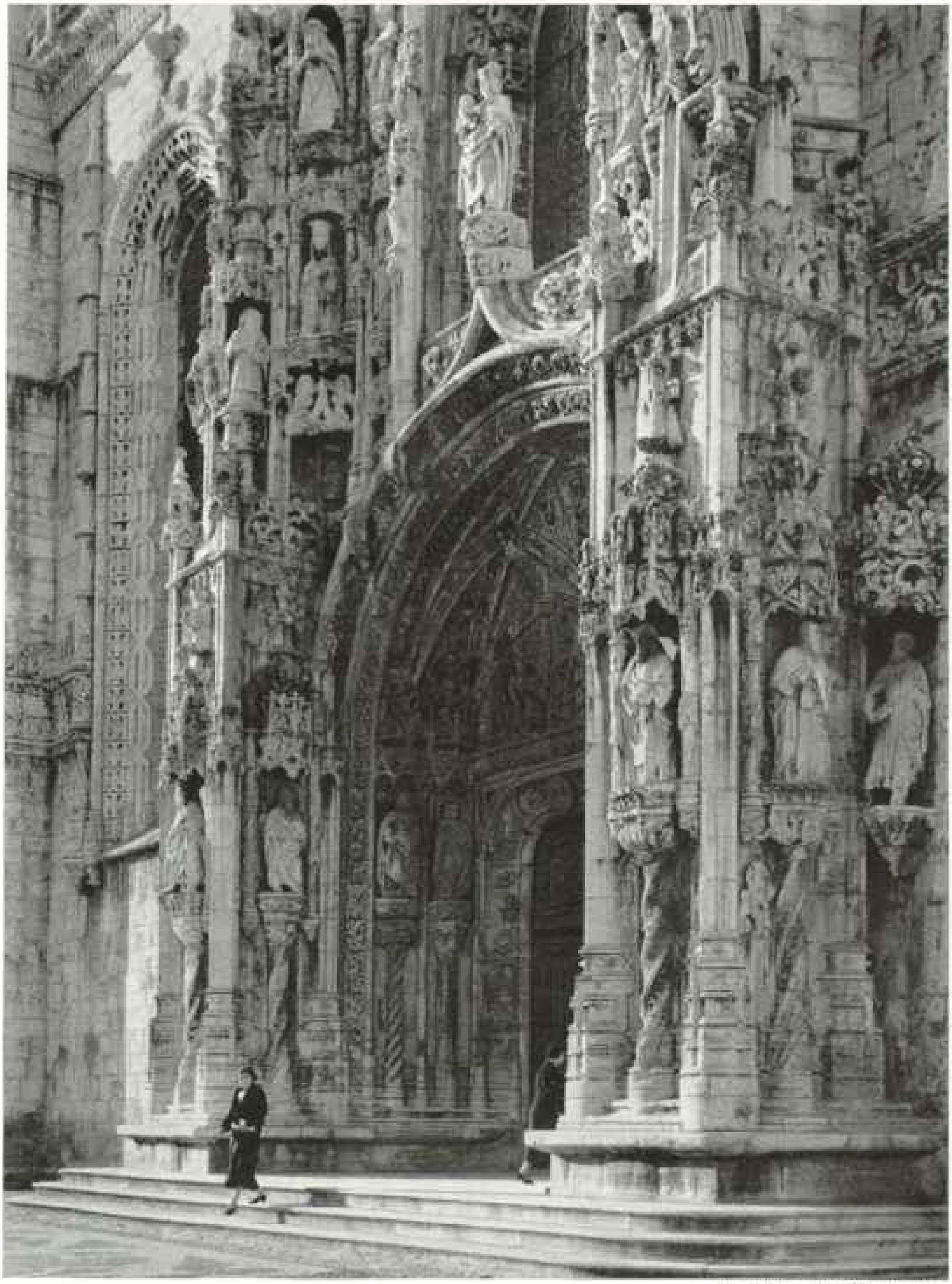
Thus Lisbon is the last loophole for thousands of people fleeing from the horrors of persecution and war. Hunted and haunted, they wait around the steamship offices, praying that the vessel which takes them to safety will not be too late.

Lisbon is the last of the great continental capitals to maintain its prewar gaiety. The

Harvey Klemmer

Lisbon, City of Stone, Safeguards Her Shade Trees

The graceful monarch atop the wall may have been brought back to the Portuguese capital from Central America by early voyagers. In both Lisbon and Madrid, trees from the Western Hemisphere, imported by the Conquistadores and other explorers, still survive.



