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Your Navy as Peace Insurance

With 32 Illustrations 26 Natural Color Photographs

FLEET ADMIRAL CHESTER W. NIMITZ, USN

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Your Navy as Peace Insurance

BY FLEET ADMIRAL CHESTER W. NIMITZ, USN.

Chief of Naval Operations

A CARTOON in a recent issue of *Collier's* showed a little group of pith-helmeted NATIONAL GEOGRAPHIC scientists taking over a Pacific atoll. The former tenants, an Army combat unit, were boarding a Navy LST for home.

Facetious though it may be, the cartoon symbolizes the return of peaceful enterprises to peoples and places so recently embroiled in global war. No one welcomes the transition more than the sailor.

Now that the war is over, and everybody seems to be eager to shove all reminders of conflict out of sight, one hears the question: "Why do we need a powerful Navy today, in peacetime?"

The Navy's Job in Peace and War

Here, in brief, is the answer:

The primary function of your Navy is the protection of the United States and its distant territories from enemy invasion.

As long as most of our commerce is waterborne, and that will be for many long years, our sea lanes must be protected on the sea, over it, and under it.

In addition, under the Act of Chapultepec, signed by the American countries in Mexico last year, the United States reaffirmed its responsibilities as a guardian of Western Hemisphere shores.

Also, as a member of the United Nations, the United States will undoubtedly contribute a large fleet to the world pool of force to safeguard the peace and act as a bulwark against aggression.

Be they years of peace, as we all hope, or years of war, the mighty United States Navy, which with the British Navy eliminated the German submarine menace and destroyed Japan's fleets of war and commerce, will play a dominant role in the years ahead.

What is the Navy? It is not just an organization of ships and aircraft and men. Our enemies have had all those, and sometimes in superior numbers.

Your Navy is a combination of ships, aircraft, and trained men backed by unmatched natural and intellectual resources and led by men skilled in the application of sea power.

Then the question arises, what is sea power? Sea power is as ancient as the Minoan galleys of 5,000 years ago, and its meaning has not changed essentially. Sea power is that force which utilizes the oceans to defend a nation against invasion and to attack an enemy power at its own shore line. It may also deny an enemy use of the ocean.

Sea Power Takes Wings, Dives under Sea

Up to this war, sea power was synonymous with surface ships bristling with guns. Today, and for tomorrow, sea power has taken on new dimensions. It has dived below the surface. It has taken wings.

Therefore, I prefer to modernize sea power by making a hybrid of it. Sea-air power conveys the meaning more exactly. But call it what you will, it still has the same function as in the days of the Sea Kings of Crete—the control of oceanic approaches. That is your Navy's job.

Sea power and air power, interdependent and interwoven, provide our carrier-borne fighting planes with a range of 15,000 miles with fuel tanks full and a maximum cargo of ammunition. Sea-borne air power enables our

U. S. Navy, Official

Carriers Parading in Line with Battleships Show No Foe Is Near

When cruising in this cramped position they cannot launch planes. "The carrier is still the Queen of the Seas," says the author (page 685). An *Independence*-class carrier (left) is built on the hull of a 10,000-ton cruiser. She is followed by an *Essex*-type, constructed from the keel up as a 27,000-ton carrier. Both carry gun mounts in their bows. Planes are parked with "broken" wings, saving deck space.

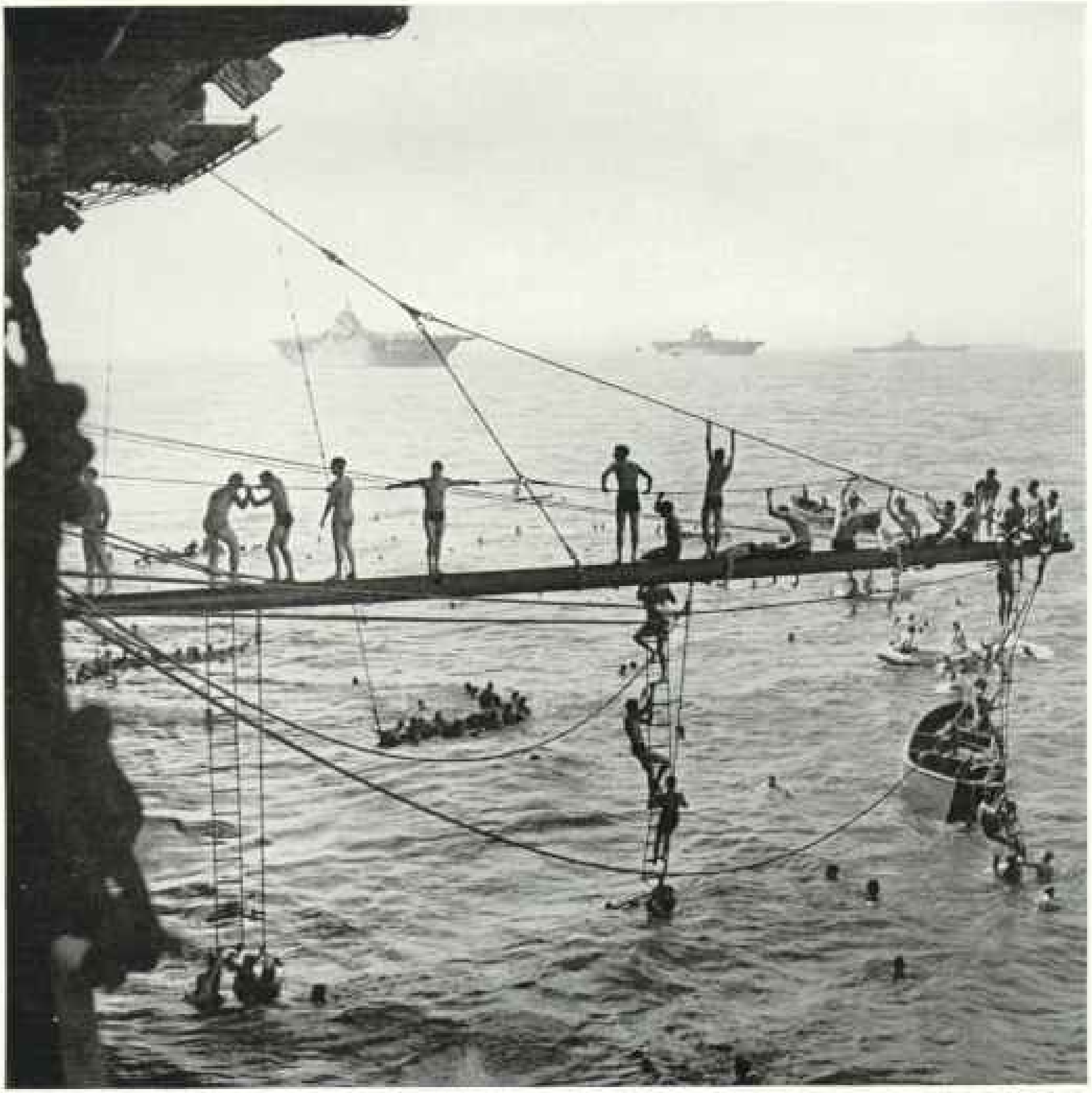
ships to see over the horizon. Sea-borne air power hit the Japanese invading forces in the Coral Sea and at Midway before the ships of the opposing fleets could sight one another. Sea-borne air power, vigorous and at peak efficiency, victorious in the last war, may well prevent the next war.

But sea power, like the navy which exercises it, does not consist of weapons and men alone. It is a science, and those who are not versed in it fare badly indeed.

Twenty-four centuries ago Xerxes sought to conquer Greece. He was a great general, but of the science of sea power he knew little. When the Greeks, with inferior naval forces, overwhelmed the Persian fleet at Salamis, Xerxes' ambitions were shattered.

Similar lack of understanding of naval warfare cost Spain her pre-eminence in the world of the 16th century. She sent her great Armada of 130 vessels, organized like a land army rather than a fleet, against the English sea dogs.

Admiral Sir Francis Drake knew sea power, but the Spanish duke did not. With some 90 ships, Drake and his fighting sailors destroyed the Armada, heralding the decline of Spain's dominance over the Western World.



U. S. Navy, Official

Swimming Call Transforms a Deadly Carrier, Fresh from Battle, into a Play Ship

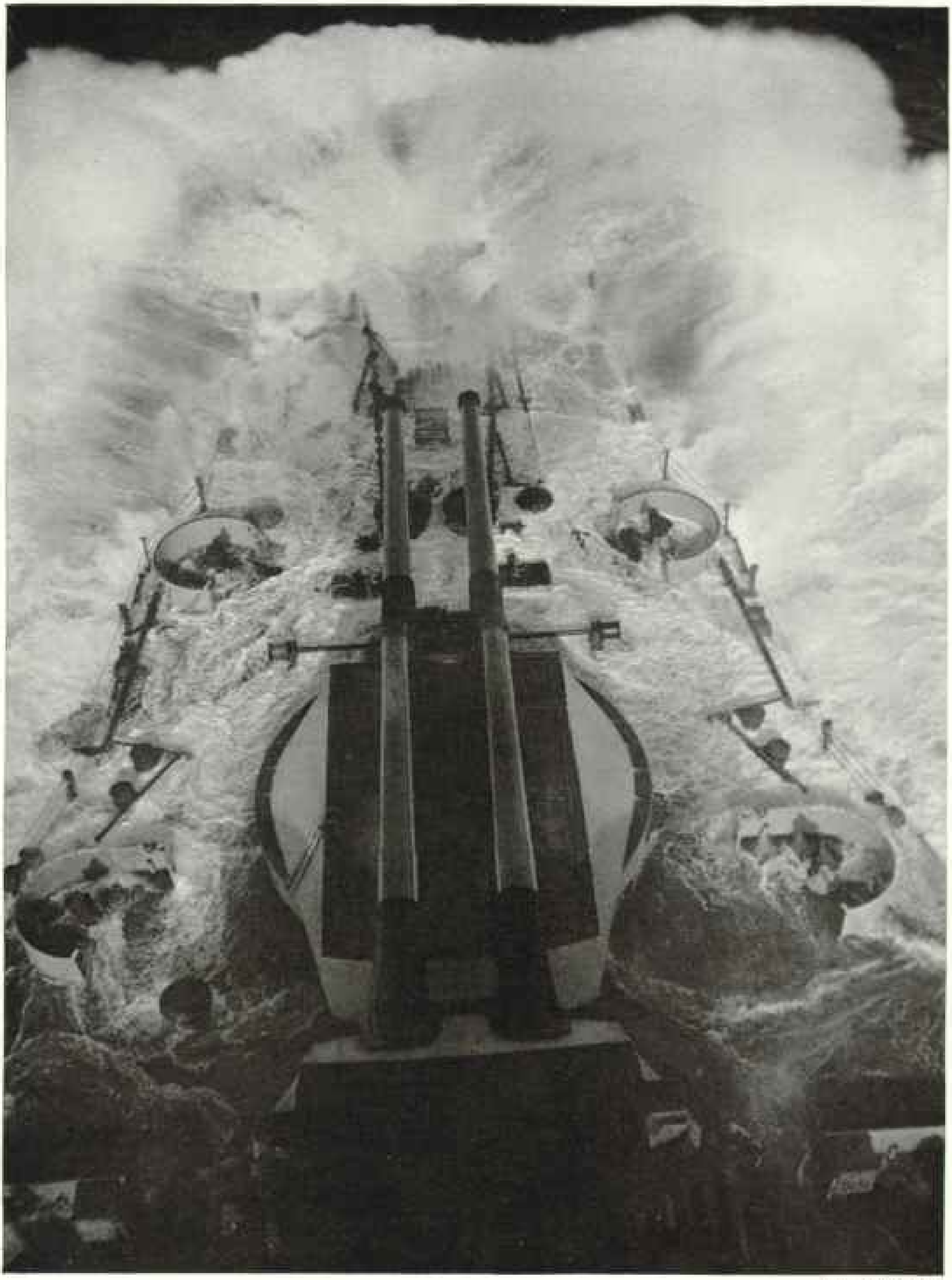
These men, having softened up Kwajalein Atoll for the capture, now swim in its immense lagoon. On the boat boom two sailors try to push each other off. Others ride rubber rafts, whaleboats, and floater nets. On board ship a safety watch keeps vigil. In the distance lie, left to right, an *Essex*-class carrier; the *Saratoga;* an *Iowa*-class battleship.

Napoleon, a brilliant soldier, did not have enough "know-how" of sea power to cross the 20-mile gap of the English Channel, although his armies ranged thousands of miles over Europe and Africa. The emperor-general insisted upon dictating to his admirals how the French fleet was to be used. The British left the strategy and tactics to their naval experts. The battles of the Nile and Trafalgar foreshadowed Napoleon's eventual doom.

In World War I, Admiral von Tirpitz, who understood the value of naval power as few Germans ever have, could not persuade the dominating German General Staff of sea power's vital role in a war against maritime nations. The General Staff was astonished when Great Britain, without an army, possessing "only a Navy," came into the war.

But Germany's fleet ventured only as far as Jutland. Though it inflicted more damage than it received, that powerful fleet retreated into hiding until led out, captive, at the war's end.

That war's end, let us remember, was clinched by American sea power. American armies, American supplies, carried and convoyed across the Atlantic by British and American ships, tipped the scales in our favor.



U. S. Navy, Official

Rifles Muzzled and Gun Tubs Awash, U. S. S. *New York* Cleaves the Surging Atlantic

This gallant battleship served with the British Fleet in World War I. In 1942 she silenced French artillery in North Africa. In 1945 she bombarded Iwo Jima and Okinawa. Bombs, torpedoes, shells, and suicide planes succeeded in making only a minor dent in the *New York*. She was assigned as a guinea pig in the atomic-bomb tests.

Did Germany heed that costly lesson? Not remotely. Adolf Hitler built a token fleet, but put his faith in the Panzer divisions and the Luftwaffe.

After the British, on May 27, 1941, sunk his great *Bismarck*, racing home from her preposterous foray into the Atlantic, Hitler gave orders that the German Navy must avoid losses. Thereafter, the Nazi fleet degenerated to commerce raiding, chiefly on the sea lanes to Russia and only when the odds were heavily on its side.

In the closing days of 1942, the British employed their hereditary lore of sea power to trap the Germans off North Cape. Once again, although the Germans were vastly superior in strength, their ships slunk home to confess that they had been "outgamed as well as outfought." In a frenzy, Hitler immobilized his big ships and supplanted Grand Admiral Erich Raeder with Grand Admiral Karl Doenitz.

After the war Doenitz said he put all his faith in submarines because the German General Staff would not permit otherwise. But even the U-boat navy ranked low in the award of priorities for materials and men. The Luftwaffe and the Army took what they needed.

The Japanese came nearer to the true concept and use of sea power than any other Axis power. But Japan's program of replacement of personnel and ships was so inadequate that she could not prevent strangulation by Anglo-American sea-air power.

Japan had a powerful submarine fleet, too, but it was of little effect because the Army chiefs insisted that the submersibles be used to supply their outposts in southeastern Asia and the Malay Archipelago. In the meantime our submarines and aircraft whittled the Nipponese merchant fleet to almost zero.

I cite these examples, from Salamis to Tokyo Bay, only to illustrate this one point—that sea-air power is not only the weight of men and machines but the intelligent and scientific use of them. An adequate navy must be implemented with the intangible force of "know-how."

Giant Submarine May Be Future Capital Ship

But the converse is as strikingly true. Of what use the "know-how" if we have not the weapons and the trained men?

Twenty-five years ago the backbone of the fleet, the cutting edge of the Navy, was the mighty battleship. In the war just won, that position of pre-eminence was taken by the carrier.

What will the capital ship of tomorrow be? Who knows?

It may very well become the submarine. Not the submarine as we know it—a surface ship which makes its approach and retreat under water—but a truly underseas warship capable of circumnavigating the world without surfacing.

This monster U-boat would approach an enemy coast under water and, remaining a hundred fathoms down, bombard the shore with self-guided atomic missiles.

However, we are still in the present and the carrier is still the Queen of the Seas.* And Her Majesty must have a bodyguard of fast battleships, modern cruisers, long-range destroyers, submarines, and a network of auxiliaries to minister to the fighting ships—tankers, cargo vessels, transports, hospital ships.

Naval Aviation, Integral Part of Fleet

Secretary of the Navy James V. Forrestal pointed out in his 1945 report to the President that our peacetime Navy will emphasize air power. This is made clear in the composition of the active fleet, which will include 13 aircraft carriers and 13 escort carriers as against only four battleships.

Fortunately we have an adequate reserve of all types of warships to strengthen this active fleet in an emergency. As a thrifty wife cans or freezes her excess garden produce, so the Navy will preserve its war-built armada in readiness for almost immediate use.

A rubberlike skin of plastic, which can be peeled off like the rind of a banana, protects deck guns and exposed machinery, while inside the ships dehumidifying apparatus reduces rust and deterioration.

Naval aviation, land-based, carrier-based, or water-based, is indeed an integral part of the fleet. It operates most effectively in close co-operation with surface and subsurface forces. It is not an autonomous or separate fighting organization, nor should it be. Ships, airplanes, and submarines, working together as components of a military team, constitute a balanced fleet, and a balanced fleet is the only effective fleet.

Foremost use of Navy planes is with our fast carrier task forces, the most powerful combination of sea-air power the world has ever seen. A carrier task force is a team of high-speed mobile airfields delivering fighter planes, dive bombers, and torpedo bombers to the chosen battlefield, be it on sea or land. As

*See "The New Queen of the Seas," by Melville Bell Grosvenor, in the NATIONAL GEOGRAPHIC MAGAZINE, July, 1942.

U. S. Navy, Official

Homeward Bound! *Spadefish* Flaunts Battle Flags; Her Men Perch on the Periscope

Here the sub returns to Pearl Harbor, July 4, 1945, after her fifth war patrol. Below the Stars and Stripes she flies "meatball" flags for each ship sunk and a rising sun for a carrier hogged on a previous trip. *Spadefish* was one of nine American subs which prowled in wolf packs in the Sea of Japan. On the first night she surprised and sank three lighted ships. Later she chased and destroyed 27 trawlers.

I have mentioned, battleships, cruisers, and destroyers are essential parts of that team, too.

Naval aviation fought enemy submarines in both oceans, but was conspicuously successful against the German U-boats which for desperate months dominated the Atlantic shipping lanes.

Here the escort carrier, sometimes called the "jeep" and sometimes the "baby flattop," with its planes and destroyer escorts, formed a smoothly co-ordinated application of sea-air power. These teams kept our convoys safe and the supply lines open.*

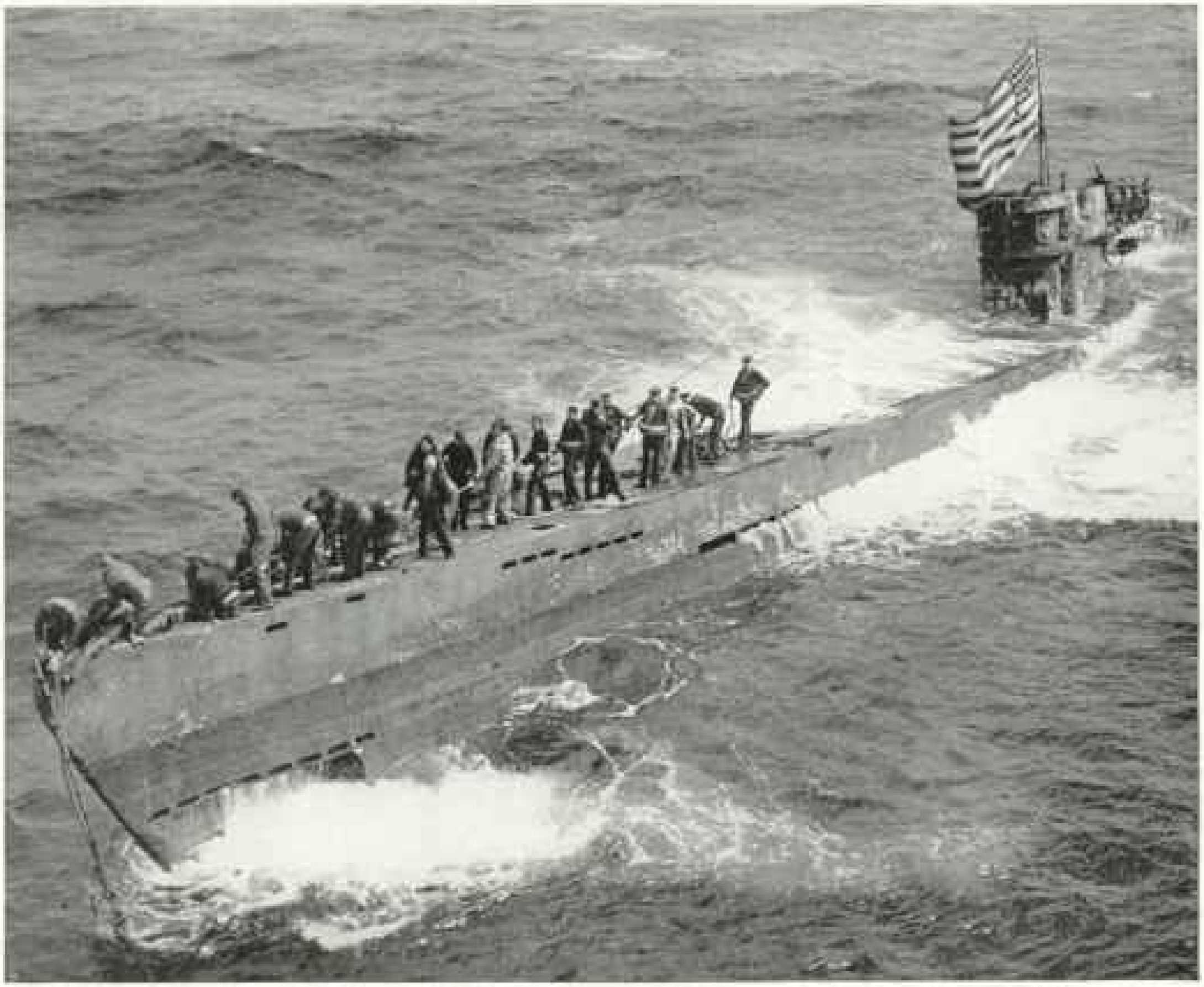
That was grim, tedious, and dangerous duty. The luck of the hunt was with some of these teams, and so they won deserved honor and abiding glory. Others, working just as hard and dangerously, achieved nothing more spectacular than keeping the enemy submarines from blasting our convoys. Well, that was *their* job.

Of course naval aviation performed many other tasks, from evacuating the wounded to the outstanding work of the air-sea rescue squadrons. These units saved the lives of hundreds of Army, Navy, and Marine flyers forced down far from base.

The Naval Air Transport Service, with its wide network of aerial routes, shrank the world into the scope of hours, instead of weeks, of travel.

As our great offensive rolled across the Pacific, progress was measured by the growth in naval aviation. At the war's beginning, the Navy had only 5,000 planes, many of them practically prehistoric, and 4,000 pilots. Less than four years later, the Navy-in-the-air had more than 22,000 combat planes and 49,000 pilots, 10,000 of them Marines.

* See "Cruise on an Escort Carrier," by Melville Bell Grosvenor, in the NATIONAL GEOGRAPHIC MAGAZINE, November, 1943.



U. S. Navy, Official

Hitler's U-Boat *505*, Bourded Pirate-style and Captured Alive, Flies Old Glory

On June 4, 1944, the escort carrier *Guadalcanal* and five destroyers "struck oil" in the Atlantic by depth-charging *U-505* to the surface. "I want to capture this buzzard," *Guadalcanal's* skipper ordered. Big guns withheld fire as planes strafed the deck. As the Nazis dived into the sea, a destroyer commander shouted, "Away boarders! Lower away whaleboats." A prize crew climbed aboard, closed sea valves and restored motors. Pumping lifted the stern. *U-505*, her rescued crew glumly watching, was towed to Bermuda. She yielded a windfall—every code book, chart, and general order carried by U-boats (page 695). U. S. sailors rig a towline.

In the first quarter of 1945, our Navy pilots were shooting down 10 Jap planes for every American lost. Navy's total score was more than 15,000 enemy aircraft.

Every beach our amphibians invaded was first carefully surveyed by naval aviation, which mapped and remapped the terrain for miles around.

When the battleships and cruisers moved in for the preliminary bombardment, naval aviation spotted the shellfire for the big guns, and naval aviation bombed the enemy defenses and troop concentrations.

Web-footed Fighters—the Marines

Finally, when the Marines and soldiers landed, naval aviation operated in close support of the ground forces, helping to blast a path through enemy lines and dropping supplies to our front ranks.

It was an Army corporal, writing in *Yank*, who called those same front-rank Marines "the Magnificent Amphibians." He went on to say that a Marine is extremely proud of being an amphibious creature and that if you get one of them to take off his shoes you will find webbed feet.

As an integral part of your Navy, those same Marines have been the Nation's amphibious spearhead for 17 decades.

From their first ship-to-shore landing in the Bahamas in 1776 to the beaches of Okinawa, the Marines have splashed ashore in more than 200 amphibious combat landings. In the recent war Marines also fought in the air and aboard the ships of the fleet.

But the contribution of the Marine Corps and its striking arm, the Fleet Marine Force, to victory in the Pacific went far beyond the impact of its famed might and valor.

U. S. Navy, Official

Marines Hit Iwo Jima Beach February 19, 1945. Four Days Later They Hoisted the Flag above Mount Suribachi (center)

Small landing craft, leaving white streaks, advance in three waves. One craft, ahead of the last wave, slows down and evades gunfire by circling. Stationary control ships (bows toward beach) direct the operation. They have bombarded the smoking shore; now they dispatch the small craft with split-second timing.

U. S. Coast Guard, Official

Marines Unload Supplies from an LSM (right) and LSTs a Few Hours after Storming Ashore on Iwo Jima

Iwo was the toughest fight in the Marines' history. They took the island, yards at a time, by rooting out 20,000 Japanese in an amazing series of interlocking caves. Underfoot, Iwo's volcanic sand exhausts these men; it stalled all vehicles but tanks and tractors. Wrecked ducks and amtracks (amphibious trucks and tractors) litter the beach.

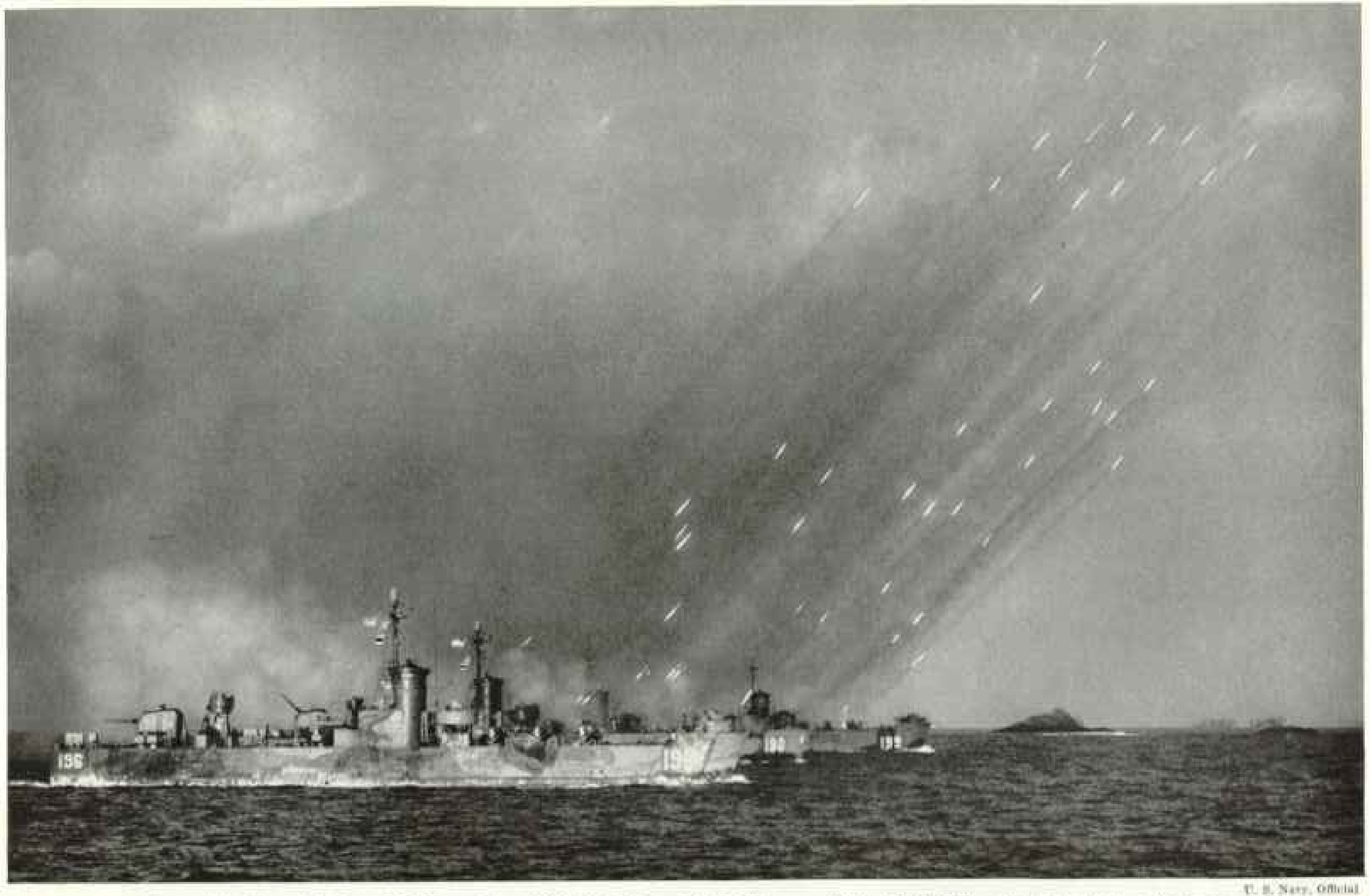
Tennessee Stands Off Okinawa and Avenges Pearl Harbor. Amtracks Flash By for the Strike at the Beach

In one year *Tennessee* fired 135,000 shells at the enemy. Wounded at Saipan, the battleship merited a second Purple Heart. She won the Nimitz "Well done!"

U. S. Navy, official

On Saipan's Marpi Point, Where Hundreds of Cornered Japanese Committed Suicide, the U. S. Navy Built a Tremendous Airbase

From the far cliffs entire families leaped to their deaths. Enemy soldiers tossed grenades at one another. The sea was thick with dead.



U. S. Navy, Official

Swoosh! Swoosh! Swoosh! Four New LSM(R)s Stand Off Okinawa Firing 1,020 Five-inch Rockets a Minute

Twelve Landing Ships, Medium (Rocket) drenched Okinawa's beaches with 30,000 missiles. Dismayed, the defenders drew out of range, permitting easy landings. The Japanese radio announced: "The American Navy has a new weapon—a small battleship." Each of these LSMs has 85 automatic launchers firing new spin-stabilized rockets.

U. S. Navy, Official

Ten Blimps on Precision Parade Look Like Fat Fish Seen from an Aquarium's Floor

Navy blimps, carrying radar and bombs, escorted 89,000 ships without loss of a cargo. Some hunted U-boats and mines from Maine to Brazil. Others patrolled the West Coast. One squadron, having flown the Atlantic, guarded the Strait of Gibraltar. Their ability to hover made blimps ideal rescue platforms over sea and jungle. Helium eliminated the fire hazard. This echelon flies in close formation near its base, Moffett Field, California.

U. S. Navy, Official

For One Minute a 381-ton LCI(R) Packs More Punch than a 45,000-ton Battleship

LCI was designed to carry infantry (page 713). Later it was fitted for launching rockets. This LCI(R)—R for rocket—stands off Balikpapan, Borneo, "paving" a beach for Australian troops, July 1, 1945. Japanese oil goes up in smoke. The United States went to war without a single combat rocket. By V-J Day the Navy alone had 1,200 plants turning out each month rockets worth $100,000,000.

Development of modern amphibious warfare was the Marine Corps' greatest contribution. Without it our island beachheads would have been costly beyond words and the Allied offensive timetable against Japan would have been delayed months, perhaps years.

However, all responsibility for getting the Army or Marines ashore to establish a beachhead falls to the Navy.

To conduct this amphibious warfare on the grand scale, an entire series of new ships and craft was designed. The Navy Register of Ships recorded for the first time a bewildering array of consonants, such as LST, LSM, LSD, LCI, LCS, LCT, etc. Each of these represented a new type of vessel designed for a specific combat task.*

Needed, too, were tremendous numbers of trained personnel to man these new thousands of ships and craft. Young reserves, who a few months before had not seen a larger body of water than Smith's Pond, filled the breach.

Ugly, blunt-nosed vessels, many resembling floating bathtubs and all a punishment to ride, these landing craft plowed across reefs

* See "Landing Craft for Invasion," by Melville Bell Grosvenor, in the National Geographic Magazine, July, 1944.

U. S. Marine Corps, Official

Iwo Jima's Agony: Navy Medical Corps Men Administer Plasma to Wounded Marines

In a volcanic gully "drier than dust," men with notebooks take records. Bamboo stakes hold plasma bottles. Iwo's first-aid stations were under such heavy fire that many corpsmen were hit. Marine casualties were 20,000. Four thousand died, but hundreds were saved by medical innovations. Four new LST(H)s (H for hospital) operated on men 20 minutes after they were wounded. For the first time in the Pacific, refrigerated whole blood was borne with an invading fleet in special "tankers." As a lifesaver, it performed "miracles." Collections by Red Cross blood banks were timed with the transports' sailing.

and shoved their bows upon the shell-spattered beaches. From their ramps spewed precious cargoes of men, who came out fighting, and tanks belching death before their treads churned the hot sands.

Robots Flying Faster Than Sound

The scientific advances made during the war in developing new weapons were truly fantastic.

The magic of radar, which permitted our ships and planes to distinguish friend from foe in the air or on the sea in total darkness and miles away, is now accepted as casually as the bridge lamp in your home (Plate I).

But conceive of an antiaircraft missile traveling *faster than sound* which follows its radar "eye" to seek and destroy a distant bomber! Such is one spectacular new device.

"Gorgon," "Gargoyle," "Bumblebee," and "Buzzbat" are the bizarre code names of new jet-propelled missiles that outstrip the imaginative devices of comic-strip artists. They make even the man-guided Japanese Baka bomb and the German V-1 and V-2 robots appear obsolete. These weapons utilize adaptations of the proximity fuse and a self-contained "radio pilot" to guide them and blow them up at the right moment.

So I can assure you that your Navy is striving diligently to make its own fleet obsolete by developing new and fantastic weapons!

In beating the best submarines the enemy could put against us, we learned how to build better ones. We were forced to invent new weapons, new tactics, to match those the enemy devised.

The Germans came up with the acoustic

U. S. Navy, Official

Seabees and Their Bulldozers Pushed the Muddy Tropics into New Shapes—New Guinea

Work-and-fight Seabees leveled hills between sunrise and sunset. They built roads, staging areas, barracks, hospitals, air and naval bases (page 710). When the enemy still controlled the airfields on invaded Iwo Jima, Fleet Admiral Halsey said, "If necessary, the Seabees will build us another island and put five airfields there." After Iwo was taken, Seabees did cut the top off Mount Suribachi (page 688).

torpedo, a nasty machine with the almost human attribute of changing course to follow and overtake a zigzagging target. We overcame that one by equipping ships with noise-makers towed astern upon which the acoustic torpedoes wasted themselves harmlessly.

The electric torpedo, which left no telltale wake, and which we also employed, could be beaten only by superior maneuvering—or by sinking the submarine before it could fire.

The United States and British Navies sank nearly 1,000 German and Japanese submarines during the war. Their most useful weapon, perhaps, was sonar, their underwater eyes, ears, and mouth. Kept under wraps until quite recently, sonar ferreted out subs lurking deep in Davy Jones's locker.

Sonar, standing for sound, navigation, and ranging, works on the same principle as radar, but uses sound instead of radio wave echoes to locate distant objects. In addition to spotting submarines, sonar detected underwater nets, mines, and other obstacles; thus it guided undersea boats through mine-strewn areas.

But ancient patterns of warfare persist in this mechanical age. Once again the old cry of "Away, boarders!" was raised. A German submarine thus engaged was actually captured intact by an escort carrier and her consorts and towed into port as a prize (page 687).

Navy Sank Subs in Atlantic, Used Them in Pacific

In another battle at close quarters, between a United States destroyer and a U-boat, American bluejackets repelled Nazis attempting to swarm over the side. Our boys used a barrage of "spuds," knives, and shell cases until small arms and hand grenades could be brought into play.

Curiously, the Navy was primarily engaged in the Atlantic in destroying submarines,

while in the Pacific it was waging war with submarines of its own.

Our submarines shook the Japanese structure to its foundations. They were the first fleet element to appear in Japanese home waters. They were second to none in their deeds of heroism and aggressiveness.

The record of our submarines in sinking Japanese ships belongs in the believe-it-or-not class. Subs destroyed almost *one-third* of the Japanese Navy. For example: Shortly before the crucial Battle of the Philippine Sea, two of our submarines sank two of the largest Japanese aircraft carriers. Of course this made the "turkey shoot," as sailors called the fierce air battle, that much easier.

Submarines sank about 63 percent of all Japanese merchant shipping lost; the remainder was destroyed by air and surface action, Army and Navy combined.

In their record month, October, 1944, our submarines sank 161 vessels of all sizes.

From Japanese sources available since the surrender, we learn that this loss of his cargo fleet had the enemy reeling on the ropes before the atomic bomb landed its knockout.

Japan, an island empire, was dependent upon her ships to keep her war and domestic industries operating. Her far-flung armies likewise needed an unbroken chain of supply from the homeland.

American submarines cut both of these life lines. Japan's conquered outposts withered on the vine, while her home industries were virtually starved into disuse.

Japanese Submarines Carried Gasoline to Grounded Planes

In the latter days of the war, the large Japanese air force could not take to the skies for lack of gasoline, and the surviving remnants of the fleet had not enough bunker fuel to raise steam for battle or escape. So desperate for fuel did the Japanese become that even submarines were pressed into service as tankers to bring gasoline from the Netherlands Indies.

Our submarines penetrated shallow Japanese harbors to sink ships at their docks, thus making both vessel and berth useless. One landed demolition parties on Japanese soil to blow up a railroad bridge—and a train speeding over it. Even early in the war our submarine crews could display snapshots of snow-covered Fuji, photographed from inshore hunting fields.

Like our aircraft, the submarines had many uses besides the obvious one. Two of our subs intercepted a Jap convoy headed for Saipan just before our Marianas campaign. Their "tin fish" ran true to the targets, and the enemy lost nearly 10,000 infantrymen by drowning; the rest of the division made shore disorganized and weaponless. Thus two United States submarines in one attack eradicated a whole division.

In many other campaigns Japanese reinforcements were similarly treated. Drowning the enemy proved to be more efficient than scourging them out of caves with flame throwers, and less costly to our boys.

But submarines had other chores: air-sea rescue work of the riskiest sort in which subs saved 510 downed aviators; supplying guerrilla troops in the Philippines with weapons, medicines, and intelligence; landing observers on enemy territory and taking them off again to report; scouting enemy naval forces and describing them to our fleets.

Teamwork Pays Off

Teamwork between submarines, aircraft, ships, and troops was the outstanding factor in our success. "Close co-ordination" is the more technical expression. Here is how it worked—and will work again if we must fight:

Our subs forced the enemy to concentrate his shipping in convoys in the narrow waterways west of the Pacific island chain. There they were easier prey for our air forces, particularly far-ranging, carrier-based planes. In attempting to escape these air attacks, the enemy only laid himself open again to our submarines. He tried to keep an umbrella of protecting aircraft over his ships. These planes, in turn, became easy targets for ours.

