

VOLUME LXV

NUMBER ONE

THE NATIONAL GEOGRAPHIC MAGAZINE

JANUARY, 1934

CONTENTS

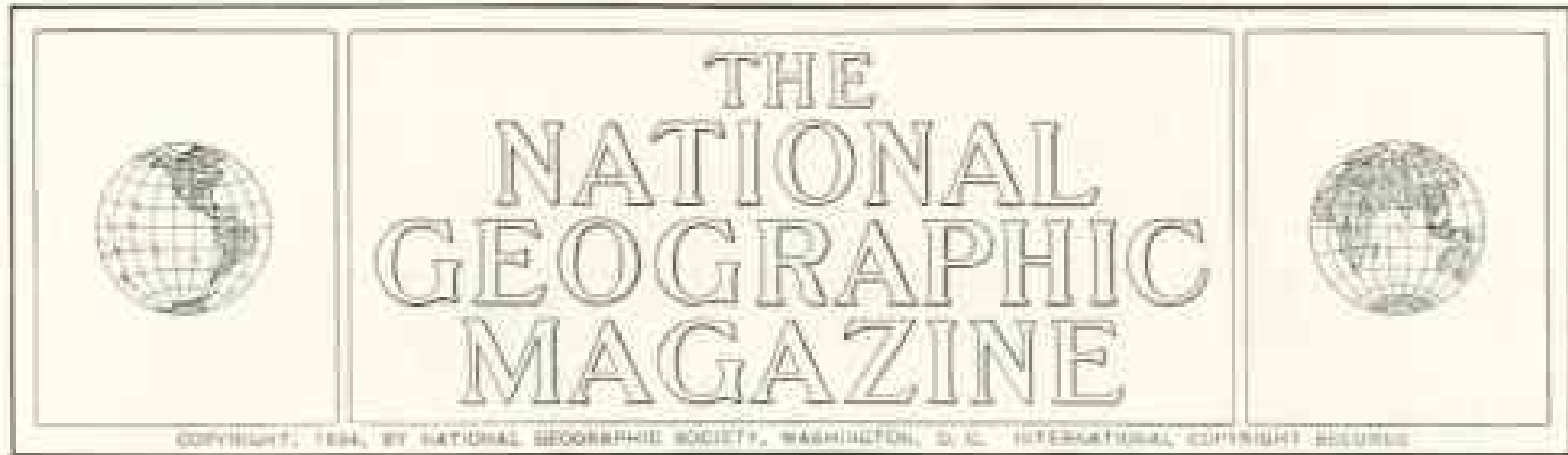
SIXTEEN PAGES OF ILLUSTRATIONS IN FULL COLOR

- Our National War Memorials in Europe
With 25 Illustrations JOHN J. PERSHING
"The Glory of Their Deeds"
11 Natural Color Photographs W. ROBERT MOORE
Three-Wheeling Through Africa
With 65 Illustrations JAMES C. WILSON
Tropical Fish Immigrants
With 8 Illustrations WALTER H. CHUTE
Rainbow Denizens of the Aquarium
16 Natural Color Photographs EDWIN L. WISHERD
A Forgotten Valley of Peru
With 22 Illustrations ROBERT SHIPPEE

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

\$3.50 A YEAR

50c THE COPY



OUR NATIONAL WAR MEMORIALS IN EUROPE

BY JOHN J. PERSHING

General of the Armies of the United States

CHAIRMAN, AMERICAN BATTLE MONUMENTS COMMISSION

WHEN the thunder of cannon ceased along the battle front on that historic day of November 11, 1918, and peace came again to the war-spent world, more than 80,000 members of the American Expeditionary Forces had valourously given their lives to the cause.

To-day 30,880 of them sleep in beautiful and peaceful cemeteries in the areas where they were engaged and stately monuments mark the chief theaters of American activity.

In order that the gallant achievements and noble sacrifices of our troops might be suitably commemorated, the American Battle Monuments Commission was created by an act of Congress approved March 4, 1923. Those now serving with me on the Commission, appointed by the President, are Robert G. Woodside, Vice Chairman; David A. Reed, John Philip Hill, D. John Markey, Finis J. Garrett, Mrs. Henry Fenimore Baker, and Maj. X. H. Price, Corps of Engineers, U. S. Army, Secretary. It has been both an honor and pleasure to have been associated with them in the development of the extensive memorial project that has now become a realization.

TOWERING MONUMENTS AND ENDURING SHRINES

Eight memorial chapels, of singular beauty and dignity, now stand in the eight American military cemeteries in France, Belgium, and England. Eleven monuments rise on the principal American battlefields and at certain chief bases of our operations. Two of these, one at Brest and

the other at Gibraltar, have been built in tribute to the achievements of our Navy's World War forces (see Color Plate VI and illustrations, pages 6 and 15).

In size and design the battlefield monuments range from the towering Doric shaft, topped by a statue, on the dominating hill of Montfaucon, to the simple, effective monument, near the town of Ypres, with its low lines blending with the plains of Belgium.

The imposing monument on Hill 204, near Château-Thierry; the majestic circular colonnade on Montsec, in the St. Mihiel region (see Color Plates IV and V), and the other memorials in their size are proportionally representative of the strategical importance and greatness of the operations conducted in those areas by American military forces.

On many of these monuments have been inscribed the names of places where the troops engaged in heavy fighting. Orientation tables assist the visitor in identifying these positions on the landscape, and maps engraved on the walls indicate the progress of the offensives, as well as the divisions which took part. Decorative features also show the insignia of the divisions and larger units, types of equipment used by the American soldiers, and the coats of arms of the United States and Allied nations.

The chapels in the military cemeteries likewise vary widely in design. Each is a gem of architectural beauty and an enduring shrine consecrated to the memory of those who fell in battle. On their walls are carved the names of the 1,289 men



Photograph from *Wide World*

GOLD STAR MOTHERS ABOARD THE S. S. "GEORGE WASHINGTON"

In four years nearly 7,000 mothers and widows of American soldiers have journeyed to France as guests of the United States Government.

whose final resting places are unknown and of all those whose marble headstones bear the inscription, "Here rests in honored glory an American soldier known but to God." This inscription, prepared by the Commission, was afterward engraved on the tomb of the Unknown Soldier in Arlington National Cemetery.

At each of the cemeteries beautiful and comfortable reception rooms have been established near to or in connection with the caretaker's offices for the convenience of visitors and those desiring information regarding the soldier dead.

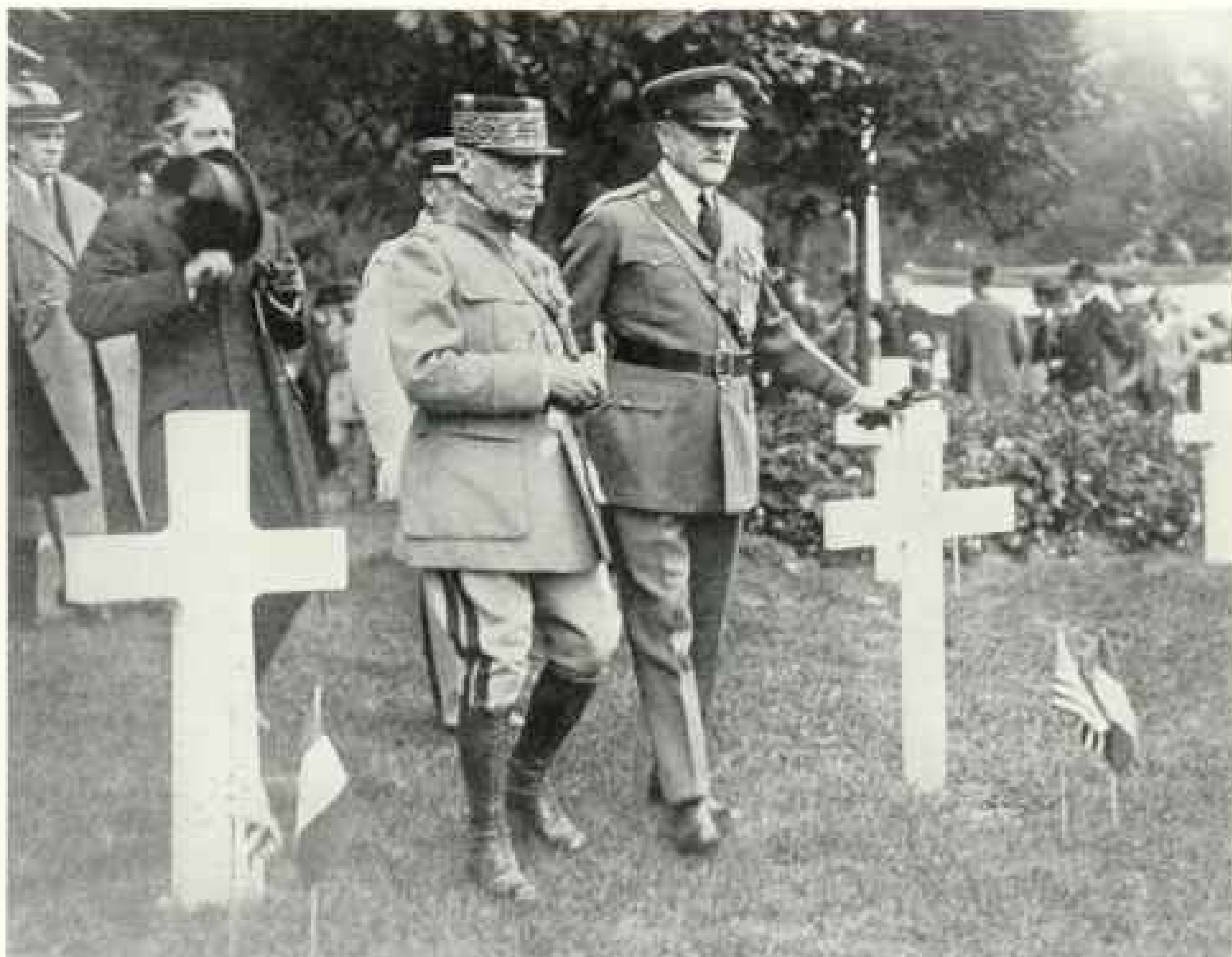
All of the memorials were designed by carefully selected American architects of note, whose work has more than justified the confidence that the Commission has reposed in them. Each memorial, too, was planned with full consideration of the inherent beauty of the particular position it occupies. In every case infinite care has been exercised in the selection of the quality and in the utilization of the stone, marble,

and other materials that have gone into their construction.

THREE MAJOR THEATERS OF ACTION

The high standards and perfection of detail attained in the successful completion of the work are due in great measure to the untiring efforts of Major Price, who has been in active charge of the work in Europe since 1927; of Dr. Paul P. Cret, the Commission's consulting architect; and the following officers of the Regular Army who have served from time to time in the European office: First Lieut. Thomas North, F. A.; Capt. H. Jones, C. E.; Maj. D. D. Eisenhower, Inf.; Capt. G. A. Horkan, Q. M. C.; Capt. H. W. Beyette, Q. M. C.; Maj. W. D. Styer, C. E.; First Lieut. R. A. Schow, Inf.; Maj. W. E. Teale, C. E.; Maj. R. G. Moses, C. E.; First Lieut. J. R. Vance, Inf.; Capt. G. F. Hobson, Q. M. C.; and First Lieut. L. J. Rumaggi, C. E.

The general locations of the major bat-



Photograph from Wide World

TWO FAMOUS SOLDIERS HONOR THEIR FALLEN COMRADES

The late Marshal Foch and General Pershing visit the Suresnes Cemetery near Paris. At each grave the French and American colors stand side by side.

field memorials are enduring reminders of the three historic localities on the Western Front where American forces in large numbers engaged in active combat. These are known as the Aisne-Marne, the Meuse-Argonne, and the St. Mihiel battlefields. Only the last named of these areas was in Lorraine, that part of eastern France set aside in the summer of 1917 as the concentration area for the American Army.

The British Army had been established in the northern part of the long battle lines, near the Channel ports, thus protecting its direct line of communication with the British Isles. The French Army protected Paris, the most vital locality in France.

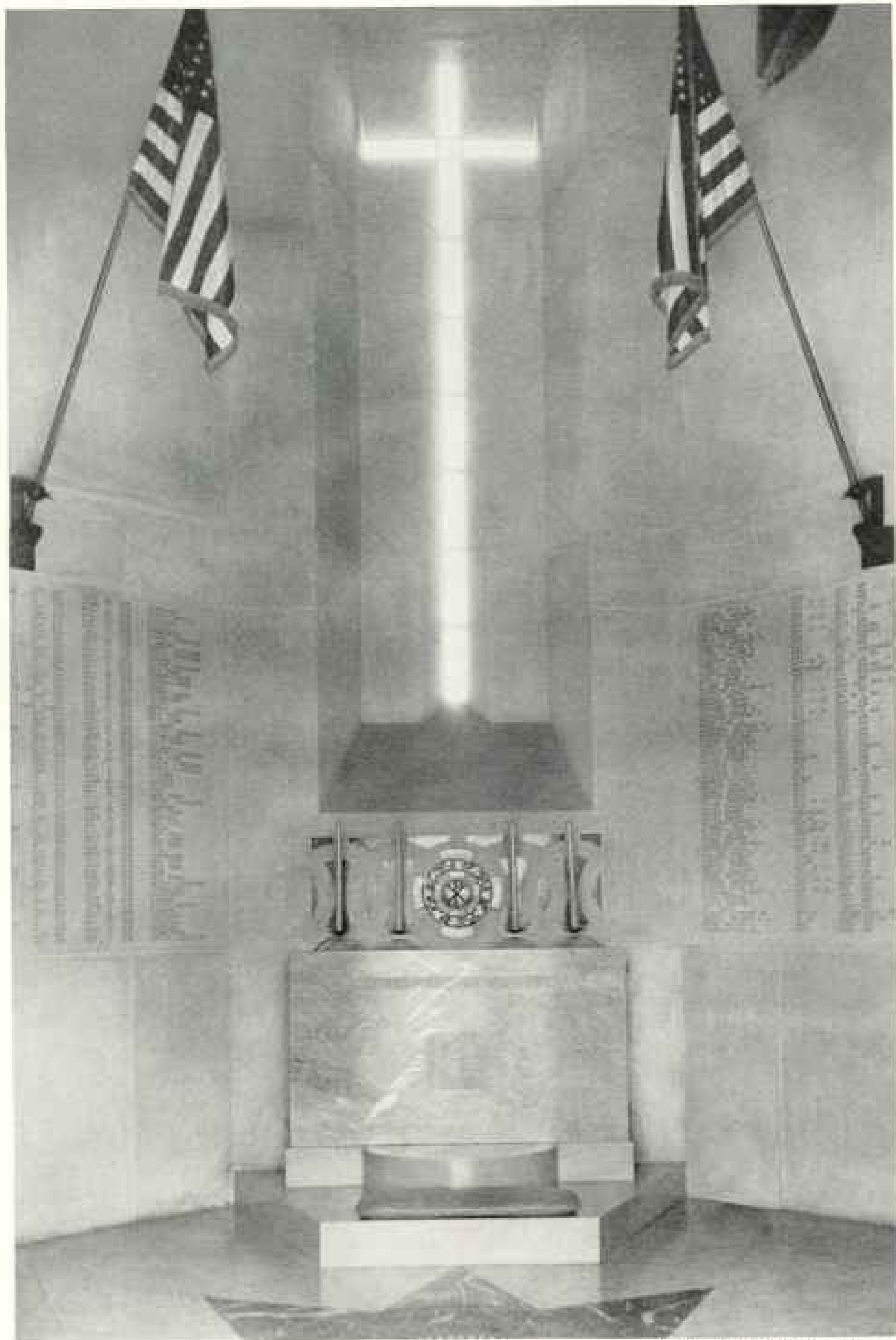
The American Army was assembled well to the east of Paris, where it could be supplied by the railways leading from the comparatively unused South Atlantic ports of France, thus avoiding the congested area around Paris (see map, page 9).

Early in 1918, while the American Army was being built up in this section, the

Germans commenced their series of major offensives. Available American troops were immediately turned over to the Allied Commander in Chief to use as he saw fit. To help stop the enemy drive of May 27, which started north of the Aisne River, American divisions were hurried into line in the vicinity of Château-Thierry, directly across the German line of advance toward Paris.

Other American divisions took part in the great counter-offensive which began July 18, 1918, and within three weeks had driven the enemy to the north of the Vesle River. The American First, Second, Third, Fourth, Twenty-sixth, Twenty-eighth, Thirty-second, Forty-second, and Seventy-seventh Divisions took part in the battles which raged in this vicinity. Of the 300,000 Americans participating in these operations, 64,000 became casualties.

Therefore, on historic Hill 204, rising just west of Château-Thierry, has been constructed an imposing memorial, with



Photograph by W. Robert Moore

THE SUN'S RAYS CREATE A CROSS

Light through a crystal-clear window produces this striking effect in the Bony Chapel (see Color Plates III and V).

twin rows of majestic columns (see Color Plate IV and illustrations, pages 8, 10, and 11).

War has come before to Château-Thierry. The town had its origin in a Gallo-Roman village known as Otmus, and was destroyed by the Huns in the fifth century. Early in the eighth century, Charles Martel, whose victory over the Saracens had given him control of the region, built a castle there as a residence for King Thierry IV.

On many occasions through the passing centuries the castle was damaged and rebuilt. Normans, Danes, the English, and pillaging bands all had their turn at spreading destruction and terror in the vicinity.

JOAN OF ARC KNEW CHÂTEAU-THIERRY

Through the castle's Gate of St. Pierre, the only gate still standing in the historic pile which rises on the hillside, rode Joan of Arc in 1429.*

The site of the monument commands a sweeping view of the Marne Valley, in an area rich in fields of grain, sugar beets, and vineyards, flecked with quaint towns and quiet villages, crisscrossed by little streams.

Here devastation stalked with the progress of battle. Every town was a target for artillery. Farms were furrowed with myriads of trenches and subterranean shelters, subsoil was turned up over formerly fertile land, fields were implanted with barbed wire and sown with shell fragments.

To-day most of the towns are restored, the refuse of the battlefield has been cleared away, and the countryside is as peaceful as it was when the famous native son of Château-Thierry, Jean de La Fontaine, according to tradition, sat under a shade tree on this very hill, now called "204," and wrote many of his immortal fables.

There would be little in this vicinity in years to come to remind American pilgrims of the heroic deeds of their countrymen who fought in the Aisne-Marne region were it not for the monument and the two American military cemeteries.

One is located at the northern side of the hill on which stands the famous Belleau Wood. The other is near Fère-en-Tardenois, just north of the Ourcq River (see Color Plates I and VII).

In the Aisne-Marne Cemetery at Belleau

nearly 2,300 marble crosses and stars form curving rows around the base of the hill, while from the center of the hillside rises the chapel of tranquil beauty.

The Oise-Aisne, near Fère, is the second largest of the American cemeteries abroad, with 6,012 battle dead resting within its confines.

Built in the form of a curving colonnade, and flanked at the ends by a chapel and a museum, the memorial possesses a distinctive charm. Here color is dominant. The walls of pink and gray sandstone and the many-hued French and Italian marble columns form a striking frame for the exterior altar of highly polished golden granite from the Côte d'Or. In the four medallions above the columns, and just beneath the commemorative inscription, the modern soldier is contrasted with the medieval Crusader. All of the decorative sculpture is characteristically Romanesque in style, but modern in subject. Thin sheets of onyx have been utilized for windows in the chapel and museum.

YANKEES ATTACK AT ST. MIHIEL

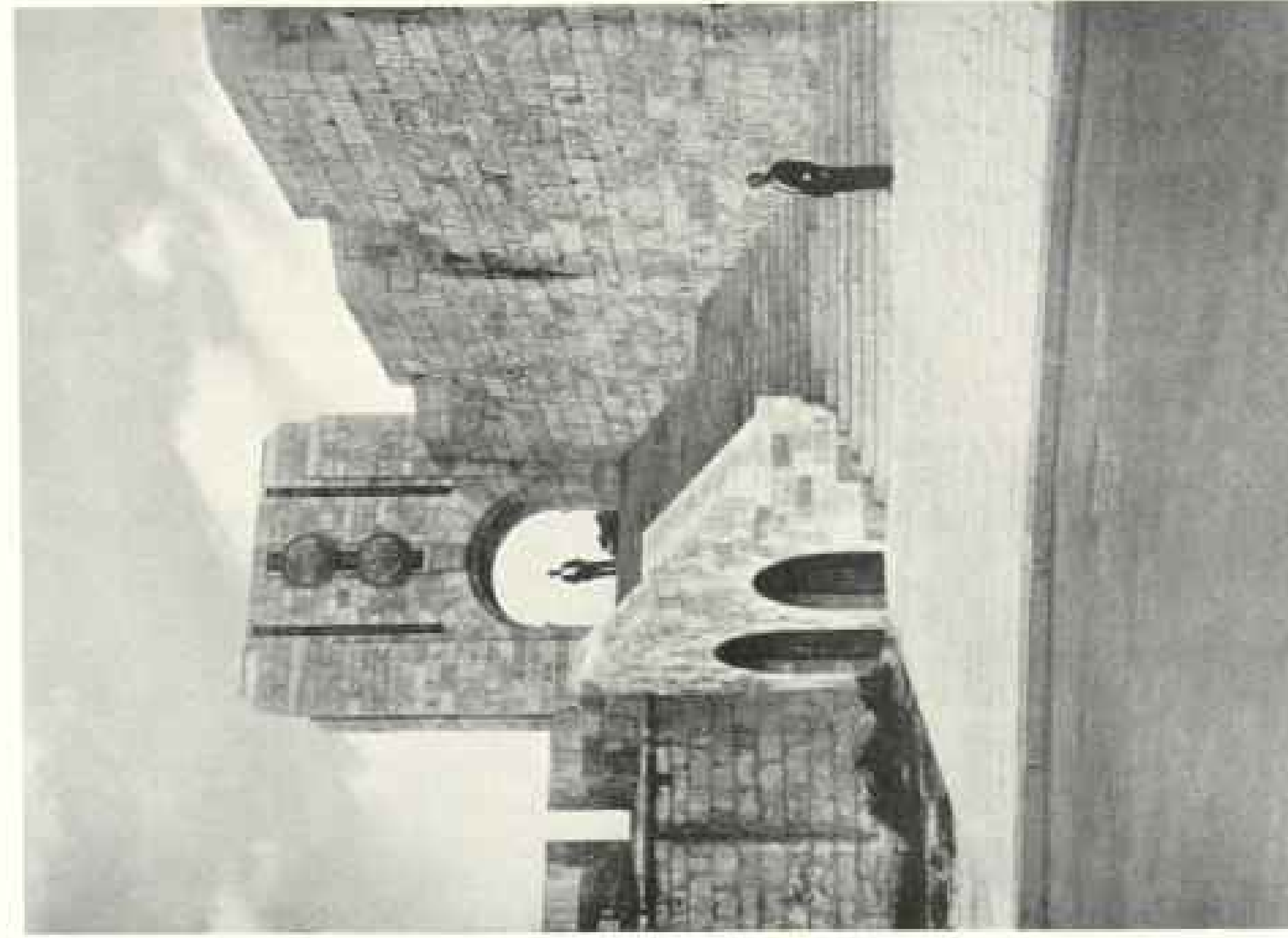
The first operation of a complete American Army as an independent unit in the World War was the attack of September 12, 1918, in the St. Mihiel region, which lies southeast of Verdun, between the Meuse and Moselle Rivers.

German attacks early in the war had driven a wedge between Verdun on the Meuse and Pont-à-Mousson on the Moselle. The apex of the wedge included St. Mihiel, about 20 miles south of Verdun. This sector, occupied by the Germans for about four years, was the St. Mihiel salient.

A study of a map will show how geography generally determines the strategy of war as well as the commerce of peace time. The environing hills to the east and west dictated that the main attack should be delivered northward. The First, Second, Fourth, Fifth, Twenty-sixth, Forty-second, Seventy-eighth, Eighty-second, Eighty-ninth, and Ninetieth Divisions took part in the offensive, in which approximately 550,000 Americans were engaged.

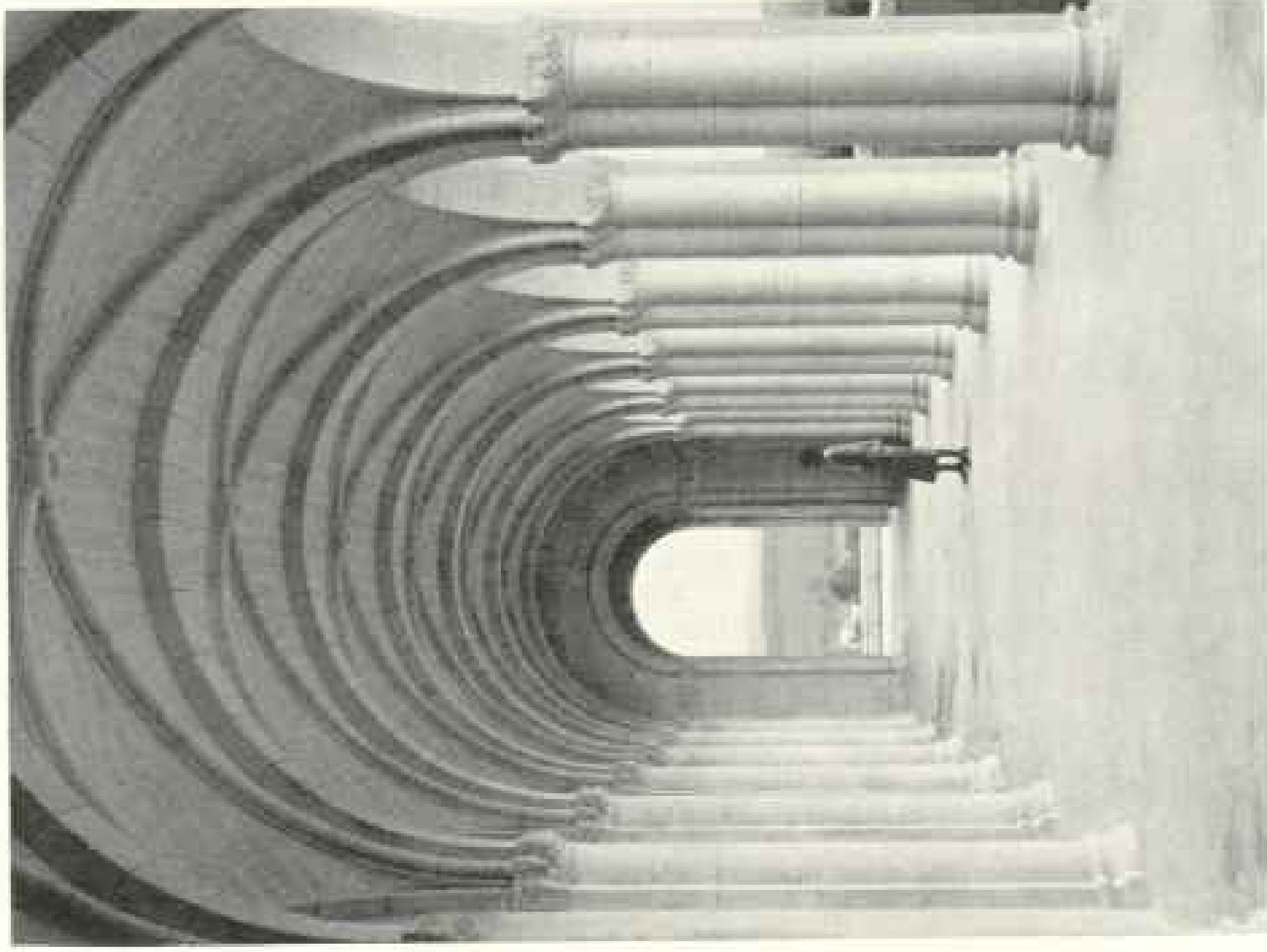
The American Second Army was organized in this region a month afterward, in October, 1918, and later the Seventh, Twenty-eighth, Thirty-third, and Ninety-second Divisions undertook a general attack in the direction of Metz. The signing of the Armistice halted that battle.

* See "The Maid of France Rides By," by Inez Buffington Ryan, in the NATIONAL GEOGRAPHIC MAGAZINE, November, 1932.



TO THE MEN WHO FOUGHT AT SEA

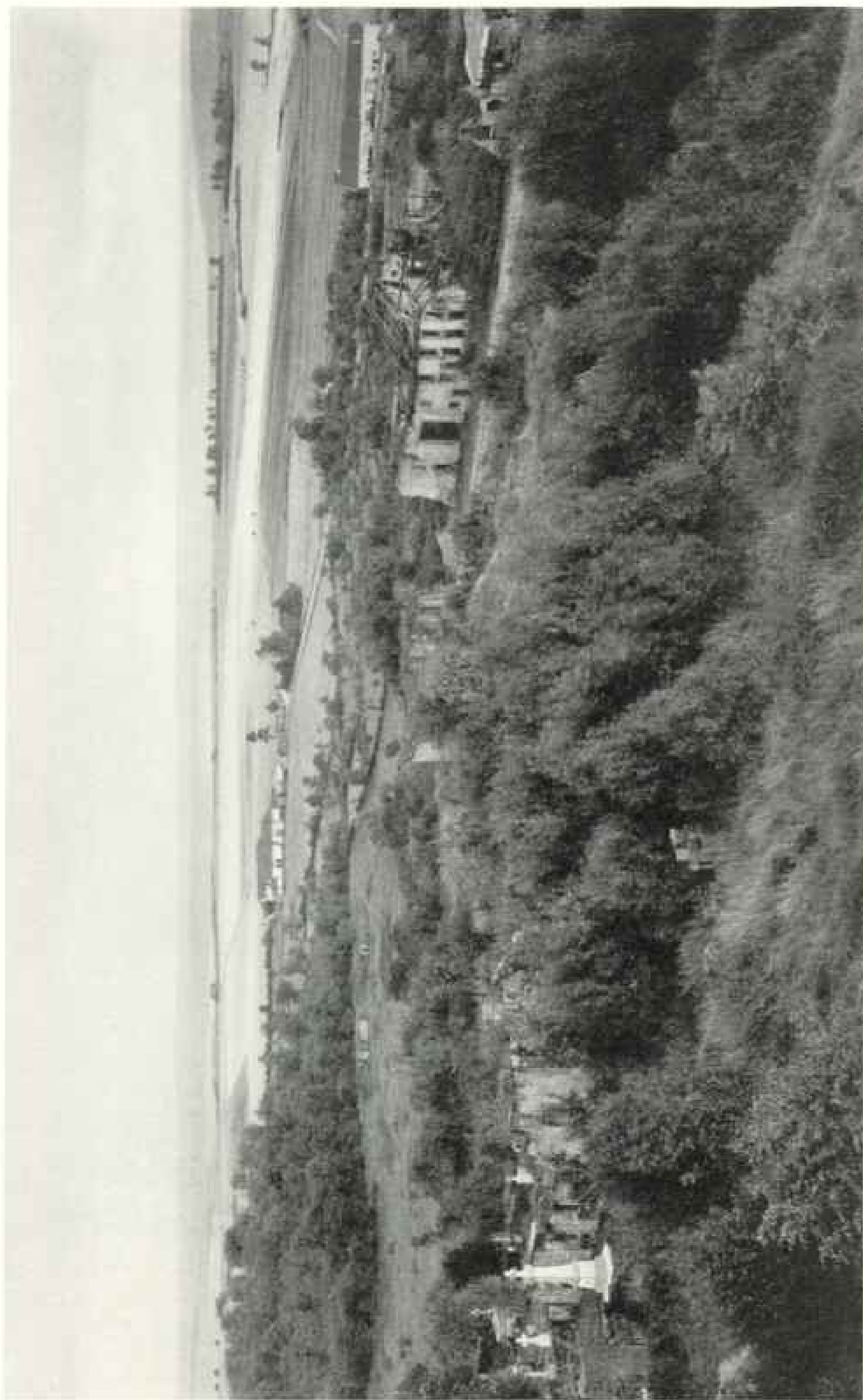
At Gibraltar, wartime base of many an American raid on U-boats, this masonry archway and flights of steps have been built to commemorate activities of the United States Navy in this locality. The photograph was taken from the naval yards side, below the town. The architect, Paul P. Cret, of Philadelphia.



Photograph from American Battle Monuments Commission

ROLLS OF SOLDIERS "KNOWN BUT TO GOD"

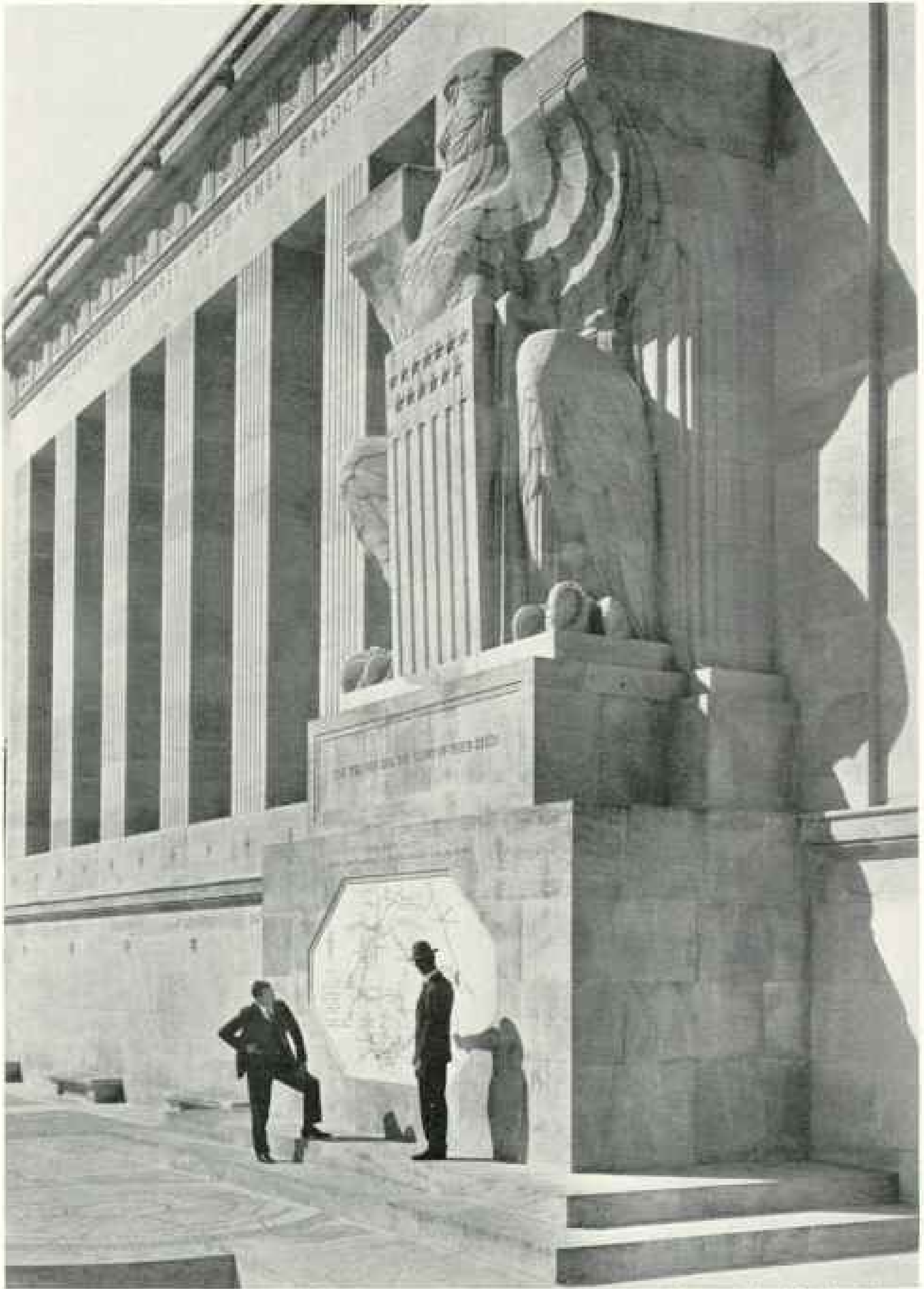
This pillared promenade is one of the loggias of the chapel in the Meuse-Argonne Cemetery near Remagne-sous-Montfaucon. Fourteen panels in the back walls speak in recognition of 883 American soldiers who fell in the Meuse-Argonne and whose final resting places are still unknown (see Color Plates II and III).



Photograph from American Battle Monuments Commission

THE COUNTRYSIDE STILL BEARS THE BRANDS OF WAR

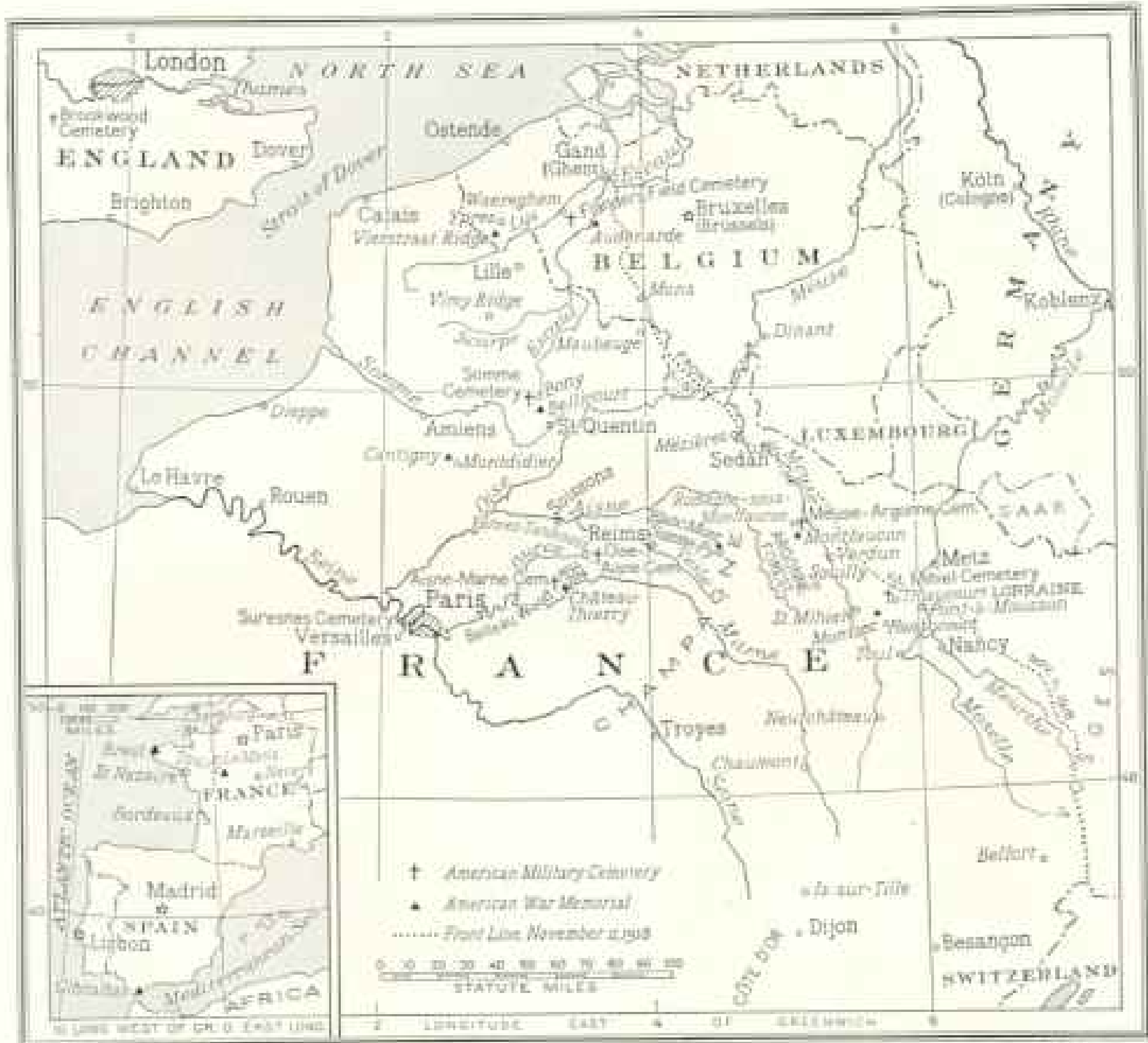
Graves and ruins stand like grim reminders of the conflict, as one looks southeastward from the hill of Montfaucon, around which swirled some of the fiercest fighting of the Meuse-Argonne Offensive (see text, page 25, and illustration, page 12).



Photograph by W. Robert Moore

BATTLE DETAILS GRAPHICALLY PORTRAYED

On the east face of the Château-Thierry Monument on Hill 204, the American eagle and shield rise above an engraved map and an orientation table which indicates the valley, towns, and centers of severe encounter (see Color Plate IV and illustrations, pages 10 and 11). At the left, along the base, appear the names and insignia of divisions and corps which participated.



Drawn by James M. Dastley

ALONG THE WESTERN FRONT TO-DAY

This map shows how memorials to the deeds of the American Expeditionary Forces are distributed in Europe as a result of the efforts of the American Battle Monuments Commission, under the chairmanship of General John J. Pershing. The American cemeteries also are shown.

These operations, and the services of American units in the quiet sectors to the southeast and in the Vosges Mountains, are commemorated by an imposing memorial on the isolated hill, Montsec, located a few miles east of St. Mihiel and lying close to the southern face of the salient, in the area liberated by the American offensive of September 12 (see Color Plate V and illustration, page 14).

For miles around it dominates the landscape, yet when one passes between the pylons and mounts the steps leading to the topmost flight of the approach, the majesty and impressiveness of the monument assume even more surprising proportions.

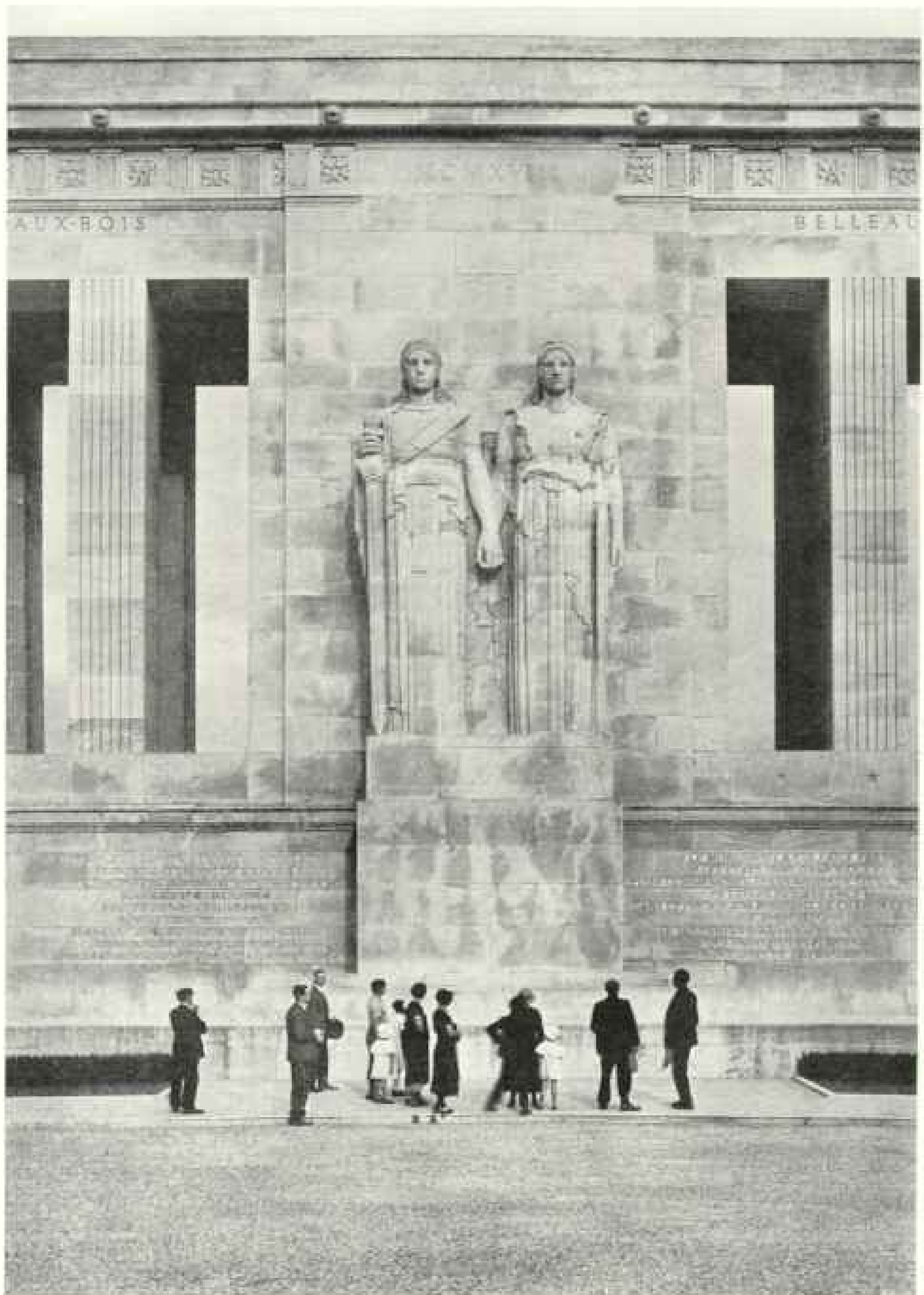
Girdling the structure above the mighty columns is a frieze, which includes the

names of some of the places where Americans had intense fighting. The central feature within the circle of columns is a large bronze relief map of the triangular-shaped St. Mihiel region, and on its borders are small key maps in colored porcelains, with decorative motifs into which have been worked the insignia of the larger units of the American Army.

The American and French units which took part in these important offensive operations are listed on the attic wall.

A MIGHTY STRONGHOLD FALLS

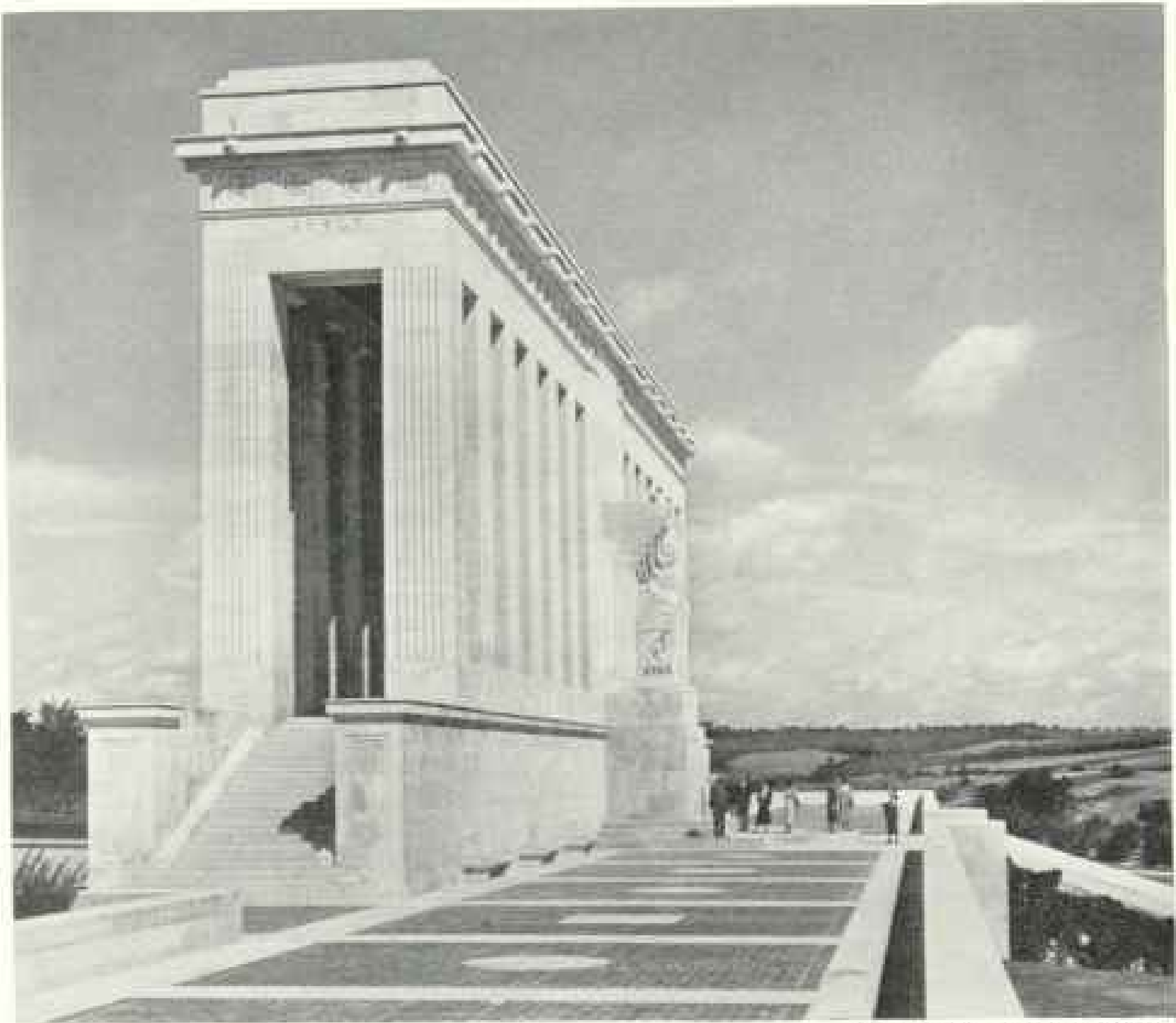
The old road of the Romans passed by Montsec; here, on this hill, they established a military camp where lived the troops who guarded the historic route. In 1914 it was



Photograph by W. Robert Moore

SHOULDER TO SHOULDER

As the French and American troops had pressed forward side by side in the fiercely contested Marne salient, so two figures of heroic size, symbolic of the two Nations, stand with hands clasped at the front of the Château-Thierry Monument. Above the columns are inscribed the names of places where the fighting was intense.



Photograph by W. Robert Moore

AMERICANS ENSHRINED IN ABODE OF FRANCE'S OWN IMMORTALS

On the hill above Chateau-Thierry, where in centuries past Joan of Arc donned her armor and La Fontaine wrote his fables, stands this monument to the valor of American soldiers in 1918 (see Color Plate IV and illustrations, pages 8 and 10, and text, page 5).

captured by the enemy, and because of its natural strength and the facilities afforded by its imposing height of more than 400 feet above the surrounding plain, it became a very important point of their defense system. On the southeast side the hill was heavily wired and entrenched, and on the opposite slope tunnels led to underground billets and to observation posts, from which the fire of their artillery was controlled. Some of the remnants of these still remain.

How different from the panorama of peaceful agricultural activity now unfolded from this height was that dramatic scene revealed at 1 o'clock in the morning of September 12, fifteen years ago, when the countryside was dotted with flashes of flame, as nearly three thousand pieces of artillery belched forth a violent bombardment! Hundreds of thousands of shells

crashed into the hostile battery emplacements, observation posts, communication centers, and trenches. A well-laid smoke screen hovered around Montsec to prevent enemy observers from seeing and reporting details of the American advance.

Expecting an attack on this sector, the enemy, a few hours before, had begun a retirement and the creation of a 10-mile-wide band of devastated territory. The great weight and suddenness of the attack, however, caught the enemy by surprise, and the scheme came to naught. More than 200 square miles of territory were restored to France, the railroads in the vicinity were cleared, and the threat of the salient against surrounding territory was removed.

Of the orientation arrows around the outer edge of the platform on the Montsec



Photograph by W. Robert Moore

A NEW "STATUE OF LIBERTY" OVERLOOKS A FAMOUS BATTLEFIELD.

On the hill of Montfaucon, northwest of Verdun, towers this 175-foot column of granite, surmounted by a figure symbolic of Liberty. Marking a strategic point in the Battle of the Meuse-Argonne, where the bulk of American military power was concentrated, it is the largest of the battle-monument projects undertaken by the United States in Europe. The architect, John Russell Pope, of New York.



VISITING THEIR BOYS' GRAVES WITH A DISTINGUISHED ESCORT

General Pershing shows Gold Star Mothers through the Aisne-Marne Cemetery at Belleau on Memorial Day, 1930. The American Graves Registration Service was charged with the duty of conducting them from place to place and with caring for the cemeteries and memorials.

Monument, none bears the significance of the one which points northeast toward Thiaucourt. There, a little more than eight miles away, the marble chapel and the 4,152 headstones of the St. Mihiel Cemetery gleam white, as the sunshine strikes them through openings in the drifting clouds (see Color Plate VIII and illustration, page 26).

Here, at Thiaucourt, is the third largest of the American military cemeteries. The graves lie in a large rectangular area, cut by tree-bordered walks and beds of flowers. At one end stands a cross-shaped monument, on the front of which is a compelling statue depicting the typical youthful American soldier, with trench helmet in hand and side arms and canteen slung on his waist and shoulder.

THE DRIVE THAT ENDED THE WAR

At the north end, beyond the eagle-shaped central sundial of stone, stands the chapel, an open, circular colonnade, or

peristyle, flanked by a chapel room and a museum. The chapel interior contains richly colored mosaics, which include, above the carved altar, the Angel of Victory.

On the museum wall is featured a large map, of inlaid marble, showing the American operations in the St. Mihiel salient. Polished black marble tablets, which panel the side walls, bear in gold letters the names of the men who engaged in the attack and still are unidentified or missing. In the center of the peristyle is a large urn, carved from a single block of granite. Pegasus, the winged horse, which appears on the front of it, represents the soul in flight.

When Marshal Foch decided on a mighty convergent movement against the enemy armies in the autumn of 1918, he planned for an American-French operation between the Meuse River and Reims, directed at Sedan and Mézières, on the railroad that formed the vital connection between the German armies in eastern France and those



Photograph by W. Robert Monte

A NEW GENERATION VISITS A HISTORIC SPOT

These French boys were unborn when the Americans launched their successful surprise attack on the St. Mihiel salient on September 12, 1918. They pause at the base of the flagpole in front of the majestic monument erected on Montsec to commemorate this and other heroic achievements in the region. The dominating hill, now topped by this memorial, was a key position of the German defense (see Color Plate V).

in Belgium. The French and British were to break through the Hindenburg Line between the Oise and the Scarpe and drive for that railroad at Maubeuge. A third attack was to be made by French, British, and Belgian troops at the left end of the line for the purpose of clearing the Belgian coast.

This mighty drive on all sectors moved forward victoriously to the Armistice.

The Meuse-Argonne region, just west of the Meuse River, was the dramatic theater of offensive combat by the main body of American troops. While our First Army here was driving forward toward Sedan, other American divisions took important parts in the French attack toward Mézières, in the crushing of the Hindenburg Line

near St. Quentin and in freeing the Belgian ports.

The Champagne district, center of the French drive, lies between Reims and the Argonne Forest. A monument to the activities of our troops—the Second, Thirty-sixth, Forty-second, and Ninety-third Divisions—in this area stands on Blanc Mont, near Somme-Py, an elevated position of strategic importance which the opposing forces had held since 1914 (see page 33).

HILL ON WHICH THE KAISER STOOD

Here, it is reported, the Kaiser and General Ludendorff had watched from an observatory their ill-fated attack of July 15, 1918, on which they had desperately staked their last hope for victory.



Photograph by W. Robert Moore

LIKE A WATCHTOWER ATOP THE OLD CITY WALLS

A massive arch on a cobbled street in Brest forms an impressive frame for the naval monument overlooking the famous port of debarkation. The lofty shaft honors the sea forces, through whose efforts a steady stream of men and supplies poured into Brest in the later stages of the war. Stairs in the interior of the monument lead to the top (see Color Plate VI).

Numerous lines of trenches and concrete machine-gun posts were built in the south slope for the protection of the hill. Many of them are still there; even the entrances to the tunnels and the air shafts remain, revealing how the forces had burrowed into the chalky stone to provide bomb-proof underground quarters.

A deep feeling of tribute to American bravery wells up as one looks at the monument of golden-colored stone standing in the midst of this desolation, where bits of gas masks, pieces of leather, and shell carriers still strew the chalky banks of the un-filled trenches.

Blanc Mont, Médéah Farm, Machault, Souain, Séchault, and other names engraved on the monument are of dramatic import.

The observation platform at the top of the memorial affords a good view of the surrounding country. On clear days one can see the lofty commemorative shaft of Montfaucon, 27 miles away.

Between Paris and northern Belgium the areas where American troops were engaged in battle are rather widely separated.

Just north of St. Quentin, in the region of the Somme, the American Twenty-seventh and Thirtieth Divisions, forming our Second Corps, went into the front line with the British Army to attack the formidable Hindenburg Line.

On this part of the front the Hindenburg Line followed roughly along the St. Quentin Canal, and made use of that obstacle as a primary feature of its defense system. For more than three miles the canal flows through a historic tunnel, which the enemy converted into a huge underground shelter and storehouse.

They dug comfortable bomb-proof rooms into the tunnel walls, and by means of numerous passageways maintained communication with their machine-gun nests and trenches above ground. Canal boats, tied up in the tunnel, afforded other living quarters and a fully protected magazine for supplies.

Altogether, it was one of their strongest places of defense, but on September 29, when the offensive was launched, the famous Hindenburg Line cracked under the blow. Both American and British losses, however, were severe.

Other American units—the Thirty-third and Eightieth Divisions and the Sixth and Eleventh Engineer regiments—also served

with the British Armies in this part of France.

TO "VALOR" AND "REMEMBRANCE"

The monument commemorating these several activities stands atop the ridge directly over the tunnel that links the Somme and Escaut (see illustration, page 27). This old subterranean water route was begun back in 1769 and, after several interruptions, was completed, in 1810, at the order of Napoleon I.

On the front of the monument is a shield of the United States, surmounted by an American eagle. On either side of this is a figure, one representing Valor, the other symbolic of Remembrance. The opposite face of the monument bears a carved map showing the zone of action of the American Second Corps, and below it on the terrace is a table indicating directions and distances to various places visible in the vicinity.

