THENATIONAL GEOGRAPHIC MAGAZINE

AUGUST, 1943

Iran in Wartime

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Fit to Fight Anywhere

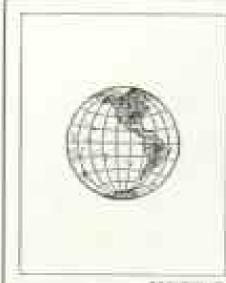
With 26 Illustrations

FREDERICK SIMPICH

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COTYBURY, 1941, BY BATKINAL STORRASHUE MODIETY, WARRENGTON, S. C. DITERRATIONAL EXPLANATIONAL

Iran in Wartime

Through Fabulous Persia, Hub of the Middle East, Americans, Britons, and Iranians Keep Sinews of War Moving to the Embattled Soviet Union

BY JOHN N. GREELY

Brigadier General, United States Army

RIGHT in the middle of the Middle East lies the old Kingdom of Persia, the Iran of today.* It takes its name from the Aryan tribes who once made it great, although it is doubtful that Hitler would ever give it the consideration which he reserves for the Aryan race!

Iran is the strategic crossroads of the Middle East. Across its deserts run the roads that carry supplies to Russia and tie Egypt to India. From the shadow of its mountains run the pipelines feeding the fleets and air armadas of the United Nations.

War is an old story to Iran. Cyrus and Darius, Xenophon and Alexander, Genghis Khan and Tamerlane fought through its mountains and burned beneath its suns.

In the greatest of all wars, Hitler threatened it from the Caucasus on the north and from Egypt on the west. His Japanese allies dreamed of a drive through India to unite the armies of the Axis beneath Iran's minarets and oil derricks.

Americans Man Russia's Southern Life Line

United Nations' victories at Stalingrad and in North Africa changed the picture considerably, and now Americans are in Iran in some force. The Army's Persian Gulf Service Command is enlarging ports and running the Trans-Iranian Railway. Over what they call the "Persian Corridor," Army men deliver Lend-Lease materials to Russia's back door (map, page 132).

American cantonments now line the railroad running north to Tehran, the Iranian capital. Side by side with Iranians, Americans sweat in the desert's sun and shiver in the snowy mountain passes.

Along the Shatt-al-Arab, dividing lower Iran from Iraq, lies a region rich in date palms. According to one legend, here was the Biblical Garden of Eden. Americans, used to thinking of the Garden as an idyllic retreat, find any such notion hard to believe. Here they have watched the summer thermometer soar above 125 degrees. If there is a wind, it blows dust from the desert or, shifting, brings intolerable humidity.

At palm-dotted Abadan Island, an oil-refining center in the Shatt-al-Arab, the Anglo-Iranian Oil Company has created for its European colony an air-conditioned garden spot. In their jerry-built quarters, Americans eat sait tablets, curse the climate, and rig electric fans to blow air through moistened excelsior.

The Liberty ships' approach to Iran and Iraq, around the Cape of Good Hope, is by the Persian Gulf, 14,000 miles from New York. An 800-mile backwater, far off peace-time's major shipways, the Gulf once again has become a strategic artery. Its pearl-rich waters lap oil-rich sands sprinkled with derricks.

* See "Old and New in Persia," by the Baroness Ravensdale, National Geographic Magazine, September, 1939.



Parriso from 9W2

An American Match Lights Russian Smokes beneath Krupp's "Gift" to the United Nations

In 1938 Essen's steelworks proudly built this locomotive. Hitler shipped it to the former Shah of Iran. Now Americans, like this sergeant engineer, operate it; the U. S. S. R. gets its war freight, and its Ruhr Valley birthplace is shattered by bombs.

Hundreds of years ago piracy and slave running flourished in the Gulf. Today it floats the guns and explosives, food and barbed wire, airplane engines and trucks that help keep Russia fighting. It leads to Iraq's modern port of Basra, Sindbad's headquarters, just across the border from the Iranian ports of Abadan, Khorramshahr, and Bandar Shahpur.

A Railroad System Arrives by Ship

His ports were a pride of the former Shah, but few boasted more than a single dock or a few cranes. The British, since the first World War, had made Basra a modern port. After they marched into Iran in 1941, they also did a lot of work on the Iranian side of the river.

This the Americans have taken over now, Harbors have been dredged. On the new docks, giant cranes swing American Diesel locomotives from barge to rails.

Into these ports the American Merchant

Marine has shipped an entire railroad system. Freight cars, rails, and operating personnel have accompanied the locomotives. Puffing for the United Nations, Krupp locomotives are reminders of the day when the Nazis influenced the former Shah. The British put his son on the throne, and some of their own locomotives on the railroad.

From Bandar Shahpur the Trans-Iranian Railway begins its 860-mile journey across desert and mountains to the Caspian Sea.

The former Shah, now in British custody after 20 years of dictatorship, built the road according to his own ideas. He made sure his road would connect neither with Russian lines to the northwest nor with British rails in Iraq and India. After nearly 11 years' work, he finished the line in 1938, just in time for it to serve his neighbors' war purposes.

The road is an extraordinary engineering feat. It twists through some 220 tunnels and



Drittah Official

From English Channel Ferries, This Freight Car Has Made a Long Sea Voyage to Iran Unloaded at Bandar Shahpur, it is bound for the Ahwar "wagon shop" (page 137). Note the English method of writing the date, "21-11-41," day first, month second. The British military railway clerk, chalking "Persia," ignores Iran's old-new name.

surmounts 7,000-foot passes. Much to our Army's exasperation, it is single-tracked, but the rail is standard gauge. Grades are too steep, and turns too sharp, but the Shah's extraordinary railroad is hauling a lot of freight today.

Uncle Sam is engineer, brakeman, and stationmaster over many of its miles. The general manager is an American Army officer. Your locomotive engineer, who wore overalls back home, is likely to show a sergeant's stripes.

Iranians Learn the Assembly Line

Supplementing the railroad in supply to Russia is the truck route over the Persian Corridor.

From ships, crated parts are taken to the assembly line. There Iranians, trained by Americans in the Detroit technique, bolt machines together in a few hours. Laden with boots, sugar, corned beef, steel, the truck convoy soon starts the long, dangerous haul north. Americans and Iranians are the "jockeys," as Army slang labels drivers.

As the caravan moves into the hills, boys from New York's First Avenue or Negroes from southern farms pass the black tents of the nomads and the mud huts of the villagers. In the mountains, the caravan may churn along in chains at a few miles an hour between snowbanks shoveled truck-high.

In the north the Russians maintain an acceptance station. Here the trucks are taken over.

Above highway and railroad, Russian pilots fly American bombers and fighters to the battle front. Some of these planes have arrived in crates, others have flown the Atlantic. Both American and Russian pilots test them in the skies. When a plane is accepted, paint blots out its American white star. In its place goes the U. S. S. R. red star.

Americans and Russians in Iran get along





The Author (Seated) and His Staff Pause for One Lunch and Get Two

Scarcely had they finished their bomemade picnic spread at this Chalus Road inn when the restaurateur tempted them with a menu announcing fresh rainbow trout. General Greely was American Military Adviser to Iran. He is the son of the late Maj. Gen. Adolphus W. Greely, a founder and life trustee of the National Geographic Society, and famous Arctic explorer.

well together. They like us because we deliver the goods. We admire their tough determination. But language and working difficulties make the exchange of beer for vodka infrequent.

Ahwaz, City of Mud Surrounded by Canvas

Suppose that you, exploring Iran, try first the railroad. From Khorramshahr, across the river from Basra, or from Bandar Shahpur on the Persian Gulf, rails lead to Ahwaz. This busy desert city is a hub of communications: barges, trucks, trains, and oil pipeline. Britons, Indians, Americans, Russians, and Poles meet here in the business of war. Surrounded by tents of troops, the town is made of mud brick. Its kilns are baking still more mud.

From Ahwaz the train skirts the foothills to Andimiskh. Then it passes through mountain gorges to the high Iranian plateau. You bring your own sleeping bag; it is always cold in the mountains.

Entering long valleys, green through irrigation from mountain streams, you reach Sultanabad. From there the trip is monotonous desert, although mountains loom on every side.

Only important station on the route is Qum,

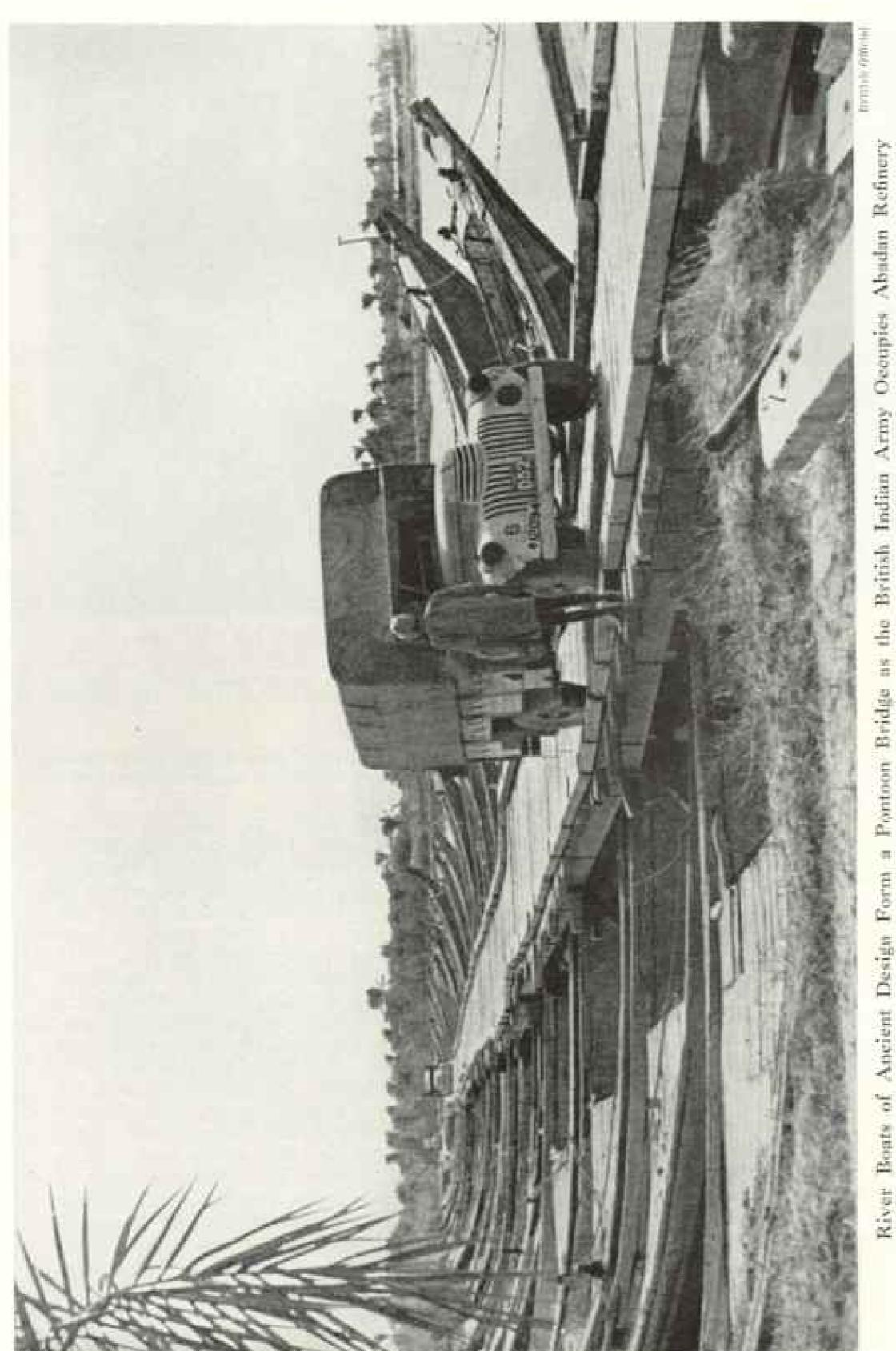
marked by the great golden dome of its famous tomb. Next comes the modern railroad station at Tehran.

Today the easiest way into this heart of Iran is by plane. Either from Basra or Habanniya, the airport near Baghdad, the plane climbs steadily up from the desert to cross the chain of mountains which forms the bastion of Iran against attack from the west. Ground passes through them are rare.

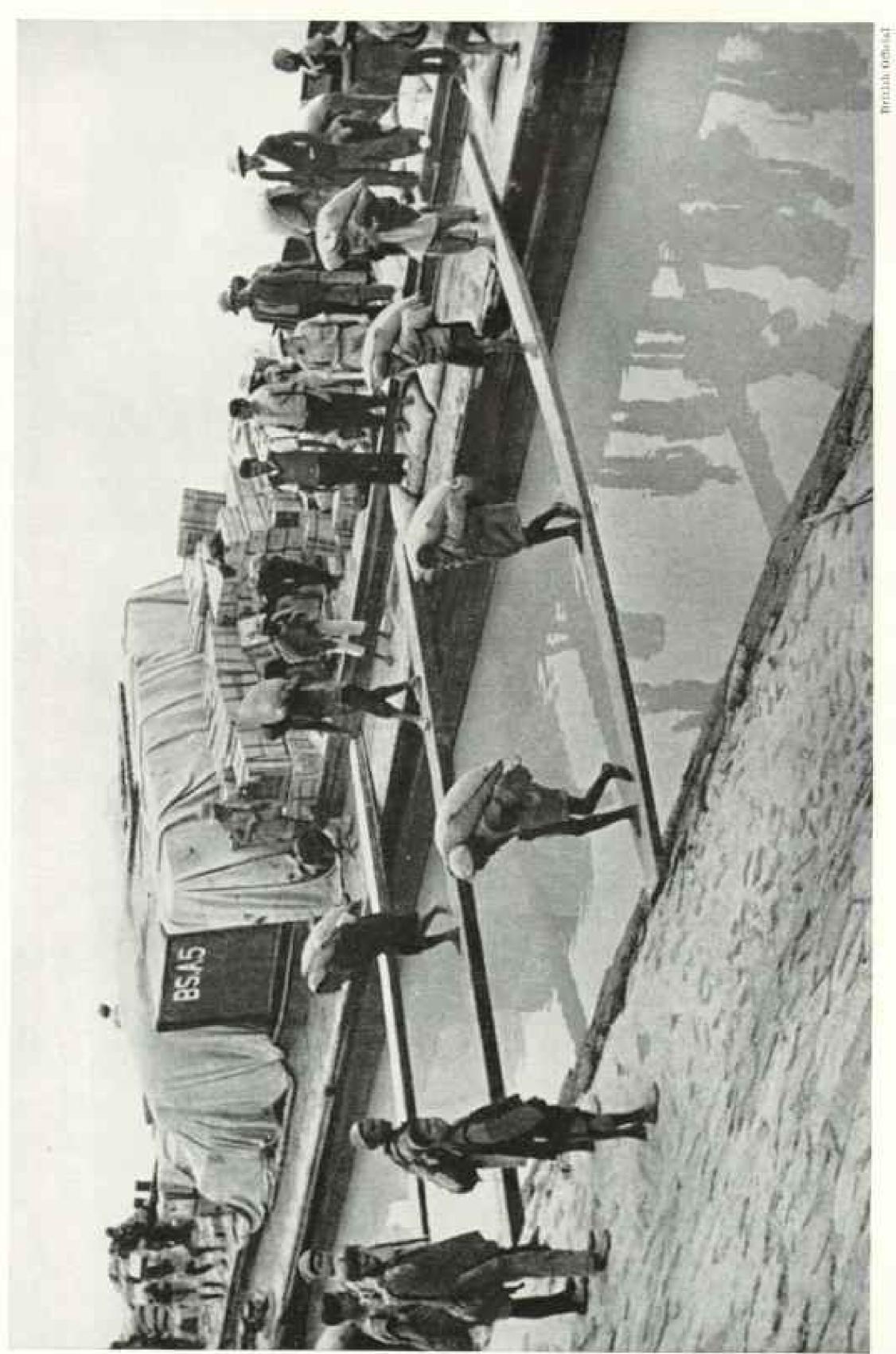
The mountains themselves are magnificent, many snow-capped all year, rugged where the hard rock breaks through, and sloping only where the ages have worn down their crags into rubble. Far below, on the route from Baghdad, the cities of Kermanshah and Hamadan, lying between ranges, mark the way.

Tehran lies at the southern foot of the Elburz Mountains on a gently sloping plain, ideal for airfields, and there are many of them, almost in the city itself. In addition to other uses of war, the Iranian Army still maintains some planes here. The former Shah encouraged aviation by forming a swank aviation club.

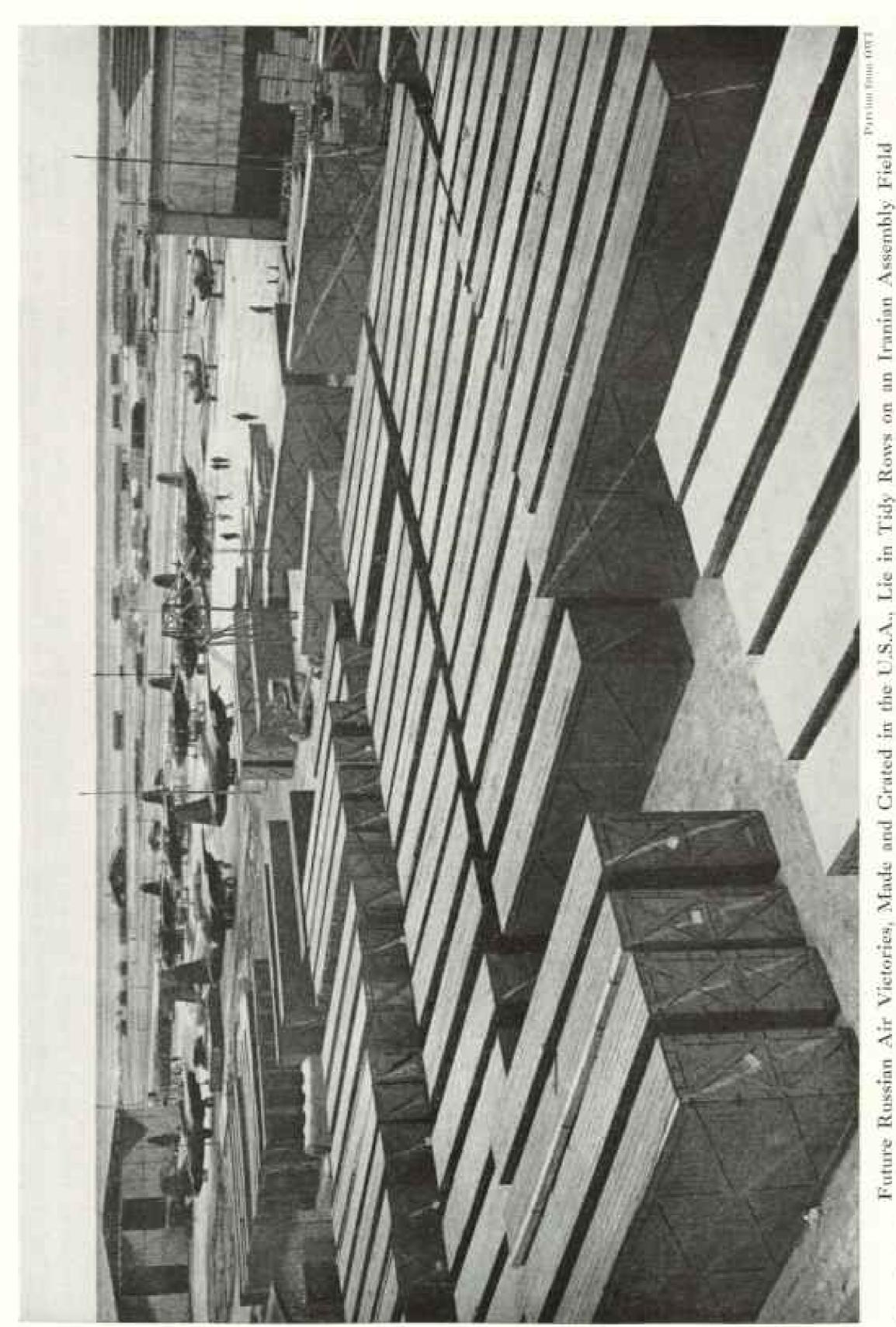
Tehran itself is almost a modern city, in many respects, although on very oriental lines. To an American its most extraordinary feature



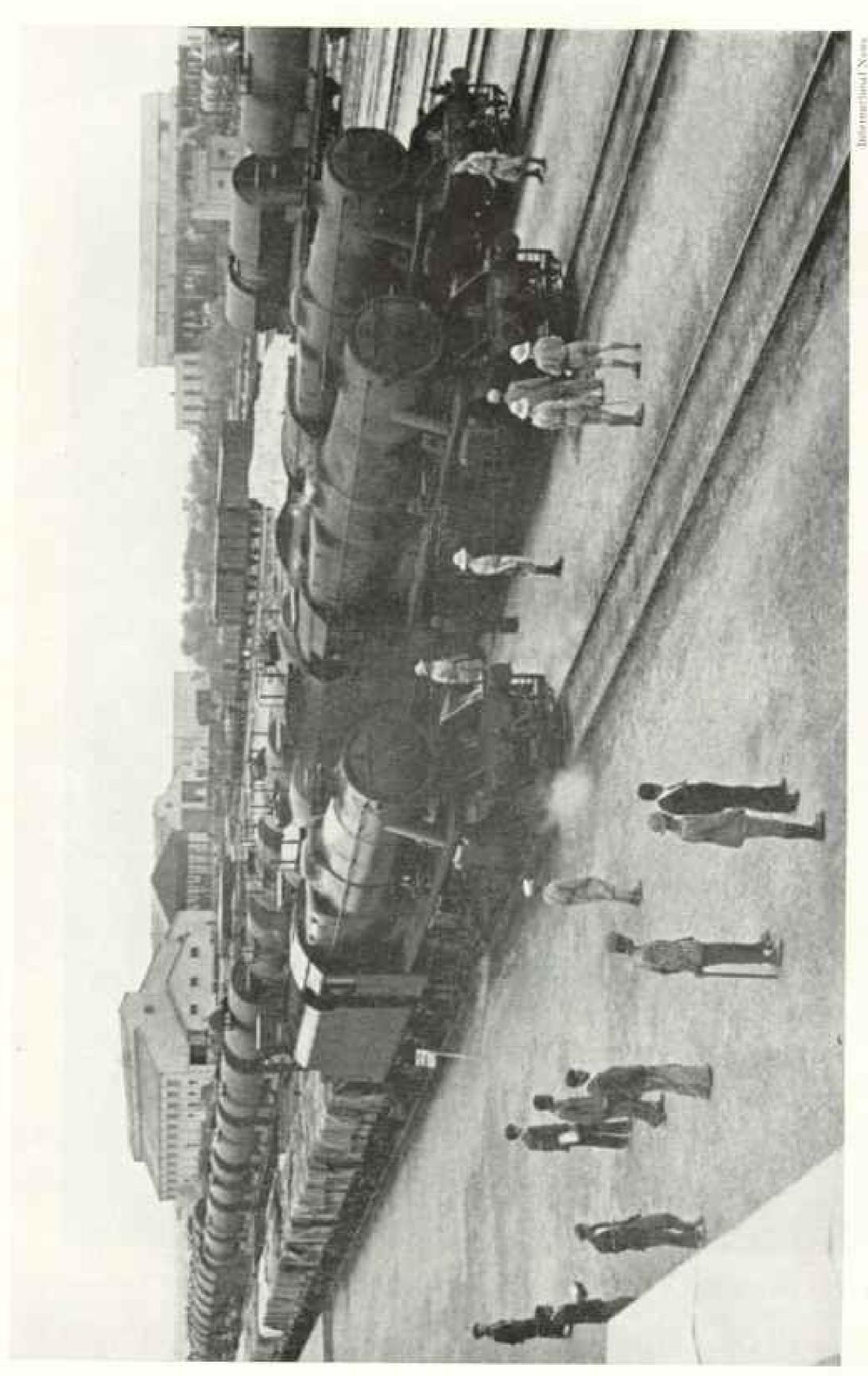
and Saviet forces jointly mayed into Iran to circumvent German agents. The buge Abadan plant, situated on an bland in the Shatt-in the world and makes bigh-octane gasoline. It sends tankers to Africa, India, and Australia (page 129). In this procession a Bornbay-British and Savlet forces Jointly maved Boats of Ancient Design Form al-Arab, is the second largest in the world and makes high-built Chevrolet cab is mounted on a Detroit-made chassia. River In August, 1941,



Last apring Lend-Leuse materials poured into Iran faster than Russians could carry them away. Meets Train to the Caspian Sea, Supplies Are Unloaded by Stevedores in White Caps At the head of mavigation on the Karun, Britons supervise the Near Ahwaz, Where Barge from the Persian Gulf

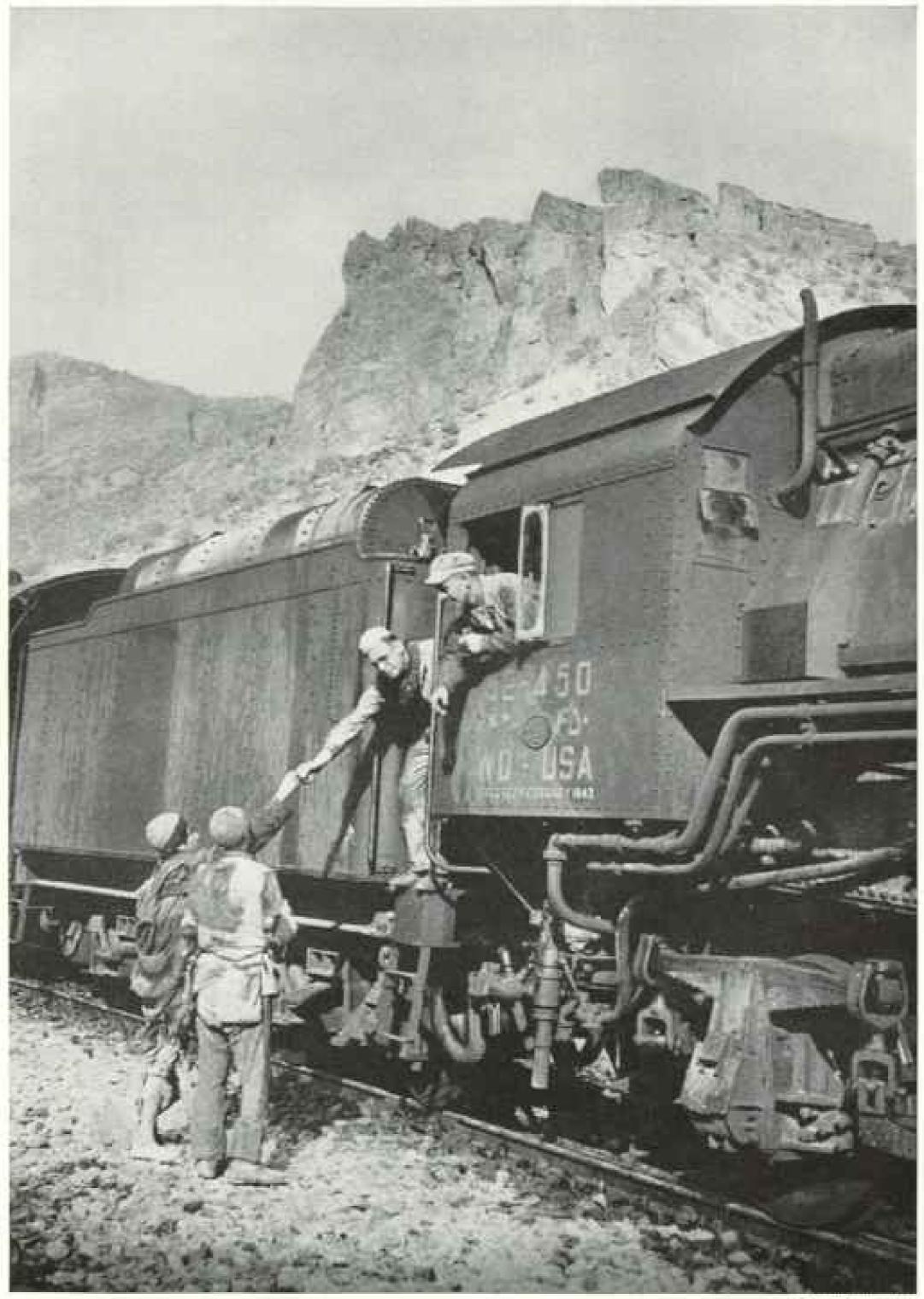


Completed planes, bearing the American white star, are parked the boxes, Summer sun heats their metal skins they base flesh, Camouflage gives the sheds the appearance of fire-blackened ruins, Southern Iran's allavial plains are so smooth they form natural fixing fields.



Hts Repair Shops Will Keep Them Rolling with War Cargo To Aid Russin, Britain Shipped These Locomotives to Ahwaz-

The Trans-Iranian Ruilway was known as the Shah's folly because he planned it, without regard to economic factors, to by-pass foreign rail terminals. Now it has become, transcally, a vital cog in Russin's southern life line. Oil provides its power—note the tank cars. These British coal burners, unlike furnices in many American homes, have since been converted from coal to cell.



Partimeterm 4/W1

Under the Ramparts of a Natural Fortress, Shepherd Boys Meet U. S. Army Trainmen

At almost every stop in Iran, engineer and fireman will find such an audience. A coin or cigarette is the usual gift. Note the cub's number and, below, its Persian equivalent. From similar Hindu-Arabic symbols, the West adopted its own handy 1-2-3-4-5-6-7-8-9-0 to replace clumsy Roman numerals. Though our figures are distortions of the originals, resemblances remain.

is the rush of waters, drawn from the mountains thirty miles away and running down the broad, square gutters of the principal streets. Running water is always pure to the Moslems, and the people use this for all purposes throughout its length. In this city of more than half a million there is no regular water or sewage system.

Many of the buildings are magnificent. The Officers Club is certainly the grandest of its kind in the world. The former Shah was primarily a military dictator, although his activities embraced all fields. He must have known the ancient proverb, "To have power, you must have an army; to have an army, you must have agriculture; to have agriculture, you must have justice." Only in the last can be be considered, perhaps, to have failed.

The Officers Club was built to establish his prestige as commander in chief and that of the Army generally. It shows the best of a mixture of Eastern and Western architecture and decoration. The gardens are Persian and lovely, with tennis courts for a modern touch. The rooms are huge, and include apartments for the Shah and for visiting generals, a glittering crystal room characteristic of Iranian palaces, and a very European bar.

The rugs can hardly be duplicated. One rather small one in the Shah's rooms might bring at least \$10,000. Today the officers cannot pretend to keep the place up from their pay, and it is used only for a weekly tea dance and formal receptions.

An "Arabian Nights" Bazaar

Tehran has many other modern buildings—
the National Bank, the Government buildings, the Opera, still unfinished, and the museum with golden inscriptions from Darius
the Great. The new buildings generally line
the main paved streets, but are interspersed
among older palaces and embassies, highwalled and cool with streams and pools and
flowers and trees. The shops are one- or twostoried only, and kept up by a substantial
minority of Jews, Armenians, and Syrians.

The covered bazaar is more truly Iranian and infinitely more picturesque. It is entered from a paved avenue crowded with cars, but you step down two steps and into an atmosphere of the ancient East. The narrow streets have a clay-bricked roof, lighted by openings in domes which rise at regular intervals.

These openings are merely cuts in the baked clay in forms presumably Arabic, but they are reminiscent of the diamonds, hearts, and clubs of a bridge deck. The shops sell literally everything—food, forage, pots, watches, rugs, jewels, and even buttons from U. S. Army uniforms. These were sent to the Near East as relief clothing after the First World War and have strayed all over the Orient.

The passageways are always jammed with ragged Kurd porters with huge loads, don-keys half hidden by theirs, women unveiled now but with scarf or headdress caught across the face, Iranian men and foreigners alike in European dress, officers on horseback. Camels are too tall to move much through the covered way, but may be seen in the courts behind the shops, kneeling with bored grunts to deliver their loads.

The side streets run by trades—coppersmiths, bakers, clothiers—and often end in the small gardens of mosques, where it is still imprudent for the non-Moslem to enter. The whole affair covers acres, and you may find yourself in a muddy alley lined with beggars before you get back to the paved street with cars and horse-drawn droshkies.

Plateau Life Depends on Water

All life on the Iranian plateau depends on irrigation. Inside or outside of town the first requisite is access to a stream or well. Next comes the planting, and next, the wall of puddled mud reinforced with brick and topped with tin. A Persian name for an estate of any sort is "walled garden which has its own water."

The former Shah went in for more elaborate building. His road construction is continuing all through the country, and at many picturesque spots in the mountains or on the sea he built elaborate hotels to bouse the tourists of the future, always with an imperial cottage for his own use. Most of these are inaccessible in these days of tire shortage. But the hotel at Darband is just out of Tehran and next to the Summer Palace. It is backed right up against the mountains, and snow patches still show just above it in August.

The hotel itself is ultramodern, with huge bathrooms and fine rugs. The gardens are always filled with flowers of some kind; orchards on the slopes are glorious in spring.

In the summer all the foreigners and functionaries in town move out to gardens in the neighborhood or to villas around the hotel, and dine outdoors to the music of a Polish orchestra.

Reza Shah Pahlevi used to supervise the hotel himself, but his modest young son lives now by himself in the palace below, and lets the tourist agency run the hotel with its attractive if sometimes dangerous mixed cuisine. This includes Iranian rice dishes with chopped



AP from Press Ass a

Coordinator of Soviet-American Affairs at Tabriz Is "Miss Julie"

Members of the interallied repair team at this final inspection station in Iran are firm friends. Not always having Julie Chembareva around, they have perfected a language of their own—half Russian, half English. Immune to masculine flattery, this Soviet interpreter insists on being treated like a man. Here the translates the master sergeant's report on the Dodge truck for a Soviet driver.

nuts or cherries, mutton broiled on a spit, Caspian caviar, trout from the mountains, crêpes Suzette, Persian melons and sherbets, local and excellent wines, and very high-priced European cocktails.

The hotel at Darband and the Firdausi in Tehran proper are gathering places for the growing number of foreigners this war has brought—soldiers, aviators, refugees, newpaper men, diplomats, and others. Many of them are connected in one way or another with Russian war activities. The embassies, too, are meeting places.

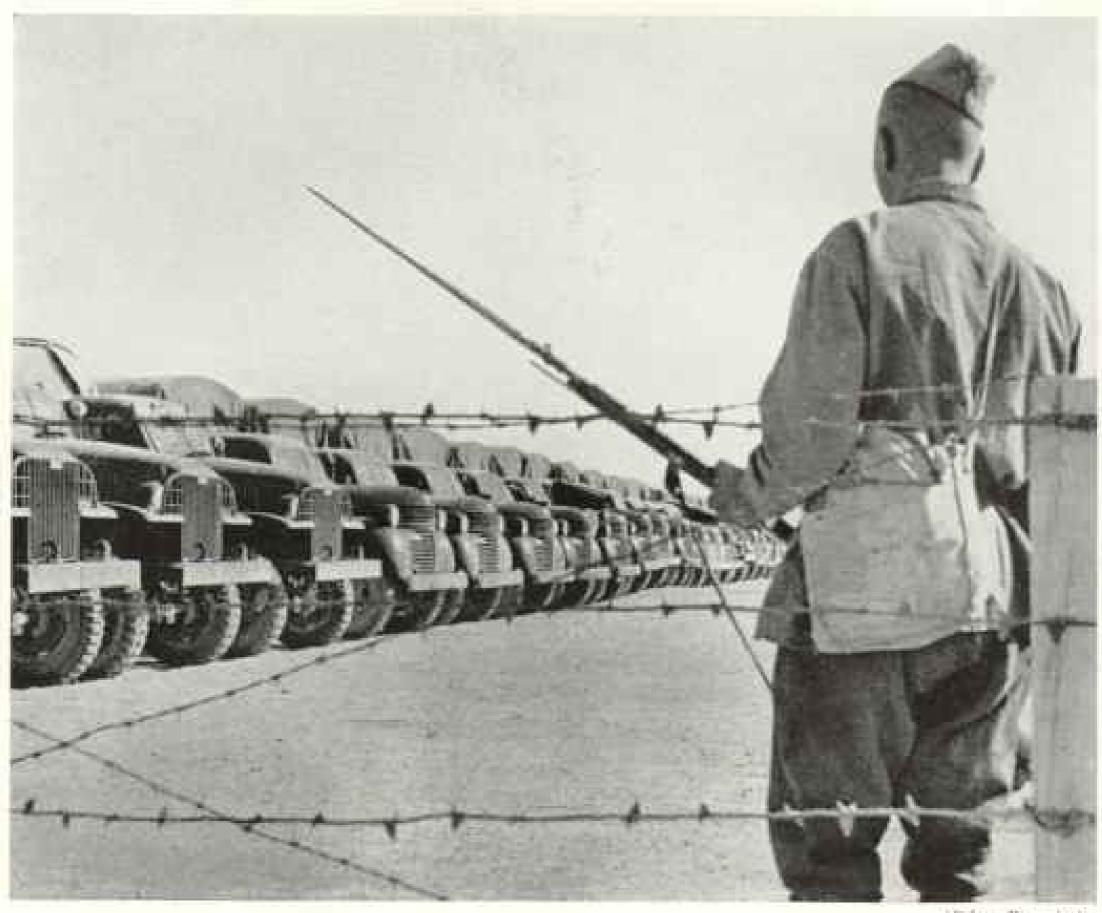
The Russians live much by themselves in their large garden, but give fine parties on the traditional holidays and keep a local theater full of Russian films, varied by troupes of Russian dancers brought down from the Army camps in the north to show at Tehran.

The British also are long and well established and dominate the Tehran Club. The former Shah prudently liked advisers and contractors from smaller countries, and the Danes, Swiss, Czechs, Belgians, Swedes, Dutch, Greeks, and Yugoslavs are much in evidence, to say nothing of the Polish invasion.

The American influence in Persia was traditionally represented by the Presbyterian missions, which did fine work in the north. Their hospitals helped thousands of all classes and their schools laid the groundwork for the present national educational system. Now the Iranian Government has purchased these schools and also has established the new Iranian University at Tehran, which offers courses in medicine, science, teachers' training, and other specialized fields.

American archeologists have also made a name in excavations at Persepolis,* Rhages,

* See "Exploring the Secrets of Persepolis," by Charles Breasted, NATIONAL GEOGRAPHIC MAGAZINE, October, 1933.



AP from Pinn Als's

Carrying Bayonet and Mask, a Russian Guards U. S.-made Trucks behind Barbed Wire Americans stationed near this lot in Tabriz admire the Russians' businesslike precautions. They let no general or minister, even Soviet, step through the wire without a pass. The sentry has orders to shoot.

Damghan, and Nishapur; and our financial advisers have honestly helped to make the country sound. This gives Americans a unique and unselfish position in Iran and makes easier the task of American soldiers working there.

Eight Languages at a Party

The representatives of neighboring countries, Afghanistan, Iraq, and Turkey, have always been important in Tehran, and the Chinese are bound by ancient as well as modern ties. At a party of fewer than thirty I heard eight languages—Persian, English, French, Russian, Polish, Turkish, Yiddish, and Serbian.

This melange is nothing new to Iran, which has been for centuries a mixture of Aryans, Mongols, Arabs, and more primitive tribes which still survive. It is responsible for the extraordinary number of dialects, and the survival of some independent government among mountain tribes such as the Kurds, Bakhtiari,

Kashgais, and Lurs. The former Shah made a great effort to break the power of the tribes and settle them as farmers. But many remain nomads, well armed now as a result of the war's disorder, and moving from winter pasturage up to the mountains in summer with all their flocks and typical black goathair tents.

The sheep and goats and camels can find food among the rocks of the desert where beef cattle or horses would starve. On the bare slopes of the lower hills they graze on the scrubbiest sort of plants. With the shepherds, jerkined old men or small boys in thick felt cloaks, and their dogs, they make a picture characteristic of Palestine of Biblical days.

Land of Mountain Glories

Its mountains are the glory of Iran. The peak of Demayend, 18,600 feet high and topped by eternal snow, occupies almost the same position in Iranian life and story as does Fujisan in Japan. It seems a perfect cone



Brettish Orbital

Ivan Guards a Crate of Spare Parts, More Precious Than Gold at the Battlefront

Awaiting shipment to Russia from a Caspian port, the crate holds sections of a Boston A-20, the American hedge-hopping attack bomber. In Britain, the Boston is used as a night fighter, called the Havoc. The marking (right) is evidence that the crate was shipped in a British vessel. This Boston was made by Boeing under license from Douglas, an example of wartime co-operation between industrial rivals.

from near Tehran, and changes from glistening white to glowing pink in the colorful desert sunsets.

The mountains determine in large part the life of Iran. To the north and around the Caspian Sea they break the clouds to bring rain, which makes that section as rich in grainfields as it is in fish. Within the mountains and their fringes live the tribes.

On the central plateau all life is dependent on irrigation, fed from the everlasting snow of the high hills. Even the forests here are artificially fed, and the light timber they provide is the only building material outside of the earth itself.

There is an interesting similarity to Iran, Spain, and Mexico. This must have made the Moslems who invaded Spain in the eighth century feel as much at home there as the 16th-century Spaniards felt in Mexico. Each country has almost tropical lowlands

bordering the sea, which rise to snow-capped mountains surrounding a bare central plateau. The tiles which you find in Mexico came straight from ancient Persia through Spain. The mosques of Iran are reproduced on even a grander scale in Spanish Cordova and Granada, and the gardens and waters from the hills make the deserts of all three countries bloom.

The pass leading up to Firuzkuh from the Caspian brings back the road from San Sebastián up to Madrid. The Chalus Road cut boldly through the Elburz range by the former Shah is even grander in its scenery than the road from Monterrey to Mexico City.

The color effects in desert, mountains, and sky are superb. In winter, upper classes of Tehran go skiing, and the tiny village boys join them on homemade skis of barrel staves. The lower hills are still the rich brown of the desert, the upper slopes are shining white,



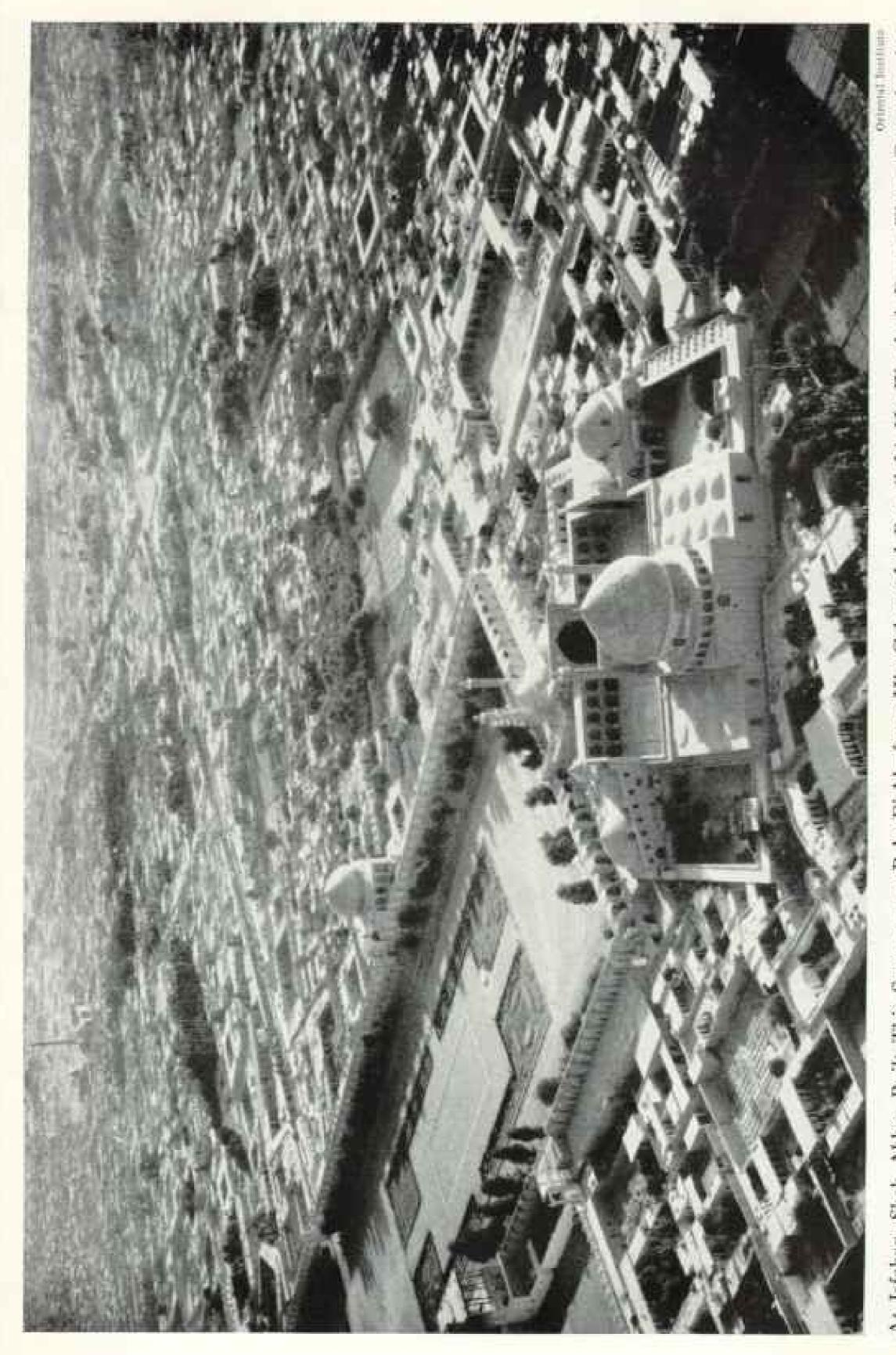
Happy Is the Red Army Driver at the Wheel of a Lend-Lease Studebaker in Iran American trucks like this went to the relief of Stalingrad. They have won the unstinted praise of the Soviet Purchasing Commission. Only trouble is a shortage of spare parts.



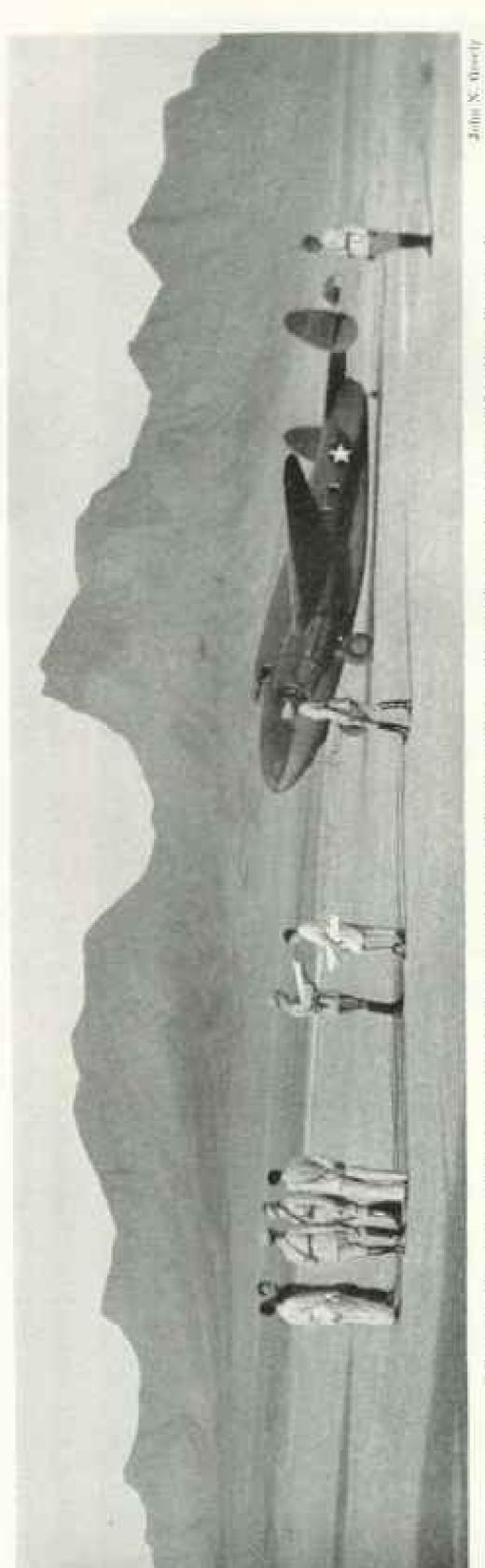
"Poland Is Not Lost While We Still Live"-First Line of Their National Anthem Using bricks for seats, these children at an Iranian transit camp study English under a Polish teacher. Some are orphans. All have come out of Russia. Many of them will go to east Africa (page 152).



