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Cruise on an Escort Carrier

BY MELVILLE BELL GROSVENOR

ONE HOT, sticky summer day I climbed the gangway and doffed my hat to the flag of the U. S. S. "C." This brand-new escort carrier was to be my home for seven exciting days. Her Captain and crew put me through every adventure from standing a watch to being catapulted in a torpedoplane.

For some time I had been fascinated by dispatches telling of the David-and-Goliath air-sea battles these carriers are fighting on every front.

"Just what are escort carriers?" I asked an aviator friend. "I can find no mention of them in prewar naval lists."

"Born of the war," he told me. "Merchant hulls with flight decks hastily added.

"After the Coral Sea and Midway victories, when ship-based planes stemmed the advancing Japanese, the United States found itself desperately short of aircraft carriers. We needed big flattops for fleet operations. Besides, we had a hunch small ones might cure the U-boat menace in mid-Atlantic.

"But how to get them and quickly, that was the question. Aircraft carriers take two years and more to build.*

"Fortunately, we had under way in our shipyards many large merchant ships and tankers. We took these hulls and built on flight and hangar decks and put bridge towers and stacks at the sides. Equipped with antisubmarine planes, these ships now are fighting in every sea."

"I should like to make a cruise on one," I commented.

"Well, why not? No reason why you shouldn't, just because most reporters prefer to go on big, glamorous carriers which 'see all the action.'"

Permission was granted.

As I reported aboard, the Officer of the Deck greeted me: "Welcome to the 'C.' The Captain's ashore, but he left word for you to make yourself at home in his quarters."

Last time I was on a naval ship, I slept in a hammock on the gun deck. To move into the Captain's country was too much.

Soon I found myself installed in a two-room suite of Spartan simplicity. Gone were the luxuries one associates with the skipper's cabin on a naval ship. A built-in bunk, chest of drawers, chair, and chart table were the bedroom's only furnishings. A big desk and a lounging chair filled one corner of the dining room, which also served as his office.

Though fresh air was constantly blowing in through ducts, the cabins seemed stuffy, because no hull openings are permitted in today's man-o'-war. Fear of bomb splinters and leaking water has sealed all ports permanently.

As I emerged from the shower, I was surprised by a Negro steward. Obviously, Daubin was taken aback at seeing a stranger in the Captain's sanctum. He blurted out, "Sir, are you the new Cap'n?"

Food That Keeps Men Fit to Fight

In the evening I was the guest of the wardroom officers for supper. To this rationed civilian it was a "banquet"! All the butter, coffee or cocoa, sugar, tomato or fruit juice, frozen vegetables, and juicy sirloin steaks that we could eat were provided.

"Do the sailors eat this well?" I asked the Executive Officer.

"Better," he said. "We officers run our own mess, but the men are fed by the Navy. Tomorrow you must visit the ship's chow line."

*See "New Queen of the Seas (Aircraft Carrier)," by Melville Bell Grosvenor, NATIONAL GEOGRAPHIC MAGAZINE, July, 1942.

U. S. Navy, Official

Planes Spotted for Quick Take-off, Carrier "A" Heads for Action at Attu

When a radio call for help came from our soldiers fighting ashore, this lone escort carrier sent her Wildcats off, despite mist, rain, and rough seas. The fighters sank Jap landing barges, destroyed gun positions, and strafed enemy soldiers. Snow-clad peaks; williwaws, dread Aleutian downdrafts; and Jap A.A. fire took a toll of eight planes (page 520).

"Every seat in the wardroom seems taken. What do you do at sea when all the officers are aboard?" I asked.

"We have two servings, sometimes three. At all times day or night we keep coffee, hot chocolate, and sandwiches available in case anyone gets hungry. The snack bar is particularly popular with the night watches. And no charge is made; the cost is covered by the mess bill. Food keeps men fit to fight."

After dinner the big tables, covered with green cloths, became a battleground for acey-deucy, cribbage, bridge, and poker. In a corner officers held informal meetings to discuss ship problems. At one table each night we were in port, officers gathered to censor the ship's mail.

"This censoring is just dreary work for us. It has to be done for the safety of the ship. Rarely do we cut words from veteran sailors' letters. They know the danger of telling folks back home about our movements. Usually, new recruits are the unwitting offenders."

"Apropos censoring, read this ditty a love-lorn sailor wrote for our ship's paper," remarked the Chaplain.

To the Cessor

My gal is—oh! so sweet,
I love her willy-nilly.
But how can I tell her of my love
When to the censor it looks so silly?

I hate the thought of those tender words
Being read by stranger's eyes,
The soul-writ words for her alone,
The lies and alibis! (Censored.)

So when you read each letter, Sir,
And laugh with profound delight,
Remember, Sir, a censor, too,
Reads every one you write!

After dinner a U.S.O. traveling troupe put on an excellent show in the hangar. The plane elevator was slightly raised to form a stage and decked out smartly with signal flags.

Guests of the ship were a hundred officers and enlisted WAVES. These vivacious ladies vied with the actors for audience attention.

After presenting an amusing dialogue with a dummy, a ventriloquist called for a sailor named Moose to come to the stage. (Every

U. S. Navy, Official

Old Glory Streams in the Breeze, as Escort Carrier "B" Sails for a U-boat Hunt

Soon her fighters and torpedoplanes, warming up on deck, will take off to search the seas for submarines and to protect the convoy from surface attack. On the voyage this baby flattop was credited with six "very probable kills" in her four-day battle against a Nazi wolf pack of 11 subs (pages 516, 517). No raider approached the convoy closer than 18 miles. Carrier men, noting the grassy wake at the left and the Stars and Stripes blowing across the deck, can tell that the ship is turning into the wind for launching planes.

U. S. Navy, official

Whang! Rat-tat-tat! Bombs and Bullets Blast a U-boat to the Surface

Here she lies helpless and smothered in foam while planes from Carrier "B" fly around like angry bees, sending .50-caliber bullets into her and dropping more eggs. Four Avengers and two Wildcats cooperated to sink this sub in 28 minutes. Seventeen survivors were picked up by destroyers.

ship has a "Moose"!) The crew pushed a big strapping fellow forward, and the ventriloquist whispered in his ear.

Moose stepped up to the microphone and began to "sing." The crew roared, for all knew he couldn't carry a tune. Yet he sang beautifully—until he forgot to move his lips. Then everyone saw the ventriloquist was putting music in his mouth.

During the entertainment, ship's routine went on as usual. Bosun's pipes trilled over the loud-speaker, drowning out Walter Huston; and the quartermaster called the "anchor watch to muster," breaking the romantic spell of a movie embrace.

At sea, movies usually are held in the afternoon, so that no stray light will betray the ship's position after dark. Officers prefer not to show them in danger zones for fear a torpedo might cause needless casualties if it hit beneath the massed audience in the hangar.

Movies over, I said goodnight to my new friends and climbed the ladders to my cabin eyrie. It took me a week to learn to thread unerringly the black maze of light locks and passageways. Patterned after photographers' darkroom entrances, U-shaped light locks let men pass quickly from below decks to topside without opening watertight doors. Thus no light can leak.

The stentorian voice of the "bull horn," bugling reveille, awakened me at 5:30. Soon I could hear the ship's work going on around me. From the door the flight deck lay flat and broad below. It seemed like a vast wooden football gridiron, with arresting and barrier wires for stripes. Along the side lines, gun galleries bristling with antiaircraft replaced players' benches.

At breakfast I sat next to the Air Officer,

"You're in the Groove, but Get That Right Wing Down," the Signal Officer Says

Arms extended tell the pilot he is coming in nicely; left wand slightly depressed indicates wing high. In an instant, the officer will give the cut and the plane will drop to the deck (Plate IV). Planes seem to hang or float in the air when in this position, yet actually they are approaching fast (page 531).

U. S. Navy, Official

Depth Bombs Drop on a Fleeing Sub; Two Crewmen Vainly Attempt to Escape

Clearly seen in lower left is a depth bomb about to enter the water close aboard; behind it a spout rises from its twin just fallen. An instant later both bombs will burst, destroying the U-boat. This was a "sure kill" for Carrier "B." One bare-legged Nazi stands frozen, while the other attempts to run forward.

U. S. Navy, Official

With Zigzagging Convoy and Sunlit Sea for Backdrop, an Avenger Flies off Its Mother Ship's Back

Starter and plane handlers have just jumped back and released the heavily laden plane, which now is roaring down the deck. Airborne, it will relieve one of the four torpedoplanes flying above the ships. Behind it a hunched-over starter coaxes out another plane, which will quickly spread its wings and take off. Six Grumman fighters snuggle at the left. Arresting wires, which hook and stop landing planes, lie flat on the deck during launchings.

U. S. Navy, Official

Skillfully and Quickly, Handlers Push a Dive Bomber to the After Elevator While Another Gets a "Wave-off"

As the forward deck is filled to capacity, the Air Officer has ordered this plane taken down to the hangar deck for stowing. Signal Officer, on a platform behind the dark screen, has just told the plane coming in to fly off and rejoin the landing circle, as the flight deck is not clear. The speed of spotting and handling planes vitally affects the efficiency of a carrier, for air operations must cease when men are working on deck. The quicker planes are spotted and got clear, the sooner others can be sent off or brought aboard.

the man directly responsible to the Captain for the ship's air operations and the care of the planes.

"Aren't you rather young to rate lieutenant commander's stripes?" I asked.

"Yes, I guess I am one of the youngest air officers on any ship, but I'd rather have a squadron of my own. In this job I am practically grounded to the ship. I would rather fly than anything else in the world."

"But isn't it vital for the safety of the pilots to have a seasoned flyer, such as you, in your job?"

"Oh, yes; otherwise we wouldn't know our pilots' reactions. Wait till you see air operations when we get to sea. Then you'll understand why we who land and service planes must be aviators."

"Tell me, what is the role of the escort carrier? What part does she play in the Fleet?"

"Strength of any team is in its reserves, the scrubs. We are the scrubs or training ships for the Fleet. Big ships get much of the credit and glory, but CVE's (escort carriers) do their job day after day. It's monotonous at times, but still we kill submarines and get our convoys through with few sinkings."

"You said escort carriers serve as training ships. Explain, please."

"On our last cruise we whipped a green crew into shape in three months. As soon as we docked, half our 'veteran' handling crews, gunners, engineers, et cetera, were transferred to a brand-new Essex-class carrier. 'Boots' fresh from training stations replaced them. If these men can make good on an escort, they will be successful on a big job. It's easier."

For permission to fly from the "C," I went ashore and called on Rear Admiral P. N. L. Bellinger, one of the Navy's first flyers. As Commander, Air Force, Atlantic Fleet, he is vitally concerned with the antisubmarine air war.

Air Umbrella Now Covers the Atlantic

"Admiral Bellinger, I have read many reports telling how we are whipping the U-boats in the Atlantic," I commented to this genial officer, who has more than 20 aviation records in his flying log. "Can you tell me what escort carriers are doing?"

"Imagine the Atlantic divided roughly north and south by three broad bands," the Admiral explained.

"Above our coastal strip land-based planes patrol, looking for submarines. On the other side of the Atlantic, the United Nations cover a similar band, planes working as far from shore as they can cruise. But in mid-Atlantic there was a broad area unprotected by airplanes. Here submarine wolf packs lurked and struck at our vital shipping arteries.

"Antisubmarine planes from escort carriers now constantly hunt in this no man's sea. Their success has been great. U-boats are rapidly vanishing, survivors taking themselves to less protected waters.

"My job is to provide and train these patrolling groups so that a convoy may carry its air umbrella clear across the Atlantic. Also we fight subs wherever we can find them. A sunken U-boat is one less to attack a convoy."

When I returned aboard, I immediately called on the Captain in "my" quarters. I asked him whether baby flattops had won their spurs as fighting ships.

"Oh, yes. We escort carrier men are proud of their role in this war," the Captain said. "Our little ships used to be a defensive arm; now they are an attack weapon. When we learn of a wolf pack lying in ambush, we head for its center. Instead of running away, we try for kills.

"Look at what escort carrier 'A' did at Attu! That little ship furnished the air cover for the Army landings. Attu veterans tell me that without her planes to strafe Jap strong points, casualties would have been greater and the island's capture delayed" (page 514).

A Tour of the Ship

"Could I make a tour of your fine ship?" I asked.

"Of course!" the Captain replied, turning me over to a young Lieutenant.

"Let's start with the bridge, the brains of the ship when under way," the Lieutenant said. "I'll lead to save time."

Up steel ladders we went to the top of the "island," or bridge structure.

"Here," my guide explained, "the Captain and Officer of the Deck hold sway. The skipper always stays on the bridge when we are in confined or dangerous waters or operating aircraft. He stands no watches, but is always on call for emergencies day and night. Usually at sea he sleeps in the emergency cabin below, which you now occupy."

It seemed awkward to stand on a bridge at the side of a ship. But this location has advantages. The Captain gains a clear view of the flight deck and can see the whole starboard side of the ship.

The Air Officer stands in the after part of the island with his various telephones and controls. He, too, has a clear vision of the flight deck and all around the horizon.

Next we visited the Air Office, where the

 Restoration, U. S. Navy, Official

Her Planes on Patrol, an Escort Carrier Scours the Sea for Submarines

Many of these little ships, built up from merchant hulls, now sail around the world escorting convoys and fighting U-boats. Though slow and of small plane capacity, "baby flattops" pack a terrific wallop. Many a sea and air battle has been fought in such warm blue skies and seas as are streaked by this zigzagging carrier.

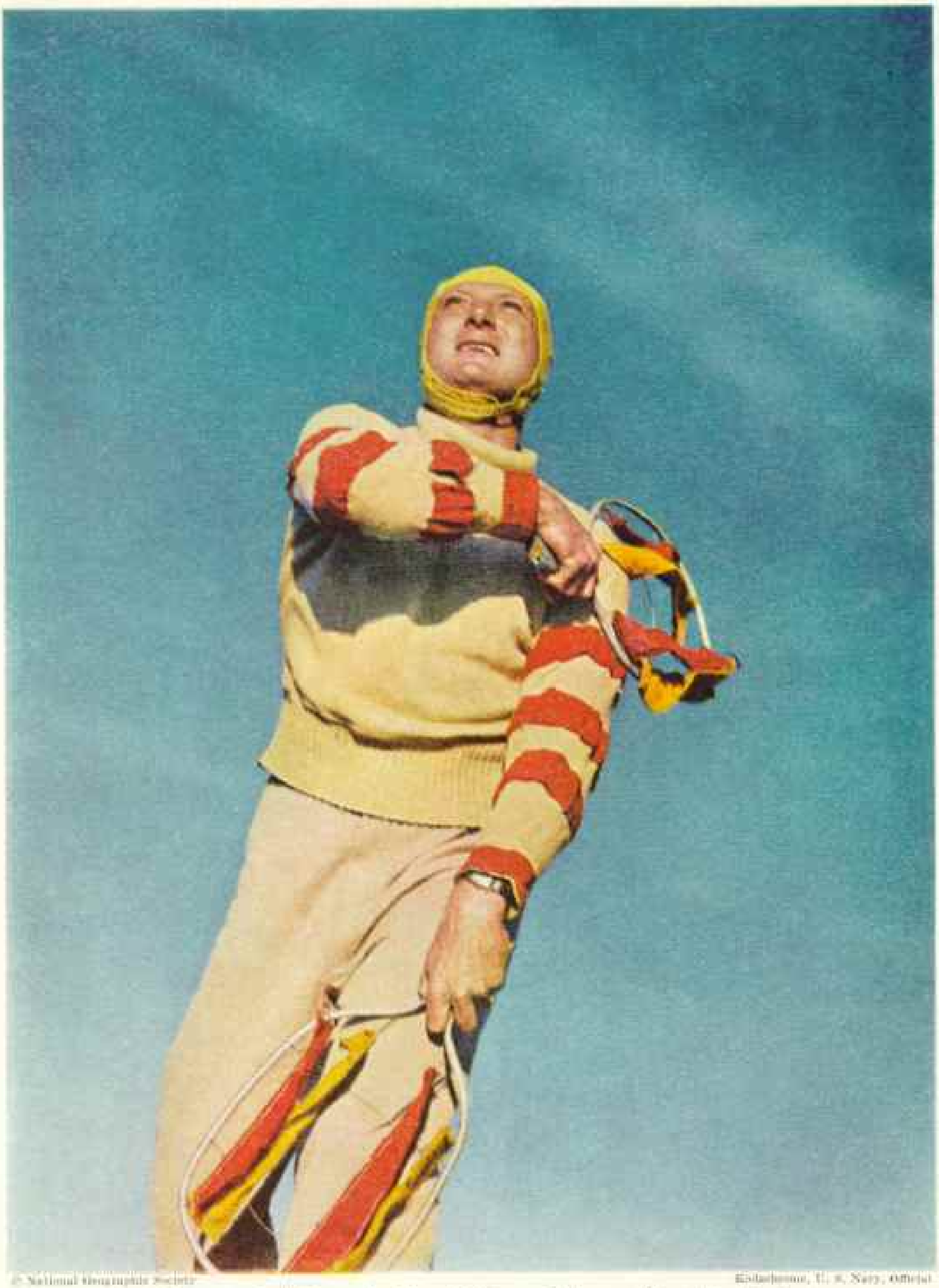
Kodachrome, U. S. Navy, Official

Aircraft Must Be Spotted and Secured to the Flight Deck So That Rough Seas and High Winds Will Not Toss Them Overboard

Big Douglas Dauntless dive bombers, left, and Grumman Wildcats are being spotted after landing. For the take-off, they must be moved farther aft to clear the runway. When the wind is light, the aircraft are catapulted. Wing lines hold planes to deck. The bridge is on the control tower to starboard.

Kodachrome, U. S. Navy, Official

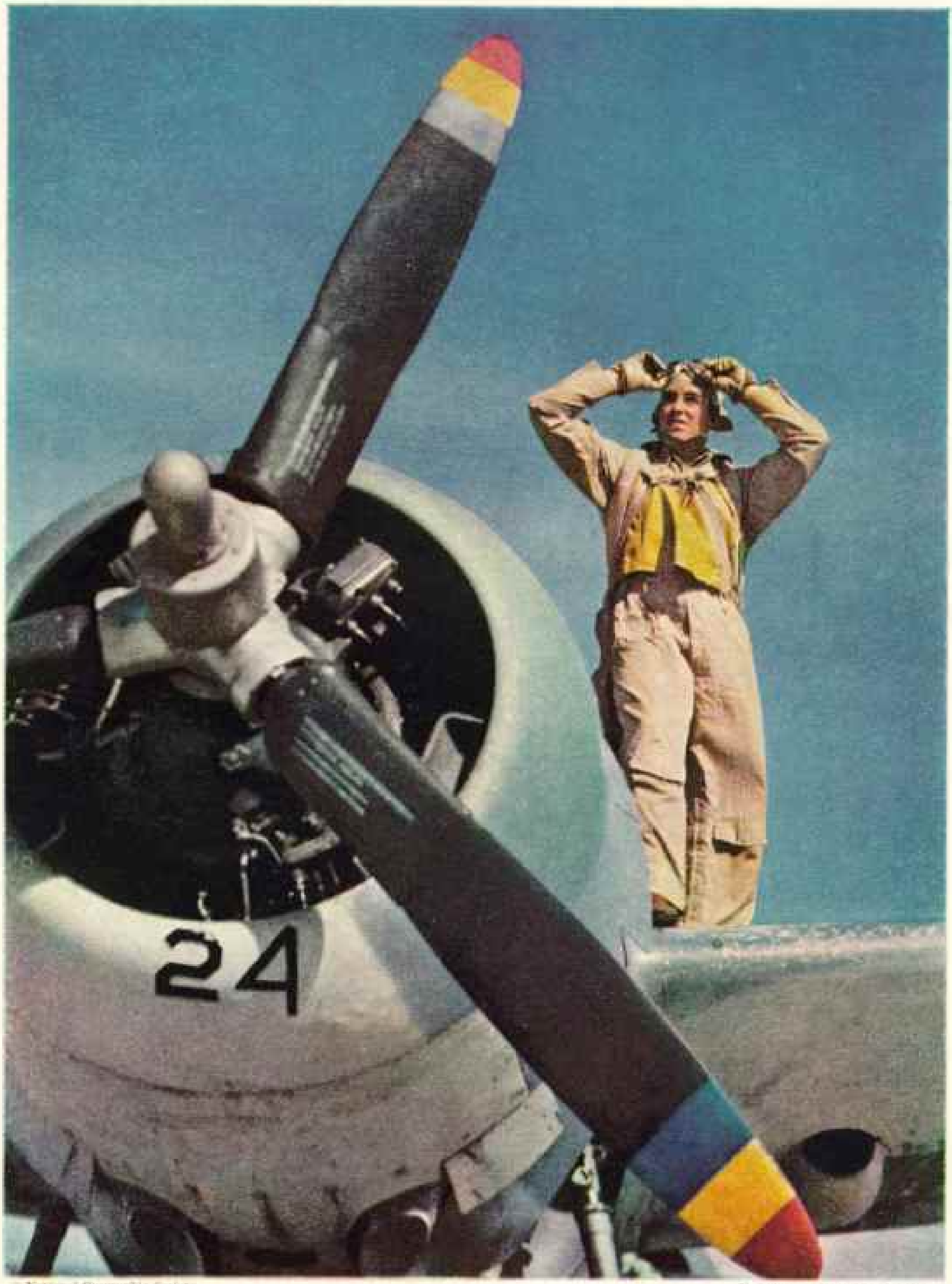
Such Coral Strands in the Pacific Become Heaven-sent Landing Fields for Lost Planes—a Tiny Destroyer Skirts the Reef (above)



 Eastman, U. S. Navy, Official

"Come on in," Says the Signal Officer, Giving a Pilot "the Cut"

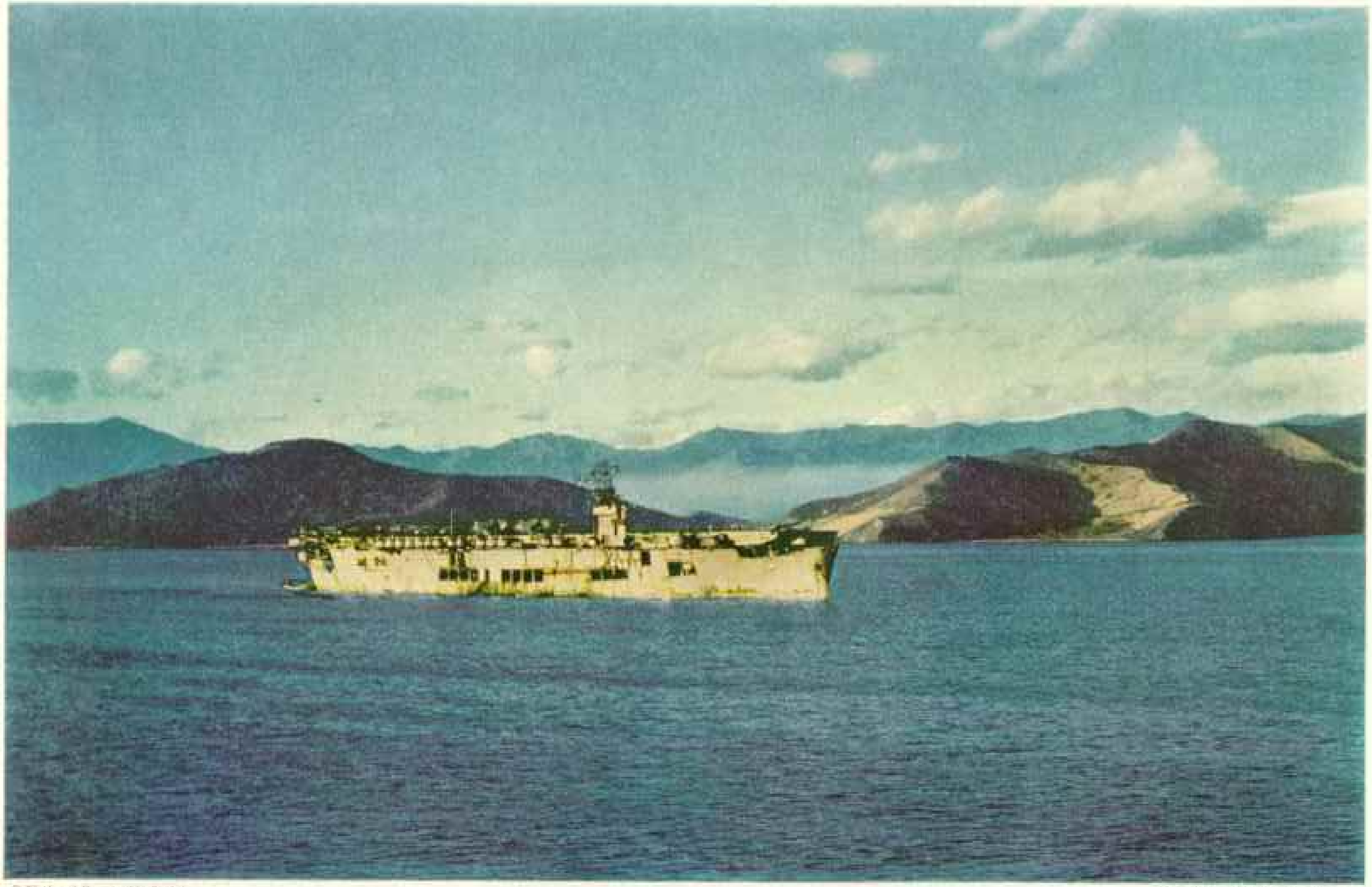
As a plane approaches the flight deck, this officer, in bright red and yellow sweater, coaches the pilot with wands, telling him whether he is too high or low, or coming in too fast or slow. Evidently the plane is "in the groove," for the officer has just brought his right hand smartly across his chest, which means "cut engine and land."



Kodachrome, U. S. Navy, Official

In Tropic Flying Suit and Parachute, a Fighter Pilot Awaits Launching Orders

Here he stands on the wing of his Wildcat adjusting his goggles, ready to strafe a submarine or escort the torpedoplanes on a mission. His zippered pants have pockets in the knees for holding maps, a knife, pencils, and other essentials. His parachute is not hooked up completely, as the leg straps have not been adjusted.



Kodachrome, U. S. Navy, Official

A Carrier of the Sangamon Class Drops Her Hook in a Far-off Harbor of the South Pacific

This big converted tanker, with hangar and flight decks and nests of antiaircraft guns, is a formidable fighter. While she is still capable of fueling vessels, her primary object is to give air cover to convoys and to fight submarines. When not needed for flight operations, she can transport many combat planes to war areas.

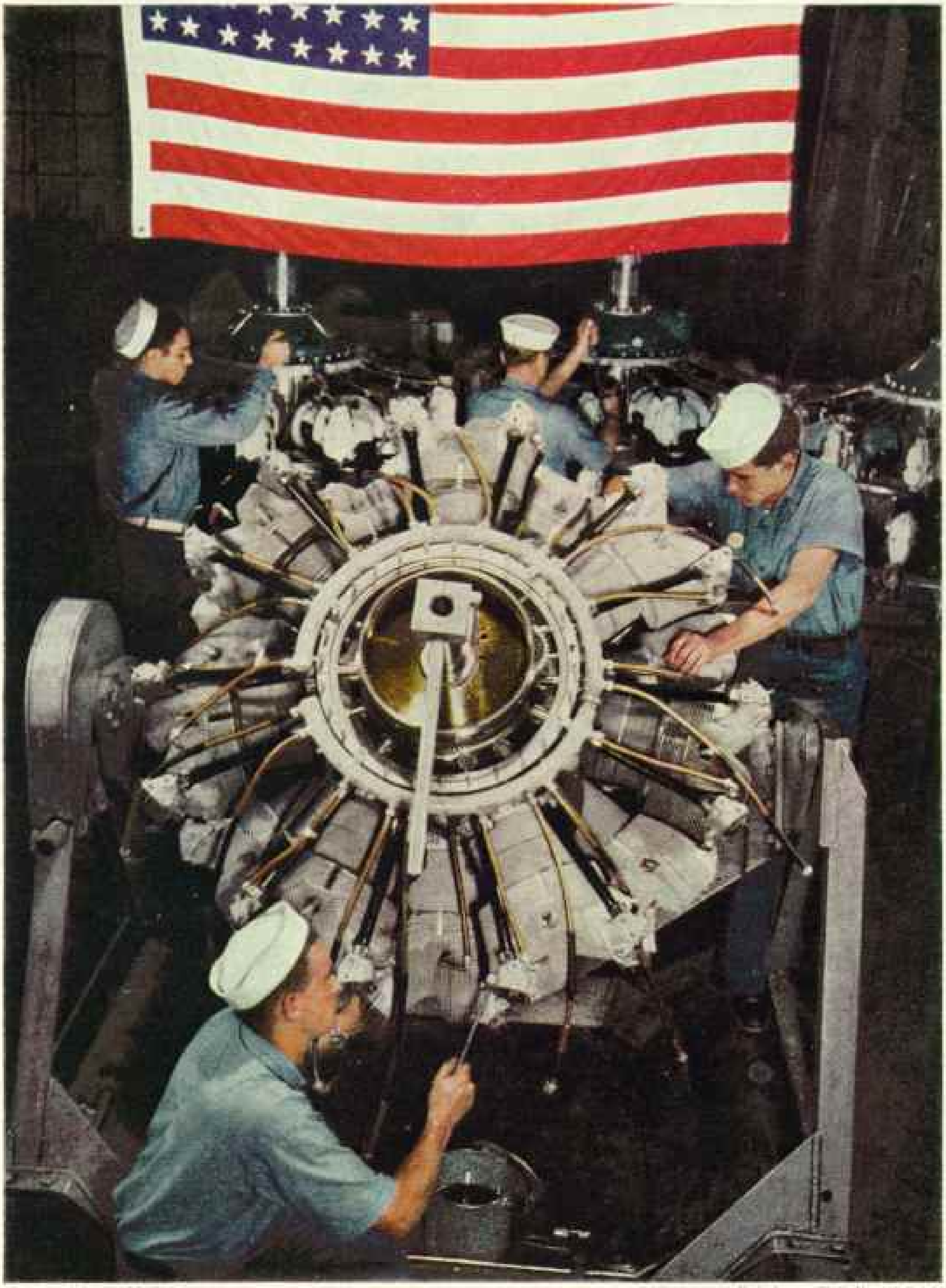
A Rigger Carries a Used Parachute to the Packing Table

To prevent fouling, he has braided the shrouds which hang from the mushrooming silk and support the harness. At the Lakehurst Naval Air Station men are taught to pack parachutes properly so that when the rip cord (right) is pulled during a jump, the chute will open, letting the man float safely down.

Kodachrome, U. S. Navy, Official

In Ready Room, Pilot Takes Down Last-minute Data for Patrol

In this comfortable, air-conditioned room with its leather chairs, bulletin boards, and loud-speakers, aviators gather to pick up weather information and to hear the briefing officer's instructions. At the command, "Pilots, man your planes," they pour out on the double to the flight deck.



 Kodachrome, U. S. Navy, Official

After Their Training Course, "Mees" Take Complete Care of the Carrier's Planes

When these mechanics report aboard, they will find all the shops and tools for repairing and servicing planes available at a shore base. Adjustments they make to an engine the day after joining ship may save or lose a man's life. Their hours are long and arduous; planes landing after dusk must be ready to take off before dawn.

Air Officer and Squadron Commander have their desks. Pilots' and planes' service records are kept here separate from the ship's files, so they can be quickly bundled together and put in a plane when the squadron moves ashore.

"What do you use that plan of the flight deck and those model planes for?" I inquired.

"Oh, that's my weegee board," the Air Officer replied. "Flight deck and planes are drawn to scale. Playing with them, I can study how best to stow our planes aboard."

Next door is air plot, where men keep track of the ship's planes in the air. On the wall a dead-reckoning tracer plots the ship's course and position automatically. Whenever the Air Officer wishes to send a message to a plane by radio, it goes through this office.

Down on the hangar deck men were busy loading torpedoes, depth bombs, and sea stores. It seemed like a huge warehouse. All ship's planes were ashore, but later I was to see this room packed and jammed with torpedo-planes and fighters.

Over in a corner the Hangar Deck Officer showed me spare engines, propellers, wings, rudders, wheels, and a complete tool and repair shop.

"If required, we can patch up or rebuild a plane as quickly as a shore base," he told me. "Since we carry so few planes, it is vital that they all be kept at top efficiency."

Down below we visited the crew's quarters, where the men sleep in bunks or cots three and four deep, one above the other. Some were lounging about, others were getting ready to go ashore, or were joking and joshing each other as sailors do.

Pants Pressing "While-U-Wait"

Off in a corner I saw a line of happy sailors. "Why are those fellows standing there wearing white hats, blouses, and shorts, but *holding* their pants?" I asked the Lieutenant.

"That's the liberty party. They are waiting to have their pants pressed! Several months ago the men banded together and bought a second-hand pants presser. Now on liberty days no one goes ashore without a last-minute 'while-U-wait' press."

Next, we had a look-see at the engine and boiler rooms. It was hot and humid down there.

"The 'black gang' deserves all the credit," said the Lieutenant. "During action they must stay below and tend the engines and boilers without ever seeing what's going on. It takes real nerve to stay on watch below when things are happening topside."

In the supply department men were taking boxes of sirloin steaks from the frozen food locker.

"We used to take sides of beef aboard and cut them up ourselves. Now steaks, chops, and veal cutlets come cut to size. All we have to do is to open a box and defrost the meat."

"How long can you feed the ship without touching port?" I asked the Supply Officer, a former hotel manager.

"We carry enough staples to last *several months*, and that's a lot of food," he replied. "For instance, each week the crew eats a ton of flour, a half ton of sugar, and a quarter ton each of stewed tomatoes and coffee."

"Where do you keep all those stores?"

"In the dance hall. Come, I'll show you."

Deep in the bowels of the ship we came to a huge storeroom cram-jammed with crates, packing boxes, plane parts, and engine spares.

"Old hands call this the 'dance hall.' Boots actually write home and tell their girls, 'Too bad I can't invite you to the ship's dance hall; it's closed for the duration.'"

Sailors Can Have Seconds on Steaks

On the way to sick bay, we passed through the mess hall. It was chow time.

Sailors were standing in line at the cafeteria, filling tray compartments with green peppers stuffed with Hamburg steak, French fried potatoes, fresh string beans, coffee or cocoa, and delicious apple pie.

"Portions are big. But can the sailors have seconds?" I asked the Supply Officer.

"Oh, yes! They can go through the line as many times as they wish, but they must observe the sign, 'Don't Waste Chow.' Many are growing boys still in their teens."

"Does that go for steaks, too?"

"Sure," he replied.

Leaving the mess hall, we passed another line of men stacking their dirty dishes. Meticulously, each turned his cup upside down in a rack, thus emptying it; dumped refuse in a barrel; and put plates, spoons, knives, and forks in their niches.

One sailor, paying more attention to us than to what he was doing, put his fork with the spoons.

"Hey, Jack! For cripes' sake, can't you tell a fork from a spoon?" an eagle-eyed cook bawled. "Make it right!"

In the eyes of the ship we came to sick bay, a miniature hospital. Here I met the Flight Surgeon, who, before the war, practiced medicine in Washington, D. C.

The doctor was proud of his spotless ward. He showed me the emergency bed, which is kept ever ready, and his operating room with the latest fittings.

U. S. Navy, Official

Tail Hook Caught in the Landing Gear, This Big Torpedoplane Still Tries to Fly

At the weird howl of the "yodeler," men jump for their lives into the gun galleries. The Signal Officer has given the cut (Plate IV), but the pilot, not satisfied with his landing, attempts to take off. He didn't know that a wire had already snared his plane. Here it stalls in the air. An instant later it slammed to the deck and skidded over the side (page 532).

"I see no patients. You must have a healthful ship," I remarked.

"Yes, indeed. My chief concern is keeping an eye on our pilots. Patrolling watery wastes, day after day, is very wearing on the nerves. I believe flying from small carriers is, perhaps, the most difficult and trying of all. Pilots not only hunt alone or in pairs, but operate from a tiny flight deck, constantly pitching and rolling."

"How can you tell when an aviator needs a rest?"

"Best fatigue signs are when a pilot gets crabby and critical of his friends and his landings are not as smooth as usual. I make a point of quietly hobnobbing with the pilots, eating and playing games with them, so that I know their characteristics. At the first signs of fatigue, we give them special physical tests. If the report is too low, we pronounce them not fit to fly, and they must rest until normal again. This undoubtedly saves lives.

"Three of our hospital corpsmen are veterans of the *Yorktown*. These are my best men and serve as models for others. It's so in other departments of the ship. A sprinkling of survivors from the *Lexington* and *Yorktown* fill key positions."

"C" Gets under Way, Handles Easily

Next morning we got under way at 9 a. m. on the dot. The ship pulled away from her berth as smoothly as a motor cruiser and she handled like one.

Standing out into the channel, we passed much traffic. A monster battleship loomed ahead. As she came closer, our lookouts spotted a big red flag spangled with four white stars and anchor.

The Officer of the Deck reported to the Captain, "The —— standing in on the port hand, sir. She's flying the Under Secretary of the Navy's flag. Mr. James V. Forrestal must be aboard."

"Very well. Sound 'Quarters'! On the double!"

Immediately the ship's bull horn blared a bugle call. Men dropped paint brushes, welding irons, air-hose cleaners, engine pliers, or whatever other tools they were using and ran to muster stations on the flight deck. In a few minutes all hands were in position, and our baby carrier saluted one of the newest ships of the Fleet. It was an impressive sight.

We steamed all day at cruising speed until we reached our rendezvous point, where we let go the anchor for the night.

That night, after another fine steak dinner, I talked again with my friend, the Air Officer. "What are the flight plans for tomorrow? Any chance you will catapult me?"

"Now, see here, I arranged for a flight for you, but nothing was said about catapulting. Very few officers, including aviators, have been shot off. Better leave well enough alone; and, besides, sometimes the catapult doesn't catapult!

"Look at these pictures," he said, drawing from his desk a remarkable set. "We had shot off hundreds of planes, yet this time the cat failed, through some strange quirk.

"The plane simply taxied off the deck and fluttered to the water in the path of the onrushing ship. With no time to change course, the ship ran right over it, forcing it down and under. Neither plane nor pilot was seen again, but the radioman escaped by swimming to the side. See that open door in the fuselage? Sparks has jumped, yet flying spray indicates the plane is still moving."

"Your photographers were certainly on the job to catch those shots. They are stills, aren't they? Not strips of movie film?"

"Yes, our cameramen must be fast as lightning to get crack-up pictures. They are always on duty during air operations. Their photographs are of great help in training pilots and correcting errors. Action shots often record happenings too quick for the human eye to see, thus revealing the accident cause."

Reveille blew early next morning so plane handlers and mechanics would be ready to receive the carrier's homing birds.

At 7:50 the "C" got under way and a few minutes later torpedoplanes hove in sight flying in groups of three from their shore base. At 8 sharp the first planes were ordered by searchlight signals to start flying in the landing zone, an imaginary circle of half-mile radius from the ship.

When the ship attained full speed and was headed into the wind, the Captain gave the order, "Land planes!"

Fast as you can say "Stand by to land planes," the Air Officer shouted just that over the bull horn. The ship's "yodeler," or weird siren, wailed a warning "Heads up! Clear the flight deck." Two black balls ran up to the yardarm telling other ships, "Stand clear! Flight operations in progress."

Men ran and jumped for safety into the gun galleries at the flight deck sides. Signal Officer, wands in hand, hopped up on his platform on the port quarter. And the red danger flag on the bridge was doused and replaced by a white one which told airborne pilots, "Deck clear, come in and land."

Almost instantly, a TBF circling counterclockwise off our port quarter swung in in a graceful swoop toward our stern. The Signal Officer kept dipping his right arm and raising his left to show the pilot the plane had one wing up and the other down (page 517). Finally he gave up and waved the plane off.

The next came in beautifully, it seemed to me. Yet he got a "wave off" too.

"What was the matter with that one?" I asked the Air Officer at my side.

"Too high and too fast," he said. "He'd get a bad bounce if Deac brought him in."

A Perfect Landing

Another came drifting in, pretty as a gull riding the breeze. He had his wheels, hook, and landing flaps down. In he floated right over the stern.

Suddenly Deac gave the cut, bringing his right arm smartly across his chest (Plate IV). The plane dropped gently to the deck, arresting wires caught the hook, and it stopped abruptly.

"Beautiful landing! No need to look his number up. I can tell that pilot by the way he handles his plane. It's the Squadron Commander, one of the finest pilots in the Navy. He's going to fly you."

By now, the handling crew had unhooked the big plane from the arresting gear and the pilot was taxiing it forward.

Another flew in. He seemed "in the groove," but Deac waved him off.

"What's wrong?"

"He forgot to lower his landing hook. Bad business!" growled the Air Officer.

"What would happen if he came in anyway?"

"He'd probably end up in the barrier, down there," pointing to heavy wires stretching like a fence across the deck. "It would mean a nasty crack-up and a smashed plane. The barrier would stop him though—like a stone wall!"

In quick succession, the other planes dropped in. Several hit hard, bouncing jerkily, but hooks engaged and wires held.

"Some weeks ago a TBF came in and Deac

U. S. Navy, official

Hung by Her Tail, an Avenger Dangles from the Flight Deck of the "C"

Captain, Air Officer, and Executive Officer look down at the cracked up torpedoplane. Its wheels ended in a life-raft nest; broken tail on the stack. A line was thrown to the pilot and crew and they climbed up safely hand over hand (Plate XV). Later the plane was retrieved by a jury boom (page 531).

U. S. Navy, Official

Four A.M. in the Ready Room. Pilots Sing as They Await the Zero Hour

Here they spend long hours waiting for "scrambles" or hurry calls; keep their chart boards up-to-date with last-minute news of the enemy and weather data, and adjust their eyes to darkness by wearing red goggles (right background). Plane insignia chart (left), estimated position of the ship on take-off and return, recognition signals, attack plans, and other information are posted on the bulkheads. A few minutes later the loud-speaker bawled "Pilots, man your planes!" and out they piled for the attack on French North Africa, November 8, 1942.

gave him the cut. The pilot 'saw a gremlin' and 'gave her the gun,' trying to fly off. He didn't know that his hook had caught a landing wire. That plane bucked and squirmed, trying to get away, like a wild steer roped by a cowpuncher. It ended up over the side, hanging by its tail. No one was hurt, but men in the gun gallery had to duck fast" (page 532).

"Why are those two men at the side wearing white monkey suits?" I queried. "They belong in a carnival!"

"They're 'hot papas,' our asbestos-clad fire fighters. Whenever planes are operating, they must stand by to rescue trapped flyers in crack-ups and snuff out fires."

So fascinated had I become watching the planes that I had taken my eyes off the handling crews—but not so the Air Officer. During the landings he kept up a running conversation with several people on different telephones.

"Air Pilot, tell those fighter pilots to quit fooling around and get into the landing circle. We'll be ready to take 'em aboard soon.

"Step lively, men. Get that fighter forward. Another is coming in.

"Yes, take six fighters down the forward elevator—spot the TBF's well forward.

"Wind 32 knots over the deck.

"Get those 'sightseers' out of the gun galleries forward. They'll get their heads chopped off!