Staff Photographer W. Robert Moore

Where Vasco da Gama Once Prayed Stands the Stately Monastery of Jeronymos

In a little mariner's chapel on this spot, the intrepid navigator and his crew gathered on the eve of their epochal voyage of discovery to the Indies. King Manoel I built the magnificent building in gratitude for the expedition's success, and the explorer's body rests here. Today the structure houses a Lisbon orphanage.

Staff Photographer W. Robert Moore

Portuguese Cork, by the Truckload, Helps Build U. S. Planes and Tanks

The compressible, elastic bark of the cork tree, an evergreen oak, goes into gaskets and washers for engines, and wads for shell cases. Portugal is the world's leading cork producer. Business depression in Spain and war blockade of North African ports have cut off the only other sources of supply. In 1940 the United States bought 318,336,000 pounds of unmanufactured cork, but imports fell off sharply in the first quarter of this year. The Office of Production Management took over control of the industry in June, 1941, because of the serious shortage.

lights are still on in the Portuguese capital. There are music and dancing and good food, for those who have the funds. People can do what they please. The city provides, in short, about the only remaining example of a way of life that was once native to London and Copenhagen, Berlin and Paris, Prague and Vienna, and Rome and Madrid. All of the others have fallen, one by one, under the shadow of war.

I came to Lisbon from the London blackout.* Perhaps my sense of values had been distorted by living overlong in the war zone, but certainly Lisbon bursts on anyone coming from England like some half-forgotten splendor out of another life. One gapes at the brilliant lights, the strolling throngs, the traffic, the displays of candy and cake in the windows. One especially exclaims at the restaurants.

The food in Lisbon is incredibly good and plentiful. I suppose that, outside of Sweden, here is found the last good food in Europe.

The cooking is on the French side, but just a little heavier, just a little more highly spiced. It is a combination of French, Italian, and Spanish, with the emphasis on the best in each. The hors d'oeuvres, the soups, the steaks, the sweets, the wines, and, finally, the rich Brazilian coffee, arouse ecstasy on the part of anyone arriving from a belligerent country.

Corn Flakes a Treat in Spain

At my hotel, one night, there were several Americans who had just come in from Spain. Once a month, they told me, they come to Lisbon for a good meal. They were consuming huge soles, which they maintained were the best in the world. One of them had bought a carton of American corn flakes which he was taking back to Spain as a treat for some friends.

The resorts at seaside Estoril are going full blast. Here are food free of rationing, lights

* See "Everyday Life in Wartime England," by Harvey Klemmer, National Geographic Magazine, April, 1941.

Harvey Klemmer

Refugees and Spies Keep Lisbon's Police Force on the Alert

It is estimated that 40,000 foreigners, driven from their native lands by war, find refuge in and near the capital. Nearly all would like to come to the United States, but few can. Representatives of foreign powers are numerous. Some are engaged in espionage, but most have ordinary commercial jobs (opposite page).

unfettered by any blackout, conversation devoid of censorship, and bathing beaches unmarred by guns, mines, or barbed wire.

The Casino does a flourishing business nightly, and all night. An American writer was on the way to winning 100,000 escudos the last time I was there. Carol of Rumania and Madame Lupescu were in the building that night. And I am sure that I saw, playing alone in the gaming room, the Pretender to the Spanish throne.

The influx of refugees has given to Lisbon an even more cosmopolitan air than it had before. The Portuguese themselves are a commingling of many races. The Spanish influence predominates, but in the streets of Lisbon you will encounter faces more Moorish than Spanish, and some that are more Arabian than anything else. There is also an interesting negroid type, a relic of the introduction of slaves from Africa in the days of Prince Henry the Navigator and later.

The newsstands indicate the cosmopolitan nature of the city. Vendors display, side by side, the periodicals of many lands. They play no favorites. You can get the London Daily Mail and the New York Times; you can also get the Deutsche Allgemeine Zeitung, the Lavora Fascista, and the Falangist Arriba.

Government Strictly Neutral

Although the sentiment of the people is preponderantly pro-British, the Government preserves a policy of strict neutrality. News dispatches are censored to prevent correspondents from using Lisbon as a base for the dissemination of propaganda.

Portugal is bound to Britain by the oldest treaty of alliance in existence, dating from 1373. The British have not, as yet, seen fit to invoke the treaty. Meanwhile, little Portugal steers a cautious course between her powerful neighbors and tries not to give anyone a pretext for erasing her from the map.

Harry Klemmer

Modern Architecture Invades a Land of Medieval Castles

Lisbon, in common with all the old European capitals, accepted the new school in the years preceding the present war. Today modern buildings like these bob up frequently in a city rich in half a dozen older styles of architecture.

Lisbon is filled with representatives of foreign powers. Some are spies, but the majority are engaged in ordinary commercial work. The Lisbon spy ring has, in my opinion, been greatly over-publicized. The suave young men and the beautiful young women who loiter about the hotels cannot be very dangerous. If they were, they would take more pains to hide their identity.

