VOLUME LXXXI NUMBER THREE

# THE NATIONAL GEOGRAPHIC MAGAZINE

MARCH, 1942

Revolution in Eating
With 33 Illustrations — J. R. HILDEBRAND

Flavor and Savor of American Foods
25 Natural Color Photographs — J. BAYLOR ROBERTS

Washington—Storehouse of Knowledge
With 20 Illustrations — ALBERT W. ATWOOD

Culture Still Lights Our Wartime Capital
9 Natural Color Photographs — B. ANTHONY STEWART

Honduran Highlights
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French West Africa in Wartime
With 37 Illustrations and 2 Maps — PAUL M. ATKINS

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THE NATIONAL GEOGRAPHIC MAGAZINE



# Revolution in Eating

## Machine Food Age—Born of Roads, Research, and Refrigeration—Makes the United States the Best-fed Nation in History

By J. R. HILDEBRAND

*With Illustrations by Staff Photographer J. Baylor Roberts*

"CORN on the cob, new potatoes, string beans, tomatoes, cucumbers—all from our own farm. Pitch in!"

There was country sausage, too, larded down from our Vermont host's "butchering"; creamy milk and golden butter from his dairy herd, homemade muffins and maple syrup, also raspberries his children picked, kept crisp in his springhouse. Only the salt and pepper were "store bought" down at Four Corners.

The next week in New York I jotted down the menu of an "aviation dinner" for a visiting dignitary at LaGuardia Field.

Every item had been brought in overnight by airplanes: stone crabs from Florida, brook trout from Canada, juicy pears from Oregon, enchiladas from Mexico City, fresh figs from California, ice cream in coconut shells from Cuba (Color Plate 1).

Both examples are extreme.

One was a carry-over from the way our grandparents ate, and some of our country cousins still eat. The other was a forecast of the refrigerator planes air-minded men talked about before the war.

But they span the annals of American eating from the first farmer families of New England to the Food Revolution of recent years—biggest change in our elemental ways of life since the Industrial Revolution in England.

Neither is more dramatic, however, than the world activities a city housewife sets in motion when she telephones her shopping list to the grocer, or conscientiously trundles a wheeled basket around the gay shelves of a neighborhood "super-market." Think what happens to fill her order.

In peacetime nimble Filipinos climb tall palms to cut down coconuts. Olive-skinned Tamil girls pick tea leaves in Far East islands where it always is summer. Men in France, and now in Minnesota, tend cheeses that cure in caves. Camel caravans plod parched deserts with figs and dates.

White-coated bakers feed shiny machines through the night. A dizzy web of speeding trains and trucks crisscrosses through 48 States. Ships normally from all the seas head into American ports with sugar, bananas, spinach seed, and precious spices. Silent motors and the clop-clop of horses' muffled hoofs deliver milk while the big city sleeps.

### It Takes a Map of the World to Chart Your Grocery Orders

Read any month's itemized grocery bill for a thrilling chapter of applied geography. It still takes a world map to spot the sources of the meals you eat so casually.

"Consider the many more kinds of things you eat now than you did when you were a boy," counseled one food expert. "You are old enough to recall when oranges were a treat in your Christmas stocking. Then you only had berries and melons, and what is more important, many vegetables, for two or three months a year."

"Nutrition is the newest science," explained another. "The telephone, the automobile,

**Machinery's Hum Replaces the Dairy Maid's Song in Modern Butter Factories**

Five giant churns in this room of the Frank Pilley and Sons plant turn out 1,500 pounds of butter in 50 minutes. Men are filling tubs which hold 60 pounds for shipping. Later the butter will be removed from the tub for packaging into pound or quarter-pound prints. This creamery has 400 buying stations within a fertile radius of 125 miles from Sioux City, Iowa.

even the movies—all got going before you heard of vitamins and minerals we now know the body needs."

But it isn't merely the vaster variety of foods, or laboratory study of diets, that the food purveyors mean when they talk about the Food Revolution.

Foods which government bulletins prescribe as the minimum for a healthful daily diet are: meat or fish, potatoes, green-leaf and other vegetables, milk, eggs, citrus and other fruits and tomatoes, bread, butter, and sugar.

Such foods healthy Americans have been eating for these 300 years, except for the oranges, grapefruit, and lemons (page 311).

The point is that as cities grew, and farming became highly specialized, most people could not get such a diet without transportation, processing, refrigeration, and tin cans.

New York City could not be fed now with a slaughterhouse every 12 blocks or so, and door-to-door vegetable vendors. Neither does a wheat grower, a cattle raiser, or a broccoli farmer live by bread, steak, or greens alone.

Hence the striking aspect of the Food Revolution, swift but little observed by the consumer: we are eating now in a Machine Food Age.

Meat passes through the great packing houses, milk is pasteurized, eggs are candled, potatoes are assorted and labeled, carrots and oranges are waxed (Plate V), vegetables are refrigerated, quick frozen, or canned.

Self-service chain groceries now sell meats—pork chops, rib roasts, veal cutlets, and even hamburger steaks—all wrapped in sanitary Cellophane so the shopper can pick her own and pay as she goes out.

### Machines Handle Most Food Now

Here are a few examples of the ways machines handle most of the foods you buy.

Your steaks average more than 900 miles of travel from cattle range to gas range. Some-

**A Master Baker Takes the Temperature of a Batch of Dough**

Fever chart and diet requirements of a human patient are no more carefully kept than the temperatures and ingredients in mass bread making. Each deep trough, which the bakers pronounce to rhyme with dough, contains about half a ton (page 279). Bread loses approximately 15 per cent of its weight between dough and loaf; hence a 24-ounce loaf requires more than 28 ounces of dough.

where along the beef-supply line the steer was cut up by 48 men, with 22 kinds of knives, into 464 pieces. From some parts they make buttons, violin strings, thyroid tablets, incense, and scores of other things; otherwise the cost of the meat would be even higher than the price you complain about.

A twist of the chemist's formula determines whether the skin they take off a hog will be pigskin gloves, glue, or gelatin. The gelatin, also from bones and sinews, is widely used to make ice cream "creamier," except by those manufacturers who prefer kelp.

At the Chicago stockyards I saw them taking sound movies of the pens, thus using the squeal, too. Packing plants vie with laundries as enormous users of water. From every three billion gallons of waste water, one plant reclaims two million pounds of fatty solids, sold to feed more livestock to supply the yards.

Other food industries are learning to use their by-products. One chain store company ships fish by fast refrigerator cars direct from a Boston pier to its New York warehouse. There cutters and skinners deftly remove the skins, cut out the bones, and pile up the fillets. The skins they sell to Pennsylvania farms that raise minks for women's fur coats.

Here, too, they candle every one of the 842,000 eggs they handle in a day (page 322). "Leakers," edible ones with cracked shells, go to the mayonnaise and cake makers. Those definitely desiccated sell to New Jersey tanners for treatment of shoe leather.

### Food Delivery Rivals Postal System

Meat packers, bread makers, dairy companies, and citrus growers have developed delivery channels that reach homes almost as universally as the postal system.

A Washington father good-naturedly complained when he sent his daughter to a New

Hampshire camp about the high cost of mountain air, lake swimming, and sleeping in a tent. Visiting the camp, he was completely sold on the high quality of air, water, sunshine—and the excellent food.

"I suppose you collect the vegetables and the berries from all these farms around here," he remarked to the director.

"Oh, no," she replied. "We couldn't get the variety that way; and they wouldn't be fresh by the time our truck picked up everything piecemeal. Our supplies are sent up daily from Boston in a refrigerated car.

"Yes," she admitted to another question, "I suppose a lot of it is shipped from this neighborhood." Then, defiantly, "But it is cheaper to buy it back from Boston."

Another Washington resident was showing friends from Salt Lake City the beauties of middle Maryland. He held forth on the high quality of Boonsboro cantaloupes. Just then a mound of the golden melons gleamed from a roadside stand. Buying some, he discoursed further on their fine flavor, stroking them lovingly the while, until he came upon a small blue label, "Grown in Utah."

### The Way Big Cities Are Fed

Amazing case history of the way big cities are fed is the way one-eighth of all the commercially sold fresh vegetables and fruits of the whole United States pours into New York City.

Manhattan's vast fruit plate and salad bowl lies along twelve blocks of cluttered Washington Street. It is rimmed on three sides by lofty skyscrapers. Its ladles are long piers that reach out into the Hudson River.

From an airplane this entire wholesale district literally looks like a bowl. The surrounding crescent of tall office buildings lights up the night skies in pride of their vertical growth. But the upper two or three stories of this century-old cluster of venerable stores and warehouses are gloomy, dingy, often empty.

Many of the merchants use even their first floors only for offices, telephone booths, and bargaining places. Products they sell don't pass through their doors. Their warehouses are the trucks; the sidewalks their unloading and loading platforms.

Life here from midnight till dawn is far more hectic, though dimmer, than on Broadway. A negro riding up with a load of Georgia melons exclaimed, "Lawdy, dere's a powerful lot of hauling goes on here. Ah'm plumb confused."

One average night checkers counted more than 1,300 trucks simultaneously honking, inching along, backing, or just stalled by jams.

The pedestrian weaves his risky way across narrow streets only to dodge handtrucks and duck porters with shoulder loads of fruit crates and vegetable baskets.

More than a carload of foodstuffs arrives here for every working minute of every day in the year. "Carloads" is used as a measure, since 5½ billion pounds of food is scarcely comprehensible. Actually about half comes by truck direct or by boat and truck.

Three-fourths of the 200,000 carloads of fruits and vegetables that New York and adjacent places eat annually in homes, hotels, and restaurants siphon through this biggest food bottleneck in the world. And the 11 million bunches of bananas New York buys in a year are not included in these figures. They are handled elsewhere.

Yet no rails enter the district nor do any boats unload here. Part of the vast volume comes in freight cars floated across the river from New Jersey terminals.

### A Price-fixing Market

Because this bedlam Washington Street Wholesale Market helps feed some 13 million people of New York City and a radius that takes in towns of New England, New Jersey, and Pennsylvania, it is a price-making market for the entire country.

The California lettuce man, the Idaho potato planter, the Iowa pumpkin grower may not ship here, but they sell with an eye on wholesale prices here.

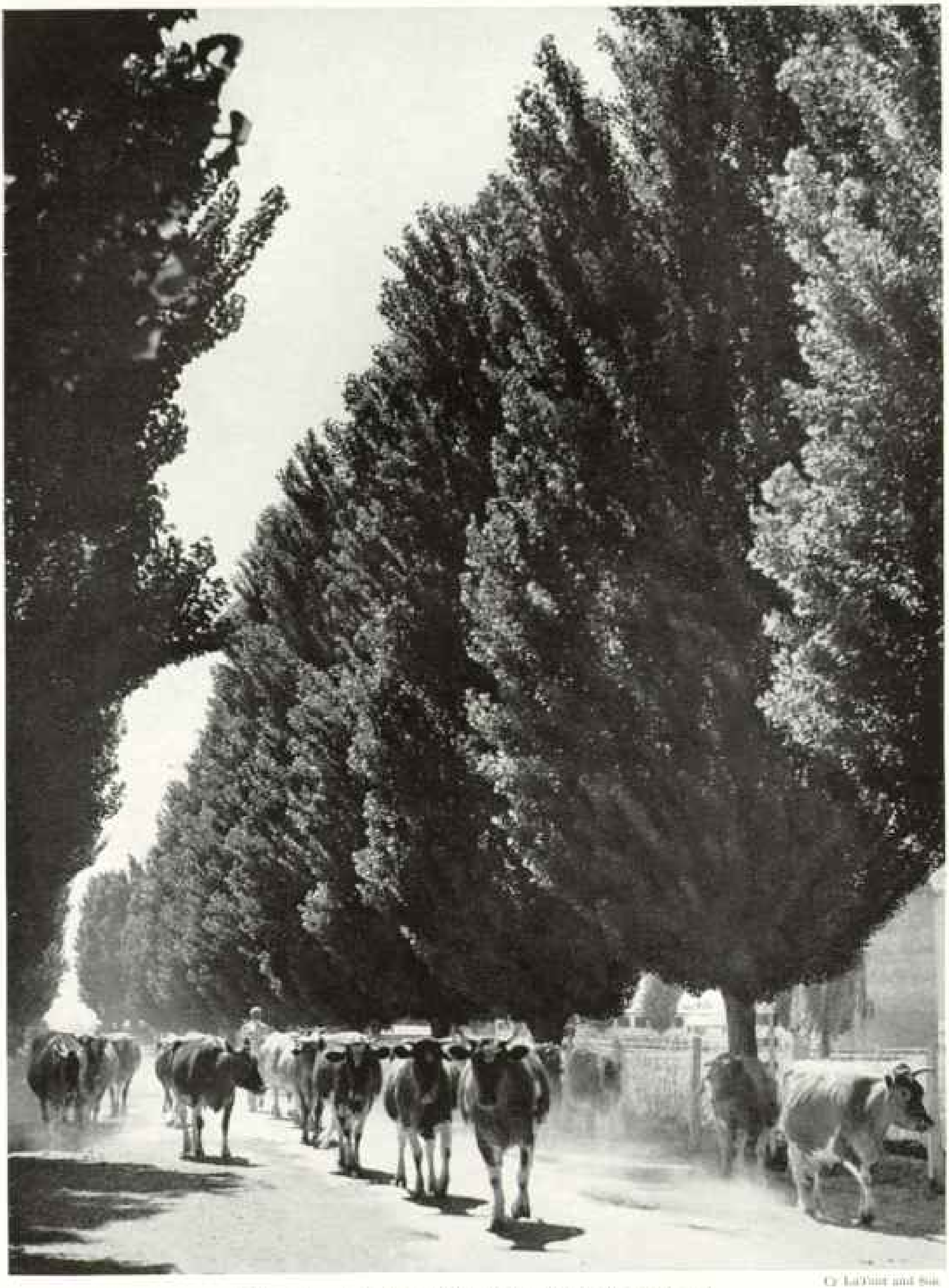
Only the Empire State itself ranks ahead of Florida and California in volume of sales. Each of the latter contributes one-fifth the supplies that come here. Last year 42 States and 18 foreign countries shipped in the remainder.

Because exchange of heavy crates, boxes, and barrels is a ground-floor business, the vacant upper floors of some 270 buildings, appraised at $19,000,000, are a real estate headache. And because these highly perishable commodities must move swiftly, the area is the city's problem traffic child.

The population this market now serves is greater than that of the whole United States when the first firm started here 102 years ago.

Few New Yorkers, even, visit this sequestered area which lays down a post-midnight tapestry of natural hues from Florida orange groves, Oregon apple orchards, California tomato fields, and Louisiana carrot patches. Their pattern of 42 State colors painted by Nature on location vies with any hand-decorated rainbow room.

Merchants and brokers always keep their hats on, even when they eat. Meat men



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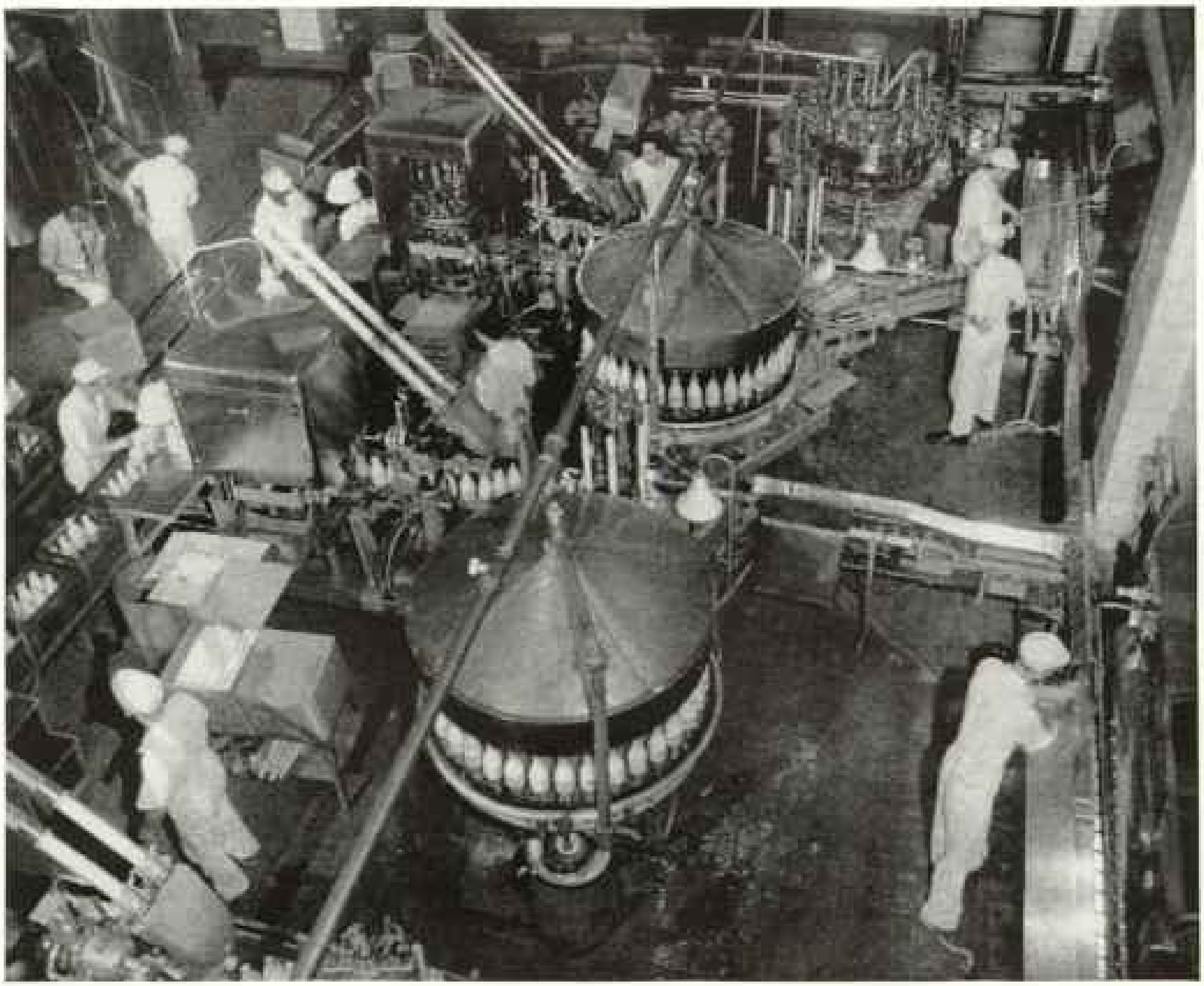
**"The Lowing Herd Wind Slowly O'er the Lea"**

This California "Elegy" is set in San Fernando Valley. Such Guernsey herds as these from Brant Rancho—also Jerseys, Herefords, Ayrshires, etc.—help pay their debt to their British Isles origin in enormous quantities of dehydrated milk, butter, and cheese now shipped to warring England.



**Great Dairies Are to Milk Sheds What Power Plants Are to Water Resources**

Pasteurization, bottling, and delivery entail elaborate machinery which adds substantially to the "teats-to-pail" cost of city milk. In this filler room of the Sheffield Farms Company, New York City, more than 143,000 bottles are washed and sterilized, filled, capped, hooded, cased, and iced nightly. Each washer cost $18,000; the fillers, $5,500 apiece. Manhattan's milk shed radiates 300 miles and includes 60,000 licensed farms.

you can tell by their stiff straw hats, often painted red, which they wear the year round. Policemen and women are conspicuously absent. Theft is practically unknown.

There is no hawking or selling. A dealer who argues about his goods loses face. He stands about and lets the buyer inspect.

Mounds of produce at one place, as well as a poster, proclaim the "Onion King." There are a "Melon King" and a "Celery King," too, if you believe the signs.

In this Eveless Eden there is one woman broker, Mrs. Matilda Dennis, who sells Florida oranges and tangerines, Texas grapefruit, Pacific coast apples, and Cape Cod cranberries. As a girl she was fascinated by three groceries her father ran in Brooklyn in the era before chain stores, and persuaded him to let her be cashier in one and later weigh out goods in the cracker-barrel era before packaging.

After the first World War, when her husband, like many other engineers, was jobless for a time, "I decided to work for a while, so I got work in the only business I knew."

"You ship the cranberries; I'll find stomachs for them," she told Massachusetts growers when cranberry consumption was limited to the sauce that went with turkeys at Christmas and Thanksgiving (Plates II and III).

Now, night after night, trucks glide down through the dark. Drivers call her by phone from their last filling station. She reads off the delivery tickets and they put down the order direct at the buyer's store.

### "Midnight Show" at a Chain Store Warehouse

Big grocery store chains cut corners on such wholesale market operations by having warehouses on the outskirts of cities. There fleets of trucks take over supplies from trains and farmers' trucks, for direct delivery to stores.

Out at the Bronx warehouse of the Great Atlantic and Pacific Tea Company is another

**There's a Pig for Every Trough—and Then Some!**

Fifty years ago such shoats would have been fattened up to 350 to 500 pounds. Now average slaughter weight is held to about 235 pounds because of demand for leaner pork and higher corn prices. This trend may change again to meet Allied need for animal fats. This scene in Jefferson County is typical of Iowa, which in 1941 raised some 16 million of the country's total 71 million hogs.

"midnight show" which really gets going full tilt about 2 o'clock in the morning.

They call it "The Farm," the vast yard where 78 freight cars unloaded supplies from sidings the night I was there. Meats and package goods may be held in storage, but many of the cars transfer vegetables and fruits direct to skids, from which the company's delivery trucks pick up their allotted hauls.

Rooms where orders for each truck are made up are like train dispatchers' towers. There are three such warehouses in New York City alone. It takes some 300 trucks to cover the routes which supply the company's 967 stores in the New York area.

In the cold-storage rooms here hang upward of 400,000 pounds of meat. Machines pack eggs into cartons of a dozen each; the carton is made now so it can be split in half if the customer buys only half a dozen. They are delivered in dated cases which the store must sell within four days.

The eggs come in from as far west as Utah and Minnesota. But for the New York market they must be white. Boston, on the other hand, prefers them brown.*

### Baking 80,000 Loaves of Bread

Here, too, is one big A. and P. bakery where they can turn out 80,000 loaves in a day. Mixing machines take a 1,150-pound batch of dough (page 275). A single oven bakes 2,000 loaves at a time. Hour by hour embryo loaves weave in and out of huge machines, some long as a city block, on conveyors that look like caterpillar tractors, until low-pressure steam gives the crust its final shine. The superintendent, what with test tubes,

* White eggs are mostly from Leghorns, and also from Minorcas, Anconas, etc.; brown eggs are from Plymouth Rocks, Rhode Island Reds, New Hampshires, Wyandottes, and others.

Staff Photographer Willard R. Culver

**A Rhode Island Clambake Picture Needs Odor Effects to Seem Real**

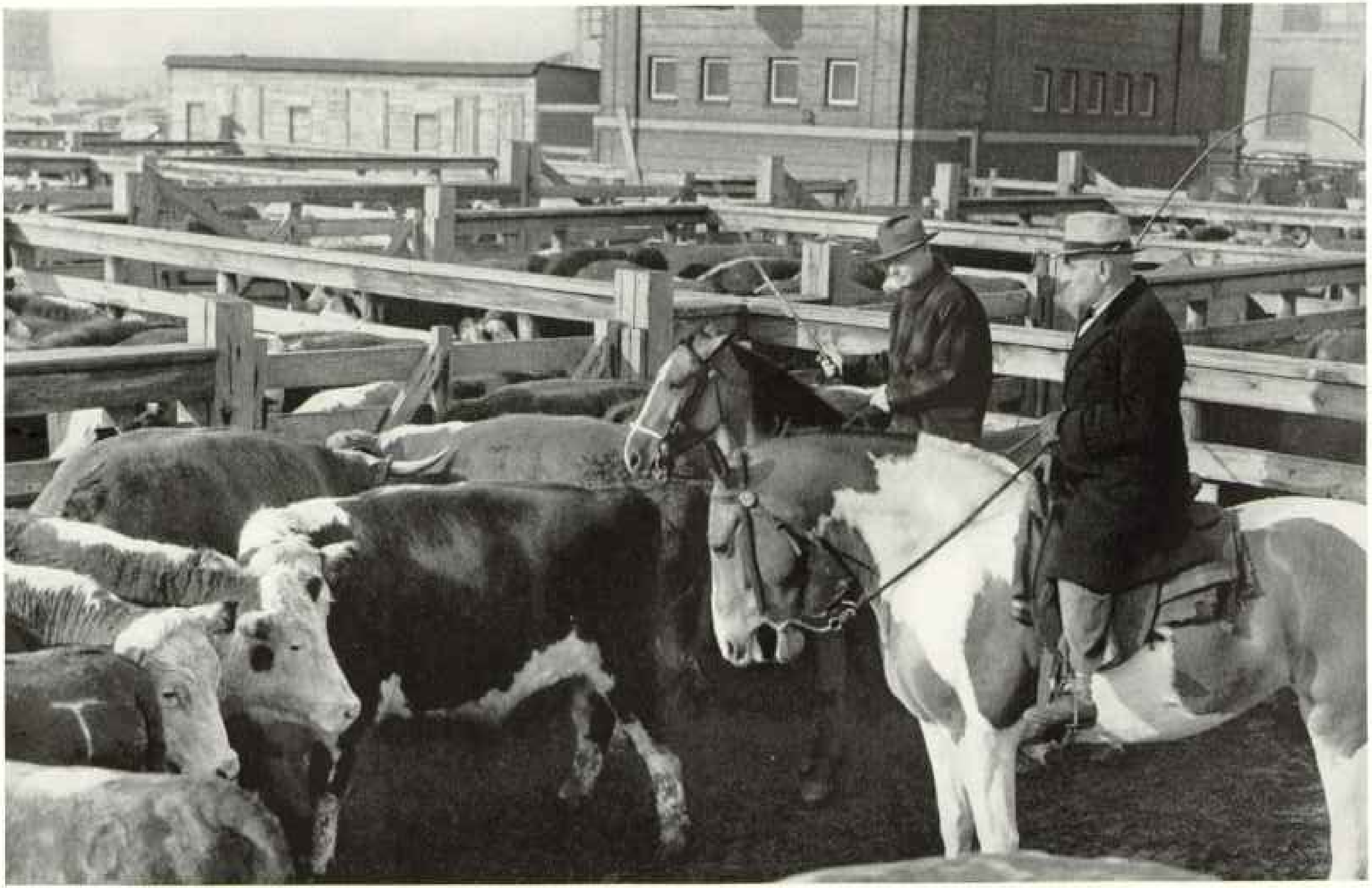
Bushels of clams, fish, and vegetables are piled high on heated stones and covered with rockweed. Over all is spread thick tarpaulin to confine the heat and conserve the moisture which penetrates the ingredients. A bake is prepared and served outdoors with complete informality.


**Climax of the Machine Food Age Is Coin-in-the-slot Service**

Through these devices the Automat chain serves more than 72,000 pieces of pie daily. Drums back of other post-officelike boxes are heated for handling baked beans, macaroni, chicken pies, etc. Sometimes patrons at the New York restaurants wait in line like payday depositors at a bank teller's window.

**Wall Street of Agricultural America Is the Trading Floor of the Chicago Board of Trade**

In the wheat pit every hand and finger movement has a meaning. Palm outward indicates selling; palm inward, an offer to buy. Each finger extended signifies an eighth of a cent a bushel. Lung power adds din. Sold here also are corn, oats, soybeans, rye, cotton, lard, and dry-salted hog bellies.

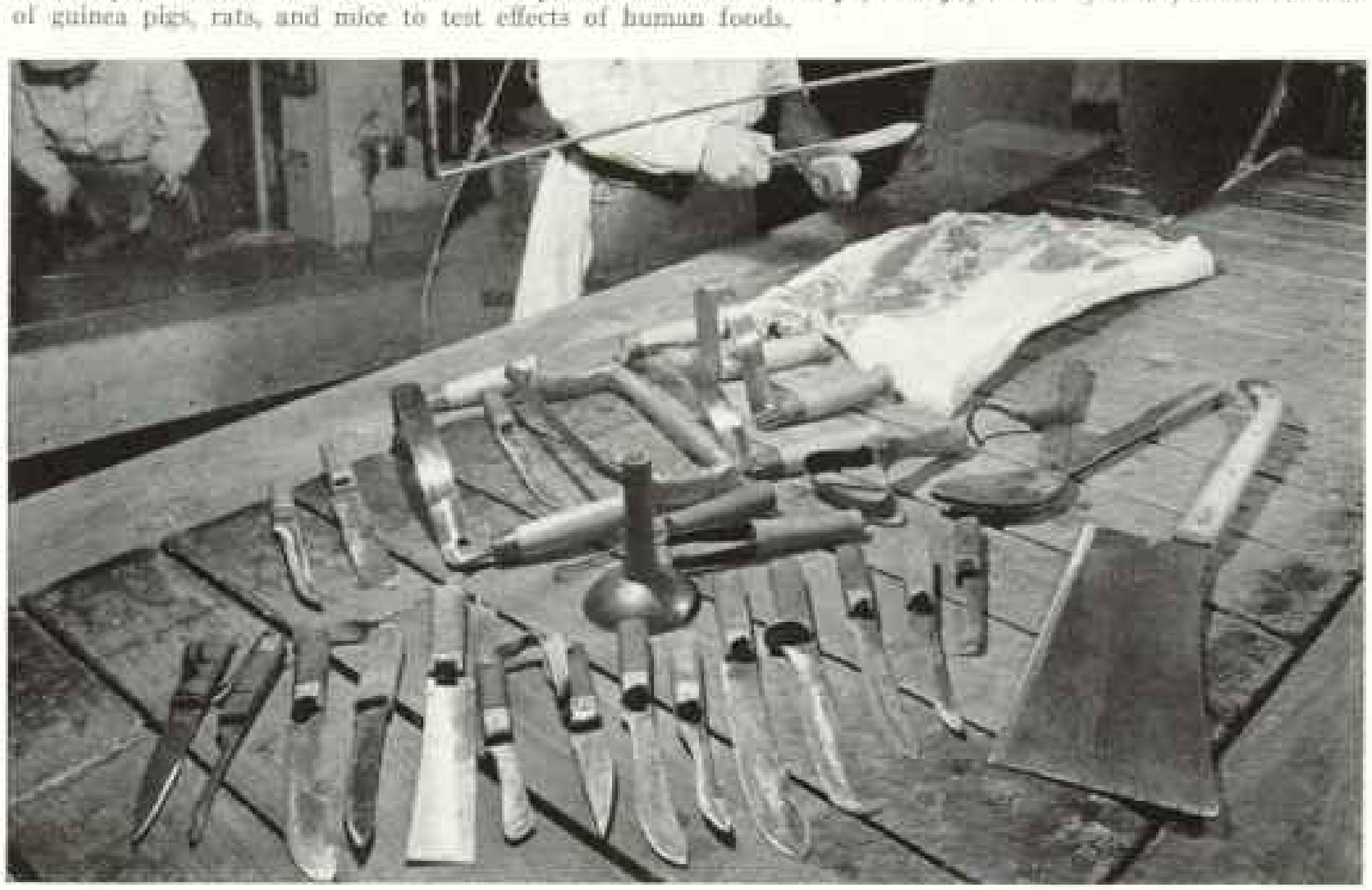


**A Buyer Needs Keen Eyes and a Walking Horse for the Last Roundup in Chicago's Vast Stockyards**

Are they short of neck, soft-boned, and heavy in hindquarters where better meats come from? How will they grade, and how much do they weigh? These are only a few points buyers must look for. Veterans can tell live weight within 25 pounds. Some Tennessee breeders specialize in walking horses (page 297).

**For Six Generations Laboratory Wirehairs Have Eaten Only Pard and Water**

Swift and Company puts eight ingredients into dogfood: meats, wheat, barley, tomato puree, two vitamins, soybean flour, and dried milk. The plant's "zoo" has monkeys, turkeys, chickens, ducks, and thousands of guinea pigs, rats, and mice to test effects of human foods.



**From Squeal to Steel—A Still Life Biography of Bacon**

It takes an armory of 29 knives, each wielded by an Armour expert with the skill of a surgeon, to disserve a porker. Functions of knives are indicated by their names, such as (counting left to right in front row): 1, sticker; 3, lip shaver; 4, hog header; 9, gut snatcher. In center are a bung fat scraper and an eyelash hook. The spoonlike implement above the big hog-splitting cleaver (right) is a bone clipper. The circular disk with two handles, upper center, cuts bacon from fat back as a moving table carries a side under the blade.

thermostats, and timing charts, seemed more like an engineer than a baker.

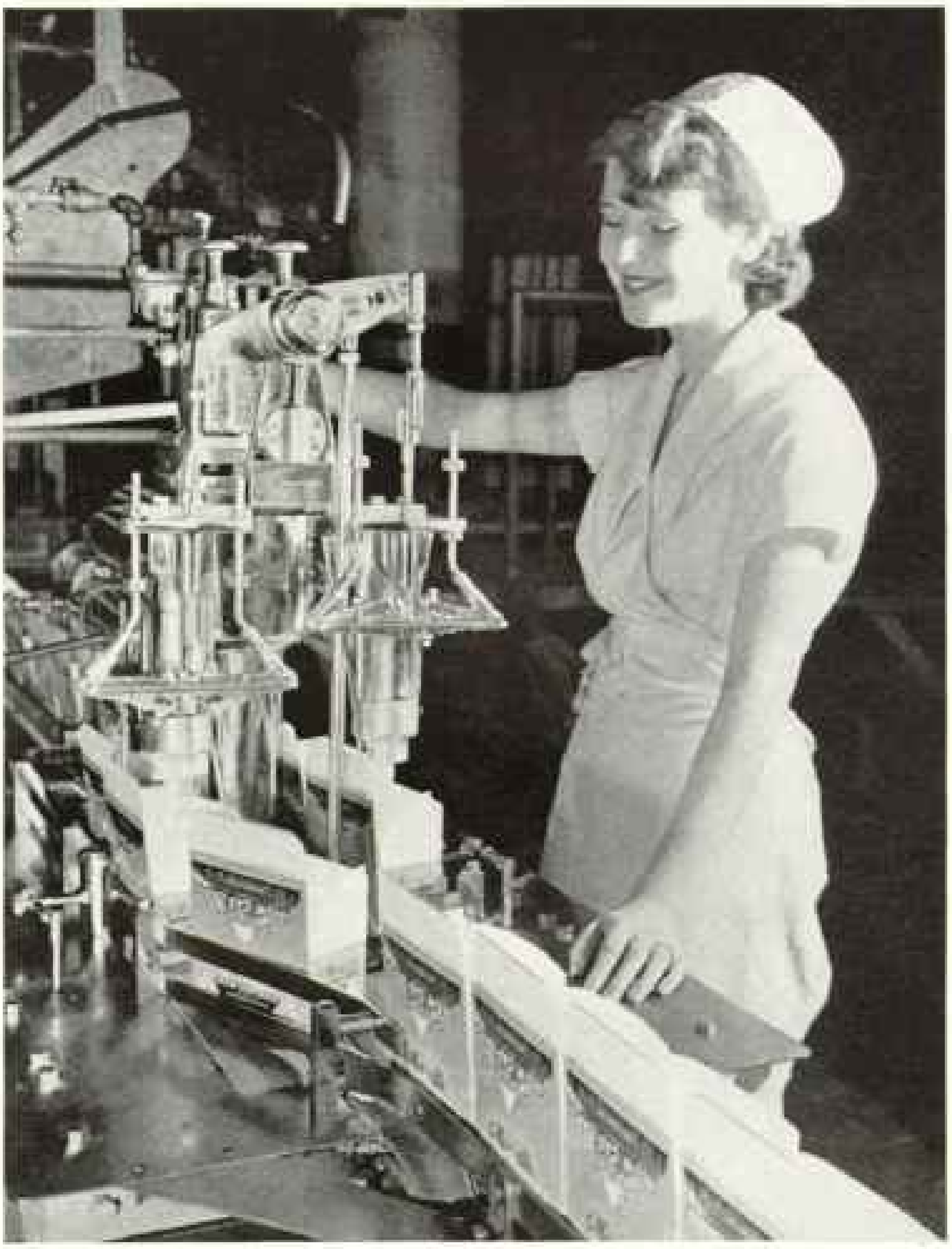
"What goes into 80,000 loaves of bread?" I asked him.

"Thirty tons of flour," he calculated; "6,000 pounds of condensed milk, 2,400 pounds of shortening, 1,800 pounds of sugar, 1,300 pounds of salt, 1,200 pounds of yeast, and 150 pounds of yeast food, a product used to speed action of the yeast."

Some days in special breads they use a thousand pounds of raisins. Poppy seed and caraway seed they buy tons at a time. Caraway seeds cost ten times as much now as they did two years ago, because they came largely from the Netherlands. Poppy seeds are scarce at any price. The edible kind came from the Adriatic. They are hard to grow because they can't stand the wind, and not enough farmers in the United States have yet studied how to pamper the plants along.

Here machinery is mammoth-sized and many units are duplicated. But even a modest-sized bakery requires upward of $50,000 worth of machinery to take the bread-baking drudgery out of the housewife's kitchen. A good oven costs $15,000; a big one $100,000. Then there are mixers, dividers, rounders, proofers, molders, and other lesser machines. Now they must add a slicing machine, too, for 95 per cent of A. and P. customers, at least, demand that their bread be sliced.

Bread has influenced human history more than any other food product. When some prehistoric tribe found a wild grass with golden kernels, men started planting, and hunted less. To harvest wheat they ceased to be nomads, settled down, and farming was born.



**A Machine Double-spouts 3,600 Pounds of Lard an Hour**

Weekly output at the John Morrell and Company refinery, Ottumwa, Iowa, uses fat from 45,000 hogs. The girl acts merely as overseer. Cartons proceed along the conveyor to instruments which place wax paper over the lard, fold the cover, and put on the lid. Many millions of pounds of lard now being shipped to England have led Londoners to refer to the United States gratefully as "The Larder of Democracy."

Leaf through the Bible from Adam's curse in Genesis, "In the sweat of thy face shalt thou eat bread," to Christendom's precious prayer, "Give us this day our daily bread," and most sacred sacrament, when Christ "took bread . . . and when he had broken it, he began to eat." You can find a Biblical text mentioning bread for every day of the year.

Chaldean ruins disclose ovens in the yards of homes. Bronzes show army camp cooks of the fierce Assyrians grinding grain and kneading bread. In excavating Pompeii explorers found round loaves stamped with the baker's name. Bethlehem means "House of Bread"; Jerusalem had a Bakers' Street.

**These Rolls Helped Make a Hotel Famous**

Harvey D. Parker, founder of the historic Parker House, Boston, conceived the folded roll that bears his name. Travelers spread its fame, and the originator, recognizing the publicity value, sent the recipe to all who asked. Upper parts of Parker House rolls are crisp and brown, contrasting with a softer inside, and the special fold is on top, never on the side.

Laboratories painstakingly prove what Christ proclaimed poetically, that "man shall not live by bread alone." Bread does not contain all the 40-odd different substances, including vitamins and minerals, now identified as essential to human health.

### Pellets of Sunshine and Morale

However, because bread is the most nearly universal food of the Western World except milk—Americans eat 12 billion loaves a year—it serves as an ideal "carrier" for essential vitamins and minerals which are deficient in diets of certain areas and income groups.

There has been confusion about this "enrichment" program, but the specifications are definite. All enriched flour *must* contain thiamin, nicotinic acid, and iron in prescribed amounts. Enriched flour also *may* contain, in addition, riboflavin, calcium, and phosphorus.

All this is not a food fad or an advertising stunt. It is an example of what an entire industry can accomplish by voluntary cooperation in a democracy.

"Hitler's 'secret weapon' may be the taking away of Vitamin $B_1$, or thiamin, from the diet of conquered countries," writes Dr. Russell M. Wilder, of the Mayo Clinic. "A little thiamin deficiency is associated with irritability; long-continued deficiency is likely to result in depression, exhaustion, and feelings of inferiority."

Anton C. Negri, who streamlined the buying for all Chicago's penal and charitable institutions, says: "We know now that the problem of delinquent children can be solved more than we thought possible by proper feeding. Their re-education begins with milk, fresh fruits, and green vegetables."

United States Army rations have been revised to assure enough meats, fresh vegetables, fruits, and milk to provide ample vitamins. For far northern service, as in Alaska and Iceland, soldiers get vitamin tablets to make up for scarcity of fresh foods and sunshine.

It should be noted that enriched bread is not medicated; the vitamins and minerals are normal food elements of the wheat grain lost in the milling necessary to make palatable bread which will not spoil. Enriched bread does not take the place of fruits and vegetables; it only represents an added health insurance.

Miracle ingredient of bread is yeast.

Ask any "Information Please" group to name ten important food plants, and the chances are they will miss out on this single-cell plant of magic properties.

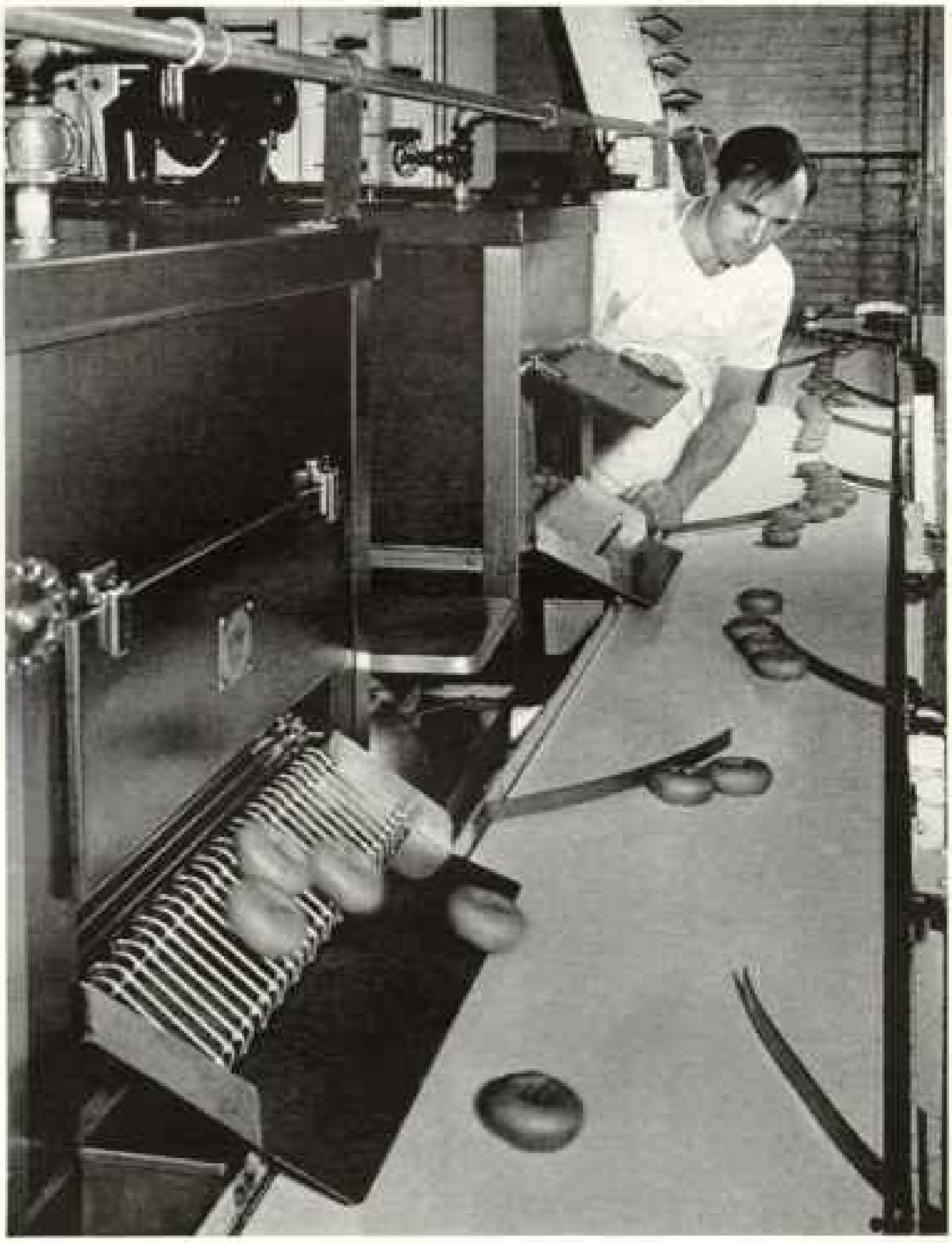
In 1868 Charles Fleischmann came to the United States from central Europe with one small test tube of live yeast in his vest pocket.