The Somme American cemetery is located near Bony, not far distant (see Color Plates III and V). At its lower end a simple, effective chapel has been dedicated to those who sleep here. On the outer walls of this structure, the only one of the Commission's projects to display a modernistic trend in architecture, are carvings of military equipment used by the forces.

Within, past the heavy bronze doors, is a room octagonal in shape. The walls bear the rolls of the missing and unknown dead, and above the marble altar is a cross-shaped window of crystal glass, which shines in illuminated radiance against the subdued interior (see illustration, page 4). Light entering the stained-glass windows, that bear the insignia of the various divisions of the American forces, heightens the color in the star-shaped motives of multi-hued marble used for the floor.

Some 40 miles in airline distance southwest of this Somme district lies the little crossroads town of Cantigny.

When the hostile troops made their great attack of March 21, 1918, they drove into the Allied lines a salient southeast of Amiens. When the attack was halted, the enemy line included, near the tip of the salient, this tiny village of Cantigny. Here the First Division went into line in April, 1918, and a month later made the first American divisional attack of the war. Cantigny was captured and held in the face

"TIME WILL NOT DIM THE GLORY OF THEIR DEEDS"



© National Geographic Society

Finlay Photograph by W. Robert Moore

A POEM IN STONE MARKS A SCENE OF STRIFE

At Belleau Wood, wrested from the Germans in the teeth of fierce machine-gun fire, stands this chapel of French Romanesque design, watching over the Aisne-Marne Cemetery. Above the portal is carved a Crusader in armor, flanked by shields of the United States and France. Trench scenes and articles of military equipment decorate the pilaster capitals at the door and window openings. The architects, Messrs. Cram and Ferguson, of Boston.

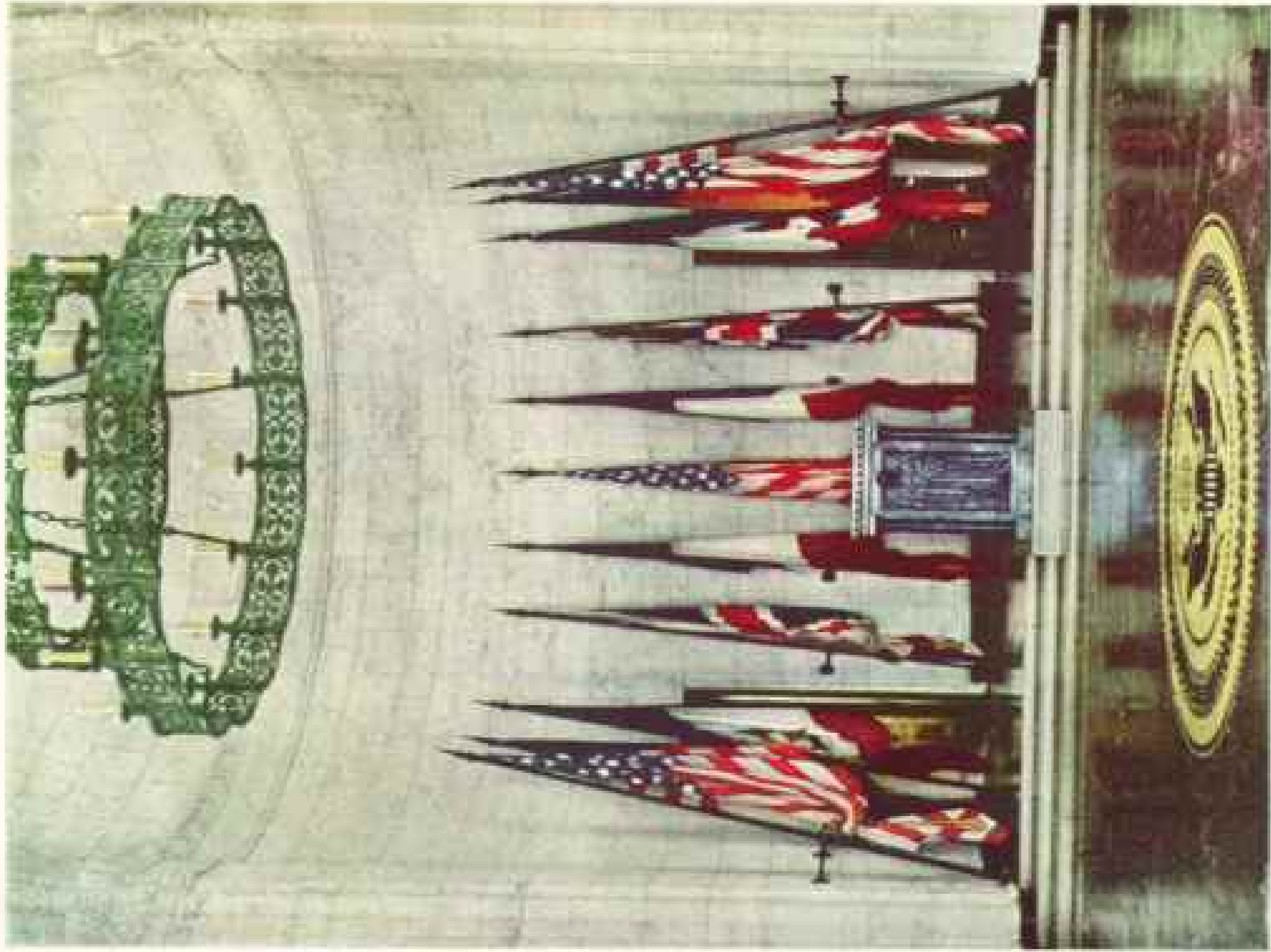


© National Geographic Society

FOR THEM "THE WAR-DROM THROBB'D NO LONGER."

Thousands who fell in the major offensive of the Meuse-Argonne repose in the largest of their country's cemeteries in France, near Romagne-sous-Montfaucon. More than 14,200 white marble crosses, and stars of David for the Jewish soldiers, stand row on row. Chapel architects, Messrs. York and Sawyer, of New York,

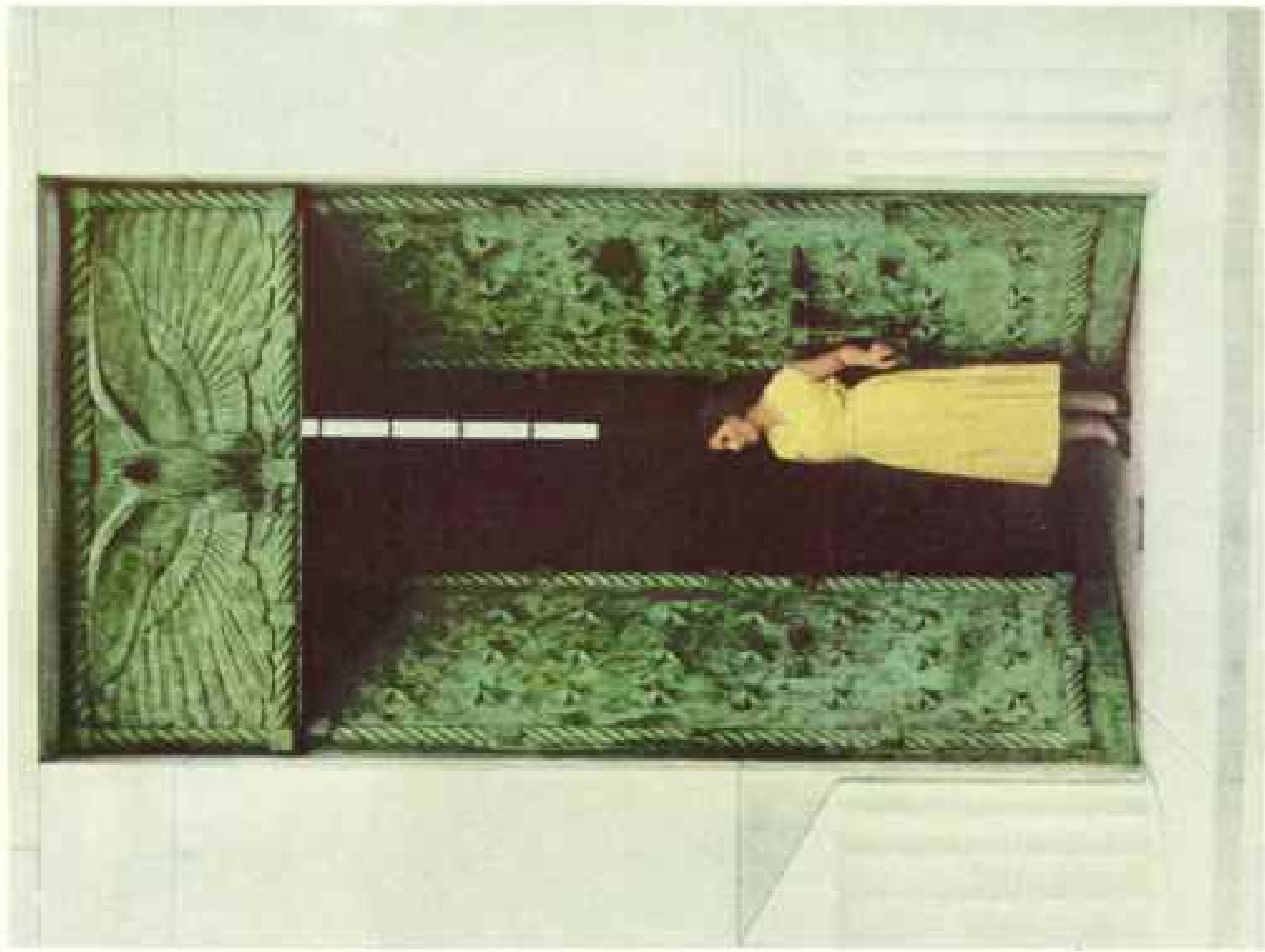
Finlay Photograph by W. Robert Moore



© National Geographic Society

"AND THE BATTLE-FLAGS WERE FURLED"

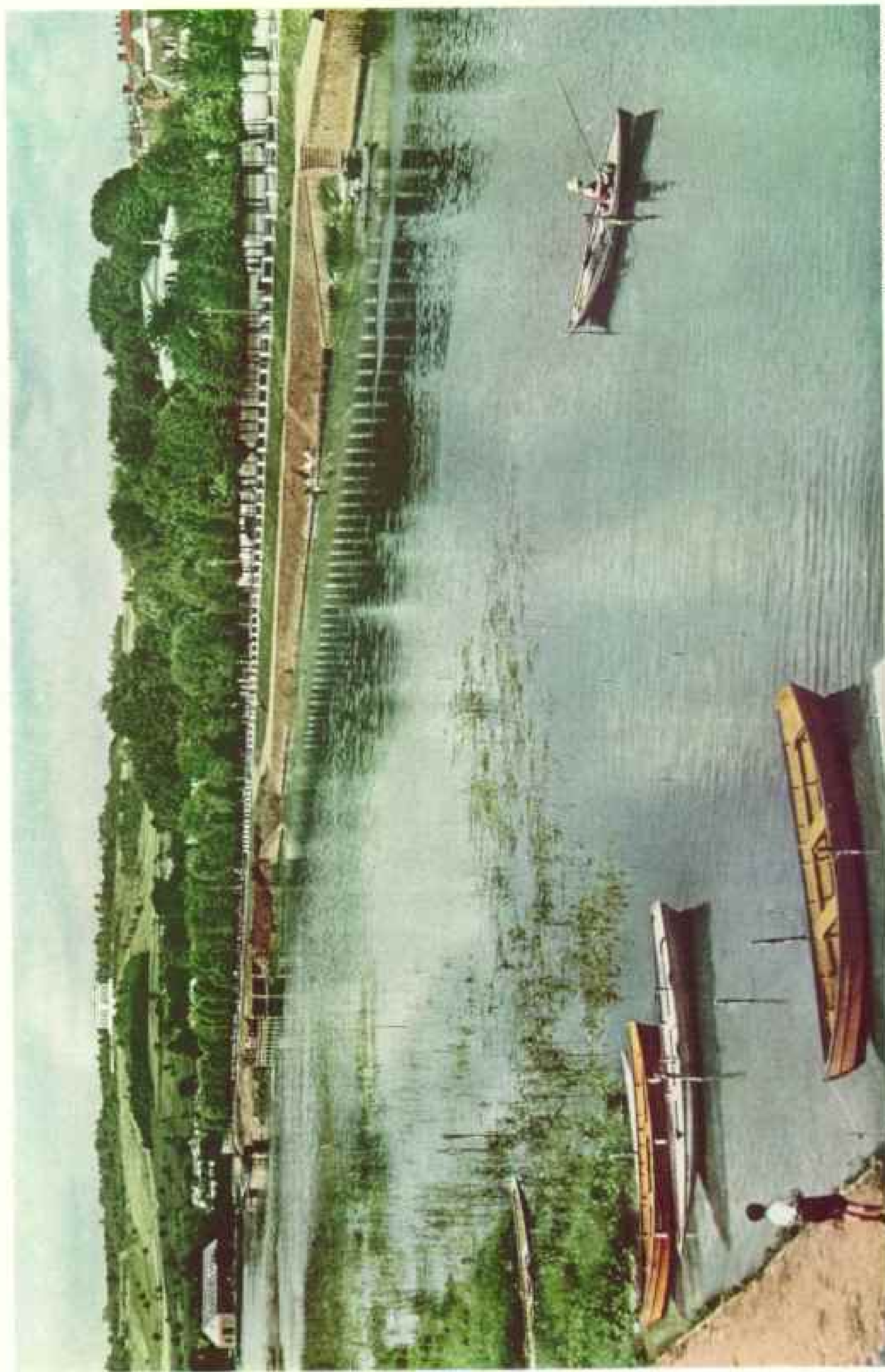
Colors of the principal Allied nations stand behind a simple altar of carved marble in the Romagne Chapel, largest of the American cemetery memorials (see Color Plate I).



Finlay Photographs by W. Robert Moore

THE EAGLE GUARDS A SHRINE OF VALOR

Executed in antique bronze, with his wings full spread, he hovers over the massive, star-studded portals of Bony Chapel (see Color Plate V). The architect, George Howe, of Philadelphia.



© National Geographic Society

Fisley Photograph by W. Robert Moore

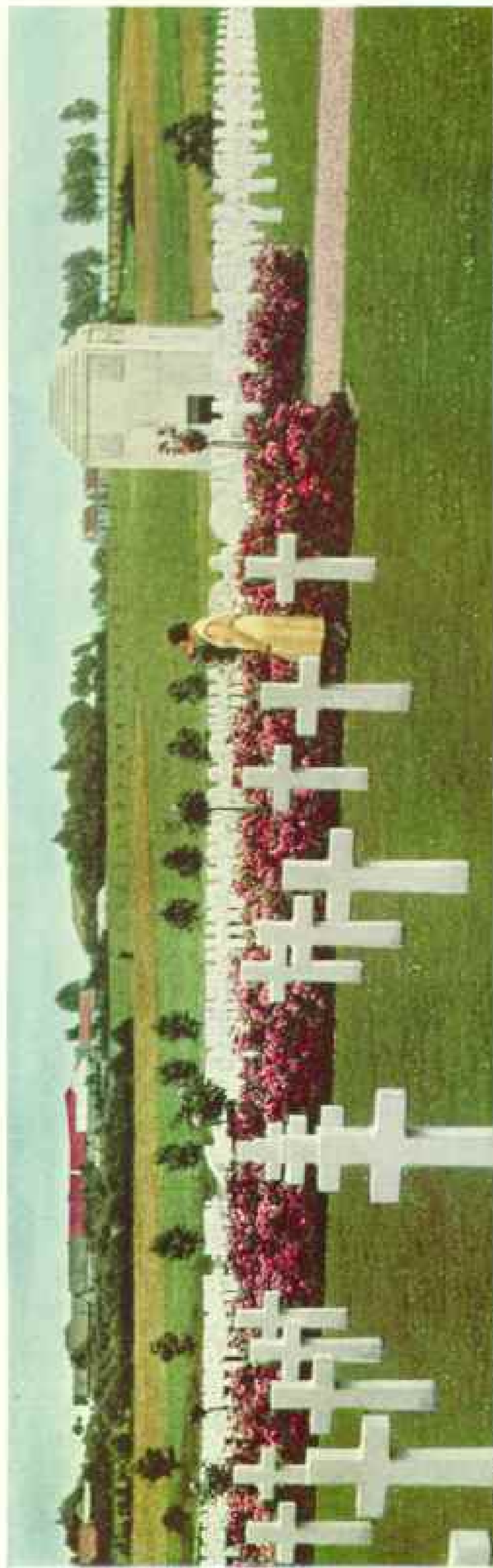
THE CHÂTEAU-THERRY MONUMENT LOOKS DOWN UPON THE MARNE.

Its double colonnade, crowning historic Hill 204, is seen in the distance from a bridge across the quiet river. Dr. Paul P. Cret, who designed this and several of the other memorial structures, also has acted as consulting architect for the American Battle Monuments Commission.



PASTORAL PEACE NOW BEIGNS BENEATH THE LOFTY MONTESEC BATTLE MONUMENT

In the bitterly contested St. Mihiel salient near Rambucourt, agriculture is overgrowing the scars of war, but the circular Doric colonnade on the far horizon recalls the past. The architect, Egerton Swartwout, New York.



© National Geographic Society

THEY HELPED BREAK THE HINDENBURG LINE

Americans killed in the indomitable assaults upon the German Army's strongly fortified positions in the Somme region rest in this flower-filled cemetery near Bony. At the right is the somewhat modernistic chapel dedicated to the 1,833 soldiers who lie here (see Color Plate III). Chapel architect, George Howe, of Philadelphia.

Friday Photographs by W. Robert Moore

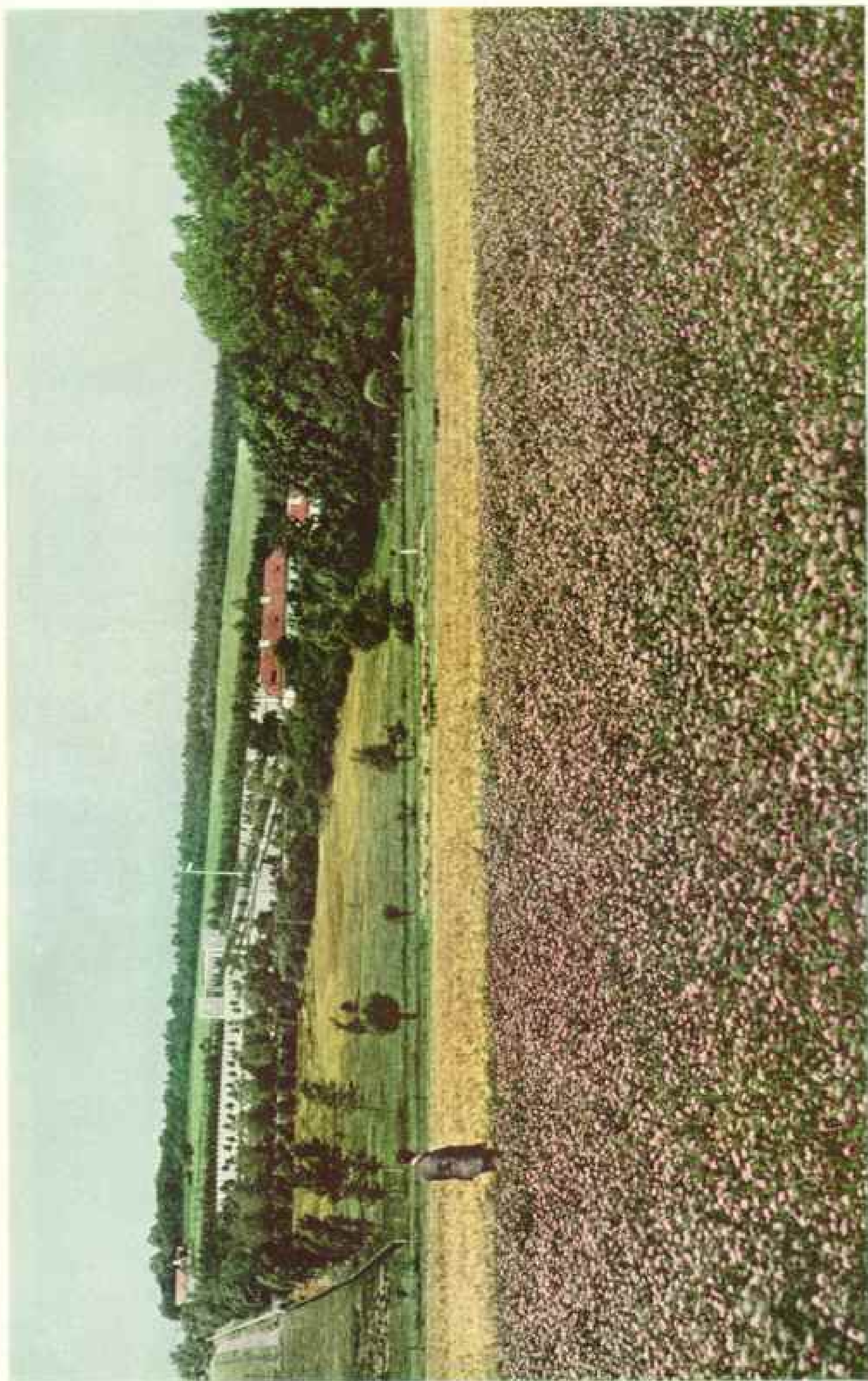


© National Geographic Society

AT BREST A NAVAL MONUMENT SOARS ABOVE THE HARBOR

In tribute to the wartime services of the American and French fleets, this rectangular shaft rises 145 feet above the lower terrace and 100 feet above the weathered walls of the old city fortifications. Its top commands a sweeping panorama of the port where many of the two million soldiers of the American Expeditionary Forces first trod the soil of France. The architect, Ralph Milman, Chicago.

Finlay Photograph by W. Robert Moore



© National Geographic Society

Pinlay Photograph by W. Robert Moore

IN A BATTLEFIELD BRIGHT WITH BLOSSOMS LIES THE PÈRE-LACHAISE CEMETERY

Across a waving field of clover appears this American military burial ground, second only to the Menes-Arrotme Cemetery in size. A majority of the 6,012 resting here fell in the drive across the near-by Ourcq River and between here and the Oise. At the upper end of the cemetery plot of sleeping land, won by sharp encounter, stands the chapel of varicolored stone. Chapel architects, Messrs. Cram and Ferguson, Boston.



HERE SLEEP THE AMERICAN HEROES OF ST. MIHIEL.

"Time Will Not Dim the Glory of Their Deeds."

Thus reads the inscription on the large stone sundial, carved in the form of a resting American eagle, which stands in the cemetery at Thiaucourt. Chapel architect, Thomas Harlan Ellett, of New York.



© National Geographic Society

Finlay Photographs by W. Robert Moore

JUST OUTSIDE PARIS IS BIVOUACKED ANOTHER SILENT LEGION

At Suresnes, on the slopes of Mont Valérien, adjacent to the fortifications of the same name, sleep 1,541 of America's sons, many of whom died in hospitals in or near Paris. The memorial chapel, in early Colonial style, overlooks the Valley of the Seine. Chapel architect, Charles Platt, of New York.

of determined counter-attacks. A simple memorial now stands in a little park area in the center of the village, commemorating the victory (see illustration, page 34).

To the north, in Belgium, there were two American battle areas. One was near battle-wrecked Ypres, where the Twenty-seventh and Thirtieth Divisions participated in an advance in the opening phase of the Ypres-Lys Offensive of August, 1918. The memorial, a stone monolith resting on a low terrace, stands on Vierstraat Ridge, on ground that previously had changed hands several times in heavy fighting. A dedicatory inscription in English, French, and Flemish, together with two bayonets in relief and a helmet resting on a wreath, gives tribute to the troops in the sharp encounter. The architect was George Howe, of Philadelphia.

FLANDERS, WHERE THE POPPIES GROW

In October, when the Allied offensive was in progress, the American Thirty-seventh and Ninety-first Divisions were sent to Belgium. Starting some distance to the west of Audenarde (Oudenaarde), they attacked to the eastward, and, except for a short period of rest, continued operations until the Armistice. Now, in a shady park in this venerable town of Audenarde, once celebrated for its lovely tapestries, stands the monument commemorating the advance of the two American divisions. The architect was Harry Sternfeld, of Philadelphia.

In the peaceful Flanders Field Cemetery, near Waereghem, rest nearly 400 men who fell in these two operations in Belgium. Masses of fragrant flowers bloom along the pathways that lead into this octagonal plot of ground where the markers extend out in four symmetrical areas beyond the classic memorial chapel (see illustration, page 32). In summer, here and there red poppies thrust through the soft grass that carpets the sacred soil.

On every sector where they were engaged, the American troops acquitted themselves in heroic manner. In the Meuse-Argonne area, however, where our main body of troops was concentrated, was written the foremost chapter in American military history.

Lying between the heavily fortified and naturally impenetrable Argonne Forest to the west and the strongly defended heights of the Meuse to the east was the towering

hill of Montfaucon. The battle which raged in this region from September 26 until the Armistice was marked by incessant attacks of American divisions and the resolute defense of the enemy. To the latter, retirement would mean the eventual severing of the Metz-Sedan-Maubeuge railway line, the spinal column of activity for troops and supply movement.

Desperate as was the resistance, the constant progress of our troops could not be checked. On November 7 the American Army held the heights overlooking Sedan; the railway was severed. The 60 miles of railroad in the Valley of the Meuse, between Dinant and Mézières, were filled from end to end with a continuous line of freight trains carrying guns, ammunition, engineering equipment, and other military supplies that the enemy had been unable to get past Sedan.

In this battle more than 900,000 Americans participated at one time; during the operations 123,000 were killed, wounded, or missing.

The site selected for the American memorial in this memorable battlefield was on the hill of Montfaucon, the most prominent feature of the terrain.

A SHAFT IN THE MEUSE-ARGONNE

Largest of the war memorials erected by the United States in Europe, this monument, of rose granite from Baveno, Italy, is in the form of a colossal Doric shaft, which rises 175 feet above the ruins of the wartime village of Montfaucon (see illustration, page 12).

At the top of the shaft is an observation balcony, from which the visitor's eye can scan vast stretches of the Meuse-Argonne battlefield. To the south is the region where the American divisions began their attack, and to the northward is visible the location of the famous Hindenburg Line.

The mighty column is surmounted by a statue symbolic of Liberty.

The dedicatory inscription, made of bronze letters inlaid in the granite, forms a central panel on the main terrace. The names Meuse Heights, Barricourt Heights, Romagne Heights, and Argonne Forest, engraved on the base, recall vividly the localities of severe fighting by the 27 divisions of the First Army, enumerated below them. A series of carvings, giving a brief account of the offensive, together with an illustrative map, feature the interior of the



Photograph by W. Robert Moore

"OLD GLORY" FLUTTERS OVER THE CHAPEL AT THIAUCOURT

Beyond the white marble pillars lie the 4,152 headstones which make the St. Mihiel Cemetery third largest of the United States military burial places in France.



Photograph by W. Robert Moore

ON THE HINDENBURG LINE

The Bellicourt Monument is built over the St. Quentin Canal, which at this point flows through a historic tunnel employed by the Germans as an important feature in the Hindenburg Line defenses (see text, page 16). The figures flanking the American shield at the front of the memorial are representative of Valor and Remembrance. The architect, Paul P. Cret, of Philadelphia.

vestibule, through which access to the staircase is gained.

Montfaucon was the site of an old market town whose origin is believed to date back more than thirteen eventful centuries. The town grew up around a monastery founded by St. Balderic, son of Sigebert I, King of Austrasia.

Like Château-Thierry, the region about Montfaucon has been the scene of many battles. Here Count Eudes (Odo), in June, 888 or 889, with the aid of several nobles, crushed the Normans with awful slaughter. During the Hundred Years' War, the countryside was frequently ravaged by bands of robbers. Again, during the religious wars of the 16th century, the town was sacked and burned. In 1636 the little town was ravaged, and the fire that was started swept all before it save one home.

Kalkreuth and his Prussian troops occupied the place in 1792, during the Valmy campaign.

Finally, in 1914, after the First Battle of the Marne, German troops held the little town, and because of its commanding height

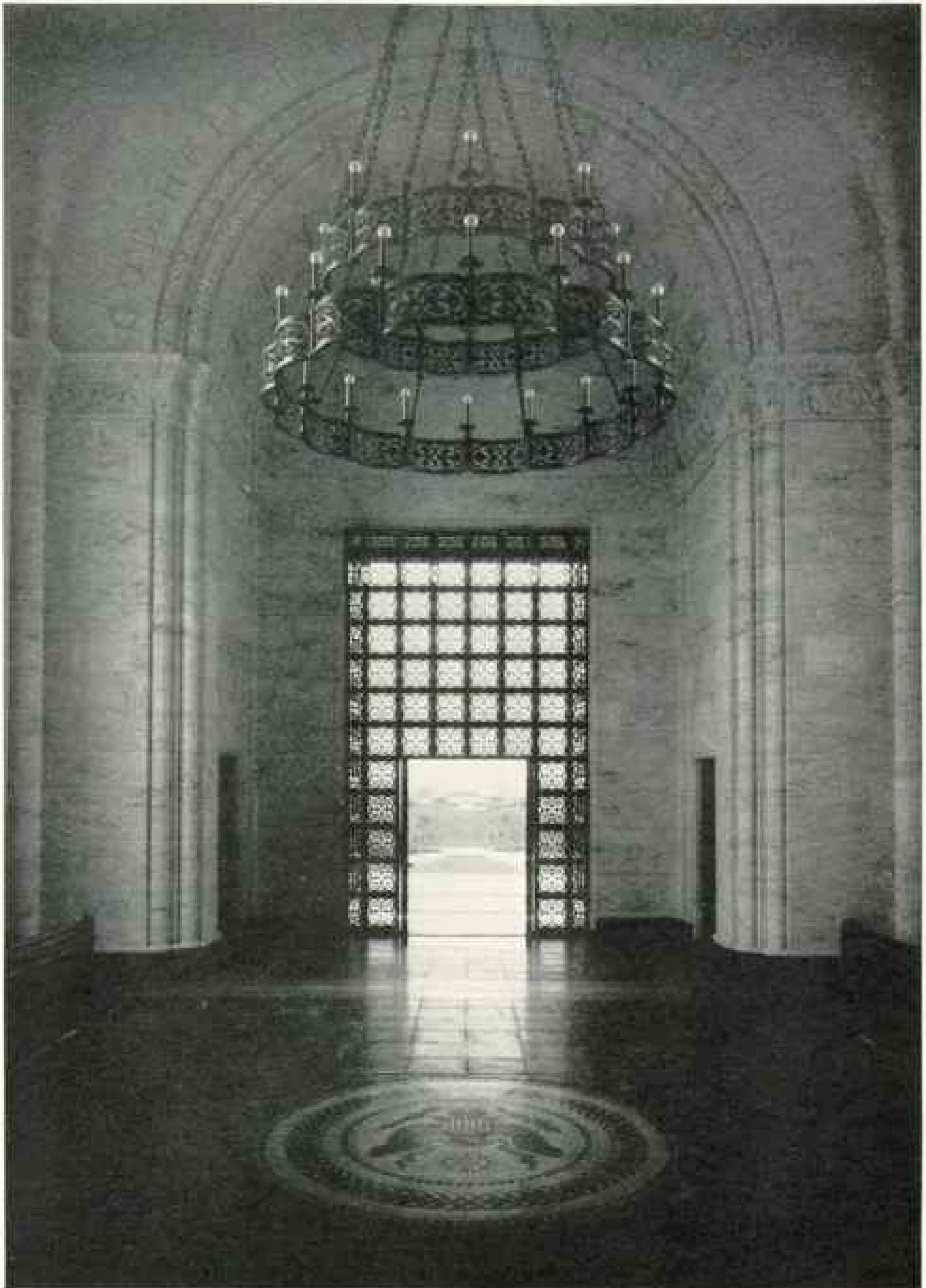
it became an extremely important feature in their scheme of defense.

When our First Army captured it, on September 27, 1918, little remained of the town; four years of bombardment had brought complete destruction.

MARKS OF WAR STILL VISIBLE

A new Montfaucon has been built to the west of the hill. At the base of the American monument, however, the remains of the old church lie in sad ruins. Many of the old bomb-proof shelters, machine-gun emplacements, and other relics of its wartime state still bear mute witness to the thoroughness with which the hill was fortified.

The American cemetery of the Meuse-Argonne is near Romagne-sous-Montfaucon (see Color Plates II and III). The more than 14,200 soldiers who rest on this hillside came from almost every division of the American Expeditionary Forces. Although most of them lost their lives in the Meuse-Argonne Offensive of the First Army between September 26 and November 11, 1918, others were brought here from the



Photograph from American Battle Monuments Commission

AN INTERIOR GLOWS WITH SUBDUED RADIANCE.

Sunlight falling through the bronze entrance screen of the Romagne Chapel in the Meuse-Argonne Cemetery outlines a pattern of finest lace. Over the archway above the chandelier appears this inscription, "God hath taken them unto Himself" (see Color Plates II and III).

area immediately west of the Argonne Forest, from the Vosges Mountains, from occupied Germany, and from Archangel (Arkhangelsk), Russia.

The chapel, which crowns the crest of the ridge, is the largest of the American cemetery memorials and is a beautiful example of modern Romanesque architecture. On the façade, above its striking bronze entrance screen, is the principal decorative detail of the exterior, a sculptural group of figures representing Grief, Fidelity, Remembrance, and Eternal Light. The soft colors of the marble floors blend with the light entering the stained-glass windows (see illustrations, pages 6 and 28).

Doors lead from the chapel proper to the loggias that extend out on either side.

The chapel, landscaping, gateways, and the reception house on the ridge opposite the grave blocks have all been executed with the completeness that befits America's largest military cemetery in France.

Two other cemeteries, one in Suresnes, outside of Paris, and the other at Brookwood, near London, are also places forever American.

At Suresnes the stately pillared chapel stands against a back drop of green foliage on the hillside and affords a splendid view of Paris (see Color Plate VIII and illustration, page 35).

The interior and altar are of colored marbles, illuminated by stained-glass windows, and, in addition to a mosaic on the wall depicting the Angel of Victory laying a tribute on the tombs of the dead, are bronze tablets containing the names of nearly 1,000 men of the Army and Navy who lost their lives at sea.

THEY REST BESIDE BRITISH COMRADES

At Brookwood the American cemetery is part of a large British cemetery established many years ago. Here the American section adjoins one used for British war burials, which contains many of their fallen Colonial forces. The 466 American members who lie here were brought together after the Armistice from various places in England, Scotland, and Ireland, and represent those who died in Great Britain or lost their lives in its surrounding waters.

The color note of the interior of the chapel is effective. The walls are mainly of brownish stone with dark-red marble pillars.

A cross, carved in the wall and gilded,

forms the background to the altar. On these walls appear the names of many members of the Army and Navy who were lost at sea, or died and were given an ocean burial. The architect was Egerton Swartwout, of New York.

THOSE WHO SERVED BEHIND THE LINES

To commemorate the achievements of more than 650,000 members of the A. E. F. who, working behind the lines, made possible the brilliant feats of the men at the front, a memorial fountain has been constructed at Tours, headquarters of the Services of Supply. The architect was Arthur Loomis Harmon, of New York.

On the lower circular basin is carved the dedicatory inscription, and below the upper basin appear in bas-relief the coats of arms of Tours, Brest, St. Nazaire, Le Mans, Is-sur-Tille, Nevers, Neufchâteau, and Bordeaux—French cities where were located American supply depots.

Figures on the upper basin represent Administration, Construction, Procurement, and Distribution, the four principal divisions of the Services of Supply organization connected with fulfilling the requirements of the 2,057,907 American troops who came to European soil.

The crowning feature is a bronze group depicting an American Indian about to release an eagle. This figure recently won a gold medal in architectural competition in the United States.

On the outside of the city hall at Souilly, Meuse, and at the Damrémont Barracks at Chaumont, Haute-Marne, were placed ornamental bronze tablets. The building at Souilly served as headquarters of the American First Army from September 21, 1918, to the end of the hostilities, and from here was conducted the Meuse-Argonne Offensive.

Previously, in 1916, Marshal Pétain, as General Commandant of the Second French Army, had established his headquarters here when directing the Battle of Verdun. It continued to be the center of operations for that army from May 1, 1916, to September 21, 1918, under the successive commands of Generals Nivelle, Guillaumat, and Hirschauer.

TO THE WATCHDOGS OF THE SEA

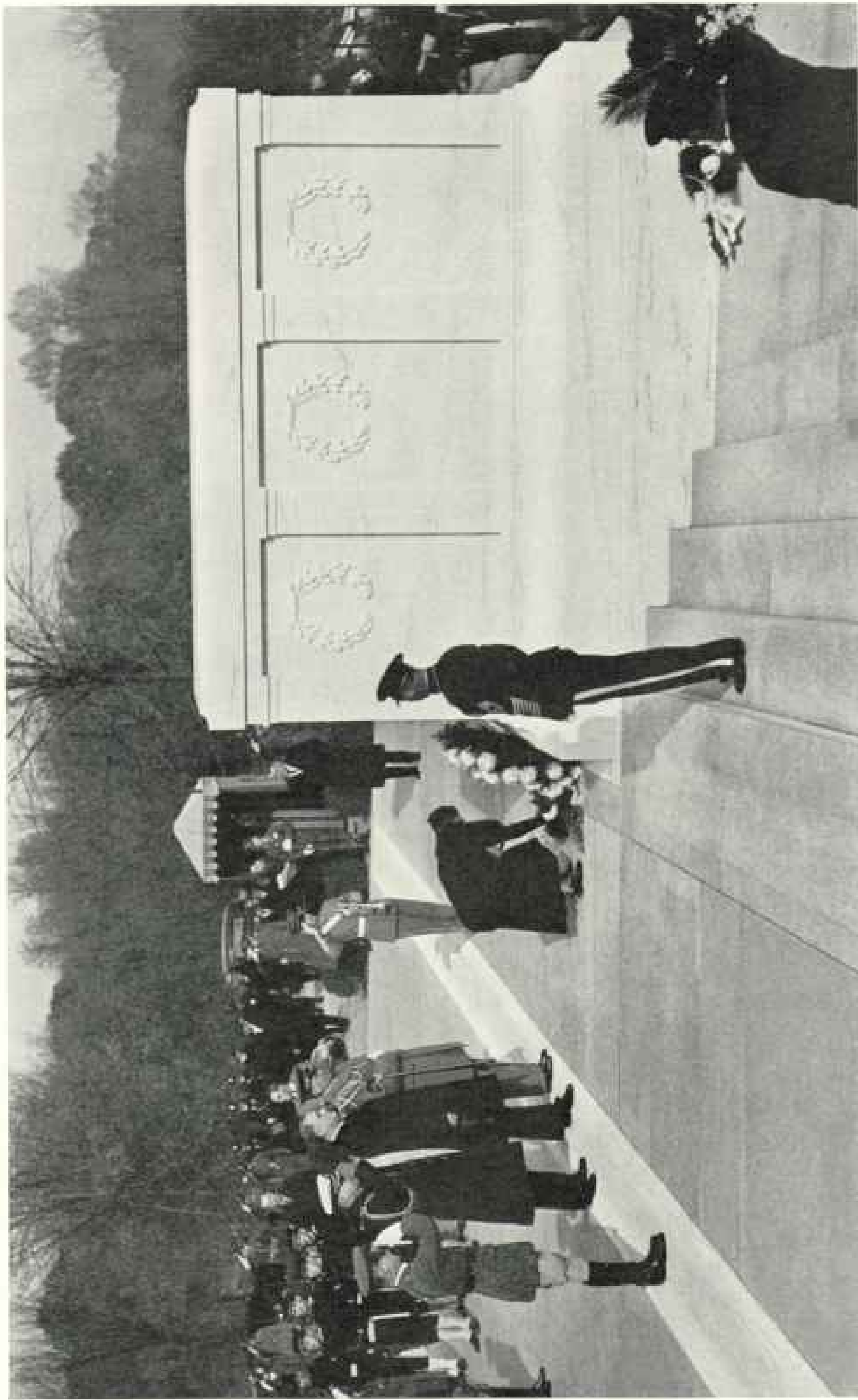
The Chaumont Barracks were selected as the General Headquarters of the American Expeditionary Forces in directing, between



Photograph from Acme

AMERICAN GOLD STAR MOTHERS PAY THEIR RESPECTS TO THE FRENCH WAR DEAD

Pilgrims to the burial places of their sons in France file by the grave of the Unknown French Soldier under the Arc de Triomphe in memorial services in Paris.



Photograph by Edwin L. Wisbord

THE NATION'S CHIEF EXECUTIVE LEADS IN TRIBUTE TO THE AMERICANS WHO DIED IN THE WORLD WAR

Before the white marble tomb of the Unknown Soldier at Arlington National Cemetery, President Roosevelt stands with bared head while Mrs. Roosevelt places yellow chrysanthemums at the shrine on Armistice Day, November 11, 1933. A bugle sounds the hour of 11 o'clock, at which time the war ended, and then for a minute solemn silence prevails. Each year this impressive scene is enacted at the hallowed spot on the Virginia hills across the Potomac from the National Capital.



Photograph by W. Robert Moore.

THE ONLY AMERICAN MILITARY CEMETERY ON BELGIAN SOIL

In Flanders Field Cemetery at Waereghem, Belgium, are buried nearly 400 men who fell in the Ypres-Lys Offensive of August, 1918, and in the Allied drive in the last weeks of the war. Bright red poppies, immortalized in the famous poem by John McCrae, nod their heads among the graves in summer. The architect, Paul P. Cret, of Philadelphia.

September 1, 1917, and July 11, 1919, the activities of more than 2,000,000 American soldiers.

To the American naval forces during the war fell the task of convoying troops and supply ships and conducting constant warfare against the submarine menace.

At Brest, near the point where Brittany thrusts farthest into the Atlantic, was established the chief base of operations. It became the principal port of debarkation of troops, and later the main point of embarkation when the American soldiers were being repatriated after the Armistice.

During the months of July and August, 1918, more than 3,000,000 tons of shipping were convoyed in and out of French ports by the vessels based at Brest, with the loss of less than one-tenth of one per cent.

The rectangular monument commemorating the splendid activities of the American and French Navies has been erected on the Cours Dajot, overlooking the harbor, the estuary, and the Elorn River (see Color Plate VI and illustration, page 15).

On its faces, besides the dedicatory inscriptions in English and French, are sculptural decorations of the trident, symbol of Neptune; American eagles; an interlaced anchor and dauphine; a sea maid; sea horses; crossed anchors; coat of arms of the United States Navy; and the shield of the United States.

Down on the grim rock of Gibraltar, base of operations of many American vessels, has been erected a memorial masonry archway and flights of steps connecting the naval yards to the town, which is located



Photograph by W. Robert Mowse

HERE WATCHED THE GERMAN HIGH COMMAND

From an observatory on this hill, now topped by the Somme-Py Monument, tradition says Kaiser Wilhelm II himself, at Ludendorff's side, followed the progress of their desperate, ill-starred offensive of July 15, 1918. This vantage point in the Champagne district was held by the Germans throughout most of the war. Trenches and shell holes may be seen around the monument. The architect, Arthur Loomis Harmon, of New York.



Photograph by W. Robert Moore

WHERE THE A. E. F. FIRST SHOWED ITS FIGHTING STEEL

Going over the top on May 28, 1918, the First Division captured Cantigny and held it against repeated counter-attacks. The architect, Arthur Loomis Harmon, of New York.



Photograph by Maynard Owen Williams

DEDICATING THE NATIONAL GEOGRAPHIC SOCIETY'S MEMORIAL AT CANTIGNY

To commemorate the first American victory in the World War, the capture of Cantigny, The Society in 1913 presented to the village a complete water-supply system and this fountain. The fountain was later removed by the National Geographic Society, as this site was desired for the national monument shown above.



Photograph from American Battle Monuments Commission

ALL PARIS IS SPREAD BELOW THE SURESNES CEMETERY

Its chapel on the heights commands a magnificent view of the French capital. On almost a straight line from the gates is the Sacré Cœur Cathedral, crowning the eminence of Montmartre. At the right is the Arc de Triomphe (see Color Plate VIII).

at a higher level (see illustration, page 6). The American naval forces established here carried out many raids on submarines. During July and August, 1918, they escorted 25 per cent of all Mediterranean convoys to French ports, as well as 70 per cent of all convoys to British ports from Gibraltar.

The battle areas of Europe have been largely rehabilitated, and to-day the increasing numbers of visitors see little that resembles the scenes of devastation visible just after the war.

Most of the towns and villages near the former battle lines were practically destroyed by heavy shellfire during four years of warfare. With few exceptions they have been rebuilt, usually along modern lines.

SOME AREAS IN WARTIME STATE

Vast agricultural districts have been reclaimed, and the land again smiles under cultivation. This restoration involved the salvaging of barbed wire, unexploded shells, and other débris on the battlefields, as well as the filling and leveling of networks of trenches and shelters.

Ypres, a city of 18,000 people before the war, had not a single house standing when the Armistice was signed. It now is almost completely rebuilt. New statues are being placed in the niches of its old cathedral, and the central tower is nearly completed. Soissons, scene of 32 major battles or sieges during its eventful annals, was badly damaged, but is practically restored.

In a few localities little reconstruction has taken place, though most of the débris has been salvaged. Throughout the vicinity of the badly battered French forts, north of Verdun and over large areas of the Meuse-Argonne and St. Mihiel battlefields, the ground surface still is pocked with thousands of shell holes. Certain villages in these regions have not been rebuilt.

In several localities signs are still posted warning against walking from the paths and building fires because of the danger of explosives.

In the Champagne region, also, there is a considerable area where no reconstruction has taken place. This is due to the fact that chalky subsoil was thrown to the surface, making it unprofitable to cultivate the



Photograph from Acme

KEEPING THEIR MEMORY BRIGHT

Soldiers fire a Memorial Day salute over the graves of their comrades buried in France. Flowers and French and American flags have been placed beside the headstones.

ground again. The towns in these areas were literally obliterated by the terrific bombardments.

Certain sections are being preserved in their wartime state as exhibits of the conditions under which the troops served. On Vimy Ridge, in the vicinity of the Canadian War Memorial, is a graphic example. The nearest to Paris where visitors can see trenches in their unreclaimed state is Belleau Wood. This historic spot, whose story is familiar to every American, was purchased shortly after the war by an association of American veterans, and has since been transferred to the Battle Monuments Commission.

At many places through the war areas other nations have erected monuments commemorating the sacrifices that were made.

Because the project of our Government fully covers all phases of the activities of the American forces in Europe, it has been the policy of the Commission, strongly supported by the French and Belgian Governments, to discourage the erection of memorials not of a utilitarian nature by nongovernment agencies. With our pro-

gram accomplished, any additional monuments would result in unbalanced commemoration.

During the last four years nearly 6,700 of the 17,000 Gold Star Mothers and Widows have visited the American cemeteries in Europe as guests of the United States Government. They have been conducted to the various places by officials of the American Graves Registration Service, which organization has charge of the perpetual care of the cemeteries and memorials. At the completion of these pilgrimages the members have written: "We are going back to our homes with a feeling of great satisfaction that we now know where our loved ones lie, and that they rest in such beautiful and peaceful spots, while their deeds are perpetuated in wonderful memorials of marble and stone."

To the other Gold Star Mothers, to relatives of soldier dead, and to every American citizen, I can give assurance that the United States Government has kept and will continue to maintain its trust in perpetuating the memory of the bravery and sacrifices of our World War heroes. "Time will not dim the glory of their deeds."

THREE-WHEELING THROUGH AFRICA

Two Adventurers Cross the So-called Dark Continent North of Lake Chad on Motorcycles with Side Cars

BY JAMES C. WILSON

A SHIPPING Board freighter was sailing for West Africa. Francis Flood told the company that in exchange for our passage he and I would write glowing reports of the opportunities in African commerce, and I would play the banjo. The offer was accepted.

Our original plan was to vacation leisurely to the pleasant hotels of Capetown and Port Elizabeth and then across to India.

But at Lagos, Nigeria, halfway down the coast, we heard of an Englishman, the Hon. Frank Gray, M. P., who, starting from Lagos, had made a lateral crossing of Africa by motorcar.*

"Has anyone ever made the trip by motorcycle?" Flood asked Gray's Negro mechanic.

"Oh, no, sah."

"Do you think it could be done?"

"No, SAH!!"

"Well, then, we'll do it!"

Flood didn't know how to ride a motorcycle, had never been on one in his life; but that, he said, didn't matter—there'd be plenty of room in Africa in which to learn.

THE MOTORCYCLES ARE PURCHASED

So we canceled what was left of our tickets, and bought the motorcycles, two little British one-lungers—with bathtubs (see page 38). We named them "Rough" and "Tumble," not realizing at the time how appropriate those names would be.

While we were waiting for passports, Flood hunted for maps, and I collected all the spare motorcycle parts in Lagos and vicinity and stowed them in, on, and about

the two side cars. Extra chains, sprockets, roller bearings, spokes, four spare tires, even a spare cylinder and piston—everything except those parts which actually did break later on! Then I loaded on a portable machine shop, and finally made two special luggage racks, each big enough to carry 16 imperial gallons of gasoline, a thousand miles' supply. After that—well, one can always get home on a camel if he has to.

THE EXPEDITION GETS UNDER WAY

As we were about to embark an American missionary stepped forward from the crowd and shook his head sadly. "I'd have just one suggestion to make. When you get to Kano, if by the grace of God you ever do get that far, you'd better swap those overloaded, single-cylinder houseboats for two good, healthy, long-legged camels, a stout, thorny stick, and 10,000 choice Arabic cuss words."

Flood shoved the gear-shift lever into low and let out the clutch. His machine began to move forward; the Flood-Wilson Trans-African Motorcycle Expedition was under way!

Off down the main street of town we roared, in the direction of Kano, Lake Chad, Khartoum, and points north and east, followed by half the black population of Lagos, all craning their necks to see what would be the first thing to happen to Flood. Nothing did—for a while—and soon we were popping along through the coastal jungle, with Lagos and the Gulf of Guinea behind us and 3,800 miles of we-knew-not-what ahead (see map, pages 40, 41).

Towering walls of tropic greenery pushed in on the narrow road from either side, clasped limbs and tendrils overhead, and dropped long, sinuous tentacles through the gloom. Southern Nigeria is thickly populated, and as we jolted along over the trail we knew from the sounds that floated out from the jungle that back behind those seemingly impenetrable walls were hundreds of little farmsteads and plantations.

* The vertical crossing of Africa by motor in 1914-5 by the Citroën Central African Expedition, under the leadership of the late Georges-Marie Haardt, is described in "Through the Deserts and Jungles of Africa by Motor," by Georges-Marie Haardt, in the NATIONAL GEOGRAPHIC MAGAZINE for June, 1916. M. Haardt was also the leader of the recently completed Citroën-Haardt Expedition across Asia by motor (see THE GEOGRAPHIC for June, 1931; October, 1931; March, 1932, and November, 1932).



Photograph by James C. Wilson

VEGETATION SWALLOWS THE ROAD FROM ILORIN TO JEBBA

In West Africa man must fight constantly to keep the giant ferns, vines, and creepers from obliterating trails and clearings. How American Garden Club members envy them!

Every now and then we caught a glimpse of one through the matted tangle of ferns and creepers—just a squat, overgrown grass beehive of a hut, surrounded by a patch of cocoa trees, Guinea corn (durra) (see page 72), or peanuts, with a woolly-headed Yoruba husbandman grubbing in the mold and half a dozen little black man-cubs romping in the sun; or occasionally a village of a dozen huts or so whiling the day through in pagan content.

They are not bad folk, these Yoruba, considering their opportunities—ambitious enough for the climate, law-abiding, and quicker at thinking than the average West African. They number more than 3,000,000 and most of them occupy the country south and west of the Niger to Dahomey.

We noticed especially their politeness. They have a special greeting for every occasion; they "salute" you for working, resting, walking, sitting down, standing, eating, because it is early morning, mid-forenoon, noon, mid-afternoon, evening, and night, and for any other reason at all. They have, so I heard, more than 40 common salutes.

Most Yoruba men wear loose-flowing

robes. A woman wraps a piece of homespun about herself and the "picken" that clings to her back (see illustration, page 53). Little girls wear a fringe or a string of coral beads around the waist; little boys seldom fret about clothes.

FACIAL SCARS MARK YORUBA FAMILIES

The various tribes or "families" are distinguished by facial marks inflicted during infancy and rubbed with ashes and irritating herbs to produce a permanent scar—a custom frequently met with in Negroland. In many localities the people file deep notches in their incisors, but otherwise they take good care of their teeth, brushing them constantly with the frayed end of a small stick. In one or two localities, to propose marriage a man sends his toothbrush to the lady by one of his friends. Modesty demands that she refuse it twice, but if she really wants him she takes no further chances.

On the evening of our first day out from Lagos we put up with some American missionary friends in Abeokuta, 64 miles inland, and the next day went to pay our respects to the Alake, black potentate of



Photograph by Francis Flood

A RECEPTION COMMITTEE MEETS THE VISITOR

The author could not converse with the Kanuri belles in their own language, but an exchange of smiles acknowledged the cordial welcome.

this branch of the Yoruba nation and ruler over some 200,000 souls. He served tea from exquisite china, with all the aplomb of an ambassador from the Court of St. James, and spoke Oxford English quite as well as Flood and I speak American.

But his face, anthracite-black and shiny beneath the ponderous silver coronet given his predecessor by Queen Victoria, was slashed with the Egba tribal marks, and his thick lips opened and closed over a row of filed teeth. And across the courtyard I saw one of the Alake's wives and her several inky offspring sitting on the floor eating couscous with their fingers out of a big carven calabash.

STORIES TOLD BY DRUMBEATS

In Abeokuta I got acquainted with the Yoruba talking drum. As a native friend and I were passing a wedding party, one of the drummers saluted us with a queer succession of sounds on his instrument.

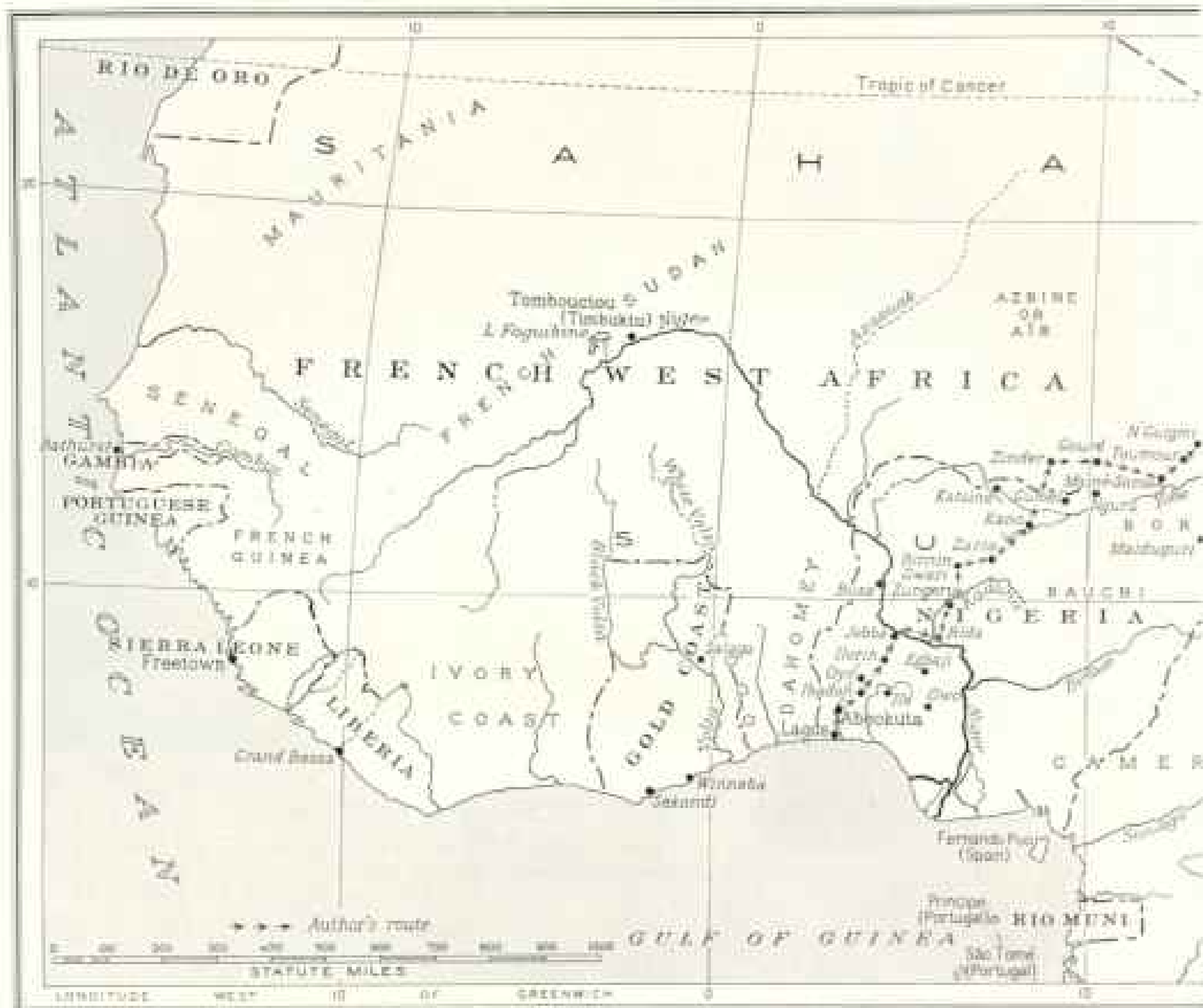
"That man, he tell you old, old Yoruba proverb," said my friend—"Two lambs cannot drink out of one calabash."

"Hmm," thought I. "Queer thing to be saying at a wedding."

