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TWENTY-FOUR PAGES OF ILLUSTRATIONS IN FULL COLOR

Changing Berlin

With 30 Illustrations

DOUGLAS CHANDLER

Life and Luster of Berlin

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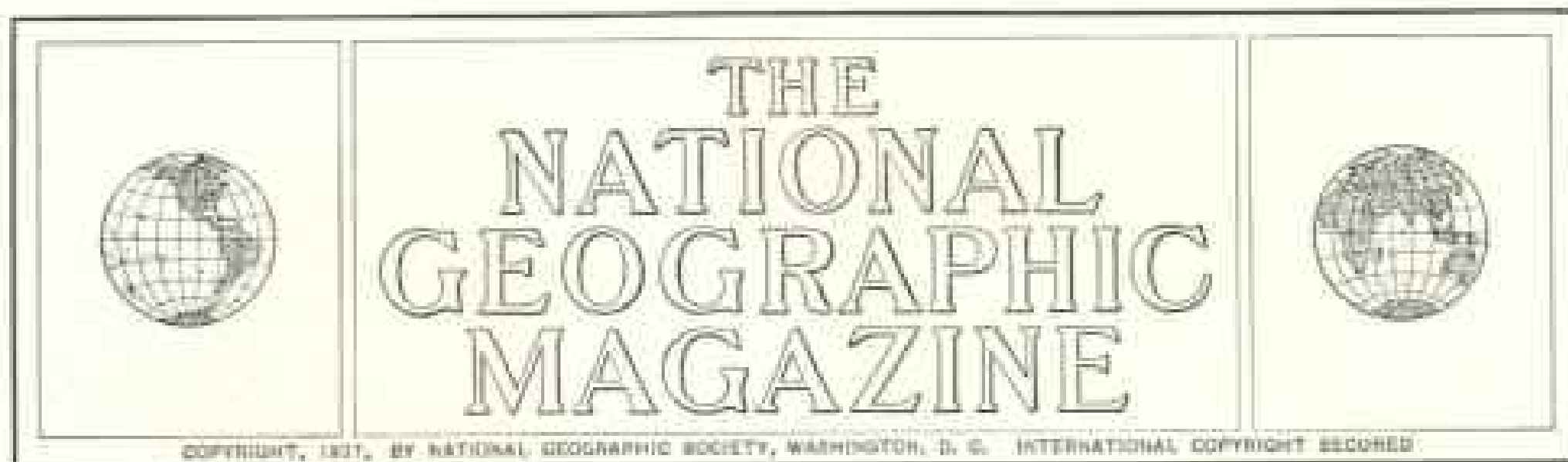
With 15 Illustrations

GRETCHEN SCHWINN

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## CHANGING BERLIN

BY DOUGLAS CHANDLER

“LOOK quickly, down there to the left of our course. That little cupola-topped button is the tower of the Wittenberg Castle Church.”

Downward I peered from the window of the plane as directed by my elderly fellow-traveler. There, pricking out from the clustering buildings like a tiny object seen through a microscope, was the church on the door of which Luther tacked his theses on that fateful 31st of October, 1517.

Wittenberg lies not more than twenty minutes before Berlin as one approaches the city from the south by airplane.

Presently thereafter, the flat, partly wooded plain is broken up by a succession of waterways stretching out in a curved, continuing sequence. On a sandy level in the midst of this maze is sprawled the world's sixth largest city from the standpoint of area covered. Only Rome, London, Rio de Janeiro, Los Angeles, and Brisbane, Australia (in the order named), surpass it in extent (Plate XIV).\*

The air route is the ideal approach to Berlin. By no other means can the mind grasp the vastness of the city's spread.

Our plane, a two-motored Douglas of the Swiss Air Lines—less than four hours out of Zürich, with stops at Stuttgart and Halle-Leipzig Airport—purred without perceptible vibration through the crystal air of an early September morning.

The pleasant drone of the motors now dropped to a lower pitch. After traversing successive areas of suburban homes

\*In population Berlin ranks fourth among world cities, being exceeded by New York, London, and Tokyo.

laid out in luxurious squares of green foliage, a section of red-brick factories with tall chimneys jutting menacingly from the earth, and finally a crazy-quilt jumble of business and residence blocks, our pilot eased his shining gull to a gentle landing on the field of Tempelhof Airport (Plate VIII).

### AN AIRPORT BORN OF THE GOOSE STEP

Berlin is especially fortunate in having this spacious terminal for air traffic well within the city limits. It was Frederick the Great's passion for reviewing the goose step that did the trick. When, a hundred and fifty years later, aviation pioneers conquered gravity, thereby placing a premium on flat lands near cities, Frederick's parade ground was waiting ready-made to serve as a landing field.

The silver-haired lady whose chance acquaintance I had made in the plane-with-a-red-cross-on-its-tail was met by her husband. Presentations concluded, she insisted that I accompany them in their car to my hotel.

“You'll find our city in a state of transition,” she remarked as we sped on our way. “The pompous old architectural forms are vanishing. I'm a native Berliner, but I don't deplore the change. In fact, I'm happy to see the New Age evolving a style of realistic beauty in keeping with today's practical needs.”

I was astonished at this expression of tolerance for the upsetting of tradition. But it was only the first of many such surprises.

“Come and dine with us when you can



Photograph from *Wide World*

#### MAY DAY MASSES JAM THE BERLIN LUSTGARTEN TO HEAR ADOLF HITLER SPEAK

Decorated with the swastika sign and guarded by troops, the speaker's stand appears in the far background, on the broad steps of the Old Museum. At the right appears a corner of the Berlin Cathedral (Color-Plate I). The Maypole, decorated with bunting and swastikas, represents a revival of an old folk custom formerly observed chiefly in the rural districts.

find a breathing spell," said my hosts as we drew up before the address I had given. I accepted with warmth, and waved them good-bye from the curb.

#### GENERALS, POETS, MUSICIANS IN BERLIN STREET NAMES

Ensnared in the high-ceilinged room of the hotel to which I had been recommended, I set myself to the task of a cursory orientation by means of a little green book, "Berlin from A to Z—An Official Directory."

As my eye roved through the alphabetical list of city streets, I realized that here before me was the epitomized history of the Mark of Brandenburg.

Important victories on the battlefield, and the generals who won them; names of former margraves, princes, and kings; religious upheavals and the leaders who sponsored them; wizards of science, poets, painters, philosophers, and musicians; outstanding personalities of the new Government—these and a multitude of other events and individuals are recorded among the names of the 9,500 streets within the city.

Luther Street and Luther Bridge—ah, here is our heroic reformer of the little town of Wittenberg! His pronouncement brought, some two centuries later, an influx of French Huguenots into Protestant



Photograph from T. R. Ylstra.

OVER THE SPREE RISES THE VAST DOME OF BERLIN'S PROTESTANT CATHEDRAL.

At the left is the Marstall, formerly the royal stables, but now a library, and beyond the Kurfürsten Bridge is the former Kaiser's Palace. Being towed is a loaded barge with rowboats trailing on behind. Beyond, still other cargo barges, one with its burdens covered, are crowded in the heavy traffic. The tug is about to lower its smokestack for the "low bridge." Because it is spread over so much territory, casual Berlin visitors may overlook this river's enormous water-borne traffic. But a glance at a big-scale city map shows how conveniently the capital is served by canals and rivers which connect it with the sea and with inland cities (page 134).

Brandenburg. Therefore, one finds a Französische Strasse, or French Street, with its French Church, and likewise a French School in which to this very day French is the spoken language.

Let us pick a random few from this imposing list of names: Agricola and Apostel-Paulus Streets, Alexander Square, Barbarossa, Beethoven, Bismarck, Blücher, and Calvin Streets; a various assortment of Friedrichs; Galvani and Goethe Streets; Judenhof and Gutenberg Streets; Herkules Bridge, Helgoland Bank, Jerusalem Street;

Krupp, Robert Koch, Röntgen Streets; Seydlitz and Richard Wagner Streets, Tirpitz Bank, Waterloo Bridge, Washington Place.

Here is provocative material for the historically minded!

As a final fillip to my curiosity I discovered the name Unterwasser-Strasse (Underwater Street).

Burying my "Berlin von A bis Z" in the bottom of my suitcase, I sallied forth into the huge metropolis.

The baffling element of Berlin's character

is its extreme simplicity. One anticipates complexities which do not exist. The city is as unaffected and logical as the language spoken by its inhabitants.

Before one can begin to comprehend what makes Berlin tick, preconceived ideas of capitals must be cast aside. Gradually, out of the confused outlines of the vast mass, emerges a recognizable pattern.

#### CITY-DWELLING COWS AND PIGS

Behold the anomaly of an urban agglomeration with a total population of some 4,220,000, a city which can boast one of the most highly perfected transportation systems in the world, with every convenience contributed by science—and yet which contains within its limits the following:

Twenty thousand cows (providing a third of the milk supply), 30,000 pigs, 10,000 goats, 700,000 chickens, 180,000 rabbits, 5,800 people keeping bees, only three or four buildings that I could find as much as ten stories high, twelve windmills still functioning, and more than 100,000 little gardens, the harvests of which include such imposing yearly figures as 46,000 tons of potatoes and proportionate quantities of other vegetables and grains.

Such items would appear fantastic to the dweller on narrow, rock-ribbed Manhattan.

These little "Schreber Gartens" afford city workers easily accessible contact with the land which is so dear to the German heart; they promote bodily fitness through exercise, and minimize food cost.

Beside each garden is a neat little house for storing equipment. Here centers the odd-hour and week-end life of a substantial number of families. During times of crisis, these wee shelters have even housed many who would otherwise have been roofless.

The so-called "Schreber Garten" movement, which has spread to most cities of Germany, was founded in 1864 by a philanthropist who named it in honor of Schreber, a famous physician of that day. The land is owned in some cases by the city, in others by the State, and is furnished to its users (together with implements and seed) at a nominal price.

"Where'er you walk, cool gales shall fan the glade,  
Trees where you sit shall crowd into a shade. . ."

Trees and rivers . . . more rivers and more trees. Therein lies Berlin's greatest hold on the hearts of its dwellers.

The two rivers, Havel and Spree (pro-

nounced "Shpray"), with their eccentric twistings and turnings, form a network of waterways which makes it possible to reach many parts of the city by water.

These small streams and their tributaries, connected by canals with the Elbe and the Oder, give communication for transport of freight by steamer and barge to the farthest corners of the land (Plates XII, XIII, XV).

Berlin has, except for Duisburg, the largest shipping tonnage of any inland city of Germany. More than five million tons of goods arrived at the port in 1935 and 1,300,000 tons were dispatched.

Through the watery lanes, under gracefully arched bridges—of which Berlin has 1,006, even more than Venice itself!—glide long wooden barges, heavy-laden carriers of coal, building materials, petroleum, and an infinite variety of other products (page 133).

Large numbers of fruit barges come in from the provinces, bringing apples, pears, and peaches in their holds. In some cases these loads are marketed directly from the barges, which find mooring at advantageous points within the town.

The banks of the rivers are planted densely with trees. Rows of lindens or plane trees line the majority of the streets. The public parks are standing armies of trees in close formation, through which cut beguiling avenues and paths.

The most numerous member of the tree family is the linden. Also in large numbers are found most of our familiar American trees, such as maple, elm, horse chestnut (much beloved by the German), oak, acacia, poplar, and birch.

A census of trees standing in streets and squares alone—entirely exclusive of the parks—totals half a million.

The Berliner's love of trees is so deep that in many cases, where city appropriations have not provided the necessary funds, private citizens have paid for the planting of their own streets.

#### THESE CHANGING TIMES

As I walked through the streets of the Old City, I found myself humming a line from a Princeton Triangle Club play way back in the dim ages of the Wiley Pure Food Act:

"Renovate, rejuvenate, and incidentally change the date," it ran. This jingle describes aptly the evolution taking place today in Berlin.



Photograph from Pictures, Inc.

WITH PERISCOPES TIERGARTEN CROWDS WATCH HITLER'S BIRTHDAY PARADE—APRIL 20, 1936

Each drawn by six magnificent matched horses, heavy iron-wheeled fieldpieces rumble over the paved streets. No other vehicle makes exactly the same sound as artillery "when the caissons go rolling along." The Tiergarten, a wooded park area popular with pedestrians and horseback riders, stretches along either side of Charlottenburger Chaussee, and is set with many monuments and sculptures.



© Douglas Chandler.

#### THOUGH VANISHING BEFORE THE TAXI, A FEW BERLIN CABMEN STILL SURVIVE

Waiting for a fare, this weather-beaten driver cheers his equine companion of many long winters with a lump of sugar (page 146). White cab horses are scarce, because certain superstitious people will not ride behind one, believing that to do so would bring bad luck.

Venerable, and in many cases unbeautiful, landmarks of a bygone day are being sacrificed to the demands of traffic.

Scaffoldings clamber over the façades of many old buildings which do not have to suffer demolition but are going through a much-needed face-lifting operation. The Town Hall, a mammoth red-brick structure, has recently emerged, rubicund and a bit garish, from an allover bath performed by steam and cleansing acids.

Where possible, worthwhile old buildings are being preserved. The march of time has not yet intruded on the neighborhood of the Nikolai Church, where one comes across such architectural oddities as the Knoblauch Haus—literally, "Garlic House"—with its vivacious rococo exterior, and its pretentious contemporary, the Ephraim House.

One learns from the archives of the Märkisches Museum that this latter was built by one Veitel Ephraim, an enterprising racketeer of Frederick the Great's time. He aided an embarrassed State and likewise amassed his own fortune by coining debased "thaler," nicknamed "Ephraimites," which

he struck from copper with only an onion-skin thickness of silver surface.

#### "MAIN STREET" SHORN OF ITS GLORY

The most striking change observed in the physical aspect of the city is that on Unter den Linden. This wide avenue, because of building the new subway, has been denuded of its famous shade trees. Their roots were too deeply sunk in tradition and earth to make their lot tenable when the human moles began their burrowing (Plate XIV).

These dignified patriarchs were carefully dug up and placed in other more hospitable locations. Their place has been taken by a quadruple row of fresh little upstarts. Shockingly callow and insufficient they look!

During the gay days of the Olympics these small lindens were overshadowed by rows of high poles from which in the mid-summer breezes waved miles of optimistic bunting (Plate III).

But now that glory is past, and they face the oncoming winter winds with ill-concealed embarrassment.



© Douglas Chandler

VISITORS, ON FIRST SEEING BERLIN, ARE AMAZED AT ITS ABUNDANT STATUARY

Here even the top of the main building of Berlin University, former palace of Prince Henry of Prussia, is lined with human effigies. This seat of learning, which now enrolls about 7,000 students, is fairly new, compared with some European universities, not having opened its doors till 1810. Many Americans take courses here. At the left, a teacher and her schoolgirls stand before a monument of Karl Wilhelm von Humboldt, brother of the distinguished explorer, and founder of the University (page 146).

It was Dorothea, wife of the Great Elector, who caused the wide boulevard to be laid out, and who herself planted the first linden tree in 1681. Perhaps it would have been only fair for her generation to name the avenue for the Electress instead of for the tree she planted. However, they made amends by giving her name to the street which parallels Unter den Linden one block north.

HOGS BARRED FROM CITY STREETS

In 1690 an ordinance was passed by the Elector Frederick III forbidding the burghers of the neighborhood to allow their hogs to root around on the public street, as they were injuring the trees!

The winter of 1705 was one of extraordinary severity. Such was the cold that the 24-year-old trees were destroyed and had to be replanted.

But the heyday of Berlin's Main Street was during the time of Frederick the Great. Then there were six rows of lindens instead of the meager four of modern times.

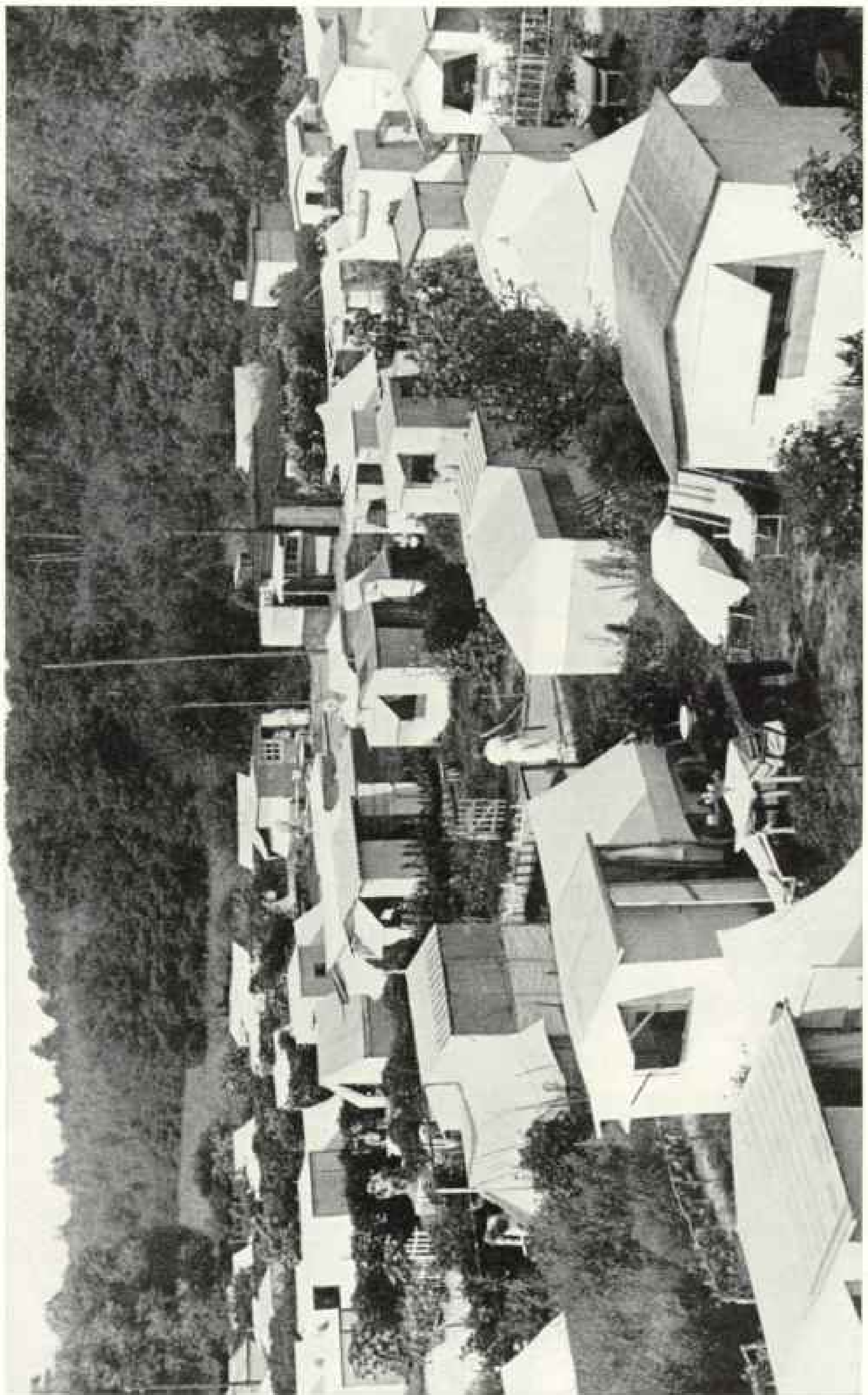
Berlin did not escape the westward-pushing urge which has possessed continents, countries, and cities.

Oldsters of today tell of open fields and woodlands in western areas where now stretch illimitable acres of concrete streets and business blocks. The inexorable thrust of building enterprise has encircled lakes and linked once widely separated communities into an urban entity.

In the galloping twenties of the postwar period came the realization of the realtor's dream of a Berlin Broadway—"Berlin in Light." The Kurfürsten-Damm sowed its wild oats in the lurid early day of jazz, but has now settled down to a snug, bourgeois middle age (page 156).

The Emperor William Memorial Church (built as a monument to Kaiser William the First and his wife, Kaiserin Augusta), which forms the root of the West Berlin section, is as out of place amid its surrounding cafés, restaurants, and movie palaces as Trinity Church is in the hubbub of lower Broadway.

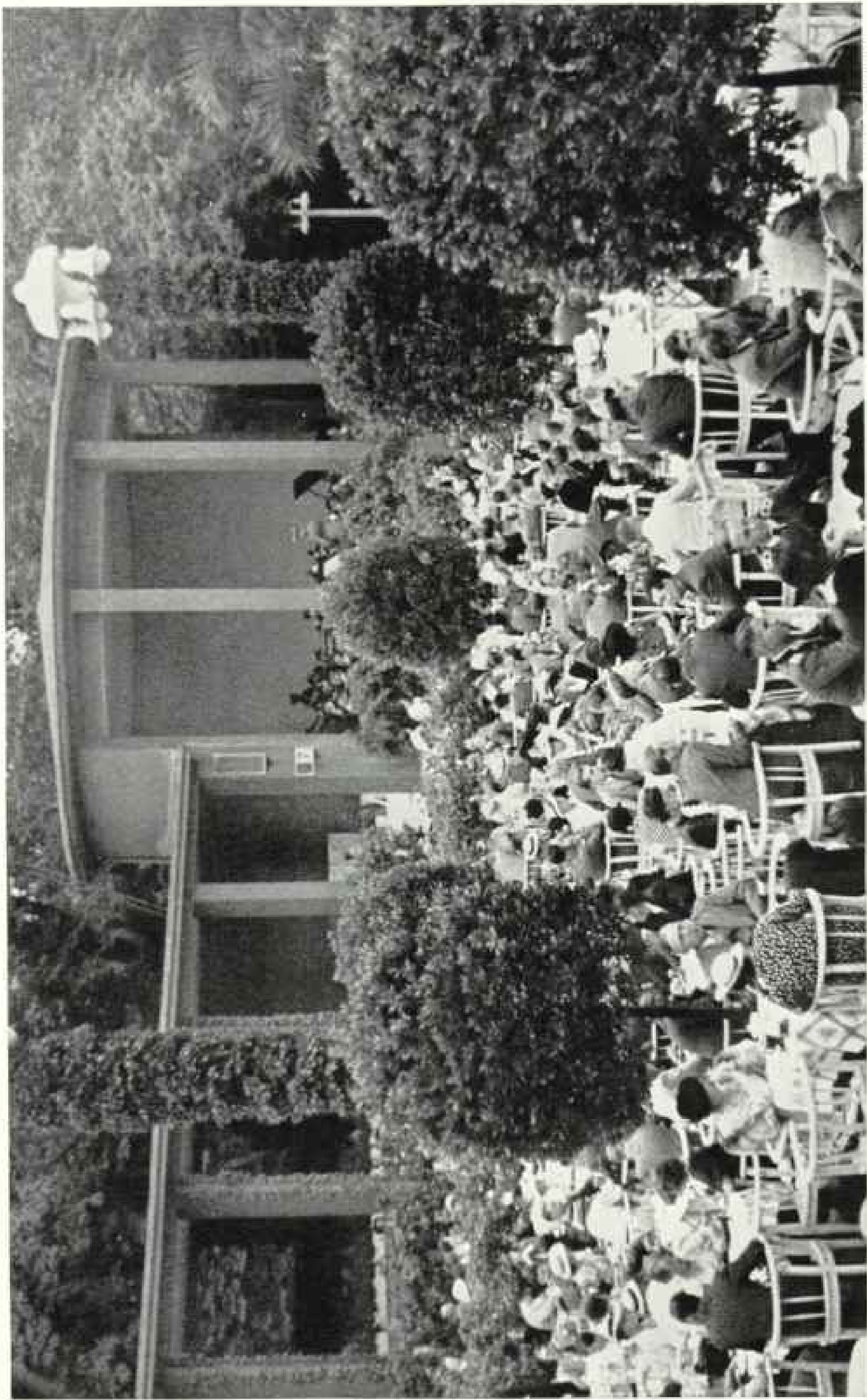




© Douglas Chamberler

SUMMERTIME ESCAPE FROM CROWDED BERLIN SEES THOUSANDS ENCAMPIED IN CROWDED QUARTERS ALONG NEAR-BY HAVEL RIVER

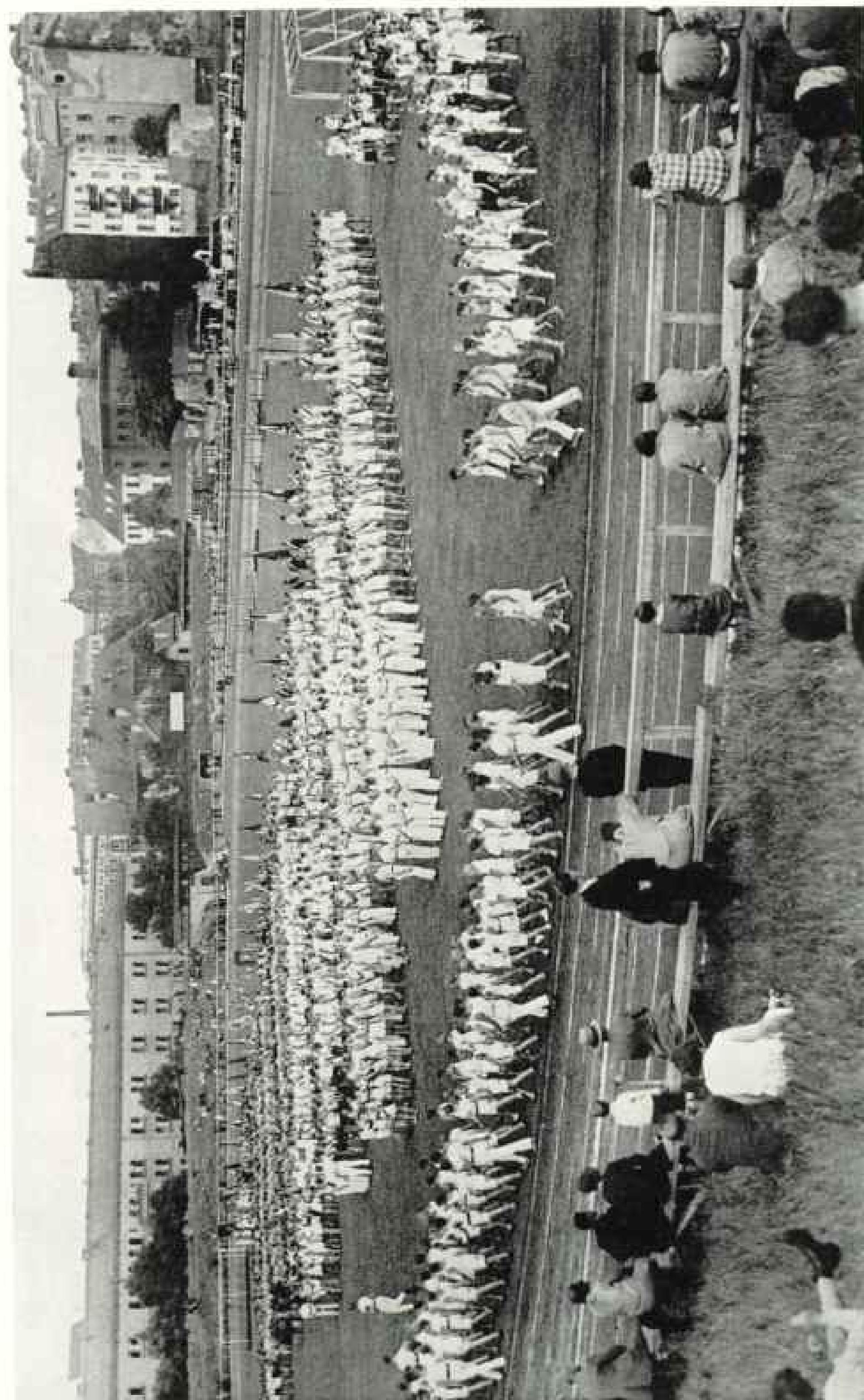
Colonies of these flimsy week-end huts and tents line river banks and lake shores about Berlin. Open-air dining, sun baths, and the care of tiny flower plots all add to the contentment of city vacationists (page 166).



© Douglas Claiborn

IN OPEN-AIR CAFES, BERLIN—ALONG WITH PARIS—LIKES TO SIT AND SIP AND TALK

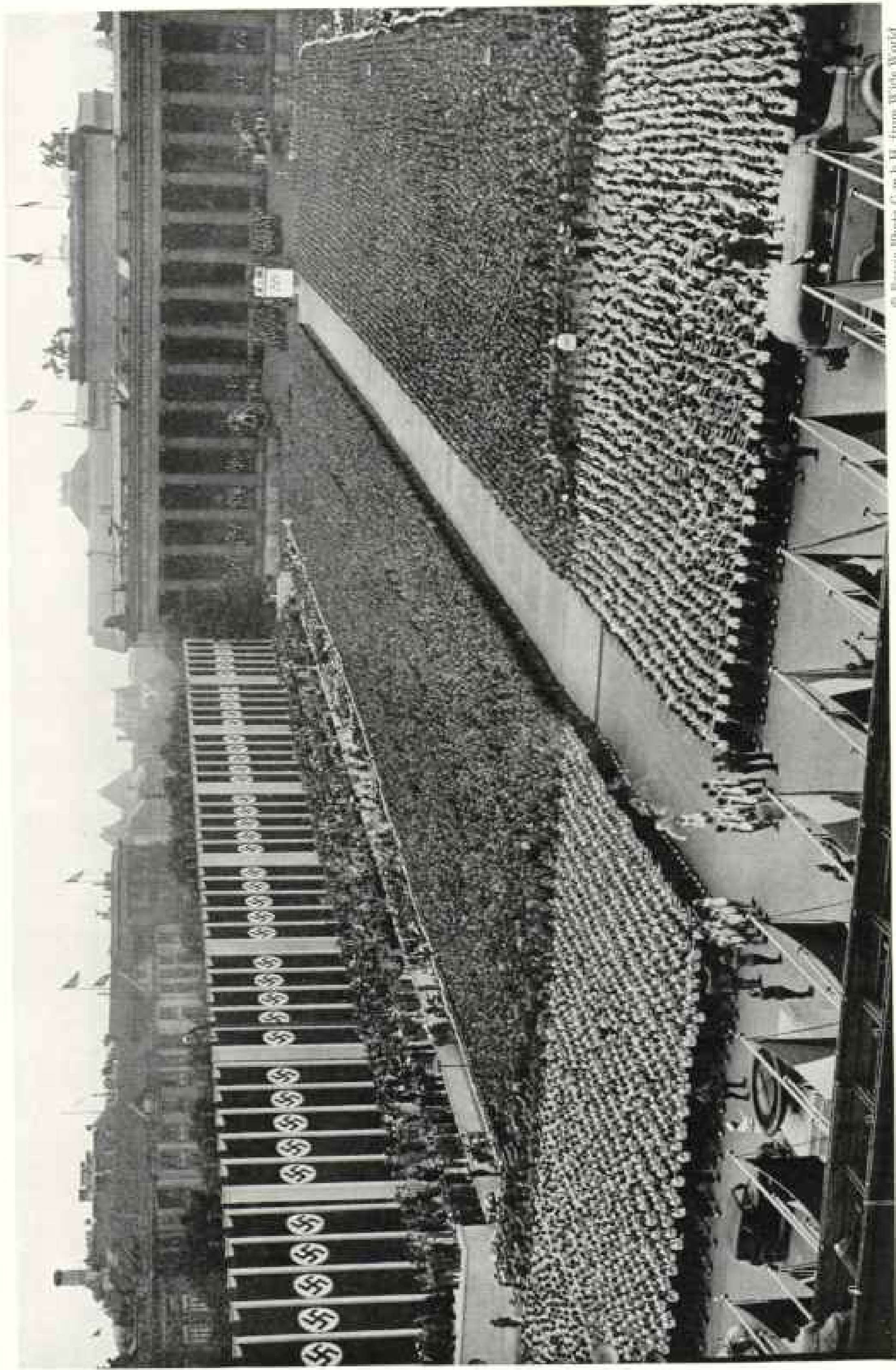
From the hole-in-the-wall eating place to such fashionable restaurants as this, the Kroll, in the Tiergarten at the edge of the River Spree, there is almost invariably the added attraction of an outside garden. In some of the more informal out-of-door cafes, families may even make their own coffee, the restaurant providing water and cups. And, as always in Germany, there is the band!



Photograph from Keystone

TO DEVELOP BOYS AND GIRLS IN BODY AND MIND, AND THUS INSURE A STURDY RACE TO DEFEND GERMANY IN THE FUTURE, IS A POLICY OF THE PRESENT GOVERNMENT.

On the athletic field of the Police Sport Society are seen some of the 5,000 young people who participated in the opening festival of the Gymnastic Corporation of Berlin.



© Press Photo G.m.b.H. from Wide World.

**OLYMPIC GAMES OPEN AT BERLIN WHEN THE "TORCHBEARER" RUNS UP WITH FIRE CARRIED FROM SOUTHERN GREECE**

Greek girls kindled the first flame by the heat of sun rays at the Temple of Zeus, at Olympia. Relay runners, about 2,900 in all, bore the torch for some 1,800 miles through Athens, Sofia, Belgrade, Budapest, Vienna, Prague, and Dresden, and then to the Lustgarten (Pleasure Garden) in Berlin.



Photograph from Wide World

"GOOD-BY! BE GOOD . . . AND SEND US A POSTCARD!"

Germany celebrates many legal holidays during the year, and picnics and excursions are popular ways of spending the free days. Here is a typical farewell scene at one of Berlin's many railway stations.

Neon signs make a vivid imprint on the night aspect of the city. Step gaily up the Kurfürsten-Damm or Friedrich-Strasse at any time after dark and you will find yourself wooed by the variegated, pulsing effulgence of a host of dance halls, ball houses, and cabarets.

"BUMMELN" IS THE GERMAN WORD FOR "DOING THE TOWN"

Haus Vaterland on the Potsdamer Platz, twelve years after its much-advertised construction, is popular with travelers. They flock in of evenings—visitors from abroad and from the provinces of Germany.

There are twelve halls, each decorated to represent some special locality. One may choose between the Bavarian Alps, the Rhineland, the Wild West of the U. S. A., a glamorous bit of sunny Spain (machine guns omitted), and other exotic scenes.

Clever tricks of stage business lend verisimilitude. I chose the Bavarian room, and, while I supped, watched a thunder storm pass over the Zugspitze, Germany's highest mountain. With an almost terrifying reality the storm tore across the backdrop, thunder shaking the room, wind whis-

ting and moaning among the crags. Knives, forks, and beer mugs lay untouched while it raged.

When the sun broke through the clouds a yodeler strolled among the tables juggling smooth balls of sound with his supple larynx. You can travel far for one Reichsmark at the Vaterland!

In an evening of Berlin *hummeln* one may explore the beer halls in the heart of the inner city.

Zum Nussbaum lays claim to being the oldest restaurant. The walls are adorned with caricatures by a popular black-and-white artist of the last generation, depicting street types of his time. The murky smoke of yesteryear shrouds the few low-volt bulbs of the narrow eating room. Wheezy laughter and cracked singing come from dismal corners.

Petty tradesmen with their families celebrate anniversaries by forgathering at Landré's Weissbierstuben, which occupy their ancient site under the shoulder of the Police Headquarters. This "white beer" is a specialty of Berlin; it is not brewed elsewhere (except in Leipzig) because of some necessary element of the water.



Photograph by A. and E. Frankl

#### BRANDENBURG CANOE CLUBS LINE UP FOR A RACE ON TEGELER SEE

This popular summer retreat for Berliners, a tree-girt lake, also draws sport lovers from near-by Brandenburg, which is connected with the capital's suburbs by the Havel River. Beyond the canoes onlookers watch the race in sailboats and in double "faltboats," kayaklike craft of canvas, now popular in Germany (page 165).

Landré's is proud of its old name and its bustling semi-respectability. The barman turns from loading a tray with a half-dozen white-capped beakers, puffs out his chest, and points to a sign above the bar: "Established in 1684."

#### FOOTNOTES ON THE FOOTLIGHTS

Berlin's thirty theaters opened the winter season with a program of offerings which ran through a chronological gamut from Aeschylus to Knut Hamsun.

The State Theater in the Gendarmen-Markt started its first night with a beautiful presentation of the "Oresteia" by Aeschylus. Among the winter selections are many plays of Schiller, Shakespeare, Ibsen, and such German favorites as Christian Dietrich Grabbe (whose centennial was celebrated last year), Hanns Johst, and Gerhart Hauptmann.

The "Little House" of the State Theater, which is dedicated to plays of a lighter vein, is producing morsels from the pens of Oscar Wilde, Per Schwenzen, and Zdenko von Kraft.

There seems to be little demand for innovations at the State Opera. Standard German and Italian works fill the bill.

Wagner will receive the homage which is now accorded him by the orthodox.

It is not only Berlin's physical aspect which is undergoing change today; the language, particularly the written language, is also in a state of evolution. Many writers are abandoning the traditional long-winded style. The tendency is toward crisp, short sentences, American tempo.

#### MARK TWAIN'S APT COMMENT ON THE GERMAN LANGUAGE

Not quite so apt today would be Mark Twain's delicious comment on German speech, in which he likens a German in the midst of a sentence to an underwater swimmer, except that he ultimately does end "holding his verb in his mouth."

Youngsters and oldsters in every walk of life are attending English classes, not only in the large centers like Berlin, Hamburg, Munich, and Dresden, but also in the small provincial towns.



© Douglas Chandler

BY THIS MONSTER ELEVATOR, CANAL BOATS WEIGHING HUNDREDS OF TONS ARE LIFTED BODILY, LOCK AND ALL.

The water systems of Berlin and Stettin are connected by the Hohenzollern Canal, through which flows an ever-increasing stream of coal and heavy goods. East of Eberswalde the canal leaves a high plateau for lowlands along the Oder River. Till recently, four locks built here raised and lowered boats a distance of 116 feet, requiring two hours to lock a 350-ton ship. After many years of work, this mammoth ship elevator was built, and now a boat can be passed up or down in five minutes. The boat simply sails into a big trough of water, which is lifted or lowered, the vessel floating in it.

A recent ruling of the railroads makes it obligatory for all conductors to learn English. Gray-bearded veterans coming in from a long, weary run dash off to "school."

On a trip which I often make from the Black Forest to Stuttgart, the conductor regularly halts when he sees me, and, dragging a copybook from his uniform pocket, gets me to "hear him his lesson."

#### SAMPLES OF GERMAN SLANG

"Where can I hear a sample of the colloquial language of Berlin streets?" I asked my concierge.

"Go you to the old flower women of the Leipziger-Strasse (page 167), handle the

blooms with disapproval, and say that they are withered and expensive."

Brashly I proceeded to the experiment. "Your flowers are no good; they are withered," I said in German.

Shades of Dr. Johnson and the fishwife! What a flood of invective was turned loose upon me! When the old witch stopped for breath, I timorously explained my jest, bought an armful of roses, and walked away crushed but enlightened.

The Berliner's sense of humor is something of a special idiom, a bit on the dry side, certainly not subtle. It has none of the bucolic coarseness of the Bavarian and is not so prankish as that of your rollicking



Photograph by Glister Ruse

TO SEE AND BE SEEN BERLINERS CROWD SIDEWALK CAFES IN FINE WEATHER

Popular as outdoor dining and drinking and concerts are with Germans, many a visitor from warmer climes finds such social adventures a chilly experience. On Sundays dense crowds promenade the Kurfürsten-Damm. Like the Boardwalk in Atlantic City at Eastertime, this is a favorite promenade for displaying new spring outfits.

Saxon. The Berliner makes fun of himself and his local institutions with good grace, but is likely to be taken aback if the outlander attempts facetious liberties.

As for typical slang of the Berlin streets, its name is legion. An expression of complete astonishment is, "Ich denke, mir laust der Affe," which must be literally translated as, "I think the monkey takes lice off me." An "Amerikaner" is a cookie with a heavy layer of icing. The expression for the first signs of baldness is "Baustelle," a building lot. The Berliner's term for a cheap, showy dress is "Fahne," a flag.

There exist in the Berlin argot innumerable synonyms for money. It is called "wire," "moss," "gravel," "powder," "pinkepinke" (obviously onomatopoeical), "Marie," "coke," "coal," "thread," "shavings," and scores of other names. The

Reichsmark is usually spoken of as "Eier" (eggs), or as "Emmchen," the diminutive form of M, the letter which stands for mark.

The boulevard wits have now dubbed Unter den Linden "Unter den Laternen" because the street lamps are bigger than the trees.

BERLIN'S TRAFFIC HEARTBEAT IS RAPID

The pace of the Berlin pedestrian is conspicuously unhurried.

Motor traffic, on the other hand, is unusually rapid. The drivers of the 620 omnibuses hurl their two-storied leviathans from stop to stop in lurching bursts of speed; the air brakes hiss with splenetic suddenness.

The comparatively small number of motor vehicles in Berlin helps explain the villagelike appearance of most streets. Counting private cars, trucks, and motor-



cycles, registrations for 1936 show only a few more than forty thousand.

The traffic flow has a heartbeat of thirty seconds—half a minute of red light, an orange flash warning of change, followed by half a minute of green. To one accustomed to the longer intervals of most American cities, it seems at first a little hysterical in its frequency of interruption.

Upon arrival I was petrified to see autos passing stopped streetcars. The law, however, permits such passing, with the injunction that it be performed with extreme care.

The large number of bicycles on Berlin streets creates an additional hazard for the motorist, especially as the riders seem endowed with a sublime faith that the vagaries of their delicate vehicles will be unfailingly observed by truck and car behind. Yet, with it all, casualty statistics are not high. The city's fatalities from traffic accidents totaled 358 for 1935.

The traffic lights halt squads of cyclists: girls in unbecoming but practical divided skirts; delivery boys carrying bundles bigger than themselves; tenders of street lights pedaling precariously from lamp to lamp with 8-foot ladders strapped to their shoulders.

There are still 51 horse-drawn cabs in the city (page 136). The Germans call them *Pferde-Droschken*, or horse droschkies. I talked with two of the old drivers who were hobnobbing beside their carriages in the Potsdamer Platz. With whimsical acrimony they bewailed the Motor Age.

"Why, sir, before the war there were between eight and ten thousand of us drivers on Berlin streets! Those were the days! There were three classes of Droschken: first class for the best people, second for the others, and third class, a combination of passenger and baggage carriers.

"Today we just pick up a bare living from the curiosity-seekers. The ninety-per-cent are in a terrible hurry to go nowhere in particular."

#### FOUR MAIL DELIVERIES A DAY

The Berlin resident receives four deliveries of mail a day on weekdays and one on Sunday for good measure.

Five thousand postboxes announce their presence on street corners with a lustrous surface of red—that shade which someone has described as "the color of audacity." Until within the last year they were a sober blue, but the color experts announced that they lacked visibility.

Special delivery obtains, but for those who desire extra-rapid service there is the fast-functioning pneumatic-tube system, reaching every section of the town. This is a convenience to the businessman and an undoubted blessing to exigent lovers.

I posted in midtown an important air-mail letter (business strictly) one hour before the starting time of the Stuttgart plane. The letter reached Tempelhof Airport in proper time and was delivered to its destination in Stuttgart four hours later.

#### A SKYSCRAPER IS CALLED A "CLOUD SCRATCHER"

"How many skyscrapers have you in Berlin?" I asked the white-jacketed *Schupo* directing traffic at Belle-Alliance-Platz. (*Schupo* is the contraction of *Verkehrsschutzpolizei*, which means a policeman-who-protects-traffic.)

"None that you Americans would call by that name," was his answer. "But," he added, "we have three or four that seem pretty tall to us, and a radio tower to boot."

I paid my entrance fee and rode up to the roof garden of Europa Haus, the newest cloud scratcher, eleven stories high. There, surrounding an actual garden with blooming flower beds and gravel walks, were tables set in wind-protected alcoves.

While I ate my luncheon I envied the sun baths being enjoyed by earlier lunchers on steamer chairs strewn about the "lawn" for the free use of roof guests. As there are no other high buildings or smokestacks adjacent, there was no soot to mar the picture.

Any list of the city's cloud scratchers should also include the new home of the Karstadt department store (page 159).

Columbus Haus on Potsdamer Platz and the handsome white building of the Shell Oil Company, which rises from the verdant bank of the Spree in mid-city, are other contenders for dizzy honors, and neither exceeds ten stories.

Berlin is not suffering from lack of educational institutions, with its 13 universities, colleges, and higher technical centers, 147 high schools, and 503 grade schools.

Berlin (Frederick William) University, center of educational life, fronts on Unter den Linden across from the State Opera House. Such a dignified atmosphere of scholarship pervades the lovely gray building and its linden-shaded court that no one would suspect it was originally built as a palace for Prince Henry by his brother, Frederick the Great (page 137).

LIFE AND LUSTER OF BERLIN



BERLIN CATHEDRAL LOOKS DOWN UPON STREETS HEDECKED FOR LAST SUMMER'S OLYMPIC GAMES

This Protestant edifice is really three separate churches under one vast roof. In its crypt are entombed nearly a hundred members of the Hohenzollern family.



© National Geographic Society

Finlay Photographs by Wilhelm Tobien

HUGE FLAGS HUNG DURING THE OLYMPICS DWARF THE MAJESTIC BRANDENBURG GATE

Beyond the colors of Japan, the Netherlands, and Canada stands the massive, Doric-columned Brandenburger Tor, often called the symbol of Berlin (Plate IV). Napoleon in 1807 removed the Quadriga of Victory, with its four copper horses, to Paris, whence German troops recovered it in 1814.

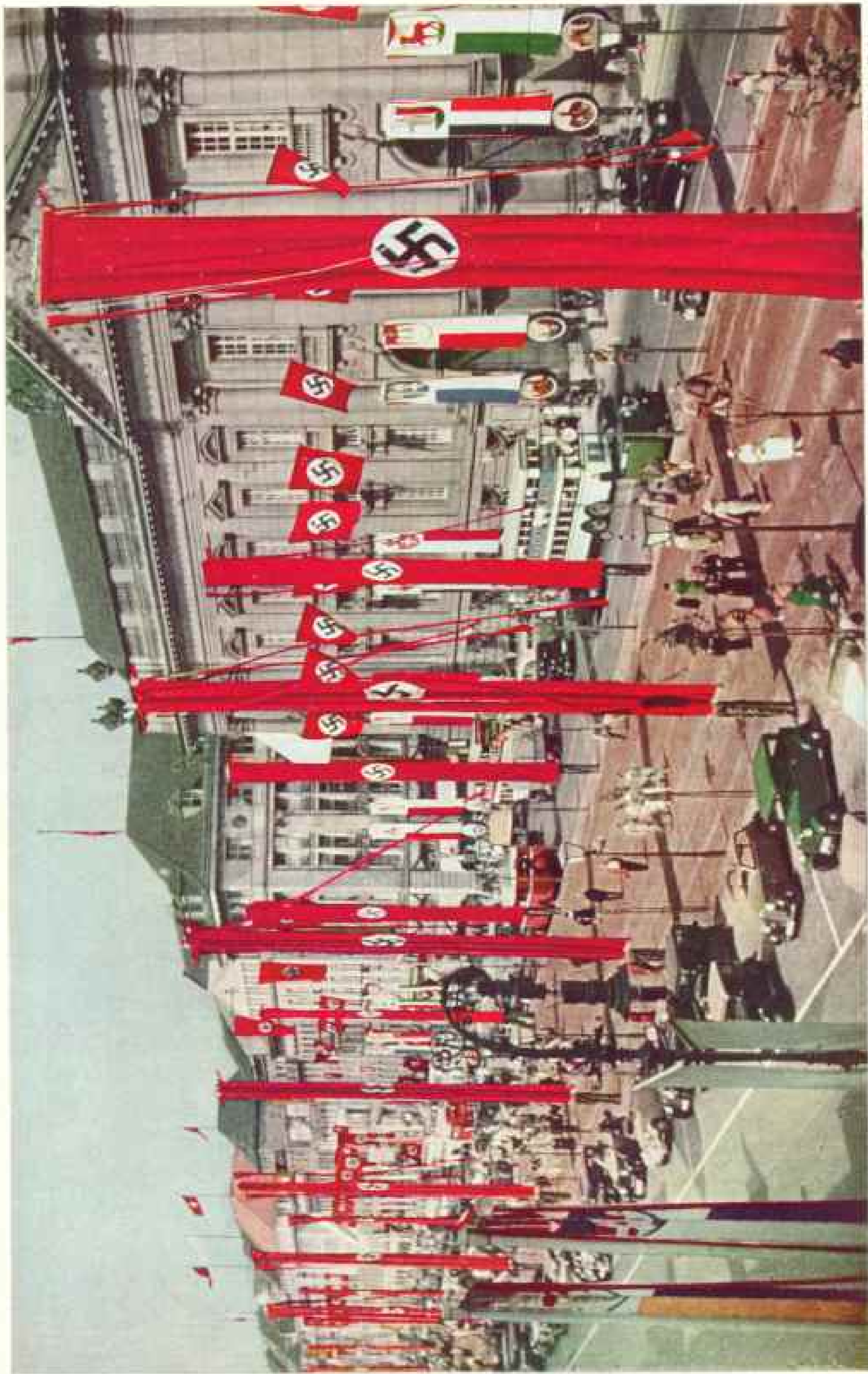


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Entsy Photograph by Wilhelm Tobien

**CROWDS OF CURIOUS BERLINERS COME AWHEEL AND AFOOT, TO SEE THE "OLYMPIC FIRE" AND FLAGS OF COMPETING NATIONS**

In the vessel burns the symbolic flame brought to Berlin in 1936 from Greece, ancient home of the Olympic Games, by some 2,900 athletes, running in relays. Greece's colors are first (left), Germany's last. The building is the Schloss, or Palace, where Kaiser William II gave the orders for war in 1914. Flags of many former combatants may be identified here (see "Flags of the World," National Geographic Magazine, September, 1934).



© National Geographic Society

BANNERS OVER BERLIN—A BRIGHT, SUNSHINY DAY, WITH UNTER DEN LINDEN IN GALA DRESS

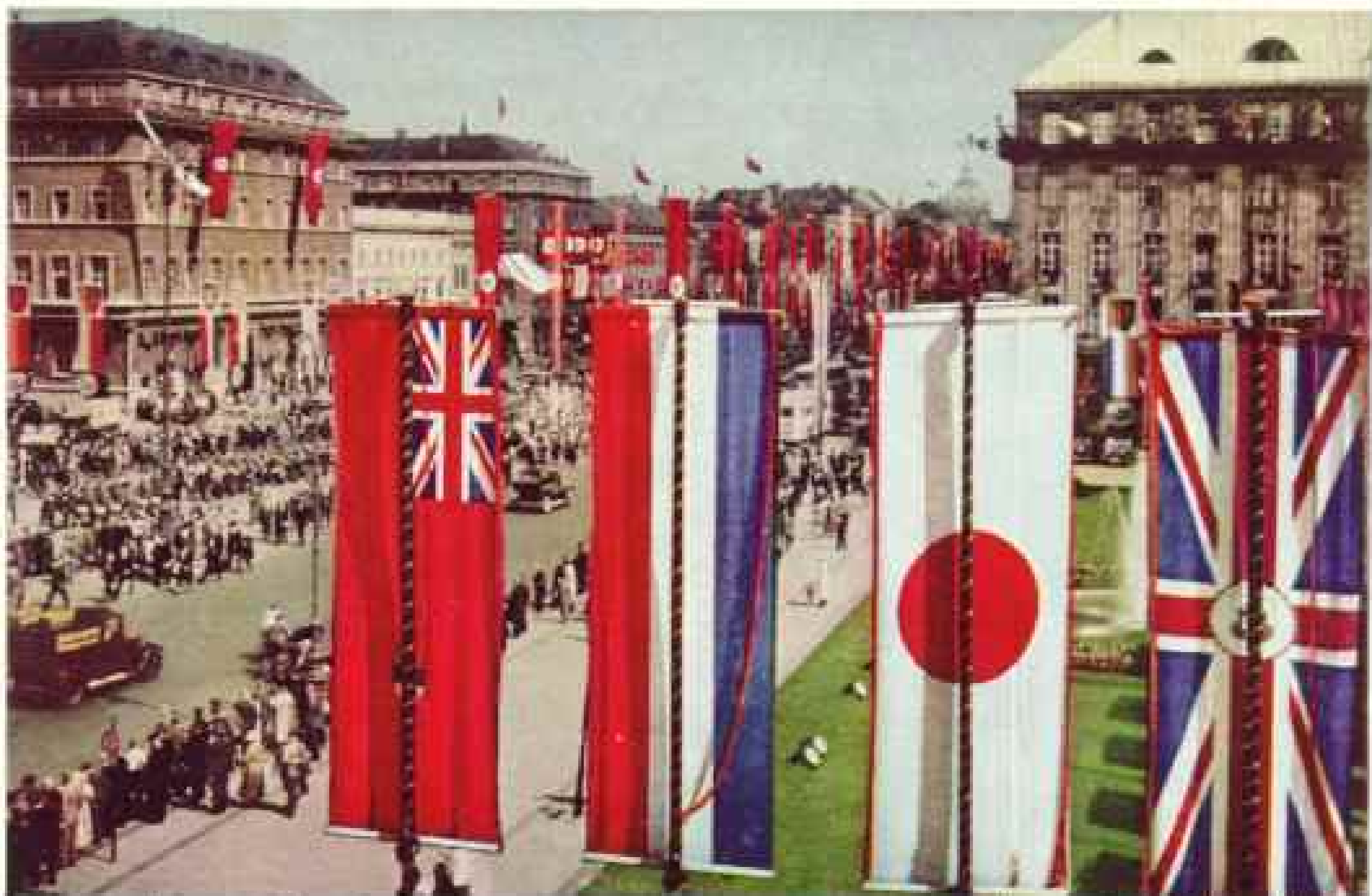
Finlay Photograph by Wilhelm Tobien

By far the most conspicuous is Germany's swastika-embazoned flag. The Zenghans (Armory) at right, begun in 1694, is now a military museum and Hall of Fame. It holds Hindenburg's death mask and busts of famous warriors and statesmen, as well as weapons, armor, and uniforms from the Middle Ages to the World War. Here, too, is Napoleon's hat, found near Waterloo!



OMNIPRESENT SWASTIKA SIGNS ENCIRCLE HITLER PLATZ IN CHARLOTTENBURG

Foreign flags are displayed in honor of visiting Olympic contenders; flanking the Stars and Stripes are the colors of Uruguay, and Germany. This *platz*, or square—with near-by Broadcasting House, fair grounds, and athletic fields—is becoming a new bright-light center in west Berlin.



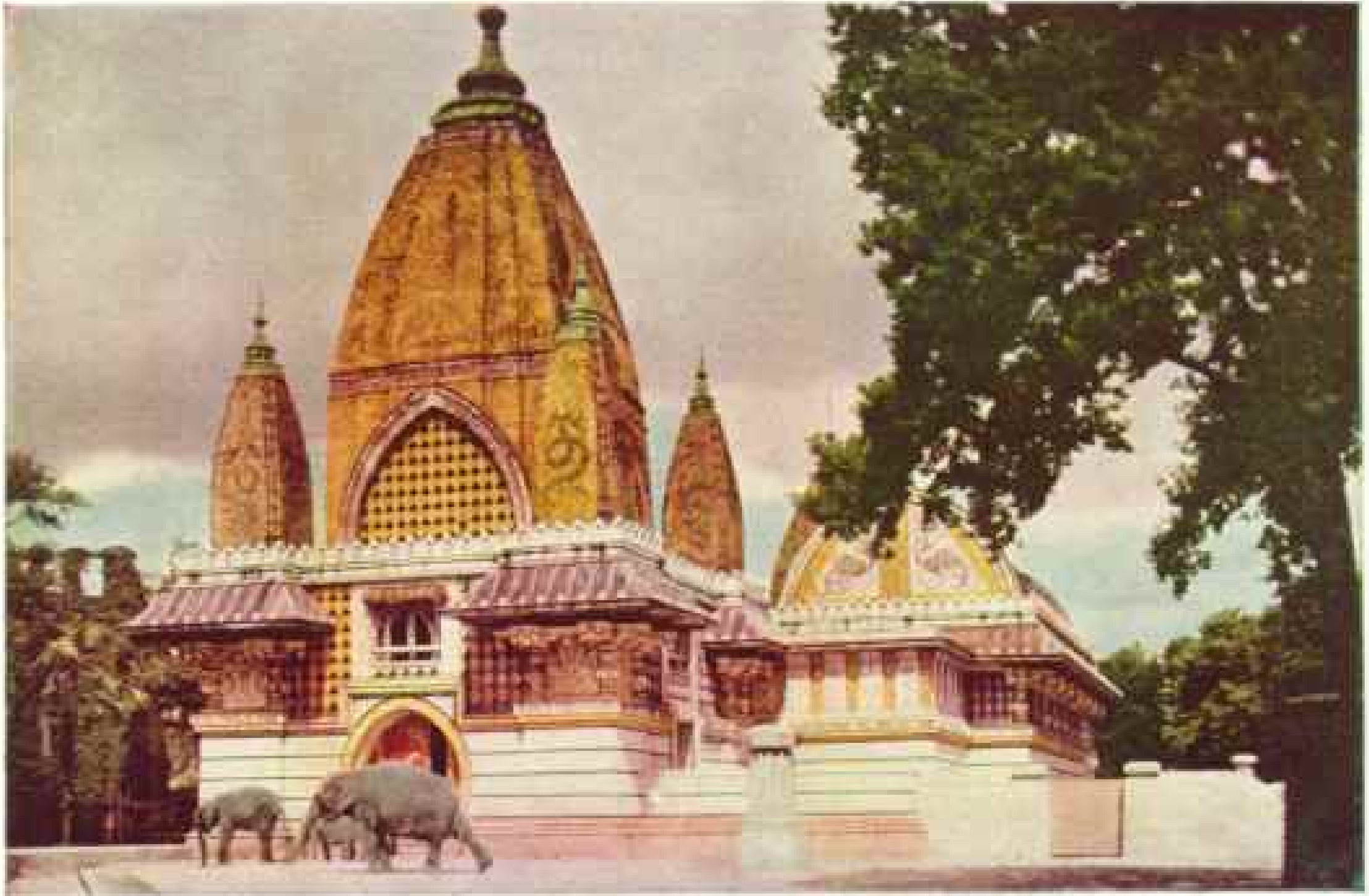
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Finlay Photographs by Wilhelm Tobien

PERENNIAL STREET OF PARADES IS UNTER DEN LINDEN, SEEN HERE FROM BRANDENBURGER TOR

At the left approaches a marching column. At the right is the Hotel Adlon. Linden trees which adorned this avenue were recently destroyed in subway building and replaced by smaller ones (Plate III).