Yeast cultures grown today at the Fleischmann plants for millions of bakers' loaves are billionth or more generation descendants of those yeast plant immigrants.

"Yeast farmers," one might call the chemists at the Fleischmann New York master laboratory, who lock up their precious test-tube "seedlings" in bank-like vaults at night.

Yeast plants must have food and air, as do other living things, to grow and multiply. And how they multiply!

Some yeast cakes weighing about half an ounce contain 225 billion hungry, prolific cells. Every two hours, under favorable conditions, each cell divides into two cells, and the two new cells proceed to grow full size, each ready to divide in another two hours into two more cells.



**Doughnuts Pop from a Fryer and Are Carried by Belt to the Cooler in the Background**

Fractions of cents and seconds count when such machines fry 1,200 doughnuts an hour. That's why the dough is cut to exact amount and the cooking timed precisely. This bakery is one of 29 operated by the A. and P. Company.

Figures for what goes on from here were worked out for the National Geographic at the Mellon Institute, at Pittsburgh.

If food and water could be supplied fast enough, and space were available, the multiplication would continue at this geometrical progression rate until at the end of the fourth day our half-ounce yeast cake would be 128 billion cubic feet big.

Neither my mathematical yeast consultant nor I could settle on anything that size. We speculated that we might sheathe the entire Great Wall of China with that much yeast. But that is guesswork. So he patiently started figuring again, and found that sometime during the eighth day the volume of our theoretical yeast would be the size of the earth!

These calculations sound more credible after a visit to "Yeast City" at Peekskill, where you have to hike two miles to walk around 130 buildings packed into 110 acres.

In a room big as Madison Square Garden are huge fermenting tubs instead of circus rings. Each holds from 20,000 to 60,000 gallons. In extract from grain or sugar cane yeast plants are springing into their Jack-and-the-super-beanstalk growth, seething like lava in a white crater.

Big separators whirl around to throw off the water from the yeast by centrifugal force. Then the creamy fluid flows over a quartz window penetrated by ultraviolet rays.

After more pressure the cheeselike mass of manufactured sunshine and morale is packaged into pound blocks for bakeries or into the familiar cakes for home use.

### Doughnuts and Science

Not all breadstuffs are bread loaves. There are myriad kinds of cakes, pastries, rolls, buns—and doughnuts, as typical an American tidbit as apple pie.

Newspaper readers may think doughnut dunking stories are bright little pieces cooked up by restive reporters to fill space on dull Mondays. In reality they are inspired by able publicity men of the National Dunking Association. As one might infer, the doughnut and coffee industries have to do with this activity, which culminates in a "National Donut Week" at Halloween time when dunker "members" are endowed with lapel buttons showing a plastic hand dipping a plastic doughnut into a plastic cup.

On its serious side commercial doughnut making is an 85-million dollar industry. Yale chemists have published an erudite monograph on "The Comparative Digestibility of the Doughnut." At General Foods I came upon a doughnut project costing thousands of dollars reported in a highly technical 44-page document. Therein are score sheets summarizing such properties as consistency, color and bloom of crust, symmetry, texture, grain, volume, crumb color, tenderness, flavor, etc.

"After all these chemists, dieticians, and bakers hand in their reports, who determines what is a good doughnut?" I inquired.

"Turn to page 22," my mentor advised.

There I found a heading "Definition of an Ideal Doughnut," which definition was 89 words long.

"How much do all these miniature ovens, mixers, cutters, and the other experimental equipment cost?"

"Upwards of $20,000."

The familiar doughnut is as good an example as any of the money and men manufacturers use in the improvement and control of food products. Experimental work is only half the story. Other laboratories here, as elsewhere, make constant control tests of doughnut mix in the making, to insure its uniform quality (page 287).

The doughnut, like many American foods, has a flavorous history.

"Who put the hole in doughnuts?" is the question bakery visitors most often ask.

Research has revealed evidence that a Captain Gregory, able seaman from Maine, suggested the hole in the fried cakes of early American cookery. The good captain who had worked up from cabin boy and cook to master mariner found that the squares of dough then used often warranted the name "sinker" because the hot fat could not reach the soggy center. This center usually contained a raisin or a nut; hence the name.

The inventive captain had a tinsmith make him a circular cutter with a small inner hole, "just like a life preserver," he directed. Thus the square fried cakes were converted into the round doughnut, minus the nut and "sinker" center.

Doughnuts also illustrate the high specialization of making modern foods. Most bakers buy their doughnut mix. One milling and mixing plant of the Doughnut Corporation of America is located at Ellicott City, the Swisslike Maryland town where the first horsecars were hauled out from Baltimore on strap-iron rails in 1830.

There has been a mill there on the same site since 1774 when three Ellicott brothers came down from Pennsylvania to start grinding grain on the banks of the Patapsco.

Their judgment that this would be a promising grain and grazing area is justified 168 years later by the mix plant's annual purchase of wheat from 50,000 acres of land, 2½ million gallons of milk from 2,500 cows, and the egg output of half a million hens, mostly from fertile mid-Maryland.

### Pies Like Mother Never Made

Bakers sell more than a hundred million dollars' worth of pies a year, but that isn't half the total oven output of this most widely homemade and typically American comestible.

Pour all the contents of all the pies United States bakers make in a year into one vast pie plate. The over-all size of such a pie would be colossal enough for some super-Charlie Chaplin to smatter the face of Mother Earth and leave the encircling rim of crust unbroken.

Pie had its origin, the industry's historians relate, in the early English custom of covering fowls with dough and baking them with the feet sticking through the crust for easier eating. When knives and forks came into vogue, fruit was used as a "filler" until, as Dickens described it, "the raspberry jam coyly withdrew itself behind a latticework of pastry."

In the meat-pie days servants in castles were given hearts and livers of the deer served on their masters' tables after a hunt. These parts, called "humbles," often were

**Air-shopping Services Now Bring Ready-to-eat Delicacies Overnight from Distant Places**

On Aviation Terrace of LaGuardia Field, New York City, the daughter of former Mexican President Calles arranges a repast from Florida and neighbor nations. Set out here are stone crabs from Miami, Mexican wild turkey and wild rice, coconut milk glacé in a half coconut shell from Habana, and a Florida citrus fruit salad.



Kodachrome by J. Baylor Roberts

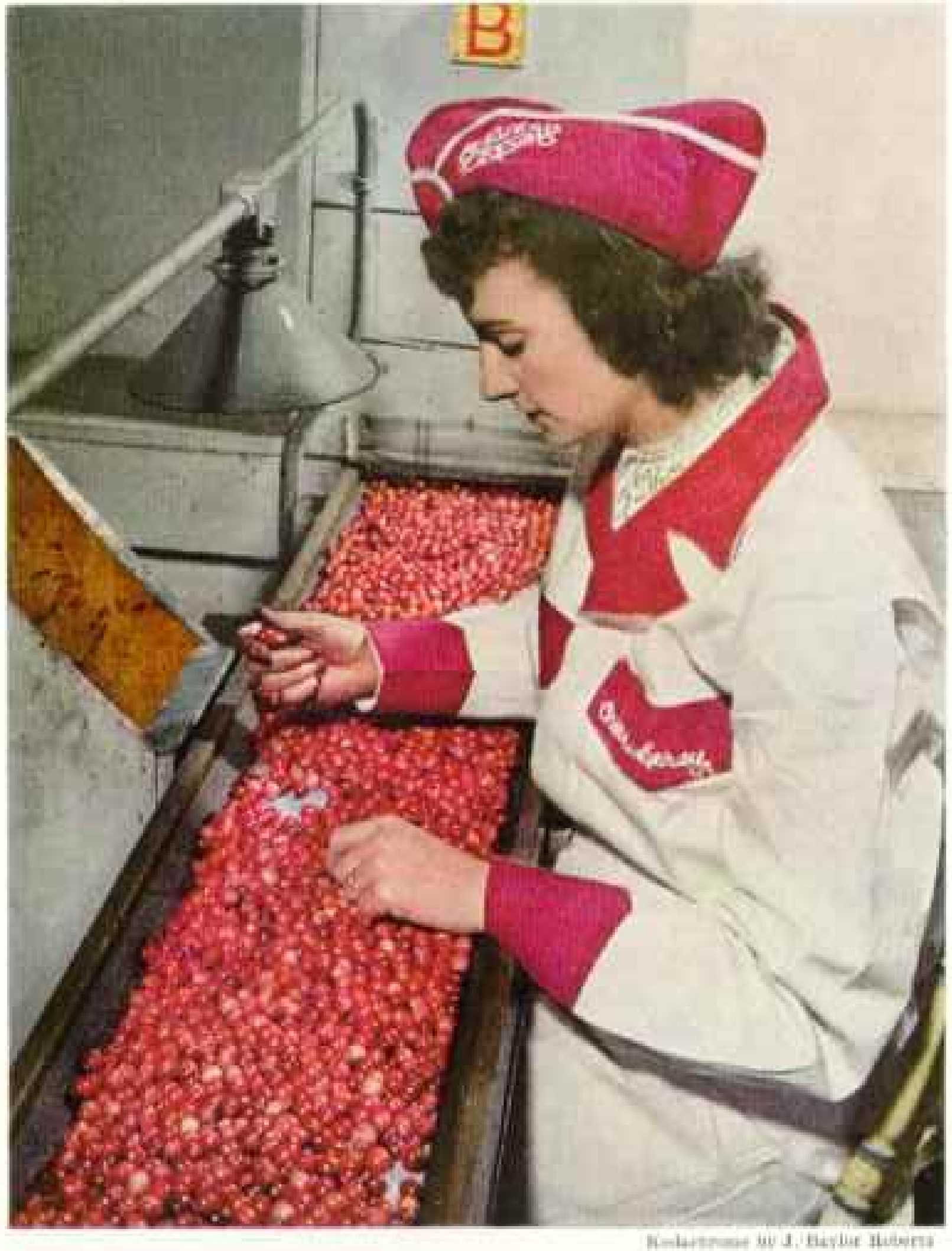
**On Cape Cod, Massachusetts, Men "Fish" for Cranberries, Then Harvest Them from Wind-blown Drifts**

After the first or dry picking with boxlike scoops, owners flood their cranberry bogs. Stubborn berries are shaken from the vines by suction paddles on scows and rise to the surface. Pickers skim them off the water and rush the containers to the cannery (Plate III). The wet pick adds 25 per cent to the grower's crop.

 Kodachrome by Luis Marden

**The Millionth Meal in a Year from United's Sky Menu**

In eight commissaries along the line's 5,200 miles of airways, hot dishes are packed in thermos bottles, cold foods in dry ice. In her compact galley a stewardess sets a passenger's tray.



Kodachrome by J. Baylor Roberts

**Berries Bounced Their Way to This Sorting Screen**

A sound cranberry rebounds as high as 12 inches; hence they are first toppled over small barriers. Arriving here, they are handpicked for color. Green ones go to the dud pile with the "flat tires."





**This Modern Otter Trawler Cruised 600 Miles Offshore to Bring Back Flounder (Left Foreground), Redfish (Alongside)**

On the far side are metal floats constructed to resist enormous pressure at even thousand-foot depths. They are placed along the headline of the net to help hold it open.

 Kodachrome by Willard R. Culver

**"California Peaches"—the Photographer Titles This One**

Half a million tons of the fruit is the yearly yield of the fertile "Orchard Valley," San Joaquin. More than ever are canned and dried now for the Army, Navy, and beleaguered Britain.


Kodachrome by J. Baylor Roberts

**Oranges, Coated with Paraffin, Are Wrapped in Tissue**

This packing house at Covina, California, is one of 200 which handle Sunkists. The thin protective coating, applied with brushes, is the household paraffin put on top of jellies.



Kodachrome by J. Baylor Roberts

**Mammoth Cheddars Roll Off the "Assembly Line" to Get Their Red Coats at Kraft's Plymouth, Wisconsin, Plant**

Better known now as "American cheese," this historic variety of English origin outsells the total of all other kinds in the United States. Dipping in paraffin mixed with vegetable coloring prevents drying out. Men at right are labeling and equipping each with cheese-cutting wire. "Mammoths" weigh 150 pounds.



**Machine-sliced Bacon Overlaps Like a Shingle Roof**

From a moving conveyor at the mechanical cutter's mouth the young lady scoops rashers for wrapping. A pound averages 22 slices. The Armour and Company's Chicago plant sometimes runs through daily enough for 3½ million breakfasts.

Kodachromes by J. Baylor Roberts

**Eager Children Stand in Line for "Bargain Milk"**

The penny-a-glass program, aided by the Federal Government, extends to schools enrolling a million pupils in New York City alone. Youngsters write essays on benefits of Vitamins A, B, and G, and of calcium and phosphorus that build hard teeth and strong bones.

**In Swift's Dry Sausage Rooms 150 Kinds Are Cured**

String binding on these 4-pound salamis is traditional. The tight cords make identifying marks while the mixture is soft. After 50 to 100 days of smoking and drying, each piece is rewrapped with clean cord.



Kodachromes by J. Baylor Roberts

**Salami Making Begins with a Rock and Roll**

The knives rock back and forth on a revolving table to chop pork trimmings for Armour's Genoa Salami. Into the minced meat go nine spices and port wine.

baked into pies. Thus arose the figure of speech, "eating humble pie."

Famed among bakers is Monroe Boston Strause, pie consultant, pie inventor, and pie columnist for trade papers.

Pie men scout for glamour pies as avidly as movie studios hunt new sweater-girl stars. Strause is credited with prescribing upwards of 150 kinds of cherry pies alone. But his foremost contribution to the public palate is the commercial chiffon pie. Twenty years ago he devised this favorite of the feminine tea-room trade, then sought a name for it.

"Why, it looks just like chiffon!" exclaimed his mother.

"That's its name," declared the inventor, and sold his first novelty lemon chiffons at 35 cents a slice.

Primarily Mr. Strause—"Boston" to the trade, for that is both his middle name and his trademark—is a pie consultant with scores of bakery clients. He flies by plane to sit at the ovensides of ailing pie makers. The Hawaiian pineapple growers engaged him to push crushed pineapples in pastry recipes. He gives mail-order advice and lectures on how to win friends and influence customers—with pies.

Mrs. Strause, incidentally, has never baked a pie, and does not know how.

### Meat Flows West to East

America's flow of meat, like that of its oil, is from west to east. Its "refineries" are the big packing houses; its "pipelines" are trains and trucks; its "filling stations" for retailers are branch houses in cities and refrigerator cars on sidings in hundreds of smaller places.

States west of the Mississippi River grow three-fifths of all the meat the United States eats, but consume only one-third of it. The eleven States from Maryland northeastward eat about three-fifths of the Nation's meat and grow less than a twentieth of it.

Since the time every farmer was his own butcher, centers of livestock and human population have grown farther apart.

Center of beef cattle production is now some 650 miles west of the population center; the sheep center is more than 850 miles away.

So fixed is the eastward movement of meats that Racine, Wisconsin, only 62 miles from Chicago, gets its steaks and chops from St. Paul, 427 miles farther west.

You think first, and rightly, of rails and roads helping feed New York and New England with meats from lambs that roam the distant Rocky Mountain region, cattle from the Rockies' eastern grazing slopes, and hogs from the upper Mississippi Valley.

Vital, also, are two other factors which figure in meats as in other food products. Cities are fed now in surprisingly large measure from the big closed spaces of chilled air, and from the honeycomb of myriad vacuum cells in tin cans.

Swift and Company alone uses daily enough cubic feet of cooling space in packing houses, branch plants, loading docks, and delivery trucks to make one "icebox" five times as big as the Empire State Building.

Army camps now have refrigerators that hold enough meat, butter, eggs, fruits, and vegetables to feed 15,000 men for two weeks.

Let the cooled air ooze out of all the refrigerators and the enveloping air rush into all the sealed cans, and any big city would face a food shortage and pestilence from food contamination.

### Before Canning and Refrigeration

See what did happen when cities were smaller, but lacked railroads, refrigerators, and canned foods.

In 1830 a New York newspaper urged that fruits and vegetables be forbidden to city children, because they were always stale by the time they were sold. Later the City Council, seeking to cope with a cholera epidemic, prohibited sale of fresh fruit to anybody!

When the epidemic hit Illinois, Chicago papers advocated a similar law. One reported how two boys ate oranges and coconuts, then went to the circus. "In a short time one was a corpse and the other was reduced to the last stages of cholera."

Grandparents of people still living recall that farmers brought milk to city homes in cans hanging from yokes on their shoulders. For big parties and sickly children wealthy New Yorkers sent messengers to dairies in suburbs to get their milk sweet and fresh.

Poorer New York people raised hogs which fed on offal of street-driven cattle and horses, and on refuse from near-by abattoirs. They branded their animals by notching their ears. With brooms and ironing boards women fought the hog-cart drivers sent around to collect the roving porkers when an ordinance forbade the practice.

Meat was the first product of the Machine Food Age. Each new way of shipping has been a headline in the geography of meat making.

The Erie Canal quickened settlement and cattle raising in the Great Lakes States. Cincinnati first flourished from pork curing and meat packing; the city was nicknamed Porkopolis. Then railroads reached Chicago. That was a shorter haul from the fast-growing livestock population of Iowa, Missouri, and Kansas.


Staff Photographer Willard R. Culver

**A Magnifying Glass Guards against Biting a Pebble When You Munch Peanuts at a Circus or a Ball Game**

After inspection the goobers are cooked, salted, and packed into 5-cent bags or vacuum tins. Only a fraction of the 800,000-ton United States annual crop is eaten thus. The major part is used in some 300 such diverse products as shampoo, printer's ink, linoleum, salad oils, and axle grease.

Highways threaded through the Middle West corn and wheat belts, so that steers and hogs could be hauled over new-made roads to Kansas City, Omaha, St. Paul, St. Louis. These became packing places, too, as later did Fort Worth, Denver, and Oklahoma City.

### World's Biggest Hotel—for Livestock

Chicago, however, still is meat capital . . . "proud to be Hog Butcher, Tool Maker, Stacker of Wheat, Player with Railroads and Freight Handler to the Nation," as Carl Sandburg affectionately writes it.

A hotel for humans that can entertain 48,000 guests a night has not yet been built. But that is what the livestock hotel known as the Union Stock Yards in Chicago does for 30,000 hogs, 12,000 sheep, and 6,000 cattle on a busy day—with bedding and board.

In the yard's 360 acres there is an inn, a diamond store, a daily newspaper, a luxurious club, a swank haberdashery, and a national bank housed in a faithful reproduction of Independence Hall.

The Saddle and Sirloin Club, with its timbered ceilings and hardwood floors, has the biggest roundup of all-male portraiture of any gallery in the world. Not only the early packers but the pioneer cattlemen are there in oils: thoroughbred men of the plains, stalwart patriarchs, often bearded, some on horseback, others "on the hoof," as my host put it.

"Sell many diamonds?" I asked the clerk in the jewelry store.

"Business is slow—income tax, you know; now you should buy," the clerk began. Then, when I had explained —"Oh, I see, you wouldn't be a customer; just one of these writing fellows. Sure we do. One for the wife and each of the children, just last week, because a shipper got a good price."

However, the main purpose of the Chicago Stock Yards Company, or any other of the big cattle depots, is to yard, feed, water, and weigh the enormous numbers of livestock that arrive every working day.

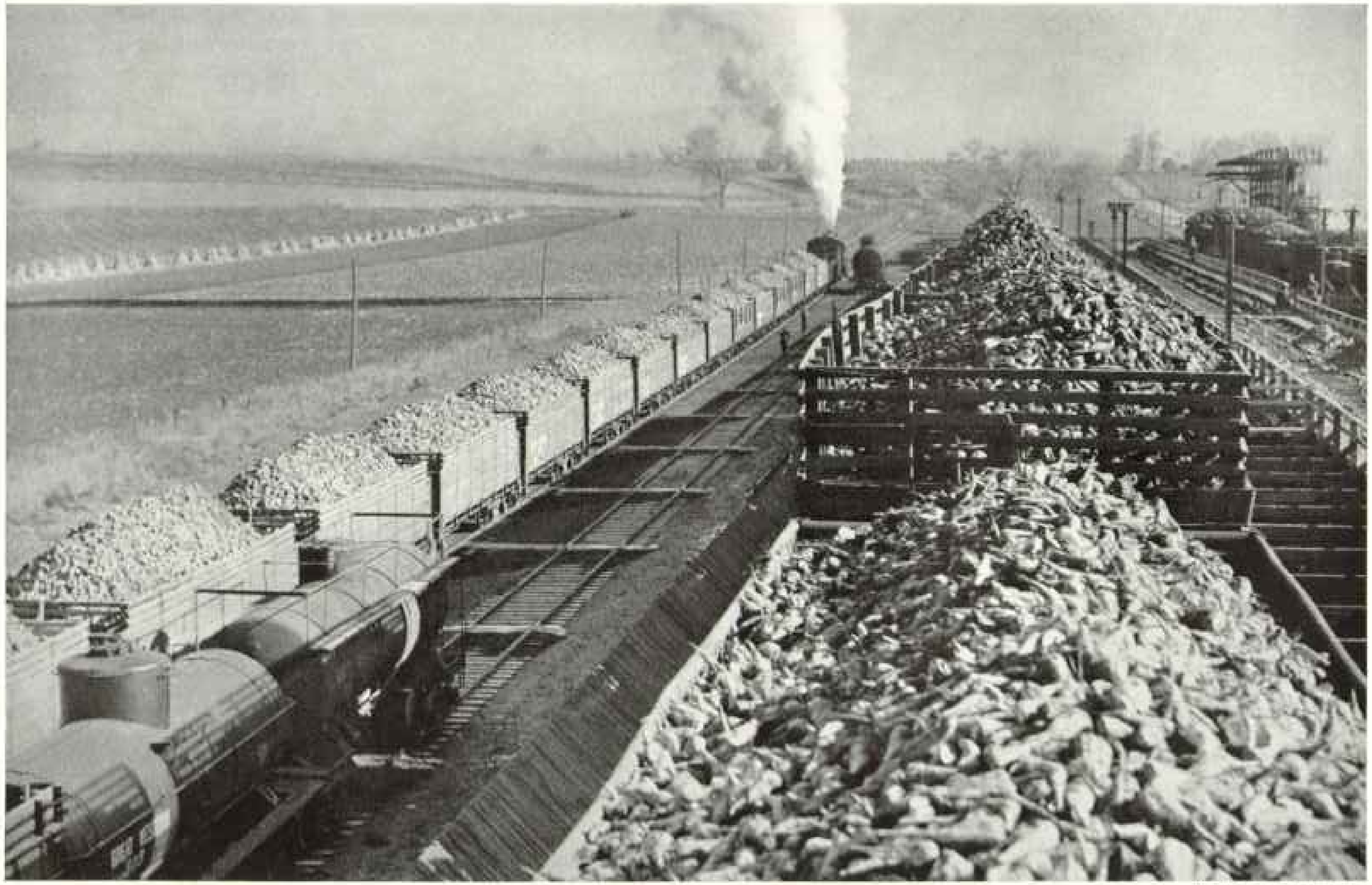
The company has nothing to do with buying or selling, nor does it own any animals except the draft horses which are the equine bellhops that haul feed to the pens and the four-legged chambermaids that help keep them clean.

**To the Layman, This Is the Molecular Structure of a Taste**

The research chemist of the General Foods research laboratories at Hoboken says: "Not exactly. Taste is a person's psychological reaction from contact with the molecules of a flavoring substance." Technically, therefore, the models are used to symbolize formulas. This one depicts an element in lemon flavoring.

**In Man-made Caves Growers Water Mushrooms by the Light of Miners' Lamps**

For the six weeks from planting to picking, windowless mushroom houses have temperature, moisture, and ventilation carefully controlled. Chester County, Pennsylvania, is the Atlantic seaboard center of this fungus crop originally developed in caves and limestone quarries of France. Soup makers take a fifth of the 40-million-pound United States output; another fifth is canned. The rest is sold fresh.



U. S. Beet Sugar Association

**It Takes Trainloads of Beets to Fill the Sweet Tooth of the Most Sugar-hungry Nation in the World**

Beet sugar supplies about one-fourth of the United States' sugar. Production increased last year to offset possible shortage of imports of other areas, such as the Philippines. Much of the crop comes from irrigated regions of the West. These solid trains of beets are riding the rails from northern Colorado fields to factories.

H. J. Heinz Company

**It's Serious Business Sitting In on a Tasting Committee**

Participants must fill in a score card listing aroma, appearance, texture, flavor, etc. This Heinz Company group at Pittsburgh meets only three times a week, lest too much tasting dull their palates. Behind the glass partition are experimental chefs in one of the laboratory kitchens. On the near side of the table is a ramp where visitors view the procedure. Executives, office and factory workers, and the visitors also make tasting reports for the quality control department.

U. S. Department of Agriculture

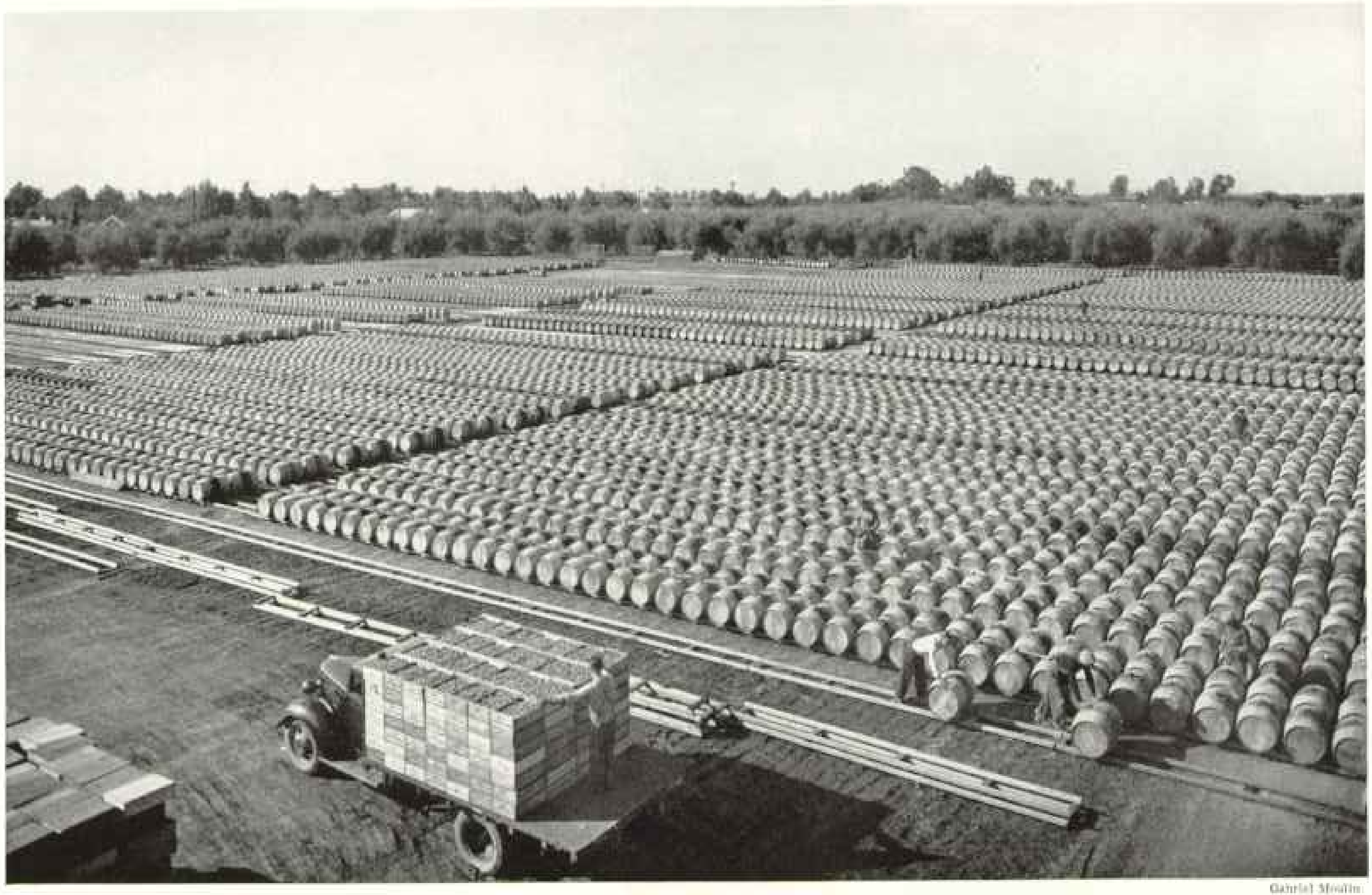
**Soybeans Have Shot Up the Economic Scale from a Forage Crop to a Plant of Myriad Uses**

Now you eat the legumes as macaroni, "milk," curd, pastries, salad oil, candy, and sauce. Soy casein helps make steering wheels for autos, waterproofing for raincoats, paint for houses, and candles, sales of which are booming because of blackouts.

H. J. Heinz Company

**Wealth of India That Early Explorers Sought Was Pepper, Which Still Is a Major Export**

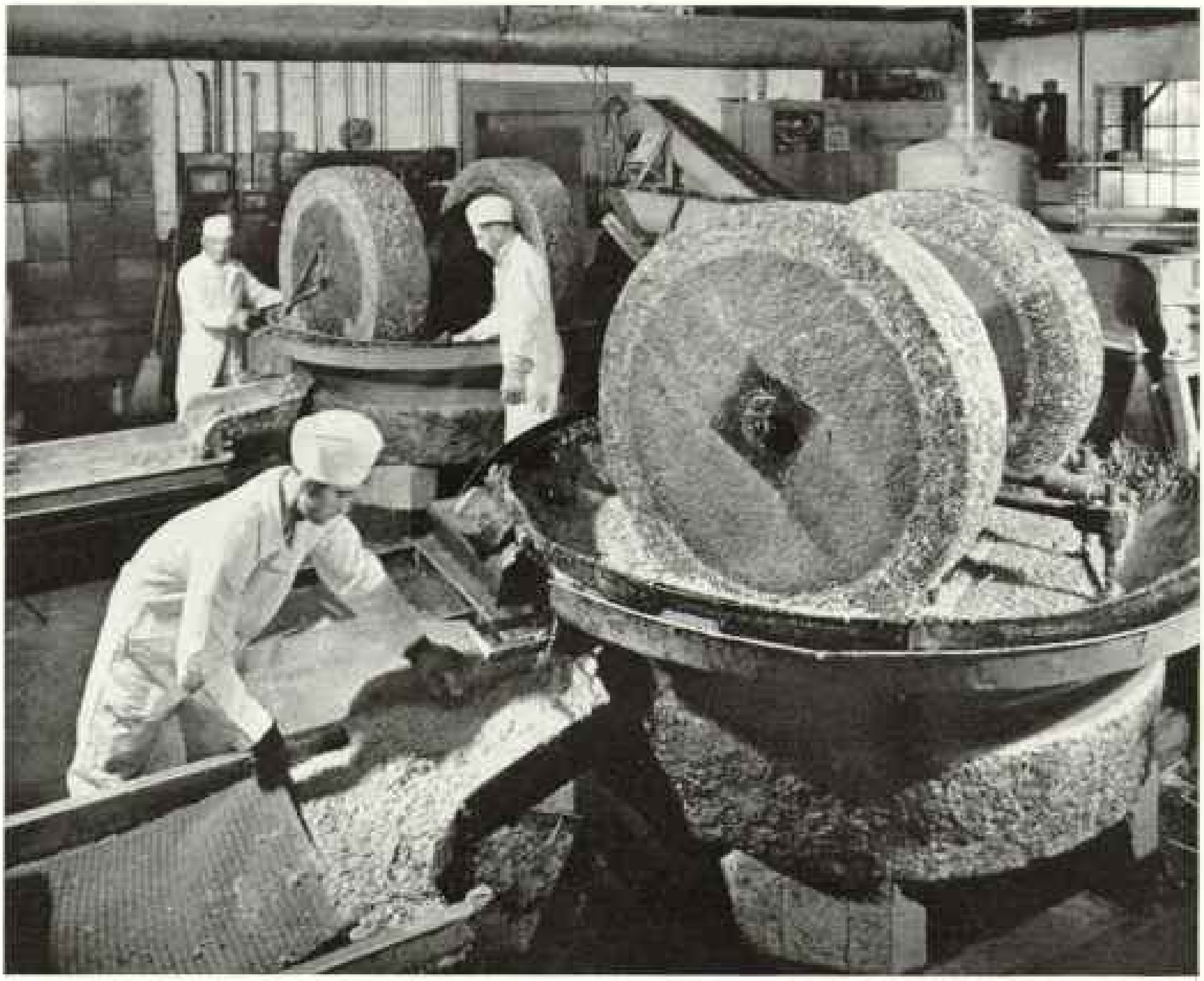
A Pittsburgh buyer watches the winnowing of black pepper at Tellicherry, on the Malabar Coast, after unripened berries have been picked from a climbing vine and sun-dried. White pepper is ground from mature berries with the outer hull removed (page 311).



Gabriel Moulin

**"Roll Out the Barrel" Might Well Be the Theme Song of the Olive Industry**

"Everything grows in California," they say in the Golden State. Already they pack some million and a quarter cases of canned ripe olives. When the supply of olive oil from Spain was cut off, the orchardists started packing green olives for oil. Acres of barrels at Lindsay show a goodly start on the new enterprise.



Gabriel Moulin

**Modern Plants Crush Olives as Growers Did in Bible Times**

In this California mill a granite-edge runner grinds the olives after they have passed through a roller crusher. The operator is holding the bag into which flows the pomace for pressing. The bag is made of coconut fiber. Similar bags of camel's hair or esparto grass are used in European countries.

Each commission firm has allotted to it a certain number of pens to handle its livestock. Mainstays of any stockyards are the buyers for the packers. Traders buy on their own account to resell to country butchers. The order buyers operate for small packers at distant places and for the feeder farms.

Machine Age terms creep into cattle raising, one of mankind's earliest vocations. "Unfinished animals," they call the livestock bought by Corn Belt farmers to be fattened for the final sale.

The Live Stock Exchange has a clearinghouse where bills are presented and payments are made. Buying begins at 8 o'clock in the morning. Bills must reach the clearinghouse by 2 o'clock and must be paid by 3 o'clock.

Cumbersome, these details, but their practical result is that in scores of accessible cities there is available for every American farmer a ready market when he has livestock to sell, and payment in nearly every case is made the same day he sells. Cattle raisers and meat men all over the world have studied this system—you can find voluminous reports about it in a dozen languages—but no other country in the world has duplicated it.

### The Last Roundup—at the Stockyards

The way to see—and hear—the stockyards is to start out at 8 o'clock with a heavy-booted, gaudy-shirted buyer, who usually carries a rawhide whip or cane to prod the animals into action for more thorough inspection. You shout questions as he makes his literal last roundup amid the cacophony of bawling calves, squealing pigs, or bleating sheep.

Cattle buyers go on horseback to get a better over-all view of the prospects, and also because of danger from irate steers that grow restive in the pens (page 283). Lamb and hog buyers bargain afoot.

Unwritten but rigid rules govern the trading. One buyer must not enter the alley

William M. Rittase

**She Packs Pickles in Patterns for Picnic Bottles**

Designers work out positions and color for eye-appeal of the H. J. Heinz Company products. Here each cucumber, onion, cauliflower tidbit, and morsel of pimento must be placed just so.

alongside a seller's pen while another buyer is negotiating. A buyer's bid is binding only so long as he stays in the alley. A few words, or a nod of the head, may conclude a transaction involving thousands of dollars. No written record is exchanged until the livestock is weighed in to the purchaser.

Adjoining the Chicago stockyards is so-called Packingtown, home of the mammoth meat factories still known as packing plants. The name is a misnomer now, a carry-over from the days when meat was mostly pickled, smoked, or salted for shipping.

Then they "packed 15 bushels of corn into a pig, packed the pig into a barrel, and packed the barrels into trains." Mountains of barrels of cured meats piled high on the prairies during seasonal slaughtering, confined to winter months because only then could fresh meat be kept long enough for shipping even to near-by markets. Hearts, brains, sweetbreads, calves' liver, and other choice parts were sold at nominal prices, or wasted.

Invention of the refrigerator car changed all that. The first one, patented in 1867, was little more than a crude icebox on wheels. But it developed rapidly, and opened markets of the world to the Iowa hog raiser, the Texas cattle producer, and the Montana sheepman.

### Cubicles of Coolth

Furthermore, refrigeration helped transform the packing plants from mere slaughterhouses to prodigious industrial museums. There thousands of visitors—scientists, students, and sight-seers—come every working day now to watch deft artisans and uncanny machines, to observe laboratory workers evolve new plastics and pills from animal parts, and see experts prepare novel meat loaves and myriad sausages from edible meats.

Go through an automobile factory and you marvel at the assembly line. In a packing plant you are amazed at the *dis*-assembly line. Specification sheets tell of strange things that come out of an animal.

I looked over the check list for the severance of a steer. Steaks, roasts, shinbones, kidneys, I understood. But then there was "From viscera: heart, heart artery, gullet, lungs, and *weasand.*"

"That 'weasand,' now; what is that?" I inquired.

"Don't you remember your Shakespeare? 'Cut his weasand (meaning his windpipe) with thy knife'?"

Other parts listed, some not edible, which help carry the overhead of the meats you buy, include dewclaws, sinews, tail switch, caul, bung, pizzle, eye fat, tripe trimmings, snout, rennet, ruffle, and ovaries.

Prized products of cattle now are the glands —pancreas, pituitary, thyroid, parathyroid, and suprarenal—which emerge through the drugstore. The cheese maker using rennet, the jeweler who employs goldbeater's skin from animal intestines, the stationer selling ink which contains ox gall, the hardware merchant with knife handles of cattle hoofs, the upholsterer who requires tail hair—all these, and many more, help subsidize the meat man.

Like finding a pearl in an oyster is coming upon a steer that has gallstones. These concretions go to the Orient for a medicine supposed to alleviate the pangs of childbirth. They sell at the rate of $250 a pound, but that figure is like quoting a quantity price on radium, because gallstones and radium don't go on sale in pound lots.

Since long before that classic poem on animal husbandry, the Twenty-third Psalm, was penned on the hallowed plains of Palestine, sheep have provided men with food and clothing. For Machine Age use, the lamb is by far the most versatile animal. More than a fourth of its cut-up value is in its by-products.

### Sheep Guts for Harp Strings

Mary's little pet may follow her to school on a Rocky Mountain ranch. But he is fattened in a Midwestern feed lot. Thence he bleats his way into a packing plant and may become a suit in a New York store, a diploma for a California college, a sweatband for a Floridian's hat, shoes and gloves for Hollywood actresses, racket strings for a tennis champion at Forest Hills, surgical ligatures, and strings for a symphony orchestra in Boston. It takes glands from 100,000 lambs to make a pound of adrenalin, chemical good Samaritan to sufferers from bad hearts.

Expert efficiency begins when animals are driven up inclined runways to top floors of the meat factories.

The most humane method of killing has been worked out for each kind of livestock. Hogs are shunted into small pens, shackled by their hind legs, lifted by a revolving wheel until they hang head down, then a "sticker" severs their jugular veins. Cattle are stunned before they are swung up. Sheep are slaughtered much the same way as hogs, by "sticking" behind the ears.

Breathless experience is following a pig through a packing house from its last squeal until it is completely cut up into parts for chops, glue, hams, buttons, hot dogs, razor strops, lard, explosives, medicines, rug pads—and some 180 other uses.

From receiving pens to coolers it takes only 45 minutes to dissever a pig into fourscore pieces, many to be fractioned further by the retailer. More than 50 men have a skilled hand in the job. In some plants 400 pigs an hour go through this streamline operation.

Crowds like to watch the dehairing of hogs. The carcass is plunged into scalding water to loosen the hair. Then machines "shave" it by a series of paddlelike devices. Men paint on a resin, wipe it off, and quick singeing in a roaring gas flame removes the last vestige of hair from the pinkish skin.

You see men with the skill of a surgeon trim bacon from a hog's belly. The yield from one side of his knife is 10 cents a pound; from the other side, 25 cents. You watch workers push sides of meat against an electrically operated circular saw beneath horizontal bars which act as "shadow guides" for cutting.

Prime product of such operations on all livestock is fresh meat.

Second most important yield is cured and smoked meats, such as bacon, dried sausages, and hams. One plant estimates that a ham is handled by 344 men along the route from the scales where it takes delivery of a live hog until the ham is sold at a retail store.

Then there are the manufactured foods made from meat ingredients mixed with other foodstuffs. Ready-to-serve meats flavored with spices, meat loaves, and headcheese are examples of this rapidly expanding branch of meat production for the age of apartment dwellers and working wives.

Laboratories work full speed ahead to find new uses for animal fats to compete with vegetable oils. Meanwhile breeders revert to thinner hogs, a sort of back-to-the-razorback movement, because vegetable oils have made inroads on the use of lard. Ironically, America seeks leaner meats, while warring Europe's acute food need is animal fat (page 279).

Then there is the preparation of specialty foods, such as the tongue, heart, liver, brains,

Photo Art

"Butchers" Clean Tons of Salmon Daily in an Astoria, Oregon, Cannery

First the operator removes the head. Then he grasps the tail and cuts off the fins. The belly is split, viscera taken out, and the "meat" is washed and passed through a brine solution, to be sliced for packing into cans. Chinooks, silversides, and other varieties are piled in this "butchering room" of the Columbia River Packers.

**"The Good Old Days Are Going; Look at All the White Space on That Table!"**

So exclaimed a Lancaster County, Pennsylvania, patriarch when he saw this threshing-time meal. Women of the family are in the kitchen. The Pennsylvania Dutch are deeply religious. The sign reads: "Christ is the head of this home, the unseen guest at every meal, the silent listener at every conversation."

**After Machine-stuffing, Cervelats Are Hung Up to Go by Trolley into Curing and Smoking Rooms**

This type of dry sausage, popular among German and Scandinavian peoples, lacks garlic and has milder spicing than the heavily seasoned Italian salamis. Dry sausages, often called summer sausages, date back to pre-refrigeration days. Mostly they are eaten uncooked. Here cervelats are being made of choice beef and pork in the modern packing plant of George A. Hormel and Company, at Austin, Minnesota.

Lake Forest

**Here You Get a Manicure Before Work, Not After**

Hands and fingers of all kitchen workers in the H. J. Heinz Company, Pittsburgh, have constant attention. When girls note improvement in appearance of their hands, they do their own manicuring. But visits to the official manicurists are required, if only for inspection.

and sweetbreads of the animals. Plain tripe from the stomach walls of cattle and hogs, and honeycomb tripe, from the second stomach, are such items. So are sausage casings from intestines, pigs' knuckles, and tails from dressed beef which the menu card calls oxtails.

Placer gold miners of the meat industry are the men who convert inedible by-products into final form for drugs and snare drums, furniture and parchment paper, cattle feed and cosmetics, and thousands of other items.

That's why they say, "No man knows the meat business. And if some superman did, he wouldn't know it next month."

The scientist who developed a use for short hair of summer hogs in parachute cushions is no expert in making water-color paints from ox gall or pipestems and crochet needles from the shinbone of a steer.

Skim the volumes of technical reports from any big packer's laboratory, and you find processes and products utilized in such diverse places as ammunition plants, ice cream freezers, tanneries, pharmaceutical makers, and soap manufacturers.

Gelatin isn't just gelatin; glue isn't merely glue. Swift and Company developed an odorless gelatin; also gelatins of high clarity for desserts, gelatins of high viscosity for marshmallows, gelatins of high stabilizing potency for ice cream.

