

VOLUME LXXVIII

NUMBER SIX

# THE NATIONAL GEOGRAPHIC MAGAZINE

DECEMBER, 1940

## Map Supplement of the United States

Aviation in Commerce and Defense

With 39 Illustrations

F. BARROWS COLTON

In the Realms of the Maharajas

With 14 Illustrations and Map

LAWRENCE AND MARGARET THAW

Princely India

40 Natural Color Photographs

Canoeing Down the River Jordan

With 19 Illustrations and Map

JOHN D. WHITING

Old-New Battle Grounds of Egypt and Libia

With 8 Illustrations and Map

W. ROBERT MOORE

United States Map Shows Census Changes

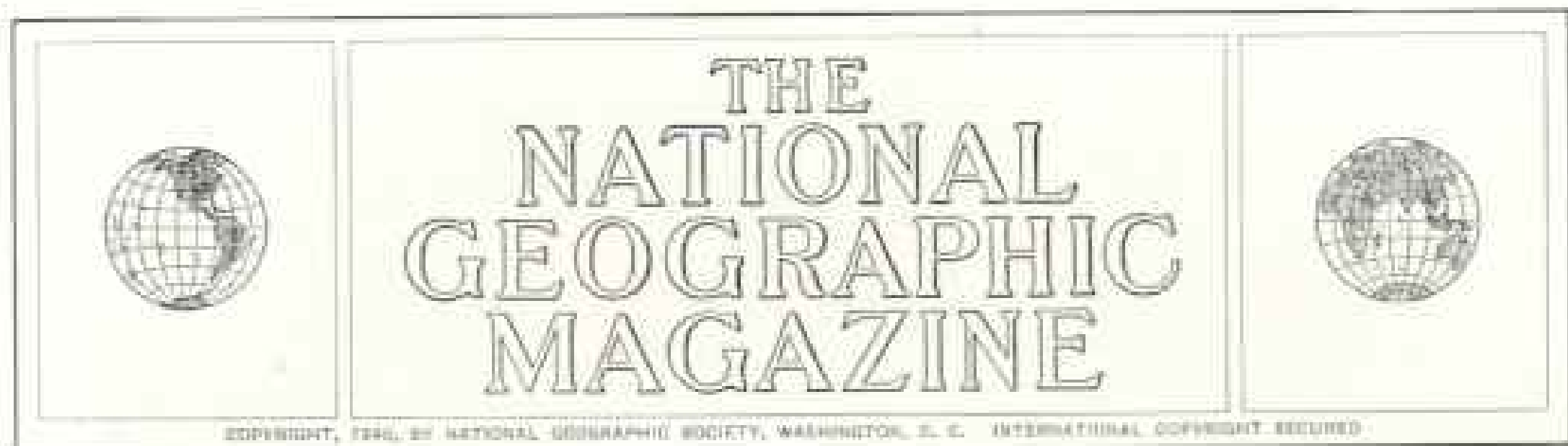
With 2 Illustrations

Thirty-two Pages of Illustrations in Full Color

PUBLISHED BY THE  
NATIONAL GEOGRAPHIC SOCIETY  
WASHINGTON, D.C.

\$3.50 A YEAR

50c THE COPY



## Aviation in Commerce and Defense

By F. BARROWS COLTON

**T**HE Earth had disappeared.

From the window of the giant "stratoliner" I could see only a crescent moon, faintly revealing a level bank of clouds below, and casting a silvery gleam on the huge metal wing just outside.

We settled back on luxurious divans as the stewardess cleared the remains of a five-course chicken dinner from the table. The captain strolled back from the control cockpit to chat.

"Our altitude now is 19,000 feet," he said. "We're cruising at 240 miles per hour."

More than  $3\frac{1}{2}$  miles above the earth and four miles a minute! Outside, the air was rarefied and cold, but inside we had no trouble breathing and were comfortably warm.

### An "Airplane of the Future"

We were riding in the "airplane of the future." Sealed inside a huge airtight metal cylinder, like passengers in a space ship, we had left the ground and even much of the weather far below, yet were carrying our earthly environment along with us.

Whirling superchargers were scooping in the thin air outside, compressing it to normal thickness as you might stuff loose feathers into a pillow, and feeding it into our cabin. At 19,000 feet we were breathing air compressed to a density equivalent to that usually found at 8,000 feet (page 688).

The "airplane of the future," or at least its forerunner, is actually here today. You can ride in one any day from New York to Los Angeles in 15 hours—just overnight. From west to east, pushed along by prevailing tail winds, you can do it in  $13\frac{1}{2}$  hours.

One woman, when a pilot tried to explain this to her, said, "Well, if tail winds are so much help, why don't you put them on all your airplanes?"

Actually, in a way, that's already being done. Transpacific Clippers have eight different standard tracks between San Francisco and Hawaii and follow the one offering most favorable winds and weather.

Soon most transport airplanes will be built with sealed, "pressurized" cabins like the "stratoliner" so that they can fly at heights of four or five miles over land or sea with equal ease, high in the clear, calm regions of the upper air, where storms are rare and "bumps" produced by turbulent air currents seldom are found.

In "pressurized" planes you do not use special oxygen. The air outside the plane at high altitudes is the same as the air at sea level, but there's less of it to the cubic foot, so in a standard breath of it you get less oxygen. But this thin air is brought into the plane and compressed, until in a single breath you get as much oxygen as you would down at levels where man is accustomed to live.

### Aviation Comes of Age

Not only are modern planes flying in regions once forbidden to man, but aviation in general today has "grown up." Gone are the days of the stunting barnstormer, when flying was a "thrill," and pilots too often were reckless glamor boys. Air liners now run as soberly and regularly as trains. Private plane owners fly on fishing trips, to golf games, or to work as matter-of-factly as they might drive an automobile.

Every day, in the United States alone, the planes of scheduled air lines travel as far as from the Earth to the Moon, a quarter of a million miles.

You can buy an airplane for your own use as cheaply as a medium-priced car, with elementary flying lessons thrown in free. Some



Photograph by Lutz Marden

### Literally You "Drop in" for the Week End in This Flying Age

Arriving in their three-seater Stinson 105 cabin plane, this young couple are wearing street clothes. Private flying is becoming so popular that one type of light plane, the Piper Cub, is being produced at the rate of 20 finished craft per day. A Texas rancher uses his light plane to find stray cattle, and notifies the nearest cowboys through radio receivers on their saddles!

of them are so easy to handle you merely pull the steering wheel toward you to go up, push it away from you to go down, and turn it to go left or right.

Only 13 years after Lindbergh flew the Atlantic nonstop, the United States has developed a bomber that will fly the Atlantic, *and back*, nonstop, at over 200 miles per hour, with a crew of 10 men—the largest military airplane in the world. Its tires alone are eight feet high and weigh more than some whole airplanes (pages 698 and 716).

The Army has pursuit ships that can dive on an enemy's tail at speeds up to 300 miles per hour, over eight miles a minute, spitting concentrated death from a cannon and four machine guns all fired at the same time by one man. "Almost literally," an engineer told me, "we took a 1½-inch cannon and designed an airplane around it. The first time an observer saw the full battery of five guns fired

in the air, so much smoke and flame burst forth he thought the airplane had caught fire!" (pages 715 and 719).

### Flying Boats Have Two Stories

Airplanes have grown so big that trans-oceanic flying boats today actually have two stories with flights of stairs between. Yes, and one was designed with even a bridal suite! The most powerful Diesel locomotive on a modern streamlined train generates less horsepower than the four engines of these airplanes (page 692).

When one of the Pan American Clippers was starting for Hawaii, a steward asked a lady passenger if he might put away her coat.

"No, thank you," she said. "I'll be needing it later when I go out on the promenade deck!"

After all, though, the lady probably was only a little ahead of her time. Airplanes to carry 100 or 200 passengers across the oceans can



Photograph by Transcontinental and Western Air

### Babies of Four Ex-air Line Stewardesses Get an Early Start at Flying

Most air liners are equipped with baby kits and have an icebox for nursing bottles. In a single day one air line carried 21 infants out of New York City. Babies under two years, incidentally, are flown free. Many transport planes have toys and games to amuse older children.

be built as soon as there's a demand for them, say engineers. Quite possibly they may have promenade decks—protected, of course, from the winds kicked up by the terrific speeds at which these air leviathans will travel.

Flying today is changing the map, altering ancient ways of life, making possible things never dreamed of before. It has opened up new phases of medicine, cookery, weather forecasting, travel, and, of course, warfare. At last it is easy, safe, and relatively inexpensive for man to satisfy his age-old desire to soar through the blue above his head.

Soil for an air line hotel lawn has been shipped to lonely Canton Island in the mid-Pacific, where only three years ago a National Geographic-U. S. Navy eclipse expedition camped primitively in tents, plagued by sun, crabs, and rats.\*

Today Canton Island is suddenly important as a way station on the new air route from California to New Zealand. In the hotel there

now you can get your suit pressed or your laundry done, buy a drink, or study the tropical fish from a glass-bottomed boat.

### An Aerial Milk Route

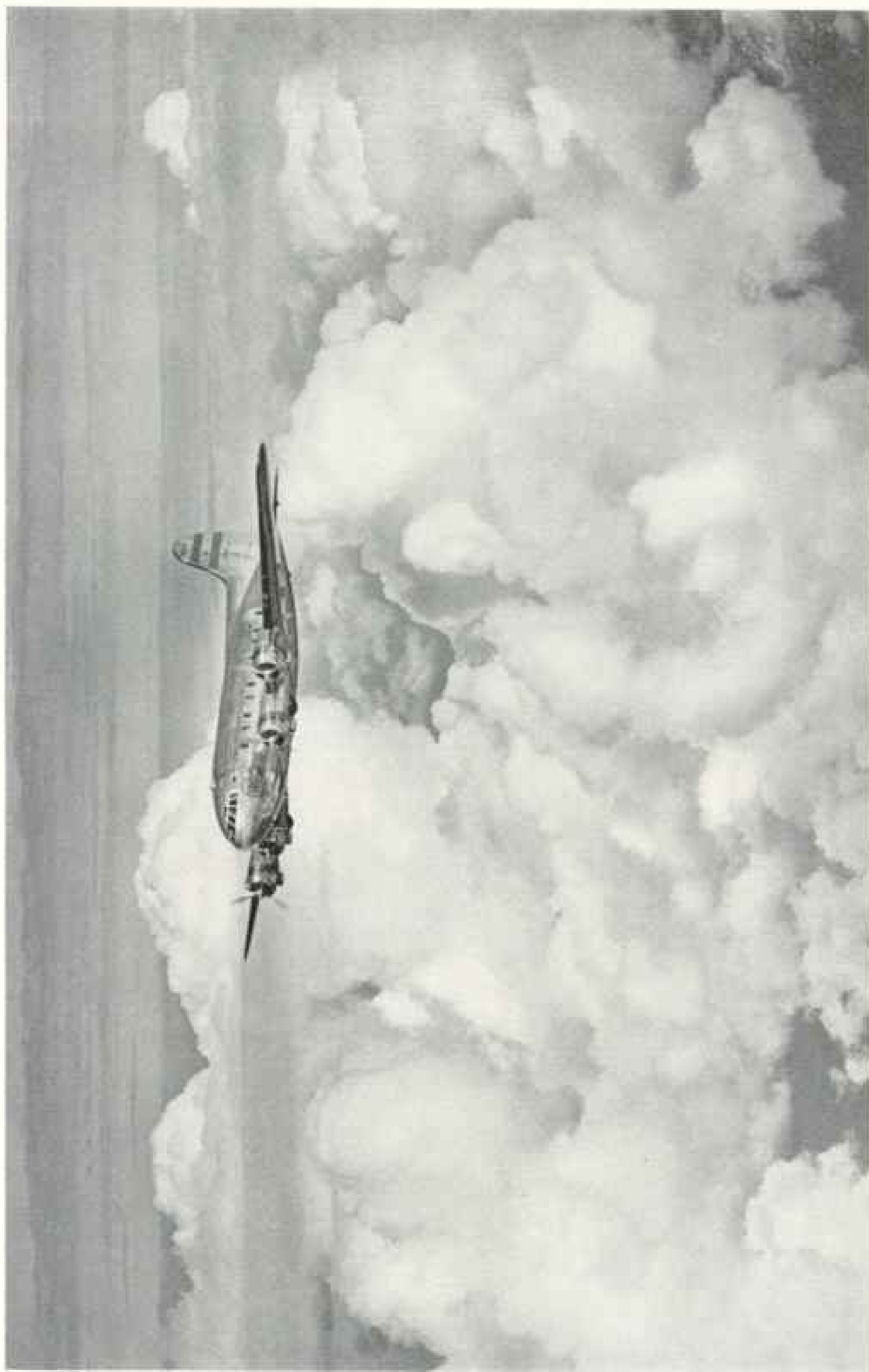
Clipper planes operate the world's longest milk route from Hawaii out to Pan-American Airways bases on Midway and Wake Islands in the Pacific.

One Sunday morning in Los Angeles, while working on this story, I received a wire from the office asking when I'd be back in Washington. I didn't reply, because, leaving at 6 p. m., I *arrived* in Washington the next day by scheduled air lines in time for lunch!

Last Mother's Day, fresh flower leis were shipped by air from Hawaii to 46 states in the Union and arrived in good condition.

Larvae of insect parasites, formerly sent by

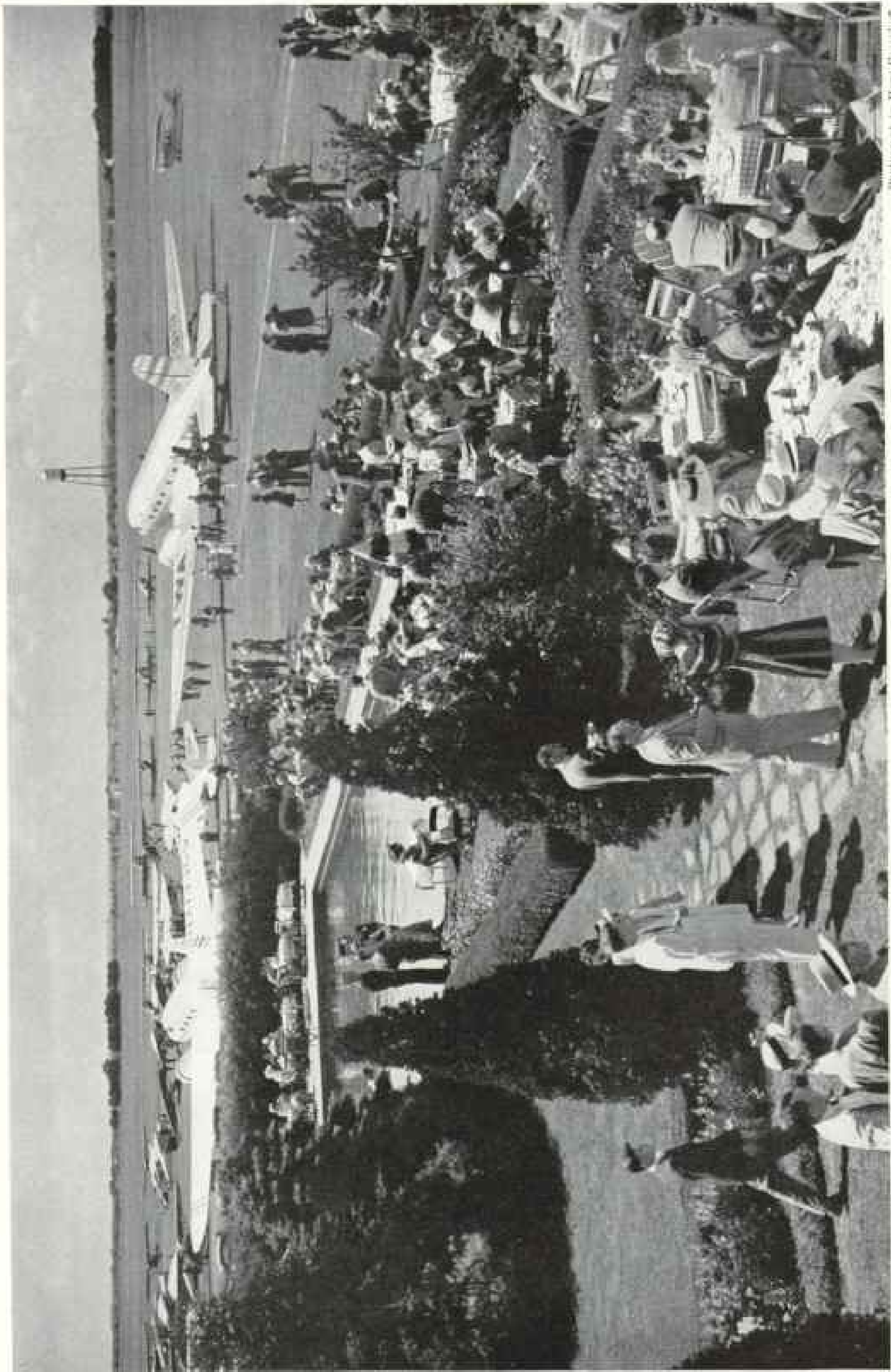
\* See "Nature's Most Dramatic Spectacle," by S. A. Mitchell, and "Eclipse Adventures on a Desert Isle," by J. F. Hellweg, NATIONAL GEOGRAPHIC MAGAZINE, September, 1937.



Photograph courtesy of Boeing Aircraft Co.

### **Its Cabin Sealed Airtight, This "Plane of the Future" Speeds Coast-to-coast at Heights Once Forbidden to Man**

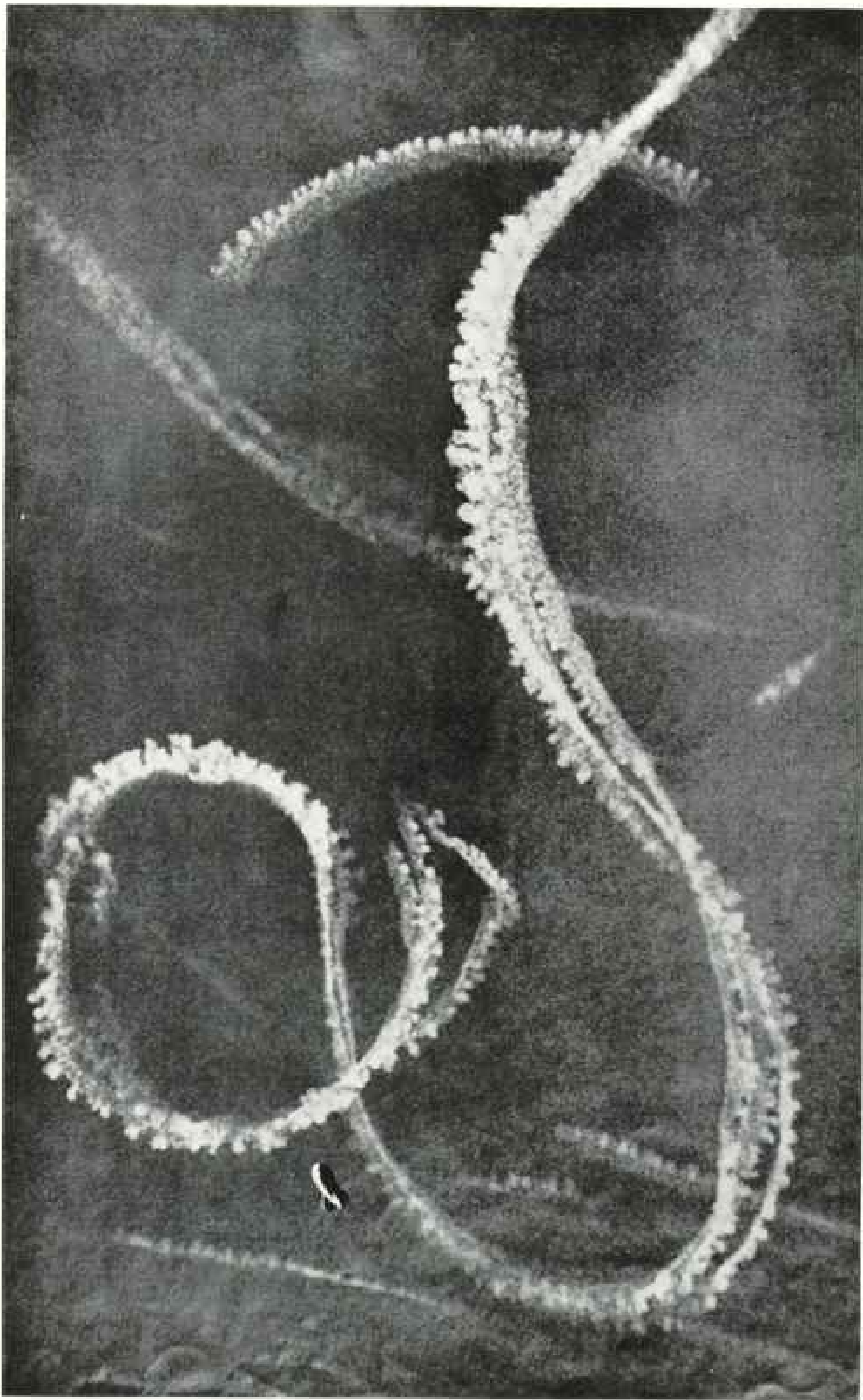
By maintaining comfortable air pressure in the cabins for normal breathing, the new "stratoliners" of Transcontinental and Western Air can fly safely at 17,000 to 20,000 feet. There the outside air is highly rarified, and greater speeds are possible (page 685). These four-engined Boeing planes cross the continent in 13½ to 15 hours, with 33 passengers by day or 25 by night.



Photograph by East-Goulding

**A Landing Field Takes the Place of a Golf Course at Hicksville, Long Island**

Most of the members are either pilots or aviation devotees. About 60 airplanes and 1,000 visitors were on hand at the club's annual demonstration air meet, shown here. Besides clubhouse, swimming pool, and tennis courts, the club has a large hangar with facilities for servicing planes.



AP Photo/Robert Tompkins, Inc.

### A Duel to the Death in the Sub-stratosphere—Fog Trails Behind Fighters Show How They Twist and Turn in Combat

This grim "skywriting" reveals breath-taking maneuvers of British and German planes during a "dogfight" over the Kent coast, August 28, 1940. So high are the fighters that they are mere specks in the sky. A barrage balloon floats in the sky at the left. Exact cause of such vapor trails frequently observed in this war is uncertain.



Photograph by Louis Marden

### Crowds Watching the Transport Planes at New York's Airport Testify to Public Interest in Flying

Thousands of visitors jam the elevated spectators' runway at LaGuardia Field on pleasant week ends and willingly pay the 10 cents admission. These 21-passenger American Airlines ships are being refueled and serviced before departure. The field has space for 15 air liners to load or unload at once.





Photograph by William T. Hoff

**Nose of the "Dixie Clipper" Shows Strikingly the Size of Modern Transoceanic Planes**

Baggage is being loaded aboard the big Pan American Airways flying boat at New York just before departure for Lisbon. So large are its wings that the crew can crawl out inside them to service the engines in flight. American Export Airlines has in construction planes for a second service to Europe.

steamer to attack crop pests, often became sterile during long voyages. Now they travel fast by air and arrive full of fight.

Dangerous insects also thrive on air travel, however. Mosquitoes capable of transmitting yellow fever have been found to be "stow-aways" on airplanes arriving from South America, so public health authorities now carefully inspect the planes and spray the interiors to destroy any insects that may be aboard.

Passengers, too, must undergo strict examination, for the air trip is so fast they would not have time to develop the full symptoms of the disease before arrival as they would on the longer journey by steamer.

Travel is so heavy now, on the domestic air lines, that air liners arrive or depart once every two minutes at New York's busy LaGuardia Field during the late afternoon.

Nearly 1,000 people now are sleeping in the air over the United States on any average night in the year—going to bed above New York or Los Angeles, waking up above Kansas City or Chicago. Thousands more are eating breakfast, lunch, or dinner while flying from one to three miles above terra firma—and that, incidentally, has given rise to a whole new science of cooking.

Some types of foods aren't served on airplanes, an air line steward told me, because they form gas, and gas in the human stomach expands the higher you go, just as it does in balloons. Also, whipped cream that was fluffy at sea level is likely to collapse like pricked soap bubbles at 8,000 feet—but more on that later (page 711).

There are four transcontinental east-west airways in this country and six from north to south, with others connecting every region of the United States.

Serving them are 28,745 miles of lighted airways, 296 lighted intermediate fields, 2,205 beacons, 273 radio range stations, 81 weather broadcasting stations, and 368 teletype weather-reporting airway and airport stations.

#### "Chief Flying Beans"

Flying the airways back and forth, pilots come to know their routes by heart. At night they sometimes spot fires and send radio alarms. John Graves, a TWA pilot, hearing of a tribe of Navajos trapped by a blizzard in the mountains, dropped some beans and other supplies to them. For weeks thereafter the grateful Indians lit fires each night to salute the TWA planes on the night run from Los Angeles to Albuquerque. Later, Graves was made an honorary chief of the tribe with the title "Chief Flying Beans."

Uses for airplanes seem unlimited. Major surgical operations were performed aboard an Argentine rescue plane fitted with an operating table after the recent earthquake in Chile.

Bringing sick or injured people to hospitals by airplane from ships at sea, scenes of disaster, or remote regions; carrying heavy mining machinery to distant camps; dusting chemicals on crops are now commonplace.

Planes are used to feed and count game animals in winter, to place fingerling trout in inaccessible lakes, to help track down escaped criminals, even to scatter tree seeds on barren mountain slopes.

Meanwhile, flying, in good weather or bad, grows constantly easier and safer. The whole vast sea of billowing air masses, winds, clouds, fogs, and storms, that tosses continuously above our heads has been charted and explored as never before.\*

Tiny balloons soar five or six miles into the blue and radio back without human aid the temperature and humidity aloft. They carry apparatus in which the changing length of a human hair records the moisture of the air. Pilots receive frequent weather reports, and one air line alone maintains the second largest broadcasting network in the world.

Today it is commonplace for air liners to fly for hours through or above clouds without seeing the ground, yet hit their destinations "on the nose."

It is possible right now for a pilot, unable to see outside his cockpit, to land an airplane safely, though it is not yet standard practice. An Army pilot has even made an "all-blind" flight, taking off, flying 300 miles to another field, and landing without seeing anything but his instrument board.

A great future is opening up (and *wp* is the word!) in the expanding business of flying, and American youth are jamming the gates.

"Are youngsters eager to get into aviation!" snorted an air line executive. "Why we've got Harvard graduates out here washing airplanes in the repair shop!"

One cadet who recently entered a flying school had never driven an automobile or ridden on a train, but he learned to fly!

Many a young air line pilot has quit smoking to be more sure of passing his rigid semi-annual physical examinations. Stewardesses, and pilots, too, may not take an alcoholic drink within 24 hours before they fly.

Marriage rates are soaring in many factory towns as young trade school graduates get

\* See "Man's Farthest Aloft," by Capt. (now Major) Albert W. Stevens, NATIONAL GEOGRAPHIC MAGAZINE, January, 1936.



Photograph by Leta Marston

### 21 Hot, Full-course Meals Come from This Tiny Galley

Appetizing steaks, chops, or chicken and "all the frings" today are served to air line passengers at no extra charge. Cooked on the ground, foods are kept hot on the planes until meal times (page 711). Thermos bottles beside the stewardess contain coffee, hot and cold water, milk, and soup.

their first steady jobs in expanding airplane plants.

During the last 12 months, 25,000 young men and women have learned to fly under the Civil Aeronautics Administration's civilian pilot training program. Many of these new aviators will want to own and fly airplanes of their own. Nearly 3,000 light planes for private flying were produced in the last year.

Busy now with war orders, the American aviation industry nevertheless is looking ahead to the day when civil, rather than military flying will form its leading market.

Ten years from now, some engineers estimate, 10,000 transport airplanes instead of about 322 as at present will be flying on the

nation's scheduled air lines. All told, there are 16 air lines in this country alone.

Not only are existing lines expected to increase their traffic greatly, but it is believed many new feeder lines will come into operation, giving small cities and towns air service and connecting them with the major lines.

All first-class mail as well as parcel post, express, and fast freight, may be carried by air in the future where distances justify it, aviation men predict. Already air mail reaches all states, our territories and possessions, and (before the war) 53 nations beyond the seas. You can send air express to all Latin America, Australia, Hawaii, and the Orient.

Air mail service for small towns without landing fields now is working in the region around Pittsburgh, Pa. The outgoing mail sack is hung on a rope between two flexible upright bamboo poles. The mail plane swoops down, snatches up the sack on the end of a 14-foot boom swinging

from beneath, and at the same time drops the incoming mail sack.

"Day-coach" transport planes with lower fares, fewer frills, and more stops than luxury liners, but just as safe, soon will offer high-speed transportation to people of small means.

Everywhere I've flown in the United States, crowds were on hand to "see the planes come in." "It's the same psychology," said an airport manager, "that used to make people go to the railroad station to see the 'Fast Mail' go through."

I stood near a young couple watching the air liners arriving and departing at New York.

"Is that a pilot? That's a funny uniform," said the girl.

"Aw, whaddaya expect, helmet and goggles?" replied her escort with disdain. "They don't wear them any more. There goes a stewardess, see?"

Came a sigh from his girl friend. "Isn't she cute! Gee, it must be fun to be a stewardess!"

Near by, a small boy frowned as an arriving plane came within sight.

"Shucks, that one's only got two motors."

His smaller companion pointed excitedly. "Hey, look at that Stinson climb! Oh, no, it's a Waco!" To me, of an older generation, it was just an airplane!

#### "New York-Hong Kong-Rangoon. All Aboard!"

Air line time-tables today look just like railroad schedules. I saw one headed "Lisbon-New York-Chicago-Los Angeles-San Francisco-Hong Kong-Rangoon."

In a big airport terminal you'll hear announcers calling out planes over loud-speakers, for all the world like the old train-callers (and now and then almost as unintelligibly!).

"American Airlines announcing the departure of Flight Number 11, 11:25 a. m. departure to Philadelphia, Washington, Tri-Cities, Knoxville, Nashville, Memphis, Little Rock, and Fort Worth. Passengers are now loading through gate 4 for immediate departure. All aboard, please!"

"United Air Lines announcing the departure of Trip No. 35, scheduled 3:15 p. m. Mainliner service to Akron, Cleveland, and Chicago. The Mainliner is ready for on-time departure at gate No. 8. All aboard, please!"

There's an air line ticket office, among other places, in the United States Capitol.



Photograph by Lois Mauden

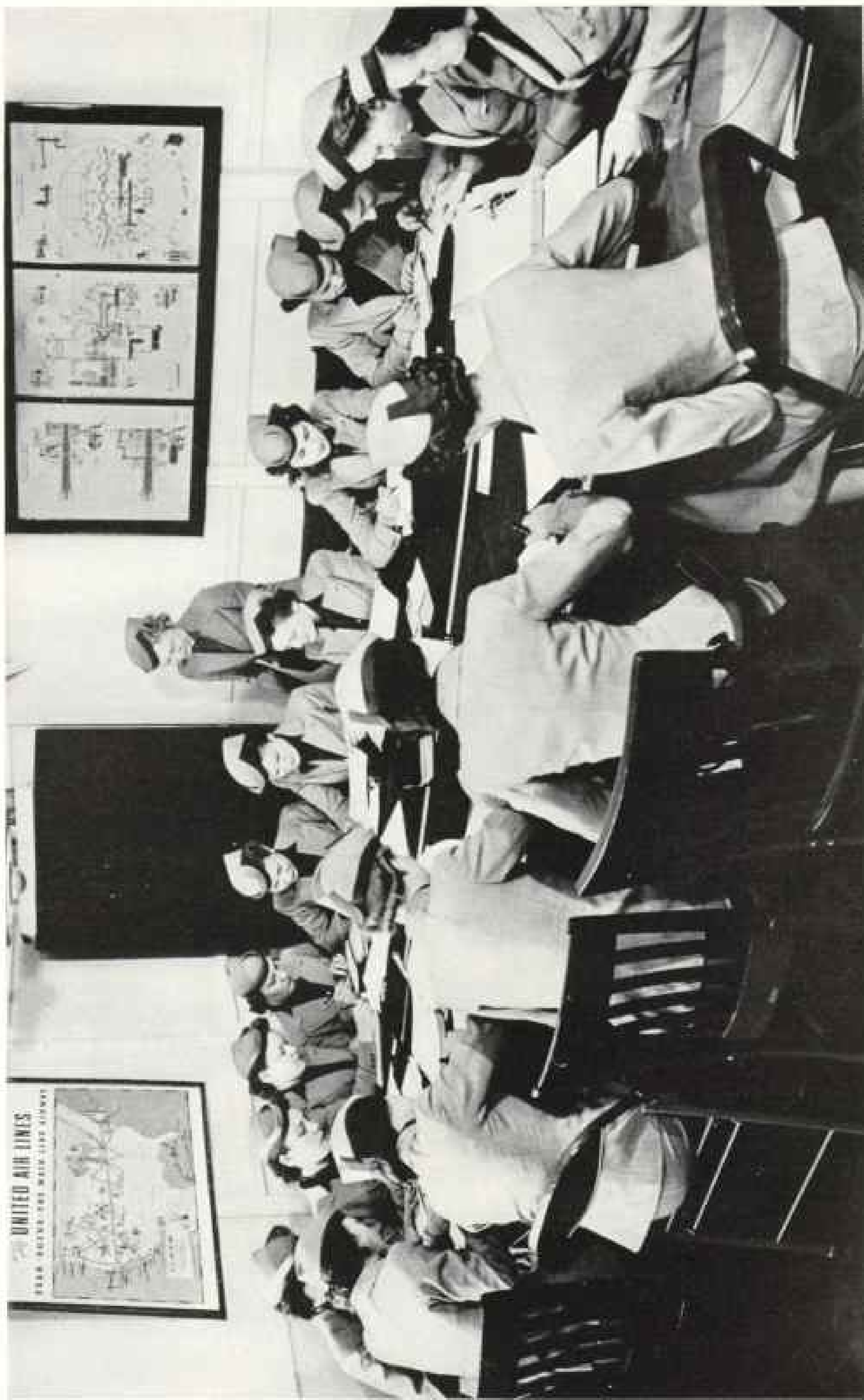
#### New Air Liners Feature a Spacious "Flying Boudoir"

Big mirrors, hot and cold running water, and every facility to enhance feminine charm are provided in the separate ladies' lounge rooms on the largest transport planes operating today.

Let's take a ride on a modern air liner and see the operation of this network of skyways that has sprung up over America. Safety, speed, and comfort are the watchwords. It has been 10 years since a transport pilot looped the loop with a load of passengers over Boston and couldn't understand why he was fired!

Today's pilots are not dare-devils but serious, highly trained engineers who are navigators and meteorologists as well. It takes two of them to fly the big, silvery porpoise-nosed Douglas ships that are standard equipment for most major air lines today.

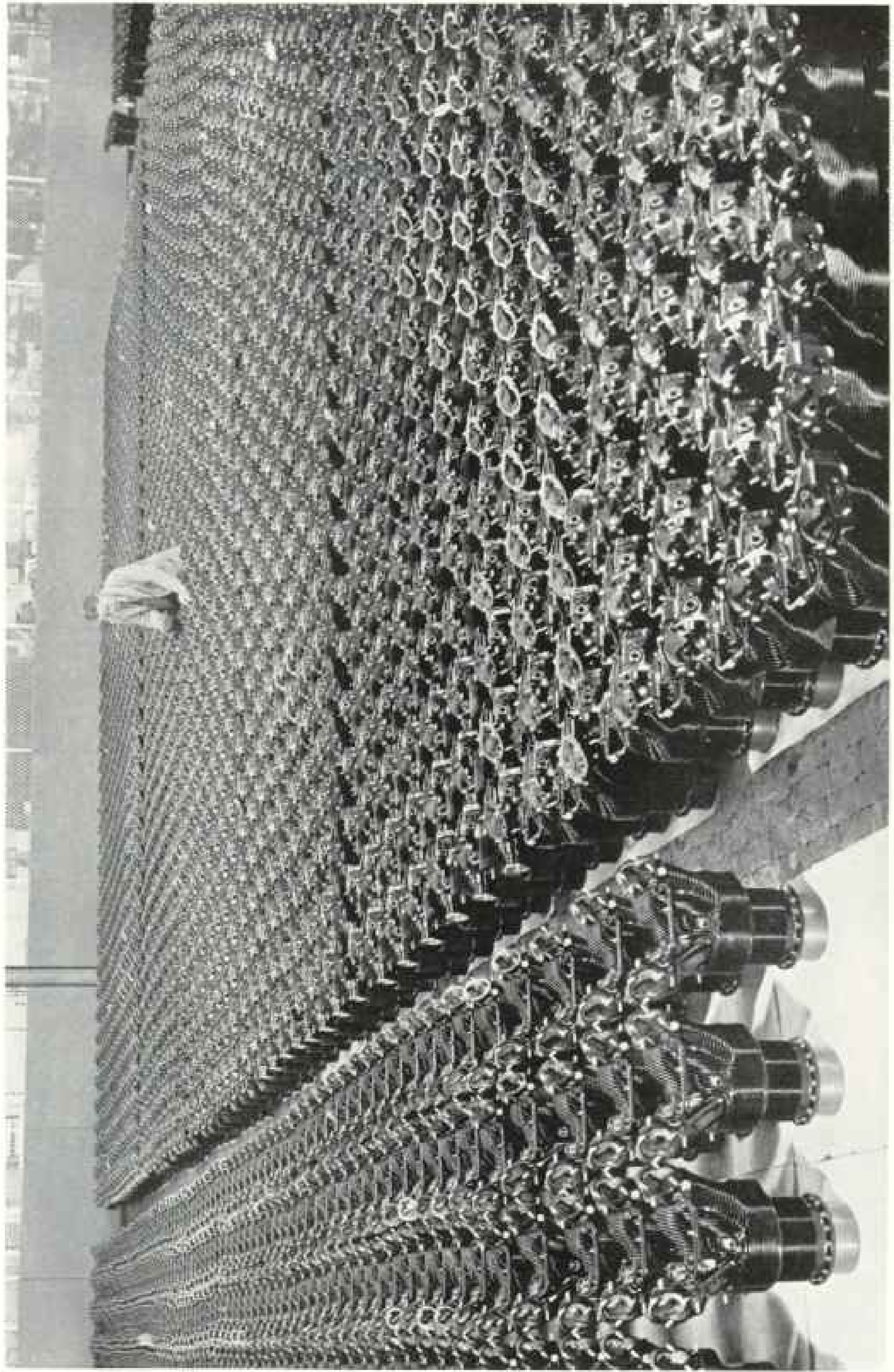
One of the crew's first considerations is for the comfort of—your ears! The stewardess, with a smile as unfailing as a chorus girl's, will



Photograph by Getman from United Air Lines

### Stewardesses Have to Cram, Too! They Must Learn Why Airplanes Stay Up, Shapes of Clouds, How to Read Air Time-tables

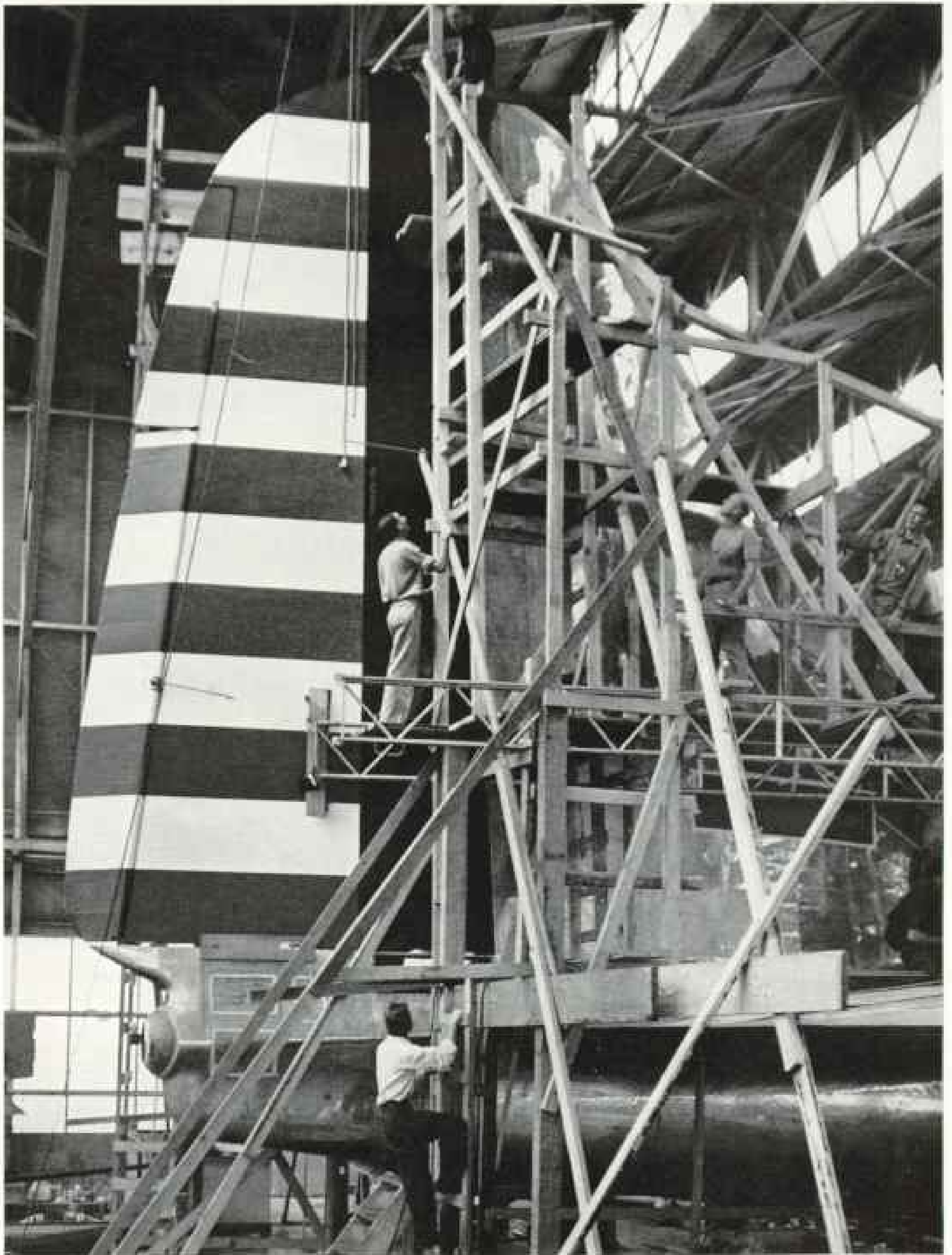
Many air lines conduct schools for stewardesses where new girls receive several weeks' training (page 713). When twin babies became airborne, a stewardess washed their clothes in the galley and dried them with hot air from the windshield de-icer in the pilot's cockpit! At least one has married a millionaire met on a plane.



Photograph from United Aircraft Corp.

**Harvest of Horsepower! Like Ripened Grain Thousands of Airplane Cylinders Stand Ready for Assembly**

Linings of many airplane cylinders must be harder than glass to withstand wear and be honed to an accuracy equal to 1/10 the thickness of a spider thread. Such preclashed enables engines to run 500 hours or 100,000 miles without a major overhaul.



Photograph by Lutz Marten.

### Not the Rudder of an Ocean Liner, but the Tail of the Army's New Giant Bomber

Workmen on the scaffolding around the tail group of the Douglas B-19 reveal graphically the size of this plane, world's largest military aircraft (page 686). So huge is the rudder it cannot be moved as a whole by the pilot. Instead he manipulates the small tab on the rudder's rear edge (left), which in turn actuates hydraulic controls to operate the main rudder. Wingspread of this plane is 212 feet.



Photograph by William T. Hill

**Snow Drifts and Icy Pavements Don't Block the Highways of the Sky**

As long as airport runways are cleared of snow, as this truck is doing at LaGuardia Field, New York, the air transport lines operate as normally in winter as in any other season.



Photograph by Lilla Maxwell

**Breakfast in Bed on an Airplane? That's Commonplace Now!**

Sleeper planes, such as this Eastern Airlines ship, have upper and lower berths. In the "stratofliners," berths are in compartments crosswise of the ship. Each passenger is given a bag (left) for overnight equipment.





Photograph by William T. Hoff

### Voice-radio Orders from the Airport Tower Govern Movements of Every Plane

Literally "monarch of all he surveys" is the busy dispatcher in the glass control room from which traffic is directed at most large air fields (page 722). This tower at LaGuardia Field, New York, surmounts the airport terminal, and weather-recording instruments are mounted on its roof. On the ground are air-conditioning and air liner service trucks. Above them is the spectators' gallery, and under the awnings a terrace restaurant.



Photograph by Rudy Arnold

### Like Angry, Sharp-nosed Hornets, U. S. Army Pursuit Planes Speed to the Attack

Hundreds of these Curtiss P-40 ships are being produced for the United States and Great Britain. Armed with three machine guns, this type is considerably faster than the Curtiss "Hawk" which has performed well in European combat. The plane is powered with an Allison liquid-cooled engine, with a small frontal area for improved streamlining.



Official Photograph from Civil Aeronautics Authority

### Washington's New Airport, Nearly Finished, Was Dredged from the Potomac River

The ultramodern field at Gravelly Point (left center), drawn in on this aerial photograph, is only 10 minutes by auto from the center of the national capital, above. The Army's Bolling Field (lower right) and the Naval Air Station at Anacostia, D. C., are directly across the river from the airport.



Official Photograph, U. S. Navy

#### Dive Bombers of the Navy Practice a Mission of War

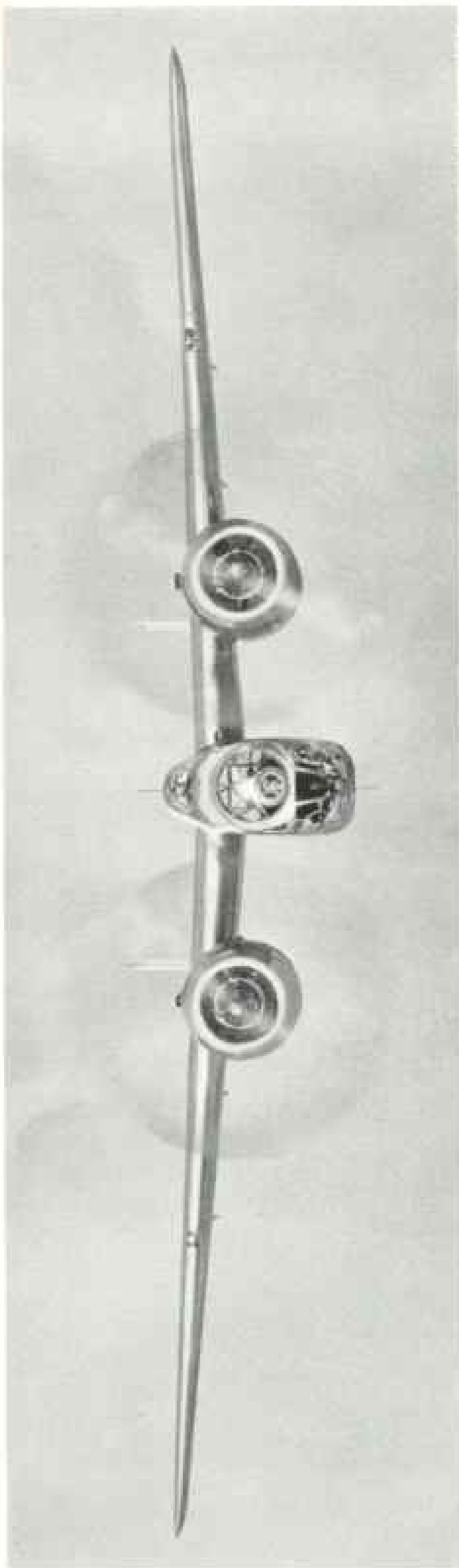
Scout bombing planes equipped for diving attacks on enemy ships can range over 500 miles out from their bases on airplane carriers with the fleet. They have a crew of two and can fly more than 250 miles per hour. This squadron, from the U. S. S. *Saratoga*, is flying over the San Diego area.



Official Photographs, U. S. Army Air Corps

**Like Migrating Birds Against the Sky, 62 Bombers in Mass Formation Symbolize America's Growing Air Power**

In the foreground, at top, are 12 four-engined "Flying Fortresses" (page 714), and accompanying them are five groups of smaller two-engined bombers of 10 planes each. Formation flying requires a high degree of training. Squadron commanders give orders by voice-radio or code.



Photograph from North American Aviation

**Coming Head-on, This Medium Bomber Shows How Highly Streamlined Are Modern Planes**

With wheels retracted and every possible protuberance removed, it offers minimum air resistance and also forms a small target.



Photograph courtesy of the Glenn L. Martin Co.

**Long-range Navy Patrol Bombers Like These Guard the Sea Approaches to North America**

The Martin flying boat is taxiing on the "steep," a break in the hull bottom which reduces water resistance and makes the take-off easier. Wing floats are retractable.



Photograph from Engineering and Research Corp.

### Driven Like an Automobile, the Ercoupe Also Is "Spin-proof"

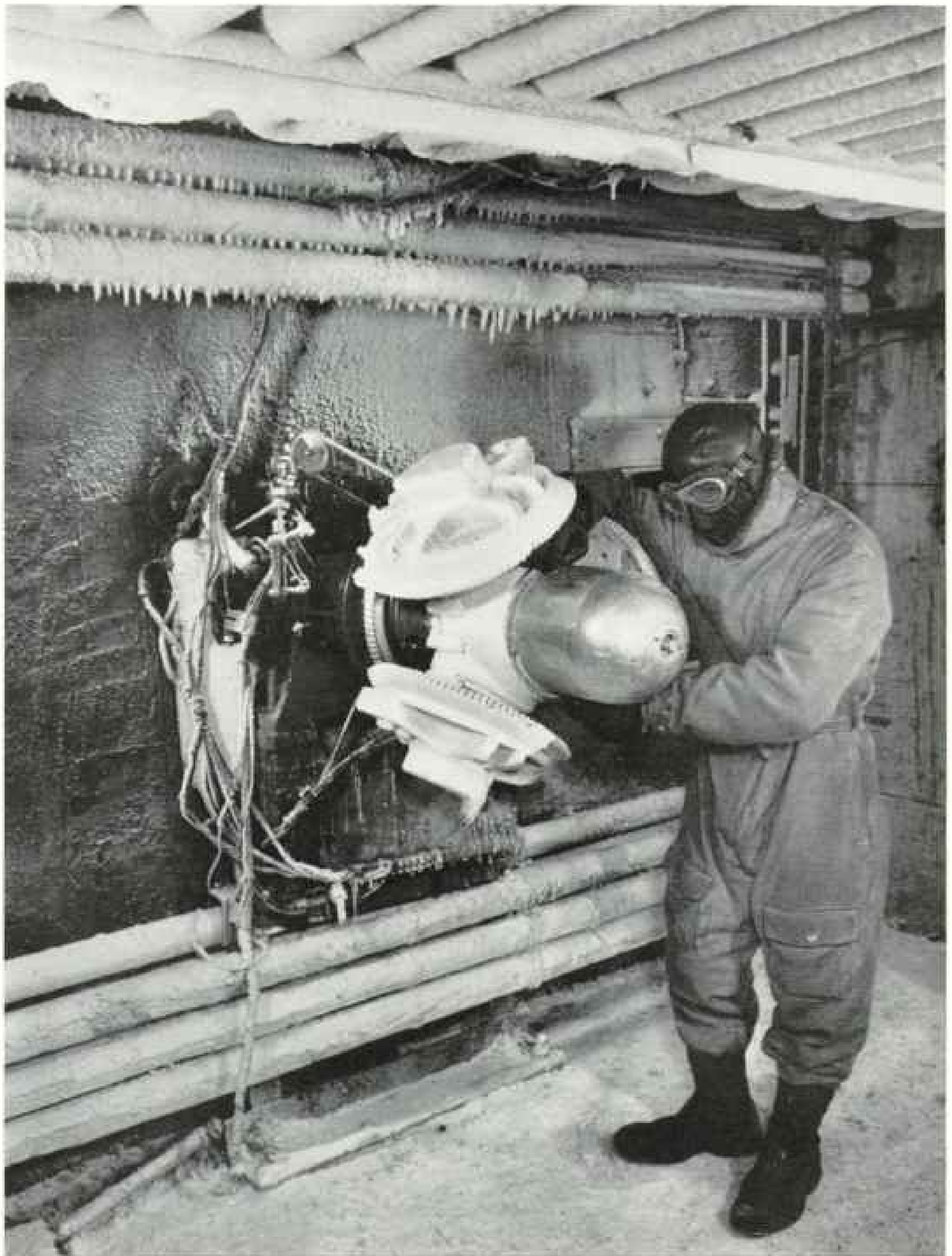
The tricycle arrangement of the wheels makes safer landings. The plane is flown by a single control wheel, without rudder pedals. The cabin seats two people. Several light planes of this type are manufactured.