LIFE AND LUSTER OF BERLIN



Agfacolor Plate by Hans Hilfenbrandt

MODEL OF SOME TEMPLE IN INDIA, THIS ORNATE EDIFICE SHELTERS ELEPHANTS

Pampered pachyderms in Berlin's Zoological Garden roam about without benefit of bars, but they are not quite as free as they look. Rows of spikes in the pavement at the left keep them from becoming too familiar. The Zoo is always well patronized, as the Germans are a Nature-loving people.



© National Geographic Society

Finlay Photograph by Wilhelm Tobien

IN DAYS OF EMPIRE MANY A ROYAL PRINCESS RODE TO HER WEDDING  
IN THIS LUXURIOUS COACH

Built in Strashourg in 1789 for King Frederick William II, the richly carved, gilded state carriage is preserved now in the Hohenzollern Museum. Führer Adolf Hitler makes official trips by motorcar.



© National Geographic Society

"NOW GIVE ME FOUR OR FIVE FRONDS TO COMPLETE MY BOUQUET"

Scenting the cool, damp air of early morning with hot-house fragrance, street flower vendors spread their fresh-cut stock before hotel, church, and office doorways to entice potential customers.



Aqueduct Plates by Hans Hildebrand

THOSE WHO CANNOT GO TO THE BEACHES MAY DO THEIR BATHING THERE

Berlin is so far north that it enjoys from 16 to 18 hours of summer daylight. Short as the season is, the city has numberless boat and bathing clubs, and is famous in the athletic world for its excellent swimmers.



© National Geographic Society

ANY BRIGHT DAY SEES BATHERS SWARM TO NEAR-BY RESORTS, AS HERE AT WANNSEE. BERLIN SUMMERS BEING SHORT, PLEASURE CRAFT PASS THIS WIDE EXpanse FORMED BY THE SPREADING RIVER. SUN-BATHING ON WARM SANDS AND DINING AND DANCING IN SHORE RESORTS, BERLINERS MAKE WANNSEE THEIR CONEY ISLAND.

Aufacholor Plate by Hans Hilberbragd





Aquacolor Plate by Hans Hildenbrand

AIR-MINDED BERLIN CROWDS WATCH PLANES AT TEMPELHOF AIRPORT

This former military parade ground has become a modern, highly specialized airport city, with hangars for scores of planes, a "Zentral Flughafen" hotel, police station, post office, ticket office, and quarters for the airdrome staff. Wireless and weather instrument masts rise in the background.



© National Geographic Society

Finlay Photograph by Wilhelm Tobien

ROLLING POST OFFICES WERE PROVIDED TO ACCOMMODATE HUGE CROWDS AT THE OLYMPIC GAMES

Set in the side of this truck is seen a characteristic "general delivery" window. Before it people line up to ask for mail, buy stamps, or drop picture cards to folks back home.

In the neighborhood of the University are several restaurants where one hears more English spoken than German. The guests are principally exchange professors from American colleges who come to Berlin for research or other scholastic purposes.

The Schwarzes Ferkel (Black Pig) is popular with the teaching fraternity and is the locale for all meetings of the Berlin Harvard Club. Tonndorf is another spot where the pedagogues exchange shoptalk over their veal cutlet and beer.

Modernism is not aggressively present today in painting and sculpture. The windows of the moderate-price art shops are filled with decorative prints and paintings designed largely to please the conventional taste. Scenes portraying fecund grainfields, mountain peaks piercing the upper ether, animal pictures, flower studies, predominate.

Only a few doors from the American Consulate in Bellevue-Strasse, street of the better art dealers, there has recently been opened an exhibition of the latest styles in modern furniture. Designs compare favorably with similar showings I have seen within the last year in other European countries. Ingenious use is being made of materials hitherto unknown to furniture making.

#### BEER DRINKING HAS SHRUNK 40 PERCENT IN BERLIN

"Has anyone ever regretted the demise of a statistician?" once wrote a disgruntled epigrammatist. Comprehensible point of view! But there are exceptions. I had the luck to meet one.

At the head office of the city's Bureau of Statistics I found the chief a person of considerable humor. Surrounded by diagrams and graphs, he fed me with such factual morsels as the following:

Seven hundred and twenty thousand loaves of bread go each day to Berlin homes; 11,000 tons of coffee made from malt are drunk each year and only two-thirds as much real coffee; some 50,000,000 people annually visit Berlin's 400 movie-houses; meat consumption is on the downgrade, having dropped in one year from 157 to 127 pounds per person; beer consumption has shrunk 40 percent in the last eight years, a fact of much significance as foreshadowing the physique of the future Berliner.

Apropos of beer, it is interesting to discover that Munich, now the Nation's beer capital, originally was the center of a wine

country and learned the brewing art from northern Germany.

We can judge of the amount habitually drunk by the "best people" in the olden days by a cellar rule of the Electorate of Bavaria in 1648: "Countesses and ladies of nobility are allowed four quarts for the day and three quarts for the night."

Now, however, the youth of Germany, striving for physical efficiency, scorn anything but the most moderate beer drinking. They predict that paunchy waistlines and bulging necks will be unknown to the next generation.

#### SPORT FIELDS AND LABOR CAMPS

A characteristic sight as one explores the various sections of Berlin is the sport fields with children or young people going through setting-up exercises. With magnificent gusto they bend and twist, flexing muscles in unison with the rhythmic counting of physical instructors. There are 236 of these fields scattered about the city, and, in addition, 660 indoor gymnasiums (page 162).

The bodily fitness of the present generation of youngsters is striking. I talked in a third-class railroad carriage with a group of brown-faced lads returning from their summer service in a labor camp. For six months they had been up near the border of the Netherlands digging ditches.

They described to me the routine of the camp life. Reveille at 5 a. m., a man-size breakfast (which sounds more like a lunch) with soup, meat, and potatoes ad lib. Shovels flying until noon. Another meal, followed by an hour's enforced siesta—"clothes off and in the bunks, every man jack of us!" No manual labor at all in the afternoons. Program of instruction, followed by an hour or two of sport. Evenings of pastime in any preferred fashion.

"Lots of us go in for woodcarving," stated one of my fellow-travelers, and digging into his gear he proudly exhibited a carved picture frame with the coat-of-arms of Dresden, his native town.

Every German boy, regardless of social position, must, between 17 and 25 years of age, give six months of labor service to the State. There are 1,200 camps throughout Germany, with 166 workers to a camp. The men live in light wooden barracks, pinned together with bolts, which can be transferred from place to place as each job is finished.

Irrigation of dry lands and swamp drainage are the exclusive tasks of these labor



© Douglas Chandler

"MUTINY ON THE BOUNTY" AS ANNOUNCED BY KURFÜRSTEN-DAMM BILLBOARDS

"Every night," says the author, "Captain Bligh has his crew flogged here for the shuddering entertainment of Berlin audiences." Spoken in English, but with screen captions in German, this South Sea drama has enjoyed much popularity among the capital's film fans.

camps—no road making or other form of construction which could compete with paid labor.

Service from the girls of Germany is not obligatory. However, it is the vogue to volunteer for such tasks as assisting workers in the fields or in the homes, caring for children, or substituting for an office or factory worker so that person can take a vacation without pay.

PARIS MODELS AND THE "AMERICAN SHOULDER"

*Verkauf, Verkauf* (Sale, Sale).

Stores are bedecked with announcements of autumn sales; windows teem with merchandise, including conservative copies of Paris models to sell to women with small incomes.

Most of the people on Berlin streets are

well dressed, if that term can be interpreted to mean the wearing of good and comfortable clothes.

Men's furnishing stores exhibit weird arrays of caricatured dummies, attenuated and globular, clad in coats as square-built as a New England woodshed. The salesman explains that this rectangular effect is the "American shoulder."

Beauty parlors flourish, a bewildering assortment of jars set forth in their windows. A few of the better-known American cosmetic lines are to be found. Red lips are no rarity.

The long-haired sisters have in this country always far outnumbered those with bobs. And with permanent waves within the range of all, it follows that one sees hordes of Brunhildes crowned with rippling corn-silk coifs.



© Douglas Chandler

#### DAY'S WORK DONE, CROWDS FLOCK HOMEWARD ON UNTER DEN LINDEN

Like upper Fifth Avenue, this artery is a broad, glittering thoroughfare of hotels, clubs, cafes, and high-priced shops. Here at Friedrich-Strasse corner is found one of Berlin's busiest spots; two dense traffic streams cross on the green lights.

A few years ago there was a slogan—"The German woman does not smoke." That cannot at present be said, though of a certainty she does not go at the business with the nervous enthusiasm of certain of her cousins across the water.

In different locations one encounters that red sign lettered in gold, so familiar in American cities—"F. W. Woolworth & Co." Prices take off at five pfennigs (about two cents) and climb to a dizzy altitude of one Reichsmark (about 40 cents). Every article, except for beads and a few novelties from Czechoslovakia, is made in Germany. The Woolworth chain in all Germany numbers more than 80 branches.

The problem of imports has been a grievous one for Germany during the years her borders have been hermetically sealed to outflow of gold. Barter has solved the diffi-

culty in the case of certain commodities. Bananas and pineapples from the Cameroons and coffee from Brazil—these and other exotic products are paid for with tractors, tools, and motor trucks.

On the same basis, butter and eggs come from near-by Denmark, and there is a project under discussion for drawing on the Argentine's beef supply.

Much midnight oil has been burned in research laboratories during recent years in the hunt for new and inexpensive synthetic materials. Little short of miraculous seem some of the results demonstrated to me in Berlin. Synthetic rubber is now so cheap that the stores use rubber bands for small paper parcels because it is more economical than string.

The art of making the public conscious of unsuspected needs is not yet highly



Photograph from Wide-World

SOLOMON IN ALL HIS GLORY WAS NOT ARRAYED LIKE FORMER BERLIN POLICEMEN. This wax-figure parade shows sartorial evolution of the law's majesty through many generations. Those at the right, suggesting field marshals and admirals, date from the 17th century.



BOY SCOUTS MAKE A LAST MARCH ALONG UNTER DEN LINDEN

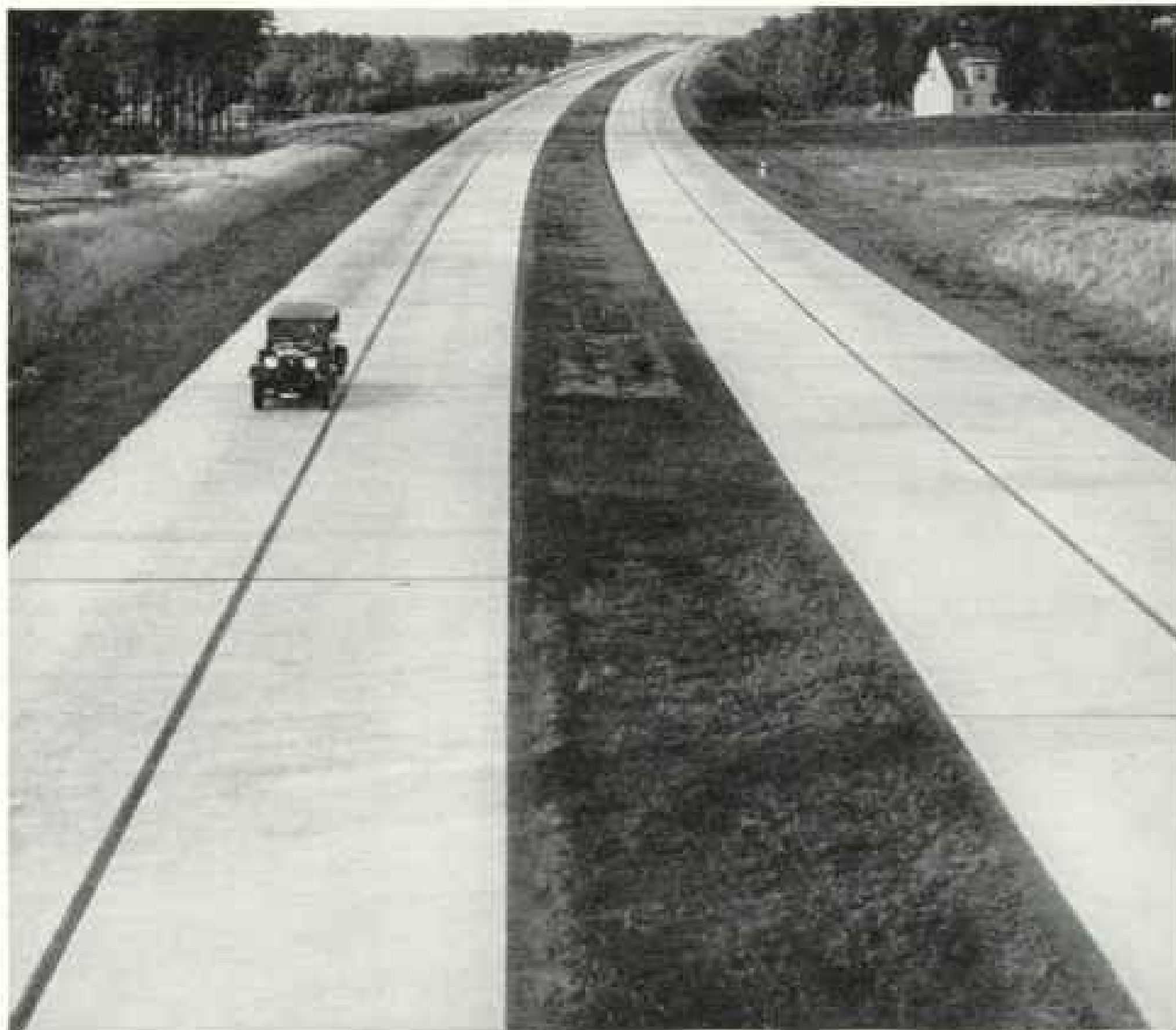
As a substitute for Scout training, German youngsters now join an institution known as the Hitler Youth organization. Its emblem is the swastika, and its wide activities and political training are enormously popular with all classes.



Photograph by Aug. Kuehner

HERMANN-PLATZ IN SOUTH BERLIN IS DOMINATED BY "WARENHAUS KARSTADT," AN ENORMOUS DEPARTMENT STORE

From a roof garden on top of this modern structure, an expansive view of all southeast Berlin may be enjoyed. In its methods of merchandising and display, as well as in its architecture, the emporium reflects American influence.



© Douglas Chandler

NEW ROADS, LIKE TWIN RIBBONS OF CEMENT, SWEEP OVER GERMAN PLAINS AND ROLLING WOODED HILLS

Because of her position on the map, military necessity long ago led Germany to build stone-paved roads radiating in various directions from Berlin. They were sufficient for horse-drawn artillery, but rough for high-speed motor vehicles. Today smooth cement roads, remindful of America's best, are beginning to be laid toward frontiers. Each strip here, wide enough for four cars, is a one-way drive. Surface crossings are often avoided by the use of overpasses, with four-leaf clover approaches (page 170).

developed. Advertising is still in the nursery stage. Highways are not cursed with helpful hints for complicating existence. Beauty preparations and cigarettes occupy the lion's share of magazine space.

In trams, subways, and elevated trains, instead of the large car cards which challenge the American eye, are narrow strips, not more than three inches wide, proclaiming in rhyme the virtues of certain wares. One brand of furniture and one of orthopedic shoes preempt the entire lateral space of all the cars.

Verse also is much in vogue for the teaching of safety rules.

One poetic plea against the evils of coughing and sneezing, which appears in every

public conveyance, may be freely translated thus:

Hold it as your duty, brothers,  
Not to give your germs to others;  
Cough not in your neighbor's face;  
Handkerchiefs the proper place!  
If you feel impelled to sneeze,  
Do it likewise, if you please.

Humor is employed far and wide as an instrument of public education. Every railroad station has a bulletin board on which appear in lurid colors grotesquely exaggerated pictures of what will happen to you—TO YOU!—if you lean against the door, place your baggage insecurely in the rack, climb on moving vehicles, or fall victim to a dozen other pitfalls of the road.

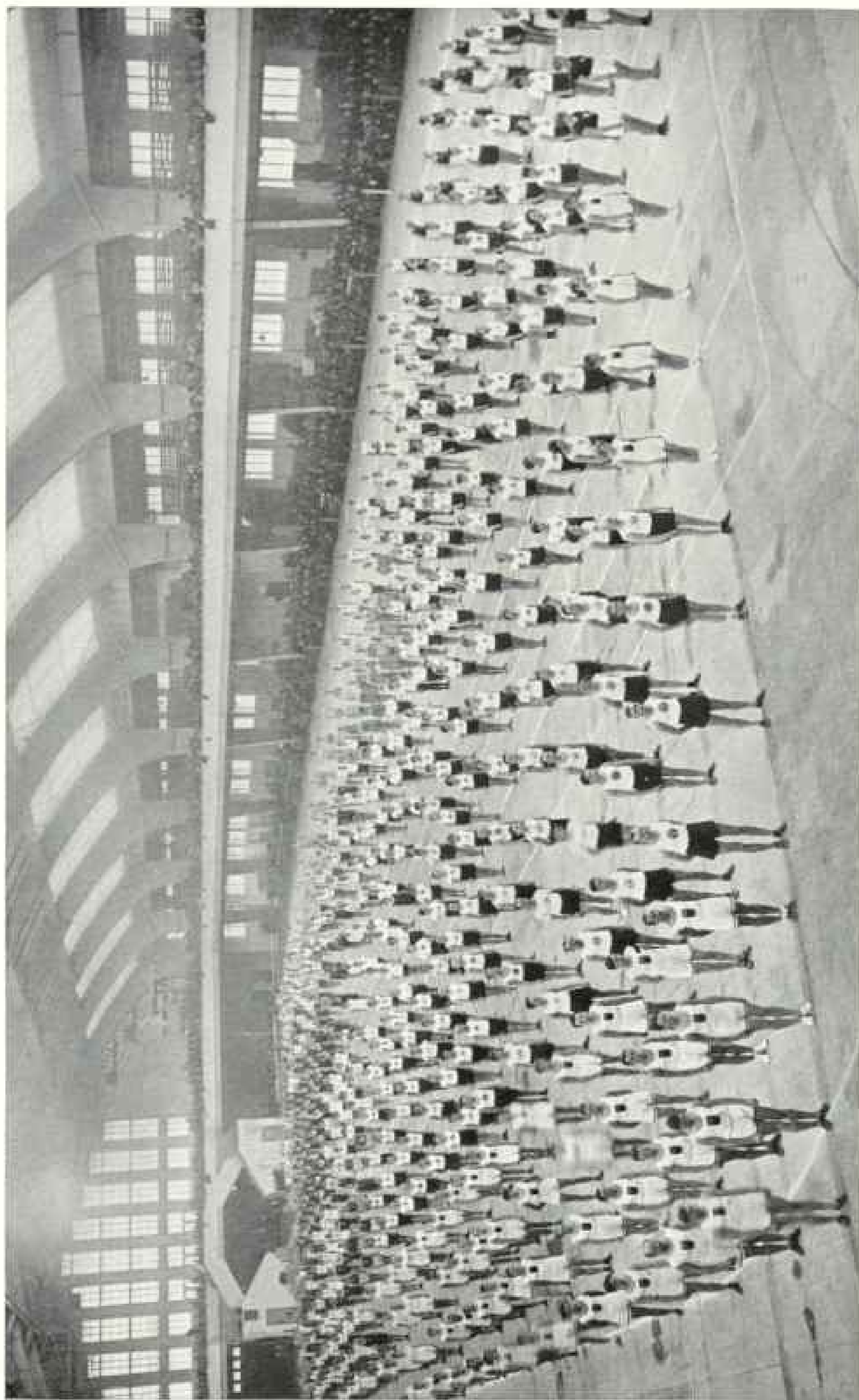


Photograph by Herbert Hoffman

THE KÖNIG-STRASSE, ENDING AT ALEXANDER-PLATZ, FORMS THE CHIEF TRAFFIC CENTER OF EAST BERLIN

Seen at the right is a subway entrance, leading to a bewildering labyrinth of subterranean life. Two great architectural masses, the Alexander and the Beroüna-Haus, flank this busy square and shelter armies of office workers.





Photograph by Wide World

**ENTHUSIASM FOR PHYSICAL CULTURE AND SPORTS OF ALL KINDS MARKS THE NEW GERMANY**

Here 1,500 men and girls in the Exhibition Hall at the Kaiser-Damm in Berlin await the word from their leader. The Fourth Winter Olympiad, was held at Garmisch-Partenkirchen in February, 1936, and Berlin, of course, was the scene of the 11th Olympic Games last summer.



Photograph by Hilmar Fabul

**ROLAND ALMOST BREAKS HIS OWN BACK REACHING FOR A FISH IN THE BERLIN ZOO**

Taught to do tricks to earn his food, this 4,500-pound sea elephant, some 15 feet in length, ate from 50 to 100 pounds of fish a day. He displayed much intelligence and became attached to his keeper.



© Douglas Chappellet

**AMONG LOTTERY TICKETS, AS AMONG RACE HORSES, THERE'S ALWAYS ONE THAT WINS**

Luck symbols in Germany may range from horseshoes and four-leaf clovers to the number "seven" and a certain kind of mushroom. This window, typical of many in Berlin, displays lottery tickets for sale.



© Douglas Chandler

TO THE UNITED STATES SCHOLAR IN BERLIN, AMERIKA-INSTITUT OFFERS USEFUL STUDY FACILITIES

Established in 1910 and financed by Germans and Americans, this institute exchanges scientific printed material between both countries. It contains not only the Roosevelt Library, donated by Theodore Roosevelt, but also a special American library of 16,000 volumes. Among members of its administrative board is a German teacher of American literature at Berlin University, who now is an exchange professor at the University of Nebraska making special studies of the American West. Explaining the library's facilities to a visitor is Director K. O. Bertling.

Another field in which advertising has definitely not been developed is that of personal publicity. The average individual seems actually to enjoy anonymity. The newspapers carry only the sketchiest accounts of the doings of society, and, except in reference to large diplomatic affairs, specific mention is seldom made of Who attended What.

SETTLEMENTS REPLACE SLUMS

Determined to hunt up the worst of Berlin's tenement areas, I plotted out a two-day walk through the quarters where the "other half" lives. Nowhere did I find a spot which measured up to my conception of a "slum."

Many unfit dwelling houses on narrow streets have been torn down. In their place stand settlements—groups of apartments offering decent, moderately priced quarters for workers' families. Nearly 3,000 have been constructed. Some have small gardens attached.

In addition to the city-developed settlements are some huge ones sponsored by industrial enterprises. The outstanding example is that of the Siemens Company, that colossal producer of electrical machinery, which was established in 1847. Its Berlin plants employ more than 120,000 workers.

Siemens Stadt has grown up around the works, forming an integral part of Berlin. There are model apartments, schools, hospitals, churches, playgrounds, and theaters. I spent the larger part of a day going over the factories of this company, and came reeling forth from that apotheosis of mechanization feeling like Charlie Chaplin in "Modern Times."

The Allgemeine Elektrizitäts-Gesellschaft, the General Electric Company of Germany, has likewise gone far in developing proper housing for its 47,000 Berlin employees.

The task of aiding the needy is being largely handled by the Winter Aid Cam-



Photograph by Burton Holmes from Galloway

STREAMLINING, EVEN ON AN APARTMENT HOUSE, REVEALS ULTRAMODERN DESIGNS  
IN NEWER BERLIN ARCHITECTURE

As in London, Hamburg, and many other world-cities, slum clearance and vast building programs have seen the bold rise of individual homes, flats, office and factory buildings differing widely from any previous ideas of human shelter.

paign. There are in the whole of Germany one and a quarter million voluntary workers contributing their services, which has kept administrative costs of the organization down to one percent of the total sum handled.

Principal among the methods of raising money are lotteries, the sale of badges and little handmade ornaments of negligible cost, and the one-dish meal once a month in private houses, restaurants, and hotels. Through the latter means alone 365,000,000 marks were raised in 1935.

The idea is that one day in each month the midday meal shall consist of just one dish instead of the customary three courses. The difference saved is turned over to the Winter Aid. This abstinence is purely voluntary, though all are asked to participate in the minor sacrifice.

The beneficiaries of the charity are given commodities, not money. Sixteen percent of all coal burned for heating purposes is provided through the Winter Aid. In Berlin a general average of 800 pounds of coal is delivered each winter to households with

up to two children; for larger families sufficient is provided to keep two stoves burning. Enormous quantities of clothing, shoes, and food are distributed.

AN EXCURSION IS "A FLYING-OUT"

"Where on earth are all the people?" you find yourself asking as you walk through the deserted streets on a fine Sunday afternoon. Certainly at this same hour the Champs Elysées is thronged with a chattering, strolling mob.

But this is not France! We are in Germany, land of probably the most devoutly nature-loving people of the Northern Hemisphere. The Berliner, with his sisters and his cousins and his aunts—and grandfather and grandmother thrown in—has joined a daybreak exodus to woods and lakes.

Those who own some sort of boat go by the water route. By eight o'clock rivers and canals swarm with craft. *Faltboote*,\* small

\* See "Entering the Front Doors of Medieval Towns (by Faltboat)," by Cornelia Stratton Parker, NATIONAL GEOGRAPHIC MAGAZINE, March, 1932.



Photograph from Acme

THOUGH NEVER "GLORIFIED" BY THE GREAT ZIEGFELD, SPREEWALD MAIDS' HATS ARE AS BIG AND STARTLING AS ANY IN THE POLLIES!

For centuries the Wends, a Slavic tribal fragment, have lived in the Spreewald swamps, near Berlin. Besides their life on bicycles, ice skates, and in punts, they are noted for their diet of cherry pie, cucumbers, and stewed eels.\*

folding canoes with double-bladed paddles, predominate. In the motley van are also canoes of American pattern, sailing boats of widely diversified rigs, motorboats no bigger than bathtubs sputtering along by the thrust of outboard kickers, sleek, rangy launches, small yachts gliding with clever arrogance through crowded lanes (page 143).

At intervals the ranks open up for the passage of river steamers plying from Berlin's center to outlying resorts (Plate VII).

Lining the shores are series of tent cities, aggregations of wood-and-canvas week-end domiciles. Huddled together at the water's edge stand the units of these flimsy colonies, a welter of happy confusion (page 138).

From cookstoves comes a hunger-teasing aroma of browning sausages; coffee bubbles on the second burner. Dishwashing, a communal affair, engenders endless chaffing and laughter.

Flaxen-haired, sun-crisped youths wrestle with accordions, the instruments panting

and wheezing in melodious exhaustion. On grassy fields fat women in purple chemises rush nimbly about, hurling blue rubber rings over the heads of their shouting relatives. Brown arms thrash the water of the lake into diamond showers.

#### A SHRINE OF PRUSSIAN HISTORY

Having explored the western environs of the city to the exclusion of the east, I took the boat from Potsdamer Bridge on a sun-flecked morning to the Köpenick district. This Brandenburg landscape is one of wistful, nostalgic beauty. Langer See, Müggel-See—scene of the annual yachting races—and Teufels See (Devil's Lake) lure hosts of wanderers.

On an island stands the Castle of Köpenick, which has played an important rôle in Prussian history. Here was the trial of the Crown Prince Frederick of Prussia, afterward Frederick the Great, court-martialed by his own father.

The baroque hall where the trial took place is still in excellent preservation. I stood long in thought, re-enacting in my mind's eye the ordeal of the young man

\* See "The Wends of the Spreewald," by Frederick Simpich, in the NATIONAL GEOGRAPHIC MAGAZINE, March, 1923.



© Douglas Chandler

"LONG-DISTANCE SEEING AND TALKING OFFICE," READS THIS SIGN

In a branch post office near the Zoo the city has installed its first commercial television station. For about 60 cents you may call up a friend in Leipzig for a "long-distance see-speak."



© Douglas Chandler

FLOWER VENDERS, NOTED FOR RICH AND RACY ARGOT, ARE PRIVILEGED CHARACTERS

Flippant back talk from these sharp-tongued, quick-witted women, educated by years of contact with street crowds, is accepted by Berliners with good-natured tolerance (page 144).



© Douglas Chandler

MANY CITIZENS USE BERLIN'S POST OFFICES FOR WRITING THEIR LETTERS

This is one of Berlin's many branch post offices. The public writing room is well lighted, with comfortable chairs, tables, inkpots and blotters. No doubt Teutonic thoroughness and painstaking also provide pens that will write! (Plate VIII.)

whose spirit was subjected to such a cruel tempering process within these four walls.

"MARYLAND" IN GERMANY

About two hours' ride east of Berlin, while cruising in a friend's automobile, I came across a strange phenomenon of nomenclature. Near Küstrin, in the Oderbruch, a region of fertile flat lands watered by the Oder River, I stared with incredulous astonishment upon encountering a group of villages which bear the names "Maryland," "Saratoga," "Hampshire," "Pennsylvania," and "Jamaica." Even more exotic were "Malta," "Sumatra," and "Ceylon."

The houses are of typical North German architecture, with little emphasis on the picturesque. But the roofs of these nondescript buildings harbor the descendants of a group of would-be pioneers who longed to gaze over far horizons.

The story of how the villages acquired their names was told me by a placid and very unromantic-looking baker in "Maryland." Incidentally, he was a rover who had never ventured farther than Nürnberg!

It seems that in the days when Frederick

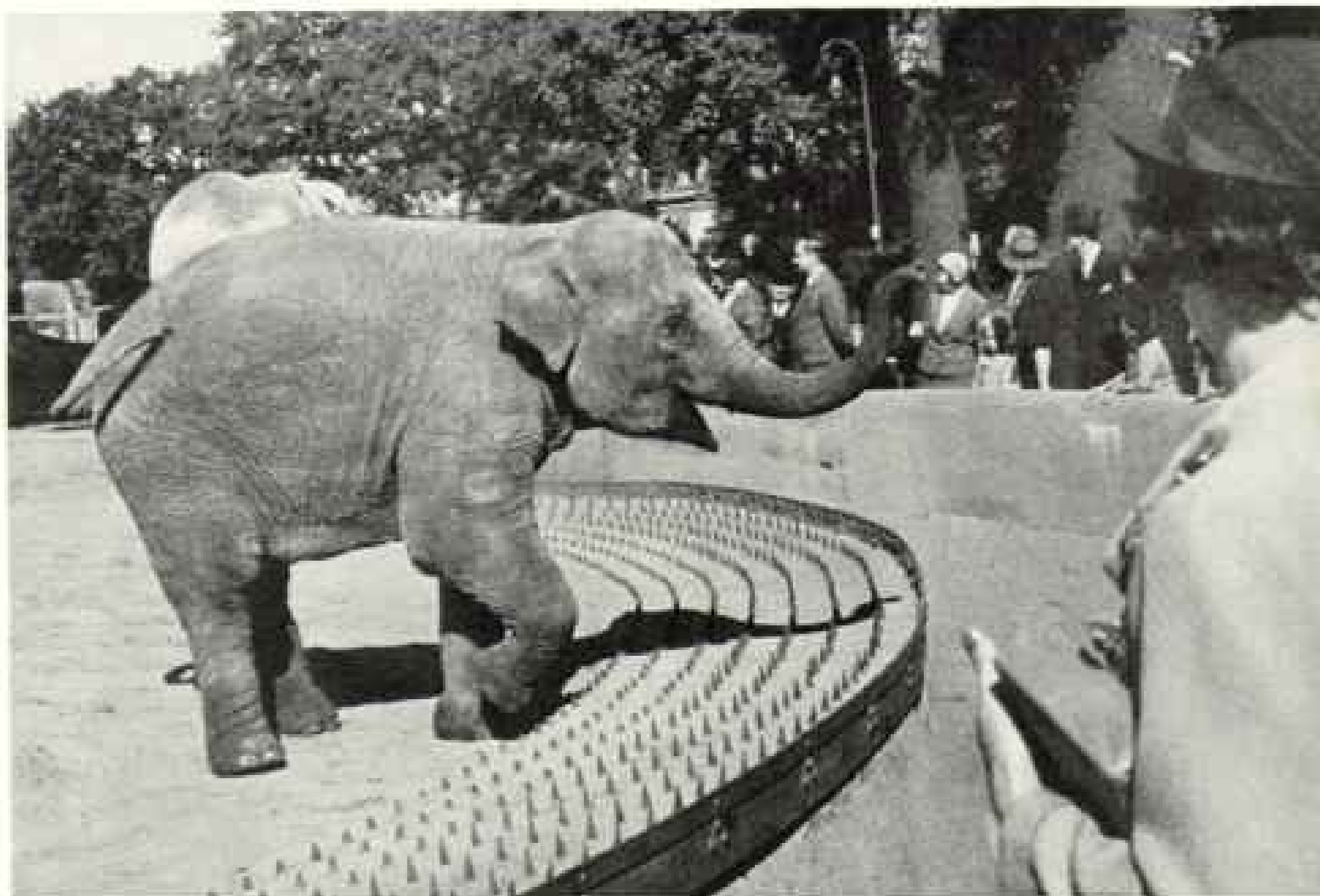
the Great was forming the villages of the Spree-Havel district into the semblance of a city, there rose up a group of restless souls who wanted to transfer their destinies to America and other such outlandish spots.

Frederick, opposed to the colonizing idea, said a firm and peremptory "No!" He offered them instead lush lands lying along the banks of the near-by Oder—and, as a sop to their thwarted wanderlust, suggested they name their new settlements after far-away places.

With commendable docility they settled down, sublimating their extravagant desires by building dikes to curb the wandering habits of Oder's banks.

Today their descendants accept the names as a matter of course. Through that alchemy of long-continued familiarity, the names have ceased to possess for them any foreignness of sound. In addition, many of the pronunciations have been so Germanized as to be practically unrecognizable, as, for example, "Yam-eye-ka" (Jamaica). But the spelling is unchanged.

In the course of my Berlin wanderings I did not forget the kind invitation of my acquaintance of the plane. An evening was



© Douglas Chandler

## NOT EVEN AN ELEPHANT WANTS TO STEP ON A TACK!

Among great zoos, in late years, many clever devices have been evolved for the better exhibition of animals, birds, and reptiles without the use of bars or screens. At Berlin seven rows of sharp spikes keep Jumbo in his place (Plate V).

arranged and I arrived in proper regalia at the gate of a handsome house in Dablen, a suburb built along lines rather suggestive of Guilford, in Baltimore.

Although the comforts of a reasonable degree of wealth were taken for granted, the household was one of tasteful simplicity.

Of the three grown daughters, each had her profession. One was a goldsmith, another a practitioner of therapeutic massage, the third a bacteriologist.

Old World customs prevailed in this home. The gentlemen formally escorted the ladies to the dining room. Toasts were drunk with musical clinking of glasses.

The conversation was animated, but more informative than witty. Like almost all Europeans of their intellectual level, these people were profoundly interested in social and political problems. Although the house was situated within earshot of the championship tennis club, neither golf nor tennis was mentioned during the evening.

"My husband reaches the age of retirement from business next year," stated my hostess as we sat over coffee.

"No, he does not dread it, because he has his *basteln* and his *musizieren*."

"*Basteln*" is a word for which we have no equivalent in English. It means, in a general sense, to practice one's special hobbies, but with the German it implies a more-than-amateur degree of skill in the doing.

The specialty of my host was the making of microscopes, telescopes, and precision instruments in an elaborately equipped workshop in his attic. And when he sat at the concert-size grand piano and played for us, I found that his "*musizieren*" was also of a high order.

Noting the diverse accomplishments of this businessman, I realized why retirement holds so little terror for many Germans.

There is a streak of sentimentality in the Berlin character that expresses itself in many ways which the sophisticated urbanite of other countries would probably sum up as "quaint."

What, for example, could be "quainter" than that splayfooted anachronism, the *dachshund*? Yet this comic-strip creature still holds leading place among canine pets in Berlin.\*

Following, in order of popularity, seem

\* See "Field Dogs in Action," by Freeman Lloyd, NATIONAL GEOGRAPHIC MAGAZINE, January, 1937.



to come the hairy-chinned schnauzer and the boxer with his worried, conscientious black muzzle.

Many department stores maintain a special room for the parking of shoppers' pups. Each dog is assigned a bed and blanket. While Mistress seeks bargains, "Lux!" or "Lumpe" waits chained to his post, sniffing reproach.

#### PARK YOUR CIGAR?

Another oddity of department-store custom is the brass rack just inside the street door, fitted with slots for holding the cigars of male customers. I have never succeeded in securing a satisfactory explanation of how the rightful owner can be assured of recovering his original stub.

Flowers fill a rôle of high spiritual importance in the lives of true Berliners. It is rare that one finds a residence without its blooming window boxes or other caches of burgeoning pigment. The flower venders about the streets do a thriving business, year in and year out (Plate VI).

I visited the wholesale flower market, the old Lindenmarkt, one morning at 7 o'clock. Rain was drizzling dismally, and the day was not one to invite early quests of beauty. Yet, at this hour, the market was swarming with buyers, both wholesale and retail. Florists' wagons were being loaded with supplies for the day, and housewives were haggling over the purchase of small bunches.

A law passed several years ago requires that electrocution be employed as the method for killing animals in the slaughterhouses throughout the entire country. Kosher killing is everywhere prohibited.

The system of house numbering is about to undergo a much-needed change. Up to the present buildings have always been numbered *around* a street—up the right side and back down the left. Great is the resulting confusion. A compilation of the minutes lost thereby since Albrecht the Bear first crossed the Spree would surely reach astronomical figures!

One enjoys a sense of amphibian freedom when utilizing Berlin's urban transportation system. Tickets entitle the user to transfer from subway to surface, from surface to elevated, from "L" to bus, or whatever combination may be chosen.

An anomaly of the public-utility situation is dual ownership. Part of the system is owned by the city, the rest is the property of the State. This results in keen competi-

tion between the different branches. The same dual ownership is found in the gas-works and the electric works. There is at present a sales and advertising war going on about the respective merits of gas versus electrical refrigeration.

A surprising amount of road construction is now under way in, or rather around, Berlin. The fine highway, when completed, will entirely encircle the city on its outskirts and will serve as a valuable time-saver for through traffic.

Amazingly ambitious is the program of highways now in progress throughout the length and breadth of Germany (page 160).

The roads are unusual in construction, of a depth and solidity which should insure years of duration. Boulevards are built in double lanes. Each strip is a one-way road wide enough to accommodate four cars abreast. There are no crossings. All transverse traffic lanes pass over bridges and intersections are provided with the four-leaf-clover type of lead-in.

When the now-finished stretches are joined, one will be able to drive from the North Sea to the Austrian frontier in about twelve hours with a fast car.

#### WINTER COMES TO BERLIN

At the close of my last day in Berlin, I stand on the north end of a bridge facing the curve of the Spree. Around me a white cloud of gulls is tilting, crying through the sad hush of a failing autumnal day. Back of the Reichstag, which looms in the near distance, the setting sun throws a red glow on the ornate dome and the gilded horsemen.

A bent old man stops at the bridge rail, opens a paper bag, and, taking out small lumps of bread, flings them one at a time out over the river. With childish delight he watches as the gulls swoop and pluck the morsels from the air.

Across the bridge, returning from an outing, marches a group of small boys wearing the uniform of the Hitler Youth—short black trousers, brown shirt, and black neckerchief slipped through a braided leather holder. They are singing in accurately pitched, youthful treble that moving modern national song, the "Horst Wessel Lied."

A faint chill creeps over the dusky, shimmering water. Winter is not far away. I shall hie me back to my Schwarzwald eyrie and my skis.

LIFE AND LUSTER OF BERLIN



POTSDAM, THE "PRUSSIAN VERSAILLES," WAS THE HOHENZOLLERNS' PLAYGROUND. Oriental figures adorn this Sanssouci Park pavilion. Because some of the walls within are decorated with simian sketches, Frederick the Great nicknamed the place "Monkey Hall."



© National Geographic Society

Finlay Photographs by Wilhelm Tobien

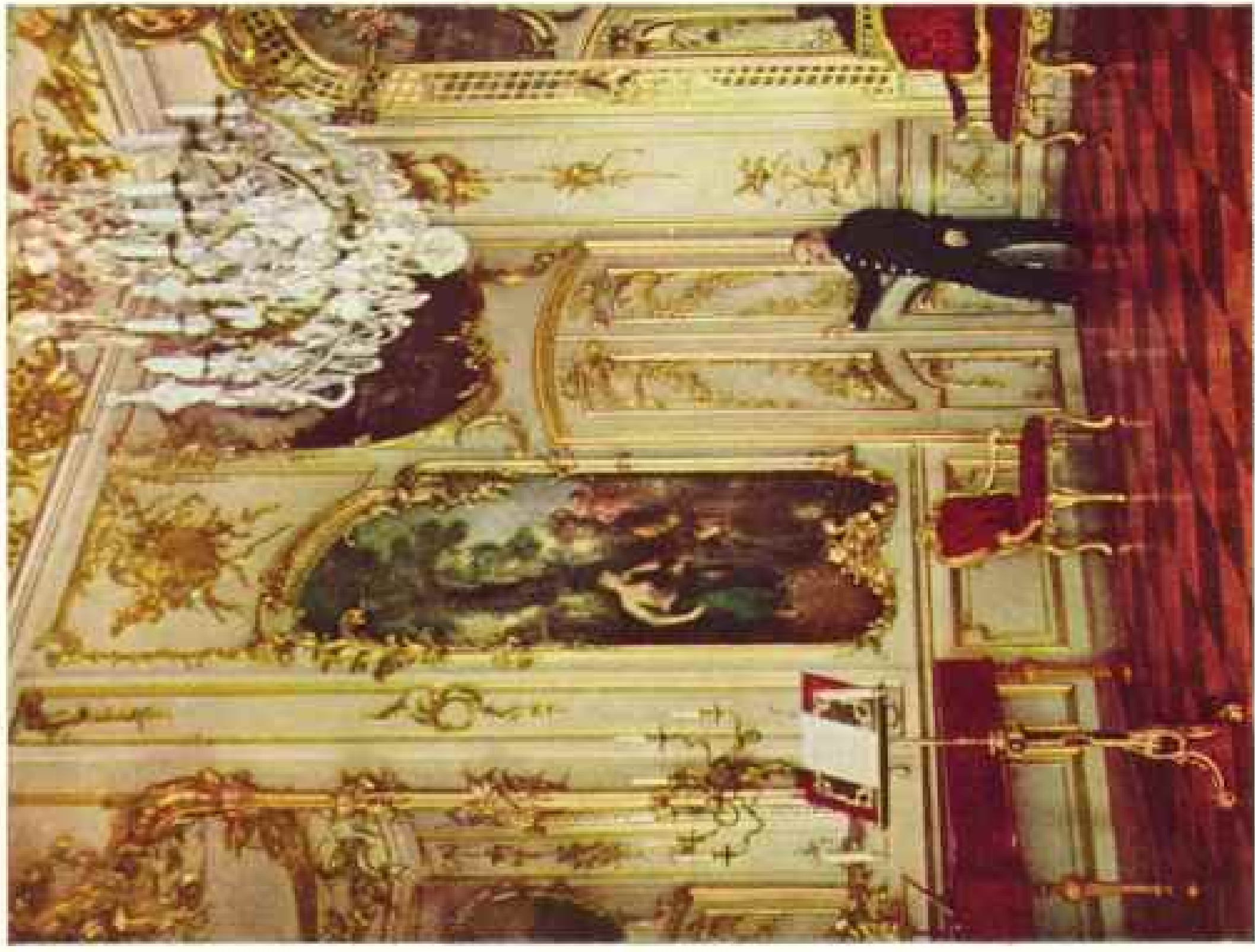
IN SUMPTUOUS, GLITTERING DAYS OF EMPIRE, SANSSOUCI PARK WAS  
A SHOW PLACE OF EUROPE

To the French Ambassador Frederick the Great once complained that oranges did not thrive here.  
"Maybe not," flashed the Frenchman diplomatically, "but Your Majesty's laurels do!"



© National Geographic Society  
**APPROXIMATELY FREDERICK THE GREAT SOUGHT IN VAIN TO BUY THIS WINDMILL.**

The story goes that the King, annoyed by the sound of the mill near his palace, brought suit to make the owner sell — and lost the case.



Finlay Photograph by Wilhelm Tolburo  
**HERE FREDERICK WAS WONT TO PLAY HIS FLUTE AND ARGUE WITH VOLTAIRE**

At Potsdam, where Frederick William I painted portraits of his generals, his son, Frederick the Great, built this one-story palace (opposite page).



© National Geographic Society

Today Photograph by Wilhelm Tolbin

ALTHOUGH ITS IMPERIAL POMP AND GLORY ARE FLED, FADED SANSSOUCI PALACE REMAINS AN OBJECT OF CURIOSITY TO SIGHT-SEERS. For 40 years this was the almost constant home of Germany's eccentric Frederick the Great. Near by his greyhounds are buried. Frederick died in the palace at 20 minutes past two on the morning of August 17, 1786, and at that very moment his clock, legend says, stopped running. "never to go again."



WARSHIPS, TANKERS, FREIGHTERS, LINERS—YOUNG GERMANY LEARNS TO BUILD THEM ALL IN THIS SHIP MODEL SCHOOL AT POTSDAM

Fascinatingly like real, full-sized craft are these model vessels, built on a scale of 1 to 20. At the left is a Lilliputian version of Germany's 10,000-ton "pocket battleship," the *Deutschland*.



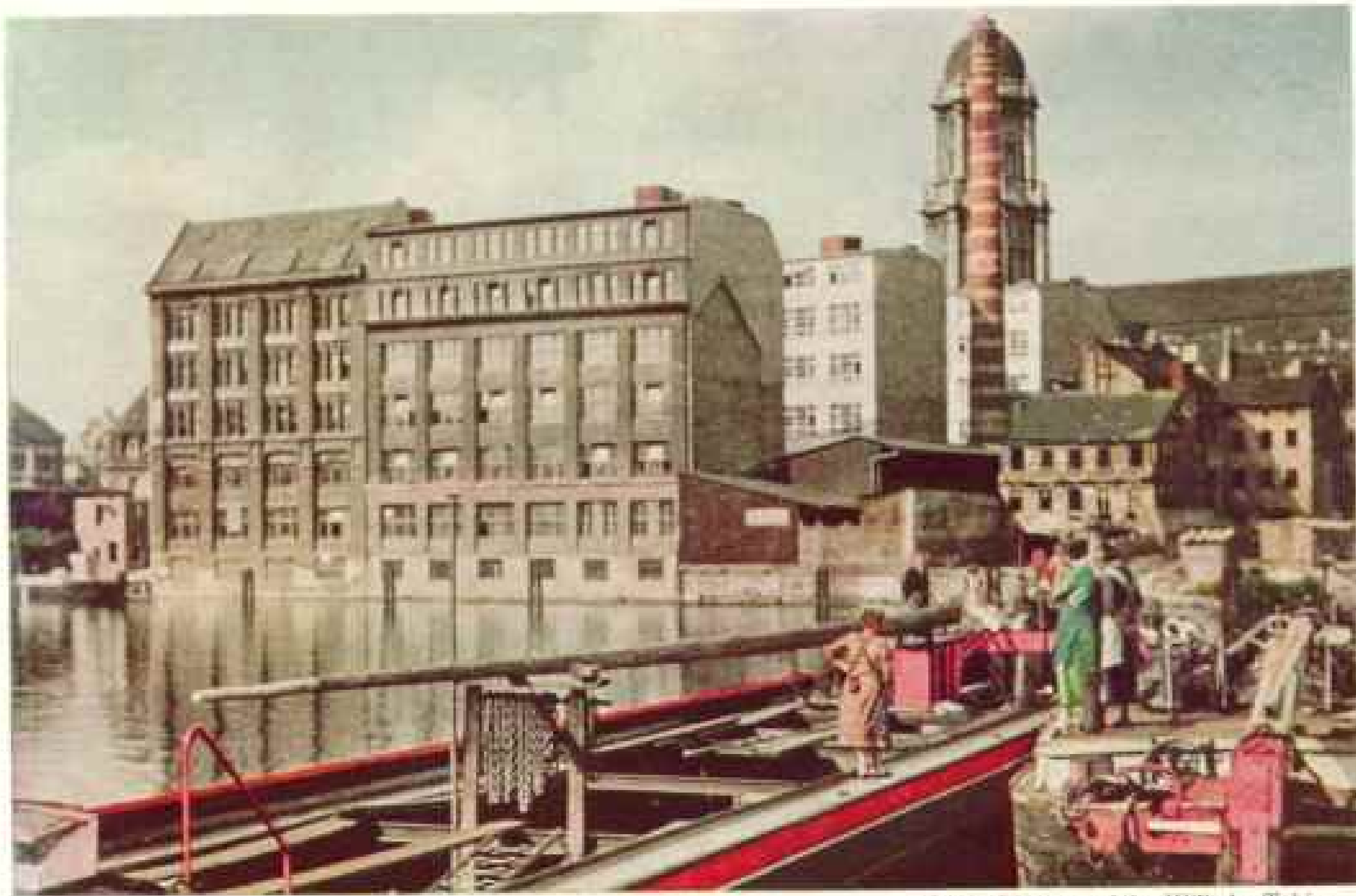
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Finlay Photographs by Wilhelm Tobien

LIKE A WIDE ARTERIAL STREET OF WATER, THE NAVIGABLE SPREE CARRIES COMMERCE INTO THE HEART OF BERLIN

Tugboat and barge are tied up near important freight depots; busy Humboldt Hafen lies not far from the Lehrte Railroad Station, which rises beyond the Moltke Bridge.

LIFE AND LUSTER OF BERLIN



Finlay Photograph by Wilhelm Tobien

NEXT-DOOR NEIGHBORS FOR AN HOUR: RIVER BOATS TIE UP ALONGSIDE AND FLOATING HOUSEWIVES EXCHANGE GOSSIP

Warehouses and factories are clustered along the Spree to take advantage of cheap transportation by water (Plate XV). Near the river stands the Stadthaus, or Town Hall.

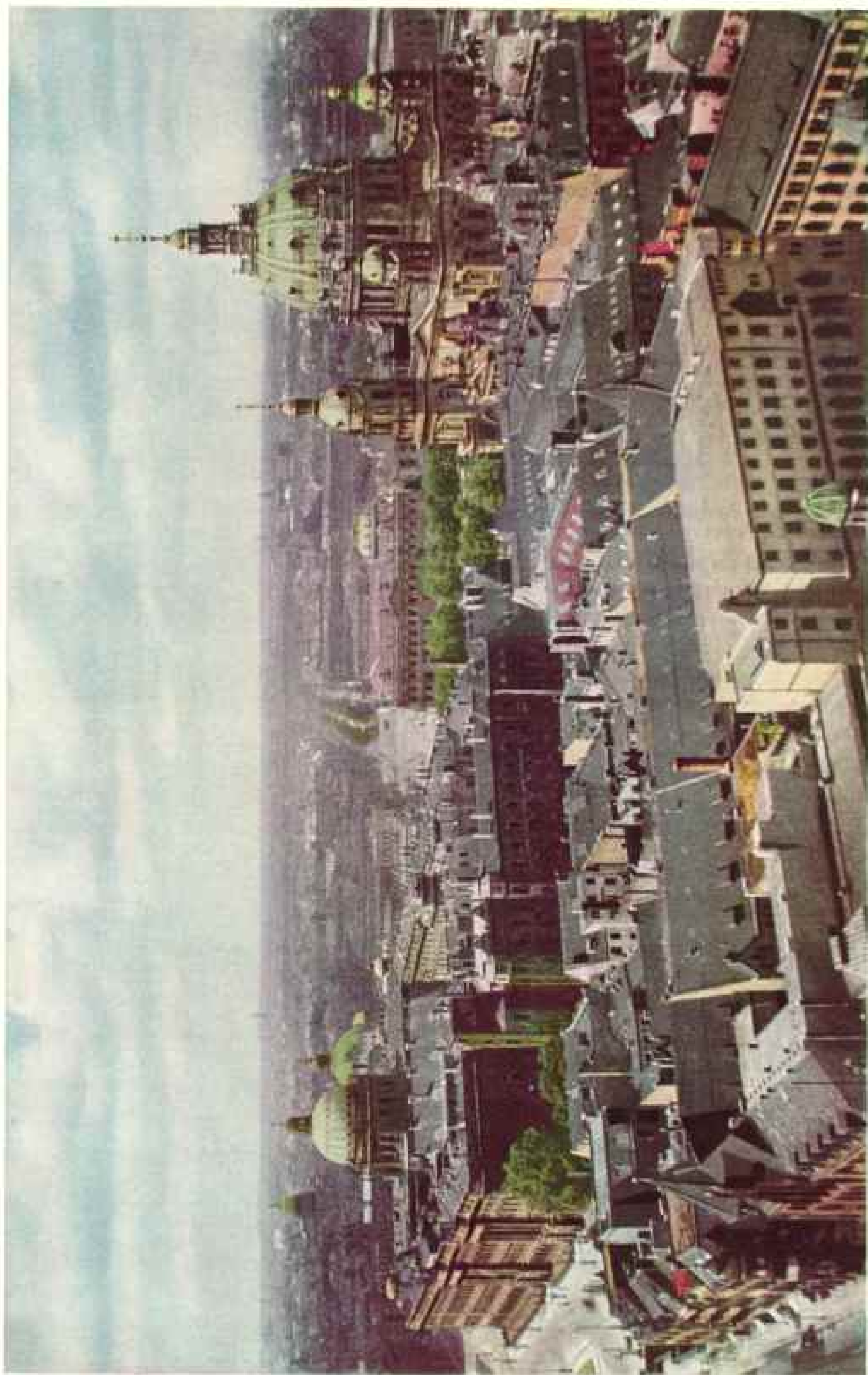


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Agiacolor Plate by Hans Hildenbrand

RIVERS AND CANALS TIE BERLIN TO MUCH OF WESTERN EUROPE AND HELP MAKE IT A TEEMING TRADE CENTER

Spanning the Spree is the sturdy Oberbaum Bridge, with its towers, built forty years ago. Beside it (at the left) is a modern preserving plant which holds literally millions of eggs.

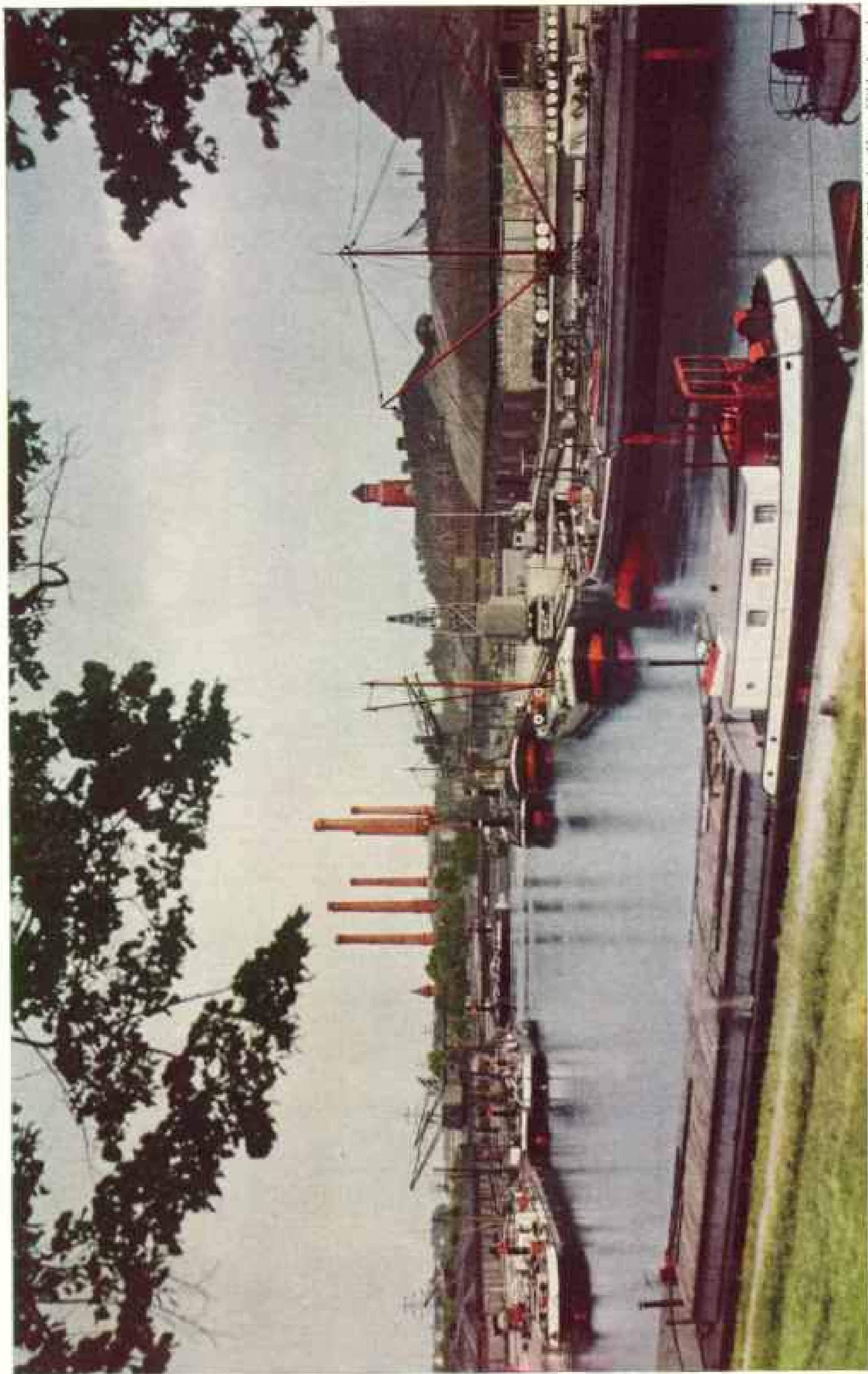


© National Geographic Society

Agricultural Plate by Hans Hildebrand

BERLIN, WITH MORE THAN 4,200,000 INHABITANTS, IS THE WORLD'S FOURTH LARGEST CITY

Only New York, London, and Tokyo exceed the German capital in population. Though mentioned in history as early as 1237, Berlin is essentially a city of modern times, having grown enormously in the past century. In the distance stretches Unter den Linden, with its old trees, since destroyed (Plates III and IV). At the right appears the Cathedral (Plate I); at the left the Schloss, former palace of the Prussian kings, now a museum (Plate II).