Yoruba oral literature is rich in proverbs, legends, and historical tales. The drummer beat out several, and then invited me to examine his drum. It was an elongated tom-tom, hourglass-shaped, so that a performer holding it under his arm could vary the pitch, tympanum-fashion, by exerting pressure on the cords connecting the heads. The three elements of Yoruba speech—vowel, consonant, and pitch inflection—could all be approximated with surprising accuracy. Drummers frequently "show off" by holding long conversations on their instruments.

Some 58 miles inland we came to Ibadan, a pagan metropolis sprawled over a score of hills. Largest city in tropical Africa is Ibadan—250,000 people sweating, working, loving, dying, year after year back there in the jungle. One wonders what life holds for them. And yet, in strolling through the market place, I noted that at least every third citizen was smiling. Poor, benighted heathen—they didn't know any better than to enjoy life as they found it!

There were 250,000 people, and not a sewer pipe within the city limits, we were told. But there's the sun—and the goats!



ACROSS THE HEART OF AFRICA, THE FIRST TRANS-AFRICAN MOTORCYCLE

On "Rough" and "Tumble," motorcycles appropriately named for the arduous 5-month journey, by way of French and British colonies and protectorates in north-central and eastern Africa,

Flood and I concluded, before we had been in Ibadan half an hour, that here was not savagery, but civilization—a simple, sturdy civilization well fitted to survive under conditions in which a more luxurious culture probably would have perished.

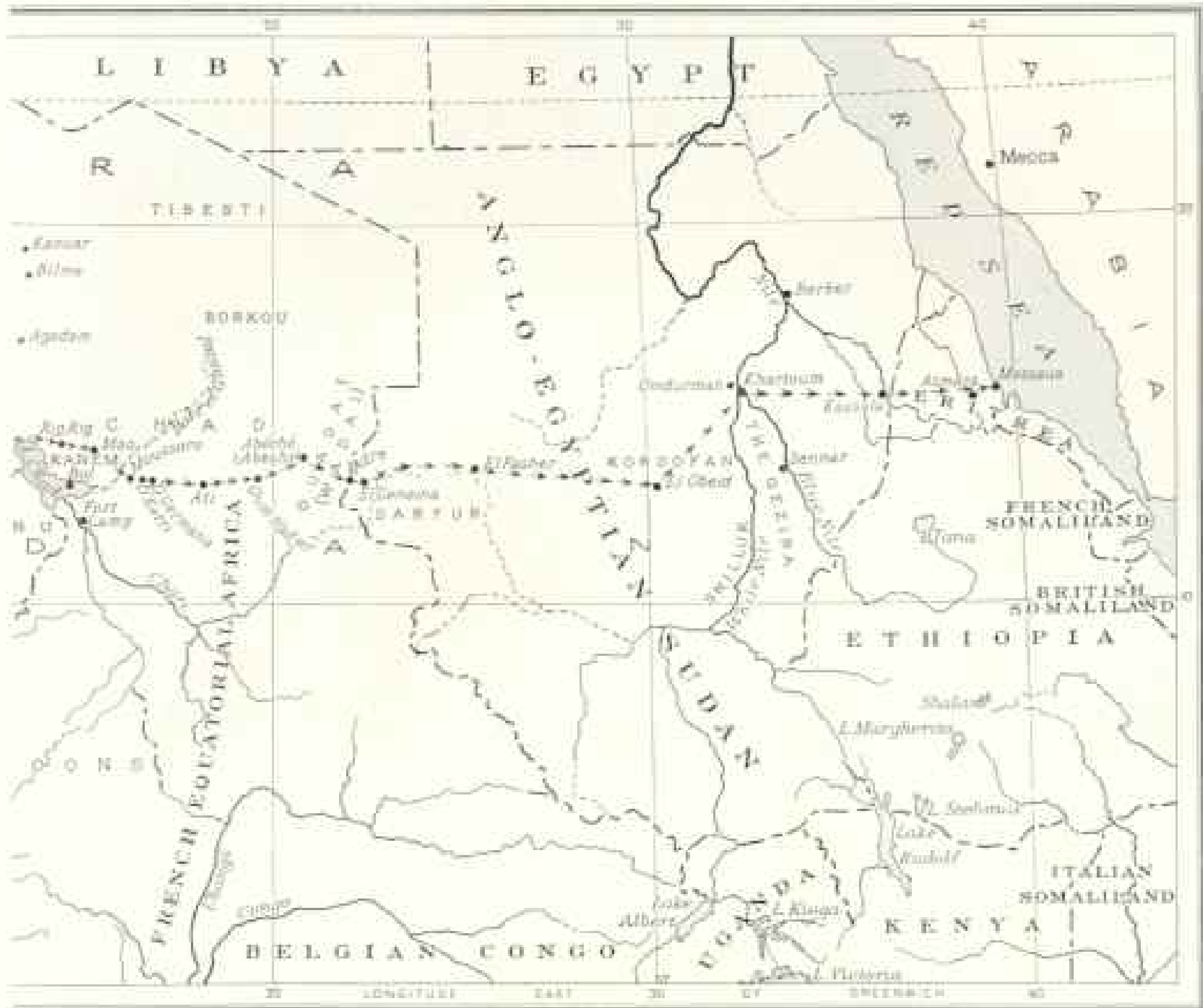
We had stopped to inquire the way, in a street which seemed to be the manufacturing center of the town.

On the left was a whole row of coal-black silversmiths squatting cross-legged in their two-by-four mud workshops and tinkling at their little anvils. And next to them three cheery chaps in G-strings, who hammered out aluminum earrings and anklets, and there were half a dozen ebony craftsmen who made long, barbed spears so esthetically chased that it must have been a real pleasure to get stuck with one of them.

Farther down were the potteries. We stopped to watch three well-muscled young wenches rhythmically battering away at a gigantic wooden mortar of clay with mighty six-foot pestles. Their sturdy shoulder-blades rippled pliantly beneath black satin skin, and they smiled coyly and displayed their clean, white teeth when we told them in sign language what good figures they had.

IBADAN RESIDENTS "WINDOW-SHOP"

The market place of Ibadan was a bizarre and fascinating jumble of sights, sounds, and smells, of which the smells—especially those emanating from the "juju" section—were perhaps the most bizarre and the least fascinating. Half the population of the city, it seemed to Flood and me, was selling something, squatting cross-



Drawn by J. S. Allen

EXPEDITION JOLTED FROM THE GULF OF GUINEA TO THE RED SEA

the author and his companion traveled a distance of approximately 3,800 miles, from Lagos, Nigeria, to Massaua, Red Sea port of the Italian colony of Eritrea. The arrows indicate the route.

legged on the ground with the something—peppers, kola nuts, ornaments, salt, or what not—arranged in neat little piles before them. Of the other half, milling about from stall to stall, a very few seemed to be buying something, but the most were “just shopping.” It reminded us of home.

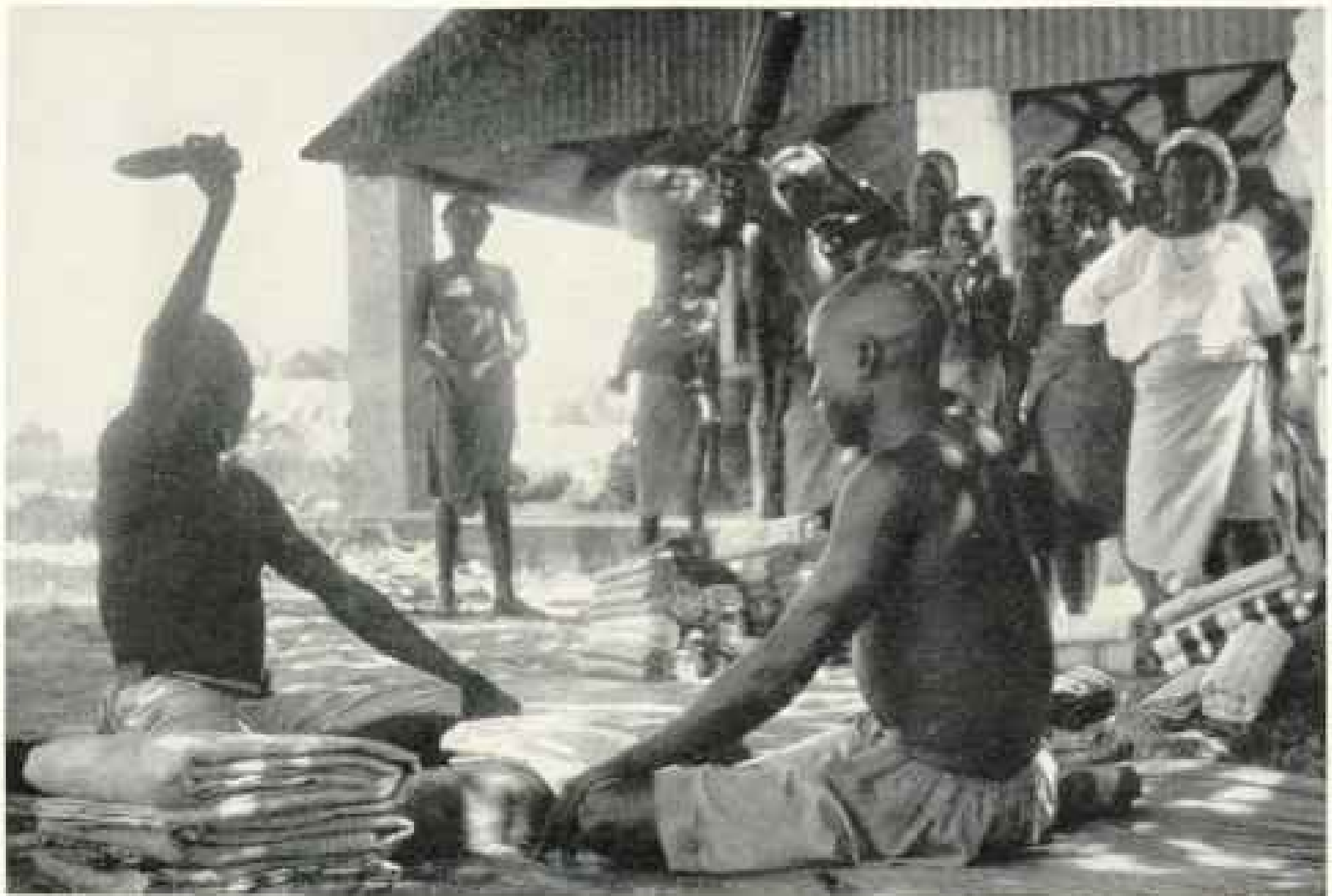
The jabbering was heterogeneous and terrific. Here are merchant and matron in heated climax to the half-hour haggle which prefaces every sale in this land, where small turn-over and big talk-over are the rule of trade; and over there a knot of chattering young things with their heads together, busily slandering in her absence the girl who has just won the most eligible young man in town—exactly like civilized people!

Density of population and the tsetse fly, driving out both wild and domestic

animals, have forced the Yoruba to vegetarianism except for the beef imported from the north on the hoof. Yams, Guinea corn, peppers, beans, cassava, plantains, pawpaws, bananas, nuts, oranges, pineapples—they were all for sale in the Ibadan market, besides a hundred things I couldn't name. And the pot-bellied “pickens,” scampering about like fat little kettles out of nursery rhymes, showed the results of such bulky diet. However, those who survived the ordeal of infancy in the Tropics grew up to be straight and stalwart enough.

The “juju” dealers of Ibadan were congregated about an enormous tree near the center of the market, dispensing picturesque cures and preventives for every conceivable affliction.

We stopped to inspect a particularly attractive display, presided over by a gnarled,



Photograph by James C. Wilson

MANPOWER OPERATES THE MANGLE IN LAGOS

The Yoruba are extraordinarily clean in their personal habits and are always washing themselves, their clothes, or their babies. In this part, southern trading center, and capital of Nigeria, the British have built sheds where the natives do their own laundry and that of the thousand or so white men who live there. The boy on the left brushes his teeth while he works (see text, page 38).

toothless old granny with three huge green lizards tethered around her neck and crawling over her shrunken breasts and shoulders. She wrinkled her nose hospitably at Flood and held out a choice and evil-looking dried squid.

"No, thanks," said Flood. "No mummies today, but I'll mention your collection to the British Museum."

THE TRAVELERS DECLINE MAGIC CHARMS

She then tried to tempt him with monkey skulls, dried snakes, little bundles of feathers, and small dehydrated carcasses of every description, but Flood remained the faithful Presbyterian, and we set out the next morning without benefit of magic, which may or may not have had something to do with the condition of the roads and trails for the next 3,000 miles!

Beyond Ibadan the highway soon lost all desire it had ever had to amount to something in this world, and before we had got to Ilorin, 92 miles farther, it had petered out into nothing but a thin trail through the tall grass.

The British resident at Ilorin said that no one had traveled the 55 miles from there to Jebba by motor vehicle for more than four months because of the rains. When we finally reached Jebba we wrote back to him that no one had passed that way by motor vehicle yet, but that two fellows had just been over the trail on foot carrying motorcycles.

Jebba marks the approximate northern limit of the Yoruba tribes. Eighty miles upstream on the Niger is Busa, where the famous Scots explorer, Mungo Park, was drowned while trying to escape a native attack. Bida, capital of the Nupe people, was about 80 miles east of Jebba, as the crow flies, on our route to Kano.

We put up with Mr. Durham, railroad maintenance of way and the only white man in Jebba, who lived in a grass-thatched mud house with his soda siphon, portable bath, two monkeys, and a pet cobra. Once a fortnight he ordered up a refrigerated roast on the "boat train," put on his tuxedo, and dined in state to remind himself that he was British.



Photograph by James C. Wilson

THE BRASS SMITH HAMMERS WHILE HIS APPRENTICE WORKS THE BELLOWES

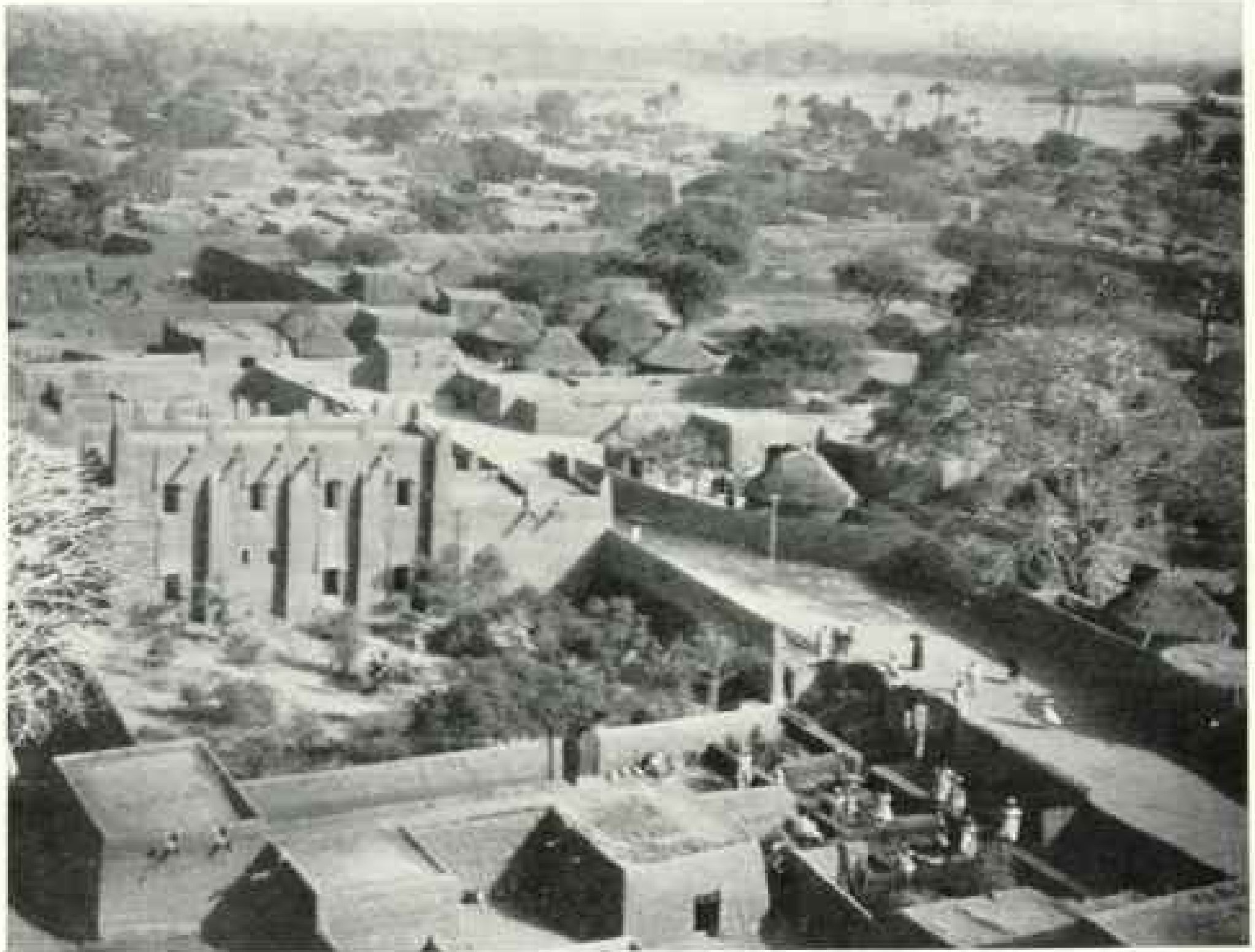
Under a guild system like that of medieval Europe, the Bida craftsmen carry on. Each craft has its chief, who maintains the standards, sets prices, determines hours and makes other rulings (p. 49).



Photograph by Walter Mittelholzer

HEALTH AND ERECT CARRIAGE MARK THE HAUSA GIRL.

She walks gracefully and unconcernedly with loads on her head that would tax a man's strength.



Photograph by Walter Mittelholzer

THE RESIDENCE OF THE EMIR AT KANO HAS SOME CLAIM TO GRANDEUR

This photograph, taken from the air, gives a good idea of the compact crossroad city of Nigeria (see map, pages 40-41).

Beyond Jebba we had beautiful roads for half a mile; then we crossed the lordly Niger on the railroad bridge. A mile the other side of the river we plunged back into the bush, and never saw those two little ribbons of steel again till we got to Bida, three days later. At Kano, 705 rail miles inland from Lagos, they stopped altogether (though now they extend to Nguru), and we didn't hear the screech of an engine whistle again for almost 2,000 miles—till we reached railhead in El Obeid, Anglo-Egyptian Sudan, at the end of a long and grueling trek by motorcycle across the heart of north-central Africa.

The colonial governments require almost every large African town to maintain an empty hut, or resthouse, for travelers, where for a shilling, which goes to the keeper, one may unpack his kit and make himself at home. If a resthouse turned up at night, we stayed in it; if not, we kept barging along until dark, slung our mosquito net between the motorcycles, and

slept in our tracks. Our camping equipment consisted of three blankets, two pans and a plate, canteens, two spoons, a fork, a jackknife and can opener, a flashlight, a small box of medicines, and my tenor banjo!

THE BANJO WINS FRIENDS

The "bloodthirsty natives of the interior," about whom we had heard so much down on the coast, turned out to be simple, friendly folk, always ready to give a traveling white man assistance if he needed it, especially if he happened to be a banjo player! Frequently, after I had strummed a few chords to rest myself at night, a delegation would appear from some near-by village with a calabash of yams or plantains and stay until I had exhausted my whole repertoire.

The first night out from Jebba we camped on the bank of the Kaduna River. There was no bridge and the river was fully a quarter of a mile wide. But the



AT JERBA THERE WAS ONE MORE RIVER TO CROSS

When the Flood-Wilson Trans-African Expedition reached the Niger they were invited to use the Government railroad bridge, a third of a mile long. It was the last "civilized" structure of the sort until they reached the Nile, approximately 2,500 miles distant by motorcycle trail (see text, page 91).



Photographs by James C. Wilson

A WEST AFRICAN PARLOR CAR TEMPTS THE TRAVEL-WORN

At Jerba the adventurers would have exchanged their motorcycles for a four-cylinder outfit like this, but nobody would trade.



Photograph by Outwell Waterfield

A NATIVE HOUSE OF KANO HAS AN ORNATE FRONT

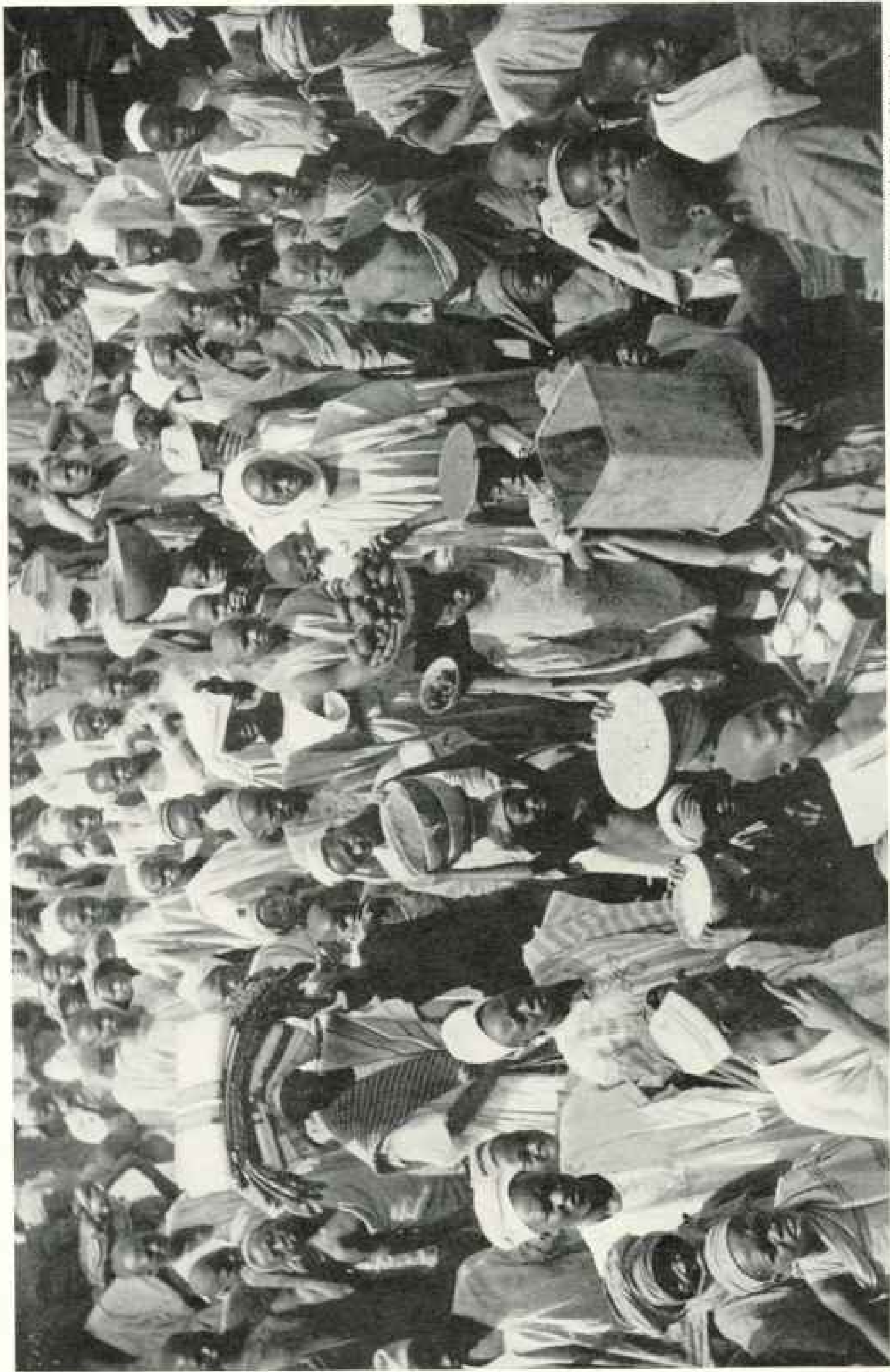
The design is carried out in mud, and several colors of clay are used to make it more striking. Such a complicated pattern is rare these days, but thirty years ago it was fairly common on the dwellings of important Nigerian tribesmen.



Photograph by James C. Wilson

THE EMIR OF MAINÉ-SOROA GOES FORTH IN GLORY

Sheep, cattle, and horses of Arab stock are common in this region, north of the tsetse-fly belt. The long spear, boxlike stirrups, and rich trappings are characteristic. The gate of the fort is in the background (see text, page 69).



Photograph by Walter Mitchell-Lalor

EVERY DAY IS LIKE BARGAIN DAY IN KANO MARKET.

The trading scene in the crossroad city is lively, though sales are less frequent than the crowd and bustle seem to indicate.



Photograph from Will F. Taylor

THE CHIEF OF OWO SITS IN STATE ATTIRE

In front of his mud-walled, grass-roofed house, this potentate of a village in southern Nigeria holds a staff as a sign of office. The cap and veil, decorated with coral, are worn only by Yoruba chiefs.

tom-toms were booming in a village not far away, so I got my banjo and flashlight and set out over the trail.

I didn't blame them for scuttling into the bush when they saw me. But the banjo soon brought them back, and I'll bet they're still talking about the powwow we had that night.

After everyone who could had done a solo dance, I laid down my banjo and put on a buck-and-wing myself. Then I taught a few steps of the tango to one of the girls, explained the tango rhythm to the drummers, and we danced it together.

But at last it was time to get back to camp. Flood would be worried.

"Putt, putt, putt!" said I, drawing pictures in the sand. "Chung!"—Hausa for "big hole with water in it"—and I spread my hands in despair.

The chief was perplexed, then brightened and nodded reassuringly.

Next morning they poled us across the Kaduna in a dugout canoe 60 feet long and gave us the village blessing as we drove away after distributing a shilling among them.

We never had to ask a favor twice; often it was performed before we had even mentioned it. And I think this attitude of friendliness and hospitality is traceable as much to the simple, unaffected courtesy of the unspoiled Negro as to the fact that the British demand good treatment from their subjects.

By the time we reached Bida, capital of the Nupe people, our mounts were beginning to act as if they needed soldering and straight-

ening, also welding and tightening; so we paused for a few days to overhaul them and to remodel the gasoline carriers, which had been giving us considerable trouble on account of unscientific distribution of weight.

Life in Bida seemed most bizarre and exotic at first. Pocket-size, pot-bellied nanny goats trotted up and down the streets on business, with their teats dragging on the ground. Dignified robed patriarchs on bicycles bumped into them and swore in Nupe. Six black, thick-lipped heralds blew shrill blasts on four-foot brass trumpets before the gates of an enormous mud-walled palace.

The Emir passed on a stunted pony, both wrapped in pomp and circumstance. Turbans, embroidered robes, a sunshade, and a horse-tail for the Emir; tassels, gold trappings, and a high-backed red saddle for the tired little pony; and the drummers, knaves, and swaddled courtiers strung out behind on foot.

All this ought to be happening in a museum, I thought. It's so queer and picturesque—like mummies or stuffed swordfish.

And then it struck me suddenly that life here in Bida wasn't that at all. It was my own ideas and conceptions of culture that were queer and picturesque; *they* were what ought to be in a museum *here in Bida*.

It took us three days to overhaul our motorcycles. To test them we drove out to visit one of the brass smiths on the outskirts of town. Bida brass is renowned throughout Nigeria. One constantly sees the Hausa traders carrying it in their packs.

The smith showed us a big tray which he had hammered out of a solid chunk of brass and punched by hand in a graceful and intricate pattern. Flood examined it carefully (see page 43).

A GOOD USE FOR EMPTY CARTRIDGES

"Aha!" he exclaimed. "Now I know what became of the empty cartridges I saw that Hausa trader picking up on the parade ground back at Lagos. See those little dark flecks in the brass? Those are the copper firing plugs. His fire isn't hot enough to fuse them completely."



Photograph from Georges-Marie Haardt

KANEMBU DANCING REQUIRES AGILITY

An ancient tribe, said to have taken refuge in Lake Chad at a time of invasion, they occupy the village of Mao. Among these people the cyclists found traces of the 1924-5 African expedition of Georges-Marie Haardt (see text, page 31).

He stood there pondering over the tray for a moment, tracing out the designs with his finger.

"Well," he said, "these people have solved a problem that's been baffling the citizens of civilized nations for a good many years."

"What's that?" I asked.

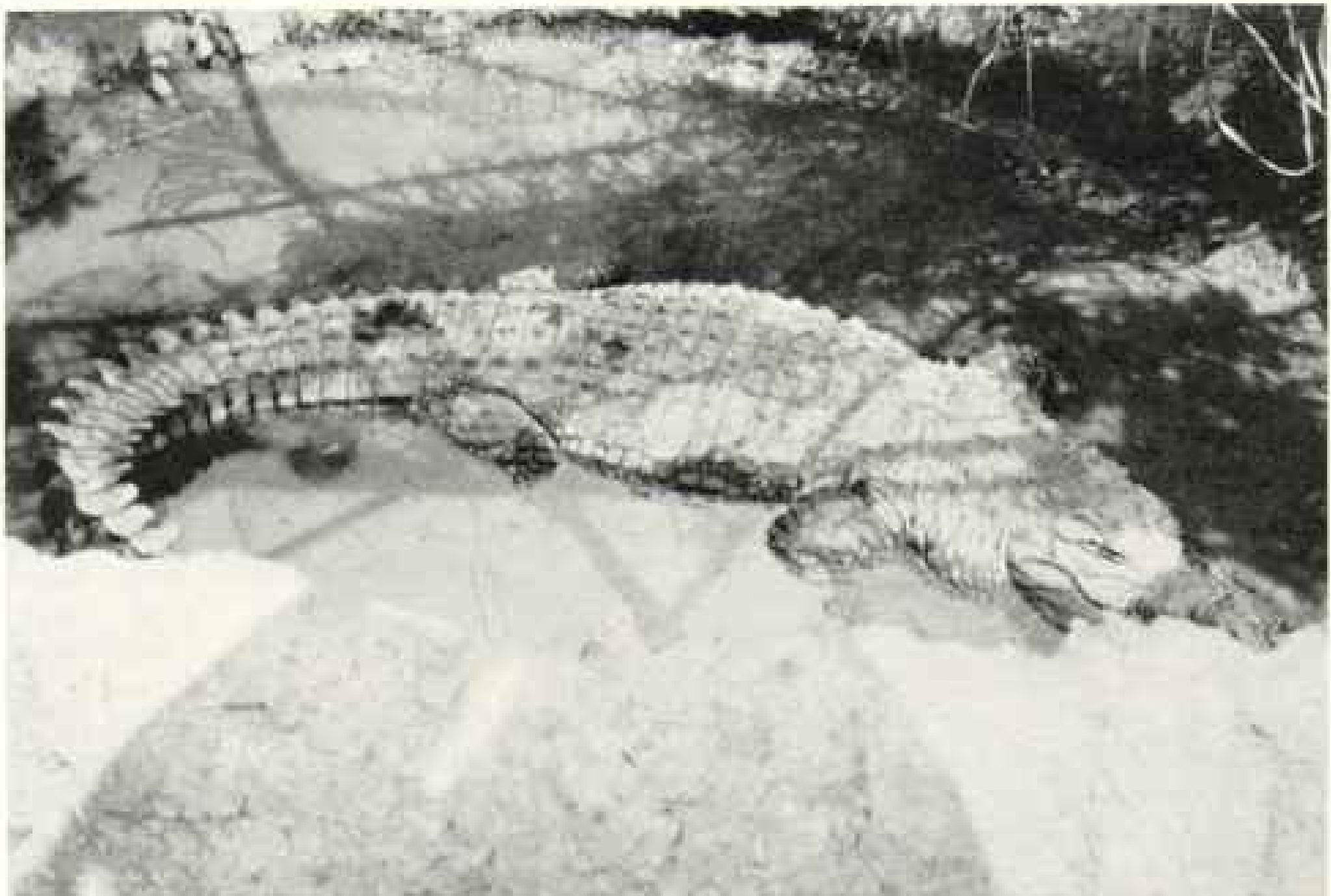
"How to make a profit on a standing army."

All the brass now used in Bida is of European origin, and I was told by some that the absence of zinc—brass is an alloy of copper and zinc—in this part of Africa is proof that the industry postdates the coming of the white man.



HERDS PLOD SADLY TO MARKET

The cattle coming up the road are in transit from the edge of the desert down to southern Nigeria. Natives let them rest for a week or so near a water hole, and then drive them, sometimes 30 miles at a jump, to the next. The beasts are monstrous-horned, with comic-opera dewlaps and humps. They furnish virtually all the beef available in southern Nigeria, where the tsetse fly makes local production sometimes impossible (see text, page 87).



Photographs by James C. Wilson

NATIVES OF IBADAN WORSHIP THE "SACRED CROCODILE"

It lives in a muddy pool in the center of the largest city in tropical Africa, where its adorers toss it chickens, goats, and other delicacies in the hope of being forgiven for some of their sins.



Photograph by James C. Wilson

NATIVES FERRIED THE TRAVELERS ACROSS THE KADUNA

Dugout canoes 40 to 60 feet long may be seen on the larger rivers of Nigeria. They are propelled sometimes by poles, sometimes by paddles.

Bronze, however, has been worked by the West African natives for a long time. Back in Jebba we saw two big bronze jujus, or idols, which, according to the natives, date from several hundred years ago. A presumptuous British district officer once thought he would like them as souvenirs. He got as far as Freetown, Sierra Leone, on the way home, and it is to the credit of his country that he was required to disembark, personally escort his prizes back to Jebba, and replace them in their shrine on the summit of the Juju Rock, in the middle of the Niger, under the disapproving supervision of the populace.

But the most characteristic African metal is iron, which is widely distributed over large areas in ores so rich that it can be extracted by the simplest methods. The early African, after learning the use of fire, could scarcely have escaped the discovery of the smelting process. Iron-working is to-day perhaps the most common African craft, and there are whole tribes who make their living by that industry.

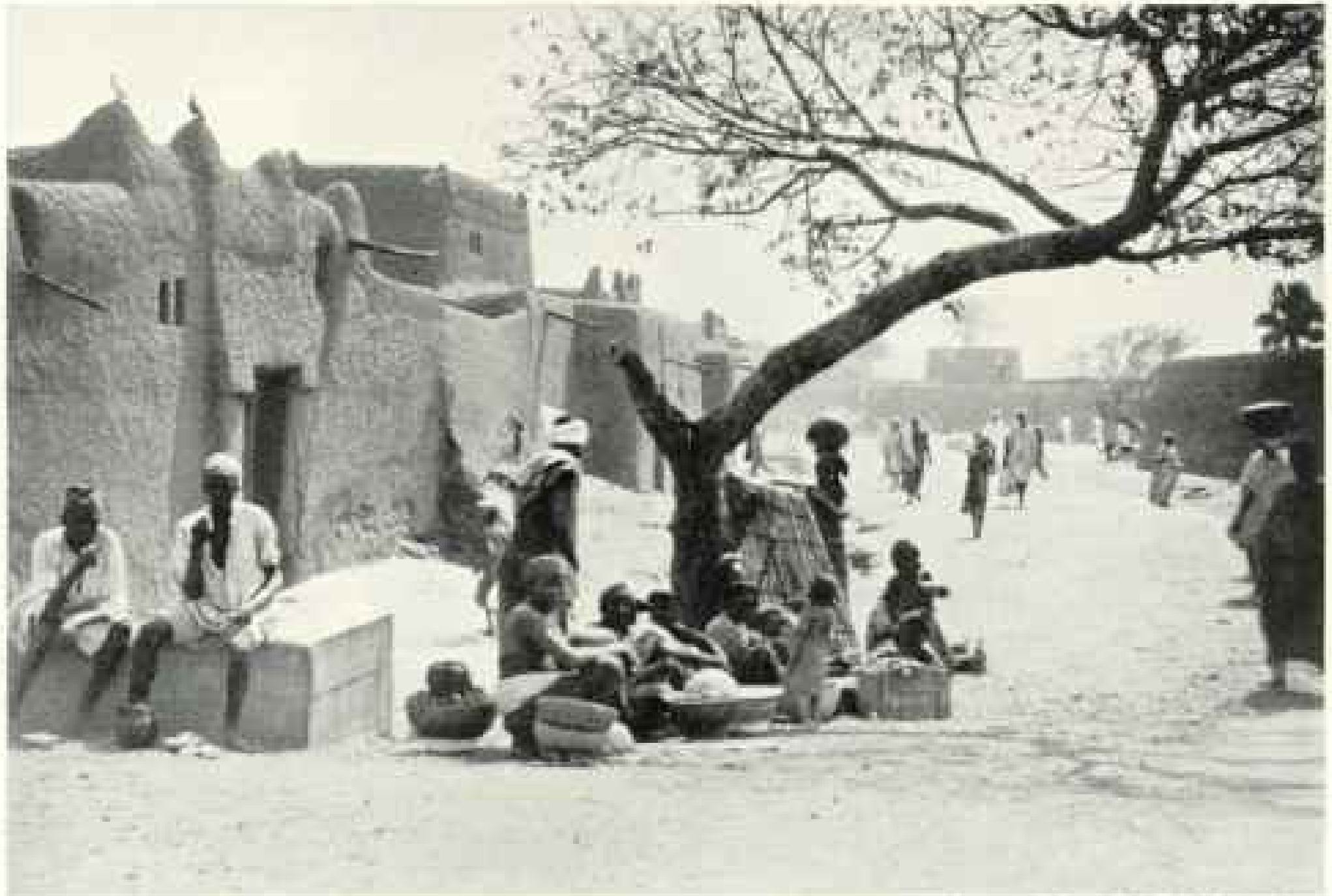
However, with the advent of the white man, the native gradually turns from the smelter, loom, and dye pot to less inspired

pursuits, whose products he can swap for imported hangles. The raising of cocoa and groundnuts is honorable enough, but any crass barbarian can wrap himself up in a Manchester print and swill palm wine from a shiny tin cup! The average African, like many others, does not realize that *creating*, not *possessing*, is the essence of culture.

As we pushed steadily inland, the steaming, rain-soaked forests gradually gave way to a region of rolling, partly wooded grasslands, or savannas, and, contrary to our expectations, the trail improved decidedly. There were even signs, in places, that some one had been over it quite recently by motorcar.

KANO, THE CROSSROAD CITY

Zungeru, Birnin Gwari, Zaria, and within ten days after bidding Bida good-bye we clattered up to a halt in front of the big mud wall that surrounds Kano, metropolis of northern Nigeria, and end of the first lap of our trip. We were now 705 rail miles inland, or about 750 the way we traveled, and still we had approximately 3,200 miles yet to go (see pages 44, 52).



Photograph by Walter Mittelholzer

IN THE SCANTY SHADE OF A FEEBLE TREE

Natives with their wares squat near mud walls of Kano; a few pigeons perch on the roofs. The street is highway and playground, promenade and market place.



© Typical Press Agency

THROUGH PORTALS IN THE MUD WALLS PASSES KANO TRAFFIC

Women balancing head loads, men just idling along afoot or on horses—such is the scene at any one of the numerous gates (see text, page 51).

Kano, with a population of about 90,000, is a crossroad of West Africa, the foremost commercial and manufacturing center in the west-central Sudan.

Under the flat roofs of the square clay houses the weavers clack away at their shuttles and the tanners and dyers bend over their pots. One street resounds to the clang of the anvil, the next to the thud of the potter's pestle; and out in the markets the traders are buying and selling and swapping and cheating in a dozen different languages.

A black, shiny Hausaman plucks at my sleeve and pulls out of his pack a long red blanket of barbaric design.

"Look, mastah, look. I sell 'im cheap."

"Where's it from, and what's it made of?"

"'E be Timbuktu, mastah. 'Ooman Hausaman, 'e make 'im. 'E be—" (frowning and scratching his shaven pate, then brightening up)—" 'e be—sheep's leathers!"

As we conclude the bargain two haughty, masked Tuaregs sweep past in their flowing blue robes, hunting buyers for their sheep, the hides of which a year from now will be sold in the smart London shops as "morocco" leather (see pages 57, 59).

Whe-e-k, whe-e-k, wheek, wheek! Here comes the "boat train," chugging up from the coast, with gramophones, alarm clocks, sugar, and tea. Those big burlap sacks piled in the warehouse? Peanuts; they'll be on their way down to Lagos and England to-morrow.

The shriek of the whistle startles a tame ostrich excavating in the dust. She rustles her plumes, lifts her feet in a few quick steps, her body rocking gracefully on her big, springy thighs, and then settles back to her work.

Pit-pat, pit-pat, pit-pat, through the dusty street, and her ladyship has to move again. This time it's a caravan of tired little donkeys coming in from Lake Chad with leopard skins and ivory for the Tripoli Arabs who ply across the Sahara; and their owner, jogging along behind, is wondering how much the Salaga merchants up from the Gold Coast will be asking for kola nuts to-morrow.

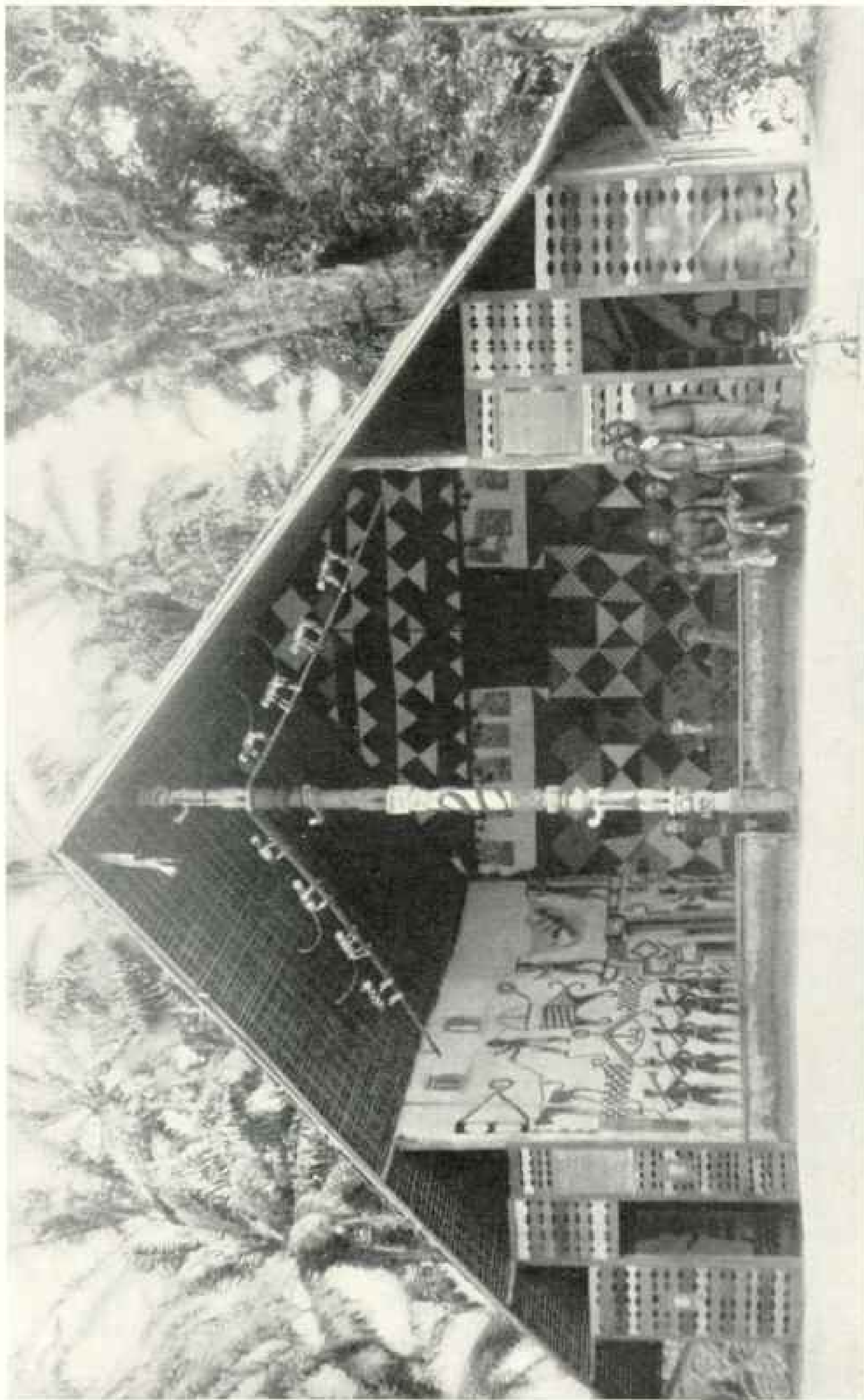
The sun goes down on the flat roofs of Kano, and out by the northern gate of the great mud wall, plop, plop, plop, slow and tireless, the big padded feet of a dozen camels plodding in from the oasis of Azbine



Photograph by James C. Wilson

YORUBA WOMEN ARE "HEAD STRONG"

The load of plantains, yams, and the week's laundry gives her an erect posture. The "picken" furnishes the bustle. The woman's costume is reminiscent of the Gibson-girl period "shirtwaist" and skirt. The men wear flowing robes (see text, page 38).



Photograph by Will F. Taylor

IT IS A MEMORIAL HOUSE, NOT A LITTLE THEATER

In southern Nigeria the people build most elaborate structures in honor of their dead chiefs. The edifices are not kept up, and in less than a year after this one had been built it was in ruins. The figures on the inside wall and the decorations on the outside are all in varied colors.



Photograph by Oswald Waterfield

GARDENING IN NORTH NIGERIA REQUIRES INGENUITY

It is difficult to grow flowers during the dry season, for the lizards eat up any green shoots that may appear. However, if native pots are mounted on clay tubes, the lizards are unable to scramble up and damage the plants; but even then they may jump upon them from a branch.



Photograph by E. C. G. Housner

THE NIGERIAN DANCER ENTERS ON HER PARTNER'S SHOULDER

Until she begins her performance, she covers her face with a bushy mude of hair. Her head is adorned with bright-bued handkerchiefs, loosely twined; a short jiridle and several strings of beads encircle her waist, and a half dozen rings, each slightly larger than the one beneath, jangle on her ankles.



Photograph by A. W. Banfield

HOE-DANCERS AND MEDICINE MEN INVOKE GOOD CROPS

In southern Nigeria the natives look to these itinerant magicians to bring prosperity.



Photograph by Francis Flood

THE BANJO DELIGHTED KANO MERCHANTS

Hausamen cover most of north-central Africa with their donkey or camel caravans loaded with cloth, leather and brass goods, grass mats, or whatever their last customers have had to exchange (see text, page 53).

(Air) with salt and "potash" for the Yoruba cooking pots down in the jungles. And when the sores on the camels' backs have healed, they'll plod back home over the hot, white sand, laden with bales of homespun Kano cloth, and perhaps some of those gramophones that just came in on the train.

From Kano one trail leads east through Bornu Province, which lies west and south of Lake Chad, to Maiduguri and Fort Lamy. This was the route taken by the Englishman, Mr. Gray, and the one we intended to follow.

Then there's a thin, white little road stretching 200 miles north across the hard sands to Zinder, first post in French territory. From Zinder caravan trails fan out into all parts of the Sudan, one leading straight east to N'Guigmi, at the northwest corner of Lake Chad, 22 days by camel from Zinder, and thence north and east of the lake to Mao, Abéché (Abeshr), and the Anglo-Egyptian Sudan. This trail, we were told, was utterly impossible for anything but a camel.

THE ROAD TOO MUCH USED FOR FLOOD

But just before leaving Kano we went to tell the chief of police good-bye. He was reading a Lagos paper.

"I say, old beans, you're in luck. Look here!" And he held out the paper to Flood.

There, on the front page, was the picture of a very charming, aristocratic-looking Englishwoman standing in front of a motor lorry. She was a noted journalist, said the paper, and was starting out alone, with



Photograph by James C. Wilson

TUAREG TRADERS BRING A TOUCH OF MYSTERY TO KANO

These proud "People of the Veil" come to the cities to trade, but rarely remain inside the walls overnight. They usually camp outside and send in a few representatives to do their buying and selling. The broad sandals provide protection from the thorns and sand burs that infest the desert.

only two mechanics, an interpreter, and a cook, to cross Africa over the trail previously broken by the Hon. Frank Gray. When she got home she would write a book.

In the background of the picture were two native boys loading her kit into the lorry. One was just in the act of stowing away a folding bathtub.

"Humph!" said Flood. "Women journalists with folding bathtubs. Humph!"

Twelve hours later we were unrolling our blankets on the sand by the thin, white little road, 90 miles out in the direction of Zinder, for, as Flood said, no woman journalist with a folding bathtub would be likely to waste her time following a caravan trail



Photograph by James C. Wilson

THE "BACK-BREAKER" HOLDS ITS OWN AT KANO

Wooden plows are used on the Government farm near by, but most of the natives still wield the short-handled hoe of their fathers.

where it was fourteen sunstrokes from one water hole to the next.

A big caravan passed during the night. Uneasily adrowse, I slowly sensed the quiet, rhythmic creaking of saddle thongs in the blackness, twitched suddenly awake to a strangely strident cry, then drifted back to sleep with the recollection of camels ploughing through the sand.

Next evening the moon rose out of the desert and hung over the firing parapet of the big mud fort at Zinder, smiling down on the terrace where Flood and I were trying to tell Monsieur le Commandant and his aides that it was a nice evening and certainly didn't look much like rain. In college we had learned a little something about a language which the professor had said was French, but it didn't sound anything like the noises those people in Zinder made with their noses.

Gasoline was 18 francs a gallon at the little Syrian trading post in Zinder. We bought 40 gallons of it in rectangular five-gallon tins and strapped them on our luggage carriers. That was enough, we calculated, to get us to the desert fort and radio station at Mao, 600 miles farther on,

where the officer said there was a gasoline engine and, he thought, gasoline. The Zinder radio operator tried repeatedly to get in touch with Mao, but failed.

Then we went back to the fort to tell the commandant good-bye. He dipped his pen in the ink, reached for our passports, and solemnly wrote across the face of each in French: "Last seen at Zinder, Dec. 24. (Signed) H. C. Drurea, Commanding Officer of the District."

It was the day before Christmas, but somehow we were beginning to wonder if there really was a Santa Claus after all. Those words bore a suggestion of prophecy that didn't sound very encouraging.

NO MORE ROADS FOR 2,000 MILES

Two hours later we dropped off at the end of the road—the last real road for 2,000 miles—and into the deep, soft sand of the caravan trail. Flood was in the lead. He plowed ahead for a few yards, then jumped off and pushed until his motor finally stopped turning with a convulsive jerk and a cough.

The sand trickled down in thin streams over the spokes of his wheels and the heat



Photograph from Will F. Taylor

YOUNG NIGERIA LEARNS THE THREE "R'S"

Education has made little progress among many of the tribes visited by the author, but at one village an outdoor school for native children is well attended.

shimmered out from the cylinder fins. He had hit his bare leg as he jumped off and I could smell burnt hair.

"Let some of the air out of your back tire, put 'er in low, and stand on the back axle," I yelled. "That'll give you more traction." He did. Slowly, uncertainly, the Flood-Wilson Trans-African Motorcycle Expedition moved forward. The scorching rays of the afternoon sun bored through my thick red flannel spine-pad, and the heat from the trail beat up into my face, cooking the leather that used to be skin.

"Oh, well, only 3,000 miles more of it," I thought, as I jumped off to push.

That night we slept on the ground, under a forlorn little thorn tree. We were stiff and cold when we woke up Christmas morning.

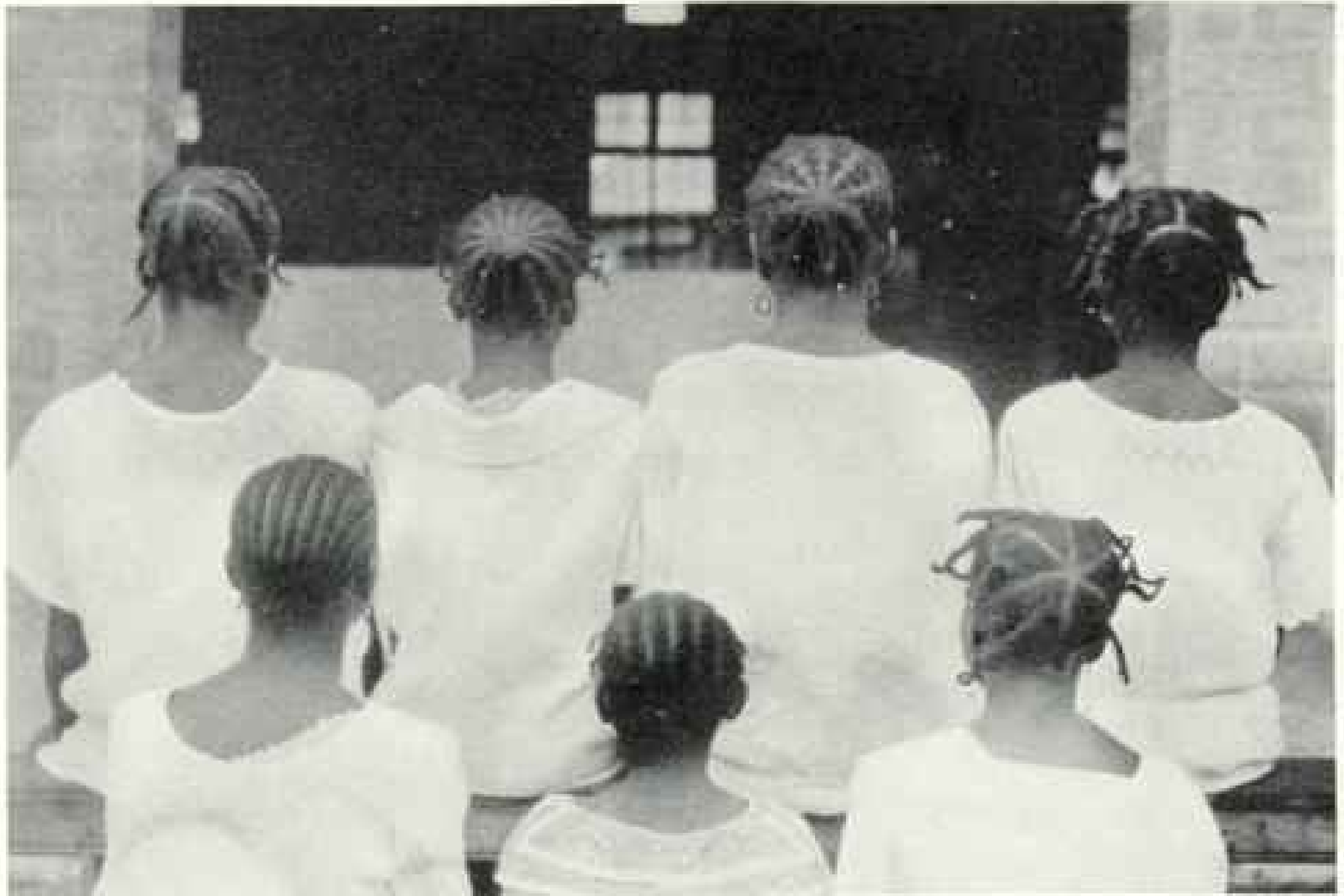
A party of Tuareg, on their way to Zinder to trade, had made camp just a few rods away during the night, and one of their camels had strolled over to eat the thorns off our tree. The chief, a tall, spare fellow whose veins stood out like ropes on the backs of his hands, walked over to drive it back.

In addition to the distinctive blue robe and veil of the Tuareg aristocrat—the vassals wear white—he had wrapped about him an enormous blanket fully fifteen feet long. It was different from anything I have ever seen—hand-woven in alternate strips of wool and that durable, fibrous "firki cotton" (see text, page 61) peculiar to the Sudan, with red, green, and orange bands and queer little slotted designs along the edges. It looked thick and warm.

"Aha!" said Flood, pulling on his shoes. "That's just what we need for these cold nights." And he dickered it right off the chief's back. We slept in that blanket all the rest of the way across Africa.

The Tuareg, reputedly one of the most warlike of African tribes, are thought to be descendants of Berbers, who were driven southward into the desert when the Arabs swept across North Africa in the 11th century, though some authorities date their emergence as a distinct people a good deal farther back than that.

After the French announced in 1890 that they owned that part of Africa, they sent expeditions galloping out from time to time to explain things to the Tuareg, and the



Photograph by A. W. Banfield

SOME "PERMANENT WAVES" IN THE YORUBA MODE

Ingenuity is given free rein among the native belles of Lagos. Seven different designs of hair-dressing are shown by the members of this group.



Photograph by James C. Wilson

THE LAGOS "BEAUTY PARLOR" IS THE SIDEWALK

Kneeling on the ground in front of their houses, Yoruba matrons gossip over their daughters' heads while braiding the woolly black hair into intricate patterns. Hairdressing, even for little girls, is a laborious process. The fashionable coiffure consists of dozens of tiny plaits, very neat and tight.

Tuareg promptly sent them galloping back with a lance point at the seat of each man's breeches. In course of time the French tired of this form of playfulness and sent out big enough expeditions to put a stop to it.

There are five main tribes, or confederations, of the Tuareg, and they occupy in a sketchy manner, with their camps and flocks, about 1,500,000 square miles in the western Sahara, centering northeast of Timbuktu.* But they are great nomads, and small bands sometimes wander as far to the east as the Wadai (French Ouadai) region of French Equatorial Africa (see map, pages 40-41, and text, page 87). After leaving Zinder we ran across them frequently and found them quite agreeable, if not exactly garrulous—but then we weren't trying to collect any taxes!

SAND RUINS EXPECTATIONS OF SPEED

The commandant back at Zinder had told us that 90 miles east we should find a small French outpost called Gouré. Thanks to a newly built military road for the first 28 miles, we made 69 miles that first day, and on Christmas morning we calculated that we could easily make the 21 miles to Gouré by noon.

But the fine sand of the trail rose in such thick clouds that we had to spend an hour making air strainers for the carburetors. Then, about 11 o'clock, one of our gasoline cans sprang a leak and I had to build a brushwood fire and solder it—full of gasoline. So, instead of noon, it was almost 3:30 when we finally pulled up out of a steep *cuvette*, or basin, and saw the fort, shaking in the heat, on top of a big dune two miles to the east.