Photograph by Grignon from United Air Lines

### "Flying" the Link Trainer Is so Realistic It May Even Make a Pilot Dizzy!

The trainer (left) is equipped with actual instruments and controls. A pilot sits inside with the hood closed and "flies blind," while an automatic recorder draws a diagram of his "flight" on the instructor's desk.



Photograph by Lois Marden

### In This 50-Below-zero Room, Propeller Hub Mechanisms for High Flying Are Developed

Because the cold of great heights may affect the clearances of metal parts and the flow of hydraulic fluids, propeller hub assemblies are tested in this "cold room" of the United Aircraft's Hamilton Standard Propellers Division at East Hartford, Connecticut. Engineers must wear masks and heavy flying suits in the room, which is insulated with a foot-thick layer of cork.





Photograph by Lutz Martini.

### It Takes Three Men and a Multitude of Instruments to Fly the Newest Air Liners

Besides the pilot or captain, left, and co-pilot or first officer, right, who comprise the flight crew of most transports, an engineer officer also rides in the cockpit of the large four-engined Boeing planes of TWA (page 688). Just to the right of the pilot's hand is the gyro-horizon and below is a bank of throttles. Among the instruments and controls are a propeller de-icer, landing light switches, altimeter, turn and bank indicator, airspeed meter, rate of climb meter, wing flap position indicator, compass, fuel gauges, warning lights to show if wheels are up or down, etc.

give you gum to chew, for swallowing will help prevent ear discomfort resulting from adjustment to the decreasing atmospheric pressure as the plane rises. One woman, when told the gum was "for her ears," put a wad in each ear to keep out the noise!

Rock wool insulation keeps modern airplane cabins as quiet as a Pullman car. When the plane descends, the pilot will take care not to come down faster than 300 feet per minute, for otherwise the increasing pressure might cause pain in the ears.

The stewardess, chosen for ability and personality even more than beauty, looks after your comfort, serves your meals, and on sleeper planes makes up the berths as on any Pullman train. On most lines she's a registered nurse, too, but few people are airsick on air liners nowadays. Only three in a thousand passengers checked recently in a one-year survey by United Air Lines suffered from airsickness.

Air liners, unlike ocean liners, can climb up away from the turbulent currents that cause the trouble. The stewardess can supply you with checkers that are magnetized so they won't slide around the board, furnish an electric razor or a toothbrush if you've forgotten yours, and even has fresh diapers for the baby.

One leading air line sticks to male stewards. "Can they change diapers?" I inquired. "Sure," was the reply, "Most of 'em are married, anyway!"

Before we start our flight the pilot has made out a "flight plan," including the weather along the course, expected fuel consumption, direction, altitude at which he is to fly, and has certified he is in good physical condition.

At our assigned level of 7,000 feet, we may find ourselves in clouds but fly on unafraid of collisions, for the airways today are "double-tracked." West- and southbound planes fly at "even" levels, six, eight, or ten thousand feet; east- and northbound ships at "odd" levels, five, seven, or nine.

#### Sky Roads of the U. S. A.

Whether it's foggy or clear, we're flying along a network of sky roads that crisscrosses the whole United States and is as plainly marked in its way as any highway route. These sky roads are the radio beams. They're invisible, but the pilot knows when he's off them almost as surely as you know when your auto wheels drop off the pavement into the ditch.

Bulging out from a central tower, in four directions like the leaves of a four-leaf clover, go continuous waves of radio signals. Two diagonally opposite ones consist of the Morse code dot-dash for "A" and the other two are

dash-dot for "N." Where the edges of the "clover leaves" meet, the signals merge into a single prolonged dash. These are the "beams." From each beam station they point out in four directions, along the airways leading to and from the airport. Each of the four beams overlaps near its end with another, forming a continuous system—the largest navigational radio system in the world.

Hearing the steady hum in his earphones, the pilot knows he's "on the beam." Should he veer to the right, he hears the dot-dash "A" signal growing stronger, knows he's "in the ditch," and pulls back "on the pavement." If he veers left, a stronger-sounding dash-dot "N" warns him of his mistake there. At intervals in the beam signal, too, comes a code letter telling him what beam he's on.

There are other aerial signboards. If really lost and far off the beam, a pilot can tune his radio direction finder to any commercial or other radio station, and immediately locate in what direction the station lies from the plane. Drawing lines on his map from two or three stations in the directions indicated, he knows that at the time he took the bearings his airplane was where the lines intersect.

Two-way radios keep him in touch with the ground for weather reports, flight instructions, and orders from the control towers of the airports. A new device shows the pilot how far he is above ground, which may be different from his height above sea level.

Flying through the clouds with no horizon visible for reference, he may get a funny feeling that the airplane isn't on an even keel. But no, on the dashboard a tiny airplane figure moves in front of a horizontal line on an instrument face.

The line is an artificial or gyro-horizon, and the wings of the little plane are level with it. "I don't care what you think," says the gyro-horizon in effect, "This airplane is flying level. If it does tip, I'll tell you before you know it yourself!"

One of the most important aids to safer, easier flying of big transport planes is the automatic gyro-pilot. Though the human pilot never relaxes his vigilance, he can switch over to this almost human machine the routine tasks of keeping the plane on its course and on an even keel. This reduces the pilot's fatigue, gives him more time for watching his instruments, operating his radio, and for navigation.

But all these marvels mean that the pilots' cockpit is a complicated place. Instrument dials, buttons, levers, and gadgets have overflowed from the dashboard to the walls, floor, and ceiling. You wonder how the pilots remember to do everything (page 708).



Photograph by Lida Marden.

### From Skeletons Like These, Completed Airplanes Grow

Training planes for Great Britain's Royal Air Force here are being produced on the main assembly floor of the North American Aviation Corporation at Inglewood, California. Complicated structure of the fuselages is evident. Wing sections, engines, and landing gears will be added later.

They tell the story of a Navy pilot who let an Army flyer take the controls in an amphibian plane for the first time. The Army man took off nicely from the field, retracted the wheels, and landed smoothly on the surface of the near-by bay. Then he absent-mindedly opened the door and calmly stepped out—into the water! The Navy pilot, laughing in derision, pulled his friend out, flew the ship back to the field, and promptly forgot to put the wheels down!

On large airplanes, today, there are mechanical memory-joggers that flash lights or blow horns to remind the crew to do things—just in case. A new Curtiss-Wright air liner has a whole bank of "tell-tale" lights to provide a check on 47 different operations.

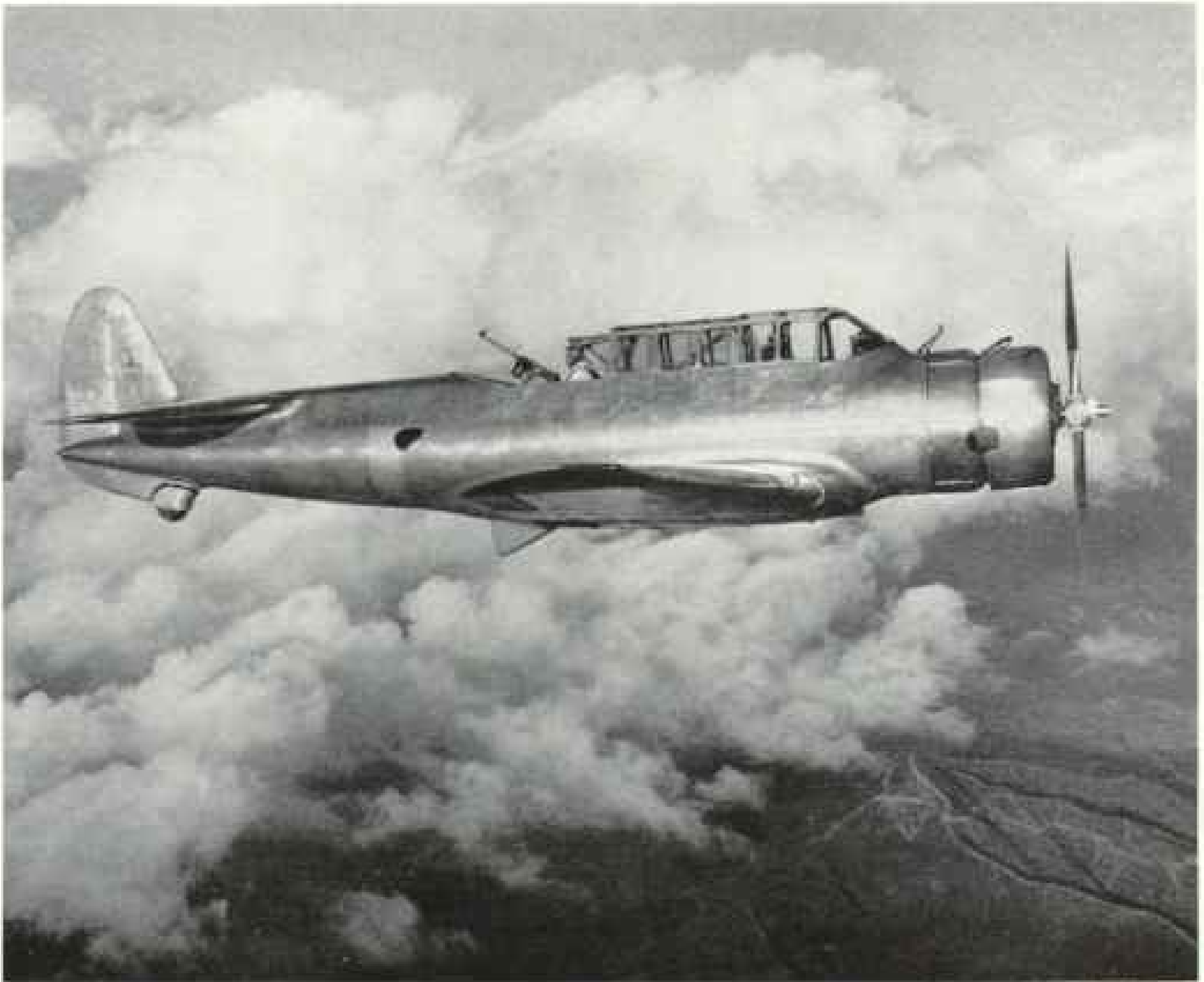
Coming in for a landing (as also on the take-off), pilots call off to each other the things they're doing: "Low pitch (propeller adjustment) . . . left main (gas tank in use) . . . full rich (carburetor setting)."

The co-pilot operates the mechanism that puts the wheels down. Out the windows on both sides the pilots look to see that the wheels *are* down. Then both repeat, "Gotta wheel!" (On the Boston runs, the story goes, all the pilots say, "I have a wheel!")

Why retract the wheels, anyhow, if it's all that trouble? Because the wheels, dragging through the air, would cut 20 miles per hour off the liner's speed.

### Housekeeping Aloft

Airplane housekeeping, too, is becoming more and more complicated, giving rise to problems nobody ever faced before. A new type of fountain pen has been invented for airplane use, as the lower atmospheric pressure may make ordinary ones leak at altitude. Strange things happen to foods, drinks, even tobacco, at altitudes of several thousand feet. Carbonated beverages may explode. Then, too, it isn't practical to cook on most



Photograph from *Vultee Aircraft*.

#### With Rear Gunner at the Alert, an Attack Bomber Speeds on Its Mission

The gunner has pushed back the sliding cockpit cover and has his machine gun trained upward and to the rear, for this is the direction from which pursuit planes usually dive on bombers. For the same reason, casualties among rear gunners of bombers in the European War have been high.

transport planes, so meals must be kept hot from one to three hours before being served, without seeming to be "warmed over."

"We can't offer choices on the menu yet, so we have to serve meals that will satisfy the varying tastes of 21 people," an air line chef explained (page 694). "Most passengers, we've found, like plain American-style foods best, such as steaks, chops, chicken, or meat pies. About one-fourth of our passengers observe a religious diet on Fridays and during Lent. One line even asks people whether they prefer fish or meat when they buy a ticket for a Friday flight!

"Rolls and cakes need extra shortening, as they dry out at high altitudes. Sponge cake falls unless specially well-mixed. Some coffees that have a fine aroma at sea level taste inferior at 8,000 feet, and vice versa. Even cigarettes burn more slowly and taste different at altitude. Some passengers, not knowing this, complain about the cigarettes we give them!

"Meals are cooked on the ground and kept hot in individual casseroles in electrically-heated boxes. Usually they're purposely a little underdone and finish cooking in the heater on the plane. We can even do this with scrambled eggs and they keep perfectly for hours. Soups, coffee, and tea are kept hot in thermos jugs, but they mustn't be too hot, for liquids boil at a lower temperature at 8,000 feet than at sea level.

"Some people are so particular about food they call several different air lines before making reservations to see what their menus will be that day!

"Since weight is important, our dishes are made of light-weight plastic that is hard to chip or break, and one air line even has knives with hollow handles. On big planes it takes 40 or 50 pounds of wire to bring electric current to the buffet to keep food hot, so in future we'll save this weight by substituting a new type of self-contained heater.



Photograph by William T. Hall

### Youth Looks Skyward, and Sees a Great Future in Flying

Aviation, more than any other subject, has captured the imagination of today's youngsters. Boys who wanted to be locomotive engineers have grown up to have sons who want to be air line pilots. Youngsters nowadays know all the different types of planes, just as they used to spot the various makes of automobiles. In the background is the control tower at LaGuardia Field, New York (page 709).

"We may never do much actual cooking on planes, because precooked meals are as good or better, and as speeds continue to increase we'll actually be serving fewer meals. People more and more will arrive at their destinations in time to eat on the ground."

Alcoholic drinks aren't served on domestic United States air lines, one reason being that a single cocktail has the effect of two or three when you're eight or nine thousand feet in the air! Transoceanic Clippers, however, serve highballs and a special cocktail in a non-tippable, nonsplashing glass.

One day I sat in, a bit self-consciously, at a class in a stewardess training school (page 696). The girls paid rapt attention while the teacher, an ex-stewardess herself, explained time zones, how to read time-tables, help passengers connect with other planes or trains, and told them never to belittle competitive lines—"we're all working together to advance aviation."

She cautioned them to wear comfortable shoes, keep passengers from catching cold in ventilator drafts, and emphasized the importance of doing everything possible for an air-sick rider.

"Most of our girls are from small towns, and like the chance to travel. Many have never flown before," the teacher told me. "The majority leave to get married. One girl had a movie offer from a producer who saw her on a plane, but turned it down to marry a pilot!"

#### A Jill of All Trades

An air stewardess must be ready for anything, from mixing a baby formula to knowing the names of mountains and types of clouds along the way. One movie star insisted that his breakfast be served on a plane by his French valet, who spoke no English! An old lady, too feeble to write, asked a stewardess to write postcards to all of her ten children.

The stewardess can even tell you what makes the plane stay up. Briefly, it's this. Air flowing across the top of the wing creates a suction, producing "lift." Air flowing beneath the wing exerts a positive upward force.

Airplanes are improving constantly because engineers are learning more about the strange behavior of air. Air seems the softest thing imaginable, yet beneath a speeding airplane wing it's as substantial as the water under a surf board. It's also a fluid, through which planes move best when they are streamlined, like a fish in water. But to a spinning propeller blade air is as solid as the water in which a steamer's screw propeller is turning.

Faster, safer, stronger airplanes for the future will grow out of research quietly going

on in the great laboratories of the government's National Advisory Committee for Aeronautics at Langley Field, Virginia.

To learn more about the strength of up-and-down air gusts that might exert sudden strains on airplane wings, N.A.C.A. scientists installed "gust-meters" on planes flying all over the world. They found the average gust had a maximum velocity of 30 feet per second; the largest "bumps" were over fairly flat country; the smallest over oceans.

Through a glass-bottomed seaplane hull with long silk streamers fastened beneath, they watched flow of water under the hull and learned how flying boats could be improved.

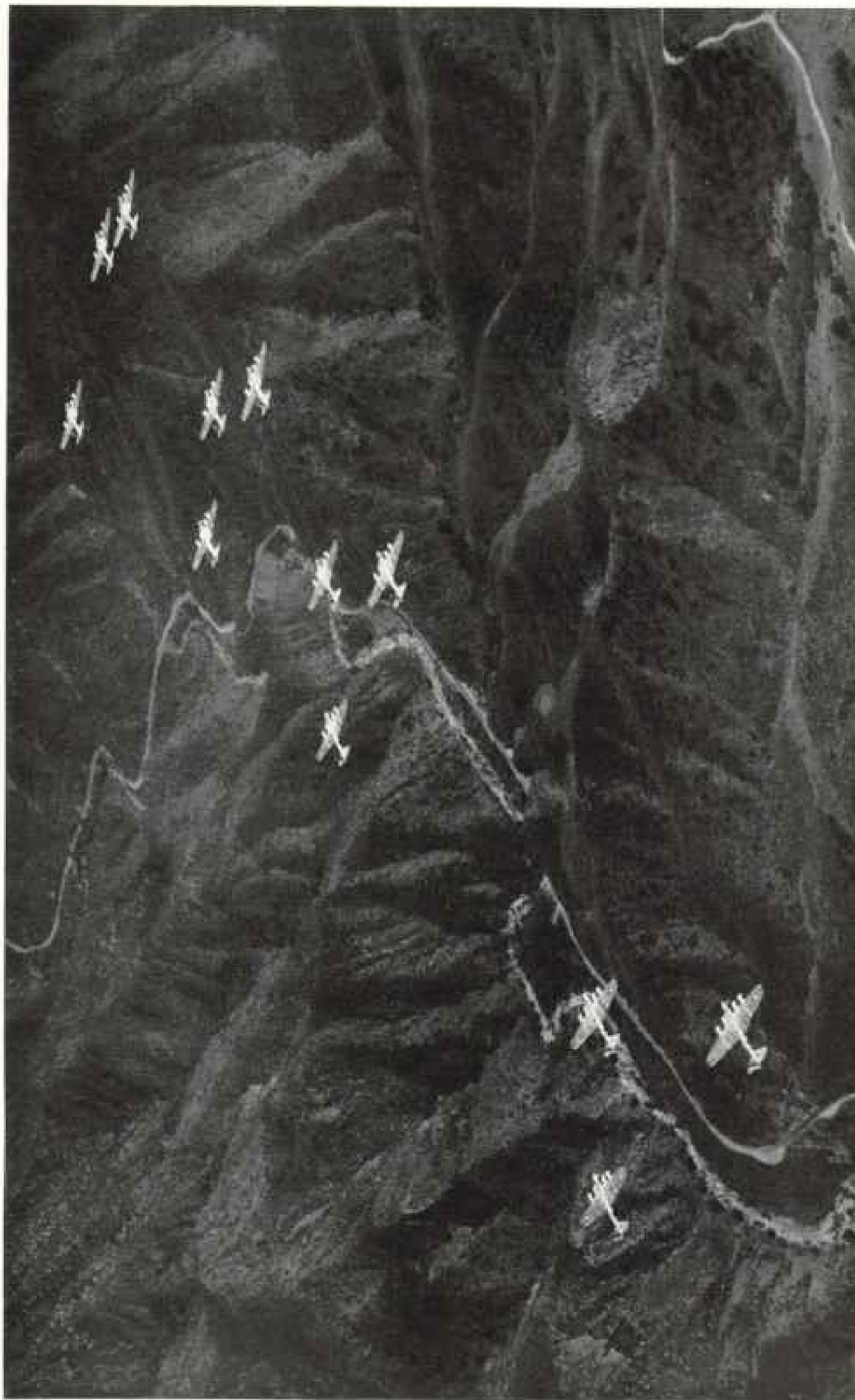
In a refrigerated wind tunnel fitted with artificial spray, new methods of keeping ice off airplane wings, control surfaces, and windshields were studied. In miniature wind tunnels, models of various types of airplanes can be flown by remote control and their behavior under various conditions investigated (p. 721).

They have played with lightning, and found it is not a great danger to planes in flight if proper precautions are taken. Engine knock was studied by taking movies at the rate of 40,000 pictures per second of what happens inside an engine cylinder. Smoke flowing over an airplane wing reveals the behavior of air. These are only a few samples of the scientific work done by the N.A.C.A. Much of it is so secret that either of two men in the same building may not know what the other is doing.

Stick your arm out the window of a speeding car, and you'll understand what flight engineers mean by "drag," or air resistance. Even 1/16-inch rivet heads, on the wing of a 10-ton airplane, cause so much drag that the plane needs 82 horsepower more than would otherwise be necessary to fly at 225 miles per hour.

Tiny grains of dirt only 5/10,000 of an inch in diameter cause enough drag to slow down a plane. So, on fast military pursuit ships the rivets are flattened down flush with the wings. Even radio aerials are placed along wing edges, and gun turrets and wires are streamlined.

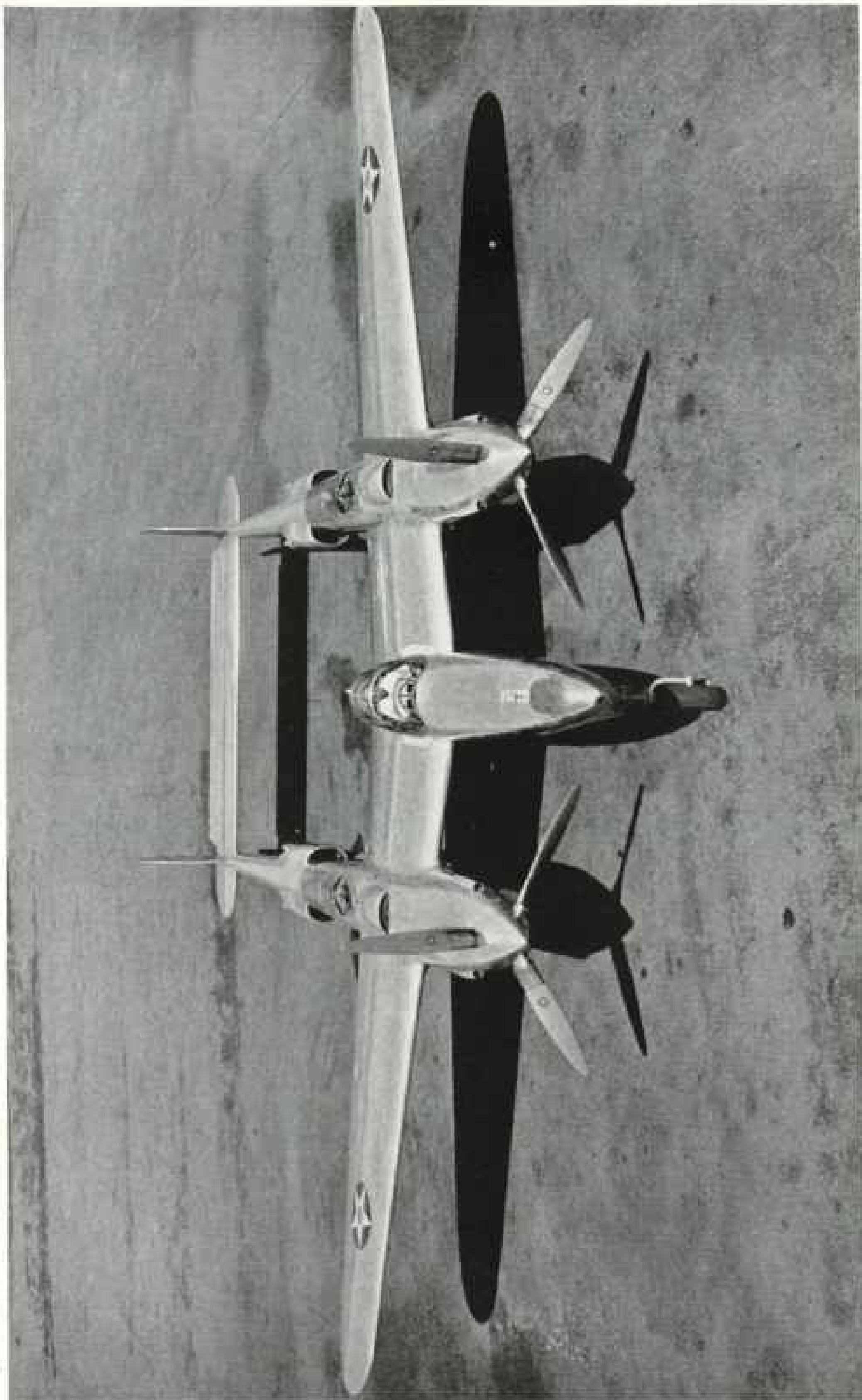
Wing designs have been improved more and more to allow easier, smoother flow of air over their surfaces for greater speeds, but there are limits. Airplanes now are traveling nearer and nearer the speed of sound, which is about 750 miles per hour. When that speed is approached, the smooth air flow over the wing is broken; it tumbles and breaks like water in rapids, and the drag of the wing is greatly increased. That's a barrier, now, to far greater airplane speeds.



Official Photograph, U. S. Army, Air Corps

### Squadrons of "Flying Fortresses" Can Speed 3,000 Miles in 12 Hours to Any Danger Point

Need for fast bombing planes to travel long distances to any part of the vast area under the United States flag gave rise to these four-engined Boeing ships, which have the longest range of any bombers in the world. They can operate six miles high and have successfully intercepted ships 650 miles out at sea.



Photograph from Government Aircraft Corps

### When Roaring to the Attack at Over 400 Miles Per Hour, This Army Fighter Has Terrific Striking Power

Though the top speed of the new, strange-appearing Lockheed P-38 is an Army secret, it once flew coast-to-coast in seven hours actual flying time. Unofficial reports call it the world's fastest airplane. The two engines fit snugly in the highly streamlined nacelles at either side. From the stubby center cockpit the single pilot can blast at enemy bombers with a cannon and four machine guns. The plane has a tricycle landing gear.





Photograph from *Firestone Tire and Rubber Company*

### How Would You Like to Inflate This Tire With a Hand Pump Some Hot Day?

Built for the world's largest military airplane, the Army's B-19 bomber (page 698), this tire is eight feet high, more than the over-all height of many light planes. When the plane lands, the tire must go from a stationary position to rotating speed of 100 miles per hour or more, almost instantly.

"But we'll solve it," said one engineer. "Maybe we'll design a wing with a changeable leading edge—round, as now, for low speeds in the take-off, thin and sharp as a knife blade for higher cruising speeds."

#### Even Engines Are Streamlined

Even engines are streamlined, and this is one big advantage of the liquid-cooled "in-line" engine used in many fast military ships. It has a smaller frontal area, hence less drag than the radial, air-cooled engine with cylinders radiating out from the drive shaft like spokes of a wheel. "Flat" engines fitting right into the wings may be used in future planes, thus eliminating the drag of the bulging nacelle, or housing.

One good-sized airplane engine could supply

light and power for a town of 6,000 people.

Engines, like humans, find it harder to work in the thin air high above earth, for they run on a mixture of air and gasoline. So modern engines, like aviators, are fed extra air at great heights—the process known as supercharging. It's done just as with the pressurized cabins we've mentioned before. Air is pulled in from outside, compressed, and then fed into the cylinders so that the engine gets enough for full efficiency.

Propellers, engineers told me, today are 84 per cent efficient, but here again that old bugbear of the speed of sound is cropping up. Some modern propellers turn so fast that their tips actually move at the speed of sound. Approaching that speed, they begin to create a pressure wave similar to a sound wave, and

this takes away energy from the total energy generated by the propeller.

The controllable-pitch propeller, "gear shift of the air," represents one of aviation's greatest recent advances. By it the propeller blades can be adjusted so that they bite into the air at larger angles—that is, take larger "bites" of air—as the plane rises and the air grows thinner. This makes it possible for propellers to be just as efficient in high, thin air as at sea level, so planes now can achieve increased speed at higher altitudes.

As planes grow better they also grow more complicated. Some ships contain 900 feet of metal tubing for hydraulic systems, gasoline, oil, electric wire conduits, fire extinguisher lines, and de-icers. To prevent confusion in making repairs, different pipes are tagged at intervals with different colors, such as red for fuel, blue for oil.

Tires on a big plane take heavy punishment in landing, for they must go from a stationary position to a speed of maybe 100 miles an hour in a second or two. As a result, someone has invented vanes for the wheels that will start them turning before the plane lands.

#### Speed in Building Planes

How rapidly can planes be built? One company today is turning out a completed military training plane every three hours. Bigger planes naturally take longer. Flat sheets of thin aluminum alloy that you can bend in your hands are shaped and riveted together to make strong, rigid wings.

Odd-shaped parts are cut out of several metal sheets at once, as you might cut a series of identical paper dolls out of several sheets of paper with a pair of shears. Other parts are bent and shaped with huge drop hammers exerting a force up to 5,000 tons, the weight of three destroyers!

Putting them all together seems like building something out of a boy's "Erector" set. Each piece is preshaped, the rivet holes all punched. Rivets are kept soft in ice boxes until used, then harden at room temperature and gain strength in the holes.

Whole airplanes are picked up and dropped on the ground a distance of several feet to test the strength of landing gears; wings are piled with tons of sand bags until they break to learn their load capacity; metal parts are twisted to the breaking point, magnified, shaken, and X-rayed to find hidden flaws. The uncanny magnaflex provides another way to "see" inside metal. An engine casting, for example, is magnetized and placed in an oil bath in which powdered iron is mixed. Unfailingly, the iron particles will arrange them-

selves on the outside exactly over any hidden inner flaw!

Planes made at least partly of plastics are being manufactured and flown. In most of them thin strips or sheets of wood are used as a reinforcing base, impregnated, and held together with synthetic resins. Such planes contain no rivets, so the surfaces of wings and fuselage are smooth and produce less drag. One maker of such planes declares his product will fly 30 miles per hour faster than a metal ship with a motor of the same power because the surfaces are so much smoother.

With headlines about dive-bombers in mind, I talked to Lloyd Child, who has dived faster in an airplane than anyone else—close to 600 miles per hour. His job is test pilot for new airplanes at the Curtiss airplane factory in Buffalo, but he looks more like a mild-mannered schoolmaster. How did it feel?

"I had no feeling of excessive speed," he said. "I was too busy watching the instruments and looking for vibrations in the ship. Diving is the easiest part of testing an airplane. It's pulling out that's bad. The sudden change of direction and acceleration has the effect of increasing the pull of gravity on the pilot's body. He can stand only as much as eight or nine times normal. When the high acceleration occurs, the blood rushes downward from your head and you may go blind for a brief period, though remaining conscious. The airplanes designed for diving can stand even greater strains than the pilot can endure.

"I've had some queer things happen at high altitudes on test flights without oxygen—had to hold the pencil in my fist to make out report blanks and found I was losing interest in what I was doing, but my interest came back quickly when I got lower down and realized that I was in a spin!"

#### Long Falls—with Parachutes

Sometimes, when wings broke off in terrific dives, test pilots have had to take to their parachutes. Time was when everyone believed that a free fall of 100 feet or more would produce unconsciousness and probably death. But parachute jumpers, making delayed jumps, have found it isn't so.

An Army Air Corps doctor, making such a jump, stayed conscious and had little sense of motion, nor was there even that "gone" feeling often felt in dropping elevators. As soon as he cleared the airplane he felt unafraid, and could see, breathe, and think normally. When he closed his eyes, he felt as though suspended in space and lost all sense of falling.

The U. S. Army, profiting from current war lessons, is training parachute infantry. Army



Official Photograph, U. S. Army Air Corps

### Faces of Army Cadets at Randolph Field Reflect the Joy of Flying

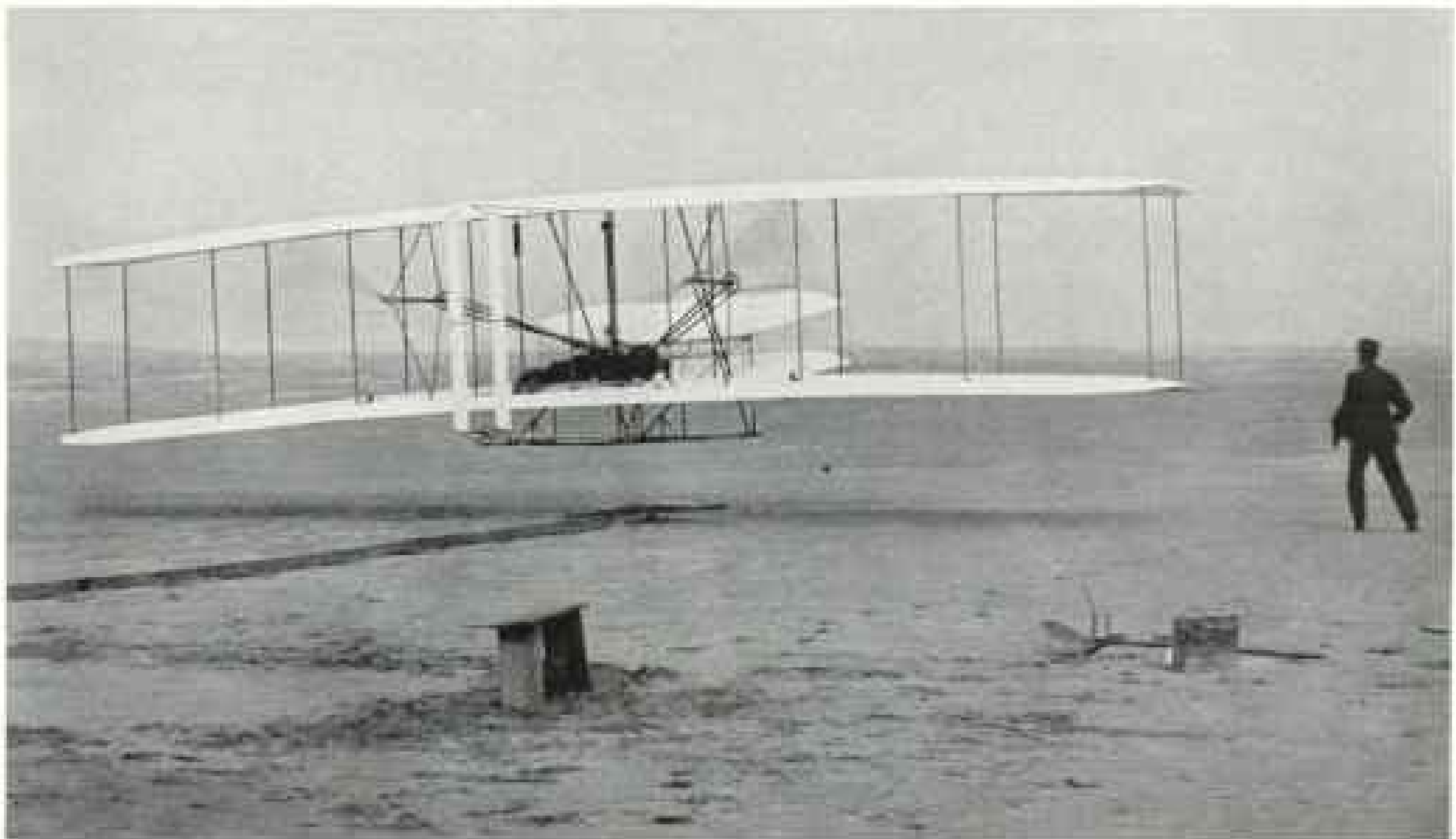
Military aviation is the most exacting of all, but these prospective Air Corps pilots face it cheerfully as they march out to their planes. Under the expanded program, cadets take their primary flying instruction at 18 civilian schools under Army supervision, then go to Randolph, Kelly, or Brooks Fields, all in Texas, for advanced training.



Official Photograph, U. S. Army Air Corps

### This Death-dealing Pursuit Plane Might be Called a "Flying Cannon"

Muzzle of the 37-millimeter (1½-inch) cannon carried by the Bell "Airacobra" can be seen projecting from the nose, through the propeller hub. Four machine guns, synchronized to fire between the propeller blades, also are mounted in the nose. The Allison engine is behind the pilot, and geared to the propeller by a drive shaft extending forward. This plane has a speed of approximately 400 miles per hour.



Photograph courtesy Dr. Orville Wright

### When Airplane Flying Was Born—the Wrights' First Flight, Only 37 Years Ago

This historic photograph shows the pioneer flight of a man-carrying, power-driven, heavier-than-air machine at Kill Devil Hill, near Kitty Hawk, North Carolina, December 17, 1903. Orville Wright, lying prone to reduce wind resistance, is at the controls, and his brother, Wilbur, is running alongside. The plane was launched from a monorail (left) and was powered by a 12-horsepower engine driving two pusher propellers. The flight, made in a 24-mile-per-hour wind, lasted twelve seconds and covered about 120 feet.

flyers have successfully dropped supplies, from bales of hay to fresh eggs, to cavalry on maneuvers in remote regions. One peacetime use for the "parachute troop" technique is in patrolling the forests and dropping fire fighters near the scenes of new blazes in order to extinguish the infant fires before they can spread.

#### Keeping Pilots Fit

The healthiest people in the United States today probably are the pilots of military and transport airplanes. Keeping them that way has opened up a whole new branch of medicine. Tests are severe. An Army ground officer, for example, must pass only three eye tests; a flying officer 14. A man may seemingly have normal hearing yet be deaf to tones of certain radio signals. Even a prospective pilot's psychic state is tested to see whether he will react correctly to the new experiences and environments met in aviation.

Flying high without oxygen does strange things to people. Above 12,000 feet a person may become either depressed and sleepy or extremely cheerful and hilarious. Around 25,000 feet he may fall into a coma. Hearing, vision, sense of touch and pain are dulled above 16,000 to 18,000 feet. Taking a whiff of oxygen, the pilot is surprised to find how much better he can see, how much louder the engine sounds.

Army flyers now are required to use oxygen above altitudes of 10,000 to 15,000 feet depending on the length of the flight. The limit of safe flying without a sealed cabin is believed to be about 20,000 feet. When a plane climbs at high speed, the pilot undergoes a rapid change of atmospheric pressure, and may get the "bends," caused by formation of nitrogen bubbles in the blood, the same malady that attacks divers who come to the surface too rapidly.

Quality of a person's handwriting, incidentally, is a good index to how he is affected by altitude. It is used to test subjects' reactions in the big pressure tank at the Army Air Corps laboratory at Wright Field, Dayton, Ohio. Air pressure in the tank can be raised or lowered to simulate conditions at various altitudes. One day, a young man undergoing tests was told to write over and over a passage from Wordsworth: "My heart leaps up when I behold a rainbow in the sky." But the power of suggestion was too much! Convinced his own heart was being affected by the dropping pressure, the subject demanded to be let out of the tank, and quit the job!

Such experiments, actually harmless, have become necessary as both military and trans-

port planes go higher above ground. Newer types of Army bombers and pursuit planes will have sealed, pressurized cabins like the latest air liners—in fact Army research in high altitude flying helped pave the way for the "stratoliners" now operating, a sample of how military and civil flying progress together.

Secrets lurk in every corner at Wright Field, where the Air Corps does its experimenting, but a visitor is permitted to see enough to realize how complex air war has become.

For example, should a bullet spring a leak in the pressurized cabin of a bomber, the crew would start using a new type of oxygen mask, so cleverly designed that the unused oxygen exhaled by the wearer is retained in a little rubber bag to be rebreathed. The Army found, too, that bullets striking small oxygen tanks would cause them to explode, so larger ones with lower pressure are now used.

Radio microphones are strapped to army pilots' throats where they pick up the vibrations of the vocal cords. If placed in front of the mouth, the mike might knock a man's teeth out in an accident.

Rubber-lined gasoline tanks automatically plug bullet holes and prevent fire. Electrically heated flying suits, weighing little more than silk, with wires imbedded within, are replacing the cumbersome equipment formerly used for winter and altitude flying.

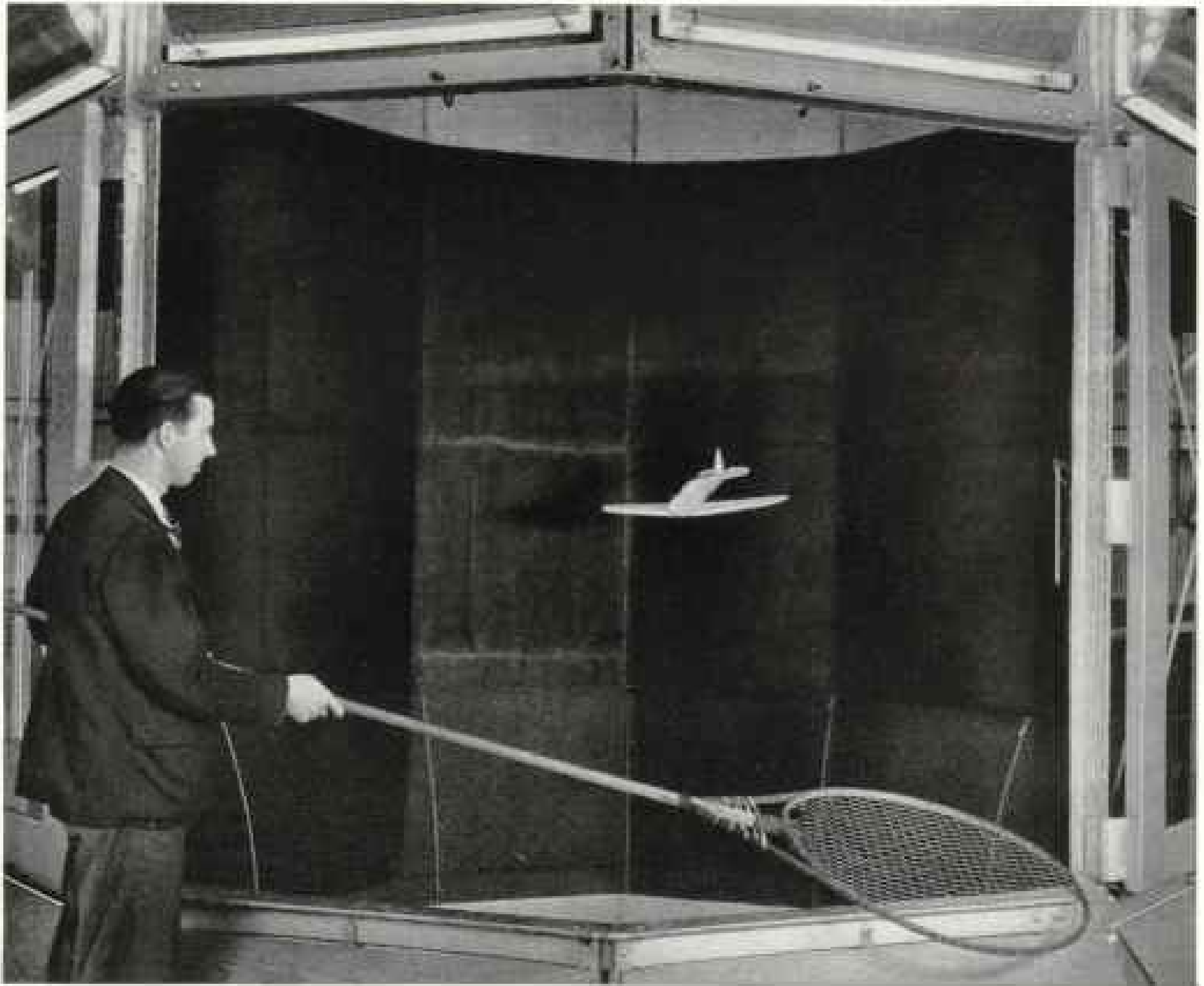
#### Army Provides "Jungle Kits"

Flying over sparsely settled regions like parts of Central America, Army pilots carry "jungle kits" attached to their parachute harness. In the kit is food, quinine, iodine, compass, machete, fishhooks and line, matches, mosquito net for the face, and ammunition. Life rafts are carried on over-water flights.

With a new type of flash bomb, giving light of billions of candlepower, enemy territory actually can be photographed better at night than in the daytime. Exploding some distance beneath the plane, the bomb brilliantly illuminates the ground beneath, and the light itself, operating a photoelectric cell, opens the camera shutter and even rewinds the film.

Such pictures reveal troops, guns, or supply trains moving under cover of darkness and show results of bombing raids as soon as the bombs are dropped. Tracks of cannon, tanks, or planes, wheeled across fields to concealment in near-by woods, can be seen clearly, giving away their positions. Trenches or other places where digging has been done stand out sharply. There are no long, concealing shadows as in daylight photographs.

Color photography, too, is increasingly used



### Not a Butterfly Hunter, But a Saver of Lives

Model of a newly designed plane is tested for dangerous spinning characteristics in a wind tunnel of the National Advisory Committee for Aeronautics, Langley Field, Virginia (page 713). The model spins freely in a stream of air forced upward through the tunnel. Clockwork moves its controls and if properly designed the model recovers from the spin. The plane is caught in the net when air is turned off.

by the Army.\* Color pictures reveal where firing has withered the leaves of trees beneath which cannon are hidden. Canvas-covered trucks, and tents, invisible in black and white photographs, stand out in color pictures. Camouflage is easily penetrated. With telephoto lenses, objects as small as gasoline pumps are clearly recognizable in pictures made from five miles high above the range of pursuit ships and antiaircraft guns. Mines and submarines are spotted more easily under water in color photographs.

Portable "flying darkrooms" with full equipment can be carried aboard planes for developing and printing pictures in a few minutes in the air, to be dropped for guidance of artillery fire or troop movements. "Reading" an aerial photograph, learning to distinguish highways

\* See "Aerial Color Photography Becomes a War Weapon," by Major General H. H. Arnold, NATIONAL GEOGRAPHIC MAGAZINE, June, 1940.

from railroads, cows from gun emplacements, is an art in itself.

Fast transport of troops by plane to distant points also is a new wrinkle in air warfare. A fleet of only 500 large transport planes, such as now are used on the commercial air lines, could carry 10,000 soldiers with rifles, ammunition, and light equipment 1,000 miles in a few hours.

Far more pleasant to contemplate, however, is the rising popularity of the "flivver plane." There are planes on the market which the makers say will not spin, stall, bounce in landing, "ground loop," or nose over. Some are so easy to fly you can step in and take them off the ground yourself on your first flight (with an instructor beside you, of course). They've been flown by people from 12 to 85 years of age! (Page 706.)

One airplane owner and his wife flew across the continent in their own light plane, with

the baby sleeping comfortably on the shelf behind the seat. Once, when climbing over some mountains was difficult, they used the principles of gliding\* to locate an upcurrent of air and got over with its help!

There's an airplane showroom today on Park Avenue, New York. You can buy planes, like autos, on the installment plan. One popular two-seater features "two-tone upholstery; glove (or radio) compartment; cabin heater; navigation lights; hydraulic brakes; parking brake; exhaust muffler; chrome-plated control sticks; modern wheel pants; hand-rubbed finish." Yes, it's an airplane, not an automobile they're describing!

There are "Fly-Yourself," airplanes available, too, run as the auto renting agencies, offering planes equipped with blind flying instruments, two-way radio, and direction finders. Light planes will climb 12,000 to 19,000 feet, have a cruising range of 200 to 320 miles at around 100 miles an hour, carry useful loads of 500 to 700 pounds.

Rich men have big, luxuriously fitted private planes, comparable to private railroad cars or yachts. But more and more the "average man" is flying—filling station owners, mail carriers (who should appreciate it!), doctors, salesmen. And what do air line and military pilots do on their days off? Fly their own light planes, of course!

#### The Private Plane Arrives

Soon, aviation people predict, the best fishing camps, hotels, beach resorts and ski slopes will have landing fields for light planes, just as they now have parking lots. At one recent "air meet" in Florida, 500 light planes were assembled. One girl hitch-hiked to and from the meeting—by air! There are some 10,000 private airplanes in the United States today, compared to about 322 on the air lines.

Learning to fly now is a standardized course, prescribed by the Administrator of Civil Aeronautics. There are 500 approved flying schools. Planes are faster, safer, land in smaller spaces. With more women flying, manufacturers are putting more "eye appeal" into planes. Engines seldom fail in the air nowadays. And if you take your girl along—well; it's safer to drive an airplane than an automobile with one hand!

There's plenty of room in the air, but, many flyers feel, not enough places to come down. They want more small landing fields scattered about, so you can go to more places in an airplane. People are taking aerial vacations, now, not only all over the United States, but in Canada, Mexico, and Central America. That is creating a demand for airplane tourist

camps so that a flyer need not travel several miles to town after he lands to find food and a place to sleep.

There are about 2,000 civil airports in the United States today, plus 282 intermediate fields along the charted airways, and 86 Army and Navy air stations. Airports range from little one-hangar fields with no paved runways, to New York's gigantic LaGuardia Field with seven vast hangars, each one with a floor area larger than Madison Square Garden, a barber shop, two restaurants, and even a bar and grill, the Kitty Hawk Room, named for the scene of the Wrights' first flight. (A girl asked, once, if Kitty Hawk was a famous woman flyer!) The runways and taxi strips at this field cover 90 acres, a good-sized farm, and total 3 2/3 miles in length. Fifteen air liners can load at once without crowding.

#### In a Control Tower

Nerve center of any large airport is the glass-enclosed control tower, where at rush hours two or three men are literally as busy as the proverbial one-armed paper hanger. A babel of voices, hardly intelligible to an unaccustomed ear, comes into the New York tower over 23 loudspeakers from planes arriving, departing, or on the ground (page 700).

With microphone in hand and seemingly with eyes in the back of his head, Larry Walsh, genial dispatcher, explained the tower's workings to me.

"Those dials in front of us show the wind direction and speed, temperature, barometer reading, and time of day," he said. "This one shows the direction in which the 'tee' out on the edge of the field is pointing. It indicates wind direction on the ground to pilots as they arrive over the field."

A voice came hoarsely from a loudspeaker. "Hello, LaGuardia. Stewart, United 28, over Metuchen at 40 (4:40 p.m.) at three five hundred (3,500 feet)." Quickly came Larry's reply: "Stewart, United 28. That is okay. Wind northwest 15, N. W. one five. Runway number 5. Proceed (to come in)."

"When it's foggy," he went on, "the Airways Traffic Control can keep 10 or 12 planes 'holding' at points of intersection on the radio ranges and bring 'em down and in as fast as safety will permit. They stay at assigned levels, 1,000 feet apart. As each plane lands the 'holding' flights are progressively assigned the next lower level."

Again the loudspeaker blared. "United 28,

\* See "Men-birds Soar on Boiling Air," by Frederick G. Vothburgh, NATIONAL GEOGRAPHIC MAGAZINE, July, 1938.



Photograph from *Wide World*

### Friendly Bombers Look Down on Targets that Enemy Planes Might Like to Hit

Directly beneath the eight reconnaissance bombers of the Army Air Corps is midtown Manhattan, with the Empire State Building, Pennsylvania Railroad Station at right, and the entrance to the Lincoln Tunnel for automobiles under the Hudson showing as a white patch at lower left. In the distance are the Tylon and Perisphere of the New York World's Fair of 1939-40.





Photograph from Three Lions

### Model Airplanes by the Millions are Making American Youth Air-minded

This model has a 13-foot wing spread and weighs 11 pounds. One manufacturer produced 10 million model airplane kits in the last year to be assembled and flown by young and old enthusiasts. Some models are powered by rubber "motors," others by miniature gasoline engines. A few even have built-in radio controls through which they can be maneuvered in the air.

over the range station." That meant over the LaGuardia range station,  $3\frac{1}{2}$  miles southwest, from which point the pilot starts the final approach for a landing. Larry cast a quick look outside, then: "United 28, over the station. You are cleared in on number 5."

He pointed to a long bank of electric switches. "When a pilot comes in at night we can turn on lights outlining the runway he is to use. Ends of the runways are marked by green range lights and also at the end of each runway are two narrow-beam floodlights, each of  $7\frac{1}{2}$  million candlepower, which further define the runway area as the plane glides in. We can turn on traffic lights if we want to keep planes off certain runways, and there's a searchlight we can throw anywhere."

The plane to which he had been talking was now down and taxiing toward us. "United 28, gate number 8," said Larry into his mike. The ship answered: "Gate 8 for 28."

Far off at one side of the field we could see where transatlantic flying boats land at a separate station at the water's edge, and passengers go through customs, as at a steamer pier.

