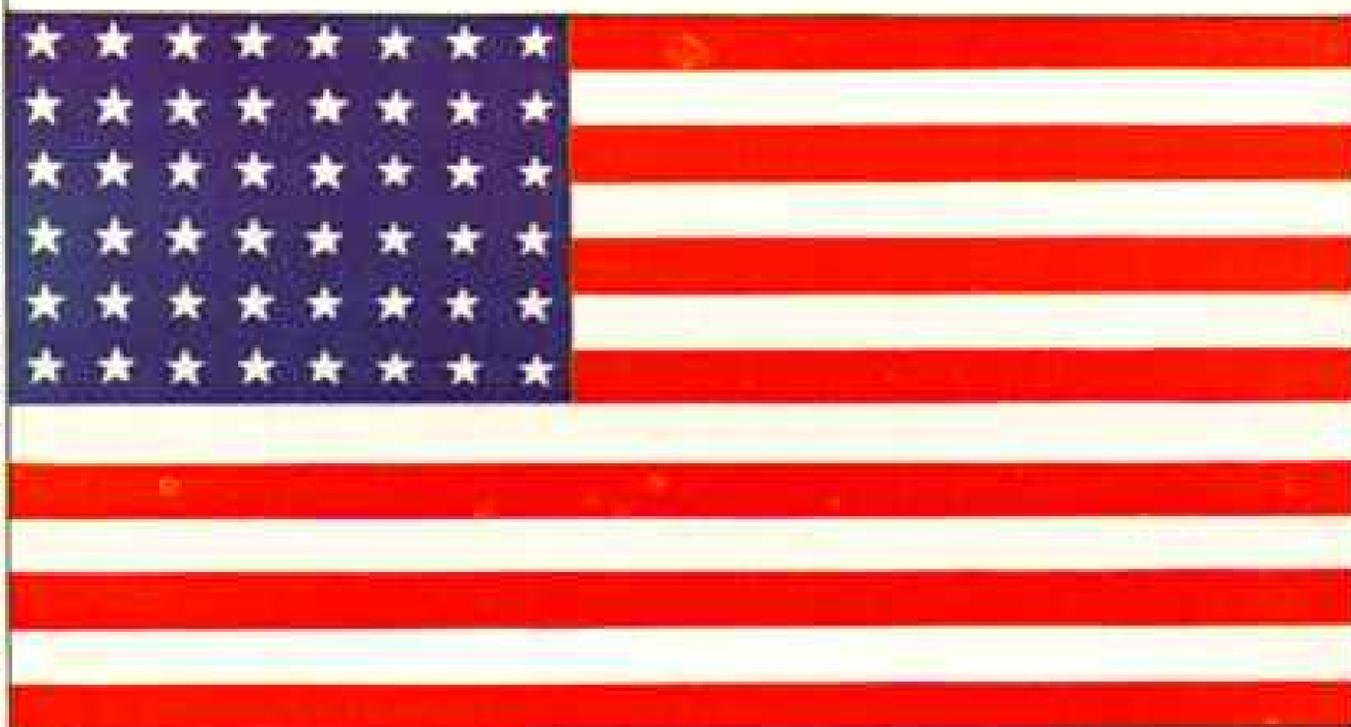


VOLUME LXXXII

NUMBER ONE

# THE NATIONAL GEOGRAPHIC



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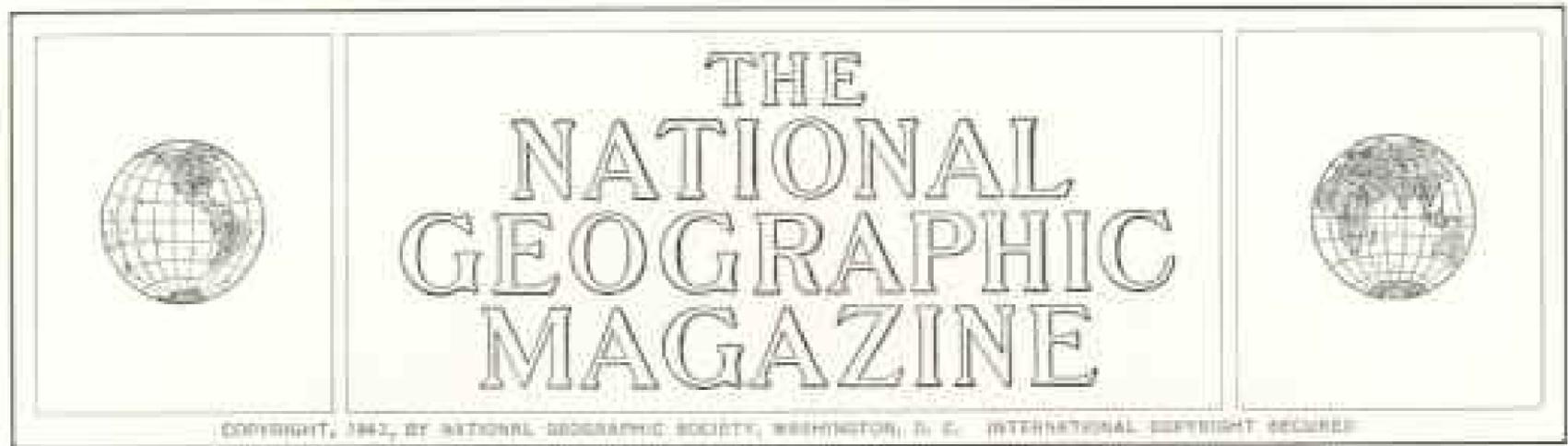
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## The New Queen of the Seas

BY MELVILLE BELL GROSVENOR

**T**HIS war has proved above all else that air power is paramount.

Even if you have all the tanks, ships, and soldiers in the world, they are as nothing if the enemy has command of the air.

From the far corners of the earth, wherever the United Nations are fighting, comes the desperate plea, "Send us planes, planes, and more planes."

Not since the days of Genghis Khan has Asia seen such conquering armies as the hordes of Japanese swarming amphibiously across the Southwest Pacific.

Nothing—not even big guns, the smartest soldiers, nor the most powerful fighting ships—was able to stop them when they had control of the air.

Not until the Japanese struck the Coral Sea—and then Midway—was their progress blocked. At last they faced superior air power.

### Carriers Clear Way for Jap Advances

Time and again first reports of Japanese advances mentioned aircraft carriers as the spearhead of attack. Read these typical dispatches quoted from the daily news:

December 7, 1941. "Waves of bombers and torpedoplanes from Japanese aircraft carriers strike Pearl Harbor, inflicting heavy damage on U. S. Pacific Fleet."

Cabled Clark Lee, Associated Press correspondent, who survived the siege of Bataan: "The fate of the Philippines was sealed some 10 hours after the Japanese attack on Pearl Harbor. Eighty-six Zero fighters from *aircraft carriers* and 54 land-based bombers bombed and strafed American planes parked at Clark and Iba Fields. They left a roaring hell of flames at both airdromes. Some of our planes were saved, but the main strength of our air force in the Philippines was gone."

Other correspondents reported: "Japanese had more than one aircraft carrier in the Bismarck Archipelago." . . . "Japs sneaked an aircraft carrier among the Indonesian islands and sank the U. S. destroyer *Poary* with dive bombers at Darwin."

### Hunted Carriers Sink Cruisers

London, April 9.—Drew Middleton, Associated Press staff writer, cabled: "Japanese planes have blasted the British heavy cruisers *Dorsetshire* and *Cornwall* to the bottom of the Indian Ocean." The cruisers had been seeking the Japanese carriers which launched the plane attack against Colombo, Ceylon.

"Aircraft from those very carriers found the cruisers first and destroyed them before they were able to close to gunnery range," continued the dispatch.

London, April 13, from Drew Middleton: "At least three Japanese battleships, five *aircraft carriers*, and a number of cruisers and destroyers are in the Bay of Bengal at this moment, Prime Minister Churchill told the House of Commons Monday in a report which made clear the stark and deadly peril of India."

Sir Keith Murdoch, Melbourne newspaper publisher, wrote May 14: "In the Coral Sea fighting, aircraft did all the work. We sent our aircraft deep into the northern waters of the Solomon Islands and their torpedoes tore holes in the light forces we discovered.

"We led a heavy Japanese fleet down to the south and then released aircraft from an unexpected quarter. On each side aircraft went into attack. . . . *Aircraft carriers are the winners of sea battles!*"

Thus over and over again in this war headlines herald the victories of the world's newest and most powerful naval ship, the aircraft carrier.



Courtesy U. S. Navy Recruiting Bureau

### Beyond the Battleship *Maryland* Lies the Carrier *Lexington*, Lost in the Coral Sea

The present war has proved the power and offensive might of the aircraft carrier. Her torpedoplanes, bombers, and fighters can soar hundreds of miles over the sea or land to attack enemy ships and cities. Though the *Lexington* was commissioned 15 years ago, her striking power increased every year as she could always take aboard the latest and fastest airplanes. The *Maryland* still has 16-inch turret guns, maximum range about 19 miles, which were provided in the blueprint stage 25 years ago. The slower battleship depends on thick armor and many guns for protection, while the carrier relies on fighter planes, high speed, and her powers of evasion. Both are vulnerable to torpedo attack.

Remember? British aircraft from carriers crippled the Italian battleship fleet at Taranto, November 11, 1940. Torpedoplanes from the *Victorious* and the gallant *Ark Royal* first winged the mighty *Bismarck* (page 7).

Our own Vice Admiral Halsey, too, has shown the vast power of the aircraft carrier in his spectacular raids with a small task force against the Gilbert and Marshall Islands, and then Wake and Marcus (page 12).

#### British Lose Historic First Carrier Battle

Early in April, 1942, occurred a milestone in naval history.

Perhaps the battle fought that day will prove as far-reaching as the famous action between the ironclads *Monitor* and *Merrimac*.

The old and tiny British aircraft carrier *Hermes* with accompanying ships was rush-

ing to the aid of India. Suddenly she ran into a superior force of three to five Japanese aircraft carriers.

The opposing mother ships may never have sighted each other, but their "big guns" duelled across the sea. Pursuit planes probably fought it out overhead while dive bombers and torpedoplanes went to work on the ships below.

Of course, the more powerful fleet won. Her 20 planes overwhelmed the lone British carrier became an easy prey for her winged enemies and was sunk.

With skies over the Indian Ocean thus cleared and sea lanes opened, the Japanese found their advance made easier in Burma.

If the British Admiralty had spent for aircraft carriers the vast sums they invested in the modern but ill-fated battleship *Prince of*



Official Photograph U. S. Navy

### Imagine This Carrier Force Multiplied 25-fold!

Here four carriers with their planes ready to take off steam peacefully along before war began. Now these ships serve as the backbone of task forces which make lightning thrusts against the enemy in such battles as the Gilberts and Marshalls and Marcus and Wake. "If we had a hundred or more carriers, screened by cruisers and destroyers, we could rule the Pacific," say veteran carrier men. "Think what damage their 6,000 fighter planes, bombers, and torpedo planes could do to the enemy."

*Wales* and her newer sisters, those carriers might have turned the tide to Britain in the Bay of Bengal.

"Leave the precious battlewagons home where nothing can happen to them," a carrier pilot of many years' experience told me.

"Give us a big fleet of carriers, convoyed by destroyers and cruisers, and we'll lick any surface fleet afloat.

"Why should we spend our energy protecting something that doesn't accomplish much?" my friend added. "We simply create an additional liability which bleeds our strength.

"While tending battleships we must be on the defensive, whereas the carrier's chief asset is that she is a weapon of offense."

Many air officers who fought the Japanese in the recent Pacific carrier actions feel the same way.

After all, what has the battleship accom-

plished in this war to date? Can it boast of a single victory as far-reaching as Taranto, Pearl Harbor, or the bombing of Tokyo?

Granted, a battleship such as the *Tirpitz* could raise havoc if she got into a convoy unprotected by planes. But at the first sight of torpedo planes she would run for safety unless protected by adequate fighter strength.

So far in this war, nine capital ships have been sunk, crippled, or capsized by aircraft. Six of these—three Italian battleships beached at Taranto, the *Bismarck*, *Arizona* and *Oklahoma*—met their fate from torpedo planes and bombers launched by carriers. Jap torpedo planes, possibly from carriers, also accounted for the *Prince of Wales* and *Repulse*, and Capt. Colin Kelly's Flying Fortress blew up the *Haruna*.

In contrast, only one carrier has been reported sunk by battleships. The German



Official Photograph U. S. Navy

### Dive Bombers Peel Off for the Attack

Dive bombing was first developed by the U. S. Navy. One after another, the planes wing over and head almost straight down for the target—soldiers ashore or a ship at sea. Antiaircraft fire can break up such formations and deflect the aim, but the only sure defense is a strong force of fighter planes.

*Scharnhorst* and *Gneisenau* caught the carrier *Glorious* off guard during the Norwegian campaign, June, 1940.

Surprisingly, *no* battleship has been sunk by a battleship, excluding the Battle of Oran between the British and Vichy-French fleets. (The *Hood*, sunk by the *Bismarck*, was a battle cruiser.)

### Every Front Demands More Air

Our wise and air-minded President Roosevelt and his Navy chiefs have put carriers at the top of our naval building program.

All admit that to win we must first gain superiority in the air. But how can we obtain this superiority unless we carry our fighter planes across the seas ready for combat, rather than in crates in the holds of ships?

C. Yates McDaniel, of the AP, in his epic last dispatch from Singapore on February 11, 1942, reported: "I can see relay after relay of Japanese planes going into murderous dives upon our soldiers, who are fighting back in a hell over which there is no protecting screen of our own fighters."

Famed C. B. S. war correspondent Cecil Brown broadcast from Sydney: "I've talked with dozens of American pilots in the Netherlands East Indies and others who got out of the Philippines. Everyone said: 'For God's sake, send us some aircraft.'"

Today the same old plea comes crackling over the ether waves from other areas not yet occupied by the enemy.

From Alaska to India and in the Near East, wherever the United Nations face the enemy one hears this cry, "More air!"

We all know our factories are turning out planes by the thousands. Soon airplanes will fly off the assembly lines in such numbers that they will blot out the skies, "like geese bound south in the fall."

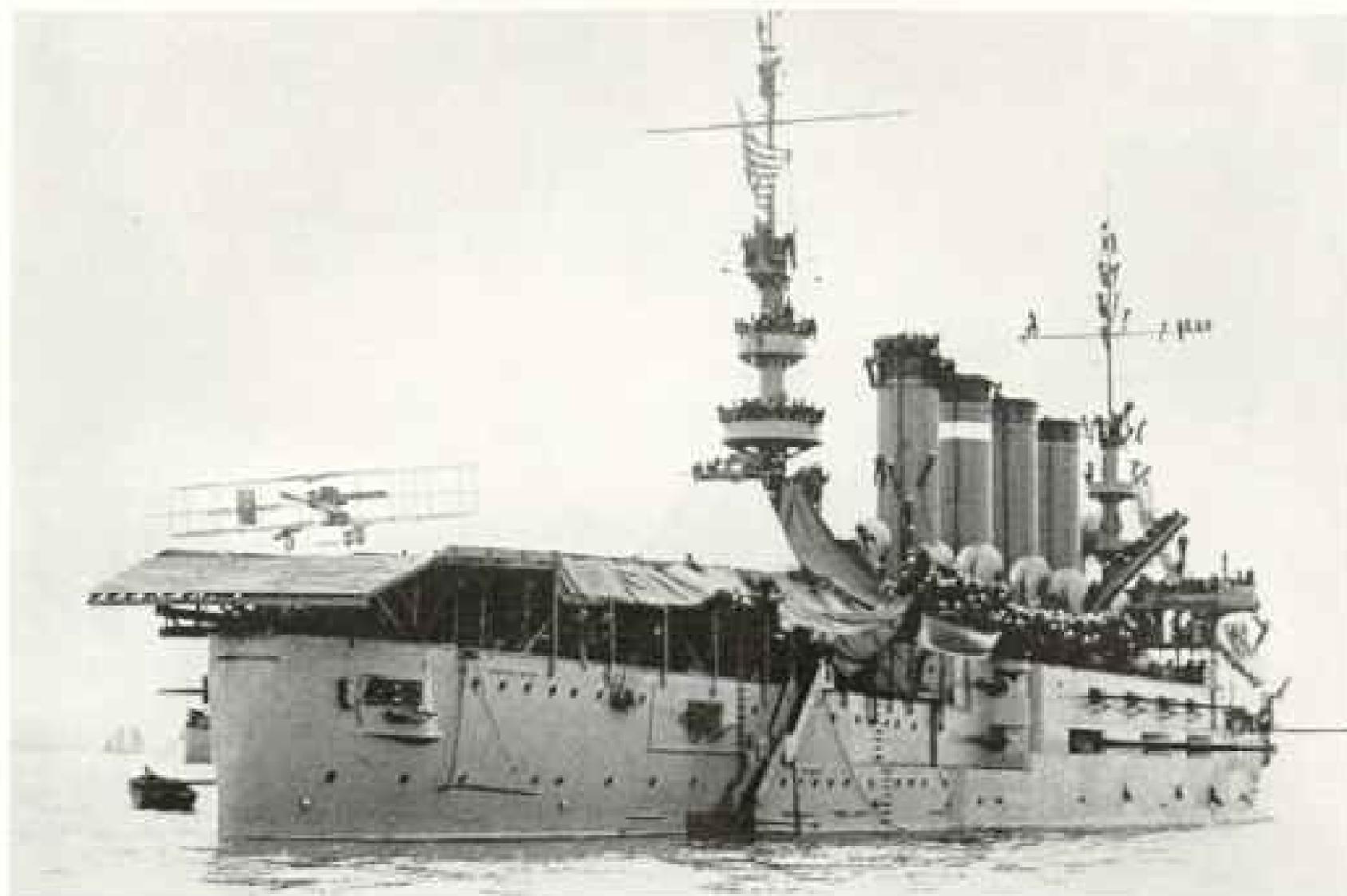
"Then why do we not send the planes so desperately needed?" everyone asks.

The answer is simple: lack of enough cargo ships to carry supplies, bombs, fuel, and huge crates of fighter planes to these distant lands.

"Look at your map," said President Roosevelt in his Washington's Birthday speech, "and you will see that the route (to the Southwest Pacific) is long, and at many places perilous, either across the South Atlantic around South Africa, or from California to the East Indies direct. A vessel can make a round trip in about four months, or only about three round trips in a whole year."

### Many Aircraft Carriers Are the Answer

"Can't some way be found to get around this impossible situation?" asks the average citizen.



Official Photograph U. S. Navy

### Eugene Ely Lands a Plane on a Ship for the First Time in History

On January 18, 1911, the pioneer Curtiss aviator performed this astounding feat in San Francisco Bay. At a speed of 40 miles an hour, his flimsy plane descended squarely on the wooden platform, 130 feet long and 50 feet wide, built over the quarter-deck of the U. S. cruiser *Pennsylvania*. Sailors cheered from every vantage point. "It means that the aeroplane is a new element in naval warfare which will have to be reckoned with seriously," said a newspaper account of the historic event.

"Yes!" shout many expert aviators of the Army Air Forces and Naval air arm, who are itching to get "over there" and help their comrades at the front. "Give us aircraft carriers—swarms of aircraft carriers. Then we can carry this air war right to the Japs."

"But isn't the carrier extremely vulnerable? Wouldn't one heavy bomb on her flight deck put her out of action?" you might ask.

"Of course she is a delicate lady; but so is the battleship, for that matter," replies the aviator. "Give us a big fleet of carriers, though, with lots of surface protection, and our torpedoplanes and bombers will rule the air and waters of the Pacific."

For every scourge or parasite, Nature seems to provide an antidote. The Japanese beetle has found a nemesis in the "milky disease" bacteria. A submarine has no chance against the destroyer's depth charges.

So, too, the aircraft carrier has its deadly counteragent: a superior enemy air force either land-based or sea-borne.

The *Illustrious*, one of the British aircraft carriers which attacked Taranto, was later put out of action and nearly destroyed when she

was caught by a cloud of Axis dive bombers based on Sicily, January 10, 1941 (page 7).

Because of what happened to the *Illustrious*, some feel that carriers are too vulnerable. But they forget the great victory at Taranto.

"Shore-based aircraft at Midway played a great part in the repulse of the Japanese," said Admiral Ernest J. King on June 7, 1942, when he reported the U. S. Midway victory.

To compare conditions in the Mediterranean and English Channel with the situation in the Pacific is like comparing one's front lawn with the broad expanse of a big municipal airport.

Vessels in European waters are under constant aerial reconnaissance. The enemy knows exactly where they are and when they come near can usually pounce on them with overwhelming numbers of land-based planes.

In contrast, the waters of the Pacific spread over a gigantic area, unconfined by huge land masses. In fact, most people hardly realize the tremendous water distances of the Pacific.

To control absolutely the Western Pacific, Japan would have to concentrate huge fleets of planes at many island bases; she could not pick out one strategic base for the whole area,



Drawn by C. E. Rindstedt

### Six Thousand Fighters, Torpedoplanes, and Bombers Would Blacken the Sky If They Flew in Mass over Their Hundred Carriers

President Roosevelt's demand for 185,000 airplanes for 1942-43 will be accomplished with some to spare. Big bombers can fly from their factories to the battlefields on the other side of the world in two or three days, but smaller combat planes must be sent in ships. With a big enough carrier fleet, these planes could be delivered "on the wing" ready to fight, rather than in crates in the holds of ships.

as the Germans have done at Sicily in the comparatively small Mediterranean.

In the vast Pacific fast ships, such as carriers, can literally hide and then, when ready, dart in and attack with impunity.

As a result, carrier flyers claim the Pacific is an ideal hunting ground and hide-out for their beloved ships.

#### Aircraft Carrier Is a Super Battleship

Let us consider the aircraft carrier for a moment. What is she, and what is the secret of her power?

To begin with, the usual carrier is a speedy vessel of perhaps 34 knots. She carries, in place of mammoth turrets and guns, a big flight deck overhead from which she fires her broadsides—scores of fast fighters, bombers, and torpedoplanes. Whereas a battleship's 16-inch rifles must be replaced with much inconvenience after firing about 200 rounds, a carrier's "big guns" can be put aboard or replaced at an hour's notice.

Also, a carrier's range and hitting power increase yearly in step with aviation progress. A battleship's turret guns, on the other hand, remain the same after her blueprint days.

Down below, the carrier has a vast hangar deck for storing and repairing planes. Instead of shells, she carries in her magazines a whole cargo of bombs, torpedoes, and ammunition. In addition, she is a veritable tanker, for she must not only carry fuel oil for her own propulsion but also huge supplies of high-octane gas for her fighting brood.

Don't for a minute think that a carrier is entirely unarmed. She fairly bristles with 5-inch and multiple pom-pom antiaircraft guns. You might call her a big flight-deck cruiser. But her fighter planes serve as her best defense by far.

She has a cruising range of many thousands of miles and requires no string of cargo ships to keep her supplied, as does a land base. When empty, she goes home and reloads, or she can refuel from an accompanying tanker.

"We like to think of our ship as a super battleship," an aircraft carrier pilot told me.

"When we fire our guns, we send many times the weight of explosive at the enemy that a battlewagon can, and, what's more, we can hit the target more than five hundred miles away. Think what a range of action that gives us! We hit and run, and the enemy never knows where our mother ship is."

Again and again in this war the tremendous striking power of the aircraft carrier has been proved. She has become the *real* backbone of the fleet.

Any battleship, unless she has command

of the air through her own sea-borne or land-based planes, stays clear of the aircraft carrier in 1942's war. Even then, if the battleship is caught napping with her air arm grounded, she becomes a "sitting duck," as carrier men say.

For instance, a surprise attack by two British aircraft carriers, the old *Eagle* and newer *Illustrious*, on the night of November 11, 1940, caught the Italian Fleet completely asleep in the snug harbor of Taranto.

Sending in their Swordfish torpedoplanes and bombers, these two ships scored hits on three battleships, sinking them in shallow water, and damaged several cruisers and destroyers. Here was a striking victory for a small carrier force against a large and powerful battle fleet.

#### Carriers Stop *Bismarck* after Battleships Fail

Read the story of the torpedoing of the *Bismarck*, May 24-27, 1941.

Her captain and crew were celebrating the sinking of the battle cruiser *Hood* a few days before. Then a patrolling Catalina, a flying boat developed by the U. S. Navy, spotted her through the clouds and spread the alarm.

Suddenly over the horizon buzzed a swarm of British torpedoplanes from the carrier *Victorious*. One "tin fish" struck home, and there was consternation on board the *Bismarck*, though damage was slight.

Next day planes from the carrier *Ark Royal* attacked again. This time they scored three hits. The *Bismarck* was crippled: one torpedo had struck her stern, jamming her rudders. She slowed and began steaming in crazy circles.

Soon the British Fleet closed in for the kill, and torpedoes from the cruiser *Dorsetshire* finished off the *Bismarck*, which her crew believed unsinkable.

To aircraft carriers, the *Victorious* and *Ark Royal*, goes the chief credit for this great victory over the mightiest battleship afloat. Two prides of the British Navy had tried and failed: the *Hood* was blown up, and the brand-new *Prince of Wales* was damaged and had to drop out of the running fight.

"Highly vulnerable" carriers, launching torpedoplanes, succeeded where "invincible" battleships failed.

On November 13, 1941, the gallant *Ark Royal* was torpedoed and sunk by a submarine, but not by a battleship. And later, the *Dorsetshire* was sunk in the Indian Ocean by Jap planes from carriers (page 1).

The tragic attack on Pearl Harbor, December 7, 1941, was a major victory for the aircraft carrier. It is believed that three or four

## Carrier Men's Vision of the Future

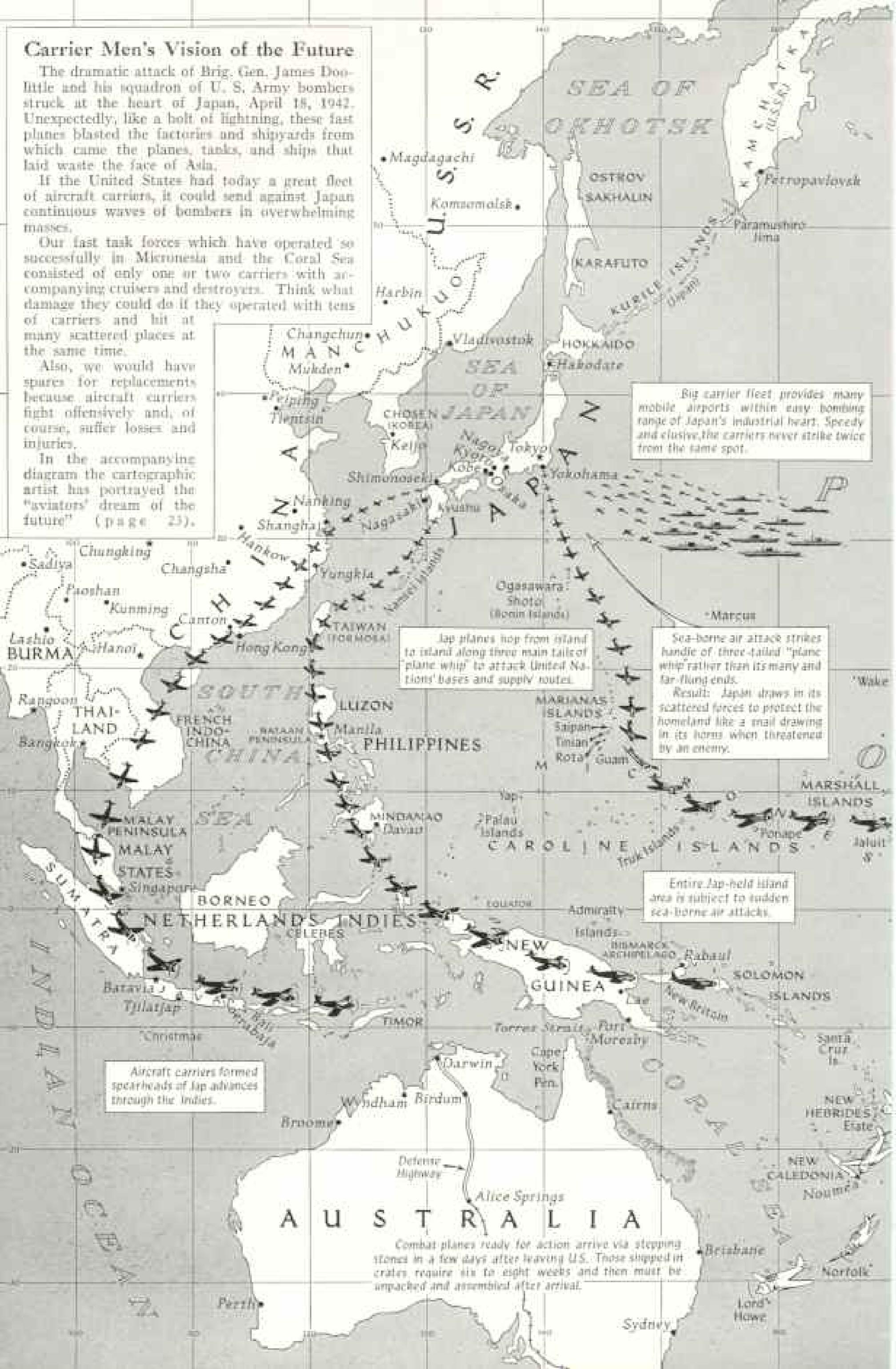
The dramatic attack of Brig. Gen. James Doolittle and his squadron of U. S. Army bombers struck at the heart of Japan, April 18, 1942. Unexpectedly, like a bolt of lightning, these fast planes blasted the factories and shipyards from which came the planes, tanks, and ships that laid waste the face of Asia.

If the United States had today a great fleet of aircraft carriers, it could send against Japan continuous waves of bombers in overwhelming masses.

Our fast task forces which have operated so successfully in Micronesia and the Coral Sea consisted of only one or two carriers with accompanying cruisers and destroyers. Think what damage they could do if they operated with tens of carriers and hit at many scattered places at the same time.

Also, we would have spares for replacements because aircraft carriers fight offensively and, of course, suffer losses and injuries.

In the accompanying diagram the cartographic artist has portrayed the "aviators' dream of the future" (page 23).



Big carrier fleet provides many mobile airports within easy bombing range of Japan's industrial heart. Speedy and elusive, the carriers never strike twice from the same spot.

Jap planes hop from island to island along three main tails of 'plane whip' to attack United Nations' bases and supply routes.

Sea-borne air attack strikes handle of three-tailed "plane whip" rather than its many and far-flung ends. Result: Japan draws in its scattered forces to protect the homeland like a snail drawing in its horns when threatened by an enemy.

Entire Jap-held island area is subject to sudden sea-borne air attacks.

Aircraft carriers formed spearheads of Jap advances through the Indies.

Combat planes ready for action arrive via stepping stones in a few days after leaving U.S. Those shipped in crates require six to eight weeks and then must be unpacked and assembled after arrival.



BERING SEA

ALASKA

CANADA

UNITED STATES

PACIFIC

Most of the year fog, storms, and icy weather hamper flying operations in North Pacific.

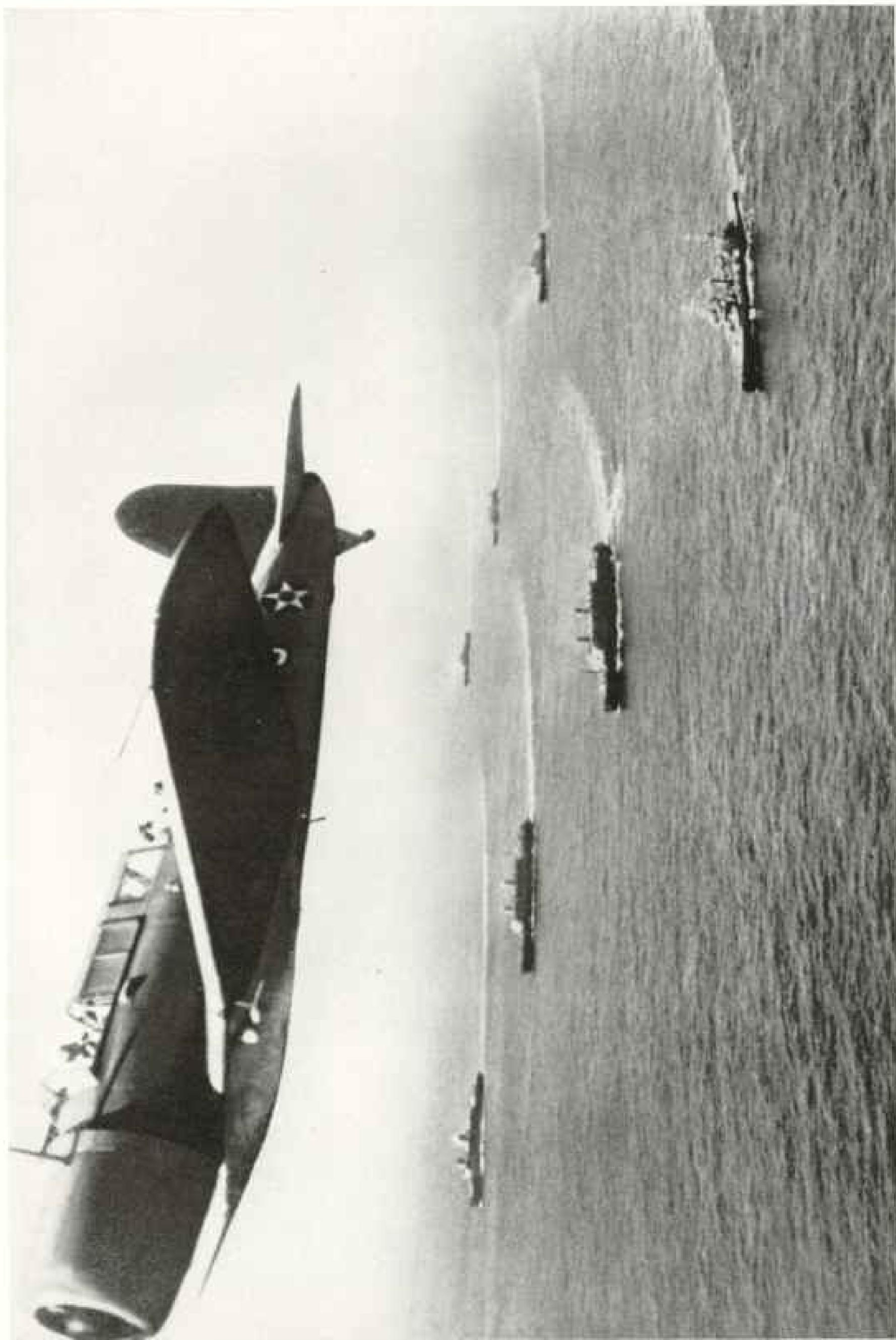
Swarms of combat aircraft stream across Pacific, pausing at three carriers and a dozen island stepping stones. Or, a thousand miles from their destination, cargo ships with flight decks unload their fighter planes "on the wing," then turn around and go home for another load.