Gouré, although not so large as some, was typical of those French posts scattered across the southern fringe of the Sahara—a square-cut crown of grim clay battlements, often several acres in extent, rising out of a mountain of gray sand; always a native village at the bottom, and a big natural basin, with several wells, the village cotton and millet patches, spreading palms and pawpaw trees, and the fort garden.

The garden is always the show-place of the post—on the rare occasions when there is some one to show it to—and no wonder,

* See "Timbuktu, in the Sands of the Sahara," by Cecil D. Priest, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1924.

in a land where the vegetation is limited almost exclusively to thorn trees except in the basins.

Here, in these grim clay outposts of the white man's authority in the Sudan, may be found one Frenchman, or perhaps two or three, in command of a corps of native soldiers. The isolation is almost complete, except for the passing at rare intervals of other Frenchmen on their way to or from more distant forts. The term of service is three years; then a year to recover one's reason in France. We once stayed a week at a post whose commandant had not seen another white man for seven months. No wonder guests are welcome!

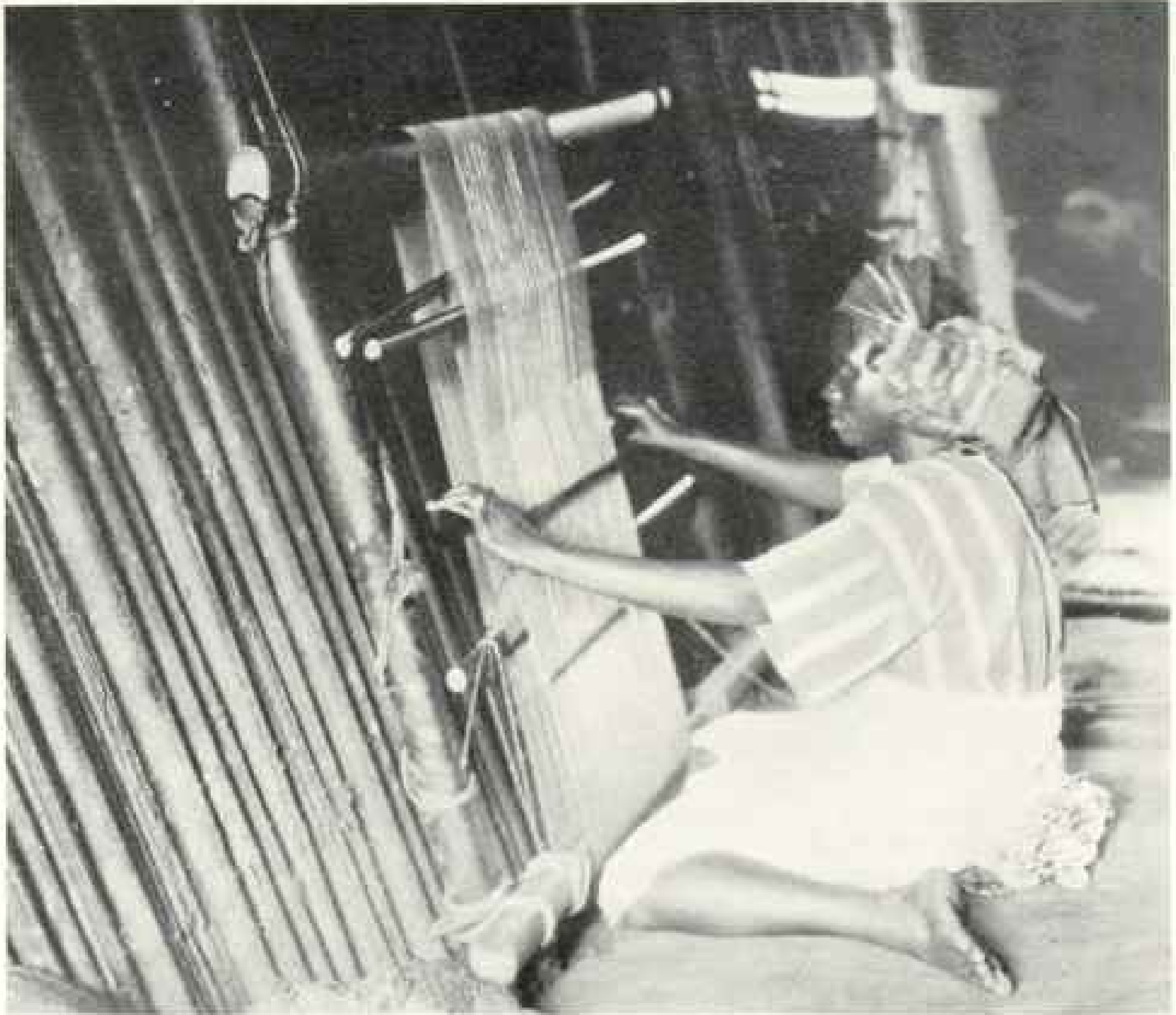
Christmas dinner with two guests who could speak the American language in French was a real event in the life of the lonely commandant at Gouré. It was an event in our lives, too. With antelope and guinea fowl dotting the hills, and a dozen native prisoners to tend and irrigate his garden, the French officer in the Sudan at least doesn't have to go hungry.

Gouré is inhabited mostly by the Manga, who subsist largely on the red millet so characteristic of the Sudan, eating the grain in the form of couscous, or porridge, and building their circular huts of the stalks. The *cuvette*, in which are located the village and the fort garden, is otherwise occupied entirely by millet, tobacco, cotton, and vegetable plantations. In the *cuvettes* south of Gouré are salt marshes and sodium carbonate, or natron, deposits which the natives work by primitive methods, exporting the products to Kano.

STRANGE CUVETTES NEAR LAKE CHAD

These *cuvettes* are the most striking topographical features of the Lake Chad basin. They are deep depressions in the sand, ranging in length from a few hundred feet to three or four miles, and usually are oval or circular in shape. The floor, smooth and almost level, is frequently of that heavy, black soil peculiar to the Sudan and known to the natives as "firki."

It is excellent for cotton, millet, and other crops, but cracks into sections with crevasses several inches across during the dry season and is very hard for animals (or motorcycles!) to travel over. Authorities differ as to the origin of the *cuvettes*. Some ascribe them to subterranean infiltration from Lake Chad. Others say that the firki soil was originally the floor of an



Photograph by James C. Wilton

A YORUBA WOMAN WEAVES COTTON IN A NIGERIAN PALM-THATCHED SHELTER

Half around the world, under a cottonwood tree in Arizona, a Navajo woman sits before a very similar loom making homespun wool into fine rugs.

ancient, much-extended Lake Chad, buried by the sand and later uncovered in the cuvettes by erosion.

Even though the surrounding dunes be perfectly bare, there are grass and trees in the cuvettes, the *dum* palm being a characteristic feature of the landscape. Water is usually only a few feet, sometimes only a few inches, below the floor, and one frequently finds a pond, or small lake, at the lowest point. Sometimes the water is fresh, sometimes impregnated with salt or sodium carbonate. The salt in this region is bitter and acrid, but the inhabitants like it.

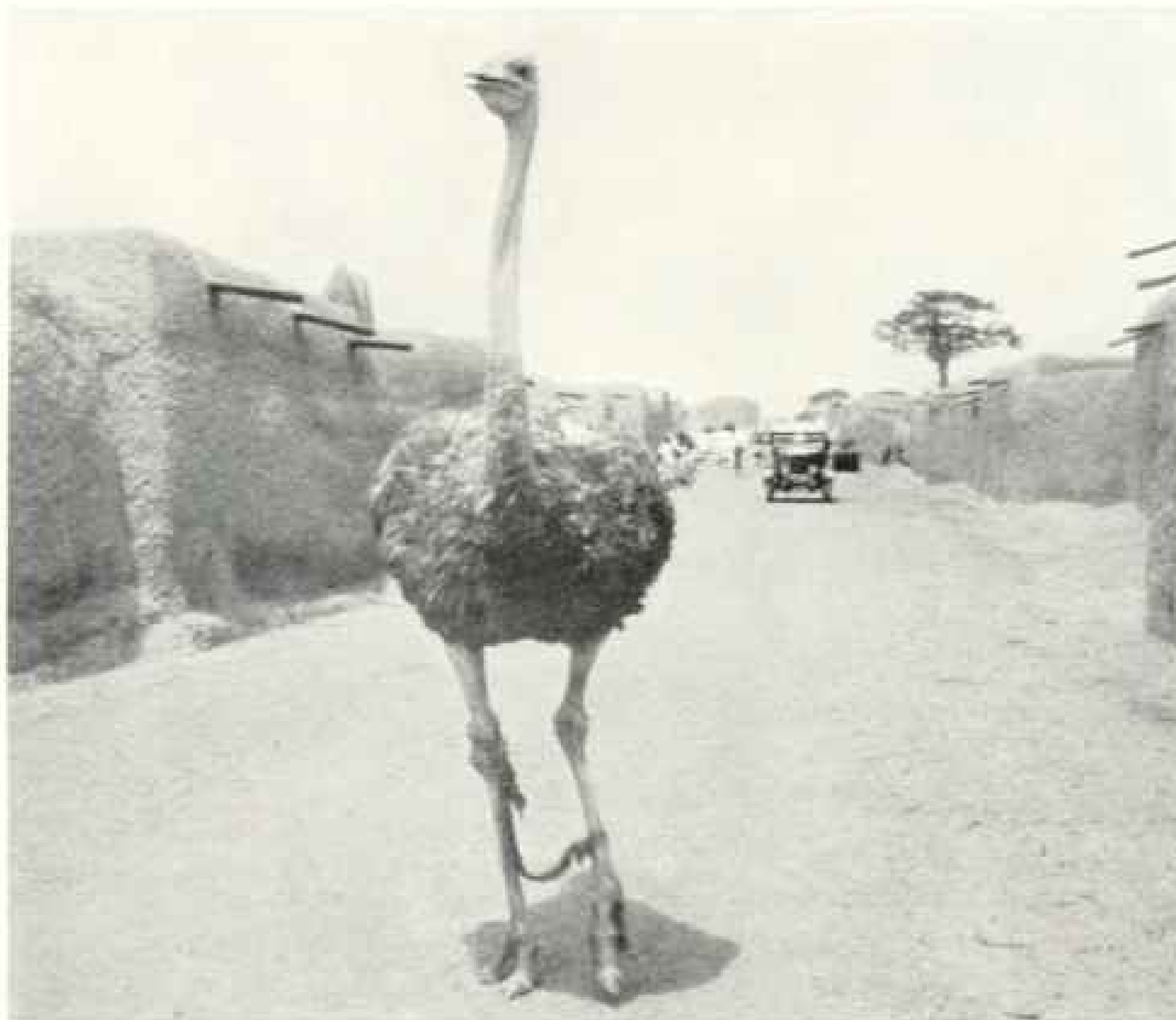
The morning after Christmas we had to push onward from Gouré, in spite of the Frenchman's entreaties that we stay. Two miles away, as we turned back to look at the fort for the last time, he was still watching us, a tiny dot on the firing parapet.

Two days' terrific battle with the sand

brought us to the headquarters of a native road gang—85 Kanuri tribesmen (see text, page 72) encamped in a cluster of grass shelters hastily thrown together. The French had just begun work at several points on a military road to extend from Zinder to N'Guigmi, about a third of the way across Africa by the route we were traveling (see map, pages 40 and 41, and text, page 57).

The tribesmen were laying down a long, narrow strip of clay across the sand for the sun to bake, carrying it in reed baskets on their heads from a cuvette about a quarter of a mile away. Some of them had little stiff-legged donkeys equipped with homemade panniers.

We were almost out of water, and the foreman sent one of his men down to the water hole in the cuvette with our empty cans.



Photograph by Ottiwel Waterfield

A PET OSTRICH WOBBLIES THROUGH THE MAIN STREET, KATSINA

Though hobbled, it chased the photographer down a side alley a few seconds after the snap was taken. In many African villages such sights are common.

"What do these fellows get for a day's work?" I asked.

"One franc (four cents) for a man, three francs for a donkey," replied the foreman.

Flood reached into his pocket and handed me three one-franc pieces. "This is for yesterday," he said.

THE GOING PROVES PUNISHING

By this time the sand was so deep and the dunes were so high that it was impossible to make any progress with our heavily loaded motorcycles. It had taken us six hours to make the last five miles to the road camp. The wear and tear on both man and machine was terrific, and in spite of our forced jauntiness we knew that neither could hold up much longer under such punishment.

The Senegalese foreman offered us six of his donkeys and drivers to carry our

baggage. About 20 miles farther on, he said, we should find the camp of a French surveyor who would get us a couple of oxen to take it to the next fort, Maïné-Soroa, 80 miles beyond.

It was then the twenty-eighth of December. "Well," said Flood, "with good luck we ought to make the fort by New Year's Eve."

Time went on, slowly and tediously—and so did we. By this time we knew only too well the folly of attempting to cross Africa by motorcycle north of Lake Chad, and had given up hope of getting across except by camel; but we were determined not to give up until we absolutely had to. So we kept pushing doggedly forward, spending our last ounce of strength on the obstacles each day brought, shutting out all thought of the future. To have looked ahead would have brought utter despair.



BAGGAGE TRANSFER COSTS LITTLE IN THE SUDAN

An ox or a camel may be hired for the equivalent of 25 cents a day, with a driver who provides board for himself and his animal. They return on their own time!



Photographs by James C. Wilson

TERMITES HAVE BUILT WAYSIDE CATHEDRALS

The West African white ant will eat the boards and timbers of a house, clothes, pack chest and contents, leather wallet and saddlebags; a traveler's diary, shoes, and sun hat—practically everything except his jackknife and can opener.

The surveyor was a good scout. He had the village chief get us the oxen, and we loaded them up and sent them off at sunrise, keeping out a few tools for emergencies, a five-gallon can of water, and enough gasoline to get us to Mainé-Soroa.

Two hours later we started out. For the first 25 miles the trail lay across the smooth floor of a series of long, palm-studded cuvettes separated by low, rounding dunes. Twelve miles from the surveyor's headquarters we came across a small encampment of Manga people extracting salt from the pond in a deep cuvette. They poured the water into inverted cones of tight grass thatching, through which it slowly seeped, evaporating on the under side and leaving a deposit of salty hoarfrost.

We passed our two oxen a little before noon, and by nightfall must have been fully ten miles ahead of them. We had tripled our lead by noon the next day, and then our troubles began. The line of cuvettes swung sharply off to the south, but our trail kept straight ahead.

Desert sand again, piled up in huge heaps, blowing and drifting in the wind. For two days we struggled with it in low gear, pushing most of the time. The last afternoon we had less than a quart of water to divide between us, and from the looks of things there wasn't a well or a human habitation within a thousand miles. Then we lost the trail, and half an hour later discovered that we had only three pints of gas left.

We were utterly exhausted. No water, no food, no trail—nothing but sand, sand, sand, and the heat. It was 2 o'clock in the afternoon, December 31, and we were still 22 miles from Mainé-Soroa. "Well," said Flood, "there goes our New Year's Eve dinner."

But look! Look! A turbaned black horseman galloping over the hills out of nowhere in a swirl of sand. Pinch me! I'm seeing things!

He dismounts, unwinds his turban, takes out a piece of paper and hands it to Flood. A letter! Addressed to us!

"MAINÉ-SOROÀ, December 30.

"*Messieurs les Américains:* We are anxiously awaiting you here for several days, since they notified us from Gouré. If you are in trouble or need assistance of any sort, please send a letter by this messenger and command me. We hope that you are safe and that we shall welcome you soon.

"(Signed) JEAN L. ROGER,
"Commanding Officer of the District."



Photograph by James C. Wilson

NATURE PROVIDES A STAND-PIPE FOR A WADAI VILLAGE

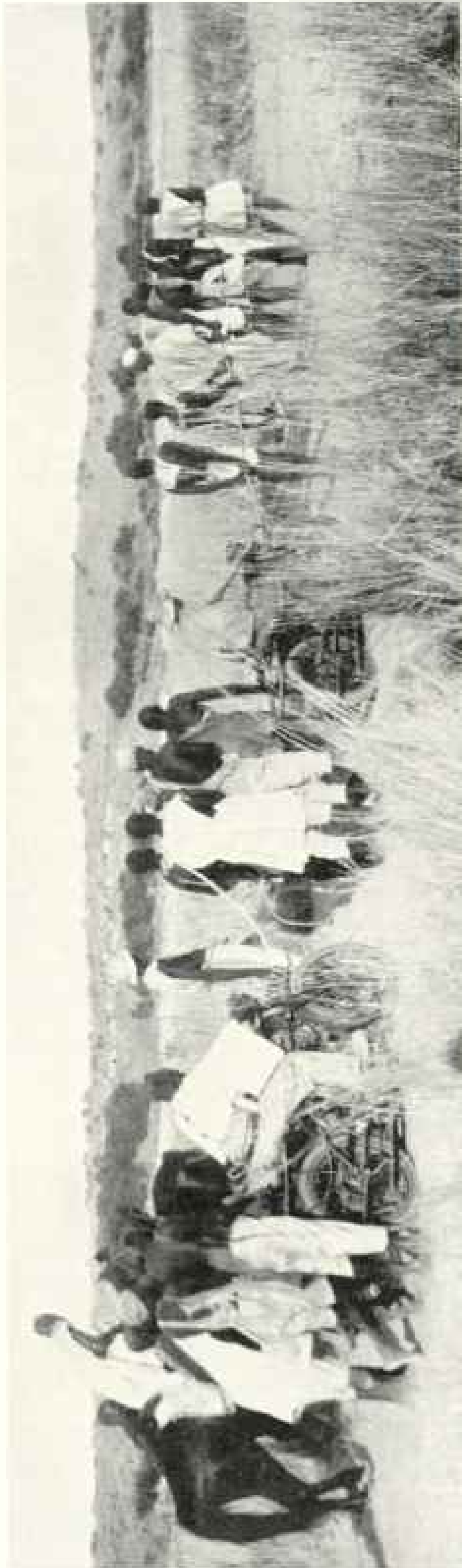
Living baobab trees offer the only storage tanks for many communities in French Equatorial Africa. During the rainy season water is collected in reservoirs and poured into the hollow trunks, where it keeps fresh and sweet during the long dry season. The woman on the limb is dipping out her household supply in a goatskin bag and lowering it.

We knew that the French were building a military trail from Zinder to Lake Chad. We didn't know, however, that there was another native road camp just over the next dune, and a brand-new stretch of clay road from there to Mainé-Soroa. But the messenger did. He sped away and returned in half an hour with a detachment of 30 laborers. They shinnied up the palm trees in the cuvette, tore off the leaves, braided them into rope, and pulled us over the dune and down to the camp.



THE ADVENTURERS ESTABLISHED THEIR OWN HOTEL AND GARAGE

Despite a broken axle, the result of an accident east of Khartoum, and warnings of white ants and black scorpions, they made repairs quickly and slept soundly.



YEOMAN SERVICE HELPED ON THE ROAD TO MAINÉ-SOROA

The Senegalese foreman of a Kamari road gang supplied the travelers with two 15-man teams, who pulled them six miles at a trot. (see text, page 65).

Photographs by James C. Wilson



Photograph by Ernest B. Schoettlbeck

TRAPPINGS TEND TO DISGUISE THE NAZIR'S ON

Ordinarily the Messeria chief would be on horseback, but he consented this time to stand beside the heavily decorated saddle bag ridden by one of his wives (see illustrations, pages 85 and 86). The Messeria are one of the nomad "horse tribes" of Kordofan Province, in the Anglo-Egyptian Sudan.



Photograph by Ottwell Waterfield

SMALL BOYS OF KATSINA MAKE ROUGH BRICKS

After being baked in the sun, these *tabuli* will be used in the construction of mud houses and walls. A little dung and straw are usually mixed in to act as a size. This material attracts white ants (termites), which infest every mud house in northern Nigeria (see page 64).

We drank about a quart of water each, and then began to think about getting to Maïné-Soroa in time for the New Year's Eve dinner at the fort.

But it was still 20 miles away, and we had gas enough to get one motorcycle about 15. No matter; we'll get there anyway. Here, boys, lay hold of the ropes again!

They pulled us six miles on a trot over that good clay road. It was the biggest thrill they'd had for years, especially when we declared dividends at the end of the stretch and gave each man a franc (p. 66).

Then we poured all the gasoline into the tank of my machine, Flood tied his on behind, and away we went.

The sun sank lower and lower, and so did the gasoline level in my tank. Perhaps we should have had them pull us a few more miles.

NEW YEAR'S DAY BRINGS JOY

Hurrah! the fort, glowing in the last red rays of the year! Only two miles to go!

I hurriedly unscrewed the lid of my tank.

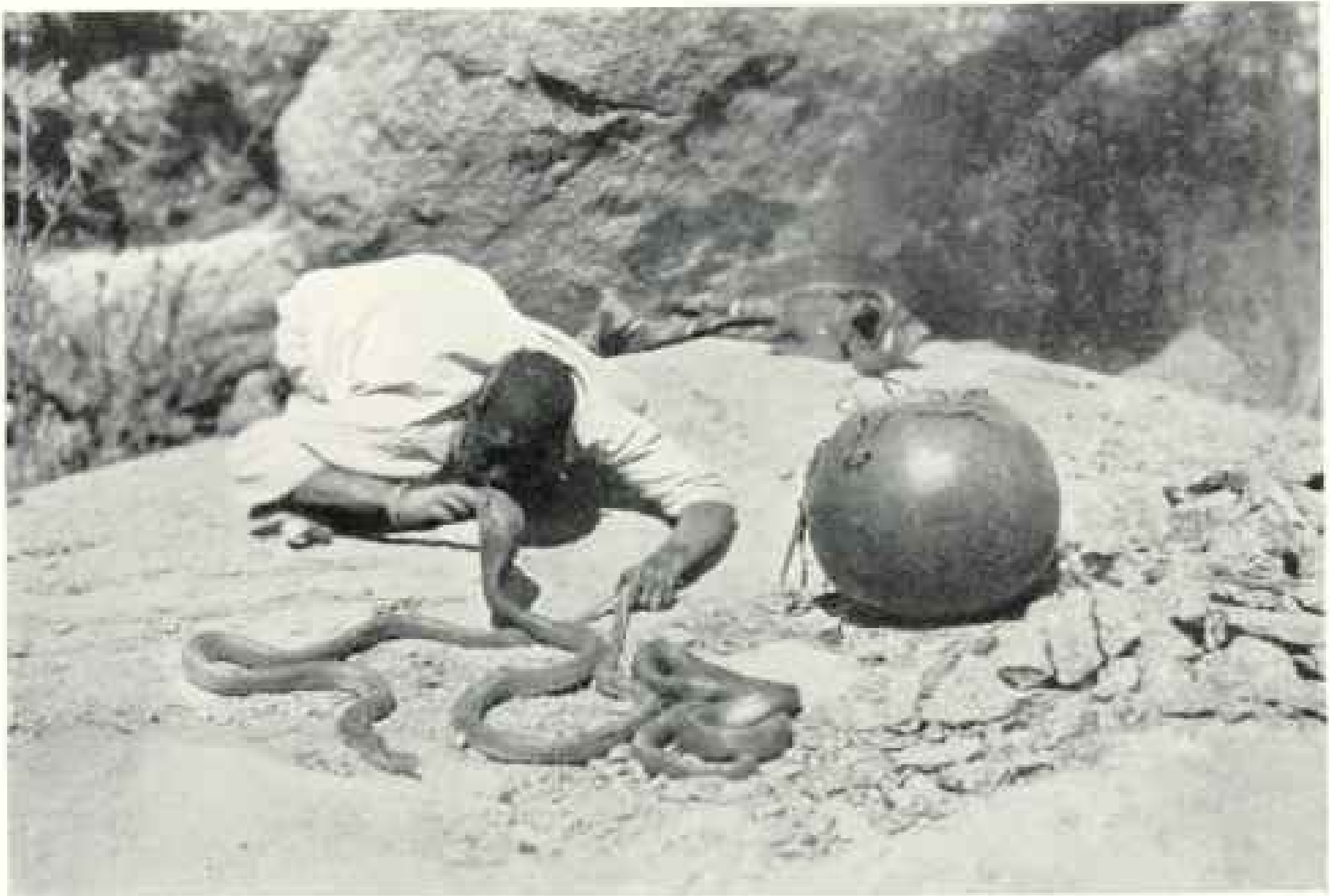
"Bottom's still wet!" I yelled back to Flood.

Closer and closer! Now we could see the garrison watching us from the parapet. They were waving their hats and cheering. Now they were throwing open the massive wooden doors, and just as the last drop of gasoline ran through the carburetor we rolled inside the gates and the motor coughed and quit. The Old Year took one last look at the triumphant spectacle, then dropped behind the horizon and was never seen again.

Down from the clay towers and parapets streamed the garrison of human black monkeys, chattering and pointing, to swarm around the motorcycles—the first motor vehicles ever to reach Maïné-Soroa, except for the French Citroën expedition of 1924-5 (see footnote, page 37). Then the black mass seethed and parted on one side, as two uniformed white men pushed their way through.

"Good evening, gentlemen! And welcome to Maïné-Soroa. But we have look for you since long time. Is it that you have had bad fortune?"

"Oh, no!" grinned Flood. "Just a little bad management. But I guess that's



Photograph by James C. Wilson

COBRAS ARE THE STOCK OF HIS ITINERANT TRADE

The performance of a snake charmer in the market place is sure to draw a crowd. This chap kept his pets in a big calabash. He insisted they had their fangs and poison sacs, and that his steady gaze bewitched them so completely that they dared not bite him.

what most bad luck amounts to in the long run."

New Year's Eve dinner at the fort repaid us for all the effort we had made to get there in time for it. And the celebration which took place during the five days of our stay at Maïné-Soroa was worth coming all the way from America by motorcycle to see.

Early New Year's morning the village Emir, smothered in glory and gold cloth, rode up to the fort to pay his respects. He was accompanied by a large band of musicians, the city council in robes and turbans, and 50 mounted lancers, and one of his vassals brought us a sheepskin full of dates as a token of the royal regard. The entire performance was much as I have often imagined a reception to a renowned knight in the days of King Arthur, though with a decided African flavor, of course.

The Emir's personal minstrel had composed during the night a long, resounding epic poem in our honor, which he recited in a huge and raucous voice to an obligato by the chief court musician on an ear-shivering native oboe. After that there were

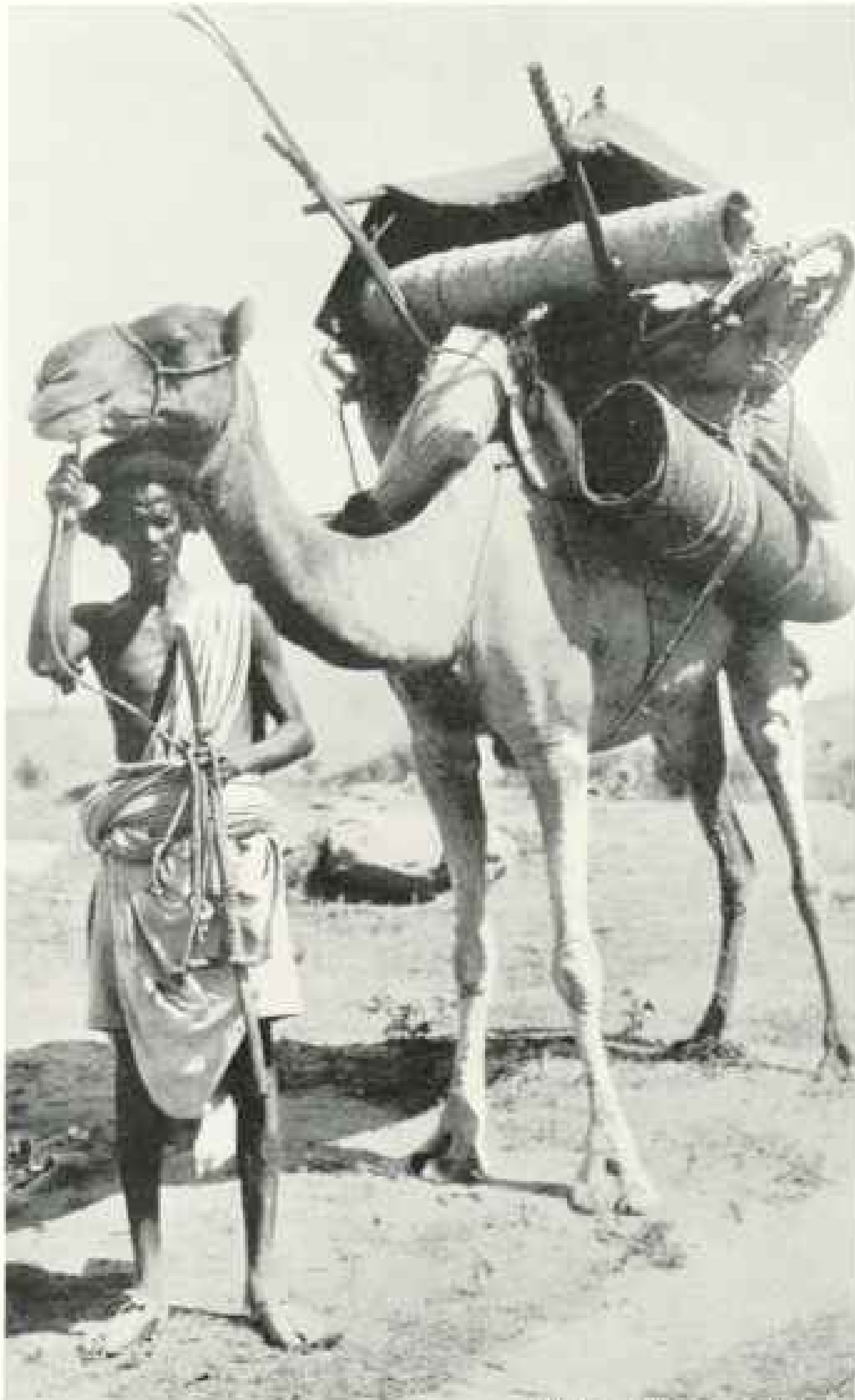
dancing girls—the Emir's favorites—performing in shifts in front of our quarters.

Immediately upon our arrival at Maïné-Soroa messengers had set out in all directions to announce the event to neighboring potentates, and on the afternoon of New Year's Day, with the Emir's ceremonies in full swing, here came a rival Sultan marching in from his stronghold 20 miles out in the desert with a detachment of a hundred camel-mounted lancers to honor the intrepid Americans.

A CHIEF TAKES A MOTORCYCLE RIDE

I took him flying down the hill in my side car, the first ride he had ever had in a motor vehicle, but his flowing robes got caught in the spokes and wrapped round and round the axle, pulling his head down over the side of the little tin bathtub so far that his ear was badly burned by the tread of the spinning tire before I could stop. But he thought it was all in the game, and I didn't tell him that it wasn't.

Many of the Sultan's men wore the chain-mail armor which since remote times has been remarked upon by visitors among cer-



Photograph by James C. Wilson

"FUZZY-WUZZY" HAS A "COVERED WAGON"

Tribesmen of the Anglo-Egyptian Sudan load their wives, babies, and chattels atop their camels. The man is a member of the Hadendoua, one of the three tribes to which the Fuzzies belong.

tain tribes of the central Sudan. It is said that some tribes possess suits taken from the Crusaders and carried south across the Sahara in the channels of commerce and warfare, but most of those in use to-day, I think, are made in the mills of Birmingham.

It was pleasant to be fêted as celebrities 24 hours a day, but we were still a long way from the Red Sea. On the fourth of

January we dispatched two camels in the direction of N'Guigmi and Lake Chad with our excess baggage, tires, spare parts, and reserve supply of gas and oil, and the next morning took off ourselves, amid much beating of tom-toms and sounding of praises by all and sundry.

Ever since leaving Zinder (page 58) our route had lain just inside the southern fringe of the Sahara. Now, however, the trail veered off to the south and dropped into the broad, flat valley of the Komaduga (a word meaning "river") Yobe, the largest western affluent of Lake Chad. It was muddy and swollen from the heavy rains farther south.

Long arms and bayous backed up across the land and over the trail, and huge shaggy trees, draped with hanging moss, rose out of the depths and dropped their reflections into the still, brown water. The river was often hundreds of yards wide. In bygone ages this had all been part of the floor of Lake Chad.

The country was a paradise for game. Stately cranes and

marabou storks stood in the shallows and scooped up fish with their bills. Flocks of blue herons flapped out of the trees and sailed away toward the sunset, and attending these feathered royalties were the smaller varieties in squads and battalions.

Out on the valley floor I saw inhabitants of a different kind: a snarling jackal and three big vultures, tearing at something



Photograph by James C. Wilson

SIXTEEN PUNCTURES AT ONE TIME!

Rounding down the side of a dune in Hausaland, the motorcycles plunged into a patch of thorns. Before the riders could stop they had holes in all six of their tires. Friendly natives spent hours pulling the skewerlike needles from the casings while the tubes were being patched.



Photograph by Will F. Taylor

THE YAGBA HUNTER PROPITIATES HIS IDOL OF THE CHASE

The native of this Nigerian tribe firmly believes that good spirits can be persuaded to enter certain objects. When one has been captured the owner puts it to work for him. He seeks its favor by offering oblations and sacrifices to it.



Photograph by Will F. Taylor

GUINEA CORN FORMS THE STAPLE DIET IN THE FAR INTERIOR OF NIGERIA

It serves the same uses there as yam and cassava do among the coast tribes. There are a number of species; one comes to maturity in three months and another requires seven months. It is not uncommon to see stalks standing 14 feet high.

that had been alive an hour before; two startled antelopes, tense and alert; a wild sow trotting grumpily along at the head of her family of six; a dozen white-tailed gazelles, off like rockets and leaping away through the grass; and, far in the distance, a flock of black-plumed ostriches coursing along in the purple haze.

LOST IN TRACKLESS COUNTRY

Fascinating country, but it wasn't made for motorcycling. When we made camp, just before dark, we were completely lost, as far as any trail was concerned. "But what's the difference?" said Flood, shrugging his shoulders. "There's plenty of water and plenty of meat, and we know that the river flows into Lake Chad."

That night we heard the elephants trumpeting and crashing through the brush.

At a resthouse near the village of Toumour we spent a very comfortable night. Next morning we resumed our march to N'Guigmi, passing through several small

villages of Kanuri cattle-raisers during the day. The main body of the Kanuri inhabit Bornu Province, southwest of Lake Chad and the Komaduga Yobe, but we ran across some communities even directly north of the lake. They are desert people who came south long ago and mixed with the Negro tribes of Bornu, and the name "Beriberi" (Berber?), given them by their neighbors, the Hausa, possibly indicates that they were once much lighter-skinned than at present. During part of the 16th century their empire was known as one of the most powerful in central Africa, but their political power and talent have waned.

Beyond the resthouse of Toumour the trail was fair for some distance, but the last 20 miles to N'Guigmi were enough to punish us for all the sins we had ever committed. It was utterly impossible to get any traction in the deep, soft sand unless we ran with the rear tires practically flat, and then the tire slipped on the rim and tore out the valve stem. This happened

seven times during the day, ruining three good tubes. We had only three extras left.

In desperation I split two of the ruined tubes and installed them in the casings as inner linings, with the flaps sticking out between tire and rim. This created enough friction to grip the tire fast—and that problem was solved.

But when we finally sighted the N'Guigmi fort there was an American flag rippling in the breeze above the tricolor! There was a so-called telegraph line from Zinder to N'Guigmi, which happened to be in working order then, and a native tailor had spent three days making the flag, to honor the first Americans who, he said, had ever reached the post.

At the base of the sand dune crowned by the fort is a Kanembu village of tall reed huts shaped like inverted ice-cream cones, each compound surrounded by a fence, also of reeds. From N'Guigmi there is a well-traveled caravan route north to the oases of Agadem, Bilma, and Kaouar, and the inhabitants of the town make a living by trade, cotton and millet culture, and the working of salt and natron (see text, page 61) deposits. A few are cattle-raisers. The women wear big silver earrings and do their hair up with liquid butter, or *ghee*.

ELEPHANT HUNTING PROVIDES A CHANGE

Captain Le Blanc, the N'Guigmi commander, was a lean, hard-bitten old colonial of about 50, with drooping, long-horn mustache and a big Adam's apple that kept chinning itself when he talked. After we had rested for a day, he proposed a horseback trip over to the shores of Lake Chad for an elephant hunt. We got no elephants, but it was a real luxury to ride on an instrument of locomotion that didn't require pushing.

It could almost be said of Lake Chad that it *has no shore line*. We followed its edge many miles that day without a sight of open water. The whole lake might have been only three inches deep, for all that we saw of it! (See page 79.)

"And you would probably have to wade out a good long distance," said the captain, "in order to see anything different. For the first 10 or 15 miles there would be nothing but a continuation of this vast wilderness of wild millet and water plants, growing six feet high in three to 20 inches of water. Then you would find yourself

in a mysterious labyrinth of swampy little islands and narrow, winding channels. By getting one of the natives to guide you, you would eventually reach open water, but it wouldn't be very deep—perhaps 15 feet in the deepest spots."

"But you don't mean to tell me there are natives living clear back in there!" exclaimed Flood, incredulously.

"Oh, yes, indeed. Most of the islands are inhabited by a curious people called the Buduma. And they are just as isolated from the rest of the world as if they lived on another planet. They go paddling about that mysterious little universe astride their 'water horses,' catching fish, snaring waterfowl, and pirating their neighbors, and they have neither knowledge nor curiosity regarding what goes on outside their swamps and islands."

A TRIBE OF STRANGE CUSTOMS

The Buduma are thought by some to be a remnant of the ancient Kanembu, who took refuge in Lake Chad. They live in villages of carelessly constructed reed huts and have little culture worth mentioning.

The "water horse" mentioned by the captain is merely a log of the ambash (ambach) tree, which grows in profusion on the islands of Lake Chad and is almost as light as cork.

Some of the islanders also lash bundles of reeds together to make canoes and barges of considerable floating capacity.

Most of the Buduma profess Mohammedanism, but many communities are purely pagan. Some venerate the reed out of which they make canoes, wearing a small section of it around the neck as an amulet. Captain Le Blanc told us about a queer custom of one of the villages in the eastern archipelago. Every morning the inhabitants throw a calabash of millet into the water, invoking the good will of their "mother," the lake. If fish come out and eat the millet, the people are happy, believing this acceptance of their offering a sign of favor.

"And no wonder they call themselves 'sons of the lake,'" said the captain, "for they spend practically all their time on it."

During the next four days I gave both motorcycles a thorough overhauling, scooping the accumulated sand out of crank-cases and gear boxes and repairing as best I could the damage it had done. We were a little more than a third of our way across



Photograph by James C. Wilson

THE HORN-PLAYER TO THE EMIR OF MAÏNÉ-SOROÀ

The prime requisites to a musical career here are a good pair of lungs and plenty of "cheek." The instrument consists of the tip end of a cow's horn fitted with a mouthpiece like that of the oboe. It has been defined as "an ill wind that nobody blows good."

Africa. The next post was Rig-Rig, 92 miles ahead; 85 miles beyond Rig-Rig was the post and the Kanembu village of Mao, where we expected to get gasoline.

We laughed and joked a good deal with Captain Le Blanc and his aides, but sometimes, laboring hopelessly over those battered little motorcycles, with the sweat dripping off our chins and noses, we felt like tired old men. . . . It was 2,400 miles to the Red Sea. . . .

The trail from N'Guigmi to Mao was so sandy that we could make no headway at all with our side cars. Therefore we took them off, draped them across the hump of

a dyspeptic-looking camel, let still more air out of our back tires, and after several disastrous experiments learned to skim over the soft sand on two wheels, after the style of an aquaplane rider.

Flood, who had never ridden a two-wheeled contraption before in his life, took 16 falls the first day. Our bare legs were striped like a zebra's with burns from the smoking cylinder fins.

And then Flood's luggage carrier broke in two. We were 60 miles from N'Guigmi and more than 500 miles from the nearest garage—clear back at Kano. However, we had a brass rod, some borax, and a big hatchet in our tool boxes, and there were dead trees in a near-by cuvette. But we had no forge! We made one out of an empty gasoline can and a pair of motorcycle handlebars, and with Flood as the bellows and the big hatchet for an anvil, I stuck that luggage carrier back together (see illustration, page 76).

Next day the cap dropped off Flood's magneto breaker box and a little hard rubber bearing the size of a small pearl—and much more valuable to us—fell out in the sand. The motorcycle wouldn't run without it, and we didn't have an extra or anything to make one out of. We absolutely *had* to have it; but a three-hour search on hands and knees only convinced us that it simply wasn't there. The Sahara had swallowed it up.

FALSE TEETH IN A NEW RÔLE

But Flood had lost his four upper front teeth, and the replacements were mounted

on a quickly detachable partial plate.

"Spit out your teeth, Flood. Let's see that plate. . . . Hurray!! Hard rubber!!" And I carved a bearing out of it that got us across Africa, but Flood had to run in on the rim to the nearest dentist, in Khartoum—1,500 miles away.

This is the no man's land of Africa, the southern fringe of the desert back of Chad. But wherever there is water there are people—even in no man's land—in a little cluster of grass huts squatting in a cuvette, and 15 or 20 villagers, as lean and sun-dried as the desert itself, anxiously scratching their scanty millet patches and hoping to harvest enough of the coarse grain to keep them alive another season.

There's something gallant about them, these dwellers in a region of eternal want, tenaciously clinging to an existence so rigorous and unadorned that it seems scarcely worth the effort necessary to maintain it.

Sometimes the water is deep in the rock. We stepped off one well rope. It was 154 feet long. No wonder a camel has to be his own windlass when he wants a drink, and no wonder he gets thirsty only once a week or so.

But who dug the wells? The French? Yes, the French have dug a considerable number in the last 30 years. But many of those holes in the ground may well be older than the Bible. I remember one in particular at which we watered. The four hardwood logs which formed the curb had been almost sawed in two in dozens of places by the friction of the rope.



Photograph from Georges-Marie Haardt

THE HAUSA WOMAN WEARS A DISTINCTIVE COSTUME

Her ideas of finery run to bright-hued sashes and much more clothing than many African belles deem necessary. Her face is marked with intentionally made scars (see text, page 38).

A new curb had been laid on top of the old one, and worn out; then another and another—16 hardwood logs worn out by the sawing of a rope; and no telling how many times in the remote past history had repeated itself on successive series of curbs. I should like to know how many skins of water have been drawn out of that well for thirsty men and camels.

But the most interesting wells are the ones that grow out of the ground. According to one legend, Perseus, after killing Medusa, flew across Africa with her head, and the drops of blood which fell on the sands turned into clusters of writhing snakes.



Photograph by James C. Wilson

THE AUTHOR SET UP A BLACKSMITH SHOP IN THE CENTRAL SUDAN

Half a petrol tin, a motorcycle handlebar, and a stout pair of lungs served when a luggage carrier broke hundreds of miles from a repair shop.

Look at the twisted limbs of the baobab trees. Who will say that the legend is false? (See opposite page.)

There is a short rainy season, even in the desert, and tiny streams run in the valleys after a shower. The villagers dam them up, collect the water as carefully as if it were molten gold, and pour it into the hollow trunks of the baobab trees. A good-sized tree will keep 500 to 1,000 gallons of water fresh and pure for many months. Dozens of villagers have no other supply than what is held by a grove of these trees. The natives hoard the precious liquid carefully, drawing it up in goatskin bags through a hole in the top of the trunk (see page 65).

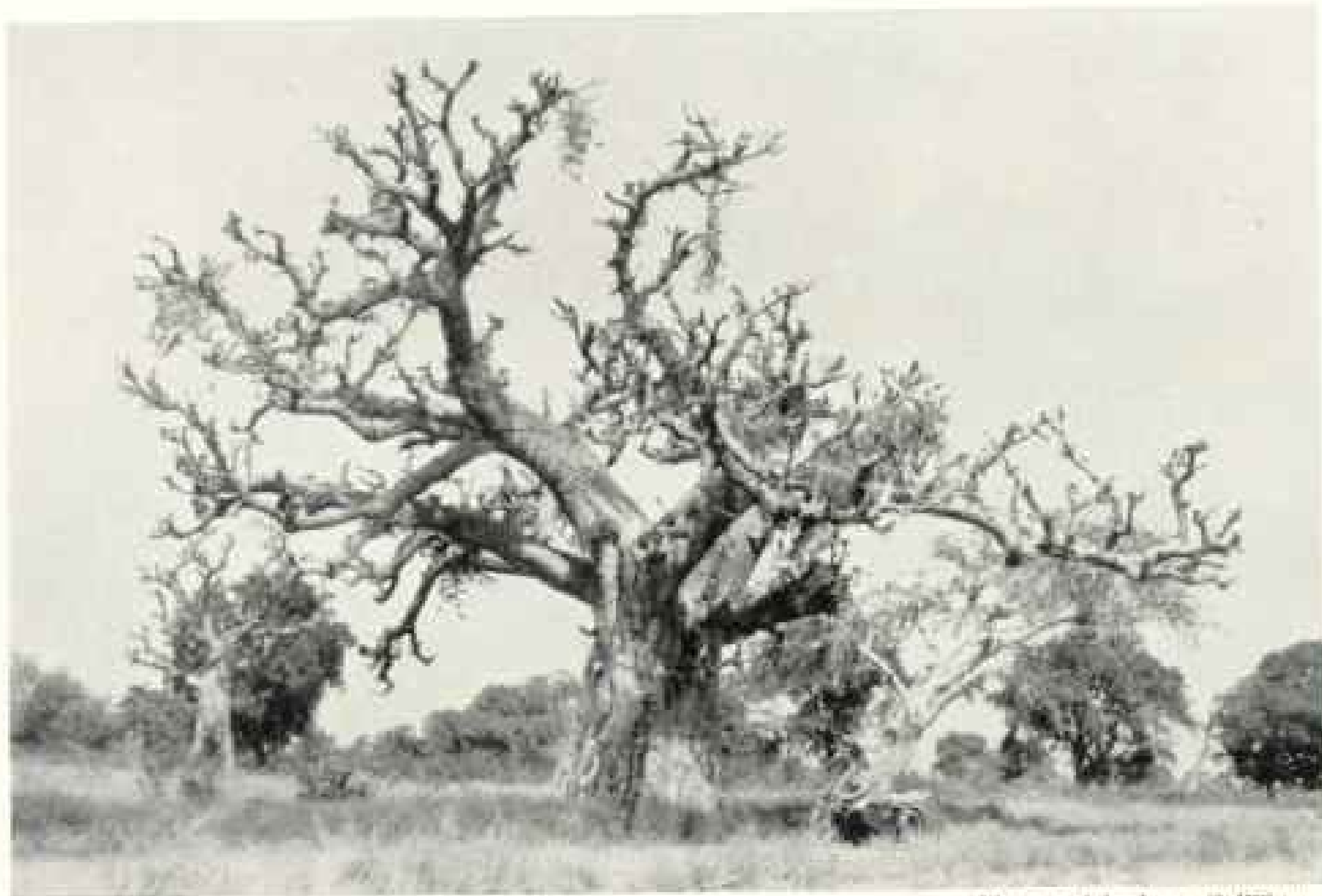
DROUGHT WINS IN AN ENDLESS FIGHT

A dry season here means real tragedy. And the dry seasons are becoming increasingly frequent, for the grim Sahara is slowly creeping south, turning savannas into sand dunes and mere aridness into desolation. The Lake Chad shore line in places has receded several miles in the last hundred years (see illustration, page 79).

The gallant little villages are losing their fight. There are old baobab trees, but almost no young ones. Wells that were good a century ago are dry holes in the sand today. The millet patches of yesterday may be wind-swept wastes to-morrow. And man can only bow his head sadly, load up his woman and babies and his few pitiful possessions on a camel, and wearily set out over the path inexorable fate has decreed for him, hunting for a spot a little less grim and hostile, where he may live a few more years before he dies.

A boy guided us to a handful of beehive grass huts huddling together in the sand. It was typical of those little African settlements which dot the central Sudan, so unreal and bizarre to the people on the other side of the world, but so eloquent of homeliness and security to the simple folk who are born, spend their lives, and die here.

Before almost every hut there was a little cooking fire and a woman busy at her pots. Two men were skinning an antelope by the guttering flicker of a twist of grass in a little dish of fat; and squatting on the ground near the light were four little boys



Photograph by James C. Wilson

HUGE BAOBAB TREES SEEM MONSTERS FROM FAIRY TALES

The size of this peculiarly twisted specimen may be judged by comparison with Flood's motorcycle, which he has stopped beside it.

intently playing a game with pebbles dropped into holes in the sand. From one of the huts came the soft, wistful notes of a bamboo flute in a melody centuries old. In another a woman was singing her baby to sleep.

Seated on the ground around a bright, crackling fire were 18 or 20 little white-robed figures with scalp locks and pigtails, dutifully droning verses of the Koran from their wooden slates, under the supervision of a watchful old patriarch with a scraggly white tuft on the end of his chin.

We followed our guide through the center of the village to a hut somewhat larger than the others. He went inside, leaving us the center of a crowd of wondering natives, who stood back in the shadows and whispered furtively to each other about us.

"Back home they'd all be peeping from behind drawn blinds," said Flood, and we both laughed to think how small the world is after all and how very much alike most people are.

Next morning when we came to tell the chief thank you and good-bye, he went into his hut and came out with a soiled, tattered photograph of half a dozen white men in

sun helmets and shorts, standing in front of three tractor-type cars, part of the French Citroën Expedition of 1924-5.

The significance of our reception in the light of the chief's possession of this photograph was not lost on us. He *had* had previous experience with white men and their "putt-putts." And it was a compliment of the highest order both to M. Haardt and his companions and to the chief and his people that Flood and Wilson, also white men with "putt-putts," had been so graciously treated when they passed that way several years later.

On through the desert, plowing, grinding, pushing, sweating; giving up hope regularly every night, renewing it every morning. A magneto chain gives out. I repair it with a piece of one of the fenders. Our camels catch up with us before the job is done. The sand isn't so bad now, so we attach the side cars again. A spring breaks. We saw off a tail-light bracket and truss it up as best we can. Another petrol tin springs a leak and we solder it out under the broiling sun. We drop over a series of bluffs and breaks into a scorching little valley and find the ground covered



Photograph by Ottiwil Waterfield

TUAREG TRAVEL WITH CAMELS ON A LEASH

Ancient methods of transportation prevail among these sturdy tribesmen of Gumbel, along the northern border of Nigeria (see text, page 59).



© Hugo Adolf Bernatzik

THE SHILLUK BOATMAN RISES GINGERLY IN HIS PRECARIOUS FLOAT

Since his body has been rubbed white with wood ashes as a protection against stings of malaria mosquitoes, his natural color appears only where the coating is washed away. The craft, common on the Nile in the Anglo-Egyptian Sudan, is made from a bush that grows in the water.



Photograph by James C. Wilson

FLOOD INTERVIEWS THE GUARD OF A TUAREG CAMP OUTSIDE ZINDER

High-backed wooden saddles, pack saddles, camel fodder, and household goods are heaped on the sand under the watchful eye of a tribesman.



Photograph by Walter Mittelholzer

SWAMPS AND MORE SWAMPS—SUCH IS LAKE CHAD

Shoreless, the author calls this shallow body of water in the heart of Africa, after following its edge for many miles without a sight of open water. It is flecked with swampy little islands which are separated by narrow, twisting channels (see page 73).

with thorns. Sixteen punctures before we notice what's wrong and get stopped. But there's a village near by. We get a tanned antelope hide, cut it into strips, and, after friendly natives have picked out the thorns (see page 71), install puncture-proof linings in all six casings. No more flat tires!

Almost halfway across Africa, out of water and lost! The last time we were in this fix I tracked a jackal four miles to a stinking little water hole, fished out two carcasses, scraped off the scum, and we made tea. But we haven't seen a jackal for hours. There was supposed to be a village ten miles back, but we missed it. Must be on the wrong trail; that means that we'll miss our camels. Ordinarily we drink over a gallon of water a day—and sweat it out. To-day we've had less than a quart between us.

The long, lonely night is anything but cheerful. We can't sleep, we can't talk, we can't swallow; our tongues are swelled up like prickly pears. It's ghastly to die of thirst!

But who said anything about dying? Ten o'clock in the morning, and here comes an old Mohammedan pilgrim plodding down the trail, driving his donkey ahead of him. He offers his calabash in the name of Allah the Merciful. And all the petty distinctions of race, creed, and color are swept away in a rush of gratitude for this act of human kindness.

Before the pilgrim passes on, our camels appear over the crest of the hill. Allah be praised—we're on the right trail after all!

WATER GLADDENS THE HEART

Our camel drivers push us to the top of the dune. What's that?—right at the foot of the other side? For the love of Mike! A village—and wells! Why didn't we have sense enough to drag ourselves to the top of that hill the night before!

It was the same village we had been looking for, except that it had moved and changed its name. These are both frequent tricks of African villages. Water or pasture gives out, or the tsetse fly appears; the village moves on. The old chief dies; the village sheds his name for that of his successor. Question: What is an African village?

On and on, plowing, pushing, grinding, sweating. At last the fort at Rig-Rig and a little Corsican sergeant who can say "I love you" in seven different languages. He hasn't

seen another white man for seven months. No wonder we get a royal welcome.

It's 85 miles from Rig-Rig to Mao. We have two gallons of gasoline left, and each motorcycle has been making about forty miles to the gallon. So we load Flood onto one camel and his motorcycle onto another, and I set out on two wheels to stretch that gas as far as possible; so that if we do get across Africa we can say that one motorcycle, at least, was driven the entire distance.

But the gasoline gives out 12 miles from Mao. I commandeer a horse from a Tebu tribesman, make a harness out of an antelope hide and break him to it, and breeze merrily up the hill on the end of a rope, to the unanimous plaudits of the garrison.

Mao, the old capital of the Kanem, has about 3,000 inhabitants, most of whom are Kanembu. The country roundabout is very sparsely settled by fragments of several peoples, including Kanembu, Tebu, Arabs, and others, most of whom are cattle and sheep raisers.

The huts of their semi-permanent encampments are made of skin or grass matting, very meagerly furnished, even for African dwellings. A mat to sleep on, a few knives, pots, and calabash cooking utensils, a mortar to grind corn and millet in, water skins, a bag of grain hanging from a forked stick, and that's about all. Occasionally one finds a small pocket mirror, which probably cost its owner a month's savings.

The regular wage for laborers paid by the French officers in the fort is one franc (four cents) a day—in metal money. A five-franc paper bill, we found, would buy no more than one franc in copper or silver.

French currency is of comparatively recent introduction, of course, and is almost unknown in the smaller villages, where most transactions take the form of barter. Curiously enough, however, the Maria Theresa *thaler* was highly prized by the natives long before the French conquest, being considered more valuable than many coins of higher denominations.

GASOLINE AND A RADIO STATION

Gasoline is transported up to Mao at intervals for the engine that supplies power to the primitive little spark radio transmitter—15 days by river steamer, five days by motor truck, and 45 days by camel. The French Government, interested from a



Photograph by Walter Mittelholzer

SUCH A VILLAGE MAY BE HERE TO-DAY BUT GONE TO-MORROW

In the vicinity of Lake Chad, when the water supply fails, or a chief dies, or any one of several other contingencies arises, the inhabitants of a rural farming community may betake themselves and all their belongings to a new location. The practice is confusing to uninitiated travelers.

military standpoint in seeing whether this trip could be accomplished, had kindly agreed to supply us with all that we needed, at cost—86 francs a gallon. We picked up 40 gallons.

By this time both the motorcycles were in practically the last stages of disintegration. And so were we.

Two months before, when Flood was still unfamiliar with the whims and fancies of an internal combustion engine, he had let his motor run out of oil, and now it sounded like the wrath of Satan. The bronze-bushing in the piston was ready to be gathered to its fathers, and we didn't have a spare. So I "borrowed" a piece of brass pipe from the radio operator and made one.

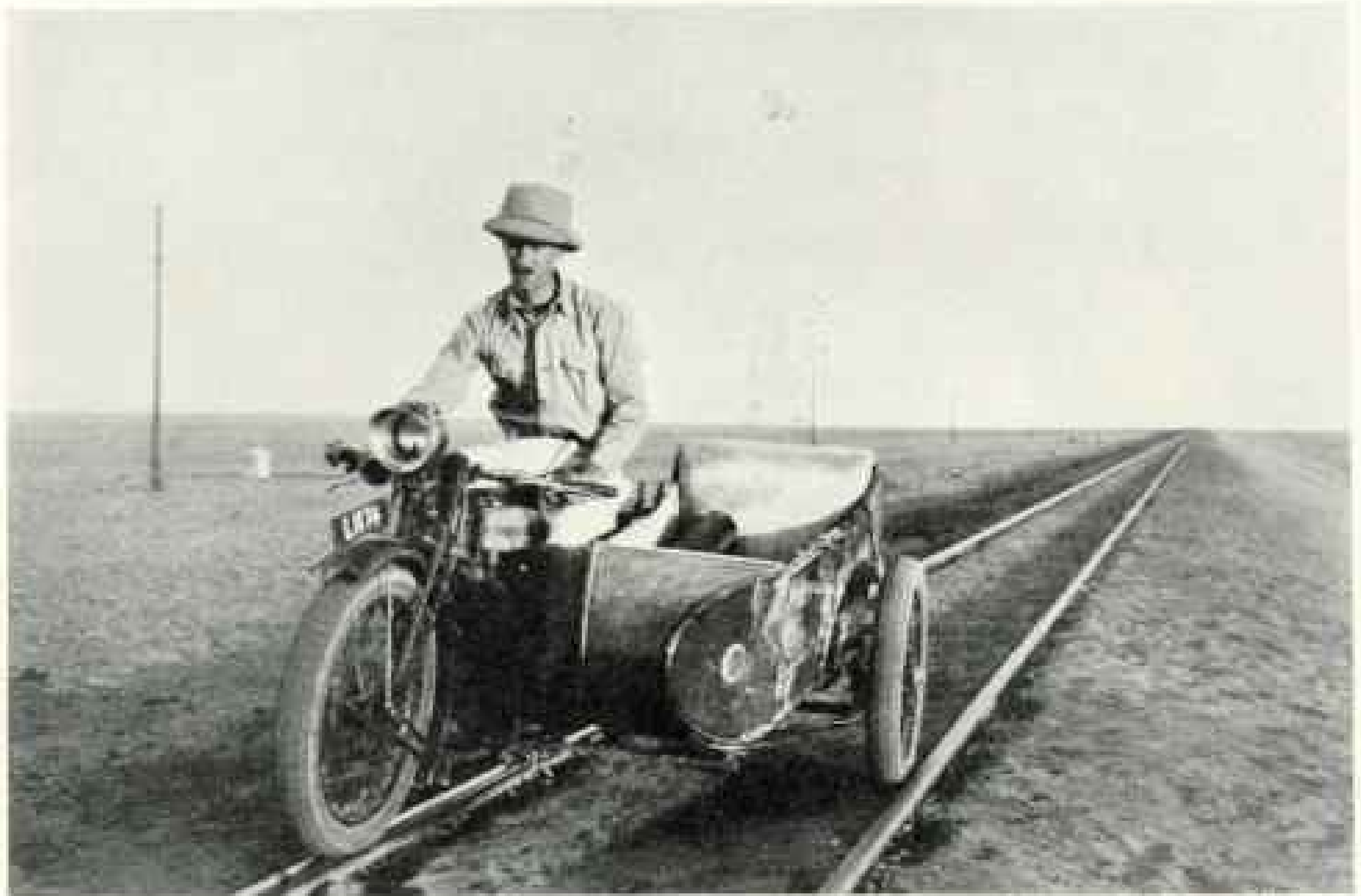
The commandant informed us that, so far as he knew, the 400 miles of caravan trail from Mao to Abeshr had never felt the print of a wheeled vehicle of any kind. The French Citroën Expedition had gone as far as Mao, he said; then turned south to Fort Lamy. They would have found it comparatively easy sailing had they gone

on east (see map, pages 40-41). Of course, the trail wasn't exactly a boulevard, but we could average 50 to 60 miles a day, which was considerably more than we had been making.