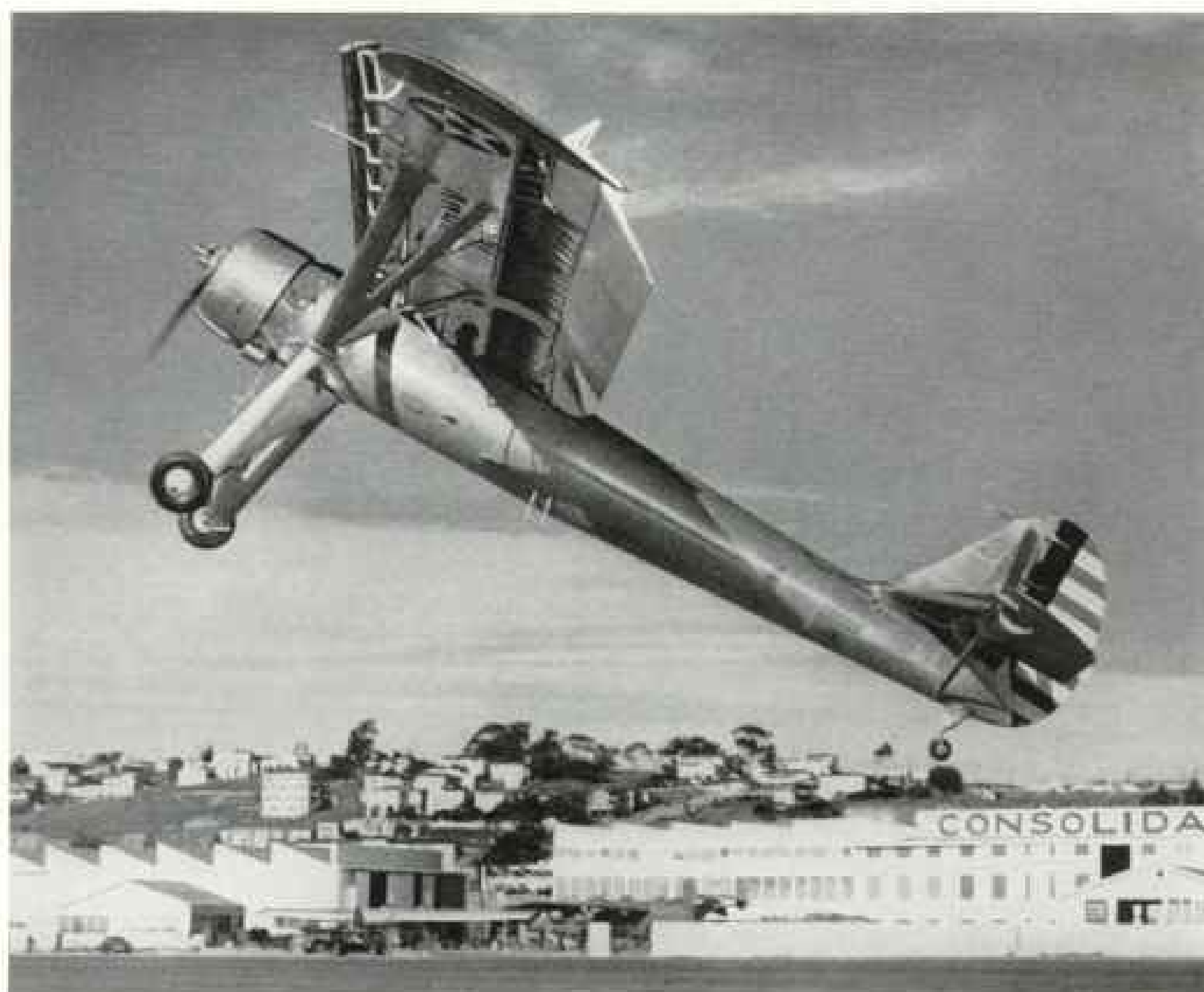
Another voice crackled out of a loudspeaker: "Atlantic Clipper NC-'04 to LaGuardia Tower. We are 1,200 feet over Port Washington. Is it clear for us to land?"

Back went the reply: "Clipper NC-'04 over Port Washington. Proceed to land in area A1. Surface wind N. W. 2-0, northwest twenty. It is clear to land."

### It's Clipper or Steamer Now

Here was the dream born of Lindbergh's flight to Paris coming true, a transatlantic airplane full of passengers arriving as prosaically as a train pulling into Grand Central Station. Newspapers now list Atlantic and Pacific Clipper movements along with those of steamers.

A workable blind landing system now exists



Photograph by Bran.

### Answer to a Flyer's Prayer, a Plane that Can Almost "Hover" or "Land on a Dime"

This U. S. Army observation plane is designed for liaison work with troops in the field where large airports are scarce. Though not able to rise vertically like a helicopter (page 716), it can land or take off in small, open areas, can climb steeply to avoid obstacles, and will fly so slowly it can nearly hover over one spot. This is made possible by extending slats and flaps at the front and rear edges of the wings, thereby greatly increasing its "lift." For level flight, slats and flaps are retracted.

with government approval, and is about to be installed at selected fields.

A radio transmitter sends out signals that form a "glide path" into the field which the pilot follows down as he might come down a toboggan slide. Instruments on his dashboard show him when he is on the glide path, whether he is getting off it, and if so in what direction.

Let's look now at farther horizons. Over far-flung Pan American Airways, you can fly on without too long a wait to Europe, Asia, the West Indies, South and Central America, and now even to New Zealand and Alaska.

#### "Master of Ocean Flying Boats"

Since Pan American started regular service across the North Atlantic, its flying boats have completed 80 per cent of the trips scheduled at the time of this writing.

The biggest ocean flying boats in service travel three miles a minute, weigh  $4\frac{1}{2}$  tons, yet the pilot can handle the ship with but two fingers on his control column and with less force on the rudder pedals than normally used in driving a car. The captain may hold the rank of "Master of Ocean Flying Boats," a title that even Magellan might envy.

Transoceanic planes are now flying weekly to New Zealand, and, eventually, will fly daily to Hawaii and "daily-except-Sunday" nonstop across the Atlantic. A 48-hour schedule to Buenos Aires is on the way. Just before Christmas last year one transpacific Clipper carried an estimated 65,000 letters on one trip. Because of the international date line, a letter postmarked in Nouméa, New Caledonia, will be delivered at Canton Island the *day before* the postmark date, though Nouméa is far west of Canton.



Photograph by Lutz Mordau

### He Hangs in Mid-air With the Greatest of Ease, While His Luggage Is Lifted Aboard!

Igor Sikorsky demonstrates how his helicopter can rise straight up off the ground and hover. Instead of using wings, the ship is lifted by the engine-driven rotor blades whirling above. The helicopter will fly forward, backward, or sideways when tilted in the desired direction by auxiliary rotors. Another plane that rises vertically, the autogiro, gets its lift from rotor blades that are rotated in flight by air forces alone, not by the engine. Such a ship has carried mail regularly from the airport to the post-office roof in Philadelphia.

Already sealed cabin planes are operating across the Caribbean between North and South America. United States air lines now have more route mileage in service in South America than all European competitors combined. The 21 American republics, including the United States, are actually closer together in air transport time than are the 48 States by rail!

#### Alaska Annexed Again

If you think that Alaska is still a remote part of the world cut off from civilization, take a look at the new flying schedules now running between the United States and the North. You can fly from Seattle to Juneau, Alaska's capital, in seven hours, and from New York or Washington to Juneau in 24. In 36 hours you can fly from New York to Nome, right on Bering Strait across from the U. S. S. R.

But even all this is only a beginning. What of the future?

"The 'flying wing' will be the ultimate air-

plane," said an engineer; "just a V-shaped wing alone without the tail and fuselage which now produce a large part of the drag that holds down speed. Rudders will be on the wing tips. The 'flying wing' will come into use just as soon as it pays to build wings large enough so people can walk around inside them.

"For the price of some ten-car, all-coach trains, it's possible right now to build six and one-half transport planes that can carry twice as many people any stated number of miles, because the planes would travel three times as fast as the train. Moreover, the cost per mile would be comparable."

One day, in Dayton, Ohio, I had the privilege of hearing Orville Wright describe to me his first flight at Kitty Hawk, North Carolina, only 37 years ago (page 719). The time came for me to leave for a scheduled flight to Chicago. It seemed entirely commonplace for me to say, as I rose: "I'm sorry to rush away, Dr. Wright, but I have to catch an airplane." Thus speedily has aviation progressed!

# In the Realms of the Maharajas

BY LAWRENCE COPLEY THAW AND MARGARET S. THAW

*With Illustrations from Photographs by Mr. Thaw*

THE Grand Trunk Road lay wide and straight before us, its thin ribbon of macadam vanishing off into the heat haze of the distance. After months of lurching through potholes or clattering endlessly over corrugated roads, its comparative silken smoothness was a blessed joy.

What mattered it that the road's great width, except for the single-track macadam strip, was ankle-deep in choking white dust; or that the endless stream of oxcarts, plodding a steady two miles an hour, invariably chose the central, surfaced portion while their drivers recuperated from labors in a deathlike sleep no horn could disturb? We had reached India, our goal of five months of continuous and arduous travel.

Behind us lay the sprawling frontier city of Peshawar, which we had first glimpsed after leaving the twistings of the Khyber Pass. Ahead lay the whole of the great peninsula, with its fifty centuries of still-preserved traditions and customs, awaiting our cameras (map, page 729).\*

## War's Upheaval Threatens Ancient Ways

The fateful war that we had feared during our journey through western Europe, the Balkans, and Turkey had finally exploded when we reached Syria. Its mutterings had been audible in Iraq, in the feverish activity of the British Royal Air Force; and in Iran, where the fear of the great bear across the Oxus never died down. It became almost inaudible in the mountain fastnesses of Afghanistan, but awakened to a new crescendo in the big concentration camp we passed near Rawalpindi in the Punjab.

We were in time; but only just. How many of India's customs of five thousand years would survive this upheaval?

A scant forty miles southeast of Lahore we turned to the right for an eight-mile run into the Punjab State of Kapurthala. Its Maharaja had invited us to visit him, and we looked forward with keen anticipation to our first contact with princely India.

Here we had our initial experience with that most wonderful Indian institution, the guest palace. Luxurious beyond belief, ultramodern in appointments, staffed with a fantastic number of magnificently uniformed and highly efficient servants who anticipate every desire, its great expanses and perfect service would

satisfy the most sybaritic mortal. Startling to us was the contrast between its oriental vastness and the cramped confines of our trailer, and strange, too, after five months on tinned rations, seemed the perfect French cuisine served in a virtual banquet hall.

In the huge rambling main palace we dined with His Highness, sampling the highly spiced and curried Indian fare, chiefly rice, served in a host of small bowls. We lunched with his daughter-in-law, Princess Brinda, and met two of her exceedingly attractive daughters, Ourmilla and Sushilla, as well as her sister, the Princess Kamla of Jubbal. All of the ladies wore brilliantly hued saris that turned Peggy green with envy and sent Larry and John Boyle, our cameraman, into the seventh heaven of a color photographer.

When the Maharaja expressed a desire to inspect our land yacht, and we brought it over to the palace, an honor guard of elephants was drawn up.

It was a delightful taste of the boundless hospitality of the East, and after a three-day visit we left with reluctance. But a hundred miles farther along the Grand Trunk Road lay the premier state of the Punjab, Patiala, and the Maharaja's birthday was about to be celebrated with a durbar. We wanted to preserve, with our color motion pictures, as many records of the pomp and circumstance of medieval Indian ceremony as possible. In the shifting sands of world affairs these could easily be swallowed up forever.

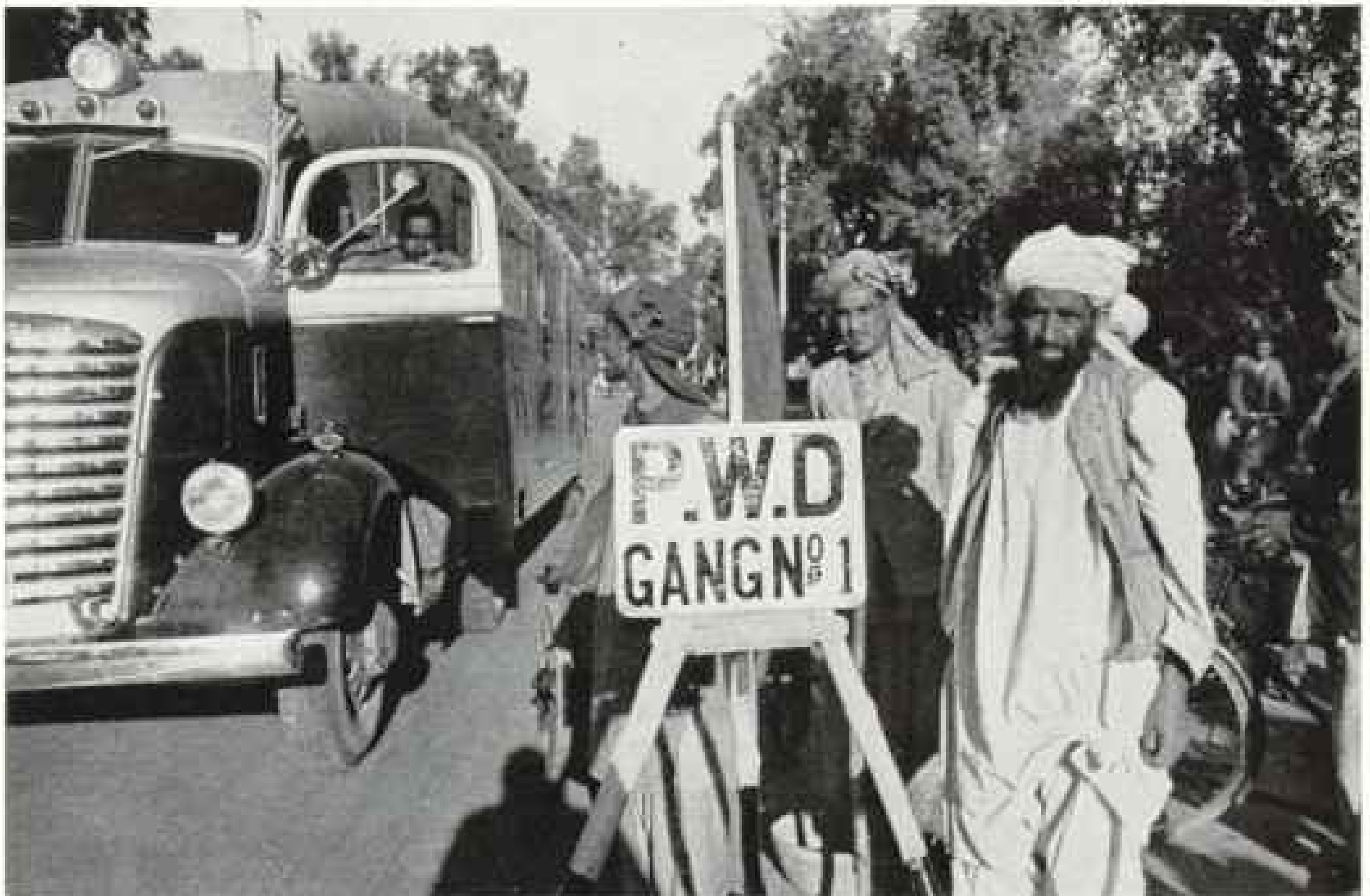
## Haircuts Shunned by Warrior Sikhs

Patiala is a stronghold of the Sikhs, those stalwart, over-six-foot, bearded fighting men of the north, who have furnished Britain with some of her finest troops for nearly a century. Most of them use the term "Singh," meaning "lion," in their names; and very aptly does it describe this race of warriors.

One of their distinguishing characteristics is the fact that they never cut their hair. We were privileged to watch and film the exceedingly complicated toilet of an officer of the Maharaja's army as he prepared for the birthday durbar.

Raven locks, reaching to the waist, were twisted into a topknot on the head and securely

\* See "Along the Old Silk Routes," by Mr. and Mrs. Thaw, NATIONAL GEOGRAPHIC MAGAZINE, October, 1940.



#### In India It's the P.W.D.

Reminiscent of the P.W.A. at home was this Public Works Department gang on the road near Madras. The authors cruised India in their "land yacht," a trailer weighing nearly 13 tons.

anchored. The luxuriant black beard was carefully brushed, an elastic was fastened under the chin and over the top of the head, and the beard was painstakingly tucked under it—an extraordinarily painful procedure, to judge by the grimaces.

A towel was then tied under the chin and over the top of the head, giving the impression that the captain was suffering from a toothache. Its purpose was to protect the beard from disarray during the arduous process of winding the turban.

#### Winding 35 Feet of Turban

And what a process it was! The smaller 12-foot inner lining was quickly whisked into place; but the 23-foot outer turban was wrapped with meticulous accuracy, great care being exercised to see that the folds were equidistant. A good quarter hour passed before the regimental badge was pinned over the forehead, signifying the end of the process.

Outside the guests were gathering under a vast scarlet marquee upheld by solid silver poles (Color Plates II and III). Several hundred had assembled, forming a great splash of orange—State color of Patiala. Troops in brilliant uniforms lined the route from the palace.

Suddenly came a flourish from the military band, and the opening strains of the Patiala State anthem. Slowly from the palace emerged the procession. "Colorful" is a weak adjective to describe the riot of hues.

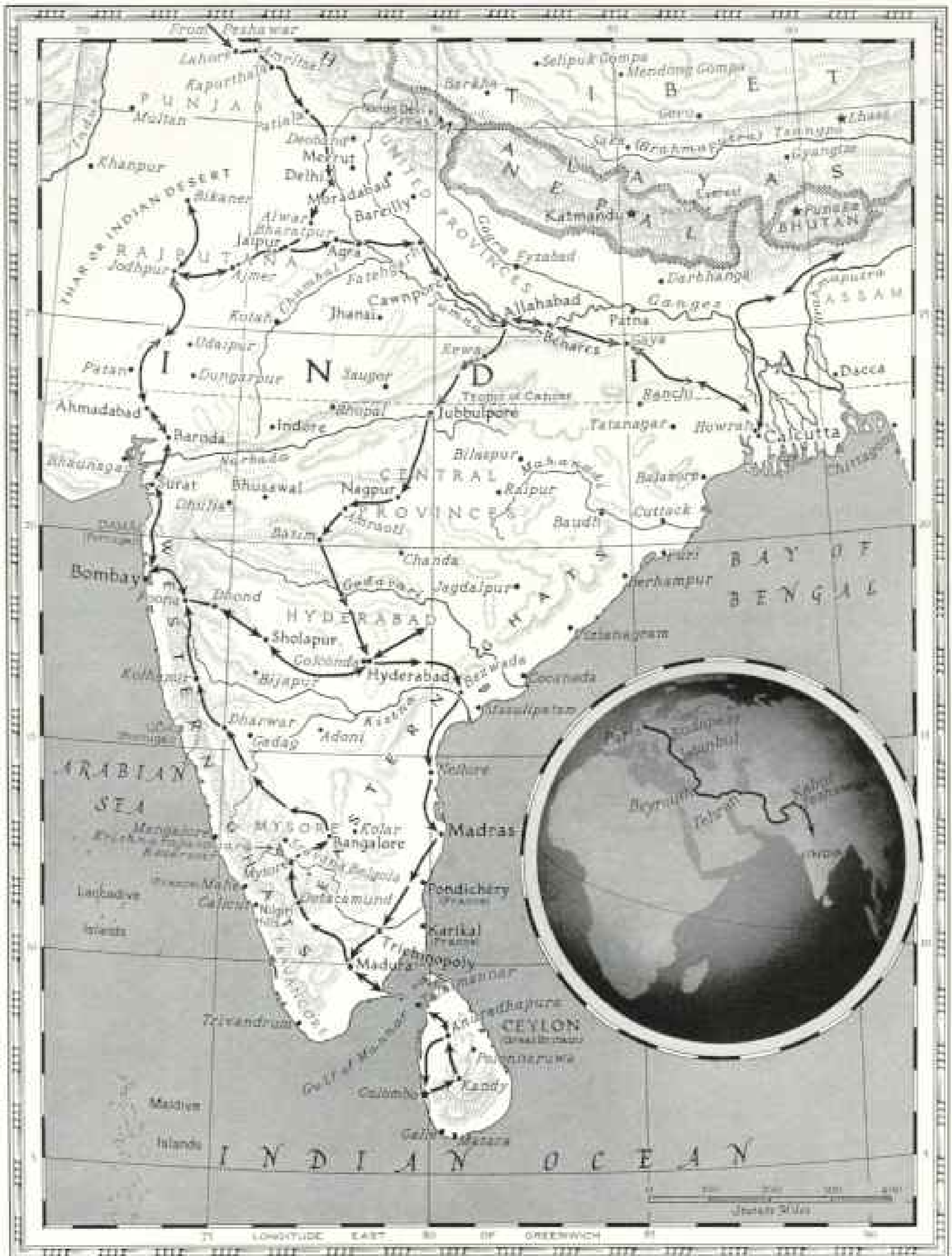
Preceded by senior officers of his army and followed by important personages of the State, all in full durbar dress, came the six-foot four-inch Maharaja of Patiala. Completely dressed in orange, he was wearing the famed Patiala diamonds looped around his neck and in his turban. Thousands of carats of enormous stones blazed in the sun, and in his belt glowed an emerald almost as big as a man's palm (Color Plate I).

As the princely group approached the marquee, all the gathering rose; and two dwarf officers, in full durbar uniform, stood at rigid attention.

Headed by the Maharaja's brother, a hundred or more of the leading dignitaries of the realm paid homage to His Highness as he sat on a golden throne in the rear of the marquee.

That afternoon we watched a polo game in which the Maharaja, magnificently mounted on a white pony, played on the winning team; and that evening we dined with His Highness at a state banquet in the great durbar hall.

Yet, despite all the splendor displayed, we



Through Colorful States Journeyed the Authors in a Land Cruise of India

By trailer, and occasionally by train, the Thaw expedition carried its color cameras into realms whose names make exotic music—Kapurthala, Patiala, Jaipur, Jodhpur, Baroda, Bikaner, Mysore, Hyderabad. In these strongholds of oriental pomp and splendor they filmed the lavish ceremonies of capitals where maharajas rule under British authority but with full local power. Arrows show the Thaws' route—from the northwest frontier and the tiger-hunting grounds of the Assam-Bhutan border, southward all the way to the island of Ceylon. The inset indicates their long trailer-trek from Paris to India (page 727).



#### Serious Is This Newly Betrothed Prince When Faced With the Camera

The young man, son of the Heir Apparent of Bikaner, is engaged to the Princess of Dungarpur, who does not appear in the picture. The wedding will not take place for some years, since the bride-to-be is still only a child. Even more elaborate than the betrothal ceremony was the wedding of a Bikaner princess and the Heir Apparent of Udaipur (pages 746, 757, and Plates XVII-XXIV).

were told that because of the war this was only a small *darbar*!

Spending several days in and around Patiala, we made the first of our Indian educational films on the life of the Punjab farmer. The most important aspect of his existence on these flat northern plains of India is irrigation. The British government has built a remarkable system of canals; but the main source of water for the thirsty fields is still the blindfolded oxen plodding around the village well.

#### British Build a New Delhi

Late on a glorious winter afternoon we rolled into the shadow of the Old Fort in Delhi, the capital city, and made camp. For twenty centuries the battered walls that frowned above our vehicles had looked down on changing empires. These ruins were the only really great works that remained from Hindu days; for most of Delhi's architectural wonders date back less than 400 years to the era of the Mogul conquests.

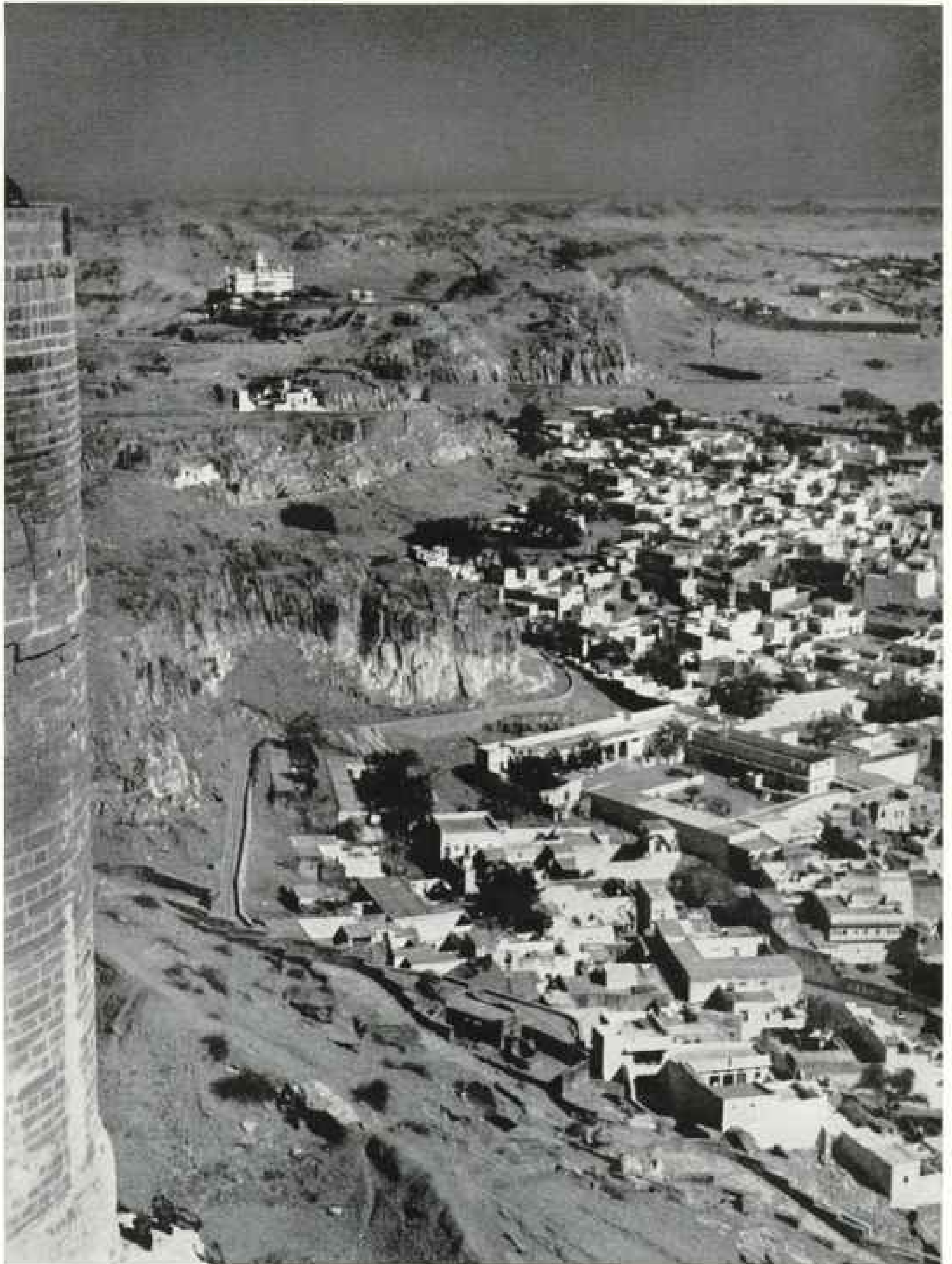
The Moguls came to conquer and remained to build. They regarded architecture as a sort of jewelry and made of each building a gem. He who has seen the *Diwan-i-Khas*, or Hall of Private Audience of Shah Jahan,

within the New Fort, or the adjacent Hall of Justice, and marveled at the delicate creations and airy screens cut from austere marble, will realize what we mean.

But a new Delhi exists alongside of the old. Starting with nothing but wide reaches of sun-baked plain, the British have left their mark in a stately city of tree-shaded avenues. The vista from the statue of the King Emperor, George V, through the All-India War Memorial arch, to the two-mile-distant Palace of the Viceroy, flanked by blocks of government buildings, is not to be excelled in any of the cities of Europe.

From Delhi we planned a long swing southwestward across India, skirting Rajputana to the mighty Mahratta State of Baroda and thence going north into the heart of the Indian Desert before returning to the main Delhi-Calcutta highway beyond Agra (map, page 729). Hence, after paying our respects to the various members of the Home Office who had been so tireless in their efforts to assist us, we struck out over a minor road for Jaipur, not quite 200 miles distant.

Along the roads the shade-trees of India were a perpetual marvel to us. Two, and even three, rows of great-boled, hundred-foot, leafy



**Jodhpur Fort Crowns a Jutting Rock High Above the City**

In the distance gleams the marble cenotaph of a former maharaja. The present ruler of Jodhpur is building a huge new palace, which will be provided with air-conditioning. The authors gave His Highness a taste of its joys by entertaining him in their air-cooled trailer (p. 741). Nearly six miles of walls surround the old city;



giants flank the way, sheltering troops of incredibly long-tailed gray monkeys, which swing at dizzy heights and grimace at the passing car.

On all roads is encountered that bane of the Indian motorist's existence, the oxcart. Whether drawn by temperamental oxen or by the more stolid water buffalo, these carts have one thing in common—a driver so firmly in the arms of Morpheus that we frequently suspected the old god had choked him to death. Horn-blowing was effective only after protracted use (we finally broke the horn ring on the Buick that led the procession), and then the long line of plodding animals would pull over only one by one.

#### Drivers Beware of Hitting Sacred Cows!

But woe betide the unfortunate motorist who bumps any of the sacred cattle of the Hindus! Running down a man would probably be a far less heinous offense. And as for peacocks in Rajputana! In some States it is a seven-year offense to kill any of these long-tailed birds that are constantly parading in front of the car.

Dust and the Indian bus are two other mental hazards.

The dust is thick, choking, and all-pervading. It can even penetrate a light-sealed film magazine carried inside a presumably hermetically closed trailer.

The buses, usually built by an American manufacturer to carry a ton and a half, rarely are loaded with less than three tons of human cargo and its baggage. To be appreciated, they must be met speeding on the tortuous roads that cross the Nilgiri Hills at Ootacamund, or on the Ghats between Poona and Bombay.

Our first stop after leaving Delhi was the Indian State of Alwar, where the British resident entertained us delightfully in the guest palace, and the Maharaja visited us. Here we came into low hills, the first we had seen since leaving the Khyber a thousand miles before. We were on the dividing line between the Mohammedan north of India, with its 100 million Moslems, roughly, and the vast south, with its 300 million Hindus. North lay the Punjab. South and west lay Rajputana.

Only 81 miles out of Alwar we came to one of the four great Rajput States: Jaipur, founded by the Maharaja Sawai Jai Singh II in 1728. The name "Sawai" was a complimentary title given to Jai Singh by the Mogul Emperor of Delhi, and it means "one and a quarter." All subsequent rulers have used it.

Warmly greeted by the young Maharaja, we were escorted to a truly magnificent suite in the palace itself. His Highness was just

getting off crutches, having broken both his legs in an airplane accident a few months before. As one of the foremost international polo players, he was irked by this forced inactivity, which also prevented him from accompanying us on our trips through his domains. Peggy grew homesick for our two sons when she met the four charming children of the Maharaja, three boys and an older girl (Plates XV and XVI).

We wandered through the interesting streets of Jaipur City.

Behind the Hawa Mahal, or Hall of the Winds, built by Jai Singh, we interrupted a crap game. The dice were cowrie shells thrown in the Harlem manner, and a score was kept on a sort of a checkerboard.

Also, one day, we witnessed a wedding procession on one of Jaipur's broad streets. First came a saddled but riderless horse; then an empty sedan chair (these first two apparently props to make the procession longer); next, a band playing a popular American tune of fifteen years ago in fifteen different keys, followed by the groom and best man on an elephant with gorgeous papier-mâché tusks over his stumps; then the bride in an enclosed sedan chair; and finally, most delicate touch of all, the bridal bed (Plate IV).

Five miles out of Jaipur City lies Amber, ancient capital of the State before the days of Jai Singh. The old citadel, captured by the Rajputs in 1037, towers high above the village. It is a stiffish climb and His Highness had thoughtfully provided elephants to take us and our half a ton of camera equipment to the top (Plate V).

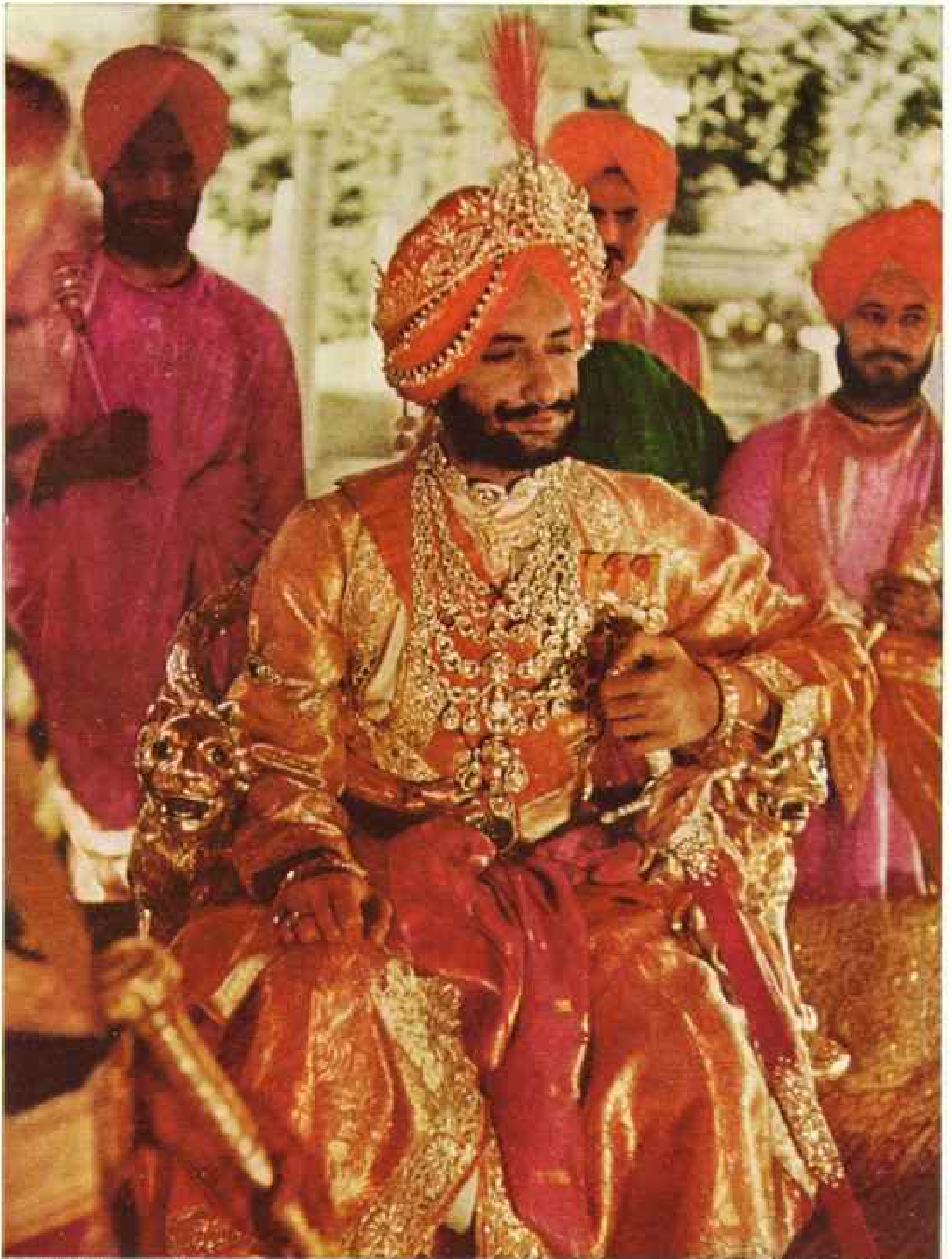
The howdahs were sidesaddle affairs designed to seat three people on either side, back to back. They are not to be recommended for hill travel when attempting to hold on to several dozen pieces of camera equipment. We walked down!

#### Jodhpur, Home of Riding Breeches

Skirting the edge of the great Indian Desert, we continued southwestward to Jodhpur—known in this country for the style of riding breeches that originated there. When still an hour's travel away, the great fort could be seen in the clear desert air, rising sheer from the plain, its perpendicular cliffs soaring from the as yet invisible town at its base (page 731).

For a fortnight we enjoyed the hospitality of His Highness the Maharaja of Jodhpur. Our cars and trucks were left with him while we traveled by train north to Bikaner—a difficult desert crossing by road—and south to Baroda, impossible to reach by trailer because of unbridged rivers.

Princely India, Resplendent With Jewels and Gold

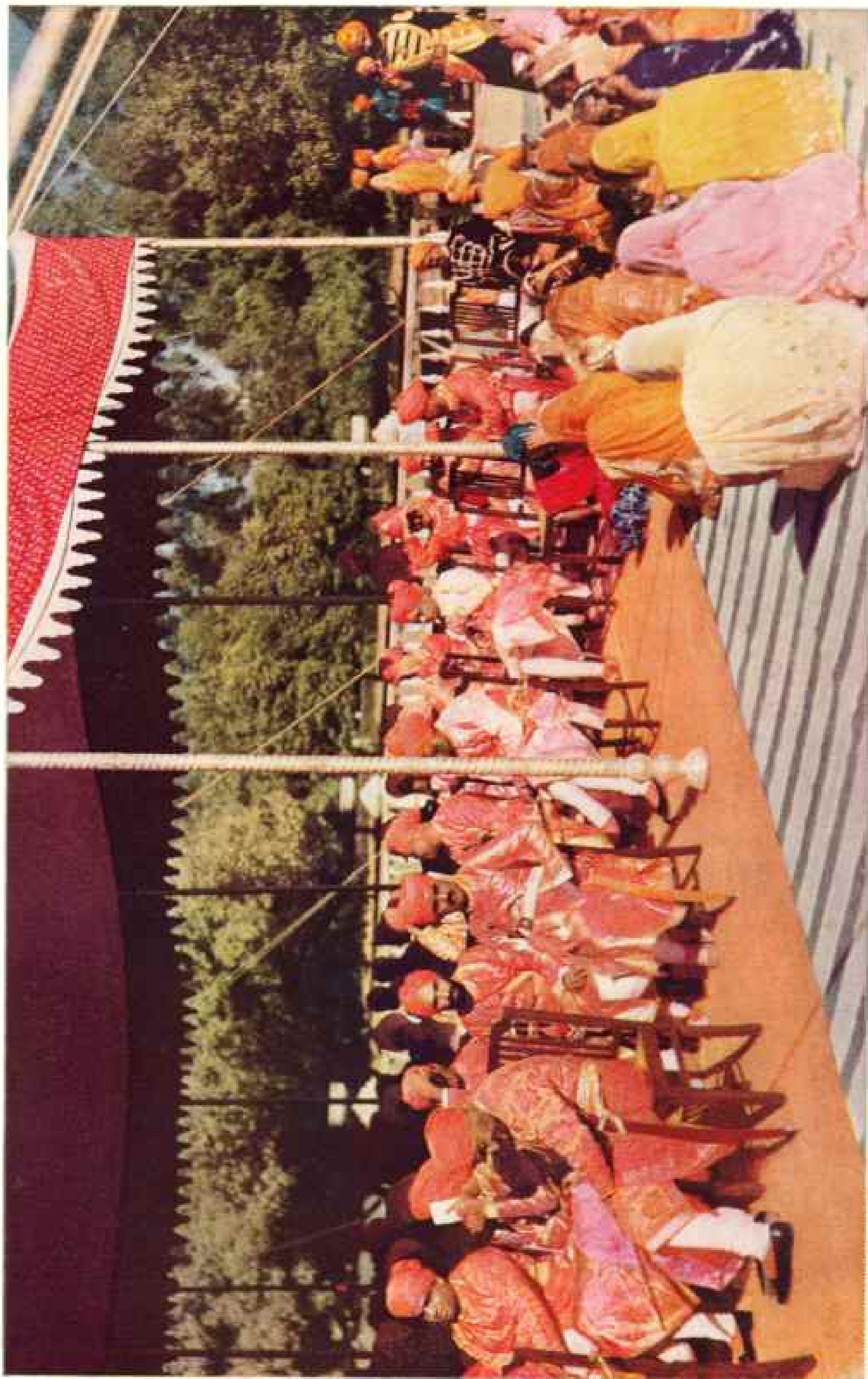


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Kollachrome by Lawrence Ogilvy Thur

**More Than a King's Ransom in Jewels Adorns the Maharaja of Patiala**

At his birthday darbar His Highness wears thousands of carats of diamonds. His belt buckle is a single enormous emerald. Behind him stand two attendants holding gold fly whisks which they wave rhythmically over his head.

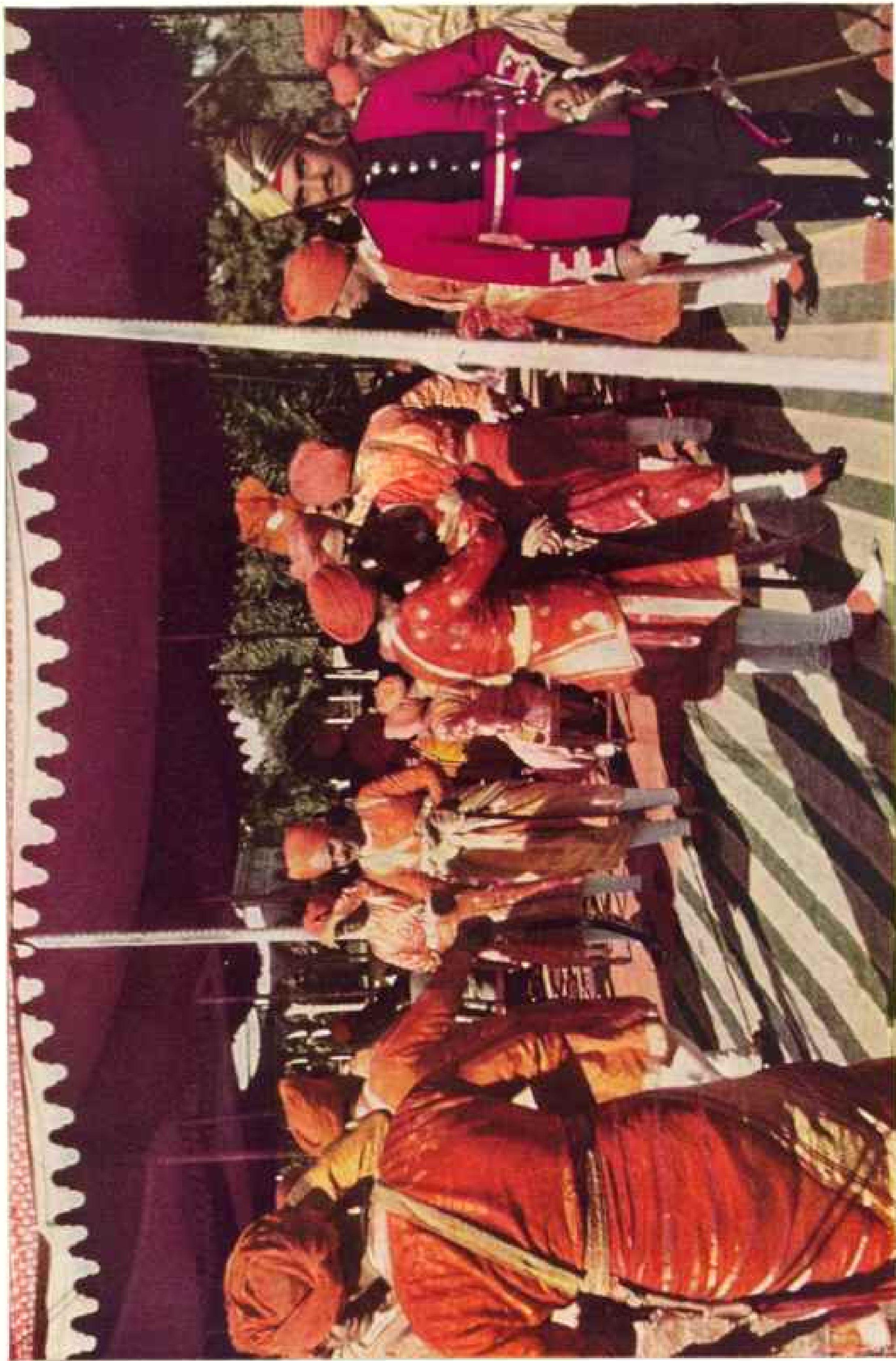


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Kolachonski or Lawrence Cooper Trust

**Seated Under a Silken Canopy, Patiala's Guests Watch the Entertainment at His Highness's Birthday Darbar**

The exquisitely chaired poles which support the top are of solid silver. At the right squat the inevitable dancing girls who perform in all celebrations. Because orange is the State color of Patiala, it is the prevailing hue in many of the costumes.

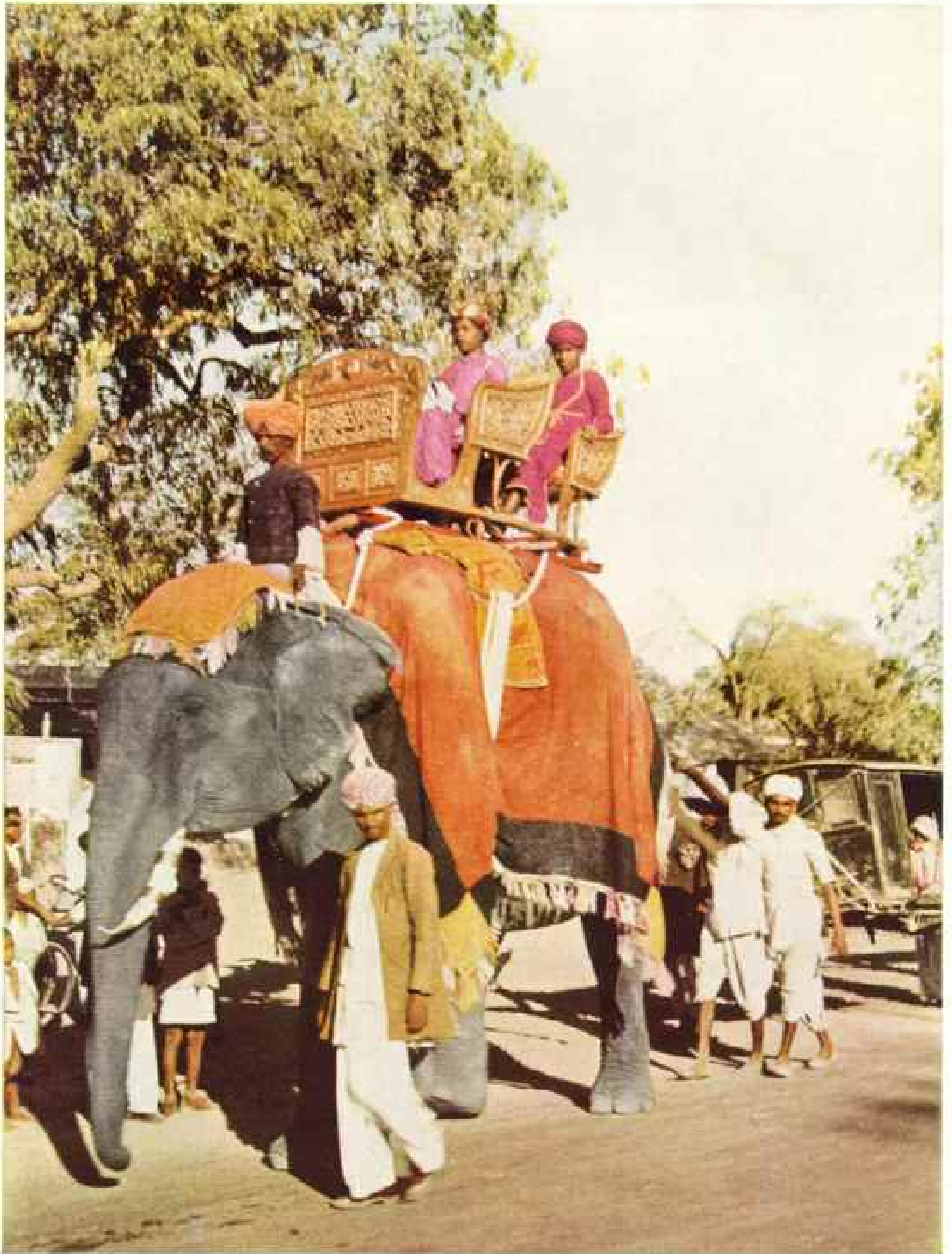


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Illustrations by Lawrence Ogden, Time

**Guests Come to Patiala's Birthday Party with Sword at Side**

To honor His Highness they have donned ceremonial garb and wear all their decorations. At the right stands one of the Maharaja's officers, in striking dress uniform.



© National Geographic Society

Photographs by Lawrence Ogler Thur

#### Not a Circus Parade, but a Wedding Procession in Jaipur

In the swaying howdah on the elephant's back ride the bridegroom and best man. The bride, heavily muffled in veils, occupies the sedan chair behind them. Leading the parade, and not shown in this picture, go a gaily caparisoned horse with no rider, an empty chair borne on poles, a band playing cacophonous music, and a queue of guests. The bridal bed, carried by two coolies, will bring up the rear.

## Princely India, Resplendent With Jewels and Gold



After Jouncing Uphill Aboard Elephants, the Authors Returned from Amber Citadel on Foot

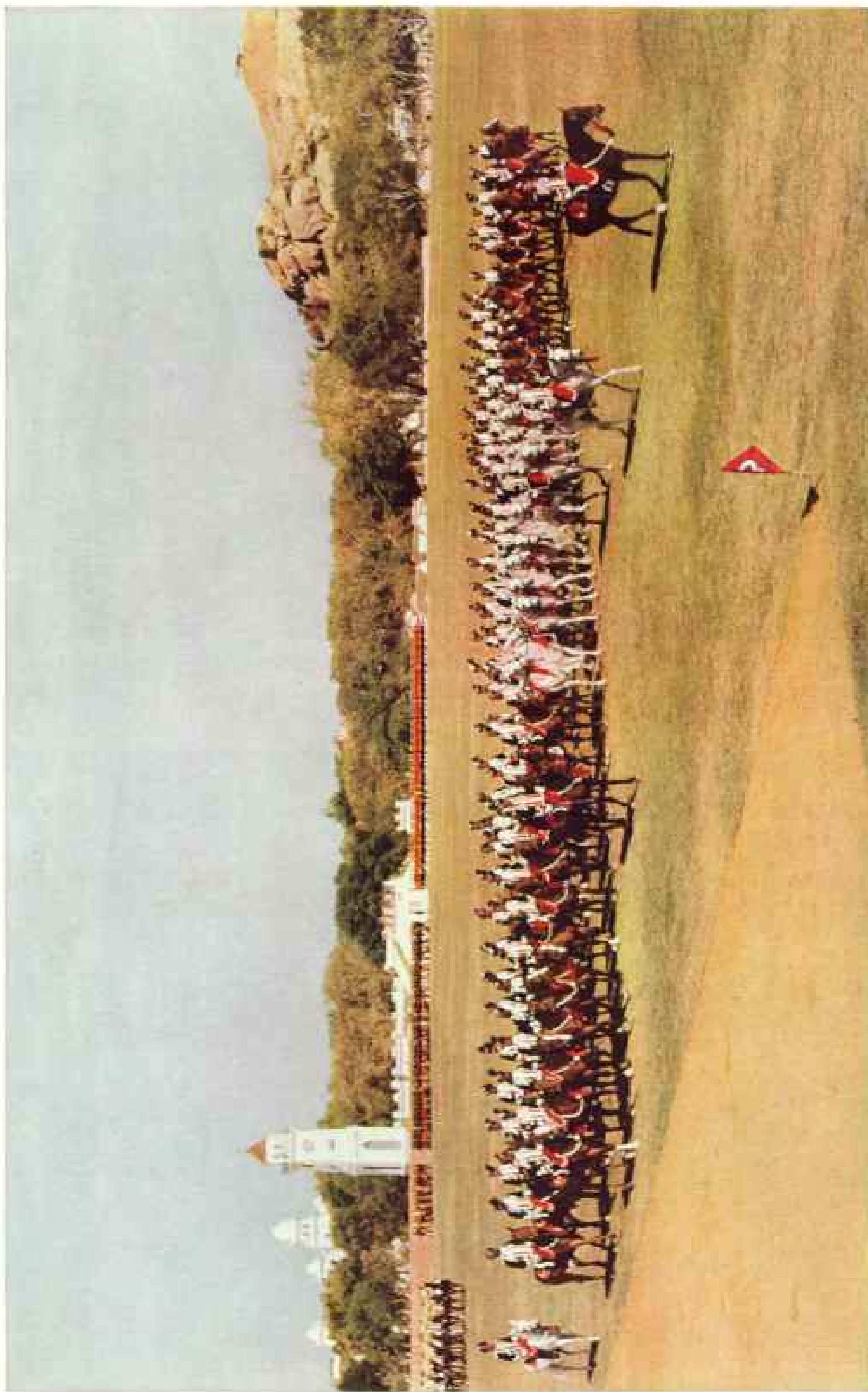
Like the pitching of a ship in a heavy sea is the motion of a pachyderm's "sun deck." Bearing equipment and drivers—but no passengers—the animals here descend the steep road from the old fortress, which dominates the valley below.