Here Harun-al-Rushid was been. After 40 centuries of existence, the once-great city Subterranean canals from the Ethurz Mountains water the farms. Mount Demayend, Volcanie Giant, Sleeps Beneath a Blanket of Snow Near Ruined Rhages, Ancient Capital of the Medes To Rhuges, guided by 18,600-foot Demayend, came Alexander, pursuing Darkus III. is dust. The village perched on its tomb is Shah Abdul Azim.



Areaded shops line the walls. Ablas built his mosque Two new automobile highways intersect in the distance. -from His Colonnaded Box (left) He Watched Games Three Centuries in the Maidan-i-Shah, Sheikh Lutf Allah is on the far side. Stone goal posts remain, but a modern pool stands where men and facing Mecca, at an angle to the square, Blue-domed Mosque of At Isfahan, Shah Abbas Built This Square as a



Lands at Isfahan's Airport, and Uniformed Iranians Gather Around On an official relesion, General Growly flow here with the Minister of War. A sentry stands guard at right The Author's Lockheed Lodestar



A Russian acceptance depot is the goal, Led by a Jeep, an American Truck Convoy Pauses in the "Persian Corridor" as Drivers Stretch Gramped Legs Manned by M.P.'s, the jeep controls traffic. Usually it carries a red flag, sign it is the "leading element."



Here the muchines will receive a last thorough inspection from American Army mechanics before they are released to the Soviet Union, A military policeman—note the convey with his signal flags, Into Tabriz Rolls a Caravan from Michigan-Dodge Trucks, Laden with War Supplies, Cross a Medieval Bridge



Interestmat News

Where Tongues Speak Vainly, Flying Hands Speak Eloquently

Somewhere in Iran, Lt. William Stewart illustrates a maneuver to Soviet mechanics in dark working dress. Occasionally the girl interprets. Named for the air prophet, a Lend-Lease Mitchell two-motor bomber is about to exchange its American white star for the U.S.S.R. red star. One of its 50-caliber machine guns peeps from the top turret. Mitchells from the carrier Hernet bombed Tokyo.



British-Othelal

Grain for the Red Army Is Carried Aboard a Boxcar at Ahwaz

These sacks have made the long voyage to Iran by boat (page 135). Thick, triangular pads cushion the bags on the Iranian stevedores' shoulders. A British soldier directs the loading.

and the sky above of the purest blue that seems to mark the sky over high plateaus.

In spring the fruit blossoms replace the snow—apricot, almond, pistachio, and cherry. Out of the brown earth spring the water-fed orchards to make a lovely lace against the clear blue of the sky.

Even the earth itself presents a rainbow of colors. On flying over the mountains, between the black of volcanic rock and the brown of the lower hills you see every shade of blue, green, red, and orange in the upturned, twisted strata that go to make up the mountain chain,

Along the Chalus Road

This is even more marked along the roads through the passes. That unique and tremendous work, the Trans-Iranian Railway, zigzags up a ridge and dives into long tunnels when there is no other way. It sometimes shows from the road at three successive levels, one above the other. Both road and railroad

pass through the narrowest gorges, filled with the foam of mountain torrents where the right of way had to be blasted out of solid and overhanging rock.

The Chalus Road was another achievement of the former Shah. It starts from the plateau just west of Tehran and climbs along a snowfed river through flowering orchards and green fields, past mines and mountain villages, and through the country of hill people, who are more gaily dressed and sturdier than the people of the plain.

It passes elaborate wayside hotels—the old Shah's work again—through snowsheds and solid tunnels cut in the ice of snow slides. At the crest it goes through a long, dark tunnel, usually filled with caravans of donkeys or mules weighed down with coal or wood or grain in saddlebags of native Persian carpet.

It starts down among greener hills on the north side of the Elburz range, zigzags down high hills above the clouds, through overhang-



15,000 Miles from Detroit, the Assembly Line Goes to Work at Andimiskh

Two decades ago, these Iranians would have worn flowing robes and driven camels. Now, in mechanics' garb, they put a truck together in three hours. Others have been trained as drivers. Thousands are in American employ. Besides wages, they draw a food allowance.

ing rock, and through the clouds to reach at last the green shores of the Caspian and another comfortable hotel (page 155).

Throughout its length, however, it is the color of the rocks which makes it loveliest.

The rock layers are bare where the streams have cut their way through. They lie in graceful curving masses shaded in beige and blue, in light and darker greens, in orange and redbrown. They are as varied if not as ethereal as a Hawaiian rainbow.

On the northern, steeper side the stream is more precipitous, often foaming white through black, narrow gorges until the lower slopes with the comforting green of real rain-fed forests is reached. Here the hills drop sharply to the vast Caspian, which reaches up to the Volga and the heart of Russia. And here are thriving towns of the richest part of Iran,

The war, of course, has made many changes. The German attack on Russia, together with Nazi infiltration into Iran, led to joint occupation of the country, with its vital oil resources, by Russia and Britain, August and September, 1941. The former Shah resisted only briefly, abdicated, and was succeeded by his 21-year-old son, Mohammed Reza Pahlevi, the present ruler. In a treaty signed on January 29, 1942, Britain and Russia undertook to respect the territorial integrity and political independence of Iran. On April 14, 1942, Iran broke off relations with Japan.

The Shah is a constitutional ruler and appoints his own Prime Minister, who must be acceptable to the Majlis, or Congress. The Prime Minister chooses a Cabinet which must be agreeable to the Majlis.

The members of the Congress remain those originally appointed by the old dictator, but may be said to represent in a fair degree the governing classes, the old nobility, the Moslem clergy, and the landowners generally, These in turn must in their own interests protect the peasants.



Exile's Children Greet the American Red Cross at a Polish Tent Colony in Iran

Byron D. McDonald, special relief representative, is the visitor. The Red Cross has contributed food, clothing, and medicine to the refugees. The British provide transportation to permanent camps. Polish-Americans have contributed generously. Polish Government officials administer funds (page 152).

The Army, which was the former Shah's weapon as a dictator, retains the difficult job of maintaining internal order. Cabinets fall, of course, because of the difficulty of pleasing everyone under war conditions. But so far, life goes on much as usual, marked only by scarcity and rising prices due to transportation difficulties, as all over the world. Camels used to be the main means of transport for long distances over the plateau, and caravansaries, for their stopping places, marked every village. They died out to a considerable extent when replaced by trucks along better roads. Now with the tire shortage they are badly missed,

Chests of Unused Pearls

The present Shah is a fine-looking young man, generally in uniform, a good soldier, a horseman and hunter, and a patriotic liberal who fills a difficult position admirably. He received part of his education in Switzerland.

His Queen, sister of the King of Egypt, is a beauty, and, with the great Crown pearls of Persia twined in her dark hair, a picture to be remembered. Many of the upper classes are fine-looking men and women, with modern education and dress. The Army officers are exceptionally well dressed, in contrast to the soldiers, who are not. Iranians generally are sturdy mountain people who show clearly the Arvan stock.

The Queen's pearls are the cream of the ancient Crown jewels, many of which were pearls from the Bahrein Islands in the Persian Gulf. Chests of them lie unused, as modern days call for less display. American oil interests now have extensive holdings in the Bahrein Islands, center of the pearl-fishing industry of the Persian Gulf.

Nadir Shah, two centuries ago, invaded India, and the ransom he brought back from Delhi, including the Peacock Throne, was largely diamonds and emeralds. Of these the Koh-i-noor passed after many adventures into the jewels of the British Crown. But the family jewels of the Shah and the lesser Iranian nobility are still magnificent bits of the loot of India. Turquoise of eastern Iran is the only native gem except the great pearls.

The war is still bound to make increasing changes in Iran's life as its demands become more imperative. One of the most interesting incidents has been the invasion of the

Poles:

Polish Prisoner Given Army Command

The German attack on Russia made the Polish captives overnight into allies of the Russians. A Polish general who had lain two years nursing his wounds in prison in Moscow and in utter ignorance of the world without, had an unexpected visitor, a barber who shaved him and cut his hair. This meant his execution, he supposed. But his next visitor was a commissar who warmly shook both hands and congratulated him on being in command of the Polish armies in Russia.

Out of the prisons and the work camps came the Polish soldiers. Many had died, but the Russians clothed those who were left, fed them the Army ration, and organized them under their own officers. Then they were concentrated in Turkistan, northeast of Iran, and when the British called for them to reinforce their manpower in the Middle East, the Russians moved them out. In a hectic week some 40,000 were moved close to the Caspian, ferried across, and turned over to the British on Iranian soil.

These men were fine soldiers from a vanquished country, with no hope in life except in victory. Those that passed through Tehran made an excellent impression in their newly issued British battle dress.

Iran Takes in the Refugees

The women, children, and old men who accompanied them were in worse shape. Some of the women, nobles and peasants alike, had been fed according to their heavy work in labor camps. But Russia has little food for useless mouths. Many of these refugees had barely lived through on food shared by soldiers. Iran took them in. Government trucks met the refugees at the border and distributed them throughout the country at designated points.

There were typhus, slow starvation and all the ills it brings, but the hospitable Iranians, with the British, American Red Cross, and U. S. Army doctors helping, took care of them,

Camps were set up on the desert west of Tehran, and the civilian Poles began to work themselves into the life of their new country. The first thing they did on landing in Iran was to kneel down and kiss the soil of a country in which at last they were free. The next was a great ceremonial mass.

Once established, they showed great resource. The hotels blossomed out with fine Polish orchestras. The dancers, singers, and actors put on a vaudeville in French which was most artistic from a European viewpoint. Polish women became waitresses, barmaids, seamstresses. Three Polish girls in a beauty shop clubbed together and married themselves an Iranian—legal under Moslem law—to establish their right in Iran as citizens.

The children, too, did amazingly well. For occasional holidays trucks took them up to the mountains or into lovely Persian gardens made available to them. Orphans were cared for. Some went to India, many to east Africa, and others to Roman Catholic institutions in Isfahan and other Iranian cities (pages 143 and 151).

People of "Bounce" and Gaiety

A people with "bounce," the Poles always seemed gay, and in the hotels those who had money danced until dawn. It was a welcome change from gutting fish or chopping down trees in Siberia. They will leave their mark on Iran, as many a less peaceful invasion has down through the centuries.

Tehran in wartime tends to be as cosmopolitan as Honolulu or Lisbon, although of course the life of the city is basically Iranian. You see the Iranian more clearly a little

farther away.

Leaving the city on the Meshed road, you pass continually peasants with pack trains of camels or donkeys bringing produce to town. Along the highways road gangs work—whole families, including young boys.

The women are less in evidence. They wear a sort of loose robe with a hood which they pull over their faces when foreigners appear. Below they wear a bodice and black Persian trousers almost like our women's wartime slacks. The men wear almost anything, particularly sheepskin jerkins in cold weather and round felt skullcaps. They are erect as becomes free men, and would be a powerful people on a better diet than the usual sweet tea and heavy bread.

Villages are all along the fringe of the mountains, where irrigation makes agriculture possible. Around the villages on the almost barren slopes, large flocks of sheep and goats miraculously thrive. In the remoter hills are many gazelles, jackals, and sometimes larger beasts. The Mazandaran tigers can be magnificent. Bird life is fairly plentiful, and there are always the raucous black and white carrion crows of the East.

You turn off the main read into one of these villages, walled for the most part with houses built of light timber and clay, whitewashed or sometimes stuccoed. This village, as it happens, is the property of one of the old Iranian families. The little valley was given to it by a Shah centuries ago.

The residence, over a hundred years old, is purely Persian, cool and open for summer occupancy, something on the order of a Virginia colonial house with central ball and wide veranda. Inside is comfort, a mixture of the East and West. The food again is purely Iranian, fried grits or a close equivalent, rice pilaw, broiled mutton, sweets, and truit.

This master's house has its typical Persian garden in front, running streams and pools, a rose bower where the nightingales come in spring, and a private

Persian steam bath dug down to tap a running stream.

The estate runs down to a large river, with irrigated timberland and fertile fields, each assigned to a family which farms it on shares. The peasants' village includes a simple open mosque, a beadman's house, a tiny central square with a community steam bath. This is built of clay, and the dome lets a dim light in through small round windows suspiciously like the bottoms of beer bottles.

The progressive owner has established a school for children, where the younger men are also required to go at night. This is rare. The peasant children are generally brought up only on the Koran and work.



"Like to Try a Jump?"

Armi

Jesse Blevans, Pan American Airways co-pilot, who has just ferried a Lend-Lease plane to Iran, shows his parachute to a Red Air Force first lieutenant and co-pilot. The plane has seen North America, South America, Africa, and Asia. Now it is going to Europe.

> Even the humblest houses are clean inside and cheerful. Each has a Persian stove in the center of the room, a sort of big brazier covered with a carpet, under the edges of which the family finds warmth and sleep.

Isfahan Least Touched by War

Of the big cities, the least touched by war is Isfahan. On a visit there we flew in very high to clear the gaunt mountains on the direct route from Tehran. It is a city of walled gardens, each one with its central pool, and from a great height they looked like tiny mirrors set in solid green.

Isfahan was great when Tehran was still desert. Now it shows little of foreign influ-



Person trum: Black Star

"Are We Modern!" Asks Young Tehran, Batting a Soccer Ball with Head and Knees

Popularized by American teachers, soccer caught on where baseball failed. Iranians play a strenuous game. Recently they defeated a crack British army team. Effurz snows look down on the new stadium (altitude 3,750 feet). The young Shah sometimes watches sports spectacles here.

ence, outside of some Polish orphans and British officials,

The center of the city is the Maidan-i-Shah, or Royal Square, with Shah Abbas's palace on one side. From its balcony the Shah watched polo played in the court below. It is much longer than the modern polo field and the two goal posts at each end are wider apart. They are stone pillars, still standing after more than 300 years (page 145).

Around the court are the quarters once occupied by the Shah's garrison, with shops open now beneath. The principal ornaments are two great mosques, with graceful minarets. They were restored by the former Shah and are open to foreigners.

The great dome of the larger was under repair, an elaborate undertaking in which the glazed blue, green, and yellow tiles are assembled in segments on curved workbenches before being carried up and placed upon the dome. Within the central court of the mosque the stone latticework, the pools and flowers, take the traveler back again to the Albambra of Granada.

Polo is played no more in the great court Shah Abbas built, and there is a long pool in its center. In the days of its greatness, local authorities told me, Isfahan was the model for much of the magnificence erected by Louis XIV of France. One of its great shaded avenues today is very nearly reproduced in Tours.

Another feature is the Armenian Christian church built by the artisans Shah Abbas brought from the north to help build his cap-



Artiur Uphan Pro-

High in the Elburz Mountains, an American Car Climbs the Tehran-Caspian Short Cut
Built by the deposed Shah, the Chalus Road leads to a port below sea level. Patches of snow are
visible on the precipice. A mountain stream races beside the guard. This range divides the ligh, semitropic north from the arid, temperate south (page 149).

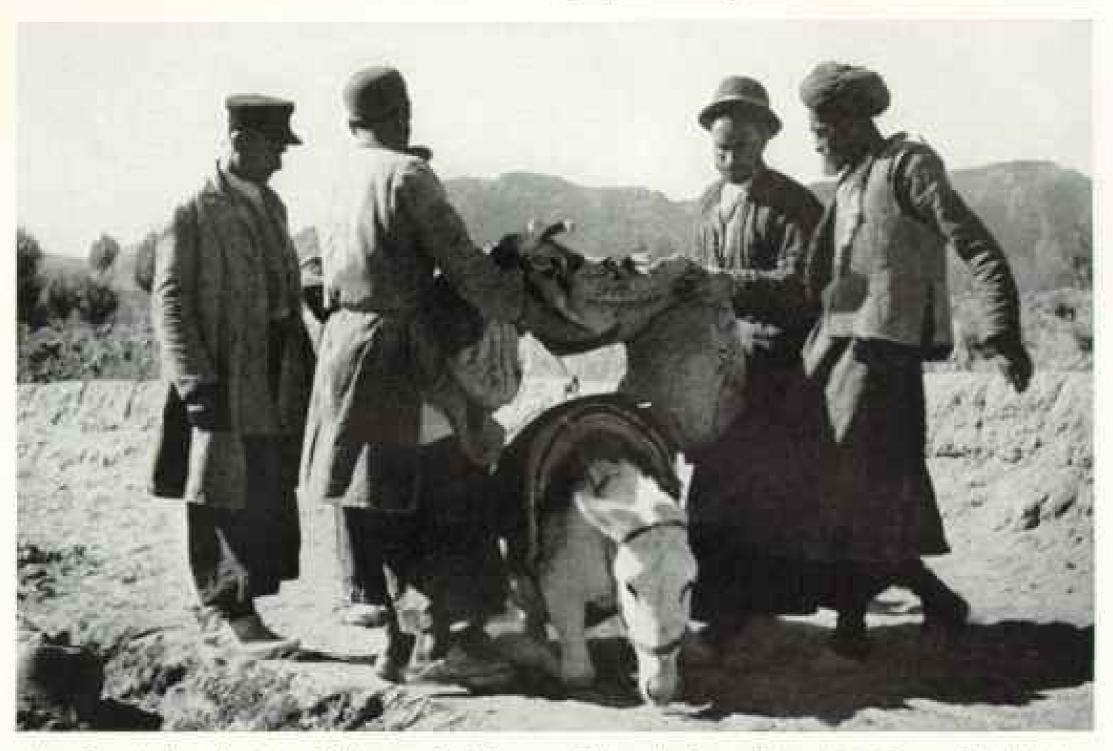
ital. It includes work in the Armenian, Iranian, and even Italian styles.

More characteristically Persian is the Bridge of Rukn ed-Din, built at three levels to take horse and foot traffic. It also has cool stone resting benches in the lower tier. Here gather hundreds of all classes to spend their leisure. They drink ten, eat fruit, smoke, gossip, and nap, as generations have done before them.

A more modern touch is an equestrian statue of Reza Shah Pahlevi, so recently abdicated (page 150). This, like others in Tehran, is a defiance of the strict Moslem tenet which forbade on Old Testament lines any "graven images." It was a part of his campaign to free his country from the fetters of outworn tradition.

Outside of town, where the mountains begin, the oldest monument is a ruin which, according to tradition, housed a temple of the Zoroastrians, the so-called fire worshipers. Zoroastrianism was the religion of Persia before the Arab invasion of the seventh century A. D. It blends into the bare hills where the Bakhtiari tribe still has its summer pastures.

This is a most important tribe, which even early in this century exercised control from Tehran of the whole of Iran and in whose lower lands lie the oil fields which have made rich the Anglo-Iranian Oil Company, the Iranian Government, and the Bakhtiari in other days. In common with the other mountain tribes, the Bakhtiari are equipped with the rifles of soldiers who deserted at the time of the 1941 occupation, and their traditional



An Overladen Donkey Sinks to Its Knees—Help Arrives, Revealing Four Hat Styles
On a road near Isfahan, a mullab is identified by his turban. Next to him, a farmer wears a European
fedora. A third has the ancient Persian skullcap. No. 4 sports a Russian-style chauffeur's cap.

habits of war and plunder make them hard to control.

The Iranian Army, therefore, keeps many scattered garrisons far up in the hill towns. Their white army tents are now seen in many mountain villages, which can be reached only by plane or by days and weeks of travel on the ground. All through the neighboring hills are seen the herds and black tents of the Bakhtiari. Scattered in small groups to take advantage of pasturage along the streams, they are still an economic and political entity which is in complete control of the remoter mountains and not above taking a shot at a too inquisitive plane.

Teas Last 3 Hours in Isfaban

Isfahan is noted for its hospitality. As the trip was made with high Iranian officials, the entertaining was lavish. Luncheons started near noon and lasted till three. Tea followed at four and ran on to seven. And then came dinner at eight. The last course was always fruit.

These parties were pleasant in the gardens of Isfahan or in the cool rooms through which passed running streams. But the Occidental stomach has its limitations. I was full up to the neck when passed a bowl of luscious Iranian fruit, so I commented on it in place of sampling it. I said it was strange to me to see cucumbers classed and passed as a fruit.

My host misunderstood. He promptly peeled a huge one with a knife, the petals of skin falling down like a banana skin, and presented it to me amid applause. This is the ultimate in Iranian hospitality—for a host to prepare and offer food with his own hands.

Hospitality Eases Traveler's Way

I had a prejudice against cucumbers so violent that I had spent large parts of fifty years in picking them out of mixed salads. But I took that cucumber and ate it all, and found it, like so many things in Iran, fresh, cool, and pleasant.

The hospitality found in Iran is a virtue which in the Moslem world replaces in a way the kindliness of the Christian religion. It makes the way of the traveler easy and pleasant.

Iran is a fine country with a fine people, and Americans should know it better.

As the young Shah said to me on my departure: "The airplane has made the world smaller. The United States should be closer to Iran. We will welcome you back as one of us."

A Navy Artist Paints the Aleutians

BY MASON SUTHERLAND

A SAFE, soft berth that must be," you say on learning the Navy has commissioned five officer-artists to paint the historic record of war.

So! Have you ever painted the Aleutians? Have you done stop-and-go sketching with fog or rain shifting scenes? Has the williwaw, that fiendish, unpredictable wind, seized your canvas like a kite, dashed it into mud? With numbed hands, have you fumbled with paints to portray the Arctic blizzard? Did your pigments solidify in their tubes? Have you sketched as Japanese bombs and bullets whistled around you?

To these questions Lt. William F. Draper, U.S.N.R., can truly answer "Yes,"

Neither Fog Nor Dark Can Stay Navy Artists

Four months last fall and winter he spent painting 42 canvases in the Aleutians and at Kodiak Island. In January this year he accompanied the landing on Amchitka Island. There the artist, standing behind an antiaircraft emplacement, got a gunner's-eye view of the winged enemy.

They serve a definite purpose, these five Navy combat artists. Their canvases can omit confidential equipment that cameras might reveal. Their vivid colors defy the foulest weather. Night actions, registering on their memories, are transferred to oils by day. Their battle scenes telescope details it would take a newsreel to show.

They must be fighters, too, when necessary. On shipboard they have definite duties. Lieutenant Draper discovered that fact on his way north from Seattle. He took the 10-to-midnight watch.

The artist found Army and Navy cheerfully enduring every incredible hardship except one. With a single voice they cursed the Aleutian climate as unfit for even the enemy. They intoned a prayer to sizzle in Guadalcanal. If a storm did not blow at 100 miles an hour, then skulking fog hid the treacherous passages between islands. If the ground was not muddy, then it was frozen into ruts.

To cope with such weather, Army and Navy became uniformed twins. Bundled in Army winter togs, sailors dressed like soldiers (Plate I). Officers and enlisted men, their insignia hidden, could scarcely be told apart.

At Kodiak,* his first stopping point, Draper moved into B.O.Q. (bachelor officers' quarters). There he found such luxuries as radiophonograph and artificial flowers on dinner tables. Enlisted men had recreation room and gymnasium. Some preferred to play touch football in the rain (Plate II).

Impatient to get to work, the artist started painting Kodiak's control tower. A Navy officer, ignoring Draper's uniform, pounced upon him.

"He demanded to know what I was doing," relates the artist, "He looked at me as if I were a spy."

Papers were shown. Telephones rang.
Painting resumed, but in "confidential status."
On visits to other bases, Draper gave more
time to preliminary explanations.

His next Kodiak subject was a cruiser and a freighter at dock. He had no more than dabbed his easel when rain fell in torrents. He ran for cover. Fifteen minutes later the sky was clear and he was back. The clouds burst again. All afternoon that went on. At dusk his sketch was half finished.

Next morning was glorious, but that didn't help Draper. In the night both ships had slipped away, and he had to complete their outlines from memory.

Having made eight paintings, the artist stowed suitcase, duffel bag, and paint box in a Navy patrol bomber bound for Dutch Harbor. Fog and motor trouble thrice turned back the plane; the 615-mile trip took three days. Draper obtained comfortable Navy quarters shared with Army P-40 pilots.

Winter howled in from Siberia. A threeday blizzard wrecked planes, tossed stacked lumber, and harried shipping. In his Army cold-weather gear, the lieutenant painted the storm (Plate VI).

Storm Tosses His Subchaser

Tempest at sea beset Draper's trip to Umnak. Says he: "Our small PC rolled 55 degrees. Destroyer men told me it was nothing; they had shipped spray down their stacks."

Umnak's landscape he found "unbelievably majestic. Mount Tulik and weird Ship Rock rose near Navy Town" (Plates VII and XII).

"This snow-clad island lived up to my idea of the northern wilderness. The only dark note was the volcanic sand on the beaches" (Plate IX).

*For an account of Kodiak's burial, in 1912, by volcanic ash from Mount Katmai, read The Valley of Ten Thousand Smokes, by Robert F. Griggs, published by the National Geographic Society. Also see The Geographic for January, 1917; February, 1918; April, 1919; and September, 1931. Kodiak Island was headquarters for The Society's expedition that discovered the valley.



II. S. Nory, official

Two Enemies Has This Navy Airman: the Japanese and the Elements

Ice, snow, rain, or fog-he rarely sees a clear day on Amchitka. Back from patrol, he plods to his cheerless
tent. Like grain bowing before the storm, military bearing yields to Arctic blast.



Game Postponed: Wet Grounds

E. E. Navy, Official

Baseball follows the fleet. But the only dry spot on Amchitka was the landing strip, and flyers got there first. These men were amused by what their first cargo of freight brought.



AP from Press Andle

Amehitka's First Washing Machine-and They Can't Believe It!

In this Alcutian morass, where every man does his own brundry, the shiny new import is welcome indeed.

The five inspectors may be sailors or soldiers; their fatigue uniforms give no cine.



D. S. Nery, Official

"Welcome, Tojo, to the Aleutians!" Says the Navy's Receiving Line

Greeting cards are issued from the 20-mm, gun. It is poked at the brow of a hill over which this Amchitka crew expects enemy flyers to attack working ships in the cove. Note the all-purpose knives,

So much snow covered the landscape that the artist's last tube of white was squeezed dry. Common house paint made an effective substitute. When diligent work exhausted the last canvas, board served in its stead.

"In a Yakutat hut, the Army and Navy's prefabricated wooden shack," says Draper, "I lived with PBY pilots. On a day when fog grounded us all, I painted my roommates

in our quarters" (Plate I).

His "Hobby" Delights Kibitzers

No matter where he worked, the artist had a gallery of admirers. Enlisted men asked respectfully, "Is it a hobby of yours, sir?"

"Yes and no," Draper would reply. "I love to do it, but it's for the record. Navy wants to show the people back home how you live."

The men yearned for amusement. Occasionally an Army band screnaded the Navy. Draper played a battered piano on a makeshift stage of tables and gave a demonstration of portrait painting.

December 25 found Christmas trees imported to treeless Umnak. A turkey dinner

was another taste of home.

To Adak Island, in the Andreanof group, 440 miles west of Dutch Harbor, went the artist. He found its beautiful harbor and rugged mountains breath-taking (Plates XIII and XIV).

A jeep was a joy to get around in.

On Adak he lived in a Quonset hut, built of corrugated iron and lined with pressed fiber—same board as his substitute canvas. In fiercest storm this hut was warm. Two transoms ventilated it (Plate VII).

Laundry was a problem. Every man did his own in a stove-heated bucket. Long underwear was a comfort, but it took so long to dry! Shirts, happily, did not have to be

pressed.

Art Wins a Passage to Amehitka

Aware of the forthcoming Army and Navy expeditionary force to Amchitka, Draper asked a senior officer how he might be included.

"Paint a picture of the transport," said the officer, "and show it to the captain. That

ought to get you a passage."

Draper did so. Thus, following hundreds of soldiers, he landed on Amchitka, up to his waist in icy water, from his landing boat.

The only resistance was the terrific, boatwrecking surf. Amchitka was deserted. But 60 miles away were the Japanese on Kiska.

The Navy's shore party of ten men slept on the frozen ground in two tents. Sleeping bags kept out the bitter cold. Frostbite, a constant menace, caused a few casualties. Chlorine, used for purifying drinking water, gagged everyone. Food was a recompense. Boxes of turkeys, chickens, steaks, and pork were jumbled on shore. All the men had to

do was to help themselves.

"After 12 days two Zero float planes found us," Draper relates, "but the Japs' bombs went wide. Ashore and on ship, we fired everything we had, down to tommy guns and pistols. Our aim was just as bad as the Japs'. Score: 0 to 0. Nobody hurt. Everybody had a grand time.

"Next day I started digging a foxhole. Two privates watched me a while and then one said, 'Sir, the Navy is O. K. at sea, but the Army is tops on land. That's no way to dig!' They took over, and soon the hole was three feet deep. I felt like Tom Sawyer gloating

over the whitewashed fence,

Draper's Companions: Tracer Bullets

"From our foxholes we rubbernecked at the Japs when they again tried to bomb our ships. Sight-seeing stopped when they strafed us with machine guns. Diving into my foxhole, I thought I heard someone jump in behind me. Turning, I found no one. Tracer bullets were screaming through the grass.

"I thereupon resolved to have the best foxhole in Amchitka. I made mine a foot deeper and camouflaged it with grass. A medical officer outdid me—be dug a seat in his!"

The enemy, having the advantage of "oneway weather" moving west to east, flew over when fog still glued our fighters to their base at Adak, 160 miles to the east.

"Pontoon Joe," as the Americans called the Japanese, came over sometimes with ten float

planes.

One day, having just received a visit from five Zeros, the Americans sighted a V of 30 flyers from the direction of Kiska. "Here they come back with reinforcements!" someone yelled. Up went the raid signal. An enlisted man laughed, "They may be Japs, but I've never seen planes flapping their wings!" Geese they were.

His Camera Does a Job for the Navy

As fast as he finished a canvas, Draper stored it in a Navy tent. The oils, refusing to dry in the clammy weather, smeared the interior. They collected dirt and sand. The artist had to retouch them on returning home.

Draper made photographs of the Amchitka landings with a low-priced camera. So well did they turn out that the Navy released them as its official pictures.

Sixteen of his remarkable paintings are reproduced on succeeding pages.

A Navy Artist Paints the Alcutians



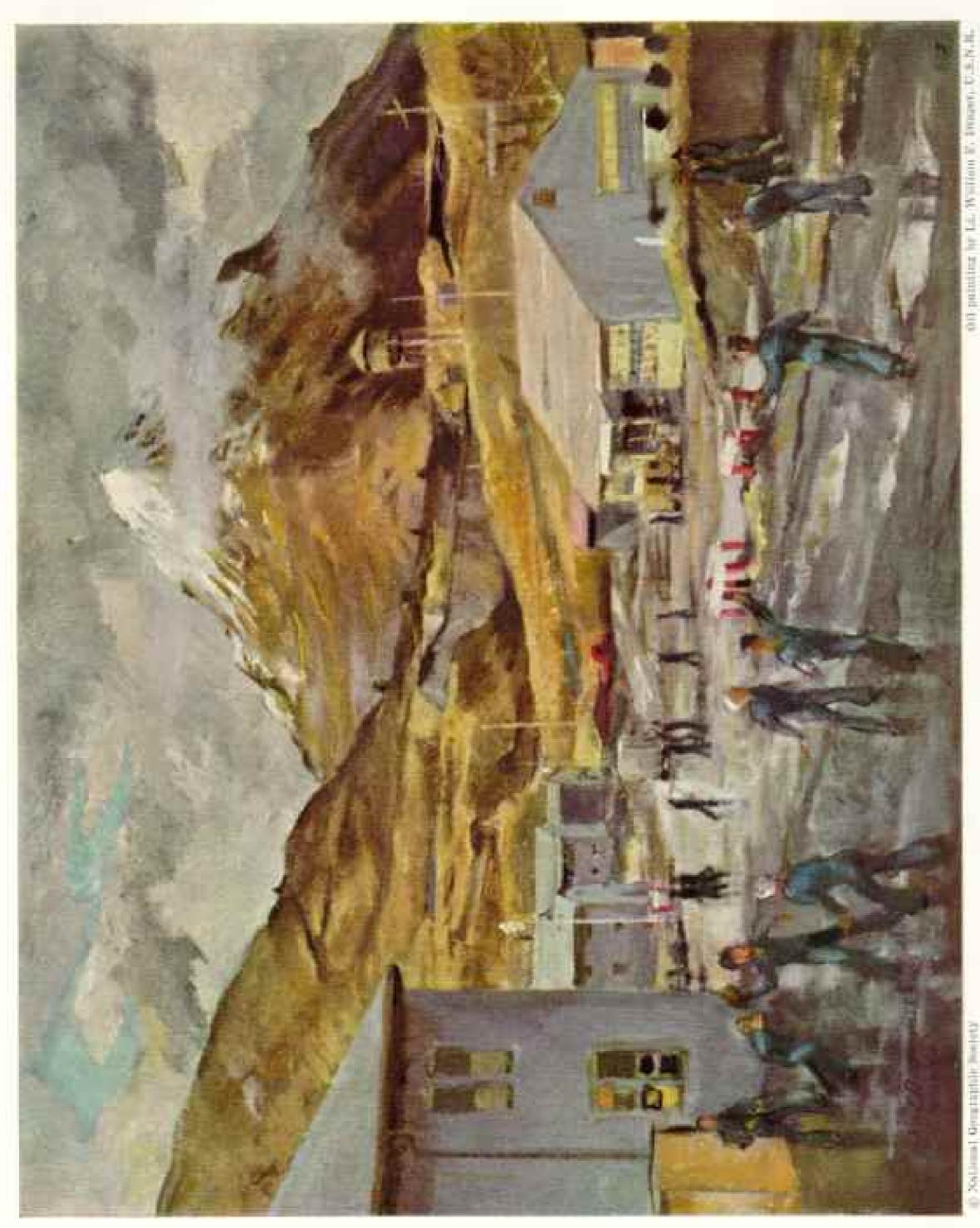
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OH painting by Lt. William F. Driper, C.B.N.R.

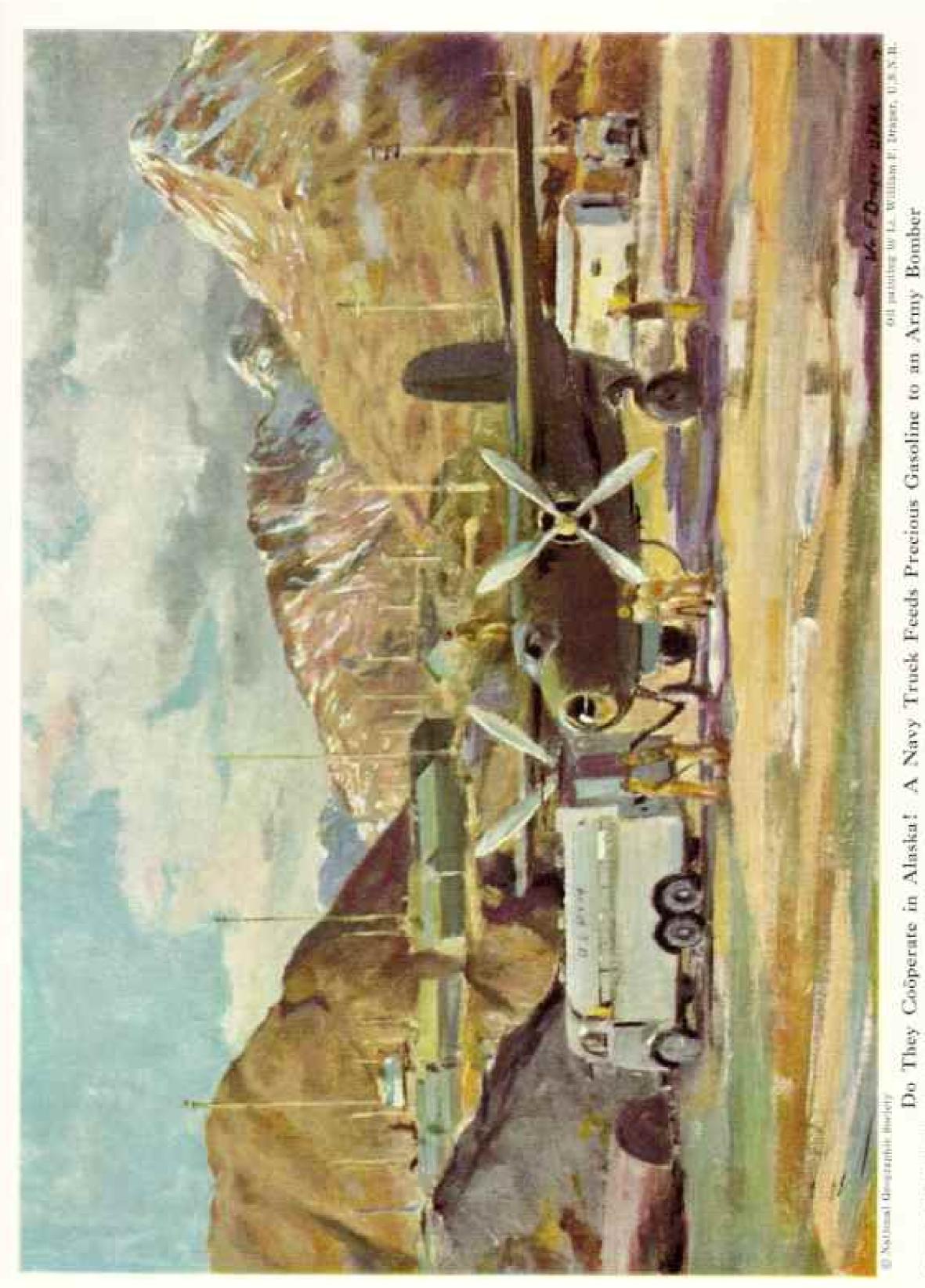
Naval Airmen's Army Clothes Symbolize the Welding of the Armed Forces

Blues and pilots' greens, hanging on the wall, are too dress-up for a muddy Alcutian base. So it's Army shirts, Army sweater, and Army helmet. Caps and towel are U.S.N. Relaxing after a day's hard flying, Lt. (j.g.) Carl Dillon fashions a model plane. Lt. Bradford M. Brooks looks down from double-deck bunk, and Lt. (j.g.) Thomas P. Sullivan reads. Sullivan was abourd the first PBY to spot the Japanese aircraft carriers raiding Dutch Harbor.

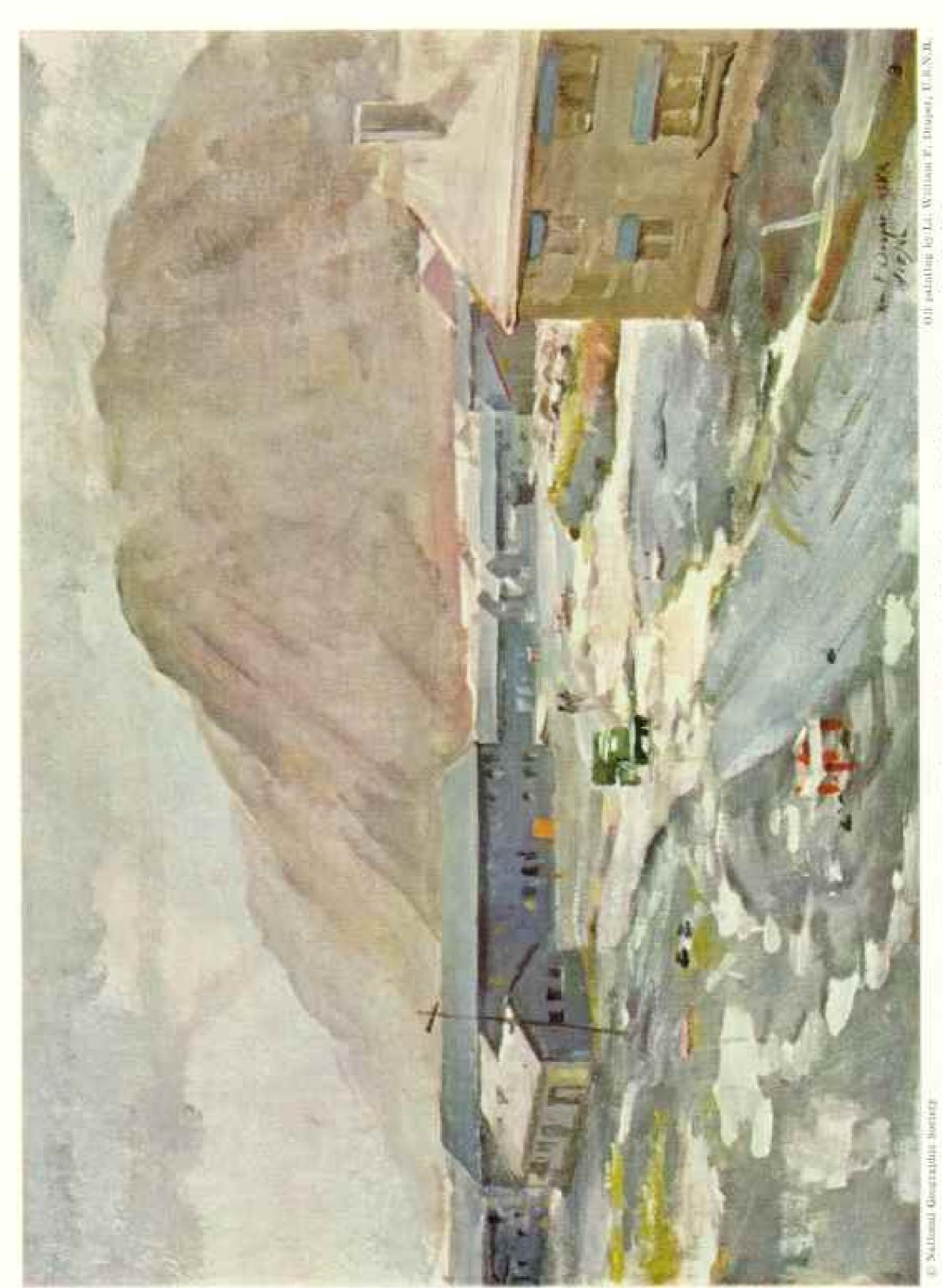
On the table are belinet, gas mask, 37-mm, shell, pliers, canteen, magazines, paper patterns for the plane, and two statuettes. The figurine was carved by an efficer; an Eskimo did the balancing seal. Dear to the artist is this scene; the flyers were his genial hosts for a month.



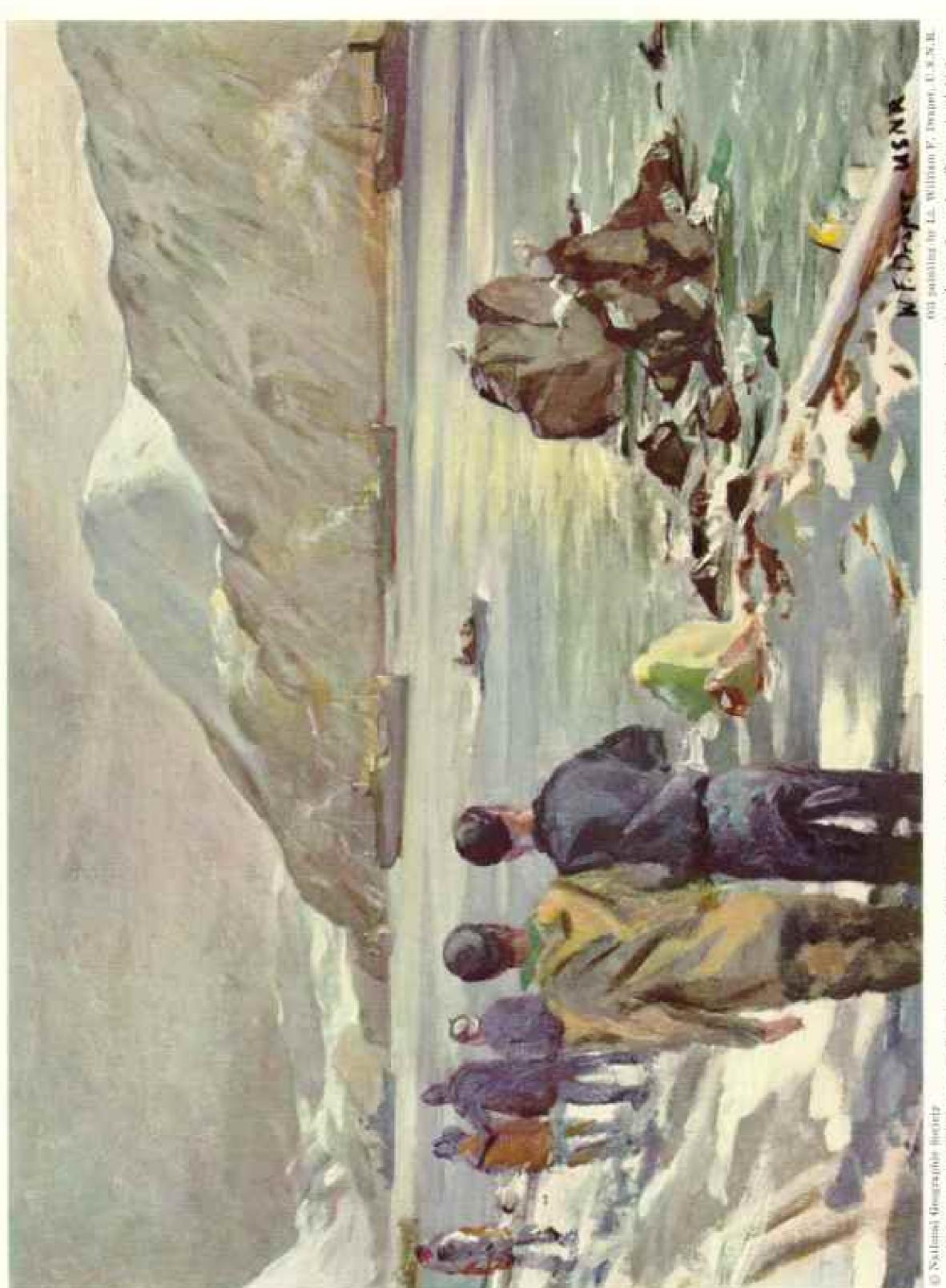
Spot of Land, Even in Muddy Kodiak, There's a Ball Game! Wherever the Navy Finds a



Here in Kedink the deadly Marauder (B-26) is on its way to bomb the Japanese in Kiska. A glauce at the depth of cloud usually hovering around Barometer Mountain (2,458 feet) to the right tells airmen the ceiling. This is one of those rare intervals when fog has litted.