Leafing further, you find a bland lard, free of taste and odor; protective colloids from by-product proteins used in making smokeless gunpowder and asphalt emulsions; an ice cream that folds in ribbons of flavor to resemble a sundae; quick cures in hams by vein pumping, and a bottle label that won't come off if soaked for days in ice water, but washes off instantly in warm water.

Armour and Company scientists will explain the vast difference between bone glue and hide glue, and the many kinds of each. There are glues for the cabinetmaker and the calciminer, for hard wood and soft wood, for bookbinding, coffin construction, sandpaper, toys, billiard tables, and window shades.

Sixteen parts of beef cattle go direct to the pharmaceutical laboratories to make endocrine and other compounds, the mere listing of which fills 28 pages of a close-printed catalogue. Ask your druggist to let you glance through his prescription files and sooner or later, amid the maze of Latin, you will come upon the name of a meat packer, Armour or Wilson.

**Few Take Their Coffee Straight; Mostly It Is Blended**

Beans vary from country to country, and also from crop to crop. Here J. W. Zawacki, taster for the A. and P. Company, tests a spoonful from each cup on a revolving table. He sniffs the samples for aroma, too. While tasting he drinks no coffee, but spits out the samples in the tall cuspidor. Across this "good neighbor table" pass coffee samples from 14 New World countries.

"Cut it up and scatter the pieces," constantly quoted admonition of Gustavus Franklin Swift, has been realized in ways that would astound that pioneer "Yankee of the Yards."

### Your Orange a Day Comes a Long Way

Comparable only to meat distribution is the way citrus growers of California, Florida, and now Texas ship their perishable fruits by even longer hauls than meats require.

California has sent 14,000 carloads of citrus fruits clear across the continent to New York in a year. That many cars would make a train nearly 90 miles long.

The Atlantic Coast Line has a fruit train that leaves Jacksonville, Florida, at 8:45 A. M., arrives in Washington the next morning, and reaches New York at 8 o'clock the evening of the second day. That is faster time than the crack Florida Special made with passengers 15 years ago.

Many fast food freights have names now, such as the New Haven's Speed Witch, the Southern's Bean Train, the Boston and Maine's Bullet, and the Great Northern's Potato Special. But the citrus fruit speedsters are mostly nameless. They run in "blocks." Sometimes western roads run 20 sections to a block.

"Many California and Texas growers use the diversion privilege to ship to phantom destinations so they can sell rolling," said a railroad man.

This means that a shipper starts his cargo along, then wires destination in the light of market conditions. Up to three diversions there is no additional cost to the shipper. Thus market gluts and price breaks are avoided.

Spices are the very essence of geography.

Marco Polo crisscrossed China, Columbus sought islands of the Indies and found a New World, Vasco da Gama nosed around the flat foot of Africa to India—all in quest of spices.

Long before that, the Children of Israel wept at the memory of the fish "which we did eat in Egypt . . . the cucumbers, and the melons, and the leeks, and the onions, and the garlick. But now . . . there is nothing at all, beside this manna, before our eyes . . . and the manna was as coriander seed."

Spices were currency when Christ admonished the multitude, "Ye pay tithe of mint and anise and cummin, and have omitted the weightier matters of the law."

Spices mean money today when the 18 ounces per capita the United States consumes annually mount up to a wholesale spice bill

of 12 million dollars a year. To the New York market alone come 14,000 tons of black pepper, best spice seller (page 302). Blocks away you can sniff "Spice Row," the segment of Franklin Street, in New York City, which imports condiments from all the continents and countless islands of distant seas.

Biggest sale of spices is not for dainty shakers or neat kitchen cans, but in barrels and boxes for sausages which require sage, coriander, marjoram, anise, fennel, cardamom, cayenne, rosemary, and scores more.

In century-old warehouses you see them grinding cinnamon bark or sifting turmeric, and you catch the first-hand aroma of poetic places spices come from—Zanzibar, Sarawak, Amboina, Grenada, Morocco, Madagascar, the Moluccas.

"That was Java that made you sneeze," remarks your guide through this honeycomb of spice rooms. "Now let's watch them grinding mace, and you'll get a cough straight from Banda."

### Too Many Wars Spoil the Spice Trade

Just the day before a chemist at General Foods' vast laboratories told me how he had experimented with 700 organic compounds to capture the elusive raspberry flavor (page 299). For the most part, however, there are no synthetic spices. That fact just now is troubling the makers of sausages, meat loaves, soups, candies, and many other food manufacturers.

Moreover, the Army estimates it will buy a million pounds of spices in 1942.

Big food companies have spice buyers in faraway places. Many sell back canned commodities to the native peoples who produced some of the ingredients. Bane of the Campbell Soup Company stenographers is correspondence with their representative in Celebes, east Borneo, and the Molucca Islands. His name is Oei Liong Tjoam merk Goam leam Kie.

The United States used to import seven million pounds of sage a year from Dalmatia. Then it was eight cents a pound; last year it sold as high as $1.50 a pound when it could be bought at all.

For marjoram we have turned from the Mediterranean countries to Chile, and Guatemala is supplying some bay leaves, which formerly came largely from Turkey and Greece. This same bay leaf, now the humble ingredient of stews and pickles, was the "laurel" with which they crowned Greek heroes.

Hungarian paprika is no more, and the first crop Louisiana planted was wiped out by a cyclone. Last year, however, enough sweet peppers came out of the Deep South to supplement shipments from Spain and California.

Cloves, cinnamon, and pepper from the Netherlands Indies come through when there are boats to carry them. Only priorities interfere with ginger, nutmeg, and mace, all largely imported from the West Indies.

With pepper away out front on the list, others of the "Big Six" among spices are: cinnamon, nutmeg, ginger, cloves, and paprika. There are hundreds more, but 24 are easily obtainable in any well-stocked grocery. From those 24 spices, a mathematically minded member of the American Spice Trade Association has computed that 17,777,215 flavor combinations can be made.

### Cheese Dictionary Is a Map Index

Cheeses are as cosmopolitan as spices.

Wherever grass grows and cattle graze mankind has converted perishable milk into solid cheeses that can be kept, carried, and eaten over a long period.

Even with well-nigh universal delivery of fresh, pure milk in the United States, cheese has increased its sales more rapidly than most other staple foods. Production has nearly doubled in 20 years until now we eat more than 750 million pounds annually.

About one-half of that mountain of cheese comes from Wisconsin, and some three-fourths of it is the American, or Cheddar, type.

By their cheeses you can trace the trails of racial groups across the States. Names of Wisconsin towns—Denmark, Belgium, New Munster, Hollandale, New Glarus (for a canton of Switzerland), and Plymouth—all give an inkling of the people who settled them and the cheeses they make.

Cheeses introduced otherwise obscure European places into the American language: Stilton, Cheshire, Blue Dorset, Brie, Gorgonzola, Parmesan (for Parma), and Roquefort. Even Lippincott's Gazetteer dismisses Gruyères, famed for its medieval castle and annual celebration of Swiss freedom, as "noted for its cheese." *

Camembert, France, erected a monument to Marie Harel in honor of her creation of temperamental Camembert, one of the trickiest of all cheeses to make.

America has its cheese shrine, too, at Rome, New York. There a memorial tablet on the site of the first cheese factory of the New World sets forth, in part, that "Jesse Williams for the first time in the history of American dairying converted sweet milk from surrounding dairies into cheese at a central plant. He

* See "August First in Gruyères," by Melville Bell Grosvenor, National Geographic Magazine, August, 1936.

**Hams and Bacon Take a Trolley Ride to Final Inspection**

Swift's regular hams (upper right), skinned hams below, and bacon (left), all move by overhead rails from curing to smoking over hardwood sawdust in this Chicago plant.



Kodachromes by J. Baylor Roberts

**By Hand and by Hook He Unloads a Red Snapper Catch**

Few commercial fish have a bigger size-spread, from 2 to 60 pounds. The catch was made on Campeche Bank, off Mexico, and brought to Pensacola, Florida. Vessels have come in with as high as 60,000 pounds.



Kodachrome by J. Baylor Roberts

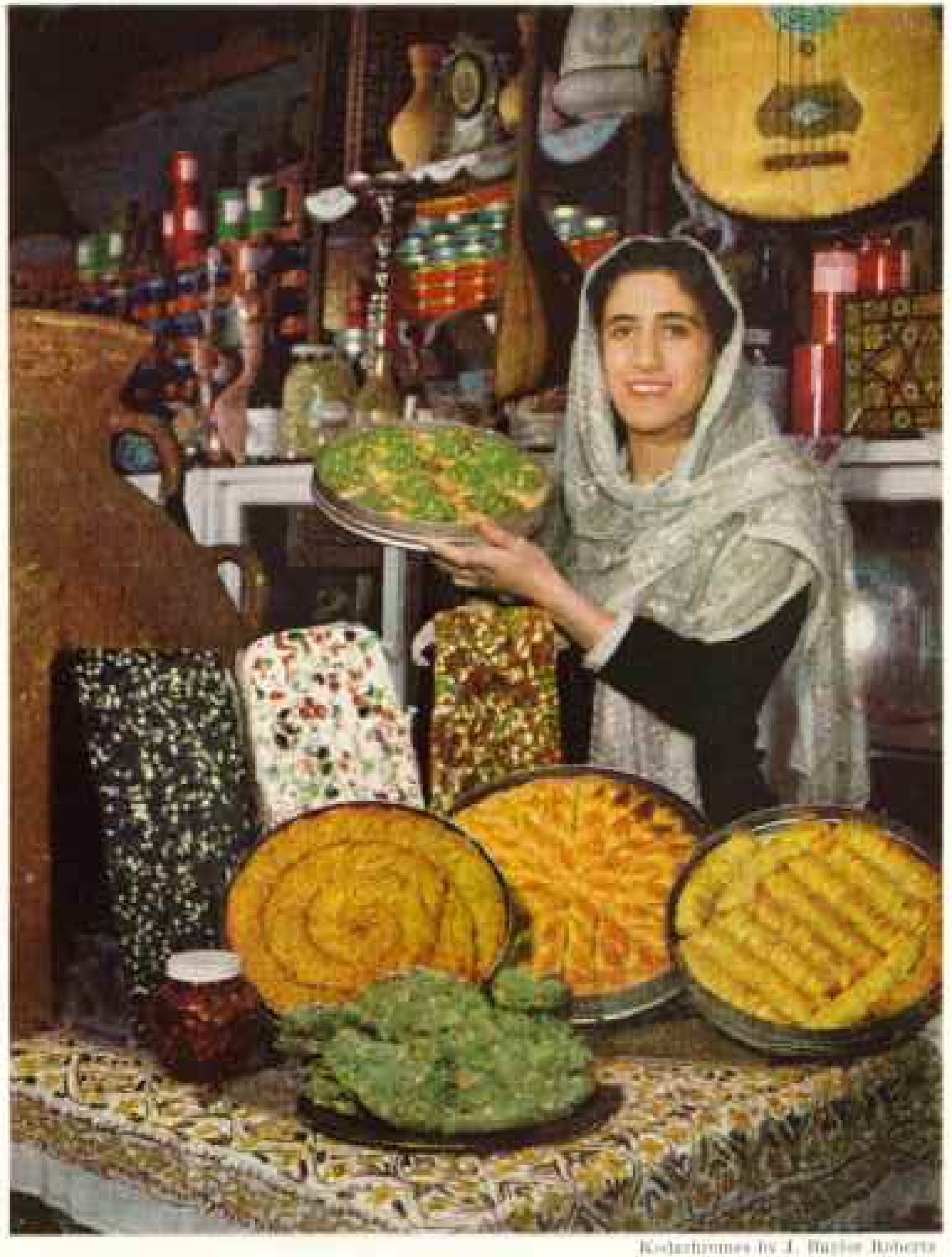
**Sides of Beef Get Their Last Brands in a Chill Room Before Shipping**

A roller stamp affixes the Swift Premium label with an edible ink. Each piece also bears the Government stamp. To protect their heads from bumps, workers wear a hard-fiber helmet. Even visitors in packing-plant rooms where meats are handled must put on white coats.



**Macaroni Curing Suggests a Tapestry Display**

The 44-inch strands are hung evenly on wooden wands to cure for six days. The 12-story La Rosa plant in New York makes a million pounds a week. Macaroni takes the place of potatoes in Italy.



Kodachromes by J. Baylor Roberts

**Syrian Pastries Date from Arabian Nights' Times**

No written recipes exist for some of these honey, fruit, and nut confections handed down through generations of Nicholas F. Abaid's family. He came from Damascus, Syria, to New York. His daughter holds a "birds' nests" cake.



Kodachrome from Virginia State Chamber of Commerce

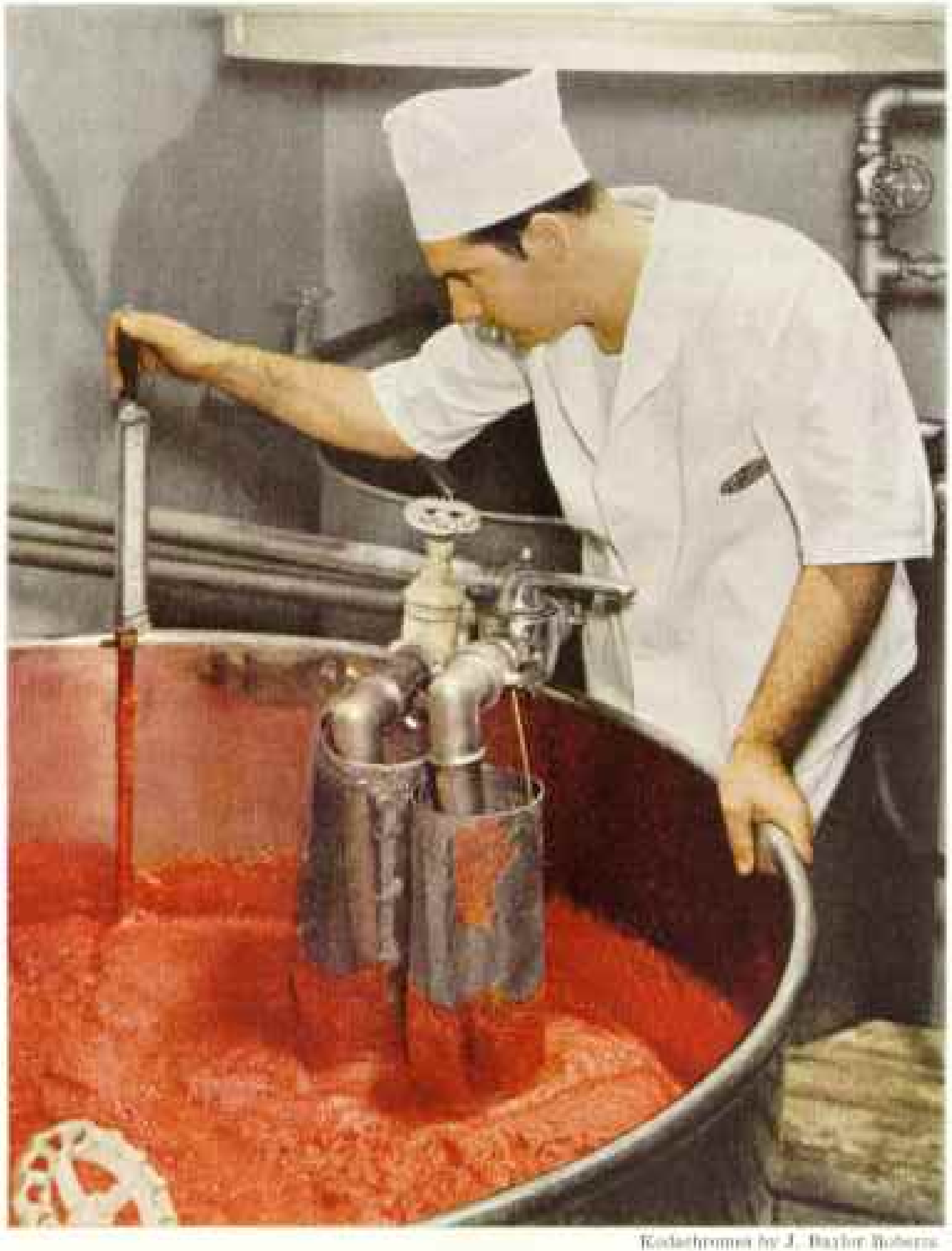
**Will Such Sizable Turkeys Some Day Be as Extinct as the Dinosaur?**

Some growers now breed the birds to a weight more suitable for apartment ovens and small-family use. Thus it is hoped to create an all-year demand, instead of selling turkeys so largely as a roast offering for Thanksgiving and Christmas.



**After a Steam Bath and Cold Showers Comes Inspection**

Plump, ripe tomatoes are touched only when the farmer picks them. Here, at the Phillips Packing Plant, Cambridge, Maryland, workers remove bruised ones from the conveyor. The rest roll on to the juicers and cookers.



Kodachromes by J. Baylor Roberts

**Intently He Awaits the Zero Hour of Tomato Juice**

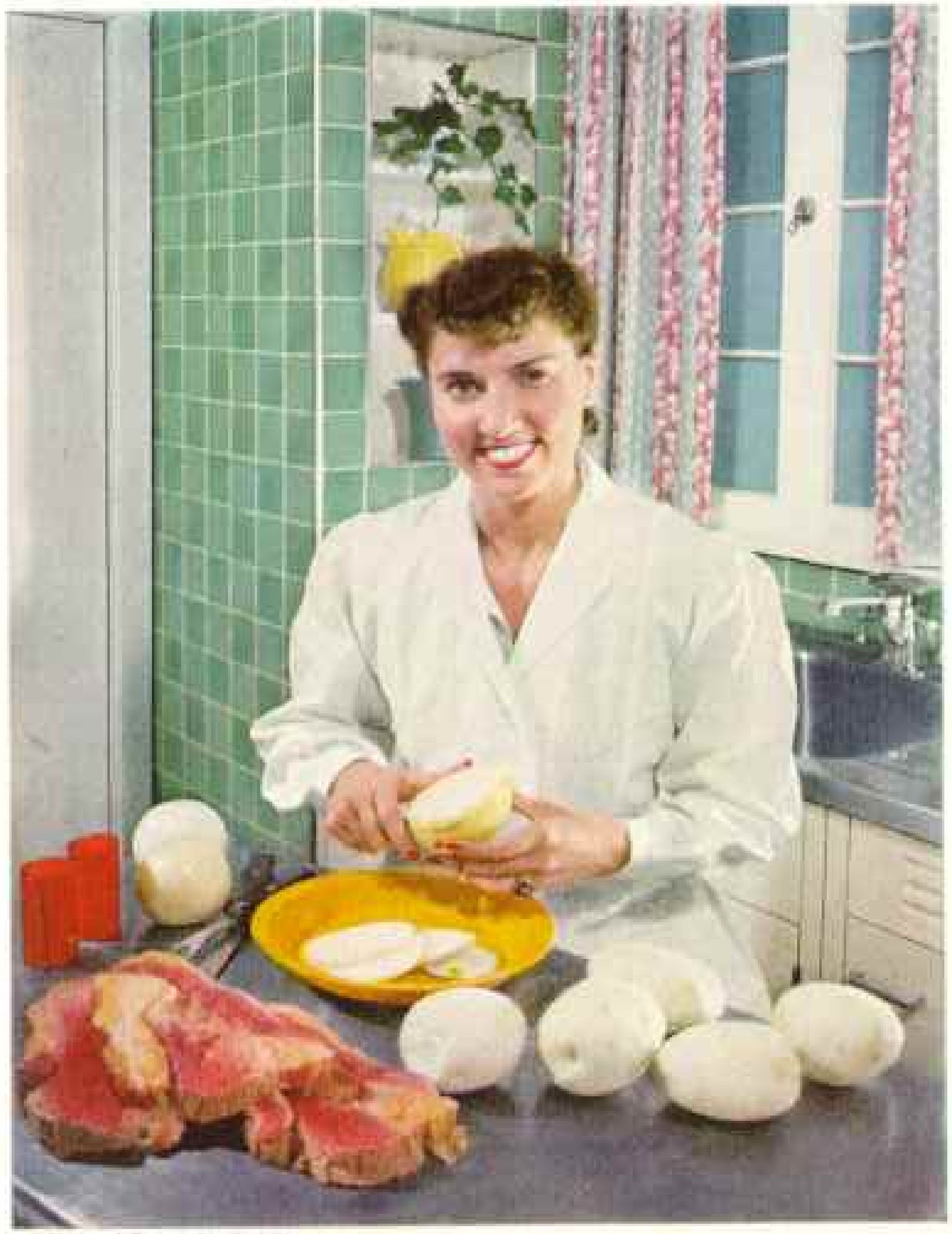
Too much heat means loss of valuable vitamins; too little, and the mixture will spoil. Each batch from this 500-gallon stainless-steel kettle must undergo microscope inspection to insure purity.




Kodachrome by J. Baylor Roberts

**It's the Overhead that Adds to the Cost of Eating While Speeding in a Hotel on Wheels**

Food and beverages being loaded on this Santa Fe Super Chief diner cost $900. The Fred Harvey Dining Service keeps a $22,000 food stock in these Chicago yards to put aboard 22 diners a day. It takes about 60 cleaners, inspectors, mechanics, oilers, and repair men to get the car ready for a run to Los Angeles.



© National Geographic Society

**"What Goes into Your Corned Beef Hash?"**

Libby demonstrates how the housewife in her home would handle the ingredients. Tons of corned beef, potatoes, onions, pepper, and salt are used to make hash by machinery.

Kodachromes by J. Baylor Roberts

**Color Means Dollars in the Foods Industries**

Helena Rubinstein's shop blends raw fruits and vegetables in "food for beauty" luncheons. People like to "eat red"; hence red tomatoes, blushing peaches, and pink salmon command higher prices than paler varieties.

**She Puts the Pear in Position; the Machine Does the Rest**

It stems, halves, pares, and cores 60 juicy Bartletts a minute. The Barron-Gray Company, of San Jose, California, ships canned pears to every State in the Union.



Kodachromes by Willard R. Culver

**Even Your Fruit Cocktail Now May Come from a Can**

Diced peaches and pears, pieces of pineapple, halved maraschino cherries, and seedless grapes go into the making. Only sugar syrup is added.

invented cheese-making machinery . . . aided in the erection of other factories, and trained numerous cheese makers."

Long before 1851, when Williams started his modest "cheese house," cheeses had been staples of American diet. The *Mayflower's* bill of lading shows that the Pilgrims brought cheeses to Plymouth, Massachusetts.

### The Wall Street of Cheese

Appropriately, Plymouth, Wisconsin, is cheese capital of the United States. In that town of fewer than 5,000 people and the aspect of a transplanted New England village, sales on the Cheese Board affect quoted prices all over the United States. There is located the National Cheese Institute.

"Why does Cheddar so far outrank all other cheeses?" I asked an Institute official.

"Your pun, if you meant one, is not well taken," he laughed. "Cheddar is popular for its relative mildness. Children eat it; so do adults who rebel at sharper and more odoriferous varieties. Moreover, it is the most versatile of all cheeses. It goes into sandwiches, on pies, makes rarebits, melts for toast, and is an all-round cooking cheese."

Cheddar, in Somerset, not only gave its name to the cheese now called American, but also to the process of matting cheese curd before pressing it into hoops. This first family of American cheeses dates back to the Middle Ages when an English cheese maker might aspire to be cheesemonger to the government.

Those were the days, too, of many special cheeses for special occasions. For example, there was the "groaning cheese," devised to fortify the husband during the vicarious pangs of his wife's childbirth. These big "rounds" were cut into from the center until a hole was formed big enough to pass the child through on the day of its christening.

Hundreds of kinds of cheeses now are made for everyday use in thousands of factories in nearly every State of the Union. Always the cheese maker is the impresario; his tricks and traditions are akin to the whims of an artist. Some old-timers still assure you that wearing wooden shoes improves the product.

Processing marked the biggest change in cheese since cheese went from home to factory production. Cheeses go from the maker to warehouses where they cure for months to develop flavor, mellow body, and texture. Thereafter they may be sold in their original forms, known to the trade as "styles"—daisies, longhorns, twins, mammoths, squares, midgets, etc. (Plate VI).

Many also are bought for processing, which means blending to assure uniform flavor, pasteurization, and packaging for consumer convenience.

Swift rise of processing cheese entailed precise scientific control.

In Kraft's big plants you see cheese tasters who savor and smell hundreds of cheese samples a day. That is only one step in the laboratories where samples taken at regular intervals are weighed; analyzed for butterfat content, moisture, and acidity; sliced for analysis of body and texture; and heated over gas ranges to test their "cookability."

James L. Kraft, who now heads the world's biggest cheese company, was the pioneer of processed cheese. He came to Chicago 39 years ago with $60 and his novel idea for pasteurized, packaged cheese.

In the monumental headquarters of the Kraft Cheese Company in Chicago is a plaque of the young Mr. Kraft driving "Paddy," a far-from-thoroughbred nag, hitched to his original cheese cart.

There they showed me a faded letter to a friend, dated August 2, 1904, which tells very humanly of the beginnings of one American big business. After suggesting that the friend join him to "get into something you can grow up with," he continued:

"To give you an idea of what you would have to do . . . it is simply a grocery route on a large scale. You take a horse and wagon and get customers that you can call on once or twice a week. I am driving one wagon myself, and I am taking care of the horses myself, but if all goes well I think I will have four horses before Christmas."

The hope of four horses by Christmas was realized. Less than 40 years later 2,000 refrigerated trucks help speed Kraft products to every city and town of the United States where there is a grocery store.

### Food Habits Slow to Change

Food habits of the conglomerate peoples that make up the United States persist long after language, dress, and social customs blend in the American melting pot.

New England's Indian pudding, baked beans, and clam chowder; Maryland's tipsy parson cake and planked shad; the South's corn pone, spoon bread, and "potlicker," left from boiling hog meat and greens; the tortillas, enchiladas, and ranch fried potatoes of the Southwest—these are but a few examples of regional foods.

Group eating is America's foremost social function, hence clambakes (280), rabbit fries, lutfisk dinners, cowboy suppers, and oyster roasts in regions where the ingredients abound, and, everywhere, church suppers and picnics.

**They "Candle" Eggs Now with Electric Lights**

This expert, one of 48 at an A. and P. New York plant, examines 120 dozen an hour. She silhouettes each against the special light to make sure the air cell in the large end is small, a sign of freshness; that the yolk is in the center, meaning the white is firm; and that there are no discolorations.

Experts say wars always change the staple food habits of a nation. Classic examples are the canning and beet-sugar industries born during the Napoleonic campaigns when the "Little Corporal" offered prizes for invention of these processes so his armies might march farther "on their stomachs."

Commercial baking got an impetus during our own Civil War by quantity production of loaves to feed armies in the field. The United States Capitol then sheltered a bakery to supply troops defending Washington.

Shipping meats to Cuba for American troops in the Spanish-American War presented a new problem. During the first World War Jay C. Hormel and others worked out a plan whereby shipping space would be saved by boning fresh meat before it was consigned to troops in France. During that same period Herbert Hoover, as Food Administrator, taught the country to eat more cornmeal and to use vegetable shortenings.

In the present emergency packers worked out a way to ship mild-cured "self-refrigerated" meat to England without the expense and delay of installing space-consuming refrigerated chambers and machinery in ships.

Ships' bottoms and sides are insulated with lard, which has been chilled in boxes to temperatures below zero. Meats are frozen to low temperatures, then quickly placed in steamer holds.

Cold from the meat forces warm air out of the holds. The holds then are sealed by placing more chilled lard on top the boxed meats. Each box contains two 28-pound blocks of lard, which the British also need.

What effect will this World War and our national defense activities have on the future eating of the United States?

That question I put to scores of experts in government and in food industries. Here is a composite of the answers:

Enormous shipments of food to Britain will mean higher prices to consumers. But producers will also get higher prices, which will help alleviate the farm problem.

Vastly improved national diet habits will spread back to their homes from the scientific feeding of a million men in army camps.

Regional food prejudices and neglect will be broken down. At one western camp in the heart of a sheep-raising area some 400 pounds of lamb were bought by the camp

Tenkel Keeling

**Dairying Began Even Before Moses Sought "A Land Flowing with Milk and Honey"**

This panel in the entrance lobby of the Kraft Cheese Company building in Chicago is a reproduction of an original found some 15 years ago at Ur. The plaque tells the story: "About 5,000 years ago the Babylonians of Ur worshipped the milk goddess Nin-Hur-Sag. Her shrine was excavated by the Museum of the University of Pennsylvania and the British Museum. . . . The panel depicts two calves emerging from a reed pen, a man milking from behind the cow, two men straining milk and pouring it into a spouted jar, another making butter by rolling a jar between his knees, and a fifth packing it away."

**Literal Frozen Assets Are Contents of a Food Locker Plant**

Farmers bring meats, fruits, and vegetables to their "safe deposit boxes" in this Staunton, Virginia, "food bank." Meat is cut into steaks, chops, etc., and other supplies are processed and packaged for "checking out" as needed. There are now some 2,500 food lockers in the United States.

Staff Photographer B. Anthony Stewart

**"Even When They're Seasick, They Eat My Pies"**

A veteran ship's baker for the President liners pulls pastry from his oven for guests on the maiden voyage of the *President Polk* from Newport News to Boston.

cook in a week of June, 1940. More than 4,000 pounds were ordered in the comparable week of 1941.

"Don't mention the camp, though," laughed my informant. "We don't want a beefsteak strike on our hands."

Canning plants have solved the problem of preserving vitamins and minerals. Scientific agriculture now must see that these important contents are grown into the "raw materials" for the canneries. Recent studies show that a head of cabbage grown on one soil may have four times the calcium of a head grown on poor soil. Some lots of spinach have 30 times the iron content of others.

"From now on there won't be killing of surplus pigs," predicted one economist. "Or feeding them skim milk, which has value as human food."

New crops will come in; old ones are finding strange new uses. Amazing is the spread of acreage in soybeans, "the perfect protein," and the protean peanut. Cotton-seed oil is helping rescue the South's problem crop from the doldrums of closed world markets.

Prepared foods—dehydrated milk, powdered eggs, breakfast cereals—already show sharp increases. A housewife may buy a 4-course dinner—soup, eggs for an omelet, vegetables, fruits for dessert, and milk—all in such compact dried form that she can carry her marketing home in her purse.

The meat industry is making more meat loaves, sausages, and other kinds of "ready-to-serve" products to reduce waste in consumption, transport, and storage.

The United States has some national worries, but a food shortage is not yet one of them—certainly not so long as watermelons rank as our seventh crop in the acreage utilized to grow them!

EDITOR'S NOTE: This article on recent developments in foods supplements the survey "How the World is Fed," by William Joseph Showalter, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1916, which still is used for basic reading in economics courses in high schools and colleges. Other articles will deal more in detail with such vital food industries as commercial fishing, citrus fruits, dairy products, cereals, etc.

# Washington—Storehouse of Knowledge

By Albert W. Atwood

WASHINGTON is no longer merely the seat of the United States Government.

It has become wartime nerve center of national defense, mecca of industrial leaders, scientists, and technicians who contribute to all-out emergency effort.

In war as in peace it remains an enduring world repository of knowledge for the use, benefit, and enjoyment of the average American citizen.

Nowhere else on this continent can so many books be found in any one place, and nowhere else in the country is there concentrated such a vast body of working savants, of specialists, of authorities upon thousands of different subjects.

It has long been said that Washington is the only city that belongs to the Nation, housing, as it does, the Congress, the President, and the Supreme Court.

But Washington now belongs to the Nation in another sense. It is not only the political capital of the country; it is the chief storehouse, library, and distributing point of information for the people, and a world center of science and research.

The Government protects the food the people eat and the clothes they wear, studies runs in their silk stockings, fights insect pests, sees that chemicals and explosives are shipped safely, studies the cause and cure of disease, prints books for the blind, improves the quality of building material, collects folk songs, sets the correct time and radio frequencies, discovers new drugs, and performs thousands of other services useful in peacetime as in war.

No one pretends that Washington is, or ever will be, the actual scene of all scientific research, or that great resources in art and education do not exist elsewhere. But Washington more than ever is the focal point where all the threads of knowledge converge; to it come most of the inquiries and from it go most of the directions.

## Acres of Laboratories

Washington is, in a sense, a city of almost endless laboratories.

The National Bureau of Standards, the largest, consists of 71 scientific and technical sections and occupies 20 permanent buildings on a site like a university campus.

The National Institute of Health in its new buildings is the greatest center of public health research in the world, with 250 separate projects under way in its far-flung war upon disease. In its spacious grounds this organization, too, looks like a college campus.

The Beltsville Research Center, just outside the District of Columbia, in Maryland, is one of the world's largest agricultural experiment stations. It has 3,000 experimental farm animals, 15,600 experimental fowls, and 5,500 rabbits, guinea pigs, rats, and white mice.

Washington has nearly 300 separate libraries, covering such diverse subjects as potash, medicine, geography, railroads, labor, farming, Latin-American affairs, Shakespeare, patent law, geology, and genealogy. The Library of Congress has the largest general, all-round collection of books, manuscripts, maps, prints, and music of any known library.

## Zoo Attracts Millions of Visitors

By actual count 2,505,871 persons in a single year, or an average of nearly 7,000 a day, visit the museums and exhibits of the Smithsonian Institution, which are devoted to science and the arts. The National Zoological Park, a "museum of living animals," is visited by 2,430,300 in a single year, and the Library of Congress by 1,037,558.

Nearly a thousand visitors a day are shown through the Washington Cathedral and about the same number through the Federal Bureau of Investigation.

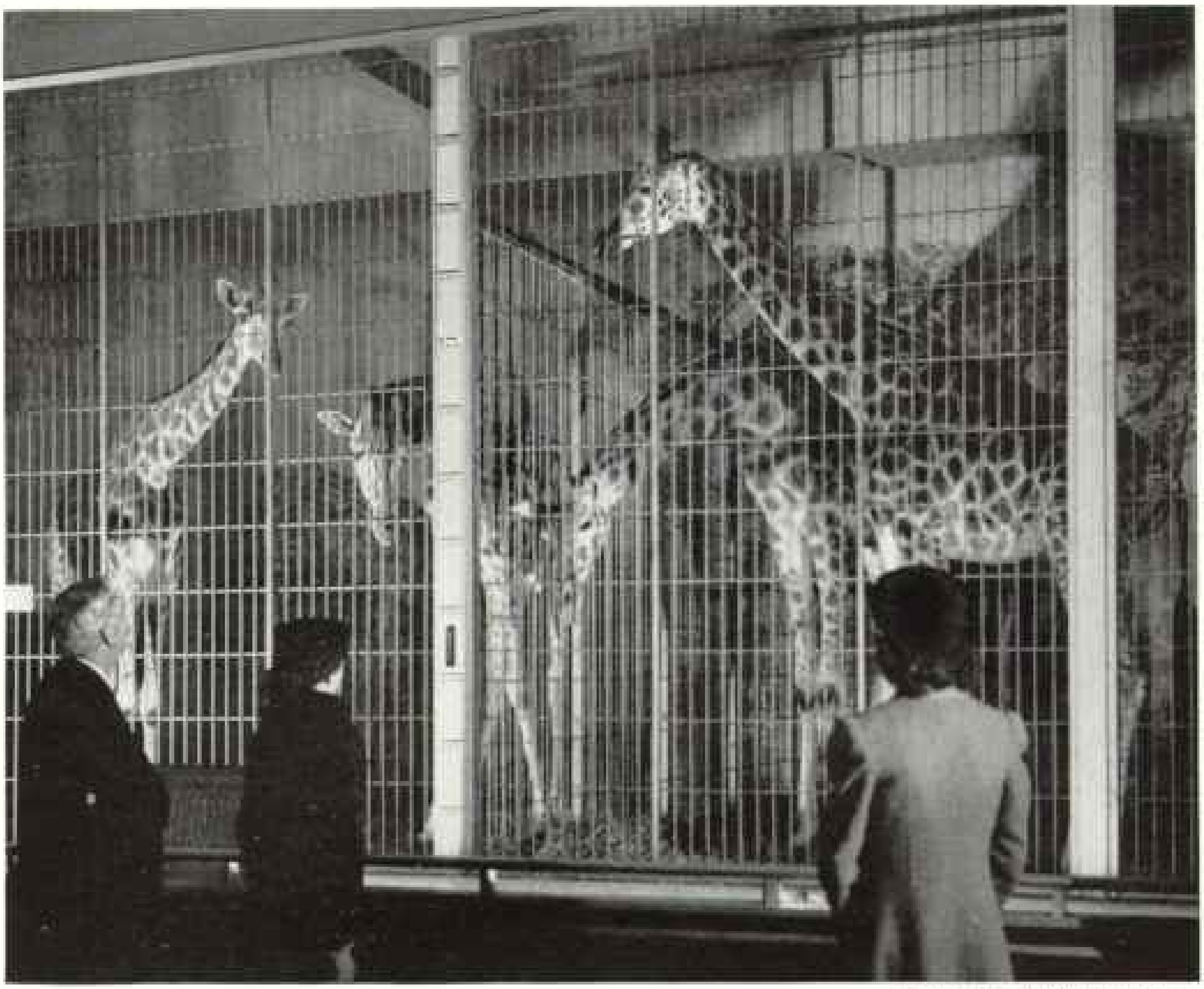
But most striking of all is the attendance at the newest of the city's numerous art galleries—the National Gallery of Art, presented to the Government by the late Andrew W. Mellon.* In the first four months following its opening in March, 1941, a million visitors entered its doors, or an average of 8,000 a day, with 23,000 on Memorial Day.

For Washington has become the outstanding city of free exhibits. In almost bewildering variety but in graphic and vivid form the citizen may see portrayed the facts and events of history, patriotism, government, science, technology, religion, and the arts.

Thus a pilgrimage to Washington has become almost a required feature of American life. One of the sights of the city is the busloads of visiting high school students, who come in incredible numbers, mostly in groups, from almost every State in the Union.

Naturally, with the war, Washington is the magnet for the leaders of many nations; busi-

* See "Old Masters in a New National Gallery," by Ruth Q. McBride, National Geographic Magazine, July, 1940.



Staff Photographer Willard R. Culver

**Washington's Thriving Giraffe Quartet Outgrows Its Measuring Stick**

Nagooma, the tallest, was named by school children for THE NATIONAL GEOGRAPHIC MAGAZINE. Now 12½ feet high, she has grown three feet since her portrait appeared in THE GEOGRAPHIC for June, 1938, shortly after her arrival at the National Zoological Park. These Nubian "camel leopards" came from Port Sudan, Africa, where they were acquired by a National Geographic Society-Smithsonian Expedition.

ness men and officials from every State pour in and out of the city.

"What I would like to have," remarked one visitor, "is the briefcase concession in Washington."

But these important visitors normally are outnumbered ten to one by those who visit Washington solely to see, learn, and enjoy.

Naturally the patriotic American, young or old, goes to Mount Vernon, the Washington Monument, the Lincoln Memorial, the United States Capitol building, the White House, and the Library of Congress.

### A "Department Store of Knowledge"

But these historic shrines are only the beginnings of a tour of Washington. Once the visitor has entered the Library of Congress he is in a mammoth department store of knowledge, and, as in any department store, he comes upon many different objects, some of them bearing very little resemblance to the idea most people have of a library.

Here, for example, is the one room where American history can be studied more nearly at first hand than anywhere else in the world. It is the crowded Division of Manuscripts, containing the original letters and papers of most of the Presidents, including Washington, Jefferson, Lincoln, Cleveland, Theodore Roosevelt, and Wilson.

The letters and papers written by and to Washington alone fill 366 volumes.

There are also the original letters and papers of Vice Presidents, Cabinet members, Senators, Representatives, and many other public men; those of the late Senator Borah alone number between 500,000 and 600,000 items.

Or the visitor may prefer to read his home town newspaper, if it happens to be among the more than 900 which the Library has on file. For here is the largest and most important

Harris and Ewing

**The President and Great Britain's Prime Minister Receive the Press**

Here Mr. Roosevelt and Mr. Churchill sit side by side in the White House Executive Offices, a day after the latter's dramatic arrival in Washington on December 22, 1941. Some 200 newspapermen attended this historic press conference. When reporters in the rear of the room were unable to see the Prime Minister, he obligingly stood up on a chair (page 350).

newspaper collection in the world, with more than 100,000 bound volumes, some 300 different papers directly accessible, and over 10,000 current periodical files.

Valuable as newspapers are, representing the contemporary record of American civilization, they take up stupendous quantities of space. When the main Library was completed in 1897, the Librarian predicted that it would be ample for a century and a half to come. Yet bound newspapers alone are rapidly filling the central core of the $12,000,000 marble annex finished in 1938 (page 335).

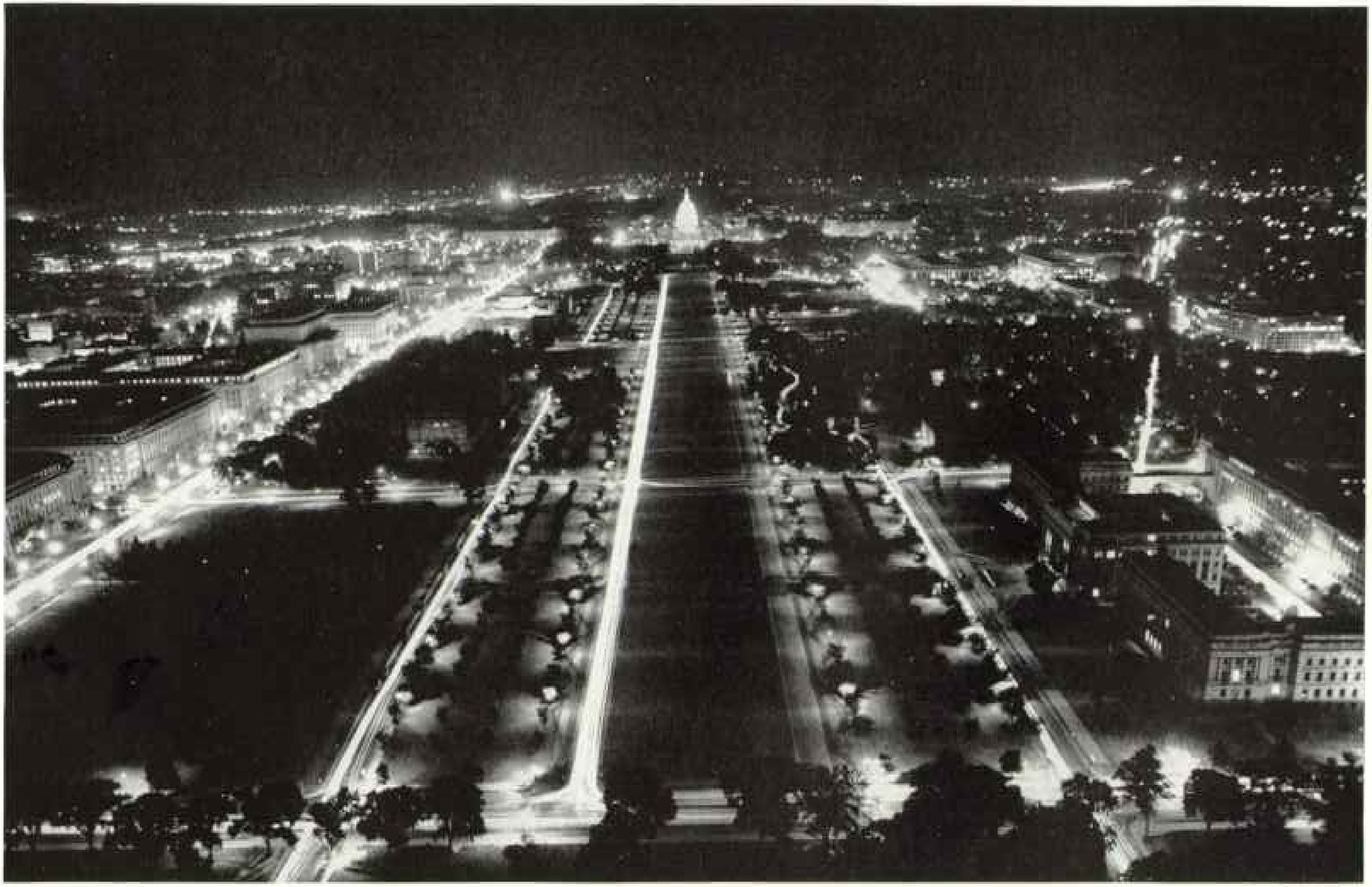
Unfortunately, most newspapers published since 1876 have been printed on wood pulp instead of rag paper, and disintegrate in about 25 years. This is the case with 80 percent of those in the Library, and the only solution is to microfilm them. This preserves the record for practically all time, and uses only from one twenty-third to one forty-seventh as much space as the actual newspapers fill.