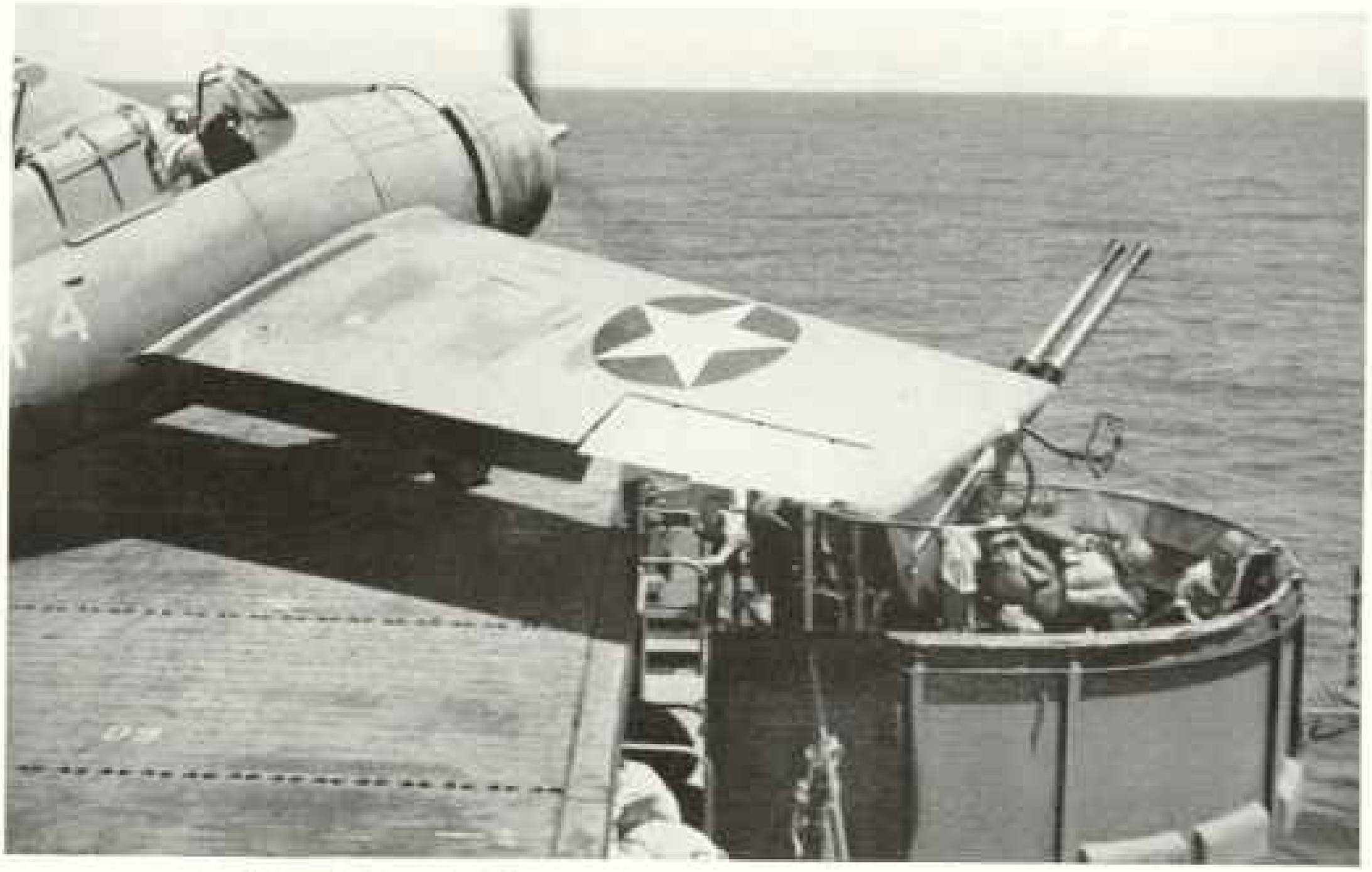
"Ready Room? Tell new TBF pilots to stand by. They will take off as soon as regular men have finished their refresher landings.

"Yes, Captain? Aye, aye, sir! I'll pass the word."

Over the bull horn he shouts, "Red flag! Stop landings!" And in an aside to a sailor, "Signalman, put up the red flag."

While the ship ran down wind, the Air Officer and I visited the ready room, where pilots get their flight orders and pick up last-minute data on the enemy and the weather.

Pilots were lounging all over the place. Some wore yellow rubber life jackets and helmets (Plate VII); others, working clothes. Comfortable leather chairs filled the room.



A Fighter Plane Taking off Suddenly Veers to Starboard and——

Hearing the ship's "yodeler" screeching a warning, these gunners duck for safety under the flight deck or gun mounts. The pilot vainly tries to straighten the plane by steering to the left and lifting his right wing. This incident occurred on the U. S. escort carrier *Altamaha*.

U. S. Navy Official

Crashes into the Bofors Guns, Neatly Slicing off a Wing Tip

Fast-working ship photographer catches all the action, including a flying helmet, blown off a gunner's head, wing tip bending up, and scratched gun muzzles. Not having flying speed, the plane swoops crazily down to the water. Note escorting destroyer constantly on the lookout for hidden subs.

U. S. Navy, Official

Then It Dives into the Sea with a Mighty Splash; but Pilot Climbs Out Unhurt

A sudden shift of wind or an unexpected heave of the flight deck from a swell may have deflected this plane. Usually in such cases the plane sinks before it can be reached, but the pilot is picked up by a destroyer. Thousands of difficult landings are made yearly on carriers; it is surprising accidents are so few.

Blackboards and charts lined the walls (533).

"Here's where we wait for a scramble (hurry call—enemy sighted)," the Squadron Commander told me, "and plan our gambits."

"What's it like, hunting submarines day after day?" I asked.

"Unromantic and tough on the boys. Hour after hour we search the seas. Then when we locate a concentration and square off at 'em, they duck. It leaves us baffled. For a year and a half I have hunted U-boats—no contacts. But I have a hunch we'll fill our bag this time!"

"When you make a contact, what will you do?"

"Our plans are all made and rehearsed. Every pilot knows what to do. If the sub stays on the surface and fights back—they have been getting sassy lately—fighters barge in and strafe the gun crews. Then TBF's come in and finish him off with depth bombs."

"But what if he dives?"

"Oh, that's when we gambit. We know the sub must come up sometime, so we pull off and hide at a distance. Every once in a while we take a look. If he surfaces, down we go to the attack."

"Do you ever have false alarms—bomb big fish and things?"

"Oh, yes. On our last trip a pilot signaled a surface ship, 'Attacked large whale.' The answer came back, 'Roger (OK), male or female?'

"Another time, a pilot approaching for a landing spotted a 'feather' dead astern. He dropped two depth bombs square on the target. It was beautiful bombing, but the spout still followed the ship. Finally he signaled, 'Thought ship's wake was periscope!'

"Though he scared everyone on the ship—engineers thought the explosions were a hit—he was not reprimanded. A pilot is his own boss in the air. He is taught to act instantly rather than do nothing. In this case, the cost of two bombs was a small price to pay for the security of the ship."

The pilots showed me some amusing cartoons penciled by one of them. Mostly they illustrated boners made by the squadron.

One pilot made four low-landing approaches in succession, which is considered very dangerous. He might crash into the ship. All you see in one cartoon is the Signal Officer looking down over the stern. "I'——, coming in low again!" reads the caption.

A fighter plane clips off the top of the ship's mast, careens wildly away streaming radio wires, signal flags, etc.

On the flight deck a sailor says to another: "Just H——, stunting low again!"

"Besides giving much amusement, these cartoons help us greatly," said the Squadron Commander. "Subtle criticism from a pal tips us off to mistakes before it's too late."

Bong! bong! bong! went the alarm bell. From a loud-speaker the voice of the Air Officer sputtered, "Pilots, man your planes!"

Out we rushed to the flight deck, pilots to their cockpits, I to the control tower.

"Stand by to start engines!"

"Stand clear of propellers!"

"Start engines!" A roar swelled up from the deck as motors coughed to life.

"Launch planes!"

The lead pilot "revved" his engine to full throttle. Mechanics jerked the wheel chocks away and dashed to the side.

Slowly the big TBF began to move. Faster and faster it rolled. Tail came up and propeller blades blasted the air as it flashed past our post. Just before it reached the bow, it took off and soared swiftly into the air, curving gently to the side.

One after another the planes thundered down the deck and leaped into the sky.

"All planes airborne, Captain," reported the Air Officer.

"Very well. Stand by to land planes."

"Aye, aye, sir."

So again the planes came aboard, and the handling crews spotted them forward, securing wings to the deck (Plate II).

"While you are servicing the planes for the next flight, I'll turn the ship down wind," advised the Captain. "Cease air operations."

At once the red flag replaced the white, and the flight deck became a milling mass of men. I never grew tired of watching this sight. While some red-shirted and red-helmeted men gassed near-empty planes, others in yellow, blue, and green jerseys "horsed" the planes aft to take-off positions (page 519).

"Hit 'em hard, hit 'em low," the handlers grunted as they pushed the heavy planes around.

A Klaxon sounded. With no further warning a big square chunk of the deck dropped from sight. Shortly it came up again, bringing two fighters, their wings folded back like big whitish moths.

Quickly handlers pushed them off the elevator, which dropped for another load. Men grabbed wing tips, deftly flipped them up and around, and lo, the two Grummans were ready to fight.

Soon all planes were spotted aft, new pilots at the controls of some, and the air department was ready for operations.

For several days this routine went on, to let new pilots get the feel of the deck and older ones brush up after weeks ashore.

"Have you noticed any change in the speed of spotting planes on deck?" the Air Officer asked one day.

"I certainly have. At first the handling crews seemed a bit bewildered. Now they work together like a professional football team," I replied.

"Exactly! That's why we go through this routine so many times, to train green handling crews as well as pilots."

One day the Captain invited the Air Officer, Squadron Commander, and me to lunch—filet mignon and ice cream! Talk was informal and pleasant, dealing mostly with ship operations.

"We three bear all the responsibility for the success of our mission," the Captain commented. "If we make a mistake, it may cost a life. We have to do everything right the first time."

Turning to the Air Officer, he said, "I noticed that our new pilots made excellent landings. This surprised me, because qualifying green pilots used to be exciting. We nearly always had a crack-up. Is that due to the new training program?"

"Yes, sir. Pilots formerly were sent to us fresh from training school. We had to qualify them for carrier operations. Now pilots are not detailed to us until they have had 18 months of school, including three months on Great Lakes training carriers or a sister of this ship. They come to us as full-fledged pilots, confident and experienced" (Plates XI to XVI).

"It's much better. Now we can devote all our energy to fighting the enemy."

Carrier Men on Duty 19 Hours a Day

"Captain, submarines attack at dawn and dusk. That means your planes must be launched and recovered in darkness?"

"Yes, we keep them patrolling constantly all day long in summer. That's why duty on an escort carrier is tough going.

"Reveille blows two hours before sunrise and taps two hours after sunset. The crew gets only about four and a half or five hours of sleep. Believe me, it's a cold, sleepy bunch that musters for roll call at sea. During the day we encourage men off watch to take naps, but they must also do their routine jobs."

"Do you have many drills at sea or is all that done in protected waters?"

"Every day we have a general drill of some sort, such as abandon ship, collision, or fire and rescue. Also we fire our guns whenever

 Rodefeld, U. S. Navy, Official

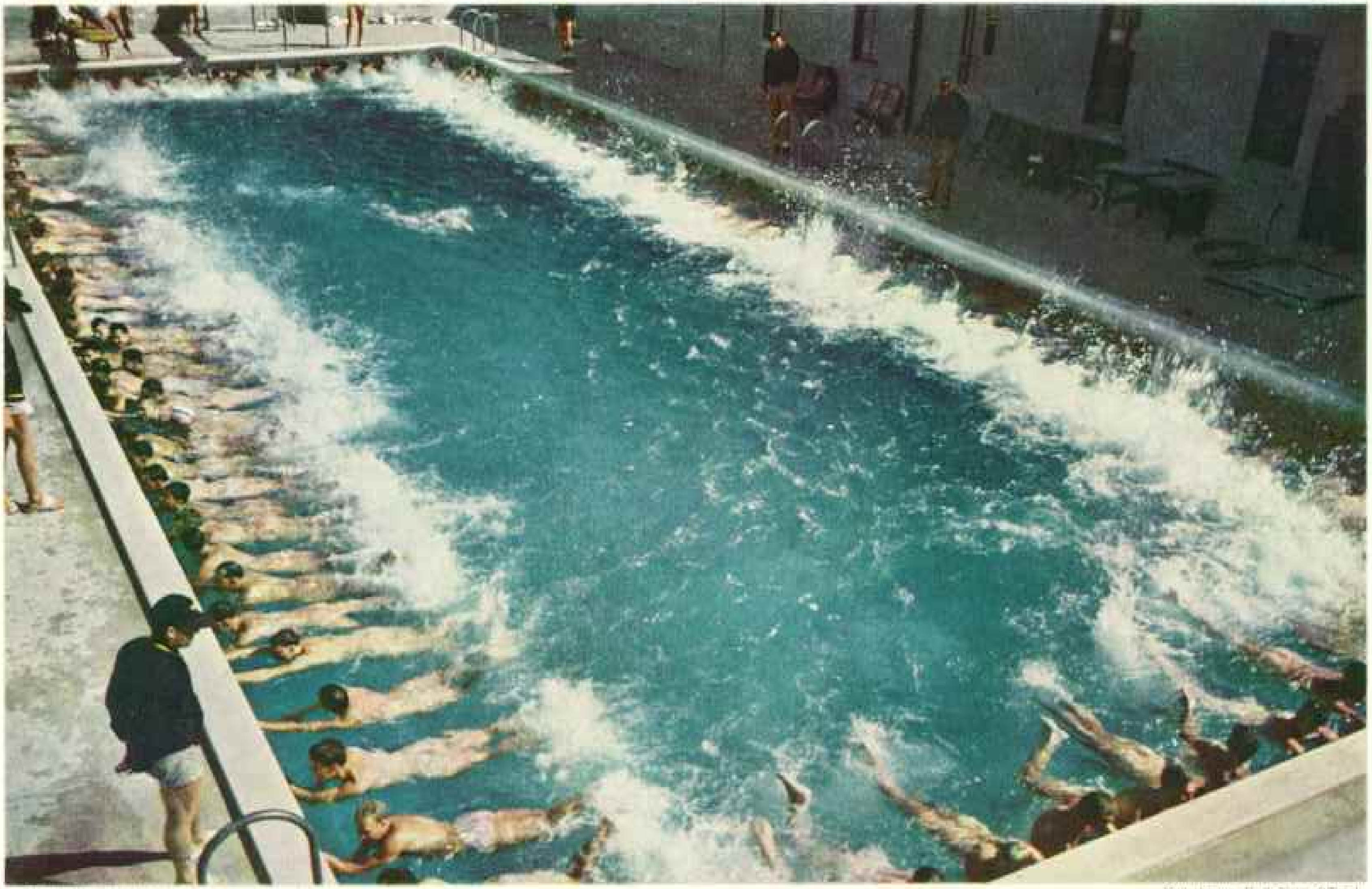
Over an East Coast Inlet an Avenger Soars, Waiting for Her Carrier to Put to Sea

First used in combat at Midway, these efficient torpedoplanes are the pride and joy of naval pilots. Armed with depth bombs and machine guns, they search for submarines in mid-Atlantic far beyond the range of land planes. All day they scan the sea ahead and around the convoy, looking for "feathers," telltale periscope wakes.

Kodachrome, U. S. Navy, Official

Grumman Avengers Cruise Over the Sea on a Torpedo Mission—For Antisubmarine Work They Fly in Pairs

When a TBF spots a U-boat, it dives down close, drops depth bombs, and then circles around to see if it is crippled. If the sub crew fights back with antiaircraft guns, the big plane will strafe them viciously with its machine guns in nose, ball turret, and belly. Each carries three men—pilot, gunner in turret, and radioman.



Kodachrome, U. S. Navy, Official

So That They May Take Care of Themselves if Forced Down at Sea, Aviation Cadets Take a Tough, Grueling Pre-Flight Course

Here in the swimming pool at St. Mary's College, California, cadets, coached by famous instructors, do kicking exercises to strengthen their legs. To graduate, they not only have to qualify in aeronautical subjects, but must pass rigid swimming tests. Later, skill in the water may save their lives.

Kodachrome, U. S. Navy, official

When Students Take the Controls of These Safe Trainers, Experienced Pilots Call Them "Yellow Perils"

It takes 18 months to train a pilot. After ground school, the cadet is given elementary flight training by the Civil Aeronautics Authority. He then goes to "Pre-Flight" for toughening, followed by his first military flying at "Primary." Next, he moves to "Intermediate" for specialized instruction; thence to "Operational" for polishing.

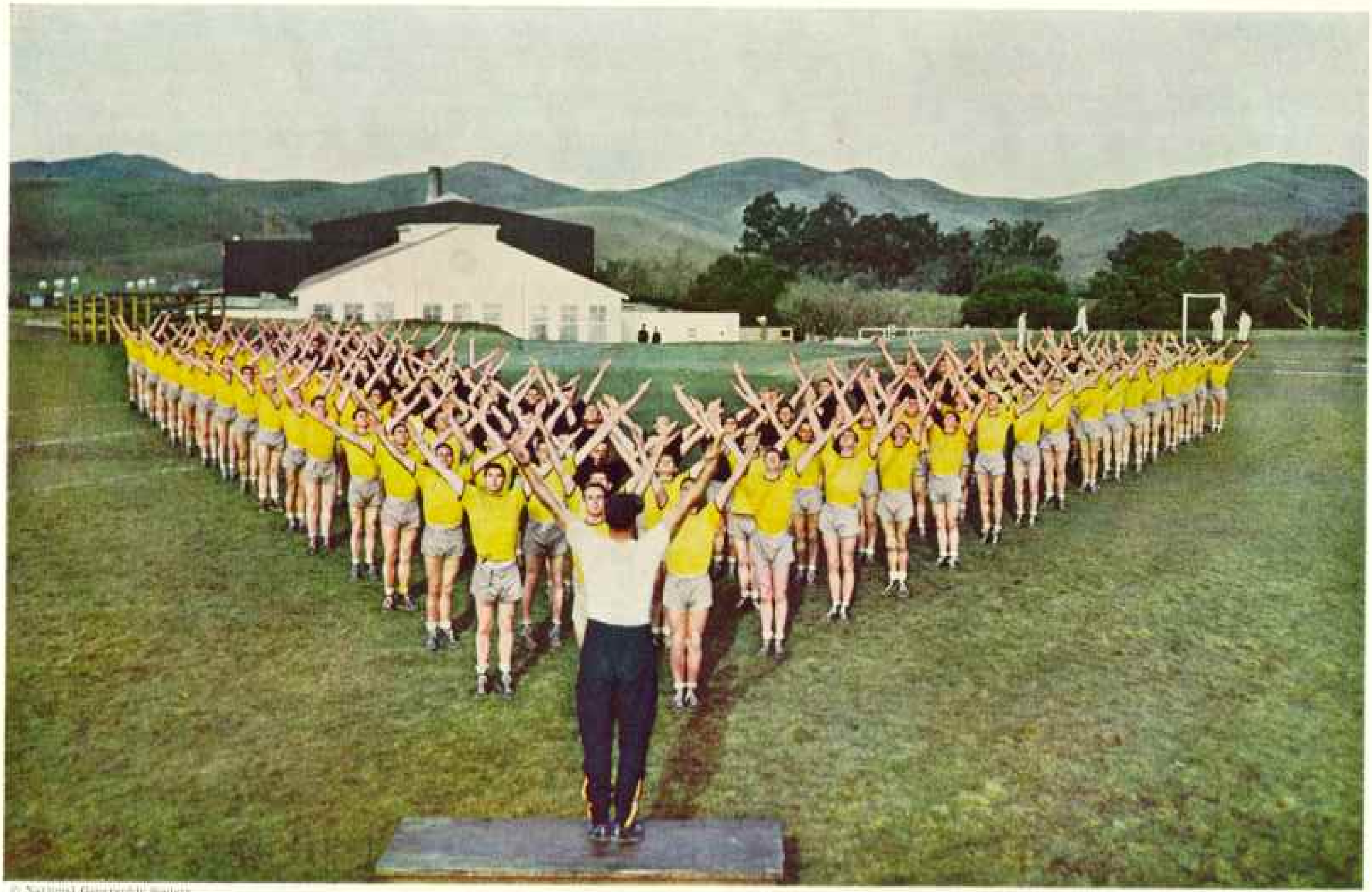
"OK, Take Her Up" Are Thrilling Words to the Fledgling

After about 10 hours of dual instruction in Primary School, the instructor tells this cadet to fly off on his own, his first solo in a naval trainer. Instructors constantly practice, so they will be ready when needed for combat.

Kodachrome, U. S. Navy, Official

Some "Intermediate" Pilots Learn to Fly Float Planes

Just after a landing, the pilot enters on the "yellow sheet" his report of the plane's performance. Only cadets who are needed to fly planes from cruisers or battleships are given training in float types.



Kodachrome, U. S. Navy, Official

Future Navy Pilots at St. Mary's Welcome the Deep-breathing Exercise which Concludes Muscle-building Setting-up Drill

Though they do no flying, these "Pre-Flight" students take aeronautical subjects such as navigation, radio, and aerology; learn jujitsu and hand-to-hand fighting, commando style, and play body-building sports, such as soccer, boxing, wrestling, and swimming. About five percent are "washed out" for physical reasons.

© National Geographic Society

"Climb That 20-foot Rope in Nine Seconds Flat!"

Cadets must strengthen their arm muscles in case they should have to abandon ship by sliding down a rope or be rescued from the water by climbing a dangling life line. Rope climbing is easy if you know how!

Keystone, U. S. Navy, Official

Fall Overboard, No Life Belt? Blow up Your Pants!

Many a shipwrecked sailor has been saved by this trick. He takes off his trousers, knots the legs, then inflates them by sweeping them through the air. When air leaks out after half an hour, he inflates his "life buoy" again.

At Command "Start Engines," the Plane Comes to Life with a Roar
The student's helmet is fitted with a speaking tube so that he can hear the instructor above the engine noise. It is a great day for the cadet when he "solos," with an empty front seat and no instructor to "bother" him.

Radiophoto, U. S. Navy, official

Even Flight Instructors Must Go to School

So that all cadets will receive identical training, instructors attend this school to learn standardized methods. This insures high efficiency among the instructors. White knob on plane is formation light for night flying.

we can at balloons and boxes thrown in the water. As a matter of fact, the guns are fully manned before dawn and at dusk, and half the crews remain at their stations throughout the day.

"Are you all ready for your flight?" the Captain asked me. "Do you still wish to catapult?"

"Yes, sir; if it's possible."

"Very well." To the Squadron Commander he said, "I want to test the catapult with a TBF and a fighter. Take Mr. Grosvenor up with you on the first shot."

"Aye, aye, sir. We'll be ready shortly."

Down to the ready room we went to get our last-minute briefing. Pilots crowded around to fit me out with proper togs. One lent me his helmet, another his life jacket, and a third his parachute harness. All were kidding and offering advice.

"Here, take this tin hat; you might need it for a bucket!"

"Gee, I hope the cat works this time!"

"Don't hook up your parachute until you get some altitude. You might land in the drink and want to get out fast."

"Please sign this waiver—no claim on the Government in case of accident."

At last the order came: "Pilots, man your planes!" and we piled out to the flight deck.

Our TBF was standing by itself, way up forward close to the bow.

"If the cat fails, oh, boy!" I thought to myself, "No room for a run-off."

Tight Squeeze in a Ball Turret

Standing beside the plane was the radioman. He made adjustments to my harness and told me I'd be riding in the ball turret (page 546).

"Brace your head against your arm during the take-off," he advised, as I climbed through the side door.

Inside, the radioman's quarters seemed roomy, with ports to look out below and to the sides. Radios, telephone, dials, and levers crowded the plane. In the belly a big .50-caliber gun poked its muzzle aft. To aim and fire it, the radioman lies awkwardly on his stomach. Overhead, an opening led to the tiny turret.

"Up you go," said the radioman, and I gingerly wedged myself up into the turret beside another .50-caliber.

I sat facing the tail in a small, cupped seat with a parachute pack for cushion. My head protruded above the fuselage, almost touching the top of the plastic turret. I had full vision all around, except forward.

"Hook up your earphones," the radioman said. "If you want to talk to the pilot, push the button on this mike. Now draw your feet up in a tight squatting position." Then he slammed a steel door below, locking me in.

"No sardine ever fit its can more snugly," I shouted to the grinning radioman through a port.

Thumbs up was his reply.

Above the crackling I heard the Squadron Commander say, "All right, Grosvenor? We are about ready."

"OK, skipper. Let her go."

"Don't forget to brace your head against your arm. You'll break your neck if you don't."

How It Feels to Be Catapulted

The motor came to life like a clap of thunder. The plane shook and strained at the brakes.

I had my head turned slightly to the left so that I could see the deck and control tower. The Air Officer gave me a wave. I could see the Captain, too, watching intently from the bridge.

It seemed ages before the pilot said calmly in the phone, "Here we go."

Suddenly I felt a terrific, prolonged push, like a mighty giant's shove. My head pressed against my arm, my doubled-up legs and feet jammed against the turret.

I looked up quickly and saw the bow of the ship far astern. It rapidly got smaller and smaller (Plate I).

"How did you like it?" the pilot asked by headphone.

"Great! Now I know how it feels to be shot from a gun!" I replied. "Only I didn't end up in a water barrel like the man in the circus—wings held me up."

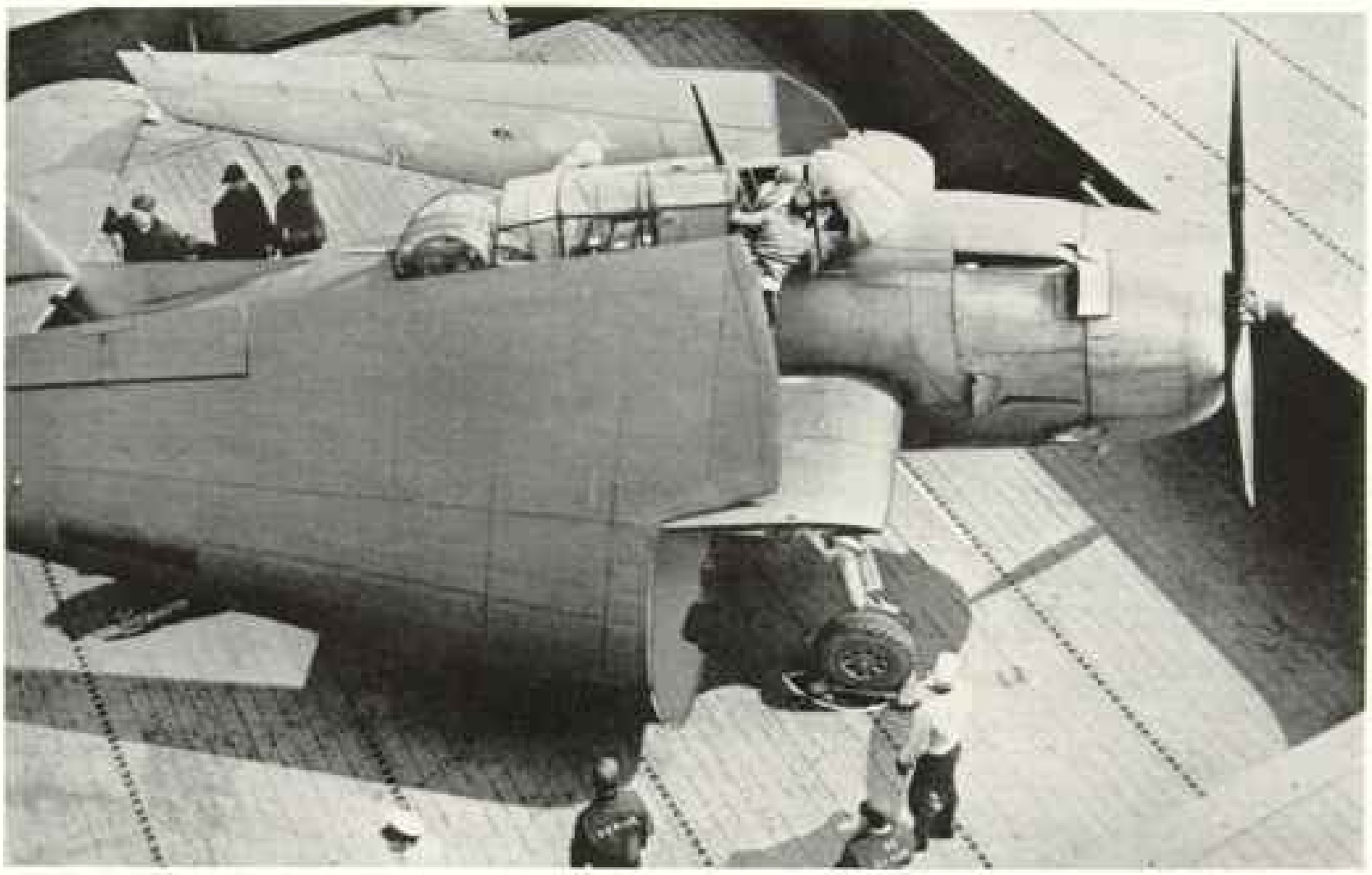
"I'll climb to 2,000 feet and let you see the ship. Other planes are taking off; they will join us. We'll show you some maneuvers."

Steeply climbing, the TBF gave me a clear view of the "C," becoming tinier and tinier. She looked like a match box on the water. White foam streaked back from the bone in her teeth. Cloud shadows raced across the water making silvery patchwork patterns.

While I watched, three toy planes ran the length of her deck and soared into the air. They climbed swiftly and joined us on either side.

Our plane waggled its wings up and down. The accompanying TBF's crossed over, two below and one above.

The planes were cruising along close together. A couple got cozy—came up under us. It seemed as if the wings would touch. Afterward I learned the pilots were experimenting!



U. S. Navy, Official

"Take Her Down!" and the Elevator Drops a TBF to the Hangar Deck

Even with wings folded back, the Avenger is a tight squeeze and must be spotted diagonally on the elevator. The author was catapulted from the flight deck of the "C" in a similar torpedoplane. He rode snug in the plastic ball turret atop the fuselage (page 545).

When two planes come up under another very slowly, they told me later, an "air cushion" sometimes "lifts" the upper one. The pilots claimed they "lifted" us. Certainly their planes were close! They grinned up at me, not more than 30 feet away.

"Would the Captain object if we made a simulated torpedo run on the ship?" I asked the pilot.

For answer, he made a series of quick dips, like a roller coaster, then put the nose down in a dive. Close to the water, he leveled off and we tore across the wave tops at incredible speed. I have never known such feeling of speed.

Nearing the ship, he again waggled his wings and said, "We are breaking formation now for the run."

As we approached from the ship's port bow, the pilot gave a rock at the spot where he would drop his "fish." Then we flashed past the stern and I looked *up* at the flight deck, so low were we.

Soon we heard our call letters and air plot on the ship giving instructions.

"TBF's. We are ready to take you aboard. Prepare to land!"

Quickly the four planes joined the landing circle, wheeling gracefully around the carrier.

When our turn came, I felt a distinct braking effect as the landing flaps and wheels were lowered. Our plane seemed to slow down almost to a walk!

I craned my head around to see our approach. The once tiny flight deck loomed larger and larger.

Finally out of the corner of my eye I saw the Signal Officer give the cut and we dropped softly to the deck. The plane stopped abruptly, like an automobile quickly braked. If I had not leaned back against the armor plate, my head and shoulders would have snapped forward.

Our TBF was taken down the elevator smartly and I climbed out in the hangar. Friends crowded around to ask how I liked it. "Greatest thrill of my life," I said.

"You're lucky. We'd give anything to cat off," commented many officers and men.

The ship took on her full complement of planes that afternoon and headed for port. "We sail soon on another mission," the Captain remarked. "I wish you could make the long cruise with us."

"There's nothing I would like to do better," I replied. "Here's wishing you luck and a full bag of subs."

"We'll do our best!"

Crete, Where Sea-Kings Reigned

By Agnes N. Stillwell

With Illustrations by Staff Photographer Maynard Owen Williams

THE small Greek freighter *Byzantion*, on the deck of which my friend and I had passed two nights, tooted and churned her way into the harbor of Canea (Khania), westernmost of the chief ports of Crete.

Immediately a swarm of rowboats came out to do the loading and unloading. These boats are often gaily decorated, and bear the names of girls, saints, or islands. Their rowers maneuver them with incredible skill, but not silently. Each man shouts a constant flow of advice, jokes, and imprecations.

Historic Canea Now in Ruins

Canea, the political capital, was a pretty town, with Venetian fortifications bordering the harbor and a Turkish minaret among the low, tile-roofed houses. It is now in ruins, systematically demolished by the German air force during the invasion of Crete.

Behind the town rise the high mountains of a long range which runs east and west through the center of the 160-mile-long island. Outside Canea was the airfield of Maleme. A long promontory, Akrotēri (cape), separates the harbor of Canea from Suda Bay to the east, one of the finest anchorages in the Mediterranean.

The area immediately around Canea, Maleme, and Suda Bay was the critical point in the defence of Crete by the British, Australians, and New Zealanders in May, 1941, although Rethýmnē and Candia, further east, were also centers of resistance.

The region saw 12 days of intensely bitter fighting before the overwhelming superiority of the German air force compelled the remaining British troops to retreat through the mountains to the southern port of Sphakia, and thence to Egypt.

Later in the evening the *Byzantion* again loaded and unloaded at Rethýmnē, another attractive harbor ringed by Venetian walls. As at Canea, houses were of brightly painted stucco, and the slender minarets of old Turkish mosques rose above them. We were rowed ashore at four the next morning at Candia, or Hērákleion, as the Greeks now call it.

Here the student of history becomes keenly aware of the vast sweep of Greek history. The region was inhabited as early as the neolithic period. For about two thousand years it was the center of the Bronze Age civilization known as Minoan, which attained a high degree of culture and artistic achievement in the third millennium B. C.

The position of Crete at the crossroads between Greece and Egypt and Greece and Asia led to its becoming a mighty sea power, whose rulers were called the Sea-Kings of Crete.*

At Cnossus (Knossos), just outside Candia, the great Palace of Minos, chief Minoan ruler, has been uncovered. Following the Minoan era, Crete, like the rest of Greece, was overrun by northern races, who brought with them the totally different culture characteristic of the early Iron Age.

After an uneventful history during the classical period of Greece, Crete passed successively to the Romans, the Byzantines, the Arabs, the Venetians, and the Turks.

The impress made by the Venetians is the most noticeable today. In Candia the harbor fortifications, city walls and gates, palace, and barracks are all of careful Venetian workmanship, some of them still emblazoned with the Lion of St. Mark.

Guided at Cnossus by Sir Arthur Evans

We wandered about the modern town and also made several visits to the vast ruins of the Minoan palace at Cnossus, where we occasionally had the guidance of Sir Arthur Evans, its excavator. One day at the museum we met Nikolaos, a Cretan who had acted as foreman for Richard B. Seager, American excavator of several ancient sites in eastern Crete.

Nikolaos strongly urged us to stay at his house if we came to that part of the island, and we promised to do this after we had taken a trip to the southern coast to visit the Minoan palaces at Phaestus and Hagia Triada.

To get to these we took a bus which went up over a high pass in the mountains and came down to the town of Moirais. Thence we walked through fields of grapevines to the village of Vori.

On the way we overtook an old man dressed in the white Cretan costume, now rarely seen. He greeted us courteously and, after asking us in true Greek manner all sorts of questions about our names, nationality, and destination, told us that when he was a young man he had lived eighteen years in America.

*See, in the National Geographic Magazine, "Sea-Kings of Crete," by James Baikie, January, 1912, and "Cruising to Crete," by Marthe Oulié and Muriel Jean-Brunhes, February, 1929.

The Apprentice Forgets the Rule, "Cobbler, Stick to Your Last"

In a humble boot shop of Candia, the Cretan proprietor attends to his work, while his roving-eyed assistant has other interests. These people delight in having their pictures taken (page 553).

After that he was silent, obviously groping for something in his mind, and then brought out "Ice crim." Further effort produced the words "Apple pie." These words were all that remained of his sojourn in America.

Contrary to usual practice among Greek emigrants, he had resumed his native costume when he returned. He parted from us with many salutations, leaving us to admire the picture he made with his white hair and beard and his white costume, an effect only slightly marred by odd bulges around his legs. Like many of his fellow Cretans, he was carrying his bundles in his voluminous trousers.

An Afternoon of Jam and Speeches

At Vori I was greeted like a long-lost relative. I had passed a night there on an earlier trip to Crete.

We stayed this time at the same house, and became involved in an unexpected social whirl. Eirene, lady of the house, took us for a series of calls, from which we returned, late in the afternoon, surfeited with jam and polite phrases.

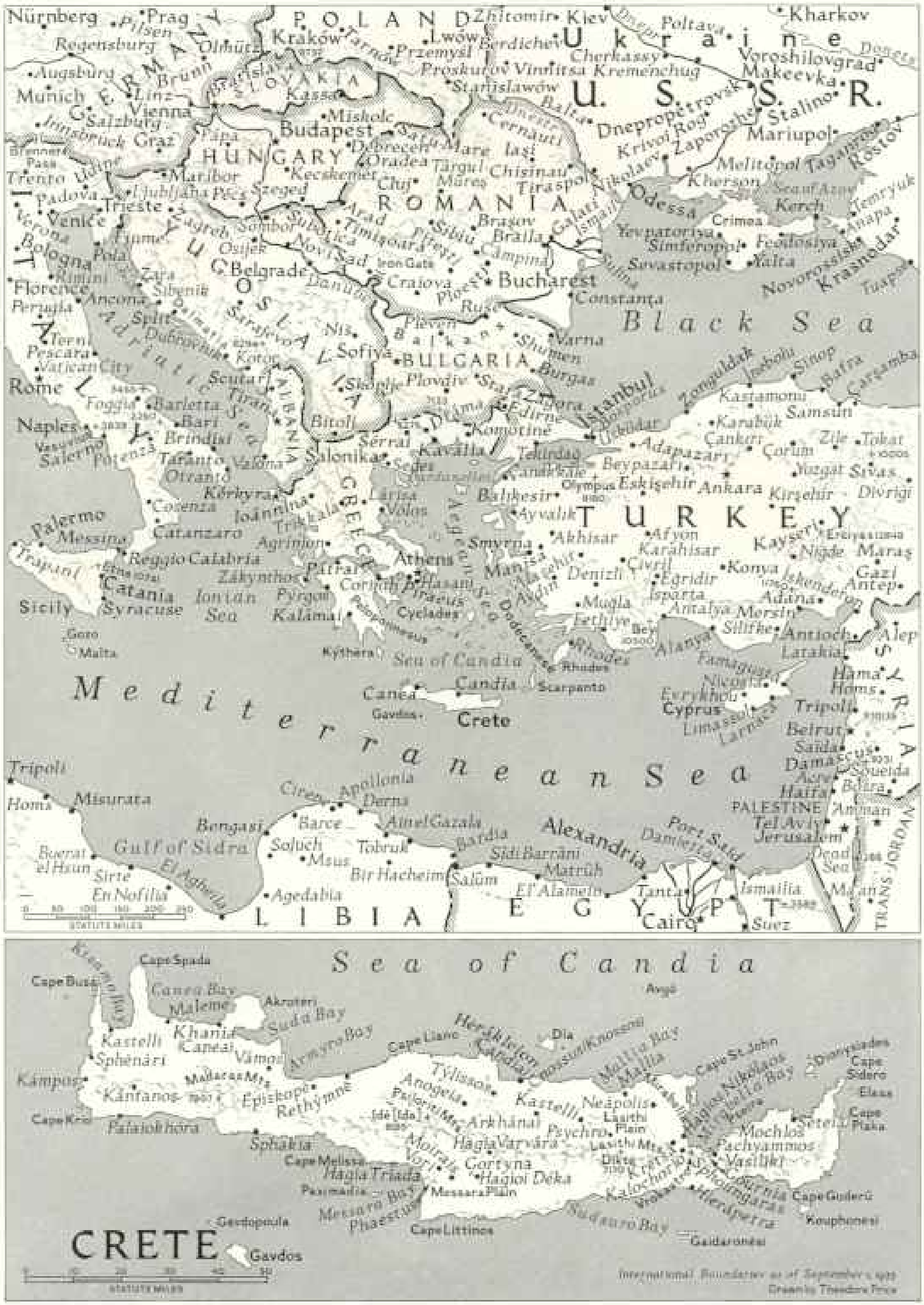
At each house the procedure was the same. The hostess would bring a tray with a glass of water, a small dish of jam, and a spoon for each person. We ate the jam with the spoon, uttering the prescribed speech for the occasion, while the hostess made the customary response. We then drank some of the water, put the spoon in the glass, and replaced the glass on the tray with expressions of gratitude.

After answering numerous questions, we looked at the photographs of stiff bridal couples on the wall while Eirene and the hostess exchanged views about us. Many Greeks have a curious delusion that foreigners understand only what is said directly to them, not what is said about them.

After dinner, of which Eirene's hospitable urgings forced us to eat far more than our jam-dulled appetites craved, the arrival of a bevy of female relatives and friends of Eirene's shattered our hope of going to bed early. A male cousin followed the ladies with his

The Venetian Owner May Have Known "Number 31" as "The House of the Hunting Cats"

Venetians ruled in Crete for more than 400 years. The fountain in Candia's main square bears the name of Admiral Morosini, who defended the city against the Turks from 1667 to 1669. Around it, when evening shadows fall, are set tables of the "Haï Laïf" Restaurant in a street scene well known to American visitors.



Crete, Once Seat of an Ancient Empire, Again Is an Island of Destiny

phonograph, an instrument of the old type with a large horn, and all his records. First we had an hour or so of polite conversation; then all the records were played.

Taste in Music Far from Classical

We enjoyed the native Greek songs and dances, but the cousin obviously preferred the Greek versions of outworn American and European popular songs, such as "Ça, c'est Paris," "Valencia," etc.

By the time the party ended, our Greek had worn very thin, our interest in jam and Victrola records had vanished, and we were ready to fall asleep at once on the trestle-supported boards which formed our beds.

We stayed three or four days at Vori and, in the intervals of our unexpectedly active social life, walked several times to Phaestus and Hagia Triada (Holy Trinity).

Phaestus is one of the most beautiful spots in all Greece. On the hilltop lie the broad courtyards, stairways, and labyrinthine foundations of the great Minoan palace.

From here we could look in all directions over the wide Messara Plain, dotted with vineyards, grainfields, and orange and olive groves, and beyond it to the ring of mountains among which Mount Ida (Idĕ) rises most prominently.

High up near the peak of Mount Ida we could see the black opening of the Kamares Cave, one of the chief shrines of the Minoans.

Beyond the mountains to the south the sea was visible, and the small Paximadia (biscuit) Islands. At Phaestus we had the company of most of the seven children of the guard, ranging from Adonis down through Electra, the baby.

Agnes N. Stillwell

An Archeologist's Foreman Played Host to the Author

Just outside the tiny village of Pachyammos he met her and her companion and took them to his house, the former home of Richard B. Seager. He was an excellent guide to the ancient sites of the area and a remarkable cook (p. 564).

The guard at Hagia Triada had strong views on the place of women and thoroughly disapproved of our traveling alone. He did, however, express approval of our hair, which was still long at that time, and remarked, "From God come the hair of women and the mustaches of men!"

On our way to Candia we stopped at the tiny village of Hagioi Déka (Ten Saints) to visit the ruins of Gortyna, an ancient Greek city, largely rebuilt by the Romans.

Here also is part of the 6th-century church of St. Titus, probably dedicated to the Titus whom St. Paul instructed to found a church in Crete.

At Gortyna, where a famous legal code was found, we slept on cots in the museum,

Women of Anogeia, on Mount Ida's North Slope, Display Traditional Finery

A few old costumes such as these, with coin necklaces, embroidered aprons, wide trousers, and hand-knit stockings, still are found in the interior of Crete. The doll and the framed picture are whims of the sitters, not relics of the past.

surrounded by marble statues of Greek gods and Roman officials in togas (page 566).

We returned to Candia on St. Constantine's Day, and late in the afternoon walked to a large church and cemetery of St. Constantine outside the town. On the road we passed many women bound for the same destination, for this was the day for visiting the graves.

Except on rare occasions, the women no longer wear the beautifully embroidered Cretan costume, but homemade dresses which are believed to imitate French styles. All, however, wear scarfs on their heads, arranged to cover their mouths.

We were never sure whether this custom was a survival from the long Turkish occupation or a protection against the choking dust which rises from Greek roads in the dry months. Greek women invariably wore these scarfs, even in their homes, and our appearance without hats always evoked a fervent appeal to the *Panagia* (the Virgin) to observe the foolhardiness of the foreigners.