Battleship Maryland had gun range of 19 miles when built in 1921. It is about the same today.

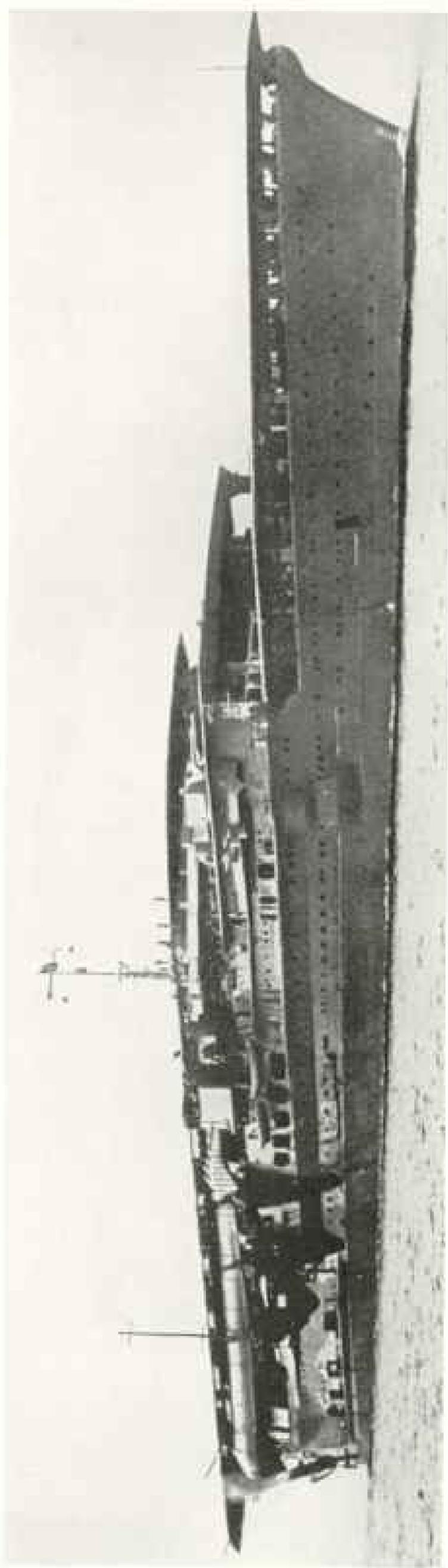
When built in 1927 the carrier Lexington had an aircraft fighting radius of 200 miles. Today it is over 500 miles.





Official Photograph U. S. Navy

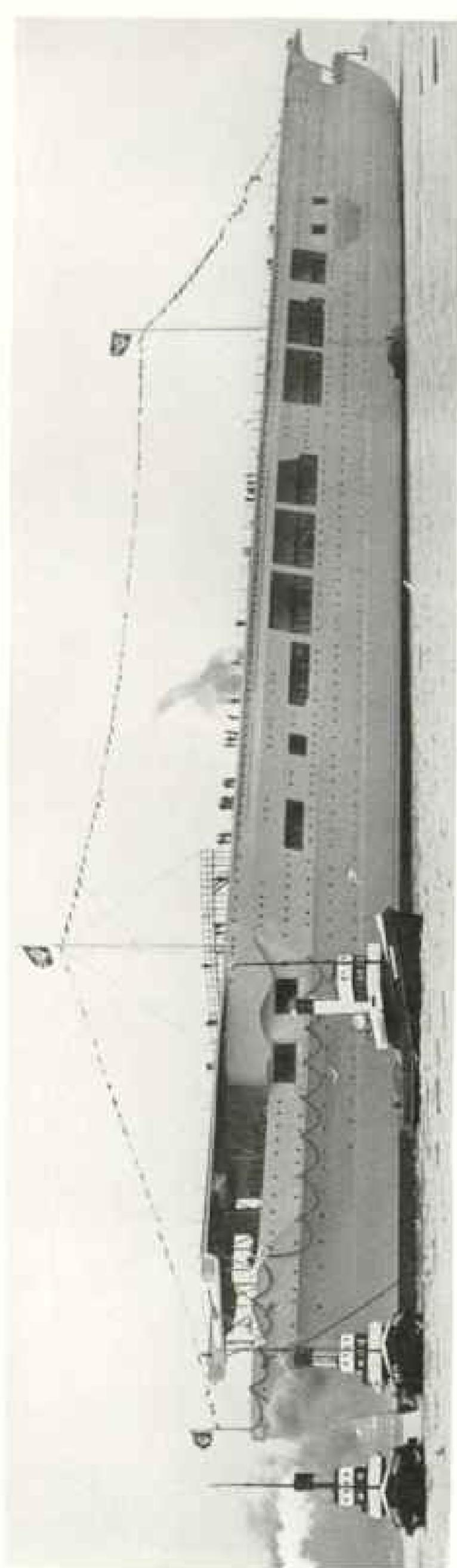
Eyes of a Carrier Watch over a Big Convoy Bound for "Somewhere on the Seven Seas"—A U. S. Scout Bomber on Patrol



Aerona

**Japan Had More Carriers Than Any Other Nation—Here's the *Kaga*, Reported Sunk at Midway**

In rough weather the lower flight deck became so wet with spray it was useless. Later, her upper deck was extended nearly to the bow. Originally the *Kaga* was laid down as a battleship of 39,000 tons, but in accordance with the disarmament Treaty of 1921 she was converted into a carrier. You can spot a Jap carrier by its clear flight deck with no tower at side (compare with page 5).



Entonant

**Where Is the *Graf Zeppelin*? Launched in 1938, Germany's New Aircraft Carrier Has Not Yet Figured in War Dispatches**

of these ships took part in this attack on America's Pacific Fleet.

While still two or three hundred miles away, these ships fired their heavy guns—torpedoplanes and bombers—at Pearl Harbor. They sank or capsized two battleships, the *Arizona* and *Oklahoma*, and damaged other capital ships and destroyers.

#### Jap Carriers Escape Unscathed after Striking Pearl Harbor

Units of the United States Fleet were at sea at the time, but they never caught the slippery enemy, which fled with speed.

Incidentally, this ability to do the disappearing act is one of the carrier's greatest assets and a wonderful protection from the enemy.

Distances are great in the Pacific and Indian Oceans, and there is so much water to patrol that a smart carrier fleet can attack, retire, and be hundreds of miles away before the enemy can locate it. Also, the enemy never knows beforehand, unless he has his own air patrols out, where these ships are or when their planes will come roaring over the horizon. Surprise and initiative are still the keys to victory.

Japan now controls Micronesia, a bastion of islands which encircle the heart of her empire.\* Using these as bases, her planes patrol the seas. No surface fleet, no matter how big and powerful, can break through this ring unless it can clear the skies overhead.

#### Picture Admiral Halsey Attacking with 100 Carriers Instead of One!

Look what Vice Admiral William F. Halsey's small task force, with only one aircraft carrier, accomplished in the raids on the Gilbert and Marshall Islands January 31, 1942, and later on Wake and Marcus.

Lieut. (now Lieut. Comdr.) Edward H. O'Hare and his mates in one day's attack downed 16 out of 18 enemy planes (page 21). Air power in those islands was destroyed for the time and the Japanese bases severely damaged.

Imagine, if you can, that instead of only one carrier, Admiral Halsey has a great fleet of a hundred or so floating airfields, some of them fast superships and others converted merchantmen. These would carry five or six thousand of the fastest, finest dive bombers, torpedoplanes, and pursuit ships in the world.

Now let Admiral Halsey take this fleet and drive across the Pacific in a vast wave. Of course his carriers, being vulnerable to submarine torpedo attack, are heavily screened by cruisers and destroyers. These speedy ships

weave in and out ahead of the fleet, looking for enemy craft so unfortunate as to be in the way.

Suppose Japan's main battle fleet should try to intercept him.

As soon as the Admiral's aerial scouts pick up the enemy, he sends off hundreds of fighters, with a few bombers for diversion. With overwhelming numbers, these harass the enemy continuously until all Jap planes are shot down or exhausted.

Then the Admiral sends off swarms of dive bombers and torpedoplanes—chiefly torpedoplanes. With their own air power destroyed, the Japanese battleships become easy targets—"sitting ducks."

The torpedoplanes, attacking relentlessly, soon sink the battleships or make them useless by driving them off. In such a major attack many planes may be lost, but, carrier men ask, "What difference does it make if you have won the battle?"

Now, with enemy air power destroyed, our main battleship fleet can follow up with little risk.

Protected by their heavy screen of submarines, destroyers, cruisers, and an air "umbrella" from their own carriers, these floating forts sweep in and mop up in the old-fashioned way what's left of the enemy.

At last, with only shore defenses to worry about, the Admiral lands troops from his transports and takes over the islands. Doubtless he will go around the strong points and land where he is not expected, as the Japanese do.

Or, with control of the air and sea in his hands, he might simply cut the long Jap supply lines and then wait for the bases "to die on the vine." Even if the Japanese can obtain oil from the captured Netherlands Indies, it won't do them much good if the American Fleet sinks their tankers.

#### Bell, Peary, and Mitchell Foretold Air Victories of Today

As far back as 1908, Alexander Graham Bell, inventor of the telephone, wrote: "The airship will revolutionize warfare . . . it may become a war-exterminating agency and thus end all armed conflicts. *The nation that secures control of the air will ultimately control the world.*"

THE GEOGRAPHIC's first article relating to the air was published in June, 1903—"Tetrahedral Principle in Kite Structure," by Alexander Graham Bell, then President of the National Geographic Society.

In fact, THE GEOGRAPHIC has printed 99

\* See "Hidden Key to the Pacific," by Willard Price, NATIONAL GEOGRAPHIC MAGAZINE, June, 1942.

articles dealing with aeronautical subjects, illustrated with 2,884 photographs, or enough to fill nearly two years of magazines. No other monthly can approach this record, excepting trade journals devoted entirely to the aviation industry.

When the doughty discoverer of the North Pole, Rear Admiral Robert E. Peary, wrote for the NATIONAL GEOGRAPHIC MAGAZINE in January, 1918, "The Future of the Airplane," some thought his words quoted below as fantastic as the writings of Jules Verne:

"We are now entering upon an era of air power—a stupendous era—which in the near future will be far superior to the greatest sea power. . . .

"The beginning of this era . . . presents to the United States, with its unique geographical position, its boundless resources, mechanical and inventive ability, and its splendid reservoir of ideal American manhood, the opportunity to be the *first air power of the world*.

"The eagle is our national emblem. Give us 10,000 fighting sea-eagles—far-seeing, swift-flying, steel-taloned—to render our coasts immune from the bloody 'killers' of the sea.

"Perfect a device—bomb, torpedo, or gun—that will enable a plane . . . to destroy a submarine on or just below the surface; then drill, and *drill*, and DRILL with this device until our airmen have the precision of the dead shot with his gun, the whaleman with his harpoon, and the cowboy with his lasso or revolver.

"Not only must America depend upon her air fleets to protect her from hostile sea fleets,



Official Photograph U. S. Navy

#### Vice Admiral Halsey Receives the Distinguished Service Medal

On the flight deck of a carrier in Pearl Harbor, Admiral C. W. Nimitz (left), Commander-in-Chief of the U. S. Pacific Fleet, presents the decoration. The citation read: "For distinguished service in a duty of great responsibility as commander of the Marshall raiding force, United States Pacific Fleet, and especially for his brilliant and audacious attack against the Marshall and Gilbert Islands on January 31, 1942."

but from air raids upon her cities, for . . . it (is) only a question of time before we shall be vulnerable to attack from above."

#### General Mitchell's Prophecy in GEOGRAPHIC Comes True

The NATIONAL GEOGRAPHIC for March, 1921, carried Brig. Gen. William L. Mitchell's famous article, "America in the Air."

So accurately did the General prophesy the future that I am quoting below some of his remarks which this war has fulfilled almost to the word:

"The effect of a bomb on an armored battle-



Official Photographer U. S. Navy

Billy Mitchell Was Right! Aerial Bombs Sank the Battleship *Arizona* at Pearl Harbor



U. S. Army Air Force

#### Effect of an Aerial Bomb Detonated on the Deck of a Battleship

"The turret is cracked and demolished; the whole deck is swept clean, and several decks down below smashed; the deck above blown off. The damage extended to practically all parts of the U. S. S. *Indiana*. A direct hit by an aerial bomb on a battleship will kill all personnel on upper decks, anti-aircraft crews, fire-control parties in the tops, or anyone standing on deck; will cause fire to break out, exploding all the anti-aircraft ammunition on upper decks, and sink or disable the battleship." (Thus wrote Brig. Gen. William L. Mitchell beneath this illustration for his article "America in the Air" in *The Geographic* for March, 1911.)



Official Photograph U. S. Navy

### "Bring on Some More"—U. S. Antiaircraft Gunners Down a Jap Bomber at Sea

The gun crew remains at its battle station aboard an aircraft carrier, after downing a Jap pilot who tried a suicide plunge on the flight deck (page 16). The action occurred during the Pacific Fleet's task force raid on the Marshall Islands. A near bomb miss riddled the gun's splinter shield with fragments and punctured a gasoline line, causing a fire. The flames were extinguished in a few minutes. The gunners were among 20 enlisted men promoted for their meritorious action.

ship is terrific. Not only does it cause great material damage, but it shatters all the navigating appliances, kills a great many of the personnel, knocks out all lighting systems, and stands a good chance of blowing the structure completely to pieces.

#### Battleships May Become Like Armored Knights of Old

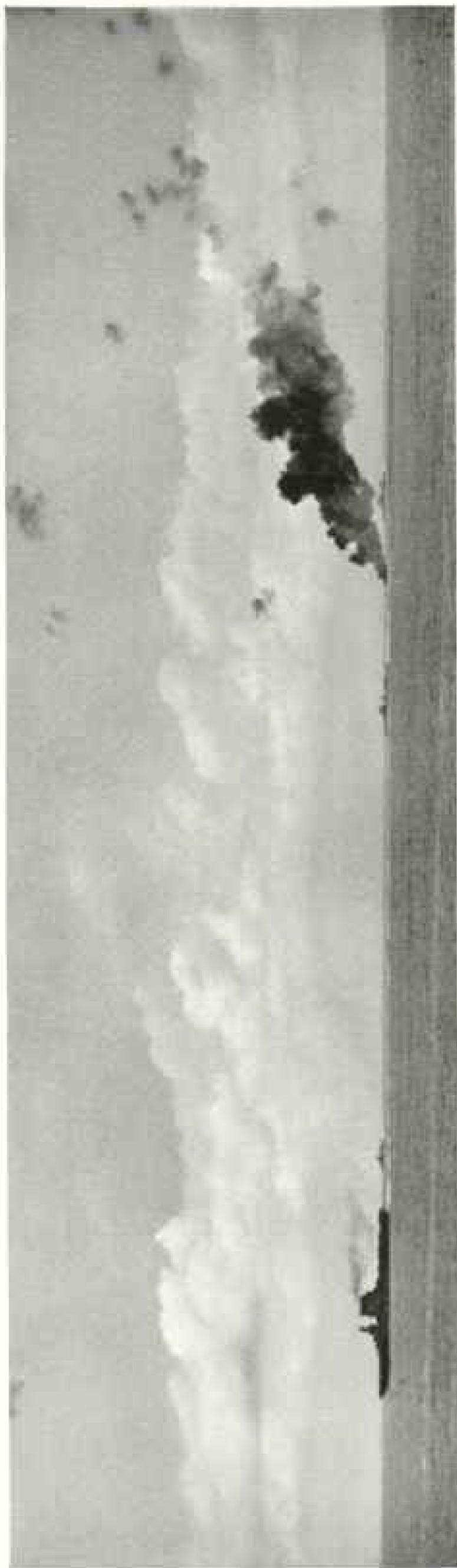
"The probability of hitting the battleship is very much greater than is the case with gunfire at a range of over 20,000 yards . . . (Accuracy at this range) requires airplanes to observe the fire and tell the (battleship) gun crews where their shots are falling.

"These airplanes, if of a bombardment type, would make many more hits than do the cannon.

"Compared to an airplane, these great vessels are very much like the knights in the Middle Ages, encased in their heavy armor, in which they could scarcely move, as compared to the light-armored foot soldier, equipped with a musket.

"As the airplanes undoubtedly will be able in future wars to control the surface of the water, an air force will be the key to the command of the sea.

"Furthermore, vessels of very high speed can be equipped to form movable airdromes, or airplane carriers, as they are called; and as these are not weighted down with armor or heavy guns, and as everything can be streamlined on them in a way that has never been done with battleships, a corresponding increase of speed is possible.



Alma

**A Close Shave! Smoke Plume Marks Spot Where a Crippled Jap Bomber Attempted a Suicide Dive on the Carrier at Left**

A few seconds before, the bomber, winged by a fighter pilot, was knocked down in flames by the ship's anti-aircraft gunners 200 yards short of its goal (page 15). Here the carrier speeds quickly away. Note "ack-ack" smoke puff above burning plane.



Official Photographs U. S. Navy

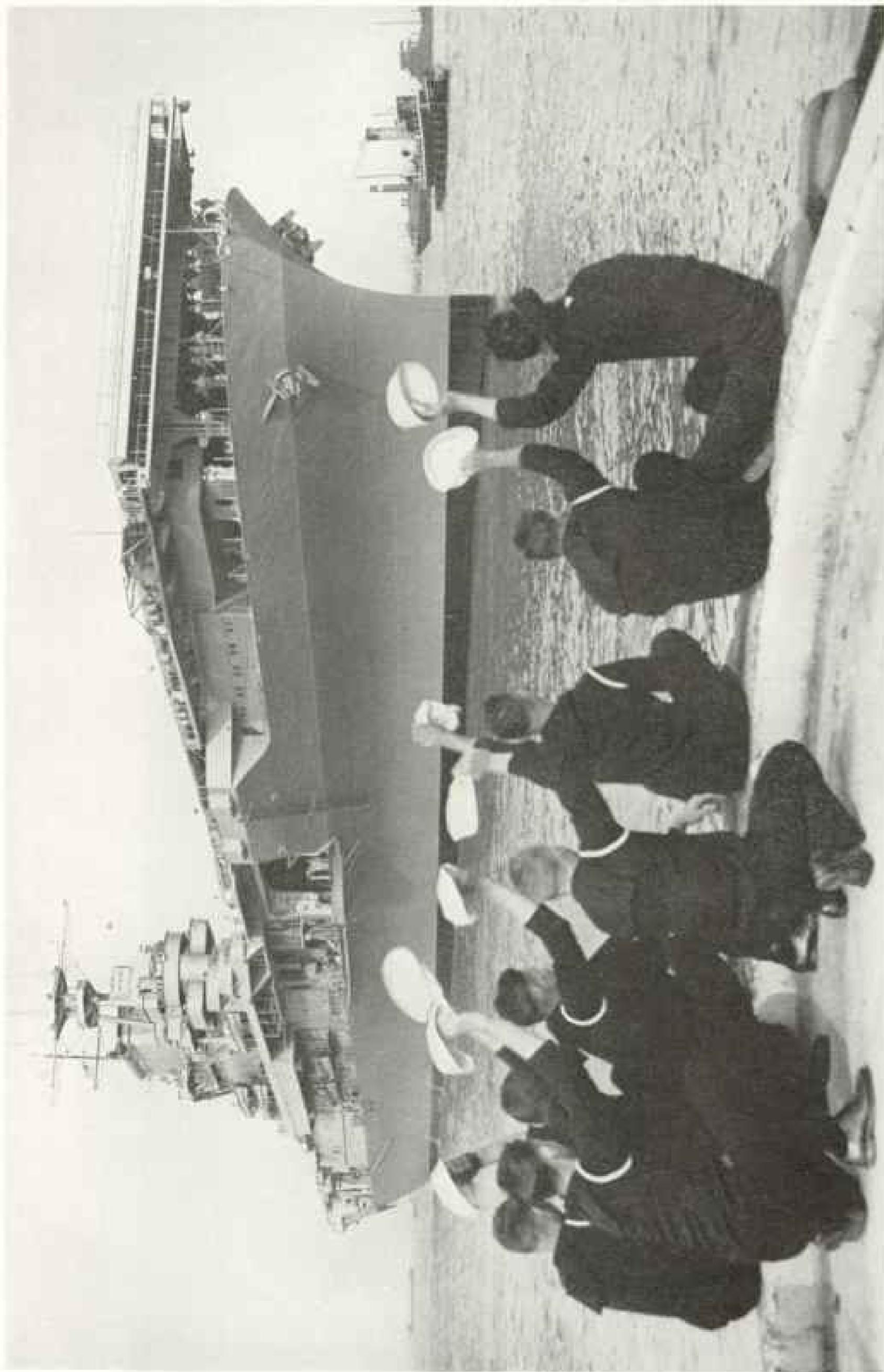
**Handling Crews Relax as a Fighter Plane Soars Smoothly into the Wind from the Flight Deck**



Official Photograph U. S. Navy

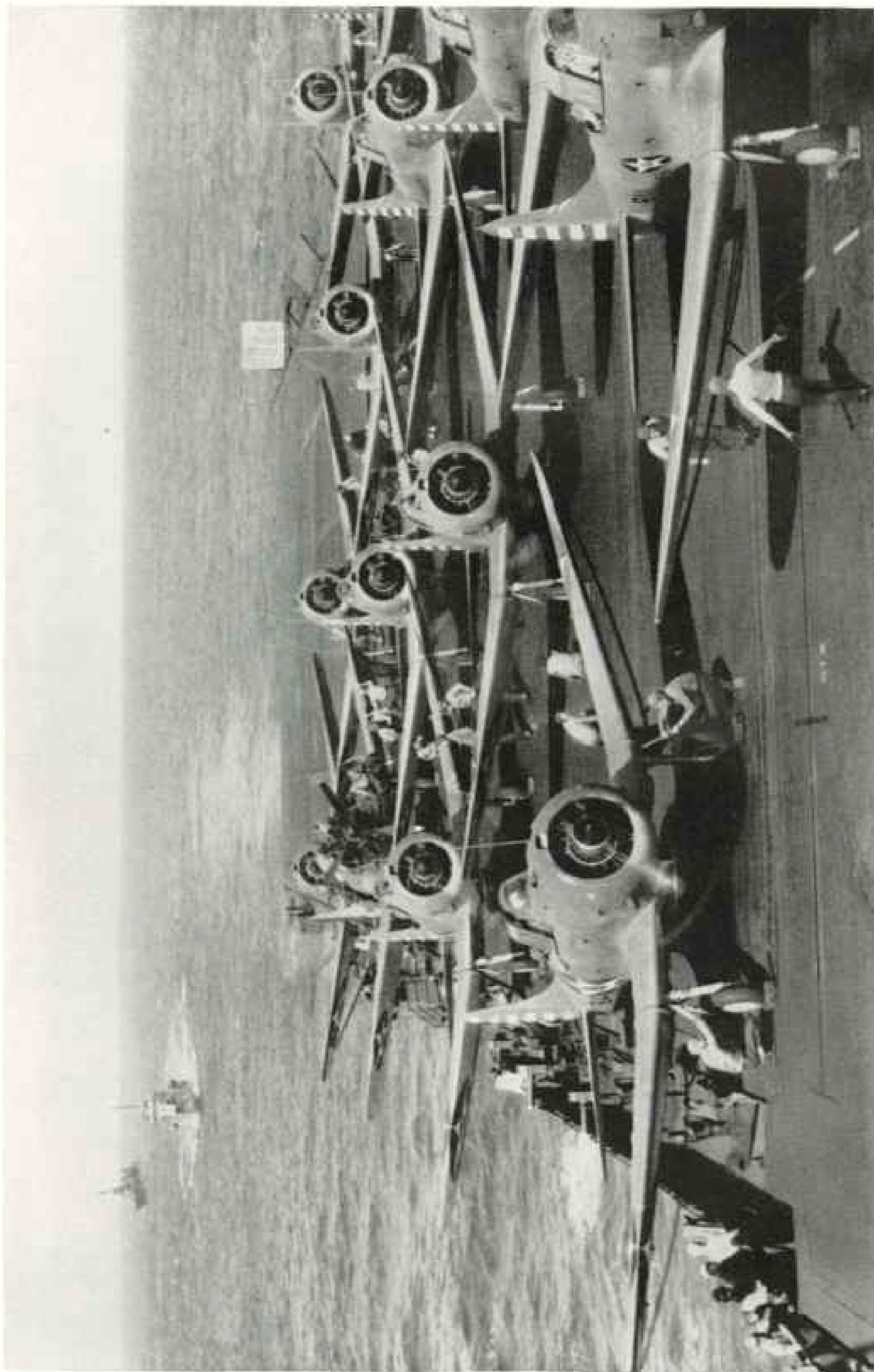
### Dispatcher Gives the "Go" Sign, and a Fighter Plane Sweeps Across the Deck for the Take-off

A carrier's air officer gives his orders through a powerful amplifier known as the "bull horn." "All hands man flight quarters stations," galvanizes the entire crew into action. At "Start engines," the din drowns out even the amplifier. The carrier heads into the wind. Planes taxi to their positions. One by one they slip past the bridge tower and these protecting 8-inch guns, then soar aloft.



International News

Hail to a New Queen of the Sea and Air—Sailors Greet the U. S. Carrier *Hornet*, Ready to be Commissioned



Official Photograph U. S. Navy

**A Tense Moment Before the Wake Island Attack—Mechanics Warm Up the Planes for the Launching**

In the distance, rolling easily, follow a screening destroyer and heavy cruiser. Shortly these ships will wade into the enemy in support of the planes overhead, shelling the Japanese guns and buildings on the island (page 20).



Official Photograph U. S. Navy

**A Torpedo Bomber from a U. S. Carrier Hovers Over Wake, Scene of the Marines' Heroic Stand Last December**

Far below the Douglas TBD lies the island sprawled around its lagoon. Columns of smoke rise at the lower left from burning Japanese oil stores, ammunition dumps, and new buildings. When this carrier task force broke off action on February 24, Wake Island was smashed and left a shambles (page 19).

"The same airplanes that are used over the land can be used over the water, both as a means of coast defense from land bases and from airplane carriers."

To emphasize his remarks, General Mitchell used as an illustration a dramatic picture of wreckage on the old *Indiana* (page 14), which had been bombed experimentally. The caption, which the General wrote, could almost do for the official Navy photograph of the *Arizona*, sunk by Jap airplanes at Pearl Harbor (page 14), or for the news story describing the bombing and sinking of the Japanese battleship *Haruna* by Capt. Colin Kelly of the U. S. Army Air Forces.

The General's chief inaccuracy was that he was too conservative. His description was mild compared to what actually happened to the *Arizona* at Honolulu, December 7, 1941.

In those days Mitchell was considered in-

subordinate for daring to foretell the future of aviation in terms too strongly divergent from the accepted beliefs of his time. He was demoted, then court-martialed and suspended from service for five years for having the courage to speak out and try to wake up America to the future of aviation.

The Japanese have in Admiral Isoroku Yamamoto a counterpart of our Billy Mitchell, with this difference: Yamamoto's advice was accepted, and he went on to command the Japanese Fleet.

**Yamamoto Foretold Power of Carriers in 1915!**

Admiral Yamamoto has been the driving force and master mind behind the Japanese Navy in its spectacular invasions.

Willard Price, familiar to readers of the NATIONAL GEOGRAPHIC MAGAZINE through his articles on the Far East, first met Yama-



Official Photograph U. S. Navy

**In This Grumman Wildcat Fighter, Lieut. Edward H. O'Hare Shot Down Five Jap Planes in Single Combat—February 20, 1942**

Five Japanese flags painted on the fuselage represent bombers credited to the Navy's first ace in this war, but he damaged one or two more. The planes were attempting to sink his carrier. President Roosevelt presented to Lieutenant O'Hare the Congressional Medal of Honor and announced his promotion to the rank of lieutenant commander.

moto in 1915 when he was a young officer in the Japanese Navy.

In an interview Price asked the budding admiral what he considered *the* war vessel of the future.

"The most important ship of the future will be a ship to carry airplanes," Yamamoto replied, and that was in 1915!

As he advanced in the Navy, this air-minded officer argued again and again in favor of aircraft carriers.

At the abortive London Naval Parley of 1934 he publicly said, "We consider the aircraft carrier the most offensive of all armament."

As time went on, Japan secretly built more aircraft carriers than she announced that she had. Big merchant ships were converted by adding flight decks.

Perhaps in her secret shipyards "behind

high walls" Japan was actually building carriers and airplanes while she was letting "slip" rumors of monster 60,000-ton battleships!

What a colossal practical joke this may prove to be! While the United States and Britain feverishly built huge ships to match the Japanese "battleships," the wily Japs were constructing a powerful fleet of airplanes and carriers.

When the war broke out, experts believed Japan had no more than seven carriers, with two more building; yet now it appears she had at least 15 and maybe more, or as many as the combined British and American carrier fleets put together.

Many United Nations' aviators, soldiers, and sailors who have fought Japanese carriers in scattered places at the same time feel that she has even more.

In an illuminating article, "America's Pub-



U. S. Bureau of Armaments

**At the Height of Her Glory as the Navy's Only Carrier, the *Langley* Plods Along Behind the Battleships**

Though slow and poky, the converted collier could launch 34 planes to protect the battle fleet and herself.



Official Photograph U. S. Navy

**With Her Flight Deck Cut Off Thus, the *Langley* Went Forth to Battle Japanese Bombers**

When Java was hard pressed and desperately needed planes, the *Langley*, packed with fighter planes, was sent to the island's relief. Sixty miles from her destination, Japanese bombers easily sank her on February 17, 1942. Her own planes could not take off from this abbreviated deck to destroy the enemy.

lic Enemy No. 2: Yamamoto," published in Harper's Magazine for April, 1942, Mr. Price tells of the rise of this Japanese admiral. His concluding remarks are particularly significant:

"Admiral Yamamoto and Admiral Suetsugu have been criticized in Japan for their emphasis on aircraft to the neglect of battleships.

"How," someone asked, "can you expect to destroy a battleship except with a battleship?"

"With torpedoplanes," replied Yamamoto, and he quoted a Japanese proverb: *The fiercest serpent may be overcome by a swarm of ants.*

"The sinking of the *Repulse* and *Prince of Wales* made his meaning clear."

It was this same Yamamoto who shortly after Pearl Harbor boasted, "I am looking forward to dictating peace to the United States in the White House at Washington."

#### Aviators' Dream of the Future

I will venture to make some further prophecies for aviation.

You might call this "the aviators' dream of the future."

Instead of attacking with "ripples" of 10 or 100 planes, as at present, thousands—yes, tens of thousands—of planes will be used in repeated and successive waves, like divisions of soldiers going over the top in a continuous charge.

When such a force attacks, no earth-bound army or battle fleet can stand against it. The defending force must have wings of equal power or face defeat.

Our fleet of the future, to gain this mastery of the air, will therefore consist mostly of aircraft carriers with a hard-hitting screen of cruisers and destroyers. Every ship of fair size will carry a deck overhead for launching planes.

Even if a tanker can carry only 10 or 15 combat planes on her deck, those few, added to the planes of other ships in the convoy, will give the fleet overwhelming air power. Too, they will serve as "big guns" in the tanker's defense.

The backbone of the fleet will be the huge all-purpose aircraft carriers as we know them today. Supporting these "super battleships" will be other carriers for special uses.

Navies of today have various kinds of warships, such as battleships, cruisers, destroyers, supply ships, etc. Each has a special task to perform.

So, too, the fleet of the near future will have many different types of carriers.

For instance, there will be a ship designed and built to launch a hundred or so tiny fight-

ers. These carriers will form the vanguard of the fleet to clear the skies of enemy planes. Perhaps they will have a few bombers for protection, but their main excuse for existence will be to *destroy* enemy planes.

Again, there will be a special carrier unknown today but vitally needed—the airplane transport carrier.