To meet the threat of our task forces, the enemy pulled his fleet from safe harbors, and our submarines were quick to profit.

When our Army and Marine troops landed and seized advanced areas, our submarines were afforded new bases from which to operate closer to enemy waters.

When the war was over and the submarine score totaled, it was found that 78 of the enemy were lost to one of our men—truly a remarkable by-product. Japanese figures show they lost a total of 276,000 personnel as a direct result of submarine action, more than five times the American submarine forces employed in the Central and Southwest Pacific. And our 50,000 submariners formed less than one and one-half percent of the total American personnel engaged.

You will not wonder, then, at my earlier surmise that the submarine is the ship of the future. Certainly, now that the war has ended, the development of the art of submarine warfare must not be retarded. We

Kodachrome, U. S. Navy, Official

Radar and Radio Antennas Festoon a Carrier's Island Like a Christmas Tree

Twelve different kinds of aerials show in this picture, taken from the bow of an *Essex*-class carrier over the twin 5-inch mounts. Through its many electronic eyes the mother ship can identify and keep track of her planes in the air, spot enemy targets at vast distances, and determine ranges for her antiaircraft batteries. These new devices extend the captain's vision through fog and darkness so he can navigate his ship as if in broad daylight.

Kodachrome, U. S. Navy, Official

Flight Operations in the Pacific—an Avenger Is Shot into Blue Skies from the *Intrepid's* Broad Deck

A Helldiver dive bomber, warming up, is about to spread its wings and take off from the starboard catapult. At left, a Corsair fighter waits its turn; a tractor tows up another. Normally, carriers must head into the wind for launching planes. Catapults allow quick emergency take-offs at an angle to the wind's direction.

Kodachrome, U. S. Navy, 676044

On an Escort Carrier's Flight Deck a Hellcat Warms Up while the Catapult Crew Adjusts the Yoke Preparatory to Take-off

Hydraulic catapults greatly increase the efficiency of an aircraft carrier by speeding up the launching of planes. The added boost shortens the take-off, allowing more space on the flight deck for parking planes. Thus a carrier may carry many more aircraft. Night take-offs, too, are simplified by the quick pull of the catapult.

Kodachrome, U. S. Navy, Official

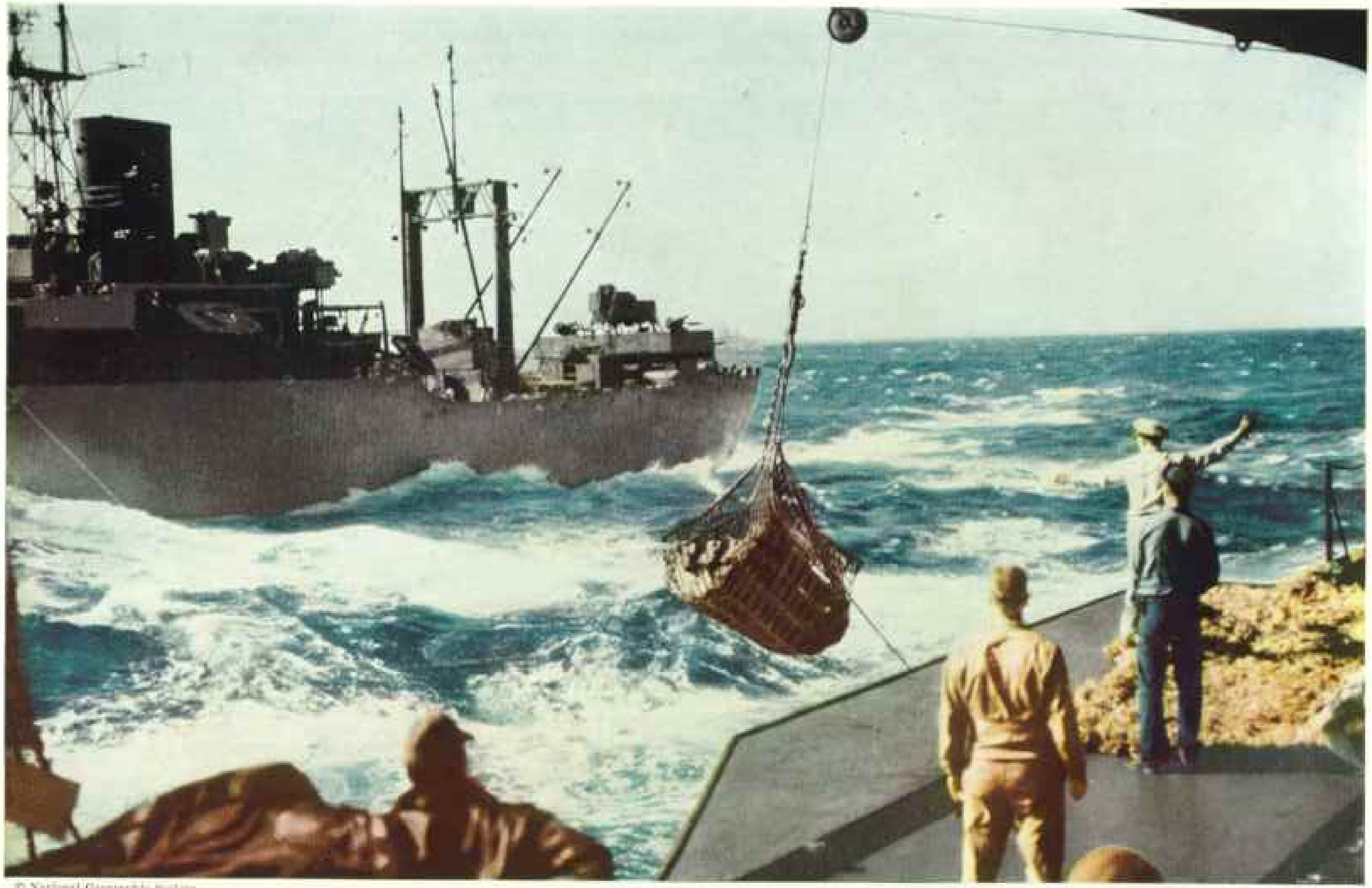
Beside a Tanker, a Monstrous *Iowa*-class Battleship Steams Placidly Along, Taking On a Cargo of Oil

Steaming thus, ships must steer a steady course and hold same speed. The fueling ship maintains position so that the two vessels are not less than 80 nor more than 120 feet apart. The controlling ship gives changes in course and speed over its loud-speaker. On the opposite side a big carrier refuels from the same oil ship.

Kodachrome, U. S. Navy, Official

Nimble Tanker Crewmen Quickly Haul In the Dragging Hose as an Escort Carrier Refuels During Iwo Jima Operations

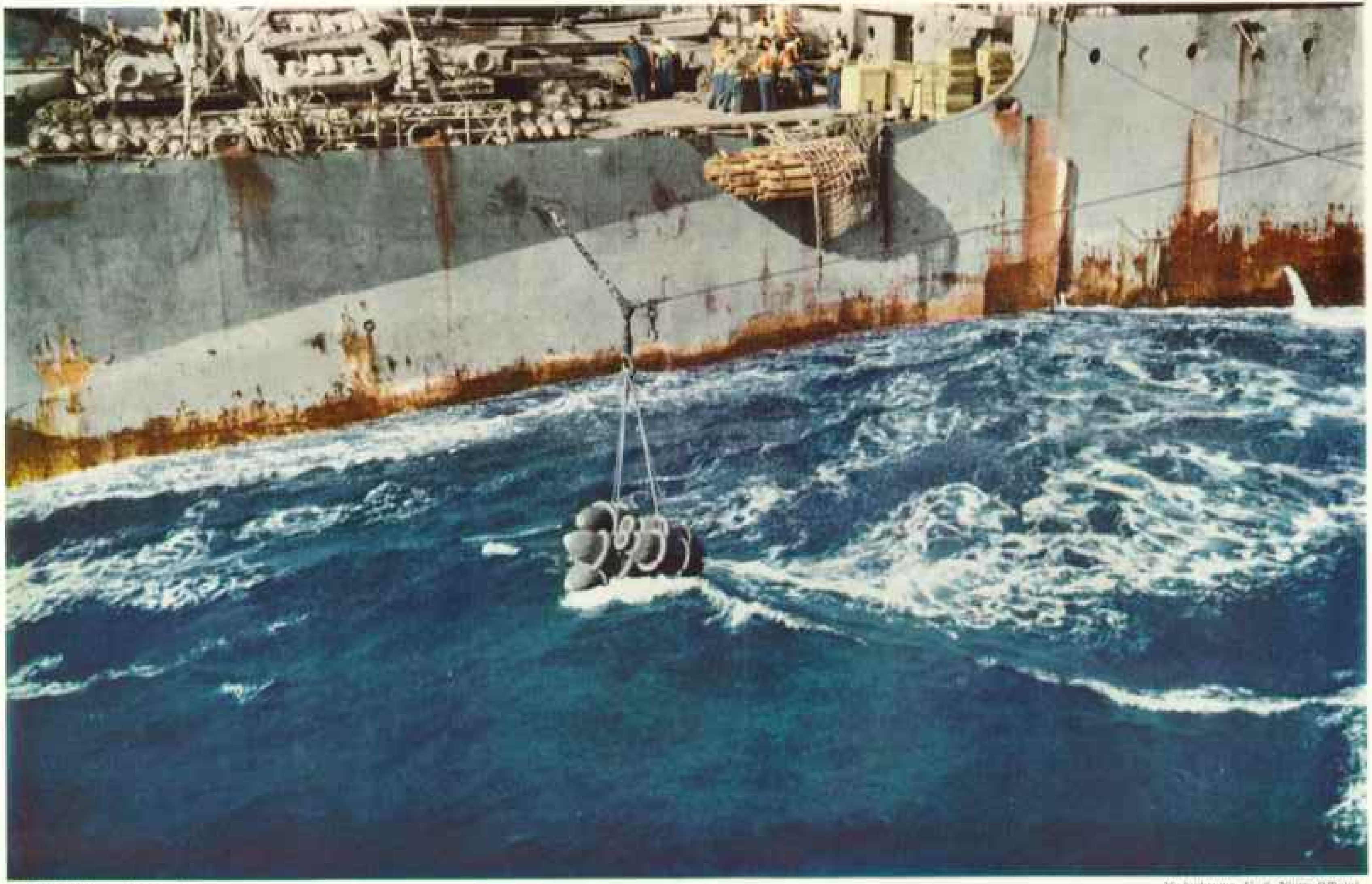
Rolling and pitching of the ships in heavy seas makes oiling difficult. Winchmen constantly watch the lines leading to the saddle which supports the hose. Carrier, out of picture to left, should haul in her saddle line to equalize the two loops. The rubber hose, heavily laden with oil or gasoline, would snap if dragged.



Rodaminoon, U. S. Navy, Official

Once Considered Impossible—an Ammunition Ship Passes Cases of Powder for 5-inch Guns to a Combatant Ship in the War Zone

The supply ship has just slacked off her burton, leading from left; the crane is swinging inboard, will drop the net gently on the thrum mat (right). Thus our ships were kept up at the front. Letters were delivered, food lockers replenished, sick, wounded, and others transferred—even ice cream and cigarettes supplied to small ships.



Kodachrome, U. S. Navy, Official

With Great Skill Crewmen Transfer Loaded 500-pound Bombs from Ammunition Ship to Carrier

Winchmen on the two ships work as a single team, one easing out on his line while the other takes in. As the ships are rolling, care is needed to keep the 2,500 pounds of bombs from dragging. Ring guards around bombs protect the lugs which hold the "eggs" to plane. Bombs will be fused and tail assemblies added later.

 Kodachrome, U. S. Navy, Official

Across Foaming Seas, a Tanker Feeds Life-giving Oil and Gasoline to the *Lexington*

One secret of the Navy's success in keeping its huge fleet at sea continuously in the far reaches of the Pacific was this unique method of servicing ships while under way. After a big strike against the enemy, the task forces retired to a rendezvous point with the fleet of tankers, refrigerator ships, and ammunition ships which the Navy kept constantly at sea.

To veteran naval officers, one of the greatest thrills in their war service was the contact at dawn of their task force with this service fleet. Each combatant ship was assigned to a tanker, "reefer," or "ammo" ship. When the signal to break formation came, the skipper spotted his "target" and maneuvered his craft, at high speed, through the supply fleet steaming on a steady course. His ship snuggled up to its service craft, just as a calf picks out its mother from a vast herd of cattle in a corral (Plates IV, V, VI, and VII).

Making the approach in heavy seas is difficult. The ship comes in on the same course as the tanker, heading directly for her stern. As the warship gets close, she sheers off slightly and slows down gradually. When the ships are steady abreast, line-throwing guns hurl light lines over to the oiler. Then the warship winches in the heavy hoses and commences refueling.

It takes skillful, accurate conning of a ship to perform this operation. When the sea is smooth, the big ships' service fleet may be steaming at 17 knots, but in rough weather as slow as eight knots.

must be sure that any future war will not find us with outmoded submarines.

With our backlog of 190 modern undersea craft, we can afford to reduce our submarine experimental program to only a few new ships a year. This will keep our building facilities alive and allow us to develop new designs with maximum economy.

Logistics—Catering to the Fleet

The word "logistics" is one that became familiar to the public during the war. It means, of course, the important but unglamorous duty of procurement and delivery of men and materials.

Logistics might be compared to the work of a caterer, who estimates the needs of a large party, orders the necessary items, sees that they are properly dished up, and then stays on after the party to clean up the mess.

This catering to the fleet is a tedious, exacting, and vitally important task. Long in advance of actual operations, logistics specialists sit in conference with the long-range strategists to determine what and how much will be needed where, and when.

Even a man is a "logistic" until he is trained and delivered to the spot where he functions for the Navy. The catalogue of items ranges from ice-cream freezers to battleships.

During the war, about 80 percent of logistics appropriations was spent on new construction, 20 percent on upkeep. In peacetime that ratio will be almost exactly reversed, but the expenditure for new construction will be nearer 10 percent.

A large part of that smaller percent will be used to complete construction initiated while the war was still going on. In some cases scrapping a partially built ship is more expensive than completing it. More money would be lost by scrapping an unwanted generator, say, than in completing it and selling it at surplus-disposal prices.

Besides procurement and delivery, logistics concerns itself with repair. At anchor or under way, a ship in operation is the concern of the tactician and strategist. But when repairs are needed because of damage or wear, she becomes a logistics problem.

In short, logistics is the housework of the Navy—the household chores of buying, serving, and mending.

In most households supply and demand are fairly constant. Sunday's roast beef is Monday's hash; Monday's washing is Tuesday's ironing.

But logistics specialists must be ready for roast beef on Sunday and a huge barbecue on Monday! Consumer demand shifts as the tide of war flows from one area to another, usually more quickly than anticipated.

In the household, and in industry, there is an established pattern of operations. The grocer's wagon makes deliveries on schedule, the wholesaler's and manufacturer's trucks run on routine.

In wartime, the Navy's housekeeping is subject to all sorts of interruptions. Supply lines are under constant threat. Designs of ships and weapons must be changed to meet new conditions.

Let me give you an example of this planning-on-the-spot. The initial plans for the capture and conversion of Guam called for 12,501 officers and men using 157,524 measurement tons of material (that is, tons figured in cubic feet, not pounds). That material had to be assembled from all over the United States. It had to be loaded in exactly the reverse order, so that the first-wanted articles would be on top of the cargo.

But when the job came to be done, we used 52,785 officers and men and 1,271,148 measurement tons. There was a 322-percent increase in personnel, and a 707-percent increase in material—a change made necessary not by the opposition encountered but by the enlarged concept for the use of Guam. The island base became the headquarters of "Cinepac" (Commander in Chief, Pacific Fleet) while the war was being fought to a conclusion.

Liken this to a housewife who expects two guests for supper and at the last moment has to prepare a seven-course dinner for nine.

Our logistics control was worked out in such detail that a commanding officer setting up an advanced base could order his components and supplies out of a "mail-order catalogue," which would rival Sears Roebuck's famous tome for completeness. Everything from quarter-inch screws to many-ton cranes and big guns was listed.

"Lion" was the code name for packaged base equipment which contained in one unit all that was needed to make a workable base out of a desert island. It was somewhat like a giant Christmas box guaranteed to contain something useful for everybody, and everything useful to anybody.

"Little Navy" Guarded Merchant Ships

In support of its logistics the Navy had what amounted to a "little Navy" within itself, 112,000 armed guardsmen who manned the guns on 6,000 merchant ships. These gun crews protected the merchantmen from attack.

U. S. Navy, Official

To Repair Torpedo Damage, U. S. S. *Canberra* Enters a Submerged ABSD at Manus

When the cruiser was centered between the walls, water was pumped out of ballast tanks; the Advanced Base Sectional Dock rose, and shortly the ship was high and *dry* (Plates XX and XXI). *Canberra* was named for the Australian cruiser sunk in the Battle of Savo Island, shortly after the Guadalcanal landing.

At the outset of the war we had no men specifically trained for armed guard duty. That should never happen again. One of the lessons of the war should be to maintain protection for the merchant fleet.

The Navy needs a strong merchant marine. These ships not only supply overseas bases but keep open the channels of commerce upon which the Navy, and all industrial America, depend for vital materials.

Sea power is also expressed in terms of these plodding burden bearers that bring to our shores the tin and tungsten and manganese from overseas; yes, and the pepper and bananas and coffee of your table needs.

During the conflict the War Shipping Administration took over the privately owned ships of our merchant marine, and the Maritime Commission built additional vessels which were Government-owned and operated. All these vessels and the merchant marine of our allies were pooled during the war.

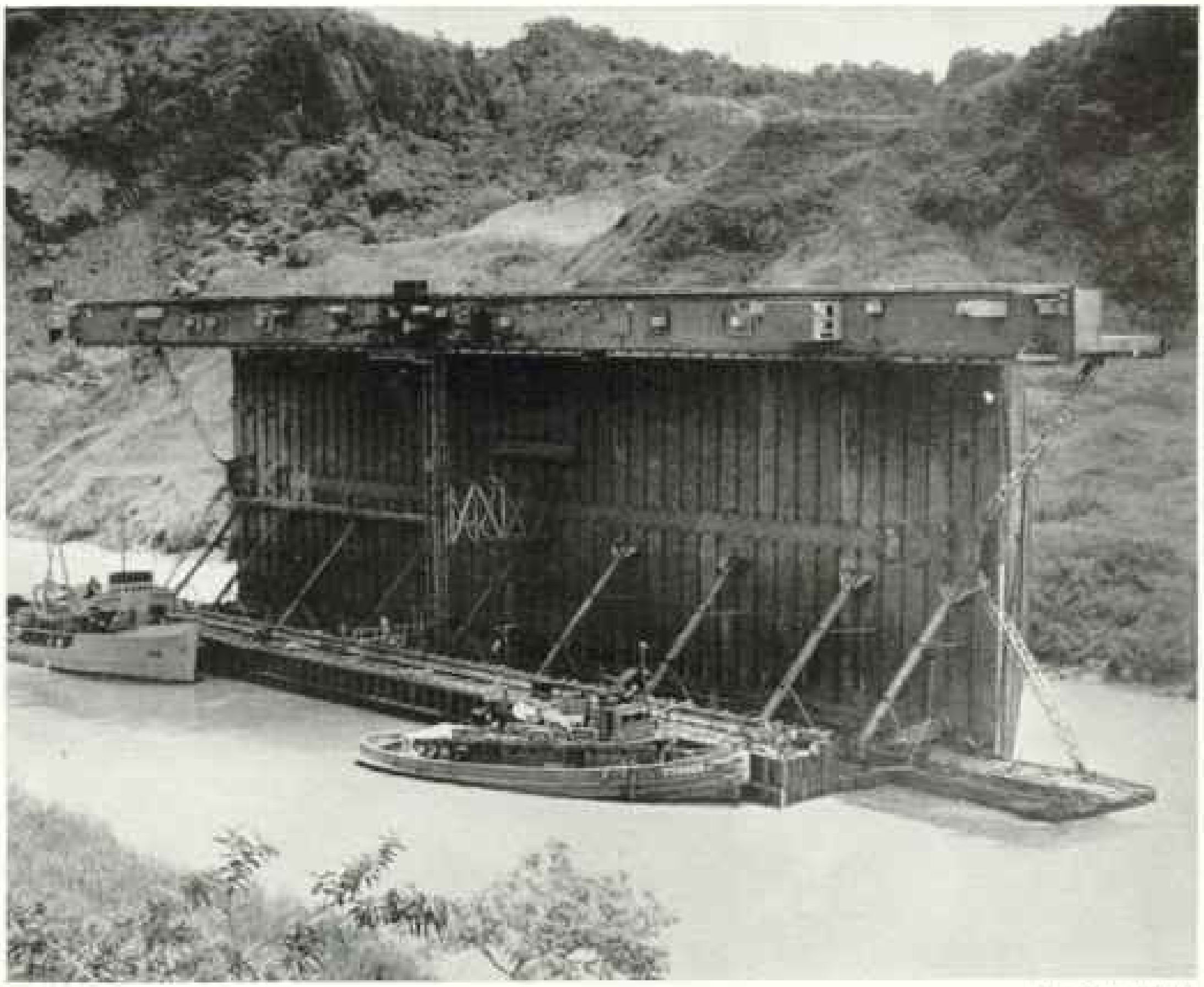
Now they are being turned back to the maritime industry, with the Navy's warmest gratitude and encouragement for future development and expansion.

While the old theory held that a Navy existed to protect the merchant fleet, World War II demonstrated that the merchant marine must be kept strong to serve the fighting fleet.

One great factor in the Pacific victory was our veritable bucket brigade from the heart of America to the fighting areas. The output of our industries was sped to West Coast docks where ships waited. In giant caravans they plowed westward, to deliver everything the fighting men on ships or shore required.

Ships' Wounds Healed in Floating Docks

Thus our warships were kept at the front. They did not have to return to base to replenish food lockers and magazines; they were serviced at sea (Plates IV-VIII). They



U. S. Navy, Official

Tipped Up on Her Beam Ends, a Floating Dock Is Towed Through Gaillard Cut

Needed vitally to repair ships in the Pacific, the YFD (Yard Floating Dock) was too wide to transit the Panama Canal on her own bottom. So Navy civil engineers devised this unique method of careening. Hundreds of pontoon boxes, used by Seabees as ferries and causeways, were locked together on top of one side wall and steel supports added. When water was pumped into these units, their weight tilted the dock until it stood on its side. Once through the Canal, the dry dock quickly righted itself when water was let out of the pontoons. Built in three sections, the YFD is a self-docking dock; its center section, if damaged, may be lifted clear of the water by its own ends. Thus the dry dock can literally raise itself by its "bootstraps"!

were out of action only for repairs, and even repairs were effected on the spot in giant floating dry docks.

As a matter of fact, if it had not been for our floating dry docks, we would literally have been sunk! As our advance got closer to the Japanese home islands, ship casualties increased. If we had not had some way to dock these ships and mend their wounds at the front, our fleet would have been greatly weakened.

Realizing the vital necessity of ship repair, the Navy shortly before the war developed several new types of portable dry docks. The largest of these, the ABSDs (Advanced Base Sectional Docks), were built in sections in various parts of the country and then towed across the Pacific. At advanced bases such as Guam and Leyte the sections were assembled and welded together (Plates XX and XXI).

Many types of repair docks were built to take care of the various classes of ships. The most interesting, perhaps, were the large ARDCs (Auxiliary Repair Docks, Concrete), built entirely of concrete. Several of these ship-shaped docks weathered typhoons on the long tow out to forward areas. Concrete docks stood up well—no rusting or painting problems!

Sides of the ARDCs are somewhat fragile, but the crews can quickly repair them with a little cement. Timber fenders put around the docks soon stopped tugs from punching holes in their sides.

Floating docks not only sewed up the wounds of battle and collision but they overhauled the ships frequently, thus making them more efficient. Ships lose their speed

U. S. Navy, Official

Navy Carries Army Home; 5,000 Bunkmates Jam *Lake Champlain* to the Sixth Tier

Navy's "magic carpet," which used fighting ships as transports, broke a two-ocean shipping bottleneck and carried hundreds of thousands of men home for Christmas. Named for the battle in the War of 1812, this carrier was born too late to fight in the Pacific, but she showed her speed across the Atlantic by averaging 29.18 knots.

These Carrier Pilots Got 17 Zeros Without a Loss; One Bagged Five in as Many Minutes

Lt. (j.g.) Eugene R. Hanks (fourth from right) became an ace in his first battle. He and his Navy buddies share their glory with one of the Hellcats that carried them to victory over 20 Japanese near Tarawa.

U. S. Navy, official

Combat-information Teams Can't See the Enemy, but They Know Exactly Where He Is

Earphones, pencils, and illuminated board are deadly tools of this carrier's radar plot room. The center of the board represents the ship. Once the radar operators had picked up an enemy, they flashed the news to this team. Range and bearing were quickly penciled on the board. Then guns and fighters went to work.

U. S. Navy, Official

A *New Mexico*-class Battleship Demonstrates the Power of a 14-inch Salvo

Out went 2,110 as this three-gun turret flung 4,100 pounds of shells at enemy-held Guam. Our old battleships were not fast enough to keep pace with the carrier task forces. In a ship-to-ship test, however, they decisively whipped the Japanese in the Battle of Surigao Strait, Philippines, in October, 1944.

rapidly as their bottoms become fouled with marine growth from long periods at sea. Lifted clear of the water by the docks, tiny subchasers and monster battleships had their bottoms scraped and painted quickly. No need to steam thousands of miles back to Pearl Harbor for overhaul.

Seabees Moved Mountains

A new development in naval warfare is the doughty Seabees, whose nickname is derived from the initials of their formal identification—Construction Battalions. Recruited largely from the skilled trades, and averaging years older than other bluejackets, the Seabees went phlegmatically ashore with the assault troops, armed with saws and wrenches. Their tanks were steam shovels and bulldozers. Their job was—to move mountains!

On Tinian alone the Seabees blasted and moved 12,000,000 cubic yards of hard and porous coral—equal in volume to three Boulder Dams. The airstrips they built for the B-29s to bomb Japan would surface an average two-lane highway from Washington, D. C., to Montreal.

As our forces advanced westward, capturing new bases, the Seabees moved mountains of battlefield debris, built roads and airfields, erected machine shops and barracks, hospitals and churches (page 695).

They were masters of improvisation. Not long after their arrival on a reeking Pacific atoll, they would have the trade winds harnessed to provide power for homemade washing machines. It was startling to see hundreds of little windmills churning away at laundry on a beach still booby-trapped.

They made pipes out of bamboo, pumps out of shell-smashed machines, and had a water system installed on many an island which only a few weeks before had been in the Stone Age.

I was told one story about Seabee ingenuity

"Safe" in His Rubber Boat, a Fin-footed Underwater-demolition Man Clowns Froglike

Navy's UDT crews, clearing beach obstacles for amphibious landings, worked by day or night, in tide or gunfire, but always ahead of H-hour. Teams at Okinawa removed 3,000 hazards. Normandy outfits' losses were as high as 40 percent. All strong swimmers, UDT men got an added push from foot fins.

U. S. Navy, *Official*

Danger Is His Business, Swim Trunks His Armor, Knife and Fuses His Weapons

This exhausted underwater-demolition man has just cleared landing obstacles off Borneo. Once fuses were set, he had to swim for life lest his work destroy him. Barbed wire, concrete, steel, and mines were blown up.

U. S. Navy, Official

Around the Burning *Gambier Bay*, Shells Fall from a Jap Cruiser (Extreme Right)

In the Battle for Leyte Gulf, October 25, 1944, this escort carrier was one of a valiant group surprised and outgunned by a Jap surface fleet. Though lightly armored, *Gambier Bay* absorbed 26 hits before she finally sank. Hers was one of the few examples of carriers engaging in close-range scraps. Usually they duel out of sight, using their planes as hundred-mile rapiers.

which I cannot guarantee, but which I am willing to believe. It is the saga of the tailless cow of Midway.

That lone bovine had her tail severed as she fled across her scant pasture during the Japanese bombardment. The wound healed, but Bossy became a nervous wreck because she could not swish away the flies. Her output dropped in quantity and quality.

She was just about to be condemned to the stewpot when the Seabees took the situation in hand. A length of rope was partially unraveled to make a fly switch of magnificent proportions, and the other end was firmly taped to the stump of the cow's tail.

Topside Teamwork Functioned Smoothly

The part of the story that is hard to believe is that, out of gratitude, Bossy thereafter produced chocolate milk shakes with whipped cream!

In the naval and military application of teamwork the United States established a pattern that was smoothly efficient.

Here in Washington sat the Joint Chiefs of Staff—General Marshall, General Arnold, Admiral Leahy, and Admiral King, with their advisers—under the chairmanship, so to speak, of the Commander in Chief, the President of the United States.

The Joint Chiefs planned the broad strategy of the war on all fronts, discussing and compromising on the problems of naval, military, and aeronautical application to the problems in hand.

When a decision was reached, the strategy was communicated to the commanders in the field: General Eisenhower in the European Theater, General MacArthur in the Southwest Pacific, and me in the Central Pacific.

We area commanders then went to work to convert our orders into an operation.

U. S. Navy, Official

Troops, Armpit Deep, Stir Morotai's Sands as They Wade Ashore from LCIs

The Landing Craft, Infantry, which crossed everything but dry land, was the soldier's or Marine's seagoing bus. Sometimes it put him and 200 buddies ashore without wetting a foot. Ungratefully, they dubbed it "Long Crude Interior" and "Lousy Crate Indeed." Here bow ramps are lowered; awnings stretch across decks. Morotai Island was occupied on September 15, 1944, to isolate near-by Halmahera.

As General Eisenhower and General MacArthur had admirals on their staffs, so at my headquarters there were Army generals, Air Force generals, Marine and Coast Guard officers—each a specialist in some aspect of war, according to his training.

These teams of Army-Navy experts tackled the problem together and worked out the plans. Then they became devil's advocates, trying to invent every possible frustration that wind, weather, or enemy action might conspire to nullify the operation. Flaws in the plans were thus found and corrected in advance.

Why the Japs Were "Seeing Double"

During the war a great deal was heard about the Third and Fifth Fleets. Now it can be told that the two fleets were one. We reversed the old stagecoach practice of changing horses, and changed drivers instead. When Admiral Halsey commanded the fleet, it was the Third; with Admiral Spruance in charge, it was the Fifth.

While one commander was at sea with the fleet, the other was at "Cincpac" headquarters, working out the final details of the next operation. Upon the fleet's return from its task of pushing the Japs farther back, the commander who had had a spell of desk duty took the ships to sea again.

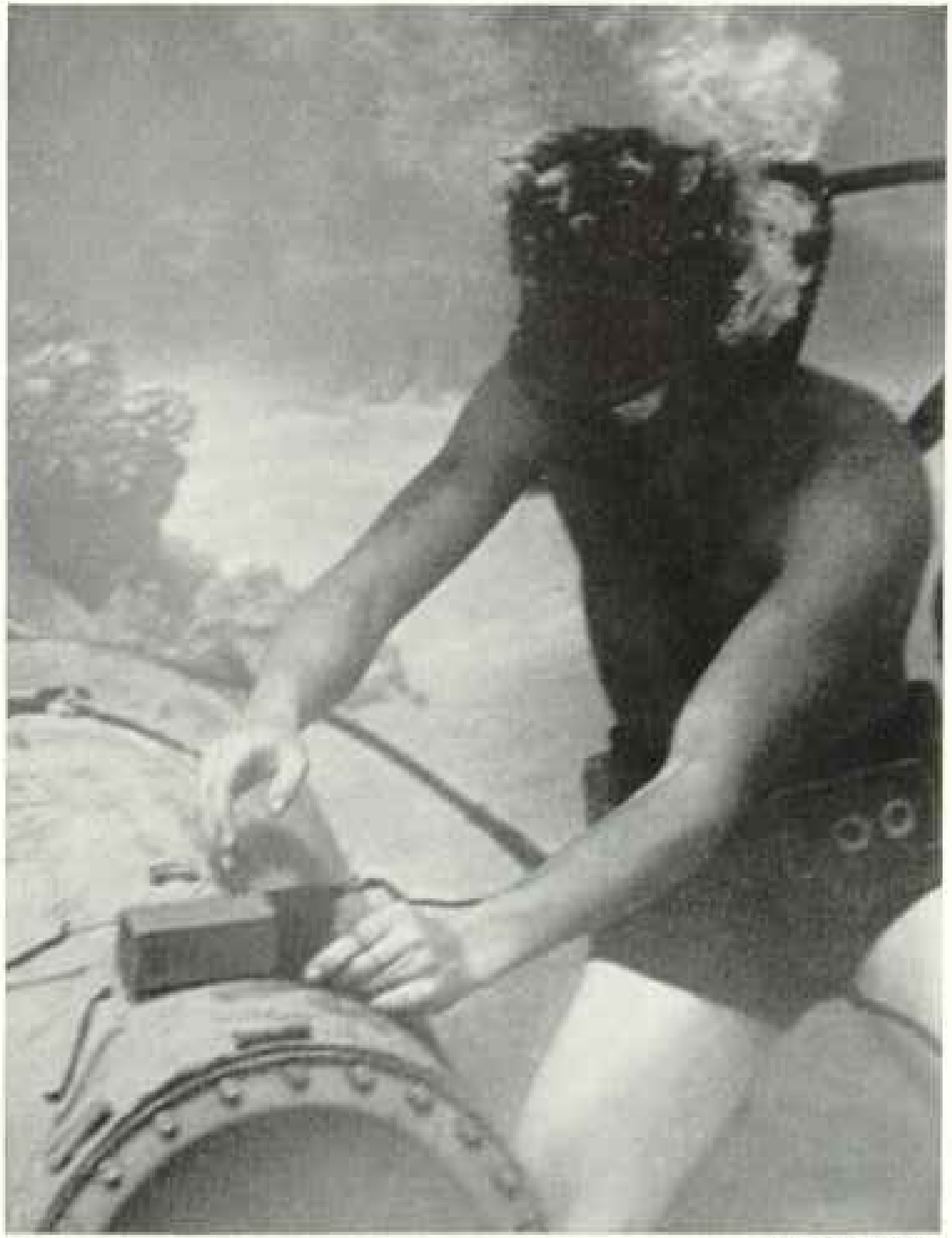
This system drove the Japanese strategists crazy. They thought we had two identical fleets, every ship a twin. By prewar standards, we did have the equivalent of two fleets, since each ship was doing double duty.

Many people ask me, "Why do we need a large Navy when no other nation has a fleet to threaten us?"

I partially answered the question in defining and illustrating sea-air power: the Navy's prime function is to carry the war to an

Mail Call Electrifies the Dull New Hebrides

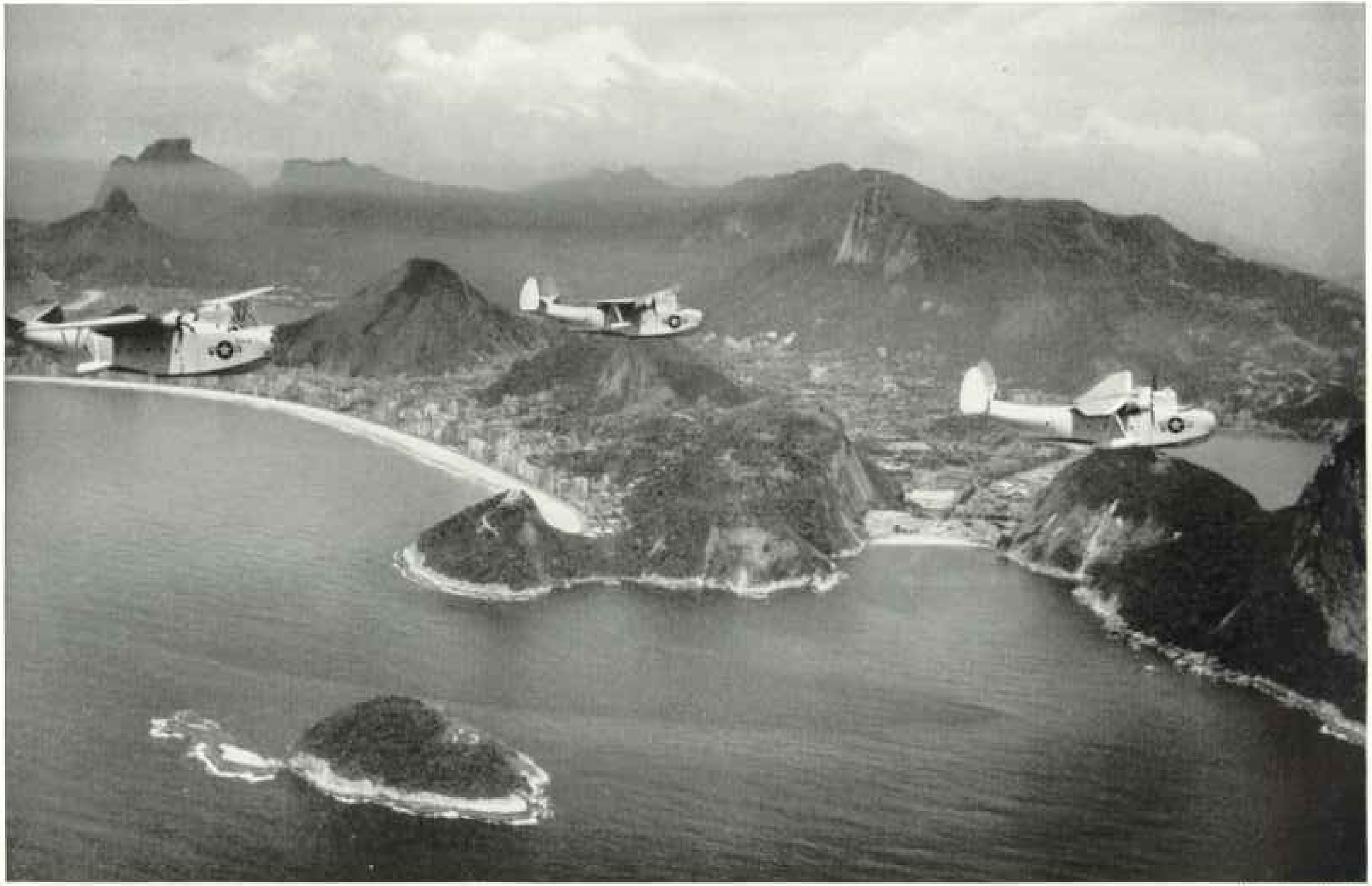
Any veteran who waited out the war on a lonely Pacific island will remember looking forward to two things: (1) the next meal and (2) mail from home. He spent much of his time wondering what his folks were doing. These Marines pitched camp in a palm grove on Espiritu Santo Island.



