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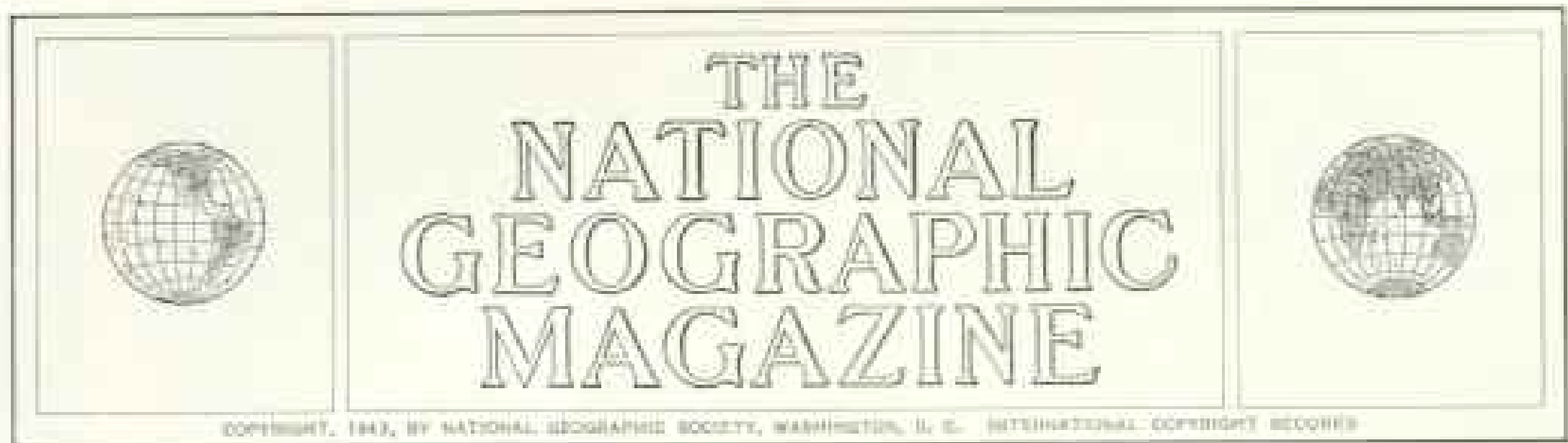
HARVEY KLEMMER

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How We Use the Gulf of Mexico

BY FREDERICK SIMPICH

EXPLORING the Gulf Coast from Key West around to the Mexican border, I fell into talk with an old pilot.

"There're big doings on the Gulf of Mexico these days," I said. "But few outsiders seem to know it."

"Not many do," he agreed. "Yet it's plain as a bumblebee on a fried egg. Since war started you can almost hear this Gulf hum! More people scrambling, more money spent than even in the big Spindletop oil boom."

After weeks in noisy Gulf shipyards, restless Army and Navy bases, crowded docks, sulphur mines, oil fields, turpentine stills, new mills working night and day on war orders, and the muddy camps of men struggling to lay new pipe lines to take more Gulf oil to the East, I knew what the old pilot meant by "people scrambling."

First, where and what is this Gulf? Well, it's that great American inland sea that stretches 2,028 miles along our southern coast, touching Florida, Alabama, Mississippi, Louisiana, and Texas, and then pointing down to Yucatán over yet more flat sandy leagues to form Mexico's oil-soaked east coast.

Midwest Rains Come from the Gulf

To grasp its odd shape and 700,000-square-mile size, draw a line on your map from Key West over to the west of Cuba, then across blue water to Yucatán (pages 8 and 9).

That cuts off the Caribbean Sea to the south, and leaves you the great Gulf. It's nearly as large as the western Mediterranean, and in one place over two miles deep. But for this Gulf, most of our fertile Middle West might be a dry and empty Sahara!

From Gulf vapors and winds are born vast rain clouds that ride north like flying street sprinklers.*

Floating over our Midwest, these clouds shower on it the benediction of abundant rainfall. But for such clouds, Midwest herds, corn, cotton, wheat, fruits, sugar, or forests might be meager indeed. There might even be no muskrats, wild fowl; no great hydroelectric plants, as under TVA; no heavy-laden inland waterways; no big Kansas City, St. Louis, or Memphis. Only desert tribes, perhaps hunting gazelles and ostriches!

Without the Gulf, then, the Mississippi would be no such giant pouring cubic miles of water *back into the Gulf*.

Since the Gulf waters that Midwest whence comes most of our meat and bread, you can see its value to Uncle Sam, either in war or peace.

War Brings Astounding Changes

Yet look at its other uses, uses that involve transportation, sea foods, furs, naval stores, oil, sulphur, playgrounds that delight millions—and now training bases for our armed forces.

Today, about the Gulf Coast, boisterous Army and Navy bases fairly shake the sandy ground. Bombs fall, cannon boom, training planes fill the skies, and air patrols swarm like hawks over chicken farms. Turtles can't sleep for the noise; deer dash for the brush; even bored-looking old pelicans flap nervously away from the chatter and splash of machine guns.

Sailing near one flat, brush-grown island off Florida, I came upon a sight as unexpected as that of a preacher throwing bricks through a church window. Amphibian landing vehicles, roaring like behemoths, swam about in the sea, crawling ashore and crashing through the mangroves (page 6).

* See "Weather Fights and Works for Man," by F. Barrows Colton, NATIONAL GEOGRAPHIC MAGAZINE, December, 1943.



Staff Photographer J. Bayne Roberts

Not Apples Nailed to the Wall, but the Scales of Big Tarpon

Everglades is a deep-south town on the Gulf side of the Florida mainland. In its Izaak Walton Club at the Everglades Inn appears this lobby display of 3,200 tarpon scales, one for each catch. Fish mounted on this panel are: center, tarpon; left upper, Mexican pompano; lower, redfish; right upper, jackfish; lower, snook.



Arthur V. Bazzell

He Gets a Drink of Fresh Water from a Well Far out in the Salty Gulf

He's 14 miles at sea, off Biloxi. Till storms washed it away, the Isle of Caprice lay here. During a resort boom, this 1,000-foot well was drilled, and it still flows fresh drinking water for thirsty fishermen.

"We're playing this is an enemy island," the reckless, sunburnt Marine said, "and we're making a landing. Come, go with us!"

Uniformed men crowd the buses, trains, and even the tiniest villages till a civilian visitor can hardly buy a hot dog or beg a drink of water. Mobile, Biloxi, Tampa, Key West, Galveston, Corpus Christi—they're all jammed with soldiers, sailors, war workers.

Airfields stretch about the Gulf Coast like links in a 2,000-mile sausage. You're amazed at the number of small new-made emergency landing places, and "satellite fields" that dot the country.

Some military and secret industrial areas are so restricted that if you fly over them you will be shot at. Barbed-wire-encircled shops make tank parts, gun barrels, machine-gun tripods, airplane struts, 100-octane aviation gasoline, TNT, butadiene for synthetic rubber; others make steel, smelt tin ore from Bolivia, or manufacture the now precious light magnesium metal from sea water.

Nobody ever dreamed such new industries would rise here.

Hungry for more and more workers, these roaring new factories upset old population centers, and draw busloads of men and women from remote inland towns.

From Tampa to Texas new ships splash into the Gulf. Rivet hammers rattle like machine guns, and night crews in iron masks toil in floodlights brighter than Times Square in antedimout days.

Nine shipyards with 48 shipways construct ocean-going cargo ships and tankers. Ten yards build coastal vessels, tugs, and barges, and can work 32 vessels at one time.

As I write, Gulf shipyards hold contracts for building 739 ships, or more than we have lost to date. Two hundred and ten have been delivered, 84 are on the shipways, 50 are in the water for outfitting, and 395 are scheduled to be built.

Here the Navy Works, Fights, Frolics

Many a mullet has wriggled down pelicans' throats since some tattooed old Yankee bosun first whistled for a breeze, or rode out a hurricane on a wooden gunboat in these historic waters.

It was 1825, and John Quincy Adams was President, when we planned Pensacola Navy Yard (Plate IV). Earlier, the Spaniards, French, and English had dropped their rusty mudhooks here; but that's another story. This short sketch has no space for exciting tales of how men used this Gulf long years ago. They



Robertson and Frost.

Two Proud Naval Air Cadets Receive Their Wings from Dr. James E. Mooney, President of the University of Tampa

Enlisted reserves now bring a wartime spirit of shouted orders and bugle calls to this once serene west Florida seat of learning. Not only campus life, but the life of all Tampa is revolutionized by military activities and the rattle of shipyard riveters sounding day and night.

already fill many a book—tales of pirate Lafitte and his treasure for which Texans are still digging; of General Winfield Scott, landing near Veracruz in the War with Mexico; of Lord Pakenham, unloading British troops on the Gulf Coast in 1814, and marching to meet Andy Jackson, shooting from behind cotton bales at the Battle of New Orleans.

There is the story, too, of Maximilian's plumed knights—their plumes drooping in retreat—who took ship off Rio Grande's mouth to sail back to Europe, after the fiasco of a Mexican Empire.

But to this short story of our Navy's present-day Gulf activities, one or two naval events of yesterday really belong.

First wartime test of naval aviation was made on this Gulf Coast. That was when the *Mississippi* and *Birmingham* were ordered to Veracruz in 1914. There their seaplane units scouted over the city and around the trenches

for 43 days. It was there, too, that our Navy planes were first under fire, and there naval aviators drew the first aerial map we ever made.

New Navy Flyers Trained by Thousands

At Pensacola our first naval air station was established in 1914. Three years later, when we entered World War I, we had 38 Navy pilots and 163 enlisted men in naval aviation. Today the numbers run into tens of thousands (page 10).

Like movie actors shifting location to stage new acts, our Navy now stages its training over wide and diverse areas of the Gulf. In one spot it may practice by bombing a hulk, or shooting at a dummy periscope towed as a target, and then suddenly roar off to an area leagues away to bomb an actual enemy submarine.

Clouds of smoke from our burning tankers,



U. S. Navy, Official

Sidewise Launching of Destroyer Escort *Newell* at Houston, Texas, Makes Big Splash

This ship was named in honor of Lt. Comdr. Byron Bruce Newell, killed in action while serving aboard the U.S.S. *Hornet* during the Battle of Santa Cruz, South Pacific. The new Navy ship was sponsored by the hero's widow and the ceremony was witnessed by his two small sons.

torpedoed close in shore, have more than once been visible to Cubans and Florida coast residents. At least once, we hear, Hun pigboats planned to sneak up the Mississippi to shell New Orleans, or dynamite the great Huey P. Long Bridge (page 12). But they didn't—not with the Navy on watch!

Day and night, eternally vigilant, Navy patrols scour the air and sea. Protecting our Gulf Coast is the Navy's responsibility. Using the Gulf and its flat, sandy coasts to train Navy and Marine airmen and amphibious troops is its next biggest job down there.

It's true you see Navy wives getting a suntan at Key West's swanky Casa Marina. Swing bands play for dances at officers' clubs. There's golf, bridge, admirals' dinners, and beach picnics—and many a quest for tarpon, many a deer and quail hunt in the wild brush west of Corpus Christi.

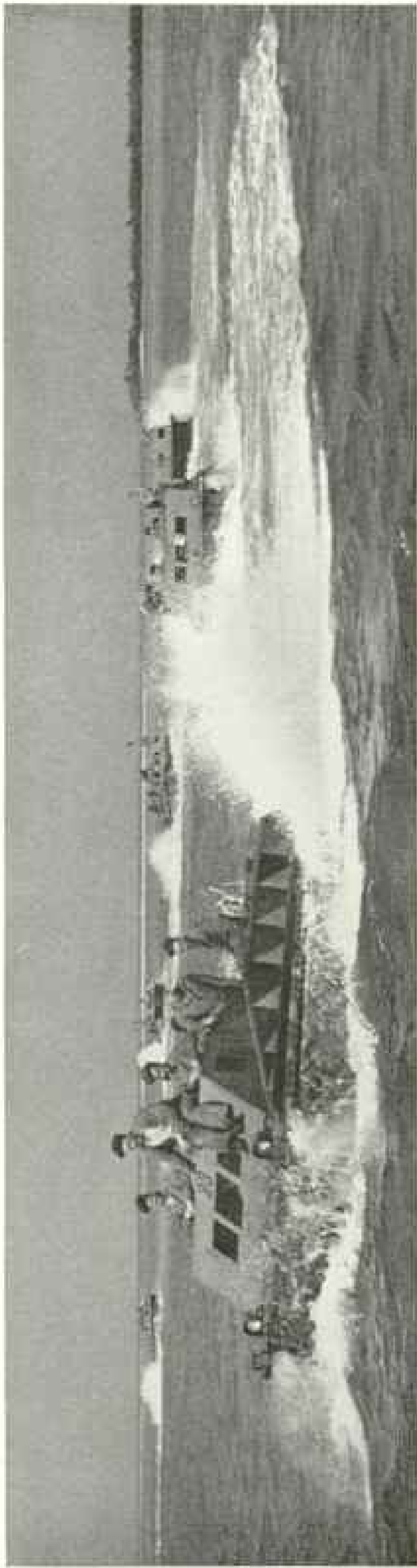
But even in wartime, no play makes Jack a dull boy. Follow this training from one

station to the next, and you soon see that hard work is above all. From admiral to cook every man is alert to his task. Study and work, work and study, fly and shoot, shoot and fly, draw maps, repair planes, rig parachutes, learn radio, camera, compass, weather forecasts—and fly, fly, fly!

Though parachute straps were too tight on my fat old tummy, I flew with them and felt, vicariously, the exultation of free life in the sky.

Out they go, into the blue, by one's, two's, or three's, by dozens. Big planes, little planes, scouts, fighters, bombers, and transports—transports that run like streetcars between Navy bases at home and to every theater of war.

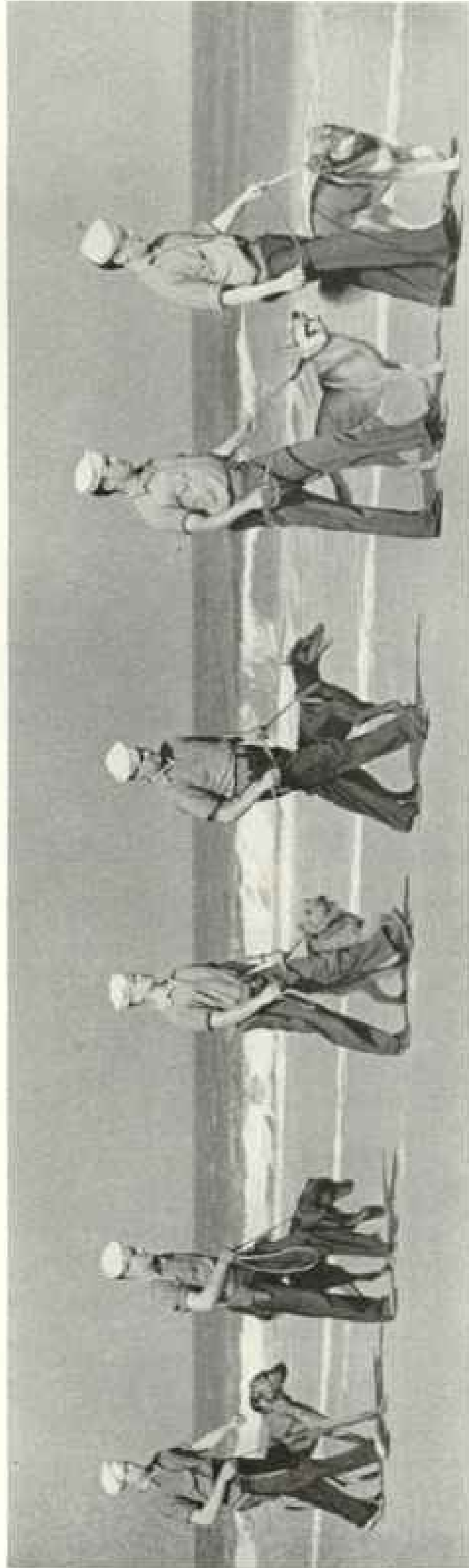
Engines roar from dawn till dusk. Up from training-station runways planes take off and circle in a given orbit, like captive gondolas in a great pleasure-resort swing—an aerial merry-go-round. One after another they land,



Staff Photographer Edwin L. Wisland

Like Broncobusters, Marines Drive Their Bucking Amphibians out to Sea and Back Again.

Used for landing men or supplies, these monster, tanklike tractors can swim, wallow through muddy swamps, knock down small trees, and climb steep banks. Leaving their base at Dumbo, west Florida, this fleet took the author to "invade" small brassy isles that lay offshore.



U. S. Navy, Official

"Walking the Dog" Is Pleasant Duty for Florida Coast Guardsmen

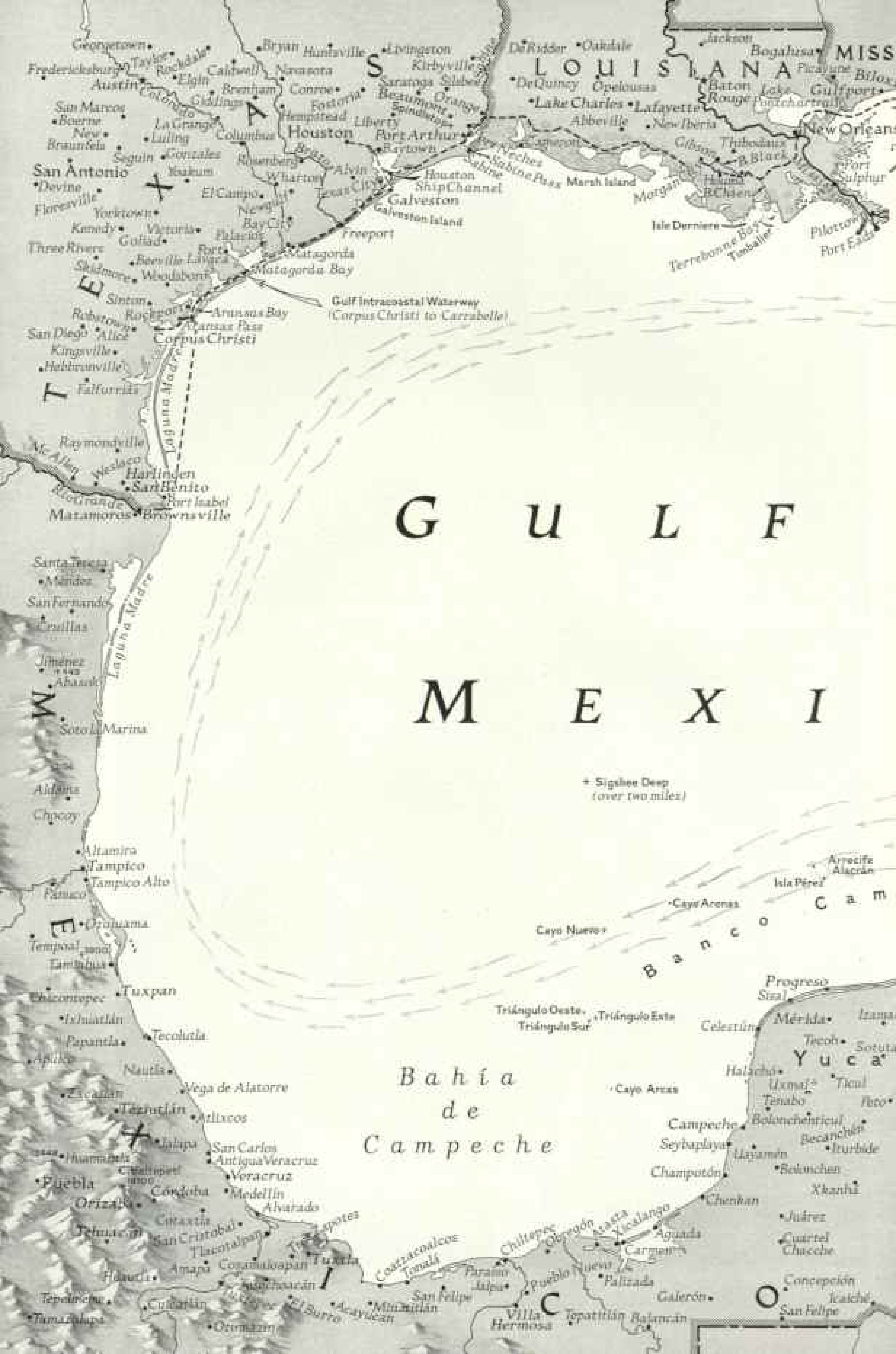
This daytime stroll is only for exercise. At night only one dog accompanies the sentry. Having far keener sense of hearing and smell than humans possess, the trained dogs are most useful in detecting attempted landings by enemies.



Staff Photographer J. Barker Roberts

At "Head of Passes," 75 Miles Below New Orleans, the Mississippi Splits into Three Forks

Silt brought down by Old Man River has built a peninsula that juts out 45 miles southeast into the Gulf. At left is Southwest Pass and, in corner, Portage Bay; in center is South Pass, while at right, Pass à L'outré. Southwest Pass is much used by ocean-going vessels, though some ships also use the other channels.



MISSISSIPPI

LOUISIANA

SAN ANTONIO

San Antonio

Three Rivers

San Diego

San Antonio

San Antonio

San Antonio

San Antonio

San Antonio

San Antonio

San Antonio

San Antonio

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G U L F

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+ Sigbee Deep (over two miles)

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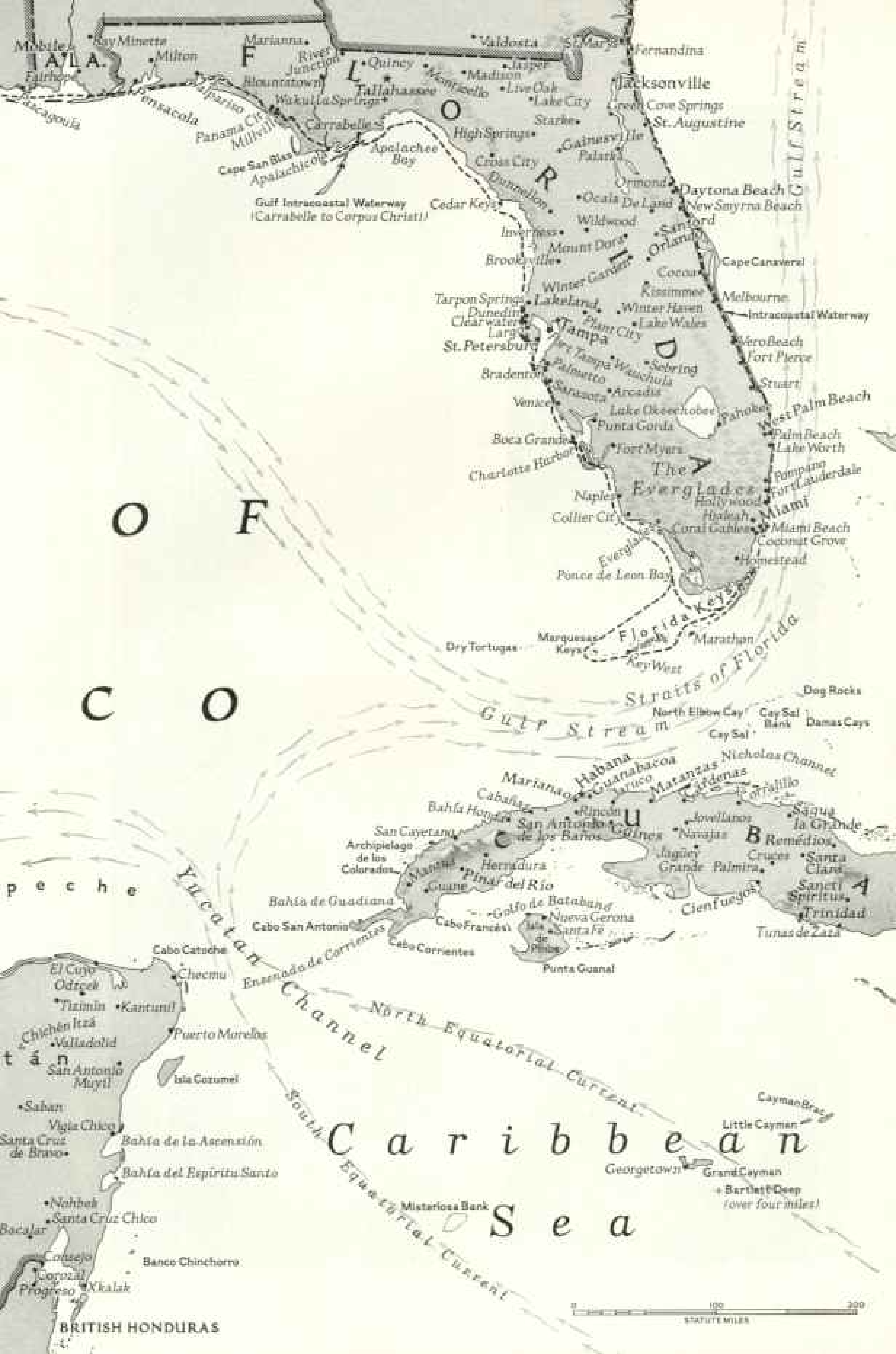
Y u c a

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C



MOBILE
FAIRHOPE
TALAHASSEE

MARIANNA
MILTON
RIVER JUNCTION
QUINCY
TALLAHASSEE
WAKULLA SPRINGS
CARRABELLE

VALDOSTA
JACKSONVILLE
CORONA SPRINGS
ST. AUGUSTINE
ORMOND
DAYTONA BEACH
NEW SMYRNA BEACH

GULF STREAM

GULF OF MEXICO

GULF STREAM

PECHER

YUCATAN

CHANNEL

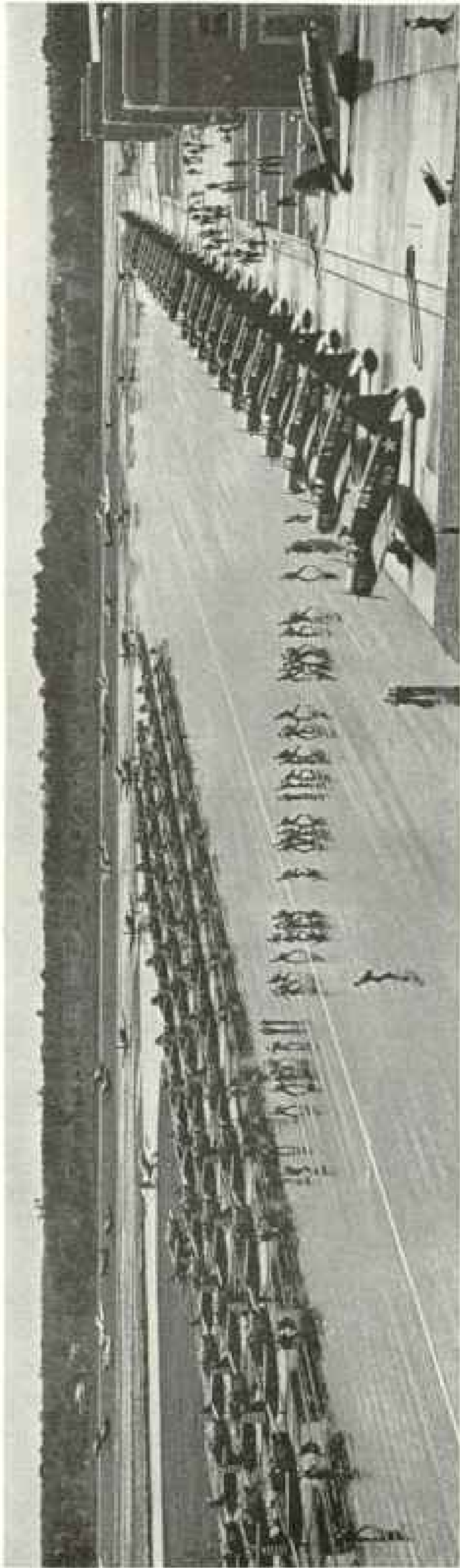
CARIBBEAN SEA

BRITISH HONDURAS
SANTA CRUZ DE BRANCO
PROGRESO
XKALAK

SOUTH EQUATORIAL CURRENT

Georgetown
Grand Cayman
Bartlett Deep (over four miles)

0 100 200
STATUTE MILES



U. P. Scott, Official

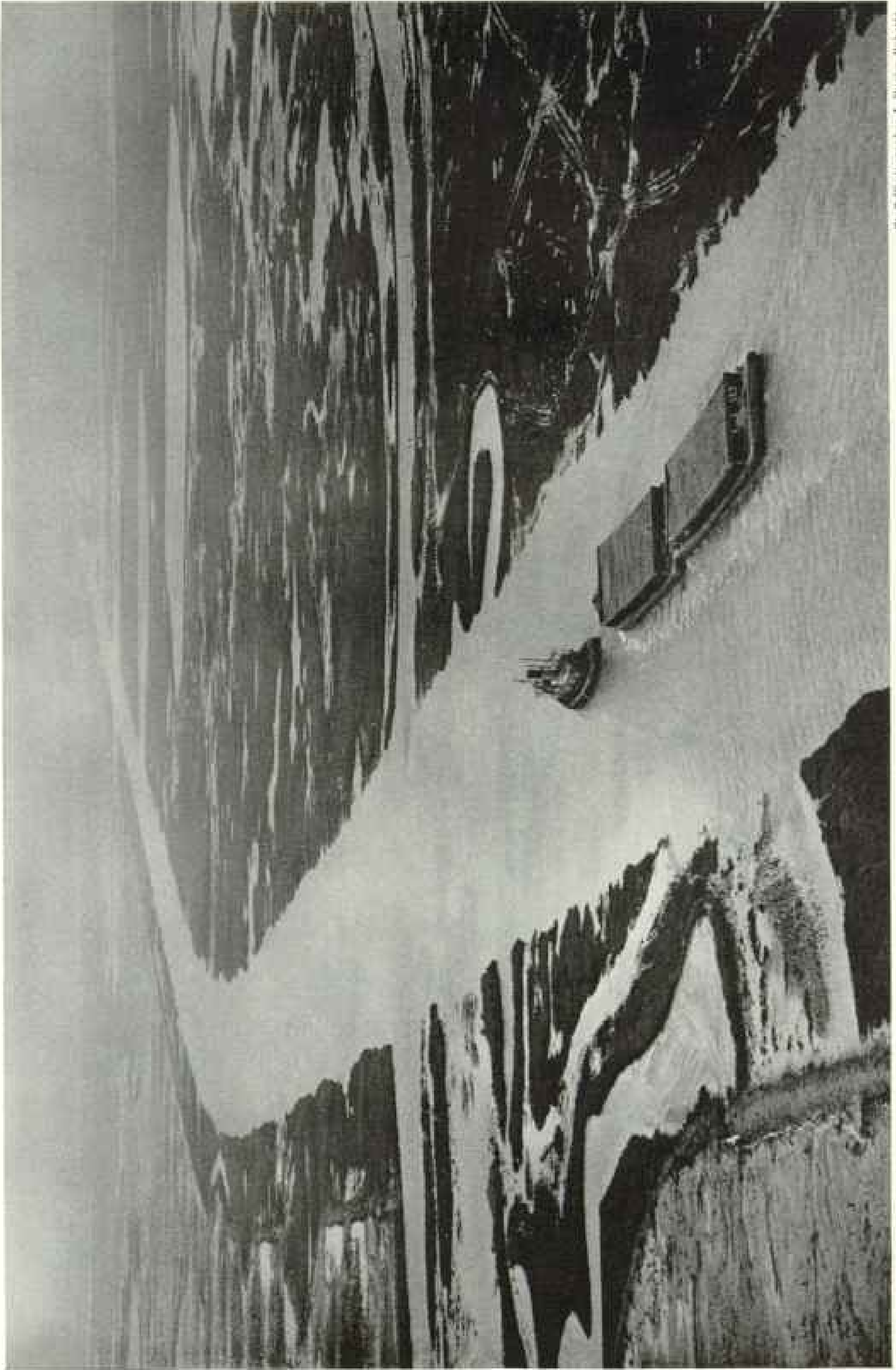
Pilots Run to Their Planes at Naval Air Training Center, Pensacola, Florida



Staff Photographer J. Porter Roberts

Port Arthur, Texas, Stands in One of the World's Busiest Oil Centers

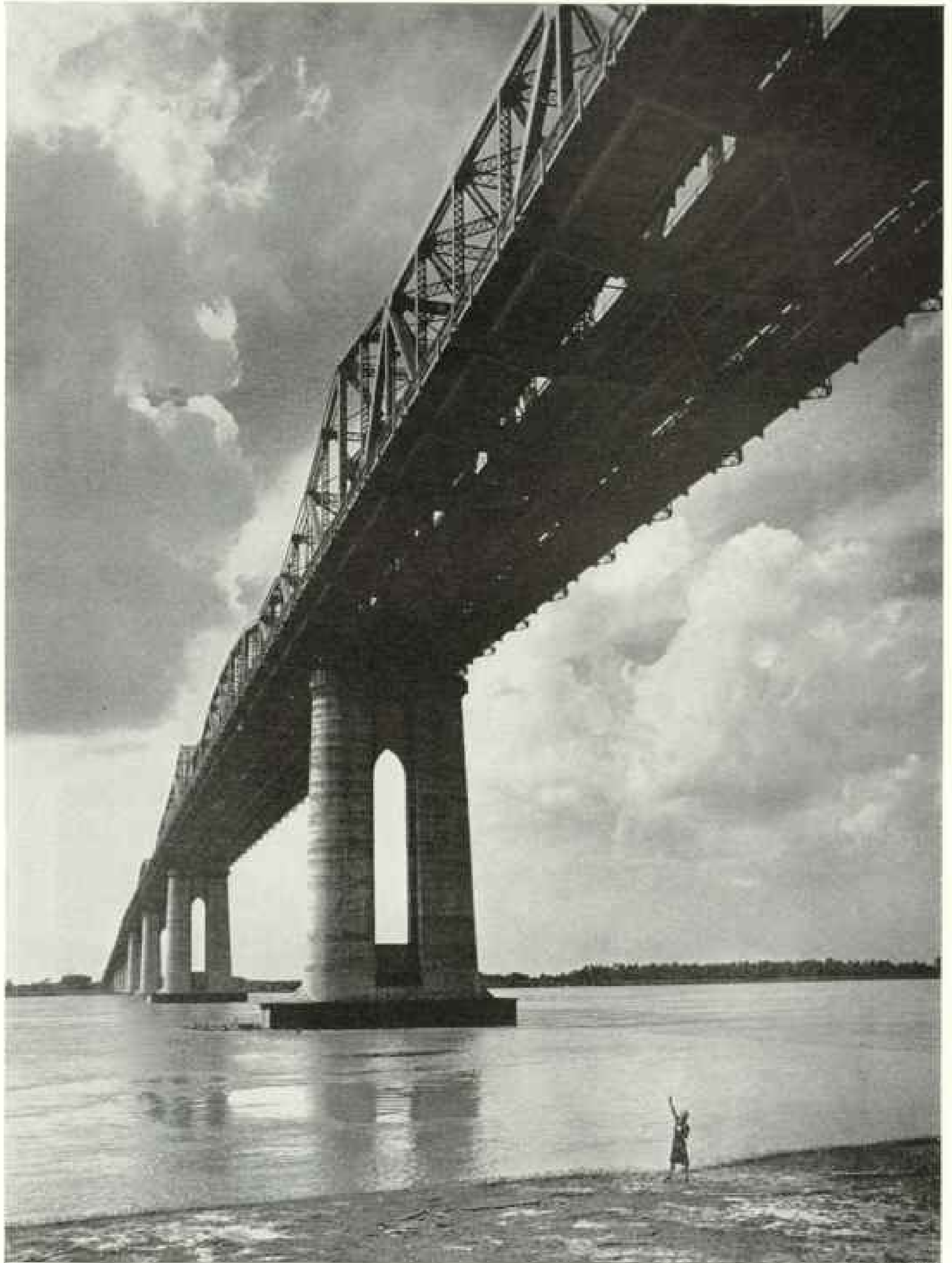
But for the rising drawbridge at left, the squat tanker would seem to be sliding along on the level plain. This channel is the Sabine-Naches Canal, a section of the Intra-coastal Waterway which stretches from Corpus Christi, on the Texas coast, eastward to Florida. Skyscrapers of Port Arthur rise in the background.



First Photographer J. Burton Hobbs

Drawn by a Tug, Bargeloads of Heavy Cargo Move through the Intracoastal Waterway Near Freeport, Texas

Enormous volumes of wartime freight now move on our extensive inland waterways system, of which this intracoastal route is a strategic part.



F. S. Lincoln

At New Orleans U. S. 90 Crosses the Mississippi on the Amazing Huey P. Long Bridge

This steel cantilever structure extends from levee to levee. Its deepest caisson rests 170 feet below sea level. Carrying railway, footpath, and motor highway traffic, the bridge, including its approaches, is 4.4 miles long. Height of the central pier, from top to base, is 409 feet, or equal to that of a 36-story building.

some on runways, some on water, graceful as swans with wings outspread.

Thousands of boys graduate, get commissions, and mysteriously disappear overseas. I stood up in the great hall at Pensacola when one class of hundreds took the oath.

It was solemn as communion. Here is what they swore:

"I, _____, do hereby accept the above appointment, and having been appointed an _____ in the United States Naval Reserve, do solemnly swear (or affirm) that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter; so help me God."

Much of Our Army Forms in the Gulf States

Our soldiers have scattered their bones like cigarette stubs about this Gulf, from the Dry Tortugas to the Mexican border. Count the wars since 1812!

Today's Army is amphibious. It assaults enemy shores with odd vehicles that can either swim or run on the ground. Also, it uses landing barges to vomit tanks, trucks, cannon, and squads of armed men, all set to commence shooting. You could see all this if, happily, sentries would let you near a certain west Florida Army post soon after sunrise.

But water, as such, is not Army's element. It uses mostly the Gulf Coast, not, like the Navy, the Gulf itself. But from Drew and MacDill airfields at Tampa clear around to cavalry posts near Rio Grande's mouth Army, too, helps guard our Gulf States, and trains thousands in this all-year working weather. More soldiers are trained in Texas than in any other State.

As I said, try to fly over certain Gulf Coast spots and Army will, without warning, shoot straight at you. On the pilot's map you see these spots painted red, and marked "restricted." Like some other correspondents, I know what's there, but "we ain't sayin'."

It may be written, however, that what with coast and field artillery, mechanized cavalry, armored divisions, air forces and their technical training schools, much of our whole Army is being formed in the Gulf States. From Camp Blanding, near Starke, Florida, to Camp Polk, near Leesville, Louisiana, and on down into Texas, constant big-scale maneuvers fit millions of men to fight overseas.

In Spanish-American War days many troops embarked at Gulf ports to go fighting in Cuba. Now they're embarking here again in vastly greater numbers; but in Army orders ports no longer go under their right names. Just call 'em "X," or "A-1."

Dry Tortugas, Once a "Devil's Island"

Prowling the Dry Tortugas, off the tip of Florida, is like exploring palace ruins at Babylon. Ponce de León got here 400 years before I did. Then these forlorn islands were flat wastes, swarming only with big sea turtles.

We fortified the islands toward the middle 1800's to defend our Gulf ports. As penal colony, coaling base, and wireless station, both Army and Navy have used the Dry Tortugas.

Don't ask the Navy what's going on there now, with Nazi pigboats prowling our seas. Anyway, decades ago, all the original big fortifications were abandoned.

Now remain only the old moats, massive brick walls, powder magazines, and marble stones marking the graves of whites who died of "black vomit."

In Civil War days deserters and federal prisoners were confined here. Among the latter was Dr. Samuel A. Mudd, of Maryland, an innocent country doctor who treated John Wilkes Booth's leg after the actor had shot Lincoln and broken it jumping from the Presidential box in Ford's Theater in Washington.

No great strategic value now attaches to these islands. But you can see how importantly they once loomed. Since Jefferson's administration, our foreign policy has been to prevent the Gulf's domination by any other foreign power. We got the Gulf Coast, bit by bit. Florida was ceded to us; we made the Louisiana Purchase; and annexed Texas.

Certain rival nations didn't like to see the United States growing so fast. Their ships also used the Gulf, reaching it through the Straits of Florida. Hard by these Straits lie the Tortugas.

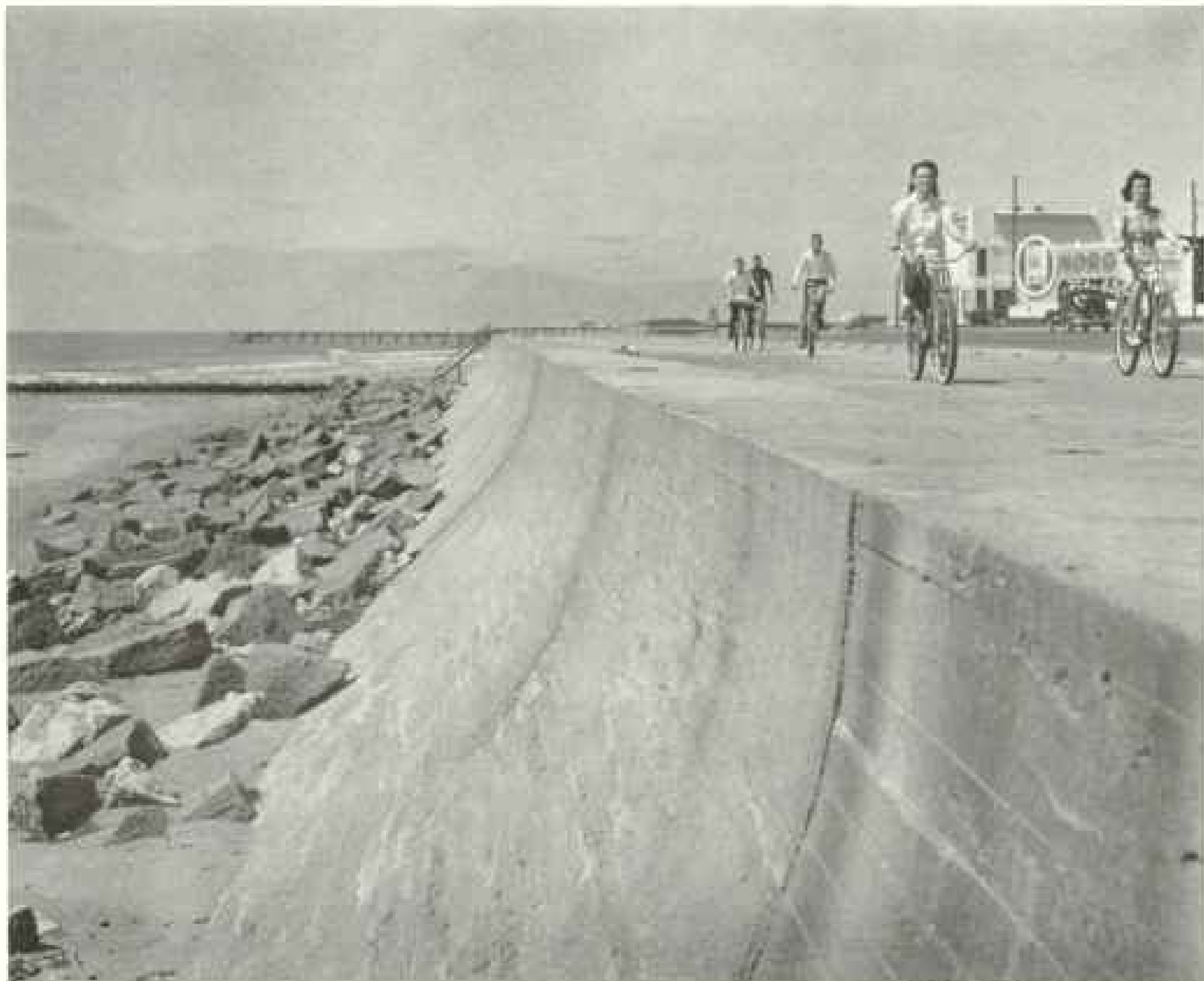
To naturalists Audubon, Louis Agassiz, Paul Bartsch, they were one big turtle factory and sea-fowl rookery. Now they belong, nominally, to the National Park Service, with birds and big turtles back in business.

Sailing from the Tortugas at dawn for Key West, I stood on the bridge with the skipper.

"Look! Look there to starboard," I said. "A bald-headed man in a tweed coat, floating face down!"

"Maybe he fell off somebody's yacht!" agreed the skipper.

"You fooled me for a minute," grinned the



Staff Photographer J. Taylor Roberts

Modern Galveston Enjoys Safety from Tidal Waves behind This Long Sea Wall

After the hurricane of 1900, when about 6,000 people died, men built this wall $7\frac{1}{2}$ miles long and 17 feet high. Behind it now, on an island of the same name, Galveston has grown to a city of oleanders, beautiful homes, and vast export trade in cotton, sulphur, and wheat.

tattooed old sailor at the wheel. "Barnacles on his back did look like a \$100 overcoat—and that slick bony head made him look bald!"

It was a big turtle, sound asleep!

Richest Source of Oil and Its Products

In its salad days the Gulf, geologically speaking, began to lay down the sedimentary deposits in which was started the slow process of petroleum formation from microscopic marine vegetable and animal matter. In those days salt water extended far inland toward the Ozarks and other northerly land masses.

Today the Gulf Embayment Province is one of the world's richest petroleum reservoirs.

Oil now comes mostly from sand formations of Tertiary age, when watery ancestors of the present Gulf covered all this land. Oil fields have also been found a mile or two out in the Gulf, where special marine drilling equipment has developed important oil production.

Chief sources of Gulf Coast oil are those

geological formations, the "salt domes." They are huge underground upthrusts of solid salt, extending thousands of feet through the ground as though punched up by some giant thumb. Around the flanks of these domes oil deposits have been trapped, proving some of the richest oil fields ever known.

Such a salt-dome field near Beaumont, Texas, really gave our petroleum industry the impetus for its spectacular later development. Spindletop oil field, discovered in January, 1901, was by far the greatest found in the 42 years of the oil industry up to that time. Oil men from all parts of the country flocked there.

There was enough for all, and to spare. Oil flowed and was wasted over the countryside. The very richness of the field captured the imagination.

Several of today's largest oil companies had their beginnings at Spindletop, and that one field, still producing, is probably responsible



Staff Photographer J. Baylor Roberts

So Many Menhaden Recall That Miraculous Haul on Galilee

Off the Florida west coast, near Apalachicola, one haul of the "purse net" almost fills the two boats. Unfit for food, menhaden are valuable as fertilizer; to make a ton of this takes about one million fish.

for making what was then a small industry into the industrial giant it is now.