The Portuguese are very tired of the whole business and recently confiscated an American magazine containing a lurid account of the supposed activities of enemy agents.

There were several of the Axis boys about the bar one night at the Palacio Hotel in Estoril. An American businessman, with whom I was having a drink, was talking rather freely about the situation in Portugal. When I called his attention to our neighbors, he said contemptuously, "Don't worry about them. They're just a bunch of leg men. The one on the left tells Musso who's here. The big fellow does the same for Himmler. The little guy keeps Goebbels supplied with English newspapers."

Civil liberties, like the other aspects of a normal peacetime existence, have not been greatly affected in Portugal. The people still have freedom of expression. The mails are not censored. I was surprised to discover that, in taking photographs to accompany this article, I was able to use my camera without restriction of any sort. I do not suppose there is another city in Europe today where one may take pictures of such things as shipyards, factories, quays, and oil tanks. You can take anything you like in Portugal.

The last free currency market in Europe is in Lisbon. Bern, which is considered free, does, in fact, have certain restrictions.

Lisbon is busy, but the city has suffered as a result of the war. Trade with the colonies has been restricted. The blockade makes it difficult to carry on trade with other nations.

The people are straightforward and industrious. Unfortunately, they don't have much to work with in the way of raw materials. There are few industries. The principal exports are cork (page 273), wine, and sardines (page 261). The weakness in the Portuguese picture, and one which the Government is trying to remedy, is the lack of manufacturing facilities.

The standard of living, as might be expected in a preponderantly agricultural country, is low. Farm laborers average about 40 cents a day; city workers make about 70 cents. Two-thirds of the population is illiterate, as in many other lands.

Lisbon itself has a population of 750,000 people, exclusive of refugees. It is a beautiful city. The view from high points is magnificent. The buildings are colorful and clean-looking. There are luxuriant, semitropical gardens. The Avenida da Liberdade is one of the most imposing boulevards in Europe.

There is a certain elegance about the people of Lisbon which immediately strikes the newcomer. It is rather reminiscent of Paris. The shops are filled with the wares of America, Britain, France, and Germany.

Traffic moves at a breakneck speed. The principal idea in driving a car in Lisbon seems to be to push the accelerator to the floor, turn on the horn, and hope for the best. Cars careen through the crowded, twisting streets seemingly without regard for the safety either of the driver or of any hapless pedestrian who might get in the way. Miraculously, casualties are not heavy. Somehow the cars stay upright; somehow the drivers retain their seats; somehow people get out of the way.

Clipper passengers declare that the ocean crossing is not nearly so harrowing as the ride into town behind a Portuguese chauffeur. I heard last year that one woman, who made the flight without difficulty, fainted on the way to her hotel.

The climate is pleasant—cool in winter and not too hot in summer. Estoril, on the sea (page 273), offers visitors sunshine throughout most of the year. Many world travelers have missed a good bet in Portugal. This little country has much to offer—scenery, picturesque cities, ancient buildings, friendly people, sunshine, good things to eat and drink.

The Portuguese have influenced history principally as navigators. Every American schoolchild is familiar with the exploits of Vasco da Gama and Henry the Navigator. The Portuguese reached Ethiopia in 1490; they discovered Japan, and they were in India before the English. Ferdinand Magellan, first circumnavigator of the world, was a Portuguese.*

A Vast Colonial Empire

Pedro Alvares Cabral left his mark on the New World by rediscovering Brazil, which remains more Portuguese than American to this day. Columbus, before setting out for India, had studied charts made by Portuguese cartographers.

The voyages of Cabral and his fellows have left Portugal with an Empire exceeded only by those of Great Britain and France. This little country, 362 miles long by 140 miles wide, has an area about the size of the State of Indiana and rules a colonial empire of more than 800,000 square miles.

The Portuguese Empire includes some islands of great interest to the rest of the world. The best-known groups, of course, are the Cape Verde Islands, the Madeira Islands, and the Azores.

The development of trans-Atlantic flying has given the Azores a particular significance—a significance which has not been lost on the Portuguese and which has caused them to strengthen the islands' defenses during recent months.

A country the size of Portugal, with possessions the size of the Portuguese Empire, is a constant temptation for land-hungry neighbors. It is surprising that the Portuguese have been able to hold their Empire together as long as they have. The only major loss they have suffered is Brazil, and they lost that not by conquest but by revolution. One explanation for Portuguese security no doubt will be found in the Anglo-Portuguese alliance (page 274).

It would be idle to deny that Portugal and her Empire are today in a precarious position. It is almost too much to hope that, after ravaging nine-tenths of the Continent, the dogs of war should stop at the Portuguese frontier.