U. S. Navy Official

A Mine-disposal Diver Never Makes the Same Mistake Twice

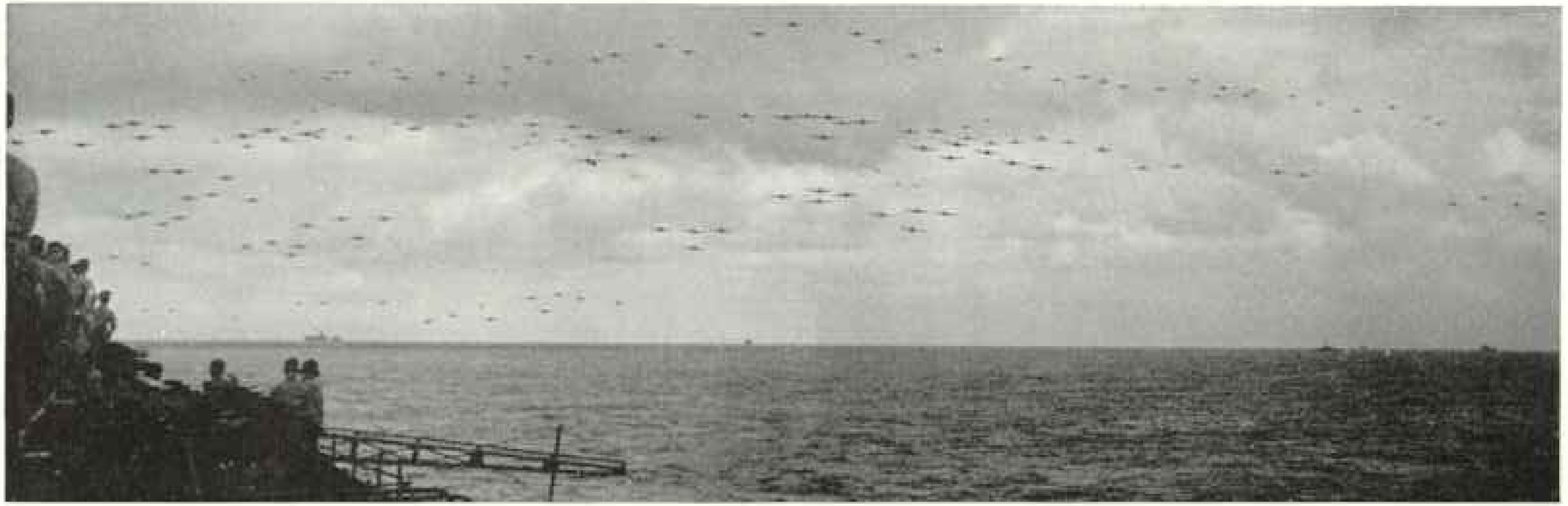
From Normandy to Okinawa, fearless Navy divers disarmed mines and booby traps so that our forces might advance. Risking destruction, they dismantled the enemy's secret weapons. On Tarawa they removed 1,000 major ordnance items. This diver is shown by a new camera which works at 300-foot depths.



U. S. Navy, Official

Navy's Subchasing PBMs Drop into Rio de Janeiro for a Rest after a Search of the South Atlantic

Baltimore-born Martin Mariners, designed to be workhorses, proved their worth in long-range combat. Stripped to fighting weight, they carried bombs in each gull wing. Across the South Atlantic the Navy maintained a tight blockade; American and Brazilian airmen sank a score of U-boats.



1,000 Planes from the Carriers of Two Nations Stage History's Greatest Naval Air Show off Japan

On August 23, 1945, the combined American and British Fleets relieved the monotony of waiting for the formal surrender by sending their airmen aloft.

U. S. Navy, Official

Bearing Fleet Admiral Nimitz for the Surrender Ceremony, a Four-engined Consolidated Coronado Drops into Tokyo Bay

Back of her stands the *Iowa*, whose 16-inch guns bombarded Japan with impunity. In two operations she fired 600 tons of ammunition.

U. S. Navy, Official

"I Was as a Person in a Dream." Chester W. Nimitz, Aboard the *Missouri*, Signs Japan's Surrender Terms for the United States

"I could not escape the feeling," the Fleet Admiral told the NATIONAL GEOGRAPHIC MAGAZINE, "that I would suddenly awaken and find the end of the struggle was still far in the future, with much bitter fighting before we reached our goal. I am sure that others present had this sense of unreality." General of the Army MacArthur, Fleet Admiral Halsey, and Vice Admiral Sherman witness the signing.

U. S. Navy Official

Navy Rescuers at Omori Prison Camp "Met a Sight That Brought Tears to Our Eyes"

"Prisoners danced, cheered, and cried on the shore," the task force commander related. "Hundreds, unable to wait, swam to meet us. It was hard to avoid colliding with them." Captives were forced to live on rice and grass and to bow to their guards. Their camp was described as a "hellhole, worse than a pig farm." One of the 500 survivors was Maj. Gregory (Pappy) Boyington, Marine Corps air ace. Last August these Netherlanders, Americans, and Britons waved their countries' flags as Navy food arrived at their island camp near Tokyo.

U. S. Navy, Official

A Destroyer Shakes Off the Pacific as She Refuels. Her Crew Loves a "Tin Can"

From skipper to seaman, everybody knows everybody on a destroyer, and they "wouldn't serve on anything else." Destroyers challenged Japanese shore batteries and battleships alike. They bore the brunt of *kamikaze* attacks. One shot down 23 planes in a day, but took so much punishment she had to be scrapped. Destroyers rescued hundreds of "ditched" airmen; one bore 30 rescue stripes on her bridge.

enemy's homeland. Without a Navy, or with merely a token fleet, we might become embroiled in a war in which both sides would hammer away at each other from the air.

But wars are won by blockade and invasion. That is why a powerful United States Navy is a great guarantor of peace.

So long as we have unmatched sea-air power, any potential enemy is going to think twice before picking a quarrel with us, a country that can hem it in and transport armies of invasion to its home soil.

Sea-Air Power Won the Base for Atom Bombing

And now someone asks, "But what about the atomic bomb?"

As to that, neither I nor anyone else can make exact answer. The atomic bomb, according to the scientists who know more about it than I, may be more effective against immovable targets—cities and airfields—than against a mobile and widely dispersed target such as a fleet in motion.

To the Navy, the atomic bomb's greatest danger appears to be, not against ships at sea, but against its ports and bases. The tests at Bikini should shed further light on this.

However, the first use of this potent weapon, at Hiroshima and Nagasaki, was essentially a triumph for sea-air power.

Before the atom bombing of Japan could be effected, we had to have a suitable land base from which to launch the Army Air Forces' B-29s that carried the bombs.

How that base was acquired, by the submarine-carrier-amphibious team in its relentless drive across the Pacific, is well known. Sea-air power won the base within easy round-trip distance for the Superforts. Sea-air power kept that base invulnerable against the enemy's

repeated attempts to nullify it. Navy, Army, and Marine teamwork again!

Two thirds of the active material of the first atomic bomb were carried to the base by an American warship. The gasoline that fueled the B-29s for their historic flights was pumped out of a Navy tanker. Air-sea rescue units stood by to rush aid to the big bombers if they were intercepted, going or coming.

From the first offshore bombardment through the relentless smashing of Jap naval resistance and communications, and the carrying of bomb parts to the hopping-off place, the atom-bombing operation was indeed a victory for that superlative team, sea-air power.

The war illustrated how sea-air power, stemming from oil fields and forests, mines, farms, and factories, can defeat the strongest and remotest enemy.

At Okinawa, without a heavy surface ship to oppose it, sea-air power absorbed the concentrated punishment of suicidal air power and supposedly impregnable shore defenses and beat the combination.

The war also proved that no nation is self-sufficient, not even so lavishly endowed a country as our own. We have everyday need for products which can be found only in lands over the sea. That was painfully brought home to us when every housewife had to stand in line at the grocery, ration book in hand. It is more pleasantly illustrated for us now as we again see more foodstuffs packed in tin from South America, in cartons lashed with Manila hemp, wrapped in paper made from Scandinavian pulp.

Sea Arteries Carry Nation's Lifeblood

The need for sea power extends to our daily life. The lifeblood of much of our country's commerce flows through the sea arteries of a vast mercantile network. Upon our exports depends the livelihood of millions who reap, mine, process, manufacture, and transport goods for our overseas markets.

To buy abroad the commodities we cannot ourselves produce, we must sell our surpluses abroad. And it is a desperately hungry world in which we live today, hungry for goods as well as for food.

In the foreseeable future, it will continue to be economical to ship commerce by water routes. Even when atomic energy is effectively harnessed, our heavy, steam-driven surface ships will probably be the first to profit by atomic propulsion. The size and weight of machinery which produces atomic power and can still withstand its own heat and radiations will probably preclude its use in air-borne vehicles for some time.

Even should commerce ever become predominantly air-borne, surface ships would still be necessary to service economically with fuel and supplies the bases from which the air fleets would operate.

Key to National Security

Whatever the outcome of our attempts to master atomic power, and whatever the outcome of our international efforts to perpetuate peace, we must preserve our naval strength. It is the key to our national security, to our ability to reach anywhere in the world in support of commerce or to destroy aggression.

After every war the American people have done what the enemy could not, and that is to sink more ships of our Navy than were lost in combat. And every succeeding war, save that against Spain, was made the longer and more costly because we had to make up for our neglect before we could strike effectively.

That goes for our Army, too. We remember with embarrassment that our troops long had to train with broomstick rifles and stovepipe guns before our invasion of Africa.

One of our most famous admirals, William S. Sims, once said: "A Navy is more in the nature of an insurance policy . . . It is difficult to appreciate its value in times of peace. Its major and ultimate mission is forced into the forefront of men's minds only when national interests are threatened or actually assailed."

The same sentiment is expressed in less serious style in an old English jingle recently parodied in Parliament during a naval debate:

> God and the Navy we adore
> In time of danger, not before.
> The danger past, all is requited;
> God is forgotten and the Navy slighted.

This time we must not, we dare not, repeat the mistake of stripping our country of its Navy in peacetime. We must maintain it in strength compatible with our pre-eminent position in world affairs.

If we are to fulfill our destiny as a peace-preserving military power of first rank, we must have sea-air power of first rank. It cannot be improvised in a crisis. Whether we are to have it depends upon the ability of our people to remember the lessons of history.

Other articles on naval subjects in the NATIONAL GEOGRAPHIC MAGAZINE include: "Saga of the Carrier *Princeton*," by Capt. William H. Buracker, August, 1945; "They Survived at Sea," by Lt. Comdr. Samuel F. Harby, May, 1945; "Life with Our Fighting Coast Guard," by F. Barrows Colton, May, 1943; and paintings by Lt. William F. Draper entitled "A Navy Artist Paints the Aleutians," August, 1943; "Jungle War," April, 1944; "Painting History in the Pacific," October, 1944; and "Victory's Portrait in the Marianas," November, 1945.

 Kodachrome, U. S. Navy, Official

With Rhythmic Boom a Porcupine Battleship Fires Her 40-mm. Antiaircraft Quads

An *Iowa*-class battleship, such as this, carries 18 of these quadruple mounts. Clips of four shells each are fed to the guns by the smooth-working crew. When our big new battle wagons let go at an attacking plane, they seem on fire, so continuous are the flashes from their 132 or more bristling AA guns. They can steam and maneuver with the carriers. Forming a screen around the task force, they provide antiaircraft cover and protect the lightly armored flattops from surface attack.

Kodachrome, U. S. Navy, official

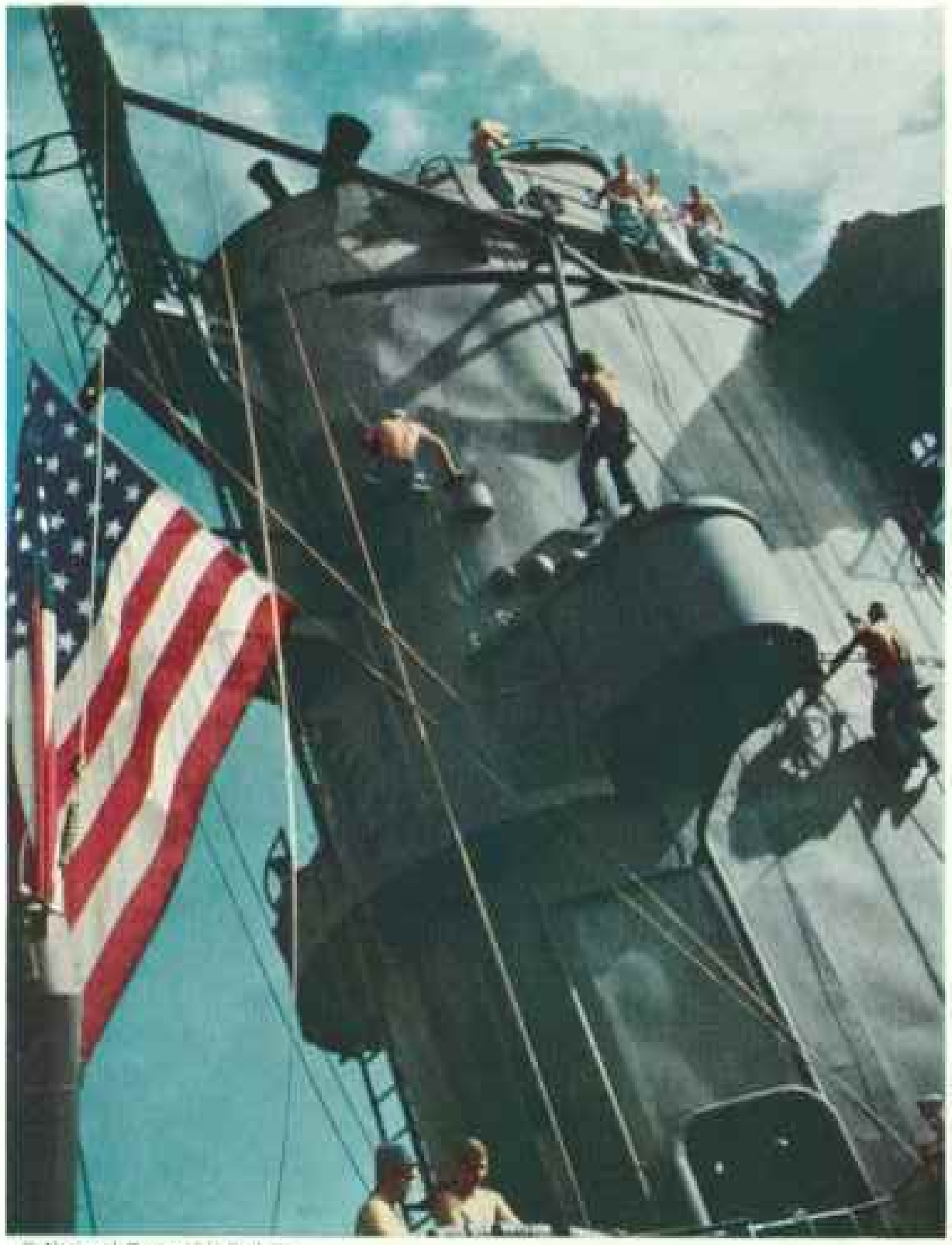
Back to New York under Her Own Power Steams the Battered *Franklin*, "the Ship That Wouldn't Sink"

While her planes were being launched to strike Kobe, Japan, March 19, 1945, this famous carrier was struck by two bombs from a lone Jap bomber which dived out of a low overcast. The bombs started fierce fires among fueled and armed planes. The crew fought violent explosions and fires for eight hours, saving the ship.

Keystone, U. S. Navy, Official

As Carrier Planes Roar Overhead, President Truman Reviews Seven Miles of Navy Ships Anchored in the Hudson—Navy Day, 1945

Smoke hangs over the *Missouri* as she fires a 21-gun salute to the Commander in Chief. Millions of New Yorkers cheered from Riverside Drive. On the destroyer *Renshaw's* open bridge, left to right: Commodore James K. Vardaman, Jr.; Admiral Jonas H. Ingram, Commander in Chief, Atlantic Fleet; the President; Mrs. Truman.



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In Boatswain's Chairs, the Deck Force Scrubs a Fat Stack

There is much good-natured joshing at such times between the Deck Force and the Engineers. The deck "apes" claim they are always cleaning up the dirt and grime the "black gang" makes with its sooty smoke.

Kodachrome, U. S. Navy, 699181

***"Cleveland* and *Lentze*, Proceed on Duty Assigned!"**

Thus speak the signal flags fluttering from a carrier's island. When the same signal is two-blocked, or hoisted by the addressed ships, the flagship will know the message has been received and understood.

© National Geographic Society — Kaltenborne, U. S. Navy, official

Panama Canal Traversed, a Brand-new Carrier Heads Out into the Pacific Bound for Task Force 58 in Japanese Waters

Passing through Miraflores Locks was a tight squeeze for this *Essex*-class flattop. She had only a half foot to spare on either side of her 109-foot beam. If the Canal were threatened by attack, vertical pipes on the docks and the floats in the distance could put up a thick smoke screen for concealment.

Richardson, U. S. Navy, Official

Rooster Tails Streaming White Astern, a PT Squadron Roars Through Battle Maneuvers in Florida Waters

PTs won their spurs in the Philippines, as William L. White told dramatically in *They Were Expendable*. Off Guadalcanal they took on the "Tokyo Express." Armed with 13 guns and 4 torpedo racks, the cocky boats destroyed Jap landing barges, scouted enemy fleets, and fought *kamikazes* in New Guinea and Philippine waters.

Kodachrome, U. S. Navy, Official

From Midway the *Peto* Sets Out to Add Her Score to the 4,780,000 Tons of Jap Merchant Ships Sunk by Our Submarines

On such cruises, our submarines were often gone 50 days and patrolled close to the Japanese home islands, sinking ships, reporting enemy movements, and dodging depth charges. When they returned, the mother ships (left background) repaired them. The crews went ashore for two weeks' rest in the old Pan American Airways Hotel.

 Kirkebirone, U. S. Navy, Official

Behind a Fast-charging PT, a Depth Charge Bursts with a Mighty Geyser

PTs seldom dropped "ash cans" in the Pacific unless the crew needed fresh fish! These midget warships were designed originally as torpedo boats, but as the war progressed guns were added until they resembled small battleships (Plate XIV). Men who "rode the boats" gave them pet names—*Super Boat, Nightmare, Roaring Twenty,*

 Kodachrome: U. S. Navy, Official

In the Quiet Waters of a Pacific Lagoon, an Old-time Battleship Takes On 14-inch Shells

The green bands and yellow tips indicate these are high-capacity projectiles for blasting beaches. In a few days they will crash on Guam as a prelude to the amphibious landing. Working parties "take a blow" after getting the shells aboard. Soon the men will send them below for stowing in the magazines. Some are sun-bathing.

Kodachrome, U. S. Navy, Official

Our Invasion Fleet Gets Under Way for the Gilberts as the Navy Begins Its March Across the Central Pacific to Tokyo

From the stern of this cruiser the blue sea seems full of fighting ships, bound for Tarawa and Makin. The Japanese realized the importance of the operations and defended the Gilbert Islands bitterly. Makin was captured by Army units November 22, 1943, and Tarawa, after a fierce battle by the Second Marines, two days later.

Kodachrome, U. S. Navy, Official

Seapower in Action—Overwhelming Forces Land and Capture Engebi in the Marshalls, February 18, 1944

After the Gilberts were secure, the naval juggernaut rode northwestward across the Marshalls. Here, after the tiny island had been severely mauled by carrier-based aircraft and by battleships, cruisers, and destroyers, waves of landing craft streak shoreward to occupy it. The fleet will lift its fire just before the landing craft hit the beach.

As if She Were a Toy, Battleship *Idaho* Is Lifted High and Dry in ABSD #3 at Guam

To repair damaged ships in the far Pacific, Vice Admiral Ben Morrell's Bureau of Yards and Docks devised these huge floating dry docks. The sections were constructed in yards scattered across the United States. Some, built in Pittsburgh, were towed down the Ohio and Mississippi Rivers, across the Caribbean and the Pacific to advance bases. There they were assembled with other sections to form an ABSD. To raise the ship, she is pulled in to the partially submerged dock, the water is pumped out of the tanks, and then the dock rises, lifting the ship.

Kodachrome, U. S. Navy, Official

Navy's "Secret Weapon"—Advanced Base Docks—Repaired 7,000 Ships in a Year

On the one month's tow out, each section of this Advanced Base Sectional Dock was an independent unit, like a ship. It contained a power plant, officers' and crew's quarters, storage spaces, and antiaircraft guns. Wing walls were folded down on deck. When the sections reached their destinations, they were welded securely together and the walls jacked into position. The sections are interchangeable; so, if one is damaged, it may be quickly replaced. Thirty officers and 750 enlisted men man this ABSD, living in air-conditioned quarters in the dock structure.

Kodachrome, U. S. Navy, Official

Drilling for a Bout with Jap Suicide Planes, a Big Carrier Lets Go with 5-inch Guns at a Sleeve Target. A Spectator Covers His Ears

© National Geographic Society

"Pass the Ammunition!" A Gunner's Mate Hands Up 40-mm. Clips

Shells for these efficient antiaircraft guns on a cruiser are stowed in convenient racks in a ready service room below the gun mount. When the guns are firing continuously, the men work with the speed and smoothness of professional football players to keep the shells flowing.

Kodachromes, U. S. Navy, Official

Animated Cartoons Joined the Navy, Too

In the Photo Science Laboratory at Anacostia, D. C., a Wave operates the animation camera (left) to make a training film. This laboratory, heart of the Navy's photographic operations, tests and creates new developments. Its staff of 400 specialists includes experts from the motion-picture industry.

A High-speed Tow Target Is Rigged Beneath a Navy JM

To give aircraft and antiaircraft gunners practice firing at speeding planes, this streamlined, rigid target was developed. Its drag is only a fraction of that of the sleeve below. Aloft, the target will be towed far behind.

 Kodachromes, U. S. Navy, Official

Ground Crew Repairs a Tow Sleeve for AA Practice

This JM, the Navy's version of the Army's Martin Marauder, will tow the red sleeve a mile behind it. If the plane goes too fast, the 30-foot sleeve will rip to pieces. Seven different types of tow targets have been devised.

Cape Cod People and Places

By Wanda Burnett

With Illustrations by Staff Photographer Robert F. Sisson

WHEN I went to Cape Cod the first time, it was autumn—the middle of October, in fact. I went with the advice of well-meaning friends to wrap myself in layers of woolens for the hard Cape winter.

They warned me about those mad nor'easters which periodically tear along the Cape's long coast, moving mountains of sand, dune by dune.*

This long and narrow arm of land curls out from the main body of Massachusetts like a fancy half-handle on a teacup. It is linked to the mainland by giant steel bridges flung gracefully across Cape Cod Canal.†

From its bridge-hinged shoulder blade all the 65 miles down to the tapering fingertip of Provincetown it is flecked with moors and dunes, lakes and ponds, and threaded with streams and eager inlets from the sea.

It is long enough and broad enough to hold 15 towns and some 140 villages, and it has enough sandy bathing beaches to reach from Washington, D. C., to the heart of New York City.

Its natives are not unsociable but "careful." As one of them explained, "We jest don't let go our words to everyoldbody."

From Buzzards Bay to North Truro, Cape Cod is anchored to the earth's floor by a clay and solid rock foundation.

The Legacy of Glaciers

Some 35,000 years ago southbound glaciers thrust rocks and debris forward to form the peninsula. The hills and hollows of Truro mark the northern limits of the glaciers' fine work. From there northward the ocean donated "filched ground" to form the graceful finger of sand upon which Provincetown is built (map, page 741).

This strip runs northward and westward from Truro for approximately 10 miles.

In some places these offerings of beach land from other parts of the Cape have been so meager that only a scant half mile now keeps the ocean from reaching across to join the bay. The restless sand has been anchored by generous plantings of deep-rooted beach grass.

Up the Cape, around the shoulder blade, the land is much wider and the vegetation richer.

From Boston you go *down* to Provincetown and from Provincetown you go *up* the Cape toward Boston. On this broad up-Cape section as much as 20 miles stand between the waters of Nantucket Sound and Cape Cod Bay. Trees grow taller. Ponds appear larger. Beach settlements are closer together.

Hyannis, the shopping center for the Cape, though not on this broad part of the land, is an up-Cape town. It has all the earmarks of a town but it is only a village—a village in the town of Barnstable, but a village which long since has outgrown the mother town. To me it appeared like a bulging muscle slightly relaxed after the summer tension.

There was still some activity when I arrived, even though the vacationists and summer people had gone and the numerous gift shops, one by one, were shuttering their windows and taking their stocks south for the winter.

Drugstores, grocery stores, dime-to-dollar stores, movie houses, summer-blooming night clubs and antique shops, and banks line the one-street village for many blocks. Railroad passenger service comes to a dead end and buses for on-Cape and off-Cape travel center here (page 742).

Tie and Snip Parties

The whist and rummage sale season was in full swing when I arrived. This is the time when housewives from surrounding villages clean out their attics and donate and sell and buy again. Churches and clubs "advertise" whist parties and bean suppers. Ladies have tie and snip parties—or just plain old-fashioned quilting bees.

At the foot of Pleasant Street, fishermen unload their catches of scallops, oysters, clams, haddock, flounder, and other fish. A small factory makes "pearls" from herring scales. Local restaurants proclaim Cape Cod clam chowder, Cape scallops, steamed clams, lobsters, and fish.

From this bustling Cape "metropolis" I set out to smaller, quieter villages, places the old whaling captains had once called home. I sought the lonely wind-swept beaches where the Atlantic pounds its fists against the cliffs.

* See "Collarin' Cape Cod," by Lt. H. R. Thurber, National Geographic Magazine, October, 1925.

† See "The Cape Cod Canal," by Commodore J. W. Miller, National Geographic Magazine, August, 1914.

A Harwich Port Boy Can't Believe What He's Caught

Puffers, or blowfish, sometimes inflate to three times their natural size to escape being swallowed. A tickle on the stomach causes them to draw in water, air, or even sand. When ballooned out at sea, they float, bellies up, until danger has passed.

I wanted to see the Cape's famous old "half houses" and its windmills waving their gaunt arms in the crisp autumn air.

I inquired of an old-timer just how I should get to these various places in winter.

"Well," he said, thoughtfully, "trains go some places. Buses might go, too." Then he added, "Most folks here get around on their feet."

"Not enough time," I told him. "And besides, it's winter."

"Time! Shucks!" he snorted. "Why, I remember tell when folks in these parts didn't even have clocks. Told time by lookin' sun'ards. Daylight, sunrise, sun an hour, two hours, and three hours high—that's how they told time. Course, that was mornin' time. Afternoon time was sun low 'stead of sun high.

"And walk? Old Barney Gould, he walked. Walked all over this old Cape pushin' a handcart and collectin' road taxes. Sometimes he even walked all the way to Boston, folks say, jest to deliver a letter. He had a crazy idea that all the roads hereabouts belonged to him, and when he caught somebody else usin' 'em he jest charged 'em the regular tax, two cents. They paid, too."

Oldest Town on the Cape

I took the train from Hyannis to Sandwich and started my *down*-Cape trip from there.

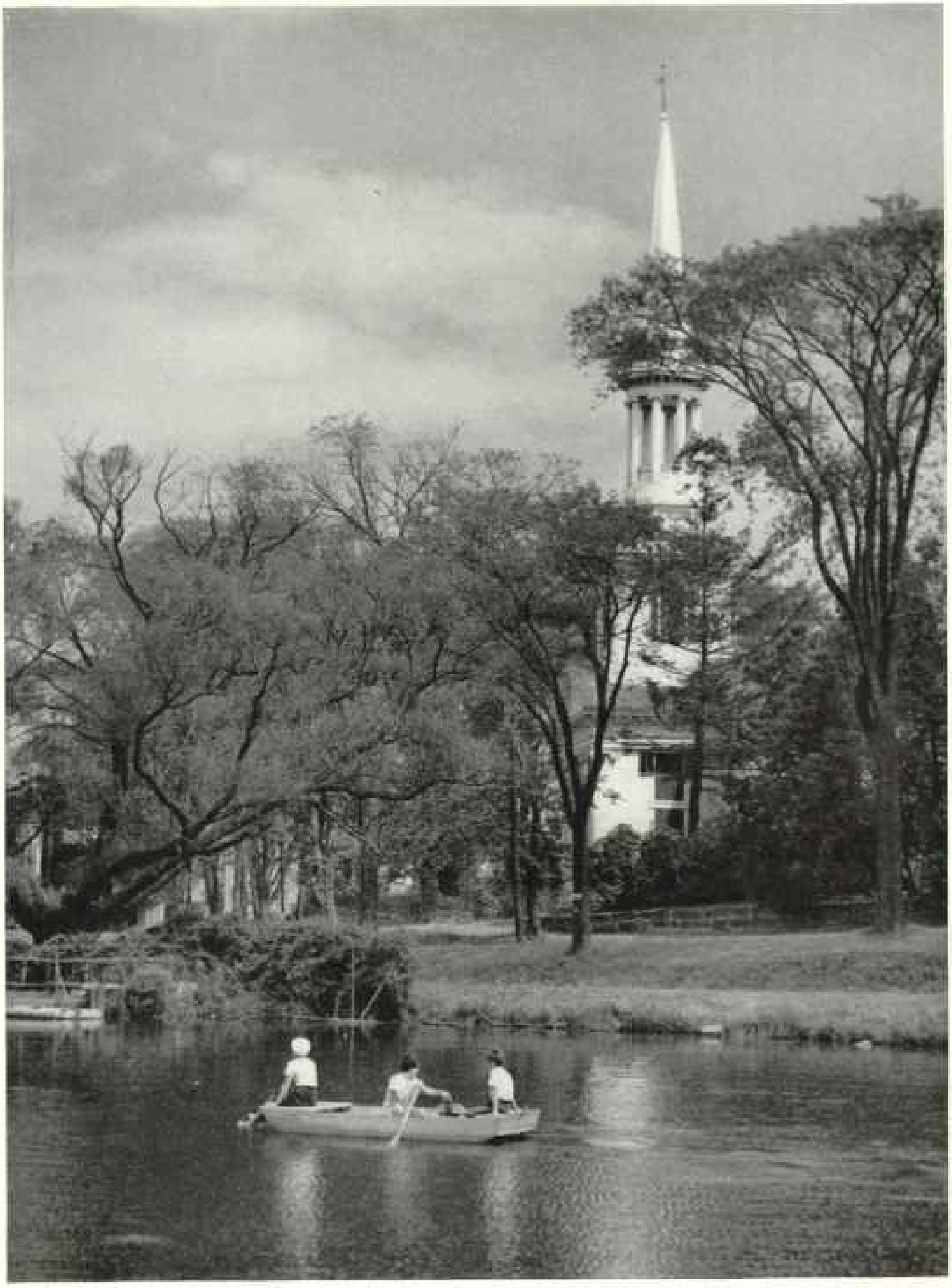
"That's the oldest town on the whole Cape," I was advised. "Settled way back in 1637. Yes, sir, she's right old, as time goes."

My guide told me there were a couple of graves in Sandwich I should see, and added: "Folks round here say they hold some of President Franklin D. Roosevelt's ancestors—the Pilgrim ones.

"And don't forget the glassworks," he continued. "Kind of down at the heel right now, windows all out and everything; but maybe someday she'll come back.

"Folks—mostly summer people—still go pokin' around in the rubbish heap back of the factory lookin' for old pieces of Sandwich glass. Don't know jest what they expect to find. Must have been most a million of 'em round there since the old place closed down."

The "old place," I later learned, had operated for some 63 years before a strike caused the fires to be drawn and the factory closed in



Spire, Lake, and Trees Tell Three Reasons Why Artists Love to Paint Sandwich

Founded in 1637, Sandwich is the Cape's oldest settlement. In the 1800's the village gained its living from a famous glass, made in distinctive patterns and coloring. Today the factory is in ruins. It was not reopened after being closed down by a strike in 1888. The beautiful spire crowns the Congregational Church.

W. D. Hine

It's Hot Work, but Midsummer Skiers Pick Up Speed on Cape Cod Dunes

On such sand hills along the Massachusetts coast, enthusiasts can practice for winter's snows. Even turns can be made on the fast runs, but spills are frequent because of sudden stops upon reaching the beach at bottom. Slopes carpeted with grass or pine needles are faster than those of sand alone.

1888. In its heyday it employed several hundred men and women and imported some of the best glass blowers, cutters, and engravers from England and Ireland. The blown, pressed, cut, and lacy glass, produced in large quantities then for everyday tableware, is now considered collectors' items.*

Every year the Cape is combed by dealers and hopefuls looking for rare cup plates or genuine dolphin candlesticks or for the harder-to-find pieces made by the workmen on their own time and for their own use.

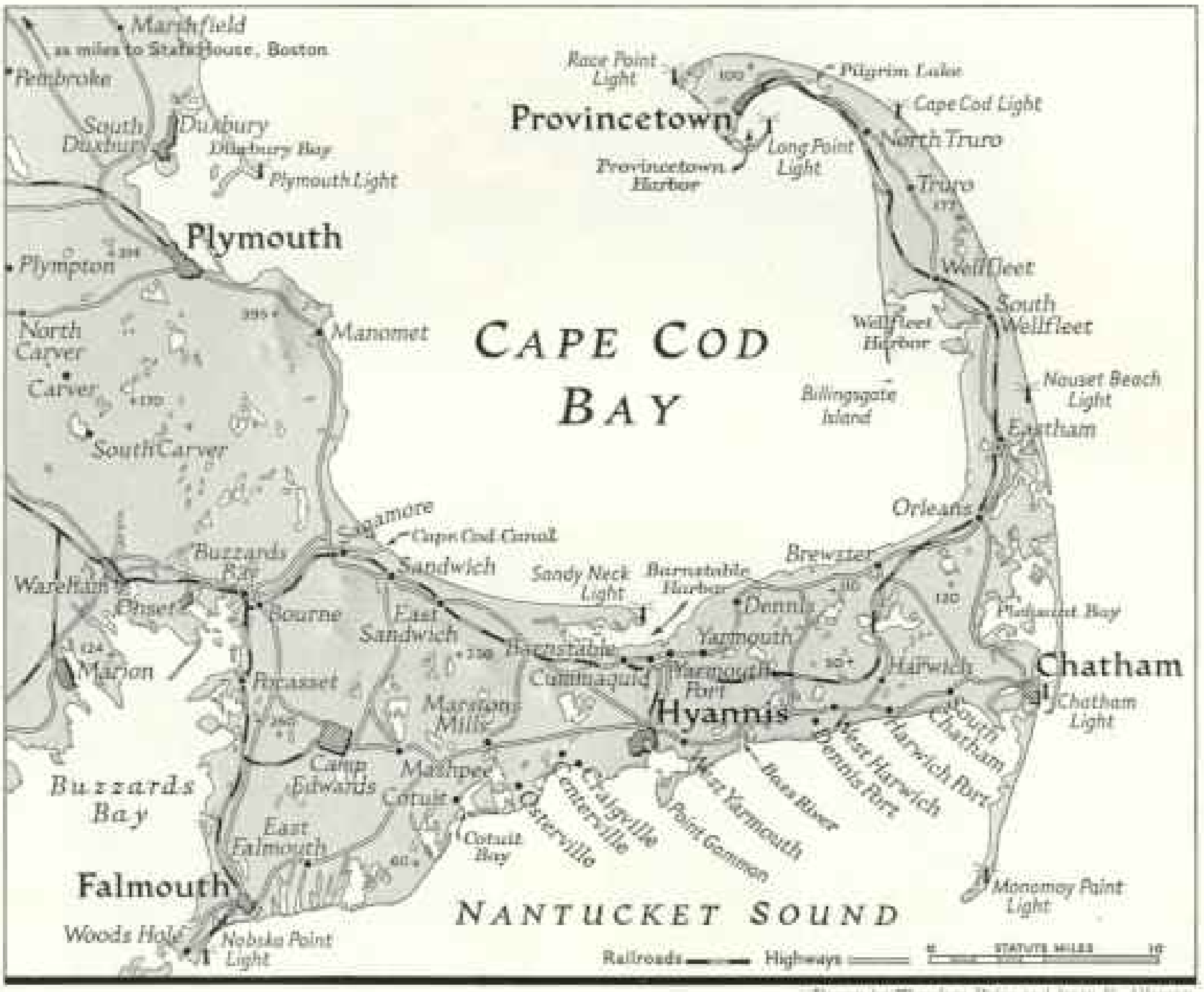
Deming Jarves, the founder of this glass company which once caused Sandwich to bustle and boom, was, apparently, a gentleman who kept a careful eye on his employees' health as well as their wealth. Not only did he finance small homes for his workmen in the "glass village," but he very generously allowed every child who had whooping cough one full hour a day in the company's gas house to "inhale the beneficial fumes."

But the activity that once surged through Sandwich is now gone. I found only a sleepy little village dreaming peacefully under its towering trees. A graceful white church spire lifted itself high above the housetops and appeared to be standing on tiptoe to catch a glimpse of its own beauty reflected in the crystal-clear pond at its feet (page 739). And at the other end of this pond, on a tombstone-covered hill, the early settlers had gathered to "sleep till the trompe of Judgement Day."

"History on Every Bush"

History was on every bush, in every house, and inscribed on the crumbling wind-bent tombstones. Off Tupper Road I found the graves of Edmond Freeman and his wife, Elizabeth—some of the Pilgrim ancestors of President Roosevelt—marked by two stones shaped like a saddle and a pillion.

* See "Glass 'Goes to Town,'" by J. R. Hildebrand, National Geographic Magazine, January, 1943.



Drawn by Theodora Price and Irvin E. Alleman

Massachusetts Wags a 65-mile Tail

Cape Cod is linked to the mainland by bridges across Cape Cod Canal, some 50 miles southeast of Boston. Two hundred miles of beaches fringe the Cape's shores. Hills and ponds characterize its interior.

After Freeman's wife had died and was placed beneath the pillion, he gathered his sons around him and told them to bury him, when he died, under the saddle next to his wife, for, he said, "Your mother and I have traveled many long years together in this world."

Edmond Freeman was one of the ten men from Saugus who in 1637 were granted permission by the court of Plymouth to "go forth and seek a place to sit down in" and there to "worship God" and, as one historian added, "make money."

The ten men chose the site of Sandwich for their "sitting" probably because it was only a few miles from the already established Aptucxet trading post (Plate I), and also because of the wide-reaching salt marshes filled with an abundance of fodder for their cattle.

But there was little time for sitting in those early years. Houses had to be built, crops raised, church attended. And there was always the wolf to be kept from the door.

At one time in the history of the Cape, these pesky animals were so numerous that it was proposed that a 10-foot-high fence be built from Buzzards Bay to Cape Cod Bay, near the line now cut through by the Canal, to keep the critters out.

But the plan was soon filed away when the people, after much deliberation, decided that distribution was better than concentration where the wolves were concerned, and that if they built this fine barrier they would actually pen themselves in with the wolves.

Another dark spot in the lives of these early settlers came in the form of "blackbirds," actually grackles. A single blackbird might be a thing of beauty, but when they came in clouds so thick they darkened the sky, the town fathers decided it was high time to look to their books and deal with the matter.

A law was passed stating that no man would thereafter be granted a license to wed until he had first killed his quota of blackbirds. Men over seventy were excused. So when a

At Hyannis, Railroad-coach Service Comes to an End, and Down-Cape Passengers Transfer to Buses

Buses, packed to the aisles, run on curving, high-crown roads. Obliging drivers stop at Tom Smith's house or Aunt Sally's beach-plum jelly stand. Hyannis is the Cape's summer business center (page 737). Rails continue to Provincetown, but they carry only freight.

A Cape Cod Auction Offers Everything from Bird Cage to Coffeepot. Buyers Dream of Discovering Antiques at Bargain Prices

At Hyannis the sheriff, who doubles as auctioneer, conducts an outdoor sale. Formerly a piece of famous Sandwich glass might be captured at auction; now it would likely be found only in an antique store. Directly behind the auctioneer, a woman calmly knits while waiting for her heart's desire to go on the block.