GAME PLENTIFUL, BUT NO FIREARMS

The country was gently rolling and grassy, with pleasant vistas dotted with trees, singly and in clumps. Antelopes, gazelles, and other game were plentiful, but that did us no good, since we had given our firearms away on account of the weight.

There were still occasional cuvettes (see text, page 61), beautifully wooded, some with date palms and millet plantations, but the salt and natron deposits so typical of the Lake Chad region grew fewer and fewer as we bore east. In one village the natives were extracting an impure potash, highly prized as a condiment, by burning the logs of a certain tree in crude clay furnaces, running water through the ashes and pouring it into evaporating cones of heavy thatching to precipitate the mineral. Salt



Photograph by James C. Wilson

"RIDING THE RAILS" TO KHARTOUM

The sand of the caravan trail at the side of the track out of El Obeid was so soft that better time was made by balancing the motorcycles on the steel of the narrow-gauge railroad.

is obtained by the same process from certain other plants and sometimes even from the dung of cattle which have eaten these plants.

MELONS SLAKE CATTLE'S THIRST

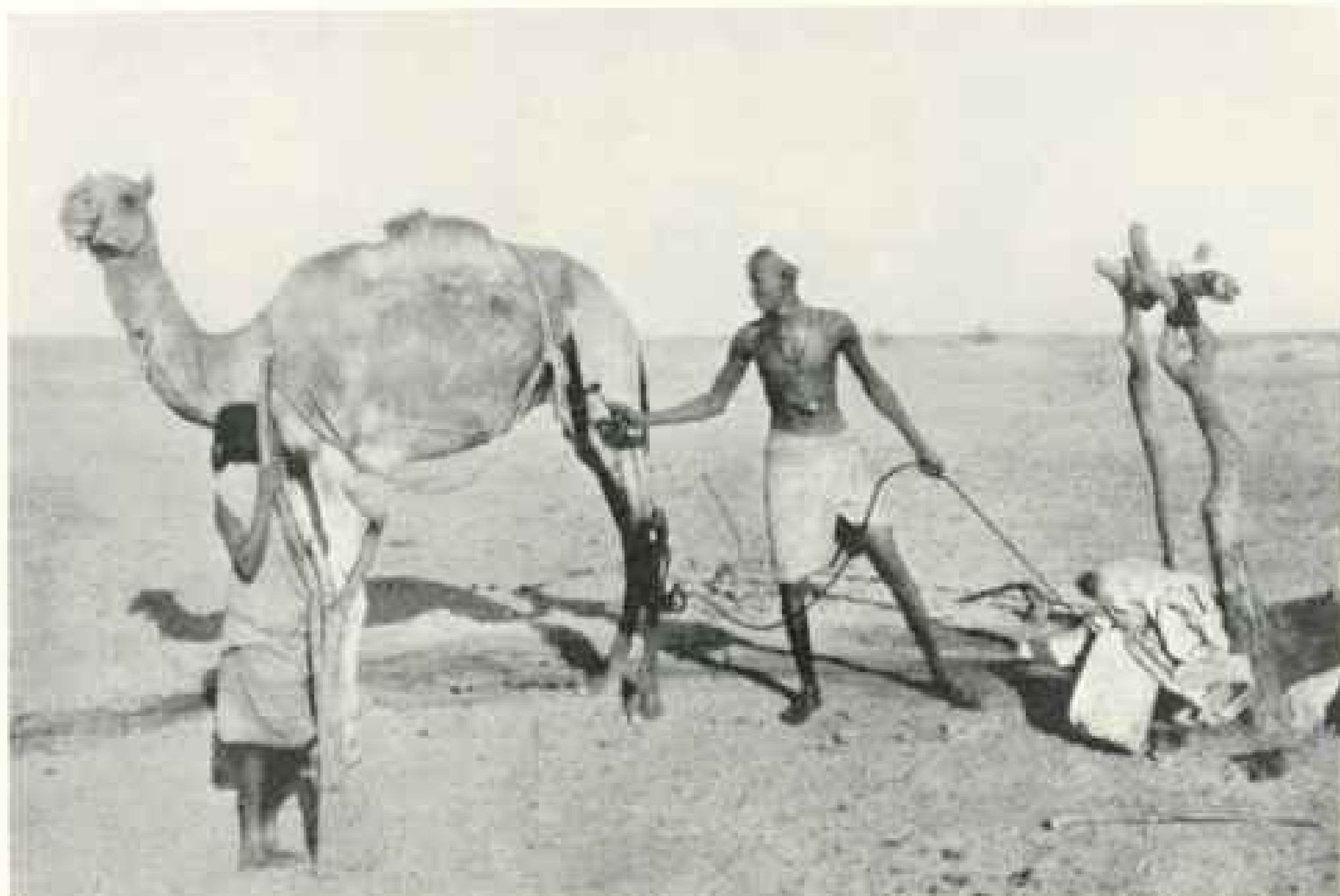
This would have been excellent cattle and sheep country except for scarcity of water. Some of the natives drive their herds as far as ten miles from pasture to wells or ponds, watering them every other day. During a certain season large melons grow in some sections, on which the animals slake their thirst. It is curious to see these melons, after the vines have died and shriveled away, scattered like green basket balls over the sand. One chief told me in sign language that for nearly two moons, while the melons were ripe, his people watered their cattle only once in eight days.

In places the grass was almost as high as a man, with the trail a bare thread of hard sand running through it. Once an enormous hyena jumped out about thirty feet ahead of me. The hyena is a coward. I stepped on the gas and bore down on him, honking my horn. He turned tail and galloped off, and I chased him several hun-

dred feet. But as he turned broadside and disappeared into the tall grass, I got a good look at his profile, and I am still wondering how to account for that big yellow mane!

This was the most sparsely settled region we had yet encountered. The few inhabitants were mostly Tebu, with some Arabs, Fulani, Kuka, and Bagirmi. Coming originally from the Tibesti, or Tou, a vast mountainous region to the north from which they take their name, "Men of the Rocks," these Tebu have paid the penalty for intermarriage with the Negro tribes of the Kanem. Whereas the Teda, or Tebu of the north, are distinctly a Berber people, darker than, but physically resembling, their western neighbors, the Tuareg, most of these Tebu whom we saw were quite negroid, with very dark-brown skin, rather heavy lips, and distended nostrils.

They wore long blue robes and veils like those of the Tuareg, but many had the facial scars characteristic of Negro tribes. Like some of the Hausa, Tuareg, and other peoples of north-central Africa, they were very fond of chewing the native tobacco mixed with sodium carbonate. Naturally



Photograph by James C. Wilson.

CAMELS DRAW WATER FROM A WELL IN THE WADAI

In the drought region near Lake Chad, it is often necessary to dig 100 to 200 feet to reach the moisture level. Skin buckets are used to raise the precious fluid (see illustration, page 89).

a predatory people, they gave the French much trouble at first, but are now generally settled down as cattle-raisers and farmers.

VALIANT FRENCHMEN SATISFIED

The second night out from Mao we ran across a couple of French officers bound for Moussoro to buy camels for the native cavalry at N'Guigmi. Moussoro camels are the best in the central Sudan, and people come hundreds of miles to buy them. The two Frenchmen had been on trek for more than a month. We passed the night with them in a little mud resthouse. The village chief sent up a lamb, and the four of us ate the whole thing and two chickens for supper and breakfast.

Late the next afternoon we crossed the Bahr el Ghazal, an enormous ancient river course extending from the southeastern corner of Lake Chad northeasterly toward Borkou and the Tibesti. Once a favorite retreat of bandits, it was greatly feared by the caravans which had to cross it, and many legends have grown up of the strange events which took place among its fastnesses.

The bright spot of the fort at Moussoro

was a scratchy little phonograph and a dozen warped records, packed in by camel from Fort Lamy. We admired the dapper young French commandant for going to such lengths to bring a little cheer to his lonely clay castle.

The next morning we set out for Ati, over a very sandy caravan trail. We tried driving off to the side for better footing, as we had often done before, but the rough clumps of tall grass which covered the landscape made it impossible and we just kept crawling along through the sand in low, pushing most of the time, and by nightfall had just enough strength left to wrestle our bikes up a steep dune to the village of D'Kerri, 22 miles from Moussoro.

A WOMAN STARTLES THE TRAVELERS

In the larger villages, particularly those on caravan routes, the natives have to maintain shelters for travelers. The resthouse in D'Kerri was a round mud hut with a conical roof of millet straw.

"Well," said Flood, with a sigh of relief, "there's our hotel for the night."

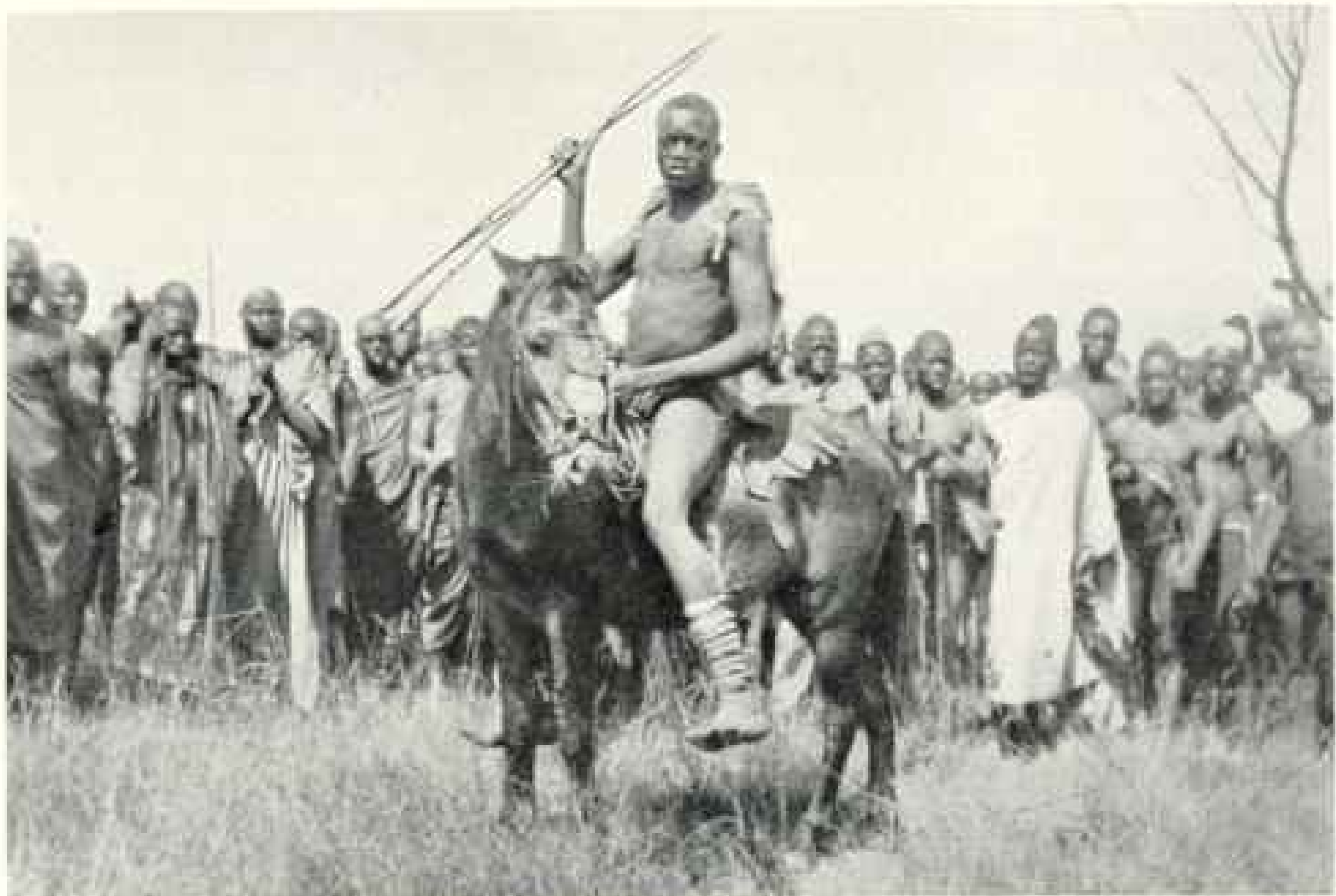
Just then a woman came out of the door, staring at us in amazement. A white



Photograph by James C. Wilson.

UNITED STATES AND AFRICA MEET ON A MISSION-SCHOOL FARM

In the Anglo-Egyptian Sudan sleek, well-led camels draw an American wagon filled with alfalfa to Khartoum, to be sold for feed at the same price as wheat straw. This crop is mowed every 21 days the year round, and the Iowa grower in charge at the time of the author's visit sold about three tons an acre, green weight, each cutting.



Photograph from Will F. Taylor.

BAUCHI PLATEAU HORSEMEN OF NIGERIA HAVE PET MOUNTS

The cost of a pony varies from the equivalent of \$2.50 to \$5. Most households possess one, which they treat more or less as an American pampers a dog. The animal, ridden without bridle or saddle and guided by a halter rope only, goes to the farm with its owner and grazes while he works.

woman, by Jove! No. Impossible! The last white woman we had seen was at Mainé-Soroa, more than a month before. . . . We stared back. . . . Yes, she *was* white, no doubt of it. Probably the wife of a French officer on tour; but whoever heard of a white woman in the Wadai, reputed to be of all regions in central Africa the most dangerous? Something was wrong somewhere. . . .

Flood rubbed the sand out of his eyes and coughed uncertainly. "Ah-h—*bon soir, madame.*"

No reply.

"Um-m—*est-ce que vous êtes seule?*"

She shook her head hopelessly.

I decided to try the scenery. . . . "*Le sable est très mal—um-m—très mauvais ici, n'est-ce pas?*"

It was a good attempt but failed to bring results.

Flood had an idea. "*Peut-être vous n'êtes pas Française, huh?*"

"No speak Arabic."

"What!?"

She was an Englishwoman, Mrs. Glover, who with her husband, a fellow of the Royal Geographical Society, was returning from a camel trip to the Tibesti, where they had been collecting mammal specimens. So far as they knew, Mrs. Glover was the first European woman to penetrate this region. We saluted her for her extraordinary courage and sportsmanship.

As we were making camp, Mr. Glover came stalking up the dune with a shotgun and four brace of guinea fowl. He was utterly astounded at the sight of our motorcycles. The evening which we spent together was epic, and we celebrated it by



Photograph by Ernest B. Schoenbeck

CHAIN MAIL ADORNS THE NAZIR'S BODYGUARD

In the region south of El Obeid, Anglo-Egyptian Sudan, Messerlin horsemen appear on special occasions thus accoutered. The native ruler keeps the armor in his own storeroom and issues it to his warriors only for special occasions (see illustrations, pages 67 and 86).

opening our last tin of biscuit and their last jar of orange marmalade.

Next morning the Glovers set out for Moussoro, while we continued our march in the direction of Ati and Oum Hadjer. We had another dose of heavy sand all the first day, but after that the soil gradually changed to a hard, black clay, over which we made excellent progress, doing 93 miles from D'Germana village to the post of Ati in one day, a record which so upset us that we stayed there for two days collecting our thoughts.

The country beyond Ati was fairly level and irregularly wooded, with many



Photograph by Ernest B. Schoeduck

THE NAZIR PROCEEDS WITH POMP IN KORDOFAN PROVINCE

Followed by his bodyguard, whom he has clothed for the occasion in coats of mail, this native chieftain of the Messeria makes a brave appearance. To-day the country is peaceful, but in the past these warriors of the wastes made things exceedingly uncomfortable for neighboring tribes until expeditions were sent out to insure good native behavior.

stretches of firki soil (see text, page 61), in which the natives raised cotton, millet, and maize.

Frequently we met caravans of from three to a hundred camels—freight cars of the desert—plodding, plodding, plodding, as slowly and inexorably as time itself.

Great slabs of salt from the mines at Bol; bags of natron, that most precious African condiment, from the cuvettes north of Chad, gum arabic and dates bound for the markets in El Obeid; and canvas bags of flimsy, bright-colored calico print stamped "Manchester"—these were the loads; for the African aristocrat, like many of his prototypes the world over, scorns the durable, artistic products made at home if he has the money to glorify himself with imported labels.

And there were always the pilgrims—those kindly, patient-looking old patriarchs, crowning a life of religious devotion with their sacred pilgrimage to Mecca; and the smiling, brown-skinned cowboys with their herds of humpbacked cattle on the 1,100-mile trek to the market in Kano. It's the tsetse fly that's bringing those cattle to Kano. From all parts of the central Sudan they come, to be sold and resold, driven down to the jungle meat-shops of southern Nigeria, and slaughtered to feed seven million Negroes who can't raise their own beef because of an infinitesimal microbe that lives on a little fly (see page 50).

WADAI ONCE THE SCOURGE OF CENTRAL AFRICA

We were now in the heart of Wadai, the question mark of the Sudan. One of the last strong Moslem sultanates to fall to European power, Wadai since earliest times has been a battle ground of Negro and Arab influence; but whereas in Kanem and the Fulani kingdoms to the west the northerners eventually gained political ascendancy, in Wadai the Arabian dynasty of Tunjur was driven from power about 1640 by the negroid Maba, who have been the native masters ever since.

It is strange that Negroes, generally considered of little force, should have made Wadai the scourge of central Africa. Proud, cruel, brave, and with a love for barbaric splendor, the Maba reduced neighboring States to dependencies, and for almost 250 years sent out a constant stream of slaves and eunuchs over the caravan trails

to the north and east—a traffic which was halted only by the French conquest of 1909-10.

Even to-day many parts of Wadai are considered unsafe for travelers; but, having traversed the heart of the country from west to east without even the hint of a mishap, I cannot help thinking that its perils to white men are grossly exaggerated on the theory that the unknown is always dangerous. Under the rule of the French, forts and resthouses have been built, would-be marauders have been taught respect, and, all in all, our trip through Wadai was—so far as we knew—marked by complete security.

LITTLE POMP LEFT IN WADAI

The casual traveler sees little of past shame and splendor in Wadai to-day, especially if he must spend all his daylight hours nursing a very sick motorcycle over the rocks and through the sand. Gone is the pomp of the black sultans of Abeshir; gone are the slave trade's revolting brutalities.

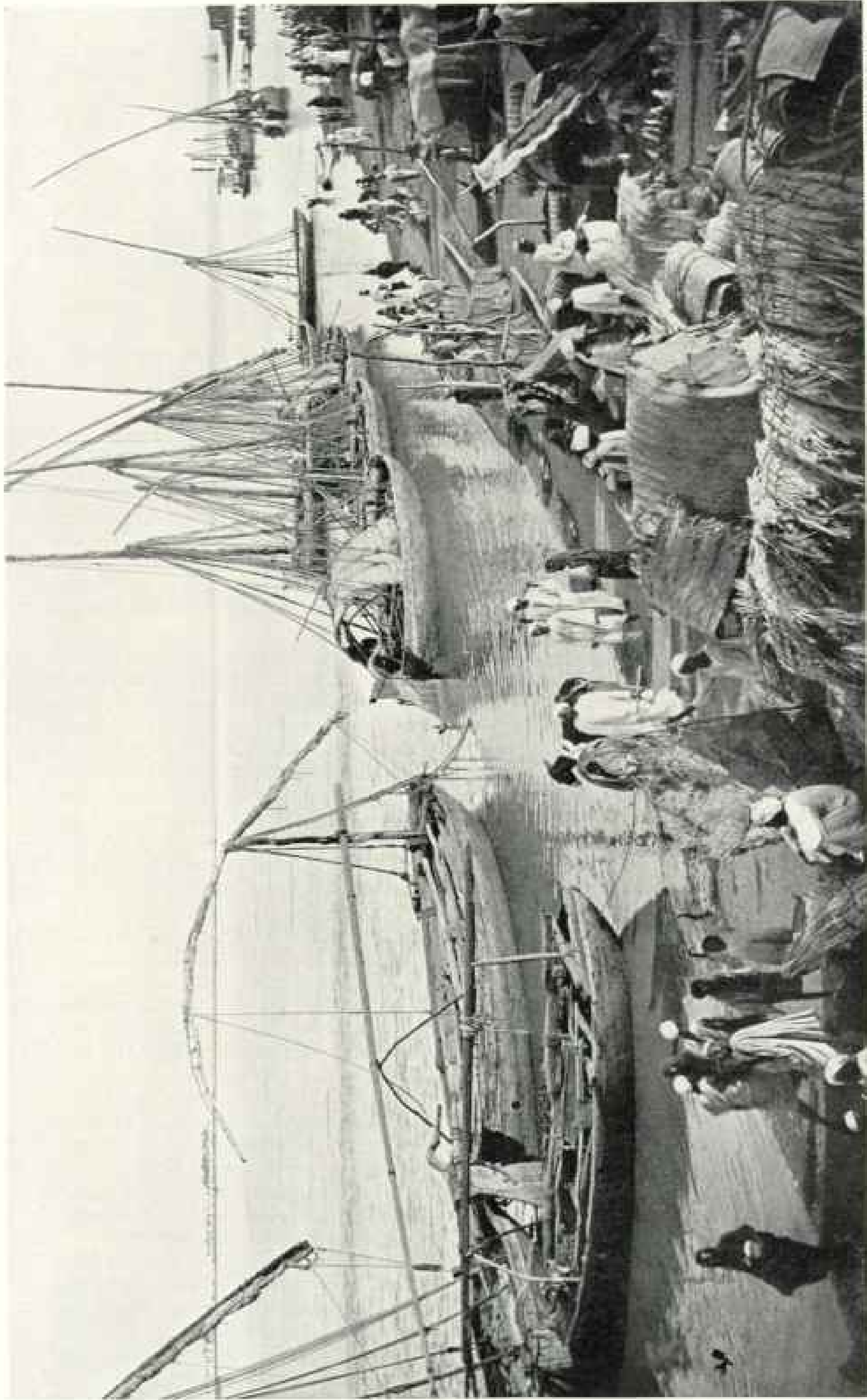
The average Wadaian is a pretty humdrum fellow now. He fights a little, drinks a lot—indulgence in *merissa*, or native beer, is about the only vice left him by the French—and tends his crops and herds.

He lives in whatever kind of house the land provides for him—grass, millet stalks, or clay—sleeps on a grass mat, and eats his curds, or couscous, out of a calabash, or, if he's a plutocrat, a tin pan. He's a good horseman and a fair husband to as many wives as he can afford, but doesn't go in for hifalutin ideas about art and culture, being a purely practical man.

On and on, plowing, pushing, grinding, sweating. Flood lets his foot hang down over the foot-rest, and a protruding rock snaps it back and almost breaks the arch. A native doctor patches him up, but it's two days before we can travel again.

Our third rear axle breaks, and we install the last spare. Always the one great question drums in our minds, to the rhythm of the tired little engines—the only important question in the whole world, it seems—Can we possibly make it to the coast?

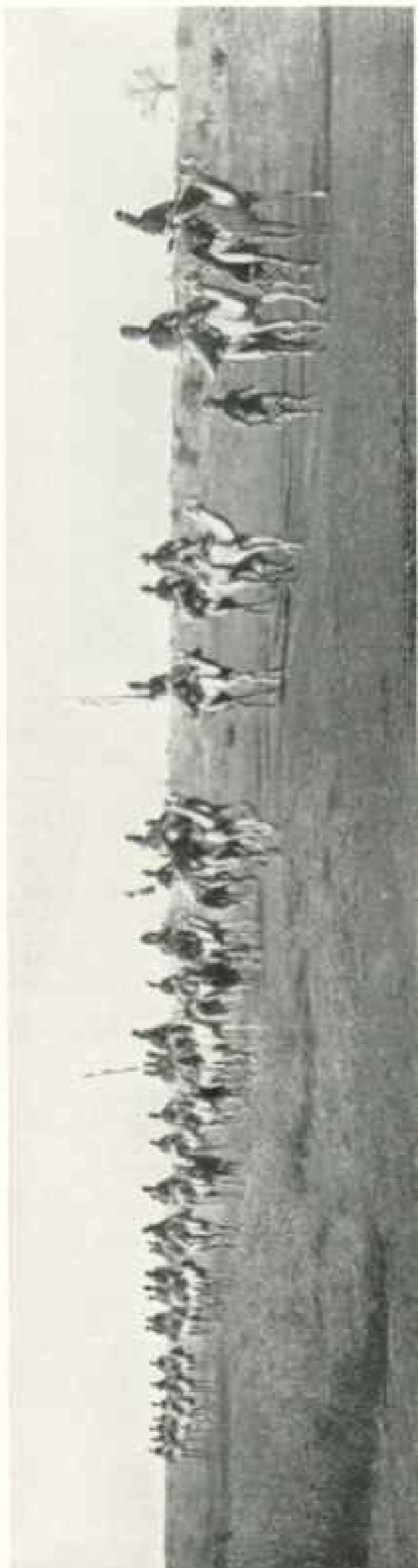
Two months ago we had lost all hope. But now it's a mere 1,700 miles, and only 90 miles to Abeshir, where our route converges again with the route of the Hon. Frank Gray, M. P. Surely if he could make it from there, burdened with all the



Photograph by M. Verrier

THE BEACH IS THE MARKET PLACE OF OMDURMAN

Queer-looking native craft anchor with their wares and lively bazaar ensues. The shore traders set up their quarters under the thatched lean-tos, seen to the right. The town is the commercial capital of the native traders of the Anglo-Egyptian Sudan.



Photograph by Ernest H. Schumacher

A CAMEL CORPS ON THE MARCH IN KORDOFAN



Photograph by Hassanain Bey

MEN GOSSIP WHILE THE WOMEN DRAW WATER IN DARFUR PROVINCE

The task of getting up the heavy skins is trying, because the wells usually have to be deep to strike water in this arid area.



Photograph by James C. Wilson

A KHARTOUM WOODWORKER HAS AN INGENUOUSLY ASSEMBLED "LATHE"

He turns the piece with a bowstring and steadies the tool with his great toe. His shop is against any mud wall which affords a bit of shade.

trappings of an organized, orthodox expedition, we ought to be able to do it without even a razor to encumber us.

ABESHR GIVES A RECEPTION

There's a big celebration in our honor at Abeshr, and another at Adre, last point in French territory. Adre has no radio station, and the officers can't believe that we've come clear from West Africa on our motorcycles. We exhibit our passports, signed by the commandants of the nine French forts through which we have passed.

"*Alors,*" says the commandant, scratching his head, "it is a fact *indubitable*, but you will have to give me a little time to get used to the idea. Messieurs, your exploit is simply stupendous. You will never convince them back in America that it is true. By camel it is quite possible; by motorcycle—*non!*"

Fifteen miles beyond Adre is El Geneina, first village and post in the Anglo-Egyptian Sudan. This is the land of the sand bur, two feet high and thicker than wheat in a field. The trail is so sandy that we have to ride off to the side to get traction.

We haven't any socks and our shorts are in tatters. After three days of it we pull into El Fasher, looking like porcupines. The British Governor of Darfur* receives us into his beautiful home, tatters and all. Dinner won't be ready for half an hour. We can't help squirming, and his wife notices what is wrong.

She brings in two pairs of tweezers and says, "Go at them, boys. I'd pull them out in the presence of King George himself, if I had as good a crop as that." We extract our quills one by one and drop them into the Governor's Chinese vase. The British are good scouts.

AN "IMPOSSIBLE" TRAIL THE BEST YET

"It's 400 miles to El Obeid," said the Governor, next morning, "and absolutely the worst road in Africa. You'll never be able to make it by motorcycle. I'll give you a military escort, and when you can't get any farther you can load your bikes onto the lorry and——"

* See "Adventures Among the 'Lost Tribes of Islam' in Eastern Darfur," by Maj. Edward Keith-Roach, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1934.



Photograph from Ewing Galloway

NATIVES OF THE CAMEROONS STUDY THE KORAN

They write their lessons on wooden slates. The part of Africa in which they live, under French control, is larger than California.

"Lorry?" said Flood. "You say a lorry's been over the road?"

We looked at each other and laughed. Four days later we were in El Obeid. It was the best trail we'd had for more than two months. I trimmed off my beard to a scholarly Vandyke, and we borrowed four pounds from an admiring Greek merchant who had never seen us before in his life.

There was an excellent road from El Obeid to Khartoum. It wasn't meant for motorcycles, but it was the only road there was for much of the distance. "Two devils on motorcycles, look out for them!" a native telegrapher wired ahead when he saw us roaring down the railroad track, our tatters flying in the breeze.

Ah! The Nile at last! What a thrill! We could surely make it from here! There were the creaking water wheels of an irrigation system centuries old, with the two sleepy oxen endlessly plodding their rounds. And a few miles beyond, the big Sennar dam was doing the work of a million oxen.

We were passing from one world into another, and the transition was accompanied by bizarre and curious compro-

mises. We saw two stolid camels hitched up to a clattering iron-wheeled wagon. A steel platform scales stood out in front of a Sudanese cotton planter's tiny grass hut.

I felt like a man gradually awakened from a 2,000-year sleep, with the memory of his former existence still vividly before him. The first car we met gave me a frightful start. I was almost timid about coming back to civilization!

KHARTOUM—AND VICTORY!

And then we sighted Khartoum, capital and metropolis of the Anglo-Egyptian Sudan, shimmering in the heat a dozen miles ahead. Suddenly the thought of what that sight meant broke over me with a rush.

"We've made it! We've made it! Nothing can stop us now!"

The events of the last four and a half months surged through my mind in crowded succession: Buying the motorcycles back at Lagos; the commandant at Zinder grimly signing our passports; Christmas dinner at Gouré and the New Year's Eve dash to Mainé-Soroa; the kindly old guide and the milk chocolate; the American flag at N'Guigmi; the leaky gasoline cans; the



Photograph by James C. Wilson

SEA AND DESERT JOIN IN ERITREA

A consignment from the ship (upper right) is transferred to the hump of an unwilling dromedary, which complains constantly during the loading process—snorting, groaning, twisting, and even biting; hence the muzzle. This beach at Massaua was the end of the Expedition's trail.

improvised forge; the Glovers; the "hyena" that jumped out into the trail; the everlasting sand and the heat.

Half an hour later we were in Khartoum, and the rush of things present ended my dream. There was mail—a bushel of it—the first in five months!

NEW TEETH AND ICE CREAM

There was a real, honest-to-goodness garage, with a sign that said, "No checks cashed here." An Austrian dentist could make Flood a new set of teeth.

Followed dinners, receptions, 700 Englishmen asking, "But, my dear chap, how did you do it?"—and ice cream! They knew we were Americans, and we were offered ice cream everywhere.

The rest is soon told. It is 600 miles from Khartoum to Massaua, a little Italian port on the Red Sea; 250 miles of desert, as flat and bare as any place in Africa, and only four wells in the whole stretch. But that was nothing, after what we had been through. We met a few Fuzz-

ies (see illustration, page 70), but didn't stop long to visit, because we were already beginning to wonder what India was like.

Then came Kassala, the Italian frontier, and a good military road. Up and over the Red Sea hills we went, and saw—Massaua in the distance, and that blue sheet of water that we'd started for almost five months ago.

But listen—Crack, crack! Bumpety-bump, bump! Aw, gee! there goes another side-car frame—broken clean in two this time. Never mind; here's a piece of rope. Tie it up. We'll get there now, even if we have to carry the bikes on our shoulders!

Down the little main street of Massaua to the beach we drove, and stood silently looking out over the water for several minutes. The Italians had not even heard that we had started, and of course they didn't know we had arrived.

"Well," said Flood, "we're here."

A week later we shipped for India, first class, on an oil-burner that served six meals a day and had a bath in every stateroom.

TROPICAL FISH IMMIGRANTS REVEAL NEW NATURE WONDERS

BY WALTER H. CHUTE

DIRECTOR, JOHN G. SHEDD AQUARIUM, CHICAGO

ONE of the most interesting phenomena in that realm of diversion commonly labeled as hobbies is the tremendous increase in the interest in tropical fishes.

In 1930 there were 25 aquarium societies in this country.* These societies have not only continued to function during hard times, but have increased in number until to-day there are 42 aquarium societies in the United States and Canada. Plans are now under way to form a National Aquarium Society to coördinate the activities of the local organizations and to present the experience gained by them in available form for general use.

Five of the large public aquariums now maintain permanent exhibits of these little fishes. They are the Lincoln Park Aquarium, Chicago; the Steinhart Aquarium, San Francisco; the New York Aquarium; the Philadelphia Aquarium, and the John G. Shedd Aquarium, Chicago. The last mentioned was the first public aquarium in which provision was made in the original plan of the building for a special room properly equipped to maintain a permanent exhibition of tropical fishes (see illustration, page 95).

MANY SPECIMENS NEW TO THE UNITED STATES

This room is equipped with skylights glazed with "violet-ray" glass. It is steam-heated and thermostatically controlled. There are 65 exhibition tanks containing an average collection of 125 to 140 distinct species of tropical fishes. A number of these specimens are new to this country.

The color plates of tropical fishes accompanying this article are natural-color photographs of live fishes in the Balanced Aquarium Room at the Shedd Aquarium. Because of the effect of the water and glass of the aquarium on the color values of the subject, special compensating filters had to be used. These pictures are the first extensive series of fish photographs in natural

color by this process to be published. They are remarkable for their clarity and their faithful rendition of color values.

A large number of commercial outlets are required to care for the needs of the fish fanciers. It would be virtually impossible to estimate the number of importers, jobbers, aquarium manufacturers, breeders, and dealers who find it profitable to supply this demand.

Originally, a few fishes were sent from Germany to individual fanciers. As the demand increased, larger shipments were made, but always to the order of American dealers. During the last few years the complexion of this import business has changed. Agents were established in various parts of this country, special rooms on ocean liners were fitted with aerators, pumps, and shelves for the cans, and preparations were made to import fishes on a large scale.

One agent contracted to dispose of 2,000 young scalare every week, and has done so all the past summer.

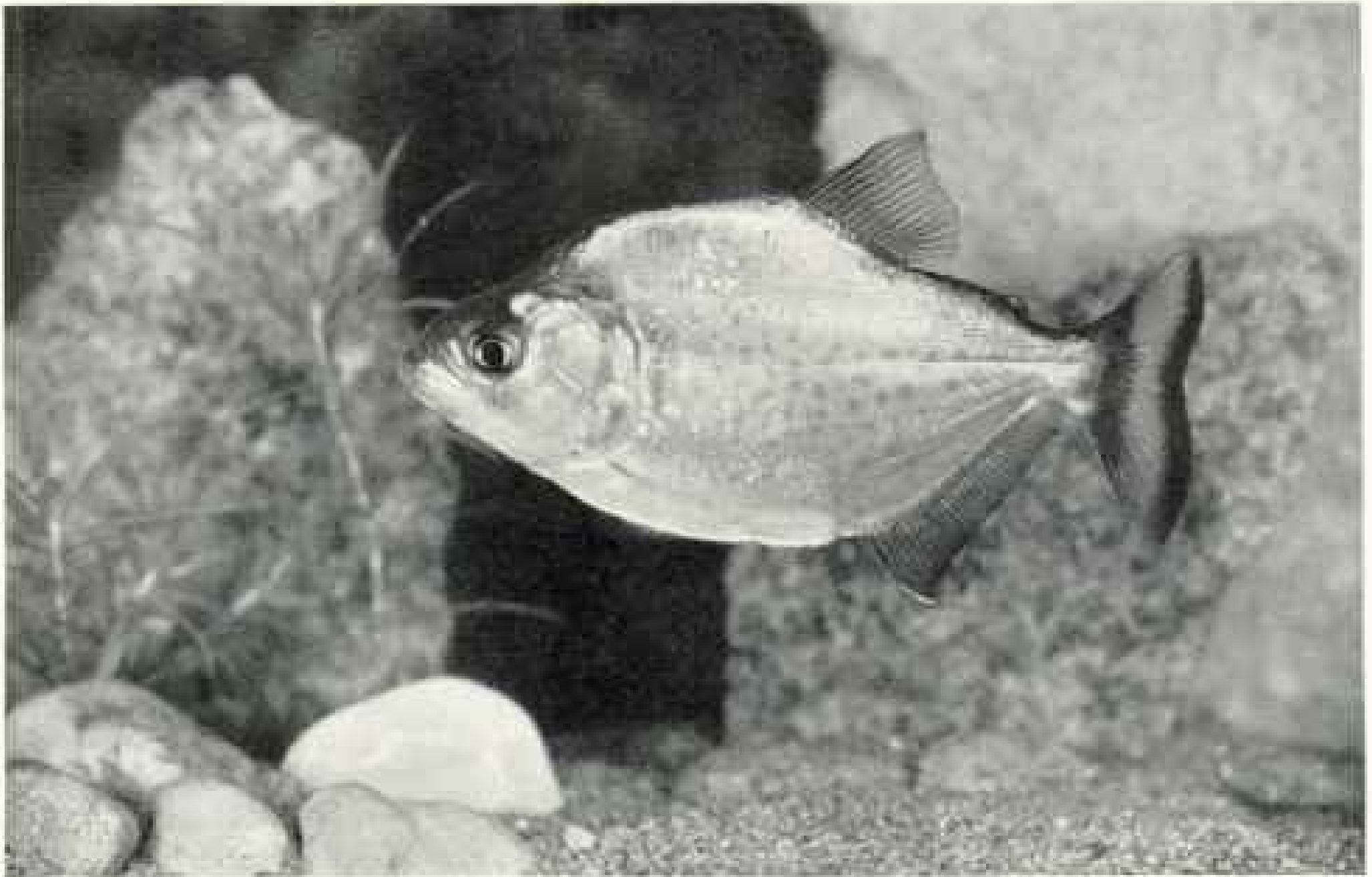
SOME FISH ARRIVE IN AIRPLANES

Not content with the variety offered in the European shipments, American dealers have in the last year or two started independent direct shipments, mostly from Central and South America.

Regular shipments are now made by airplane express between Central America and points as far north as New York. To be sure, this does not entitle the aquarists to call their pets "flying fishes," but at least they can claim that they do drop into the aquariums from the sky.

Several expeditions made by ichthyologists have resulted in the introduction of a number of new species. Taking a leaf from the book of the amateur aquarist, these scientists have added traveling cans and fish food to the alcohol jars of their regular equipment. In this way they have learned something of the life histories of their catch, so that the facts gleaned and the methods evolved by the aquarist in the pursuit of his hobby have aided science in its eternal search for knowledge.

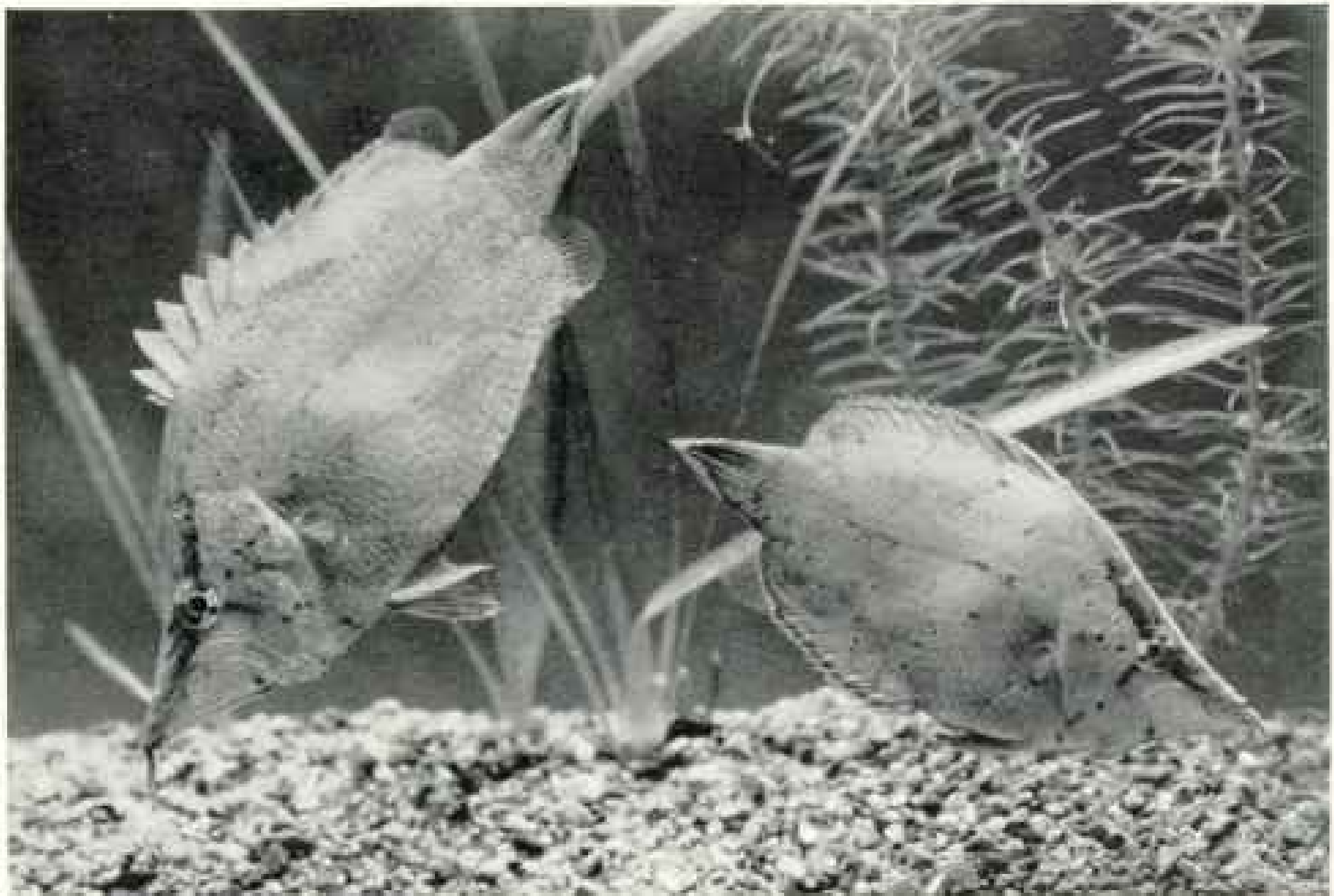
* See "Tropical Toy Fishes," by Ida Mellen, in the NATIONAL GEOGRAPHIC MAGAZINE for March, 1931.



Photograph by Edwin L. Wisberg

A FEROCIOUS PIRATE OF THE AMAZON REGION

Called the "tigerfish" of the Amazon by the late Theodore Roosevelt, the piranha, or caribe, *Serrasalmo rhombus*, lives up to its sinister name. It travels in enormous schools, which unhesitatingly attack any living thing in the water, regardless of size. They can reduce large animals to bare skeletons in a few minutes. In the aquarium small specimens make interesting pets, but they must be kept by themselves or with others of their own species and size. Reduced two diameters.



Photograph by Walter H. Chute and Loren Tutell

EXCELLENT EXAMPLES OF NATURE'S CAMOUFLAGE

The dark-brown leaf fish resembles a dead leaf in color and shape. The illusion is helped by the short barbel on the lower jaw, which simulates the stem of the leaf, and by the fish's habit of floating head down near the surface of the water (see text, page 108). Natural size.



Photograph by Loren Tuttle

THE TROPICAL FISH "APARTMENTS" AT THE SHEDD AQUARIUM

In this specially equipped and artistically designed section the aquarium maintains a permanent public exhibition of 65 tanks containing an average of 125 to 140 distinct species.

The public aquariums have aided the movement by direct importations. During the past summer the Shedd Aquarium dispatched an expedition to Australia, which, in addition to the large fishes that were the object of the trip, obtained a number of smaller tropical specimens new to this country, although known to aquarists in the antipodes. Notable in this collection were the firetail and carp gudgeons and the little Australian blue-eye (see Color Plate IV). The latter, if it is successfully established, bids fair to become a popular favorite.

A BABEL OF FISH NAMES

Various textbooks and scientific reports list approximately 600 distinct fishes adaptable to life in the small aquarium. Of these about 200 species were available in this country a few years ago. To-day, largely as a result of the increased importations, the number of available species has been doubled. Many of these species were known to aquarists only by name and picture; others, which had been occasionally

received in the past, were so rare that they were greeted as new fishes, and a few were unknown to aquarists and scientists alike.

It is not surprising that, with so many new arrivals in a comparatively short time, there should be a resulting confusion of names. Some of the new arrivals were named hastily and put on the market, only to have the rightful owner of the name appear in a subsequent shipment. Some were erroneously identified, and still others have been put on the market with only the generic names.

Interested ichthyologists are working as rapidly as possible to straighten out the tangle. Meanwhile, the fishes have been distributed and occasional protests have been voiced against the changing of a name that already has become familiar. Aquarists will realize, however, that every fish should have its correct name in the interest of order and the avoidance of future confusion.

For twenty years or more American aquarists have kept and bred a beautiful fish known as *Cichlasoma nigrofasciatum*,

This fish's natural pugnacity is recognized by its nickname, "Jack Dempsey." Recently, in a shipment from South America, some entirely different fishes were received which were positively identified by a prominent ichthyologist as the true *C. nigrofasciatum*. Now, after two decades of masquerading under an alias, poor "Jack Dempsey" is temporarily a fish without a scientific name.

There is even more confusion in the matter of common names. Importers and wholesalers handle tropical fishes under their scientific names. The average fancier, however, is disinclined to learn the often formidable scientific name. For this reason the retailer names the fish as his fancy or his commercial instincts dictate. The difficulty lies in the fact that many of these names are local, and some fishes have as many common names as localities in which they are known.

HOW THE "JEWELFISH" WAS NAMED

One of the favorites of long standing is the Cichlid, *Hemichromis bimaculatus*, or red chromide (see Color Plate II). Considered by some aquarists to be one of the most colorful of tropical fishes, it has held its popularity despite a somewhat pugnacious disposition. Recently a certain dealer, dissatisfied with sales under the old name, conceived the idea of advertising this fish under the name "jewelfish," a title which is perfectly applicable to a large number of tropical species. It is probable that his gratification at the rush of orders was not entirely duplicated by the purchasers, who, on opening the shipping cans, discovered their old friend *Hemichromis*. Fortunately, the name "jewelfish" has now been generally accepted for this fish, but there are many other names not so acceptable.

Although the increased importations are the largest single factor in the changing list of available species, part of the change is due to the fact that tropical fishes, like other pets, are subject to vogues. Not so long ago the fishes of the live-bearing group greatly exceeded in number all other tropical fishes in American aquariums. Fanciers became interested in the possibilities of hybridization, and a perfect orgy of crossbreeding resulted. Fortunately for the "fancy," this rage soon died out; for, although some splendid hybrids, such as the red helleri and the black helleri, were pro-

duced, a large number of undesirable cross-bred fishes were placed on the market, and at one time it was virtually impossible to obtain purebred specimens.

This situation has been corrected by the importation of more wild stock, and the live-bearers, though still in favor, are now reduced to a more proportionate status.

Rather than try to make unnatural crosses, experienced breeders are now turning more attention to the production of larger, better, and healthier fishes than the imported parents. We are indebted to these efforts for a fish that has enjoyed enormous popularity during the last two years, the veiltail fighting fish, *Betta splendens* var. *cambodia* (see Color Plate VII). This fish was produced by breeding the Siamese fighting fish, *Betta splendens*, a favorite of long standing, with a recently imported albino form which had exceptionally long fins.

By careful, selective breeding through several generations, fishes with the large fins were developed in self-colors, either blue, metallic green, or bright crimson. To appreciate their beauty fully, two males must be placed where they can see each other. In an effort to intimidate its adversary, each fish spreads its fins to their fullest extent, and the play of iridescent color across the body and fins makes a breathtaking display of sheer loveliness.

At the present time the pendulum of favor seems to be swinging toward the Characins. One of the largest families of fresh-water fishes, the Characinidae, have from the first been well represented in the aquarists' tanks. With the advent of direct American importations from Central and South America, this representation has been largely augmented, both in number of individuals available and by a number of hitherto-unknown species, until at the present time the Characins easily constitute the largest single group of aquarium fishes.

ONE NOTORIOUS FISH GIVES ITS FAMILY A BAD NAME

Most of them are small, brightly colored fishes, lively but perfectly inoffensive. The notorious piranha, or serrasalmo (see illustration, page 94), is the inevitable exception that proves the rule. The majority of the members of this family that are suitable for aquariums belong to the Tetragonopterus group and are known familiarly as "Tetras." Typical Tetras

RAINBOW DENIZENS OF THE AQUARIUM



EAST MEETS WEST IN THE BALANCED AQUARIUM

Glass perches, *Ambassis labi* (two upper), from India swim amiably in the same tank with striped hatchet fishes, *Carnegiella strigata*, from South America. The former are so transparent that they have little personal privacy. Slightly enlarged.

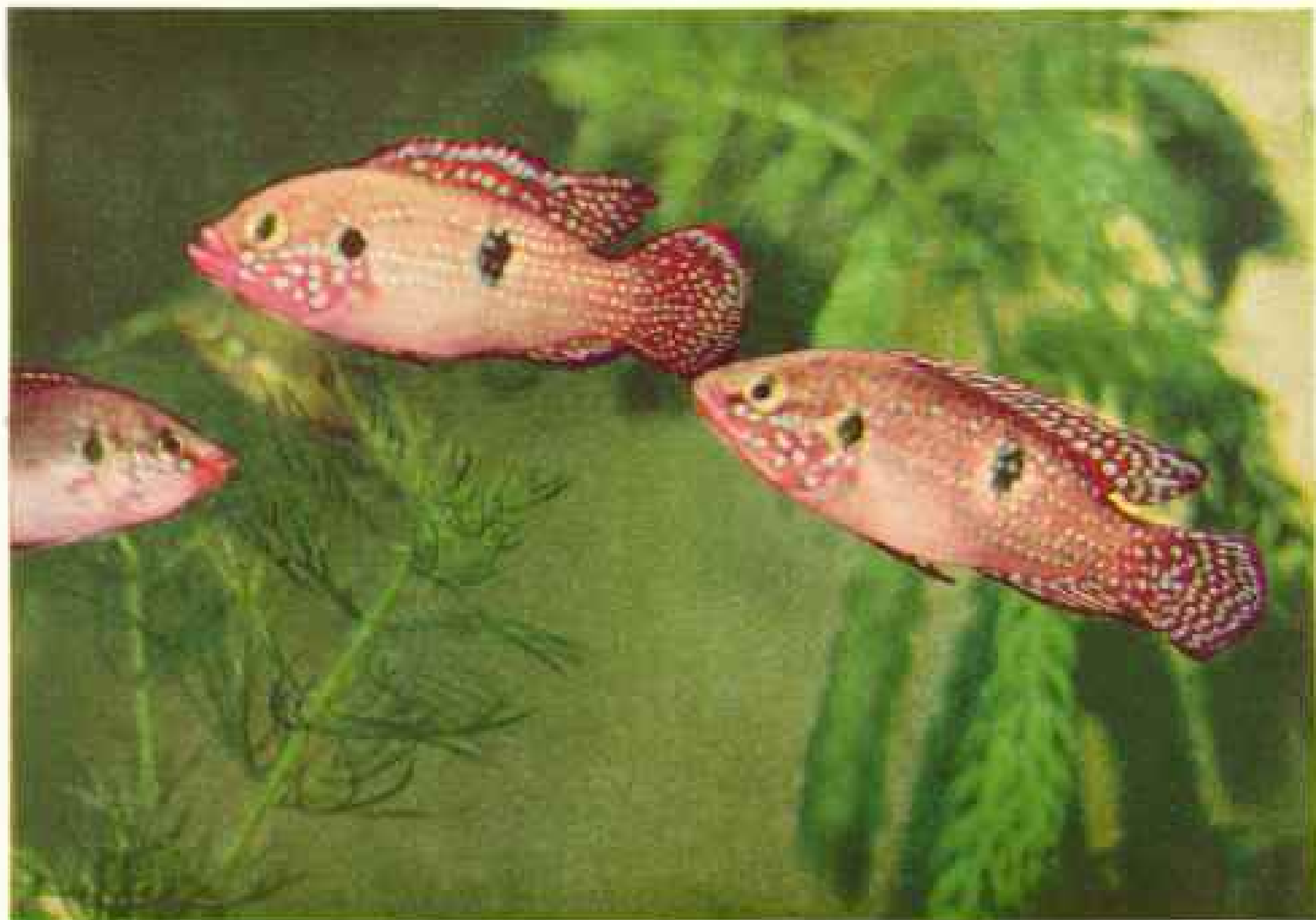


© National Geographic Society

Finlay Photographs by Edwin L. Wisland

ASPIRANTS TO THE THRONE

The pompadour, *Symphysodon discus*, is urged by some aquarists to replace the scalare as the king of aquarium fishes. It brings individually a top price in the market. The common name refers to the effect created by the dorsal fin. Reduced three diameters.



AQUATIC JEWELS GLEAM BRIGHTLY

Hemichromis bimaculatus, the Jewelfish, is an old favorite from Africa. One of the most colorful of all, it continues in popularity despite its tendency to pugnacity. The young up to two inches in size display more red than mature specimens. Slightly reduced.



© National Geographic Society

Finlay Photographs by Edwin L. Wisland

NOT ALL CICHLIDS ARE FIGHTERS

The attractive *Cichlasoma severum*, from the Amazon, belies the belief that all members of the family are quarrelsome. Even large specimens live amiably with other species, although they should be kept by themselves during the breeding season. Reduced two diameters.

RAINBOW DENIZENS OF THE AQUARIUM



PANCHAX VARIETIES HAVE A WIDE POPULARITY

Their graceful shape and bright colors are retained the year round. They were formerly known as *Haplochromis* species. *Panchax playfairi* is beautifully colored, although not so graceful as some other members of the family. Life size.



© National Geographic Society

Finlay Photographs by Edwin L. Wisford

THE PEACOCK OF THE PANCHAX FAMILY

Although considered by many to be the most beautiful of all aquarium fishes, the blue gularis, *Fundulopanchax gularis*, is difficult to handle. Breeding requires unusual patience, since the eggs take from five to six weeks to hatch. Life size.



A NEW VISITOR COMES FROM AUSTRALIA

The Australian blue-eye, *Pseudomugil signifer*, was first imported to this country in 1932. After the breeding period, the orange fins of the male fade to pale reddish. It belongs to the family Atherinidae, another member of which is the Australian rainbow fish. Life size.



© National Geographic Society

Finlay Photographs by Edwin L. Wislizenus

TINY ARISTOCRATS OF THE AQUARIUM

The rich hues of *Neolebias ansergi* make it one of the most attractive of the rarer tropicals, despite its small size. The unusual coloration of the new miniature loach, *Acanthopthalmus kuhli* (lower), is a decided departure from the subdued colors of the rest of its family. Life size.

RAINBOW DENIZENS OF THE AQUARIUM



HARMLESS RELATIVES OF THE TIGER FISH

Mylozoma dariventris (left) and *Mylozoma rosezelli* are two of a number of closely allied species that are gradually increasing in popularity. They are smaller members of the family to which the famous Amazon tiger fish belongs. Half size.