Oil and natural gas built up traffic on the Gulf, and did much to develop the whole Gulf Coast. Today vast refineries at Baton Rouge, Beaumont, Corpus Christi, Houston, Port Arthur, and many other places process not only the crude oil from local wells, but much that is produced far inland and brought by pipe line to the Gulf, as well as crude oil carried from Venezuela and other South American countries by tanker.

Now the old idea of building refineries in the fields has been superseded. Gulf Coast refineries can take oil from almost anywhere, and all the markets of the world lie open to their products in peacetime by tanker lanes through the Gulf.

New Chemical Factories Rise Overnight

In war petroleum becomes the all-important, number one product; without it all our tanks, planes, and munitions would be so

much junk. Gulf Coast is a prime source for oil products, and its refineries now produce much of our fighting petroleum.

At Baytown is America's largest toluene plant, making that vital TNT ingredient of explosives from petroleum. At Port Neches is the largest unit in the synthetic-rubber program, a single plant being built and operated by a number of companies to make butadiene from oil.

At near-by Texas City is the Monsanto Chemical's huge styrene plant, which alone will manufacture nearly one-fourth of that other ingredient of Buna-S synthetic rubber, using ethylene from petroleum and benzol from coal tar. Nearly every refinery and natural-gasoline plant from one end of the Gulf Coast to the other is making high-octane aviation fuel, or material for it.

Before the war squat, heavy-laden oil tankers and barges provided most of the merchant shipping on the Gulf, carrying crude oil and petroleum products to the great consuming

centers on the Atlantic Coast, and to all the markets of the world. Now virtually the only tanker movement on its waters is en route to the war fronts.

Our now oil-starved Eastern seaboard gets almost no petroleum by tanker. Instead, new pipe line systems are built and old ones re-arranged; some are even reversed—through them petroleum products once went west and now oil comes east!

Also, there are barges along the Intra-coastal Waterway to Florida's two pipe line terminals, barges up the Mississippi, and thousands upon thousands of tank cars, taking the Gulf Coast's oil to the East in one of the most amazing transportation revolutions ever seen.

Peacetime tanker movement of 1,500,000 barrels (more than 60,000,000 gallons) of petroleum a day to the East Coast was supplanted in less than 18 months, and by the end of 1943, these substitute methods were carrying as much oil to the East as tankers ever brought. Much of it, however, is of no help to civilians; oil on the Atlantic Coast is just that much nearer to the fighting fronts in Europe and Africa.

Gulf Sulphur Helps Make TNT and Motor Tires

Men drilling for oil first struck Gulf Coast sulphur deposits; they now make us world's chief producer of this indispensable mineral. From Texas and Louisiana coasts come 99 percent of our native sulphur.

In the making of almost every manufactured thing you can touch—from a tire to a tube of paint—sulphur or sulphuric acid takes its place.

Sulphur in fact is the chemical maker's essential raw material. Our normal peacetime use runs close to 2,000,000 tons a year, and we then supply much of world needs overseas.

Sulphur from volcanoes was used long ago. Homer and Pliny wrote of it. Ancients used sulphur to clean wool, make torches and medicine; they burnt it to cure human ills and cast out devils.

After men learned to use gunpowder, in the 14th century, sulphur use multiplied as wars increased. When America began to make wood pulp for paper, to make "commercial fertilizers," and to vulcanize rubber, we imported more and more sulphur from Sicilian mines. But the Gulf Coast freed us from this bondage, just as learning to take nitrates from the air freed us from so much dependence on imports from Chile.

Now, besides TNT and smokeless powder,

we use most sulphur in making coal products, iron and steel, rayon and cellulose film, insecticides, etc. In your car, including its tires, are about 35 pounds of sulphur.

Those "salt domes" or "plugs" that yield oil may also yield sulphur—though not always. Some are enormously rich. Big Hill, in the Spindletop region, yielded over 12,000,000 tons! Biggest known deposit is Boling Dome, Texas.

Lively model towns such as Port Sulphur and Newgulf grow up, where everybody works for the sulphur company. We "mine" sulphur by the Frasch process, which melts the yellow material with hot water forced down deep wells and then pumps it up to surface vats (Plate XV).

Flying over the Gulf sulphur mines, you see mountainous yellow piles of stored sulphur, and derricks that remind you of an oil field.

Seismographers and other prospectors for oil—and they're the boys who also find the sulphur—flounder through these Gulf Coast swamps, riding barges or "swamp buggies." Mosquitoes are often so thick that workers must set up engines hooked to airplane propellers, to blow the blood-suckers away.

Before rails came, Midwest's only easy tie with our Atlantic Coast and the rest of the seas lay via Mississippi River and Gulf waters. So Midwest inland water traffic with the Gulf is old.

Missouri pig lead to make bullets in New Orleans; bears' fat packed in hollow logs; venison hams, furs, salt evaporated at brine wells—all floated down Old Man River in pioneer days. Twice Abe Lincoln worked his way to New Orleans; once he took potatoes, bacon, hams, jeans, flour, and apples.

Mark Twain's *Huckleberry Finn*, Edna Ferber's *Show Boat*, historic wrecks, explosions, and breakneck races between bacon-burning sternwheelers such as the steamer *Natchez* and the *Robert E. Lee*! Moonlight excursions, southern belles in hoop skirts, banjo-playing stevedores, and courtly card sharps in top hats and ruffled white shirts! All these are part of the Mississippi legend.

Inland Waterways Tied to Gulf-borne Traffic

Such romance is gone now. But today traffic on the big river and its tributaries, with some 1,000 towboats and 5,500 barges, is heavier than ever. Not counting the Great Lakes, this traffic now totals over 100,000,000 tons a year—hundreds of times heavier than in that golden age of sumptuous packets.

Pittsburgh, Cincinnati, Great Lakes ports, St. Paul, Minneapolis, St. Louis, Kansas City,

Gulf Coast Towns Get into the Fight



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Illustration by J. Taylor Roberts

A Stunning Reason Why Tampa's Latin Quarter Is Called Romantic

In Ybor City, Tampa's gayest section, you eat Spanish food, drink Spanish wine, hear Spanish speech, songs, and music, and meet Cuban newsboys selling Spanish-language papers. Even the Cuban baseball fans root in Spanish. Hundreds of Cuban girls work in Tampa cigar factories.



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Crowds Throng Tampa's Water Front in Peacetimes to Welcome the Annual Return of Historic Pirate Don José Gaspar

This "Gasparilla" carnival, when the old sea rover arrives on his freebooting schooner, has long been Tampa's top holiday. When war ends, all good Tampa folk plan to resume the colorful festa, and once again turn their town over to merrymaking pirate bands.

Illustration by J. Arthur Roberts



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Reprints by J. DuBois Roberts

Though Too Chilly for Winter Bathing, Gulf Beaches in Summer Are Crowded from Florida to Texas

Out on the west Florida coast, where U. S. Highway 98 parallels the Gulf, the cameraman found this coy quartet. But he had gas then, and tires! Now no pleasure cars are seen—only trucks, buses, and long lines of Army vehicles.



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Naval Aviation Cadets at Pensacola Taxi in to the Beach on Return from Practice Flights

The "benchmark," at left, waves his striped flag as a signal that pilots may now bring in their Vought-Sikorsky "Kingfishers." In readiness to his red flag, should orders change. The Naval Air Station at Pensacola, Florida, is often called "The Annapolis of the Air."

Kodachrome by J. Buster Bennett

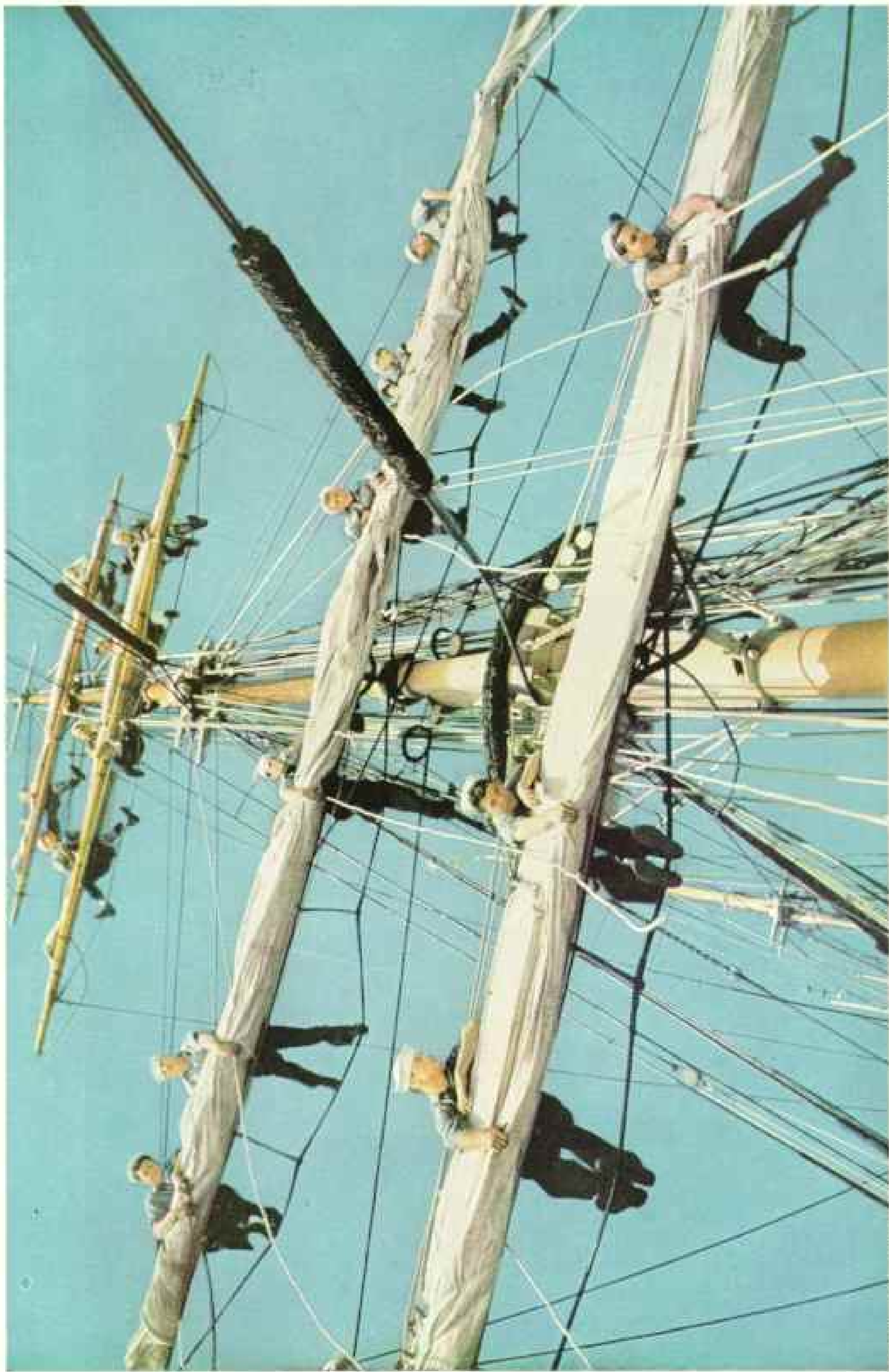


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Coast Guard Flyers Take a Sick Man from a Shrimp Boat to Rush Him to the Hospital

Equipped with radio, the *Bill Cruz*, of the Biloxi, Mississippi, shrimp fleet, wirelesses the Coast Guard for help. For transfer, the patient is strapped in a long wire basket. This is one activity of the many small Coast Guard stations about the Gulf. Large permanent bases are at important centers such as St. Petersburg and Biloxi.

Kodachrome by J. Bealir Roberts



© National Geographic Society

Illustration by F. Darius Eubanks

"Bell-bottom Trousers; Coat of Navy Blue. He'll Climb the Rigging Like His Daddy Used To Do!"

Again that famous sailing ship, *Joseph Conrad*, splits the blue water. She's a school ship now, used at St. Petersburg, Florida, by the War Shipping Administration for training merchant seamen.



© National Geographic Society

Woman with Macaw in Blossomtime

Gorgeous as is his plumage, the strill macaw has the world's most raucous voice. This one is 14 years old, but still has an eye for beauty—and bougainvillea—at Fort Myers, Florida.



Illustrations by J. Bayler Roberts

Stripes Gets His Back Scratched

Citizens of Sarasota, Florida, enjoy free shows when trainers with Ringling Brothers and Barnum and Bailey Circus, wintering here, put animals through their acts. Equestrienne Betty Steel makes a pet of a young tiger.



"Too Bad You Can't Make Pies as Well as You Make Model Boats!"

So says the oil-skinned skipper of this Pensacola red snapper fishing boat, when "Cookie" exhibits a sample of his spare-time whittling. From Pensacola, in normal times, the red snapper fleet ranges far out over the Gulf.



© National Geographic Society

Illustrations by J. Taylor Johnson

"What's the Use of Putting on Lipstick at the Bottom of a Lake?"

Sitting on a log in the waters of Florida's famous Wakulla Springs, near Tallahassee, two trick swimmers start a submarine beauty shop. In places this crystal-clear spring is 185 feet deep. Many underwater movies are made here.

Memphis, all are tied to the Gulf. So is Birmingham by the Warrior River and Tombigbee, Houston by its great Ship Channel, and Brownsville, Texas, by its new deep-water ditch and citrus-loading docks.

Stand on any high bridge over the Ohio or Mississippi, and you see veritable freight trains of barges, each tow carrying probably 150 times any load ever borne by the gilded, twin-stack river queens of Mark Twain's day.

Safe from enemy subs that might lurk in the Gulf, colossal freightloads now also move through Uncle Sam's long intracoastal canals. Army engineers are enlarging this waterway, and someday, if the Florida barge canal is dug, the Atlantic and Gulf Intracoastal Waterway may connect Boston with Texas (p. 11).

Consider here only that 1,000-mile stretch now operating between Carrabelle, Florida, and Corpus Christi, Texas. By Eastern Air Lines, as from Mobile to Houston, you fly over parts of this system.

As in south Louisiana, you see where a wide, straight ditch cuts through cane fields or brushy swamps. Elsewhere, you see the barge tows twisting around bends and curves where engineers dredged the channel through existing streams, bays, and bayous. Lake Pontchartrain, east of New Orleans, forms an easy, natural stretch.

Oil, coal, stone, sulphur, steel, iron pipe for oil fields, motor vehicles, cement, grain, lumber, and fertilizer are among the loads that ride this ditch in normal times.

Today, its biggest job is carrying eastbound oil and gasoline to west Florida, where pipe lines transport the cargo to Jacksonville and to the north.

I talked with some tugboat skippers and Army engineers, while cameraman Joe Roberts made pictures.

"Today more than 400 tugboats drag oil barge strings from Texas to Florida," said one master. "We move tens of thousands of barrels a day, then hurry back empty for more loads. . . . In this ditch, we're not only safe from pigboats, but we miss all those quick squalls that kick up out in the Gulf."

Gulf Steamers Carry Enormous Freights

Through the Straits of Florida from the North Atlantic, and up through the Caribbean from Latin American ports, is spun a veritable network of ocean lanes that tie Gulf traffic with overseas ports.

Till war came, the number of domestic and foreign steamship lines serving Gulf ports was counted in dozens. After peace, many of these will resume.

Among the chief American lines were Water-

man Steamship, Lykes Brothers, Grace Line, United Fruit Company, Mississippi Shipping Company, Panama Mail Line, Tampa Inter-ocean Steamship Company, and Gulf and Pacific Mail Company.

Most of their cargo vessels are now taken over by War Shipping Administration, carrying both Army and Navy cargo.

In peacetime over three-fourths of all our export cotton goes out from Gulf ports. Today, cotton export, except to England, has practically ceased; we ourselves use much more to meet our war needs.

Oil now is Gulf's biggest cargo. Even in peace, half of all our oil and oil products, and one-third of our lumber, went out through the Gulf. Other normal Gulf exports are sulphur, phosphates, iron pipe, steel, much naval stores, some copper and Mexican lead, grain, meat, fruit, and fruit products, ground oyster shells for chicken feed, and some sea food.

Into our Gulf ports ships normally bring coffee, bananas, coconuts, cacao beans, hardwoods, hides, and the incredible tons of Chilean nitrates, aluminum, tin, and other ores.

Staggering loads of mysterious freight and express are now also flown from and over Gulf ports by Army, Navy, and commercial air line transports. Flying about as Uncle Sam's guest, you see all this, but you don't write much about it!

Increasing Air Traffic Around the Gulf

Near the head of the Gulf Stream, where the equal of 1,000 Mississippi Rivers flows through the Straits of Florida to join the Atlantic, America's first commercial overseas air line, Pan American Airways, was born some sixteen years ago.

"Since that first 90-mile flight from Key West to Habana," says Juan T. Trippe, President of Pan-Am, "air traffic in the Gulf of Mexico has grown enormously. Around the Gulf Coast today are three great international air gateways to Latin America, from which more than 60 flights weekly now link North and South America. With the mails go priority personnel and cargo essential to the hemisphere war effort."

First Florida-to-Panama air mail was flown on February 4, 1929.

When air transport began to grow along the Gulf Coast in Mexico, Pan American set up a base for trunk-line operations at Brownsville, Texas. Now air transport serves Tampico, Tuxpan, Veracruz, Minatitlán, Carmen, Campeche, and Mérida, all important cities along the Gulf Coast.

"To its three international air gateways—Brownsville, Miami, and Los Angeles—Pan



E. K. NARR, Official

With a Lurch and Roar, a Cadet Shoots off the Catapult in an OS2U-2 "Kingfisher"

This maneuver is part of his course in the observation-scout squadron of the Naval Air Training Center at Corpus Christi, Texas. Similar to the type used on larger ships of the fleet, the catapult gives the cadet experience in this type of flight, and provides what most students call the greatest thrill of their cadet career.

American this year added the fourth, New Orleans," says Mr. Trippe.

"On June 13 last it began triweekly service between New Orleans and Balboa in the Canal Zone. On this new route, increased now to five weekly trips, planes fly over the Gulf from north to south, and make stops at Mérida in Yucatán, Guatemala City and Managua in Central America."

Air cargo developments have been just as far-reaching. Clippers carry every kind of air freight from machinery to minerals, baby chicks, chicle, seeds and seedlings, to drugs, cut flowers and millinery, and, more recently, the vital materials of war—which censors will not let me describe.

This Gulf Is One Big Sea-food Factory

Like cows munching hay you watch captive turtles eat seaweed in the crawls at Key West.

Fish seeking food move about this Gulf in astronomic millions. Vast schools of mack-

erel, some five miles long by three miles wide—15 solid square miles of leaping fish—swim up the Texas Gulf Coast every Spring.

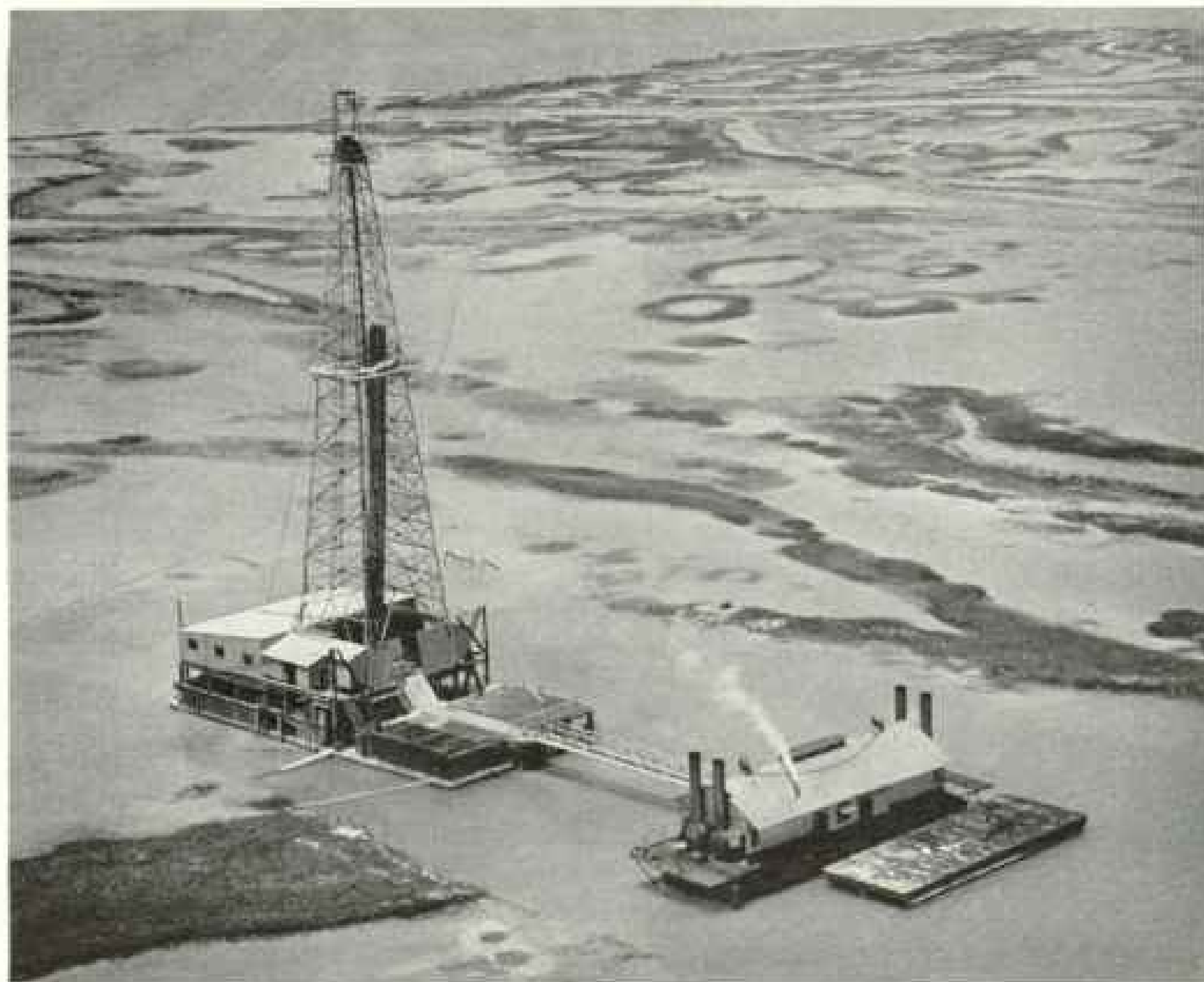
Shrimp come in by boatloads. But New Orleans saw all-time high prices in 1943—up to \$60 for a barrel of shrimp!

Even jellyfish! They get so thick off Corpus Christi that sometimes launch propellers get clogged with them, and the boat can't run. Science now seeks some good use for these creatures.

Despite submarine threats, and the fact so many Gulf areas are closed to fishermen now and used for bombing and other wartime activities, quest for Gulf sea food is unabated.

Shrimp amounts to about 50 percent of the catch. Then come mullet, crabs, and oysters; red snapper, grouper, spotted sea trout, Spanish mackerel, etc.—some 250,000,000 pounds in 1940.

But, says the Office of the U. S. Coordinator of Fisheries, we concentrate on some kinds,



Staff Photographer J. Harley Roberts

A Texas Drilling Outfit Sinks an Oil Well in Aransas Bay

Much of all our wartime oil comes from Gulf Coast fields. Refineries are busy here, as well as factories using oil products in making synthetic rubber, sulphuric acid, and TNT for explosives.

to the neglect of others. Texans, for example, don't like mullet, but the Gulf is full of them. It's full of "trash fish," too, that are now thrown away—and full of menhaden, only partly exploited; yet trash fish and tons of discarded shrimp offal are now valuable in making fertilizer and we are short of that; so, here's one good way in which we are *not* making full use of the Gulf of Mexico.

Picking Galveston's Name from a Hat

Rimming our Gulf Coast is a whole string of busy ports, each with a colorful story. I couldn't write them all. So I scrambled their names in a hat, drew blind to get a typical town, and up came Galveston!

This world's biggest sulphur port stands on Galveston Island, tied to mainland by causeway. Its long, turbulent life is a kaleidoscope of wrecks, battles, pirates, hurricanes, epidemics, booms, and beauty parades.

First white man ashore was Cabeza de Vaca, cast up by the sea in November, 1528. With

the Narváez expedition De Vaca landed near Tampa Bay, bringing 400 men and 80 horses to explore the Gulf Coast. Later, part of the expedition sailed on, past the mouth of the Mississippi. On the coast of Texas they were wrecked, Narváez vanishing from history.

De Vaca and a few other survivors made new boats, using their shirts for sails and sewing them with hair from horse manes and tails.

De Vaca, in turn, was wrecked off Galveston Island; reaching shore, his band dwindled from sickness and hunger.

Finally, after Indian trouble, De Vaca and three companions started walking west and were the first Europeans to cross the continent by way of what is now the southern United States and northern Mexico. In Sinaloa, they met up with other Spaniards.

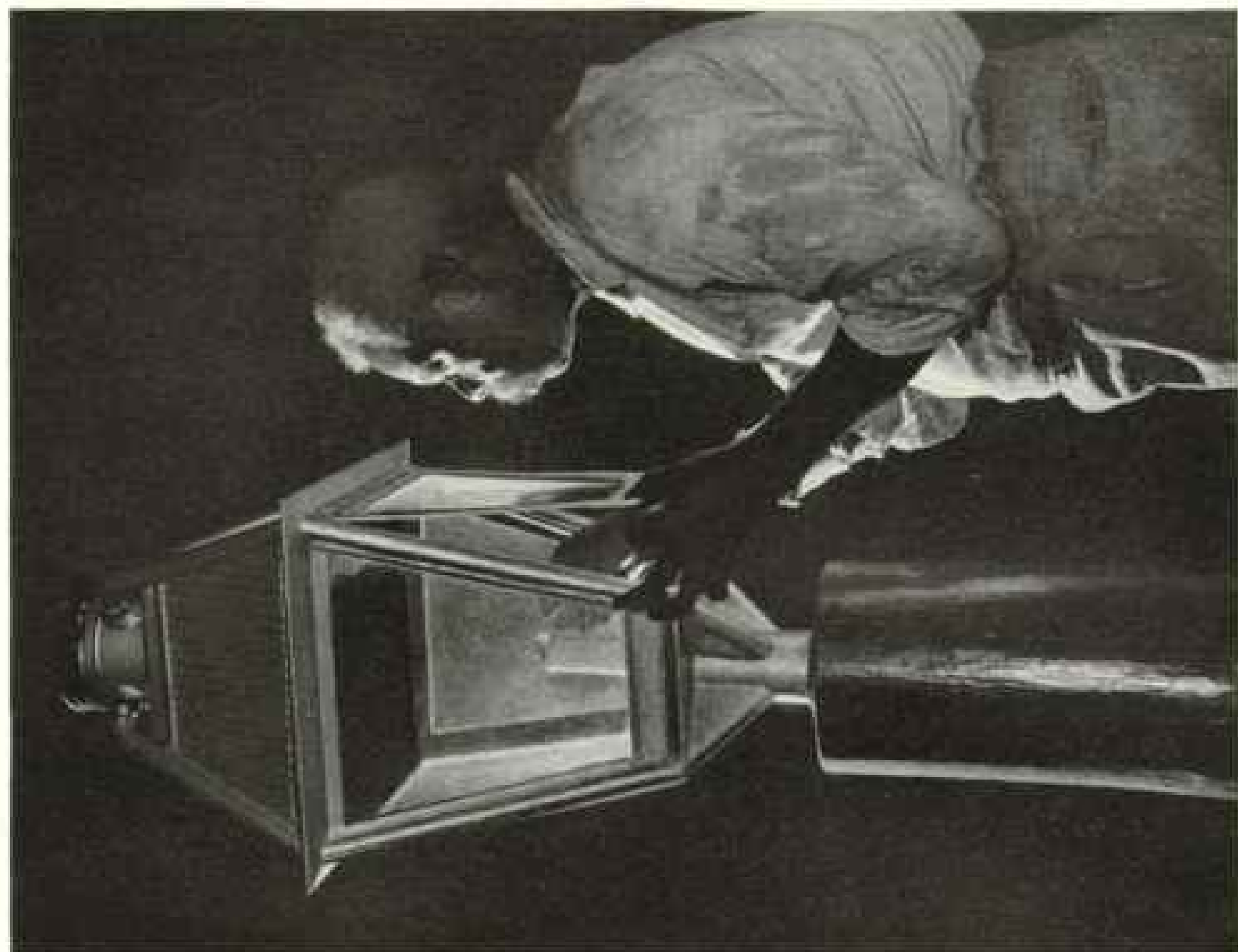
By the early 1800's Mexicans used this island as a base for privateering. Then Jean Lafitte, cultured pirate, ruled here with more than 1,000 ruffians.



Walt Whitman/PA

No Wonder New Orleans Men Enjoy Streetcar Trips

Mrs. Leon Levy is one of the women who serve there now as conductors. She took the job when her motorman husband quit to join the Coast Guard.



Wall Whitman/PA

This Former Slave Was Born in New Bedford, Massachusetts

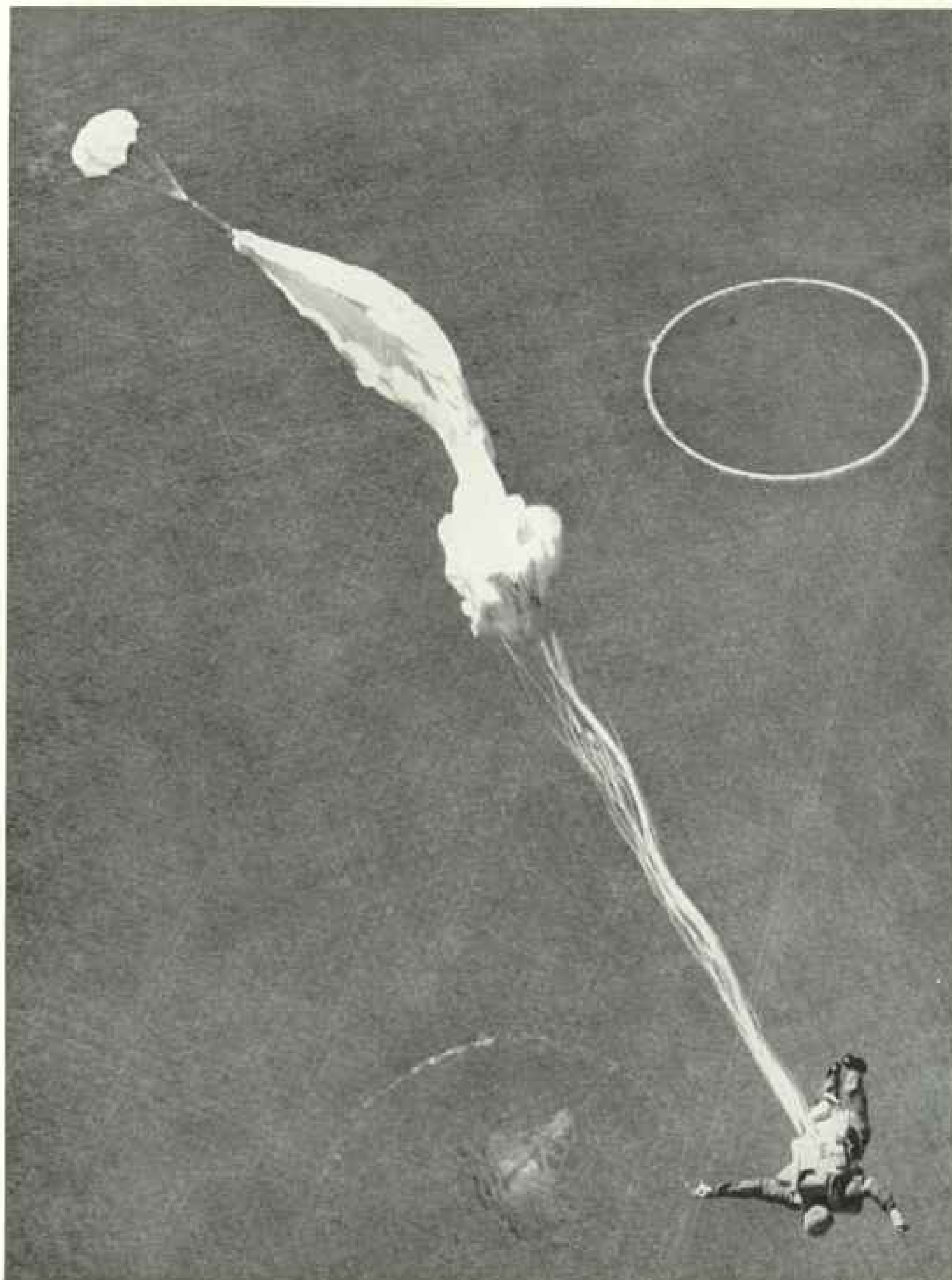
The gardener at Beauvoir, near Biloxi, Mississippi, last home of Jefferson Davis, says he was born August 2, 1843. Here this candle street light is kept burning.



Blatt Photographs J. H. Fisher, Houston

Mexican Boys and Girls Juggle a Giant Shrimp Cocktail at Palacios, Texas

In season boats trawl in near-by Matagorda Bay, returning each night with their catch. These workers are busy at a "heading table," Some shrimp are canned, some shipped in crushed ice, and some packed in quick-frozen 5-pound cakes.



U. S. Navy, Official

"Hitting the Silk" Deep in the Heart of Texas

This shows how a parachute works. The camera catches a parachute jumper, just as his pilot-chute is unfurling his main chute from the pack. The jumper is a sailor at the Naval Air Station, Corpus Christi, Texas. He is using a chute that he packed himself, as a petty officer and parachute rigger.



U. S. Navy, Official

Navy Student Pilots Get Last-minute Orders before Going "Upstairs"

Names of students, their instructors, and other details appear on the schedule board. Over it are the phrases, "Don't get caught above clouds" and "Up and at 'em, boys." Fliers trained at the Naval Air Station, Corpus Christi, Texas, are now serving on the *Seven Seas*.

At Galveston today, when dreamers get bored because fish don't bite or bathing girls aren't on parade, they lay down their tackle, pick up a shovel, and start digging somewhere for Lafitte's buried treasure!

In his prime, Lafitte became such a scourge to merchant traders that Governor Claiborne of Louisiana offered \$500 for his capture; in turn, Lafitte promised \$15,000 to any man who could catch and deliver to him the Governor of Louisiana!

Files of Galveston's 102-year-old *Daily News* are rich in frontier lore. Men in buckskin or broadcloth, women in calico or silk, helped build the town.

When Steak Was Given Away

Texas' now colossal cattle business was born on this coast. Gail Borden built his first packing plant at Galveston about 1845. Good steak was sometimes given away—when only hides and tallow were needed.

Half-wild pigs roamed the streets then, rooting up gardens and melon patches. The jail was the hulk of an old wreck. Once the bay froze over, men and animals walking over ice to the mainland.

It took Galveston some years to rebuild after the hurricane and tidal wave of 1900.

My brother-in-law lived there then. His house was swept away so completely that later he couldn't even identify the lot on which it had stood.

Now a high sea wall protects the city. As the wall went up, big brick buildings were jacked up and lifted bodily—every brick in place—to higher levels (page 14).

Now Galveston looms large in Gulf trade. Many railroads end here. Switchyards on the island will hold 11,300 freight cars. Fine wharves accommodate tankers and steamers. Templelike elevators help make Galveston a great grain-exporting center.

Summer vacationists swarm here from as far away as Canada.

Prize fish stories abound all along this coast.

You hear of one leaping tarpon that struck the boatman in the head and killed him. From Corpus Christi comes a yarn of a woman who hooked a 16-foot sawfish. Four men helped her land it.

Then they loaded it into a wagon, and started to the taxidermist's. Thought to be dead, the fish gave a sudden flop, turned the wagon over, and so frightened the mules that they ran away!

One of Nation's Biggest Playgrounds

HOSTS OF NATIONAL GEOGRAPHIC readers are among the millions who know this 2,028-mile coastal playground from halcyon days of peace and gasoline. How nostalgic its sights, sounds, and smells! What happy memories they conjure!

Key West's Duval Street on Saturday night, lime pies, and "turtleburgers"; seagoing motorbuses on that long viaduct across the Florida Keys. . . . Sponge auctions, green-shuttered old wooden houses shipped over from the Bahamas long ago. . . . Barelegged, sunburnt girls on bicycles. . . . Navy men in whites; submarines, destroyers.

Fort Myers' royal palms, and that historic garden where Thomas A. Edison worked with myriad weeds, hunting one that might yield rubber.

St. Petersburg, community singing, open-air prayers, sidewalk benches to which, like swallows, the same winter visitors return year after year.

Sarasota, where acrobatic blondes turn somersaults on white horses, swing in elephants' trunks, and walk with tigers at circus winter quarters.

Tampa, Cuban cafés crowded with diners calling for *pimpano en papillo*. Spangled-pants fandango girls, gay caballeros playing *La Golondrina* or *La Cucaracha* on guitars inlaid with mother-of-pearl.

Tarpon Springs, Greek spongers, a Bishop blessing the fleet and then tossing his crucifix into the sea, to be retrieved by one of the swift-diving boys.

Pensacola, mother-in-law of the Navy, whose favorite dish is fish throats. An old, old town of many flags—and Spanish families who still own plantations granted them by the crown.

Mobile, city of Azaleas, proud of its new underriver tunnel, busy port of cotton, lumber, Alabama iron, aluminum ore from South America.

Bombers over Biloxi

Biloxi, where in 1699 d'Iberville, French explorer, set up the Louisiana colony's first capital; once winter training ground for big-league ball teams; overshadowed now by Keesler Field and its roaring bombers.

But if you remember the Gulf Coast from Mississippi Delta on to Texas, it is only because you flew over it. No roads along those low, swampy tide flats. Rails and highways skirt these marshlands only along their northern edges, past Evangeline's country, through lush Louisiana cane fields, past sugar centrals with tall smokestacks and huge piles of crushed cane stalks, past oil well derricks and the works of sulphur mines.

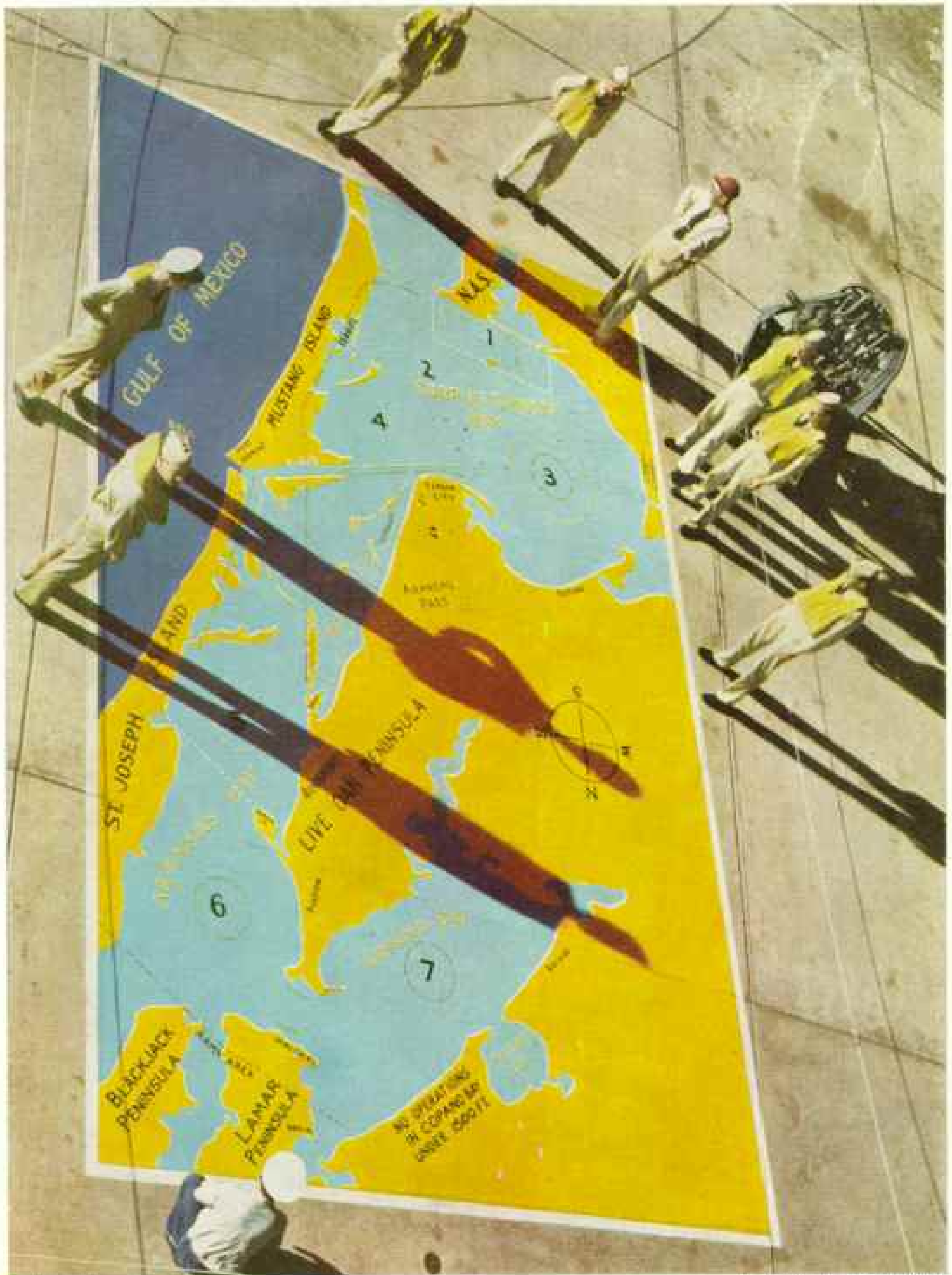
Beaumont, Texas City, Port Arthur—more oil wells, tank farms, and shipyards. San Jacinto Battlefield, near Houston, where Sam Houston whipped Santa Anna to help free Texas, and so on to Galveston, with its Buccaneer Hotel, curvaceous bathing beauties, bingo parlors, and soldiers, soldiers.

Freeport, with more sulphur piles. Corpus Christi, trailer camps, ducks, fish, some streets named for wild animals, with Mexican barber shops where you can still get a shine for a dime.

Brownsville, loading citrus fruit by tons and tons, pioneer fiestas, trips over the Rio Grande to Mexican Matamoras for enchiladas, serapes, and burlesque bullfights that amuse Sunday visitors.

"When the lights come on again," vacationists will be back, from "all over the world." In how many kindly ways this Gulf is good to us!

Gulf Coast Towns Get into the Fight

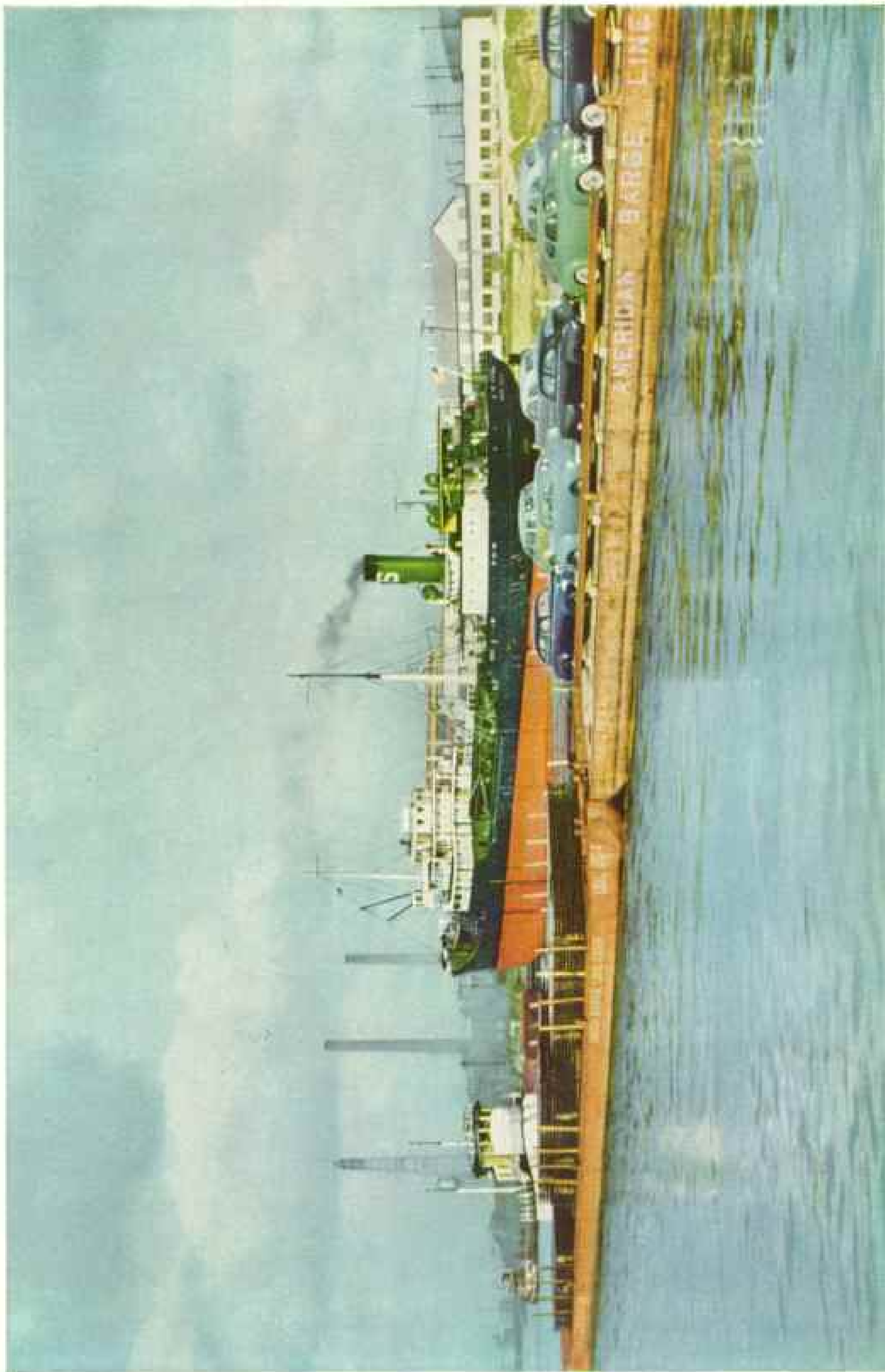


© National Geographic Society

Photograph, U. S. Navy, Official

Pilots Study a Chart of Corpus Christi Naval Air Station Painted on Concrete

Known to instructors and flyers as a "familiarization map," this big geographic fillboard shows the station and its relation to surrounding territory. By frequent consultation, pilots fix adjacent terrain firmly in mind. Like a long necklace, air bases and "satellite fields" are strung along the Gulf Coast from Key West to Brownsville.