The country's defenses are insignificant compared with those of the Great Powers. There is a standing joke among foreigners in Lisbon to the effect that Hitler can take the country any time he wishes by picking up the telephone. I don't think it would be quite that easy, but there is no use pretending that Portugal could, by herself, resist aggression for more than a few hours.

The Portuguese have handled themselves extremely well, thus far, in one of the most difficult situations with which any nation has ever been confronted.

* See, by J. R. Hildebrand, "Pathfinder of the East" (Vasco da Gama), National Geographic Magazine, November, 1927, and "Greatest Voyage in the Annals of the Sea" (Magellan), December, 1932.

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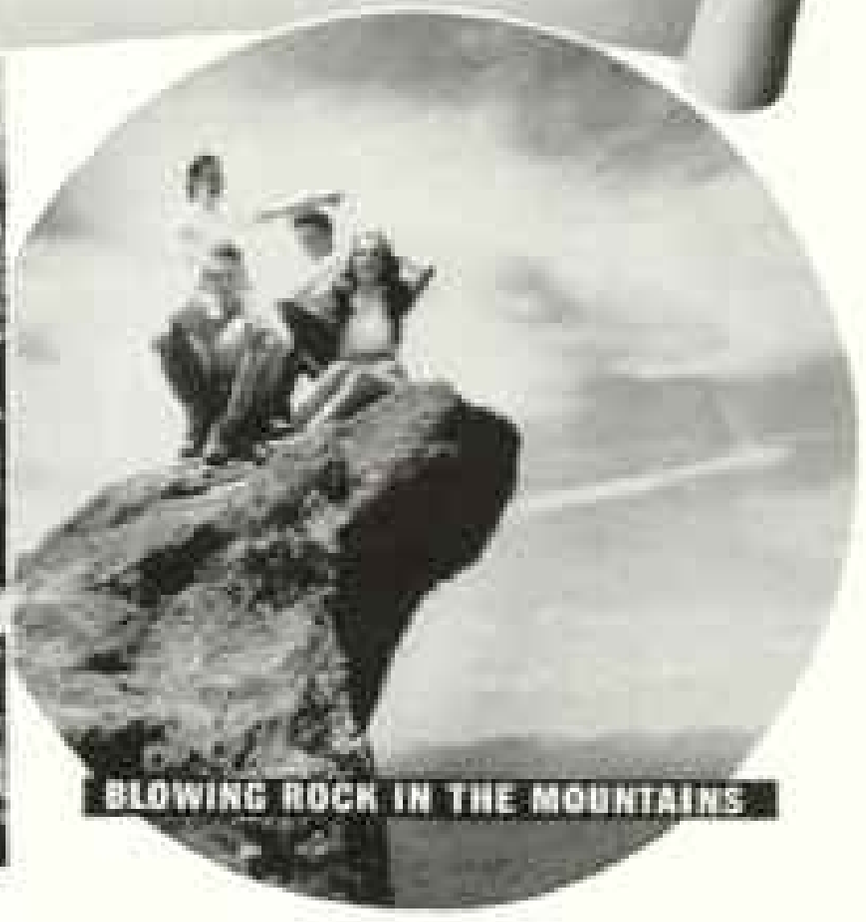
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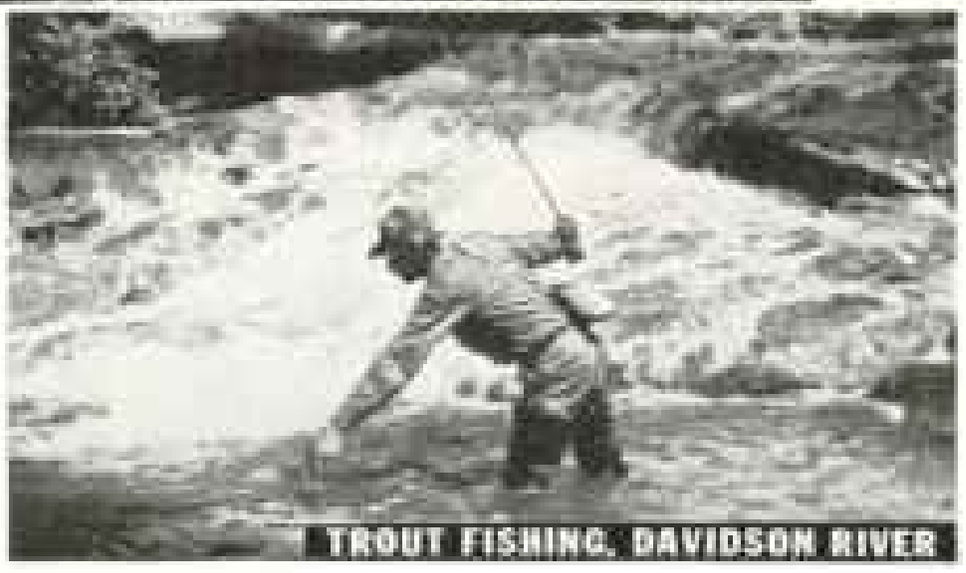
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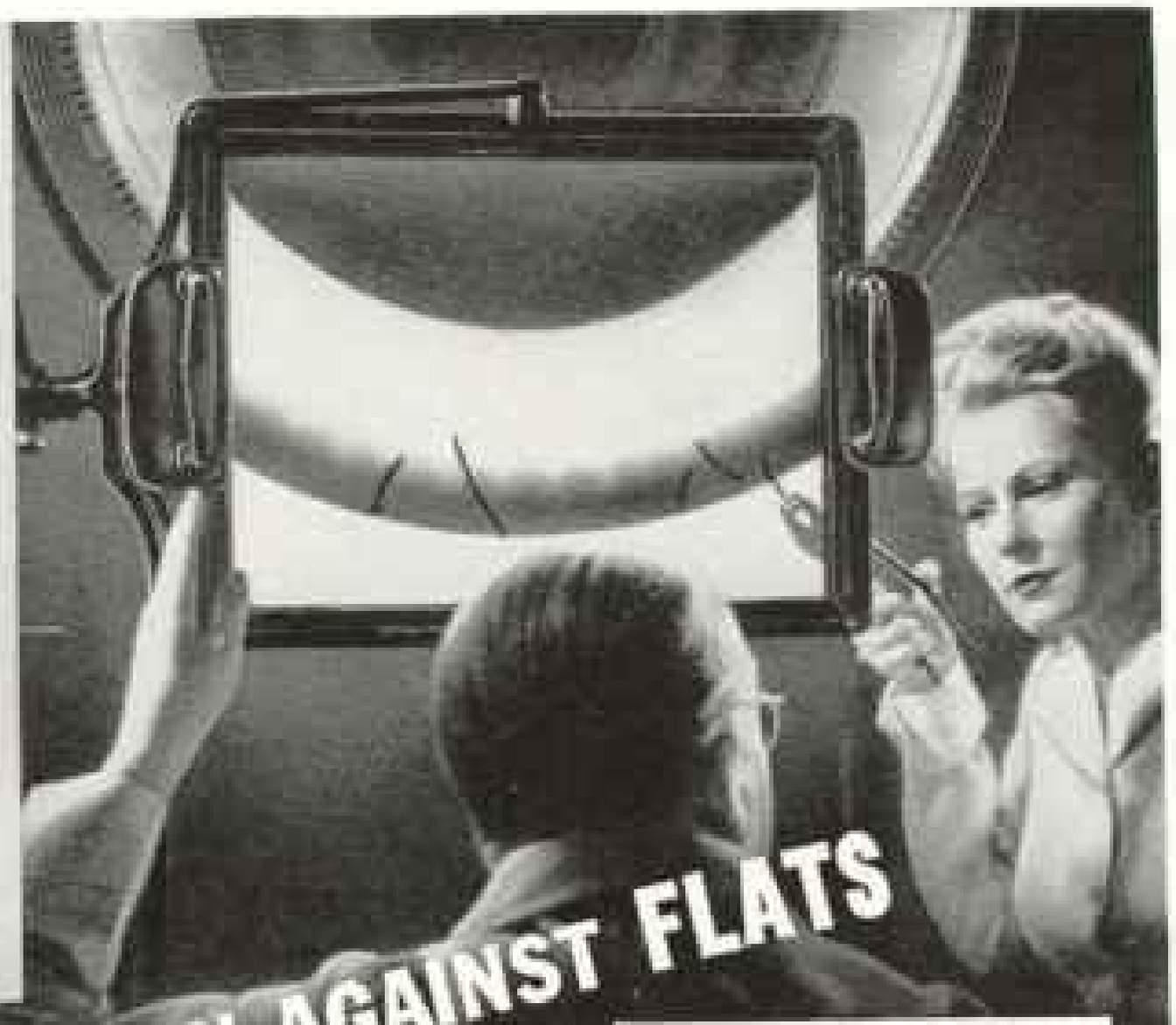