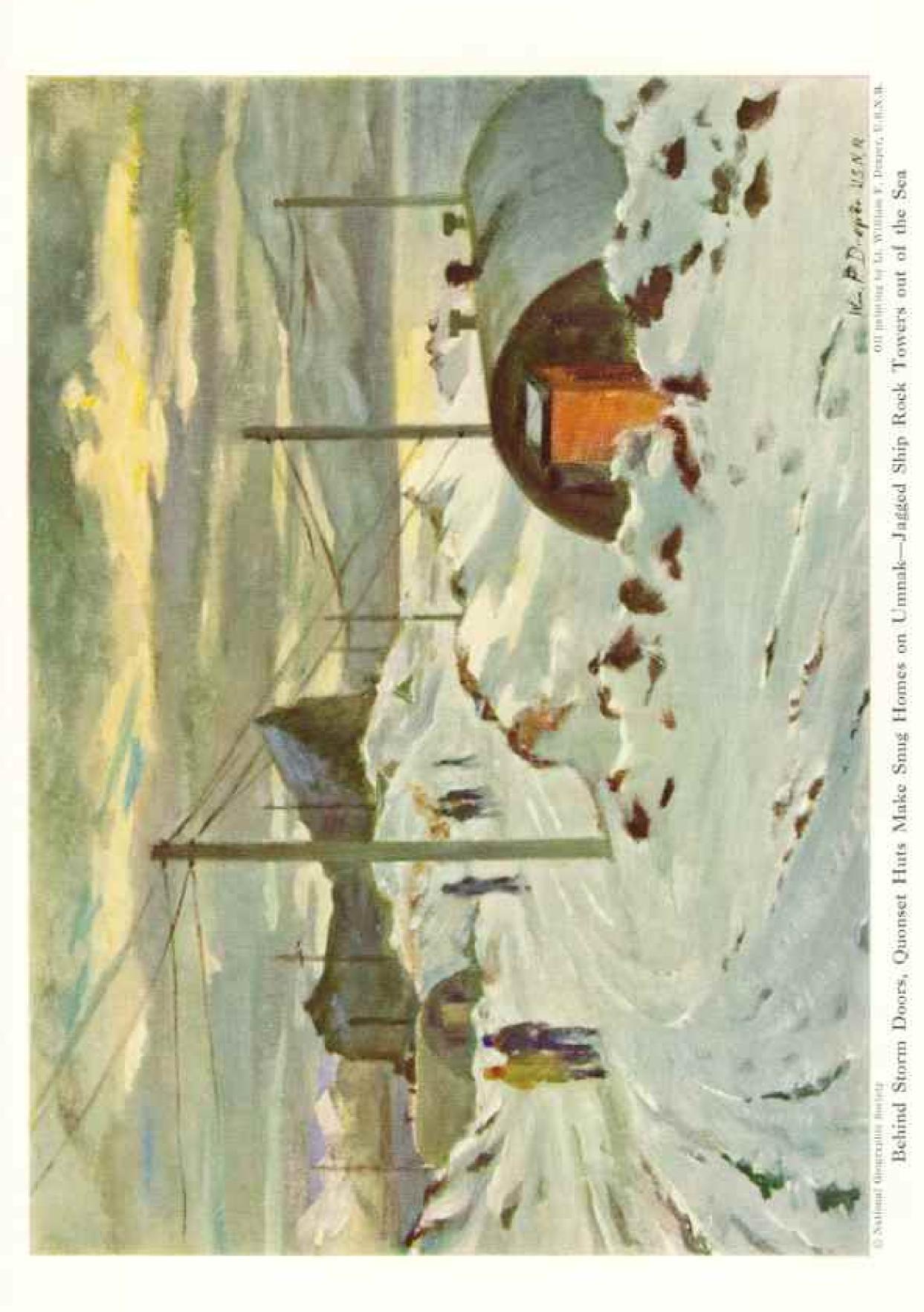
Trucks and Sailors Slosh through Mire at the Navy's Rain-drenched Living Quarters in Kodink



Smoking Convoy Awaits Destroyer Escorts, and a Cruiser Stands Guard (left Sailors Walk Dutch Harbor's Icy Shore, a



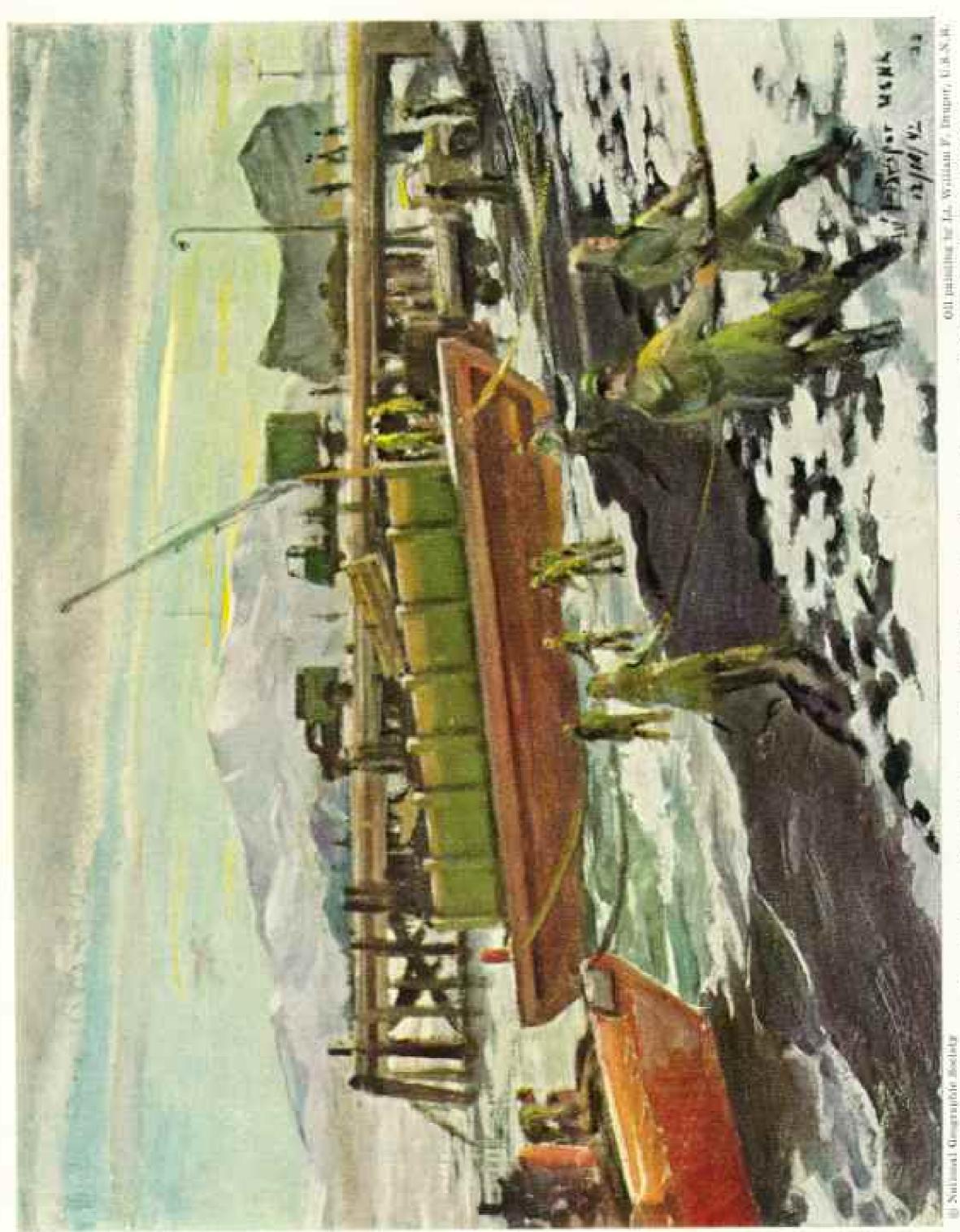
Pitiless as Bombs, a Blizzard Lashes Dutch Harbor-Soon the Stacked Lumber Will Fly Like Shavings



VII



VIII



Army Barges, Beached on Black Volcanic Sand, Deliver Supplies to Army and Navy on Lonely Umnak



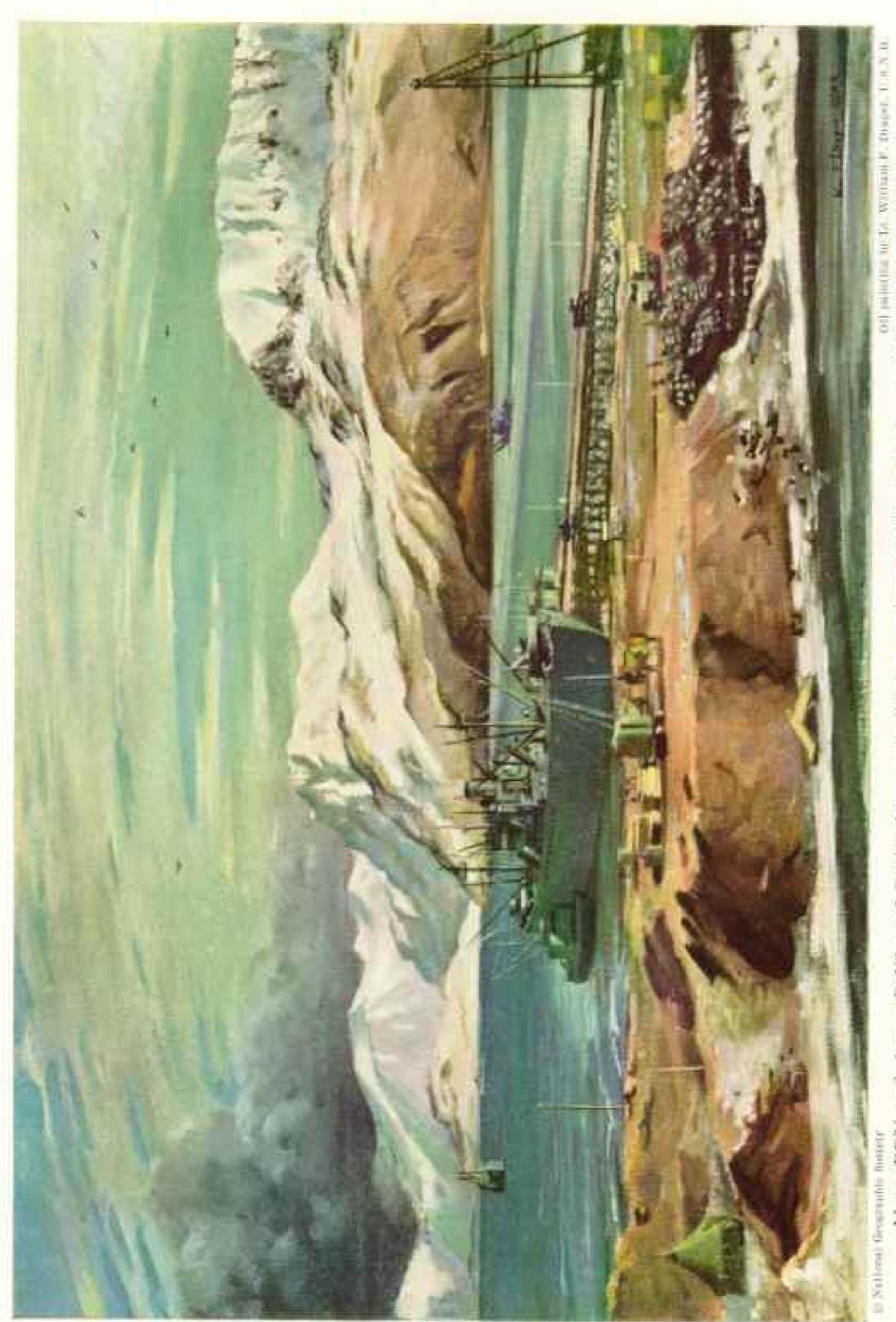
Lt. Col. John S. Chennault's Warhawks, in War Paint Like His Father's Tiger Planes in China, Bed Down on Ummk



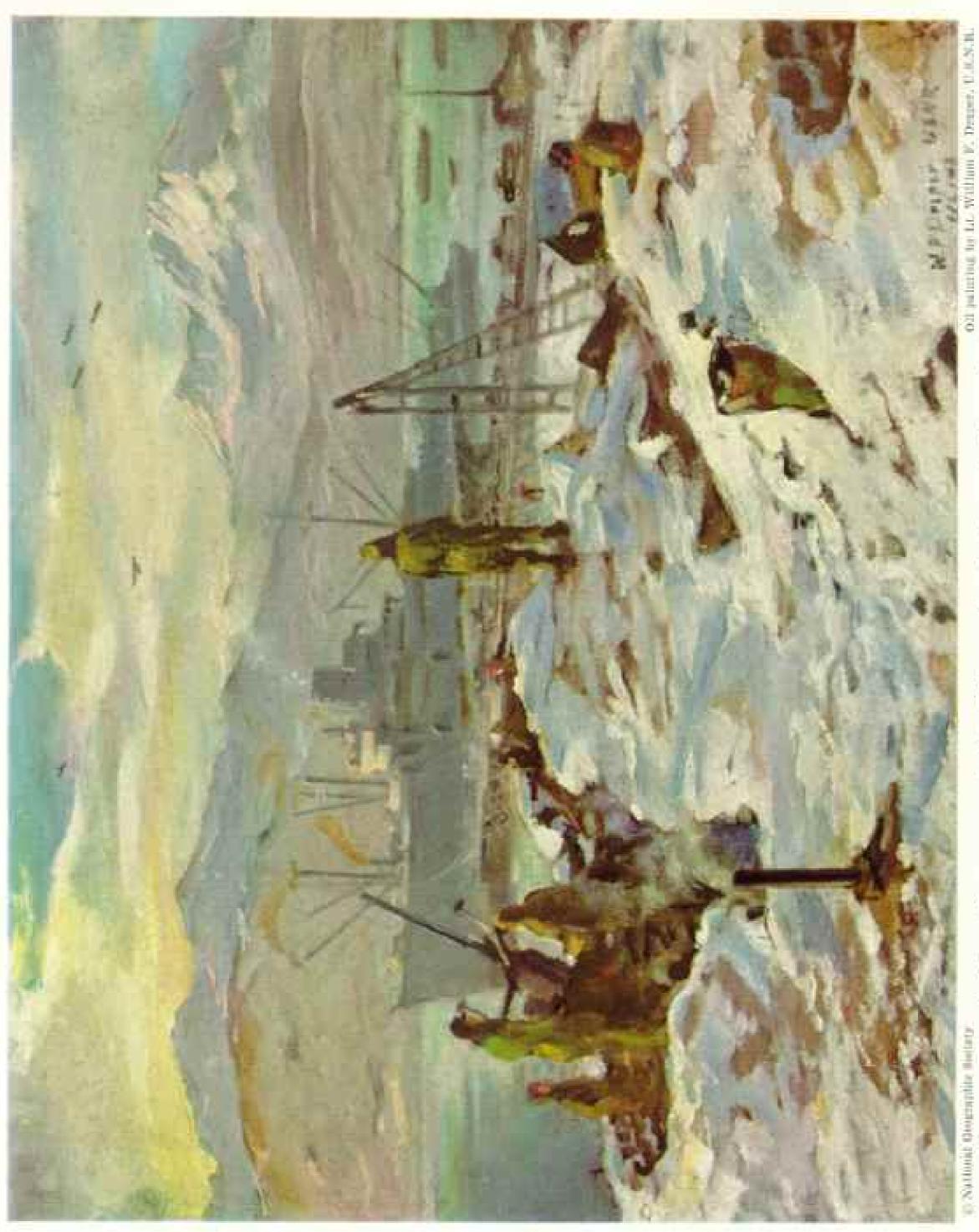
Williwaw, Dread Downdraft from Mountaintop, Churns Snow around Navy Mechanics Checking a PBY



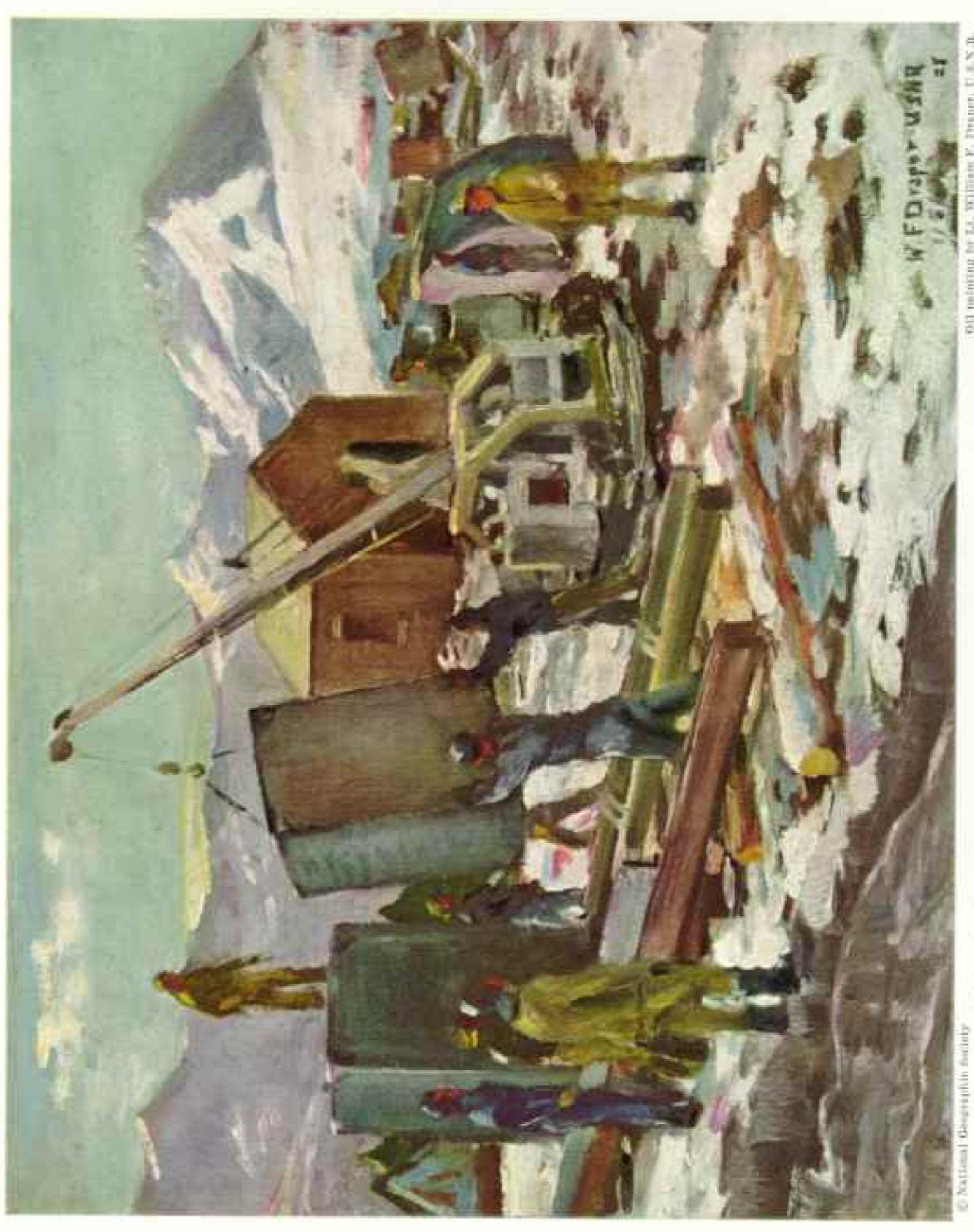
 $X\Pi$



the narrow peninsula. A net layer (right) and a destroyer and transport (left) lie at anchor in the rucks roll across the dock. Storm clouds gather; within ten minutes green sky will be black. 's Sweep the Sky as a Liberty Ship Unloads at Adak, Andreanof Islands Navy PBY and Army P-38's and P-40 Awaiting dispural, a jumbled mass of eil drums lies on harbor. A harge attends the docked freighter. 7

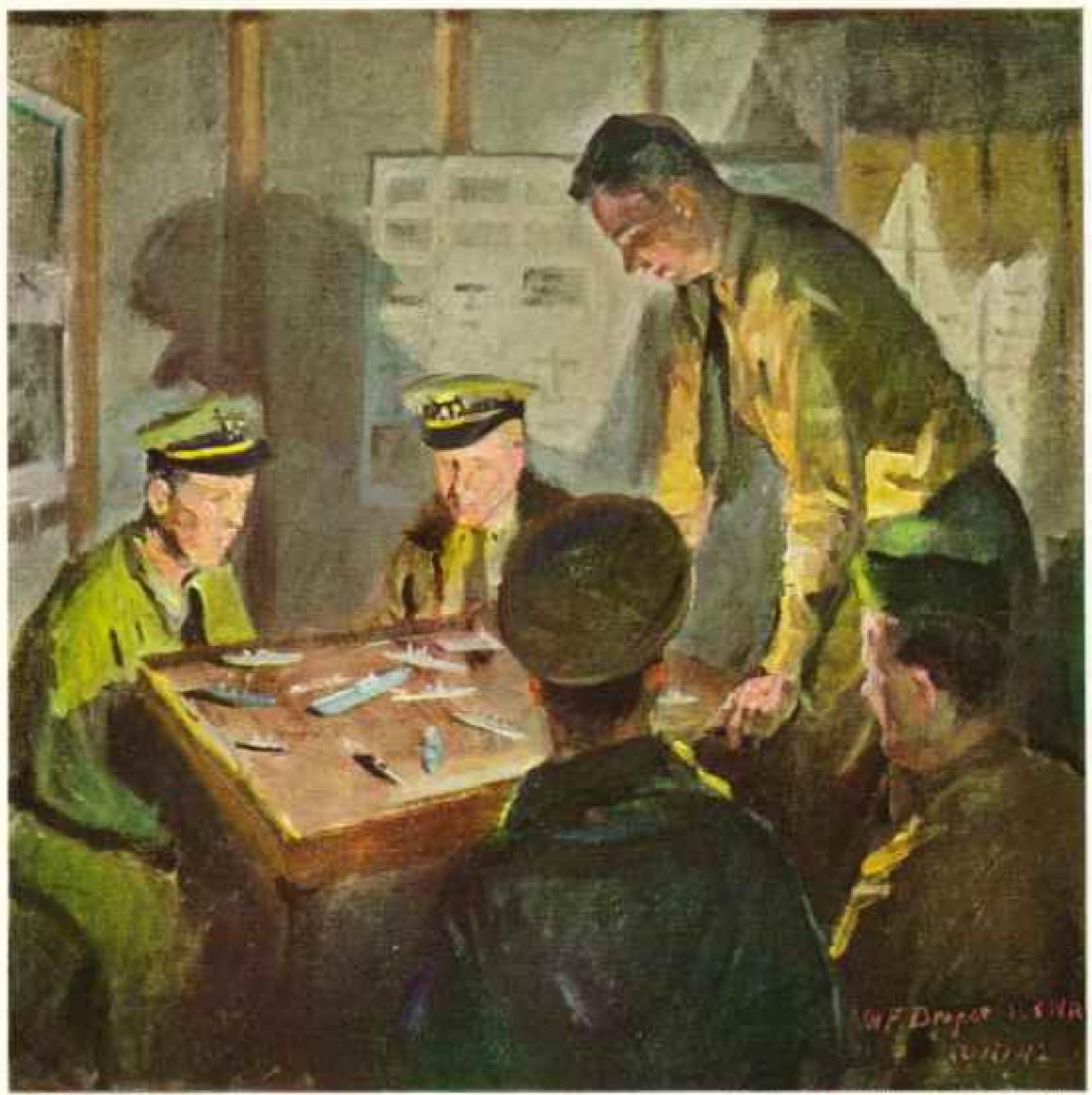


at Adak-Chimney Smoke Unmasks Nature's Snowy Disguise of Their Dugout Army Gunners Guard a Navy Transport



Assembling One Side of a Pontoon Barge, Navy Men at Adak Hoist Hollow Tanks of Iron upon Angle Bars

The National Geographic Magazine



to Peaconal Geographic Source

400 painting by Lt. William F. Droper, U.S.N.B.

Friend or Enemy? Navy Officers Memorize Warship Outlines

Long winter nights allow ample time for classes in ship identification. By lamplight, Lt. (j.g.) R. Delafield, air combat intelligence officer, instructs. Scated, left to right, are F. R. Robinson, warrant carpenter; Lt. (j.g.) J. W. Sahlman, Ensign J. J. Romero, and Lt. (j.g.) Royal A. Lett. Silhouettes of enemy planes line the walls of their Yakutat hut on Umnak.

When the Japanese sneaked into the Alcutians in June, 1942, ship identification became supremely important. Piloting durable but immbering PBV's (Catalinas), Navy men scouted the enemy through fog, rain, and snow. Doggedly tracking two aircraft carriers, the flying boats ducked in and out of clouds to escape antialreraft fire and swarms of hostile fighters.

"Cats" discovered the enemy on Kisks and, doubling as dive bombers, sank or damaged 65,000 tons of warships and transports. Others were rigged as torpedo carriers. A few performed during rescue missions. For all this they paid a heavy price. But, in the words of their wing commander in the fifth day of battle:

"Their superhuman endurance and beroic persistence in contacting and trailing the enemy day and night is all that has prevented him from attaining his objective."

Capturing Giant Turtles in the Caribbean

By DAVID D. DUNCAN*

With Illustrations from Photographs by the Author

IG FELLOWS, aren't they?" I began, speaking to a heavy-set stranger smoking on the wharf at Key West, Florida. Slowly he removed his pipe,

"Chickens," he replied, without taking his

eyes from the churning water below.

"You think those are fairly sizable turtles down there?" he chuckled. I admitted I did,

"Well, in the deep-sea turtle trade we call those young'uns 'chickens.' Don't get to be turtles until they weigh over a hundred and twenty-five pounds. Why, they're just babies. Come on over to the next kraal and see the really big ones" (page 186).

One look and I was convinced. There, leisurely swimming through the enclosed waters, were the largest turtles I had ever

seen.

Turtles That Are Turtles

"Four feet across and weighing up to four hundred pounds, sometimes even more," was his answer to my question. "Vegetarians, feed on eelgrass, catch em off Nicaragua, use nets to . . . say, my name's Ebanks, Capt. Allie Ebanks, master of the schooner Adams that brings 'em in. Come on down to the vessel. I'll show you the whole outfit."

Luck was with me, for here was a man who could tell me the full story of the little-known turtle fleet. It was the theme of his own life, Little did I realize while hastening down the water front that this was the opening of a

great adventure.

"These are what we catch 'em in-all handwoven by my crew," continued Captain Allie, as he unfolded a heavy net upon the deck. "Y' know," said the friendly skipper as my tour of inspection ended, "y've seen the turtles, tested our nets, met my crew, and walked the deck of the finest schooner in the islands. Why don't you come with us when we sail tomorrow? See the whole thing for yourself."

"Nothing could be better," I replied.

"But don't for a minute think it'll be an easy voyage," he cautioned. "We'll be sailing into dangerous waters, the sea'll try to spit us out, and the wind'll hurl us back. The food's the same seven days a week, and we won't be back for two months. But, so far as I know, the story has never been told, and you'll be the first writing person to sail with us to the Mosquito Coast. Do you want to go?"

"When do we sail?" I shouted, then rowed the little tender nearly out of the water in my haste to get ashore. Cameras and clothes

collected, I reboarded the Adams.

We sailed around Cuba, touched briefly at the men's home port in the Cayman Islands, and then anchored alongside the fleet, nestling in the lee of Mosquito Cays. Here, 30 miles off the northeastern shore of Nicaragua, we had reached the headquarters for turtling operations on the east coast of Central America. On this tiny, palm-crested island, scarcely more than a mangrove swamp, crews find one of the few sources of fresh water within easy reach of the turtling grounds.

While seamen from other schooners came abourd to help refill our water tanks, letters from home and news from the States were exchanged for information about the latest activities on the reefs. As I quietly listened, I learned much about the fishermen, their fami-

lies, and the turtles.

Cayman islanders are British subjects, hardbodied but soft-spoken, seldom at home yet devoted to their families. They combine several schooners, a handful of men, and the lore derived from generations in the pursuit of the king of the Mosquito Coast. From grandfather, to father, to son, only the men and their vessels change. After 150 years the method of fishing remains much the same. and turtles, seemingly, are just as numerous.

Even in the days of the Conquistadores, the green turtles were prized for the savory steaks and broths which stimulated jaded tastes of the Spanish warriors. According to legend, lost buccaneers were sometimes guided through the night by following the explosive breathing of the broad-backed leviathans. swimming in quest of sandy beaches on which to lay their eggs.

Today the search for turtles has slackened, for many Cayman schooners and seamen are helping the British Navy.

Grass to Suit Mr. Turtle's Taste

Home port of the trim schooners of the turtle fleet is Georgetown, Grand Cayman, British West Indies. Though wandering yachtsmen have come to Cayman from far corners of the world, the story of the fertile islands, incomparable beaches, and hospitable

* The author now is a second lieutenant, U. S. Marine Corps Reserve, on duty in the Pacific,



"Fire Away!" Captain Shouts, and over the Side Go Sinker and Float

Attached to a 60-foot line, the stone will anchor corkwood over a turtle lair. At evening the fishermen will return to spread nets. In the gloom, their quarry is less likely to detect the trap (page 188).

inhabitants is still a virtually unwritten chapter in the travel annals of the Caribbean. The narrative of the turtle trade itself could be woven into a fascinating modern romance of the sea.

"Competition?" mused Henry, the first mate, as we lay stretched on the afterdeck of the schooner while trolling heavily baited lines over the stern. "No, ours is the only big-scale commercial turtle fleet in Central American waters. It's mighty strange, too, but there's the reason for it right there." His rope-calloused finger pointed to a floating line of grasslike weed sliding past our stern.

"Eelgrass—some folks call it turtle grass—the commonest thing in the water, and the cussedest," and he brought in his line, hand over hand, to remove several of the tough, greenish, ticker-tape strands from his book.

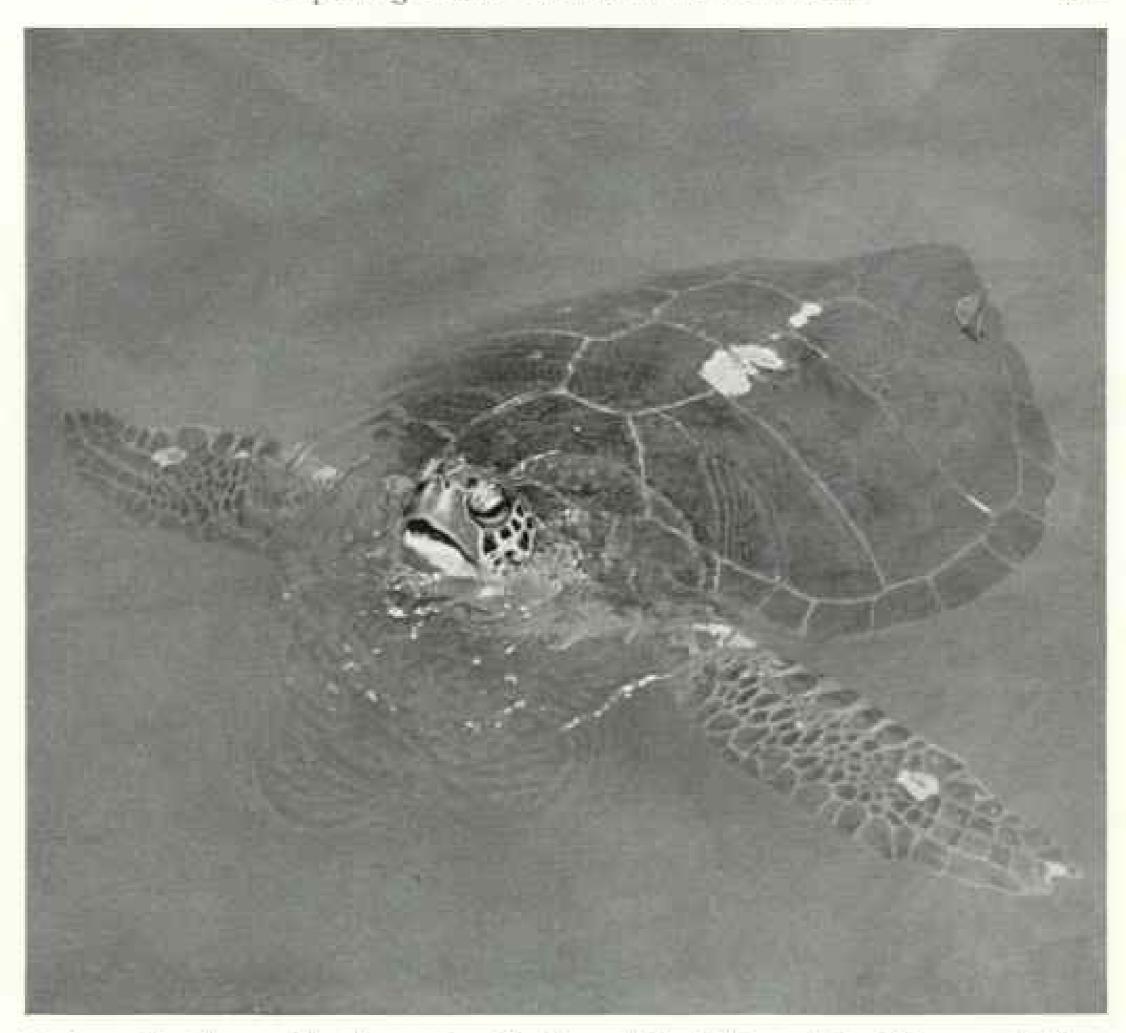
Eelgrass, he explained, grows in many

places, but Henry insisted that the Mosquito Cay variety was "special," and that only the turtles which feed on it yield savory soup, steaks, or chowder. Flesh of turtles feeding on other eelgrass acquires too strong a taste, he said.

"Guess that's why my daddy, his daddy, and his daddy's daddy all turtled right here on the coast, hating and cussing it when here, but missing and loving it when away, because it gave 'em their living, protected their homes, and made proud, scafaring men of their sons."

Henry had no scientific proof to back up his theory, but it was evident that every man in the fleet believed his story, long a tradition with Cayman Island turtle fishers.

The conversation was interrupted when Henry suddenly jumped to his feet, trying to brake the wildly racing line as it tore through his fingers. Far astern, our bubbling wake



Up for a Breather and Look-around, a Goggle-eyed Turtle Spreads Its Flippers and Blows

Surfacing for air about every 45 minutes, the giants tangle with nots spread over their sleeping grounds. After the mating season, females lay eggs on warm beaches. The males, having little curiosity about land, seldom venture out of water (page 184).

exploded. A surprised barracuda leaped high in the air, in a determined effort to throw the glittering bait and hook.

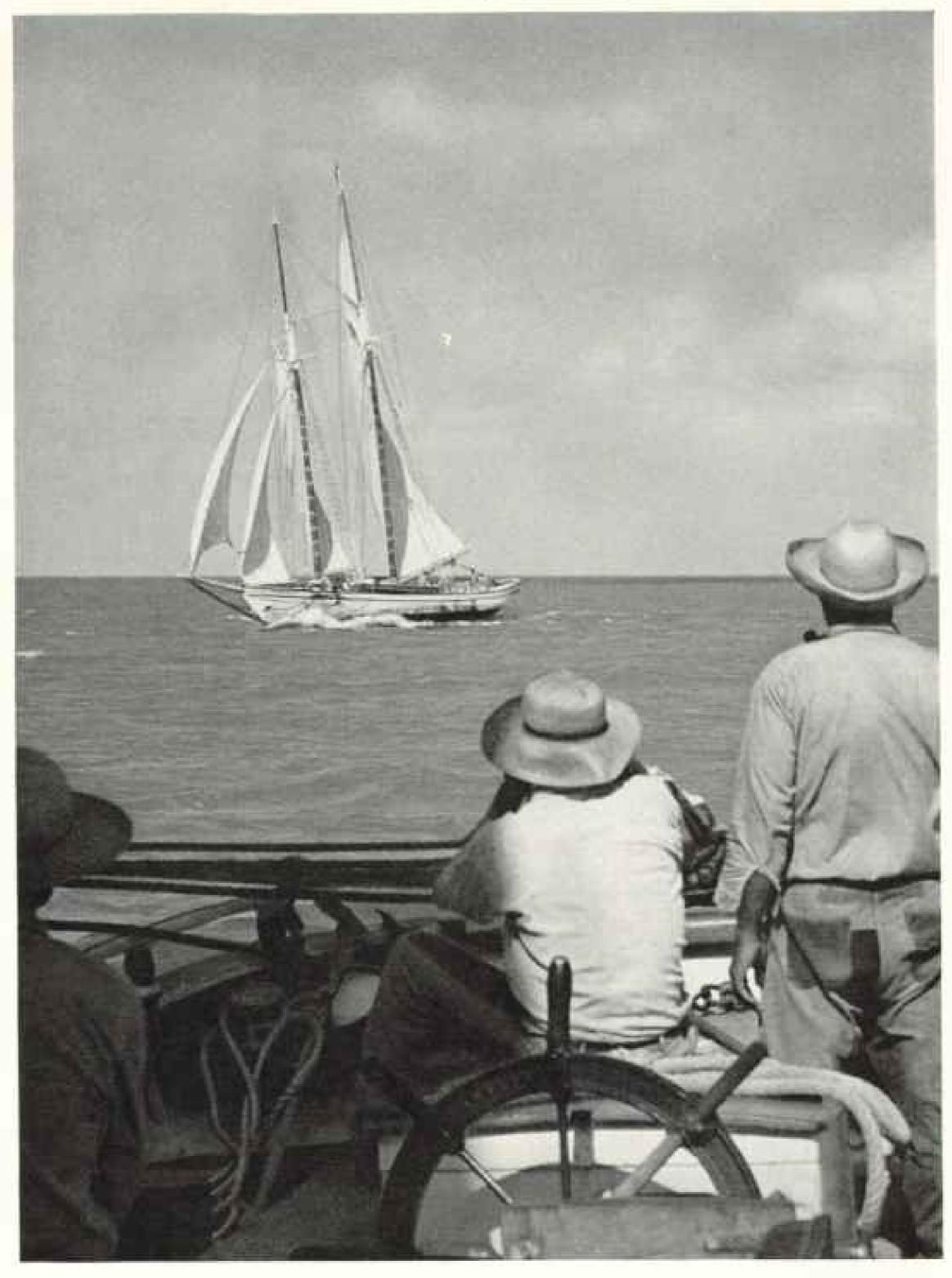
"'Cuda," muttered Renee, the helmsman, as the knifing fish flashed into the air again, this time nearer the vessel. He joined the mate, and the two fought the plungings of the fish and the speed of the vessel in a tug-o'-war which threatened the doubled line.

Unexpected Ducking Rewards Hecklers

Shouts of encouragement and advice rang out from all over the ship, as everyone cherished visions of a change from our threetimes-a-day menu of salt turtle. Captain Allie, far above decks in the lookout, bellowed like a wounded bull each time the fish threatened to escape. Out on the bowsprit, two members of the crew began a barrage of good-natured heckling, which ended in a muffled sputter as the bow disappeared in a comber. When the spray cleared, two drenched, mouselike creatures were revealed, clinging to the rigging. The battle continued without their aid. Cooky, after whetting his knife, stood by in experienced silence.

After a couple of more arm-jarring runs, the barracuda was brought alongside. The men yanked the fish on deck, and Cooky went to work with his knife, reducing the silvery, streamlined fighter to portions just the size of his skillet. After supper that evening I sprawled in my bunk, stuffed to the brim with golden fillets, coconut bread, and steaming, gravy-laden rice. For once I had proved to my complete satisfaction that the barracuda was a worthy food fish.

My meditation on the error of scorning the



Members of the Adams Crew Wistfully Watch a Companion Sail for Home

A schooner, going back for supplies, quits the Mosquito Coast for the Cayman Islands. Left behind, three idle mariners fasten envious eyes on the lucky ship. Having been away from home for months, they are weary of the sea.

barracuda was cut short as Renee, relieved of the wheel, dropped down on the bunk beside me. Like every other man aboard, he was anxious that I profit by his knowledge of turtle fishing.

"Mate has told you about their feeding on eelgrass, and you've seen how the grass grows in the shallows all along the coast. But there's more to it than that." He paused to

light his carefully rolled cigarette.

"You see," he resumed, "the turtle spends the entire day in these shallow meadows feeding on grasses. He only stops eating to swim up to the surface to breathe, or to hide on the bottom from a cruising shark. Then, as soon as dusk begins to fall, the turtle leaves this submarine meadow for deeper water, where it spends the night holding fast to a bottom rock.

"Seems kind of funny, doesn't it, the way old Brother Turtle feeds in the same shallows, swims through the same channels, and even spends each night wrapped around the very same rock? And that's just why we can catch

him."

Next morning I awoke to find the schooner under full sail, heading into the rising sun. By noon all hands were ready for the turtle hunt. High on the foremast, Captain Allie surveyed the water and shouted instructions to the helmsman below as the schooner pushed through the breaking reefs.

Floats Mark Turtle Lairs

The mates were alert and watching for coral heads, far beneath the surface, which might harbor turtles. On the deck a seaman stood ready on each side of the vessel. At a command, one would toss overboard a corkwood float, attached with 60 feet of line to a heavy weight. After several hours of work, ninety floats dotted the ocean, marking sites where nets would be placed and, it was hoped, turtles might be caught (page 178).

Reduced to writing, the work seems simple. In reality, it appeared miraculous that a 100-foot vessel, crowded with canvas and wholly dependent on the wind, could be maneuvered so handily among the jagged reefs.

Many times the captain waited so long to tack that the shadow of the mainsail fell across the rocks themselves. The schooner pulled away at the last possible moment, leaving only a foaming wake to splash upon the reefs.

When the vessel anchored in the lee of the reefs that afternoon, three small boats were put overside for the return to the floating markers. Captain Allie, Henry, and Albert, the second mate, each accompanied by two



Drawn by Irwin E. Attenua

Where the Turtle Fleets Roam

Three seldom-visited dots in the Caribbean are the Cayman Islands, a dependency of British-owned Jamuica. From these isles sail men who trap the green turtle. At Mosquito Cays they lodge captives temporarily. Holds full, their schooners deliver live cargoes to Key West. A tribe of Indians, not insects, gave its name to Nicaragua's Mosquito Coast.

of the crew, manned the dugouts, as turtlers call their neat little craft. I went along with the skipper. Only Cooky remained on board.

"Now you'll see what I meant last night," reminded Renee, leaning over the tiller of the captain's dugout as we plowed along.

How Turtles Are Trapped

"Turtling is just like any other kind of trapping," cut in Captain Allie, taking the helm while Rence and the second seaman made ready the nets. "Catching turtles is just like catching otters or foxes, or other smart animals. You have to place your nets just like traps, in such a way that everything looks natural and nice until the turtle comes along."



Navigating Is Father-and-Son Teamwork on the Adams

Outward bound from Key West, Captain Allie Ebanks shoots the sun with his sextant while Junior keeps the ship on course. The helmsman starts his career young. It's an old Cayman Islands custom, one that produces fine seamen and generations of captains.

We arrived at the markers just before sundown. With sail furled, the dugout was rowed from one marker to the next, and the full technique developed.

As each float was approached, a seaman fastened one end of a turtle net to it. Then the oarsmen pulled away hard until the net lay stretched horizontally upon the water, covering an area approximately 60 feet long by 10 feet wide. A second anchored float was tied to the other end, and the net lay ready for Brother Turtle's arrival. As the captain stood in the stern of the dugout, spreading net after net in our wake, he alternated commands to his men with brief bits of information.

"We come out to the reefs at this time of evening," he told me, "because a turtle can see like a hawk in the daylight. And shy! Why, never in all your life have you seen a more timid thing. That's why we have to put out our nets near nightfall, so's when he comes home after feeding all day, he can't see it floating over his favorite rock."

During the night the turtle rises to the surface for air. This is the big moment. If the net has been laid just right, he rises directly beneath it, puts his head or a flipper through the mesh, gets excited, flounces, and istrapped. The creature becomes so tangled up that it can't move, and the anchors hold the net in place until the seamen reach the spot the next morning.

With all nets in place and explanations over, the men returned to the mother ship to the supper which Cooky had laid out upon the low cabin-house roof. After the meal, the same comfortable roof served as a couch for

the islanders, while they listened to the captain's plans for the morrow and debated the probable catch in each net. Before long, deep, measured breathing sounded from arm-pillowed heads.

Beating Early-rising Sharks to the Nets

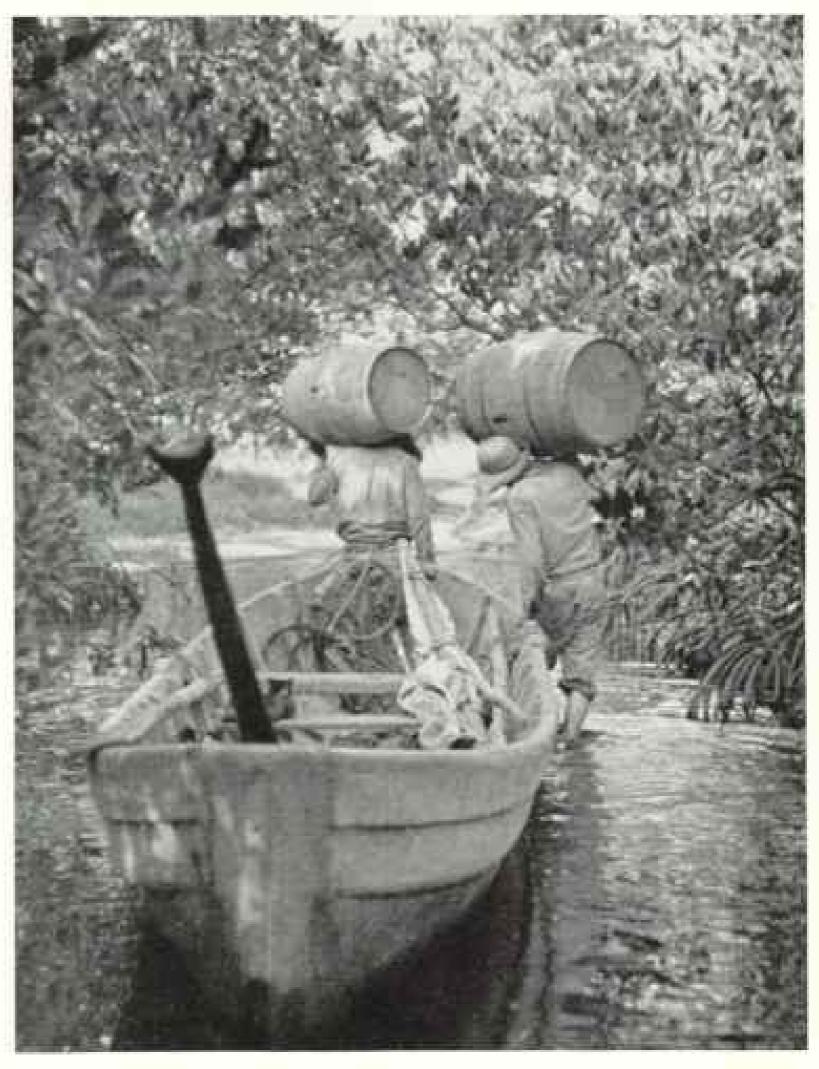
Dawn found all three dugouts well out toward the nets, for the men hurried to remove ensnared turtles before early-marauding sharks might find the catch. By sunup most of the nets had been taken in. Some were untouched and empty, others completely snarled by flailing turtles. Of the thirty nets set by each boat, a catch of five turtles per dugout was considered good luck.

Some of the nets were difficult to locate, having been pulled down into the snags of the coral reefs by escaping creatures. Other nets were found with gaping holes, minus the catch-evidence of attacks by sharks. Still others were never seen again. They had been towed away by some powerful denizen of the depths. With all of these obstacles at work and sometimes with a gale blowing for long periods, it seemed lucky when a dugout returned with several huge turtles as the day's catch.

Even on a smooth sea, extracting the turtles from the nets is dangerous. Although these men have been trained to the work from early boyhood, the turtles' beaklike jaws and bone-crushing flippers are constant sources of peril. The green turtles are not vicious, but as they are taken from the water they become excited, lashing wildly with their flippers and snapping their huge jaws with a menacing clang (page 187).

Finding one snarled in a net, the men row their dugout alongside the tangle, which floats on the surface. One stands by the oars as the other two attempt to grasp the captive under the collarlike shell. Then, as the wildly thrashing turtle is brought nearer the boat, each man tries to catch a front flipper so that together they may pull the brute over the gunwale. Maintaining a grip on a flipper is more than most men can do, but to lift the four hundred pounds of frantically fighting turtle over the side is herculean. Once in the boat, the turtle, strangely enough, subsides into a lethargic stupor and remains so on the ride back to the schooner.

As a dugout pulls alongside the mother ship, a cable ending in double nooses is low-



Fishermen Wade a Pirate Trail to Fresh-water Wells

Buccaneers discovered Mosquito Cays' springs in a mangrove swamp centuries ago. For the last 150 years turtlers have used them. They are a seaman's ossis in a salt-water desert (page 177).

ered. A seaman places a loop around each front flipper of a turtle, and the big fellow is swung aboard.