Very popular with visitors is the national print collection in the Division of Fine Arts. It comprises more than half a million prints, etchings, engravings, lithographs, cartoons, and illustrations. In one of the largest print exhibition rooms in existence, prints from the presses of Rembrandt van Rijn, Albrecht Dürer, James McNeill Whistler, Joseph Pennell, and numerous contemporary printmakers are currently exhibited.

There are approximately 3,000 of the much admired Currier & Ives lithographs. More than a thousand of them were found in the Library cellar several years ago.

### A Fortune in Violins

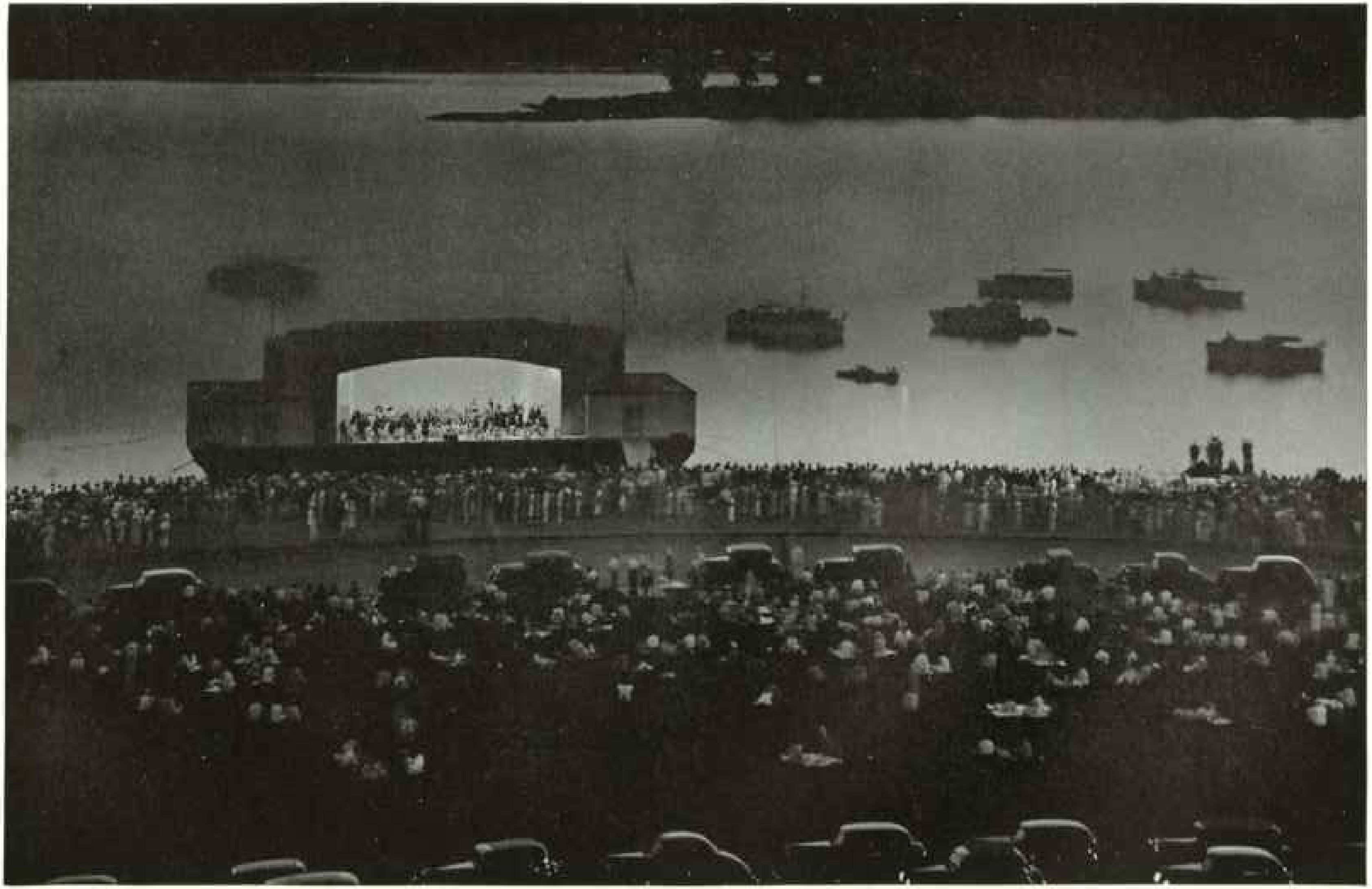
If a visitor's interest leans toward music, he will go to the little pavilion given by Mrs. Gertrude Clarke Whittall, where are exhibited five examples of Stradivari's work, including



Guy David Bowman

**This Incandescent Panorama of Dancing Lights Will Not Be Seen Again Till After the War**

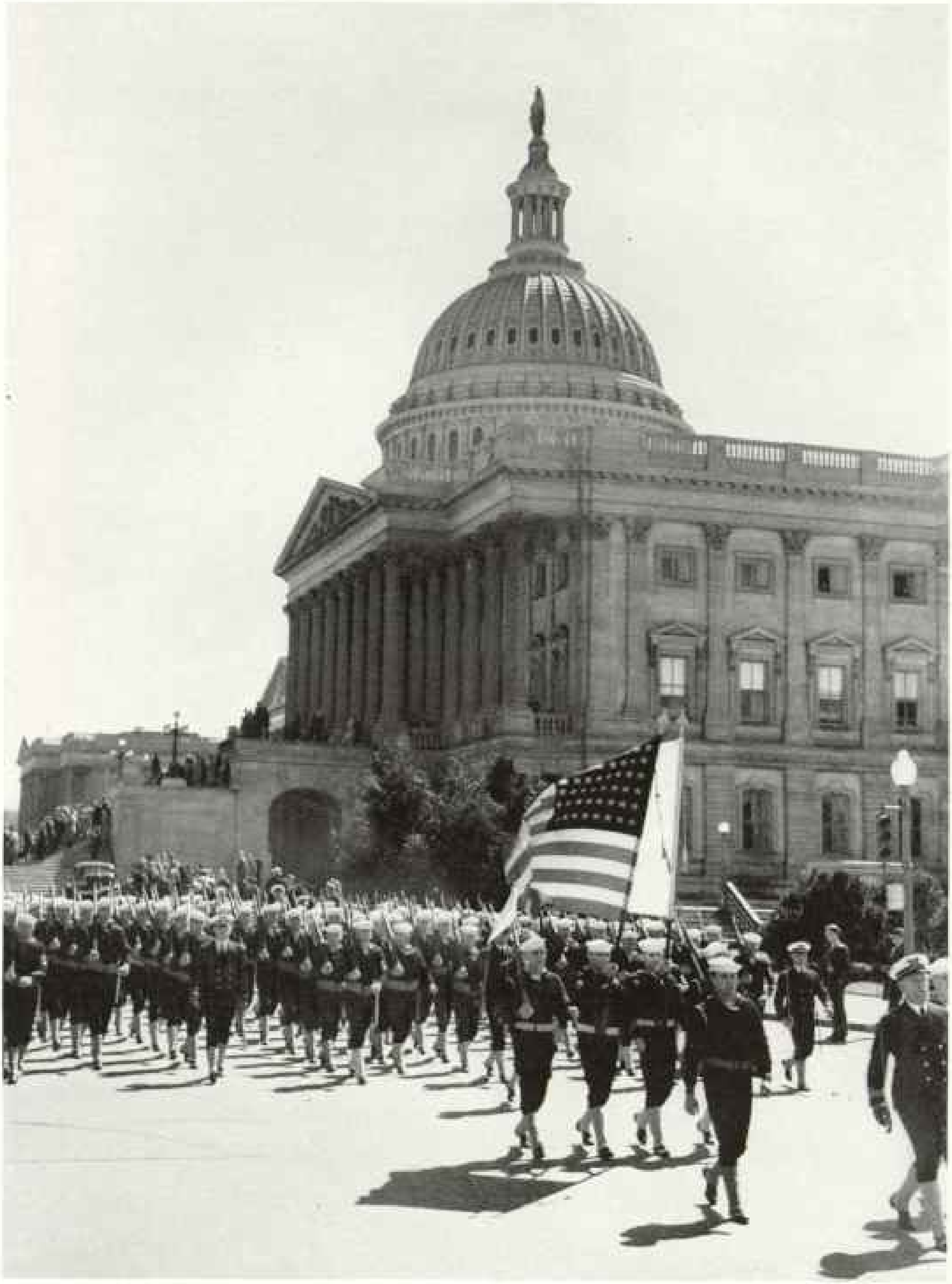
The Mall glistened thus when viewed from the Washington Monument before December 7, 1941. At left, massive Government buildings line Constitution Avenue, whose blazing lights have been dimmed. At the eastern end rises the white dome of the Capitol. Now it has been blacked out for the duration.



Staff Photographer J. Baylor Roberts

**From a Barge Moored in the Potomac, the National Symphony Orchestra Plays on Summer Evenings**

The musicians are seated in a large shell on a float moored at the Water Gate. Originally planned as a ceremonial entrance by water to the Nation's Capital, the broad terrace and granite steps now serve as an open-air amphitheater for thousands of music lovers. Many listen from canoes, or in larger pleasure craft.



Army

**Old Glory Before Them, Bluejackets Parade in Front of Our Nation's Capitol**

Soldiers armed with rifles and bayonets guard the entrances to the Capitol and other public buildings in Washington. Like the Jefferson Memorial, now nearing completion, the Capitol's large iron dome was a wartime project. Five months after the Battle of Gettysburg, in the Civil War, the work was finished, and Thomas Crawford's Statue of Freedom was put in place atop the dome. It is 3½ times the average height of a man.

the "Betts," said to be the most nearly perfect and valuable violin in the world.

If the perfection of Stradivari lay partly in his varnish, whose secret was lost after 1760, every care is taken to preserve it in these five examples, for they are kept in an even temperature day and night. But they are not museum pieces only; they are played frequently in the Coolidge Auditorium of the Library of Congress by distinguished musicians.

The same Music Division has the largest collection of opera librettos, and nearly 20,000 recorded folk songs obtained through years of search in remote mountain and wilderness areas—a real national archive of American folk song.

### Chinese and Russian Books

In another part of the vast building is the largest Russian collection outside of Russia and Finland, and the largest Chinese library outside of China, with many thousands of volumes in the Japanese, Korean, Tibetan, Manchurian, and Mongolian languages as well.

The collection is especially rich in local histories of China, and in descriptions of famous mountains, temples, academies, tombs, gardens, rivers, and bridges.

This great Oriental library exists largely because Dr. Walter T. Swingle, of the Department of Agriculture, seeking to introduce new fruits and vegetables into the United States, wisely insisted years ago that the Library collect Chinese agricultural and botanical books.

This was because practically the same plants can be grown in this country as in China, and because China has a fully documented and unbroken record of details of its life for 3,000 years.

For years Dr. Joseph F. Rock has added to America's agricultural riches by plant explorations in China. From one trip, while leading a National Geographic Society expedition, he brought back a blight-resisting chestnut tree and more than 6,000 plants. He also obtained for the Library of Congress a set of priceless Tibetan classics from a Buddhist monastery in Choni.

The Rare Book Collection contains more than 127,000 items on public exhibit or in its series of air-conditioned vaults. These books range from illuminated medieval manuscripts through the beginning of printing and bookmaking up to the fine printing of today.

There is the exquisite 3-volume copy of the Gutenberg Bible, on vellum, one of the world's most valuable books; John Eliot's Indian Bible of 1663; *Do(c)trina Breve*, oldest existing book printed in the Americas (Mexico, 1544); thousands of incunabula, or books printed in Europe before 1501; the famous library of Thomas Jefferson, reduced two-thirds by the fire of 1851; and those of such persons as the last Tsar of Russia, Justice Holmes, Susan B. Anthony, Houdini the magician, and Benjamin Franklin.

Although sheer physical limitations make it impossible for even this huge library to contain every book, the progress of cooperation among libraries and in the field of mechanization provides substitutes which are even better.

On the main floor of the Library, and open to the public, like everything else, is the great Union Catalog, which contains 11,000,000 cards of books in 750 other libraries, thus saving the student the time and expense of correspondence and travel.

On the other hand, when smaller libraries purchase books that are already in the Library of Congress, they buy from the latter for a few cents apiece catalogue cards already made out for the same books. This is such a saving to libraries throughout the country that 6,500 of them bought 17,000,000 such cards in 1941.

But the greatest progress is in the field of photo-duplication. The resident of Texas or Oregon does not need to visit Washington to see the maps, manuscripts, documents, and rare books which he needs. Through photographic process and at modest cost he can assemble the same material in his own library, in large or small amount. In fact, the Library of Congress will fill his order at the cost of a few cents for a single page out of a book, either of text or of illustration.

From the Library of Congress visitors naturally go to the vast and massive National Archives. This is not a collection of books but a permanent repository into which records of the many departments of the Government itself are gradually being gathered. Here, for example, are the original laws, treaties, dispatches, and correspondence between the State Department and its foreign representatives; the pension claims, and War Department records (page 346).

### A "Laundry" for Precious Documents

Heretofore, Government archives have been widely scattered and poorly kept. When admitted to the National Archives they must first be cleaned, fumigated, unfolded, and then put through the only humidifying, drying, and flattening machine in the world, a sort of glorified laundry mangle for documents.

Although this machine can handle from 10,000 to 25,000 papers a day, it has several centuries of work ahead, so numerous are the Government's records.




**War Brings a 24-hour Military Guard to the White House Grounds**

Soldiers and police are stationed at the heads of the avenues separating the State Department, on the west, and the Treasury Department, on the east, from the Executive Mansion. Both streets have been closed to traffic. Sentries patrol the entire area, and the customary throng of sight-seers has been barred.

Staff Photographer Willard R. Culver

**Mapping History in the Making—A Corner of the Cartographic Section of the National Geographic Society**

With the entire world now a theater of war, thousands of National Geographic Society maps are in daily use in the State, War, and Navy Departments, ships at sea, and far-flung military posts. Foreign governments also order many through their embassies in Washington. Four wall-size maps of vital areas, each in ten colors, were produced as supplements to the NATIONAL GEOGRAPHIC MAGAZINE in 1941 and distributed to The Society's 1,165,000 member families. In addition, nearly two score local-area and large-scale detail maps were drawn for the pages of The Magazine, and many more were prepared for newspaper and school use.

Staff Photographer B. Anthony Stewart

**Top, Bottom, Right or Left, You Can Read Music from This Songbook**

This sixteenth-century volume in the Folger Shakespeare Library, designed for small groups seated about a table, has the four voice parts printed in type facing in four directions. For large choral groups, separate books were scored with individual melodies for soprano, alto, tenor, and bass. In Elizabethan vocal music the four parts not only harmonized, but sometimes each carried a tune of its own.

In the past such papers were folded, but to preserve them properly all folds, wrinkles, and creases must be removed. The paper is then laminated; that is, it is coated on both sides with transparent cellulose acetate foil under heat and pressure. In this way a sheet of paper torn into many pieces becomes whole again, is actually thinner than it was before, is less subject to damage and forgery, and is more impervious to spilled ink.

The National Archives also preserves for the use of Government officials, scholars, and study groups a wonderful library of historical films. This is history in the third dimension, a mobile supplement to the written word. Ordinary films disintegrate in fifty to a hundred years at most, but by copying them on more durable material it is hoped that this film library will last for several thousand years.

Although small as compared with the National Archives and Library of Congress, the Folger Library is an architectural gem and one of the world's foremost treasure houses.

Here the visitor finds himself in both a museum and a library of almost unbelievable fullness and richness on its chosen subject, Elizabethan England in general and Shakespeare in particular. We may think of Shakespeare as having lived a long time ago, but his England coincided with the birthtime of our own American civilization; the two were inextricably joined together.

### "Hamlet" in 800 Editions

There is infinite variety in the Folger. It has 79 of the 200 first folios of Shakespeare. There is also a quarter of a million theatrical playbills, promptbooks, and costume books from Shakespeare's time to the present (page 347). Modern actors, such as Maurice Evans, consult them.

Seventy letters and documents written by

Staff Photographer R. Anthony Stewart

GERMANY IS SWEPT BY REVOLUTIONISTS—Washington Sunday Star, November 10, 1918

The periodical filing room of the Library of Congress receives 545 United States daily newspapers, 232 weeklies, and 133 foreign periodicals (page 326). Editions of at least one important newspaper from each State are kept in bound volumes. With the opening of the new marble Annex in 1938, 414 miles of steel shelving became available.

or signed by Queen Elizabeth are here; also her Great Seal and the Privy Seal of Henry VIII. Besides books, documents, and manuscripts, including 800 editions of *Hamlet* alone, there are actors' costumes, stage properties, tapestries, paintings, prints, busts, medals, furniture, coins, and objects strange to us moderns, such as hornbooks, ring dials, pomanders, posy rings, and sheets of music facing four ways so that four singers can read from one sheet (opposite page).

The Folger ranks next to the British Museum as a source of original material of the British Renaissance; yet many of its richest treasures, as well as its exquisite little Elizabethan theater, are on constant public exhibition.

It took nearly a lifetime for the late Henry Clay Folger to gather this rare collection. Although he placed it in Washington, giving it "to the American people," he vested the trust in the trustees of his own college, Amherst, in Massachusetts; for he first became a collector of Shakespeare and Shakespeare's England when as a college senior he heard a lecture by Ralph Waldo Emerson.

More than 12,000 early English books have been added to the collection since Mr. Folger's death.

### Priceless Art Treasures

Just as the libraries of Washington supplement one another, so do its many art galleries. The majestic new National Gallery confines itself solely to classic masterpieces, and when the Widener collection is added to those of Mellon and Kress, it will combine what were considered three of the foremost art collections in private hands. Being one of the largest marble buildings in existence, it provides room

for still more such collections (page 355).

The most visited art gallery in America or Europe, it is one of the chief sights of the Western Hemisphere. No doubt many visitors go to see the $15,000,000 building more than the pictures, or to glance at Raphael's Madonna just because Mr. Mellon paid more than $1,000,000 for it (Plate VII).

But the glorious array of paintings, mostly inspired by incidents in the Christian religion, cannot fail to have an uplifting effect on beholders.*

While the National Gallery takes for permanent exhibit no paintings of artists who have not been dead for at least 20 years, the Corcoran Gallery of Art, in another part of Washington, accepts only oil paintings of living American artists in its Biennial Exhibits, and is devoted to the development of American art.

There is no limit to the number of entrants in these Biennials, and paintings need not be confined to any one school of art. In addition, the Corcoran has a large permanent collection of American and other paintings, sculpture, tapestries, and an art school with approximately 500 students a year.

### A Gallery for Moderns

An art school is also conducted by the Phillips Memorial Gallery, which is known everywhere as a pioneer in the appreciation of modern painting. It is widely known, too, for its growing collection of outstanding modern and contemporary art and some of its sources.

On the grounds of the Smithsonian Institution stands an entirely different kind of art gallery, that given by the late Charles Lang Freer of Detroit. To most visitors it is essentially a place of rarities, for its chief purposes are the study and acquisition of the fine arts of China, Japan, Korea, India, Indo-China, Iran, Iraq, Syria, Asia Minor, and Egypt.

But visitors should not miss its far-famed blue Peacock Room, designed by the artist Whistler, or its Chinese jades, bronzes, and vases. One Chinese ceremonial sickle, which was made at least twelve centuries before Christ, consists of jade, bronze, and turquoise, all in excellent preservation.

Another specialized and unique collection and study center is the Dumbarton Oaks Research Library and Collection, in historic Georgetown. Until recently the private residence of Mr. and Mrs. Robert Woods Bliss, it is now part of Harvard University, and the collection is open to the public.

Here the art and culture of the Byzantine Empire, which ruled so much of the world from 331 to 1453, is the chief pursuit. The collection consists of objects in metal and ivory, as well as sculpture, mosaics, and textiles.

Washington's Cathedral of St. Peter and St. Paul is not primarily an art gallery or a museum. But with its infinite symbolic detail, its stained glass, wood carvings, wrought iron, murals, sacred monuments, ancient crosses, and the vast sculptured Gothic fabric itself, it is indeed a place of many beauties.

Even in its unfinished state, the Cathedral provides facilities for the religious assemblies incidental to national conventions, for state funerals, and for public services at times of national joy and sorrow (Plate VIII).

The Cathedral stands on one of the highest hills in Washington, and its great central tower will eventually rise 125 feet above the Washington Monument. When completed the Cathedral will be a tenth of a mile long.

Among points of interest are the seven chapels, large and small and of varying design and purpose. One, the crypt Chapel of St. Joseph of Arimathea, contains four of the largest circular piers in the world, which support the piers of the crossing and central tower above.

The gifts of 100,000 contributors are represented in the buildings and extensive grounds. Associated with the Cathedral is a school for boys, one for girls, one for young children, a library, and a unique institution called the College of Preachers, which is really a graduate school for clergy.

### A "Dictionary of Nature"

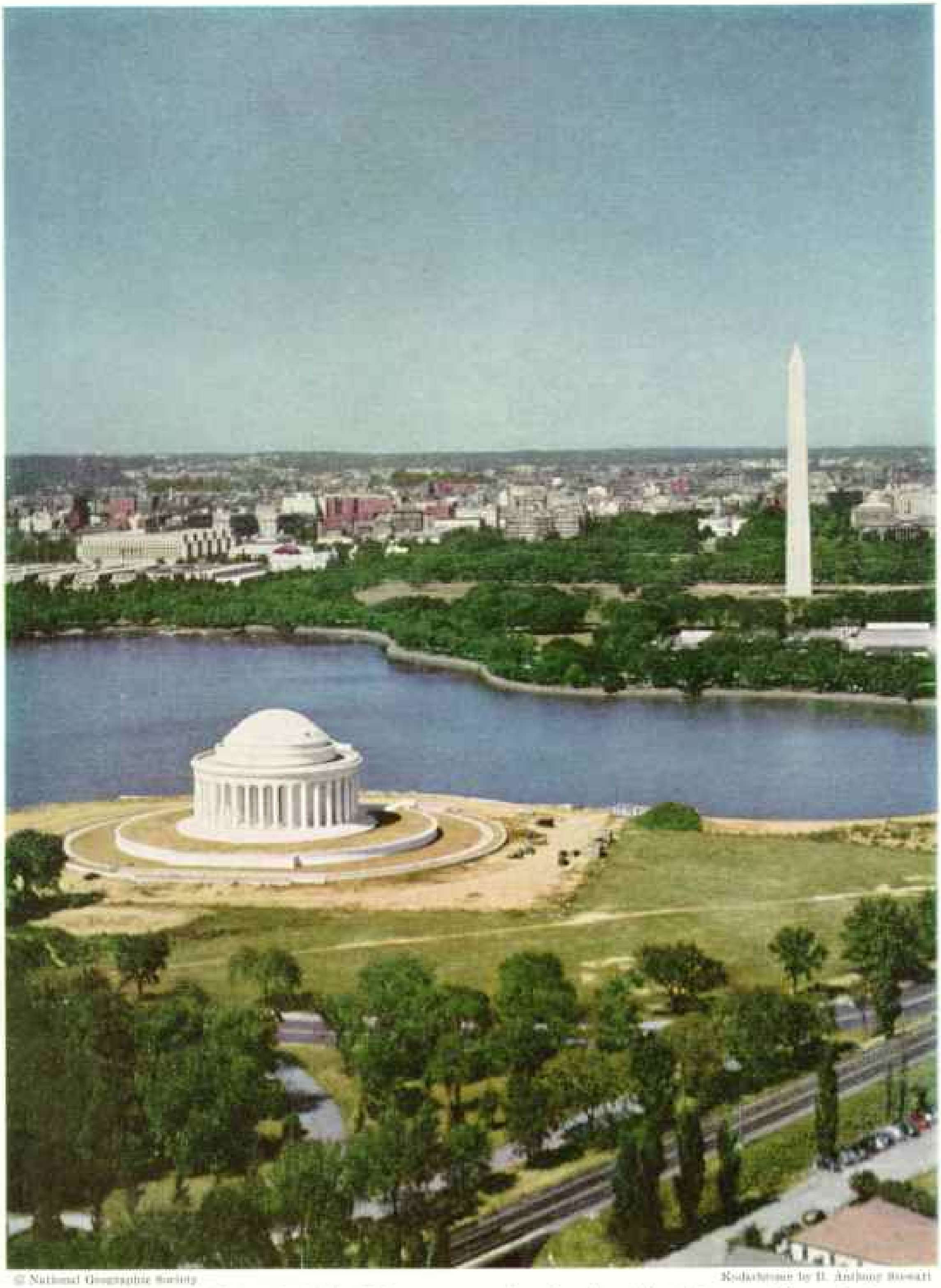
But the most likely destination of any visitor to Washington is the Smithsonian group of buildings on the Mall, about halfway between the Capitol and the Washington Monument. There he sees public exhibits ranging from sea urchins to locomotives and from beetles to airplanes.

For this is the Government's chief collection of scientific specimens and physical objects, aside from books and documents, and it has been in course of collection for nearly a hundred years.

Founded for the "increase and diffusion of knowledge among men" by an Englishman who never saw America, the Smithsonian Institution came into being so early that it initiated or stimulated much of the far-flung scientific work of today, and has been, as it were, the mother of Government bureaus.

But its own work has steadily expanded until now it has more than 17,000,000 scientific specimens, with 212,000 added in a single year; and it carries on scientific research in many fields.

* Some of these treasures have been removed to places not disclosed for safekeeping.



 Kodachrome by B. Anthony Stewart

**Washington's New Symbol of Democracy—the Pantheonlike Jefferson Memorial**

Designed by John Russell Pope, the monument overlooks the Tidal Basin, fringed with flowering cherry trees. A 24-foot statue of Jefferson, sculptured by Rudolph Evans, will stand beneath the dome. Washington Monument (right); Department of Interior Building (left background). Taken from Goodyear airship *Enterprise*.



Kodachrome by B. Anthony Stewart

**Screens at National Geographic Society Headquarters Unfold a Quarter-century of Achievement in Color Photography**

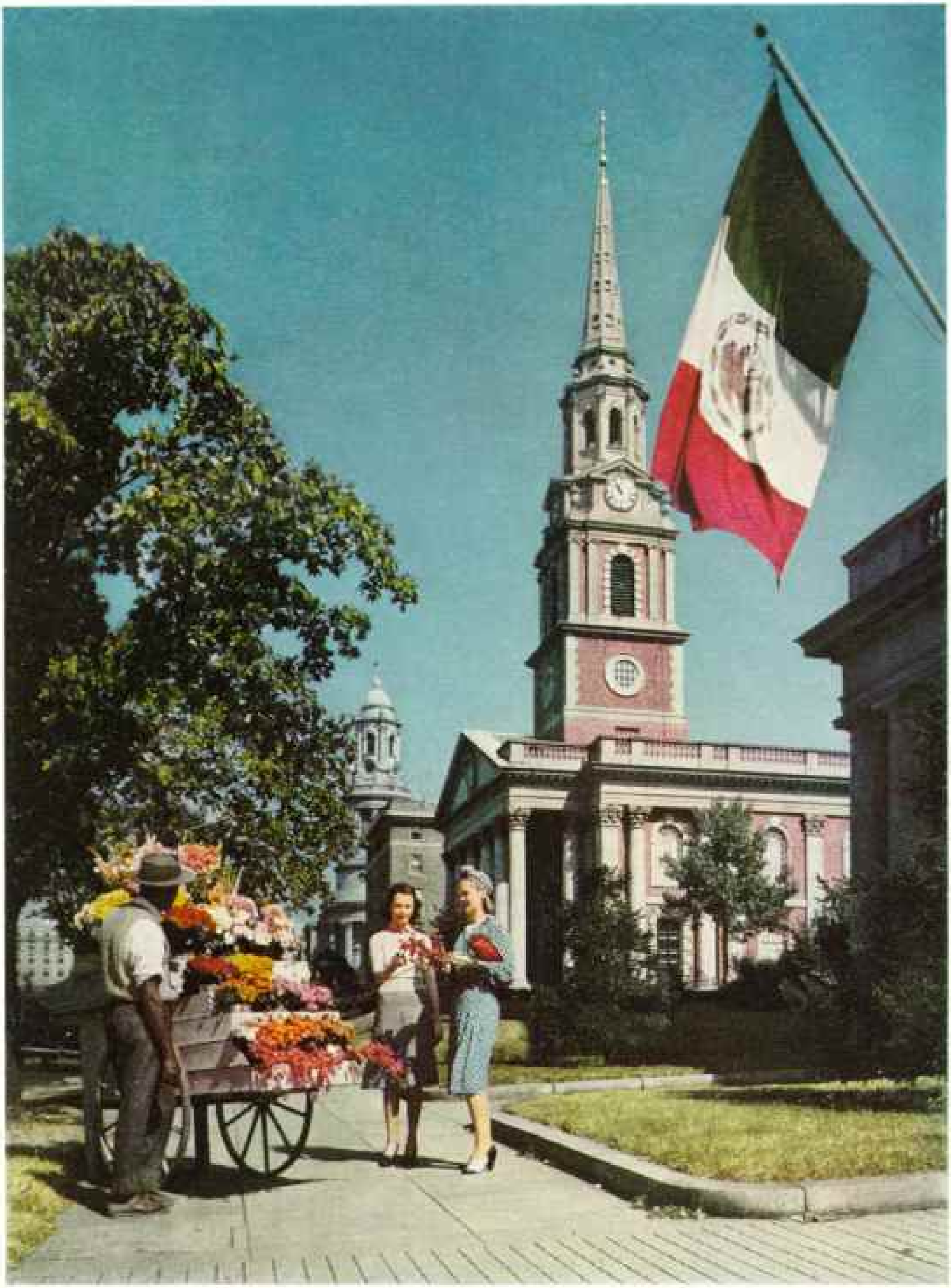
The cast of an ancient Mayan slab, background, bears a date equivalent to 291 B.C., oldest recorded date yet found in the Western Hemisphere. The original stone was excavated by a National Geographic Society-Smithsonian Expedition to Veracruz, Mexico. To Explorers' Hall come thousands of visitors from every land.



Kodachrome by B. Anthony Stewart

**Want to Know What Time It Is? Fort Lincoln Cemetery Tells It with Flowers**

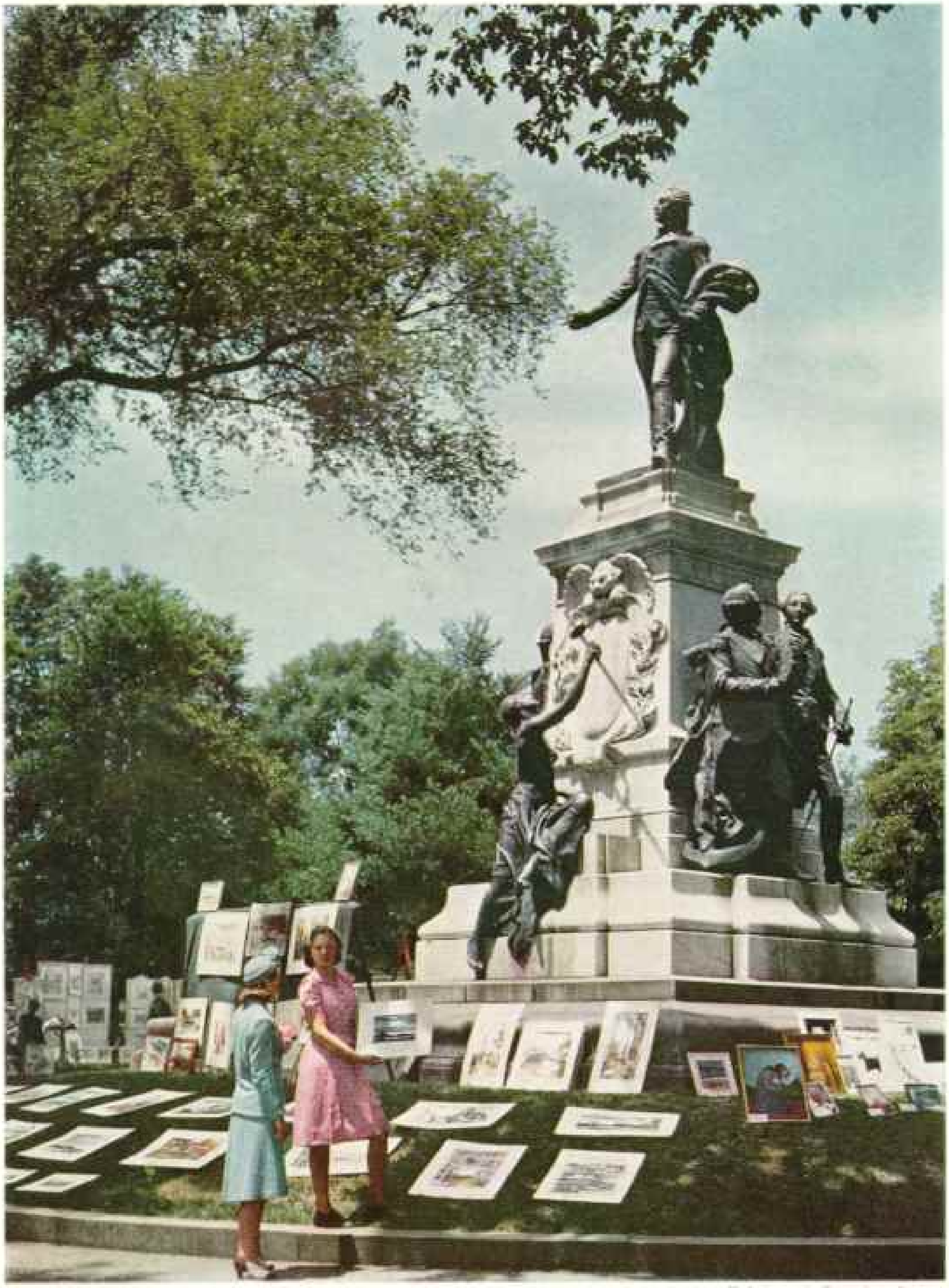
Hidden beneath the foliage, an electric mechanism operates the aluminum hands. More than 10,000 hothouse plants make up this floral clock's face, 26 feet in diameter. They must be trimmed every two weeks. The six varieties are pink, red, and yellow *Alternanthera; Sedum japonicum; Crassula* sp., and *Santolina chamaecyparissus.*



 Kodachrome by B. Anthony Stewart

**In Historic Sixteenth Street a Flower Vender Finds a Ready Market**

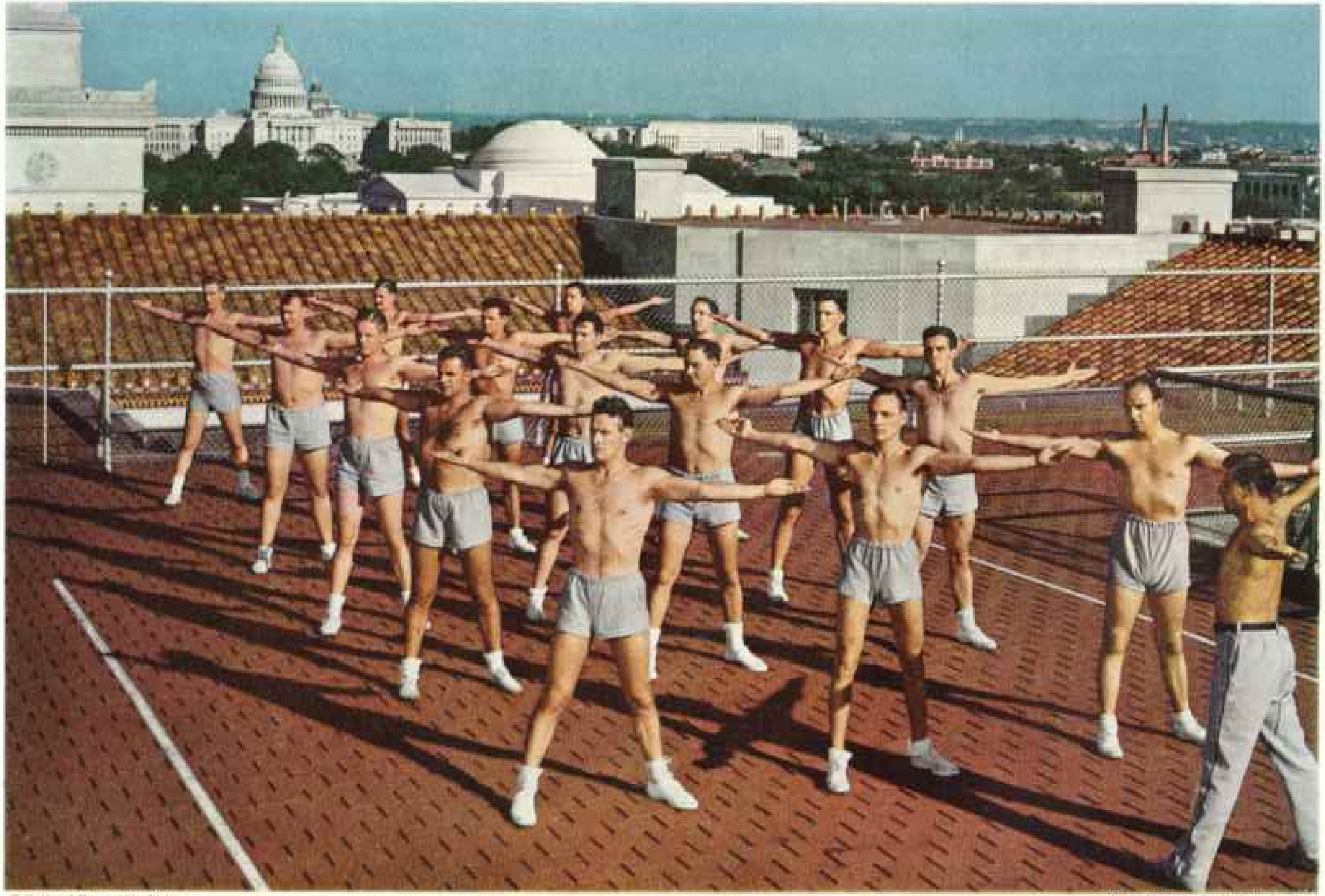
From the staff of the Mexican Embassy flies the national flag of our sister republic. Beyond rises the clock tower and slender spire of All Souls' Unitarian Church, designed after St. Martin in the Fields, London. The tower of National Baptist Memorial Church appears in background.



 Kodachrome by B. Anthony Stewart

**Splashes of Color Dot Lafayette Square During the Outdoor Art Fair**

Sponsored by the Washington Times-Herald, the exhibition is held annually in May. Anyone may enter; prizes are awarded in many classes. The statue of Lafayette is one of four memorials to Revolutionary War heroes which stand in corners of the park, directly across Pennsylvania Avenue from the White House.





Special Agents of the Federal Bureau of Investigation Keep Fit Atop the Department of Justice Building

© National Geographic Society

**Britain Entrusts Her Precious Magna Carta to America**

This Lincoln Cathedral copy, finest of the four originals of the document, was exhibited in the Library of Congress until war was declared. Now, along with the Declaration of Independence and the Constitution of the United States, it has been put in a safe place "for the duration."

Kodachromes by B. Anthony Stewart

**Washington's Costliest Art Treasure—the Alba Madonna**

Raphael's masterpiece, painted about 1510, once was owned by the Russian Tsars, and cost the late Andrew W. Mellon more than $1,000,000. Here it hangs in the magnificent new National Gallery of Art, presented to the United States by Mr. Mellon, together with his collection of Old Masters.

 Kodachrome by B. Anthony Stewart

**"Come Before His Presence with Singing"**

Washington Cathedral's choirboys, from 11 to 13 years old, begin training at the age of nine. Under construction since 1907, this huge Episcopal cathedral on Mount St. Alban, overlooking the Capital City, is nearly half completed. More than 100,000 persons have contributed to the $14,000,000 building fund.

The specimens, only a small fraction of which are on public exhibit, constitute a vast dictionary of nature and embody no small part of the world's knowledge of life and of our material resources. Without such classified knowledge it would be difficult to write textbooks and encyclopedias, and practical matters, such as oil wells, fruit culture, drugs, and lumbering, depend upon it.

Four or five million insects in a single building furnish basic knowledge for the Government's warfare upon pests.* The butterflies compose one of the world's outstanding collections. Many specimens formerly belonged to European royalty.

The gem collection is less valuable than the British crown jewels and does not contain as showy a display of diamonds, emeralds, sapphires, and rubies as the great New York City jewelry shops. But here are to be seen the rarest of gems, peridots and alexandrites, the latter spinach green by daylight and columbine red by night, including the largest specimen known, 65 carats.

The beautifully mounted and displayed coin and stamp collections are noteworthy because they cover in unusually wide manner the whole fields, historical and otherwise, of numismatics and philately. Of stamps there are 70,000 varieties.

After more than ten years visitors still prefer to see, among the almost countless objects, the airplane, *The Spirit of St. Louis*, in which Lindbergh made the first nonstop flight from New York to Paris. The dresses of all the past mistresses of the White House rank next, followed by fossil monsters, Theodore Roosevelt's stuffed African animals, and historic airplanes other than Lindbergh's.

One of the necessary Government scientific services, the Coast and Geodetic Survey, is the oldest, having been founded in 1807. It surveys the coastal waters of the United States and possessions and makes the official nautical and aeronautical charts, without which navigation and aviation would be practically impossible. It also predicts the rise and fall of tides, studies earthquakes and magnetism, and establishes throughout the country basic geographic positions, with latitude, longitude, and elevations, so necessary to map making and various kinds of engineering and industry.

### "Brass-brains" Predicts the Tides

In the Survey's headquarters in the Department of Commerce building may be seen the tide-predicting machine, a beautiful piece of mechanism which does the work of a hundred mathematicians. It gives the past or future time and height of tide at any port.

But predictions are based on the assumption that harbor conditions will not change substantially, so the machine may not work too far in advance. It has, however, already finished its 1943 predictions.

Another historic scientific bureau is the Geological Survey, founded as a result of combining four geographical explorations or surveys of the West, which followed the Civil War. Being the Government's chief agency for measuring stream flow and the location of water resources, it is particularly important as population concentrates in cities and great defense industries spring up, requiring vast amounts of water. In addition, the Geological Survey is the chief source of knowledge concerning the country's mineral resources.

Maps were first made by the Survey for its own use, but these three-dimensional contour maps of rectangular divisions of land throughout the country, based on points established by the Coast and Geodetic Survey, have come into general use by millions of people, and the Geological Survey is now the Government's chief map-making agency.

Twenty-five years ago two of the workers in Alaska first thought of using aerial photography, which has played an increasingly important part ever since. Airplane mapping now breaks the back of the job, but it cannot do the whole thing; for political boundaries cannot be distinguished from 20,000 feet in the air, nor can dirt roads always be distinguished from paved ones.

### A Bureau That Measures Everything

Well out in the residential section of Washington on a wooded hill is the National Bureau of Standards. Perhaps more than any other institution it touches the lives of all of us. For upon it eventually depends the ability of inspectors in every State and community to test the grocers' and butchers' scales, the machines for weighing trucks, and the accuracy of ordinary milk bottles and gasoline pumps.

But this is only the beginning of what the Bureau does. Practically all commercial and industrial developments depend upon measurements, and this is where the national standards of measurements are determined. It would be impossible to manufacture in quantity such articles as electric lights, automobiles, radios, telephones, typewriters, or even tools like hammers and saws, without exact measurements.