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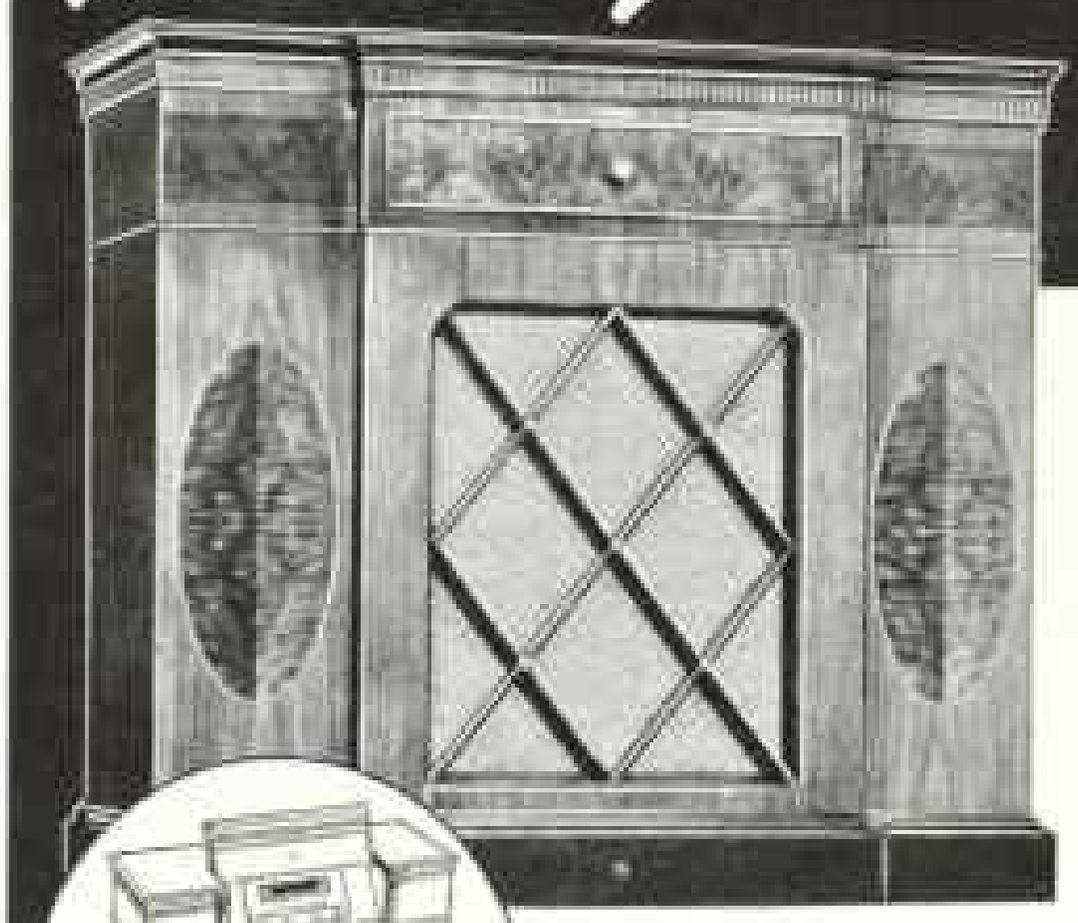

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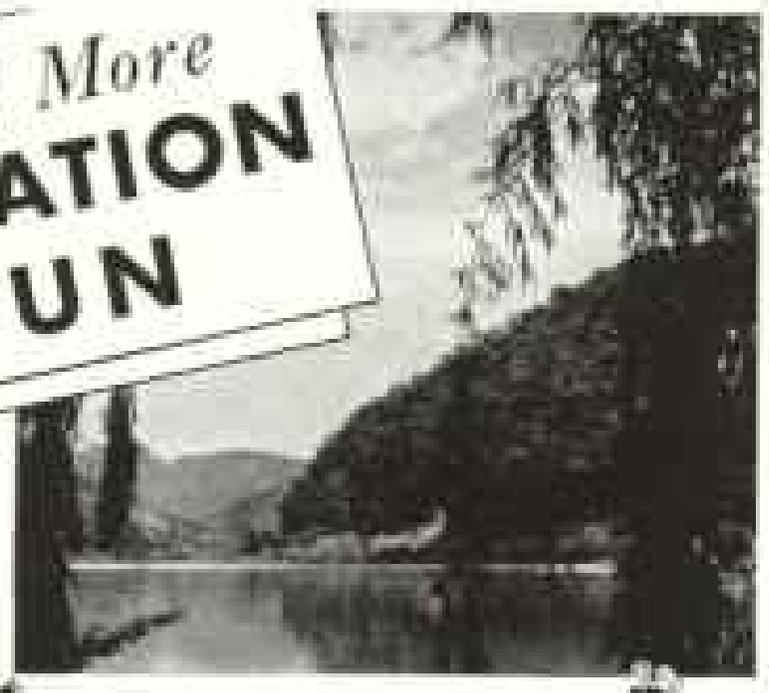