Captain Allie Carves Initials on His Quarry

Once over the side, ceremonies are brief. The captain, with a razor-sharp knife, cuts the initials of the vessel on the bottom plate of the turtle. This serves as a brand to distinguish the giants caught by each schooner of the fleet. The brands simplify distribution of the receipts, after the catch has been marketed in Key West (pages 186, 187).

Lifted from the deck, the turtle descends through a hatch into the hold. Nooses removed, the captive is rolled over on its back and a block of wood shoved under its head



Seen against the Sail, a Shadowy Phantom with Pinocchio Nose Climbs the Ratlines

for a cushion. Peering into the semi-gloom below, I could see the whole turtle cargo resting quietly in this same upside-down position.

Warm Sand Incubates Eggs

Mother turtles scoop out holes in the sand and lay their eggs—sometimes three hundred in one nest. Then, after pushing the sand back to cover them, they waddle slowly again to the water and leave the eggs to their fate. Jaguars often visit the beaches to eat the eggs.

When the tiny turtles hatch, they poke through the sand and begin to webble on unsteady legs toward the water. Many are eaten by gulls and other predatory birds before they reach the comparative safety of the waves, but some escape. Once in the water, they grow rapidly in size, and protective shells form on their backs. As time passes, these shells become harder, thicker, and heavier, but the plates on their bellies remain leathery and soft.

Captured Turtles Must Lie Upside Down

"Naturally, then," said Cooky, "if we take a turtle out of the water and put him on his belly, the soft bottom shell will push against his lungs, so he can't breathe, and he's going to die. But, way back, somebody figured that if a turtle were put on his back, he would keep right on breathing. So that's why we carry 'em the same way, too."

It was true, for in that position the turtle can breathe with perfect ease, seemingly unperturbed in a strangely rolling and pitching world. Often the whisper of the brutes' breathing swelled into an asthmatic chorus, as each new arrival was welcomed.

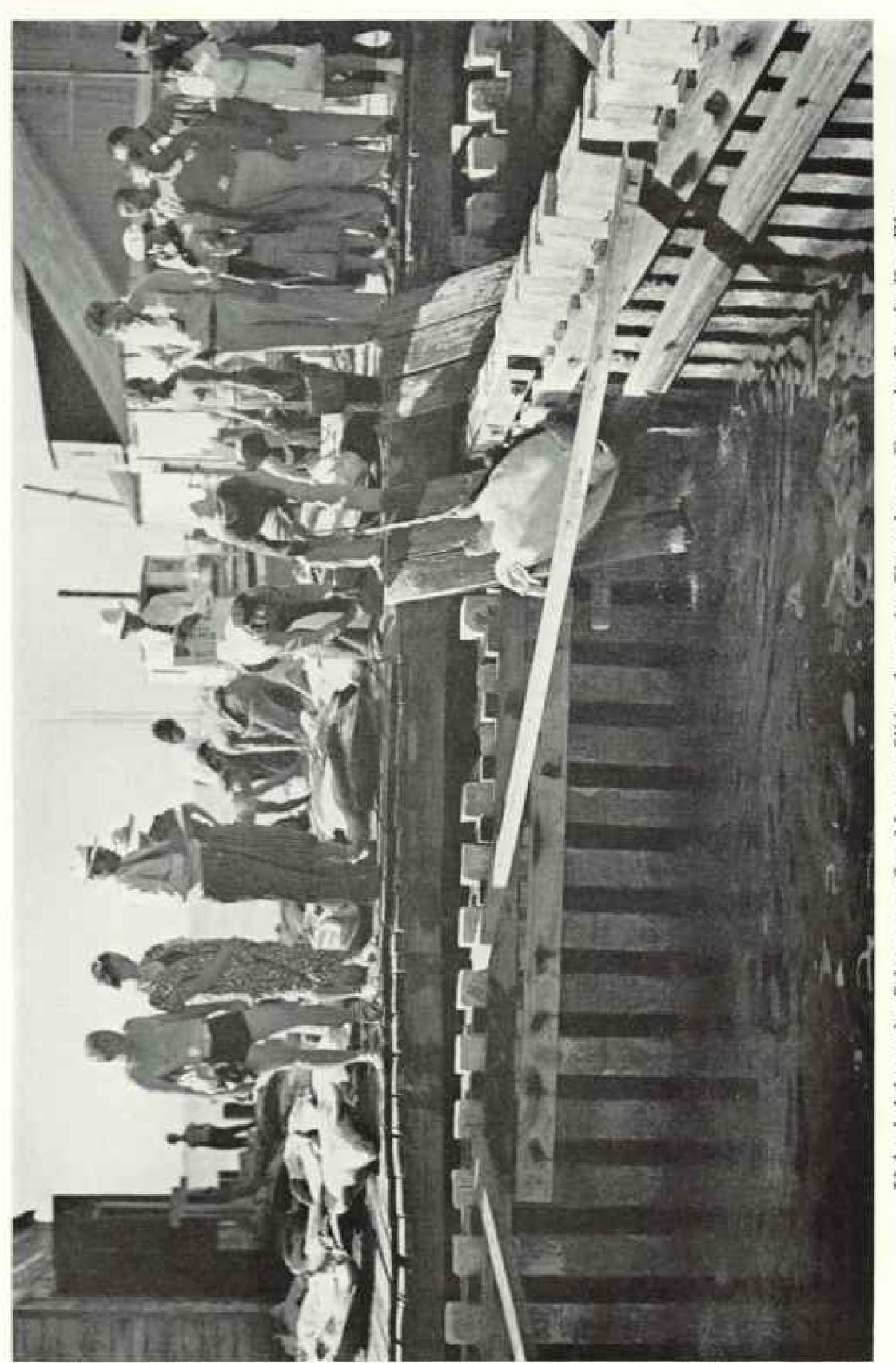
While the cargo grew, days passed into weeks, and weeks became months, until at last the combined catch of all the schooners warranted a trip to Key West. And none too soon, for cloudy puffballs scudding across the skies gave warning of the approaching hurricane season.

Nets were placed nearer, so that crews might go rapidly aboard and the schooner sail out to deep water in case of a sudden storm. All running gear was kept clear, and the mainsail remained towering and vigilant through the nights. The watches, discontinued upon arrival at the turtle grounds, were resumed so that neither rising wind nor falling barometer might escape notice. Relief was felt when the order finally came to weigh anchor, hoist sail, and lay a course to Mosquito Cays.



Belly Side Up, These Passengers Have "Turned Turtle"

Sea turtles' backs are well armored; their stomachs are lightly covered. Therefore, they are turned top side down lest the tremendous weight stave in lungs and cause death. Fresh from nets, they go abourd the schooner on ropes noosed around flippers (page 183).



Henceforth they eat fish and meat scraps, and make no protest. 'The Unloaded from the Schooner, a Sea Monster Slides down the Chute into a Fattening Pen in Key West off initials on the turtles' belly plates and credits their owners (page 183). Vegetarians by preference, turtles destined for the soup kettle scorekeeper with notebook checks



With Painless Carving, the Skipper Brands His Catch

Cutting "Ad" for Adoms on the turtle's leathery belly plate, the captain distinguishes his catch from that of other schooners. At Key West fattening pens the brand will identify his "herd" (opposite page).

Look Out for Those Flippers, Boyst

Turtlers pull a net-entangled grant into the boat after a terrific strangle. One aboard, he will subaide (page 183). At 150 pounds, turtles are tender; at 400 pounds, they are better for soup.



Arriving at the Corkwood Markers at Dusk, the Captain Sets a Turtle Trap

A net woven of 85-pound test line is spread over the surface. Tied to anchored floats, it is stretched taut as the oarsmen pull away. Night hours are trapping time, for "a turtle can see like a hawk in the day" (pages 178 and 182).

Our return to the cay was unlike any other during the months spent off Nicaragua. Previously, each Saturday we had returned to release the week's catch of turtles into the kraals, stockadelike enclosures scattered through the shallow lagoons. These enclosures are bamboo poles, sunk in about five feet of water. Here the turtles are kept well fed while waiting for shipment day. The procedure seemed similar to the cattle roundups so familiar on the great ranches of the Western States.

From Saturday evening until Monday morning, the turtle fleet rode at anchor while the crews swapped yarns and enjoyed a wellearned rest.

Thrills Mark a Turtle Rodeo

This time, however, all ideas of rest were forgotten in the swirl of activity around the kraals. Excitement ran high as the islanders, barehanded, caught the wildly swimming turtles in the kraals. While two men shouted encouragement from a dugout alongside, a third waded neck-deep in the water. Arms and legs outstretched, he moved gingerly along, apparently only rolling the muddy bottom with his toes. Then suddenly he lunged

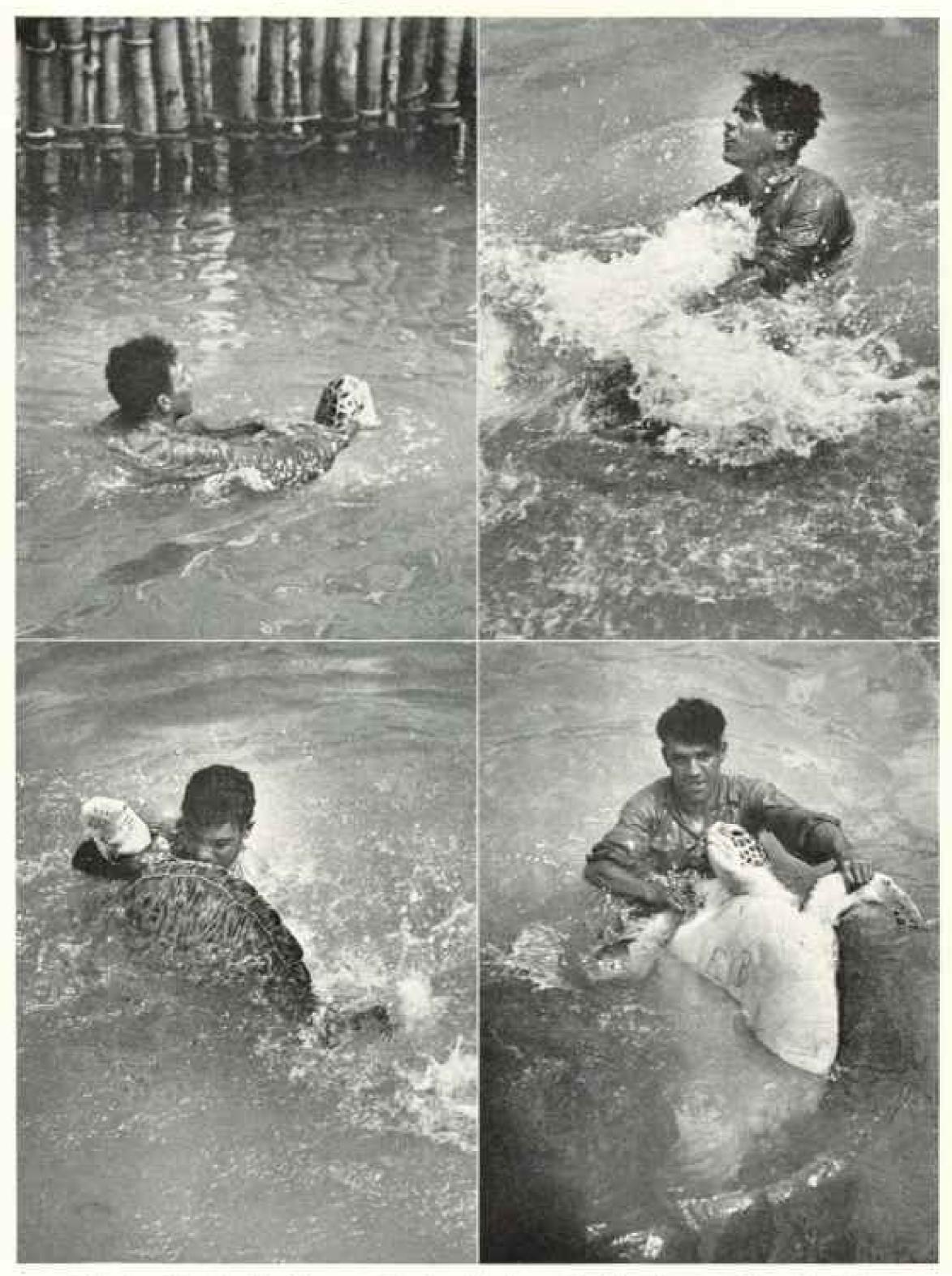
and disappeared. Spray flew and bedlam broke loose (opposite page).

Riding a "Bucking" Turtle

Foam boiled up and whirlpools sucked at the surface. Then the water erupted to eject our friend, clinging for dear life to the back of a turtle. Gleeful shouts mingled with the spray while the other hundred-odd turtles in the kraal went crazy. From one side to the other, in the water and then out, the boy rode his rocketing steed.

Working one hand up under its throat and pressing against the broad shell with his knees, the boy steered his charger straight into the side of the kraal where his friends were stationed. Powerful hands grabbed its flippers; the boy pushed, they pulled; and presto, out of the water into the dugout went the turtle. Not a dry stitch of clothing could be found in the crowd. As the boy climbed out of the water, one of his companions jumped in. Then, to the tune of shouting men and gasping turtles the second round of an amazing rodeo swung into action.

Normal tranquillity of Mosquito Cays was shattered that evening as men continued to work in the kraals by lantern light and the



Ride 'em, Turtler! A Cayman Islander Subdues a Bucking Steed at Roundup Time

Pole-enclosed kraal (or crawl) is this aquatic rodeo's corral. First the youth works a hand under the turtle's toothless jaw (upper left). Spray flies as the reptile, enorting and pawing, tries to unhorse him. Below, the rider applies the strangle hold. At last he secures the front flippers and his antagonist is powerless (opposite page).



Spray Blots Out the Sky as the Angry Caribbean Drenches the Adams, Homeward Bound Heading north from Mosquito Cays with 100,000 pounds of live turtles, the schooner races the storm to Key West. The hurricane season approaches (page 184).

final boatloads of turtles were taken aboard the schooner. Upside-down turtles overflowed the dunnage, filled the hold, covered the decks, and finally the last few even found their way to a resting place under the cabin floor. Noah may have had a more cosmopolitan passenger list, but surely he would have been hard pressed to find one more novel.

Next morning I once again awoke to discover Mosquito Cays far astern, but this time the vessel was pointing due north. The turtles were on their way to Key West and from thence to pantry shelves all over the world. I was going home with the story and photographs of a thrilling adventure.

The final days of the voyage roared away with a wind that threw mountainous seas across our bow. Yet the schooner plunged on, dropping Nicaragua, Honduras, British Honduras, the Yucatan Peninsula, and finally Cuba slowly in her wake. At last the game little craft sailed serenely into the port of Key West, to mark the end of another trip to the Mosquito Const.

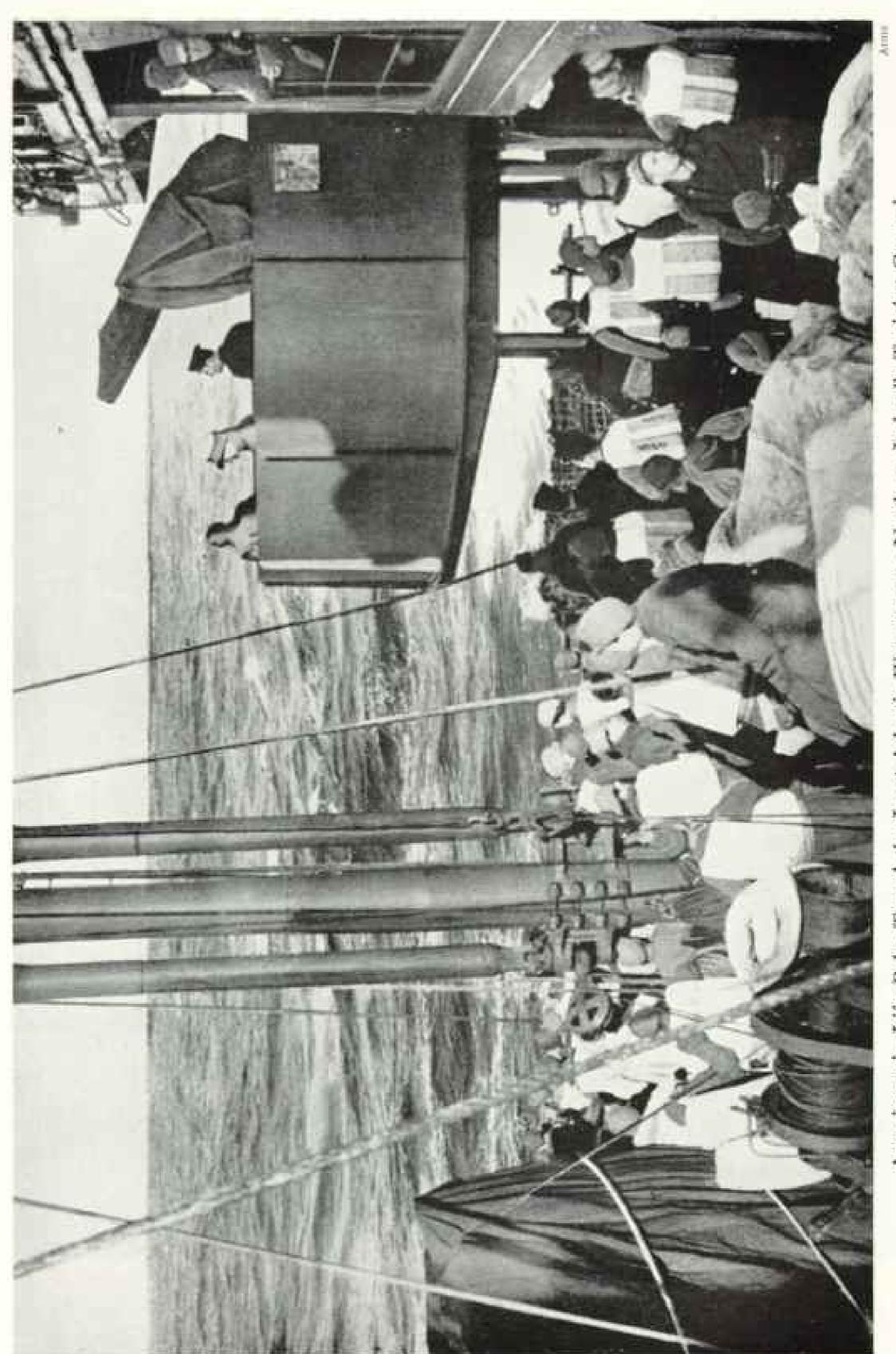
Notice of change of address for your National Geographic Magazine should be received in the offices of the National Geographic Society by the first of the mouth to affect the following mouth's issue. For instance, if you desire the address changed for your October number, The Society should be notified of your new address not later than September first. Be sure to include your new postal zone number.

Yanks in Northern Ireland



Two Young Allies Get a Ride on American Shoulders in Ulster

Sand pail and rifle, toy shovel and gas mask, hair ribbon and helmet symbolize childhood's peace and man's struggle. These two doughboys heed their Army's advice: "Every American soldier an ambassador of good will." Thousands like them are receiving their final training in Northern Ireland, part of the old Province of Ulster.



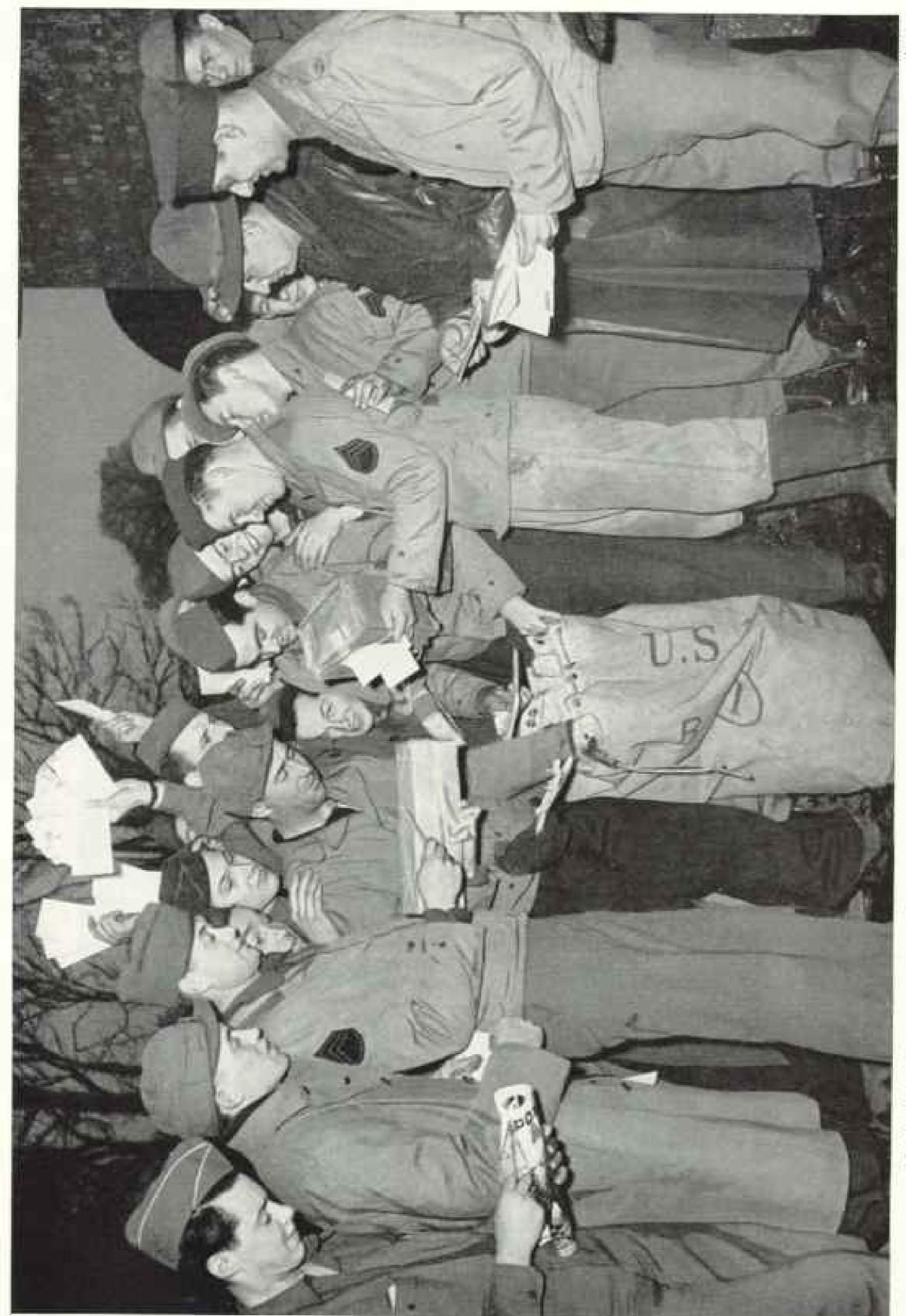
An antialrenaft gun, muzzled against spray, juts from the splinter screen, or "gun tub." In January, 1942, surface vessels protected this first A. E. F. crossing to Europe of World War II. In mid-occan they Jacked aerial support against the U-boat. Now V. L. R. (very long range) aircraft patrol much of that "blind spat." the Long Atlantic Waterway to Northern Ireland's Training Ground Americans in Life Belts Travel



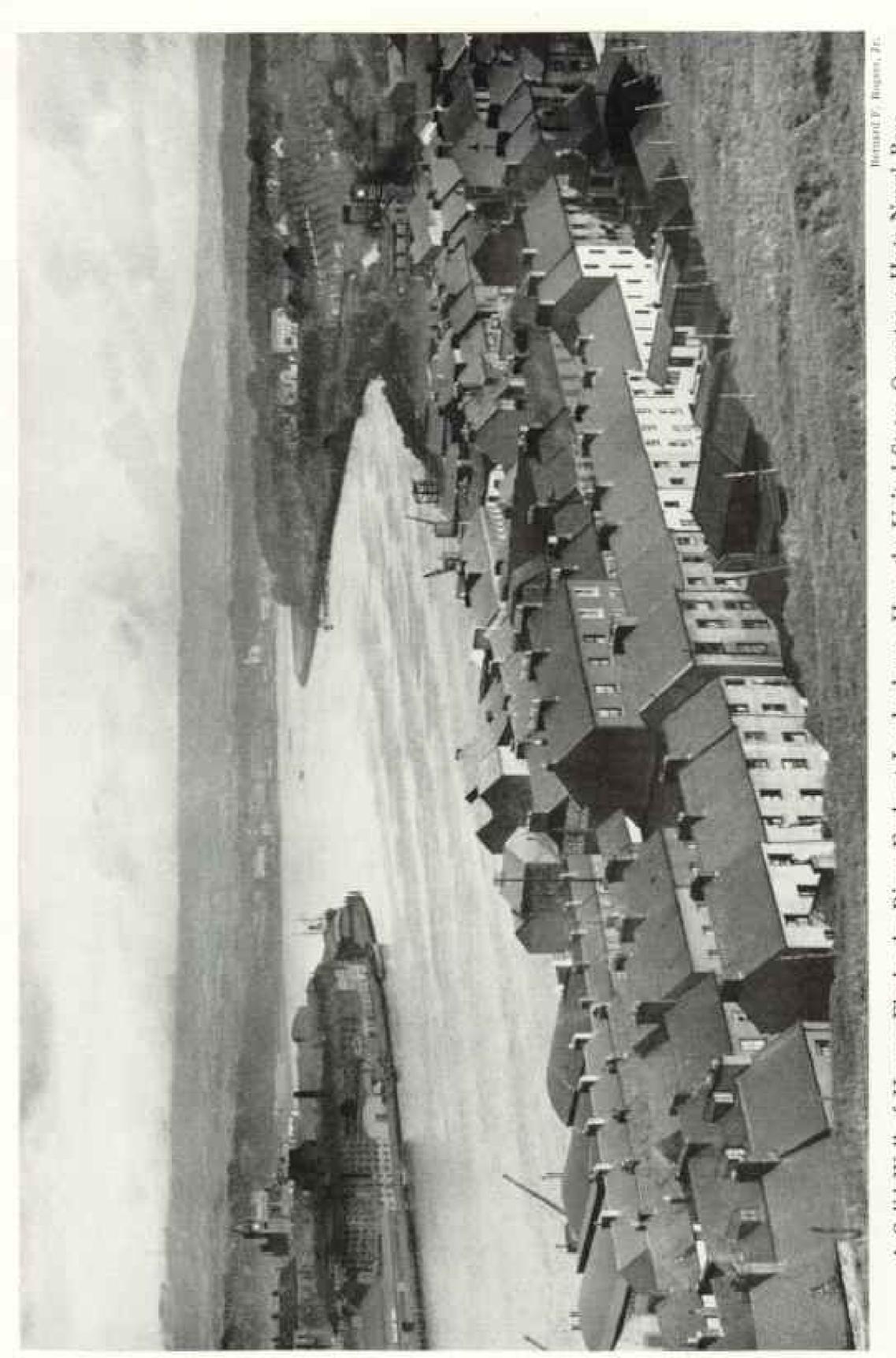
is. But Eire protested the Americans' arrival. Eire remains neutral, although German bombs have in World War I for combating German submarines, are now scaled to Allied warships. Such sights are common in Northern Ireland's friendly ports, teful in fallen on Dublin, its capital. Its ports, useful in



American Riflemen and Antitank Gunners Rehearse the Second Front Behind Blitzed Irish Buildings, A



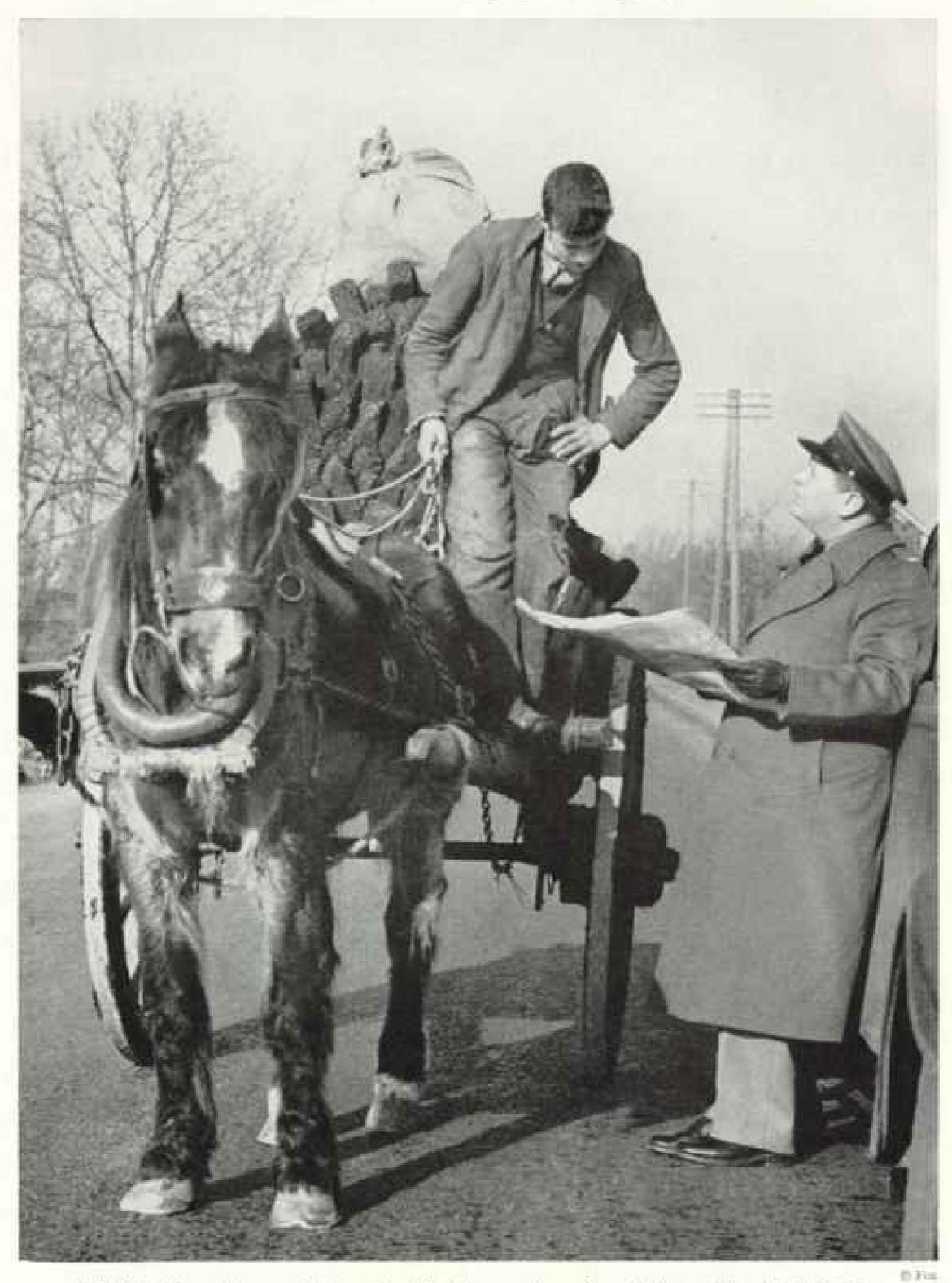
Gas Masks as the Magie Sack Whisks Thoughts back to the U. S. A. Mail's in! Forgotten Are Guns and



A Solid Wall of Houses Flunks the River Foyle at Londonderry-Here the United States Operates a Huge Naval Base Like the Irish, Americana call this city "Derry. concerned with music and more with weather. When you can't-4t's raining." Marines at this port have organized a bagpipe band, with kills and all, you can see the mountains, it's going to rain. When



"The Irish love to argue," says the A. E. F.'s packet guide. "They call each other names, include in exaggeration. In Ulster this is within the rules ... part of the full. . . . There are two excellent rules for Americans: Don't argue religion; don't argue politics. . . . Voor place in on the sidelines."



"Which Way, Mac, and How Far?" Asks an American Officer, Showing His Map

The answer, delivered in an Irish brogue, will be hard to understand. Boston, Brooklyn, and Texas talk are equally strange to the Irishman. Road signs offer no help; they're removed for the duration. The load of peat—the driver calls it turf—is his source of fuel. Coal is imported from England.

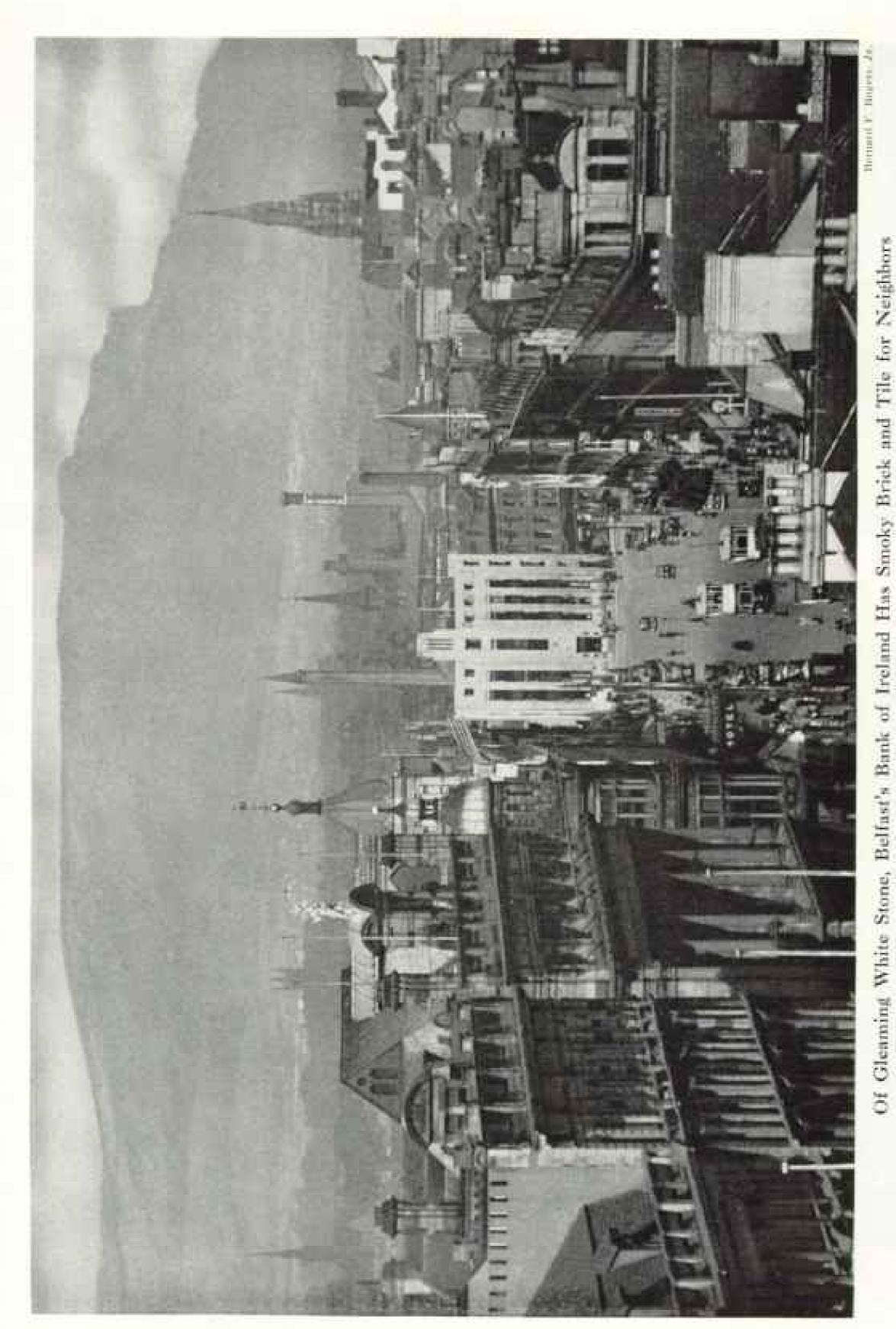


As a Preliminary to Their Bout with the Nazis, Boxers Entertain the Camp

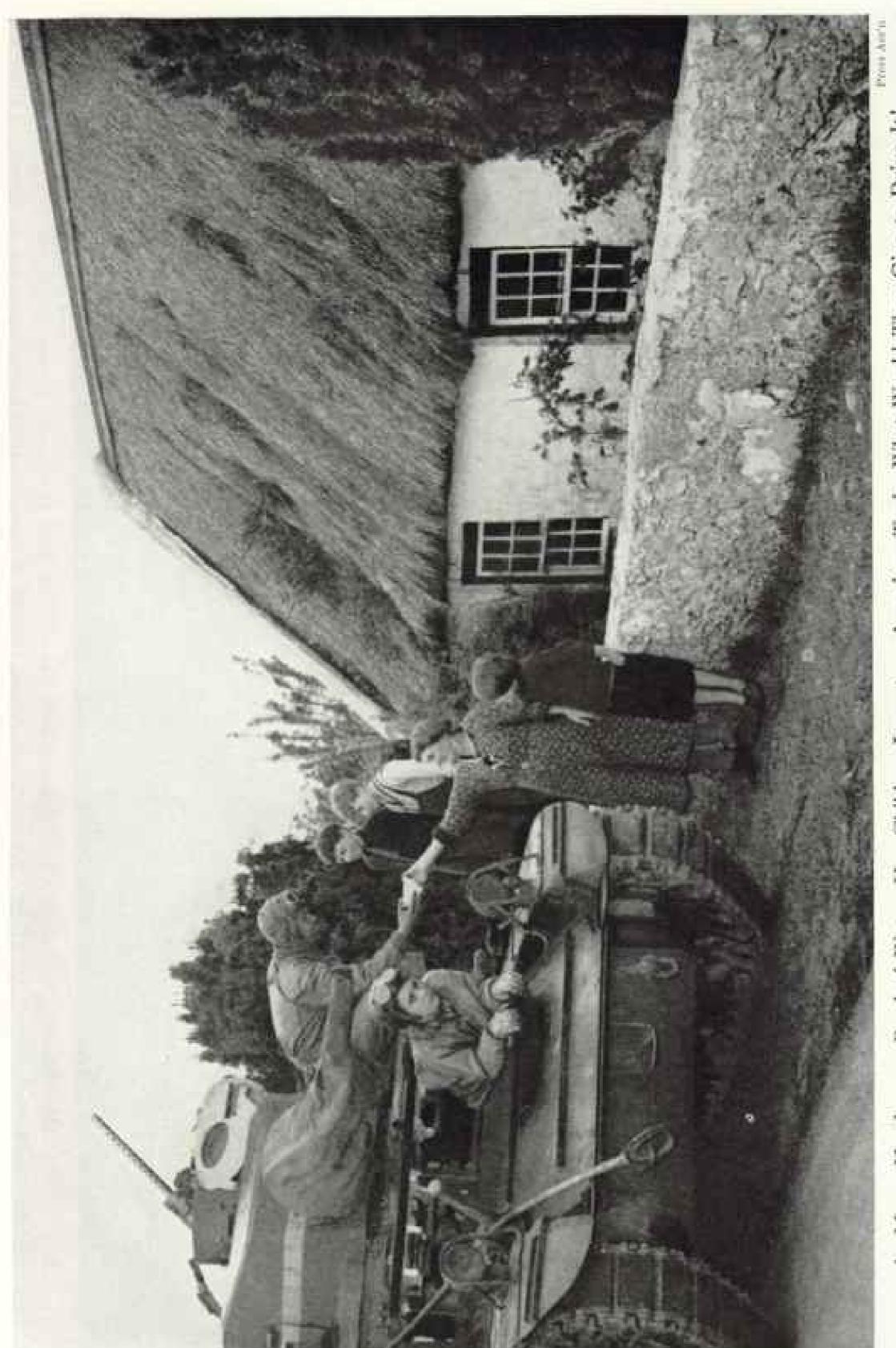
The Nissen but in the background is typical of the soldiers' living quarters. Prefabricated and well insulated against Ireland's cold, rainy weather, these dwellings, in the shape of half barrels, replace the army tent here. Twelve men can easily set one up in half a day.



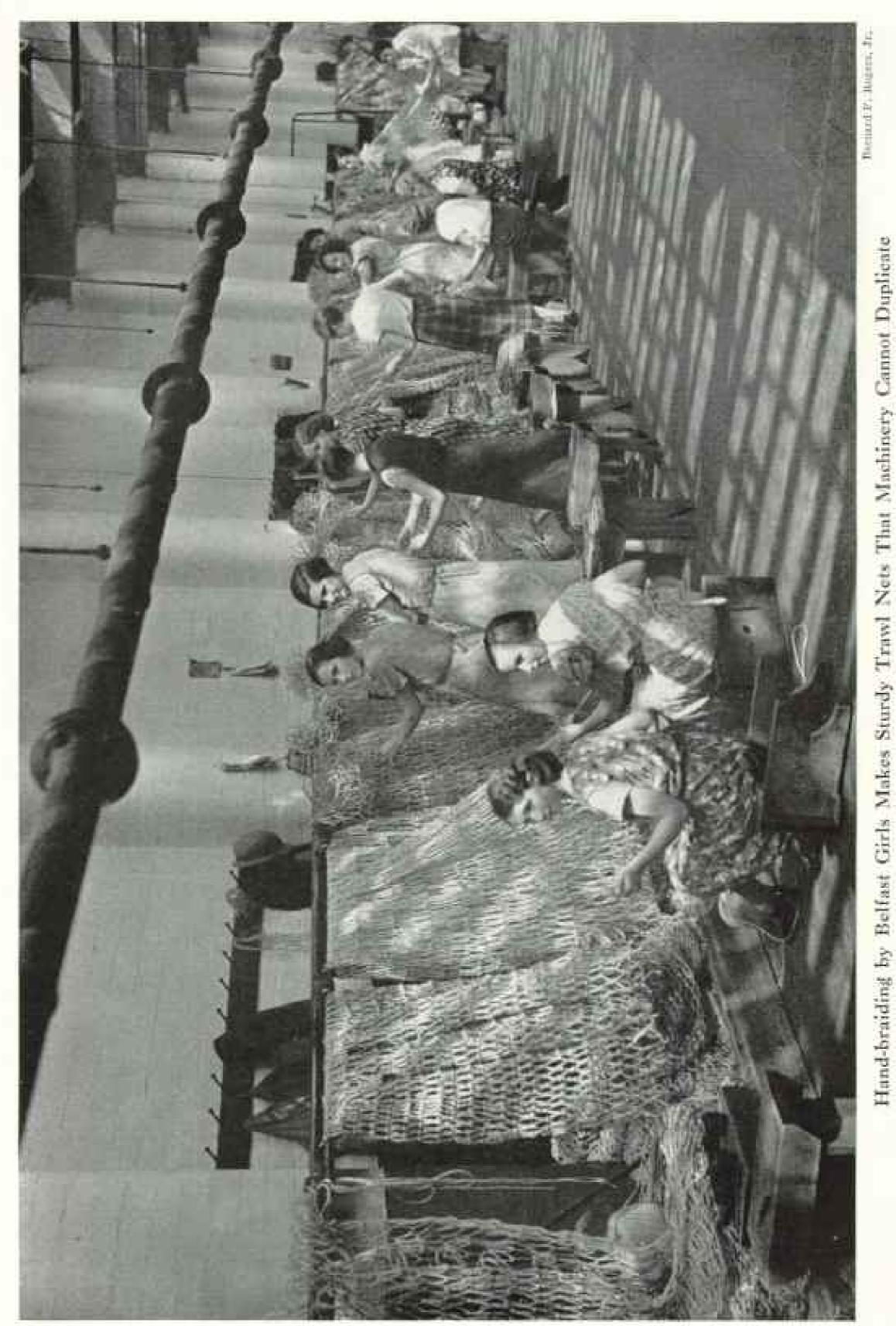
Cornered by a King and a Yank, an A. T. S. Private Studies Her Next Move
This American sergeant enjoys his "squib of tea" and game of "draughts" almost as much as his companions,



Its huge shipyards, builders of the Thurk and other liners, now pour out fighting ships. Peacetime's War workers make Cave Hill, towering above the city, their playground. German bombers tried in vain to knock out this war-busy port. Its he linen industry now weaves cotton for uniforms.



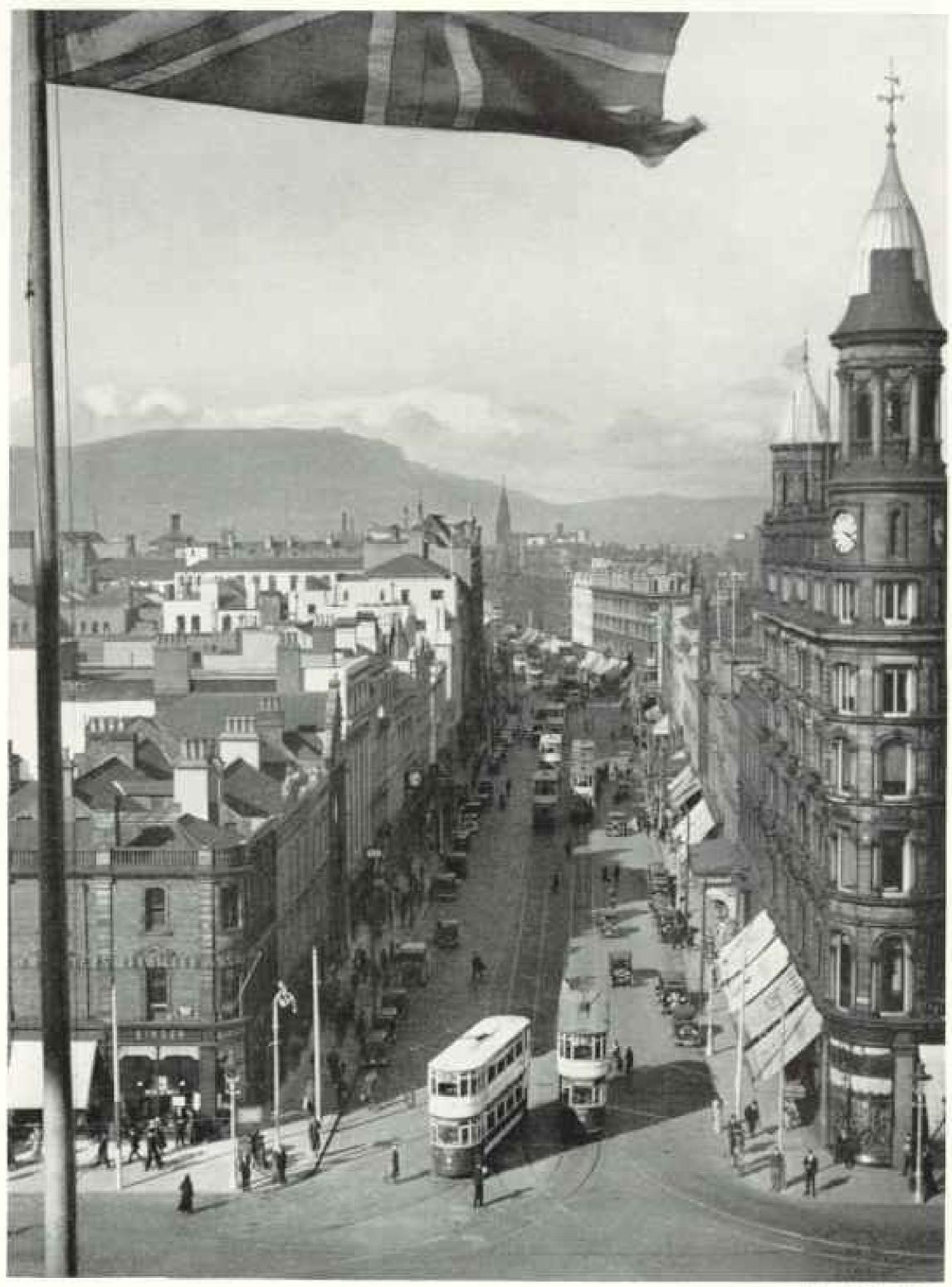
farmhouse for ten or dinner. But ten is rationed, and a good dinner costs the housewife most of her The Army, therefore, discourages acceptance of Ulster hospitality. As Mama Hands up a Bowl of Water, Her Children Inspect an American Tank-What Would They Give to Drive It! More than likely the crew has been invited into the thatched week's meat allotment.



Storl fingers for weaving are not satisfactory in this factory because fishermen demand bundreds of types of nets, each requiring a mesh of different shape and size. Scooping food from the sea, 100-foot-long nets help to break the U-boats' food blockade.