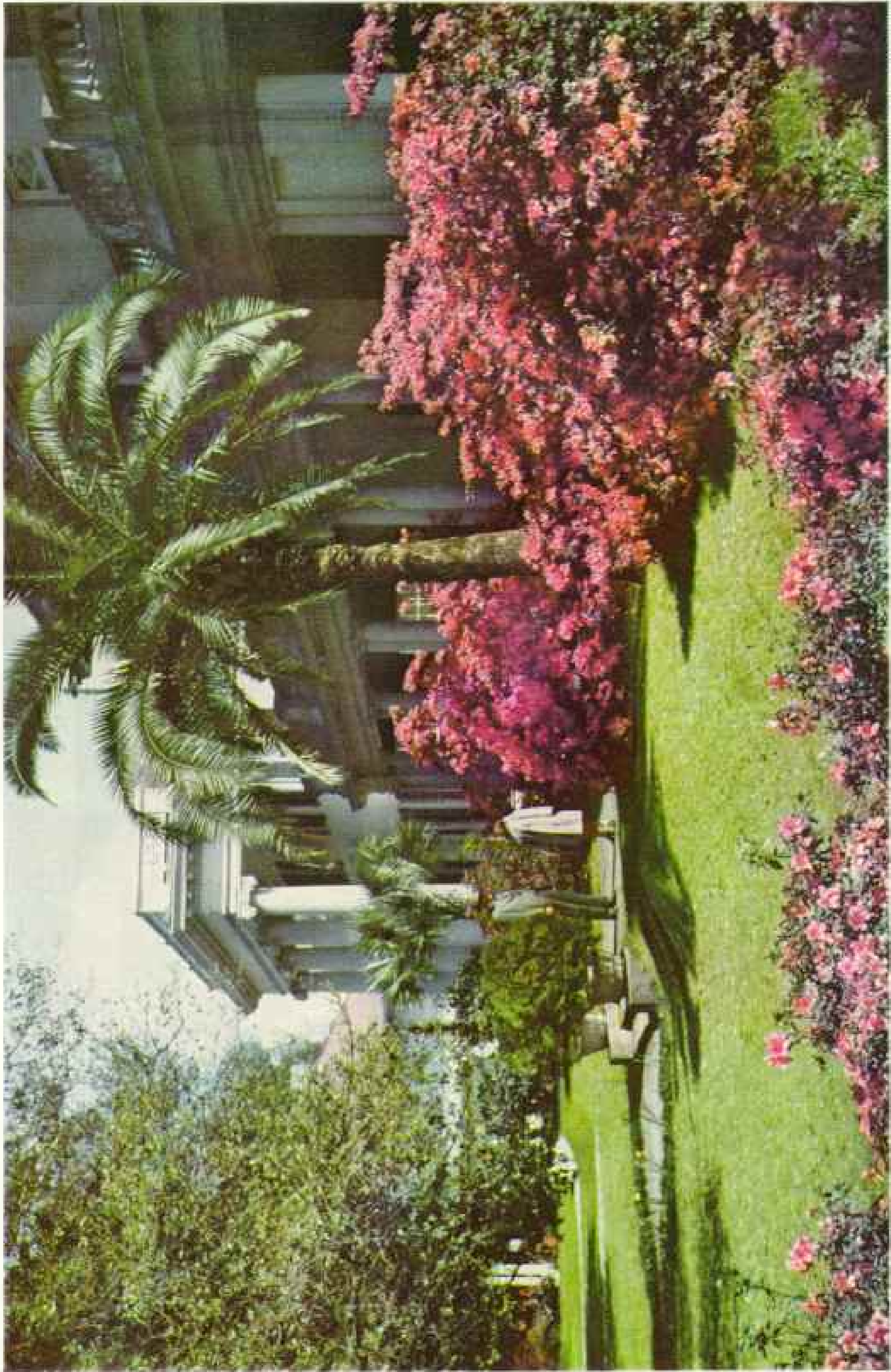


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Illustrations by J. Taylor Roberts

Though Houston Is 50 Miles Inland, Its Busy Ship Canal Makes It the United States' Third Largest Seaport

Founded in 1837, Houston village was then tied to the Gulf only by shallow, crooked, tree-lined Buffalo Bayou. After a half-century of dredging, it is now one of the world's five largest cotton export ports, and is visited, in peacetime, by some 3,000 vessels a year.



© National Geographic Society

Endorsed by Edwin L. Hubbard

Every Spring Nature Paints the Town Red along Historic Mobile's Azalea-clad Residential Streets

Here is a characteristic southern mansion with one of many beautiful gardens along that classic city's hospitable "Azalea Trail." From all over America visitors flock here to admire these gorgeous blossoms; and all owners, true to Mobile's traditional courtesy, open their gardens to the public.



© National Geographic Society

Reichman pp. 3, Bayou Roberts

A School Boat, Not a Bus, Takes Some Louisiana Children of Terrebonne Parish Bayous to Classrooms

About 50 of them make this daily round trip of two and a half hours. Starting at 6:30 in the morning, the boat picks up children at various landings on the way along Bayou Chien, the Intracoastal Waterway, and then up Bayou Black to the little white schoolhouse at Gibson. Schoolboys help with smaller children.



© National Geographic Society

"No Crackles, Now, about Me Being the One with the Hat on"
 Ever since Balam was outsmarted by his ass, mules have figured in the news. This one, trained by the young lady, figures in Texas rodeos.



Kodachrome by J. Barber Roberts

E. H. Marks and Grandson of Texas H-7 Ranch, Near Houston
 At annual H-7 rodeos professional riders compete against local ranch hands, who enter their own bucking horses, Brahman bulls, and calves. A barbecue follows.

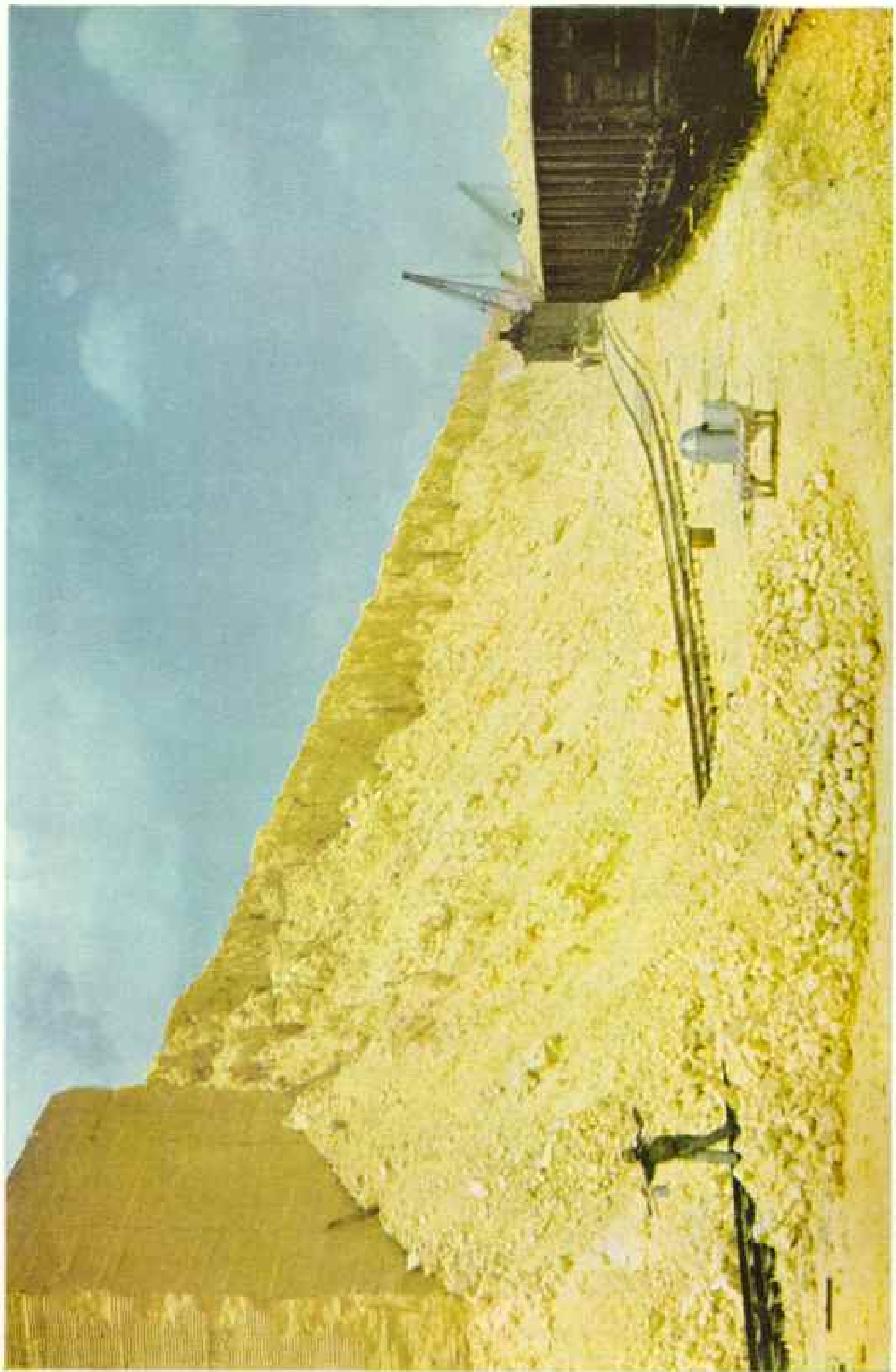


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No Man-made Gliders Drift in for Happier Landings than Those Made by Sourcing Pelicans

Big Bird Island in the Laguna Madre, or "Mother Lake," south of Corpus Christi, Texas, is a veritable pelican factory! Young ones are so tame and thick at hatching time that you can't walk without stepping on them. To make this picture Mr. Roberts flew in with a flying game-and-fish warden, who patrols this coast.

Reproduction by J. Harter Roberts

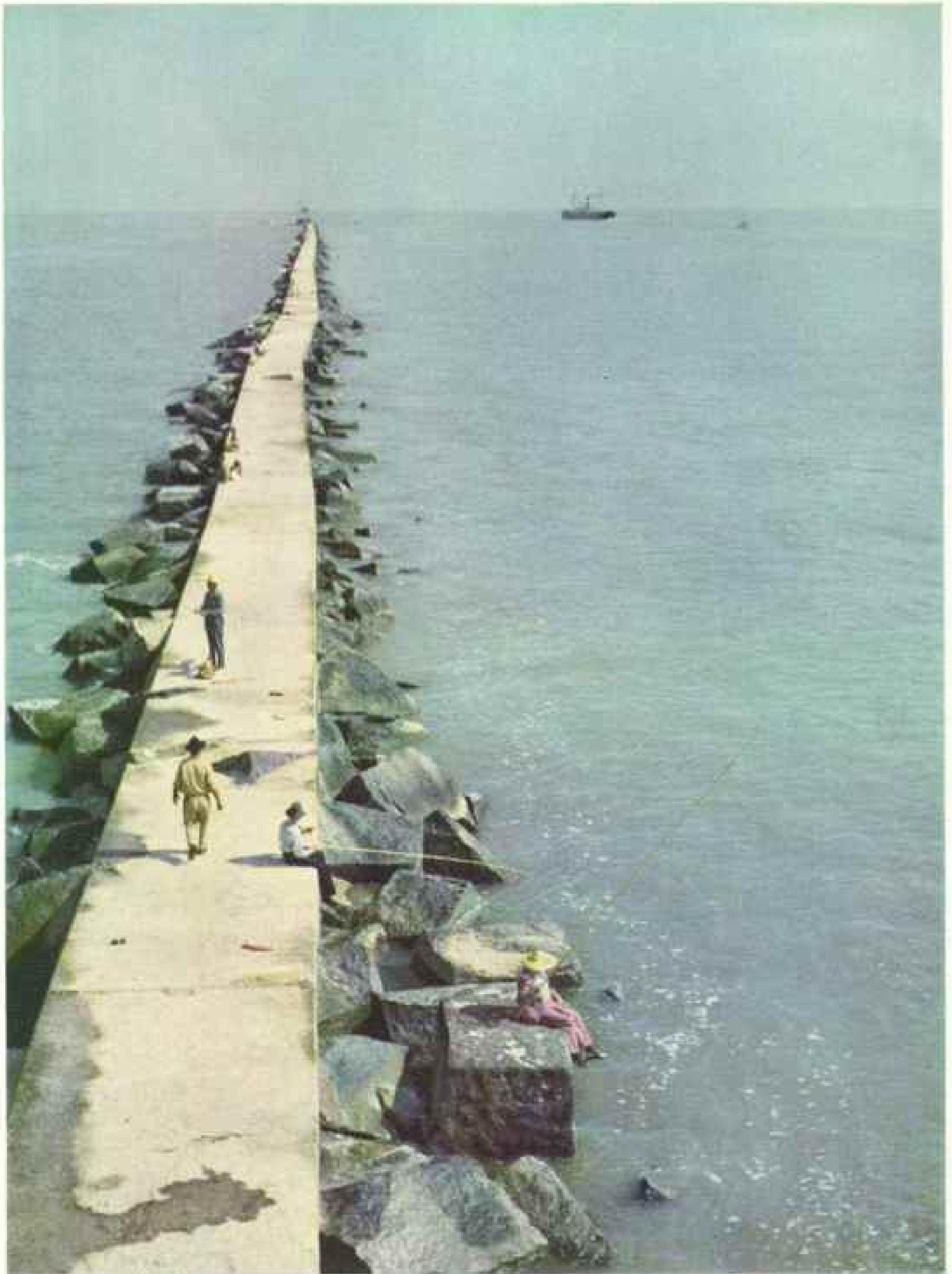


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Remindful of Babylonian Ruins, These Mountainous Heaps of Sulphur Rise from Deep in the Bowels of Texas

Here freight cars load at the mines of the Texas Gulf Sulphur Co., near Newgulf. To extract sulphur from deposits 500 to 1,500 feet underground, holes are bored down into it, and hot water forced down through pipes. Boiling back up, the sulphur is piped to these surface vats where it solidifies.

Photograph by J. Taylor Roberts



© National Geographic Society

Photograph by J. Taylor Roberts

On This Jetty Lucky Fishermen May Walk Two Miles out to Sea

This is the east jetty at the mouth of Sabine Pass. Texas lies to its right, Louisiana to its left. Launches, bringing fishermen, reach here from near-by Port Arthur, Texas. Few waters, anywhere, afford better fishing than the Gulf of Mexico, noted especially for tarpon, red snapper, barracuda, and Spanish mackerel.

Brazil's Potent Weapons

BY W. ROBERT MOORE

With Illustrations from Photographs by the Author

BASES in Brazil helped win the victory over the Axis in North Africa. From the huge northeastern "bulge" of this biggest American republic the African coast is only 1,770 miles away. With the Axis on a rampage in Europe and spreading into Africa, its nearness made the Western Hemisphere vulnerable to attack.

But not now. Today northeast Brazil is a Grand Central Station of the air. Through it were flown countless tons of equipment that bolstered the British Eighth Army when Rommel was making his supreme bid for Alexandria.

After flying back by Clipper from the Casablanca Conference, President Roosevelt conferred with President Vargas aboard a United States destroyer at Natal harbor. Together they inspected the Army, Navy, and air forces of the United States and Brazil, who jointly guard this vital area (page 42).

It was announced that they had reached "complete agreement that it must be permanently and definitely assured that the coasts of West Africa and Dakar never again under any circumstances be allowed to become a blockade or an invasion threat against the two Americas."

Sentinel and Supply Depot

Brazil's contribution to the Allied cause, however, is not only one of position. She is fighting today with potent weapons of raw materials, with factory products, and with food.

Her soldiers stand guard. Her merchant marine is part of the United Nations' shipping pool for carrying vital supplies, while her naval craft maintain alert coastal patrol. The air force has blasted out of existence a number of enemy pigboats that preyed on South Atlantic shipping.

The ruthless U-boat campaign precipitated the country's declaration of war against Germany and Italy on August 22, 1942, after 19 of her ships had been torpedoed, six within a single week.

I was anxious to see how the war has changed Rio de Janeiro. I hadn't been there for four years.*

Here was one of the few cities where planes could still land without having their windows barred by military screens. As our Pan American Clipper spiraled toward the Santos Dumont Airport we could look down on the majestic panorama of mountains, bay, and

long, scalloping, sandy beaches, about which the city snuggles (Plate II).

The same remarkable Rio, I thought. There was bulky Tijuca backing the whole city. There was bold granite Pão de Açúcar (Sugar Loaf) standing sentinel at the harbor entrance, with an aerial car creeping up the cable to its peak.

The statue of Christ still stood benignly atop precipitous Corcovado. But searchlights which once made it stand out like a white beacon at night had been blacked out.

The main difference from the air since my previous visit was the unusual growth of modern buildings in the old Morro do Castelo area. Government offices and commercial structures now almost completely cover the space left when the hill was sluiced into the bay to build the airport.

Through the city a new swath is being cut to provide a wide arterial thoroughfare.

Rio Busy and Crowded, Too

Rio has changed in a number of ways. It is busier and more crowded. Queues at street-car and bus stops are longer. The open trolleys, always festooned with people, are more packed than ever (page 60).

Rio early had its own gas shortage. In July, 1942, all private cars, save for high Government officials and diplomats, were ordered off the streets. Some have reappeared, but they are equipped with charcoal-burning units.

Taxicabs still operate, but on restricted gas rations. Every afternoon, near office-closing time, they chalk names of residential locations on their windshields and line up to wait for passenger pools. If you try to get one privately at that time, you become party to a black market and pay exorbitant fare in the bargain!

After having been closed three months, casinos were busy. At their night clubs samba orchestras again played to packed houses. In floor shows there were fewer European acts, more Latin American. Instead of pleasure trippers many of the patrons were war workers.

While I was in Rio sugar and salt rationing went into effect. Sugar bowls vanished, but soon were brought back for coffee. How familiar it was to see people lining up at schools to receive ration cards!

* See "Rio Panorama," by W. Robert Moore, NATIONAL GEOGRAPHIC MAGAZINE, September, 1939.



Army Air Forces, Official

The President Tells a Good One to the President!

The jokester is either President Roosevelt, from the biggest North American Republic, or President Getulio Vargas, of the biggest South American Republic (in civilian whites behind him). The two heads of State inspect Army, Navy, and air forces of the two Republics upon President Roosevelt's return from the Casablanca Conference. Seated beside President Vargas is Vice Admiral Jonas H. Ingram, Commander South Atlantic Force. Standing at right is Brig. Gen. (now Maj. Gen.) Robert LeG. Walsh, Commanding General of the South Atlantic Wing of the Air Transport Command.

Brazil produces adequate sugar and salt. But, like oil for the eastern United States, the supply is a problem of transportation.

Sun-bronzed fishermen still sit on the harbor sea wall wetting their lines, but their catch is small. Ships come in clusters now and vanish at night for rendezvous at sea.

There's another wartime difference in Rio—people can't wander at will with a camera. I know!

Later, through the kind cooperation of the Ministry of War, however, I was allowed to make pictures of the city, to see the busy shell factories, and also to visit the coastal batteries that guard the harbor.

Training Aviation Cadets

Out from Rio, I was taken also through the aviation cadets' school, Brazil's aerial West Point. I watched these future officers in classroom workshops, in Link trainers, flying American-built training planes, and at play. They're good, those youths; otherwise they don't stay.

Tough assignment for many graduates has been flying these small trainer planes all the

way from the factories in the United States to Brazil (page 58).

Out in the bush and open country I spent two blistering days in the sun, hiking and riding a bucking jeep with units of infantry, artillery, and a motor-mechanized outfit on war maneuvers to see how Brazil's armies are being trained and toughened.

Armed forces and civilians from the United States are working with the Brazilians. Hemisphere cooperation is really functioning. Our Government is giving much valuable technical and material assistance to Brazil's economic expansion.

In mines, in health and sanitation projects, in the vital battle for rubber in the Amazon, and in other work I saw numerous American engineers, doctors, and technical men helping fight the war of production.

Many have no easy task. Out in the interior of Minas Gerais I met miners slogging over trails on muleback to investigate new crystal and mica mines. I watched others supervising bucking bulldozers taken deep into the bush to strip the overburdens from veins of minerals which have top priority ratings.



H. Bouchieris, from C.I.A.A.

"Ooh! Look at the Picture of This Handsome Soldier"

Smiling girls at the University of São Paulo turn the pages of *Em Guarda* (On Guard). This is the Portuguese edition, a periodical devoted to the defense of the Americas, put out by the Office of the Coordinator of Inter-American Affairs. It has a Spanish edition, also a quarterly in French, chiefly for Haiti.



Pistol-packing Miner Pries Loose a Book of Mica

After being dug out, the mica is split into sheets and trimmed (page 76). Much of the mineral is taken from open cuts in Brazil. However, the dark tunnel (left) of this mine near Governador Valadares, leads to an underground part of the mica-bearing vein.



Gigantic Brazil Embraces Nearly One-half of All South America

Its area would overflow our 48 States by an extra Texas. Air and sea bases on the northeastern "bulge" are way stops to North Africa and the Allied Mediterranean battle front. Brazil's mines, especially in Minas Gerais, provide strategic quartz crystals, mica, and manganese. The vast Amazon yields vital rubber and many other vegetable products.



Brazilian State Boundaries in White
 Pan American Highway



Buenos Aires
 Montevideo



Which to Admire Most?—Jumper or the Hurdle

An officer of the First Regiment of Cavalry at Rio demonstrates superb horsemanship. The other chap closes his eyes; not from lack of confidence, but against the dust kicked up by flying hoofs. This oldest cavalry regiment in Brazil wears historic garb for State occasions (Plate I).

In Belém, Belo Horizonte, and Rio I talked with U. S. Rubber Reserve men, bronzed by the tropical sun, who were just in from the far reaches of the Amazon and other remote parts of the interior where they were trying to ease the handicap caused by the Japanese occupation of Malayan and Netherlands Indies rubber regions.

"If you want some good back-country copy," said one, "come with me. I'm leaving in a few days for a three months' trip into Mato Grosso!"

American and Brazilian doctors likewise are working together to map and effect the well-nigh superhuman task of a health and sanitation program for the Amazon Valley, one of the world's most ambitious health projects.

Amazing Variety of Strategic Materials

Long thought of mainly as a coffee- and cotton-producing country, Brazil is now furnishing an amazing number of strategic materials upon which the Allies rely heavily.

They range from the heavy base ores of iron and manganese through rare metals, non-metallic minerals, industrial diamonds, vegetable oils, bully beef, and hides to insecticides, ipecac, and caffeine. Virtually every part of the country, which in area is bigger than the United States, is contributing one thing or another toward victory.

Take rock crystal, or quartz. "Brazilian pebble" some call it, for Brazil is almost the sole source of high-quality clear crystals.

Because every radio communications unit, many sound-detection and locating devices used against submarines and airplanes, optical equipment, also range finders and other military precision instruments utilize quartz crystal, its importance looms large (page 77).

Every one of our ships and submarines



Food-taster for the Regiment Is the Colonel Himself!

No man in Brazil's First Cavalry can grouse about his food. Every day a K. P. brings samples to the commanding officer for a test taste.

prowling the seas, every Flying Fortress or fighter plane that roars through the skies, every tank that rumbles into battle, and the numerous Signal Corps communications sets right down to the walkie-talkies which soldiers pack on their backs—all use crystal.

Quartz Crystals Help Tune Radios

Quartz crystals are piezoelectric—they generate a measurable electrical potential when placed under stress.

Because of this property quartz-plate oscillators are made to control radio frequencies to narrow accurate bands. That's why you can always find your favorite program at exactly the same kilocycle setting on your radio dial. That is why, too, when quartz-plate resonators are utilized, hundreds of different mes-

sages can be sent over a single transoceanic cable or long-distance wire at one time.

Production of rock crystal in Brazil before the war was comparatively casual. Free-lance diggers furnished much of the output. Mines were mostly open cuts, worked largely in the dry seasons when water would not fill the pits.

Japan and Germany were the principal buyers. Mineral that was of no value for scientific use was cut into necklaces and other decorative objects.

Chief producing areas for quartz are the States of Minas Gerais and to a less extent Goiaz, Bahia, and Mato Grosso. Many of the old mines are being re-explored and opened for production to meet expanded war demands. Ever larger quantities are being rushed to Allied war factories.

Digging Crystals in Minas Gerais

I visited several of the Minas Gerais mines, located about 75 miles northwest of the modern capital of Belo Horizonte.

In one, near Sete Lagoas, some 500 men were digging in a yawning trench carved into the reddish-yellow earth. The scene looked like some building project conceived by the prehistoric cliff dwellers of our United States Southwest (Plates VII, VIII).

The walls of the huge cut were stairstepped with big earth benches. For every man digging in the crystal-bearing vein in the bottom of the mine, six or eight others stood on the benches to throw out the waste material where it could be hauled away by mule carts and trucks.

At a similar site some miles away I saw a snorting bulldozer at work. American advisory engineers were supervising its operation. The machine had been shipped more than 400 miles by rail from Rio and then driven through bush and creeks to the mine.

Earlier workers had literally dug themselves into a hole. They had quit mining when they had no more room for piling the waste. The bulldozer was ripping the earth overburden away from the rich workable vein and pushing it into the valley below, accomplishing more in a day than hundreds of men could have done in weeks by hand.

Chemically, quartz is the same as sand. It is silicon dioxide, the most common of all solid minerals. To find crystals of suitable size and purity for technical use, however, is another story.

The crystals vary in size from tiny hexagonal slivers, often clustered together, to huge six-sided blocks of rock. One crystal on display in Belo Horizonte weighs more than five tons!

Some crystals are stained; others have fractures, ghosts, cloudiness, or other defects. Even one which appears perfect to the eye may show flaws under polarized light (p. 77).

In Rio the United States Office of Economic Warfare now operates cleaning and testing laboratories. In them later I watched dozens of men and girls chipping off defective portions of larger crystals and testing each selected piece of quartz under the searching rays of arc lamps and polarized light before it was approved for shipment.

A Miracule Mineral Is Mica

Mica, like quartz, also has heavy wartime demand.

A remarkable mineral this. It is so formed and crystallized in nature that it can be readily separated into thin flexible sheets.

"Isinglass" is the popular term for the transparent pieces of mica used as windows in coal stoves and in electric ranges. It appears in your prewar toaster, electric iron, radio tubes, condensers, and other gadgets. Powdered mica was your Christmas tree "snow."

Its electrical-insulation and heat-resistant qualities, plus its transparency, flexibility, and the thinness to which it can be split have given this mineral an amazing number of uses.

In normal years Brazil was the world's fifth largest producer and exporter of mica. Although the United States produces quantities, British India has long held the lead for muscovite mica. Madagascar held a similar dominant position for the amber mineral.

Of late, even before the war raised it to priority status, Brazilian mica was coming more and more into use.

It is so common in some parts of the country that flecks glitter in the roads. In Minas Gerais alone 20 districts have been exploited. The State of Rio de Janeiro and other localities also have considerable deposits.

"Books" of mica being uncovered in the pegmatite dikes of the mica schist areas in eastern Minas Gerais varied in size up to one and one-half feet square and several inches in thickness (page 43).

The pieces of so-called "mica bruto," or crude mica, after being removed from the mines are first split into sheets to the thickness of light cardboard and trimmed of their irregular edges. Much is sent from the mines in this form.

In interior towns and in Rio I saw many mica-trimming shops where girls deftly split the thick sheets into thinner layers, cut off stains and imperfections, and sometimes to the untrained eye slashed a big sheet into a pitifully small square (page 76).

Bright Facets of Brazil

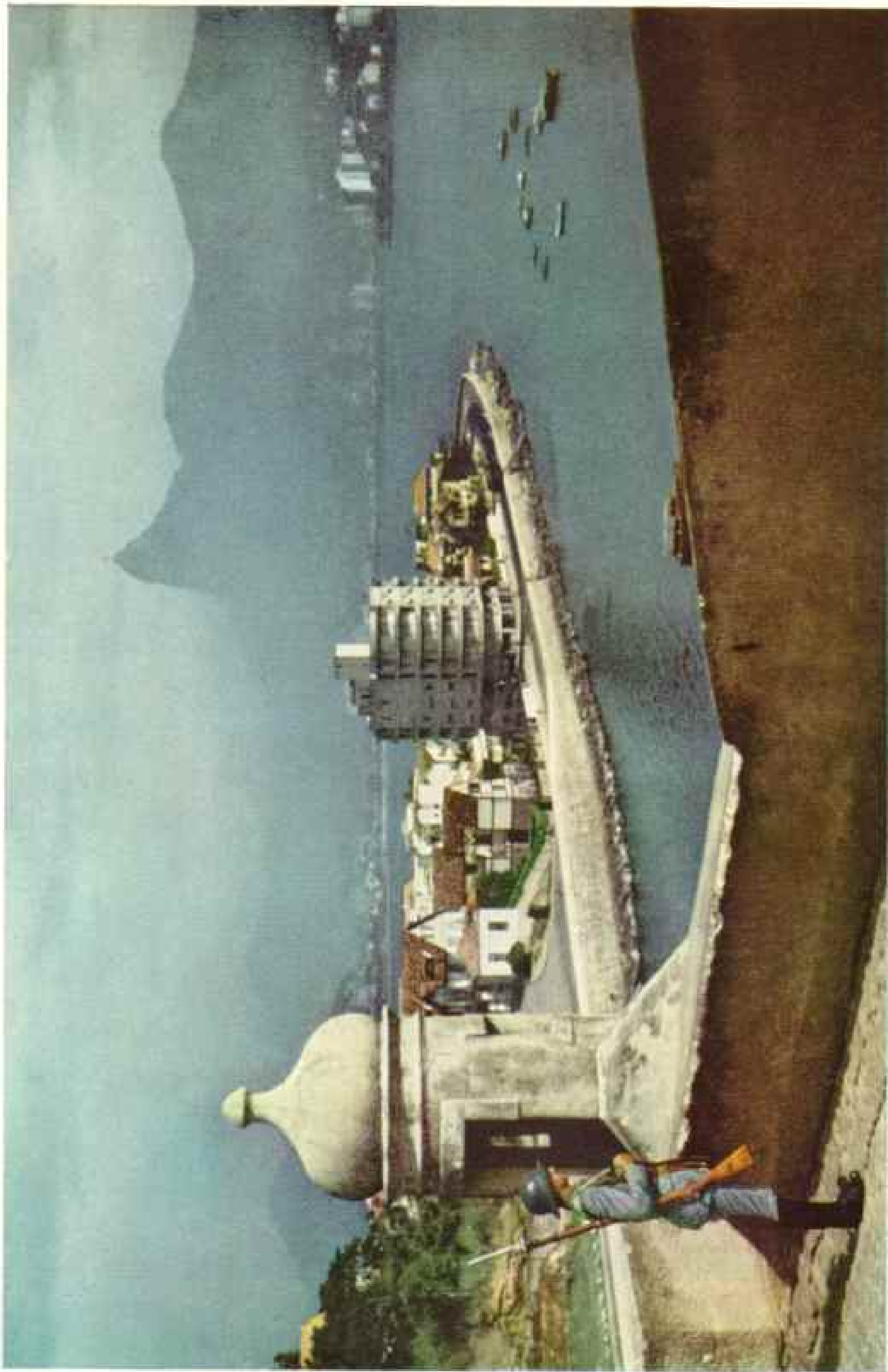


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Reproduction by W. Bennett Moore

Winged-dragon Helmets Are the First Cavalry's Inheritance from Imperial Days

Attired in uniforms like these, the regiment stood beside Dom Pedro I on September 7, 1822, and heard him proclaim "Independence or death!" Then Mother Portugal was the antagonist. Today Brazil's armed forces are mobilized against the Axis. Saber, sashes, and epaulets are for ceremonies only.

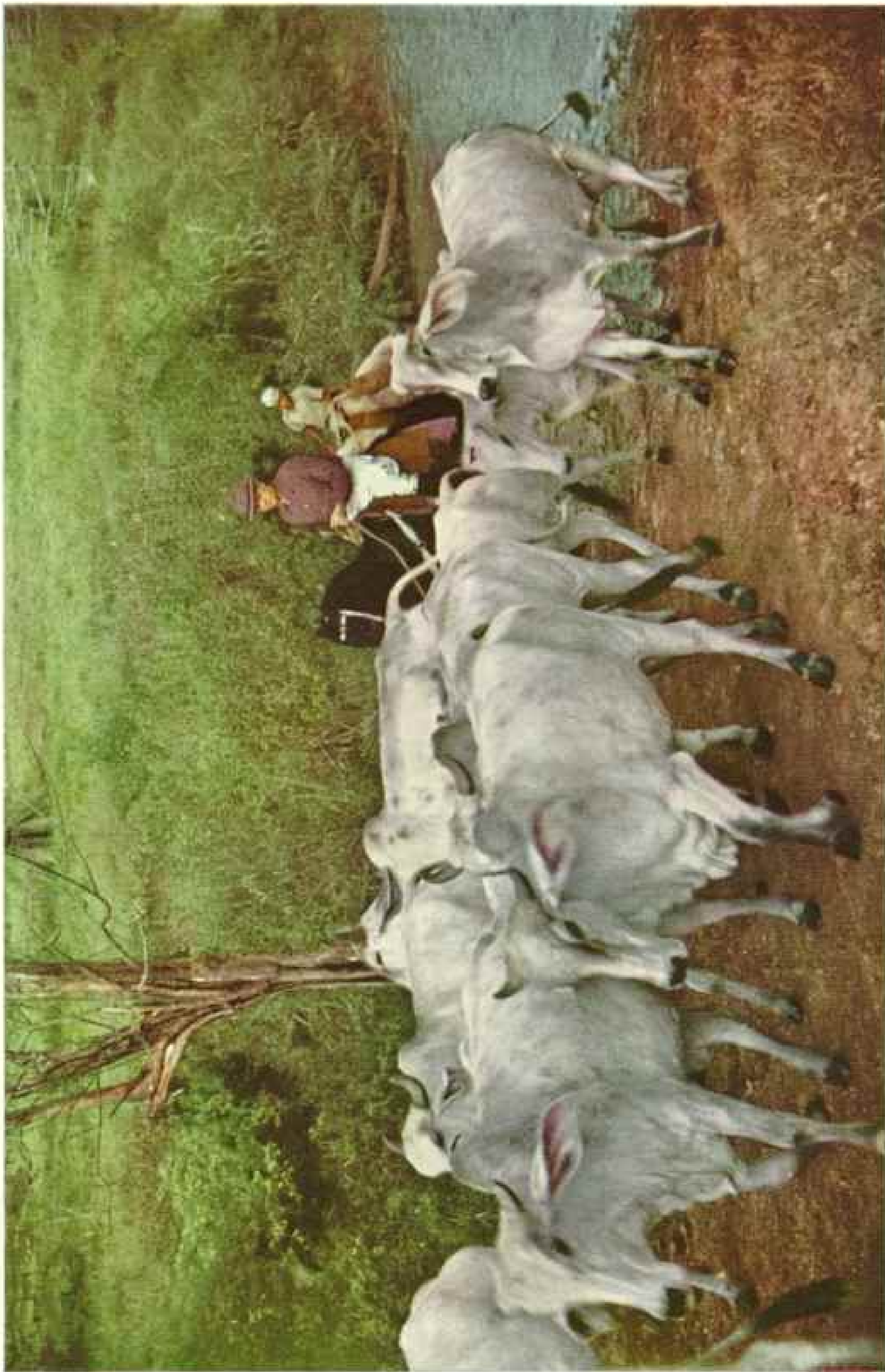


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Centuries Pass and Skyscrapers Rise, but Still a Sentry Stands Watch over This Old Fort in Rio de Janeiro

At Fortaleza de São João, Brazil has replaced Portugal's muzzle-loading cannon with powerful coastal batteries. Across the harbor, Corcovado (the Hunchback) rises to a sharp peak. Surmounting it is the 130-foot statue of Christ.

Continued by W. Bennett Minoy

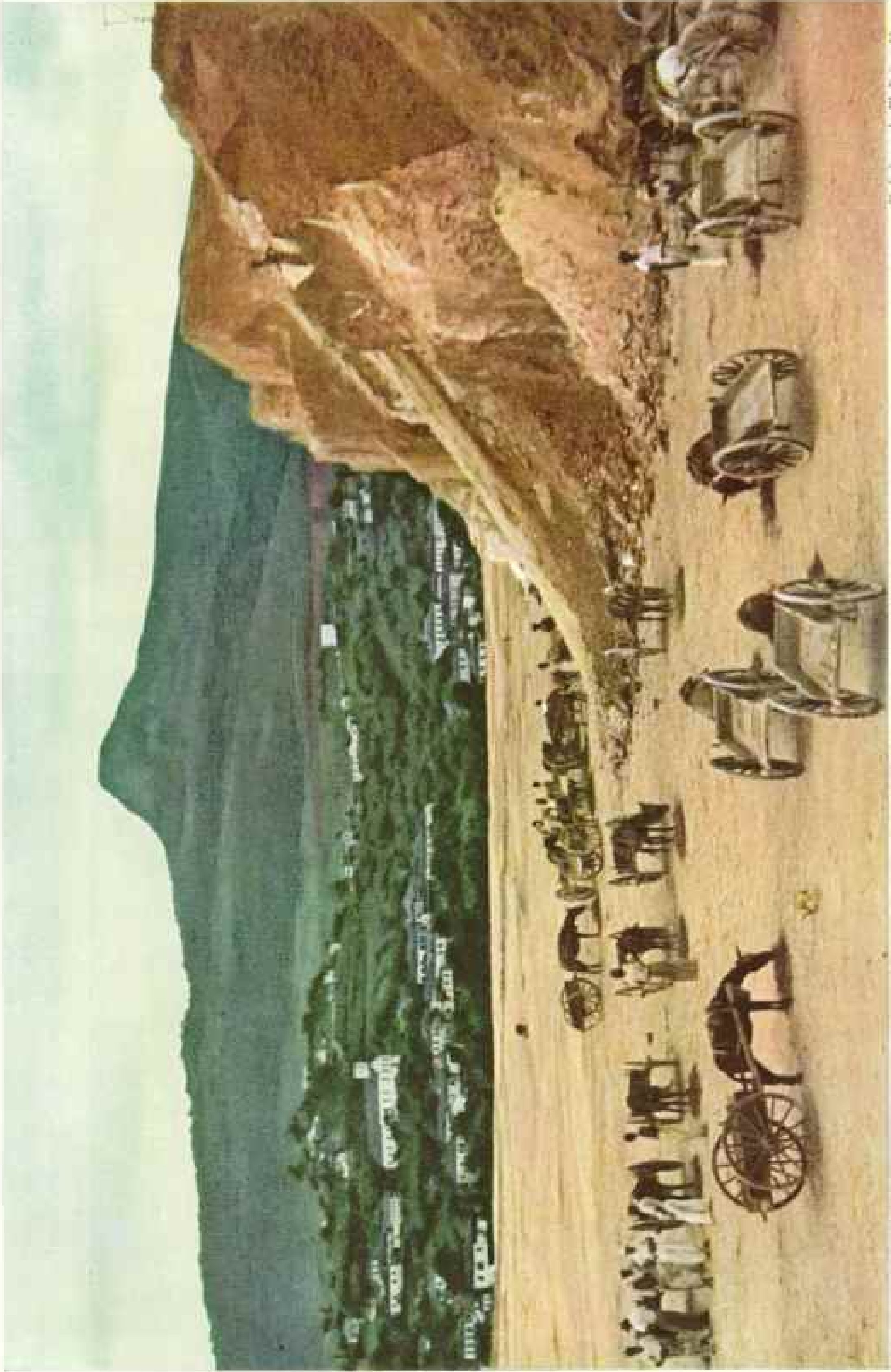


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Reproduction by W. Robert Mann

Humpbacked, Sad-faced, and Trumpet-eared, but No Longer Sacred, These Brazilian Cattle Bear the Stamp of India

At roundup time on his ranch, the Governor of Minas Gerais drives his prize zebus, or Brahmins. Brazil's breeders have developed a strain, known as Indubrasil, to fit the new environment. The country's packing plants ship beef to the war fronts.

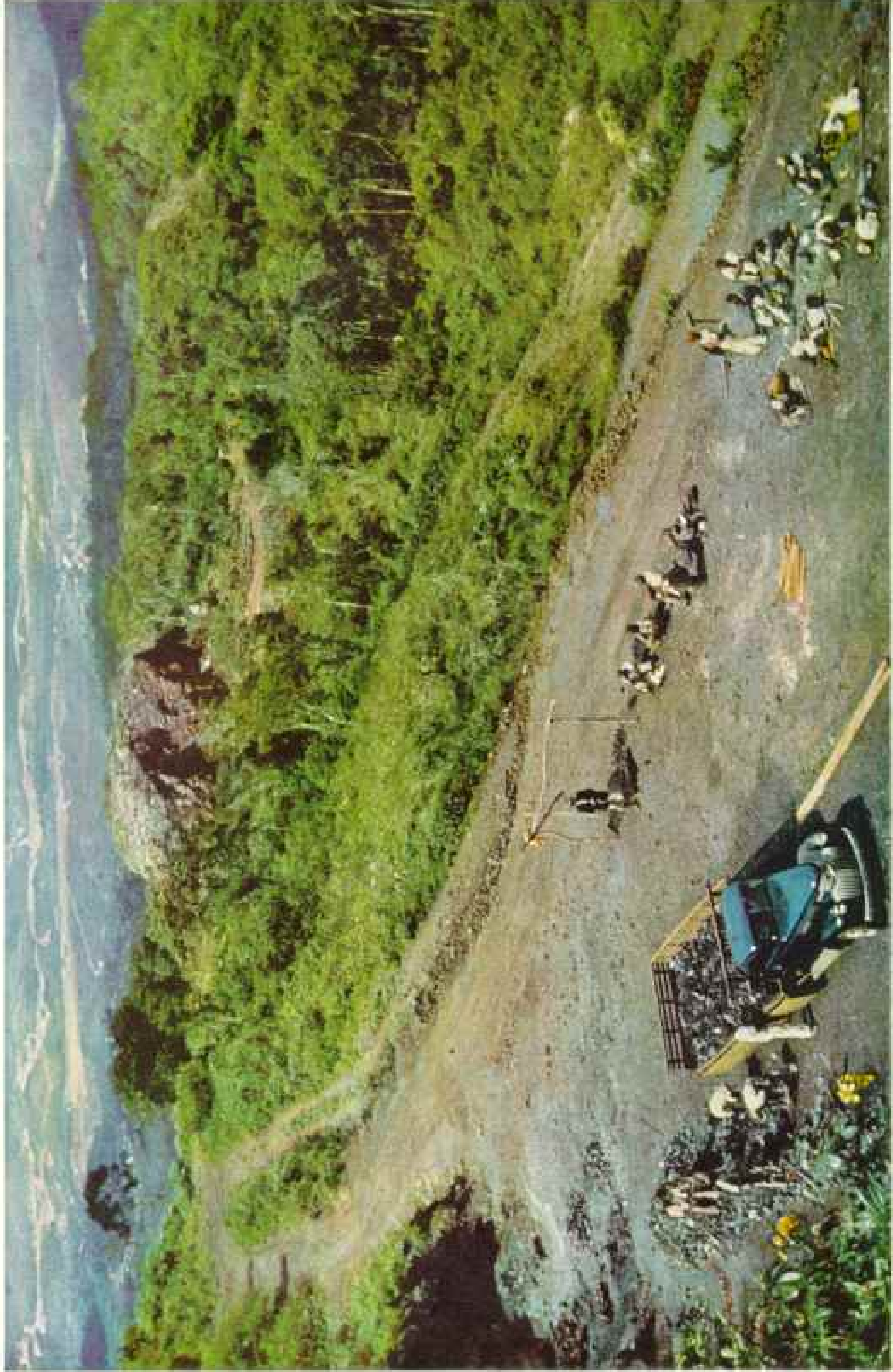


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Away Goes the Hill in Donkey Carts! After It Is Leveled, Itabira Will Have a Big Railway Marshaling Yard

Back of this Minas Gerais town is Camé Peak, the iron mountain (opposite). When the developers have installed all the machinery, switch engines will shuttle more than a million tons of high-grade ore a year. Already completed, the station is named for Getúlio Vargas, Brazil's President.