Cape Cod's Salt-water Dude Ranchers Go Ridin' the Old Beach Trail

These eastern cowboys were met by stagecoach at Yarmouth Port and jolted to the ranch house in Cummaquid. They enjoy fishing, bathing, and archery, as well as a bronco-busting rodeo. In season they build blinds along the beach and hunt ducks. At this point they like to gallop their ponies into the shallows. As a substitute for towering buttes, they have old Sandy Neck Light, now a private dwelling (seen across Barnstable Harbor). For sagebrush, they have dwarf pines.

single man went forth shouldering his gun in those days, the village gossips could nod wisely and say he was out gunning for a wife.

Improvident Were "Warned Out"

Sandwich was always a careful village with a great fear of "public charges." If a man couldn't show his money or might be inclined to lean on the village for support, he was "warned out."

Seth the peddler was warned out in 1669. He went, vowing to return and buy up the whole town. Thirty years later Seth did return, a swaggering gentleman with money in every pocket, and straightway bought up almost every parcel of land in the village. He built two fine houses, one for his son John and one for his son Seth.

Then, without explanation or apologies, he left Sandwich to tap its brow and puzzle over where he could have made so much money and why, after he had built two of the best houses in the village, he stomped out, saying he "wouldn't live in the damn town, anyway!"

I found one of Seth's houses standing with its back turned in rightful scorn on the old graveyard which now holds the remains of those overcautious old-timers who warned him out almost 300 years ago.

There is another very old house in Sandwich, too, the Hoxie House, a tumble-down, gray-shingled, salt-box house that looks down from a green knoll above the millpond to the old graveyard and across to the church spire.

The granddaughter of an old whaling captain lives there now. And when the captain, many years ago, removed a brick from the chimney while "tidying up a bit," he found it had the date 1637 plainly marked on it.

"That makes this one of the very oldest

Fog Draws a Clammy, Treacherous Blindfold over Woods Hole Harbor

Hundreds of vessels have been wrecked off Cape Cod by fog, storm, and tide. Others have been spared a like fate by the construction of Cape Cod Canal (Plate I). Even now, fishermen stay home on misty days. *Anna* is a fishing trawler.

houses on the Cape," the granddaughter proudly informed me.

"There used to be willows all around that pond," she pointed out (page 739). "And my grandmother used to sit up in those old trees and write love letters to my grandfather. Now they're all gone. Even the letters. But the house—well, I guess that's why I hang on to it. Nobody but Smiths and Hoxies has lived in it since a few years after it was built. And my grandfather was a Hoxie."

She opened the door to the parlor, or "great room," as they were once referred to, so that I might see some of the chests and sewing cabinets the old captain had made between whaling trips.

There were several pieces of Sandwich glass on the old mantel. A particularly lovely clear red ball she pointed out to me as being a genuine witches' ball, guaranteed to keep even the most persistent witch from witching if suspended from a cord and hung in plain sight in the window. It apparently had served well and long, for it appeared slightly crackled with age.

"These," she said, "were made by my brothers at the factory." She flipped the glass cups and pedestaled dishes with her thumb and forefinger to produce a bell-like ring as proof that these weren't just common glass.

Where Daniel Webster Stopped

On my way back to the railroad station I stopped for dinner at the Daniel Webster Inn. As I ate Cape scallops and topped my meal with a scoop of vanilla ice cream, I wondered just what Dan'l would have thought of the change in his favorite stopping place.

I wondered if the same chintz curtains that held their full-blown blossoms against the windows might also hang in the room where Dan'l used to prop himself up in his great double feather bed to drink his jug of ale or rum, which often was delivered to him by lift

Wanda Burnett

A Forthright Sign Goes Up: "Sorry, No Candy, Due to Weather"

In Yarmouth Port the Swift sisters, Carrie (left) and Saidee, make hand-dipped chocolates. Humidity and high temperature, they explained, cause their wares to dry in white streaks (page 748).

and slipped into his room through a small secret panel in the wall.

But long before Daniel Webster made the inn his Cape headquarters, the place was well known. It was the first licensed "ordinary" in the village of Sandwich, and the license provided that the tavern keeper could sell "strong waters, and wines, but must not let the town dwellers stay drinking unnecessarily at his house."

Early-day Boston to Cape Cod stagecoaches also dropped their passengers at the inn for "refreshment."

I had a few minutes to see some of the damage the hurricane of September, 1944, had done to this part of the Cape before my train arrived to take me back to Hyannis. What I saw convinced me that I should take a quick trip down the Cape the next day.

I discovered then just what that blow had done and why I had to stumble from the railroad station to the inn at Hyannis that first night by the feeble flickering light of street "bombs."

This hurried and powerful wind had uprooted trees, swung houses around on their foundations, and ripped down electric-light wires before it finally swept out to sea, leaving the land to lick its wounds and heal in almost total darkness.

The bright-red cranberries which I had hoped to see were torn from their bogs. Oysters had been smothered in their beds. And even the brilliant fall coloring for which the Cape is noted had gone with that wind. Salt spray had blown over the land and scorched the grass. The pines which had managed to withstand the force of the violent gusts were seared and brown. Others had been snapped off four or five feet from the ground.

But it was the big trees, the elms which had been planted so many years ago that oldsters now in their nineties had spoken of them as "the old trees" even when they were youngsters swinging on the branches—it was these trees that suffered most. A number of them had been torn up by the roots, and some had left cavities in the ground that actually looked large enough to lose a house in.

In all the excitement, Mother Nature had a change of mind, too. Seasonal confusion appeared. Lilacs began to blossom shyly on their leafless branches. Yellow forsythia shot out like beams of sunlight. Cherry and even

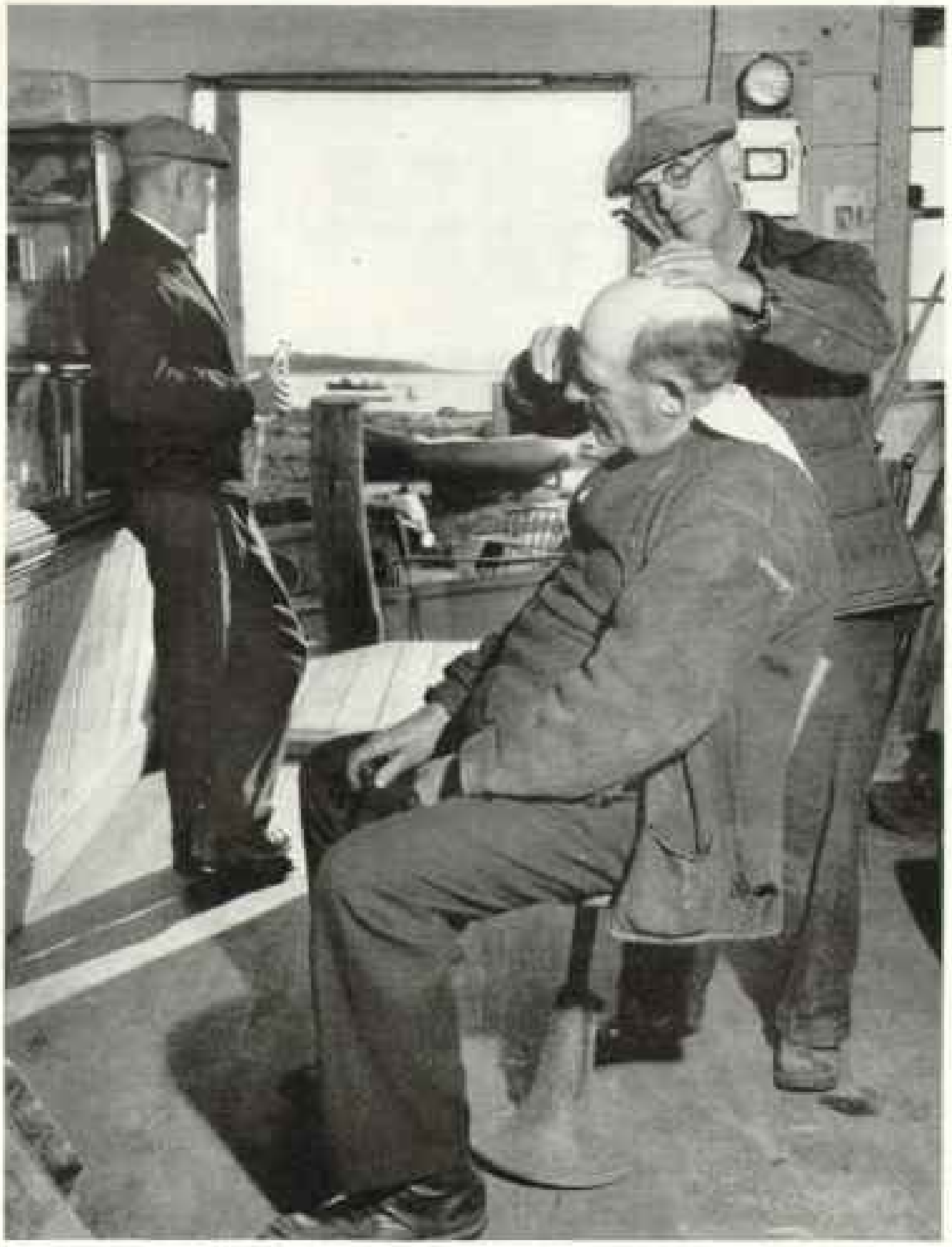
occasional peach blossoms blushed on their naked twigs. The salt-burned grass recovered and turned a bright spring green.

But down the Cape, along the rolling hills of Truro, autumn was still determined to have its fling, and bright-red leaves hugged the hills like rich carpeting. Then winter suddenly put in a bid for the land, and snow fell to lend a little more confusion to Nature's vague plans.

Capitalizing on a Hurricane

But Cape people are energetic and hopeful, and before the wind had scarcely died down they were reshingling their tattered roofs, taking their beached boats back to the water, and clearing up the debris. Hurricane conversation ran like a theme song among the natives.*

Pictures of the wind damage began to appear in gift shops and on drugstore counters. And, oddly, some of the villagers were actually hurt when their town's wreckage wasn't played up in the published works. One old fellow, well up in his eighties, told me it was "the old fogies in his town who kept out publicity and wouldn't let the place grow up!"



A Clam Dealer Gives a Friend a Fisherman's Haircut

Most Cape Cod men are Jacks-of-all-trades. Captain Higgins, proprietor of a shellfish shop in Wellfleet, is handy with a pair of scissors, besides selling clams, oysters, candy, tonic—and telling stories (Plates VIII and X).

There were many theories as to the cause of this great wind among the Cape folk. And one day while I was leaning on a guide rope helping to hoist a huge pine tree which had toppled, but for which there was still some hope, I got the prize answer to the weather riddle.

"It's the shootin' over there," the owner of the tree informed me, and from his firmness I gathered he wanted no arguments from me when he embellished his original statement with this:

"It's the war and all that bangin' around that makes the elements nervous. That's why we have all these big winds—of course."

These people have definite ideas about us off-Capers, too. They refer to the two-weekers who flock to the beaches every summer to toast their bodies in the sun as just plain vacationists. Those who come for longer, who are more leisurely, but still head for home with the after-Labor Day crowds, are "summer people."

But for those few hardier souls who don't choose to shutter their windows and leave with the first southbound birds, but who "bank up" and stack their logs for the coming winter in real Cape fashion, the natives have a very

* See "Geography of a Hurricane," by F. Barrows Colton, National Geographic Magazine, April, 1939.

special tag. These few are the "permanents"—the almost, but never quite, natives.

On my way *down* to Provincetown I passed through several of the numerous little villages and settlements. From Hyannis to this sandy tip takes almost two hours by bus. The highway in some places follows the old Indian trails and the dusty roads over which the early stagecoaches once jolted.

I couldn't help noticing the openness of the countryside. Each house had room to stand and spread without bumping into its neighbor. Snow-white cottages sat primly among the more settled salt-grayed and weathered "half houses" of earlier days.

Along the elm-lined stretch of the highway at Yarmouth Port I noticed several of these old houses—some half, some three-quarter, and some full houses. But on the entire Cape I found very few which had not grown from the original half house to "accommodate the family" (Plate IX).

One old-timer told me with no little sadness that these few which hadn't extended themselves into numerous ells and added rooms were "really pitiful." According to his story, the reason was evident. There just wasn't any family.

Weather and Candymaking

It was at Yarmouth Port, too, that I really met Cape Cod. I met Saidee Swift and her sister Carrie—two youngsters in their early eighties—filled with wit, intelligence, and the type of old-time New England hospitality one often reads about.

It was quite by accident that I found their modest little sign swinging from the branch of a giant tree which laced its shadow across the highway. "Saidee Swift's Candy," it read, and it swung there with a carefree manner that neither invited, insisted, nor seemed to care.

The house in which Saidee "dipped" and Carrie sold had an aloof, stand-apartness air. It was not a true Cape Cod house. And when I later remarked about this to Carrie, she said it was a trifle haughty because it had traveled some. Her father, years before when lumber was very expensive, had bought the house in Nantucket and brought it the long water way to Cape Cod.

I could just see that house bobbing across the waves like a great dowager, but Carrie soon exploded my dream by telling me that it had been completely dismantled and then reassembled on this pleasant rise of land overlooking the bay.

Tacked on the front door was a sign which puzzled me, as it no doubt had puzzled many another candy customer. In careful but firm handwriting it read: "Sorry, no candy for several days," and under this was added: "Due to bad weather conditions" (p. 746).

Saidee was very busy "getting ready" when I arrived. This meant making the base, or fondant, which she would swirl in rich melted chocolate "the very minute the weather's right." But while she mixed and stirred and tested she took time to explain that making candy on the Cape was a real problem.

"Sometimes," she exclaimed, "I have to wait as long as a whole week for decent dipping weather!

"What we need this minute is a rip-roaring nor'easter. Then I could really get to work!"

She began checking up on the numerous thermometers placed at strategic spots all over the house. There was one on the front porch and one in the small shop where the candy was displayed and sold.

I later found them in the dining room, on the dipping table, in the bedrooms, and there was, of course, the huge candy thermometer in the kitchen which Saidee plunged into the boiling sirups at regular intervals.

But in the living room I discovered something really special, an ancient hourglass which dripped its grains of sand accurately, so I was told, unless the weather was too humid. Then, Carrie remarked, even time—as well as Saidee—just stood still.

Hourglass Timed Sermons

Carrie tapped the glass sharply to jolt the sluggish sand on its way and informed me that hourglasses were right handy little gadgets in the days when Cape ministers were overinclined toward long-windedness. It was the sexton's solemn duty then to turn the glass at the beginning of the sermon, and while the allotted hour slipped away with the sand, the minister preached. The filtering through of the last few grains was anxiously watched by the entire congregation.

Apparently the minister had to keep an eye on the glass, too, according to Carrie's tale, for it was considered equally distasteful for him to finish his discourse before, or to continue after, the last grain had dropped.

Later that afternoon I walked to the village post office with Carrie, who took along a shopping bag filled with neatly wrapped packages of candy for the boys overseas.

Our way led down the King's Highway—U.S. 6. While we ambled along, Carrie obligingly pointed out the homes of several old sea captains and also the home of Mr. Amos Otis, who planted the saplings which have grown into the giant elms for which Yarmouth Port is now famous.

U. S. Maritime Service, Official

Future Skippers in Steam Must First Master Sails

Students of the Massachusetts Maritime Academy man this gaff-rigged cutter footing before a quartering breeze off Hyannis, their base. The cutter has 12 oar positions and room for 15 additional men. Massachusetts is one of five States maintaining maritime academies.

A Woman Whittler Makes Her Hobby Pay Dividends

By selling her creations in East Sandwich, Mrs. Clara Marchant has helped support her children. "I have to have a jackknife and a piece of wood in my hands or I'm lost," says she. "Like a clock, I guess, I just can't stop." Such wooden clippers sell for $100.

She told me that Yarmouth Port had many claims to fame. Here lived Ichabod Paddock, the whaling teacher who taught Nantucket men the fine art of catching the whale.*

Deep-water Captains, and Just Captains

"And right there," she said, pointing to a comfortable old house, "lived old Cap'n Asa Eldridge. Cap'n Asa set a record in 1854. Thirteen days to Liverpool in the clipper ship *Red Jacket*.

"We had a lot of deep-water men once," she reflected, "but Brewster probably had more. I guess there were more sea captains from that little town than from almost any other place of equal size in the whole country."

I discovered there was quite a distinction between "deep-water" captains and just plain captains. The captains, Carrie explained, were coast boating men, cautious, and mostly from the Cape's South Shore. Deep-water men were more venturesome and fearless. They searched the waters of the world. These came, of course, from the North Shore.†

This was the same old story—up-Capers versus down-Capers, North Shore versus South Shore, each feeling somewhat superior to the other. I had even heard up-Capers speak of the people who lived "below the bridges"—in this case meaning the bridges which span the Bass River and not the Canal—as "inferior folks." These, in turn, scoffed at the merits of the up-Capers. The score was never completely evened.

Strangely, too, I found that almost every off-Cape town or village, even those as far away as Plymouth, thought of themselves as being "on the Cape." And each on-Cape settlement felt that the Cape really began, and probably ended, right in that particular town or village. As far down as Truro I heard summer people, permanents, and natives say very definitely, "Here the Cape *really* begins!"

At the post office I left Carrie and took the bus again. The drivers were a good-natured lot. They were the means of carrying news along the Cape as well as passengers. And when they were flagged down between village stops, it was usually by an old-timer who

* See "American Pathfinders in the Pacific," by William H. Nicholas, National Geographic Magazine, May, 1946.

† See "Northeast of Boston," by Albert W. Atwood, National Geographic Magazine, September, 1945.

asked to be dropped at such strange-sounding places as Thumpertown or Long Nook Roads. They kidded the drivers, compared their ailments, stood their ground on political issues, and frequently arrived at their destinations in a real huff.

But good-natured or not, most of the drivers, I soon learned, merely paused at post-office stops, and if you weren't there with one foot already raised and waiting for the bus step, they zipped away without you.

When I went through Dennis, a settlement four miles down from Yarmouth Port, I had the feeling that this neat little village had just been newly washed and combed and like a child been told not to get dirty. Its fresh white cottages and churches stood on their green lawns like stage props.

Even the trees and shrubs appeared as if they had been specially groomed for the passing through of the bus.

Cotuit Oysters, Like the Cape's Visitors, Are "Furriners"

Seed from Long Island is transplanted to Cotuit Bay to absorb the famous flavor, a quality enhanced by the chemistry of the water. These shuckers take pride in their speed; falling shells tinkle every few seconds. Long-visored tuna caps resemble naval aviators' "baseball" caps.

Years ago Dennis was populated almost entirely by seafaring men, who built some of the graceful clipper ships of nearly a hundred years ago and who manned the fishing fleets.

Salt from "Sear's Folly"

Cape Cod's salt industry began here. When salt became scarce during Revolutionary times, and fishermen needed salt to keep their catches from spoiling, old Capt. John Sears decided to make the sun and the ocean do the trick.

Village folk shook their heads over such "workin's" and called them "Sear's folly." But when the sun actually evaporated the water in the long wooden vats which the captain had made and left only the pure crystals, not only Dennis people but folks all over the Cape began coaxing the ocean into vats and praying for the sun to shine long and hot.

At Brewster we paused just long enough for one passenger to board the bus and for me to catch a glimpse of a few of the old houses of early-day sea captains.

At Orleans there was a short pause and a great confusion while the driver searched for a sailor among the passengers in the back seats, "'cause his ma is out there a-lookin' for him."

I could well understand when I saw the productive fields of Eastham why some of the Pilgrims, after twenty-odd years of urging the lands of Plymouth to produce, had finally become discouraged and moved to Eastham

(then Nauset) where lay the "richest soyles for ye most part a blakish and deep mould" and where the Indians once raised quantities of "corn and beans of various collours." *

This appeared to be the flattest spot on the entire Cape. Fields rich with autumn produce stretched away from the highway on one side toward the blue waters of the Bay. On the other side the land wandered lazily over yellowed moors, interrupted by ponds and inlets, before it finally made its way across the dunes toward the Atlantic.

Pumpkins were piled in golden mounds and marked for sale. Eastham housewives, like other women on the Cape, had gathered beach plums and made them into jelly. Their efforts stood in jelly glasses on tiny makeshift stands all along the road.

A fellow passenger pointed out to me the distant spot along the bay where the Pilgrims had their first encounter with the Indians and in the same breath added that Eastham once grew the best darned asparagus in the country.

A Founder of the Banana Trade

The road began straightening out for the long dash toward Wellfleet, a town whose expectations, apparently, exceeded its development. Once famous for men who whaled and sailed, it also prides itself upon being the home town of a founder of the banana trade.

The United Fruit Company had its beginning when Capt. Lorenzo Dow Baker, from Wellfleet, made quick voyages back to the United States with bananas from Jamaica in 1870 and 1871.

But long before we reached the combination gas station, drugstore, country store, post office, Western Union, and bus stop of South Wellfleet, we were in the environs of the little town which had allowed itself so much room to expand and grow. And long after we had left the cluster of houses, churches, and stores of the main village, a sign by the side of the highway boldly asked: "Did you see our town?"

The first glimpse I had of Provincetown was when the bus suddenly rounded a curve, swept up an incline, and headed straight for the bluest patch of water I had ever seen.

The road at this point seemed to disappear completely, to be swallowed up by the water. Sand dunes, held in place by glistening crowns of pale-green beach grass, bordered the long flat reaches of Pilgrim Lake on the right of the highway.

On the left was the bay with its ever-circling gulls, its fishing fleet, and its towering and overpowering Pilgrim Monument (Plate VI).

After the roominess of the rest of the Cape, Provincetown seemed extremely congested. Its strange houses, with little architectural plan or design, nudged and crowded one another closer and closer to the water's edge. Some appeared so eager for front-row seats and a better view that they literally stood on one another's shoulders.

A few brave ones had even waded out into the water and were standing precariously perched on spindly wooden legs. Others ran up the hill for choice balcony seats. Some had even spilled down the opposite slope, probably with the hope of watching the Atlantic tossing its waves along the beach.

Some of these houses are apparently very old. Others are unmistakably new or remodeled. Some have mellowed and grayed. Others have been tossed up for the summer crowds. These makeshifts wear ruffles and loose hems and have such fancy names as Bide a Wee, Home at Last, or Welikeit.

Older ones, with their twining ramblers and graceful trees, have drawn their shutters and closed their eyes in embarrassment at these mongrel types which have sprung up among them.

A Compact and a Child Are Born

One of the first chapters in American history was written here 326 years ago when the *Mayflower*, driven far off its course by storms, rounded the northern tip of Cape Cod and sailed into Provincetown's sheltered and spacious harbor.

While the boat rocked on the waves, the Pilgrim Fathers drew up and signed the famous Compact which was to govern their actions in the new land. And while the boat still bobbed on Bay waters, the first English child to be born in New England—Peregrine White—came into the world.

The travel-weary Pilgrims anchored offshore on Saturday, November 11, 1620, according to Provincetown's tablets and markers.

With due piety they stayed aboard over Sunday to "observe the Sabbath." But on the following Monday, the Pilgrim women, feeling no doubt that cleanliness was next to godliness—and that godliness had been taken care of the day before—bundled up their laundry and came ashore to dabble out their clothes. Thus they established a Monday-washday custom which still clings to most American homes.

But there were even earlier footprints than these left in Cape Cod sands. Almost a century ago, Provincetown, digging into its past, uncovered the remnants of what is believed to

* See "America's First Settlers, the Indians," by Matthew W. Stirling, NATIONAL GEOGRAPHIC MAGAZINE, November, 1937.

First Trading Post of the Plymouth Colony Dates from 1627

Here, near what is now Bourne, the Pilgrims traded with Indians and New Amsterdam Dutch. In 1930 the Bourne Historical Society built this replica of the Aptucxet trading post on the original foundation.

 Kodachrome by Robert F. Sisson

Cape Cod Canal, 8 Miles Long, Saves 60 Miles from New York to Boston

The Plymouth Colony envisioned such a short cut. In its day Indian paddlers used the route by portaging between rivers. The canal was opened in 1914. It is spanned here by Sagamore Bridge.

Kodachrome by Robert F. Sisson

Gloucester's Fishing Fleet, Awaiting a Moonless Night for Mackerel, Ties Up at a Provincetown Wharf

Crews of Italians, Portuguese, and Nova Scotians while away the time by telling stories, playing cards, and going to the movies. When the moon goes down, they'll hunt mackerel. They spot catches by watching for phosphorescent patches at sea. On bright nights the glow is not visible.

Kodachrome by Robert F. Sisson

In Peter Hunt's Studio Overlooking Provincetown Harbor, Girls Make Rugs in Old Portuguese Style

Designs are hand-stitched with bright wools; felt edgings are machined. Mr. Hunt, who creates the designs, is noted for his face-lifting jobs on old furniture—note the cabinet (left). Dolls on chimney table are another Hunt enterprise. Many Portuguese came to Massachusetts on American whaling vessels.

Kodachrome by Robert F. Sisson

Provincetown Art Students in Bathing Suits Set Up Easels on the Dunes and Paint One Another

Once Provincetown lived under the threat of being washed into the sea each time the wind shifted the dunes. To stay the wandering sands, beach grass and ground-hugging pines were planted. Now roots of this thin grass anchor the soil to a depth of 12 feet.

Kodachrome by Oscar Langlois

Pleasure Cruising Takes Them to Their Day's Work

Students of the Marine Biological Laboratory, Woods Hole, set out on a hunt for sea specimens, which they will analyze at their laboratory. Small boats astern are used for landings.

Kodachrome by Robert F. Hasso

Breezy Seaside Studios Brighten a Wharf in Provincetown

To Captain Jack's wharf, carefree vacationists like to move in the summer. Provincetown is a favorite haunt of artists, writers, and actors. It has been an art colony since 1901.

Kodachrome by Robert F. Sisson

Provincetown's Water Front, Where Long, Narrow Houses Vie for Space, Is Viewed from Pilgrim Monument

A crowd streams down Town Wharf to meet the Boston boat. To the left, Cape Cod curves southward. Long Point (right) is the Cape's sandy tip end. Families living there before the Civil War ferried their homes to Provincetown when storms ate into their land.

To Catch Its Fish, Provincetown First Mends Its Nets

Nets spread to dry are a common sight along the water fronts in a number of Cape Cod towns. This fisherman, busy with repairs, submits to questions by his volunteer assistant.

Kodachromes by Robert F. Sisson

Relics of Whaling Days Ornament an Inn in Wellfleet

Time was, before the blockade in 1775, when nearly every Wellfleet man was a whaler. Old-timers left these instruments: a cutting spade for stripping blubber; a sextant for navigation; and scales for weighing fish.

Stormbound Fishermen Play Cribbage at "Spit and Chatter" Club in Wellfleet

Here by a cozy stove they wait for the weather to improve. Kibitzers, giving advice, stand by. The card-room is Higgins Shellfish Shop (Plate X).

Kodachromes by Robert F. Sisson

65 Turns of the Wheel, 65 Dips in the Wax Vat—Out Come Fat Bayberry Candles

Since Pilgrim days Cape Cod folk have gathered gray-green, wax-coated bayberries after autumn's first frost (Plate XI). Boiled down, the fat goes into candles valued for their scent.

Cape Cod Calls This a "Half" House Because It Fulfills Only a Part of the Plan

Tear down the wall (left), add a room with two front windows, and you have a "whole" house. An added room with one window makes a "three-quarter" house. In such fashion growing families are accommodated.

Kodachromes by Robert F. Sisson

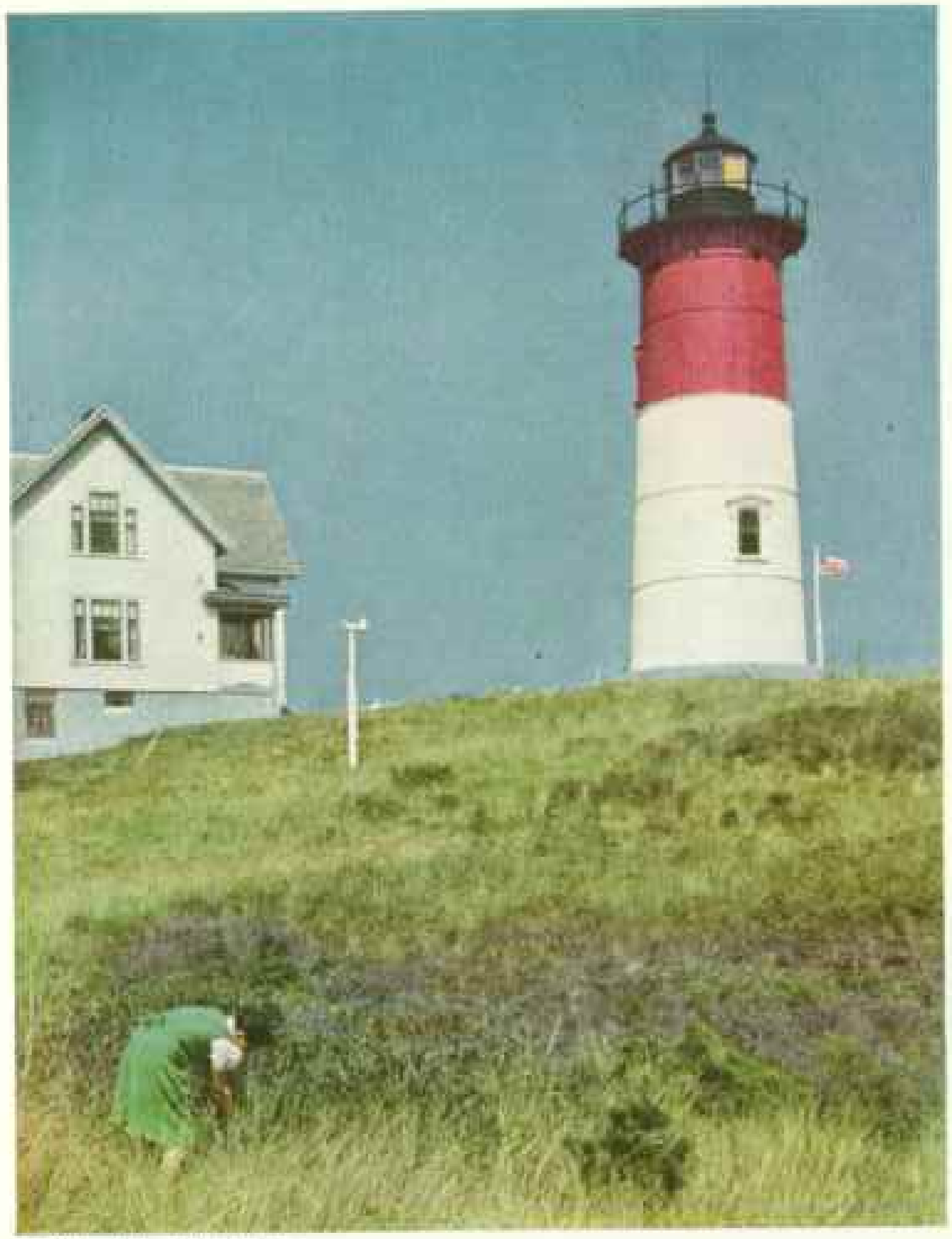
West Harwich's Yankee Trader Sells Antiques at a Half House

Tracing descent from William Bradford, 30 times re-elected governor of Plymouth Colony, the dealer calls his place "The Governor's House." Two whalebones hang below the windows. The figure at right is a hitching post.

 Kodachrome by Robert F. Sisson

Fishing and Clamming Cease, Men and Boats Rest, and Quiet Spreads over Wellfleet—It Is Sunday

Weather, politics, and fishing are the topics of the Spit and Chatter Club in Higgins Shellfish Shop (Plate VIII). Small houses (right) are for "summer people." Wellfleet calls them "apple-pie" houses because roofs are shaped like slices of pie.



Nauset Beach Light Winks a 25,000-Candlepower Warning

It has not always stood at Eastham. In 1923 the light, one of twins, was moved from Chatham. Towering 114 feet above the sea, the beacon casts a beam visible 17 miles. The woman gathers bayberries (Plate VIII).

Kodachrome by Robert F. Stone

Cascading Cranberries Sparkle in a Bog near West Yarmouth

Cape Cod produces approximately two-thirds of the United States crop. Pickers comb the bogs with long-toothed scoops, such as this woman empties. White flags mark pickers' lanes.

Kodachrome by Robert F. Sisson

Craigville Exhibits a Sample of Cape Cod's 200 Miles of Silvery Beaches

Cape beaches are enjoyed for their pure-white sands; there are no sharp pebbles to bruise tender feet. For bathers who prefer "teakettle" water, Craigville is ideal. Summer water temperature ranges from 65° to 72°. There is little tide or undertow.

Kodachrome by Robert F. Sisson

A Nantucket Island Steamer Docks at Woods Hole. As Hundreds Wait to Land, Other Hundreds Press to Go Aboard

Weathered Bones of an Old Rum Runner Lie Half-buried on Race Point

In prohibition days a gale tossed the outlaw vessel almost on the doorstep of a Coast Guard station. A fog bank creeps in over the horizon.

Sportsmen Land a 20-pound Striped Bass after a Battle with Surf and Fish

During October, Cape waters swarm with schools of bass moving south to their winter grounds.

 Kodachrome by Robert F. Sisson

Commercial Fishermen Carry Their Catch from Dory to Weighing Station in Chatham

Cleaned, iced, and crated, the fish are transferred to trucks. Within a few hours they will appear on Boston or New York menus. Livers are saved. "They pay our fuel bill," these men said. Screaming gulls circle for waste bait cast on the water.

For Captains or Their Widows, a Railed Walk Crowns a House in Falmouth

Captain's walk or widow's walk? New England uses both terms. From the enclosure, anxious watchers used to scan the sea for incoming ships. This white mansion has stood since 1814.

Kodachromes by Robert F. Sisson

A Whole House, Plus an Addition, Serves as an Art Shop in Provincetown

Built in the early 1700's, this cottage is one of the oldest in town. After Labor Day most art shops close.

be an ancient Norse wall, which indicated that seafaring Norsemen not only touched on the Cape in the 11th century but stayed long enough to build.

In 1498 John Cabot doubtless took a quick look at the Cape on his way south, and Henry Hudson probably allowed his men to go ashore to pick grapes before continuing on to New York and the river which bears his name. Capt. John Smith noted it on his map of 1614.

Gosnold's Search for Gold

At least half a dozen explorers touched on this Cape in the twenty years before the Pilgrims landed, but of these only Bartholomew Gosnold left an indelible mark. Gosnold sailed from Falmouth, England, in the spring of 1602 to "found a colony in some agreeable spot, preferably where gold was abundant," and dropped anchor in Provincetown Harbor some six weeks later.

He found no golden nuggets on the sandy shores, but he did find the waters crowded with codfish. After hauling in great numbers of these fish, he named the place Cape Cod, "a name," Cotton Mather later said, "it will never lose till shoals of codfish be seen swimming on the highest hills."

Today Provincetown is a magnet for artists, writers, and vacationists. It has one of the most elastic populations on the entire Cape. The winter-thinned, narrow-streeted settlement, consisting mostly of year-round Portuguese fishermen, actually triples its number of inhabitants during July and August (p. 773).

Artists set up easels along the water front. Portuguese fishermen become "colorful" subjects for canvases. Artists become such "interesting characters" to the fishermen (Plates IV and V).

The summer theater blossoms out with new plays and revivals of older ones. The tide of traffic flows steadily toward the center of town. Huge refrigerated fish trucks rumble along "Back Street," or Bradford, headed for New York markets with the catch.

But when I arrived, the town was in its more natural and more desirable state. Only the fishermen, the natives, and a few tenacious hangers-on were left. People who were ordinarily engaged with the summer rush now had time to sit and chat and remember.

The "*Portland* Gale"

Some remembered the big blow of 1898 when the *Portland* was lost with all aboard. Some spoke of the "boodle" which had been picked up along the beach after this great gale. Others had memories geared to the hurricanes of 1938 and 1944.

And while the fishermen mended nets and painted dories, they remembered their big catches and spoke of fishing as a good life, if the weather didn't get too "aired up."

The handkerchief-sized plots of lawn and flowers in front of many of the houses were grown on "imported dirt" brought in as ballast in returning ships years ago. "Front," or Commercial, Street, now hard-surfaced for its entire length, was once ankle-deep in sand.

But so averse were the ladies of the town to improving conditions that when plank sidewalks were proposed and finally laid, they merely hoisted their skirts a bit higher and took to the middle of the road. "The sidewalks," they said, "would be bad for young folks' morals. They would do nothing but walk back and forth on the fine walk."

I should have liked very much to stay on indefinitely. The unhurriedness of off-season Cape Cod was settling in my bones. But there were still other spots on the Cape to see.

A Stop at Truro

It would be a very simple matter to cut across the Cape at Orleans and within a few miles find yourself in Chatham. But the bus doesn't do business that way. It prefers to run breathlessly back to the railroad stop in Hyannis, repeating every stop it made on the way down, and there drop its passengers for points along the Atlantic side of the Cape.

I discussed this short-cut possibility with the bus driver, but he was firm. As we jogged along the road that wound through the hills of Truro, I thought I might stop for a night or two there.

The settlement, I remembered on my down-Cape trip, was thin and scattered and lay about halfway between Wellfleet and Provincetown. I wondered about accommodations. When I casually suggested to the driver that he might let me off in Truro, he tossed me a wise smile and asked, "Where?"

"Oh, anywhere, I guess. In the center of town. Wherever there's a hotel or inn."

"That reminds me of a story I once heard about Truro," he said as he swerved the bus around a sharp curve. "There was a passenger once came along here to see the sights. He wanted to get off in Truro, too. Said he wanted off at the most populated section."

Here the driver chuckled and rubbed his chin in anticipation of the rise he always got from his passengers when he told this story.

The bus was slowing to a crawl, and while I waited for the rest of the story the driver slammed on the brakes and came to a stop.

"And right here's where he got off!" To emphasize his point, he roared and swung his

Though Sawed in Half, the Lady Keeps Her Chin Up

In 1867 a Provincetown whaler, the *A. L. Putnam*, was in the Indian Ocean when the cry "Woman all adrift!" came from aloft. A rescue crew hauled her aboard—a figurehead. Capt. Ben Handy described her as "a colossal full-length presentment of womankind . . . fully eight feet from the placid brow to the underside of the sandaled feet." To save space, he ordered the lady sawed in half. Now the top half decorates Figurehead House in Provincetown. Mrs. Abbie Cook Putnam (at door) is descended from the *A. L. Putnam*'s owner.

arm in the direction of emptiness that stretched away from the road, then added: "The most populated spot in all Truro—the cemetery!"

I declined his offer to let me off at the next most populated spot—the bus stop.

The following day and on another bus I went to Chatham. The driver cautiously picked his way down the byways between fallen trees and on past more hurricane damage. The road threaded its way through several small settlements, past Dennis Port, and past Harwich Port's beautiful little harbor with its small craft now tossed like loose kindling wood along the shore.

Chatham had not escaped the leisurely air that permeated the rest of the Cape, either. I soon found this out when I tried the door of a small antique shop on the main street. It was not too late in the evening nor was it too early in the morning for this shop to be open, but pasted on the door was a note which informed customers that it would be "open sometime—later."

Inside, the proprietor snoozed in his chair beside a comfortably warm and glowing stove.

Several hours later I tiptoed hopefully toward the door again. The sign was still there. So was the proprietor. But the fire had gone out.

A Handmade Driftwood House

The wind was howling along the beach when I visited Good Walter in his handmade driftwood house (page 772). There were Good Walter, Bad Walter, and "Weeked" Walter, I was told, but this well-preserved ageless man, whose eyes constantly searched the horizon while he chatted about "the treasure that lies buried out there in ships just off the bar," was Good Walter.