In the last days of February, 1942, the Dutch and their allies were fighting desperately to hold Java. Daily came such pleas as the following transpacific telephone request from Ensign Edgar F. Hazleton, Jr., in Batavia to his father: "I'm sure we can hold Java if only you send us some planes—fighting planes, dive bombers, bombers, planes of every sort."

The United States answered the call to the best of its ability. It had no spare carriers to send, but the old aircraft tender *Langley* was available. She had just escaped with hardly a scratch from Manila after being "sunk" three times in Japanese reports.

Now, the *Langley* was a sacred vessel to carrier men. She began life as a lowly collier, but in 1920-21 a flight deck was put over her and she became our first aircraft carrier. For years she served as an experimental and training ship for the Navy.

Many of the secret innovations which make her modern daughters so efficient were developed in the *Langley*. Some of our leading naval flyers qualified as carrier pilots on the *Langley's* flight deck.

But, after all, the *Langley* was still only a glorified collier, slow and poky. She could not keep up with the fleet. She was always in the way or holding up maneuvers. So, five years ago, believing her usefulness as a carrier was ended, the Navy cut her flight deck in half and turned her into a seaplane tender. In this emasculated state she could transport planes, but none could take off from her deck (opposite page).

#### Tragedy of *Langley* Shows Necessity for Plane Transports

When Java desperately needed fighter planes, the *Langley* was pressed into service. She was packed to the gills with planes, jammed below decks and squeezed on her flight deck, and sent with an escort of destroyers and the tanker *Pecos* to Tjilatjap, Java.

If these planes could reach Java in time, the Dutch might be able to hold out a little longer. But it was not to be.

Let me quote from the dispatch of George Weller, foreign correspondent of the Washington Evening Star and Chicago Daily News,



Official Photograph U. S. Navy

### On Northern Patrol, Snowplows Are Sometimes Needed to Clear a Carrier's Big Deck

In blizzards, fog, and stormy weather, flying operations are limited. Then the carrier must depend on her high speed and her accompanying destroyer and cruiser screen for protection. A Navy man can tell at a glance that this ship is under way, probably at sea, because her ensign flies from the peak, upper center. If she were moored, it would be set from the staff at her stern, with the union jack at the bow.

who interviewed the survivors of the *Langley* and *Pecos*:

"The *Langley's* last day began the same as those of the *Repulse* and the *Prince of Wales*, the lost warships of the Dutch Fleet, and ships in other engagements in the Southwest Pacific, by being discovered in the early morning by a carrier-based reconnaissance plane which wirelessed the ships' locations to shore bases.

"Coming apparently from Bali, nine Jap bombers attacked the *Langley* from a height of about 18,000 feet at 1:55 p. m. February 27. The bombing was accurate, even though the *Langley* set up a continual chattering reply from the 50-caliber guns on her bridge and the four 3-inch guns on the flight deck.

"The Japs took plenty of time, allowing almost 45 minutes for each of their three runs.

"Soon the *Langley* was irretrievably lost because she no longer had headway, her seams were opened, and water was gushing into her.

"Ironically, the *Langley* was carrying many P-40 fighter planes, the means of her own defense, above and below decks, but she could neither launch them aloft nor send them to Java, where they were needed as the life blood of the defense—for she was only a seaplane tender; that is, vessel adapted for transport but not for launching aircraft."

The *Langley* tragedy emphasizes the need for transport carriers to carry quantities of planes *ready to fly*.

### Airplane Transports Will Deliver Cargo While 1,000 Miles at Sea

Ordinary merchant ships could serve as airplane transports, if flight decks were added.

These ships would be veritable floating parking lots, but they could carry defensive broadsides in their planes, which would be deadly against the enemy.

If we had a fleet of such transport carriers,



Official Photograph U. S. Navy

### "On Deck, Sailors"—"Shake a Leg"—"Show a Sock." Bawls the Boston at Reveille

Most carrier men sleep in pipe berths, built three deep, which fold up in daytime. These sailors prefer old-fashioned hammocks and cots which are stowed in the nettings when not needed. Tables overhead are lowered for meals and recreation. Two thousand men live aboard a carrier, bunking in every nook and cranny.

we could today send quantities of Army fighter planes abroad quickly and efficiently. Instead of unloading crated planes at a dock whence they have to be trucked to an airport, the transport could launch her plane cargo 1,000 or 1,500 miles at sea, well out of reach of enemy bombers. The planes would fly to their destination with pilots aboard and in fighting trim, while their mother ship turned around and headed home for another load without risking her precious hull in the danger zone. Or the transport carrier could continue to port with the convoy, her planes giving air protection to the accompanying supply ships.

Accommodations for pilots, mechanics, and sailors on these ships would be meager. The men would live like sardines, as they do on any troop transport. Space now used on big carriers for wardrooms, spacious cabins, and messrooms could be used for stowing planes.

"Cut out the frills. Forget peacetime comforts," a carrier pilot told me. "Give us some ships designed as plane transports. Build carriers with two hangar decks if possible—anything to increase the plane capacity."

Then there will be the tanker carriers, equipped to refuel the air fleet and supporting surface ships. The ordinary tanker is a long, low ship with not much top hamper. Engines and stack are usually placed far aft and the bridge amidships or forward. A flight deck could easily be put over them.

Flight decks could be added to many other types of surface ships, thus increasing the combined air power of the fleet.

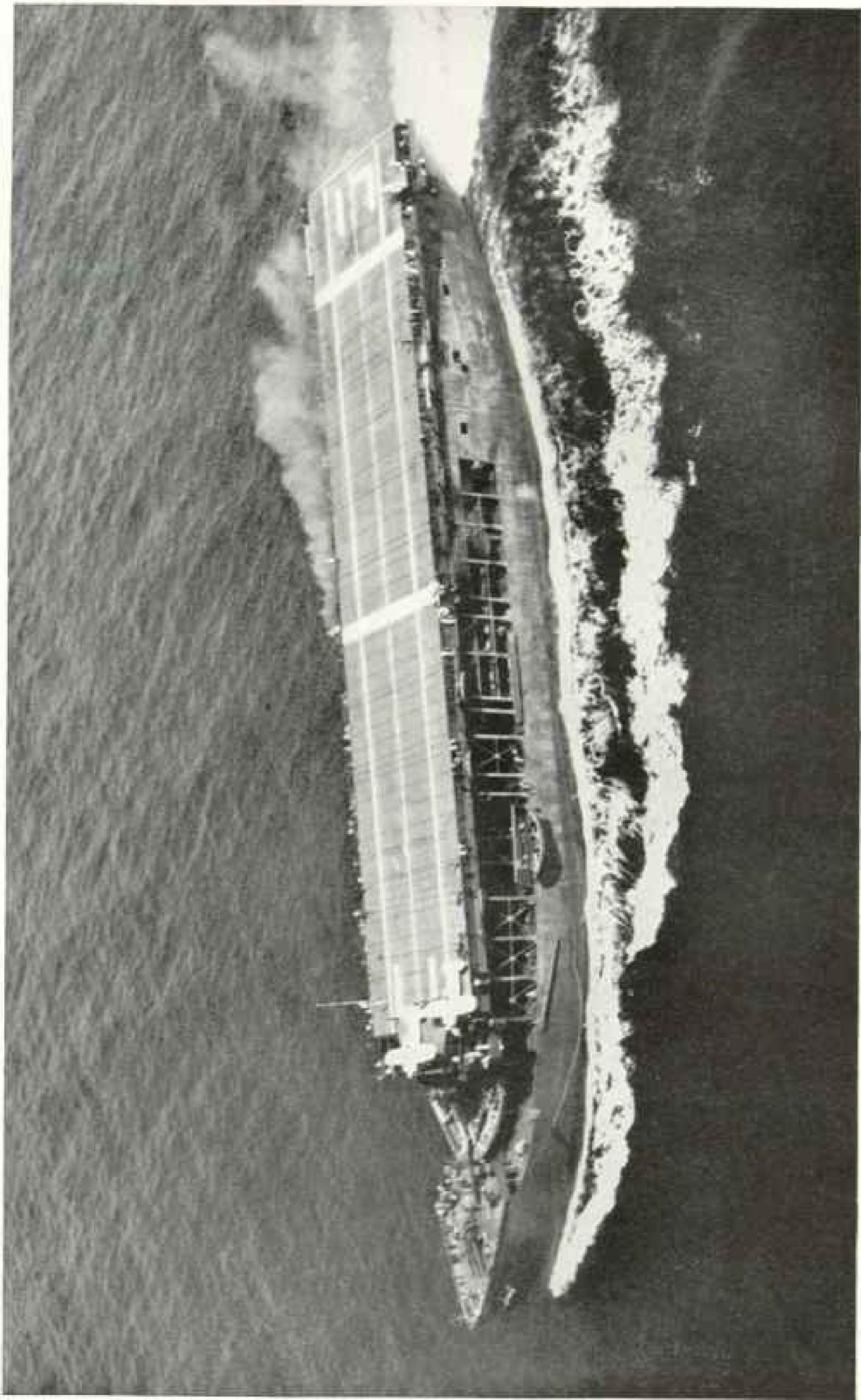
For instance, why not put a deck over big troop transports, doing away with promenade decks and tennis courts, and putting the bridge, masts, stacks, and movable derricks off in a tower at one side? The larger supply ships, too, could be converted.

The Japanese, we know, have put flight



Official Photograph U. S. Navy

“Heading for the Barn”—Torpedo Bombers Fly in to Land on Their Mother Ship’s Back; Destroyers Screen Her from Submarines



Official Photograph U. S. Navy

**Photograph of the First American Merchant Ship to Be Converted into an Aircraft Carrier—U. S. S. *Long Island***

Originally, this vessel was the 7,680-ton C-3 cargo-passenger ship *Mormacmod*. Flying operations on a small flight deck such as this are difficult. Only a few craft can be kept on the deck when planes are taking off or landing. Representative Carl Vinson, Chairman of the House Naval Affairs Committee, introduced a bill on June 3, 1942, providing for some 30 big, new carriers with their accompanying cruisers and destroyers. These are in addition to the 11 carriers now nearly completed or building. Many merchant ships, too, are being converted for launching and carrying airplanes, but the exact number is a carefully guarded secret.



British Consulate

### British Tars Hitch a Mechanical Mule to a Martlet Fighter

On the flight deck of the *Illustrious* a Grumman-built American fighter is towed forward to the "lift" for lowering to the hangar. Her wings fold back neatly like a bird's. This famous carrier launched torpedoplanes which helped cripple the Italian battleships at Taranto (page 7). Later she was damaged by Axis dive bombers and limped across the sea to Norfolk to be repaired by the U. S. Navy. She is now back in service.

decks on seven or eight big merchant ships, and probably many more. We are rapidly doing the same, but just how many ships we are turning into "covered wagons" is a carefully guarded secret (page 27).

#### Carriers Could Serve as Stepping Stones Across the Oceans

When we have enough carriers, a few could be stationed between our island bases—say 800-1,000 miles apart—as "stepping stones" across the Pacific or Atlantic (map, pages 8-9). Tanker planes could take off from these to refuel ocean-hopping Flying Fortresses in the air.

Big patrol seaplanes like the Catalina also could refuel *in the air* from tanker planes at these floating bases. Then they wouldn't have to come home so often for supplies.

In July, 1930, refueling planes kept Dale Jackson and Forest O'Brine aloft 647 hours. Think of that! They flew for 27 days without once touching the ground. N. B. Mamer and Arthur Walker flew from Spokane, Washington, to New York and back in one continuous flight with 11 aerial refuelings along the way.

Though these endurance flights may be

classed as stunts, they prove that refueling is feasible in the air and that planes can be flown nonstop for long distances. Why not turn these feats to military use, so that big planes can fly in a hurry from California to the Philippines or Australia?

Stopping off at the carriers and our island bases, Navy-type fighter planes could fly across the Pacific in a continuous stream. At each floating or land service station the planes would be refueled and the engines checked while the pilots rested. Perhaps a fresh pilot could take the plane across the next hop.

Of course these planes would have to be equipped with arresting hooks for landing on a carrier's deck, and the mobile "landing fields" carefully protected from submarines by a destroyer screen.

#### Fabricate Carriers Like Liberty Ships!

"Naturally, such a ferry service would be dangerous, and planes would be lost," my pilot friend said. "But we could do it if we had to get planes across in a hurry. In wartime we shouldn't overlook any possibility."

"But how can we possibly build so many carriers?" I asked him. "It takes two years



AP from Press Association

### Next Time the *Seward* Cruises Lake Erie, She'll Carry Planes on Her Back

Tied up at Cleveland's Ninth Street pier, the famous 29-year-old side-wheeler loses her fourth, or upper deck. The 454-foot Lake craft carried as many as 2,500 vacationists at one time. Soon she will become a U. S. Navy training carrier. Over Lake Erie young flyers will learn how to land and take off from the mother ship. They will practice under wartime conditions, except that the usual screens of protecting destroyers will be missing.

at least to commission a new one now."

"Frederick Simpich in the May, 1942, NATIONAL GEOGRAPHIC told how the U. S. Maritime Commission is building 2,000 assorted ships in 1942 and 1943," he answered. "Convert a hundred—or better still 200—of the largest and fastest of these into carriers. After all, these ships would not be missed because they will be used to carry crated planes, anyway. Put a flight deck over them and they will deliver their cargoes *on the wing*."

"Let's fabricate carriers like our new mass-produced Liberty Ships."

"Ah, yes, but you overlook the pilot problem," I said. "I understand it takes months, even years, to train flyers to operate from carriers."

"Not a bit of it! Don't think you have to be a superman to land on a flight deck," replied my carrier friend. "Why, any good Army combat pilot can learn in two weeks. His chief difficulty would be aerial navigation. He would have to brush up on that."

"The Army is training tens of thousands of pilots," he continued. "Let some of them go across the seas with their planes aboard our new carriers. Then, when they near their

destination, they get into the air with their guns ready—no chance for a *Langley* disaster there!

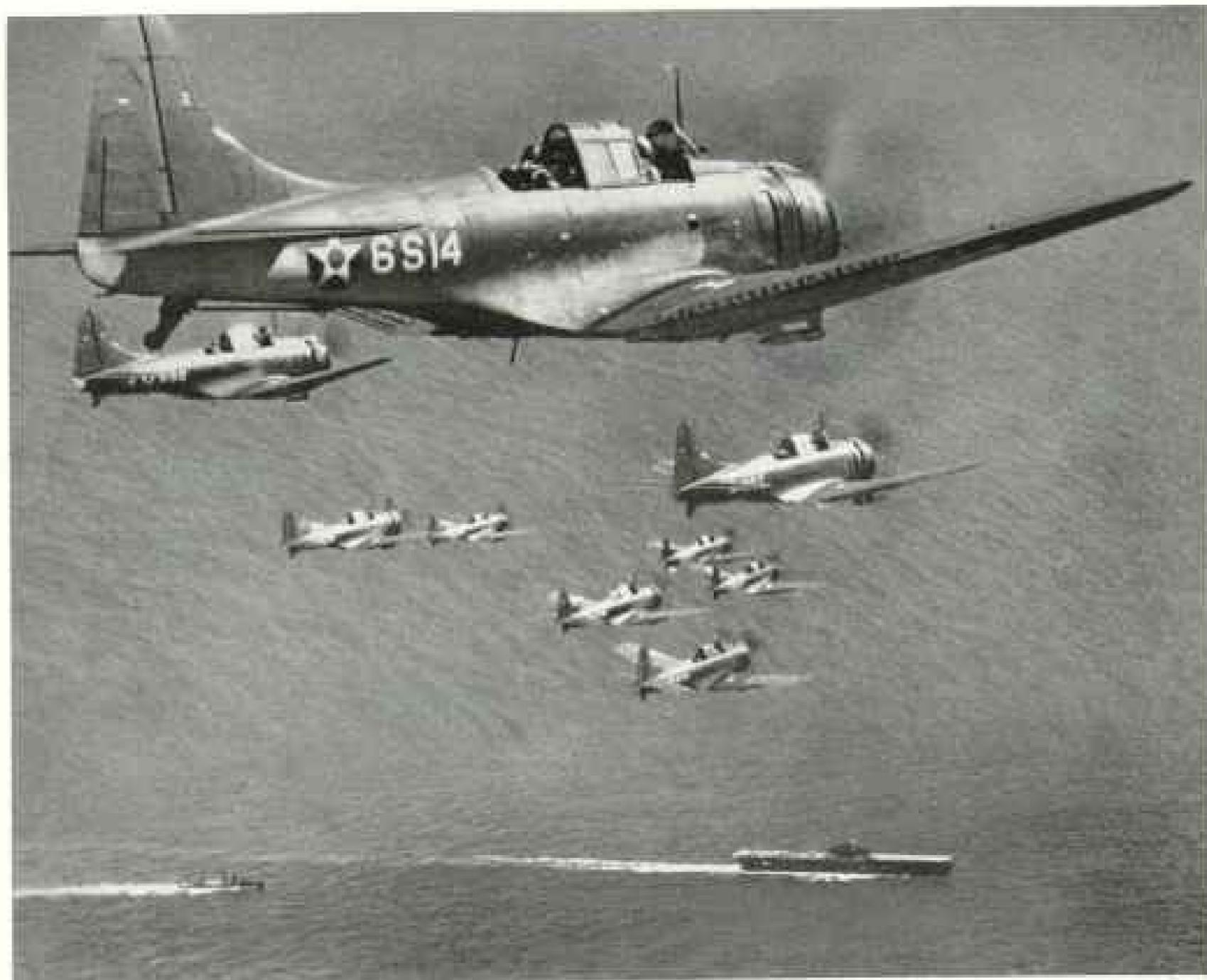
"As a matter of fact, a good Army flyer could be taught first to land on a carrier and then fly a ship across the Pacific via your stepping stones in shorter time than it takes to send that plane to Australia crated in the hold of a cargo ship and then assemble it."

### 100 Hidden Airports Within Range of Tokyo!

Supposing some Genie should say to the people of the United States, "I can deliver for you within 300 miles of Tokyo 100 airports complete with runways, hangars, repair shops, and airplanes ready to fly. Could you use them?"

"Don't be absurd. Off Japan lies some of the deepest water in the world—six miles of it! How could you possibly build airports there?" an incredulous citizen would ask. "But if you could, we would pay you anything—half the gold at Fort Knox."

"Oh, but you wouldn't have to spend a nation's ransom. A mere five billions would do. Build 100 or more aircraft carriers, protect them well, and, presto, overnight you could have your 'airports,' within striking distance



Official Photograph U. S. Navy

### A Carrier Puts Up Her Air Umbrella

Here a dive-bombing squadron circles the mother ship. The planes might be waiting for a signal to dart out and attack an enemy picked up by a scout far over the horizon. Others are still taking off from the flight deck. The remaining planes will have to be moved forward before this squadron can return aboard.

of your enemies. What's more, they would be there today and gone tomorrow—the ideal hide-out for airplanes."

"But if we could do that, the enemy could, too, off our coasts. What then, Genie?"

"Don't worry, that won't happen to you. President Roosevelt's 185,000 planes will take care of that. There's *your* protection."

To Rear Admiral Bradley A. Fiske goes much credit for the carrier's success. It was this farseeing American officer who, in 1912, invented the torpedoplane, the carrier's most potent weapon.

Just before he died, on April 6, 1942, the Admiral wrote for the U. S. Naval Institute Proceedings, May, 1942, an illuminating article, "Air Power 1913-43." He concluded his swan song with these prophetic words: "The air battles for the control of the Atlantic and the Pacific of the near future may dwarf the greatest battles held so far."

Conservative people may say that our big carrier program cannot be completed in

time or that it sounds utterly fantastic.

But nothing is fantastic or impossible in this age to American industry.

When our mighty fleet of carriers with its armada of planes steams across the Pacific—let the Japanese beware.

From our massed planes will fall such a deluge of shells, bombs, and torpedoes as the world has never seen.

Japanese ships and planes will be annihilated. The evil yards and factories that built them will be wiped forever from the face of the earth.

Following in the wake of our airplanes and their carriers and our battle fleet, our massed armies will march in and mop up in such a continuous tidal wave that the Japanese advances to date will seem as child's play.

No, Admiral Yamamoto, you won't dictate peace in the White House at Washington; but the President of the United States, Franklin D. Roosevelt, will. Our conquering pilots, sailors, and soldiers will see to that!

# War Awakened New Caledonia

Swift Changes Take Place on the South Pacific Island of Mineral Wealth  
Defended by Free French and American Troops

BY ENZO DE CHETELAT

**M**ANY an American soldier and sailor has been getting acquainted with New Caledonia, big cigar-shaped Free French island whose name sounds strangely Scottish.

Captain James Cook discovered it in 1774, and its mountains so reminded him of Scotland—Caledonia—that he named it accordingly. But even the great English navigator, impressed though he was, could hardly have foretold how important a part that South Pacific island was to play in our modern world.

Both geography and geology decreed a notable destiny for New Caledonia. It flanks the lifeline over which men and equipment have been pouring from the United States to Australia (map, page 43). And in its ancient rocks are found rich deposits of nickel, chromite, cobalt, iron—all sorely needed in war (pages 42, 50-52, and Plates I and IV).

Today the mines are booming, and American troops, warships, and planes, with the approval of Free French authorities, now assist in the island's defense.

At the stores in Nouméa, the capital, French products are no longer obtainable. Australian and, more recently, American goods are being substituted. California wines, American cigarettes, toothpaste, and other commodities make the local shops look almost like stores on Main Street, U. S. A.

## Massed Mountains and Red Plateaus

Travelers in peacetime can fly to New Caledonia, for Nouméa is a stop on the regular route of Pan American clippers flying between the United States and New Zealand (page 48).

At sunset of an austral summer day at the end of January, 1941, Reddy, our snappy steward, announced, "In 20 minutes we will be in Nouméa."

I saw through the small window of the giant Pan American clipper the mass of mountains and the red plateaus of New Caledonia. To me the familiar landscape brought back memories of my previous trips by foot and horseback through the desolate but rich mineral sections in the south of the island.

The deep blue of the open ocean contrasted with the pale green-blue of the lagoons and the white foam of waves breaking against the outer belt of coral reefs.

As the clipper climbed high to avoid the cloud-ringed mountain tops of the central chain, I made a quick change from my khaki shorts and blue sport shirt, which had been the ideal attire during two hot days on Canton Island, and donned more formal clothes.

Provincial France, even in the South Pacific, expected dignified dress on important occasions, and I knew that several officials of my company and friends would be waiting for me.

Through the thin lower clouds, patches of red roofs, water, and gardens outlined the town of Nouméa, capital of New Caledonia. After circling around, the clipper slid smoothly into the water and taxied toward the airport of Nouville.

## Flags of Free France Wave Here

Under the big tricolor on the pier's flagstaff floated a blue fanion with the red cross of Lorraine, insignia of the Free French Government. This insignia was embroidered on the left side of the tunics of young soldiers who cheered us from the steps of their barracks, former living quarters for the penal colony of 40 years ago.

Going across the bay by launch from Nouville to Nouméa, I asked why there were three big Japanese freighters in ballast. I was told that by order of General de Gaulle no more iron or nickel ore could be exported from New Caledonia to Japan. The ships would have to return with empty holds.

Further conversations with my friends made me realize that many changes had taken place since my departure seven months before.

The fall of France in that fateful June of 1940 had wide repercussions in her distant Pacific possessions, particularly in New Caledonia.

During the first nine months of World War II, few changes had been noticeable here. The only obvious differences had been some uniforms in the street, and the cancellation of the horse races and the September festivities, held in honor of the colony's founding on September 24, 1853. The arrival of the mail steamer from France had continued to be an important event. French magazines and Paris styles had kept femininity busy for several days after the unloading of

these boats, which came every six weeks. Visitors from Australia could ransack the local shops and buy French perfume, lingerie, and champagne at one-third of Sydney prices.

The island was tremendously affected by the fall of France. Nouméa lost its nonchalant atmosphere. Gloom and despair were on every face, even on those of the native Kanakas, who consider themselves a part of the big French family.

When General de Gaulle resolved to keep up the fight against the Axis, he found practically everybody in New Caledonia on his side. Only the Governor, a few Army officers, and bureaucrats sided with Vichy. Under popular pressure the pro-Vichy group had to leave the island (pages 46, 47).

The French High Commissioner of the New Hebrides was called by the Free French Committee of New Caledonia to take over the administration of the island. This was confirmed by his appointment as Governor by General de Gaulle (Plate III).

The fact that New Caledonia rallied to the Free French movement was important to the strategy of the United Nations in the South Pacific. Had this island followed the example of French Indo-China, undoubtedly Japan would have obtained from Vichy permission to set up naval and air bases there.

New Caledonia, along with the Loyalties and the New Hebrides, is so strategically located that any help from the United States to the British dominions in the South Pacific would have been seriously handicapped and menaced from the moment war broke out.

#### Mining, the Wealth of the Island

New Caledonia, for its size, has been showered with mineral wealth comparable to few other places on earth. Copper, gold, coal, cobalt, and iron are found, but nickel and chromite are the real wealth of the country.

Since the 1870's the island has been producing nickel, and up until the beginning of this century it was the most important nickel-producing country in the world. Canada, with her new mines, has since overshadowed New Caledonia in nickel production, but the big demand in the last five or six years, particularly for war materials, has revived mining and prospecting in the island.

Chromite is also of great importance. The United States' customary supply from Turkey is almost entirely cut off, and the Philippine mines are no longer under American control. Now the United States has to rely on what she can get from Southern Rhodesia, South Africa, Cuba, her increasing home production, and New Caledonia.

For a decade Japan has tried to gain an economic foothold in New Caledonia to obtain strategic minerals. Dummy French companies were started, their capital and management in Japanese hands. Just before the war the shipment of iron ore to Japan was increasing at a tremendous pace. Shortly after the advent of General de Gaulle, that was stopped.

The nickel mines of New Caledonia are in reality open quarries. They are located in the mountains, generally at an altitude of 800 to 2,000 feet. From them the views overlooking the sea and the ridges are stupendous (Plates I and IV).

Working here is wholly unlike work underground with poor light and little ventilation. But on days when the sun beats hot, or under a tropical downpour, deep underground mines—as some of the chromite mines—would not seem so bad after all.

#### Old Prospectors Tell Tall Tales

All mining communities have their quota of old-time prospectors, and New Caledonia is no exception.

On my trips all over the island I passed many evenings with these old fellows, swapping tales and learning about the days when the mines were worked partly by convict labor. Besides the usual stories of marvelous strikes and the sensational luck of the narrators, I heard descriptions of escapes by the convicts and meetings with bands of fugitives in the bush.

In one of my prospecting crews was a veteran named Camille. He had no book knowledge of chemistry or other sciences, but he could spot any good outcropping by the shape of the mountain or by its vegetation. He would pick up any piece of ore, scratch it, weigh it in his hand, and tell the nickel percentage. Most of the time he was right.

After a month or so of rough life in the mountains, where I traveled by foot and horse, a trip back to the city of Nouméa was a pleasant change. From the northern section of the island, where I worked in 1941, it was a full day's drive by car over graveled roads to reach the town. Nouméa, with its 12,000 inhabitants, looked to me like a metropolis.

Anse Vata, the bathing resort, was a short distance from town. Here, during the hot months, most of the white population would congregate. Except for the background of palm trees, the beach might have been situated on the coast of Normandy.

Regularly at sunset a land breeze springs up, bringing swarms of hungry mosquitoes. The bathers retire quickly, leaving the beach to these pests, and return to town—some to

## South Sea Isle of Mineral Mountains



**A French Prospector with His Tonkinese Helpers Explores a New Nickel Strike.** New Caledonia is second only to Canada in production of this metal. High in the mountains are the mines. The ore is found near the surface as a natural concentration caused by weathering of dull-greenish serpentine rock.



© National Geographic Society

Endo/Armas by Enzo de Chiaris

### **Javanese Women Grading Nickel Ore Wear Men's Hats as Sunshades**

Mined in open quarries, the nickel-bearing rock is painstakingly sorted by hand. Gay sarongs of female workers contrast strangely with the male headgear provided by mining companies as protection from the tropical sun.



© National Geographic Society

**Free French Soldiers Guard New Caledonia: Decorating an Officer for Valor**

Guard of honor, in this ceremony at Nouméa, is a line of New Caledonian veterans of World War I. One bears a specially inscribed tricolor flag. At attention in the background stands a company of Melanesian volunteers from the Loyalty Islands.

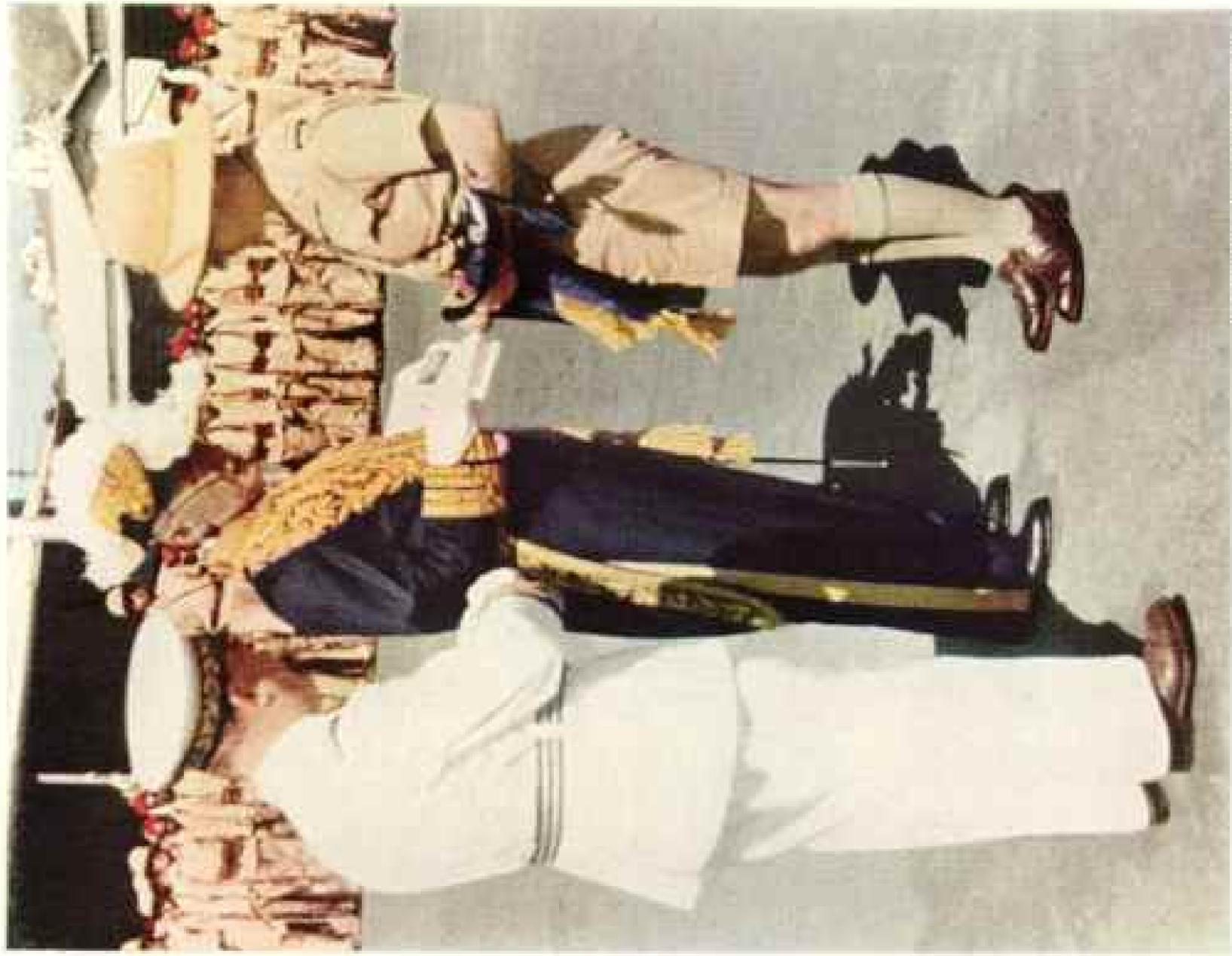
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**This Stalwart Tahitian Fights for the Free French**

On his overseas cap he wears the Cross of Lorraine, insignia of the armies of General de Gaulle. Beyond are officials reviewing troops at Nouméa.



Reproduction by Einar de Christoff

**Local Betsy Rosses Made the Flag Being Presented Here**

The officer in shorts receives the standard from an envoy of General de Gaulle. At left is M. Henri Sautot, Free French Governor of New Caledonia.