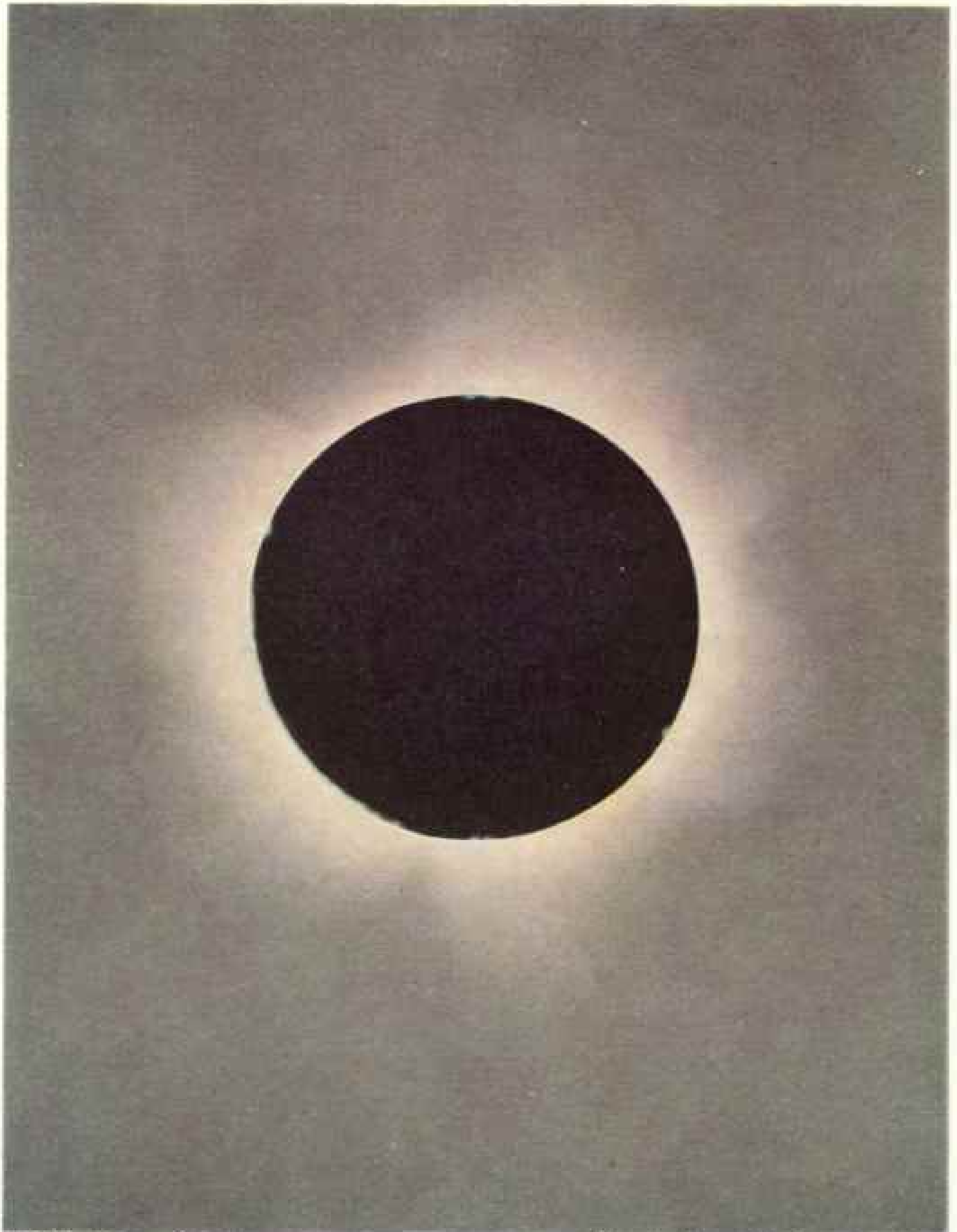
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Agfacolor Plate by Hans Hildenbrand

PRODIGIOUS QUANTITIES OF COAL, GRAIN, AND OTHER VITAL FREIGHT MOVE THROUGH BERLIN'S VAST WEST HARBOR.

Since Hamburg, Berlin, Rhine cities, and others are tied by canal and river traffic, the inland waterway system here much resembles China's in importance to trade. River workers' families live on the boats, as in the Orient (Plate XIII).





© National Geographic Society

Dufaycolor Photograph by Irvine C. Gardner

IN THE FIRST NATURAL COLOR PHOTOGRAPH OF AN ECLIPSE EVER REPRODUCED, THE CORONA FLARES INTO VIEW AS THE MOON BLOTS OUT THE SUN

Normally invisible because of the sun's greater brilliance, the corona's blazing gaseous mass is always present, but cannot be seen except during a total eclipse. The most striking feature of this photograph is that the sun's chromosphere (a layer of incandescent gas whose lower left-hand edge is not yet eclipsed) and the bright prominences rising from around the sun, appear bluish-white instead of red, as heretofore depicted. The notches in the moon's rim are not real, but are caused by light spreading from the prominences. This one-second exposure was made by the National Geographic Society-National Bureau of Standards Expedition on June 19, 1936, at Ak Bulak, U. S. S. R.

# OBSERVING AN ECLIPSE IN ASIATIC RUSSIA

BY IRVINE C. GARDNER

*Leader of the National Geographic Society-National Bureau of Standards Eclipse Expedition*

UNDER the sponsorship of the National Geographic Society and the National Bureau of Standards, it was my good fortune to observe in Asiatic Russia the solar eclipse of June 19, 1936. Excellent weather conditions permitted the making of satisfactory photographs of the solar corona in black and white and also in color. This successful outcome enables THE NATIONAL GEOGRAPHIC MAGAZINE to reproduce the first natural-color photograph of a total eclipse ever published (opposite page).

Observation of a total solar eclipse is one of the most thrilling gambles of scientific research. After elaborate and highly specialized apparatus has been built, taken possibly a third or halfway around the world, and set up with meticulous care, the best that can be hoped for usually is two or three minutes of observing time.

Even that outcome is entirely dependent upon the caprice of the weather. A tiny cloud over the sun may spoil everything. Dame Nature must have been in a truly sporting mood when she provided the eclipse-producing mechanism for the earth.

## ECLIPSES FREQUENT ON JUPITER

She did much better for Jupiter. Jovianians, if there were such people, would be well supplied with solar eclipses by the several moons large enough to produce them frequently. In fact, it is not unusual for two or three total solar eclipses to be proceeding on Jupiter at the same time.

From the earth, with a telescope of moderate size, one may see the black, approximately circular shadows of the satellites as they travel across the disk of Jupiter. These shadows represent regions of total eclipse on that planet.

The earth, however, has only one moon. Its orbit and size are such that it appears slightly smaller than the sun when it is most remote from the earth and a little larger in its nearer positions. Its path comes directly between the earth and the sun only at rare intervals. Then, if it is sufficiently near the earth to blot out the sun entirely, its elliptical shadow lying on the earth is the area within which the sun is totally eclipsed.

As a result of the rotation of the earth and the apparent motions of the sun and

moon, this elliptical shadow sweeps over a long, narrow strip extending approximately a third of the way around the earth. Only along that path is a total solar eclipse visible.

Eclipses seem to have a predilection for visiting inaccessible places. The coming eclipse of June 8, 1937, for example, will have a maximum duration of seven minutes and four seconds, an extraordinarily long period, but the region from which it can be viewed lies almost entirely in the Pacific Ocean and there are only a few small islands which afford sites for eclipse expeditions.\*

The eclipse of 1936 was much more accommodating. It was total over a narrow shaded strip beginning in the Mediterranean south of Italy, crossing Greece and Soviet Russia, and ending in Japan. In central and eastern Siberia, the only territory conveniently accessible was that along the Trans-Siberian Railroad; indeed, the central line of this eclipse path followed the railroad so closely as to cross it five times.

An early problem of an eclipse expedition is the selection of a site.

Near the middle of this strip of territory the eclipse would be at noon, an advantage because of the height of the sun at that hour and the consequent increased duration of the eclipse. The probabilities of fair weather, however, had also to be taken into consideration.

## SITE STUDIED TWO YEARS IN ADVANCE

The U. S. S. R. Government generously authorized a study of the advantages and disadvantages of different possible locations for eclipse expeditions. This study was made two years in advance of the eclipse, and the results were published in English by Dr. B. P. Gerasimovič and Dr. H. J. Ščerbakova, and by Dr. A. Michailov. These publications enabled foreign astronomers to compare the advantages and disadvantages of different parts of the total eclipse region lying within Russia.

Taken into consideration were the probability of a clear sky, temperature, freedom from dust storms, freedom from strong winds which might shake the instruments,

\* See "The Society's New Map of the Pacific," by Gilbert Grosvenor, NATIONAL GEOGRAPHIC MAGAZINE, December, 1936



Photograph by Merril M. Gardner

ADDRESS: "LATITUDE  $51^{\circ} 1'$  N., LONGITUDE  $53^{\circ} 39'$  E."—AND THE MAIL CAME THROUGH WITH ONLY THAT DESIGNATION!

An American-built radio station was parked between the two "hotel" cars. A laboratory in the baggage car, center, enabled men of the Harvard-M. I. T. group to study the effect of the eclipse on radio transmission. One night they talked to an amateur in England, and soon were besieged with calls from other Britishers who had listened in. The scientists broadcast their location in astronomical fashion and received letters with no other address than the latitude and longitude above. The sleeping car next to the two porters contained the dining salon.

convenience of living conditions, and many other factors.

The village of Ak Bulak, in Asiatic Russia, was selected as an observation site. This village, in the Autonomous Kazak Republic, situated about 60 miles southeast of Orenburg, where the Kirghiz Steppe begins, could be reached conveniently from Moscow (Moskva), and the probability of fair weather there was high.

The Harvard-Massachusetts Institute of Technology and Pulkovo expeditions had selected the same site—a real advantage to us because our work, which was limited to corona photography, did not overlap that of the other two observatories. Thus the different expeditions could be of material assistance to each other.

Prof. Donald H. Menzel, leader of the Harvard-M. I. T. expedition, agreed to our plan, and the U. S. S. R. Government, through Dr. Gerasimovič, Director of the Pulkovo Observatory at Leningrad, gave Mrs. Gardner and me permission to enter

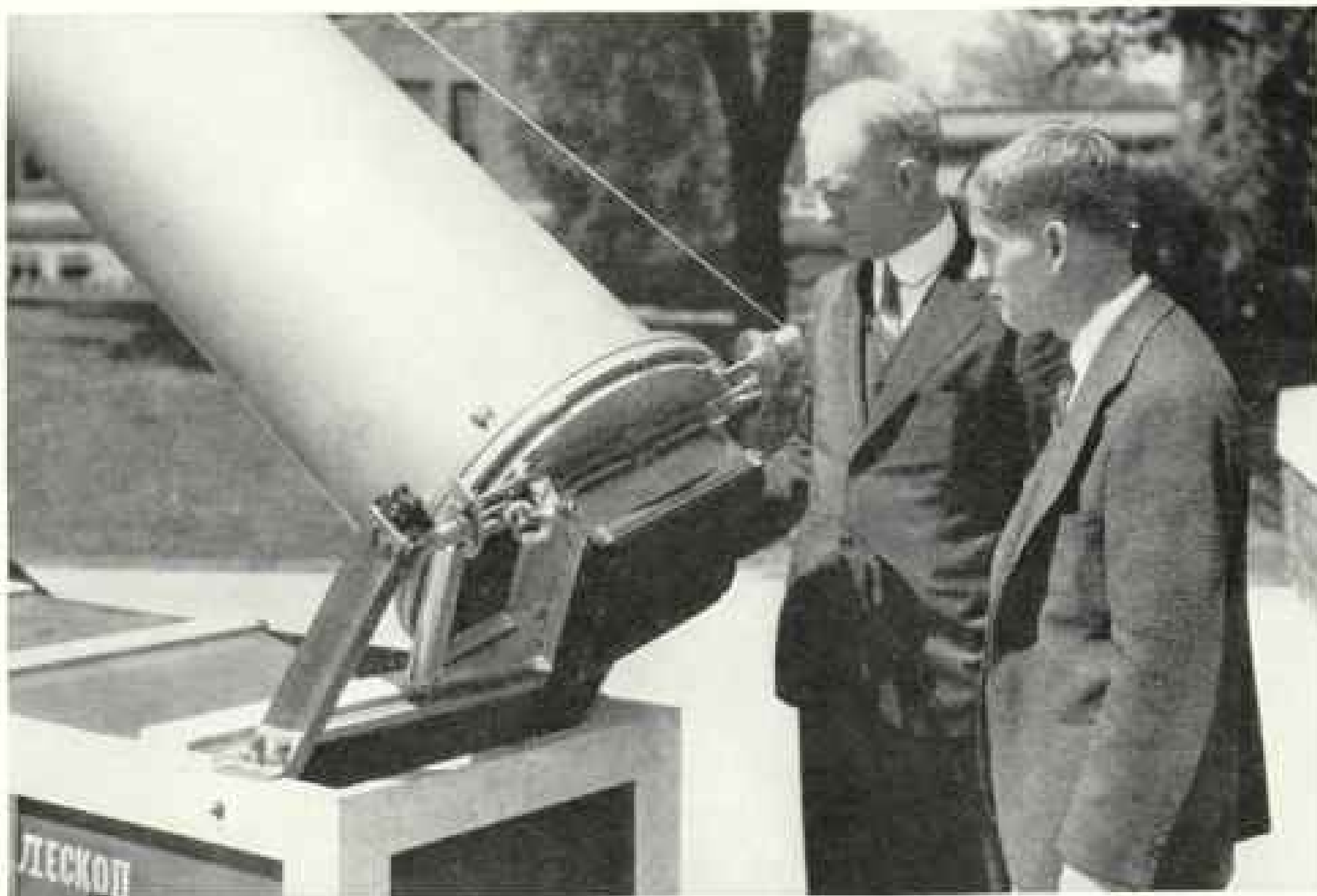
the Soviet Union as scientific observers and to bring in instruments for use at Ak Bulak.

#### A HALF TON OF EQUIPMENT

Even for our modest expedition, approximately a half ton of scientific apparatus and camping materials was transported, as personal baggage, more than a third of the way around the earth and through many customs barriers.

Food and a complete camping equipment were taken because we were not certain what type of accommodations might be available. Photographic chemicals were weighed out ready for use, and the photographic plates had to be kept cool during the entire journey.

The publications mentioned (page 179) gave a careful and detailed discussion of the characteristics of the region in which Ak Bulak is situated. We knew that the probability of a clear sky was as good there as at any place along the eclipse path, that the dangers from winds and



Photograph by Charles Martin

DR. LYMAN J. BRIGGS AND THE AUTHOR INSPECT THE CAMERA'S "BUSINESS END"

Dr. Briggs, Director of the National Bureau of Standards, at Washington, D. C., examines the clockwork mechanism which slowly moves the boxlike plateholder, so that the photographic plate follows the sun's motion, thus making it possible to take time exposures of the eclipse. The clockwork is driven by a weight attached to the wire. The telescope is set up for a test in the grounds of the National Bureau of Standards, where the camera was made and where optical glass was manufactured, ground, and polished for the 9-inch lens especially designed for photographing the sun's corona (Color Plate XVI and pages 182, 183).

dust storms were not so great as at points nearer the Caspian Sea, and that the village was accessible.

We also knew that Ak Bulak was approximately eight or nine miles from the center line of the eclipse. But we did not know whether we should stay at an eclipse camp near the center line or whether we should live at Ak Bulak and make daily trips to the camp.

The only obtainable description of our base of operations was:

"Ak Bulak: (51° 1' N, 55° 39' E)—a station and town on the Orenburg-Tashkent railroad, 17 km. from central line (of eclipse). Administrative center of a small district: power stations, meteorological station, good water, hospital, railroad mechanical shops, etc."

In making our plans, it was natural to think of Russia as a cold country. "Michael Strogoff," "Napoleon's Retreat from Moscow," "Anna Karenina," in the motion pictures, and other stories, have emphasized

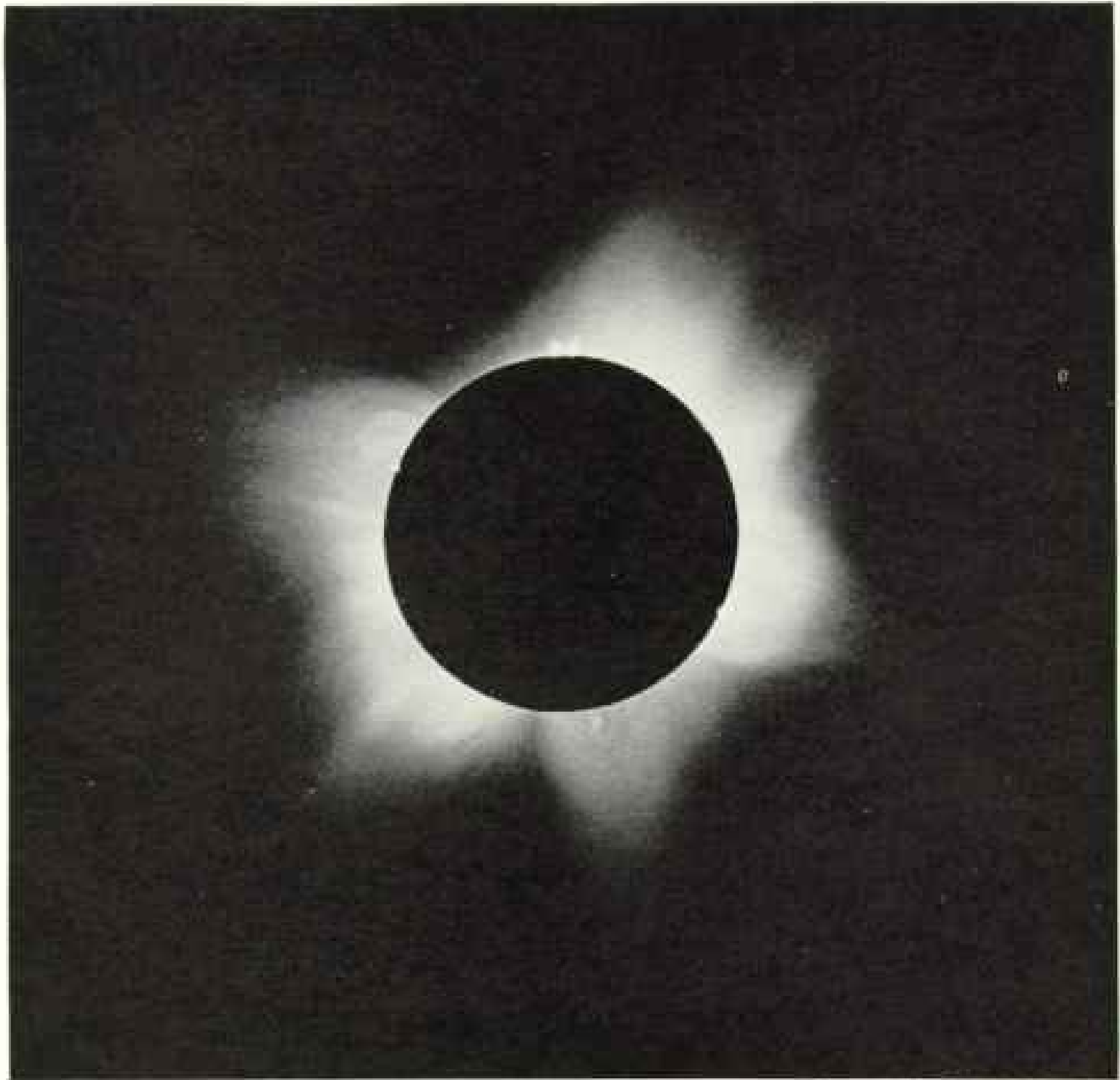
the snow and wolves which one is apt to believe are characteristic of the U. S. S. R. at all times. For some reason Russian summers seem not to figure prominently in our fiction.

"FROZEN RUSSIA" PROVES TO BE WARM

Actually, when we arrived at Ak Bulak, we found ourselves in a very warm country, entirely without natural shade, and with midday temperatures of 90 degrees Fahrenheit, or higher. Fortunately, although the elevation was not great, the hot days were followed by cool nights.

In Washington, D. C., our apparatus was completed, tested, and packed, and we started out with high hope that the big gamble on the weather would be successful.

We went by way of Berlin and Warsaw (Warszawa), entering Russia at Negoreloe, near Minsk. Soon after passing through the large arch which signalizes entry into the country, we arrived at the station and customs, housed in a modern building



Photograph by Irvine C. Gardner

PEARLY WHITE, THE CORONA'S IRREGULAR SHAPE VARIES FROM YEAR TO YEAR

By contrast with it, the moon's face during a total eclipse seems a much deeper black than ordinarily is seen in any black object on the earth. This one-second exposure was one of eight "shots," six in color and two in black and white, made with the big eclipse camera of the National Geographic Society-National Bureau of Standards Expedition (Color Plate XVI and opposite page).

with a spacious, conveniently arranged room for the examination of baggage.

The routine here was much the same as in other countries, except that magazines and written matter were perhaps more closely scanned.

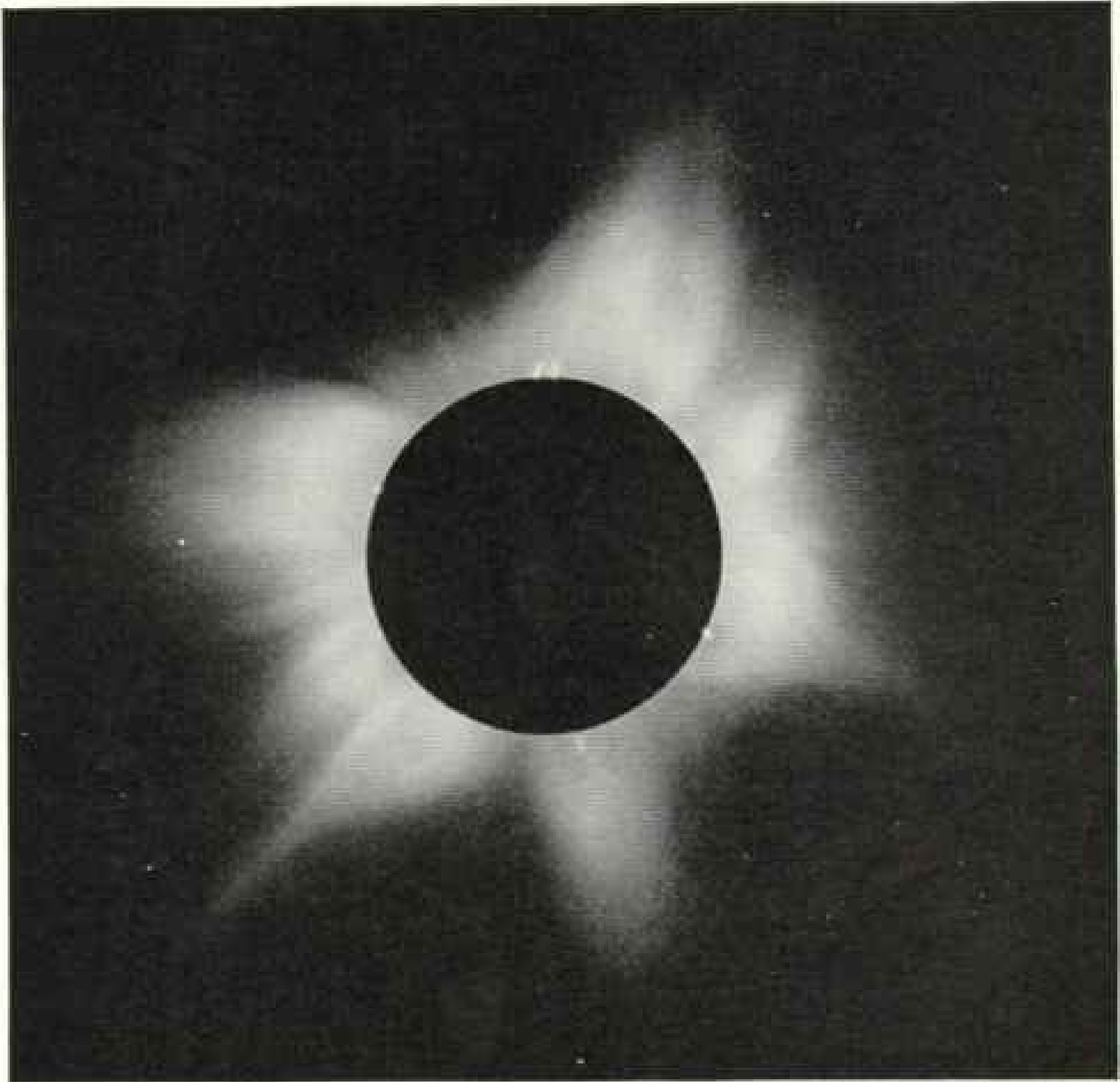
The English-speaking representative of Intourist (the Soviet travel agency) met us with the welcome news that the chests containing our telescopes and equipment had been received and forwarded to Ak Bulak.

From Negoreloe it was an overnight journey to Moscow.

From Moscow we proceeded directly to Ak Bulak. This village lies approximately

eight hundred miles southeast of Moscow, on the railroad which extends to Tashkent and Samarkand. Dr. B. Novakova (Miss Novakova) and a student, who were the advance members of the eclipse party from the Prague (Prahá) Observatory, which was to be stationed at Sara, accompanied us as far as Orenburg.

We were elated when we learned that a special car was provided for us four observers. Also aboard it were our Intourist English-speaking guide, a porter, and a brakeman. This special car was to serve as a hotel at Ak Bulak for us and for others who were to arrive later. The car had a salon at the end and, being last on



Photograph by Irvine C. Gardner

#### GAUZE-LIKE STREAMERS OF THE CORONA SHOOT OUT MILLIONS OF MILES

If the earth could be pictured in these flames, it would appear approximately the size of the period at the end of this sentence. Some of the streamers extend beyond the limits of the photograph (page 192). Scientists believe that the corona holds clues to the composition of the sun, whose heat and energy make life possible on earth. This 10-second exposure reveals a much greater extension of the corona than is shown on the opposite page. The short projections from the moon's disk, a double one at the top and others on the sides and bottom, are the prominences, which are incandescent hydrogen.

the train, furnished us with a fine observation place.

#### RUSSIAN PLAINS RESEMBLE THE AMERICAN MIDDLE WEST

The country which we saw on this journey reminded us, in its physical characteristics, of the American Middle West. We were traveling through a vast prairie which was then very hot, with the evidence of rainfall decreasing as we proceeded. Many river beds which evidently carry large streams at certain times of the year were dried-up beds of sand.

When we reached Ak Bulak, our additional car was greeted with enthusiasm by members of the Harvard group. They already had been there approximately three weeks, and needed the additional sleeping quarters into which they might expand from their original and much overcrowded car.

With our arrival the rolling stock, which constituted the hotel, consisted of two sleeping cars, each of which contained a salon in addition to the sleeping compartments, and a baggage car located on a temporary siding not far from the station.



Photograph by Irvine C. Gardner

TRUCKLOADS OF FARMERS CAME FROM MILES AROUND TO VISIT THE ECLIPSE CAMP

The solar phenomenon of 1936 made their remote corner of the world a goal for observers from distant America. Here one of the Russian astronomers (in dark coat and cap, upper right) demonstrates the scientific apparatus. Behind the two girls, foreground, is the clockwork driving mechanism for one of the Russian-made instruments used by the Pulkovo Observatory's expedition, which camped near the Americans.

The baggage car was the laboratory of the four radio men from Harvard. They had brought equipment for studying changes in the ionosphere which might be indicated by changes in radio transmission during the eclipse.

At this time, approximately three weeks before the eclipse, the party consisted of the radio men, six members of the Harvard astronomical group, and the two members of our expedition.\* About a week before the eclipse others began to arrive.

One car had a small galley which served as a kitchen for warming the food and washing dishes. The salon in this car was both dining room and living room. Our meals were prepared at the restaurant in the railroad station and carried to the car

\* Besides Mrs. Gardner and the author, there were Professor and Mrs. Donald H. Menzel, and Mr. Henry Hemmendinger, of the Harvard Astronomical Observatory; Prof. Joseph C. Boyce, of Massachusetts Institute of Technology; Prof. Robert d'E. Atkinson, of Rutgers University; Prof. Wallace R. Brode, of Ohio State University; Mr. H. Selvidge, Mr. Paul King, Mr. J. A. Pierce, and Mr. E. P. York, of the Craft Laboratory of Harvard.

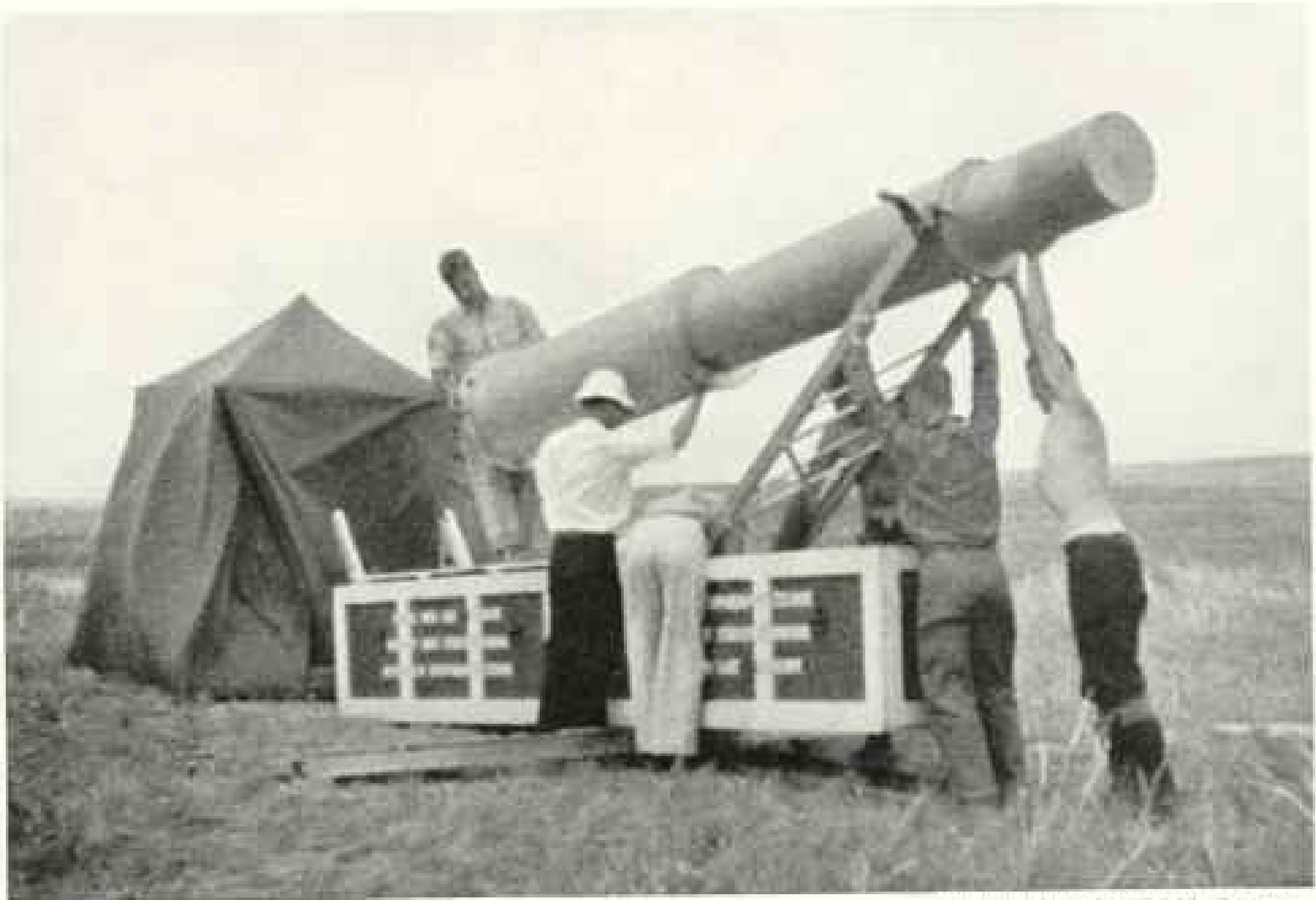
to be served. We did not need the food which we had brought with us and much of it came back to the United States unopened.

We found Ak Bulak, with its Eastern flavor, an interesting village. The Kazaks, most of whom were genial, are Turkish in origin, with nomadic traits. We never tired of watching them. It seemed impossible that so many different combinations of clothing could be worn, always with an Oriental touch.

The population in the village was divided, perhaps about equally, between the Russians and the Kazaks, who have separate schools. In the Russian schools Russian is taught as the native language, and Kazak as the favored foreign language. In the schools attended by the Kazaks the situation is the reverse.

The Kazak language is entirely different from Russian and has an alphabet resembling the Arabic in appearance.

Immediately after our first dinner in Ak Bulak, we started on a tour of the town. Because of its northerly location, the



Photograph by Merriell M. Gardner

SETTING UP THE ECLIPSE CAMERA WAS LIKE GETTING A LONG-RANGE GUN INTO ACTION

Neighbors from the Harvard University-Massachusetts Institute of Technology camp helped Dr. Gardner erect the 14-foot aluminum telescope on an ancient burial mound about nine miles from Ak Bulak. The upright support had been constructed, in Washington, D. C., of the proper length to aim the camera point-blank at the sun at the moment of eclipse (page 194). The tent sheltered working parts of the instrument and housed Dr. and Mrs. Gardner the night before the eclipse.

twilights are long. We had, therefore, plenty of time to see the hospital, the apartments being built for the railroad workers, and a number of private homes under construction. There appeared to be a mild building boom in the town.

We watched the builders make the molded blocks from clay and straw, and saw the piles of blocks which had been sun-baked. Some workers were laying the blocks into walls and others were roofing their houses with adobe supported by poles.

ADOBE HOUSES ARE "AIR-CONDITIONED"

The houses are built in a workmanlike manner, with the corners square and the walls plumb. After the blocks are laid, the walls are plastered inside and out, and the exterior is "whitewashed," the base of the wall being generally brown and the upper part white.

Window and door frames of the more ornate houses are decorated with elaborate and finely detailed fretwork. Lumber, which has to be brought a long distance at

considerable expense, does not make suitable building material for the extremes of the climate. The thick walls and small windows of the adobe houses keep the interior surprisingly cool in the summer and warm in winter (page 186).

As we continued our walk, we saw some of the villagers enjoying the cool twilight sitting on their front "porches," adobe ledges built across the fronts of the houses about a foot from the ground. We admired the newly whitewashed exteriors and the clean courtyards which belonged to each peasant's home.

It is not easy to grow grass or flowers in this semi-arid sand, but in front of many of the houses were circular plots of well fertilized soil in which trees had been planted.

At many windows were geraniums, begonias, or other flowering plants. The homes were laid out along very wide, straight streets, some of which had a fairly good covering of grass, but most of them were too sandy for grass.





Photograph by Irvine C. Gardner

DRIVEN LIKE A HORSE IN HARNESS, THIS "SHIP OF THE DESERT" BRINGS WATER TO THE EXPEDITION CAMP

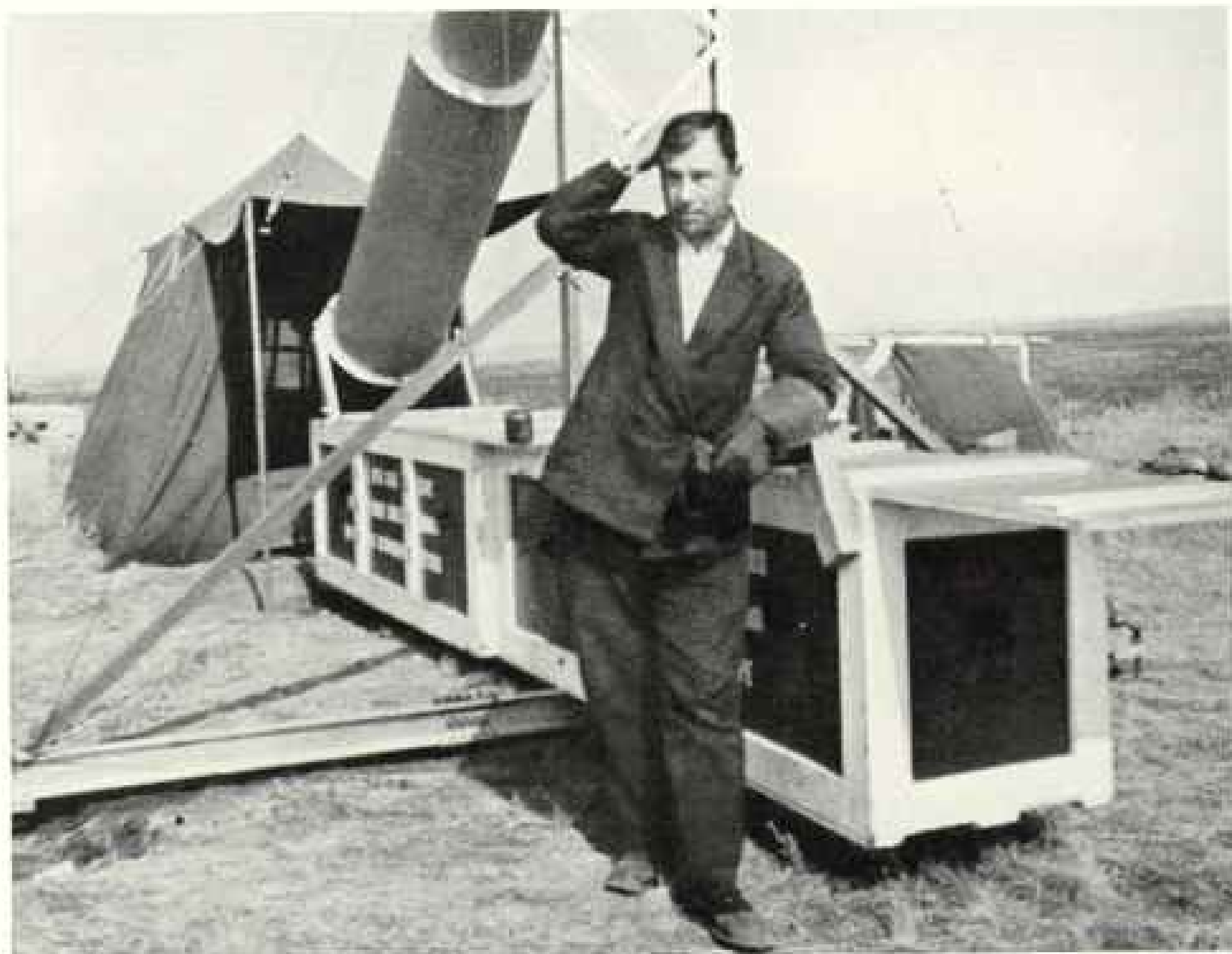
Much of the treeless steppe country is virtually without water most of the year. The eclipse expedition's supply for photographic purposes was obtained at holes remaining from a dried-up river; drinking water was brought in carboys from Ak Bulak.



Photograph by Meriel M. Gardner

HÄNSEL AND GRETEL MIGHT MISTAKE THIS AK BULAK HOME FOR THE OLD WITCH'S GINGERBREAD HOUSE

Its walls, however, are of clay and straw blocks, plastered and whitewashed, and the elaborate fret-work is cut in wood (page 185). These adobe houses are cool in summer and warm in winter.



Photograph by Merriell M. Garbner

NIKOLAI AND A RUSSIAN-BUILT FORD WERE ASSIGNED BY THE GOVERNMENT TO SERVE THE EXPEDITION

"He had great faith in our ability to learn Russian," says the author, "and taught us many words by a skillful use of the sign language on our trips between Ak Bulak and the eclipse camp" (page 188).

Our walk led to a little river partly obscured by some of the few trees of the region. A small cart carrying a barrel and drawn by a bullock had been backed into the stream by two boys who were filling the barrel with water, using their hats and their hands. The road, passing through the stream and winding up one of the few hills of this region, provided a delightful background for the scene.

From the hilltop the town extended before us with its pleasing contrast of white-washed homes and blue haze. We heard the European cuckoos calling to each other in the willows along the river. Much more familiar with clocks than with cuckoos, we decided that the cuckoos cleverly imitated our well-known Swiss clocks.

Although Ak Bulak has a population of 9,000, it did not, with its small business section, appear to be as large as an American city of that size. The public bath was an adobe building with hot shower and steam baths. There was an abundance of

hot water, and a tub was added for the use of the eclipse group.

The electric-light plant was driven by a Diesel motor. A grain elevator, a grist-mill, a telephone system, a bank, several stores, a barber shop, and railroad shops completed the business district.

#### THE "HOUSE OF CULTURE AND REST"

Each Russian town now has its park with a clubhouse, or "House of Culture and Rest," as it is called. We passed two pleasant evenings in the one at Ak Bulak. Trees had been plentifully planted in the park and there were the usual opportunities for chess, pool, dancing, and amateur dramatics.

The play we attended was didactic, and taught that a wife should not be required to work in the kitchen if she has talent for a professional career. In this drama it developed that the husband and wife were both architects, and the wife was much the more talented of the two.



Photograph by Irvine C. Gardner

LUNCHEON IS INFORMAL, AND SO ARE CLOTHES, WHEN SCIENTISTS MEET ON THE STEPPES

Mrs. Gardner and members of the Harvard-M. I. T. group enjoy a meal which was sent out from Ak Bulak, warmed at camp on a portable gas stove, and served on packing boxes marked with the Harvard "H." Behind the tent, the author's camera is aimed at exactly the right angle to "shoot" the eclipse, so that none of the 117 seconds of totality need be wasted in making adjustments.

The native Russians were as cordial and friendly with us as they could be with the language barrier. A few who spoke German were most helpful; we could talk with them freely. Our chauffeur never missed an opportunity to teach us Russian words by means of an ingenious sign language as we traveled back and forth between Ak Bulak and the eclipse camp (page 187).

CAMELS DRAW MOWING MACHINES

Transportation in Ak Bulak takes varied forms. On one of our trips to the camp

a motor truck, our Russian-built Ford, and three low-wheeled carts, one drawn by a horse, one by bullocks, and one by a camel, arrived at a crossroad about the same time. Mules also are used.

We were rather nonplussed at first when we saw camels, the "ships of the desert," ignominiously drawing mowing machines. Russian-built tractors and combines were available on the farms, and we saw numbers of them passing through on the trains for more distant points.

Ak Bulak was approximately nine miles from the center of the total eclipse zone. For convenience we maintained our headquarters in the group of cars in the village, but the eclipse apparatus was set up on a hill, which was

really an ancient burial mound, only a short distance from the center line of the eclipse.

CORONA STREAMERS MAY BE MILLIONS OF MILES LONG

When we first arrived at this eclipse station or camp, the piers for the instruments for the three expeditions—the Russian, the Harvard, and our own—were in place; the common building, containing two dark-rooms, was under construction; and the Harvard tents were erected.

The diameter of the sun is approximately

864,000 miles. From its surface flamelike masses of incandescent hydrogen, termed prominences, reach sometimes several hundred thousand miles. Extending much farther from the sun is the corona, a gaseous mass irregular in shape, which has streamers that are often millions of miles in length.

The prominences and the corona are always present, but usually they cannot be seen because they are masked by the greater brightness of the sun, just as the stars are made invisible in daytime.

At the time of a total eclipse the moon, very accommodatingly, cuts off the direct light proceeding from the sun and, against the relatively dark sky, the corona stands out so brilliantly that it can be seen with the unaided eye.

Near the middle of the last century a method was discovered for viewing the prominences by means of a spectroscope attached to an astronomical telescope, and it is no longer necessary to wait for eclipses to study them. They are photographed daily, as a matter of routine, at Mount Wilson and other observatories.

The corona, however, has remained more elusive. Despite much effort and many attempts, no very satisfactory information regarding it can be obtained except during a total eclipse.



Photograph by Irvine C. Gardner

TOWNSFOLK HURRY TO MARKET, AND THE YOUNGER GENERATION GOES, TOO

"It is not easy to grow grass or flowers in this semi-arid sand," writes Dr. Gardner, "but in front of many of the houses were circular plots of well-fertilized soil in which trees had been planted." Some of Kazakhstan's towns have mushroomed as fast as American prairie centers, and have motion picture theaters.

It requires approximately an hour for the moon to travel across, and completely cover, the sun's disk. During this period the sun appears as a crescent gradually growing thinner, and a strange twilight fades rapidly into darkness. At the instant that the crescent disappears, the corona and the prominences become visible in all their glory (Plate XVI and pages 182-3).

The character of the corona varies from year to year. At this eclipse it was characterized by streamers several times as long as the diameter of the sun. On the



**THIS LITTLE COLT GOES TO MARKET WITH ITS MOTHER**

The wooden arch, to which a checkrein is attached over the mare's neck, holds the wagon's shafts in place. To enter an Ak Bulak home, one passes through the gateway into a courtyard.



Photographs by Irvine C. Gardner

**LIKE A CIRCUS PARADE IS AK BULAK'S TRAFFIC, WITH MANY KINDS OF MOTIVE POWER**

This team of yoked bullocks arrived at an intersection at about the same time as the expedition's Ford, a motor truck, a horse and wagon, and a camel-drawn cart. The community has several trucks and tractors, used for farming and in other Government work.



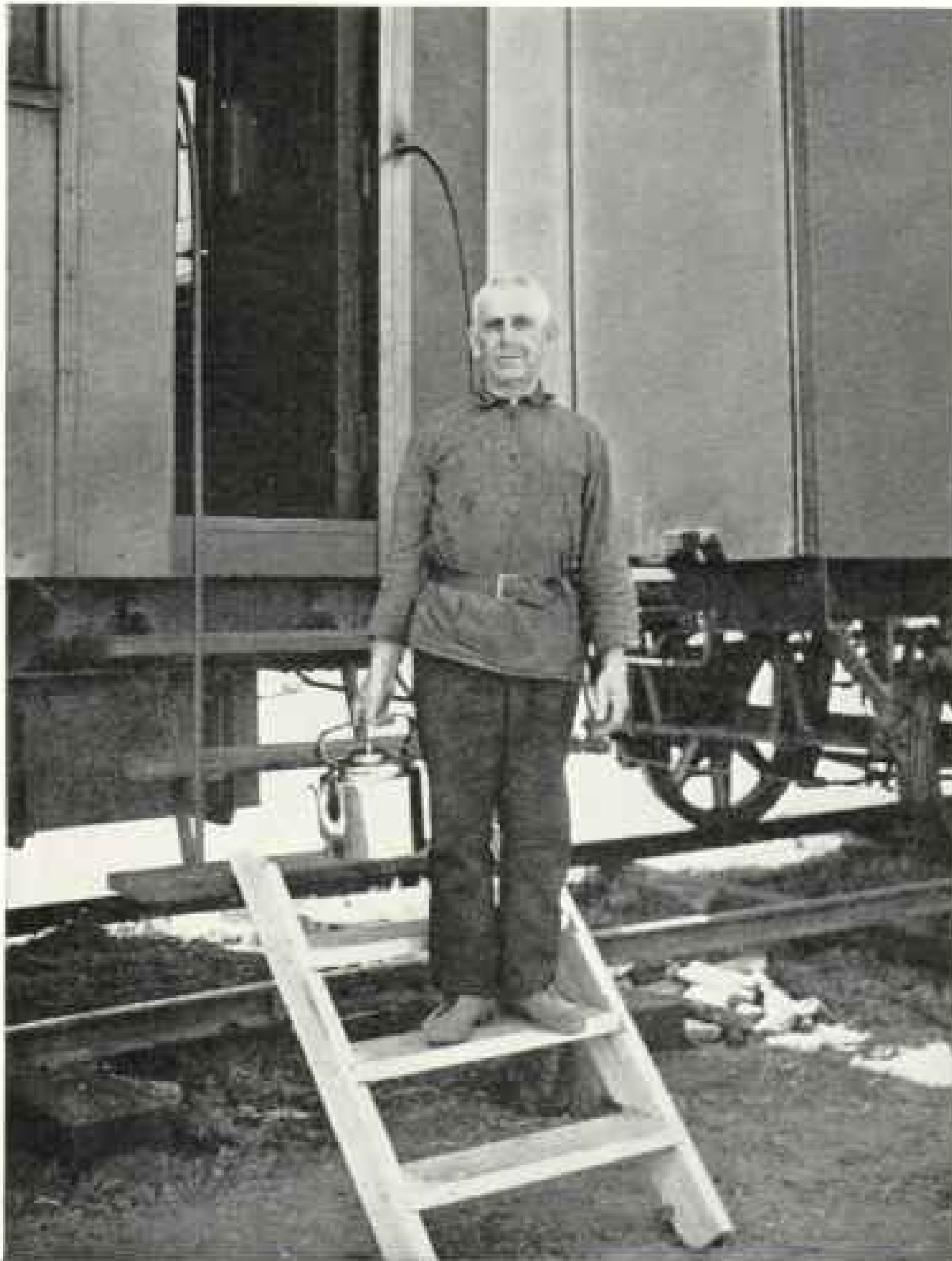
ON THE STEPPE A SCIENTIST EXPLAINS THE ECLIPSE TO VISITING COUNTRYFOLK. Many of these Russians are descendants of pioneers who began to colonize the vast grasslands of northern Kazakhstan at about the same time that the American plains were being settled.



Photographs by Irvine C. Gardner

A "RECEPTION COMMITTEE," 800 STRONG, WELCOMES THE AMERICANS

Here is only part of the crowd of workers who dressed up in their "rest day" clothes and greeted the scientists in front of their schoolhouse, near Ak Bulak. An American bull owned by the collective farm was proudly shown to the visitors.



Photograph by Irvine C. Gardner

THIS "HOTEL ON WHEELS" HOUSED THE ECLIPSE EXPEDITION AT AK BULAK

Containing sleeping quarters and an observation salon, the special car, provided by the Soviet Government, brought Dr. and Mrs. Gardner from Moscow to their goal in Karakistan, north of the Caspian Sea (page 182). Another car was devoted entirely to shower baths for the two American expeditions. Here one of the porters is on his way to fill a kettle with boiling water, supplied free to passengers at virtually every station in tea-loving Russia.

original negatives from which the illustration on page 183 was made, the streamers extend beyond the limits of the plate.

After about two minutes the moon, continuing its motion relative to the sun, exposes the crescent of the sun on the side opposite that where it had previously disappeared, and the period of totality is over. Approximately an hour later the moon has passed entirely from in front of the sun and its entire disk is again exposed.\*

Why should the astronomer be sufficiently interested in an eclipse to conduct such expensive studies of the corona, prominences, and solar spectra? There is no immediate utilitarian purpose served by these observations. The impelling motive is curiosity; but it is an intelligent and justifiable curiosity.

#### THE IMPORTANCE OF THE SUN

Almost all the energy on the earth has been given us by the sun. When we burn any of our fuels, utilize water or wind power, or enjoy the pleasant outdoor climate, we are using energy that has come directly from the sun or that has been received from it during the past ages.

The corona is a mantle, in some places millions of miles thick, surrounding this all-important celestial body. The

prominences are flames of incandescent hydrogen playing on its surface. The spectra tell us of the composition of the sun and also furnish important information regarding the chemical structure of the elements on our earth.

\* See "Photographing the Eclipse of 1932 from the Air," by Capt. Albert W. Stevens, and "Observing a Total Eclipse of the Sun," by Paul A. McNally, NATIONAL GEOGRAPHIC MAGAZINE, November, 1932.

Having once learned that advantageous study of these phenomena may be made at the time of an eclipse, it is difficult to see how eclipse observations can be neglected. Many of the greatest contributions that science has made to the convenience and pleasure of life date their beginning to the observation, by research scientists, of phenomena which, like eclipse study, gave no promise of utilitarian value.

DATA MUST BE  
OBTAINED IN  
A FEW MIN-  
UTES

The astronomer is interested chiefly in the phenomena which appear when the eclipse is total. He also is interested in the spectrum of the sun immediately before and after the period of totality. The sun's atmosphere is built up of concentric layers, and these are blocked out or exposed, one by one, as totality begins and ends.

The Harvard group had two large instruments, each carrying several spectrographs, which made photographs of the spectrum in rapid succession, beginning shortly before the period of totality and ceasing just after the period had ended.

By this procedure they were certain to record photographs of the "flash spectrum," which is the name applied to a



Photograph by Irvine C. Gardner

#### SWARTHY KAZAKS MINGLE WITH RUSSIANS AT AK BULAK'S MARKET

The genial natives are nominally Mohammedans, but the women go unveiled. This one wears a glittering earring and a tight headcloth to keep out dust. Kazaks (a branch of the Kirghiz) are of Turkish origin, with Mongolian physical characteristics. Subjugated by Genghis Khan, they later became part of the Golden Horde, which overran eastern Europe in the 13th century. Many still live as nomadic herdsmen, but in regions colonized by Russians the Kazaks also have settled on farms.

characteristic spectrum obtained when the moon has covered all the surface of the sun except a thin layer referred to as the "reversing layer."

#### PHOTOGRAPHING THE CORONA

During the period of totality these spectrographs recorded the spectra of the corona and prominences. The astronomers from Pulkovo also concentrated on spectroscopic observations of the sun. We had



no apparatus of this nature, but we had a camera for photographing the corona.

We used a camera with a specially designed lens, approximately nine inches in diameter, and with a focal length of 19 feet. The sun is of such a size that the diameter of its photograph is approximately one one-hundredth of the focal length of the lens used to make the picture. Consequently, with our lens, the image was approximately two inches in diameter.

This lens combined a large diameter with a relatively short focal length. Several advantages arise from this arrangement. It is approximately ten times as fast as a lens of the same diameter, but with a focal length of 60 feet or more, such as is often used for eclipse work (page 181).

In other words, a one-second exposure with the shorter focal length is equivalent to an exposure of 10 seconds with the longer focal length. This is of considerable importance when one has less than two minutes available for making pictures.

The camera was built of aluminum and, with the relatively short focal length, it could be made compact and self-contained. The portability was still further increased by the design of the mount. The packing cases, which were necessarily heavy to withstand the long journey, were made to serve a double duty. After arrival at the eclipse station they formed the base for the mount (page 185).

The National Bureau of Standards within its own plant conducted all processes necessary for the conversion of sand and the other required ingredients into a finished lens. This construction included the production of the optical glass, the computation of the curvatures of the different surfaces, and the grinding and polishing of the four components of the lens.

#### CHECK—AND DOUBLE CHECK!

During an eclipse, as at other times, the sun and the moon are moving across the sky. Since all eclipse exposures are time exposures, it is necessary to compensate for this motion if the picture is to be free from blur. This can be done by moving the entire camera to follow the eclipse, by employing a mirror to reflect the image of the eclipse into the telescope and slowly turning the mirror, or by moving the photographic plate so that it follows the image of the moving sun.

It seemed simplest to move the photo-

graphic plate, and this was done by a clockwork device.

At Ak Bulak we had to erect the camera and point it so that it would be aimed directly at the sun at the proper time on the morning of the eclipse. Adjustment had to be exactly right, for one cannot waste the few seconds of totality adjusting the telescope.

The latitude and longitude of the eclipse site had been known before the mounting was completed in Washington, D. C. Accordingly, the height of the sun at the time of the eclipse was computed, and the two uprights supporting the upper end of the telescope tube were made of the proper length for this eclipse. With the mount specially designed in this manner, there was no difficulty in getting the telescope adjusted at the proper elevation. An adjustable level was used to check this.