Anyone in Chatham will tell you about Good Walter, and Good Walter, in turn, can tell you anything about Chatham,

Provincetown's Crier Meets Visitors on the Wharf and Recites Town News

Carrying a bell and dressing in Pilgrim garb, he provides more atmosphere than news. In 1886 a Provincetown crier had a scoop. He solemnly told that he had seen a 300-foot sea serpent, with three red eyes and three green ones, its fiery breath searing the beach plums as it went ashore. He was not excited by "liquor or otherwise," he swore.

but it takes time. He'll also rent you one of his small boats or row you out where you can go clamming or where the fish are "schoolin'." He'll point out the dangerous waters where hundreds of ships have been wrecked in the stormy past.

And if you show a spark of interest, he may even toss in a few good yarns about "moon-cussin'" days when ships were lured to disaster and their cargoes looted by men with well-developed "beach eyes." He will probably explain lengthily how they came by this strange name—how they worked only in the dark of the moon and cussed the bright moon which shone on their dark deeds.

If you are fortunate and arrive in Chatham before the turn of the seasons has caused Aunt Clara to pack her bag and take the train to New York for the winter, you may also run into this delightful representative of Cape Cod.

Aunt Clara, though just past ninety, is as ageless as most of the other Cape oldsters, and she will likely tell you that most of her social life has resolved into letter writing and crocheting. But she also has a hobby. All through the war she wrote to soldiers, mostly Cape boys who wanted bits of news about their home towns. In exchange they filled pages with their observations about Turkey, China, Australia, and other remote areas and rushed them on to Aunt Clara.

I first met Aunt Clara as she was extracting several of these answers from her mailbox. A well-worn path had been made from her door to the mailbox, and the grass on either side was tall and uncut. She smiled apologetically and said that it was amazing how a place could get so "grassed over" while a person merely wrote letters.

When I commented on the beauty of her neat little house and asked her its age, she said she didn't know, but they bought it

"Good Walter" Sits Dreaming of the Day He'll Find Another Golden Treasure

Chatham folk used to pay little attention to his tales of "treasure that lies buried out there." Last year he surprised them. With two other men he uncovered a cache of old coins concealed almost a century ago by "the King of Calf Island," a fugitive from Canadian justice. Key to the trove was a pin-pricked message decoded by a historian. Walter lives in a handmade house of driftwood (page 770).

years ago because it was the only house they could find that had "a little house for the horse."

A house for a horse, I discovered later, was really important. Horses in early days were scarce and transportation scarcer. Sunday-go-to-meetin' folks in many Cape villages either walked or rode horseback to church and shared their rides with neighbors.

"Share the Ride" in Horseback Days

"Tying and riding" was the vogue. The man who owned the horse usually rode in the saddle to the "halfway block" with his wife and possibly an infant perched on the pillion behind him. Here they dismounted, tied the horse, and made the last lap of the journey on foot.

"Share the ride" neighbors, having started earlier and walked the first half, took over from here. Young people were often foot travelers for the entire trip. Careful ones, to save their shoes, frequently tripped along carrying their shoes in their hands until they reached the church, where they again donned them for the services.

Whether Aunt Clara had ever participated in any of these plans, I never found out. But I did find that she had been preserved for posterity by Mrs. Alice Stallknecht Wight, who painted the famous murals that hung in Chatham's Congregational Church for several years. The murals, depicting Christ as a village fisherman, with His followers well represented by Chatham residents, are now on display in Mrs. Wight's studio.

When the artist asked Aunt Clara to pose for one of the murals, she consented, but with reservations.

She said that if she were to stand so close to her Saviour, she most certainly must bow her head. In the finished painting Aunt

On Provincetown's Narrow Main Street a Bus Weaves among Pedestrians and Cars

Progressive citizens once moved to widen Commercial Street to 64 feet; when paving finally was laid, its width was 22. Sidewalks came in over strenuous opposition. "Young folks would do nothing but walk back and forth," standpatters warned. Walks are so narrow that people are crowded off (page 752).

Some Early New England Couples Did Their Courting in Bed, Called It Bundling

Winter was cold and heat inadequate. Young folks, fully clothed, were tucked under covers, a center-board separating them. Like speak-easy proprietors of a later era, parents cut eye-level slots through doors. This door is preserved in the Provincetown home of Mrs. Harriet Adams (left).

Clara, nearest the Saviour, sits with her head bowed in deep reverence.

After paying my respects to the oldest house in town, the lighthouse, and the spot "where one can look straight across the Atlantic to Spain"—and, I might add, see nothing but water—I started back towards Hyannis.

A short distance out of Chatham there is a small settlement which, unlike other Cape villages, lays no claim to historical importance. Mackerel schooners and scallop fishermen once dropped anchor in its waters, and saltworks and flake yards speckled its shores.

This is South Chatham, a village which has the courage to speak of its present-day comfortable life "with plenty of electricity, fresh eggs, and fresh fish, but *no* landmarks or monuments to famous explorers or Pilgrim footprints."

The weather had settled down to a real November blow when I arrived in Falmouth. The village green, where "thirty good, able-bodied, effective men" trained during the Revolution to turn back the fire of the British who threatened to burn the town, shivered in the rain. The homes of the old skippers and whalers, and even the church which boasts of having a genuine Paul Revere bell in its tower, looked grim and bleak.

It was not a pleasant day for delving into the past or looking at the present. It was just the day, I decided, to leave the Cape, to take "that ancient crossing from the 'Cape to the Continent' used by white men for all the early years and by the Indians for a thousand years before." *

* For additional articles of general interest on Massachusetts in the National Geographic Magazine, see: "Nantucket—Little Gray Lady," by William H. Nicholas, April, 1944; "Long River of New England (the Connecticut)," by Albert W. Atwood, April, 1943; "Massachusetts and Its Position in the Life of the Nation," by Calvin Coolidge, April, 1925; "Massachusetts—Beehive of Business," by William Joseph Showalter, March, 1920; and "Boston Through Midwest Eyes," by Frederick Simpich, July, 1936.

The Worm Turns

By Samuel Sandrof

With Illustrations from Photographs by Ivan Flye

ON A SANDY beach of Long Island, New York, a fisherman added a fine sea bass to his catch.

"That's sure a beauty!" shouted an envious bystander above the rolling surf.

The angler became voluble. "Yeah, not bad. It's the bait. Them fish just love it."

He picked a giant-sized worm from the juicy collection in the bait bucket and neatly threaded it onto his hook. "Cost me 60 cents a dozen, and wuth a sight more. Come down all the way from a little place called Wiscasset, Maine."

Because this bait has been so successful in luring millions of wary game fish, an unusual industry has boomed to prominence in recent years, and the tidewater flats of Maine these days are dotted with mud-splattered figures raking feverishly into the soft, wet earth.

More than 12½ million worms have been picked by the diggers of Maine in a single year. A strange crop to harvest; yet this lowly creature has produced a year's cash return of more than a quarter of a million dollars and is a source of employment to hundreds of diggers, distributors, and dealers. The Maine worm has established such a reputation that the demand far exceeds the available supply.

Lair of the Maine Worm Digger

The lair of the Maine worm digger lies centered chiefly in picturesque and peaceful Wiscasset, distinguished for its venerable, undisturbed harbor and industrious citizens.*

Settled in 1734, the town is situated on the Sheepscot River about sixteen miles from its entrance to the sea. The harbor afforded a safe natural anchorage for sailing vessels of old when storms forced their captains to seek refuge. Today many of the colonial homes they built are a mecca for the artists and other visitors who flock to Wiscasset every summer.

On the shores of Long Island, before 1932, limited quantities of the worms were found. There was no abundance, however, and landowners objected to digging up their beaches; so ever-searching dealers explored farther north to Fairfield, Connecticut, and Boston, Massachusetts, finding meager quantities.

The big strike in and around Wiscasset came in 1933. Perhaps the worms preferred the climate of Maine, as many humans do in summer, or maybe too much digging and failure to initiate conservation measures depleted the supply in other localities.

These giants of their species are of two principal types: the bloodworm (*Glycera americana*) and the sandworm (*Nereis*, or *Neanthes, virens*). The former also is called the proboscis worm because its front end is extended or retracted at will and acts as a burrowing organ.

Glycera's mouth is armed with four tiny, black, curved "teeth," actually jaws, which may fasten onto a finger, creating the sensation of a bee sting and producing a painful swelling in persons allergic to the bite (pp. 781, 785).

Bloodworms range from pink to red and have short finlike appendages along the sides, with firm, round, barely visible segments under the smooth skin. They are found in the surface layer of soft mud, in burrows lined with their own mucous secretion.

Although in some cases the bloodworm has reached a phenomenal length of more than three feet, the average is from six to eight inches. Abnormal worms are sometimes found, and one freak had two tails (page 784).

Sandworm Favored for Vivid Color

The sandworm is the more sought after for use as bait, because of its unusual size and lustrous coloring. It has a flat appearance, with obvious segments, of which a mature worm will have about two hundred, and their protruding, fleshy appendages are used for propulsion (page 779).

The proboscis, which is partly withdrawn inside the body, has teeth that are saw-shaped pincers for feeding. In rare instances sandworms have exceeded four feet in length, but normal size runs from 10 to 18 inches.

The brilliant colors of the worm are actually due to blood vessels seen through its steel-blue and green skin. Coloring varies with the locality, ranging from vivid orange red to cloudy black. Worms of the latter color are poor bait and valueless on the market.

The sandworm's iridescence and dazzling appearance are the secret of its attraction for fish. While an ordinary garden angleworm will turn white in salt water, both bloodworm and sandworm remain colorful and lively in their natural element, the ocean.

The sex life of the sandworm is simple. Cells are separated from the segments of the female, and coincidentally the male worm, which has been attracted, discharges its sperm.

* See "Maine, the Outpost State," by George Otis Smith, National Geographic Magazine, May, 1935.

A Shipper Gathers Rockweed for Packing Bait

This man's problem is to keep bloodworms and sandworms alive in transit. His preservative, unlike the soil preferred by earthworms, is a moist weed found in salt marshes (p. 785). Sometimes kelp, which diggers call "lettuce," is used.

The female worms die after shedding their sex cells.

Fertilized, the eggs develop into larvae (trochophores) bearing rows of hair (cilia) by which they propel themselves.

The reproduction process takes place in early spring, a conclusion supported by the visual evidence of veteran diggers who have observed hundreds of dead green worms floating on the surface of the mud flats.

During the spawning season the worms become soft and are easily broken.

The spawner is readily identified by a pasty green over-all hue and by its insides flowing to one end when held up. Worms in this condition cannot be sold or shipped for bait, since, if mixed with healthy worms, a broken spawner's fluid will kill off the rest.

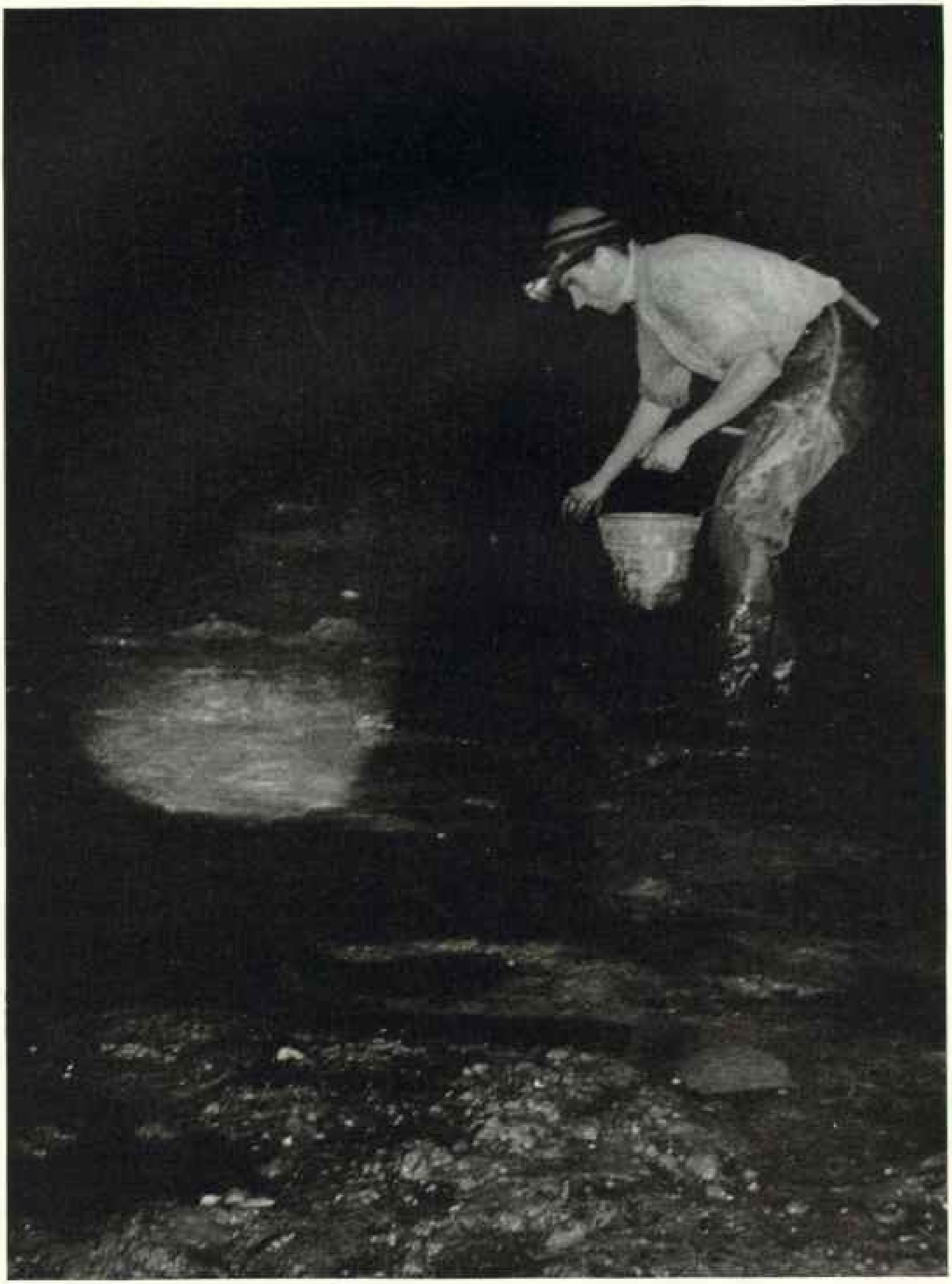
The sandworm is a voracious breed that feeds mostly on other worms and crustacea, seizing its prey with jaw and teeth. Much care must be exercised to avoid mixing bloodworms and sandworms together, else the sandworms will destroy all the bloodworms. It was no accident that Nature placed the natural habitat of the bloodworm near the surface of the flats, while the sandworm lives farther below.

Digging worms demands a physique and endurance capable of standing the long, irregular hours and continual strain of bend-rake-pick, bend-rake-pick. As one veteran native put it: "To be a good worm digger, two things are required —a strong back and a weak mind!"

The bloodworms are easier picking, because of their nearness to the surface. One man is able to uncover about 600 square feet of top-layer mud surface each tide. Digging for sandworms, deeper in the mud, is slower work. During a tide a single digger can unearth an area of about 150 to 300 square feet. After the top layer of mud is removed he must dig down at least 12 inches into the clay before any quantity is found. Test digging is used to discover the richest finds.

Picking Good on "Charcoal Nights"

The nocturnal habits of the sandworm are peculiar. It appears on the surface of the flats only on dark, damp nights. A waning moon, or even the sporadic flashes of northern lights, will keep it below. An abnormal sensitivity is apparent. With the mere vibration of footsteps or the approach of a hand, the quarry is gone like a flash.



Guided by His Head Lamp, a "Sniper" Stalks Sandworms on a Maine Tidal Flat

A night picker is called a sniper because he must be so stealthy. He walks in a crouch, poised for pouncing. His free hand must be quick, for the elusive worm, sensitive to thud of boots and glimmer of light, recoils into its burrow on a second's warning. An unusually good night's work may net 1,000 worms (page 778).

"There's Money in Mud," Says a Spattered Hunter, Digging Deep for Sandworms

A single ebb tide may bring him $7 from the flats. If a good digger, he averages some $1,600 a season. In the last ten years Maine diggers have taken an average of 85½ million worms a year.

On the dark "charcoal nights" when the sandworm rises to the surface, returns are high for the night worm digger, called a "sniper." He finds this exciting work but exhausting, for he must walk in a crouch ready to grab the elusive worm with split-second timing.

A good sniper will sometimes garner a thousand worms in one night. The night pickers use a head flashlight similar to that which miners wear (page 777).

Equipment used in daylight digging includes a pair of boots, a rake, and a pail or box (the diggers prefer old dynamite boxes), while some add a boat and an outboard motor (page 780). Diggers pool their cars for travel to and from the flats.

The season really starts about the first of April and continues through the year. But August, when worms burrow deeper into the mud to keep cool, is a poor time for digging.

Tides and weather also affect the work. There is a variation of more than four feet in the height of Maine tides, and the so-called moon tides, or very low tides, are preferred, since a much larger digging area is exposed. When it rains, the diggers stay home; they don't like to dig in the rain.

Digger Trapped by Tricky Fog

The tricky fog that rolls in sometimes snares the unwary who dig at dusk. This happened to Lester Paine, one of the oldest hands at the game. Straightening up from his arduous digging, he suddenly noticed that the fog had come up; everything looked unfamiliar.

Lest he walk farther away from shore, he climbed a near-by rock which the incoming tide soon nearly covered, and there he spent the night. At dawn a lobsterman out to collect his pots rescued Lester. "Lester's Rock" it has been called ever since. When the seals that frequent the section bark, diggers say it is Lester calling for help. Incidentally, most diggers out at night carry a compass.

Walking on the flats, slogging along, is tiring—worse than plodding through deep snow,

Sandworms, Seemingly Slothful Prey of Fish, Are Ferocious Hunters

By day the creature hides in its double-exit burrow in the mud; there the flatfish and horseshoe crab know how to dig it out. By night it does its own hunting. A fast, graceful swimmer, the sandworm is armed with powerful horny jaws set back in its throat. It overpowers any other worm its own size. Sandworms usually grow to a length of 10 to 18 inches, although rare specimens have been reported more than four feet long. In the breeding season, males swarm the waters. For the rest of the year they are seen no more.

as one novice discovered. First time out, he found himself standing still, boots stuck firmly, and had to climb out, dig them up, and start all over again.

The knack is mainly in twisting the heel sideways at each step, a way of walking that gives the perennial digger a peculiar gait, marking him on his visits to town as one who works the flats.

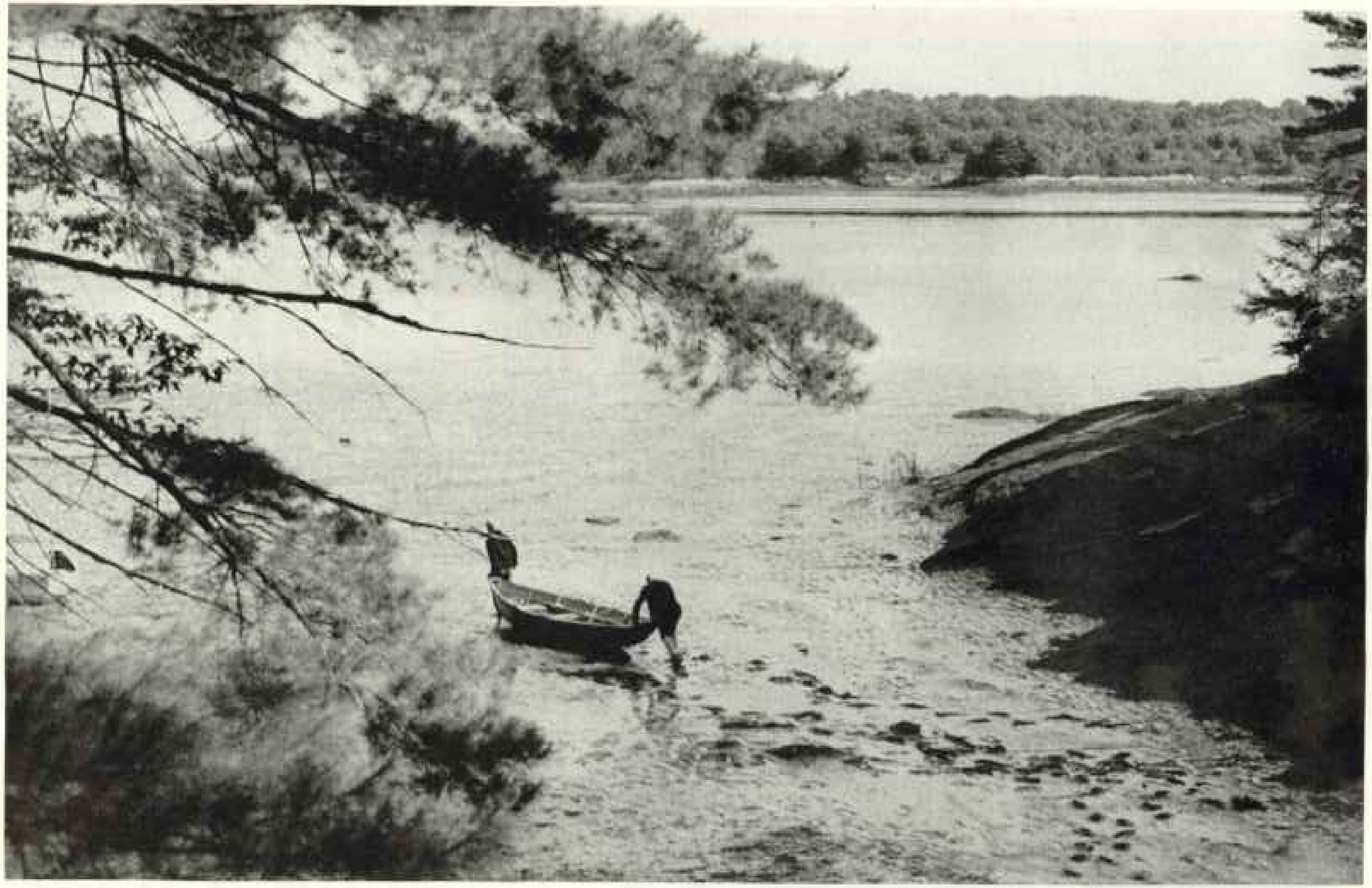
When a down-Easter gets to doing something unusual and different, he is so much an individual that he invents his own expressions to go along with it. So the diggers refer to their bonanza as "bugging" and to themselves as "buggers." The stealthy technique cultivated by the night picker is vividly expressed by calling him a "sniper."

The gulls that hover around to snatch a worm the diggers pass by are termed "digger's chickens." Worms that die in transit are known as "mush" or "soup." The Railway Express agent at Wiscasset is "Zeke" (page 786), and if Zeke lets the packaged worms sit out in the heat of the noonday sun too long, they say he "sunned 'em."

"Snakes" are extra-large choice worms. The tide is, capriciously enough, always feminine to these folk and called "she." "Scratching" is digging as fast as possible.

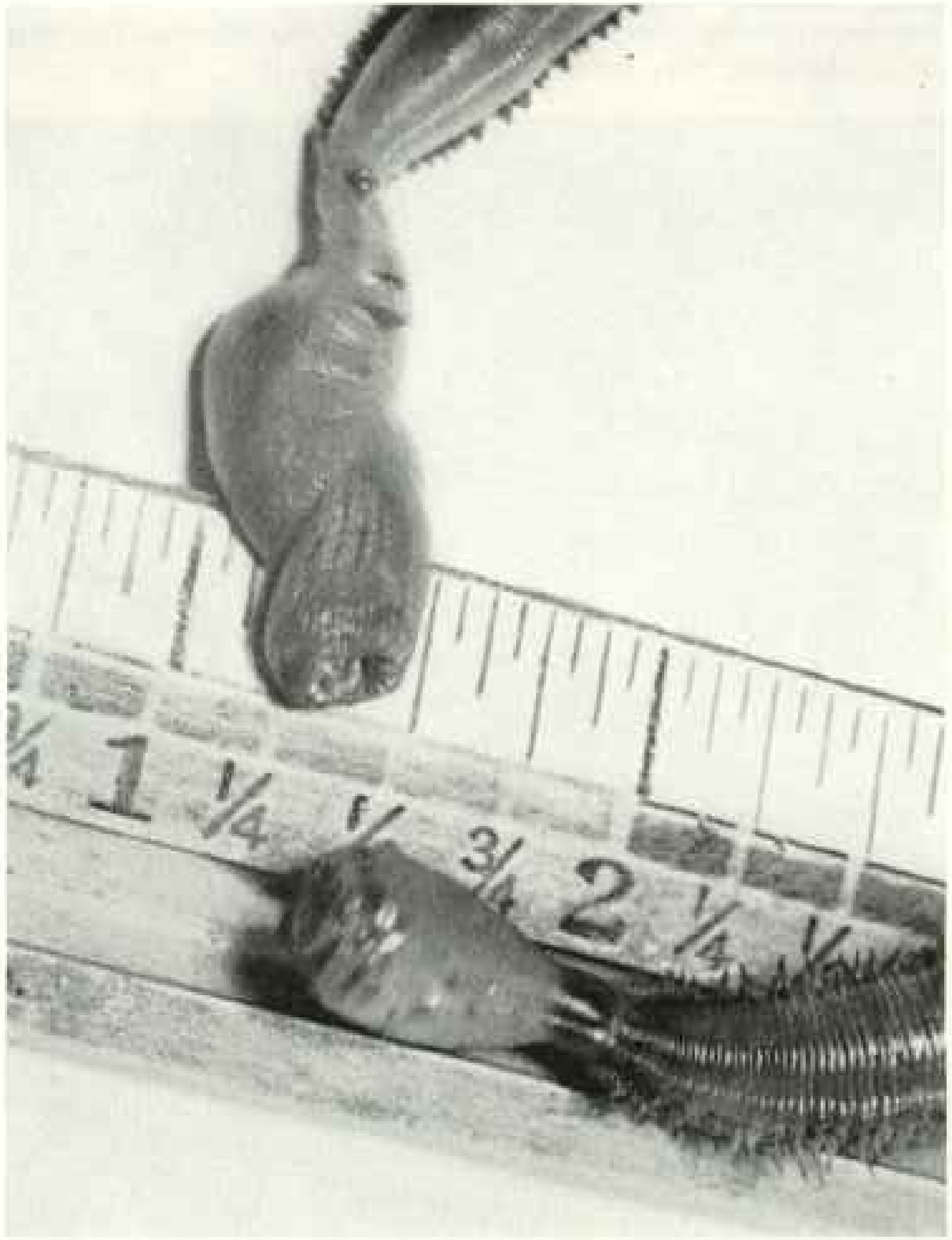
"There's money in the mud," they say in Wiscasset, and the saying is literally true. It is not unusual to find an entire family, including women and children, digging alongside the man.

After a hard day's work the digger's expressionless face may relax for an instant as he runs his hand through a bucketful of choice worms, revealing the pride and satisfaction of a man of Maine in his work, thoroughly and well done.



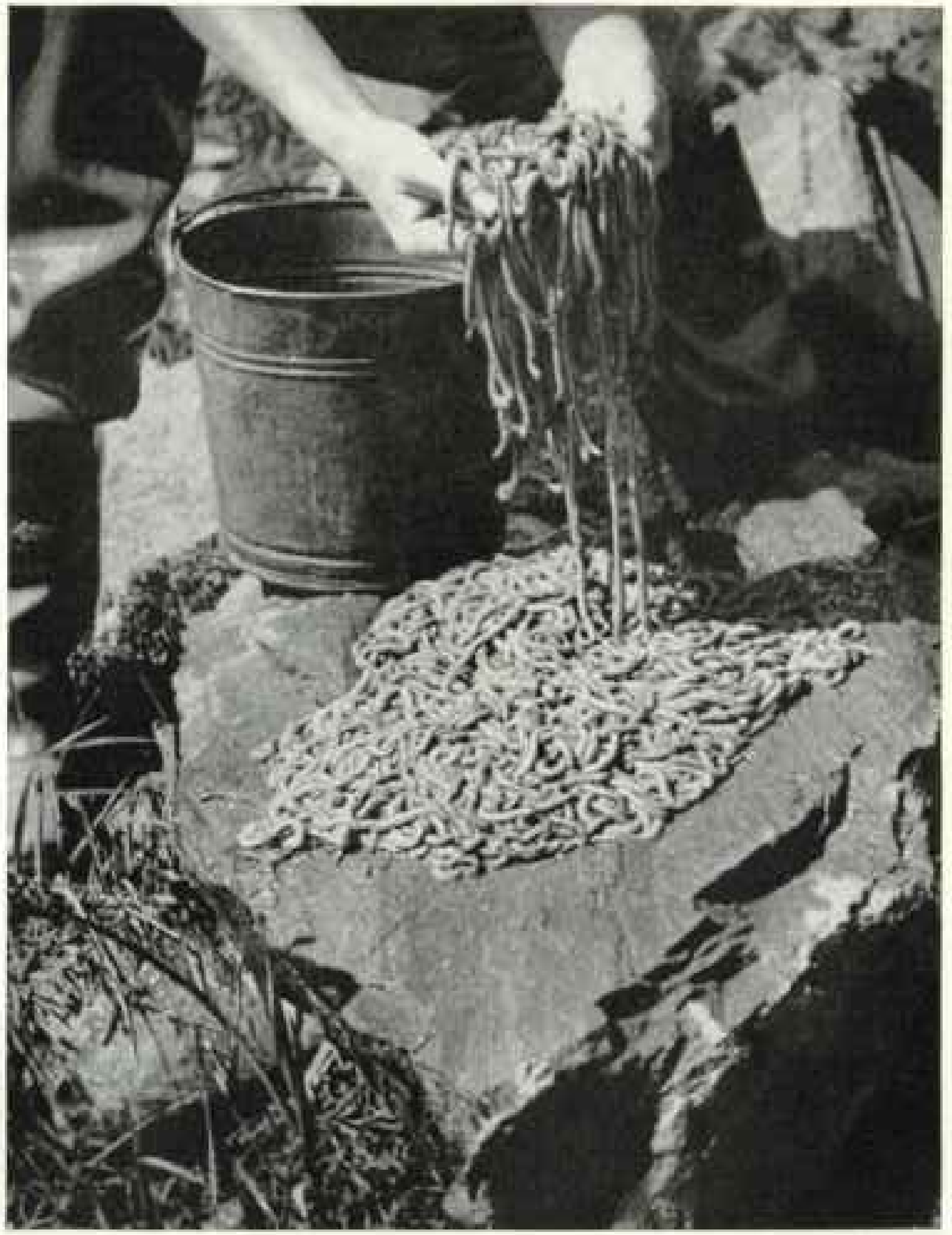
Weary Boatmen Battle Mud to Meet Fishermen's Demand for More Worms

Worm-hunting in Long Island, Connecticut, and Massachusetts yielded bait only in insufficient quantities. Maine made the big strike in 1933 (page 775). Now the search is being widened again. These men are going out to look at an island off the coast.



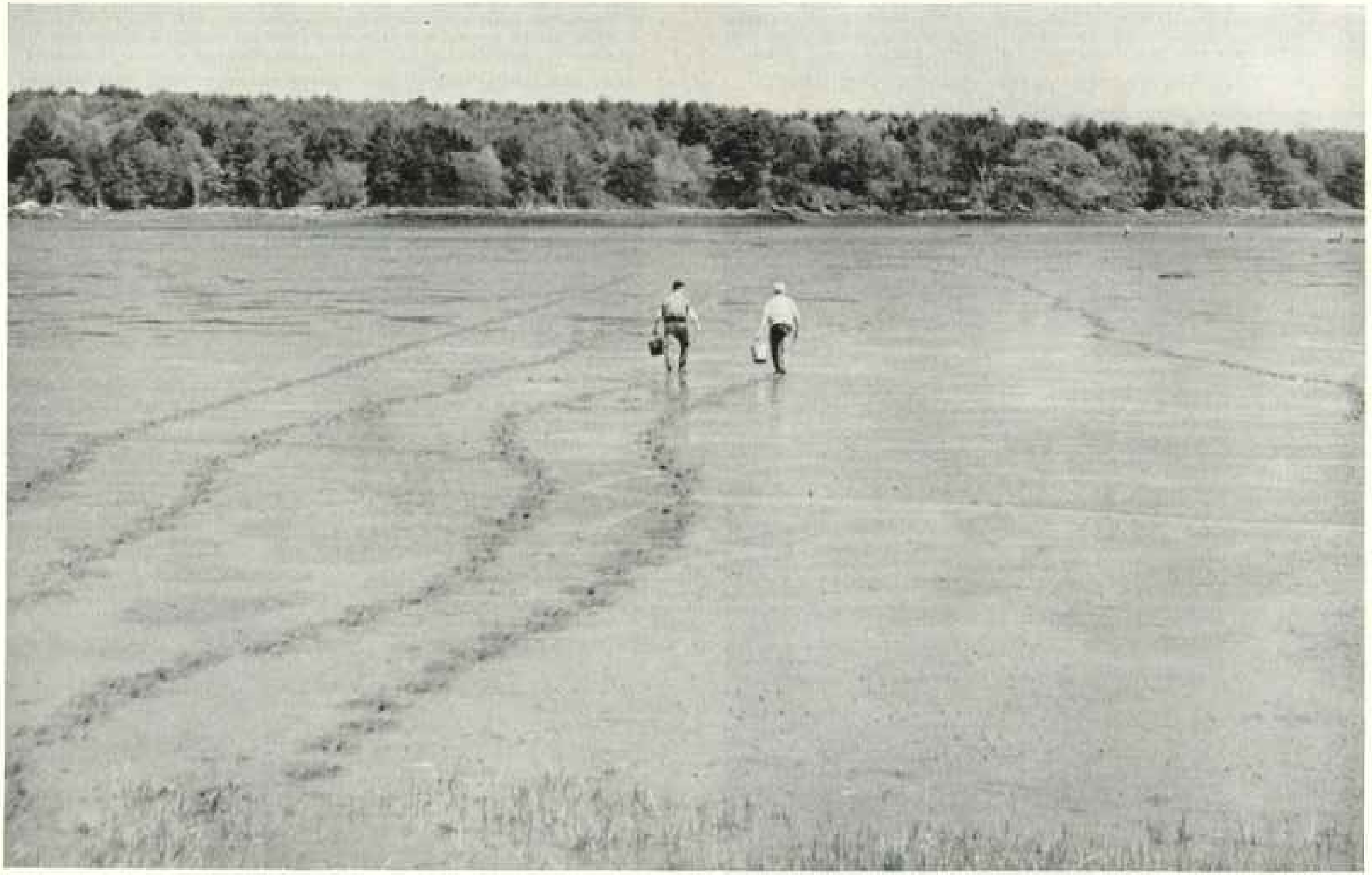
Bloodworms Have Distinct Heads with Brains, Eyes, and Jaws

Four-jawed worm is perhaps a better name, since there are other bloodworms, including marine worms of the genus *Polycirrus* and the red aquatic larvae of certain flies. "Four jaws," if disturbed, turns its proboscis inside out, displaying black jaws. When these nip a fisherman's finger, he knows the worm can turn!



Little Girls Say "Horrors!" Big Fish Say "Delicious"

Marine worms are an accepted bait in salt water, their natural element, because they retain their iridescent colors. Anglers say there are times when fish do not seem to take anything else. One good-sized worm may cover the curves of six ordinary hooks. These 500 bloodworms have been cleaned for shipment.



As if a Herd of Monsters Had Struggled to a Watering Hole, Worm Diggers Leave Trails Ankle Deep

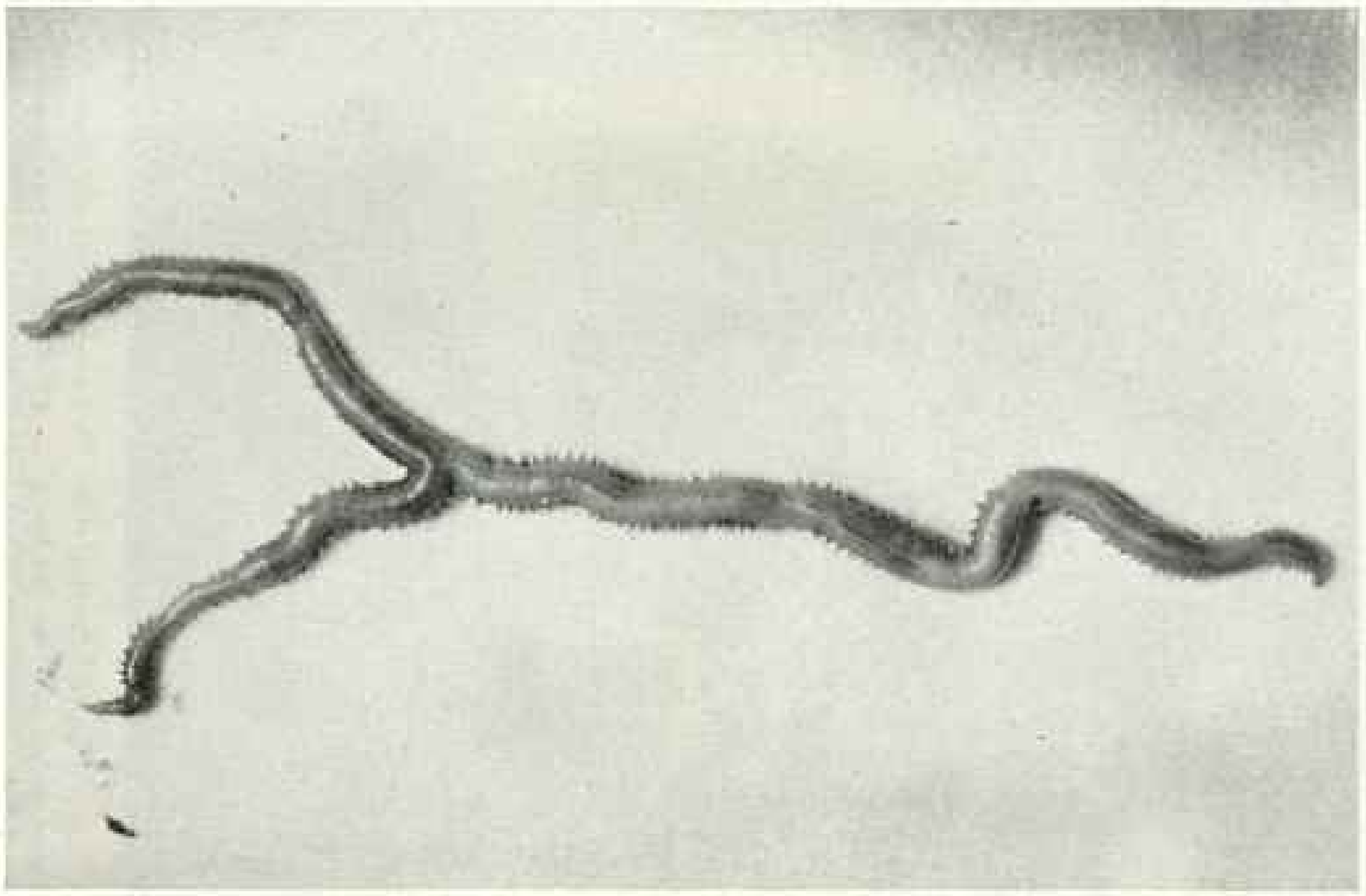
High tide, protecting their quarry, will erase these men's footprints from the flats of Brooking Bay, Woolwich, Maine. Pail, fork, and hip boots are the tools of their trade. "Bugging," they call it. Sometimes their entire families join in mining the mud for live oré (page 779).