Always we received a flood of warnings about the evil effect of the sun on the complexion, and the lectures usually ended with the statement that two unmarried girls should not be traveling alone, anyway, and that our place was at home with our mothers, who ought to be busy finding us husbands.

Soon after we left the town, a priest riding a minute donkey passed us. He was seated sideways on a high wooden saddle, his heels drumming rhythmically against the fuzzy gray sides of his mount.

The Rider Conceals His Mount

Little could be seen of the donkey, but the priest was an imposing figure in his long black robes, his curly gray beard, and his long hair, braided and tucked up under the edge of his high, cylindrical black hat.

Both hands were busy with a string of amber conversation beads as he majestically returned greetings of women pedestrians. A wool saddlebag behind him was brightly striped in green, yellow, and red, a typically Cretan combination of colors.

The sun was just setting as we reached the cemetery, and dusty shafts of golden light were falling between the cypresses among the thick crosses. The small lanterns of green

A Mountaineer on Muleback Laughs at a Stalled Car

To the right are the mist-covered Lasithi Mountains. The peak of Dikte is 7,170 feet high. Behind the rider is the watershed between Mallia Bay and Mirabella Bay. East of the latter bay an area of pre-Hellenic trade and culture centered in Gournia, Pseira, and Mochlos. Some of the treasures found on these sites are in the Boston Museum of Fine Arts.

glass on most of the graves had already been lit, and their small flickering lights made us think of fireflies in American fields.

Most of the crosses were of wood, painted red, yellow, blue, white, or black, with the name, age, and date of death of the memorialized person inscribed on them.

Many of these grave markers were embellished with small photographs which stared solemnly out of protecting celluloid covers. Products of provincial photographers and antiquated cameras, the pictures showed the subjects determinedly rigid in pose. All expression and intelligence were drained from their faces by the unusualness of the experience and the necessity of remaining motionless for several seconds.

Even in a snapshot, a Greek who is conscious that his picture is being taken is likely to assume a wooden pose and expression, making the picture virtually worthless, no matter how flattered and eager the subject may be.

Small groups of women were tidying up the graves, lighting lanterns, or kneeling in prayer in front of the crosses. Several insisted on our tasting some of the traditional offering of food they were placing on the graves. It consists usually of boiled wheat kernels, pomegranate seeds, raisins and nuts, which are doubtless symbols of resurrection and rebirth. This custom is probably a direct survival from ancient times.

A Grave Wailer Takes Time Off to Eat

From a corner of the cemetery we heard a weird, monotonous howling. As we approached, we saw a woman crouched over a grave, rocking back and forth and wailing with every appearance of inconsolable grief.

Before we could tiptoe away, she suddenly stopped, calmly took from her striped wool bag a string of small, doughnut-shaped rolls sprinkled with sesame seeds, and began to eat.

Catching sight of us, she greeted us in a perfectly normal tone of voice and made the usual inquiries about our names, nationalities, etc. We looked back as we were picking our way among the crosses toward the gate. She was just finishing her rolls.

Three Modern Chambermaids of the Palace of Minos Indicate the Size of Cnossus' Ali Baba Jars

Such girls prevent growing grass from destroying the ancient palace pavements. Olive oil was stored in the large jars. The sunken *kasélle*, or floor cist, in front of the girls held oil or treasures and was rifled ages ago.

She put the rest back in her bag, brushed the crumbs carefully from her skirt, threw herself on the grave, and began wailing again in what appeared to be a complete abandonment to grief.

At one side of the cemetery there were few graves, and the grass was long and green under the shade of clumps of huge cypresses. Here, among the graves of English soldiers, a large, flat marble monument, with a simple cross in relief, bore the name of Richard Seager, the American archeologist who died in Crete in 1925.

On our way back to the hotel, we made inquiries about means of getting to the eastern part of the island. Finally we found the driver of a bus which ran as far as Kastelli (castle), at the foot of the Lasithi Mountains. He assured us that he would be going the next day.

"Exactly Noon" Proves Elastic

When we asked at what time, he said firmly, "At noon exactly," accompanying the statement by holding his palm upward with the fingers partly closed and bringing the tips of the thumb and forefinger slowly together.

This gesture expressed the abstract idea of exactness in so vivid and concrete a form that we went away reassured. It evoked a vision of the driver bent tensely over his wheel, the motor humming, the bus in gear, his foot quivering on the accelerator, and his eyes fastened on an official who stood with one hand holding a watch and the other raised to give the signal "Go!"

The next day we reached the square a little before noon. The bus was indeed there, but there was no sign of the driver nor of any other passengers. We finally ran the driver to earth in a cafe. He was mildly surprised that we should have thought that the bus would leave at 12, but said that it would definitely go at 1.

To kill time, we went to the main square, which is adorned by the Morosini Fountain dating from the Venetian occupation. Here we had lunch at a sidewalk table in front of the Haï Laïf (high life) Restaurant (p. 549). This old-fashioned bit of English slang is rather popular in Greece as a name for restaurants and cafes.

We usually had our meals at the Haï Laïf or at its rival on the other side of the square, and made many interesting acquaintances

among Greeks and tourists of various nationalities.

On this day, as we ate our *dolmades*—meat balls boiled in grape leaves—we conversed in a mixture of German, English, and Greek with a rather voluminous but very handsome Austrian poetess who always wore high-waisted Empire dresses in flower-sprigged cotton. She was as constant a visitor to the museum as we were. She believed she had solved the mystery of the Phaestus Disk, a round clay tablet covered with writing of a hieroglyphic type which no one has yet deciphered with certainty (562).

When we got back to the bus, we found that a few passengers had left bundles in it, although it was still unoccupied. We consumed an hour in drinking coffee at a cafe, and at 2 o'clock the bus driver put in a brief appearance to remark that he would start at any moment now.

"Glad Rags" Won His Fame, and He Enjoys It

When this visitor to Candia, the commercial metropolis of Crete, attracted the photographer's attention, he gladly posed amid less resplendent citizens with his amber-tipped nargbile, his well-polished boots, his blue broadcloth costume, and red-lined hooded cloak.

At 2:30 passengers began arriving; at 3 they began complaining of the delay; at 3:30 they began yelling for the driver. During the next half hour he made several reappearances and once got so far as to start the motor briefly. A little after 4, however, we got going.

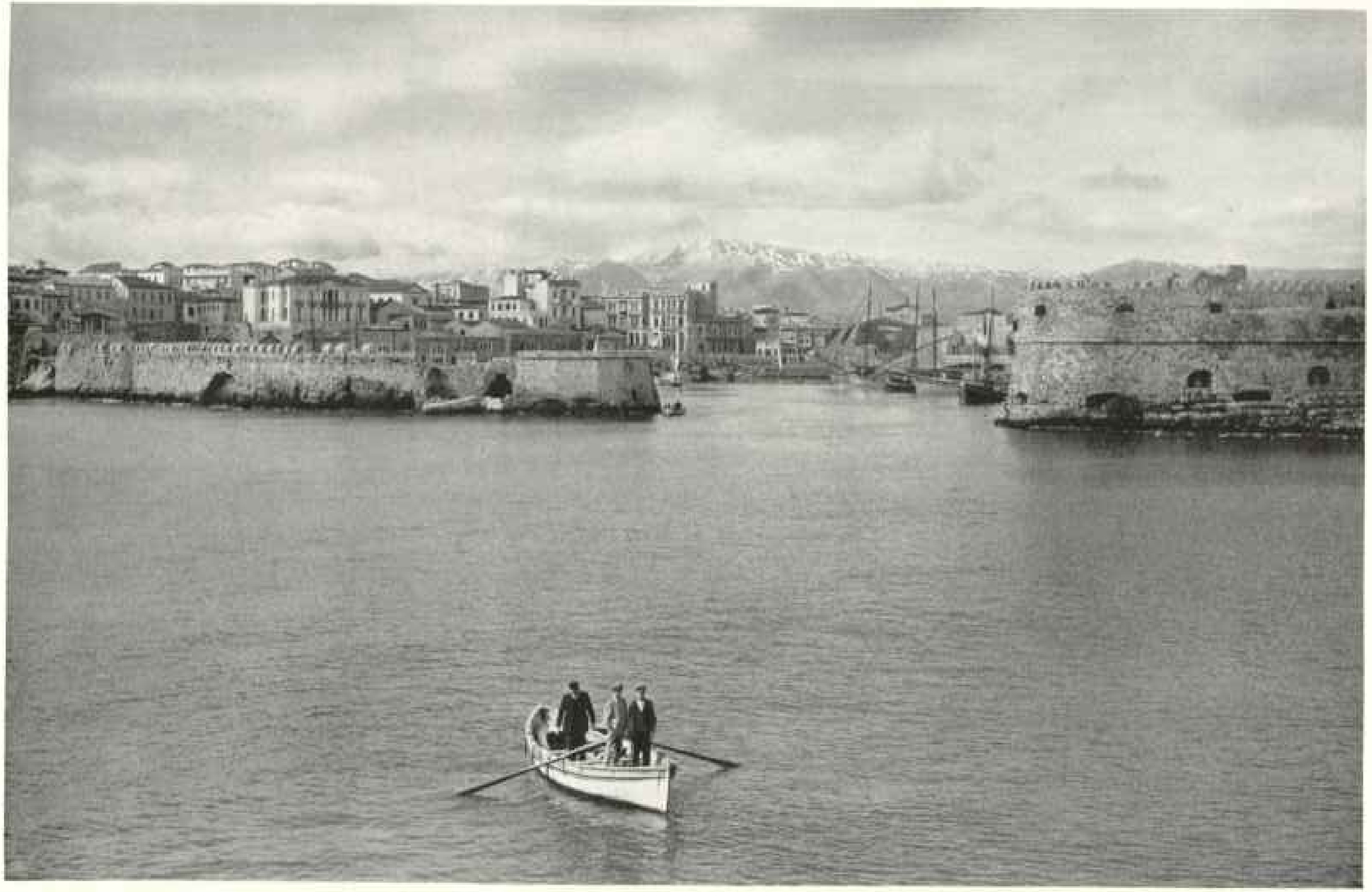
The bus was a vehicle of extreme age, with no windows, and no floor between the two rows of seats. Slow as our progress was, the sight of the road going by under our feet made it appear as if we were really going fast. One door was missing, and the driver steered with one hand while he held the other door shut with his other hand.

The outside of the bus was festooned with gaily striped bags, newspaper bundles, hens in burlap sacks, and circular loaves of bread suspended by strings through the hole in the middle. A string of fish smacked against the remains of the windshield as we leaped from bump to bump.

Personal Questions Mean No Offense

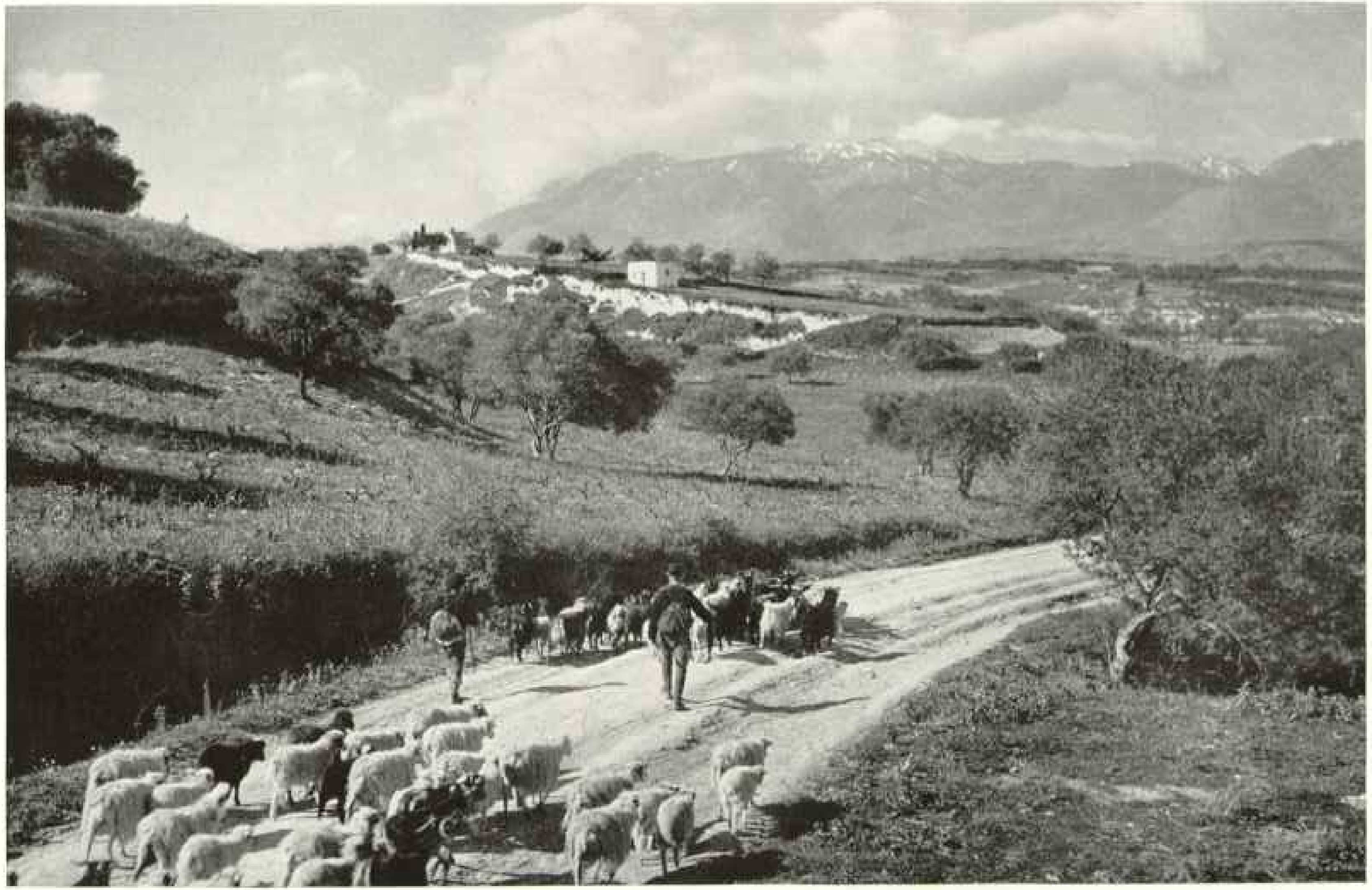
The first part of the trip was occupied in answering the questions of the other passengers. "What is your name? What is your father's name? What is your mother's name? How old are you? From what country are you? Where did you come from? Where are you going? Are you married? Are you rich? Is everyone in America very rich?"

Those of the women passengers who were near enough felt the material of our dresses



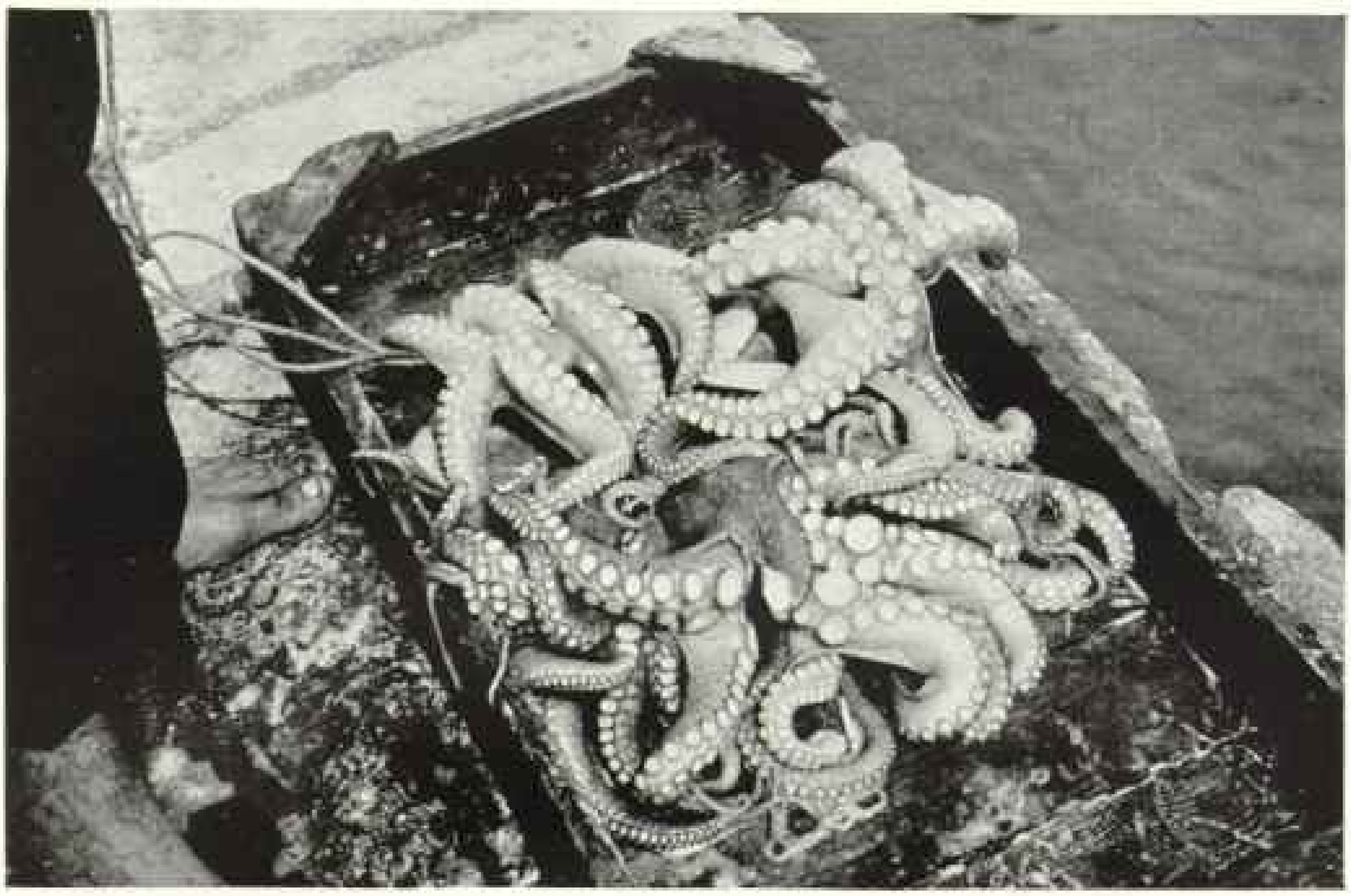
Candia's Harbor Seems an Anachronism in Modern War Setting

Passenger steamers usually anchor outside, but in the harbor are galley slips dating from Venetian days. In May, 1941, this area saw much bitter fighting. The center of the struggle was around Canea, farther west, but the British also put up stormy resistance here (page 547).



Olive, Vine, and Fleecy Flock Still Benefit Barren, Stony Crete

Carrying the homespun Cretan knapsack of many colors, these shepherds drive their goats and sheep along the Candia-Canea road near Týlissos. In the background are the Psiloriti Mountains, which the ancients knew as Mount Ida. This range shares with Mount Dikté the claim of being the birthplace of Zeus.



Octopuses Like Those Pictured on Minoan Pottery Are Still Used for Food

In this slimy box, the head-and-foot creatures (cephalopods) are shaken and prodded until they are freed of an inklike fluid which makes them unfit for cooking.

and asked how much we paid for them. Since many Greek women do their own weaving, this interest was professional rather than merely curious.

As the road ascended the foothills of the Lasithi Mountains, the engine grew more and more rebellious. Several times we had to halt until the geyser of steam from the radiator subsided. Finally the engine stopped completely. The driver opened the hood, studied the engine, and asked if anyone had a piece of string or, even better, a piece of wire.

Hairpins to the Rescue When the Decrepit Motor Fails

My friend and I produced two large hairpins of good American steel. These evoked cries of admiration from the female passengers and expressions of satisfaction from the driver, who tied the engine together again with the help of a pair of pliers, his only tool. This was far from being the only time I saved a motor trip from a premature ending by the sacrifice of a hairpin.

It was nearly 6 when we reached Kastelli, a village of about thirty gray stone houses, with a single stone-paved street climbing up the sides of a steep, rocky slope. At one side of the small, flagged square where the bus stopped there was a house which proclaimed itself a restaurant.

The dining room was a small chamber containing two tables and a shelf at the back where the cooking was done on a small charcoal stove. The front parlor, which we were given for the night, occupied a rather public position, with its curtainless windows opening directly on the square.

For supper we had only fried eggs and bread, which we ate on a vine-shaded terrace at the edge of the moonlit square. We decided to go to bed early and start at dawn the next morning. We were far from being the first users of the sheets, but, by taking off the minimum of clothing, spreading our sweaters over the pillowcases, and resolutely thinking of higher things, we managed to fall asleep fairly promptly.

We were awakened considerably before dawn by a rooster crowing from the foot of our bed and by two pairs of swallows among the rafters, quarreling over a nest site. Several hens were busily looking for crumbs under the bed. Opening the windows, it seemed, had been a mistake.

After a breakfast of brown bread and strong camomile tea we were ready to leave. Faced with the necessity of choosing between walk-

Here Flows the "Black Cretan Wine" of Which Homer Wrote

Beside the harbor at Candia, dark wine is being poured from goatskins into a hogshead. Thence it is pumped into great tuns in the hold of a caïque for shipment to the mainland.

ing in the broiling sun, burdened with coats or blankets, or freezing at night in insufficiently blanketed beds, we had chosen the latter evil.

We wore cotton dresses of a hand-woven material which could do without ironing, and carried thin sweaters in our knapsacks. These knapsacks were the small imitation canvas affairs which Greek schoolboys use for their books. A canteen, which we took turns in carrying, completed our equipment.

Traveling Light Involves Discomfort

Our scheme to avoid carrying much luggage was to wash our clothes before we went to bed. If they were somewhat damp when we put them on in the gray chill of early morning, the hot Cretan sun soon dried them.

From Kastelli we climbed over a series of foothills leading up to Mount Diktē. The road was a fairly good mule track, carefully buttressed on the slopes, but often easy to lose on the dry turf of upland pastures. We walked about six or seven hours that day, mostly uphill.

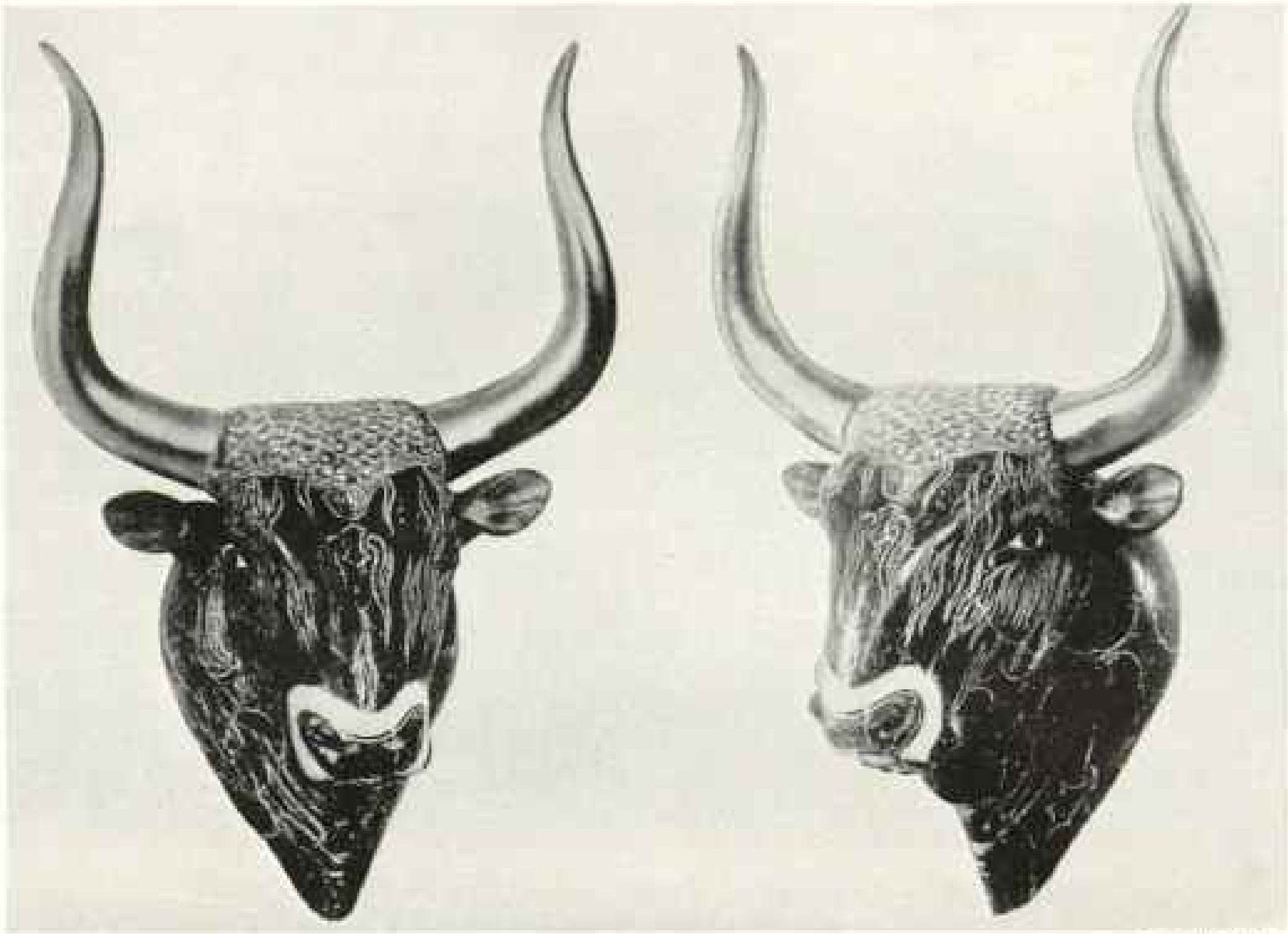
From each height we attained we could look back over a new panorama of mountains, bare and rocky for the most part, with snow still lingering in the crevices of the highest. Their color constantly changed, and we never tired of watching the green of the nearer hills gradually merging into the blue and purple of more distant mountains or darkening under the shadows of clouds.

Toward the middle of the afternoon we climbed a steep slope, sat down to rest, and found that on the other side we were looking down over the Lasithi Plain. This is a broad, flat plain near the top of Mount Diktē and completely encircled by mountains. It was well cultivated, laid out in squares of varying shades of green and brown, crossed by rows of tall poplars, and dotted by countless windmills with canvas sails (page 567).

From the slope on which we were sitting, a road ran straight across the plain to a small white village, Psychro (cold), backed against a rocky slope at the other end.

Election Day in a Cretan Town

Psychro, when we reached it, was buzzing with unusual activity, for it was election day. There were no women to be seen, but the streets were filled with groups of men, discussing the election with the passionate interest which all Greeks, even in the remotest villages, take in politics. They carry on lively arguments about the politics of the entire island as well as of their own village.



N. Lambrinoudakis

On a Vase This Bull Has Golden Horns, Rock-crystal Eyes, and a Mother-of-pearl Muzzle

Not a democratic election but the judgment of the bull-god determined the rule of the Minoan priest-king. After a nine-year term, Minos communed with the sacred bull in the Diktaian Cave. While the Cretans awaited the election results, men and maidens were sacrificed. If the king won favor, he ruled for another nine-year term. This priceless portrait vase was found at Crossus, near Candia.

The men were all in full gala costume. One or two of the old men wore the now rare white costume, but the majority were in dark blue, brightened by the red linings of their long cloaks. They wore voluminous trousers, ending where the black knee-length boots began, blue vests heavily braided in black, and round black caps.

The long hooded cloaks which some of them wore were also blue, but lined in red and embroidered on the lapels and at the bottom in red and yellow.

In the Cave Where Zeus Was Born

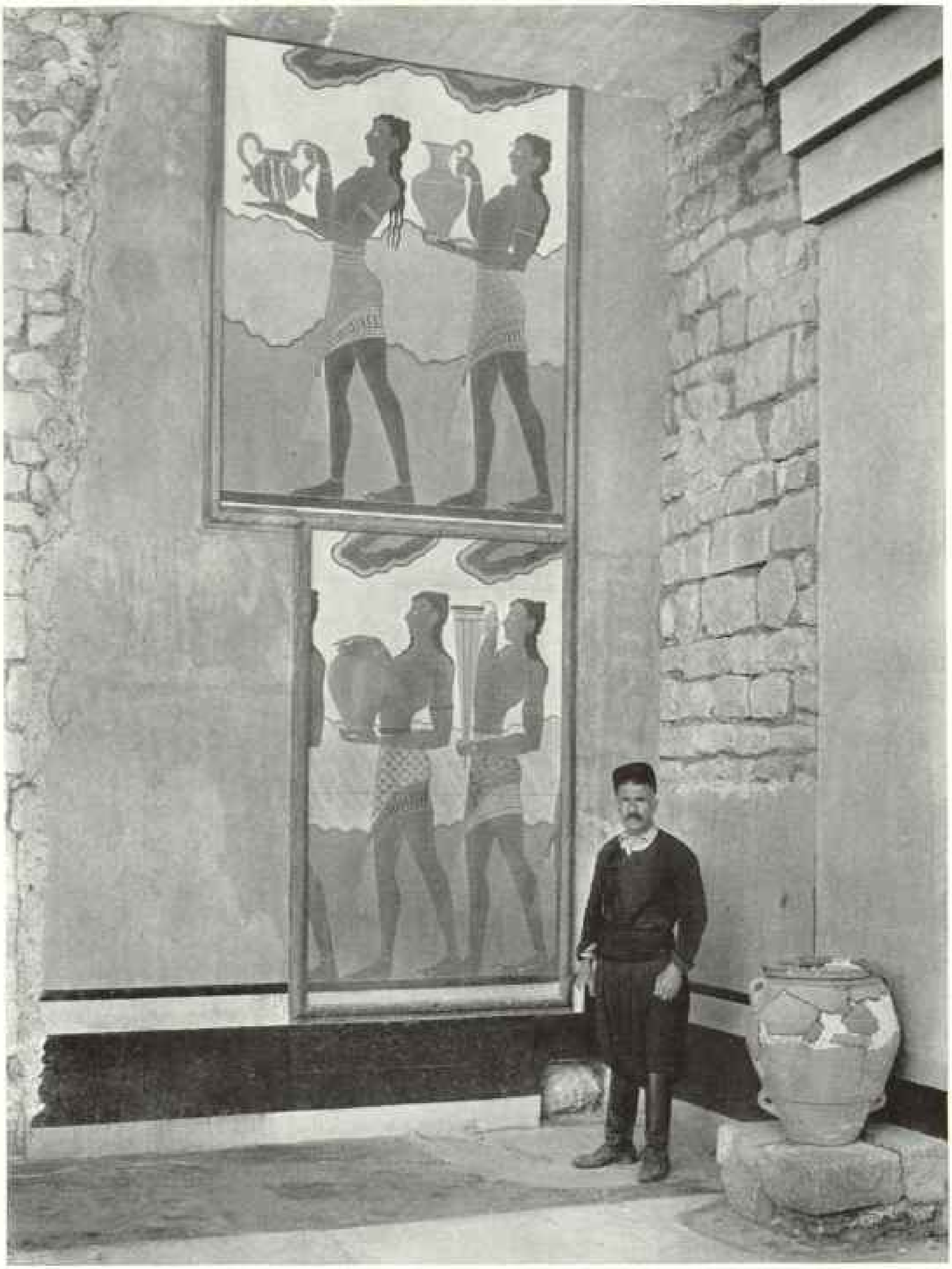
One of the men offered to get candles and matches and show us the way to the Diktaian Cave, just above the village. This cave was famous in ancient times as the birthplace of Zeus. Because Zeus' father, Kronos, had devoured all his other children at birth, Rhea, his wife, hid in the cave until this son was born and concealed him there until he was old enough to take vengeance on his father.

Here also Zeus was said to have wed Europa, whom he had kidnaped from Phoenicia, taking the disguise of a white bull. The son of Zeus and Europa was Minos, the first king of Crete. Minos is said later to have gone up into the cave and received, as did Moses, a code which became the basis of Cretan law.

The entrance of the cave, surrounded by brier roses, ivy, and ferns, admits a dim light to the black, dripping walls of the outer chamber.

The inner cave is considerably lower, and the feeble light of the candles barely sufficed to show us the edges of a pool at the bottom. The water was so clear that the reflections of the stalactites which hung from the roof of the cavern were indistinguishable from the stalagmites which rose like columns from the floor. All these formations were of extreme delicacy and beauty.

Excavations in the cave many years before had uncovered large numbers of votive offerings—pottery, jewelry, weapons, etc.—in the outer chamber, and a number of bronze double axes embedded in the stalagmites on the floor of the inner cavern. These offerings, which



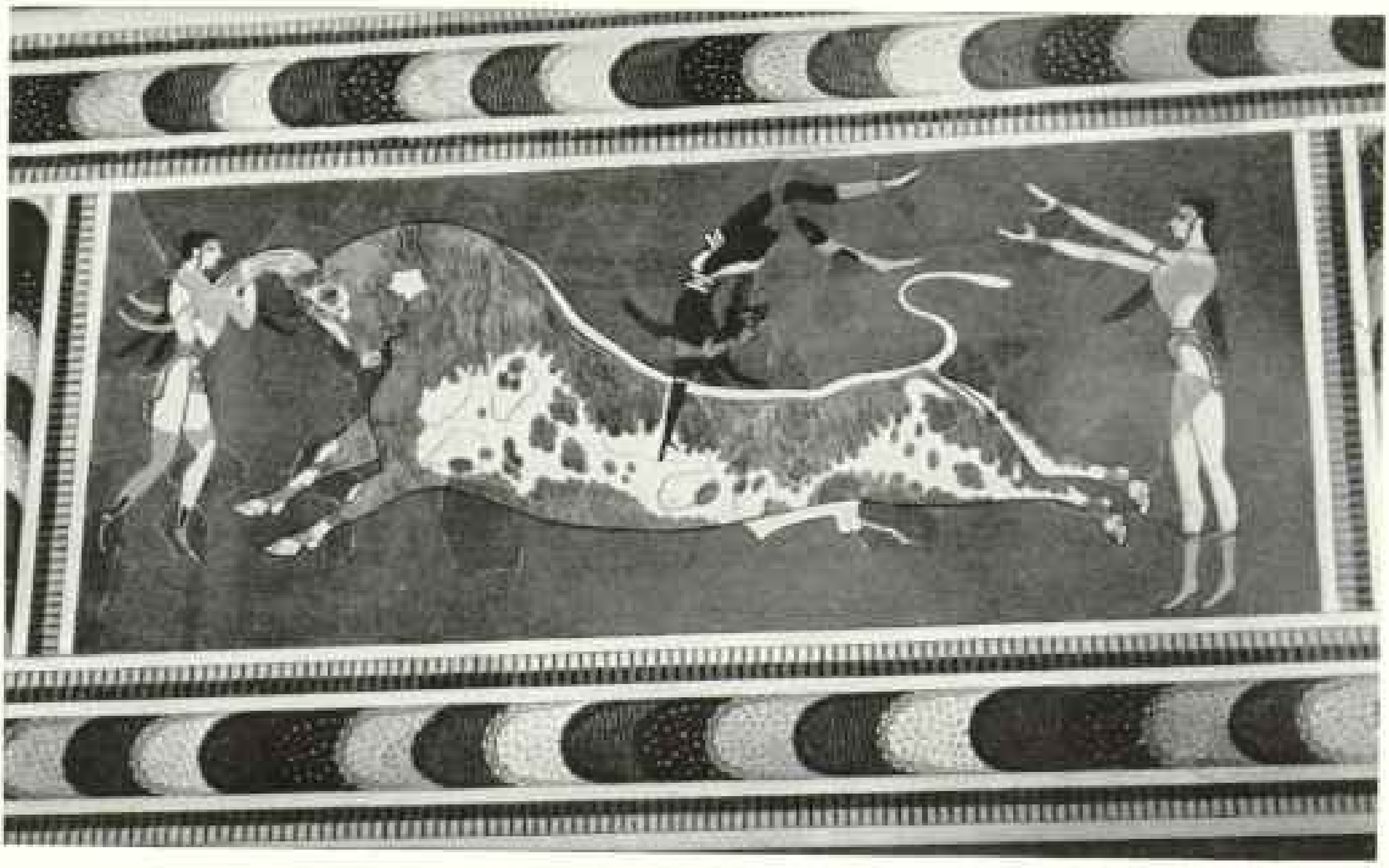
Reproductions of Crumbled Frescoes Help Visitors to Picture the Age of Minos

Similar to the detective work and clue analysis of the F. B. I., archeology is a fascinating profession. But to the casual visitor an excavated site may seem dead. At Cnossus, Sir Arthur Evans provided reconstructed stairways and faithful copies of frescoes to enable his guests to appreciate Minoan culture. In ancient art the Cretan men were distinguished by their small waists, quite unlike that of this foreman of the Cnossus "digs."

N. Lambrinoudakis

Fascinating Puzzle of Early Geography Is the Famous Phaestus Disk

Printed on clay by an ancient form of movable type, this mysterious record is marked with 45 different hieroglyphs. They include a man with a feather crest, a round shield with seven bosses, a ship with battle armament, and an ancient form of boxing glove. Research has not yet solved this ancient key to geographical relationships thousands of years before Christ.



Rodeo Experts Pronounce Such Bull-leaping "Impossible"

At the left, one female acrobat starts a somersault by grasping the horns of a charging bull. A boy, his sex indicated by a darker skin, is halfway over. A second woman has either just landed or is about to catch the boy. Such scenes are common in Minoan frescoes, ivory figurines, and seal rings. This restoration decorates an upper hall of the Palace of Minos at Cnossus.

we had seen in the museum at Candia, were dedicated in the prehistoric age, during a period of perhaps four or five hundred years, beginning with the Middle era of Minoan civilization.

When we emerged from the darkness of the cave, the sun was low in the west and the rows of poplars were throwing long shadows across the wheatfields. The guide told us that the doctor, who was usually glad to have strangers stay at his house, happened to be "in Europe" at that time, but he pointed out the small monastery of the Christougennia (Birth of Christ), at the eastern edge of the plain, where we could pass the night.

We were welcomed there by one of the four monks who occupied it. He showed us to two small rooms on the upper floor overlooking the courtyard in front of the church. From below we could hear the clatter of pans, and presently the cook appeared, beaming behind his bushy red beard, to say that if he had only known in time, he could have shot us a rabbit.

A Jolly Muleteer Breaks His Journey at a Coffeehouse of Hagia Varvára

Laced like a corset, his blue broadcloth waistcoat is braided with black. His elaborate shirt has seen better days. A scalloped scarf is worn like a turban. The gay sense of humor which Sir Arthur Evans noted in Cretan character shines in his merry eyes.

Supper, when it appeared, consisted of quantities of hard-boiled eggs, a round loaf of brown bread about a foot in diameter, and a carafe of water. After our early start, light breakfast, and even lighter lunch, we had no trouble in eating a considerable number of eggs.

The bread baffled us at first, since the crust was nearly an inch thick and of the consistency of rock, but with the aid of a huge knife we managed to hew off some pieces from the loaf. We had already discovered that it was the custom in many places in Crete to make enough bread for a month at one baking. We had apparently arrived at the monastery at the end of the month.

It is considered correct to dip the crust in water when eating it. The bread is baked in an outdoor oven, which has had a brush fire burning in it. When the oven is hot enough, the coals are raked out and the bread is put in. The ashes imbedded in the bottom crust give it a distinctive flavor.

The Abbot Asks about U. S. A. Politics

When we had finished our supper, the abbot, a man of imposing stature and a dignified figure in his black robes, high black hat, and black beard, made us a stately call. Instead

of the usual questions which we could by now have answered in our sleep, this island compatriot of Venizelos preferred to make detailed inquiries about American politics, with which our Greek was barely adequate to deal.

Our beds turned out to be boards covered by thin straw mattresses, and the single goat's-hair blanket on each bed presaged a chilly night. Outside the window the moon was shining on the white wall of the monastery church, and a faint breeze was stirring the leaves of a lemon tree and blowing the fragrance of the young green lemons into our rooms.

The bell for early prayers awakened us well before dawn, and soon a small boy brought us a large bunch of roses and a breakfast of more bread and another plate of eggs.

We took some of the food along for lunch, left some money in the offering box in the church, and started eastward on the path to Hagios Nikólaos (St. Nicholas). That day we walked about nine hours.

All morning we climbed over a pass through ragged, rocky peaks, then descended the mountain on a steep mule path covered with rolling stones about the size of an egg. About noon we emerged on a broad plain which stretched to the sea. Here the path lay through olive groves and fragrant fields of ripe grain.

A Land of Flowers

There were more wild flowers than there had been on the mountain. On the dry, rocky slopes we saw yellow broom and deep pink, white, and yellow cistus; red poppies were blossoming in the grainfields; in the longer grass under the trees were growing grape hyacinths, red pheasant's-eye, and large blue-bells. In the dry stream beds which we crossed, the oleander bushes were just breaking into rose-colored flowers.

It was raining lightly as we passed through two small villages, and when we were halfway across the plain, with no shelter in sight, a violent thunderstorm came up.

We were quite wet by the time we reached Hagios Nikólaos on Mirabella Bay. It was a fairly large town, and we found a small, but reasonably comfortable hotel. We had a dinner of fish on the harbor's edge at a restaurant which overlooks a row of lateen-sailed caïques.

Our path the next day, southeastward from Hagios Nikólaos, lay for a long way along the edge of rocky cliffs, from which we looked over a wide expanse of the Aegean Sea, purple in the distance, then turquoise, lightening to a milky green nearer the shore, and to dazzling white where the surf outlined the base of the wave-battered cliffs.

The air was intensely hot and we had emptied our canteen. Toward noon we began to wonder if there were any hope of lunch in this apparent wilderness. Soon the road crossed a river and led into groves of huge trees through which we caught glimpses of the white houses of a village.

A small, yellow-haired girl, driving a flock of sheep, goats, cows, and one pig under the shadow of the trees, told us that we were in Kalochorio (beautiful village) and that it had a small cafe.

Since the cafe menu offered only boiled potatoes and snails, we had boiled potatoes, without salt or butter, and snails, and were hungry enough to enjoy at least the potatoes.

A little farther on we came to the high, three-peaked hill of Vrokastro (Jew Castle), which we climbed in the blazing sun to see the remains of an ancient town excavated by an American archeologist, Edith H. Hall. In the heat the smell of thyme from the gray-green slopes was almost overpowering.

We followed the shore, first along cliffs and then along beaches, past Sphoungaras (sponge fisher), where the ancient remains once excavated are now buried again under the oat-fields, and past the prehistoric town of Gournia, which we visited later (page 566), to Pachyammos (deep sand).

This is a tiny village at the end of a sickle-shaped promontory enclosing a minute semicircular harbor. On either side stretch the beaches for which the town is named. The twenty or so tiny houses are white, with pale-blue windows and doors and dull-red tiled roofs. At one side of the harbor is a small white church with blue doors and a pale-pink barrel-vaulted roof.

We could hardly believe that Pachyammos was real; it looked like a stage set against its dazzling background of white beaches, brilliant blue sea, and distant gray-lavender mountains.

Rest at the House of Nikolaos

Outside the village we were warmly welcomed at Richard Seager's house by Nikolaos, who now owns it (page 551). The rooms were all on one floor, opening onto a grapevine-covered terrace which ran part way around an open courtyard in which grass and flowers were growing. Around the edge stood huge clay jars.

Nikolaos was a friendly and humorous man, wearing the typical Cretan costume. His speech was strongly tinged with the soft Cretan dialect, in which all the "k" sounds be-

British Official

In the Aegean—Annapolis of the Ancients—Such Simple Ships Have Played a Major Role

Early navigators and traders helped to unite the diverse cultures of the ancient world. Hundreds of such white-winged caïques now lie in the harbors of Crete or venture forth on the war-torn sea. As when Cretan Sea-Kings ruled the shipping lanes between Europe and Egypt, Crete today is one of the keys to the Aegean, the Balkans, and the Black Sea.