'erritorial Service) Entertain Americans at a St. Patrick's Day Celebration Girls of Britain's A. T. S. (Auxiliary 7



Donegall Place Seen from Belfast's Flag-topped City Hall

Detaind P. Bourss, Jr.

Double-deck "trams" keep to the left—note how the "motorcars" are parked. Here Americans patronize the "chemist's" instead of the drugstore; they window-shop for clothes at a "draper's" and go to a "stationer's" for writing materials. They see no skyscrapers—and the Army advises them not to brag about those back home.

The Coasts of Normandy and Brittany

By W. ROBERT MOORE

AY AFTER DAY, night after night, squadrons of United Nations' planes sweep over the ancient French provinces of Normandy and Brittany, where old friends welcome deadly bombs aimed at Nazi targets.

American Flying Fortresses and British bombers have dropped thousands of tons of high explosives on U-boat pens at Lorient, St. Nazaire, and Brest. Shipping and docks at Le Havre and Dieppe, factories and railway yards in Rouen and Caen, and power stations along the many-castled Loire have been blasted to bits.

Facing England across the Channel, Normandy and Brittany stand at the front gate for a direct frontal invasion of Europe.

Until the German armies, in the summer of 1940, swarmed over France with the suddenness of the equinoctial tidal bore surging into the funnel-like mouth of the Seine River, the two provinces were peaceful, smiling lands.

On Norman dairy farms cattle contentedly scythed arcs in deep clover where they were tethered. Milkmaids went to and from the pastures swinging pails. The brown earth curled in precise furrows behind plows drawn by huge, sleek Percherons.

Apple orchards, after spraying the springtime countryside with fragrance and color, set new fruit, which in ripened fullness provided Normandy with its chief beverage cider.

Gemlike fishing ports along the coast bustled with activity as bright-colored fishing fleets came and went. Sun-bronzed, salty seamen worked with their nets. Vacationists thronged the beaches at Deauville, Trouville, and other resorts in the summer months.

How different now!

Nazi Troops Fortify Beaches

Gray armies, not gay holiday crowds, occupy these coastal towns. If there are tripods and easels in the narrow Old World streets and along the water fronts, they are the kind that hold map tables and machine guns rather than cameras and canvases. Beaches are strewn with barbed wire. Big guns also stud the chalk cliffs and shores, to guard against counterinvasion.

This is not the first time that war has come to these historic provinces. Witness their very names. Normandy, land of the Northmen, gained its title back in the 10th century when the hardy Norse adventurer, Rollo, set up a state here. Brittany is a lesser Britain. Its people still retain a strong Celtic strain, such as is found in Wales and Cornwall.

Crisscrossing threads of fortune and struggle have woven an intricate tapestry of history. Its pattern is in every village and at every turn in the highway. But in the daily life of the people there is remarkable continuity. Centuries ago Normans and Bretons farmed the soil and fished the sea. Centuries hence they will probably be doing the same.

Homeland of William the Conqueror

Before war locked their gates I rambled through Normandy and Brittany and sampled their charm and hospitality. Along highways and byways I visited medieval cathedrals, intimate old half-timbered houses, thatch-roofed cottages, attended religious pilgrimages, and talked with the bardy farm and fisher folk. They arrested the eye and caused a surge in the heart.

"How like an English countryside!" I once heard an English traveler exclaim as a Parisbound train sped across Normandy.

"Yes, 1066 and all that, you know," an-

other replied.

Deftly, with a single date, the error was rectified. If the spirit of William the Conqueror hovered near, as it must have at that moment, it no doubt smiled approval at the retort courteous, for he, William, had helped make England look like Normandy!

This was William the Conqueror's homeland,* At Falaise stands the much-reconstructed old castle where he first saw the light of day. Villagers were keen to point out the very window where Robert the Devil stood when he gazed down into the gorge below and first caught sight of Arlette, the tanner's daughter, washing clothes. Romance was kindled. In one of the rooms in the thickwalled stronghold William was born.

At Dives-sur-Mer, now a sleepy village a mile back from the sea, William assembled his ships and soldiers for his conquest of England. Not since that year, 1066, has that "tight little island" been successfully invaded.

Back home in Normandy after the Conquest, William, to stop raids on his duchy, burned Mantes to the ground. While riding

*See, in the National Geographic Magazine, "France Farms as War Wages," by Howell Walker, February, 1940; "Normandy, Choice of the Vikings," by Helen Churchill Candec, May, 1936; and "Land of William the Conqueror," by Inez B, Ryan, January, 1932.



S Retros Translet from Genderen

Two Stalwart Men of Stone Gaze Toward an Unknown Grave of Men Who Dared

On a wind-swept hill at Etretat, this monument to Charles Nungesser and François Coli looks toward the Atlantic. Two weeks before Charles Lindbergh landed at Le Bourget on May 21, 1927, these French pioneers attempted the more difficult east-west flight, only to perish at sea. Not until September 1-2, 1930, did their countrymen Coste and Belloute make the first non-stop flight from Europe to New York.

among its smoking ruins his horse stumbled on a charred stick; the corpulent warrior fell and sustained an internal injury which caused his death at Rouen in 1087.

To the Abbey of St. Stephen at Caen, gift of William to the clergy, his body was carried for burial.

Through Mantes, past charming Vernon, Pont-de-l'Arche, and Rouen the placid Seine wanders toward the sea. It loops lazily through green-and-gold-striped farms and around a hundred rolling hills. Here and there it splits to enclose verdant islands.

Rouen, Target of Flying Fortresses

In peacetime there was heavy river traffic between Rouen and Paris. Sturdy tugs chugged up and down this winding waterway, towing long lines of barges. On some, tiny boxes of geraniums flaunted gay color. On others, water wives' laundry fluttered and snapped in the breeze. Children played on the afterdecks.

Though it lies 80 winding miles up the Seine from the sea, Rouen ranked first among France's ports for weight of cargo handled.

The city sprawls in a vale within a horseshoe of hills. Innumerable church spires and smoking factory chimneys rear high above its expanse of rooftops.

Describing a long, sweeping curve, the broad Seine severs Rouen into unequal parts. Art, architecture, and history are on one bank; industry on the other. Two bridges and a steel transporter span link the two shores.

Before war came, Rouen worked with huge quantities of cotton. That single task absorbed much of its daily toil. But it also had chemical and other industries. Many of these machines have since been converted to war uses by the Nazis. Against these and the railway yards U. S. bomber crews directed their



Drittish (tmichal)

U. S. Boston Bombers Blast the Seven-year-old Tidal Basin of Le Havre

Night and day, R. A. E. and U. S. A. A. F. planes have rained bombs on Le Havre's proud new port. At the right are gasoline storage tanks. Diagonally across the center runs the quay from which the Normandie started its record-breaking maiden voyage of May 29-June 3, 1935. Just to the right of the bomb bursts is a sunken dredger. To the left, two white buoys mark sunken vessels (page 208):

explosive loads in the first all-American bombing attack on the Continent on August 17, 1942. Flying Fortresses and R. A. F. bombers have been back numerous times since.

Rouen is a shrine. For 500 years the name of Joan of Arc has been held in reverence. Idealism, patriotism, and stanch courage were hers. Here in the old market place she was burned at the stake. The spot is marked by a simple monument, portraying the Maid in prayer as flames writhe about her body. Green shrubs and fresh flowers surround its base (Plate XIII).

One day as I watched, a young girl, whose face might have been that of the Maid of Orléans herself, dropped to her knee and tenderly laid a single bursting bud before the gentle figure.

Near by is the donjon of the castle where Joan was imprisoned. Tablets in the vicinity mark sites closely associated with her in those tragic weeks leading to her execution.

Once the capital of Normandy, Rouen is also a museum town. But it is no cold and catalogued display. On a corner opposite the Joan of Arc monument I photographed—and I hope it still is undamaged—a time-caressed timbered auberge, or inn. Cheery geraniums filled its window boxes, and crisp curtains hung at the tiny-paned windows. After centuries it was still open for business!

Along other narrow streets old houses lean chummily toward one another, so that house-wives in upper windows can chat easily across the few intervening feet between them. The Law Courts occupy buildings that were originally erected to house the parliament of Normandy about the time that the first news of the New World was being heard in the Old.

And churches! Here are churches galore big ones, little ones, rich ones, poor ones, Many who profess to know Gothic architecture claim that St. Ouen is the finest of all. Some have called it "the most perfect building out of Greece." I don't know; but its soaring walls, towers, and flying buttresses stir the soul.

At the end of a narrow lane, over which arches the famous Renaissance Great Clock of Rouen, is the Cathedral (Plate XII). This lofty structure is a melange of various stages of Gothic architecture.

One of its most impressive parts is the delicately wrought 252-foot-high Tour de Beurre, or Butter Tower. This magnificent 15th-century Flamboyant tower of lacelike stone was built from money collected by selling indulgences to eat butter during Lent.

U. S. Bombers Find Le Trait

And who did not eat butter in Normandy? In normal times its dairy berds provided much of the rural wealth. In village inns and at hospitable farmhouses where I have stayed I was served no thin inch-square pats with my meals. Instead, there were often golden chunks weighing a quarter of a pound. And thick slices of cheese, too. On all the tables were brimming pitchers of cider, squeezed from apples of Normandy's many orchards.

Westward from Rouen on the twisting Seine is Le Trait. It has vast shippards, and workers' cottages built in Norman style. American bombers have been at it, for here the Germans are said to be building submarines.

One feature of the lower Seine which war will not change is its mascaret, or tidal bore. A day or two after each new moon high tides sweep into the narrowing mouth of the Seine and pile up water against the outflowing current.

At the equinoxes it produces a spectacular display. A seething, churning wall of water advances upstream past Quillebeuf and Caudebec-en-Caux. High waves curl against the shore wall, shoot into the air, and send tons of water splashing everywhere. Boats along the way bob, bounce, and sometimes break from their moorings. Out in China I have watched a similar bore surge up Hangchow Bay.

Le Havre-Blasted by Nazis and British

Many visitors periodically came to Caudebec-en-Caux to see this featured attraction of the Seine. At any time the village itself was well worth a visit. Some of its old wooden homes have really been *lived* in—ever since the 13th to 16th centuries! Here are some of the finest examples of early Norman architecture to be found in the country. Big, modern Le Havre, known to countless trans-Atlantic voyagers, has taken a bad beating. The Germans bombed it before they occupied it in June, 1940. The British and Americans have come back to blast at anything in the port the Germans might use (page 207).

Reports claim that every one of the tidal gates, regulating the depth of water in its big artificial docking basins, has been broken.

In peacetime this well-equipped harbor handled huge imports of coffee, cotton—and transatlantic visitors.

Across the wide mouth of the Seine from this gateway to Paris is Honfleur. Powerful as early as the 13th century, it grew into a thriving port and heavily walled town. So prosperous, indeed, did it become that many rulers cast covetous eyes (and sent covetous soldiers) for its control.

Its importance faded when sand banks began blocking its harbor and Francis I ordered the building of Le Havre.

Honfleur came to be coveted mainly by artists. To know why, one needed only to look at its multicolored fishing boats and sturdy fishermen, to wander up by its old wooden church which was pieced together by a shipwright, or to roam about the narrow streets and mellow slate-covered houses.

From Honfleur Sailed Quebee's Founder

Among the town's memories are its contributions to exploration. Its colonists and traders ranged far afield.

Facing the water front is a quaint old stone building with corner turrets, the Lieutenance, which is part of a 400-year-old castle of the king's lieutenant. A slab set in its walls proclaims that Samuel de Champlain sailed from this port when he ventured forth to found Quebec.

The scent of woods mingles with the tang of salt air on the Calvados coast road down to the twin resorts of Trouville and Deauville. In normal summer seasons vacationists from all the world gathered here to swim in the sea, loll on the beaches, attend horse races, and try their luck at the casinos.

During the height of the season it was almost impossible to find a room. When September came, however, Deauville was locked and boarded up, while Trouville shrank to a quiet little town of fewer than 6,000 persons and forgot the deserted villas, castles, chalets, and timbered houses that perched on the high bluffs above (Plate XIV).

Distances are so short here in the heart of Normandy that peacetime pleasure trippers could motor down the coast from Trouville

Normandy and Brittany in Brighter Days



13 National Geographic morrey

Roderdarime by Petry Upon Mair

In a Spanking Breeze a Tunny Boat Sails from Douarnenez

Jutting out into the Atlantic, Brittany forms the western outpost of Hitler's vaunted "Atlantic wall." These color plates, made just before the fall of France, record the normal life and customs of the fisher folk living along the coasts of Normandy and Brittany. In the past, wars often have interrupted the daily activities and colorful festivals of these sturdy people who till the soil and fish the sea. Douarnenez was France's largest sardine fishing center, with a fleet of 800 boats and a number of canneries.



Timbers Go into the Building of Lobster Boats at Camaret Honest Lubor and Strong

In peacetime voyages these small ships often wandered as the coasts of Morocco in search of sea crayfish. A sardine fishing fleet also operated from this port, at the tip of a long peninsula which encloses the wide roadstead of Brest, Many sailors in France's Navy come from the seafaring men of Brittany,



Southwest Respectible Southers

"M-m-m, Your Cakes Look So Good, Grandma"

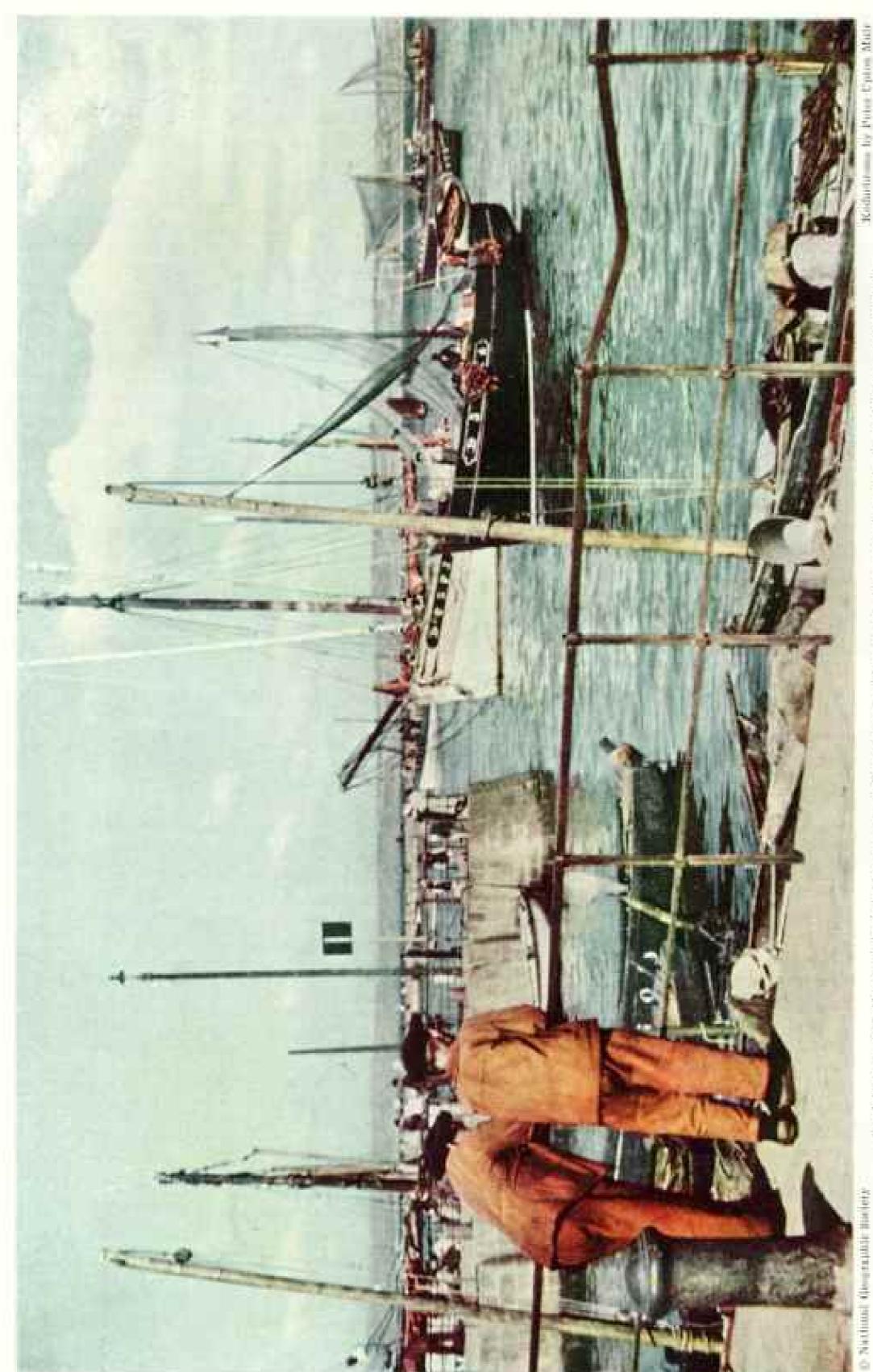
Pantry is scarce now in France, but at this peacetime festival in Fouesnant the youngster knew she would get all she could cat. At such half-secular pilgrimages, saints, cakes, and créper (pancakes) were specialties.



Mollachmonics by Peter Purse Mo-

Fifty Years at Sea Have Weathered His Strong Face

But in spirit this hardy fisherman was still young. He looked forward to spending many more years with the sardine fleet. Beret and red-tinted denius are typical dress in normal times for these milty seamen on the Brittany coast.



Two Fishermen Hang on the Rail and Talk Ships and Fish Taking a "Sailor's Holiday,"

Several sardine boats, their bluish nets bung on the masts to dry, have returned to their home port of Douarmener. The white craft, center, engages in tunny fishing. Recause the sea is an important source of livelihood, the people here in pracetime held an elaborate ceremony of Blessing the Sea on the first Sunday in August,



The Male of the Species Can Be Colorful,

7007

These two young men of the Dotturbenez district are dressed here in their Sunday best. From his costumes and workaday denims, young Normans and Bretons changed to khaki or mayy blue. Many are still in German prison camps.



Keelechpmen by Peter Upom Man

Crisp Lace Caps, Bright Aprons, Gay Smiles

It was festival day at Pont-Ayen, Breathless, these young women had just finished a village dance. In Brittany there are about 800 types of coifs; each locality has its own. Some cover the head; others are but they wisps of lace,



Fishing Fleet Dotted the Sea That France Might Have Food Sails of the Douarnenez

Many Americans visited this harbor to watch the colorful craft sail in by the hundreds with their catches of sardine and tunny. Sailors and women packers champed along the quays and narrow atrects in wooden shoes, During the season, which extends mainly from June to December, almost everyone in this town of nearly 12,000 people was engaged in the fishing industry.



Under the Springtime Wistaria in Normandy Approximate familiary for G

This girl from Auge perhaps waits now in vain for a soldier sweetheart or husband who went to the defense of France. She puts on her folk costume for holidays, market days, and religious festivals,

Centuries, Not Seasons, Dietated Her Hat Style

Sugar-loaf headdress shows this young woman lived in the Pont-l'Abbé region. Beneath the conical cap a small bonnet holds her hair up tight. Bretons call both headdress and weaver Bigoudens. Her costume was four generations old.

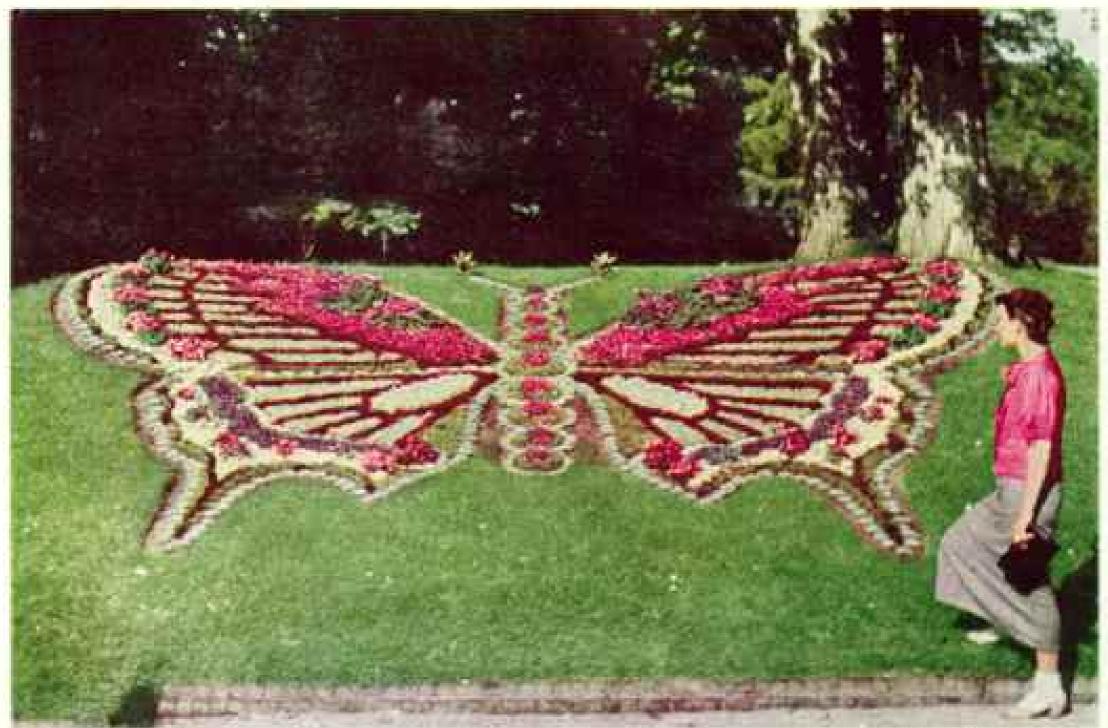
The National Geographic Magazine



Modernme by Poor Upton Moir

In Brittany, as in Scotland, Bagpipes Wail

Used as an accompaniment to folk dancer, the bampipe, or history, has one drone and a smaller pipe that is fingured. It is Brittany's ancient musical instrument. The second performer (left) plays a kind of clurinet.



Stational Greens his Sorbety

Finder by W. Balsett Moore

Botanists, Not Lepidopterists, Please Identify This Butterfly!

From no coccon, but from the ingenious use of flowers in the Botanical Gardens at Rouen, this "specimen" has been hatched. The groenswards, bordered with colorful blooms, and plants growing in glasshouses attracted many Rouennais here on Sundays and holidays.

to Dives-sur-Mer, swing back through Pontl'Evêque, of cheese fame, then on to ancient Lisieux, to Falaise where William the Conqueror was born, and end the day at Caen.

Such a quick trip was no adequate way to see Normandy, but it was a day packed with rich memories.

At Dives-sur-Mer, William assembled his invasion fleet for the conquest of England. It is difficult to imagine 250,000 men awaiting the day of departure, for Dives is now separated from the sea by a mile of meadow land. It has a population of only a little more than 4,000 persons.

One of the most intriguing spots in town is the rambling old Hostellerie Guillaume-le-Conquérant. William never saw this flowerembroidered old inn, but it is a charming bit of Normandy (Plate XVI).

Parts of Lisieux are the very essence of an old Norman town. Dozens of history-caressed houses overhang narrow lanes. Its cathedral, now the parish Church of St. Pierre, is the oldest Gothic church in Normandy.

At Lisieux, too, is the shrine of the Little Flower, that gentle Carmelite saint, Thérèse. Thousands of persons from all over the earth have come here on pilgrimage.

Caen is gloomy, severe. It is built chiefly of stone. Its churches, abbeys, and castle have acquired a patina of age, but hardly of mellowness. To me, however, Caen has a ruggedness that I associate with the Conqueror. This one-time capital of Normandy was his favorite residence.

In the Abbaye-aux-Hommes, also known as St. Stephen's, William was buried. A slab set in the paving in front of the high altar marks his grave. Huguenots and the people of the Revolution, however, did not let his bones rest in peace.

Caen Industry Based on Iron

Iron discovered in the locality provided much of the normal industrial activity of the town. Though 9 miles inland, Caen has a small modern harbor. A canal has been dug to the sea. Boats loaded with cargo seem to be drifting across green fields as they move up and down this channel.

Both shipping and foundries have been the targets of United Nations' bombers in several intensive raids this year.

Westward from Caen is Bayeux, widely known for its famous tapestry which has been attributed to Queen Matilda, the Conqueror's wife. It matters hardly a whit that it is not a tapestry, but embroidery.

It still is a remarkable historical record of the Norman Conquest of England. To say that the tapestry pictures 623 persons, 202 horses and mules, 55 dogs, 505 other animals, 57 buildings, 41 ships and boats, and 49 trees, and that it is 230 feet long by 20 inches wide, is like telling the square inches and number of brush strokes on an Old Master. But it does give some idea of the infinite amount of work that went into its making.

Westward from Grandcamp-les-Bains and Isigny the Normandy coast turns north. The Cotentin Peninsula juts up saucily into the English Channel. Midway on its northern shore is the transatlantic port of Cherbourg.

Numerous foreign visitors knew its expanse of modern docks, its mammoth maritime building, and its large naval and harbor works, choice targets for R. A. F. bombers many times. Few travelers, however, paused between steamer and boat train to explore the inner basins where the fishing fleets tied up, or listened to the gay banter of the fishwives in the market. Yet Cherbourg had many attractions beyond its function as steppingstone to Paris.

On one of my trips out from Cherbourg I arrived at Barfleur, on the northeastern tip of the Peninsula, on Sunday. It was also festival day. All the fishing boats had come into harbor, and from their masts fluttered countless flags.

Festival Day in a Fishing Village

A local band tootled through a quayside midway. Sweetmeat stands, catch-penny shows, a carrousel, and numerous stalls had been staked out beside the harbor. Smacking strongly of the proverbial postman on a holiday, fishermen tacked their boats in an exciting sailing race.

The fair may have lacked impressiveness. Not so the laughter of the fishermen, the starry-eyed expression of the youngsters, and the gay smiles of the women folk. They still could enjoy simple pleasures with full-hearted enthusiasm. What of those same people now?

Westward from Cherbourg, toward the tiny finger of land that is Cap de la Hague, are rolling fields and farmlands above bold coastal bluffs. Here is a region for artist or poet.

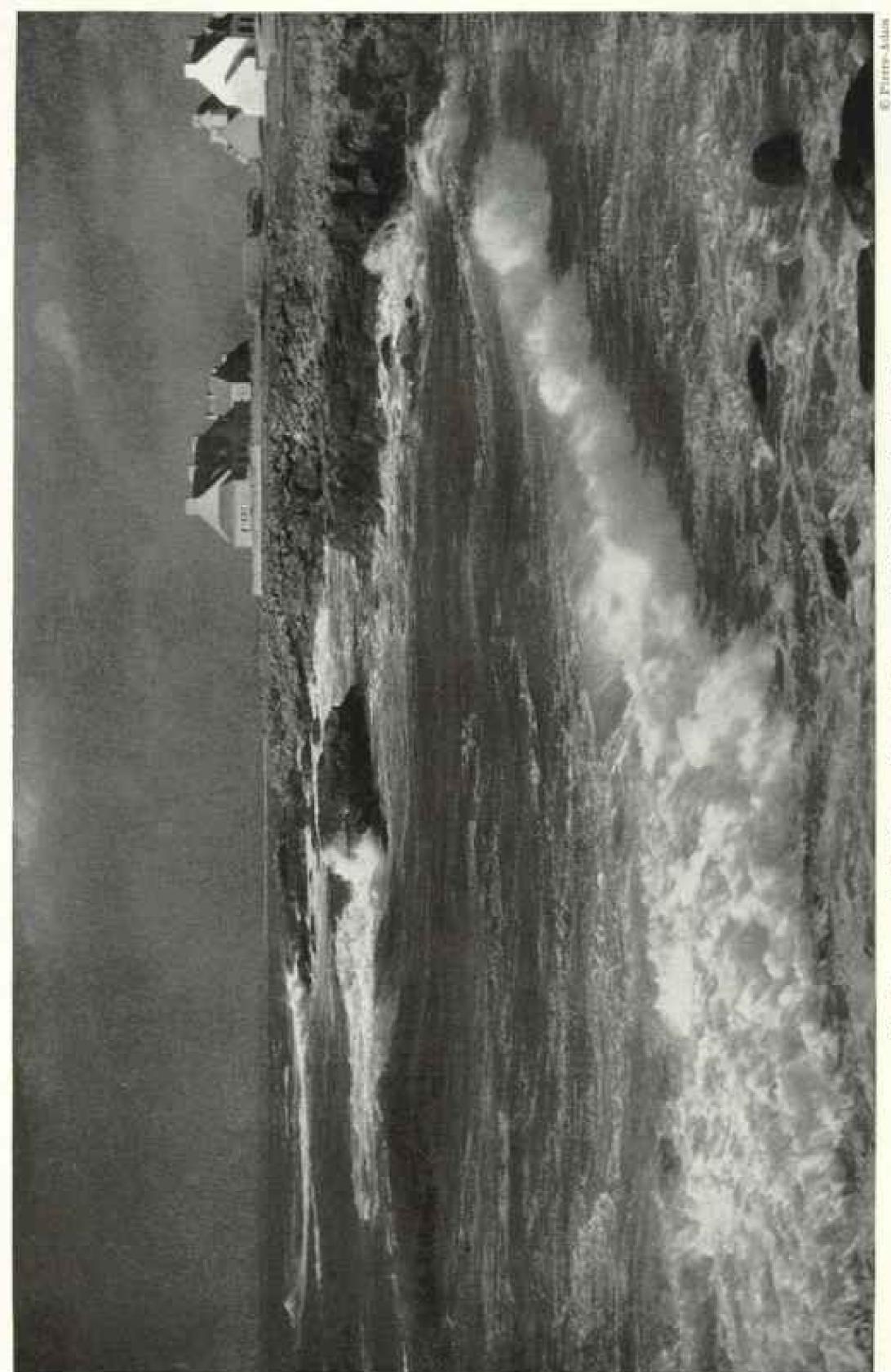
And it was here that an artist was born— Jean François Millet.

From a humble peasant boyhood spent in one of the small, flower-splashed stone houses in the cluster of peasant cottages at Gruchy, he became a painter of peasant life. Rugged characters and homely occupations, such as his understanding brush transferred to canvas, still fill this part of Normandy.

Off the western coastline, punctuated by fishing ports, the British Channel Islands can

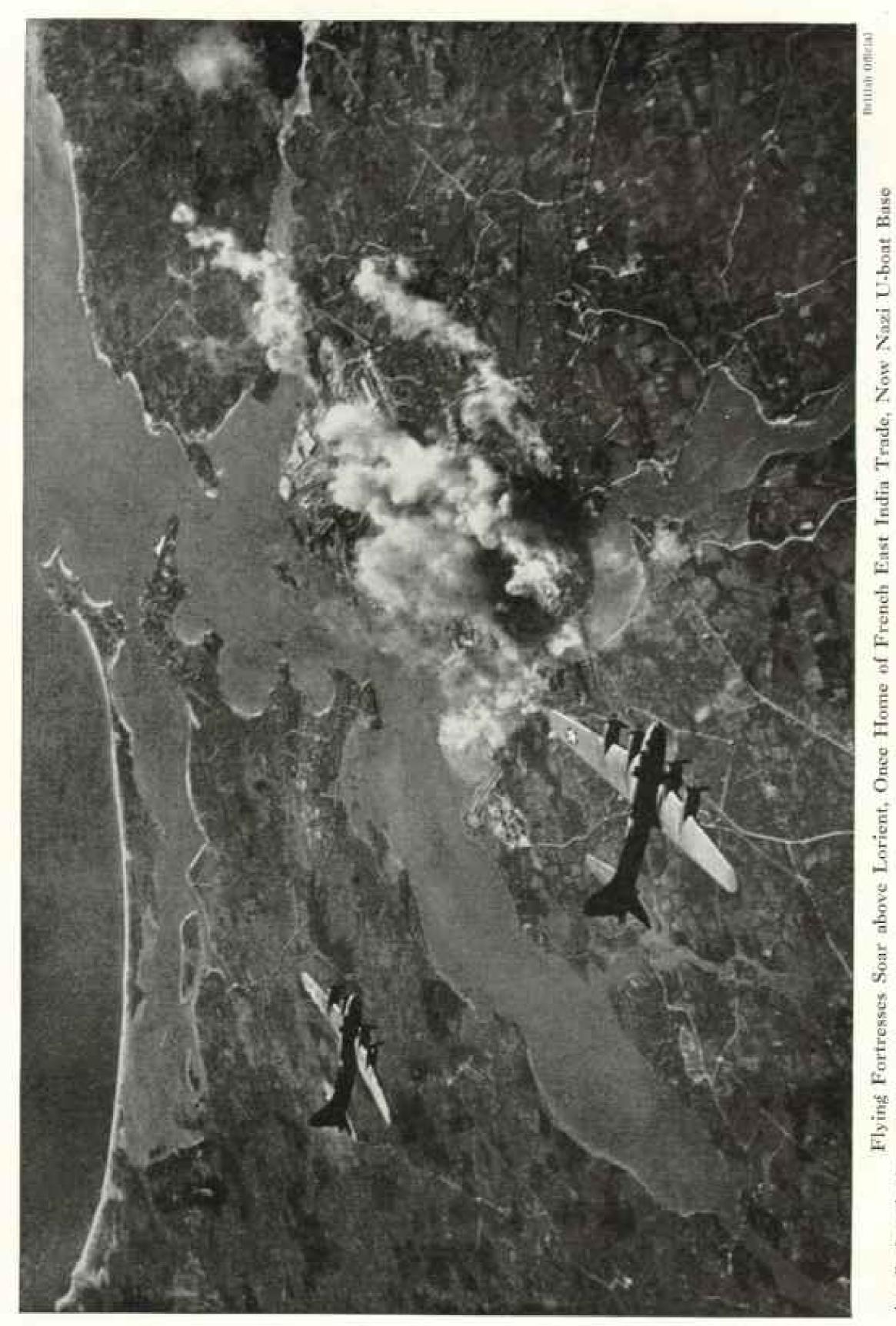






The Wave-washed Western Prong of France Is Finistère-Land's End

Between such rocky headlands are deep estuaries where ports are hidden and landing boats could ground on sandy beaches. In the Bay of Audienne, this bubbling caldron of rock and wave is known as "Hell's Fit." At near-biel scaport of Finistère—nearly 800,000 American soldiers landed in the year which brought victory to the Allies, 25 years ago.



A pall of amoke from well-placed bombs hides the west-France city whose name came from the Orient. On Murch 6, 1943, these war birds laid their eggs on the laid of submarines which now menuce the sea lance blacks to India and beyond.

be seen in fair weather. Like France, these have been occupied by German troops.

"You haven't seen anything in France until you have seen Mont St. Michel," a friend once remarked.

From the hills near Avranches one can see its tall spire spearing the sky in the distance. It is a spectacular exclamation point between Normandy and Brittany.†

Far out in a sweep of sea and sand hemming the coast the Mount stands, a pyramid of isolated grandeur. It is like a fairy-book

castle come to reality.

"Go build an oratory on the Mount," was the command which St. Aubert, Bishop of Avranches, heard twelve centuries ago. Was it the temptation of the Devil? Or had he only looked so long at the great granite rock rearing majestically above sand and sea as the tides swept back and forth that his soul could not be stilled?

Again the voice came, spoken, tradition says, by the apparition of St. Michael—saint of high places.

Kings and Commoners Built Mont St. Michel

So St. Aubert began to build. Kings, clergy, and common people who came afterward continued to heap battlements, houses, and skyreaching spires upon the rock.

Countless thousands of people of high and low estate, bent on pilgrimage, romance, or war, picked their way across its bordering quicksands. In the Bayeux Tapestry I saw one scene of Harold rescuing Norman soldiers caught in these quicksands (p. 217).

Mont St. Michel was sufficiently prosperous in the days of William the Conqueror to provide several boats for his invasion of

England.

Garrisons here beat off onslaughts of the English during the Hundred Years' War. Here, too, later inhabitants slew the Huguenots one by one as they climbed ropes to effect entrance. Yes, Mont St. Michel has its history. It permeates every stone in its heavy walls, houses, abbey, and buttressed monastic buildings.

Since 1879 the Mount has had a causeway, enabling people to reach it dry-shod. Over it extends a light railway and motor road.

To appreciate Mont St. Michel one had to climb its steep steps (there are 663) and tread the worn flagstones to examine its turreted châteaux, slender cloisters, and airy pinnacles.

Westward along the coast is ancient St. Malo. Here was the one-time haunt of the corsairs. In their heyday, these swashbuckling Malouins, manning freebooter ships, preyed heavily on English craft. "Robbers of the sea" was but one of the mildest epithets hurled at them. Some accounts say that the corsairs took nearly 1,400 ships between 1692 and 1697. England struck back twice by bombarding the town, but was unsuccessful in destroying it. Again, between 1793 and 1814, the St. Malo fleet captured between 5,000 and 7,000 English warships and merchantmen.

The history of the port has an odd way of repeating. The British have recently returned to bombard the town again, this time from the air.

Pictures Reveal Bomb Hits

British pilots have brought back motion pictures showing their bombs bursting across the port. Just how much damage has been inflicted, however, only the German overlords in the locality can assess with accuracy.

Just off Rue St. Vincent, main street of St. Malo, is a house, which, if it has not now been destroyed, has its upper stories hanging over the thoroughfare. It was the home of Duguay-Trouin, one of the most noted corsairs of them all. To his single credit (or discredit, from the English point of view) was the capture of some 300 English ships. In a spectacular expedition he also captured Rio de Janeiro in 1711.

Named for him is the 7,249-ton cruiser Duguay-Trouin, one of the nine French warships which joined the United Nations' naval forces at Alexandria, Egypt, on May 30, 1943.

St. Malo had men remembered for other deeds. Set in the mosaic in the pavement of St. Vincent's Church are these words: "Here knelt Jacques Cartier to receive the blessing of the Bishop of St. Malo on his departure for the discovery of Canada, May 16, 1535."

Actually Cartier had made a voyage the previous year in two tiny boats manned by 61 men to explore the coasts of Newfoundland and islands off Canada's mainland.

Recruiting Ground for France's Navy

There is still salt on the lips of the hardbitten Bretons who toil with their nets and their sails. The sea is in their blood. From these rocky shores have come many sailors to man France's Navy.

St. Malo was an island once. For years it has been linked to the mainland by a causeway.

*See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Foudal Isle of Sark," by Sibyl Hathaway, July, 1932; "Guernsey, the Friendly Island," by Alfred S. Campbell, March, 1938; "Channel Islands," by Edith Carey, August, 1920.

7 See "Mont St. Michel, a Medieval Masterpiece," 72 Bustrations in duotone, National Geographic

Magazine, May, 1936.



British Official

An Anglo-American Suicide Ship Changed the Picture at St. Nazaire

In Nazi hands, this premier shippard of all France became the lair of U-bouts, the repair depot for sea raiders. On March 28, 1942, the four-stacker Campheltown-ex-U.S.S. Buchanan-charged the dock gates in lower center, blowing them up. This view, taken ten months later, shows the bottleneck corked behind an earthen dike, thus blocking the main entrance to the great Penhoët Basin in upper right (page 224).

Seventeen miles upstream from St. Malo is nitely to bracket the whole year and touch Dinan. Like many medieval towns, it grew the entire province. about a castle. The castle still stands sufficiently intact for one to cloak its weathered halls and dungeons in intrigue, imprisonments, siege, chivalry, or romance according to one's personal desire.

Westward still from Dinan is the main road toward Brest, on the jagged end of the outthrust peninsula. It is a road that in peacetime encouraged many detours, especially if one chose a religious calendar as a guide.

At Whitsuntide numerous costumed Bretons gathered at the village of Moncontour for a Saturday-evening torchlight procession, a street parade on Sunday, and dancing and merrymaking on Monday.

On June 24 pilgrims and farmers rode horseback round and round the chapel of St. Eloi, near Landerneau, and then put tufts of hair cut from manes and tails of their mounts on the altar before St. Eloi, patron saint of horses.

One might expand the list almost indefi-

Northwestward from St. Brieuc, gorse-covered moors alternate with green valleys. Fishing villages dot the wave-scalloped coast.

Binie's Codfishermen Roamed Atlantic

Four centuries ago the village of Binic became indubitably linked with the codfishing trade. From the method employed here in curing cod it gave the name benicusser to that salty seafood.

Even in recent years some codfishing vessels have left this port on long voyages to Iceland and Newfoundland waters. So, too, have others from Paimpol and Ploubazianec.

Stout little ships have long been built on these Breton shores -- cod boats, lobster craft, and sardine and tunny fishing fleets. But still stouter hearts have been bred to man them. There is hardly a family which does not know the toil and the toll of the sea. Now the people know the added toll of war.

Not all the coastal inhabitants are fishermen. Bretons about the old sea rovers' nest

of Roscoff raised quantities of early vegetables in their Gulf Stream-conditioned gardens for the prewar English markets.

Compared with these intimate little fishing villages, Brest is large. In fact, I must confess having got lost on my first visit there years ago when I sought out the city's historic old castle by moonlight.

A kindly gray-haired woman set me aright,

and then queried:

"You are American?"

Upon my affirmation she burst into conversation.

"Your American soldiers and sailors, they were here. They were so gay, so loud of laughter, and so good-looking. And the chocolate they brought!"

Her lips still seemed to savor those bars

of sweet chocolate.

"And your President Wilson. How well I remember when he arrived."

World War I Yanks Landed at Brest

Brest was selected as chief base of operations in World War I for that part of the American Navy engaged in convoying merchantmen and troopships into French ports. It also became the principal port of embarkation for soldiers returning after the Armistice.

Above the city walls on the Cours Dajot, overlooking the wide, almost landlocked roadstead, the American Battle Monuments Commission erected a tall, rectangular monument to commemorate the activities of the American Navy.

Brest is a battered place now, the naval docks the German battle-scarred Scharnhorst, Gneisenau, and Prinz Eugen were

tied up for months.

The giant battleship Bismarck, after her dramatic dash into the Atlantic when she sank the British battleship Hood, was probably trying to reach Brest when she was sunk, May 27, 1941.

South and castward along the ragged lower coast of Brittany are other ports. On every cove about the headlands and beside each

sweeping bay nestle fishing villages.

There is Camaret, Douarnenez, Concarneau, Groix, and many others (Plates I, II, IV, VI and X). In peacetime they were places of rare charm. When the sardine and tunny fishing fleets came and went, the sea was studded with bright sails. Red-denimed sailors clumped about the water front in wooden shoes as they worked on their fishing gear.

Once up in Normandy a companion and I spent a whole forenoon wandering through lanes and fields to find a dolmen. Down here in southern Brittany there are hundreds. In fact, more than 5,700 menhirs and dolmens

stud this province.

Menhirs, the tall single stones, far exceed the dolmens, or tablelike structures in which a large flat rock rests on upright stones. There are also some allees convertes, or covered passages, built of huge unwieldy slabs.

Near Carnac menhirs stand row on rowvast alignments of lichen-covered, gray granite rocks. It is said that the Romans used them to hold their tents. But who first labored to put these mighty rocks in place?

Did they form a colossal calendar by which the ancients measured the equinoxes and solstices? Were strange Druidic rites performed here? Or were they the pagan soldiers turned to stone who tried to chase St. Cornely (Cornelius) into the sea? Neither tradition nor archeology has yet given full answers,

You ponder these questions about this mighty rock riddle; and, indeed, you ponder the mystical quality of the Bretons themselves and of their beautiful, though partially austere land. Then suddenly you are brought back to stern reality by such place names as Lorient and St. Nazaire.

The port of Lorient on the estuary formed by the Scorff and Blavet Rivers has been bombed repeatedly because its naval dockyards became a haven for German submarines.

Commandos Raided St. Nazaire

St. Nazaire has an even more dramatic story. Here the Commandos made a daring raid on March 28, 1942. Steaming into the mouth of the Loire River in the face of withering fire, many of these tough British troops went ashore to wreck shore installations, while the H.M.S. Campbeltonen was maneuvered to ram the main lock gates to the harbor basin.

The Campbeltown had been converted into a veritable delayed-action torpedo. She had been filled with tons of dynamite, set to explode when the men were safely away (page 2231.

Long after the Commandos had withdrawn and the Campbeltown had done her work, freedom-longing French battled the confused

German troops in the streets.

The Campbeltown formerly was the American destroyer Buchanan. The United States, however, has closer association with St. Nazuire than this. During the first World War part of the American Expeditionary Force was landed here.

If it has not yet been removed, a bronze statue of a doughboy standing on the wings of an eagle surmounts a granite pile near the entrance of the harbor.

Normandy and Brittany in Brighter Days

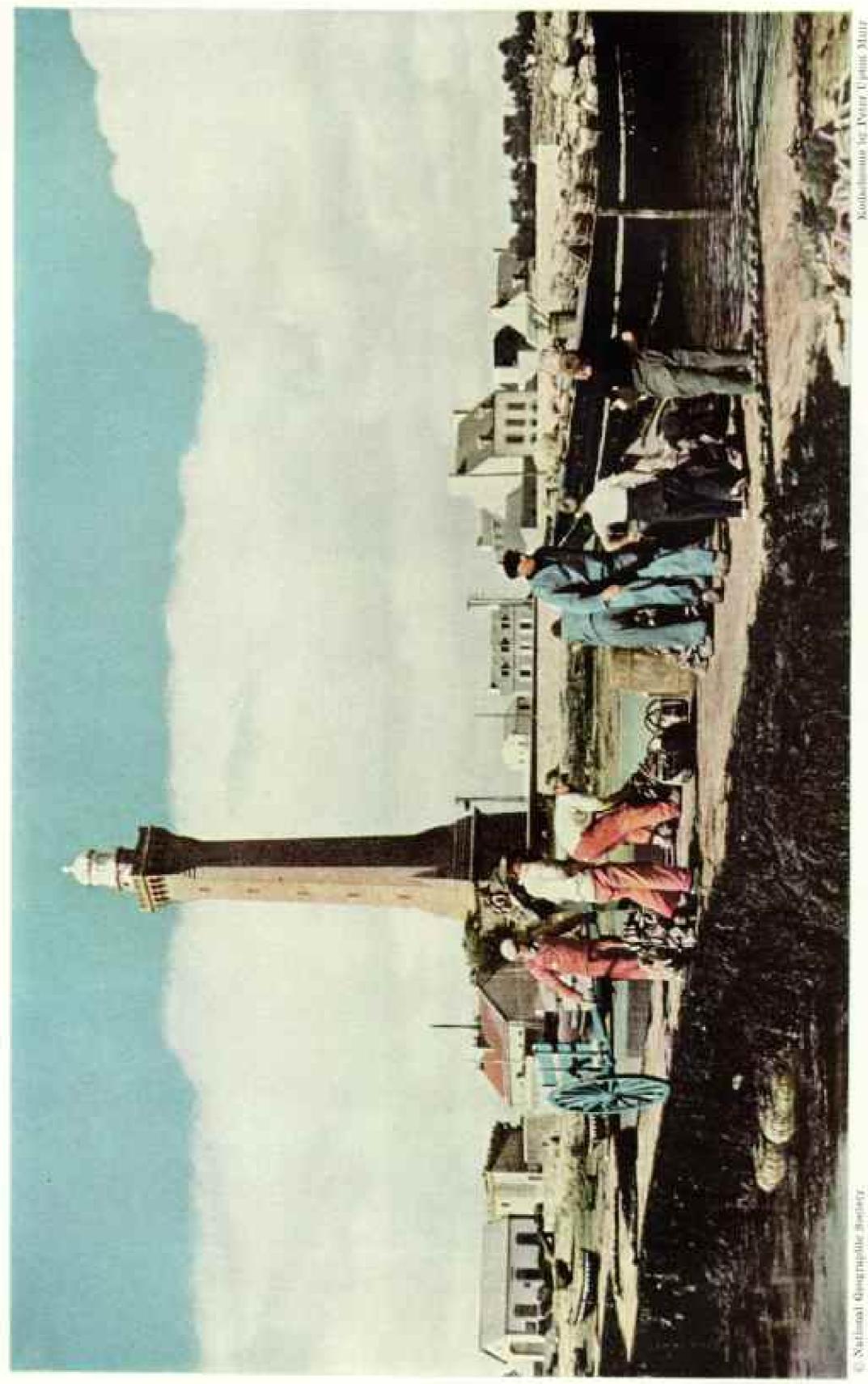


C National designations thering

Mularheome by Pictor Upton Mater

Drink from This Spring and You Will Be Blessed

So believe the deeply religious Bretons, who erect crosses and shrines over many springs and holy wells throughout the countryside. This elderly woman, tasting the cold, crystal-clear water, dispenses thirst-quenching draughts in exchange for small coins to pilgrims who visit the shady dell near Fourstant. Many elaborate shrines stand at crossroads and at villages in Finistère.