© National Geographic Society

Kishinchimes for Lawrence Copsey Thayer

Elephants in Bright Trappings Gather to Bear the Americans to the Citadel of Amber



© National Geographic Society

### Oriental Pomp and Color on Parade—Troops of His Exalted Highness the Nizam of Hyderabad Maneuver for the Guests

In the foreground is the African Bodyguard. It has just been preceded by the Mounted Band. At the extreme left is another company of cavalry, the Prince's Bodyguard. In the background, left to right, march the Arab Band, the Arab Battalion, and the Fourth Battalion of Golconda Infantry. A clock tower and buildings of Hyderabad City can be seen beyond the parade ground. The Nizam contributed a squadron of Spitfire fighting planes to England's defense.

Illustration by Lawrence Cupler Tharr



© National Geographic Society

Illustration by Lawrence Copley Shaw

### Naked Steel Flashes in the Sun in the Colorful Changing of the Horse Guards at the Palace in Jaipur

Smartly military as the formation at Whitehall, in London, this ceremony takes place each morning. The men are picked champions of an army famed for horsemanship.





As a Birthday Gift from a Subject, the Gaekwar of Baroda Receives Grains of Corn

Seated on his magnificent throne with his Heir Apparent on his right, His Highness accepts the small offerings from a long line of those who thus pay their respects (Plate XIV). He wears a collar of diamonds, his son an emerald chaplet. Behind him stand two uniformed officers and two mace-bearers. The coat of arms of Baroda is embroidered in gold on the back of the chair beneath a diamond crown and sunburst.



The Maharaja of Jodhpur is building (and has been for the past ten years) a huge stone palace now nearing completion. Covering several acres, it will be ultra-modern, with one of the world's largest air-conditioning installations. We could understand the necessity for this last-named amenity. The desert heat was intense, even during the cool season; and we gave His Highness a taste of the pleasures that were to be his, when he honored us by taking tea in our air-conditioned trailer.

A keen cinematographer, the ruler took much interest in our photographic equipment. One evening, after dinner in the old palace, he screened for us some of the finest animal pictures we had seen. We have not seen any photography that excels some 400 feet of 16-millimeter film that His Highness, with infinite patience, made of a leopard killing a goat and defending his meal from voracious vultures.

#### Rough Riding in Quest of Wild Boars

Pigsticking, the hunting of the vicious wild boar on polo ponies with no other weapon than a lance, is the chief sport of Jodhpur (page 760). The Maharaja kindly arranged for us to photograph a morning of this form of the chase, both he and his young son participating. Boyle had the big color movie camera set up—and firmly lashed down—in the rear of a Ford truck. Larry, with two men to keep him from falling out, operated the still cameras from a touring car. It is exceedingly doubtful that the hunters had half the thrills we experienced!

With half a dozen camel riders to guard the flanks, the dozen horsemen in the princely party rode out to the preserve of these savage boars, whose tusks can inflict grave wounds on horses and have killed not a few men.

Before long we came across a crotchety old fellow, and then the fun started. The pig set off at an astonishing pace, zigzagging with the speed of lightning. The fleetest horses had no difficulty in overtaking him on the straight-away, but could not turn nearly as fast.

The two Indian Barney Oldfields that piloted our cars were forced to speeds of 45 miles an hour to keep the quarry in camera range, for they had to make many detours to avoid deep dried-up watercourses.

How the springs of the cars held out as we bounded over the lumpy terrain is a mystery. How Larry and Boyle kept from falling out is a still deeper one. We cracked two legs of the movie camera tripod, an exceptionally sturdy piece of equipment, but we got the pictures. The hunters bagged eight boars.

The Maharaja of Jodhpur is an ardent avia-

tor, owning and piloting his own Lockheed plane and holding the rank of Air Commodore in the British Army. He gave us an exhibition of his skill and of the maneuverability of his plane at the magnificent Jodhpur airport, used as a stopping place by lines flying to China, the Netherlands Indies, and Australia.

When the time came for us to leave to visit the great Mahratta State of Baroda, where we were scheduled to film the Gaekwar's birthday durbar, the Maharaja of Jodhpur provided us with a private railway car, which greatly alleviated a tedious 36-hour journey.

#### Baths, Alfresco and Piecework Style

But despite the luxury of our conveyance, Indian railway travel was an experience that could not have been duplicated in any other land. Screaming hordes surround trains at every stop, day or night, fighting to wedge themselves into already crowded third-class compartments (page 742). Raucous vendors sell the most poisonous-looking edibles.

At the early-morning stops baths are taken by both men and women on the station platforms at conveniently located spigots.

Once we saw a man give himself a full bath out of the window of a car. First he reached out an arm and washed it thoroughly, then a leg, and so on until he had finished the job—and all with a little water in a tiny bowl!

Kaleidoscopic pictures pass in review: the sleeping bundles of rags philosophically waiting for tomorrow morning's train; the squatting line of red-turbaned baggage coolies who carry 80 pounds of assorted baggage for an anna (two cents); the inevitable changes of trains where narrow gauge supplants broad; the scramble to get to the dining car (there are no corridor trains) at auspicious stops, and the gulping of the demitasse to get back at the next; the comfort of the large first-class compartments with their private showers and innumerable fans; the necessity for carrying a bedding roll, since no bed clothing is provided; the all-pervading dust . . .

We had timed our arrival in Baroda a little closely and barely had opportunity to set up our cameras and lights in the huge durbar hall before the ceremonies began.

Seated on a golden throne surmounted by a diamond sunburst and crown, the Gaekwar received the felicitations of his subjects. Behind him stood two magnificently uniformed officers of his guard and two golden macebearers; at his right was his eldest son wearing a chaplet of enormous emeralds. The Gaekwar was adorned with a glittering collection of diamonds, and an emerald brooch held a bunch of aigrettes in his turban (Plate VIII).



**"No, No! Over My Dead Body Shall You Bring That Bass Drum in Here"**

It looks as if even a piccolo wouldn't fit into this packed third-class compartment, yet the big bass drum finally went aboard despite impassioned protests. At right a traveler grits his teeth in rage as his turban is knocked askew.

In the ceremony, which lasted over an hour, the people presented the Gaekwar with grains of corn, and he returned a part of each gift to the donor. Dancing girls performed at the far end of the hall.

**Kite-flying Princee Knows Baseball**

His Highness and his attractive eldest son joined us in the extensive gardens behind the palace that afternoon. It was a half-mile walk to get the camera equipment from the durbar hall around the palace to the gardens.

The young prince discussed cricket and kite flying, his favorite sports, with Peggy, who was delighted to find that he was familiar also with baseball.

Some of the State treasures were shown us, notably a solid gold cannon weighing 280 pounds (\$117,600 in gold content) and a solid gold and silver coach, beautifully fashioned. Both are used on State occasions, the former drawn by milk-white bullocks.

The purpose of our visit to the desert principality of Bikaner was twofold. First, we were to film the betrothal ceremonies of Prince Karni Singhji Bahadur, son of the Heir Apparent and grandson of His Highness the Maharaja, to the Princess of Dungarpur.

To our occidental eyes this ceremony was to appear overwhelming. But of vastly greater importance were the plans which had been a year maturing for the wedding of the granddaughter of the Maharaja of Bikaner to the Heir Apparent of Udaipur, a state in existence since the beginning of the Christian era. This event was to take place some six weeks after the betrothal ceremony and was to be the greatest durbar in India in years.

Early morning of the second day after our departure from Baroda saw us rolling across the sand desert that surrounds Bikaner City. Two stations away came a knock at the railway carriage door and a splendidly uniformed servant appeared.

"His Highness the Maharaja has sent you breakfast," he announced. "What is your pleasure?"

Aladdin and the genii; all we had to do was rub the lamp! Peggy, ever hungry, said oatmeal, toast, and coffee; while Larry, still half asleep, dazedly concurred. Thereupon, with a charcoal burner, a delicious breakfast was cooked and served.

At the next station the head man appeared again. What was our further pleasure? Bacon and eggs were the decision. This time

the train waited while the food was prepared on the platform.

At Bikaner station British and Indian representatives of His Highness met us and we were escorted to the guest palace.

As at Baroda we had little time for preparations. Since there was no platform for our cameras, we shot from the back of a truck.

Through troop-lined streets came the colorful procession, led by a camel drummer, two horse drummers, the band, and one company of the Sadul Light Infantry.

A magnificently caparisoned elephant preceded a host of bearers carrying the betrothal gifts on covered silver salvers, and these were followed by carriages bearing the distinguished guests. They were on their way to the palace, where the betrothal ceremony was to take place (Plates XVII to XX).

#### Princes Endure Hollywood Tribulations

We cannot proceed farther in our story without paying the highest tribute in our power to the co-operation we received from all of the rulers of the princely Indian states we were privileged to visit.

It is one thing to have afforded us every luxury imaginable in our living appointments and to have ordered their subordinates to facilitate our photographic work. But pictures are made, not taken. And there is no royal road to ease in their making.

If a religious or state ceremony is to be photographed, it must be done not once but many times—each time necessitating laborious shifting of heavy cameras, lights, and reflectors—so that various "angles" may appear on the screen. The only way was to spend weary hours in repeating the action after the ceremony was over—which involved great inconvenience to the Maharaja personally.

Similarly, it is not always convenient to dress in a given costume, frequently a most complicated affair to get into, and it is never pleasant to sit in the glare of a battery of 3,000-watt solar spots or half a dozen silvered reflectors that "kick" the heat of the Indian sun on one for hours at a time.

Never once was there a murmur! Our hats are off to our princely friends. Not only were they royal hosts, but, even more important, great sportsmen. We sincerely hope that the results of our work, which will shortly go forward to them, will find favor in their eyes.

On arrival at the palace we were presented to that great-hearted old warrior Lieutenant General His Highness Maharajadhiraj Raj Rajeshwar Narendra Shiromani Maharaja Sri Ganga Singhji Bahadur, G.C.S.I.; G.C.I.E.; G.C.V.O.; G.B.E.; K.C.B.; A.D.C.; L.L.D.

(page 746). The complicated ritual of the betrothal ceremony followed in the durbar hall immediately, involving His Highness, the Heir Apparent, his garlanded son the betrothed, and a younger son.

At the end of the ceremony all went to the temple to pray, after which His Highness, taking the salute from his massed troops during the playing of the Bikaner State anthem, retired to his apartments. The aide-de-camp assigned to us, together with the head of the State electric power service, spent the afternoon with Larry and Boyle, deciding where power lines would have to be run to supply lights for photographing the night aspects of the wedding durbar six weeks later.

The train to which our special car was connected for the return journey to Jodhpur was scheduled to leave at six o'clock. A big fireworks display was at seven. A word from His Highness and the departure of the train was delayed two hours. It was on the tracks of the Bikaner State Railway, so there were no arguments!

So elastic are Indian train schedules, however, that we pulled into Jodhpur the next morning on time. Luxurious as our rail and palace accommodations had been, there is no place like home—even if it is a rolling one. We all felt glad to see the big trailer again.

#### Curious Hordes Besiege the Trailer

Retracing our steps the 231 miles to Jaipur, we struck east over a newly made road through Bharatpur into Agra. When making long hops such as this, we customarily had a time-saving picnic lunch in the trailer.

So dense is the population in India that even if we stopped in open country, it was only a matter of seconds before we were surrounded by seething hordes of curious. These did not hesitate to open the doors to see what wonders lurked within the big trailer. Our privacy was that of the proverbial goldfish!

In Agra, by a curve in the Jumna River, we gazed breathless at the chaste beauty of this earth's most magnificent architectural jewel, the "Taj Bibi Ka Roza," or "Crown Lady's Tomb," called now the Taj Mahal (Plates XII and XIII).

Millions have done likewise since, in 1629, the beloved wife of Shah Jahan, Mumtaz-i-Mahal, "Pride of the Palace," died in childbirth, and the great Mogul's grief inspired him to enrich the world with this pure-white marble tomb. Thousands have sketched, painted, and photographed it, yet it never becomes trite.

The classic purity of its outlines and the breathtaking beauty of its carved and inlaid decorations are as striking today as they were



#### Princely Table Talk Turns to Music and Tigers

Prince Muazzam Jah Bahadur of Hyderabad and his Turkish wife, the Princess Nilofar Farhat Begum Sahiba, listen intently to Mrs. Thaw's comparison of occidental music with the haunting songs of India (page 759). They were interested, too, in her tiger-hunting experiences, one of which nearly ended in tragedy.

three centuries ago when they were the inspiration of His Imperial Majesty, the Resident of Paradise, the Second Alexander, the Lord of the Two Horns, Emperor Shah Jahan.

We rejoined the Delhi-Calcutta highroad at Fatehgarh and slowly followed the valley of the mighty Ganges the three hundred miles through Allahabad to sacred Benares, making an educational film on the life of the farmer in the United Provinces as we went.

#### Sacred Ganges Claims Hindu Dead

Benares and the sacred Ganges—the life, the blood, and the salvation of more than a quarter of a billion Hindus!

Horrible as the waters of the river are with pollution and filth, they are holy. He who bathes therein is cleansed of sin; and he whose ashes are deposited on its broad bosom will have his soul fly to everlasting paradise.

For miles along the banks stretch burning and bathing ghats (Plate XXVI). On the former, constant clouds of smoke billow up from the fortunate rich who can afford the wood for a funeral pyre. Those not so affluent are merely singed, and the really poor simply

entrust their dead to the river, uncremated. We saw the body of a child floating within fifty feet of where a group were bathing, and even drinking the "purifying" waters, between prayers!

At intervals along the banks can be seen the fakirs—holy fanatics of Hinduism—staring steadfastly at the sun with eyes long since blinded, holding holy poses until the joints freeze, torturing themselves in life to avoid the terrors beyond death.

In Benares we saw one of India's fantastic tales come true, and filmed it! For a modest honorarium one of the fakirs chewed up and swallowed one of our large glasses and an electric light bulb! After these hors d'oeuvres he chewed up and swallowed a package of razor blades.

While we were still wondering what sort of inhuman inner mechanism enabled him to do this, he motioned to his assistant who produced a good-sized live cobra. Our friend apparently had not begun to take the edge off his appetite. He seized the squirming hooded death, deftly bit off the head, and proceeded to munch the balance of the wriggling carcass



#### At the Yellow Flash of a Springing Tiger This Elephant Whirled Like a Ballet Dancer

Mrs. Thaw would have been thrown from its back had not the mahout caught her foot (page 748). Here she draws a bead on a bison, while Cecil Baron, professional hunter, holds his rifle ready. Through the dense cover of the Assam-Bhutan frontier the elephants plowed like huge tanks (page 746).

with every evidence of enjoyment! When our cutter in Hollywood came across this bit of film, he became quite actively ill. We decided not to use it in our picture.

#### Mongoose Makes Short Work of Cobra

Also in Benares we suffered a grievous disillusionment. The town was crawling with snake charmers and their lethargic, tame, defanged cobras. Larry wanted to stage a fight between the two traditional enemies, the cobra and the mongoose. He insisted on having captured—at ridiculous expense and a week of time—a really wild, six-foot king cobra as big around as your wrist and black as night.

A rough pen, some eight feet in diameter, was built of chicken wire, which was concealed by interlaced branches and leaves from the all-seeing eye of the camera. Unfortunately, it was apparently also invisible to the snake.

After rearing himself once, with distended hood, and seeing the mongoose, he slipped through the wire mesh as if it did not exist and headed straight for the cameras! Several thousand dollars worth of apparatus was abandoned without any argument whatever.

When finally the corral had been made what we devoutly prayed was snake-proof, and the two contestants had entered the ring, what a disappointment! There was no fight; there was not even a preliminary skirmish. There was a three-second approach, a flash of brown lightning, and the great snake lay thrashing in its death agonies, its spade head crushed in the inexorable jaws of its furry adversary. We began to have a profound respect for Rikki-tikki-tavi.

Our plans called for a fortnight of hunting, north of Calcutta, on the Assam-Bhutan frontier.

Leaving our equipment in Benares with Earle Fahrney, the mechanical engineer loaned us by General Motors, we took the night express for Calcutta, where our *shikari* (professional hunter), Cecil Baron, met us.

Another night's run and we were deposited on the station platform of a village far to the north, whence a truck conveyed us forty miles farther north to a tiny outpost of civilization, an Assam tea plantation. There two oxcarts and two hunting elephants awaited us, the former to transport our kit and the latter our-



The Maharaja of Bikaner Chats With His New Grandson-in-law

A doughty soldier, the 61-year-old ruler has fought for Britain on three continents—against the Chinese in 1900-1901 and in Egypt and France in the first World War, at the head of his own troops. The youthful bridegroom is the Heir Apparent of Udaipur.

selves on the 28-mile trek to the site of our hunting camp.

As the creaking oxcarts slowly got under way, Peggy eyed dubiously the flat hunting pad on the elephant's back. Before many hours had passed, she had to admit that though it did not quite equal the front seat of the car for comfort—and certainly not for speed—the hunter's place, just behind the mahout on the beast's neck, was not uncomfortable (page 745). On the other elephant Larry rode in front and Boyle in the rumble seat.

We followed the wide rocky bed of a stream whose icy waters flowed from the snow-capped Himalayas, the foothills of which form the frontier between British Assam and the virtually autonomous, wholly Mongolian, State of Bhutan. Tiger spoor was everywhere in the sand underfoot, showing where the beasts had come from the seemingly impassable bush on either side to drink.

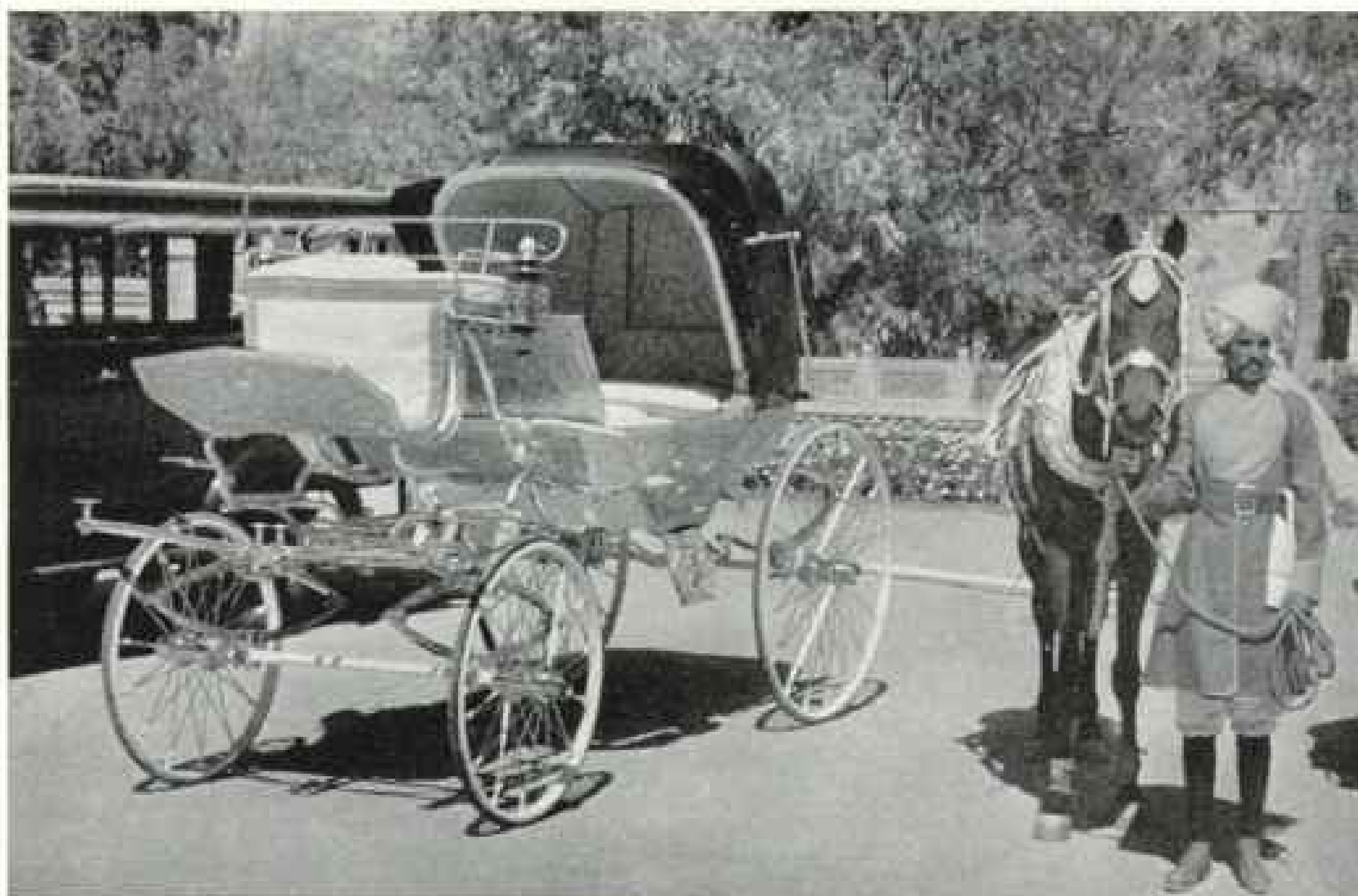
Late in the afternoon, weary and aching in every bone from the exaggerated rotary motion, we sighted the tents that were to be home for the next 14 days. Right on the river's bank they stood, while behind them, tier after tier, soared the majestic heights of the world's highest mountain range.

Two forms of hunting were practiced. One method was to tie a live cow as tiger bait, then to sit up in a *machan* (tree platform) over the carcass, awaiting the tiger's return to its kill. The other was to make long forays on elephant back in search of bison, buffalo, sambar, barking deer, wild elephant, and an occasional Indian rhinoceros. We tried both—the latter in the daytime; the former, evenings.

Day after day we ranged far and wide in a 15- or 20-mile circle. The ease with which the elephants, like great tanks, plowed through the appalling jungle growth was remarkable. Even more amazing was the solicitude they showed for the riders on their backs.

Never were the elephants so absorbed in stuffing various vegetable tidbits into their cavernous maws that they did not have a weather eye cocked on vines or overhanging branches. Whenever these appeared to threaten their human cargo, the immensely powerful trunk would come up, its sensitive tip would wrap around the offending limb, and the branch would be ripped off.

If a tree in the way was too large to uproot, the great head went down and inexorably pushed it over. Our progress was a series of cracks and snaps that seemed in no way to



Among the Wedding Gifts Were a Silver Carriage and Silver-harnessed Team

Eyes were dazzled by the splendor of the presents bestowed at the marriage of the Princess Sushil Kanwarji Sahib of Bikaner and the Heir Apparent of Udaipur (opposite page, Color Plates XVII and XXII to XXIV). This glittering equipage is lined with pink satin.

frighten the game, doubtless accustomed to the noisy feeding habits of wild elephants.

One day we had followed our river far beyond the Bhutan frontier. Larry and Boyle were slightly in the lead as we rounded a bend. Not 75 yards from us, lazily feeding, was a lone bull elephant, with fine ivory.

With the elephant's traditionally poor eyesight, he had not seen us, and fortunately we were down wind. We halted dead in our tracks.

"What do you want to do?" Baron mouthed noiselessly to Larry.

Larry thought furiously. Elephant hunting we knew, but on foot and not from the swaying back of another elephant. The bull was facing us and the range was too great to try the small target of the frontal brain shot. If we tried to advance on elephant back, he would surely hear us, and the water was too deep to slide off our mounts and try to stalk him on foot. Further, Peggy's elephant was a tuskless male that the big rogue would surely charge.

With no room to maneuver, Larry thought discretion the better part of valor and noiselessly gestured a retreat. We had not seen the last of our little friend, however.

As we returned to camp for luncheon we were surprised to see it surrounded by several hundred men and horses. It was the beginning of the annual migration of the Bhutanese, from their mountain fastnesses to the plains of Assam to trade.

A Bhutanese official presented us with gifts—two beautifully embroidered bags (Plate XXV). We had not come prepared for such social amenities and were hard put to find the gifts that were expected in return. The best we could do was a scarf of Peggy's and half our cigarette supply. There were some rather pointed hints on the beauty of a pair of riding boots, but these were equally pointedly ignored.

Short, squat, powerful, and definitely Mongolian in features, our visitors were a walking arsenal. Each had a rifle, and many carried a Chinese sword as well.

#### Tiger Spoor—and a Snarling Challenge

We had not been having much luck with the kills we had tied out every night for tigers, but one morning our boys came in excitedly with the news that we had had two kills about a mile apart.

We found the first kill easily. It was only



a few yards in the bush, where the tiger had dragged it to protect it from vultures. A machan was quickly erected and Larry and Boyle perched precariously on it with many admonitions from Baron to maintain absolute immobility and a breathless silence.

Peggy and Baron thereupon went off to find the second kill. From where the cow had been tied a clear spoor led into the almost impenetrable bush. The kill had to be recovered and placed under a near-by tree in which a machan could be built, so they started the elephant in, following the spoor. It led far into the bush.

Suddenly the elephant stopped. From not ten feet away came an ominous snarl. Nothing was visible. The visibility improved, however, with startling rapidity. Leaping straight into the air came yards and yards of seriously annoyed tiger. The elephant took one look and bolted.

Now, it is difficult to imagine the sensation of being on the back of a bolting elephant. When frightened, the big fellows go straight as an arrow, through any obstruction, at fearsome speed; and the riders can fend for themselves.

#### Saved by a Foot

Peggy's elephant was no exception. He whirled like a ballet dancer from the menacing yellow flash, instinctively protecting his sensitive trunk. Peggy was sent sprawling, but was caught by the left ankle by her mahout while she clutched a saddle rope with one hand and her rifle with the other.

Fortunately, the thick brush hampered the big cat more than it did the elephant. The tiger could advance only by making leaps into the air while the elephant plowed right through. Also fortunately, the mahout kept a firm grip on Peggy's foot, for the tiger, uttering far from pretty noises, was giving every evidence of preferring her to the cow for dinner.

At the edge of the bush the tiger stopped. His honor had apparently been vindicated. A few hundred yards farther on, the badly frightened elephant was brought under control, Peggy put right side up, and it was discovered that Baron's hat had been lost in the headlong flight. Had it been the Crown of England, no one would have had any interest in attempting to retrieve it just then.

In the meantime, wholly unconscious of the exciting events a mile away, Larry and Boyle sat, in breathless silence, mentally cursing a particularly ferocious brand of mosquito that carried on an aerial blitzkrieg while infantry assaults were executed by vicious red ants.

Slowly the shadows lengthened; slowly the outline of the kill below us was swallowed up in pools of darkness. No haunted house on the Scottish moors is half so spooky as straining one's ears in the dark for a twig snap that never comes! Then it started to rain.

Just as the entire lower part of Larry's body was turning over in its second sleep, there was a deep sigh immediately beneath the tree! Boyle clutched one of Larry's numb legs. That was enough! The slight motion had been perceived by the tiger 18 feet below us. There was a bound, a crash in the brush, and again the unearthly silence.

#### Glowing Eyes in the Inky Gloom

Cursing ourselves for interrupting the tiger's reconnaissance, we flashed the electric torch on the kill. In the inky gloom of the brush, fifty feet way, glowed two eyes the size of saucers! Just that, and nothing more! Larry sent a right and left from his .465 between the yellow beacons. They vanished; and no sound came from the thicket.

After a suitable pause our elephant came up, the mahout having heard the shots. We climbed from our machan directly on to its back, not caring to have any arguments in the dark with a possibly wounded tiger. A search the next day showed he had not been touched.

Peggy got her revenge several days later from a tree platform—a magnificent tiger, 9 feet 8 inches from tip to tip. We made movies of the whole affair from a near-by machan.

As we came back to camp from this successful evening's work, we found our entire personnel in a complete dither. A wild elephant, presumably the lone rogue which we had seen up the river, had winded our two elephants and was snorting around in the jungle behind our camp.

Our boys were running around in circles, and Boyle, who had never fired even a .22 rifle, was clutching one of Larry's double-barreled elephant guns while tearing into innumerable boxes in search of ammunition that would fit it.

In the meantime, the rogue was making a tremendous row and everyone was fearful that he would attack one of our hunting elephants, which he could undoubtedly have killed. Peggy had a mental vision of what he could do to our frail tents.

The picture of Peggy, Larry, and Baron creeping out to the edge of the bush behind our camp with loaded rifles in Stygian darkness, while Boyle played a flashlight around trying to find the elephant, is one which in retrospect is very funny. None of us were

## Princely India, Resplendent With Jewels and Gold

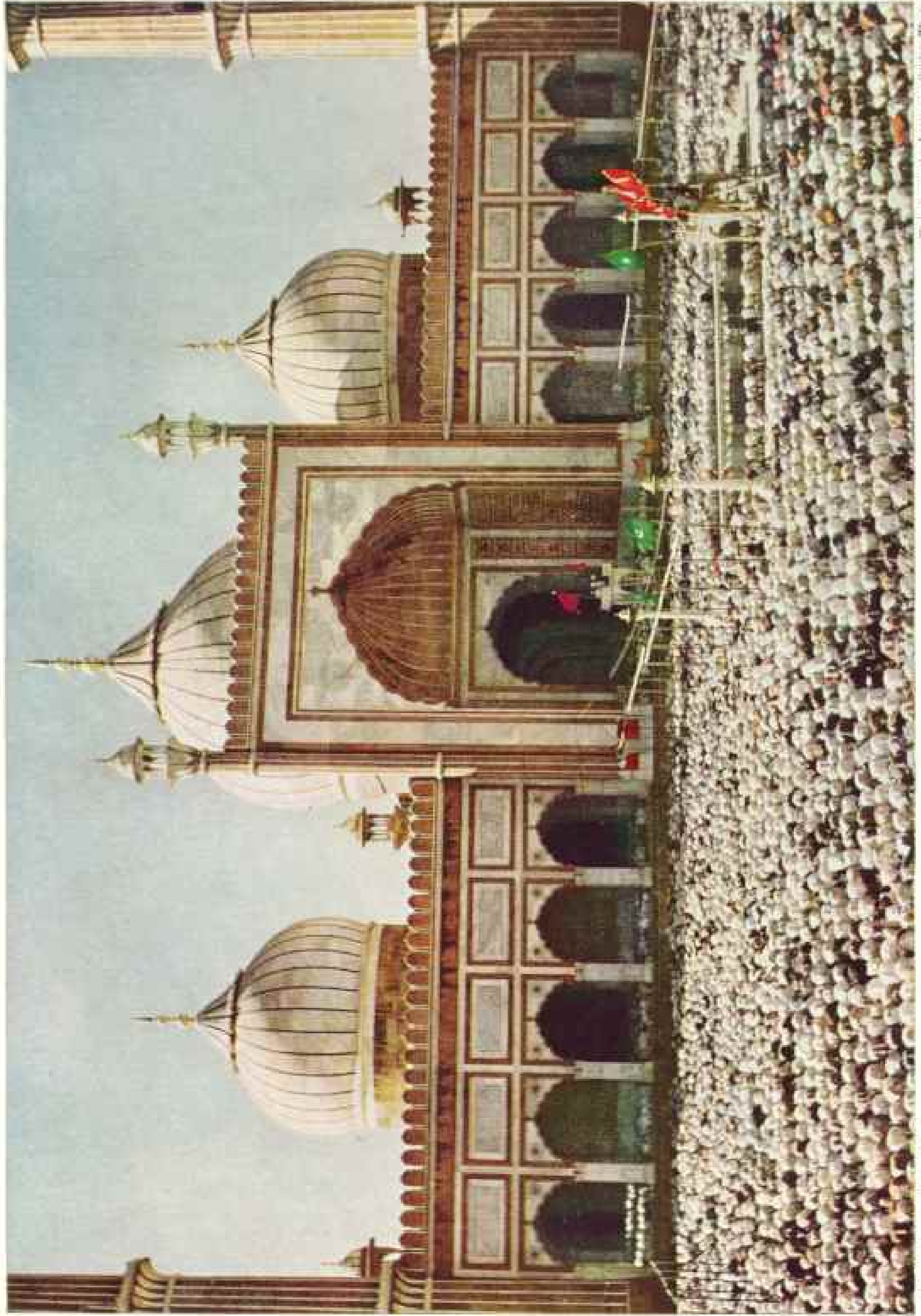


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Redaction by Lawrence Ogier, Thru

### With a Splendid Memorial New Delhi Honors King George V

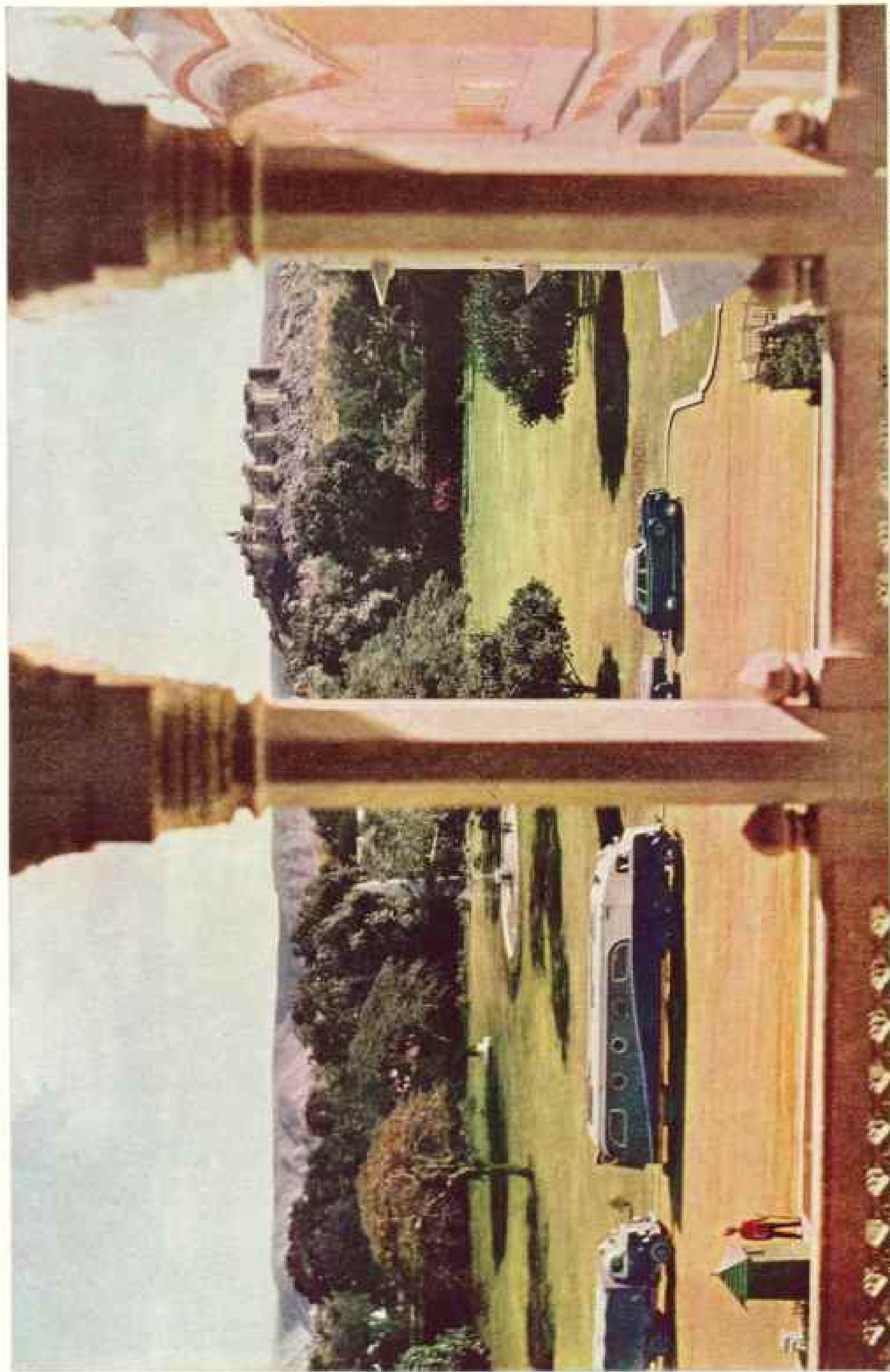
The statue stands immediately behind the All-India War Memorial and at the end of a long avenue leading to the Viceroy's Palace, which is flanked by Government buildings. Begun before the first World War and inaugurated in 1931, the modern city is the latest of the long series of capitals erected on this plain since the founding of Indraprastha about 3100 B.C. All architecture harmonizes with that in the older parts of the metropolis.



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Illustration by Lawrence Culpay Thur

Ten Thousand Moslems Throng Delhi's Jami Mosque Courtyard for Services on Friday, Their Holy Day.



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### Study in Contrasts—Streamlined Trailer and Medieval Fort

The author's expedition parks in front of Jaipur Palace. Set in the midst of a half mile of formal gardens and pleasure grounds adorned with fountains, trees, and flowering shrubs, the Maharaja's abode occupies a seventh of the area of the entire city.



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**Exquisite Monument to Love Is the Taj Mahal**

It was built by Shah Jahan as a tomb for his beloved wife, Mumtaz-i-Mahal, who died in 1629 bearing her fourteenth child.

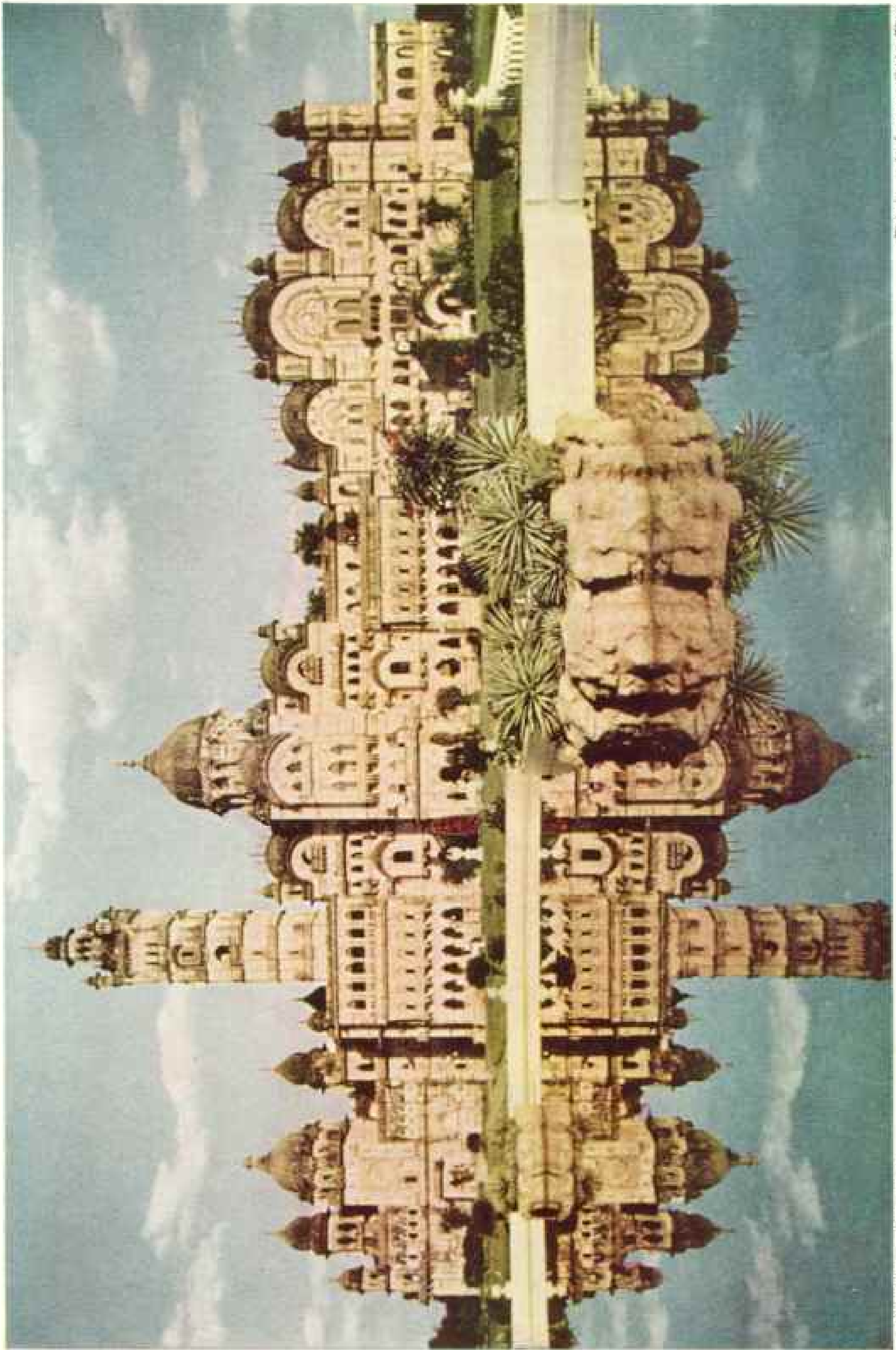


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Kodjehans in Lawrence Capley Photo

**Walls of the Taj Mahal Gleam with Inlay Work of Semiprecious Stones**

Details of the inlaid marble are shown in this view from a minaret. In the distance appears Agra Fort, beyond the almost dry Jumna River.



© National Geographic Society

Illustration by Lawrence Cooper, Thane

**Vast and Ornate—Is the Palace of the Gaekwar of Baroda**

Incredible, unreal, it seems, as reflected in a pool in the palace gardens. During the authors' visit here, they were entertained by His Highness at his birthday durbār (Plate VIII). The occasion brought together his subjects from all parts of the principality to pay their respects by offering grains of corn in token of a gift.



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**The Heir Apparent Wears Large Jewels and a Sword**

Eldest son of the Maharaja of Jaipur, he will one day succeed to his father's throne (Plate XVI).



Kodachrome by Lawrence Fertig, U.S.A.P.

**The Youngest Son Must Be Content with Less**

This little prince of Jaipur wears as a mark of rank a double necklace of pearls and emeralds and a diamond ornament in his turban.





Jaipur Horse Guards Are Called by a Trumpeter Bearing the State Coat of Arms



© National Geographic Society

Kodachrome by Lawrence Carter Thaw

**Children of the Maharaja of Jaipur Chat with Mrs. Thaw**

At the left is the Heir Apparent, farthest right the youngest boy (Plate XV). The daughter, the oldest of the four, will go into purdah, or womanly seclusion, in about a year.

laughing at the time, and all breathed a sigh of relief when the crashings disappeared.

Returning to Benares from our hunting trip, we started our thousand-mile trek through the Central Provinces to mighty Hyderabad, huge Indian State, with an area greater than that of England and Scotland combined, and a population of seventeen millions.

We had to backtrack to Allahabad to find a bridge over the Ganges strong enough to take the big trailer; but from then on it was smooth sailing, through Rewa, Jubbulpore, Nagpur, and Amraoti. Several times a day we would pass the frontier of some Indian State—there are 562—and a strong position would have to be taken by Larry with the customs guards, who invariably thought they should examine our 15 tons of kit, piece by piece.

Just after Basim we entered the vast domains of His Exalted Highness, the Nizam of Hyderabad, being immediately passed by the customs guards. They had been informed of our expected arrival by that noted Indian statesman, Sir Akbar Hydari, President of the Executive Council, with whom Larry had been in long correspondence.

But before we began our serious photographic study of the Deccan, we had an engagement to keep in far-distant Bikaner, where February 29 was to witness the wedding of the Maharaja's granddaughter, Princess Sushil Kanwarji Sahib of Bikaner, with the Heir Apparent of Udaipur, thereby uniting these two great Rajput States. From Hyderabad City we started the three-day train journey via Bombay, where we picked up a freight car full of huge photographic searchlights.

The morning of the 29th found Larry, impeccably garbed in morning clothes—but with a white topee replacing the conventional silk topper—beginning the five-day task of recording the largest *darbar* India had seen in many years.

Fourteen reigning princes, each with an entourage of 200 to 600, were present; and the yards of the Bikaner railway station were jammed with private trains. Our friends the Maharajas of Jaipur and Jodhpur had arrived in their airplanes and the entire city was decked with bunting and outlined in multi-colored electric lights.

The procession to the palace was like a chapter from the Arabian Nights. Preceded by troops, and following troop-lined streets, came magnificently blanketed white oxen pulling solid silver carts, and elephants that, mighty beasts though they were, felt the weight of the most ornate solid gold and silver howdahs on their backs.

Covered with cloth of gold, with gold and

silver ornaments on his legs, and with a gold howdah on his back, a huge bull elephant proudly bore the bridegroom up to a platform where the caste mark was painted on his forehead. On either side were two other elephants, only slightly less gorgeously caparisoned, whose riders waved long fly whisks over the young prince.

Within the great square of the palace, the Maharaja of Bikaner, surrounded by his court, awaited the bridegroom. It was a riot of color impossible to describe (Plates XVII, XXI, XXII, XXIII, and XXIV). As the Heir Apparent of Udaipur descended from his elephant, he was greeted by His Highness and carried away in a silver sedan chair.

#### Bride Not Visible—Only Her Hand

The wedding ceremonies lasted four hours, until well after dark. No men, except the immediate families, were allowed to be present; but Peggy spent several hours watching the fascinating rites inside the women's quarters of the palace. In obedience to religious custom she left her shoes outside.

The bride was totally hidden by her magenta- and silver-garbed attendants, who held a huge shawl before her. Only her hand appeared, bound by a long scarf to that of the bridegroom. Three priests intoned the service, very loud and very fast, while the Maharaja of Bikaner sat under a canopy on a throne.

The ritualistic parts of the marriage ceremony included the burning of *ghee*, or Indian butter. Three times the bride and bridegroom, still bound to each other, were led by their attendants around the burning fat. Since there was quite a draft, Peggy was fearful lest the bride's voluminous skirts catch fire.

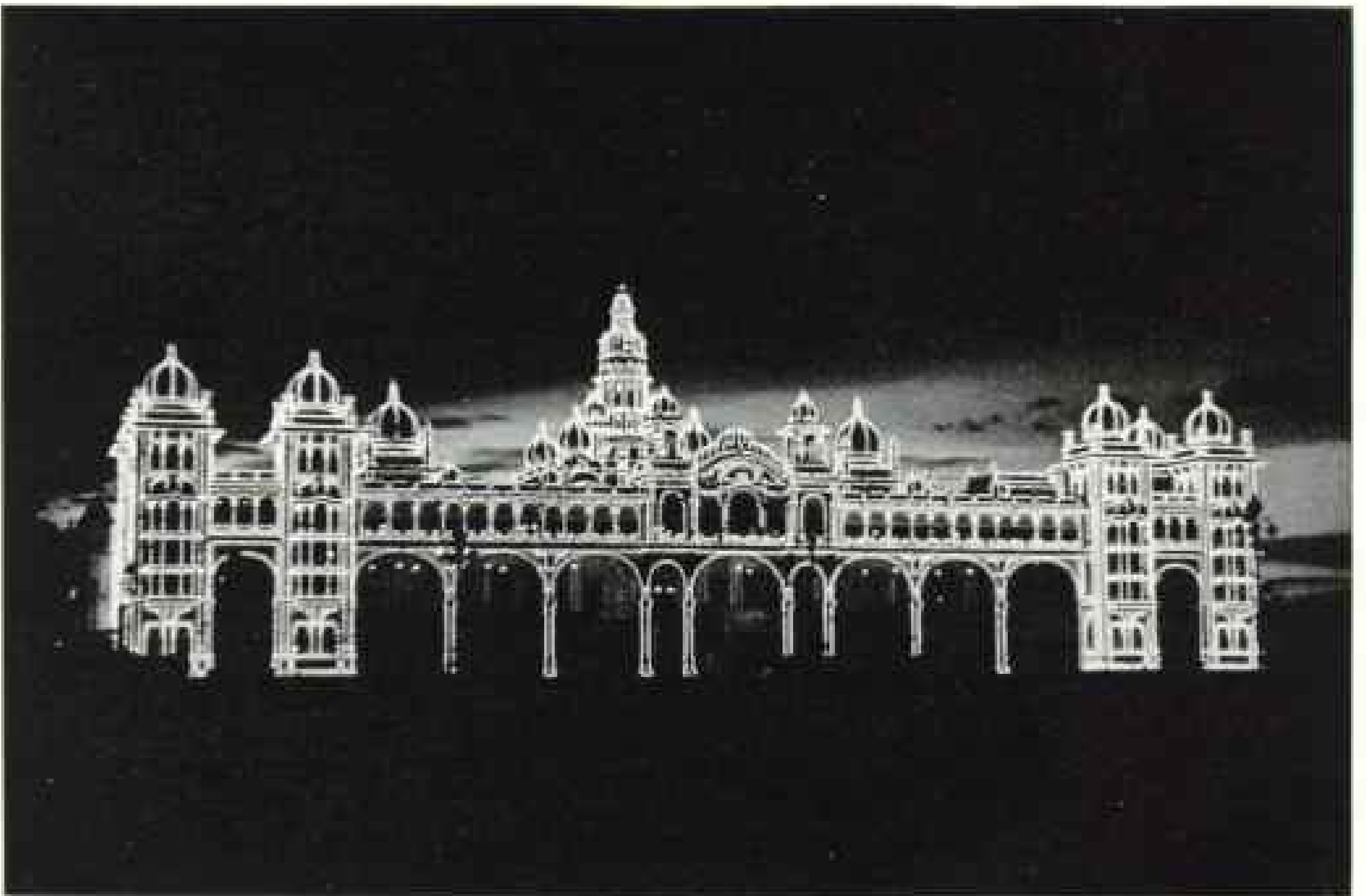
At intervals the veiled attendants burst into sad chants. The most impressive moment in the ceremony was when Her Highness the Maharani appeared, heavily veiled. She carried a long skein of silk which she presented to her husband. This stretched out of sight and was designed to symbolize the carrying on of the newly formed princely line.

During this lengthy interval the visiting princes and their large entourages were entertained by dancing and singing girls. About nine in the evening, with the palace a fairyland of lights, the happy couple were borne from the entrance in a silver and gold *pardah* sedan chair, the groom sitting in front and the bride within, hidden from all eyes.

For us the next four days were like a dream. Every minute of every day was taken up in royal entertainment. There was a review of Bikaner's army, and a sham battle that realistically displayed the efficiency of



**A Thousand Natives Serve as Beaters at a Tiger Hunt in Hyderabad**  
 On the way to the scene, some of them bear on their heads the authors' camera equipment.



**Fabulous as Fairyland Is the Palace of Mysore, Bejeweled With Myriad Electric Lights**

Its splendor bespeaks the opulence of the East—and also the tremendous progress made in the development of hydroelectric power in the great South Indian State of Mysore. From the Maharaja's own powerhouses comes the current for this striking illumination.



### Toes Help as Craftsmen Weave Pure Gold and Silver Thread

Chief among the cottage industries fostered by the Nizam of Hyderabad is the ancient one of weaving. A technical institute trains artisans in making and embroidering fine fabrics, dyeing cloth and carpets, silver working, and producing hidri wear—an alloy of zinc, lead, and copper inlaid with silver or gold.

His Highness' camel corps and camel artillery, ably commanded by the Maharaja in person during the first World War. There were Indian plays, and a renowned dancer, Gopinath, had been imported from far-off Travancore to entertain the guests.

One evening we were given opportunity to see the famous Bikaner fire dancers. Lashing themselves into a religious frenzy, they danced on white-hot coals and even ran around with them in their mouths.

Every evening there were fireworks; and the four-day celebration culminated in a State banquet where 300 ate from solid gold plates with solid gold tableware.

Before the banquet Peggy was presented to a beautiful child, the ten-year-old Raja of Mudhol.

"I have the pleasure of taking you in to dinner, Mrs. Thaw," he gravely informed her.

With long, dark, curling lashes set in a face of pale ivory and framed by an orange tur-

ban, he did not quite reach Peggy's shoulder.

He chose the most suitable of the eight kinds of curry for her; and, perceiving her to be in a draft, imperiously ordered the attendants to bring her wrap immediately.

He exchanged hunting experiences with her, though his were largely those of his father who had died the year before, leaving him a Raja at the age of nine.

"I hope that you will do me the honor of hunting in my country, as my guest," he remarked with all the aplomb of a grown man.