The telescope also had to be pointed in the proper direction. The camp had already been surveyed when we arrived, and stakes indicated the direction of the line pointing toward the eclipse. But no matter how great confidence one has in work of this character, everything must be checked and rechecked because of the terrible finality of a mistake before an eclipse.

The beam from the sun should come almost exactly down the center of the tube and form an image almost on the center of the ground glass used for focusing.

If clear days come shortly before the eclipse, the pointing of the telescope easily can be determined. The position of the sun at a given time of day does not change greatly in three or four days. Accordingly, each morning, exactly at the time of the eclipse, the alignment of the telescope with respect to the sun was carefully checked.

The time was correctly known from a chronometer checked against time signals received by radio.

On these same rehearsal mornings the adjustment of the clockwork for driving the photographic plate was checked and adjusted until the image of the sun and the ground glass moved at exactly the same rate.

#### A DRAMATIC WAIT

The day and night immediately preceding the eclipse were full of dramatic interest. The entire eclipse party had arrived. Twenty-two Americans were on



Photograph by Irvine C. Gardner

**A DROWSY DONKEY PLODS ALONG A STREET WHOSE SURFACE IS LIKE BEACH SAND**

Window shutters on the tin-roofed house are tightly closed as protection against dust storms, which blow up nearly every afternoon at Ak Bulak. The dust hazard was lessened at the eclipse camp, where grass kept the wind from stirring up dirt.

hand and seven scientific men in the Russian expedition from Pulkovo. All were interested in getting some final task completed.

The schedules and assignments for the work of the next morning were posted and distributed to the different members of the party. Rehearsals were in order, and we practiced all the operations to be performed during the eclipse, timing them by a stop watch to make sure that everything could be accomplished with the utmost precision in the precious 117 seconds which would be at our disposal if weather permitted.

The eclipse would occur at 9:16 a. m., local time\* (11:16 the night before, Wash-

\* The time used locally was that of the 75th meridian, east longitude, which was an hour ahead of their standard time.

ington, D. C., time); and it obviously was impossible for the available automobiles to bring all of us out from Ak Bulak in the morning in time for the eclipse. No one wished to chance being stranded away from the camp; consequently, everyone decided to stay at the camp that night.

There were satisfactory sleeping accommodations for only six or seven, but that was not important. No one slept more than three hours, and that much sleep can be obtained in almost any position.

**LAST-MINUTE PRECAUTIONS**

A long table made from a box lid was set up in the black laboratory tent, and boxes served as chairs. A pressure gasoline lamp gave good illumination. A few members of the party were outside, working on the large instruments. The others were



Photograph by Marciel M. Gardner.

#### "LIFE HISTORY" OF A SOLAR ECLIPSE

Old Sol shines as round-faced as usual, lower left, in the first of this series of exposures made at five-minute intervals; but in the next "shot" the moon has begun to move between it and the earth. Swinging higher in the sky, the sun gradually shrinks until, in the central exposure, it is totally eclipsed. Now the flaming corona becomes visible (Color Plate XVI, and pages 182, 183). In this exposure, the moon's disk is hidden by light spreading from the corona. After nearly two minutes of totality, a thin crescent of the sun appears, and in approximately an hour the eclipse ends. This photograph was taken with a short-focus camera; the third, fifth, and sixth exposures were omitted, as the scientists were busy with the big camera (pages 181 and 185).

around this table and so busily engaged that even the most loquacious said little.

There is always some added precaution to be taken. Placeholder can be dusted, the automatic mechanisms of the film magazines can be tested, motion picture camera lenses can be cleaned, and all photographic equipment has to be loaded with plates or films. This is postponed until the last night because it is safer to keep such material in the original sealed containers as long as possible.

For the American group, only one dark-room was available and the different ones took turns using it. A member would return to the table with his loading completed, and the next on the schedule would take his place. Such subdued conversation as there was concerned itself mostly with the weather prospects.

There had been several weeks of almost uniformly good weather, but the last few days had been distinctly unfavorable each

morning at the time of the eclipse. Would the coming morning be the same or would the sky be clear? All one could do was to carry on and hope for the best.

Three o'clock came, and the group began to separate. At five in the morning we heard a subdued conversation outside our tent.

#### MORNING, AND AN OVERCAST SKY!

Our worst fears were realized. Virtually the entire sky was overcast. We envied the radio crew in the village, who would conduct their researches upon the ionosphere unconcerned by the presence or absence of clouds. Despite the dark prospect, all went ahead with their preparations as if assured of a perfect day.

By seven it had begun to clear in the east and to look as if there were a chance for a clear spot large enough to view the eclipse. By eight the clouds were so open in the east that it seemed certain some re-

sults could be secured. By nine all the clouds in the eastern sky had vanished!

The eclipse came and went.

Only a very few incidents of that 117 seconds stand out.

Two or three minutes before the eclipse I was mildly perturbed because so much less light seemed to be coming down the telescope tube than on the rehearsal mornings. Could it be that the telescope had been accidentally moved out of adjustment?

Immediately I realized that the light was absent because, this morning, unlike the rehearsal mornings, the sun was almost completely eclipsed.

At the instant totality began, the shutter was opened for the first exposure, and the stop-watch was started. Eight exposures were completed before the sun again appeared. The longest exposure was 16 seconds and, during this exposure, there was opportunity to take a good look at the corona.

For the quiet the evening before, everybody amply made up afterward. All were pleased with the excellent sky, and there were dozens of minor incidents to relate.

Outside the limits of the eclipse camp there were hundreds of Russians who had come to our mound. Shortly after the event they were all gathered in a large assembly listening respectfully to a speaker addressing them.

The occasion was an impromptu meeting in honor of Maxim Gorki, who had died the day before.

During the day reports were received from the different stations telling of the weather and fortunes of the various expeditions which were distributed along the region of totality. In the evening there was a broadcast in which the different groups of observers participated.

That same night development of plates began, and continued for three nights.

#### RESULTS OF 117 SECONDS OF WORK

When our plates were developed, we were satisfied with the results of our two minutes of work. We made six exposures with color plates, the lengths of exposure being 1, 2, 4, 8, 16, and 8 seconds, respectively. Between the last two exposures with color plates, two exposures of 1 and 10 seconds each were made on panchromatic plates registering in black and white. All of the exposures were successful.

From the black and white pictures measurements can be made of the manner in which the brightness of the corona decreases for the parts more remote from the sun.

The complete interpretation of the color films is not so direct and will, to some extent, have to await more careful study. They do not register detail as fine as that shown by the black and white negatives, and the corona and prominences did not possess enough color to give spectacular results.

Visual observation by Professor Menzel showed the prominences to be lavender or purple, instead of the usual brilliant red. This was satisfactorily confirmed by our color films, which show the prominences as blue or bluish white. In the first color film and, to a less extent, in the two following, a portion of the chromosphere is not entirely covered by the moon's disk and it also appears blue (Plate XVI).

#### "HARD" AND "SOFT" TRAVEL

On June 22 we were invited to a dinner at Orenburg in honor of the astronomers visiting Russia.

For the trip we were provided with a special newly painted "hard" car attached to the afternoon train. Travel in Russia is characterized as "hard" or "soft," "hard" cars having only seats without upholstery. On each bench in our car there was a mattress and a bedspread, all new and spick-and-span. Everybody made use of the mattresses.

We reached Orenburg about four in the afternoon and after a sight-seeing trip gathered for the dinner. The speeches in English, Czech, and Russian were translated afterward for all guests.

Upon leaving, each family represented at the party was presented with an Orenburg shawl. Of fine, hand-woven wool, these shawls are world-famous for their delicate structure. Although approximately six feet square, they can be passed through a finger ring.

It required about four days to complete the development and the packing. The camp which had been the scene of such activity for six weeks became deserted.

The next solar eclipse in this region is in 1941. Then astronomers will pass hurriedly through Ak Bulak to reach observation points on the same railroad in the neighborhood of Tashkent.



Photograph by Eunice Thomas Miner

#### CONCH DIVERS SAILING THEIR BOATS TO GOOD CONCH GROUNDS

Headfirst over the side they plunge, swimming deep to search the bottom for the big, white shells. To remove a conch from its "house," natives knock a hole in the spire directly over the spot where the creature is attached. It can then be pulled out readily.



Photograph by Sands

"KEEP HER STEADY WHILE I HOOK THAT SPONGE!"

Peering through a water glass, the sponger lowers a long-handled hook and lifts the animal to the surface. Newly gathered sponges look like uncooked liver, for a gelatinous substance surrounds the fibrous skeletal structure (page 219).

# DENIZENS OF OUR WARM ATLANTIC WATERS

BY ROY WALDO MINER\*

VOYAGING southward from New York toward tropic waters on a midwinter day, we gaze out over a leaden sea of dull-green color, lashed by the stiff, chilling wind. But the next morning we awaken to a balmy air and go on deck to behold the ocean miraculously changed to ultramarine blue, the dark, swelling waves crowned with snowy foam which churns up in the wake of the vessel in turquoise turmoil before reaching the surface.

Petrels follow the ship, skipping from wave to wave. Toward afternoon a school of porpoises glides in and out of the sea in never-ending chase, while flying fishes, glinting in blue and silver, dart anxiously from the water and sail long distances, flicking the wave crests with their tails to gain momentum.

We are in the Gulf Stream, that marvelous river in the ocean, which gives the North Atlantic its unique character and profoundly affects its temperature even as far as the North Sea, bestowing upon the British Isles and Scandinavia the inestimable boon of a chastened climate.†

We can imagine the surprise of Ponce de Leon when, sailing along the coast of Florida in 1513, he found his ship borne irresistibly northward in its current. We acknowledge the service rendered to seamen by Benjamin Franklin, who advised vessels bound for England to take advantage of its northeastward course.

## THE GULF STREAM'S MAGIC TOUCH

The Gulf Stream exerts an influence on the spread and distribution of the marine life of the Atlantic which cannot be overestimated.

The main current warms the whole North Atlantic, and spurs setting in toward the coast have a striking effect on the distribution of floating life off the Middle

Atlantic States and southern New England. Here, however, the warm stream is separated from shore by colder waters forming what is known as the "Cold Wall." South of the Grand Banks of Newfoundland it meets the icy Labrador Current which flows down from the north, bringing a northern fauna and making its influence felt along the shore, particularly north of Cape Cod.

The Gulf Stream, on the other hand, extends the range of many West Indian and other tropical species far to the northward during the summer, some of them being borne to the British Isles, so that the pelagic life of the mid-Atlantic is more tropical in character than that of the same latitude on the North American coast.

## LIVING FLEETS SAIL SUNNY WATERS

Let us sail out across the Gulf Stream in a southeasterly direction, keeping our eyes open for evidences of its floating life.

It is a calm day. Our seagoing launch glides over quiet waters, but the northeastward drift of the current is obvious.

Suddenly we see a graceful, translucent object, like an oddly elongated bladder, floating on the surface. It is brilliantly colored blue and crimson, the hues more intense at its tapering ends and shading into a play of delicate transparent tints along its sides.

As we come nearer we see still others, and soon we realize that we are steering into the midst of a fleet of these fairy craft. Each one erects a crest resembling a succession of iridescent, foamlike bubbles along its summit, bordered with an edging of deep crimson.

These are the Portuguese man-of-war (*Physalia pelagica*), an organism related to the hydroids and jellyfish, but consisting of a whole colony of connected individuals floating as a unit (Plate II).

At first glance only one member of the colony is visible. But, as we look downward through the transparent water, we see masses of smaller tube-shaped projections depending from its lower side just beneath the surface. The majority are deep blue, while scattered here and there among them are clusters of salmon pink, and fingerlike protuberances of green. Fringelike strings edged with bluish beads float out from this mass, jerking spasmodically.

\* This is the second of two articles by Dr. Miner, Curator of Marine Life, American Museum of Natural History, describing coastal creatures of the eastern seaboard. The first, "Sea Creatures of Our Atlantic Shores," with paintings by Else Bostelmann, appeared in THE NATIONAL GEOGRAPHIC MAGAZINE for August, 1936.

† See "The Grandest and Most Mighty Terrestrial Phenomenon: The Gulf Stream," by Rear Admiral John Elliott Pillsbury, NATIONAL GEOGRAPHIC MAGAZINE, August, 1912.

Looking deeper, we finally perceive, extending far into the depths, a whole series of cordlike filaments, spirally adorned with close-set beads similar to those on the shorter strings, but larger. These slender cables are continually extending and contracting independently of each other, thickened knots passing each other up and down on neighboring strands like elevators.

A sudden breeze ruffles the water surface. The floats change shape, twisting in such a way as to "trim sail." The long, submerged cables, being attached to only one side of the bladder, act as a drag anchor, enabling the craft to head up into the wind and thus counteract a too rapid leeway.

#### A MAN-OF-WAR'S POISON GUNS

On board the boat we have a tall glass jar. Reaching over the side, as the vessel drifts with the current, we pick up a fine example of *Physalia*, being careful to lift it by the float and thus avoid contact with any of the bead-adorned streamers. This caution is essential, for every bead is a battery of powerful sting cells loaded with minute barbed threads, thousands of which, at the slightest touch, will penetrate the skin and inject an irritating poison.

Once while wading near Ponce, on the south shore of Puerto Rico, I attempted to lift one of these creatures into a pail of water. The trade winds were blowing strongly, and, as the streamers came clear of the surface, the wind caught them and blew them around the bare arm with which I held the pail. Immediately a pain as of living fire shot through it.

I quickly dropped the *Physalia* into the pail and began to unwind the clinging streamers with my free hand. When I had finished, each finger pained like a toothache. The arm was fiery red and swollen to the elbow, and my armpit ached where the poison had spread to the lymphatic glands.

I did not sleep that night, and the pain passed away slowly during the next day. Fortunately I was not seriously affected, but some people, more susceptible, have been known to collapse after being stung.

So we are extremely careful as we place our *Physalia* in our tall jar of sea water. The long streamers, which may extend as far as forty feet down into the sea, immediately contract to two or three feet when the bladder is brought out of the water. In the jar they lengthen to its bottom and

begin their eternal contracting and extending.

The cluster of individuals immediately under the float is of several kinds, each having a special function.

The blue, tube-shaped members are feeding polyps, with mouth openings at their lower extremity. They do the feeding and digesting for the entire community.

The green, tapering fingers are feelers and tasters, very sensitive.

The finely divided pink clusters, reproductive in function, develop the sex cells. Male and female cells are found only in separate colonies.

The streamers, of course, are fighting polyps, the longer ones, as above stated, having a stabilizing function as well. Fishes or other organisms that chance to swim against the streamers are immediately stung to death and drawn up by the contracting filaments to come in contact with the mouths of the feeding polyps, which suck out the victims' body fluid, digest the food, and pass the excess on to the mouthless members of the colony.

#### UNHARMED AMID DEADLY STINGERS

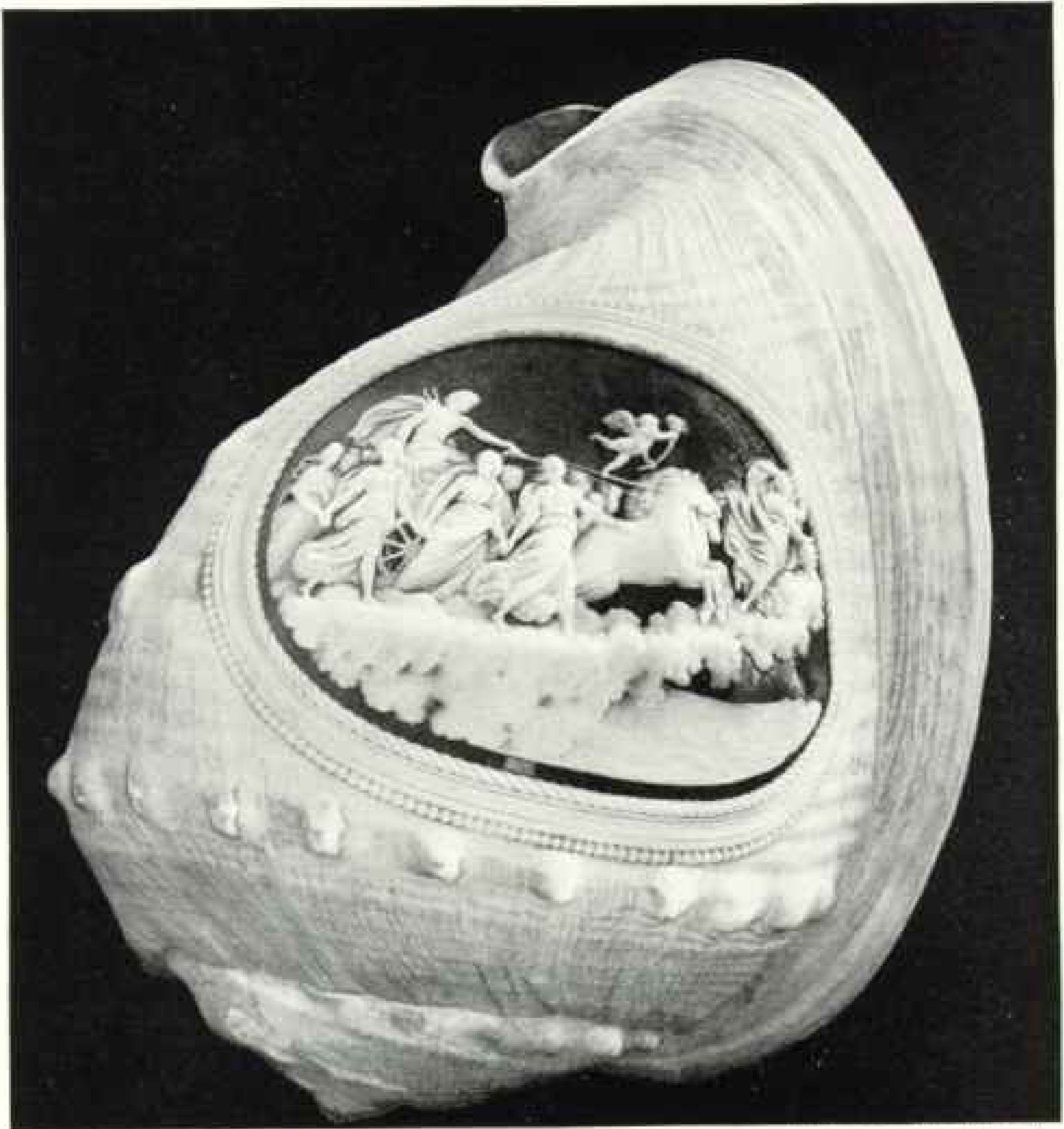
A species of small fish, the Portuguese man-of-war fish (*Nomus gronovii*) appears to be immune to the sting, and seeks shelter among the tentacles from its enemies. In return, it perhaps acts as a lure for larger fish preyed upon by its host, and doubtless nibbles at the feast! A similar habit of the butterfishes which associate with the red-rayed jellyfish (*Dactylometra quinquecirrha*) has been described in "Sea Creatures of Our Atlantic Shores."\*

Other floating colonies, related to the Portuguese man-of-war, are occasionally seen in the Gulf Stream. Among them are the *Porpita*, having a disklike float about the size of a silver quarter, bright blue in color, and the *Veella*, with a rectangular raft about two inches in length, colored blue, green, and pink, and with a curious elevated keel standing up cornerwise upon it.

#### PULSATING JELLYFISHES ABOUND

Jellyfishes also are abundant in these warm waters (Plate III). In fact, the *Dactylometra*, above mentioned, as well as the Portuguese man-of-war, are borne to the shores of New England by currents

\* See NATIONAL GEOGRAPHIC MAGAZINE, AUGUST 1936.



Photograph by Julius Kirschner

PHOEBUS, GOD OF THE SUN, DRIVES HIS CHARIOT ACROSS A HELMET SHELL

This exquisite carving is from the original Guido Reni painting "Aurora" exhibited in Rome. Before the chariot the Goddess of the Dawn sprinkles flowers over the clouds. Cupid, bearing a flaming torch, represents the morning star. For this work, the artist chose the shell of a helmet conch instead of a queen conch (Plate IV), because the white exterior and brownish lining give more contrast than the white and rose of the queen conch (page 208). Mr. J. P. Morgan presented the shell, cut in Italy, to the American Museum of Natural History in New York City.

setting in from the Gulf Stream, and the former has become established there as a regular inhabitant.

Another beautiful creature comes to the surface close to our boat and we capture it with a hand net. In a glass jar it swims with the utmost grace, its purplish-brown umbrella pulsating rhythmically as it propels the creature through the water.

This is the purple oceanic jellyfish (*Pelagia cyanella*). It possesses the four long,

ruffled mouth lobes familiar in *Dactylometra*, and eight slender tentacles margin the umbrella, which is further ornamented with numerous small wartlike knobs.

The mushroom jellyfish (*Stomolophus meleagris*) is smaller. Its almost globular, brown to cream-colored umbrella, unadorned with tentacles, gives it nearly the appearance of a swimming mushroom, an impression emphasized by the stemlike cluster of folded and scalloped mouth lobes





Photograph by Ray Waldo Minor

"PLAYING POSSUM," BUT STILL FULL OF PEP

Unless one knows how to hold spiny lobsters correctly, their spines will lacerate the hands, for the creatures struggle vigorously and flap their abdomens up and down. These were captured in traps, but man often dive overboard and catch them with their hands. Crayfish, now becoming scarce from overfishing, are occasionally found in rock crevices at low tide (pages 204, 208, and Plate V).

furnished with numerous suckers which function instead of a mouth (Plate III).

COMB JELLIES FLASH PRISMATIC COLORS

As we look down through the water, we see, contracting and pulsating everywhere, the bubblelike globes of smaller medusae, so transparent that they are only momentarily visible as the light glints across their delicately tinted umbrellas and faintly outlined radial canals. Most of them are hemispherical, but here and there are cuboid forms (*Tamoida haplonema*), angular

in outline, with two or four tentacles at the corners.

Among these lovely phantom creatures are certain species with iridescent flashes of brilliant prismatic colors playing in narrow lines over their otherwise nearly invisible surfaces. They are the ctenophores, or comb jellies, which form a group distantly related to the true jellyfishes (Plate III).

The flashes of colored light are caused by tiny propelling appendages shaped like infinitesimal combs, arranged in eight radial rows over the surface of the body. They move rapidly back and forth in ordered succession, the rays of light being diffracted into countless tiny rainbows by the unbelievably fine teeth with which each comb is equipped.

Most ctenophores have a pair of long, branched tentacles armed with sting cells. These appendages act as snares for small food creatures and may be retracted into transparent, pitlike sheaths.

A common species (*Pleurobrachia pileus*) has an oval body like a transparent plum. It is extremely widespread in the Atlantic, occurring from the Arctic to the Antarctic, and from Europe to America. It swarms abundantly in the Gulf Stream, as well as close to the New Jersey coast, the Virginia Capes, and Cape Hatteras.

The powerful stinging tentacles are very destructive to small crustaceans such as copepods and shrimp, which are important factors in the food supply of many of our fishes (some of which, in turn, feed upon the ctenophores). The creature is therefore of considerable significance in the balance of life off our coast.

The Venus's-girdle (*Cestus veneris*) is one of the most striking of the ctenophore group. Its filmy body, bandlike in shape, resembles a transparent ribbon and is often three feet in length (Plate III).

As it swims, undulating through the water, its ends keep rolling and unrolling in scroll-like fashion, while the rows of comb plates along the margin shimmer with iridescent colors, especially green, blue, and violet. This beautiful creature is more common in the Tropics, but the Gulf Stream occasionally brings it northward as far as the southern New England coast.

#### CAPE COD ACTS AS BARRIER

Cape Cod and the Labrador Current together form an efficient barrier which prevents the more southern species, such as these, from reaching the northern New England region, though some may be carried far north of this latitude toward Europe.



Photograph by Julius Kirschner from painting by Albert Dietl

#### AN ARTIST'S CONCEPTION OF SEA LIFE IN A MANGROVE SWAMP

Clinging to the mangrove roots are coon oysters (just above water surface) and spotted cowries (lower left and left center). Beneath them rests a starfish. Three tube sponges rise from a root, and near by crouches a slender-legged spider crab. Beyond are living cup corals and sea fans. Careful scrutiny reveals many tiny brittle stars that lie flat on the bottom, arms radiating in every direction.

On the other hand, Cape Cod, because of its barren, sandy character, also acts as a barrier to the northern shore fauna, keeping it confined to the Gulf of Maine, Nova Scotia, and Labrador.

Nevertheless, in recent years, such species of mollusks as the indefatigable periwinkle, dog whelk, and "buckie" have slowly surmounted this obstacle and are now found on the coast of southern New England and Long Island Sound.

Warm and cold currents determine the spread of floating sea life, while barren



Photograph by Roy Waldo Miner

**SPEARING CRAYFISH IS GREAT FUN, BUT DON'T STEP ON ONE!**

Fishermen and sportsmen usually harpoon spiny lobsters, but sometimes they are caught in traps, and boys even dive for them (pages 202, 208, and Plate V). The creatures haunt dark crevices and are fascinating to hunt. When a crayfish is spotted, usually with a water glass, the grains or spear is brought down to within a foot or two of the quarry before striking. If no refuge is handy, the gamy knight usually rears back and gesticulates fiercely with his appendages, as if to say, "I dare you to strike." Other kinds of spiny lobsters inhabit the seas of California, Australia, South Africa, and Great Britain. One variety, caught off Norway, cannot be kept alive and must be boiled as soon as caught.

stretches of shifting sand are difficult for many of the creeping animals of shallow waters, and only those survive that are particularly adapted to such conditions.

The inlets and sheltered waters of Long Island, with their bottoms of mixed mud and sand, harbor an abundant fauna of their own, but south of New York the long barren stretch of the New Jersey sand beaches interposes another barrier. These

are so predominantly siliceous that they support but few species of shallow-water marine animals and effectively prevent the spread of others in both directions.

Hence, we enter another zone of distribution as we trend southward toward Cape Hatteras. The coast is once more characterized by sunken valleys like that of the Gulf of Maine, but not so extensive. Delaware and Chesapeake Bays, Albemarle and Pamlico Sounds shelter numerous coastal species, but the range of shallow-water life offshore is limited by the rapidly narrowing continental shelf, as compared with the wide banks northeast of New York opposite the Gulf of Maine.

Off Cape Hatteras the open-water fauna is abundant near the shore. Here

the Gulf Stream, with its masses of floating plankton, is close to the edge of the narrow oceanic shelf, while its tropical influence gives a southern tinge to the shore fauna.

South of Cape Hatteras, barren conditions once more prevail, and shore species are comparatively sparse, while the sea bottom is scoured of its deeper life by the swift current of the Gulf Stream.

But southern Florida presents a striking contrast, with its tropical climate and extensive continental shelf. This submarine platform, though cut by the Gulf Stream in the Straits of Florida, nevertheless reaches far eastward to include the Bahama Islands. Here we pass into the West Indian world, with its hosts of tropical marine species.

#### WRAITHS ON THE BARREN SANDS

To emphasize the contrast between the barren shore just south of New York and the teeming life of the tropical Florida shallows, let us visit a part of the southern New Jersey coast toward dusk.

A sandy beach extends into the distance until its continuation is hidden by the curve of the shore. It is bounded inland by the sand dunes, their snowy sides diversified by beach grass and stunted vegetation. Long lines of beach wrack brought in by the tides parallel the water's edge. The sands seem empty of life and movement except for the wash of the sea.

But not quite!

There is a shadowy stir by the dead seaweeds—and another like a fleeting wraith farther up the sands. We blink our eyes, for it has vanished. Now there is a start directly in front of us and a ghostlike creature materializes before our very eyes, only to disappear apparently into thin air. We focus our gaze more carefully, and, at the next sign of movement, follow it eagerly.

Now, at last, we identify a swift, silently moving form, a set of scampering legs, and a pair of shining black eyes erected on upright stalks. We have stumbled on a community of ghost crabs (*Ocypode albicans*) and well do they deserve their name (Plate I).

Their pale, yellowish-gray carapaces match the beach so exactly that when they are stationary it is almost impossible to see them. They are betrayed only by their swift movements as they glide over to the beach wrack to snatch a sand hopper or two, and quickly dart back to their homes when alarmed.

Their abodes are burrows dug deep into the sand above the high tide line. The entrance is a round hole flanked by a sand heap, where they stand guard or retreat until only partly visible in their doorways.

If we approach, they vanish inside in a twinkling. It is almost impossible to catch them, so fleet are their movements.

We secure a few specimens only by flinging a hand net over them from a distance as they dart across the beach.

If cut off from their homes, they will take refuge in the sea, but it is apparent that they do not enjoy a watery environment, for at the first opportunity they dart out and make for their burrows.

They seem veritable creatures of the sand, being adapted to it by their concealing coloration, burrowing habits, agility, and speed, as well as by their custom of feeding upon the small crustaceans living in the jetsam of the sea.

But even these dwellers on the barren beach are invaders from the south, for this is the northern limit of their range. There are a few doubtful records of their having reached Long Island, and their free-swimming larvae often have been found as far east as Block Island and Martha's Vineyard.

Apparently the cold winters prevent the adults from becoming established north of New Jersey. To the south they range with increasing abundance to Florida and the West Indies, while on our New Jersey beach they have merely established their venturesome outposts.

#### WHERE LIFE IS LUSH AND TEEMING

Contrast this bleak barrenness with the balmy and prolific region from which they have migrated in the South. It is, of course, a sea abounding in coral reefs, with an amazing undersea life. But since these remarkable structures have been described at length in a previous article,\* we shall speak rather of the interesting creatures of the quiet lagoons enclosed between the reefs and the shore, as well as of those that have invaded the low-lying beaches and the extensive shallow mangrove swamps that abound here.

The coral lagoon is the area of quiet water protected from the open sea by coral barriers and lying between them and some near-by coast. The lagoon floor consists of coarse, white calcareous sand derived from materials washed in through the reefs by the tides and currents. Isolated clumps and shoals of living corals rise here and there toward the surface and small islands or "cays" of eroded aeolian limestone diversify the prospect.

\* See "Coral Castle Builders of Tropic Seas," by Roy Waldo Miner, in the NATIONAL GEOGRAPHIC MAGAZINE, June, 1934.



Photograph by Roy Walds Miner

A SCIENTIST EXPLORES A MANGROVE SWAMP IN SOUTH BIGHT, ANDROS ISLAND

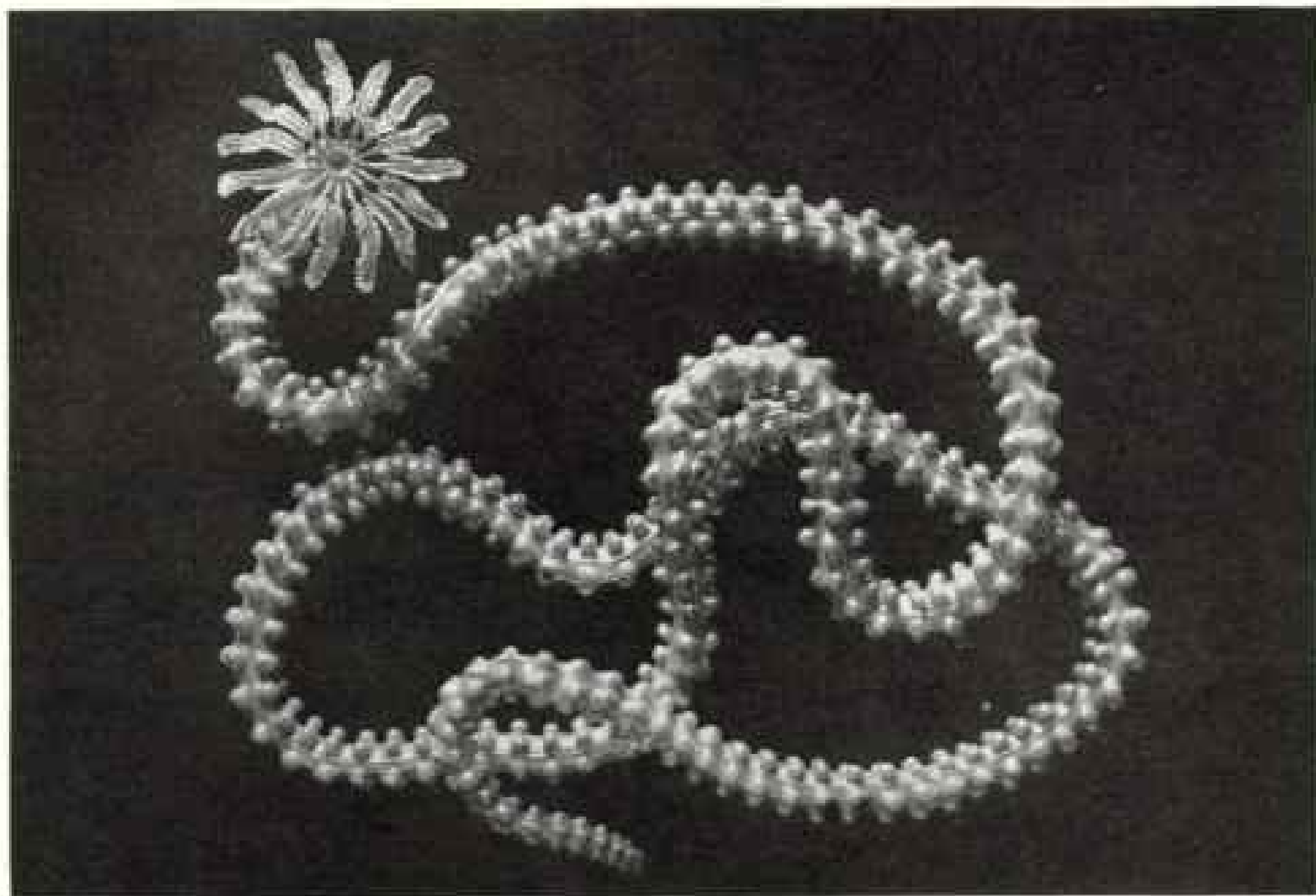
With an outboard motor, he works in and out of the coves to rake from the muddy ooze shells, worms, and other forms of burrowing life. Lime impregnates the water on the west side of this Bahama island, forming the hard crust visible on the mangrove roots beyond the boat.



Photograph by Sands

NIMBLE FINGERS QUICKLY TRIM THIS ODORIFEROUS MOUNTAIN OF SPONGES

After a boat docks at Nassau in the Bahamas, its cargo is spread under a shed along the waterfront, and dealers purchase the sponges at auction by the "lot" or boatload. Buyers cart them to huge yards, where they are trimmed and sorted by women. Odds and ends become fertilizer or packing material, and finished sponges are shipped out in large bales (page 219).



Photograph by R. E. Dahlgren

LIKE A PEARLY NECKLACE SEEMS THIS MODEL OF A THREE-FOOT DENIZEN  
OF ANDROS ISLAND

Knobs on the body of the giant *Synapta*, a genus of holothurians, or sea cucumbers, are soft and pliable, and aid the animal in creeping. Highly sensitive petal-like tentacles or feelers on the head locate and entangle food particles. The creature is related to the sea stars and sea urchins, but not to the eel.

The sea is very transparent, and on quiet days the boat seems to be floating in air, while the sandy bottom with its denizens shows with the utmost clearness.

Huge sea stars (*Oreaster reticulatus*) slowly crawl about looking for mollusks (Plate IV). They vary in color from red to blue or purple and are marked with an intricate network of raised ridges forming a pattern of triangles decorated with small knobs. They are the largest of the West Indian sea stars.

Conchs of two species are especially abundant. One, the queen conch (*Strombus gigas*), is the largest sea snail found in American waters, some specimens growing to a foot or more in length (Plate IV).

The thick shell has a coiled spire nearly obscured by the flange of the broadly flaring lip, its lining a brilliant rosy pink.

When the creature is alive, the narrow foot of the thick-skinned muscular body projects from the aperture, armed with a horny, hooklike spine. By means of this, the conch pulls itself actively about on the sea floor, digging it into the sand and

moving in irregular hops and jumps, causing the heavy shell to rock from side to side in its haste to escape pursuers. It is a scavenger, its food consisting of dead and decaying animal life.

One of the occupations of the Bahaman negroes is "diving conchs." As our launch lies anchored in a lagoon at Andros Island, we see the homemade sailboats of the natives drifting about slowly, while the occupants scan the bottom through a water glass.

Suddenly there is a splash as a negro dives overboard. Soon reappearing, his dripping body gleaming like polished mahogany, he hands up a conch over the gunwale, then drops back to get another (page 198).

Sometimes conchs are baited with meat, the odor of which attracts them in large numbers, and thus more may be caught in a short time by diving.

Conchs form an important article of food for the native islanders. In fact, they themselves are often termed "conchs" to distinguish them from persons not born in the islands.

Conch shells are sold for ornamental purposes and are familiar everywhere, especially in country districts in the United States, as parlor ornaments, doorstops, and borders for garden walks. They often secrete "conch pearls" of a beautiful rose color, which are mounted as jewelry and have a moderate value. The shells, with the tips of their spires sawed off, are sometimes used as dinner horns by natives.

#### CONCH SHELLS FOR CAMEOS

The helmet shell (*Cassis madagascariensis*) is another conch common in the West Indies and often associated with the queen conch on sandy lagoon bottoms. It almost equals the latter in size (Plate IV).

This huge snail creeps about on a flat foot, searching for the bivalve mollusks on which it feeds.

The shell is indeed shaped like a white helmet, with a broad, flat, cream-colored lip, blotched and striped with a deep chocolate brown. It is quite thick and of fine texture, composed of layers of white shell over the deep brown.

Since about 1820 it has been exported to Italy and France for making cameos, and has practically superseded the more expensive semiprecious stones formerly used for that purpose. Beautifully delicate carvings are made, standing out in white bas-relief against the brown background. Rome, Genoa, and Paris are the most noted centers for cameo cutting.

The queen conch is also used for this purpose, but not so extensively. Cameos made from it show a rose-colored carving against a white background, but as the rose tends to fade upon too great exposure to light, eventually these cameos lose much of their contrast, and those made from the helmet shell are more highly favored (page 201).

#### SPINY LOBSTERS LURK IN CREVICES

Here and there rocky shoals and coral clumps rise from the sandy floor of the lagoon. The crevices and holes with which they abound are the haunts of the spiny lobsters (*Panulirus argus*).

These weird creatures are about the size of the northern lobster, but lack the large pincer claws. However, they are so completely equipped with hooklike spines that it is difficult to handle a living animal without suffering injuries (Plate V).

Brightly banded, striped, and spotted with brown, black, green, and cream color,

they are conspicuous objects when caught in the hand net. Habitually, however, they avoid the light and hide in their dens during the day. Toward evening they come out, and then it is possible to capture them more readily (pages 202 and 204).

Like the northern lobster, they move about the sea bottom on the tips of their claws, or swim rapidly with oarlike motions of the swimmerets beneath the abdomen. They attain their greatest speed in retreating from enemies by vigorous flexion of the terminal joints of the abdomen, which drives them swiftly backward after the manner of the common lobster.

Their armored bodies are covered with hairs sensitive to the slightest touch, and they have a keen sense of smell by which they can readily detect the presence of food animals even at a considerable distance. They feed upon small bottom creatures such as shrimp, mollusks, and worms.

Many enemies attack them, and they especially fall prey to the larger reef fishes, such as the grouper and jewfish. One authority states that sixteen large lobsters were found in the stomach of a 350-pound jewfish.

Spiny lobsters are very important in the markets of Florida and the West Indies, the tail furnishing a meat of delicious flavor.

#### MANGROVE SWAMPS RICH IN LIFE

The low-lying keys and reefs off the Florida coast, as well as the numerous inlets connected with the open sea, are bordered with areas of shallow water, where, in sheltered places, extensive mangrove swamps occur. These remarkable plants grow here with great luxuriance, their branches covered with thick, glossy leaves interlacing to form continuous thickets. Their slender trunks are braced by buttresslike aerial roots, spreading out on all sides and firmly embedded in the calcareous mud (p. 203).

The warm, shallow waters are rich with life of all sorts.

Extensive beds of coon oysters (*Ostrea frons*) project from the white mud at low water, and even grow up on the aerial roots of the mangroves, hanging in bunches like a strange sort of fruit, so that they are often spoken of as the "oysters that grow on trees" (Plate VI).

The crown melongena (*Melongena corona*), a handsome whelk about the size of a pear, preys upon them avidly. They are very sweet and, though the meat is smaller



Photograph by Roy Waldo Miner

“A SHILLING A PIECE FOR YOUR HELMET SHELLS!”

The cost of a good one is a matter of bargaining, and of the native's whim. A shilling is a good price, though a sixpence (about 12 cents) may sometimes be accepted if the seller has a large number to market. Natives of the Bahama Islands are locally called “conchs.”

than that of the Virginia oysters, it is nevertheless well worth the trouble of extracting for food.

These oysters are abundant from Florida and the West Indies to North Carolina, and throughout the coast of the Southern States are much sought after by raccoons; hence their popular name.

The spotted cowry (*Cypraca exanthema*) is very abundant here. Its polished chestnut and bluish-white shells decorated with round white spots cling to the stems of the mangroves. When submerged, the voluminous and conspicuously colored folds of its mantle emerge from the shell opening on both sides and slide up symmetrically, nearly covering its smooth surface to the middle line and laying down a thin, glossy layer of porcelain as they do so.

Brightly colored mangrove crabs (*Goni-*

*opsis cruentata*), their square carapaces aglow with scarlet marked with brilliant yellow and blue, scamper over the oyster beds. Here and there in the shallow pools are seen the more soberly attired mud crabs (*Panopeus herbstii*), recognizable by the black fingers of their claws and the arched, saw-toothed margin of the carapace.

Leaving the swamp, we round a rocky point where, among the cavities and pinnacles of the “honeycomb” limestone rock, hundreds of small snails cling to the rough stone, awash or between the tidemarks.

Three species having strongly arched shells are abundant, belonging to the genus *Nerita*. The smallest, about one-half inch in diameter, is finely marked with a black and white checkerboard pattern (*Nerita tessellata*); another, somewhat larger (*Nerita versicolor*), is distinguished by close-set



rounded ridges gaily decorated with red, black, and white squares and blotches; the third (*Nerita peleronta*) is the well-known "bleeding tooth." Turning it over, we find that the mouth opening bears two flat teeth on its white inner margin, one or both of which are blotched with yellowish red resembling a bloody stain.

The zigzag periwinkle (*Littorina zigzag*) is also found here, its cone-shaped spire marked by fine zigzag lines of brownish yellow.

Large chitons cling tightly in the hollows near the water line, their oval bodies protected by an armor of jointed plates bordered with a zone of feltlike spines.

Tropical rock crabs, the "Sally Light-foot" (*Grapsus grapsus*), swiftly scamper over the rocks in all directions, especially where they are drenched by salt spray. These creatures are found everywhere in the Tropics in similar situations. Their thin, squarish carapaces are brightly marked by yellow and red lines, and long, flat, jointed legs bear them agilely over the rocks with such speed that it is very difficult to capture them.

#### LAND CRABS SCUTTLE ABOUT AT DUSK

We step off the outcropping of rock onto a white beach of calcareous sand. Thickets of sea grape grow along its upper margin under the coconut palms, diversified with low, flat clumps of beach lavender, the pale-green leaf clusters of which are covered with a whitish bloom, like dusty miller.

Even here animal life is abundant. Large land crabs of two species—the red mountain crab (*Gecarcinus ruricola*), purplish red with pale-yellow markings, and the great white land crab (*Cardisoma guanhumi*), with shell of bluish gray to yellowish white—dig extensive burrows in the sand with their powerful claws (Plate VII).

These huge crabs scuttle about awkwardly, but with considerable speed. They come out in large numbers at dusk, and if we are walking along the beach in the darkness, they are likely to come bumping against our legs. Both species dig their homes not only near the shore, but also on the low, wooded hills.

Each year they migrate to the sea in immense armies. There the females enter the surf to wash off the eggs clinging to the underside of their abdomens, and thus allow them to hatch. Then the adults return to their abodes in the hills, to be followed

about two weeks later by the migration of their newly hatched young.

Red mountain crabs have a delicious flavor when boiled, stewed, or baked in the shell.

The land hermit crabs (*Coenobita diogenes*) run along the beach, foraging among the dead leaves and the prostrate, decaying trunks of fallen coconut palms. Their spiny pincer claws are brightly colored red and blue, and, like our northern hermits, when disturbed they quickly withdraw into their shells, blocking the entrance with expanded pincers.

They utilize empty mollusk shells for homes, and, when they outgrow them, promptly investigate all new possibilities, alternately trying various shells and popping back into the old one for comparison. Finally they select the most comfortable abode, though they may walk off with the original shell, after all.

Apparently they are willing to try anything that at all resembles a shell, for one of our expeditions from the American Museum discovered a hermit crab on a Bahaman beach that had adopted the bowl of an old clay pipe for its abode! This specimen, pipe and all, is now on exhibition in the Museum (Plate VII).

Coral reefs and sand bars are typical of the eastern or windward side of the Florida coast and the Bahama Islands. On the westward, or sheltered, side of the larger bodies of land, coral reefs are practically nonexistent, and the sea is floored with a very soft calcareous mud.

This is true especially of the Great Bahama Bank between the Straits of Florida and Andros Island. A curious spreading seaweed known as "old man's beard" grows over the muddy bottom, and here and there are outcrops and ledges of old limestone rock. These are the great sponge banks. Here and on the Gulf coast of Florida most of the commercial sponges of American waters are harvested for the market.

Many species of sponges cannot be used commercially because of the glassy spicules or needles embedded in their tissues. This is universally true of the northern sponges, and there are many species in the Tropics as well that belong to this category.

Several of the latter are shown in Color Plate VIII. The spiny tube sponge (*Spinosella saroria*) grows in clusters of trumpet-shaped chimneys of papery texture, too hard and resistant for commercial use, even

## STRANGE CREATURES OF SUNNY SEAS



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Painted by Else Bostelmann under direction Roy W. Miner

### GHOST CRABS SCUTTLE ACROSS THE BEACH TO SNATCH A MEAL OF SAND HOPPERS

When motionless, these yellowish wraiths, with black, glistening eyes mounted on stalks, blend with the sand. In the faint light of dusk, the yellow carapaces seem of lighter color when viewed from a distance. A seemingly pale GHOST CRAB (upper right) rests beside a burrow, its refuge in times of danger. These creatures are very active and hard to catch. New Jersey marks their northern limit, and they become increasingly abundant southward along the Atlantic coast. The empty shells of the SAND COLLAR SNAIL (lower left) and the large CHANNIELED WHELK (left center) were cast up by waves. Edges of dead scallop shells protrude from the sand in the lower right corner.



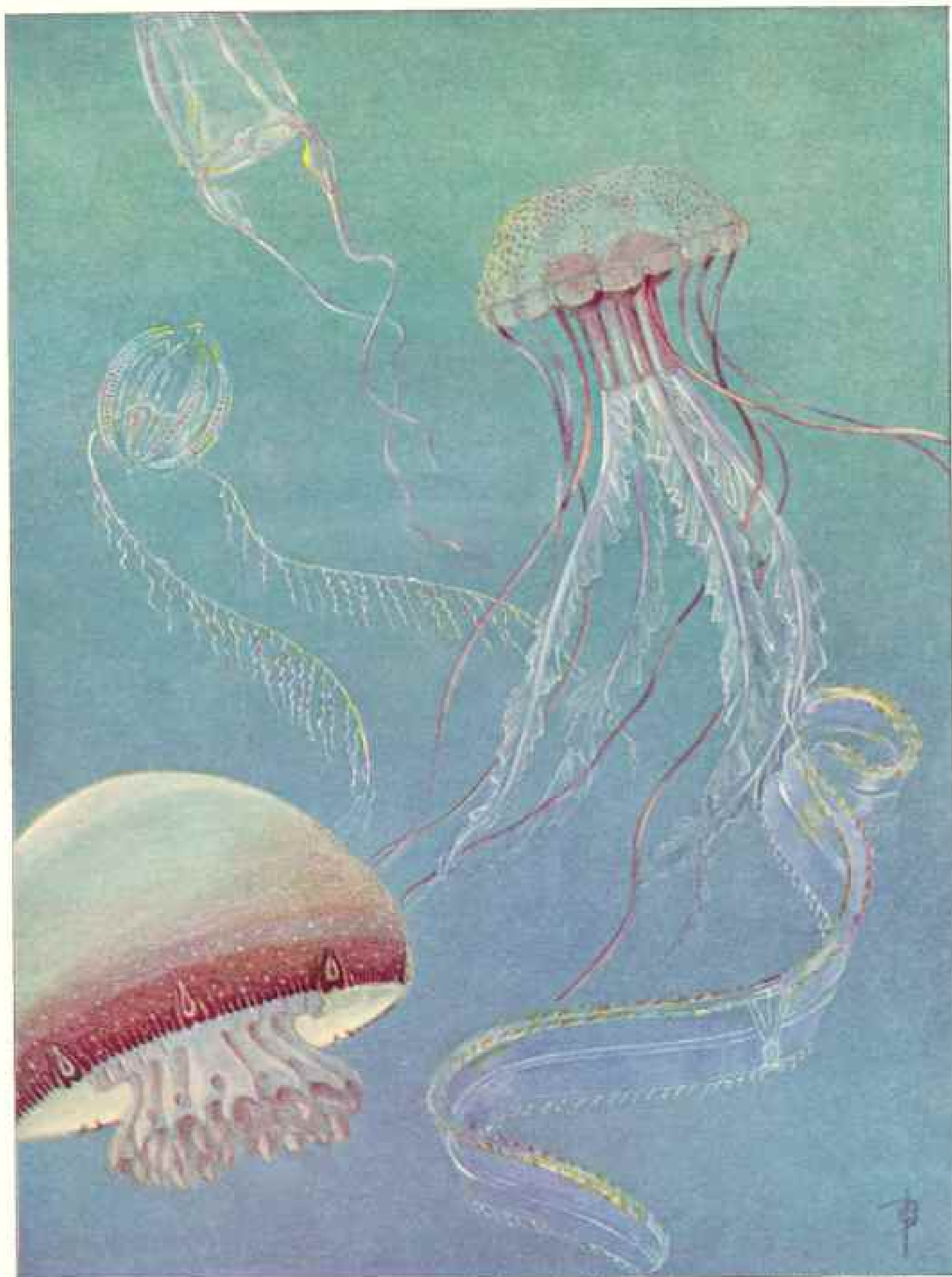
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A FAIRY FRIGATE DRIFTS NORTHWARD ON THE GULF STREAM

Dealing death to tiny tropic dwellers, the PORTUGUESE MAN-OF-WAR seems an iridescent, bubble-like craft. Actually, it is a colony of cooperative polyps, each with a special function. The "sail," or crested bladder of the mother unit, contains gas that keeps the craft afloat. Green polyps feel and taste, blue ones absorb food, and the pink are reproductive organs. The long streamers bear batteries of nettle cells so powerful that shipwrecked sailors stung by them have been known to die. The tentacles paralyze fish and convey them to the "mouths." Curiously, the PORTUGUESE MAN-OF-WAR FISH (lower) lives unharmed among the streamers, probably acting as a lure and sharing the prey.

## STRANGE CREATURES OF SUNNY SEAS



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### SEA NETTLES AND SOME COUSINS THAT LURK IN DEEP BLUE WATERS

Graceful and rose-flecked, the PELAGIA (upper right) propels itself by expanding and contracting the umbrella. Slender tentacles, armed with sting cells, hang from the border to entangle the prey. Vast swarms of the MUSHROOM JELLYFISH (lower left) sometimes carpet the ocean in patches 100 miles long. The animal has no mouth, and uses instead curious mouth lobes equipped with suckers. The CUBOID MEDUSA (upper left) swims in the open sea. Two species of comb jellies are shown: the ribbon-like VENUS'S-GIRDLE (lower right), which rolls and unrolls as it swims, and the delicate ROSECOMB (left center).



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**QUEEN CONCH, LARGEST OF AMERICAN SHELLS, MAY END UP AS A DINNER HORN**

These giant sea snails, one resting on its side above, attain a length of a foot or more. The meat makes fine chowder, but fishermen cut it up for bait. If alarmed, the **QUEEN CONCH** jumps jerkily along the sea floor, rocking from side to side. Cameo cutters in Italy and France import large numbers of the **CAMEO HELMET SHELL** (lower left). Between two purplish tentacles protrudes the mouth tube, which sheathes a band or tongue set with tiny, filelike teeth that grind up fleshy food and drill holes in the shells of prey. A **GREAT SEA STAR** (right) crawls on the white sand. Clinging to the Gorgonian or "sea bush" (left) are a **SWOLLEN EGG SHELL** (lower) and three **SPINDLE EGG SHELLS** (above).

STRANGE CREATURES OF SUNNY SEAS



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GRAB THIS GAMY ARMORED KNIGHT AT YOUR PERIL!

Although the SPINY LOBSTER, or CRAYFISH, of Florida and the West Indies has no pincer claws, as does its northern cousin, long, lancelike antennae and sharp spines help protect it against enemies. During the day this brightly banded creature lurks in crevices, but at night it wanders about in search of food, pointed tips of slender legs barely touching the bottom. Its jointed tail contains delicious meat. Needlike spines of the SEA URCHIN (upper left) seldom stop waving back and forth on ball-and-socket joints. When the points pierce a bather's leg, they break off, work inward, and cause festering sores. Red-striped SQUIDFISH swim above the crayfish, and red FIRE SPONGES brighten the coral.



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Painted by Elise Bostelmann under direction Roy W. Miner

OYSTERS GROW ON TREES IN SOUTHERN MANGROVE SWAMPS

Named for the raccoons that relish them, COON OYSTERS cluster about and cling to side roots of the COMMON MANGROVE. Running over the oysters in search of worms and small mollusks is a MANGROVE CRAB, with long jointed legs and menacing claws. When covered by the flood tide, the SPOTTED COWRY (upper center) pushes out from the slit in its pear-shaped shell a resplendent mantle which polishes and enamels its outside surface. The animal slides forward on its brightly colored foot and explores with two waving tentacles equipped with eyes. A MUD CRAB lingers in the foreground.

STRANGE CREATURES OF SUNNY SEAS



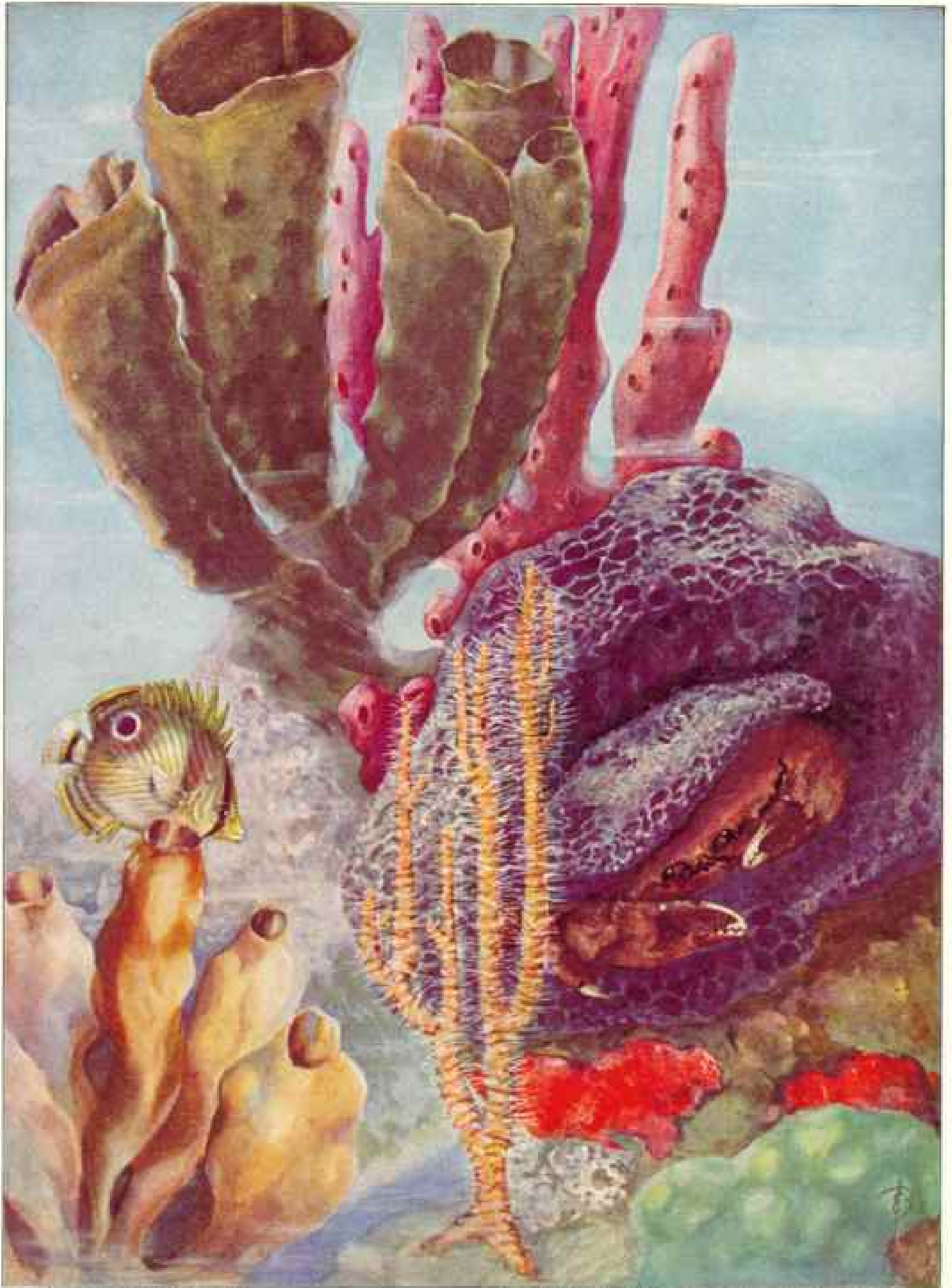
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Painted by Else Bostelmann under direction Roy W. Muer

LAND CRABS MAKE ANNUAL PILGRIMAGES TO THE SEA

Marching in vast armies, the black or blue MOUNTAIN CRAB (upper right) and the whirre (lower left), of the Bahamas and southern Florida, swarm down to the water each May to spawn. No obstacle seems to deter them; they have been known to crawl through and over houses that stood in their line of march. Eggs hatch in the sea, and soon a young army follows the parental horde landward. The LAND HERMIT CRAB, also abundant in the Tropics, utilizes shells and even broken clay pipes to protect its soft abdomen. One, pipe and all, is now in the American Museum of Natural History in New York.