Agnew N. Hilliard

A Headless Statue Has No Terrors for Travelers Who Sleep in the Gortyna Museum

The guard of antiquities and his goat have ancient marbles as familiars. Gortyna's municipal laws, carved in stone on the courthouse walls, form the longest ancient Greek inscription extant. They remain legible after 25 centuries. Some British troops still live with Greek guerrilla fighters in the interior of Crete.

come "ch." Characteristic also is a slurring of the vowel in the accented syllables.

Cretans are likely to affix to their words the diminutive ending *aki*, pronounced "achi" in Crete. When a Cretan woman urges you to take a little bread, she is apt to say, instead of the usual "Ligo psomi," "Ligachi psomachi." All these characteristics give an unusual but charming flavor to Cretan speech.

Nikolaos a Resoureeful Cook

We stayed at Nikolaos' house for three days. During that time he was unable to obtain any food except bread, eggs, and canned American salmon, but from these ingredients he produced a different dish at every meal, each one seemingly more delicious than the last.

From Pachyammos we visited Vasiliki (royal), a prehistoric site in the midst of a grove of ancient olive trees. Under them the ground was covered with the tiny, pale, faintly fragrant olive blossoms. Both places are associated with Seager's work.

Gournia is one of the most interesting pre-Hellenic sites in Crete.

Though not so impressive as the great palaces of Cnossus, Phaestus, or Hagia Triada, it gives the visitor a vivid picture of a small town of 3,500 years ago. It was uncovered by an American woman, Harriet Boyd Hawes.

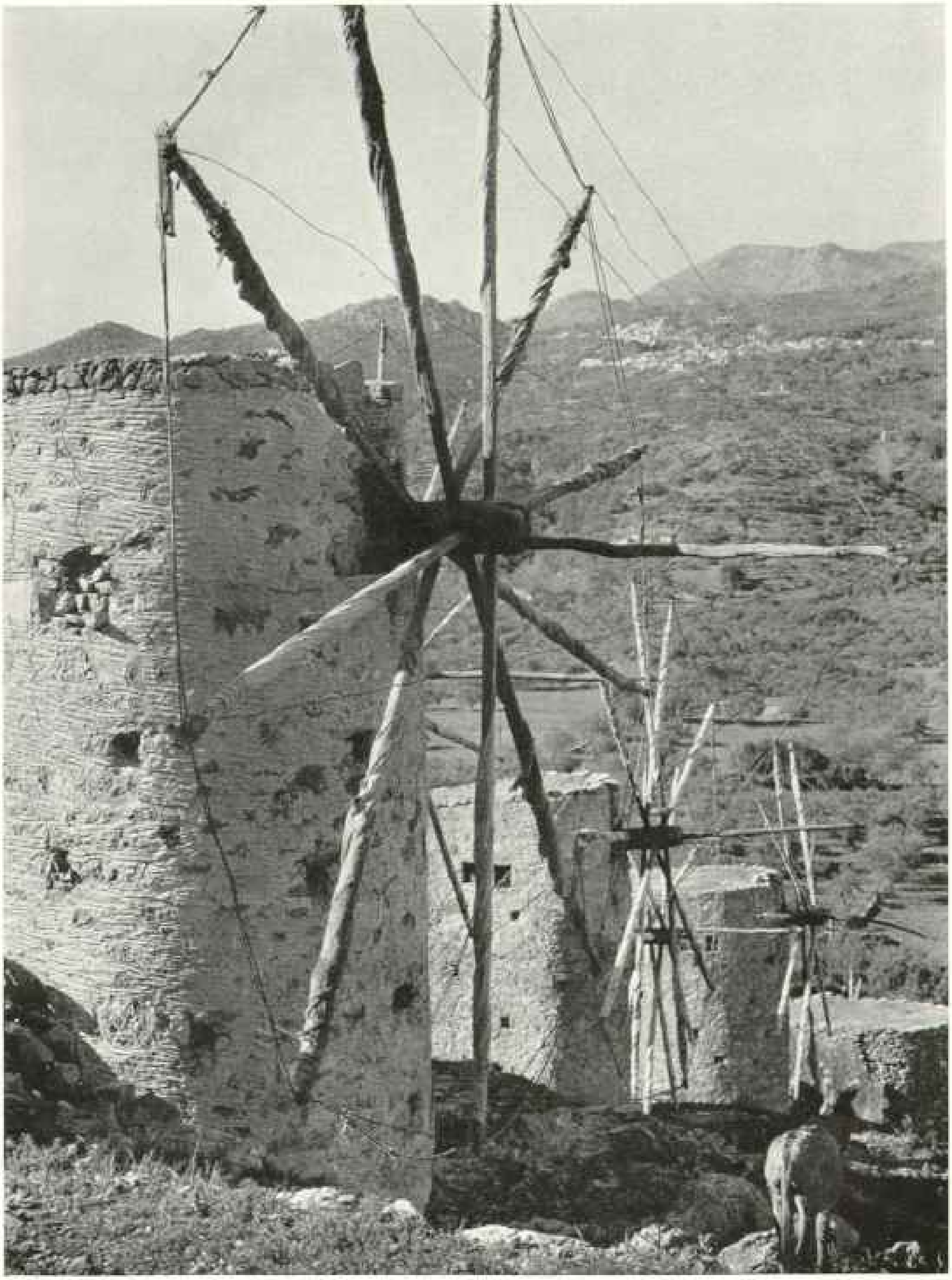
Some of the walls are standing to a height of several feet, and the neatly fitted stone paving of the streets is still in place. Many of the houses were originally two stories; the number of rooms in each varied from six to twelve or more, and their arrangement is curiously like that of modern houses.

A well-worn road leads to a small shrine in the center of the town.

Another leads up to the ruins of a modest palace at the top of the low hill on which Gournia is situated.

A few offerings were still in place in the shrine when it was uncovered, and many objects of domestic use, even craftsmen's tools, were found in the houses.

Looking down from the palace on the well-planned houses and carefully made streets of Gournia and over the olive groves and fertile fields to the distant mountains, one gains a vivid impression of the orderly civilization of



Oneway Windmills Set on a Steep Ridge Show the Constancy of Cretan Winds

These stone-towered gristmills with their sails close-furled always face up the valley of Mirabella, combing the breezes which move toward the bay. Grain is brought up from the road, and when the wind is right the ridge looks like a multimotored bomber banked for a steep turn.

A Wide-trousered Farmer Makes a Move

At Vori, a small village near the ancient sites of Phaestus and Hagia Triada (Holy Trinity), a friendly game is the only activity during the noon hour. Even the sale of wine is at a standstill, and one Cretan takes forty winks before setting out along the chalk-white and dusty road.

these beauty-loving and culture-loving Minoans.

When the time came for us to leave Pachyammos and the charms of Nikolaos' conversation and cooking, he found for us a broad-bottomed caïque which was going back to Hagios Nikólaos. It sailed about noon, with a few other passengers and a load of cucumbers.

Although the distance across Mirabella Bay at that point is not great, the wind was against us, and it took four hours of rolling and pitching before we reached the harbor.

Cucumbers Still Remind the Author of a Plunging Caïque

Most Greek women are so convinced that they are going to be seasick that they begin to feel the symptoms even before they get on the boat. The women passengers on this caïque were no exception and, though our pride forced us to prove ourselves made of sterner stuff, it was some time before the sight of a cucumber ceased to recall the plunging gunwales and slapping keel of that caïque.

After another night at Hagios Nikólaos, we found a bus which was returning directly to Candia. The road lay along the northern shore of the island, an area nearly as wild and uninhabited as the region of Mount Diktē through which we had come.

When we returned to the Haï Laïï for dinner that night, feeling that we had been away for weeks in a different world, we could hardly believe that we had been gone so short a time, for there were still one or two of the same tourists, paying for the same lamb with the same Cook's meal tickets.

Our week's trip had been full of unforgettable impressions. We had come back, not only with a clearer picture of Minoan life in the prehistoric period, but also with a deep sense of the unsurpassed natural beauty of Crete and of the friendly hospitality and charm of its people.

Non-sporting Dogs

By Freeman Lloyd

NON-SPORTING DOGS as classified by kennel clubs are breeds considered not particularly adaptable for hunting. However, even the most pampered pets of them all, if they are active enough to cover country, will search for game.

All dogs are born hunters, and to nose out prey by scent is natural to them.

The Standard Poodle (Plate I), handsome star of many bench shows, may prefer the role of a water spaniel to that of a stage performer or milady's companion on Fifth Avenue. More than a hundred years ago the large Poodle was favored as a water spaniel by European wildfowl shooters.

A Poodle Proves His Sporting Skill

It was proved that a standard-sized Poodle bred in the United States still possesses the old sporting spirit of his race when a bench-show champion dog of the Poodle breed, Blakeen Cafe Parfait, demonstrated his usefulness as a wild-duck retriever at a spaniel club's field trial in 1936 (page 570). Thus an officially listed non-sporting dog became a fully qualified sporting dog.

He was a graceful, hardy swimmer and had excellent manners, always bringing the bird straight to the handler and never dropping it on the way. He was unusually tender with a live bird and scored high on this point in competition with his rivals. His only weakness lay in not using his nose enough on land but trusting to his amazingly keen eyesight—an advantage to him while the light was good but a handicap toward nightfall.

My old friend, the late Lewis Clement, French-Canadian born, enjoyed game shooting in several of the European countries, especially the Netherlands, France, and Britain. Again and again he expressed to me his wonder that the bigger Poodles in England were not used as retrieving dogs for duck shooting. That was their work, he declared.

There are corded-coated as well as woolly coated poodles, but the former are seldom seen now, the corded coats being difficult to keep free from foreign matter. Poodles have always been popular as ladies' companions, and when well kept, with coats nicely shorn or trimmed, attract much attention.

However, would-be purchasers of purebred Poodles should beware of frauds, if tempted to purchase a puppy from a curbstone peddler. Years ago, when French black Poodles became popular in England, a ready sale was found for black, curly coated, purebred retriever puppies with docked tails and clipped-to-fashion, poodlelike coats. These were palmed off as purebred black Poodles.

One time a dog seller in the Leadenhall Market approached me with an offer of what he styled "the best dog he had ever got hold of, good for anything."

The dog was a bedraggled-looking white Poodle, no longer young, but there was a look in his eye that appealed to me. I bought him.

After I had taken him to my apartment and cleaned him up, I handed him a plate of food to eat while I was enjoying my tea. He finished off the food, then picked up the plate daintily, and, sitting up at my side, held it out for a second helping.

That evening when some friends and I were having a glass of beer, I gave the Poodle some water. He declined it, and one of my friends suggested that beer might be more acceptable. We offered the dog a glass of beer. He drank it with evident relish. From that moment he was known as Boozer.

I took Boozer with me one afternoon months later to a music hall. We went backstage where "props" of a dog act were assembled.

No sooner did Boozer see the paraphernalia than he climbed up on a brightly painted keg and began rolling it across the stage. He was an old trooper, a top-notch vaudeville dog. Reluctantly, I sold him to the theater man.

Dogs do not forget acquired habits, much less their natural instincts.

Originally the Dalmatian or spotted dog (Plate III) came from Dalmatia, in the southern part of old Austria, now in Yugoslavia, and no breed has been kept more to its type and coloration.

This handsome and well-built breed is readily distinguishable because of the prominent black- or liver-colored spots on the white body ground of the coat. But the Dalmatian is born all white. The spots begin to develop when the whelp is around five weeks old.

Coach Dogs Good Bobcat Hunters

Before the days of automobiles, the Dalmatian was known as "Coach Dog" or "Carriage Dog." He was and is highly popular with horse owners (page 573).

Dalmatians have been employed as hounds and used with success for hunting bobcats and other felines in the mountains of south-

Mrs. Sherman R. Hoyt

"Mr. Pouf" Proves His Mettle as a Game Retriever

How a standard-sized Poodle, Champion Blakeen Cafe Parfait, little more than a year old, brings in a duck at a spaniel field trial in Connecticut (page 569). He swam beautifully and handled the fowl with remarkable skill. Large dogs of this breed are used for fowling in continental Europe.

ern Arizona. From a snapshot before me, it appears evident that even at the age of five and a half months S. B. Ross's purebred spotted dogs were putting their noses to the ground and hunting with just as much enthusiasm as might be displayed by American foxhounds of the same age.

Here is another example of a non-sporting dog of the bench-show class filling the role of a sporting hound in the field.

Rightly or wrongly, the English Bulldog (Plate II) has been described as having the most persevering courage of all dogs. Such was the character he bore in his own country in the days when bullbaiting was a popular amusement. The pastime was frequently patronized by noblemen, and even royalty itself visited the bull ring.

At a baiting, the bull was fastened to a stake and given about seven or eight yards of rope to allow him sufficient liberty for the fight. A bulldog "slipped" at him then endeavored to seize him by the nose.

If the bull was well practiced, he received the dog on his horns, threw him off, and sometimes killed him. If the bull was not very dexterous, the dog would seize him by the nose and cling to his hold until the bull stood still.

This was termed "pinning the bull." It was not deemed fair to "slip," or let loose, more than one dog at a time.

A similar and more cruel amusement described as "bull running" was established at Tutbury in Staffordshire by John of Gaunt, Duke of Lancaster. Here, by custom of the manor, a bull was given by the prior to the minstrels.

After having his horns cut off, his nostrils filled with pepper, and his body besmeared with soap, the bull was turned out to be hunted by the minstrels. When taken or obstructed long enough for some of his hair to be pulled off by his pursuers, he was chained to the stake to be baited by dogs. This barbarous custom was abolished in 1778.

Such was the background of the present-day Bulldog of the English breed.

Obviously, the dogs employed for such pastimes as bullbaiting and dog fighting were less bulky in body and longer in legs than our purebred Bulldogs of the present time, since such dogs must have been extremely active.

Percy T. Jones

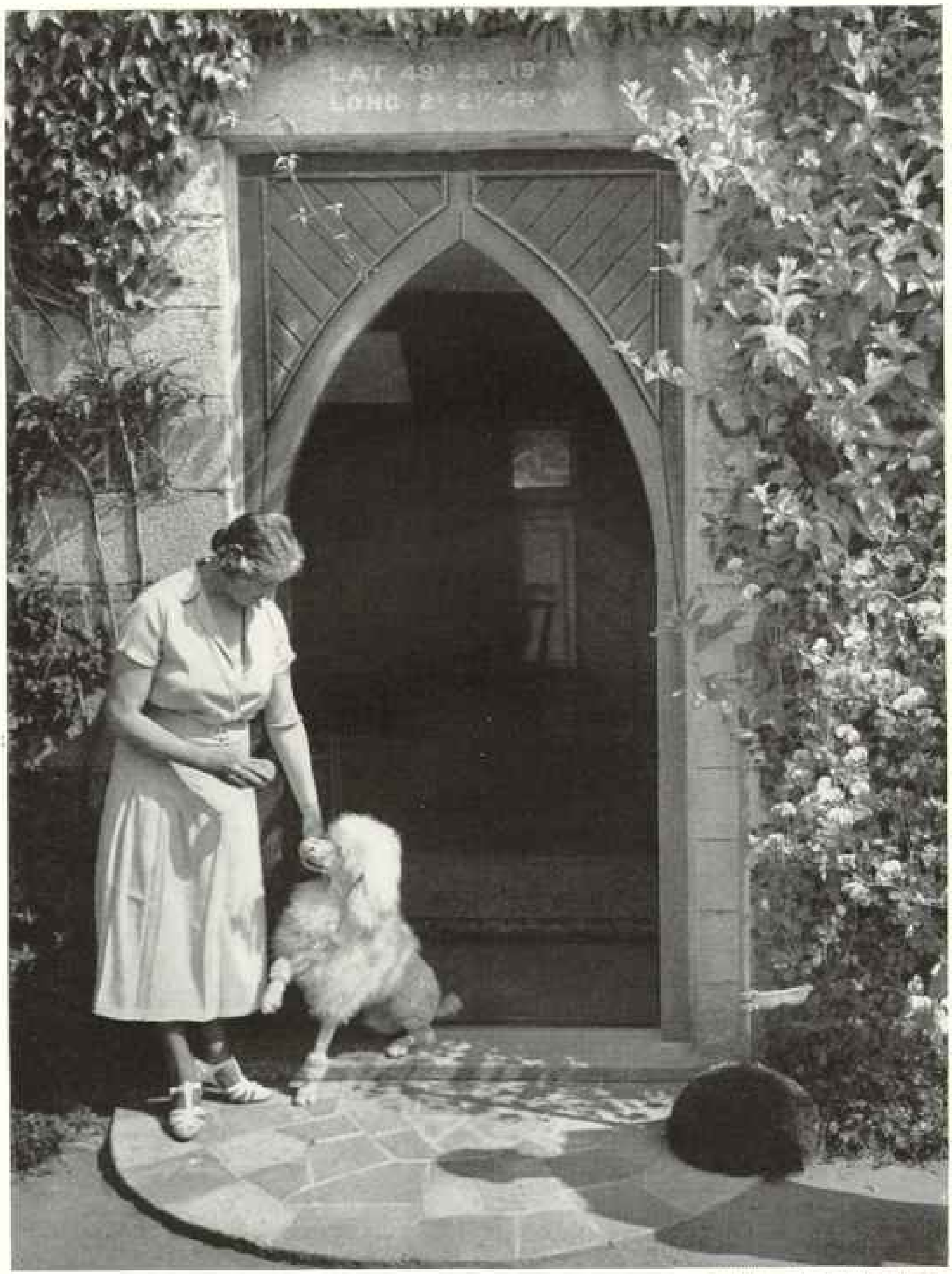
Mrs. Sherman R. Hoyt Presents Two Champions

Owner of the Blakeen Kennels at Stamford, Connecticut, she has had winners in many of the best shows. The dogs with her are the standard Poodle Champion Blakeen Eiger and the miniature Champion Vendas the Black Imp of Catawba. Her Champion Blakeen Cafe Parfait went from the bench where he had two highest honors to demonstrate his ability as a wildfowl retriever (pages 569 and 570).

H. Armstrong Roberts

Here's a Basketful of Chow

To fanciers in the Occident these puppies have a different appeal from that in parts of the Orient. Their name is pidgin English for *food*! In their original habitat these dogs are used for hunting (page 574).



Staff Photographer B. Anthony Stewart

Constant Companion of the Dame de Serk Is Her White Poodle

Exact address is shown in latitude and longitude above the doorway. Sibyl Hathaway, hereditary owner and ruler of the isle of Sark, in the English Channel, told of her unusual home in the NATIONAL GEOGRAPHIC MAGAZINE, July, 1932. Her husband is an American. Nazi invaders now occupy the island.

Thomas W. Keller

Tsk! Tsk! There's a Black Sheep in the Family!

In a litter of seven puppies born to Trotter and True Call, a handsome pair of well-marked Dalmatians owned by the Gardner Hallmans of Silver Spring, Maryland, one developed an all-over blackness instead of the usual Coach Dog spots. Mrs. Hallman, left, and Mrs. Ethel Kerr are at a loss to understand the oddity.

Bullbaiting has long passed into the discard, but unfortunately dog fighting remains as a disgraceful, although illegal, amusement on both sides of the Atlantic Ocean.

Dog Fighting a Disgrace to Sport

I once saw a professional dogfight in a foul-smelling, secret hall in the East End of London—an evil place known as "Dog Thieves' Kitchen." Before the fight all windows were nailed shut to prevent interference. The air was thick with smoke, the crowd the roughest I have ever seen.

In a canvas-floored pit two heavy bull-and-terrier dogs fought to the death, each straining to fasten its teeth in the "neck hole" of its rival, while two degraded men urged the gladiators to greater fury. These "seconds" actually tasted the hair around the necks of the fighters before the battle started to make sure that no "dope" had been applied.

When the dogs got grips on each other, the handlers kneeled beside them, striking the canvas to induce them to bite harder. The sickening spectacle ended as soon as one of the dogs was declared dead.

Immediately the handler of the dead dog dragged his charge to a corner and, crouching, held the poor animal upright between his knees. The living dog took one cowering look at its erstwhile foe, then turned away, refusing to attack again.

The referee awarded the victory to the dead dog! All it had lost was life. The other had lost its courage.

Out of that place I went sick at heart and ashamed that I had been there.

Huge prices have been paid for first-class show Bulldogs. About 40 years ago, Richard Croker, Jr., of New York, gave $5,000 for Rodney Stone, the British champion. The late Thomas W. Lawson, of Boston, exchanged huge sums for several of the breed.

The original Boston Terriers (Plate VI) were bred of the brindle-and-white bull-and-terrier mixture, weighing 30 pounds or less, and of a type generally accepted as fighters. From such ancestors, owned in Massachusetts, there came a dog known as Barnard's Tom, which was to become the first pillar of the studbook kept in connection with the Boston Terrier breed.

"Somebody Come and Tuck Me In"

Usually demanding special attention, the Boston Terrier is one of the most lovable and intelligent of all dogs. It is hard to believe that this little fellow snuggling into his basket is a true scion of a famous fighting breed (page 587).

At the earliest shows these dogs were entered in the bull-terrier sections and sometimes alluded to as "roundheaded bull-and-terriers." Today, the Boston Terrier is a dog suitable for homes and is one of the most widely known of all breeds in the United States.

During the last two decades the Boston Terrier has become highly prized in Great Britain. Until recent years an English lady of title was the principal importer of prize-bred Boston Terriers, while the American exporter accepted in trade large consignments of Norwich canaries and other songbirds.

About 1890 the first of the newly imported French Bulldogs (Plate V) were seen in England. A few of the breed were placed on sale by a professional dog dealer who had opened a high-class dog emporium in Regent Street, London. Previously, dog and bird shops had been confined mostly to the Seven Dials and the East End of the metropolis.

Much of the ever-increasing trend toward purebred dog exhibiting by women was traceable to the fact that Queen Victoria and the Princess of Wales (Alexandra) had begun to exhibit their collies, Pomeranians, Russian wolfhounds, basset hounds, and clumber spaniels.

On the formation of the Ladies' Kennel Association in London, more and more women became interested in the pastime of dog showing, since "What is right for Her Majesty must be right for us."

The Chow, or Chowchow, dog of China (Plate IV) stands out as one of the most remarkable of all purebreds. For that reason, he is readily recognized because of the blackish color of the tongue, lips, and other flesh parts of the mouth.

The term "chow" is a pidgin-English expression for food. Among some Chinese this dog is fattened with rice and slaughtered for meat. The Chinese do not give their dogs so much meat to eat as do Western people. They believe the flesh of rice-fed dogs possesses medicinal properties.

The upright-carried ears and the curled tail of the Chow may point to a relationship between the sleigh and herd dogs of northern Asia, Europe, and America.

When selecting puppies of from two to three months old, one should choose those with short faces, short backs, dense coats, great foreleg bone, short feet, and well-twisted tails.

In China this breed may or may not be considered a hunting or draft dog; but in

Harold M. Lambert

Four Freedoms and Their Dog!

Carefree and happy, an American family heads for the picnic grounds, good things to eat in the lunch hampers, baseball equipment ready for play, and the Boston Terrier pal along to share the fun. Such days of sport and recreation epitomize rights Americans are fighting for. Among treasured memories of gray-haired men, how many are linked with a "Tippy" or "Sport," constant companion of their playtime!

America and Europe he is looked upon as a purely non-sporting "fancy" dog.

Before the French Revolution a political group in the Netherlands was opposed to the princes of Orange. These dissenters, known as "Patriots," were led by Cornelis van Gyselaer of Dordrecht. Van Gyselaer has no great place in political history, but he owned a dog that attained undying fame.

The pet dog of the Dutch insurgent was called "Kees," and the posterity of Kees became known as Keeshonden (singular, Keeshond). It is now an internationally recognized non-sporting breed (Plate VII).

Belgium is the fatherland of the Schipperke (Plate VIII), and a smart, extremely alert little dog he will be found.

In Belgium the Schipperke was used as a watchdog on canalboats and other craft. Although he has much of the appearance of the spitz or Pomeranian breeds, some hold that he is a distant relation of the much bigger and black-colored Belgian sheep dog.

The Schipperke is not always (though sometimes) born tailless, and other than black puppies occasionally appear in the same litter. But the several Schipperke clubs in both hemispheres have ruled that only wholly black specimens are true representatives of the breed. My belief is that the Schipperke, in blood, is more closely related to the curl-tailed German spitz dog than to the long- and straight-tailed small sheep dog of Belgium.

A Royal Dog Fancier

King Leopold was a keen dog fancier. At an annual dog show held under the auspices of the St. Hubert Society—the kennel club of Belgium—I was presented to the monarch. He was asked to express an opinion regarding the merits of the black Pomeranian named Skoff, the English champion, which had been sent across the Channel to compete against the Belgian dogs of the same breed.

"A nicely made and coated dog, but he's too big," promptly replied the ruler.

Skoff weighed about 10 pounds, and at that time—in the late eighties—the miniature toy Pomeranians scaling under five pounds were virtually unknown or unrecognized as show Pomeranians in Britain. A few years later they became all the rage.

It is remarkable how the love of dogs levels off class distinctions. Once at a London show I observed a noblewoman talking chummily with a fish salesman. Both were dog fanciers; each had entered a pet at the bench event. I induced the oddly assorted pair to pose together for a picture which I titled "Belgravia and Billingsgate."

Poodle

The English name Poodle appears to have been derived from the German word *Pudel*, while the designation "French Poodle" was used to signify the Poodles of France (Plate I). The latter were the more popular in Britain, since they were more readily available than those of Germany, and French fashions have always been acceptable among the fair sex.

There is little difference in the appearance of the German and French Poodles, and their colors are the same. These are of solid shades: white, black, blue, cream, red, liver, apricot. The shades should be solid and even.

Poodles vary in height, weight, and forms of coat. There are corded- or tag-coated specimens, but if the cords be cut off, the new and woolly coat may be kept fleecelike.

Several years ago I owned a white corded Poodle. When some of the cords were shed from over the shoulders, I had her clipped. The new coat was kept combed and fluffed out, and soon White Wings won first prize at Brighton, England, and was purchased by the late Lord Rothschild.

Corded Poodles are difficult to keep in presentable condition; consequently, they are seldom seen nowadays. Among them was a small Maltese-dog-sized variety. These were known as "Cuban Poodles," and remarkable little creatures they were, with perfectly formed "cords" of lengths that trailed the ground. A woolly Poodle should be clipped, or its coat trimmed at least three times a year.

For flapper (young wild duck) shooting in parts of Europe, Poodles are used as water spaniels. Flapper shooting starts on August 1, when the ducklings have not attained full powers of flight; but a wounded bird might not be chased and caught amid reeds if the retrieving Poodle's heavy coat should impede the dog's progress in the water. The forepart of the coat is therefore sheared off.

Even during winter months in New York one sees really first-class Poodles clipped in a senseless way, the whole of the head, back, and loins being bared. Thus are the most vulnerable parts purposely left exposed to the elements.

The Standard Poodle is 15 inches or over at the shoulder. A 22-inch dog weighs around 50 pounds. The Miniature Poodle should be under 15 inches. He is larger than the Toy, which is usually under 10 inches at the shoulder.

Poodles are favorites with public entertainers because they are even-tempered and are easily taught tricks and acrobatic stunts. Their physical form suits them for the work of the stage, and they are brainy, active, and strong.

Bulldog

In general appearance the Bulldog is smooth-coated, thick-set, rather low in stature, but broad, powerful, and compact (Plate II).

The head is strikingly massive, and large in proportion to the dog's size. Its face is extremely short and the muzzle very broad, blunt, and

 Painting by Walter A. Weber

Standard Poodles, Sagacious and Agile, Quickly Master Tricks

More than 15 inches high, with long legs and short, compact bodies, **Poodles** are well built for acrobatics. Handsome in either curly or corded coats, they are fashionable pets for ladies, but can be trained as duck retrievers. One of the miniature variety (under 15 inches) was judged best dog of any breed at a recent New York show.

Painting by Walter A. Weber

Symbol of British Courage and Tenacity Is the Bulldog, Originally Developed for Bullbaiting

In the background, two of his early forebears have a tethered bull by the nose and strive to hold him still. This "sport" was popular throughout the Kingdom until prohibited by Parliament in 1835. Nature and breeding provide **English Bulldogs** with protruding lower jaws and receded noses so that they can breathe with some freedom even while their teeth are fastened on a foe. Many city fire departments fancy them as mascots.

Painting by Walter A. Weber

Gas Rationing May Bring the Dalmatian Back into His Own as a Coach Dog

Most readily identified of all breeds because of the black or liver-colored spots on a white coat, the **Dalmatian** has been kept singularly pure in blood. Cloudiness or absence of distinct markings may point to an alien strain. In the days of the carriage, these dogs accompanied horses, especially nervous ones, to give them confidence and keep them from shying. They also may be trained for hunting.

Painting by Walter A. Weber

Chows from China Are the Only Dogs with Wholly Blue or Black Tongues and Lips

For centuries in their native land they have been used for hunting, but in the Occident their ability in this respect has been overlooked. The first **Chow** exhibited in the United States was seen at a show in New York in 1890. Ten years earlier Queen Victoria imported a Chinese-bred pair to England.

Painting by Walter A. Weber

The French Bulldog Is Smaller and Less Aggressive than His English Cousin

For 50 years this variety has been considered a pure breed, an offshoot of English Bulldogs exported to France early in the Victorian period. Its weight seldom exceeds 28 pounds. About 1900 the **French Bulldog** became popular in America, and he remains a favorite as a dog for the home. Some of the best have been bred and exhibited in the United States.

Painting by Walter A. Weber

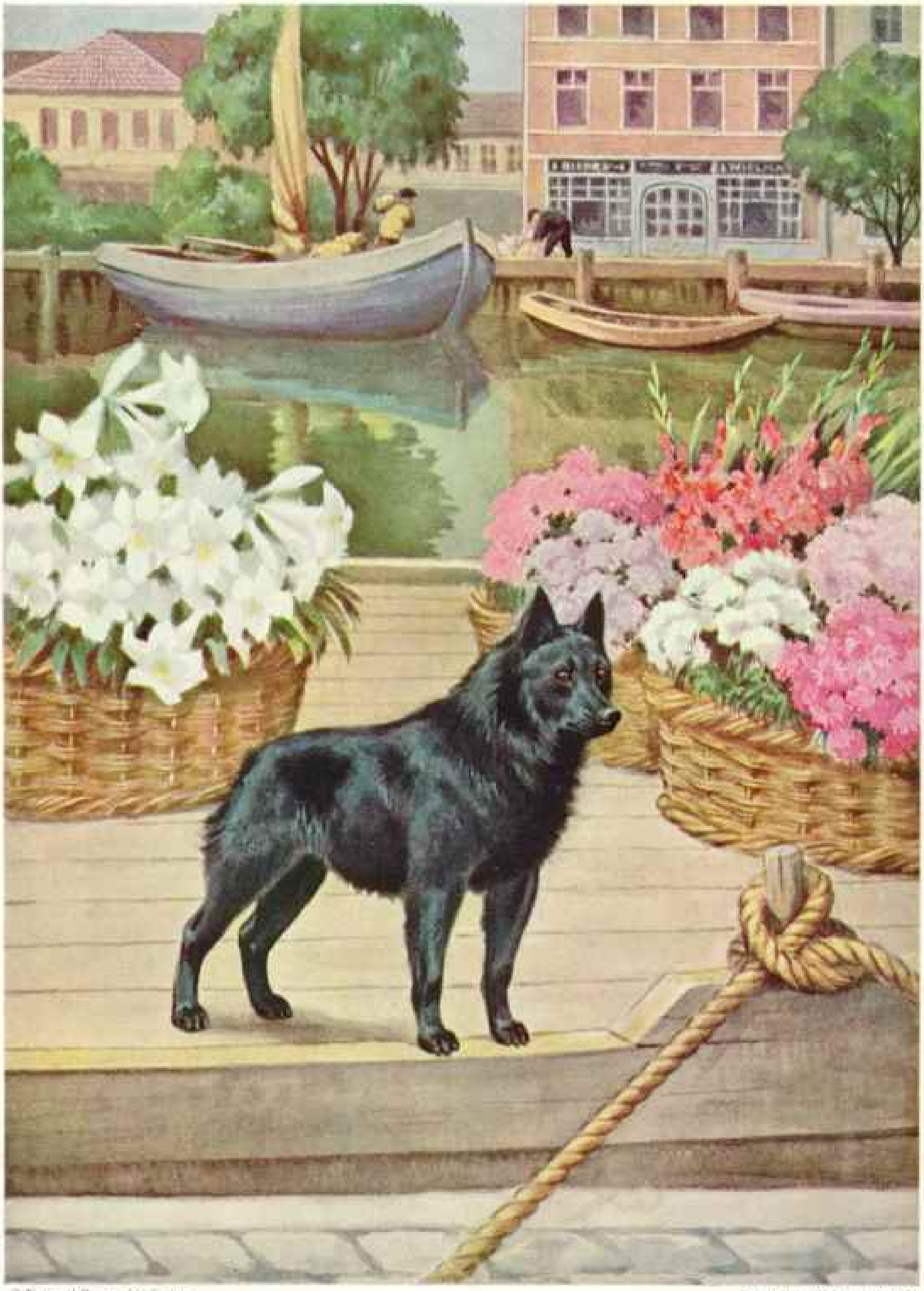
Fighting Bulldog and White English Terrier Were Ancestors of the Friendly Little Boston Terrier

Though his jaw is not undershot like that of his first forefather, the handsome **Boston Terrier** has inherited the gurgling voice of the pit warrior. This strictly American breed, now almost world-wide in distribution, is popular. More children-visitors are attracted to Boston Terrier Club shows in New York than to any other specialty canine event in the United States.

Painting by Walter A. Weber

The Keeshonden Is as Dutch as Wooden Shoes

Named after "Kees," owned by Cornelis de Gyselaer, a leader of the Patriots who opposed the Prince of Orange in 1782, the **Keeshonden** has been a favorite breed in the Netherlands for centuries. The dogs were not internationally recognized at bench shows until after 1920. They are faithful and sagacious. There are now many good specimens in the United States.



 Painting by Walter A. Weber

The Schipperke, "Little Captain," Guards Canalboats in Belgium

Although Spitzlike in appearance, **Schipperkes** are descended from Belgian black Sheep Dogs of long ago.

inclined upward. Its body is short and well knit; the limbs are stout and muscular. Its hindquarters are high and strong, but rather lightly made in comparison with its heavy foreparts.

The dog should convey an impression of determination, strength, and considerable activity.

The jaw should be broad and square, the canine teeth, or tusks, wide apart. The lower jaw should project considerably in front of the upper, and turn up. It should be broad and square, and have six small front teeth between the canines in an even row. The teeth should be large and strong.

These head points are assessed as of more value than other ideals in the formation of body and limbs; in short, the index of a dog's breed may point to what might be its usefulness for any given pastime or sport.

As members of the Bulldog Club, England, in the early nineties, rich men and poor men fraternized at banquets, the men of means paying for the entertainment of those who could not afford it. And all drank champagne from the great silver loving cups at the club's dinners.

One interesting dog show I attended was in the Shoreditch district of London, where a famous old-time Bulldog fancier was landlord of a beer house. Recognizing that the East End of the metropolis was a hotbed for Bulldogs, the Bulldog Club decided to hold a show at Harry Layton's "pub." All rules and recognized values of certain "points" were ordered cast aside; disqualifying faults forgotten.

The upstairs rooms were cleared of furniture, and gaily costumed Italians with street pianos provided music.

The prize for the best dog in the show was awarded to one with a flesh-colored nose which would have been passed over in a competition held under Kennel Club rules. Bulldogs that have flesh-colored noses with light-colored eyes and generally yellowish-looking countenances are classed as "Dudley," because such animals originally came from the town of Dudley in England.

The color of the Bulldog is white, or white with black mask or muzzle, brindle, red, fawns (fallows, occasionally pied and mixed colors). Mature male dogs should weigh about 50 pounds; bitches, about 40 pounds.

Dalmatian

The Dalmatian was named for the old Austrian province on the eastern shore of the Adriatic (Plate III).

A strikingly handsome, splendidly built, and active dog, he has remained unique in his markings—small dots or spots of black or liver color on an otherwise milk-white coat. In the best specimens the more or less round markings are of a size varying from that of a dime to a half dollar. Large patches are disliked, but distinct spots on the ears and tail are most prized.

In make and shape the Dalmatian resembles the English pointer, a gun dog, and there is little reason to doubt that the spotted dog might be trained for game-bird shooting purposes.

Standing 22 inches at the shoulder and weighing around 55 pounds, this dog not only is well built but possesses speed and stamina. He makes a capital dog on a country place, as a house dog and one friendly to other animals, especially horses. For this reason he is often referred to as the "Coach Dog" or "Carriage Dog."

As a fire-brigade dog he remains popular with firemen and public, even though horse-drawn vehicles for fire fighting have been superseded by mechanical trucks and other conveyances.

Dalmatians are also liked by showmen because of their attractive colorations. A trainer of lions and other of the larger felines said that he preferred to use Dalmatians and Great Danes of the harlequin color to work with tamed wild beasts. These dogs' unusual markings, he said, gave gaiety to the performance.

When choosing puppies from two to three months old, one should select those with distinct spots, and free from patches. The deeper and richer the black spots, the better. The liver-spotted variety should be brown, but the two colors should not be intermixed.

Chow

The Chow, or Chowchow, Chinese dog is of a distinctly pure breed. His type appears to be as fixed as that of an animal of the wild. His flat skull, small, dark, upright-carried ears, blunt though fairly long muzzle, black tongue, and curled tail carried well over the back are quickly noted by anyone (Plate IV).

The disqualifying points for show purposes are drop ears, other than a black tongue, a long muzzle, tail not carried over the back, white spots on coat, and a red nose, except in yellow or white specimens.

A more or less common fault, it seems to me, is the straight hock or stifle joint that frequently is noticeable. But this physical defect sometimes is passed over as a point in the dog's favor. It is argued by some that such a structural failing, being common in the breed, should be recognized as a sign of purity of blood, and not evidence of weakness in the hind legs.

The features of this breed are concentrated in its head and coat, although there is a smooth- or short-coated variety. The hair of the rough Chow is abundant, dense, and rather coarse in texture, with a soft, woolly undercoat. The feet are remarkably round and well formed for a dog of this weight; indeed, few, if any, other breeds have better formed feet.

In general appearance the Chow is a lively, compact, short-coupled dog with a well-curled tail over the back. He should be whole-colored black, red, yellow, blue, white. The underparts of the coat of the tail and thighs are of a lighter shade than that of the body coat. Few breeds are exhibited in better condition and coat.

A Chow may stand 20 inches at the shoulder and weigh 40 to 50 pounds. In the Occident he is kept as a fancy or companionable dog, although in his own country he is sometimes used as a hunting and sled dog.

International News

Tippy Goes Out for His Last Ride on the Fire Truck

When the gong called out the Franklin Fire Company in Chester, Pennsylvania, the dog mascot was first aboard the engine. He missed his footing one day and died beneath the wheels. With junior members of the company as pallbearers, the firemen and some 6,000 townfolk gave him a true fire-fighter's funeral.

French Bulldog

The French Bulldog was named for the country of his origin and to distinguish him from his obviously close blood relative, the English Bulldog, from which he differs slightly in size and in the carriage of the ears (Plate V).

The French dog has upright ear cartilages, while the English dog has folded or rose ears somewhat smaller. It has been generally accepted by dog breeders that closely related dogs when continuously inbred have a tendency to produce puppies which at adult age carry their ears upright. The French Bulldog's ear is wide at the base and rounded at the top. This formation is highly valued by exhibitors at dog shows.

It has been said that small-sized English Bulldogs exported to France were crossed with native French dogs of other breeds and in time produced the now standardized and certainly very attractive French Bulldog.

On the first appearance of the French breed in England in the late eighties or early nineties the new arrivals were well received and greatly admired. Pride was expressed among the older Bulldog fanciers of London that such a handsome dog, evidently of old and fighting Bulldog stock, could be produced in a "foreign" land.

The short, straight, or screwed tail of the French dog may point to a race much inbred. Although a dark brindle appears to be the most popular color of this breed, fawn, white, brindle-and-white are acceptable. Black-and-white, black-and-tan, mouse, and solid black are disqualifications under the rules of the French Bulldog Club of America.

These dogs may be classified by weights. A lightweight is under 22 pounds; a heavyweight, 22 pounds and not over 28 pounds.

Some of the best specimens have been bred in America, and a few of the earlier importations of French Bulldogs may have been encouraged by the late James Gordon Bennett of New York, who was once president of the French Bulldog Club of France.

Boston Terrier

The Boston Terrier is an embodiment of fixed type, produced from ancestors of more or less different types, but still representative of the Bulldog or bull-and-terrier fighting breeds of English origin. He is a living example of what may be obtained from the traditional dog-breeding melting pots of the United States of yesterday (Plate VI).

The Boston Terrier not only has been bred to a distinct type, but reproduces that type in form, coloration, markings, and temperament. America has reason to be proud of this breed, which is distinctly recognizable as not only different from any other pure breed of Europe and Asia, but as handsome, companionable, and useful.

The little dog is admired and beloved in all countries where he is known. Once a bare-fisted prize fighter of the pit, he has become a home dog and an even-tempered friend of women and children. The environment in which a dog is reared frames its disposition.

The approved color is brindle with even white markings. According to the ruling of the Boston Terrier Club of America, this terrier should be a lively, highly intelligent, smooth-coated, short-headed, compactly built, short-tailed, well-balanced dog of a weight not exceeding 25 pounds. The lightweights are under 15 pounds; the middleweights 15 and under 20 pounds; the heavyweights 20 and not exceeding 25 pounds. Dogs of nearly 25 pounds are seldom, if ever, seen at recognized American Kennel Club events.

Another point sought for is a head indicating intelligence. The body should be rather short and well knit, and the limbs strong. There should be strength and activity with graceful carriage.

The Boston Terrier is fast becoming a world favorite, not only because of his smart appearance, but because of his affectionate disposition and small size—one that befits the apartment as well as the larger domicile.

Keeshonden

Although up to a few years ago the Dutch Keeshond (plural, Keeshonden) breed was not well known in the United States, it had for centuries been considered a sort of national dog in its own country (Plate VII). Strictly of the larger type of the spitz dog of Europe, the Keeshond may be classed as one of that great family of dogs used for working or herding on farms, their value as helps to man being appraised according to their size, strength, and activities.

According to the description and standard of points drawn by and adopted by the Keeshond Club and approved by the American Kennel Club in 1930, this dog should have a short, compact body and alert carriage. He should have a foxlike head, small pointed ears, and a well-coated and curled tail carried over the back. The body hair should be extremely thick over the neck, forming a ruff; and the head, ears, and legs should be covered with short, thick hair.

The Keeshond as a breed was at very low ebb until 1920, at which time Baroness van Hardenbroek undertook an investigation to see how many of the old stock still survived.

The results of this inquiry were surprising. Whereas the breed had passed from public attention, it was still kept in its original form by certain captains of river boats, and by farmers and truckmen. There were many excellent specimens. Some owners even had maintained their own crude studbooks to record pedigrees.

In some ten years the Baroness brought the Keeshond to such a solid position that the Netherlands Kennel Club accepted the standard and points for judging the breed. The Dutch Keeshond Club was formed.

For some time the Keeshond has been fairly well known in the United States, and several of the breed have been exhibited at leading shows. Here, as elsewhere, these smart, wolf-gray, prick-eared, and curl-tailed dogs have been

U. S. Marine Corps Official

Jiggs, of the Marines, Guards the Gunner's Baby

While J. A. Burch, U. S. M. C., is fighting in the South Pacific, his 8-month-old daughter Erie is well protected by her devoted friend, the Leatherneck mascot at Quantico, Virginia. The dog is resplendent for the photograph in his blue dress uniform with service stripes.

attracting favorable attention. The ideal height for the dogs is 18 inches; bitches 17 inches.

Schipperke

The very appearance of the Schipperke, developed and standardized in color, size, and general characteristics in the Flemish provinces of Belgium, denotes that he is a particularly alert and active little dog (Plate VIII).