This lighthouse, 197 feet high, guards the wild, rocky poninsula of Penmarch. Funds from a legacy of a relative of the Prince d'Eckmühl, a Marshal under Napoleon, helped to build it. The Marshal hoped that the fives it saved would atone for those fost in his campaigns. Fishermen hand the day's catch of sardines to market. High above the Tiny Fishing Village of Kerity Towers the Phare d'Eckmühl



From Chiseled Wood a Breton Peasant Smiles

Working from morning till night through the summer months, this skillful wood carver in the hills above Douarnenez produced many striking studies of country types. He achieved excellent likenesses either from life or photographs,

Deftly She Dabs Color on a Souvenir Sabot

Settlined Grant (8th Feeling)

This tiny model of the wooden shoes worn by the fishing folk of Brittany is one of many novelties from Quimper's potteries. For centuries, Locmaria, a suburb, has been noted for its decorative earthenware, or Quimper Jalence.

The National Geographic Magazine



C: National Growmobie Society

Finlay by W. Bobers Moore

In Hours Only, Not Minutes, the Great Clock at Rouen Measures Time

Citizens who pass beneath the arch to shop or visit the near-by Cathedral have to guess at the exact time, for there is no minute hand. The clock was built in 1511. At the end of this narrow street, called the Grosse Horloge, stands the Cathedral, an outstanding landmark in the old museum town. While the railway yards and port of Rouen have been repeatedly bombed, this clock tower and the Cathedral probably still stand. Such Geographic pictures may someday serve as models for restoring the war-rayaged shrines of Europe.

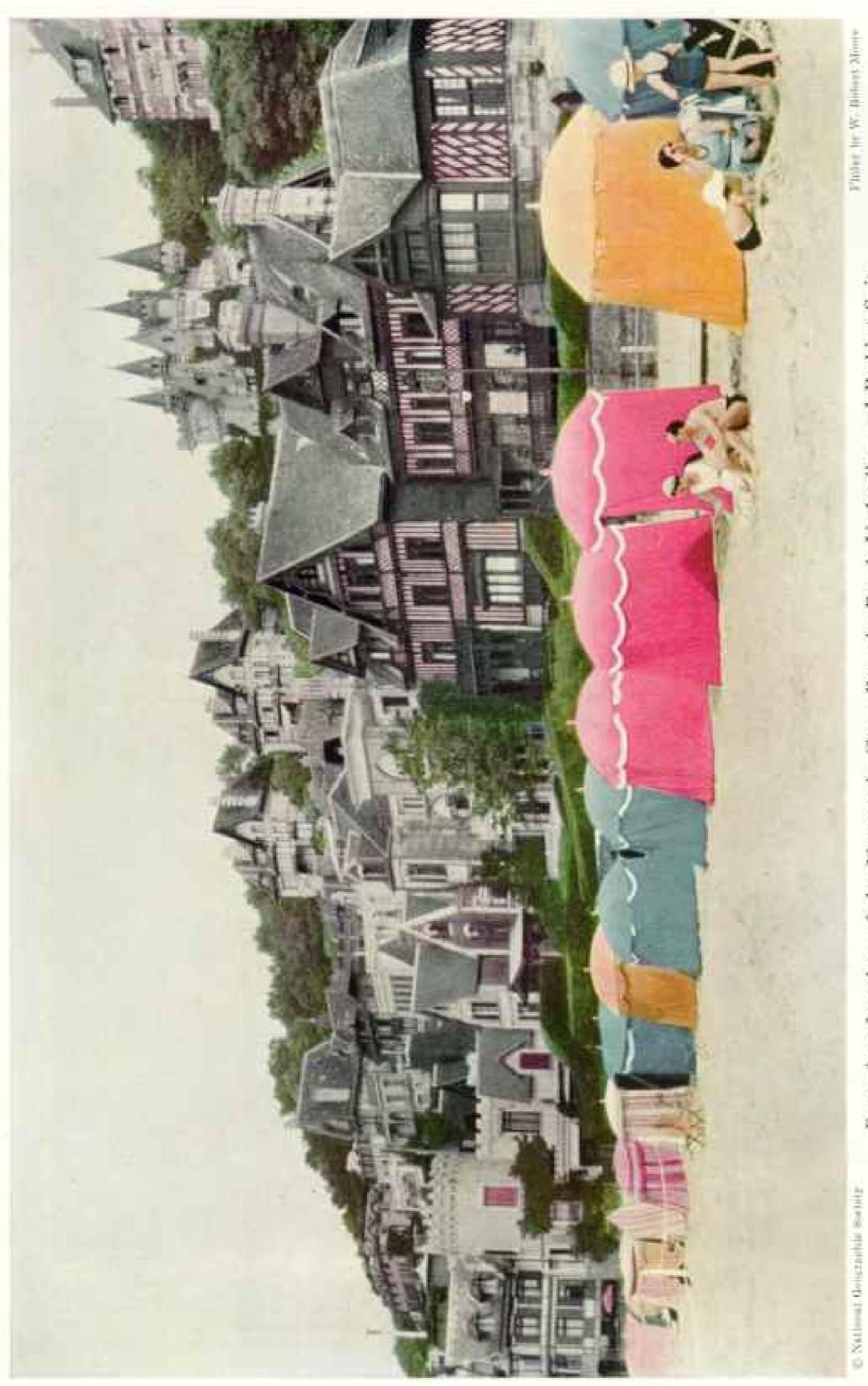


S National Geographic Society

Finites by W. Botsest Moore

After Five Centuries Memories of Joan of Arc Arc Still Green in Rouen

This monument stands in the market place where the Maid of Orleans was burned at the stake. The donjon, or keep, of the castle where she was imprisoned still exists. Tablets mark the sites of her cell and the abbey where she was forced to deny the sanctity of her mission. Joan is still the symbol of independent France. In 1943, when enemy-held Tunisian poets fell to the Allies, General Giraud said: "On Joun of Arc Day-May 8-Tunis has been liberated, Bizerte has been set free,"



Normandy Coast Brought Beach Umbrellas and Bathing Suits Peacetime Invaders of the

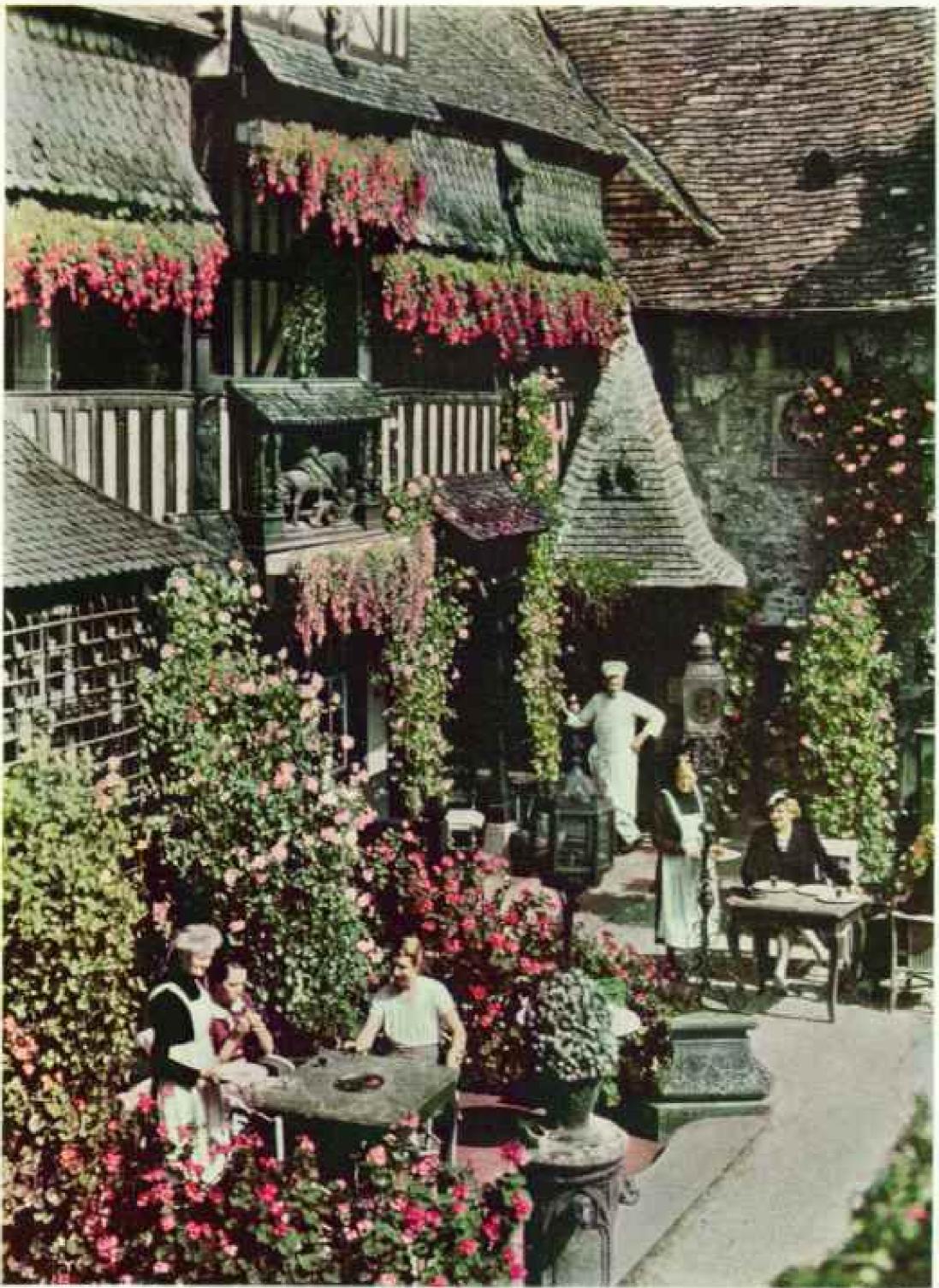
The Germans have temoved most of the French population living along the English Channel. To strengthen defenses, these castles, chalets, and hotels at Trouville probably have been removed or turned into fortnesses by bricking up the windows and doors on the first and second levels and installing gains. A staze of barbard wire and machine-gun nests replace the bathing tents.



Dairy Herds and Apple Orchards-the Pastoral Epitome of Normandy

Everywhere throughout the old Province these fruit trees cover the landscape; chief beverage of the Normans is cider—not wine. Cheese and butter normally provide moch of the rural wealth. The denkey transports the filled cam back to the farmbouse after the woman has finished milking the cows in the pasture,

The National Geographic Magazine



Sational Geographic Swisty

Finlar by W. Belieft Mores

Flowers Adorn the Hostelry of William the Conqueror at Dives-sur-Mer

The Norman leader never saw this inn, as it dates only from the 16th century. But he sailed from this port with his 50,000 men-at-arms and 200,000 of other ranks on his conquest of England in 1056—an invasion which has not since been duplicated. Over the entrance of the village church are listed some of the important members of William's expeditionary forces. Dives, once an important scapart, is now more than a mile inland,

Fit to Fight Anywhere

By Frederick Simplich

FIGHTING from hot tropic swamps to cold Aleutian fogs, today's Yankee soldiers use every art of Mars from savage woodcraft to latest lessons learned in a Haryard laboratory.

"Watch the monkeys, if you soldiers get hungry in the jungles," warns one scientist. "Eat only the fruits monkeys eat, and you'll never get poisoned." Or, eat the monkey itself! I have, in the Philippines, and the

hind legs are good.

If you're forced down in tropic bush or cast away on a South Sea island, there are manuals (from the Ethnogeographic Board of the Smithsonian Institution) that not only tell what snakes and insects like to bite soldiers, and what the men can do about it; they also tell how to knock your breakfast off a tree, make a net from vines to seine for fish, or tell an edible eel from a poisonous sea snake. "If your island has no springs or puddles of fresh water, simply dig a deep hole in the sandy beach and wait for it to fill."

Island savages and jungle tribes all get enough to eat, and so can a white castaway, if he knows how. Hence, in simple words, troops are told how to identify and eat wild ferns, breadfruits, the taro, durian, bamboo shoots, wild figs, yams, pandanus, climbing rattans, etc., as well as spails, turtles, tapirs, iguanas, fruit bats, pigs, and other wild creatures.

"All birds are edible," says the book. Parrots are tough, but make good soup. Even buzzards can be eaten as a last resort. But don't eat parrot fish or puffers; both are sometimes poisonous.

How Cook a Kungaroo?

Already, American boys fighting overseas ask Uncle Sam for quick answers to other odd, unexpected questions.

"How do you cook that tree-climbing kan-

garoo that lives in New Guinea?"

"If my toes begin to freeze in my sleeping

bag, what should I do to get warm?"

"Can you really go 70 days without a bath and still keep clean if you rub yourself with olive oil, if you've got the oil?"

"When a Malay leech drops off a bush and bites into my bare neck, is it true I can make it let go by scorching it with a lighted

cigarette?"

Hence, training our young men not only to fight but to keep fit under strange conditions calls for curious and unusual kinds of mental and physiological conditioning. Remember that Frenchman who, when asked what he did in the Revolution, answered that he "survived"? That's what we want our boys to do—survive. Important questions Uncle Sam must answer, in this respect, have to do with diet and equipment of men fighting in extreme heat and cold, and with changes which occur in both body and mind when men are being severely conditioned for combat.

This build-up of soldiers as machines, with both mental and physical qualities, is made

in two ways.

Field Conditions in Laboratories

First, a few normal, healthy men who volunteer to serve as guinea pigs are intensively "processed" and observed in fatigue and climatic laboratories.

Obviously, it would be impracticable to build enough such laboratories to process the whole American Army before it goes into battle. So a few small experimental shops are used to learn what men should wear and eat, and how they can best be conditioned for combat in hot and cold countries.

Second, large masses of men are actually conditioned at once, as when whole army corps maneuver through southern States in sham battles, or when armored divisions and mechanized cavalry drill in such dry, hot regions as California's blistering Mojave Desert to prepare for combat, say, in North Africa.

In the same way, other forces work with skis, dog sleds, and other Arctic equipment on the snowy mountain slopes of Colorado, Oregon, and New England, conditioning themselves for Alaskan, Scandinavian, Siberian, or

other cold-country campaigns.

I stepped into the "hot room" at one laboratory, and was astonished to see stark-naked soldier volunteers running on treadmills, in humid "jungle air" where the temperature was near 100° Fahrenheit. They told me about a dog, too. In 17 hours, resting 5 minutes out of each 30, he ran on his tilted treadmill a distance equal to 82 horizontal miles, and climbed over 14 miles straight up—or more than two and a half times the height of Mount Everest.

At another laboratory, in a "cold room," soldiers tested Arctic clothing. On piles of snow at subzero temperatures men dozed in sleeping bags, their heads invisible (page 249).

To dispel doubt and get absolutely accurate reports on different types of Arctic suits and sleeping bags, some of these volunteers even wore thermocouples. These are wires, attached to subjects' ears, noses, toes, fingers,



Heallquartery Armored Piece, Official

Winter Comes to the Crew of an M-4 Tank, Here Frozen up Like an Icebox

How will a tank work—and what about clothing, and men's fighting efficiency, in subzero weather? Such questions are studied in the "cold room" at the Medical Research Laboratory, Fort Knox, Kentucky. The icicles on the gun were added to simulate Arctic conditions.

etc., which flash to dials outside the cold room the exact skin temperatures of the different men at various parts of their bodies (p. 248).

You can imagine the observer at the dial saying: "Private Jones there, in bag number 4. My dial shows his right big toe is about to freeze—better get him out of there!"

In still other tests, soldiers don raincoats and stand in artificial wind-driven storms to see whether that certain "waterproof" is really water-repellent. Of these odd indoor experiments, more later.

One Cold Laboratory Atop a Mountain

Spectacular was one Army crew's adventures on top of frigid Mount McKinley, in central Alaska, where it went to make tests (pages 236, 237, 238).

These dangerous trials, made by American and Canadian mountaineers and scientists, were under the direction of the U. S. Army's Quartermaster General. They involved all the thrills and comedy of a movie melodrama.

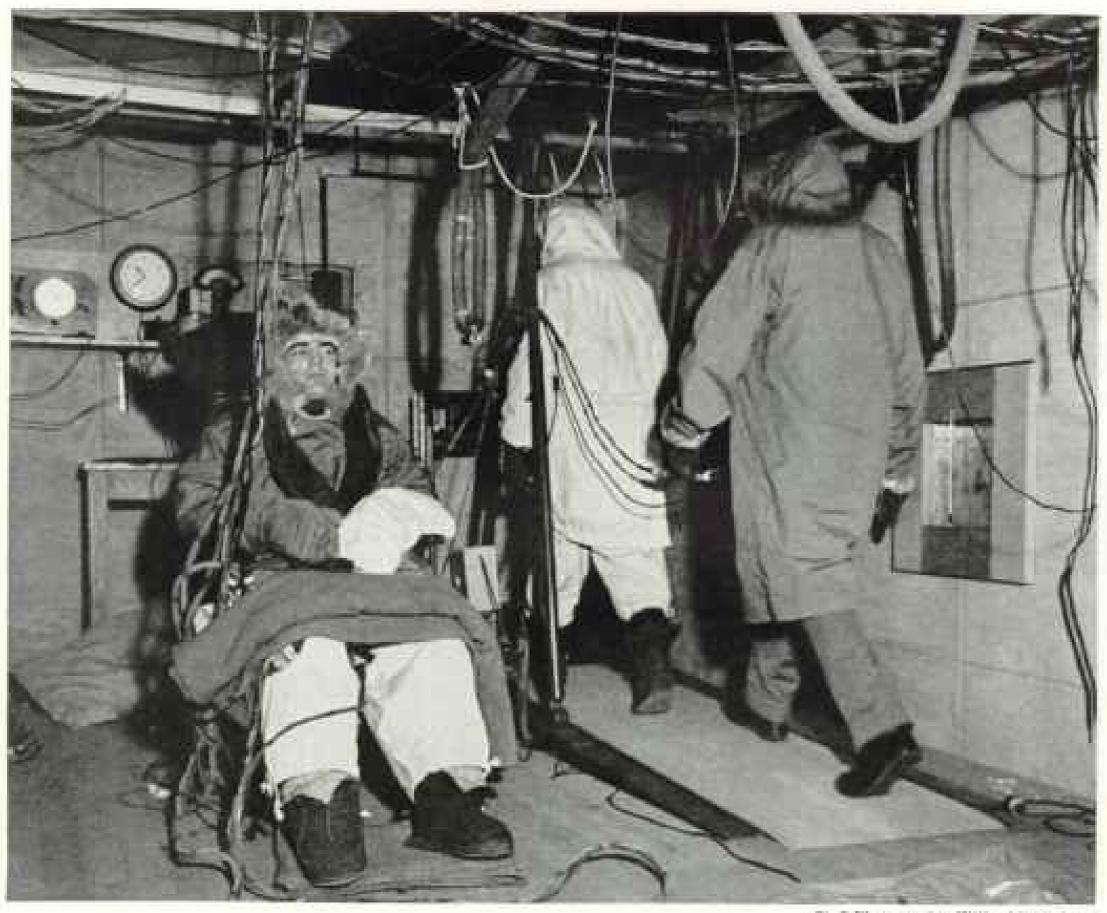
Planes for assisting this Army crew were based at Ladd Field, near Fairbanks. They made preliminary reconnaissance flights to decide where supplies should be dropped.

On these flights the whole mountain area was photographed from the air and then sectioned, as on a grid or checkerboard. Each square was numbered and lettered. Two sets of these grids were made, one for the mountain climbers' use, one for the pilot who flew loads up from Fairbanks and dumped them out.

When men on the mountain wanted certain supplies at a given place, they sent a radio call to Ladd Field and said, for example, "Tomorrow please drop food for 10 days and 25 gallons of gasoline." Then the pilot came and let things fall.

Useful Below-zero Lessons

Bradford Washburn of the American Alpine Club, mountain climber, explorer, and aerial



Staff Photographer William R. Culter

Like Squirrels in Their Wheel, These Men Walk Interminably but Get Nowhere

The men on the treadmill walk seven miles in two hours, up a six-percent grade, testing cold-weather clothing. Perspiration produced while a man is working creates ice and moisture in his clothing, which reduces the protection from cold. The scated man is testing electrically wired clothing to determine best distribution of heat to various parts of the body,

photographer, was a member of this expedition.

I asked him why the Quartermaster General chose Mount McKinley.

"Because it's the only reasonably accessible place in North America which gives Arctic conditions in summer," he said. "Army wanted to test winter equipment in advance, before buying a big lot for actual combat. So we used this mountain, bottom to top, for a cross section of all kinds of tough weather."

"Will you tell us about some tests you made?"

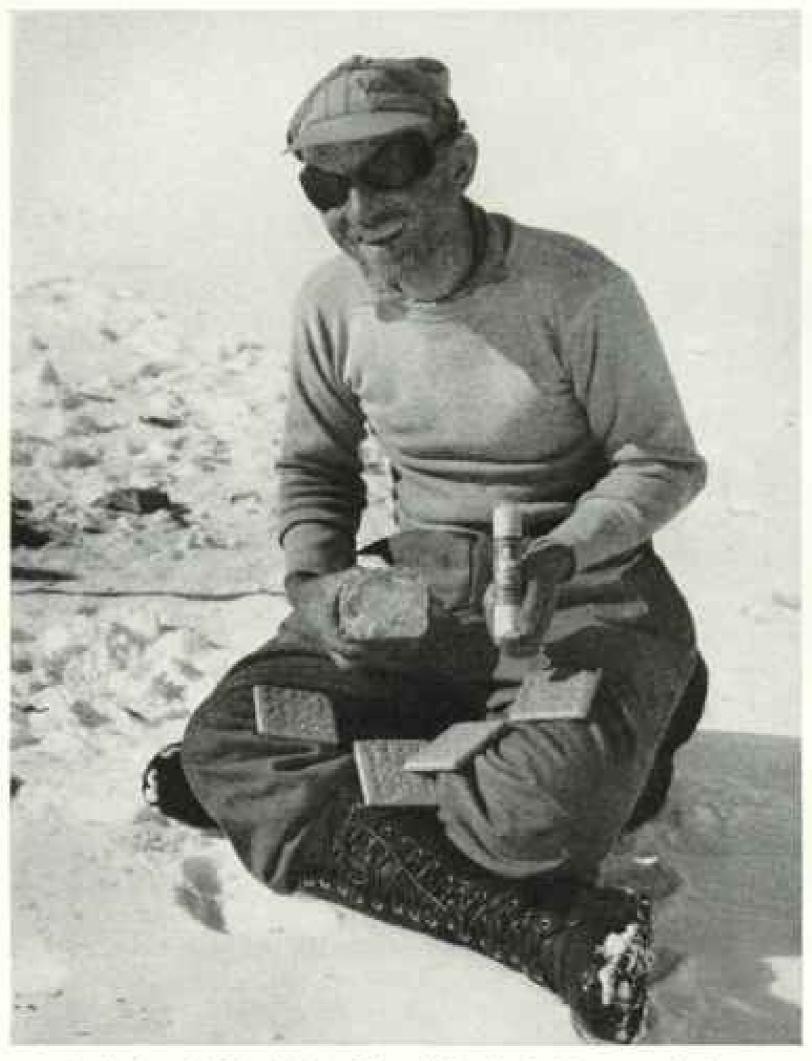
"Sure! Our job was to try out and report on more than 100 items of Army equipment, many of which are now being used in actual combat. We were to give these a punishing and practical field test. If we tore them apart or if they failed to do their jobs, we were to report not only that they failed, but why.

"Approaches to Mount McKinley are just above timber line, where the barren tundra swarms with mosquitoes. There we tested nets.

"We tested and improved on gas stoves, tents, mittens, plastic canteens, sleeping bags, boots, snowshoes, paper underwear, dehydrated foods, etc. Gasoline stoves, for one thing, must be light to carry, of low fuel consumption, quick to ignite, have high heat value, and be able to work well in any temperature on any kind of gasoline, leaded or not:

"Some equipment was tested flying in the freezing air over McKinley."

These men learned, too, that a temperature of 25° below at 18,000 feet is more severe on the human body than the same temperature at sea level, since at this altitude you have left behind more than half of the earth's atmosphere, and you encounter increased wind



A Cache of Food Was Found Perfectly Preserved after Lying 10 Years in Mount McKinley Snows

Members of the Army's laboratory staff at this natural "quick-frozen" food and found it wholesome. It included a can of Hormel chicken, a stick of Knorr's bean soup, sardines, sausage, and the "Eskimo biscuits" in his lap (page 242).

velocity. It seems, therefore, harder to keep warm at 20 below zero at 18,000 feet than at 40° below near sea level.

Army's research includes work on clothing and equipment, dog harness, snow goggles, pitons, parkas, snowshoes for horses, avalanche probes, etc.

"But our tests on Mount McKinley," continued Mr. Washburn, "were not like a laboratory test at all. Don't think we just took our equipment out and walked back and forth in front of a tent for a couple of hours to see how it worked. We wore the experimental clothing all the time; we slept in the experimental sleeping bags; we lived in the experimental tents; we cooked experimental food on experimental gasoline stoves in experimental utensils."

Mukluks Roplace Alpine Boots

Heavy leather climbing boots impregnated
with grease, entirely
satisfactory in the
Alps, were discarded
after lessons learned
here, because they will
not hold enough socks
for terrific subzero
temperatures. Leather
freezes to rocky hardness at 25° below.

In place of these heavy boots, the expedition recommended Eskimo mukluks made from dry tanned leather with canvas tops, an absurdly simple answer to an apparently tough problem.

Mukluks were also recommended for mobile troops, constantly on cold marches. For relatively stationary troops Arctic felt shoes were recommended.

"We also learned one needs more sleep at high altitudes," said Mr. Washburn. "You sleep well, but not so soundly.

"Although we went

weeks without a bath, we found that one's feet remain in fine condition and look very clean, because up on this snow-clad mountain there is no dirt or dust. In 70 days I took no bath, but rubbed myself with olive oil."

Eskimos and Indians practice layering their clothing, the secret of warmth. Layering means wearing several lighter garments on top of each other, instead of one heavy bulky garment.

Army no longer holds the old idea about "changing your clothes." It now says to take a little off, or add a little more.

One of Army's knottiest problems is still that of materials and priorities.

Indians of western Canada and Alaska wear caribou clothing and moccasins of moose skin. The foot of the moccasin is moose hide and the upper part caribou skin. They're good, but we can't get enough of them. If we sent out thousands of hunters, they couldn't kill enough moose and caribou to make costumes to supply even half a dozen regiments. So we hunt a substitute.

Army also tries to get captured enemy equipment and takes from it any good ideas. Sometimes Uncle Sam finds he can improve on the captured item, through use of better materials.

Army is particularly interested in Russian equipment, because Russians have had so much experience in cold-weather fighting.

Dehydrated Rations Do Not Freeze

"We also tested dehydrated rations, light and compact," continued Mr. Washburn, "such as meat, vegetables, soup, milk, etc. We had no particular trouble in cooking, al-

though we had to be careful of carbon monoxide. Dehydrated stuff did not freeze, because of absence of water.

"Some foods proved better than others.

Two of the meats were not good (liver paste and dehydrated liver). We recommended that they be discontinued. Dehydrated hamburger was excellent.

"For bread we bad K-1 ration biscuits. We relished hard candy, as well as raw sugar, chocolate, fruit. We had dried apricots, raisins, figs; also concentrated lemon juice, but no alcoholic drinks at all. For drinking water we melted the snow. Old snow is better because it is more solidified. Buried here and



Supplies in This Man's Pack Were Parachuted to Him from a Plane Flying over Mount McKinley

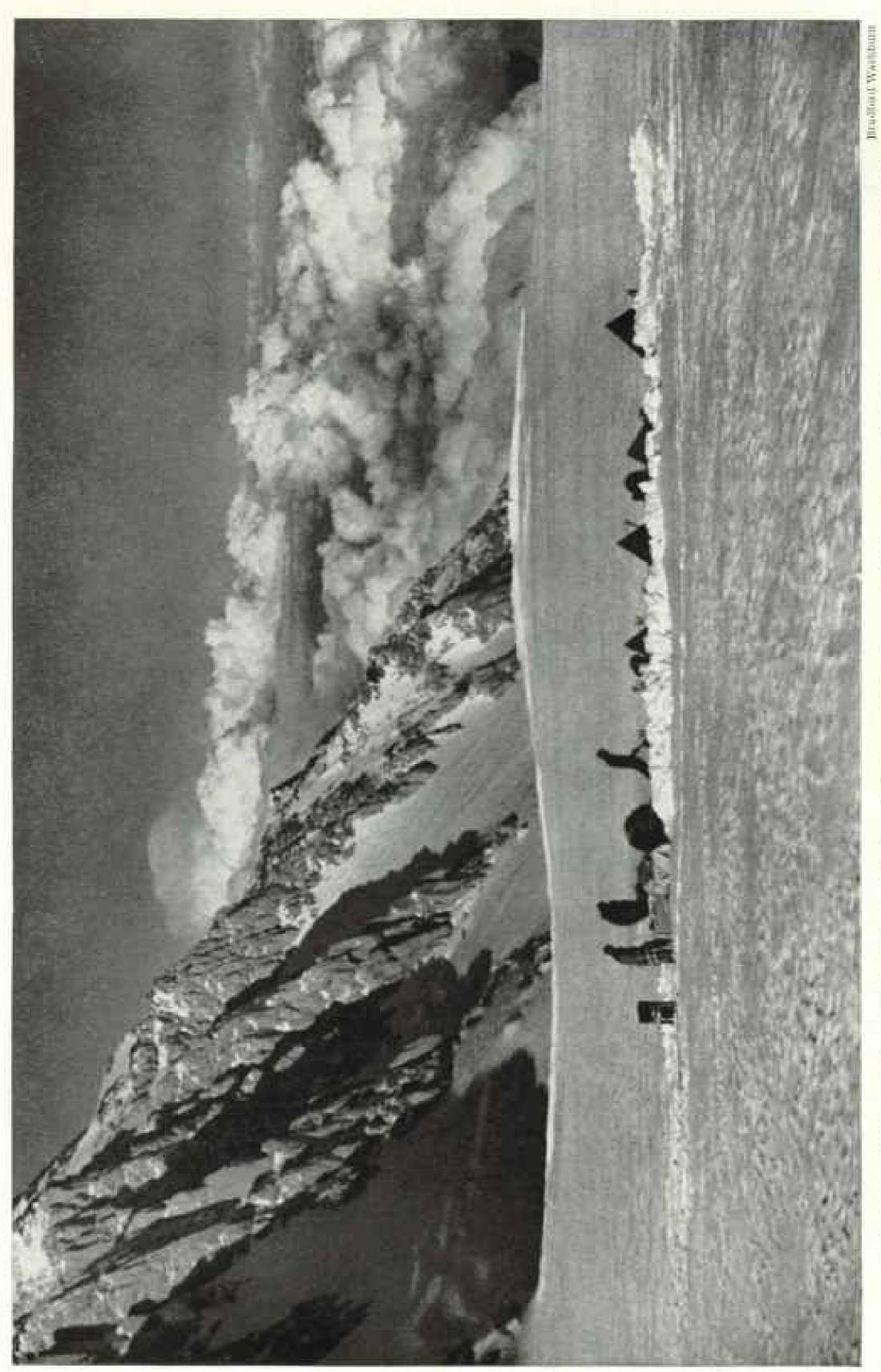
That Yukon pack board, between his back and the pack, accommodates beavy, awkward loads that will fit no knapsack. Also, since the load is laced to the board and not to the man, air can freely circulate and keep the man's back from getting too hot (page 234).

there under fresher snow, there must be snow that has lain on this mountain for thousands of years.

"Finally, I might say, many things which we originally believed would be ideal for troops' mountain use were later rejected, because our tests proved them unsuitable for military combat."

United States and Canadian Armies Work Well Together

This expedition showed in what a friendly way the U.S. Army and the Canadian Army now work together. Canadian officers from their R.C.A.F. and Ground Forces worked



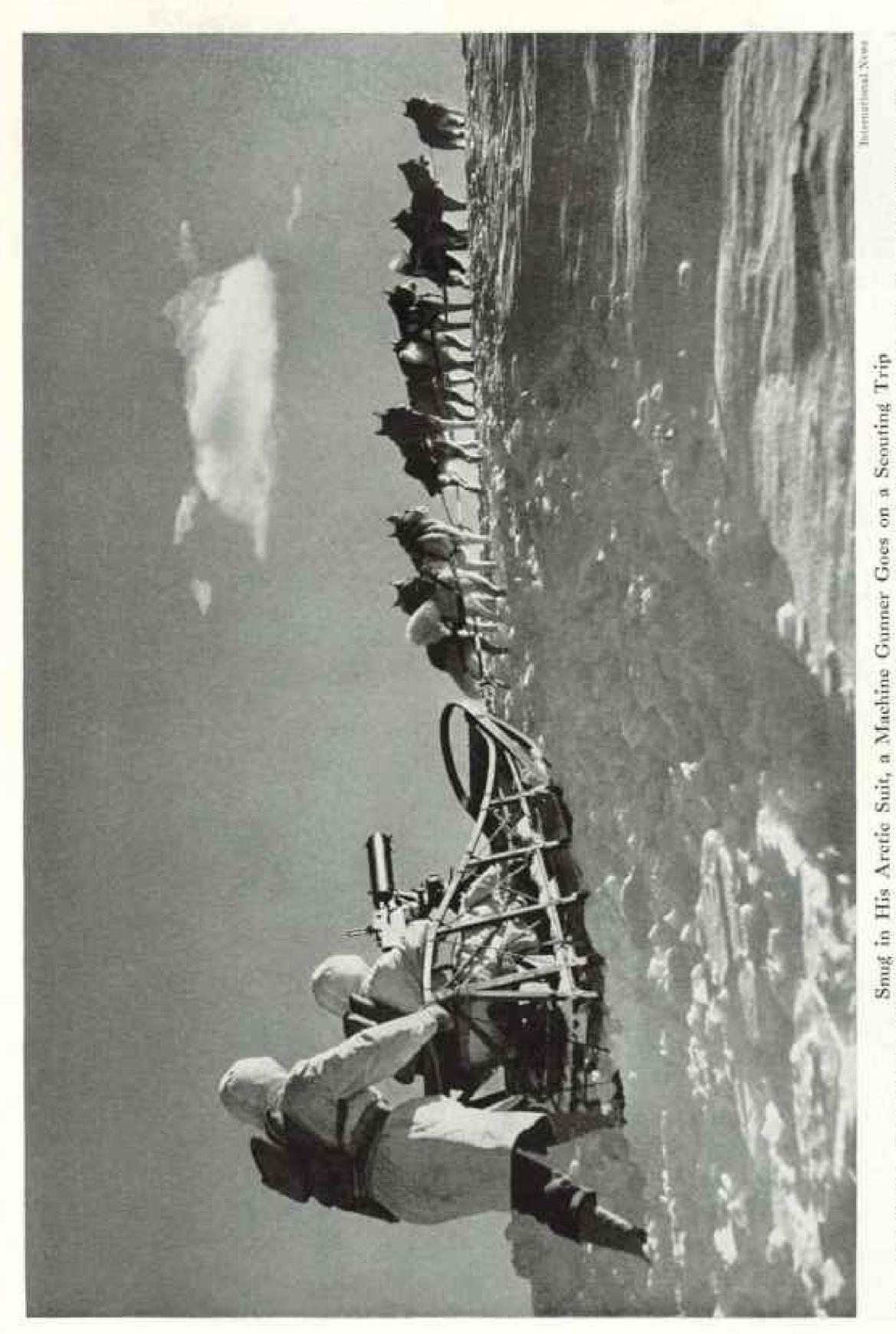
Jothes, Food, and Equipment Pitches its Highest Camp on Mount McKinley QM's Expedition to Test Cold-climate (

This camp (17,800 feet) stood only a 50-minute downhill walk from the wind-swept summit. By using this high-sittings in North America (20,300 feet) in the summer of 1942 instead of waiting for winter in the United States, the Army saved six months, time in its high-sittings on food and tough combat equipment for Air Force and mountain troops (page

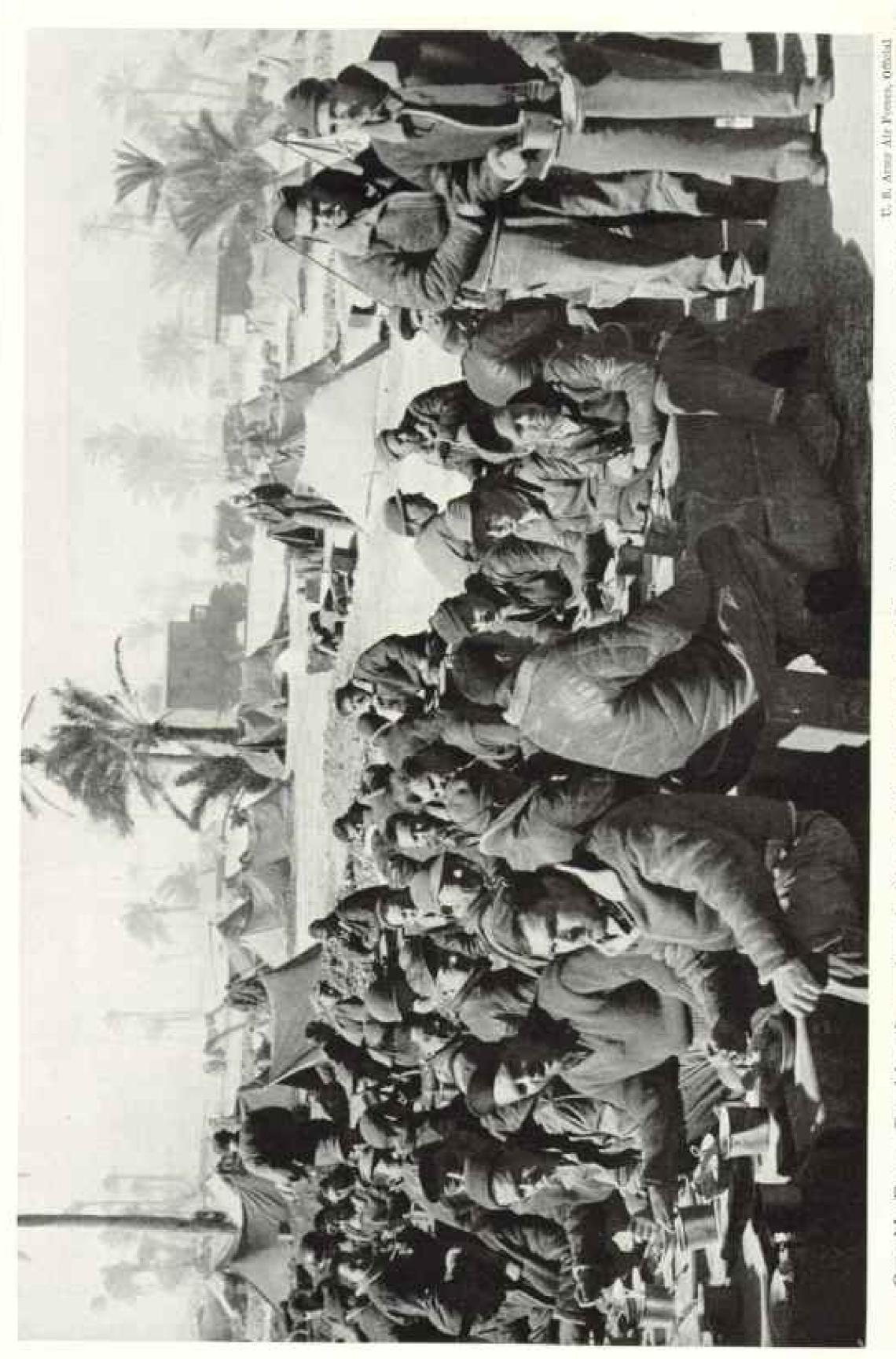


Not Madame Tussand's Farnous London Waxworks, but Dummies Showing Some of the Army's Muny Kinds of Uniforms

Shown at the Philadelphia Quartermaster Depot, the uniforms are, left to right; tropical, jungle with sand-fly har headnet and flotation bladders, nurse's seer-series were the cap is worn only when an duty, the cape for warmth), WAC, officer's overcost (with removable wool links), paratrooper, winter combat, motorized troops' wool, ski-troop, and cold-climate field,



Any hunter who has ever lugged a beavy gun through deep snow will appreciate this outfit. In subzero weather at Womlancet, New Hampshite, Army sled dugs and have to push going up streper hills.



Previous tests in Army's climatic laboratories have determined just what kinds of food, clothing, and equipment should be supplied for this area, which is blistering hot in summer yet often swept by cold winds in winter. Here, in a Bean Gente setting, fighting men camp against a wild landscape whipped by desert dust storms. Our Air Forces Breakfast Somewhere in North Africa beside Parked Trucks and Tents Pitched among Wind-whipped Palms.



Staff Photographer Willand St. Culver

"How Much Longer Must We Stay Locked in This Icebox?"

Under Arctic conditions these volunteers test food and clothing and learn what habits a soldier should best observe. They are checking off the days on their calendar to see how many they have to go.

side by side with American officers of our Army Ground Forces, Air Forces, and our Medical Corps.

In command was Lt. Col. Frank G. Marchman, of the U. S. Quartermaster Corps; in charge of field tests on the mountain was Capt. Robert H. Bates, also of that Corps.

"Finding our stuff after planes dumped it down was often a hard job," said Captain Bates, veteran mountain climber and former Phillips-Exeter teacher, "Sometimes chutes themselves tore to pieces when thrown from a plane moving too fast. To recover stuff chuted down to us, we always tried to be near when it fell.

"On Mount McKinley chutes also brought our mail, Highest delivery ever made in North America dropped near 18,000-foot Denali Pass, Wind pulled our mail chute to the edge of an 11,000-foot wall. Luckily it stuck there; otherwise it would have slipped down two miles to a 'dead letter office' all its own!

"Worst storm we met was a 50-mile wind that blew three days at the 18,000-foot level. Canned food froze so hard we couldn't thaw out sardines even by holding them against our bodies inside the sleeping bags. Frozen sardines and frozen cheese taste almost alike."

"Did you find any signs left by previous climbers?" Captain Bates was asked.

"Lots of them—an old stove, empty cans, frying pans. One empty box we found on a glacier bore the address of 'Allen Carpé, Fairbanks, Alaska.' It had belonged to the illfated Carpé-Koven 'Cosmic Ray' Expedition of 1932, on which both these men perished.

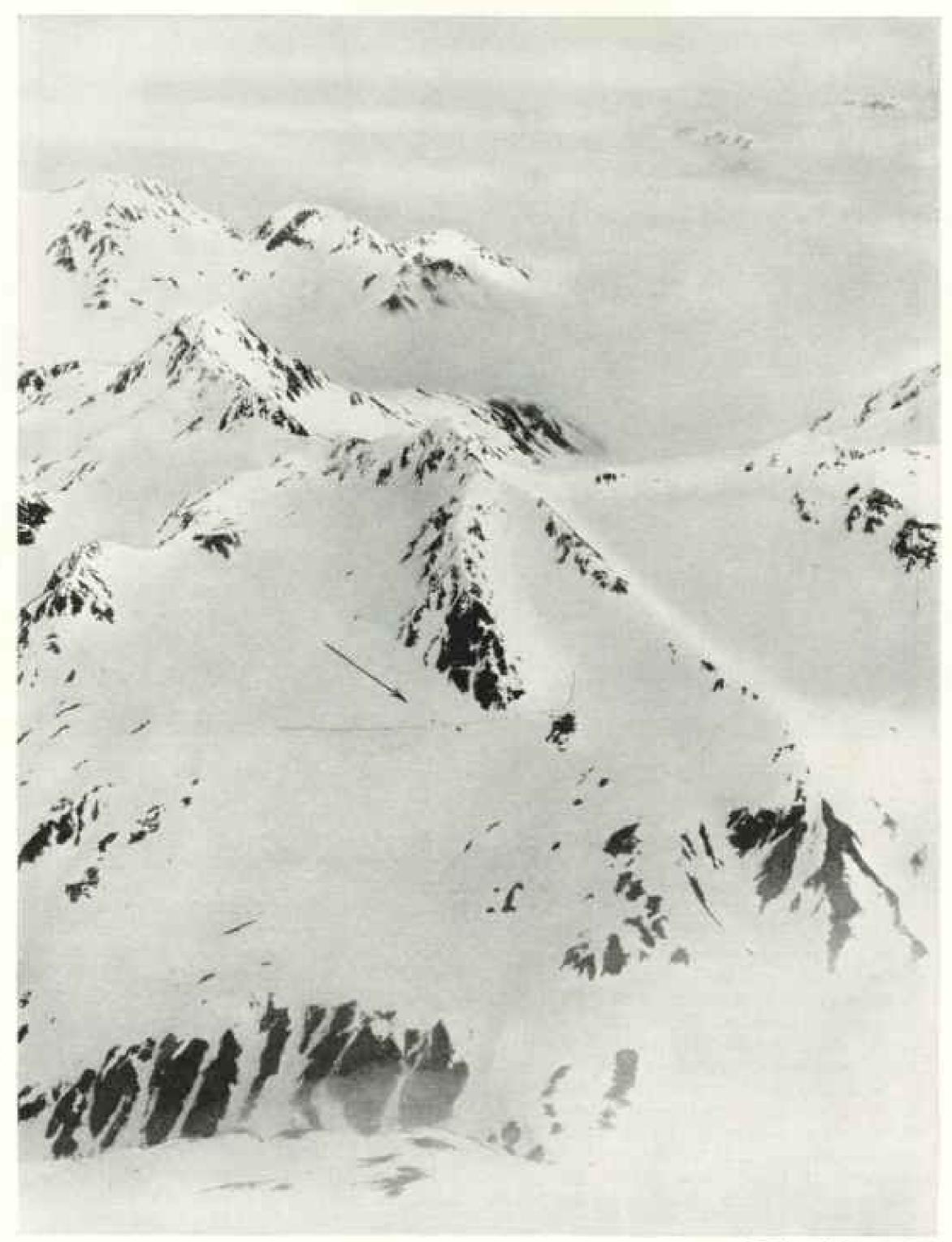
"One day with Dr. Terris Moore, Harvard scientist and one of the first two men ever to climb 24,900-foot Minya Konka in China," I came upon a pair of abandoned boots. To my astonishment Moore sat down and began to pull them on—icy boots that had been taken from the frozen body of Koven, who died there ten years ago.

"They're mine, anyway,' explained Moore,
'I bought them from Abercrombie and Fitch
in New York years ago and lent them to
Koven.'

"At 15,000 feet we found a cache of food left by the Liek-Lindley-Strom Expedition, which made a successful ascent in 1932.

"Here were tinned sausage, sardines, biscuits, Ovaltine, soup tablets, and a can of

*See "Climbing Mighty Minya Konka, Landmark of China's New Skyline," by Richard L. Burdsall and Terris Moore, National Grockaphic Magazine, May, 1943.



U. S. Aymy Ale Pierra, Official

Arrow Points to American Soldiers Climbing Attu Snows to Attack the Japanese

Enemy forces are entrenched in Holtz Bay, which lies over the saddle at the right beneath the clouds. To make a rear assault, our soldiers climbed up these snowy slopes and over the crest. Taken from a reconnaissance plane, this graphic picture reveals the hardships and hazards overcome by American troops. Learning how to equip men for such ordeals is the important task of Army's climatic research work.



U. S. Army Signal Corps, Official

This Sniper's Jungle Suit Makes Him Almost Invisible a Few Rods Away

Camouflage, though used by fighting men for centuries, has been amazingly developed in this war. This is a practice picture, made in New Caledonia. Otherwise, that telltale tent wouldn't be in plain sight.