A Wiscasset Buyer Tests Diggers' Wares for Size

Quiet old Wiscasset is noted for its mansions built by shipping merchants and for the artists attracted by its charm. Today Nature's strange bounty has made this Maine town a capital of the marine-worm industry. Its tidal flats crawl with fish food (page 775).

A Long Island Dealer Examines His Live Bait

Kept at icebox temperatures of 38° to 40° F., bloodworms survive ten days to two weeks. Mortality is highest when fishermen take them out on hot days. Retailers get 60 to 75 cents a dozen. One Washington, D. C., dealer sold half a million marine worms in 1945.



Fish Should Love This Double Helping—a Bloodworm with Two Tails

A rare discovery, the specimen was taken near the mouth of the Sheepscot River, Wiscasset (page 775).

For Walking in Gluey Mud, Boots Are Clamped On

Each tiresome step across the flats chafes the heel. When withdrawing his foot from the muck, the veteran digger twists his heel—a peculiar gait that becomes the habit of a few even in town (page 779). Bands cut from an old inner tube solve this man's problem.

Bloodworms Breathe with Gill Feet and Swim with the Bristly Paddles on Their Sides

Glycera americana is one of the annelids, or segmented worms, which include the earthworm and leech. Each segment is one of many similar units. Like various other worms, this creature is capable of regenerating lost parts. *Glycera's* parapods (side feet) bear swimming bristles lacking in the earthworm. Male and female are separate, whereas the land worm contains both sexes in its body. Both worms are alike in providing tasty morsels for fish (pages 775 and 781).

These traits, added to the natural abundance of the worms and their widespread popularity as bait, explain why worm digging has become so successful an enterprise.

Diggers' Tales in the Night

There are storytelling sessions around the cracker barrel next the stove in the general store, where the buggers may gather of a cold October night. Charley Knapp unfailingly repeats his tale of meeting, while on a midnight sniping session, a neatly ordered formation of hundreds of sandworms crawling along the beach. Since Charley is a veteran digger, his confreres soberly nod, accepting his story as gospel truth.

Then there is the tale of bloodworms and sandworms locked in conflict to the death. This is a story of some truth, for the worms often attack one another. The talk wanders from tales to gossip of the tides and into tricks of the trade.

Strange is the story of one colorful character of the flats who nipped on a bottle too long one night and roasted a sandworm over a fire, then ate it with evident relish. Smacking his lips, he remarked to his cronies, "'Tain't bad; tastes jest like fish."

A good digger's earnings will average about $1,600 a season, although an unusual year may bring much more. A single tide often yields him 350 worms, valued now at $7. The pay is by the hundred worms, paid him by the shipper.

The latter's responsibility includes the proper sorting, packing, and expressing of the worms to the wholesaler whose order he is filling, whether to New York City or Norfolk, Virginia. Rockweed is vital to keeping the worms energetic and alive; so his big problem

"Zeke," Railway Express Agent at Wiscasset, Loads Boxes of Worms

A retailer who tried air express during the hot months saved enough worms to pay the increased freight cost. Worms dying in transit are called "mush" by the diggers, who coin their own slang (page 779).

is combing the rocks on the coast for enough of the weed to keep in business (page 776).

This money-bearing crop brings a cash return to digger, shipper, wholesaler, and finally to the dealer who sells the worms across the counter along with fishing equipment and supplies (page 783). The fisherman pays up to 60 or 75 cents a dozen for them.

Unfortunately, since the worms from Maine will not live long away from the cool sea and mud that is their home, a few days of rail travel time limit their distribution and sale. Refrigeration for shipping has proved awkward, expensive, and impractical, although at the worms' final destination dealers and wholesalers keep them for long periods in cold compartments. Sometimes, in hot weather, these aristocrats of worms ride the airways.

The wise diggers of Maine are not killing their golden goose. They practice conservation by throwing back undersized worms and refraining from overdigging areas.

A roar of laughter went up on the floor of the Maine Legislature, convened at Augusta, in 1937. The resolution being introduced solemnly declared that no person should dig or take bloodworms and sandworms unless granted a license, a condition for such license being residence in the State for at least five years.

The amused lawmakers finally quieted down and unanimously voted the measure, which today provides residence as a prerequisite to digging worms.

Bizarre and amusing though worm digging on a mass-production basis may seem, to the folk of Maine who bend their backs in the mud it is a work of pride—and profit. They do not scoff at the menial appearance of their vocation and are not averse to the dirt and mud which are their constant companions.

As for the worm, don't despise the lowly creature next time you meet him. He has come of age. His slimy exterior may be unpleasant to the touch, but he has a heart of gold. Ask the men of Maine!

Pirate-Fighters of the South China Sea

By Robert Cardwell

With Illustrations from Photographs by the Author

ONE of the world's last strongholds of piracy is the coast of southern China, where in self-defense the owners of fishing and trading junks have assembled some of the strangest collections of weapons to be seen outside of a museum (pages 789-796).

During the war many auxiliary-engined pirate junks acquired Japanese guns and armor, and the ancient practice of piracy boomed. The British have found it especially rife in the Hong Kong area and are making determined efforts to stamp it out with the aid of aircraft and fast patrol boats.

With the Chinese Government developing a modern navy, the day of the pirate may be numbered along the whole coast. If so, it may mean the eventual passing of the picturesque armed merchant or fishing junk carrying, for self-protection, anything that will shoot.

To study and photograph these craft and their weird armament, I boarded many of them while living in China in the years just before the war, examining the weapons in detail and questioning the crews.

Pattern for Piracy, Chinese Style

The pattern of piracy in these waters had been established for many years, and British-owned ships were occasionally victims.

If the quarry was strong, perhaps a good-sized steamship, the freebooters used "fifth-column" methods. After getting all necessary information, sometimes with the aid of a preliminary reconnoitering trip on the vessel chosen as victim, the pirates eventually came aboard in odd numbers at various ports in the guise of peaceful unacquainted travelers. Revolvers and automatic pistols were smuggled aboard by devious and clever means.

During the voyage, at a prearranged signal, they suddenly joined forces, rushed the bridge, wireless cabin, and engine room, and quickly gained command of the ship at pistol point.

So sudden and unexpected was the attack that it was usually impossible for the foreign officers and Chinese crew to put up a stand. Nevertheless, this has happened on occasion, and the ensuing fights have sometimes proved as bitter and exciting as any sea struggle on the old Spanish Main.

If the coup was successful, the ship was steered to one of the pirate bases, such as Bias Bay on the mainland of China, some 40 miles from the British colony of Hong Kong. Here her cargo was discharged into waiting junks and sampans, and after her well-to-do Chinese passengers had been taken off to be held for ransom, the ship with her crew was allowed to proceed.

Modern Mausers and Antique Cannon

Much more subject to pirate attacks than steamers were the hundreds, even thousands, of fishing and cargo-carrying junks. The curious combinations of ancient and modern weapons which many of these craft adopted might include efficient Mauser pistols, usually kept out of sight below, and a goodly showing of antique muzzle-loading cannon mounted on deck for all to see (pages 791 and 792).

Even the most decrepit, down-and-out-looking junk often carried several of these ancient muzzle-loading cannon of our great-grandfather's day. Although some of the guns were of Chinese manufacture, many of them—to judge by their markings—were survivals of the armaments of long bygone and now almost forgotten warships. Among them I have seen guns of British make marked with a crown and dated 1812, and another, of undoubted French origin, dated 1798.

The wily and resourceful Chinese, however, had greatly improved on the unwieldy type of mounting used in the old days by placing their guns on pivoted wooden turntables clamped to the decks. The recoil was taken up by a strong steel helical spring.

Since the turntable permitted these muzzle-loading guns to be rotated inboard, their charging was done much more rapidly than if they had had to be run backward and forward, in and out of their ports, by means of the old block and tackle.

Furthermore, in the old wooden warship days, the guns had to be slued into position by levering the heavy carriage around with crowbars until the gun bore on its target—an indeed laborious business. The simple turntable did away with all this.

Load Might Include Bolts, Nuts, Nails

Coarse native powder was used, and after the required quantity had been pushed down the barrel, a wad of any old newspaper at hand—Chinese, English, or American—followed it. To compress the powder and so secure its maximum force, the whole was then tamped down tight with a wooden rammer.

The subsequent load consisted of either a round iron cannon ball, any size so long as it could be pushed down the barrel, or little sausage-shaped bags of sackcloth or basketwork containing a heterogeneous assortment of bolts, nuts, nails, knobs, and any odd chunks of iron, picked up heaven knows where. At the proper moment all this was let fly by igniting the powder in the touchhole (pages 793 and 795).

This type of old-fashioned smoothbore cannon was by far the most common on the junks I visited, but on occasion I noticed others of entirely different model. One, for instance, was a rifled breech-loading gun bearing as recent a date as 1875 and apparently of Austrian or German origin.

Even more curious was one which might be called a breech-loading culverin. This weapon was some eight feet long with a bore of but an inch or two. Its outstanding feature was the removable breechblock, which, except for its solid base, was hollowed out to take the charge of powder, newspaper wad, and half a dozen lead balls the size of marbles.

When the gun was fired, the breechblock containing the charge was ingeniously kept in place by a wedge-shaped iron pin which was hammered into transverse slots cut in its solid base and in the body of the gun itself.

Fired by Modern Percussion Cap

The breechblock was provided with a perforated nipple over which was pushed a present-day percussion cap, and the weapon was fired by giving this cap a sharp blow with a second wedge-shaped piece of iron (p. 792).

Four such guns were mounted on this particular junk, and since each was supplied with several of these detachable breechblocks, fitted with iron handles for quick manipulation, a relatively rapid rate of fire could be maintained. While one breechblock was being fired, the others were being recharged.

The effective range of these guns was said by the crew to be a hundred yards or so; and I was told that they had proved their worth some ten years before, when a determined but unsuccessful attempt had been made to pirate the junk.

Apart from its modern form of ignition by means of a percussion cap, the principle employed in this type of weapon is very old, for the same method was used as far back as the first half of the 16th century. Doughty Henry VIII of England used a breech-loading arquebus of almost the same design when shooting the royal deer.

In addition to these old-fashioned guns, I sometimes came across specimens of one of the earliest and crudest forms of firearm. This was a kind of Roman candle composed of a mixture of tow, wax, gunpowder, and other evil-smelling ingredients pressed in alternate layers into a length of hollow bamboo wrapped with rattan to give it strength.

"Roman Candles" Used as Incendiaries

The contents of the tube were ignited at its mouth, and the tube was then aimed at the attacking craft with the object of setting it on fire or driving the helmsman from his post by means of the cataract of sputtering fire and burning wads of tow. How effective this was I do not know, but the fact remains that some junks at least carried a supply of these incendiary tubes (page 794).

For escorting the weaker craft in pirate-infested waters, special convoying junks were sometimes engaged. They were constructed of heavy timbers and their wooden decks were exceptionally thick, partly as protection and partly to support the great weight of the numerous cannon.

Some fighting junks carried as many as twenty large muzzle-loading cannon ranged on either side of their flush decks, protected by large sheets of steel plating.

To lessen the chances of treachery and to ensure greater loyalty, some of these fighting junks were crewed almost entirely by blood relations. Entire families lived on board, and this was also usually the case with the more humble fishing junks.

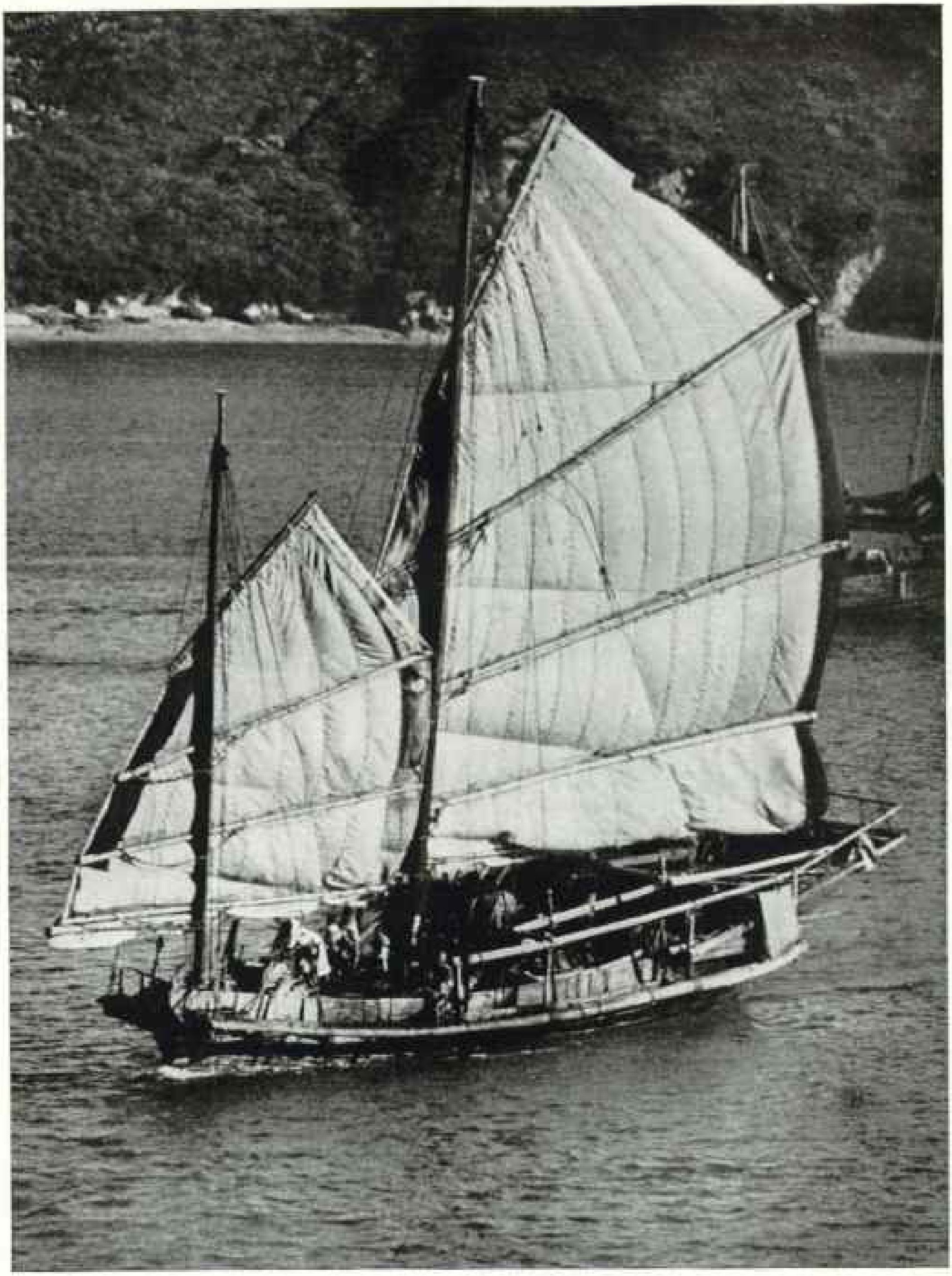
As a safety measure, the younger children were sometimes tied to a stanchion by a length of cord or perhaps had a buoy of pith or a gourd attached to their backs to keep them afloat should they fall overboard (p. 796).

When I asked what happened to the youngsters during a fight, I was assured that the children soon got over their preliminary fright and reappeared on deck to lend a hand. I do not doubt it, for in the main the seafaring Chinese are a fine, sturdy, self-reliant folk.

Many persons regard the junk with contempt as being lubberly and unwieldy. Some even employ the word itself as a term of scorn and derision. In actual fact, junks are both handy and seaworthy, with a rugged beauty of their own (pages 789 and 790).

At false dawn as they pass by with a melodious creaking of spars and cordage like so many ghostlike wraiths of the sea, the watcher will surely realize the truth and beauty of H. Warington Smyth's lines:

> The hum of bow clean-cutting,
> The song of shroud and stay;
> The creak of spar and halyard,
> The drumming of the spray.



Beating to Windward, a Tall Junk Braves Pirate-infested Waters of South China

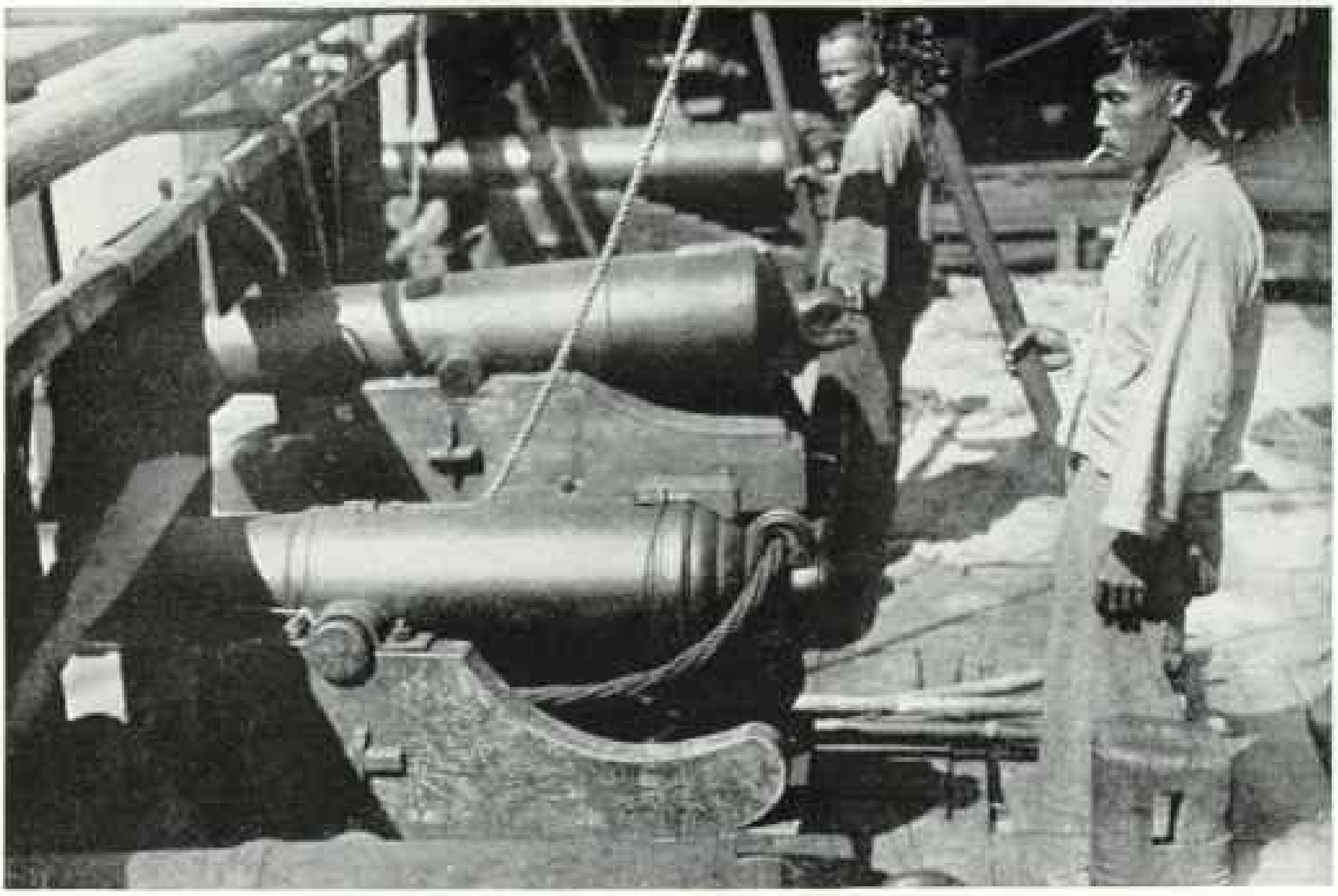
Keeping a sharp lookout, the crew stands ready to defend the high-pooped merchant vessel against marauders. From bases such as Bias Bay, some 40 miles northeast of British-owned Hong Kong, ruthless Chinese sea rovers have long preyed on cargo and fishing junks. Even steamers have been captured on occasion. So extensive was the prewar pirate "industry" that foreigners humorously termed it "Bias Bay, Ltd." Japanese guns and armor, acquired during the war, have made the pirates more deadly than ever. This ship carries only a small defensive armament; others bristle with cannon like frigates of Nelson's day.

With Spars Creaking and Cordage Singing in the Breeze, Big Junks Skim Gracefully to an Anchorage

Far from being lubberly and awkward, these vessels are amazingly handy and seaworthy. A joy to the lover of sailing craft is the sight of dozens of junks crowded together in a stiff breeze, beating out of a narrow river mouth or working up a restricted channel. Some sail on one tack and some on another, crossing and recrossing each other's course with perfect precision and style, yet with never a shout or warning hail. Their lugsails, often made of matting, are strengthened by long battens or booms.

Shades of Captain Kidd!—Modern Mauser Pistols Team Up with Antique Cannon to Protect This Junk from Pirates

Crouching behind steel plates on the lofty poop, the sailors man an old-fashioned muzzle-loading piece (right) and a crude breechloader (left) which resembles a culverin (pages 788 and 792). Aboard such vessels the photographer discovered French ordnance dated 1798, British cannon cast in 1812, and guns of imperial Chinese manufacture. Even the humblest junks were often armed with battered relics that once thundered broadsides aboard proud men-of-war.



"Man the Guns!"

Unsoldierly but surprisingly efficient were these unkempt gunners, standing nonchalantly with their swabs on the untidy deck of a fighting junk. Heavily armed vessels like this hired out as convoys for merchantmen. To guard against treachery, members of the crew were almost always chosen from blood relations.

To Fire This Contraption, the Gunner Hits a Percussion Cap by Hand

Fixed to a perforated nipple, the cap ignites powder in the hollow breechblock, and half a dozen lead balls are discharged through the eight-foot barrel. An iron wedge holds the breechblock in place. This pirate-killer has an effective range of about 100 yards.

Ready to Fire

The cannoneer applies a lighted stick to the touchhole, while his mate stands by to swab out the gun. At the base are several projectiles; size and shape do not matter, providing they can be crammed into the barrel. Steel plates protect the stern of this large trading junk, which would be a valuable prize for pirates.

Long John Silver Himself Would Probably Hold No Terrors for These Boys

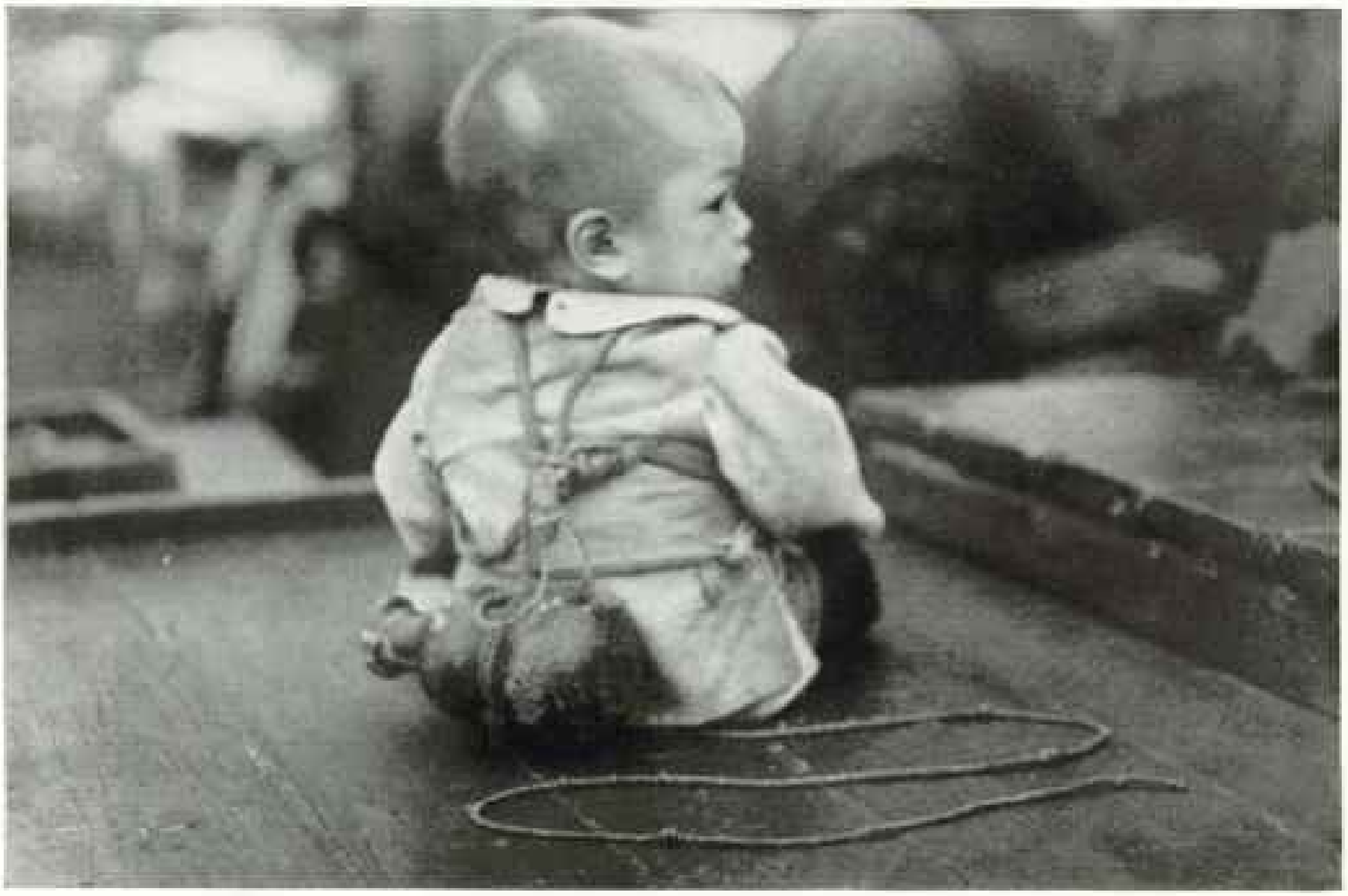
Pirates are all in the day's work aboard their floating home. During an engagement these children of the crew helped load guns and carry water. Here, beside a cannon, they play mah-jongg with a young visitor wearing a sun helmet. Entire families often live on the ships.

With Huge "Roman Candles," a Cargo Junk's Crew Pours Fire on Attacking Pirate Craft

Gunpowder and wax-covered tow are packed in alternating layers inside the bamboo tubes, which are reinforced with bands of rattan. When the "fireworks" are ignited at the mouth of the tube, a torrent of blazing tow is spewed upon the enemy junk, setting it afire or driving the helmsman from his post. The pirates themselves are well armed, some with machine guns. Capturing a rich vessel, they loot it on the spot or take it to their lair, unload the cargo, and hold the wealthy for ransom.

This Elderly Cannoneer Loads His Smoothbore with Sausage-shaped Bags of Scrap Iron

Doorknobs, nails, nuts, bolts, and other assorted chunks of metal are stuffed into the cloth or basketwork containers. The charge of coarse native powder is sometimes packed in discarded stocking legs. Newspapers form the wad. To aim his gun, the old sailor with the fan rotates the turntable mount and elevates or lowers the piece by adjusting the wooden wedge under the breech. Some junks, particularly the pirate vessels, carry rifled guns of much more recent vintage.



If Chinese Pirates Made Victims Walk the Plank, This Tot Would Be Prepared

The wooden float tied to his back serves as a life preserver in case he breaks the tether and falls overboard. This youngster will probably spend most of his life at sea.

A Trading Junk's "Nursery" Is on Deck Beside a Cannon

These mothers and children sometimes faced buccaneers as savage as those that sailed the Spanish Main. Post-war pirate junks are powered and heavily armed, with armor plate beneath their innocent-seeming sides.

Sunset in the East

By Blair A. Walliser *

THE thin gray dust that lies over Japan today like powder in the sun is more than the dust of Hiroshima and Nagasaki, Tokyo and Osaka; more than the dust of blasted factories and shattered homes. It is the fine dry dust into which the mills of the gods slowly ground a dream of empire.

Across the land the dust is worried and stirred by the wind, the rain, the treads of American tires, and the patient feet of the Japanese who trudge toward new goals down old paths.

Perhaps never before in history has any fighting people accepted so humbly and obediently the will of a conqueror. And the answer to this is the deep, insatiate desire of the Japanese to be better than he is.

When our war fleets furrowed the warm September haze and took attentive stations in the harbors of Japan, the country and its people were still much of a mystery.

Warned against treachery, guarding against sudden attack, American forces studied the sheer hills and rocky beaches and silently offered thanks that here were no bloody beachheads to be won and no nights of dark horror to be endured beneath the bombs and screaming dives of *kamikazes*.

Hope for Peace, but Poised for Action

When we first went ashore and rode down the quiet streets in our jeeps, with helmets on and side arms poised, we knew less what to expect than we would have known in a full invasion.

We scanned the timid, smiling faces—humble old people, diffident girls, and kids who actually saluted and cheered as we passed.

Our grim fear of treachery virtually vanished when we stopped to examine a block of bombed-out houses and a shy little girl came up and offered us an orange. This was the amazing Japan that most Americans first discovered, a Japan in which the Emperor's edict, "We must not hate our enemies," was obeyed implicitly.

Yet that very quality of obedience which thus far has made the occupation so simple is the one quality that will make the democratization of Japan profoundly complex.

To the docile, defeated Japanese, America represents Power—the Power of B-29's and Corsairs, atomic bombs and battleships, submarines and flame throwers.

Though he had great faith in the force that was Nippon, he saw it overwhelmed by the Power of America. His conclusion, simple and direct, was that the American way must be a better way; therefore he will accept American authority, obey American will, and exert every effort to learn and adapt himself to this better way.

In this sense, democracy is regarded as an end in itself rather than as a means toward an end.

Japanese eagerness to co-operate was made easier by the apparently real liking that Americans in uniform inspired. So little liquor was available that the unpleasant incidents usually associated with shore liberty in foreign ports were almost wholly lacking. Americans were such contrasts to the beastly monsters the Japanese had been taught to expect that they were quickly accepted by many as friends and liberators.

Characteristic were three words the two races soon employed in common: "singaretto," "chokoretto," and "shabon." The soldiers and sailors represented a windfall of smokable tobacco, palatable sweets, and fragrant soap. During the first weeks, until the services were paid in yen, these products were the sole medium of exchange.

Plenty of Money; Little to Buy

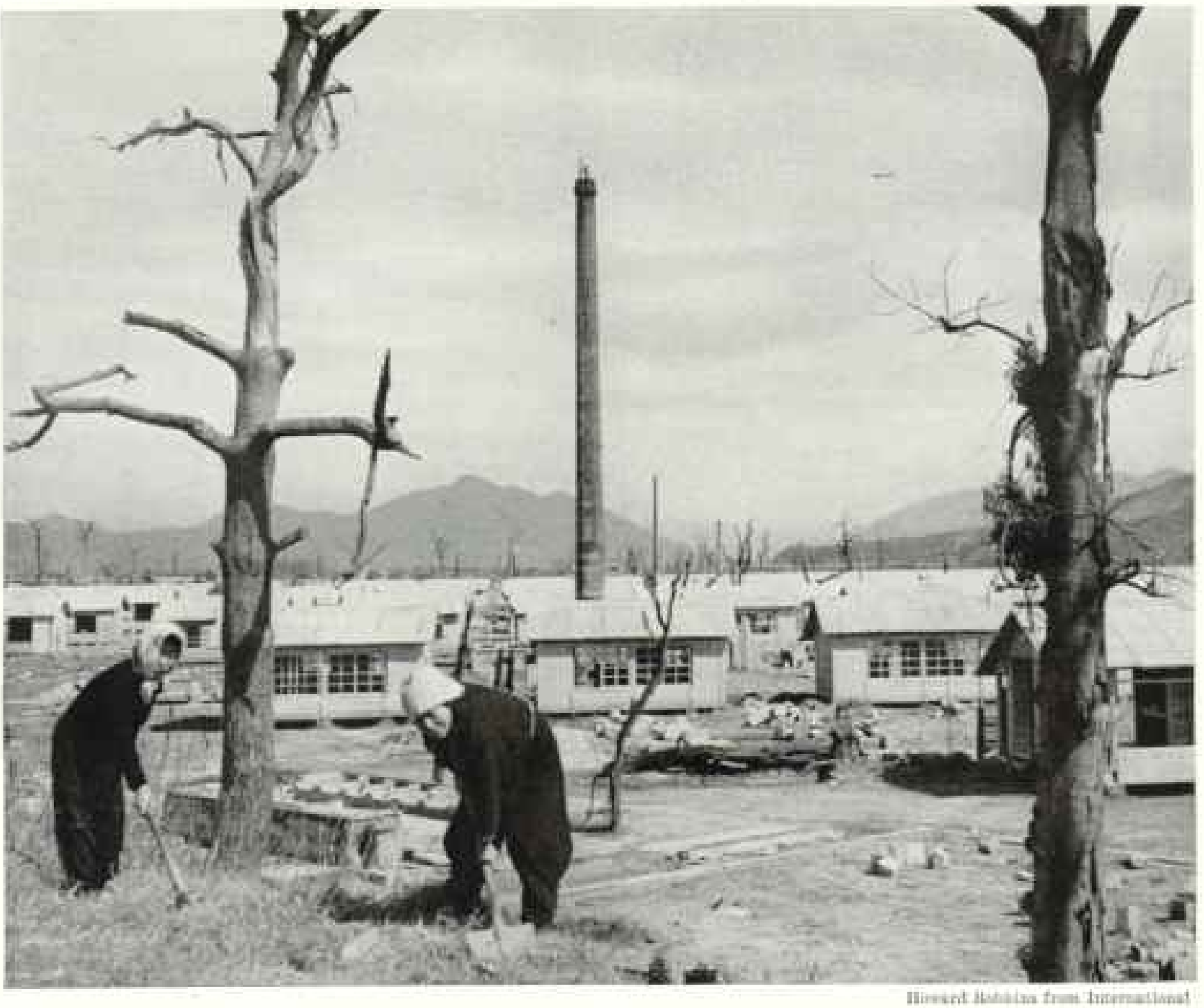
To the American, the sight of a small boy or a ragged old man with a fistful of paper money eagerly offering anything from 66 cents to $2 for a pack of cigarettes (costing 6 cents at the PX) was an almost unexplainable mystery. Granted that 15 yen looked like so much stage money, you could still take it back to the PX and buy a dollar's worth of merchandise.

What the American mainly did not understand was the peculiar economy which has made most Japanese comparatively wealthy in spite of defeat. To civilians at home it is the very familiar story of expansion of purchasing power beyond the available supply of consumer goods. In Japan this reached almost the ultimate in simple economics.

Under the Americans, unskilled workers received 8 yen (53¢) a day; skilled workers, 12 yen. But before the arrival of the Americans, a skilled workman such as a carpenter received only 7 yen a day.

The normal ration, including clothing, food, fuel, and housing did not permit expenditure of more than 200 yen a month.

* The author, a Chicago newspaperman and radio director, became a Commander in the United States Coast Guard during the war and commanded a flotilla in Japanese waters for nearly a year. He has now returned to civilian life.



Howard Bohlsen from International

Gardening Starts, Wooden Barracks Rise; Life Returns to Annihilated Hiroshima

From the hills, thousands have trooped back to the atom-bombed city. Squatters, building shacks, often disregard land ownership. Here, where stone and iron crumbled, a factory's frail chimney stands because it presented a small front to the tricky blast. These trees are dead; some elsewhere are charcoal. Hungry cities cultivate every acre, even the earthen tops of air-raid shelters.

Thus a man who earned 75 yen a week could spend no more than a man who earned 50 yen.

Since almost every family has one or two skilled workers, there is a surplus of money in most homes.

There is little commercial entertainment, but Japs are used to working ten to twelve hours a day with only two holidays a month; so they expect to spend little on amusement.

Of course, there are "kickbacks" to paymasters. Even Japs working for occupation forces are paid by the Japanese Government, and paymasters are civil-service employees.

Taxes are high, as much as one yen a day as I write, with the Diet planning to double or treble that amount to counteract inflation. Few people receive as little for their taxes as the Japanese. Children are required to attend school through the sixth grade. After that, they pay tuition. There are no such things as free textbooks, school buses, or free lunches.

The Japanese will probably get through to the next harvest in better shape than most Europeans, not because they have more but because they need less. Their food ration is governed by the number in the family and the amount of supplies available.

No individual ration books are held, but the records are kept in one large book at the ration board. Each group of perhaps a dozen houses is divided into a *buraku* (block) with a leader, or *buraku cho*, elected by the people. Whenever rations are available for issue, he goes to the board with a wagon or several helpers carrying double shoulder buckets. With them he brings back supplies for his houses.

Children are sent around to knock at doors, and, when the people have assembled, the food is divided (page 810). It may be rice, beans, potatoes, or fish, such as mackerel or eels. Charcoal is dealt out in the same way.

AP from Press Ass'n

Tokyo, Rid of Its Dreaded Thought Police, Lets Off Steam with a Demonstration

Communications workers, identified by their flag, demand a "threefold wage increase," according to their small white banner. Oppressed for years, they enjoy freedom's excitement but do not understand its responsibilities (page 810). Political prisoners, upon release from jail, have started street meetings immediately. Some demonstrators cheer General MacArthur and denounce the Emperor.

On Kyushu, *biru* (beer) is rationed at the rate of two quarts every two weeks or month, depending upon the supply. The brewery at Sasebo was destroyed in raids on the naval base, so the best beer now comes from Fukuoka. When the beer is sold, saki is also apportioned, usually in the amount of one *issho bin*, a bottle of nearly two quarts.

Last fall the Army turned over some surplus rice to the Japanese for issue. Many families who received this American milled type were so amazed and delighted at its whiteness that they placed it on their shelves in ornamental display.

American-type Salt and Sugar

American salt and sugar were equally amazing. Japanese salt comes in small, hard cakes, served in a little dish. Sugar from Formosa was brown and that from Okinawa black and lumpy, like stewed prunes. Since this supply, along with that from Saipan, has been cut off, sugar has virtually disappeared from the diet.

Eggs are available in the black market. They may cost from two to five yen each, but only the very influential can get them. Some soldiers brought home "cow meat" when they were mustered out, but since then almost no other meat has been available. Few cattle or pigs are being raised.

Three cigarettes a day is the common ration, the usual brand being Hikari, which is acrid and strong. Sakura, a much more popular brand, is available only to military officers and bureaucrats. The Jap is more than eager to offer as much as two days' pay for a pack of American cigarettes.

The Jap understands the American love of souvenirs, for he has it, too. Many a Jap home has a pair of American shoes from the Philippines, a book or a pencil from Guam, a British chair from Singapore.

AP from Press Ass'n

Hirohito Makes His Revolutionary Call for Woman Suffrage. Peers and Representatives of the Postwar Diet Bow Reverently

The Emperor stands before his throne November 27, 1945, reading a rescript based on MacArthur directives. "Demobilized," he wears a new nonmilitary uniform. Significantly, no officer carries a sword. Later, Hirohito shed his divinity as a "myth." "The Tenno [Heavenly Sovereign] is not a living god," he told his people.

Eric M. Bedford

Young Tokyo Laughs to Forget Its Hunger and Misery. This Theater Queue Stretched Around a Block

To audiences grown weary of propaganda shows, the return of music and song was blessed relief. Toho Theater's English advertising did not attract many Americans. GI's couldn't understand the show, didn't like the fishy odors left by lunch-box parties, and also found many native theaters out of bounds.