On his arrival in other countries he was colloquially spoken of as the *barge*, which associated him with his general occupation—that of a smart, although small, guard or watchdog for barges and other small craft used for canal service. Such dogs in the days of horse-drawn vans and other commercial delivery vehicles were used in towns to keep off would-be pilferers.

The origin of the Schipperke, or "Little Captain," has often been discussed. Some thought that the present and somewhat diminutive breed descended from the small and black Belgian sheep dogs known as the "Leauvenaar." Such was the belief of Charles Huge, a Belgian judge of the breed. Others, with whom I am inclined to agree, have been disposed to believe there might have been considerable spitz or Pomeranian blood or breed in the make-up of the sprightly Belgian barge dog. But Mr. Huge pointed out that Schipperke puppies are born either tailless or with straight tails quite unlike the curled appendages of the spitz varieties, big and little.

The Complete Dog Book, published by the American Kennel Club, New York, records that in 1690 a show for the Schipperkes of the Guild workmen was held in the Grand Palace of Brussels. The men were invited to bring their dogs and the hammered brass collars which even at that time custom had ordered for the Schipperke. The breed was called spitz or spitzke then.

The name Schipperke was chosen in 1888 as a compliment to Mr. Renssens, owner of a Brussels-Antwerp canalboat line, who was known as "the father of the Schipperke" because of his efforts to gain recognition for the breed. He had observed that many Schipperkes were used as guards on the canalboats.

The first Schipperkes to arrive in the United States landed in 1888, and were purchased in London by the late Walter Comstock of Providence, Rhode Island, and the late Frank Dole of New Haven, Connecticut.

These dogs and bitches were of the choicest stock. The same type of Schipperke is winning today.

The Schipperke is a small, cobby dog with sharp expression. He is intensely lively and presents the appearance of being always on the alert. He is solid black and may weigh as much as 18 pounds, but those of 12 pounds are usually preferred. He makes an excellent companion for children and an ever-watchful little house dog.

Pelican Profiles

By Lewis Wayne Walker

With Illustrations from Photographs by the Author

ON SIX tiny islands in the Salton Sea, groups of white pelicans hatch out their young—blind, naked, and helpless—in a bake-oven world.

Maximum temperatures, exceeding 120° in nonexistent shade, are sufficient to broil the tender baby chicks. And broil they would, did not their parents, sponging up water in starch-white plumage, turn themselves into air conditioners.

The shores of this 30-mile-long sea lap the inhospitable Colorado Desert, as this section of what used to be known as the "Great American Desert" is frequently called. This wilderness, sprinkled with greasewood and cactus, is the abode of road runners, rattlesnakes, and lizards. Truly, they fit the desert scenery. The presence of birds commonly associated with cool, marshbound lakes brings up the question, "Hasn't Nature made a mistake?"

On the contrary, their tenancy is the direct result of an error by man. In 1905, irrigation engineers, carving the verdant Imperial Valley out of the Colorado Desert, allowed the Colorado River to burst its sluices.

For two years the diverted stream poured a muddy torrent into an extinct lake bed called Salton Sink. By the time flood waters were controlled, the sink had become an inland sea. Two hundred and forty-four feet below ocean level, Salton Sea has no outlet. Waste waters from irrigation canals, balanced by evaporation, keep its area fairly constant. Its mullet and other fish support the white pelicans.

In 1930, Congress set aside a refuge here for migrating ducks and geese. It now comprises 32,407 acres.

No one invited the pelicans, but a small flock of winged squatters, discovering safety in the desert, settled down to stay some 35 years ago.

A White Parade in the Blue

I recall the day in the early thirties when a companion and I, sight-seeing among the bubbling mud geysers on the eastern side of the sea, observed a hundred white birds maneuvering majestically in the sky. They played follow-the-leader. Then they soared into the blue until only the sun, glinting on white feathers, flashed their location.

Descending, they "snapped the whip" and performed other acrobatic feats. What birds were these? We wondered.

As they alighted on the water, their identity became apparent. White pelicans, sublime in flight, seemed ridiculous on foot. Glossy-white wings, stretching eight to almost ten feet, were tipped with black. Weight: 15 to 17 pounds. Male and female looked alike.

Since that day their numbers have increased steadily. Last spring a friend and I were permitted to make a closer inspection. Plying a small boat, we visited the six isles which pelicans share with gull-billed terns (the rarest tern breeding in the United States).

We had no more than landed on the first island than the terns, protecting their eggs, subjected us to a dive-bombing. Folding wings and sounding laughlike cries of warning, they plummeted like screaming Stukas. Just as they seemed about to strike, they pulled out of their plunges.

In Terntown, Two Minus One Leaves None

Unlike airmen, these flyers are poor mathematicians. Taking advantage of their weakness, we tricked them with a variety of shell game in which men instead of peas deceived the eye.

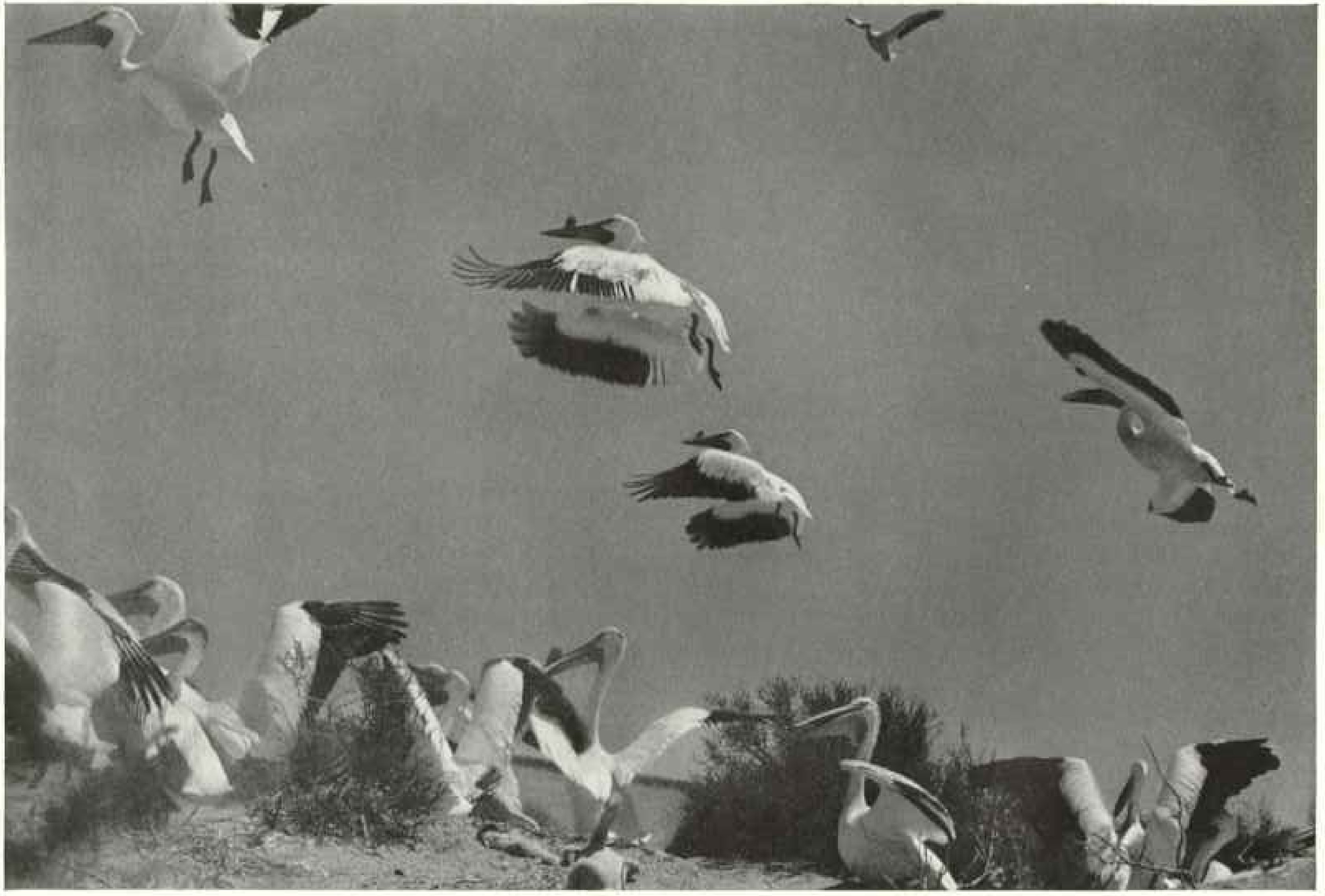
Hastily erecting one of our prefabricated blinds, we both entered. The terns, realizing we were inside the uncamouflaged structure, persisted in scolding us with demoniac laughter. But when my companion allowed himself to be seen departing in the boat, the birds were convinced no human remained. Muting their cries, they resumed setting.

Better the air raid than the shelter in which I now found sanctuary from the birds! Built seemingly for a midget, my combination torture chamber and Turkish bath shut out the breeze and imprisoned the heat. It was four feet high, three feet long, two feet broad.

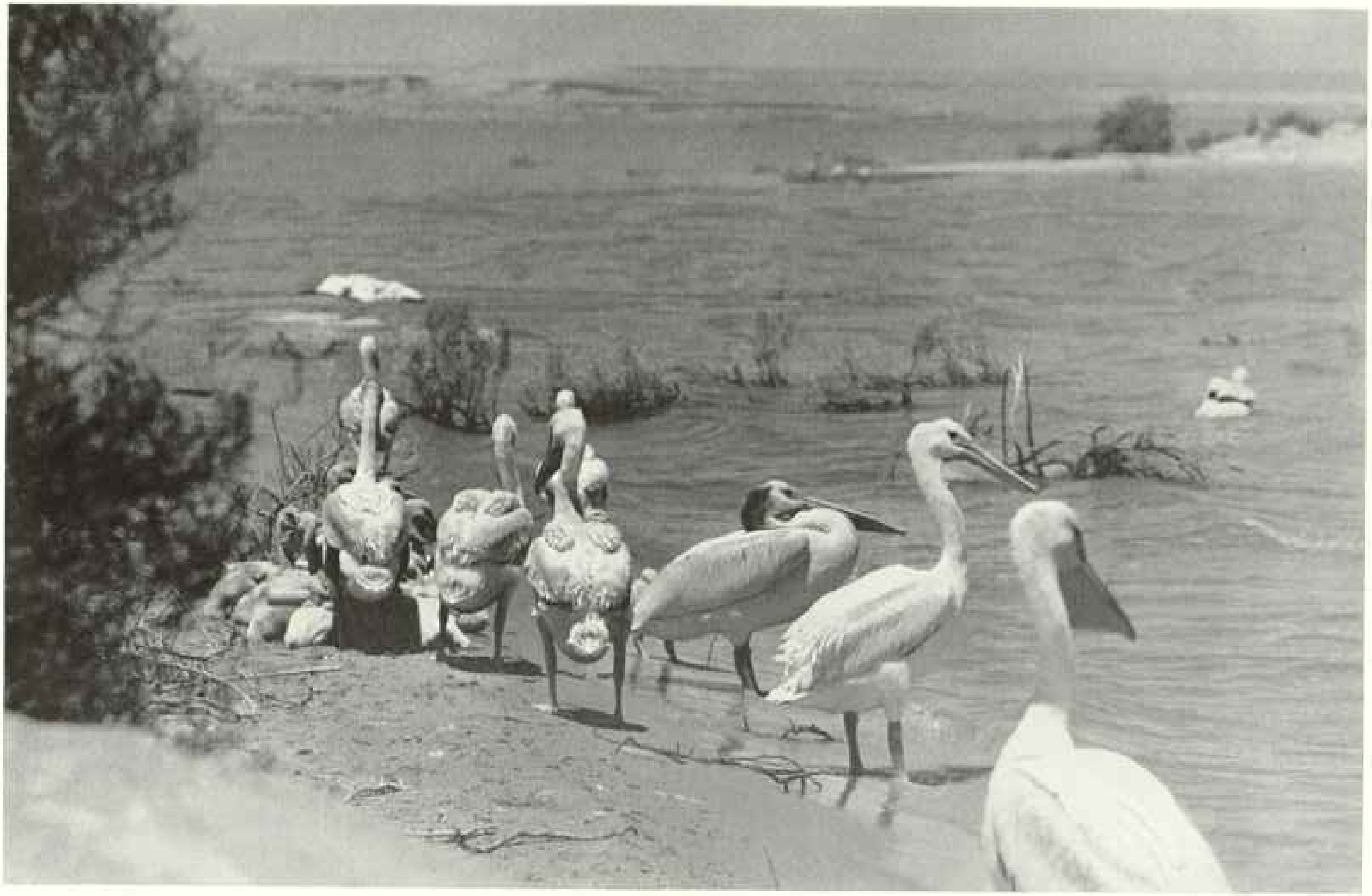
Pelican-high above the sandy floor, a small opening accommodated the camera. Above it a slot, covered with cheesecloth, permitted me to see without being seen. Within such blinds I spent eight sweltering week ends (page 592).

We are accustomed to think of nesting birds warming their eggs. On Salton Sea islands, where the sun heats metal until it blisters the human arm, waterfowl reverse the incubation process of northern climes.

Pelicans, like white tents in the sand, crouched above their eggs to shade them.

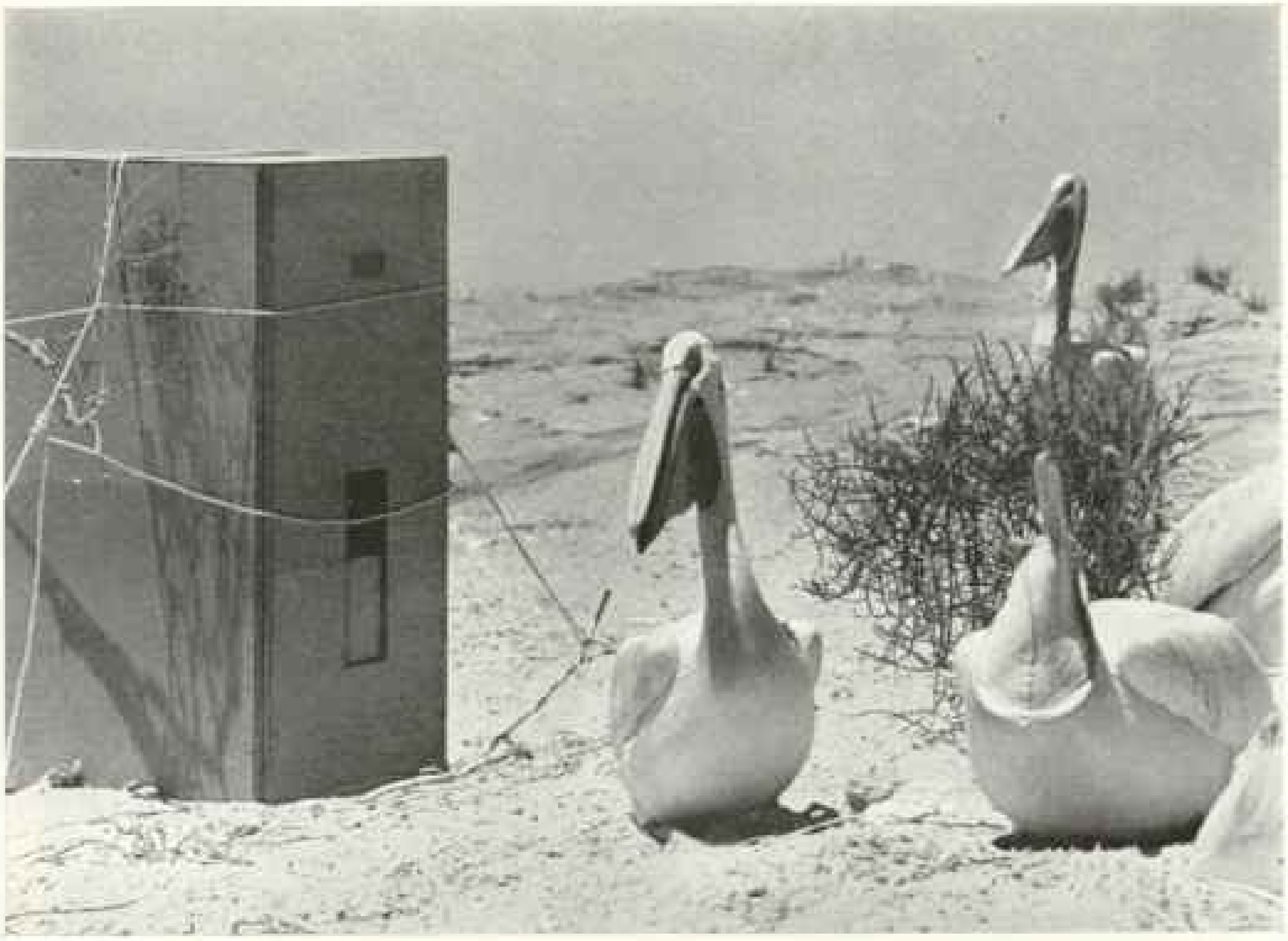


In Landing, Wings and Tails Become Brakes—Horny Excrescences on Upper Bills Are Temporary Adornments of the Mating Season



Like Coney Island Bathers, Lazy Birds Wade in Waves, a Bold Few Swim into Salton Sea, and Babies Huddle on Sand

Their demanding offspring quieted, tired parents relax. But let a tempting school of fish venture near and calm will vanish. Then the adults, forming a semicircle, beat the waters with wings and herd their darting prey into shallows. Enormous scoop bills complete the roundup.



"What's in That Box?" Two Inquisitive Faces Ask as a Third Yawns

Here the author, hidden in a second blind, photographs one of the airless torture chambers in which he spent eight sweltering week ends (page 589).

Mother and father took turns dipping into the water, wetting breast feathers, and sheltering their setting. Evaporation created natural air conditioning. Temperature differences between shaded eggs and abandoned ones were readily apparent to the hand.

Pap for Pelicans—They Can Have It!

Before long, pairs of chicks, their waxy skins an orange-salmon color, emerged from white, unspotted shells. Sightless, bare blobs of jelly, they were unable to lift their heads (Plate IV). How could such helpless mites survive the torrid days ahead? How would they be fed?

These questions were soon solved.

The first hungry chirp was answered by the parent with a racking series of coughs. In what appeared to be a painful process of tearing her body apart, she forced a mass of semi-digested fish from her stomach into her voluminous pouch. Then she placed her lower mandible under baby's head, and he gobbled up his pap.

When the twins peeped a protest against the sun, mother or father thoughtfully provided shadow with their own bodies (Plates II and III).

Phenomenal growth rewarded the parents' devotion. By the following week end their offspring had trebled in size. Gray-white down, cloaking nakedness, provided a flimsy sun shield.

In two weeks the chicks waddled about the colony, visiting neighbors. Scores clustered like boys playing "Pile on!" All fought for the shade at the bottom of the heap (Plate IV). With throat sacks throbbing, they steamed like the "four-and-twenty blackbirds baked in a pie." When a food-bearing parent returned to the nest, its twins exploded unceremoniously from the caucus.

At four or five weeks the young found relief from heat by forming bands and swimming about the islands.

To Feed Junior, Mother Takes a Beating

When the young reached walking stage, dinner was accompanied by assault and battery. No crew of cowhands rivaled the stampede to the table. As mama (or papa) landed with fish, a famished son ran up with open

The White Pelican Is a Giant Seaplane of the Bird World

Weighing 15 to 17 pounds, this heavyweight of waterfowl takes off on broad wings tipped with black flight feathers. Ungainly on the ground, it is a master of graceful formation flying.

 Reproduction by Lewis W. Walker

"His Mouth Holds More than His Bellican"

Woodrow Wilson's favorite limerick earns credence from this pelican portrait. A pair of the "wondrous birds" have just returned to their eggs. A helpless chick lies partly shaded by its parent, right.

Under Uncle Sam's Wing, This Flying Colony Is Growing

White pelicans live with little fear on six tiny islands in a Salton Sea sanctuary. They share their Federal preserve with gull-billed terns and migrant ducks and geese.

© National Geographic Society

Kodachrome by Lewis W. Walker

Air-conditioned Papa Keeps His Progeny from Broiling

Combating 120-degree heat of the Salton Sea summer, pelican parents take turns dipping in the water and shading the young. Moisture evaporating from breast feathers cools the air.

Lunch for Junior Is Seasoned with Assault and Battery

A ravenous fledgling, seemingly headless, has rushed his returned parent. Now he plunges beak into her gullet. Muffled whinnying, violent wrestling attend regurgitation. Soon the youngster, fed to gidditie=, is shaken loose.

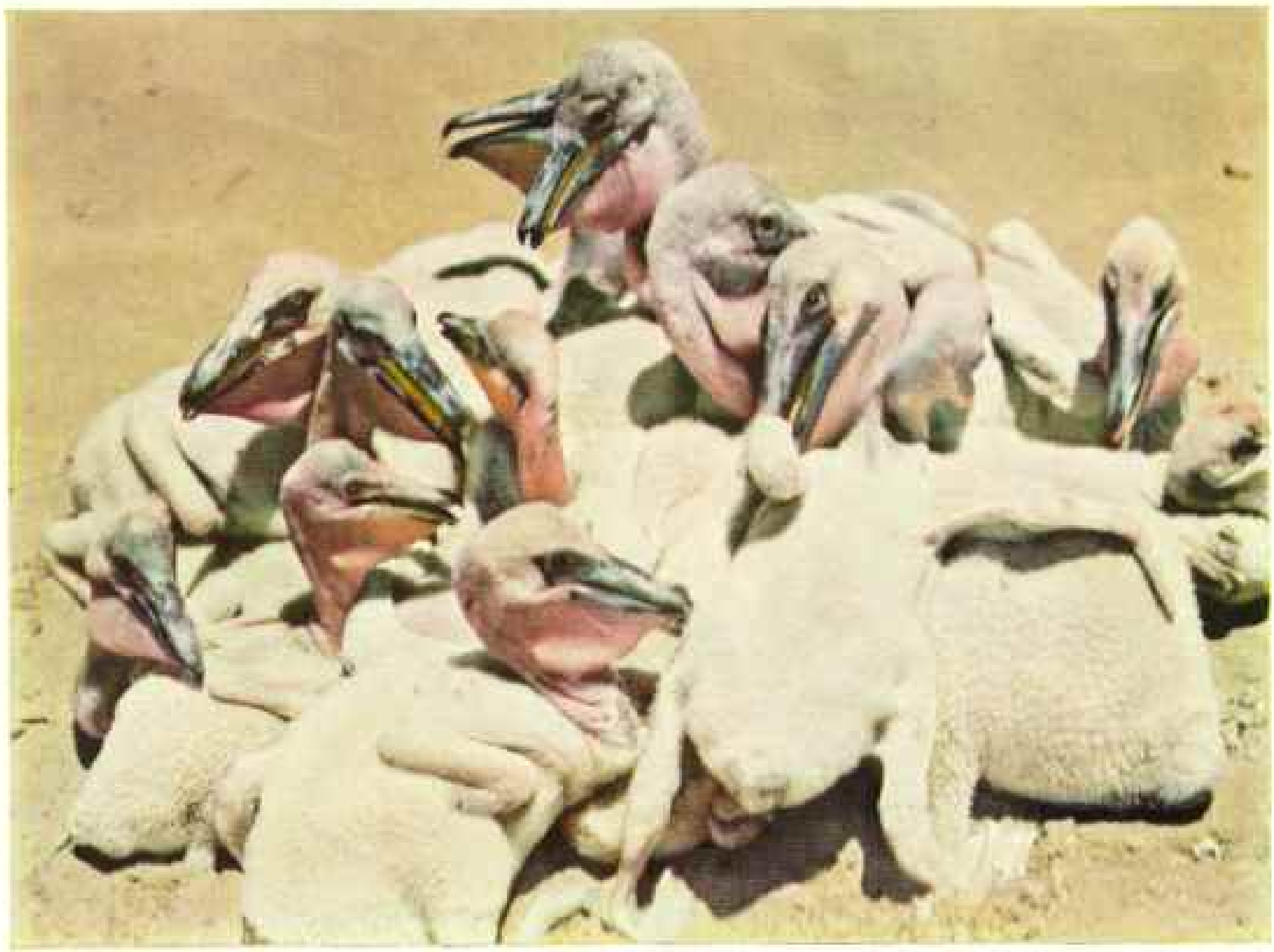
Reproduction by Lewis W. Walker

Mama Cocks a Shining Eye and Says, "It's My Turn Now"

The female takes over on the nest shown in Plate II, lower. As wet feathers dry and cooling action lessens, she will rise to permit freer circulation of air across her brood.

Naked and Forlorn in a World of Tropical Heat

Within two weeks these sightless infants, their waxy skins a salmon-orange hue, will resemble their cousins in the picture below. Two to a nest is usual. Island nesting grounds shield them from most natural enemies.



Kodachromes by Lewis W. Walker

Birds of No Feather Flock Together in a Struggle for Shade

Youngsters from many nests begin community life with a scrimmage to put their neighbors next to the sun. The pile erupts when a pair fights its way free to join a food-laden parent.

Like Crossed Swords Are the Clashing Beaks of Jealous Parents

Bickering among the elders arises when a young interloper (center left) seeks shade intended for its rightful owner (center right). As the proprietor of the nest seeks to push him away, his own parent resists.

wings and attacked all obstacles in his path.

Wise old pelicans, several times his strength, gave way. Uttering a whinnying cry, Master Pelican placed his beak in mother's. Flailing wings fanned her head and back. Too impatient to wait for regurgitation to bring up food, he dived for its source. Deep within her gullet, his whinnying was muffled but audible (Plate III).

In the Middle Ages this act gave rise to a legend that the mother wounded her breast and fed the young on her own blood. Thus the artist pictured her in ecclesiastical heraldry. Her fabled sacrifice made the pelican a symbol of self-sacrifice and atonement.

From my blind I witnessed the feeding's violent termination when mama decided baby had had enough. Swinging her head like a bell, she shook her "suckling" as if he were the clapper. Feet dangling, he hung on desperately. "Weaned" for the nonce, he fell to the sand.

A strange reaction followed dinner. Gorged with fish and intoxicated with false courage, the bold young pelican staggered off and attacked all in reach. Torpor set in quickly. Walking became impossible. The fledgling slumped asleep beside a bush.

Here he would have been easy prey had not Nature devised a stomach pump to restore speed and wits. As I walked among a group of young gluttons, they awoke with fright and, pushing along on bulging bellies, jettisoned their dinners. Some of these castings were immense. When the disturbance ceased, the young returned and reclaimed their lunch.

Fishing Pelicans Form a Living Net

No less interesting was the adults' method of catching dinner. From my blind I could observe a long line of birds beating water with their wings as if splashing in their bath.

Herding a school of fish, a solid row paddled toward the shallows. Seeking an opening, fish darted from bird to bird. Now the solid ranks of birds broke formation. Lower mandibles, like the scoops of mechanical shovels, were thrust below water.

Then I understood the purpose of these foot-long beaks. They are intended, not to hold "enough food for a week," but to serve as fishing nets.

At the Take-off, Webbed Feet Churn the Sand, Giant Wings Beat the Air

On the ground or struggling to rise, the heavy white pelican is laboriously clumsy. Gaining altitude, the bird sails with ease and dignity to heights almost beyond reach of human eyes.

In coastal waters you may have seen the familiar brown pelican folding wings and diving 50 feet for fish a yard deep. An individualist, the brown pelican may be likened to the lone goggle-and-spear fisherman. In contrast, his white cousins of the inland lakes are a gang using the equivalent of a seine.

Young Terns Gobble Lizards and Snakes

Named for its heavy beak, the gull-billed tern provided additional entertainment.* So far as I am aware, this colony of 300 is the only one in the Pacific States. Like pelicans, the terns shade eggs. Rising as if by command every 10 or 15 minutes, brooding terns wet their breast feathers.

In eastern States, I understand, the gull-billed tern's principal fare is insects. Desert life has wrought a change. Here lizard is the favorite dish. I saw many a juicy reptile delivered to gaping young mouths. Sometimes a small snake, dangling from an adult's bill, was carried home, but rarely fish.

By mid-June the islands were alive with downy, brown-spotted young terns. Much spryer than web-foot pelican fledglings, they raced across the sands. At a danger signal, they darted to a bush and "froze." Even sand blown into their eyes could not make them blink. Protective coloration made them all but invisible.

Several years ago a few pairs of Caspian terns, red-billed giants, raised families on one of the sand-bar islands. This season they had increased to 25 couples.

Salton Sea refuge is in good hands. Under the jurisdiction of Luther C. Goldman, naturalist, of the Fish and Wildlife Service, all the wildfowl have thrived surprisingly.

* See "The Gulls and Terns," by T. Gilbert Pearson, in Volume I, "The Book of Birds," published by the National Geographic Society. For brown pelicans, see "Birds That Cruise the Coast and Inland Waters," by the same author, in the March, 1934, National Geographic Magazine.

The Healing Arts in Global War

As Weapons Grow Deadlier, Scientific Medicine Pits Its Ever-rising Skill Against Them

By Albert W. Atwood

THE STRIKING power of an army or navy depends upon the number of physically fit men available for duty; the sick and wounded do not fight.

To select men for our Army and Navy, and to preserve their lives and also their health and strength require thousands of physicians and dentists, nurses, medical enlisted men, and others. The Medical Department of our Army is today three or four times as large as our entire Regular Army in peacetime. The Navy shows proportionate increases.

To handle the casualties of war there has been built up a chain of medical care and evacuation which, beginning with the first line of attacking troops in remote corners of the globe, reaches far back into the great general hospitals in this country.

A magnificent medical center in New York or San Francisco is of no use to a wounded man in a distant continent if he cannot reach it alive. What he needs are the essential parts of a hospital where he lies.

His fate, whether his wound remains healthy or becomes infected, whether his limb is saved or lost, whether he lives or dies, is determined largely in the forward area.

Soldiers Carry Their Own Sulfa Tablets

Under the system used in this war, combat troops are given a small metal box holding 12 sulfa tablets to be taken internally.

The container is so designed that one tablet can be released at a time with one hand without spilling the others. The soldier is also given an envelope of crystalline sulfa to sprinkle on wounds.

Carefully trained enlisted "medics," or company aid men (hospital corpsmen in the Navy), follow closely in the rear of each assault wave to locate the wounded where each falls and to provide the first care.

They give the fallen man morphine, if he has not already stuck a "syrette" needle into himself or if some buddy has not done it for him. Increasing importance is being attached to this immediate treatment, both for wounds and for burns.

They cut away clothing from his wound, apply a battle dressing, perhaps from the soldier's own kit, improvise a splint if necessary, and give sulfa drugs if these have not already been taken.

If the wounded soldier cannot walk to the rear, he must be left where he falls, but in a secure position, the site tagged, perhaps with a bayonet, so that the advancing litter bearers can identify him. The aid men then move on with their company.

As a rule, the wounded first meet doctors at the battalion aid station, tucked away in the most sheltered available spot.

Here emergency surgery is given, and shock is combatted by various means, including plasma, although the more easily carried, highly concentrated serum albumin of the blood can be given to the wounded right up in the fox holes and slit trenches (page 605). At this station, too, an emergency tag is filled out and attached to the wounded man's tunic.

Back go the more seriously wounded through various stages of hospitalization, until they can be restored to duty or discharged.

Mobile War Means Mobile Medical Care

In World War I various types of medical stations and, farther back, more or less permanent hospitals could be set up a comparatively few miles behind the lines, sometimes in existing buildings.

But the blitz which drove the British through Flanders and into the sea at Dunkirk changed all that. Now portable, or mobile units, in trucks and trailers which can be packed up and moved in 15 or 20 minutes, are essential if capture is to be avoided.

So we have surgical trucks and various mobile units, such as dentistry, optics, and X-ray. Entire mobile hospitals are assembled, made up of numerous self-contained units, such as those having to do with water purification, sterilization, laundry, and cooking, as well as surgery.

Because of the speed of modern warfare, with its pincer movements, encirclements, flank attacks, and the use of tanks, planes, and paratroopers, some of the mobile surgical units in North Africa were obliged to change their base every day (page 617).

A surgical van, or truck, can get very close to the battle line to perform emergency surgery, but if it gets too close a single shell may destroy the whole outfit.

In tank warfare, pistol belts, suspender belts, or safety belts can be used to form a sling or harness with which to hoist a wounded

U. S. Navy, Official

Easy There, Mates! His Feet Are Frostbitten

Against Japanese bullet, grenade, and booby trap he bore a charmed life. But Attu Island's snow-covered mountains and damp fox holes gave him few dry places to stand. Frostbite was a common complaint in Aleutian operations.

man through the tank's small opening. Often it is quicker and simpler to tie his feet together in a half hitch and pull him out feet first.

Disabled and stationary tanks offer a preferred target for enemy fire. One-third of all tank casualties are those of crews caught or surprised outside but near a disabled tank.

The British have found that many severely wounded and apparently helpless men climb out of disabled tanks unaided because of the urge to get away from a constricted space.

Where possible, medical supplies are taken to the front lines in this war by the "one-man carry" or "back pack" method, freeing personnel from the restrictions imposed by the use of wheeled vehicles so near the battle front and also from the use of the unwieldy, heavy medicine chests of previous wars (page 602).

With a back pack a man's hands are free, a great advantage when debarking over a ship's sides or the gunwales of a landing boat.

An improvement is the use of a single type of litter for both land and sea evacuation. The Navy's Stokes stretcher, or shallow wire basket, was unsuitable for land use, and the Army litter was in danger of tilting when being loaded onto boats. Merely by putting straps on the Army litter it can be used for sea evacuation as well (page 604).

Wounded Carried in Jeeps and Planes

The rearward movement of the wounded in its early stages is difficult and often exceedingly dangerous. Enemy snipers may make it impossible to carry out any removals until nightfall, or jungle trails may be nearly impassable for days at a time.

"The hospital corpsmen took a terrible beating on Guadalcanal," said a naval officer. "When it's raining and muddy, just try to walk down a hill carrying a man on a stretcher, then walk up and down another hill, then another, and another."

Transportation of patients has become a

U. S. Navy, Official

"Stick Around, Chums; I'll Be Back Soon"—A Wounded Sailor's Adieu

In Navy wire-basket litters, he and his companions are leaving ship for hospital. Burns and bomb fragments are the sailor's principal enemies.

major problem of war, and almost every conceivable means is used, including the jeep, "alligator" ambulance (an amphibian tractor), and airplane (page 602).

Evacuation of the wounded by plane was used on a large scale by the Germans in Poland; it was also used to a limited extent in World War I. It is now a rapidly developing and dramatic medical service.

Portable Hospital in a Jungle

In New Guinea, wounded men are transported from the front to a field hospital in an hour or less; by pack animals or on foot it would take from two to three weeks. A complete portable hospital was flown in to New Guinea and set up in the jungle.

Hit by a Japanese sniper's bullet in Guadalcanal at 10 o'clock at night, Corporal Jones of the Marines was cared for at once by the corpsman, then by the battalion aid doctor, and reached a division field hospital much farther in the rear a few hours later.

He was put on an ambulance plane at 7 o'clock the next morning, along with 12 stretcher cases and five other "sitting" cases, and within three hours was lying between white sheets at a completely equipped base hospital in the New Hebrides. Later a hospital ship took him to a large mobile hospital in New Zealand for the follow-up care to restore him to active duty.

Aerial evacuation may be within a theater of operations, as from New Guinea to Australia, from the Caribbean to this country, from Alaska to the Pacific coast, or from such distant points as North Africa, New Caledonia, India, or China to the United States.

At the Walter Reed General Hospital, Washington, D. C., patients coming by air from the borders of far-off Baluchistan, who had taken less than a week, including rest stops, dressings, and changes of plane, met other patients just arriving from the same starting point who had taken two months by slower modes of travel.

U. S. Navy, Official

In Its Tail This Flying Navy Ambulance Carries a Stretcher Case

Like the single-piece hood of an automobile, the "turtleback" bonnet folds up over the wings of the Piper Cub while the litter is being adjusted. Then it swings back, shielding the patient from the elements. Getting him in and out of the cabin would be much more awkward and dangerous.

U. S. Army Signal Corps, Official

Across Mountains and Jungle, Husky Medical Corps Men Carried a Hospital on Their Backs

From Port Moresby to Buna, they hiked across New Guinea in 40 days. On the way they abandoned all personal gear and 15 to 25 pounds of weight apiece. But they and their companions delivered to the front lines a 75-bed tent hospital capable of all major surgery. Here, at the start of their walk, they suspend 90-pound packs from foreheads (page 600).

From North Africa the trip can be made in less than 48 hours by air.

On rough roads near battle areas trucks and ambulances can make only five or ten miles an hour, and the many hours of jolting do the seriously wounded no good. One ambulance trip in North Africa that took 18 hours on the road took one hour by plane.

Various kinds of planes are being used. Racks and fixtures are installed in all transport and cargo planes to carry the standard litters.

Aviation Medicine a New Specialty

Aviation medicine has developed into the largest of the newer medical specialties. Its disciples are known as flight surgeons. They received their graduate medical training in this specialty at the School of Aviation Medicine, Randolph Field, Texas. In 1938 the Army Air Forces had fewer than 100 flight surgeons; now it has more than 3,000.

The flight surgeon, of course, cares for the wounded and sick, like any other military surgeon (doctor). He also acts as a general trouble shooter, friend, counselor, and confidant.

A very personal relationship must exist between the flight surgeon and the Air Forces personnel, and perhaps no other military branch is so dependent upon its medical service. This is because part of the flight surgeon's work has to do not with wounds and disease but with the disturbance of normal physiological function.

He has to protect and preserve his personnel against speed, altitude, acceleration, heat, extreme cold, wind, noise, glare, vibration, and fatigue.

This is done first of all by emphasis upon physical and mental fitness and by the earliest possible recognition and treatment of minor mental and nervous disorders.

Many of the conditions of wartime flying contribute to the serious "operational fatigue."

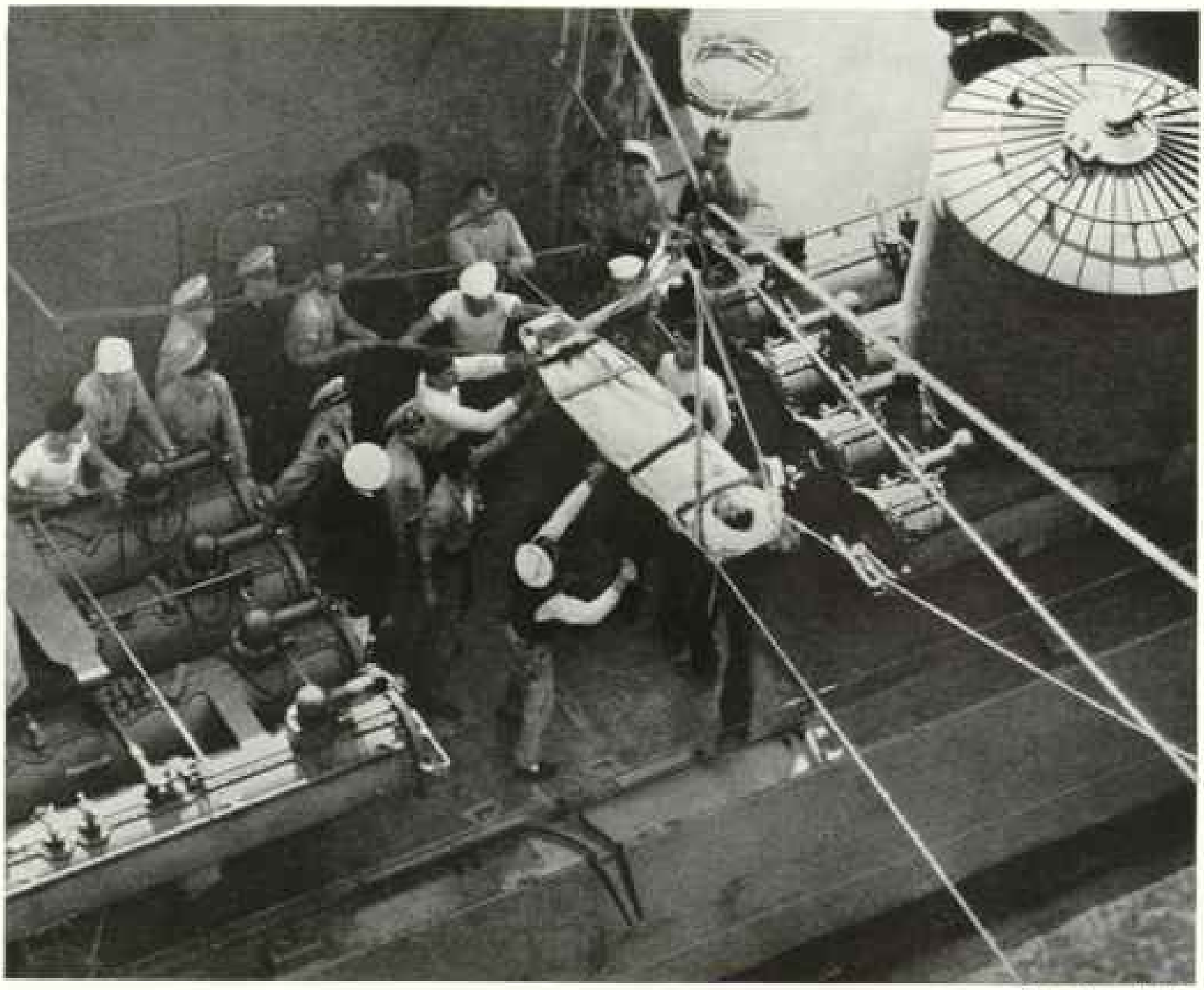
Another serious problem is that of bends, or aeroembolism, which comes from the startling altitudes to which men are able to fly in present-day aircraft. By testing men out in a low-pressure chamber, those most susceptible to this decompression illness can be eliminated from such work.

Extreme acceleration in flying disturbs the body organs and fluids, but "blackouts" and similar ill effects can be partly offset by the

U. S. Marine Corps, Official

Under the Microscope Lurks an Enemy as Deadly as the Japanese

In a rude laboratory on Guadalcanal, a Navy pharmacist's mate scans a blood smear for evidence of the malaria parasite. Carried by mosquitoes, malaria was as dangerous as the Japanese in disabling our men in the Solomons. Unlike mosquito-borne yellow fever, malaria submits to no known preventive.



U. S. Navy, Official

Like a Tightrope Crossing of Niagara Is This Casualty's Ride above Heaving Seas

Injured during a ship-and-plane bombardment of Japanese-held Wake Island, he is swung from tossing destroyer to steadier aircraft carrier. The carrier has better medical facilities.

men's taking a crouching position and eating properly before the flight.

They are advised to eat frequent small meals, the last one from one to two hours in advance of a flight and free from any food that causes gas or bloating.

Men starve for oxygen at high altitudes, but this anoxia can be prevented, and night blindness also partly avoided, by using oxygen. One of the flight surgeon's chief duties is to aid in the training and testing of air crews in the use of oxygen equipment.

Relatively simple changes in equipment may be important; changes in cockpit illumination and the use of red lens goggles are real steps forward in ability to fly and see at night.

The military plane flies faster, goes higher, and rises, turns, and dives with greater force than any human can withstand unaided.

Thus aviation medicine, like industrial medicine, seeks to bridge the gap between man and his machine.

The flight surgeon searches diligently to discover the differences in the individual's ability to fly at night and to withstand extreme cold, lack of oxygen, and gravitational stress.

Having taken the best men available, he then tries to build a house of sound physiological protection around them.

Treatment of War Wounded

Organized care of the wounded and sick in war, as we think of it today, is comparatively new. True, even the ancient Greeks had military surgeons, and there are many recorded attempts all through history to relieve the suffering of the wounded.

But, generally speaking, in earlier times the wounded were either carried to the rear by comrades, or left to lie unattended and exposed until the battle was over. Frequently the military surgeons could not get to them until a day or two after the battle, by which time many had died. Also, under cover of darkness, even as recently as Waterloo, some were killed by looters, and occasionally a by-

stander would slit the throat of a badly wounded man to spare him further suffering.