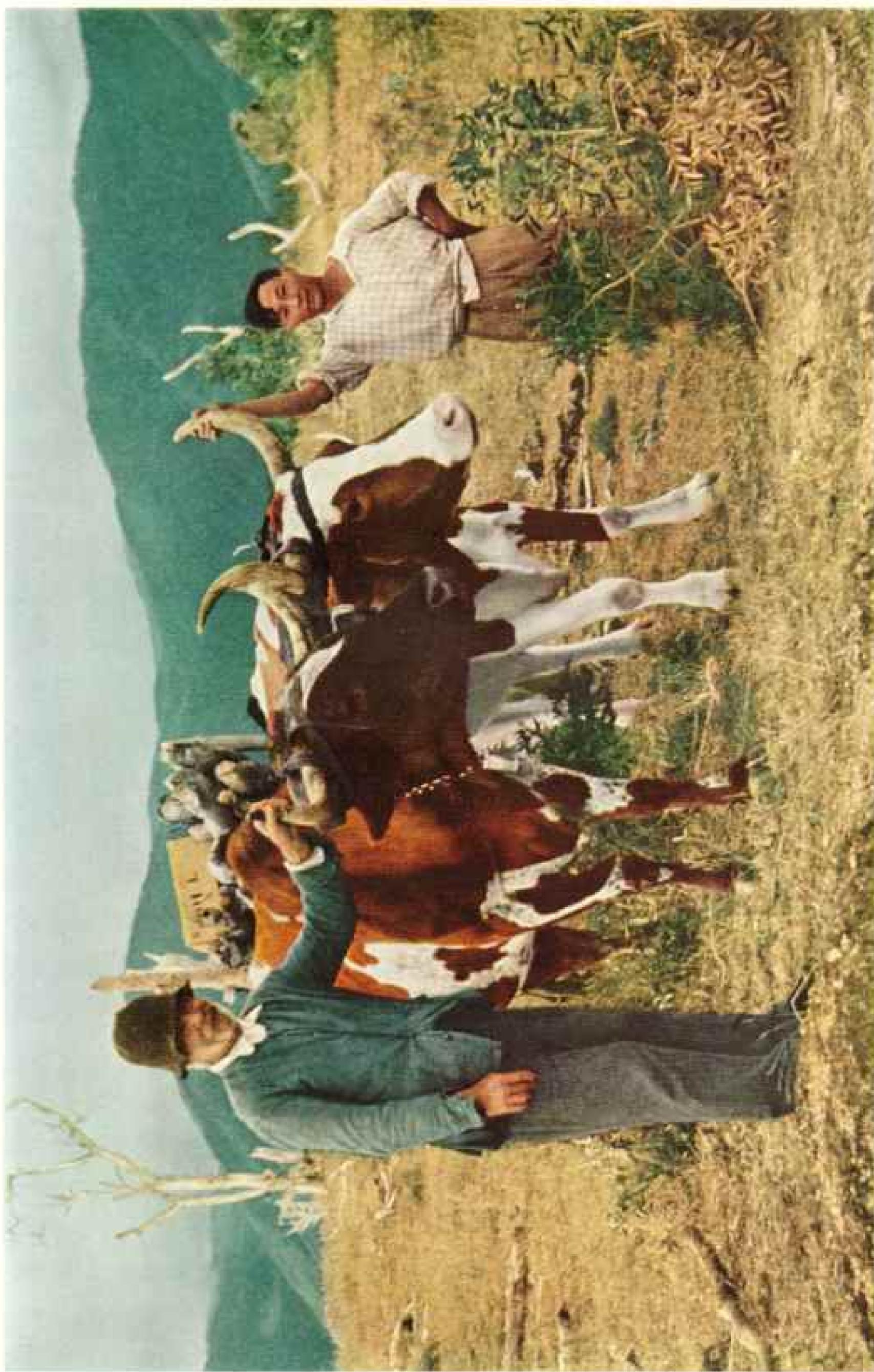


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### Nine-tenths of Nickel-rich New Caledonia Is Wildly Mountainous

Illustration by Blake de Christoforo

In the foreground an abandoned quarry shows the terraces made in digging the ore, which crops up on the surface. The island has few underground mines. Some of the ridges in the distance have been ravaged by forest fire, and on the grass that sprang up in its wake thousands of roaming cattle graze.

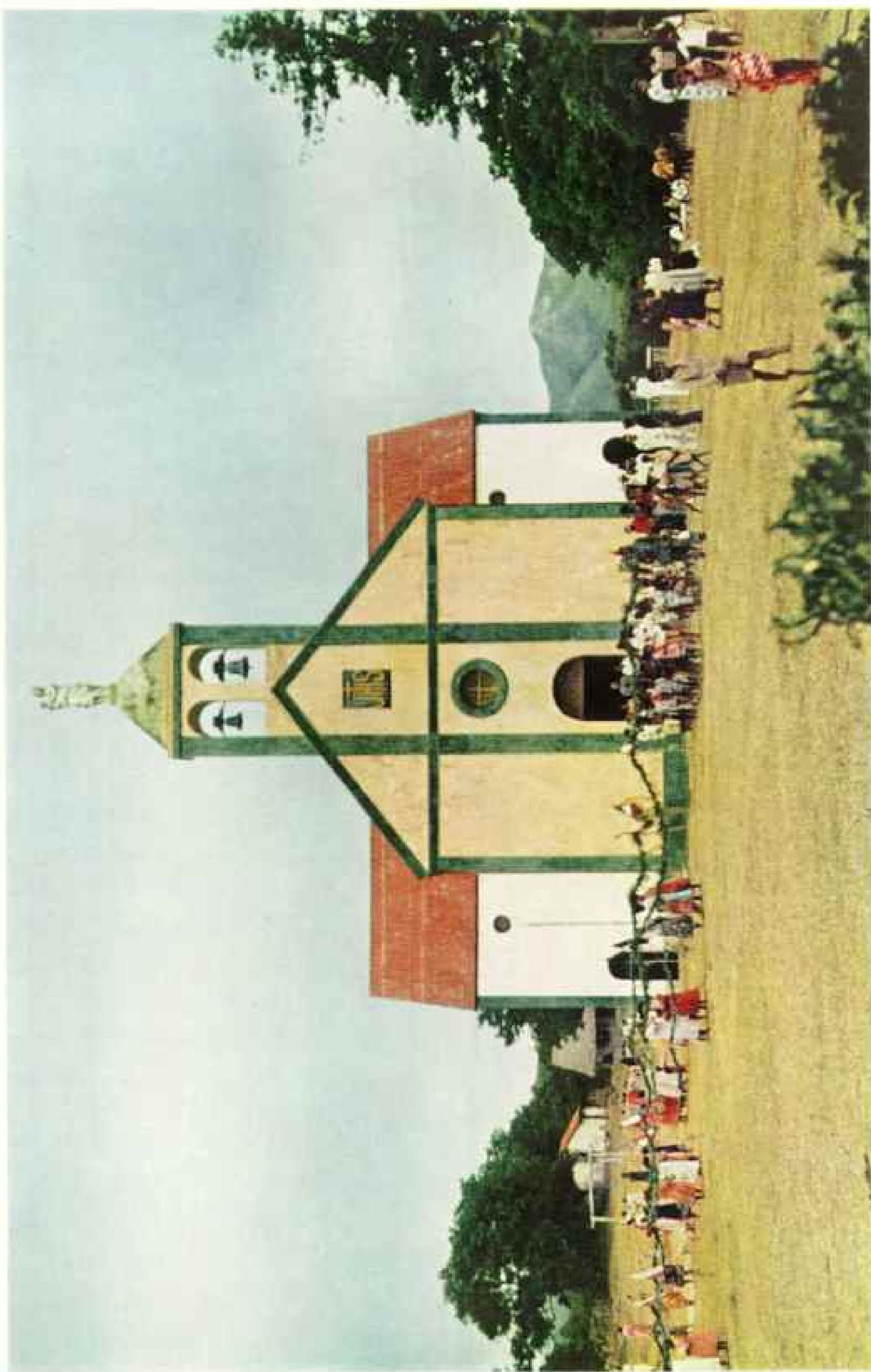


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### Rural France in the South Pacific

Here, across the world from the land of his birth, an old colon, or settler, of pure French stock lives a life similar to that of the peasant farmers of the mother country. The ox team is used for plowing and for hauling wood. Triumphantlly atop the load is borne a box of imported apricots.

Reproduction by E. J. de Chatelet

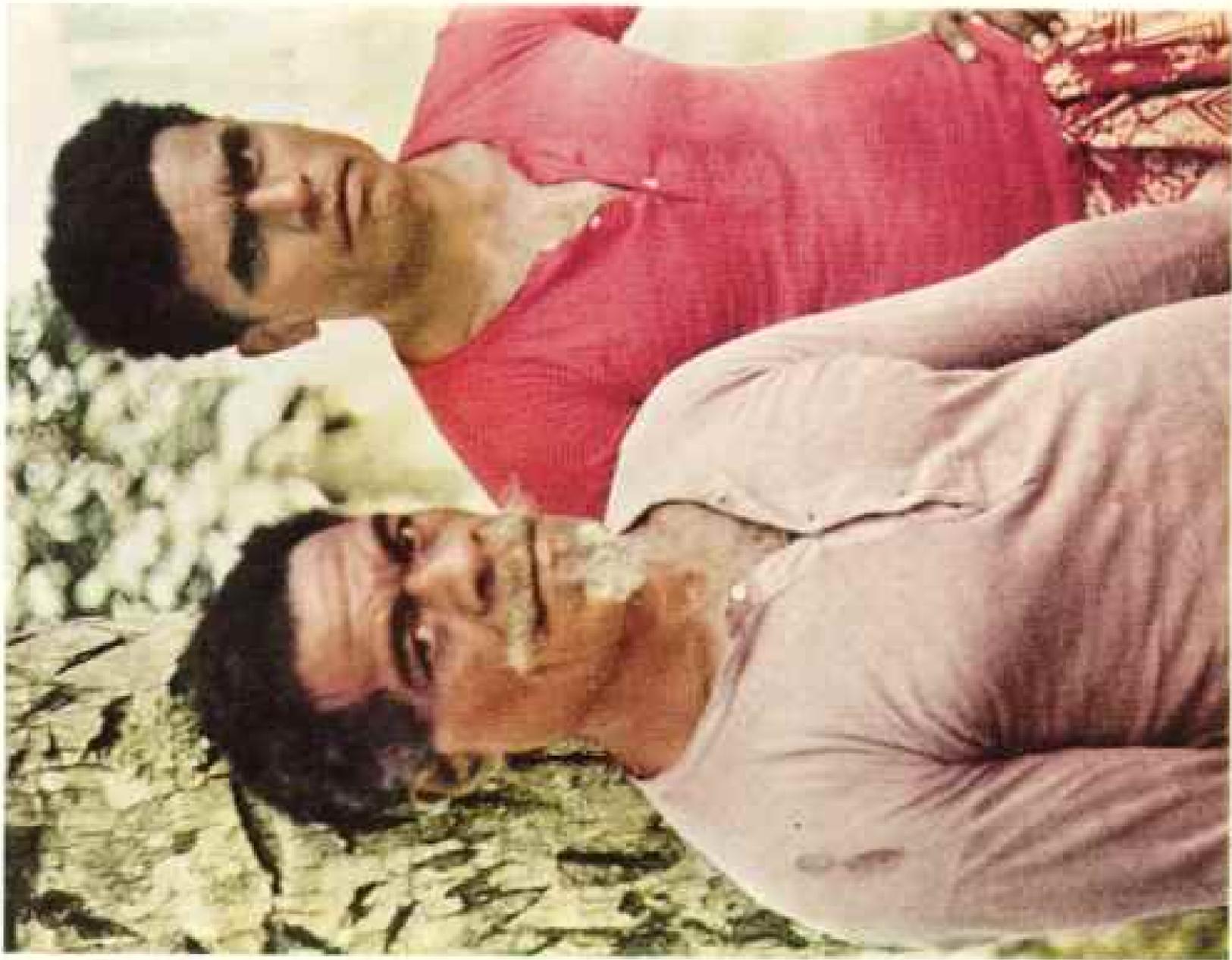


Il Natunat, Omegepibio noeta

**In the Midst of Wilderness Stands the Church of the Catholic Mission of Bondé**

Surprising to the traveler is this flourishing institution in a remote and little-populated part of New Caledonia. From the church, after Mass on Ascension Day, troop crowds of natives, many of whom have come long distances from mountain hamlets. Ropes of leaves and flowers will be borne in a procession.

Koadepirone by Easo de Chépelet



© National Geographic Society

**French Goatee and Mustache Adorn a South Sea Islander**

For dignity the New Caledonia tribesman follows the style of the period of Napoleon III, during whose reign the island was annexed by France (1853). Both he and his clean-shaven son wear shirts made in Japan.



© Hulton-Deutsch from Getty Images

**Javanese Belles Sheathe Their Slim Bodies in Batik Sarongs**

They and their menfolk were brought to New Caledonia to work in the mines, but most of the women prefer housework. Virtually every white family in the island has a Javanese servant.



**From Thio the Mail Is Borne Inland by a Native with Bare but Tireless Feet**

This prosperous mining town on the east coast of New Caledonia lies in a deep valley surrounded by mountains of nickel-bearing rock. Twice weekly, mail is delivered on foot to tribes living in the district.



© National Geographic Society

Photographed by Jean de Chatelet

**Kaniaka Children at Voh Are All Redheads**

The surprising hue is not natural, however; their black "wool" has been discolored by quicklime used to kill head parasites. At mission schools these youngsters of Melanesian blood learn to speak good French.

their homes, others to the cafes of the Place des Cocotiers.

Cafes close at 10 p. m., and lately there had been a partial nightly blackout, with the result that the streets of Nouméa were deserted in the evening. Except for private parties, the only way to have an evening out was to go to one of the three movie theaters.

New Caledonia used to be the graveyard of French films. When they arrived they were sometimes four years old. Since the fall of France, except for some Australian newsreels there had been no new film arrivals. The same features were played over and over again. One man told me he had attended one French screen play more than a dozen times.

Even though the films were aged and often flickery, the public continued to attend. The theaters are a combination of film show, social gathering, and night club. The performances start officially at nine o'clock, and there are two intermissions of half an hour each.

During intermission, in the courtyards which adjoin the theaters, the young bucks, proud of the khaki uniforms which show they are members of the Volunteer Corps, exchange smiles and persiflage with the feminine set. A loud-speaker blares catchy if not too recent tunes. Many couples dance during the intermissions and sometimes even after the show, which lasts until 1 a. m.

The first time I went to New Caledonia the trip consumed nearly five weeks. Crossing by boat from San Francisco to Sydney, Australia, required three weeks. At Sydney I had to wait several days before catching a small boat which took a week more to reach Nouméa.

#### "Calédoniens" Discover America

America was then little known to many "Calédoniens" (the white inhabitants). They thought of America as a country of millionaires, movie stars, gangsters, and highly paid workers, most of whom lived in skyscrapers.

About two years ago, Pan American Airways, locally known as "La Panair," started to build an air base for the service from San Francisco to Auckland, New Zealand, via Honolulu, Canton Island,\* and Nouméa. The first passenger flight took place in September, 1940, and the trip was completed in four days.

The personnel at the air base consisted of about a dozen young Americans who, because of their jolly and democratic ways, were extremely popular. Friendship and romance

flourish here under the Southern Cross. The ideas of the New Caledonians on the subject of America and the Americans have undergone a great change.

Five international marriages have taken place in a year. One of the happy couples invited me to their ceremony, which was held in the afternoon at the Cathedral and was a big event. The Nouméan family of the bride attended in full evening dress. After the ceremony the American friends of the bridegroom threw the traditional rice and tied old shoes and tin cans to the bridal car.

The older generation of New Caledonians seemed horrified by this noisy custom, but the younger ones were highly amused. Very likely they will adopt it themselves.

At the party given by the bride's family that evening at the Grand Hotel du Pacifique, what was probably the last case of French champagne on the island was consumed.

#### Climate, Though Tropical, Is Pleasant

Americans making their first visit to New Caledonia are not finding it at all the standard South Sea island of the movies. In the first place, it is larger than most Pacific isles, since it averages about 250 miles long and 50 miles wide.

Of the 53,000 inhabitants, one-third are white, and about one thousand are Japanese. The islanders, predominantly Melanesian with Polynesian admixture, care not at all for work as paid laborers, and most of the manual labor in the mines is done by imported Javanese and Indo-Chinese.

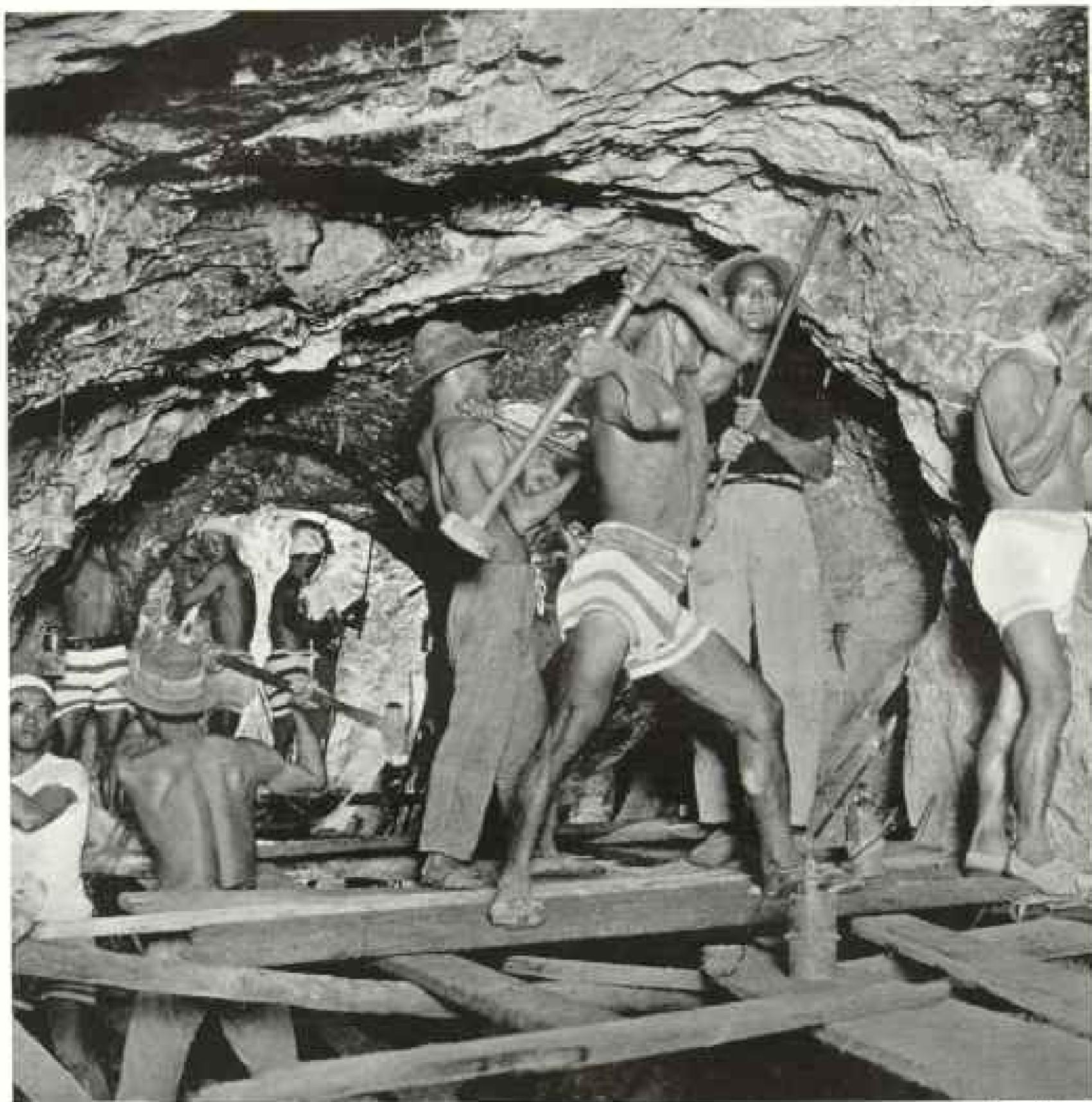
New Caledonia is that rare tropic land where white people thrive. The climate from May to December is cool and generally dry—as pleasant as Florida in winter. Even in the cyclone season, from December to April, the average temperature is only 72 degrees Fahrenheit. For the rest of the year the average is about 65 degrees.

On the more rainy eastern, or windward, side, dense forests clothe many of the valleys. Tree ferns sometimes reach a height of 60 feet. Coconut palms fringe the beaches on both coasts, and the low western shore is bordered with mangrove swamps.

Geology has had a spectacular hand in determining the island's vegetation. Somewhat less than two-thirds of New Caledonia's surface consists of crystalline serpentine rock, which contains the rich deposits of nickel, chromite, cobalt, and iron. These heavily mineralized regions grow only hardy native plants, mostly scrubby shrubs.

In the more fertile parts of the island, coffee, copra, manioc, and corn are grown.

\*See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Cruises of Canton Island," by Irvine C. Gardner, June, 1938, and "Eclipse Adventures on a Desert Isle," by Capt. J. F. Hellweg, September, 1937.



Eugène Perrier

### With Sledges, Drills, and Dynamite, Workers Mine War-precious Chromite

Timber scaffolding helps miners reach the ore in the Fantoche chromite mine at Néhoué (page 50). New Caledonia chromite is of the highest grade, and for months the island's entire output has been coming to the swiftly arming United States. American soldiers and Free French troops together guard this rich source of both nickel and chromium, essential for armor plate and other supersteels (page 32).

Some areas are overrun with introduced plants, such as grasses, lantana, guava, some acacias, aloes, and wild lemons.

#### Nouméa Is Island's Only Large Port

Coral reefs almost completely encircle New Caledonia at a distance of from one to ten miles offshore. Gaps in the reefs occur mostly opposite the mouths of the numerous short, swift streams.

Nouméa is the only large, well-equipped port, but around the island are a number of small ports and open roadsteads where chrome, nickel, and iron ore are loaded and shipped.

New Caledonia also has several big undeveloped bays which are fine natural harbors. Best of these are the Bay of Canala, midway along the east coast; Prony, on the south coast; and Port Bouquet and Nakéty, both on the east coast.

A fair motor road runs the length of the west coast, roughly skirting the inland border of the lowlands, and three roads suitable for automobiles and trucks cross the island.

Most of New Caledonia is unfenced, and semiwild cattle roam freely, especially in the mountainous grazing lands and forests. Some sections reminded me of the ranching country



**New Caledonia Now Looms Large in Southwest Pacific War Strategy**

Lying 750 miles east of Australia and roughly 900 miles north of New Zealand, this Free French island holds a key position on the flank of the sea supply routes from the United States to the world down under. The island's mineral wealth in nickel, chromite, cobalt, and iron is a stake of special value in wartime (page 31).

in the western United States. The cowboys are called "stockmen" and the ranches "stations," both words borrowed from Australia.

**Cotton "Fence" Holds Wild Cattle**

Once or twice a year some of the wild cattle are rounded up. The local method of corraling is called *travail au calicot*. This is done by forming a fence of white cotton cloth one yard wide and in the shape of a V half a mile long.

The stockmen on horseback beat the bush and drive the cattle toward the wide end of the V. The frightened animals do not dare

cross the flimsy white band, and rush forward into the corral.

Here they mix with tame cattle and remain without food or water for five days. Subdued by this time, they follow the tame cattle on foot to the fattening pastures in the valleys and along the coast. Three or four months later they are taken on the hoof by the stockmen to Nouméa or to the meat-canning factory of Ouaco.

Last fall I made a trip by horseback through the central chain of mountains from Koné to Hienghène. After a seven-hour ride from the west coast motor road, I arrived in



E. J. H. H. H.

### A Wild Chase through the Bush Ends in Venison for All

The small deer of New Caledonia was introduced from other islands and has so multiplied that it is a pest in certain areas, destroying gardens and grazing clean the pastures meant for cattle. Some Kanakas and white hunters make a living by selling deer hides, which find a ready market in Australia. The animals are hunted with rifles and dogs. Often a gun is not necessary, for the dogs are trained to drive the deer into the sea or into water holes (page 50).

the afternoon at a "cattle station" at the edge of the Faténaoué Valley, in the northern section.

The proprietor of the ranch, a stocky Frenchman in high boots and spurs, greeted me cordially and asked me if I would like to pass the night in his unpretentious but comfortable bungalow. I accepted the invitation with pleasure.

#### New Caledonians Ready to Fight Japs

After a hearty dinner we lolled for the rest of the evening on steamer chairs on the ve-

randa. The conversation turned to the international situation.

At that time, September, 1941, the Japanese menace was growing over the Pacific and people there instinctively realized the common danger. I asked my host what he would do if Japan should try to invade the island.

"My folks came from France over 60 years ago," he answered. "I was born here and so were my wife and our eight children. I own this land and the cattle and this is my country.

"Since I was a kid, I have had a rifle for



Rene de Chassel

### Dead Squid "Freeze" Spiny Lobsters with Fear, and Divers Readily Catch the Quarry

Favorite Sunday pastime for white residents of southern New Caledonia is fishing for spiny lobsters (*Panulirus penicillatus*) in shallow pools of the coral reefs at low tide. When a dead squid on a pole is moved in front of the underwater grottoes where the lobsters hide, the latter are so frightened that they do not move and are easily captured by divers wearing goggles and gloves. Shovel-nosed lobsters, smaller, often flip themselves out on the dry coral reef to escape the squid and are caught by hand.

hunting deer and I know every bush of the chain. Most of the grown white men—about 5,000—on New Caledonia are in the same position as I am.

"We know how to ride in the most difficult terrain and how to shoot straight.

"If the Japs come, we will put up a fight, mountain by mountain, valley by valley, inch by inch, and they will have to pay dearly to get our land, our cattle, and our other belongings.

"Probably the Japs will have plenty of tanks and planes. The tanks will be useless in our

craggy mountains, and planes cannot spot us in the high bush. Without aid from outside, we probably can be overcome, but America and Australia will help us."

The following morning my host offered to act as my guide to a little-known section where I intended to do some geological work. When he saw my horses, which were considered very good, he told me that they could not make the trip because of the hard terrain and offered me one of his horses accustomed to chasing wild cattle in the highlands.

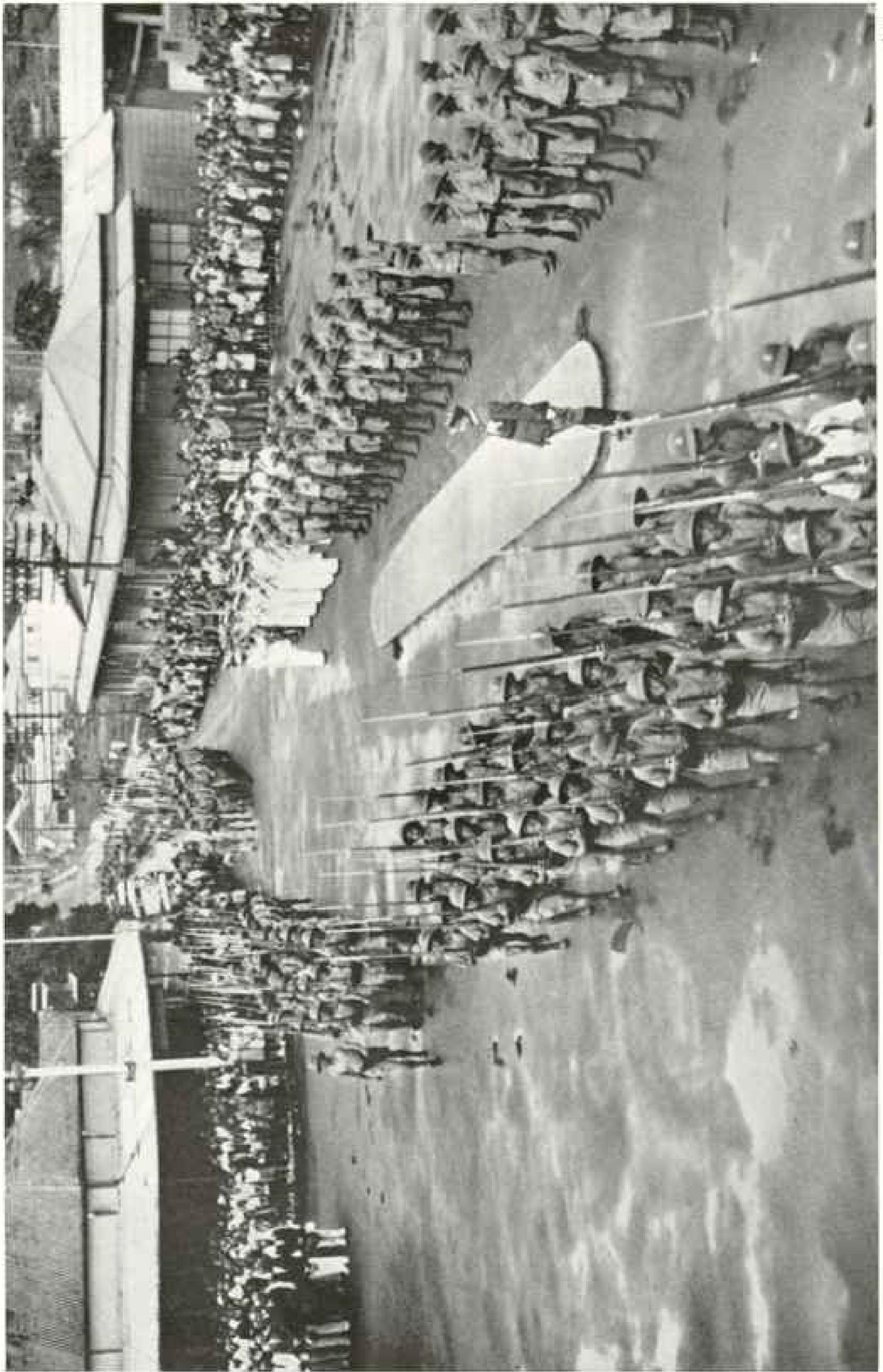
The ranchman advised me to wear my



Apres

### Nouméa Crowds March to Government House to Protest the Governor's Pro-Vichy Stand

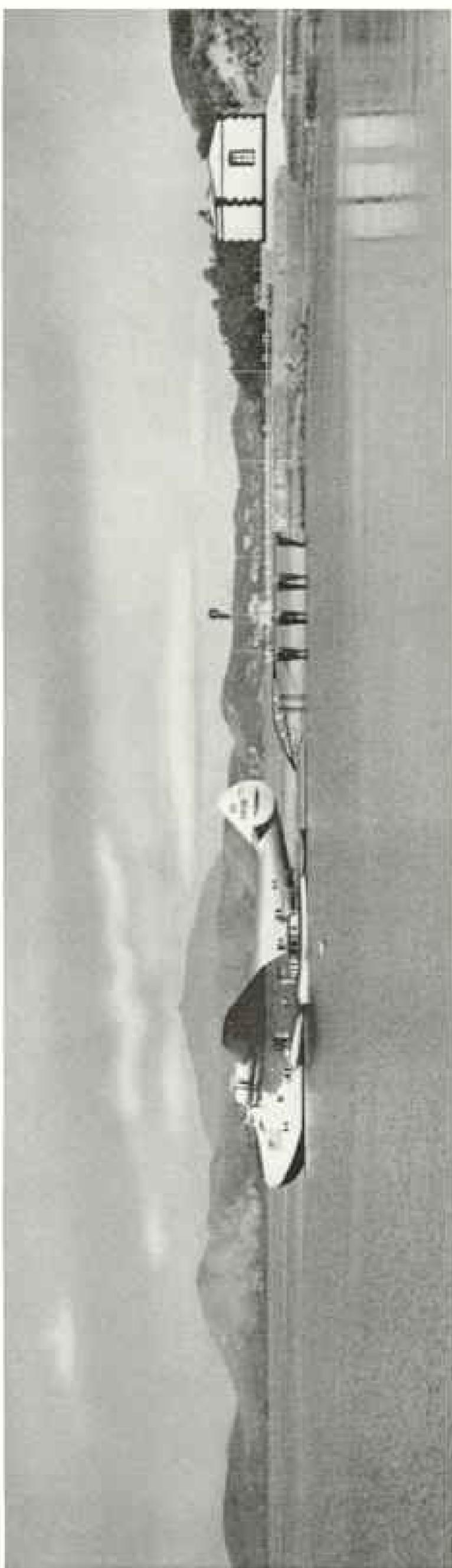
After the fall of France in June, 1940, the Council Général (Conseil Général) of New Caledonia unanimously decided that Free Frenchmen should continue the struggle against the Axis powers. The Vichy Governor of the island left, under pressure from the Council, and later M. Henri Sautot (Plate III) was made Governor.



APRIL

**United States Forces Now Have Joined These New Caledonian Troops in Defense of Their Strategic Island**

Wearing brief tropical uniforms, Free French soldiers parade through the streets of Nouméa (Plate II). On April 23, 1942, the United States War Department announced that American troops had landed in New Caledonia, with the approval of Free-French authorities, to assist in defense of the island.



P.P.O.

**Nouméa, Capital of New Caledonia, Is a Stop on the Clipper Route between the United States and New Zealand**

In pretetime the *California Clipper* ties up at the new Pan American Airways seaplane base at Nouméa. Now American combat planes patrol the island.