© National Geographic Society

Fishy Photographs by Edwin L. Wisard

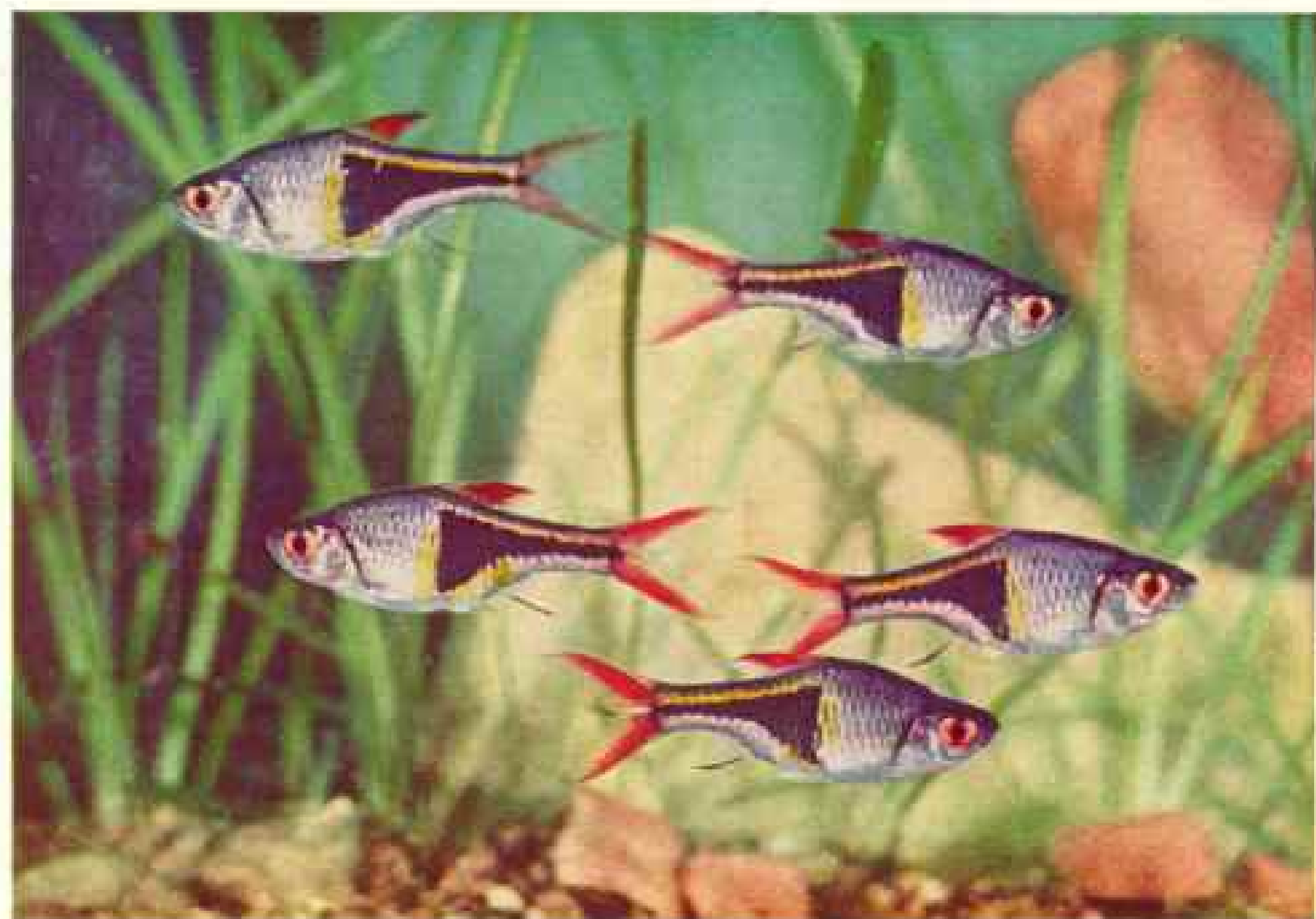
THESE BEAUTIES WORK FOR THEIR MEALS

The archer fish, *Toxotes jaculator*, has long been known for its habit of obtaining food by shooting drops of water at insects perched on overhanging leaves or grass. It soon learns to do this in the aquarium. It is surprisingly accurate up to a distance of two feet. Half size.



THE PRIZE BEAUTIES OF THE GOURAMIS CONCEAL THEIR CHARMS

It is generally conceded that of the six species of this family suitable for small aquariums, the dwarf member, *Cobitis lala*, is the most colorful. It is timid by nature and, unless kept with bolder fishes, is apt to hide in the plants most of the time. Life size.



© National Geographic Society

Fintley Photographs by Edwin L. Wisland

BEAUTY IS AS BEAUTY DOES

The aquarium manners of the *Rasbora heteromorphus* are just as attractive as its striking colors. It is one of the most desirable of all tropical fishes. Hardy and active, although difficult to breed, it is perfectly gentle and is in large demand for the community tank. Life size.

RAINBOW DENIZENS OF THE AQUARIUM



A RECENT ADDITION TO THE BARBUS GROUP

Erroneously known at first as *Barbus lateristrius* and later recognized as *B. dunckeri* or *B. everetti*, this fish is a member of a large and popular family. It seems to be less apt to eat aquatic plants than most of its relatives. Slightly reduced.



© National Geographic Society

Fishy Photographs by Edwin L. Wilford

A CHIP ON THE SHOULDER HAS ITS AQUATIC EQUIVALENT

These veiltail fighters are preparing for battle. Note the widely spread fins and the extended ruff around the gill covers. Although two males, *Betta splendens*, will struggle till death, individuals may be kept with other fishes with perfect safety. Slightly reduced.



SUCH MINNOWS MAKE SOUTH AMERICA ANGLERS' PARADISE

Bait such as *Nannostomus trilineatus* (upper) and *Nannostomus anomalus* (lower) ought to attract the big ones. These two recent importations have met with instantaneous favor with aquarists. Enlarged one third.



© National Geographic Society

Finlay Photographs by Edwin L. Wisford

TWO MEMBERS OF THE PROLIFIC TETRA FAMILY COME BACK

Absent from collections for several years, the bloodfin, *Aphyocharax rubripinnis* (upper and lower), has recently reappeared in gratifying numbers. *Hemigrammus ulreyi* (center) is known in Germany as flagfish because of the tricolor stripe on the sides. Slightly enlarged.

among the new imports are the rose tetra, *Hyphessobrycon rosaceus*, and the brass tetra, a color variety of *Hyphessobrycon bifasciatus*. Both of these fish are similar to the more familiar members of the family.

Quite different are the recently imported hatchet fishes, *Thoracochorax securis* and *Carnegiella strigata* (see Color Plate I). The common name of these fishes refers to their peculiar shape, which, when viewed head-on, resembles the head of a hatchet. They are equipped with long, scythelike pectoral fins and are said to be able to make flights through the air. In the aquarium they are known to be great jumpers, but have not yet been reported as having demonstrated their flying ability.

A closely allied species, *Chalcinus elongatus*, is also a new fish. It is a herring-like fish with the central rays of the tail jet-black and extended considerably longer than the rest of the fin. Also, from South America we obtain the delicately colored *Pseudocorynopoma doriae*, whose enormous dorsal and anal fins seem to be a positive liability—an effect that is heightened by the fish's habit of carrying them partly folded.

THE PENCIL FISH SWIMS AT AN ANGLE

A departure from the typical Characin body is shown by the *Nannostomus* species (see Color Plate VIII). These fish are long and slim, similar to our native minnows, and their exceedingly brilliant hues and sharply defined color patterns seem almost artificial. Another new arrival of similar shape is the pencil fish, *Poecilibrycon eques*. This specimen is characterized by a broad, reddish-brown band starting from the mouth, extending the full length of the body, and onto the lower lobe of the tail. The upper half of the tail is transparent, so that at first glance half of the fin seems to be missing. This fish has the peculiar habit of swimming head up and tail down at an angle of 45 degrees.

Although South America is the headquarters of the Characins, a few species are known from Africa. It is from the latter continent that we get the lovely *Neolebias ansorgi* (see Color Plate IV). This little fish is a typical Tetra in shape, although lacking the characteristic adipose dorsal fin. So far, very few specimens have been imported and it has not been bred in this country; but its rich colorings and

gentle nature make it well worthy of special effort.

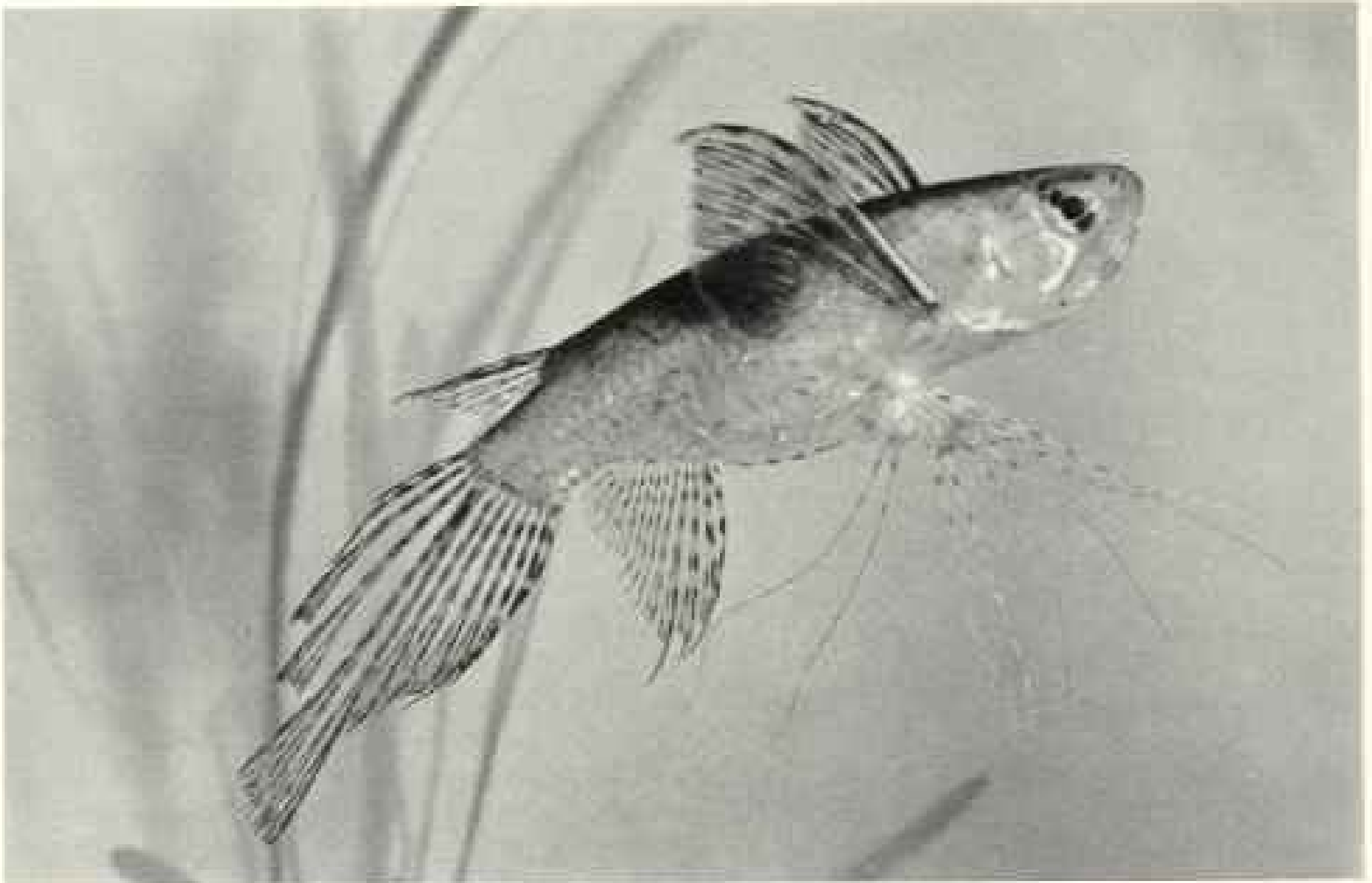
Every fisherman is familiar with our native American sunfishes, and every tropical fish fancier knows their South American counterparts, the Cichlids. This large family contains one of the finest of all aquarium fishes, the majestic scalare, and some of the worst rowdies and wife-beaters of fishdom. Most of the Cichlids are excellent aquarium fishes when young, but as they grow to a comparatively large size they are capable of doing considerable damage to both the plants and other inmates of the tanks. Despite their unpleasant characteristics, they all have exceedingly interesting breeding habits and are easily induced to display them in the small aquarium. Most aquarists, therefore, have a few tanks devoted entirely to the Cichlids.

Claims of good behavior have been advanced for several species, such as *Cichlasoma severum* (see Color Plate II), *C. festivum*, and several of the Acaras, but undoubtedly the best-behaved Cichlid is the Brazilian half-moon fish, or scalare, *Pterophyllum scalare*. Exceedingly graceful, shapely, and majestic in its movements, this beautiful fish has long been recognized as the king of aquarium fishes. Mild of manner and easily tamed, though hard to breed in captivity, in behavior it is just the opposite of what one would expect in a Cichlid.

THE POMPADOUR OF THE FINNY WORLD

Perhaps the most notable new importation of the past year was a new Cichlid, the pompadour fish, *Symphysodon discus* (see Color Plate I). It comes from the Amazon region and is found in the same localities, but over slightly different bottom, as the scalare. First introduced as the blue scalare and later changed to a more appropriate name, pompadour fish, this newcomer has been urged by some as the new king of aquarium fishes. True, it has more bright colors than the scalare, but it lacks the beautifully shaped fins, the long trailing streamers, and, above all, the natural, stately manner of the latter.

It is argued that the scalare is getting too common, as evidenced by the hundreds of thousands of young fish imported annually; but, strictly speaking, these young fishes are not true scalares. They are actually *Pterophyllum eimecke*, a closely related



Photograph by Walter H. Chute and Loren Tutell

IT SEEMS TO BE FLYING—THROUGH WATER

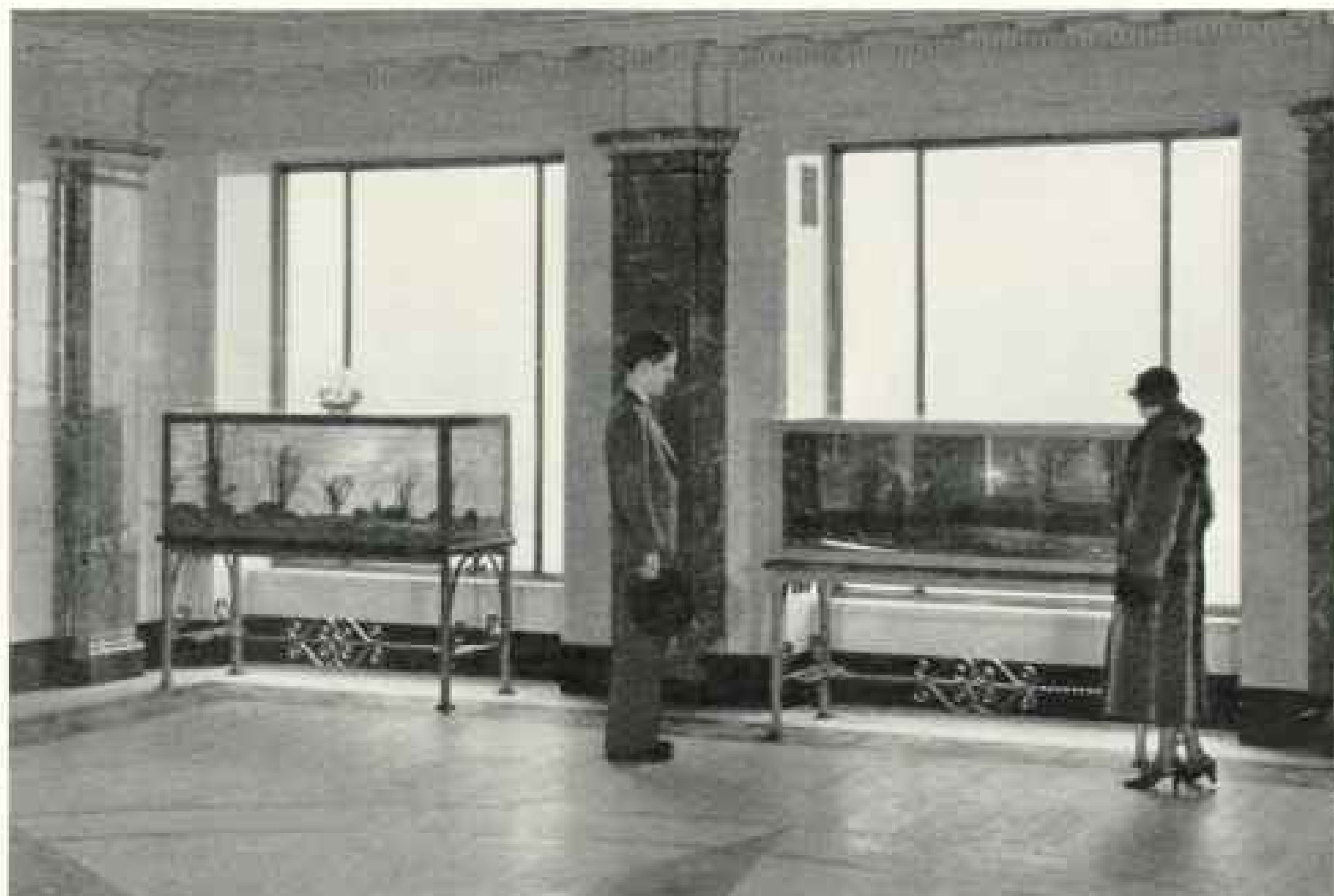
At first glance the fresh-water butterflyfish, *Pantodon buchholzi*, appears to be better fitted for life in the air than in the water. It uses the broad, winglike pectoral fins to help it skim along just below the surface of the water. When resting, the long, spreading rays of the ventral fins enable it to perch on the aquatic plants near the surface (see text, page 109). Slightly reduced.



Photograph by Edwin L. Wherry

A NEW SPECIMEN FROM WEST AFRICA

Although first received in a West African shipment, provisional identification names this fish *Vinculum sexfasciatum*, and extends its range through the Pacific islands to Australia. It displays the same lively curiosity over what is going on outside its tank as does its commoner relative, the spotted scat, *Scatophagus argus*. Should more of them be imported, they will undoubtedly prove popular. Reduced two diameters.



GEMS OF THE TROPICAL FISH WORLD FLASH THEIR BEAUTY IN THE FOYER OF THE NATIONAL GEOGRAPHIC SOCIETY'S WASHINGTON HEADQUARTERS

Among the bright denizens of the tank at the left are the Mexican swordtail, with its rapierlike fin of orange or green edged with black; the gourami, which blows bubbles coated with a sticky secretion and builds a nest of them; and the Siamese fighting fish, which assumes the colors of the rainbow as he prepares for battle. In the aquarium on the right are richly colored goldfish: the veiltail, the fantail, and the fringetail, with its trailing, diaphanous fins. In another tank are the highly popular Brazilian "angel fish," with their grave and aristocratic bearing.

species. However, regardless of which one deserves the honorary title, they are both noble fishes and there is plenty of room for each in the aquarist's tanks.

Quite overshadowed by their royal brethren, but, nevertheless, worthy representatives of the family, *Cichlasoma cutteri* and *C. meeki* are other Cichlids that have made their appearance recently. The former fish is the possessor of flashing, blue-green eyes, which probably are the brightest eyes in all fishdom. In certain lights they appear to be illuminated. *Cichlasoma meeki*, the red-breasted Cichlid, has the usual Cichlid spots of dark color surrounded by flecks of iridescence, but, in addition, the breast is bright red and this color extends inside the mouth. This is a common occurrence with salt-water fishes, but very unusual in fresh-water varieties. *C. meeki* also holds the distinction of being one of the first tropical fishes to make its debut by airplane.

More attention has been paid of late to the smaller varieties of Cichlids. These

dwarfs of the family exhibit the same bright colors and interesting breeding habits of their larger relatives, but they are inclined to be more peaceable and their very size prevents them from digging up the aquatic plants. *Apistogramma pertense* and *A. agassizi* are two dwarf varieties that have reappeared during the past year.

THE COMEDIAN FAMILY OF THE AQUARIUM

A shipment seldom arrives from South America without some members of the interesting catfish group. These droll little whiskered (really barbeled) fishes are always welcome and many an aquarist can testify to the efficiency of *Plecostomus*, *Doras*, *Corydoras*, and their relatives as "white-wings" in the aquarium.

Two new *Corydoras* have recently appeared in the imports. *Corydoras undulatus* is the most strikingly marked of the genus. Its pattern of silver and black makes a charming contrast in the aquarium with the brighter colors of other species.



Photograph by Walter H. Chate and Loren Tuttle

MUD-SPRINGERS OUT FOR AN AIRING

Although a true fish, the mud-springer, *Periophthalmus koelreuteri*, spends much of its time out of the water, returning occasionally to wet its skin. It can move rapidly on its fleshy pectoral fins and is capable of jumping a distance three or four times its own length (see text below). One-third natural size.

Another new *Corydoras* is the gold variety, similar to the familiar *C. natterii*, but with pale gold on belly and lower fins.

Among the most interesting of the recently available fishes is the leaf fish, *Monocirrhus polyacanthus* (see illustration, page 94). It is a member of the Nandidae, a family in which the posterior parts of the dorsal and anal fins are transparent, giving the effect of being cut off. *Monocirrhus* floats near the surface of the water, in a position that makes it look like a dead leaf.

Its method of feeding is unusual. If a small fish is introduced into the leaf-fish tank, the floating "dead leaf" starts to drift with an almost imperceptible motion toward the victim, seemingly as if propelled by some vagrant current of water. If the little fish is alarmed and dashes off in another direction, the leaf fish slowly drifts around and gradually approaches its victim again. When close enough to strike, the dead leaf suddenly comes to life, darts at the little fish, at the same time opening a surprisingly large mouth, and with one gulp it is all over.

As it will take nothing but live fishes, it is probable that the average fancier will be deterred from trying *Monocirrhus* by the difficulty of supplying food; but its interesting habits and appearance will commend it to those who are in a position to supply its needs.

There are several species of tropical fishes that are known to the fish fanciers and to the general public because of numerous articles describing their peculiar habits and unusual appearance. Several of these have been imported at rare intervals in the past, but it was not until the last few years that they have appeared in the market with any degree of regularity.

A TRUANT FROM ITS AQUATIC HOME

The mud-springer (see above) is one of the best known. This little Goby is a common sight on the beaches of certain parts of the Tropics. It spends much time out of the water, chasing the insects that form part of its food. Its eyes are perched close together on top of its head and are depressible into hollows situated just below them. These depressions retain moisture and the eyes are "blinked" frequently, either singly or both together, to moisten them so that the fish can see clearly.

The mud-springers are quite active out of the water, and, when kept in the aquarium, a place must be provided so that they can come out in the air at will. Best results are obtained when the water is half fresh and half ocean water. They become tame in captivity and will take food from the owner's hand. As they come from the warmest parts of the Tropics, provision must be made to keep both the water and the air in their tanks warm.



Photograph by Edwin L. Wisner

SETTINGS REFLECT SKILL AND TASTE

In this display tank a profuse growth of *Cryptocoryne willisii*, above a ledge of Ohio tufa rock, forms the central motif. The subdued tints of aquatic foliage make a pleasing foil for the brilliant colors of the fish. Artistic effects can be produced by using aquatic plants and rocks without recourse to artificial ornaments.

Another of these rare tropicals is the butterflyfish, *Pantodon buchholzi* (see illustration, page 106). It is rather plain in color, but is exquisitely modeled. The rays of the ventral fins are lengthened and spread in a circle below the fish. The pectoral fins are placed high on the body and have a transparent area in the center.

It is said that this fish can fly, and the story is told that it was discovered by an entomologist who caught one in his butterfly net while collecting insects over a pool in West Africa. These fishes have shown no inclination to fly in the aquarium, however, where they spend most of their time resting on the plants near the surface of the water. They are hardy in captivity and will live for years on worms or raw beef.

ARCHERS SQUIRT WATER AT INSECTS

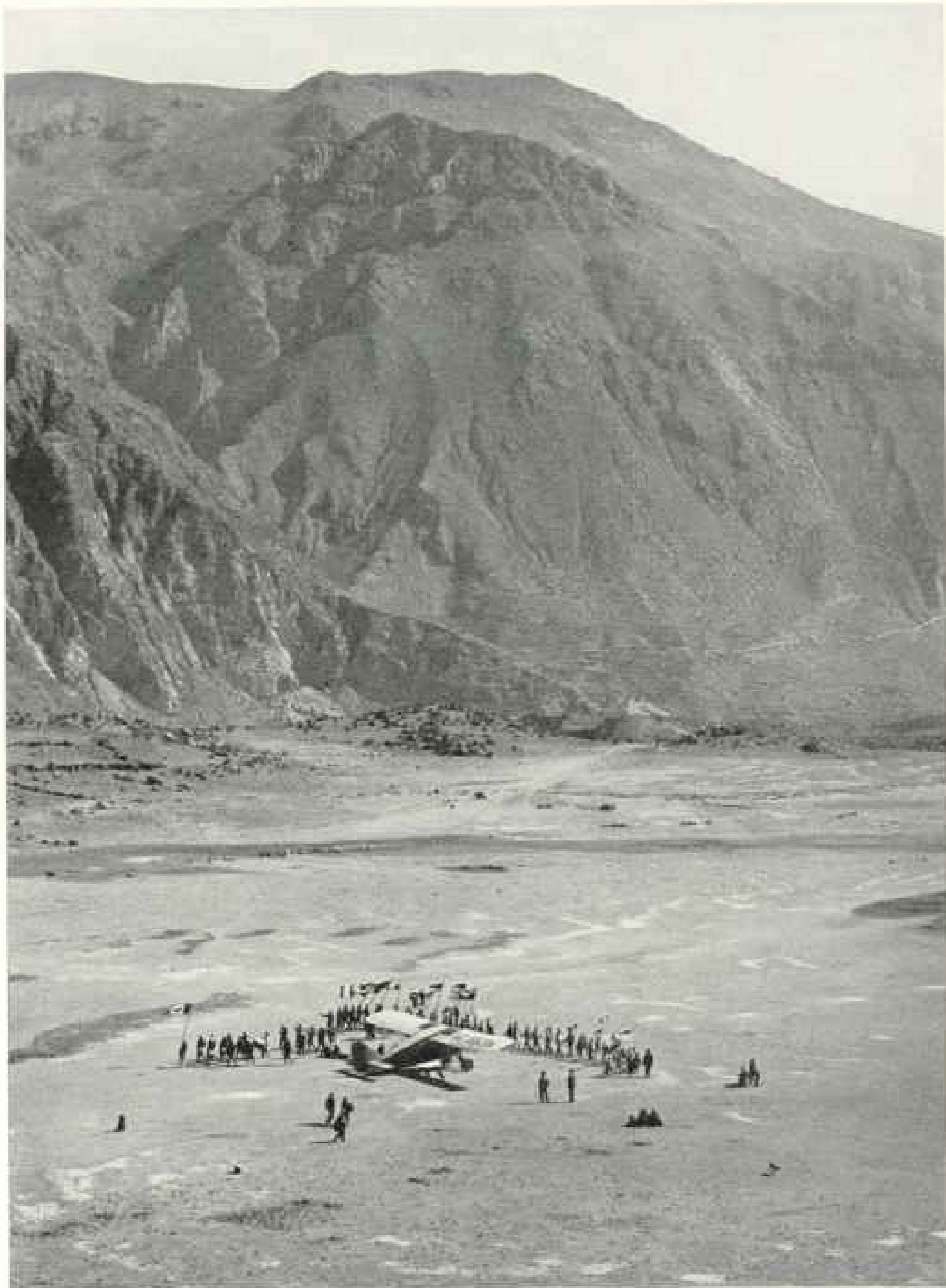
Frequent mention is made by travelers in southern Asia and adjacent islands of a little fish called the archer fish, *Toxotes jaculator* (see Color Plate V). It swims at the surface of the water and captures the insects on which it feeds by shooting a spray of water at them as they perch on overhanging leaves or grass. It is surprisingly accurate up to a distance of two feet.

Several specimens of this interesting fish have lived in the Shedd Aquarium for the past two years. They will shoot at meal

worms or other food held in the hand over their tank, and when very hungry will apprise their keeper of the fact by squirting water at him as he passes their tank. The largest specimen, now about 5 inches long, is capable of shooting, by actual measurement, a distance of 13 feet.

Many of the tropical aquarium fishes are salt- or brackish-water inhabitants that have been acclimated gradually to pure fresh water. This is why a little salt in the tanks is advocated for certain species. There are quantities of little fishes along the shores of this country as well as foreign ones that could be accustomed to life in the fresh-water aquarium. Several concerns in the South make a practice of collecting these species and gradually changing them over to fresh water.

The hog-choker, *Achirus fasciatus*, and the sergeant major, *Abudefduf marginatus*, are two of these fishes that have recently appeared in the market. The former is now sold as "airplane fish," while the latter is burdened with the title of "convict fish." Although some of these fishes do fairly well in pure fresh water, best results are obtained if they are kept in one part salt water to five parts fresh water, a strength that has been demonstrated to be safe for aquatic plants. It is probable that this source of supply has just been broached, and as experimentation is continued we may expect a number of additional species.



© Aerial Explorations, Inc.

INHABITANTS OF THE "LOST VILLAGE" OF LARI PARADE AROUND THE PLANE

To clear a safe landing field among the high mountains that surrounded this remote settlement was a difficult task. The first work was insufficient, and the natives were disappointed almost to the point of violence when the *Washington*, flying over the new airport, signaled that it was impossible to alight. Later, successful landings were made (see text, pages 127 and 131, and illustration, page 126).

A FORGOTTEN VALLEY OF PERU

Conquered by Incas, Scourged by Famine, Plagues, and Earthquakes, Colca Valley Shelters the Last Fragment of an Ancient Andean Tribe

BY ROBERT SHIPPEE

AUTHOR OF "AIR ADVENTURES IN PERU," IN THE NATIONAL GEOGRAPHIC MAGAZINE

With Illustrations from Photographs by Lieut. George R. Johnson

INDIANS crowded the plazas and threw their hats into the air as we zoomed half-forgotten towns in the Colca Valley of Peru. One old woman groveled in the dirt as our strange "birds" roared overhead.

Some towns were completely deserted. On the zigzag trails that lined the steep valley sides, we could see stampeding herds of llamas. Over short stretches of pampa we flew so low that blasts from the propeller stirred the dust into little whirling cones. But nowhere in the valley had we found a safe place to land. At sea level we could have landed in several of the flatter stretches, but the floor of this valley was two miles above sea level, and we needed plenty of room.

In a previous article* we told how we lost our other plane, the *Lima*. Had it not been cracked up, we might have attempted a landing; but with only one plane, the *Washington*, now in commission, we finally thought it best to explore the valley first on land, and thus find a spot where the plane might alight.

So it came to pass that late in June we left the plane at Arequipa and set out for Chivay, a town at the head of the Colca Valley, some 70 air miles north. Valentine Van Keuren, topographer; W. O. Runcie, motion-picture cameraman; Max Distel, mechanic, and I, pilot and historian, went on this trip. Lieut. George R. Johnson, our chief photographer and field leader, and Irving G. Hay, pilot and mechanic, remained at Arequipa to complete an aerial survey of the Colca.

Over a circuitous and difficult route, by train, truck, and muleback, we reached Chivay in two and a half days. Our path had taken us along trails cut into sheer

mountain sides, through icy streams, and across sun-blazed pampas. Yet we were more than repaid by our first sight of this strange little town (see map, page 113).

A LUKEWARM RECEPTION AT CHIVAY

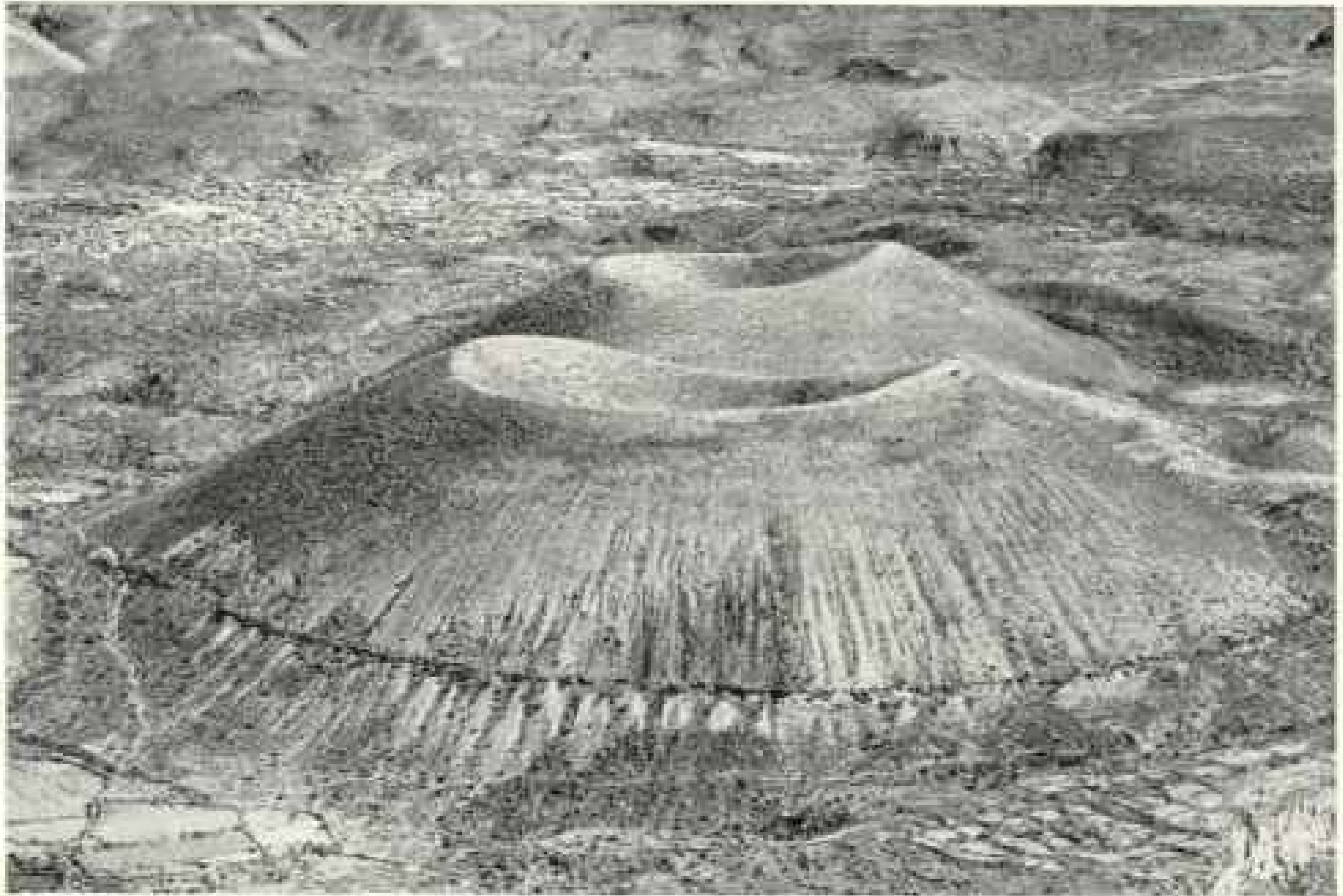
Over brown-thatched roofs loomed two white church towers, their spires in sharp relief against dark, scarred cliffs until they lost themselves in the whiteness of distant snow peaks. The deep gorge of the Colca swung wide of the town; hundreds of feet below our trail we heard the voice of the river as it poured over hidden falls. Curis of blue-tinged smoke, at first the only signs of life, dissipated as they formed, when afternoon winds began to freshen. When our mules came plodding through unpaved streets, natives eyed us unconcernedly.

Whatever warmth was lacking in our reception by the general public was, however, soon forgotten in the hospitality afforded at the town's combined hostelry and *bodega* (wine shop). There Señor Salinas, owner of the *bodega*, and his manager met us with open arms, as we rode through a whitewashed archway into a tiny paved courtyard.

Soon we were being shown all the wonders of this Colca Valley outpost of civilization—tin roofing, a miniature gasoline-electric plant, an ancient phonograph, a typewriter, and bottled beer—all brought from Arequipa on muleback. Chivay, we learned, was the valley's link with the outside world. The natives sold their llama and alpaca wool at this trading post, from whence it was sent on by llama train to the railroad or direct to Arequipa (115-116).

Both Salinas and his manager seemed well acquainted with the history of the valley. In 48 hours we had acquired the answers to more than half the questions later asked by New York historians when they saw our photographs of the Colca

* See "Air Adventures in Peru," by Robert Shippee, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1933.



© Aerial Explorations, Inc.

WIND AND RAIN ERODED THESE CRADLELIKE CONES

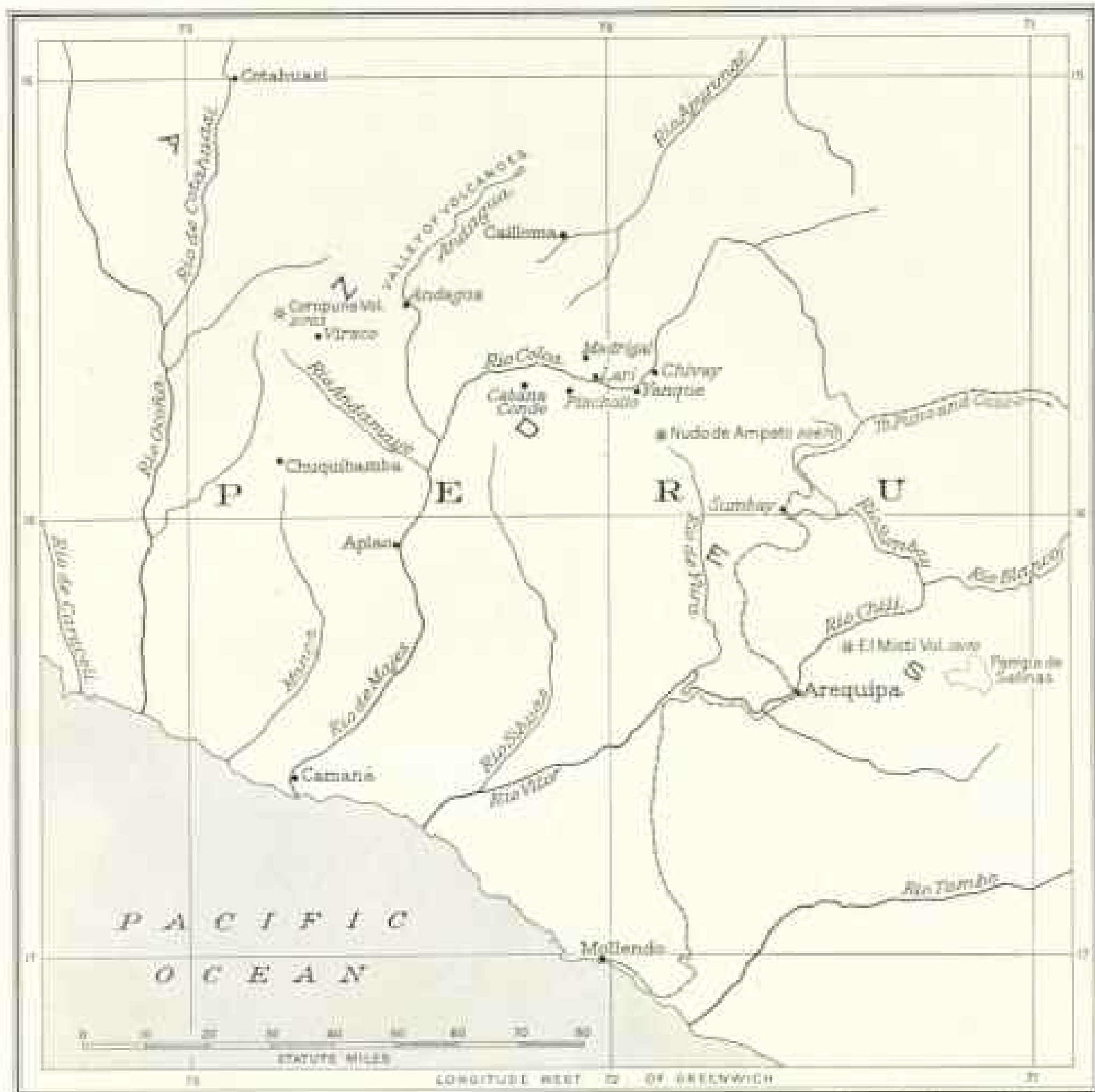
The streamline effect at the top is carried out around the base by a man-made trail. In the left background is Andagua, one-time valley metropolis of some 10,000 people, now dwindled to an Indian village of not more than 1,200. The rock cliff in the right foreground marks the edge of the Andagua River Canyon, several hundred feet deep at this point.



© Aerial Explorations, Inc.

THE AUTHOR, THE PHOTOGRAPHER, AND THEIR MASCOT ENJOY A TRIUMPH

It was a gala occasion when the *Washington* came to rest safely on the improvised field at Lari. Natives of the village gathered to see the "magic bird." El Pibe, the dog, was an important part of the picture (see text, page 112).



Drawn by Newman Dunstead

IN THE HEART OF PERU LIES A VOLCANIC AREA OF FORGOTTEN TOWNS AND DESERTED VILLAGES

Valley. That information, combined with what we have learned since completion of the expedition (mainly through the diligent research work of Mr. Philip Ainsworth Means, author of "Ancient Civilizations of the Andes"), gives us an interesting history of the valley.

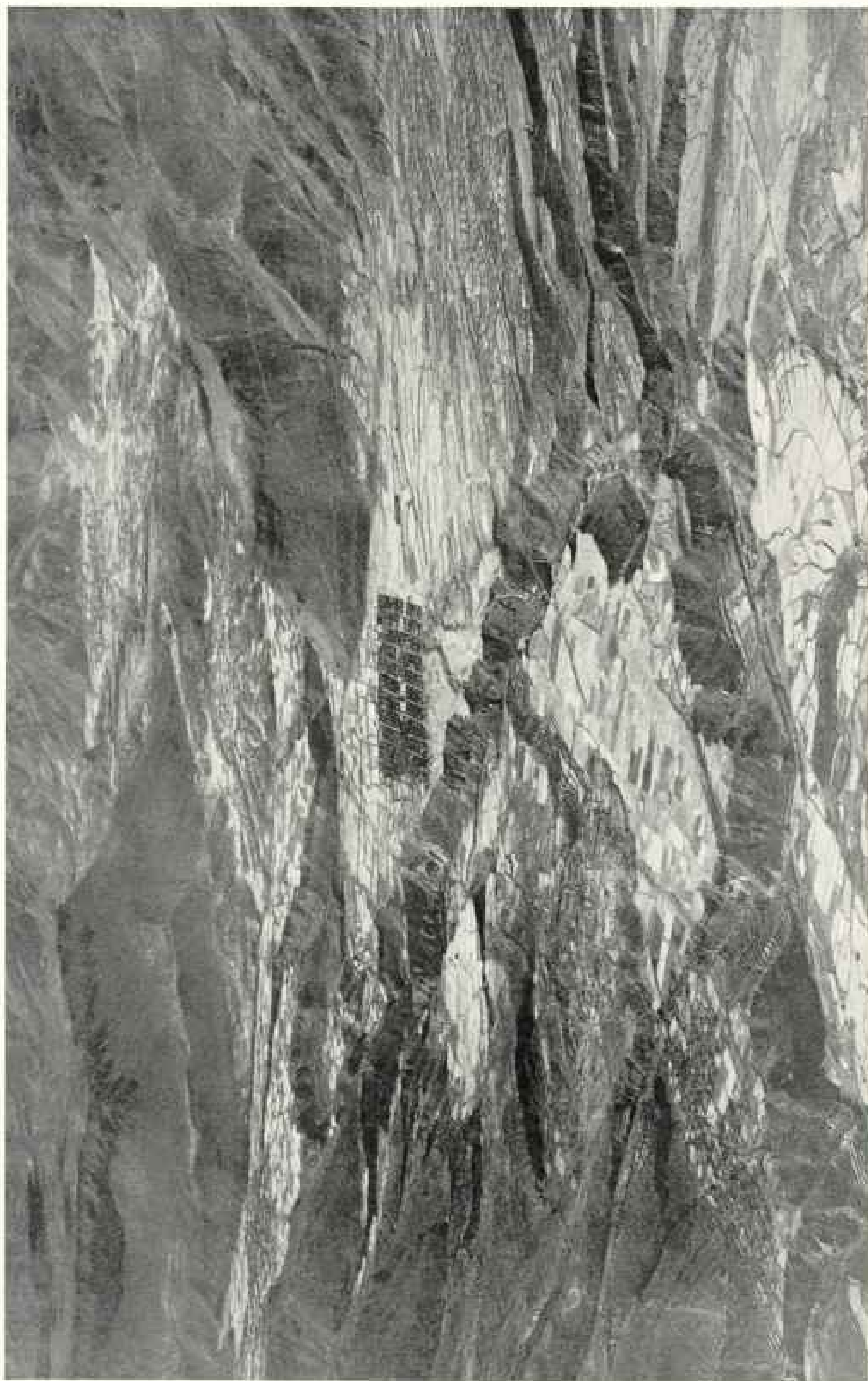
COLCA VALLEY PEOPLE ORIGINATED IN A VOLCANO

The ancient inhabitants of the Colca Valley, whose descendants still occupy it, were the Collahuas, or Collaguas. According to their own legends, they had their origin in a snow-covered conical volcano named Collaguata, in a neighboring province. They came out of the mountain and down into

the valley of the Colca, drove out some scattered tribes already there, and established themselves. Their name they took from the holy mountain, Collaguata, whence they came.

From a document written in the valley before the visit of inspection made by the Viceroy Don Francisco de Toledo (about 1570-1575), it appears the Collahuas were wont to bind the heads of their children very tightly in such a way as to make them tall and conical, like the sacred volcano Collaguata. On these artificially shaped heads they wore very tall conical hats without brims.

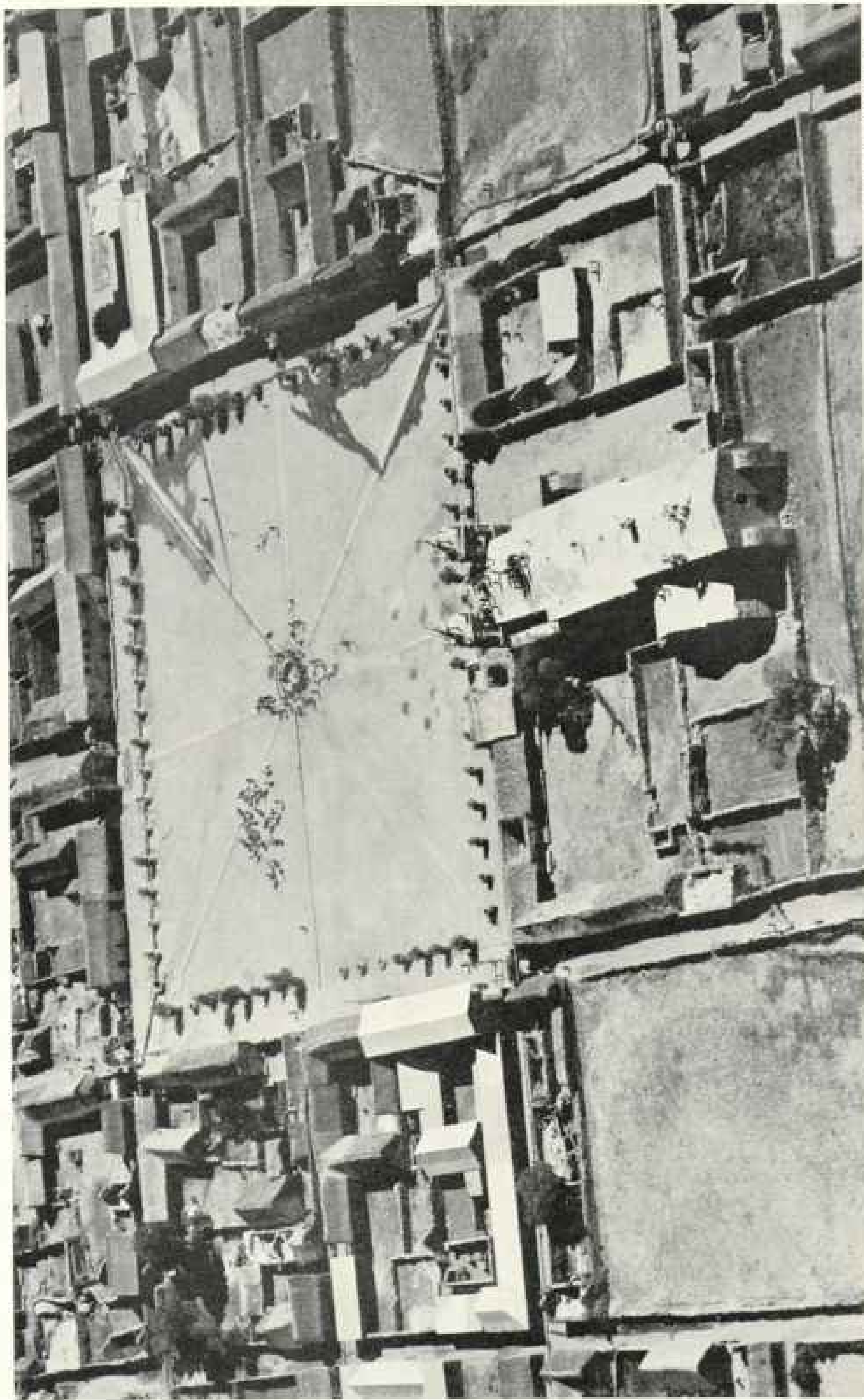
These usages were subsequently stopped by Toledo.



© Aerial Explorations, Inc.

THIS REMARKABLE PHOTOGRAPH LED TO THE ORGANIZATION OF THE EXPEDITION

Lieutenant Johnson took the picture while on a reconnoitering flight over the Colca Valley in 1928. It aroused the interest of New York historians and became a prime factor in the subsequent survey. Four villages show distinctly: Ichupampa, in the left foreground; Yanjuc, right center; Copotaque, left top center; Chivay, top center. The village of Lari, where the landing field was made, is just out of the picture, below Ichupampa.



© Aerial Explorations, Inc.

CHIVAY CHURCH ROOF DREW A CROWD FOR THE MESSAGE PICK-UPS

The Washington swooped low over the ancient village and snarred with draglines the ropes to which mail bags were attached (see text, page 117). The town, like others in the region, is built around a central plaza—a style traceable to Spanish influence (see illustration, page 116).



© Aerial Explorations, Inc.

THE ANCIENT CHURCH IN CHIVAY SERVED AN UNEXPECTED PURPOSE

From its roof (see illustration, page 115) messages were picked up by the *Washington*. Transit sights from the top of the highest peak in the background (16,500 feet) made it possible to tie in the ground control for the aerial maps.

One gathers from the chronicles that the Collahuas were incorporated into the Inca Empire by the Emperor Mayta Capac, who ruled about 1195-1230. This end he achieved by marriage with the daughter of the chief of the Collahuas, backed up by a war against that tribe.

It is clearly indicated, not only in the chronicles, but also by ruins in the valley to-day, that the population was considerable at the time of the Spanish Conquest. Then there must have been good crops of maize, potatoes, and of the cereal known as quinoa. Melting snows of the higher mountains watered the fields.

Colonization of the valley by the Spaniards was apparently not difficult. "The Indians of this province are settled in permanent villages already formed; but anciently, before the general visitation of Don Francisco de Toledo, they had many hamlets. Toledo put them in the larger and more commodious villages where they now are. Their understanding is, for Indians, good; and they display reason in the affairs with which they concern themselves. There are among them good scribes,

singers, and musicians upon the flutes and flageolets, and they have aptitude for even more difficult things. Their inclination is toward feasts and banquets and pastimes, and their manners are affable and but little marked by covetousness. . . ."

In early days the valley belonged to the Diocese of Cusco, 45 leagues distant by a reasonably good road. Each of the 14 towns had a church and a priest appointed by the Viceroy on behalf of the Crown. The churches, however, had been built and adorned by the Friars of San Francisco, who won the people away from their pagan cults.

In several churches of the Colca Valley are statues of Philip II of Spain. That fact, together with the testimony of several 17th-century documents, indicates that the King was, at any rate indirectly, the founder of the towns in question. In 1573 Philip II set forth in minute detail the outward characteristics which new towns were to have. The Colca towns conform in almost every detail—in the arrangement of the plazas, with the churches slightly raised and blocked off; in the rectangular



© Aerial Explorations, Inc.

THE LLAMA IS THE YAK OF PERU

Loads are tied to the backs of the willing beasts in the courtyard of the hostelry in Chivay. The train will march to Arequipa. The trail leads through desolate stretches, and often the native helpers, mounted on the backs of mules, have rough going.

disposition of the streets, and in other respects.

The Colca Valley has been in a decadent condition ever since the early Republican Period. The population was cut down by famines, plagues, and earthquakes. Apparently a change of season caused lack of water and abandonment of many of the terraces. Adventurous spirits left the valley for new lands and either failed to return or brought back fevers and other diseases contracted in the lowlands. Others succumbed to the hard labor they were put to in the mines at Cailloma. The whole story, in later times at least, seems one of discouragement; yet the inhabitants of the valley are still a cheerful, hard-working lot.

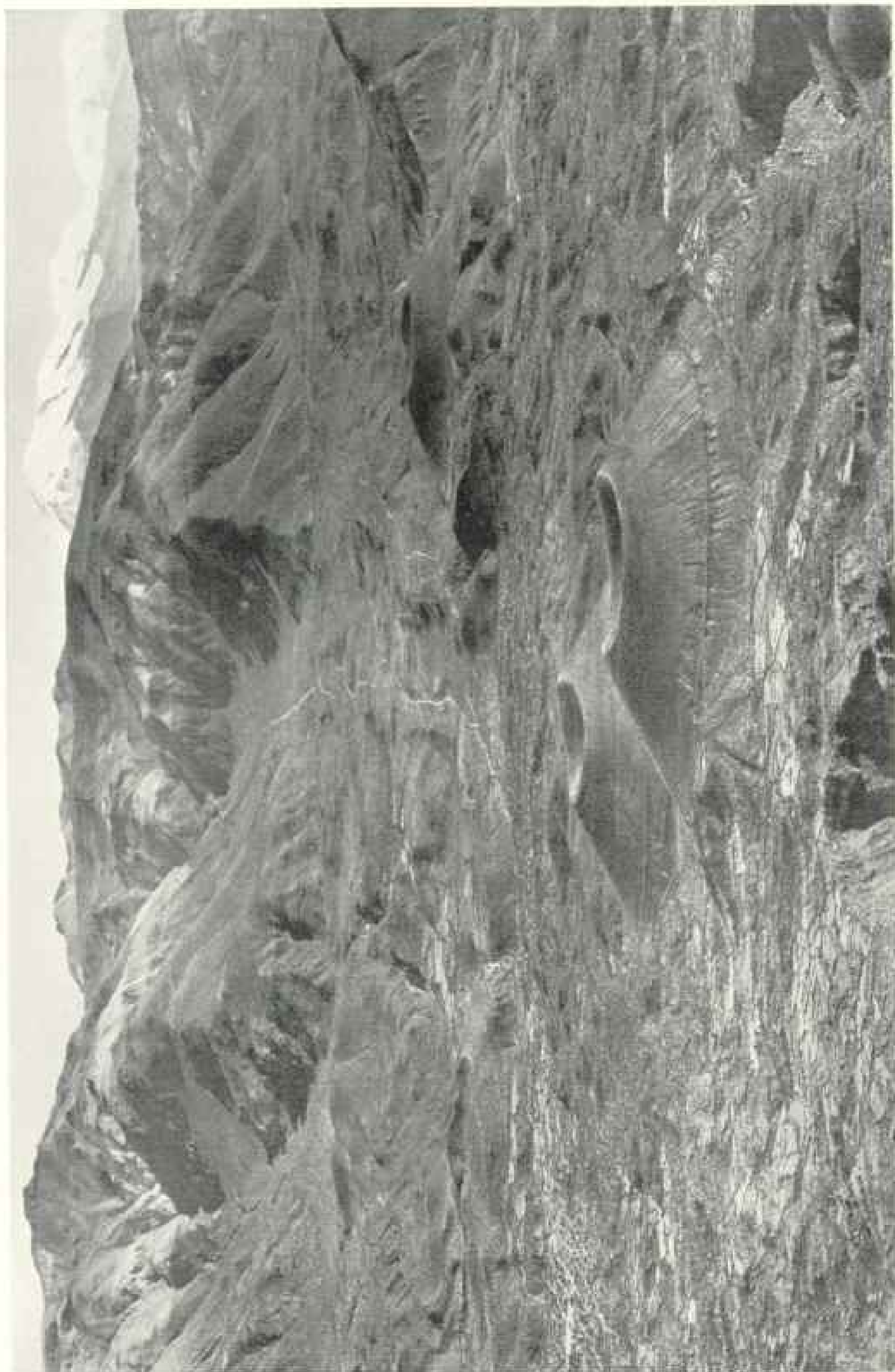
THE EXPLORERS GIVE THE VALLEY AN AIR-MAIL SERVICE

While we were photographing the people, excitement was aroused by the appearance overhead of the *Washington*. We cautioned the natives to stay clear as the plane zoomed over the little plaza. Johnson leaned from a cabin window and dropped a message bag attached to a min-

iature parachute. Along with the rest of the bystanders, we all rushed for that bag. As the *Washington* waggled its wings in the distance and climbed for altitude, we drew forth not only a message, but a chocolate cake!

Next day, when the plane came again, we experimented with a pick-up device of two poles and a cross-line which we set up on the roof of the church. After several attempts the right arrangement was found. Thereafter, during our stay in Chivay, we had quick communication with the rest of our outfit. Swooping low over the church roof and dragging a weighted line that tangled with ours, the *Washington* easily picked up messages to be cabled to New York; also numerous requests for extra socks and cigarettes. Especially valuable was this transport system when we needed medicine for Runcie, who had contracted a serious chest cold in the high altitudes.