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Painted by Elae Bostelmann under direction Roy W. Miner

MANY SPONGES OF FLORIDA AND THE BAHAMAS GROW TO STARTLING SIZE AND SHAPE.

When alive, the COMMERCIAL SPONGE (right) is usually dark, even coal black. From the one pictured, a SPONGE CRAB has cut a slice with its sharp claws to serve as an "overcoat" camouflage. Many tropical sponges, like relatives in northern waters, have no commercial value because of glassy needles embedded in their tissues. Among these are the SPINY TUBE (upper), the RED BRANCHED, and the gray and green ENCRUSTING forms in the foreground. Brilliant red FIRE SPONGES grow over dead coral. The HYDROID CORAL overgrows a dead "sea bush." Its whitish filaments sting if they touch human skin.

were it not for the spicules. The shorter yellow siphons of the tuba sponge (*Tuba bullata*), though of much finer and more delicate mesh, are also unsuited for this purpose.

Some sponges, like the red branched sponge (*Pachychalina rubens*), grow in colonies made up of long, branching fingers, with conspicuous oval oscula scattered at intervals over the sides. Brilliantly colored encrusting sponges, like the scarlet fire sponge (*Tetania ignis*) and the soft, mat-like layers of various blue and green species enliven the surface of dead coral rock with bright patches of color.

The true commercial sponges, however, when alive, probably never would be recognized by one not familiar with them in this condition. They are of very somber colors, from yellowish gray through various shades of brown to coal black. In fact, some of the finest and most valuable varieties resemble masses of coal-black leather or rubber rather than anything else.

#### HOW A SPONGE CRAB HIDES

Most of them belong to two main genera, *Euspongia* and *Hippospongia*. *Euspongia officinalis* is shown in Color Plate VIII.

A sponge crab (*Dromidia antillensis*) has cut off a piece of the sponge and is holding it over its back by means of its hind claws. The crab then neatly subsides into the hollow of the sponge from which the piece was cut, as if under a trap door, and is immediately and protectively concealed by this bit of camouflage!

The commercial sponge, as seen in the market, is merely the skeletal network by which the gelatinous animal tissues of the sponge are supported and held in shape. Of silken texture, it is composed of a fibrous, somewhat elastic substance known as spongin.

The best commercial sponges have compressibility and resiliency to the highest degree, and also the added features of velvety softness and freedom from accumulated particles of hard foreign matter. The best sponges are also durable and evenly rounded or oval in shape.

When alive, the skeleton is embedded in a living tissue which has much the consistency of liver. Some sponges are massive, others cup-shaped, while still others are welded clusters of fingerlike tubes.

The finest commercial sponges are those of the Mediterranean, but certain varieties

fished on the Bahama and Florida banks are of excellent quality. The best American sponges are the sheep's-wool, velvet, and Florida yellow. Fleets of sponging schooners carry the fishermen out to the banks and the sponges are secured by diving or "hooking" (page 198).

#### "HOOKING" FOR SPONGES

The latter method, used universally on the Bahama banks, consists of spotting the sponges through a water glass, then lowering a long-handled hook with two or three prongs to dislodge the sponge. The boats are filled with them, and as much of the animal material as possible is beaten off against the gunwales of the boat with wooden bats. The sponges are then allowed to decay in the sun, and more of the ill-smelling soft tissue is beaten away.

They are then heaped in "crawls," wicker enclosures built in the edge of the water near the shore. The macerating process is advanced and cleansing completed by more beating and rinsing.

The catch is dried aboard the boat while returning to the sponge market, where it is sorted and spread out in long sheds to be auctioned off to sponge merchants. It is then taken to sponge houses to be shaped, trimmed, and sorted for market (p. 206).

#### FITTEST AND FIERCEST SURVIVE

These are only a few examples of the multitudinous forms of life that swarm in the shallow waters along the ocean margin.

In the more southern waters, genial temperatures the year round allow continuous development of myriad creatures not adapted to northern seas, while an abundance of lime-producing organisms makes possible the construction of skeletal substances and protective shells to a degree not attainable elsewhere. So coral reefs abound and the shell-building mollusks have reached an unusual degree of development.

Nevertheless, the same fundamental principle of interdependent relationship of all life remains. Conditions of temperature, essential chemical elements, and sunlight determine the abundance of plant life, whether microscopic or of larger growth. This basic submarine pasturage feeds hosts of the smaller animals, which in turn are fed upon by larger forms in obedience to the sea's inexorable law that the strong shall prey on the weak and the fittest shall survive.



FOR DAYS THE "JOSEPH CONRAD" DRIFTED ON A PAINTED SEA, NOT A BREATH OF AIR  
BLURRING HER GLASSY REFLECTION

Once in the Celebes Sea she floated in one spot so long that garbage and tin cans lay stagnant in the water alongside for five days, until "the sight grew oppressive and we fired at them to sink them" (page 229). Originally the little vessel was built as the Danish school ship *Georg Stage* in Copenhagen in 1882. Designed as a frigate with single topsails, topgallants, and royals on all three masts, she was intended to train 80 boys yearly in sail, and for 52 years carried on this work in Baltic waters, where she was a familiar sight. She had never been beyond the North Sea until Mr. Villiers took her around the world.

# NORTH ABOUT

BY ALAN J. VILLIERS

AUTHOR OF "CAPE HORN: GRASS-SHIP RACE," "ROUNDING THE HORN IN A WINDJAMMER," AND "WHERE THE SAILING SHIP SURVIVED," IN THE NATIONAL GEOGRAPHIC MAGAZINE

*With Illustrations from Photographs by the Author*

FROM Singapore there are two routes by which a square-rigged ship may hope to reach Sydney, New South Wales. Either she may make the best of her way to the southward, through Soenda (Sunda) Strait, or around the north of Sumatra with the southeast monsoon, standing down the west coast of Australia and then running her longitude down in the wild west winds to the south of that continent; or she may go northward around Borneo and eastward into the Pacific, hoping that when that difficult stage of the voyage is past she may make her southing with the southeast trade.\*

The Admiralty Sailing Directions, a large, concise volume with information on how to take a sailing ship from anywhere on earth to anywhere else, warn that the northern passage ought not to be attempted at the time of the year I had to set out; but it was the most interesting way and I took it.

The dawn of the first of August found me under all sail outside the Strait of Singapore, headed across the China Sea toward the coast of Borneo and from there to Balabac and the Sulu Sea, through there to Tawitawi and the Celebes Sea, and southward of Mindanao into the Pacific.

After that, I did not know, but I planned to make what way I could in the general direction of the Solomon Islands.

At first we made good speed, but then the wind fell light and we sailed along upright and silent in the China Sea with never a ship in sight, the coast of Borneo low and unseen, and the green-blue sea littered with logs and trees and forest jetsam, round which sea-snakes swam.

Then we had squalls, and waterspouts—I gave them a good berth—and stifling calm.

In a week the heights of Balabac Island loomed ahead and we had before us the waters of the Sulu Sea. I stood on care-

fully toward the land (for Balabac there is surrounded by reefs) and toward nightfall noticed a large steamer ahead, curiously still and unlit.

What could she be? A derelict? Or a wreck?

We sailed closer, and at evening, with the clouds heavy over Borneo, anchored for the night close by the stranger on a reef with twenty fathoms of water. There was little wind then; we were better with a kedge down for the night in those waters.

## BOARDING A DERELICT

At daylight I rowed over to the steamer, to find her the gutted hull of a Japanese tramp. She was a long, old vessel, narrow and deep, with every hold full of water and the after well deck all slime where every rising tide had washed, and big crabs scuttling at our approach. Even in the dim light of breaking day, one could see the reef on which the steamer stood almost upright.

Here and there her steel decks were rotted, and the shapes of queer big fish shimmered in the darkened water in the holds. She was full of weird, sad noises, like a lonely beach with a quiet sea breaking and a moaning, rising wind (page 222).

Poor ship! Everything of value had been stripped from her long since; but I was not interested in her fittings. We fished in the holds, swam in one of them, then left her, ruminating on the futility of ships without water under them and the finality of getting upon a Sulu reef.

We hove up the kedge and sailed on through Balabac Strait. At nightfall, off Dalawan Bay, the wind drew ahead so that I could not go on. I stood in for the entrance of the narrow bay and anchored.

In the morning arrived a stout and somewhat greasy master of a motor vessel from Manila who came in twice a year to load wood; but, seeing us, he forgot about the wood. He came alongside, shouting. Were we in distress? No, we were not in distress, I replied.

There was no salvage; I saw the bleak disappointment on his florid face.

Then had we permission to visit the

\* See "The Society's New Map of the Pacific," published as a supplement to the December, 1936, issue of THE NATIONAL GEOGRAPHIC MAGAZINE, and the accompanying article about the map, by Gilbert Grosvenor.



FISH SWIMMING IN WATER-FILLED HOLDS ARE NOW THE  
"KOWA MARU'S" ONLY CARGO

Sailing in the Sulu Sea past the reefs of Balabac Island, the lookout of the *Joseph Conrad* spotted a big ship strangely still and somber. On approaching closer and putting off a boat, it was discovered that the hulk was the wreck of an old Japanese steamer perched precariously on a submerged reef. Seas swept over the afterdeck and the dark forms of fish could be seen swimming inside of her. Bits of coal still remained. The derelict had been stripped of all loose gear and apparently had been abandoned to the sea (page 221).

Philippines? Were we cleared inwards from a port of entry? We were not, I said. Nor were we visiting the Philippines; we were anchored outside Dalawan Bay waiting for a fair wind.

But the greasy one seemed not to realize we were a sailing ship. We were inside the territorial limits (there wasn't any anchorage outside), and we were therefore a highly suspicious vessel, probably piratical and certainly, at the very least, smuggling.

He was desolated at the thought of causing trouble to gentlemen of his own calling, but he felt it was his duty to summon a gunboat from Manila.

To this I replied that I would cordially receive any number of gunboats and ships of war of any description, and had no doubt they would have pleasant steaming; but their visit could hardly be justified.

He got busy on his wireless to Manila, urgently imploring, I gathered, the dispatch of six cruisers.

Then he went in for his timber, and I went ashore. But there was nothing but a small stream and a tiny village, and in a clearing three natives building a hut.

One spoke English of a kind that he said he had learned at an American school in Balabac; the others spoke

Spanish with even more indifference. They looked fierce and were attired in cotton singlets bought from a Chinese store. Later we found a Manila man who had been a steward in the American Navy; on the veranda of his small house among the babies and the dogs were notices in Spanish exhorting all and sundry to vote for Somebody for President.

Late in the afternoon the greasy one departed, desperately anxious for us to be a

piratical vessel of some kind in order that he might have the honor—and reward—of first finding us. But his gunboats had not come, and now he was hurrying off to a larger port from which to summon armed constabulary.

At midnight the wind sprang up, light and fair; I hove up my anchor and departed.

From Dalawan Bay we were ten days making the next 200 miles, dribbling and drifting through the Sulu Sea calms with tide rips and overfalls, and with long lines of logs, coconuts, and other débris floating by, and once the half of a native fence and a tree on a small island that must have been swept in flood down some Borneo stream. But never so much as the smoke of a gunboat did we see.

We beat about, tacking and wearing ship many times each watch in the baffling airs, seldom making much progress. Once, after a particularly trying 24 hours, during which we must have put the ship round at least 15 times, the noon position showed that a contrary set had put us 20 miles backward. It was dispiriting, but the only thing was to go on, hoping for a decent breeze.

It was hot and humid, and it rained every day. There were nights when the calms were deader than any I had previ-



TAKING IN SAIL—AN EASY TASK IN LIGHT AIR WHEN SNEAKERS OR BARE FEET WILL DO

But if the wind blows and the ship rolls, heavy boots with good heels are necessary to give a firm grip on the wire footrope. As the men lean forward in unison to grasp the bellying canvas, the footropes swing up behind them, giving them the dizzy feeling when they first try it that they will be shot head-first over the yard. Here the ship sails close "by the wind" and the yardarms are braced inboard at a sharp angle to the keel.

ously known. All the sky was so dead that the very twinkle had gone from the stars, and the sea was flatter than Kensington Pond and all the ship was still—not moving, not even gently lifting with that slow motion so seldom absent from the sea; all quietened, with the sails' blackened shapes hanging dead from the yards and not a block creaking.

It was a calm unnatural, foreboding, frightening: the helmsmen softly spoke the unsteered course to their somnolent reliefs;

the lookout on the fo'c'sle head stood quietly in the same place, not moving; the red and green sidelights threw long reflections in the dull water, not shimmering; the second mate on watch hung over the rail aft as if he had been built there with the ship and was as incapable of movement without wind as she was.

But in the course of time we made a little progress. We passed Cagayan Sulu, picturesque and lovely, but there was no port of entry and I did not stop.

One day we found ourselves close to an island known as Mambahenuhan—a tiny place, nothing but a precipitous brown rock with a few trees clinging to its flattened top. I put out a boat and pulled over, the weather being calm, to discover why so small a place had so long a name.

Landing on a narrow ledge of rock which ran around it, I saw tropic fish swimming in rock pools and crabs running; on the summit was a fireplace, very old. Had this been used in far-off days for secret rites and sacrifice? I don't know; far more likely it was used by the wandering pirates for cooking a supper of rockfish and crabs.

But all the 'pirates' we saw were engaged in the humdrum business of carrying copra into Jolo. Yet they had fast boats, I noticed, and always came to have a look at us.

At last we came to Tawitawi and anchored beneath Bongao Peak in Chongos Bay, one of the best anchorages of the whole voyage. It was evening behind the island of coconut groves with a native village on stilts close by; and Bongao Peak, bluff and wooded and worn, held up the rain clouds of the south monsoon.

I looked about for the pirates of Balimbing, for whom the warning is printed on the Admiralty chart, but saw none; nor port officials, nor gunboats, nor visitors.

#### BONGAO—NO FORMS OR FORMALITY

In the morning, going into Bongao Island to report the ship's arrival, I found it a pleasant, sleepy place of palms and beaches and a native town on stilts out in the water, a rickety wharf and stone stockade, a military post and a jail, and graves in a grass plot with white men's names above them.

A wide, sandy roadway, glaring in the sun, leads from the ancient wharf past barracks and guardhouse and wooden jail to the commandant's quarters, past a grassy square marked "Off the grass!" From the

jail a few nondescript inhabitants looked out sadly; everywhere I saw fixed bayonets.

The commandant, a pleasant, rotund Filipino, in shorts and a pajama coat of rich blue silk, was seated on his veranda. Formalities were scant. There were no harbor dues, port dues, light dues; no pilots, no ship chandlers, no shipping butchers. There was scarcely a form to be filled in. A good place, this Bongao.

I yarn with the commandant a while.

Trouble? Not much; not real trouble. Now and again there is a bit of a murder. The Moros run amuck and kill someone, usually a teacher. The teachers are mostly Filipino Christians; there are more than a hundred of them scattered in 30 schools through Tawitawi and its surrounding islands.

Two had been disemboweled just before we came, on an island called Parangan, near Balimbing. Three soldiers were killed in the fight that followed the attempt to arrest the murderers. But excitement? No.

I did not see any white men about. Bongao was given up entirely to the Moros and a few Bajaos (Bajaus), living in their picturesque carved boats. There were four Chinese stores and one Japanese. On the floors of the former babies played and the tails of big sharks stank to the heavens.

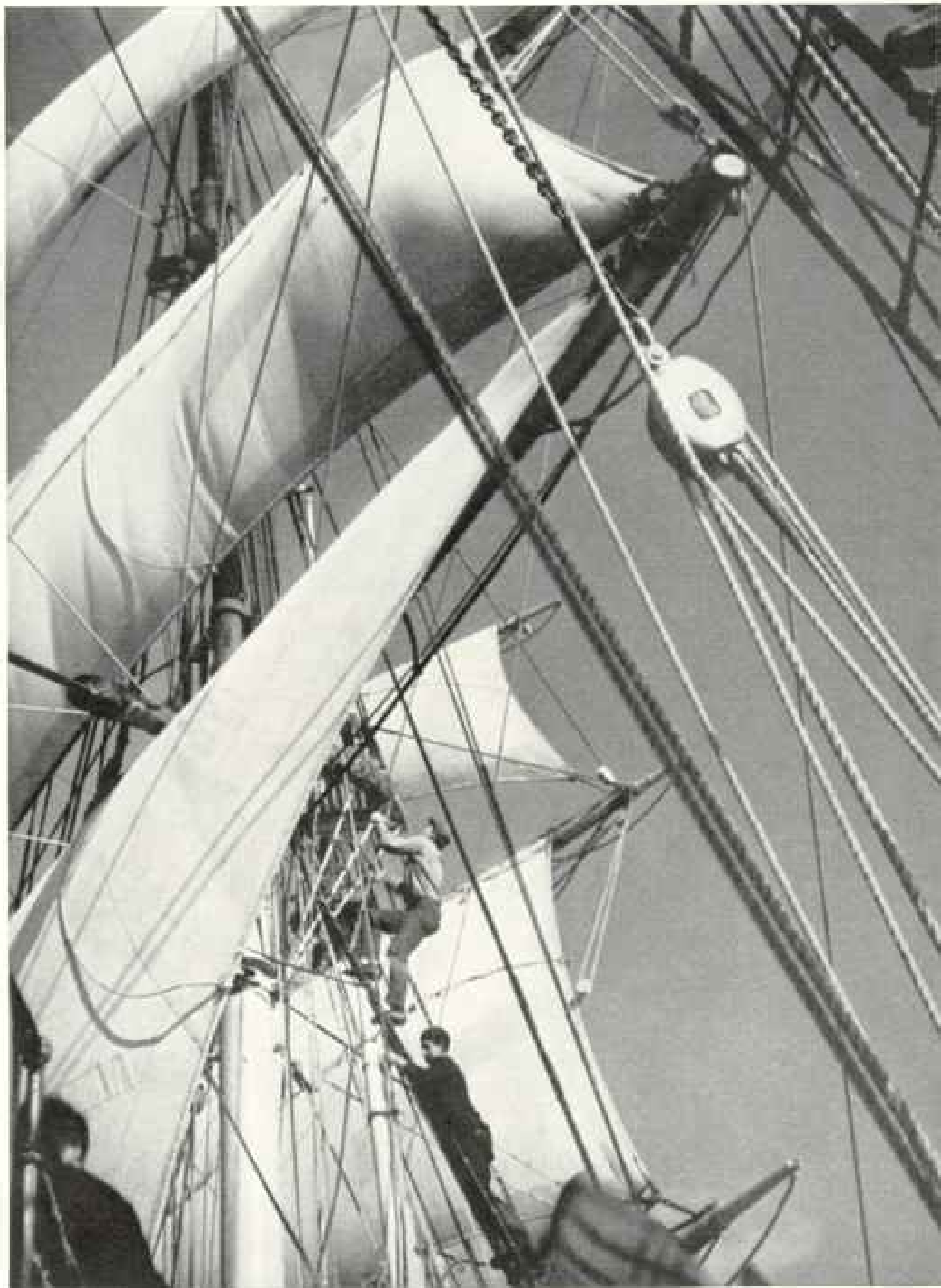
#### TRIBAL FEELDS SUPPLANT PIRATE RAIDS

And the pirates, where were they? Out of business, said the commandant; it was some years now since they had dared to raid in northern Celebes Sea (page 233).

In the old days the people of Balimbing and near-by villages, builders of fast and magnificent boats, were the scourges of these seas, raiding with fire and sword into Celebes and all around for slaves to sell in Borneo and Mindanao, not hesitating to attack such weaker vessels as came their way.

The Spaniards sent a squadron to destroy their ships and towns, but such efforts did not stop piracy for a month. The "towns" were, and still are, merely lines of wooden homes built up roughly on stilts over the harbors; these were easy enough to destroy, and easy to build again.

The fast boats, too, were easily replaced, though this took time. The people of Balimbing were magnificent boatbuilders; still are, I gathered, though now they build for peaceful export, and smuggling. They could still do a little of that, for there was



CADETS GO ALOFT "OVER THE TOP" TO SEND UP THE MAIN ROYAL YARD.

Youngsters of the crew who intended to follow the sea as a career were taught seamanship in much the same manner as were their great-grandfathers 100 years ago. Here they have been ordered aloft, like monkeys, "in a drill" to the topmost yard of the ship. The upper lad is just climbing over the top, or platform, that serves as a spreader for some of the complicated network of rigging which stays the masts upright. The lower boy is awaiting his turn on the ratlines, or ladderlike crosspieces, of the main shrouds.





TWO DAYS ARE REQUIRED TO CHANGE A SHIP'S HEAVY CANVAS TO A LIGHT SUIT

The boys much prefer changing sails to the routine cleaning and painting which must go on in periods of good weather. Here the fore-topsail is being unbent, or taken off, preparatory to changing.

no control of the boats going and coming to and from North Borneo.

The Balimbing people were intractable, said the commandant. Energy which formerly found outlet in pirate raids now led to intertribal fights. The people of the village near which the ship was anchored had, he said, come from Balimbing. I had better keep an eye on them; they were all right, but if they saw that they could get off with anything, they would. Yes, even the ship.

The schoolchildren fought; the women fought. Recently someone had tried to organize a school "meet" of all the island. It had to be stopped because the Balimbing and Malasa children seemed determined to murder all the others. A week or two after that the commandant had been compelled to arrest 39 women who had begun a battle with the girls of Simmul.

#### A VILLAGE ON STILTS

Balimbing village was about six miles from the ship, along the shores of Tawitawi Bay. I sailed there in the lifeboat, going quickly with rain squalls through the wide waters of the bay.

A group stood waiting on the rickety

pier as we came in; I saw a big knife or two, and wondered if they might not still be pirates. A huge giant leered wickedly as I brought the boat alongside; but it turned out that he was the schoolteacher, and he spoke English. He straightway wanted us to inspect the kindergarten; on the foreshore under the trees I saw children playing hopscotch near their new school.

Pirates! That Admiralty chart, it seemed to me, was slightly out of date.

The school was very modern, with mottoes on the walls and exhortations to the young to eat fruit twice daily (they get little else), clean their teeth, and see that their "bowils" move regularly.

The teacher was slightly pessimistic. The children, he remarked, learn little and remember less. If there is harvesting, they do not bother about school, and it is almost impossible to get the girls to go.

Back on the wharf a horde of grinning shipwrights were pawing over every detail of the ship's lifeboat, feeling the oiled canvas of the sails, throwing out the anchors and trying them, trying the oars. It was probably the first European boat they had seen; after a long and ribald examination

they announced—so the teacher interpreted—that it was not so bad, but they could do much better themselves.

#### A FRIENDLY CHIEF ENTERTAINS

At Chongos Bay in Tawitawi the ship lay close by Malasa village (page 229), with whose chief and people we became very friendly. The chief was a stout man who went around with a loaded Colt revolver strapped to his waist; his title was the Panglima Sarawi.

He was most interested in the ship and all on board. I entertained him to the best of my ability. But he did not want to be entertained; he seemed content merely to be on board, though he never came without a large bodyguard.

One evening he put on an exhibition of Moro dancing at his home, a spacious, airy, and not unbeautiful dwelling of rough wood situated in the most strategic position in the village, which is built upon piles by the sea. One crazy, dangerous "bridge" connects the row of wooden houses with the beach, where the coconuts and crops are grown and the boats built.

They are excellent boatbuilders, these Malasa people. Their boats, high-ended like the old Vikings', beamy, with great sheer and flare, rest in uncompleted state beneath the palms. They are often lavishly carved and their speed is surprising.

An even crazier bridge than that to the shore connects the row of houses. Naked brown children scampered about and stared and little boys baled out waterlogged canoes. Some of the elders had a piratical look, but said and did nothing except crowd in at the dance.

Inside the great room of the Panglima's dwelling (in a corner of which was a large double bed) two half-naked stalwarts banged immense metal drums resembling huge inverted cooking pots. A woman played monotonously on a row of brass xylophones.

We people from the ship sat in state and watched the dance, a weird shuffle with jerky movements of the arms, done by little girls in velvets and gold. Much of the gold was strange coins long in disuse.

Afterwards came little boys, who stamped dexterously in their bare behinds; always to the same monotonous music, they danced and danced. Then evening came, and then the night, and weird lights threw long shadows in the great room until the whole

took on a semblance of unreality—the gongs and the drums and the little boys and girls stamping in their velvets and gold.

A number of my cadets were present at the dance, among them 14-year-old Stormalong (pages 231 and 249). Among the dancers was the daughter of the Panglima, aged perhaps thirteen.

It appeared that the Panglima's daughter, for political reasons, was promised in marriage to an elderly gentleman living in the next village. This man, though apparently possessed of considerable power (he was said to be fifth cousin to the Sultan of Sulu) was stout, scarred, cross-eyed, already much married. His favorite attire seemed to be old underpants and a white shirt, collarless, the whole decorated lavishly with golden coins; across his back hung a huge jeweled kris, and on his face usually sat a look of some malevolence.

#### A PRINCESS PROPOSES TO STORMALONG

At any rate, the Panglima's daughter did not want to marry him; instead, she took a liking to our Stormalong.

Nothing was said about this until just before we were to sail, when, long after midnight, the Panglima and a delegation of the chief men came on board to acquaint the boy with the little Princess' decision.

They came mysteriously, in several large boats, with two interpreters who asked for Stormalong. He was asleep, as was everybody else save the watchmen at that hour of the night. Well, said the Panglima, find him; and round the decks he went with his delegation, peering at the faces of the sleeping boys.

At length they found him, woke him, and proceeded to explain their proposal. The Panglima, said the interpreter, wanted a white son; his daughter, the little Princess, wanted a white husband. Would he stay? The Panglima grinned encouragement.

#### NO WEDDING BELLS FOR STORMALONG

Stormalong, disbelieving, blinked. Was he dreaming? No, the Princess was there. She and her mother were waiting in a boat at the foot of the gangway. He could come straight away. No one need know. His life at Malasa would be a happy one. He could have all the boats he wanted, and sail all day on the bay.

But as soon as Stormalong was sufficiently awake to understand that the proposition really was serious, he jumped up,



A BOARDING PARTY OF MELANESIANS IN FRAIL OUTRIGGERS STORMS THE "CONRAD"

But nowadays they come bringing pigs, fowls, coconuts, yams, oranges, and limes instead of spears and arrows, as in former days. They will exchange the produce for heavy black "stick" tobacco so dear to all South Sea islanders. Clearly shown here is the manner of setting up outboard the *Conrad's* standing rigging which stays the masts (page 240).

brusquely refused, ran down into the hold and hid himself. It was several hours later before the watchmen could induce the disappointed delegation to leave.

"I reckon it's an insult!" shouted the boy next morning, appalled at the idea that white blood should join with brown; but he really was scared, considering the whole thing a plot to cajole him ashore and eat him. But Hardcase and the other boys did not share this view, and for days lamented that the little Princess had not shown the good sense to choose one of themselves instead of bashful Stormalong.

Not long before sailing from Tawitawi, I discovered that on Bongao Peak was the historic Tree of Life, for which the old explorers often searched. It is, they told me, an exceptionally large and beautiful palm, the foliage of which changes daily; if you eat of its leaves you will grow old, but you will not die.

Since the tree is in an utterly inaccessible place, no one knows whether the legend has truth or not, so the tree may safely be worshiped. It is, I gathered, still worshiped, though not as much as

formerly. With the advent of schools the Moro worships less, believes less, works less.

One day, sailing in the lifeboat through the long inlet that divides Sanga Sanga Island from Tawitawi, we came across the plantation of a white man gone native. Lean, tanned, bearded, barefooted, and leathery-skinned, attired in ancient garments surmounted by a floppy native hat, with a large wife and numerous progeny, he looks the part.

But the children are not his, and his wife is neither young nor particularly attractive, possessing instead the finer attributes of being hard-working and soft-spoken. And the white man, instead of lolling at his ease in the lotus-eating land, works very hard upon a large plantation which he has himself hacked from the boulder-strewn, pig-infested Tawitawi bush.

"Come on in, strangers!" he shouted to us as we crossed his clearing, after miles of moist, windless, heat-belching path. Sleek dogs moved over to make room and some well-groomed Filipino children scurried away, dragging a protesting monkey.

The white man, we gathered, had been



"JOSEPH CONRAD" LAY TO CLOSE BY MALASA, A PHILIPPINE VILLAGE ON STILTS

A rickety bridge, the only main street, connects the thatch-roofed houses with the rocky foreshore. Beside every home the owner's canoe, his only mode of transportation, was "parked" by the piles.

there since 1907. Like it? No, he didn't like it; it had grown around him. It was kind of home now. There wasn't any other place where he meant anything.

He did not ordinarily get much news, except for such scraps as could be read in ancient copies of the San Francisco *Examiner* used by the Chinese storekeeper in Bongao to wrap up his few purchases.

In the late afternoon he saw us back to our boat, plodding barefoot through his rough, fetid fields. Here and there the heat belched from the hot earth as if a furnace door had just been opened; we passed coconut groves (the lazy man's crop, he said), banana groves, orange groves, heaps of peanuts drying in the sun.

#### THE PRINCESS' CURSE BRINGS BAD LUCK

In a day or two I sailed, dribbling down Sibutu Passage bound outward to the Celebes Sea and Pacific. It was so calm that four days after leaving Tawitawi we still could see the place, and the uncrowned "Prince of Malasa" was sworn at around the decks for bringing the curse of Princess Sarawi upon us. He would not stay in Tawitawi; and now we could not go.

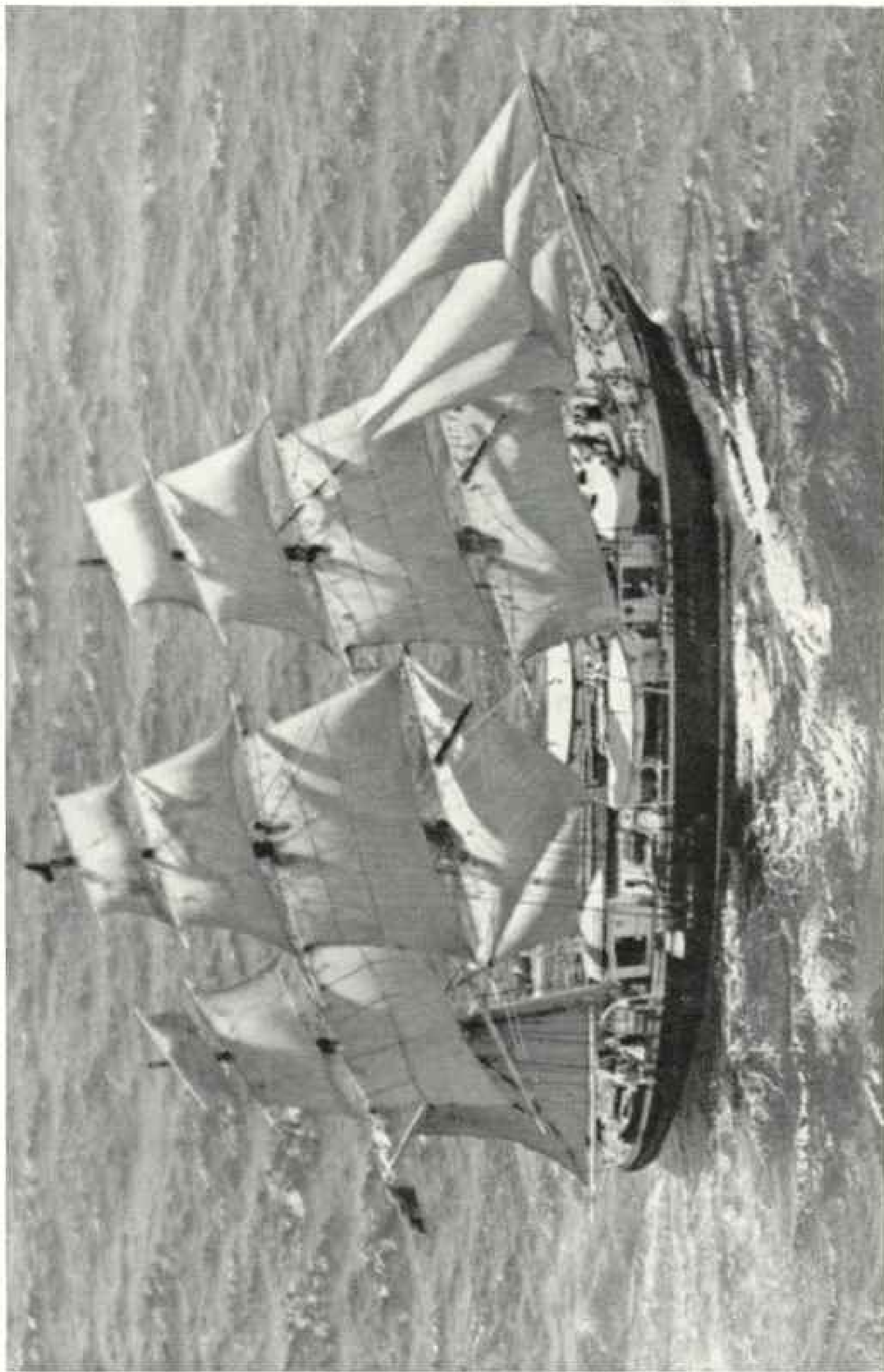
After leaving Tawitawi our progress for

a week was so poor that I began to despair of making the passage to Sydney. It was so calm the clouds were mirrored perfectly in the sea by day and the stars by night, and the sails hung so lifelessly that half their shade was robbed from them.

The helmsmen, barebacked, stewed in their sweat at the open wheel. The pitch bubbled up in the seams and stuck to the boys' feet, burning them; the drinking water was insufferably hot; and always in the limpid depths alongside where we might have swum lurked huge sharks.

The galley refuse of three days lay alongside, not moving; some tins thrown overboard two days out from Bongao were still there on the fifth day. The sight of them grew oppressive and we fired at them to sink them (page 220).

Calm, calm. Always the accursed calm. Where was that Prince of Sarawi, rejector of the Princess' hand? Stormalong kept out of sight, for wrath was hot against him. Beginning as a joke, in the course of the monotonous days the boys' anger became real; if the calm had gone on a week or more, they would actually have thought that Stormalong's rejection of the Princess was responsible for it.



Photograph from The Sydney Sun.

AN AUSTRALIAN AIRMAN VIEWS THE FULL-BIGGERED SHIP "JOSEPH CONRAD" LEAVING SYDNEY, BOUND ROUND THE COAST TO MELBOURNE

Making more than nine knots, the little ship boils along with all sails set. But conditions soon changed. The passage of 669 miles took 13 days and turned out to be the stormiest of all. While the *Conrad* was successfully fighting Tasman Sea gales, the 2,000-ton Australian steamer *Peringa* "went missing with all hands."



STANLEY SOUNDED TOO LUBBERLY, SO STORMALONG HE BECAME

The first mate refused to bellow "Stanley Goodchild" along the decks, so this cadet was given the name of a salt in an old sailing-ship country. He became a great little sailor and could make fast by himself the mizzen royal, one of the highest sails. A dark Princess of Malasa fell in love with him, but he refused her proposal because his ambition is to command a four-masted barque!



STORMALONG, WHO JILTED A PRINCESS, BECAME THE SHIP HOODOO

Upon leaving Malasa the *Joseph Conrad* drifted for 10 days, making only 200 miles. The crew became so exasperated that they threatened to "take it out" on this 14-year-old lad, playing with one of the ship's two kittens (page 229). Many of the halyards, brails, hantlines, braces, and other gear used in handling the sails and yards are coiled here on belaying pins on the mizzen five rail.



Photograph from *The Sydney Sun*.

ALAN VILLIERS, MASTER AND OWNER OF THE "JOSEPH CONRAD"

Since he was 15 years old, Mr. Villiers has wandered over the world in square-riggers in all capacities from cadet to master. In the *Conrad* he was master, doctor, chief instructor of the apprentices, and navigator. An Australian by birth, he served his apprenticeship in South Pacific barques and the Cape Horn grain trade to England, but he has also been a newspaper man in Tasmania and London and has written many books and articles on the sea.\* He now lives in Brooklyn, for, he says, "You can see the ships from there."

Then we moved on a little, south of Mindanao, with the slave island Sarangani in sight for two days whenever we cared to look in its direction through the rain. Certainly in a sailing ship one has a good look around. Too good; sometimes I thought I would have to change my route, after all, and go south-about. But how could I do

\* See, in *THE NATIONAL GEOGRAPHIC MAGAZINE*, "Rounding the Horn in a Windjammer," February, 1931; "Cape Horn Grain-Ship Race," January, 1933; and "Where the Sailing Ship Survives," January, 1935.

that now? Or go anywhere, without wind? No, I had to keep on as I had begun; for better or for worse, we were committed to the northern passage.

Besides, I knew that if I could find, in the wide streams of the west-setting equatorial current, the narrow river of the counter-equatorial setting east, my progress would be very much better.

INTO THE PACIFIC—AT LAST!

We had not even entered the Pacific then. But calms depart, and at length came a sunny morning with a fair wind when we dashed out into the Pacific's blue through the narrow gateway of Kawio and Marore Islands, with the Celebes boats out fishing a score strong, and sailing swiftly out of our way for fear of this strange apparition.

A single-top's<sup>1</sup> full-rigged ship had not passed that way in half a century.

Kawio with its beaches and coconut groves seemed one of the most picturesque islands of the whole voyage; I should have liked to anchor there, but I could not waste fair wind. We ran on; and Stormalong crept about the decks again.

So we came to the Pacific, found the east-setting counter-equatorial, and sailed on. On and on and on, a long, hot, hard road. It rained every day and sometimes blew,

though often we had days of doldrum conditions. But the current was strong and we progressed steadily to eastward, to the western Carolines, past Sonsorol and Pulo Anna, and Merir, and all those other low islands of the Japanese mandate.

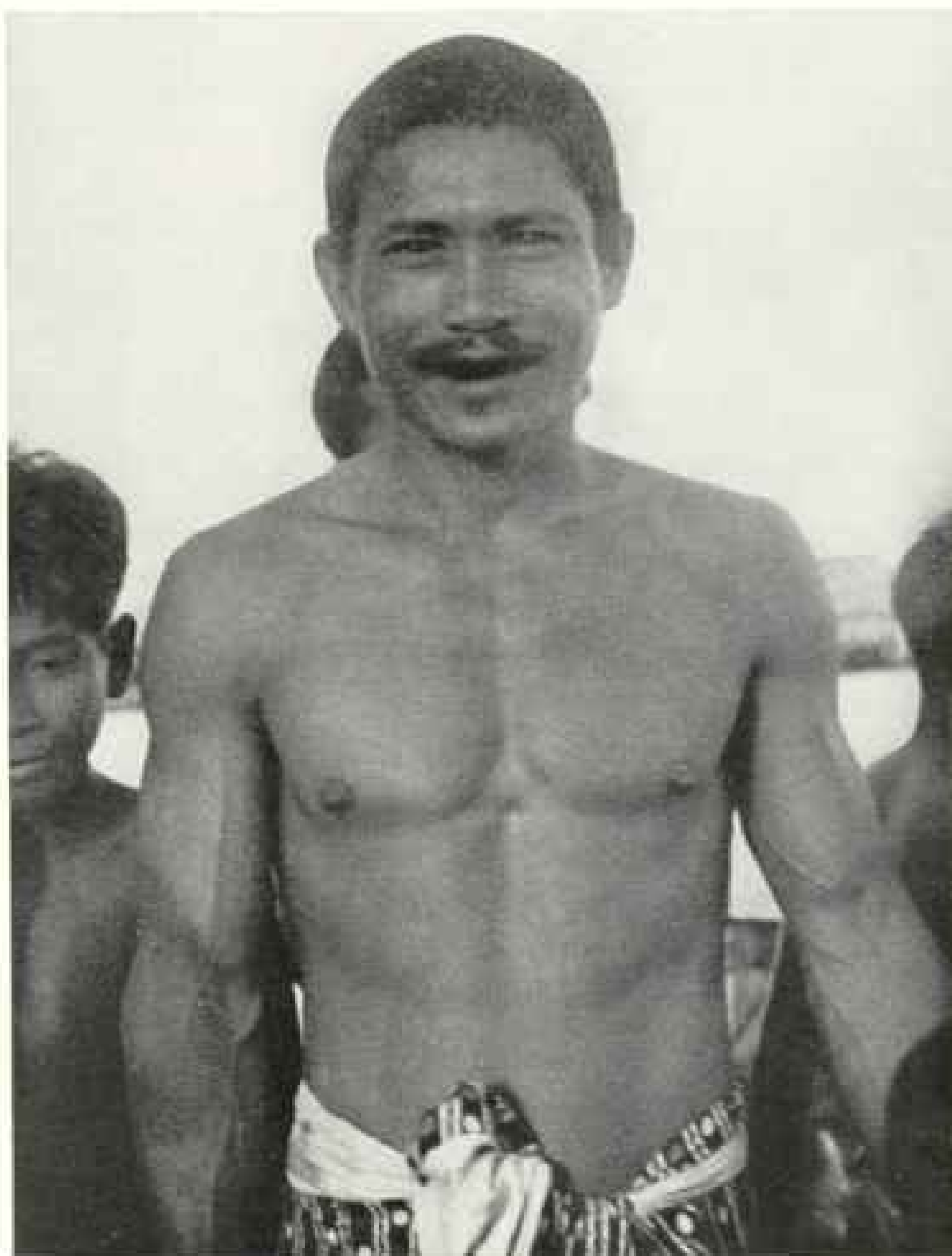
We saw the blue streak of Sonsorol early one morning, but I did not go in there, nor into any other of the Japanese islands.

At length we progressed until we had sufficient longitude run down to head southward toward the strait between Bougainville and New Ireland; I turned south then, crossing the Line for the third time since leaving England, on the 49th day out from Singapore.

We found the doldrums again, stifling hot and calm, with the glassy sea sometimes ruffled fleetingly by faint whiffs of wind that went before the yards could be braced to them, and that always seemed to take the ship aback, robbing her in sternway of far more than they would have sent her ahead.

There was a long, uneasy swell, as if the great volume of the sea itself, hot and broiling, felt the intense unending heat of the overhead sun and panted in protest.

But it did not; it heaved and rose and fell slowly, in great content, as if nothing would have pleased it more than for us to stay there forever.



WELCOME TO BALIMBING FROM A "PIRATE" CHIEF

Once villagers in the Sulu Archipelago were a scourge of the eastern seas. Now their children go to American-type schools built on stilts on the pleasant shore near their sea homes (page 224). Their parents brought long, murderous knives for sale to the crew of the ship. This man spoke Spanish but no English.

But these were passing moods; it rained, and the air cleared; it blew, and tempers were cooled. Somehow life seemed better again and the sea, though still a worried mirror of the dead sky, not so utterly heartless and bitter, so cynical and depressing.

#### A BIRD VISITOR HAS TROUBLE BALANCING ON THE MAIN YARD

Sometimes we found things to interest us, even in the calms. A bird flew aboard one evening, very tired; a land bird, by the look of him, from some lagoon in the Carolines. He rested on the main yard, but could not balance there with the rolling.



He fell on the lifeboat cover and we took him from there, expecting him to die. We gave him water and he rested.

Next day he was lively enough, busily examining the decks for food. He was later identified as a young bird of the curlew family, and was named Oscar.

The bird soon made himself at home, though at first it was difficult to find something he would eat. We found some suckers on the log rotator and these he ate with relish; we caught some sharks, and he gobbled up the suckers from them. But before long he was not at all fussy, eating whatever there was going, as everyone else did.

He got to know his name and ran to the galley when the cook called him; he had a bath of sea water in the scuppers, and spent hours each day happily bathing. He was a nice bird, Oscar, though he could never get over an undue interest in fresh paint.

#### WATERS WHERE SHARKS ABOUND

Sharks we often caught. The boys cut out the backbones for walking sticks, but we never tried eating the meat. Once after a small shark had been lying in the scuppers nearly half an hour, disemboweled, with a capstan bar rammed down its throat, it was thrown overboard and promptly swam away. But another shark, much larger, attracted by the blood, rushed at it and ate it in a wild flurry of blood and foam.

Several times we saw large sharks leap violently out of the water and thwack themselves down again in what seemed an effort to rid themselves of an undue accumulation of suckers. On odd occasions a sucker was dislodged, but they always came back again and the shark soon gave up the effort.

Bonito, albacore, porpoise, and dolphin we saw, though we never caught any; sometimes flying fish flew on board in the night. Whoever found them ate them.

By this time the vessel was becoming pretty foul on the waterline, and I began to think of putting into some convenient lagoon to careen and clean her up. But where was there such a lagoon? The islands round those parts are largely volcanic, with few anchorages and no harbors. There seemed only one place that would fit the bill, Nissan, northernmost of the Solomon Islands, not far from New Ireland.

I changed my course to make toward Nissan, which was more or less in our way. After some days we picked up the heights of New Ireland, and later Feni and Tanga

and Lihir Islands. The wind was fresh from the southeast and I had to beat, standing in close to the New Ireland shore but not putting in anywhere.

We saw nothing except the trees of a coastal plantation now and then: once a Japanese steamer went past loaded down with wheat from Australia.

The wind was still ahead; I beat and beat, carrying as much sail as the little vessel would stand. We were 56 days out from Singapore before the low atoll of Nissan came in sight. In the evening we were close by, but the place is little known and the Sailing Directions were not even sure where the entrance was. It is "apparently" between Nissan and the small island of Barahun, but all the charts are different.

It was foolish to attempt to enter such a place in bad light, without proper precautions, so I shortened down and stood off and on for the night.

In the night it blew up half a gale, and we were blown away.

Two days later, we were back again in a wind so fresh that the little ship staggered under the 'gallants. It rained and the weather was dull and threatening; I got close to the entrance, but again could not go in. I would not go in there without an examination first; I wanted to send in a boat to sound.

My disagreeing charts all agreed that there were fourteen feet of water in the "apparent" entrance; but coral grows, and I wanted to know, before I took the ship that way, that what was described as apparent was also real.

I must send in a boat. But how? The weather was too bad.

#### BRAVE MEN IN A DINGHY

I stood away again, this time in some dejection. It did not seem possible that we should ever come to Nissan. But the weather fined in the later morning and the wind decreased; so I stood back again, as close to the entrance as I could safely get, and sent in the dinghy with the carpenter and two of the best men.

Their instructions were to sound thoroughly in the entrance (which they had first to find), and then, if there was water enough there to float us in in safety, to hoist a French flag on an oar.

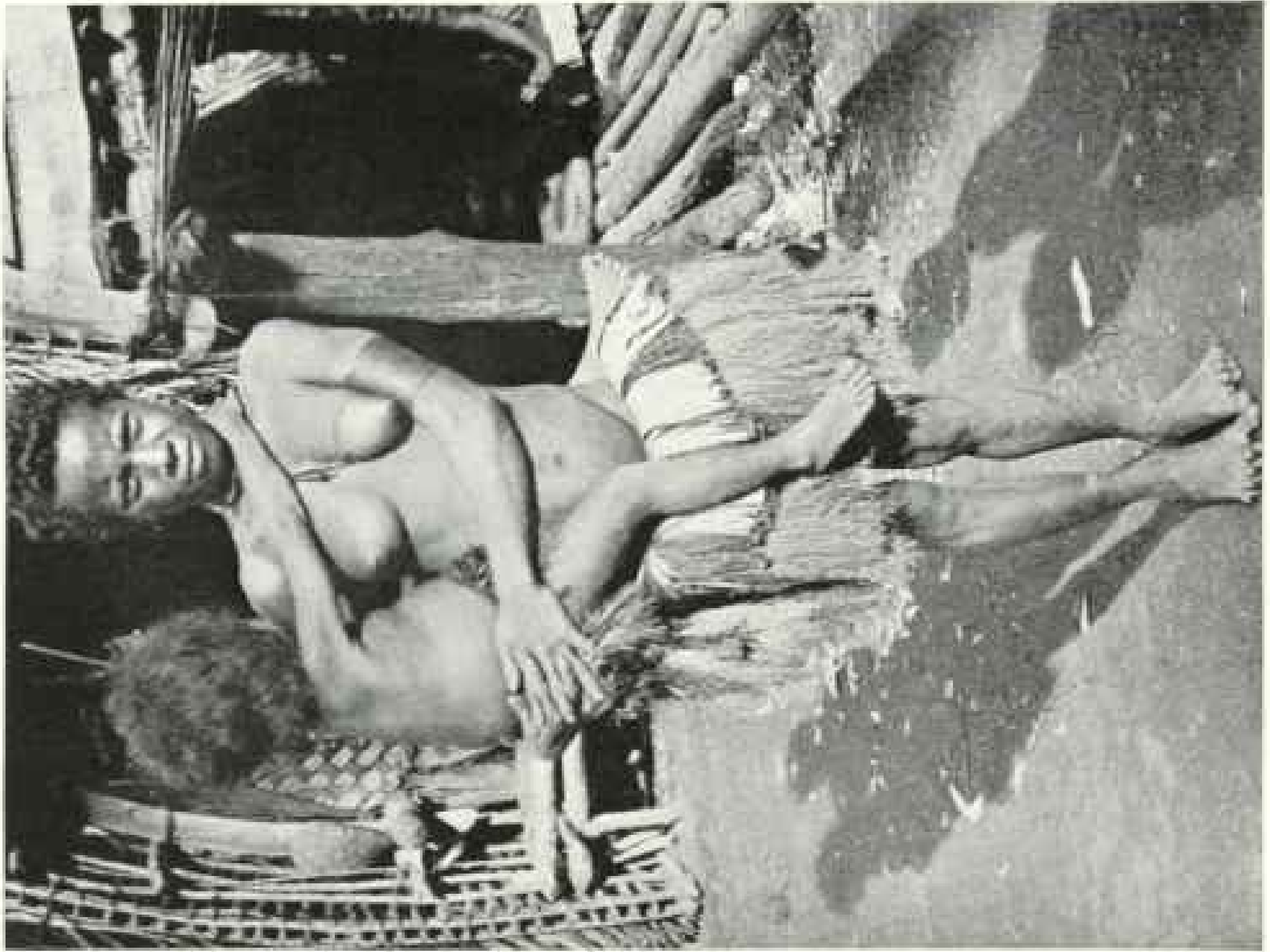
They went in, and we stood off and on. Then the wind freshened again, until it was blowing more than a strong breeze. The



Photograph from The Sydney Sun

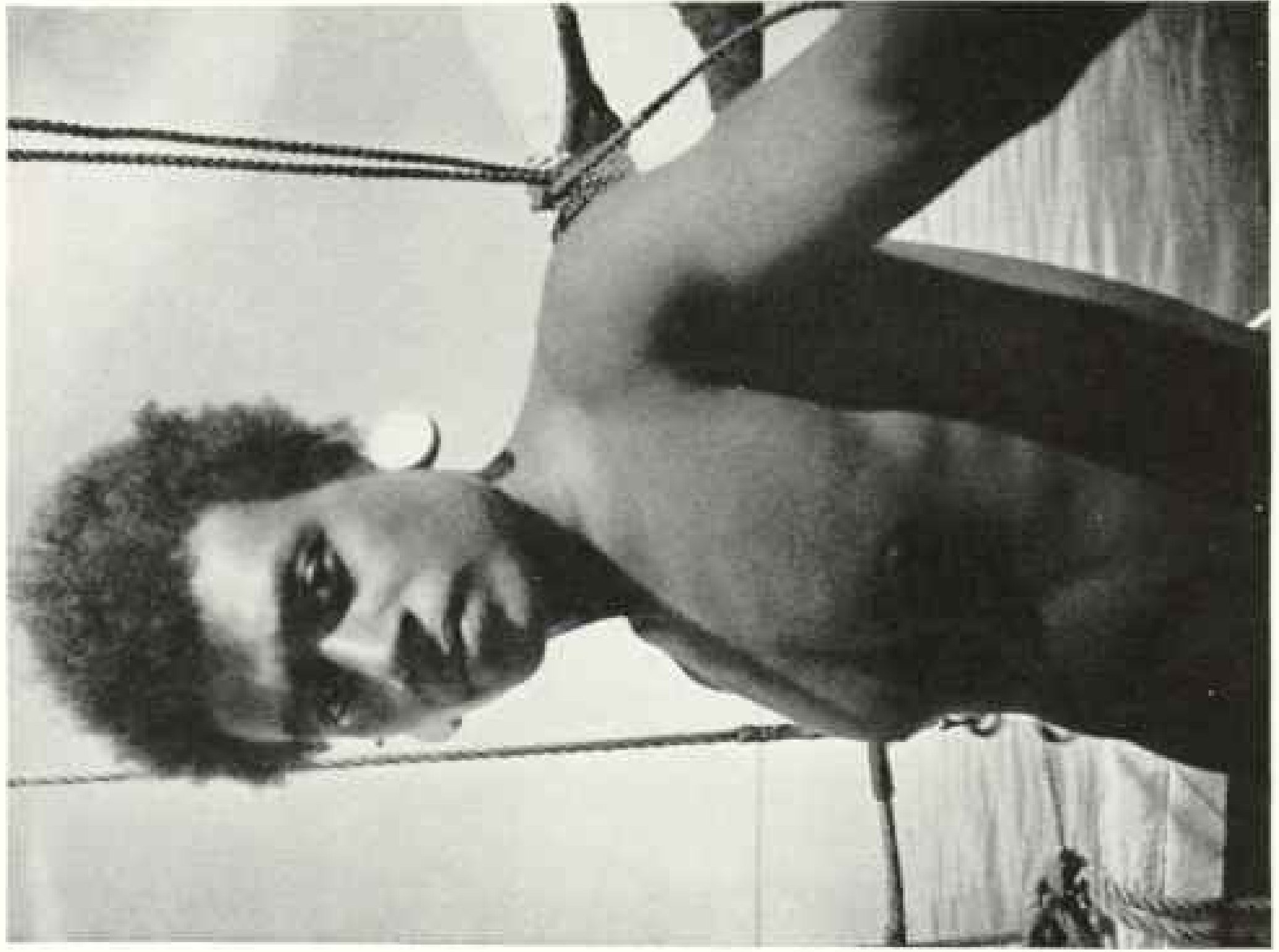
RISING AND FALLING TO A GENTLE SWELL, "JOSEPH CONRAD" HEAVES TO OFF SYDNEY HEADS TO DISEMBARK THE PILOT

This ancient maneuver brings the vessel to a stop while still keeping her sails set. But it is different from heaving to in heavy weather, when canvas is so much reduced that the ship lies quietly shoulder to the sea, giving to the gale and the scend of the waves. Great steamships in the Atlantic lanes heave to, when gales become too dangerous to be fought longer, by slowing engines so that the ship merely keeps her head to the sea. Here the *Conrad's* small size is emphasized by the men on the fore-castle head who are cutting, or securing, the anchor with its chains, the shank painter and the ring stopper.