Empire de Clouet

**Native Mission Girls Are Draped in All-concealing "Mother Hubbards," Even When Taking Their Daily Dip**

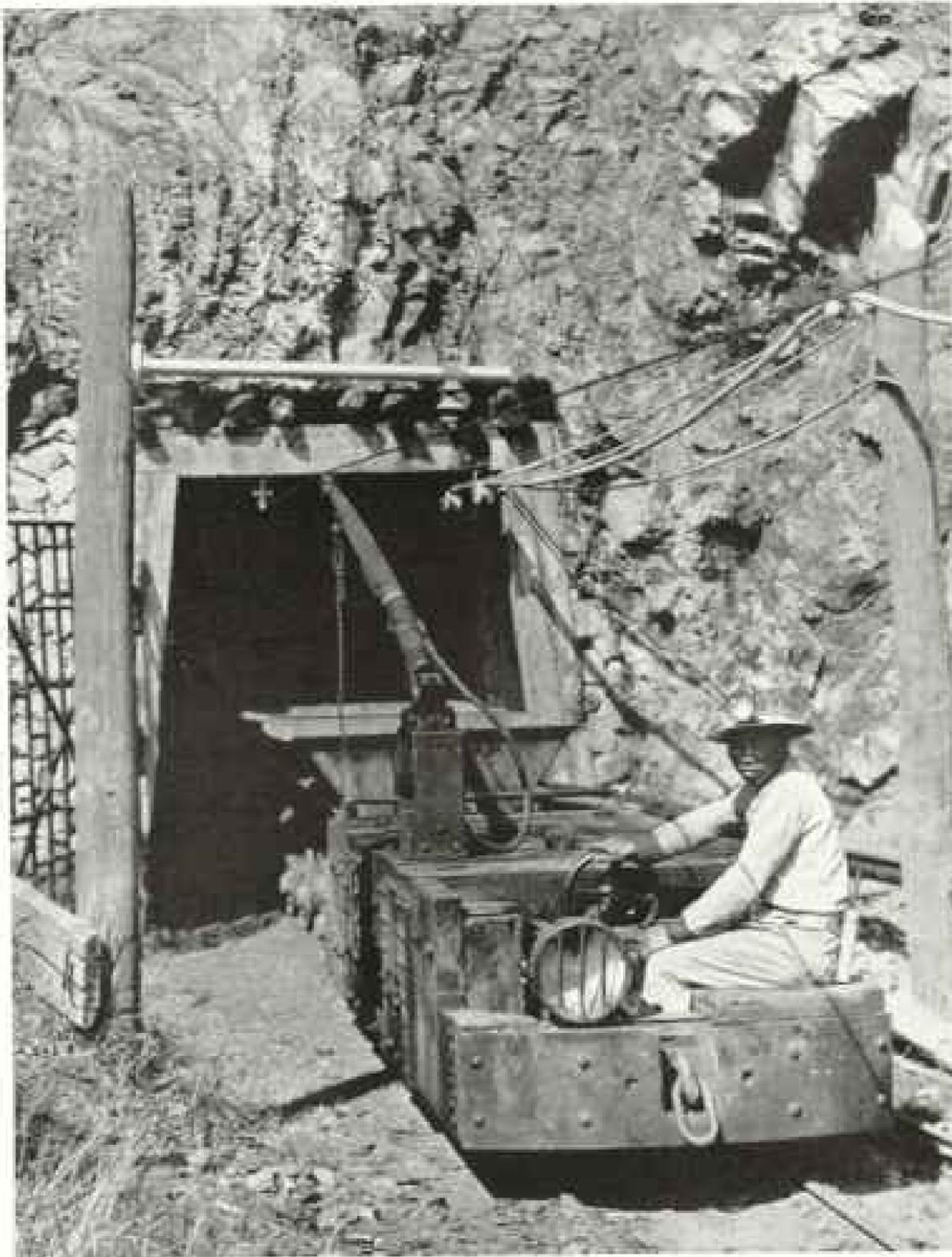
Everyday cotton dresses, loose and voluminous, serve as bathing suits for girls in the Catholic mission at Tounourou. In black habit, a nun (right) wades in, too.



Earth, Peckles

### A White Farmer, Following Bees to Their Hives, Stumbled upon This Startling Display of Human Remains

The beehive led to a native burial cave, with skulls and whitened bones beneath the honeycombs (left center). The strange sepulcher is in Fatimoué Valley near Témala, New Caledonia. With strong, flexible cord made from a tree-clinging vine, the mummies were bound in litters with knees to chins and placed in a sitting posture, as if to enable them to enjoy the view down the valley and out to sea.



Eugene Perkins

### His Electric Mule Hauls Ore from a Deep Chromite Mine

Both locomotive and Tonkinese motorman have headlights. The 15-car train is emerging from New Caledonia's Néhoué mine, one of the deepest chromite mines in the world (page 32).

oldest clothes and gave me a pair of high leggings because we had to go through some extremely thorny lantana bushes. After a few hours my hands and face were badly scratched, and my cotton shirt looked like a Kashmir sweater.

My host's little horse behaved marvelously in the most difficult spots and was as sure-footed as a goat.

Every few minutes we saw deer—single animals, couples, and even herds up to 20. Deer used to be considered a pest and still are by some ranchers because they destroy pastures, but for the last few years there has been a good market for their hides in Australia. Fine leather is made from these skins (p. 44).

Certain inhabitants of New Caledonia, both white and native, take up hunting if they happen to lose their jobs in the mines or on the farms. With their rifles and a pack of mongrels they can get as many as five or six deer a day. From the sale of the skins they can make enough money to support themselves and their families. That kind of life appeals to some types who dislike to work under a boss.

### Deer Driven into the Water

Some of the dogs used for tracking deer are so well trained that shooting the quarry is unnecessary. The dogs drive the deer into a water hole or into the sea, where they are easily overtaken. A pack of dogs numbers from five to fifteen. The hunter sometimes makes the kill with just a knife. At least 60,000 deer-skins are now exported to Australia yearly.

Next morning I went on toward the east coast, following a river along which I often saw wild ducks. I knew

wild ducks are wary, but the New Caledonia variety seemed especially smart. As we rode we could approach within 20 yards, but as soon as the horses stopped, away flew the ducks! So long as the horses kept going, the ducks just looked at us.

That same night I arrived at Hienghène, one of the most beautiful spots on New Caledonia. The bay is surrounded by high cliffs, grottoes, and limestone rocks. Emerging from the sea is a two-pinnacled giant which so closely resembles the Cathedral of Notre Dame in Paris that these rocks are called "Tours de Notre Dame."

Hunting and sea fishing are carried on both for fun and because of economic necessity.

Fish of many sorts are plentiful, from the tiny sardine up to the king-fish, which sometimes weighs more than 50 pounds. Fish of every variety and color can be found on the coral reefs.

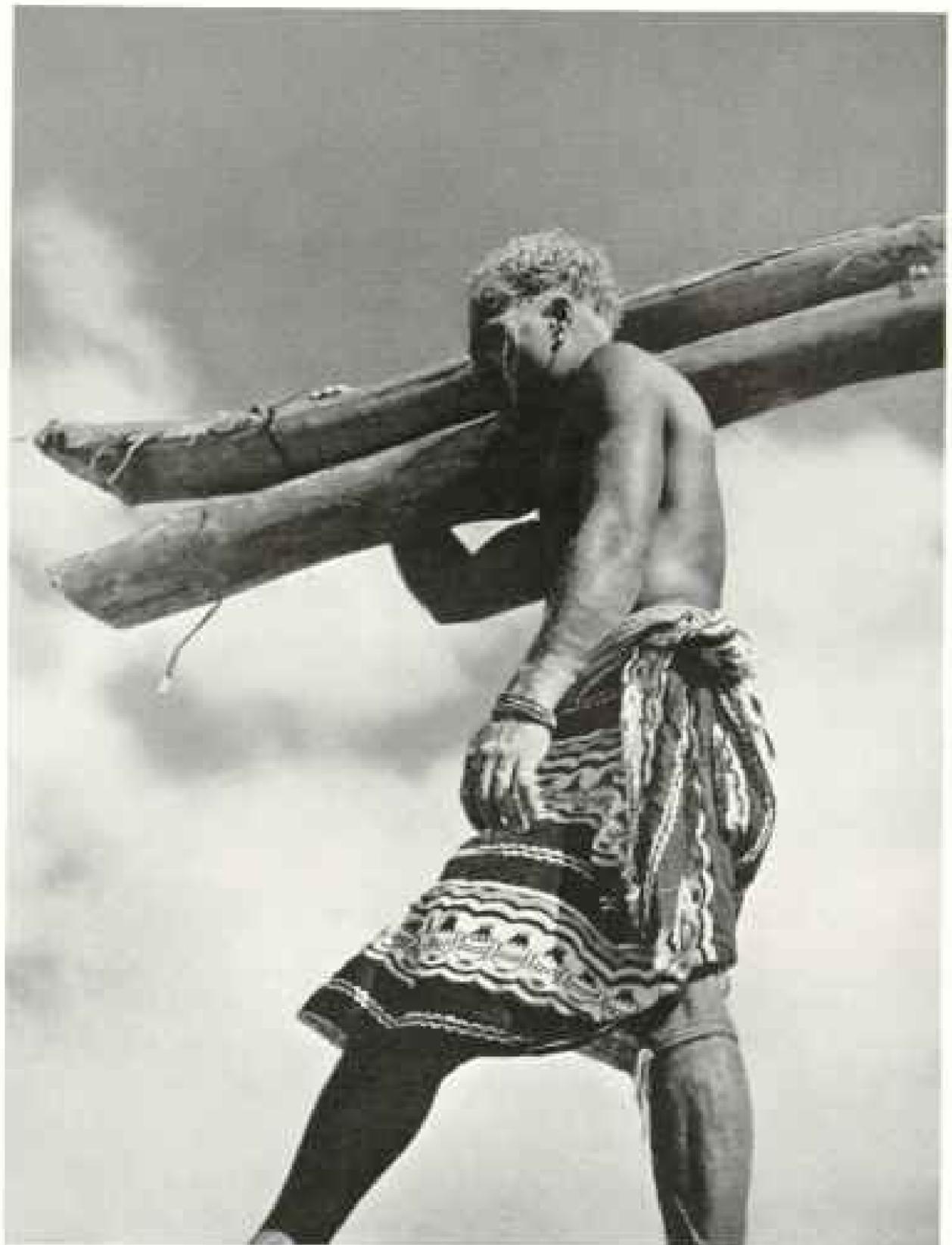
New Caledonia is a shell collector's happy hunting ground. Porcelain, trochus, conch, pearl oyster, floating nautilus, and other varieties are plentiful on certain coral reefs and beaches.

An unsportsmanlike but productive method of fishing is by the use of dynamite. Despite a severe penalty for this kind of fishing, much dynamiting goes on. It is not only illegal but dangerous and has cost some lives.

I remember meeting an old man who had lost his right arm in this practice, but that did not prevent him from continuing his favorite sport while holding a lighted cigar in his mouth. He would hold the cartridge under the stump of the lost arm and by tilting his head light the fuse!

After the cartridge was lighted, he would throw it into the lagoon with his left hand. With luck and good aim the old dynamiter could obtain more than 200 pounds of fish with a single cartridge.

Several times I went lobster fishing on the coral reefs in the southern part of the island. An amusing and effective method for catching lobsters is to attach a dead squid to a pole and move the pole in front of the underwater grottoes of the coral reefs. The big lobsters, terrified by the sight of the squid, do not move. They are captured easily by divers who go under water wearing goggles to shield their eyes and gloves to prevent injury to their hands. The lobsters look like the



Elmer Perkins

### Even This Gaudy-skirted Native of a Distant Isle Adds His Bit to America's War Effort

A Loyalty Islander, working in New Caledonia, shoulders his burden of timbers which will brace working shafts in a chromite mine (opposite and page 32). Shipped to America, the island's nickel and chromium have long been going into armor plate for warships, tanks, and warplane cockpits or into the making of stainless steels and other vital alloys.

Florida spiny variety and have an excellent flavor (page 45).

#### Tahitian Soldiers in Free French Army

In the first week of May, 1941, Nouméa changed from a quiet, sleepy town to a riotous and excited metropolis as a corps of volunteers made ready to leave for Australia.

A few days earlier two companies of Tahitian soldiers had landed in Nouméa (Color Plate III).

These big, good-humored boys made themselves popular with song, dance, and jollity, enjoying a good time till late at night. They



Enoch Perkins

#### Indo-Chinese Women Wield Spade and Mattock, Though Not Enthusiastically

A hidden worker, plying a spade, makes the central figure seem to be a three-armed woman. This group was preparing an ore-stocking platform at a chromite mine. Mining companies importing Indo-Chinese labor have brought in women in the proportion of one to three. A few women work in the mines (Plate I).



Enoch Perkins

#### Seven South Sea Stalwarts Revert to Primitive Garb

Decked out in palm-leaf necklaces and patterned cloth turbans and scarves, husky Loyalty Islanders are dressed up for Sunday. White on their heads is quicklime, which kills parasites and bleaches their hair, of which they are very proud (Plate VIII).

set the whole town and the near-by beaches echoing with Tahitian and Hawaiian tunes. At first there were a few fist fights with the local boys, but both Caledonians and Tahitians are generally good-spirited, and peace was soon restored.

The day before the departure of the troops from New Caledonia they were reviewed in front of the monument to the dead of World War I. The men paraded in perfect time and were cheered by the whole populace—whites, Javanese, Tonkinese, and Kanakas (page 47).

First in line were the Tahitians, followed by the contingent of New Caledonians. There were companies of white soldiers and others of Kanakas, including some from the near-by Loyalty Islands.

On the reviewing stand were all the authorities. A former Governor General of French Equatorial Africa, as special envoy of General de Gaulle, was the chief personality. He was in full uniform with embroidered frock coat and feathered hat (fore 'n aft).

Near him was the Governor of New Caledonia, in white linen uniform, and the Roman Catholic bishop in purple vestments and the pectoral cross. The mayor of Nouméa and other important officials were also present.

After the review General de Gaulle's envoy gave to the commandant a fanion upon which a committee of ladies of Nouméa had embroidered the cross of Lorraine. The emblem was to be carried by the battalion in its future fights against the Axis.

Two days later, under a drizzling rain, the battalion departed on a gray British ship. The gay atmosphere of former days was gone.



Francis de Clotet

### The Flightless Kagu Makes a Good Pet

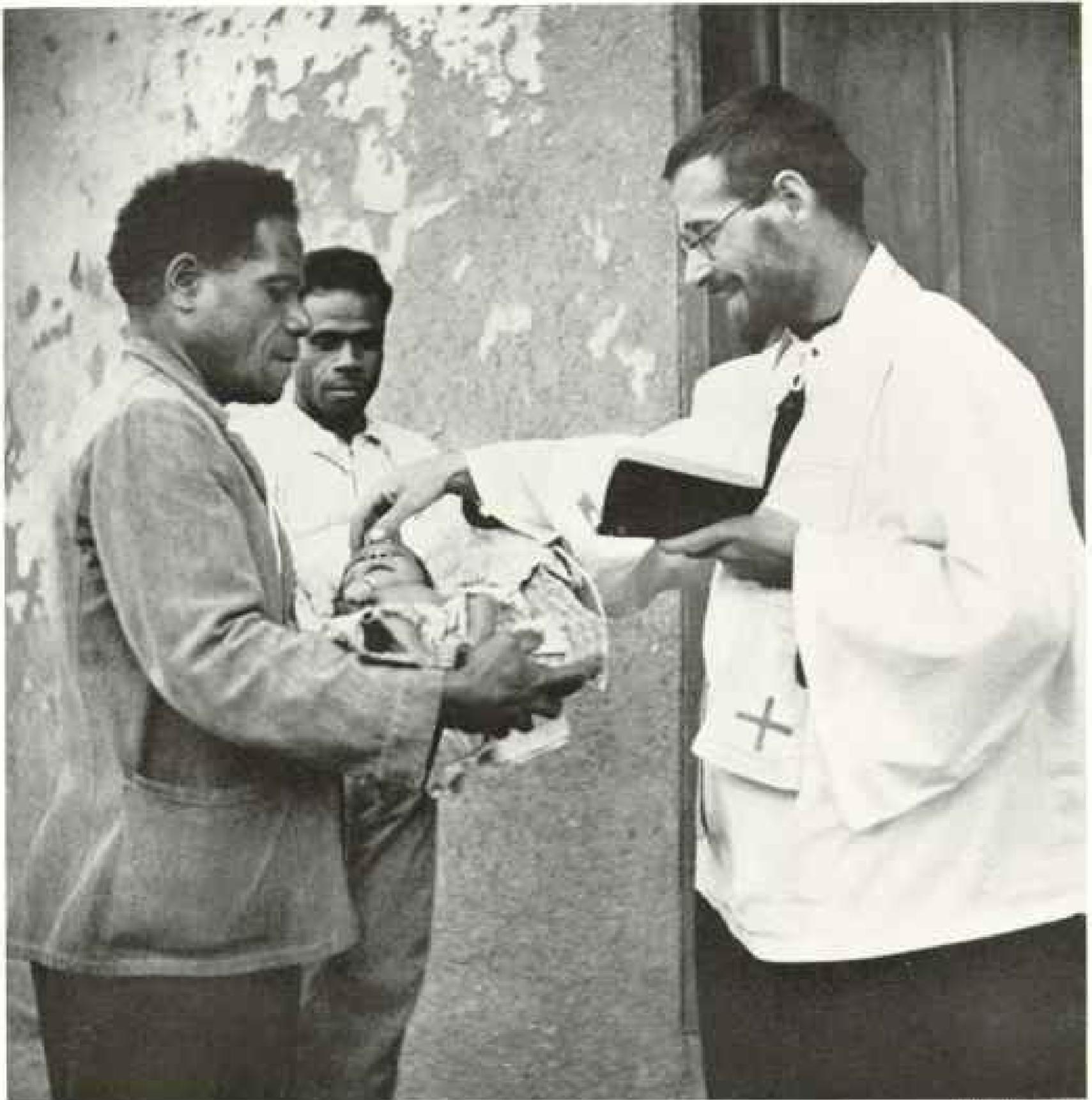
As "national bird" of New Caledonia, its only habitat, the creature is represented on a new postage stamp issued by the Free French authorities. The kagu makes a noise like the bark of a dog and is easily tamed. It is now rare, for it can escape dogs and hunters only by running.

Many of the volunteers were leaving behind mothers, sweethearts, wives, and children.

The high emotional quality of the French people was shown especially by the feminine part of the crowd. Tears were in their eyes, and sobs mixed with cries of "Write often," "Don't forget me," and "Goodbye." As the ship left the quay and steamed away, the band played "Auld Lang Syne."

### New Caledonia Prepares for Trouble

During the following months the menace of Japanese attack kept growing every day. New Caledonia, with little armament on hand and with some help from the British, started to build defenses.



Eusebio Chetelat

#### For the Baptism of His Child, A Proud Kanaka Father Dons European Dress

At the chapel of Pamboa, near Bondé, the Catholic missionary, Father Dupuis, performs the sacrament over the few-days-old infant. Very few Kanakas remain unbaptized, and scarcely any still practice openly their primitive native religion.

On November 5, 1941, Captain (now Admiral) Georges Thierry d'Argenlieu was sent by General de Gaulle as High Commissioner for all Free French Pacific possessions (New Caledonia, New Hebrides, and French Oceania, which includes Tahiti and the Marquesas Islands) to Nouméa to organize a strong defense of the islands.

#### Warrior Monk of Free France

Captain d'Argenlieu had been an officer in the French Navy in the first World War, after which he had joined the Order of the Carmelite monks and later had become the head of the Order in France.

At the outbreak of the war in 1939 he was called back into the French Navy. In June, 1940, he was made a prisoner by the Germans in Cherbourg.

On his way to Germany the captain escaped and after a perilous trip reached London where he joined the Free French movement.

When General de Gaulle attempted to gain the support of French West Africa in the following September, Captain d'Argenlieu was sent as an emissary to Governor General Pierre Boisson in Dakar.

The Governor refused to receive the delegation, and Captain d'Argenlieu, on the way back to his ship by launch across the harbor

of Dakar, was shot by machine gun fire and seriously wounded in the legs.\*

For many months I had planned to leave New Caledonia by clipper on November 23 to visit my family in the United States.

I left Voh in the north of the island a week before my planned departure. My papers were ready, my packing was nearly finished, and I had been invited to farewell parties.

But two days before the arrival of the plane a few cases of bubonic plague broke out in the native reserve of St. Louis, ten miles outside Nouméa. I was advised by the Pan American Airways agent that Nouméa was under quarantine and that no passage was allowed on that flight.

#### Plague Announced Ahead of Schedule

I went to see the Health Commissioner of Nouméa and tried to find some way to catch that clipper. The doctor, polite but firm, stated that nothing could be done about it. During our conversation he told me this sudden epidemic looked strange to him.

"About ten days ago," he said, "everybody heard radio stations in Berlin, Germany, and Saïgon, French Indo-China, announce that bubonic plague was spreading in New Caledonia. The last epidemic had taken place almost eight months before and no new cases had been discovered here since that time.

"It is possible that through some Japanese fifth columnist in the islands the disease was brought in by feeding rats with contaminated food. Saïgon and Berlin announced the epidemic ten days ahead of schedule! Probably it is only coincidence, but a very strange one."

Convinced that because of the quarantine there was no chance of my getting away on that plane, I took an inoculation and went back to Voh. Ten days later I had a long-distance telephone call from the Pan American agent, telling me that if I wished to catch the next clipper I should go immediately to Nouméa. There I could get a clean bill of health by being isolated on the yacht of the Pan American Airways in the middle of the bay. The yacht is used as a floating hotel for the overnight guests of the company.

I drove all night and in the morning of the following day finished packing and said good-

bye to a few of my friends. I stayed six days on the yacht very peacefully, being entertained by the officers. I had a delightful rest, read some good books, and listened to the radio announcement of the negotiations between Japan and the United States taking place in Washington.

I was told that the *Pacific Clipper* going to New Zealand would not stop on the way back to Nouméa but would go directly from Auckland to Suva, then to Honolulu. Therefore I decided to take that clipper, which arrived in Nouméa Sunday morning and departed at 7 a. m. Monday, December 8—December 7 in the United States.

We left Nouméa without knowing anything was going on in the Pacific, and an hour and a half afterward, while we were flying toward New Zealand, the pilot announced he had just heard over the radio that Pearl Harbor had been bombed. Naturally, no one would believe it at first, and all sorts of explanations were given. Later the news was confirmed.

We arrived in Auckland early that same afternoon. In the evening we were told that the plane was not leaving for the United States and to await instructions at our hotel.

About a week later the *Pacific Clipper*, under the command of Captain Robert Ford, left New Zealand without commercial passengers and went around the world, arriving in New York on January 6, 1942.

During its remarkable global flight between San Francisco and New York, the *Pacific Clipper* had covered 31,500 miles, of which some 8,500 miles were flown over areas new to the company's ships and without benefit of advance weather reports. It had also made the first flight by clipper between New Caledonia and Australia.

#### Hide-and-Seek in the Pacific

I stayed ten days in Auckland. The austral spring was just starting, and flowers were blooming everywhere, but the flower beds in the beautiful parks had been uprooted to make shelters and trenches for air raids.

One night I left Auckland in a blacked-out gray American ship. We played hide-and-peek for weeks in the Pacific until one morning I came up on deck and saw overhead the Golden Gate Bridge. Half an hour later we docked at a pier in downtown San Francisco.

\* See "French West Africa in Wartime," by Paul M. Atkins, NATIONAL GEOGRAPHIC MAGAZINE, March, 1942.

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Staff Photographer B. Anthony Bennett

### In Wilderness Lived Daniel Boone; in Wilderness Stands His Statue

Louisville has 1,400 acres of unspoiled recreation areas. Most attractive of these is Cherokee Park, where the monument to the woodsman who made Kentucky stands in a sylvan dell. A section of the famous tree on which the pioneer carved "D Boone Kill A Bar" is now in the Filson Club's historical collection.

# Kentucky, Boone's Great Meadow

The Bluegrass State Celebrates Its Sesquicentennial As It Helps the Nation Gird for War

BY LEO A. BORAH

**K**ENTUCKY, proudly toasted by its citizens as "daughter of the East, mother of the West, and link that binds the North and South," celebrates this year the 150th anniversary of its admission to the Union. It has grown old graciously since that memorable June 1, 1792, when it became the fifteenth State.

During the Revolutionary War it was Kentucky County—prior to that, Fincastle County—Virginia. The intrepid Daniel Boone led the first rush to it in 1775 by blazing with his 29 axmen the Wilderness Road over Cumberland Gap and north to the Ohio River.

## Gateway to the Winning of the West

In the first Federal census, 1790, Kentucky County, where Dr. Thomas Walker had built the first white man's house in 1750, had a white population of 75,677, mostly adventurers from North Carolina, Tennessee, and Tidewater Virginia. It had already been seeking statehood for six years but had failed to win consent to its separation from Virginia.

Following George Rogers Clark, a vanguard of 3,000 new settlers in 1780 led an influx of thousands of land seekers. The first of these were southerners, but later many people from New England joined them.

They came down the Ohio River in "broad-horn" boats, modern adaptation of Noah's Ark, running a gauntlet of savage Indians from Limestone (now Maysville) to the Falls (now Louisville). The Indians would lie in ambush on the high bank of the Kentucky side and fire relentlessly on them.

When the War between the States began, Kentucky citizens were almost equally divided in their sympathies. The State gave Abraham Lincoln to the North, Jefferson Davis to the South. Though it did not secede, almost as many of its sons fought for the Confederacy as for the Union.

Thus historically Kentucky is all the brave old toast claims for it. Romantically it is far more—a cross section of American tradition.

Its nostalgic State song, "My Old Kentucky Home," written not by a Kentuckian but by Stephen Collins Foster of Pittsburgh, Pennsylvania, is the unofficial national anthem of the fireside. Throughout the world it is one of the best-loved American songs.

At the Coronation of George VI in London a friend of mine was one of a throng in Trafalgar Square. The wait for the procession was becoming tiresome, and to relieve the monotony a British soldier in uniform mounted the base of the Nelson statue and led community singing. One of the first songs called for was "My Old Kentucky Home."

To my friend's amazement that vast concourse of English people knew the words and music perfectly. Through its State song Kentucky defies geographic boundaries.

Long before my first visit to Kentucky I was so well acquainted with its traditions that I felt it almost as much my own State as my native Iowa. My father's people had told me stirring tales of "Boone's Great Meadow." They had told how my great-grandfather and his brother, with warrants for service under Washington, came over Cumberland Gap just after the Revolutionary War.

Their sister married Col. James Rogers, one of the early "forters." Last summer I saw his old blockhouse on a farm near Bardstown. Sunlight streamed through loopholes once used for long rifles upon a litter of broken machinery.

The family lived midway between Fairview, the birthplace of Jefferson Davis, and Hodgenville, where Abraham Lincoln was born (Color Plate IX).

Borah's Ferry, established by my great-grandfather on the Green River near Morgantown, is still in use, operated by a distant cousin. There were born my grandfather and my father.

## Old South's Flavor in Kentucky

Because I had grown up on Kentucky lore, my first visit to the State gave me a special thrill. I came down to Maysville from Cleveland with the famous Paducah, Kentucky, humorist, Irvin S. Cobb, who was lecturing on his experiences on the Western Front in the first World War.

High on the wall of the hotel at which we stayed was a mark showing the point reached by the water in a recent Ohio flood.

That afternoon we rode a lazy trolley up to the city park where we were to give our program. The motorman-conductor was in no hurry. Midway of several blocks he stopped



Staff Photographer W. Arthur Stewart

#### At the Folk Festival He Blows a Summons on the Jawbone of an Ass

This "gathering" at "Traipsin' Woman Cabin" (Plate XII) is gay with the colorful linsy-woolsey frocks of the womenfolk; the picturesque, traditional folk dances of early England and of the mountains, and the notes of homemade, primitive musical instruments, such as this jawbone bugle. Measured tones of the Gregorian Chanters of Rowan County add a more solemn note.

the car to deliver newspapers, groceries, a freezer of ice cream to housewives.

Cobb spoke the language of the people who gathered around the open-air platform. When he told of a Kentucky regiment's heroism, the crowd, many of them descendants of the men who helped George Rogers Clark take Vincennes from the British and open the West to American settlers, cheered for five minutes.

#### Boone's Wilderness Road Retraced

My second journey to Kentucky was in 1934, when with Edwin L. Wisherd, National Geographic photographer, I made a survey trip over the Eastern National Park-to-Park Highway to obtain material for an article in the Magazine.\*

That year we came to Kentucky by way of Cumberland Gap, entrance to Boone's Wilderness Road, or Trail, and to the famous Warriors Path of the Indians. The Transylvania Land Company, Daniel Boone's employers, bought the "Path" from the Cherokee Indians.

After the treaty had been signed at Watauga,

\* See "A Patriotic Pilgrimage to Eastern National Parks," NATIONAL GEOGRAPHIC MAGAZINE, JUNE, 1934.

now in Tennessee, Chief Dragging Canoe said to Judge Richard Henderson of the Transylvania Company, "We have given you a fine land, Brother, but you will find its settlement dark and bloody."

Strangely enough, Kentucky was never home to any large number of Indians, though it was their hunting ground and the scene of many savage battles among the tribes.

Today only one town in the State bears an Indian name. That is Paducah, named by General Clark's brother, William, for Chief Paduke, leader of a branch of the Chickasaws who occupied the part of western Kentucky known as "Jackson's Purchase" (page 78).

Perhaps the most comprehensive modern route through Kentucky is U. S. Highway 60, which enters the State at Catlettsburg and Ashland and runs to Wickliffe on the Mississippi. My latest three survey trips have followed that route.

At Ashland, largest and most important city of eastern Kentucky, is the American Rolling Mill Company's plant in which iron ore, coal, and limestone are converted into fine steel. Another important plant is that of the North American Refractories, which man-



Courier-Journal

#### Hale and Happy, the Lashley Quadruplets Have Brought Fame to Leitchfield

Beulah, Martine, Mildred, and John—total weight 18½ pounds—were born to Mr. and Mrs. Porter Lashley on February 23, 1941. A few hours after their birth they were whisked in an ambulance to a Louisville hospital. There seemed at first little hope for the boy, but he is now heartiest of the four. Like the famed Dionne quintuplets, they have brought fortune to their parents.

ufactures locomotive fireboxes, furnace linings, gas retorts, and other articles capable of withstanding intense heat. For this industry non-plastic clays which abound throughout eastern Kentucky and particularly around Ashland are high-quality material.

#### Back to Elizabethan Times

At the "Wee House in the Wood" on the edge of Ashland my wife and I called on Jean Thomas, the "Traipsin' Woman," who in 1930 founded the American Folk Song Society.

Miss Thomas, a descendant of Kentucky mountain folk, was in the nineties a court reporter going about the country with circuit judges and a "passel of lawyers." Because of her flitting from place to place the mountain folk dubbed her the "Traipsin' Woman."

She bought and moved to the garden of her "wee house" at Ashland the last log school-house where *McGuffey's Reader* was used as a textbook. For some time after the book was abandoned by school authorities, the aged teacher of this school refused to give it up. His neighbors jokingly told him he would be arrested for disobeying orders, and so cruelly did the threat prey upon his mind that he was

stricken with a cerebral hemorrhage one day while he was conducting a class. The book lies where it fell from his hand (Plate VII).

Annually on the second Sunday in June a great Singin' Gatherin' is held under Miss Thomas' direction at "Traipsin' Woman Cabin," 18 miles south of Ashland (Plate XII). To it come the mountain folk to sing ballads and hymns, play their homemade instruments, dance their Elizabethan folk dances, and recite tales of long ago. Some still wear homespun linsey-woolsey dyed with juices of wild plants and berries.

#### Peace Comes to the Feud Country

The mountainous region near Ashland was once feud country. Here the Hatfields and the McCoy's, the Martins and the Tollivers, fought long and bitterly.

Today young folk of onetime enemy families are intermarried, and last June little Melissa Hatfield and little Bud McCoy sang at the Folk Festival "The Love of Rosanna McCoy" and "The Death of Jim Hatfield."

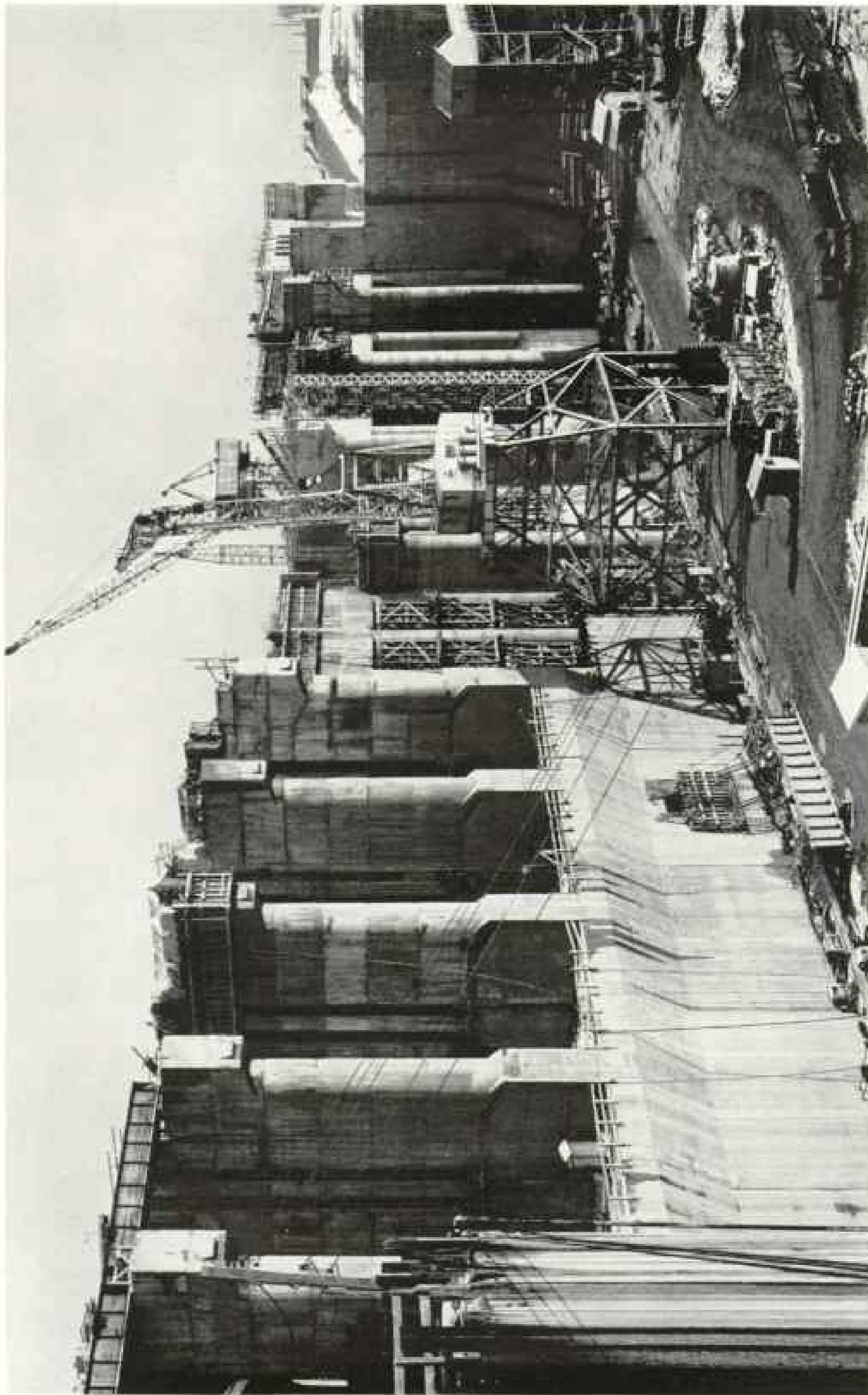
"When singin' comes in, fightin' goes out," commented Jilson Setters, the "Singin' Fiddler of Lost Hope Hollow."