International News

Yanks, Teeing Off on a Japanese Course, Have Girls for Caddies

AP from Press Ass'n

Hands on Knees, Tokyo Girls Bow to Their Empress on the Imperial Palace Grounds

U. S. Coast Guard, Official

A Gasoline Can Is a Godsend to a Householder Starved for Consumer Goods

This farmer-soldier converts tins into appliances. His sweet potatoes and beans dry on grass mats, his firewood under the house. Mother and her brood keep a safe distance from the photographer. Despite their intelligence, many Japanese show an unaccountable fear of the camera (page 805).

In general, however, ornaments and personal property are scarce. The floor has grass mats; the windows may have paper panes; there is a rude charcoal stove, a few cotton blankets, a set of dishes and saki cups, and perhaps pictures of the Emperor and Empress.

Women and girls still wear long, trouserlike bloomers and tucked-in blouses over heavy cotton underwear. They may or may not still have their silk kimonos for dress. A vast number of kimonos have gone to America in trade for a couple of cartons of cigarettes.

Most men and boys still wear their khaki-colored uniforms. Men wear them because they are the best material available and boys because that was all they were given to wear during the war. They have no feelings about continuing to wear uniforms; everyone does it.

Back-borne Babies Stare at the Sky

In front of every house are babies and toddlers with running noses which are never wiped. Most young mothers carry babies on their backs, but as soon as one child is big enough to support the weight, he gets the next younger strapped to his back and the process continues. With their heads unsupported and hanging back, eyes staring dully at the sky, most Japanese youngsters get off to a flying start toward poor eyesight.

John Bonnevita

From Equator to Japan, the American Soldier Has Left a Long Candy Trail

These residents of Chiba, on Tokyo Bay, know what chocolate means, but they are scarcely acquainted with gum, for there hasn't been much gum to give away. Too young to have learned a few words of English, the little fellow reaches instinctively. Japanese sandals—no comfort on a cold day—are equipped with wooden clogs designed to keep feet out of the mud.

A child is considered to be one year old when it is born; but, even so, all Japanese children look about two-thirds of their age, according to our standards.

Whatever else he lacks, the Jap has a plentiful supply of children. Evidently the armed forces got a good deal of leave, and few soldiers on holiday failed in their family duty. Nonetheless, the American is continually surprised by the lack of companionship between the sexes. Even in the cities the woman walks about three paces behind, carrying all the bundles and the youngest baby.

In the country she does most of the work in the field, besides keeping up the house.* A collateral duty is emptying the latrine regularly and spreading the feces in the little field where the beans and sweet potatoes grow, not far from the ancestral persimmon tree.

Americans continually find the most charming vistas afflicted with the most offensive odors. As one officer remarked, "You can't walk anywhere without keeping your nose squinted." However, nearly all Japanese soil is deficient in nitrogen and phosphorus, and therefore what comes from the earth must return to the earth.

Japanese notions of modesty are also at some variance with our own. Women nurse their babies on their front stoops without giving the matter a second thought. In the fishing villages it is by no means indecent to go bare-bosomed in summer.

Most boys speak a little English, since it has been required in school for some years. However, they are shy about it and would rather write than speak. Girls learn English in the intermediate schools, but they are exceedingly diffident and will giggle rather than

* See "Women's Work in Japan," by Mary A. Nourse, NATIONAL GEOGRAPHIC MAGAZINE, January, 1938.

Eric M. Sanford

Having Weighed Potatoes, a Sales Girl Calculates the Price on Her Abacus

Next to the kimono, such a counting device is the Americans' favorite souvenir. The sight of Japanese making rapid calculations, even as they gossip, fascinates GFs. Japan calls the calculator a *soroban*. It is worked from right to left and read from left to right. There are ten rows of counters. Five lower bobbins of each row count as ones; two uppers as fives. As each column represents a power of ten, the soroban, like a line of our Arabic numerals, can express sums in billions.

answer a question. However, a girl and her mother will flee in mortal terror if you point a camera at them. Getting photographed is their idea of indecent exposure (page 803).

Emperor Worship Waning

Reverence for the Emperor is beginning to wane. An American sergeant who spoke a little Japanese was a favorite guest in one Jap home. During one visit he asked to look at the picture of the Emperor on the wall. It was handed down to him. He looked at it and set it down.

Later, after a bite of *satsuma imo* (sweet potatoes), he sat down again, squarely on the picture. In a kind of fascinated horror, the young son blurted out, "Look! He has his backside on the Emperor's face!"

There was an instant of stunned silence. Then the whole family broke into uproarious laughter. Somehow the Emperor isn't quite so sacred as he used to be (page 800).

Before the war, the father in this home worked in a shipyard. He belonged to a union, but he wasn't exactly sure whether it was a company union or a government union. At any rate, it didn't seem to belong to the workers, because the men paid their dues and held their meetings but never dared to demand anything, since that would have seemed unpatriotic.

The same obedience that is required of every Japanese from childhood was also required of the labor unions.

The union had about 600,000 yen in its treasury when war was declared, and this sum was taken over by one of the admirals for "protection." Now the union wants its money back. The admiral didn't feel the time was ripe, but the union threatened to take up

U. S. Coast Guard, Official

School Lets Out in Nagasaki. A Ridge of Hills Mercifully Sheltered These Children from the Atomic Bomb

Americans can't help liking the enemy's youngsters. When jeeps pass, boys salute, girls bow, and little mites wave both hands. They shout "Hello, good-bye" almost as one word. They represent the world's hope for a law-abiding Japan. These boys and girls look healthy, but they are on half rations.

Moohouse

Lottery Tickets, Phenomenon of Defeat, Sell on Streets

By draining off surplus earnings into its lottery, the Government hopes to curb inflation. American troops, who can't read the tickets, are loath to invest. The salesman has a soldier's cap. "Books" sign on a Tokyo wall is a reminder that Japan is going bilingual.

International News

It's Hard to Keep Clean in Poverty-stricken Tokyo

All over town, corrugated-iron shanties rise out of the ruins. Seen from a plane, the roofs appear to be rusting away. Many family tasks must be carried on in the open. Mamma, packing her youngest on her back, has salvaged a tub —a far cry from the luxurious deep-seated prewar bath.

AP from Free Asia

Back to Japan Goes a Boatload of Colonists, Uprooted from Homes in Korea

They prepare their first meal at sea around a small fire on the crowded deck. One repatriation ship, the *Enoshima Maru*, carrying 4,300 Japs, sank on January 23, 1946, after it struck a mine 60 miles off the mouth of the Yangtze. All persons, except 20 killed in the explosion, were transferred to the near-by American freighter *Brevard*.

U. S. Army Signal Corps, Official

Japan's Balky, Dilapidated Jalopies Stop Her Conquerors at Yokohama

Five hundred motor vehicles met the first Americans at Atsugi Airfield; only half proved serviceable. Even the 11th Airborne Division can't fathom this 8-horsepower miniature. One lamp is gone; the door is in tatters. Four brawny Yanks pack such a car, but eight Japanese can squeeze in.

the matter with the Americans; so he has agreed to restore the money.

One of the leading spirits in this union is an enlightened worker who claims to be a socialist. He has read John Stuart Mill and Karl Marx; he doesn't believe in Shinto or in the Emperor, and he says that Japan must rebuild as a democracy.

He knows there are labor unions in America, but he has never heard of either the AF of L or CIO. He is in contact with union leaders in other towns, and, under the new reform program projected by General MacArthur and implemented by the Diet, he hopes to combine vertical with horizontal organization.

He is sure the workers are in favor, because they will agree to anything their leaders plan for them.

One things seems to baffle labor. If the unions get large and powerful, there is still the question of what to demand. The present hours don't seem to be unreasonable; there's nothing else to do, anyway. As for money, there's not much to spend it on and it would only tend to increase inflation. Their only live issue appears to be a determined stand on keeping power out of the hands of the military clique again, and equally out of the hands of the bureaucrats.

The newspaper *Mainichi*, one of the largest in Japan, offered a prize of 3,000 yen for an essay on "Democracy in Japan." The winner sounded a timely warning when he observed, with more perspicacity than grammar: "The militarists have now been consigned to the limbo, but the powerful organization and privileged position of the bureaucrats, who have been the arch enemy of all the democratic legislations, projects, and ideas for the past 100 years, still remain intact at the center as well as in the local field."

The essay itself is undistinguished and full of the usual pat phrases about democracy. But the problem that inspired the contest is

U. S. Navy, Official

Tokyo Housewives Draw Their Half Rations at a Food Distribution Center

Once the average Japanese got five cups of rice a day; now he is lucky to have two. Last March Tokyo's rice dwindled to a 3½-day supply. Women strap babies to their backs so that hands may be free for work (left). When infant heads drop back, eyes stare dully at the sun. Thus, says the author, "most Japanese youngsters get off to a flying start toward poor eyesight."

one of the most serious in Japan today. The American Military Government has promised democracy to the Japanese. The Japanese are convinced that democracy is good and they want it. But what is it?

"Democracy"—Japanese Style

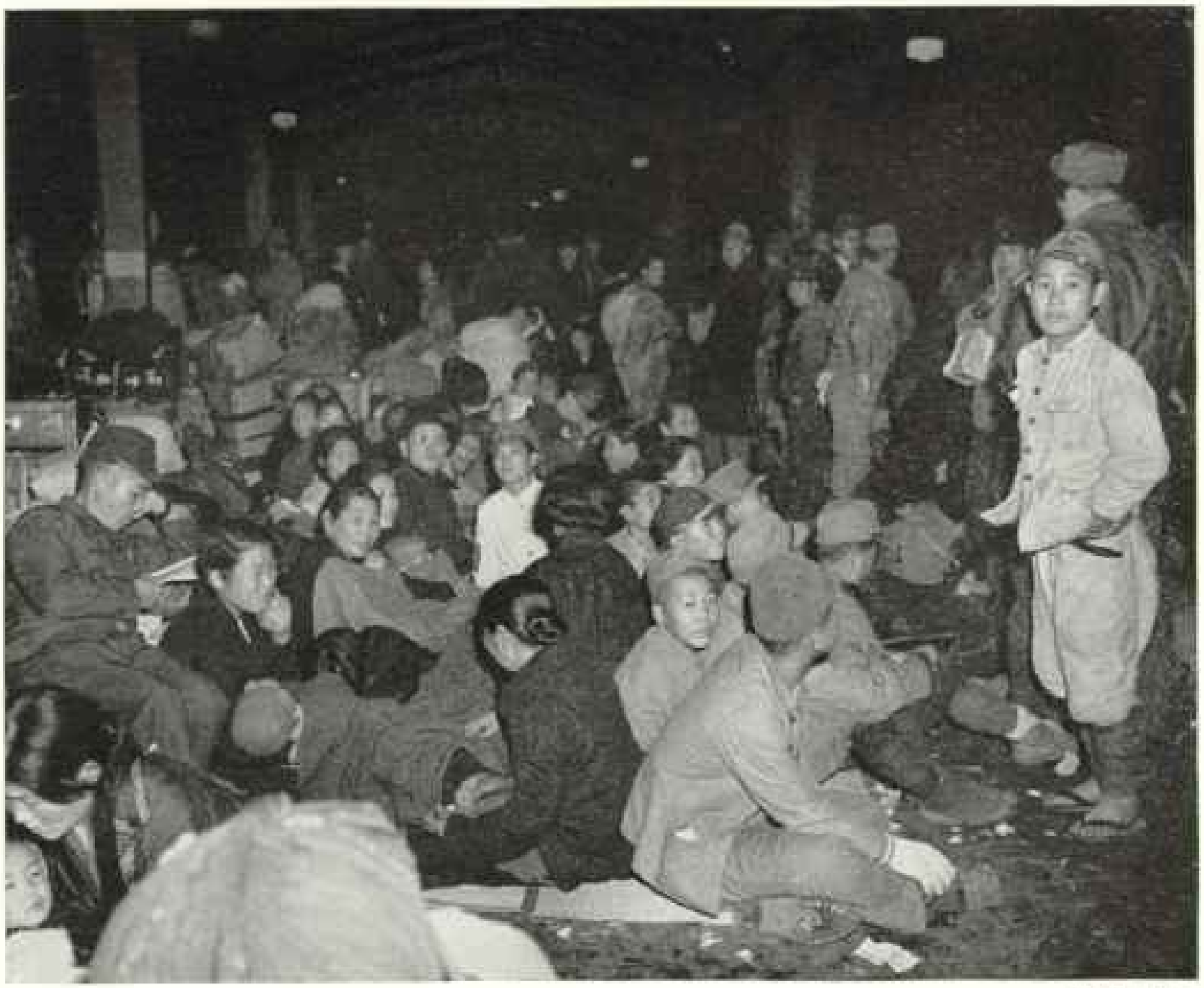
The schools want to teach democracy and the children want to learn about it. In an intermediate school near Nagasaki the daring experiment of having a forum was tried. The idea of open discussion in place of formal instruction in the school is a very new one. The teacher assigned the subject and told each of several boys just what view he was to take and what he was to report. This is regarded as a step toward democracy.

An imperial rescript ordered the schools to discontinue military training, fencing, and close-order drill. This was done. Teachers were ordered to delete from their texts anything of a militaristic or jingoistic nature.

As a result, many schools have discontinued history and geography entirely, since there are no suitable books. One Japanese school superintendent told American education officers that in his opinion 75 percent of all textbooks were unusable.

The governing directive on education, contained in the Emperor's rescript as ordered by American authorities, reads in part as follows: "We must establish a new world of peace and must be perseverant in establishing a new Japan. We must keep international order and must not hate our enemies. . . . Such things must be taught in the schools."

Last summer the police removed all books which described or discussed any form of government other than Japanese militaristic nationalism. With those texts gone and most of the remaining books classed as "unsuitable," the school principal finds his schedule a genuine



John Bonnevelle

Refugees, Bearing All Their Possessions, Crowd a Tokyo Railroad Station

All over Japan the dispossessed are on the move. Some hunt relatives; thousands wander in from Korea. War veterans, leaving cities which have no more use for them, go to the country to try farming. In the stations babies wail and old women dejectedly hold heads in hands. Every train is packed, even to the locomotive. Incendiary bombs, which spared rails, destroyed many coaches.

headache. What not to teach is a lot clearer than what is to be taught.

One Military Government educational officer with whom I talked said that he had airmailed home for a copy of a junior high school text called *Democracy at Work*. When it arrived, he gave it to the superintendent of schools, who was so affected that he broke into tears. He said it was the first chance he had had to read about the living ways of other people since he had attended a missionary school.

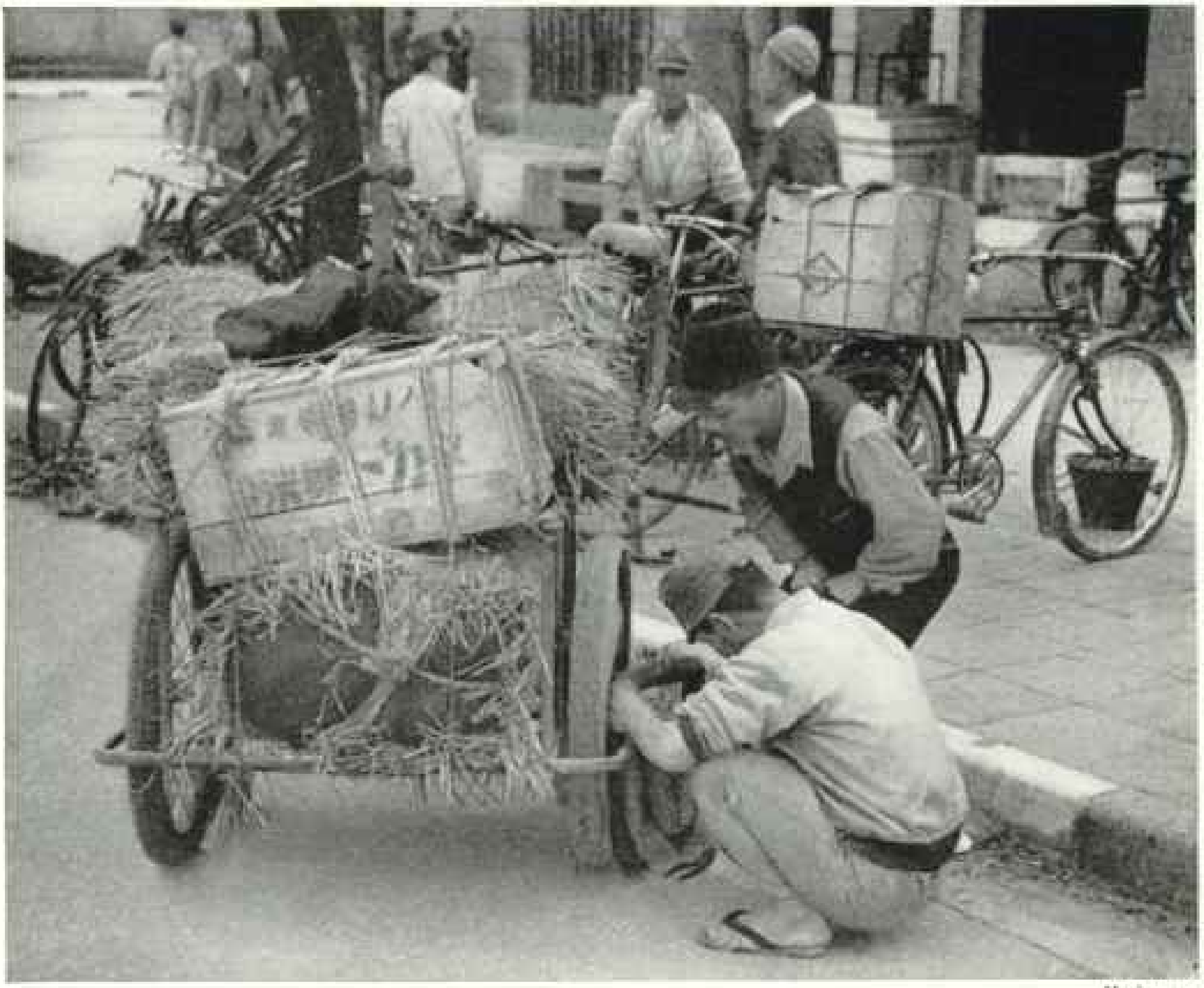
Yet in this same school the Emperor's rescript on education is handled only with white gloves, and entire classes rise and bow before the Emperor's picture at the beginning of each class day.*

At an intermediate school near Wakayama the principal cordially invited us into his office. His coat and trousers hung on him like unironed wash, but his manner was punctilious and he had the distinguished air of a man who wears a tie. He invited his teachers, eight women and two men, in to meet us.

We sat around a charcoal brazier and tea was served. The women answered only when spoken to. We offered cigarettes around and they were accepted with grave eagerness. The women did not light theirs, since smoking is considered unbecoming to women, but they tucked them into their blouses.

Japanese-English dictionaries were passed out, and the chat that followed was partly spoken, partly written. The principal announced that he and his teachers considered theirs a very enlightened school. They had stopped teaching their children the importance of fighting spirit. They dwelt upon the beauties of peace, art, and contemplation.

* See "Behind the Mask of Modern Japan," by Willard Price, NATIONAL GEOGRAPHIC MAGAZINE, November, 1945.



Moskowitz

Tricycle Cart, the Japanese Army's Foot-driven Jeep, Gets Repairs at a Tokyo Curb

Wherever Americans encountered Japanese on the Pacific islands, they saw cycles in profusion. They were not surprised, therefore, at finding bikes doing most of the hauling in Japan proper. Many a disembarked soldier used one to pedal his gear home. Most tires were worn pretty thin.

They wished to teach the children about democracy, American machinery, and modern production methods in industry, but they had no books and very little information. They felt democracy would succeed very well in Japan, for it was a good thing to see that everyone was instructed to go to the polls and vote for the candidate selected by his party.

Another male teacher entered. All the women rose and politely offered their chairs. He accepted one graciously and the women bowed out unobtrusively.

The men then agreed that it was a good thing that women were to be allowed to vote and that the voting age was to be reduced from 25 to 20. Japanese women were intelligent and could readily be taught how to vote.

"We want our country to be a democracy," the principal was saying. "We want to become a great peace-loving nation. As soon as the necessary laws are passed and we are told what to do, we shall have freedom—freedom, equality, and unity."

And so the old sun sets in Japan. And the new day brings democracy—the modern kind of democracy, taken by prescription, like vitamins.*

* For additional articles on Japan, consult the "Cumulative Index to the National Geographic Magazine, 1899 to 1945," especially "Japan and the Pacific," by Joseph C. Grew, April, 1944; "Face of Japan," by W. Robert Moore, December, 1945; "Unknown Japan," by Willard Price, August, 1942; "Tokyo Today," by William R. Castle, Jr., February, 1932.

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

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

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

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

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

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

The Society granted $25,000, and in addition $75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

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

I kept Ned waiting at the church

. . . because he's so wonderful!

IT WAS DAD'S FAULT, really. I was all ready to leave for the church when he handed me a small package. "Ned asked me to give you this, Sally," he said, "at the last moment."

The card was in Ned's handwriting. It read, *"Let this be your 'something new,' darling. See you in church!"*

I did my best not to cry. And I don't think I would have cried if Dad hadn't been there.

He must have seen the tears in my eyes because he said, "Go ahead and bawl, dear—even if we are a minute or two late. A girl has a perfect right to cry a little when she gets a wonderful husband and a wonderful Hamilton Watch all on the same day!"

Getting married? Give your beloved a fine Hamilton. The painstaking skill with which this fine American watch is made is your assurance that you are investing in the greatest watch value and the finest timekeeping accuracy.

* * *

HOW MUCH DOES A PENCIL-MARK WEIGH? Hamilton has a chemical balance so sensitive that it will record the weight of a pencil-mark—one three-millionth of an ounce! It's one of many incredibly precise instruments and tools used to maintain high standards of timekeeping accuracy.

Hamilton

THE WATCH OF RAILROAD ACCURACY

Hamilton's experience building timepieces for railroad men and navigational timepieces for the armed forces assures greatest possible accuracy in every size and grade. Hamilton Watch Co., Dept. C-15, Lancaster, Pa.

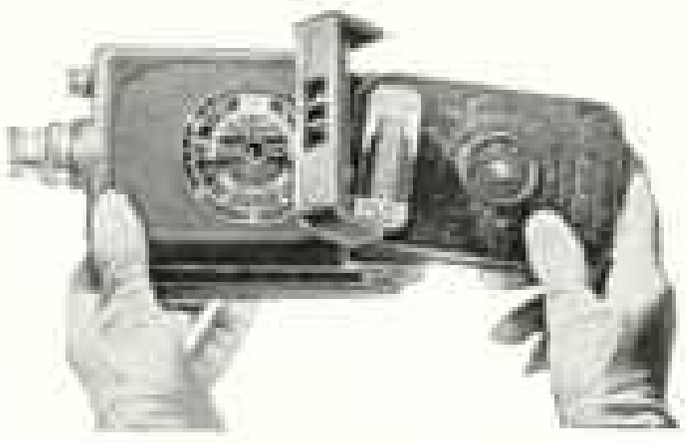
"Jeepers!

Hasn't a Guy Got Any Privacy?"

Not when it's home movie time, mister! You're the *star* in home movies, and Mom and Pop the cameramen.

They'll invade your privacy at breakfast, they'll film you at the beach, in your first school suit...everywhere you do those wonderful things growing kids do.

For your Mom and Pop know the endless joy of pleasure in home movies —the lasting record they make of every cherished family occasion.



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BG 6-48

SINCE 1907 THE LARGEST MANUFACTURER OF PROFESSIONAL MOTION PICTURE EQUIPMENT FOR HOLLYWOOD AND THE WORLD

Anthony Schick watches alertly as his son, Ferris Schick, handles an exacting heat-treating operation in Studebaker's chassis division tool department. The young man is 20—the father 53. There are many such family teams on the Studebaker employment roster.

Many a boy learns fine craftsmanship from his own father in the Studebaker plants

Dean Knepp served overseas for 13 months before returning to his Studebaker job after medical discharge from the Army. His father, Raymond J. Knepp, seated in above picture, has been a Studebaker craftsman over 23 years.

SOMEONE once said, "They get 'em young and train 'em right at Studebaker"—and there's a world of significant truth in that explanation of the consistent high quality of Studebaker workmanship.

A good many of the older men in the Studebaker factories are proud to have their own sons or younger relatives as their apprentices.

In fact, not a few of the craftsmen who have grown old in Studebaker service followed fathers—and, in some cases, grandfathers—into places in these famous vehicle-building plants.

All the fine craftsmanship that distinguishes Studebaker cars and trucks is not the work of father-and-son teams. But most of it is the proud achievement of men who have made a lifetime career of their service under the flag of Studebaker.

The story of Studebaker quality goes back over 94 years now, through generations of home-loving, home-owning craftsmen who settled in South Bend and made it one of America's strongholds of expert workmanship.

This painstaking care puts long-lasting, high quality performance into every car and truck that carries the trustworthy Studebaker name.

STUDEBAKER

South Bend 27, Indiana, U.S.A.

BUILDER OF CARS WORTHY OF AMERICA'S HOMES

Plan now for the Orient

—THE WORLD'S SUPREME TRAVEL EXPERIENCE

The tide has turned. It's tugging at ships. And pulling at men. We, of American President Lines, feel this pull more than any—for ours are the ships which for over 75 years have linked the Orient to America.

A NEW LUXURY FLEET

American President's ships went to war—so now we are rebuilding our fleet from scratch. New ships, new speeds—new luxury—a total investment above $100,000,000.

We are asked: "But how soon?"

We answer: "At once, with new fast cargo vessels and interim passenger ships. And soon, with the first ships of our new luxury fleet—enough for schedules of moderate frequency."

EXPRESS LINERS—TRANS-PACIFIC LUXURY

We are asked: "What are the new ships to be like?"

We answer: "Fast (19 knots) and comfortable. All outside staterooms. Fine beds. And our later ships, the express liners, swift and luxurious, will be air-conditioned throughout, with swimming pools for every Class, smart shops, theaters, cafe-grill and many other innovations.

'ROUND-THE-WORLD EVERY 2 WEEKS

We are asked: "What routes will your ships travel?"

We answer: "First to be reopened will be our trans-Pacific service via Honolulu to China, Japan and the Philippines. Four other services will follow, including our famed 'Round-the-World regular tours touching 14 countries and 23 ports of call (see below)."

SAIL UNDER THE AMERICAN FLAG

We are asked: "What about stop-overs?"

We answer: "As always, you may stop off as long as you please, at all ports, and resume your trip on a later ship. And all the experience inherited from 75 years of American Flag service is at your disposal on your trip.

So, plan now for the Orient. See your own travel agent or write or call on us at 604 Fifth Avenue, New York 20; 177 State St., Boston 9; 716 Transportation Building, Washington 6; 110 South Dearborn St., Chicago 3; 226 Henry Building, Seattle; 510 West Sixth St., Los Angeles 14; 311 California St., San Francisco 4 (Head Office).

American President
LINES

For 75 years America's link with the Orient

'Round the World normal ports of call: New York • Boston • Havana • Cristobal Balboa • Los Angeles • San Francisco • Honolulu • Yokohama • Kobe Shanghai • Hong Kong • Manila • Singapore • Penang • Colombo • Bombay Suez • Port Said • Alexandria • Naples • Genoa • Marseilles • (New York)

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Here is the triumph of that sensational new development—the G-E Electronic Reproducer. (It virtually does away with the annoyance of surface noise and needle scratch.) With electronic magic it unerringly responds to every musical impulse, revealing hidden beauty never before reproduced by any radio-phonograph.

Your favorite radio programs, too, are recreated by this magnificent instrument with all the glowing realism of General Electric's exclusive natural color tone. Through the sorcery of General Electric FM you hear them in studio freshness—unclouded by static—undimmed by fading—each voice and instrument as vivid as a newly minted rainbow.

For this superb FM radio-phonograph, master craftsmen have created distinctive period cabinets of unusual charm. Whether you prefer classic beauty or modern grace you'll find a Musaphonic that will enhance the most gracious room.

G-E Electronic Reproducer—Virtually Ends Surface Noise and Needle Scratch

GENERAL ELECTRIC

RADIO-PHONOGRAPHS

The charm of tradition

The spirit of industrial growth

Which is the South? *Both are!*

Perhaps you picture the South as a land of magnolias and romance... mellow tradition and courteous people...charming plantation homes and quaint streets...or as a scenic wonderland.

If so, that picture is a delightful reality today just as it was yesterday. And it has an irresistible fascination for vacationists.

It's the other picture that gives you a jolt of surprise. For the busy factory scene symbolizes the dynamic industrial giant that has leaped into life throughout the territory served by the Southern Railway System.

The Southland has an irresistible attraction for industry, too, because of a unique combination of vital advantages found nowhere else...temperate climate, which permits economies in construction, operation and maintenance...low-cost power and fuel...plentiful raw materials and water supply...ample reserves of skilled and unskilled workers...populous and prosperous consumer markets...and the reliable, economical transportation service of the Southern Railway System.

"Look Ahead—Look South"... for an ideal vacationland...*and* for a land offering new and greater opportunities for your factory and business.

Ernest E. Norris
President

LOOK SOUTH
LOOK AHEAD

SOUTHERN RAILWAY SYSTEM

The Southern Serves the South

The moon and fenpence

Even today, a dime or so will still enable a fellow to end an evening in style. The high cost of living hasn't ruled out *some* old favorites — not the moon, at least, nor summer's own frosty-cool ice cream cone!

At such a moment, it's almost unromantic to say more. But the fact is, there's a lot besides frostiness and flavor that makes a certain ice cream a very *special* treat. You see it under the labels "Sealtest" and "Breyers"—and by cone or quart, it means *extra* money's worth.

Every lick of ice cream wearing these labels is subject to a supervision both rigid and unique. Sealtest Laboratories, established by National Dairy, set the standards for them. And, moreover, check continually to make sure those standards are met.

Of course, National Dairy's red Sealtest symbol is found, too, on milk and other milk products. The system of inspection and the research behind it are all part of a larger program to perfect and improve milk in whatever form it reaches you, wherever you may live.

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.

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PRODUCTS CORPORATION
AND AFFILIATED COMPANIES

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BEAUTIFUL to look at, or beautiful of heart—or both!

Especially beautiful—in every way—to its own parents, and worthy of every effort to make its future better and brighter than the generation before. That's as it should be—and that's why so many devoted fathers own Prudential life insurance. For in more than *eight million American homes*, parents have found that Prudential provides the kind of life insurance which best protects these future hopes. Prudential policies can be arranged to provide immediate funds in case of death . . . guarantee a regular income for the family . . . to pay for the children's education. Prudential is the sensible and practical life insurance for the family man.

Ask your nearest Prudential agent to tell you about these policies. He will show you how to build a Prudential program to meet your own needs and circumstances.

You will enjoy the Prudential Family Hour—Every Sunday afternoon, CBS. And the Jack Berch Show—Every afternoon, Mondays through Fridays, ABC.

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A mutual life insurance company

HOME OFFICE: NEWARK, NEW JERSEY

THE FUTURE BELONGS TO THOSE WHO PREPARE FOR IT

Gainsborough

AND

Girard-Perregaux

Only a few years after Gainsborough had put the last brush stroke to his famous portrait, Bauttе, another genius in a different field—the art of watchmaking—put his signature to *his* first masterpiece—a watch of enduring beauty and precision.

From that achievement, *Girard-Perregaux* traces its rich heritage. So distinguished is this ancestry, that leading museums treasure the hand-wrought models which preceded today's fine *Girard-Perregaux* watches.

Five generations of skilled craftsmen have made possible the modern *Girard-Perregaux* watch and perpetuated the tradition of excellence and dependability for which the name stands.

The shops of the finest jewelers the world over display many types of *Girard-Perregaux* timepieces in a wide price range.

Gainsborough's Portrait of The Hon. Mrs. Graham in The National Gallery of Scotland in Edinburgh

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Fine Watches since 1791

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Girard-Perregaux watches are priced from $40.00

In 14 kt. gold, 17 jewels
left, $50.00
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To learn more about watches, write for Illustrated Booklet Number 63

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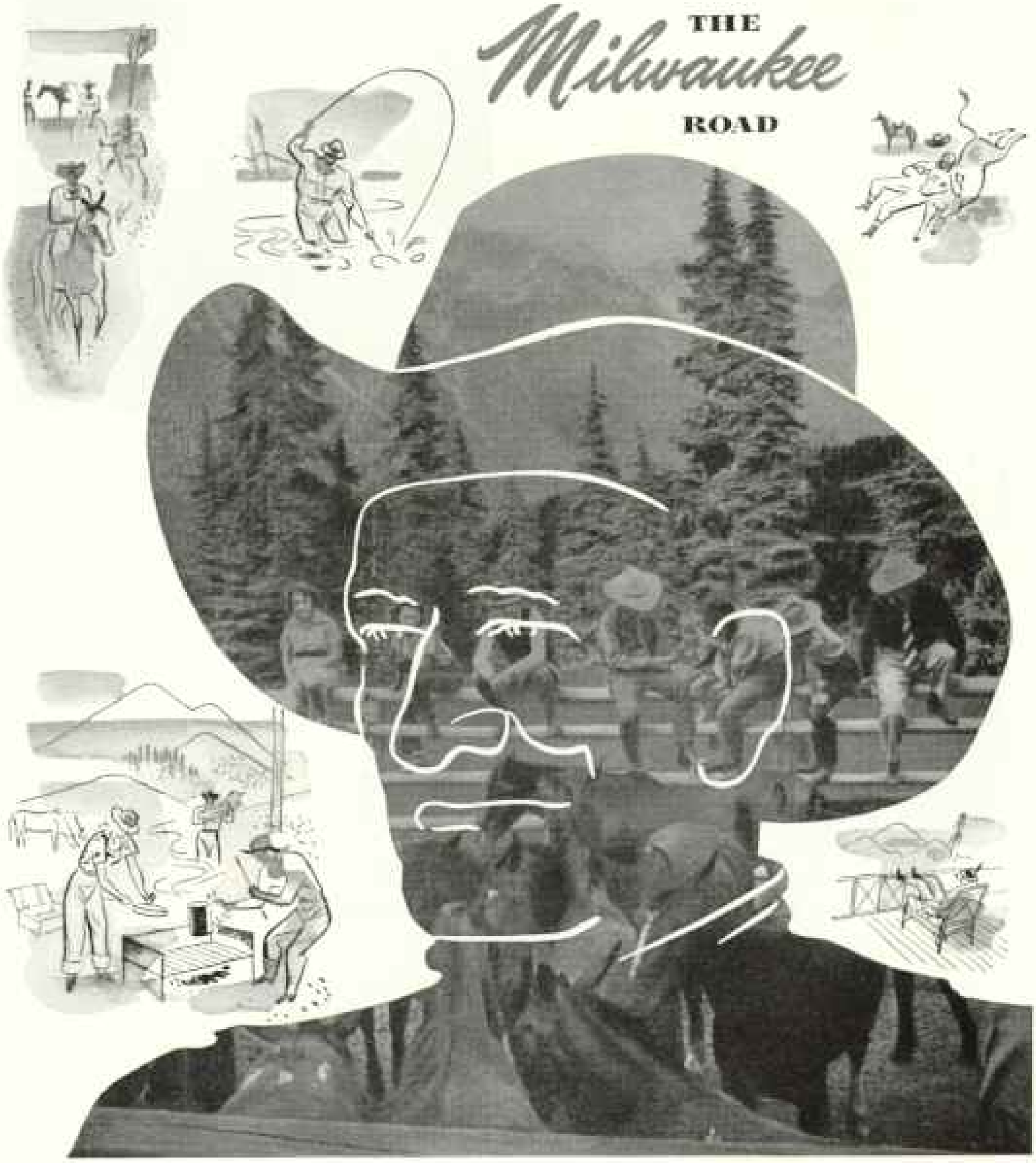
Montana

TREASURE'S where you find it. Montana has silver, gold and copper, rich acres of wheat, cattle grazing in green valleys. Touristwise, Montana's treasures are equally varied. It has mile-high retreats from the Belt to the Bitter Root ranges . . . dancing trout streams . . . Rocky Mountain trails in the Gallatin, Flathead and other dude ranch areas. There are newly-opened Morrison Cave and National Parks, too. The Gallatin Gateway to Yellowstone is just off The Milwaukee Road's electrified transcontinental line, route of The OLYMPIAN. The Milwaukee hopes to complete its mission of getting veterans home in time to take you away in comfort on that 1946 Victory Vacation. ¶ F. N. Hicks, *Passenger Traffic Manager*, Chicago 6, Illinois.



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For Style . . . for Fit . . . for Longer Wear . . . Men who know choose

* Interwoven Socks

BY THE LARGEST MANUFACTURER
OF MEN'S SOCKS IN THE WORLD

* REG. U.S. PAT. OFF.

"The railroad runs right through my store!"

"WHAT I MEAN IS THIS: the railroad connects my store . . . and my business . . . with every other town and city in the whole country.

"That means I can give my customers the same kind of merchandise—the same up-to-the-minute goods—that folks in the big towns enjoy.

"So you see why I figure that the railroad is really in partnership with me, and with every other local merchant."

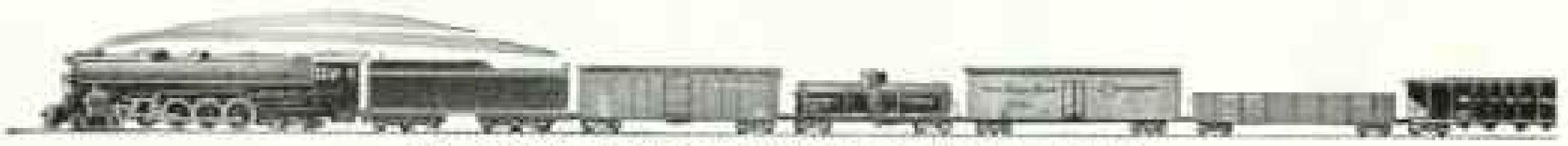
•

Yes, throughout their exciting history, America's railroads have played a big part in helping to develop community life and business.

The railroads are *local* business. They employ people wherever they run. They buy supplies in seven out of every eight counties of the U. S. They own property in every community they serve—and pay local taxes. In fact, as much as half the tax money received by many counties is paid by the railroads. And that can't be said of any other form of commercial transportation!

American railroads are working to improve still further their essential service to the nation's people, to expand their partnership with the nation's business. The vast amount of new equipment required will be bought with railroad money, without federal, state, or municipal aid. For the railroads, like other local business, are self-supporting—neither asking nor expecting financial aid from other taxpayers. Safe, dependable, inexpensive—the railroads continue to be the backbone of America's transportation service.

AMERICAN RAILROADS



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A true-color transparency on grand new Ansco Color Film, now available in 35 mm cartridges, 120 (B2) and 620 (PB20) rolls, as well as in 16 mm movie film and sheet film.

Film by Ansco–*true-color* by nature!

This Indian maiden makes a colorful model. Hence, it would have been a pity to take her picture on anything less than the glorious new Ansco Color Film. This magnificent film gives superb true-color reproduction in still pictures or movies!

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NO HUGE STEAM SHOVELS to help early Pennsylvania Railroad builders! It was pick, shovel and muscle—as you can see from this old photograph.

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Since 1846, four generations of Pennsylvania Railroad men and women—working together as a team—have striven ceaselessly to improve transportation for the American people.

Each generation has made its vital contribution, left its mark on the roadbed of progress.