After dinner the Maharaja invited the ladies to another part of the palace to hear one of his favorite singers. The girl, lovely in the orange colors of Bikaner, sat at his feet with drums and lute for the accompaniment.

When first heard, Indian music appears discordant and monotonous; but after the ear becomes attuned it takes on a definite character and charm. One becomes fascinated with the accents in the rhythm.



### One of the Most Dangerous Creatures on Earth Is a Wounded Bear

With a single flick of its terrible tusks it can disembowel a horse; the stubborn fighters have even been known to hurl themselves at elephants. In dense cover the bear has at least an even chance, but here it has been driven into the open and several lancers have come up for the kill. From a rough-riding truck and touring car the authors' party filmed pigsticking, chief sport of Jodhpur (page 741).



For 950 Years a Giant Stone Saint Has Gazed Down Upon This Scene

The hill from which the picture was taken is topped by a 70-foot, 8-inch statue of the Jain saint Gomata (page 763). Between the two rocky hills lies the reservoir about which centers the town of Sravama Belgola, with its temples and rough temporary abodes of pilgrims. By tens of thousands they pour into town to render homage to the curly-haired sage.

His Highness asked Peggy if there was anything special that she would like the artist to sing. She mentioned a rather sad song she had liked because it had somewhat more harmony than the others.

"But it is not time for that song yet," the Maharaja exclaimed.

As Peggy looked puzzled, he explained: "Each piece of music has its time of day to be played. Certain are morning pieces, others for the afternoon, and still others for the evening. You have requested a morning piece, and it may not be played until after one o'clock." We were so enthralled with the entertainment that we were still there at 1 a. m., and Peggy heard her song.

The next day came the departure of the 16-year-old bride from the home of her fathers. The station was decked with flags, and its carpeted platforms were crowded with the subjects of Bikaner come to say goodbye.

All went well until the carefully hidden bride was put aboard her private car. She said farewell to her beloved grandfather and then dissolved in tears. She wanted, as a last favor, to be permitted to see her English "nannie" for the last time—her nurse, who was being left behind in Bikaner.

The royal train was kept waiting over an hour while a car sped to the palace to fetch this faithful gray-haired retainer. As she emerged, red-eyed, from a 15-minute interview with the princess, the band struck up the Bikaner and Udaipur anthems, and the train steamed slowly out of the station.

It was all a spectacle such as few have been privileged to see, and, so far as we know, none given the marvelous facilities to photograph. When will it be repeated, in our war-torn era? We were exhausted, and the three-day rest on the train journey back to Hyderabad was most welcome.

Our two weeks' work in Hyderabad was designed to register the vast progress the Nizam has made, in his reign of nearly a third of a century, in bettering the lot of his subjects by the judicious use of his wealth and resources. We photographed the great Osmania University, named after the Nizam and founded by him in 1918; the Osmania General Hospital, the most modern in South India; the mint, where all Hyderabad coins and stamps are made; the great fortress of Golconda, ancient capital of the Gutab Shahi kings.

But the phases of Hyderabad life that the Nizam has fostered most are agriculture and cottage industries (page 759), in sharp contrast with hydroelectric power and centralized heavy industry fostered by his neighbor, Mysore, in the south.

Mr. and Mrs. Ali Hydari, son and daughter-in-law of Sir Akbar, invited us to go on a hunt, 125 miles northeast of Hyderabad City. It was our first experience with princely luxury on shikar, and with the driven game method of shooting (page 758).

Our camp was in reality a small town. Tents that could have housed a circus were set up in a jungle clearing and a score of uniformed palace retainers given the job of taking care of five of us. When we hunted we were taken in motor cars to most comfortable, ready-built machans, and up to 1500 beaters drove the game toward us from several miles away. We each bagged a tiger.

#### Unsung Heroine of Hyderabad

At a country fair some thirty miles away we watched a baby contest.

An Indian woman doctor, charming in a pale-green sari, trained the mothers in the proper technique by personally washing 24 babies. The healthiest was then selected and Peggy awarded the prize to the proud mother.

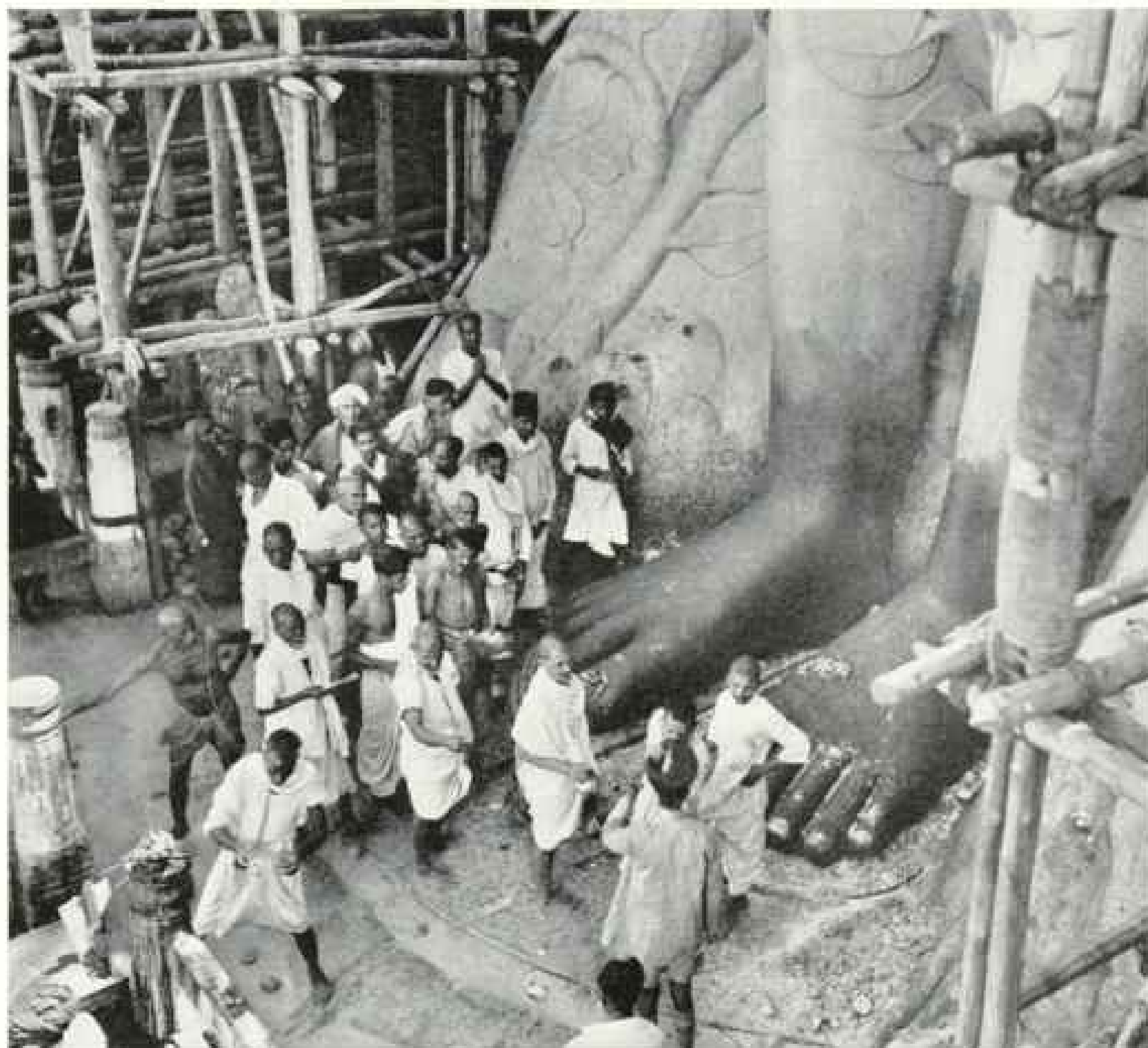
The woman doctor told us of her battle to stay the ravages of tuberculosis, and invited Peggy to visit the woman's hospital where she was doctor, surgeon, nurse, and guiding spirit. Miracles had been performed in the simple operating room without electric lights or running water.

On our return to Hyderabad City we told Sir Akbar about this brave little doctor and her courageous fight in the jungles of northern Hyderabad. He promised to send her assistance.

What a remarkable old gentleman Sir Akbar is! Well over 70, he is the nearest approach to a human dynamo we saw in India. With all of the many threads of public affairs in the great State of Hyderabad in his hands, he is in no small part responsible for the remarkable efficiency with which the humanitarian ideas of His Exalted Highness are carried out.

Upon him has been heaped every honor that Great Britain can bestow, yet he is quiet and unassuming. He took up boxing a year or so ago, his son told us, and was quite indignant when his physician advised him that this was a bit too strenuous a sport for a man of his years.

As we moved south, through Berwada and Madras to Madura, it got hot. It was the end of March and the monsoon season was approaching. It is not exactly cool in South India on the sea, even in the cold season. It is really unbearable in the eight weeks before the monsoon rains bring a welcome relief from the stifling, sticky heat.



**With Milk, Honey, Sugar, and Sandalwood Oil They Smear the Feet of a 70-foot Saint**

Barefoot pilgrims also bring flowers and fruit to lay at the enormous discolored extremities of the statue of the Jain sage Gomata at Sravana Belgola (pages 761, 764). About the legs of the nude colossus twine stone vines; these and stone anthills at its feet symbolize the holy man's deep abstraction. The timbers form a scaffold from which a thousand priests anointed the 950-year-old statue in a big religious celebration.

Possibly because it was overworked, our Frigidaire gave up the ghost at this point. Fahrney vowed that it couldn't do that to him. Assembling a formidable array of tools, he took the machinery completely apart and, to our astonishment, got it back together again. It thereupon froze everything, including the tinned beer, solid! Fahrney protested that he was no refrigeration expert; but the Madras service station man simply turned an adjustment, and all was well.

**To the Island Tea Made Famous**

At Madura stands the Great Temple, one of the largest Hindu places of worship in India. Built in the 17th century by Tirumala Nayak, ruler of Madura, it consists of two parts: one dedicated to the god Siva and one to his con-

sort, "the fish-eyed goddess." Mighty towers rise from its labyrinthine courts, and its walls are bright with miles of paintings depicting scenes from Hindu mythology.

We included a week in Ceylon in our Indian itinerary—far too short a time to visit this Crown Colony of the British Empire, but all the approaching monsoon season would allow. It was our purpose to make an educational film on the life and resources of this tropical paradise. Despite the shortness of time, we managed to get sequences on tea, copra, and cinnamon and some interesting light on the life of the people.

Our loop through the island took us, by excellently paved but narrow roads, along the coast to Colombo, thence inland, over rugged and densely overgrown mountains, to Kandy,



and finally through the heart of the island to Anuradhapura and back to Talaimannar.

Many travelers have visited Kandy, with its 14th-century Temple of the Tooth. This famous temple, built to house a tooth of Buddha, caused the city to become an important seat of the Buddhist hierarchy.

#### Deserted City Once Enormous

Comparatively few, however, except archeologists and pilgrim Buddhists, have visited the fabulous city of Anuradhapura, a hundred miles to the north. Twenty centuries ago this now-deserted city is reputed to have had a population of many millions, and an area the size of present-day London!

Stretching for miles, its ancient streets and crumbling ruins are engulfed in the rank jungle, but those few that have been cleared of undergrowth bespeak the magnificent civilization of the time of Christ, which vanished so mysteriously (Plate XXV).

How was it possible, with the primitive methods of transport of that day, to feed its staggering population? Think of the vast and complicated machine New York or London has to supply the necessities of food and water to its millions. Whither did this early civilization vanish? The total population of the whole island is less than six million today.

Back with our expedition units in Madura, we started on the final leg of our long journey—over the 7400-foot pass of the Nilgiri Hills at Ootacamund and on to the great South Indian State of Mysore.

As in the case of Hyderabad, we had been in long communication with the Prime Minister of this progressive State, Sir Mirza Ismail; and all arrangements had been completed to enable us to film its important industrial development.

Housed in the guest palace, we visited the mighty Krishnarajasagara Dam,  $1\frac{1}{4}$  miles long and impounding a lake of 50 square miles. This guarantees water for irrigation of hundreds of square miles of otherwise arid land, and hydroelectric power for many industries.

In the wake of Mysore's progressive trend, silk weaving, heavy chemical, sandalwood oil, steel, and gold mining industries are springing up. The great Kolar gold fields, near Bangalore, are the most important source of the precious metal in India. They have been mined for millenniums and were the ancient world's chief source of gold. Today their mines rival those of Africa's Rand in depth, some shafts penetrating nearly 8,000 feet.

It was most amusing, on the blistering hot day that we worked in the Kolar field, to see

the workmen coming to the surface from the great depths wearing heavy fur coats. It was 125 degrees where they had been working, far down toward the earth's hot heart, and the air as they neared the surface seemed to them cold by comparison.

We met His Highness Sir Sri Krishnaraja Wadiyar Bahadur, in his great palace completely outlined with electric lights (page 758), and he also visited us at the guest palace. A quiet, saintly man, who spent much of his time in meditation and prayer, he nevertheless had advanced ideas for his people. We heard of his death in August, 1940, of a heart ailment. With his passing, India lost one of its foremost princes and the world one of its great men.

We were fortunate in our year of visit to Mysore State, for, north of Mysore City in the village of Sravana Belgola, a great religious celebration was about to take place. It is held every 15 years.

On the crest of a hill which is a single, smooth boulder, and which is climbed by 500 steps hewn into the rock, stands a 70-foot statue of the Jain saint Gomata. Larger than any known figure of Rameses in Egypt, this giant carved monolith has withstood the weather of almost a thousand years, a cryptic smile on its stone lips.

A scaffold was erected around the figure, for the saint was to be anointed by a thousand of his priests. For weeks tens of thousands of Jains from all over India had poured into the temporary city that sprang up at the hill's base, until half a million had come.

Day and night a steady stream of pilgrims climbed the hill to make offerings of milk, honey, fruit, flowers, sugar and sandalwood oil at the statue's feet (pages 761 and 763). All were barefoot, as were we, perforce, when we toiled up the interminable 500 steps.

#### 11-Month Journey Ends at Bombay

North, ever north, through Kolhapur and over the Western Ghats, we pressed. Finally, on April 16, 1940, under the shadow of the Gateway of India arch on Bombay's water front, our wheels came to rest (Plate XXX). Where once goods bound over middle Asia to the Assyrian, Persian, and Roman Empires began their long journey, we ended ours.

Since 1498, when Vasco da Gama sailed around the Cape of Good Hope to Calicut, and Europe found a sea road to the Indies, few had so faithfully followed the silk and spice route across the breadth of the East to the great peninsula of India. We had completed our longest trek—back over one of the most historic trails on earth.

## Princely India, Resplendent With Jewels and Gold



### After a Grandson's Betrothal Ceremony, Bikaner Leaves His Palace by Car

The Maharaja in traditional attire stands at salute in his automobile while his military band plays the anthem of his State, one of 21 in the Rajputana Agency.



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Kodachromes by Lawrence Carter, Thos.

### Fourteen Neighbor Princes Come to the Wedding Durbar of Bikaner's Granddaughter

Since each ruler is accompanied by a retinue of 200 or more, the enormous palace is crowded. The Heir Apparent is here seated third from the left. At his right is the 37-year-old Maharaja of Jodhpur.



© National Geographic Society

Kabulistan by Lawrence Capley Thun

**For the Betrothal There Is a Procession Almost as Brilliant as That for the Wedding**

A drummer riding a camel leads the march, with two dashing horsemen in his wake. Then comes a full band followed by a company of infantry. A troop of hearse-carrying the gifts on covered salveys is next in line; and last come carriages conveying the leading guests and dignitaries.



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Reproduction by Lawrence Cupler Thun

### Crack Troops of the Maharaja of Bikaner's Camel Corps Line up for His Grandson's Betrothal Ceremony

In the first World War this organization with camel-drawn artillery (Plate XXI) was commanded by His Highness in person. It did useful service around the Suez Canal. Here a detachment stands at attention for the announcement of the marriage of Prince Karni Singhji Bahadur and the Princess of Dungarpur.



© National Geographic Society

Kodachrome by Lawrence Ogilby Thayer

**An Aged Standard-Bearer Stands Behind the Troops at the Betrothal**

Though obviously not an official, he held his place in front of the palace during the ceremony. The banner, the significance of which no one seemed to know, was evidently his own idea.

Princely India; Resplendent With Jewels and Gold



Pride of Bikaner's Army Is the Camel-drawn Artillery

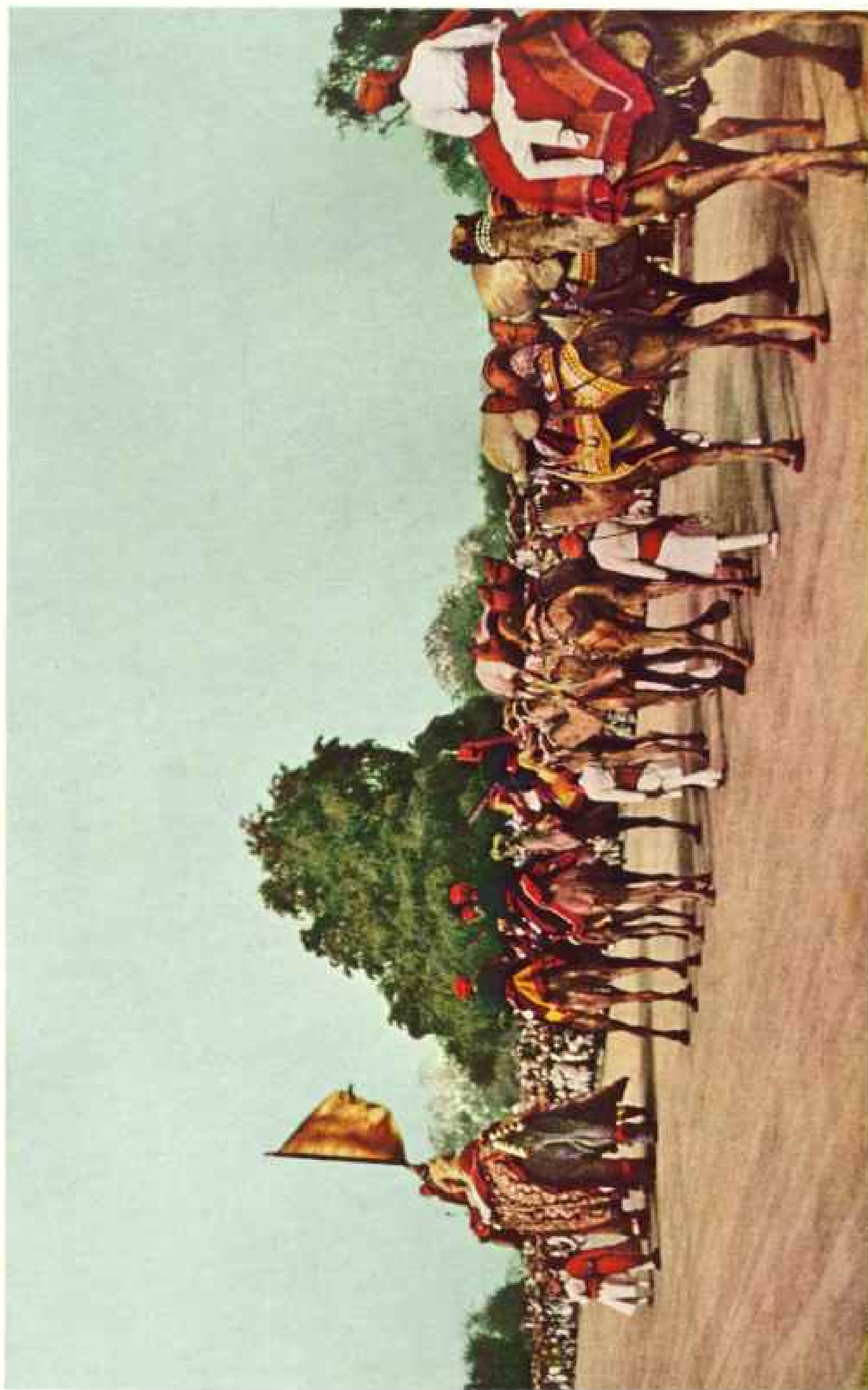
The gunners gave an exhibition of accurate marksmanship in a sham battle staged as a part of the entertainment in the wedding durbat of the Maharaja's granddaughter.



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Kulchrose by Lawrence Cooley Thayer

Magnificently Matched Teams of Oxen, Decked with Silver Blankets, Draw Ornate Carriages in the Bikaner Wedding Procession



© National Geographic Society

Redactions by Lawrence E. Copley, Thru

### Like a Scene from an Oriental Legend Is a Bikaner Wedding Procession

The standard of the principality is carried at the front on a richly caparisoned elephant. In the camel train which follows, the bed beasts, all bearing women's saddles, are gifts presented to the bride. The parade marched only on the day of the actual ceremony uniting the Maharaja's granddaughter and the heir Apparent of Udaipur. The durbar celebrating the nuptials began a week earlier, however, and lasted a fortnight.



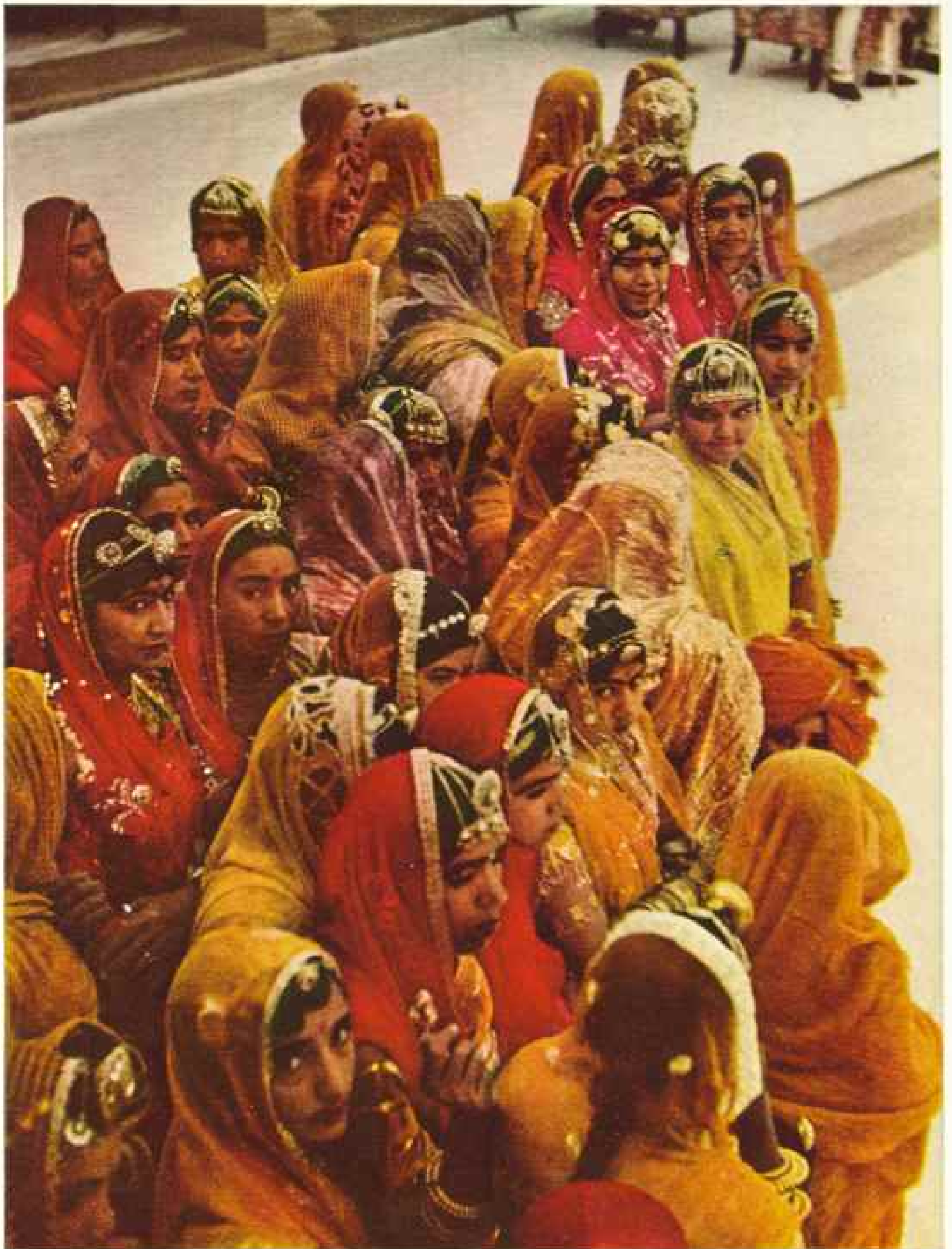
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### The Wedding Procession Ends in the Thronged Courtyard of Bikaner Palace

Mounted on an elephant, and with two other elephants following, the bridegroom, the heir apparent of Udaipur, came through the archway in the rear and up to the platform at the extreme left. He descended there to receive the greeting of the Maharaja of Bikaner, who was soon to be his father-in-law. This ceremony over, he was carried in a silver palanquin through the doorway at the right to the scene of the nuptial rites.

Redaction by Lawrence Collier Thayer





© National Geographic Society

Kailashree by Laurence Carter Thaw

**"They Also Serve Who Only Stand and Wait"**

During the wedding ceremony of the granddaughter of the Maharaja of Bikaner and the Heir Apparent of Udaipur, these girls entertained the visiting princes and other guests with seemingly interminable songs and dances. Only the immediate families and a few ladies, including Mrs. Thaw, were permitted to attend the actual nuptial service, which went on for hours.

## Princely India, Resplendent With Jewels and Gold



### Bhutanese Tribesmen Were Unexpected Callers on the Assam-Bhutan Frontier

Just returned from a hunt on elephant back, the authors hastily produced boxes of cigarettes and a scarf of Mrs. Thaw's to reciprocate their visitors' gift of elaborately embroidered bags. The man wearing a felt hat is an official of the migrating tribe, his companion a Tibetan lama with gold-lacquer headpiece and prayer beads.

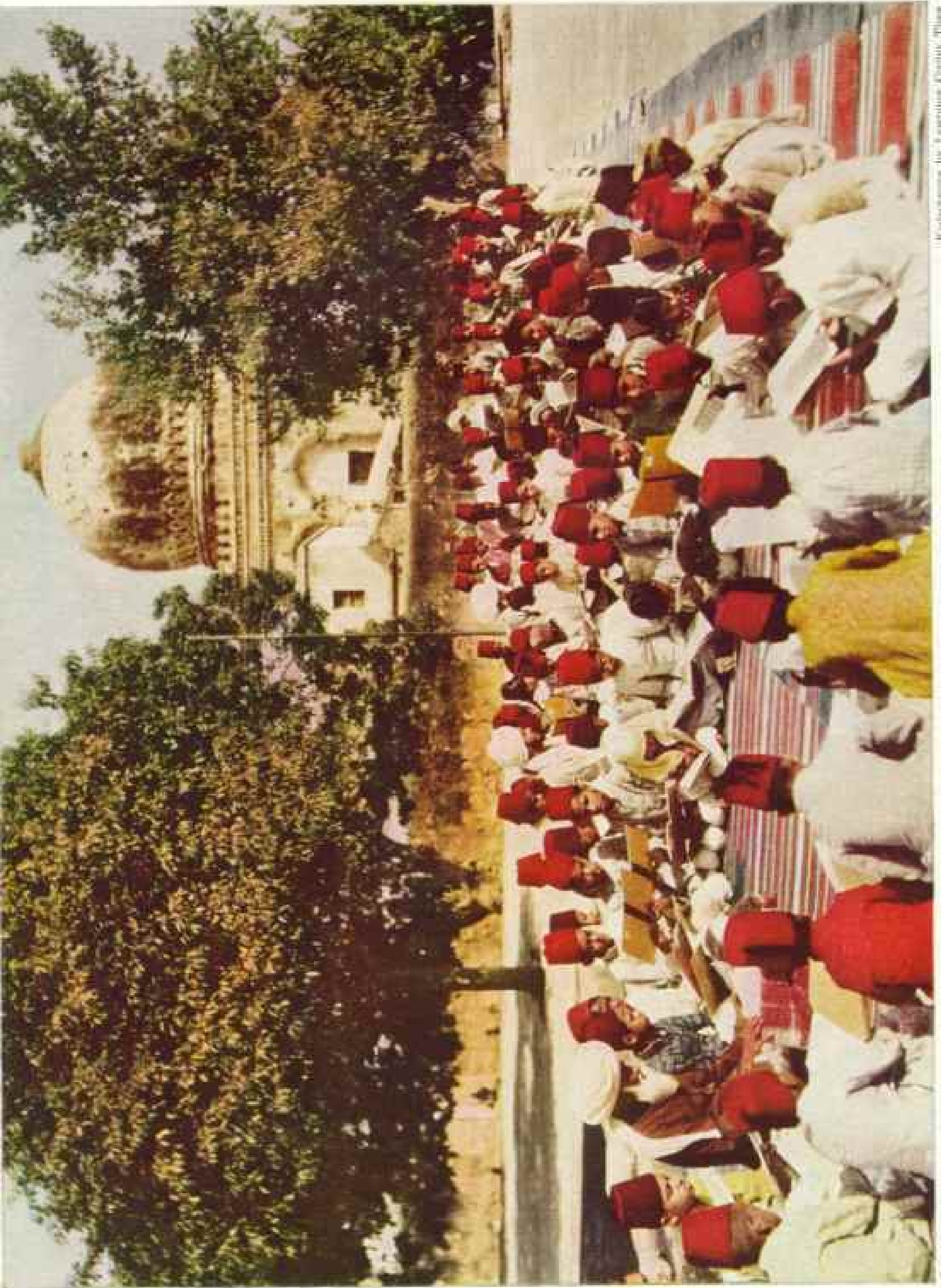




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For Miles Along the Ganges at Benares the Devout Bathe and Hindu Dead Are Cremated on Burning Ghats

Illustration by Laurinda Clutter Thiss

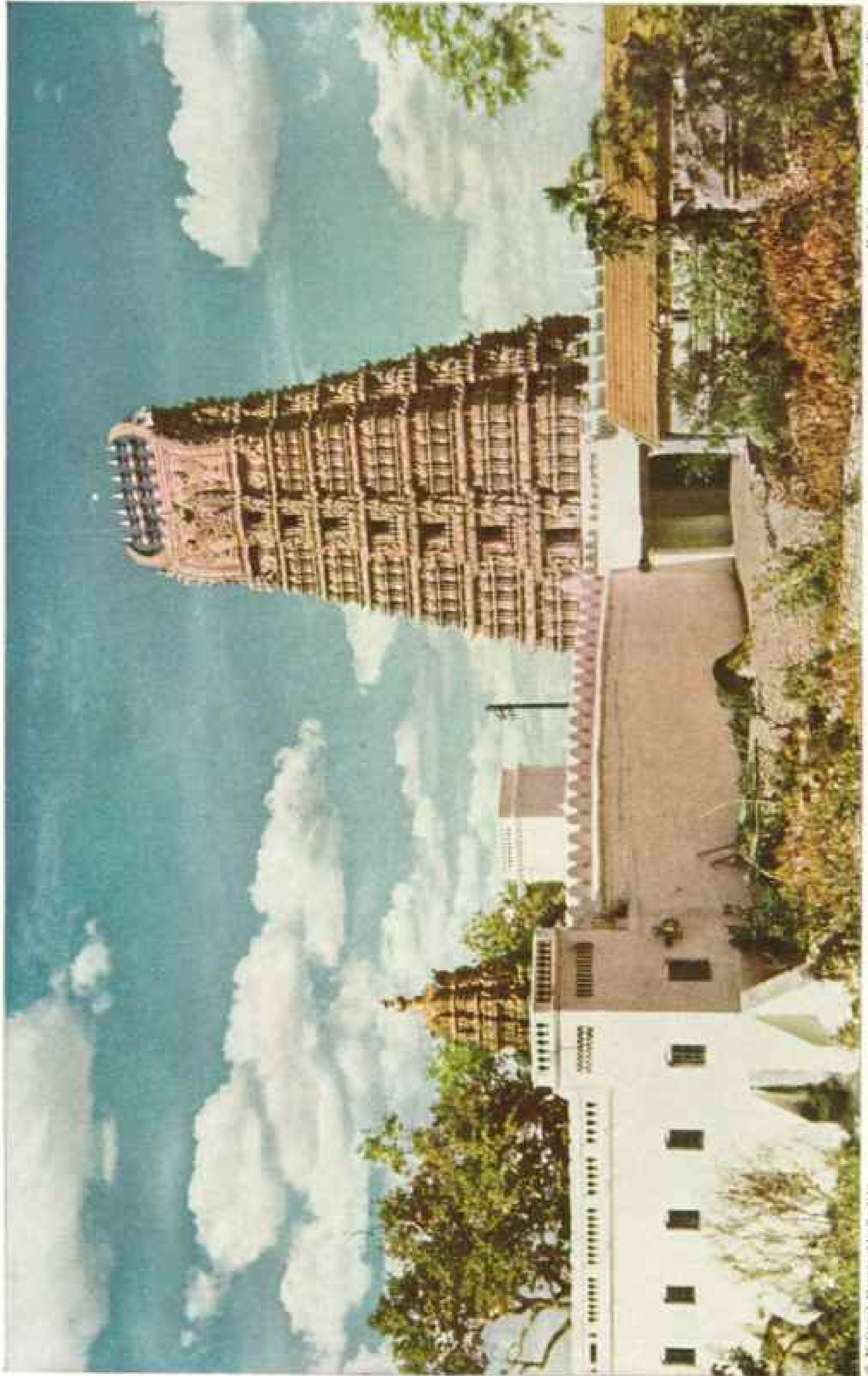


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Illustration by Lawrence Ogden, Tulsa

Led by a Mullah, Moslem Boys Sway in Unison and Chant the Koran until They Know It by Rote

Hyderabad State is predominantly Hindu, even though the Nizam is a Mohammedan. Here are held Friday classes, the Moslem equivalent of Sunday School.



Kochurama by Lakkurama Gopaley, Pisee

**Crowning Chamundi Hill in Mysore City Rises Chamundi Temple**

It stands 2,489 feet above sea level and commands a fine view of the surrounding country. Beyond the shrine is a residence of His Highness the Maharaja. The name of the eminence is a title of the Goddess Kali, family patroness of the Wadiyar dynasty. Ornatmentation of the main edifice is characteristic of Hindu sacred architecture.

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Reproduction by Lawrence Cribber, Thane

### Electric Lights Outline the Entire Palace of the Maharaja of Mysore

Current for modern illumination around the historic structure is generated at up-to-date hydroelectric plants.

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Before the Gateway of India in Bombay the Expedition Ended Its 11-month Journey

This magnificent portal stands on the water front immediately opposite the Taj Mahal Hotel. The trailer later became the property of the Gateway of Baroda.

Photograph by American Explorer, Thayer



© National Geographic Society

Statuehouse in Laurium, Capri, Italy

### In Deserted Polonnaruwa Are Statues Carved Out of Solid Rock Two Thousand Years Ago

These relics found on the island of Ceylon are remarkably preserved, considering their antiquity. Cut from the cliff face is a figure of Ananda, Buddha's chief disciple. The recumbent Buddha, before which a worshiper is kneeling, is 45 feet long. The city is 50 miles southeast of Anuradhapura (Plate XXV, lower).





**Hyderabad Women Wade the Flooded Rice Fields to Pull Weeds**

When the crop is about a month old, this task must be done, and everywhere in the farms long lines of female laborers plod through the grain close together, so that no areas will be left unattended.



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Contributions by Lawrence Cooper Thayer

**On a Ceylon Tea Plantation Women Pick the Leaves**

When the crop has been gathered in baskets, it is taken to a factory near by and there processed and packed in 100-pound boxes for shipment.

# Canoeing Down the River Jordan

Voyagers in Rubber Boats Find the Bible Stream Little Tamed  
Today as It Plunges to the Dead Sea Over the  
Earth's Lowest River Bed

BY JOHN D. WHITING

**D**OWN a deep rift in the earth's crust rolls the River Jordan of our hymns, most sacred stream in all Christendom and also one of the strangest and most forbidding.

Throughout most of its often-tumultuous course this river in which Jesus was baptized flows hundreds of feet below ocean level on its way to the Dead Sea, lowest spot on earth.\*

Though its hurrying waters now generate power, the Jordan today is far from tamed. Boats are barred by rocks and rapids, and men shun its hot unhealthful shores, even as they did in Old Testament times when this valley wilderness was a rough boundary line between the desolate abodes of the nomads and the Promised Land of town and farm.

From faraway England the Reverend R. J. E. Boggis, Vicar of St. John's, Torquay, wrote that he long had desired to make a trip down Jordan and was seeking companions. He had written not only to world-renowned travel agencies but also to the Orthodox Lord Archbishop of Jordan, and the answer from all was "Impossible!" Still, he was undismayed.

I volunteered to make the trip myself and to find a suitable crew for two double canoes. The capacity of the holds of the decked canoes was calculated to a fine point, and compact forms of food were selected to fit the space available. We carried, for emergency, canned foods and hard Swedish rye bread which was delicious when crisped in a Jordan sun. Dry dates in small tins were among the mainstays.

The oldest clothes we had, rolled tightly in two heavy wool blankets, were encased in watertight duffel bags. A Swedish miniature primus stove and a few simple utensils completed our necessities.

## Malaria and Vipers Feared

Our native doctor suggested we "eat" quinine generously to escape malaria. Upon our return to Jerusalem after twelve nights of exposure—sleeping in marshes, on sand, or clay banks—we all had our blood tested and not a trace of malaria was found.

Snakes, not generally dangerous in Palestine, are exceptionally venomous in the Ghor, as the valley of the lower Jordan and the Dead Sea is known, and the viper is much feared.

To our camp in Jericho, years ago, a shepherd came limping, his bloody foot minus a great toe. Walking barefoot through the dry grass, he had felt something strike him. Believing it a poisonous snake, he set his foot on a rock, his dagger blade at the joint, and with blows from a stone severed the supposedly poisoned member (Matt. 5:30).

Was it not in "all the country about Jordan" that John, of the camel-hair raiment, said to the multitude that came forth to be baptized of him, "O generation of vipers, who hath warned you to flee from the wrath to come"? (Luke 3:3, 7).

Snake serum and hypodermic syringes went into our compact medical kit.

## Armed with Only a "Shibboleth"

We carried no weapons, and the few simple folk we saw were generous, helpful, and friendly. Once you can salute a Bedouin in his own vocabulary, can grasp his hand as an equal, look him squarely in the eye as a friend, and converse in his own peculiar dialect, you have nothing to fear.†

During an early Hebrew intertribal war "the Gileadites took the passages of Jordan," and, stopping the escaping defeated Ephraimites, tested their identity by asking them to repeat the word "Shibboleth"—for the Ephraimite "could not frame to pronounce it right" (Judges 12:1-6).

I had pictured the Reverend Mr. Boggis as a man in the prime of life, a canoeist of experience, and an efficient swimmer. My son, Spafford, then 22, with some knowledge of medicine, and my nephew, John Vester, 21, volunteered as crew. All three of us knew how to handle a boat.

When finally my correspondent presented himself, I must admit to a shock. Here was a man of smallish stature, lightly built and frail-looking, of at least threescore summers and ten. The huge life preserver he carried was an admission that he could not swim (p. 808).

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

† See "Bedouin Life in Bible Lands," by Mr. Whiting, NATIONAL GEOGRAPHIC MAGAZINE, January, 1937.



© John D. Whiting

### Galilee Fishermen Like Unto Those of New Testament Days

From such everyday scenes as this, Jesus drew many of his parables. "The kingdom of heaven is like unto a net, that was cast into the sea, and gathered of every kind" (Matt. 13:47). The first Disciples were Galilee fishermen. These men don short coats when coming ashore. "When Simon Peter heard that it was the Lord, he girt his fisher's coat unto him (for he was naked) and did cast himself into the sea" (John 21:7).

But how deceitful looks often are! Never could one wish for a more delightful companion—sagacious, merry, cheerful under strain, and exhibiting extraordinary stamina. During the early military occupation of Palestine in the First World War, our children had adopted the name "Padre" for all military chaplains, so throughout the trip Mr. Boggis was "Padre."

#### The Crossroads at Nazareth

One bright autumn morning—for all but a few winter days are bright in Palestine—we packed our few belongings into a car and whisked through Judaea and Samaria. The day was still young as we reached the crossroads at Nazareth, and I sped west to Haifa to get the canoes, of the faltboat type, out of customs.\* The others continued east to Tiberias and north to Tabigha, at the upper end of the Sea of Galilee (map, page 784).

Late evening found me at Tabigha and crack of dawn under the palm trees with the boys, puzzling out the translation of directions for assembling the canoes. Working as if doing a picture puzzle, we finally got both the dismantled canoes together. These rubber-covered, wood-ribbed craft, when assem-

bled, were as rigid and firm as a wooden canoe, but later we found that in rough water they were fortunately supple (page 798).

Too excited to let a moment pass, we carried the canoes down to the lake and set out along the north shore, Spafford taking Padre in his canoe, John and I leading in the other.

A short paddle eastward brought us to Tell Hüm, not without reason identified by some students with Capernaum, the home of Jesus after he left Nazareth † (Matt. 4:13).

#### Where Jesus May Have Taught

In this hill the Franciscan Fathers have bared, by excavation over a long period, the basalt remains of a city—columns, a large public olive crusher and oil press, many smaller olive and wine presses for home use, and stone water pots (John 2:6-7).

These homely remains are usually passed

\* See "Entering the Front Doors of Medieval Towns (in a folding boat)," by Cornelia Stratton Parker, in THE NATIONAL GEOGRAPHIC MAGAZINE for March, 1932.

† The New Testament name means "Village of Nabum (consolation)"; the Arabic word "Tell" or "Tel" indicates an artificial hill covering ruins and is identical in Biblical Hebrew.



Photograph by MARSHALL OWEN WILLIAMS

#### Sea Level Near Capernaum Means High Pasture Land

The sign is located in a field alongside the road, which climbs upward from the Sea of Galilee on its way northward to Damascus. The surface of Galilee is 686 feet below the Mediterranean.

unnoticed, for the main interest here lies in the ruins of a synagogue which was originally built of huge blocks of white stone hauled at considerable labor from the distant mountains.

The workmanship and elaborate carvings are clearly Roman in type, interspersed with Hebrew motifs—the seal of David, pomegranates, grape clusters, wreaths and chalice, and so on, mentioned in the decorations of the Tabernacle and Solomon's Temple (I Kings 7:18, 42; II Chron. 4:13).

Such features, and the fact that an eagle is carved upon a door lintel, have led to the belief that this was the synagogue built for the Jews by the Roman centurion, an officer of 100 legionaries garrisoned here (Luke 7:5). If so, this would be the one to which Jesus often resorted and where He taught (Mark 1:21). Some students, however, place it at a slightly later date.

Again we followed the north pebble-strewn shore, and, reaching the inflow of Jordan, paddled up it as far as we could. Trudging across a boggy delta that 20 centuries ago had been lake, and jumping irrigating ditches into which green tortoises slithered to bury themselves in the muddy bottom, we found ourselves, scratched by thorns and briars, at Et Tell (The Hill of Ruins).

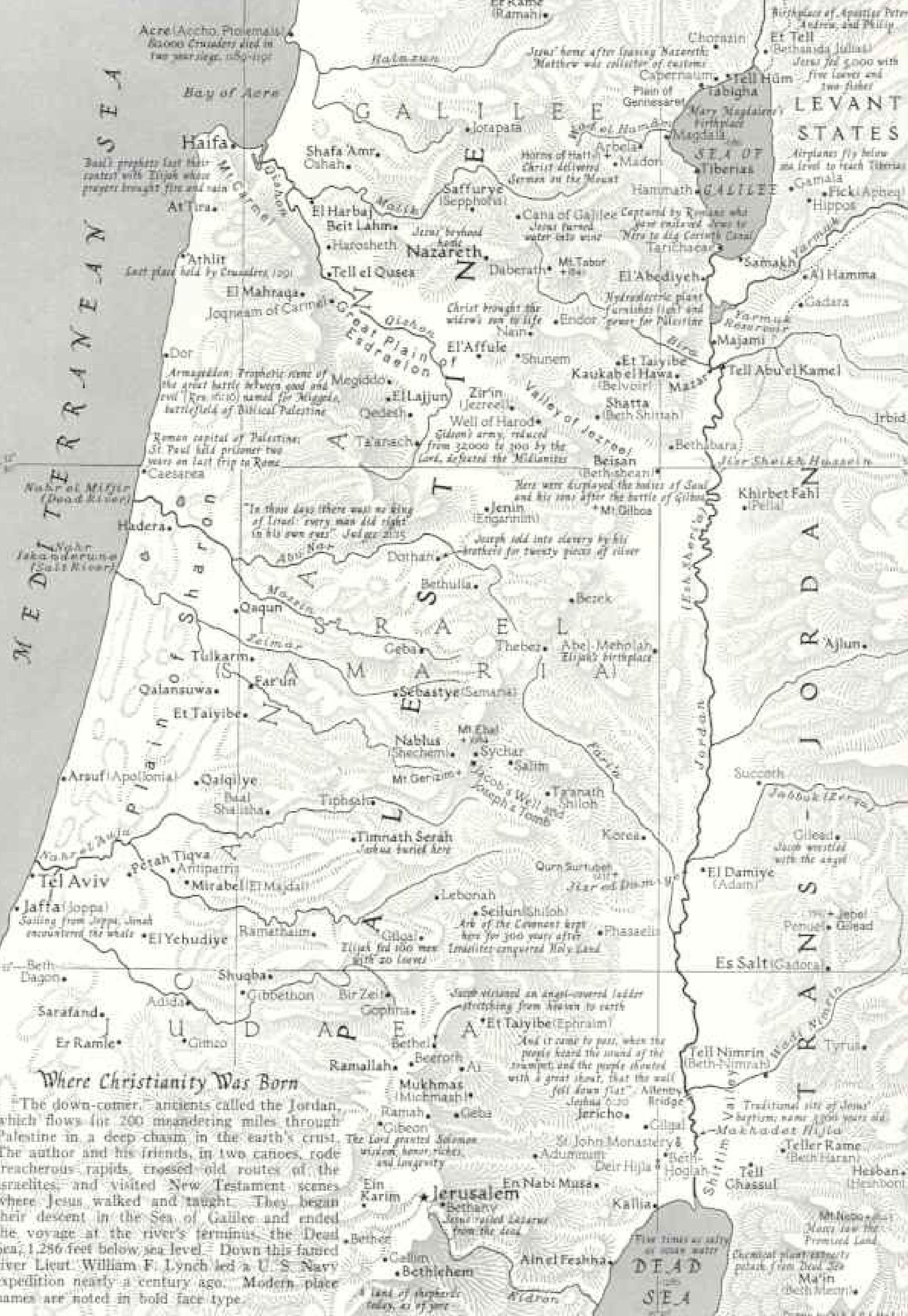
Hereabouts possibly was situated—then on the shore of the Sea of Tiberias (Galilee) at the inflow of Jordan—Bethsaida, "place of fishing," home of Jesus' fisher disciples. "Now Philip was of Bethsaida, the city of Andrew and Peter" (John 1:44).

#### "There Came Down a Storm of Wind"

Weary from a long walk over rough ground, we reached the canoes and headed for Tabigha. The lake was millpond smooth, clear and blue as an aquamarine. Flocks of goats came down to water, and herds of cattle stood cooling in the lake. Bright-plumed kingfishers, large and tiny, poised in the air and then hurled themselves waterward, seizing a small fish and winging away. Ducks floating at ease disappeared like a flash when alarmed, and reappeared at a distance.

Without warning—to use the New Testament phraseology that bears no improvement—"there came down a storm of wind on the lake . . . and (we) were in jeopardy" (Luke 8:23). Like a flash our minds switched from contemplating the beautiful to saving the expedition from disaster.

Bending to the paddles, John and I outstripped the other canoe and managed to reach the little Tabigha hospice breakwater,



### Where Christianity Was Born

The down-comer, ancients called the Jordan, which flows for 200 meandering miles through Palestine in a deep chasm in the earth's crust. The author and his friends, in two canoes, rode treacherous rapids, crossed old routes of the Israelites, and visited New Testament scenes where Jesus walked and taught. They began their descent in the Sea of Galilee and ended the voyage at the river's terminus, the Dead Sea, 1,286 feet below sea level. Down this famed river Lieut. William F. Lynch led a U. S. Navy expedition nearly a century ago. Modern place names are noted in bold face type.

But Spafford, having landed Padre, was having difficulty.

As we ran along the beach, we saw him swimming and trying to steer the half-filled canoe to shore. Jumping in, clothes and all, we swam out and steered it into a shallow protected bay.

As suddenly as the storm arose, it abated: "the wind ceased and there was a great calm" (Mark 4:39; Matt. 8:26).

These terrific sudden storms have a geographic reason. Upon the Dead Sea, in the earth's deepest pocket, and to a less extent upon the whole Jordan Valley, the noontide sun beats down unmercifully. A vacuum is caused, and, as the heat slackens, the cooler air from the mountains literally rushes down to fill the void, swaying tall palms and other trees like dervishes and whipping the lake into angered fury.

#### Bound for the Dead Sea

At dawn we finally stowed the various small bags and boxes, with enough room left to stretch our legs on the bottom. Between each man's legs stood his duffel bag, which served at times as a rest for the double paddle.

When, shortly after 8 a. m., we were ready, Padre was encased in a huge double life preserver, which he never failed to wear but which fortunately never was wetted.

As we pushed off from shore, Father Tepper, beloved head of the tiny Catholic hospital on the lake shore, stood on the water steps, pulling at his Barbarossa whiskers, the smile all gone from his happy, genial face which has welcomed and bid farewell to thousands of Galilee visitors.

He had told us in no uncertain terms what fools we were.

Counting on crossing the lake before a possible afternoon storm, we headed straight for Tiberias across the bay.

#### Home of Mary Magdalene

Mud-built Magdala, identified as the home of Mary Magdalene (John 19:25), lay on the shore to our right, close by the fertile Plain of Gennesaret (Matt. 14:34), richly clothed in orange and banana plantations.\*

Contrasting with the greenery of the plain are the gray rock precipices towering above Magdala. Into these cliffs the modern road had to be blasted.

The Old Testament Migdal-el (Tower of God) was probably situated here (Josh. 19:38). The Greek name "Magdala" means

\* Dalmanutha, mentioned in Mark 8:10, may have been either another name for Magdala or a suburb or village near it.

"The Tower," implying greatness. This rock tower is rent asunder by a deep chasm, the Wad el Hamám (Valley of Doves), through which most of yesterday's wind storm had "come down" upon the lake.

The precipices are still honeycombed with artificial caves. When Herod the Great came into power, these were infested with robbers who could not be dislodged.

"These caves," wrote the historian Josephus, "were in mountains exceedingly abrupt, their middle no other than precipices with entrances into the caves; in these did the robbers lie concealed. But the King caused chests to be made and to be (let) down with iron chains by an engine from the top of the mountain, it being not possible to get up to them (the robber caves) by reason of the sharp ascent, nor to creep down from above.

"Now these chests were filled with armored men who had long hooks by which they might pull out such as resisted them, and then tumble them down and kill them by so doing. But the letting the chest down proved to be a matter of great danger because of the vast depth."

Josephus describes the assaults upon the caves by armored soldiers, the slaughter, the amnesty offered to those that capitulated, and the case of one old man who slew his own wife and seven children and threw their bodies over the precipice rather than allow them to surrender. The historian records that by such means "all these caves were at length subdued entirely."