Illustration by W. Bennett Moore

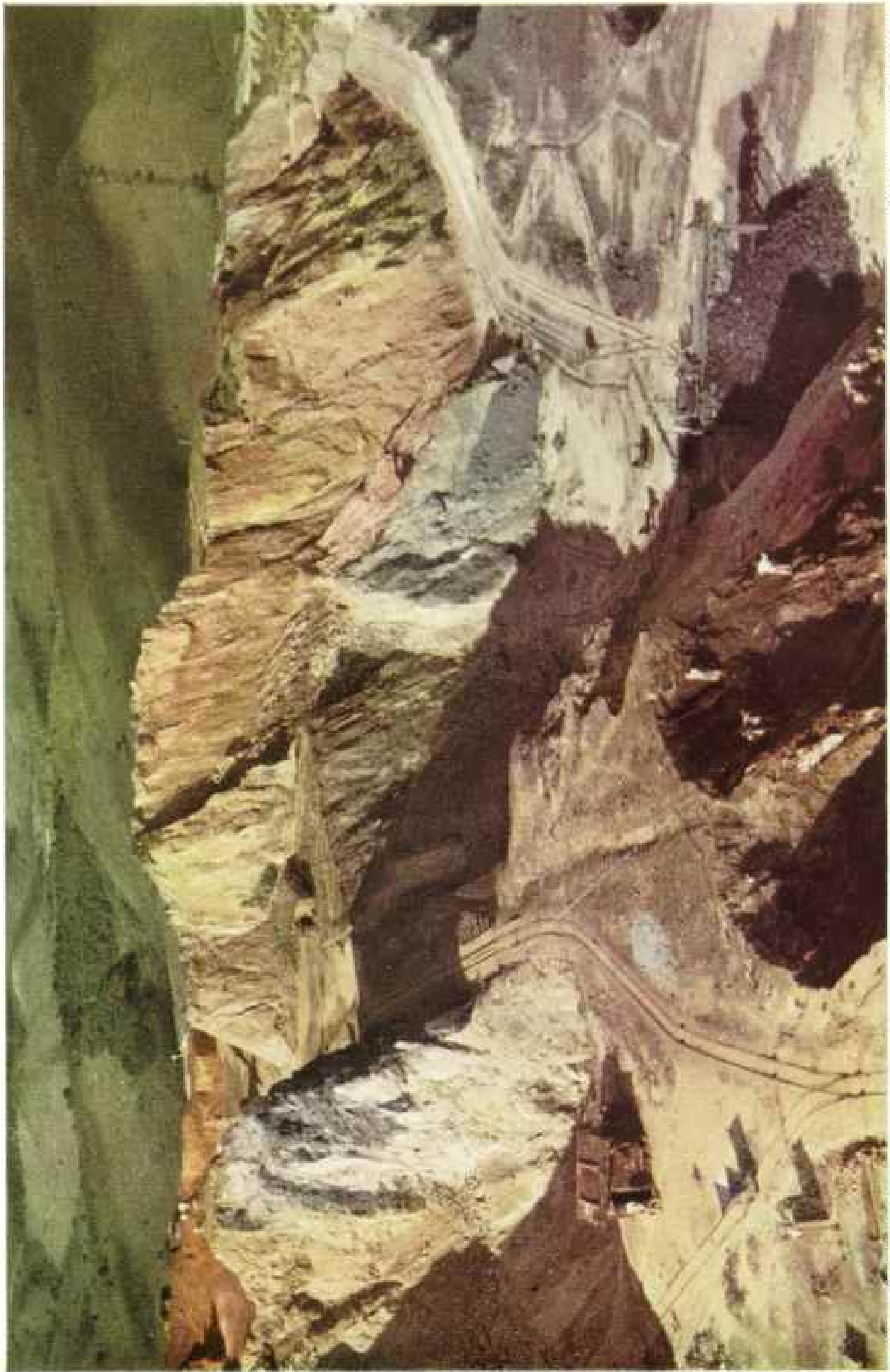


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Even the Road Is Iron! This Is Caué Peak, Fabulous Mountain of Solid Ore

On Caué, excavations dug for storage bins yield iron. Taken from the mountainside, paving blocks of Itabira will be exported to steel mills. Here laborers load a truck with ore, while their companions take a noontime rest.

Photographs by W. Robert Moore



© National Geographic Society

Pick-slash and Rail-grooved, Morro da Mina Yields War-vital Manganese to Toughen American Steel

This hill is only a small section of the huge diggings at Lafaiete, Minas Gerais. Since their opening in 1907, they have given up nearly 4,500,000 tons of ore. They are operated by a subsidiary of United States Steel. Several other huge deposits are worked in the vicinity.

Illustration by W. Robert Mann



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Workmen Make Little Ones from Big Ones at Itabira!

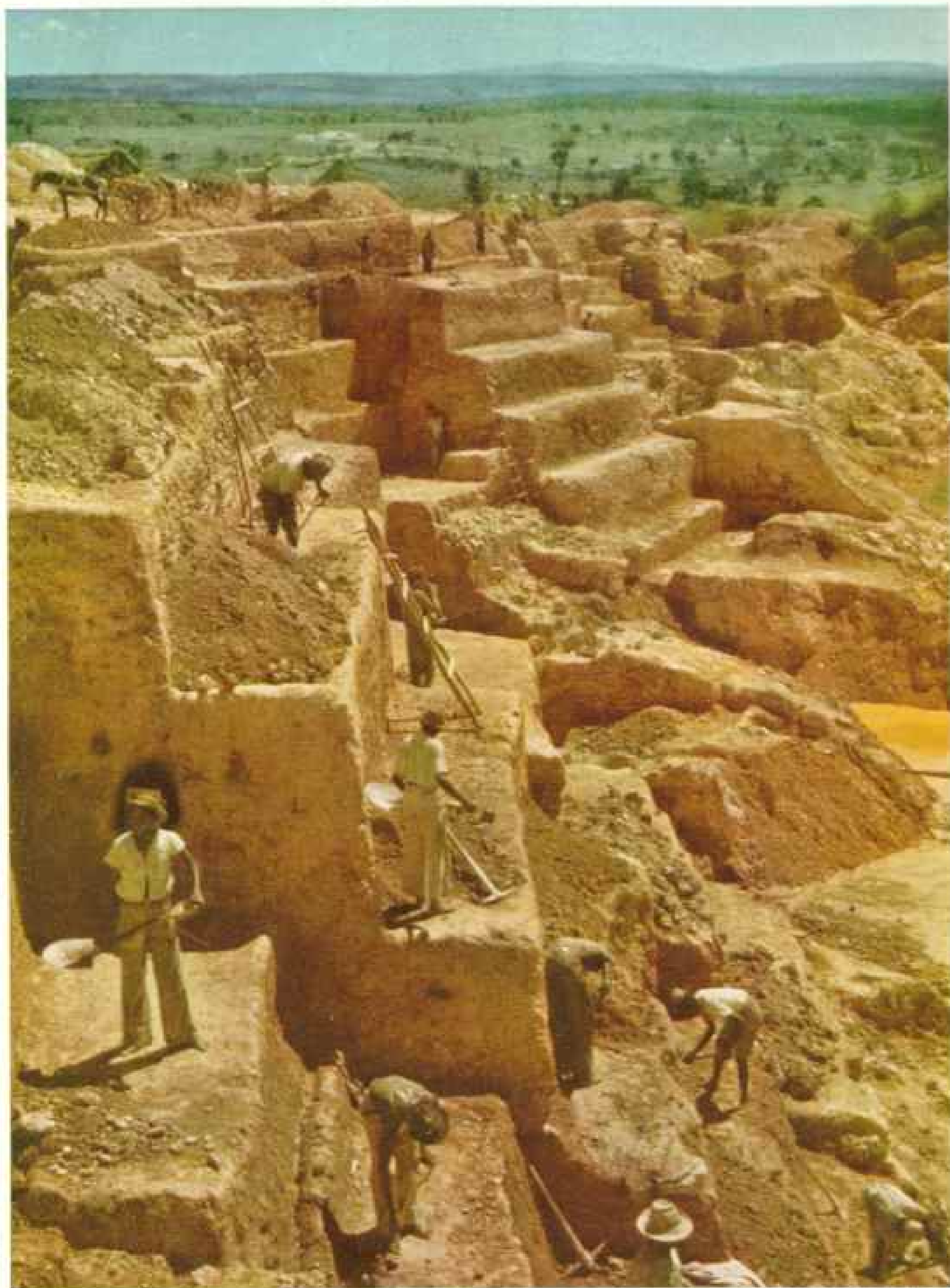
As soon as machinery is installed, the big blocks of iron ore will be crushed mechanically into shipping sizes.



Illustration by W. Robert Stocco

Critical Eyes Examine Quartz Crystals for Imperfections

Before being shipped from Rio de Janeiro they are inspected under ultraviolet light. Flawless crystal plates are needed for radio and detection devices.



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Exhibition by W. Robert Moore

These Huge Steps, Suggesting a Theater for Giants, Serve Science and War

Near Sete Lagoas, Minas Gerais, workmen shovel waste material up the terraces. Others at the bottom dig for radio's quartz crystals (Plate VII). Brazil produces virtually all of the United Nations' supply of this vital mineral. Some mines are stripped by American bulldozers.

They are trained, however, to spot defects and know how to trim to get the largest available pieces from the rough mica. Even so, only about 10 to 20 percent of useful sheet is saved from the mica bruto. Prices are based on the sizes of the sheets and the absence of damaging stain.

Metals More Vital Than Gold

The gold and precious stones which lured the early Portuguese and many other adventurers into the interior were the stimulus that led to exploration and settlement of vast Brazil.

Gold is still mined: but the glistening "fool's gold," or iron pyrites, which appears in the hills near the old mining town of Ouro Preto in Minas Gerais, has assumed more vital significance than the precious metal itself.

Lacking free sulphur, Brazil had to import her supply for making sulphuric acid and other chemicals from Italy, Chile, and the United States. When the Italian source was cut off and shipping became acute, increasing quantities of the pyrites were mined for sulphur extraction.

"We are now producing more than 60 tons of concentrates a day," said the manager of the largest mine. He is a physician and the mayor of Ouro Preto besides. "Our output may seem small, but it is important. We are now supplying about one-third of Brazil's needs for sulphur.

"We ship the concentrate, which is 47 percent sulphur content, to Lorena, in São Paulo State, where it is used in making explosives for the Army and Navy."

Just outside the two-century-old museum town of Ouro Preto stands a brand-new factory of the Electro-Química Brasileira, S. A. It is so new that much of the equipment for manufacturing aluminum from near-by bauxite mines has not yet been installed. The factory is set up to produce sulphuric acid, copper sulphate, and ferromanganese for Brazilian industry.

Groups still search remote areas for diamonds as of old. I had the pleasure of handling and photographing one clear gem stone that had just been found. It weighs 325 carats!

At the moment industrial diamonds mean more. Brazil is supplying quantities of them to the United States for use in dies, drills, and other cutting tools.

New Uses for "New" Minerals

Many of the minerals that Brazil is now furnishing for the war effort were not even known to the 17th- and 18th-century gold and

diamond diggers. Much less could they guess the multitude of uses to which the minerals are put. Nor can we. Some are secret and as new as tomorrow.

There is columbite and tantalite, source of tantalum, one use of which is in that new wizard of detection devices—radar.

There is beryl ore, source of beryllium, which is finding even wider use in alloys, notably copper. A bit of beryllium gives remarkable hardness to copper. The alloy is utilized in safety nonsparking grinding tools, springs, diaphragms for delicate instruments, and as a setting for diamonds in drill bits.

On the list, too, is chrome, manganese, nickel, and tungsten which are used in making high-grade steels. Electric bulbs and radio tubes also need tungsten.

Brazil's supply of rutile, or titanium dioxide, affords coatings for welding rods and serves in the making of ceramics, plastics, soaps, cosmetics, etc. Her zirconium finds place in radio transmission tubes, ammunition primers, electric spotwelding equipment, and other uses.

Manganese for Making Steel

No war baby is manganese mining, but it is important as never before. Without manganese there would be no steel. An average of about 13 pounds of manganese, in the form of ferromanganese, goes into each ton of ingot steel.

As you ride the Brazilian Central Railway from Rio to Belo Horizonte in Minas Gerais, you see big piles of manganese ore heaped beside the tracks (Plate VI).

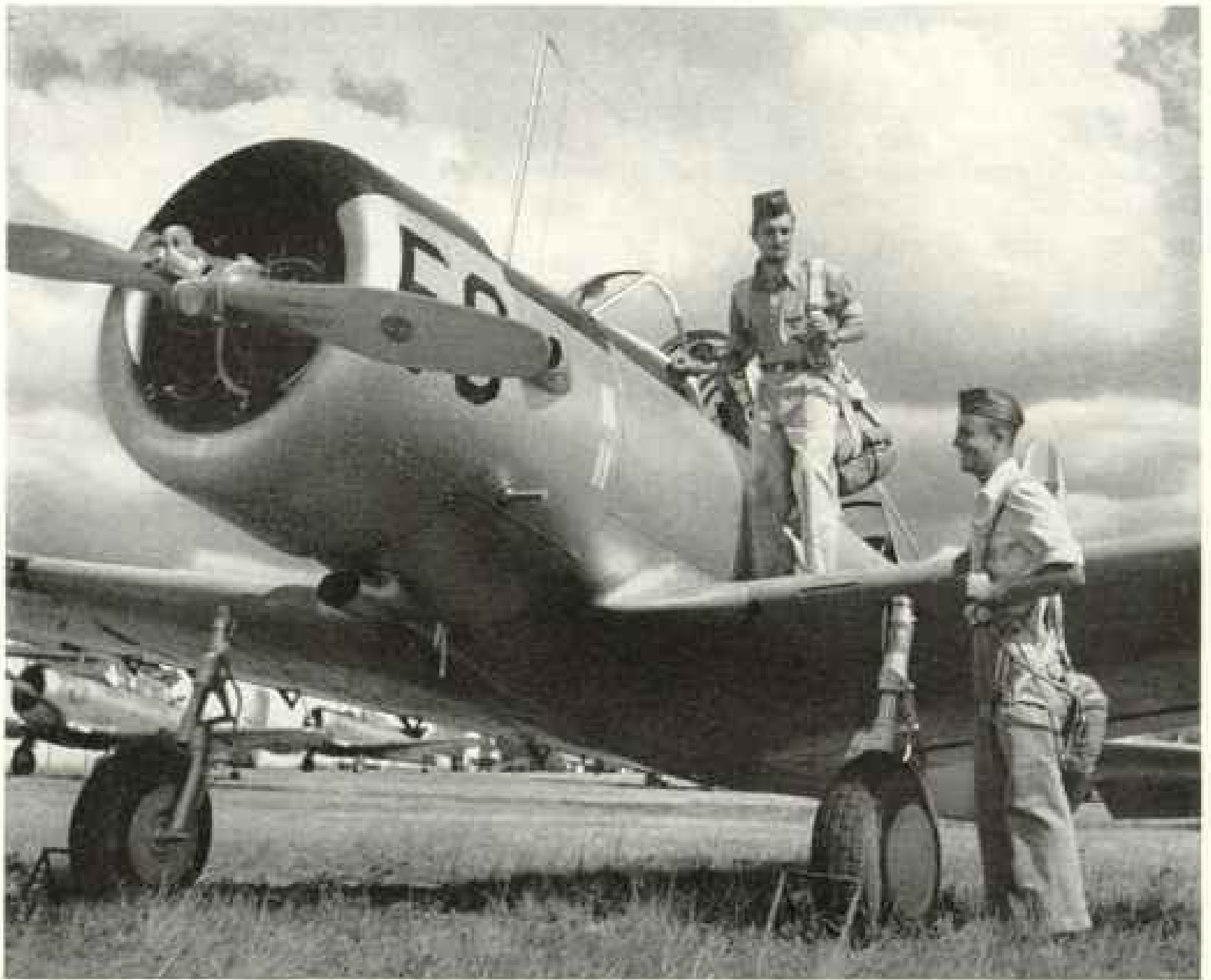
At Lafaiete is one of the largest manganese mines in operation anywhere. Since men began digging into the big hill, Morro da Mina, back in 1902, nearly 4,500,000 tons of ore have been extracted. The Cia. Meridional de Mineração, a subsidiary of United States Steel, has operated the mine since 1920.

Other companies working in the region produce additional quantities of the valuable ore. Mato Grosso, Baía, and Paraná also have large reserves, some of which are being utilized.

Right alongside the manganese mines in Minas Gerais are large deposits of iron.

Indeed, the region around Belo Horizonte is a vast iron ore reserve. The "iron quadrangle," Brazilians call this district, so fabulously rich is it in high-grade ore. Some estimates, based on surveys, but estimates which obviously involve a certain amount of guessing, place the amount of ore here at 15 billion tons! Brazil possesses about 22 percent of the world's known iron reserves.

Perhaps the most spectacular single deposit



Brazilian Wings Bear the Mark: "Made in U. S. A."

These training planes used at the Aviation Cadet School near Rio de Janeiro were flown from the United States. By the time graduates get these short-range "puddle hoppers" safely home, they have given abundant proof of their flying ability.

is at Itabira, 50 miles northeast of Belo Horizonte. Here is Cané Peak, a whole mountain of solid hematite sticking up above the surrounding countryside. Other iron hills flank this fantastic iron knob (Plates IV, V).

"To many people Swedish ore is considered a standard for quality," said one of the engineers who showed me around Itabira. "But, generally speaking, this is equal to Swedish ore in every respect."

It averages nearly 68 percent pure iron, practically the maximum metallic content possible in iron ore.

Though once owned by British interests, it is now in the preliminary stages of extensive development by the Cia. Vale do Rio Doce, a Brazilian company. American engineers are designing and carrying out the project.

Against a loan from the Export-Import Bank of \$14,000,000, the Brazilian Government has provided an equal amount. The loan is to be repaid with ore exports over 25

years. As soon as machinery is installed, 1,000,000 to 1,500,000 tons of ore can be mined annually and hauled down over the reconditioned railway for shipment at Vitória, 300 miles away.

Streets Paved with Plentiful Iron

While roads are being built, storage bins excavated, and machinery installed for cutting down the peak, all operations will be producing ore. Even the streets to be torn up in an area occupied by poor dwellings to make way for a model mining village are to be shipped away. For they are paved with iron!

At Monlevade and at Sabará, in the iron quadrangle, two iron and steel mills are operated by a Belgian concern. They furnish a sizable portion of Brazil's production. Local output, however, falls far short of the country's requirements even in peacetime.

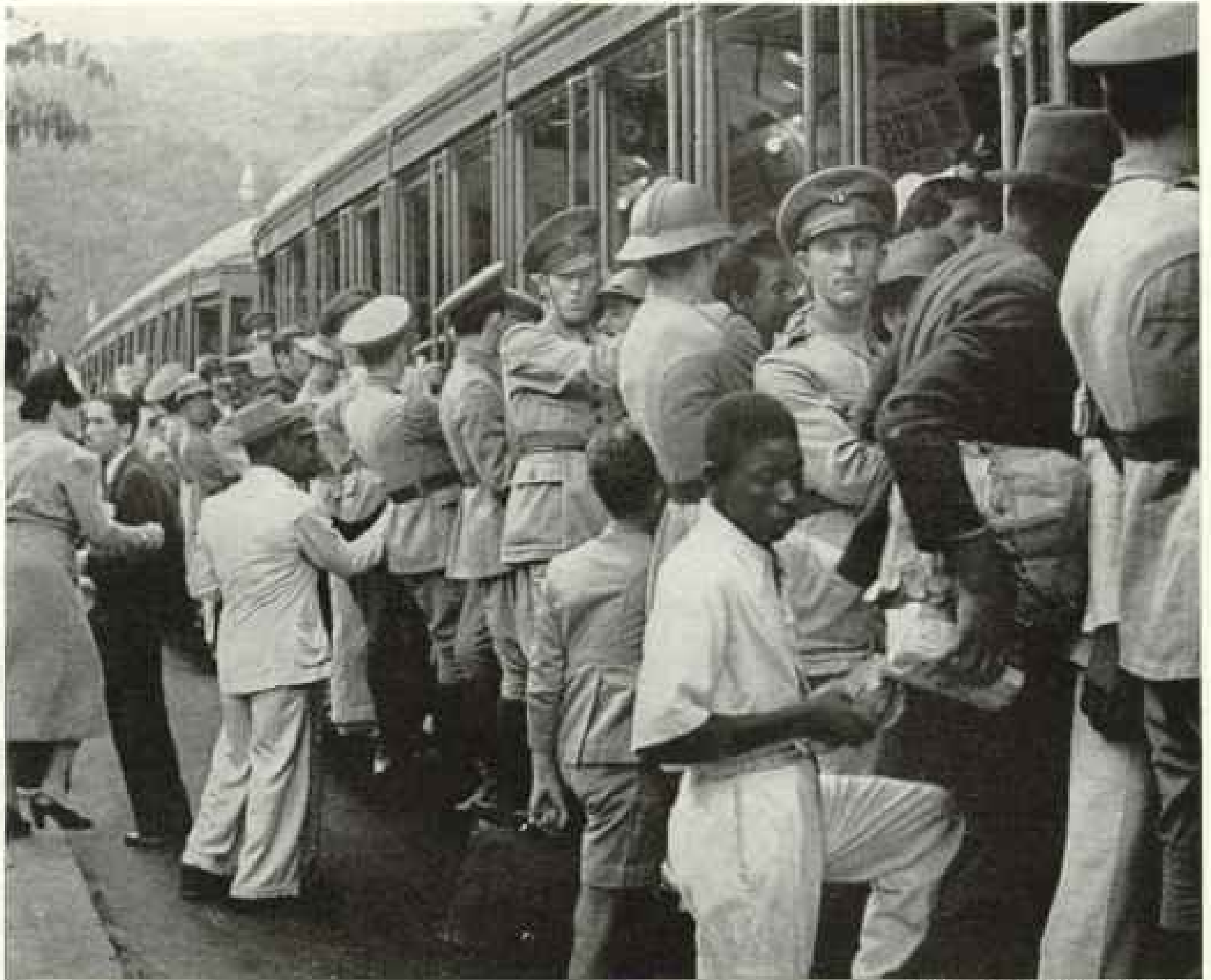
War demands have emphasized this deficiency. So today at Volta Redonda, between



Bouncing Jeeps Go Everywhere and Are Favorites Everywhere They Go!

G. I. A. A.

Students at the School of Motor-Mechanization of the Brazilian Army man this curving row. The school, near Rio de Janeiro, gives training courses of from eight to ten months. Graduates then join the mechanized divisions. Much of their heavy equipment comes from the United States.



Genevieve Naylor, from *These Lines*

During Rush Hours in Rio Every Streetcar Has Its Own Traffic Jam!

Soldiers and civilians alike cling precariously on the outer steps of these open trolley cars. Bus traffic is more orderly, as overloading is not permitted. People queue up at the stops and each awaits his turn. War deprives private cars of gasoline (page 41).

Rio de Janeiro and São Paulo, Brazil is building a huge modern iron and steel center.

Chief handicap to steel production in the past has been lack of coking coal. Existing mills operate on charcoal. Volta Redonda, however, will use Brazilian coal, as some better grades are now being uncovered, especially in the State of Santa Catarina.

At the moment Volta Redonda is a story of 50,000 tons of iron for construction, three million sacks of cement, and vast quantities of wood and crushed rock. Many of the buildings have been erected and are now waiting the installation of the machinery. Financial assistance for the undertaking has been given by the Export-Import Bank, and much of the machinery will be American.

The story of this "Steel City" for tomorrow was expressed by President Vargas upon his visit there, in May, 1943, when he said that the construction of these steel mills means the transformation of Brazil from a strictly

agricultural into a recognized industrial nation.

"Our war," he emphasized, "does not include only defense preparation and training for military campaigns. It must include a vast construction program for our future development, so that when fighting ceases we may, with steel from these mills and with the efforts of these trained industrious Brazilian workers, remodel our industrial structure."

Industries Booming in São Paulo

Brazil is not now an entirely agricultural and mining country. That fact strikes you as you fly over São Paulo and look down on the numerous factories that encircle the city.

São Paulo is the biggest industrial center in all South America. In the four years since I was last there, it has grown much. More tall buildings have risen in the heart of town. More factories, too, have widened the city's horizons.

Today city planning is also taking shape in



Georgette Naylor, from *These Lines*

Their Faces Reflect the Action of the Drama They Watch

Though their ancestry is varied, they are Brazilians all. And all find amusement in the lines of an outdoor play given "somewhere in the State of São Paulo." Films depicting the war effort of the United Nations are shown to such evening audiences of working folk.

the wide arterial thoroughfares, new viaducts, and tunnels through the hills to the suburbs. That program is being pressed by its engineer mayor.

Here in São Paulo are big cotton and rayon mills, meat packing plants, rubber companies, metal and alcohol industries, an automobile assembly plant, and a variety of other factories, large and small. Most have been geared to war.

At the General Motors plant, for instance, I saw workers turning out Army trucks and other motorized units as fast as the Brazilian Army could take them away.

The company is cooperating with military authorities in maintaining a motor school for soldiers. The factory assembles ambulances, makes motorized workshops, and builds mobile mounts for field guns and soup kitchens. They've even designed a mule cart for miners!

"Here we're building *gasogenios* for trucks and motorcars," said Mr. Elijah G. Poxson,

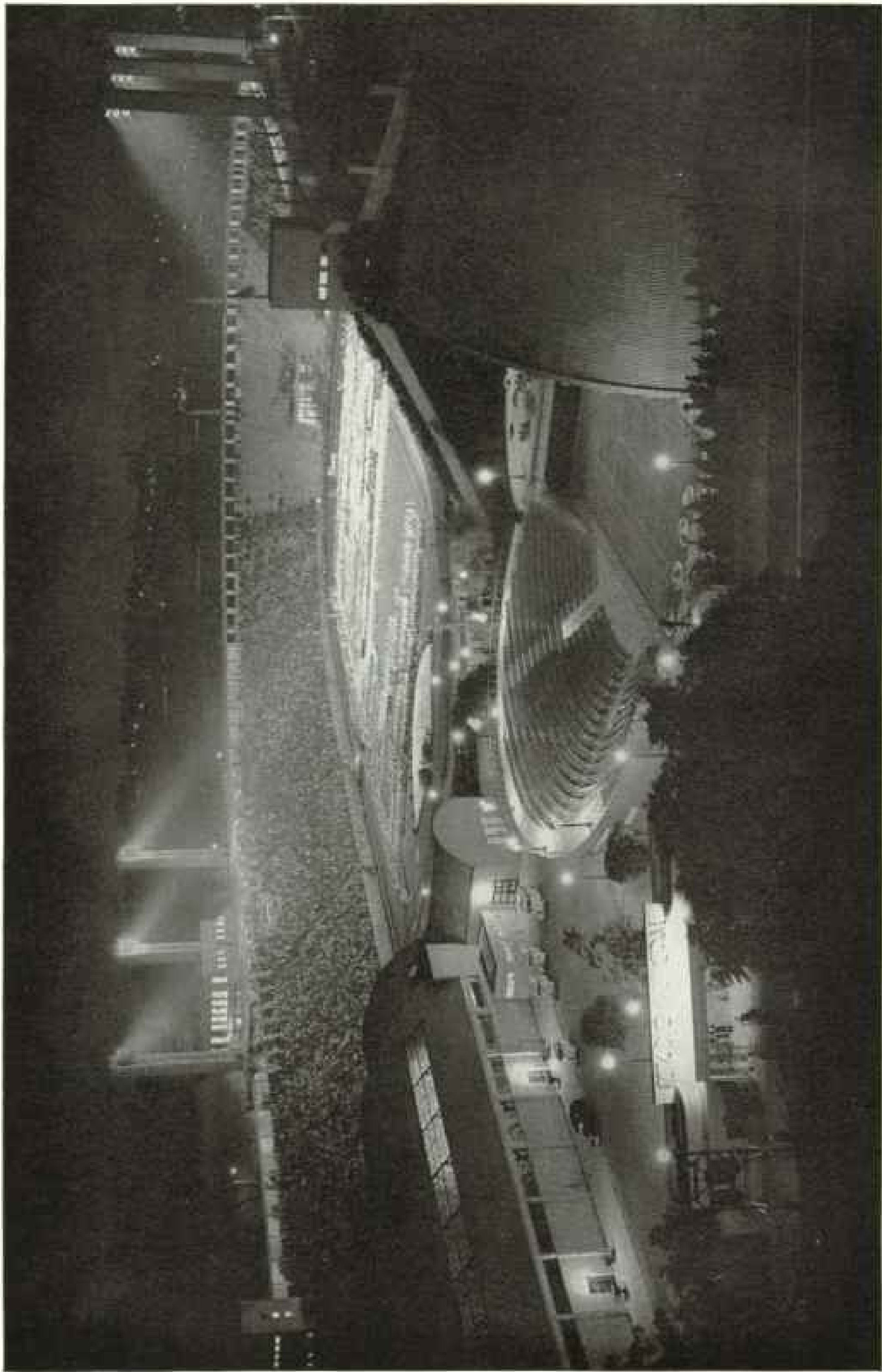
the Director General, as we entered one room. "Gasogenios have been of vital importance to Brazil. They are keeping the country mobile at a time when gasoline is restricted, and every available means of transportation must be kept going. We can turn out about two hundred units a month."

Other companies also are busy making these charcoal-burning units. In truth, you see an amazing number of different designs among the more than 5,000 units installed in São Paulo cars alone (Plate XIII).

"Fill It Up!"—with Charcoal

When a private car owner drives into a gasoline station now and says, "Fill it up!" he means with charcoal. One new filling station located beside the broad boulevard leading in from Jardim America has never sold a drop of gasoline. But the place is stacked all around with bags of charcoal!

To see some of the extensive output of meat



Z. Biquelra

Paraders March in the Hugo Arena of São Paulo's New Municipal Stadium

Horseshoe-shaped grandstands seat 80,000 persons. The central field, used chiefly for soccer games, is surrounded by an eight-lane 400-meter track. Besides the large gymnasium (left) and tennis courts in the foreground, this recreation center has a big outdoor swimming pool and a stage for open-air concerts.



Juan Herrera, from C.L.A.A.

They Heed the Call "Go West"; But Their West Is the Far Reaches of the Vast Amazon

Many rubber workers have been recruited in the arid states of Ceará, Piauí, and surrounding districts. Such groups as this gather at inland transit camps, whence they are taken by train and trucks to coastal embarkation points. Some have clambered aboard a freight car; others sit in hammocks awaiting their turn.

products I went out one day to the Frigorífico Wilson. Armour likewise has a large meat packing plant near São Paulo, while Frigorífico Anglo and Swift are located elsewhere in the country.

As I walked through the plant I saw so much meat that perhaps I should be ostracized for talking about it!

In addition to supplying local needs, Brazil packers send much meat abroad. In one labeling and packing room I saw thousands of tins of corned beef to be shipped to Britain, United States soldiers stationed in north Brazil also eat Brazilian pork and beef.

Wearing heavy overcoats, we went into the cold rooms to see row upon row of molded beef. All bones are first removed, and the meat is then folded into canvas compresses, which hang one below the other, so that the weight of the lower ones help in molding the others. Boards are fastened at the open sides of the canvas "hammocks" to keep the ends of the meat flat. Thus the beef is pressed into uniform compact blocks (page 75).

Meat so prepared occupies only 57 to 63 cubic feet to the ton, instead of about 85 cubic feet, a saving of 30 to 35 percent in shipping and storage space.

Most of the packers are also installing equipment for dehydration. One shipload of dehydrated meat is equivalent to 8 or 10 ships full of ordinary dressed meat.

Natural form of dehydration is the making of *xarque*, or sun-dried beef, now being sent in quantities to the rubber workers in the Amazon.

"Black Shell" Meat Sealed by Asphalt

Still another manner of preparing meat for shipment to north Brazil is to dip it into an asphalt mixture which effectively seals it over the outside. "Black shell" it is called, because of this asphalt coating.

Hides from the slaughterhouses formerly were sent to the United States for tanning. In the first year of the war this export almost stopped. Since then, local tanneries have increased their capacity and are now furnishing the United Nations, especially Russia and the United Kingdom, with finished leather.

In São Paulo alone there are 52 rubber companies making various types of rubber articles. There are others in Rio. No longer, however, can you get rubber balls, dolls, and other nonessential items. All companies have turned to making war products.

Three major companies—Firestone, Good-year, and Pirelli—have tire-manufacturing plants here. Brazil also has one other major and two smaller tire companies.

Each of the major plants produces thousands of tires, tubes, and other accessories. They supply local needs and are turning over enough standard tires to the Rubber Development Corporation to fill most essential requirements throughout South America.

As I went through the modern Firestone plant, I saw balls of Brazilian rubber going into the washers. All of the square woven fabric and much of the cord fabric used in the tires also were locally made from Brazilian cotton.

At the University of São Paulo I saw research being conducted in the alimentation of Brazilian soldiers.

Because many of the troops have been sent to northeast Brazil, foods from that locality are being studied for their richness in vitamins, proteins, calories, etc.

Some have been eliminated because they possess few vitamins; others have been recommended. Peanuts, cashews, and Brazil nuts in various forms have been suggested as dietary adjuncts.

War Bread from Plant Roots

One war bread has been developed which will last six months and still keep its eating qualities. Loaves are hard on the surface, but remain soft inside. The bread is made from a mixture of wheat flour and flours of mandioca and other roots of Brazilian plants.

Research scientists are conducting work on malaria and malaria therapy. Substitutes are being sought for quinine. This includes testing native herbs and medicines reputed to check the fever, and also searching new regions of Brazil for trees which belong to the same family as the cinchona.

One of the most interesting efforts to me was the "pre-solo," or preliminary aviation course, conducted by Dr. Jayme Americano, a São Paulo physician.

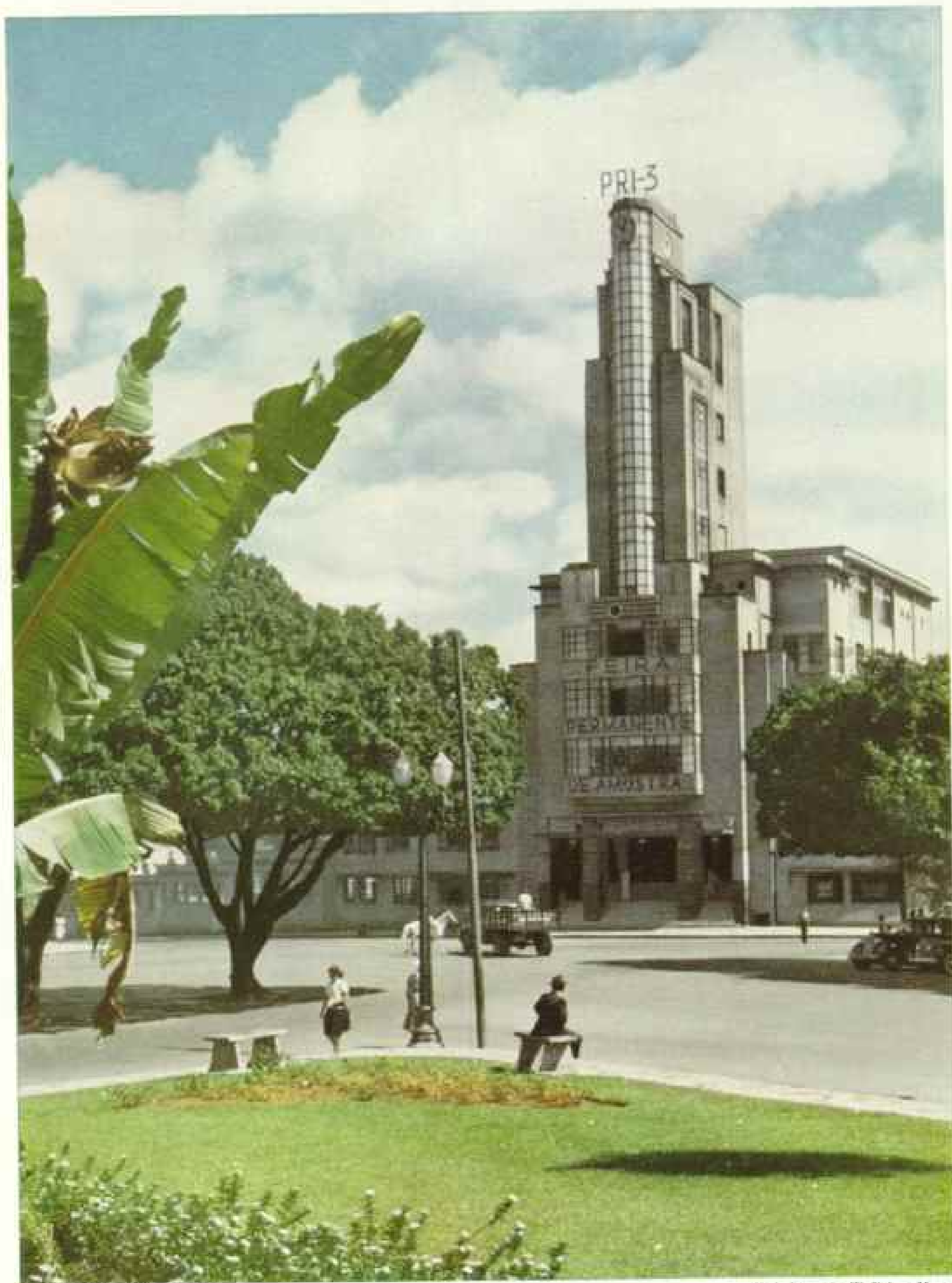
Lacking finances for a Link trainer, he has designed a trainer of his own.

Instead of being electrically operated, dials and controls of the trainer are connected to columns of water. Artificial disturbances can be set up in the columns of water to simulate air disturbances in flying.

Seated in the trainer, a student operates the controls as in a plane and endeavors to keep the dials registering level flight.

It's hard, I found out, as the doctor gave me my first "lesson" in blind flying. While I watched my turn and bank indicators, I went into a bad nose dive. When I finally got the nose up, I found that I had gone into a wild, badly banked turn. Many students find themselves in the same predicament.

Bright Facets of Brazil



© National Geographic Society

Kidderminster by W. Robert Moore

A Tower of Glass and Concrete Is the Setting for Minas Gerais' Jewels.

In Belo Horizonte, the museum houses precious and semiprecious stones, gold, iron, manganese, and other minerals from which the State gained its name, General Mines. Agricultural and industrial products likewise are an exhibit. A radio studio and a weather station occupy upper floors.



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Pampulha's Casino, a Concrete Mushroom, Springs Out of a Man-made Lake

Belo Horizonte, a few miles away, sends crowds nightly to this modernistic club. A restaurant-dancer pavilion is near by. The sailboat points to the Yacht Club. From its veranda the photograph was taken. Overhead, the plane heads for a commercial airport close by.

Kindergarten by W. Robert Moore

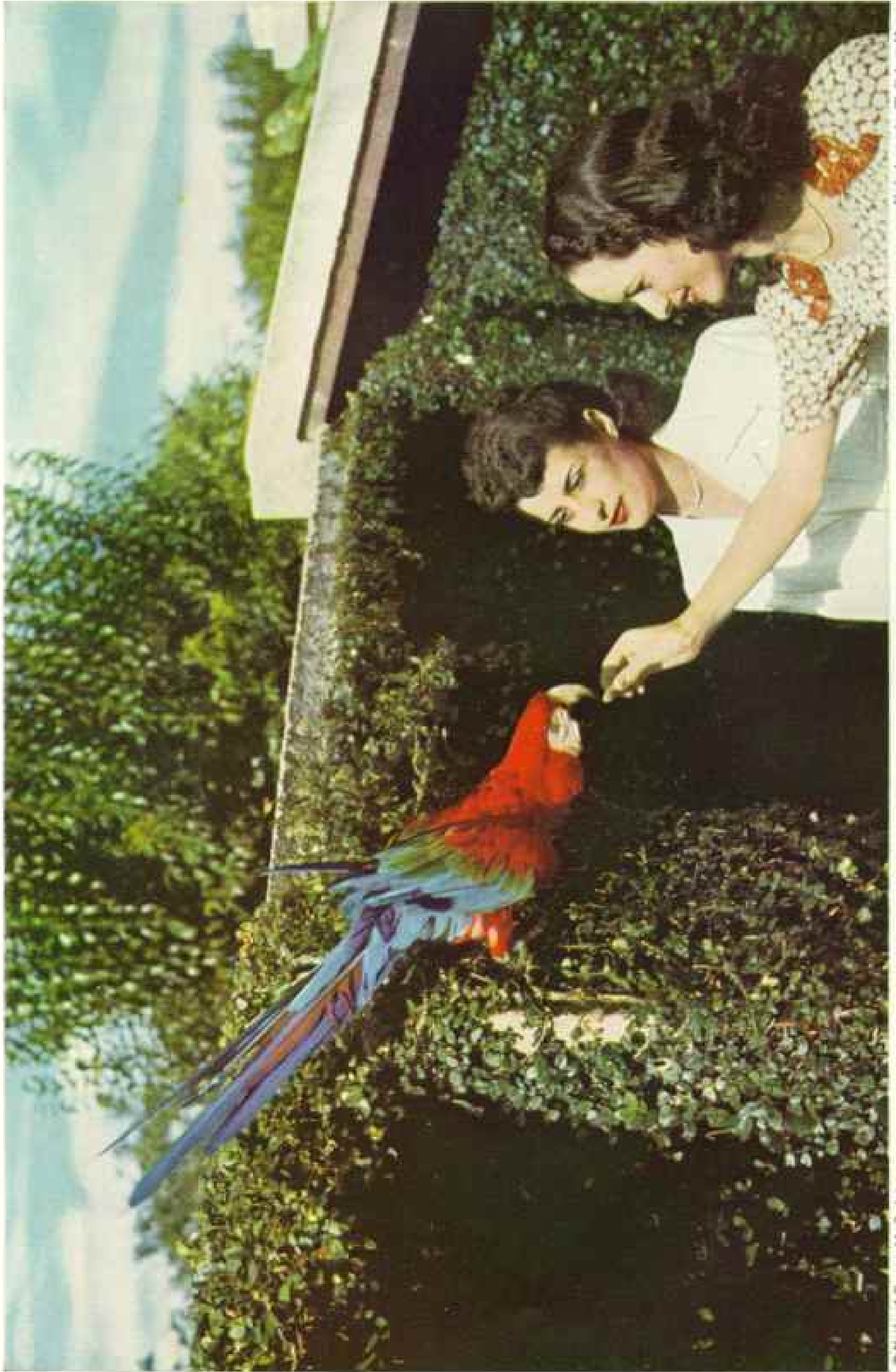


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Illustration by W. Albert Moore

An Arrow of Flat-topped Green Trees Penetrates Belo Horizonte Almost to Its Beautiful Horizon

This is Afonso Pena Avenue, the main thoroughfare. Other shady green streets parallel it. Less than 30 years ago the city existed only in an architect's plans. Today it houses some 200,000 persons. It is the capital and distributing center of Minas Gerais.



© National Geographic Society

João Macaw Has a Treacherous Jaw—Cakes or Thumbs Are Alike to His Maw

In a Belo Horizonte garden, this bird delighted in taking a few playful nips at the fair hands feeding him. Largest of South American parrots, some of the macaws have brilliant blue and yellow plumage.

Rephotomicro by W. Robert Hoar



Kindness by W. Robert Moore

"Light It Here, as You Would a Gas Oven," Says the Chauffeur of a São Paulo "Charcomobile"

Lacking gasoline in wartime, thousands of Brazil's cars are equipped with charcoal burners. They require a quarter-hour warmup and lack power on hills. Clearing the filters stored in the tank at right may take an hour a day. Tank at left holds the charcoal.

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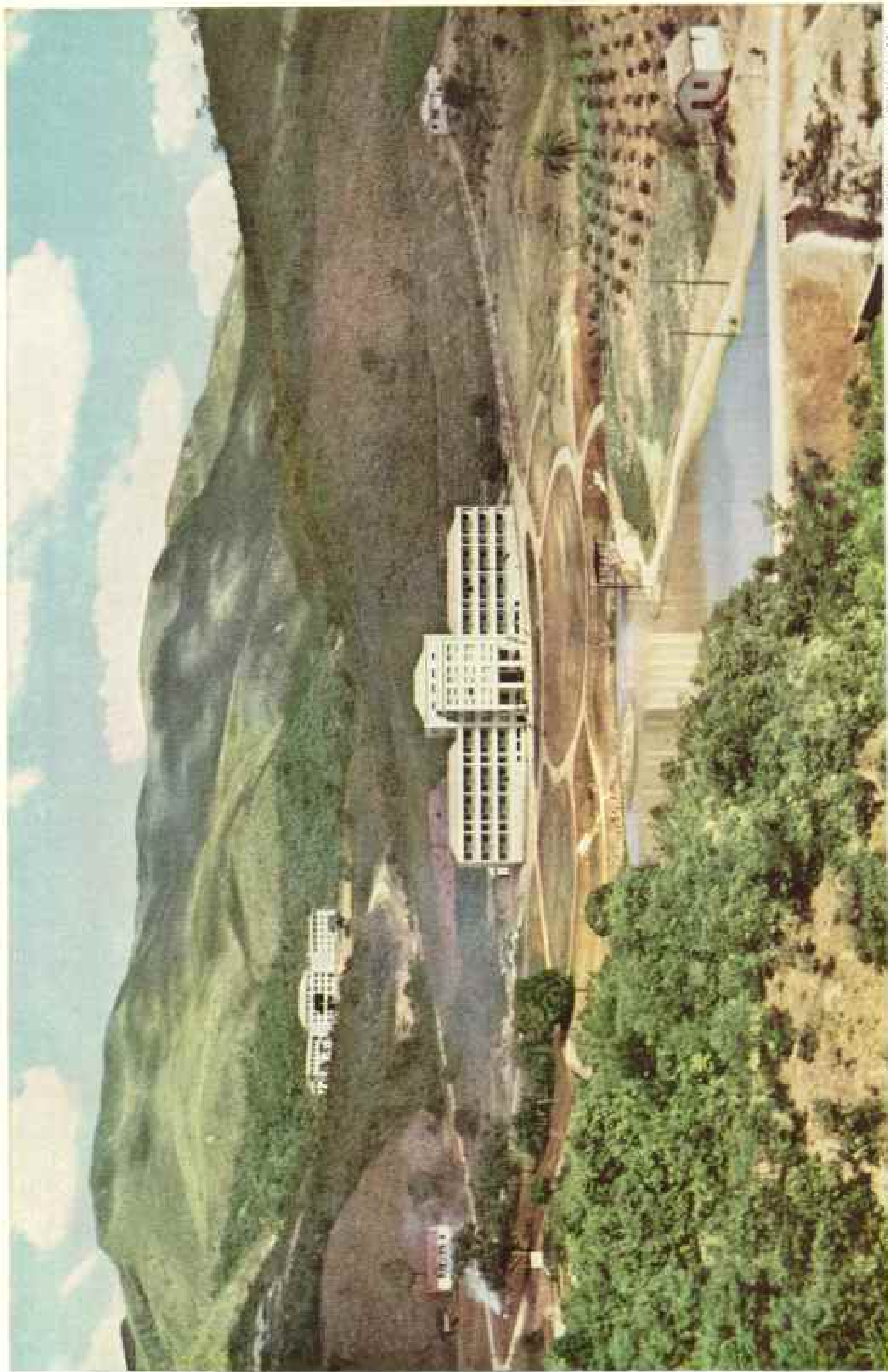


Illustration by W. Robert Zolner

Frail Children Are Made Whole at Glistering Hospital Units in the Hills near Belo Horizonte

Fundação Benjamin Guimarães is named for the wealthy Brazilian who financed it. The institution has cared for hundreds of youngsters showing a weakness to lung diseases. It has beds for 500.

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Immigrant Trees, Like Peoples, Take Root in Brazil

In São Paulo the ax bites into a eucalyptus of Australian stock. Some 280,000,000 others have been planted. Fast growth recommends this tree for railway fuel, fence posts, and telegraph poles.



Illustration by W. Robert Moore

A Landlocked Sea Scout Finds Water

Boy and dog live at Belo Horizonte, more than 200 miles from the Atlantic. His troop has a lake for scouting activities. At the moment he is exploring Ouro Preto, an old mining town.