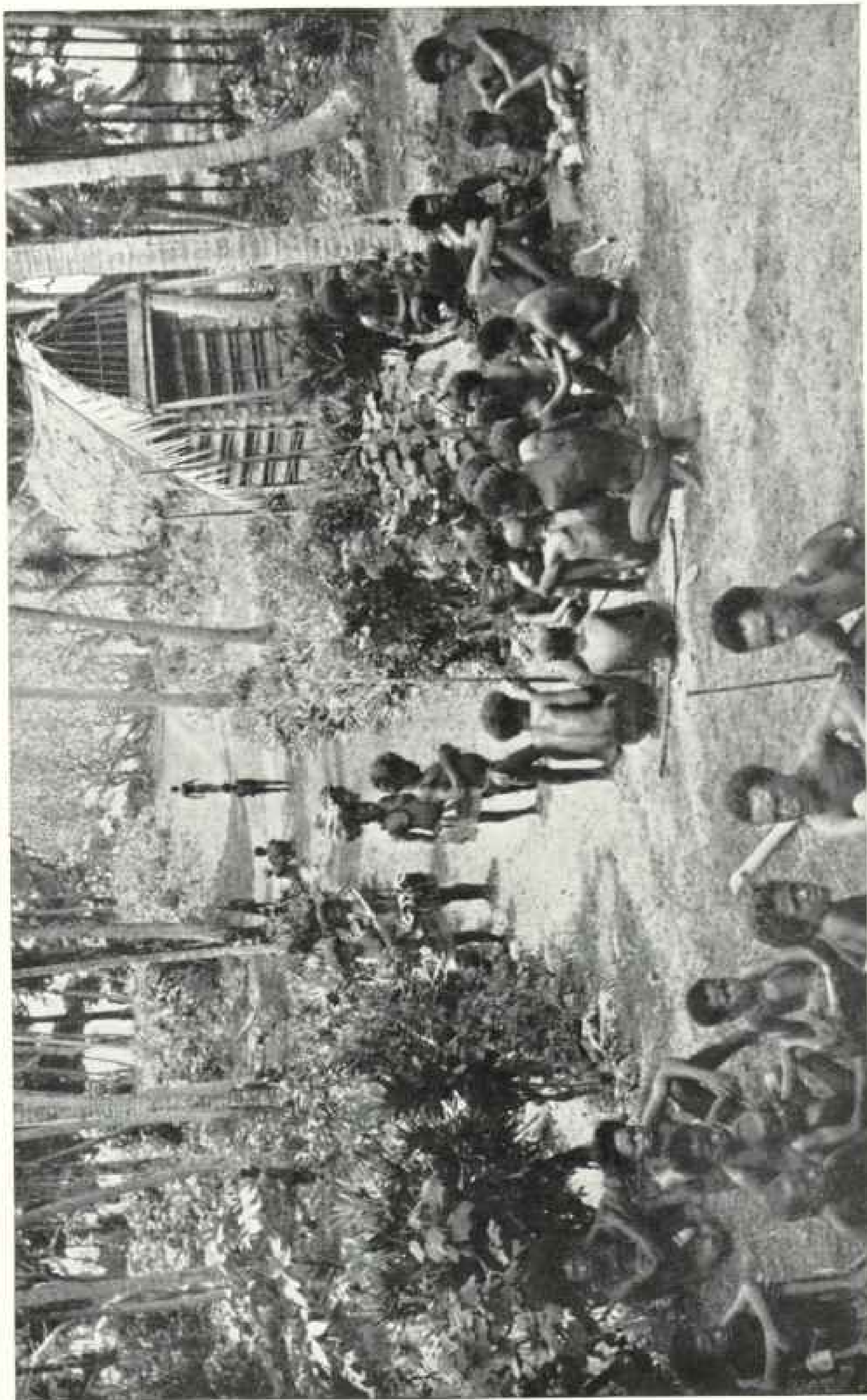
SCANTY CLOTHING IS ENCOURAGED IN THE TROBRANDS

Attempts to introduce cotton garments among the natives of the islands are frowned upon by the colonial administration, because tuberculosis and other diseases take a terrible toll, and sun-bathing in the warm climate is healthful. Many layers of grass make this young matron's skirt stick out like a ruff.



THE HAUGHTY SON OF AN ISLAND CHIEF COMES ABOARD

Ornaments of clamshells distort the ears; his hair grows fuzzy and wild; his chest is deep and his arms powerful, as becomes the principal young man of Santa Catalina. Many islanders swarmed aboard, but girls no longer swim out to welcome strange ships—unless the mermaids chance to be short of tobacco!



KIRIWINA IN THE THOBRIAN ISLANDS IS A HAPPY ISLAND OF MARKET GARDENS, PEARL DIVERS, AND LARGE THATCH-ROOFED VILLAGES

Pushed off her course by a strong adverse current, the *Joseph Conrad* put into this little island to reaw her torn and weather-beaten sails. Natives swarmed about the ship in their canoes, bringing sweet potatoes and fish to exchange for stick tobacco, and an invitation to visit their homes. Here a government officer came out and insisted that the ship proceed to Samarai, the port of entry, some 200 miles off her course, failing to realize that the *Conrad*, being a square-rigger, could not "steam" at will, but was dependent upon wind and tide (page 243).



STUNS'LS ALOW AND ALOFT, THE LAST FULL-RIGGED SHIP ROLLS ALONG ON HER VOYAGE  
AROUND THE WORLD

Well over 50 years old, the *Joseph Conrad* is stoutly built of Swedish iron and teak and is good, says her owner, for another half century. Here she carries her studding sails (stuns'ls to sailors of bygone generations), which are difficult to set and dangerous in sudden shifts of wind. These extra sails, set on special booms fastened to the ends of the yards, were the equivalent of another mast of sails and increased the speed of the vessel at least a knot. In sudden heavy weather, stuns'ls are a nuisance, for it requires much time to take them in (page 241). The *Conrad* carried no studding sails for the royal, or topmost yards.

sea rose and it began to rain. The sea increased so much I did not think the dinghy could come out. Perhaps it was lost!

I search the seas anxiously; no dinghy. Wind and sea increase; still no dinghy. We have been getting farther from the island; I wear again, and stand in on the dangerous tack toward Barahun. The island is now a lee shore, but I have to find the dinghy. Many sharp eyes look out from aloft.

I do not think myself that the dinghy will dare come out; probably it lies in the entrance, showing the French flag; or maybe not. But there is nothing in the entrance.

I stand toward the island, on and on. It is ticklish work. I do not want to stand so close on that lee shore that I cannot get away again, but I must find the dinghy. Now I steer toward the entrance, the break between Nissan and Barahun, conning from the fore crossrees; I have decided now that the dinghy is waiting there. I will chance the French flag.

There they are! They *have* come out, in that frail pine dinghy! But they are real sailors.

The sea is so high now I cannot see the dinghy until we are close upon it, and then the first thing I see is the French flag, flung high on a crest. I run down upon them, pick them up quickly as we roll past, and leave the dinghy on a long line astern.

There is an entrance, they say, between Nissan and Barahun; the least depth they had was 16 feet. (We draw a fraction over twelve.) Inside the lagoon they had 12 to 20 fathoms; water enough in there. It is only the entrance that is dangerous.

#### A TICKLISH PASSAGE

Well, we are pretty close now. I square up and stand in, under easy canvas. The wind has increased to a moderate gale. From aloft I can see no entrance, though now we are pretty close. The sea breaks furiously on a reef which seems to extend right across. But as we come in, I see a break, quite close to Barahun. How narrow! And there the bottom is clearly to be seen. Sixteen feet? I hope so!

We are on it now. Beside us from the crossrees I see the rocks and hear the surf's roar and glance at the coconut palms of Pokenium, so close; and there ahead the water seems to shallow again, ominously.

We have good way. She makes eight knots under only the fore and main tops'ls,

the fores'l, and a few stays'ls; with good men at wheel, anchor, windlass, and all four lead lines, she rushes in. I hold my breath aloft as she comes on.

There is little sea here now; thank God for that! We straighten in the coral gateway to choose the streak of heaviest green from the confusing array of surface colors ahead, colors that vary sharply, indicating the shoals and the depth of water. I have not much time to choose.

Quickly! Starboard a little! Ah, she comes—steady now! It is the place of darkest green in a poor selection: there seems to be a shallowing inner bar right across. Sixteen feet? I *hope* so!

But there is. She comes across. The fish flit frightened in the gloomy depths; the water deepens, and the flattened area of the huge lagoon is now around us. We are across the bar and I have only to choose an anchorage. I get away from the entrance and let go. Within ten minutes the native canoes are out to us, wanting tobacco, selling pigs (page 228).

In the evening I landed at Pokenium to watch the primitive natives broiling their evening meal of fish taken straight from the lagoon. I walked a while through the white man's abandoned plantation on the point where the depression has left the buildings derelict and the coconuts strewn heavily on the sodden ground.

#### A SOUTH SEA ISLAND IDYL

The sun's setting over the broad lagoon was beautiful. The quietened wind sung softly in the high palms and the blue waters lapped lazily on the golden inner beach while the surf of the wild Pacific roared outside. It was all peaceful and romantic and vaguely adventurous, as a South Sea island ought to be.

But in the lagoon the long shapes of hungry sharks were often seen, and the fierce sting ray abounded; the golden beach soon gave way to a jagged coral strand, poisonous to bare feet; behind the plantation clearing, the jungle was a dank, moldy swamp; and through the high palms pretty soon it rained.

The people? Melanesian, and, I'm afraid, not very interesting. They might have been once; but now the remnant is gloomy, scabby, sad. A wholesome, up-standing, clear-skinned specimen is rare.

The men are more handsome than the women, are quiet, speak pidgin English

volubly, wear loincloths and (if at all possible) felt hats, live in grass houses in small, compact villages, dislike work, like bargaining and tobacco.

Especially tobacco. For this they brought out coconuts, limes, and other fruits, pigs, fish, bows and arrows—everything they had. But it had to be the right kind of tobacco, a strong, black twist of American manufacture used as currency among the South Sea islands for years.

In addition, they always demanded a supply of paper, newspaper by preference, though a few pieces of toilet paper would do. With this they rolled stout cigarettes, one whiff from which would send many a European under the table.

#### SOAP AND PEROXIDE IN DEMAND

They were also mildly interested in highly perfumed soap (though I think it was the perfume that attracted), in gaily colored loincloths, and peroxide. This they used to bleach their hair, a fashion that has been current among them for years, although formerly they used lime. With a head of thick, peroxidized hair surmounted by a brilliant red flower, a Nissan brave felt good enough for anyone (page 242).

I had no peroxide to spare. What I had I used for medicinal purposes, which the natives regarded as a great waste.

I had gone in there to heave down the ship, if I could, to clean at least the upper strakes beneath the waterline. To do this I first roughly surveyed the lagoon, choosing a place where I could bring the ship in almost to the beach, which rose steeply and was lined with trees.

I brought her there and anchored her, bow and stern, mooring her in line with the beach. Then I carried out lines to the trees to hold her fast, and rigged tackles from the fore and main crosstrees to other trees. When all was ready, all hands hove away on the tackles, heaving the ship over. She came fairly easily at first, but then stubbornly, so that it took all hands a hard morning's hauling to get her over.

But it was interesting work. No one in the ship (including myself) had ever seen it done before; it was prehistoric, almost, like the single-tops'l ship. But we enjoyed it; and we cleaned the ship and learned a lot.

We stayed in under the trees two days and then warped out to a safe anchorage. It blew fresh every day and every day it

rained, though this was allegedly not the rainy season. The rain poured into the gloomy lagoon, fringed heavily with its monotonous circle of wet trees. The water was not blue on such days, but black; the sun shone seldom, and, outside, the Pacific surf pounded on the coral without end.

It is all coral; coral crops out everywhere. Crabs scurry, huge bloated things, and in the marshes lean pigs grunt. Through the water fish flit, multicolored, at tremendous speed; the waving frondlike arms of the starfish and octopus stretch for their prey from every sea-wet rock. In the forest the smell is of a dead land, rank, black, putrid almost, at times repellent and awful. Tropic paradise? Not Nissan's huge, gloomy lagoon.

Yet when the sun shines it is attractive enough, even beautiful in a somber way; and there are fair coves on Barahun. But in the lagoon sea snakes swim, and sharks; by the foreshore you dare not paddle because of the poison prongs of the vindictive stonefish, lurking invisible.

Morose Nissan! It all seems brooding, resentful, sad, as if it did not care for the coming of the Sailing Gods, the gods who brought copra, and weird beliefs that never seemed to bother them very much, and a fierce desire for profit and for trade, and guns and disease. No, perhaps Nissan, nor any other South Sea island, does not care for these Sailing Gods, from whom the islanders of old prayed for deliverance.

I sailed for Tulagi, on Florida Island in the Solomons, early one hot October morning. We were destined to be within 500 miles of Tulagi for the next six weeks, and the wind never came from the nor'west nor from any other direction that was fair once in all that period.

#### FIGHTING SEA AND HEAD WINDS

First it was calm. Then it rained. Then it blew strong from the east, and the southeast, and the east-southeast. Then it was calm again, and after that blew up a moderate gale.

Where were those idyllic breezes of the blue tropic seas? We waited for them in vain; a cloudburst a day and the most difficult conditions for windward sailing we had ever known were our lot. But at least it was warm, sometimes too much so.

I beat and beat, holding a press of sail in the strong winds to make up for the effect of the adverse current in the calms.

The current there was setting to the west and west-northwest, taking us in toward New Guinea, setting us back steadily, until I found myself driven to the westward of the Lusancay Islands within sight of the high mountains of the New Guinea coast.

Now this was interesting, but not bargained for. I had to get to Tulagi for water and provisions. If I went into New Guinea, I would have to wait for the nor'west season to get out again.

It blew hard again from the southeast and the current strengthened. My sails began to go, chafed and worn from the long passage in the rain and tropic sun. The fore and main t'gallants were split and also the main royal, and the inner jib, thrice resewn, was blown to pieces.

It was with no pleasure that I looked upon the westernmost of the reef-surrounded Lusancays, lonely, uninhabited islands, and went about to stand out to sea again in a long fight to make to the eastward.

For days this went on, days that grew into weeks, fighting the sea and the fresh head wind and the strong current. A square-rigged ship, I regretfully concluded after sailing 300 miles in two days to lose



NOT SEEN FOR MANY YEARS—STUNDS'LS IN THE CHINA SEA

Clearly shown here is how the historic studding sails are set. They are sheeted out, or fastened, to booms rigged through I irons on the yards. Halyards and sheets come down to the deck and the sails can be both set and taken in entirely from below (page 238). Studding sails of the *Joseph Conrad* bore the maker's imprint and the date "1882." Still in excellent condition was this light duck canvas, though it had been on the ship throughout her long career, including two duckings—when she was sunk in collision with a steamer in 1905, and again when she was blown ashore in Brooklyn, New York, in January, 1935.

twenty, is *not* the rig for windward work in those reef-strewn and current-filled waters. An auxiliary schooner is the thing for the islands, I had to admit, and the stronger the engine the better.

#### BEATING ON WITH TORN SAILS

I beat on. More sails began to go. I had of course the trade-wind suit aloft. The good Cape Horn sails were stowed below, waiting for the west winds and the Roaring





LYING OFF THE BEATEN TRACK, THE TROBRIANDS ARE ONE OF THE FEW UNSPOILED GROUPS LEFT IN THE SOUTH SEAS

The *Joseph Conrad* called at these Australian-controlled islands near the southeastern tip of British New Guinea. Biggest houses in the village are for storing yams, not housing chiefs. Logs carefully fitted together at the corners, with air spaces between them, and placed on stilts form the walls of these thatch-roofed storehouses. In the daytime the chief rarely goes inside of his home with the tall doorway in the center, preferring to remain outside in the sunlight.



FROM A COMMON BOWL, KIRIWINA BOYS HELP THEMSELVES TO "KAI-KAI"

Pearl oyster shells serve as spoons at this alfresco meal. Peroxide is a favorite item for trade with the natives; they use it to bleach their hair, as the two boys at the left and center have done.

Forties and the storms of Cape Horn. It began to look as if the trade-wind sails would not be good enough to complete the voyage. The tops'ls began to go, and after them the courses.

I still beat doggedly to get away from the Lusancays, round which the current to the west seemed to swirl with strength and even violence; try as I might, I could not get out of the current. The sails aloft were now getting in such a sorry state that I had either to repair or change them. We had no chance to repair them, and I did not wish to bend the Cape Horn suit and spoil that, too.

So I began to look around for an anchorage in shelter, where we could lie a while and make the sails fit to continue the beat to Tulagi.

There was no anchorage in the Lusancays. I stood in as close as I dared to several of the islands, to find no shelter anywhere—nothing but the low islands and the vast area of surf around them and beyond, with the sea breaking and the whole aspect wretched and ferocious. I must go to the Trobriands (see opposite page).

I saw on the chart that there was a Government station at Losuia, on Kiriwina Island; that would be the place, if I could make it. The anchorage there looked good enough. But how to get there?

I beat on, beat and beat, with the torn sails, and the ship staggering and the warm sea spilling over her and driving in heavy sprays across the foredeck. It was miserable sailing most of the time—out a hundred miles to sea, tack and stand toward the land again, hoping always against hope to come within striking distance of the channel between Kiriwina and Kaileuna leading to the anchorage; and sometimes making twenty miles, sometimes losing thirty.

The current was a savage enemy. Some of the boys began to lose heart about it; but in a sailing ship you have to keep on and on.

#### FINDING BOTTOM—AT LAST!

Eventually, after a solid week of heavy beating, I came to the entrance of the Kiriwina channel just after sunset on a black evening. There were no lights, but I was not going to stand out to sea again, to be driven off.

I stood in, groping my way carefully in the channel with the leadsmen going and the ship under easy sail, conning her from

the jib boom end with the narrowing channel closing in and the trees so near.

It is impossible to judge distance at sea by night; how close seemed the trees! Yet the leadsmen, sounding to 40 and 50 fathoms with the deep-sea lead, reported constantly no bottom.

No bottom! The ship came in and in; was there no anchorage, then? There must be! I knew I could not go in too far. I knew that the wide bay of Kiriwina was almost wholly blocked with reefs; I had to find an anchorage before the ship sailed in that far. It was pretty close then.

No bottom, no bottom! The chant grew worrying, the trees closer; I could hear the quiet night surf breaking on the coral and see the lights of natives fishing here and there. Then suddenly the water shoaled. The leadsmen had bottom at 19 fathoms, at 9 fathoms, at 6.

Hard-a-starboard! Into the wind with her to stop her way; let go! The cable roared; she brought up nicely. The sails were furled and the yards trimmed. We were farther from Tulagi than we had been at Nissan, two weeks before; but we were in some shelter now and had at least the prospect of a welcome break from the hard beating.

In the morning there came the man from the Government demanding whether we had been to Samarai, on the southeastern tip of New Guinea. No, we hadn't been there; weren't going. We were on passage from Singapore to Sydney and had been driven out of our way. Our sails were torn and had to be repaired.

Well, said the Government, Samarai is the port of entry and you have to go there first. It did not seem to occur to him that it was an impossible demand to make of a square-rigged ship—that she should negotiate 200 miles of difficult waters, to leeward, merely to secure the proper rubber stamps.

If I went to Samarai, how could I get back? If I had got there, I would have had no need to put in at the Trobriands. No, I hadn't been and I wasn't going. I didn't want to go to the Trobriands, either; but I was intending to repair my sails.

There were times on this voyage when I felt envious of the circumnavigators of old whose welcome around the islands was a canoe full of brown men throwing spears.

However, the Government man at Kiriwina was decent enough when the situation was properly explained to him. He was not



TULAGI NATIVE TROOPS PARADE OUTSIDE THE LOCAL LEGISLATURE

These police are smart, tough fellows, but there is not much work for them in the Solomons now. Their officers are European. This town is the British headquarters in the islands and, of course, golf, tennis, and cricket are played here by the white district officers (opposite page).

accustomed to receiving full-rigged ships; indeed, our arrival at Losuia was the first unheralded coming of an ocean-going ship in his experience, for Kiriwina is an island little visited these days.

#### AN ISLAND OF HAPPY NATIVES

To the natives, of course, the visit of the ship was a great event. Shortly after daylight they were out in their fine canoes, with yams and sweet potatoes and grass skirts, and betel gourds and clubs and paddles and fish, all of which they wanted to exchange for stick tobacco. A sturdy lot, wearing almost nothing, they seemed the most cheerful and unspoiled natives we had yet met.

Ashore their welcome was quiet but sincere; crowds waited on the little jetty whenever we came in with the lifeboat for water and stores, anxious to help us, to have us join in their cricket matches on the mission field (the missionaries were away at some conference).

Kiriwina is an island of market gardeners and pearl divers, an intensely interesting place of large villages, happy natives, and

ordered living (page 237). In its midst is the Government station of Losuia where the blue Papuan ensign flies, and there is a jail for tax defaulters and adulterers and whatever other wrongdoers may be found.

In the Government ground the prisoners were at work, somewhat morosely, with warders watching them; but their lot was not hard and there were not many of them. Outside on the mission compound, children romped; the elders played cricket, and whenever we walked in the clean coastal villages many natives came to talk with us and to offer fruit and make us welcome.

#### YAMS AND SWEET POTATOES

I liked Kiriwina; so did all hands. But we were seldom ashore and saw little of it. We unbent our sails, changed them where necessary, and thoroughly repaired the others. We took in some water and a supply of yams and sweet potatoes, and sailed as soon as we were able.

Tulagi was still more than 600 miles away, and I did not know how I was going to get there.

After Kiriwina came the same old hard

beat again, to windward toward Tulagi. Nothing of the nor'west season ever as much as shimmered one cloud; we slogged on. Usually the wind was fresh from the east-southeast, so that with the ship able to lie up six points, I could take my choice between making toward the south on one tack or the northeast on the other, neither of which directions, unfortunately, was anywhere near the course. But at least we were soon out of the worst of the current, and that was something.

#### TROPIC SAILING UNDER DIFFICULTIES

In the nights it was often miserable beyond words, with endless cold rain and sometimes hard squalls and sometimes deluges with cat's-paws from all directions, and a big swell in which the ship jumped so violently that it was difficult to stand and the night so black it was impossible to see even the tops'ls from the deck.

As a change from this, there was always the probability of a moderate gale, to my surprise; somehow I had counted upon this part of the Pacific as being free from these petty annoyances. The tops'ls, newly repaired at the Trobriands, began to go again; in disgust I sent the Cape Horn suit aloft in their stead.

After many days we picked up the Solomons, at Rendova and Tetipari Islands, only to be blown away again for half a week. Then it was calm. We were 93 days out from Singapore before we came at last to Tulagi, though we had been only 49 days to the Line.

We made out the heights of Florida Island late on a quiet afternoon, coming in past volcanic Savo from the northern end of Guadalcanal; but it was night before we were off Tulagi Harbor.

#### A CALL AT THE SOLOMON ISLANDS' CAPITAL

Again I had to enter a bad harbor by night, though this was lit. I had not been able to get a chart for Tulagi in Singapore and had penciled one as well as I could from the data in the Sailing Directions; the place abounds with small islands and reefs, and I was glad to get the anchor down.

Ninety-three days from Singapore! It had been a long, hard road, beset with navigational difficulties worse than any storm; hot, wet, sometimes depressing; through the China Sea, Sulu Sea, Celebes Sea, and the Pacific, all strewn with reefs and

low islands, filled with incalculable sets, liable to all manner of disturbances.

Nor was Tulagi a very interesting place. The Government, administrative, and business headquarters of the Solomons are there, a small Chinatown (as is common in most of the islands), and little else. It is a small island of high hills and tin roofs, with a club, golf links, tennis courts, jail, wireless station, Government house, ice works, and so forth, the whole largely populated with excellent citizens who rarely go off it except to Brisbane or to Sydney (opposite page).

Florida Island, while geographically of the Solomons, is most certainly not representative of them. It is frankly a headquarters for white living, a place where laws are—well, not exactly made, since that apparently has to be done somehow between Downing Street and the Fijis; but thought over, discussed, and sometimes vaguely suggested: where white meets white, lives with white, thinks white, and plays golf and tennis and cricket.

And works, of course. There is enough of that; the administration is not overstaffed. The Solomons are a large area with troubles enough to be smoothed over, though it is ordinarily the district officers who go out and attend to them. These men are not found in Tulagi, though now and again their trim craft look in for stores and to deliver reports.

One gathered, even in a brief stay of a week or so, that all is far from quiet in the Solomon Islands. The natives (not many of whom are to be seen around Tulagi except police, prisoners, houseboys, and schooners' crews) have deep-rooted objections to the idea of taxpaying, which objections are apt to result in direct action.

We went alongside at Makambo and were hospitably received.

The boys played cricket with a Tulagi eleven, though I had to send some baseball experts to complete our side and a Finn and a Dane who had never seen cricket in their lives.

#### ON THE TRAIL OF JACK LONDON

Then we moved on to Berande, on Guadalcanal, about 10 miles away. Berande was a large plantation of coconuts and rubber where hospitality has been traditional for generations. It was at Berande that Jack London stayed (and afterward wrote a book which residents claim is not com-

pletely accurate); since his time visitors of all kinds have met with kindness.

The boys rode lively young horses along the beaches and through the wide plantation fields, saw copra cut and dried, and the wild Malaita labor practicing a stamping dance for the Christmas celebrations.

We saw labor given its ration of stick tobacco, soap, and matches on Saturday afternoon, and the trade store opened for them to make such purchases as they wished; clay pipes, mostly. We visited small villages near by, each with its church and its old men seated under trees. We rode to Tetere along the coast to see the monument to eleven Austrians from the *Albatros* who were murdered.

It is not so long since the white man had to walk warily here and life was cheap, both brown and white. But the Government and missions have brought a change, and killing is rare.

We traveled in an 8-cylinder American car, the only one we found in the Solomons, along a new bush track to what may some day be a gold field rivaling New Guinea's Morobe. The track was a winding forest trail that sped past jungle and native garden and sometimes left the matted growth with unexpected suddenness for a wild career over a treeless plain which, without any reason whatever, quickly emerged.

There were several of these plains, all large, all uncultivated. Then we came to a mountain stream and the boring machines, and got out and walked. The country was wild and primitive there.

There is gold in the hills behind Berande. Now and again, one heard, the chief out there sends in a nugget or two, though no one knows exactly where he gets them. But if the white man gets any, he will earn them. Mining of any kind under such conditions must be expensive and difficult and is likely to remain so.

#### BEWILDERING NAVIGATION

I sailed in the early morning from the anchorage off Berande, making down the passage between Guadalcanal and Florida Islands toward the open sea. The wind drew ahead again and I beat and beat.

The combination of navigational difficulties presented by these islands is such that I wonder the early navigators survived them. There are deep troughs surrounded by reefs, shallows serrated with rocks, and coral growths over which tidal waters boil and eddy; discoloration from the mountain

streams which muddies the water so that the coral heads cannot be seen; baffling winds, now light, now strong, changing so often and so suddenly that one is bewildered even to know on which tack to keep the vessel; pitch-black nights, and rain; poor anchorages, for the most part; high mountains coughing their williwaw winds, spilling their black rain.

Always through these confused waters is the general westward set of the trade-wind drift setting the ship back and back.

Suddenly ahead reefs loom up; I must go round quickly, to save the ship; yet to make any progress in the head winds I must constantly steer deliberately toward danger. It is better in a powered vessel, which may pick her way; but many of those have been lost around the Solomons.

I had been anxious to make the Solomons; now I was eager to get away. I was beating now through Indispensable Strait, between Guadalcanal and Malaita, with the long island of San Cristobal in sight; I stood on toward the eastward trying to make toward Vanikoro and Santa Cruz and down through the New Hebrides to Sydney.

#### THE TROPICS BEGIN TO PALL

We did not make Santa Cruz, nor Vanikoro, nor any of those places. A week out from Berande we had made good only 100 miles; at that rate we would have been another month. I did not have the time or provisions to spare. A full-rigged ship carrying 28 souls cannot remain cruising indefinitely. There is a limit to her water supplies, to the provisions she can carry; aye, and to the tempers of the crew.

The longer she stays around these tropic islands the greater the susceptibility to disease; fortunately I had not as yet been troubled with fevers or with elephantiasis (most hateful and repellent of tropic diseases, though rarely found in whites). But many of the boys had tropic sores which proved difficult to heal, and one or two had badly ulcerated legs. My medical work (for I was also physician and surgeon to the expedition, as well as master, navigator, chief instructor, guardian of the younger boys, and many things besides) now kept me busy for at least two hours a day.

The boys had stood up very well to the long demands of heat and rain, the long trial of baffling conditions and the hard slog to windward; but there was a limit for them and for everyone. The Tropics had begun to pall.



Photograph from *The Sydney Sun*

HEELING TO THE BREEZE, "JOSEPH CONRAD" BEATS OUT OF SYDNEY HARBOUR

Close-hauled on the starboard tack, she makes for Bradley Head and the open Pacific. The foresail is hauled up and the mainsail (lowest sail on the tallest mast) is furled to make it easier to handle the ship in the difficult tacking. A quick glance at this photograph tells the sailor that the helmsman, near the stern, is steering a little too close to the wind, or "pinching her," because the royals, or upper sails, are fluttering. The helmsman of a square-rigged ship usually steers, when the vessel is "by the wind," by watching the weather clew (right edge here) of the mizzen royal, or upper sail on the mast to the left.

I saw by the chart that I could make one more group of islands and then run down to Sydney, inside New Caledonia, more or less with a fair wind.

This last group was the interesting pair of islands shown variously on the charts as Santa Ana and Santa Catalina, and Owa Raha and Owa Riki, lying a few miles from the southeastern end of San Cristobal at the eastern limit of the Solomons.

I knew nothing of these islands and the Sailing Directions did not add very greatly to my knowledge. But they sounded interesting; and there was a good harbor at Santa Ana.

So I fell off, gave up the beat toward Vanikoro, and made for Santa Ana (Owa Raha). This was one of the few places which we were able to make easily throughout the whole voyage; but the trouble was, I made it too easily and came by night. There were no lights and no moon; I sailed by, through the narrow strait between San Cristobal and the two islands (the breaking of the long Pacific swells on the reefs was fearful in the dark) and came back in the morning.

I was glad then that I had not attempted to enter by night, for the harbor of Port Mary was nothing but a small break in a dangerous wide reef.

I was mighty glad, too, that circumstances had sent me to this place. The people were friendly, clean, and hospitable; the islands were interesting and lovely; and that night a trader came out to us who had been a master mariner and had served much of his time in the old *Parma*.

He had married the daughter of one Bugga Bugga, last of the paramount chiefs of Santa Ana, and was himself now a kind of uncrowned chief of the island.

#### MEMORIES OUT OF THE DAYS OF SAIL

What a man! He had not seen square yards upon a vessel in twenty years, and was so wildly excited at sight of them again that he would not leave the ship.

He brought a stock of island yarns, at the telling of which he was expert; and a colored man from Philadelphia, some 70-odd years of age, who had been in Yankee clippers in his time and had been master of pearling vessels. He was now married in the islands and fished the *bêche-de-mer* and sharks' fins for China; he'd lost half an arm to the sharks, but that did not seem to worry him. He danced a hornpipe when he came aboard and sang chanteys.

When we left the island, he and the uncrowned chief followed us for miles in their cutter, and the look upon their faces as they gazed upon the white, square sails was profound and memorable. Long settled in the islands, they had not expected to see a full-rigged ship come floating unheralded again into their lives. They gazed up, drinking everything in, for this was the last time such a ship would come their way; and they knew it.

We tramped across Santa Ana (the natives called Owa Raha Santa Ana, and Santa Catalina they spoke of always as Owa Riki, selecting the shorter and more easily pronounced names in both cases), visiting the villages, some heathen, some Christian. They were all clean, orderly, and well laid out.

In the Christian villages were small churches, very simple and suitable. In the heathen strongholds were *tabu* houses in which were skulls of great chiefs resting in canoes, and large representations of fish. Here no woman was allowed to come; even in the Christian villages much of the old *tabu* system still survived.

We also visited Santa Catalina, where the conditions of life today are much as Mendaña found them some 370 years ago. Here there are no missions or missionaries, no schools, teachers, or district officers. It is a small island, without a harbor, and there are only about 100 people; somehow, with so much to do in the larger islands, they must have been passed by.

A peaceful and industrious folk, they ask only to be left alone—a privilege rarely granted in these days to their kind. They were happy, healthy, contented. I saw no sullen looks or morose jowls; I heard of no conflict. The people were unclad and their homes were, of course, somewhat primitive. But they were clean and seemed well suited to the needs of their occupants.

The women and girls and the men danced for us, separately, the women dressed in green branches and leaves and palm fronds and things, and the men also attired in shrubbery. As the dance progressed (which it did for hours), the greenery steadily fell from them.

Their "music" was an orchestra of old men singing, rather monotonously, very solemn. The men used dance sticks and kicked at the earth quite a lot; their energy was amazing, for they danced on with agility and determination hour after hour.

At Santa Ana they also performed a



Photograph from *The Sydney Sun*

CADETS OF THE "JOSEPH CONRAD," INCLUDING SEVEN YOUNG AMERICANS, POSE  
IN SYDNEY HARBOUR

Only one "Yankee" remained for the ship's midwinter rounding of Cape Horn. From left to right, back row, are David Hunt, Quincy, Massachusetts; Harry S. Hopper, Merion, Pennsylvania; Adair Miller, Southport, Connecticut; H. Ely Griswold, Jr., Morristown, New Jersey; Jan Junker, Copenhagen, Denmark; John Devlin, Southsea, Hampshire, England; Ed Lane, New Canaan, Connecticut; Fred Sturges, Fairfield, Connecticut; Dennis Leech, St. Briavelis, Gloucestershire, England; and seated, Hilgard Pannes, Plandome, Long Island; C. J. Carmichael, Stellenbosch, Union of South Africa; Vernon Harcourt, Hayes, Middlesex, England.

weird old dance-symbolic of the history of the place, wherein first a troupe of natives, clay-covered and lurching unsteadily, came down from the trees and staggered to the water's edge, looking out to sea. With curious grace these tree dwellers tried to learn to walk, but while they were busily engaged in this a horde of strange marauders came, black men, fiercely visaged, and fell upon them in mortal fight. Some died on both sides; and in the end the tree dwellers retired, driven from the island.

A PEOPLE WHO DID NOT KNOW HOW TO  
COUGH

Now the newcomers took up the dance, dancing through history, giving perhaps a more accurate picture of it than they themselves knew. One saw Mendaña and his men come, and more fierce fighting (three of Mendaña's men were wounded here); and after that a century and more of peace

disturbed only by gales and earthquakes and such ordinary things, which are taken as a matter of course in these parts.

Then came the whites, and the dance showing the coming of disease, principally performed by two stars in great bull masks, was superb and terrible. Skin diseases, colds, tuberculosis (their attempts at reproducing the commonplace cough were in themselves ghastly and tragic, for these people did not know how to cough when chest ailments first struck them)—these followed quickly the one upon the other. People died.

Then missionaries came, and schools; and in the finale the two stars performed the dance of the queer strangers taking photographs.

It was all unexpected and excellent, but, thinking back over it, a little too true. The population of Santa Ana and Santa Catalina has declined terribly.





"THE ALBATROSS DID FOLLOW, AND EVERY DAY, FOR FOOD OR PLAY, CAME TO THE MARINERS' HOLLO!"

As in Coleridge's "Ancient Mariner," albatrosses flew around the *Joseph Conrad* as it neared the Australian coast. They plunged to the water to pick up scraps of refuse, but the crew held to the old sailors' belief that it is bad luck to kill one of these birds.

At last I sailed, from the last of the islands, and shaped a course toward Sydney. It was about 1,700 miles; we had 1,500 done in twelve days, but then we came to the Australian coast and stopped. Fever had broken out on board, a kind of intestinal malaria; I was anxious to make port.

But the whole of the way down the Australian coast the conditions were constantly adverse, and we were more than a week on the last 200 miles. It was almost mid-December when, just as day was breaking, the pilot came aboard off Sydney Heads, and the little ship sailed in to the quarantine anchorage.

Ferries blew upon their sirens and great liners dipped, to my surprise; Sydney's

welcome was almost tumultuous. The only difficulties were to read my mail (I could never answer it) and to get some sleep. All hands were entertained royally.

We had been 131 days from Singapore, a long, difficult passage. But it had been many years since a square-rigged ship had come that way, north about, and I felt some mild pleasure that the voyage had been safely accomplished.

I was even more pleased that the whole circumnavigation was more than half over; for this getting of a full-rigged ship around the earth is apt to grow difficult and wearing.

But it is a full life, a full, real life, very much worth while.

# WE ESCAPE FROM MADRID

BY GRETCHEN SCHWINN

**S**TEWED cat cost mother and me a dollar a plate in Madrid.

We were Americans, and still had money. Two aged Spaniards, less fortunate, watched us through the restaurant window.

The dark, tendon-laced meat, little like the rabbit for which it masqueraded, was our first, except horseflesh, in six weeks.

Audible to us as we ate, rebel artillery, some 20 miles away, blasted slowly toward Spain's capital, where the first bombs had fallen two months before.

Four days later we left Madrid.

A British destroyer brought us from Alicante to Marseille. Now we are refugees in Genoa.

The Spanish revolt was two months in the future when I, a 19-year-old student, arrived in Madrid (page 260). Strikes, frequent, general, long-lasting, marred the gaiety of the city only a little.

In July, 1936, José Calvo Sotelo, monarchist Deputy and Conservative leader, was murdered. His assassination set off the revolution.

## AN EMPTY AMBULANCE

I saw his body carried at night from the hospital to a pretentious government ambulance. A few, who knew the "patient" was a corpse, kissed its feet, as some emotional Spaniards do.

Soldiers cleared a route for the vehicle. Off it went, siren screaming, but empty! I had seen the body hastily transferred to a rickety old hospital "pickup car" that rattled down an unguarded side street. Not even in death, now, was there peace!

That night two young Spanish army officers, revolutionists, deserted our boarding house. By morning, anti-aircraft guns appeared on the roof of the Ministry of Labor, opposite. Streets were barricaded.

Pointing to sandbag breastworks, I asked Nancy, in the room next to mine, if she were going to school that morning.

"It'll be over before school's out," she said.

At siesta time I sat beside Nancy's bed, chatting for a moment before she fell asleep.

A bullet splintered the window frame, whistled past my head, buried itself in the wall above Nancy, and sprinkled her face with plaster bits.

"Maybe I was wrong," she said, sitting up.

Reckless shooting, however, had not yet begun on a large scale.

"It's mine," later admitted a Ministry guard, digging out the bullet. "Most regular soldiers are rebels. I never shot a gun before. I didn't mean to shoot this time. But don't worry. It just went off!"

Our first intimation of organized armed resistance to the revolt came by radio a few hours later as the Government called workers' organizations—there were dozens of them—to their respective headquarters.

## A NIGHT BOMBARDMENT

That night the house shook. No one slept. Loyalist guns battered a fortified barracks inside the city, the rebel headquarters. By the following night it had been captured. Artillery fire ceased as rebels were imprisoned (page 255).

In the poorer part of Madrid is its art-loving "Bohemia," where I went to my classes. There unrest seemed greatest. There people soon began shooting their new Government-issue guns—just for fun, at first.

One day I saw fifty men firing at cornices. One, hearing a shot, had fancied an enemy was sniping from a roof.

I went home by another street.

When Loyalists began midnight raids on houses suspected of harboring rebel conspirators, foreign flags appeared. On our front door a posted notice certified official permission to fly American colors because two Americans lived there. Special warrants were now required to search our house.

Outside, we wore red, white, and blue arm bands with the symbol "U. S." in large letters, the Embassy stamp, and an identification number, "just in case."

We dressed in our oldest, plainest clothes, never wearing hats. One rainy day a menacing crowd forced mother to throw away a hat she had recklessly worn. Our arm bands weren't enough. Only aristocrats wore hats. We had seen a woman stoned by girls because of her hat. For a young man, a mustache would have been as dangerous (pages 256 and 259).

Once-fashionable sidewalk cafes were deserted except for the militia of both sexes,



Photograph from Wide World

**HATLESS, BEARING THEIR OWN LUGGAGE, BRITONS ARRIVE AT THEIR EMBASSY**

Some of the 200 British nationals who sought refuge within the confines of their Nation's official quarters in Madrid, when the siege of the Spanish capital began, pass through iron gates guarded by Loyalist soldiers in overall uniforms. A few refugees camped in the gardens surrounding these buildings. Many Americans found haven in their own Embassy, which was kept open until Thanksgiving Day, when the efficient *Chargé d'Affaires*, Eric C. Wendelin, officially closed it and transported 73 refugees by motorcar to Valencia.

recognizable by distinctive uniforms, overalls!

Pedestrians were few; cars were plentiful. Commandeered private automobiles were unceremoniously issued to defending recruits who seemed never to have driven before. Cars, like guns, were fascinating new playthings.

I often saw 15 or 20 militia, all armed, in five-passenger cars lunging through unpoliced intersections. When one inexperienced hand held a steering wheel and the other a pistol, accidents were certain. I saw three resulting fatalities in a week.

**PAINTINGS, RUGS, AND SILVERWARE  
STORED IN A PALACE**

Every night fleets of canvas-covered army trucks rumbled past my window. Hours later they returned. In the courtyard of an old palace near by I watched precious cargoes unloaded—paintings, oriental rugs, silverware—until the enclosure might have been an unroofed Aladdin's cave.

I saw a barrel carried into the palace basement. Rumor called it dynamite. A fuse, they said, was ready if Madrid fell. If rebels lost, then Loyalists would divide confiscated heirlooms of insurgent aristocracy.

"All seats one price; first come, first choice." was a new policy of Government-controlled cinemas.

In the Capitol Theater we saw "The Festival of the Dove," a popular, well-produced Spanish picture. Our seats, the best, cost 35 cents. Normally 2,000 people crowded into the theater, particularly into the cheaper sections. Now a handful of patrons occupied loges.

Afterward we were stranded for an hour in the foyer until a few squads of militia had spent their ammunition in apparently aimless street shooting.

News was scarce; rumor was plentiful. Madrid newspapers and radio broadcasts were naturally pro-Government. Loyalist successes were magnified and rebel gains minimized.



Photograph from Acme

## IT LOOKED LIKE A "SIT DOWN" WAR!

The first frost of winter joined hands with the Loyalist forces defending the capital, and rebel soldiers had to forage for fuel. Here a group of the insurgents are gathered around a campfire behind their lines. Chairs and scraps of lumber serve as kindling. In the left background rises a sandbag redoubt, commanding a street intersection leading to Carabanchel, a suburb of Madrid on the road to Toledo.

A new decree required every radio owner to amplify his instrument enough to permit street patrols to hear it. Listening to foreign stations was forbidden.

One evening Eduardo Rocafort failed to come to dinner. Apprehensive and solemn, we ate little. Perhaps our happy-go-lucky haberdasher had "disappeared." We breakfasted even more sadly. Rocafort had not returned. Most of us had not slept.

"He was nice," murmured Nancy as she shared a little can of cherished sardines with me. "I liked him," she added, and I winced at her use of the past tense.

Just then, haggard but cheerful, Rocafort reappeared. Some of us kissed him.

## CHECKS PAYABLE "A.R."

The revolution was then three weeks old. Our friend, like other merchants, had been asked to exchange his goods for a peculiar form of "money." Newly recruited militiamen, in lieu of other pay, had been supplied with sheaves of what were almost blank checks on the Loyalist Government, payable after the revolution.

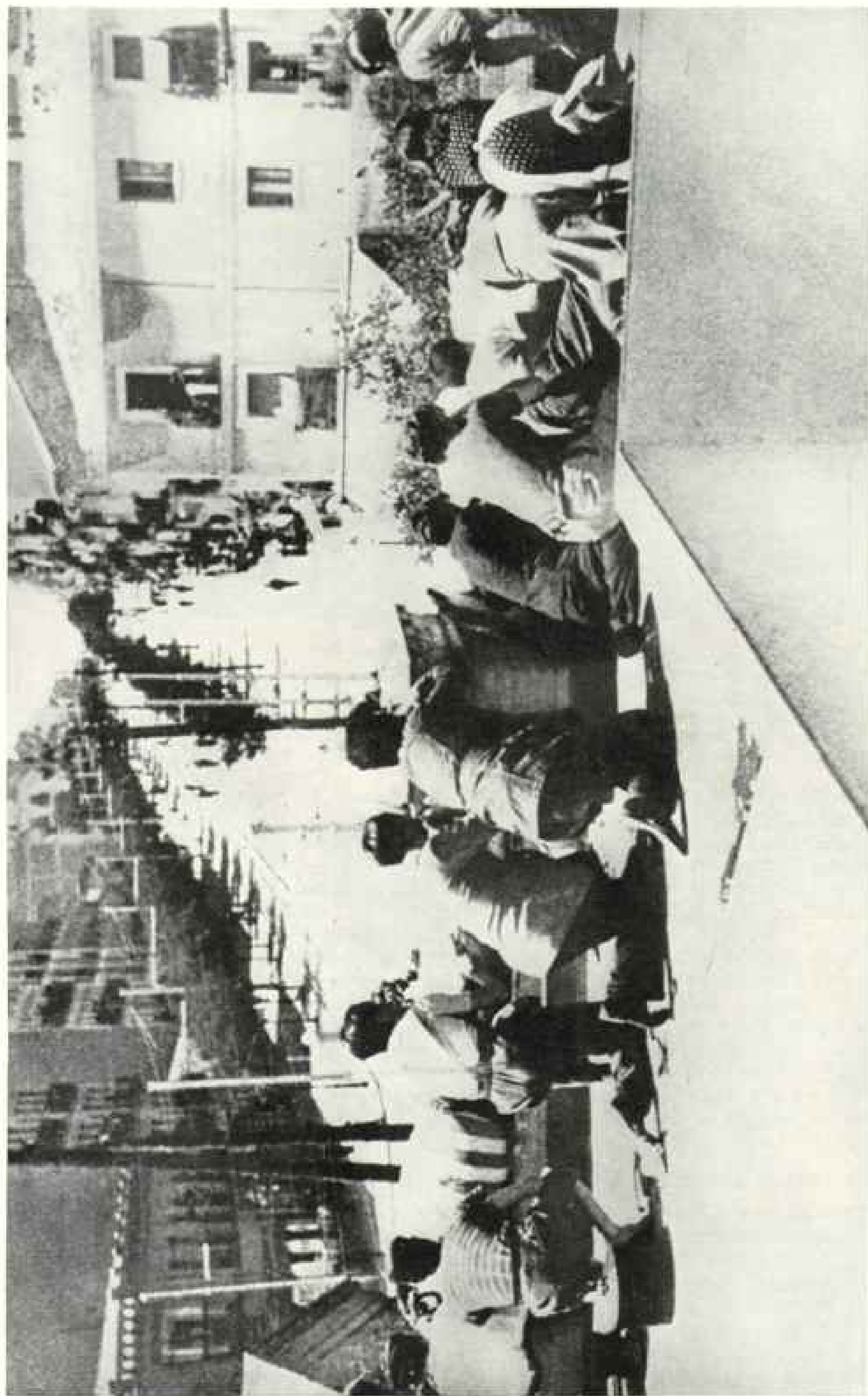
They looked to me typewritten, many copies at a time, and each rubber-stamped with a Government seal. When a defender of the capital needed a silk handkerchief or a cigarette case, he could peel a "note" from his roll, fill in the date and the amount, sign it, hand it to the clerk and pocket his purchase.

Rocafort's stock had dwindled fast. At last he quit accepting this currency. But this was defiance. He was marched to the headquarters of the Proletariat Brothers.

"One of my captors looked like a nice fellow. I knew he wouldn't shoot me," explained the haberdasher. "But the other—well, I was afraid he might. At headquarters they gave me what American cinemas call the 'third degree.' One fellow kept waving a gun at my head. I remembered the guard who'd accidentally shot into Nancy's room.

"They thought I had no confidence in the Government. One of my inquisitors thought me a conspirator. But I guess to the rest I looked too simple for that.

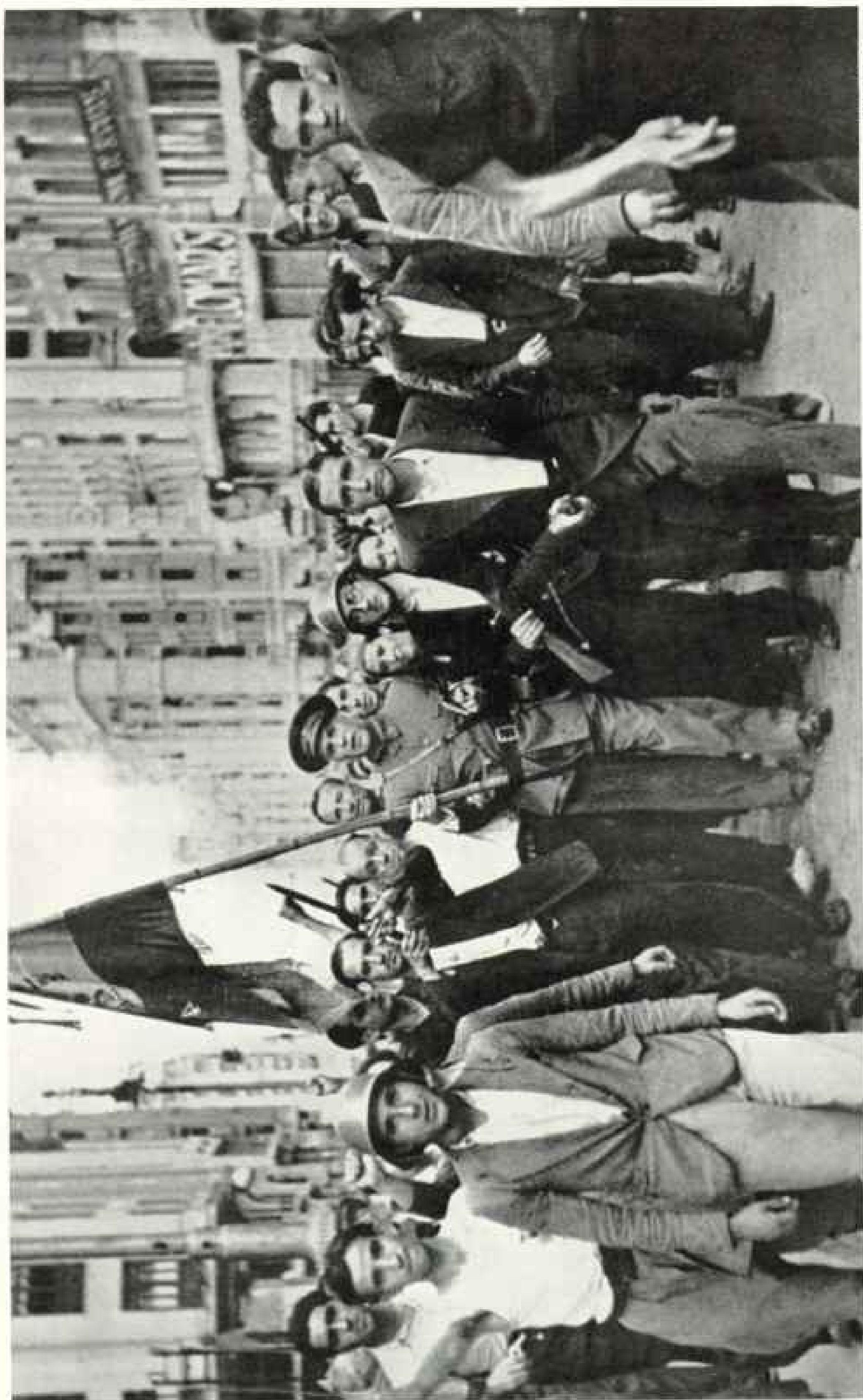
"After a few hours they got hungry, and



Photograph from Wide World

**"DEATH FROM THE SKIES" DID NOT ALWAYS MEAN BOMBING PLANES**

During the sporadic street fighting that marked the early stages of the revolution, Loyalist riflemen and machine gunners quickly chose places of vantage on the roofs of buildings throughout the Spanish capital. Women (right) as well as men, many of whom had never before handled firearms, crouched behind cornices and parapets, shooting wildly at anyone in sight. Stray bullets caused scores of casualties (page 251).



Photograph from *World*

SINGING AND CHEERING, LOYALISTS RETURN IN TRIUMPH FROM A RAID ON THE MONTAÑA BARRACKS

When, early in the Spanish Civil War, rebel officers seized the military barracks in Madrid, Loyalist gunfire shook the city until these strongholds surrendered. At the big Montaña Barracks, near the North Station, groups of workers captured the guns, bayonets, banners, and helmets displayed here. This Republican flag, which flew over the barracks during the fighting, was carried by the officer to the Ministry of the Interior and hoisted from the central balcony.



Photograph from Acme

STREETCARS LIKE TOONERVILLE TROLLEYS WERE PRESSED INTO SERVICE BY RESIDENTS FLEEING THE MADRID HOLOCAUST

Warmly dressed men and hatless women, young and old, crowded about the entrance to an already overloaded trolley that will take them as far as the city limits with their meager belongings. Streetcar service on many lines was suspended when aerial bombs tore up tracks and leveled wires.



Photograph from Wide World

THE HAVOC OF AERIAL BOMBS IS REVEALED IN THIS DEBRIS-STREWN CORNER OF THE PUERTA DEL SOL, THE "TIMES SQUARE" OF MADRID. Paving blocks, streetcar rails, subway entrance, curbstones, and shop fronts were smashed and scattered, as if by a giant's hand, after a rebel war bird had "laid its eggs." The sign suspended across the side street reminds Madrileños that "the best defense is an attack!"





Photograph from Wide World

## CHILDREN DO THEIR BIT BY MODELING IN MUD

Members of a youth organization called "Pioneros" outline the emblems of various Loyalist groups to collect funds for the International Red Relief. Conspicuous is the Soviet five-pointed star and crossed sickle and hammer. Their sidewalk "billboard" is in the Cuatro Camines district, later the scene of terrific fighting between rebels and Loyalists seeking possession of this northern suburb of Madrid.

let me share in a banquet—meat, eggs, potatoes and coffee. Wine seemed to mellow them. The tough-looking fellow apologized to me. 'I'm not as bad as I look,' he said. 'I'd hoped you weren't,' I replied, laughing with him."

The proletarian salute—a clenched fist held high—was obligatory, but not, I thought, for foreigners (page 265). One day when I failed to reply to a militiaman's salute, he slowly unsheathed and lowered his revolver. I became a conformist.

## HORSE MEAT DEARER THAN FISH

Food, except starches, grew scarcer. It was sold at high prices, only a little at a time. Like a dozen tramps foraging for the ingredients of mulligan stew, my fellow boarders straggled in before mealtimes, each with a contribution. Sometimes one found a can of milk, another a little coffee, a third carrots—we had plenty of them—and still another had purchased a fat river fish.

There already was a race between the Government and civilians for custody of

staple foodstuffs. Most shopkeepers favored civilians. We paid cash, plenty of it. Fish was a dollar a pound; horse meat was half again as much.

The first serious bombardment occurred about midnight. Mother and I were on the Paseo de la Castellana, once a show place, now deserted. Sweethearts no longer strolled beneath the spreading trees. It seemed wider than ever in its desolation.

An airplane suddenly roared earthward. A blinding flash threw into sharp relief the branches of the trees along the barren street. Then an explosion, little more than a block away, shook the pavement as if an earthquake were in progress.

We hiked for home, our skirts waist-high.

Bombing continued all night. The target seemed to be the Ministry of War, two blocks away.

Of the numerous foreigners then in Madrid, only a fraction remained after that night. We were among them. My friends paid well for train tickets, auctioned off at the station by foresighted militia who had purchased them beforehand.



Photograph from Wide World

#### MODERN AMAZONS RECEIVE A HASTY FIREARMS LESSON

Wearing cotton house dresses and blouses, and shoes with high heels, Loyalist women and their newly issued rifles rushed to the defense of Madrid. In the revolution-torn capital a forage, or overseas cap, was the only safe headgear for women. One rainy day a menacing crowd forced the author's mother to throw away her hat, because such head covering was considered a symbol of aristocracy. For a young man, a mustache would have been as dangerous (page 251).

Our American friends sat on their baggage in the aisle of a crowded train, and arrived at Alicante, we learned later, in time to catch the last American war vessel to evacuate refugees to Marseille.

Street lamps were painted a ghastly blue; so were auto and streetcar headlights, to be less visible from the air. But they intensified the pallor of many an already drawn and frightened face.

#### WATER HOARDED IN BATHTUBS

Henceforward we barred our entrances at ten and, lest water mains be broken, insured ourselves a supply of drinking water by keeping bathtubs full. We boiled every drop we drank, which seemed a whimsical procedure to our servants.

One night I heard a racket downstairs. I crept down with a candle—lights went out at 10:30—and discovered my Spanish friend, Carmen, pounding on the big grilled front door. I unbarred it and let her in.

"They've taken our house for a barracks. I left with mother by the back door as

soldiers entered the front. We left only Felipe!"

I found them a place to sleep.

Two days later Felipe brought some of their clothes.

"Our house can never be the same!" he said, describing barrack life in the mansion where long service had given him a certain proprietorship.

"There aren't enough ashtrays, so they use the floor," he continued, sadly. "Rugs and tapestries become bedding. They toss things to one another, and if they've been drinking their aim is bad. Many mirrors are broken. One fellow was fainting with his sword. The blade slipped and cut the Goya. Believing the painting ruined, he tore it from the frame and threw it in the grate where some of your father's books are usually burning."

Fighting men—and these were unlettered, untrained, and undisciplined—have little time for the finer things of life. Such things must be in wartime, but I felt only little less sorrow than Carmen, for I, too, loved her fine old house.



JUST A PICTURE, BUT WITHOUT IT NO ESCAPE FROM  
WAR-TORN SPAIN

At Alicante police and immigration officials stamped the author's passport, and then it was carefully scrutinized by workers' groups, many of whom could not read. Gretchen Schwinn, born in California, began taking lessons in interpretive dancing when she was five years old. Last year she went to Madrid to continue her studies under a famous Spanish master. She remained in the capital until the siege compelled her to seek safety in Italy.

One day I found five cans of milk in an out-of-the-way store. Who could know that such a little shop, in so poor a district, still contained such treasure?

Yes, I could buy them, with a certificate from our building porter that five adults lived together. I raced home for it. An hour later I returned. The milk was gone.

One night a woman, a stranger, took refuge with us. The next afternoon she left, then returned with police, for she was in the Government intelligence department,

and had reported a rebel sympathizer. The suspect, absent as officers arrived, returned while the house was being searched.

"They're looking for you," warned the friendly porter, but he spoke too loudly. The woman heard him as the quarry vanished. Yet she did not inform on the porter, and I wondered why.

"If the rebels enter Madrid she'll need friends," was Nancy's explanation.