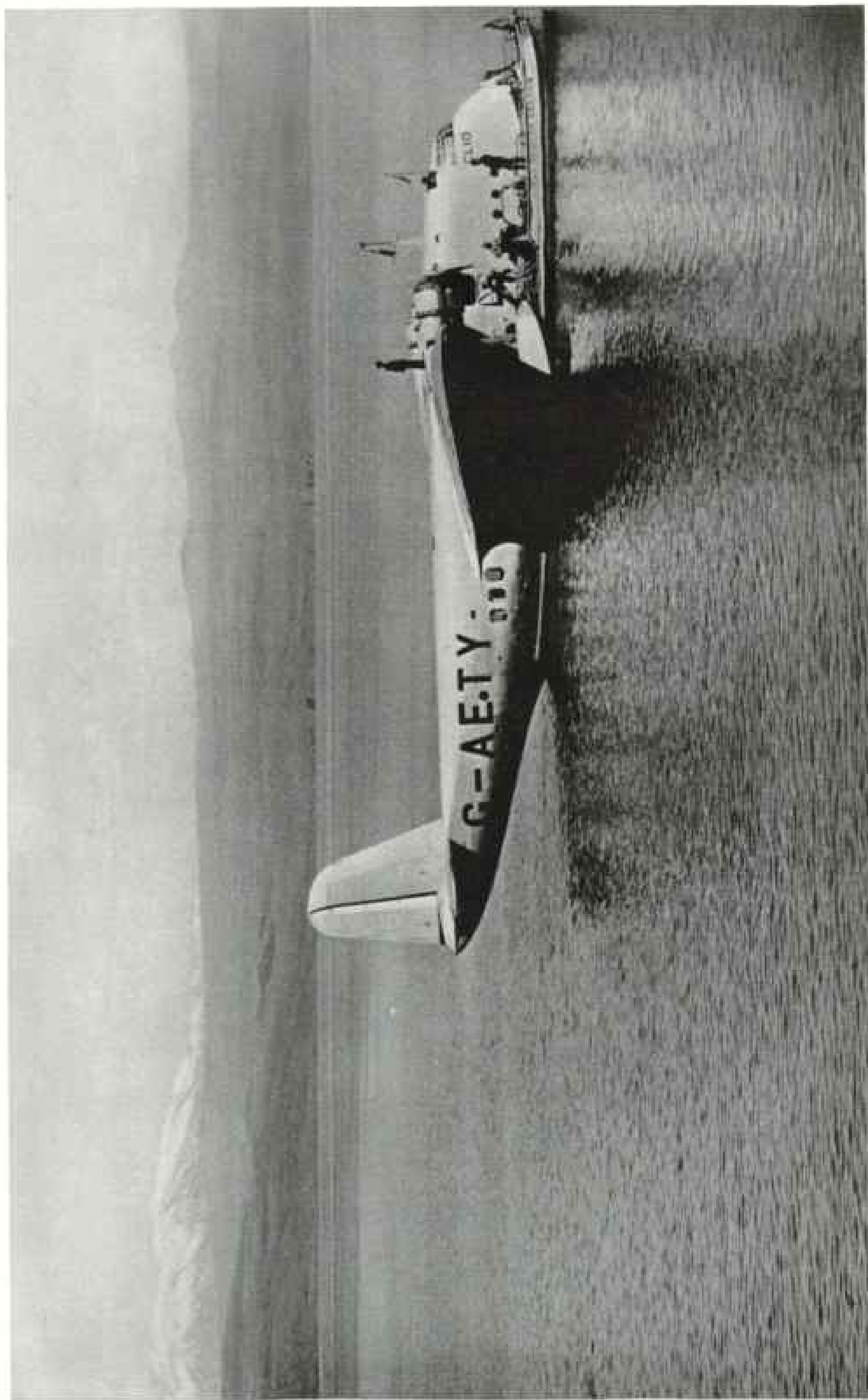
#### Flying Boats on Galilee

Our thoughts were suddenly jolted out of the past as we neared Tiberias and were confronted by a huge white mechanical bird floating gracefully upon the bluest of waters (p. 786).

We landed at Tiberias only long enough to buy a few last but necessary trifles, have a bit of lunch and a short rest. In full view lay the ancient city with its remnants of Crusader walls.

In the cool of the evening the inhabitants here gather to eat and relax, as did the Crusader knights sipping the choice wines of Cyprus and watching for any movements of Saracens from across the lake and chasm. The last vision one gets of the Crusaders is that of their lords and knights herded within these ramparts, captives of Saladin after the fateful Battle of Hattin in 1187.

After the destruction of Jerusalem, A. D. 70, Tiberias, from the rank of a semiheathen city, became a center of Jewish religious learning (page 790). From a Tiberias rabbi, St. Jerome learned Hebrew; and later, the Vulgate, as his



Photograph from *Wide World*

#### Modern Wings in a Biblical Setting

*Clio*, a graceful flying boat of the Imperial Airways, pauses on the Sea of Galilee on its way to India (page 285). In the left background stands Mount Hermon, with its three snow-capped summits, referred to in the lines of the 42nd Psalm: "Therefore will I remember thee from the land of Jordan, and of the Hermonites." Trees near the water's edge, directly beyond the seaplane, mark the traditional site of Capernaum of the New Testament.



© G. Herr Madsen

#### Where Placid Galilee Mirrors Mount Hermon, the Canoeists Began Their Voyage Down the Jordan

The river enters from the valley in the background. In the Old Testament the lake is called "Chinneroth," meaning harp, because of its shape. In the New Testament it is called the "Sea of Galilee," "Sea of Tiberias," "Lake of Gennesaret," and also simply "the sea," or "the lake." No appellation is more apt than its modern one, "Blue Galilee."





© G. Eric Matson

### Downward Rushes the Jordan from the Sea of Galilee

Dam and road crossing in center mark the point of outflow from the lake, at left. Beyond lie modern communities and well-tended fields of Jewish settlers in Palestine.

version of the Hebrew scriptures is known, became the first great translation of the Bible into a language of Western Europe.

The afternoon gale again threatened, so we hugged the shore, passing close to the white-domed hot baths, first mentioned nearly 2,000 years ago by Josephus in connection with the selection of the site for Tiberias.

Reaching the southern end of the lake, the day being far spent, we camped on a sandy pebbled beach between the lake and the outflow of Jordan.

As I lay there, it was soothing to listen to the rippling sound of small waves beating against the shore, seemingly answering the silver tinkle of Jordan's first little rapid just across the barrier. The half-moon was exceptionally bright and lit up much of the lake and the mountains of Syria. Everything seemed utterly peaceful. Still, this very soil had been drenched with blood.

Seemingly without reason, the spot is known as "Kerak." Hereabouts, unpretentious ruins

probably mark the site of the Jewish fortified town of Tarichaeae, conquered with terrible slaughter by Vespasian's son Titus in the Roman wars waged against the Jews. After its conquest, what might be called a naval battle subdued those who had taken refuge in ships.

The remnants were allowed to escape, but only on the road toward Tiberias. Here they were herded into the stadium. Urged by his officers, Vespasian had all the aged and useless males slain and the rest sold into slavery, many being sent as a gift to the cruel Nero to be used in digging the Corinth Canal.

### A Mountain Like a Kneeling Camel

Gamala, northward across the lake, abrupt and detached from the rest of the range, could be detected by the lesser lights that ruled the night. Because of its likeness to a kneeling camel, it received its Hebrew name. Vespasian took it, after heavy loss to his army.

Delightfully weary, we dozed at last. The thundering hoofs of the Roman horse and the

battle cry of their legionaries faded away into Jordan's murmurs.

Next morning each member of the party fell into the duty for which he was best fitted. I became captain, cook, commissariat, and stevedore.

Possibly no moment of the whole trip had the same thrill as when we dipped our paddles for the last time in the lake. It was October 9. The drought of summer had been broken by an early autumn shower. Before us rose the steep marl bank that holds back the lake waters. Upon it rests the small town of Samakh, through which runs the railway linking Haifa with Damascus and thereby with the great pilgrim road to Mecca.

Thus far we had been able to visualize what we should encounter; now we were entering dark Jordan, a hidden river.

The first slight rapid held us up, but was negotiated. We had more difficulty in getting the canoes past a caisson on which Zionists labored; it was destined to become an important as well as an excellent bridge to supplant the rickety wooden one under which we had just floated.

#### River Friendly at First

Our first real taste of canoeing on Jordan was agreeable. The stream was sufficiently swift to make progress easy; a single dip of the paddle sent the canoe bounding ahead.

For this short stretch the river was deep, hemmed in by thickets of tall reeds and occasional trees. One could not see beyond the banks or far ahead because of the sharp bends, and this, to an increasing degree, was true of most of Jordan.

Here we saw black and mallard ducks, kingfishers, and other water birds, and brilliant butterflies. A few late bright-pink oleander blooms tipped plants the size of small trees, and leafless large squill bulbs sent out tall arrows of white blossoms from hard and dry soil (Is. 53:2).

We passed dense eucalyptus plantings and modern pump machinery belonging to a new Zionist colony; also a Turkish stone bridge blown up in 1916 to stop the Allenby advance.

An hour and a half after starting we reached the old (probably Saracenic) bridge of Samakh. Only the massive piers remained, the huge arches long since having fallen in.

Here, in 1848, the United States Navy expedition under Lieut. William Francis Lynch, spent the first night of its eight-day descent from the Sea of Galilee to the Dead Sea.

The voyage marked the most successful navigation of the Jordan recorded up to that time and yielded valuable scientific information.

Here, too, John MacGreggor ended his journey in 1869. Taking his canoe, the *Rob Roy*, out of the water, he loaded it on horseback and trudged back to the more peaceful waters of Galilee.

The successive and entangled masses of rapids soon made it clear that no man could take a canoe down alone. The river seemed to fall down a hillside filled with huge black boulders, and, to make matters more difficult, natives had cut channels and erected dams of loosely thrown together stone, leading much of the water away to irrigate fields of kaffir corn and vegetables. This compelled our first portage.

The canoes were unloaded, and a few naked Bedouin youngsters delighted in helping carry the provisions and kit. Singing at the top of their voices, they temporarily drowned Jordan's grumbling rapids.

#### Torn by "Thorns of the Wilderness"

The luxuriant verdure along the banks here was only skin-deep. The terrain we had to cross was rocky, dry, and given over to thickets. Most troublesome was the Christ's-thorn (*Paliurus spina-christi*) which abounds in these parts.

This tree was named by the Crusaders, who believed that from it Roman soldiers plaited the crown of thorns placed on the head of Jesus. Many branches had been lopped off by shepherds so their goats could browse upon the leaves; hence the ground was littered with dry spines.

Before we were afloat again we better understood the severity of Gideon's threat, "I will tear your flesh with the thorns of the wilderness and with briers" (Judges 8:7).

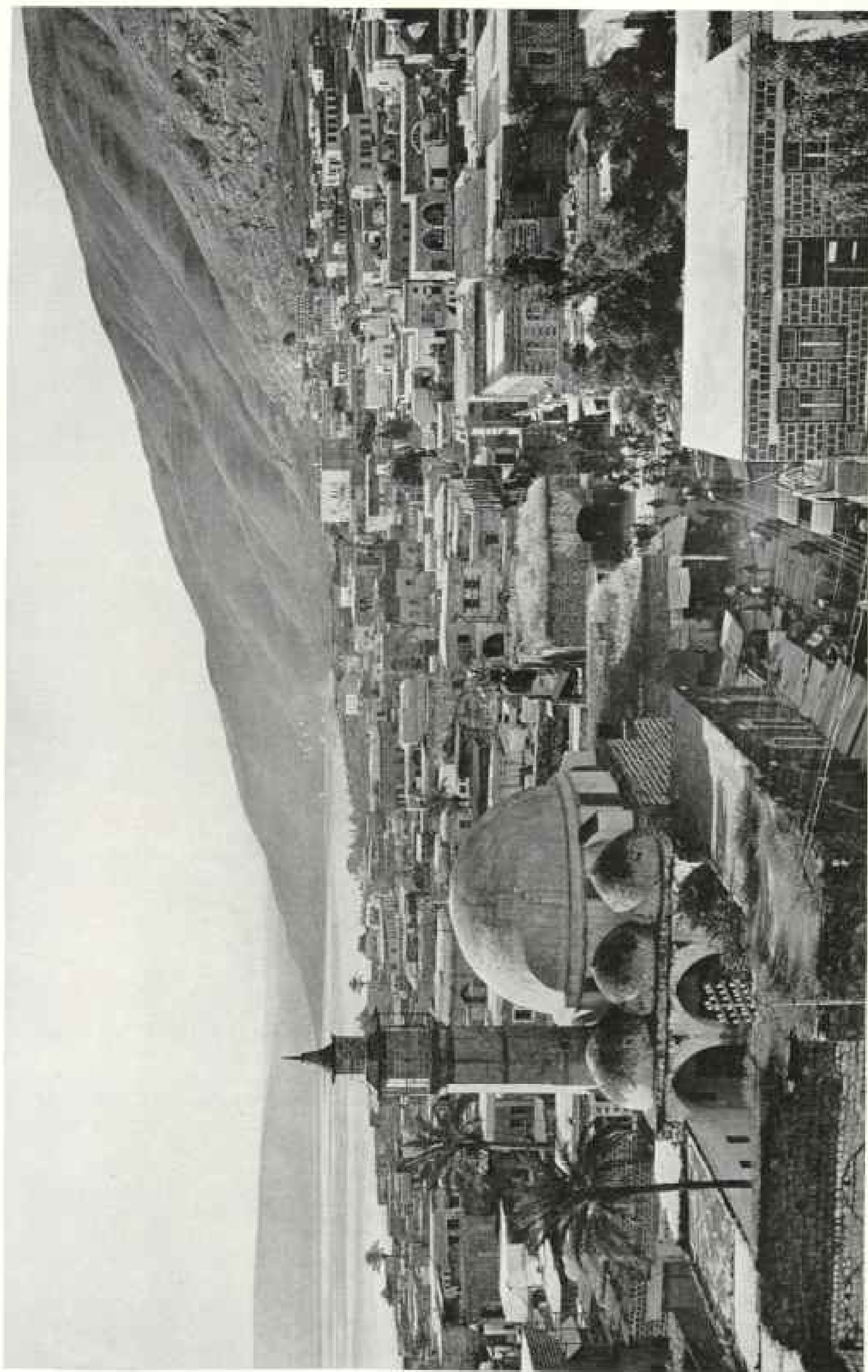
Too soon we came to a second weir. Here we were able to lift the canoes over the three-to-four-foot drop, fully loaded.

#### Jordan Goes Mad

The Jordan here started literally tumbling down and down, hitting large rocks and spouting upward, or twisting and turning between boulders in a white-foam rage. Now and then it calmed itself in a quiet pool, only to continue its angry course.

Padre managed to find his way along the banks, while the boys and I, stripped, swam or waded to steer the canoes through the rocky rapids.

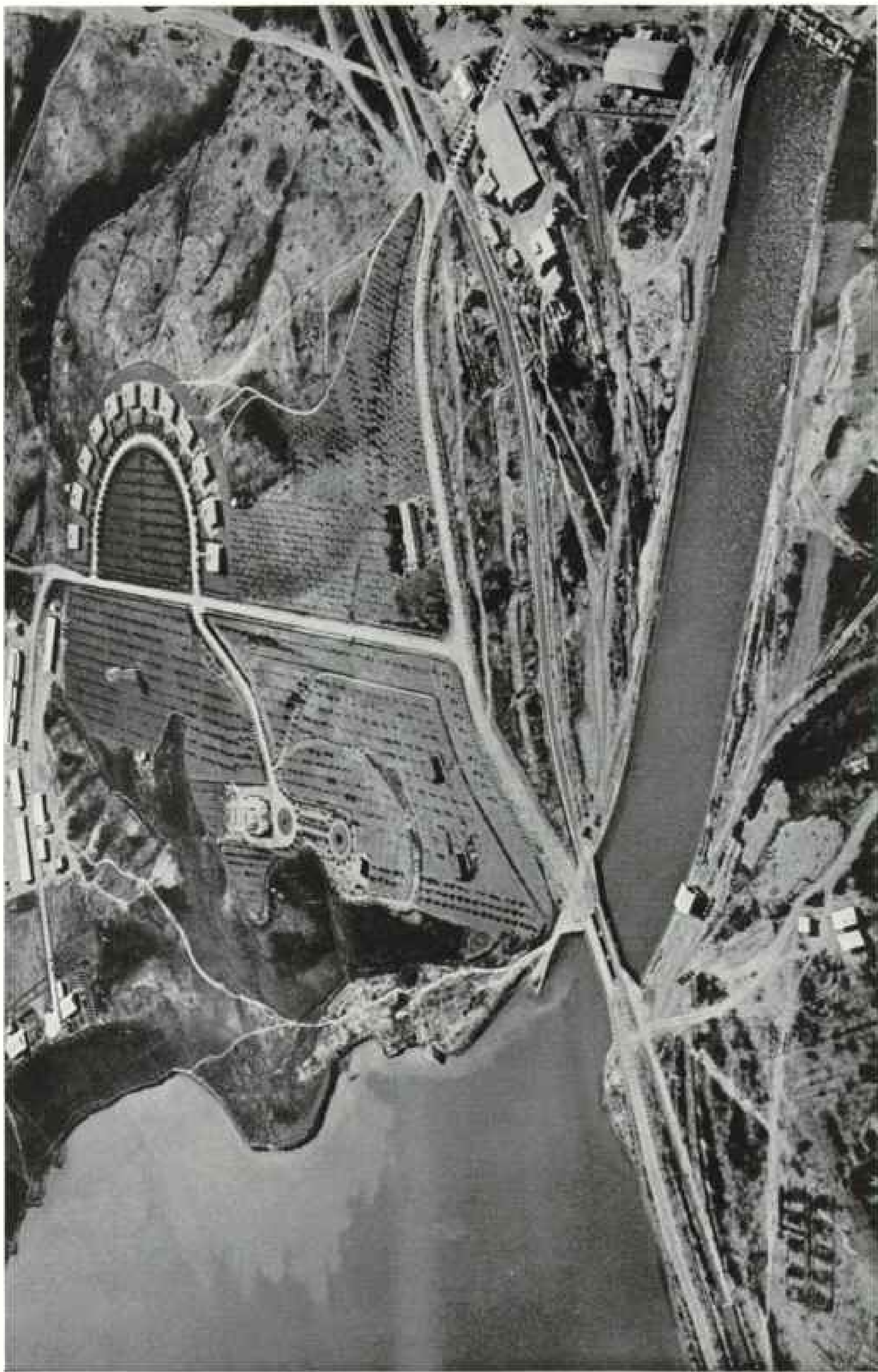
One moment we would be wading knee-deep; the next, we had dropped into a black pool over our depth. This minute we would have to push the canoe; the next, in the grip of the current, we were dashed against rocks and bruised.



Photograph by Maxmard Owen Williams

**On the Ruins of Ancient Sepulchers, Tiberias Was Founded by the Son of Herod the Great**

The new capital on the Sea of Galilee, built about 20 years after the birth of Christ, was named by Herod Antipas for his friend, the Emperor Tiberius. Chief structures, a raccourse and a palace, were decorated with the figures of animals, which made the place ritually impure to Orthodox Jews. Antipas had to resort to force and gifts to populate the city, mentioned in the New Testament—John 6:23.



© G. Ben Meir

### Yarmuk Reservoir, Where Modern Palestine Harnesses the Ancient Jordan

Five miles south of the Sea of Galilee, the waters of the Jordan and a tributary, the Yarmuk, are led into an artificial lake on a terrace above a deep rock chasm. The water flows past the power house (lower right) and back to the river bed through a headrace canal. Employees of the Palestine Electric Corporation live in the clusters of houses. Between these and the lake stands the so-called "White House," home of the director.



© John D. Whiting

### Like Absalom, Bedouin Youths Admire Long Tresses

The young trooper is a member of the Desert Patrol, a small body of picked men from leading families who keep peace in the desert. Glubb Pasha, their British commanding officer, was first named by them "Abu Hnaik," Father of the Little Chin, because of a World War scar. His admiring soldiers soon discarded the nickname, however, and now call him "Es-Sahib," the Friend.

Anything was better than letting the canoes come to harm, for now we were absolutely dependent upon them. Here, however, some Bedouins offered help.

Selecting a shaded spot, we stopped for lunch and tea. Jordan water is not so bad; at least no sewage goes into it. Taken from the river, it is warm and flat; but allowed to settle and cool in the camel-hide bags, it becomes really palatable.

Up to the end of Galilee the water was

crystal clear. The farther we went, however, the more muddy it became. But that did not matter; we just drank the water and poured the sediment away. Still, hot tea was always welcome and particularly refreshing, noon and night.

### Sleeping in a Bedouin Cemetery

For our second night's camp we chose a parched hill on the left side of the river. Above was a Bedouin cemetery, dilapidated and abandoned, with slabs of stone crosswise on the graves as head markers for men and lengthwise for women. Luckily, none of us was superstitious.

We could look across into a small "Ghor," or valley, only partly cleared of jungle and planted by Arabs, an old sluice gate evidently supplying irrigation. At a distance was a watchtower booth, uplifted on stilts, dimly seen in the waning light. During the early part of the night I could faintly hear the voices of the watchmen. More pronounced were the plaintive notes of their reed pipes.

From now on it became an important duty every time we camped to turn the craft bottom up and examine every inch of it. We stuck long thin strips of tire patch wherever the outer rubber skins, taut against the wooden ribs, had been scraped. In no case on the whole trip was this imperative, for we never sprang a leak. Still, I believe in the Arab proverb, "Keep far from trouble and sing to it."

At first, during our third day on the water, there were shallow rapids that were easily shot, and presently we came to El 'Abediyeh,

a native mud hut village piled up in conical form against a steep bank.

As the canoes came round a big bend, the young girls of the place were having a morning dip, hidden from the village by a screen of tamarisk trees and reeds. Old women stood guard against intrusion by males.

Silently the canoes neared them, quite unnoticed, when a sudden yell was echoed by terrified voices. Our bright-red dragons had been sighted. Light-skinned bodies, with bronzed heads, arms, and legs, ducked behind any available protection, or enveloped themselves in yards of indigo garments. Already the canoes had shot past.

El 'Abediyeh is seldom visited. Padre and I walked over to it. The homes are mostly flat-roofed, one-story houses, with rooms, stables, and storerooms built round an open court entered through a door from the crooked, narrow, unpaved streets. A few of the houses had a small square second-story chamber reached by a court stairway. Such *aliyyah* (lofty, high) are common in Palestine Arab villages and usually mark the homes of the better-to-do.

In such a "loft" or "chamber" (I Kings 17:19, 23) Elijah the Tishbite, a native of this Jordan borderland, abode with the widow of Zarephath, and a like "little chamber on the wall" was built for the prophet Elisha by the "great woman" of Shunem (II Kings 4:8, 10).

We now struck one of the most beautiful stretches of Jordan, culminating in a hydro-electric plant of the Palestine Electric Corporation, Ltd. Shortly after El 'Abediyeh the river became wide and deep. A small wooded island teemed with wild bird life of many lovely species. The river banks grew steep and high, with trees and shrubs.

#### Jordan Lights Most of Palestine

The Palestine Electric Corporation has built a massive power plant on the east bank of Jordan, at Jisr el Majami, just below where the River Yarmuk joins it (page 791).

During the rainy winter months the Yarmuk alone may suffice to turn the turbines. Then the sluices of the dam upstream (page 788) are closed, and all Jordan pours into the Sea of Galilee, raising the level by several feet. During the drought of summer this huge surplus is drawn upon as needed till the lake level falls some feet below average.

This artificial manipulation had its drawbacks. Pools of stagnant water bred mosquitoes, and malaria became common where before it was not a menace. Sanitary control has righted this now, but previously the innovation caused considerable discomfort

to those living along parts of the lake shore.

As we paddled through the power plant aqueduct, we suddenly came to a metal screen that entirely obstructed further progress. With ropes we hauled the canoes up and let them down on the other side of the barrier. Here, most fortunately, the sluice gate was closed, and the water was being impounded in the artificial lake, since the works were closed down for the Jewish Feast of Tabernacles.

Sitting under a big stone bridge that carries the trains from Haifa to Damascus, we lunched in the shade opposite the sluice gate, where sufficient water was leaking out to make a feathery waterfall.

#### Old Milestone Still Praises Caesar

Finding no one but the watchmen, I tramped alone down the dusty road to Jisr el Majami (Bridge of the Uniting), so named from the uniting of Yarmuk (the classical Hieromax) and Jordan.

Here a small village of traders has sprung up. In its dusty, unpaved street I found not only a Ford driver, willing to drive up for our canoes, but also a Roman milestone, its legible Latin still proclaiming the greatness of one of Rome's deified Caesars, dead nearly two millenniums.

Here passed one branch of the "Via Maris" from Damascus to the Mediterranean, "the way of the sea, beyond Jordan, in Galilee" (Isaiah 9:1). Another branch skirted Capernaum, Jesus' second home, where Matthew collected the customs (Matt. 4:13-16; 9:9).

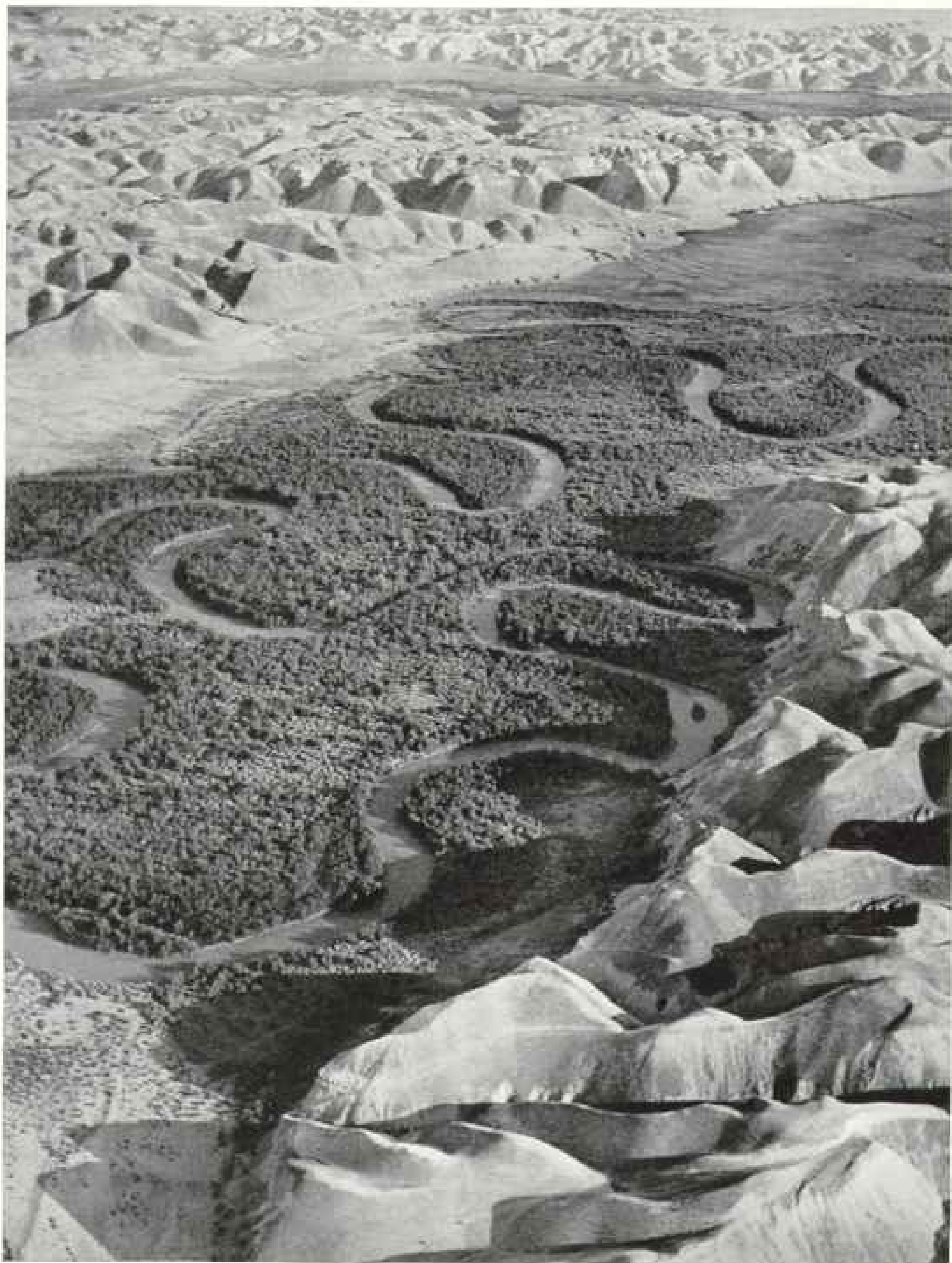
Soon we had the canoes afloat again, many of the villagers following a short distance to shout farewell as the current shot us forward. This portage of about two miles was necessitated by the diversion of the rivers into the electric plant.

Finding a tiny sandy island, we stopped before night and camped. The canoes were drawn up onto higher land and each was securely tethered to a sapling.

This was well. By sunset the Jewish festival had come to an end and before dawn the impounded waters in the tiny lake just above had been let loose, the turbines had started generating current, and the Jordan here had raised its level.

Like slim, nervous, restless race horses lined up for the start and pulling at their bits, the two canoes were tugging away.

To the west rose a high, steep mountain range, and atop the loftiest peak we could see the ruins of Belvoir Castle silhouetted against the pink glow of the setting sun. To guard against the Saracens, whose country was divided from that of the Crusaders by Jordan's



© Orient Press Photo Co. Inc. E. King

### "Roll, Jordan, Roll!"

Through the wilderness of Judaea, the stream celebrated in the spiritual winds its serpentine way. Between the Sea of Galilee and the Dead Sea, about 65 airline miles, the Jordan meanders more than three times that distance. From its source, the river descends to Lake Hule, 7 feet above sea level. Then it drops 693 feet in the ten miles to Galilee and plunges on downward to the Dead Sea, 1,286 feet below sea level.

chasm, King Fulk, in about 1140, built this seemingly impregnable fortress appropriately named "Beautiful View."

The small Arab village now occupying the site is known as *Kaukab el Hawa* (Star of the Wind). As if to enhance its romantic name, a bright star poised over the castle after the light of the sun had ceased. Across the river was much irrigated cultivation, and a watchman in an elevated booth tower was using a sling (Judges 20:16; I Sam. 17:40-50) to frighten away the birds.

The island, like the denser banks of the river, was overgrown with tamarisks that break from their winter nakedness into a mass of feathery pink blossoms; now, in the autumn, there were leaves only. With their branches we erected nightly a small frame over which Padre stretched yards of netting to make an adequate mosquito-proof tabernacle. The boys and I, unprotected, lavishly smeared ourselves with citronella oil.

Our fourth day out, the third on Jordan, started a definite change in geographic type and scenery. The valley bottom was becoming wider and flatter, scarred deeply by dry wadi beds cut by the tributary winter torrents. We were now entering the *Zar*, or depression, which the river, ever deepening, is cutting for itself.

Swollen by the influx of the Yarmuk, Jordan was broadening considerably, but instead of a river it was fast becoming a veritable watery stairway.

#### Reading the River, Like Mark Twain

Whenever we came to a rapid, I scanned the water for the best gap between the protruding rocks, John holding back or slowing the canoe if possible. When a decision was made, the canoe shot forward like a race horse as it nears the goal, writhing and twisting as it was buffeted by the conflicting currents, the banks or trees a blur to the eyes.

Once the few seconds of breath-taking experience had passed, we slowed down to signal any needed instructions to Spafford, who would now guide his canoe down the rapid.

In reading Mark Twain's experiences in piloting on the Mississippi, I used to be mystified as to how he could choose between safe and dangerous waters; both seemed to be dark and evil-looking. We soon found that Jordan rapids also had contradicting features which we early learned to decipher.

One type of rough water was caused by the current's hitting submerged rocks. These were perils from which, gratefully, we escaped with little harm.

Other waters, often rougher, meant that

two currents were being pressed and thrown together by hindering rocks and barriers, literally slapping each other in the face and splashing up in a flare of rage. Here the waters were deep, and the V-shaped current kept the canoes in the center of the channel. Little could be done to steer the boat once it was in such a vortex.

I feel sure no craft could be more appropriate for use on these rapids than our supple rubber-covered canoes, and none more pleasant. Seated practically upon the bottom, legs stretched out under the deck and packed in tightly with duffel bag and other bundles, we felt every vibration, twist, and movement of the canoe. We seemed to be part of a giant fish, as it went slithering at lightning speed through angry waters.

A second rapid was soon encountered, and we could see no gap safe enough to risk. When we landed, a crowd of semi-Bedouins from the little mud hut village of *Mazar* (Shrine) ran out to greet us. Willingly, they offered to carry the canoes below.

In these little-known regions, one seldom hears the word "baksheesh" (tip, gift). Part of the Bedouin's creed is his belief in a life hereafter where he obtains merit by entertaining and protecting the stranger.

In the swift current we soon passed the third and last of the villages on Jordan's banks. It is called *Tell Abu el Kamel* (Mound of the Father of Lice). For generations it has been said that the King of the Fleas holds his court in Tiberias, but now I had to learn that his first cousins originated at no great distance.

The ford where we lunched might quite possibly be that of *Beth Ba-Rah* (Hebrew for "fording place"), for it was hereabouts that some of the exploits of Gideon took place (Judges 7:24).

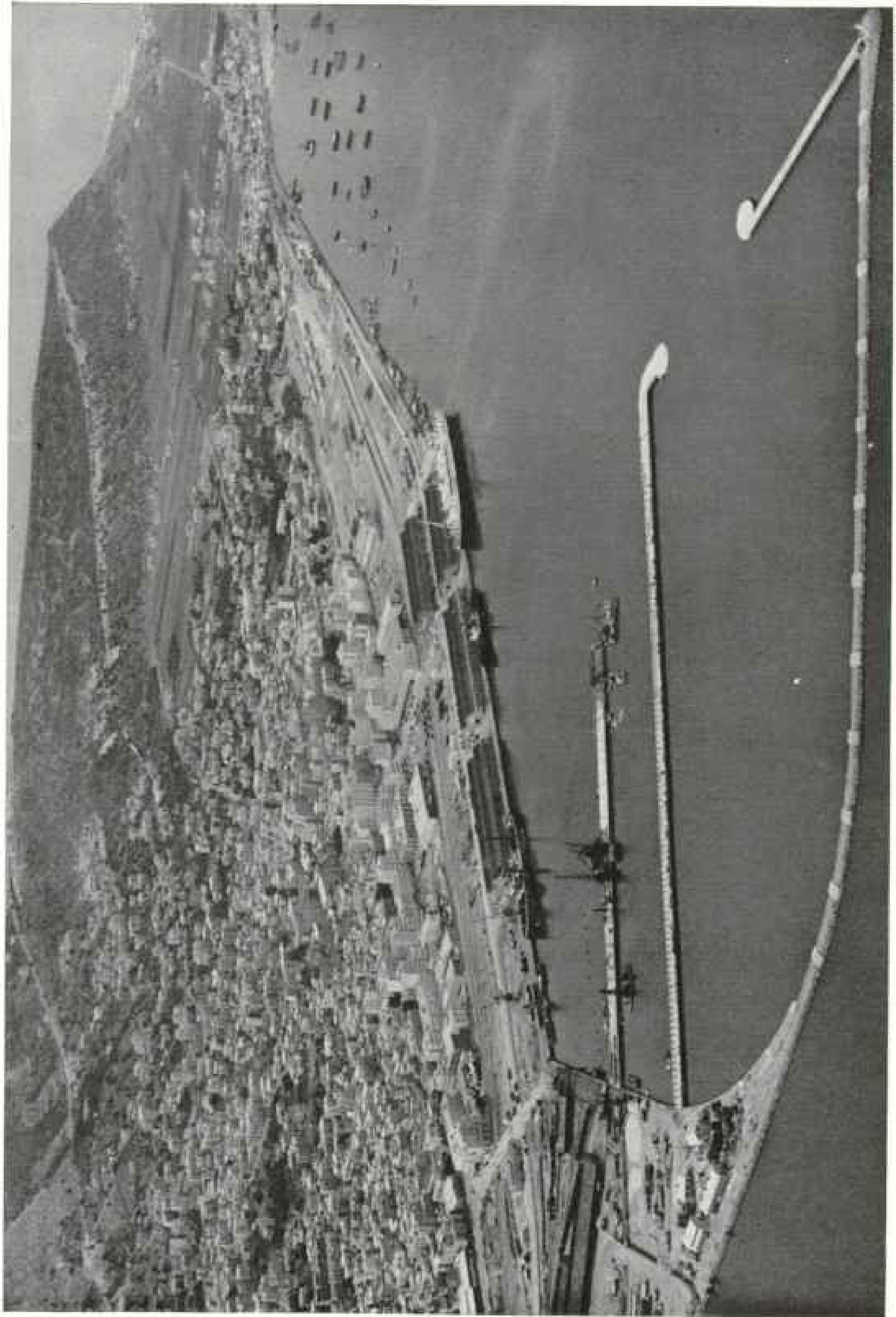
Both sides of the valley for the most part are now devoid of agriculture and are desert. Down by the water's edge, here and there, grow clumps of tall reeds, their autumn tops like white ostrich plumes waving in the evening breeze.

According to St. John, it was at *Bethabara* (Place of Passage) that John was baptizing (John 1:28), and concerning him Jesus said, "What went ye out into the wilderness to see? A reed shaken with the wind?" (Matt. 11:7).

#### Sucking Jordan Dry for Turkish Gold

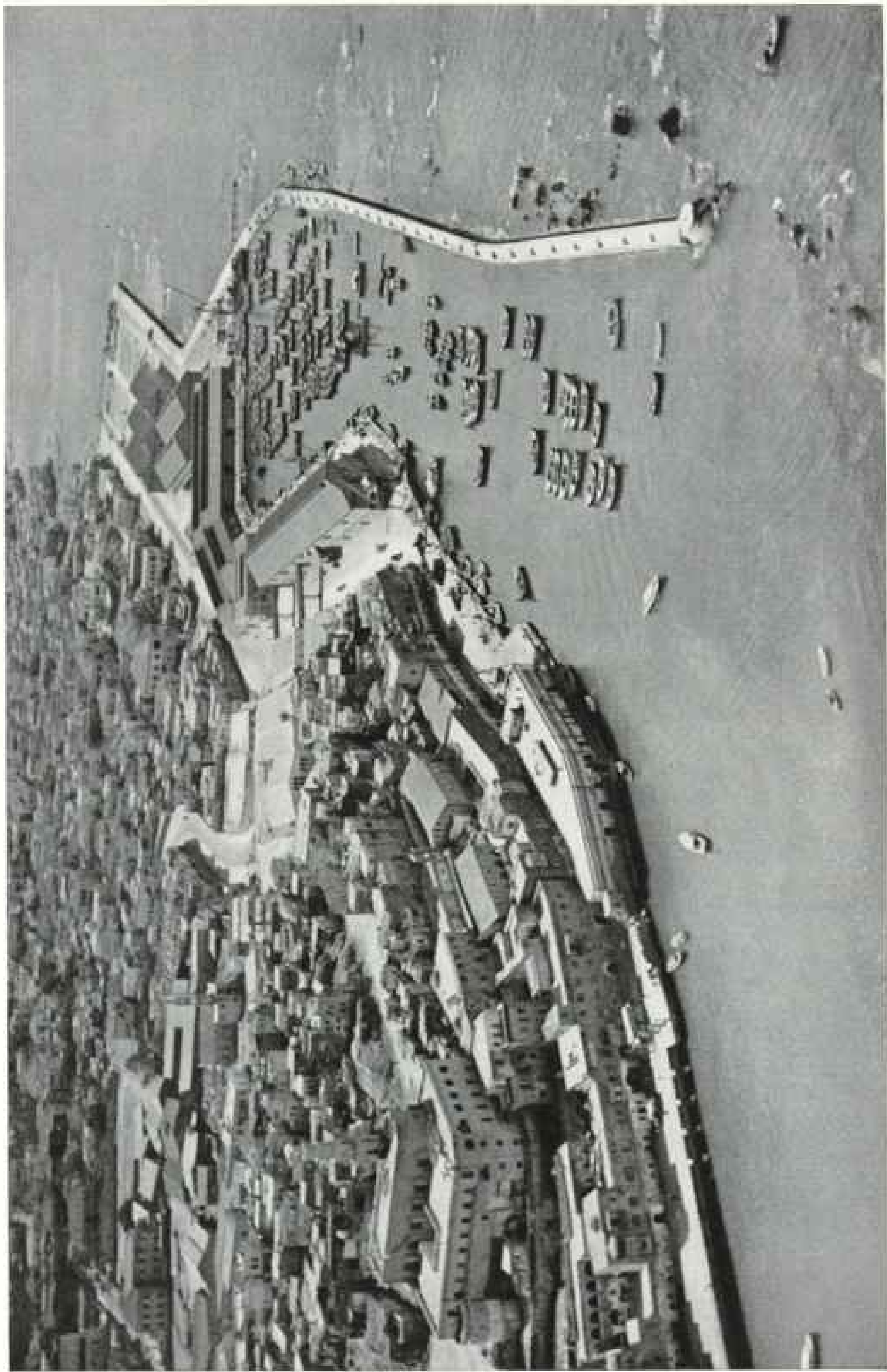
As the afternoon slipped by, we came upon the remains of a bridge that had been blown up by the retreating Turks when Lord Allenby's army occupied Palestine. Huge piles of sandbags placed above a waterfall diverted the river into a channel dug along the left bank.





© United Press by E. Kluwe

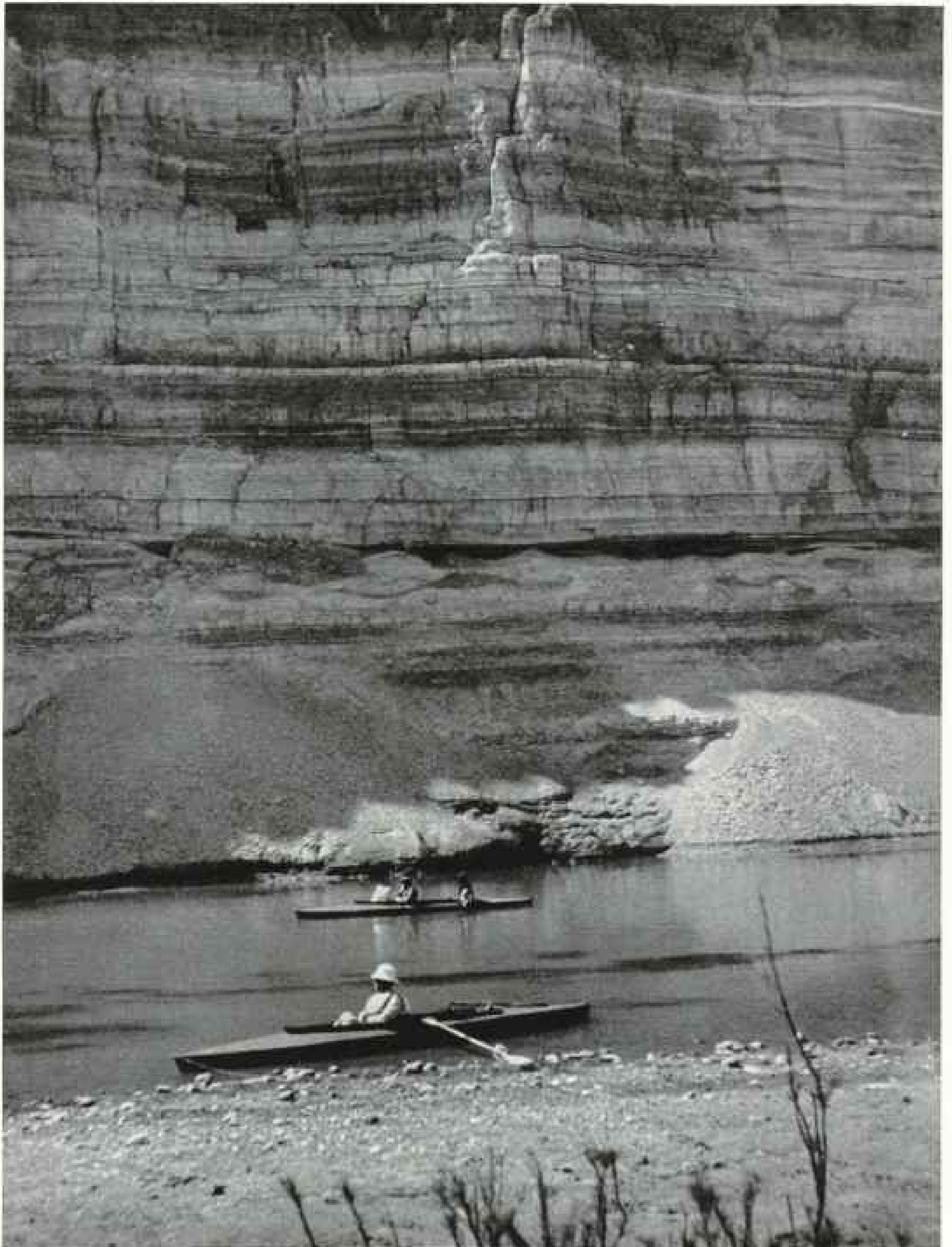
Targets Now for Italian Bombers Are the Docks, Oil Tanks, and Warehouses of Haifa, Palestine's Modern Boom City



© G. Eric Matton

**New Breakwater and Buildings Transform the Joppa of Jonah and Peter Into Palestine's Modern Seaport of Jaffa**

Here the hero of the Old Testament story of the whale set sail for Tarshish "to flee from the presence of the Lord" (Jonah 1:3). Here, too, in the home of Simon the tanner, "by the seaside," Peter saw his vision of tolerance (Acts 10).



Photograph by Bradford Whiting

#### Falling Rocks Imperil the Voyagers Where the Jordan Cuts Through Sheer Cliffs

On the sixth day of their trip, the author and his friends found the river contracting into a narrow but deep stream. "The stratified banks rose high," Mr. Whiting writes, "and as we passed, bits broke off and fell, hitting us like stinging bullets from an airplane. A big chunk could have ended our expedition. During the years, the Jordan hereabouts has changed its course by miles in width."

Two big motor pumps were at work day and night, vainly trying to dry a deep pool that had formed under the falls.

What was it all about? A Turkish colonel had come with the word that during the retreat his pony wagons had carried a huge stock of gold coin packed in wooden cases. Hard pressed, he had thrown it over into the Jordan and then blown up the bridge rather than let the enemy get the gold.

Now that peace had been established, he had returned, found partners, and, with the permission of the Mandatory powers, sought the treasure. Like Job's behemoth, "he trusted that he" could "draw up Jordan" (Job 40:23).

We saw the bottom of the river, almost, but no gold was found. The work was given up just after we left, having been arduously pressed for over a year. With difficulty we canoed through the by-pass and into the river-bed again.

Before night we reached a modern iron bridge at Sheikh Hussein, on a highway linking Beisan in Palestine to Irbid and Ajlun in Trans-Jordan. On each side was a police station representing the British Mandate and Emirate.

#### "Who Goes to Hell to Steal Fire?"

Beisan, at the base of the Valley of Jezreel, was the ancient Beth-shean (Josh. 17:16), or Beth-shan, the original Hebrew name meaning "House of Security."

We landed on the Palestine shore. The Arab policemen in British uniforms, spick and span, were most courteous. A special runner brought from Beisan a supply of food. The police had phoned up for us. I wonder what the ghosts of three thousand years ago thought of it.

Heretofore we had camped hidden and unnoticed, but now we were beside a public thoroughfare near the police post. When I asked the corporal in charge if we needed to post a watch while we slept, he simply answered, "Who goes to hell to steal fire?"

Scarcely had we dropped to sleep before a large hyena came sniffing at Spafford's face, but trotted off through the brush when pursued.

Before dawn such a heavy dew fell that our blankets were soaked through. From them, as from Gideon's fleece, we might have wrung "a bowl full of water" (Judges 6:38). These heavy dews are the salvation of the summer crops and fruit, when from May to November not a drop of rain falls.

Our fifth day was marked by a widening river, a greater fall, and many rapids. We counted nineteen. The later ones were swift

and treacherous. Once, although we tried to keep the canoes apart, both were brought broadside against tree trunks, and several ribs were smashed—canoe ribs, of course.

The banks now were not less than ten feet high and rose to 150 in places. We therefore got no glimpses of the broad expanse of valley as we had done the day before, when many flocks of sheep and goats and herds of camels had been grazing and browsing under the care of Arabs. At the fords, however, flocks were being watered or were resting in the noon shade of the cliffs.

#### Adhesive Tape for Healing Canoe Ribs

Although we rose early, we were delayed the morning of the sixth day in repairing yesterday's damage. Adhesive tape seemed as effective on a split canoe rib as on a human one. All were thus repaired and returned to their positions, except one; it had to be discarded in favor of a new one cut from a tamarisk branch. With ax and jackknife we turned boatmakers. Many patches were stuck onto the scraped and scathed—but not punctured—rubber canoe skins.

The rapids this day were more numerous and breath-taking than those of the day before. It was a veritable flooded stairway. When we came to some of the worst, the boys and I, learning by earlier experience, pulled off every stitch of clothing and swam the canoes through the most dangerous currents.

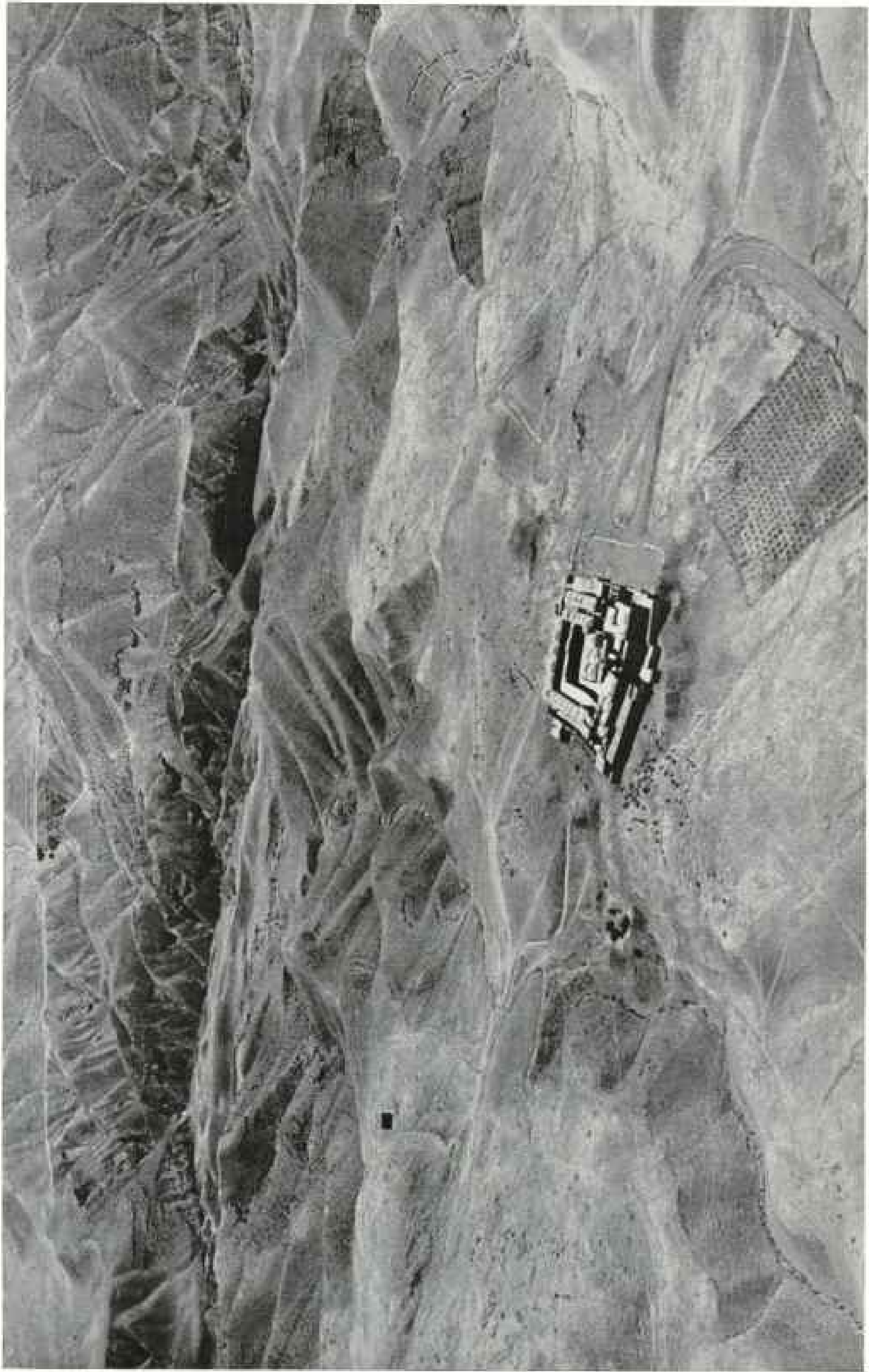
From a broad shallow river, Jordan often played a trick here by contracting itself into a narrow but deep stream (page 798).

Like the two preceding days, our seventh day afloat carried us into ever-deepening chasms between high marl banks. The trees, especially the poplars, were large, and both they and the willows were turning to autumn tan and yellow. As we proceeded down the river, we found it to an increasing degree choked with fallen trees brought down by the floods. They constituted a hazard.