© National Geographic Society

Kodachrome by W. Robert Miles

Lily Pads Break the Mirrored White Shafts of Eucalyptus

This peaceful pond is at Rio Claro, São Paulo State. All around the town are forests of eucalyptus and other trees. In these the Paulista Railway carries on extensive research into firewoods for locomotives. Brazil has been a coal importer; now she is developing her own supply.

"The course is equivalent to about 10 or 15 hours of actual flying," said the doctor. "Even more important than the training it gives in instrument flying, the course eliminates many whose coordination is not of the caliber required for a pilot. It also eliminates many who are only thrilled by the idea of being pilots of the movie hero variety.

"From a beginning class of perhaps 50 students," continued the doctor, "I may end with only 10 or 15, but they have excellent possibilities as pilots."

Coffee and Cotton Still Staples

Despite the industrial expansion of São Paulo, much of its economy is still tied to the staple crops of coffee and cotton. Through here and from the near-by seaport of Santos passes the bulk of these two important products.

Until 1942 the exports of cotton suffered little. Canada's purchases largely counterbalanced lost European markets. Since then lack of shipping has cut off this outlet.

Even though cotton stocks are piling up, prices remain good. The Brazilian Government has granted loans to stabilize prices, and there is a certain amount of speculative buying.

Because of gasoline rationing, too, transport of the crop from farms to gins has been extremely slow.

Before the war local textile mills were utilizing about 45,000 tons of raw spinning cotton annually. Now they have increased that consumption to about 80,000 tons, and an export market for textiles is being developed in Argentina and other South American countries. That demand, however, represents less than one-fourth of the country's cotton production, for it is estimated that the 1943 crop will be approximately 350,000 tons.

As Brazilian cotton is much cheaper than United States cotton, dealers believe that, should the war end in a reasonably short time, the surpluses would be quickly sold; so at the moment, at least, they were not worrying.

On coffee, the United States has agreed to underwrite any unshipped balances on a basic quota of 9,300,000 bags for the current crop year. A similar agreement has been made on 1,300,000 bags of cocoa.

For the 1941-42 crop some 2,654,000 bags of coffee remained unshipped; there may be perhaps 3,000,000 bags on the present crop.

Since the Tunisian Campaign ended, we have been hearing of increased quantities of coffee reaching the States. When coffee rationing was suspended, that meant more coffee was moving out of Santos.

Another product leaving Santos is castor-bean seed. War demands have increased Brazilian production of castor beans to some ten times what it was ten years ago.

Strange Oils and Waxes

Ever hear of babassu nut oil, oiticica oil, and copaiba oil; or of carnauba wax, and uricuri wax?

I must confess that I hadn't until the American Embassy in Rio informed me that they were on the list of materials the United States is drawing from Brazil, along with rotenone, pyrethrum flowers, and other products bearing tongue-twister names.

All of these come mainly from the Amazon region and northeastern Brazil, except pyrethrum flowers which grow in Rio Grande do Sul. They're gathered for insecticides and vermifuges.

It seems a far cry from a native fishing in an Amazon tributary to your Victory garden or war-boosted agricultural production. Yet *timbó* roots help both.

Primitive people here long ago learned that if they put *timbó* root in the water, presto! they needed only to pick up the fish! The Brazilian *timbó* (*Lonchocarpus nicou*) contains quantities of rotenone, a potent poison to cold-blooded animals.

Commercially, rotenone is used as an insecticide to combat pests and insects in vineyards, fruit orchards, and fields. It is also effective against parasites commonly found on livestock.

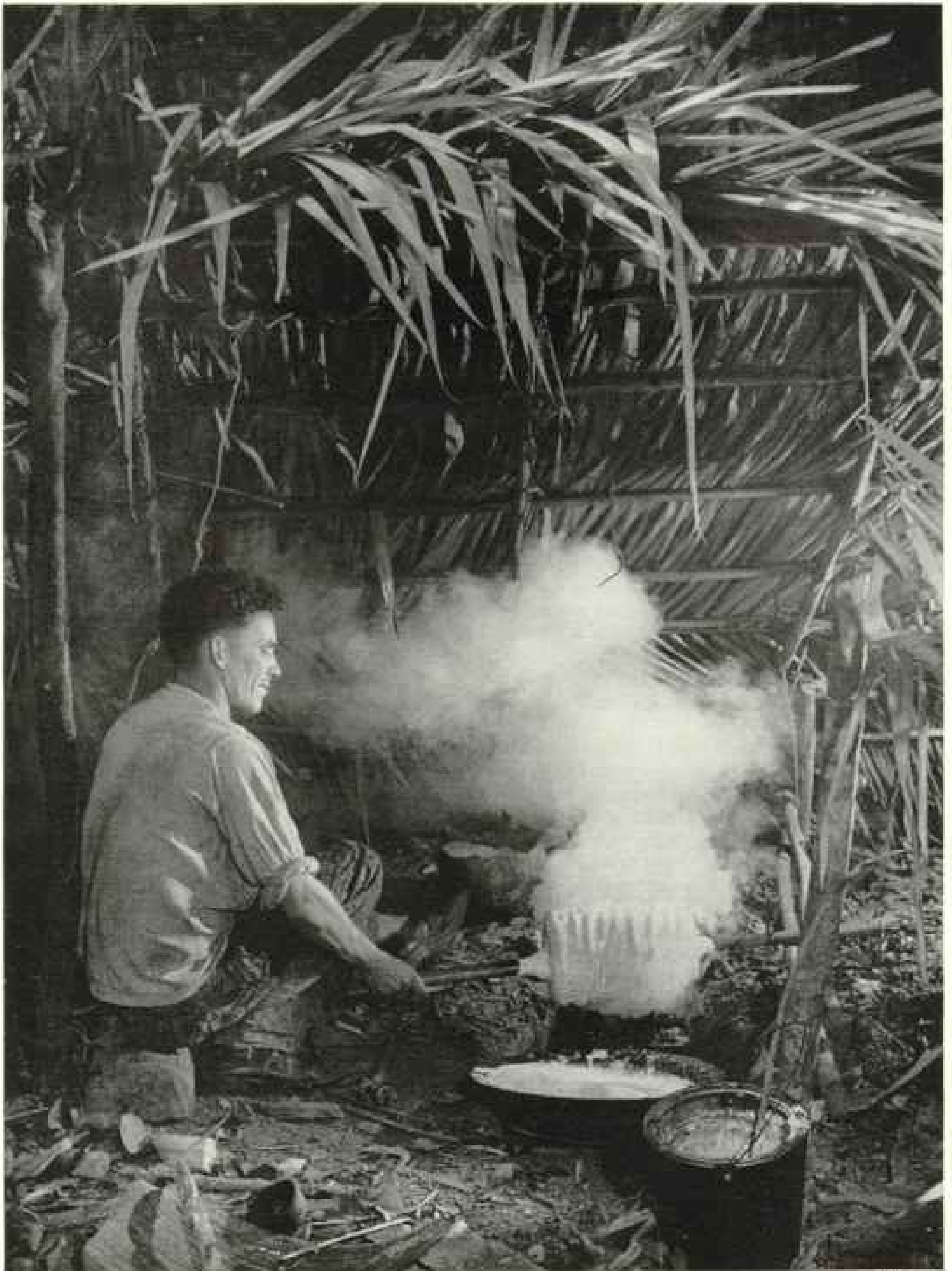
Copaiba oil also was first utilized by the South American aborigines. They found that the oil, tapped from the trunk of this leguminous tree growing from the Amazon to Rio, was an excellent healing balsam for sores.

Early Portuguese colonists, convinced of its healing and antiseptic virtues, took it to Europe. Besides its use as an ingredient in medicinal preparations, the raw oil is now employed in the manufacture of varnishes and in photography.

Into varnishes, paints, and enamels, too, go quantities of oiticica oil, expressed from the seeds of oiticica trees which thrive extensively in the States of Ceará, Rio Grande do Norte, Paraíba, and Piauí. A quick-drying oil, oiticica fulfills much the same requirements as the widely known tung oil of China, whose sources are now barred by war.

Babassu Palm Has Many Uses

The musically named babassu palm of northern Brazil is behind, if not in, our world battle fronts. It is one of the most valuable palms of Brazilian flora. In its home dis-



C. I. A. A.

What's Cooking? A Ball of Amazon Rubber, not Lunch!

This independent Amazon worker builds up a big wad of rubber on a rotating stick. Alternately he holds it over the pan of latex and pours on some of the white liquid, then smokes it over his gasoline-can fire-pot. Babassu palm nuts are frequently used as fuel for coagulation.



Because of These "Hammocks" More Brazilian Beef Goes Abroad

After it is deboned, the meat is folded into canvas compresses. The man places boards over the openings to flatten the ends. Beef, thus molded into compact blocks, occupies less shipping and storage space. A ton takes up 57 to 63 cubic feet, instead of about 85 cubic feet (page 64).

tricts it has an amazing number of uses. Leaves serve as material for making hats, mats, and baskets. The nuts are used for firing the boilers of river steamers, and to provide smoke for the coagulation of rubber latex. The inner kernel produces a rich edible oil.

Before war imposed a censorship on figures and uses, nearly 50,000 tons of these babassu kernels were being shipped to the United States in a year. The oil is a substitute for lard and olive oil, and in the manufacture of margarine it possesses nutritious qualities.

Nuts from the uricuri palm likewise produce edible oils and also a wax similar in properties to that of the carnauba.

Whenever you wax your hardwood floors or polish your almost garage-bound automobile, you are very probably using some Brazilian carnauba wax. Some may also be contained in your shoe polish, if it has not all been commandeered by war factories for preparing water-resistant varnishes and other strategic products.

Brazilians refer to the carnauba palm as



Deft Female Fingers Split and Sort War-needed Mica

Using sharp knives, these girls separate the mineral into thin sheets and slash off stained and broken portions. Before them are size charts used in mica selection. Prices vary with size; inch-square sheets are the smallest exported (page 48).

"the tree of life." It flourishes in the arid areas of northeast Brazil, where drought conditions are chronic and, to the inhabitants, sometimes tragic.

In periods of extreme dryness, when other plants die in the blazing sun, the people often extract starch from the hearts of young palms to gain sufficient food.

To the tree, as in its commercial uses, the wax serves as a protective covering. During dry periods it forms a coating over the surfaces of the leaves to check the evaporation of moisture.

Wax gatherers cut the leaves, let them dry, and then beat off this thin layer, which breaks into powdery particles. To get a pound of

wax, anywhere from 60 to more than 115 leaves must be handled.

Imagine the work involved in securing the more than 16 million pounds which the United States took in a year just before the war began!

"Go West," Says President Vargas

Many of the people who have fought the battle of drought and famine here in northeast Brazil are now being recruited to fight the battle of the Amazon.*

For years there has been considerable migration from the States of Ceará, Piauí, and surrounding districts, as drought often has made "Okies" of uncounted thousands of the inhabitants. President Vargas has long advocated a "move to the West."

Now it is under way at accelerated pace, forced by the urgent need for war rubber.

Today thousands of these workers are on the move. You see them waiting with their bundles at Fortaleza, at Sobral, and at Belém

—waiting to be moved into the Amazon. Others are at transit camps in Manaus, waiting for transport farther into the interior.

Leaders of the rubber program contracted to move many thousands of the laborers this year. To move large numbers of persons into almost virgin territory is a stupendous undertaking. The men need transport ships, river barges, homes, food.

Health problems have to be handled. In camps at assembly or transit points all workers must be inoculated against typhoid, small-

*See "Exploring the Valley of the Amazon in a Hydroplane," by Capt. Albert W. Stevens, NATIONAL GEOGRAPHIC MAGAZINE, April, 1926, and "How Latin America Looks from the Air," by Maj. Herbert A. Dargue, October, 1927.

pox, tetanus, and yellow fever.

To understand the problems, too, you must consider the colossal distances to be traversed. From Belém some of the upper tributary stations of the Amazon are as much as a month and a half away. Some can get supplies only in the flood seasons when waters are high.

"Much silly romance has been written about the rubber program and development of the Amazon Valley," said one American who was in the job up to his sunburned neck. "To us it is hard work, headaches, and how!"

In truth, there is little glamour for those who are doing the task. Ask the pilots who are flying mile after mile over a solid mass of green treetops. Ask the men who have to hack trails through the tangled bush searching and tapping wild rubber trees. Ask the doctors who are trying to work out the program of health and sanitation in this hot, watery jungle land where malarial mosquitoes thrive.

Airports are opening this vast Amazon Valley. Infirmaries are being built at strategic centers, and launches are carrying medical supplies for the peoples up and down the river.

This year when you have no Brazil nuts on your Christmas table, you can blame it on the war. There is an embargo on their shipment.

In 1942 just over 20,000 tons of crude rubber were milked from the Amazon trees. The 1943 output was appreciably larger. How much will be produced in the five-year program no one can yet tell (page 74).

In addition to the Amazon rubber, *Hevea brasiliensis*, other latex-producing trees, notably the *manicoba* (*Manihot spp.*) and *mangabeira* (*Hancornia speciosa*), are being sought



With Polarized Light She Spots Flaws in Quartz Crystals

Crystals are submerged in an oil bath and examined under polarized and direct arc lights. Fractures, cloudiness, "ghosts," and other imperfections which impair their use for radio and detection devices are revealed. Dozens of inspectors, mostly girls, work in these testing rooms in Rio de Janeiro.

in other parts of Brazil. Though not of the quality of the hevea, rubber from these trees can be utilized in making many products.

What of the rubber program and development of the Amazon following this war boom?

Prior to World War I, the Amazon saw one other scramble for rubber. Production reached 40,000 to 50,000 tons in a year. Then its rubber balloon burst. Manaus still bears sad memories of that glory for a day. Here were luxurious homes, elaborate hotels, and a magnificent Parisian Opera House.*

"Will this be another bubble?" I asked

* See "Our Most Versatile Vegetable Product (Rubber)," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, February, 1940.



Mauri Fisher, U.S.A.A.

Big Viaducts Straddle Deep Mountain Ravines on the New São Paulo-Santos Highway

Abruptly above the seaport of Santos towers steep Serra do Mar, barring easy access to the plateau capital. Trains are hauled up by cable. For ever-increasing traffic a new superhighway will soon replace the narrow motor road that winds up the mountain.

several rubber experts and doctors in the health and sanitation service.

Opinions varied, but all emphasized that the situation is considerably different today.

Despite the possibility of competition again from natural rubber coming from Far East plantations and also from new synthetic rubbers, the Brazilian product still will have use. Furthermore, Brazil herself now has rapidly growing rubber industries which will require ever-increasing quantities of crude rubber.

Then, too, the Inter-American health program is a long-range effort aimed at sanitation, checking of malaria, and rendering medical aid to the inhabitants in the area. In itself,

this improvement in living conditions will go far toward aiding economic development.

Throughout all Brazil today you see new leaven at work. Here are new and rapidly expanding factories. More and more resources are being opened for exploitation. Air and transport facilities are being extended throughout the nation. And, more important, the country is gaining an ever larger number of technical and scientific personnel.

The vital materials and weapons of war that Brazil is now contributing toward victory for the United Nations will be her plowshares for future industrial and economic expansion.

At Ease in the South Seas

BY MAJ. FREDERICK SIMPICH, JR., A.U.S.

AMERICAN soldiers carry their ways and habits with them, including the American habit of keeping clean. Doing their laundry has now become a big business in the South Pacific.

When they can, they stick to American food. A native-owned "beanery" in Fiji, called "Popeye the Sailor's," features murals of "Wimpy" and "Olive Oyl," and a blackboard menu offering hamburgers, cheeseburgers, and vanilla ice cream.

Such things symbolize the American way of life our troops have brought to the coral and jungle of these far places.

Visit them, as I did, expecting to find the men changed by their weird environment of head-hunters and gooney birds. You will find they live by an American pattern true as that of our Southern States or in the open spaces of our great Southwest.

There are baseball diamonds set in jungle glades to the specifications of Abner Doubleday, daily news mimeographs filled with the latest communiqués—from Hollywood, and bomb shelters on advanced bases with electric lights and poker tables—popular spots in the frequent raids!

Security First—Then Morale

Life on these island garrisons can't be all work and sweat and thoughts of home. Amusements are devised by seasoned commanders as soon as security measures are established.

"Greatest boost to morale," one general said, "came when Army Service Forces set up the 16-mm. film exchange. To those of us who have been here 15 months and more these films are the next thing to a visit home."

From the movies the men learn what fads their girls are wearing now, and how the President and Prime Minister looked at Quebec. The movies even keep them posted on the latest ration jokes.

Film comedian Lou Costello drew just as big a laugh on Espiritu Santo as he ever earned at Roxy's, when in a movie one night he threw away a roll of bills he'd found—just to save the rubber band!

These shows, held out of doors, now reach even the remote garrisons two or three times a week. Through the cooperation of the movie industry many films play on such spots as New Caledonia simultaneously with cities in our Eastern States.

Just as at home, radio is an entertainer in the South Seas. Most bivouacs have a set or

two capable of "pulling in" KGEI over short wave from San Francisco. Equally favored is "radio Tokyo" which beams American dance music larded with propaganda at the Solomons and New Guinea.

The men really like the music. The propaganda falls so flat it has given rise to one well-worn but ever popular gag: this calls for the American listener to address a card to Tokyo, listing his special "request" numbers.

Battles Fought in the Night

In this air war, battles are often fought at night or beyond sight in the substratosphere, so radio serves also to give groundlings a first-hand account of how their side is doing.

During a night alert on Guadalcanal, an accustomed group gathered about a colonel's short-wave set to listen to the fighter pilots talk. I was amused to hear one tardy arrival run up and ask, in the manner of a boy late for a world's series broadcast, "What's the score?"

Leisure time is filled by more than mechanical devices. Members of one bomber crew have developed a regular routine for picnics in New Guinea. On free days between missions they assemble a lunch from the mounds of bread that pass for sandwiches in the Army and set off in a borrowed truck for a jungle stream miles up the coast. Here on their tropic Riviera they laze out the day as if there were no war.

Ironically, the South Pacific with all its beautiful beaches affords little good ocean swimming. Coral reefs are everywhere to gash unwary toes, sharks and barracudas lend doubts to the stoutest hearts, and the tropic sun adds a further hazard. So, on many of the forest-covered islands swimming is centered about shaded streams.

Signs Display Soldiers' Humor

Around such spots the soldier's penchant for writing signs comes into play. Carefully lettered boards inevitably mark these natural pools and read "Jones Beach," "Ventura," or simply "Old Swimmin' Hole."

This matter of signs provides a vent for soldier humor from Honolulu to Melbourne (page 80). Every hut for transient passengers on the long air route across the Pacific is labeled regardless of rats or mosquitos, earthen floors or sandbags—"Waldorf," "Ritz," or "Biltmore."

Pets also appear wherever troops go. Though barred from air transports and troop-



U. S. Army Signal Corps

Billboard Humor Sets Up a Marker on the Road to Tokyo

Jeeping along New Guinea's north coast with Col. C. S. Myers at the wheel, two American entertainers halt to read a signboard. Ray Bolger, comedian, holding a tommy gun, is perched atop the rear seat. Little Jack Little, orchestra leader, is at the left.

ships, pups mysteriously emerge from bedding rolls and knapsacks once a voyage is under way (page 94).

I was awakened one cold night far above the Coral Sea by a contraband Scotty trying to smuggle into my sleeping bag. It developed he had flown all over the world with his Air Transport Command master, zipped into a parachute bag away from prying eyes.

Later, this stowaway was found by an alert ground crew and taken off the plane while his master, under orders, flew on. Such is the soldier's affection for his pet, it's a safe wager the two are somewhere reunited by now.

Dogs are not the only favorites. One major general at GHQ has a specially built cage for the parrots he has collected "up the line." At a New Caledonia air field tame deer live from the officers' table scraps, loping up to the mess hall regularly at chow time.

Fighter pilot Lt. Richard Birk of California had the tables turned on him one day when,

after jumping from his burning plane, he found himself adrift in his rubber boat—the pet of a whale!

As he and witnesses tell it, the little orange raft first attracted sharks, then in turn a whale came up to investigate. Intrigued by the boat and its passenger, the 40-foot monster toyed with the raft for minutes, tapping it gently with its snout, while the harried pilot found comfort only in thoughts of Jonah.

A rescue plane, by zooming low, finally put an end to the game.

Reading a Principal Recreation

In these South Sea isles and waters, known principally to Americans from the books of Melville and Stevenson, it seems fitting that reading is the universal pastime of all the services (page 82).

What they read and how much is limited only by the pile of books and magazines available. Post Exchanges cannot hope to supply

the demands of the American soldier and sailor. Even the big bookstores of Honolulu and other Pacific cities are unable to meet the need.

Go into a Hotel Street book vendor's any day, and you will be jostled by emissaries from the vessels lying at Pearl Harbor and the detachments scattered around Oahu Island, shouldering one another, clamoring for a clerk's attention. These men buy, not a score of books, but several hundred dollars' worth for wardroom and barrack libraries.

Purchases range through secondhand NATIONAL GEOGRAPHICS, new fiction, 25-cent "who-dunnits" to much that is professional or technical. One volume seen in many South Seas tents teaches the rough stuff of commando tactics.

The enterprising Honolulu Advertiser has built a large mail circulation throughout the South Pacific catering to soldier tastes in its features.

Not all that the men read comes from home. Occupation of these distant places and the necessity for training men in their environment has given rise to a new literature, published on the spot by the several American commands; random titles from this list include *Cast-away's Baedeker*, *The Native Carrier*, *Getting About in New Guinea*, and *You and the Native*.

Don'ts for Non-natives

From these widely studied booklets the soldier and the sailor learn of native ways through such cautions as these:

The native is nearly, if not quite, as good a man as you are. Don't underrate his intelligence. Don't curse and swear at him—and don't make fun of him. Joke with him by all means . . . (but) don't deliberately descend to his level. He will consider it unfitting.

Don't enter a native village as if it entirely belonged to you. Don't beat a drum without first asking . . . As often is not the village drums are under tabu.

Pay is important. The native economic system is one of reciprocity . . . Give him something for services rendered, even if it is only a half stick of tobacco, a fishhook, or a razor blade. Good trade lines, easy for the individual to carry, are beads, matches, handkerchiefs, fishlines, and red and black "paint" powder.

Coarse salt goes well in the mountains. A dessertspoonful is worth a stick of tobacco. Keep your old newspapers for native cigarettes.

Remember three things in any village—gardens, pigs, and women. Interference with any of them will bring trouble to you and your mates.



U. S. Marine Corps, Official

"Luxury" in Guadaleanal's Jungle

Ask any man at an advanced base what he wants first when he gets "out" and he'll answer, "A warm bath." This shower serves officers as well as privates. Having been swung into place by block and tackle, the oil drum is filled with water from trucks touring the bivouac daily.



U. S. Army Signal Corps

Five Allies Intently Reading *Guinea Gold* Block the Steps of Its Printing Office

Says the headline: "America's Answer to Pearl Harbor: Fifteen New Warships Launched." Scanning the war news are two Americans and (back row) three Australians.

Finally, here is this blunt advice: "Don't abuse him (the native) and don't nag. If you find yourself especially irritated by the way your laborers are behaving, take some more quinine and a dose of salts!"

A Manual for Crusoes

Many men, conscious that they may someday be castaways, read with care from the texts on tropical boy-scouting with such passages as these:

Shark yarns inevitably become tall stories. Of the sixteen species of shark, only one, the tiger shark, is a serious threat to a man swimming . . . Always face the shark. It bites only if turned on its back and in this awkward position can be met by merely pushing it away—it has been done. Like most animals its nose is tender and a hit on the nose has satisfied the curiosity of many.

The most useless appearing article in your pocket can be given practical application. A hand lens, for example, will start a fire. A small mirror . . . has several uses. Afloat, reflecting the rays of the sun or the moon, it has served as a lure for fish. Its use as a signalling device

is obvious. It may be an acceptable gift for native entertainment.

There are innumerable uses for the material in your parachute. It provides cordage . . . cloth for a hammock, tent, ground cloth, rain catcher, mosquito net, blanket, sunshade, sail, etc.

A durable candle can be made by drying in the sun for a few hours the meat of a mature coconut, placing a piece on a stone and lighting one end.

Fresh water is carried in coconut water bottles made by piercing the stem opening of a husked mature nut, filling it with fresh water, and allowing it to dissolve the meat within.

Such facts as these make vivid reading for men who have seen scores of their comrades come back from the shadows, as Rickenbacker did, through exercise of faith and fortitude.

Much conversation turns on tales of rescues from under the eyes of the Japs. Most of these have been effected through the help of the natives. So many men have been saved from Jap-held islands by these tribal allies that a standard reward, rich in terms of rice and tobacco, has been established.



U. S. Navy, official

"Don't Look So Worried, Fella; It Won't Explode," Says the Navy Photographer

The Melanesian's face betrays fear that the camera may be a gun. He and others were taken to Guadalcanal, organized on military lines, and put to work. Earrings contrast strangely with wrist watch.

This led to some embarrassment recently when a hundred or more stranded sailors were secretly removed from Jap territory with native aid. To pay a reward for scores of sailors on the basis established for lone pilots meant a heavy drain on scant supplies, but, after some negotiation, all agreed a man was a man, even by the canoe load.

They Read National Geographic Maps

Maps of the National Geographic Society are standard reading, too (page 93). You see them on the walls of the GHQ, in the cockpits of transport planes, and nailed to easels improvised from orange crates in advanced command posts.

Allied troops use them for plotting the progress of the war, and many preserve them, carefully marked up from day to day, for a post-war record of their travels.

Handicraft occupies many idle hours. On Christmas Island where mother-of-pearl is free for the diving, members of the garrison make

a business of carving souvenirs for sale to transient plane travelers. This is a case of the "native" profiteering from the "tourist."

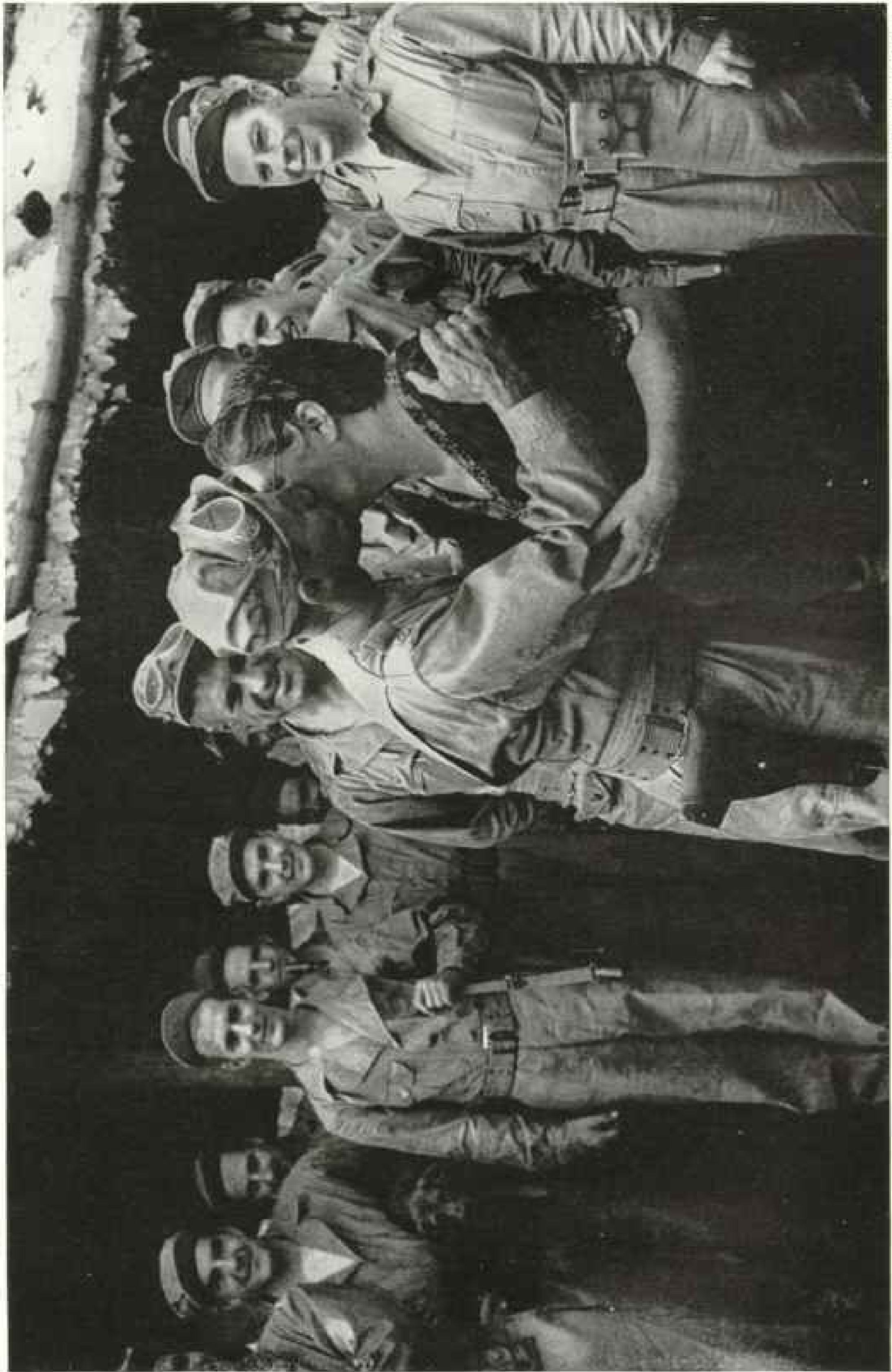
Among the favorite designs are the various service insignia such as the Air Transport Command globe and pylon, the Engineer's castle, and the pilot's wings.*

With time on their hands, you find men using salvaged lumber and scant tools to make "home" more comfortable. There is scarcely a tent that doesn't have its crude table and chair pieced together Robinson Crusoe-fashion from discarded crating. Some even fashion crude lawn chairs for use at the open-air movies.

In New Caledonia where lakelike inlets provide incomparable boating, groups of men have laboriously tooled small sailboats for themselves from discarded dunnage.

Sight-seeing fills lonely hours on the larger islands. Who, in peacetime, could ever see

* See "Insignia of the United States Armed Forces," NATIONAL GEOGRAPHIC MAGAZINE, JUNE, 1943.



U. S. Army Signal Corps

Grimming Soldiers See Their Colonel Reward a French Betsy Ross for Her Gift of an American Flag

Resident of New Caledonia, she stitched the Stars and Stripes to show appreciation of the United States' defense of her island. Months of occupation have not dimmed hospitality toward the fighting men "who stayed to dinner." At every opportunity French families invite Americans into their homes.



U. S. Marine Corps, Official

Even on Guadalcanal Card Games Have Kibitzers

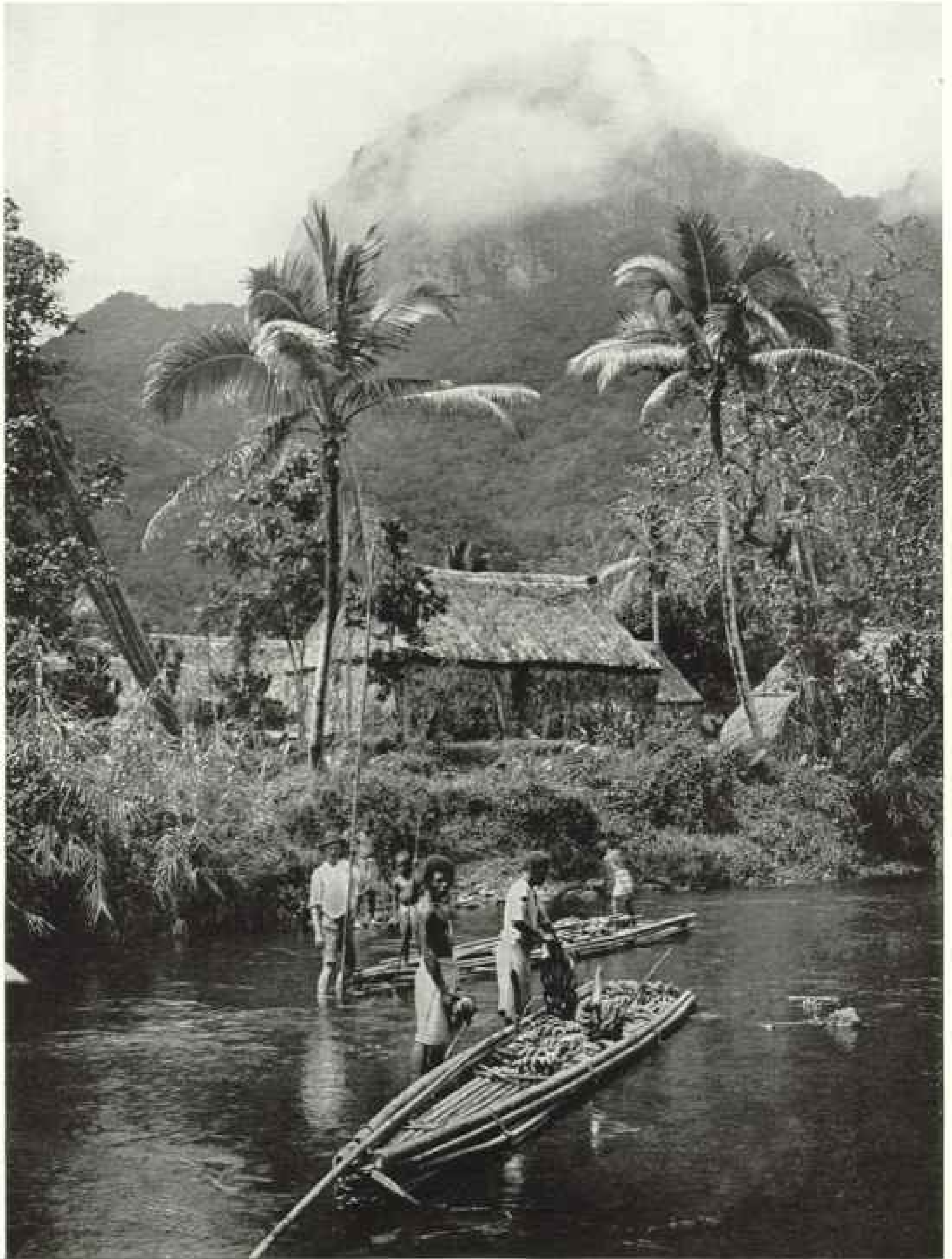
Good roads, shelters, movies, and malaria control make life bearable. This historic island now resembles any other advanced base.



U. S. Army Signal Corps

Not Far from Japanese Lines, the Barber Wears a Pith Helmet

Called a "finer" by the Army, the sun helmet slips into a battletime "tin hat." For health's sake, hair is kept trimmed even in fighting areas.



© Fiji Government, Official

In a Mountain Stream, Fiji Islanders Load a Bamboo Raft with Bananas

Fijians, like other South Sea islanders, love this easy type of work. Hard labor in the sugar-cane fields they leave to immigrants from India. Old-time Fijians were notorious cannibals; their grandsons are Christians. Wounded American fighting men convalesce in modern hospitals here.



U. S. Marine Corps, Official

Three Marines, Each with His Stable of Two, Are Starters in a Coconut Crab Race

Watch your fingers, men! Your entries have powerful claws capable of mangling hands. The coconut crab, born at sea, returns only to spawn. On land it climbs palms and feeds on the softer green nuts.



U. S. Navy, Official

Prefabrication, Modern Construction Miracle, Engages the Palm-frond Industry

A sailor at an advanced base takes a weaving lesson from an islander who puffs a pipe and wears a military identification tag. Such products are shipped to newly captured bases for camouflage or roofing.



U. S. Army Signal Corps

Each Month Our Soldiers Abroad Send Millions of Dollars Home

In most Pacific bases there is nothing to buy. Officers sometimes accumulate pay checks for eight months before cashing them. These men line up to buy money orders at a New Caledonia Army post office.

Fiji as I did by "hitching" a ride with a colored soldier driver of a two-and-a-half ton Army truck? This man, when he found I was a transient, insisted in great good humor that we tour his side of the island.

Tearing along the left side of the dusty road in approved British fashion, we paused at native huts where he was a favored guest. We visited taro patches and groves of breadfruit trees that he might introduce me in Georgia accents to these exotic crops.

While examining tapioca roots, which he said were good, I asked, "How do you like this place?"

"Why, suh," he beamed, "I likes everything about it 'cept the whiskey—*kava* they calls it—and it's worse than any corn we ever made back home."

"Clearing" His Land by Bombing

This almost universal affection for "their" island strikes you in most garrisons. News accounts have told of men who have bought

homesites—even whole atolls—planning a place to live after the war. But there is one flier who leads all the rest. He has bought and paid its rightful Australian owner for a property outside Jap-held Rabaul.

Returning from his frequent bombing missions over that base, he cheerfully reports, "Well, I cleared another acre on my land today!"

There is sharp rivalry among the garrisons. As individuals shift from one command to another, the advantages of each island are debated in tones reminiscent of the Florida-California feud.

In such talk the men seldom call the name of the island or the place but use instead the identifying Army post office number. This is less for security reasons than because many names are tongue-twisters. So you talk of a trip to "500" or the mess at "502."

There is much travel in this island-to-island war where forces leapfrog one another, where casualties must be evacuated over thousands

of miles by plane and ship, and where a leave will carry you across 20 degrees of latitude from the unexplored areas of the jungle to such impressive cities as Melbourne and Sydney.

"Leave!" That is a golden word throughout the Army, but never more reverently phrased than in the South Pacific. The rare privilege of leave is first accorded those who have distinguished themselves in combat, though all troops are ordered to rest areas after rigorous service.

In Sydney, generally regarded as a "good leave town," you see the Red Cross and the Army joining forces to provide rest homes where worn pilots can sleep till noon, then lunch from menus so lavish that to quote them would make "chops water" back home. This in surroundings and service as clean, quiet, and relaxing as provided tired millionaires by resort hotels before the war.

In Sydney, too, you may sit one night as I was privileged to do with a man who 48 hours before had been slugging it out with the Japs from the deck of a warship in Kula Gulf 2,000 miles distant.*

Daily Flights of "Leave Planes"

"Leave planes" make this possible. Daily flights from combat zones bring out the battle-weary and return refreshed replacements.

Ride such a ship both ways, and you are struck to find that the conversation does not turn on combat or the drudgery of field life.

On the way "down" the men want first a bath, second a bed, and then to go out on the town—any town. On the way "up" the chatter is of the times they had, the things they failed to do, and of the prospects of another leave someday. No hint of fear, no complaints, rather the atmosphere of a New Haven train after the Christmas holidays.

When Johnny comes marching home from the Pacific, airplanes are going to be very much on his mind. Much of his work in these tropic areas has been in winning and building air fields, and planes continue to play an important part in his day-to-day life.

Most mail moves through these theaters by plane. These men write by the ton! One day's accumulation of mail from a typical garrison can fill a cargo plane (page 92).

The space-saving value of V-mail was graphically illustrated to me one day when the pilot of a C-47 loaded with regular letters held out a small cloth sack loosely filled with reels of V-mail and said, "There are probably more

* See "Sydney Faces the War Front Down Under," by Howell Walker, NATIONAL GEOGRAPHIC MAGAZINE, March, 1943.



U. H. Nara, Official

Purple Heart Ribbon Decorates a Wounded Samoan Cook

A member of the Fita-Fita guard established in Samoa by the Navy in 1900, this man wears his cook's rating on his lava-lava. Wounded by shellfire from a Japanese submarine early in 1942, he pins his decoration conventionally above the left breast.



U. S. Navy, (Official)

"South Sea Island Scandals" Is a Bit of Broadway in the French Pacific

Soldiers, sailors, Marines, four French girls, and a New Zealander staged this musicale in Nouméa, New Caledonia. Producers' publicity said nine admirals and 37 generals attended the premiere. They were satirized unmercifully. So were South Pacific censors. North African forces were joshed as "goldbricks."

letters in this little bag than in all the rest of the airplane."

The home front does a good job in writing the men in the service. Incoming mail far exceeds outgoing loads. But morale officers say that this is still not enough. Even a letter a week is slim comfort to a man who hasn't seen home for a year.

What jobs the planes do! In the course of 20,000 miles by air I rode on everything from garbage cans and mop handles to musical instruments and Bibles, all going to the front.

At one point we were delayed a day to let Artie Shaw and his band pass through—they had a better priority!

Throughout these diverse islands the American has used his time well to make friends. At one New Caledonia camp the Javanese labor regularly plays football with the American troops during the lunch hour. Both strangers in a foreign land, they are learning from each other.

The Javanese have been taught to boot a spiral with their bare right foot that would win credit at Franklin Field. In turn they have taught the Americans to speak French—French with an accent strange to the Sorbonne, but serviceable in New Caledonia.

"Pidgin" Is "Basic English" of South Seas

Study of Pidgin English, which along with Malay is the common tongue of the South Pacific, has been furthered by the services.

Pidgin vocabularies are published in every Pacific theater and, though subject to persistent study, provide many a laugh. Such phrases as "big mouth" for insolent and "mary" for woman come easily to the slang-minded Army. But to say "chikker-im-up-im" for scrape, "face-no-good 'long" for angry, or "kee-nene kee-ow" for quinine pills is asking a lot from even the most versatile linguist.

Our troops leave many marks on native culture. A common if spectacular sight is the



U. S. Army Signal Corps

In New Caledonia the Army Finds Willing, Intelligent Helpers

Taking orders from a private, the tractor driver is typical of fine physical specimens who have helped build our installations. In contrast to his mechanical aptitude, his fuzzy hair is stained red in primitive style.

New Caledonian, his fuzzy, red-dyed hair cut in GI style. And discarded khaki, despite all orders to the contrary, gradually becomes the standard garment for natives living near the Army camps. Threadbare, salvaged overseas caps perch jauntily on many a bushy and pomaded head in these regions.

Not all the contacts of the American boy in the South Pacific are with the semicivilized. Wherever whites are settled, the American has met ready welcome.

The warmth of the reception given Americans in New Zealand, Australia, New Caledonia, and Fiji can never be reported adequately.

Go to a Brisbane racetrack on a day when the Australian government permits such pleasures, and your American uniform passes you free through to the rail.

Look up the marriage notices of any paper published in these lands, and it is likely you'll find American soldiers are winning more than their share of girls.

And, unusual in war, even the Allied troops get along well together. Good-natured jeering is frequent.

Americans popularly refer to their allies of any nation as "aliens." But a profound respect for the Australian and New Zealand fighting man is expressed by every American who has served with them. And for those who know its extent there is equal appreciation for the reverse Lend-Lease benefits whereby American forces are fed and partially equipped at a sacrifice of personal comfort by every civilian "down under." *

Silver Coins Go into Bracelets

Wherever troops go, their purchasing power and foreign tastes create problems for businessmen and governments.

In Fiji, as example, many Hindus, first imported as labor, have long since become small

* See "Lend-Lease is a Two-way Benefit," by Francis Flood, NATIONAL GEOGRAPHIC MAGAZINE, JUNE, 1943.



From Staff Photographer Howell Walker

At an Australian Base the Army Sorts Soldier Mail to the 48 States

Knowing that mail from home is the key to morale, the Army maintains post offices at all Pacific bases. "Write more letters and keep them cheery," morale officers advise relatives of troops abroad.



Staff Photographer Howell Walker

An Air Force Canteen Quenches American Thirsts in Tropical North Australia

Soft drinks and beer—but no hard liquor—are served. Tea has become popular. Soldier at right wears a religious medal or good-luck charm in addition to his Army identification plate, or "dog tag."



U. S. Navy, Official

On a Geographic Map Lt. Col. Evans Carlson Points to an Island His Marines Raided
Beside him is Comdr. W. H. Brockman, Jr., who commanded a submarine carrying the surprise party to Makin, in the Gilberts, in August, 1942. More than a year later Americans invaded the island.



Staff Photographer Howell Walker

Are They Air-minded! Two Pilots Build Model Planes in Their Spare Time
Other American bombardment men returning from sorties against the Japanese relax with tennis, swimming, roller skating, kangaroo hunting, or visiting sheep ranches.



W. H. Mays, Official

On Coral Sands, "Scuttlebutt" the Pup Wears Camouflage on All but Ears

Not much of a dog as yet, but what a joy he is to his Marine Corps master on this tiny, lonely island! White sand and driftwood shelter indicate this is a mid-Pacific base.

traders and jewelers. The influx of Americans with money to spend so boomed the sale of filigree silver jewelry that the Indian craftsmen were hard put to find more metal to make more trinkets. Their solution has caused finance officers many a headache, for the silver coins paid troops now disappear from circulation as fast as they are spent.

Each payday new shipments of silver must come from the United States, and as fast as it is spent, complacent Indian artisans painstakingly convert the new dimes and quarters into ten-dollar bracelets.

Australia, too, had its coinage problem. There we pay our troops in pounds. The added demand for coins resulting from this policy created a shortage solved only by shipping impressions from master dies of the Australian mint to the United States. Now your American-coined Australian "thrippence" may very likely carry a small "s" or "d," symbolizing its San Francisco or Denver origin.

The old rule of supply and demand could

never ask for better demonstration than is found in these theaters where values vary widely with the station.

In many places it is safe to leave a wallet with your month's pay in your tent all day. Who would steal money with no place to spend it? But on the same island you have to put a guard on your plane overnight to protect the candy bars carried as emergency rations!

In Australia the buying power of the American soldier is subject to the regular controls of the price and rationing system when he buys from civilian sources. This is just as at home.

But on Guadalcanal there is price control, too! Inflation in the trade with the natives made action necessary by the troop commander.

Under his schedules you may pay sixty-six cents for a "female chicken" but only fifty cents for a "male." A *tubi* (black walking stick) inlaid with shells can cost two dollars,



U. S. Army Signal Corps

"That's Where the Tall Corn Grows!"—New Caledonia

An American captain, together with the French owner of the plantation, inspects corn on the cob to be served at Army messes. To conserve cargo space, the armed forces have fostered garden crops in the South Pacific.

but the maximum for a stick without inlay is only one dollar. Avoiding the complexities of the OPA schedules, the price of fish reads, simply, "1 pound—5 cents."

New business springs up on these isolated spots to meet new demands. On Espiritu Santo a little Tonkinese woman brought by the French from Indochina as indentured labor has learned the knack of making doughnuts and does a land-office business with passing jeeps and carryalls.