That night Lola was discharged for fighting with Paulina, her fellow maid. At the police station Lola reported Paulina a rebel. Again the police came.

This time their search was stricter. A guard herded us into a front room. He wore a uniform—overalls, and a militia cap with a red tassel. A

scarlet rag tied to his arm bore police insignia. From his shoulder hung a cartridge belt and from his lower lip a cigarette. Frequently he aimed his revolver at each of us to show us he meant business.

We were relieved when his two comrades returned, but only for a moment. They waved a bit of paper with a look that said: "We thought so!"

Musical Antonio had clipped and saved newspaper programs of a Madrid orchestra he hoped one day to join. On the back of

one pre-revolutionary program were names of members of an organization that since had joined the rebels.

Paulina they questioned and released. Antonio they took away. He did not return. We had been a long time realizing how serious the civil war had become.

#### CACHE OF BURIED CARROTS

We had a daily meal, regularly, of rice, beans, or spaghetti. Of carrots there was a good supply. Someone had once told me they kept almost indefinitely in the ground, so we had filled a box with moist earth and could always produce a fresh one.

By day we still went walking, and often saw squads of Loyalist rookies being drilled in the streets by officers who seemed little more than re-

cruits themselves. Learning squad maneuvers was especially difficult for the peasants, so recently from the fields that they still wore their loose canvas-topped, hempen-soled shoes (pages 255 and 265).

And if at last a group of them seemed about to execute a perfect about-face, ranks would break and soldiers scatter at the approach of a rumbling cart or an envied comrade in a commandeered car.

Our unaccustomed diet soon affected our health. We fell easy victims of an influ-



Photograph from Wide World

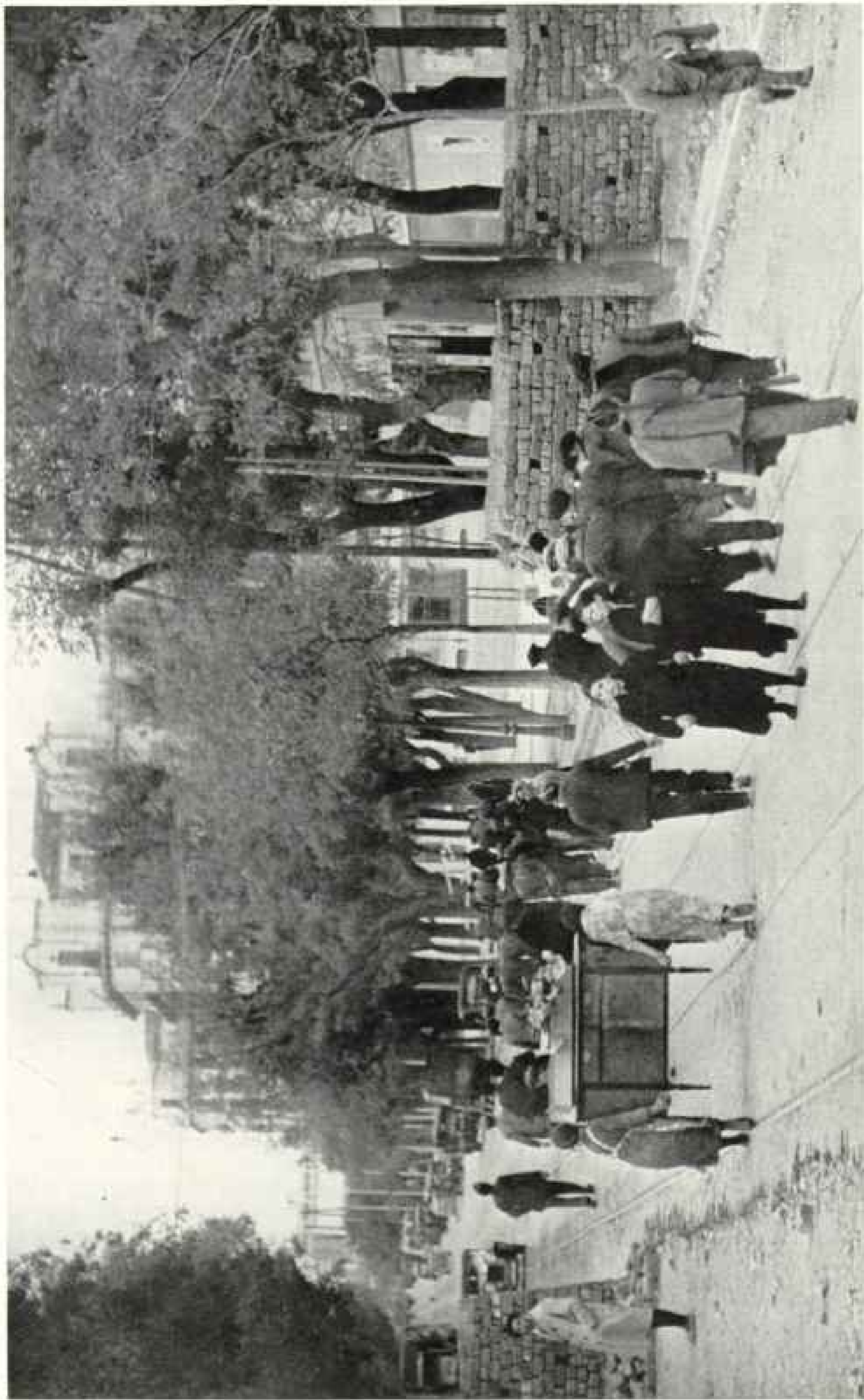
#### WHEN NOT FLEEING BOMBS OR FIGHTING FIRES, ALL MADRID PARADES

This procession of youth is campaigning for money for Loyalist hospitals. On the placard is the portrait of La Pasionaria, nickname for Deputy Dolores Ibaruri, a famous woman radical leader of the Government forces. She suggests a combination of Joan of Arc and the "knitting" women of the French Revolution.

enza epidemic that swept the city just as it had during the time of the World War.

One day Mateo burst into the room where I lay ill, shut and locked the door, then triumphantly exhibited a small package.

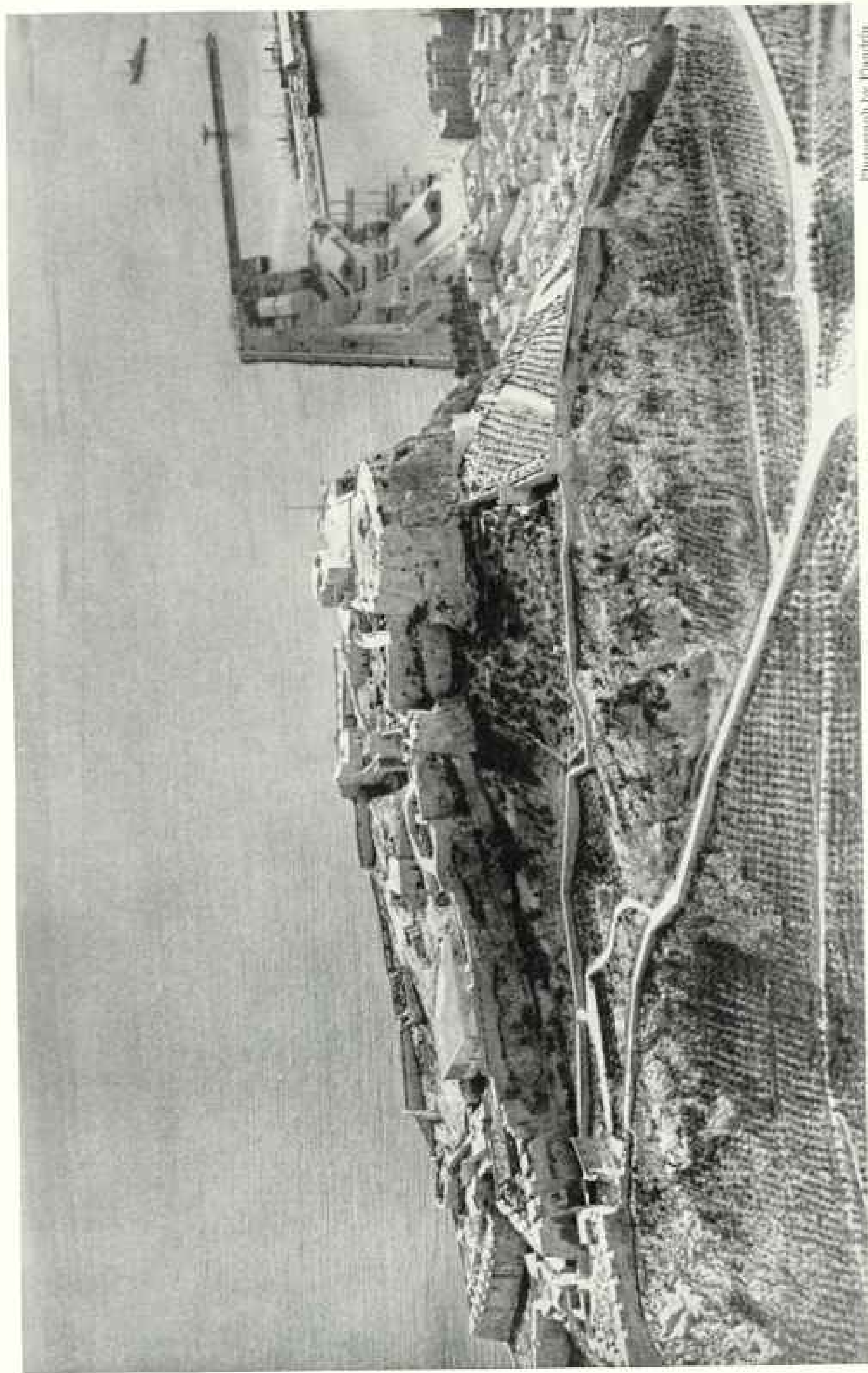
"It's for the invalid," he said, gayly, as he unwrapped the contents, perhaps a pound of ham! We cut it into small bits and ate it leisurely, enjoying every morsel as much as I ever enjoyed cake frosting when I was much younger.



© Photo News from Acme

WITH MANY ANXIOUS GLANCES AT THE SKY, STREET CROWDS HURRY ALONG.

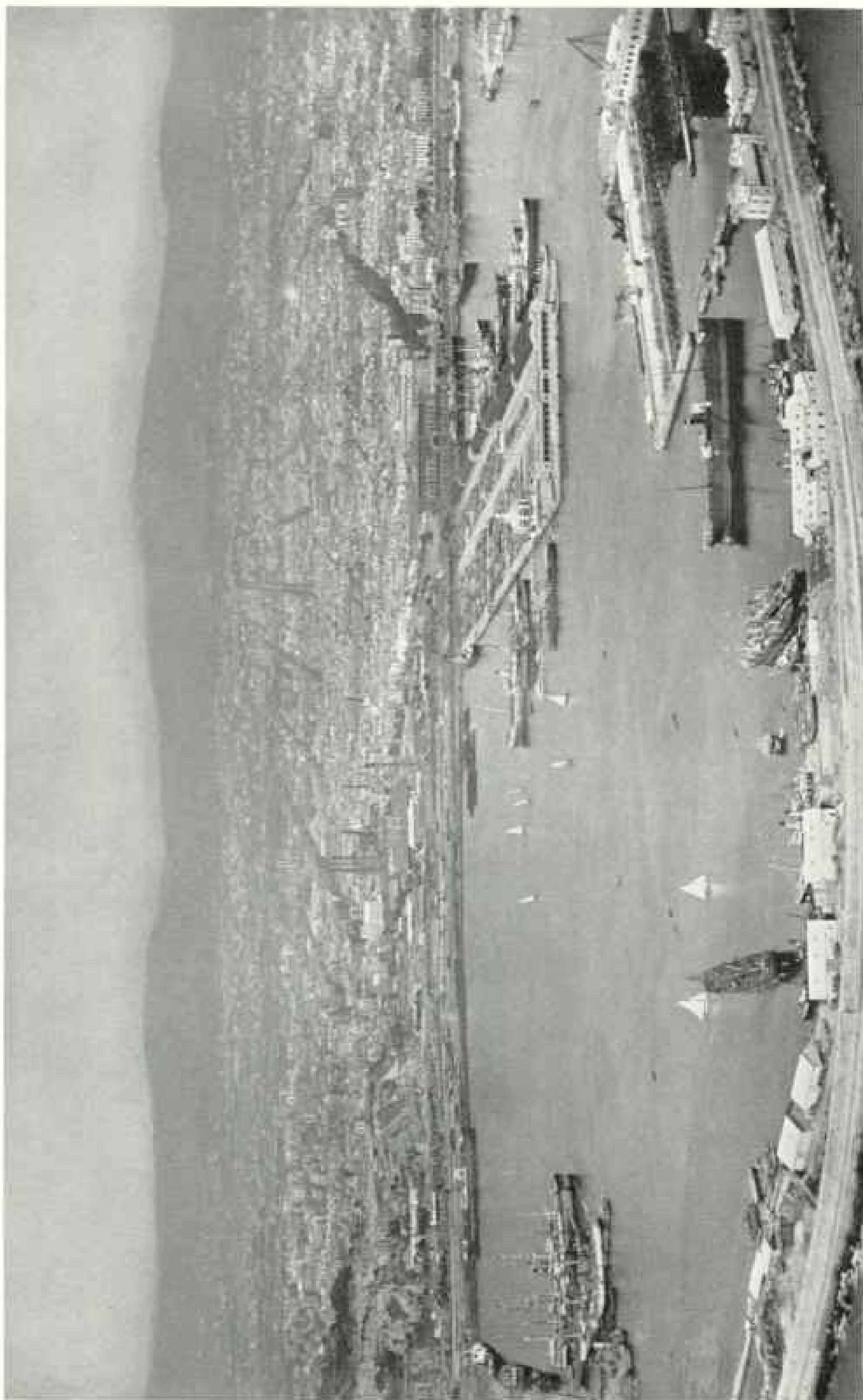
There is tense drama in this photograph, taken in the western part of Madrid during a rebel aerial bombardment. Two women stagger unbesieged under the weight of a heavy piece of furniture. Wounded militiamen enter a Red Cross station in the middle background and at the extreme right a soldier is returning after treatment. The walls on either side are barricades made of paving stones torn from the street.



Photograph by Fouadria

TO BE SURE THEY WERE CONCEALING NO MONEY, THE AUTHOR AND HER MOTHER WERE DISROBED BY CUSTOMS INSPECTORS HERE

But luckily, the Spanish militiamen who completely undressed the two Americans did not find a roll of traveler's checks hidden in the author's hair. She had been warned that such checks would be torn up by the zealous officials, following strictly the law that only \$50 could be taken out of Spain (page 266). The frowning bastions of the Castillo de Santa Barbara overlook the moles and modern harbor of Alicante.



Photograph by Flaudels

THOUSANDS OF FOREIGN REFUGEES HAVE BEEN EVACUATED THROUGH BUSY BARCELONA

From a porthole of the British destroyer *Andalope*, Spain's largest city and most important seaport seemed to the author "peaceful in the quiet of early morning, with a few starlike lights marking the streets." The harbor, however, was ominously full of foreign war vessels, the German ships being particularly conspicuous by their black paint. From Barcelona's many factories have poured munitions and other war supplies for the Government forces at the front.



Photograph from *Wide World*

NEWLY RECRUITED MILITIA LEADERS, WITHOUT ARMS OR UNIFORMS, PARADE IN MADRID

Because many of the regular soldiers of the Republic went over to the rebels early in the Revolution, forces for the defense of the Spanish capital had to be drawn largely from labor unions and various youth organizations. Overall, smocks, berets, cockney caps, *alpargatas* (hemp-soled sandals), and broad eschus lend informal touches to a grim and determined rebel force at the very gates of the city. One of the marchers (lower right) gives the clenched fist salute of the Loyalists.



How Mateo got the ham he never said. Before I was ill, he had not been out of the house for six weeks and had hidden safely while it was searched, for he was known to have had rebel sympathies.

Like two conspirators, we erased all traces of our little feast.

Our fevers continued. Nevertheless, I would have stayed in Madrid, but mother insisted on packing. We went to the British Consulate (page 252), the last American warship having departed.

Our passports were inspected closely, then verified by a telephone call to American consular officials. We learned there had been more than 100 cases of forged passports.

We were to leave Spain on a British battleship.

Taxis and transfer trucks were serving at the front. The coal man took our trunks to the station on his rickshaw-like handcart. Baggage was inspected and questions asked at the train.

"You don't look like foreigners to me," said the inspector.

"But we are," I insisted. "We're Americans."

"Then why are you afraid?"

"We aren't afraid!" I answered, emphatically.

"If you aren't afraid," was his next question, "then why are you leaving Madrid?"

My explanation that conditions were not conducive to study satisfied him, apparently, and, after settling us for the night, he even asked a compartmentful of soldiers, next door, to help us.

Although we had been assured that foreign checks, drawn on funds on deposit abroad, were permitted to leave Madrid, we had learned that many travelers' checks had been torn up in Alicante (page 263) by zealous officials who followed strictly the law that no more than \$50 could be withdrawn from Spain by a departing foreigner.

#### FUNDS CONCEALED IN HAIR

I carried our travelers' checks, rolled tightly, hidden in a knot of hair at the back of my head.

Representatives of the British Consulate and H.M.S. *Despatch* met us at the train.

"Voice no opinions," warned the Britishers, "or you may be detained. Say nothing of the revolution. Intelligence men are everywhere."

Passport visas affixed by police and emigration authorities were insufficient. It was

also necessary to secure the approval of representatives of the groups of workers who made up the Loyalist Government. Though I had the feeling that many of the inspectors could not read English, both we and our passports were scrutinized long and carefully.

Everything we carried was studied. Several inspectors worked from 4 o'clock until 6:30 examining our luggage, two trunks and three bags. Every sleeve, pocket, hem, shoe and stocking was investigated. A hundred pieces of music were unfolded, one by one.

"This prayer book is forbidden," said an examiner, holding up a worn little volume without a cover, my French-English dictionary!

"All right, take it," I said, saving my arguments for better things.

Our baggage passed, we were "frisked" more personally by women who completely disrobed us. One militiawoman examined and admired my earrings. She was dangerously near my hairknotful of travelers' checks. I gave her the earrings with a smile.

Again we were questioned by the men in charge. One asked if I had any American cigarettes. I gave him one of the cigars I carried for tipping purposes. Then I had to explain myself to the amazed Englishmen.

It was nearly seven when we appeared at last before the man who seemed to be in highest authority.

"You have little money, not even the allowed fifty dollars," he said, glancing at our reports. "You must have had more. Where is it?"

"We spent it," I said.

"On what?" he asked, suspiciously.

"Oh, clothes and gifts," I answered lightly, "and this watch."

"Is it gold?"

"No," I said, truthfully, though the watch was quite good.

"How do you expect to live?"

"Oh," I improvised easily, "I have a rich uncle in Marseille."

A little motorboat took us to the *Despatch*, where all the officers—at least, it seemed so—and five other refugees were on the deck to greet us.

Dinner was waiting in the messroom. I'm afraid I made a pig of myself, particularly with the meat and butter, but there seemed to be plenty.

Mother had been in the habit of addressing pert "asides" to me in English about people who could not understand that lan-



Photograph from Wide World

#### INNOCENT SUFFERERS IN A WAR THAT KNOWS NO QUARTER

Volunteer Government workers dole out the meager rations that can be spared for children whose fathers, and in some cases mothers, are at the front fighting to stem the rebel advance. Later, when Spanish mothers learned that Madrid's tallest building, a skyscraper built by an American-owned telephone company, had successfully resisted aerial bombs, they flocked there with their children. Given biscuits and milk, they asked timidly about the cost, but were told that the company would foot all bills.

guage. Now she could not realize we were on a British boat—that the sailors here understood English as well as we did.

"This waiter," she said, "would have done well in Utah a few years back."

"And why in Utah?" asked the handsome, athletic-looking seaman.

Mother, speechless now, started to blush.

"She always thinks of a sailor as 'an old salt,' I said, a bit slowly, "and out in Utah is a big old salt lake where a sailor, you see, could really be even more of an old salt, couldn't he?"

"I suppose so, ma'am," replied the seaman courteously, while one of his mates, I observed, smothered a guffaw.

With darkness, the *Despatch* raised anchor and proceeded outside the harbor, lest the port be bombed during the night. We were snug and comfortable in a cabin given up by an officer.

In the morning we returned to Alicante.

I was vaccinated for smallpox, as the rules required, by the ship's doctor. He laughed when I asked him "to put the scar where it wouldn't show." The sickroom was the whitest, neatest place, with two rows of enameled bunks and compact but efficient-looking medical equipment. There was one lonesome patient.

That morning the seamen unloaded five tons of food for the British Embassy in Madrid. The *Despatch*, I was told, carried six months' supply.

#### ATTENTION! SALUTE!—FOR THE REFUGEES.

The faster destroyer *Antelope* entered the harbor and came alongside us. That was the boat that would take us from Spain. As we walked down the gangplank of the *Despatch*, most of the officers and men stood at attention and saluted. We were only a handful of refugees, but I felt for a moment like a little girl in a fairy story.

Argentine and Italian destroyers dipped their flags as we steamed slowly out of the harbor. Their sailors stood at attention. Eight seamen on each of two German boats marched forward and presented arms. The old fort on the hill was almost beautiful in the autumn sunlight. How could all these things be for so grim a purpose?

Our seamen watched two men who carried diplomatic passports from another country, fearful lest they be bent on sabotage. "They knows boats," I overheard one Cockney sailor say. "Hit's huncanny the way they climbed them ladders."

We sat in deck chairs under a tarpaulin, beneath the muzzles of two heavy guns that were primed and manned. The narrow *Antelope* closely resembled a Spanish rebel destroyer. Already she had been shelled, but without effect.

Propeller spray flew high above the stern. I commented to the engineer on our speed of 29 knots.

"We can do 35!" he said, contemptuous of the present rate. "We're using only two boilers."

Yet, despite steam boiler economy, evacuating refugees was expensive. It cost, they said, nearly \$4,000 for the run from Barcelona to Marseille, and we had come from Alicante, more than twice as far!

I shall always feel nearly a thousand dollars in debt to the British Treasury, especially when I remember the butter I ate!

#### CRETONNE CURTAINS ON A WARSHIP

When it grew chilly on deck, we sat in the officers' mess, small, but ever so cozy, with big leather armchairs, benches along the walls, a case of books, smoking table, and even a polished little coal stove.

We dined there, too, but so small it was that its rightful occupants, the officers, waited until we had finished. Bully beef, soup, salad, butter, cheese, and coffee was our second real meal in three months.

We chatted afterward with the officers. All seemed young, even the captain, and I'm sure the chief officers were not more than 28 years or so. We cramped them terribly and upset their routine, but they were charming hosts.

That night, with some of the other women, I slept on one of the benches. When I awakened, at five, the engineer let me wash in his compact little cabin. Every bit of space was utilized, yet there were many conveniences and a place for every-

thing. Cretonne curtains—I never imagined them on a warship—gave the quarters a homey look.

I peered from a porthole as we entered the harbor of Barcelona—ever so peaceful in the quiet of early morning, with a few starlike lights marking the streets. The harbor, however, was full of war boats. I could distinguish the German ones, because they were black (page 264).

We drew near a ship which I guessed was British, for a rowboat was silently lowered from it and rowed toward us. A sailor handed a package to someone on our deck. It all seemed so mysterious in the graying dawn of a war-torn land. Later I learned it was only the ship's mail for Marseille.

From Barcelona we skirted the coast.

"Returning, we'll come direct," said the engineer, "but the water is rougher that way. We don't want our passengers seasick."

The Cuban woman *did* get sick, and my oddest memory of the *Antelope* is that of an unusually large and tanned sailor, walking up and down the deck, between the guns, singing lullabies to her baby.

Formalities at Marseille were brief. Consular representatives met the refugees. We didn't have a cent—not even a Spanish one—for I had given away the last of our cash. An American attaché lent us 60 francs until I could cash a travelers' check rumbled from long hiding in my hair.

Now we are in Genoa, living in a house with many other refugees from Spain—all Spanish save ourselves.

A mother and her four small children are fellow guests of mine. She left Barcelona early, before searching was so strict and so personal, and brought a few valuable jewels hidden in her corset. She wears them now, but one after another disappears.

"Mañana," says she, "the war is over. Yet I am worried about my husband. He is still in Barcelona."

After many anxious days there came a letter. It contained only a scrap from a newspaper—a clipping with torn corners. She smiled, called her children, and handed me the printed bit.

It was the death notice of her husband.

"He's alive, and safe!" she said, laughing at my amazement. "He plans to escape under another name. If they think him dead, it is easier. He arranged for his obituary, and tore the clipping just so, himself!"

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Articles and photographs are desired. For material which The Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

Immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fumaroles. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

The Society cooperated with Dr. William Beebe in a deep-sea exploration of undersea life off Bermuda, during which a world record depth of 3,028 feet was attained August 15, 1934, enabling observations of hitherto unknown submarine creatures.

The Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed \$100,000 to Admiral Byrd's Antarctic Expeditions.

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

The Society's notable expeditions to New Mexico 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 have solved secrets that have puzzled historians for three hundred years. The Society is sponsoring an ornithological survey of Venezuela.

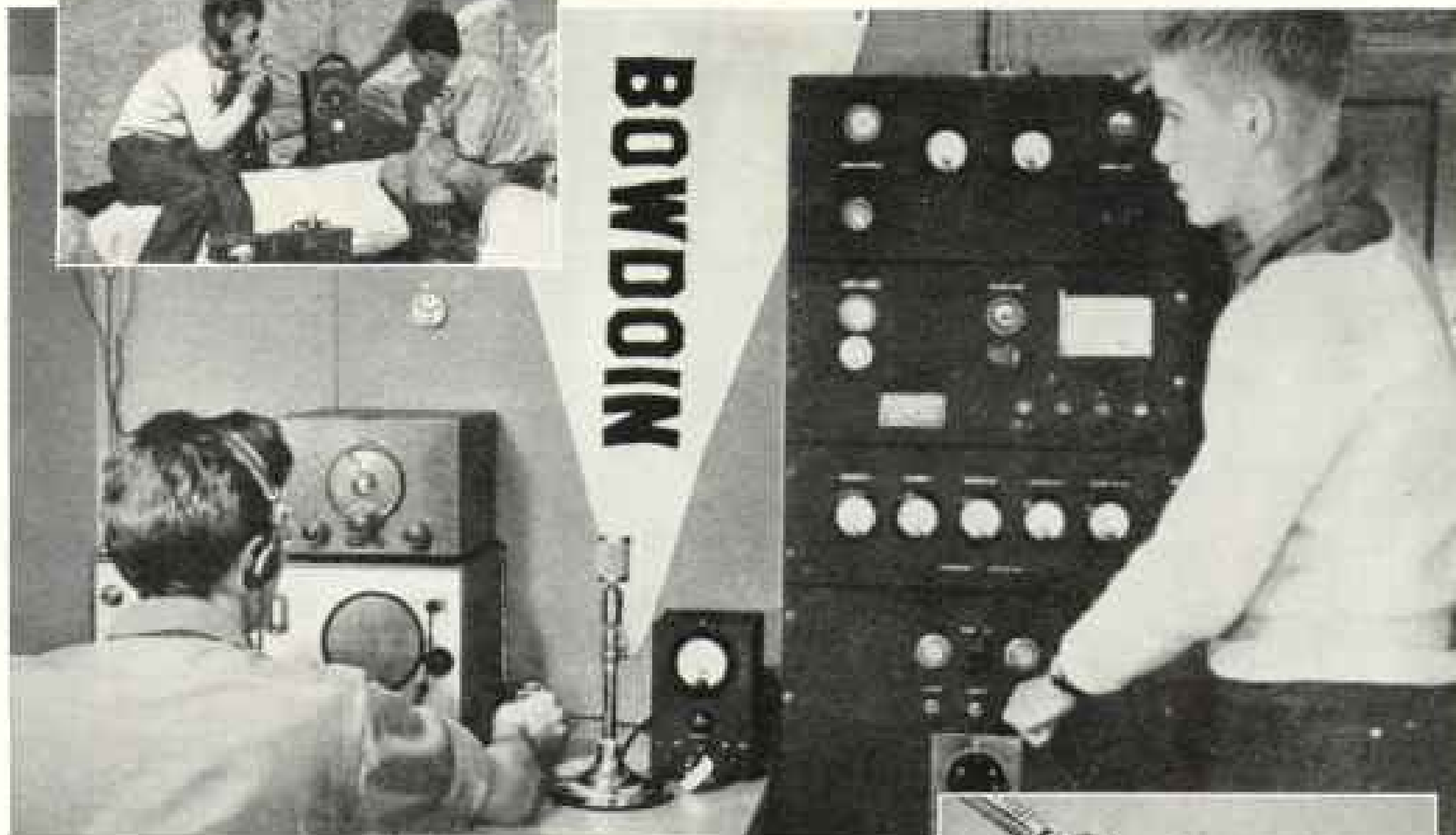
On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to an officially recognized altitude record of 71,495 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

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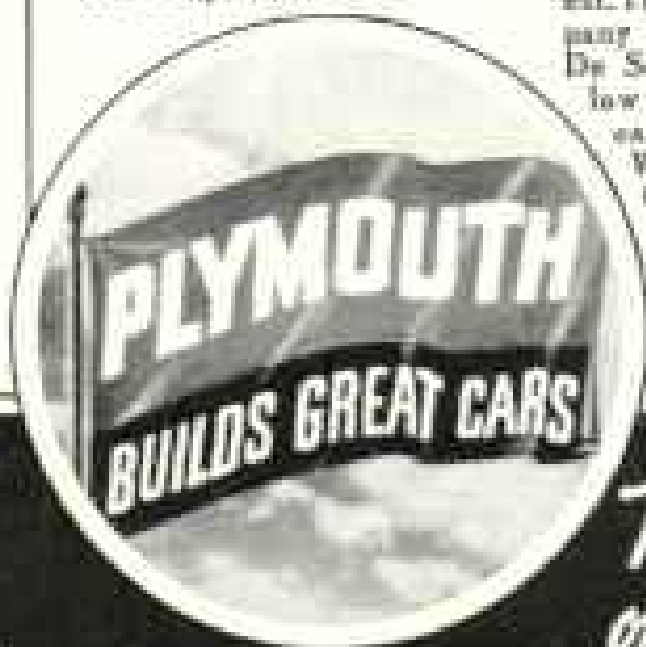
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\*\* The most facile pen cannot describe Hawaii's charm. People seeking widely different things end their search happily in these mid-Pacific isles. \* Laughter frames Hawaii's language. Soft melodies chant her theme-song. June flowers form her garland. And the only passport needed to this surprising corner of the United States is a wish to really live.

\*\* A strip of famous Waikiki, or a mountain view; an exquisite hotel or a smart Honolulu shop...all things that life hopes for... as you turn the pages of Hawaii's story. And her *Aloha* welcome...personal, sincere...explains why she inspires that come-back-when-ever-possible affection. \*\* Gay luxury distinguishes the sea-voyage to Honolulu from Los Angeles, San Francisco and Vancouver, B. C. Less than one day away on giant air Clippers.

*\* Graceful outrigger canoes add thrills to Waikiki's famous surf.*

Booklets "Nearby Hawaii" and "Tourfax" free from Travel Agents or Hawaii Tourist Bureau, 203 Market Street, San Francisco, Calif.; 242 Petroleum Securities Bldg., Los Angeles, Calif.

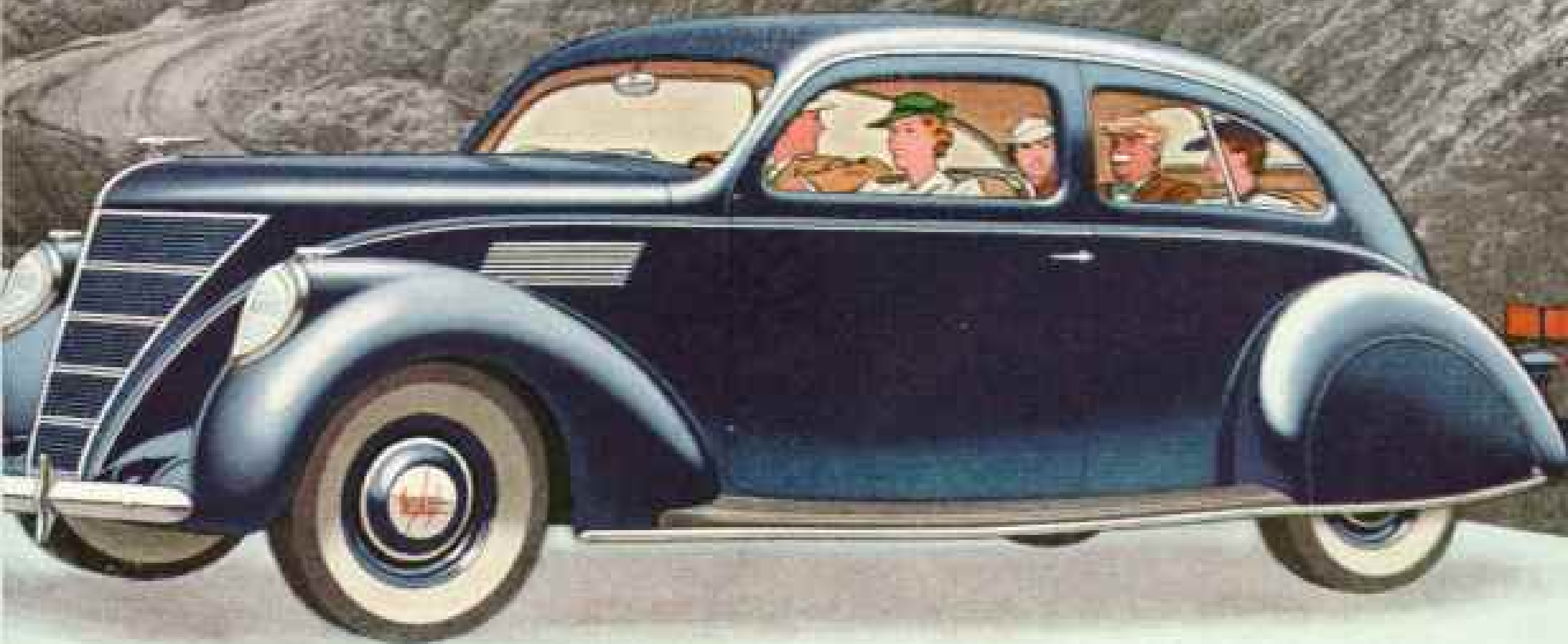
*This Bureau, with headquarters at 763 Bishop Street, in Honolulu, is a non-profit organization, maintained by*

## THE PEOPLE OF HAWAII

*to enable you to obtain accurate information on any subject concerning the entire Territory of Hawaii, U. S. A.*



"Good-bye Bad Lands... the Lincoln-Zephyr  
was too much for you!"



**W**HHEELS ARE WINGS on this new kind of car! Like an air transport hugging the land, the LINCOLN-ZEPHYR glides across hill and countryside . . . giving a fresh idea of how a car should perform, rolling up fresh records of economy.

This is the new car, Lincoln-built, in which a Louisiana owner drove 12,000 miles across country through ice, snow, flood and windstorm to average 17 miles per gallon. (Consistently, owners report 14 to 18 miles to the gallon.)

This is the car with an engine of 12 cylinders in V-formation . . . with a new, rigid, steel, one-

piece body and frame . . . with the advanced features that set new standards of comfort, safety, roadability. *This is the only car of its kind!*

Arrange to drive the LINCOLN-ZEPHYR today. Prepare for a new thrill at the wheel. For this new car brings back the old desire to travel . . . to look again upon far and lovely places.

The LINCOLN-ZEPHYR is priced well below its specifications! Convenient terms can be arranged through Authorized Universal Credit Company Finance Plans. *Lincoln Motor Company, builders of the Lincoln and Lincoln-Zephyr.*

L I N C O L N - Z E P H Y R V • 1 2



*"Parachute  
Jumping  
is Safe..."*

COMPARED TO SPEEDING  
ON THE HIGHWAY" Says  
ROGER DON RAE



"That's Why  
I Joined the

## *'Not-Over-50' Club!"*

"I'd rather bail out at 500 feet any day than take a chance on the open road at over 50 miles an hour," says Roger Don Rae, Professional Aerial Performer, Lansing, Michigan, who has more than 500 jumps to his credit. "Parachute jumping is safe compared to speeding on the highway. That's why I joined the 'NOT-OVER-50' Club."

Did you know that when your car speed doubles, its *destructive force is multiplied by four . . .* that more than two-thirds of the motor car fatalities occur on the open highway, mainly as the result of high speed? That's surely reason enough for joining the "NOT-OVER-50" Club, organized by Lumbermens as a contribution to the national safety movement. It costs you nothing to join. Just mail the coupon below for safety's sake.

The "NOT-OVER-50" Club is an important

part of Lumbermens program of providing car insurance at cost. Lumbermens insures only careful drivers. It operates economically. The result is a substantial saving which makes possible the payment of big yearly cash dividends to policy holders. When you insure in Lumbermens you insure at cost.

Whether you are a Lumbermens policyholder or not, join the "NOT-OVER-50" Club now and do your part to halt America's terrible toll of auto accidents.

### *Send for Your Free Insignia*

*The red arrow reminder for your speedometer . . . the Safety seal for your rear window, and the safe driving creed can be obtained from your local Lumbermens representative or will be sent free upon request. No obligation.*



LUMBERMENS MUTUAL CASUALTY COMPANY

*Division of Kemper Insurance*

*"World's Greatest Automobile Mutual"*

HOME OFFICE: MUTUAL INSURANCE BUILDING, CHICAGO, U. S. A.

START  
SAVING LIVES  
*Today*

"NOT-OVER-50" CLUB,  
4750 Sheridan Road, Chicago, Illinois

Please mail me \_\_\_\_\_ safety packets described above. I understand that these insignia are free and that this places me under no obligation.  Also send me your booklet *How Careful Driving May Pay You a Dollars and Cents Return.* 80-1

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

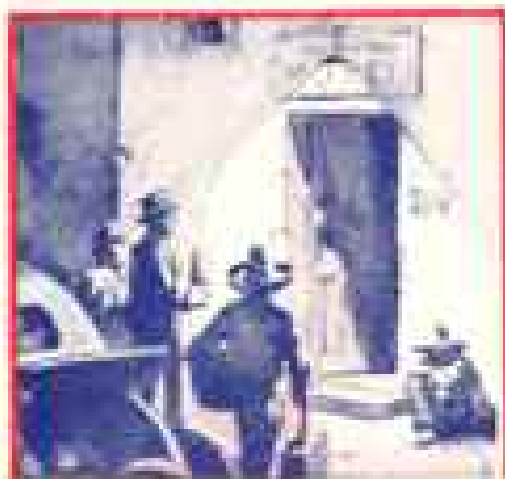
# What was that *Hiss of Doom* in *Mrs. Barton's Room*?

A Snake? Escaping Steam? Some Creature of the Dark? More Swift and Sure than any of these, Death Lay, that Night, at her Fingertips



"I owe you an apology!", writes Mrs. Florence Whitfield Barton (above), of Cisco, Texas. "I thought you really made up those ticklish situations you print in your advertisements where explorers and adventurers and travelers owe their lives to dated Eveready flashlight batteries.\* But not any more!

"This summer my husband and I were forced to stop overnight in a little town near the border. The only hotel was close to the railroad track, where a freight locomotive was switching when we went to bed. It was terribly hot, and to get any air at all we had to drag our bed out from the wall and pull it as near the single window as we could. Late in the night I awoke with a splitting headache, caused, I thought, by the heat, and the hissing of the locomotive. But after lying awake a few moments, I realized



that hissing sound was in our own room. I reached over to the table for (I confess it with shame) a match, and just happened to feel Bart's flashlight, which he always carries in the car. When I switched on the flashlight I saw what had happened: a leg of the bed had opened the gas-cock at the base-board as we dragged the bed away from the wall. The room was full of gas. I shudder to think what would have happened if I had struck that match! Now I am always the one to see that the flashlight is brought out of the car along with the luggage—and that the batteries are fresh.

"You never know when—"

Very truly yours,

*Florence Whitfield Barton*

\*We don't make them up. All our advertisements of this kind are based upon actual experiences of actual people. They reach us in letters from all over the country. Many appear in the news—your own newspaper frequently carries news items telling how flashlights have saved lives, averted accidents, saved property.



Once more the **DATE-LINE** is a **LIFE-LINE**

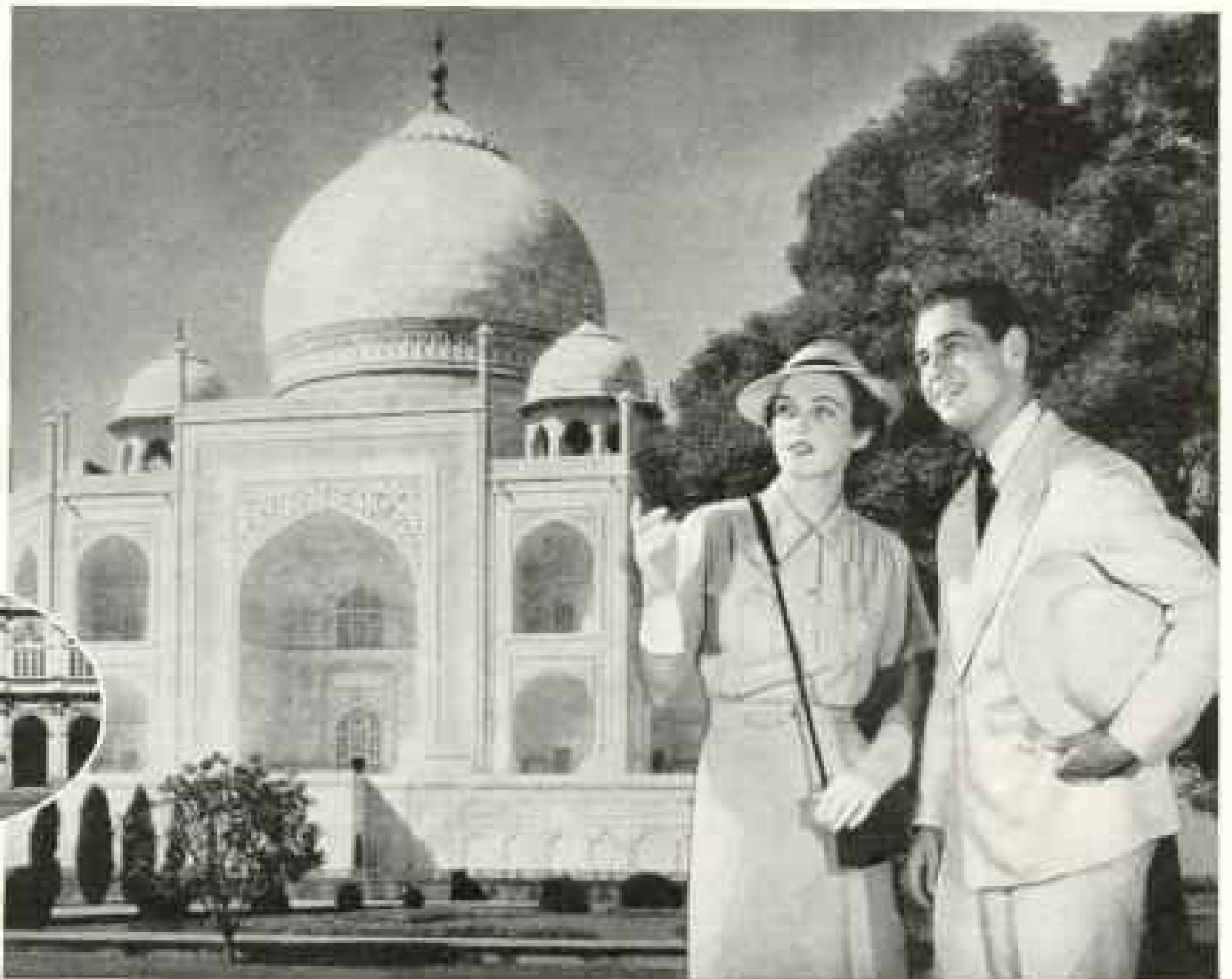
**EVEREADY BATTERIES ARE FRESH BATTERIES**

National Carbon Co., Inc., 35 East 43rd St., New York



Wherever you go!

WORLD-WIDE  
AMERICAN EXPRESS TRAVEL SERVICE  
SMOOTHS YOUR WAY...



The office of American Express Travel Service in district Bombay ...

London ... Paris ... Bombay ... Shanghai ... wherever you wish to go, the great authority on travel, the American Express Travel Service, with a brilliant international prestige in the world of travel and finance, offers you carefree, effortless travel ... *planned in advance*. No last minute disappointments due to over-flowing trains or hotels ... no "slip-ups" in sightseeing arrangements to mar your pleasure, because American Express Travel Service plans an itinerary with you point-by-point according to your own ideas. All transportation by land, by sea, by air ... hotel accommodations ... sightseeing ... Travelers Cheques to safeguard your funds ... all are arranged for you *before you start your trip!*

Abroad, experienced English-speaking interpreters assist you at principal frontiers, piers, depots ... help to make your journey even more pleasant. And in most of the countries of the world, you'll find that welcome sign: "American Express Travel Service" ... your *personal* headquarters while you travel, where you may receive your mail, do your banking, and meet your

friends in an atmosphere that is cordially American.

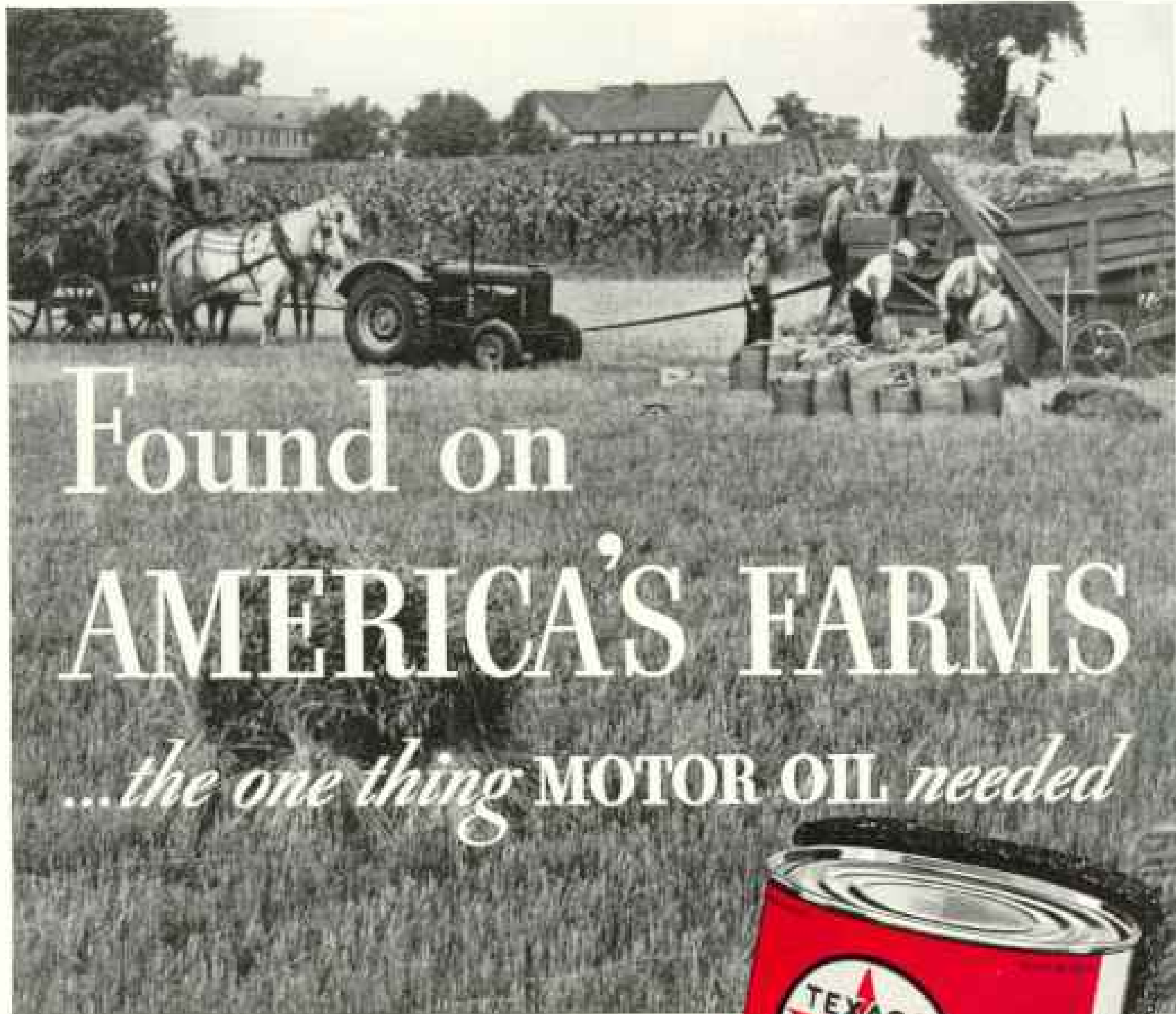
Whenever you go, you'll find that the experience and efficiency of American Express Travel Service smooths the way ... leaving you free to enjoy your travels ... completely! A visit, telephone call, or letter to your local office will bring you the advantage of unbiased and accurate travel advice and assistance.

Offices in Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Miami, Milwaukee, Minneapolis, Montreal, Newark, New Orleans, New York, Philadelphia, Pittsburgh, Portland, St. Louis, Salt Lake City, San Francisco, Seattle, Toronto and Washington and in principal cities throughout the world.

**AMERICAN EXPRESS**

*America's Foremost Travel Organization*

AMERICAN EXPRESS TRAVELERS CHEQUES ALWAYS PROTECT YOUR FUNDS



# Found on AMERICA'S FARMS

*...the one thing MOTOR OIL needed*

**T**ODAY, farmers are helping to produce a new and better motor oil.

Thousands who have never even *seen* an oil well are now a part of the oil industry.

*Back of this lies a discovery.*

From oats, wheat, corn, rice, cotton seed, sugar cane... comes a remarkable purifier, *Furfural*. Science finds it ideal for use in taking the impurities out of motor oil.

Your rapid oil consumption is often due to these impurities. The engine becomes dirty and worn. Then every stroke sucks up oil out of the crankcase.

Here is a definite reason for changing to New Texaco Motor Oil. Because taking out impurities means you get full lubrication, without buying so much oil.

Start using New Texaco Motor Oil in your car *today*. At Texaco Dealers everywhere.



In refining New Texaco Motor Oil, we pipe Furfural in at the top of the tower. Every particle that might form sludge, gum or tar in the heat of your engine is completely removed.

**25¢ A QUART**

*Stays* **FULL** *longer*

Hear EDDIE CANTOR... Every SUNDAY NIGHT  
COLUMBIA NETWORK • 8:30 EST, 7:30 CST, 6:00 MST, 5:00 PST



## RETURN ENGAGEMENT

Tune in *Heinz Magazine of the Air*. Full half hour—Monday, Wednesday, and Friday mornings, 11 E. S. T.; 10 C. S. T.; 9 M. T.; 12 Noon Pacific Time—Columbia Network.

ONE doesn't have to be a crystal-gazer to prophesy a lifelong honeymoon for this household—numberless *return engagements*. Many a well-meaning dad has brought home a knickknack when his wife would have preferred a quick snack! Dads should say it with orchids, yes; but they should also be taught to say it with delicious home-style soups, and with all the other eloquent, ready-to-serve 57 Heinz Varieties. For then they are presenting a gift that makes entertaining a delight rather than a drudgery; and the planning of home meals a temptation rather than a task...The *case* way, incidentally, of buying Heinz products saves sufficient time and money to permit more frequent visits to the florist's.



# A superb concert organ for your living room



## NO LARGER THAN A WRITING DESK

*The graceful console of the Hammond Organ fits in a four-foot square and can be accommodated comfortably in an apartment living room. It is installed simply by connecting it to an ordinary electric outlet. Far easier to move than a piano, two men can carry it anywhere.*

## *The full range of exquisite organ music at the price of a fine piano*

Now you can have, in your own home, the music of the loveliest instrument man knows—the organ.

In two attractive units small enough for any living-room, Hammond has built an instrument that has captivated the world of music. All the beautiful, varied voices of the concert organ are available—diapason, flute, strings, reeds—and scores of new tone colors besides.

With instant action and perfect flexibility, the Hammond permits brilliant interpretation of any music scored for

piano, including modern rhythms. And in addition, it puts at your finger-tips all the rich literature of the organ itself.

The Hammond Organ is based on a wholly new principle—creates lovely organ tones by *electrical impulses*. It is easy to play; anyone familiar with the piano can get satisfying music almost from the start.

You'll find hearing the Hammond Organ a rare musical experience. See the Hammond dealer in any principal city . . . or write The Hammond Organ, 2959 North Western Avenue, Chicago,

**\$1250** and up f. o. b. Chicago—slightly higher for large installations

## THE HAMMOND ORGAN

TODAY, LESS THAN TWO YEARS AFTER ITS INTRODUCTION, THE HAMMOND IS THE LARGEST-SELLING ORGAN IN THE WORLD

*Nearly 1000 churches use the Hammond...it is an appropriate donation for your church*



LIDO

## ... IN MID-WINTER, TOO!

ONE THING ONLY permits all year Lido life at sea—the amazing constant mildness of the Southern Route! Actual midwinter weather statistics\* in the Atlantic generally show temperatures forty to fifty degrees higher than in New York. That's why the sweeping Lido Decks of Italian liners are crowded with sunbathers on every winter voyage . . . enjoying sports, "beach life" and outdoor relaxation.

For a direct crossing choose the super-liners Rex or gyro-stabilized Conte di Savoia, or the popular Roma. For a leisurely itinerary including as many as ten fascinating ports, book on the newly remodeled Saturnia or Vulcania.

\* Ask for booklet "Why it is called the Mild Southern Route." Apply your TRAVEL AGENT or nearest Italian Line Office. New York: 624 Fifth Ave.; Philadelphia: 1501 Walnut St.; Boston: 85 Arlington St.; Cleveland: 944 Arcade, Union Trust Bldg.; Chicago: 333 North Michigan Ave.; San Francisco: 185 Post St.; New Orleans: 1304 American Bank Bldg.; Montreal: 1133 Beaver Hall Hill; Toronto: 159 Bay St.



ITALIAN LINE

WHEN BETTER AUTOMOBILES ARE BUILT BUICK WILL BUILD THEM

**T**HE spirit of youth is written clear in every fleet line of this brilliant Buick for 1937—its grace and beauty alone are enough to commend it to those of experienced taste. But neither of these, of itself, is quite sufficient to explain the increasing frequency with which Buick is seen in high places. Rather is it the unchanging solid goodness of this great car, made richer and more perfect by youthfulness of line and eagerness of action, which makes Buick more and more the favorite of those whose discerning judgment is most widely and properly admired.



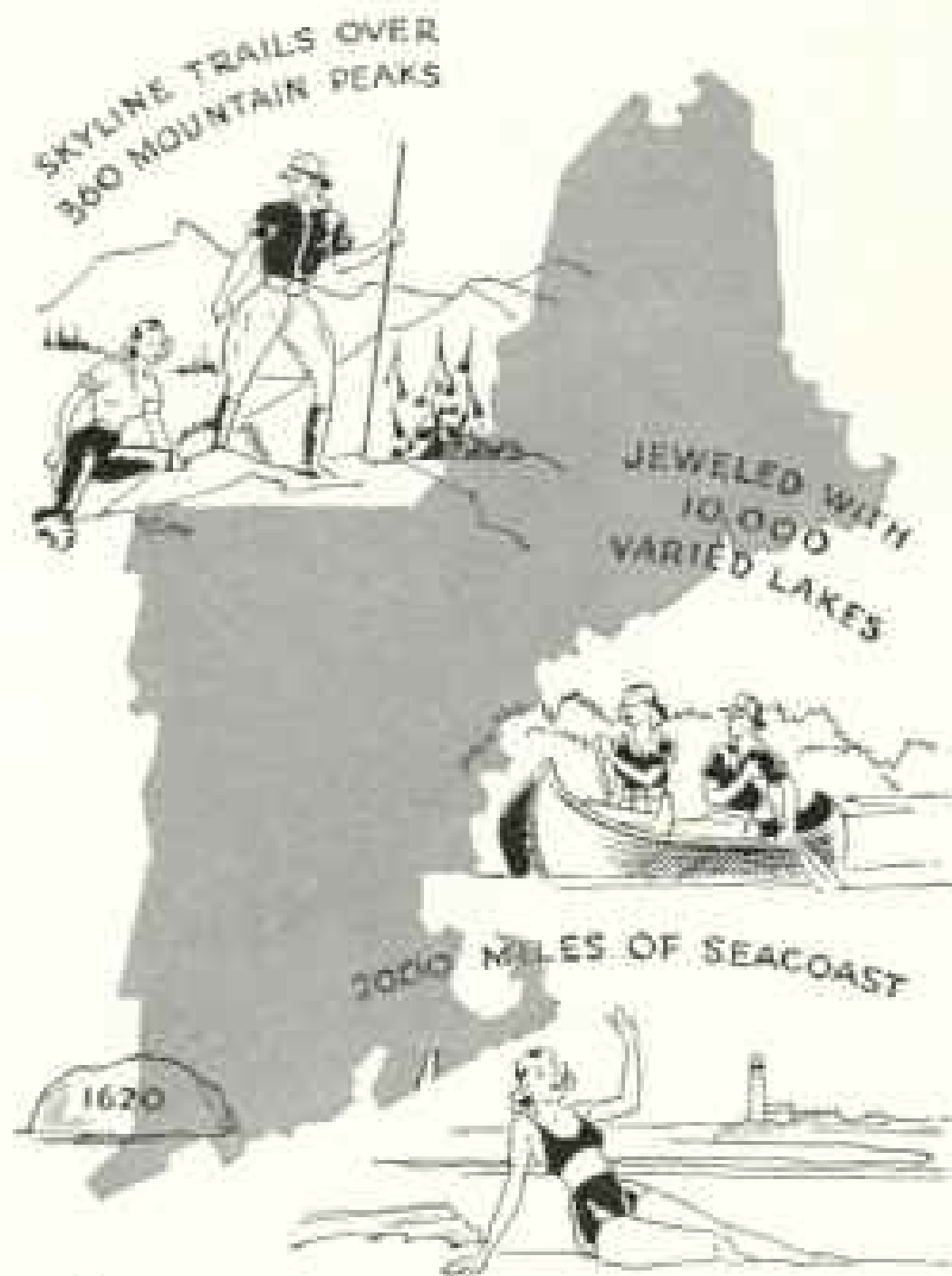
*“It’s Buick again!”*

YOUR MONEY GOES FARTHER IN A GENERAL MOTORS CAR

NOTE—NO OTHER CAR IN THE WORLD HAS ALL THESE FEATURES: Valve-in-Head Straight-Eight Engine . . . Aerobal Carburetor . . . Sealed Chassis . . . Torque-Tube Drive . . . Unstayed Body by Fisher . . . Taper Hydraulic Brakes . . . Knee-Action Comfort and Safety . . . “High Output” Generator . . . Jumbo Luggage Compartments . . . Double Stabilization . . . Safety Glass

\$765 to \$1095 are list prices of the new Buicks at Flint, Mich., subject to change without notice. Standard and special accessories groups at extra cost. Model shown, Roadmaster Six-Passenger Four-Door Sedan, \$1275 list at Flint.