Staff Photographer, Editor L. Wheeler

### Asphalt Ready for Road Paving Is Made by Nature in Kentucky

After the roll has been stripped from the top, the asphalt rock is blasted out and crushed. No other processing is necessary. It is hauled to the highways and easily rolled to make a smooth, durable surface. This quarry is at Kyrock.

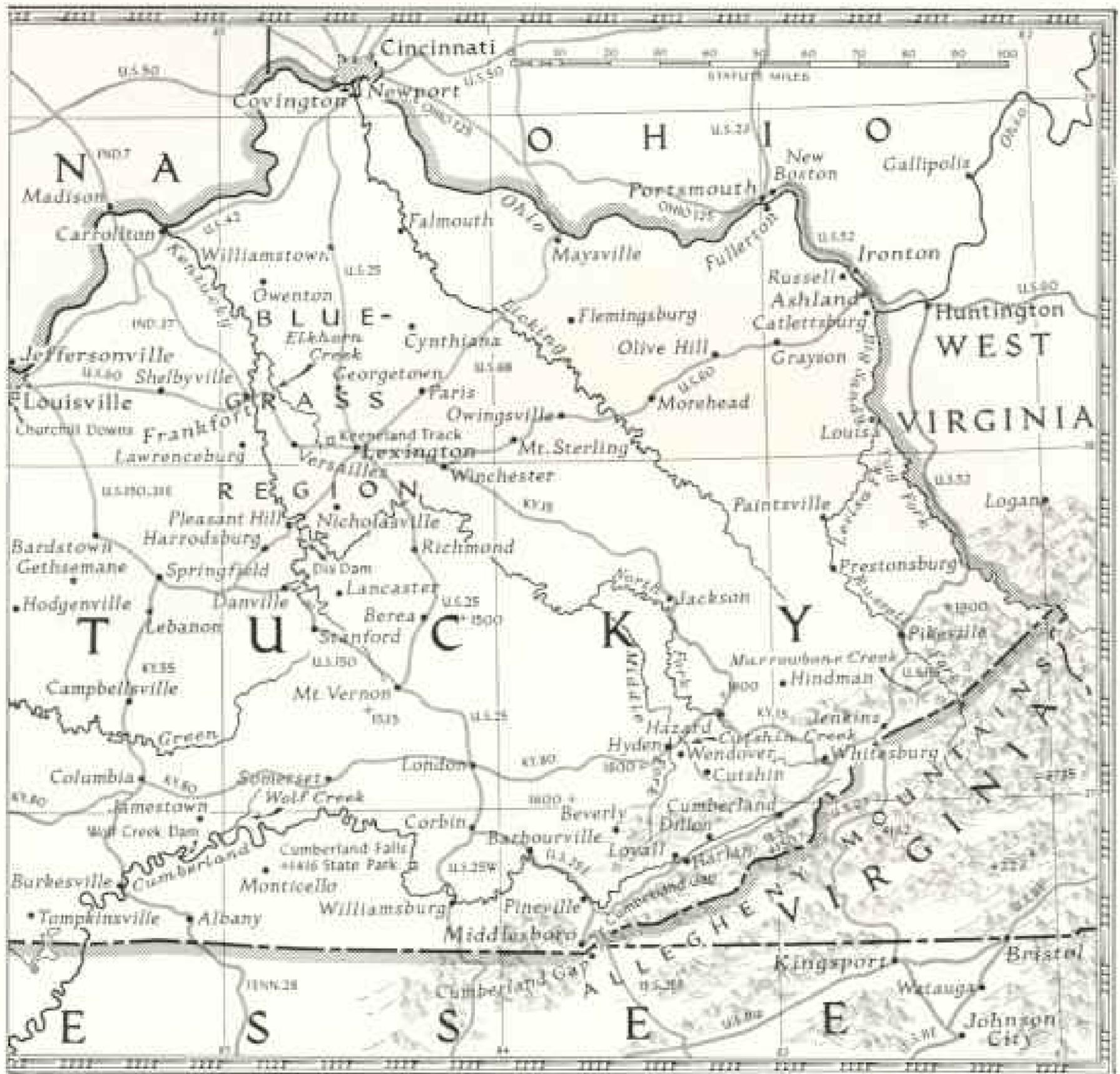


Tennessee Valley Authority

### A Kentucky Dam Rises under TVA's Wartime Construction Schedule

Rapid progress is being made on the spillway section, as may be seen in this photograph showing the upstream side. Under emergency construction schedules the completion date of the project has been advanced one year, first storage of water now being scheduled for January, 1944. The dam will be 8,650 feet long and 160 feet high, with a reservoir area of more than 256,000 acres extending 184 miles up the river (page 89).





**Eastern Kentucky's Bluegrass Country Is the Home of the Kentucky Thoroughbred**

Here also, in the mountains near the West Virginia border, are the highland folk who speak the language of Elizabethan England (page 59). The whole State was settled by hardy pioneers, many of them Scotch-Irish, who came first over Cumberland Gap and later down the Ohio River (page 57).

of the Alleghenies. It had its beginning as a grammar school, Transylvania Seminary, at Crows Crossing, now Danville, in 1785.

In Transylvania's Law College Henry Clay was a professor from 1805 to 1807. Dr. Samuel Brown, one of the pioneers in the field of vaccination to prevent smallpox, taught in its Medical College until 1825. Today its College of the Bible is notable as a postgraduate school of theology.

Famous old homes are legion in Lexington. There are gracious old Ashland (1806), home of Henry Clay until his death in 1852; the red-brick house which was the girlhood home of Mary Todd Lincoln; the Benjamin Gratz

home, where lived the brother of the Rebecca who was the prototype of the beautiful Jewess in Sir Walter Scott's *Ivanhoe*.

The University of Kentucky, founded as a land-grant college in 1866, has seven schools, an agricultural experiment station, and a department of university extension. On a magnificent campus near the center of the city, it offers education to nearly 4,000 students.

Kentucky hospitality flowers in Lexington. Life is unhurried, and the charm of the South in the "days before the war" lingers lovingly.

Before starting a trip around the horse farms near Lexington, the visitor should read

James Whitcomb Riley's touching tribute to horses, "The Hoss":

I bless the hoss from hoof to head—  
From head to hoof and tail to mane—  
I bless the hoss, as I have said,  
From head to hoof and back again!

I love my God the first of all,  
Then Him that perished on the Cross;  
And next, my wife—and then I fall  
Down on my knees and love the hoss.

The true Kentuckian "sees no sin in loving a horse." In Kentucky newspapers race reports mention not only the name of each horse competing but the name of his sire, his dam, and his dam's sire. No thoroughbred is ever referred to by the pronoun "which." Invariably "who" is used.

#### Miles and Miles of Bluegrass Pastures

Here are miles upon miles of lush bluegrass pastures separated by trim wooden fences, mostly white. Stables are veritable palaces, often much more pretentious than the homes occupied by the farm owners.

The route followed in a tour of the horse farms, arranged by the Lexington civic leader Ed Wilder, goes out past the Country Club to John Hay Whitney's Llangollen, then to C. V. Whitney's farm and Mrs. Payne Whitney's Greentree. The Whitneys are often referred to as the first family of the American turf.

Next on the way is Joseph E. Widener's El-mendorf, with its magnificent training barn comprising two units of 21 stalls each. The various rooms face an oval court, about which runs an electrically lighted track one-sixth of a mile around. Here the horses are exercised in bad weather. The outdoor training track near by is a full mile in length with chute.

An attraction to many visitors is George's Hill, a burial place of turf stars. It is dominated by a lifelike bronze statue of Fair Play, sire of Man-o'-War. In front of the statue are the graves of Fair Play and Mahubah, father and mother of "Big Red." Behind it are buried Nature, Quelle est Belle, Quelle Chance, Rose Pompon, and Stagecraft.

At Charles T. Fisher's Dixiana I saw in the tanbark-floored enclosure of a splendid stable a strangely assorted trio of pets—dog, deer, and goat—playing happily together while thoroughbreds thrust sleek heads from the surrounding stalls to watch good-naturedly.

From luxurious Dixiana we went to Samuel Riddle's Faraway Farm, where we were permitted to pay our respects to Man-o'-War, most famous race horse of American history (Plate III). I first signed the great champion's guest book in 1934 when he was 17

years old. This year I signed it in honor of his silver anniversary.

To see Man-o'-War is always a treat: to hear his groom, Will Harbut, tell about the noble stallion makes a visit to the stable an occasion.

Will declares himself the most contented man in the world. He would not trade jobs with the President of the United States. He stays with Big Red all day, sleeps near him at night.

At the tip of his tongue is every detail of the wonder horse's racing record. His denunciation of the one unscrupulous jockey who deliberately caused Man-o'-War the only loss of his racing career is dramatic.

"That jockey," says Will, "was put down, and he's been walkin' ever since."

A little off the main route, by a roadside on old Mount Brilliant farm, now owned by Joseph Widener, I paused before a simple tombstone to copy this epitaph, "Here lies the fleetest runner the American turf has ever known and one of the gamest and most generous of Horses: Domino." There speaks the heart of Kentucky.

David M. Look's Castleton, C. B. Shaffer's Coldstream Stud, Mrs. M. F. Yount's Spindletop, Dr. O. M. Edwards' Walnut Hall, home of standardbreds; and Col. E. R. Bradley's Idle Hour, where four Derby winners have been developed, complete the regular tour.

Another magnificent place is Warren Wright's Calumet, birthplace of Whirlaway, 1941 Derby winner (Color Plate V). There are also many smaller horse farms in the area.

The countryside is a vision of green and white with some fine cattle browsing in the pastures where the horses are kept. Observing that mares in England did not often drop foals prematurely, horsemen in Lexington sought the reason. They found that pasturing of cattle in the English fields with the mares had checked loss of foals. That accounts for cattle on Lexington's horse farms.

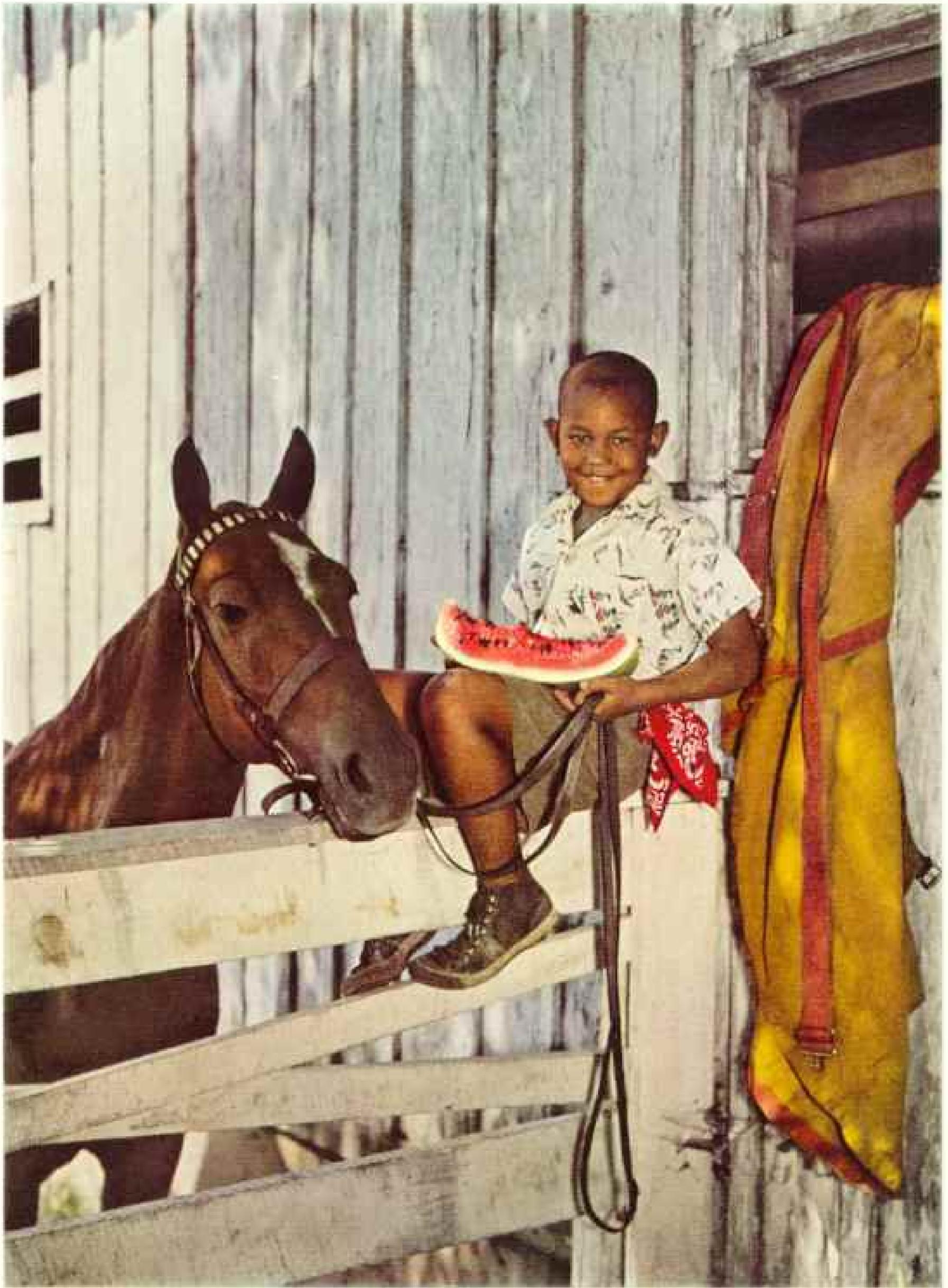
#### A Dramatic Sale of Trotting Horses

We went one rainy night to Walnut Hall stables to see an auction sale of yearling standardbreds. These were bred and trained for the circuit trotting races.

In a long barn tiers of seats were built at the sides of a large tanbark enclosure where the sale horses were put through their paces for the benefit of prospective buyers.

The scene was dramatic. Trainers on handsome saddle horses led the display colts at top speed up and down the tanbark course while the auctioneer pointed out the fine qualities of each. Bids from the buyers in the

The Sun Shines Bright in Kentucky



© National Geographic Society

Kodachrome by Voltsmar Wenzel

'Tis Summer, These Comrades Are Gay

When it's watermelon time, in the Bluegrass and meadows are lush with green, both the young thoroughbred and his little friend have cause to be lighthearted. What more could a stable boy ask than to hold the reins of a spirited horse and contemplate a treat "red and juicy from the vine"?



© National Geographic Society

Photograph by H. Anthony Howard

**Castor Oil! Mother Looks Solicitous While Her Colt Gets the Physic All Youngsters Abhor**

Just like a small boy, this little thoroughbred at Spindletop Farm objects strenuously to swallowing the nasty stuff in the veterinarian's dosing syringe. The foal must take from an ounce to an ounce and a half.

## The Sun Shines Bright in Kentucky



### Noblest Sire of Them All Is Man-o'-War, 25 Years Young

More than 300,000 visitors each year write their names in "Big Red's" guest book at Samuel Riddle's Faraway Farm, near Lexington. Says Will Harbut, faithful groom, "I've got the finest job in the world."

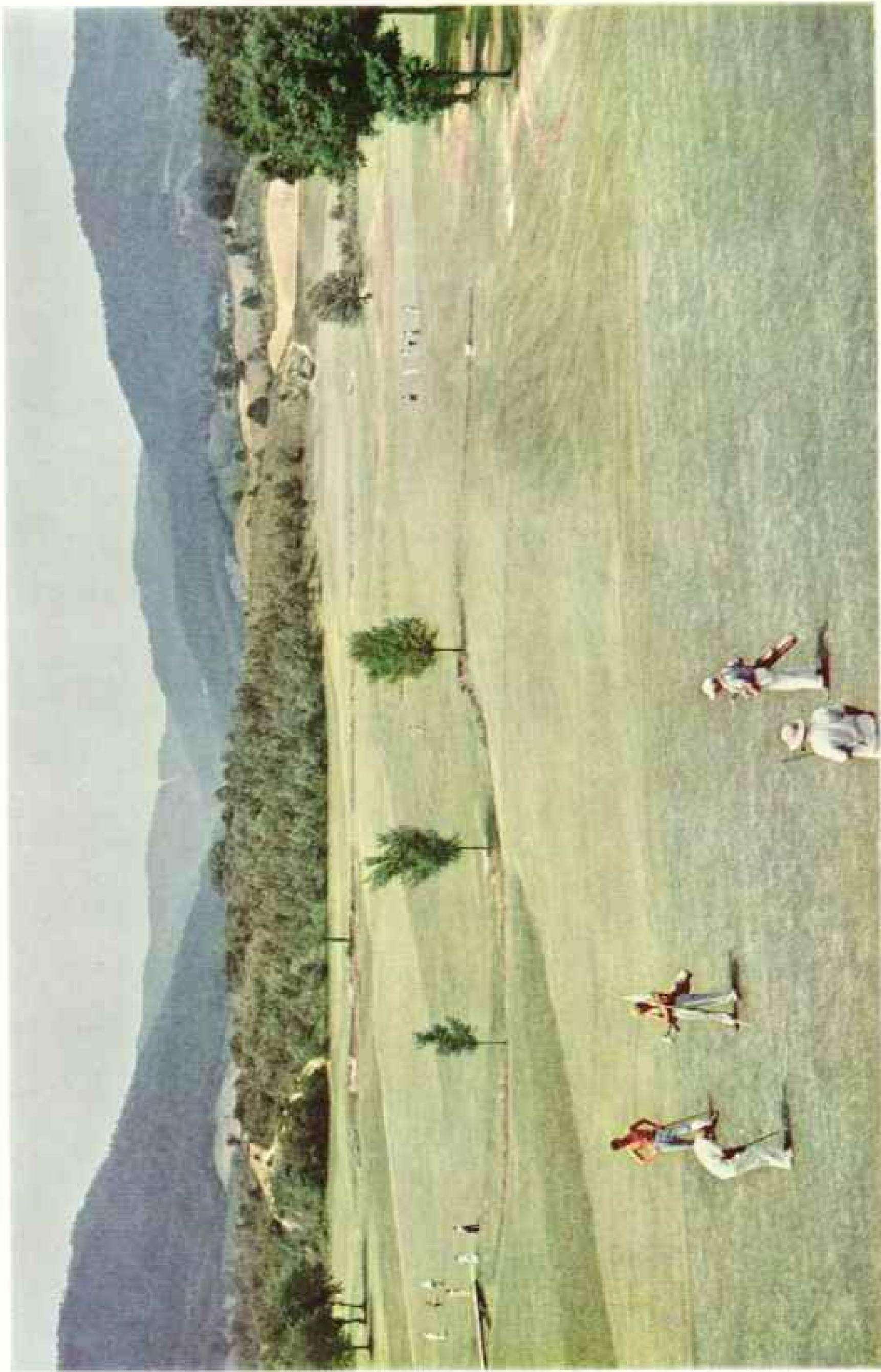


© National Geographic Society

Illustration by H. Anthony Stewart

### Young Sons and Daughters of Man-o'-War Develop Speed at Faraway

As many as twenty scions of the old champion have been pastured here together, but Mr. Samuel Riddle, their distinguished owner, can call each one by name. Man-o'-War, in his twenty-third year, fathered 22 foals.

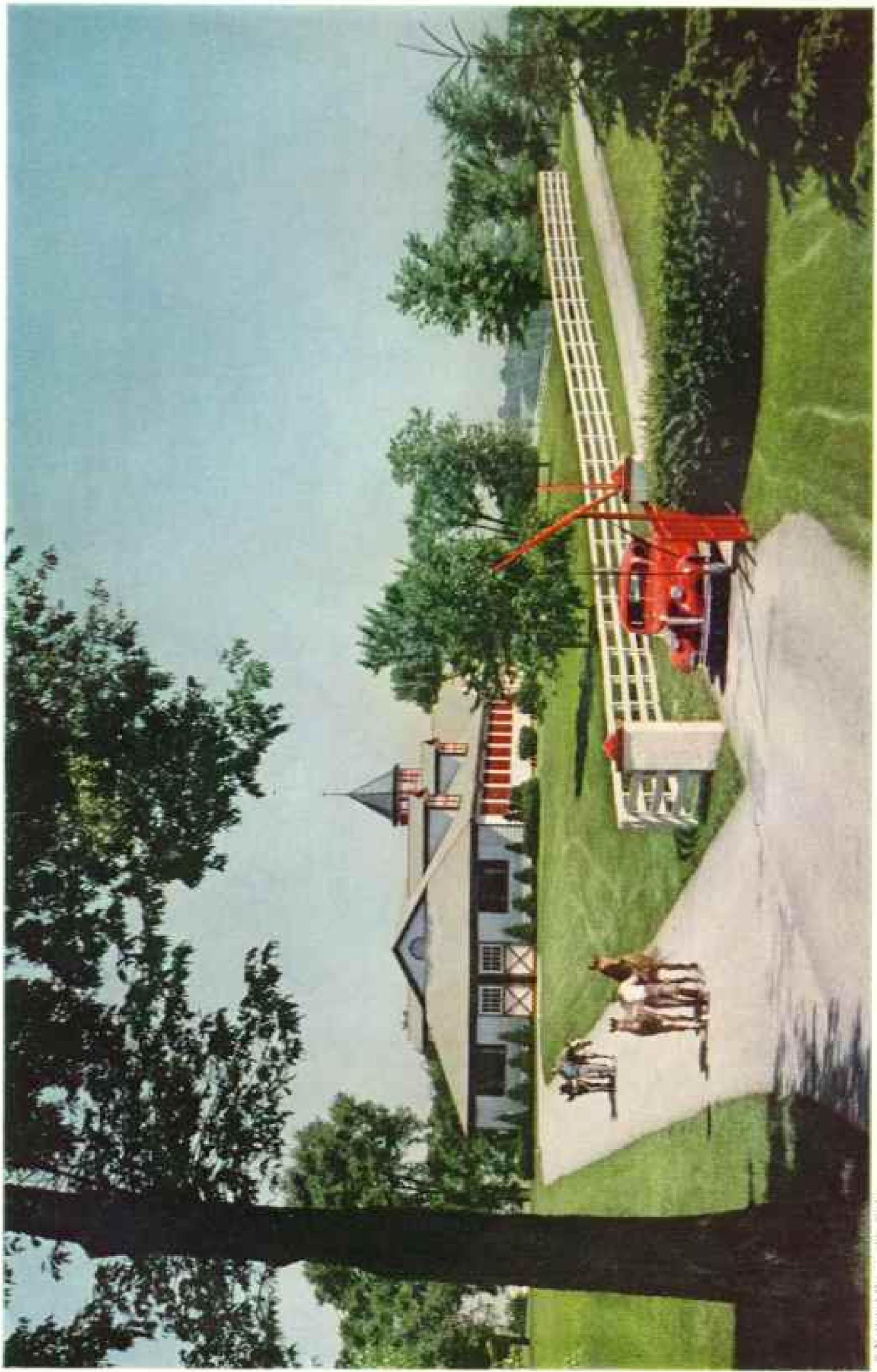


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### Where Golfers of Middlesboro Swing Their Clubs, Lurking Indians Once Swung Tomahawks

The course was laid out about 1890 by members of an English inventor's colony which later failed. Through Cumberland Gap near by came Daniel Boone with his axmen to build the Wilderness Road to Kentucky. More than 70,000 settlers had followed him before 1790. Here on the Indians' "Warriors' Path" danger ever lurked.

Photograph by Yulbany, Weitzel



© National Geographic Society

**At Calumet Farm Was Foaled Warren Wright's Whirlaway, 1941 Derby Winner**

Many fine stables grace "Horse Heaven" along Elkhorn Creek, homeland of champions. For years a Lexington publisher's offer to distribute his newspaper free any day no Kentucky entry anywhere wins a race has stood without costing an edition. The "lazy mate," foreground, can be operated from the driver's seat of a car.

Reproduction by H. Ashburn Howard



© National Geographic Society

Reproduction by H. Arthur Stewart

**Among Treasures in "My Old Kentucky Home" Is a Desk Once Used by Stephen Foster**

Legend has it that the masterpiece was written or inspired while the song writer was visiting his relatives, the Rowans, at their home near Bardstown. It is now a State shrine. Once visible from this rear door were the slave quarters, with their "bench by the old cabin door."

## The Sun Shines Bright in Kentucky



### Many Berea Students Literally Weave Their Way Through College

Deftly a coed makes a scarf. Boys, operating bigger looms, made the heavier woollens at right.

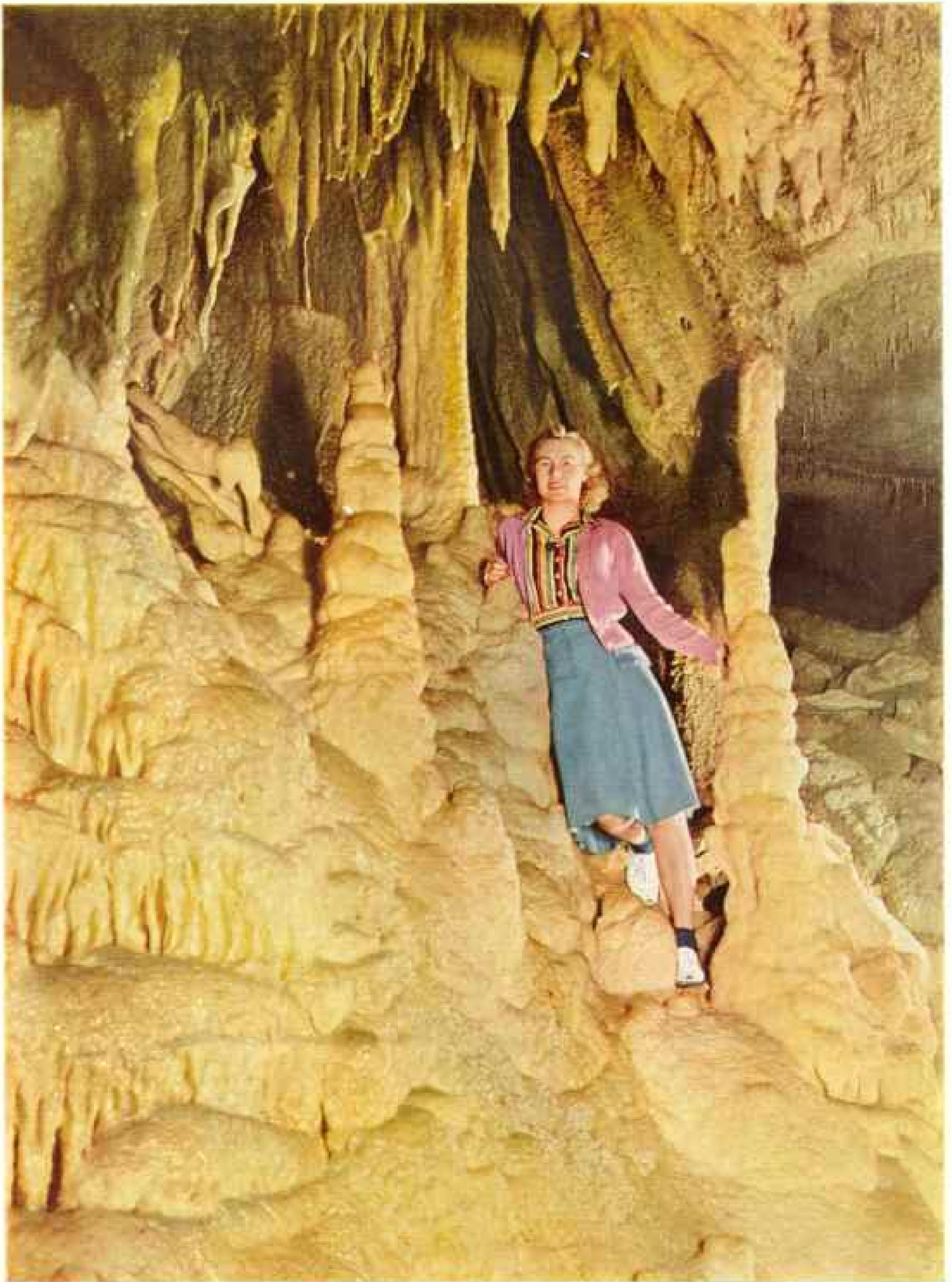


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### At the "Wee House in the Wood," Children See How Grandpa Learned to Read

Miss Jean Thomas, "the trapezoid woman," collector of Kentucky ballads, bought the log schoolhouse where *McGuffey's Reader* was last used and moved it to her garden near Ashland (Plate XII). The book lies where it fell when the aged schoolmaster who clung to the old text was fatally stricken at his desk.



© National Geographic Society

Kodachrome No. 247 45011

### Nature Built This "Chinese Temple" of Flowstone Deep in Mammoth Cave

Because of the graceful "curtains" which hang from the ceiling, the chamber is known as the Drapery Room. The cavern was first discovered by white men about 1800, and during the War of 1812 it yielded nitrates to make gunpowder. In this vast maze new passages are still being found.

stands came fast, and prices ranged to \$5,000 or more.

Walnut Hall proprietors do not expect to make money on sale of yearlings. If a colt which brings \$5,000 as a yearling makes an outstanding record on the trotting track, it may be repurchased in a few years for service at Walnut Hall at ten times its original sale price. Some 400 brood mares were in the fields at Walnut Hall at the time of our visit.

We went to the 65th running of the Lexington Trots. There, with a crowd of thousands of spectators, we stood bareheaded at request of the announcer to honor a 35-year-old mare, the grandmother of the world champion trotter, Greyhound. Greyhound was there himself and trotted a mile against time.

Keeneland, near Lexington, is one of the most interesting running tracks in the world. A horseman's track, it is operated not for profit but for the good of racing. Owners of famous thoroughbreds enter them in Keeneland races just for the sport's sake.

From Lexington we took several trips to places of interest in southeastern, southern, and midwestern Kentucky. A real adventure was a drive through hill country to Pikeville, coking-coal center.

Through the publication of my article on the Eastern National Park-to-Park Highway I had come to know an elderly second cousin who lives in Lexington. (In Kentucky, as elsewhere in the South, relationships are traced through many generations.) He had been a pioneer in developing coking-coal areas, and volunteered to show us the mines.

#### The Road to Pikeville Loops the Loop

Over a road that winds up, over, and around mountainous hills we went at breathless speed. In one mile I counted 11 snakelike curves.

We relaxed a little as we came down into the valley, where we saw the gas wells from which pipelines carry gas to eastern cities. Much natural gas used in Pittsburgh and Washington, D. C., comes from these fields.

As we approached Pikeville, I got fleeting glimpses of signboards advertising a hotel. To my puzzlement the advertisement stressed that *this* hostelry had an elevator. "Why feature elevator service?" I wondered.

The mystery was soon solved. Four hours out of Lexington we checked in at the Hatcher Hotel in Pikeville, the strangest hostelry I have ever visited. The late proprietor was an eccentric mining man who had his own ideas on how to entertain guests. His hotel has no elevators. Mr. Hatcher was wont to say, "People too lazy to walk upstairs to bed can sleep somewhere else."

The walls and ceiling of the huge lobby are covered with beautifully lettered bits of verse, wise sayings, jokes, historical references, and homely advice (page 74). On the wall of the first landing, as we lugged our bags up to our room, we read this terse instruction: "Please be quiet for benefit of those who have gone to bed. The only substitute for brains is silence."

In one of the longest wills on record Mr. Hatcher left a large fortune, mostly to unexpected distant relatives. He commanded that all the lettering on the hotel walls must be kept unmarred forever. When these walls need cleaning or retinting, the cost is high, for the legends must be preserved.

#### Religious Service in a Bank

After a comfortable night in our walk-up apartment, we rose early to attend morning religious service at a bank! (Page 76.) Before starting the day's work, all the employees gather in the music room. Two hymns are sung, one of the staff takes a turn at leading devotions, and the meeting ends with prayer or the reading of a thought for the day.