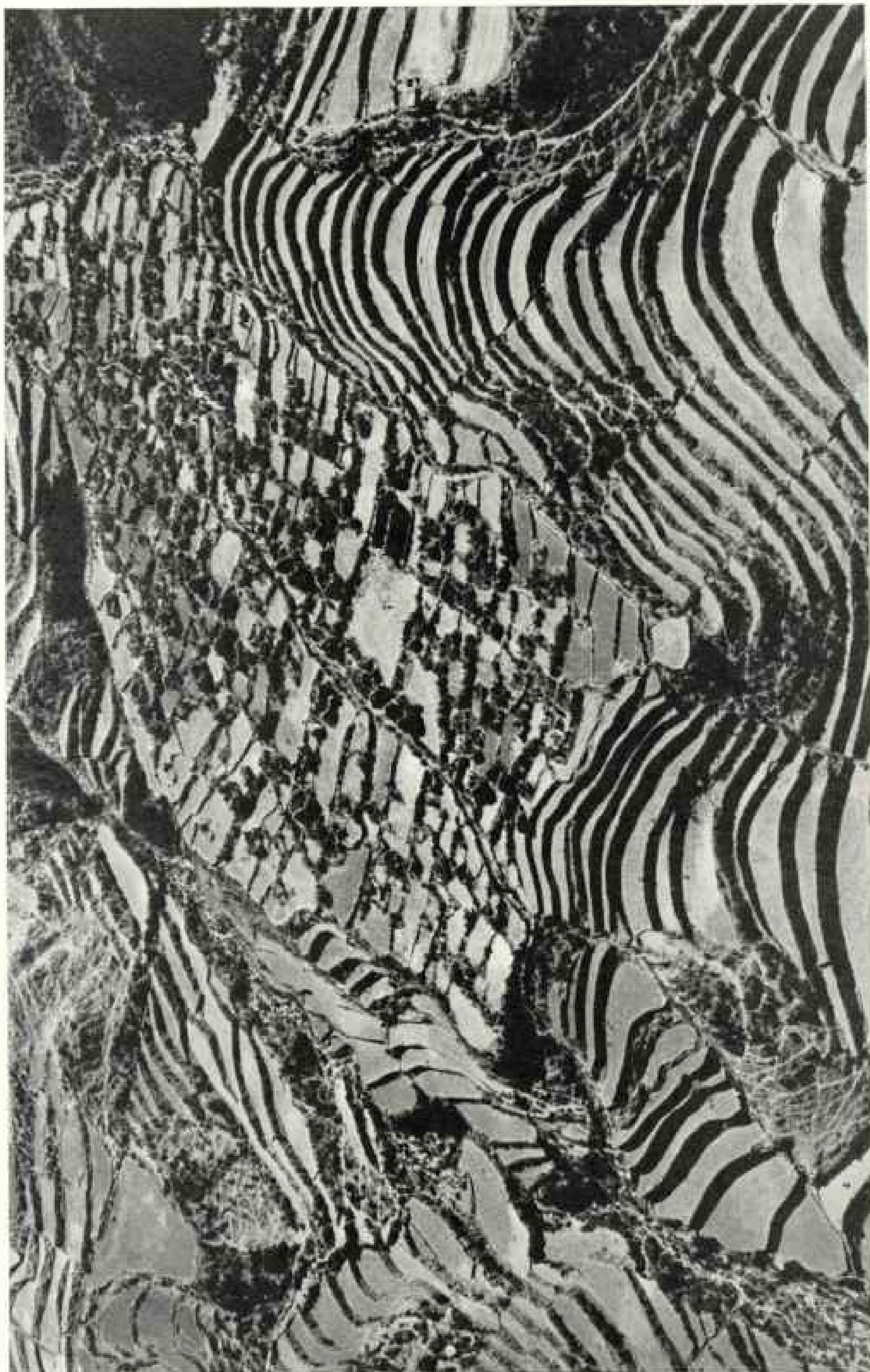
From one falling message we learned that a revolution was getting under way in the Cusco and Puno regions. Rumors also percolated into Chivay as pack trains came in from Arequipa. Rebels were attacking



© Aerial Explorations, Inc.

ONCE THE GOD OF FIRE ROARED MIGHTILY AMONG THE PEAKS NEAR ANDAGUA

Silent now, the huge cones gaze in the clear mountain air. The town lies at the extreme left—a gateway to the Valley of Volcanoes (see map, page 113, and illustration, page 112).



© Aerial Explorations, Inc.

NO SPANISH ARCHITECT LAID OUT THIS VILLAGE

Ruins of an Indian community in the Colca Valley show the jumbled arrangement made by untutored natives. Where the white conquerors exerted their influence, the houses are set in order about a central plaza (see illustration, page 115). The terraces once were gardens that supplied food for the inhabitants.



⊕ Aerial Explorations, Inc.

THE EXPLORERS CAMPED IN THE CRATER OF THE LOWER CONE

Dense cactus growth has crawled up the sides of the cinder cone and carpeted the interior. The yawning bowl of the crater is approximately the height of a five-story building, 350 feet in diameter at the rim and 90 feet across the bottom. These volcanoes in this central section of Colca Valley are younger, as indicated by lesser erosion, than those of the upper valley.

railroad trains, had laid siege to Cusco, and were heading for Arequipa by a detour that would take them just south of the Colca Valley. Yet the Colca seemed so secluded that we did not worry much.

ECHOES OF A REVOLUTION

Truth lurked behind the rumors, however. Wrapped in ponchos against extreme cold, a dozen of us—members of the Expedition, Salinas and his manager, and the leading citizens of Chivay—huddled around the rough, planked table. Bowls of llama stew steamed in front of us, dogs scrambled and fought among our boots, crude candles guttered in the draft from the doorless doorway of the adobe house. Conversation was a muddle of Spanish, Quichua, and English.

But when a ponchoed, barefooted native burst through the doorway and exploded into unintelligible Quichua, we fell silent. Salinas calmed the newcomer, listened to his message carefully; then, without any warning, blew out the candles on the table. He explained in rapid Spanish: A detachment of regular Army soldiers are encamped at Sumbay, nearest railroad station to Chivay. They have sent a patrol in search of mules and horses, so that they can push on toward Cusco by a route north of the railway.

That patrol is approaching Chivay. The natives here are hiding their animals farther down the valley; all lights have been extinguished; it is hoped that the soldiers will not linger in the valley, for if they do so "there will be much plundering. Por



© Aerial Explorations, Inc.

THE CRATER SEEMS A SENTINEL IN A COAL-BLACK SEA OF EBONY WAVES

The overlay of lava, "frozen" in its swirling tracks, is from 20 to 50 feet deep. The surf effect is enhanced by occasional crests of gray. The maze of flows makes travel tortuous in this part of Colca Valley, and a day's journey of ten miles over the few trails that skirt the edges is good going on muleback. Faintly discernible is cactus growth.

Dios! They would drink all my liquor, steal all my trade goods!"

Groaning and creaking, the massive wooden gates at the entrance to the patio were swung shut. Apparently we were in for a siege.

We sat there in the dark for several hours. Rifle shots sounded in the distance. Then some one from beyond the gate yelled that the patrol had left and headed back toward the railway. As far as Chivay was concerned, the revolution was over. The candles were relit; then we had a laugh. Under cover of darkness the native messenger, who had remained in the room, had finished all but two of the bowls of stew!

Much of our time in Chivay was spent in running down "landing fields." The natives, who could not understand that we

required a stretch of level ground at least a half mile in length, insisted on showing us many impossible locations. After four or five hours' riding we would come upon some little patch of pampa, crowded in between high alluvial fans, where one could not have landed even an autogiro! When we inquired about the lower valley, which from the air had seemed the most likely section, violent jealousy of the other villages would throw the people of Chivay into speech almost apoplectic.

THE ROCKY ROAD TO LARI

We should have pushed directly down the valley, had not the mules we had come in with been sent back to Arequipa. The few local mules were inferior beasts, small and skinny, incapable of a long trip.



© Aerial Explorations, Inc.

WORKING IN A CRATER THAT ONCE SEETHED WITH FIRE

The extinct cone was the site for pitching the tents in this part of the Valley of Volcanoes. The shelter is the light-proof photographic laboratory.

We had expected Johnson to bring mules from Arequipa when he had finished the aerial work; but he dropped from his plane a note saying the disturbance in Arequipa would delay him for several weeks. There was raiding all along the railroad, and the rebels would be sure to seize any passing pack train. In the meantime he would fly the *Washington* to Lima to undergo an overhaul and to pick up more film. To save time, we might as well start down the valley with such mules as we could procure.

And what sorry-looking beasts they were! The riding mules had sore backs. So many wool pads had to be put under the saddles that we were perched in the air like flagpole-sitters. The pack animals were in even worse condition. A stout man could have carried a heavier load than the best of those four-legged scarecrows.

The first day on the trail took us to the town of Yanque, only five air miles from Chivay. Yet even with hardier mules we could not have gone much more rapidly, since every few minutes we had to dismount and edge our way along yard-wide, slippery trails that seemed hung in mid-air hundreds of feet above the river. The rough topography made it necessary to zigzag back and forth along the south side of the valley. Travel on the floor was impossible, since the deep gorge of the river ribboned from side to side. It was easy to see why there was little intervillage travel in the Colca Valley.

At one particularly dangerous spot on the trail, where broken shale gave precarious footing on a narrow ledge, we noticed the cliff wall spattered with little dark-green lumps. The native muleteers would give no explanation. Days later, however,



© Aerial Explorations, Inc.

A NATIVE DRINK CHEERED THE WORKERS AT LARI FIELD

Women were ever present with jugs and pitchers of *chicha*, a beer made from maize, to serve their men (see text, page 127).

we learned that those lumps were cuds of coca, thrown against the cliff by native travelers to insure safe passage for themselves and their beasts. That superstition, similar to many in the sierra, has been handed down from Inca times.

In Yanque we were put up by the *gobernador* (governor), a cheerful old chap who spoke a curious mixture of Quichua and Spanish. Fortunately, several members of the governor's family were absent. As it was, the four of us were housed in an adobe-walled, thatch-roofed, windowless room, with seven gubernatorial representatives. The dirt floor was our mattress. Fleas assured enough involuntary movement during the night to keep us from freezing.

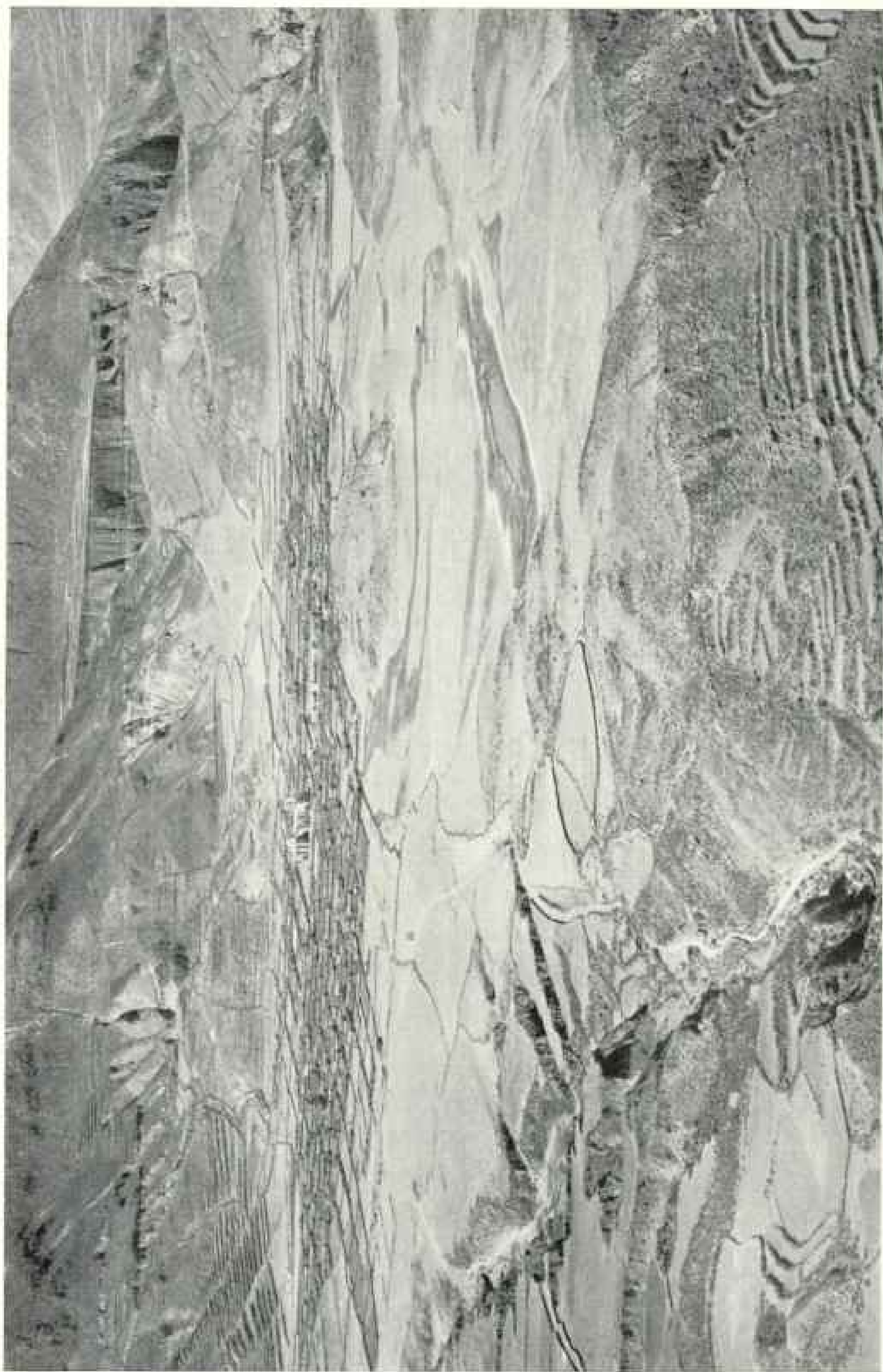
Aside from hotel facilities, there was a striking difference between Yanque and Chivay. The feeling of contact with the outside world was gone. The church, once

far ahead of that of Chivay in both interior and exterior ornamentation, was more tumbled down; the houses were more fallen in, if possible, than those of Chivay; fewer natives understood Spanish; and geographically, situated as it is in a depression in the valley side, Yanque seemed more isolated from even the remainder of the valley.

Yet its atmosphere was restful. Eucalyptus trees shaded the little plaza. There was no sound but the gurgling of water in the tiny channels that split the deserted streets. And when the distant, snow-covered humps of the Nudo de Ampato were gilded by the rising sun—well, that scene across the plaza was like a classic painting come to life.

ADOPTING A TRAMP DOG

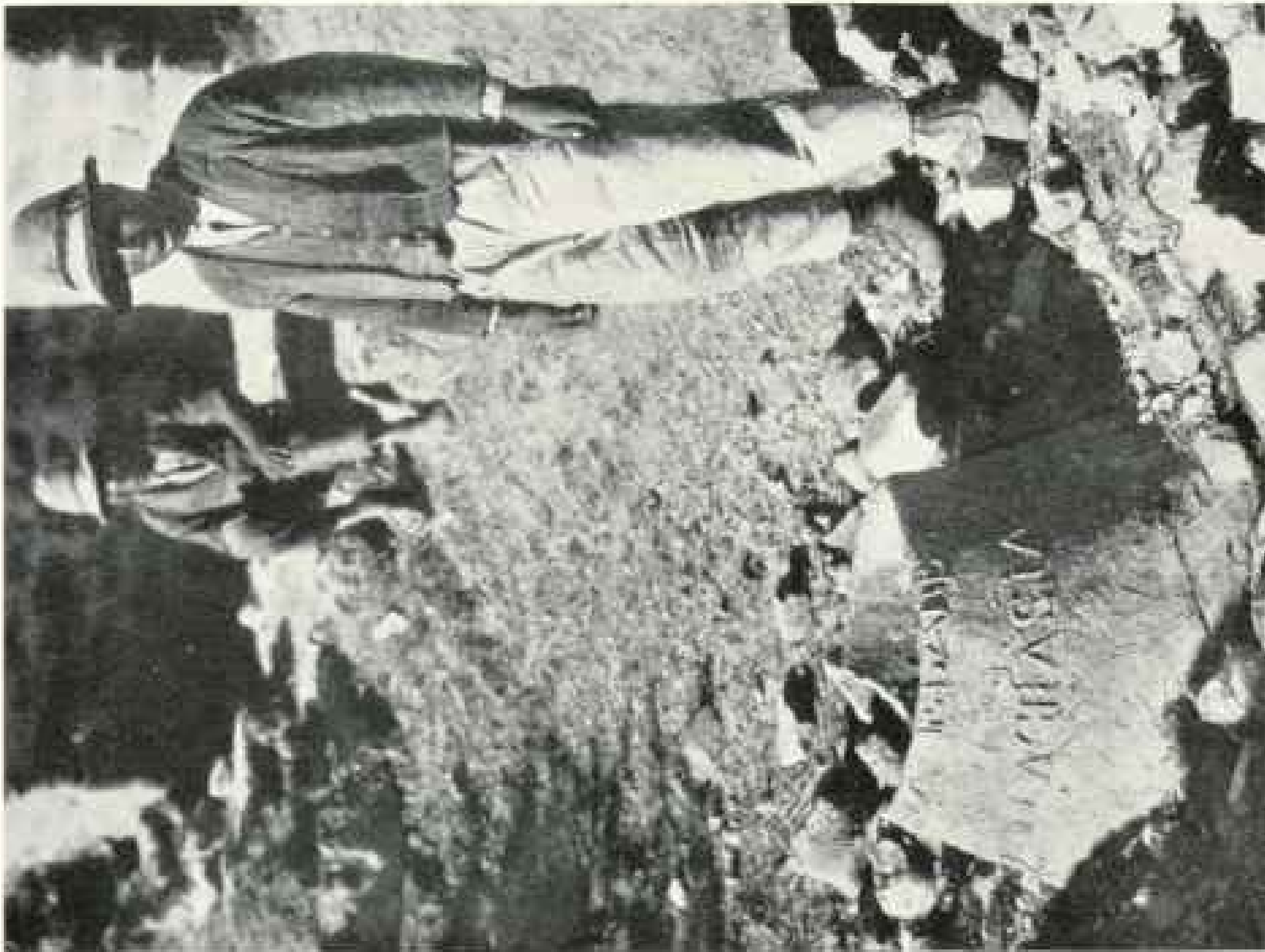
Besides the beauty of its ancient plaza, Yanque has another significance that will



© Aerial Explorations, Inc.

FROM A DISTANCE THE CHURCH AT LARI DWARFS THE TOWN

The markings of the landing field are faintly discernible at the right. In the foreground and on the slopes in the left background lie the ancient garden terraces, now entirely arid (see text, page 127).



© Aerial Explorations, Inc.

AN EARTHQUAKE RANG THE VILLAGE TUCSIN FOR THE LAST TIME.

In the shadow of the huge church at Lari the explorers uncovered a bell that had been hurled from the towers by a *temblor*. It was originally cast by the Spanish settlers. The skill of the present-day inhabitants of the valley was not equal to the task of recasting it.



© Aerial Explorations, Inc.

THE MADRIGAL CHURCH HOUSED A MYSTERIOUS STATUE OF ST. JAMES

Just how this elaborate equestrian figure of Santiago found its way over the mountain passes into the forgotten valley of the Colca is a problem. The bridle, spurs, and sword are of solid silver, and the cloak is heavily ornamented with gold and silver spangles.



© Aerial Explorations, Inc.

THE MOST APPROVED METHODS WERE OBSERVED IN MARKING THE FIELD

From a level area strewn with boulders the ground party created a usable airport at Lari (see text, opposite page, and illustrations, pages 110 and 124).

never be forgotten by the Expedition. It was here that Pibe officially joined forces with us.

El Pibe (The Kid) was a little "yaller dog" of the sierra. His mother, a fox terrier, had been brought to Chivay by Salinas. Pibe was born in the Colca Valley and had never been out of the valley, had never been below 11,000 feet above sea level, and had never seen a cat. He had been just one of the dozen dogs accustomed to fight under the dining table in Chivay.

But, somehow, Pibe conceived a liking for us, probably because we used to give him scraps of food at mealtime. When we left Chivay he tried to follow us. We sent him back twice, and, since he had not ap-

peared again on the trail, we thought that was the last of him.

Yet scarcely had we unsaddled the mules in Yanque when Pibe was sighted, limping toward us down the street.

From then on Pibe tagged along. On the trail he ran at the heels of the mules, stopping now and then and running back to make sure every one was in line. Occasionally we would lift him up into a saddle; on the high passes we wrapped him in ponchos against the bitter cold. But always Pibe was dead game. He would tackle anything that seemed in our way, from drunken Indians to mongrel dogs and stray burros (see illustration, page 112, and text, page 131).

Sometimes, at night, he was too tired to raise his head to eat, but at daybreak he would be on the job again helping round up the mules. He used to sleep in our blankets, showing no particular preference, but going from person to person and snuggling down without waking the sleeper. But there was no rest for the sleeper when Pibe heard some unusual sound outside. Then he would shoot out past one's head like a rifle bullet, leaving a snapping streak of static electricity in his wake!

AT LARI A LANDING FIELD WAS FOUND

Lari, once one of the largest towns in the valley, is a short day's ride from Yanque. To-day its houses are nearly all deserted, and the church, the largest in the valley, shows the ravages of time. But Lari now boasts of one thing that none of the other towns has or is likely to have—an airport. On the very outskirts of the town we found a long, hard, level, ideal stretch of pampa (see pages 110, 124, 125).

There was a man in Lari much out of his element. Once he had been a high official in the district of Cailloma. After one of the major revolutions he had fled into the Colca Valley, where, by reason of his superior education, he had made himself governor of Lari. His quarters were more than ample, and he and his family made us welcome during our stay. He was enthusiastic over the idea of a flying field at Lari, and at once obtained the cooperation of the natives.

We got the work of 165 natives—men, women, and children for eight days—at a cost to us of about six dollars American, which they spent for *chicha* (maize beer) and coca (page 123). Watercourses were diverted, holes filled in, and heavy boulders rolled to one side (see opposite page).

When the field was finished we marked all boundaries with a chalky substance found in large quantities near the river. This field was at an elevation of 10,300 feet, but was nearly 4,000 feet long. Even the natives were pleased with the results of their labor, though they were not quite sure just what it was all about.

While the field was being prepared we had gone on with exploration of that district. Just as we were beginning to worry about not having heard again from the *Washington*, Johnson suddenly arrived by mule with a train of 20 animals. He had returned to Arequipa in another plane before his was ready, and had brought photo-

graphic and other supplies on the mules, not knowing that we had found a good landing place. As things turned out later, it was fortunate he had done exactly that.

FOOL'S GOLD AND BURIAL CAVES

In making photographs of the terraces on the slopes above Lari, Johnson noticed a glitter in the bed of a small mountain stream that supplied most of the water to the town. He brought back a few samples. Although we suspected the myriad yellow specks in that sand to be pyrites, we thought we might as well explore the upper reaches of that stream. For thousands of feet we climbed above the level of the town.

Though we soon proved our "gold" to be valueless, the climb was worth while. In the shadow of a towering rocky spur we noticed several bleached skulls. Further investigation showed a half dozen caves in the cliff itself, and in the caves were numerous skeletons. Apparently the caves had been broken into not many years before. We found nothing but bleached bones, a few cracked fragments of pottery, and decayed wisps of cloth. Inquiries in Lari brought no further information.

The exact history of those burial caves may never be known; but, in reconstructing the general history of the Colca Valley, it appears that some of the Indians must have fled to the high sides of the valley to escape persecution by the Spaniards. The fact that the skulls are of normal shape and not deformed seems to date them at least a generation after the Spanish Conquest, when head-binding had been abolished.

A little farther down the valley, though on the opposite side, we found ruins of small villages far above the valley floor and, even higher, in the very cliffs, a few cave dwellings.

INTO THE VALLEY OF VOLCANOS

At last the field was finished. The *Washington*, now repaired in Lima, arrived on the scene. Then came the great disappointment; apparently the field did not look so good from the air. Even after various pick-up messages, it was clear that the plane would not land on our new Lari airport. The natives could not understand the situation. For a time it looked as if they were going to take their disappointment out on us. Finally, however, we persuaded them that we should eventually land the plane



© Aerial Explorations, Inc.

THE PLOW USED BY THE NATIVES IS CRUDE BUT SERVICEABLE

At Yanque Messes. Runcie, Shippee, and Distel had an opportunity to examine closely one of these queer-looking implements. At high altitudes there is a chill in the air that makes a poncho, or blanket shawl, a well-nigh indispensable part of the wardrobe.



© Aerial Explorations, Inc.

NATIVES SET HIGH VALUES ON COCA LEAVES

They weigh out the narcotic with as much care as a tobacconist observes with his finest blends. On the trail, packers cast chewed bits of the product against rock walls to propitiate their gods of fortune (see text, page 122).



© Aerial Explorations, Inc.

YOUNGSTERS BROUGHT UP THE REAR IN THE PARADE AT LARI

The landing of the *Washington* was the occasion for a celebration by the natives, who marched to the rhythm of drums around the airplane (see illustration, page 110, and text, page 132).

on their field. But first we had to proceed on our way by muleback.

Months before, while on a reconnaissance flight, we had noticed a valley some 40 miles long, just beyond the Colca, in which stood dozens of small extinct volcanoes. Since that valley was not on our maps we had marked it out for ground exploration. Consequently we now proceeded down the Colca Valley, looking for a pass over the mountains to the north. Natives could give us no direction, though we knew the name of the town, Andagua, that stands at the head of the Valley of Volcanoes. And as for "little volcanoes," they thought we were crazy.

Finally, in the town of Cabana Conde, perched high on the valley side, we were told there was a pass directly across the river. It was a full day's work to zigzag our way down to that river, to cross on a suspension bridge (page 131) made of small sticks and twisted fibers, and then to zigzag up the steep northern slope. After 11 hours of riding we were still within plain sight of Cabana Conde!

The pass out of the Colca Valley was at an elevation of 17,000 feet. Several times

it was necessary to hold bottles of ammonia under the mules' nostrils; they would sniff, shake their heads, then plod calmly onward. Pibe was nauseated with an attack of mountain sickness, but, refusing to be lifted upon a saddle, trotted gamely along at the head of the column.

After four days on the trail from Lari, we seemed to be nearing our goal. We passed one small extinct volcano on a barren table-land that we remembered having noticed from the air. A native herdsman gave positive directions for reaching Andagua. But even when we reached the Valley of Volcanoes we were not immediately sure of our location, for we attained the valley rim at 10 o'clock in the evening, when the sky was overcast and the darkness far denser than that inside the proverbial hat.

The trail seemed fairly good, so we decided to make the descent without delay, hoping to find water and forage for the mules somewhere at the bottom of that black void. Perhaps we should have waited for daybreak if we had known how far it was to the valley floor. It took exactly four hours to make that descent.



© Aerial Explorations, Inc.

SUSTAINED BY NATIVE ENTHUSIASM, THE MUSICIANS PLAYED ALL NIGHT

These traveling harpists lent their art to the fiesta which was given at Lari to honor the author and his companions (see text, page 132).

Though the Andagua River gorge is hundreds of feet deep, in the still night we could plainly hear the water. Its burbling warned us in advance; yet I nearly met disaster in the gorge.

A timber bridge afforded safe crossing, but just before reaching the bridge, as my mule jumped down from a 4-foot ledge, the crupper strap on my saddle gave way. I took a dive in the dark, landing over the mule's head with an unusually hard boulder supporting my back. For a moment I was paralyzed and could not move—luckily, as it turned out, since I was sprawled on the very edge of the gorge. I could not straighten up and could not have endured a saddle; so we pitched camp there.

Andagua, very similar to many of the Colca Valley towns, was only an hour's ride away. The trail led past two hills, twin volcanoes. Now we remembered landmarks picked out from the air; we had reached our destination.

According to inscriptions on the walls of the church, Andagua was founded in the

latter part of the 16th century. Yet there is only vague mention of this district in the *Diccionario Geográfico Peruano y Almanaque de "La Crónica,"* published at Lima. It is stated, however, that there are 10 per cent more women than men!

CAMPING IN A VOLCANO'S CRATER

The upper part of the valley, especially around Andagua, is thickly terraced and provides forage for a fairly large number of cattle. Occasionally cattle are driven to the coast. That is the only commercial contact with the outside world.

The central and lower sections of the valley are dotted with small volcanoes, which stick out like sore thumbs from the lava beds. Quite likely there are towns buried beneath that lava; along its edges there still remain terraces, now abandoned, which are only partly covered. Geologically, the volcanoes are young. They may have been in action not long before the conquest. What an inferno this region must have been then!



© Aerial Explorations, Inc.

THE GRASS BRIDGE OVER THE TUMULTUOUS COLCA LOOKS DANGEROUS

When the rainy season is at its height, the stream becomes a wild torrent that reaches within a few feet of this fragile span just below Cabana Conde.

We went by muleback about halfway down the valley, checking control points for the aerial map. Once we pitched camp in the crater of one of the larger cones. The view from the rim was amazing; as far as the eye could see, there were volcanoes and volcanoes. Some had burst, and fans of lava spread from the breaches. Some, older than the rest, resembled huge pincushions where giant cacti bristled from their flanks. Far in the distance, where the lava had dammed a mountain stream, a lake sparkled greenly; and the high scarred sides of the valley merged their snow peaks with equally white clouds.

Yet we could leave the Andagua Valley without regret. Several of us were suffering from bad colds, what with extreme changes of temperature in the high altitudes. All had visions of a hot bath waiting at the Quinta Bates (estate), in Arequipa.

THE RETURN TO AREQUIPA

Then came the question of what route to take. Either we could follow down the

valley until the river joined with the lower Colca, which the natives assured us it did, or we could climb out of Andagua Valley and take a better trail down the Andamayo River, a day's ride to the northwest. We decided on the latter course, since there was a town on that river where we could hire a truck, and thus save time to Arequipa.

After crossing a 17,000-foot pass at the base of Coropuna Volcano, we struck the Andamayo Valley near the town of Viraco. We remember that town because of a fight Pibe had with a large pig. Pibe grabbed the pig by its tail, and then and there, in the little plaza of Viraco, ensued a vigorous tug of war. The porker grunted and squealed, legs churning frantically. Pibe, half blinded by the dust thrown in his face by the struggling swine, hung on. At last, much to our elation and the disgust of the villagers, Pibe got the decision.

We followed the lower course of the Andamayo, and at Aplao we transferred to an automobile. After much embracing,

we said good-bye to our muleteers, who were to follow along with the more bulky equipment. What a happy moment it was when I bade farewell to Cleopatra, my mule; she was, without doubt, the joggiest, balkiest, hardest-riding mule in all Peru!

That automobile trip, however, was no Sunday afternoon ride over macadam roads. Eight times we halted to change and patch tires cut to pieces by sharp rocks. We held our breath when the edge of the trail disappeared beneath the off mudguard. Twice we had to dry spark plugs and ignition wires after fording streams. It had been so long since any of us had ridden in an automobile that the constant motion made us seasick.

After seven hours we neared our goal. El Misti, towering over the city, was a welcome sight in the distance. Four hours more and we steamed to a halt in front of the Quinta Bates. I still remember the dismay on the faces of recently arrived guests at the Quinta when we walked in, unshaven, our clothing torn and covered with dust, and began clamoring for "agua caliente, hastante, y muy rápido!" (Hot water, lots of it, and be quick about it!)

A DOG AND A GOAT TAKE AN AIRPLANE RIDE

The day after our return to Arequipa, Johnson and I flew back to Lari. In 40 minutes we covered a distance that had taken us days on the ground. As the *Washington* spiraled down over the landing field, on which our markings stood out quite plainly: "Lari—S. J. P. E.," and the distances and boundaries, natives began streaming from the village. It was not without apprehension that we came in for a landing; but the *Washington* sat down smoothly and rolled to a stop in the very center of the field (see page 110).

Then we could hardly get out of the cabin, so excited were the natives. But the climax was reached when Pibe hopped out; he had enjoyed the flight immensely, sitting on the rear seat and looking calmly out of the window. Now he was a full-

fledged aviator, or so his attitude seemed to say, as he strutted with nose in air past his Lari mongrel friends.

Leaving Johnson to the mercy of the jubilant natives, who, incidentally, seemed to have no fear of the airplane, I took off for Arequipa. There I picked up Runcie and his motion-picture equipment, and then headed back to Lari.

That evening there was a celebration. Before dark the fiesta was in full swing, and it was still in progress the following afternoon when, after making motion and still pictures we had missed on our former visit to Lari, we got ready to leave.

Yet before we started the motor we had to go through an official presentation ceremony. We were presented with a young goat! As we zoomed the field in farewell and then climbed out of the valley, the dog was looking out of one window, the goat was peering out of the other.

Before returning to Arequipa, we played Santa Claus to the other villages we had visited. In the plaza of Andagua we dropped miniature parachutes carrying bars of chocolate. At Viraco we dropped bundles of newspapers, giving the governor news that he would not ordinarily have received for another week. The natives waved madly and, as we turned back, motioned for us to come down and land, just where no one knows.

The exploration of the Colca and Andagua valleys terminated our work in southern Peru. From Arequipa we moved north to Lima, where we at once began packing up for the return to the United States.

On that return trip, probably the proudest member of the party was "El Pibe," who had adopted the Expedition in the Colca Valley and who had stuck with us through hundreds of miles of travel by mule, automobile, and airplane.

The one tragedy of the Expedition is that Pibe disappeared the very day we docked in New York. Whether he was stolen or simply jumped overboard after something floating in the water, we never saw him again.

Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your March number, The Society should be notified of your new address not later than February first.

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

GILBERT GROSVENOR, President

JOHN JOY EDSON, Treasurer

FREDERICK V. COVILLE, Chairman Committee on Research

JOHN OLIVER LA GORCE, Vice-President

GEO. W. HUTCHISON, Secretary

HERBERT A. POOLE, Assistant Treasurer



EXECUTIVE STAFF OF THE NATIONAL GEOGRAPHIC MAGAZINE

GILBERT GROSVENOR, EDITOR

JOHN OLIVER LA GORCE, Associate Editor



J. R. HILDEBRAND
Assistant Editor

MAYNARD OWEN WILLIAMS
Chief Foreign Editorial Staff

ALBERT H. BUMSTEAD
Chief Cartographer

FREDERICK SIMPICH
Assistant Editor

WILLIAM JOSEPH SHOWALTER
Chief Research Division

McFALL KERBEY
Chief of School Service

FRANKLIN L. FISHER
Chief Illustrations Division

MELVILLE BELL GROSVENOR
Ass. Chief Illustrations Division

CHARLES MARTIN
Chief Photographic Laboratory

BOARD OF TRUSTEES

JOHN JOY EDSON
Chairman of the Board, Wash-
ington Loan & Trust Company

WALTER S. GIFFORD
President American Telephone and
Telegraph Co.

DAVID FAIRCHILD
Special Agricultural Explorer, U. S.
Department of Agriculture

C. HART MERRIAM
Member National Academy of
Sciences

LYMAN J. BRIGGS
Director U. S. Bureau of Standards

GEORGE R. PUTNAM
Commissioner U. S. Bureau of
Lighthouses

THEODORE W. NOYES
Editor of The Evening Star

CHARLES EVANS HUGHES
Chief Justice of the United States

JOHN J. PERSHING
General of the Armies of the
United States

WILLIAM V. PRATT
Rear Admiral U. S. Navy, Retired

RAYMOND S. PATTON
Director U. S. Coast and Geodetic
Survey

ALEXANDER WETMORE
Assistant Secretary, Smithsonian
Institution

GILBERT GROSVENOR
Editor of National Geographic
Magazine

J. HOWARD GORE
Prof. Emeritus Mathematics, The
George Washington University

FREDERICK V. COVILLE
Botanist, U. S. Department of
Agriculture

CHARLES G. DAWES
Formerly Vice-President of the
United States

JOHN BARTON PAYNE
Chairman American Red Cross

A. W. GREELY
Arctic Explorer, Major General
U. S. Army

GEORGE OTIS SMITH
Formerly Director U. S. Geological
Survey

O. H. TITTMANN
Formerly Superintendent U. S.
Coast and Geodetic Survey

JOHN OLIVER LA GORCE
Associate Editor National Geo-
graphic Magazine

ROBERT V. FLEMING
President Riggs National Bank

GEORGE SHIRAS, Jr.
Formerly Member U. S. Con-
gress, Faunal Naturalist and
Wild-Game Photographer

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

TO carry out the purposes for which it was founded forty-six years ago the National Geographic Society publishes this Magazine monthly. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material 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 fissures. 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.

AT an expense of over \$50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed \$55,000 to Admiral Byrd's Antarctic Expedition.

NOT long ago The Society granted \$25,000, and in addition \$75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees 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.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated \$65,000 to enable the Smithsonian Institution to establish a station for six years on Mt. Brukkaros, in South West Africa.

The Most Beautifully Bound SHAKESPEARE Ever Offered for Only \$2⁹⁸

*Every Word Shakespeare Wrote—
Bound in ONE Lovely Volume of
Limp, Florentine-Tooled Leather*

WILL you let us send—for free examination—this lovely new volume containing ALL of Shakespeare? Yes—and bound in the beauty that the world's greatest treasure so richly deserves! Exquisite enough for the most exclusive private library, its luxurious cover of limp leather in Florentine-tooled, illuminated by hand in color, with authentic heraldic shield of the Florentine Medici. Its 1312 pages are in clear type, with specially designed title page. The paper is opaque, non-glaring.

ALL 34 PLAYS -ALL HIS POEMS

The Comedy of Errors
Coriolanus
Antony and Cleopatra
Measure for Measure
The Merchant of Venice
Macbeth
Love's Labour's Lost
All's Well That Ends Well
A Midsummer Night's Dream
Much Ado About Nothing
Two Gentlemen of Verona
The Tempest
Romeo and Juliet
King John
King Richard II
King Henry IV
King Henry V
King Henry VI
King Richard III
King Henry VIII
Troilus and Cressida
Timon of Athens
As You Like It
The Winter's Tale
Taming of the Shrew
Twelfth Night
Cymbeline
Julius Caesar
Hamlet
Titus Andronicus
Othello
Merry Wives of Windsor
King Lear
Pericles, Prince of Tyre
The Passionate Pilgrim
The Rape of Lucrece
Phoenix and the Turtle
Sonnets—all 154, complete
Sonnets to Sundry Notes of
Music
Venus and Adonis
A Lover's Complaint
Index to the Characters
Quick guide in every char-
acter in the plays.
Glossary
Defines all Shakespearean
terms.

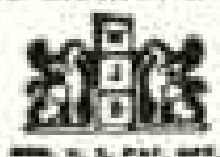
Seldom has bookbinder's art created so beautiful a volume. Certainly never at such a low price! Attend World's Greatest "Opening Nights"—For Less Than 9c Each!

This volume should be the cornerstone of your library. With it in your hands, discover unsuspected pleasure—a Shakespeare that your school-day type of reading may never have revealed!

Chuckle at Falstaff's ever-modern "wise-cracks," be fascinated by voluptuous Cleopatra, shudder at Macbeth's intrigues, thrill with Romeo's ecstasies of love, be amazed at Iago's treachery, step into the whimsical world of Puck and Bottom. Or be enchanted with the Sonnets—or with the unbridled passion of "The Rape of Lucrece" and "Venus and Adonis."

EXAMINE IT 7 DAYS FREE

PAY nothing in advance—nothing to postman. Just mail coupon for this lovely volume. Admire its beauty, luxurious limp leather binding, crisp, clean pages. See if this re-discovered Shakespeare doesn't delight you with his furious adventure, passionate romance, dangerous intrigue, unending philosophy, humor and wit! Then, if you don't think this volume should be the very heart of your library—and it back. If, however, you desire to keep it, then send us only \$2.98 plus a few cents postage in full payment. You risk nothing. Send coupon, without money, now. WALTER J. BLACK, Inc., Dept. 71, 171 Madison Avenue, New York.



WALTER J. BLACK, Inc.
171 Madison Avenue
NEW YORK CITY, N.Y.



WALTER J. BLACK, Inc.
Dept. 71
171 Madison Ave., New York

Gentlemen: Please send me for free examination your new one-volume, thumb-indexed edition of the Complete Works of SHAKESPEARE—1312 pages, bound in richly Florentine-tooled limp leather and illuminated by hand in color. I will either return the book or send you \$2.98 plus a few cents postage in full payment within one week.

Name _____

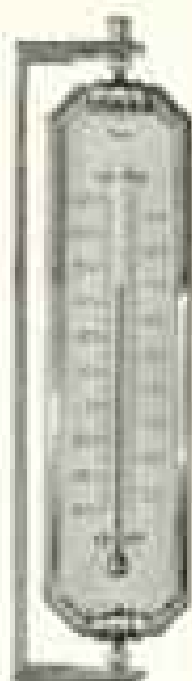
Address _____

City _____ State _____

Resolved to enjoy more comfort in 1934

For your comfort . . . your better health in this year of 1934 . . . make this resolution: To know daily what the temperature is outside and inside; to know in advance if there's a storm or a cold snap in the offing; to know whether the humidity in your room or office is just right, or too low. Small things, to be sure, but knowing them can increase your comfort immeasurably.

Taylor weather and temperature instruments are accurate and dependable. The Temperature and Humidity Recording and Controlling Instruments made by Taylor are known the world over. Look for the distinguishing name "Taylor," Taylor Instrument Companies, Rochester, New York, and Toronto, Canada.



I'LL TELL YOU
HOW TO DRESS FOR THE
OUTDOORS

TAYLOR WINDOW THERMOMETER in chrome with 8-inch white enamel face with black lettering and red Permaseal tube. No. 2300. \$3.50. Other thermometers as low as \$1.00.



I'LL TELL YOU
WHEN THE AIR IS
TOO DRY INSIDE

TAYLOR HUMIDIGUIDE, New Hampton direct-reading model. Satin black with chrome trim and Permaseal tube thermometer. No. 5539. \$3.00

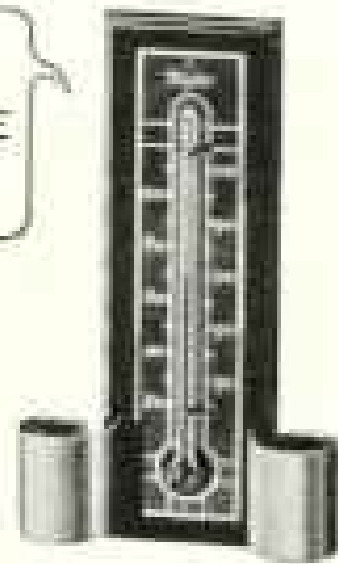
I'LL HELP YOU
ENJOY YOUR TRAVELS



TAYLOR ADMIRAL BYRD SET. Includes compass and altitude indicator (altimeter). Soft leather case that slips in pocket. No. 4950. \$50—complete.

I'LL KEEP YOU
MORE COMFORTABLE
IN THE OFFICE

TAYLOR STANDING THERMOMETER, 3 inches high, satin black finish, blue lacquered scale, with white metal trim, scroll base, indoor temperature range, red Permaseal tube. No. 5558. \$1.75.



Taylor 
INSTRUMENTS

IN INDUSTRY, other types for indicating, recording and controlling temperature, pressure and humidity.

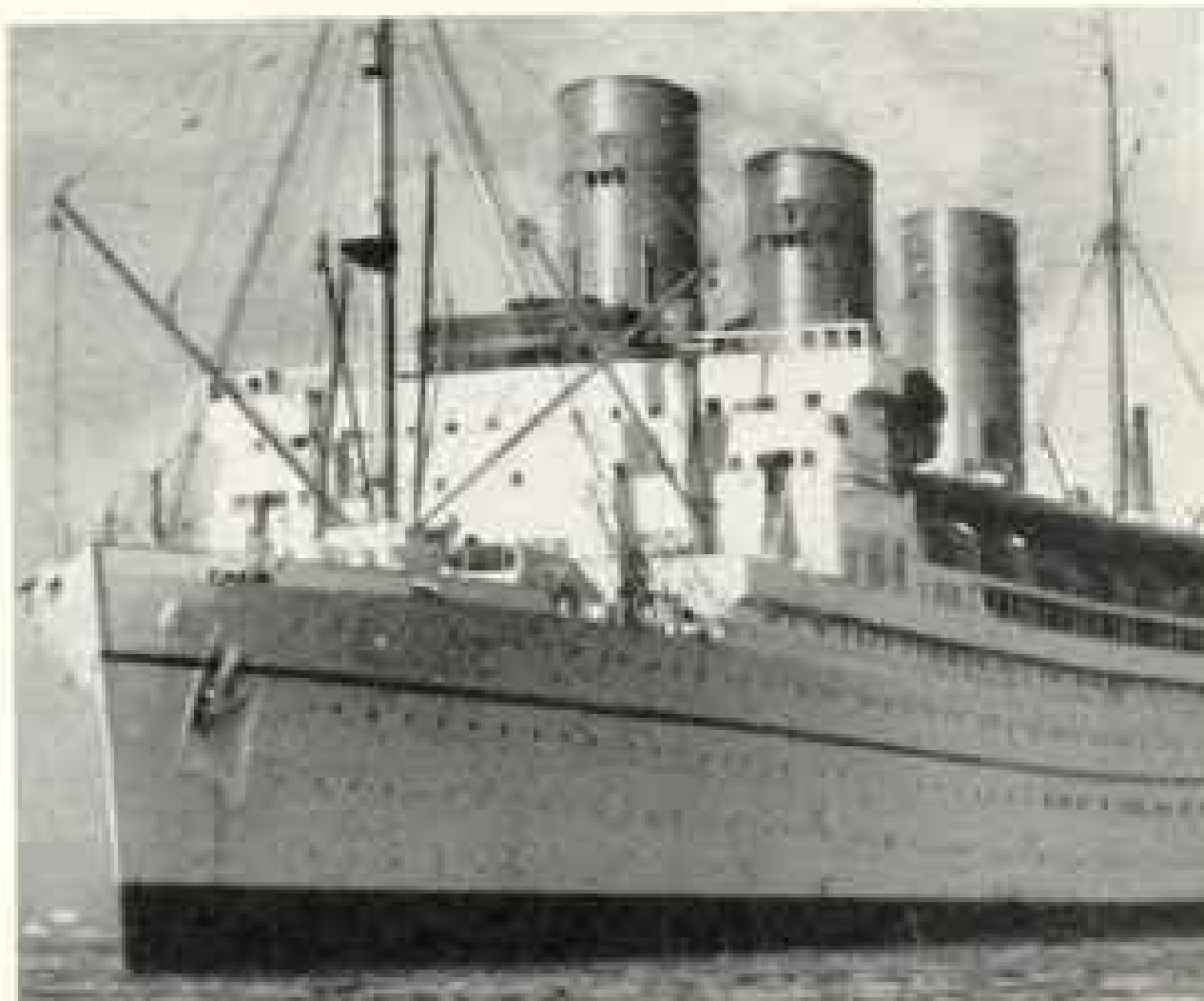
FASTEST *across the Pacific*

HONOLULU *in 5 days*

ON THE PACIFIC'S
LARGEST, FASTEST LINER

A dazzling white streak across the Pacific. *The Empress of Japan!* Largest, fastest ship on the largest of oceans. Reaching Honolulu in 5 days . . . and Yokohama in just 8 days more . . . along with her running-mate, the Empress of Canada. Canadian Australasian liners reach Honolulu in 7 days.

Two sailings a month from Vancouver (trains direct to ship-side) and Victoria. Get information, schedules, rates.



RECORD SPEED TO ORIENT

SISTER "EMPRESSES"
REACH YOKOHAMA IN 10 DAYS!

Speed! Empress of Asia and Empress of Russia make Yokohama in 10 days flat, via Direct Express Route. Typical "Empresses," these proud sister ships offer spaciousness and solid comfort in addition to speed!

Frequent sailings from Vancouver and Victoria. First, Tourist, Third Class. Fares include passage from Seattle. Reduced round-trip fares. If you sail from San Francisco or Los Angeles, you can connect at Honolulu.



"INDEPENDENT" WORLD TOURS

OVER
200
ROUTES

Go east or go west . . . go wherever you want. Stay as long as you please in each port. Shore excursions when and where you want them. Tickets good for two years. First and Tourist Class. A globe-circling network of 179 offices and agencies to smooth the way for you. Surprisingly low fares.

Baskets, maps, information . . . from any Canadian Pacific office . . . New York, Boston, Philadelphia, San Francisco, Montreal, and 50 other cities in U. S. and Canada . . . OR YOUR LOCAL TRAVEL AGENT.

Canadian Pacific

WORLD'S GREATEST TRAVEL SYSTEM

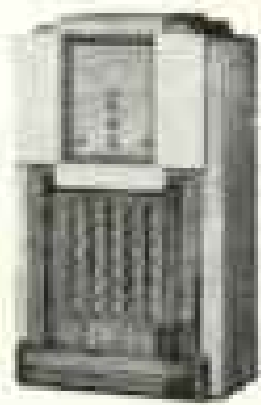
**WORLD-WIDE
RECEPTION
LONG A
GUARANTEED
ACTUALITY**



with
THIS RADIO!

**SCOTT ALLWAVE DELUXE
15-550 Meter Superheterodyne**

Original in chassis design . . . efficient in acoustic quality. SCOTT CONSOLES are made exclusively for this receiver in the interest of woods by cabinet craftsmen of recognized skill.



There is nothing experimental or "special" in the sense of having been designed for most peculiar specific circumstances about this receiver. It is custom-built, in one of the most modern and completely equipped radio laboratories, to give anyone—anywhere—consistent, pleasurable loud-speaker reception of everything that's on the air within 10,000 miles or more distance. Such performance has been guaranteed to every buyer ever since the first SCOTT ALL-WAVE RADIO was produced several years ago. Efficient on short wave reception from the ends of the earth . . . superb on domestic broadcasts. Broaden your world culture by listening to all the fascinating entertainment of the entire world. Send NOW for details, specifications and PROOF of its every claim to being "The World's Finest Radio."

USE THIS PROOF COUPON

E. H. SCOTT RADIO LABORATORIES, INC.
5156 Rossmore Avenue, Dept. GN 14, Chicago, Ill.
Send me full particulars regarding the SCOTT ALL-WAVE DELUXE 15-550 Meter Custom-built Superheterodyne Receiver.

NAME _____
ADDRESS _____
TOWN _____ STATE _____

WORLD-LEADING



THE ORIGINAL

DRINK HOT BOVRIL

Fight winter ills with this famous beef beverage. Selected by Byrd Antarctic Expedition II.

Highly concentrated, a teaspoonful in a cup of boiling water makes a richly delicious, invigorating drink.

If not obtainable at a convenient store, send \$1.00 for a 4-oz. bottle today.

WM. S. SCULL CO., 109 Federal Street, Camden, N. J.
Enclosed is \$1.00. Send 4-oz. bottle of Bovril postpaid.

Name _____

Address _____

**From MT. HOOD
TO FUJIYAMA**

Short route to the Orient from
Portland—100-mile scenic trip
down the historic Columbia—



\$160

ORIENT

OUTSIDE ROOMS WITH BEDS



● NOW you can travel One-Class to the Orient! Portland-Yokohama \$160, Kobe \$165, Shanghai \$185, Hong Kong \$200, Manila \$200. Round-the-World tours, \$495.

Modern "General" liners—complete privileges of ship—splendid American food—spacious saloon and deck space—outside rooms with beds.

GENERAL PERSHING JAN. 17

GENERAL SHERMAN FEB. 7

GENERAL LEE . . . FEB. 28

"GENERAL" LINERS

See your travel or railroad ticket agent
for literature, full particulars—or write

STATES STEAMSHIP LINES

Parlier Building (Dept. Y), Portland, Oregon

**SOUTH
AFRICA'S
Wonders**

A Land of Colorful Contrasts: Beautiful homes—and picturesque Bantu kraals; the Alp-like Drakensbergs—and the fascinating Cango Caves; Victoria Falls—and glorious trout streams; Zimbabwe's reputed ruins of ancient Ophir—and the great modern gold mines of the Rand. Big game—Romance—Mystery!

South Africa abounds in sight-seeing thrills and health-giving sunshine. Comfortable travel facilities—moderate in cost. Enjoy the trip of a lifetime in wonderful South Africa!

● For full information address:
Thos. Cook & Son—Wagons-Lits, Inc.
587 Fifth Avenue, New York

or
American Express Company
65 Broadway, New York
or any office of the American Express Company
or Thos. Cook & Son—Wagons-Lits, Inc.

SEVEN QUESTIONS

you should be able to answer **NOW**

1. *What is the first thing to do when death occurs?*
2. *Which funeral director should be called?*
3. *Where should the funeral be held?*
4. *What casket will be best?*
5. *What are the funeral director's responsibilities?*
6. *How much should the funeral cost?*
7. *How may the quality and value of the casket be definitely determined?*

WHY should you know these things now? Because when the emergency arises there is little time to find the answers; because a knowledge of these things in advance of need may prevent painful embarrassment and distress at a time when they are hardest to bear.

There are so many important but unfamiliar details concerning funeral arrangements that we have written a little book on the subject. Its name is *Funeral Facts*. We shall be glad to send you a copy if you will write. In the meantime, please remember these simple facts:

Every casket carrying the National Trade-mark, be it wood or metal, costly or inexpensive, is guaranteed as to quality and value. It will cost no more than a casket about which you know nothing—so be sure to look for the National Trade-mark on the casket you buy.

NATIONAL CASKETS are made

to suit every individual purse and every individual taste. (They are sold through funeral directors only.) If your funeral director does not have exactly the NATIONAL CASKET you want at the price you wish to pay, he can easily get it for you.

Finally, choose a reliable funeral director in advance of need. Then you will never have to make a hasty decision which may lead to regrets later.

Write National Casket Company, Dept. N-1, 60 Massachusetts Ave., Boston, Mass., for booklet, "Funeral Facts."



NATIONAL
Casket
COMPANY, INC.



DISPLAY ROOMS IN THIRTY CITIES

No. 25725 — A National Armes Ingot Iron Design, Mod-Urn Panel-side Series. Look for the National Trade-mark on the casket when you buy.

ARIZONA



Vacation in the Sunniest Spot in America

The hot-so-long-ago frontier town of Phoenix and the romantic surrounding towns of Mesa, Tempe, Chandler, Glendale, Wickenburg and Buckeye offer the leisurely tourist, the two-week-vacationer and those seeking a permanent home in an ideal climate, a multitude of things to do and see in this warm, dry, clear land of romance and sunshine.

Golden days...silvery nights...the glamorous desert...multi-colored sunsets...rugged mountains...Indians...cowboys...orange groves...date gardens...modern hotels...desert inns... dude ranches... warm friendships...outdoor sports...the kindest sun in the world...color...romance...glamour... grandeur.

Living costs are moderate in this healthy, happy land of sunshine. Decide right now to vacation this winter—under the sun—in Phoenix.

Reduced winter fares now effective on the Rock Island-Southern Pacific, and Santa Fe Lines.

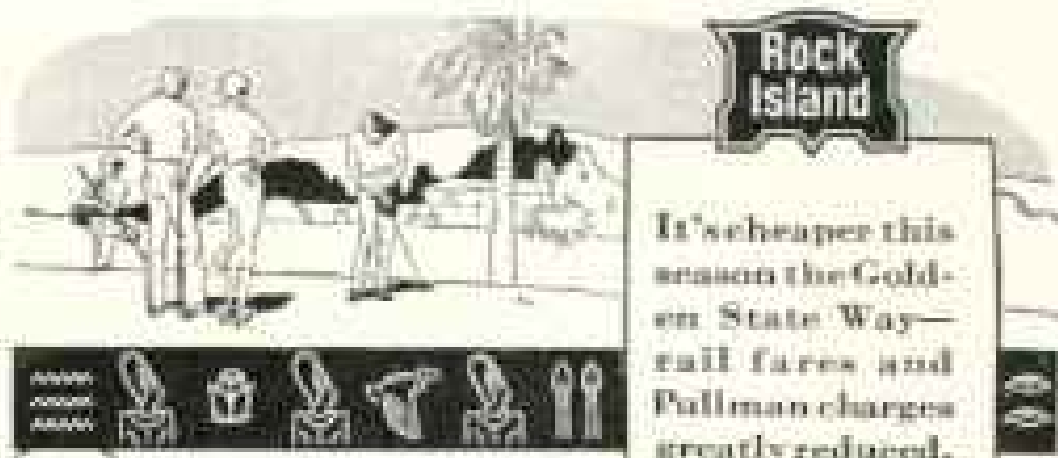
PHOENIX CHAMBER OF COMMERCE

100-C La Ciudad Del Sol
(The City of the Sun)

Please send me attractive free literature and booklets

NAME _____

ADDRESS _____



It's cheaper this season the Golden State Way—rail fares and Pullman charges greatly reduced.

De luxe

Golden State LIMITED

No Extra fare

ROCK ISLAND -- SOUTHERN PACIFIC

TO

ARIZONA • CALIFORNIA

A thousand sunny miles through the Garden of Allah

The Train That Challenges Comparison

Quickest by many hours Chicago to Phoenix. Only through service to El Paso-Juarez, Tucson, Chandler, Palm Springs and Agua Caliente. Direct low altitude route—through sleeping cars to San Diego, Coronado, Los Angeles and Santa Barbara. Only 61 hours Chicago to California.

Morning and Evening Trains from Chicago

For further information, write

L. M. ALLEN, Vice Pres. and Pass'r Traffic Mgr.
Rock Island Lines

725 La Salle St. Station, Chicago, Ill. 1417

ROCK ISLAND
THE ROAD OF UNUSUAL SERVICE

Santa Fe

Santa Fe
Cuts
Fares
TO

California
Arizona
New Mexico
Texas

and other
western
states

also eliminates
Pullman
surcharge

WHAT a chance for a low-out winter vacation! Santa Fe has cut rail fares west of Chicago 16-2/3% to 44-2/5%; and eliminated the 33-1/3% surcharge in Pullmans. These savings will more than pay for a fascinating Indian-detour; a Grand Canyon side trip; or extra play days at destination.

California and southern Arizona—warm, sunny, alluring—are ideal winter playgrounds. Santa Fe trains serve them both—*finely, cheaply, daily*. Trip information and picture folders are yours for the asking.

MAIL THIS

to: S. B. ADEL, E. T. MC, Santa Fe System Lines
1210 Bellvue Exchange, Chicago, Illinois

Send Picture Folders and new San Santa Fe book

Name _____

Address _____

City _____

Statendam

LUXURY CRUISE TO THE

MEDITERRANEAN

PALESTINE—EGYPT



25 enchanting ports
in 16 countries
Sailing, from New York
FEBRUARY 8TH

For 58 golden days, over 15,400 fascinating miles, you view an age-old world from an ultra-modern ship, whose luxury and appointments are the talk of the Atlantic.