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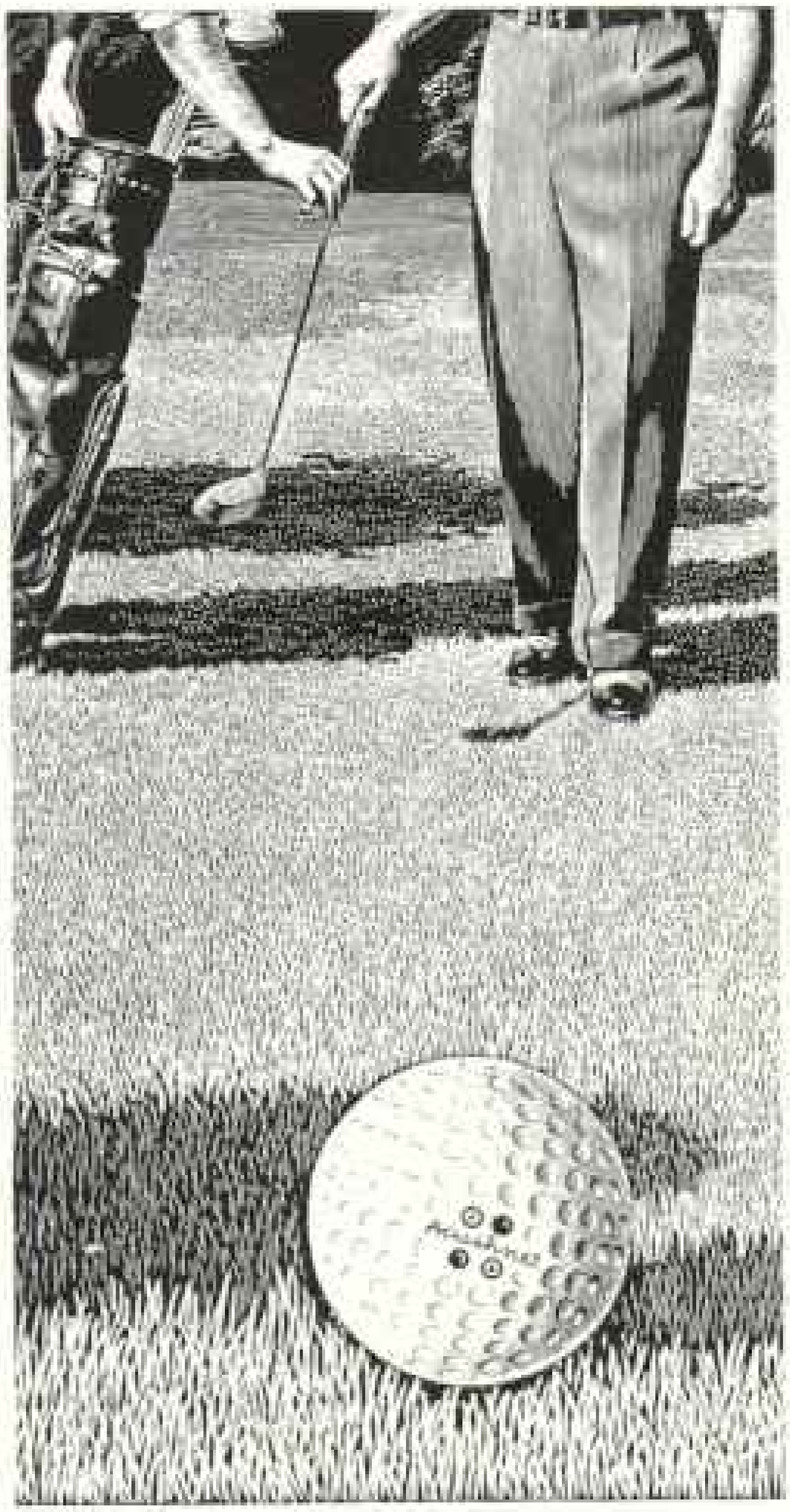

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Boys' Schools and Girls' Schools on two preceding pages

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After forty, diseases of the heart and circulatory system begin to take their heavy toll. It must be remembered that heart muscles and blood vessels grow older just as your external appearance does. As they do, coronary heart disease and circulatory diseases, particularly, are more liable to develop.

So it is the better part of wisdom to act your age—to adjust your habits and modify your activities to match your capacities—even though you don't *feel* the need of doing so.

For instance, after forty it is well to avoid sudden indulgence in unusual or over-long exercise—don't be a "week-end athlete." Ease up on your more strenuous activities, and get plenty of rest. Avoid overweight, and take more seriously the annual physical examination that so often detects the first stage of trouble before serious symptoms appear. Above all—*follow your doctor's advice.*

This doesn't mean that you must *worry* about your heart, or entirely abandon your usual recreations. Sensible consideration for your heart, on the contrary, should bring *freedom* from worry, and the likelihood of enjoying *added* years of fun and usefulness.