Refreshed by this simple morning service, we started out to see the coal mines along Marrowbone Creek. Only a few of them were operating, for strikes had closed more than forty. Workers who had been idle for many months were sitting on porches of company houses, their feet on the rails, contentedly smoking cob pipes. A few wagon mines were being operated on the precipitous hillsides. Usually these little mines were worked by one or two men who dug the coal in shallow shafts, loaded it on wagons, and hauled it to market.

"We may get back into operation of the coke furnaces before long," my cousin said. "This is a rich field. We saved it from ruin when we had five carloads of coal tested and proved it is the best quality coal for coking."

"We built the first coke plant in eastern Kentucky in 1911. With 13 houses and a 'hole in the ground' for our start, we built a first-class plant. When we sold the property in 1916, we were producing more than 40,000 tons monthly."

Most of eastern Kentucky is rich in coal. Even town dwellers can obtain their own fuel by digging in the back yard. At Middlesboro the Chamber of Commerce building is constructed of blocks of coal. Gas wells are everywhere around Pikeville, and many oil wells are now producing.

Back at the hotel I heard about the Settlement School in the mountains at Hindman, a county school to which 400 or more children come by bus, or on foot, many of them walk-



STAFF PHOTOGRAPHER H. ANTHONY STEWART

### Jim Hatcher Left Sound Advice Lettered on the Lobby Walls of His Hotel at Pikeville

In an eccentric will the wealthy mining man commanded that all the mural legends be left intact as long as the hotel should stand (page 73). Beside the fireplace in another part of the room he invites visitors: "If used to carrying coal for wife at home, carry it here; we want you to feel at home."

ing four and five miles a day, so determined are they to get an education.

The school was established 40 years ago in response to the plea of Uncle Solomon Everidge that 'learning' be brought to his 'grands and greats.' His log house now occupies a place of honor on the Hindman campus.

About 25 miles southwest of Hindman a noble woman, Mary Breckinridge, conducts the famous Frontier Nursing Service and Hospital. Headquarters of the Service are at Hyden and Wendover. From these points heroic traveling nurses go out into well-nigh impassable country to care for mothers in childbirth and for all manner of sufferers.

The nurses made a 14-year record of 3,000 deliveries of babies without a maternal death as a direct result of pregnancy, and with the loss of only four mothers from pneumonia and chronic conditions.

They have studied and combated hookworm in cooperation with the Kentucky State

Board of Health, the United States Public Health Service, and Johns Hopkins and Vanderbilt Universities. In fighting pellagra they have cooperated with the University of Cincinnati.

I quote the story told by one of the nurses who daily risk their very lives to save others.

"'You're wanted on Cutshin,' said the man to me. 'The river's in tide, so it will be a matter of walking.'

"It was a pitch-black night, with an east wind blowing and a flurry of snow in the air. We walked fast and the man chatted gaily, carrying the bags easily. 'We hope it'll be a girl,' he said.

"From the only State bridge on the Middle Fork we turned left and soon reached a few logs bridging a creek that sounded like a giant Niagara.

"'Wonder this bridge doesn't give way!' remarked my companion when I was insecurely balanced in the middle.



Vollmar Wentzel

### Out of the Night and the Dangerous Ways Comes an Angel of Mercy

Young women of the Frontier Nursing Service at Hyden risk life and limb daily to visit isolated mountain cabins (page 74). If this nurse had not braved the wilds to reach the home of Mrs. May Morgan, who looks on while first aid is administered, the little girl might have suffered serious complications from an infection in her foot.

"By this time the roar of the river was much louder and the mud stickier and footholds less firm; in fact, we were soon using hands as well as feet to keep from rolling down the hillside.

"When we had nearly reached the mouth of Owlsnest Branch, I heard a thud and, suddenly missing my guide, I wildly shone my flashlight around. To my horror I found my beloved saddlebags vanishing over the cliff edge, and a pair of hands fumbling in the mud. It took me a few seconds to decide which to save, the man or the bags, and during those few seconds he scrambled up unaided, much to my relief.

"A mule was waiting for me at Owlsnest. His owner said apologetically:

"We didn't rightly know if you would ride a scary mule, and the saddle is fixed with string and hardly good for a woman."

"After a few minor incidents, such as sink-

ing to the top of the mule's legs in sand, and slipping on rock, and being 'scary' in the middle of a rushing creek, we got going.

"The mule was splendid in getting over tree trunks; in fact, our getting to Cutshin Creek was due to that poor animal.

"When we at last caught sight of a light flickering in the far distance, I thought my eyes were deceiving me, but when we had slid and slithered nearer, we plainly heard a lusty yell from the new arrival.

"With a word of thanks to the mule and the man, I staggered into the cabin. A dim light, a fire burning low, a white-faced, anxious woman on a tumbled bed, and somewhere amongst the bedclothes an eight-pound baby girl!

"Two hours later, a clean baby, a happy mother, and a bright fire--in fact, a peaceful cabin. All had to be left, and with a sinking heart I faced the return journey."



Viktor Westwall

### Mayfield Has One of the Strangest Family Burying Lots in the World

In Maplewood Cemetery are the Woolridge monuments, erected by Henry C. Woolridge, who accumulated a large fortune as horse trader and breeder. The life-size figures represent his family, including two girl friends of his youth, his favorite dogs, a deer, a fox, and other animals.



Staff Photographer B. Anthony Stewart

### A Pikeville Bank Has Religious Service Each Morning Before Opening

With the singing of hymns, the reading of a thought for the day, and a word of prayer, the workers prepare for their business duties (page 73). John Yost, the banker (extreme left), has installed broadcasting facilities and often sends out special programs.

Such an experience is all in a night's work, Mrs. Breckinridge says. The Service averages a baby a day.

From the mountain country we returned to Lexington feeling that we had been in another world.

#### Berea, Free College for Mountain Folk

One morning my wife and I drove down to Berea, the town operated by Berea College, a coeducational institution founded by John G. Fee in 1855 for boys and girls of the southern highlands.

I talked with the young president, Dr. Francis Stephenson Hutchins, who succeeded his distinguished father, Dr. William J. Hutchins, in 1939. In a few words he explained the aims and ideals of the college.

"Ninety percent of the 2,000 students each year come from the southern mountains.

"No tuition is charged. The sum of \$150 covers board, lodging, and incidental fees. Meals cost the student 13 cents each; room rent is 65 cents a week. A large part of this amount may be earned through labor in Berea College student industries (Color Plate VII). Berea receives no subsidy from State or denomination, but is dependent upon income from endowment funds and gifts from friends."

Young President Hutchins showed me pictures of four young people of one mountain family who had all been graduated with honors. They had paid their way to bachelor's degrees, and their outlay of cash brought from home had been only \$24.

At midday we went to Boone Tavern for luncheon. In a delightful dining room we were served one of the best meals we had in Kentucky. Pleased with the service, I wished



Staff Photographer D. Andrew Stewart

#### Bat Racks at the Louisville Slugger Factory Present a Baseball Hall of Fame

In the Hillerich and Bradshy workrooms baseball bats are hand-turned for famous players. What a thrill to the lover of the national sport to see the war clubs of the late Lou Gehrig, Babe Ruth, Joe Di Maggio, Hank Greenberg, and scores of other big-league stars.

to give the waitress a modest tip, but the lady in charge politely but firmly forbade me.

"The college operates this inn," she said, "and the girls who wait on guests do their work as part of their labor program. All students are granted a fair hourly wage. That is all we wish them to receive."

Berea graduates have demonstrated that they are as well-trained and as thoroughly educated in academic subjects as graduates of larger and much more expensive schools. Many of them go back into the mountains after graduation to teach or to make other unselfish use of their training for the betterment of their less-favored fellows.



Vittorio Wenzel

#### Paducah Honors Chief Paduke

Friend of General George Rogers Clark, the famous Chickasaw leader came with his warriors in 1819 to a celebration here. He died of malaria, and his white friends laid him to rest under a tree which had sheltered his wigwam. Lorado Taft made the statue for the Daughters of the American Revolution, by whom it was dedicated.

From Berea we drove over to Danville, first capital of Kentucky and seat of the convention which in April, 1792, gained statehood for the Commonwealth. The old town opened the Sesqui-centennial Celebration this year by a re-enactment of that constitutional convention. Replicas of the old buildings were erected in the public square, and descendants of the early legislators dressed in authentic costumes to take the part of the convention delegates.

At Danville is Centre College, chartered in 1819 and next to Transylvania the oldest college in Kentucky. Under Presbyterian auspices, it is an outstanding denominational college.

In the McDowell House in Danville, Dr. Ephraim McDowell performed, on Christmas Day, 1809, the first successful ovariectomy. He improvised an operating room in his home and removed a tumor which threatened the life of Jane Todd Crawford.

That was long before the administration of anesthetics, and the patient was conscious throughout the operation. Men held her still on the table. She was 47 years old at the time of the operation and lived to the age of 78.

#### Legend Lingers in Talbott Tavern

Whenever I visit Kentucky I make it a point to go to Bardstown, if for no other reason than to stay a day or two in the Old Talbott Tavern. This inn has been a host to travelers since 1779.

We had a room in the old hostelry where the bandit Frank James, brother of Jesse James, shot a man in an argument over a poker game. The bullet holes are still in the wall. Not far from the inn is the church where James had been teaching a Sunday-school class.

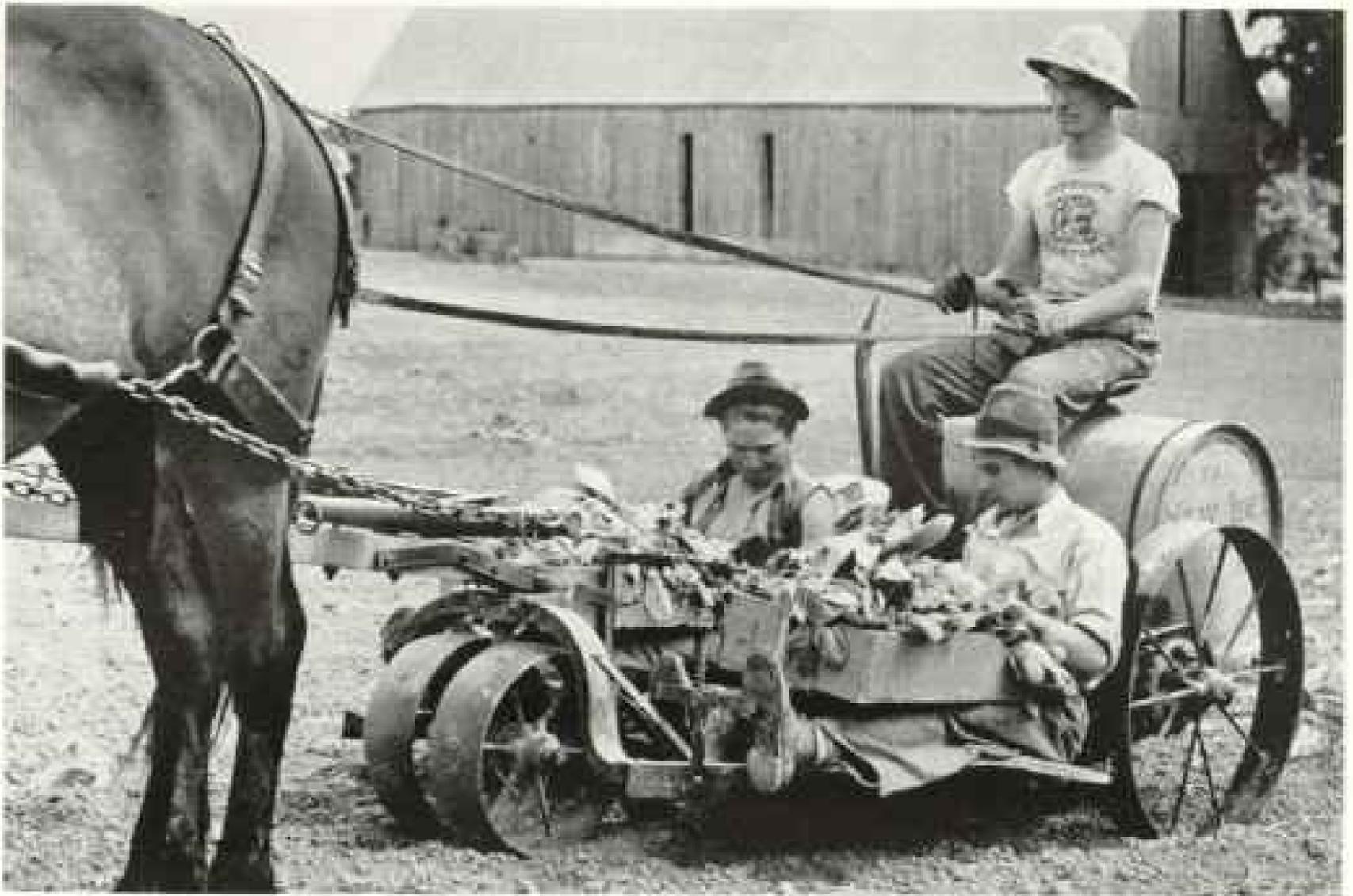
Bardstown is a veritable treasury of historic scenes. Here is St. Joseph's Cathedral, the walls of which are graced by genuine Old Masters said to have been the gift of Louis Philippe to his friend Bishop Benedict Joseph Flaget in appreciation of a friendship begun in Cuba.

Near town is the State shrine, "My Old Kentucky Home," the first wing of which Judge John Rowan built in 1795 (Color Plate VI).

We went down to Hodgenville to visit the ever-appealing Abraham Lincoln National Historical Park on the farm where Lincoln was born (Color Plate IX). Most interesting is the walled sunken spring from which the Lincoln family obtained drinking water.

On our way back to Bardstown that afternoon we turned off on a short side road to visit Gethsemane, one of three strict Trappist monasteries in the United States.

At the entrance a pair of eyes peered at us for a moment through a slit, and then a brown-robed brother opened the door to us. In the reception room another courteous brother told Mrs. Borah



Voltaire Winzard

**As If by Magic a Machine Sets Out Tobacco Plants**

No more back-breaking labor crawling along the rows to plant the tiny seedlings. Kentucky grows both white and dark burley (Color Plate XVI). This farm is near Lexington.



Voltaire Winzard

**Audubon Memorial State Park at Henderson Has Many Original Audubon Prints**

Near Henderson the great naturalist did much of his work. People of the county donated the park, which today is one of the beauty spots of Kentucky, with an elaborate castlelike building housing the museum.

she would have to entertain herself by looking through the museum while I went through the monastery.

My guide led me across a beautiful garden to the main building. As we mounted the steps, the door swung mysteriously open before us. I was a little startled to see the door-keeper in pale robes walk on his knees to close the portal.

Along the spacious halls monks in the same sort of robes padded soundlessly on amorphous moccasins as they read their breviaries. The abbot was most cordial. An ardent reader of the NATIONAL GEOGRAPHIC MAGAZINE, he welcomed a visitor from its staff.

The monks, who have taken a vow of silence, never speak save to chant their services. They rise at 2 A. M. to begin their prayers. Before dawn they prepare the vegetables, bread, and milk for their day's meals. They eat no meat except under doctor's orders.

In their refectory I saw the long, bare tables set with wooden dishes and spoons. A bottle of cod-liver oil was at each place.

These men eke a living from the poor soil of a large farm. Devoting life to prayer and meditation, they are out of the world.

From Bardstown we returned to Lexington through country sweet with honey locust, past fields of young tobacco plants. Kentucky was smiling for us.

Following Route 60 again, we left Lexington behind and drove by way of Versailles to Frankfort, the capital of Kentucky, immortalized by the novels of John Fox, Jr.

The magnificent New Capitol and State office buildings occupy a commanding site above the Kentucky River. On both sides of the stream the old town invites visitors with its stately homes on tree-shaded streets.

#### Historic Relics in Old Statehouse

Grand as is the new Statehouse, the Old Capitol has greater romantic appeal. It is now a museum rich in relics of the past. Up the famous circular staircase we climbed to the legislative halls, and passed an hour looking at the exhibits. Among them is the dueling pistol with which Aaron Burr killed Alexander Hamilton.

On a hill high above the Kentucky River where Boone once stood and looked out for the first time over what he called "Cuntucke, the Great Meadow," is the old Frankfort Cemetery. Under the shade of its spreading trees rest the bodies of Boone and his wife, Rebecca; the Kentucky soldier-poet, Theodore O'Hara, author of "The Bivouac of the Dead"; and many another famous in history.

An impressive marble shaft surmounted by

a Statue of Victory stands in the cemetery as a fitting monument to Kentucky war heroes.

A year ago we drove out to Louisville from Washington for our first visit to the Kentucky Derby.

If one wishes to see the Derby at Churchill Downs in comfort, he should obtain his ticket and accommodations a year in advance. No accurate figures on the crowd are given out, but estimates put the throng at 95,000.

#### The Kentucky Derby, Race of Races

From the moment we entered the gates of the famous track, we could feel the thrill of the scene. People were climbing on sills and ledges in the clubhouse to get a glimpse of the track. Every seat in the huge stands was occupied. If one got a place in the clubhouse from which the track was visible, he was fortunate—until a race started. Then people in the stands rose and blotted out the view.

Mint juleps were being sold like soft drinks at a baseball game. A dollar each in souvenir cups, they were vended by girls in pretty frocks. Bettors were rushing from stands to ticket windows before each race. It was rumored that a famous motion-picture star, for a prank, purloined the Derby winner's wreath of flowers.

Just before the great race, the band, in keeping with tradition, played "My Old Kentucky Home." The "hardboots" (horse-racing devotees) stood uncovered, tears actually streaming down the cheeks of many. The Kentucky Derby is more than a race; it is the glory of the "sport of kings."

How Warren Wright's Whirlaway broke the track record in winning the 1941 Derby everybody knows. That was a brilliant race—what little one could see of it, over, around, or under the milling crowd.

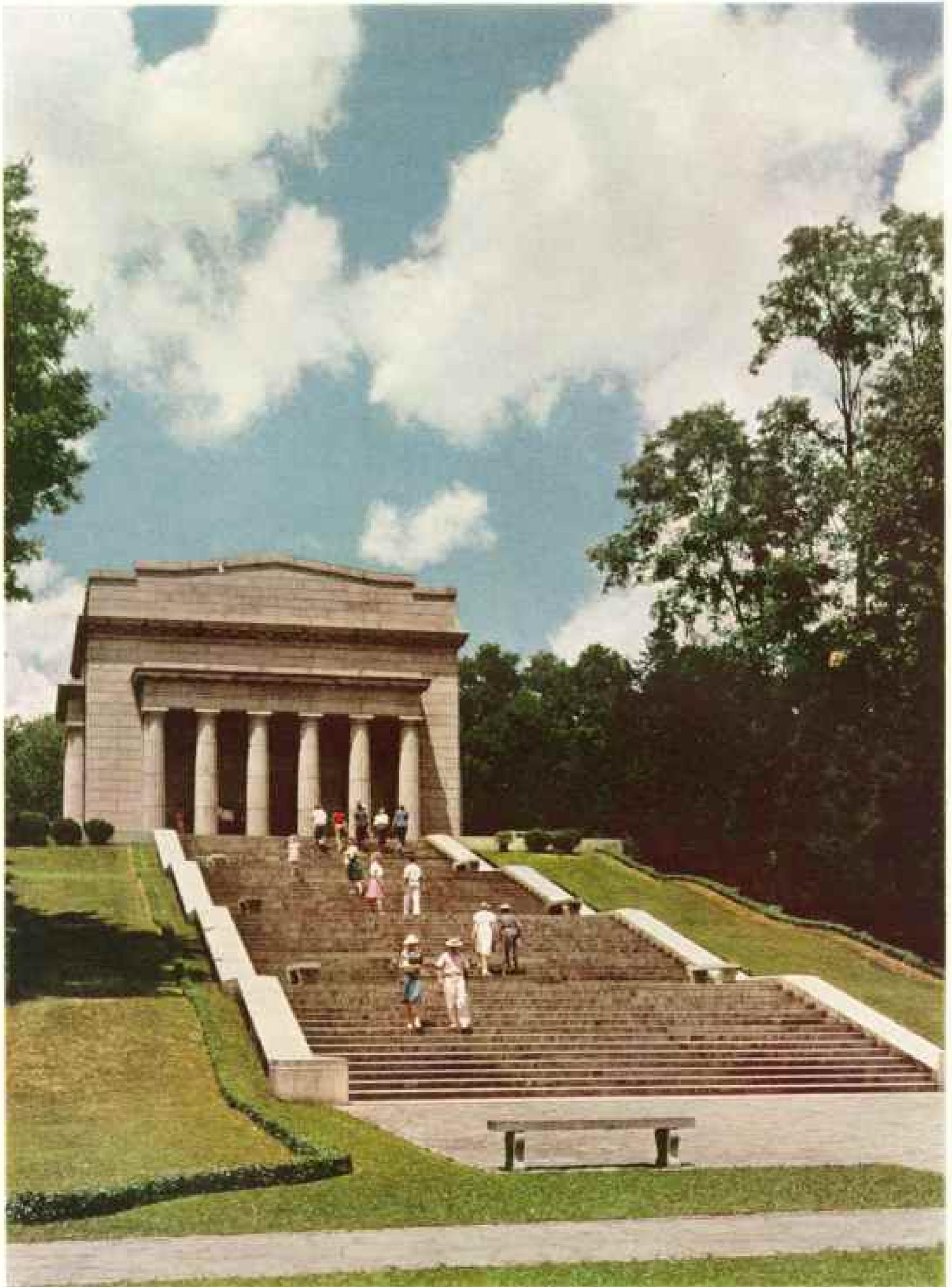
Residential Louisville is always lovely, particularly in springtime when the wide lawns around the stately homes are gay with flowers, and the pale green of young leaves contrasts strikingly with the dark trunks of the fine oaks lining the beautiful parkway that leads out to the Zachary Taylor monument.

On the Sunday of Derby week this year I went to church near my hotel.

Before service, I gazed enchanted at the exquisite stained-glass windows. They were the work, I learned later from Eugene Stuart, secretary-manager of the 39-year-old Louisville Automobile Club, of John Bernard Alberts, who established in Louisville in 1890 the John B. Alberts Studio. Until his death 16 years ago he carried on his creation of stained glass.

His son, Gisbert B. Alberts, expresses his artistry not in stained glass but in orchids.

The Sun Shines Bright in Kentucky

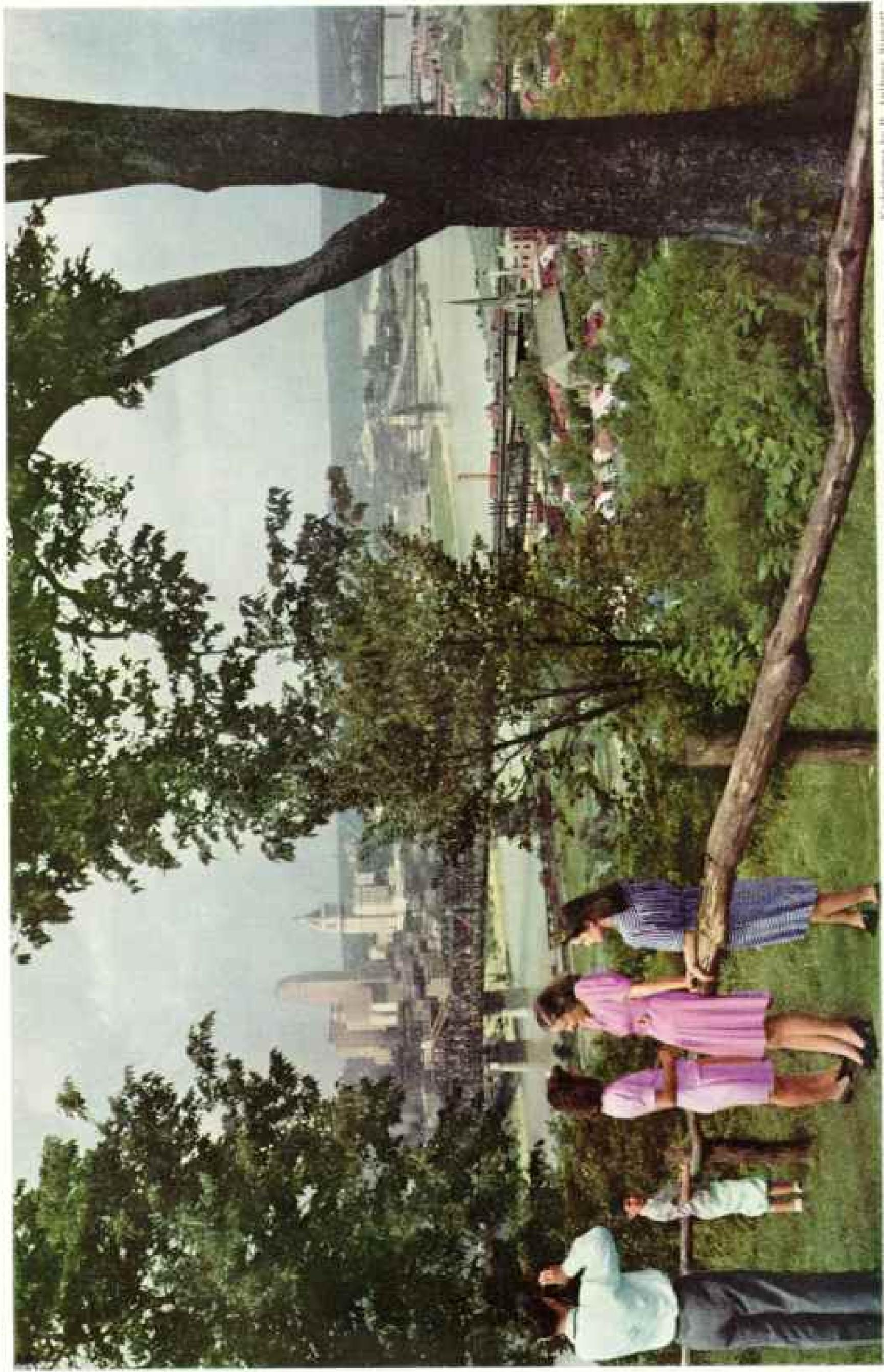


© National Geographic Society

Restoration by William Wetzel

**"With Malice Toward None, with Charity for All"**

In this chaste structure near Hodgenville is preserved the log cabin believed to have been the birthplace of Abraham Lincoln. It stands in the Abraham Lincoln National Historical Park, formerly Sinking Spring Farm, which Thomas Lincoln purchased in 1809. The future President was born here the following year.



© National Geographic Society

Reproduction by H. Anthony Hurvart

**Peaceful, Leafy Devon Park in Covington Overlooks the Cincinnati Skyline Beyond the Historic Ohio**

Five bridges link the second largest city in Kentucky with its big Ohio neighbor across the river. The land on which Covington now stands was traded for a keg of whiskey in 1780, and for a quarter of buffalo meat soon afterward. Today it is an industrial center of fabulous value.



© National Geographic Society

**John Jacob Niles Sings a Ballad to the Dulcimer**

Ardent student of Kentucky folk music, he fashions his own instruments on the same patterns and with the same materials used by the mountain people.



Illustrations by H. Anthony Stewart

**A Cast-iron Boy Will Hold Your Horse in Kentucky**

Throughout the State, as elsewhere in the South, such little figures are used as hitching posts. This one is at Elmendorf Farm, near Lexington.



© National Geographic Society

Illustration by H. Anthony Stewart

**Ten Thousand Visitors Came to the American Folk Song Festival at "Traipsin' Woman Cabin" near Ashland**

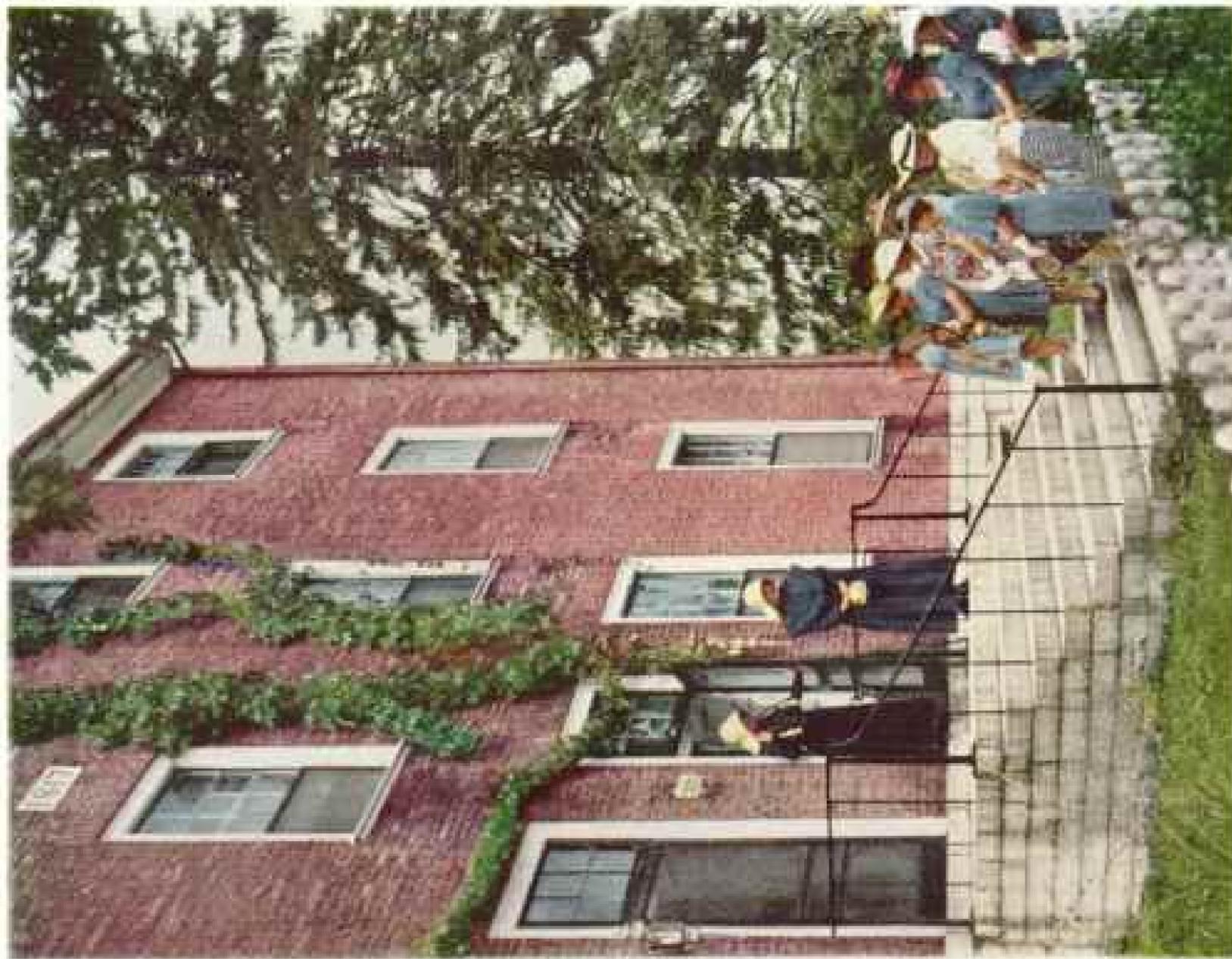
Mountain people of pure Anglo-Saxon stock sing English ballads and dance country dances on Jean Thomas' outdoor stage (Plate VII). Fiddlers play "devil's ditties," and other musicians, with turkey feathers, coax weird minor strains from homemade dulcimers (Plate XI).



© National Geographic Society

**Wickland at Bardstown Is an Architect's Dream**

Hand-fashioned by slaves, the doorway of this stately "home of three governors" seems attuned to the time of crinolines and parasol. Yet its appeal is timeless, and modern architects make pilgrimages here.



Reproduction by H. Anthony Roberts

**A Deserted Shakertown Home Recalls a Vanished Sect**

Gone are the strange celibates who here awaited the Second Advent. One entrance led to the men's quarters, the other to the women's. Mingling of the sexes was considered deadly sin.



© National Geographic Society

Illustration by Vladimir Kozlov

### Aboard a Puffing Stern-wheeler a Holiday Through Relives the Old River Days at Louisville

Modern merry-makers enjoy a trip through the pages of Mark Twain when this paddle steamer puts out on an excursion. As recently as 1934 an old-time showboat plied the Ohio between here and Cincinnati, and now war's effect upon highway touring is bringing pleasure travel back to the river.



© National Geographic Society

**When the Moon Is Full, a Moonbow Appears in These Mists over Cumberland Falls**

Cumberland Falls State Park, 500 acres of virgin forest, was given to Kentucky by a native son, T. Coleman du Pont. Here for seven miles the Cumberland River tumbles in whirlpools and rapids through a boulder-strewn gorge walled by cliffs often 300 to 400 feet high.

Illustration by H. Anthony Stewart



They Harvest Tobacco in the Cavern-honeycombed Countryside near Cave City. Some farmers in this area grow burley, but others reap underground harvests by showing visitors through caves.



© National Geographic Society

Photographed by Volkmur Westhof

Mules Haul Brown Gold from the Fields to a Curing Barn near Lexington. Projecting sticks on which the tobacco is hung make the load look like a porcupine's back or a bunch of haymats.

About 25 years ago young Alberts' mother gave him an orchid plant as a Christmas gift. He has been growing orchids ever since and now has more than 25,000 plants in his greenhouses near Louisville.

After a visit to the orchid farm, I understand why these delicate flowers cost so much at the florist shops. Each plant requires from eight to ten years to bloom!