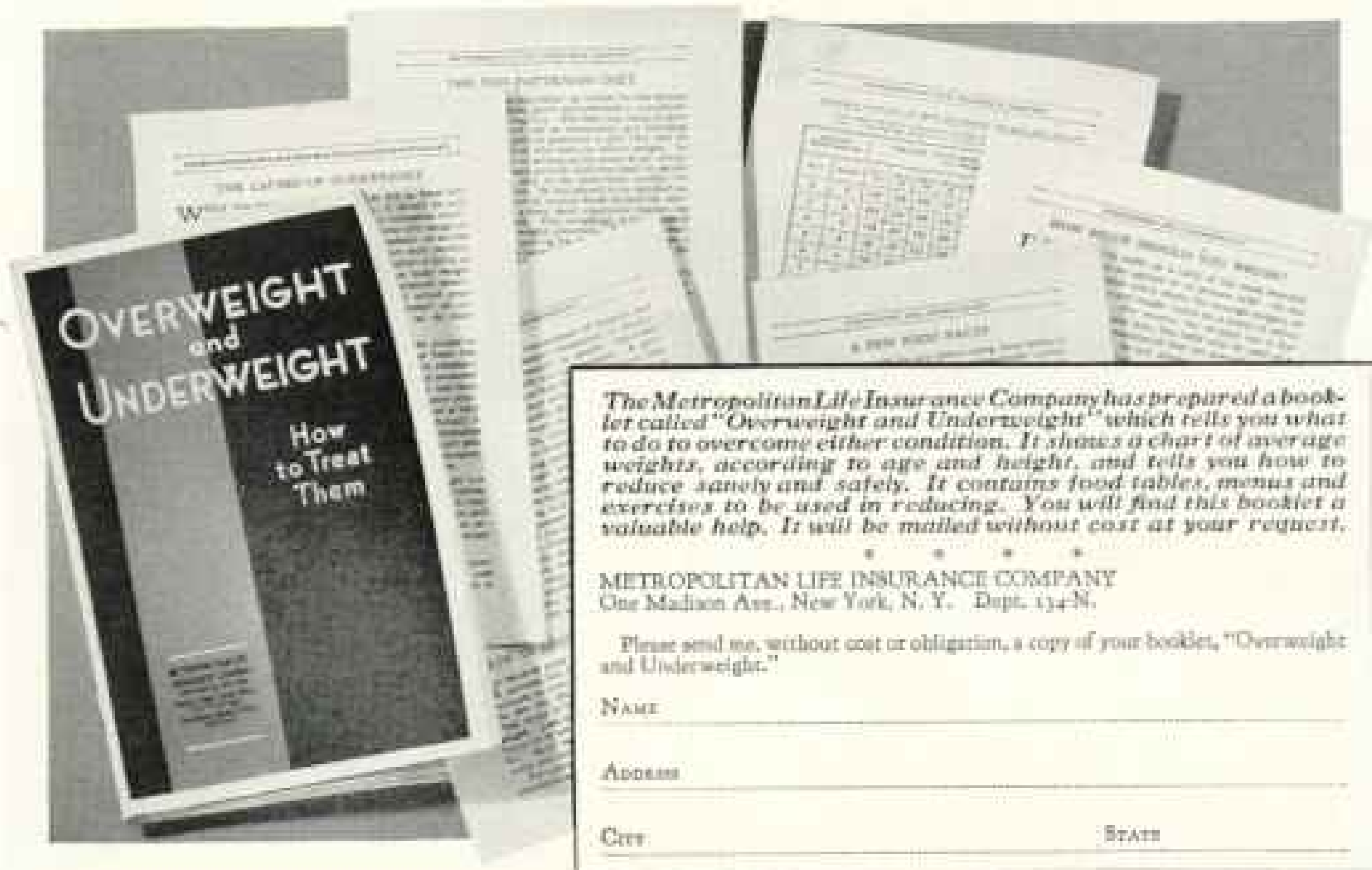
First Class from \$595
Tourist Class from \$325

Details and bookings from your own agent,
American Express Co., Frank C. Clark or

HOLLAND-AMERICA
LINE New York

Branches in all principal cities

Agents everywhere



The Metropolitan Life Insurance Company has prepared a booklet called "Overweight and Underweight" which tells you what to do to overcome either condition. It shows a chart of average weights, according to age and height, and tells you how to reduce sanely and safely. It contains food tables, menus and exercises to be used in reducing. You will find this booklet a valuable help. It will be mailed without cost at your request.

METROPOLITAN LIFE INSURANCE COMPANY
One Madison Ave., New York, N. Y. Dept. 134-N.

Please send me, without cost or obligation, a copy of your booklet, "Overweight and Underweight."

NAME _____

ADDRESS _____

CITY _____ STATE _____

Overweight is Dangerous

IT is sometimes extremely difficult to persuade a jolly person who weighs many pounds too much—and who honestly says "I never felt better in my life"—that excess pounds are as dangerous as some of the diseases to which he would give immediate attention, if afflicted.

Consider these figures, especially if you are more than 35: People past 45 who weigh 20% more than the average have a death-rate greater by one-half than the average for their age. If they have a persistent 40% overweight, the rate is almost double that of the average.

As a simple cold may lead to pneumonia or to serious bronchial trouble, so excess weight may be a forerunner of high blood pressure, heart disease, diabetes, kidney trouble, hardening of the arteries, or apoplexy. It makes recovery from surgical operations and acute diseases more difficult.

In rare instances, overweight is caused by disease of the glands of internal secretion,



but in nearly every case it is brought on by eating too much food and exercising too little.

You will not be uncomfortably hungry if you gradually change to foods which are bulkier and less fattening than the foods which have brought the dangerous extra pounds. With a corrected diet and proper exercise, it is usually possible to reduce excess weight, comfortably, about a pound a week, until a reasonable reduction has been attained.

Do not attempt abrupt or too extensive reduction of weight. Beware of "reducing" medicines. Some of them would wreck a normal person's constitution, to say nothing of a fat person's. Before taking any drug in an attempt to reduce your weight, consult your own physician.

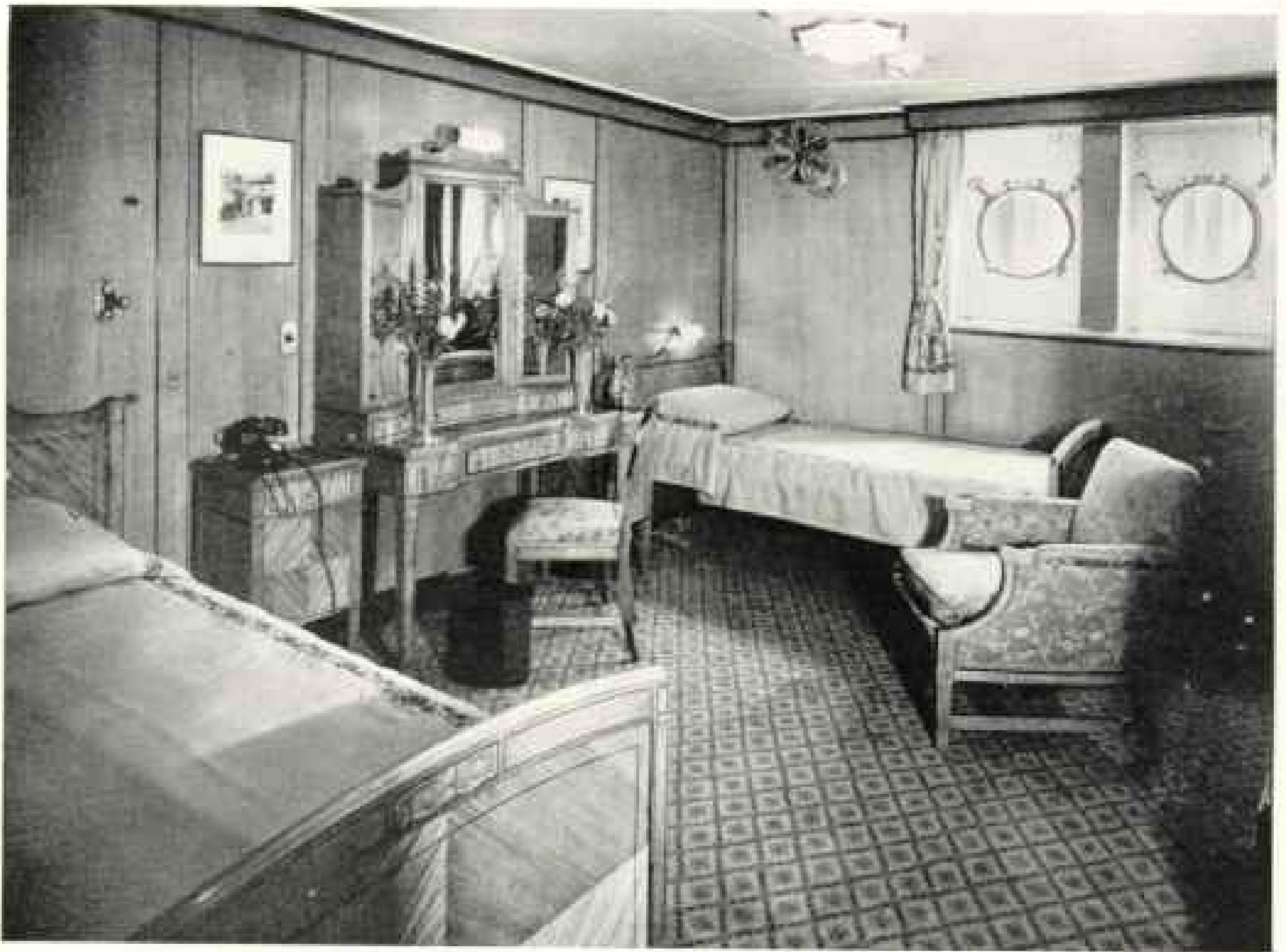
If you weigh too much you should treat your overweight as you would a menacing disease. Give it immediate attention. Fill out and mail above coupon.

METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKER, PRESIDENT

ONE MADISON AVE., NEW YORK, N. Y.

© 1939 M. L. I. CO.



BIG ENOUGH FOR 3 TABLES OF BRIDGE!

To Europe
 in this room for \$151 (each for two)

No wonder the new giant sisters MANHATTAN and WASHINGTON are going over in a big way . . . they are carrying more passengers to Europe than any other two Cabin ships! Big rooms and big times at little money is the secret. If you want to go over in a big way, why not make this big room yours?

World's fastest Cabin liners — largest ships ever built in America. The MANHATTAN and WASHINGTON with their running mates, PRESIDENT HARDING and PRESIDENT ROOSEVELT, offer weekly service to Cobh, Plymouth, Havre, Hamburg. See your local agent. His services are free.

UNITED STATES LINES

Roosevelt Steamship Company, Inc., *General Agents*
 No. 1 Broadway, New York City Agents Everywhere



MANHATTAN—Jan. 31, Feb. 28 (from Europe Jan. 17, Feb. 14) WASHINGTON—Jan. 17, Feb. 15 (from Europe Jan. 31, Feb. 28)
 PRESIDENT ROOSEVELT—January 10, February 7 (from Europe January 24, February 21)
 PRESIDENT HARDING—January 24, February 21 (from Europe February 7, March 7)

only **GRACE** Cruises visit
 NEW YORK • HAVANA • COLOMBIA • PANAMA • EL SALVADOR • GUATEMALA • MEXICO • PACIFIC NORTHWEST
California



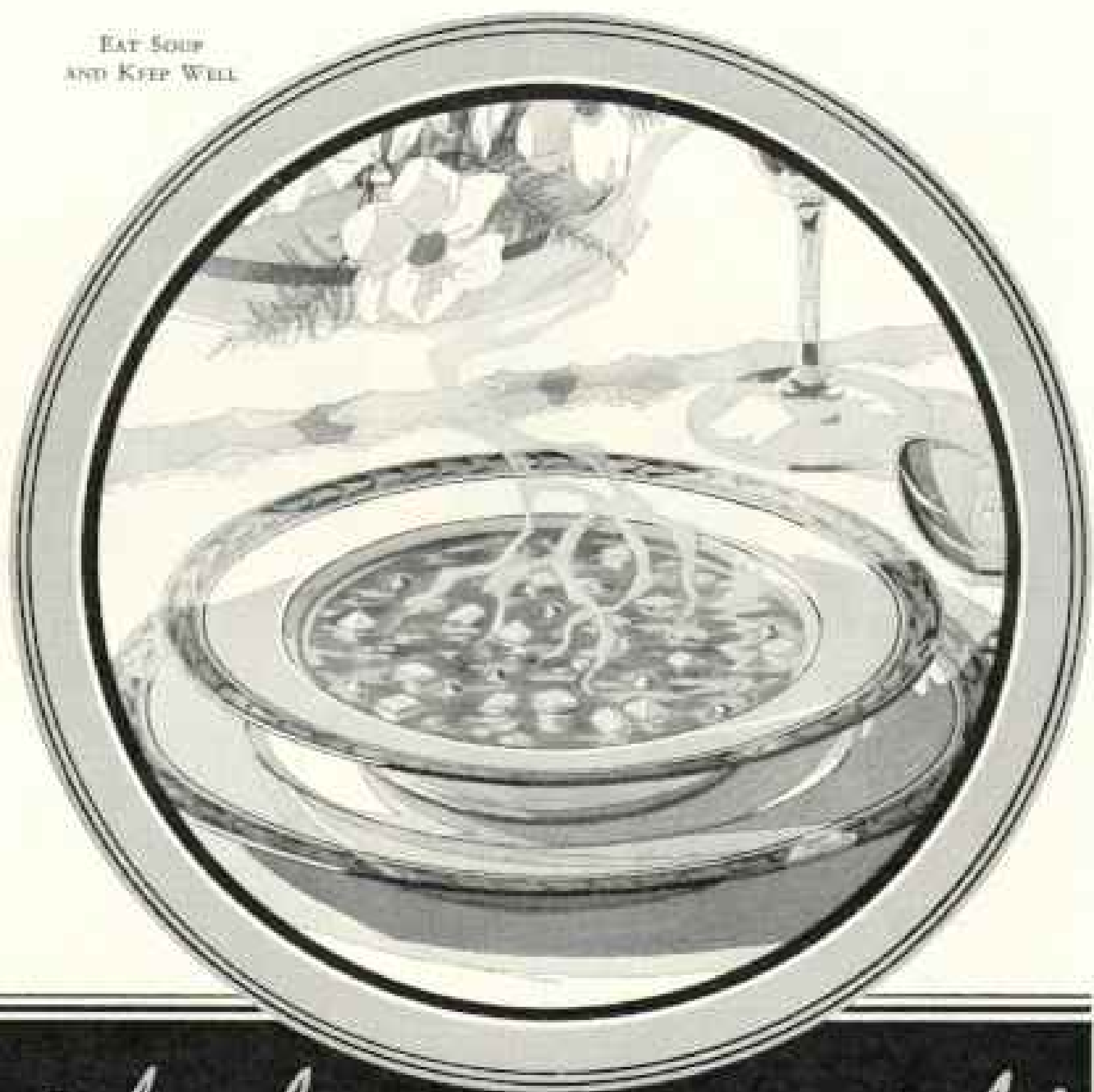
PHOTOGRAPHED IN NATURAL COLOR ABOARD THE "SANTA PAULA"

17 DAYS OF RARE ADVENTURE AND LUXURY—While the ship awaits—leisurely inland visits to the capitals of El Salvador and Guatemala; trips ashore in Havana, Cartagena, Barranquilla, Panama Canal Zone, Mazatlan. And at sea, on a new GRACE "Santa"; enjoy every transoceanic luxury, plus tropical cruising comforts. All First Class outside rooms with private baths. A GRACE "Santa" Liner sails weekly from New York and from Pacific Coast ports. See your travel agent or write Dept. NG-26, GRACE Line: 10 Hanover Square, New York; or 230 North Michigan Avenue, Chicago; or 2 Pine Street, San Francisco; or 525 West 6th Street, Los Angeles.

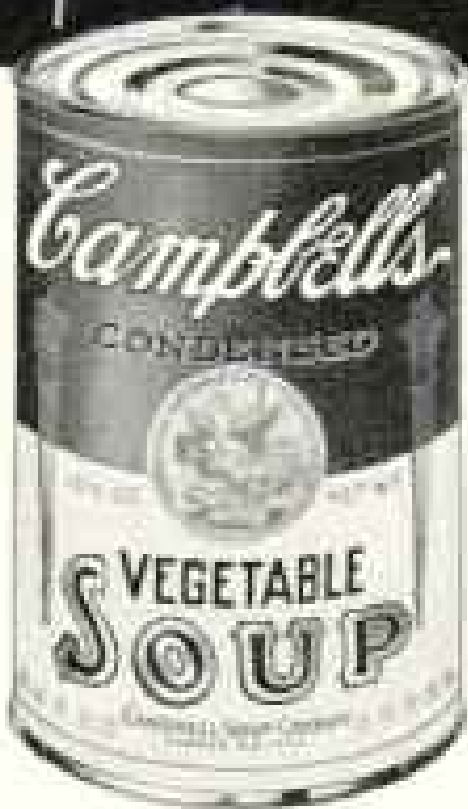


HOMETOWN TO HOMETOWN • ONE WAY RAIL ONE WAY GRACE "SANTA" • THRU PANAMA CANAL • LOW RATE

EAT SOUP
AND KEEP WELL



An ideal midday meal!



This is the day of the simplified luncheon—the luncheon that delights the taste and supplies the needed nourishment without fuss and bother—the luncheon that is wholesome and readily digestible. There's nothing like good hot soup to invigorate you in the middle of your busy day. And to serve it is simplicity itself! Campbell's Vegetable Soup, with its fifteen choice garden vegetables cooked in rich beef broth, is a delicious meal that sustains and fortifies. And it's on the table a few minutes after you think of serving it.

21 kinds to choose from...

Asparagus	Mock Turtle
Bean	Mulligatawny
Beef	Mutton
Bouillon	Ox Tail
Celery	Pea
Chicken	Pepper Pot
Chicken-Gumbo	Primaniar
Clam Chowder	Tomato
Consommé	Tomato-Olea
Julienne	Vegetable
Vegetable-Beef	

LOOK FOR THE RED-AND-WHITE LABEL

Campbell's
Vegetable Soup

CONTAINING RICH BEEF BROTH PLUS 15 GARDEN VEGETABLES



Hawaii

At the pier Hawaii bids you, "Komo mai",... "Welcome." Across the gangplank you are at once in the atmosphere of youth and gaiety of Hawaii, come to speed the hours of your five-day voyage.

Nowhere else such a voyage...nowhere else ships more pleasing than the "Lurline," "Mariposa," "Monterey" and "Malolo." Hawaiian rest for living is their keynote... Hawaiian hospitality their creed. In their grand salons Hawaiian natural splendor soothes your senses from wall and tapestry. In lanai suite or single stateroom Hawaiian concern for your comfort bids twentieth century genius outdo itself that you may be royally at your ease.

When you reach Honolulu, you are no longer a "Malihini"... "Stranger." You have been living in Hawaii all the way over, and homeward bound, you've still another five days before the final parting.

SOUTH SEAS • NEW ZEALAND AUSTRALIA • via Hawaii, Samoa, Fiji

New delights along the pleasure highway as revealed by the shining new ships, "Mariposa" and "Monterey." Only 15 days to New Zealand... to Australia, 18.

For the complete story, especially about the low costs and All-Expense Tours that chart new economies, ask your travel agency or

Matson Line • Oceanic Line

New York • Chicago • San Francisco • Los Angeles • Seattle • Portland

Brilliant Winter Cruises on Famous Southern Route Liners



TO THE MEDITERRANEAN HOLY LAND EGYPT

JAN. 27... VULCANIA... 40 Days, 18 Calls. Remarkable Mediterranean-Adriatic itinerary, including 8 full days at Trieste for visiting Northern Italy or Central Europe. Famous Cosulich liner calling at Madeira, Gibraltar, Algiers, Palma de Maiorca, Cannes, Naples, Palermo, Patras, Ragusa, Trieste, Lisbon, Azores. First Class \$435 up, TOURIST \$240 up.

FEB. 10... ROMA... 39 Days, 12 Calls. The whole Mediterranean with call at Ceuta, colorful African port, on favorite Lido vessel. Also Madeira, Naples, Palermo (Athens), Istanbul, Rhodes, Haifa, Port Said, Genoa, Cannes, Gibraltar. First Class \$485 up, TOURIST \$270 up.

FEB. 15... Conte di SAVOIA... 28 Days, 12 Calls. Whole Mediterranean in four weeks, thanks to unusual speed of the only gyro-stabilized liner afloat. Gibraltar, Monte Carlo, Genoa, Naples, Haifa, Port Said, Palermo (Athens), Villefranche. First Class \$550 up, SPECIAL CLASS \$315 up, TOURIST \$270 up.

Other Mediterranean Cruises

MARCH 9... VULCANIA... 40 days... 17 calls
MARCH 24... ROMA... 40 days... 15 calls
APRIL 20... VULCANIA... 40 days... 16 calls

Further details on Request

to the WEST INDIES and SOUTH AMERICA

Three Mid-Winter Cruises on the SATURNIA

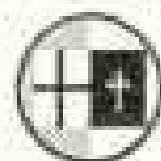
Noted Cosulich liner, sister-ship of the Vulcania famous in cruise service to the West Indies. Offers private deck-terraced suites and other modern marine luxuries.

JAN. 6... 15 Days. Nassau, Kingston, Panama Canal, Havana.* \$167.50 up.

JAN. 20... 17 Days. Nassau, La Guaira, Curaçao, Panama Canal, Kingston, Havana.* \$215 up.

FEB. 8... 17 days. Only 10 1/2 days away from business. Same itinerary as Jan. 20th cruise. \$215 up.

* If conditions make it advisable, Bermuda will be substituted for Havana.



Regular Sailings to
ALL EUROPE
over the Mid Southern Route.

ITALIAN LINE

Write for illustrated literature to local agent or 1 Suite 20, New York, 1007 Walnut St., Philadelphia; 20 Arlington St., Boston; 242 Avenue Union Trust Bldg., Cleveland; 212 N. Michigan Ave., Chicago; 164 Post St., San Francisco; 2100 Avenue Royal Mile, New Orleans; Architects Bldg., 1125 Beaver Hall Bld., Montreal.



THE
SYMBOL
OF
SERVICE

WELL-KNOWN to millions of telephone users is the circular emblem of the Bell System. Its importance is not in its plain and simple design but in what it represents. Back of it is the far-flung organization that enables you to talk to almost any one — anywhere — at any time. It is the mark of a friendly service.

The Bell System consists of twenty-four regional companies, each attuned to the needs of the territory it serves. There is also the Bell Telephone Laboratories, working ceaselessly and scientifically to improve the scope and value of your telephone. There is the Western Electric Company, specializing in the economical production of telephone equipment of the highest quality. Co-ordinating and assisting the work of the operating companies, Bell Laboratories and Western Electric, is the American Telephone and Telegraph

Company. It looks upon the operation of telephone service as a public trust and is owned largely by the people it serves. There are today nearly 700,000 stockholders of American Telephone and Telegraph. They represent a cross-section of the American people; they come from every walk of life and live in every state of the Union. Yet no one owns as much as one per cent of its stock.

Everything has been planned and organized for one specific purpose — to give you the best possible telephone service at the lowest possible cost. That is the ideal and the goal. That is why the work of improvement goes steadily on.

A telephone serves you in many ways each day. It runs your errands; takes you to friends and brings them to you; speeds aid in sickness or emergency. It does these things and many more — for a few cents a day. The Business Office of your local Bell Telephone Company, or any employee, will gladly take your order.

BELL TELEPHONE SYSTEM

THROUGH FLOWERING INDIA

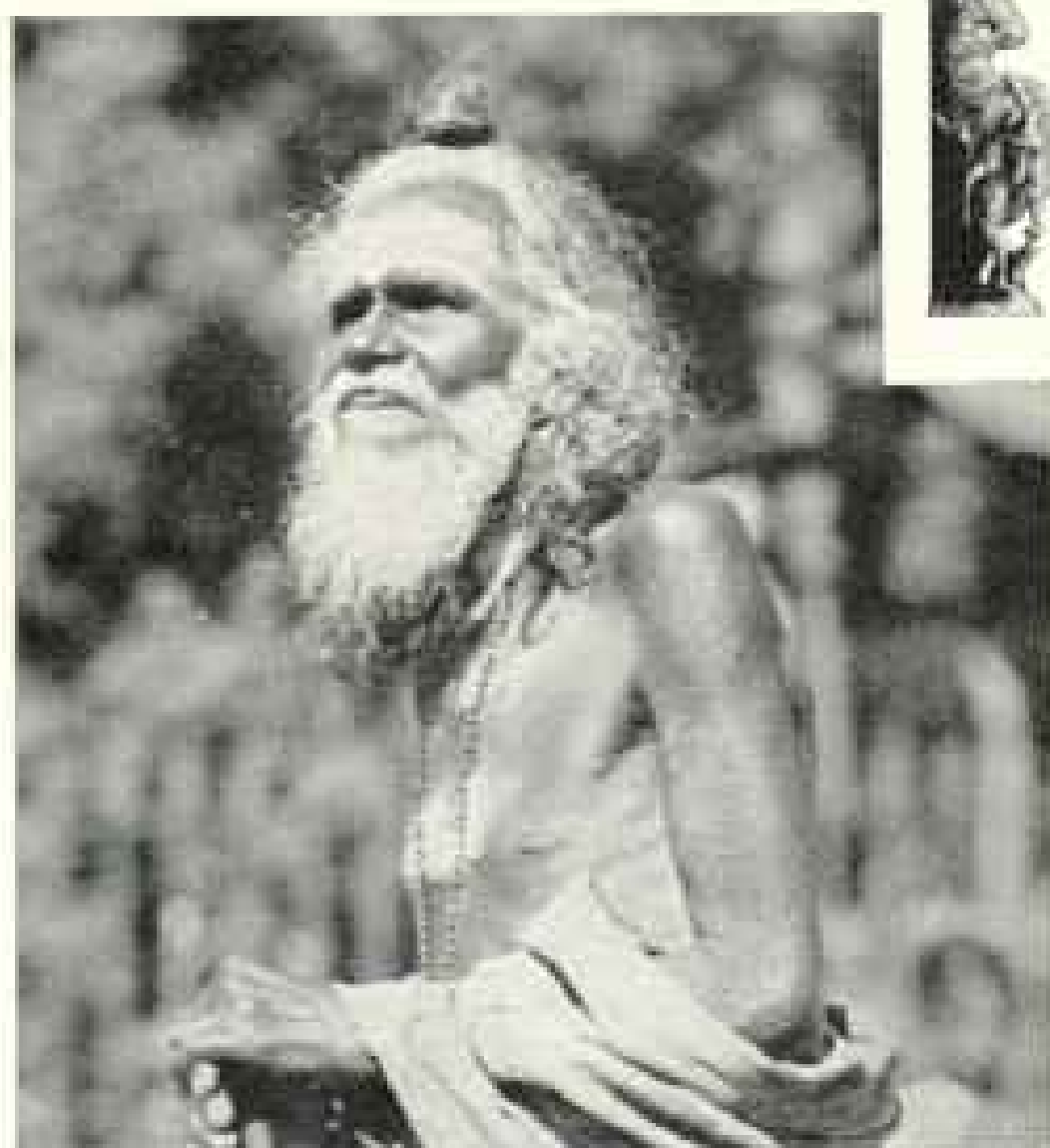
\$500*

A MONTH'S WINTER TOUR

WOULD you like to do something totally different this winter? Combine resort-weather with soul-stirring beauty and adventure? Northern India is at its best in winter...flowers, temples, shrines...sun-drenched days, cool nights. Visit the "rose pink-city" of Jaipur, with its fantastically beautiful buildings in pink and mauve. Agra...famed for its Taj Mahal...alive with romance and color. Benares...on the banks of the Ganges...in festival time.

Accommodations? 5000 miles of first-class compartment railway express travel...comparable in luxury with America's finest travelling. English spoken everywhere. Motor-car excursions to Hindu universities, temples, pilgrim-shrines, and little-known colorful places.

Write to Delhi House, 38 East 57th Street, New York, for complete Winter Tour Itinerary No. 1. *with exchange at par



Hindu holy man on his way to Benares, the sacred city

India

There's nothing like a
SEA TRIP
on the largest liners to
CALIFORNIA



NO OTHER mode of travel affords as much genuine pleasure as travel by sea. When you go to California, choose a Big Three liner, the largest in intercoastal service. The huge size of these fine ships assures you utmost comfort. The days will be happy ones, with swimming in two outdoor pools under tropic skies, broad decks for rest and recreation, the thrill of Havana and the wonderful Panama Canal. All outside staterooms. Delicious cuisine in air-conditioned dining rooms. Excellent service. Low rates: First Class \$225; Tourist Class \$120. 25% reduction for round trips. See your local agent. His services are free.

THE BIG THREE

S. S. CALIFORNIA
S. S. VIRGINIA
S. S. PENNSYLVANIA

PANAMA PACIFIC LINE

INTERNATIONAL MERCANTILE MARINE CO.

Main Office: No. 1 Broadway, New York

Other offices in all principal cities





**The "K" is simple for the beginner,
versatile for the expert**



● Extra equipment for the "K" includes four telephoto lenses, for close-ups of distant action; the wide-angle lens, giving breadth in close quarters; filters for cloud effects and outdoor scenes; and the adjustable Kodazolor filter for movies in full natural color.

● Ciné-Kodak "K" adapts itself beautifully to your needs. In the hands of a beginner, it gets clear, brilliant movies at the touch of a button . . . and an enthusiast is made.

Then, as your demands increase, the scope of the camera becomes apparent. Movies at night—wide-angle and telephoto shots—scenes in full natural color—the "K" makes them all easily.

The "K" loads with full 100 feet of 16 mm. film. Eastman processing stations for Ciné-Kodak Film are located in most of the principal cities throughout the world. Eastman Kodak Company, Rochester, New York. *If it isn't an Eastman, it isn't a Kodak.*

Ciné-Kodak "K"

EASTMAN'S FINEST MOVIE CAMERA

Send for a Budget

The JOHN HANCOCK MONTHLY BUDGET SHEET will be sent you on request. Enclose 2c for postage.

John Hancock
MUTUAL
LIFE INSURANCE COMPANY
OF BOSTON, MASSACHUSETTS

JOHN HANCOCK INQUIRY BUREAU
197 Clarendon Street, Boston, Mass.

Please send John Hancock Monthly Budget Sheet. Enclosed find 2c for postage.

Name.....

Street.....

City..... State.....

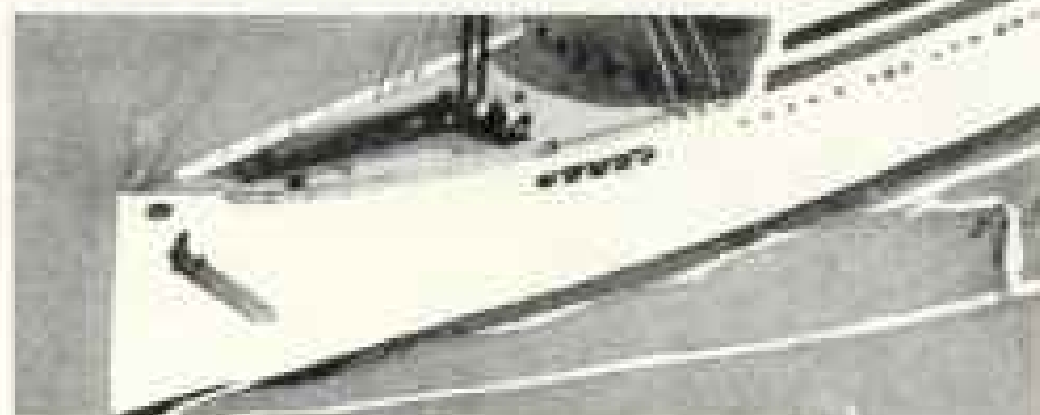
N. O. 1-28

Pioneers AND Pacemakers

TO THE

WEST INDIES

and the CARIBBEAN



"GUEST CRUISES"!... setting the pace today as in the pioneer days of 1902. Six spacious new liners. Deck sports, dancing, permanent outdoor pools, intimate service.

FROM NEW YORK—a wide selection of cruises of 10 to 20 days—currently to HAYANA, JAMAICA, PANAMA, COLOMBIA, COSTA RICA, GUATEMALA, HONDURAS. Rates vary from \$25 to \$225 minimum. Sailings Thursdays and Saturdays.

Regular "Guest Cruises" from New Orleans, Los Angeles, San Francisco. Also through service from all ports.

TO AND FROM CALIFORNIA

Apply any authorized travel agency or Pym & Smith Bldg., or 311 Fifth Avenue, New York.

GREAT WHITE FLEET

UNITED FRUIT COMPANY

Refresh yourself where nature is friendly.

GIVE yourself a new deal. Let this high-desert climate lead you to a renewed zest for living... Tucson has everything. All-grass golf courses, polo, tennis, riding, aviation, hunting, fine schools including our University of Arizona, delightful shops, theatres, hotels and modern sanatoria... Nearby—interesting ruins, cactus forests, Indian villages, Missions, guest ranches, Old Mexico & other attractions.

Mail coupon or wire for booklet of information re: hotels, air, rail & road data. We render personal service without obligation. Winter rates and privileges now available on Rock Island & Southern Pacific Lines.

TUCSON SUNSHINE-CLIMATE CLUB ARIZONA

1344 E. OLD PEARLE BLDG., TUCSON, ARIZONA

Please send me your free literature

Name.....

Address.....

EGYPT and the NILE

'ROUND THE WORLD TOURS

MEDITERRANEAN CRUISES

SAIL to Italy in Roman splendor... then embark—via the "Grand Express" for Egypt, Greece, Russia, Turkey, the Holy Land and the Near and Far East—on the fast, ultra luxurious steamers of Lloyd Triestino. Service backed by the skill of 104 years of experience.

MEDITERRANEAN CRUISES embracing 22 ports. Stopover privileges within 4 months.

'ROUND THE WORLD TOURS offering 75 independent itineraries.

For literature and reservations apply your local travel agent or

LLOYD TRIESTINO

1 State St., New York; 1621 Walnut St., Philadelphia; 86 Arlington St., Boston; 944 Arcade, Union Trust Bldg., Cleveland; 333 N. Michigan Ave., Chicago; 386 Post St., San Francisco; 1806 American Bank Bldg., New Orleans; Architects Building, 1133 Beaver Hall Hill, Montreal.



By the compass

There is always one goal in education. Set your boy or girl on a true course with the opportunities offered at selective private schools.

THE NATIONAL GEOGRAPHIC
MAGAZINE

America's Winter Playground

St. Petersburg

FLORIDA



On the beautiful West Coast of Florida, situated on a tiny peninsula between Tampa Bay and the Gulf of Mexico, is sunny St. Petersburg, a city of countless charms to the

vacationist. A winter climate unsurpassed, an amazing variety of sport and entertainment, accommodations to suit every purse, and a friendly atmosphere combine to create a playground which thousands consider ideal. . . . A new illustrated booklet will be sent on request. Mail the coupon.

M. B. DEADERICK, Sec'y, Chamber of Commerce,
St. Petersburg, Florida.

Please send free booklet.

Name.....

Address.....

MAIL TO-DAY



SEND FOR FREE BOOKLET

ATTENTION—Garden Clubs of America

Enjoy the life and color of Wild Flowers the
year 'round . . .

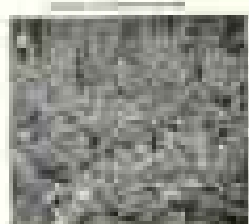
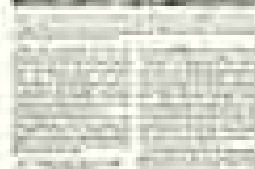
The Book of Wild Flowers

By WILLIAM JOSEPH SHOWALTER

NEW EDITION

CHAPTER HEADS

- I Exploring the Mysteries of Plant Life
- II Our State Flowers
- III Familiar Grasses and Their Flowers
- IV Flower Biographies, etc.



ILLUSTRATIONS

250 exquisite color reproductions of familiar varieties of flowers, by Mary Eaton and E. J. Geske; also numerous half-tones.

A new revised edition of the Book of Flowers is now available. Completely up-to-date, this handsome volume—a boon to Nature Lovers—contains among its additional material the latest legislative actions by the States on State Flowers.

Reduced Price \$3.00

Postpaid in U. S.; Mailing abroad: 25 cents extra.

OBTAINABLE ONLY FROM

NATIONAL GEOGRAPHIC SOCIETY, Department G, Washington, D. C.

Mark Everything With
Cash's
WOVEN NAME TAPES

SAFETY for your clothes, your pocketbook and yourself is assured only when your belongings are marked with your name. That's why travelers and thousands of families have used CASH'S NAMES for generations. Attached quickly with thread or Cash's NO-SO Cement.

Order from your dealer or us.

Trial Offer: Send 15 cents for one dozen of your own first name and sample tube of NO-SO Cement.

J. & J. CASH, Inc.

134th St., So. Norwalk, Conn., or
 6211 So. Gramercy Place, Los Angeles, Cal., or
 34 Gray St., Toronto, Canada



CASH'S 3 doz \$1.50 6 doz \$2. NO-SO 25¢
NAMES 9 - 20¢ 12 - 3. Cement / c. 1 doz



How to Sell Your SNAPSHOTS

Do you often wonder where Magazines, Newspapers and Advertisers get so many thousands of pictures? . . . They BUY them. And they'll buy them from YOU if you learn how to take reliable pictures! Make your camera pay you good money—spare time or full time. Read how others do it. Their first step in getting into fascinating, profitable Journalistic Photography was to send for this FREE BOOK, "How to Make Money With Your Camera."

FREE BOOK Write for your copy. Read how you can earn right while you learn. We teach you by mail how to take the kind of newsy, human-interest pictures that publications are eager to buy—and how and where to sell them with help of our unlimited Marketing Service. Mail card or letter at once. No cost or obligation. Address: UNIVERSAL PHOTOGRAPHERS, Dept. 521, 18 West 33d St., New York City.

DREER'S 1934 GARDEN BOOK

If you have discovered through experience the true economy of buying the best seeds and plants, you will find this new 216-page Garden Book indispensable. Prized the year round by those to whom accuracy and thoroughness do make a

difference. Free on request if you are interested in vegetable and flower seeds, roses, perennial plants, etc.

HENRY A. DREER

157 Dreer Building 1306 Spring Garden St.
 PHILADELPHIA, PA.

CHAMPION-INTERNATIONAL COMPANY

MANUFACTURERS OF

National Geographic Paper

and other high-grade coated paper

LAWRENCE, MASS.

THIS MAGAZINE IS FROM OUR PRESSES

JUDD & DETWEILER, INC.

Master Printers

ECKINGTON PLACE AND FLORIDA AVENUE

WASHINGTON, D. C.

TROPICAL AND FANCY
GOLDFISH
WATER LILIES

Everything for lily pools. We list a complete line of aquariums, fish food, scavengers, oxygen plants; in fact, every requirement needed for aquarium and lily-pool success. Catalogue free. **SPECIAL OFFER:** 1 pr. Sailfins, 1 pr. Cardinal fish, one 3-gallon aquarium, including plants, scavengers and fish food. All for \$5.75.

BELDT'S AQUARIUM
 2149 Crescent Avenue, St. Louis, Mo.

Bound for the Seven Seas

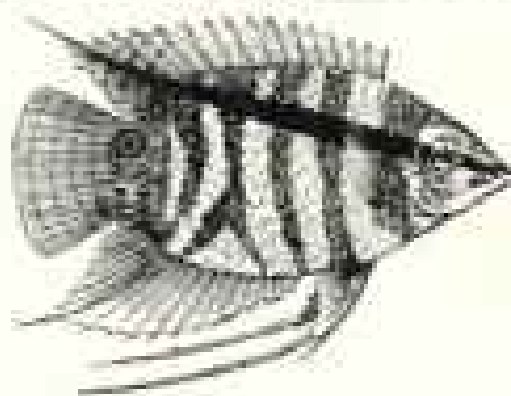


Army of Geography—This old-time "Square Rigger," bowling along in mid-Gulf Stream, from a photograph by John Oliver La Gorce, preserves the full beauty, mystery, and power of the sea. Blue photogravure, 17 x 20 inches, on beveled Superfine Bristol—packed for convenient remailing to your friends.

\$1; Framed \$3. Postpaid in U. S. A. Abroad 25 cents extra

Among other outdoor subjects:
DOE AND TWIN FAWNS
PRAYER IN THE DESERT
BABES IN THE WOODS

Illustrated circular on request. Obtainable only from the National Geographic Society, Dept. E-1, Washington, D. C.



WONDERFUL AQUARIUM FISHES

Now featured in prominent magazines

can be successfully kept and bred in your home for pleasure or profit. Our beautifully illustrated monthly magazine, **THE AQUARIUM**, tells about them in clear, popular language, and where to get them. To interest new readers, we accept 6 months' subscription for \$1, or give a tested aquarium thermometer free with each new \$2 yearly subscription (foreign \$2.50). Copies 20c. No fish for sale. Innes Publishing Co., Phila., Pa.

"Mention the Geographic—It identifies you."



STANDARD FOR FIFTY YEARS

THE love of a Virginia druggist for "SERGEANT," his favorite hunting-dog, prompted the making of the first "SERGEANT'S DOG MEDICINES."

Every true dog lover will understand why he used only the very finest chemicals and drugs in his shop and compounded them with all the skill and care at his command.

To these original formulas have been added modern scientific accuracy and the knowledge gained in long and painstaking study of the cause and treatment of canine ills.

This explains why "SERGEANT'S DOG MEDICINES" not only meet but surpass all government requirements for purity and quality.

It explains why generations of dog owners have found them so uniformly safe and effective in treating the diseases of their dogs.

There is now a complete line of "SERGEANT'S DOG MEDICINES." They are sold by dealers everywhere. If you love your dog and want to keep him healthy, we urge you to write for a free copy of the famous "SERGEANT'S DOG BOOK" on the care of dogs.

FOLK MILLER PRODUCTS CORPORATION
1960 W. Broad Street, Richmond, Virginia

Sergeant's DOG MEDICINES



Save him from a 'Starvation Diet'

Protect your canary's health and song by feeding him French's Bird Seed and Biscuit. Different from ordinary bird seed, because it is a complete diet of wholesome seeds—offering perfect nourishment and air-washed to remove harmful dust, dirt and chaff.

French's Bird Gravel Aids Digestion

French's BIRD SEED AND BISCUIT

GIVE A CANARY FOR COMPANIONSHIP

The Flamingo Hotel

America's Winter Playground

Miami Beach, Florida



Internationally known for its charming location, excellent cuisine, efficient service and every convenience.

Spacious private swimming pool, cabanas, and solarium—three tennis courts on grounds. Unexcelled golf courses; polo, Gulf Stream surf bathing, fishing.

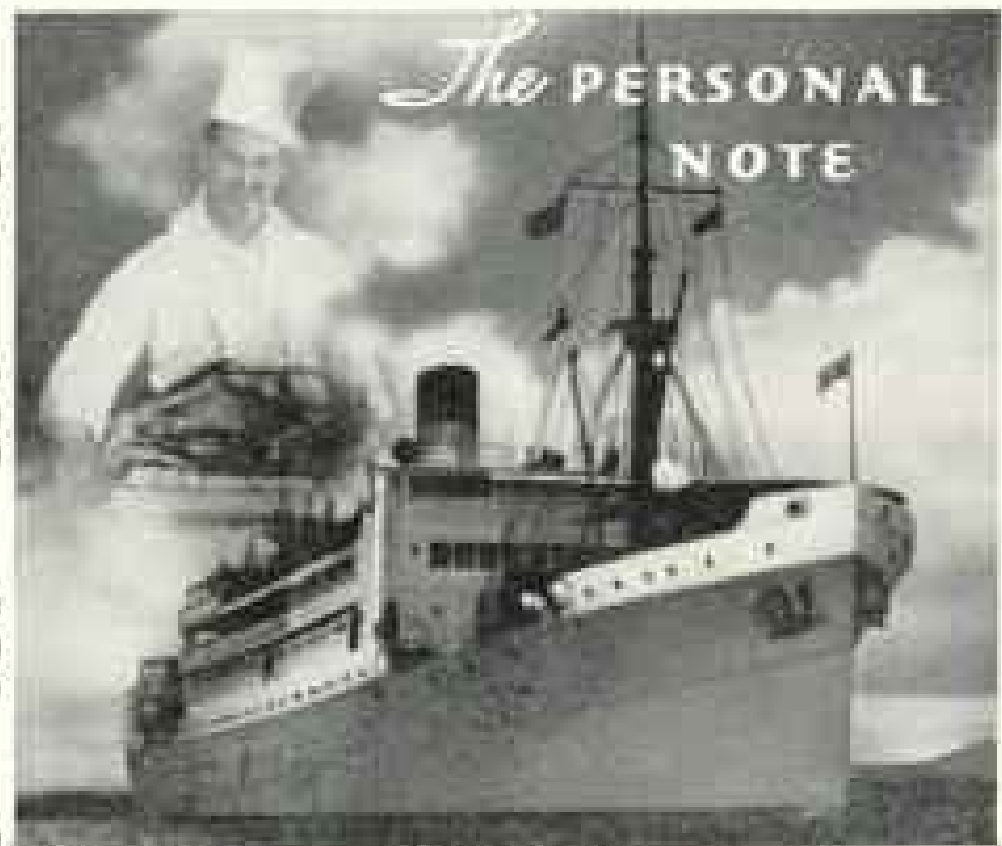
Revised rates with traditional standards maintained. American plan, \$9 per day up. Bungalows with hotel service available. Season November 30th to April 15th.

Write for illustrated book

The Flamingo Hotel

C. E. KROM, MANAGER

Miami Beach, Florida



*The PERSONAL
NOTE*

Cruising on NEW ships to the SPANISH MAIN

Not alone the fascinating itineraries and low cost—the shining new "Haiti" and "Columbia," with all outside rooms, outdoor pools, air-cooled dining rooms. It's all these, plus the personal note, that makes these cruises popular.

Two weeks and an extra week-end: 9 days at sea, 9 days ashore in Haiti, Jamaica, Colombia (S.A.), Panama. Also 11-day cruises to Haiti and Jamaica. \$100 and \$145 up respectively.

Sailing Thursdays from New York.

COLOMBIAN Line

17 Battery Place,
New York, or any
Tourist Agent.

To the Members of the NATIONAL GEOGRAPHIC SOCIETY

EACH member of the National Geographic Society may nominate any number of friends, both men and women, for membership. Nominations involve no financial obligation.

The extension of The Society's far-flung, fact-finding expeditions to gather new and invaluable material, the progressive maintenance of the unexcelled pictorial and humanized text interest, the up-to-date, large wall maps and panoramas returned to them in their NATIONAL GEOGRAPHIC MAGAZINE, as well as The Society's educational services to public schools and

the press throughout the Nation, depend upon continuous, conservative membership growth. Many members realizing this avail themselves of their nominating privilege which their friends quickly and cordially appreciate.

By such generous member coöperation The Society has been soundly builded and expanded throughout its forty-six years of activity and service.

Your officers bespeak your further aid and particularly request your activity now. The form below may be filled in, detached, and mailed to Washington.



ON THE TIBETAN BORDER—FOR THE GEOGRAPHIC

DETACH HERE

Nomination for Membership

To the Secretary, National Geographic Society, _____ 1—1934
Sixteenth and M Streets Northwest, Washington, D. C.:

I nominate for membership in the National Geographic Society:

DUES
Annual membership in U. S., \$3.00; abroad, \$4.00; Canada, \$3.50; life membership, \$100. Please make remittances payable to the National Geographic Society. Please remit by check, draft, postal or express order.

- (1) NAME _____
ADDRESS _____
- (2) NAME _____
ADDRESS _____
- (3) NAME _____
ADDRESS _____

[Name and Address of Nominating Member]

Membership Fee Includes Annual Subscription to THE NATIONAL GEOGRAPHIC MAGAZINE



The National Geographic
**DIRECTORY OF SELECTIVE
 PRIVATE SCHOOLS**

INDIVIDUAL tastes may vary, but the desire for cultural attainment is constant among thinking people The time to begin cultural training is the school age The place is in a selective private school . . .

Boys' Schools

GEORGETOWN PREP SCHOOL

22 acres near Washington. Four-year course. Every facility for physical and intellectual development. Ten new tennis courts. Nine-hole golf course. Established 1783. Tuition \$1,500. Rev. Robert S. Lloyd, S. J., Headmaster, Garrett Park, Md.

NEW YORK MILITARY ACADEMY

College Preparatory and Junior High schools. High scholastic standing, excellent discipline, supervised athletics, commercial courses. Catalog. Brig. Gen. Milton F. Davis, D.S.M., Capt., Cornwall-on-Hudson, N. Y.

Girls' Schools

WARD-BELMONT

Accommodates Junior college and preparatory school with special courses in music, art, expression, dramatic art, physical training, secretarialship. Impressive buildings. Sports. Ask for literature. Alma Paine, Registrar, Box 108, Nashville, Tenn.

WARRENTON COUNTRY SCHOOL

College preparatory. Cultural courses. French—language of the house. Ideas of order and economy emphasized. Riding, sports. 48 miles from Washington. Mile. Lee M. Bouffery, Box N, Warrenton, Va.

Girls' Schools

ARLINGTON HALL

129-Acres Woodland Park. Standard High School and Junior College. Music, Art, Expression, Dramatics, Home Economics, Secretarial. All Athletics. Catalog. Carrie Sutherland, M. A., Principal, P. O. Box 810, S.W., Franklin Station, Washington, D. C.

GULF-PARK COLLEGE

St. Petersburg. Fully accredited Junior College for girls, 4 years high school, 2 years college. Music, art, expression, home economics, secretarialship. Outdoor sports all year. Riding, swimming (salt water). Catalog. Box N, Gulfport, Miss.

NATIONAL PARK SEMINARY

Jewish College and Preparatory School suburban to Washington, 33 buildings. Art, music, dramatics, home economics, secretarial, journalism. Rates \$950 and up according to room. Catalog. James E. Ament, Ph.D., LL.D., Box 614, Forest Glen, Md.

OGONTZ

School for Girls. Near Philadelphia. Grace of finishing school with educational thoroughness. Junior College. General courses. College preparation. Home-making Department. *Spald Hall*, girls 7-14. Abby A. Sutherland, Prin., Ogontz School P. O., Pa.

Vocational

AMERICAN ACADEMY OF DRAMATIC ARTS

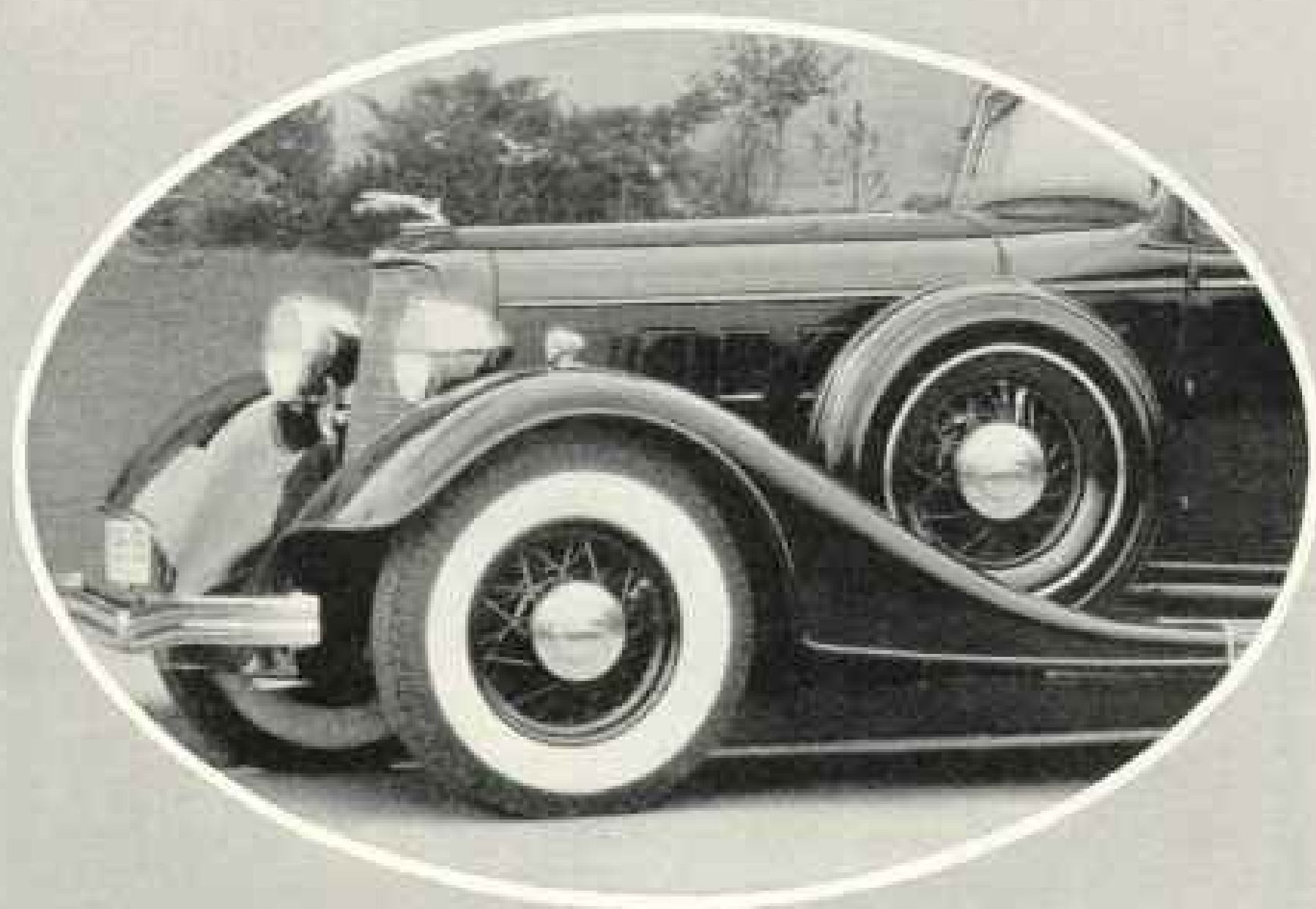
Formed 1944 by Franklin H. Sargent. The foremost institution for Dramatic Training. Mid-Winter Term Opens January 1946. Address: Secretary, Room 271-A, Carnegie Hall, N. Y.

PACKARD SCHOOL

THREE YEARS. Complete Secretarial, General Business and Accounting Courses. Creditational for students of colleges and high-school grade. Placement service rendered. For catalog write: Assistant Principal, 253 Lexington Avenue, New York.

TRI-STATE COLLEGE

World famous for technical 2-year courses in Civil, Electrical, Mechanical, Chemical, Radio, Aeronautical Engineering; Business Administration and Accounting. B. S. Degree. Equivalent in technical hours to 4-year course. Those who lack high school may make up work. Low tuition. Low living costs. Located in picturesque hill and lake region. Students from every State in the Union and many foreign countries. 51st year. Write for catalog. 1414 College Ave. Angola, Ind.



*A new series of
V-12 cylinder
Lincoln motor cars*

THE new Lincoln series marks a distinct advance in engineering design and construction. A single design, V-12 cylinder, 150-horsepower engine, has been adopted for all Lincoln cars. It provides great power with maximum flexibility and smoothness. The polished aluminum cylinder head, oil temperature regulator, bearings of high-speed airplane type—

insure finer engine operation, greater endurance, greater economy. Outstanding among other features is the new Lincoln clear vision, no draft system of body ventilation.

The Lincoln of today is available in two wheelbase lengths, in standard body types, and in custom-built types by Judkins, Brunn, Willoughby, Dietrich and LeBaron.

LINCOLN MOTOR COMPANY, DIVISION OF FORD MOTOR COMPANY

Fascinating new Game!

Have the fun . . . thrills . . . adventure of a

RADIO TOUR



A "First Night" in Hollywood—get the thrill of it on a Radio Tour!



Sioux Indians in the Black Hills stage a primitive tribal dance—what an adventure on a Radio Tour!



Ride your Radio to the Mardi Gras . . . get all its glamour and color touring via Radio!

Throw out old, worn-out radio tubes . . . re-tube with new Cunninghams or RCA Radiotrons—get in the game!

HERE'S a chance to get in on the greatest game ever devised for radio set owners! Don't confine yourself to five or six stations . . . there are more than 650 to choose from. A turn of the dial and you're touring North America! In Miami, hear a dance under a warm tropic moon . . . get the thrill of the Mardi Gras in New Orleans . . . a "First Night" in Hollywood . . . pick up Mexico City . . . From Maine to California, the game is on—get in it! Here's all you need to start playing: A good radio set, with a good antenna system—*plus* a new set of Cunningham radio tubes or RCA Radiotrons.

Have your dealer test your tubes!

Don't be held back by weak, worn tubes. Step out tonight with the world's finest—the *only* tubes guaranteed by RCA . . . built with 5 great new improvements undreamed of when most people bought their tubes. Send for a large 4-color "Radio Tours" map showing all the radio stations in the United States, Canada and Mexico, with call letters and kilocycles . . . And the remarkable new "Radio Set Performance Yardstick" devised by RCA engineers. It tells you whether your set is in excellent, good, fair or poor operating condition. Get this exciting booklet "Radio Tours" with the new "Radio Set Performance Yardstick" from your dealer or send 10c in stamps to cover handling and mailing to RCA Radiotron Co., Camden, N. J.



Cunningham Radiotron



Please send your illustrated folder "Radio Tours" with station map and "radio yardstick". I am enclosing 10c in stamps for postage and handling.

Name _____

Address _____

(Coupon must be sent to RCA Radiotron Co., Camden, N. J.)