Heroes of Hygiene

Advertising, too, has been affected. Cracked signs reading "coiffeur" are displaced by freshly painted boards lettered in red and white—"Barber Shop." Australian papers carry ads for "jitterbug contests," and one or two small restaurants I saw sought to prove their Americanization with window cards reading, "Water served with meals."

Much has been heard of the health hazards of service in these areas. Milne Bay, Guadal-

canal, and other familiar names have long been known as centers of tropical disease. Yet when the full story of the South Pacific war is told the achievements of American medical officers in reducing malaria to insignificance where combat has ceased, will match the accomplishments of Walter Reed's generation in lands closer to home.

Credit for the success goes also to the individual soldier, sailor, or Marine, who has exercised cooperation and intelligence day and night in fighting disease.

Certainly, there is a full measure of "blood, sweat, and tears" in the South Pacific. Many think we are beginning there our hardest fight against our toughest enemy. Yet the Americans stationed along this island-studded battle line, the boys named Smith and Jones, from right next door, are not wasting their lives away. Rather their health is generally better than before. They'll come home better informed and more nearly self-sufficient men by having pioneered this life for themselves.



Douglas L. Oliver

Delousing Calls for Sharp Eyes and Nimble Fingers on Bougainville

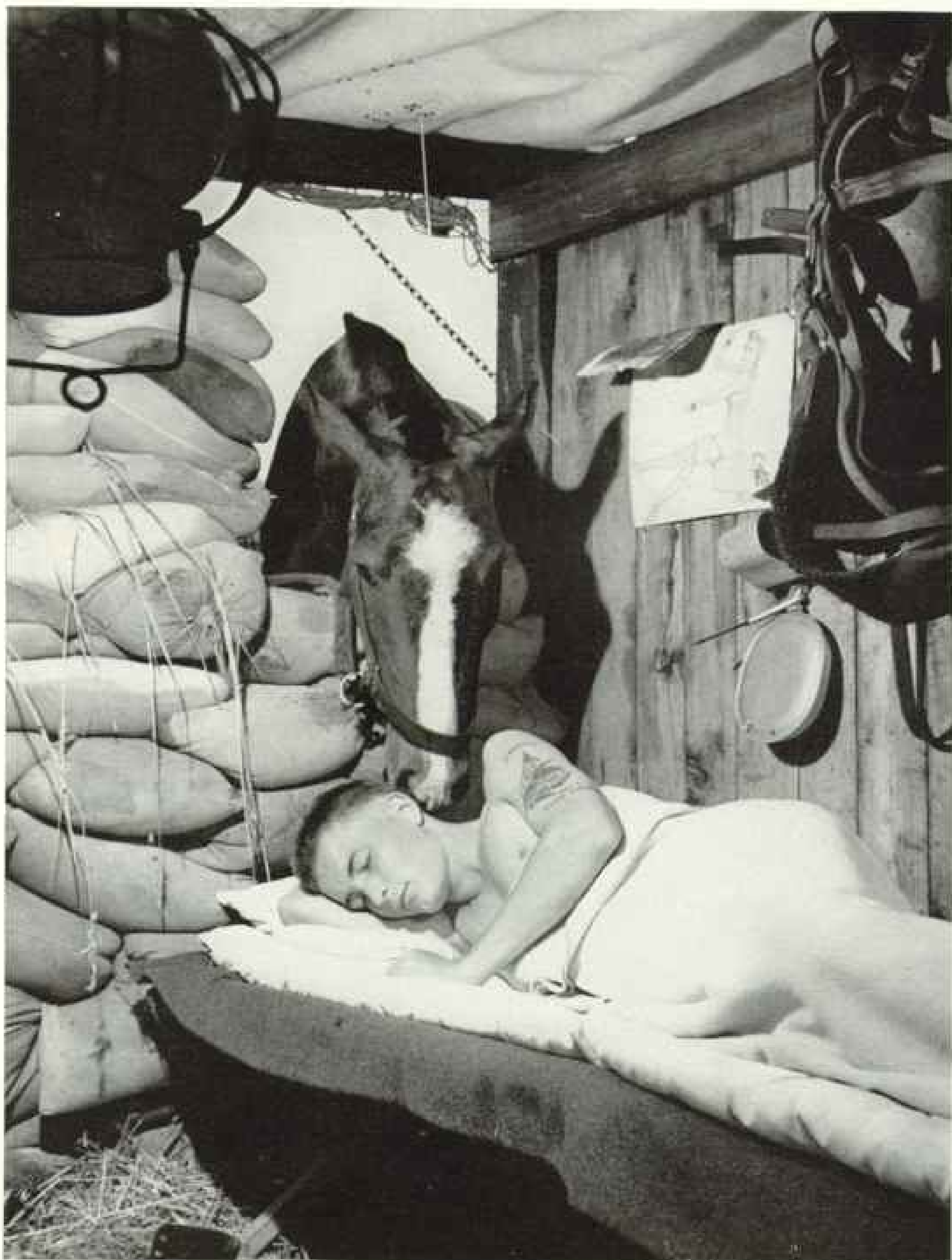
Tribesmen in the Siwai District conduct this sanitary operation on the steps of a pig corral. Most prized possessions of the islanders, next to their wives, are their pigs and gardens. Siwai is midway between Buin, where the Japs built their principal Bougainville base, and Empress Augusta Bay, where United States Marines established their beachhead and first clashed with the enemy on Bougainville ground November 1, 1943.



From Staff Photographer Harold Walker

Koalas Say These Yankees Are in Australia

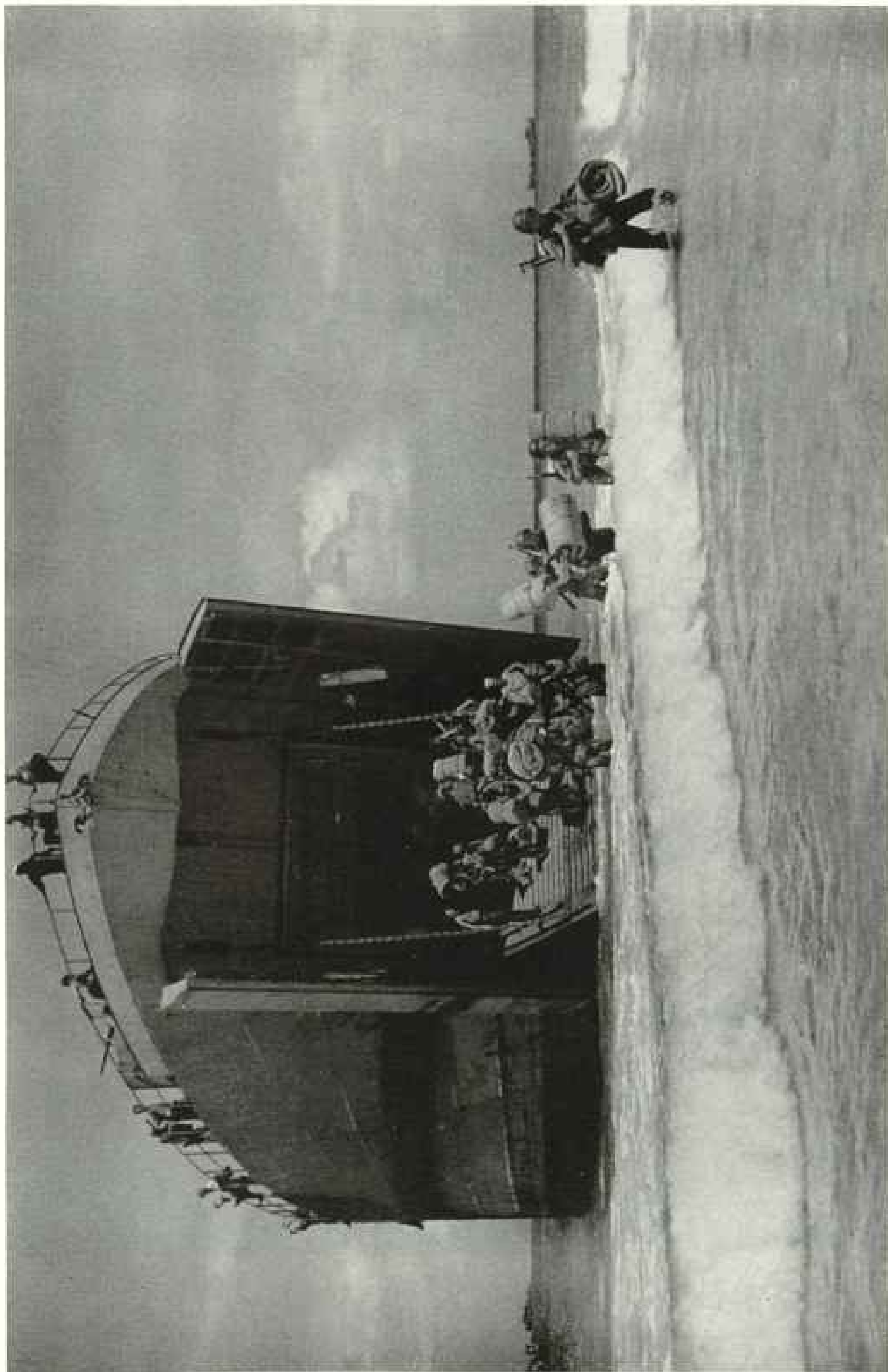
To American soldiers, the strange "critters" in the zoos down under are a never-ending source of wonder.



U. S. Navy, Official

"Turn out and Turn to!" Says This Army Horse Nuzzling a Sleeping Sailor

Fighting a "triphibious" war—air, sea, and land—the services in the Southwest Pacific have scrambled their identifications. Army planes fly from Navy carriers, Marines eat Army stocks, and this sailor rides an Army horse to supply his New Caledonia signal outpost. "Remember Pearl Harbor" is tattooed on his arm. Sandbags, saddle, and pin-up girl decorate his home.



U. S. Marine Corps (Official)

LST's Steel Jaws Open, and Out Spill Marines with Full Equipment to Occupy Nanumea, Ellice Islands

Defying seamanship rules, the captain has steered across reefs to the beach. Now the drawbridge drops, and troops wade the shallows. Like ferryboats, these war-born landing craft are designed for easy loading and discharge. Men emerge first, then vehicles. Gasoline, ammunition, and stores follow in the order needed.



U. S. Army Signal Corps

Dillinger Is the Name of This Evil-tempered Parrot

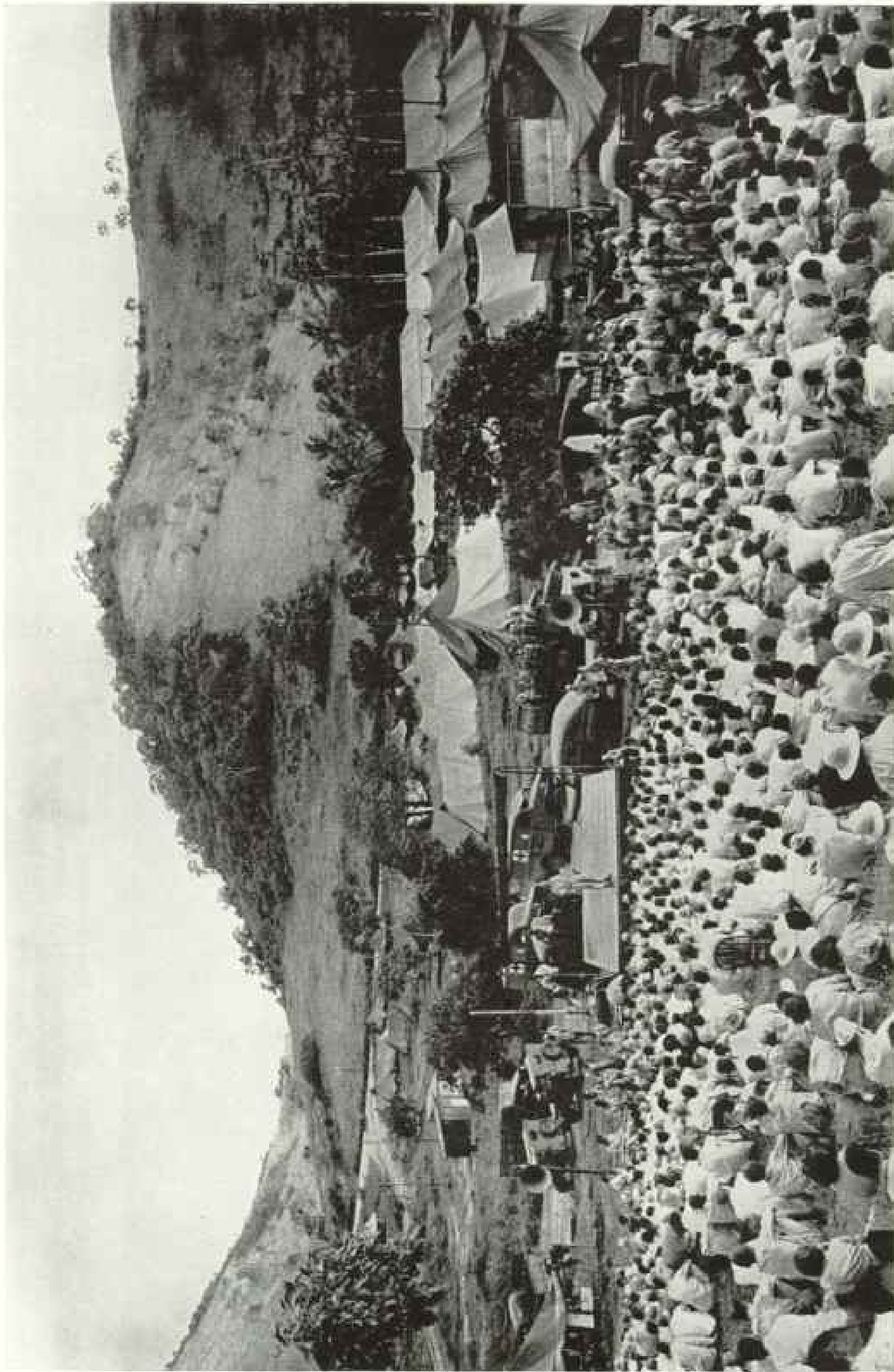
The bird's vocabulary and disposition reminded his soldier master of the notorious gangster. Dillinger likes the movies but swears when reels are changed. He adopted the Army by "just flying into camp one day."



U. S. Marine Corps. Official

This Goggle-fishing Marine Can't Believe What He Caught

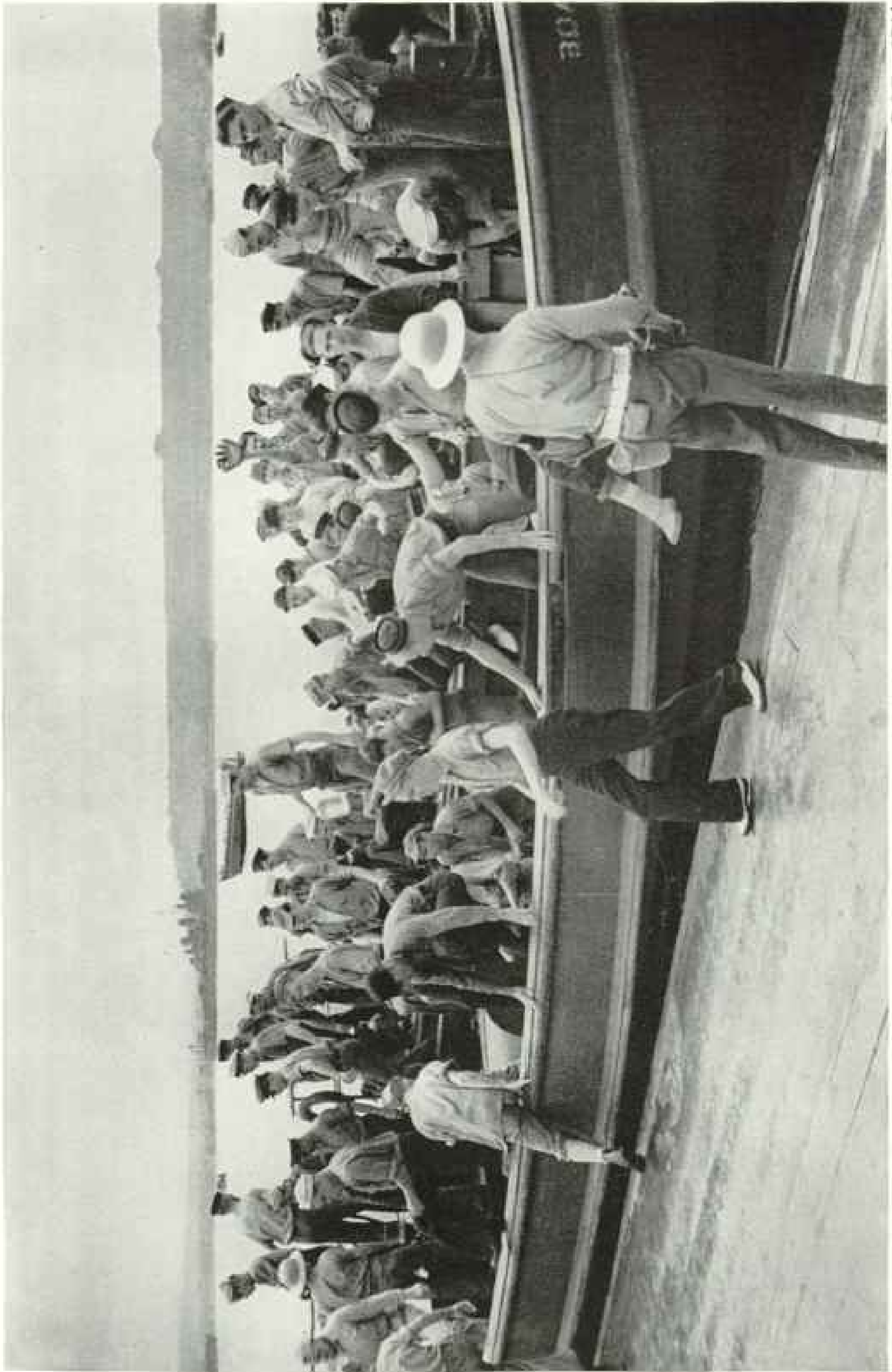
The gnome's face belongs to a blowfish, which wears a white beard of spines as protection against being swallowed. So as not to fit fishes' interiors, he puffs up to thrice normal size. Out of water, he grunts.



U. S. Army Signal Corps

Joe E. Brown, Who Lost His Own Son in the War, Entertains with a Monologue at a New Guinea Hospital Station

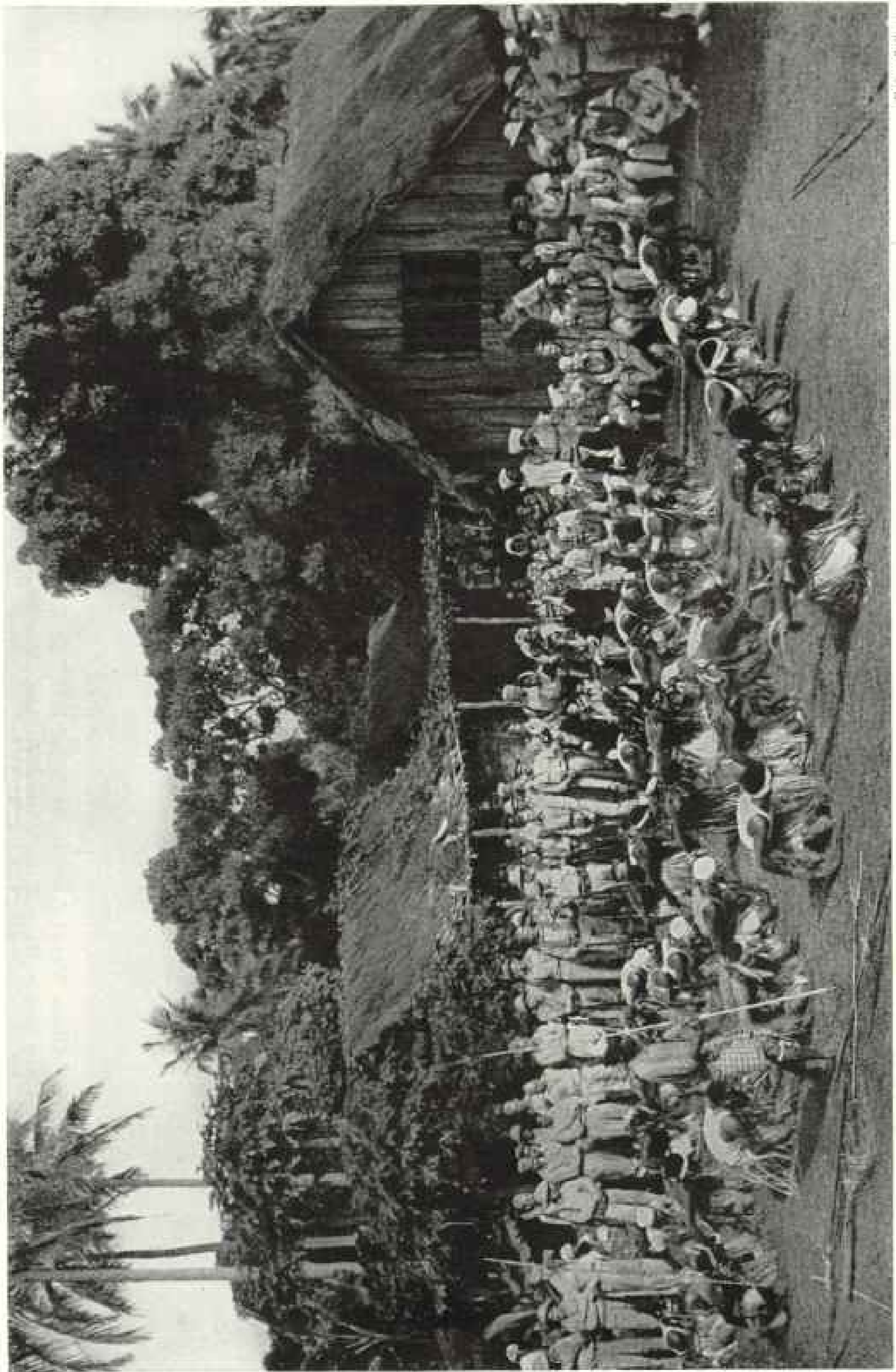
"Live talent" from Broadway and Hollywood gets enthusiastic receptions at advanced bases. However, such occasions are exceptional in the faraway bivouacs. 16-mm. film provides most entertainment.



U. S. NAVY, 972414

A Baseball Glove Waved Aloft Is the Signal that This Boatload of Sailors Is Going Ashore for Fun

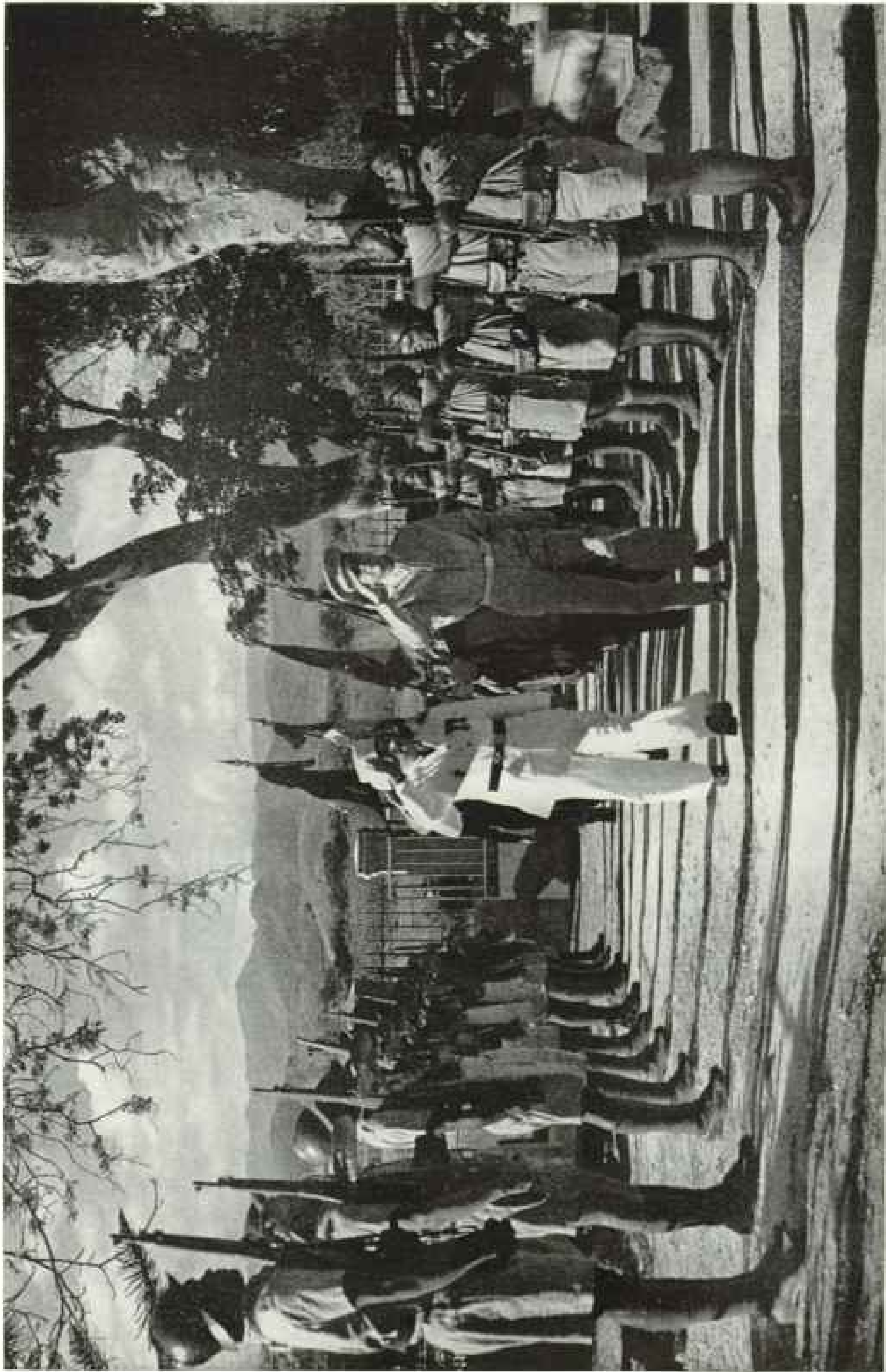
To restore battle-worn crews, the Navy provides liberty at a quiet recreational base. Here the men will find canteen, athletic field, movie theater, and possibly a dance floor. But the shore patrol will get no rest; his job is just beginning. The task force, its chore finished, rides at anchor.



Edwin Galbreath

New Caledonia Men Perform a War Dance While Their Wives and Our Fighting Men Stand on the Side Lines

Flanking our life line to Australia, New Caledonia has become a little America. United States jeeps and trucks roar through its once sleepy streets. In return for American cigarettes, toothpaste, wine, and protection, the island provides war-vital nickel and chrome.



U. S. Army Signal Corps

Soldiers of New Caledonia Stand Stiffly at Attention for American and French Inspection

Major Gen. Alexander M. Patch, as commander of United Nations' forces on New Caledonia, is accompanied by Henri Montchamp, then Governor of the French possession. On November 2, 1942, the honor guard lined up at the entrance to a French cemetery. General Patch later led Army forces on Guadalcanal.



U. S. Navy, official

Laughs Aimed at Themselves Kept Marines' Morale High on Oft-bombed Guadalcanal

At a foxhole the officer points out his comrades did not lag when the Japanese flew over. The poster parodies the stage-door sign, "Through these portals pass the most beautiful girls in the world."



U. S. Marine Corps, official

A Wounded American Learns to Carve Maori Canoe Paddles

So interested is the Marine Corps sergeant, hospitalized in New Zealand, that his attention is distracted from the pretty nurse. His Maori instructor is employed by our Government.

Front-line Town of Britain's Siege

BY HARVEY KLEMMER

"BRITISH and German batteries last night engaged in a cross-Channel gun duel. The exchange lasted about an hour. Buildings were damaged. There were some casualties."

For three years readers opened their newspapers to find the foregoing item tucked away on an inside page. Or perhaps it would go like this:

"German raiders were over the English coast this morning. Bombs were dropped on a southeast coast town. Hits were made on homes, stores, and a school. Rescue workers are still digging in the debris."

Invariably in the first instance, and frequently in the second instance, the piece of British territory involved in the attack would be an ordinary little town once known chiefly as the terminus for a ferry line but now renowned throughout the civilized world as a community of indestructible ideals.

The community, of course, is Dover—Britain's "front-line town."

Now that the tide of raids has reversed and the Allies pound Axis lands, Dover catches its breath and reviews its historic siege.

Closest to the Enemy

Of all British cities Dover is closest to the enemy (page 110). The Channel at this point is only 20 miles wide. On a clear day enemy positions can be seen from Dover with the naked eye. Through binoculars it is possible to watch enemy vehicles bringing up supplies and to follow small boats skulking along the opposite shore. The Calais Casino and a hospital are clearly visible. There are people who claim that they can tell time by the clock in the tower of the Hotel de Ville.

During the anxious summer of 1940 the people of Dover stood on the cliffs and watched German preparations for the invasion of Britain. The invasion did not come off. The Battle of Britain did, and much of it was fought over the rooftops of Dover.

Many towns in Britain have suffered the agony of German bombing. Dover has been both bombed and shelled. Her streets have been sprayed with bullets, and farmers have been attacked in the fields.

The other end of the Miracle of Dunkirk (Dunkerque) was Dover.

In one trip to Britain I was able to spend some time in the front-line town. The first thing I did there was to call on Inspector Fenn, subcontroller of civil defense.

"How many alerts have you had to date?" I asked.

The inspector opened a black ledger, ran his finger down a long column of figures, and replied casually: "2,118."

A telephone rang. Fenn picked up the receiver, listened gravely, nodded to his assistant in the control room. Then, turning to me, he said in a matter-of-fact tone:

"I beg your pardon. Make it 2,119."

By nightfall the number had reached 2,120, and by the end of the next day it stood at 2,125.

Five and six alarms in a day were not uncommon in Dover. The Sunday before I arrived, there were eight; one day there were 15. During the Battle of Britain the waves of enemy planes came so close together that it was impossible to keep track of them. One alert merged into the other. Were it not for that circumstance, the number of alarms would be even higher than it is.

The First Bomb on Britain Hit Dover

Recorded alerts cover both air raids and shellings.

Bombing is old stuff to the people of Dover. The first bomb to fall on British soil fell in this city December 24, 1914.

In the present war, Dover was bombed for months before the enemy went after London; in fact, Dover firemen were in London for a rest when the first raid was staged on the capital. More weight of bombs to the square mile was dropped on the Dover area than on any other place in Britain.

When I was there, the number of bombs dropped stood at 448. That included only those in the immediate vicinity. The number scattered over the rest of Kent is incalculable. Many other Kentish towns have been badly blitzed. And hundreds of farmers tending crops detour daily around ominous-looking craters.

Most of the bombs dropped around Dover were big fellows—usually of the one-ton variety. Many thousands of incendiaries also were dropped.

Fifteen hundred shells had fallen in the Dover area up to the time I left.

After that, there were several furious duels. The count soon reached to 2,000. Sometimes the Germans just lobbed over a few as a sort of a reminder that they were still there. Another time they would toss over a dozen salvos of six or eight shells each. Two hundred



International News

In Strait of Dover a Launch Takes Aboard a Downed Airman Saved by a Rescue Buoy

Steel chambers like the one at right are anchored at intervals in the English Channel. In their cabins parachuting fliers find provisions, medical supplies, and radio sending sets. The ramp is for exhausted swimmers. A depth charge for U-boats is carried by the rescue launch.

shells came over in one bombardment. Shellings lasted as long as five hours.

The shells ranged in size from 8 inches to 11 inches. Most were of the latter size.

The people of Dover have a healthy respect for shells. They have become accustomed to bombs and planes and rarely take cover in an air raid. A shelling is different. Shells explode on impact, and each one gives off a blizzard of splinters. Splinters are nasty things. I don't blame anyone for taking cover when they are flying about.

People told me in Dover that there is no warning from a shell. The first thing you hear is the explosion itself. The thing to do then is to dive for cover—not to escape the shell (it is too late for that) but to get out of the way of falling debris. A big shell throws up a lot of rubbish which continues to come down for some time after the detonation.

Many of the shells exploded on the tops of buildings. This resulted in the changing of

several places from three-story buildings into one-story buildings. I saw one place where a shell had gone under a bank and into the strong room before going off. The bank was doing business at the time. And it kept right on doing business.

The Nazi gunners like to fire in salvos of six. Occasionally as many as 10 guns would be fired simultaneously. Most of the shells came from the vicinity of Cap Gris Nez. Many landed in the Channel. In other cases enemy gunners overshot the town by as much as 10 miles. In the beginning the shells came only in the daytime. Then they started coming at night. Finally they came any old time.

The first shell arrived two months after the Dunkirk evacuation, in August, 1940. There was a great argument as to whether the explosion was caused by a shell or a bomb. The argument was ended when someone found a rifled fragment several miles away. Even then there were some who felt that the shell was



British Official

From a Dover Observation Post, Winston Churchill Views an Air Battle

Smoking the inevitable cigar, the Prime Minister wears a steel helmet. On his left, Dover's Mayor prefers his own black derby. On August 28, 1940, they saw two German raiders shot down.

brought over by a plane and dropped on the town. The angle at which the missile landed gave credence to this belief.

Long-range Shells Come Straight Down

Contrary to popular understanding, long-range shells do not land at an acute angle. They come more or less straight down. British gunners on the Kentish coast told me that the German shells reach a height of about seven miles on their way over from Cap Gris Nez. They reached this height when only a few miles from the English coast. Thereafter they fell rapidly and landed more nearly vertical than horizontal.

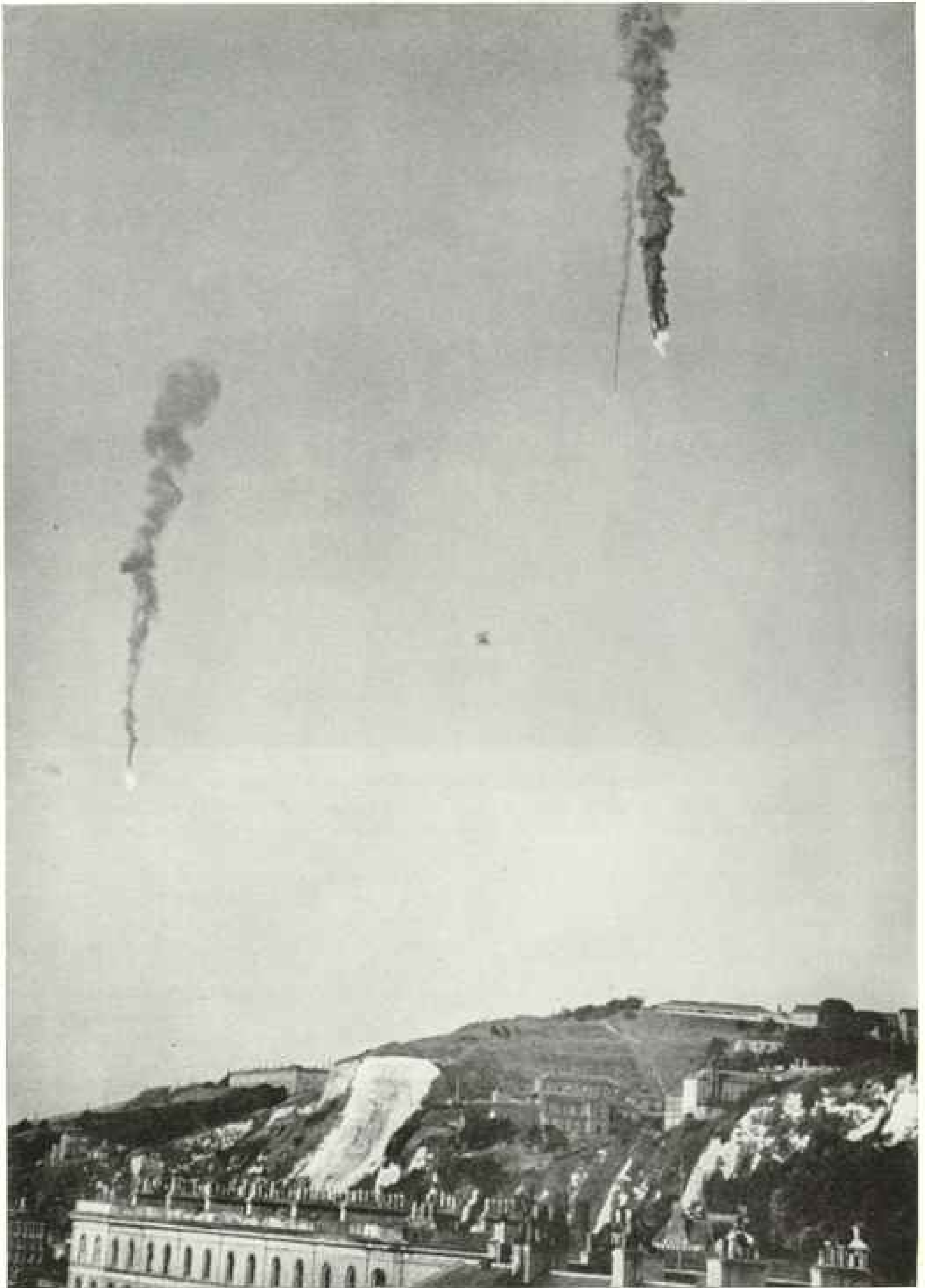
This is the explanation for several seemingly impossible hits scored in Dover. Once a shell came over a tall building to demolish a low building on the far side. I saw several hits which had been made near the sides of the buildings *away from* the Channel. One shell had gone over a four-story building and landed only eight feet out from the base.

It takes about a minute for the shells to reach Dover from the French coast. If you see the flash, you have time to take cover; otherwise, the shell is likely to announce its own arrival. Men on the water front keep an eye cocked in the general direction of Cap Gris Nez. The interval between flash and explosion is described as "just time to down a pint and duck."

Shells landing on land make a different sound from those landing on water. The residents of Dover have learned to tell the difference. Splinters fly in either case. The police gave me a going-away present of a five-pound chunk of wickedness dug out of a tree. It was from a shell which had landed on the water half a mile from shore.

"Shell Alley" Splits the City

There is one section of Dover which has had more than its fair share of attention. This is known locally as "Shell Alley." When the big guns began to boom, and the shells



ARMOR

Fiery Comets with Smoking Tails—All That's Left of Two Punctured Barrage Balloons.

"Balloon potting" was a favorite sport of Nazi airmen during the daylight blitz. Within six minutes they shot down 23 Dover balloons. In a few hours undaunted Dover hoisted 18 more. Still high above the white cliffs today, their cables weave a steel web for unwary dive bombers.

started landing with their muffled "wumpfs," that was the time to move out of the line of fire. People who have been through several bombardments learned to assess the danger areas. They worked out the line of attack and then calmly strolled over to another part of the city. Shell Alley looks as if someone had driven a giant lawn mower through the center of the city.

Everything considered, however, Dover is not so badly smashed up as one would imagine. Casualties have not been so heavy as might be expected. Most of the city is still present, and many buildings are undamaged.

Casualties when I was there stood at 139 dead, 305 seriously injured, and 220 slightly injured. There are several explanations for the relatively small number of casualties. One is the fact that a good share of the population has been evacuated to safer areas. Another is the availability of bomb- and shellproof shelters in the chalk cliffs. A final explanation is found in the really excellent civil defense organization and in the degree to which the people cooperated with the authorities.

Although the damage is less than you would expect, considering what Dover has been through, it is by no means inconsiderable. In addition to Shell Alley, some hundreds of buildings have been destroyed in other sections of the city, and several times as many damaged. Everywhere you turn you come on the skeletons of houses and stores and the other structures which go to make up a modern city. There are huge craters in the streets.

The municipal skating rink is a mass of splinters and broken glass. One side of Market Square is a vacant lot, bounded by tottering walls and containing an enormous crater filled with green water. The once-proud Burlington Hotel is a shell of its former self.

The walls of the Burlington are still standing, but not much else. The management tried to keep going, but finally, after being hit by five shells and six bombs, had to fold up. They survived the loss of half the roof, all the windows, and pieces of wall big enough to drive a truck through. What licked them in the end was the destruction of every stairway in the building. When the last salvo of bombs arrived, a man was left hanging from a pipe four stories above the ground. Every room was isolated and had to be searched by men on ladders. The man on the pipe was saved.

The local bus station was burned. It consists now of nothing but a maze of twisted girders.

In a beautiful garden I saw a crater 20 feet across and 10 feet deep. The owner of

the property had converted it into a sunken garden. Roses and Michaelmas daisies were striving valiantly to obliterate the scars of war.

The head air-raid warden took me around the city. One day we came to a row of badly blitzed houses. One had been removed as completely as if carved out with a knife. There was not so much as a piece of glass to mark its passing. The warden looked thoughtfully at the spot.

"That's where my house used to be," he said, and then, before I could say anything, looked quickly the other way.

There is a man in Dover who has lost three business places. He is now in his fourth place. It is rumored that the neighbors are thinking of buying him out!

The Grand Hotel, once the rendezvous of correspondents in Dover, is no more. The back of the building has been neatly removed.

Two American correspondents were in that part of the building when the removal took place. They fell four floors when the corridor in which they were standing went out from under them. One of the correspondents, Guy Murchie, later dictated a first-rate account of the occurrence while waiting to be operated on.

Damage Cleaned up Quickly

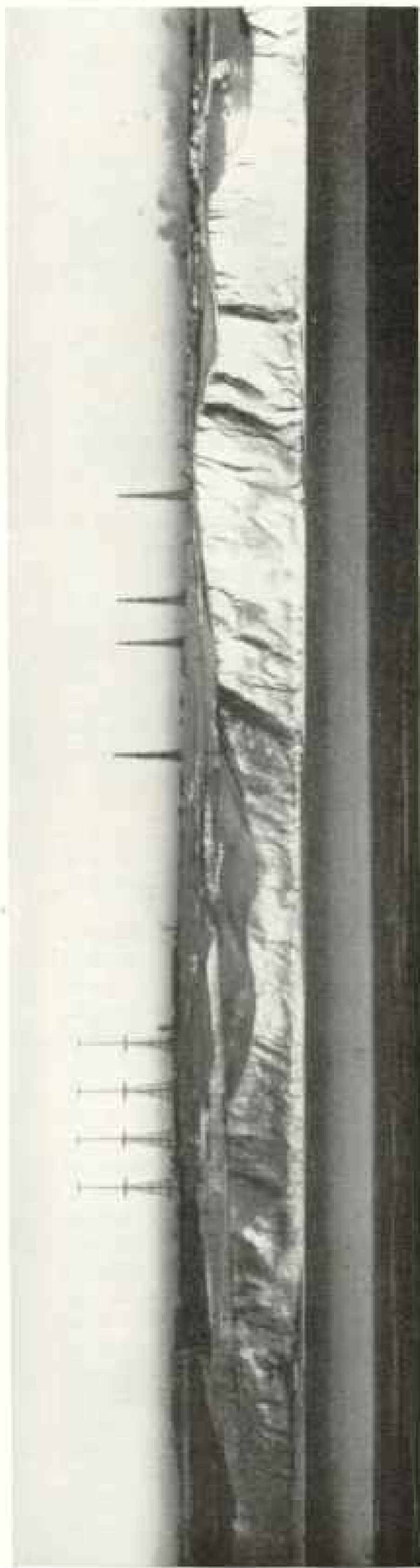
Frequently, in walking about Dover, you come to a light-colored patch in the pavement. That is where a crater used to be.

The City Fathers cleaned up damaged premises as rapidly as possible. They did so well that newspaper photographers, coming down from London in the wake of a heavy attack, complained that the debris was cleared away before they could get their pictures. I also heard the opinion expressed in Dover that some of the wreckage should be left as an attraction for post-war visitors. The City Fathers were obdurate. They went right on cleaning up the city as rapidly as they could.

Churches in Dover as elsewhere in Britain suffered particularly at the hands of the enemy. The first shell known to have landed in Britain hit a church. St. James's Church is out of action. Old St. James's Church has been badly damaged. St. Barnabas's Church is closed, as are also St. Paul's Roman Catholic Hall and the Salvation Army Citadel.

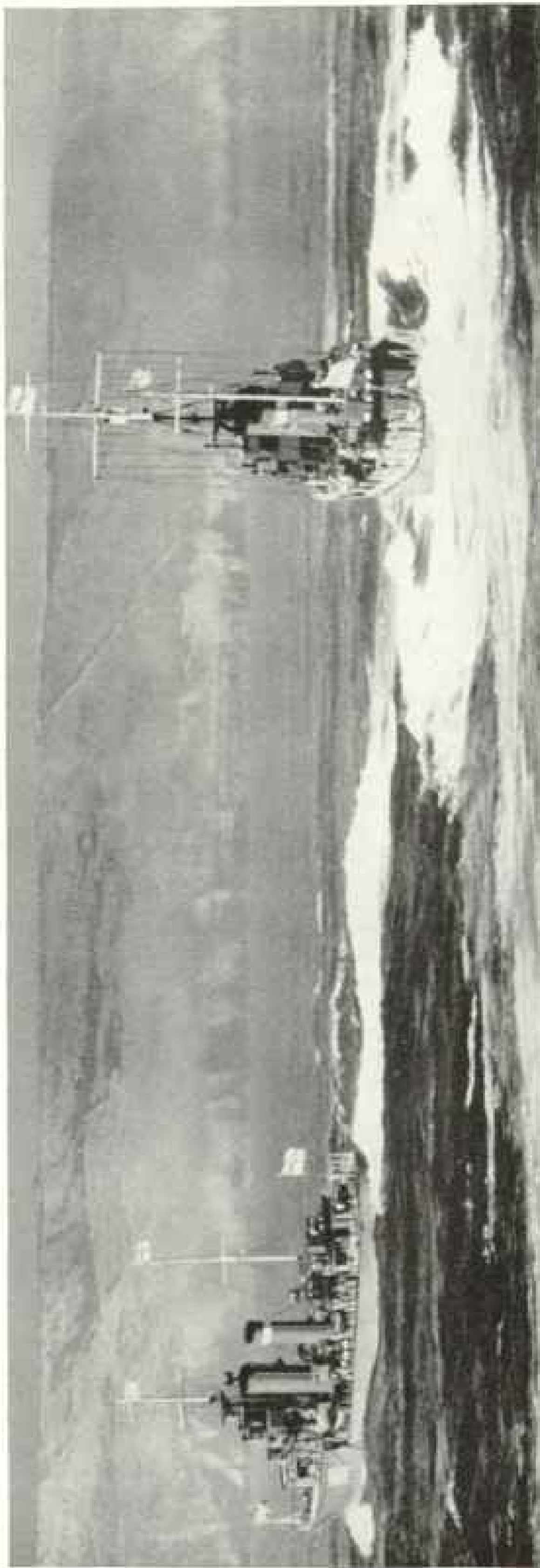
One Wesleyan church has been a victim of two wars. Beside a gaping hole in the wall is a tablet bearing the following inscription: "*Built 1910. Bombed 1917. Rebuilt 1920.*" I suppose there will be additional entries on the tablet after the present war.