Of course, warning symptoms of possible heart trouble, such as fainting, shortness of breath, sense of oppression or pain near the heart, call for the immediate attention of your physician. He may make use of such aids to accurate diagnosis as the X-ray, the fluoroscope, and the electrocardiograph. He knows best how to guide you in safely and sensibly acting your age.

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Like the Hyla faber, most men realize that precious things must be guarded and watched over carefully. For instance, your home, your car, and your income, are possessions around which it is well to erect a strong protecting wall. One of the best ways for you to do this is to have insurance. If you are careful to guard them behind this strong wall, sudden disaster can never take them away from you.

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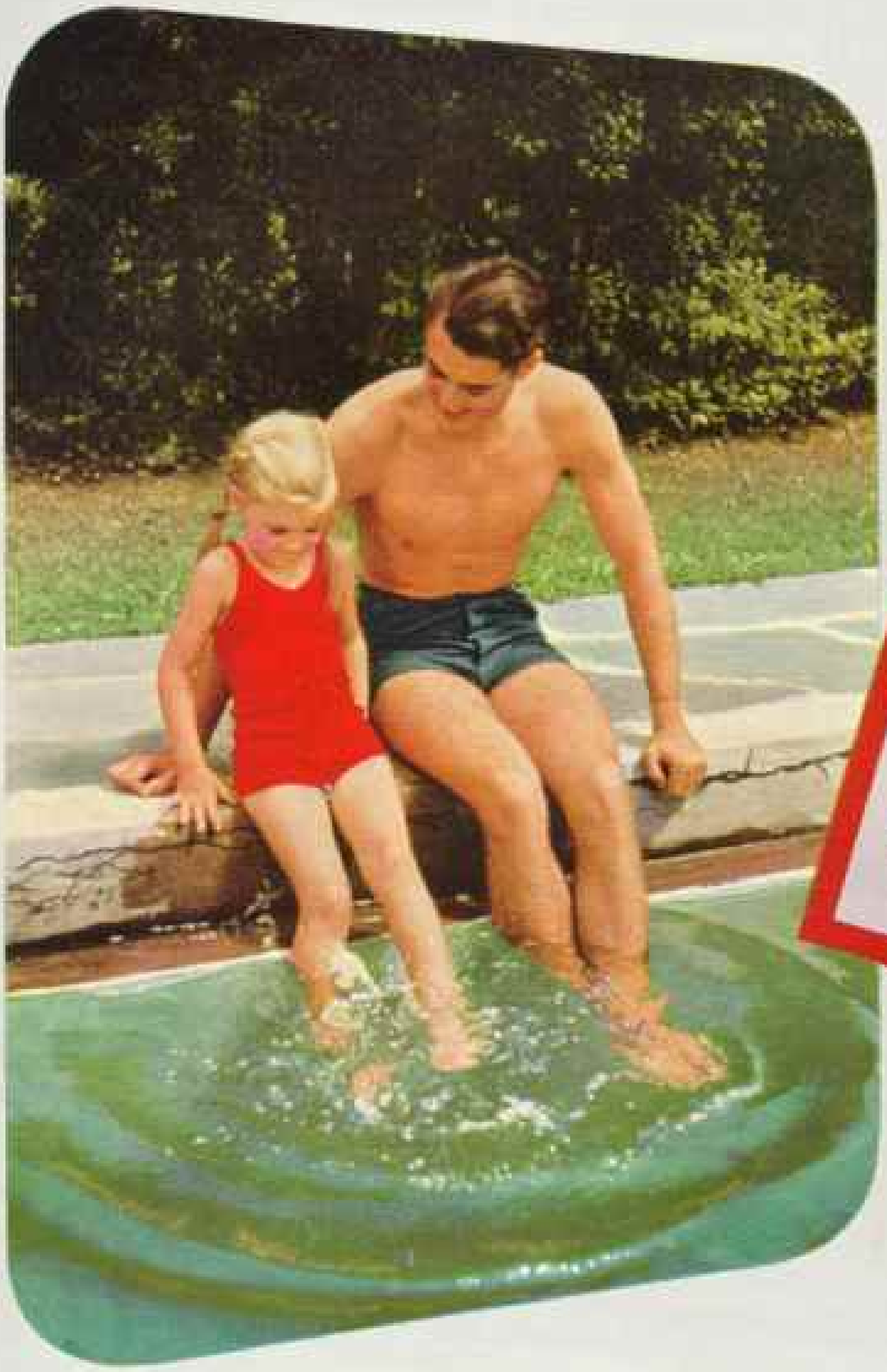

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