The first person to organize medical field service on an effective scale along modern lines was Maj. Jonathan Letterman, of the Union Army. With the best medical education of his day and with ingenuity and improvisation learned in numerous Indian campaigns, he began to put his detailed plans into effect at the Battle of Antietam, 1862.

So thoroughly did he plan and organize that subsequent systems of medical service in combat are based on his work.

Besides organizing medical supplies, Letterman set up a system of field hospitals and a medical department ambulance corps. The type of vehicle used by him became more or less standard for civil communities, hospitals, and the like.

Although the Union line of battle at Antietam was six miles long, the 10,000 wounded were collected promptly, and the same system was employed in later battles.

Tired and hungry after the Battle of Antietam, Letterman visited a Maryland home for dinner, fell in love with a member of the family, Mary Lee, and married her. Crushed by her sudden death in 1867, he never recovered his own broken health.

Casualties of Naval Battles

Naval battles do not usually require such an elaborate chain for removing the wounded as does land warfare. Even when the Marines land on islands, ships can usually approach at nightfall and remove the wounded directly.

Ever since steel ships came in, the greatest naval casualties have been from drowning. The old wooden ships took tremendous punishment before they sank, and sailors could cling to fragments of wood.

On the other hand, wounds from gunshot and splinters and from cutlasses, bayonets, and boarding pikes reached large totals.

The front-line medical officer, on land or sea, must face sudden and overwhelming activity and a total number of injuries that would disorganize the largest civilian hospital. Frequently a big ship has 200 seriously wounded men in 20 minutes' action.

Wounds and injuries of every description and surprising numbers naturally result from war and preparation for war. We now have "immersion foot" and crushed heels; in 1915 nearly 16,000 cases of frostbite and exposure were reported from Gallipoli. One of our armies in southwest desert maneuvers had 17 black-widow spider bites. All recovered.

Beginning with Pearl Harbor, this has proved to be very much of a "burn war."

We hear a lot about "flash burns," caused by intense heat from exploding torpedoes and bombs. Men are burned by blast waves that follow the line of least resistance along passageways and up and down hatches; they are also burned by jumping overboard into burning oil. Even the ignition of paint on a ship causes burns.

In addition, there is the use of gasoline or fuel oil in planes and tanks. A third of all tank casualties are burns. There is always the danger of fire from sprayed or spattered gasoline when a plane makes a forced landing and cracks up.

Treating Pearl Harbor Burns

Dramatically, Pearl Harbor opened a new era in American surgery, because Army and Navy doctors were able, in a small area and in a short period, to treat for the first time large numbers of wounds and burns with sulfa drugs and blood plasma. The results were truly "miraculous," according to previous standards, and have continued so ever since.

"Had it not been for the huge loss of life, Pearl Harbor could be pointed to as one of the finest things that could have happened in the good that has come from it," says Rear Adm. Ross T. McIntire, M. C., Surgeon General of the Navy.

In 1929 Dr. Alexander Fleming, an English bacteriologist, discovered that a certain mold yields a chemical which prevents the growth of powerful bacteria. Penicillin, as the new drug is now known, is expected to be of great value in controlling long-standing infections and some not reached by sulfa drugs, including even gas gangrene, one of the most dangerous infections in World War I.

Penicillin has the great advantage of being nontoxic, and can be injected into the veins for hours at a time. As yet, most of it is available only for military use. First tests with it were made in this country as recently as 1941.

If General Meade had had penicillin, blood plasma, sulfa drugs, airplane evacuation, and the other aids of modern medicine and surgery at Gettysburg, he might have been able to pursue Lee immediately and to end the Civil War two years earlier.

Sulfa drugs are now used successfully and on a large scale by the military to prevent or delay infection, and blood plasma is used to combat what the doctors call "traumatic shock," which follows serious wounds and burns and sometimes surgery (pages 610-611). In all previous wars, infection and shock were two of the chief causes of death.

The use of plasma, the liquid part of the blood, is perhaps the greatest single contribu-

U. S. Marine Corps, Official

"There Are No Atheists in Fox Holes," but You Should See the Mosquitoes!

Just before dusk on Guadalcanal, a Marine Corps private sprays atomized death on evening's marauders ambushed in sandbags. Sanitary squads, armed with squirt guns, go into action with combat outfits. Jeeps pump oil over breeding places. Mosquito "bombs" destroy malaria carriers in tents (page 614).

tion of medical science to the war up to this time. Its preparation is the largest controlled medical procedure in all history, and is one in which millions of civilians are taking part.

Plasma's Role in War

In traumatic shock the amount of circulating blood is decreased, thus dangerously reducing the amount of oxygen that is carried to the tissues.

But by introducing plasma into the veins, the circulating blood volume is restored and a disastrous fall in blood pressure is checked.

This is especially necessary in battle casualties, because soldiers and sailors, unlike victims of automobile or industrial accidents, have already been under severe physical and mental strain, often living on emergency rations and a dangerously small intake of water.

Plasma literally drags men up from the depths. A medical unit in North Africa had to care for 400 badly burned men between midnight and 8 o'clock in the morning, with only primitive field equipment. But plasma was available and only four men died.

Maj. Gen. Norman T. Kirk, Surgeon General of the Army, credits plasma as being the foremost lifesaver in Tunisia, and "Old Blood and Guts" Lt. Gen. George S. Patton, Jr., wrote his wife from North Africa that "Plasma saves more lives than you could believe."

Transfusion of whole blood is nothing new and was used to some extent in the last war. But donor and recipient had to be brought together for the transfusion—a condition obviously impractical on a large scale under combat conditions. Nor did attempts to preserve and use whole blood prove satisfactory.

A British medical officer, Capt. Gordon R. Ward, suggested in March, 1918, that plasma was the only part of the blood that need be used.

But the idea was not followed up seriously by research workers until some years after the war. In the forefront was Dr. Max M. Strumia, who, as a young medical officer in the Italian Army in the last war, saw thousands of men die from shock and hemorrhage. Later he came to this country and is now connected with the Bryn Mawr, Pennsylvania, Hospital.

In January, 1941, the Surgeons General of the Army and Navy and the National Research Council "got busy" in a big way with plasma.

Strumia and others proved the general efficacy and safety of frozen and dried plasma,

U. S. Navy, Official

Oxygen Tent and a Pretty Nurse's Touch Quicken His Pulse

Scene is at the Navy's modern hospital at Coco Solo, Canal Zone. The tent, fed by an oxygen cylinder, is useful in heart, asthma, and pneumonia cases—whenever respiration is difficult.

and established principles by which the liquid could be dehydrated into a light straw-colored powder that would keep for years without refrigeration. It can be shipped anywhere in a standard 3¾-pound cardboard box, which also contains distilled water to mix with it, along with rubber tubing and needles for almost instantaneous injection.

Having decided upon a blood substitute and a standard package, a program had to be established to collect sufficient blood from voluntary donors. This the American Red Cross has undertaken to do through 30-odd bleeding stations or centers.

War Is Fought with Blood of Civilians

Thus the war is literally being fought with the blood of civilians. Research may make it possible to use horse and cattle blood later on, or other blood substitutes, but the present needs of the Army and Navy require that more than 4,000,000 human beings donate their blood this year.

In one center visited, this means more than one person a minute during working hours.

Visiting a bleeding center, a newspaper reporter noticed a little girl, with badly burned hands, waiting while her mother was being bled. Questioning developed that the child's injury and the death of a sister took place at Pearl Harbor, that the father was in a submarine somewhere in the Pacific, and that the mother had donated several times before.

Each night the bottles of fresh blood are shipped to the nearest laboratory in Church containers, refrigerating units formerly used to ship fresh fruit and fish. Each container holds 80 pints.

At the laboratories the blood is whirled at high speed, driving the white and red corpuscles to the bottom and allowing the clear plasma to rise to the top, like cream on milk. The plasma is then siphoned off, frozen, and, by a vacuum process, reduced to a light, flaky, straw-colored powder.

Plasma, unlike the oxygen-bearing red corpuscles which it carries, is not divided into four types. In the old-style transfusion, donor and recipient had to have matching corpuscles. Plasma from all types of blood is now mixed and given to anyone.

Red and white corpuscles are not wasted. Certain limited uses have been found. Experiments are seeking still wider uses.

In addition to dried plasma, serum albumin, one of the highly concentrated proteins of the blood, is being used to combat shock.

Unlike dried plasma, it is prepared for ship-

U. S. Army Signal Corps, Official

"What a Life!" Says the Human Motor Pumping the Army Dentist's Drill

Many an old-time dentist will recall the day when he wearily provided foot power. The field army lacking electricity is grateful for such old-fashioned equipment. Many teeth neglected in civil life are saved by the Army's free care.

ment in solution, requiring no distilled water to use. It occupies a minimum of space and is simple to administer. The package, with all equipment for injection, would easily fit into a man's vest pocket. On naval landing parties one corpsman can carry several scores of these serum-albumin injections.

The military surgeon of today has the advantage of years of improvement in technique, including anesthesia. Near the battle front it is not desirable to use inflammable gases or elaborate apparatus. Thus, intravenous anesthesia with a new drug, pentothal sodium, has proved its military worth for minor surgery in forward areas.

The powder is taken out of a small ampule, mixed with distilled water, put into a syringe, and injected into a wounded man's vein. After-effects are minimized, and the patient gets around sooner.

An interesting military adaptation from civilian practice is the use of a new technique for safe and painless childbirth known as continuous caudal analgesia, for leg amputations. Also, before the war is over, the new refrigeration anesthesia may be used.

The surgeon also has a portable X-ray machine, which can be flown into a combat area to locate bits of metal in the body.

The death rate from severe burns has been reduced, and the period of hospitalization until the patient is ready for plastic, or reconstructive surgery, has been decreased.

The Army and Navy have greatly improved facilities for physiotherapy and more and better trained surgeons and assistants in the fields of orthopedic and plastic surgery.

There will be relatively less disfigurement, the blinded will be cared for better, and amputees will get out of bed more quickly.

Even skin grafting has been speeded up. One ingenious device for improvement in this field is a dermatome, a machine for cutting skin grafts, developed and designed in 1938

by Dr. Earl C. Padgett of Kansas City.

The present enormous chain of Army and Navy general hospitals has the best in physical plant, equipment, and supplies.

In each Army service command and in the Air Forces, there are distinguished consultants who travel about and seek to raise the standards of medical practice in the hospitals. Certainly the average boy from a small town does not receive such care in civil life.

Epidemics Prevalent in Former Wars

The major problem in most past wars has not been injuries inflicted by the enemy but epidemics of disease.

Xerxes invaded Greece with a great army, but plague and dysentery did for a large number of them. The Crusaders were stricken by disease, and the campaigns of Gustavus Adolphus, Frederick the Great, and the French Revolution were decided in part in the same way. The Prussians who fought the armies of the French Revolution in 1792 retreated across the Rhine when they lost 12,000 out of 42,000 men from dysentery.

A large part of the mighty army with which Napoleon invaded Russia succumbed to the same disease, as well as to typhus.

Typhoid and dysentery made the ratio of disease to injuries very high in our own Civil War and Spanish-American War. But the ratio began to improve in the Franco-Prussian War of 1870-71 and in the Russo-Japanese War of 1904-5.

The work of Maj. Walter Reed in demonstrating conclusively that the mosquito transmits yellow fever led to the eradication of a pestilence that had scourged the Spanish Main for centuries, and affected the history of America and the world. Maj. William C. Gorgas stamped out the disease in Panama in less than a year, so that the Panama Canal could be built. Gorgas's preventive measures were later used all over the world and showed that white men could live and work in the Tropics and remain healthy.

In 1910 Brig. Gen. Carl R. Darnall introduced the liquid chlorine method of purifying water, which has probably saved as many lives as any medical achievement. In 1911 Brig. Gen. Frederick F. Russell, after studying European experiences and making tests of his own, brought about compulsory inoculation for our Army against typhoid.

Despite flu and pneumonia in World War I, the U. S. Army for the first time had almost as many deaths from injuries as from disease. On the eastern front, however, disease was rampant. The Central Powers were held up for six months because of typhus in Serbia.

There is no way of preventing men from being killed or wounded in war by enemy action. But disease is at least theoretically preventable; it is the height of military futility to mobilize and train millions of men only to have large numbers of them die even before they can fight.

The mobilization of masses of young men into inevitably close contact with one another in camps, barracks, and ships has always provided unusual opportunity for the transference of disease. The inductees come from all sections and naturally bring together the infections prevalent in their home areas.

Thus far, we have been fortunate in the mobilization and training of our huge armies. Serious pandemics, including flu and pneumonia, have been absent, and the average ratio of health is excellent.

But an army in combat, even in the most healthful of climates, faces difficult sanitary conditions because of the improvised nature of appliances. This problem is accentuated by long distances and scant shipping space.

Besides, there is no way as yet of successfully vaccinating against malaria and the dysenteries, amoebic and bacillary, which are so prevalent in the tropical regions where much of today's fighting is being done.

Dysentery is the most characteristic epidemic disease of armies and often in the past it has been the most important cause of noneffectiveness in our own Army. One of the sulfa drugs, sulfaguanidine, is helpful in treating the bacillary form.

Many of the areas where American troops have been fighting are disease-ridden. Former Surg. Gen. J. C. Magee of the Army says that in "one small walled native town in North Africa we found plague, leprosy, smallpox, typhoid, typhus, two or three kinds of dysentery, and just about all the skin diseases known."

Capt. Eddie Rickenbacker mentions the "stink, corruption, filth, vermin, diarrhea, malaria, and Japs" of such places as the Solomons and New Guinea.

Where Malaria Is a Menace

New Guinea, the Solomon Islands, China, Burma, India, and North Africa are all malaria infested, and in some places this widespread disease is proving even a worse menace than the enemy himself.

One reason we lost the Battle of Bataan was because the quinine gave out. Correspondents report that, 10 days before it ended, 80 percent of our front-line troops had malaria.

When the First Division of Marines came out of Guadalcanal late in 1942, after turn-

Staff Photographer Willard R. Culver

A Pint of Blood, Given without Pain, May Save the Life of a Fighting Man in Agony

Three volunteers from the National Geographic Society visit the Red Cross Blood Donor Center, Washington, D. C. For their protection, the doctor tests for anemia and the nurse for high blood pressure. After the donation, light refreshments are served as a bracer. There are 32 similar centers in the United States. Dried blood plasma, carried up to the front lines, has saved thousands of shock cases (page 605).

ing back the Japs, 70 percent had malaria.

As every one knows, the Japanese early seized Java, our only large source of quinine, so long used to fight malaria. But atabrine, a synthetic drug used for the same purpose, is being manufactured in enormous quantities in this country. Each drug has its advantages and disadvantages, but both are used to treat the symptoms. Neither prevents infection itself; they merely delay the appearance of clinical symptoms (page 603).

In the basement of the imposing marble building of the American Pharmaceutical Association on Constitution Avenue, Washington, D. C., I gazed upon scores of barrels filled with seemingly countless quinine pills of every kind and size, donated to the National Quinine Pool for Army and Navy use by multitudes of druggists, doctors, chemists, chemical companies, hospitals, Federal and State institutions, colleges, and private individuals (614).

The larger part of this quinine and related cinchona derivatives comes from pharmacists, and in some cities every pharmacist has made a donation.

Twelve men from the Army and Navy Medical Corps were sorting and examining the gifts. I saw rooms full of unopened packages; 18 mailbags had arrived in a single day. The largest gift was one of 134,000 grains, but a half-dozen pills were received just as thankfully.

Swift Travel Spreads Disease

One of the grave facts about this war is the potential hazard of disease to which whole populations may be exposed.

Today the speed of air travel permits an infected individual to be transported within the incubation period; when he reaches quarantine he shows no symptoms, as he did in slower steamship travel.

U. S. Navy, Official

In the Sick Bay of a Hospital Ship, Guadalcanal Marines Get Lifesaving Blood Plasma

A Navy medical officer (in white), assisted by a hospital corpsman (two knives), prepares the solution. The patient with the arm tattoo has a hot-water bottle.

Some years ago an especially dangerous malaria mosquito, *Anopheles gambiae*, spread from west Africa to the tip of Brazil, either by airplane or French destroyers, and caused a severe form of malaria in the "bulge" of South America. To prevent its spreading and to eradicate the mosquito proved a costly undertaking for the Brazilian Government and the Rockefeller Foundation.

Among the dread possibilities are these: that *Anopheles gambiae*, now working its way down the Nile Valley, may reach the populous sections of Egypt; that yellow fever may jump from Africa to crowded India and to other parts of Asia; or that cholera may spread westward from India into Europe, or from India and east Asia into Australia and the Pacific islands.

In the past we have had serious outbreaks of cholera, yellow fever, and malaria even in our northern cities. But that was before the role of insects in carrying disease had been recognized, before city water supplies were purified, and before we had extensive sanitary, public health, and other control measures.

Immunization Program Effective

The peacetime immunization program of the armed forces has been expanded since 1940 until it now is a potent weapon for the preservation of health. In World War I our forces were vaccinated against smallpox, typhoid, and paratyphoid.

Tetanus, or lockjaw, was a serious cause of death in the early days of the last war, but later on many lives were saved by giving the wounded antitetanic serum. But this so-called passive immunity lasted less than a few weeks and had to be repeatedly given.

Now every member of the armed forces is given tetanus toxoid, which enables the soldier's own body to manufacture its antitoxin instead of borrowing what has been manufactured in the body of a horse. This makes his immunity active rather than passive, and

AP from Press Ass'n

Unarmed Are They, Yet First-aid Men Are Trained to Accompany Invasion Troops Ashore

Landing, pairs carry litters, individuals bear first-aid packs. Taking advantage of terrain, they creep up to the wounded. They administer morphine and sulfa drugs if necessary. They are skilled in artificial respiration and minor surgery (page 599).

U. S. Army Signal Corps, Official

So Savage in Appearance, New Guinea Stretcher Bearers Are as "Gentle as Angels" to Wounded Aussies and Yanks

On long treks over difficult trails they hold palm leaves to shield their charges from equatorial sun. "Sorry, master," they murmur if a jolted patient groans. Their burden delivered, they return to the front with supplies. Troops call them "boongs."

Staff Photographer Alfred T. Palmer

Into This Pool Go Civilian Quinine Stocks to Protect Our Fighters in the Tropics

At the American Pharmaceutical Association's building in Washington, D. C., the armed forces classify the drug and its derivatives. Java, principal source of quinine, is held by Japan. Atabrine, a synthetic, is a substitute, but allergies make it unavailable to some. For them quinine is still necessary (page 610).

it lasts more than a year instead of a few weeks.

In addition, the soldier is vaccinated against yellow fever, cholera, and typhus, if he is going to areas where these diseases are common. He is not vaccinated against plague, however, until he reaches a plague-ridden area.

The War Against Insects

But the armed forces are fighting the dread tropical diseases in still other ways that are possibly of momentous significance for the future health of the world. One of the chief of these is the warfare against insects.

In the past, troops have been deloused in wartime in units. But the individual soldier might become infested again almost at once.

The American armed forces now have a powder, nontoxic and odorless, which, applied to the individual's clothing, not only kills all insects and eggs but keeps him free for a period of ten days or more. This treatment is effective even where bathing facilities are unavailable.

There is no reason why in time civil populations should not be treated in the same way and typhus wiped off a large part of the earth's surface.

Another new device, which should also be useful to civilian populations after the war, is the small pressure container known popularly as a "health bomb."

It holds about one pound of insecticide, which, when the spray outlet is opened, kills all mosquitoes or other insects in a pup tent in three seconds, or in the standard Army pyramidal tent in ten (page 606).

Maintenance of the ordinary type of spray equipment in combat areas is difficult; so the health bomb takes its place.

There is also now in general use by American troops several liquids which, applied to the skin, are extremely effective in preventing mosquito bites for from two to five hours.

Another health measure is a germicidal rinse. One package dumped into the water in which the company mess dishes are rinsed will disinfect them, without the necessity of calculating the amount of chemical to be used.

Since 1940 there has developed in the Medical Department of the Army a Preventive Medicine Service.

One branch of it, the Division of Medical Intelligence, collects exhaustive information regarding medical and health conditions in foreign countries, on which recommendations are based for every military force that has left our shores.

Two closely related malarial regions may be infested with disease-carrying mosquitoes so different in habits that control measures which work in one area might be actually harmful in the other. Medical Intelligence must provide warning of this.

Troops bound for certain parts of Africa are warned against sleeping sickness, whereas troops sent to Trinidad require protection against vampire bats, of which about four percent are vectors of rabies.

Medical Intelligence consults not only all available medical literature, but returned travelers and explorers and the written accounts of such persons to be found in libraries such as that of the National Geographic Society.

Training in tropical medicine throughout the country has been expanded by means of numerous short refresher courses, not only for the benefit of Army and Navy doctors but for professors in civilian medical schools as well.

At the Army Medical School in Washington I saw 130 recently inducted doctors, mostly in the thirties and early forties, each enthusiastically examining the internal organs of a malaria-carrying mosquito under 130 microscopes.

In the great lounge on the floor below, another section awaited its turn in the laboratory. Among the student body were 30 medical-school professors.

Recruiting Medical Personnel

The recruiting and training of military medical personnel in wartime are two of the country's most vital tasks.

Besides the doctors, there are dentists, who assist the doctors in combat and take their place if the former are killed or disabled; the veterinarians, who inspect dairy and meat products besides caring for animals; the sanitary and administrative officers; the nurses; and the enlisted "medics" and hospital corpsmen.

But naturally the public is most interested in the procurement and training of the doctors themselves. Since the beginning of the war, about a third of the country's doctors in active, full-time practice have joined the armed forces, and about 80 percent of all students now enrolled in medical schools are headed toward military service.

Since active military service is a "young man's game," most of the doctors who go into the armed forces are under 45.

Both the Army and Navy desire a ratio of about 6½ doctors to 1,000 men. These doctors have to be secured and trained in advance of the period of greatest casualties; the Army and Navy cannot wait until the most critical battle comes before making the necessary provision.

Many highly skilled and distinguished physicians and surgeons go into the service in groups, or units, representing and being sponsored by a medical school or hospital.

The military doctor must be an officer as well as a physician. Therefore, upon his regular professional training and practice there is superimposed not only an intensive specialized course but a training in field medicine as well.

To Hippocrates himself is attributed the observation, "He who would become a surgeon should join the army and follow it."

The military doctor must know something about the tactics of his unit, the organization of infantry and artillery, the effect of bombing, chemical warfare, map reading, river crossings, terrain and elevation analysis, road marches, motor transport, night driving, desert driving, the selection of locations where casualties are likely to occur, daily sick report, disposal of property, and what to do about deaths and desertions, in addition to medicine, surgery, public health, and first aid.

Many Doctors Train at Historic Carlisle Barracks

The field training school for military doctors is at historic Carlisle Barracks, Pennsylvania, where 500 medical officers are graduated every two weeks in their field duties.

The Barracks were established by the British in 1758 during the French and Indian War and were used by the Continental Army during the Revolution.

Hessian prisoners built a guardhouse, with prison cells. It is still standing and until recently it was used for the purpose for which it was built.

Later the Barracks were used as a school for "artillerists," and still later as a cavalry school. They were captured and largely burned by the Confederate general Fitzhugh Lee in the Civil War. From 1879 to 1918 Carlisle was a famous Indian school. It be-

U. S. Army Signal Corps, Official

In New Caledonia the "Ferocious" Patient Needs a Bedside Manner to Reassure the Doctor

Many Melanesians work at the American base on this French island in the Pacific. Here an Army surgeon, flashing a light, examines a throat.

came a field training school for medical officers in 1920.

On the football field where Jim Thorpe won so many games for the Carlisle Indians, I saw several hundred alert doctors, most of them from 35 to 42 or 43 years old, being shown where each officer and enlisted man of an actual medical battalion is stationed during battle, just what his assignment is, what movements he makes, what his field equipment is for, how it works, and how he is expected to improvise in emergencies.

Once the Army and Navy doctor is trained, every effort is made to furnish him with the best tools, mental and physical, that the world affords.

To the country's leading scientists on some 50 medical committees and subcommittees of the National Research Council, the Surgeons General of the Army and Navy bring their problems of procedure and research.

As soon as the answer is given, it is relayed out to the tens of thousands of doctors in the field and in the hundreds of military hospitals all over the world.

No fewer than 300 medical research projects for the Army and Navy are now under way in the country's universities, medical schools, and other institutions.

Washington's Master Medical Laboratory and Library

To a far greater extent than in previous wars, doctors in the field or in hospitals are furnished with the newest medical knowledge by mimeographed materials, movies, and radio. Upon request, microfilms of medical articles are sent from the Army Medical Library by plane to doctors in remote places.

Within a comparatively few hours, Army hospitals may receive radio reports on pathologic specimens submitted to the Army Medical Museum in Washington, D. C. This is the Army's central pathology laboratory.

All autopsies have their findings reviewed by the Museum's staff of trained pathologists.

Its vast accumulation of scientific medical material is made available (case histories, specimens, etc.) currently in teaching form to Army hospitals, particularly in the study of tropical diseases.

In Washington also the Army maintains one of the world's largest medical libraries, supplemented by important medical collections

in the Library of Congress and by those of the National Naval Medical Center and Public Health Service near Bethesda, Maryland.

The medical problems of the armed forces would be far more serious if a substantial proportion of all selectees were not rejected at the start for mental and physical reasons. In previous wars large numbers of men with tuberculosis were accepted. Many of them broke down later on, proving a heavy burden to the Government.

In this war all selectees are given an X-ray examination of the chest. Recent improvements in X-ray equipment and technic make it possible to take miniature films on an inexpensive assembly-line, mass-production basis, thus providing the greatest tuberculosis-control program ever attempted.

It is impossible in an article such as this to do more than suggest the existence of two very serious medical problems which always confront armies and navies: namely, venereal disease and the class of disorders known as nervous and mental.

AP from Press Ass'n

Within Shell Range of Tunisian Battle Lines, Surgeon and Helper Wear Helmets

Their operating room, mounted on a truck, receives wounded from company dressing stations. It advances and retreats with the tide of battle. Such mobile units, utilizing the surgeon's "golden hours" immediately following an injury, have saved thousands who would have perished under the slower methods of World War I (page 599).

Nervous Disorders Show Up in Military Life

Venereal disease cannot be immunized against, like typhoid and yellow fever. Being a great ethical and social as well as medical problem, it is approached by the Army and Navy mainly in an educational way, in conjunction with the Public Health Service and local authorities. The rate, however, is much lower than in the last war.

Both rejection of selectees and subsequent discharge from the service for neuropsychiatric disorders are high, but so is their incidence in the civil population. One major difference is that it is much more difficult to conceal these conditions under the close observation of military life.

Military psychiatry is a relatively new specialty. There are comparatively few practitioners in this field, and new ones must be trained. Quick ways of discovering whether a soldier is likely to develop a nervous or mental disorder are lacking. But progress was made in World War I, and continues in the present war.

AP from Press Ass'n.

Red Cross Girls Teach Cheerful Convalescents to "Pack Up Your Troubles" and "Smile, Smile, Smile".

Song chases battle memories at Halloran Hospital, a magnificent medical city on Staten Island, New York. Here crutch will give way to artificial limb. Extraordinary advances have been made in the manufacture of such legs.

What effect will all this wartime medical activity have upon the health of the world when peace comes again? Prophecies cannot be made, but the facts already cited point to many forward steps.

Knowledge Gained in War Will Minister to Millions When Peace Comes

Medicine depends largely upon drugs and equipment. In the last war we had a serious shortage of drugs because of our dependence upon German chemicals. But the growth of the pharmaceutical industry in this country in the past twenty years has been one of the wonders of the age.

Its ability to process or manufacture, in enormous quantities, blood plasma, sulfa compounds, atabrine, and such chemicals as methyl bromide (needed to destroy lice to meet the constant threat of typhus) promises well for the future health of nations.

The war has released tremendous energy and enthusiasm in solving, partly through research, medical and other problems, and much of the knowledge gained will be useful in peace as well as in war.

For example, unusual attention is being given to studies of influenza, pneumonia, and the streptococcic infections.

Also, as a by-product of the search for blood substitutes, many purified components of blood are being prepared, whose usefulness is only beginning to be explored. One of these may prove a powerful weapon in protecting man against certain infections.

The question of how far this country will help to rebuild the world after the war covers far more than health and disease.

But it seems highly probable that we may push new frontiers of health in far-distant lands, thus widening the very bounds of civilization itself.

I Learn About the Russians

By Eddy Gilmore

Moscow Correspondent, The Associated Press

With Illustrations from Photographs by Sovfoto

GENERAL Rodion Malinovsky looked us up and down as we huddled around a neatly scrubbed pine table in a little Cossack schoolhouse on the banks of the river Don.

"Russians," said the big-chested, huge-fisted general, who two weeks later was to move on from here and smash his way into Rostov, "are like Americans. You love life as we love life. You like to sing and to dance and to be happy. And we do, too. You like music. You like colors.

"You fight well and we fight well. You can be gay and you can be sad. And so can we Russians. Ah, yes, *tovarischi*, the Russians and the Americans are so alike."

This wasn't the general's first exposure to Americans. In World War I he was a corporal and a machine gunner with the Russian Expeditionary Force in France. He spent much time stationed next to Americans.

He continued.

"Two things do I remember how to say in your language." (All this time the general had been speaking in Russian.) He gazed about him with a smile. "They are—'I love you' and 'Good night.'"

By Their Collars the General Knew Them

General Malinovsky was talking to a group of British and American correspondents who had come up to the front.

"I can look at you," he said, "and say who is English and who is American. I can tell the Americans because they are Americans and I can tell the English, not because they're English, but because they're not Americans."

We asked him to try.

Slowly he pointed to Walter Kerr, of the New York Herald-Tribune. To Meyer Handler, of the United Press. To Edgar Snow, of the Saturday Evening Post. To me.

"You," he said, "are the Americans."

"And me?" asked Robert Magidoff, of the National Broadcasting Company.

"You," said the general, "are either Russian or American."

Magidoff told Malinovsky that he was an American, but that he had been born in a little country town near Kiev, Russia.

The general was very happy. We asked him how he made such deductions.

"Very easily," he said, "because most of you Americans have your collars open like the Russians, and those of you who don't have them open look as if you wanted them open."

General Malinovsky, like many other Russian commanders, carries in his hard peasant head a lot of logic and common sense. When he is fighting the Germans he applies it. Incidentally, he gets results.

Russian and American Traits in Common

When we got back to Moskva (Moscow), and resumed our natural American-Russian lives, we thought more about what the general had said. I thought about the many things the Russian and American people have in common. I don't mean the way we comb our hair or wear our clothes, but the way we work and play and fight. Our impulses. Our emotions. Our loves and hates. Our violences and our gentleness.

Maybe you'd think so, too. Let me tell you about a Russian party and see what you think.

The telephone rang. It was Mischa.

"Eddy," he gasped, "I have found the two needed strings for my guitar."

"And I," I interrupted, "have found two needed packages of Georgian tea and a bottle of Moscow vodka."

"Tovarisch," sighed Mischa, "tonight will be wonderful. Come soon."

I walked out into the snowy night with the tea and vodka. For Moscow it was a bright night. There were no street lights, of course, for the old capital has a very black blackout. But there was a half-moon shimmering down on the sparkling snow.

I walked down our little side street past a very old church and looked up at the dark shadows of the so-Russian domes against the yellow moon. I entered Smolensk Boulevard.

I could see some swaying forms ahead of me. They were soldiers marching down the road and they were singing just as soldiers of ours were singing that night in many parts of the world.

The Russians weren't singing "Sidewalks of New York," or "You're in the Army Now," or "Take Me Back to Indiana," but they were singing "Moscow, My Moscow."

The night was cold but not too cold for Saturday-night strollers. In fact, Russians

Soldiers on the Moscow Front Dance before a New Year Tree

Lenin's regime frowned on public display of the Christmas tree, a reminder of rural noblemen's largesse to peasants. Under Stalin the gift-laden evergreen was restored to favor in 1936, but the celebration was shifted to January 1. In Russia, Santa Claus is Grandfather Frost.

never seem to get too cold to stroll. Women were taking packages of food home. Husbands hurried on with parcels and bags from downtown. There was laughter along the sidewalks. On the frosty Muscovite air I caught snatches of conversation. Little things about love. Little things about life. Little things about plans for tomorrow. Little things about "How's your mother?" and "How's your brother?"

The strollers included boys and girls from the factories, soldiers from the front and their wives and girls. As I got closer to the downtown sector and the theaters, the sidewalks were crowded with them.

A burly Red Army man went by carrying an accordion. The laughter increased—laughter in the midst of one of the grimmest wars in history. Laughter among the Russian people—the Ivan Ivanoviches and the Lena Ivanovnas—who are making personal sacrifices for the war like no other people I know.

When I reached Mischa's, a party was going. There were several Russian girls, four or five Russian men, and another American. Over in the corner a samovar was simmering. I handed Mischa my tea and vodka and he quickly got the covers off both.

One Russian was the author of a successful play. He wasn't as successful with his English language, but, at that, it was as good or better than our Russian. He asked the American what he thought about Hemingway.

"You like," he asked, "my friend Gemingway?"

The Russians pronounce most names that normally begin with an H as if they began with a G. In Russia Hitler is Gitler. Himmler is Gimmler. Harry Hopkins is Garry Gopkins.

The American didn't know any more about Gemingway than the Russian did. Neither had ever seen him.

"No," said the American, who always liked to start a discussion, "I don't like Gemingway."

"You don't like Gemingway?" shouted the playwright, considerably startled. "You don't like my friend Gemingway?"

"I like his books," said the young American with a straight face, "I just don't like him."

"Mischa," the writer of plays appealed, "this American man is my friend; yet he does not like my friend Gemingway. What am I to do, Mischa? My friend Gemingway. My poor friend Gemingway!"

Even Baby Smiles as the Red Army Is Toasted in Red Wine

Foreign visitors are staggered by the Russians' capacity for toasts. Ceremony attends virtually every drink. At a hospitable collective farm, salutes to the various allies tested the author's mettle (page 640). Here Marshal Klementi Voroshilov, defender of embattled Leningrad, looks down from his portrait on one of his soldiers in old-style uniform.

Just then up came Tamara, red-mouthed and black-coated.

"Please," she laughed, "don't argue. I want to dance."

And Tamara, as girls like Tamara do all over the world, had her way.

Mischa abandoned the tea and vodka for the guitar. He played some dance tunes, then turned to "Stenka Razin," the sad old song about the Volga pirate. He twanged his new strings and made beautiful music. And it was just as melodious and just as sad and natural as "Old Black Joe" or "Look Down That Lonesome Road."

Then he played "Kak Ya Vas Lublu," which means "How I Love You."

I looked about me.

"This girl," I asked Mischa, "what does she do except be beautiful and dance? And what sort of family does she have?"

"Ah," said Mischa, "she is beautiful and she does dance. She dances in the Ballet. If you were at the Ballet last night, you would have seen her. And if you are at the Ballet Friday night you will see her.

"Her family? Her father repairs trolley cars. He is a fine mechanic. Her mother works in a factory twelve hours a day. And this girl, who is beautiful and dances, she cooks many meals for her family. I think that it is she who works harder than all the rest of her family."

"And the rest of them, these girls there?"

A Girl of the Red Army

"This one," Mischa went on, "she does not have her uniform on tonight, but she is a Red Army girl. She is home on two days' leave. She operates the very delicate radio instruments for finding airplanes of the enemy.

"That girl is a bookkeeper in a movie theater. And this other girl, she is the wife of this man and they have three children and a grandmother. She has already lost two brothers at the front. The husband here, the man who is laughing so much, works as an engineer in a factory."

"And this girl?" I asked, pointing to a dark-haired, dark-eyed one in a bright-red dress.

"This girl," Mischa explained, "drives a streetcar. She has been driving one for over a year now. She can also drive a trolley bus. She is very strong. Dance with her and you can feel it in her hands. But," he added with

Today These Feasters Are Scattered, Their Fields Trampled—They Are Ukrainians

Before Germany overran Russia's "bread basket," each collective celebrated its harvest with a thanksgiving dinner. This farm honored poet Taras Shevchenko (1814-61) equally with Lenin and Stalin. Born a serf, Shevchenko became a symbol of the Ukrainian spirit.

Sons and Daughters of Dirt Farmers Get Book Learning in Horticultural School

Celebrated for its apples is the Mari Republic, where these children live. A quarter-century ago it was one of Russia's most backward areas. Tractors, collectives, and technical schools have revolutionized its agriculture. This class is at Kozmodemyansk, on the Volga between Gorki and Kazan. Actual fighting has not reached it.

a smile, "you can't feel the streetcar or the trolley bus in her feet."

Mischa was correct. She danced wonderfully.

And such was this gathering of friends. Not very different from a gathering of friends in the United States. There were those who argued, and those who danced and sang, and those who just sat around and had a good time. They had been working all the week and this was a night off.

Except for the setting and the fact that we were all in one small room and not too warm, it might have been in New York, or New Orleans, or Chicago, or San Francisco, or a hundred other places in the United States or the Soviet Union.

Life in general, however, is not much like life in the United States.

When we were in Moscow in the winter of 1941-42 and the Germans were practically kicking down the front gates of the city, the capital had more night life than it does today. The Soviets are now stretched all out for war.

In those days the Metropole Hotel, where the foreign correspondents live, staged four dances a week. It cost about thirty cents to get in. People from all parts of Moscow came and danced and tried to forget the war.

The boys came in sweaters and heavy shirts, the workers often in their work clothes, and the Red Army men and sailors in the uniforms they wore at the front. I have even seen tank drivers swinging around the floor, their tank helmets hanging onto their arms.

The girls, for the most part, wore ski pants or their brothers' or fathers' trousers, and when they reached the checkroom they whipped off the trousers and checked them with their coats. Underneath they had on their dress—and all kinds of dresses.

When Moscow Danced

The dance floor of the Metropole in those days was like no other. There were evening dresses, summer dresses, and those that looked as if they had been made for a costume ball. But the Russian girls and women said "Nitchevo," which in this case means, "What of it?" and kept on dancing.

There was a huge fountain with a pool about it in the center of the floor. The Russians like to enjoy themselves in a large way. Practically every night some enthusiastic

Moscow's Pulsing Heart under Empire and Soviet, This Was Red Square Long before the Red Star Topped the Kremlin's Tower

Red stood for the imperial purple as well as for the revolutionary flag. Muscovy's medieval princes ruled from the fortified Kremlin. Today it is the citadel of Marshal Stalin, and its walls shade the common grave of Red Guards who stormed it in October, 1917. Many-domed St. Basil's Cathedral was built by Ivan the Terrible in 1555-60 to commemorate the conquest of Kazan. Under the Soviet Government it is a museum. Unknown to the Tsars was the granite mausoleum of Vladimir Ilyich Ulyanov Lenin, who shattered the last remnants of their power. Here in a glass coffin he lies embalmed. In 1918 Lenin restored to Moscow the capital which Peter the Great transferred to St. Petersburg in 1709. Upon Lenin's tomb Soviet leaders reviewed the millions who paraded down Red Square twice a year. German bombs have damaged none of these monuments.

Julian Bryan

Window Shopping at a Department Store, Prewar Moscow Saw the Promise of a More Abundant Life

Through successive Five-Year Plans Russians sacrificed luxuries such as china, silverware, and electrical appliances for the sake of heavy industry to make their State secure. Consumer goods were reaching State-controlled stores in quantity when war swept them off the shelves.

In Honor of Tchaikovsky His Ballet "Swan Lake" Was Given May 7, 1940, the Hundredth Anniversary of His Birth

In Tsarist Russia the composer gained appreciation slowly. In Soviet Russia his works are heard perhaps more often than they are in the United States. This scene, a dance by bridal candidates, was performed at historic Bolshoi Theater, Moscow. Founded in 1825, it is devoted to ballet and opera. In 1937 the theater received the Order of Lenin (page 630). In wartime Russia "the ballet brings out the biggest crowds," says the author, "and 'Swan Lake' is the best-loved ballet. . . . The authorities have reasoned that there must be diversion and the best diversion is the theater" (page 629).

Under Blazing Chandeliers, Shostakovitch's Leningrad Symphony Is Performed in Moscow for a Wartime Audience of 2,000

As a rooftop fire watcher, the composer wrote his Seventh Symphony to describe the Siege of Leningrad. Major orchestras in the United States hastened to play it. Scene of this concert is the Hall of Columns, named for its 28 white pillars, in the House of Trade Unions. Once it contained the Noblemen's Club.

In a Leningrad Roundhouse She Is a Water Tender

Other Russian women drive locomotives and stoke their furnaces. Buses, snow plows, and road rollers are women's work. On blacked-out farms near front lines, they operate tractors by night (opposite page).

dancer flung himself or herself into this fountain filled with water and goldfish.

I never could figure out whether it was by accident or on purpose. Anyhow, in they went and out they came, to the great amusement of the other dancers and spectators.

All that has stopped now.

I don't know of a public dance being held in Moscow in a year. Sometimes they do have them in factories, after work, when there is speechmaking or the beginning of special competitions for more production.

Public dances have not stopped because the Government is against them, for it isn't. Soviet officials, as do the rest of the people, like to have fun. There just isn't time and space for such things. Also, so many of the musicians have gone to war.

The dance floor of the Metropole is now used as a community dining room. The fountain still operates, but no one falls in it any more, and the goldfish have gone.

Much Night; Little Night Life, Now

There is a great deal of night in the Soviet Union, but there isn't much night life. There isn't a cabaret or a night club functioning any place that I know of, and I think I've been to most of the big cities in the Soviet Union in the last 21 months.

The closest thing to a night club is the dining room of the little Grand Hotel in Kuibyshev (formerly Samara), diplomatic capital of Russia for a time.

Six old men gather there every evening with instruments in their hands and play what passes for dance music. But no one dances to it. It would be a little difficult, for there Americans eat at the next table to Japanese. Chinese may be at the next table. There are Bulgarians and Turks and Greeks and Fighting French, Czechs and Yugoslavs, Australians, Canadians, Swedes, Afghans, Persians, and British.

Russia's main nocturnal attraction of the moment is the theater.

Two ballets are operating in Moscow. One just as good or better is going full blast in

Kuibyshev. There are others in Saratov, Baku, Leningrad, Gorki, and through Siberia.

In Moscow there is also a light opera theater, and about seven theaters producing drama nightly. There is a musical comedy theater; also numerous concerts (page 627).

I have seen opera in the low Volga cities and in Siberia and on the Caspian. I'm sure it must be going on in the high Caucasus* and on the other sides of the mountains and in the cold north.

The ballet brings out the biggest crowds, but that isn't giving a correct picture of the theater situation. Every theater in Moscow is crowded every night. Seats are not expensive, but they are hard to get, so many people want to go. The best seats go to the soldiers and sailors and the air force and merchant navy. Preference is also given to workers in factories turning out stuff for the front.

Outside every theater I know of there is a wild clamoring for two hours before each performance. Those who have been unable to get tickets in advance come down in hopes of making a trade with someone at the last moment. Many do.

The Russian theater in the midst of war is excellent.

The costuming is gorgeous. The lighting is all that you want. Consumer goods may be short all over the Soviet Union, but the theater isn't short on costumes. Wisely, I think, the authorities have reasoned that in this war, when life among the people is grim and hard, there must be diversion and the best diversion is the theater.

Ballet Fans Cheer Their Favorites

Tchaikovsky's "Swan Lake" is the best-loved ballet (page 626). The ballet fans (the wildest ones are the young girls and boys) cheer their favorites as the boys here cheer their baseball and football heroes or their dance-band leaders. The always highly inventive Russians have also made a fetching ballet out of Sheridan's "Rivals." This draws, or rather turns away, tremendous crowds.

A big reason for the success of the Russian opera is the great bass, Mikhailov. He is a fine actor as well as a singer and won the Stalin premium last year for his excellence.

Mikhailov performs in the principal role in Glinka's beloved patriotic opera, "A Life for the Tsar," or "Ivan Susanin." He does it as I'm sure no one else in the world could do it. Though it is an old opera, the war has brought it up to date. It concerns an aged bearded peasant who is ordered by a foreign invader to lead his soldiers through an unknown—to the invader—Russian forest.