I passed a couple of hours in Old St. James's,



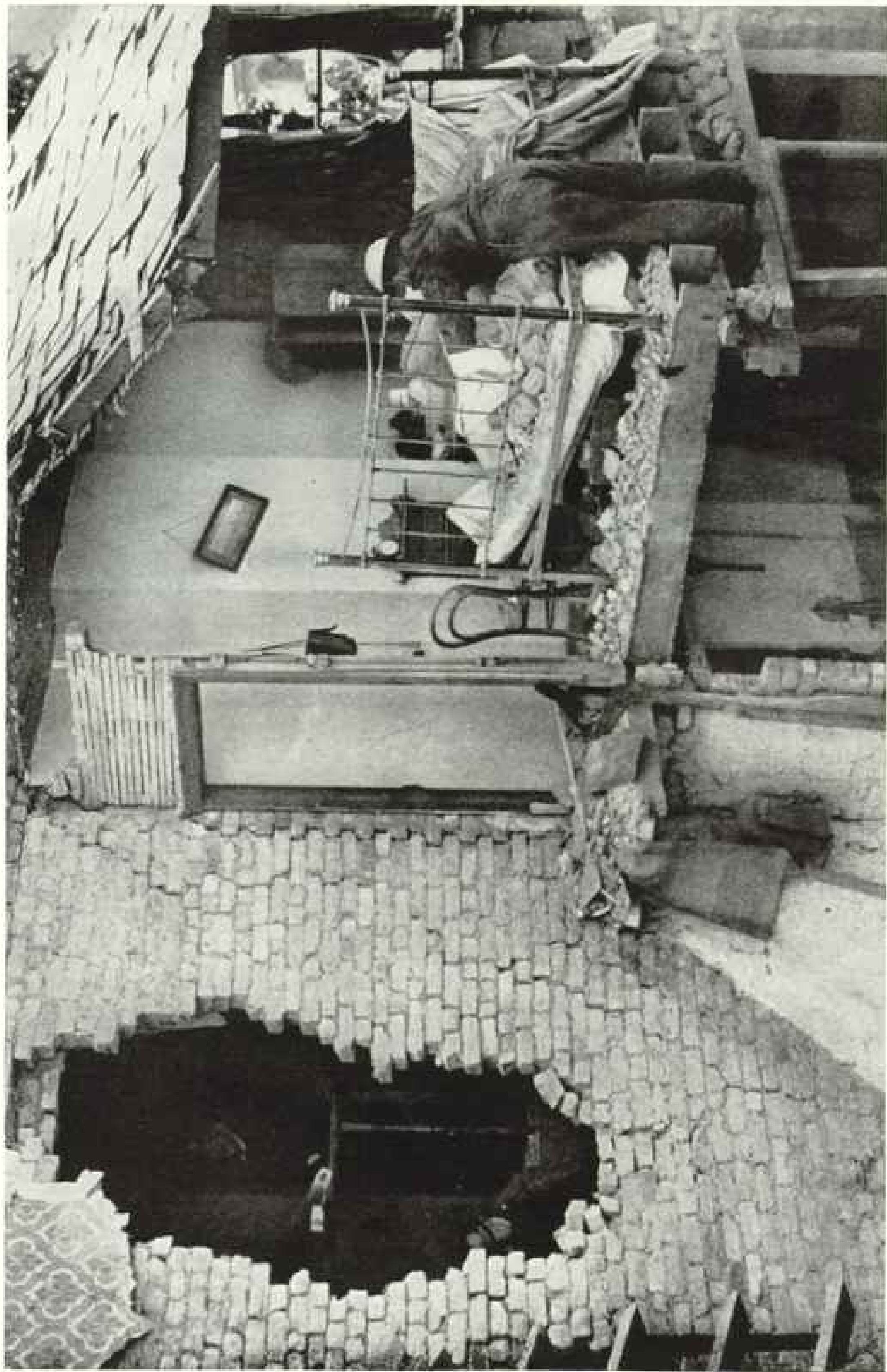
Seen from Black Star

Seen from France through Enemy Telephoto Lens, Dover's Cliffs and Towers Seem Very Near
 This German photograph was sent to Japan, returned to England through Russia, and reached Tim Gossart via New York.



Black Star

Old-type Destroyers Prowl the Waters Off Dover to "Seek Out, Engage, and Destroy"—Motto of the Royal Navy
 Since the fall of France they and their sister ships have helped to escort a thousand convoys through the Strait.



Amun

A German Bomb, Turning This Bedroom into a Sleeping Perch, Leaves a Flimsy Canopy above the Bed

An Air Raid Precautions worker searches the cottage to see that no one, alive or dead, is left in the wreckage. No man in Dover can be sure his home will not be struck next. Love of his front-line city holds him fast. "We've not really been blitzed," he says (page 128).



Harvey Klemmer

An Air Raid Patrol Warden Peers across the Channel for Big Bertha's Flash

When a gun fires on Cap Gris-Nez, an alarm is sounded in Dover. A minute later the shell arrives (page 107). This Dover post boasts that it is closest to the enemy.

The thousand-year-old Norman tower is intact, but the chipped flint walls were badly battered by shellfire. The interior was a mass of debris. As I stepped over the remains of an organ, I saw a sign by the door: "Please Wipe Your Boots."

From the ancient walls look down plaques marking the burial places of many generations of Englishmen. I studied one of them in the half light:

"Near This Place Lyeth Interred

The Body of

Michael Hodgson, gent.

Who Dyed the 20th Day of April 1730

in the Twenty first year
of his age"

Near by, on another stone, I managed to decipher this:

"Here lieth the body of Alice

The wife of Simon Yorke by

Whom he had liffve 5 sons

And one Daughter. she died

ye 4th of XBr Anno 1663

Actat 52"

Civil Defense Proves Efficient

The loss of life in Dover, and the destruction of property as well, would have been

much greater were it not for the excellent civil defense organizations. I passed some time at Civil Defense Headquarters. They have a simple yet effective system which has proved equal to the most savage onslaughts by plane and by gun and sometimes by both together.

At Civil Defense Headquarters there is a large-scale map showing the location of every building in Dover. Wardens' posts are indicated, as are fire stations, shelters, hospitals, and first-aid stations.

The landing of a bomb or shell is known as an "incident." Each incident is marked with an appropriate pin on the map. If there are casualties, and a first-aid unit is sent, that is indicated. The dispatch of fire apparatus is similarly recorded. The location of every piece of equipment, even of every individual in the civil defense organization, is shown on the map. Delayed-action bombs and unexploded shells call for a special symbol.

In addition to the large map are sheets of supplementary material. One shows every place in the Dover area where a fire engine can get water. Another covers detours. Rescue workers or firemen, responding to a call in the blackout, save valuable minutes by knowing which streets are blocked.

Thus, every shell or bomb, in addition to

being recorded on the big map, is also recorded on the detour map, so that drivers hurtling through the night can proceed with reasonable assurance that they will not crash into a crater.

Dover is part of a county-wide system, of which the headquarters is at Maidstone. Still another map at the Dover headquarters shows the relationship of the local defense setup to that of neighboring communities and to that of the county as a whole. When things got too hot in Dover, men and equipment were brought in from other points. This was done according to a definite schedule, in the same manner as fire apparatus is shifted to cover all areas during a big blaze in a large city.

I paid a visit one day to a warden's post which is said to be the nearest one to the enemy. I found an old man standing on the edge of the cliff, peering across the Strait at enemy positions. We discussed the two air raids which had taken place that morning.

"Let 'em come," he said grimly. "The more they send over, the more we can knock down."

The French coast was plainly visible. The water was so blue, the sky so clear, and the whole scene so peaceful that I found it hard to realize that at any moment a fleet of bombers might come diving out of the clouds or a black messenger of death come hurtling across the sea.

Shells Cross the Channel in One Minute

Lookouts have been placed at two of the highest points to give warning of gun flashes. These lookouts keep logs and they are very methodical about entries. One entry reads:

"13:12—two gun flashes; 13:13—two shells."

So was recorded for history the minute which it takes for a shell to cross the Channel!

Speed is the essence of safety in a blitz. The people of Dover have more incentive than other Britons to perfect themselves in this respect. I saw a place where a ton bomb had brought down two houses, burying eight people. In 20 minutes there were 53 rescue workers on the job. Three of the eight victims were dug out alive.

There are two types of warning in Dover—one for bombs, the other for shells. The shell warning consists of the regular alert repeated a minute later. Signs are displayed for the benefit of motorists, principally officials and military men, since there is no more private driving in Britain.

One sign says, "The town is being shelled"; the other reads, "Air raid in progress." Either is supposed to induce people to seek shelter.

In practice it does not often work out that way. During attacks cars and buses are stopped at the outskirts of the city.

The anti-aircraft fire around Dover was spectacular. By day British gunners filled the sky with gray puffs. In the night jagged flashes of lightning illuminated the void overhead.

The blackout was very rigid, and still is. Woe to any witless person striking a light around Dover. A rifle shot from the beach would as likely as not be the result of any serious infraction. Sometimes the blackout becomes a hollow mockery. That is when the Germans turn on their searchlights. These are so powerful that they light up the whole Channel, including the sea front at Dover.

A great deal of attention is paid to gas along the southeast coast. Dover has one of the most up-to-date decontamination centers in Britain. I saw more gas masks on the streets than I did elsewhere. I remarked about that to a bobby.

"Well, sir," he said, "you're apt to be a bit more careful when gas is only one minute away by shell and three minutes by plane."

Constant Fear of Poison Gas

One night I went around with my friend Warden Elviry while he visited some of the posts. I noticed the men laying out oilskins and the huge wooden rattles which have been distributed throughout Britain to be used in case of gas attack. I asked the warden what was the idea. He replied:

"We're always a little extra careful when the wind is from the east."

Practically everyone remaining in Dover takes some instruction in first aid. Living in the front line makes one acutely conscious of the advantage of knowing what to do in case of emergency. The first thing to do in learning how to live under fire is to get used to the sight of mangled bodies. A person who cannot stand the sight of blood would be of little use in a bombardment. For that reason simulated gore is used in teaching first aid at Dover.

Catchup and ground meat are the ingredients. It may not sound credible, but I was told that people who get used to catchup are much stronger in the presence of blood. Hamburger conditions workers to what is grimly called "raw meat casualties." People who have been burned are known as "cooked meat casualties." This is not a pleasant subject to discuss; I bring it up to illustrate the courage of the people of Dover and the extent to which they have had to condition themselves to the realities of their position in order to survive.

First-aid and rescue workers have learned



© Illustration, from Black Star

Nazi Bombs Often Change Dover Bus Routes, So Warning and Queue Signs Must Be Mobile

During air raids, or shelling, people waiting in line for buses often hold their places instead of seeking shelter. No one may take advantage of confusion at such times to "crash" the queue—it is against the law.

to take adult casualties; they are still unable to stand the sight of a wounded child.

"I saw a three-year-old boy blown from his crib," a warden said. "One of his cheeks was hanging loose. What do you do in a case like that?"

In digging for people who have been buried, the workers sometimes tear at the debris in a frenzy. This is especially likely to happen if children are known to be in the wreckage.

Dover Is Really a Fortress

It has been found that rescue workers are also affected by the gray color of people who have been buried alive. To accustom them

to this macabre sight, putty and powder are used in first-aid training.

There are many things that one doesn't ask about in Dover. The city is really a fortress and lots of buildings are not what they seem. That little place on the left side of the street, which looks like a tobacconist's shop, may be a pillbox. The place where you bought a bit of fish yesterday has walls six feet thick, with loopholes on the side facing the Jerries. If you will look into that house across the park, you will notice that there is a sandbag barricade in the living room.

Everywhere you go in Dover you see the machinery of war.

If you are walking along the sea front, you will come to a sign warning you that it is not safe to go any farther. That means mines—and possibly other devices which cannot be discussed. The beach, the cliffs, and the surrounding countryside bristle with guns.

I saw some large holes in a hillside and

asked an officer what they were. That, it appeared, was something you don't ask about in Dover. Day and night workmen dig in the cliffs. That, also, is something you don't ask about. After a while you get very discreet in Dover.

Uniforms, as can be imagined, are common. Soldiers are everywhere. The blue-clad lads of the R. A. F. are a part of the life of the city. Sailors—both naval and mercantile marine—are much in evidence, many with the ferocious-appearing black beards affected by British naval officers in the present war. Home Guards and civilian defense workers complete the picture. You see far more men

in uniform than out around Dover.

Cameras are taboo. The local editor has been trying for months to get permission to take some pictures. He seems unable to manage it. Once the Army was agreeable, but the Navy was not. Then it was the other way around. Meanwhile, history was being made and Editor Jones was not getting any pictures. Even with the best of credentials it is difficult to take pictures in Dover. There is just too much stuff that can't be shown.

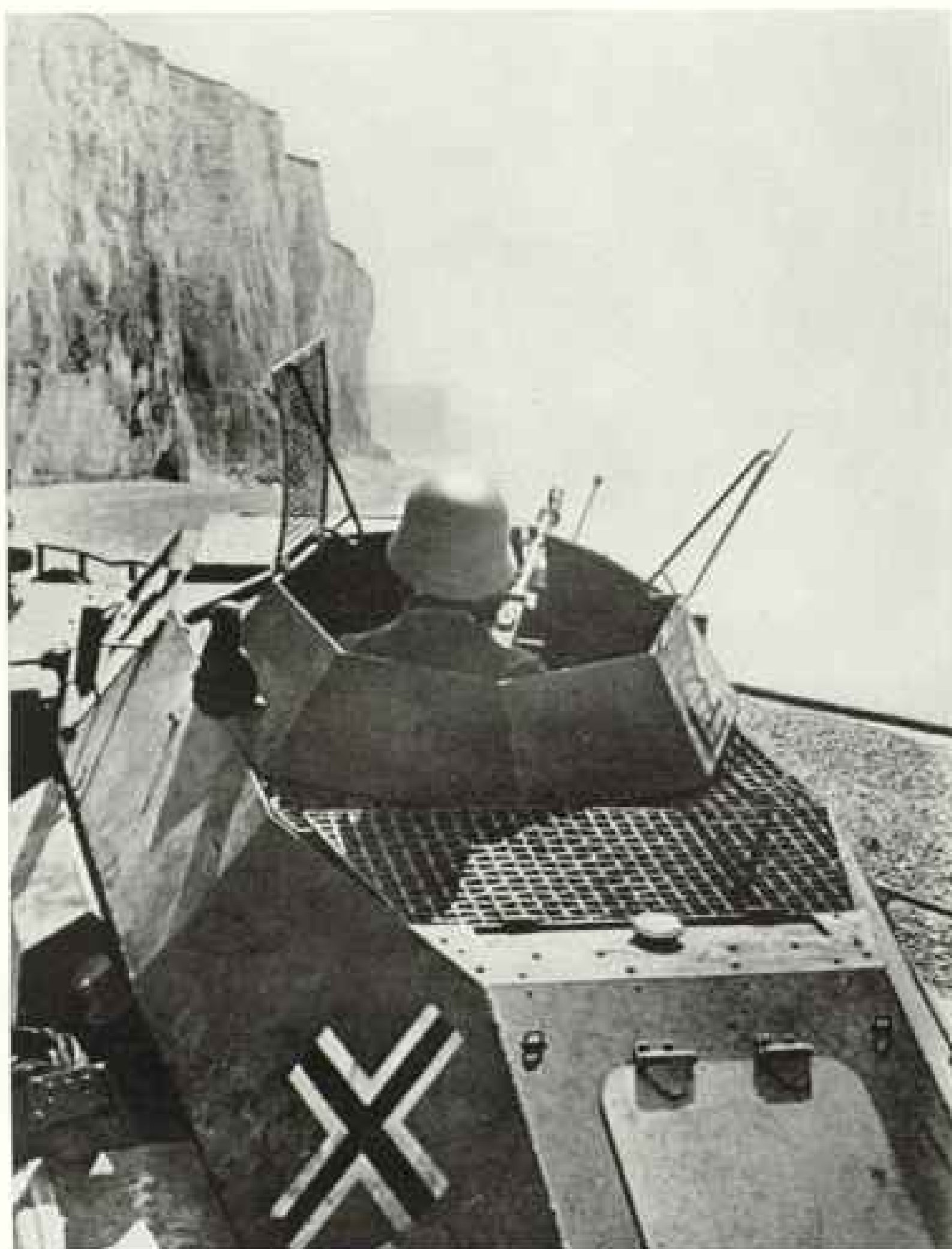
Radio Publicity Tips Off Jerry

Some of the inhabitants, including civil defense workers, were complaining about the British Broadcasting Corporation when I was there. They thought the BBC was far too explicit in its treatment of Channel affairs. At 9 P. M., they said, the BBC broadcast that Dover had been shelled but that no damage was done, since all of the shells fell in the sea. At 9:15, so the story went, the Nazis opened up again and the shells did *not* fall in the sea.

Doverites cite another instance. In this case, the BBC is supposed to have broadcast a statement about the magnificent production being achieved at a certain coal mine in the vicinity. A few days later the enemy bombed the colliery.

I don't know how the controversy came out. Dover keeps right on being big news in Britain; the newspapers and radio naturally pay a lot of attention to their front-line town.

Strangers are not wanted in Dover. That does not mean the people are inhospitable. It does mean that, living under fire as they are, they can't be bothered keeping an eye on



Harvey Klemmer

Panzer Army at the White Cliffs—Picture of Berlin's Wishful Thinking

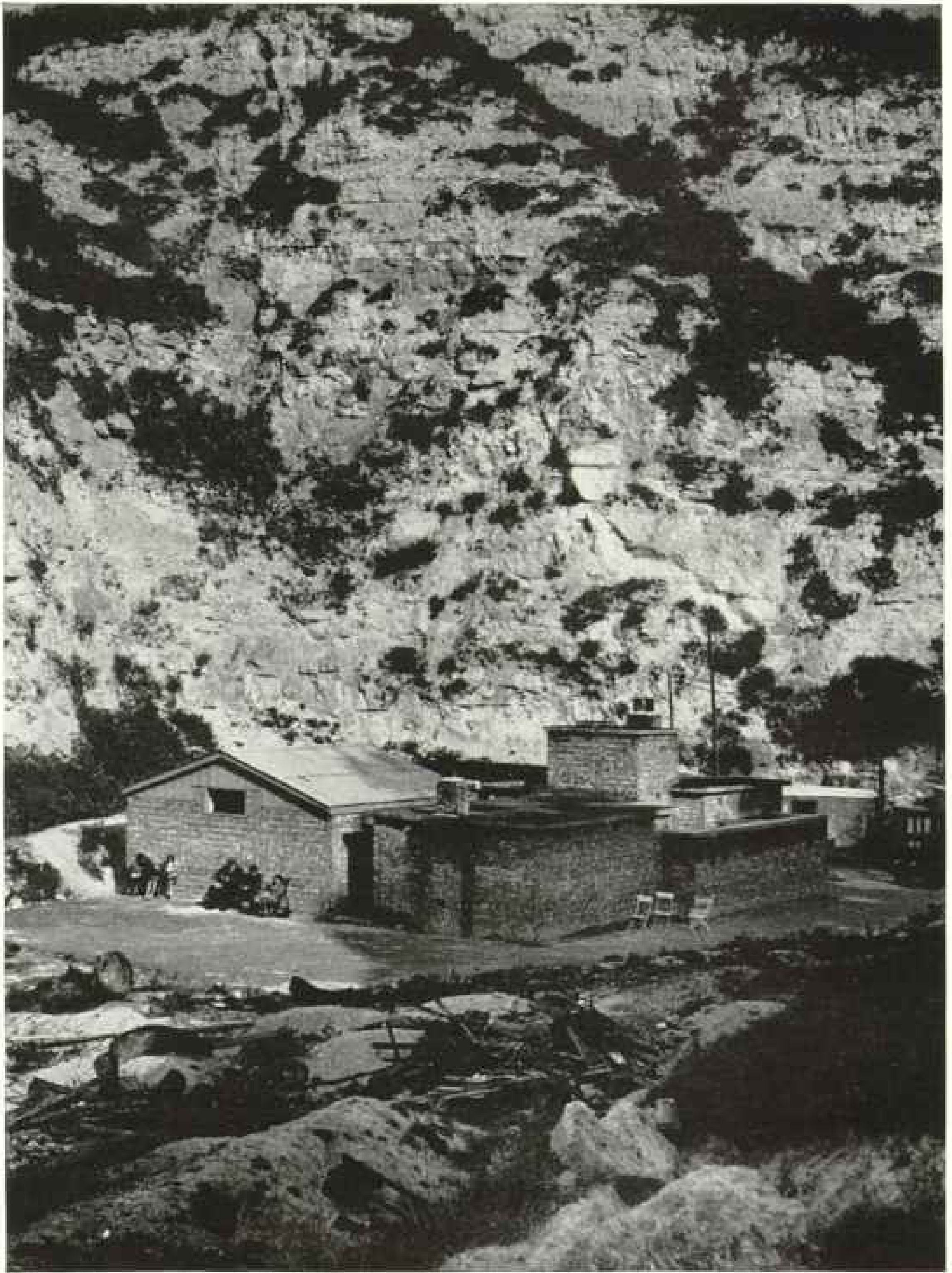
A German photographic studio, superimposing the swastika on Dover beach, developed this fake. The picture was sent to a neutral country to be held for release, presumably on invasion day. The invasion didn't get started; the British did get the film.

people whom they don't know. No one is allowed to enter the town without a pass.

Police officers are stationed at the railroad station and on the roads to stop unauthorized visitors. Regulations have broken the hearts of many persons, who, thrilled by the story of Dover, wanted to see for themselves how the little town manages to carry on.

A couple of boys came all the way from Newcastle while I was there. They never got beyond the station platform.

The authorities admitted me to Dover readily enough, but they were not keen on having me stay there at night. It would be



Harvey Klemmer

Dover Decontamination Station Is Prepared for Poison Gas Shells One Minute Away

Masks are seen frequently here. Wardens have gasproof clothing. During raids cautious townspeople stay close to the station. During lulls they find it a convenient place to sit in the sun. The R.A.F. believes Germany got a whiff of its own poison gas last August when the Leverkusen chemical works were bombed.

much better, they thought, if I would sleep at Folkestone. The hotel accommodations were better. It would be quieter—and safer. I stuck to my guns and finally got permission to stay in Dover. More, I found a little hotel right on the water, with a balcony overlooking the beach—a grandstand seat for whatever might develop.

The normal population of Dover is 43,000. During the worst of the blitz, it got down to 14,500. The number stood at 17,000 when I left, and was steadily increasing as people continued to drift back. The authorities do not like this development. They especially object to the return of women and children. When you are living under the muzzles of enemy guns, you don't like to have any more non-combatants around than necessary.

"Dover is a city of grass widowers," Editor Jones said when I called on him one Sunday morning while he was cooking dinner.

We chatted about Dover history, on which he is an authority. The Cinque Ports (Sandwich, Dover, Hythe, New Romney, Hastings) were once responsible for maintaining the Navy, in return for exemption from army service. The Five Ports also were allowed to have their own courts.

Most of the men have doubled up to ease the burden of keeping house. They usually cook for themselves; otherwise, they eat at their civil defense centers or at one of the government-sponsored British Restaurants. I asked a couple of chaps how they went about keeping their place clean.

"That's easy," they said together. "We let the dirt accumulate for a week, then have a blitz on Sunday."



Harver Klemmer

They Mend the Maimed

Three Dover war nurses chat in front of a blast wall protecting the entrance to a cave shelter. Seventeen-year-old Joyce Fagg (center) is a decorated heroine of Dover's long siege (page 119).

Women who remain in Dover are expected to take their places beside the men in carrying on the work of the city, including civil defense. Women are doing many kinds of work once carried on exclusively by men. The driver of a car furnished me by a local garage turned out to be a woman, a mere slip of a girl who had driven through a hundred bombings and shellings and had had more than one narrow escape in the process.

The split families are pathetic. Because of travel difficulties and the press of duty, the men are not often able to get away. Some of them have not seen their families for a year or more.

An irony of the situation is the fact that Dover was designated, at the beginning of



© Illustrated, from Black Star

Alert! Children Pop into an Air-raid Shelter at a Bus Stop in Canterbury

"It's second nature with them now," the woman conductor told the photographer. "They wouldn't leave Kent for anything." The bus pulled into the historic town on its way from Dover, just as the alert sounded. In background, Church of the Holy Cross.

the war, as a so-called "reception area" for the women and children of large cities. The City Fathers, foreseeing that their town was to become a front line, flatly refused to accept any evacuees from other areas. It is well that they did, else casualties at Dover might have been much higher. Even as it was, evacuees were sent to the country behind Dover, which proved to be hardly less unhealthful than the city itself.

It must have been a heart-breaking moment when the children of Dover were sent away. To prevent tearful farewells, parents were instructed to pack lunches and send the children to school as usual. No one knew where the children were going. They were loaded into trains (which were likely to be machine-gunned at any moment) and taken west.

A few days later each household received a postal card telling where little Betty and little Bobby were and under what conditions they could be visited. Yes, the mothers and fathers

of Britain have had to endure much to preserve their island kingdom.

The White Cliffs Furnish Shelter

Dover is fortunate in one respect: There are caves in the cliffs sufficient to shelter most of the population during raids. These caves are proof against the heaviest bombs. Since shells fall vertically, they are also proof against shells. The cliffs are solid chalk, and there is up to 180 feet of it over the caves.

There are 12 of these cave shelters in the cliffs (pp. 123, 131). One of them has a capacity of 5,000 people, and altogether they can accommodate 12,000 persons. In addition to the deep shelters, there are surface shelters capable of accommodating 6,000 persons.

The caves are equipped with everything needed to sustain the occupants for an indefinite period. There are stocks of food and water. Heat, light, and cooking facilities are provided. There are underground hospitals,



Harvey Klammner

"Now I Lay Me Down to Sleep"

This child cannot remember sleeping anywhere but in a cave. She has her own double-deck bunk with wire netting for springs.

including operating room and decontamination centers.

The nurses frequently have to work under fire. One of them, Joyce Fagg, age 17, was given a medal for treating, while the town was under bombardment, a soldier whose leg had been blown off.

Shelter marshals chosen for their kindness and tact are on duty in each cave.

There are canteens in some of the caves, where snacks are served at all hours. In addition, mobile vans from the British Restaurants make the rounds during raids. Two of the vans were donated by organizations in the United States, a kind of Anglo-American collaboration deeply appreciated by the people of Britain's front-line town.

The Dover caves at night are a never-to-be-forgotten sight. Some 1,500 people were sleeping in the caves when I left. There were old, old people and hundreds of the very young. On one hand mothers would be nursing their babies; a few feet away children

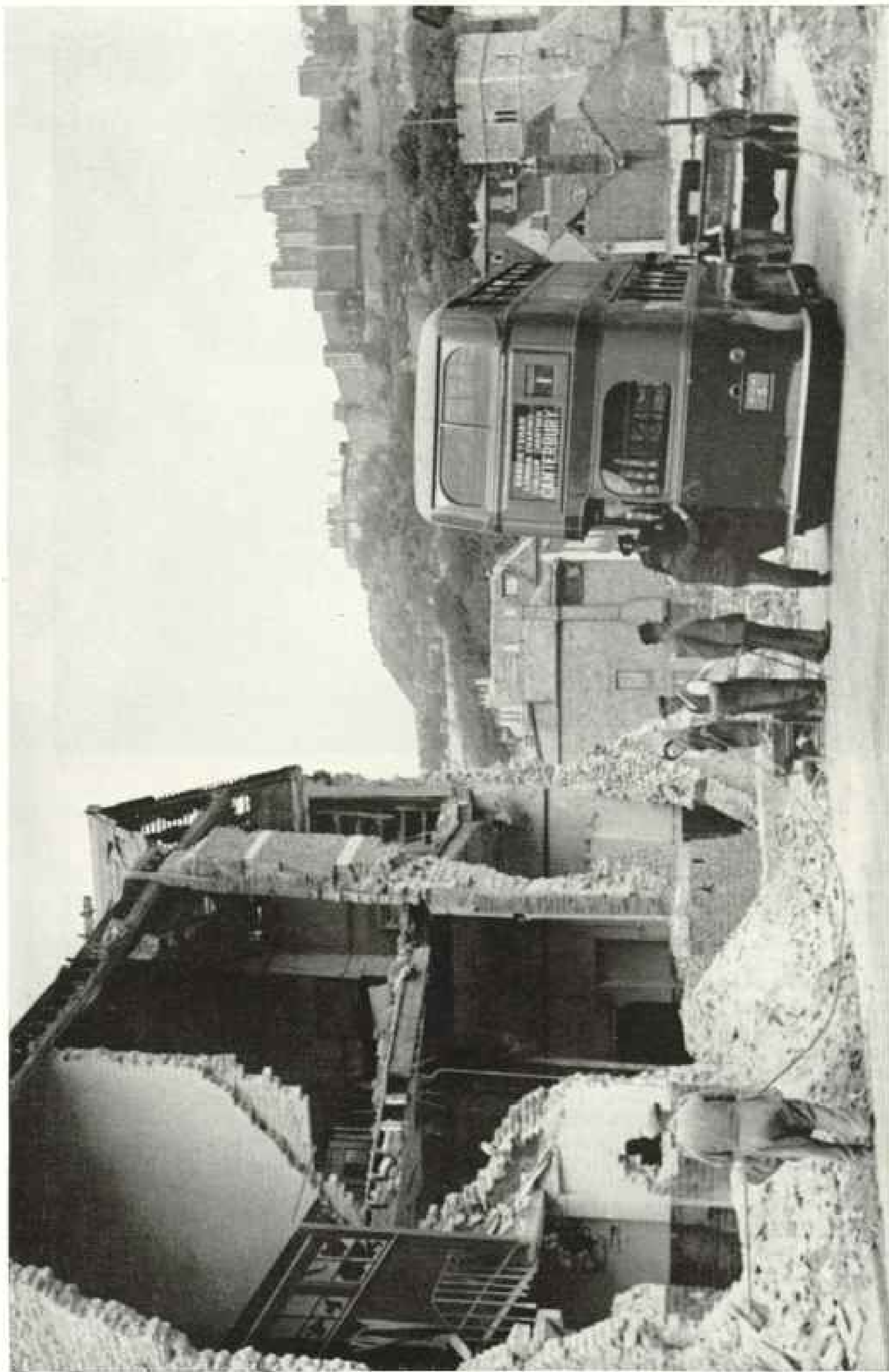
were romping on the floor, while beside an adjoining bunk a coterie of old ladies knitted briskly. Around the stoves at the mouths of the caves ruddy-cheeked men would be playing a fast game of rummy.

The scene reminded me of something from another world; yet the people were matter of fact about it.

A troglodytic existence has been re-created in these caves. People die there; couples are married; babies are born. I saw some miners from a coalfield near by. All day they dig coal. At night they sleep in the caves. The only time they see the sky is on their way to and from work.

Caves in the Dover Cliffs a Mystery

The origin of the caves is shrouded in mystery. Some of them undoubtedly were caused by the action of sea water. Others are believed to have been dug by smugglers. Still others are said to have been used to house French prisoners during the Napoleonic wars.



© Illustrated, from Blue Star

This Bus Driver Keeps His Own Schedule on the Dover Road—Nazi Bombers Are No Respecters of Timetables

Keeping buses running in this war-torn corner of England requires an East Kent Transport Column of 130 vehicles and a staff of cooks, fitters, gunners, mechanics, motorcyclists, ambulance men, and nurses. Many drivers were killed and wounded, buses machine-gunned, and garages blown to bits. Dover Castle in background.



Acme

Children Keep Right on Playing in Dover's Streets—a Long-range Shell Could Wipe Out This Happy Group

The popular song about Dover and its absentee bluebirds says, "There'll be love and laughter . . . when the world is free." These boys and girls smile in the midst of terror. Some of them, since evacuated, have returned to take their chances on familiar sidewalks.



Girls Man a Range Finder 20 Miles from Enemy Lines

Calculating the height and range of German planes is the job of this crew of the Auxiliary Territorial Service at Dover. The Lance-Corporal and her team relay their findings to the director for calculation. All four wear battledress.

Somebody must have used the caves in past centuries, for one occasionally comes upon figures carved in the chalk in a manner obviously not of modern times.

One tunnel was dug in the last war as an experiment. British sappers planned to dig a hole through Hill 60 on the Western Front. To gauge the time it would take, and to try out a new rotary cutting machine which had been placed at their disposal, they practiced on the Dover cliffs. The immediate result was a first-rate tunnel capable of sheltering 1,600 people.

One of the tunnels runs into the cliff for half a mile. Tunneling is still going on.

In addition to providing protection against shells and bombs, the caves would come in handy in case of invasion. The townspeople believe that they could hold out for weeks, even months, in these vast labyrinths if the enemy should succeed in crossing the Channel.

The people of Dover are invasion-con-

scious. They have seen with their own eyes the preparations of the enemy for an assault on Britain. They received the bulk of the battered armies brought back from Dunkirk. They witnessed—and participated in—the Battle of Britain, universally recognized as the prelude to what was to have been the subjugation of the British Isles. The people of Dover know, better than anyone else, how near the country was to disaster, and they are not sure that the Germans have yet abandoned the idea of taking a final crack at them.

Meanwhile, between raids from the air and shellings from the French coast, the people of Dover go about the everyday business of living. They raise their children and go to church and shop and till the fields just as they did in time of peace. Community life has proved to be stronger than Nazi explosives.

The health of the people remains good—better indeed than it was before the war.



British Official

A Dover Defense Gun Casts a Cyclopean Eye toward the Invader Who Never Arrived

This 9.2-inch rifle guarding the island "aircraft carrier" is intended to "repel boarders." It does not take part in cross-channel duels. From its railway mounting it fires a 380-pound shell.

Despite the fact that they sleep in damp caves, there have been no epidemics except a mild outbreak of measles.

The cinemas are crowded; also the Royal Hippodrome, Dover's famous variety house. The buildings may shake and the curtains billow from blast, but the show goes on. The theater operators used to interrupt the picture in movie houses to flash a sign on the screen announcing alerts. Now they superimpose the warning over the film so that none of the picture is lost.

Nobody Gets Panicky at an Alert

Men play darts in the pubs, as they always did. They shove coppers over a board in the ancient and economical game of "pushpenny." They dig in their gardens and strive mightily to bring out a new variety of rose. Women crowd into Biggin Street to shop. Children romp in the playgrounds. Boys and girls stroll in the evening.

One Sunday morning there was a terrific

blast under my window, which looked out on the Channel. I ran out to the balcony. The gunners below were giving Jerry a pasting. They sent over about a dozen shots, all told.

Everyone knew that Jerry, if events ran true to form, would reply in about 10 minutes. People should have been running for shelter. They were not. Guests at the hotel came out with their coffee cups in their hands. A young couple remained seated on a bench below. A middle-aged gentleman walked sedately along the sea front, puffing on his pipe and pushing a pram.

There was an alert the first afternoon I was there, while I was having tea. Nobody paid any attention to it. That bothered me. I told the proprietor of the shop that I was making some pictures of Dover at war and wanted to get a shot of people running for shelter. He laughed uproariously.

"You'll have to pose 'em if you do," he said. "Not many people go to shelters. Even if they did, they certainly wouldn't *run*."



© Illustrated from Mark Star

Dover Bus Drivers and Woman Conductor Enjoy a Spot of Tea

Their mobile canteen, parked on a side street, once was a double-decker bus. Another old bus serves as the bus company's local office. A Nazi bomb fell in the street outside the original company building, ripped off the front, killed 14 people, and hurt 30 more.

People are so used to shells and bombs that they sometimes do not hear them go off. A land mine went off one night with a terrific detonation. Several buildings were damaged, and debris was thrown over a wide area. A warden, looking for the scene of the explosion, encountered a soldier and a girl strolling in the blackout.

"Where is it?" the warden asked.

"Where is *what*?" replied the soldier.

Dover is scared but defiant, and good-humored about it all. When the watchmaker's shop was blown to pieces, he did not go around moaning about his loss. He had the town in stitches describing his difficulties in trying to put the watches together again.

The food is good—not too plentiful, but enough. There are plenty of cigarettes; however, matches are a problem. A WREN, just back from London, brought a box of matches with her. She spread them out in the lounge of the hotel and carefully counted them.

"Seventy," she gloated. "Seventy matches!"

We had eggs for breakfast the first morning I was there. A woman at the next table could hardly believe her eyes. It was her first egg in nine months.

The town council meets as usual, although

two of the members have been killed. The municipal court is in the same building. Once when things got too hot, the judge adjourned court to the basement of police headquarters. The prisoner, a woman, came along. Everyone had tea, and court was reconvened with great dignity.

Outside the Town Hall in Brook House Gardens the park keeper mows the Cumberland turf of the bowling green as tenderly as ever. The council has the usual discussions about new drainpipes, cross-Channel traffic, and so on, for which they are roundly chaffed by the townspeople. The mayor, J. R. Cairns, runs a pub in his spare time.

Schools Get Frequent Recesses

The schools, which were closed for a time, have been re-opened, even though the children have to pass much of their time in the shelter trenches which have been dug outside of each school. With six, eight, and 10 alerts a day, some lasting more than an hour, there is not much time for study.

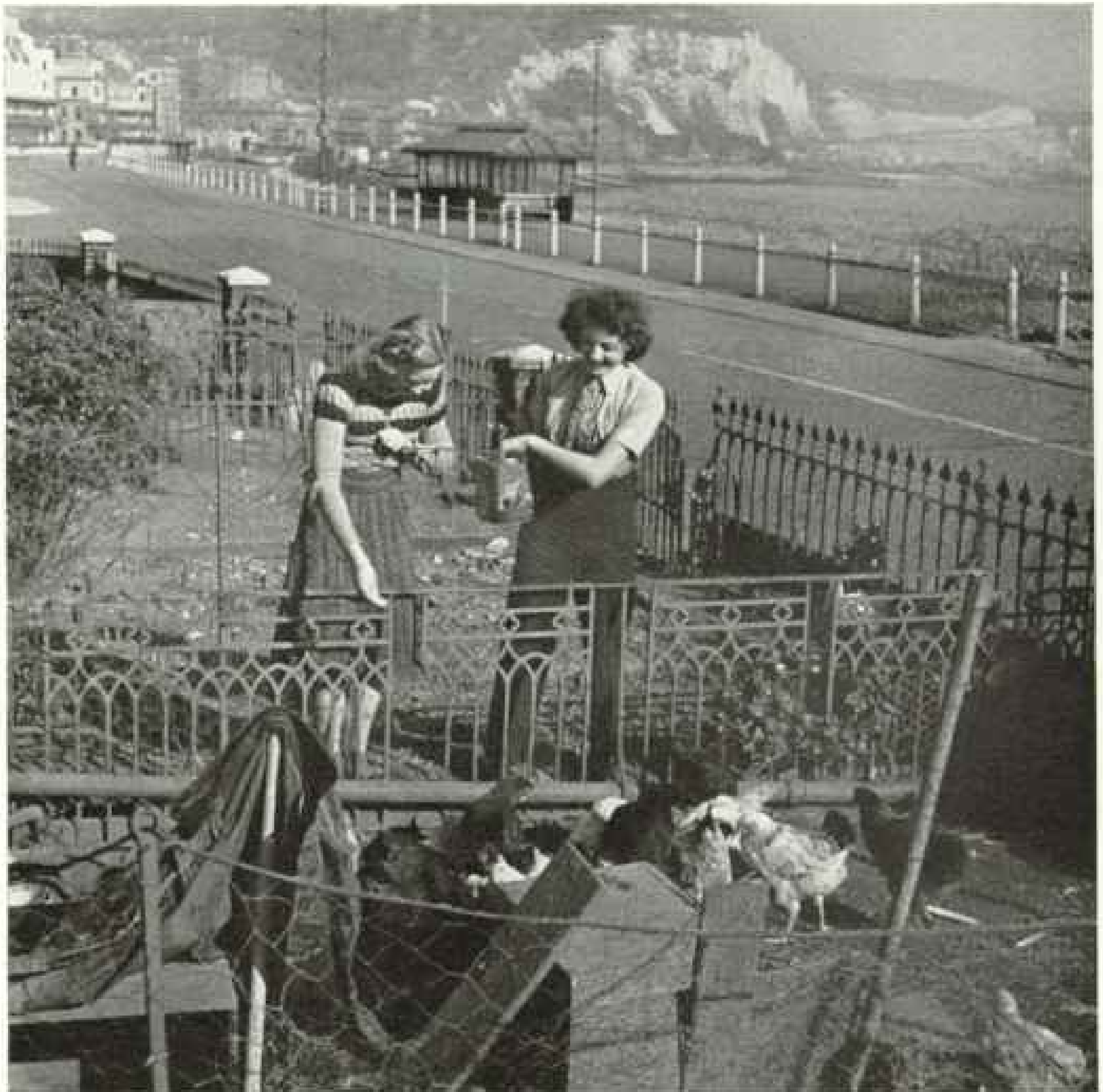
One teacher told me that they try to work in the trenches, but that the light is too poor. However, they do do a lot of singing, which takes care of the music period at least.



International News

This Book Shop Is One of Dover's Many "Front-line" Stores

Distinction of being closest to the enemy is considered good advertising. This store claims to be just "over the fence" from Hitler. Its most popular books are those about Dover itself. As in the United States, blackouts in England have given enforced home-stayers more time for reading.



© "Illustrated," from Black Star

Raising Chickens under Fire Is Everybody's Business in "Hell's Corner"

Eggs are scarce in wartime Dover. Almost everyone keeps a hen house to supplement the three-a-month egg ration. This flock occupies a once-fashionable flower garden facing the seaside promenade.

It would be idle to deny that the education of the children of Dover has suffered. Some of them, evacuated to isolated districts, have not had any schooling for a couple of years. The grades are all mixed up. I saw an eight-year-old learning the alphabet.

People still die from natural causes. You get a shock to read that Mrs. Brown has died of pneumonia. Somehow, in the presence of violent death, natural death seems out of place. But babies are still being born.

Miss Winifred Scanlan, head of the local telephone exchange, was awarded the British Empire Medal for devotion to duty. Miss Scanlan is a middle-aged woman who keeps the telephone lines open no matter how much

enemy blitz may be coming over. She sees nothing unusual about her attitude. She and her sister operate a small hotel on the sea front. Miss Scanlan showed me her award. She wears the bar every day, wears the medal only when she is "dressing up."

Mr. Libby, the postmaster, still dispenses stamps, pensions, money orders, and telegrams. Says he, "As long as there is any business, I'll be here." He will be, in carpet slippers and a deerstalker hat, despite the fact that his post office is in the center of Shell Alley and has been hit three times to date.

The Postmaster General wrote to Mr. Libby to congratulate him on his "courage and determination" in maintaining the public serv-



Harvey Klumner

In His Cave, Blitz Baby Is Safe from Shell and Bomb

Dover mothers like the security of 100 feet of rock above their children. Here a child is tucked in a "duration" bed.

ices "in difficult and dangerous circumstances." When reporters came around, the doughty postmaster said, "Why all the fuss? If Mr. Morrison had said I would be let off income tax for five years, that would be something to get excited about."

Danger Spots Preferred Business Sites

Frank Vickery has been bombed out five times, but he is determined to keep his lunch stand going.

Mrs. Rose Philpott runs a tea shop high on the cliffs. She probably saw more of the Battle of Britain than any person in the country.

Merchants vie for the distinction of being

closest to the enemy. There is a front-line bookshop (page 125), a front-line ice cream stall, a front-line hotel (where I stayed). Postmaster Libby is proud of the fact that he sells stamps closer to the Nazis than any other postmaster; wardens and firemen compete for the privilege of serving in the most advanced posts.

There is also a front-line farm. It is operated by a hero named George Mitchell, his wife, and his sister-in-law. The farm is pitted with shell and bomb craters; Mrs. Mitchell has had to nail her curtains to the wall to keep them from being blown off the rods; many of the farm animals have been killed; people are machine-gunned in the fields.

Mitchell carries on. When he hasn't anything else to do, he goes out and picks up shell splinters, of which he has more than half a ton piled by the front door.

"Souvenirs?" asked a visitor.

"Hell, no," said Mitchell. "Salvage."

Mitchell has been awarded the George Medal for heroism (meaning farming) under fire. The women got the British Empire Medal for sticking it out with him.

Bathing at the beach used to be permitted. It was stopped for civilians because of constant machine-gunning by the Nazis. However, the crews of gun batteries still bathe. That annoys the citizens, who are loudly demanding that the beaches be re-opened to them this summer, Germans or no Germans.

Front-line cricket is still played, on a field atop the cliffs. A game was interrupted—but not canceled—when one of the players was killed by a shell.

Everybody collects souvenirs. People find the scenes of hits at night by following the smell of burning powder. When it came time for me to leave, the police were grieved to learn that I did not have a chunk of shell. One of the wardens knew where there was a good piece, buried in a tree. He went out with a hatchet and in a few minutes came back with a beautiful specimen.

Conversation runs to the macabre. It would be unnatural for people not to talk about the tremendous drama in which they are participating. First words you hear from a new acquaintance are apt to go about like this:

"I lost a chap in my sector last night. It was his own fault. He had already lost an arm. Still, he insisted on going for a walk. One of his legs was blown off by a shell. He died before we could get him to a hospital."

Dover is conscious of its importance to the world, but modest about it. "We've not really been blitzed," said Alderman Goodfellow. "Just chivvied around." Alice Duer Miller's narrative poem, *White Cliffs*, is very popular. So is that American song hit containing the line, "There'll be bluebirds over . . ." even though nobody ever saw a bluebird around there.

No Foe Ever Took and Held Dover

The people of Dover are students of history, especially their own history. They have a great heritage. It was always a great landing place, even in Roman times. Richard the Lionheart assembled his knights here for the Third Crusade.