The heat was becoming oppressive, not only because we were shut in by conforting banks that kept out the air, but also because we were literally boring down into the earth's surface. We were then about a thousand feet below sea level.

The current here was very strong, and rapids frequent. Without warning, as we rounded a sharp curve, our canoe shot into the top of a tree. The roots had been loosened by the current, and it had flopped over. This cost another rib.

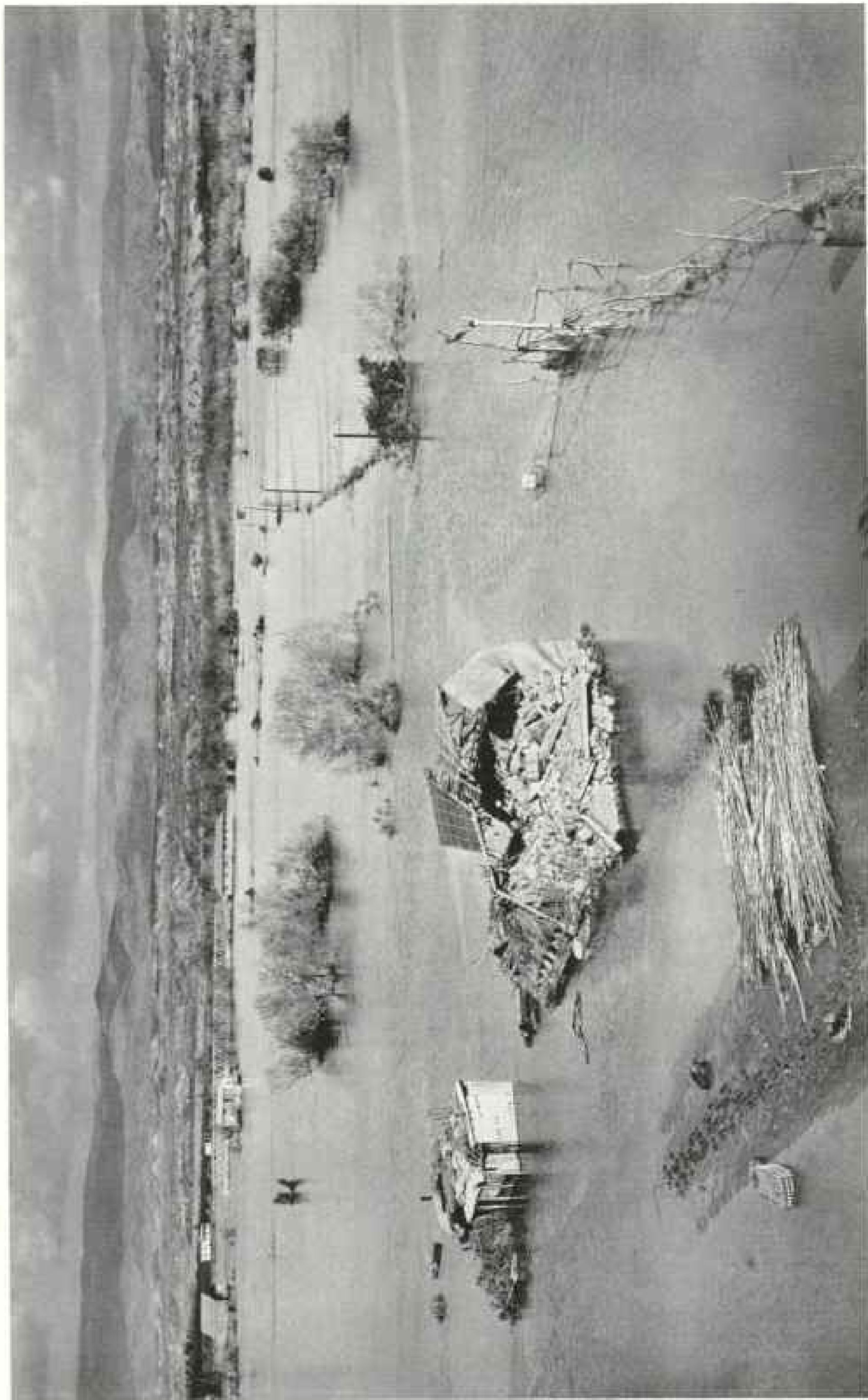
Some of the rock steps were so high, with so little water, that the canoes literally nose-dived off onto the lower level.



© Orient Press Photo by E. Kruger.

**Moslems Believe the Tomb of Moses Stands Within the Walls of En Nabi Musa, Judaean Desert Sanctuary**

Wayfarers on the road from Jerusalem to Jericho see from a distance the large, square, white mosque, rising on a small plain surrounded by marl hills. The so-called tomb of the Jewish lawgiver is in a small building in the center of the main court. Mohammed accepted much of the Bible, including the teachings of Moses, and many Moslems make a pilgrimage to the tomb each year.



© G. Eric Matton.

**"For Jordan Overfloweth All His Banks All the Time of Harvest"**

To this day the river flows up to its Old Testament reputation (Joshua 3:15). Remnants of a fence and a row of telephone poles mark the course of the road, which turns left in background to meet the Allenby Bridge (page 807). Volume of this unusual overflow can be gauged by the bridge, which more than spans the Jordan's normal width. This time the onrush of water came so suddenly that bridge police were rescued by boat, and a gendarme's mate and foal were left on the structure. An adobe house (foreground) has collapsed.



© G. Kete Matson

### By Such a Primitive Ferry, King David Crossed the Jordan

This old craft undoubtedly is like its Biblical predecessor mentioned in the description of David's return after crushing the revolt of Absalom (II Samuel 19:18). A new steel bridge is to be erected here soon.

The Beni Sakhr of Trans-Jordan had sent their camels here to browse on the thorn trees of the desert and spend the coming winter months. It was a most unnatural sight to see these dry desert beasts, distracted by the flies, lying immersed in the Jordan with only their humps and long necks protruding.

As we faced a big bend in Jordan, we saw, pitched upon the brink of the precipice, a black goat-hair tent. A small Bedouin girl saw us coming and called out in a half-awed, half-scared, shrill voice, "My father, my father!"

This form of expressing awe is almost as old as history. Did not Elisha, after crossing Jordan, presumably a short way downstream from here, cry out in amazement when he was parted from Elijah, "My father, my father, the chariot of Israel and the horsemen thereof?" (II Kings 2:12).

The child's mother ran to her side, and again she cried out, "Mother, they are skinned, see they are skinned!" pointing to the unclothed, sunburned torsos of our youths.

Early on our eighth day out, we came upon the two-pronged and far-divided outflows of the River Jabbok into Jordan. This river comes down from the east through a magnificent valley of Mount Gilead. At its ford, where Jacob wrestled with the angel (Gen. 32:24), I have since found some new species of almost black iris.

### A Ferry Such as King David Used

Both a shock and a pleasant surprise were in store for us on reaching Damiye ferry. Its modern name is the Arabic reflection of the ancient Hebrew *Adam*.

Here, at the lower end of the valley, through which runs the natural highway connecting Samaria, through Sychar, with Gilead, is a simple flat-bottomed ferry, pulled across by ropes. On a similar ferry King David crossed the Jordan (II Sam. 19:18).

As at all such crossings nowadays, there were police stations on both sides. Hardly had we stopped before the Palestine police in-

formed us that for a couple of days Jerusalem had been telephoning. Our folks were thoroughly worried about us.

It seemed strange to walk out of a howling desert and, in an incredibly short time, be able to speak with home. We had been expected at Damiye two days earlier, for few realize the twists and turns Jordan makes, increasing its direct length by threefold. As it was, we had been making about thirty miles a day.

John's father was already on the road via Jericho to institute a search party. Even then, as we stepped out into the open, we saw his car approaching at top speed.

A full basket of provisions was greeted with a shout of joy, but second inspection showed that most of the lunch consisted of bottles of drinking water. The ladies should have seen the quantities of Jordan mud we had already imbibed! Our larder was augmented, however, with some spring chicken bought from a Bedouin.

#### Castle Recalls Cruelties of Herod

Qurn Surtubeh (Qurn, "horn" or "promontory"), the Hasmonean castle of Alexandria, fulfills Josephus' description, "a stronghold fortified with the utmost magnificence and situated on a high mountain." This isolated peak rising like a sugar loaf to over 1,200 feet above sea level was, in fact, much higher, and looked it. Jordan had already burrowed a thousand feet lower than the sea.

As we passed Qurn Surtubeh, loaded down with history and the cruelties of Herod, we seemed to see it at every point of the compass, so much did Jordan twist and turn and loop back on itself.

In the evening, as we camped, a lone camel herder visited us, glad to find someone to talk to. Later that night we heard voices and were a little nervous, but early in the morning we found that we were at a ford, and a party of Bedouins had spent the night across the river.

To cross they ungirt their clothing, stripped, and, placing their bundles on their heads, walked neck-deep in the middle. After greeting us they passed through the Zor of Jordan (page 794) and up into Trans-Jordan, for we had slept on the Emir's side that night.

This, our last day but one on Jordan, was strenuous for the paddles. The river had flattened out, and the rapids were few and small.

After a fried-chicken lunch on a sandy bank, the chicken bones and scraps were boiled into a soup for supper. When we started on, the pot, almost brimful, was placed beside Padre with the request that he keep it from spilling.

By now we had become accustomed to the

rapids and were rather disappointed when they were too far apart, for paddling in slower waters was more laborious.

The day was no longer young, and we were looking forward to camping at Allenby Bridge that night, when John and I, far ahead of the other canoe, heard a mighty roar. We pulled up against the right bank.

It proved to be a large fall of turbulent water, but there was a clear passage. The only uncertainty was that it disappeared behind a sharp curve and we could not see the end.

The clay banks were precipitous on both sides and there was no way to walk ahead to reconnoiter. All we could do was to signal the other canoe what course to take and plunge in ourselves.

#### Left, Like Absalom, in a Tree

With breath-taking speed the canoe raced through the torrent, ever narrowing as we advanced. Just as we rounded the corner, the entire river—normally 150 to 200 yards wide—contracted to scarcely 25 yards and became proportionately swift and deep.

Despite our best efforts with the paddles, the canoe hugged the high left bank. This would have been well but for a tree that had grown with its trunk bent over and was lying but a few inches above the water.

It all happened so quickly that there was no time to lie flat, or jump out, or even to think. Like Absalom on the opposite side of Jordan, I found myself "under the thick boughs . . . taken up between the heaven" and the turbulent stream.

My watery steed, like Absalom's mule, had slipped away (II Sam. 18:9).

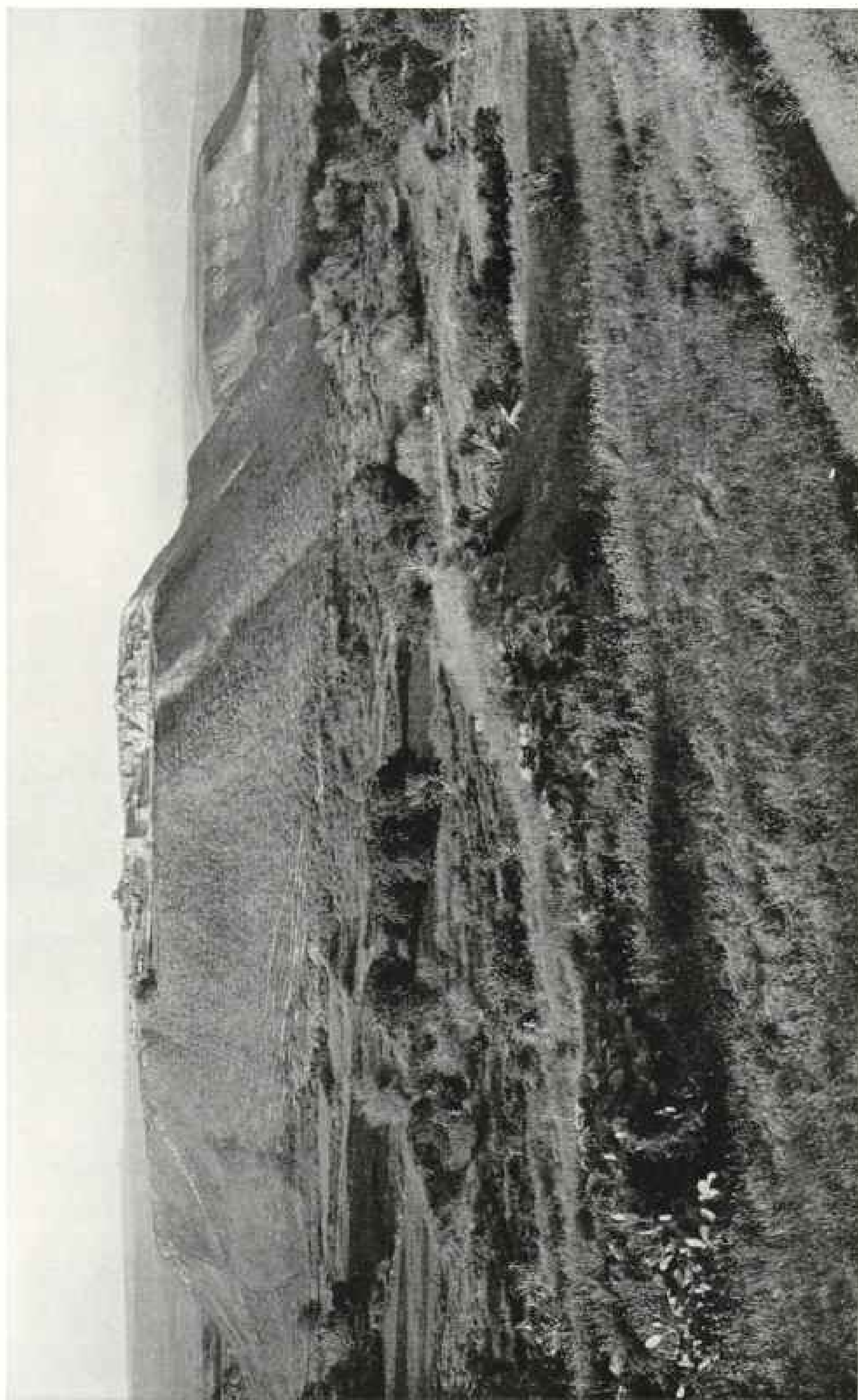
Clinging to a branch, my body swept downstream by the current, I saw that the canoe had tipped sideways, throwing out John, who was now battling with the river. The canoe was half full and slipping away.

In a split second I glimpsed the prow of the second boat aiming straight for my head. Spafford was shouting to me, but in the roar of waters nothing could be heard. We had long since learned not to try to fight Jordan's strongest currents, so, curling up in a ball, my knees to my chin and my hands protecting my skull, I let the river roll me like a football. Mercifully, the second canoe had stuck unharmed in the tree.

John and I lunged forward and caught our canoe in the nick of time before it sank. We righted it and tied it to roots protruding from the high clay bank. The other canoe was in peril; there was no time to lose.

Running upstream through low water along the opposite bank, we both plunged in, but on

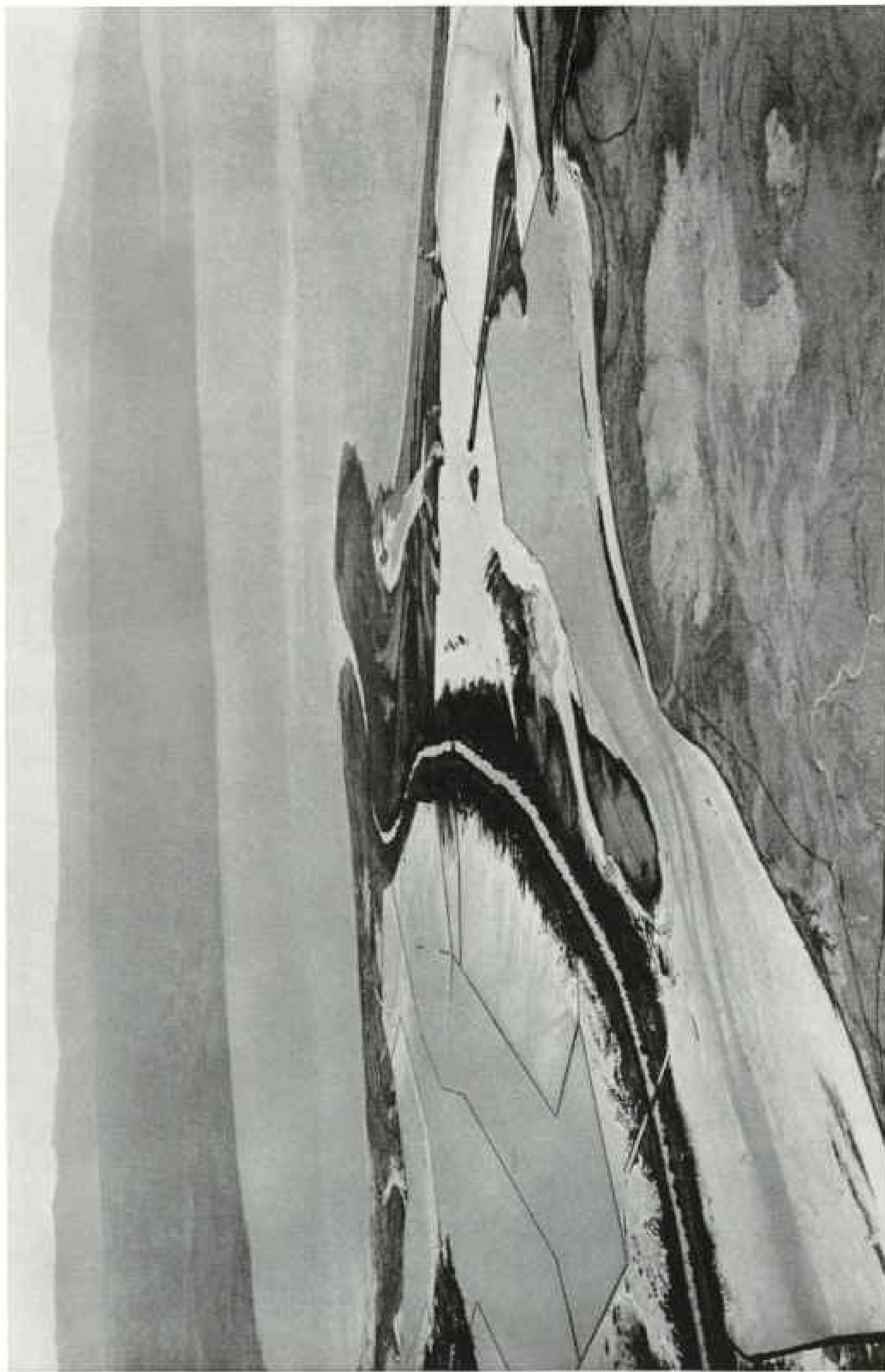




Photograph by Maximal Owen Williams

### On the Walls of Beth-shean, Conquering Philistines Displayed the Bodies of King Saul and His Sons

When the Hebrew ruler saw he was about to meet defeat at the fateful battle of Mount Gilboa, he took his own life by falling on his sword (I Sam. 31). American archeologists have excavated the historic ruins on the isolated hill at the base of the Valley of Jezreel (page 799). Before the days of Saul, the early Israelites had failed to capture this "House of Security" from the Canaanites (Judges 1:27). Later it came under the rule of King Solomon (I Kings 4:12).



© G. Eric Matson

### Journey's End—The Jordan Flows Into the Deep Pocket of the Dead Sea

In the salt pans of Palestine Potash, Ltd., the mineral in the Dead Sea is recovered by evaporation. Salt from each crystallizing pan is raked into rows, drained, washed, and finally dried. In the distance rise the mountains of Moab, rich highlands which were the original home of the Old Testament Moabites.



© Curtis E. Brown from W. B. Magness

### Modern Temples and Skyscrapers Adjoin Centuries-old Buildings in Jerusalem

From the air, the city is revealed sprawled across the rocky plateau. The white Rockefeller Museum stands in the foreground. Beyond it rises the Dome of the Rock. To the right are government buildings in front of the Damascus Gate.

reaching the canoe we found the current so strong and deep that we were helpless. Getting a rope from our own canoe, however, we waded out as far as possible and threw the end to Spafford. Slowly and laboriously we pulled the torrent-tugged canoe over to our side and eased it down over the rapid to quiet waters.

### No Soup is Spilled

All through this ordeal Padre sat quite unruffled and complacent in the prow of his canoe, smothered in his voluminous life preserver and making our task, by his level-headedness, so much the easier. While we were still extricating his boat, a clear, sweet voice called across the deafening waters, "Mr. Whiting, the soup is not spilled."

Admonishing my son to race ahead and try to recover my duffel bag, which was last seen floating down the stream with all my bedding and clothing in it, John and I set about emptying and righting our canoe. Our stove, camel-skin water bag, some provisions, and our needed hatchet had gone to the bottom. The supply of dry Swedish bread we poured out of a bag was the consistency of milk.

Luckily the first canoe had stopped upon a sizable sandy peninsula with plenty of dry driftwood. My duffel bag was there, but so soaked and heavy I could scarcely lift it. My son said he had found it before darkness set in, caught like Abraham's ram in a thicket (Gen. 22:13).

On a clothesline rigged up around the now roaring fire, John and I hung up our blankets and clothes to dry for sleeping.

Soup was all very well, and chicken broth at that, but rather thin supper for the occasion; so the commissariat went into action.

Downstream we could hear the rattle of the loose planks of Allenby Bridge, as laden camels and donkeys, or a speeding car, crossed. Wading through stream and thicket by sense of sound only, I found my way by now bright moonlight to a small Bedouin store. Like an apparition I appeared out of the darkness, and the faces of the natives did not belie their astonishment.

Here I was able to obtain whole-wheat loaves, goat cheeses, and a can of bully beef. I walked back to camp whistling, with the promise of a coming lunch of hot saffroned rice with a cap of minced meat and layers of egg-plant.

### Modern Naomis and Ruths Cross Jordan

Crossing the Allenby Bridge were numbers of Palestine peasants, men and women, with their donkeys loaded down with wheat and barley. They had gone over to Trans-Jordan

at the beginning of harvest, the men to hire out as reapers, to be paid in kind, and the women to glean.

Thus Naomi of Bethlehem crossed Jordan to Moab in time of famine with her husband and grown sons. We see her return with Ruth the Moabitess, who was destined to become the forebear of the kingly House of David (Ruth, Chapter 1).

A short stretch back, we had passed in the evening the inflow of Wadi Nimrin that passes Tell Nimrin, the Beth-Nimrah of the tribe of Gad (Joshua 13:27). Along these upper waters the people of the Adwan tribe have their winter quarters, and many a night have I spent in their hospitable black tents, both here and in the summer camps around Hesban, the old Heshbon (Num. 21:25; Song of Solomon 7:4). It was at Tell Nimrin that Sheik Majid Pasha el Adwan entertained the National Geographic Society's Vice President, Dr. John Oliver La Gorce.

The morning light revealed a most treacherous rapid just below our camp. Had we tried it in the moonlight in our eagerness to get to the bridge and supplies, the results would have been disastrous. Carrying the canoes across a short neck of land, we escaped this obstruction.

A short distance below the bridge the last of the high cliffs ceased. We were now going from the narrow gorge of Jordan into the open Shittim Valley, so closely connected with the crossing of Jordan by the invading Hebrews (Josh. 2:1; 3:1; Num. 25:1). We read that they "passed over . . . to the plains of Jericho," and that their first camp in Canaan was "in Gilgal, in the east border of Jericho" (Josh. 4:13, 19).

### Place Names 33 Centuries Old

Of the several possible fords here, that of Makhadet Hijla is the most used. "Makhada" is Arabic for ford, and "hijla" is inherited from Bethhoglah, one of Joshua's tribal boundaries (Josh. 15:6; 18:19).

Strange how these ancient names stick—in this case more than 33 centuries! "Hogla" and "hajal" (singular for hijla) both mean partridge, a wild bird that abounds hereabouts.

Atop a bank of the river is the Monastery of St. John, almost ruined by a recent earthquake.

Shortly after leaving Allenby Bridge, we encountered a fall that caused a little trouble, but was not the last.

Rapidly Jordan changed its aspect. Its distinctive features were falling away, and it became deep, wide, and placid, with low banks sloping to the water. But we were partly



© G. Eric Matson

### The Vicar Keeps a Memento of the Voyage—His Life Preserver

Unable to swim, the Rev. Mr. Boggis wore it constantly while the two boats fought the Jordan's rapids (page 807). Sunburned John Vester, one of the quartet of canoeists, shows his mother and sister all that is left of long white trousers. The ladies greeted the travelers on the last day of their journey.

compensated by a wider view of the distant mountains, that of the barren Judæan range to the right, and the mountains of Trans-Jordan, with the peak of Mount Nebo, to the left.

We early passed the Latin Place of Baptism, and below it a small round woven wattle church erected by the Ethiopians in their native manner. Lastly we came to the spot where the Greek Orthodox baptisms take place. Here tourists visit the Jordan. Before the First World War many thousands of Russian and other pilgrims gathered for the Epiphany (January 6).

All three places are fairly close together and are shown as the "traditional site of Jesus'

baptism," as opposed to the other site of Bethabara (page 795). Hereabouts, also, the Israelites crossed.

As we hove into sight, a greeting went up from our families, who had come to lunch with us.

Without undue delay we pressed on. Soon we encountered our last obstacle, a double wooden dam thrown clear across Jordan to stop salty waters of the Dead Sea from advancing upstream at low river water. Previously we had passed huge pumps that sent the water to the potash works and to the new Kallia resort to be filtered and used. With ropes we lifted the canoes over the obstacles and lowered them into the river beyond.

Two hours after leaving the Place of Baptism we entered the Dead Sea (page 805). Luckily it was calm. Having made a careful marking on my canoe while still in the sweet waters of the river, and again now, I found that the buoyancy of the saline water lifted the craft about three inches.

Long after we had passed beyond the curved line of the shore, we were still in the mouth of Jordan, for the downcoming floods had pushed a huge deposit of mud out to sea like two giant horns. Even when we seemed far out in the open sea, we found the mud deposits still there and the water not deep enough even for our shallow-draught canoes.

Ashore at last, we were met by our American-built bus, which has done yeoman work for 14 years. Though we were eager to get home after ten days and nine nights in the wilderness, we took time first to wash off every bit of salt from the canoes, dry them, and pack them away. Happily, though scarred, they are still fit, ready for some new adventure.

# Old-New Battle Grounds of Egypt and Libia

BY W. ROBERT MOORE

"ALEXANDRIA has fallen to the fleet and soldiery of Rome." Had there been radio broadcasters or telegraphic agencies, such might have been the news flashed from Egypt in the year 30 B. C.\*

Newsreels of the event could have shown Octavianus (Augustus) taking the salute as his soldiers marched through the town. Flashbacks would have included the naval battle of Actium the year before when the fleets of the glamorous Cleopatra and her doting Mark Antony had been defeated.

Film editors might also have included a few feet of scenes showing Julius Caesar in Alexandria 18 years previously when he had championed Cleopatra's cause.

Actually the capture of Alexandria by Octavianus marked no spectacular change in Egypt at the time. For, upwards of a century and a half, puppet Ptolemies had held the throne; the country's foreign policy had been almost completely dictated by Rome.

One Ptolemy had bequeathed the province of Cirenaica, the part of Libia bordering on northwestern Egypt, to the Romans in 96 B. C. A few years ago archeologists digging in the ruins of the ancient city of Cirene turned up a tablet bearing that decree of the Egyptian king.

## A Parade of Alien Powers

It was not the first time that a foreign power had gained control over these key lands of northern Africa—nor the last. Through the ages Greeks, Byzantines, Arabs, and Turks established rule here, often with chaotic results.

Such a period of internal strife existed when, a little more than a half-century ago, Britain entered the Egyptian scene. Her interests in the Suez Canal, purchased from the Egyptian ruler, were constantly menaced. Under Anglo-Egyptian rule, order was established and fabulous prosperity brought to this historic land.

In 1912 Libia was taken from the Turks by Italy. Armies are again on the march here. Under modern dress and conditions the ancient conflict is revived (map, page 811).

The Rome of old assumed overlordship to guarantee shipments of supplies from the granaries of coastal Cirenaica and the rich valley of the Nile. She sought and secured domination of the Mediterranean.

Modern Rome with one hand is re-establishing agricultural colonies in northern Libia; with the other she is massing her legions for a drive through Egypt to Suez. Again the cry "Mare Nostrum" (Our Sea) is revived.

Today Egypt is richer than ever before.

Ferdinand de Lesseps' "ditch in the sand," too, has provided a route of empire outstripping the old caravan route across Suez to the East (page 818).

Originally a part of the Turkish Empire, Egypt became a British Protectorate in 1914. This Protectorate ended in 1922. In 1936 an Anglo-Egyptian treaty was signed whereby military occupation by British forces was terminated, but special British interest in defense of the Suez Canal Zone was recognized, and the right accorded Britain to use Alexandria and Port Said as naval bases.

Let us cruise the coasts of Libia and Egypt from Bengasi to Suez and re-explore briefly these old-new battle grounds.

## Airplanes and Golden Apples

Fly into Bengasi on an Italian skyliner, and hard by the airport you look down on the legendary Garden of Hesperides.

Here grew the golden apples that Hercules sought. In this vicinity, Italian colonists are putting Herculean efforts into expanding gardens to raise "golden apples" of prosperity.

Extending beyond the isthmus, dividing salt lakes and sprawling along the coastal plain, are the dazzling white buildings of this capital town in the Cirenaica district. In three decades under Italian control Bengasi has more than tripled in size. Its peacetime population numbers about 65,000 persons.

A new town with wide thoroughfares and park areas has been transplanted beside the old Arab quarter.

That Italy's colonists might play, a new stadium has also been built where in normal years six days in late September are devoted to horse racing, football, foot races, and other athletic events.

With war in progress Bengasi has become one of the chief bases for landing troops and military supplies from Italy.

The land hereabout is rich; orchards, vineyards, and barley fields have spread in an ever-widening circle in recent years.

Rainfall along the coastal belt of Cirenaica is usually adequate for cultivation without irrigation. Only about one year in five is there a drought. And against that fifth year Italian engineers are developing the springs and wells.

Drive eastward on the new metaled high-road that forms a speedway clear across north Libia from Tunisia to the Egyptian frontier,

\* See "By Felucca Down the Nile," by Willard Price, and 2-page map of Egypt, in the NATIONAL GEOGRAPHIC MAGAZINE, April, 1940.



Drawn by Ralph E. McAfee

### Desert Borders the Mediterranean Coast Where British and Italian Forces Duel for the Rich Nile Delta and Suez Canal

and you see new farming settlements and villages—some so new that they have hardly found place even on recent maps.

This development is part of the Italian scheme of colonizing 80,000 families in Libya by 1942. Families must consist of eight or more persons. They must be of real peasant stock, in sound health, literate, members of the National Fascist Party, and of unimpeachable morality. Preference is given to veterans of the Ethiopian campaign.

Set in uniform pattern, villages include church, school, playground, dispensary, town hall, and Party headquarters.

Though farms are provided complete with houses, sties and store barns, livestock, seeds, tools, machinery, and other supplies, it takes considerable courage and pioneer spirit for the people to pack up from home, ship off to Libya, and eventually be dropped off a truck at one of the new farms to begin life anew. But such, in brief, is the way Imperial Rome's granaries are being re-established.

#### A Land of Art and Olives

Each year sees new olive orchards bursting into green in areas where orchards appear in ancient mosaic maps. Golden barley fields again sway over some of the same red soil that gave grain to ancient Greece and Rome. Farmers look up from threshers and baling machines, and chubby brown-eyed bambinos wave from freshly plastered houses as you ride the road to Cirene.

Suddenly, like running off a smooth concrete highway onto a camel track, you bump mentally from the immediate today and tomorrow's aspiration back to history's early youth.

Cirene, the "Athens of Africa," lies before you. Broken columns protrude from excavated areas on the terraced hillside. Below, in the

valley by the water source, are the ancient baths, one of which was reconstructed for the private use of the late Governor General Italo Balbo, who built a lodge on the heights where he could look down over the scene of past grandeur.

Only rubble; broken sculptures; remnants of platforms, pavements, and walls; and immense cemeteries surrounding the north side of the old capital remain from which to reconstruct a picture of this once greatest of Grecian cities outside of Greece.

A hundred thousand people—some archeologists say many more—lived here during the height of its power. For about 700 years Cirene flourished, following its founding by voluntary Greek exiles in the seventh century B. C.

One of the examples of its prosperity is indicated by an inscription dug from the ruins wherein it is disclosed that during a famine in Greece between the years 331 and 323 B. C. Cirene exported some 29,000 tons of cereals for the relief of starving Greek cities.

From Greece, Sour (Tyre) and Saïda (Sidon), the Delta towns of the Nile, and the far corners of the Mediterranean, ships came to trade at Apollonia, port of Cirene, ten miles or so away.

Aristippus, founder of the Cyrenaic philosophy; Theodorus, the Atheist; Eratosthenes, the geographer, who first determined the length of the terrestrial meridian and mapped the then-known world; Callimachus, the poet—these and many others had their homes here.

Of its position in art, the exquisite statue of the Venus of Cirene, uncovered in 1913 when a rainstorm flooded the tents of Italian troops, bears eloquent testimony. Even today one can see the ruins of the kilns where later Byzantine iconoclasts profitably made lime from precious Greco-Roman sculptures.



© For from Globe

### Scout Hawks Patrol Over de Lesseps' "Ditch in the Sand"

This thin segment of the British lifeline, cutting through desert, marshes, and lakes, is just over 100 miles long. It shortens the sea route from London to Bombay by 5,100 miles. A railway and road parallel the canal. Thousands of troops from Australia, New Zealand, and other parts of the British Empire now are based here to guard against any thrust by the enemy.

From its control by Greeks, Cirene passed into Egyptian hands and then to Rome for further glorification of its temples, palaces, and baths. A severe blow came to the city when, A. D. 115-116, Jewish settlers massacred thousands of Romans and Libians. Invasion by barbarians and earthquakes almost completed its destruction four centuries later.

Eastward over the plateau, the route is punctuated by more new agricultural colonies.

Derna, richest in gardens in ancient days because of its spring-fed irrigation, is richest still. Festoons of bougainvillea and other vines shade its market streets. Before war brought disruption of normal trade the countryside grew quantities of barley for Scottish maltsters.

Today, Derna's abundant water supply as-

sumes strategic importance to Italian legions. Handicapped by lack of fresh water, Tobrukh, farther along the coast, draws its supply by tank ship from the springs of Derna. Derna and Bengasi are the only two water fronts on the Cirenaica coast that have been functioning uninterruptedly throughout the ages.

### Stars and Stripes Once Flew at Derna

Of particular interest to Americans is the fact that the Stars and Stripes once flew for a short time over the battlements of Derna.

In 1805 when the United States was at war with the Barbary pirates, General William Eaton was instrumental in assembling in Alexandria a motley army of some 500 men and 107 camels and marched westward across the desert into Cirenaica—a distance of nearly





Photograph by Darrin from Black Star

### Under the Italian Banner March Native African Legions in Tripoli

These troops, parading along the capital's long promenade, now are fighting on Libyan frontiers or form the spearhead which Marshal Graziani seeks to thrust into Egypt. During the Tripolitan War, 1801-5, U. S. Navy squadrons under Commodores Dale and Preble blockaded and bombarded the port five times. In 1804 Lieutenant Stephen Decatur heroically fired the captured frigate *Philadelphia* in the harbor. Again in 1815 the United States was compelled to send a squadron to Tripoli under Decatur, who forced the Pasha to release all ships and prisoners and pay indemnities.

600 miles—to capture the battery guarding Derna. The U. S. brig *Argus* had co-operated by meeting the land force at Bomba.

Traveling still eastward over the ribbon of asphalt, modern version of the one-time chariot route of old Imperial Rome, you come to Tobrukh. On the 110-mile drive fertility tapers off and you skirt the desert fringe.

Much in the news headlines now, because of the frequent bombardments by British air and sea forces aiming to disrupt the Italian advance, this modern port is largely a product of Fascist labor. Near by, smothered by the dust of the Libyan Desert and of the ages, lie ruins believed to be the Greek colonial town of Antipyrgos.

An Italian naval station and army garrisons are based beside the harbor, which is one of the best on the North African coast. The bay, formed by a peninsula jutting eastward into the sea, provides a protected area for anchorage some two miles long and three-quarters of a mile wide that can be entered in any weather.

### A Road Into the Desert

Off these Libyan shores, where battle fleets now maneuver in tag games of destruction, lies Libya's richest harvest after her barley—the sponge crop. Since ancient days, Greek fishermen have been diving into these Mediterranean waters to bring up the fine quality cup-shaped sponges. Annually from April to

October they work from the Gulf of Sidra to the Egyptian port of Matrûh (Mersa Matrûh).

Tunny fishing has also become an industry of growing importance. Though our Pacific coast canneries remove the oil from the tunny to make it taste like chicken, the Italians prepare theirs to retain the full fish flavor.

From Tobruch a road thrusts southward into the desert to the oasis of Giarabub (Jara-bub), ceded a few years ago by Egypt to Italy. The main military highway stretches eastward another 90 miles to Porto Bardia and the Egyptian frontier.

On the map Libia is an impressive area. Though some five and a half times the size of Italy proper, comparatively limited portions of it are suitable for cultivation. Beyond the coastal fringe of Cirenaica and regions in Tripolitania, however, place names on the map may indicate only a military outpost, a handful of mud houses, an oasis, or only a water hole. All the rest is a desert of sand dunes, or pebbly and rocky surfaces.

Mapwise, Egypt also embraces a sizable land patch in North Africa. But the oft-quoted statement, "Egypt is the Nile and the Nile is Egypt," summarizes that country.

Even more than of old, this narrow ribbon that stretches through Egypt is a garden of fertility. In the past fifty years British capital and engineering genius, linked with Egyptian enterprise, have been responsible for building projects which in themselves are as spectacular as some of the ancient monuments. But with a difference—the structures have been erected for the living, rather than the dead!

No longer do the Egyptians rely upon the annual flooding of the Nile. Dams and barges now harness the life-giving waters of the river so that two and three crops can be grown in a year where only one grew before.

Egyptian cotton normally influences world prices of that commodity. If you hear British and Egyptian traders talking about Giza 7 or Giza 29, it isn't about the latest excavations around the pyramids. They're discussing particular grades of long staple cotton!

Every year engineers developing new schemes take another bite from the thirsty desert fringe and convert it into a productive garden. Still, viewed as a whole, Egypt's cultivable area appears small—only about one twenty-eighth is under the plow.

The Libian Desert flanks and encroaches on the Nile in the west; the Arabian Desert stretches eastward to Suez and the Red Sea. Only oases, tribal encampments, and caravan trails break their emptiness. Here, a cluster of sun-parched mud huts around wells of water assumes significance.

Such a place is Sidi Barrâni, 60 miles from the Libian frontier, which the Italian forces captured in September on their drive into Egypt.

According to Italian news dispatches, wells in the village were destroyed when the British evacuated. Even if the wells are still usable, the supply is inadequate for the extensive needs of an army. Motor caravans must still haul quantities from distant springs in Libia.

As I write, the port town of Matrûh, beside a sheltered lagoon farther eastward along the Egyptian coast, is a heavily armed camp. Backed by sea communications and a rail link to Alexandria, British Tommies stand guard here to forestall any Italian thrust deeper into Egypt.

#### Soldiers Bathe in "Cleopatra's Bath"

Twenty centuries ago, this fishing town was converted into a summer resort where Cleopatra and Antony could watch the Mediterranean waves break against the shore. Soldiers no doubt are bathing in the waters known yet as "Cleopatra's Bath"!

Other distinguished visitors have also come to Matrûh. In 331 B. C. Alexander the Great passed through here on his way to the famous desert oasis of Siwa. He had completed his victorious march from Macedonia through Asia Minor, had defeated the Persians at Issus, reduced Tyre by a seven-months' siege, conquered Palestine and Egypt, and founded Alexandria.

Now he was on his way to Siwa to consult the oracle of Jupiter Ammon to learn if he were indeed a god, the son of Zeus!

Upon reaching Matrûh he was met by a delegation from Cirene who had hastened here to assure him of their allegiance.

Bowed before Jupiter Ammon, Alexander apparently was reassured that he was half-god, as his violent, barbaric mother had insisted. So, following the Siwa journey, he set out to expand his empire in Persia and India.

Siwa lies nearly 200 miles southwest of Matrûh, over desert and rocky hills punctuated only by a few wells. Famed as early as 600 B. C., the oracle eclipsed and outlived the Delphic oracle of Greece. Many dignitaries, anxious over personal or state problems, visited the Temple of Jupiter Ammon before and after Alexander. While the temple existed, the road there was much traveled.

Spread in a depression, it forms a sunken garden of date palms, pomegranates, limes, olives, and vegetables some 60 feet below sea level. During the date harvest season caravans trek here to buy the luscious, sticky piles of fruit.



Photograph by Christian De Gues

### Italy's Colonial Tillers of the Soil Are Also Prepared to Wield the Sword

Here, on a feast day, they wear their uniforms and parade with gaily garlanded bullock carts. Veterans of the Ethiopian campaign are given preference in this colonial enterprise in Cirmaica (page 811).

Many of the homes of the villagers sprawl in the floor of the valley; others are either excavated chambers in—or mud skyscrapers perched above—the rocky rim of cliffs that encircles the gardens.

In 1928 the late King Fuad of Egypt, father of youthful King Farouk (page 820), made the trip to Siwa in a fleet of motor cars. Since then, the oasis has been added to the list of places to be seen by visiting motorists.

Much of the time, however, Siwa lives its own life and echoes to its own language. You wonder, however, if, because of its water supply, the isolation of the oasis may not be broken by some daring military thrust toward the Nile, upward to 400 miles away.

#### Busy Alexandria

One of the most enduring monuments of the Macedonian conqueror was the founding of Alexandria.

Fly into Alexandria, as I did one morning from Greece, and you see the city's mighty sickle of business and apartment blocks facing a 10-mile coastal drive. Back of it is packed a mass of roof tops broken only by park areas.

Boats cluster in the harbor and roadstead. Puffs of smoke rise from railway yards.

After your plane has dropped down onto the water beside several other metallic sky birds, you have really to hunt for antiquity in the museum, in underground tombs, or out at Pompey's Pillar.

Alexandria is too busy trading in cotton, adding shipping figures, conducting business, or swimming at the beach normally to bother much about its past. Just now it is thinking about its immediate future.

"The Library?" you ask.

"What library? Is an air raid shelter there?"

No one seems to know the location of the famous library of old, whose volumes, it is said, kept the fires burning in the public baths for six months back in 642 A. D.

"If they agree with the Koran they are useless; if not, they should be destroyed." Such was the supposed comment of Caliph Omar when he ordered the library destroyed.

Near where the Pharos, or lighthouse, one of the Seven Wonders of the Ancient World, once stood on the Alexandria shore, search-

lights now rake the sky to spot enemy planes.

Once, when Vasco da Gama and others found a sea route to India around the Cape of Good Hope, the city's trade was ruined. The Suez Canal and Egyptian cotton have changed that.

#### Rosetta, Made Famous by a Stone

One day on the Alexandria water front, several boats unloading melons attracted the lens of my color camera.

"Where are you from?" I asked some of the men whose craft I had boarded.

"Rosetta," was the reply.

Not for melons, but for the famous Rosetta stone is this village of the left branch of the Nile best known. Off Abu Qir, part way up the coast toward Rosetta, where I watched fishermen hauling in mile-long nets, Nelson attacked and destroyed 13 of the 17 vessels that were to cover Napoleon's invasion.

In two flights from Alexandria by the Misr, or Egyptian, airways—one to Port Said and the other to Cairo—you gain a quick comprehensive panorama of the intensive cultivation and the homes in the rich Delta region.

About the river forks, the canals, and ditches, farms spread green and gold. Where the last trickle of water ends, the desert begins. Along the edge of the desert, cultivation appears to have been laid out by T-square and transit. And indeed it has, for it marks the limit of some new irrigation project.

The Delta barrage at the bifurcation of the Nile, 15 miles north of Cairo, was the first of the modern irrigation works. When Mohammed Ali ordered its building in 1833, he wanted the Pyramids at Giza pulled down to provide the rock for its construction.

The ancient landmarks remain only because engineers pointed out that their demolition would be too expensive. Even so, the barrage was so costly that it remained unfinished until British engineers completed it in 1891.

Flying south to Cairo at high altitude, I noticed numerous circles on the ground that I could not identify.

On the ground, later, I found that they were threshing floors, where water buffaloes dragged sledges round and round over the straw and men with hand-made wooden forks and shovels winnowed the grain as in the days of the Pharaohs. Camels carried mountainous loads of sheaves from the fields.

Cairo, to me, is always a surprise. Somehow you expect to find some ancient procession pass down the street. Instead, you have to step lively at the street corners to keep from being run down by an automobile or a street-car (page 816).

True, you can wander in the old *souks* (bazaars), up to the citadel, and along narrow streets in the Arab quarter and almost forget the 20th century.

But suddenly you are jarred back to the present by a newly cut street, modernistic buildings, a veilles young woman attired in the latest style dress, or by a hawker shouting, "Ice cream!"

Motor out to ancient On to find the site of the Virgin's Tree, where the Holy Family stopped after their flight into Egypt, and you see ultra-modern suburban Heliopolis, complete with its racecourse and tennis courts.

Go in the opposite direction to visit the Sphinx and Pyramids of Giza, and you pass a garden city, new hospital, and other modern developments.

About the drawbridges, freight boats with eyes painted on their prows and their tall graceful sails fluttering in the vagrant breeze wait patiently for the carefully clocked opening of the spans to allow their passage.

Bright new residential homes dot the highway far out toward the Pyramids. In the evening at hotels and clubs young Egypt jitterbugs to a hot swing band.

Seek the Mosque El-Azhar, the famous Moslem university founded in 988, and you end up by taking in other schools and colleges (including the American University), where Egyptian students chatter in English and French as well as in their native Arabic.

To clear the whirl from my head after a round of looking at Cairo's latest building projects, I went out to the camel market to see long-gowned natives leisurely dickering among the grumpy beasts!

#### Pharaohs Back to Their Tombs

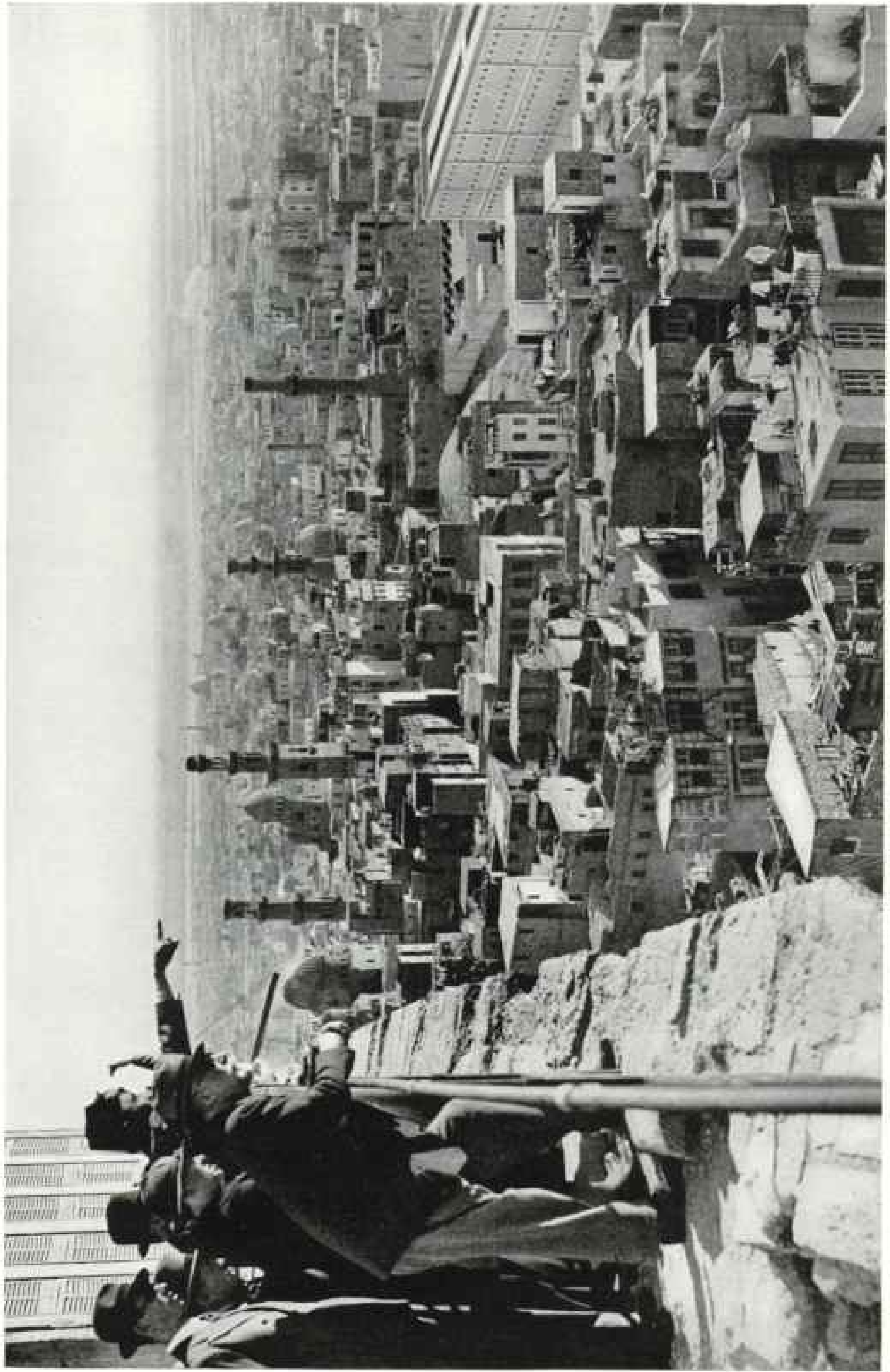
As Cairo today scans the skies for hostile aircraft, museum guardians are carrying treasures and mummy Pharaohs back to their tombs for safekeeping.

"Egypt is the Nile. . . ." Mile after mile upstream, stand the monuments of Egypt's long dramatic history—the Pyramids of Giza; Memphis, capital when Alexander the Great came; the Saqqāra Pyramids; and the square skyscraperlike Pyramid of Maidūm.

At Beni Hasan are rock tombs, whose wall paintings portray fascinating scenes of the domestic life of the ancient Egyptians—hunting, dancing, wrestling, cultivating the valley, yes, even gambling.

Still journeying southward, you come to the Temples of Abýdos, Karnak, and Luxor, and the vast Necropolis of Thebes with its famed Valley of the Kings.