Ivan leads them, all right, but to their doom. Russian-like, he gets killed, too, but the point is, he did it for his country.

This same incident has been reported in the press at least four times during this war—modern Ivan Susanins, peasants who have led the Germans into Red Army traps and ambushes. I'm sure this old opera's story (which every peasant knows) has had something to do with it.

Then there's Tchaikovsky's "The Queen of Spades," the opera taken from Pushkin's quaint short story. It is lush and highly dramatic, with all the overtones that Russians love.

The people of Moscow are seeing many new plays these days. Many are about the war and are excellent and moving. But the old Russian plays are just as popular. It is very difficult to get a seat to see "The Three Sisters," or "The Lower Depths," or "The Cherry Orchard."

Incidentally, the most popular of the lighter offerings is still our own "Rose Marie."

The movies bring in huge crowds also. Moscow and the rest of Russia have been seeing several foreign films lately and there are more to come.

The veteran secretary of the Moscow Bureau of the Associated Press, Sophia Tchijova, recently came back from seeing "Lady Hamilton" (pronounced in Russian, Ladee Gamilton, of course). She had tears in her blue eyes.

"It is," she said, "the most beautiful film I ever saw."

The Russians swoon at anything sentimental.

"War," one of them told me once, "is very hard. That is as it should be. But when something so soft and light and kind comes along, we cry."

But don't get the impression that all Russians do is sit around and cry. Especially the women. I don't know of women anywhere in the world who could be doing more to help their country win a war than those of the Soviet Union.

Virtually every streetcar, bus, and many of the trucks on the streets of Moscow are driven by women. When the big snows come, women clear the streets and the large squares. They drive the snowplows and they use shovels.

You can see Russian women and girls digging away all hours of the day and night. You see them almost up to midnight, and you see them in the cold Russian dawn clearing the sidewalks.

* See "Roaming Russia's Caucasus," by Rolf Singer, National Geographic Magazine, July, 1942.

In the Shadow of the Kremlin, Two Heroes Escort a Heroine in Sunlit Red Square

Junior Commander (left) and Lieutenant wear highest awards, Gold Star Medal and Order of Lenin, given together to Heroes of the Soviet Union. Order of the Red Star decorates the Surgeon's Assistant.

Recently I spent a few days on a collective farm (pages 636, 637). I estimated that about 85 percent of the work was being done by women. Only old men and boys were left on the farm, and the boys had their eyes on the west, anxious to join the Red Army.

The women were driving tractors. Another group was assigned to repair tractors and other farm machinery. Still another group was building a dam so that the flour mill could operate when the rains came and the water rose. And inside the mill I saw two girls mending the mill's grinding apparatus.

Off on the side of a sunlit hill another crowd dug potatoes. The mail was brought to the collective farm by a girl mailman.

Women and older girls by the thousands were leaving Moscow for the near-by forests not so many weeks ago. They were to spend a couple of months cutting trees so there would be fuel for the wood stoves.

From all walks of life women and girls are summoned for wood-cutting. Girls from the theater, from the ballet, singers and dancers and concert artists. Last year we saw them come back from the forests, sunburned and strong, but uncomplaining and a little proud of their calloused hands.

When you ask them if it wasn't hard, they laughed and answered, "Nitchevo!"

Girls Are Traffic Policemen

Girls have poured into the police force since the war. Most all of the traffic in the bigger Soviet cities is being directed by girls in the smart blue uniform of the interior police. The girls wear skirts and berets. The men wear trousers and military caps. Both wear the customary high Russian boots and the same blue jackets.

Russian women may do all kinds of men's work, but they don't seem to like to wear trousers. They stick to their skirts through winter and summer; that is, excepting the ski pants which they wear over their dresses in winter when going to a dance (page 623).

Women have practically taken over the navigation of the long and important Volga.* The river is full of boats which have women captains as well as chief engineers and mates. Practically all of the loading and unloading is done by strong peasant girls from the Volga agricultural areas, pressed into navigation for the war (page 635).

* See "Mother Volga Defends Her Own," by Maynard Owen Williams, National Geographic Magazine, December, 1942.

Though the Enemy Was Still Near, Moscow Enrolled These University Students in 1942

Four freshmen stand before a door to Lomonossov Institute, one of the capital's fourscore institutions of higher learning. His hatband says the sailor is from the submarine fleet.

Women also drive locomotives and serve as firemen. That unique individual of the Russian train, the *provodnik*, or porter, seems to remain wholly masculine, however.

There is no character in the world like a provodnik. He usually has long, sad whiskers and looks sad. He keeps the samovar going at the end of the car and brings hot water for your tea. He also cleans up and makes your bed. He is very kind and gentle.

I am often tempted to write a book entitled "My Life Among the Provodniks." I figured out the other day that I have spent a great deal of my time in Russia on trains, that I have traveled ten thousand miles in trains, and that I seem to have had a provodnik practically by my side all the time. I have had dozens of them and I have never met one I didn't like almost instantly.

A Lesson in Understanding the Russians

You can make a big error by making too big an effort to understand the Russians. I mean by that, you don't have to make an effort. If you just go along and accept them, you'll understand them. I have certainly been among the group that erred.

My first experience in not understanding Russians involved a woman engineer from Leningrad, a Red Air Force colonel, and a former Russian circus performer, the latter a 250-pound gentleman who in the days before the war worked as a lion trainer. He was named Marago—at least, that's what his card said.

I was on a train going from a place named Yaroslavl to a city in Siberia, just on the eastern side of the Ural Mountains. The porter saw the guitar on my bunk, and he must have told the woman engineer from Leningrad, because that night she came up and asked me if I could play "Yes, Sir, That's My Baby."

Actually, I can play nothing, but I'll try to play anything, especially for a lady engineer from Leningrad and a Red Air Force colonel.

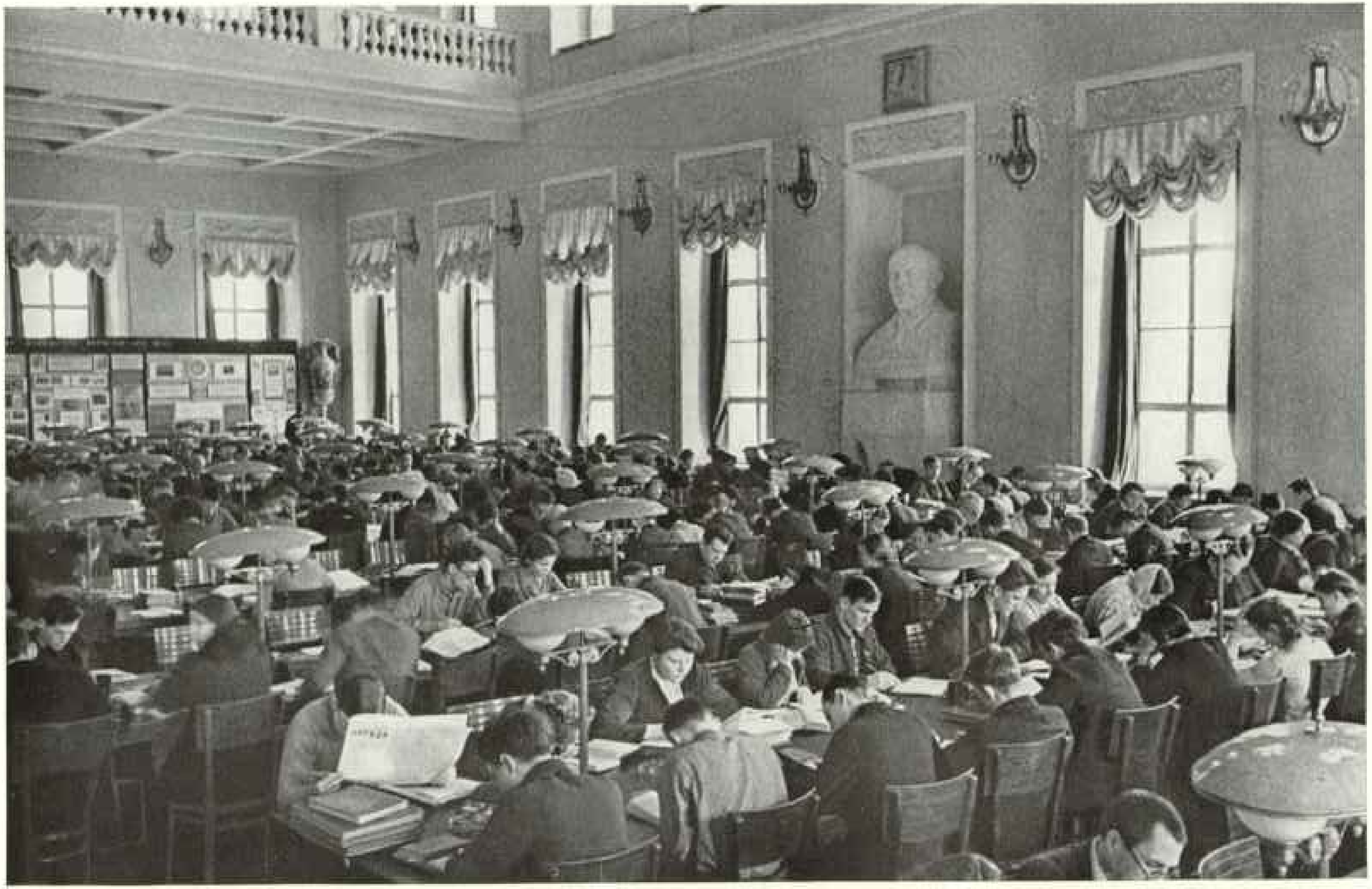
"The colonel," she added, presenting him, "wants to dance and I do, too."

Up in her car I met the former lion trainer, who was introduced to me as a slightly wounded guerrilla fighter, or partisan—one of those fellows who in Russia raise so much havoc behind the German lines.

"Greetings, guerrilla," I said. I thought he frowned slightly, but you never can be sure about a Russian lion trainer; I began playing.

As I played, the lady engineer and the colonel danced and the guerrilla sat and stared at me.

While His Army Companions Beat Time and Shout Encouragement, an Acrobatic Dancer Soars Like a Biplane



Lenin in Marble Presides over the Crowded Reading Room of a Moscow Library Named in His Honor

Pravda (Truth), official organ of the Communist Party of the Soviet Union, is the choice of the newspaper reader. The bulletin board usually is devoted to the life of a famous author. Lenin All-Union Library has 100,000 rare old volumes and 60,000 manuscripts, including originals by Gogol and Pushkin.

When Winter Snow Blankets Moscow, the People Bundle in Long Overcoats, Ear-warming Hats and Shawls

On Manezhnaya Square, created by demolitions, the camera looks up Gorki Street, a continuation of Red Square (page 624). Columns at right are those of new Hotel Moskva. Obliquely across the plaza is Hotel National, neighbor of the United States Embassy. Numbers on lamppost sign list trolley buses.

Proud of Her Electric Power, She Irons an Embroidered Blouse

Strung along the wall, her extension cord has accidentally tilted Marshal Stalin's picture. Lace valance and potted plants brighten her window.

A Deck Hand Manfully Snubs Rope around a Barge Post

Northern pulpwood is the cargo. On the historic Volga women have taken over as navigators, engineers, stevedores, even as captains (page 630).

Eager Smiles and Admiring Eyes Welcome a Lieutenant Home to the Collective Farm
When pleasant lands like these became battlefields, Russia shifted farmers back of the Urals. Severe climate required different crops and new techniques. Hardy American seeds helped to fill the need.

"Don't you dance, guerrilla?" I asked him finally.

This time I knew he frowned.

"I am wounded in my leg," he said glumly. "I have been a partisan and before that I was a lion trainer in a circus. I am a strong man."

He looked it, too. He had the body of a bear and short muscular arms. His face was as broad as long and at the bottom of this face there was an aggressive black beard, through which shone bright, even teeth.

"I can see you're a very strong man, guerrilla," I said, beginning to play another piece for the lady and the colonel who were trying to waltz in the corridor of the Trans-Siberian.

The guerrilla continued to frown. Finally he began to glare. Then he got up and hobbled over to me and my guitar. He handed me a card. I had to stop playing to take it. It said in English:

"Marago the Great Lion Trainer. Marago the Great."

"Ochen horosho, guerrilla," I said, meaning "That's very good."

He drew himself up despite his game leg, beat his big chest in the best Tarzan style, and began to bellow so loud and fast in Russian that I couldn't follow him. I knew he was angry, but I didn't know why.

The guerrilla was making so much noise that a British colonel, Leslie R. Hulls, who can speak Russian perfectly, rushed into the car. The guerrilla turned on him and amid more wild gestures began what sounded to me like a long-winded story. At last the colonel turned to me.

"Gilmore," he said, "this man says you've been insulting him. He says you've been calling him bad names. Is that true?"

I told the colonel of course it wasn't true.

"What have you been calling him?"

"What everyone calls him," I explained.

"What's that?"

"The guerrilla," I said.

The guerrilla stood over us with clenched fist and a taut beard.

"The guerrilla," I added. "That's what he is and he should be proud of it."

"Oh, lord," said Hulls, beginning to laugh. "Of course. This is a circus man. He thinks you've been calling him a gorilla!"

He turned and made profuse explanations to the guerrilla. Came the dawn. Understanding spread over his big face. He began to smile. He grasped my hand. He kissed it.

"Tovarisch," he said, "I am very sorry. I did not understand. To call a lion trainer, one who bends the will of the king of beasts,

For Holiday Breakfast, a Collective Farm Family Wears Its Sunday Best

Familiar samovar is absent as mother pours the teapot's boiling water into a liquid tea concentrate. Since 1940, staggered holidays have been abandoned in favor of Sunday rest.

a gorilla, is a very hard thing. But to call him a guerrilla, a partisan, a brave man, this is a fine thing indeed. I am thankful to you and I beg your pardon."

You see what I mean? If I had just gone ahead and called him Ivan, which I believe was his name, there wouldn't have been all that misunderstanding. But, being a foreigner, I had to get fancy and call him something strange that I thought he wanted to be called. From that time on I've tried to be more natural around Russians.

It has helped, too.

A Sleigh Ride on the Volga

Russians are among the most hospitable people in the world, and I come from Alabama where we deal in that commodity also.

One day one of our secretaries, Sam Gurevich, said he knew of a good collective farm on the other side of the Volga.

"How are we going to get there?" I asked, looking out of the ice-coated window of Kuibyshev's Grand Hotel.

"Sleighs," said Sam. "Sleighs and horses."

"How are we going to get across the Volga? There's no bridge, you know."

"There's ice on the Volga," he said. "We simply drive across the ice."

"Okay," said I. "You get the horses and sleighs and I'll get the typewriter and the permission."

Sam fixed up everything with the local secretary of the Communist Party. We were to leave the hotel at 5 o'clock the next morning, which wasn't my idea of a time to start a 20-mile trip through the snow, but I agreed.

That night Sam was reading the evening edition of the Volga Commune, the local newspaper. One item shocked me considerably, especially considering the morrow.

"A total of 71 wolves," it began, "have been killed in Kuibyshev Region this year. The killing of wolves continues."

Anyhow, when the sleighs and 5 o'clock arrived the next morning I was there. Shivering, I might add: but, to be truthful, more from the cold than the thought of wolves.

Our driver was right out of Chekhov and even his name was Uncle Vanya. Sam and I pulled on some huge sheepskins over our already warm fur coats. The party secretary was in another sleigh.

We started and swept through the long main street of Kuibyshev, which overlooks and parallels the Volga. Then we shot down onto the river, plunged out on the ice, and galloped for the other side.

Julian Bryan

High above the Roofs of Moscow, Women Carry Mortar to the Top of a New Hotel

Woman-haters who want men's jobs find them in the mines, where women are seldom allowed.

It was a queer sensation, charging down the heart of a river, especially Mother Volga.

We reached the other side and followed a narrow trail into the forest. An animal came running out after us.

"Dog, not wolf," grinned Sam.

We passed a group of peasants, who looked at us and smiled.

"Why are they smiling?" I asked.

"Very easily explained," said Sam. "They see your fine fur hat. It is an expensive fur hat. The peasants know it; yet it is a conservative hat. They think you're a doctor. And they see I'm worried."

"Are you worried about the wolves?" I asked him.

"No," he said. "I'm afraid I'm going to fall out. How much do you weigh?"

"Two hundred and twelve," I told him.

"If I weighed that much we couldn't get in here," said Sam.

I asked him to go on with the explanation.

"Well," he said, "they think you're a doctor and they see I'm worried. We are going fast, so they know we are in a hurry. Peasants are keenly observant. What is there left for them to think? They think my wife is having a baby, that you're the doctor from the city, and we're galloping home to try to beat the stork."

We hurried on and the peasants kept on smiling and waving.

"It could be," Sam said finally, "they're just laughing at your hat."

Eventually we reached the farm.

The chairman of the collective, a young man in the plain blue uniform worn by so many party members, greeted us. He told us he used to be a sailor, but that he'd been wounded. He showed us with great pride the pigs, cows, horses, sheep, oxen, and the many sheds full of grain.

"Grain," he said with even greater pride, "for the brave Red Army."

We had lunch and kept on seeing more things about the farm. Then we went to

Like a Scene from Tolstoy Is This Wedding Party Sledging through a Soviet Village
Harness and houses recall the Russia that was. Bearded peasants have given way to clean-shaven farmers. The bridal couple may be identified by their serious mien.

Music Dims the Haunting Memory of Sky Battles
Four young airmen relax at an airdrome on the Leningrad front. A mechanic makes an adjustment on the fighter plane. Russians love the accordion. The author found many able to play it (page 640).

the home of the head collective farmer.

He welcomed us with a handclasp and a smile. His wife did the same; also his two pretty daughters and *babushka*, which is Russian for the "old one," or grandmother.

The host's name was Kosta. He sat me in the guest of honor's seat; in a peasant home it is always under the icon.

Came the first course, hot soup. Came the first toast. Kosta got up.

"I drink," he said, "to America, the great friend of the Soviet Union."

In the best Russian style we downed our first glass of vodka. I then drank to the health of our host and his wife. The host drank to my health. I drank to the health of the party secretary and the chairman of the collective farm. They drank to the health of President Roosevelt. I drank to the health of Premier Stalin.

Came the fish. The party secretary drank to the continued friendship of Great Britain, the United States, and the Soviet Union. I drank to the success of the Red Army. Kosta drank to the second front.

Came the meat course, a suckling pig and chicken. The chairman of the collective got up. Tears rolled down his cheeks as he spoke.

"My friends," he said, "I was born in this province. In the early days of my life we had great starvation here. Our nation was young and we were fighting a civil war. I had six brothers. Things got worse as time went by. One brother died. We were all very hungry. Then came the American Relief Administration.

"They fed us and we lived. Now we are attacked by this beast Hitler. I have been wounded and I have lost two brothers. Now America sends us supplies. In my humble heart I shall always be grateful to America."

He was practically sobbing by now.

I had to do something. I don't know why, but I took off my red tie and gave it to him. Mine was red and American. He took off his tie and gave it to me. His was blue and Russian. Then we drank a toast to our ties.

There was a polite knocking at the door. An ancient peasant came in and whispered to Kosta.

Our host turned to us.

"Send Me a Tractor"

"The entire village," he said, "wants to meet an American. Not a soul in this village, excepting the secretary and the chairman here, have ever seen a foreigner before. Especially an American."

They came in single file and shook hands. One of them was a tall freckled-faced boy.

"Tell President Roosevelt," he shouted, "to send me a tractor! Mine's worn out."

I said I'd tell the President the first time I saw him. Apparently the boy didn't understand that I understood. He shouted louder.

"Tell President Roosevelt to send me a tractor. Mine's worn out!"

The party secretary told the boy that I'd tell the President. Beaming, he went away. I never have had a chance to tell the President, but I later learned that the boy got a new tractor. It was a Russian one, though.*

The meal over, we pushed back our chairs. The former sailor got out his guitar and he could really get music from those steel strings. Practically all Russians seem to be able to play either the guitar or the accordion (639).

He played that most beautiful, I think, of all Russian songs, "The Tide Goes Out." It is about a sailor who is dying at sea and who whispered to his *tovarisch*, or comrade, to give this last message to his mother. It is gentle and touching and unashamed in its simplicity, as are so many songs of the Red Army and the Red Navy.

Soon we were all singing it. Babushka began to cry. As we sang chorus after chorus, we all began to cry. That's the way it is with Slavic sadness. Soon it gets you, too.

At last Kosta's little daughters, Tanya and Valya, came out and danced. Then they asked me to play. I played very badly but with great volume. I played Negro spirituals and cowboy songs.

Babushka got out the phonograph and we held a dance. We kept this up until almost 11 o'clock at night. Then it was time to go home.

We piled outside Kosta's house. There was a great Russian moon overhead. The whole village was standing around a big fire on the snowy hillside. They began to sing while individually they came up and said good-bye. Kosta kissed me on both cheeks. From this never-to-be-forgotten scene we slid away into the night.

We didn't see any wolves, but Uncle Vanya, who had pulled heavily at the vodka bottle, very quickly turned the sleigh over. We laughingly dug ourselves out of the snow.

Three more times on the way back Uncle Vanya gave us the heave-ho. To him each time seemed to be funnier than the last.

"Nitchevo!" he bellowed.

"Nitchevo," we answered.

But I was thinking of kindly Kosta. The former sailor. Babushka. My friends on the hillside under the moon. All of them. They are such nice people.

* See "Valiant Russia's Industrial Might," by John Scott, NATIONAL GEOGRAPHIC MAGAZINE, May, 1943.

NATIONAL GEOGRAPHIC SOCIETY

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

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

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

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

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

In Mexico, The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 300 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.

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Limited production of Sheaffer writing instruments is helping vital war work on home and battle fronts. Sheaffer precision workers who are released from writing instrument production are devoting all their working hours to producing munitions of war. W. A. Sheaffer Pen Company, Fort Madison, Iowa; Toronto, Ontario, Canada.

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"**Having a baby** is tough enough on a soldier, without it coming ahead of time.

"So I was plenty excited when I hot-footed it to headquarters after getting that long distance telephone call.

"The C.O. was swell about it, though, when I asked could I go home. Gave me a furlough quick as you can say "Paratroops", which is what I'm training for. I got a lift in here from camp—feeling grand—but now I'm as sunk as a Jap destroyer because . . .

"**I'm stuck!** The plane was sold out and the only train home until morning is the all-Pullman Limited—leaving in ten minutes with every bed reserved!

"Now, I wouldn't mind so much, if I was overseas with no chance of getting home—like lots of guys when their babies are born. I could take that without crabbing, as a part of war.

"What burns me up is that here I am only a few hundred miles away—with a perfectly good furlough—and it looks like I'll stew in the station all night long. That's war, too, I suppose—travel being so heavy—but by the law of averages you'd think that *someone* with a reservation on that train would change his plans and not be able to use it.

"**And this being wartime,** you'd think he'd *surely* cancel it, so someone else could go!

"There's still 10 minutes for that to happen. That's why the railroad and Pullman people—who've practically turned this station inside out trying to help me—said to stick around. It'll be a miracle if I get on that train, but . . .

"Miracles still happen! And, brother, that guy who *cancelled* instead of just not showing up *rates a medal* in my book!"

Although sleeping cars are loaded to a higher percentage of capacity than ever before, practically every train carrying Pullmans still goes out with unused space due to "no shows" and late cancellations.

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One of a series of dramatic incidents in the lives of great composers, painted for the Magnavox collection

How Handel's "Messiah" was saved by a button . . .

AMONG all the great masters whose work inspires us today, there is no more violent and picturesque figure than George Frederick Handel (1685-1759). Once, in his youth, hot words with a fellow musician led to drawn swords at the stage door. And the life of the future composer of the Messiah was saved only because a large button on his coat intercepted his opponent's thrust.

Eventually, he was recognized as one of the foremost composers of his age. Today the body of this barber's son lies buried in Westminster Abbey. He was the first great musician to be so honored.

To appreciate the true worth of a Handel oratorio or any of the thousand and one other musical treasures we have inherited from the past, you should hear them played by a Magnavox radio-phonograph. Because of its incomparable clarity and unique quality of tone, this is the instrument that has been chosen above all others by such great musicians as Rachmaninoff, Ormandy, Kreisler and Rodzinski.

The Magnavox Company is now producing electronic and communication equipment for the armed forces and music distribution systems for warships—and has won the first Navy "E" award (and White Star Renewal Citations) to be given to a manufacturer in this field. When the war ends, Magnavox will again take its place as the pre-eminent radio-phonograph combination. The Magnavox Company, Fort Wayne, Ind.

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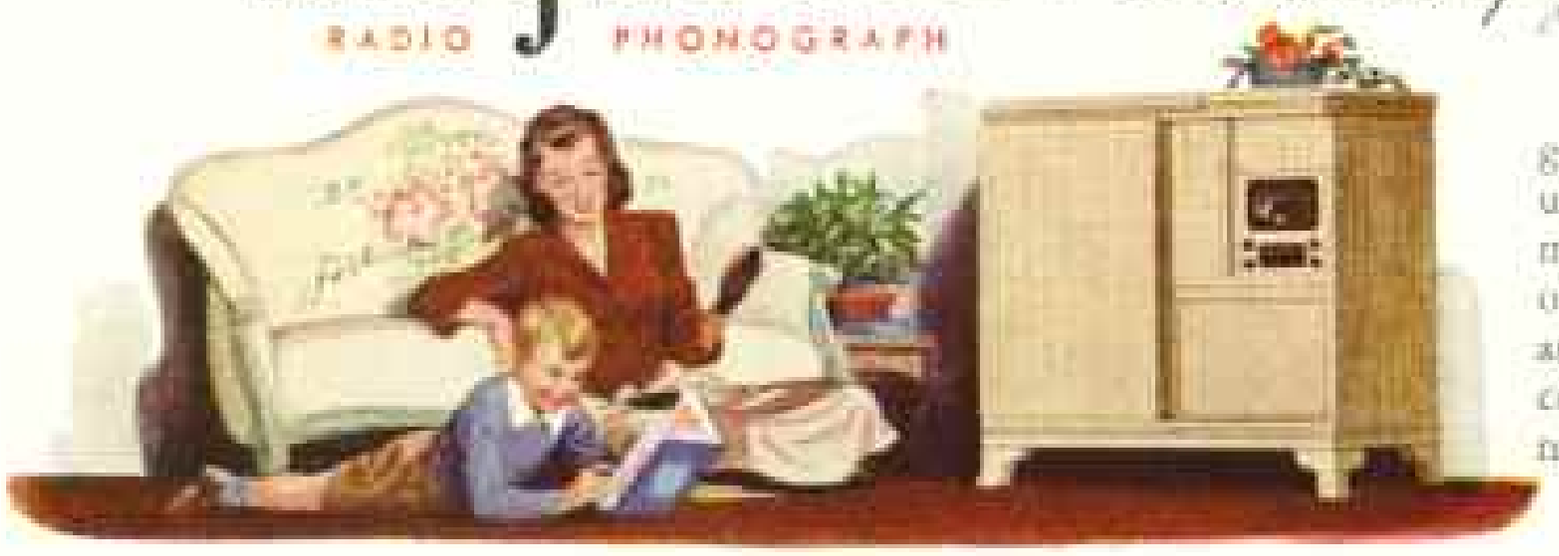
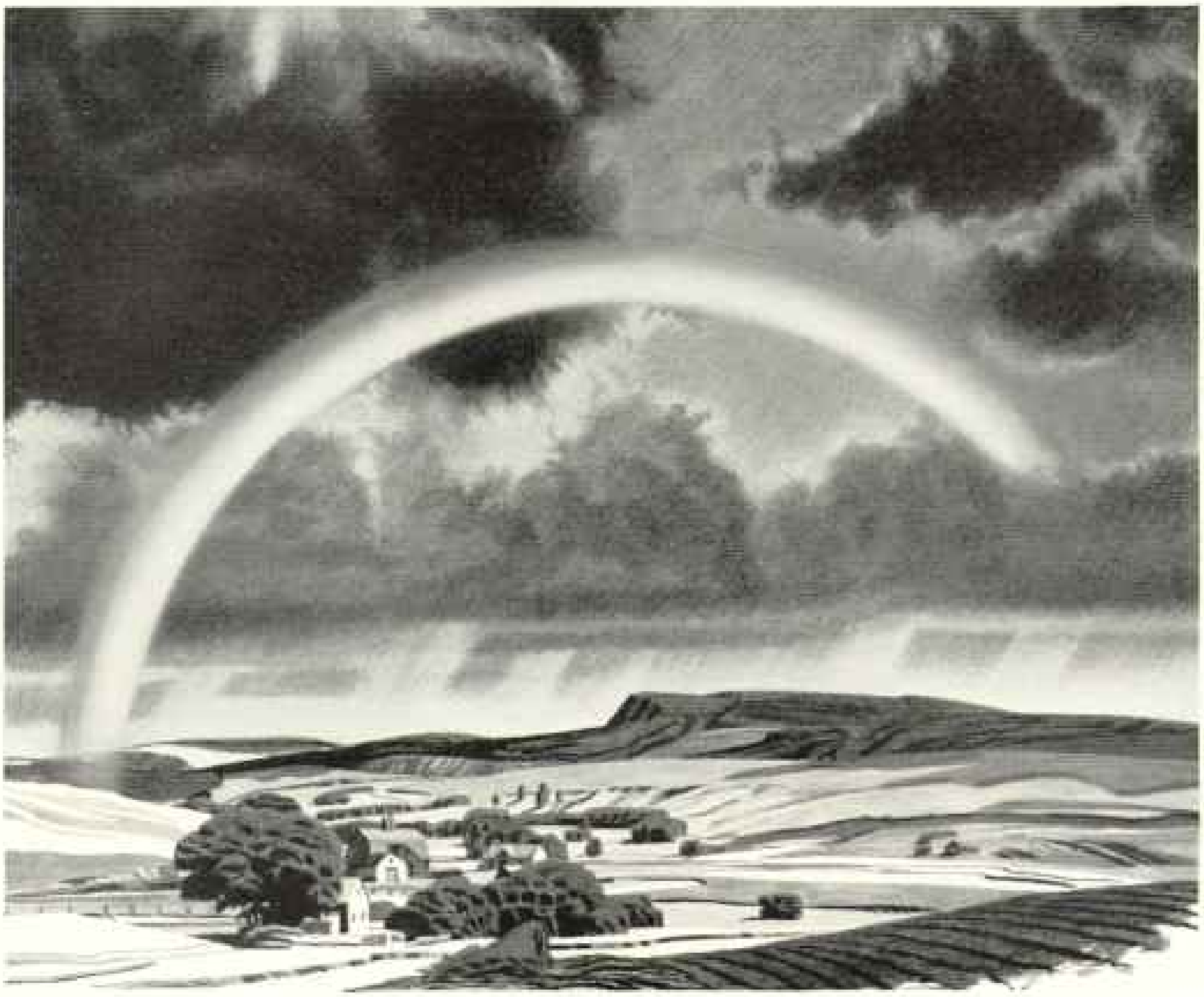
RADIO PHONOGRAPH



Children In homes where good music is played habitually acquire a taste for music which will be a source of inspiration and pleasure as long as they live. They come by their appreciation as naturally as they learn to talk.



RAINBOW IN THE SKY

There is good news in the work of American laboratories. It is a reason for confidence in the war — a promise for the future.

Little is said about our scientists because they labor behind locked doors and their work is secret. But the topside of the German and Japanese armies and navies know about them. Things they do turn up at the front and make life harder for our enemies.

After the war, from these same scientists and their laboratories, will come the things that make jobs, comforts, conveniences and luxuries for the American people. They hold out prospects for good use of the opportunities victory will bring.

The Bell Telephone Laboratories, with some seven thousand workers, are among the many research groups that are devoted to winning the war.

When that is done, Bell System scientists will be back on their old job of making your telephone service, and your human contacts over the distances, easier and better than ever.

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HELP THE WAR BY MAKING ONLY VITAL CALLS TO WAR-BUSY CENTERS. THAT'S MORE AND MORE ESSENTIAL EVERY DAY.

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A crack "Express Train" of 1863 as pictured by Currier & Ives. Four years later an important new era began when the first railroad linked the Atlantic and Pacific.

War traffic has more than doubled the volume of freight hauled by the Western Pacific Railroad from Salt Lake City to San Francisco. Wherever the going is toughest on this rugged route, General Motors Diesel freight locomotives have kept this vast stream of vital munitions moving steadily.

Throughout history, wars have set up new milestones of transportation progress. And with this war, it is the General Motors Diesel Locomotive that is ushering in the new era. What advances the future will bring are already apparent in the present performance of these locomotives and the way they are helping to meet the abnormal demands upon the railroads today.

War building is being rushed ahead with reliable General Motors Diesel power. In the days to come this dependable, economical power will be ready to do the hard jobs of peace.

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This new plan of "Honesty Engineering" helps reduce employee dishonesty in much the same way that safety engineering and fire prevention work have reduced accidents and cut losses for American business.

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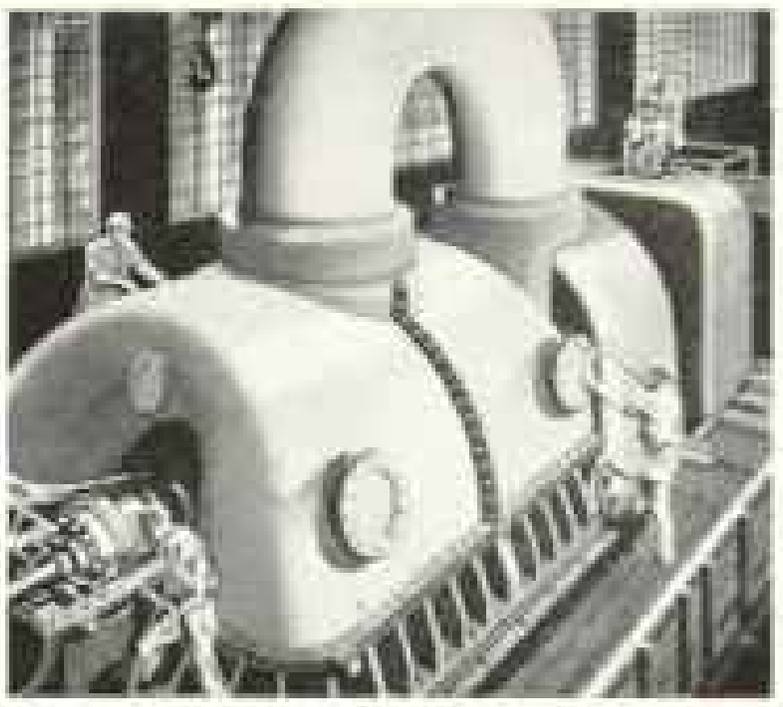

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When the incredible weapons born of wartime research are reforged for peacetime service, the daily miracles that electricity will perform are certain to create new and finer standards of living . . . while the cost of electricity continues to decrease as our nation's power-generating capacity continues to increase. Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania. Plants in 25 cities—offices everywhere.

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World's Ferry

Not long ago one of Pan American Airways' Boeing Clippers crossed the Atlantic twice in one 24-hour period.

Shortly before that, these same Clipper ships flew the Atlantic 12 times in 13 days and 15 hours.

President Roosevelt, on his historic flight to Casablanca, crossed the ocean both ways in Boeing Clippers. Winston Churchill, on nearly all of his aerial trips to America, traveled in Boeing-built planes of British Overseas Airways.

These are the high-lights. But perhaps the most remarkable thing about these Boeing flying boats, largest commercial planes in the world, is the way they have come to be taken for granted.

Crossing the Atlantic is no novelty to them; they have done it more than 1400 times! In fact, from the beginning of regular flight schedules between this country and Europe four years ago, the transatlantic service has been maintained almost entirely by airplanes designed and built by Boeing. These transoceanic Clippers have flown more than 7,000,000 miles, carried more than 44,000 passengers, 100,000,000 pieces of mail.

Today these ships, designed as peacetime luxury liners, are completing vital missions of war . . . shuttling across the oceans with the regularity of *ferry boats!*

Behind their dependability of performance stand research, design, engineering and manufacturing skills of high degree, the same skills which have given America the Boeing Stratoliner,* the Boeing Flying Fortress,* and the Boeing Kaydet Primary Trainer.

Tomorrow as well as today you can look for integrity in any Boeing product . . . if it's "Built by Boeing" it's bound to be good.

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RADIONICS*

"the impossible we do immediately the miraculous takes a little longer"

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"AYE, AYE, SIR"

In old English, "Aye" meant "yes."

It means far more in the Navy.

"Aye, Aye, Sir," means that the order is understood and will be obeyed.

The Navy has given Zenith many "orders" since this war began.

Our prompt "Aye, Aye, Sir," has, we believe, been justified by the "intelligence and initiative" (as the Navy says) with which these orders have been executed.

—in days of civilian radio, Zenith was proud of its long series of "firsts"—improvements which made radio history and established leadership in the industry.

—today our viewpoint has changed—materially.

—engaged exclusively in war production, the things we have been called upon to do—the tasks we have succeeded in accomplishing, make past improvements in civilian radio literally look like "child's play."

—the work of our engineers in radionics has made the "impossible" possible and accomplished the "miraculous."

*—mark that word "RADIONICS" (with its subdivisions of Electronics, Radio, etc.)—it has brought into reality and being, devices which only a year or so ago came in the "impossible" and "miraculous" categories.

—today Zenith works in the science of radionics for our armed forces alone.

—in that bright "tomorrow" when peace returns—

—we can only say—the post-war radios that Zenith will produce will contain many interesting new developments.

—that statement is based upon experience which we can not now reveal—but you may take our word that it is a fact.

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Our airmen have proved themselves masters of anything that flies.

When you hear of their exploits you wonder how such skill, such devastating dexterity could be acquired in a few brief months. Surely, these men must have been "born to the blue."

Yet the plain fact is that scarcely one in a thousand ever flew a plane before the war. Each and every one had to be *trained*—thoroughly and quickly.

In their training, the Fairchild PT-19 Primary Trainer with "fighter" characteristics is their flying school.

This staunch little ship is ideal for the rigorous acrobatic program prescribed in primary training. In the words of a veteran pilot-teacher now at an Army flying school: "It is unnecessary to caution a student or to warn him about excessive speeds in pull-outs or dangerous positions while he is flying a PT-19. We simply go ahead and teach him to do every maneuver in the book: slow rolls, snap rolls, Immelmanns, loops, half rolls, inverted coordination exercises and turns, vertical reversements, spins, and combinations of these. The PT-19 can certainly 'take it.' That is the best confidence builder ever invented."

From behind soda fountain and plow, office desk and ivied walls, after a short intensive training in the PT-19, the most daring and expert flyers the world has known have emerged. After six hours training in a PT-19 it is not unusual to solo Army students who have never flown before.

As a constant check on the performance of PT-19's, on the American mainland and abroad, the reports of a corps of specialists written in the field, enable our engineers and designers back home to keep that "touch of tomorrow in the planes of today."

BACK THE ATTACK WITH WAR BONDS

FAIRCHILD ENGINE AND AIRPLANE CORPORATION

30 ROCKEFELLER PLAZA, NEW YORK

Ranger Aircraft Engines Division, Farmingdale, L.I. • Fairchild Aircraft Division, Hagerstown, Md. ... Burlington, N.C. • Duramold Division, New York, N.Y.

Color Motion Picture—"FAIRCHILD PT-19 TRAINER"—16 mm. sound—25 minutes—Write Dept. I for information

21 NAMES YOU'RE GOING TO KNOW BETTER

HERE are the names of twenty-one different Airlines of the United States. Most people are familiar with four or five, but few have traveled on all twenty-one. The day is swiftly approaching, however, when the names and routes of all of them will be known first-hand by millions. Here is why:

Improved transportation of any kind creates more travel than existed before. Air transportation speeds this process by granting to millions the *time* for wider and more frequent travel. Further, the Airlines of the United States comprise a network of neighborly streets permitting more people to go more places with more ease and convenience than ever before in history. And because America is the *travelingest* nation in the world anyway—*they'll be going!*

The war has momentarily delayed the expansion of air travel. But the domestic and world-wide operating experience which the Airlines of the United States are concentrating into these few war years has already set the air transport clock ahead a quarter of a century.

Yes, America will take to the air in ever increasing millions when this war is over. The urge will be there—and so will these twenty-one Airlines, grown vastly in stature and proficiency by their service to the armed forces and wartime industry of the nation.

* * *

When you travel by Air *make reservations early; please cancel early if plans change.* When you use Air Express *speed delivery by dispatching shipments as soon as they're ready.* Air Transport Association, 1515 Massachusetts Ave., N. W., Washington, D. C.

BET YOUR DOUGH ON UNCLE SAM . . . BUY BONDS!

THE AIRLINES OF THE UNITED STATES

AIR TRANSPORT GETS THERE FIRST . . . PASSENGERS . . . MAIL . . . AIR EXPRESS

...compliments of Milwaukee Road *"white coal"*

ALLIED bombers are raining ruin on the strongholds of the Axis, wrecking war production centers, transportation facilities, docks and warehouses. Do you realize that the fuel The Milwaukee Road is conserving by using "White Coal" may be helping to deal those devastating blows?

This "White Coal" is electricity from mountain water power, used for years to move Milwaukee Road trains across the Rockies, Bitter Roots and Cascades.

How fortunate that this electrification was functioning with proved efficiency when war came! It conserves millions of gallons of oil to help provide America's ever-growing air armadas with needed flying power!

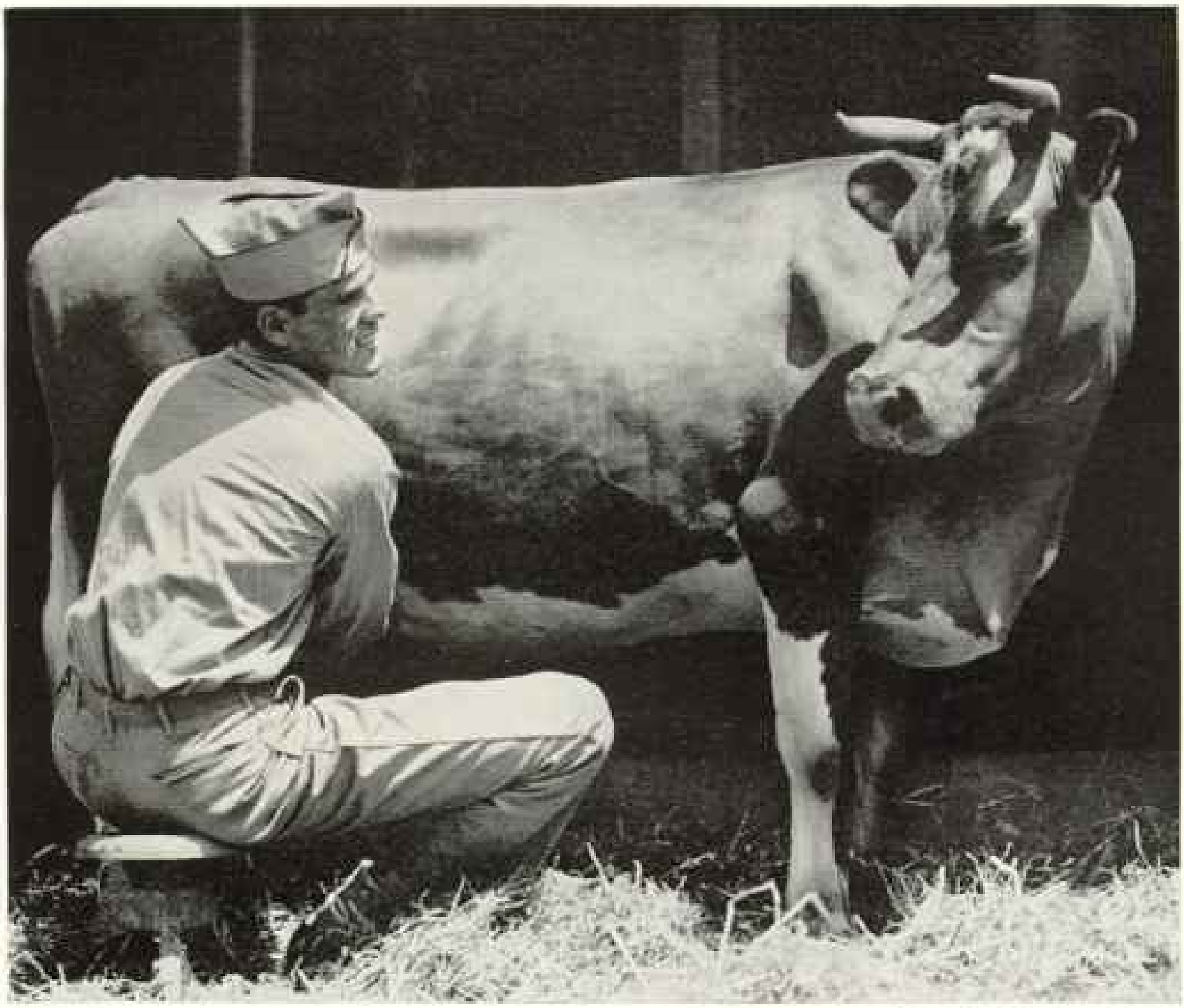
Milwaukee Road "White Coal" makes it unnecessary to tie up precious railway equipment in hauling fuel to our mountain divisions. This means more freight cars available to help ease the transportation situation.