At the Bureau of Standards measurements are fixed for length, weight, volume, and for

* See "Our Insect Fifth Column," by Frederick G. Vosburgh, NATIONAL GEOGRAPHIC MAGAZINE, August, 1941.

Staff Photographer Willard R. Culver

**Silken Cords and Golden Skippets Adorn Treaties**

Original agreements, bound in elaborate portfolios and bearing seals of state, are preserved in the Archives Building (page 331). The open volume contains an 1899 treaty with Great Britain over property rights, with Queen Victoria's signature. At top, left to right, are 19th-century extradition treaties with the Orange Free State and Turkey, and a commerce and navigation treaty of 1839 with the Netherlands.

such things as electricity, light, heat, sound, and radio activity, often in unbelievably small amounts. If a fly alighted on the end of a steel bar a foot long and an inch square, the bar would be bent out of line by only a millionth of an inch. Yet this deviation can be measured.

### The Bureau That Helps Make Buildings and Bridges Safer

In addition, the Bureau tests innumerable materials and articles, ranging from toothpaste and silk stockings to the George Washington Bridge, for strength, behavior, and wearing qualities. Even in normal times the Government is a large buyer of supplies, including five or six million electric lamps a year, and this is where they are tested.

Such varied products as airplane beacons, shoes, flashlights, thermometers, storage batteries, tableware, clocks, carpets, paints, tires, brakes, concrete, meters, airplane instruments —all come in for searching examination.

The Bureau even determined the effect of wind velocities upon the Empire State Building by putting a large model inside a wind tunnel.

All sorts of materials and structures, including an actual six-story building, have been burned to test the effect of fire and of resistance to it. At the other extreme, the peculiar behavior of substances at temperatures as low as minus 456° Fahrenheit have been studied.

The quality of paper used for currency was greatly improved a few years ago by Bureau studies. Now the Bureau has a machine which duplicates, in a quick laboratory wear test, the kind of treatment which a dollar bill gets in many months of use.

Some years ago, after two tragic collapses of the Quebec, Ontario, Bridge, a 10,000,000-pound testing machine, the largest in the world at the time, was set up in one of the Bureau laboratories. Therefore, when the great George Washington Bridge over the Hudson was built, nothing was left to chance.

Since then there has been continuous smashing and crushing of steel and of every other kind of building material, including all the walls, roofs, and other parts of a house. The result is that today engineers and architects have a body of more authentic knowledge concerning safety and economy in construction than ever before.

Staff Photographer B. Anthony Stewart

**Scholars at Folger Library Study Shakespeare in an Elizabethan Setting**

The reading room, with hammer-beam ceiling and bronze chandeliers, is designed after a traditional English great hall. About 100,000 volumes fill the double tier of shelves lining the walls. The stone-canopied fireplace is set with marble inlays. In a large adjoining gallery Shakespearean and Elizabethan relics are exhibited (p. 334).


Chimo, from Washington Star

**Poised Above Potomac's Waters Is Venerable Georgetown University**

Facing the campus entrance on the river bluffs stands the statue of Archbishop John Carroll, who founded in 1789 this oldest Catholic college in the United States. Classrooms of the University's distinguished School of Foreign Service, one of the few to offer courses in Chinese, are in the Healy Building, background (page 354).

Curiously enough, the Bureau of Standards is not in an industrial or commercial center; it is not in a producing area at all. There is not even a railroad siding into the grounds. But the scientists and the instruments are what count; and practically every industry finds its way there, sooner or later.

### Where Our Time Comes From

The Bureau does not determine official time: that is done by the Naval Observatory, on another wooded hill in residential Washington. By photographic observation of the stars the time for the country is recorded, with an inaccuracy of only .003 of a second, on the Nation's three official clocks, buried underground in heat- and cold-proof vaults, and thence it is broadcast 24 times a day (page 359).

But from the Bureau of Standards comes that absolute essential of broadcasting, the standard of radio frequency. Orchestras also get their standard of musical pitch in the same way, and industries which must have an exact interval of time, such as one second, obtain it from the same place.

One result of the Bureau's radio work has been the development of the radiosonde, now one of the chief reliances of the U. S. Weather Bureau. Radiosondes are automatic miniature radio transmitting devices. They are attached to small balloons and sent high into the stratosphere, where they begin at once to record temperature, humidity, and wind velocity. These recordings are then picked up on the ground by automatic receiving sets.

Nearly 10,000 of these sondes, weighing only a few pounds each, are sent up in balloons each year by the Weather Bureau; they go to heights of 50,000 to 75,000 feet. It is the best means yet developed by which information of severe thunderstorms, ice storms, and tornadoes can be secured for the use of the air lines.

A few miles from Washington, at Carderock, Maryland, on the north bank of the Potomac River, is the Navy's new model basin, named after the late Rear Admiral David W. Taylor. It was planned to provide the world's outstanding facilities for research in naval architecture, chiefly hull and propulsion characteristics in naval and merchant vessels.

Research here covers also such diverse subjects as turning, maneuvering, and rolling, strength of structures used in naval construction, and numerous problems in applied and fluid mechanics.

The basin building is a quarter of a mile long, a barrel-arched structure without ribs, projections, or windows. Artificial light is not only better for photography, but does not stimulate animal and plant growth in the still water, as does natural light.

Accuracy goes so far that even the curvature of the earth is allowed for in the tracks on which move the giant carriages used to tow the models through the water. Since the still water is concentric with the surface of the earth itself, the rails in turn were laid to be concentric with the water.

Just outside of Washington on the road to Rockville and Frederick, Maryland, is the National Institute of Health, research arm of the Public Health Service, where the prevention and cure of disease are being studied on the broadest possible scale. More than 300 physicians and other scientists are employed. Of these 75 are engaged in cancer research.

Here the combined discoveries of all the sciences are brought to bear upon a single problem, and here are pieced together the individual contributions made and recorded by a multitude of workers. No item is too small.

### Raising Mice and Ticks

For example, last year it was found that infantile paralysis could be transmitted to rats and mice as well as to monkeys. This knowledge is important, for the prosaic reason that monkeys cost $15 apiece and rats and mice only a few cents. The Institute of Health, incidentally, breeds its own rabbits, guinea pigs, rats, and mice, some 300,000 of the latter a year.

Vaccines for yellow fever, Rocky Mountain spotted fever, and typhus are made at the Institute. In the case of typhus and spotted fever, the best processes have been discoveries of the Institute. Typhus vaccine has been sent to Spain, China, Germany, and other countries.

Each year 1,500,000 ticks are raised, fed on animals infected with spotted fever, and ground into a fluid which is used to vaccinate sheep herders, cattle raisers, and others exposed to the dread infection. Recently the Institute developed a serum which cures the disease in animals.

Many important original discoveries are due to the work of the Public Health Service in the past, and new fields are constantly opening up. The relation of nutrition, or rather undernutrition, to infection, is one of these.

Some years ago a heroic worker and his wife upset the accepted theory that pellagra was catching by swallowing scabs from victims without contracting the disease. They discovered, too, that attendants in an orphanage did not catch it, although the children did. The answer was dietary deficiency.

More recently it was found that an eye dis-

Harris and Ewing

**"Sure I Am That This Day Now We Are the Masters of Our Fate"—Winston Churchill Before the Congress of the United States**

The British Prime Minister received an ovation when he delivered his eloquent address before a joint session of the Senate and House of Representatives on December 26, 1941. Nearly a thousand men and women crowded into the small Senate galleries to hear the speech; other thousands stood in the rain outside the Capitol to catch a glimpse of the indomitable British leader (page 327).

ease supposed to be caused by infection may be due to deficiency in the vitamin riboflavin.

The latest sensational discovery is the reservoir of sleeping sickness, or encephalitis infection, in wild birds and animals of the northern prairies, whence mosquitoes are the likely carrier to man.

Efforts are being made to find substitutes for opium, quinine, and other drugs that come from war-torn countries. Some research on sulfonamides has been conducted at the Institute.

The Institute of Health also has a laboratory where every kind of poisonous substance is studied, especially noxious dusts and fumes in various trades and industries.

Some of the studies seem quite novel at first glance, although their necessity is obvious enough. Much work was recently done on truck drivers' fatigue, and also on mottled enamel. There are large sections of the country where children's second teeth become incurably black if up to the age of eight they use certain types of drinking water.

Not far from the Institute of Health is the lofty new Navy Medical Center, a miniature

"city in white," whose twenty-story tower dominates the suburban landscape for many miles. On Washington's Sixteenth Street, six miles north of the White House, is the Army Medical Center, which, like that of the Navy, has a medical and dental school, and a general hospital, the great Walter Reed. In the Army and Navy medical schools emphasis is laid upon prevention, upon the health of the whole group and not merely that of the individual.

### Army Medical Center Saves Many Lives

Distinctive in the Army Medical Center is its modern typhoid vaccine laboratory, capable of producing half a million doses of vaccine a week. In the Ohio River flood of 1937 a Coast Guard plane, carrying a thousand bottles of this vaccine, could not land and bailed them all out. Only twelve were broken.

In an old outmoded building on the Mall, next to the Smithsonian Institution, are the Army Medical Museum and the Army Medical Library, the former originally founded to preserve the enormous medical experience and pathological collections of the Civil War. The Army Medical Library is the world's largest in its field, exceeding those of the British Museum and the Bibliothèque Nationale.

Its index catalogue is one of the foremost bibliographies in any field of knowledge, and matching its vast collections of recent medical literature are its older treasures, hundreds of medical incunabula, and even ancient Arabian medical manuscripts.

Still another notable center of scientific research, which affects the health and welfare of us all, is the Department of Agriculture's experiment station at Beltsville, a few miles from Washington. This is a farm which employs approximately 1,600 persons, including several hundred scientists. It is used by 22 different units or bureaus of the Government.

Every State in the Union has an experiment station, and the Department of Agriculture has for many years carried on a multitude of activities all over the country as well as searched the uttermost parts of the earth for new fruits and vegetables.

But Beltsville is now the main center not only for research in protecting the country against plant and animal diseases and ravages by insects, but in the breeding of new and better plants and animals.

One of the greatest of human achievements, now nearing completion, has been the eradication of tuberculosis from cattle over large areas of the country. The fact that one can drink milk practically anywhere without fear of tuberculosis germs is a real triumph. More than 200,000,000 cattle were tested in the course of this major campaign; every herd in the United States was tested at least once; 2,000,000 cattle were removed from herds.

But not all the animal diseases have been conquered as yet. Speaking of animals, a word should be said to cheer the millions of consumers of the humble frankfurter.

A recent test showed that 99 percent of all samples were free from trichinae, and the remaining one percent showed only a few of the parasites, all of which were dead and consequently unable to cause infection. Trichinae in hogs, a cause of trichinosis in humans, are only one-fifth as prevalent as 35 years ago.

One of the greatest animal problems is to increase the butterfat production of the unprofitable two-thirds of the country's 25,000,000 milk cows. Beltsville's job is to discover which bulls can transmit to their daughters the more profitable butterfat-producing qualities, and then induce farmers to use these bulls, which are aptly known as "meritoriously proved sires."

This is really a gigantic job in keeping production records for individual cows, and already such records are kept for 676,000 of them.

### Breeding New Vegetables and Fruits

The introduction of new plants and improvements in existing ones is an oft-told story and one of the greatest achievements in applied science in America. But the work goes right on. Last year the Department of Agriculture and cooperating State experiment stations introduced to the trade new varieties of peaches, blackberries, raspberries, tomatoes, cabbage, potatoes, and cantaloupes.

Consider the unromantic but useful tomato. Some years ago a new variety proved itself supreme, except for one single defect: it succumbed to wilt in Indiana, Illinois, and Michigan. From Peru the Department's explorers brought the wild Peruvian currant, the size of a marble but a member of the tomato family just the same. They crossed it with the tomato in question and found the resulting plant to be immune to all the local diseases. It was then bred up to ample size and turned over to the nursery trade and seed dealers to be put on the market.

Also at Beltsville the workers have long studied the effects of hormones, or internal secretions, on plants. Recently they discovered that certain substances, when sprayed on the trees, will not only prevent apples from dropping prematurely but will even keep them on the trees long past normal harvest time. In the same way, leaves and flowers can be kept from falling.

AP from Press Association, Inc.

**"I Have Tonight Issued a Proclamation That an Unlimited National Emergency Exists"—President Roosevelt, May 27, 1941**

Surrounded by representatives of 20 Latin-American republics, in the historic East Room of the White House, the President broadcast the momentous declaration. The battery of microphones before Mr. Roosevelt carried the speech to all parts of the United States. Also, translated into 14 languages, it was transmitted throughout the world by short-wave radio.

A peculiar feature of Washington is the constant inflow and outflow of scientists, scholars, and experts who live in other parts of the country. Many of them are members of the more than 100 advisory committees to various bureaus and agencies of the Government, which in this way commands the services on the spot of experts from every section.

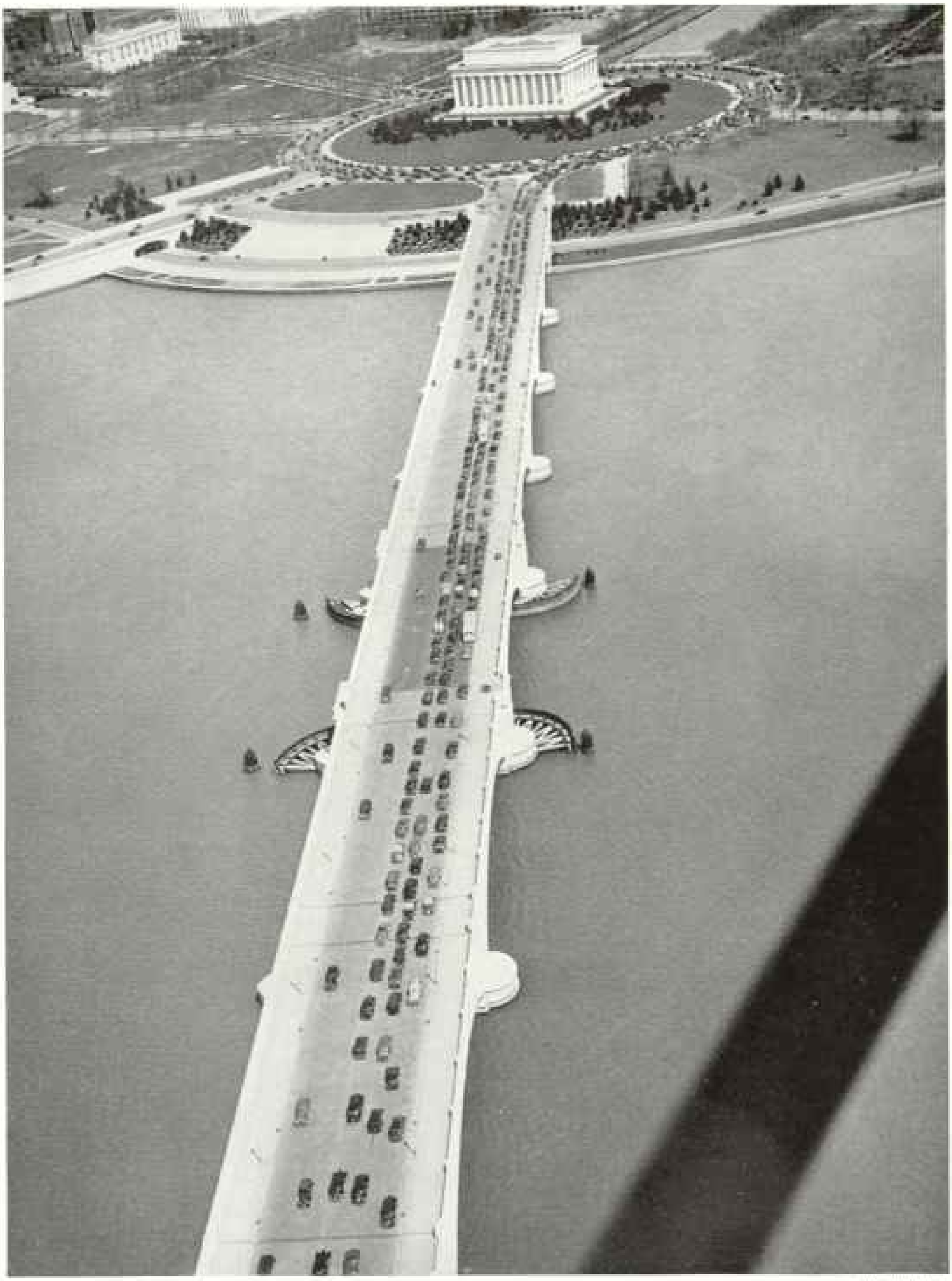
But scientific research in Washington is not confined to the Government.

The Carnegie Institution of Washington, founded nearly 40 years ago by Andrew Carnegie, has its headquarters here. It studies such far-reaching problems as the physical nature of the sun, stars, earth, animals, and plants, and has been described as the "largest scientific empire on earth."

Like a distinguished university faculty and graduate school, the Brookings Institution brings together many scholars, young and old. But they are not engaged in teaching; rather, they make serious studies of fundamental governmental and economic problems, many of which give rise to current issues, not so much for other scholars as for the intelligent general reader.

The Pan American Union is much visited for its tropical plants, charming patio, and beautiful Spanish architecture. It also contains the Columbus Memorial Library, which is 20 libraries in one, for it aims to provide everyone who is interested with detailed material on all of the 20 Latin-American republics.

Washington is also the headquarters for



Rhoads Baker

**Will This Tide of Traffic Ebb When Tires Wear Out?**

During rush hours, cars to and from Virginia suburbs flow across Arlington Memorial Bridge in a steady stream. Thirty-five thousand automobiles use the span daily, as ever-increasing numbers of Government employees travel between their mushrooming homes in Arlington and Fairfax Counties, and the Capital.

many of the groups which represent business, the farmers, labor unions, women, and the churches. A number of these groups have fine buildings of their own.

### Women's Biggest Building Enterprise

The Daughters of the American Revolution own three large buildings occupying a whole city block, including an important genealogical library, a historical exhibit, and Constitution Hall, one of the finest auditoriums in the country. This is the foremost group of buildings in the world erected entirely by women, and entirely through voluntary contributions.

Of the more than a thousand national trade associations, approximately 100, including many of the most important, have headquarters in the Capital, 300 have branches here, and most of the remaining ones are represented in various ways.

Many trade associations are in reality among the leading educational channels. They serve as centers of information and answer countless questions for their members, the public, and Government officials, and in some cases they do scientific research.

The National Canners Association was a pioneer in scientific research for the benefit of an entire industry, and for years has maintained its chief laboratory in Washington. Formerly canning was at best on a "cut-and-try" basis. Cans given different heat treatments were set aside, and the one which after a lapse of time showed no spoilage was adopted as commercial practice.

### Tin Can an Instrument of Precision

But the scientists of the National Canners found the exact resistance of spoilage bacteria to heat, and they also developed an apparatus by which it is possible to determine the rate of heat penetration even into cans that are in process of being sterilized. Therefore canning has become a matter of precision instead of luck, and weapons are at hand to prevent an outbreak of food poisoning such as botulism.

The American Potash Institute not only has at its Washington headquarters a library of 93,000 books and pamphlets on soil fertility, but supports 55 graduate students in universities studying such subjects as the effect of potash on young apple trees and the relation of potash to the quality of tobacco.

Washington is manifestly a city of rich educational opportunities. The Department of Agriculture's graduate school offers 150 courses and has 5,000 students, half its own employees and the remainder from other Government departments. The Government also supports Howard University, a leader among negro institutions, and Gallaudet College, for the deaf.

The State Department has a Foreign Service School where its young careerists are given an intensive training, and the Army War College is one of the landmarks of Washington. Two academies are conducted by the Federal Bureau of Investigation. One is for its own personnel (Plate VI), and the other, a unique institution, is known as the FBI National Police Academy.

The latter is attended by police representing States, counties, and localities, and ranging all the way from ordinary patrolmen to State superintendents of police, provided they are under 46 years of age. The course lasts for twelve weeks and may cover the choice of several hundred subjects, including the use of firearms, the simulation of crime situations, and maneuvers in tracking down escaped criminals.

The universities in Washington which are not supported by the Government also fill many and varied needs and use the city's rich cultural resources as an extension of their own facilities. They have long commanded the teaching services of numbers of the eminent scholars, scientists, diplomats, and legislators who make Washington their home.

Georgetown University, founded in 1789, is the oldest in Washington; also the oldest Catholic college in the United States.

It is noted for its seismological observatory, for, like many Jesuit institutions in this country, it specializes in the study of earthquakes. Its Foreign Service School is also well known (page 348).

George Washington University, with an enrollment of 11,000, is second in age and is essentially the great urban university. It serves a small army of Government employees through evening and early-morning courses, not only in the arts, but in law, medicine, engineering, and in many other fields of knowledge.

American University and the Catholic University of America are much newer than the other two. American University is under the patronage of the Methodist Church, and its graduate school has specialized, among other subjects, in courses in archival science, much as some universities give courses in library science.

### The Oxford of Catholic America

Although only a little more than fifty years old, the Catholic University of America is the greatest center for culture and learning for Catholics in this country (page 358). The coming of the religious orders had much to do with the greatness of medieval universities, and the chief characteristic of Catholic

Staff Photographer B. Anthony Stewart

**Every Month a Quarter Million Visitors Enter the National Gallery of Art**

From this rotunda 100 large gallery rooms radiate on the main floor. In the center stands the bronze statue of Mercury, sculptured by Giovanni da Bologna. Nearly 5½ acres of floor space are available for exhibits (page 335). Several of the most famous masterpieces have been removed for safekeeping during the war.

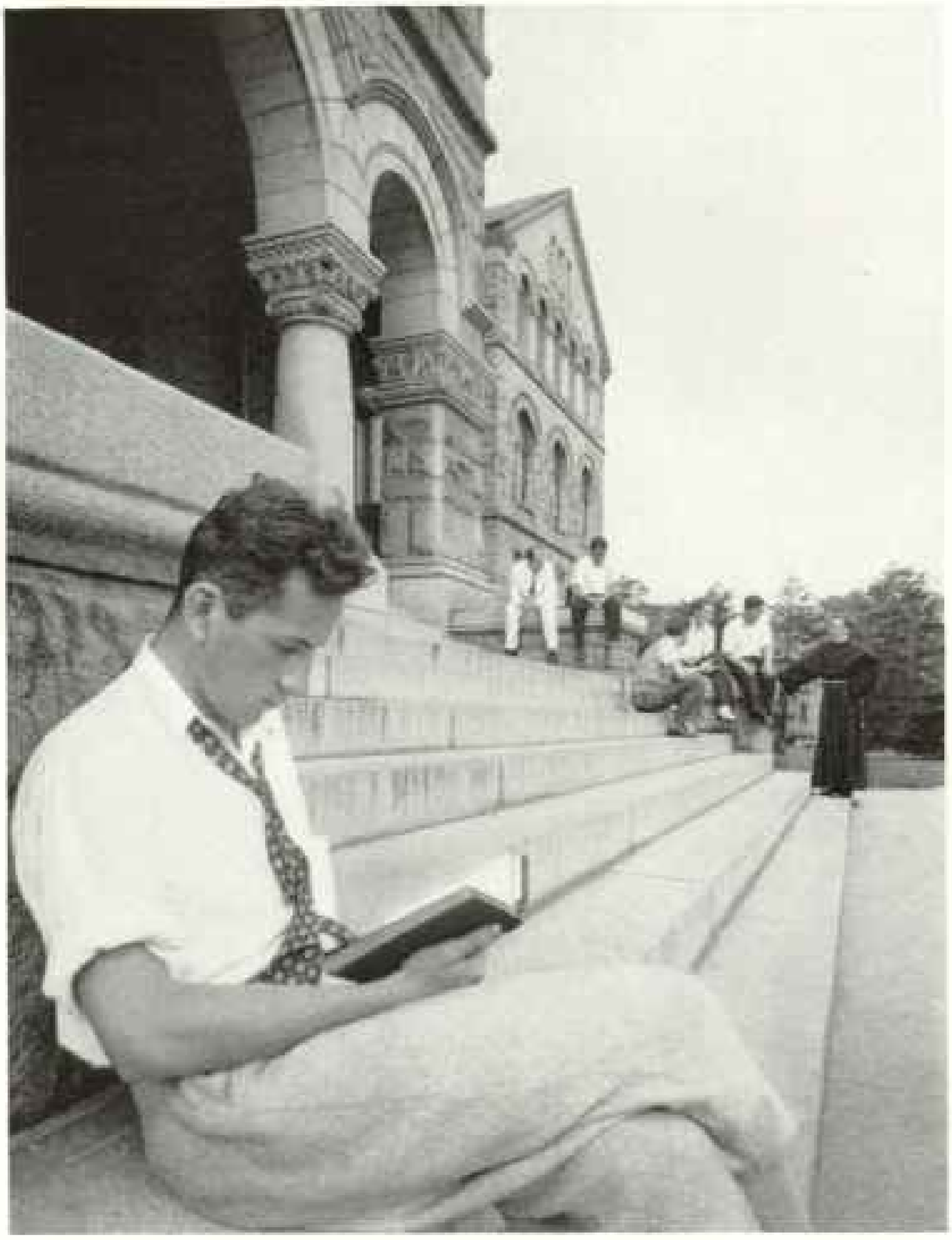
Fairchild Aerial Surveys

**Focal Point for Downtown Washington Is the Tree-enclosed White House (Center)**

The sprawling group of low buildings, right center, houses many offices of the War and Navy Departments. From Scott Circle, foreground, Sixteenth Street extends to Lafayette Square, facing the White House. On the right side of the street is the headquarters of the National Geographic Society, with white parking lot in rear. In the hazy background, on the Virginia side of the Potomac River, lies the new Washington National Airport.

Staff Photographer R. Anthony Stewart

George Washington University Students, Many Federal Employees by Day, Swarm from "Sundown Classes" in the School of Government



**Steps to Knowledge at Catholic University of America**

Students lounge about the entrance to McMahon Hall, in the center of the campus. More than 2,000 young men from all parts of the United States attend the University, founded under the direct patronage of Pope Leo XIII in 1887. An affiliated institution is Trinity College, for girls (page 354).

University is the concentration near by of 57 religious communities and houses of study, such as colleges, schools, convents, seminaries, friaries, and monasteries.

This system has brought together an unusual accumulation of Catholic religious and intellectual interests, besides stamping the University as a unique counterpart of Oxford and Cambridge.

Its library naturally specializes in theology, canon law, philosophy, and the classics; and on its faculties are scholars in many rare subjects. Of all Catholic educational institutions in this country, this is the only one under the control of the American hierarchy; also, it is the only pontifical university in America.

But the most distinctive feature of education in Washington, as far as the residents themselves are concerned, is that the whole community is keyed to having its young people work and go to college at the same time. Of the city's nine law schools, all but one specialize on students who attend classes either in the evening or before work begins in the morning (page 357).

### Universities Offer Government Workers Evening Classes

The Southeastern University, a branch of the YMCA, actually has classes at 6:30 in the morning. This enables the students to devote nearly two hours to law, accountancy, public speaking, and other subjects, before they go to work. One of the classes is taught by a prominent Congressman, who says that it refreshes him for his day's work.

With nine law schools in Washington, the choice of careers of the Capital's ambitious youth is obvious. Two of the law schools are for negroes and all but one of the nine admit women. About 80 percent of the students are Government employees, who come from every State in the Union. Many of them deliberately planned to enter the civil service so that they might study law in Washington at night.

Government officials encourage this practice, thus securing a superior type of clerk. J. Edgar Hoover, chief of the Federal Bureau of Investigation, and Daniel W. Bell, Under Secretary of the Treasury, had such a start.

A number of Senators and Representatives bring young men and women from their home States to work in their offices expressly to give them this educational opportunity.

The story is told that "Uncle Joe" Cannon thus brought a young man from an Illinois village, but promptly fired him the morning after the youth had graduated with honors from the George Washington Law School. Naturally startled at first, the young man was ordered back to Illinois to open a law office, and is now a distinguished judge in his home State.

The son of recent immigrant parents, living on a small farm near Spokane, read an advertisement of a secretarial school which told how graduates could take civil service examinations and go to school in Washington.

Taking advantage of this advice, the lad found himself, to his disappointment, on a remote Indian reservation. But after a few years he was transferred to Washington, studied law, and is now a leading practitioner in the Northwest.

Education in Washington is not only democratic but cosmopolitan. In the public schools and in the unusually large number of private schools, the child of a Government official or employee is often in the same class with the sons and daughters of diplomats. It surprises no one if the valedictorian of the class is the child of the Chinese Ambassador or of a European prince.

George Washington dreamed of locating a great national university in the Capital. Today the city that bears his name is the happy hunting ground of students, scholars, biographers, and historians of every degree, ranging from high school teens up through college undergraduates, university graduate students, and the most advanced and famous specialists, all bent upon securing "source material."

Staff Photographer B. Anthony Stewart

**With a Periscope, the United States Naval Observatory Watches Time March On**

Captain Frederick Hellweg, Superintendent of the Observatory, reclaimed the periscope from an old submarine. He installed it over a vault in which three standard clocks are kept under constant temperature and air pressure. Astronomers now can check the performance of these clocks, which set the time for the Nation, without entering the vault. The familiar time signals, synchronized with the clocks, are flashed by private wire to Annapolis, where they are broadcast (page 349).

The Department of Agriculture alone has more scientists on its staff than any university. The Library of Congress, the varied scientific institutions, the private endowments, and the Federal bureaus in general—all these fulfill in a broad and comprehensive way many of the functions of a national university.

The Capital has become a center of knowledge and learning far beyond any dreams that even the Father of his Country could possibly have had.

# Honduran Highlights

NEXT time you buy bananas at the corner fruit stand, think of Honduras. From the hot lowlands of its northern coast on the Caribbean Sea come millions of bunches of the world's supply of the mealy fruit.

Back of the coastal lowlands, mountains have hindered access to the country's interior since the days of Spanish colonization, long before the outside world thought of eating bananas. A relief map shows that Honduras, third largest of the six Central American republics, is one of the most mountainous of them all. The million people of Honduras formerly could travel only with difficulty through most of their country, which is about the size of Pennsylvania.

When the airplane came, a modern miracle took place. Many a Honduran town, which for centuries had depended upon pack mules or oxcarts to bring in its goods over rough mountain trails, suddenly found itself with an airport. Large areas jumped almost overnight from primitive means of communication to the most modern, skipping completely the intermediate steps of highways and railroads (Color Plate I).

### Airplane Versus Pack Mule

Flying to Tegucigalpa, Honduras's 3,200-foot-high capital, a traveler can look down upon a panorama of transportation progress toiling up the mountain roads below. Carrying the heaviest freight, for which time is not an important factor, he will see ponderous oxcarts, which take five days to make the journey up from the west coast. Lighter-weight, more valuable merchandise goes by pack mule in three days. Still more valuable goods ride up by truck in a single day. The airplane passenger, with mail and express, makes the distance in about one hour.

Aside from the airplane lines, Honduras still is comparatively isolated from its neighboring republics, Guatemala and El Salvador on the west, and Nicaragua on the southeast, except for one railway track that crosses into Guatemala near the Caribbean coast.

There are railroads within Honduras on the north coast, however, and a good road connects the Pacific coast with Tegucigalpa and points beyond.

Past and present live side by side in Tegucigalpa, which, incidentally, is an Indian word for "silver hill." Your incoming plane drops down low over two bridges across the Choluteca River, one built during Spanish colonial days, the other of modern structure and design. In the city's shops visitors can buy the latest model of automobile or radio, or the newest creation in ladies' fashions, but there are few plate-glass show windows fronting on the largely unpaved streets.

Most buildings, in the style of old Spain, turn only bleak, bare walls to the street and keep their beauty hidden within.

### Soccer Fields Double as Airports

Planes of the TACA line, which operates in several Central American countries, carry mail, foodstuffs, assorted freight, and even cut flowers. Bouquets weigh so little that air express charges on them are small, and sending flowers by air has become a common practice in a country where in many regions mule trains are the only other transport.

In many parts of mountainous Honduras level spaces are at a premium, and the fields that are used as airports also serve other purposes in the intervals between plane arrivals. Sometimes the pilot must circle above a field until grazing cattle have been driven off, or even drive them off himself by flying low. A holiday soccer game may be interrupted while a plane lands on the only level patch of ground in the vicinity.

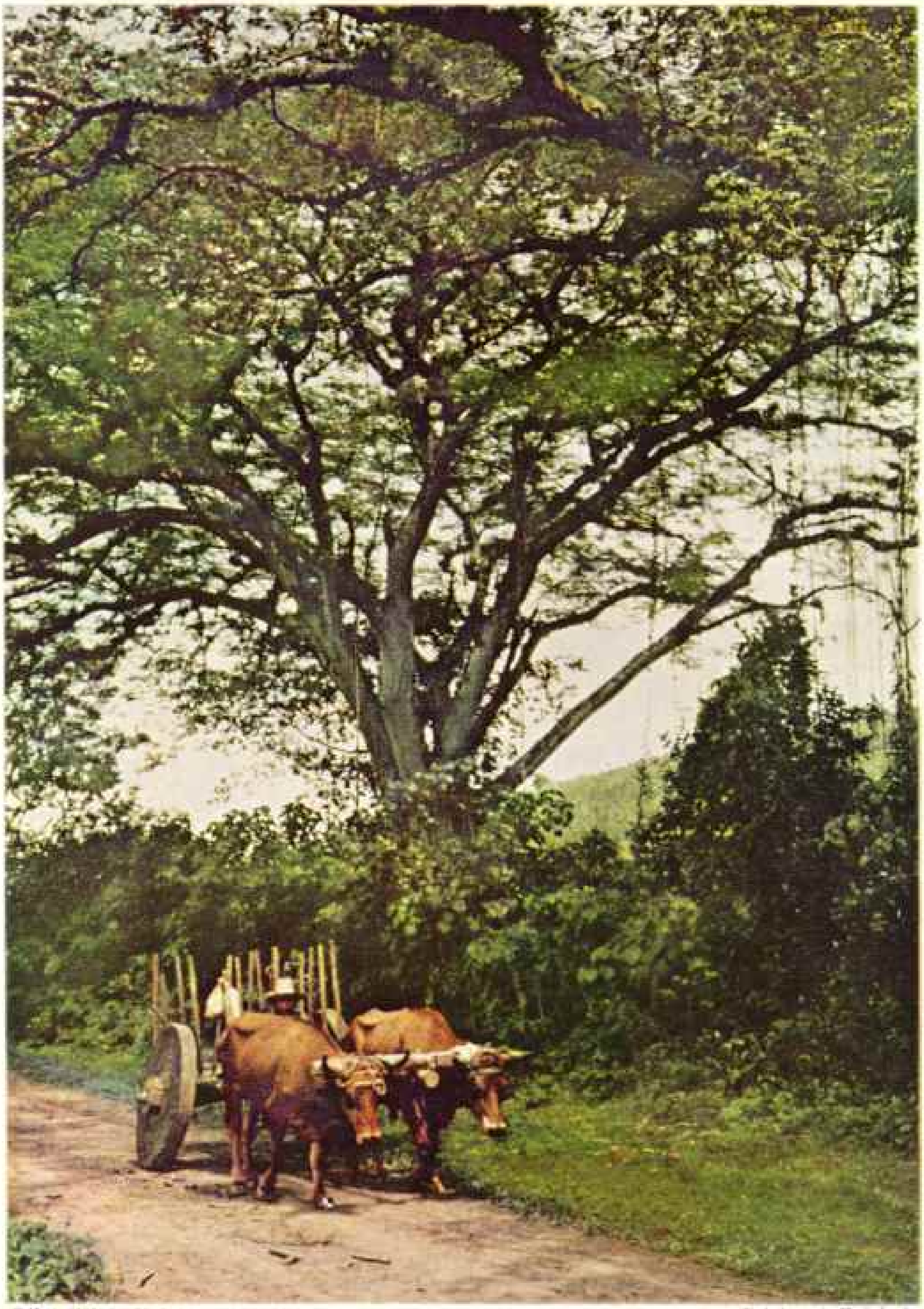
Ancient ruins of the civilization of the Maya Indians, which flourished long before the white man came to the New World, are located at Copán, on the western border of Honduras. In the heart of a deep forest, great stone monoliths and mounds crowned with templelike structures have been cleared from the covering of jungle and earth which has hidden them for centuries (Plate IV).

### Ancient Monuments Survive

Archeologists of the Carnegie Institution of Washington have restored some of the structures and have been able to decipher the dates on the inscriptions, which show that the monuments, or stelae, were erected at intervals of about 20 years. They date back to about 500 A. D., nearly 1,000 years before the arrival of Columbus.

Many of the stones are covered with elaborate decorations and grotesque figures of ancient gods, carved by a people who had no metal tools and did this work laboriously with chisels of stone. Here the old Maya worshiped deities which they believed governed the vagaries of weather and crops.

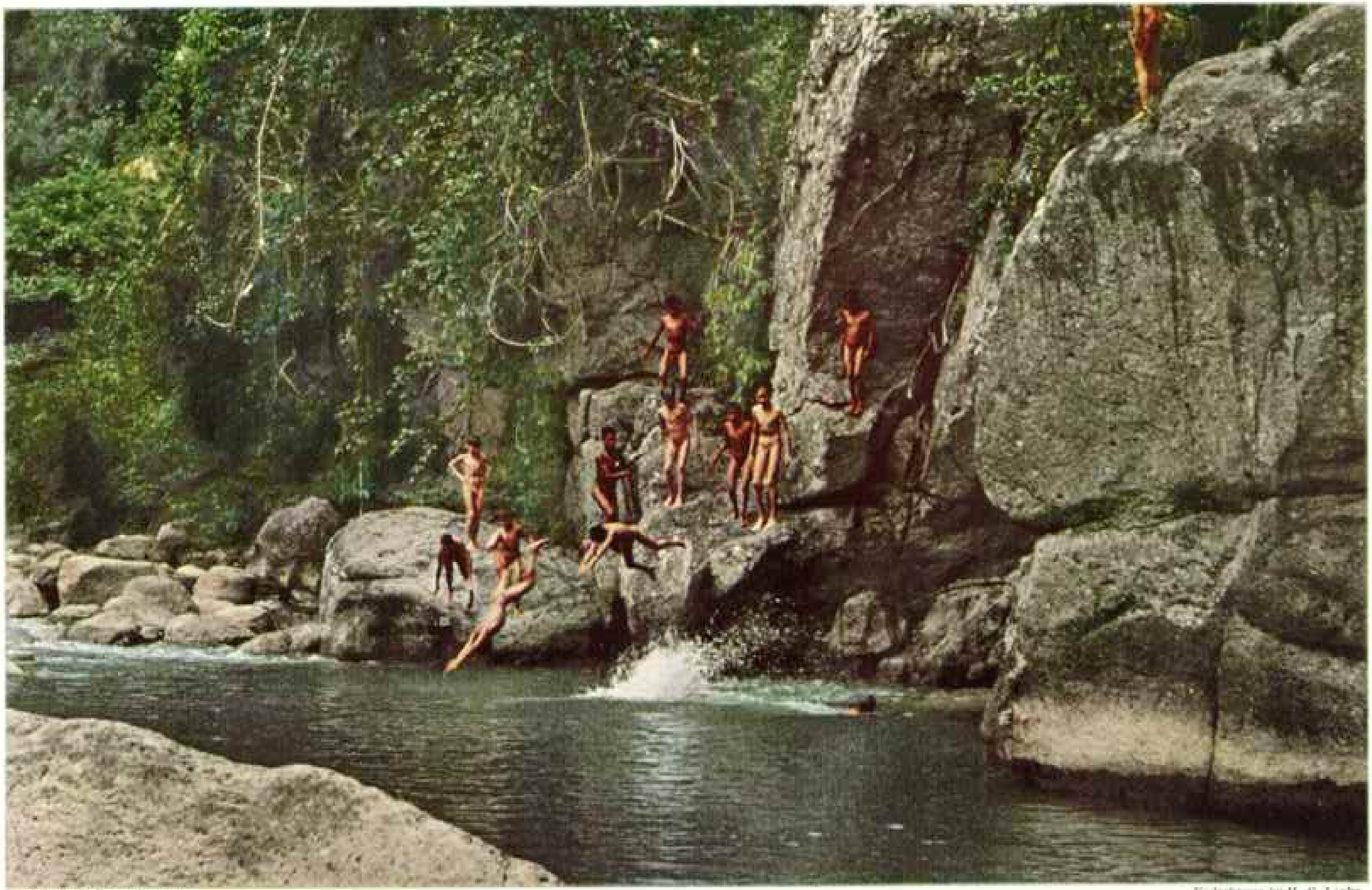
Sometime in the dim past this center of worship was abandoned and the people migrated north to Yucatán, where similar stone structures were erected later. Scientists believe the migration resulted from the farming methods of the Maya, which exhausted



 Kodachrome by H. C. Landis

**Oxcarts of Honduras, Slow But Sure, Compete Today with Airplanes**

Rugged mountain ranges in this Central American Republic have made good roads difficult to build, so heavy freight often is hauled by sure-footed oxen, while passengers and mail soar overhead by plane. This stretch of highway is near Juticalpa, center of a district raising cattle, grain, and sugar.

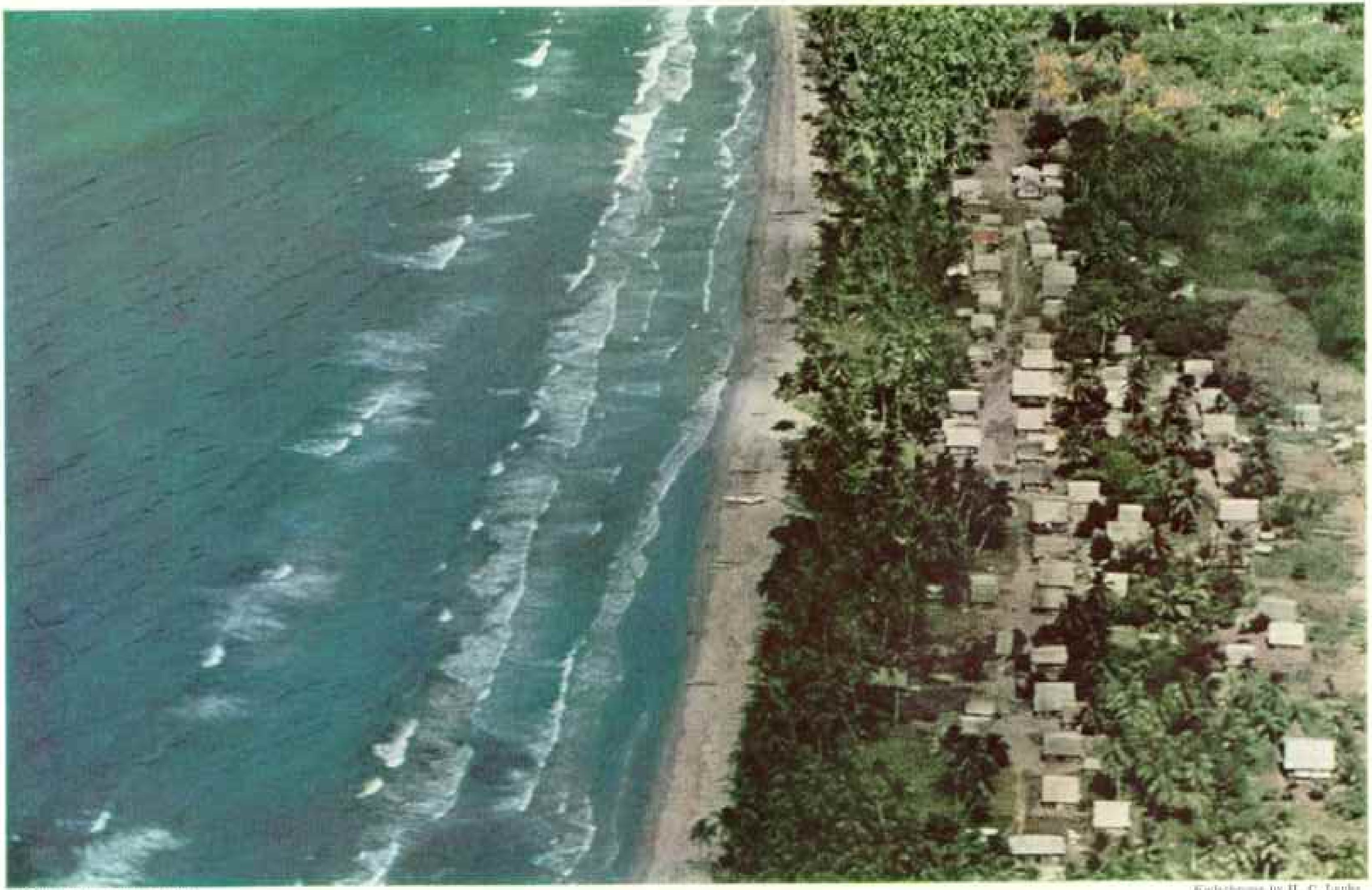




Kodachrome by H. C. Lanks

**"Last One in Is a Monkey!" A Vine-draped Jungle Pool Is the "Ol' Swimmin' Hole" in Honduras**

Brown-skinned Honduran boys delight in going swimming, as do their cousins all over the world. Most of the people of Honduras are Indians or of mixed Indian and Spanish descent.