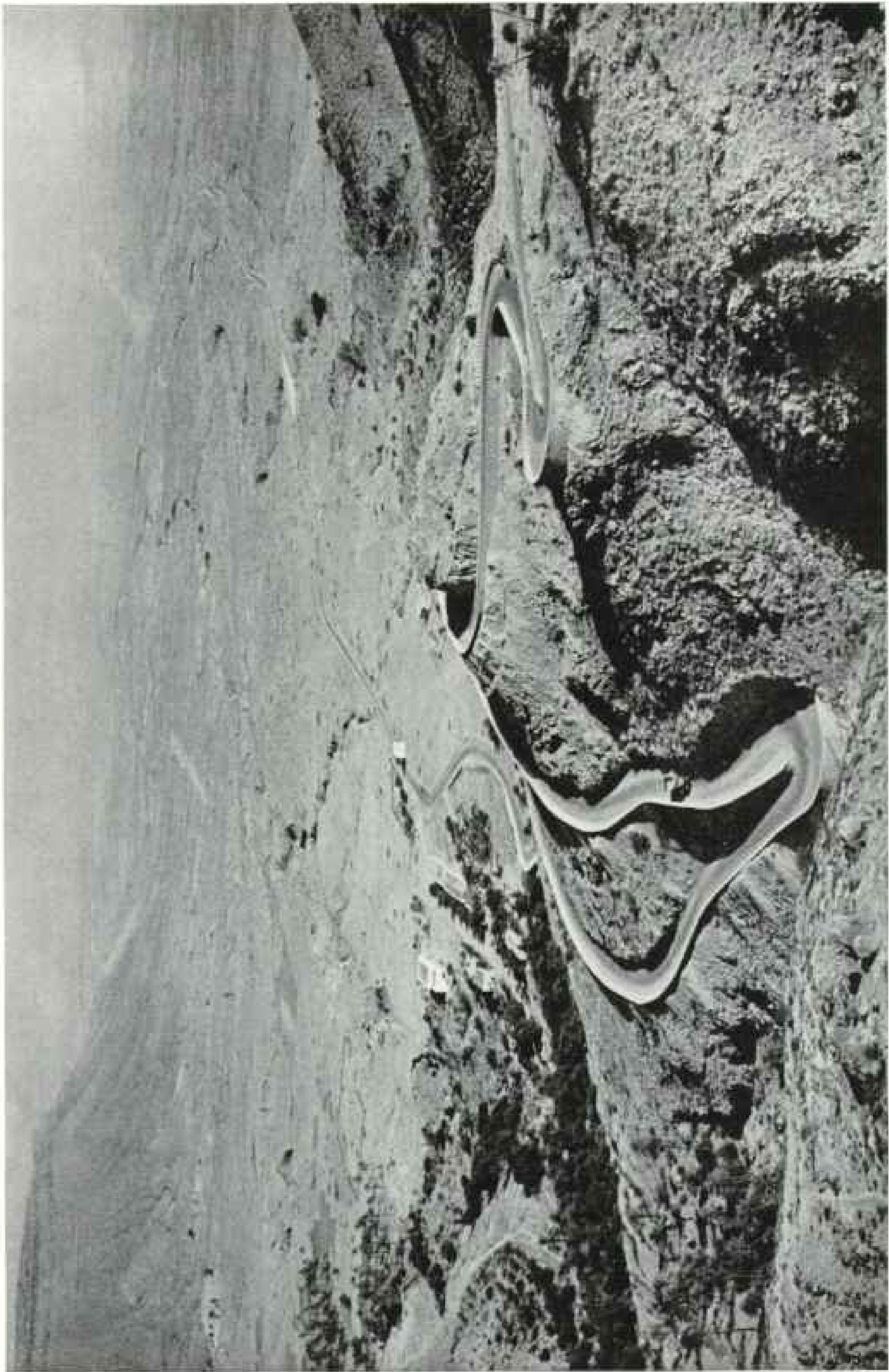
At the Aswān quarries, where building stone



Photograph by Herbert Gede from Black Star.

**Below the Citadel in Cairo Spread Acres of Roof Tops Pierced by Slender Minarets and Bulbous Domes**

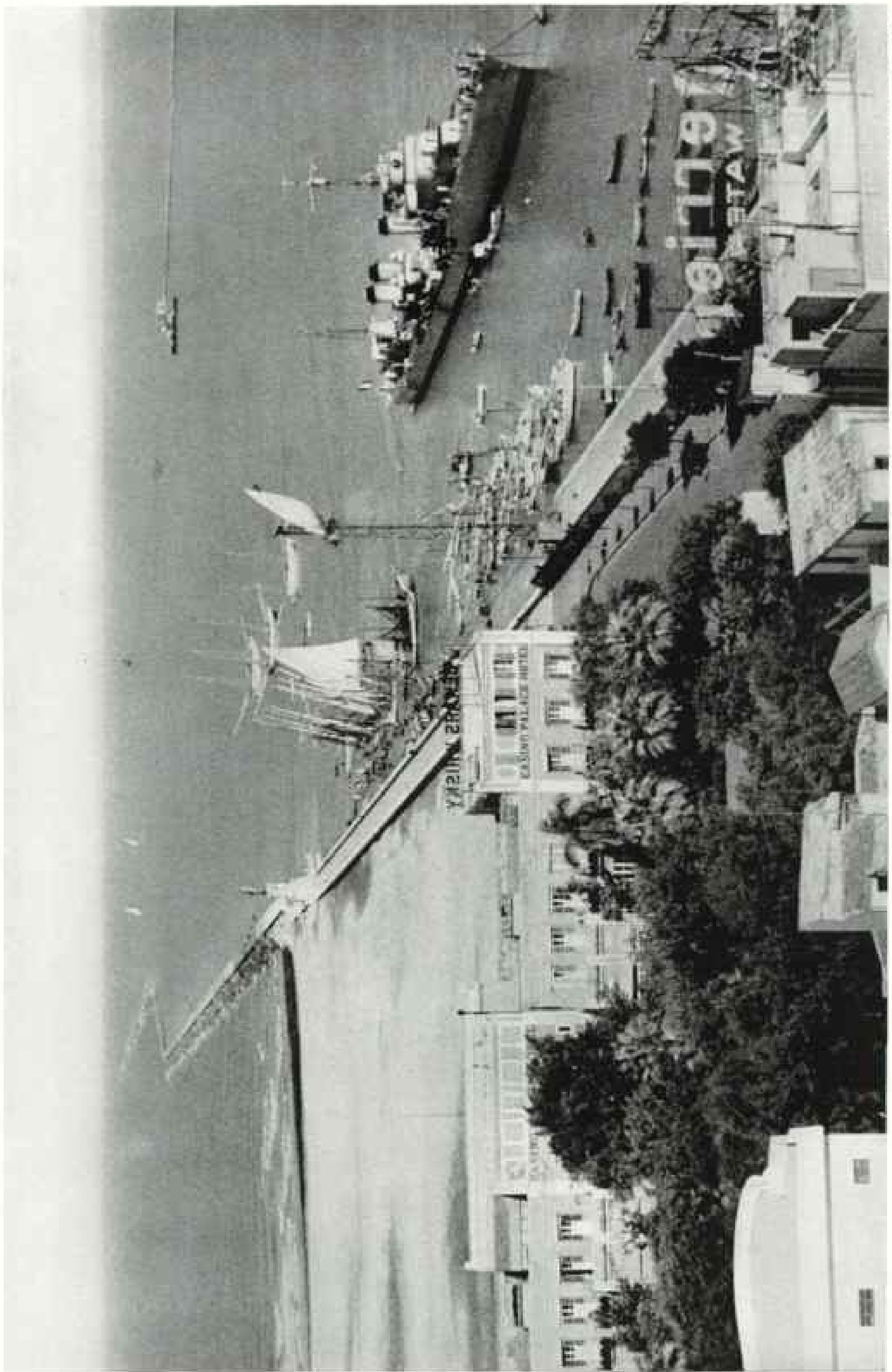
In the distance is the Nile and the edge of the Libyan Desert. Some sections of the capital are quite modern; even in this older portion wide streets have been cut and new buildings erected. The Citadel was built by Salâh ed-Dîn (Saladin), famous Saracenic leader who fought the Crusaders in Syria and Palestine.



Photograph by Burns Heaton from *Being a Soldier*

**Boldly Engineered Highways Thread Rocky Hills and Wide Deserts in Libya**

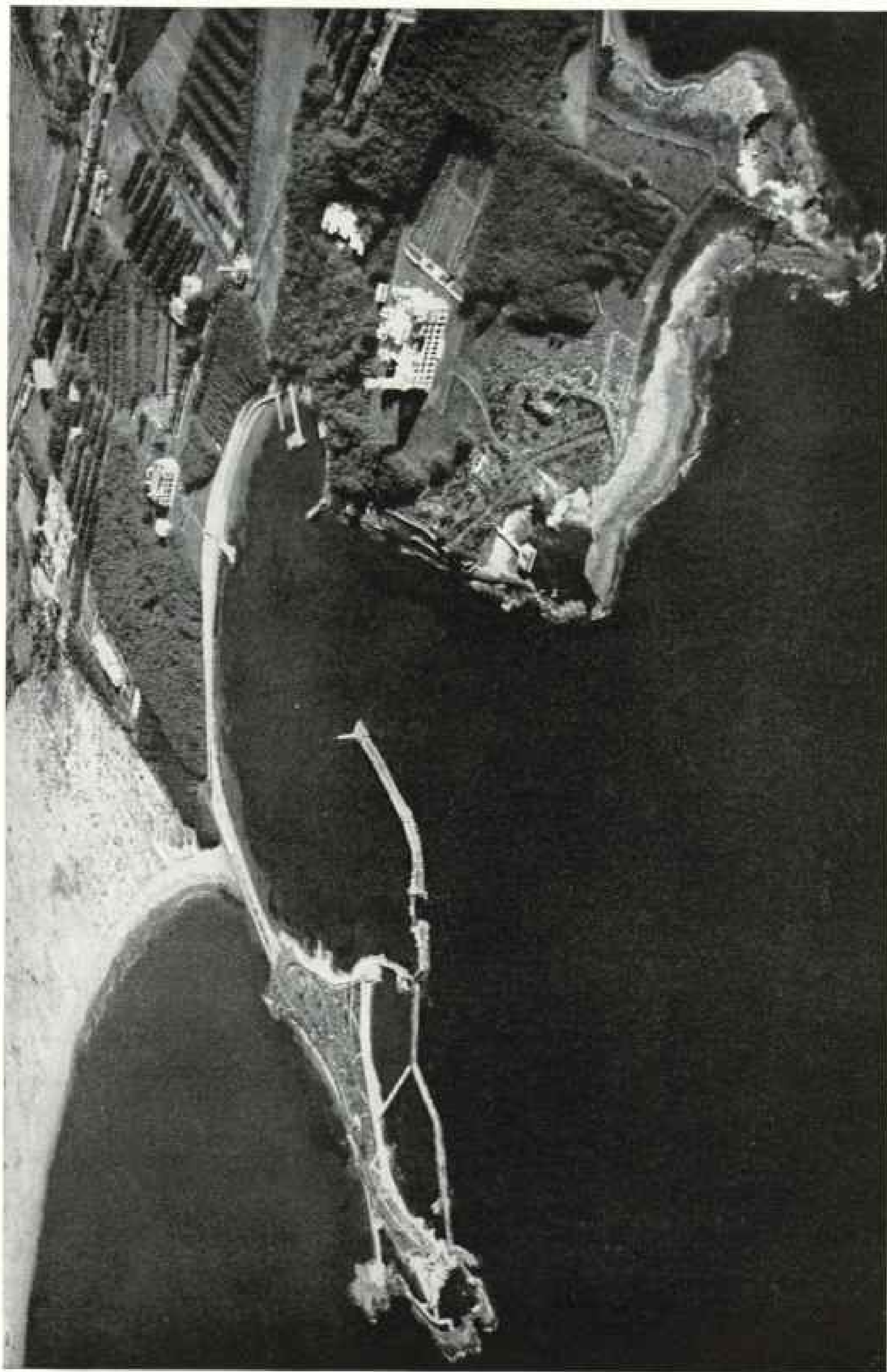
This one, twisting over steep slopes, links Tripoli with Gadhames on the Tunisian border. Another skirts the coast across Libya to the Egyptian border. Over it now rumble trucks filled with supplies for the army that threatens Egypt. In ancient days, Roman chariots rattled along almost the same route.



Photograph by Paol from Three Lions

**Past a Monument of Ferdinand de Lesseps, Ships Steam Into the Port Said Gateway of the Suez Canal**

The French engineer dug this strategic waterway to the East between 1859 and 1869. Great Britain obtained a vital interest here in 1875, and its defense is left to her armed forces, though French business men hold controlling shares of stock.



Photograph courtesy Egyptian Army, Ali Fawzi

**Egypt's Royal Family, Fleeing Cairo's Summer Heat, Takes Refuge in Cool Montaza Palace**

On a point between scalloped beaches near Alexandria stands the royal residence, swept by Mediterranean breezes. The diplomatic corps follows the King to the coast.





#### King Farouk Speaks to His People on the Radio

This popular young monarch came to the throne in 1936, when he was 16 years old. Two years later, he acquired full sovereignty over his 16 million subjects upon reaching majority according to Egyptian law. Educated by English tutors, he also spent a brief period studying in England.

for the mighty temples and obelisks was cut, you see men still quarrying rock; now it is for bank buildings and new barrages on the Nile. It is the Aswân dam; the barrages of Isna, Nag Hammâdi, and Asyût; and the ever-widening network of canals watering fields of cotton and sugar cane, however, which remind you that Egypt, developed by energetic British and Egyptian industry, is a land with a progressive present as well as a spectacular past.

If you take the plane from Cairo to Port Said, you fly almost directly over the ancient town of Tanis, another of Egypt's historic treasure-troves. In February this year the French Egyptologist, Pierre Montet, uncovered here the tomb of Psu Sennes, second king of the 21st Dynasty.

#### Here Moses Started His Journey

From near this site Moses started his 40-year journey through Sinai to the Promised Land. That may not be its only link with Palestine, for Psu Sennes may have been one of King Solomon's numerous fathers-in-law!

The gold and silver that surrounds Psu Sennes may indeed be part of Solomon's treasure.

At Port Said, the statue of de Lesseps stands

serenely on the breakwater with one hand pointing to the canal which was that visionary French engineer's life achievement (page 818). Half the world away, at Panama, is another canal at which de Lesseps tried his hand but failed.

"To Open the Earth to All Peoples" (*Aperire Terram Centibus*), reads the inscription on the pedestal of the monument; but de Lesseps, even in his most expansive moments, could not have visualized the parade of ships that pass through this waterway and fan out to ports in East Africa, India, and the Far East.

As bigger and bigger steamers have been built, squealing dredges have bit deeper into the bottom and banks of the canal to expand the path for their passage. Now, all except the very largest can move through the channel. Normally, there is a transit of nearly 6,000 vessels annually.

Today this 100-mile water path through sand, Lake Timsâh and the Bitter Lakes from Port Said to Suez, is the objective of a military campaign.

As you look at the boats moving through this "Empire lifeline" and reflect on the long history of these North African lands, you realize that in Egypt and Libia drama never dies.

# New United States Map Shows Census Changes

**S**WIFT-CHANGING America, altered mightily in a decade by engineers and builders, rather than scarred by bomb and blitzkrieg, along with epochal population movements, is delineated in the new 10-color map supplement of the United States, 41 by 26½ inches, which accompanies this issue of the NATIONAL GEOGRAPHIC MAGAZINE.\*

Hereon are shown striking results of the 1940 census, most comprehensive enumeration in all history, and also historic alterations on the face of a vast nation—new dams and express highways, newly created national parks and monuments, expanding cities and dust-bowl migrations, and defense bases and sites of camps where millions of the country's first peace-time conscripted forces will train.

Increases and decreases of State populations are recorded in another inset, and the altered order of our 30 biggest cities is given in a table comparing their 1930 size with that of 1940.

Besides the 48 States of the Union, "from sea to shining sea," the new map shows all of the Maritime Provinces of Canada and most of its industrially developed section, Mexico as far south as the Tropic of Cancer, and virtually all of the Bahama Islands, site of one of the eight new air and naval bases acquired by lease from Great Britain.

## Miami Beach Has Biggest Gain

In the light of the latest census, scores of towns and cities emerge for the first time on a national map, most of them in the western States. Thirty others—notably Charlotte, North Carolina, and Sacramento, California, which have passed the 100,000 mark—move into heavier type with an increased population, while a few drop into a lower classification.

On the map appear 8,838 place names, 288 of which have been added since The Society last mapped the Nation seven years ago.

Biggest percentage gain recorded for any city was made by Miami Beach, Florida, which grew 321 per cent in the last ten years—from 6,494 to 27,340. But even that is small compared to its 908.4 per cent growth in the 1920's. In 1910 it did not exist.

Among the larger cities, those of 100,000 or more, Miami, Florida, made the greatest increase, with 54.4 per cent. San Diego, California, was second with 36.5 per cent, and Washington, D. C., third, with 36.2 per cent.

Among cities of a million or more, Los Angeles, with its area of 365.7 square miles, grew fastest in population. It gained 20.9 per cent.

Of the Nation's top thirty cities—those above the 300,000 level—Baltimore has moved ahead of St. Louis. Washington, with its mul-

tiplying government activities, has shot up from fourteenth to eleventh place, entering the 500,000-to-a-million class.

Moreover, suburban counties surrounding the Nation's Capital were among the most rapidly growing in the country. Arlington County, Virginia, gained 112.3 per cent and Montgomery County, Maryland, 65.5 per cent.

## Army Training Camps Shown

The special National Defense inset shows the nine Corps Areas of the United States Army, with the various corps area and division headquarters, principal air stations, posts and recruit reception centers.

National Guard divisional areas are outlined to indicate the States from which the divisions are drawn. Each division is numbered in red and its training camp bears the corresponding number.

Thus friends of a National Guardsman from Ohio can see at a glance that his division, the 37th, trains at Camp Shelby, Mississippi. A New Yorker, belonging to the 27th Division of the National Guard, would train at Fort McClellan, Anniston, Alabama. The 26th, or Yankee Division, trains in Massachusetts at Camp Edwards, named for its World War commander. Most of the other northern units drill in the South.

On the same inset appear naval and submarine bases, torpedo stations, navy yards, marine barracks, and naval air stations, including the big southeastern air base recently completed at Jacksonville, Florida, more than six months ahead of schedule. Also of major importance in the program of the expanding Navy is the United States Fleet Training Base on San Clemente Island, California, between San Diego and Los Angeles.

Population shifts revealed by Uncle Sam's immense nose-counting chore, the 1940 census, are indicated in another eloquent inset.

Shown in white are the six States which decreased in population during the decade—North and South Dakota, Nebraska, Kansas, Oklahoma, and Vermont. Never before in United States history have more than three States shown a loss. The explanation in the case of the first five is drought, for these Great Plains States reflect the exodus from the Dust Bowl, reaching from Texas to Canada.

\* Additional copies of the map The United States may be obtained by writing to the National Geographic Society, Washington, D. C. Prices, in United States and Possessions, 50¢ on paper (unfolded); 75¢ mounted on linen; Index 25¢. Outside of U. S. and Possessions, 75¢ on paper; \$1.00 on linen; Index, 50¢—all remittances to be payable in U. S. funds. Postage is prepaid.

A similar map drawn by counties would show that the great central loss region extends far beyond the five States mentioned. In fact, it takes in 587 counties in Montana, Wyoming, the Dakotas, Nebraska, Colorado, Kansas, Iowa, Missouri, New Mexico, Oklahoma, and Texas, with a combined loss of 835,978 persons—the equivalent of the whole population of St. Louis picking up and moving out, 229 persons for every day in the last ten years.

To many of the victims of searing winds "California" was the magic word of hope.

Obedying the inborn American urge to "go west," a vast horde poured into the Golden State. In the decade which ended in 1940 its population jumped by 1,196,437 to boost California into fifth place in the Union, displacing Texas and closely rivaling Ohio. The big three, of course, are still New York, Pennsylvania, and Illinois.

Although California registered the biggest increase of all the States in actual numbers, its fellow El Dorado, Florida, heads the list in percentage of gain. In ten years Florida grew 27.9 per cent. New Mexico was second with 24.9 per cent and California third with 21.1. The District of Columbia increased 36.2 per cent.

With a population of 131,409,881,\* the United States as a whole gained 8,634,835, or more than all the people in Venezuela and Chile combined. Only three countries in the world contain more people than the U. S. A.—teeming China, India, and the Soviet Union. But the percentage of gain in the United States is less than half that of any previous decade—7 per cent, compared to 16.1 per cent from 1920 to 1930.

The reasons for this slowing of growth are that the birth rate is lower and immigration has virtually stopped. The slackening leads Census Bureau experts to estimate that the United States will attain full growth between 1970 and 1980 with a population of about 150,000,000.

The biggest regional population gains came in the Pacific Coast and Rocky Mountain sections. Next in growth came the South with its high birth rate. With unemployment reigning in northern industrial centers in the thirties, and with many new industries springing up in southern States, fewer southerners were leaving the South to find work.

#### Growth of Big Cities Slows Down

All the northeastern States except Vermont increased, but at a pace below the national average. In part this reflects adverse industrial conditions which prevailed during some of

the period, and also the comparatively low birth rate of the urban areas.

For the first time in United States history, the census showed, the Nation's big cities grew more slowly than the rest of the country.

Cities with a population of 25,000 or over in 1940 showed a gain of 5 per cent, well below the national 7 per cent average. Fewer boys and girls were leaving farms, villages, and towns to flock to the cities, and some city folk were turning back to the farm.

Cities of half a million or more especially reflected this trend, several of them actually losing population (see list on map). Of the "big three," New York City gained 6.5 per cent, Chicago added only two-tenths of one per cent, and Philadelphia lost.

On the other hand, the small cities of 10,000 to 25,000 showed an average 9 per cent gain.

With general use of the automobile, many Americans were making their homes beyond the city limits in suburban communities. Counties in which big cities are located generally grew more rapidly than the cities themselves. Metropolitan areas were spreading. Around the city as a core were clustering suburban towns and cities, made possible by the automobile and faster commuting trains.

#### Oil Builds Thriving New Towns

Even in the great central loss region there are conspicuous islands and peninsulas of gain which do not appear on a map drawn on the basis of States. Some of these spots of growth correspond with oil and gas fields, others with manufacturing centers or with Federal reclamation projects.

Because of oil, Tyler, Texas, increased from 17,113 in 1930 to 28,256 in 1940, and the nearby towns of Kilgore and Gladewater grew to an importance that warranted showing them on the 1940 map. For the same reason, Hobbs, New Mexico, boomed from a town of 598 in 1930 to 10,641 ten years later.

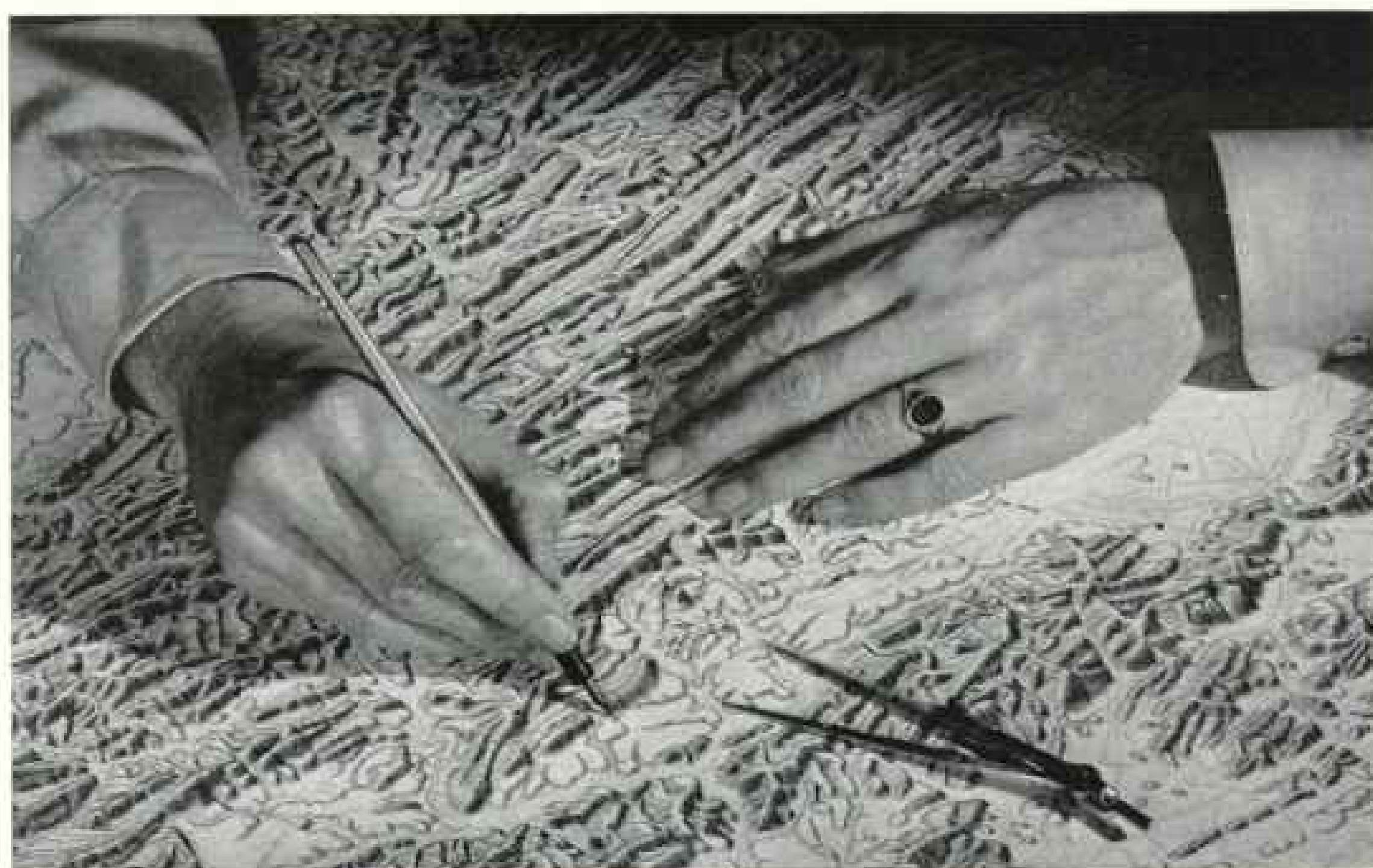
Huge dams, enriching the Nation with irrigation, flood control, power, and navigation facilities, are changing the very face of the land. This new map shows several of the largest man-made lakes in the world, held behind the greatest constructions in history.

Fort Peck Dam, on the upper Missouri River in Montana, is the world's largest in volume of material, containing 100,000,000 cubic yards of earth. For flood control and power it will create a lake, Fort Peck Reservoir, half as large as Lake Okeechobee in Florida. This new body of water will stand third among fresh-water lakes wholly within the United States. Only Lake Michigan and Lake Okeechobee will exceed its 383 square miles.

\* Preliminary figure from the U. S. Bureau of the Census.



Each Name on a Geographic Map Is a Tiny Photographic Print from Hand Lettering



Photographs by Volkmar Wenzel

#### Two Million Pen Strokes Are Needed to Make the Mountains on a Single Map

It takes three months' work, but no method so satisfactory as drawing hachures by hand has yet been discovered for showing relief. A notable Geographic process, however, makes possible the reproduction of place names with the clarity and distinction of hand lettering and the speed of printing (upper picture). Names are "set up" on a photo-composing machine in which negatives of hand-drawn letters take the place of type. The name is then printed photographically and the print is cemented into place on the map.

So winding will be the margins of Fort Peck Reservoir that its shore line will be greater than that of California and nearly double the shore line of great Lake Erie.

The Reservoir is shown on the map as it will appear when full.

Lake Mead, created by Boulder Dam (world's tallest, 727 feet) on the Colorado River, is by far the largest of the man-made lakes in volume, but its area is less than that of shallow Fort Peck Reservoir when filled.

Grand Coulee Dam, for irrigation, flood control, and power, now nearing completion in the State of Washington, will contain 11,250,000 cubic yards of concrete—a world's record volume of that material. The structure, 553 feet high, will back up an 82,000-acre lake extending 150 miles to the Canadian border.

When Shasta Dam in California is built, it will be second only to Boulder Dam in height and to Grand Coulee in volume of concrete, its 5,400,000-cubic yard bulk towering 560 feet above bed rock. Being the overflow type, it will create the world's highest artificial waterfall—480 feet, or nearly three times the height of famous Niagara Falls.

Besides these giants of construction, the new map shows many other vastly important new developments, such as the Colorado River Aqueduct and the All American Canal, in the California desert, Parker and Imperial Dams on the Colorado River, the dams and reservoirs in the Tennessee Valley, and Bonneville Dam on the Columbia River.

#### New National Playgrounds

Outstanding among the newer national parks and monuments is King's Canyon National Park in California, 454,600 acres of lofty mountains, deep canyons, blue lakes, and wild-flower-jeweled alpine meadows in the region once described as the "shining mountains" because of the sparkle of the sun on lofty rock and glacier. Its boundaries include the former General Grant National Park.

Another comparative newcomer to a detailed U. S. map is Olympic National Park, Washington, a "last frontier" containing one of the few remaining tracts of virgin forest to be found in the United States. In this lake-studded, stream-veined mountain wilderness grow giant Douglas firs, saved forever from the woodsman's axe.

Other notable additions to America's incomparable playgrounds are Waterton-Glacier International Peace Park, between Montana and Alberta, and the Boulder Dam National Recreational Area, which drew 655,910 visitors to the mighty dam and blue Lake Mead in

the year which ended on September 30, 1940.

Among a host of newly designated national monuments is old Fort Jefferson, on Dry Tortugas in the Gulf of Mexico.

#### Bridge to Good Neighbor Canada

The new Thousand Islands International Bridge, which links the United States and Canada, follows the old trail that the Mohawks used as they crossed the frozen river some two centuries ago. Five bridges and connecting highways traverse four of the Thousand Islands, bringing some 200 of them into view. Within 300 miles, a day's drive of the bridge, live a fourth of the population of the United States and a third of Canada's.

It was at the opening of this bridge in August, 1938, that the President of the United States said, "The people of the United States will not stand idly by if domination of Canadian soil is threatened by any other empire."

A new superhighway, the \$70,000,000 Pennsylvania Turnpike, is shown, from near Carlisle almost to Pittsburgh—160 miles without a shift in gears! It has no sharp curves, heavy grades, or intersections to slow down the motorist. Built on an old railway bed laid out in 1883, the road passes through nine tunnels, seven of which were partially completed for the projected railroad.

Many minor changes have been made. On the 1933 map the highest point in every State was marked with its altitude—except in Missouri and Rhode Island. There the surveys were not yet complete. Now they are included. In Missouri the highest point is Tom Sauk Mountain, 1,772 feet. Rhode Island's highest "peak" is Durfee Hill, 805 feet.

The Red River which forms part of the Minnesota-North Dakota boundary and flows north into Lake Winnipeg across the Canadian border is now the Red River of the North, by an official decision of the U. S. Board on Geographical Names. The change distinguishes it from the Red River which forms the Oklahoma-Texas boundary.

#### First Census and Registration

Census-taking has gone far since Moses ordered the children of Israel counted, proclaimed the first registration day (Numbers 1: 2, 3), and the results were reported in 36 chapters of the Book of Numbers.

The 1940 census of the United States with its maze of geographical, industrial, and commercial information will take 65 volumes.

Highlights of these data, and trends which make history, are charted first in your Society's new Map of the United States.

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## ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-two years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material which The Magazine can use, generous remuneration is made.

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 researchers have solved secrets that have puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 10, 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. 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 71,295 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took shift in the gondola hourly 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.

The world's largest ice field and glacial system outside the Polar regions was discovered in Alaska by Bradford Washburn while making explorations for The Society and the Harvard Institute of Exploration, 1937-8.

# To Peggy - for marrying me in the first place...

for bringing up our children—while I mostly sat back and gave advice.  
 for the 2,008 pairs of socks you've darned.  
 for finding my umbrella and my rubbers Heaven knows how often!  
 for tying innumerable dress ties.  
 for being the family chauffeur, years on end.  
 for never getting sore at my always getting sore at your bridge playing.

for planning a thousand meals a year—and having them taken for granted.  
 for a constant tenderness I rarely notice but am sure I couldn't live without.  
 for wanting a good watch ever so long... and letting your slow-moving husband think he'd hit on it all by himself.  
 for just being you... Darling, here's your Hamilton with all my love!

*Jim*



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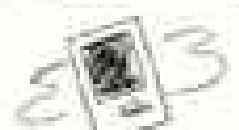
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Brighten your home this Christmas with the joys of recorded music . . . played on a *Beam of Light!* Philco's amazing new *Photo-Electric* radio-phonograph does away with needles, reduces record wear and surface noise by 10 to 1 and gives glorious new beauty to any record. By an entirely new principle, a permanent jewel floats over the record grooves and reflects the music on a beam of light from a tiny mirror to a photo-electric cell. It's the first basic improvement in record reproduction since the invention of the phonograph!

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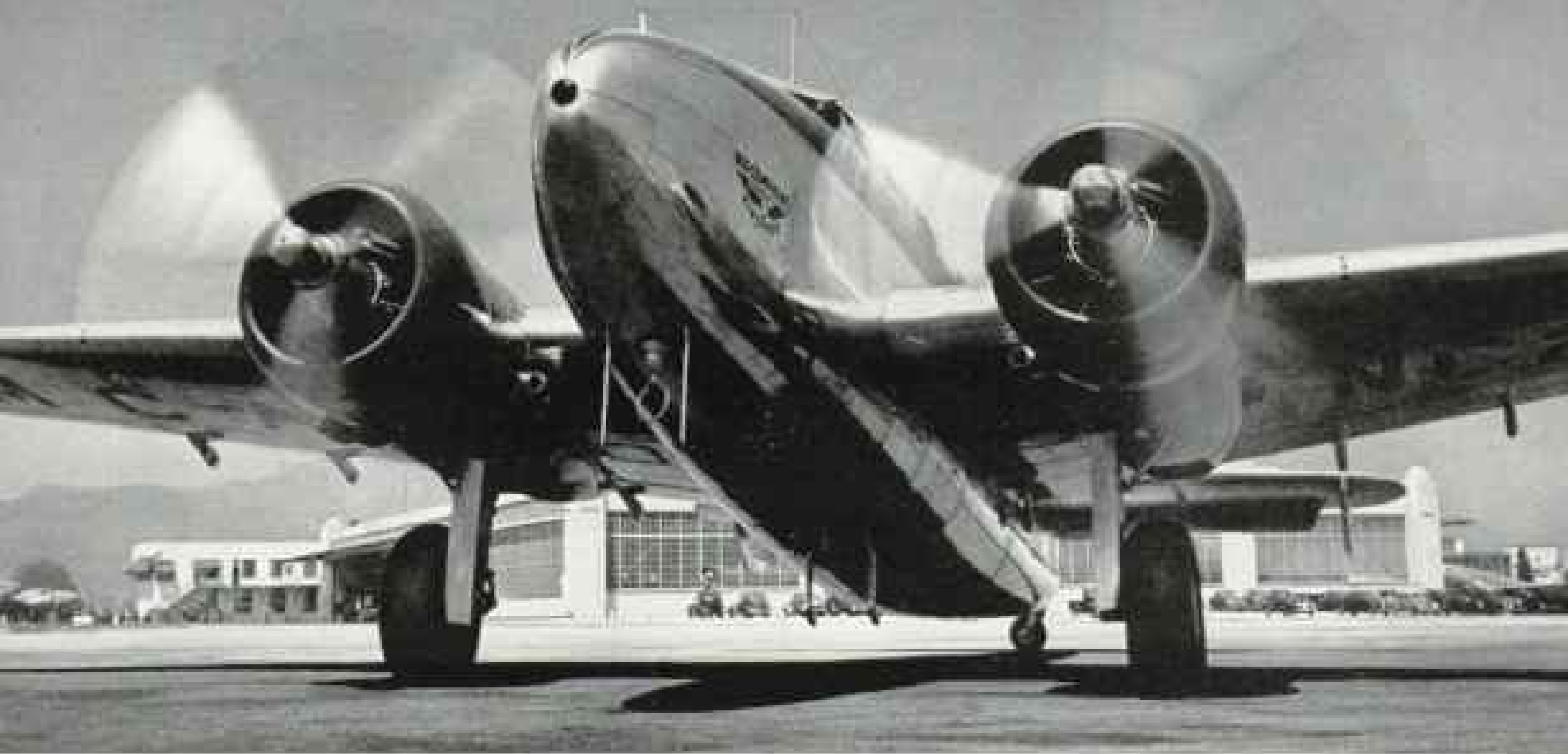
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**Just what  
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You'll never know how delicious fish can be until you serve some of my mackerel fillets, prepared the Down East way. Take one of my new, meaty, late-caught fat mackerel fillets. Freshen it. Broil quickly to a nice brown so all the flavor is retained and the rich, tender meat falls apart at the touch of your fork. Serve sizzling hot. Your mouth will water at its rich, appetizing aroma, and the wonderful flavor will surprise and please everyone.

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Extra Choice  
Mackerel  
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Delivered  
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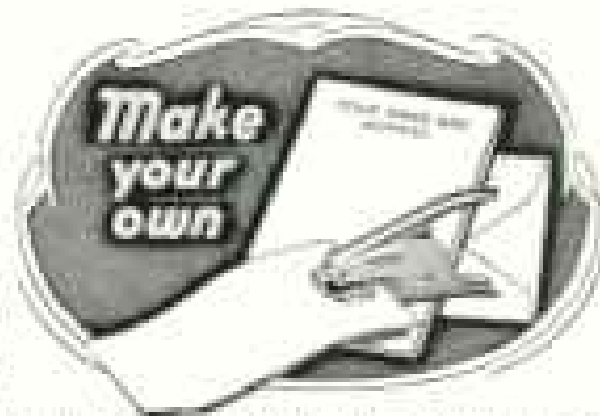
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The Scott has everything—full tonal range, standard broadcast perfection, powerful short wave, amazingly faithful record reproduction—and now FREQUENCY MODULATION that avoids static and electrical interference within the service area of the station.

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## *A Dream Car Brought to Life!*

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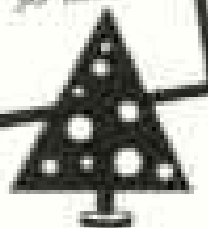
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► Also, in seven of last year's contest cities, no mothers died in childbirth; in five, fewer than one mother died per 1,000 births, and in fifty, only four mothers died per 1,000 births.

These are only a few of many examples that show how health conditions are being improved and death rates lowered in contest cities.

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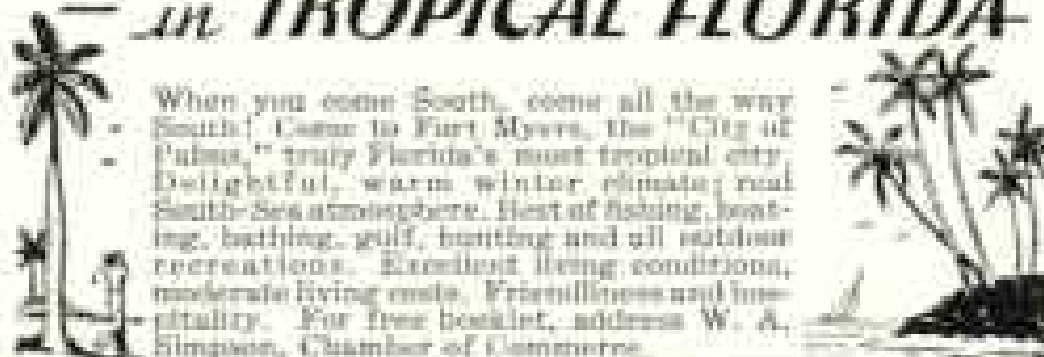
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# "Where shall we stay?"

NATIONAL GEOGRAPHIC MAGAZINE'S HOTEL SECTION

## FLORIDA — A Page of Florida Hotels — FLORIDA

### Fort Lauderdale



#### Lauderdale Beach Hotel

Trend-Christians holidays—gay with parties, bright with sunshine—a happy annual institution at this modern, attractive, oceanfront hotel between Miami and Palm Beach. Atmosphere is homelike, friendly, intimate and quiet—yet all Florida's famed diversions are just minutes away. American Plan, superior cuisine. Carefully restricted clientele. Ownership management. Booklet, reservations: A. H. Ogle, Mng. Dir., P. O. Box 2005.

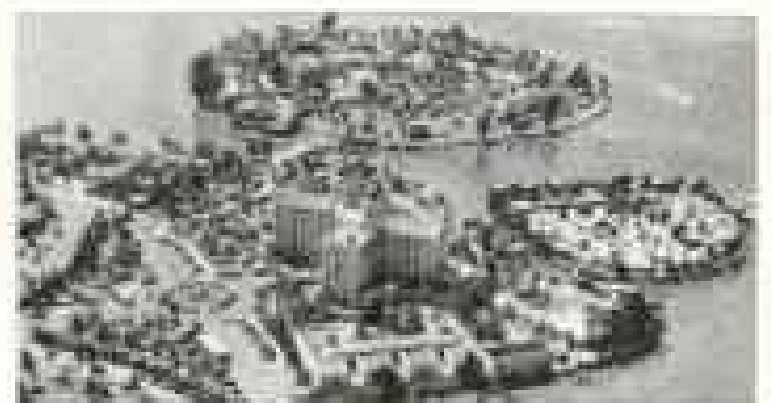
### Miami Beach



#### Hotel Good

To those who prefer the niceties of gracious living, the Good offers an exclusive club-like residence in the fashionable northshore district. Oceanfront at 43rd St., private beach, deck sports, handy to all recreations. Garage on premises. Distinguished cuisine. Restricted. Open year round, reservations desirable. Booklet, Carolyn G. Good, Pres., Ernest McDonald, Mgr.

### Miami Beach



#### The Nautilus Hotel

Distinctively different from other Miami Beach Hotels. Beautifully located on Biscayne Bay, 20 acre estate, modern, fireproof, all rooms with bath, 10 non-housekeeping villas, golf course, complete cafeteria, beach and pool center at hotel. Modified American Plan. Restricted clientele. Ross W. Thompson, Manager.

### Miami



#### The McAllister

Ideally located, overlooking Bayfront Park, Bay and Ocean—yet right "downtown"—accessible to every sport and attraction. Convenient shops and services save time—allow more hours spent in recreation. 500 Rooms, each with bath and shower; 10 stories, steam heat, fireproof. Modern appointments throughout. Superior cuisine. Write Leonard K. Thomson, Manager, for booklet, rates.

**Miami Colonial Hotel.** Outstanding Bayfront Hotel. New Lobby. New Air-conditioned restaurant and cocktail lounge. Steam-heated. Bobatum.

### Miami Beach

**The Flamingo.** All that is best in Resort Life. Restricted. Special early season rates. Hungalown. Holiday reductions for students. C. B. Ryan, Mgr.

### Clearwater

**Fort Harrison Hotel.** Overlooks Clearwater Bay, Gulf of Mexico. Golf, bathing, boating, fishing. A. or E. plan. 200 rms., moderate rates. L. G. Davis, Mgr.

### Orlando

**Colonial Orange Court Hotel.** Outstanding in Orlando. Charming location. Modern, with every desirable feature. Descriptive folder.

### St. Petersburg

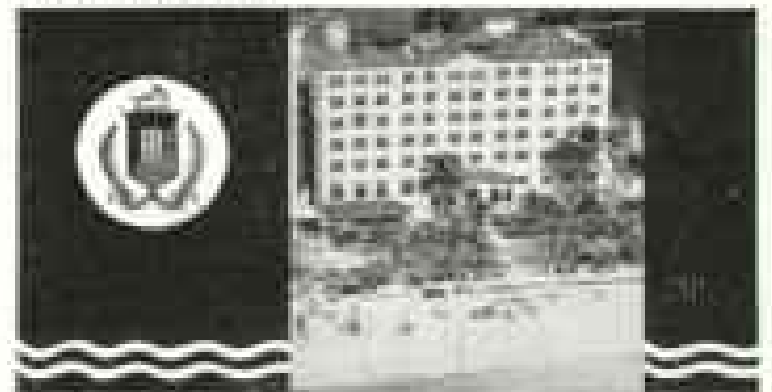
**The Huntington.** A Resort Hotel of Merit, in beautiful and exclusive surroundings. Open Nov. to May. Eat. and Amer. plan. Booklet. Paul Barnes, Mgr.

**The Princess Martha.** St. Petersburg's largest and best located downtown hotel. Every modern comfort. European. Dining room. Hkt. A. L. Manning.

**Swannee Hotel.** Close to everything of interest. 300 rooms, each with bath and shower bath. European plan. Dining room. Paul Brown, Manager.

**Vinoy Park Hotel.** On Charles Tampa Bay. 175 Rooms, all with bath. Every recreational feature. Booklet. Clement Kennedy, Managing Director.

### Miami Beach



#### The Surfside

Situated between the Atlantic and Lake Park coast, every room "waterfront." Private ocean beach reserved for guests is one of largest on Miami Beach. Surf bathing from rooms. Separate bathers' elevator. All rooms with private baths, showers. Excellent dining room and coffee shop. Courteous, complete service. All sports. Ownership management. European Plan, moderate rates. Booklet on request. J. H. Miller, Mng. Dir.

### Miami Beach



#### The Belmar

Modern, new—invariably the choice of the "right people." Wholesome environment, pleasingly diversified recreations—Private beach, palm garden, solaria, beach refreshment bar, glass-enclosed roof recreation room, ocean view dining room and terrace. Extensive structural glass invites air, sunshine. Steam heat, Hot baths. European Plan. On ocean at 25th St. Advance reservations advised. Booklet, rates on request. Bruno Weil, Gen. Mgr.

### St. Petersburg



#### The Soreno

One of Florida's finest American plan winter resort hotels. Situated on beautiful Tampa Bay, overlooking tropical Waterfront Park, and close to all recreation facilities. Modern and fireproof. 300 rooms, each with bath. Dining room famous for excellent cuisine. Pleasant social life. Booklet and rates on request. Soreno Land, Mgr.

### Miami Beach



#### The Whitman By-the-Sea

"Aristocrat of Miami Beach" . . . Occupying full block between Ocean and Indian Creek in exclusive section at 14th St. Private beach, marine terrace for dining, dancing and deck sports. Unrivalled cuisine and service. European Plan. Restricted clientele. Reservations in advance. Season dates: Dec. 20 to Apr. 20—no deviation. Illustrated brochure on request to Patie Dorcham, Manager.

# "Where shall we stay?"

## NATIONAL GEOGRAPHIC MAGAZINE'S HOTEL SECTION

### ARIZONA

#### Chandler

**San Marcos Hotel and Individual Bungalows.** Wonders of luxurious desert playground! Golf, swimming, tennis, riding, other sports. Robert Powell, Mgr.

#### Litchfield Park

**The Wigwam.** Distinguished winter resort hotel and bungalows in glorious desert setting near Phoenix. Famous cuisine, golf, ride, swim, tennis. B&T.

#### Phoenix

**Hotel Westward Ho.** Premier Hotel of the Southwest, in world-famous Valley of the Sun. Modern with desert resort atmosphere. Am. & E. Plans. B&T.

#### Tucson

**El Conquistador Hotel and Cottages,** a winter resort on desert estate, three miles from Tucson. Finest facilities, all sports. American Plan. Booklet.

**Pioneer Hotel.** Southern Arizona's Finest. 224 Rooms with bath. Europ. Coffee Room, Dining Room, Roof Garden, Sun Deck, Sensible Rates. Booklet.

### ARKANSAS

#### Hot Springs National Park

**Arlington Hotel and Baths.** Arthritis, circulatory benefits. Waters owned and recommended by U. S. Govt. Golf, Horseback. Write for folder.

**Eastman Hotel and Baths—**Health giving mineral waters; U. S. controlled bath under same roof. Situated in own private park. Write for booklet.

### CALIFORNIA

#### Riverside

**Mission Inn.** California's historic hotel. In lovely Riverside. Art treasures. All sports. American or European Plan. Rooms \$3.50 up. Write for folder.

### DISTRICT OF COLUMBIA

#### Washington

**The Dodge Hotel.** On Capitol Hill opposite Union Station Plaza. Renowned cuisine. No smoking. Single from \$2.50, double from \$4.50. H. B. Williams, Mgr.

**Hay-Adams House.** 16th St. H. Opposite the White House. Completely air-conditioned. Single room with bath from \$2.50. Double from \$5.50.

**Wardman Park Hotel.** Washington's largest. 190 outside rooms. Ample parking. Avoid traffic to all highways. Write for maps. Rates from \$2.50.

**Willard Hotel—**"The Residence of Presidents," 14th and Pennsylvania Avenue, two blocks from White House. Single \$4.00 up; double \$7.00 up.

### FLORIDA See facing page GEORGIA

#### Sea Island

**The Clister.** A seaside resort of smart distinction. Best in sports. Early season rates. Restricted. New York Office, 620 Fifth Avenue, Circle 5-6116.

### MARYLAND

#### Baltimore

**The Belvedere.** Traditionally and actually, Baltimore's finest hotel. Spacious, modern rooms, famous food and service. Ideally located. Rates begin at \$2.50.

### MASSACHUSETTS

#### Boston

**The Copley-Plaza** faces beautiful Copley Square. Single rooms from \$4.00; double from \$7.00; Suites from \$10.00. Arthur L. Rice, Managing Director.

### MISSISSIPPI

#### Biloxi (On the Gulf)

**Hotel Buena Vista and Cottages.** Vacation Headquarters of the Deep South. Open year-round. Land and water sports. Am. or Eu. plan. Write for booklet.

### NEW JERSEY

#### Atlantic City

**Marlborough-Blenheim.** A "year-end" of exciting festivity throughout the Christmas Season by the sea. Full information on request.

### NEW YORK

#### Albany

**De Witt Clinton.** A Knott Hotel. New, well appointed. Fine Capitol Park. Splendid meals; attentive service. Come, we'll make you happy.

#### New York City

**The Biltmore.** Madison Avenue at 63rd St. All that is best in atmosphere, appointments, service. Single \$2 up; Double \$4 up; with Twin Beds \$4 up.

**The Commodore—**41st at Grand Central and Air Lines Terminals. Convenient to all attractions. 300 outside rooms with private bath—Tram \$2.

**Hotel Edison—**48th to 47th Sts. at Broadway. 100 Outside Rooms, each with Bath, Shower, Radio, Circulating Ice Water. From \$2.50. 2 Restaurants.

**Essex House.** facing Central Park. Rooms and Suites with bath or pantries—from \$5. 160 Central Park Sq., Cable Address—Essex New York.

**The Grovernor,** on convenient Lower Fifth Ave. at Tenth Street—A Distinctive Hotel of Quiet Charm. Single from \$4.00, twin beds from \$5.00.

**Hampshire House,** Central Park Sq., New York's most beautiful apartment hotel. Convenient to everything. Single from \$6; double from \$8; suites from \$10.

**Hotel Lincoln—**48th to 47th Sts. at 8th Ave.—180 Rooms. Rooms from \$2. 4 Fine Restaurants, excellent Cuisine. Direct Subway Entrance to all points.

**Park Lane Hotel.** Park Ave. at 108th. Convenient, distinguished. Single rooms from \$5; double from \$7; suites from \$12. Apartments, permanent occupancy.

**Hotel Pierre,** Fifth Ave. at 61st St. Overlooking Central Park in most fashionable location. Single rooms or suites by the day, month or season.

**The Plaza,** New York, facing Central Park. Every year the Plaza becomes richer in tradition and more luxurious in surroundings. Henry A. East, President.

**St. Moritz-on-the-Park.** New York's truly Continental hotel. Home of Rumpelstiltskin's and Cafe de la Paix. Single, \$4. Double, \$6. Suites, \$8.

**The Savoy-Plaza,** at Central Park, provides every service to make your visit to New York enjoyable. Henry A. East, Man'g Dir. George Bator, Res. Mgr.

**Hotel Seymour,** 31 W. 45th St. Near Fifth Ave., theatres, shops, art galleries, Radio City. Quiet, refined surroundings. Single \$4; double \$5.50; Suites \$8.

**The Sherry-Netherland,** 6th Ave. at 59th St., "Where the Park Begins." Famous cuisine, impeccable service, quiet surroundings. From \$7 daily.

**The Vanderbilt Hotel** on Park Ave. at 58th St. A distinguished address. An internationally famous hotel. Single from \$4, double from \$6, suites from \$10.

**The Waldorf-Astoria,** Park Avenue, 49th to 50th Street. There are many alternatives—but there is no duplicate.

### PENNSYLVANIA

#### Hershey

**Hotel Hershey.** One of America's finest. Magnificent setting. Open year around. European and American plans. Four Golf Courses. All outdoor sports.

#### Philadelphia

**Bolton-Stratford—**"One of the Few World Famous Hotels in America." Rates begin at \$3.45. Claude H. Bennett, General Manager.

### SOUTH CAROLINA

#### Charleston

**Fort Sumter Hotel,** on the famous Battery. Only waterfront hotel in Charleston. Just redecorated. Golf Club privileges. Folder. Mrs. B. Cator, Mgr.

### VIRGINIA

#### Richmond

**The Jefferson,** Richmond's distinctive hotel, recently refurbished. 12 mi. to Colonial Williamsburg. Historic DeWitt-Fisher grille. Wm. C. Rorer, Mgr.

#### Virginia Beach

**Cavalier Hotel and Country Club.** Open all year. 2 golf courses, tennis, riding, fishing, heated pool. Roland Eaton, Mgr. Dir. Write for Booklet "G."

#### Williamsburg

**Williamsburg Inn & Lodge—**Visit Colonial Williamsburg Restoration. Choice rooms—Moderate rates. Fine food. N. Y. Office, 68-5th Av. Circle 5-5265.

### CUBA

#### Havana

**Hotel Nacional de Cuba.** 10-acre estate by the sea. In the heart of Havana. Swimming pool, tennis, starlight dancing. All rooms with bath. \$5 up. Booklet.

### MEXICO

#### Mexico City

**Hotel Reforma.** Mexican hospitality at its best. On the beautiful Paseo de la Reforma. Distinguished atmosphere. Superb appointments. Singles from \$2.

HOTEL SECTION,  
NATIONAL GEOGRAPHIC MAGAZINE  
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