# MAP YOUR New England VACATION NOW



SIX STATES INVITE YOU! OLD COLONIAL HOUSES, HISTORIC VILLAGE GREENS, EXCITING OCEAN WHALING PORTS, IDEAL VACATION CLIMATE, FACILITIES FOR EVERY MODERN SPORT AND PLAYTIME ACTIVITY. LET YOUR CHILDREN SEE BUNKER HILL AND PLYMOUTH ROCK, VACATION THIS YEAR IN NEW ENGLAND WHERE MOUNTAIN, LAKE AND SANDY OCEAN BEACH ARE ALL NEARBY... CLIP THE COUPON.

Write NOW for 40 page Vacation Guide 

NEW ENGLAND COUNCIL  
STATLER BUILDING  
BOSTON, MASSACHUSETTS.

**FREE**

PLEASE SEND ME MY COPY OF YOUR  
VACATION GUIDE G-17.

Name \_\_\_\_\_

Address \_\_\_\_\_



## Make Glacier National Park the high spot of your Western trip

● No matter where else you go in the West be sure to include Glacier National Park. Its sixty glaciers, 900 miles of trails, gem-like lakes, plunging streams and shimmering waterfalls make Glacier Park ideal for a summer vacation. For those whose time is limited, 1, 2 or 3 day Stop-Off Tours have been arranged by the Great Northern Railway in connection with Empire Builder train service to or from the Pacific Northwest — Spokane, Seattle, Tacoma, Portland, Vancouver, Victoria.

You'll enjoy traveling on the air-conditioned Empire Builder — extra fine trans-continental train, unsurpassed dining car service with low prices . . .

Route of the Empire Builder  
every luxury—every economy

Get full particulars from local railroad ticket agent or send for literature.

-----PLEASE CLIP THIS COUPON-----

A. I. Dickinson, Passenger Traffic Manager  
Great Northern Railway, Dept. NG1 St. Paul, Minn.

Please send me information about your service to  
Glacier Park  Pacific Northwest  Alaska  California

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

# UNITED STATES SAVINGS BONDS

DIRECT OBLIGATIONS OF THE UNITED STATES GOVERNMENT



## "Let's build a firm foundation, Son"

Systematic investment in United States Savings Bonds provides a firm foundation to support future financial needs. In ten years, these bonds add 33½% to the amount invested and are tax exempt both as to principal and interest to the same extent as other Treasury bonds. They may be redeemed in cash at any time after 60 days from issue date, at their full purchase price, plus any accruals due.

A safe means of accumulating funds for the education of children—for retirement—for building a cash estate—for travel and recreation—is afforded by regular investment in United States Savings Bonds.

Bonds are available in the denominations shown in the coupon.

The results of systematically investing each month in United States Savings Bonds through the Regular Purchase Plan are shown in the following tables:

Amount you invest each month for 120 months	Amount of Bonds (Maturity Value*) you would own at end of 120 months	Payable each month for 120 months starting in 10 years
<b>\$18.75</b> . . . .	<b>\$3,000</b> . . . .	<b>\$25</b> per month
<b>\$37.50</b> . . . .	<b>\$6,000</b> . . . .	<b>\$50</b> " "
<b>\$75.00</b> . . . .	<b>\$12,000</b> . . . .	<b>\$100</b> " "
<b>\$93.75</b> . . . .	<b>\$15,000</b> . . . .	<b>\$125</b> " "
<b>\$187.50</b> . . . .	<b>\$30,000</b> . . . .	<b>\$250</b> " "
<b>\$375.00</b> . . . .	<b>\$60,000</b> . . . .	<b>\$500</b> " "

\* Savings Bonds are sold on a discount basis. They mature in 10 years from issue date for ½ more than their purchase price.

For Sale at Post Offices and — Direct by Mail

### TO ORDER BY MAIL

TREASURER OF THE UNITED STATES, DEPT. OF THE TREASURY, WASHINGTON, D. C.

- Please send me without obligation your Regular Purchase Plan and forms for my consideration and optional use.
- Send me the following bonds for which I enclose check, draft, or money order.

NUMBER

.... **\$25** U. S. Savings Bonds at **\$18.75** \$ .....

.... **\$50** U. S. Savings Bonds at **\$37.50** \$ .....

.... **\$100** U. S. Savings Bonds at **\$75.00** \$ .....

.... **\$500** U. S. Savings Bonds at **\$375.00** \$ .....

.... **\$1000** U. S. Savings Bonds at **\$750.00** \$ .....

**Total \$** .....

Register in the name of and send to: Name (Mr/Ms/Mc) \_\_\_\_\_ Street Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

Make all remittances payable to Treasurer of the United States.

HOST OF THE CARIBBEAN



**As if you OWNED THE SHIP . . .**

**I**F YOU had a ship of your own . . . with a staff you'd select . . . friends you'd enjoy . . . the Great White Fleet would be its pattern. A Guest Cruise on one of these gleaming liners has an easy grace, the spontaneity of a gay house-party. You are welcomed without fanfare . . . given the Keys to the ship, the ports—without tiresome social routine. There are sun decks and shaded sanctuaries; swimming pools; provocative dance orchestras—or chairs before an absorbing feature film. Food that steals your faithful cook's laurels . . . The attentions a guest enjoys, at the hands of a friendly host who knows how to entertain.

From New York to Havana, Jamaica, S. W. I., Panama Canal and Costa Rica, every Thursday, 17 days, \$210 ★ To Jamaica, S. W. I., Panama Canal and 3 ports in Colombia, S. A., every Saturday, 19 days, \$210.

Ask about weekly cruises from Philadelphia to Guatemala, 19 days, \$278. Other Guest Cruises from New Orleans, Los Angeles Harbor, San Francisco.

All outside staterooms, mechanical ventilation. No passports required. Superior accommodations only slightly higher.

Apply any Authorized Travel Agent or **UNITED FRUIT COMPANY**, Pier 3, N. R., or 632 Fifth Ave., New York; 111 West Washington St., Chicago; 321 St. Charles St., New Orleans.

**GREAT WHITE FLEET**



You'll sail with true  
sons of the sea...

**ON THE ANCHOR LINE**

Those who man Anchor liners, from Able Seamen to Masters, are as sturdy as the ships themselves... trained from boyhood to the life of the sea. That's why, when you sail the friendly Anchor Line Route direct to Ireland and Scotland, you're conscious of the fine romance of sea voyaging. • And against this splendid background on spacious, modern Anchor liners, Clyde-built, you'll enjoy all the more the heartfelt hospitality and honest, devoted service which creates an atmosphere all its own. • You're bound to have grand good times on Anchor liners... in luxurious lounges and club-like smoking rooms... dancing to the gayest of orchestra music... dining sumptuously... living well. • You'll welcome staterooms that are attractive and comfortable... and rates that are modestly low! Deck sports, talkies, well-equipped gyms.

Frequent sailings from New York and Boston to Londonderry, Dublin, Belfast and Glasgow.  
**MINIMUM RATES**  
Cabin Class, \$142    Tourist Class, \$110  
Third Class, \$82  
Slightly higher during summer season.  
Reductions for Round Trips.

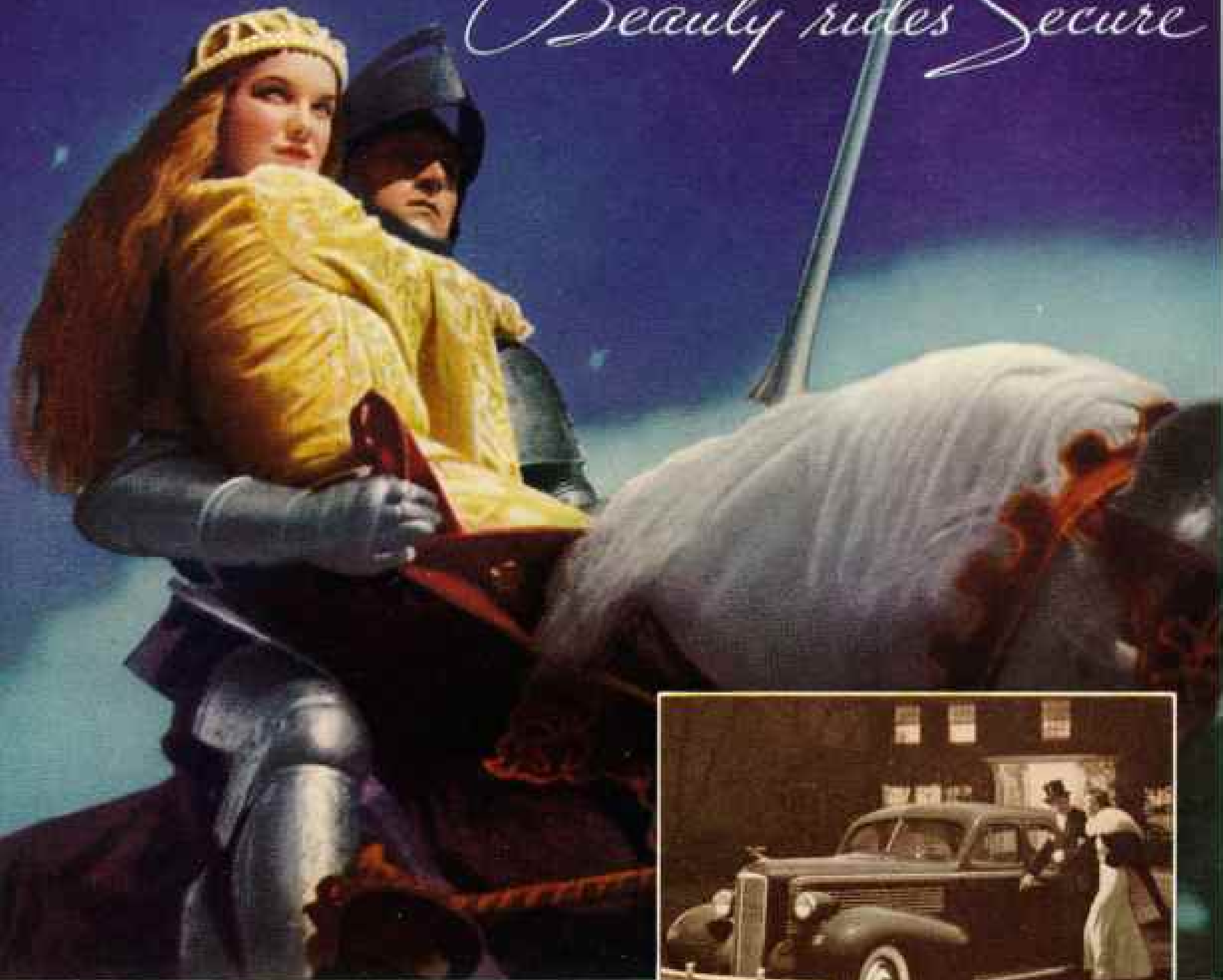
SEE YOUR OWN  
TRAVEL AGENT OR

**ANCHOR** *Line*

69 BROAD STREET, NEW YORK CITY  
Offices in Boston, Chicago, Cleveland, New Orleans, Philadelphia,  
San Francisco, Toronto.

"Mention the Geographic—It identifies you."

*Beauty rides Secure*



Bring this glamorous picture up to date and you replace the knight's charger with a new General Motors car... You substitute for the security of his armor the new Unisteel Turret Top Body by Fisher... Then beauty rides secure at its 1937 best!... For now Fisher glorifies the steel body with conspicuous new luxury and comfort, as well as with greater safety... The whole beautiful structure is fused into one integrally solid steel unit — with all its steel panels insulated against heat, cold and noise... You relax, at ease in mind and body, crowded no more by your fellow passengers. You ride as you never rode before — in the new Unisteel Turret Top Body by Fisher — available *only* on General Motors cars.



**THE UNISTEEL TURRET TOP BODY BY**

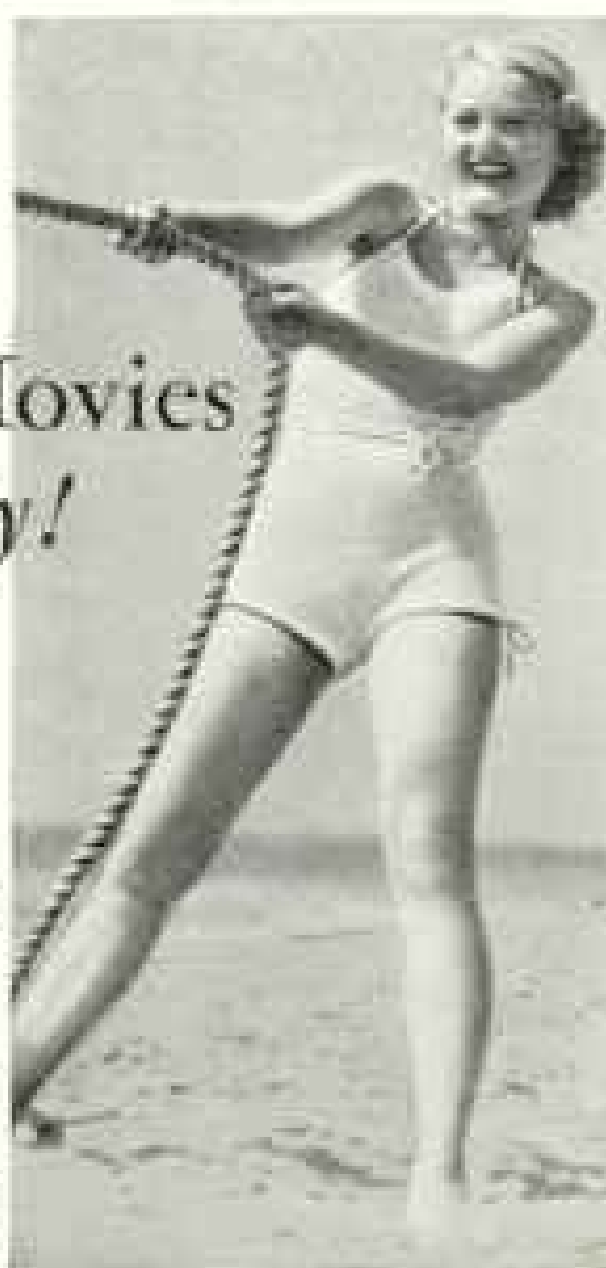
ON GENERAL MOTORS CARS ONLY: CHEVROLET • PONTIAC • OLDSMOBILE • BUICK\*

\*On the most popular models

*fisher*  
LA SALLE • CADILLAC\*

MAKE  
SUPERB  
LOW-COST

Color Movies  
...easily!



WITH THE PALM-SIZE

*Filmo 8*  
\$49.50

• Now it's supremely easy for you to make natural color movies—movies that any movie director would be proud of. There's a thrill as you point your Filmo 8, touch a button, and *what you see, you get.*

The cost is surprisingly low—just a very few cents for the average length scene.

Hollywood's best-known makers of professional studio cameras make the Filmo 8—the world's smallest personal movie camera. Palm-size, it slips into purse or pocket—a grand traveling companion. With its four speeds, interchangeable color-corrected lenses, and many other exclusive features, it makes black-and-white movies of superb theater quality. Now as low as \$49.50 at photographic dealers'.

**WRITE FOR BOOKLET** "How to Make Inexpensive Personal Movies" tells all about personal movie-making. Mail the coupon for your copy.

**BELL & HOWELL COMPANY**

Chicago • New York • Hollywood • London

*Since 1907 the world's largest manufacturer of precision equipment for motion picture studios of Hollywood and the world*

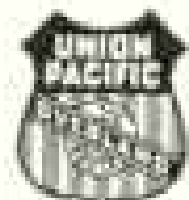
BELL & HOWELL COMPANY  
1804 Larchmont Ave., Chicago

Please send me, without obligation, a copy of "How to Make Inexpensive Personal Movies."

Name.....

Address.....

City.....State.....NO 2-11



Discovered!  
WINTER SPORTS  
"Under a Summer Sun"



**SUN VALLEY  
Lodge**

IN SUN VALLEY, AT KETCHUM, IDAHO

**T**HE season is now in full swing . . . snow blankets the valley and timber-free slopes . . . brilliant sunshine transforms the region into radiance.

Ski-Lifts are ready to whisk us up to mountain tops for exhilarating downhill runs. The skating rink gleams invitingly. Sledge dogs are eager to be away. A dip in the warm-water outdoor pool is a happy, late-afternoon thought. Tired!—Let the ultra-violet ray work its magic as you relax in a sun-room igloo.

And there's the Ski School, under the able direction of Hans Hauser, three times open champion of Austria. He and his staff of experts are available to all guests, with special attention given to beginners.

SUN VALLEY offers all this and more. SUN VALLEY LODGE completes the picture—it is luxuriously modern, with accommodations for 250 guests. Rates are moderate. Reservations necessary.

**Only Union Pacific Serves Sun Valley**

For information ask Union Pacific representatives in principal cities or write or wire

Raymond F. Stevens, Manager Sun Valley Lodge  
Ketchum, Idaho

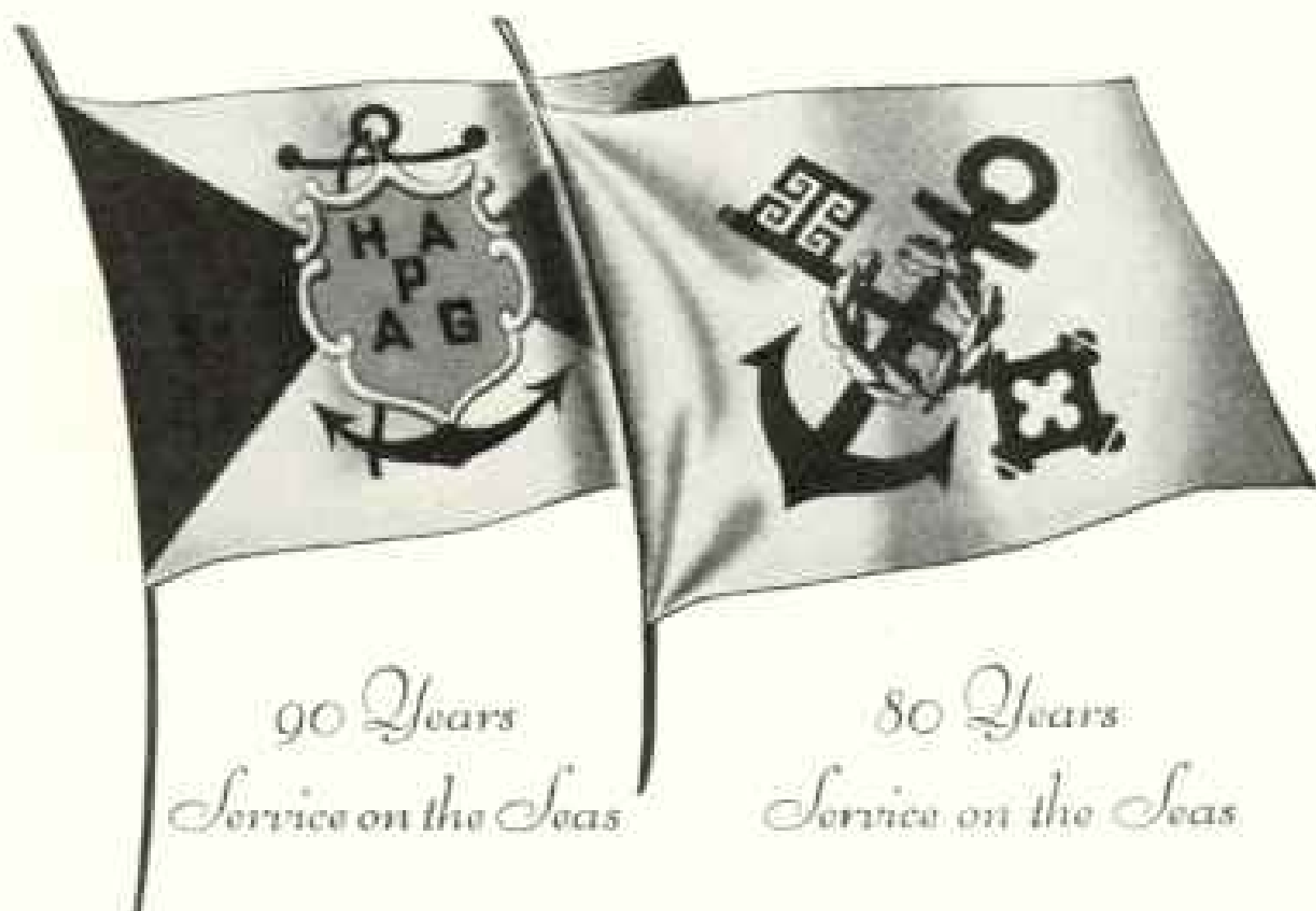
W. E. Deringer, Passenger Traffic Manager  
Union Pacific Railroad  
Omaha, Neb.



**UNION PACIFIC  
RAILROAD COMPANY**



TO IRELAND • ENGLAND • FRANCE • GERMANY



FROM the very start, 1847 and 1857, the ideals were: regularity of sailings, punctuality, speed—and fine living aboard. Ideals in the training of officers, sailors, chefs, stewards . . . in selecting engineers, all of diploma rank. Ideals carried on in scientific marine construction, in greater, swifter, steadier ships that startled the world; in splendid artistry of decorations and luxury of accommodations . . . Ever progressing with sound navigation to the 1937 records of the BREMEN, EUROPA, two mighty ships swinging swiftly back and forth between New York and Cherbourg—Southampton-Bremen on more than 100 round trips each, conveying notables of all lands . . . In the similar, over-100 round trips of the "Famous Four" Expresses—NEW YORK, HANSA, DEUTSCHLAND, HAMBURG, adding to the luxury of living a most pleasing economy.

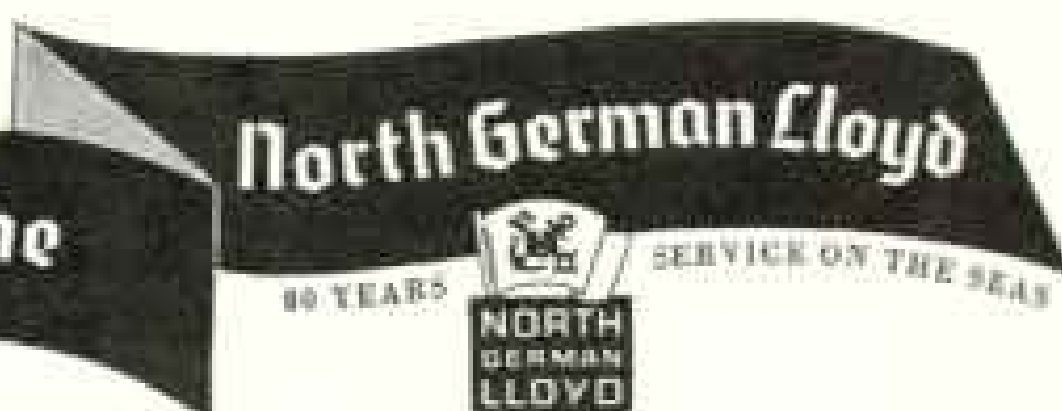
THE LLOYD EXPRESSES:

**Bremen Columbus Europa**

THE HAPAG "FAMOUS FOUR" EXPRESSES:

**New York Deutschland Hamburg Hansa**  
**St. Louis** HAPAG MOTORSHIP • LLOYD STEAMER **Berlin**

Literature, Sailing Schedules, Reservations on a dozen cruises of this year and 1937's more than 200 Atlantic Crossings, from Your Local Travel Agent, or



# The Tastiest Ocean Treat from Gloucester

*plump, tender, juicy*

## CHICKEN SALT MACKEREL

I guarantee them to please you!



Sent on  
Approval

Just what you want for a hearty  
breakfast!

**TASTE  
THEM  
AT MY  
EXPENSE**

You'll never know how delicious fish can be until you serve some of my tender Mackerel prepared the Down East way. It will be the rarest treat you've known in months. Take one of my new, meaty, late-caught Mackerel. Freshen it. Broil it in its own juices to a tempting brown, until the rich, tender meat falls apart at the touch of your fork. Serve piping hot. Your mouth will water at its appetizing aroma. You'll smack your lips over its wonderful flavor.

### What Makes My Mackerel So Good?

But you must get the right kind of Mackerel—the pick of the new late catch is what you want—to get this real food joy. That's the secret of the tempting goodness of my tender Mackerel. I send you the choicest Whole Split Fish that are carefully selected from the fat, tender catches of the new, late-caught Mackerel. There are no waste parts whatever in your pail. These new Salt Mackerel are so tender and full bodied that they just flake into juicy mouthfuls.

## Send No Money Now— unless you wish to

Just send the coupon below or write me a letter, and I'll ship you a pail containing 18 servings of my choice Whole Split Salt Mackerel—each fish suitable for two or three people. My fish come to you all cleaned—no heads—no tails—just meaty, fat fish packed in new brine, in a wax lined wooden pail. Taste one—broiled the Down East way. If not satisfied it's the finest Mackerel you ever tasted, return the pail at my expense. Otherwise, send me only \$2.00 within ten days. Families everywhere get their sea food from me this "prove-it-yourself" way. We've been doing business this way for 51 years and I must say that this is the lowest price for this size pail of Mackerel I've ever offered. Send your coupon today for this real Gloucester treat.

Arthur C. Davis, The Gloucester Fishman  
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Enjoyable  
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Mackerel  
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Name \_\_\_\_\_

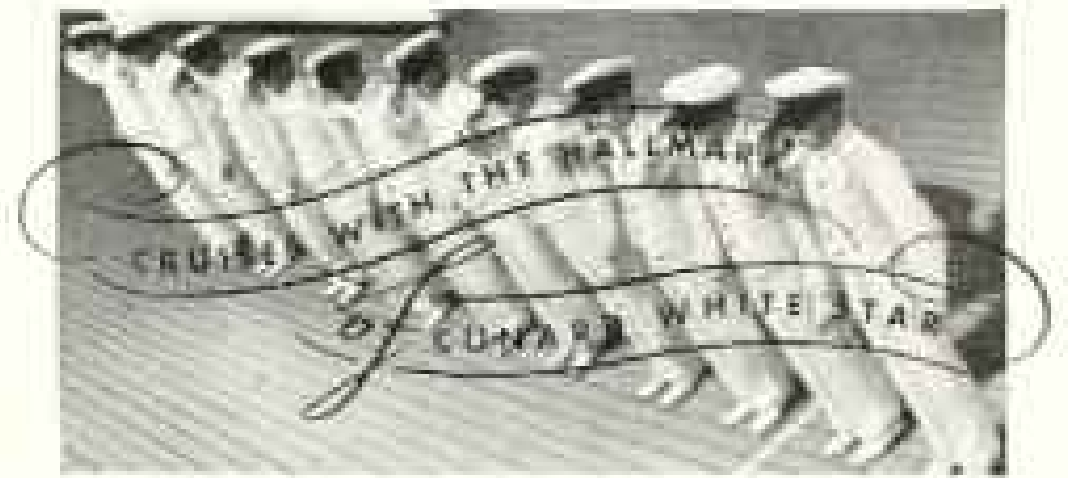
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DISTINGUISHES  
**CUNARD WHITE STAR**

# The Great Imitator

**T**HE next great plague to go is syphilis. Dr. Thomas Parran, Surgeon General of the United States Public Health Service, has stated that a major objective of his administration is to stamp out syphilis.

Dr. Parran reports that in the Scandinavian countries an aroused public opinion caused the governments to take effective measures which have reduced syphilis to negligible proportions. Less than 1600 new cases were found in Norway, Sweden and Denmark during the past year.

\* \* \*

In the United States, according to the best evidence, there are more than a half million new cases of syphilis every year seeking medical care. Of these, only one in five gets into the hands of competent physicians soon enough to receive the full benefit of early and continued treatment.

In its early stages, this virulent infection can usually be completely cured by experienced, licensed physicians. Much can be done even for those suffering from the disease in its advanced stages. Syphilis is then "The Great Imitator." It may masquerade as heart, lung, throat or kidney trouble; as a form of skin disease or as rheumatism. It often attacks the brain or spinal cord. It may result in blindness, deafness, paralysis, or insanity.

Many persons are unaware of their infection. The disease may be passed unknowingly from one person to another. Fathers and mothers have infected their children in this way. Most tragic of all are its innocent

prey, especially babies born with syphilis. Early and competent prenatal care of syphilitic mothers can prevent most cases of congenital syphilis—children born diseased, blind or deaf, or with crippled bodies or minds.

As a rule, syphilis cannot be diagnosed from outward signs alone, because often there are none. The presence of syphilis can be positively determined only by medical examination and laboratory tests. Too frequently its victims appeal to the medical charlatan and the quack who promise speedy and sure cures.

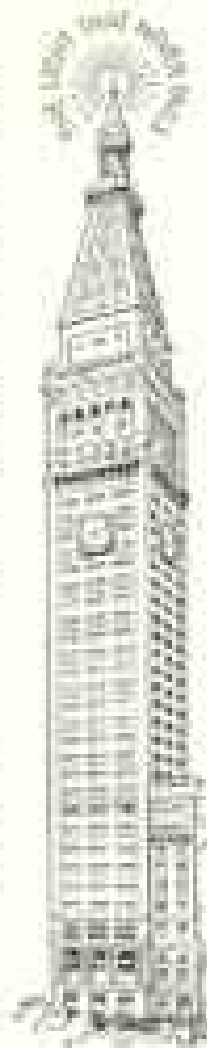
*There is no quick nor short-cut method of curing syphilis.* Treatments must be regular, usually weekly, for a period of many months. Because obvious signs and symptoms often disappear after a few treatments, many patients consider themselves cured and stop treatments. This may be an irreparable mistake.

The full effects of the disease may not appear until years later. Only the doctor, with repeated blood tests as his guide, can determine when a cure has been effected.

Prevention, early diagnosis and thorough treatment will overcome this most dangerous enemy of mankind. Send for a free copy of the Metropolitan booklet, "The Great Imitator." Address Booklet Department 237-N.

\* \* \*

On February 3rd, 1937, the first National Social Hygiene Day, public health authorities and local organizations all over the country will discuss the control of syphilis. The American Social Hygiene Association, 50 West 50th St., New York, N. Y., will be glad to send literature and full particulars regarding the meetings.



Keep Healthy—Be Examined Regularly

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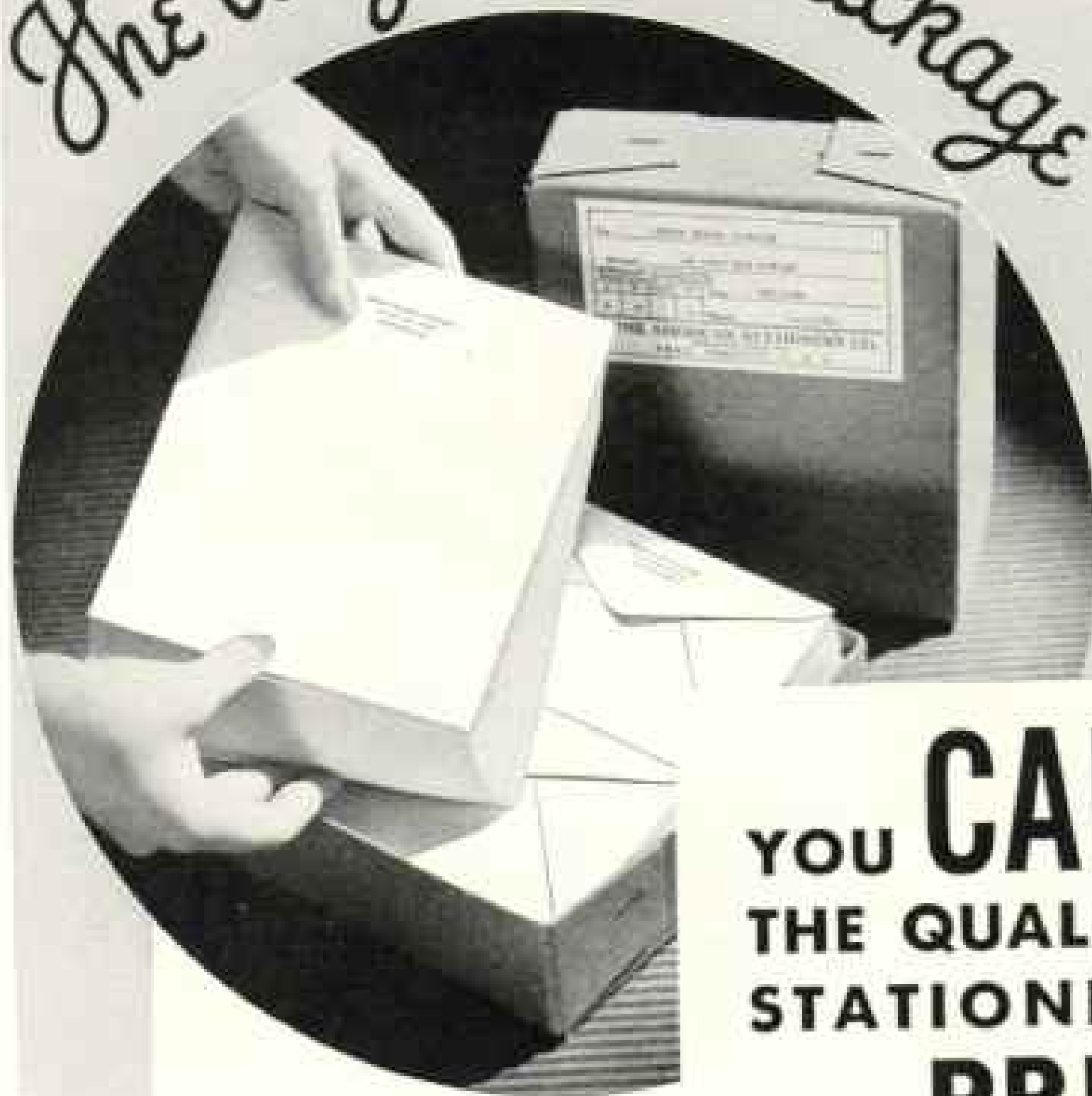


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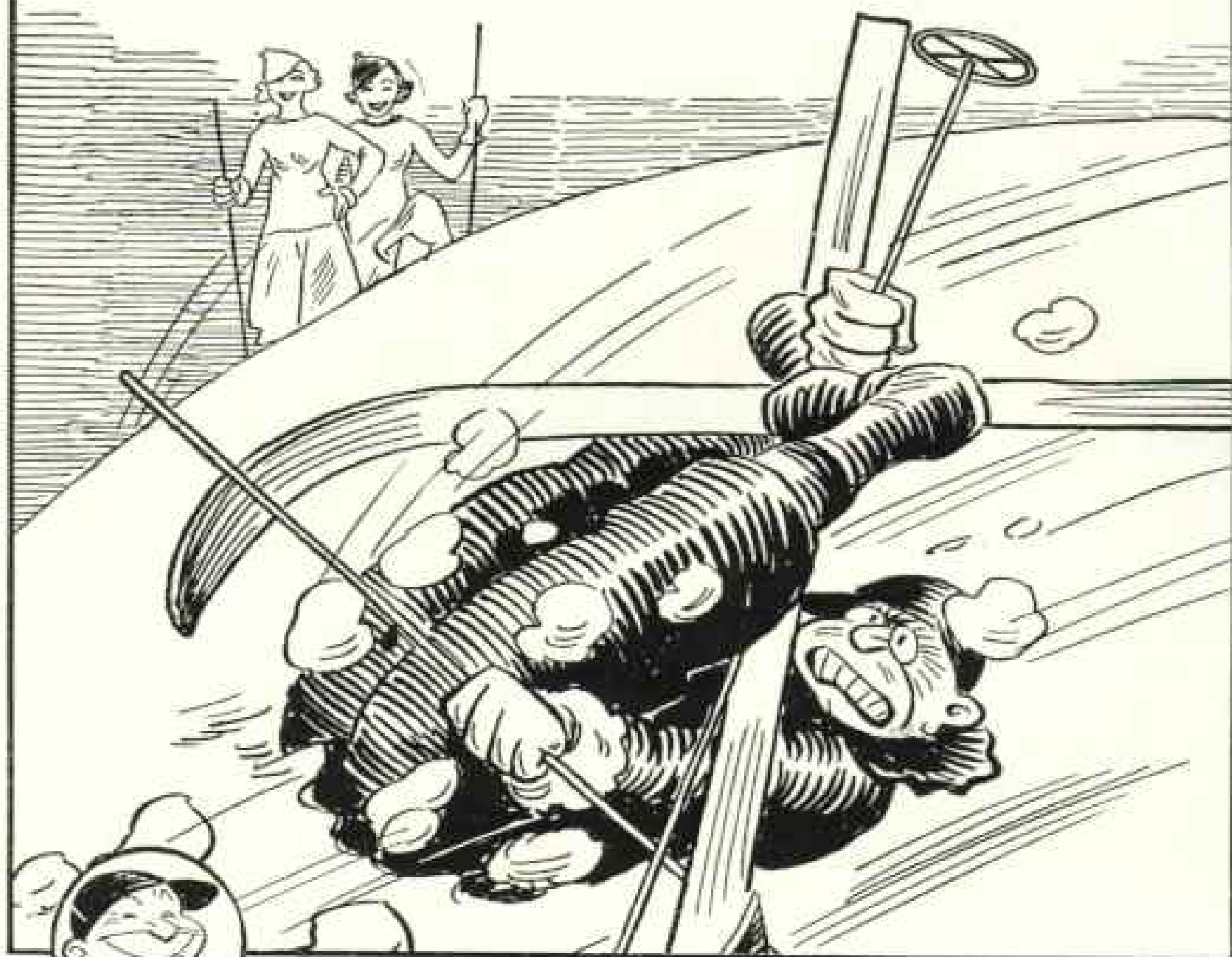
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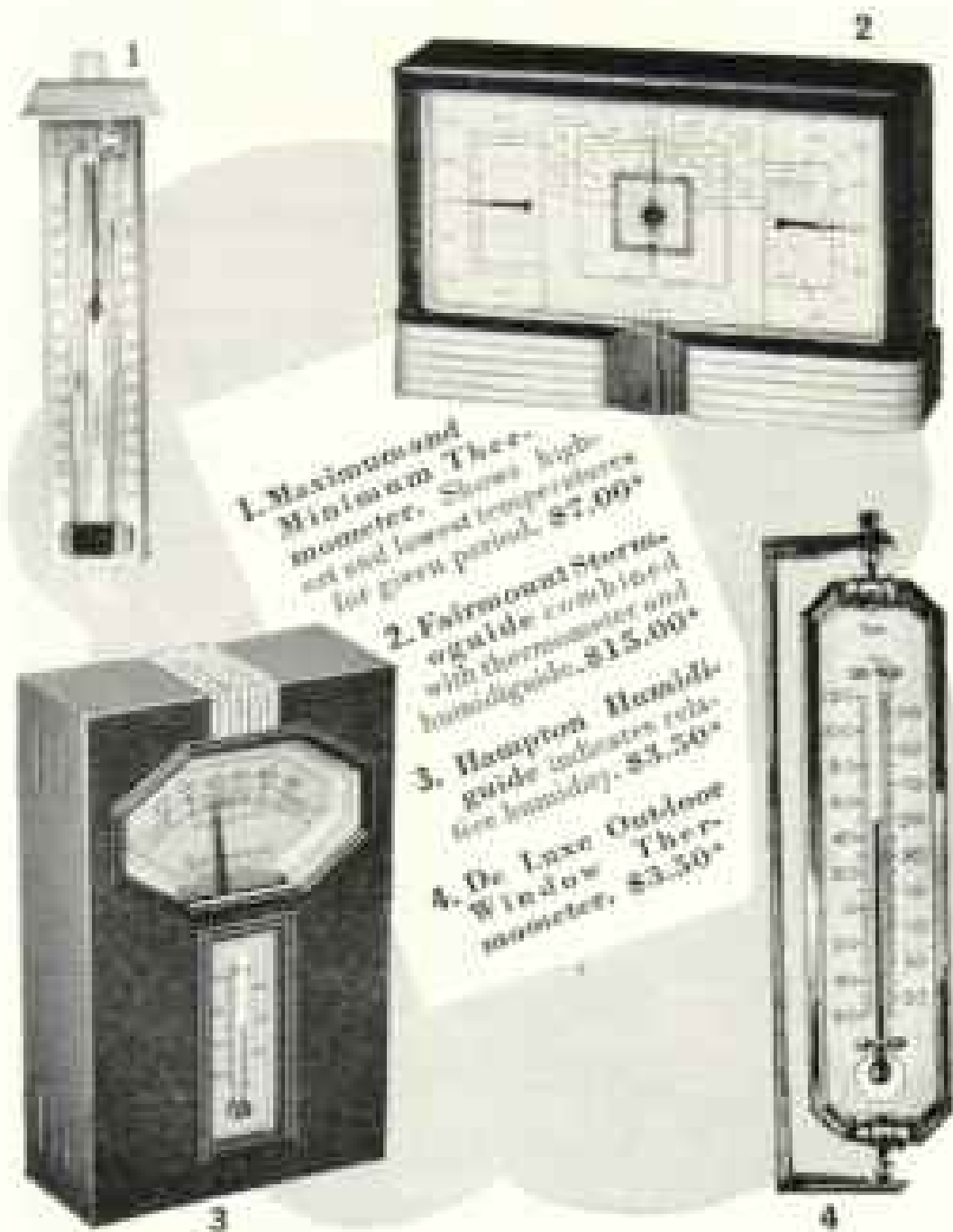
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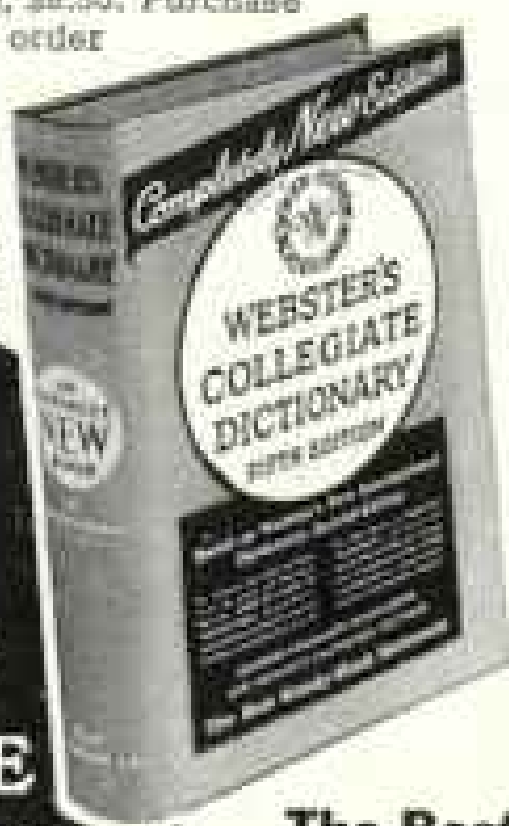
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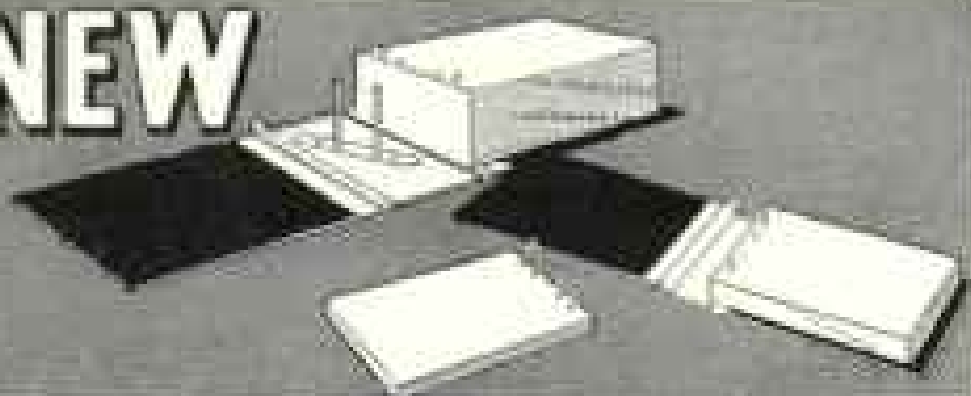
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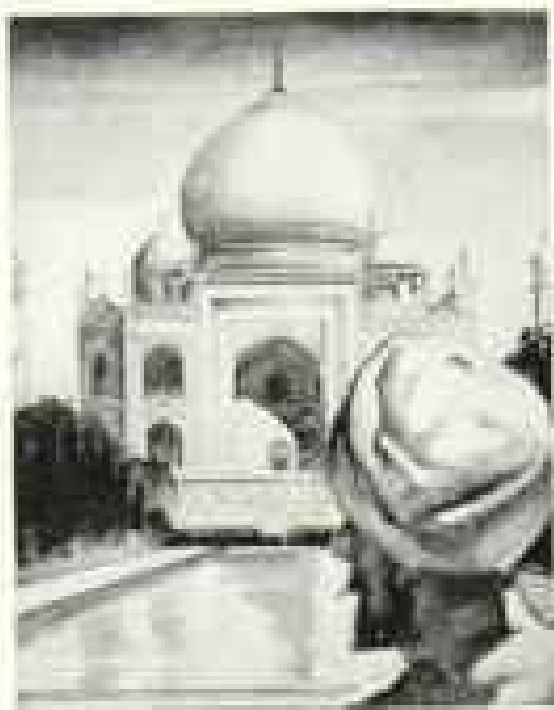
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# INDIA

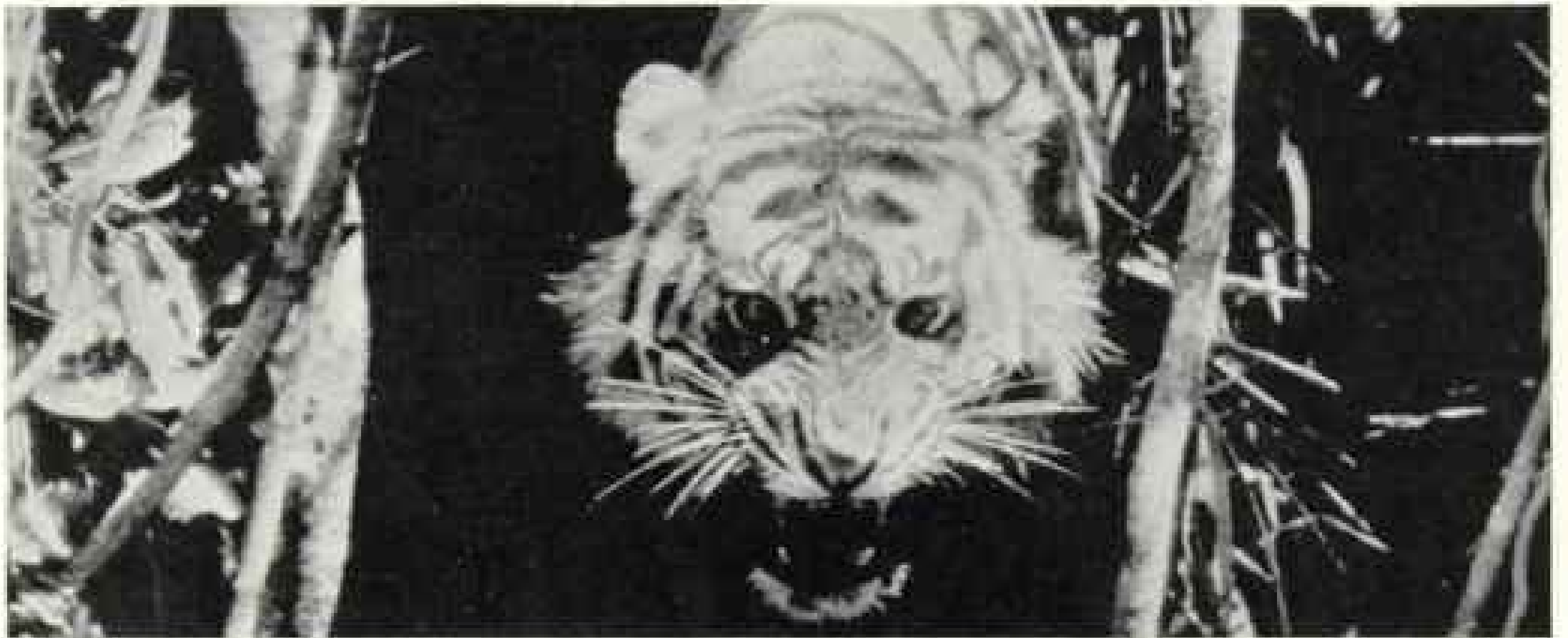
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and adventures in capturing wild life, which your *NATIONAL GEOGRAPHIC MAGAZINE* will bring to you with many "on the spot" photographs.

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You may use the form below, or you may nominate by letter if you prefer not to cut this page. Your cooperation will help to keep geography a living, fascinating subject for young and old.

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Secretary, National Geographic Society, \_\_\_\_\_ 1937  
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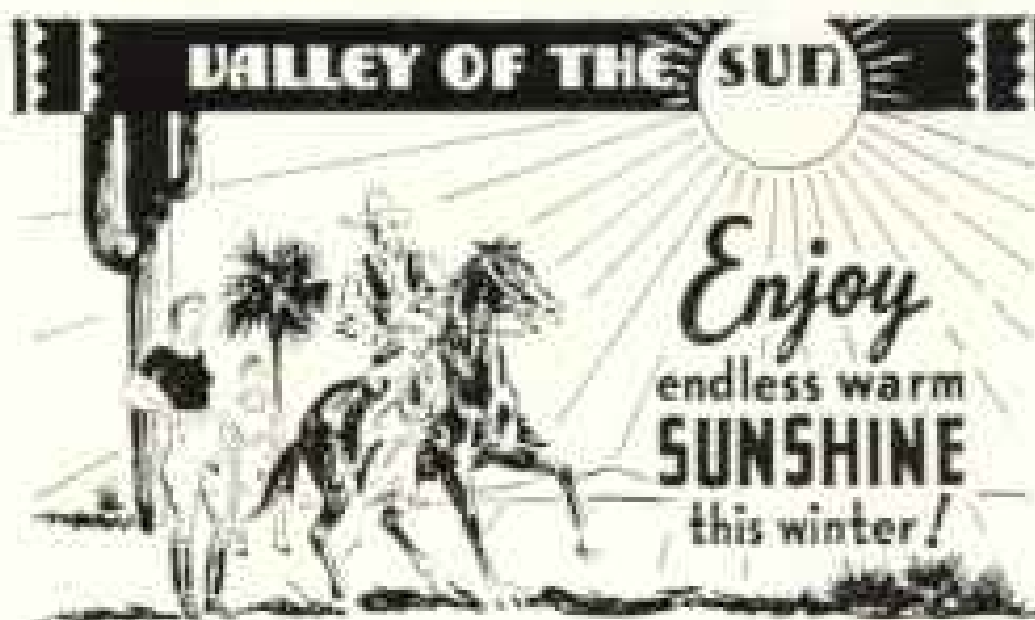
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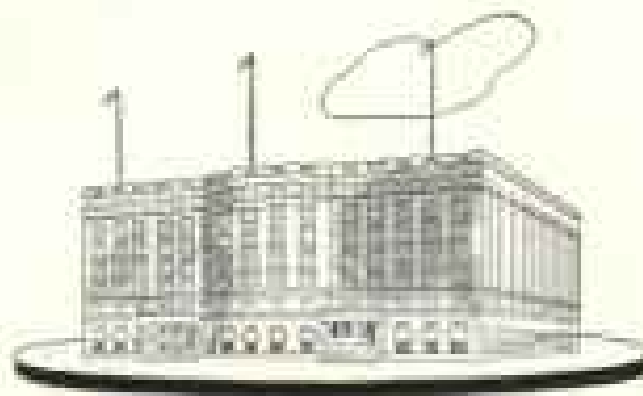
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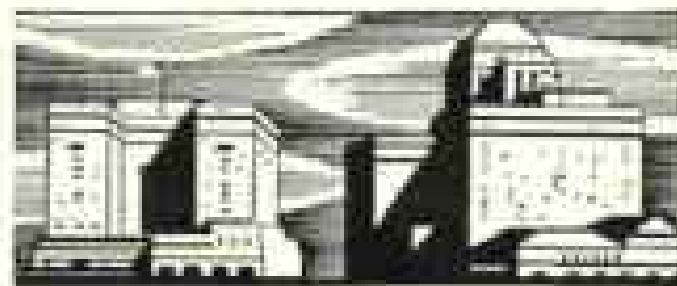
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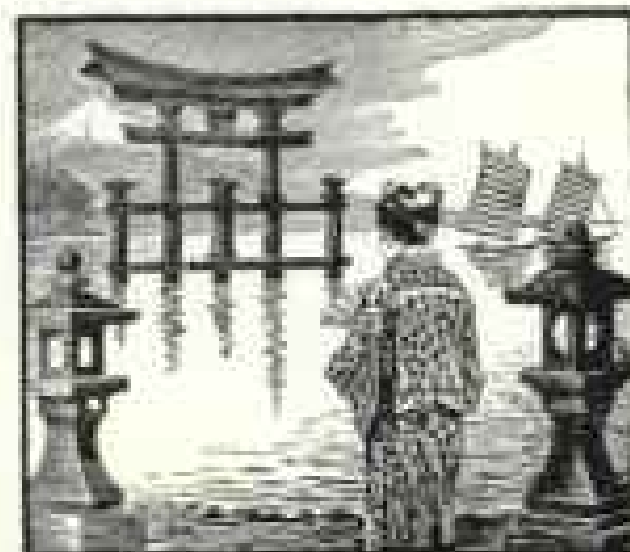
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touch with stores and friends and office—by telephone. The cost is but a few cents a day. In return, the telephone offers you increasing measure of security, convenience, happiness and achievement.

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What would you have done, if you had stood in the shoes of young Charles Martin Hall in Oberlin, Ohio in 1886, just after he had discovered the process for the commercial production of aluminum?

You would have had a great vision of the usefulness of the new metal and of the possibilities of large financial returns. But you would have had no money, no influence, no one to be of assistance.

You would have looked for help, wouldn't you? Hall did. He found in Pittsburgh a group of young men who had a few thousand dollars, much courage, and a lot of enterprise.

Hall had his patent and his fine talents; he persuaded the six young men to put in their money. Some of them also contributed their personal services. Together they formed a company.

It was the natural thing for such venturesome young men to do. But the process of incorporation did not change the fact that they were still just a group of earnest young men fired with an idea.

After many heartaches they produced and sold a few pounds of the new metal. For a long period, business came in almost pound by pound. But eventually there came a time when the days weren't long enough for these few men to do all the work. So they engaged others to help them.

Some went to work

to find ways to make aluminum stronger and harder. Others worked to improve production methods so the price could be lowered.

Some made a specialty of devising new ways to use aluminum, and others became salesmen demonstrating the new uses.

That is a brief word-picture of the growth of this or almost any other large manufacturing company; each man's value multiplied by what his associates are doing; each man aided by the physical facilities provided by the company. The contagious enthusiasms of group action are what cause companies to grow.

This is exactly how and why we have grown year by year since 1888.

Literally, we had to grow, for it now takes 23,500 of us to make sure that more than

5,000 companies in more than 200 industries get the best aluminum we know how to make. Every man and woman in the United States is benefited in some way every day by the fact that aluminum has been made capable of doing some special thing better than it can be done by any other material. That is the real accomplishment of the aluminum industry.

We are interested in conducting our own part of the aluminum business profitably. Therefore, we are interested in the continued growth of the manpower and facilities necessary to make our product still more useful,