Kodachrome by H. C. Lanks

**Waves of the Blue Caribbean Roll in Endlessly on Beaches of the North Coast**

A hot, tropical coastal plain fringes the country's Caribbean shore for more than 300 miles. Columbus, on his fourth and last voyage, discovered the mainland of North America at what is now known as Cape Honduras.

 Kodachrome by H. C. Lanks

**Monuments of Ancient Maya Civilization Still Stand at Copán**

Elaborately carved stelae and imposing temples have enabled archeologists to reconstruct much of the story of an Indian empire that flourished in Honduras some 1,000 years ago. Scientists of the Carnegie Institution of Washington, in cooperation with the Honduran Government, are restoring the monuments and deciphering their dates. Ruins of a city that once stood in this Copán region cover an area of about 15 square miles.

**Your Breakfast Banana May Have Started to Market in Such an Oxcart**

Bananas are the most important export of Honduras. Millions of bunches are shipped annually to the United States in steamers that are specially refrigerated to keep the fruit from ripening too soon.

 Kodachromes by B. C. Lasko

**Green Bananas, Fresh-cut from the "Tree," Start to Market by Muleback**

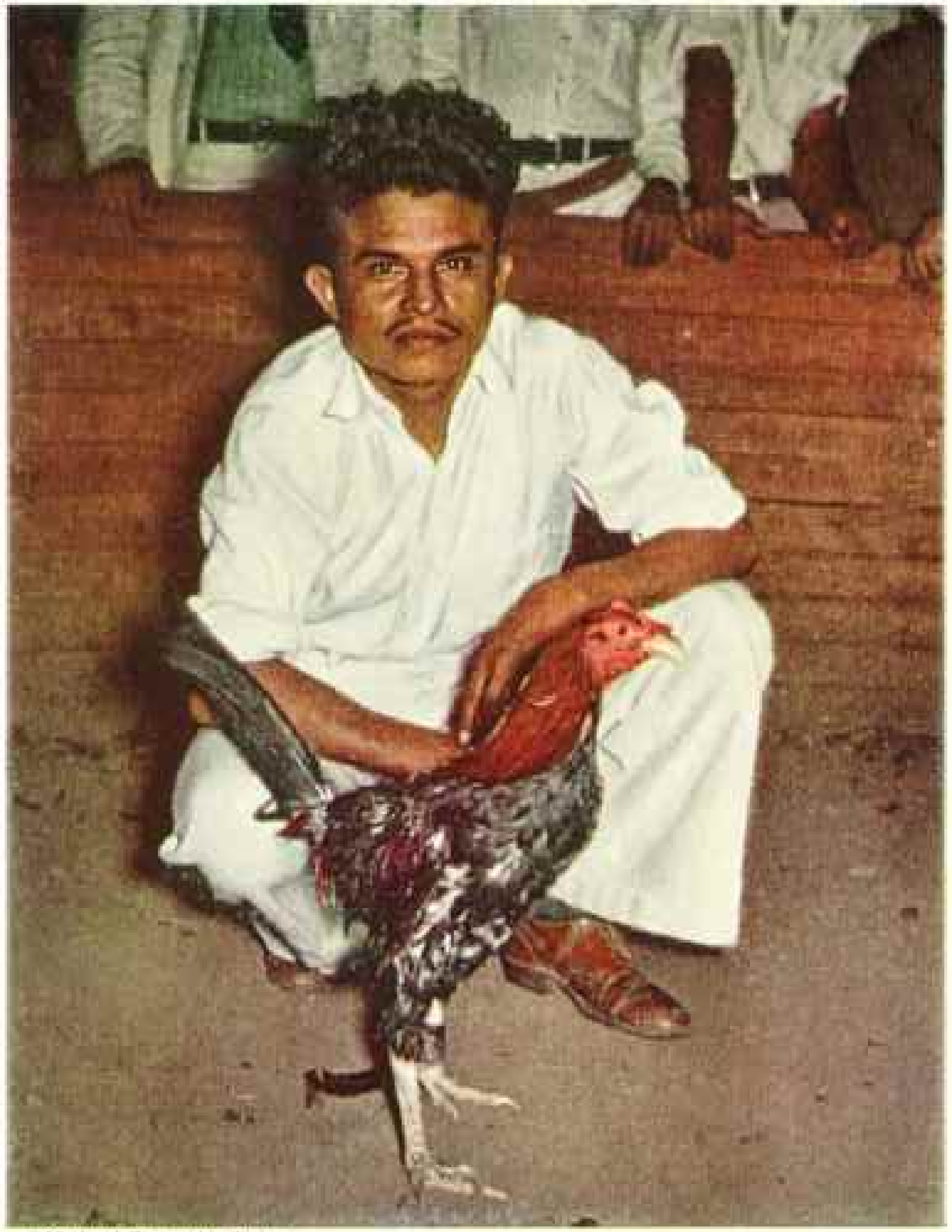
The banana "tree" is really a large perennial plant, which grows to maturity and then is cut down after its single bunch of fruit is harvested. Even for local consumption bananas are picked green.



Reproduction by H. C. Lacks

**Gold and Silver from Deep Down in This Mountain Are Poured Forth by the Big Rosario Mine**

Buildings of the mine, which is not far from Tegucigalpa, capital of Honduras, cling to the steep slope. Honduran mines have produced the treasure since the days of Spanish colonization.





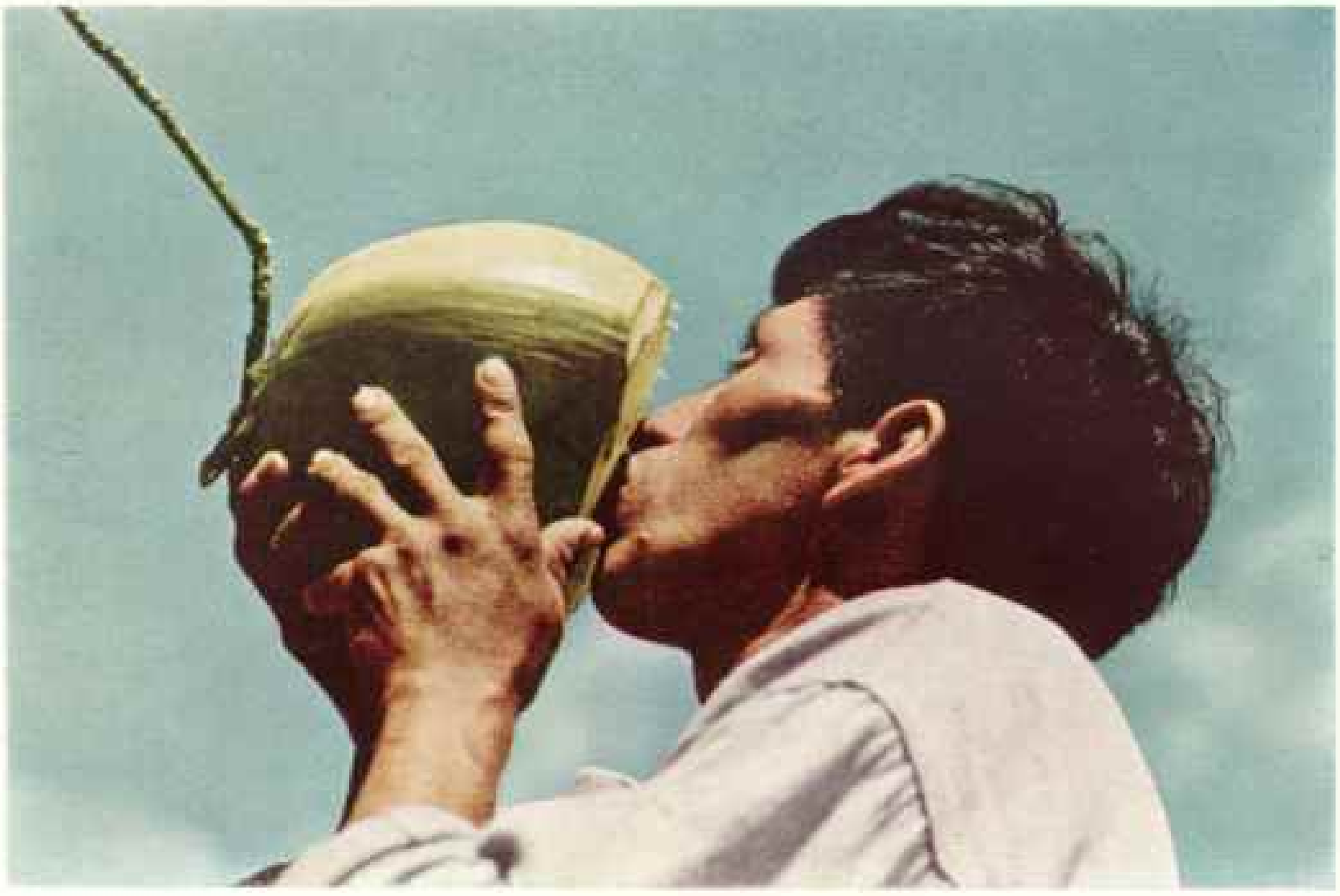
**"Sure I Can Lick Him," This Fighting Cock Seems to Say**

His owner crouches in the pit, ready to remove the sheath from the sharp steel spur attached to the left leg of the bird. Betting is fast and furious.

Kodachromes by B. C. Lantz

**When She Finishes Bathing Baby, She May Look for Gold**

Honduran women often wash the sand of stream beds in search of the precious metal, as did the California gold-hunters in '49.



**"Give Me Sweet, Fresh Coconut Milk, and I'll Do without a Soda Fountain!"**

A Honduran sucks the refreshing liquid straight from the heart of the nut. Coconuts, raised on the north coast and the Bay Islands offshore, form an important export from the Republic.



Kodachromes by H. C. Lanks

**Modern Life's Mad Whirl Has Not Yet Touched This Honduran Street**

Pack animals stand patiently while their master rests in the shade. Grass, growing between the paving stones, is a reminder that in this warm climate life moves at a leisurely pace.

the land and steadily diminished the yield of their cornfields. To this day the Indians who are their descendants practice the same methods, clearing a section of jungle, planting corn for a few seasons, and then, as the jungle begins to come back and choke out the crops, clearing a new field.

When the Maya city at Copán was at the height of its glory, temples, dwellings, and other structures were spread over an area of some 15 square miles. One of its prominent features was a ball court, where a game somewhat similar to basketball was played.

This isolated region now grows considerable tobacco. Huge bundles of hand-made cigars wait at the airport of Santa Rosa de Copán, capital of the Province of Copán, to be flown to Tegucigalpa or the coast.

### Bananas the Leading Export

Bananas, which were a curiosity in the United States only 65 years ago, have become the leading export of Honduras. On the big banana farms on the north coast, the fruit is irrigated and sprayed to combat pests and disease. This helps produce larger and better fruit.

Cutting and loading bananas is a highly synchronized process. When a fruit ship is on its way, word is sent by radio of the time it is expected to arrive. Orders from shore headquarters then are telephoned to the various farms, instructing how many "stems" are to be cut, and when.

Before the fruit ship docks, cutting has started. With a sharp blade fastened to a long pole, the cutter slices high up into the main stem of the banana "tree." Actually, of course, it is not a tree but a gigantic perennial herbaceous plant which grows to maturity and is cut down each season. The cutter allows the partially severed stem to lower its bunch of bananas onto the waiting shoulder of his assistant. Then it is freed from the tree by one blow of a machete and loaded on a waiting mule (Color Plate V).

Arriving at a railroad siding, the fruit is dipped in water to remove any spray that may remain. Then the carloads of bananas are shuttled to the pier, where they start arriving just as the ship docks. Laborers carry the bunches of bananas from the cars to loading conveyors. Aboard ship, the fruit is packed in refrigerated holds.

Bananas are cut green, and are kept cool enough on the ship so that they do not ripen during the voyage northward. The fruit is not allowed to ripen on the plant even for local consumption, for the "tree-ripened" banana is an insipid and tasteless product. Bananas are not native to the Western Hemisphere, but were introduced by early explorers.

Off the north coast of Honduras, out in the Caribbean Sea, are the Bay Islands, inhabited by English-speaking Hondurans. These people are descendants of English settlers and pirates who came to the region in the 17th and 18th centuries.

At the port of Trujillo, on the mainland, lies the body of William Walker, the adventurer from the United States who became president of Nicaragua in 1856, fought a war with the neighboring Central American nations, and finally was executed by the Hondurans after he fell into their hands.

Mahogany trees grow in the forests of Honduras, but they are always isolated, with seldom more than a few to the square mile. There is no such thing as a mahogany forest, so there can be no large-scale cutting of the trees, which is one reason for the high cost of this wood.

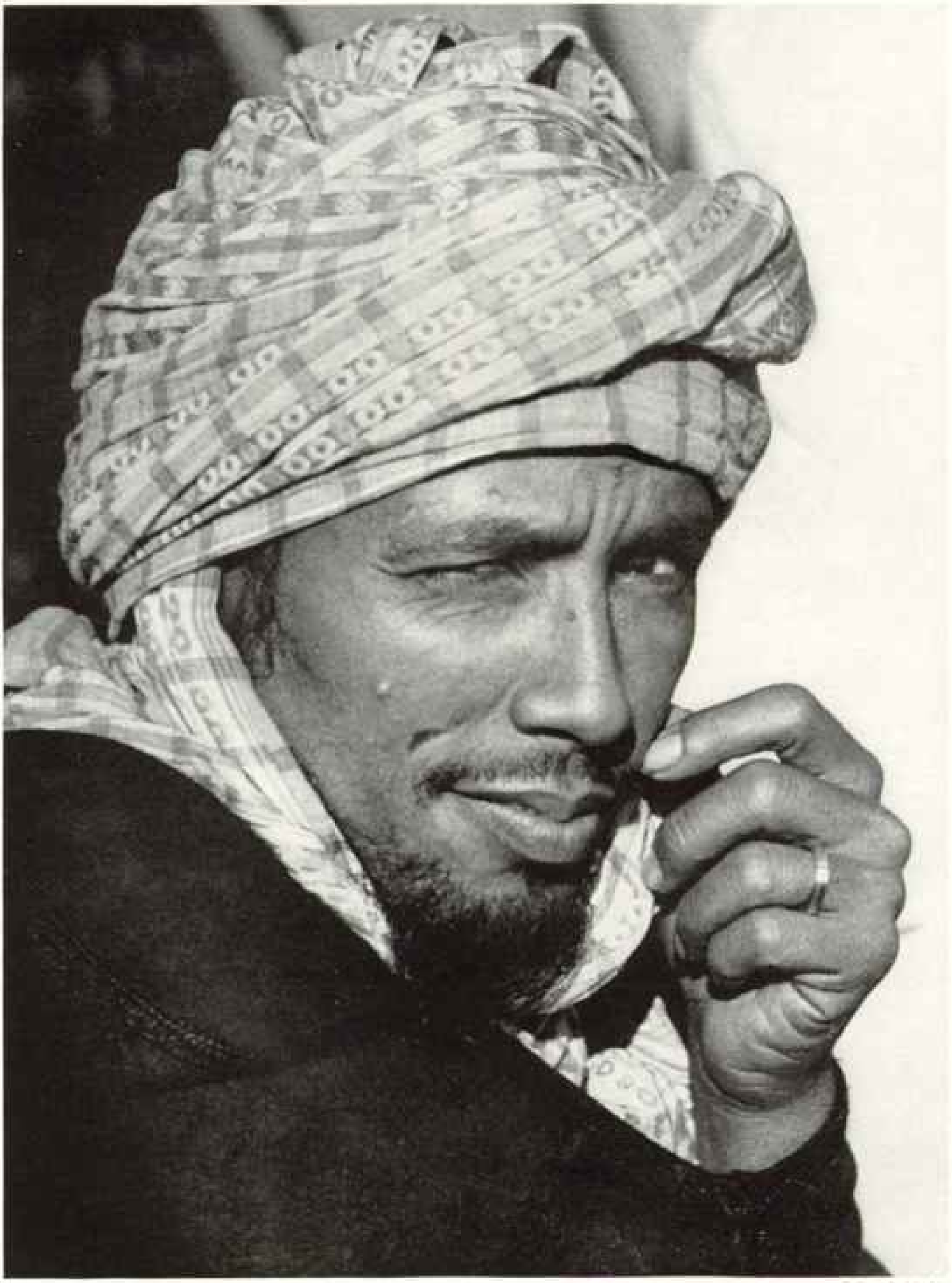
Sarsaparilla, obtained from the roots of a forest-growing plant, also is produced in Honduras.

### Gold May Be a By-product of Doing the Family Laundry

Not many women can expect to find gold in the same water in which they do the family wash, but it does happen in Honduras. Many a Honduran woman, after she has finished washing clothes in a rushing stream, takes a basin and washes the gravel in the stream bed in search of gold, much as did the early gold-seekers in California. The yield today is small, but the lure of sudden wealth remains.

The great Rosario Mine, near Tegucigalpa, one of the largest in the world, yields both gold and silver. Bars of precious metal produced by the mine refinery are carried by pack mule 100 miles down to the Pacific coast for shipment. Until recently all the supplies for the mine and the town which houses the workers, including mining machinery, motion picture reels, food, furniture, even schoolbooks, were hauled up from the coast by oxcart or on muleback (Color Plate VI).

Mines of the Republic also produce copper, iron, coal, lead, and zinc. Some coffee is grown, along with the sugar to sweeten it. Cattle raising is an important industry. With new highways under construction and airplanes surmounting the old mountain barriers, Honduras is making itself more accessible to the world and opening the way to further development of its rich resources.



© Kurt Lahrman

**Romantic Son of the Desert Is the Mauritanian**

He has come to Dakar to sell trinkets carved from an ebonylike black wood which grows in his own country (page 408). Strikingly turbaned and garbed in flowing robes, he trudged barefoot over many miles of rough going to reach the market.

# French West Africa in Wartime

By Paul M. Atkins

AIRPLANES from British men-of-war and from Free French ships which had approached during the night flitted over Dakar early on a misty morning. Slips of paper—red, white, and blue on one side and white on the other—fluttered down into the streets in which people were just beginning to circulate.

These papers carried an importunate message from General Charles Joseph de Gaulle: "Frenchmen of Dakar! Join with us to deliver France!" (Page 372.)

About seven o'clock a small launch bearing representatives of De Gaulle and flying a white flag as well as the French colors approached the inner harbor. A staccato outburst from a machine gun caused it to stop. After another burst of fire it turned back to the ship from which it came.

Meantime a group of Free French officers landed by plane at Ouakam, the big airport of Dakar. They brought personal messages addressed to the principal De Gaulle sympathizers in French West Africa. The officers were promptly seized. Because of the papers they carried, it was easy for the Vichy Government forces to identify and arrest the leading De Gaullists.

Then came an interchange of radio messages. "Join us and save France," said De Gaulle.

"I have been charged with the defense of Dakar against all comers," replied Governor General Pierre Boisson, "and I will obey my orders."

### Dakar Bombarded for Three Days

Thus began the bombardment of Dakar by the British on September 23, 1940—a bombardment which continued intermittently for three days.

Many houses in Dakar and on the island of Gorée at the entrance of the harbor were damaged (pages 380, 391).

A shell destroyed an oil fuel pipe on the fueling pier, causing the loss of much valuable oil. The defenders also lost the destroyer *L' Audacieux* and the submarines *Persée* and *Ajax*.

The French fired not only from their shore batteries but also from the *Richelieu*, the 35,000-ton battleship which had sought refuge in Dakar after the fall of France (p. 376).

They also sent out an old submarine which had previously been used as a training ship. It succeeded in torpedoing one of the major British vessels. The extent of the damage done to the British is not publicly known, but it was serious. At the end of three days the besiegers withdrew.

The French in Dakar licked their wounds and with Gallic wit mocked their attackers. They also gathered up fragments of a half-exploded shell and labeled them: "Supplies from De Gaulle."

The bombardment of Dakar was over—for the time being. As I write, early in 1942, the Germans are not yet there—officially—but it is certain that they are determined to have possession of the port and that the Allies are equally determined to keep them from getting it or to take it from them if they seize it.

Governor General Boisson said to me several months after the British bombardment, "I have defended Dakar against the British. I will defend it a hundred times more stubbornly against the Germans." He did not say what he would do if the Vichy Government ordered him to turn over the city to the Germans.

### Germans at Dakar Would Menace America

A glance at the map will show why Dakar is regarded as a key position by both sides in this conflict. It is located at the extreme western point of Africa (see maps, pages 374 and 377, and the National Geographic Society's Map of the Atlantic Ocean, published September, 1941).

In peacetime Dakar is the usual port of call for all ships sailing from Europe to west, south, and southeast Africa, and for ships from the Mediterranean section of Europe to the east coast of South America. It is almost equally distant, some 1,860 statute miles, from the nearest points of South America and Europe—namely, Natal and Gibraltar. Thus it is as much within the American as the European orbit.

Furthermore, Dakar has one of the two best harbors between Europe and Capetown, the other being Freetown in Sierra Leone.

Dakar has excellent port units, several large piers capable of accommodating 35,000- to 40,000-ton vessels, a pier especially equipped for refueling ships, a drydock, a large and well-arranged airfield complete with lights for night service, and, behind the main port, a shallow bay admirably suited to the needs of flying boats.

With its location and its equipment, Dakar is ideally adapted as a base for the control by surface craft, submarines, and airplanes of the central and southern sections of the Atlantic Ocean (map, page 374).


Staff Photographer Willard R. Culver

**This Handbill Was One of Thousands Showered on Dakar Before the Bombardment**

"Frenchmen of Dakar!" it exhorts, "Join with us to deliver France!" Hoping to occupy the city without bloodshed, the British and Free French dropped the red-white-and-blue appeals into the streets from an airplane, but the Vichy Government forces refused to capitulate (page 373).

If Germany should ever launch an attack against South America, Dakar is the point from which this departure would take place. The Germans could not embark on such an adventure without first occupying Dakar.

For this vital port of Dakar I set out from Lisbon on a business trip one crisp, bright day in January, 1941, on the little Portuguese ship *Guiné*, which makes scheduled trips to the Portuguese Islands and to Portuguese Guinea. The short voyage required almost three weeks, evidence of the difficulties and delays in travel in that part of the world under war conditions.

Through the tail end of a hurricane that had wrought havoc in Portugal the *Guiné* rolled and pitched to Funchal, on the island of Madeira.

The war had struck this beautiful spot indirect, but severe blows. Gone were the winter tourists of former years who had purchased Madeira's famed lace and other handmade products.*

In their place were thousands of refugees from Gibraltar. A few of these have funds of their own and are able to live comfortably, but the large majority are dependent on the allowance granted them by the British Government, a sum sufficient for only strict necessaries. Much of the food has to be imported. Lack of shipping, high prices, and lowered income have created problems.

From Funchal we went on to São Vicente, center of population in the Cape Verde Islands. War has caused near-starvation conditions there. Lying leeward of Santo Antão, which, being larger and higher, cuts off considerable rainfall, São Vicente must import not only every bit of its food but even its drinking water from its sister island. The only reason for its development is that it possesses a fairly good harbor (page 379).

## Gambia, Slender British Foothold

Two days later we reached Bathurst, a town only a few feet above tide level at the mouth of the Gambia River, which gives its name to the British colony.

Gambia is a freak of political geography. Only 12 to 30 miles wide and split in half by the Gambia River, it extends approximately 200 miles inland, cutting directly across the southern portion of French Sénégal and separating Casamance from the main body of that colony. The French long before the present

* See "Madeira the Florescent," by Harriet Chalmers Adams, National Geographic Magazine, July, 1934.

© Hans Twitty, Ewing from Europa

**Senegalese Mohammedan Women of Dakar Do Their Hair in Hooks**

Stylish coiffures feature stiff braids bound with black string. For turbans the women purchase cotton piece goods which they employ native street tailors to make up and embroider (page 407).

war tried unsuccessfully to induce the British to sell it to them or to trade it for some other bit of territory.

Because the British know that it would be impossible for them to protect Bathurst against any determined drive, they have made no serious effort to fortify it. It is used as a hopping-off spot for the flying boats which connect England with the British colonies in West Africa. It is also employed as a naval control port for the inspection of ships, principally Portuguese craft such as the *Guiné*.

We tarried approximately 24 hours in Bathurst while the British censored the mail and checked up on the cargo. Some of the officers of the *Guiné* dined ashore and several of the British came on board for dinner. Our guests said that though they had plenty to eat in Bathurst the variety was limited, and they welcomed the change which a good Portuguese meal afforded.

The next port at which we touched was Bolama, the island capital of Portuguese Guinea, though by no means its most important town. In the winter of 1940 Bolama attained sudden prominence in American eyes when it became a temporary stopping point for the Pan American Clippers on their westbound flights (pages 386 and 389).

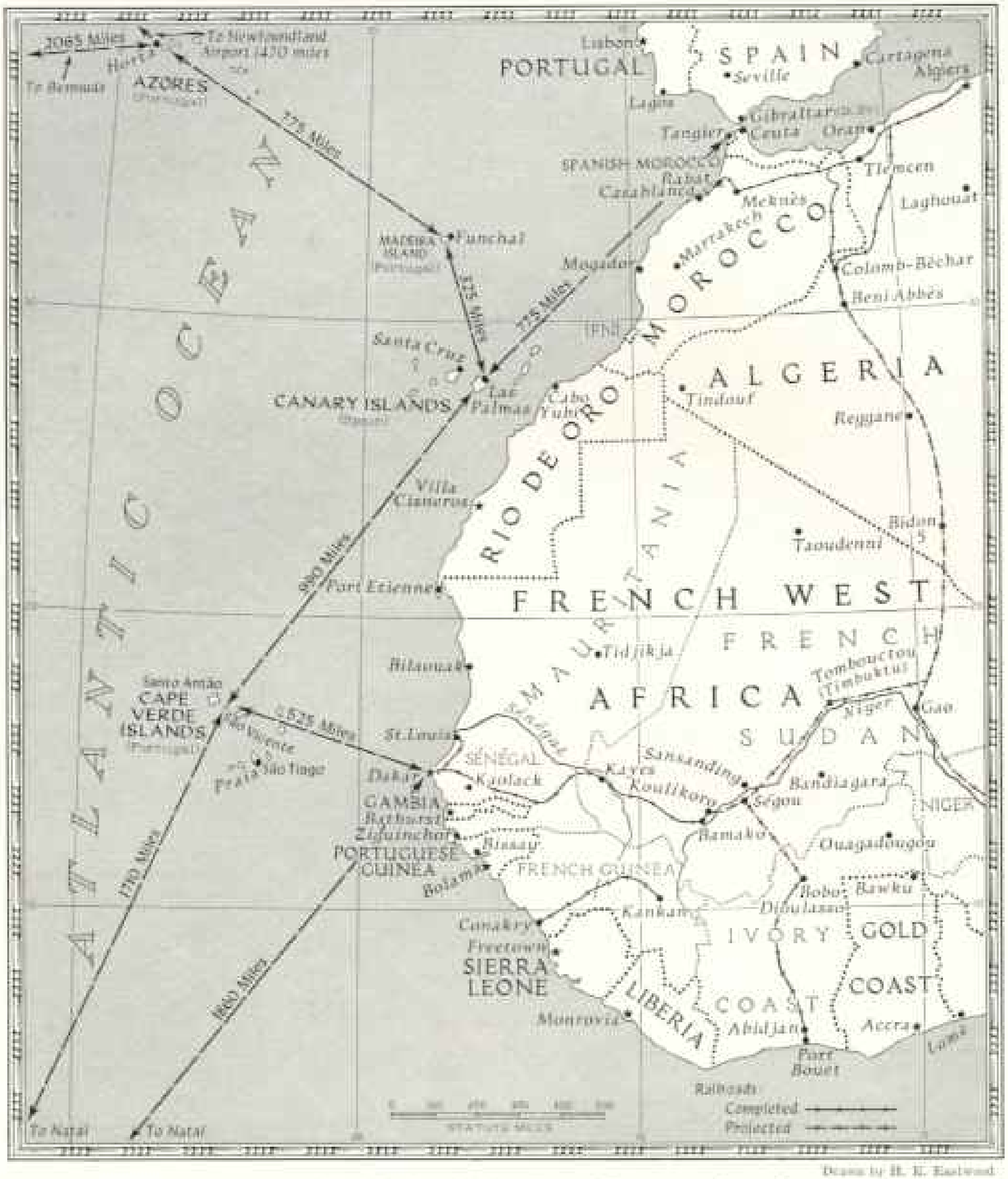
The unpretentious Pan American Airways station at Bolama, used now only during the months when the stormy westerlies shift south and cause rough seas at Horta in the Azores, may be abandoned in favor of a permanent station at Dakar when the war is over—or perhaps nonstop passenger flights between Europe and America will then be feasible.

### Bissau the Portuguese Trade Center

Bissau, the next and last port of call, is the principal city of Portuguese Guinea. The stores and warehouses of several of the larger companies operating them occupy the ground floors of the buildings facing the water front. Upstairs the managers and their principal assistants have their apartments. Wide verandas, some screened, others open for the sake of circulation, protect the rooms from the direct rays of the sun.

Behind many of the stores are patios filled with flowers. The Portuguese love flowers and will have them even at sacrifice of comforts which Americans consider necessary.

Every bed in an apartment has its mosquito netting, unless the bedroom itself has special screening. In every household the familiar old kerosene lamp has its place, and candles are usually available.




Drawn by R. E. Eastwood

**Axis-controlled, Dakar Might Be a Menace to America**

Only 1860 miles from Brazil and about the same from Gibraltar, it could serve as a base for both airplanes and submarines to harry not only Atlantic shipping but the coast of the Western Hemisphere (page 371). Railroads connect it with Bamako and other inland cities, but scarcity of fuel renders these of doubtful value. Those which were nearing completion at the beginning of war remain useless, for steel is unobtainable save by importation through blockaded waters (page 393 and map, page 377).

Because electricity is lacking save from nightfall till midnight, there are few electric fans and, of course, no electric refrigerators. Digestive diseases are more prevalent here than in colder climates, and food which has been turned slightly by the heat is an important factor in causing such maladies. The residents of Bissau, like those of many other places in West Africa, have solved the problem by introducing refrigerators operated by kerosene.

These refrigerators are expensive luxuries, both because transportation costs and import duties are high and because West Africa—whether British, French, or Portuguese—is

© Harris Tuttle-Lucke from Rapaport

**Motor Taxis and Trucks Are Out of Date in Dakar—the Horse Rules Again**



Walter Mittelholzer

**South of Dakar the Gambia and Its Tributaries Wind Tortuous Courses**

Movement of troops along the coast to flank the city would be well-nigh impossible because of the rivers and dense jungle (page 392). The harbor entrance is the only practicable approach from seaward.

Britstaff Press Agency

**Though Crippled, the *Richelieu* Still Protects Dakar**

This French battleship, completed after the war began, suffered severe damage to its propellers when daring British sailors exploded a mine under its stern in the summer of 1940. Unable to leave the harbor, it has become an antiaircraft fortress and a bulwark of Dakar's coastal defense (pages 371 and 392).

not a wealthy region. Partly for ostentation, and partly for safeguarding food from light-fingered servants, the refrigerators are frequently placed conspicuously in the dining rooms.

Radios, virtually the only link with the outside world, are operated by batteries. At the time of my visit the British Broadcasting Company was beaming many of its broadcasts to West Africa not only in English but also in French, Portuguese, and Spanish. There were then no restrictions, either legal or social, on listening to broadcasts in any language from any country. Recently, however, citizens in French West Africa have been forbidden to tune in on British and American programs.

Portuguese Guinea is one of the least important of the Portuguese African colonies, holding a comparatively insignificant position when compared with Angola and Mozambique. It has been relatively neglected, therefore; for the Portuguese do not have sufficient capital to develop even their major colonies. A few years ago an ambitious governor started to build some imposing buildings in Bissau. A partly finished government building and an incomplete cathedral are mute testimony to the failure of his immediate ambitions.

The Belgian consul, who was also the manager of one of the principal commercial houses, was nearing 60 years of age. But for the war, he would have been retired on a pension. His wife had gone to Belgium on a vacation in the spring of 1940 and had been caught in the invasion. Though the consul had appealed to his own government, to the American diplomatic authorities, to the Red Cross, and to friends and business acquaintances, he had received no word of her for eight months.

How many like tragedies have occurred no one knows.

### Across Country by Automobile

From Bissau my next move was by automobile to Ziguinchor, the seat of the French administration and the principal town of Casamance, as the southern portion of Sénégal is called. The French consul accompanied me.

To avoid the midday heat and also to reach the first river ferry at the proper stage of the tide, we started at 6 A. M. The ferry was only a few miles from Bissau.

Over what would be considered a good dirt road in the United States, our car rolled past fields in which peanuts, a little cotton, and some of the native foodstuffs were raised in season. It was now midwinter, and the fields were lying fallow. Curious baobab trees with tremendously thick trunks and few branches dotted the landscape (page 394).

Groups of natives—the women naked to the waist, and the men wearing breechcloths only—were beginning to work in the fields or were headed for Bissau with loads of produce. Throughout most of Africa human beings are the principal burden bearers, and the loads are carried on the head. It is astonishing what weights can be transported in this manner (page 387).

The ferry, typical of those employed to cross small streams in West Africa, consisted of three large dugout canoes lashed together and supporting a platform large enough to carry a medium-weight truck. There was ample room for our Ford car and for the dozen or so natives who wished to cross with us.

At first glance, the task of getting aboard looked perilous. The relatively level plain had been cut down by the action of the river, and now that the tide was out the ferry was 30 or 40 feet below us. To reach it, we had to negotiate a 15- to 20-degree slope on a road which seemed to be bottomless, slippery mud. I had grave misgivings.

However, my companion, who had been 35 years in French West African colonial service, assured me that everything was all right and remained tranquilly seated in the car. When the ferry was ready to receive us, and we started down the slope in low gear, I found that the mud, only two or three inches thick, covered a well-constructed roadway of stones rough enough to prevent skidding.

A rope, one end tied on each bank, crossed the river and passed over the ferry. By hauling on this rope, the crew soon had us across the river. The slope on the opposite side was paved in the same way as the one we had descended, and we were soon up and on our way.

The scenery was at first substantially the same as that just outside of Bissau, though cultivated fields and habitations were fewer. From time to time we saw native villages, in most cases made up of a few families and usually set a hundred yards or so back from the roads.

Presently the vegetation became thicker; there were more and different trees and much shrubbery. Occasionally along or near the banks of small streams women were working in rice fields. Many of them, standing knee-deep in the mud, were naked, for they had removed their single wrap-around garments to keep them dry and clean. Seldom giving our car more than a fleeting glance, they continued with their work.


**Strategic Dakar Commands the Western Bulge of Africa**

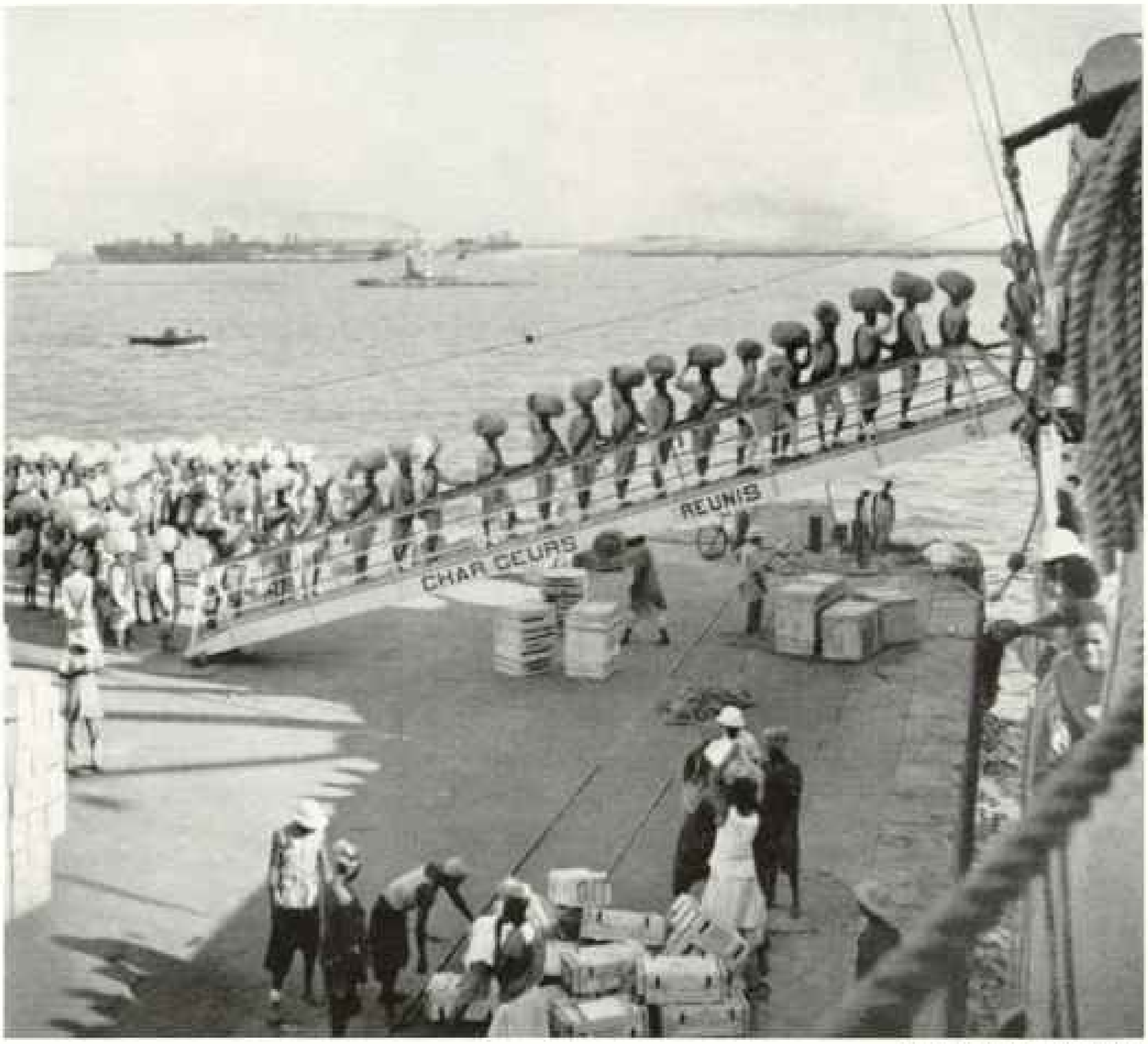
Because of its location and excellent harbor, Dakar figures importantly in the plans of both the Axis and the United Nations. To the south lies the British port of Bathurst in Gambia (map, page 374).

There was a little settlement of three or four huts at the next ferry—round structures, with walls of wattled branches and thatched roofs. In some of them parts of the walls were left open for better ventilation. They were so grouped that one or two fires sufficed for all cooking by day and for lighting the place at night.

Among the natives of West Africa lamps and candles are little used, particularly since petroleum products have become almost unobtainable because of war rationing.

### Birth of Twins Thought Unlucky

My companion directed my attention to what he called a most unusual sight—twins, perhaps a year old, playing near one of the houses. He explained that the natives consider the birth of twins contrary to nature




Dentur Bethat from Black Star

**Troops of the French Colonial Army Board a Transport at Dakar**

Though well drilled in arms, these native soldiers cling to their traditions and carry their equipment on their heads instead of their backs. The city lies to the left of the dock. In the far background at the right is a fueling pier, at the left the submarine base. The white line between is the Plage d'Hann, where seaplanes land. The author reports that there were no German forces here at the time of his visit in 1941. Vichy was in complete control (page 371).

and hence very unlucky. Almost invariably, therefore, one twin and sometimes both will mysteriously disappear within a day or two after birth, never to be seen again.

He added that, although the natives at this place were pagans, they had evidently had sufficient contact with European civilization to modify the superstition.

Ziguinchor is the metropolis, if a town of 10,000 natives and perhaps 200 whites can be dignified by that name, of Casamance, the richest part of Sénégal.

Since Ziguinchor is located on the Casamance River some 35 miles from its mouth where the water is deep enough for navigation by ocean-going ships of 3,000 tons, and since it has sufficient rainfall for a varied agriculture, it is an important port for shipping peanuts.

The town consists of a French section close to the river bank and a native section inland. In the French district are the stores and warehouses and a few government buildings.

### Ground-strafing Mosquitoes

The managers and their European assistants live over their business quarters, 15 feet or more off the ground, to keep away from the mosquitoes, which here, as in some other parts of West Africa, fly low. In the evening white men wear knee boots of soft leather inside their trouser legs to protect their ankles. The mosquitoes seldom rise high enough to reach a standing person's hands or face.

The native village is well laid out in squares

Pierre Verger from P.P.A.

**Portugal's Marines Parade Before the Governor at São Vicente, Cape Verde Islands**

Though the official capital of the Cape Verde Islands is on productive São Tiago, the administrator (taking salute on steps) prefers to live on this barren island, which is less molested by storms. Rains are infrequent here, and most of the fresh water used is brought in by boat (page 372). To keep the few shrubs going, residents drain their baths into sprinklers.

with a few diagonal avenues which lead to roads into the country. The principal streets are broad, with narrower secondary and cross streets. Though dusty in the dry season and muddy when the rains come, they are well cared for, and no litter is to be seen even in unoccupied lots. The French have insisted upon adequate sanitary regulations.

### Peanut Shellers Whir Incessantly

Scattered around the native quarter are a number of elementary schools organized by the French Government. Those I visited were all for boys, for whom education is generally reserved. Organized like the schools of corresponding grade in France, they strive as a major objective to teach the natives to speak good French.

The French section of the town is a bustling spot. There large quantities of the peanuts barged in from the country are shelled. The whir of the machines used for this purpose can be heard all day long and, during the busy season, far into the night, for two shifts of men are employed to run them.

In the larger towns the trading companies have two classes of stores—one for Europeans and one for natives. The two groups of customers rarely mix. In smaller places the stores are primarily for the natives, and separate corners are set aside for white customers. Branch stores in outlying villages are often run entirely by native employees.

Native men tailors with foot-power sewing machines set up their equipment in or near the retail stores which cater to natives (p. 407).

Kenneth G. Morton

The French Have Built New Fortifications on the 40-acre Island of Gorée; the Old Fort Lies on the Southern Tip

Kenneth G. Morton

**Gorée Was Bombarded During the British and Free French Attempt to Take Dakar**

The two large buildings, left background, were hit (pages 371, 391). To civilians passage on the ferry (foreground) is denied. The boat now carries only soldiers and supplies for the garrison.

Pictorial Publishing Co.