Off Dover the Spanish Armada was dealt its first serious blow. The Romans couldn't hold

these islands; neither Napoleon nor Philip of Spain could take them. The Kaiser bombed Dover and shelled it from the sea, but he ended up at Doorn. Hitler has punished this town in a manner endured by few cities in the history of the world. The town has survived, and the people look confidently forward to the time when the Fuehrer will take his place with the others who undertook to assail this island—and lost.

Men of Kent and Kentish Men

Back in the tenth century, when Britons were battling the Danes, there arose a distinction between those who lived east of the Medway and those who lived west of it. Those in the first group were known as the Men of Kent; those from the other side of the river were called the Kentish Men.

The distinction still applies, and there is much friendly rivalry around Dover between the two groups. They are united on one thing, however—the utter necessity of crushing the enemy if peace ever again is to come to the tortured continent of Europe.

Once the sky was black with the ill-omened birds of Goering's Luftwaffe. The Men of Kent, accompanied by the Kentish Men, went into the fields with clubs to await the arrival of enemy paratroops. Today that is all changed. Most of the planes are going in the other direction. And the invasion, when it comes, will also be outward bound.

Kent, once the target of enemy attack, has become a springboard from which a modern Richard leading an army of 20th-century Crusaders may well plunge straight to the heart of the hosts of infidelity.

The sirens were going when I left Dover. It gave me an eerie feeling to be taking leave thus of the good friends I had made there. It gave me a feeling of guilt, as if I were running out on a brave and friendly town which has held the fort overlong. However, I had no choice in the matter and reluctantly went on my train.

Suddenly the rise and fall of the sirens changed to a series of short, sharp blasts. The blasts were of such compelling urgency that I got a tingly feeling in the middle of my spine.

"What does that mean?" I asked an elderly man in the next seat.

"Oh, that," he replied casually. "That means they are directly overhead."

There was the dull boom of an explosion in the distance. The elderly man turned the pages of his paper. The engineer gave a shrill toot on the whistle. We pulled out of the station and headed slowly for the open country.

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-six years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1919, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

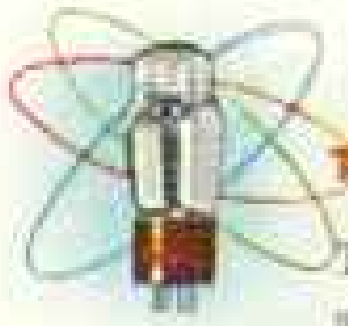
On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took slot in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

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

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

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

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

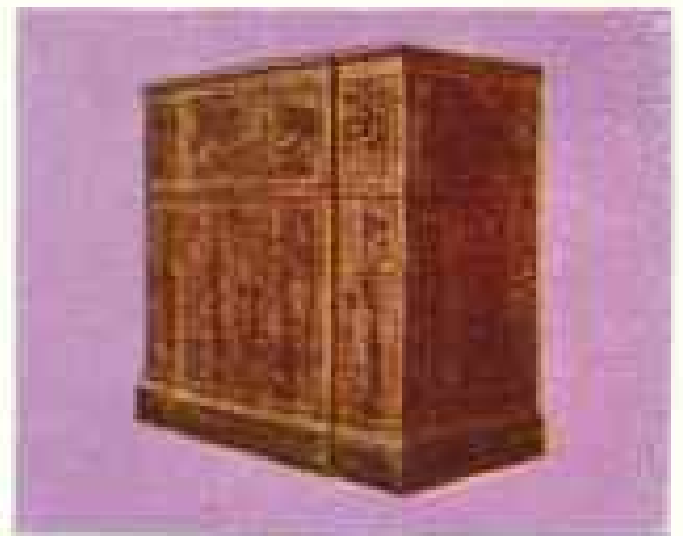


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Trumpets sound. Cries of *Olé! Olé!* The shaking of castanets, and a distant chant. *Le Tricorne* begins! . . . So brilliantly does the Musaphonic recreate the subtlety and the humor of De Falla's music, that you almost see the dancers before you! This superb radio-phonograph, product of General Electric electronic research, is endowed with a tone of astonishing realism. Today General Electric is engaged in war production only, though the Musaphonic with FM (Frequency Modulation) is bringing music's rewards to many owners. Tomorrow, research will offer a still finer instrument.



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Regardless of weather conditions, the trains are going through. Carloads of war materials, thousands of troops, are being transported without undue delay. Every minute counts.

War has re-awakened America to the vital part railroads play in the nation's life at all times. In addition to transporting normal, essential freight, the railroads — by their performance in handling the enormous wartime traffic — have won the unstinted praise of high-ranking government and military officials.

This achievement has been due to the tireless effort of employes, keen edged efficiency, the whole-hearted cooperation of shippers, and the remarkable progress in rail transportation engineering during pre-war days.

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Meanwhile the Scott's amazing fidelity brings our men-at-sea (with never a telltale leakback to the enemy) the vital messages of war, or those longed-for programs from home. With all the famous Scott handcrafting skill we are building Marine Models faster and faster, to fit out newly launched ships of the Navy and Merchant Marine, and for our gallant older ships that once were forced to sail in lonely silence. . . . And are *you* buying bonds, bonds, and still more bonds, to hasten the peace and your appointment with the Scott of your dreams?

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most difficult for a
radio to capture . . .
but listen with any
musician and hear
his Oh's and Ah's at
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Sperry Gyro-Compasses of Chrysler Corporation manufacture are installed on aircraft carriers, transports, sub-chasers, destroyer escorts, tankers, mine sweepers, net tenders, and ocean tugs.



Assembly of thousands of parts of this sensitive instrument continues in large quantity by Chrysler Corporation production methods.



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A CRITICAL SITUATION! Enemy magnetic mines were playing havoc with ocean shipping.

Scientists overcame the menace. But the "remedy" made the ordinary mariners' compass useless. Thousands of Gyro-Compasses, which are

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One of a series of incidents in the lives of immortal composers, painted for the Magnavox collection.

Only 20 Cents for Music that is Immortal

THROUGHOUT his short life, the genius of Franz Schubert met with little recognition. Often he lacked money to buy paper on which to write his music. And for some of his most lovely melodies, he received nothing more than a few pennies.

Yet, in spite of poverty, hardships and disappointments, Schubert is not a tragic figure. His gay and charming spirit won him a host of good friends. And from his early youth, he knew that deep, inner satisfaction that comes to those who have the gift of creating great music.

Today, critics hail him as the "greatest poet of music." For sheer lyrical beauty, his work has never been surpassed. To enjoy Schubert's immortal songs to the full, hear them played on an instrument that

does justice to their greatness. Hear his *Serenade* or his *Ave Maria* on a Magnavox radio-phonograph. Because of its incomparable tone and clarity, the Magnavox is the instrument that many of the most illustrious musicians—Rachmaninoff, Kreisler, Horowitz, Ormandy, and Rodzinski, to mention only a few—have chosen for their own homes.



Today the Magnavox Company is producing electronic and communication equipment for the armed forces and music distribution systems for warships—and has won the first Navy "E" award to be given in this field. When the war ends, Magnavox will again take its place as the pre-eminent radio-phonograph combination. The Magnavox Company, Fort Wayne 4, Indiana

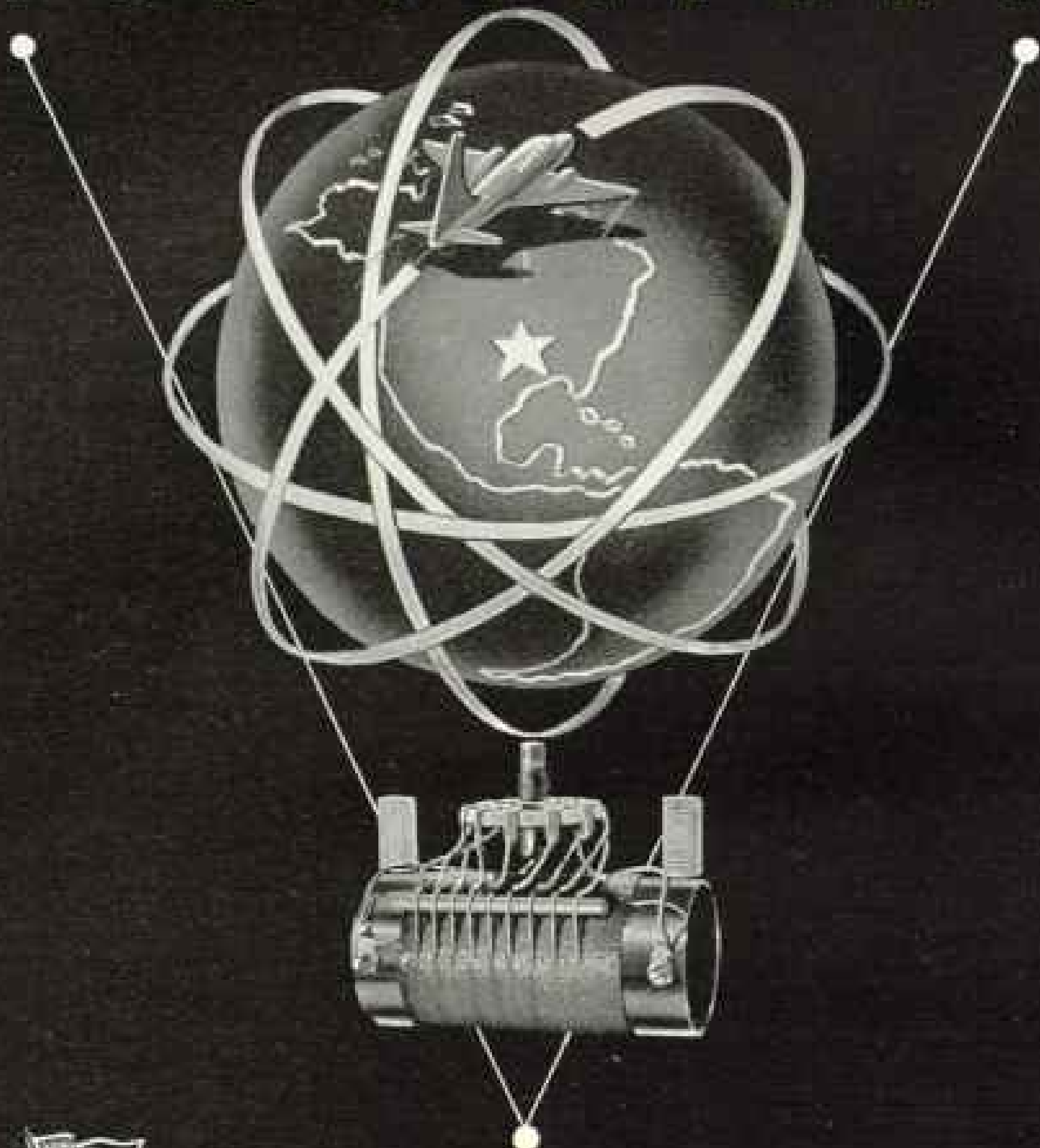
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Helping the tire maker: Pictured here is a laboratory model of the new Westinghouse-developed "mass spectrometer," an adaptation of which analyzes gases with incredible swiftness and accuracy. Right now, one of the most important of its many uses is speeding up tremendously a step in the making of synthetic rubber.

Westinghouse research accepts every wartime challenge . . .

Under the spur of war, Westinghouse research is delving into numberless mysteries, not only in the vast field of electricity and electronics, but also in chemistry, physics, metallurgy, plastics. And as a result, out of the great Westinghouse laboratories has come a steady stream of new war products, and new and better ways of making old ones.

Westinghouse research develops new talent for America . . .

To Westinghouse, each year, come several hundred budding scientists and engineers—to work, to learn, to blaze new trails in electrical research. And each year, through more than 100 Westinghouse scholarships, young men enter America's engineering colleges to develop the native skill and talent that have made America great and will make it greater.



Westinghouse research promises new wonders for peace . . .

You have heard much talk of the marvels science will offer you after the War. Well, there *will* be marvels—plenty of them—and Westinghouse research is working to contribute its full share. But we will never lose sight of what we consider our first duty: seeing that, beyond all question, each Westinghouse product, old or new, is the very finest of its kind. Westinghouse Electric & Manufacturing Co., Pittsburgh, Penna. Plants in 25 cities, offices everywhere.



Their ears have heard

The music of the morrow



DURING this holiday season the high school pupils in a little Illinois city are having an unforgettable experience.

They are hearing the richest voice born of the new science of electronics, singing carols with the age-old promise... "On earth peace, good will towards men."

Only *one* such voice sings today. For, at war's outbreak, research had just been completed on only one Meissner radio-phonograph, designed to revolutionize all standards for reproduction of sound in the home.

That laboratory model is on loan to the high school of Meissner's home town, Mt. Carmel, Ill. There the pupils are enjoying a musical experience you also may share when this instrument

is marketed after victory. When that day comes these are advantages you may expect:

FREQUENCY MODULATION—plus advanced electronic fidelity and tonal range greatly surpassing that found in any home radio-phonographs now in use.

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A COMPLETE HOME RECORDER...DISTINGUISHED CABINETS...NEW IDEAS already being engineered into Meissner electronic equipment for our armed forces around the world.

☆ ☆ ☆



TO ARMY AND NAVY EXPERTS in electronics, the Meissner name plate is as familiar as it has been for years to advanced amateurs and professional radio engineers. For excellence in the production of electronic equipment, Meissner has been awarded the Army-Navy "E" with additional star.

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The Zenith Hearing Aid can be supplied only by your Zenith franchised Optician or Ophthalmist (no home calls or solicitations).
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Zenith Radio Corporation

CHICAGO

OFFICE OF
L. T. McDONALD, JR.
PRESIDENT

To: Manpower Authorities, Employers, Physicians,
Parents, Teachers and Hard of Hearing.

Our country's manpower crisis calls for everyone's maximum efficiency. Since I lost the hearing of one ear in an accident twenty years ago, I have been acutely conscious of the handicaps of the hard of hearing. While pioneering in radio I have for some years directed Zenith's research toward development of the best wearable hearing aid that science could produce.

My own company has spent millions, the radio industry tens of millions for research. This research has been paid for by scores of millions of purchasers of radio sets.

We, with this technical knowledge and engineering skill, now bring to the hard of hearing a new precision aid — the ZENITH RADIONIC: an instrument of the highest quality.

A hearing aid is essentially a part of a radio receiver. It wires the human body for sound. It is composed of a crystal microphone and parts of a radio receiver set reduced to miniature size and manufactured with watch-like precision. For many years it has seemed to me incredible that the public could buy a complete radio receiver for \$29 or less with which they could hear the words whispered in Europe, Asia, or South America, but people with deficient hearing have paid \$100 to \$200 for a comparably good hearing aid to hear the human voice across the room.

Zenith's facilities and methods for precision mass production of radio sets, Radionic devices, etc., enable it to bring this superb hearing aid within the reach of all.

Eye-glasses, like hearing aids today, were once the luxury of the few. What the optical cooperatives have done to make the finest spectacles available to everybody at low cost, Zenith is now prepared to do for the hard of hearing — to bring with the aid of modern radionic science a highly perfected hearing aid within the reach of the masses.

ZENITH RADIONIC — low cost battery snap-on wearable hearing aid — complete with miniature radio tubes, crystal microphone and batteries — will sell for \$40 — about one-quarter of the price of the better vacuum tube instruments of today. Hereafter no one, child or adult, need be without a hearing aid because it is too high-priced. There are ten million people, of whom over three million are children in our schools, who are hard of hearing.

Even if Zenith never takes a dollar at this low price, it is willing to take its pay in the good will of the hard of hearing, their families and their friends. Thus begins a revolution in hearing aids — a revolution to "lower the cost of hearing" within the reach of all.

L. T. McDonald, Jr.

President,
Zenith Radio Corporation

Write for Free Descriptive Booklet
ADDRESS DEPT. NG-1, HEARING AID DIVISION
ZENITH RADIO CORPORATION • CHICAGO 39, ILLINOIS





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Firepower of a Fortress

This is a sight that Axis pilots have learned to dread.

It is one of the reasons the Japs announced that America had introduced a "four-engine fighter plane," when a new model of the Boeing Flying Fortress* first went into battle action in the Pacific.

It is why British Air Chief Marshal Sir Philip Joubert recently declared: "It almost looks as though the Fortress type of bomber has defeated the contemporary fighter."

The main job of the Fortress is, of course, high-altitude precision

bombing. Its objectives are often deep in enemy territory, hundreds of miles beyond the range of fighter escorts. Fortress crews, therefore, must be equipped to handle the hottest opposition the enemy can send against them.

They are! Each Fortress can spit thousands of bullets in any direction, with deadly accuracy up to half a mile. A formation of 18 Fortresses can place a curtain of fire around itself totaling more than 5 tons of lead a minute!

That's why the Fortresses are chosen, day after day, for the

toughest assignments. Their crews are among the finest in the world. In addition to the almost unbelievable accuracy of their bombing, they have earned for the Fortress the description of "deadliest fighter-plane destroyer of the war."

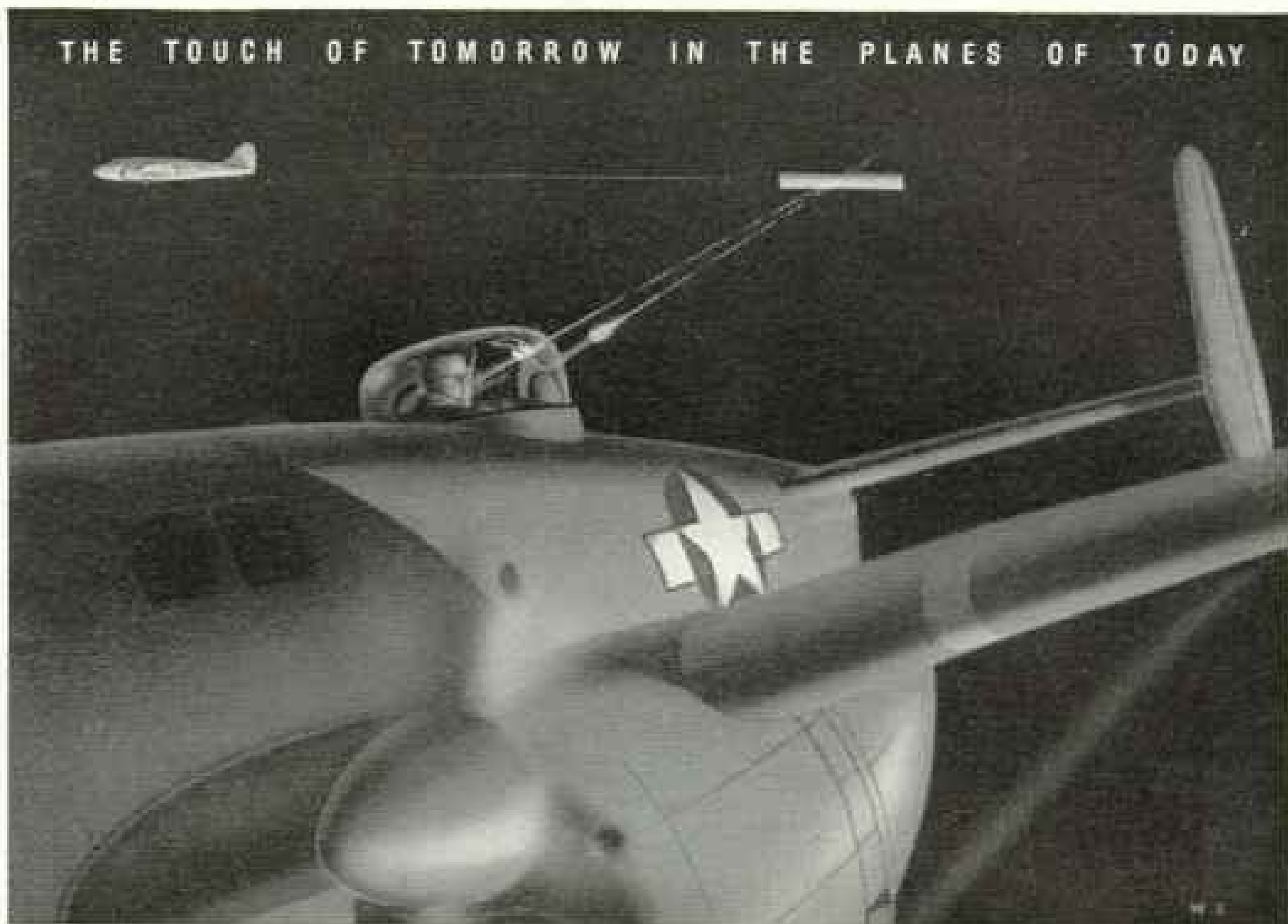
You will find that Fortress crews have deep respect for Boeing design and engineering, wholehearted confidence in Boeing integrity of manufacture. They have good reason to know that . . . if it's "Built by Boeing" it's bound to be good.

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS

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*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS

THE TOUCH OF TOMORROW IN THE PLANES OF TODAY



It All Adds Up To Subtracting Zeros

Today's apprentice gunner enters a deadly trade—defending American bombers against vicious attacks of Jap Zeros and other heavily armed enemy fighters.

To follow his trade and survive, the gunner first has to learn how to "polish 'em off around the clock." His training must be thorough and painstaking, and it must come within a hair's breadth of being the real thing. That's why Fairchild developed the GUNNER.

This advanced trainer has the essential characteristics of the bombers from which our student marksmen will soon shoot it out with Axis pursuits. From a power turret,

similar to one on a Flying Fortress, each fledgling is taught to pick off tiny targets while moving at better than 200 miles per hour. It's fast, tricky work and it takes a keen eye, steady nerves, precision equipment. It's the kind of training that pays off when the chips are down.

Fairchild's GUNNER, from which apprentice marksmen step into bombers and thence into action, is one of the largest, speediest training planes used by the Army Air Forces. Powered by two 12-cylinder, inverted, in-line, air-cooled Ranger engines, the GUNNER is a typical example of Fairchild's "touch of tomorrow in the planes of today."

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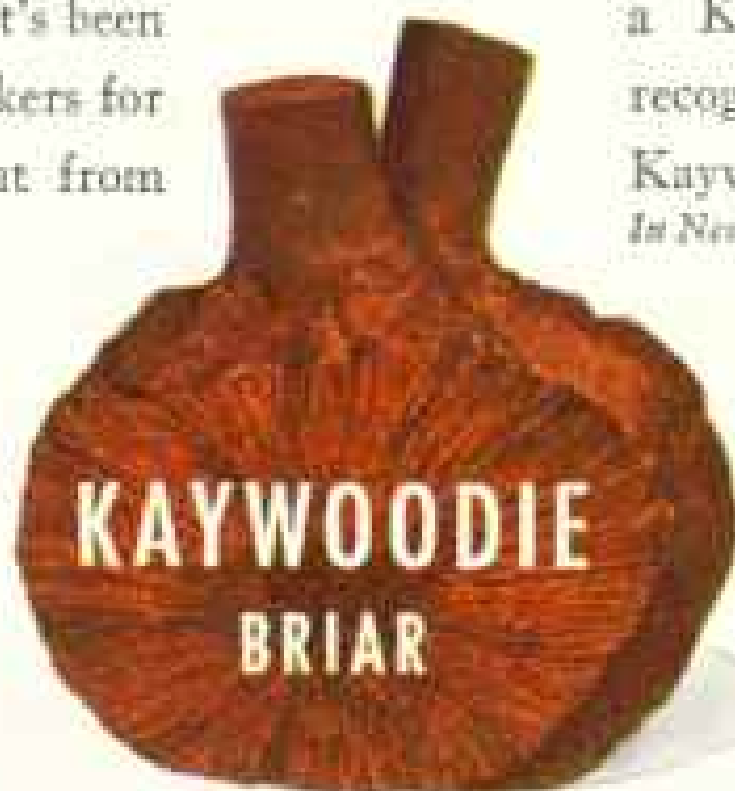
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Kaywoodie with Inner
Bowl of Meerschaum
\$12.50

"I smoke a Kaywoodie"

I've learned about pipes. Learned from smoking them. There's a difference—some pipes smoke better than others, and taste better. Kaywoodie is the pipe I've smoked for years. I could do without any of the others. The war hasn't stopped Kaywoodie from using the real Mediterranean briar-wood that's been the universal choice of pipe makers for 100 years. Kaywoodies are cut from

pre-war stocks, in the same old way. You won't find in any other pipe the good-tempered flavor that's characteristic of Kaywoodie. Always pleases, never troubles. Discriminating smokers know this and like it so well that all over the world you hear "I Smoke a Kaywoodie." It's internationally recognized best.

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BUY
WAR
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electronics



FUNNY-LOOKING gadget, that old-time radio set. Big, bulky horn . . . dials and more dials . . . squeaky and noisy as all get out. Not much like the radio now in your living-room or car. And yet the radio you buy not too long after the war may make your present-day set look and sound as antiquated as that early Electronic instrument looks now. Today Electronics is fighting bril-

liantly for America and its Allies. In battle it warns of approaching danger so we can destroy the enemy; in the electric eye it searches for and exposes flaws in heavy castings; in resistance-welding it doubles and triples production. These and countless others are Electronic achievements of vast importance now and for the future. The First Electronic instrument to benefit will be radio.



For the development and production of Radio Communications Equipment for our Armed Forces, the Motorola organization was awarded the Army-Navy "E" with added Star for continued excellence of performance. Motorola is proud of the part it has been privileged to play in the speeding of Victory.

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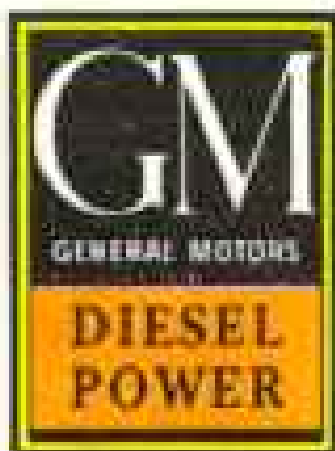
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Buy War Bonds for a Victory Vacation. You'll want to get away for a complete change—to feel as free as the wind—once the Victory is won. It will be glorious fun to spend your vacation in Southern California. So

plan now for your post-war vacation here. Regular purchases of war bonds—earmarked for this specific purpose—will make your trip a reality instead of a dream. Send today coupon below for special, free, full-color folder which tells how much fun and glamour a few war bonds will buy.

This advertisement sponsored by the Los Angeles County Board of Supervisors brings you a wartime message from the citizens of the County's rich agricultural and industrial areas and of its famous cities—Beverly Hills, Glendale, Hollywood, Long Beach, Los Angeles, Pasadena, Pomona, Santa Monica and 112 other communities.

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PNEUMOCOCCUS is the germ that causes most cases of pneumonia.

He is a skillful hunter, preferring the cold winter months when people are less able to ward off his attacks.

Sometimes Pneumococcus strikes people who are in excellent physical condition. But he really goes to work with glee on someone whose resistance has been weakened—perhaps through overwork, poor nutrition, or insufficient exercise.

He enjoys good hunting in stormy weather, stalking people who aren't dressed warmly, or whose clothing or shoes are soaked. Even better, he likes to shadow someone who has influenza, a severe cold, or a cold that hangs on. Such infections of the nose, throat, or lungs help him start a full-blown case of pneumonia.

Once you learn these wily habits of Pneumococcus, you can take the obvious steps to avoid his attack.

If, in spite of precautions, he should press home a successful attack, *quick action is necessary!* Any of the following signs of early pneumonia are an urgent warning to call the doctor *immediately*: A chill, followed by fever . . . coughing accompanied by pain in the side . . . thick, rust-colored sputum . . . rapid breathing.

In most cases of pneumonia, the doctor has a powerful weapon in the sulfa drugs. In some

cases, serum is still used effectively. The earlier treatment is started, the better are the chances of hastening recovery and of preventing serious consequences.

Sometimes when pneumonia strikes, Pneumococcus is not to blame. The cause may be a germ or a virus against which sulfa drugs and serums are not effective. *In such cases, prompt medical and nursing care are particularly important, for recovery depends upon general care.*

During the "pneumonia months" the wisest course is to keep fit . . . to avoid colds . . . to take care of a cold should one develop. If a cold is very severe or hangs on, *go to bed . . . call the doctor!*

For more information about pneumonia, send for Metropolitan's free booklet, 14-N, entitled, "Respiratory Diseases."

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Tree, Spare that Woodman

FROM TIME IMMEMORIAL the Manchineel tree has brought injury, and, according to legend death to natives of islands in the Caribbean.

Early histories of these places contain forbidding descriptions of its malignant powers. "So dire is the Manchineel that the very sun, darting its rays upon it, calls forth its dangerous odours and renders it unsafe to the touch . . . The apples if eaten, are said to be certain death to anything but goats."

Much of this is pure fantasy, but the fact remains that juices of the tree cause severe inflammation and acute conjunctivitis, if they come in contact with skin or eyes.

An early authentic account of the tree was furnished by Mr. Seemann, of His Majesty's good ship *Herald*, who wrote his report around 1850. Carpenters of his ship were rendered blind merely by cutting down one of the trees for lumber.

When he investigated the case, his eyes, too, were affected, although he only gathered some of the tree's leaves and bright-colored, sweet-smelling apples.

Happily, all regained sight, but from then on they eyed the Manchineel from a safe distance.

When Travelers Safety Engineers were assigned to guard the safety of workmen in the construction of projects in places where the Manchineel grows, they were confronted with this unprecedented problem and they minimized its menace with characteristic efficiency.

They recommended the use of goggles to protect the eyes, gloves for the hands, and grease for tender areas of the skin. In the space of three months, the cases of Manchineel poisoning were reduced from 100 to zero.

Safety Engineers of The Travelers Insurance Companies are not considered "cranky yankees" on their jobs. With sound reasoning based on experiences and training, they daily are meeting and solving a variety of safety problems as difficult as that created by the Manchineel. The contribution they have made to America's war endeavor by cutting down industrial accidents, and thus saving time, is a vital and personal one.

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SPAM BIRDS

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Kodak Minicolor Prints are full-color photographic enlargements which reproduce all the natural beauty of your original Kodachrome Film transparencies. They come in three sizes—2X (about 2½x3¼ inches), 5X (about 5x7½ inches), and 8X (about 8x11 inches).

Send the home scenes he longs to see in these beautiful Minicolor Prints. Order through your Kodak dealer—he'll be glad to show you samples...Eastman Kodak Company, Rochester, N. Y.



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IN 1938 Kodachrome sheet film led to full-color photographs as magazine and newspaper illustrations.

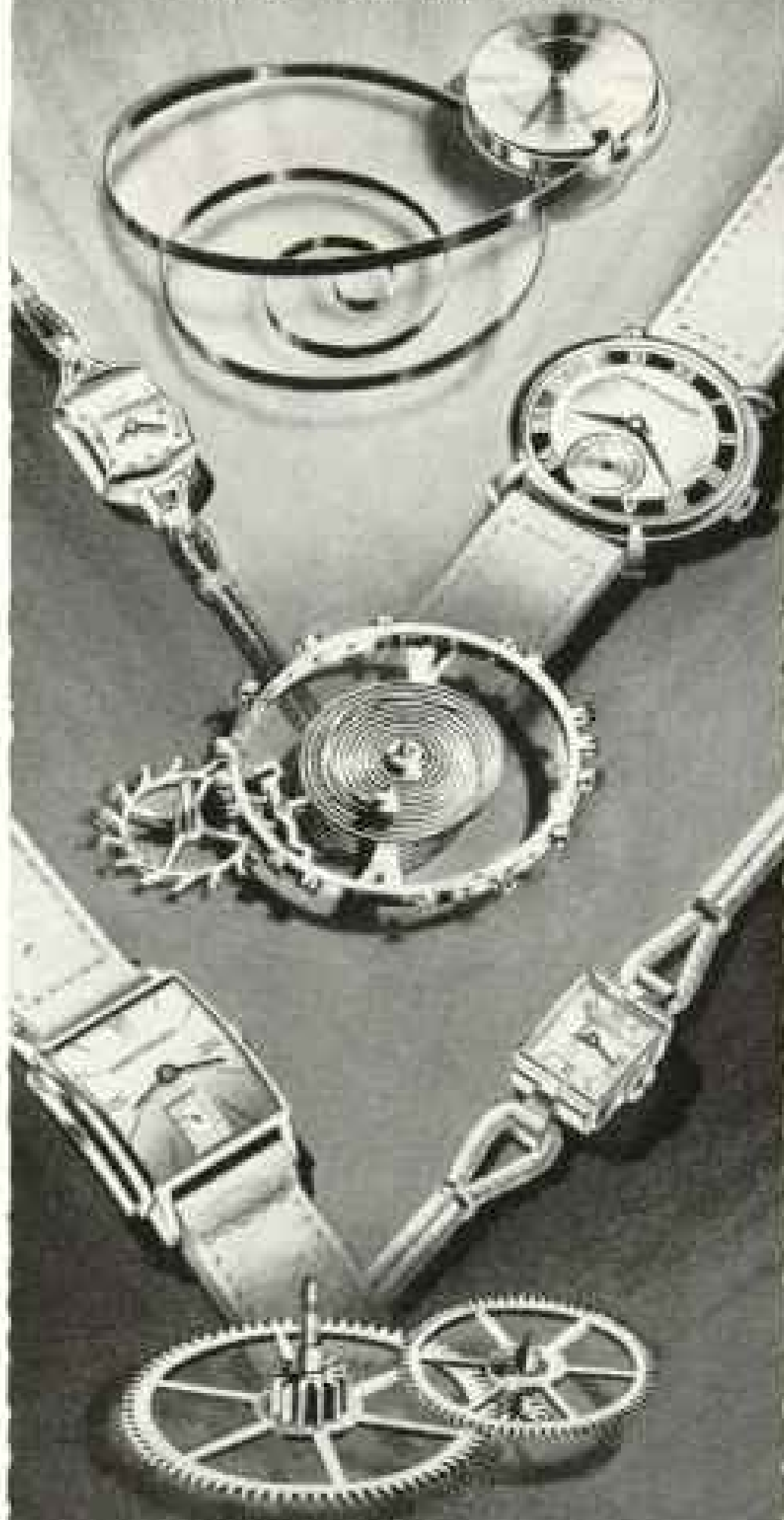
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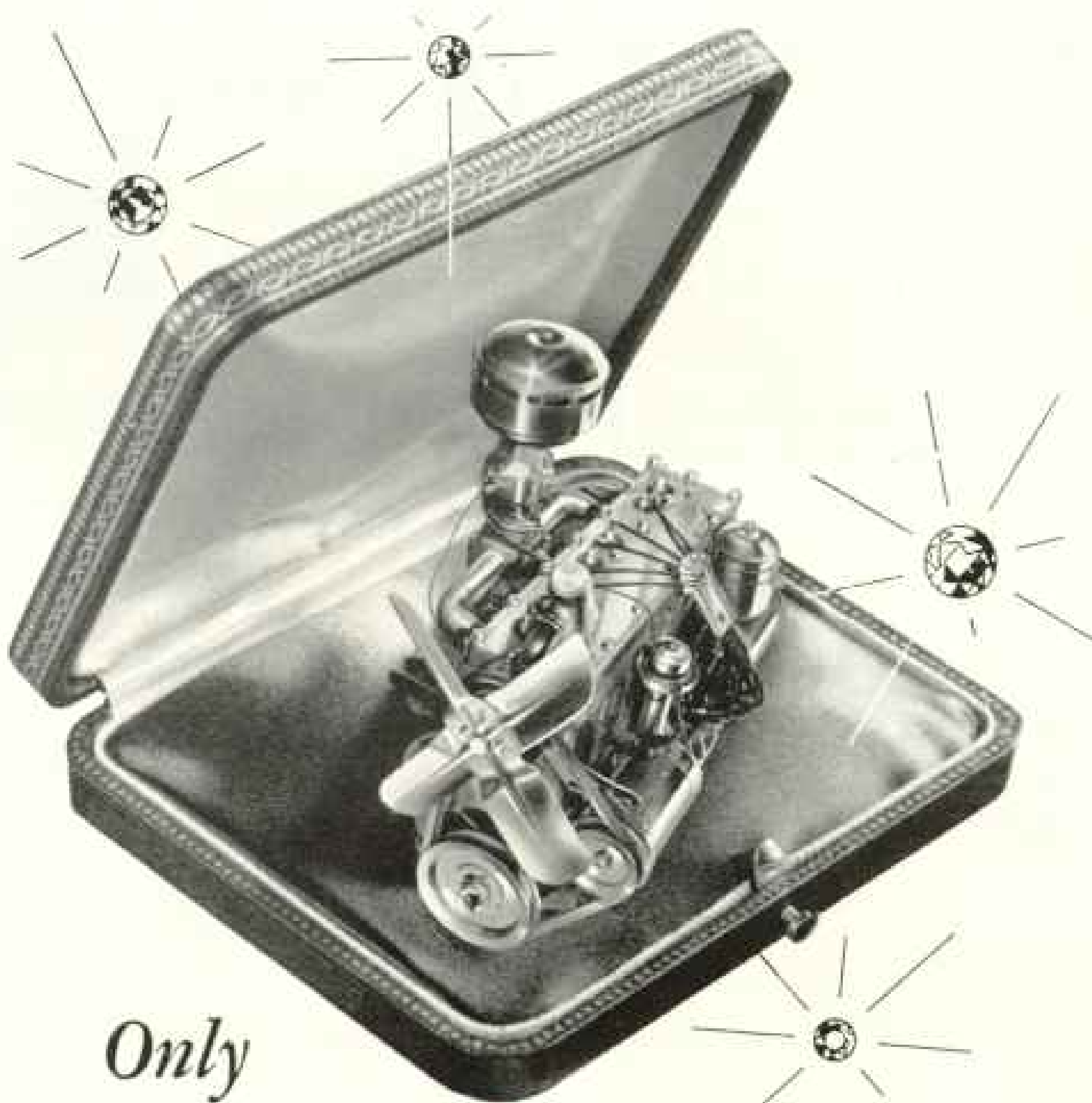
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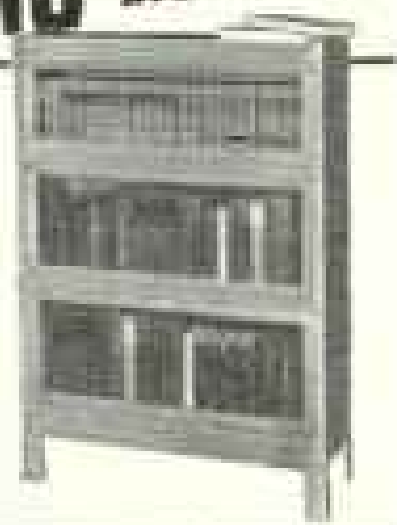
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Engines



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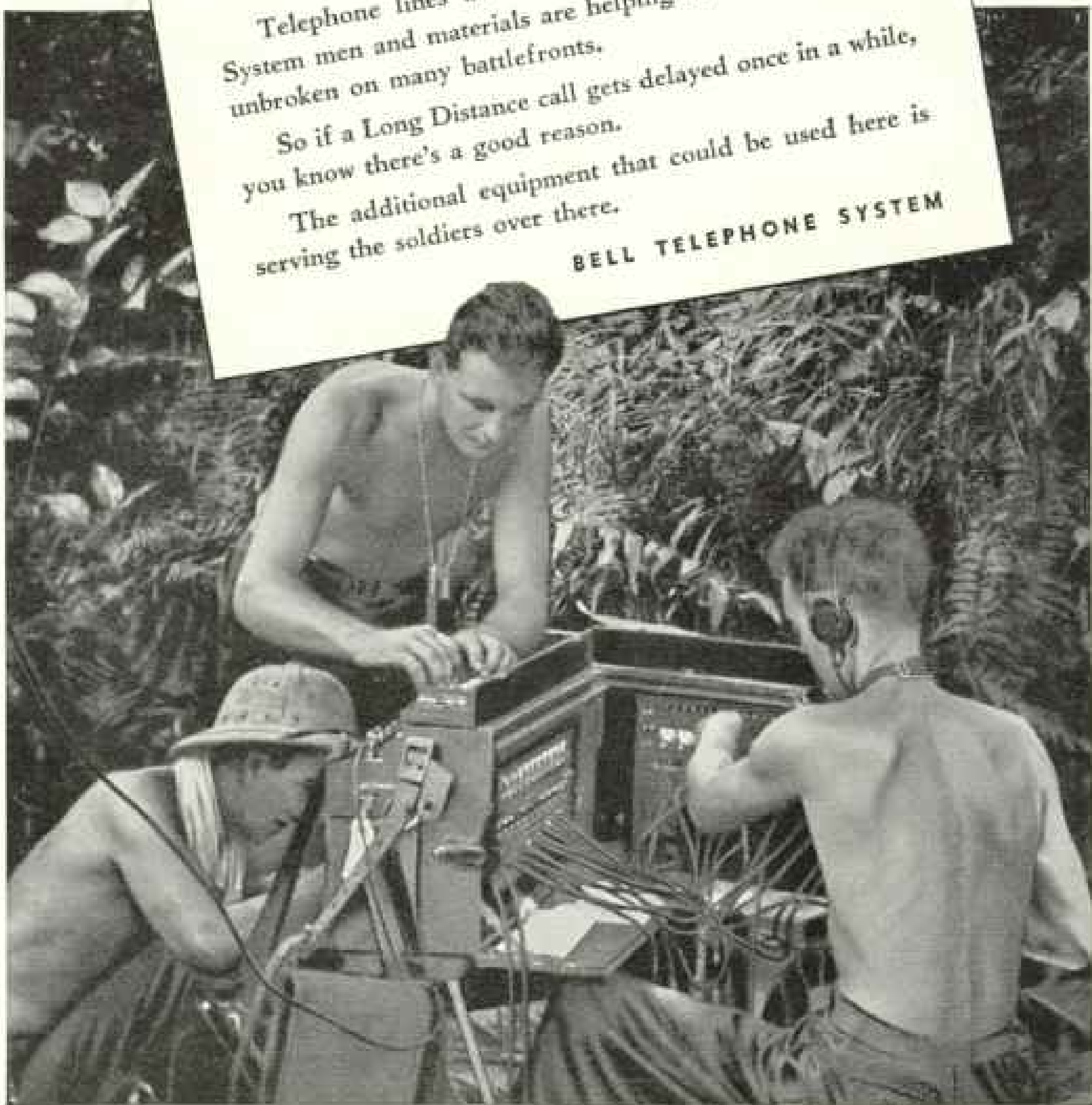
Your Long Distance call may have gone to New Guinea

Telephone lines are the life-lines of an army. Bell System men and materials are helping to keep those lines unbroken on many battlefronts.

So if a Long Distance call gets delayed once in a while, you know there's a good reason.

The additional equipment that could be used here is serving the soldiers over there.

BELL TELEPHONE SYSTEM



U. S. Army Signal Corps installing switchboard in New Guinea

**WAR NEEDS
THE WIRES**

If the Long Distance circuit you want is busy — and your call isn't really urgent — it will help if you will cancel it.

If it must go through, we'll appreciate your cooperation when the operator says: "Please limit your call to 5 minutes."





GREATER SAFETY! Improved electrical wiring insulation that will not support flames can be made from several VINYLITE plastic compounds. Such wiring, now employed in vital circuits of warships, will some day provide greater safety in the home.

Plastics Will Mean Better Homes

... and more of them!

EVEN TODAY, plastics men can vision a bathroom with practically everything in it made of plastics or containing plastics in some form. Imagine such a bathroom, costing less to manufacture, to ship, and to install, delivered as a unit to your home!

The raw materials to make better homes with more bathrooms and finer kitchens come true are in existence today... in VINYLITE and BAKELITE resins, and plastics made from them.

BAKELITE resin-bonded plywood, like that from which planes and torpedo boats are made, can be used to make floors, walls, ceilings, and furniture.

The type of plastic film used in waterproof, chemical-resistant food bags and rifle covers can be fabricated into mildew-proof shower curtains. VINYLITE resins can also be made into rot-resistant floor coverings that can be walked on millions of times without showing appreciable wear!

Our engineers know from the record of VINYLITE plastic-coated life raft sails, sleeping bags, and life preservers,

that VINYLITE plastics and compounds can be used in the future to bring you wall coverings, window curtains, and furniture finishes that will outlast anything now available.

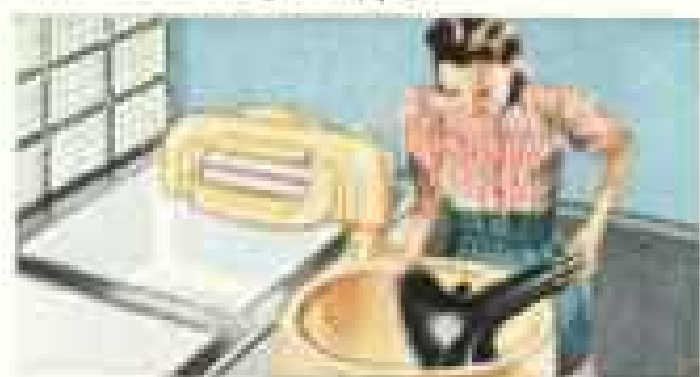
Under heat and pressure, VINYLITE and BAKELITE plastics can be molded into numberless useful forms. Experience gained in molding war equipment will help to bring you such things as molded plastic furniture which will be lighter, easier to move, easier to keep clean!

Spun plastics made from vinyl resins are resistant to rot. Right now, such plastics are used for making jungle hammock ropes and vital chemical filters. They also can be fashioned into draperies, upholstery, stockings, and other articles of clothing... sun-proof, water-proof, and moth-proof!

VINYLITE and BAKELITE resins and plastics, and many new techniques for using them, are peacetime research achievements of CARBIDE AND CARBON CHEMICALS CORPORATION and BAKELITE CORPORATION, both Units of UCC. Fabricators converting these raw materials into finished articles are making them mean more and more to you.



MORE BEAUTY! New washable water paints, based on BAKELITE resins, will bring new beauty to homes. These paints are inexpensive... and easy to apply!



LESS EXPENSE! Use of BAKELITE molding plastics in making washing machines, refrigerators, and many other household devices and fixtures can mean lower-priced, longer-lasting equipment for you.



LESS WORK! Easier cleaning of plastic-treated walls, ceilings, and floors. Plastic furniture and upholstery that are easier to keep clean. Yours in the future!

BUY UNITED STATES WAR BONDS AND STAMPS

UNION CARBIDE AND CARBON CORPORATION

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Bakelite Corporation
Plastics Division of Carbide and Carbon Chemicals Corporation