The first generation laid the immense framework, with few exceptions, of the present Pennsylvania System . . . The second double-tracked, triple-tracked, four-tracked—broadened and strengthened it . . . The third generation drove the tunnels under the Hudson River and built the great Pennsylvania Station in New York;

Partners

linked New England with the Pennsylvania Railroad by bridging the East River at Hell Gate; electrified the railroad's Atlantic seaboard operation—and, in addition, helped to move the enormous numbers of men and materials that brought victory in World Wars I and II.

Today the fourth and newest generation, united with the third—a working force of 168,000 employees—is not only meeting the day-to-day transportation needs of the American traveler and shipper—but building new locomotives, new cars, new technical equipment to carry on the work of progress so ably started 100 years ago.

PENNSYLVANIA RAILROAD

1846 *1946*

ONE HUNDRED YEARS OF TRANSPORTATION PROGRESS

Parker 51's

arriving in greater numbers

. . . BUT THE SUPPLY IS STILL LIMITED!

Your Parker dealer is now receiving more Parker "51" pens. But his still-limited shipments are usually sold out quickly. Better see him soon.

You'll find the Parker "51" is sheer beauty. No side filling lever mars its lines (the patented plunger is hidden safely inside the barrel).

The 51's tubular point is the most fully enclosed of any pen . . . protected from air, dirt, damage. The tip is a ball of Osmiridium—the most wear-proof, corrosion-proof metal ever known—fused to 14K gold. So smooth is this tip, your "51" seems to float *above* the paper.

And then—more magic. This pen *writes dry with wet ink!* For the "51" alone is designed for satisfactory use of fast-drying Parker "51" Ink. See the precision-made Parker "51" today.

Colors: Black, Blue Cedar, Dove Gray, Cordovan Brown. $12.50; $15.00. Pencils, $5.00; $7.50. Sets, $17.50 to $80.00. Vacumatic Pens, $8.75. Pencils, $4.00.

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→When your Diesel-Electric Baltimore & Ohio luxury train glides smoothly from the station, you'll know your holiday has really started. Mile after mile, you'll enjoy the thrill of modern rail travel . . . the extra measure of pleasure for which B&O is so well-known. →Outstanding with "holidayers" is the friendly courtesy of B&O people. In big and little services, alike, you'll constantly enjoy this warm hospitality . . . for courtesy is traditional on the B&O. →And, when you visit B&O diners, you're in for a real "holiday treat." For, B&O is famous for its good food . . . prepared just the way you like it . . . at prices that are reasonable. →Then, there's B&O's record for "on-time" dependability. Not only does B&O strive to make your travel time thoroughly enjoyable but it also makes a special point of seeing that you arrive at your destination on schedule! →Yes, when you start your holiday with Baltimore & Ohio, the extra measure of pleasure given by such features as friendly courtesy, good food and "on-time" dependability will be proof why more and more travelers say:

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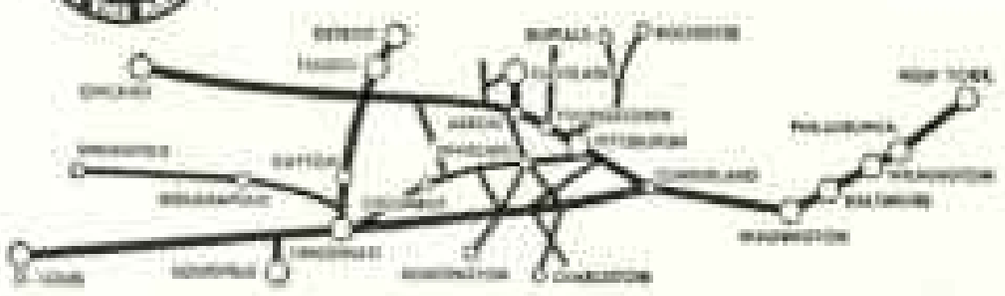

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— by Graflex

FREE! Here it is! A dramatic story of photography at war! Together with 26 great war pictures—all in the new GRAFLEX picture booklet, GREAT MOMENTS OF THE WAR! Ask your local GRAFLEX Dealer for a *free* copy, or send 10¢, to cover handling, to Room 59, GRAFLEX, Inc., Rochester 8, New York.

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COLOR *Photography*

Is No Mystery

You can take *good* color pictures as easily as ordinary black-and-white . . . get brilliant, true-color exposures every time . . . if you let the Master II do the work for you. Its extremely sensitive Photronic Cell, created by WESTON, spans the entire color spectrum. Its restricted viewing angle, double light-scale, and exclusive exposure-control dial give exposure readings quickly and accurately. Ask your dealer to demonstrate the Master II; or write for literature. Weston Electrical Instrument Corp., 584 Frelinghuysen Ave., Newark 5, New Jersey.

The New WESTON *Master* II **EXPOSURE METER**

1 **Pick the place** you want to go and *write for reservations.* When you get word there's room for you, see your railroad ticket agent and . . .

2 **Reserve Pullman space** for a trouble-free trip that will get you there *safely*—in *more comfort* than you'll get going any other way!

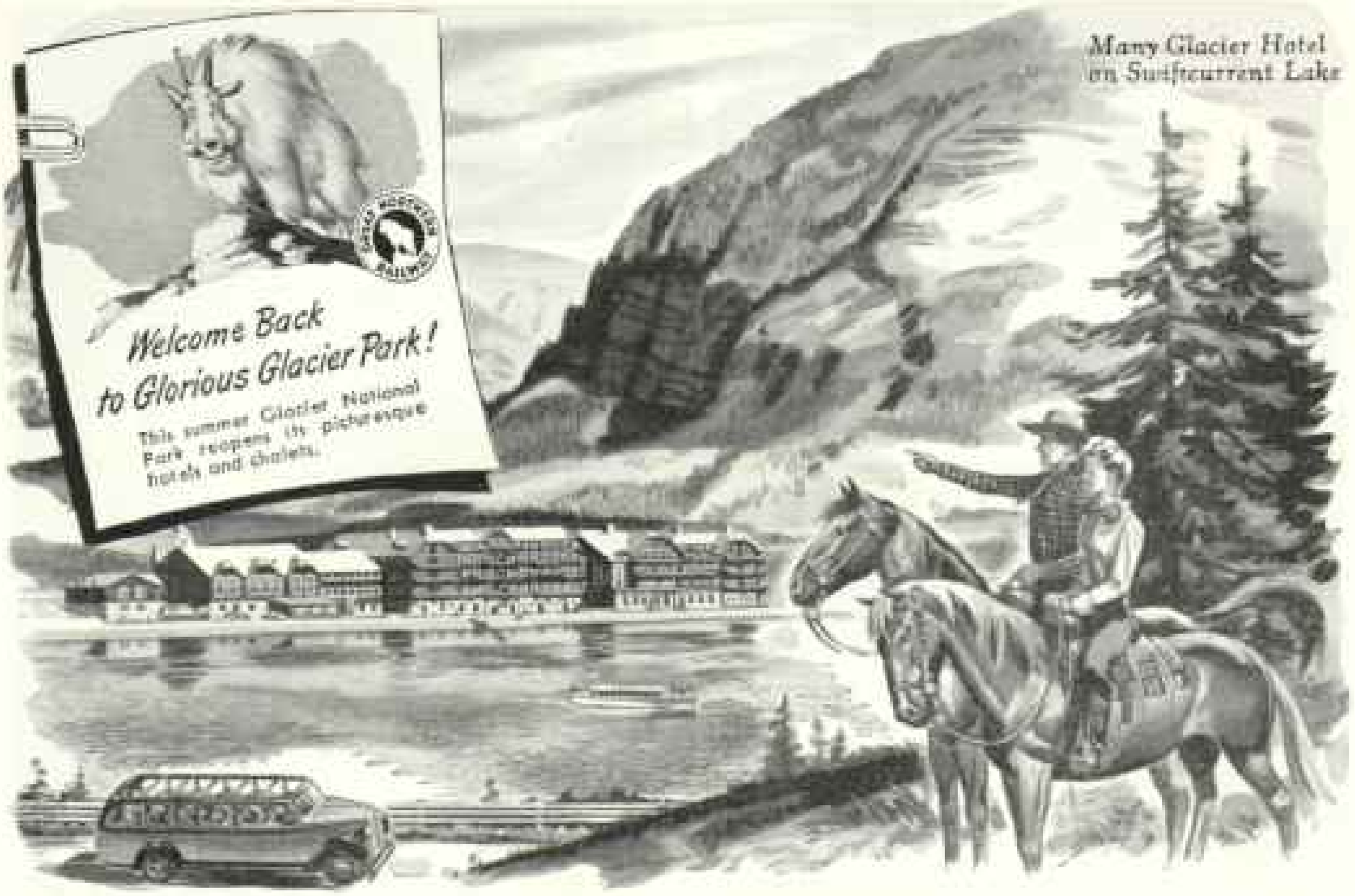
How to start on your vacation

(WITHOUT A WORRY IN THE WORLD)

3 **No worry** about weather, roads or mountains in an all-steel Pullman car. Pullman's been the *safest* way of going places fast for more than 80 years!

4 **No worry** about privacy or sleep. Your air-conditioned Pullman space is all your own, with big, comfortable beds it's a joy to stretch out in!

WHEN YOU GO ON YOUR VACATION . . . *GO PULLMAN* THE SAFEST, MOST COMFORTABLE WAY OF GOING PLACES FAST!



Somewhere West of Worry, U.S.A.

I'm headin' west of Worry, U.S.A.,
I've said good-bye to Hurry every day.
Now my only real ambition
Is to be in the condition
Of having nothing else to do but play.

• So head for Montana's Glorious Glacier Park and Waterton Lakes Park, Alberta—where American and Canadian Rockies meet. This is magnificent vacation country with cozy hotels and chalets, with unforgettable launch trips on lovely alpine lakes and sightseeing motor coach rides on spectacular scenic highways. Superb trout fishing, hikes, horseback riding, golf. On any Western trip, travel via Great Northern Railway one way at least. It costs no more and the transcontinental Empire Builder stops at both rail entrances to Glacier Park.

Write to A. J. Dickinson, Passenger Traffic Manager, Great Northern Railway, St. Paul 1, Minnesota, for more information about vacations and stop-off tours in Glacier National Park.

See America First the West
Plan Your Postwar Vacation around Glacier · Waterton Parks

• No matter where you plan to go in the West, include a stop-off at Glorious Glacier Park. Inquire about these four popular vacations.

Glacier Park and California
Glacier Park and Canadian Rockies
Glacier Park and Pacific Northwest
Glacier, Yellowstone and Dude Ranches

GREAT NORTHERN RAILWAY

Route of the Empire Builder

BETWEEN CHICAGO, ST. PAUL, MINNEAPOLIS, SPOKANE, SEATTLE, TACOMA, PORTLAND AND VANCOUVER, B. C.

Glacier Park

Enrich Your Home Life with 16 mm. Talking Pictures

Now—your family and friends can gather at their convenience and see selections from the rapidly increasing libraries of 16 mm. sound films. These libraries include not only popular entertainment films—but a vast assortment of educational, travel and musical subjects.

And with the new low-cost Ampro 16 mm. sound projector—you obtain brilliant images, rich colors, and lifelike tone. Ampro's centralized controls make operation almost as easy as using a radio.

Many Special Ampro Features—Ampro 16 mm. sound projectors are rugged, compact, lightweight. Special Ampro features include: Simplified Threading System, Centralized Controls, Triple Claw Movement, Centralized Oiling System, Quick Set-up, Quiet Operation—and many other exclusive advantages. Write today for folder giving specifications, prices and full details.

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AMPRO

8 mm. silent... 16 mm. silent... 16 mm. sound-on-film... 16 mm. arc projectors... accessories

AMPRO CORPORATION, CHICAGO 18

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WINSHIP
UTICA LUGGAGE
Traditional SINCE 1774

Sensationally new... Radically different

HOLLIS
Automatic
WINDPROOF LIGHTER
featuring
feather-touch action

The Only Lighter of Its Kind

Automatic, with unfailing precision . . . windproof with uncanny dependability. In spite of its revolutionary advances in design and engineering, the Hollis Automatic is handsome as fine jewelry. No protruding parts, no "mechanical look." Light in weight . . . compact. **GUARANTEED!** You must agree that Hollis Automatic Lighter is without equal or return it within 10 days and money will be refunded. Sorry, no C.O.D.'s.

Dealers inquiries are invited

$6.00 Ideal for monogramming

HOLLIS CO., 11 Commerce St., Newark 2, N. J. Dept. L-1

Enclosed $.....for..... HOLLIS AUTOMATIC Windproof Lighters at $6. I must be completely satisfied or my money will be refunded in full within 10 days.

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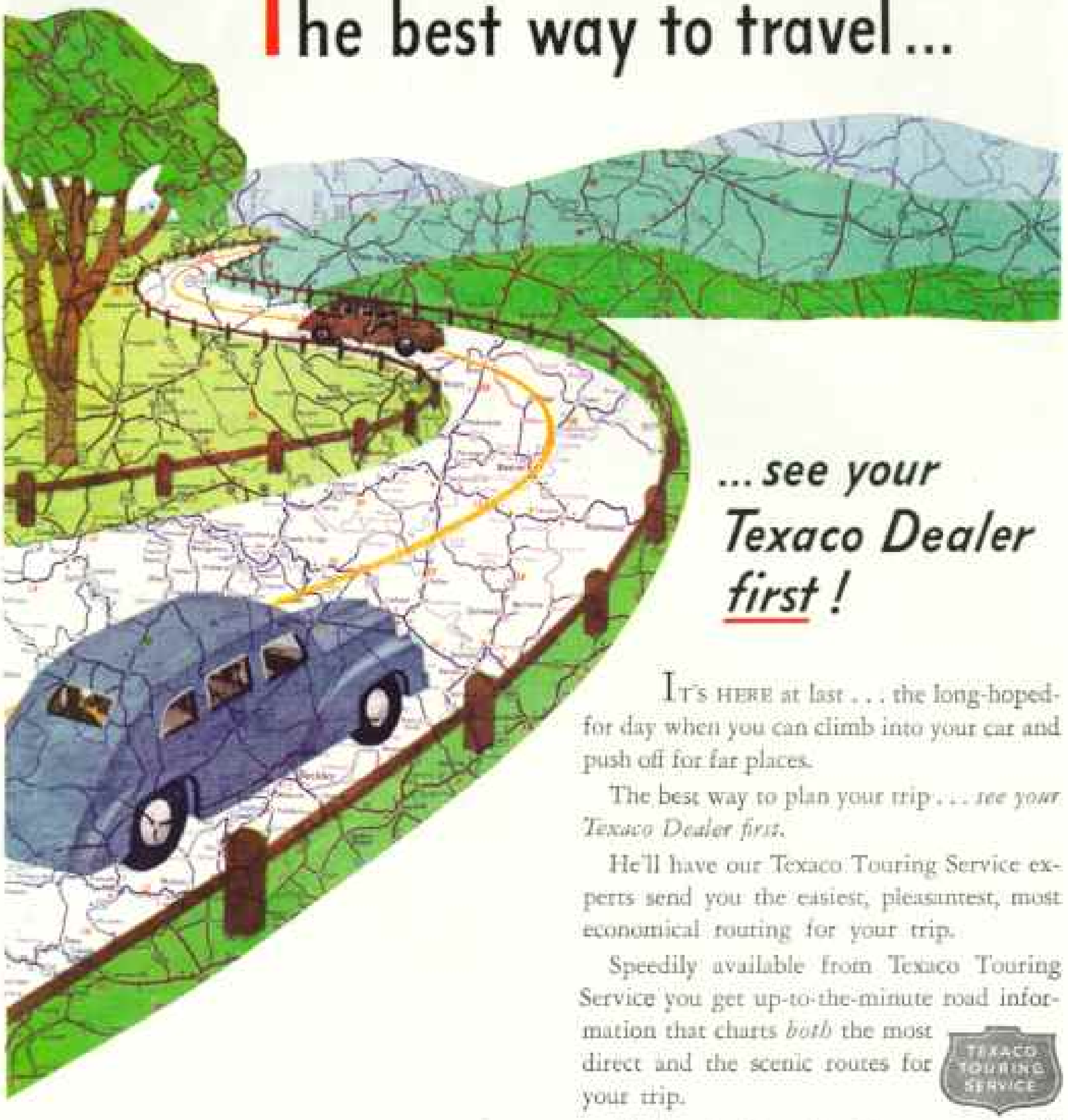
The best way to travel...



...see your Texaco Dealer first!

It's HERE at last . . . the long-hoped-for day when you can climb into your car and push off for far places.

The best way to plan your trip . . . *see your Texaco Dealer first.*

He'll have our Texaco Touring Service experts send you the easiest, pleasantest, most economical routing for your trip.

Speedily available from Texaco Touring Service you get up-to-the-minute road information that charts *both* the most direct and the scenic routes for your trip.

TEXACO TOURING SERVICE

All America is waiting for you again. "Fill 'er up" at your Texaco Dealer's . . . and GO.

You're welcome at

TEXACO DEALERS

where you get . . .

FIRE-CHIEF GASOLINE

SKY CHIEF GASOLINE

HAVOLINE AND TEXACO MOTOR OILS

MARFAK LUBRICATION

TEXACO

THE TEXAS COMPANY

TUNE IN . . . Texaco Star Theatre every Sunday night starring James Melton, with his guest, Ed Wynn. See newspapers for time and stations.

We're going to Pennsylvania!

We've waited for it—now we're going to enjoy our vacation in picturesque, pleasant Pennsylvania.

We're going to fish...camp...hike...swim and sail. We're going to rest...relax...and recuperate in the forest-spread acres of William Penn's land.

We're going to be exhilarated by stirring sights and places. Gigantic industrial areas...peaceful agricultural districts...cherished historic shrines. We'll revel in the good eating and warm to the friendly hospitality which are famous in Pennsylvania.

We'll find our accommodations where our fancy chooses—a cabin in a State Forest . . . an inn in the mountains...a hospice on the shores of a lake...or a renowned hotel in gay resort areas.

We'll have fun whenever we go, for there will be something to do and see every day of every month the year 'round. Yes—for a vacation we will remember happily—we're going to Pennsylvania!

For information write to the Department of Commerce, Harrisburg, Pennsylvania, Dept. N-2.

JUNE 1, 1946—JUNE 1, 1947
VICTORY VACATION YEAR
You earned it—now enjoy it

See PENNSYLVANIA
Birth State of The Nation
Keystone of Your Vacation

Pennsylvania Department of Commerce

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Cool, comfortable, safe vision, even in brightest sunlight is provided by Ray-Ban. Preferred by airline pilots, championship shooters, and outdoor lovers, Ray-Ban became the first-choice glare protection of Army and Navy fliers. Bausch & Lomb Optical Co., 270 Lowell St., Rochester 2, N. Y.

Ray-Ban lenses are available in your prescription through regular optical channels.

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ESTABLISHED 1853

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With My
POWER PACKED
"ATOMEER"
The world's smallest and lightest single unit hearing instrument

Only Maico combines these 5 important features in a single unit hearing instrument

- Full "B" Battery Power
- 5½ Octave Sound Range
- The Amazing Mercury Cell
- Audiometric Fitting
- No Separate Battery Pack

Write today for free booklet on hearing and hearing instruments

THE MAICO CO., INC.
Dept. 546, Maico Bldg. Minneapolis 1, Minn.

How to avoid

America's next housing problem

Part of today's housing problem could have been prevented. Repairs and replacements costing millions of dollars would not be needed now, if wood used in building had been protected against rot and insect attack. It is a waste that should not be repeated in the *new* housing to be built in the next few years.

Monsanto chemistry can check this loss with Santophen 20,* used in preserving wood. Properly formulated and applied, it penetrates the wood, protecting it against termites, powder-post beetles and wood borers. It also guards wood against common rot.

*Reg. U. S. Pat. Off.

When you build, protect yourself against the cost of future repairs. Study the interesting applications pictured here. They show many ways Monsanto can help you avoid your share of America's *next* housing problem.

MONSANTO CHEMICAL COMPANY
St. Louis 4

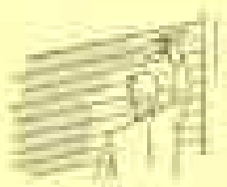
District Offices: Akron, Birmingham, Boston, Charlotte, Chicago, Cincinnati, Dayton, Detroit, Los Angeles, Montreal, New York, San Francisco, Seattle, Springfield, Toronto.

What is Santophen 20?
What are its advantages?

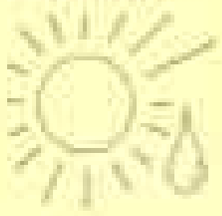
Santophen 20 is Monsanto's pentachlorophenol. It preserves lumber, millwork, heavy timbers, plywood and other building materials made of wood. When suitably formulated and applied:

Doesn't discolor or stain wood. Treatment is clean.

No objectionable odors remain after treatment.

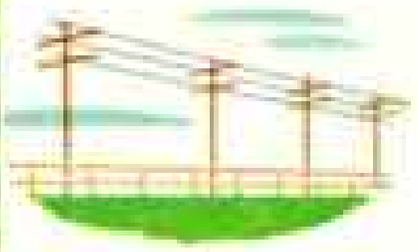


Surfaces can be satisfactorily finished.



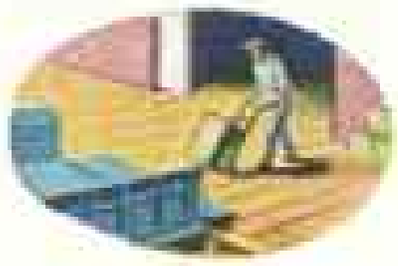
Withstands exposure to rain and sun.

Save millions of dollars on farms... Termites do $40,000,000 damage every year on farms. Prevent this and even greater losses through rot. Use lumber, woodwork and posts treated with formulations of Santophen 20.



Public utilities use wood preservatives to guard their investments.

Railroads and highway departments find wood preservatives essential.



Industry uses wood preservatives for roofing, flooring, loading docks.

What's YOUR Problem?

What do you do with wood, plywood, wallboard or other wood products? Are you interested in controlling insects and rot? Whatever your problem, take it up with Monsanto —producers of hundreds of chemicals and plastics that serve you in countless ways every day.

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MONSANTO
CHEMICALS for PLASTICS

IN LA PROVINCE DE

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Old world charm . . . Old world hospitality . . . fine roads . . . beautiful scenery . . . comfortable modern hostelries. An atmosphere that is different awaits you in Quebec.

For maps and illustrated booklets, write Province of Quebec Tourist Bureau, Quebec City, Quebec, Canada.

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MAKE *SURE* OF BETTER PICTURES

Come back with perfectly exposed pictures every time. It's easy with the new, improved G-E exposure meter to guide your camera. Gives you correct exposure in a jiffy. New, simplified dials make it easier, faster to use. Proved accuracy. Extreme sensitivity. And *now* lighter, sturdier. The ideal travel companion for your camera. A grand gift. See the G-E meter at photo dealers . . . it's 3 meters in one. *General Electric, Schenectady 5, New York.*

New, improved **G-E** EXPOSURE METER

GENERAL ELECTRIC

BOE-1-10C

How the baby volcano has grown! Three years ago Paricutin wasn't any bigger than a molehill. Wesco slide No. 184 shows the active youngster in full color. It's one of the marvelous Wesco photographic transparencies in an outstanding series which has caught for your lasting enjoyment the breathtaking beauty of Mexico. Packed in individual envelopes with detailed captions, 50¢ each.

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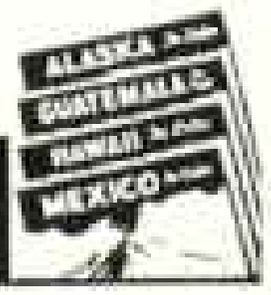

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Thousands of people want to move to the wonderful year-round climate of Albuquerque, and we have prepared this beautiful new booklet to help you plan—because there are no accommodations available yet. Send for the free booklet today, and plan to come later.

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RCA airborne television will bring you thrilling news events that could not otherwise be "covered"—while they are happening.

You'll see news in the making— through Television

Imagine! A helicopter is "covering" the story of a man marooned on a burning building. Sitting at your home television receiver, you will get the same eye-witness view as though you were riding along in the nose of the plane!

To develop equipment compact enough to fit into a plane was a major problem. But RCA-NBC scientists and engineers in cooperation with the U. S. Navy did it—and airborne television became a wartime reality.

This portable equipment has many peacetime uses—and may lead to development of a "walkie-lookie" with which a radio or news reporter might cover a story by television as readily as a news photographer does now with a camera.

Such progress-making research goes into each and every RCA product—and is your assurance that anything bearing the RCA or RCA Victor emblem is one of the finest instruments of its kind that science has achieved.

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Radio Corporation of America, Radio City, New York 20 . . . Listen to The RCA Victor Show, Sundays, 4:30 P.M., Eastern Time, over the NBC Network.

A television "eye" in the nose of a plane! Besides covering news events, by plane, automobile or boat, such equipment, developed by RCA and NBC, can make extremely accurate geographical surveys from planes flown by remote control. Moreover, similar television equipment can be used to observe hazardous manufacturing processes from a safe distance.

RADIO CORPORATION of AMERICA

FALSE TEETH WEARERS

Some things... you just can't "Brush Off!"

DON'T BRUSH DELICATE* PLATES!

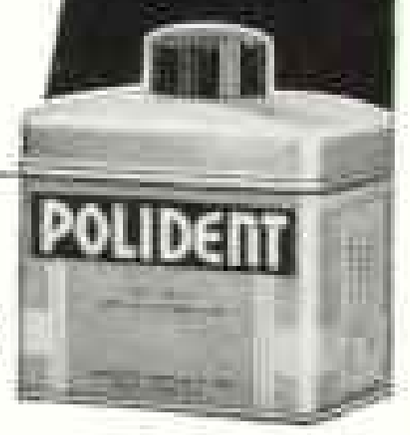
Soak them in Polident to keep them clean, bright, sweet.

*Brushing roughens plate material (60 times softer than natural teeth) making film and food particles cling more tightly. And brushing does *not reach* many little crevices, where food and film hide to taint the breath. Thus, brushing can *cause* unpleasant breath, but can not *cure* it!

Soak your plates in Polident! A Polident bath never scratches or roughens plates, yet reaches every nook and cranny. Polident is recommended by more dentists than any other denture cleanser. 30¢ and 60¢ sizes at all drug counters. Costs less than a penny a day.

IT'S EASY! IT'S QUICK!

Add Polident to ½ glass water, soak your plates 15 minutes or more—rinse—and they're ready to use!



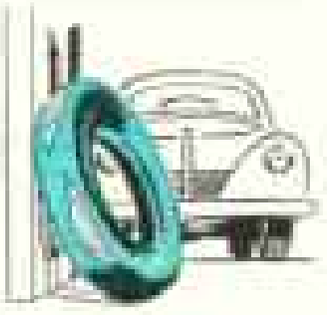
Use POLIDENT *Daily* TO KEEP PLATES AND BRIDGES CLEAN... AND ODOR-FREE!

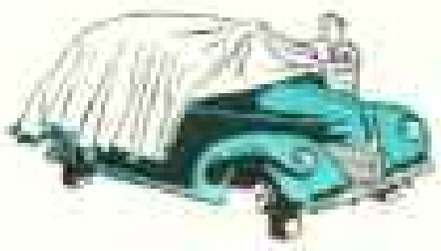
There's a great day ahead

for motorists  when new cars and tires

are plentiful...highways are repaired 

and made safe by modern engineering...and when those whose driving experience was limited during the war years renew their skill.

Right now, cars  average over 8 years of age, many with parts and tires  badly worn. The older your car gets, the more cautiously you should drive. If you aren't sure your car is safe, protect yourself and others by

keeping it off the road! 

You can *help* reduce the traffic accident toll which has been rising steadily since the war's end. For a check list of vital parts you should have inspected regularly, and for driving suggestions on how you can help reduce traffic accidents, send for Metropolitan's pamphlet. Just ask for Booklet 66-N.

Metropolitan Life Insurance Company

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The minstrel who loves his home

Most crickets, as you might expect, are wandering minstrels—cheerful vagabonds who love the open road.

But the great French naturalist, M. Fabre, tells us that the field cricket, (Gryllus campestris), views life differently. He yearns to become a solid citizen, a fellow with a permanent address.

So, after a briefly irresponsible youth, he settles down. Choosing a spot with a good, sunny exposure, he starts to dig.

He makes a small house, first. But he keeps improving it—deepening his hall, enlarging his bedroom, making a clean-swept doorway where he can sit and strum away on summer evenings. And, invariably, his doorway is concealed under a tuft of grass which protects it from intruders.

Now the field cricket's attitude, though unusual among his kind, is by no means so rare among humans. We, too, have a deep-seated instinct for home owning. We, too, tend to keep adding and improving, so that our homes constantly become more valuable to us. And we also do our best to protect our homes against both intruders and a more serious menace, fire. We do this by carrying insurance.

But in the last few years, many of us have overlooked an important fact about this protection: even if you haven't improved your house by so much as a new shingle, the chances are that it has materially increased in value. And, obviously, the insurance which used to be adequate may be woefully inadequate today.

Moreover, not only is your house worth more, but so is almost everything in it. Even if you have bought nothing new, the amount of fire and burglary insurance which used to be sufficient may now be far too little.

Fire and burglary insurance are not only two of the most useful forms of protection, but also two of the least costly. Why not call your Travelers agent, or your own broker, and let him bring your policies up to date—today?

MORAL: INSURE IN

The Travelers

ALL FORMS OF INSURANCE AND SURETY BONDS

The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, The Charter Oak Fire Insurance Company, Hartford, Connecticut.

You're wonderful... Have a Coca-Cola

...or the great day calls for the friendly pause

Graduation day is a big moment in any family's life. Everybody's happy, and "Let's celebrate" is the order of the day. So, out come frosty bottles of Coca-Cola and the friendly pause begins. *Have a Coke* is the word to all hands around —and there's no pleasanter way of saying *Mighty glad you're with us, folks. This is an occasion.*

* * *

"Coca-Cola" and its abbreviation "Coke" are the registered trade-marks which distinguish the product of The Coca-Cola Company.

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Full-Color Pictures

with your miniature camera

When you load with Kodachrome Film, you and your miniature camera are suddenly gifted beyond measure . . .

Your world of color comes back to you in your pictures . . . the colors of its flowers and fields and sky and water . . . warmth and radiance of the people you love.

It is a new adventure with your camera, and the beginning of great experiences.

You can project your Kodachrome transparencies in your own living room. You can also take them to your Kodak dealer and have him order full-color Kodachrome Prints (formerly called Minicolor), which range from the size shown above to as large as 11 x 14—and now cost less than ever.

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Kodachrome Film

for prints and projection

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across the nation

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Refresh yourself in mind and body with a vacation in mile-high Denver and the near-by Rockies. Drive historic Prospectors Trail, visiting gold-famed Central City (Play Festival, July 6-27) and Buffalo Bill's tomb and museum, to the 14,260 ft. summit of Mt. Evans over the world's highest auto highway. Old West rodeos, trout fishing in snow-fed streams, pine-scented hiking and riding trails . . . *rest in air-cooled comfort.*

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Send scenic booklet and guide of Denver and its Rocky Mtn. Wonderland.

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Address _____

1946 • BUFFALO BILL CENTENNIAL

YELLOWSTONE
NATIONAL PARK

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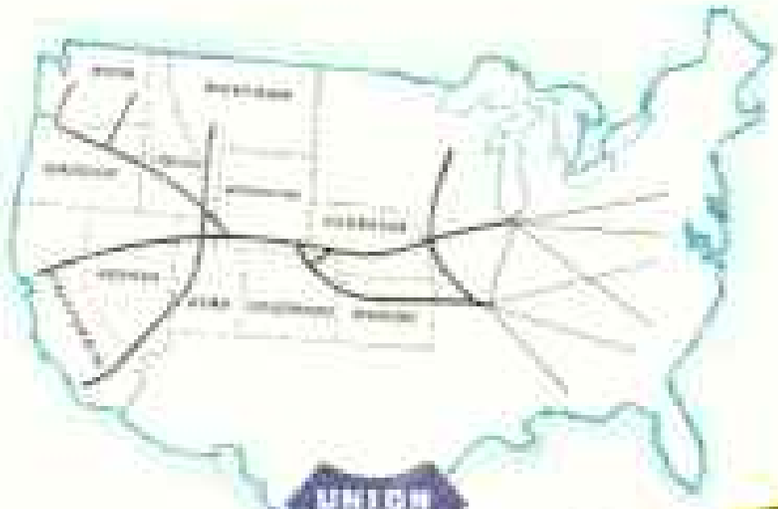
The famous Yellowstone bears, with their entertaining antics, perform for visitors and there is other wild-life in abundance.

Beautiful Grand Teton National Park is but a few miles south of Yellowstone. Together they offer a double attraction for vacationists. Comfortable, inexpensive guest accommodations are available.

These western wonderlands also may be visited as a short side-trip when enroute to or from the Pacific Coast via Union Pacific.

Travel by train and begin your vacation with relaxation. Ride in comfort and arrive rested. Union Pacific offers a variety of fast Streamliners and steam-powered transportation.

More western scenic regions are served by Union Pacific than by any other railroad. It's the world's greatest vacation travel bargain. For unexcelled passenger service—



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UNION PACIFIC RAILROAD
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MARVIN

Watch

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California . . . Land of Broad Horizons!

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Consult your insurance agent or broker as you would your doctor or lawyer

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Colleges for Women

CHRISTIAN COLLEGE ACCREDITED Junior College and Conservatory (A.A. degree). Terminal, transfer, pre-career courses. Music, Art, Drama, Secretarial, Nursing, Int. Dec., Costume Design, Home Mgmt. All sports, pool. 97th year. Catalog. **James C. Miller, Ph.D., Pres., Box D, Columbia, Mo.**

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A sports and recreational camp for boys 5-15 with one hour daily military training. Large staff mature men, many from **St. John's Military Academy** faculty, others, leading university athletes. Superb equipment, modern sanitation, pure water, splendid meals, physician and trained nurses. Accredited academic work offered. Lake location. One term only, 4 weeks. Catalog.

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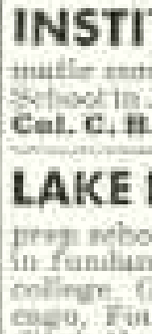

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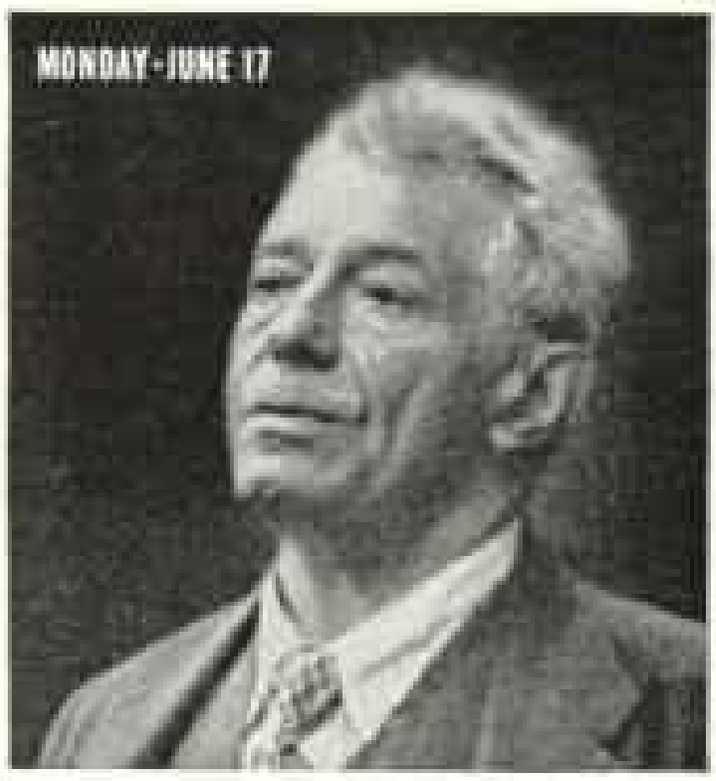

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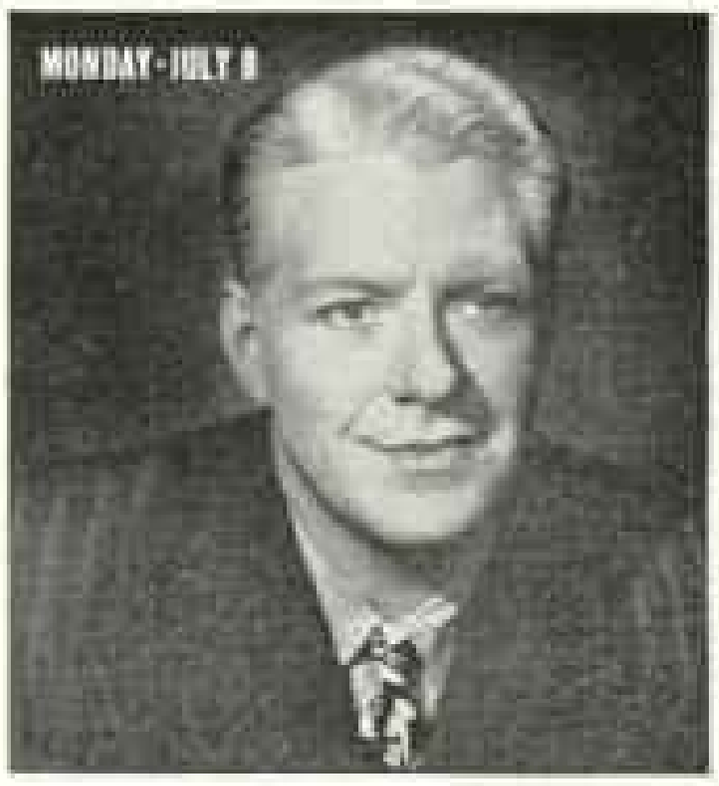

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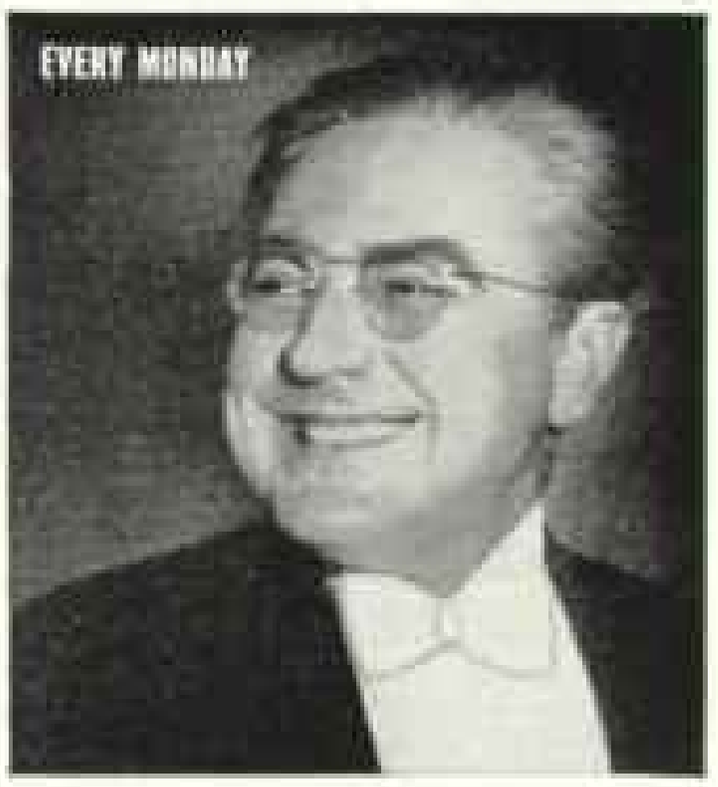

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