With a vast network of lines reaching from the dynamic midwest to the vital ocean ports of the Pacific northwest, The Milwaukee Road is now handling a traffic volume never approached before.

Heavy service, of course, is taking a toll of all railroad equipment. But modernized operating methods —plus the active co-operation of shippers and essential travelers—enable The Milwaukee Road's 35,000 loyal, alert employees to do their full share for Victory.

THE MILWAUKEE ROAD

ELECTRIFIED OVER THE ROCKIES
TO THE SEA



BUY WAR BONDS AND STAMPS

"Give for the Army, Lulu!"

Private Peterson, home on leave, is trying hard to satisfy his Army-created appetite for milk.

Today's fighting men have been taught how to stay fit. They've rediscovered habits of good health, often neglected since childhood. *They've rediscovered milk—and drink all they can get!*

The standard soldier's ration calls for eight ounces of fresh milk every day, and regularly includes butter, cheese, ice cream and other milk products as well.

This generous serving of nature's most *complete* food is one big reason why American boys in uniform are huskier than they've ever been before. A big reason, too, why Americans will be healthier for generations to come!

We're proud to be a part of all this. Proud that our farms and dairies—*and plans*—were *able to help to feed these big forces!*

We're glad, too, that our products can also help protect the health of hard-working civilians on the job back home.

Today our research is looking far into that peaceful tomorrow when exciting new products and nutritious new foods will come from the National Dairy laboratories.

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

NATIONAL DAIRY
PRODUCTS CORPORATION
AND AFFILIATED COMPANIES

"Electronics?"

SURE! We've had it in our home for twenty years

You're not being fooled by what you've read and heard about the wonders of Electronics. We have been enjoying the miracle of Electronics these many eventful years. *Where? How?* Why that radio in our living-room and the one in our car is an electronic device. So the next time anyone talks to you about Electronics . . . you just be smart and say, "Sure, I have an *electronic device* right now . . . it's my *radio*."

Motorola Radio engineers who built those fine pre-war home and car radios were pioneers in Electronics. They have added much to their wealth of electronic knowledge in the development and production of Radar and Radio Communications Equipment for our Army and Navy. And for the duration, the production of these weapons for Victory will be Motorola's full time job.

We cannot tell you what the post-war Motorola Radio will look like, but we can tell you that it will look and sound swell. Meanwhile, let's keep all that Victory stuff coming off the production lines! *And let's buy all the War Bonds we can!*

For the development and production of Radio Communications Equipment for our Armed Forces, the Motorola organization was awarded the Army-Navy "E" with added Star for continued excellence of performance. Motorola is proud of the part it has been privileged to play in the speeding of Victory.

Motorola RADIO FOR HOME & CAR

GALVIN MFG. CORPORATION • CHICAGO, ILLINOIS

Wartime Housekeeping on Wheels

How we serve 3,000,000 EXTRA meals a year on the Water Level Route

TODAY each New York Central dining car is doing double duty. That's because we must serve millions more meals than ever before... at a time when no new diners can be built, while a third of those we have are needed for troops.

So if you have to wait for a seat, remember that diners, like everything else on America's railroads, have a war job to do. They're working to speed the day when victorious America can travel to suit itself . . . on the finer trains of tomorrow.

YOUR BUSY HOST—THE STEWARD

Faced with shortages of both food and trained manpower, he must be eternally vigilant to save time, prevent waste, and operate within wartime ration rules.

YOUR WAITER—A SPECIALIST

With an average of four years at his post, the dining car waiter is a hard man to replace if he changes his New York Central uniform for Uncle Sam's.

WARTIME EAT-IQUETTE

New York Central dining cars average 60 seats. Not a chair can be added to meet today's rush. So please be considerate, and refrain from lingering at the table after you've dined.

A MEAL A MINUTE

In a kitchen only 6 by 13½ feet, New York Central chefs average more than a meal a minute to meet wartime demands!

TIGHT-PACKED PANTRY

This tiny pantry holds 2,096 nesting pieces of specially designed tableware. Priorities prevent replacements. So *please*, no souvenirs!

10% OFF FOR FIGHTERS

New York Central diners allow 10% discount to those in uniform . . . thousands of whom travel on furlough — especially on week-ends.

NO RATION COUPONS, BUT...

New York Central's rationing is even more difficult than yours at home. Our points are based on the number of meals we served months ago. So, we must now plan more meals with no extra points.

BUY MORE WAR BONDS

New York Central

ONE OF AMERICA'S RAILROADS—ALL UNITED FOR VICTORY

The Axis knows these Aircraft well ... do You?

1 Mighty Middleweight. this lightning-fast, heavily-armed medium bomber is pounding the Japs in Asia . . . blasting the Nazis in Europe. Recognize her stubby wings, torpedo-shaped fuselage, all-plastic nose? *See answer at lower left.*

2 Plenty of Punch is packed into this 24-ton Navy flying boat. Easily recognized by gull wings and up-tilted tail assembly, this patrol bomber has done good work in the Atlantic and elsewhere. Can you name her? *See answer at lower left.*

3 Fast Freight rushes fighting fronts quickly in this twin-engine Navy transport. Big sister of plane No. 2 above, she has similar silhouette but weighs four tons more, lacks gun-turrets. Could you spot this plane? *See answer at lower left.*

4 Built for Britain by an American company, this twin-engined bomber won laurels over North Africa. Extremely fast, she carries a crew of 3, has sufficient firepower to serve as a long-range fighter. Know her? *See answer at lower left.*

You won't recognize this Airplane

. . . because it hasn't yet been built. And it won't look like this, either. But 125-ton airliners of advanced design will be familiar sights, after Victory. Already designed by Martin, such mighty ships need only peace to become reality. That's why we say, buy War Bonds today . . . because you're going places, tomorrow!

THE GLENN L. MARTIN COMPANY, BALTIMORE, MARYLAND, U. S. A.

THE GLENN L. MARTIN-NEBRASKA COMPANY — OMAHA

The Martin Planes pictured above are:

1 "MARAUDER" *Army Bomber*

2 "MARINER" *Navy Patrol*

3 PBM-3 *Navy Transport*

4 "BALTIMORE" *British Bomber*

Martin
AIRCRAFT

Builders of Unconditionally Aircraft Since 1909

This ARMY MOVES BY GREYHOUND

. . . 132 Million Passengers in One Year . . . the Fighting, Working Manpower of America!

It will amaze many to learn that Greyhound and other bus lines now carry more than half of all *intercity* passengers between cities, towns, military centers, farm and factory areas. Buses do this immensely important job on less than 3 per cent of the motor fuel used by all commercial vehicles!

Greyhound, doing the largest single share of this war job, has seen its passengers change, almost overnight, to war plant workers, men and women in uniform, farm help—and all the others whose trips are so necessary to back our fighting men in far lands.

To provide extra space on buses for men and women in the service, Greyhound is urging civilians to take only necessary trips . . . to avoid travel on holidays and week-ends . . . to take less baggage. *And be sure to buy more War Savings Bonds and Stamps!*

GREYHOUND

"TAMING THE WILD"

THE last frontier of the vast Northlands has been opened. Civilization and Man's ingenuity are spreading their wings to the far reaches of these rugged lands of Canada and Alaska. The Wild is being tamed.

The men and women of Jacobs are very proud of the part their products have played in this pioneering. For a decade, planes powered by Jacobs have been carrying men and supplies into the "Bush Country," helping to open it. The Alcan Highway—that great achievement of modern engineering and human energy—has recently been completed, and Jacobs-powered planes carried in much of the equipment and supplies for its construction.

Today, military needs swallow all aircraft production, and Jacobs' output, multiplied many times, is powering the majority of the Bomber Pilot Trainers of the huge U. S. Army Air Forces' training program and Canada's Commonwealth Air Training Plan. After Victory is won, however, airplanes will make the rich resources of the Northwest available for the civilized progress of the World, and Jacobs Engines, with new efficiency and new economy, will be ready to blaze the way.

JACOBS AIRCRAFT Engines

POTTSTOWN • PENNSYLVANIA • U. S. A.

How a home-front army suffers heavy casualties

LAST YEAR, twice as many Americans lost their lives in accidents within their own homes as were reported killed in battle in the first 18 months of this war!

In the same year, *well over three quarters of a million* workers were temporarily disabled by accidents in their homes.

The working time lost by this huge Home-Front army was enough to operate more than 50 war plants, each employing 1000 people, for an entire year.

Most home accidents need not happen. Today, especially, it is your responsibility and that of your family to help reduce them.

The practice of the three basic safety principles outlined below would eliminate most home accidents.

Remove danger points. Keep stairs, including railings, in repair and well-lighted... *a greater number of serious accidents occur on stairs than in any room.*

It is sometimes wise to put guards on windows so children won't fall.

Have electrical equipment, irons, heaters, toasters, etc., inspected and repaired. Replace frayed cords and loose plugs. Watch out for leaks in gas appliances and pipes. Clean chimney flues and heating equipment regularly.

Practice good housekeeping. Stairs and landings should be kept free of brooms, toys, boxes, and other objects which might cause falls. Scatter rugs should be securely anchored.

Tie back kitchen curtains so they won't catch fire. Knives and sharp instruments should be kept in a safe place when not in use... handles of pots and pans on the stove should be turned in to avoid tipping.

Keep furniture and other objects out of the way so you won't trip or stumble over them.

Develop careful habits. Use a stepladder, or a straight, strong chair—not the nearest rocker or box—when reaching to high places.

Careful householders will disconnect electric appliances like irons and curlers before leaving the room. They will never leave a hearth fire, whether gas, wood, or coal, unguarded.

Close cupboard doors and bureau drawers promptly to avoid collision. Get rid of broken glass or other sharp refuse as quickly as possible.

Hands should be dry when touching any electrical switch or apparatus.

Make a tour of your home this very day

Check for yourself, and urge your family, especially the children, to see that these three basic safety principles are consistently carried out. Don't give an accident a chance to happen!

On request, Metropolitan will send you a free folder, 113-N, entitled, "Home Defense Against Accidents."

This bird takes no chances

ALMOST ANYONE who has hunted the wild turkey, will tell you that it is one of the most cautious of all birds.

Wild turkeys can be shot, but it isn't easy. If a hunter plans to shoot from a blind, he can't build the blind all at once, but must do it in stages long before the hunting season starts so that the turkeys have a chance to get used to it.

Even then, it is said that if so much as a fallen branch in the immediate vicinity of the blind is disturbed, the keen-eyed, careful turkeys will give the place a wide berth.

This is but one of many examples of the turkey's caution. Woodsmen say that when the hen turkey leaves her nest, she almost always flies so that no tracks will betray the site to a fox or wildcat. When the big birds are feeding or taking dust baths, they take turns standing guard so that no enemy can catch them unawares.

Due to these exceptional precautions, when the wild turkey meets with an accident it is usually not his fault. This is more than you can say for man.

Because man has no natural enemy of much consequence save himself, the instincts which make wild things cautious have become dulled in him. Striking proof of this can be found in the number of accidents men suffer through carelessness in working with their own machines.

Last year alone, industrial accidents in this country caused 19,200 deaths, permanently disabled over 100,000 workers, and resulted in the loss of 42,000,000 man-days.

This toll would be serious at any time. Now, when industrial accidents slow up vital war production, it is a definite drag on the war effort.

For this reason, more and more manufacturers and contractors are calling on the services of men who can stop accidents before they happen.

These men are Travelers Safety Engineers. Years of experience have taught them just what kinds of working practices are apt to lead to accidents and what measures should be taken to prevent them from occurring.

This knowledge has enabled these specialists in safety to reduce industrial accidents very substantially.

Inasmuch as the accidents which cut plant production, and increase insurance rates needlessly, form a definite pattern, a Travelers Safety Engineer can nearly always help reduce them. Any Travelers agent or insurance broker can put you in touch with him.

MORAL: Insure in The Travelers. All forms of insurance. The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, Hartford, Connecticut.

PRINCESS AURORA . . . BY ELECTRONICS

The silver of Tschaikowsky's music. Porcelain princesses, the bluebird, and a young Prince Charming. The mystery and magic of an ancient tale, danced in a swirl of rhythm! . . . So vividly does the Musaphonic radio-phonograph reproduce this sparkling ballet that you almost seem present at the performance. . . . The Musaphonic, built by General Electric, is a product of electronic research. Production for victory now claims all General Electric resources. But tomorrow, following new advances in electronics, the Musaphonic with FM (Frequency Modulation) will be an even finer instrument!

Alicia Markova as the Princess, and Anton Dolin as the Prince, in the Ballet Theatre's beautiful production of Princess Aurora.

The Sheraton, Musaphonic prices from $390. Tune in "THE WORLD TODAY" every evening except Sunday at 6:45 E.W.T., CBS. On Sunday listen to "The Hour of Charm" at 10 P.M. E.W.T., NBC. *Buy War Bonds.*

MUSAPHONIC

BY GENERAL ELECTRIC

116-81

Reunion at Christmas

HIS BEST GIRL smiles her sweetest smile . . . while little sister (who's not so little any more) makes sure Bruce sits nicely for his picture . . . they've come, all three, to gladden a soldier's heart, at Christmas.

If yours is a miniature camera, you can send your man in the service Kodak Minicolor Prints . . . beautiful, full-color enlargements made from your miniature Kodachrome transparencies. (Above, is the small size; there are also larger sizes, ideal for framing.)

Or, if you use a standard size roll-film camera, you can send him Kodacolor Prints, the full-color prints you get of the snapshots you take with Kodacolor Film. Ask your Kodak dealer for details, and be sure to see his pocket cases and easel mounts for "dressing up" your color prints.

* * *

The Christmas card that's all your own is the photo greeting kind. Take a favorite black-and-white negative to your Kodak dealer and he'll do the rest . . . Eastman Kodak Company, Rochester, N. Y.

Time is short. See your Kodak dealer now

PROPER FILLING MAKES PENS WILLING

No smudge and no dirt, no sand and no grime. Ideas flow fast into words every time. Your Ink-O-Graph races, when properly filled. Hard work becomes play, and everyone's thrilled! If Ink-O-Graph filling's a mystery to you, read the offer below and learn what to do. So you, too, can enjoy a wonderful time, with no smudge and no dirt, no sand and no grime!

ONLY ONE PERSON IN 5,000 KNOWS HOW TO FILL ANY FOUNTAIN PEN PROPERLY!

An Ink-O-Graph pen will give perfect satisfaction for many years—equal to that you expect from the highest-priced fountain pen—*provided you fill it properly*. If you haven't received one of our instruction sheets from your dealer, send us a 3c stamped, self-addressed envelope and we will mail you a copy.

Beware of imitations—Only by insisting on the genuine can you enjoy *every one of the advantages* offered by Ink-O-Graph. Look for the name Ink-O-Graph on every pen.

DeLuxe Model **INK-O-GRAPH $2**

N. Inkograph Co., 200 Hudson St., N.Y.C., 13

An important message to previous Tucson visitors

COME AGAIN this winter, by all means, if you can—to share our warm, dry sunshine—to *re-energize* for the bigger war and post-war jobs ahead. But—this is important—*do not come without advance reservations!* Write today to our 22-year, non-profit Sunshine Climate Club!

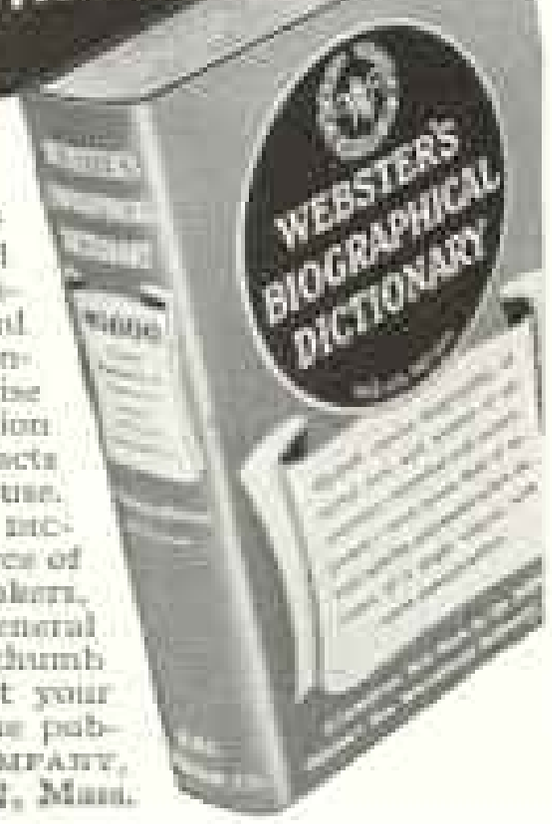
- Guest ranches • Excellent private schools • University of Ariz. • Fine medical facilities

For RESERVATIONS ☐ or FREE BOOKLET ☐, write *Tucson Sunshine Climate Club*, 4304-B Rialto, Tucson, Ariz.

Your place in the sun is **TUCSON**

Just Published! the NEW MERRIAM-WEBSTER BOOK OF BIOGRAPHIES

40,000 Noted Men and Women—Historical and Contemporary—From Every Country and Every Field of Human Achievement!



A new entirely new work by the famed Editorial Staff of WEBSTER'S NEW INTERNATIONAL DICTIONARY, Second Edition. This single volume contains more than 40,000 concise biographies, with pronunciation of names and all essential facts required for quick-reference use. WEBSTER'S BIOGRAPHICAL DICTIONARY is an invaluable source of information for writers, speakers, teachers, as well as for the general reader. 1,756 pages, with thumb notch index. Price $6.50. At your bookdealer, or direct from the publishers. G. & C. MERRIAM COMPANY, 451 Federal St., Springfield 2, Mass.

"Buy U. S. War Bonds—They Identify You"

"TO THEIR HEALTH"

Oranges and other citrus fruits are in greater demand today than ever before. As an abundant source of Vitamin C, they are invaluable in maintaining the health of America's fighters in the field and on the industrial home-front.

Union Pacific serves a large part of the Western territory which produces great quantities of citrus fruits. Modern refrigerator cars provide the protective transportation that keeps these fruits in orchard-fresh condition.

Thus, a transportation service of commercial value in peace-time has become even more essential in war-time. To guard America's health through supplying proper foods might be considered almost as important as the transportation of armament and troops; another job that the railroads are doing efficiently and whole-heartedly.

The Progressive

UNION PACIFIC RAILROAD

ROAD OF THE STREAMLINERS AND THE CHALLENGERS

BUY MORE WAR BONDS

Our Guests of 1943

THE FIGHTING MEN OF AMERICA

You'll see them everywhere in Britain these days — those jaunty good-natured men of America's armed forces who have left the comfort and security of their own homes to join with the men of Britain, the British Empire and Colonies and our other Allies to fight Oppression and Treachery.

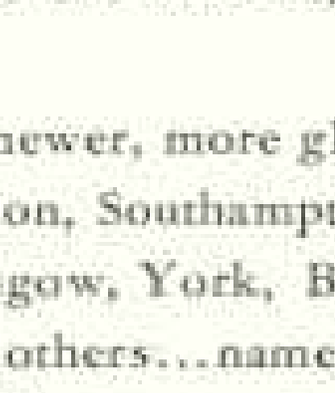
They see our roofless shrines and bomb-pocked countryside proud and undaunted. Humble cottages and great castles . . . many which our visitors were accustomed to see in all their charm and perfection . . . are now shattered beyond repair.

In happier days when Victory is won, we hope to be able again to welcome the even bigger army of American friends — new as well as old — to our historic, battle-scarred land.

You will find newer, more glorious significance in London, Southampton, Plymouth, Coventry, Glasgow, York, Belfast, Bristol, Edinburgh and others . . . names which people everywhere will pronounce with pride in a free and resurrected world.

9 Rockefeller Plaza New York, N.Y.

British Railways



There's a great day coming—when the clouds of war will disappear and you can head for sunshine! Begin planning now for the vacation of a lifetime in the warm, dry Valley of the Sun! And back up your plans by buying as many War Bonds as you possibly can!! Phoenix' friendly *Certified—Climate** makes every day an outdoor day for relaxation and recreation—offers everything you'll need to give your war-jangled nerves a rest.

**Phoenix Arizona*
In the Valley of the Sun

**This climate was literally "Certified" when the Valley of the Sun was chosen by U. S. government officials for one of America's foremost aviation training centers because of its unexcelled weather conditions—high percentage of clear, warm, sunny days; low humidity, wind velocity and rainfall; ideal altitude.*

For free, profusely illustrated booklet and cartograph map, write Valley of the Sun Club, 100 Chamber of Commerce Bldg., Phoenix

BANK of AMERICA TRAVELERS CHEQUES

Sold by banks and travel agents everywhere

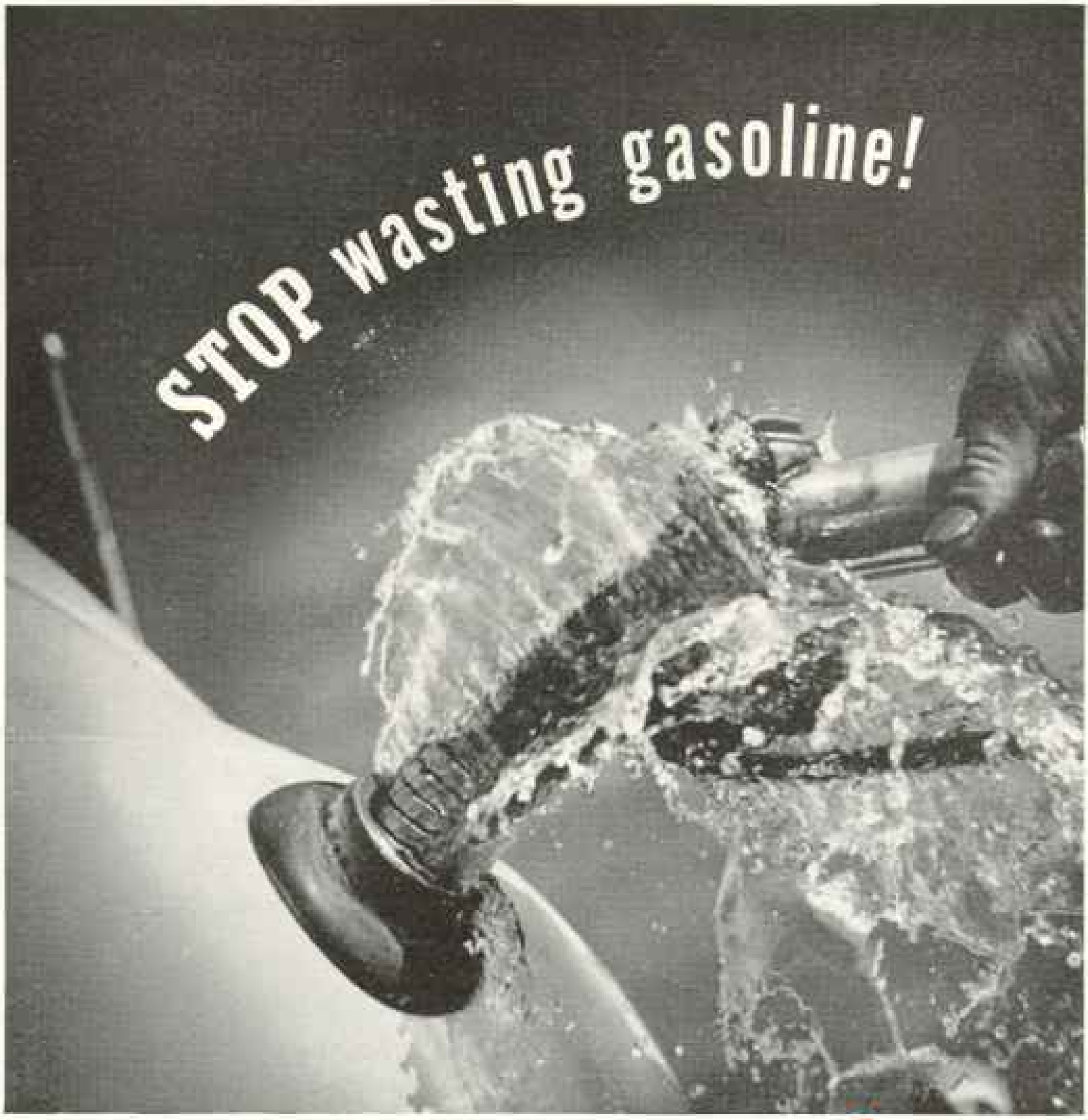
Backed by the resources of a three billion dollar bank

Issued by Bank of America National Trust and Savings Association, CALIFORNIA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

London, England, Branch: 12 Nicholas Lane, London, E.C.4.

"Buy U. S. War Bonds—They Identify You"



RING-FREE Motor Oil saves gasoline 2 ways

Carbon on pistons, rings, valves decreases motor efficiency—leads to loss of power—wastes gasoline. Macmillan RING-FREE Motor Oil *removes carbon* while you drive! That means better motor operation and substantial gasoline savings.

The 2nd thing RING-FREE does to save gasoline is *reduce friction fast!* Reducing motor friction releases more power to your car's rear wheels, and that really cuts gasoline waste.

Here's proof: In scores of certified road tests, with various makes of owner-driven cars, an average gasoline saving of 1.3 miles per gallon was reported after crankcases had been drained and refilled with RING-FREE Motor Oil.

Let Macmillan RING-FREE help *you* save gasoline two ways. Let it make your car last longer, too, by removing carbon, reducing friction and giving more thorough motor lubrication.

SOLD BY INDEPENDENT DEALERS

MACMILLAN PETROLEUM CORP.

30 W. 50th, New York; 624 S. Michigan Av., Chicago; 530 W. 8th, Los Angeles

*DUES: Annual membership in United States, $3.50; Canada, $4.50; abroad, $4.50; life membership, $100. Remittances should be payable to National Geographic Society. Those from outside of continental United States and Canada should be made by New York draft or International money order.

RECOMMENDATION FOR MEMBERSHIP

IN THE

NATIONAL GEOGRAPHIC SOCIETY

* *The Membership Dues, Which Are for the Calendar Year, Include Subscription to the National Geographic Magazine*

PLEASE FILL IN BLANKS BELOW, DETACH, AND MAIL TO THE SECRETARY

1943

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington 6, D. C.:

I nominate _____

Occupation _____
(This information is important for the records)

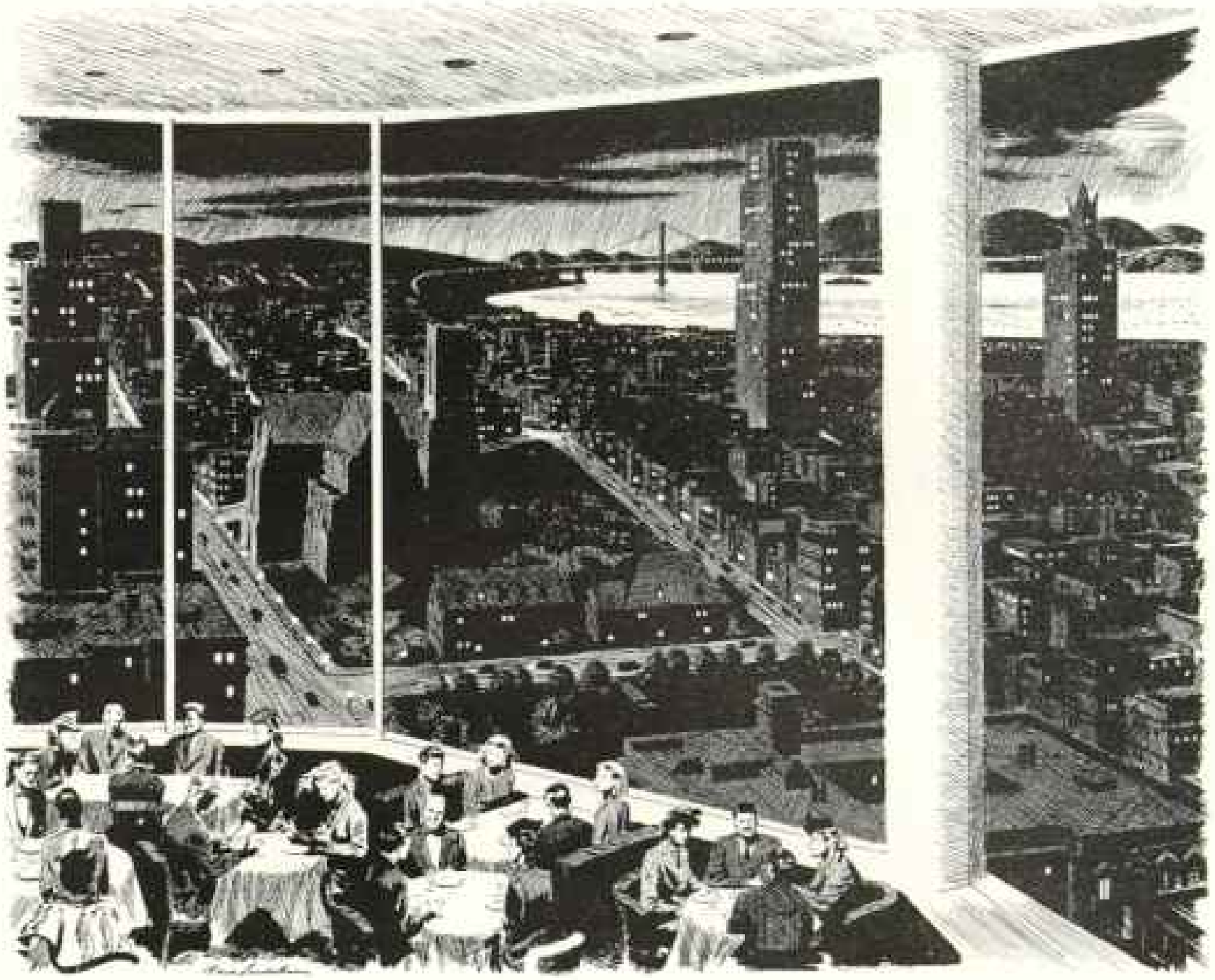
Address _____

_____ *for membership in The Society.*

_____

_____
Name and Address of Nominating Member

11-43



The Chapter in Your Life entitled **SAN FRANCISCO**

...when the lights go on again

Tonight the tall towers on the hills are black shafts against the stars, and the mystery of the dim-out shrouds the city of St. Francis.

But a day is surely coming when the news of Peace will flash around the world, firing these hills with a million joyous lights.

Then you may journey westward for that vacation you postponed so long—west to California, and San Francisco!

How can we tell you how you'll feel when first you see this city! The two mighty bridges arching over the vast blue bay...buildings massed upon the hills like pastel-colored stairs...bright flags streaming in the ocean breeze...tang of adventure in the cool salt air...

You will find exciting things to see and do. Cable cars to ride over the hills. Flowers to buy at curbside stands. Chinatown's bazaars and byways to explore. Fishermen's Wharf, where fresh-caught crab is boiled in sidewalk cauldrons. Golden Gate Park that rolls out to the Ocean Beach. Old Spanish Mission Dolores...

You will visit famous places close to San Francisco: Yosemite National Park and groves of giant Redwoods, Lake Tahoe, the Gold Country, Monterey Bay, little valleys where choice wines are made...

Now, of course, San Francisco is very busy. It is virtually the West Coast capital of America at war. And you are busy too. However, it may give you pleasure and relaxation just to think about and plan your Victory Vacation. So mail the coupon for your free copy of the illustrated booklet, *The Chapter in Your Life entitled San Francisco*. Send the coupon now.

CALIFORNIANS INC.

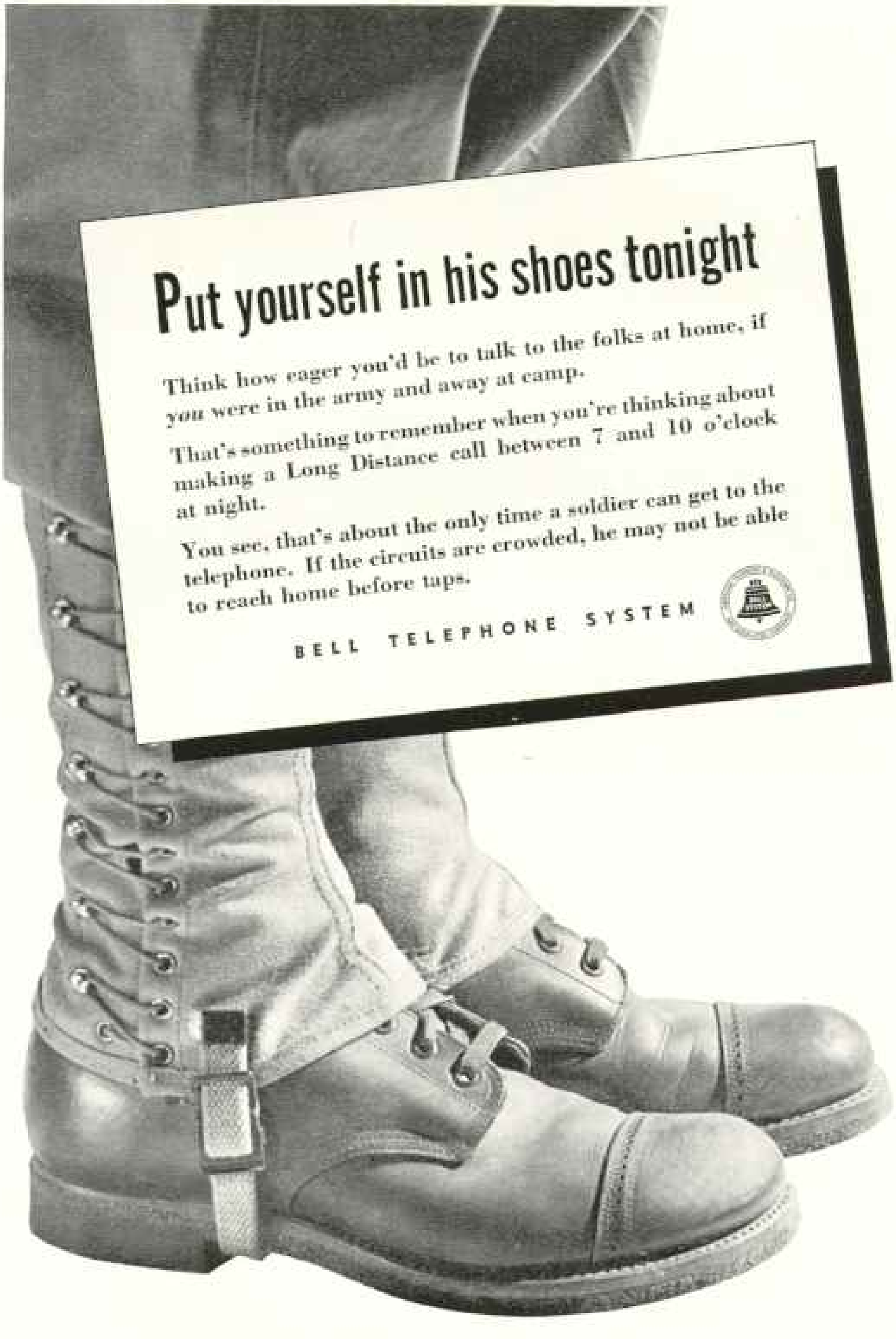
Dept. 511, 703 Market St., San Francisco, California.

Please send me my free copy of the illustrated booklet, "The Chapter in Your Life entitled San Francisco." Thank you.

Name _____

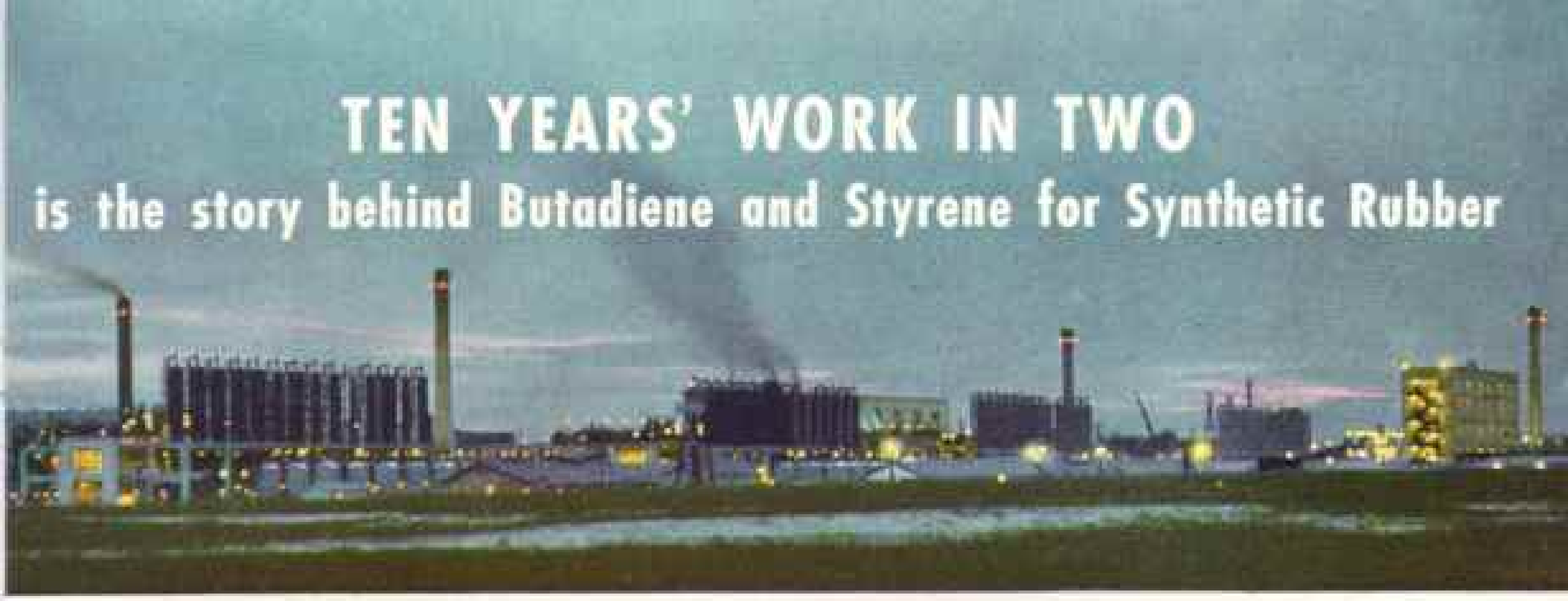
Address _____

City _____ *State* _____


Put yourself in his shoes tonight
Think how eager you'd be to talk to the folks at home, if you were in the army and away at camp.
That's something to remember when you're thinking about making a Long Distance call between 7 and 10 o'clock at night.
You see, that's about the only time a soldier can get to the telephone. If the circuits are crowded, he may not be able to reach home before taps.
BELL TELEPHONE SYSTEM

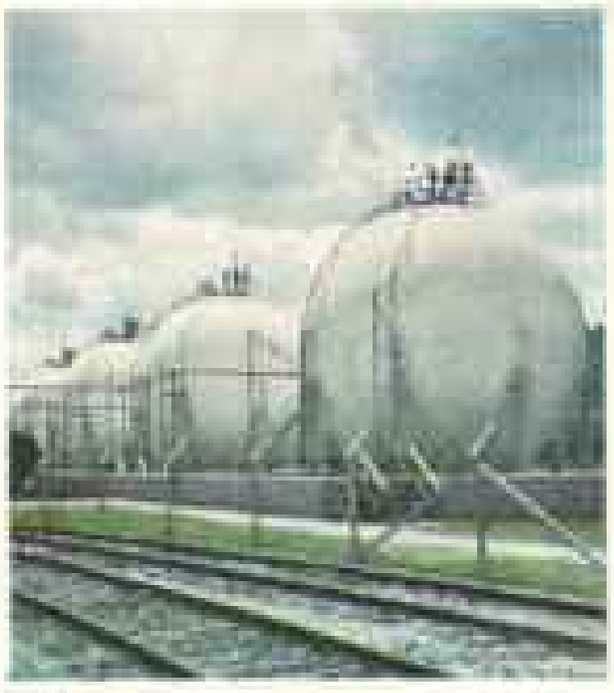
TEN YEARS' WORK IN TWO

is the story behind Butadiene and Styrene for Synthetic Rubber



Distillation Column for Styrene

Where Distillation Columns separate and purify the Butadiene



Butadiene Storage Spheres

YOU SEE HERE a night scene and some daytime views of the immense butadiene and styrene plants that CARBIDE AND CARBON CHEMICALS CORPORATION, a Unit of UCC, has designed and built at Institute, West Virginia, for the Government's Defense Plant Corporation and is operating for the Rubber Reserve Company.

Carbide and Carbon also has completed another butadiene plant at Louisville, Kentucky—and has released plans to Koppers United Company for a third butadiene plant near Pittsburgh, Pennsylvania.

Butadiene had never been manufactured in the United States in large quantities before the plants at Institute went into production. The task involved in providing the mass production facilities the Government asked for was an unusual one . . . but one that took full advantage of the experience and processes developed by Carbide and Carbon.

Generally, it requires seven to ten years for a company to take a process developed in the laboratory, put that process to test in a pilot plant, iron out production problems, design a full-size plant, and then actually build the plant and go into mass production.

By working at top speed for twenty months—Carbide and Carbon telescoped research, development, engineering, and construction work that would have taken 10 years in normal times. In this short time laboratory research was translated through chemical engineering into larger and more modern facilities for producing the chemicals for synthetic rubber than existed anywhere else in the world.

This achievement could never have been possible had it not been for the years of research and experimentation which, prior to the emergency, Carbide and Carbon had devoted to the production of synthetic—or man-made—chemicals of the organic series.

Business men, technicians, teachers, and others are invited to send for the book "Butadiene and Styrene for Buna S Synthetic Rubber from Grain Alcohol" which explains what these plants do, and what their place is in the Government's rubber program.

BUY UNITED STATES WAR BONDS AND STAMPS

CONSTRUCTION RECORD AT INSTITUTE

June 25, 1941

Carbide and Carbon submits definite production estimates.

July 31, 1941

Design work starts on 10,000 ton-a-year butadiene unit.

Aug. 22, 1941

Government authorizes construction.

Dec. 7, 1941

Pearl Harbor

Dec. 15, 1941

Design "freeze" for 20,000 ton-a-year alcohol-to-butadiene plant.

March, 1942

Japanese occupy Malay Peninsula and Dutch East Indies; cut off about 90 per cent of U. S. natural rubber supply.

April, 1942

Construction on the first two 20,000-ton-a-year butadiene units starts at Institute, W. Va.

July, 1942

Construction of 23,000-ton-a-year styrene plant starts.

Sept. 10, 1942

Rubber Survey (Baruch) Committee report accepted.

Jan. 29, 1943

First large-scale, alcohol-to-butadiene unit goes into operation two months ahead of schedule.

Feb. 18, 1943

First tank car of butadiene from grain alcohol shipped from Institute plant.

April 7, 1943

First styrene unit begins operation.

May 25, 1943

Fourth 20,000-ton-a-year butadiene unit begins operation at Institute plant.