**The 7,600-ton Cruiser *Georges Leygues* Puts Out to Sea from Dakar**

Although freight traffic is virtually at a standstill, the Vichy Government still keeps a few war vessels in operation. This view is from the deck of another cruiser. The gravity trough in the foreground is bringing a shell to the gun turret (right). This temporary device, rigged up for harbor use, would have to be dismantled at sea. Discarded powder cans are scattered near by.

Photo Voigt from F.F.C.

**A Riverside Mound of Peanuts Awaiting Shipment at Dakar Looks Like a Desert Dune**

Only money crop of French West Africa, they go by boat to Marseille or Bordeaux, there to be pressed for their light, clear, tasteless oil. During the British blockade, vessels loaded with peanuts have often been seized as prizes. The heap is piled up loosely and then bound with bags to prevent spreading (page 387).


Pierre Verger from P.P.C.

**Dakar's Military Commander Salutes the French Flag Borne by a Guard of Honor at the Arrival of Governor General Boisson**

In the right background is the city's leading store. The new governor, who represents Vichy, ordered a stout defense against the British and Free French, and announced that he would resist German attack a hundred times more strongly (page 371).

Pierre Verger from F.F.C.

**Who Cares for Riding Style? The Race Is the Thing**

Every Sunday Dakar turns out to see the horses—far from Derby prospects but evenly matched—run on the "turf" track between the city and the airfield at Ouakam.

Pierre Verger from F.F.C.

**Native Soldiers Fought Off the British and Free French Assault on Dakar**

Because the first volunteers for the French colonial army (note anchor insignia) were Senegalese, all native troops are known as *tirailleurs sénégalais*. They are, however, recruited from many different tribes.

There they stand, ready to cut and make garments of cotton piece goods. Many of them will also do the embroidery work which the well-to-do native women fancy.

The retail store serves, like the old-time country store in the United States, as a meeting place and news center. It is frequently noisy, with its babble of conversation, the shouting and crying of children, the whir of the sewing machines, and the cackling of chickens brought in for sale. Since the many different tribes mingle, costumes vary like the colors of a kaleidoscope.

Mohammedans predominate in the northern part of French West Africa, pagans in the southern, and both visit Ziguinchor. The Mohammedans can be distinguished by their long robes, which clear the ground by only a few inches.

The pagans are seldom nearly as fully clothed and in some of the outlying districts go almost naked (pages 373 and 391).

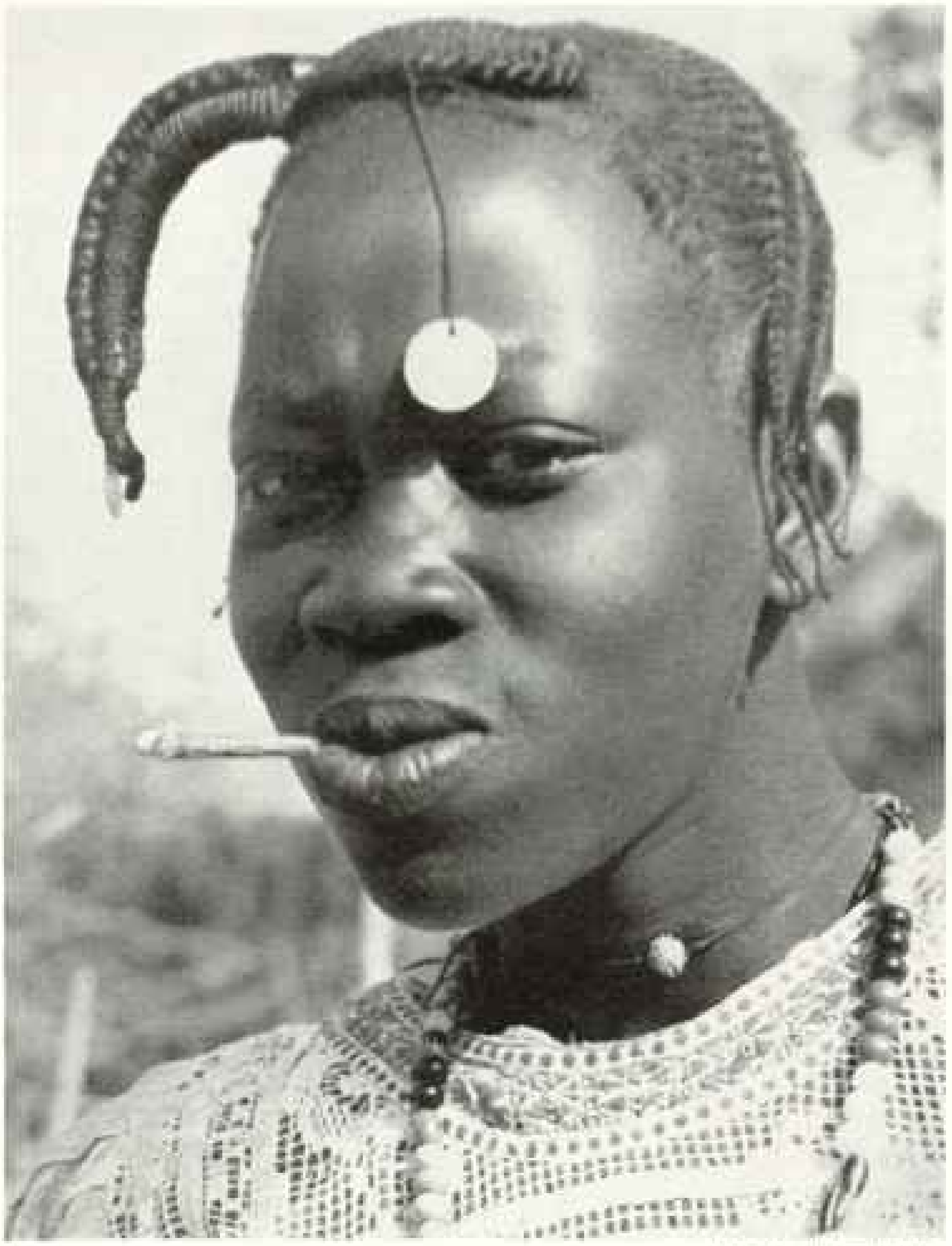


Photo Verger from P.P.C.

**The Native Belle of Dakar Keeps Her Toothbrush in Use**

As she goes about town, she chews a limewood stick which from time to time she rubs vigorously over her teeth and gums. Her hair is braided with black cord into stiff twists and decorated with a dangling disk.

The principal social center of Ziguinchor is the club, a building with a high-ceilinged roof, a large part of it open on three sides, with a concrete tennis court adjacent to it. The tennis court is lighted for night playing.

In late afternoon the social-minded group of the population gathers here. A few play tennis; more watch the game; others play cards or billiards, and all have apéritifs and chat. The club, however, is not so jolly now as it was before the war. The variety and supply of apéritifs have dwindled, and the tennis balls have become dead from long use.

The administrator of the civil government, a friend I had met in the days of World War I, invited me to go with him one day on a little inspection tour. A few miles out from Ziguinchor, he shot a partridge from his seat in the car and so added to the variety of the family larder. Game of several kinds is still fairly plentiful.

### Polished Manners in a Native Village

At a little village where my host paused to see a native employee, a comely young native woman, naked to the waist, approached us. The employee introduced her as his wife. She greeted me in excellent French and with as much social ease and grace as would have been shown by a socially experienced young matron in a suburb of an American city. She assured me that I was welcome.

**At Bolama Are Trim, Efficient Agents for Westbound Pan American Clippers**

Portuguese Guinea's capital is a base for winter operations on the Lisbon-New York run (page 373). Dressed up in gift finery, native porters pose proudly with the air-line officials (page 389).

*Pierre Verger from P.A.A.*

**"Cut-to-order" Meat Markets Circulate in Dakar**

In horse-drawn butcher vans carcasses of sheep, slaughtered according to Mohammedan rule but poorly protected from flies, are borne from door to door.

Pierre Verger from P. P. C.

**By Rail or Boat from All over Sénégal and Even French Sudan, Peanuts Come to Dakar**

The pile in the background is a giant of its kind, fully 30 feet in height (pages 382, 407). In the foreground a native dock hand carries a heavy bag of peanuts on his head! The letters are initials of Peterson, a leading trader of the city.

expressed interest, but no surprise, that I had just arrived from the United States, and at once began to ask me how I liked Africa in general and Casamance in particular.

From Ziguinchor to Dakar I went on the *Oued-Grou*, a little mail boat which makes the round trip between these two ports twice a month. Its arrival and departure are the big events in the life of the community. It is practically the only means of regular communication between Ziguinchor and the rest of Sénégal, the other colonies, and France.

Headed by the administrator, most of the white population and many of the natives came down to see it off. It was supposed to sail at 7 A. M., but did not leave the pier until after eight.

The upper deck was reserved for the white passengers, and the lower deck, especially forward, was occupied by the natives with all kinds of baggage piled among them. Prayer rugs and the ubiquitous teakettles in which loyal Mohammedans carry water for the ceremonial washing of their hands before prayers were mingled with furniture, supplies of food, live chickens, and even goats (page 396).

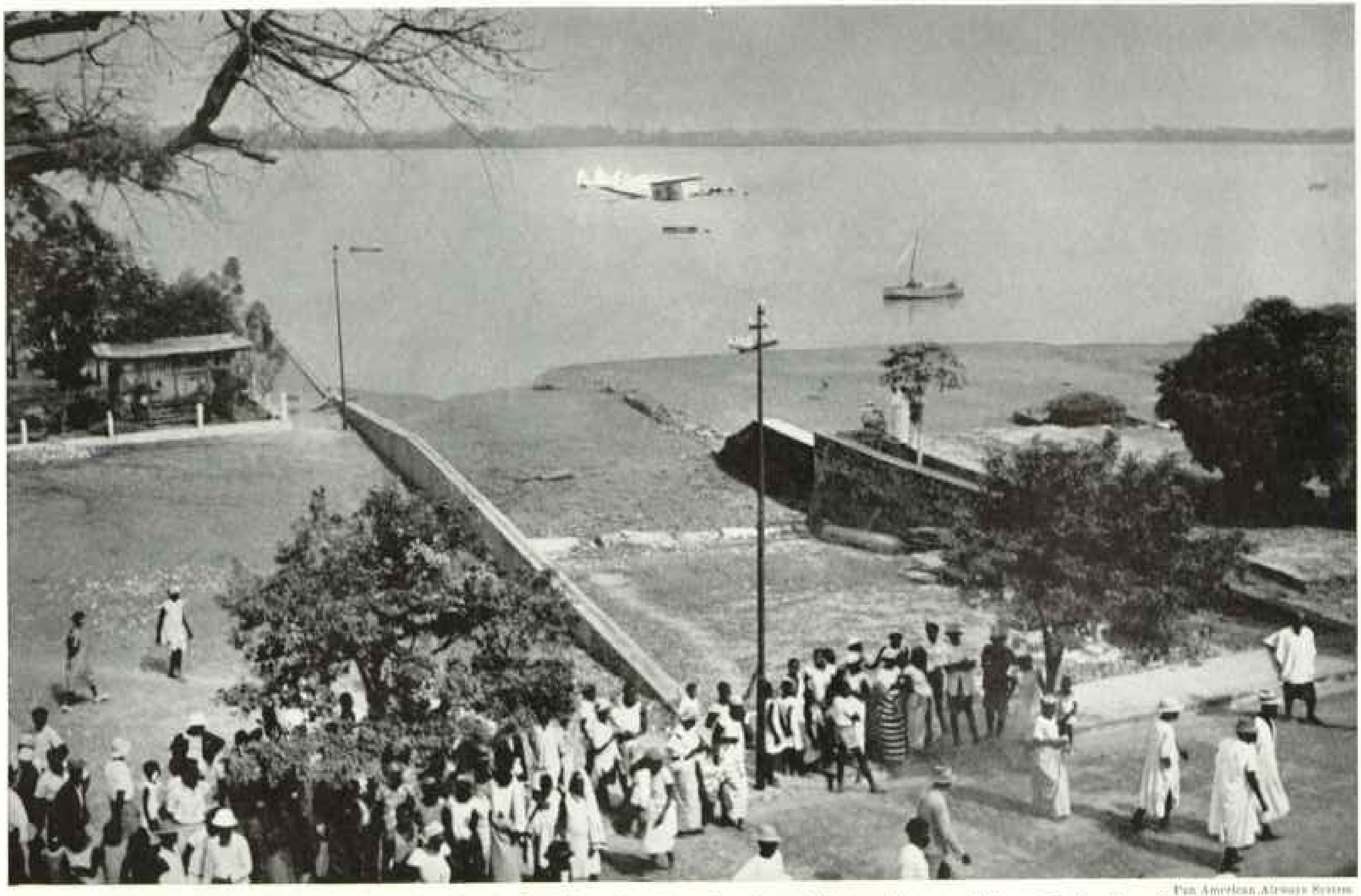
In midmorning an awning was stretched over this deck to shade the occupants, and at night it was lowered and secured to the deck to shut out the sea wind, which becomes fresh when darkness falls.

The quarters reserved for the white passengers were cramped and decidedly dirty. For these conditions the young captain apologized, explaining that the present voyage was only his second with the ship. He assured his

Pierre Verger

**Seydou Norouthal, Highest *Marabout* (Religious Leader) of the Dakar Region, Brings Moslems Together for a Great Praying**

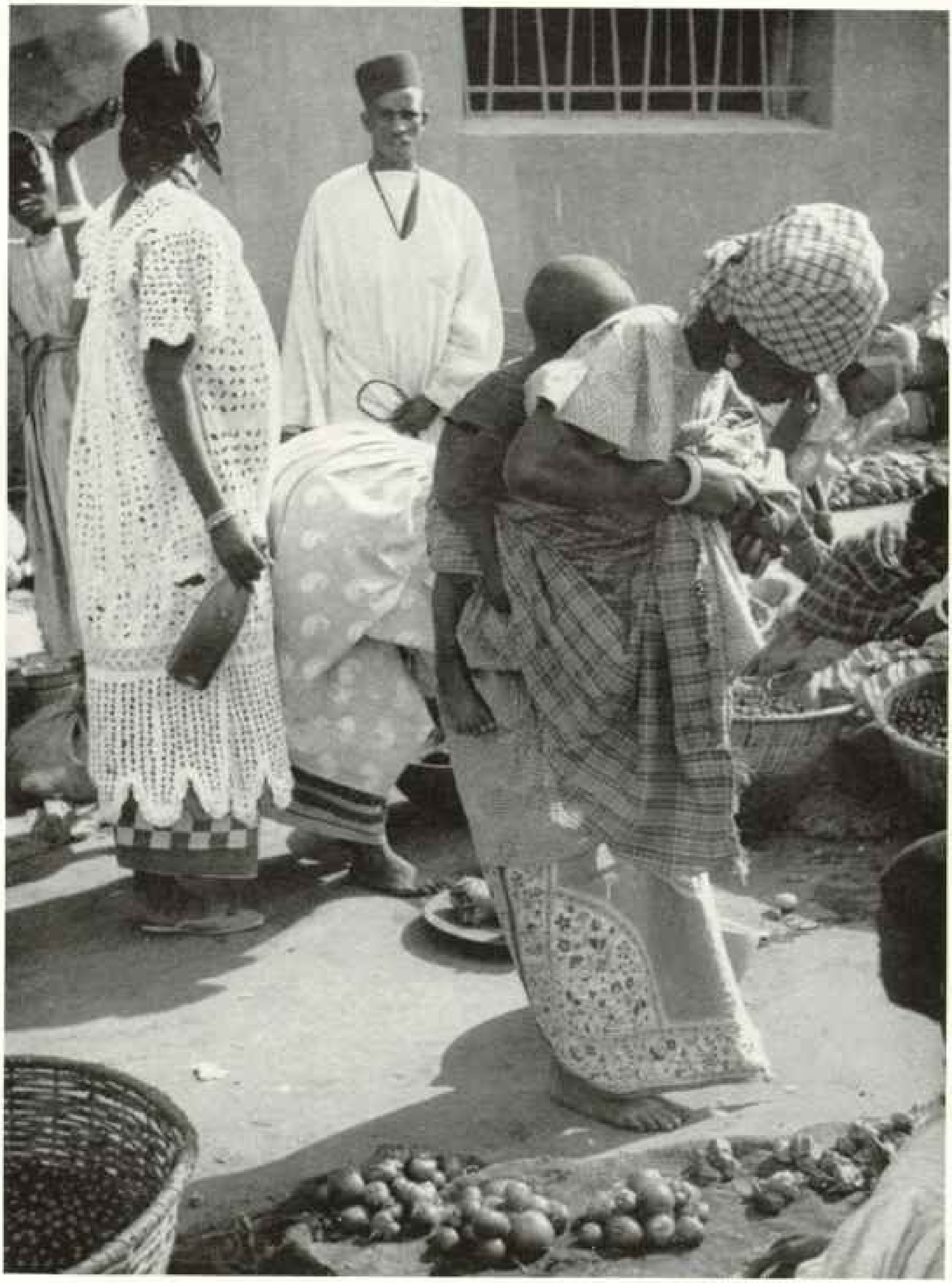
Although his father, El Hadj Omar, fought the French bravely, this man (center, left) now acts as an agent between the conquerors and the tribesmen, quieting discontent and preventing revolts. Behind the barbed-wire fence squat the faithful, their umbrellas, tokens of dignity, proudly displayed.



Pan American Airways System

A Crowd at Bolama Awaits the Landing of a Pan American Clipper, Soon to Take Off for Brazil

In the winter of 1940-41, when the stormy westerlies shifted southward as usual and caused rough seas at Horta in the Azores, the planes were temporarily rerouted to this island capital of Portuguese Guinea. An unpretentious station was set up for them (pages 373 and 386).



© Hans Tschira-Locke from Ewing Galloway

**Because Fresh Vegetables Are Scarce, They Sell Quickly in the Dakar Street Market**

The basket at the left contains native-grown tomatoes the size of cherries. On the ground at far right are *poivrons*, the fruit of a pepper plant. These are a staple food, rather hot and excellent in salads. Truck gardening is precarious because of frequent drought.

Field Museum of Natural History

**Unlike the Mohammedans, Pagan Women Go Naked to the Waist**

Near Bamako, French Sudan, these young Malinké belles came out to watch members of the Field Museum-Straus West African Expedition at luncheon. They were more interested in the white men's table manners than in the menu, and were delighted when presented with some empty tin cans after the meal.

passengers that as soon as he could get some paint, which is almost unobtainable in West Africa, things would be different.

Compensating somewhat for the poor accommodations, the food was excellent. The old Chinese cook knew how to prepare a good meal from very limited resources.

Though we made only one brief stop at a town near the mouth of the Casamance River, the 190-mile trip from Ziguinchor to Dakar consumed almost 36 hours.

The ship seemed barely able to hold its own against the moderate head winds which came up with the moon. In explanation of the slow progress, the captain told me the coal he was burning was mostly slate and virtually worthless. All of it had to be shipped to Dakar from France, where the Germans were confiscating every pound of good fuel.

As we approached Dakar, we saw first the Mamelles, so called because of two breastlike elevations, and then the gleam of the Government House, standing out white against the green palm trees and dwarfing all neighboring buildings.

Soon we passed the island of Gorée, which with the breakwater from the mainland serves to protect the harbor of Dakar (page 380).

Because this island could be more easily defended against attacks by the natives than any place on the mainland, it was the site of the first French settlements in the vicinity. It is now virtually taken over by the Government, and though private citizens who own buildings there have not been compelled to evacuate, they are not allowed to repair the damage caused by the British bombardment.

### Dakar Is Strongly Fortified

Reports that Gorée has been fortified by the Army are doubtless correct. However, rumors about the mounting there of the heaviest artillery are probably unfounded.

Gorée is not the only point near Dakar

which has been fortified. There is a battery on the point just below the lighthouse. With it is a large range finder. Farther north is a battery of what appear to be six-inch guns.

All of these are easily visible from the unrestricted public road which runs around the Corniche.

Pillboxes to house machine guns have been constructed along the beaches both north and west of Dakar, approximately five-eighths of a mile apart, the distances between them depending on the configuration of the coast. About every third or fourth pillbox is armed and occupied by a squad of native troops and is connected with headquarters by telephone.

The French of Dakar do not propose to be caught napping by a surprise attack. In the city itself, deep bombproof shelters have been dug, sufficient, it is estimated, to protect the entire white civilian population, which has now increased to almost 15,000. A large portion of the native population of approximately 90,000 is expected to depart for the interior at the first sign of hostilities.

The Army is supposed to have some 20 to 30 thousand troops in and around Dakar. Most of these are native soldiers with white officers and sometimes white noncommissioned officers. There are a few units of artillery and some tank units which have white personnel. There are also some airplanes, most of them bombers and fighters of American make. However, the majority of them are several years old and not to be compared with the craft now coming off American assembly lines.

The French Navy has several cruisers, destroyers, and submarines which cruise back and forth between Dakar and Casablanca, frequently escorting merchantmen. If the French feared an attack at that point, these could easily be made available for the defense of Dakar.

### A Daring Attack on the *Richelieu*

The most important single unit for the defense of the city is the *Richelieu*, a 35,000-ton battleship completed after the outbreak of the war. She is armed with 15-inch guns, secondary batteries, and antiaircraft artillery. After the downfall of France she escaped to Dakar and has been there ever since (pages 371 and 376).

In the summer of 1940, when the British feared that the French Fleet might be turned over to the Germans, they accomplished one of the most daring and romantic attacks of the whole war. Under cover of darkness a small launch put into the harbor of Dakar from one of their warships. The men in the launch succeeded in attaching a mine to the stern of the *Richelieu* and exploding it. This seriously damaged the steering gear and put the propellers out of action.

For months the *Richelieu* could not be moved. The French worked hard to make good the damage and by spring had repaired the steering gear, put two of the screws back into normal working condition, and made a third usable at part speed.

The *Richelieu's* bottom is badly fouled because she has lain for months in Dakar waters. There is no way of cleaning it satisfactorily, for the drydock there is much too small to receive her. She cannot be operated at normal speed, but she can be maneuvered.

When I left Dakar, she was laid up beside one of the piers, which protected her bow and starboard side. The port side and stern were protected by two or three rows of nets arranged so that launches could reach her, but so that she could not be attacked by aerial torpedoes. Located where she was, she could fire over the city at any hostile naval forces, and her antiaircraft guns were a strong defense against aerial attack.

It is now reliably reported that she has been moved to the outer harbor where she is protected by nets on all sides and where she can be easily maneuvered in case of need.

### Geography Helps Protect Dakar

Dakar is well protected by its surroundings. The coast north of the city is a long beach extending for some 115 miles with hardly a break to St. Louis, at the mouth of the Sénégal River. A ground swell breaks constantly along the shore, rendering difficult if not virtually impossible the landing of any troops except infantry.

The sand bar at the mouth of the Sénégal River prevents boats of more than three-foot draft from entering that stream. Artillery or tanks could hardly be brought close enough to shore for landing. The Saloum River, and the little streams that flow into it or into the sea, render difficult any approach to Dakar along the coast from the south. Even if tanks could be put ashore there, they would find the going virtually impossible.

With the forces in and near the city and the fortifications which have been erected, Dakar is in a position to put up a stiff defense. A heavy assault would be required to capture the city, whether by the Germans, by the British, or by other powers.

Dakar prospered before the war as the major entrepôt for Sénégal and the western part of the French Sudan, being connected by a railroad line with Bamako, the capital



**Professional Scribes Pen Letters for Fees of One Franc Up**

In all principal post offices and along the streets of Dakar they solicit business from those who have not learned to write. This man is a Mauritanian (pages 370, 408).

of the latter territory. However, war wrought sad changes, and Dakar is no longer a port of call. No ships could enter its harbor without permission from the Armistice Commission at Wiesbaden, Germany, and vessels with this permission have been refused navicerts by the British.

The only remaining traffic is between Dakar and Casablanca, Algiers, and Marseille: and the British are picking up French ships on this run at every opportunity.

### Convoy Attacks Prevent Colonial Products from Falling into German Hands

Until lately, convoyed ships were unmolested, but a recent report tells of a British attack on a French convoy.

The British give reasons for such action: first, that the colonial products taken to France from French West Africa find their way largely into the hands of the Germans; and, second, that at the time of the downfall of France the French Government held in French ports many British ships which could easily have escaped.

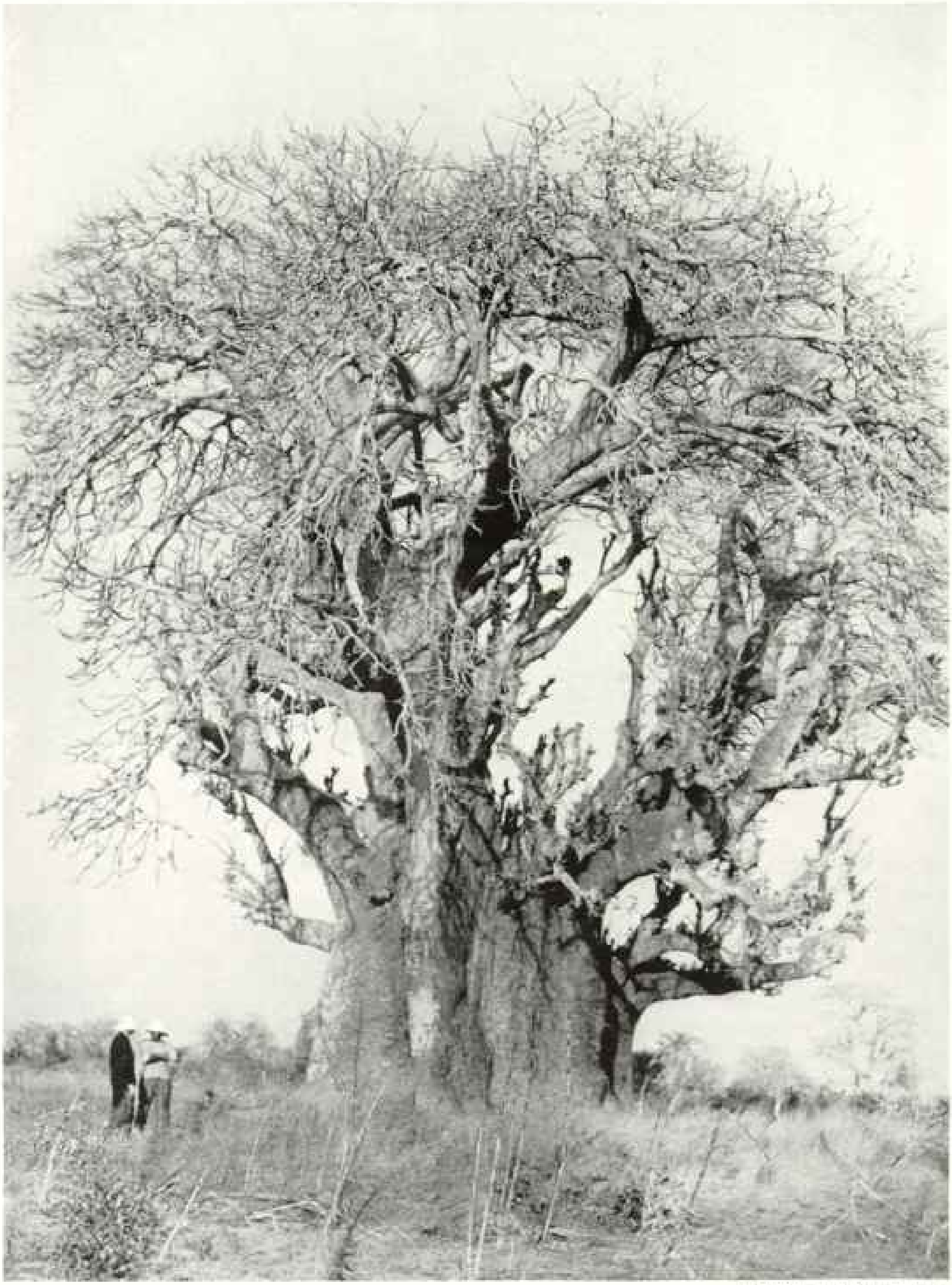
Two British ships swinging idly at anchor in the port of Dakar are mute evidence of the truth of the latter contention.

Seizures of ships combine with shortage of all kinds of goods in France to make life difficult in Dakar and Sénégal.

Even in normal times food as well as manufactured goods must be imported to meet the needs of the area. Some garden truck is raised, but the only large crop is peanuts for export.

Ordinarily natives live on rice from Indo-China and the Niger basin. The whites get meat from South Africa, South America, and the interior, flour from France, vegetables from Egypt, Syria, and Europe, and fruit from French Guinea and South America. Upon the United States they rely for canned goods, particularly condensed milk to feed babies.

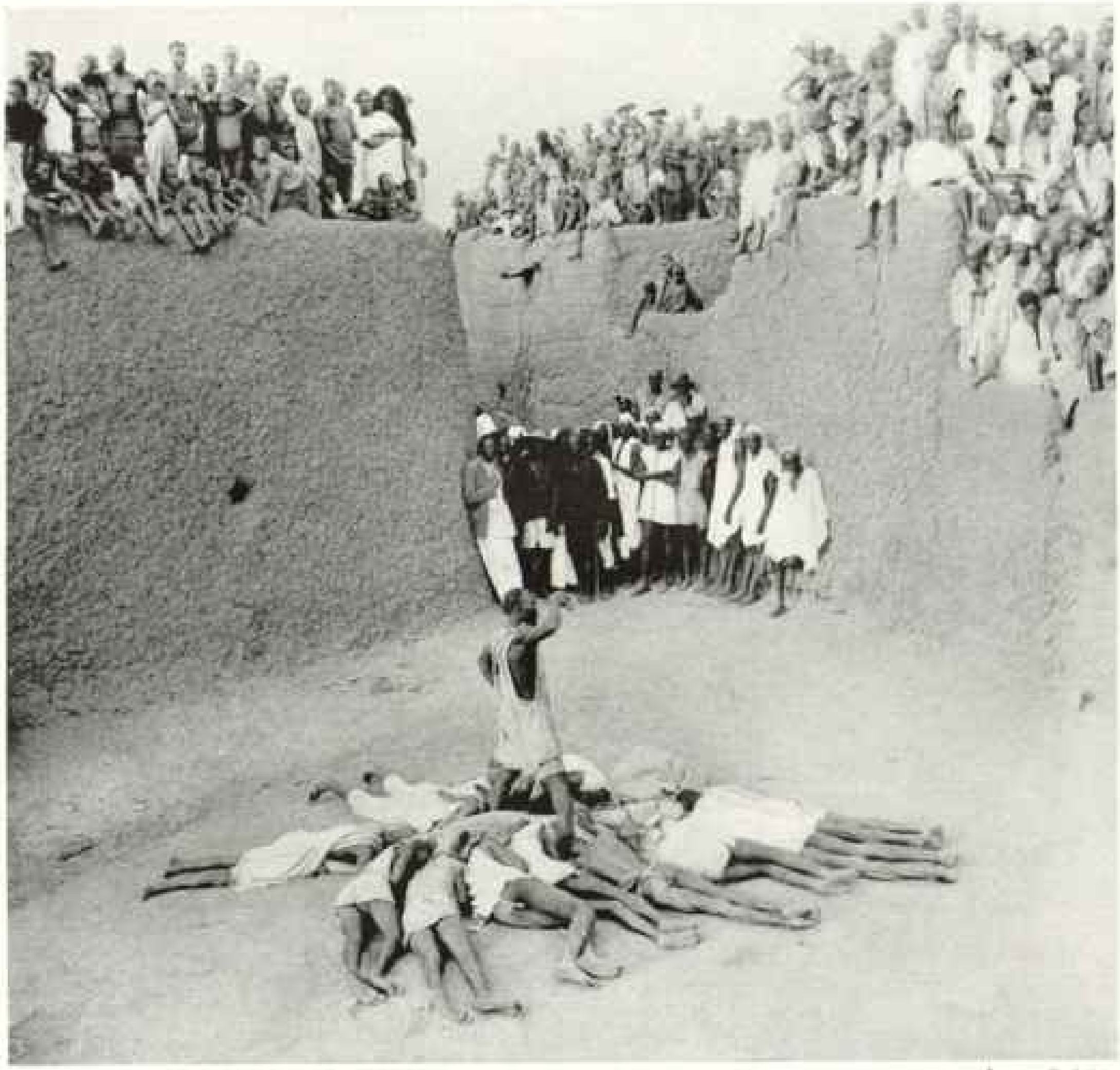
With trade limited to Morocco and France, famine threatens, and mothers complain that their babies are starving.



Field Museum of Natural History

**Tree of All Uses in Arid West Africa Is the Baobab**

Large cavities serve as reservoirs for water storage. The natives relish the leaves in soup, make eye medicine by baking or steeping the bark, and eat the large fruit as a cooked vegetable. This gigantic specimen, near Dakar, is more than 65 feet in circumference. The wood is too spongy and porous for lumber.



Barnes Studios

**A Fetishist Conducts a Burial at Bobo Dioulasso, Upper Ivory Coast**

Tied up in a shroud, the departed is placed on the ground while the relatives stretch in star formation all around, touching the body with their heads. The leader stands with his legs apart, straddling the body and whirling above his head a string with a lance head at its end. He lets the string slide in his hand in ever-widening circles to dispel the watching crowd.

Cotton piece goods for natives' clothing, a principal import from France in normal times, are no longer available, raw cotton having virtually ceased to reach France. Almost all iron is reserved for war purposes, and little can be obtained to make the utensils and simple tools the natives use.

As for the white residents, women long since gave up wearing stockings except on Sundays or special occasions. Men were still wearing socks at the time of my visit, but it seemed probable that these too would soon be exhausted.

New clothes or materials to make clothes are practically unobtainable, and thread even for mending garments or sewing on buttons can no longer be had. If a button is lost, it cannot be replaced. Shoes needing resoling have to be discarded in favor of native slippers and sandals.

### Transportation at a Standstill

French West Africa is a territory of vast distances, almost two-thirds the size of continental United States. Transportation, therefore, is important in the business life of the region, and transportation depends on fuel, especially on gasoline and Diesel oil.

After a month in Dakar I had to make a business trip to Abidjan, the capital of the Ivory Coast. The city is located on a lagoon a few miles from the sea.



**When Dakar Natives Go on a Voyage, They Take Along Most of Their Belongings**

Crowded on the lower deck of the ship are members of many tribes (page 387). Passengers with robes are mostly Senegalese and Mauritanian Mohammedans, but half-clothed pagans mingle with the throng. Besides bundles of clothing, the baggage includes teakettles for ceremonial handwashing, prayer rugs, hampers of food, household goods, and even live chickens and goats.

In normal times I could have left Dakar by plane early in the morning and landed in Abidjan in the late afternoon after a trip of substantially the same distance as that between New York and Kansas City. The service, however, had been discontinued and the only regular plane departed once a week for France by way of Bamako, Gao, and Algiers.

Having obtained a priority and reserved a place several weeks in advance, I was able to fly to Bamako in this plane.

### Heavy Rains Handicap Airplane Landings

The plane, an American Lockheed commercial, took off at 6 A. M., and a little more than a half hour later stopped briefly at Kaolack, the center of the peanut-raising area, to pick up mail. To enable planes to operate there in the wet season, a part of the landing field has been hard-surfaced. The time of my visit was early March, more than two months before the first rains were expected; yet we ran into a heavy shower.

An hour and a half after leaving Kaolack, we landed at Kayes, where we got out of the plane to have a breakfast of sandwiches and wine, coffee, or mineral water.

We reached Bamako, the capital of the French Sudan, about four hours out from Dakar, and there I left the Lockheed, which was going on to France.

My priority called for a place on a smaller plane scheduled to go to Bobo Dioulasso, Ouagadougou, Niamey, and Lomé; but I found that my priority was not "absolute" enough, and my place had been taken by some military officer. It looked as if I might be compelled to make the overland trip to Bobo Dioulasso to get the train for Abidjan.

However, luck favored me when it was discovered that a naval officer scheduled for immediate service at Abidjan had no place in

Photo Verger from P.P.F.

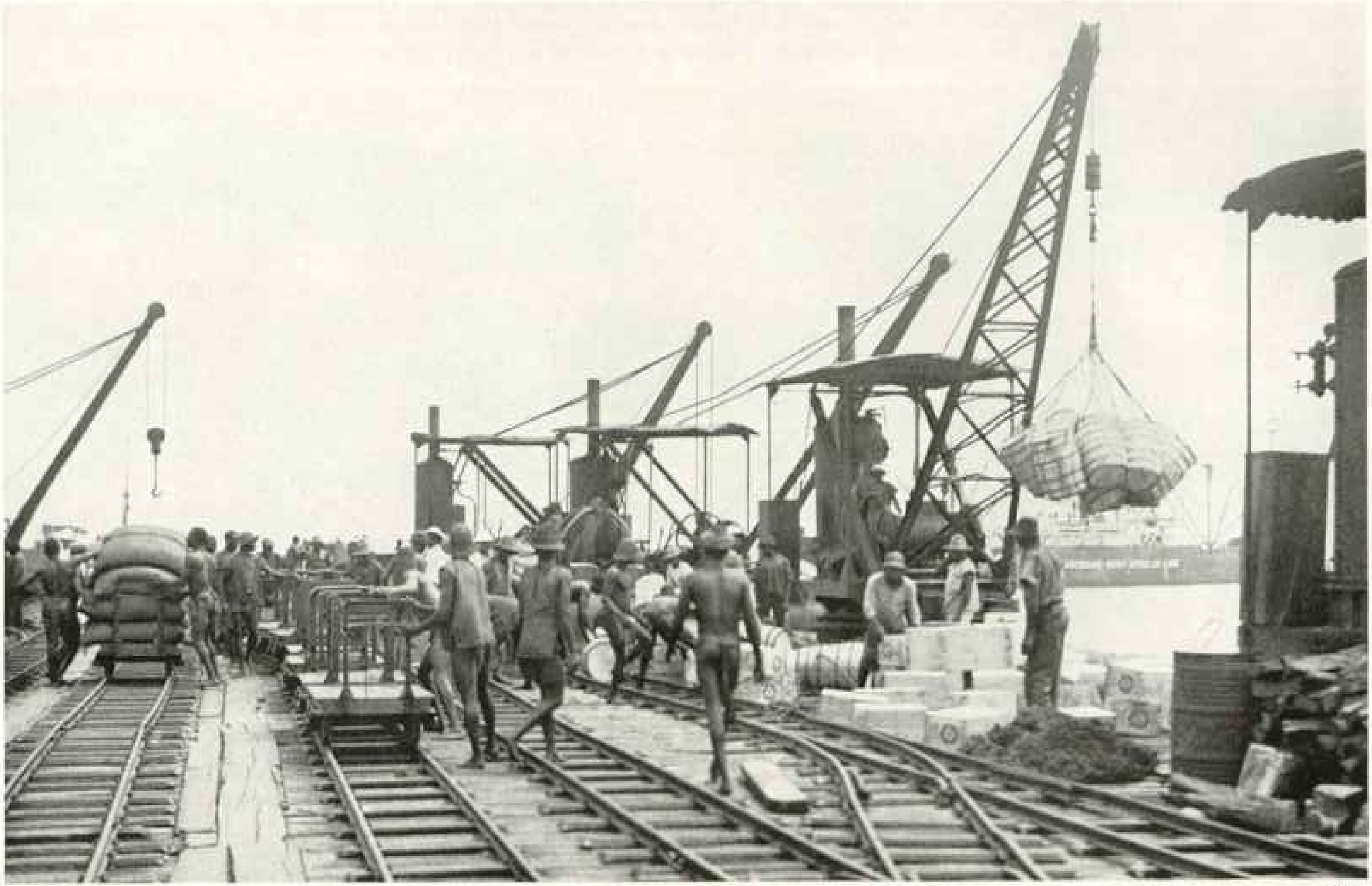
**In the Dakar Abattoir Moors Do the Slaughtering**

Mohammedans will eat no meat unless the animal has been killed by throat cutting. Butcher stock, mostly sheep, comes to the market from long distances, since there is no pasturage near the city. In case of siege lack of foodstuffs would cause serious difficulty. Curtailment of steamer traffic has already brought hardship.

Field Museum of Natural History

**Every Day Is Market Day in Bamako, Capital of the French Sudan, Where Hundreds of Natives Assemble for Barter**

The African tribesman drives a close bargain, and there would be no joy if the transactions were completed quickly and without long arguments. Lying in the *sahel*, an intermediate zone between the desert and the agricultural region, this city is insufferably hot, temperatures rising to 125 degrees preceding the rains.



Amax

**Cargo Lightered from an American Ship Is Unloaded by Natives at Port Bouet**

Handcar tracks of the same gauge as the railroad permit bringing freight cars onto the pier at this important shipping center of the Ivory Coast, so named because it is elephant country. For many years tusk hunters reaped rich profits here, and shooting for sport continues to some extent (page 406).

U. S. Bur. Photgs. Stokes Field

**Natives Come to Freetown Market in Sailboats; Sometimes Sudden Storms Blow Them Far Out to Sea**

Passing steamers have picked up survivors as far as 50 miles offshore. On small garden patches across the bay they grow fruits and vegetables which find ready sale in the city. They load their precarious craft with these foodstuffs and head out into the broad harbor, hoping for fair weather.

L. A. Ray-Phelps-Stokes Fund

**Their Produce Exchanged for Store Goods, Natives Set Sail from Freetown for Home Across the Bay**

The house on the promontory is an English trading company establishment. In such buildings managers and assistants live in the upper rooms and conduct business on the lower floor. Mosquitoes fly low in West Africa, and for that reason white residents have their quarters as high above ground as possible (page 378).



**Streets of Freetown Ring with Martial Music**

Since war came, this port of Sierra Leone has been an armed camp. Rhythm is natural to the African native, and the fife and drum corps swings along to a sprightly beat. The non-commissioned officer at right wears shoes, but his fellow negroes march barefoot.

Ewing Galloway

**To the Market on the Freetown Waterfront Flock Small Boats Laden with Garden Truck**

Descended from many intermingled negro tribes, the people have become a distinct type known as Sierra Leoneans. Their language is pidgin English and they are nominally Christian. Sierra Leone consists of a British colony, along the coast, and a British protectorate extending inland about 180 miles.

the regular plane. A second plane, a little four-passenger Goeland, had to be sent on his account and there was room in it for me.

The inadequate airplane service in French West Africa was due almost entirely to the lack of gasoline. Except between Dakar and Bamako, there was no airplane service where railroads were available. The use of gasoline by cars and trucks was severely restricted.

In Dakar the normal ration of gasoline to a car was five litres (about 1¼ gallons) *a month*. Only doctors and business men who must carry on business which the Government considered essential were allowed more.

No cars were permitted to run after 8 o'clock in the evening or on Sundays in Dakar, and in Bamako none except two official automobiles could circulate. Even the trucks for collecting waste had been replaced by animal-drawn carts (page 375).

No one was allowed to drive outside any city limits without a special permit granted for trips of the greatest importance, and even the holder of such a permit could not go unless he took a carload of persons with him.

### Cars Run with Charcoal Gas

The blockade by the British necessitated moving more goods overland in spite of the lack of gasoline. Consequently, many trucks were equipped with gazogenes, charcoal burners which produce a gas to run the motor. This device is not very efficient, but it does enable trucks to move over the roads.

These roads at best were in no way comparable to those in the United States. Serious effort was being made before the war to build well-planned and well-constructed trunk highways.

Road-building machinery was employed, most of it powered with gas motors and most of it from the United States. Now, however, the road-building machinery stands idle. Much of it could not be utilized even if gasoline were plentiful, for the wearing parts of the scrapers, rollers, tractors, etc., have been worn out, and repair parts cannot be had to replace them.

The effort to keep the roads in condition by the use of hand labor has not been successful. One trip of a four- or five-ton truck over a road at even moderate speed can rip out surface packed by many hours of toil.

On my return from Abidjan to Dakar, I was obliged to drive from Bobo Dioulasso to Bamako.

I made this trip in a 1939 model Chevrolet sedan—a big, high-powered car for that part of the world—and took with me a Frenchman and his wife and a native chauffeur. Though I drove as rapidly as the road would permit, it took twelve hours actual driving time to cover a 225-mile stretch.