Hormel chicken (page 236). What a supper we had? That chicken was as fresh and tasty as the day it was packed. Why not?

"We bear of hairy mammoth meat found after centuries in Siberian ice, and I saw a horse leg dug from the ice north of Fairbanks in a gold mine operation. It must have been there years and years. Yet the meat still looked good. Dogs would have eaten it. Apparently meat will keep as long as it is frozen."

To armies, cold is a bigger problem than heat. Thousands could freeze to death, but thousands wouldn't die of sunstroke. Baghdad or the Sahara is not hotter than Yuma, Arizona. I know them both. And summer nights in parts of our own South can be just as sticky as equatorial jungles. Hence, much clothing suitable for use in hot regions of the States will also suffice for use in equatorial and hot desert regions abroad.

Nevertheless, how to keep men well fed, properly dressed, and fighting at maximum efficiency in dry, hot deserts and in steaming Tropics remains a problem in conditioning a soldier.

That's why Army operates such workshops as its Climatic Research Laboratory at Lawrence, Massachusetts, and the Armored Force Medical Research Laboratory at Fort Knox, Kentucky.

At Fort Knox, for example, soldiers face every kind of weather "from Greenland's icy mountains" to "India's coral strand." They learn it can be as hard to fight the elements as to fight the enemy.

Army Learns How to Adapt Men to Heat

Nor are all tests concerned with climate. Effects of noise on the nervous system, what gun and gas fumes do to blood circulation and respiration, how tank seats can be modified to relieve visual difficulties—these are also among problems studied.

In hot and cold rooms soldiers live just as they will when fighting in deserts or Arctic wastes. Outside, the sun may blaze or snow



Staff Photographer Willard B. Culver

Testing an Army Hammock in a "Hot Room" Filled with Warm, Wet "Jungle Air"

A camouflaged suit, especially designed for jungle snipers, is worn by the soldier. Lightweight suit and hammock are water-repellent and the net is insect-proof.

cover the Kentucky landscape; but, inside, engineers make whatever kind of weather they want (page 234).

Thermometers are shot up to 150 degrees, relative humidity is set anywhere from 10 percent to 95 percent, and wind velocity from big fans reaches 50 miles an hour.

Here soldiers live, sleep, and work as much as 26 days at a time, all under observation to see how they react. Men in this hot room carry 20-pound packs as they march around and around, 12½ miles a day at the ordinary rate of 2½ miles an hour. Or they expend similar amounts of energy on a treadmill, with mysterious dials and charts recording their progress, their intake and output of liquid.

In Hot Weather, Salt Water Is Better Than Tablets

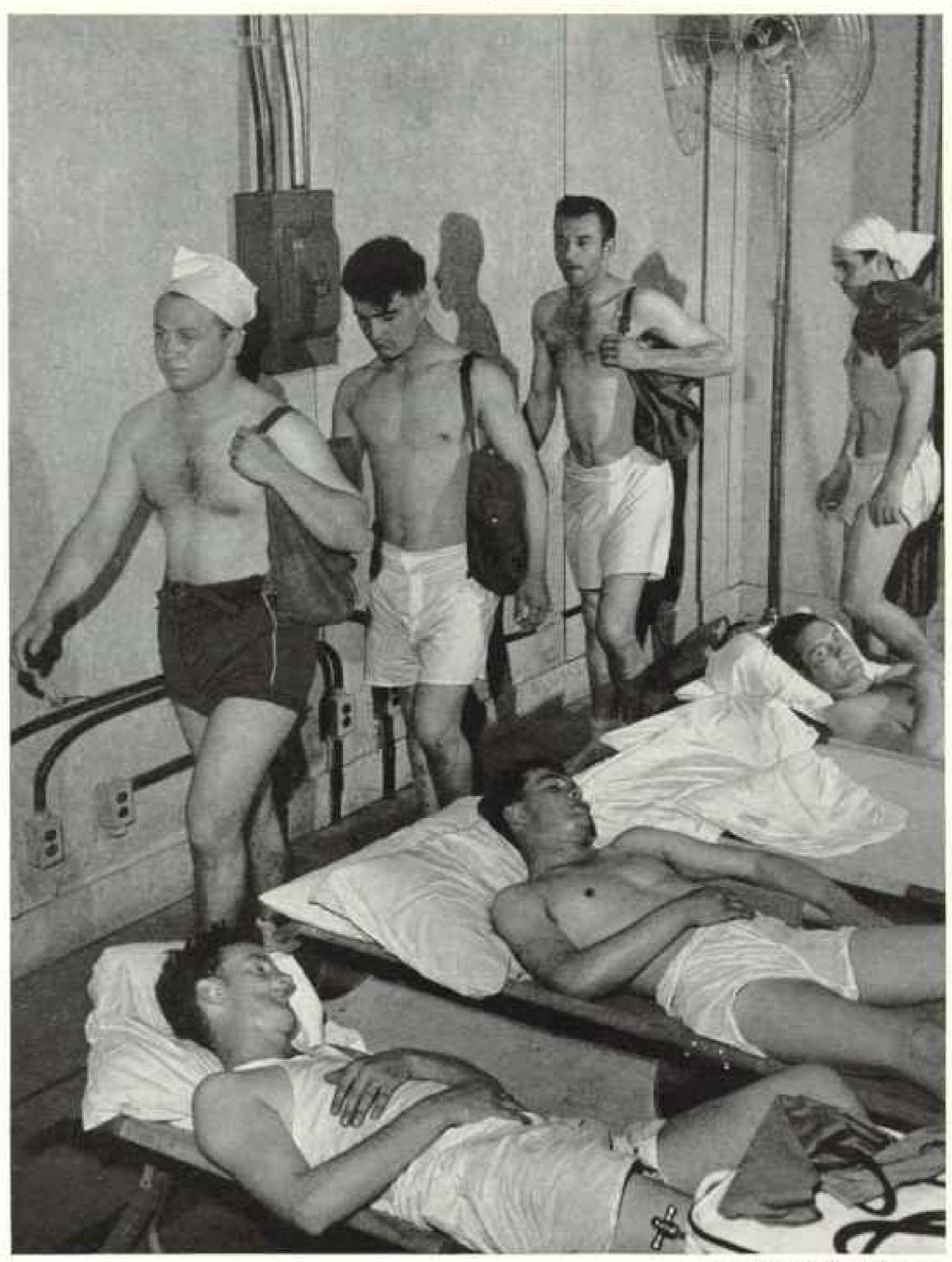
It has been learned here that a man can be well acclimatized to desert heat in three days' time, by gradually increasing his work. After three days he becomes adapted to extreme heat, provided his intake of water and salt is maintained (page 246).

"Another thing we found," says an Army doctor, "is that men can, without dislike or discomfort, drink a one-tenth percent solution of salt water. This is preferable to salt tablets, for the solution doesn't cause the nausea and cramps frequently associated with tablets." It is known, too, that during severe daytime desert heat a working soldier loses from a quart to a quart and a half of sweat per hour.

Once a soldier has become inured to intense heat, how long will be retain that acclimatization? That is important.

Assume, for example, that an armored division trained in the California desert is shipped to North Africa. Will the men retain their adjustment to high temperatures long enough to cross the ocean?

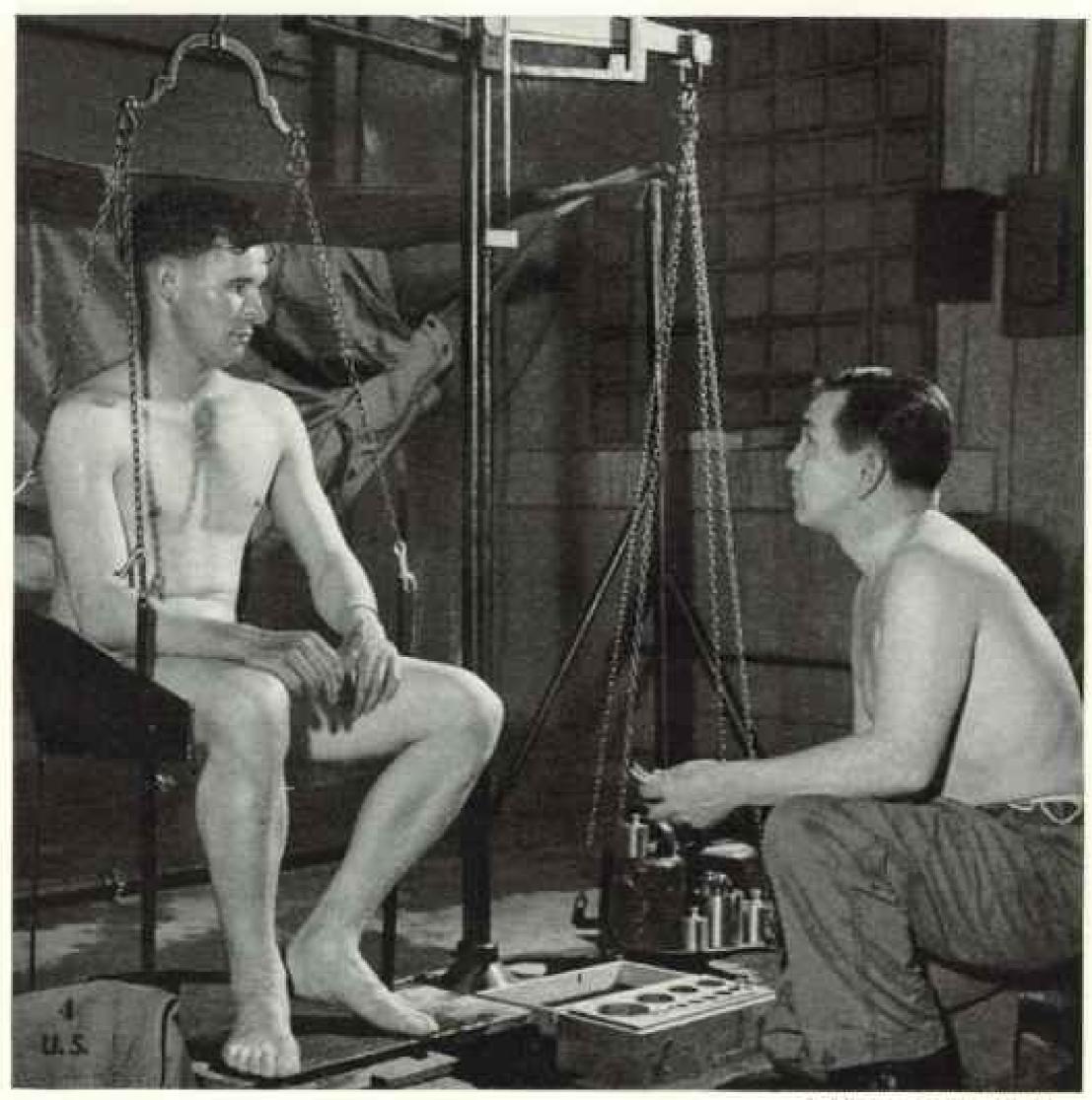
Soldiers here have undergone laboratory tests, returned to outdoor routine, and then come back to the "Tropics." From the frozen



Staff Photographer Willard B. Curve

While Taking a Marching Test in "Desert Heat" the Man in the Middle Gave Out

With 20-pound packs these soldiers walk for 50 minutes, rest for ten minutes, then start again. Each day they do five marches, totaling 12½ miles, in a temperature of 120° Fabr., simulating desert heat. It takes three days to acclimatize a man to desert temperature. After that he is immune to heat exhaustion, at least for a few weeks, if he takes the required amount of salt and water (page 245).



Staff Plutographer Willard B. Calver

Weighing a Soldier, after a Hot Walk, to See How Much He's Lost by Sweat

Body heat, from work and environment, is dissipated by the cooling or evaporation of a man's perspiration. Sweat lost is replaced by drinking salted water. Soldiers are weighed before and after each 25%-mile walk in this room, heated to 120° Fahr., in the Medical Research Laboratory at Fort Knox.

outdoors they have entered the 120-degree hot room, donned full field packs, and immediately plunged into a day's work under desert conditions, without suffering exhaustion. This seems to show that, once acclimatized, a man retains that conditioning at least for a few weeks.

Jungle Heat and Desert Heat

Fort Knox also makes experiments with jungle conditions. There's wide difference between jungle heat and desert heat.

A soldier can stand desert temperature of 135°, with corresponding desert humidity of 20 percent or less. But when the relative humidity rises to 95 percent, as it does in the jungle, a man cannot stand a temperature of much over 100°.

One aim of this test is to learn whether men acclimatized to desert heat are similarly acclimatized to jungle heat, and vice versa. Jungle experiments deal also with the amount of water and salt necessary for a man, effect of various diets, and ways and means of protecting the skin against infection.

Army learns, too, that some men are unfitted for tropic use and others for Arctic use. But since a division includes some 12,000 men—and men for it may be chosen at the rate of 1,000 or more per hour—Army has not



Sport Photographer William IL. Cubic

His Harness Tells How Cold He Is at 18 Separate Parts of His Body

Here an assistant helps the experimenter into a complicated thermocouple. This set of straps, with wires running to thermometers set outside the cold room, graphically shows how cold this man's ears, fingers, and toes are under his heavy clothes (page 250).

yet found a quick way of deciding who can best serve where.

Cold-room tests also show a chilled soldier's bodily reaction to various hot foods, efficiency of various containers in keeping food and liquids hot, and determination of the warmest types of clothing (page 235).

Heretofore, the Army has abided by hardand-fast rules in issuing standard uniforms. Till lately, for example, no Arctic clothing was issued a soldier unless he was being sent to a latitude north of 56" (page 239).

Now Army's new map of the world's cold belts shows that it's not so much latitude north or south as it is altitude, wind, and sun that make one feel heat or cold. From these maps a comparison of the climate of a familiar region may be made with every other part of the world. Surprising discoveries are made, such as that the January average temperature of Boston is lower than that of Reykjavik, Iceland.

A Laboratory Makes Its Own Snowstorms

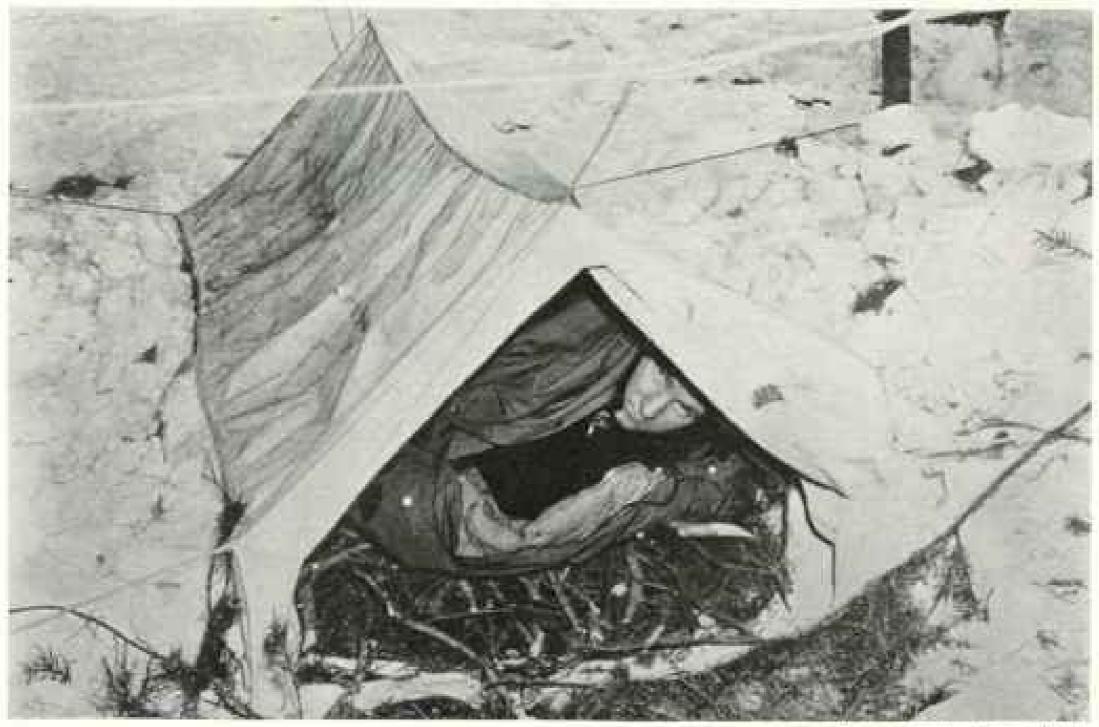
Soldiers at Anchorage, Alaska, for example, were formerly issued Arctic clothing, while nowhere in the United States was it issued. We know now, from Army's climatic maps, that North Dakota, Minnesota, upper New York State, and parts of the tip of Maine,



Staff Photographer Willard M. Cuiver

Sea Lion-shaped Sleeping Bags Keep Soldiers Warm at 60" Below

For almost-frozen cameraman Culver they uncovered their faces. Into the Dictograph they speak, describing their reactions to observers outside the cold chamber.



E. S. Arms Stunet Corps. Official.

Like a Rubbit in Its Winter Form, This Soldier Can Sleep Comfortably and Warm.

He is testing a new type of snow tent and sleeping bag near Camp McCoy, Wisconsin. On his twig mattress, with tent flap down, and in his bag, outside temperature of 19" below worries him not at all.



U. S. Atmy Signal Corps, Official.

Time Out for Chow on a Practice Trip

From Fort Francis E. Warren, near Cheyenne, an O.C.S. class went up Pole Mountain on maneuvers. As shown by the chevrons on his belinet, this officer candidate has been designated a sergeant. At chow time all Army supply trucks were canouflaged for security against imaginary elemies.

during any given month, including the coldest, may have temperatures equivalent to those at Anchorage.

At Lawrence, Massachusetts, the Quartermaster General has set up another Climatic Research Laboratory that makes its own snowstorms.

In a cold chamber temperatures as low as 80° Fahr, below zero may be achieved. This chamber is large enough to inclose three mountain tents, if tents are being tested; sleeping quarters for fifteen men if sleeping bags are being tested; or space enough for walking for ten men if clothing is being tested.

It is here that, in the testing of clothing and sleeping bags in the cold room, tiny wires, or thermocouples, are placed on various parts of the body, and skin temperatures are recorded. This test also shows how the soldiers react to cold and numbness (page 248).

To reproduce actual polar conditions, snow is made to fall here, by use of atomizers which squirt a fine spray into the room at a low temperature. They can make a half-inch snow-fall each hour.

Human interest here centers on the soldiers themselves. They were chosen from a large group of volunteers in the First Service Command.

In selecting these men attention was given to several factors. In the first place, young men were chosen. Since the average combat soldier is less than 30 years of age, all men here are under 30.

Variation in height and weight is also desired, 50 small, medium, and large men are in the group.

Because of previous experience, certain soldiers were picked to work with delicate electrical instruments.

There is also need now and then for taking pictures of experiments; so a professional photographer does it. Making the thermocouples for testing of skin temperatures is a delicate task; so a soldier who had been a jewelry designer was chosen for this job.

All work here is in charge of Lt. Col. John H. Talbott, now of the U. S. Army Medical Corps. In civil life he had long experience in studying reactions of man to climate extremes. He was a member of the expedition of the Harvard Fatigue Laboratory to Boulder Dam in 1932, when extensive tests were made on the ill effects of heat. Army uses these lessons now.

How much a man can carry, hour after

hour, in different temperatures, is also important in conditioning troops.

A colonel recently returned from the Pacific theater of war told of a conversation among three men just before they went into battle. One said, "You take the shaving brush, I'll take the soap, and you, number three, carry the razor,"

In another case a sergeant had a tube of toothpaste. To save stowage space and even that small amount of weight, he squeezed half of the paste out and put the remainder in his kit.

Army chiefs learn a lot of new tricks from watching their own soldiers. On Guadalcanal men use extra underwear for cleaning their rifles.

Our men don't like shorts. They feel undressed in them and say that when they have to crawl under fire, it skins their knees to crawl in shorts. They want long pants!

Good camouflage saves many a life. Olive drab may blend with one landscape, khaki with another.

Army now issues a lightweight, one-piece jungle suit, green on one side and brownish on the other. A hiding soldier, chameleonlike, can take on the needed protective coloration.

Food Disappears on Way to Front Even Though Porters' Packs Are Cut

Getting food to the front over long supply lines means reducing weight of packs to minimum. Even at that, as for example on Kokoda trail across New Guinea, use of food by the porters themselves, sickness, fatigue, and loss from other reasons showed that a large part of all food disappeared before final delivery.

Men at the front got less than half of all supplies originally dispatched! That means



AP from Press Ass'n

Initiation? Paying a Wager? No. He's Hiding from a Gas Attack

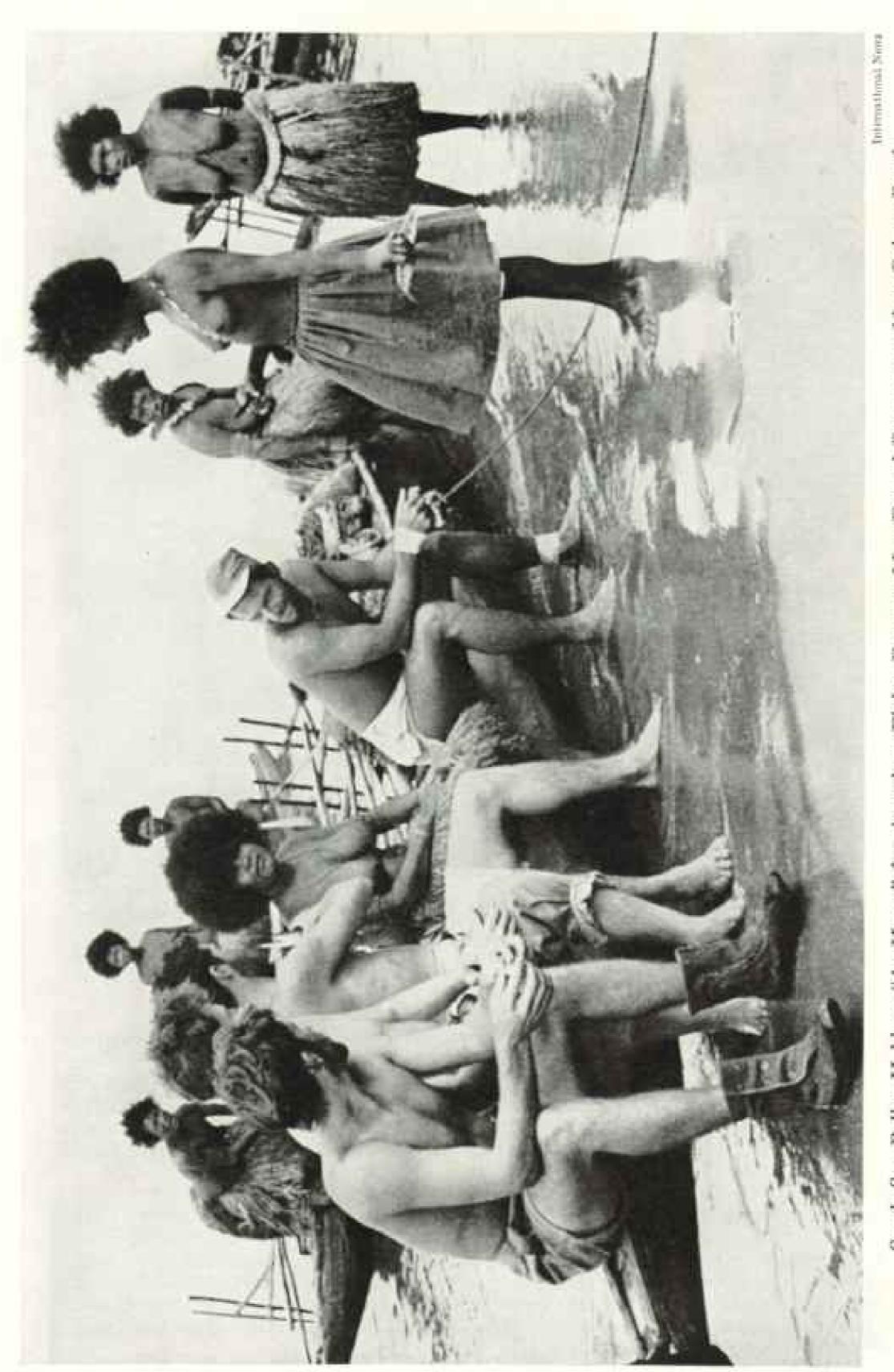
Over himself like a tent, the officer wears the new protector against liquid gas, devised by the Quartermaster Corps. An Army nurse holds the pocketsize box into which the hond can be folded and packed. Uncle Sam is ready, if the Axis resorts to poison gas.

> some men either went hungry or used their wits to live partly off the country.

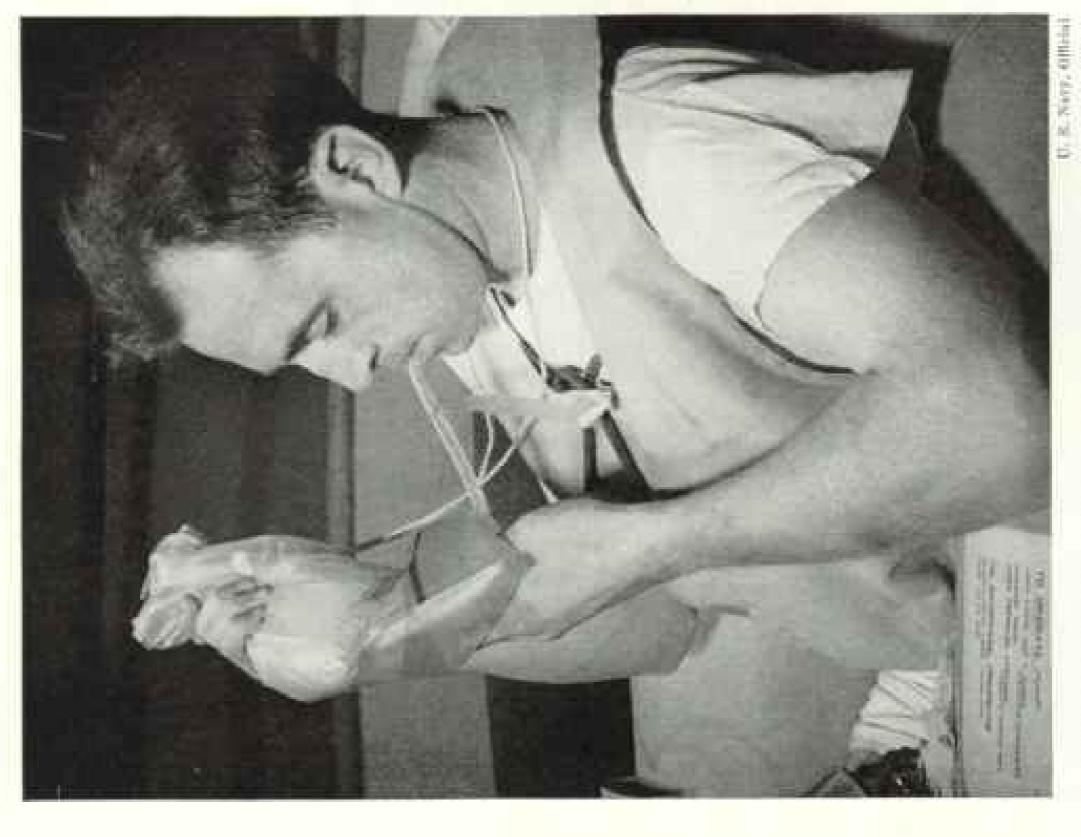
> How to win and hold friendly relations with natives of occupied countries, or with those in lands through which our forces may have to march, is also an important lesson now taught to our soldiers.

> Carloads of little books, full of do's and dont's, are sent to troops for study. They hold hints on how Americans should behave abroad. Even in England, though we enjoy common speech, religion, democracy, and other ways of life, our viewpoints may often differ, and too many arguments don't make for unity.

More specifically, however, these books tell



Look at the high-altitude Arctic flying footwear on the American in shorts at the left. And the raw fish in the left hand of the girl in foreground, Returning from a raid on Jap-held Rabaul, this crew's "Fort" was damaged in a forced landing. Taking off from a temporary runway made from metal strips flown in, they brought their repaired plane safely "bome," South Sea Belles Hold an "At Home" for American Flying Fortress Men Forced Down on a New Guinea Beach





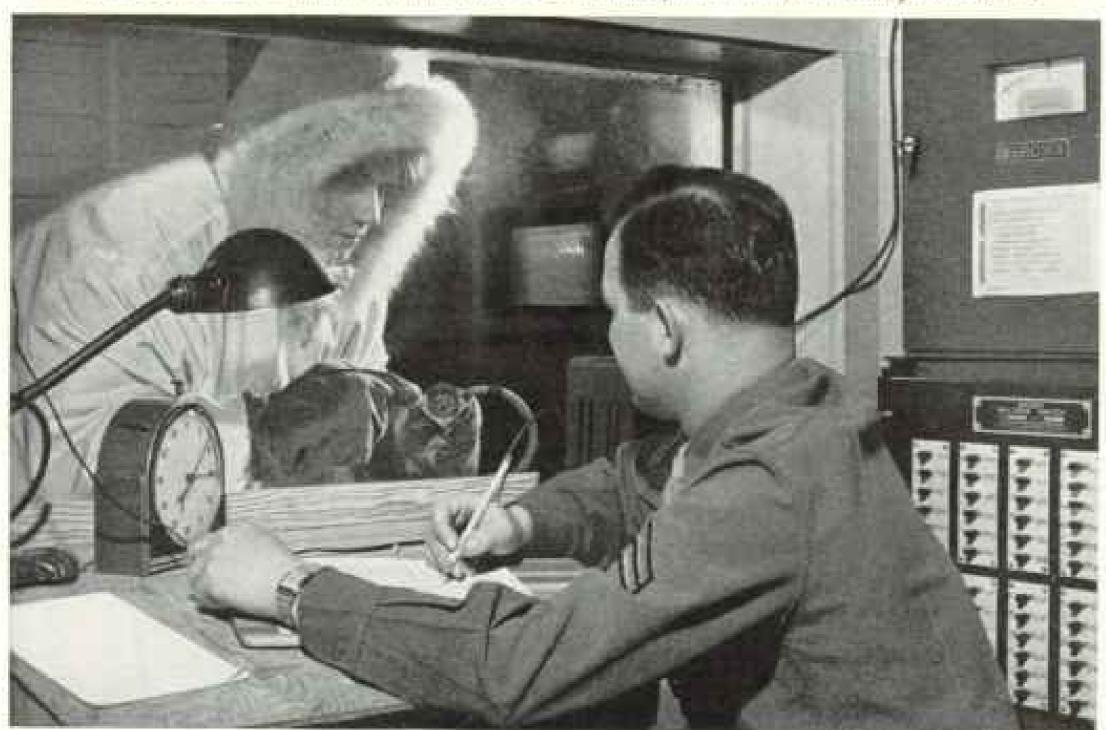
Getting Thirsty on His Raft, This "Castaway" Squeezes Sea Water and Chemicals Through Filters. Presto! Fresh Water to Drink

For centuries men have hanted a short cut for making water from salt water by simpler means than distillation. By this process, perfected by Lt. W. V. Consolarlo of the Naval Medical Research Institute, sea water can be made fit to drink in 45 minutes, or less (page 256). Like some spring waters, it tastes of sulphur, but is free of salts. Bags cannot get away, being tied to the man.



U. R. Navy, Official

These "Survivors" Are About to Chew Fresh Water from Raw Fish, on the Cloth Latest-type life rafts used by the Army and Navy carry an emergency fishing kit. In a method devised by Gillord Pinchot, fresh-cut fish is chewed, or squeezed in a porous cloth, to obtain potable water.



Staff Photographer Willard R. Culter.

From Inside His "Cold Room" a Fur-clad Guinea Pig Speaks to an Observer

Temperature behind that window may be 140° colder than outside. Speaker system, controls, and recording machines are installed at Army's Climatic Research Laboratory, Lawrence, Massachusetts (page 250).



Airmen Flying over Wide Water Stretches Can Wear Fishing Kits as Vests

Then, if forced down at sea, crewmen can catch fish for food and fresh water. The fishing kits, which roll up like travelers' toilet sets, were developed by S. Kip Farrington, Jr., and Michael Lerner (above),

men how to act in Moslem and other non-Christian lands, and among savage tribes.

Don't point your finger at a camel in Iraq, they advise. Natives might fear you were casting an evil spell on the beast.

Don't slap a mandarin on the back, or behave unseemly in a "heathen temple." It's polite in many lands to ask as to the whereabouts and well-being of a man's wife and daughters. But that's rude in Moslem lands.

We don't eat sheeps' eyes in Missouri and Idaho. But they're a pièce de résistance at many Middle East desert tribal functions, and if a sheik offers you one, open your mouth and he'll drop it in!

Fish Kits, Radios, Even Water Purifiers, Now Go on Rubber Boats

Finally, studies of still more ways to help yourself, in case of shipwreck or forced landings, have brought new and better equipment to rafts and rubber boats,

Based on studies made by Gifford Pinchot,

thousands of such emergency craft are now fitted with light, compact tackle kits, so cast-aways can catch fish. And since fish, like the human body, are mostly water, crews are taught now to chew raw fresh fish to slake thirst; chew the fish, swallow the water, and spit out the residue (opposite page).

Amazing in practical value are other items of equipment now carried by these new rafts.

One, developed at Wright Field, Dayton, Ohio, carries a radio with an antenna that can be lifted by a kite. The kite serves as a distress signal by day.

You don't even have to know any code to call for help with this new set. A hand crank generates power, and the instrument automatically grinds out an S O S, using 500 kilocycles, the international distress frequency. If you're adrift in the North Sea, where AA is used as the distress signal, you merely turn your switch to send that message manually.

If you know how to use it, there's also a manual sending key on this radio, useful up



AP from Press Ascin

On Newly Conquered Attu American Soldiers Rest in Sleeping Bags behind Turf Barricades

Exhausted by fighting, but with loaded guns still in easy reach, these men settle down for a sound sleep of 10 or 12 hours. Beyond the foxholes more doughboys go out on patrol,

to 200 miles. Planes hunting you by day can ride in or "home" to you on the beam you're sending out, and if they approach at night, you on the raft can switch from the radio signal to a blinker light to flash S O S.

Among the new raft's equipment are also sunburn medicines, a knife, a compass, a sail, and now, plastic bags and secret chemicals for making fresh water.

The age-old riddle of how to make sea water good to drink—without distilling it—has at last been solved. Lt. W. V. Consolazio, of Naval Medical Research Institute, Bethesda, Maryland, does it with chemicals, bags, and plastic filters. Here is the process, as he defines it:

The castaway scoops up some salt water in a plastic bag and adds a bit of black chemical. This fluid is then squeezed and kneaded for five to ten minutes, until the chemical is thoroughly dispersed through the water. The contents are then forced through a filter into a second bag containing a white chemical. The kneading process is repeated until the water becomes colorless, when it is again filtered. Then the water is ready to drink (page 253).

Hundreds of castaways who have perished might easily have been saved had they carried this new raft—and had time to launch it, with equipment, after they were forced down.

Compare Today's Soldiers with Rough Riders

All these things help make the Yankee soldier of today. How well-equipped he is, in mind, body, and estate! Compare a spickand-span and well-conditioned crack division of today with, for example, the Rough Riders who camped at Tampa in 1898, Cuba-bound.

In that hot, sticky town some of those soldiers still wore winter uniforms. While waiting and waiting for the slow, rusty old ships that finally hauled them to Cuba, their half-wild mules ran loose through the streets of Tampa, while the men, often minus guns or ammunition, sat in the shade singing "There'll Be a Hot Time in the Old Town Tonight,"

Even in World War I some American soldiers were sent abroad who had never fired an Army rifle. 1943 sees a different army the best that science and experience can train, condition, and equip.

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-five years ugo, the National Geographic Society publishes this Magazine monthly. All receipts are invented in The Magazine Itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made. The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the wast communal dwellings in that region. The Society's re-searches solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithumian Institution, January 16, 1939, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 p. c. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great senter of early American culture, previously unknown.

On November 11, 1935, in a flight appnaored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, Explorer 11, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Servens and Capt. Orvil A. Anderson took aloft in the goodela nearly a ton of scientific instruments, and obtained results of extraordinary value.

The National Geographic Society-U. S. Navy Expedition cumped on desert Conton Island in mid-Pacific and successfully photographed and observed the solar eclipse of 1937. The Society has taken part in many projects to increase knowledge of the suit.

The Society enoperated with Dr. William Beelse in deep sea explorations off Bermuda, during which a world record depth of 3,028 feet was attained.

The Society granted \$35,000, 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 glant sequois trees in the Giant Forest of Sequoia National Park of California. ween thereby saved for the American people.

One of the world's largest icefields and glacial systems cuttide the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.

The longest minute in Jimmy's life





IN ONE MINUTE Jimmy will know if he's worthy of his navigator's wings. This is his first raid. All about him, hundreds of invisible bombers drone through the murky night. It's Jimmy's job to bring his bomber to the target at a certain specified minute—or the careful timing of the whole raid will be thrown off.

The seconds creep along on his watch. Since the take-off, the incredible precision of this master navigation watch has helped Jimmy keep his plane precisely on its zig-zag course ...even though a thick blanket of clouds hides the earth.

But what if he's made a mistake in his calculations? The minute is almost up. Then suddenly, the clouds break away. Far below, a red carpet of fire. A voice buzzes in his ear. "Nice work, Jimmy, we're right on top of it!"

Hamilton workers are proud of their ability to build these master navigation watches, as well as many other accurate timepieces for our Army and Navy. It means fewer Hamiltons for civilians. But it promises a future Hamilton that will be more than the equal of "The Watch of Railroad Accuracy." Hamilton Watch Company, 384 Columbin Avenue, Lancaster, Penna.

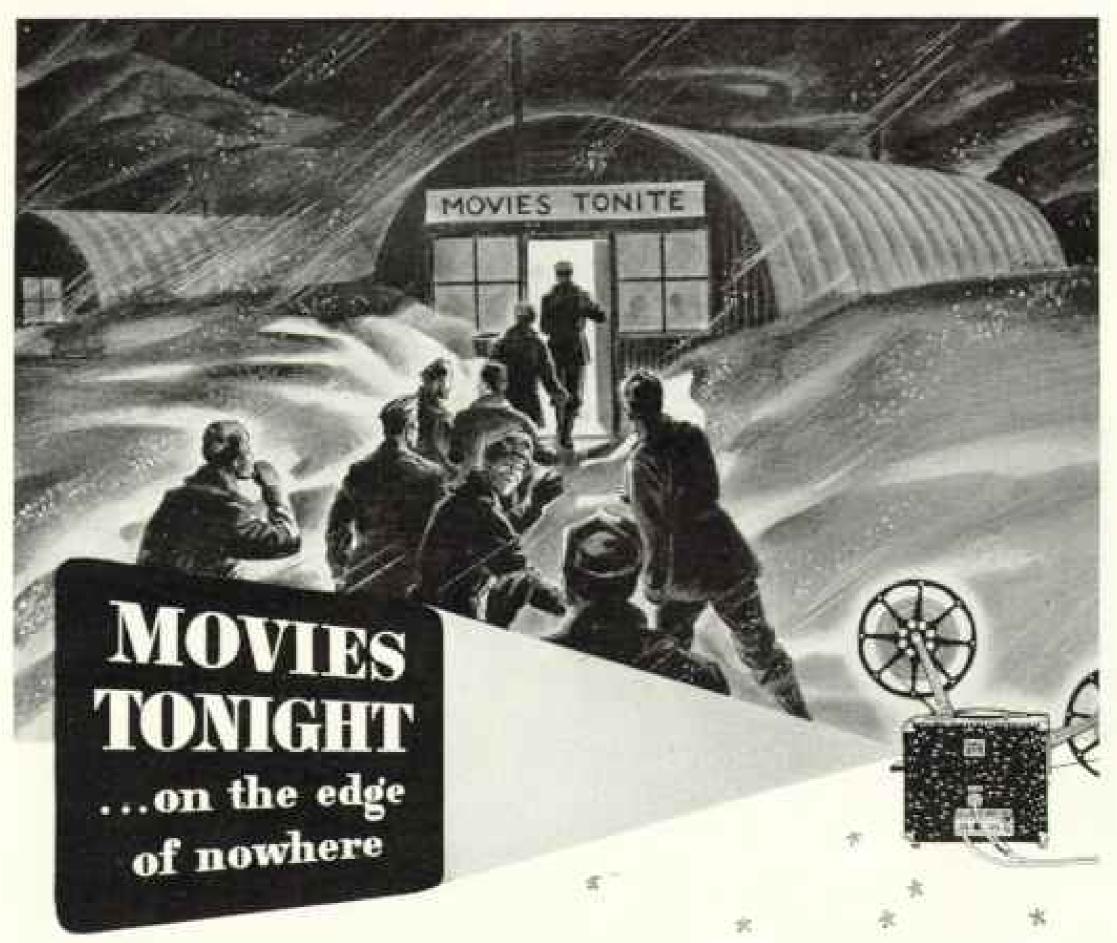


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- Grim faces relax... cold Aleutian fog is almost forgotten and fighting hearts look home again as a Filmosound Projector grinds out the laughter of the latest Hollywood smash.
- Dog-tired Marines on a Pacific island watch the screen that brings home closer for an hour.
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In every battle zone, on fighting ships, in camps
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pleasure and information ... helping fighters fight
... helping trainees learn the way to Victory.

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And so, on both fronts, Bell & Howell equipment and Filmosound Library movies are "dug in" for the duration . . . doing war work to the exclusion of every lesser job.

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MORE POWER FOR TANKS TODAY— CHEAPER POWER FOR AMERICA TOMORROW!

America's tanks pack a powerful push as well as a powerful punch. And more times than most people know, this push comes from a General Motors Diesel Engine,

What's more, you'll also find these rugged, hard-working power plants in landing barges, patrol vessels, military trucks, construction tractors and many other wartime jobs where sturdy dependability is required.

They burn cheaper fuel and use less

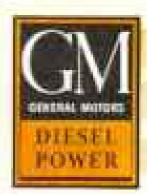
of it-operate with a minimum of attention.

Of course the needs of war are taking every engine that even our expanded production can make, but when peace comes America will profit—through low-cost power for many new applications.

So while now GM Diesels are adding strength to America's fighting arm, they will be one of the important contributions to better days after victory is ours.



With each war there seems to develop a new era in transportation. And in this one there is the epoch-making General Motors Diesel Locomotive, tried, proved and providing a new pattern of transportation, keyed to the greater days shead.



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ENGINES .. 150 to 2000 H.P. .. CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

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'WAY BACK IN 1940, THEY WERE RUNNING ON B.F. GOODRICH SYNTHETIC TIRES



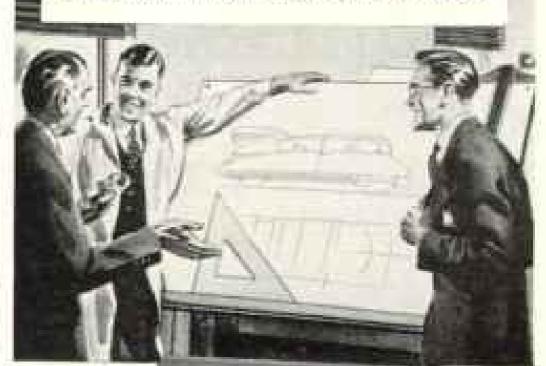
"Thousands of these tires were sold then. One of my suppliers bought 'em... and so did scores of other companies. Private car owners, too. It proved that synthetic was okay!" This grocer knows—for Standard Brands put B. F. Goodrich tires (in which more than half the rubber was synthetic) on company cars. Some of these tires ranfor more than 30,000 miles. This was the greatest tire test ever made.



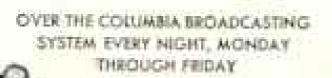
Your Wor Bonds help to pay for the synthetic rubber used by our armed forces. Jeeps run on it, fighter planes land on it, and guns move on it. Synthetic rubber is used in self-sealing fuel tanks for planes, too. That's why everybody can't have synthetic rubber tires now.



what the tuture has in store for new car buyers, we can't say. But tires seem likely to be made wholly or partly of synthetic. Wise buyers will look for the tire that has been proved. And they'll get it from B. F. Goodrich, the company with experience in synthetic rubber.



LISTEN TO JOSEPH C. HARSCH



Inside information by a mon who has lived where the news is being mode





En war or peace
B.F.Goodrich
FIRST IN RUBBER





Osperight 1946, The Poliman Company

"Okay, guys – this is it!"

Assembly in 20 minutes. Full kit and no farewells. Their next letters home will be V-mail; their address an APO. That's what travel orders mean.

To Pullman, those orders mean that sleeping cars must be waiting when the boys are ready to roll. 20 cars here—40 there—100 somewhere else. Every night, special trains of Pullmans move an average of almost 30,000 troops.

That takes a lot of cars. It leaves only part of the Pullman fleet to handle regular passenger travel that is far heavier than in peacetime, when the whole fleet was available. So no wonder trains are crowded and accommodations sometimes scarce.

But most passengers understand the situation.
And the fact that boys in uniform come first with
them, as they do with Pullman, is not the only reason for the tolerance with which they take whatever
space is open. It's also that wartime travelers seem
to look on Pullman in a different light, A Pullman

trip, to them, is no longer simply the gay adventure in good living that it was before the war. Now, Pullman privacy and comfort are a means to an end instead of an end in themselves. They help a harassed man relax from the drive of a troubled day. They give him a few restful hours undisturbed—in which to think things over. Then, when hed-time comes, they invite the deep, refreshing sleep from which a wartime traveler wakes with the new energy and vigor he needs to do the kind of job that Uncle Sam expects of him.

These things, though they may not themselves win battles, are important to those whom war keeps on the go. So please:

Concel promptly, when plans change, and make the Pullman bed reserved for you available to someone else.

Travel light and give yourself and fellow passengers the room that excess higgings would take up,

Ask your Ticket Agent on which days trains may be least crowded on the route you want to take. Try to go on one of those days if you can.



THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.

A 100% RECORD

Awards on May 8th, 1943 to two plants in Kenosha, Wisc., completed this 100% record for The American Bruss Campany.

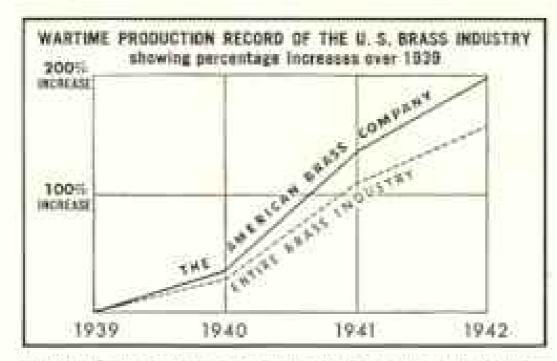


ALL TEN AMERICAN BRASS CO. PLANTS IN U. S. A. HAVE EARNED RIGHT TO FLY ARMY-NAVY "E" FLAGS

This is the story in terms of war production

Our Connecticut plants were among the first in the brass industry to receive the coveted "E" Award for outstanding production of war materials. Since then all our plants, including those in the States of Michigan, Wisconsin and New York, have been similarly honored.

As the largest fabricator in the copper and brass field, The American Brass Company is keenly aware of its responsibility and its opportunity to serve the cause of the United Nations.



This chart", Sneed on BEF peacetime production, shows the rapid swing into all-out war production, both by the copper and bruss fabricating industry and The American Bruss Company (not including Government-owised plants). All-time production records have been continually broken ever since the National Defense Program was initiated in 1981.

*Based on compliations of The American Bureau of Metal Statistics.

Since 1939, production has been tripled, with virtually every pound today going for war purposes.

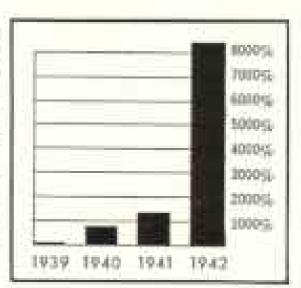
This record was accomplished by close cooperation between management and labor . . . careful planning for rapid conversion to wartime operations . . . intensive training of new personnel . . . plus efficient utilization of existing and new plant equipment.