When I left Bobo Dioulasso for Abidjan, my friends reserved a compartment for me in the *train-avion*, so called because it connected with the airplane from Bamako. The plane arrived at 3 P. M. and the train left at 3:30 P. M.—the following day! Each made one trip a week.

In peacetime the better passenger trains had been powered with Diesel-motored engines which were faster than any of the steam-powered locomotives. Diesel oil, however, had become as scarce in French West Africa as gasoline, and except between Dakar and St. Louis, no Diesel units were operating.

Steam locomotives in use on the French West African railroads had been designed to burn coal, which, as I have already pointed out (page 391), was both scarce and poor. Consequently, locomotives were now crawling along, burning wood under their boilers.

The trip to Abidjan from Bobo Dioulasso, about 500 miles, required 21 hours. Because of the danger of sparks from the engine, native boys rode on each platform and frequently climbed up to look for incipient fires on the roofs of the cars.

They soon spotted a lively blaze on the coach in which I was riding.

### A Train Boy Spits Out a Fire

Immediately the train was stopped and several pails of water brought back from the tender were poured on the flames. This checked the fire but did not put it out entirely, for it had taken hold under the roof and above the ceiling of the car.

From a pail one of the boys took a draught of water that puffed out his cheeks. He stooped, drew a bead on the smoldering wood, and with the skill of a champion tobacco spitter sent a fine stream of water between his teeth to the points where it was most needed.

The fire thus extinguished, the train proceeded; but the man who had the compartment next to mine had more ventilation that night than he had expected. Numerous patches in the ceiling bore witness to previous accidents of the same sort.

On the return trip from Abidjan to Bobo Dioulasso, I had to travel by a mixed passenger and freight train which took 33 hours to cover the 500 miles.

My reservation, which was defined as a *location de luxe*, was a little iron army cot placed with four others in what had been a dining car. The cots were separated by cur-

© Kurt Lubinski

**Freetown Native Soldiers Fancy Rolled Puttees but March Barefoot**

Well drilled by British officers, the regiment makes a smart appearance as it marches through the streets of the principal port of Sierra Leone. British prize crews bring captured ships to this city (page 408).

tains of light material which provided the minimum of privacy.

No chairs or tables were available, and no provision was made for either food or drinking water en route except at stations. Washing facilities were limited to a 10-inch bowl, half of it set into the wall of the toilet room and fed by a trickle from a tiny faucet.

Fortunately, my traveling companion, who had lived in the colony for a long time, had brought along a large thermos jug of ice, some bottled water and wine, and a specially fitted suitcase filled with the best food obtainable in Abidjan.

The trip, though made shortly after the hot season had begun, was not unduly uncomfortable. As the train moved from the tropical forest belt in which Abidjan is located through the tsetse fly region to the semi-desert country around Bobo Dioulasso, I lounged on my cot and enjoyed the scenery.

Just as my companion and I had begun our evening meal on the second day, the lights of the car suddenly went out. The "boy" who acted as porter could not find another fuse, and the batteries of my pocket flashlight were about exhausted.

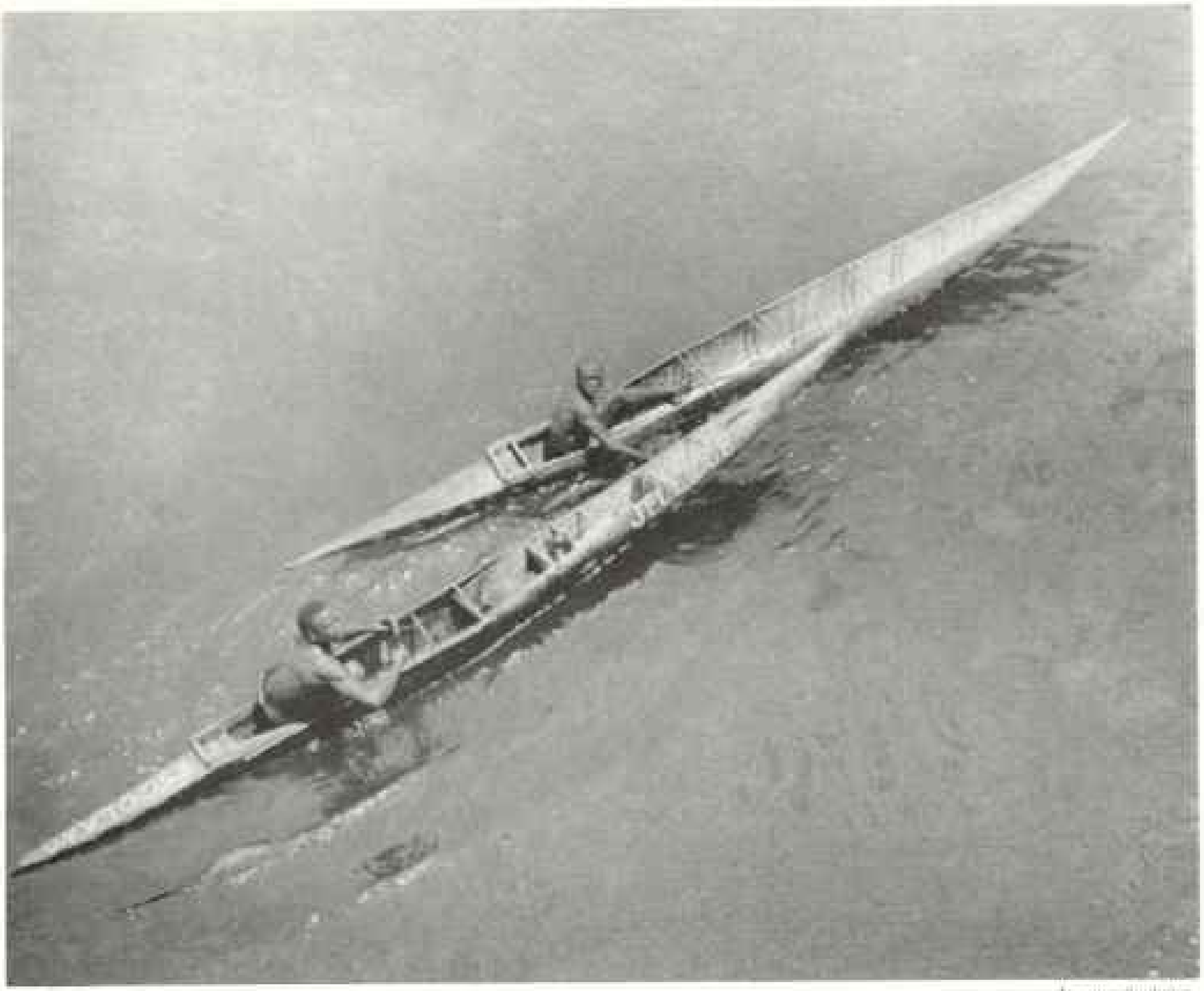
At the next station I "borrowed" a kerosene lantern. This gave us light to finish eating, but we had to surrender it a few stops later to a determined station agent who had been notified by telegraph of its disappearance.

### Abidjan, Ivory Coast, a Modern City

Most of Abidjan, the capital of the Ivory Coast colony, was constructed in a few years preceding the outbreak of the war. With few exceptions, therefore, the houses, offices, warehouses, and government buildings are modern, built of concrete, and, on the whole, adapted to the climate.

The most noticeable feature in view of the locality is the scarcity of roofed porches.

Abidjan has a small but good hotel, one of the few acceptable hostelries in West Africa, and an interestingly arranged motion-picture house. In the theater the regular seats are separated from the screen by an open space where on occasion additional chairs may be placed. There is a roofed balcony which extends over the lower seats so that perform-



Jacques Boulerice

**In Sliverlike Pirogues Freetown Fruit Sellers Paddle Out to Visit Ships**

These Sierra Leone natives are as adept with their slender craft as Eskimos with kayaks. They make a comfortable living from garden truck which they grow in small patches.

ances can go on during the rainy season.

The concrete structure is open on all sides for ventilation.

The French plan to make Abidjan the principal port of the Ivory Coast. It is located on a lagoon, cut off from the sea by a strip of sand. Before the war started, work had been begun on cutting a canal through this sand, but the project has been held up because of lack of gasoline for power and of repair parts for the excavating machinery.

For the present, Port Bouet, a village on the outer edge of the sand strip, is used for what little traffic remains. A pier carrying railroad tracks has been built out into the sea for several hundred yards, far enough so that lighters can be loaded and unloaded conveniently except in rough weather, but the water is not deep enough to allow ocean-going vessels to come alongside.

The port, therefore, is just another of the open roadsteads which are the usual African ports, although it is better equipped than many.

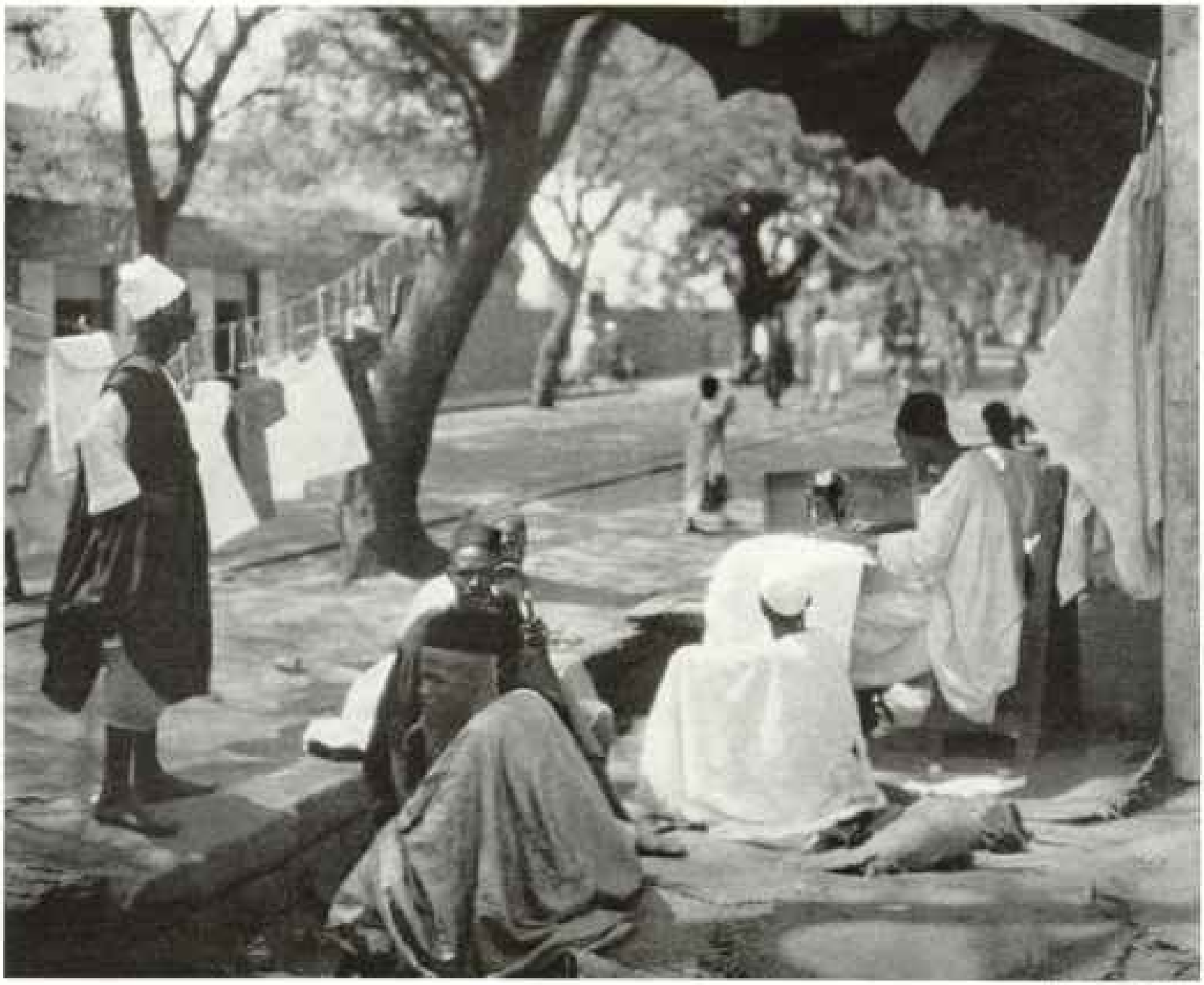
On my return from Abidjan, I sojourned several days at the capital of the French Sudan, Bamako, located on the Niger at the Sotuba Rapids. In the rainy season small steamboats can come up as far as this city, but in the dry season only native boats can reach it (page 398).

Bamako is in that geographic region known as the *sahel*, an intermediate zone between the desert and the area where varied agriculture can be carried on.

In the dry season the surrounding country is practically a desert; therefore a person normally must drink at such times several quarts of water a day.

In the hot period, which immediately precedes the rains, shade temperatures at midday often rise to 115, 120, 125 degrees, and sometimes more.

Some residents seek relief at night by standing in the shower bath clad in pajamas before going to bed. By the time they get to sleep, the pajamas and the sheet are com-



Robert B. Fiehey

**Bamako Street Tailors Wait near Piece Goods Stores to Make Dresses for Natives**

Equipped with portable sewing machines, most of them of American make, they are ready to do plain or fancy work—even intricate embroidery (page 385).

pletely dry. They repeat the process whenever they are awakened.

The French have hopes that by irrigation the Sudan can be made to produce large quantities of cotton. They expect, in this way, to make themselves largely independent of cotton from the United States. A beginning has been made on this irrigation by the construction of a large dam at Sansanding, 160 miles down the Niger from Bamako.

Although the railroad from Dakar to Bamako has been driven forward to Koulikoro, Bamako is its real eastern terminus. The regular passenger trains take 33 hours to make the trip of approximately 700 miles between these two cities.

### Kaolack a Peanut Port

On the Saloum River in Sénégal about 50 miles from the sea is Kaolack, the center of the peanut-growing area, where ships come to load peanuts for transportation to France. In peacetime most of the ships engaged in this trade are also employed to bring out lumber from the Baltic region. They haul lumber in summer and peanuts in winter.

So shallow and tortuous is the Saloum that it is difficult and frequently impossible to navigate at night in spite of recent efforts to have it adequately buoyed.

Even small ships of 4,000 to 5,000 tons do not try to take out a full cargo from Kaolack, but load to the limit of their draft for navigation in the Saloum and then go to Dakar for the rest.

In recent years port facilities at Kaolack have been improved by dredging and by the construction of docks. Huge piles of loose peanuts awaiting shipment are heaped up out of doors and prevented from spreading over too great an area by walls of bagged peanuts (pages 382 and 387).

To reduce transportation costs, exporters are shelling more and more of the peanuts before shipment, though the shelling increases the rate of deterioration in transit.

The other city in Sénégal which merits mention is St. Louis, its oldest French settlement and the capital of the colony. Dakar, the seat of the government of all French West Africa, is set off from the remainder of Sénégal in a separate organization on the same general plan as Washington in the District of Columbia.

St. Louis is located at the mouth of the Sénégal River, the old part of the city being on an island in the river. Because of the sand bar piled up by the combined action of the sea and the river current, boats of more than three feet draft are unable to come in the ocean side (page 392), and many products brought down by boat on the Sénégal River must be shipped to Dakar by rail for export.

Since Dakar was founded, St. Louis has lost much of its commercial importance, though it enjoys a climate perhaps a little better than that at Dakar and maintains an excellent school patronized by many residents who cannot send their children to France to be educated. The architecture of many of the houses is faintly reminiscent of southern France. Others are of a style like that found in Caribbean countries, with patios and overhanging balconies.

Because of the climate, St. Louis is able to grow oranges and other fruits which cannot be raised in or around Dakar.

The Government has established a large experimental garden there in which efforts are being made to develop plants and fruits which may be grown in quantity to help feed the rest of Sénégal.

### Mauritania Is an Orphan Country

The Sénégal River separates the Colony of Sénégal from that of Mauritania. Because the latter is one of the most sparsely settled regions of French West Africa and possesses no town of importance, its government is located in St. Louis.

The Mauritanians are a peculiar people, almost as dark as the negroes but with decidedly different physical characteristics. Generally shorter than most negroes of West Africa, they are of slender build and small boned, with aquiline noses and long faces. They are said to be the descendants of Semitic tribes which, centuries ago, wandered into Africa from Asia Minor and mingled with the negroes (pages 370 and 393).

Because of the curious formation of the mouth of the Sénégal River, it is necessary to cross into Mauritania from St. Louis if one wants to reach the sea at that point. On that tongue of land the big native market of St. Louis has been erected. From an economic standpoint, it is a part of St. Louis, although from a governmental viewpoint it belongs to another territory.

Before beginning my trip to the Ivory Coast, I had made application in regular form for a transit visa for Morocco, for it was my intention to return home by way of Casablanca, Tangier, and Lisbon. I found on my return that no reply had been received and that no immediate means of transportation were available. I had to wait three weeks for the visa and transportation, and the visa was obtained then only by a personal request by the Governor General.

After saying good-by to the friends who had done so much to make my seven weeks in Dakar pleasant and happy, I went aboard a 15,000-ton French ship which, though loaded with a full cargo of peanuts, carried 560 passengers for Casablanca. I looked forward to reaching Lisbon within ten days.

### Captured by a British Warship

However, I reckoned without thought of war conditions. On the morning of the second day I was astonished to see the sleek lines of another ship a few hundred yards off the starboard beam of our ship and to hear from the loud-speaker mounted on its bridge the command in English, "Let my men on board or I'll open fire on you." We were being captured by a British auxiliary cruiser.

I made a hasty toilet and reached the deck before the first boatload of British officers and ratings came on board. They were soon followed by two other boatloads, together with machine guns, ammunition, and food. Soon we were steaming in a general westerly direction with a prize crew of eight officers and 40 men on board.

The auxiliary cruiser escorted us on a course which took us out around the Cape Verde Islands and at the end of a week brought us to Freetown in Sierra Leone (pages 400-403, 405, 406).

To me fell the duty of being interpreter between the British officers and the French passengers. Several of the French officers could speak English, but they declined to cooperate with the British officers.

I received every courtesy at the hands of the British while I was with them. Soon after our arrival at Freetown, I was taken off the ship, the only passenger permitted to leave, and given the freedom of the town. Because of my business connections, I was invited to stay with the manager of one of the principal commercial houses.

At the end of ten days, I obtained passage on a Portuguese ship which landed me in Lisbon ten days later.

# NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

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## ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-four years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

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

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

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

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

# Return of the Carbon Age

CARBON . . . one of Nature's oldest and most plentiful materials . . . is making possible some of industry's newest achievements.

In the *chemical* industry, massive black towers of carbon . . . erected in incredibly short periods of time . . . speed the delivery of vital acids. The all-carbon electrostatic precipitator . . . built of carbon from the bottom to the top of the stack . . . is now an actuality. Such towers can be erected in as little as *a week's time!* Staunchly immune to corrosion and thermal shock, they should last *indefinitely.*

Today . . . due to basic and applied research into the properties of carbon and graphite . . . it is possible to obtain these black, wonder-working materials in such a variety of forms—blocks, bricks, beams, tubes, pipes, and fittings . . . even valves and pumps . . . that almost any size or shape of structure can be built from them. For making tight joints, which give the structure uniform properties throughout, special carbon- and graphite-base cements have been developed.

Undisturbed by the torture of heat, carbon is also a "must" in the *metallurgical* industry. Carbon *cannot be melted* . . . will not soften . . . and has remarkable dimensional stability even at incandescent heat. In addition, it will not flake off and hot metal will not stick to it. That is why it is ideal for such uses as molds, cores, and plugs . . . for the lining of furnaces . . . and for sampling-dippers.

Because electric-furnace graphite conducts heat *even better than most metals,* it is becoming increasingly important in the manufacture of heat exchangers for the processing of corrosive liquids and gases.

These new uses for carbon and graphite . . . added to the almost interminable list of uses that existed before . . . make this era truly a carbon age. Your inquiries are cordially invited.

*The strides made in the development of structural carbon, and in the uses of other carbon and graphite products, are greatly facilitated by the technical assistance of other Units of Union Carbide and Carbon Corporation including: The Linde Air Products Company, Carbide and Carbon Chemicals Corporation, Electro Metallurgical Company, Haynes Stellite Company, and Union Carbide and Carbon Research Laboratories, Inc.—all of which collaborate with National Carbon Company in research into the properties and applications of carbon and graphite.*

**NATIONAL CARBON COMPANY, INC.**

*Unit of Union Carbide and Carbon Corporation*

30 East 42nd Street New York, N. Y.

*Unit all-carbon electrostatic precipitator erected atop 60-foot, 9-million-brick stack*

# Two people sleep when one goes Pullman

DICK HILL'S lighted Pullman speeds swiftly through the night.

Snow whispers at the windows, tugs at the vestibules, swirls and eddies in the glow of the lights—silently mounts in feathery drifts over a hushed landscape.

In the warm cheer of the Lounge car, Dick Hill puts out his cigarette. He closes his book, says good night to the couple across the aisle, strolls slowly through the train to his berth. Toilet kit and dressing gown in hand, he enters the spacious dressing room—scrubs up for the night with piping-hot water and plenty of clean, white towels.

He says good night to the smiling porter and goes to his berth—hangs up his clothes, fastens his curtains, turns in between crispy-clean sheets in a bed as soft as his own at home.

A last, lingering look at the rush of snow past the window—a flick of the switch on the reading lights, a satisfying punch at the two fluffy pillows—then the last, shivery little snuggle before warm, dreamless sleep. Dick Hill *likes* Pullman travel. Tomorrow morning he'll be where he *expects* to be.

*But he's not the only one who's sleeping because of that snug, cozy Pullman berth.*

• • •

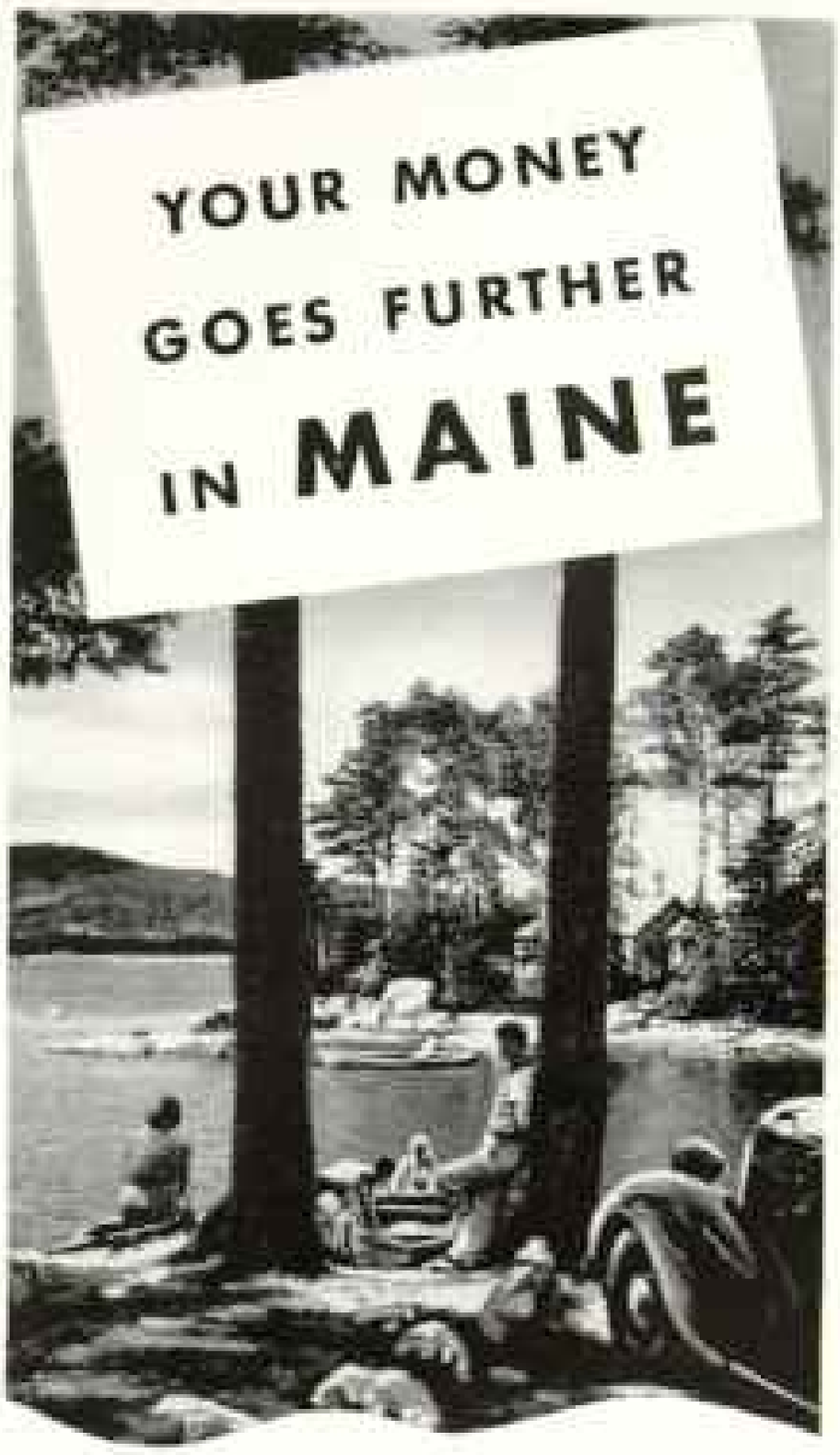
A hundred miles away, Dick Hill's wife puts away her knitting, shuts Spot in the kitchen, opens the front door and looks out.

The snow is deeper, here—falling faster, from a sky that looks black and angry. A car inches its way along the street, plowing white furrows with its wheels.

Dick Hill's wife smiles a little—puts out the porch light, locks the door, tiptoes upstairs. She looks in on the children, undresses and goes to bed. Ten minutes later, she's fast asleep—with the same drowsy little smile playing around her lips.

*Dick's snug and safe in a Pullman—all's well!*

## For comfort, safety and dependability - *GO PULLMAN*




This year, of all years, make the most of vacation. Refresh your mind and body with a trip to Maine. Any vacation budget goes further in Maine. Spend what you like. But the beauty of Maine is free. The variety of Maine pleasures is built into the state.

Rocky seacoast and sandy beaches are yours to enjoy. There are mountains. And lakes. Everywhere there's the hospitality of Maine. The famous Maine food. The comfortable tourist places. The well-known hotels.

Hike. Ride. Camp. Play tennis and golf. Swim, fish and sail in salt water or fresh. You get more for your money in Maine! The free picture-book helps you plan. Mail the coupon.

**HAVE THE TIME OF YOUR LIFE IN MAINE!**

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Tourist Service, 11 St. John Street
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FREE BOOKLET

Please send me the new illustrated Maine Official Vacation Guide for 1942.

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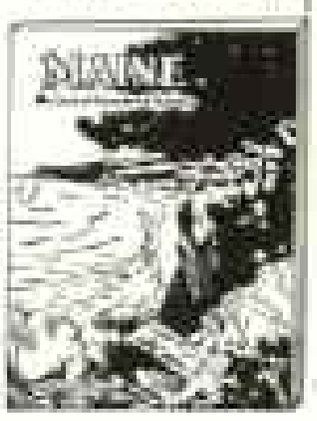


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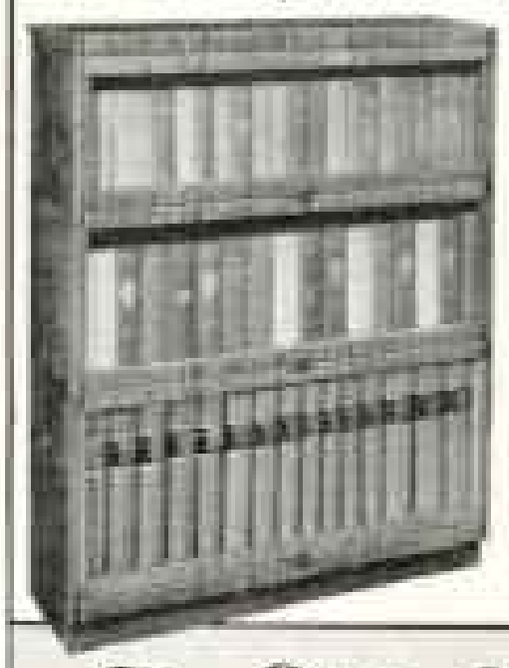

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# FALSE TEETH

## Played "hob" with Daniel Dobb—
## But this is how he saved his job

*From door to door trudged Daniel Dobb,*
*His sample case in hand;*

*Yet all day long he made no sales,*
*No orders could he land.*

*Alas! his dingy, foul*
false teeth
*Were more than folks*
*could stand.*

A dentist said: "Try POLIDENT,
The *modern* thing to do.

"Although *you neither rub nor scrub*
Your teeth will 'look like new';

"It brightens smiles; checks Denture Breath;
Is inexpensive too."


Dobb did! And now his order file
Is simply overflowing;

His pay-checks, too, are lush and fat;
His bank account is growing;

The *lesson?* POLIDENT can keep
*Your* plates clean, sweet and glowing!

**CLEAN PLATES, BRIDGES WITH**

# POLIDENT

**ALL DRUG STORES, ONLY 30¢**

# Serene AND Peaceful

THESE MAJESTIC MOUNTAINS INVITE YOU TO PERFECT RELAXATION AND RECREATION

COME and relax in the Great Smoky Mountains, serene and peaceful in a world filled with strife . . . the nation's most popular National Park—visited by more than a million people in 1941. The sheer beauty and grandeur of North Carolina mountains, plus their proximity to teeming cities where tens of millions of people live and work under a tension which must be broken from time to time, makes them tops as a vacationland. North Carolina is truly a land of Amazing Variety! From seashore to mountain tops there is something out-of-the-ordinary to see and do . . . historic, Old South plantation homes, Revolutionary War Shrines, Kitty Hawk—where aviation began, the birthplace of Virginia Dare, brilliant flowers growing wild in fields and forests, golf links by the scores, many of them world famous, horseback riding trails, fishing of all varieties . . . all seemingly designed to relax and renew tired bodies and minds. Come to North Carolina for a day or two, for a week, for as long as you can stay . . . you will go back home refreshed and better fitted to do your part to preserve America's way of life. Mail coupon for official booklet, "Variety Vacationland."

**NORTH CAROLINA**

Governor's Hospitality Committee,
Dept. of Conservation and Development,
Raleigh, North Carolina

Gentlemen: Please send me official booklet,
"NORTH CAROLINA, VARIETY VACATIONLAND"

Name _____

Address _____

*It's Summertime*

# in SAN·DIEGO

THIS month, this week, today, the sun is friendly, the air is soft, flowers are everywhere, birds sing early . . . living is living. Nature forgets the rest of the Country, this time of year, and comes out here to play with us. So why don't you!

The trip takes but little time and little money, nowadays. And the good it will do you is more than ever to be desired. You know that's true, don't you . . . so come!

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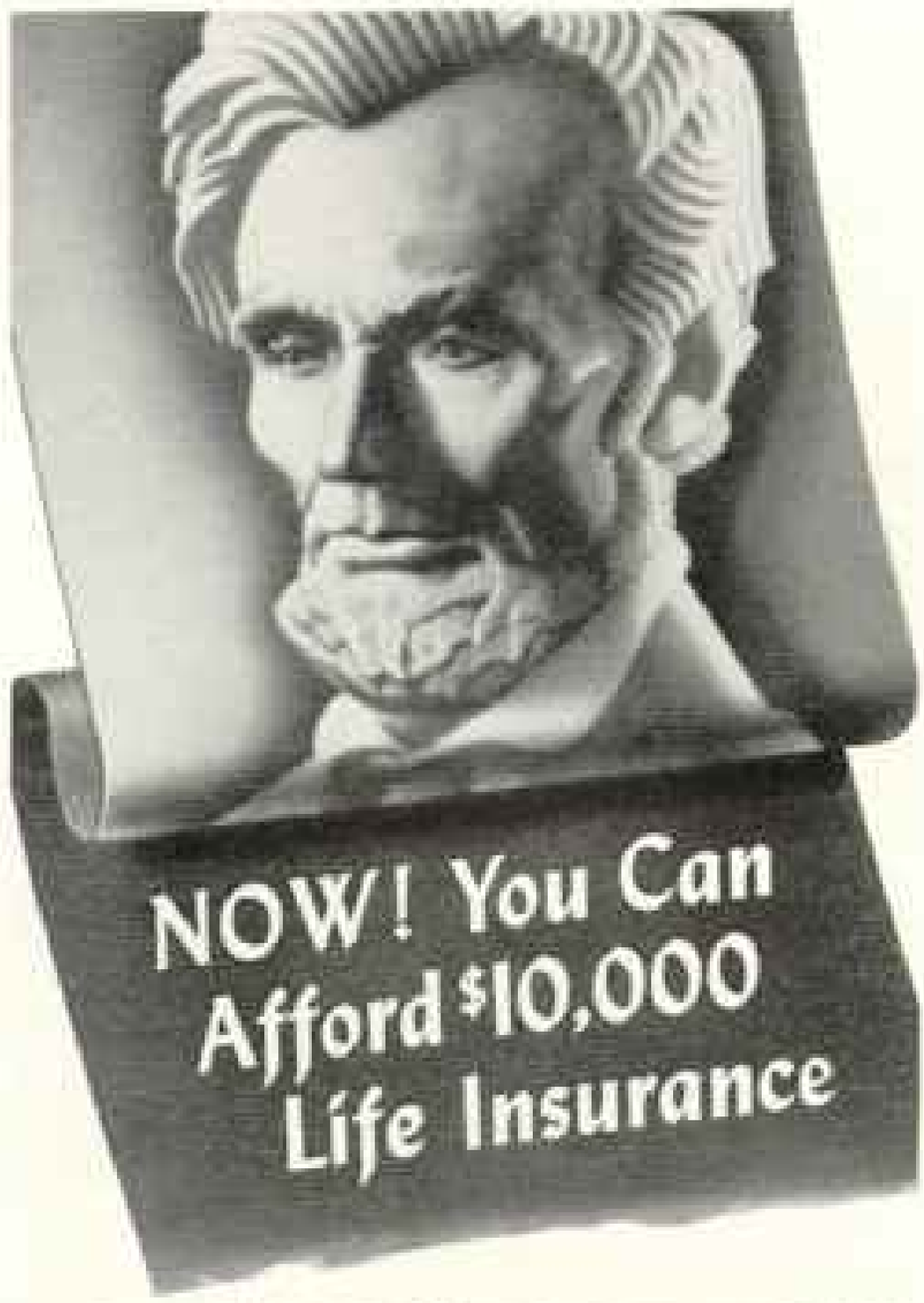


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| 20 | $ .90 |
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| 30 | 1.12 |
| 35 | 1.28 |
| 40 | 1.54 |
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AT AGE 35 a $10,000 policy costs you only $12.80 per month and will, should you die during the expectancy period, pay your beneficiary $10,000 or a monthly income for life. This low-cost policy cannot be issued in amounts less than $2,500. Write for full details, stating date of birth. Use coupon below.

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Please send me full details about your Low Cost Plan, which provides ample protection at low cost.

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A superlative shave soap, compounded for swift, free-lathering action. An after-shave lotion that leaves the face tingling and refreshed. A talcum that soothes and cools the skin. These are the three Old Spice shave requisites that *make good shaves perfect!* All bracingly scented with Old Spice and packaged in pottery containers decorated with authentic reproductions of historic trading ships. Early American Old Spice Shave Requisites may be purchased individually . . . or in combination gift sets from $1.75 to $5.00

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*Average Weight 6½ to 11 pounds—Price 95 cents a pound*

**FREE** *if you enclose check with your order we will send with each ham a FREE sample of genuine Jordan's Virginia Bacon.*

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Please send me prepaid
Jordan's Virginia Ham. Size about _____ lbs.
Enclosed check for $_____. Send C. O. D. ☐

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Transportation charges prepaid east of Rocky Mountains. For shipments west of Rockies add 5c per pound.


# How well do you feed your family?

**MERE *QUANTITY* OF FOOD** does not guarantee good nutrition. "Plenty to eat" does *not* always mean "well fed."

A proper diet requires a daily balance of the foods which *supply energy*, the foods which *build and repair*, and the foods which *protect and regulate*.

Such foods cost no more. Yet they will help you maintain the good health that keeps you on the job. A balanced diet may also help ward off the diseases which usually become more prevalent in times of great stress and strain.

Nutrition experts have prepared simple guides to help you select the right foods. One of these is illustrated above. If you will follow it, your meals will provide the elements of a good diet. You need not concern yourself with such technicalities as carbohydrates, proteins, vitamins, and minerals.

Here are some suggestions for making the family food-dollar go further, do more:

1. ***Foods in season*** are usually cheaper; buying in larger quantities more economical.

2. ***The cheaper cuts*** of meat supply the same food value as the fancier ones.

3. ***Dried fruits*** may be used in place of fresh when these are out of season, but should be supplemented with citrus or tomato juice. Canned foods supply virtually the same food values as fresh.

4. ***Cook vegetables only until tender*** in as small a quantity of water as practical. This saves fuel, preserves vitamins and minerals. Use the water, and the juices from canned vegetables in soups and stews. They contain vitamins and minerals. Do not add baking soda to vegetables—it destroys vitamins. *Use some vegetables raw.*

5. ***Milk***, fresh, canned, dried, or in the form of cheese, is one of the most important food buys you can make. It is the best source of calcium.

For more information about planning nourishing, economical meals, send for Metropolitan's free booklet, 32-N, "The Family Food Supply."



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# The Bird with the Wobbly Landing Gear

Pity the poor Man-o'-War bird . . . his landing gear isn't worth a plugged nickel. And any aviator will tell you that landing gear is as important to taking off as landing.

Because the Man-o'-War bird has such weak ankles and toes, he would be practically helpless if he landed on the water or a flat stretch of land. In fact, authorities refer to his impotent extremities as vestigial. About the only way the Man-o'-War bird can take off is by leaping from a high cliff or a branch at the top of a tree.

But before you start feeling too sorry for this bird, you might notice how nature has compensated for all the disadvantages he has to put up with. She has made him the world's champion soarer! Yes, the Man-o'-War bird can stay up in the air longer, and with less effort, than any other bird in existence. Some authorities even suspect he goes to sleep up there.

The phenomenon of Nature providing compensating advantages for birds and animals is a common one. In the case of man, however, Nature apparently felt that he could rely on his own brains and ingenuity. So, for the most part, we must supply our own compensations.

Of course, none of us can avoid our share of the accidents and misfortunes of life any more than the Man-o'-War bird could avoid the disadvantages Nature has given him. But through insurance, properly written by a wise agent, we have found compensation for the misfortunes that we may have to suffer.

No man can afford to be without the security of insurance. None of us are so lucky that we can take our chances without it. Why not talk to a Travelers Insurance Agent and find out if you're getting the fullest possible protection from this man-made buffer against insecurity?

Moral: Insure in The Travelers. All forms of insurance. The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, Hartford, Connecticut.

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*Lifetime* Feathertouch
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*All *Lifetime* pens are unconditionally guaranteed for the life of the owner except against loss and willful damage—when serviced, if complete pen is returned, subject only to insurance, postage, handling charge—35c.

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"TO PROVIDE FOR THE COMMON DEFENSE, TO PROMOTE THE GENERAL WELFARE"

# Reykjavik off the port bow!

TONIGHT, somewhere at sea, a man stands on the bridge of a freighter with the life line of a nation in his hands.

He is straining his eyes for sight of one of those islands which are our country's first line of defense. To these islands must be transported huge quantities of munitions and food. And the only answer is ships, ships, and more ships.

How is America meeting this tremendous responsibility? You'll get a fair idea at such great factories as the Westinghouse plant where the machinery to drive many of those supply ships is being built, or at the huge Westinghouse-operated Maritime Commission plant which is now being erected alongside it.

### The "know how" that works 24 hours a day

There, in these factories, is a dramatic example of how Westinghouse "know how" is doing a job for National Defense.

What is this "know how"? It is the ability to get things done in the best possible way—learned in building products for the general welfare and now used in building materials for the common defense.

The same skill and ingenuity that are building those turbines for the merchant fleet, not long ago built more efficient electric refrigerators and washing machines.

At 17 Westinghouse Divisions, and in the plants of more than 300 sub-contractors, our energies are almost exclusively concentrated on the creation of $400,000,000 worth of defense materials. It's our way of speeding the day when our "know how" will be serving you again—in the home, the farm, and the factory.

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|---|---|
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| | | |
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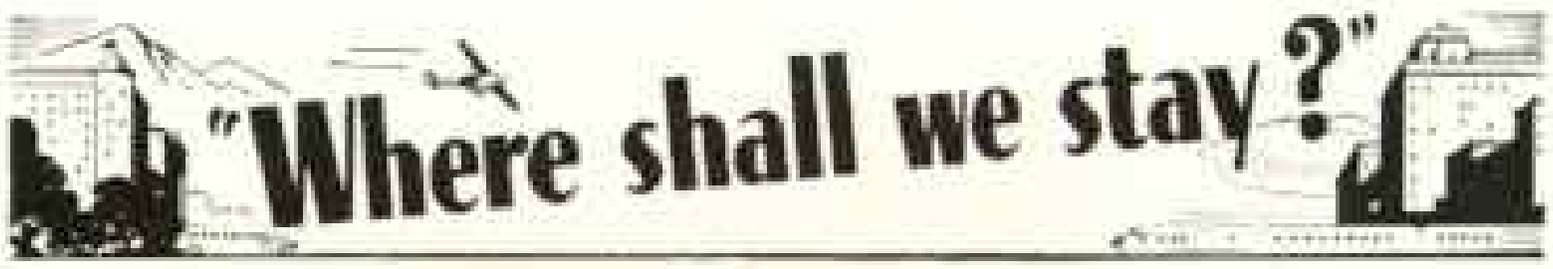
*These lists mention only some of the many thousands of Westinghouse products.*

**Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.**

Dept. 1-N, Westinghouse Electric & Manufacturing Co.

"Mention the Geographic—It identifies you."




NATIONAL GEOGRAPHIC MAGAZINE'S HOTEL SECTION

## ARIZONA

### Phoenix

**The Arizona Biltmore**—In the Desert—Unique and beautiful. Golf, swim, ride, shoot, sunbathe. Music and dancing. Mild, even climate. Sun. Rest. Fun.

**Hotel Westward Ho.** Premier Hotel of the Southwest, in world-famous Valley of the Sun. Midtown with desert resort atmosphere. Air-C. Plans. Bklt.

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## DISTRICT OF COLUMBIA

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**The Dodge Hotel.** On Capitol Hill opposite Union Station Plaza. Renovated entire. No tipping. Single from $2.50, double from $4.00. H. B. Williams, Mgr.

**Hay-Adams House.** 16th at H. Opposite the White House. Completely air-conditioned. Single room with bath from $5.50. Double from $6.00.

**Wardman Park Hotel.** Washington's Largest. 1000 outside rooms. Ample parking. Avoid traffic to all highways. Write for maps. Rates from $3.50.

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**The Belmar**—Ocean front at 20th Street. Private beach—wholesome environment—complete restrictions. Write Bruno Weil, Gen. Mgr., for details.

**The Pancoast.** Beautiful, exclusive ocean front world of entertainment. Ideal for Spring vacations. Restricted. Arthur Pancoast, Pres., Norman Pancoast, Mgr.

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**The Belvedere.** A fine hotel, justly celebrated for its spacious, modern rooms, famous cuisine, and superb service. Ideally located. $3.50 up.

**Lord Baltimore.** Every modern facility. 700 rooms with radio, bath and shower. Famed Maryland cuisine. Faultless service. Centrally located.

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**Marlborough-Blenheim.** For relaxation—just what you need now more than ever. Booklet on request.—Josiah White & Sons Co.

## NEW YORK

### Albany

**The Wellington**—Albany's "Garage-In" Hotel. Known for its unusual "Double-Service." Convenient, Fine Food. 400 Rooms. Rates from $2.25.

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