Detailed figures, of course, cannot be revealed, but 'The American Brass Company is consistently breaking all previous volume records. In addition to its U. S. plants and that of a Canadian subsidiary, Anaconda American Brass Ltd., the company's production also embraces three plants operated for the United States and Canadian Governments.

Shipments this past January were the largest in the company's history. March exceeded January. The first quarter of '43 was by far the greatest tonnage quarter in the records of the company.

PRODUCTION OF COPPER ALLOYS FOR AMMUNITION by The American Brass Co.

This shart shows the wast increase is production of coppertage alloys directly curmarked for amountities is plants operated by The American Brass Company. This is our of the soost vital needs for copper and brass. Tremendous quantities are required for all types of amountities.



The American Brass Company is proud indeed that all the plants it operates in the U. S. A. have won the honor of flying the Army-Navy "E" for excellence in production. But it is even prouder of the organization and the will-to-produce that have made this record possible... and will keep it going.

THE AMERICAN BRASS COMPANY



Subsidiary of Anaconda Copper Mining Company



First in the automotion industry to fly the Navy "E" with these more, Fisher has also been awarded the Army Nary "E" for its abradoof schadule tunk production.

It's bad news for enemy planes - this 90-millimeter anti-aircraft gan.

Here are a few notes for the record—time and place deleted.

A four-gun battery of these "nineties" brought down sixteen high-altitude bombers in twelve days.

"Body blow" was right!

Fisher is proud of this gun, although Fisher did not make all of it. Like most armament, it is a fine example of the cooperative spirit of American industry, with many manufacturers contributing to the finished product.

Perhaps Fisher's most notable contribution

to this national effort is craftsmanship well directed. Precision men and precision methods help to give Fisher tanks, bombers, anti-aircraft guns and delicate aircraft instruments a technical plus. All the unusual crafts and special skills we have developed are trained on this target.

In war as in peace, craftsmanship is our goal. And we do our best to make the Fisher name on

armament mean an ace in the hole when the going gets tough.





He is one in two million who every month board American military railroad trains under sometimes of away on somether terrible, necessary business—the business of America's salvation—the business of war-

To move these two million men each month in special cars and trains takes more than one-half of all the sleeping cars and other of all the coaches in the third of all the coaches in the United States.

With what equipment is left the railroads must move individual servicemen or smaller groups traveling under orders—soldiers, sailsons, marines and coast guards on furlough—families visiting servicemen in camps—businessmen in camps—obusinessmen and other workers on war business and other workers on war longer their automobiles—and every other sort of traveler by rail.

That's the score today, and Americans who know it understand why travelers sometimes have to they at ticket windows or why cannot always get accommodations when they want them.

Whether you travel this summer—
and where—and when, are questions which you alone can answer
tions which you alone can answer
—but answer them with your eyes
fixed on the fighting fronts and
with the needs of the armed forces
in your mind.

When your trip is necessary, you can help by asking the railroad tieket agents about less crowded tieket agents on which to travel, days and trains on which to tright. You can help by traveling reservations and by canceling are changed, promptly if your plans are changed.





Westinghouse provides vision to pierce the darkness . . .

Amazing electronic "eyes" for a Navy skipper, searching the sea . . . eyes for the pilot of a night-flying bomber . . . eyes for an anti-aircraft battery, seeing far beyond the range of human sight.

Westinghouse sees with the sharp vision of trained inspectors...

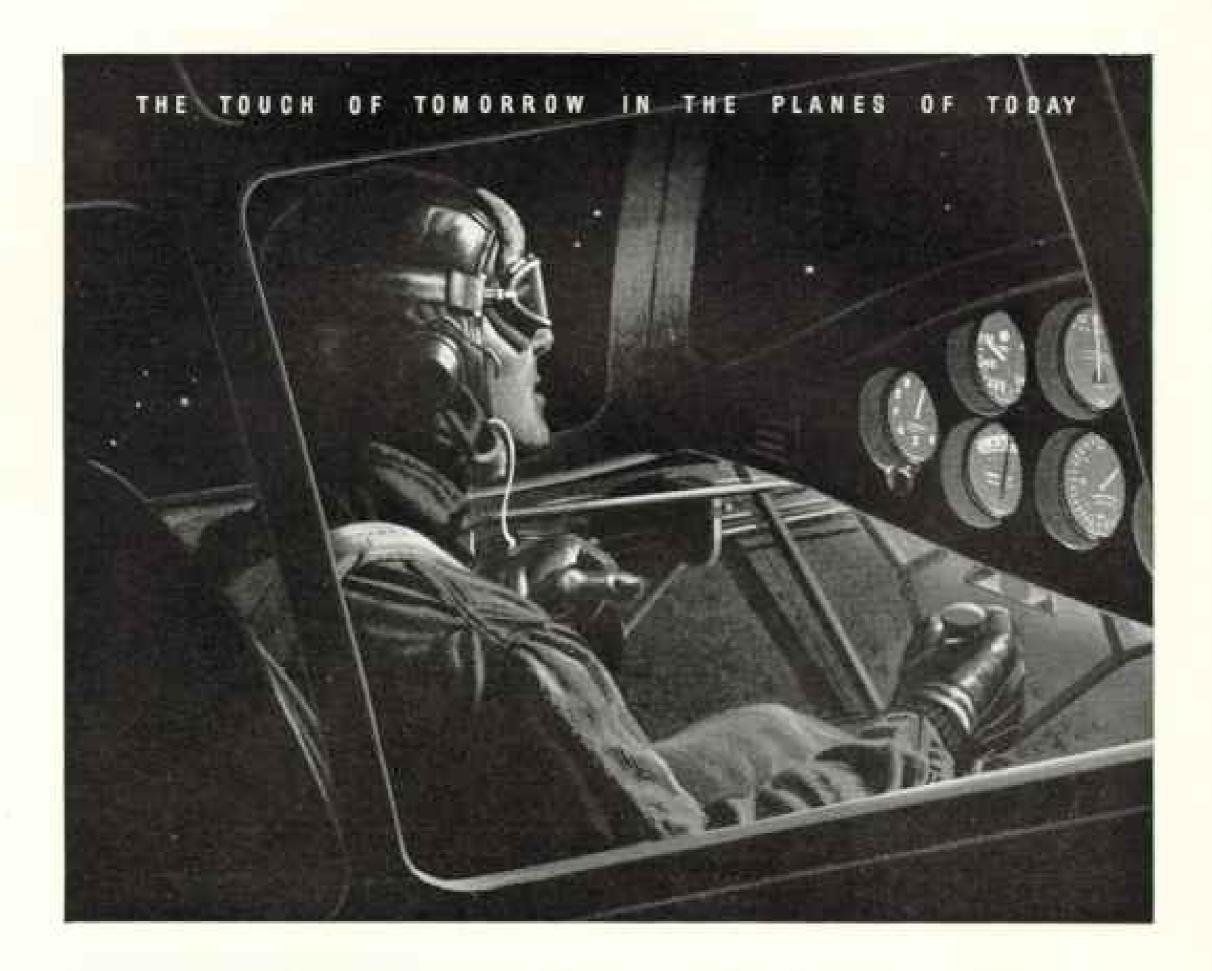
Critical, probing vision inspects Westinghouse products at every step . . . enforces high standards of accuracy and precision to the 1/10,000th of an inch, to the 1/1,000,000th of a pound. On Westinghouse inspectors like this alert girl, the 57-year Westinghouse creed of quality depends.



Westinghouse opens up the vision of a brave new day . . .

In Westinghouse inboratories today, electronics and electricity are giving up their secrets . . . bringing the promise of immeasurably better, happier living in the new world of peace that lies ahead. Those secrets are working today for Victory. When the war is ended, they will work for human happiness—in new electrical products and appliances far beyond your dreams. Westinghouse Electric & Manufacturing Co., Pittsburgh, Pennsylvania. Plants in 25 cities—offices everywhere.





War Is a Skill Our Sons Must Learn

Every American soldier fights with courage characteristics of the combat plane. Thus, they and self-sacrifice. But these alone do not win wars. War also demands high technical skill because it is a struggle not only of men against men, but also of machine against machinetanks, planes, battleships. Without training in the use of these instruments of war, soldiers today are without weapons!

One weapon in this war—the airplane—calls for more personal skill than any other. And one of the most critical phases in a pilot's training is his step-by-step transition from primary trainers to combat planes. These steps cannot be abrupt, yet time demands that they be swift. Therefore, along with the relative stability and safety required in a training plane, Fairchild engineered into its trainers certain definite get a pilot ready for his second step while teaching him the first!

Fairchild training planes—primary trainers, bomber crew trainers and gunnery trainers are being used on United Nations training fields throughout the western hemisphere. They are powered by Fairchild Ranger aircraft engines. They reflect the 20 crowded years which Fairchild engineers have devoted to "creating the plane for the purpose." The "touch of tomorrow" in Fairchild engineering indicates courage to try new things. We shall need many new things to further prosecute this war against our resourceful enemies. Fairchild has quite a number on the way-to add to those already on its record!



CORPORATION

ROCKEFELLER PLAZA, NEW YORK



How FAR is an hour?

Is it 4 miles or 400? It depends on how you travel!
When grandpa was a boy, he spent most of a
Saturday getting to town and back in a buggy.

But today he can step into an airliner and cross the country before the sun goes down.

To thousands of people who travel by air, miles are merely minutes . . . oceans and continents, hours.

Today, the Airlines maintain the fastest passenger, mail and cargo schedules in the world—serving hundreds of U. S. cities and scores of foreign countries.

For the Army and Navy, the Airlines also operate an armada of transport planes that reduce weface days to air bours in getting vital goods and personnel to every fighting front.

a remarkable as a second

Yet the 180-mile-an-hour speed on which the Airlines base their present schedules will probably seem slow indeed, when the giant transports of the future lift their wings to global skies.

What that speed will be—how far it will take you in 60 minutes—can only be conjectured by this fact: Our aircraft builders are now making military planes that fly more than 400 miles an hour—7 miles a minute!

When you travel by Air make reservations early; please cancel early if plans change. When you use Air Express speed delivery by disputching shipments as some as they're ready. Air Transport Association, 1515 Massachusetts Ave., N. W., Washington, D. C. IF YOU CAN'T GO OVER, COME ACROSS . . . BUY BONDS!

THE AIRLINES OF THE UNITED STATES

AIR TRANSPORT GETS THERE PIRST ... PASSINGERS ... MAIL ... AIR EXPRESS

THE Milwaukee Road

11,000-MILE SUPPLY LINE

for war and home fronts



It serves the dynamic midwest, stretches out across the great plains states, on into the green and growing northwest.

In all, there are 12 Milwaukee Road states, wide in territory, bountiful in resources, rich in opportunity, where huge quantities of basic commodities and finished products originate.

Passenger traffic on The Milwaukee Road is three, sometimes four times higher than in recent pre-war yearsand the volume of freight traffic is reaching new peaks. Yet, thanks to the cooperation of the government, civilian passengers and shippers, this tremendous extra load is handled without delays.

Every resource and facility of this 11,000-mile supply line are intensively

home front in order to insure success on the fighting fronts.

For 92 years, The Milwaukee Road has played a big part in our nation's progress. And, to a man and a woman, 35,000 loyal Milwaukee Roademployees are determined that they shall not fail America now.

My to leave the same to be not 2000 LUMBER **€** 38 38 38 38 METALS AAAAA FACTORY PRODUCTS





BUY WAR BONDS AND STAMPS

For jungle or ski troops - a new kind of cheese

Global war is hard on the food that keeps men fighting! One package may fry in a tank on hot desert sands—while the next freezes on a sled in Alaskan snows. But they should taste the same—and taste good—wherever eaten.

That has meant many headaches for the Army Quartermaster Corps and the food processors who supply them. But they've been cured, repeatedly, by American ingenuity. And National Dairy scientists have helped.

Cheese is a good example. For emergency use in arctic and tropics, National Dairy laboratories developed a dehydrated, compressed cheese bar that keeps well anywhere and takes less shipping weight and space.

When guns are hot and time is short, the emergency cheese ration can be eaten as is—
like a candy bar. Or it can be mixed with a little water to make a tasty spread for bread.

Or the mixture can be set aside for an hour or so and then sliced.

Best of all, this versatile cheese bar is rich in the nutrition of milk—nature's finest food high in protein, and full of the energy fighting men need. And it's only one development of National Dairy research. We are working on others that we hope will play a part in ending the war and enriching the peace.

Dedicated to the wider use and better understanding of dairy products as human food . . . as a base for the development of new products and materials . . . as a source of health and enduring progress on the farms and in the towns and cities of America.

NATIONAL DAIRY PRODUCTS CORPORATION

AND AFFILIATED COMPANIES

Originators of the Sealtest System of Laboratory Protection

Wartime Guide to

STEP FROM the heart of New York into the cathedral-like beauty of Grand Central Terminal.

Beneath this high, blue-vaulted ceiling now pass some 54,000,000 travelers a year. Boys on their way to war, watched to the train gares by bravely smiling parents. Workers journeying to war jobs. Business leaders speeding to win production barrles.

Together they form part of the greatest traffic America's railroads have ever carried. A tremendous mak, vital to Victory, and rich in promise for the future. For out of this experience will come the finer rail transport of tomorrow, when Grand Central will echo to the footsteps of free, victorious people bound on errands of peace,

14.800 QUESTIONS AN HOUR

Terminal information men answer 14,800 questions during a hury bout. To save habiting up ticker lines, get information in infrarer at this booth or by telephone.

@ GRAND CENTRAL SERVICE FLAG

Honors 21:314 New York Central emplayees. Thousands of other Counst workers have suny and daughters in unjform . . . an added drive behind this railroad's war effort,

TICKET OFFICE 90% BUSIER

Though we've added entra windows and personnel to meet the rush, war-wise mayelers prefer to buy ticken at quieter mul-morning and early evening bours.

SERVICE MEN'S LOUNGE

This lounge is husiest on weekends when thousands travel on furlough. To give them room on weekend trains, plan trips you send make for mid-work.

54.000.000 PASSENGERS A YEAR

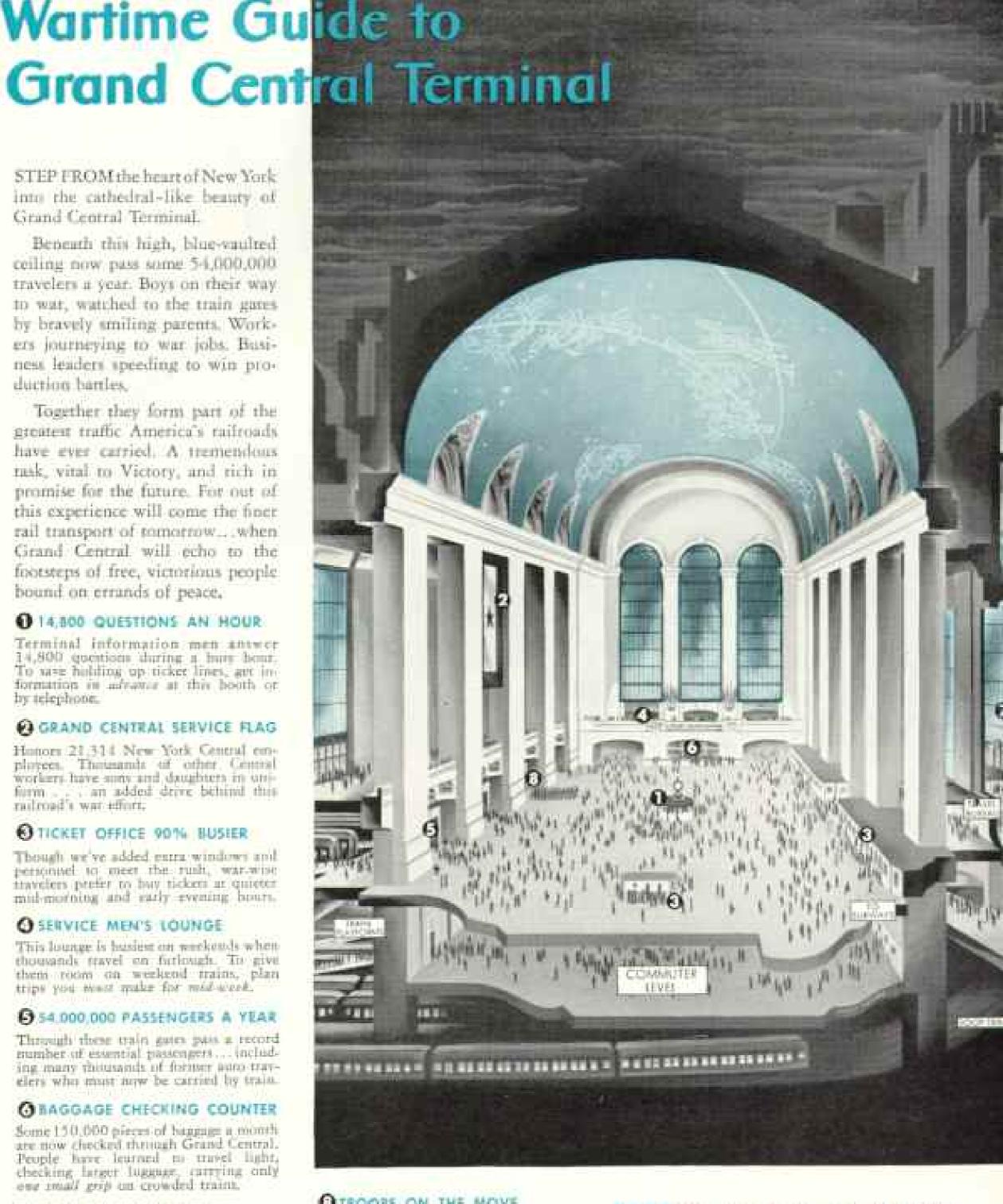
Through those train guter pass a record number of essential passengers ... including many thousands of former ages travelers who must now be carried by train.

THAGGAGE CHECKING COUNTER

Some 150,000 pieces of baggage a month are now checked through Grand Central. People have learned to travel light, checking larger lugueur, carrying only one small grip on crowded trains.

MAIN WAITING ROOM

Where some one may have to wait for a later train if you fail to cancel an unwanted reservation. These days, cancel reservations the minute plans change.



TROOPS ON THE MOVE

Today, half the nurion's Pullmans and 3.0 55 of its coaches are needed to move 2,000,000 troops per month. One more reason railroads can't always provide the accommodations you want.

FREE WARTIME GUIDE TO GRAND CENTEAL

A fuscinating booklet with large detailed cutaway view that takes you behind the occurs of the Terminal in warring. Write Passenger Department, Room 1261H. 466 Lexington Avenue, New York.

BBY MORE WAR BONDS AND STAMPS



New York Central

ONE OF AMERICA'S RAILROADS - ALL UNITED FOR VICTORY



Report from the front on SYNTHETIC TIRES

Out in the great desert training camps and at the front, too—the Army is putting all-synthetic tires to grueling test. The first tires of this type, produced from synthetics entirely manufactured in government plants erected since Pearl Harbor, were delivered by Goodyear.

How are these synthetic tires standing up under such rough usage? The answer is—surprisingly well! They have stamina, withstand abuse, give adequate mileage. In many re-

spects they are proving comparable to prewar natural rubber tires.

And here is one more important fact you will be glad to know. Unlike German buna tires that,

it is reported, cracked and split under extreme cold in Russia, Goodyear-built tires keep resilient at low temperatures. They will perform

Characters (pronounced Kern-terrain - T.M. The Gandynar Druß flather Gengany

as well in Alaska as in the tropics.

This superiority is due to the intensive work in improving methods of compounding synthetics and developing tougher cord that has gone on continuously since Goodyear produced its first all-synthetic tire in 1937.

Tires for civilian cars made from synthetics like Goodyear's Chemigum are now in production. Meanwhile, further improvements and

> refinements have been going on apace—so when you get them you can be sure they will be the best synthetic tires money can buy,



ALL-SYNTHETIC TIRES BUILT BY GOODYEAR 1 Military type 2 Passenger type



GOODSYEAR

THE GREATEST NAME IN RUBBER

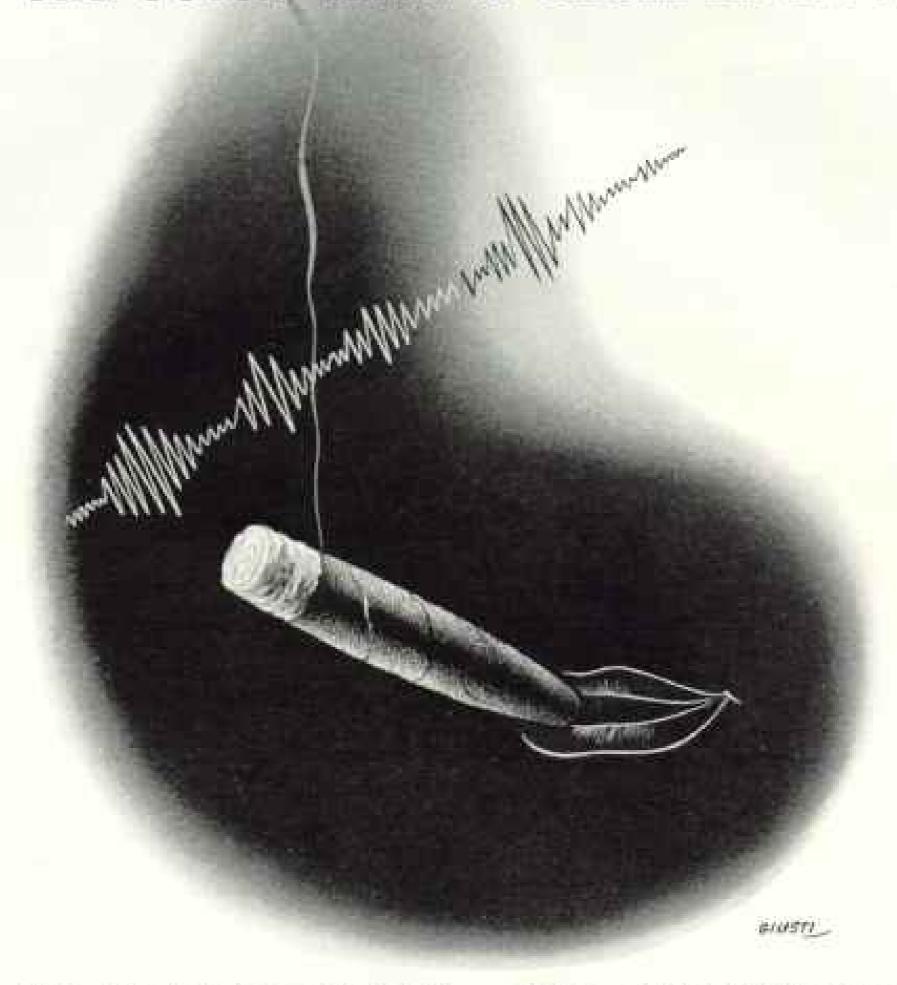
JUST HOW FAR executive thinking is aided by a clear Havana perfecto is a question not yet surveyed.

The fact remains that many a business man dictates to his Dictaphone with a cigar in his mouth.

That kind of talk is strictly American, but secretaries don't like it, because it isn't always easy for them to understand it.

So in the Dictaphone Research Laboratories at Bridgeport, Conn., we have done quite a bit of research on the problem presented by the voice with a cigar in it. After all, the aim of Dictaphone engineers is to make a machine that will record dictation intelligibly under all sorts of office conditions,

THE VOICE WITH A CIGAR IN IT . . .



The first thing that Dictaphone engineers did was to trim away all disturbing overtones and resonances. Then they started experimenting with the reconstruction of voices which had been thus pared down. When war struck, they had already taken long steps in this direction. Toothin and too-deep voices—words mumbled or over-emphasized were being successfully built up or cut away to produce intelligible tones that secretaries could more easily understand.

In the avalanche of war activity Dictaphone dictating and recording equipment bears the brunt in many an office of both Government and industry—saving precious minutes — getting vital ideas into action fast!

Meanwhile Dictaphone engineers have turned out many improvements in electric voice recording for use by the armed services—brandnew ideas which will further extend the usefulness of the Dictaphone method of dictation to meet the challenge of the post-war era.

Dietaphone Corporation, 420 Lexington Avenue, New York City.



DICTAPHONE

ACOUSTICORD DICTATING EQUIPMENT ELECTRICORD RECORDING EQUIPMENT

The most DECLAPHONE is the Registered Trade-Mark of Disturbons Corporation, Makers of Disturbing Machines and Accessories to which said Trade-Mark to Applied,

" WHEN THE LAST BOMB GOES HOME ... "

"Some dawn, our orders will come in.

"In the mist and the half light, we'll bomb up' as always. Strap on our parachutes. Take our places. Buckle our safety straps.

"Once again . . . familiar thunder will burst about our cars as the motors are gunned and the props bite bright circles in the air. Under our rumbling wheels the runway will tremble. Once more, the long driving rush and roar as we take to the sky!

"Some day, the cross-bairs of my sight will center a target. And at the cry 'Bombs away,' the last train will leave the bay and the last bomb will begin its long curved run to earth. If "And in its dull, exploding echoes,

I shall hear the sullen crumble of
walls, the crash of falling masonry
and shattering glass, as the very
swime of the last stronghold of hate
and lust and tyranny is purged forever from the world in one final
burst of flame!

"Then—I'll turn homeward in the
dusk. Home to my country, home
to my town where I want unchanged, just as I left it, everything
that is America to me. Everything!
I hope they haven't even fixed the
fence where the third picket from
the gate was missing!

"Out here, America has come to mean just this to me . . . a country where I can live the way my folks and I have always lived . . . a counis, try where there's work to do, where
of no one is ashamed to work, where
there are no limits on a man's ambition or his opportunity to go as
far as ability can take him—to grow
as great as he wants to be. Whatever you do, don't change that,
ever! I know now—that's what I'm
fighting for!"

Here at Nash-Keleinatov, we're building
giant new 2,000 horsepower engines for
U. S. Navy Corsust fighters . . . propellers for United Nations hombers . . .
working to harry the day when our boys
will come home again, the day when
we'll turn again to peaceful things, to
the building of an even finer Kelvinator,
an even greater Nash!

NAME-KELVINATOR CORPORATION, DETROIT

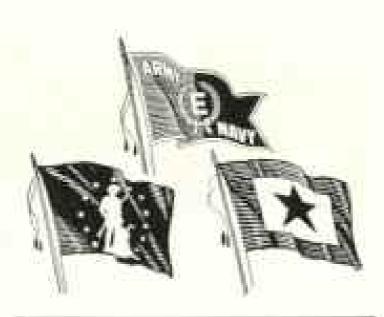


RAIDIONICS*

"the impossible we do immediately the miraculous takes a little longer"

ARMY SERVICE FORCES-

The Army is . . . men . . . trained men . . . equipped and maintained. On the home front . . . in factories and on farms . . . civilians produce the armament and food and supplies. The bridge between civilians who furnish and soldiers who use . . . is . . . the Army Service Forces. Wherever the soldier is . . . whatever he does . . . the Army Service Forces are charged with seeing that he lacks no essential thing. To fulfill the task outlined in the twenty-one words above . . . literally . . . the "impossible" and the "miraculous" become daily routine with the Army Service Forces.



"AYE, AYE, SIR"

In old English, "Aye" meant "yes."

It means far more in the Navy.

"Aye, Aye, Sir," means that the order is understood and will be obeyed,

The Navy has given Zenith many "orders" since this war began.

Our prompt "Aye, Aye, Sir," has, we believe, been justified by the "intelligence and initiative" (as the Navy says) with which these orders have been executed,

- —in days of civilian radio, Zenith was proud of its long series of "firsts"—improvements which made radio history and established leadership in the industry.
- -today our viewpoint has changed-materially.
- -engaged exclusively in war production, the things we have been called upon to do-the tasks we have succeeded in accomplishing, make past improvements in civilian radio literally look like "child's play."
- -the work of our engineers in radionics has made the "impossible" possible and accomplished the "miraculous."
- "-mark that word "RADIONICS"-it has brought into reality and being, devices which only a year or so ago came in the "impossible" and "miraculous" categories.
- -today Zenith works in the science of radionics for our armed forces alone.
- -in that bright "tomorrow" when peace returns-
- -we can only say-the post-war radios that Zenith will produce will contain many interesting new developments.
- -that statement is based upon experience which we can not now reveal-but you may take our word that it is a fact.

ZENITH RADIO CORPORATION, CHICAGO

BETTER THAN CASH

U. S. War Savings Stamps and Bonds





Buy War Bonds and Stamps

Another Fortress Is Hatched

A mammoth door is raised. Without fanfare, another Boeing Fortress is rolled out—ready to fly!

Huge and mysterious in the half-twilight, the Fortress beneath its trim lines sheathes interior structures and installations that are both durable and complex.

Despite the many difficulties entailed in the building of so complicated a weapon, Boeing is able to hatch out Flying Fortresses* in constantly accelerating volume, because it has reduced even the most involved procedures to simple, accurate operations which can be learned quickly. This means manufacturing planning of the highest order.

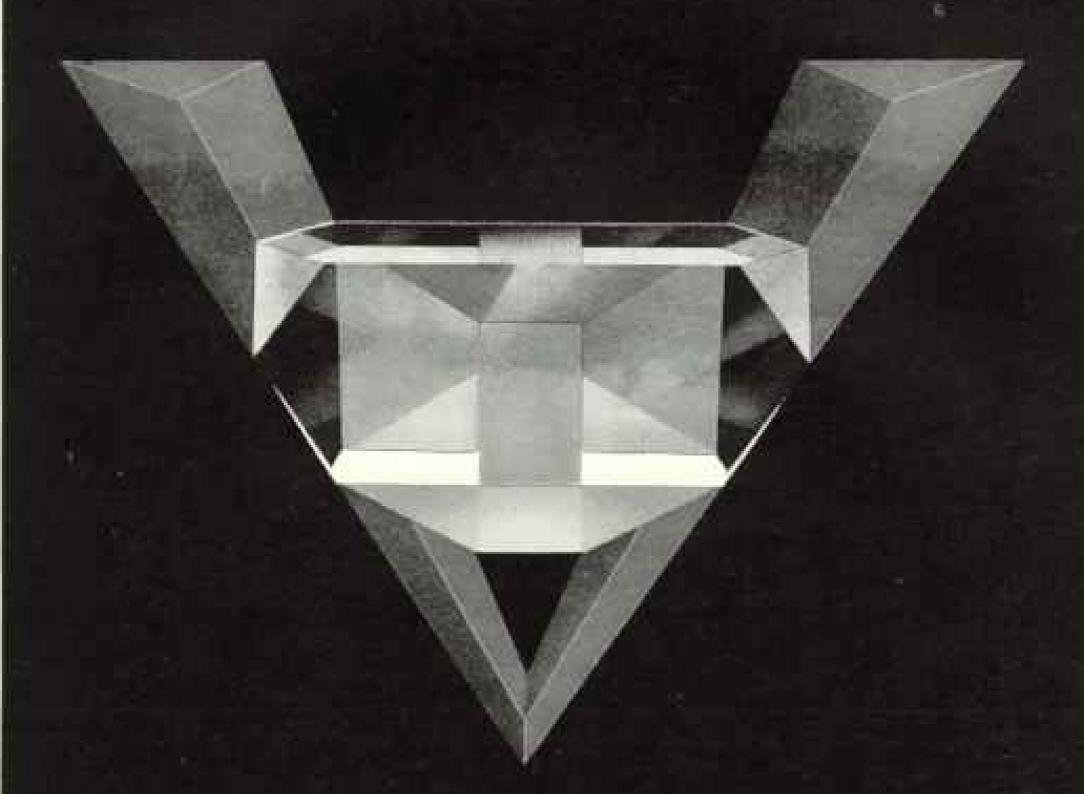
Each part, each function, each assembly (and they total thousands) had to be arranged and tooled. Boeing, for example, developed more than 100,000 special tools to do the job.

One result is that Boeing's output is the greatest of any aircraft manufacturer — per man, per machine, per unit of floor space. Today, Boeing is building Flying Fortresses at a rate 8 times greater than the month before Pearl Harbor. Further, the results of Boeing's planning are, in turn, helping other companies to speed up America's aircraft production. For, under the BDV agreement, Boeing has made its plans and specifications available to both Douglas and Vega which also are building Boeing Flying Fortresses.

Once peace is won, you can look to Boeing's research, design, engineering and manufacturing genius to bring you many a new and interesting product . . . with the sure knowledge that if it's "Built by Boeing" it's bound to be good.

BOEING

Jewels of Today ARGUS EYES FOR VICTORY



MILITARY OPTICS

FINE AMERICAN CAMERAS

PRECISION OPTICAL INSTRUMENTS

AVIATION RADIO

BUY WAR BONDS



INTERNATIONAL INDUSTRIES, INC.





Studebaker's big military trucks stand out in all the major war zones

In virtually every theater of this global war, mighty military trucks produced by Studebaker are moving the men and supplies of the United Nations.

From the Alcan highway to the Russian front, from Africa to China, tens of thousands of these big Studebakers have been writing brilliant new pages of transport history.

The stand-up stamina of these rugged Studebaker trucks is nothing new. It's as old as the Studebaker business. It goes back more than 91 years to the days when the Studebaker brothers made the phrase, "give more than you promise," the watchword for all Studebaker activities.

Studebaker today is one of the world's leading builders of big, multiple-drive military trucks—and is also producing great quantities of powerful Wright Cyclone engines for the Boeing Flying Fortress as well as much other vital war materiel.



Send 104 for a beautiful reprint of this Flying Fortress painting.— This dramatic pacture of a Flying Fortress is available in 24x22 inch size on a special stock suitable for framing, free from advertising. Address Studebaker, South Hend, Indiana, enclosing 10¢ to cover mailing cost.



A LOT GOING ON IN THIS PICTURE— AND A LOT GOING ON IN INDUSTRY

It's big, dramatic. You can see it. But you can't see the idea that made it.

You can't photograph ideas. But they win wars. They make jobs. They make prosperity. They make well-being.

They used to come as a revelation once in a while, almost like a miracle to an individual. Now, there are teams that insure them.

Groups that keep ideas flowing. People who know how to dip into the wealth of nature for what they need.

They are scientists. They work together in laboratories. They are working at the Bell Telephone Laboratories. Thousands of them. This is the biggest industrial laboratory in the world. Once its work was all telephone. To help your voice reach any one, anywhere. Easily, quickly, at low cost. Now it's war. Day and night. Seven days a week.

Our fighting men see the results of American research every day.

BELL TELEPHONE SYSTEM



Help the war by making only vital calls to war-busy centers. That's more and more essential every day.



Some heartening facts about Cancer

WHAT PROGRESS is being made in the battle against cancer? Are more lives now being saved?

The answer is "Yes!" The proof is found in the growing thousands of cured cancer patients who literally have new leases on life. But medical men would like to impress the public with one important point:

The chances of cure depend directly upon how early the disease is recognized and treatment begun. Caneer, in the beginning, is confined to a small area. Later, it spreads until cure is difficult, often impossible.

People sometimes delay examination of a suspicious symptom—they "wait and see." If this applies to you or someone you know, your own peace of mind calls for an immediate examination. Encouragingly, authorities tell us that only a comparatively small percentage of such symptoms prove to be cancers. This is borne out by the following report of a leading cancer clinic...

Of several hundred women who applied for examination because they had suspicious symptoms and suspected cancer, only 11½%, or slightly more than one in ten, actually had the disease. Imagine the relief of the other 88½% who learned that they did not have cancer!

Thus, suspicious symptoms do not always mean that cancer is present. They usually do indicate that something else needs medical attention.

The difference can be determined only by a careful examination. It is always best to play safe.

Any of the following symptoms warrants an immediate visit to the doctor...

- I. Any unusual lump or thickening, especially in the breast.
- 2. Any irregular or unexplained bleeding.
- 3. Any sore that does not heal, particularly about the mouth, tongue or lips.
- Persistent indigestion, often accompanied by loss of weight.
- Noticeable changes in the form, size, or color of a mole or wart.
- 6. Any persistent change from the normal action of climination.

Metropolitan will send upon request a free booklet, 83-N, "A Message of Hope about Cancer."





Talerco Josephane - Americo pertonis for she Magnaron series of Jalerco Josephane famous musicians primited by Beres Chulingin

Born to the baton . . .

His father fought in Garibaldi's army of liberation. From this soldier of freedom, Arturo Toscanini must have inherited his uncompromising integrity . . . his readiness to fight for the higher standards of life, musical performance and appreciation that has characterized his career.

To such a man, the flattery of public applianse is never important. He believes that orchestra and conductor should be hidden from view and that there should be no encores. You amain this ideal when you listen to a Toscanini broadcast or recording played by a Magnavox radio-phonograph.

This unique instrument captures all the intensity, all the subtle shades of beauty, that masterly conducting reveals in great music. It is not a matter of chance that so many famous musicians of our time have chosen the Magnavox for their own homes.

The Magnavox Company is now concentrating entirely on the production of electronic and communication equipment and music distribution systems for watships. Letters from fighting men tell of the priceless hours of pleasure that music has brought to them. See your Magnavox dealer for a wide selection of records to send to your soldier or sailor.

BUY WAR BONDS TODAY FOR VICTORY AND SECURITY



The fine craftsmanship which went for Magnauers the first Navy' E award and White Star Renewal Citation) among instrument manufacturers has made these radio-phonographs the first choice of discriminating buyers. The Magnatox Co., Fort Wayne, Ind.

Magnavox



FROM "THE BATTLE OF MIDWAY" - filmed on 16-mm. Kodachrome (actual size film strip at right) by the U.S. Navy, Winner of 1942 Documentary Shart Subject Award, Academy of Motion Picture Arts and Sciences.





Cine-Kodak covers our First Great Victory

THE original of that great movie you saw—
"The Battle of Midney"—was made with
Ciné-Kodaks, on 16-mm. Kodachrome Film.
It was made by Navy men who risked their
lives in a bail of bombs, a bell of fire, an inferno of exploding ammunition and gasoline,
to give the Army and Navy authentic battle
data. And incidentally, to inform you, too.

You may have noticed that the movie was rough and jerky in spots—that was because the cameramen were recling under the concussions. One shot—one of the finest—of the flaming sky above exploding oil tanks, was preceded by a terrific jolt in the picture. Remember?

That was because the Ciné-Kodak was blown out of the operator's hands, hit the ground right side up but with an upward angle-and coolly continued making the movie . . . doing its job without benefit of an operator.

Think what superb construction a camera must have, to stand up under tests like these.

Because the Ciné-Kodak can "take it" because it goes on operating with precision and dependability under incredibly rough conditions—it is used by the Army and Navy, Air Force, and Signal Corps to record these actual battle scenes at the front, as well as for the valuable work of making training films.

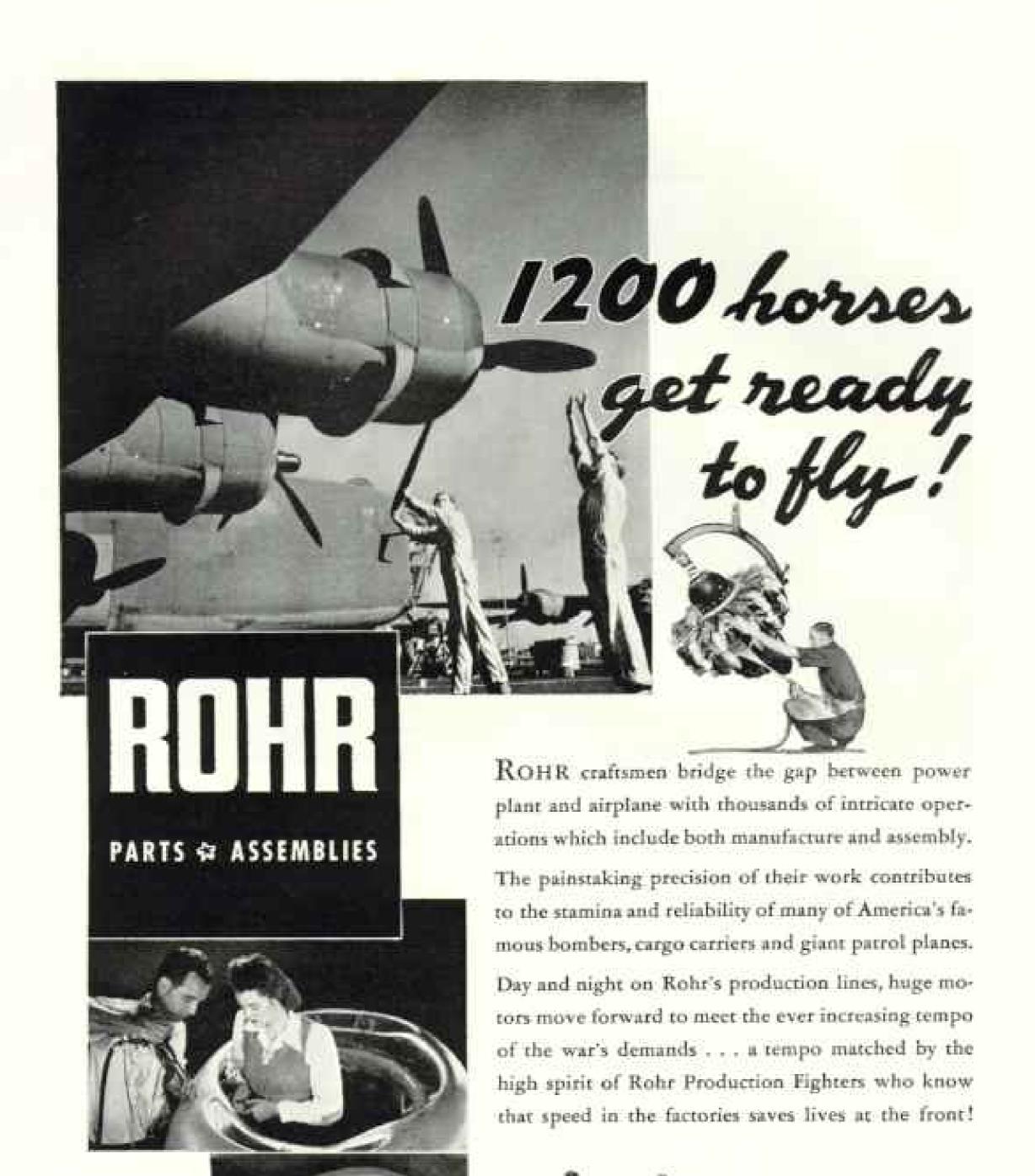
* * *

If you own a Ciné-Kodak—he proud of it. Take care of it. Use it, these days of limited film, to make movies of the home front . . . to show your soldier when he comes back . . . Eastman Kodak Company, Rochester, N. Y.

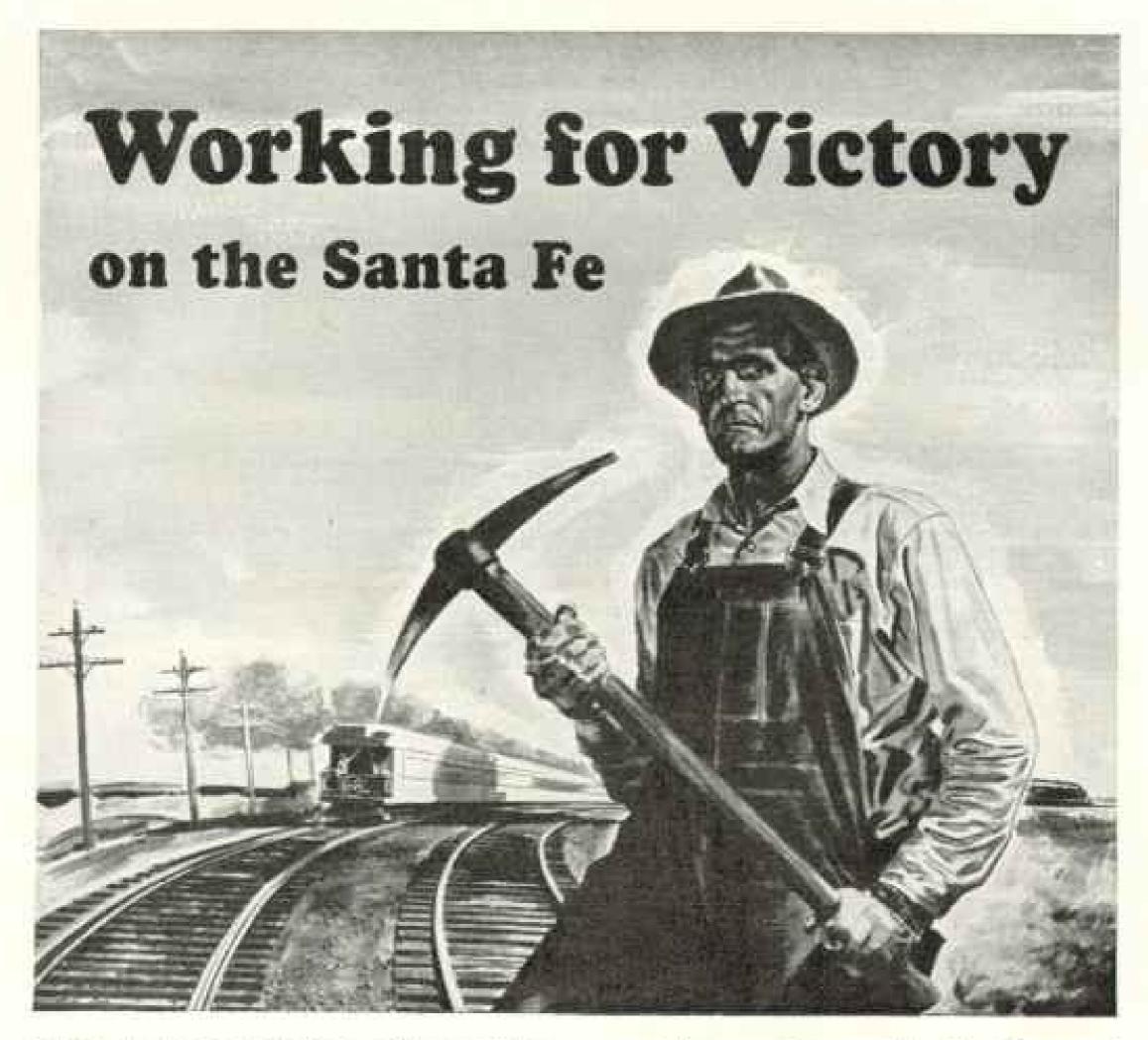
Ciné-Kodak



Eastman's Finer Home Movie Camera



HELPING TO WRITE
THE STORY OF TOMORROW



Through these hectic days and busy nights, troop trains, regular trains with troop cars, and freights loaded with war materials keep rolling along the Santa Fe.

Watch a section hand grab his pick a little tighter after a trainload of American fighting boys has rolled past. "We'll-get-'em-through" is his attitude these days.

Yet—he is only one of more than 55,000 employes on the Santa Fe who are doing their bit "keeping 'em rolling" all along the line... moving millions of troops and millions of tons of materials needed for Victory, where and when they are needed.

They know that if you stop the wheels that

move them, you stop everything that floats and flies as well!

And they never forget that thousands of boys in our armed forces came from Santa Fe ranks and from the families of Santa Fe employes, and these boys who are fighting for all of us have the toughest job of all!

You bet, we're backing them up in the best way we know—and that's by buying War Bonds, and seeing to it that movements essential to Victory come first on the Santa Fe!

SANTA FE SYSTEM LINES

Serving the Southwest and California

ONE OF AMERICA'S RAILROADS-ALL UNITED FOR VICTORY







CHAMBERLIN METAL WEATHER STRIP CO., Inc. 1402 LaBrosse Detroit, Mich.

Send me U. S. Gov't Book on Fuel Bavings. Also information on Weather Strine | Rock Wool | Storm Sash | Calking

Nums.... Street

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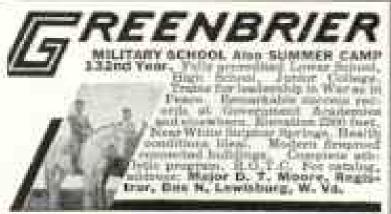
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