Young Mr. Worth, Mr. Alberts' assistant, showed me how the gorgeous hybrid orchids are grown. First, a flower of an especially fine plant is hybridized by the introduction under aseptic conditions of male pollen from another chosen flower. A bulb soon appears in the stem of the hybridized flower. After 9 to 12 months this bulb, in which seeds develop, is ripe; and the seeds, scarcely visible to the naked eye, are taken out.

Agar gelatin is placed in the bottom of a conical flask and inoculated with a fungus under aseptic conditions. As soon as the fungus puts out growth, about fifty of the infinitesimal orchid seeds are sprinkled over the gelatin. These seeds require from a year to 18 months to produce orchid plants.

One almost needs a microscope to see the orchid plants when they are taken out of the gelatin and transplanted singly into thimble-sized pots. In these tiny pots they remain for a year. Then they are again transplanted to pots half the size of a small teacup. Transplanting to ever larger pots is done annually till the plants are ready to bloom.

#### Kentucky Girds for War

War has changed one large Kentucky industrial city into a seething center of arms manufacture. Housing is becoming a serious problem there.

At various places around the State are made such important and diversified war materials as aluminum products of several types, aircraft parts, shells and shell cases, synthetic rubber, carbide and acetylene gas, marine boilers, valves and fittings, field ranges, trailers, and powder containers. The assembly of naval guns is a big job done in Kentucky.

On the Indiana side of the Ohio River at one point some 60,000 workers commuting from Kentucky make powder, ammunition bags, submarine chasers and other naval boats, and prefabricated houses.

At one city, which must be nameless because of censorship, is a large United States Government plant for the manufacture of ammonia; a second has a 30-million-dollar plant for making TNT; a third has a huge storage depot for war munitions; a fourth is the site of a motorized triangular division camp where the

principal construction contract outlay is 10 million dollars; and near a fifth is a big armored division camp.

Three of the distilleries for which the State is famous are equipped for production of 190-proof alcohol and are now making this solvent for powder-manufacturing purposes. Other distilleries await only installation of the necessary equipment.

#### Books for Blind Printed in Louisville

The American Printing House for the Blind, chartered in 1858, is an unusual establishment in Louisville. Here a complete Braille edition of a popular magazine is printed monthly, and several books, one of them *Les Misérables*, are mailed free to the blind.

I went through the Brown and Williamson Tobacco Corporation's plant, following the tobacco from the room where it was taken from shipping hogsheads to the department from which sealed, stamped cases of cartons of cigarettes are shipped to consumers.

The Brown and Williamson plant is air-conditioned throughout, and one of the neatest places I have seen. The handsome buildings are on high land, and during the disastrous Ohio River flood of 1937 were places of refuge for 2,500 victims of the turbulent waters.

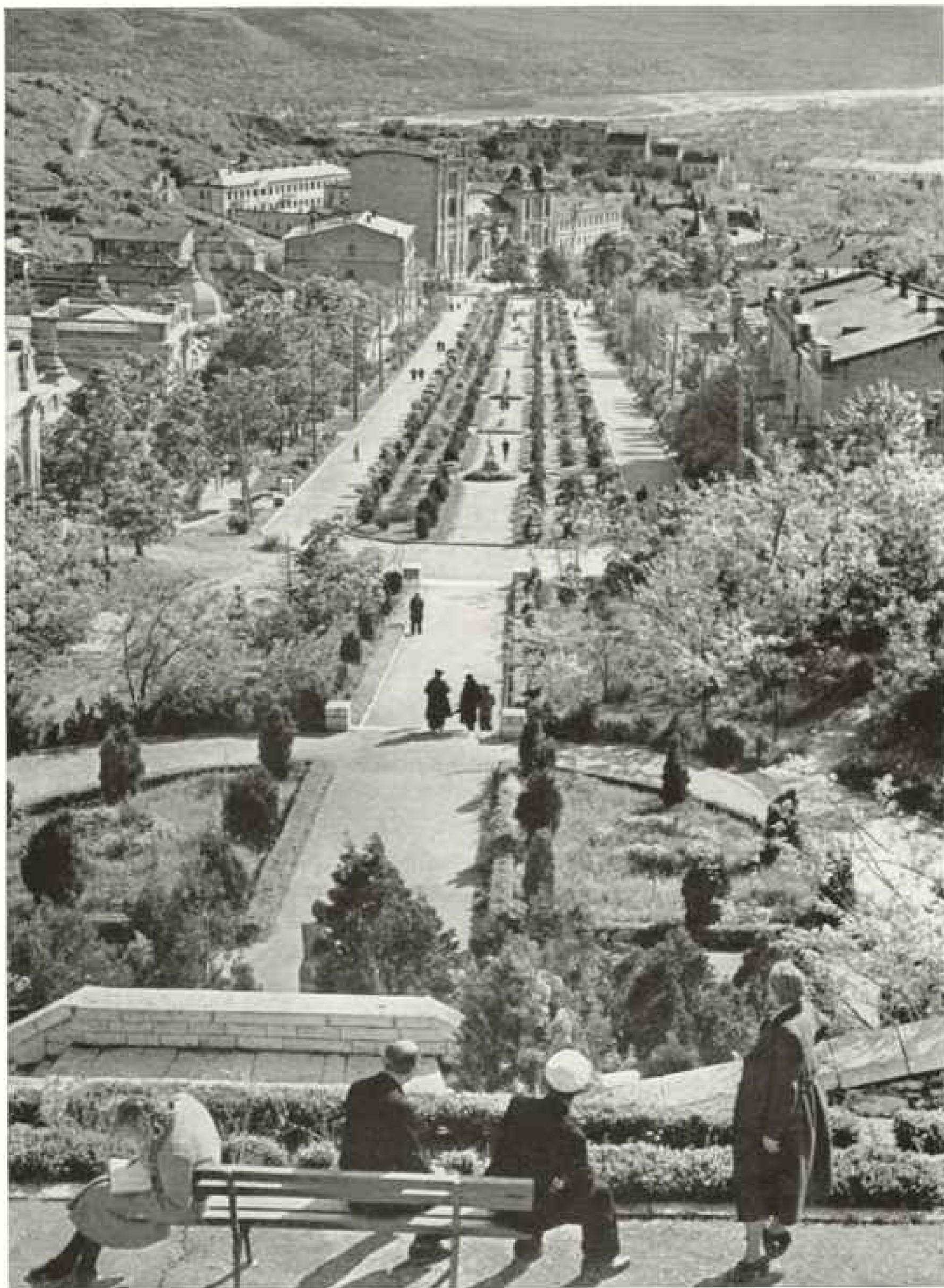
Out at Fort Knox, about thirty miles southwest of Louisville, where the Government has stored billions of dollars in gold, activity is feverish. Two years ago the gold repository was the chief attraction. Today Fort Knox is headquarters of the motorized forces of the United States Army.

One day I took a trip from Louisville down to Mammoth Cave National Park (Plate VIII). New caverns have recently been discovered in this vast maze, with its miles of water-carved passageways.

Gilbertsville is the site of the Kentucky TVA Dam, largest in the TVA area, for flood control and power. It will form a lake 184 miles long.

Another new project for power production and flood control is now under construction on the Cumberland River. Of course, the famous Dix River Dam has long been in successful operation.

History and horses, mountains and meadows, Elizabethan folk and millionaire horse farmers, tobacco and corn, racing and juleps, striking scenery from the breath-taking glory of the Breaks of the Sandy in the east to Mills Point in Hickman at the southwest corner, orators and politicians, friendly voices and leisurely living, love of the sport of kings and adoration of women—all these are part of the glamour of Kentucky.



#### Mountain Views and Hot Sulphur Baths Attract Visitors to Pyatigorsk

Sanatoriums line the terraced hillside park of this health resort in the northern Caucasus. From Tambukan Lake (background) come radioactive waters and medicinal mud. Closely grouped in this area are 17 mountains of volcanic origin, giving rise to mineral springs. Popular resorts have sprung up around them (opposite page).

# Roaming Russia's Caucasus

## Rugged Mountains and Hardy Fighters Guard the Soviet Union's Caucasian Treasury of Manganese and Oil

BY ROLF SINGER

*Research Associate, Farlow Herbarium, Harvard University*

**D**OOR to Russia's Caucasus is Rostov on the Don. Not far southeast of that gateway city the country and the people begin to change.

Through dense clouds of dust whirled up by the train, we caught our first glimpse of Circassian or Tatar horsemen in the Caucasian national costume. They wore long coats with a cartridge band sewn across the chest, and carried the long, thin, straight Caucasian dagger, often in a magnificent silver-inlaid scabbard.

Despite the intense heat, they sported black lambskin caps perched at a jaunty angle. They call themselves "Adygei," and "the Autonomous Territory of Adygei," a small settlement of Circassians, is all that remains of the once great Circassian nation, conquered and colonized by the Russians in the 19th century.

Circassians are excellent horsemen and proudly exhibit their skill, especially on national holidays. Their chief industry is more prosaic—vegetable canning.

As the train rolled onward, camels appeared. The shapes of the distant hills grew more distinct and weird. The air became drier, more transparent. The shadows took on a violet hue.

### White Phantom at Asia's Door

Just as the Westerner realizes he is approaching the threshold of Asia, he sees rising in the south, like a glittering white phantom floating above the monotonous chains of hills, the rounded twin peaks of Elbrus (Elborus), highest mountain in the Caucasus and in Europe (see "Theater of War in Europe, Africa, and Western Asia," 26½ by 31-inch Map Supplement with this issue).

Suddenly the train left the loneliness of the steppe and rolled into a cultivated district of resort hotels, parks, well-kept stations, and roads. This is the Kavminvody, the region of Caucasian mineral baths.

Pyatigorsk is known for its sulphur baths, and others for treatment of gastric ulcers. Most famous is Kislovodsk, chiefly for alleviation of heart disease (pages 90, 95).

Mineral waters of the various resorts are also popular table beverages in the Soviet

Union. Narzan, the Kislovodsk water, was exported in large quantities before the present war. Warm springs of this region owe their existence to the once volcanic nature of near-by Elbrus.

Locally, Elbrus is called "Mingitau," meaning "White Mountain." It was ascended and adequately mapped before any of the other high Caucasian peaks.

When I made my first trip to Elbrus in 1928 with a group of scientists, we approached our destination from the northeast by the only route which then existed, an old road from Kislovodsk. It consisted of irregular wheel tracks visible only to our Russian drivers.

### Shepherds Friendly, But Not Their Dogs

At the end of the road, near a small village, mountaineers gathered to look us over and sell us horses. We bargained for several days in true oriental fashion. They asked twice as much as they hoped to receive, and we offered half as much as we expected to pay.

In the evening, Said, Achmed, and the others would break off negotiations "for good"—only to turn up next morning in the best of humor, demanding ten rubles less.

Before we obtained horses, I took a number of trips on foot into the surrounding valleys and the mountains flanking them.

On one of these trips I came to an upland shepherd's hut, and a pack of vicious white Caucasian sheep dogs attacked me. I warded them off with the end of my ice ax and angry cries of "Rrrr," learned from the Circassians, until Dadau, a Balkar shepherd, came along brandishing a rifle and rescued me. Two other shepherds and a boy, the entire population of the settlement, came running up.

I had been commissioned by my friends to buy a sheep, but unfortunately I knew no Balkar at the time, and Dadau knew no Russian. I pointed to the mountain, where, like moving spots, thousands of black sheep were grazing over the slope. The shepherds looked at me in uncomprehending silence.

I bleated like a sheep. They looked sympathetic and giggled.

I defined a sheep in my best Russian. They mumbled approval but produced no sheep.



### Beside Grazing Herds, Ranchers and Milkmaids Learn Scientific Cattle Raising

The class is conducted on the edge of rich pastureland in Kabardino-Balkaria, Caucasus mountain republic. In summer months horses, cattle, and sheep from the collective farms in the lowland plains are driven up the slopes to these highland meadows.

Finally, to the best of my ability, I drew a black sheep with two horns on a sheet of paper and passed my masterpiece around the circle. The older shepherd made some comment and the others repeated it. There was a glacial silence.

When I learned later that my drawing had been taken for a picture of the devil, I knew I would never make an artist. I had to climb the mountainside and bring back a living example of the Caucasian fat-tailed sheep before they understood.

We concluded the sale, and a gay evening followed. Dadau taught me to play Balkar national dances on my harmonica, and in the light of the campfire, to the clapping of the shepherds, the men danced in fiery, rapid rhythm, their shadows like weird apparitions in the night. Sometimes the thundering of an avalanche drowned out the shepherds' clapping.

After the dancing we drank the familiar, refreshing sour milk and ate disk-shaped bread made of water and corn meal, which Dadau had baked in the ashes of the fire.

My friends vied with one another in spitting into the fire, but that didn't detract from the taste of the meal. However, the bread weighs like a stone on your stomach if you are unaccustomed to it. Sour milk, bread, cheese, and now and then a bit of mutton are the main nourishment of the Balkars.

### Women No Longer Do All the Work

For about ten years the Balkar peasants of the Elbrus region have been in the process of collectivization, which they have accepted more readily than other Caucasian farmers.

Collective-farming methods have been effective in the cattle-breeding industry and have served as an inducement for the men to work.

At the time of my first visit, the women did practically all the work at home and in the fields, while their husbands, brothers, and sons sat about in the middle of the village, chatting, philosophizing, making deals, playing games, smoking, or simply gazing into the air.

Nowadays, of course, most of the men are at work or in the Army.

On a trip from Nalchik, capital of the



### When Farmers Can't Go to Town, Traveling Stores Come to Them

So vast are the Soviet collective farms on the North Caucasus steppes that crews live in the fields, during busy season, in portable houses (background). Here a commissary on wheels, carrying the slogan, "Serves all field camps," rumbles out to location with a full stock of soap, razor blades, candy, and other small commodities.

Kabardino-Balkar Republic, to upper Balkaria, I talked with a leading citizen of the Republic. He told me that the population of the Russian and German settlements around Nalchik was encouraged to intermarry with the mountain tribes in the hope that the latter, by mixing with people of a higher culture, would learn more progressive methods of agriculture and achieve a higher cultural level.

He showed me articles in the Balkar and Russian local press recommending intermarriage, but I saw no indication that the appeal met with success. Since then the Germans have been deported as potential fifth columnists.

The village houses are pressed close to the mountain slopes. They are built of stone and consist of a single dark, stuffy room. Grass grows over the top, so that one man's roof is his neighbor's terrace.

#### Beyond "Pig Pass" Dwell the Svans

After my visit with Dadau, I hastened to obtain a primer in the local school. The pictures explained the words and I soon had a

small vocabulary. But in my next adventure, my knowledge of Balkar did me less good than a bit of chocolate.

My friends had gone off southward across the mountains with the baggage. I followed with our single horse and a guide.

Our path mounted steeply, first through a fir forest, then through pasture land, until we came to a shepherd's hut above the glacier. From here our course led over an ice-covered pass, on the other side of which lay the Nakra Valley, inhabited by Svans (page 103).

Although most of their customs retain a heathen stamp, the Svans are Christians. Their religion allows them to eat pork, and they do so as often as they can afford it.

Because of the pork-eating propensities of the Svans, the Balkars have called the pass *Douguz-Orun*, meaning "Pig Pass." Likewise, the mountain is called "Pig Mountain"; the glacier, "Pig Glacier," and so on.

To the Balkars the eating of pork is an abomination, and the antipathy they feel for the Svans is mutual. The Svans made a habit of catching the sheep of their Moham-

medan neighbors, killing the shepherds and bringing their booty across the pass. This activity was considered so praiseworthy that the Svan prince used to take part in person.

Consequently, a Balkar guard with a rifle was stationed on the pass. Yunus, my "guide," knew this, and, trusting in the armed support of his compatriot, kept trying to extort money from me. "Ber, ber," meaning "give, give," was the refrain.

Fortunately, I was able to make friends with the guard by giving him chocolate, a rare delicacy. This, he said, he loved "more than real tobacco and the most beautiful woman." Yunus was obliged to leave me unshorn and was sent home.

A year later, in 1929, when my expedition climbed Elbrus, we found conditions much changed. An automobile road led from Nalchik to the foot of the mountain. A shelter maintained by the Soviet Tourist Society occupied the site of our camp the year before, and the bridge had been repaired.

Said, whose horse I had bought on the last trip, was now one of the first mountain guides in Balkaria. Although he had no idea of mountain-climbing, he was well paid for leading swarms of Russian vacationists, as badly equipped as he was, to the pass below the two peaks. Here he would stop and explain that the weather made further ascent dangerous.

#### On the Roof of the Caucasus

Our equipment on our backs, we struggled slowly across the moraine to the eternal snow. We spent the night on the ice, near a kind of tin dog-hut called "Refuge 11," entirely filled by six Russians who had arrived before us.

The next day members of our expedition reached the summit of Elbrus, 18,471 feet, achieving the first ascension of the peak on skis.

As we climbed, it was indeed novel to see the mountain peaks, even the highest and proudest among them, sinking lower and lower beneath us. By the time the summit was reached, however, what began as a breathtaking panorama had sunk into a sort of relief map, more interesting than beautiful. Far below lay a sea of peaks, from the Georgian Military Highway in the east to the last snowy mountains in the west.

Ushba, one of the most impressive Caucasian peaks, seems no more than a small hill near by. Behind Ushba you see a low chain, and still farther to the south, in a bluish mist, the Transcaucasian lowland. Beyond the lowlands, on especially clear days, you can discern a whitish cone, Mount Ararat, the

heraldic mountain of Armenia, at present in Turkish territory.

In Batumi I once heard a Turk ask an Armenian: "Why do you have Ararat on your coat of arms when it doesn't belong to you?" The Armenian replied: "Does the moon belong to you?"

#### Mountains Guard Manganese and Oil

The main Caucasian chain, called "Greater Caucasus" in contrast to the southern chain, called "Lesser Caucasus," runs from the Strait of Kerch on the Black Sea to Baku on the Caspian. It is about 770 miles long and has a maximum width of 140 miles. The west part is not quite so high as the central portion, but drops sharply to the Black Sea.

To reach the manganese mines and oil wells and gain possession of the fertile valleys of Transcaucasia, an invading army from the north would have to cross the main chain, an extremely difficult feat. Some of the mountains are higher, wilder, and steeper than the Alps, and the passes, with the exception of the most westerly, are higher and more easily defended than the Alpine passes.

Moreover, between the First and Second World Wars the Russians built strategic roads and trained mountain troops in the Caucasus. They brought movies, radios, automobiles, schools, and a written language to the mountain peoples.

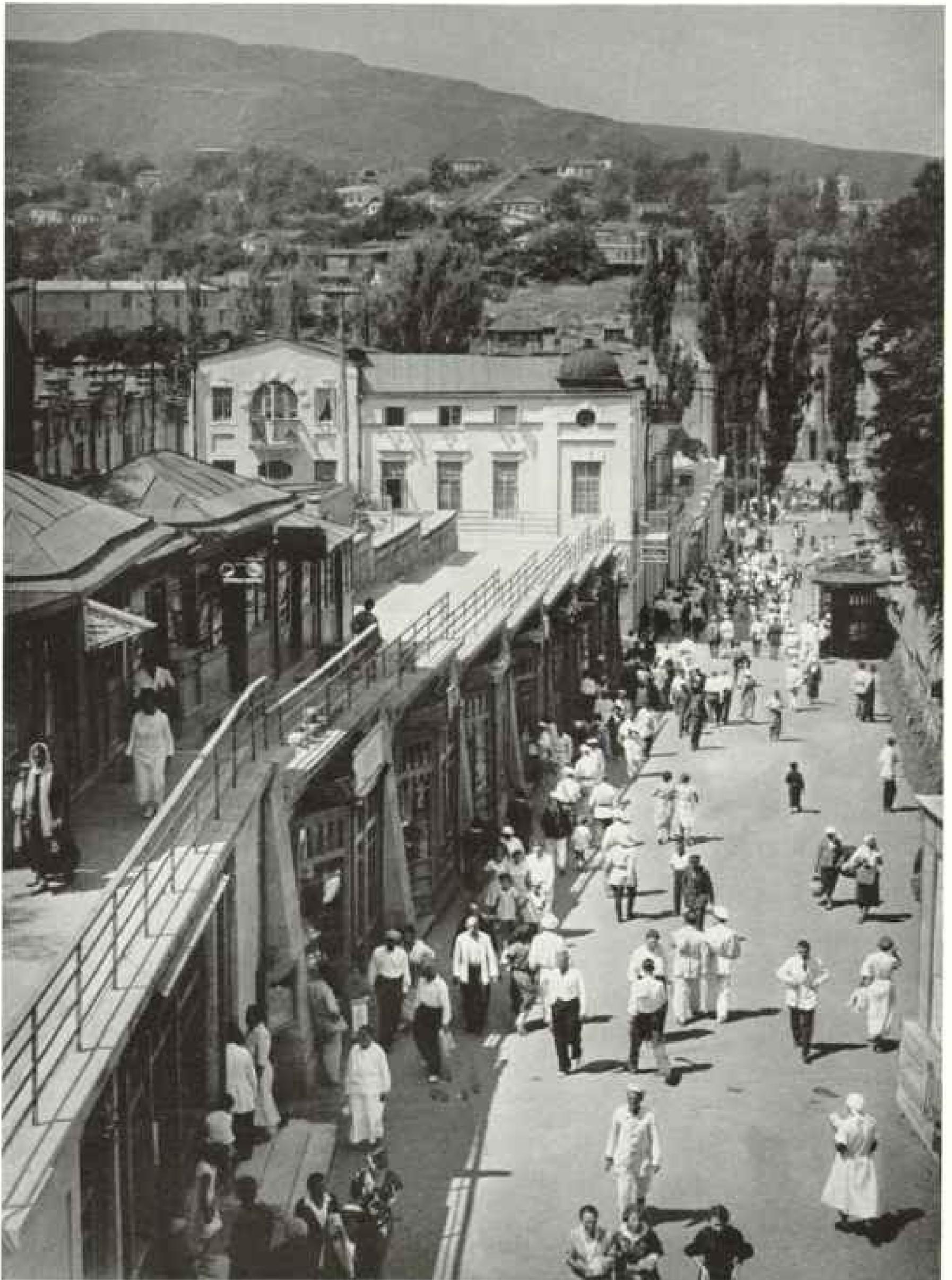
The inhabitants have never seen any culture but the Russian and consequently regard all culture as Russian. Today the majority of the mountain population of the Caucasus is loyal to the Russians.

In 1937 a hotel was built on the site of Refuge 11, where we had once spent the night on the ice (page 104). Supply wagons full of meat, potatoes, and wine are hauled to the hotel by tractors.

On the saddle of the Elbrus, where Said, the guide, used to end his "ascents," stands a modern observatory. Near the hotel skiing instructors conduct classes in alpinism, teaching the use of ropes, first aid, map reading, etc. The ski trip to the summit, which we were the first to make, is now a requirement for those aspiring to the blue insignia denoting an "alpinist of the USSR."

The Russian form of alpinism differs from the Swiss in at least one essential: It cannot be engaged in without official permission. I almost flunked an instructors' examination for not knowing that unlicensed mountain climbers are liable to arrest.

Russians are not allowed to make independent explorations, and only those foreign expeditions which have been approved by In-



Sufferers from Heart Ailments Fill Karl Marx Street in Kislovodsk.

They seek relief in this most famous of Caucasus Mountain health resorts. A mineral spring here yields more than 625,000 gallons of carbonated water, known as Narzan, every 24 hours (page 91). Before the war large shipments were exported. The second-story sidewalks are reminiscent of those in Chester, England.



### Soviet Farmers Harvest Bumper Crops on the North Caucasus Steppes

This collective farm is in the heart of the Soviet Union's richest grain region, lying between the Black and Caspian Seas north of the mountains. Crops move to market over a network of railroads. Gateway to the entire area is Rostov on the Don, river port and railway junction as large as Newark, New Jersey.

tourist, the Soviet tourist organization for foreigners, have this privilege. Since 1939, however, foreign expeditions have been almost entirely prohibited because of a not unjustifiable fear of espionage.

#### Sport for Defense

Every summer in peacetime, sport groups of the trade unions camp around Elbrus in tent colonies for a short course in mountaineering. One year, for instance, the Leningrad metalworkers had a camp in the region west of Elbrus, and the Nauka (science) group, organized by the union for scientific professions, camped in an adjacent valley.

These mountain-climbing expeditions are organized and planned by the central Moscow commission for sports. The aim is frankly represented as training for defense of the Soviet Union. Equipment, even shoes and clothing, is furnished free (pages 99, 102).

By their semimilitary sport organization,

the Russians have built up a reserve army for mountain warfare. Should German troops land in Transcaucasia or break into the North Caucasus by way of Rostov, the Soviet sport organization would get its supreme test.

One of the most interesting sections of the Caucasus is Svanetia, southeast of Elbrus, and the rapidity of its cultural development is just as amazing as that of Balkaria, its northern neighbor.

From the time of the Russian civil war, until 1928, when I entered my first Svan village, no foreign expedition had set foot on Svan soil.

The mayor, elder, or chairman of the village council—all different names for the same dignitary—came proudly and inquisitively to meet me. He was the only man in the whole village who spoke Russian.

"Where do you come from?" he asked.

"From Vienna."

"Where is that?"



### Daghestan Babies Attend Kindergarten While Their Mothers Till the Fields

Their homes are on the "January 9th" Collective Farm, named after the historic Bloody Sunday in 1905. On that date, a throng of workers, singing religious songs, marched to the Winter Palace in Leningrad (then St. Petersburg) to confer with Tsar Nicholas II. The tsar was absent. Troops opened fire on the defenseless crowd, killing about 1,000.

"In Austria."

"Is that the same as England? We don't like the English."

Later, when a few photographs and some tobacco had established friendly relations, he leaned over and whispered into my ear: "But, I assure you, we like the Russians even less."

#### "Blood Vengeance" Reduced Population

At that time there were virtually no Communists in Svanetia. They were hardly necessary, for the prevailing order was a sort of primitive family communism. The princes had been driven out by the East, or Free Svans, hundreds of years before, the West Svan prince having been sent home from the wars, naked, unarmed and on foot, the greatest disgrace that can befall a Caucasian prince. In every village the soil was tilled in common.

During Russia's civil war, for the first time

since the Russian occupation the Svans were free to devote themselves to their feuds involving blood vengeance. It was traditional for a young man to carry away a girl from a neighboring family, and for the girl's uncle to wreak vengeance on the young man.

Innumerable family wars broke out. Within a few years the male population had fallen about fifty percent.

The population was further reduced by the restoration of the Svan custom, prohibited by the tsar, of smothering unwanted newborn girl babies by putting a handful of ashes in their mouths, in order to spare them the disgrace of possible old-maidhood.

When the Soviets took over the administration of the neighboring section of Tsebelda, the Svans began a kind of peasant war against them. Failing to drive out the Reds, they retreated with their families and all their belongings to several uninhabited valleys,



### Skirts Billow and Boots Thump in a Caucasus Mass *Lezghinka*

Mountain horsemen and their partners take part in this favorite national dance at a *djigit*, or horse show festival, in Pyatigorsk (page 90). From the northern Caucasus come the celebrated Cossacks, whose reputation for daring horsemanship is world-wide.

where they settled. Every year more families packed their chattels on horseback and migrated to the new and growing villages in the west.

These historical facts were unknown to us when we entered the district. On the basis of the available maps, we expected to find a wilderness where unfortunately there was none—unfortunately because the Svans are not always the most pleasant company. As late as 1939 a Russian geological expedition was attacked by Svan bandits, the leader murdered, and another member wounded.

Our displeasure at finding the territory inhabited gradually gave way to the joy of discovery. In the end everything went off well enough.

#### Bullets, Then Apologies

In one village, where we arrived at dusk, Svans shot at us with rifles from an orchard. They apologized later, saying they had taken us for bandits.

Once real bandits did steal our entire baggage. By chance we came upon them again by a romantic campfire in the midst of the

Colchian forest. They returned our baggage, piece by piece, on condition that we leave them a tin box.

"What do you need it for?"

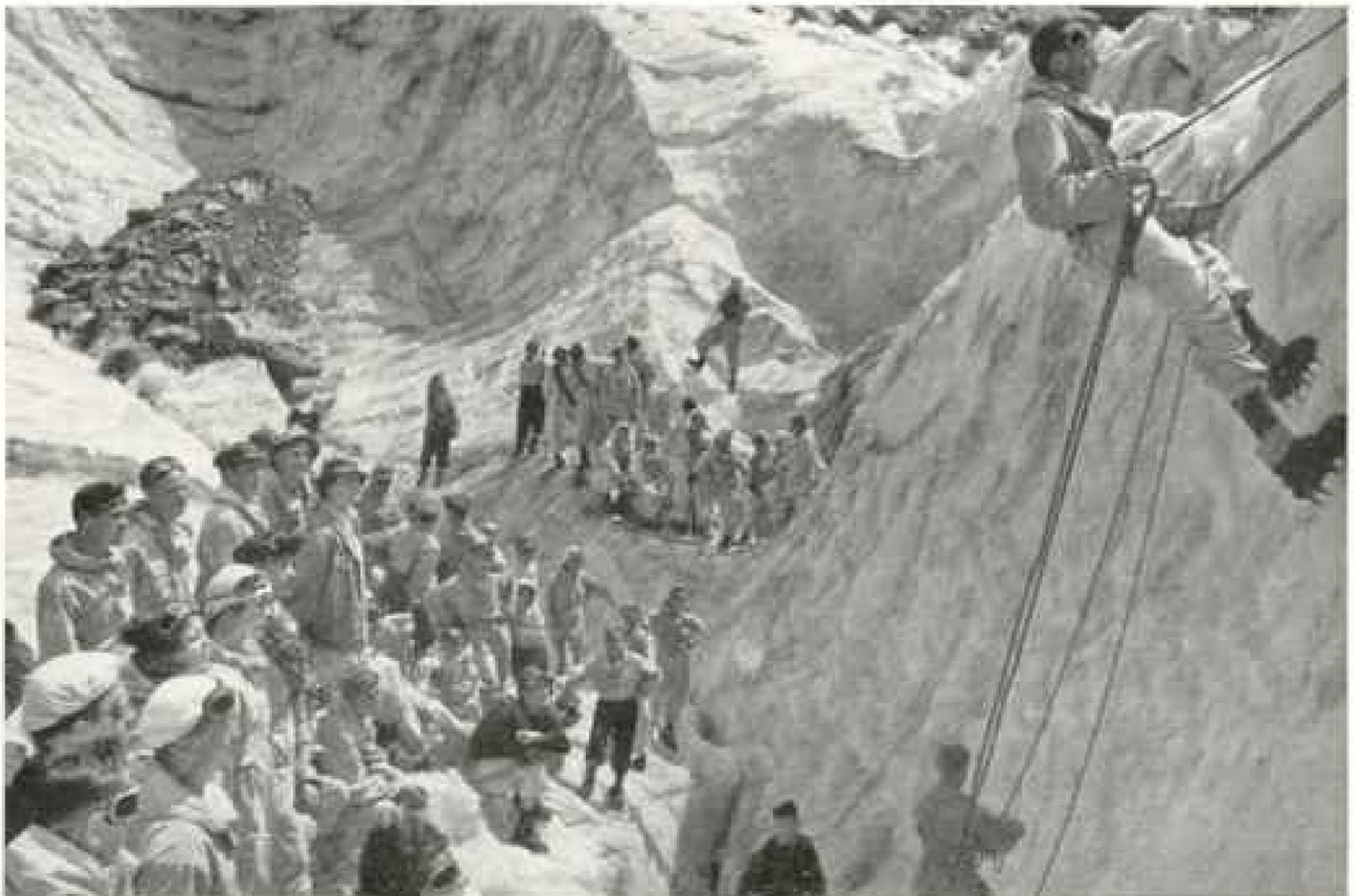
"For my wife's sewing things," answered the chief.

I didn't argue.

At length we reached the Sukhumi Military Highway leading over the Klukhor, an important pass in the west. Except for the level stretch near the coast, the highway at that time was impassable for automobiles. We traversed the lower part as far as Sukhumi in an ordinary peasant's cart.

Klukhor Pass itself is covered with snow most of the year and is difficult even for pedestrians to cross. I expected to ask the soldiers presumably stationed at the Klukhor Pass barracks for a saddle, hay, and a night's lodging. But when we arrived, we found the barracks were nothing but a small ruin, about 100 feet square, standing where the "military highway" definitely turned into a footpath.

The untrodden and almost impenetrable forest, the remains of avalanches surrounded by luxuriant vegetation, the towering cliffs



**White-clad Soviet Youths Learn to Defend the Caucasus**

Forfun

At an alpinist training camp an instructor shows a sports society how to descend a sheer wall of ice with spiked shoes and ropes. Such groups of young men and women are semimilitary (page 96).



Shaban

**"Now Tell Me the Same Thing, But Say It in Russian"**

The teacher and her assistant in this Kabardino-Balkaria school test little Vladimir Garbashiiev's knowledge of Russian. He and his fellow pupils speak a native tongue related to Turkish, one of numerous dialects in use for centuries throughout the mountain area.

and gleaming icefields in the distance, were inexpressibly beautiful. We crossed the dense mountain forest, waded along rushing mountain brooks, and pitched camp at the other end, amid fragrant alpine shrubbery, at a place visited only by an occasional Abkhaz shepherd.

The Autonomous Republic of the Abkhaze consists chiefly of the Kodor Valley and the territory northwest of it. In their own homeland the Abkhaze are outnumbered by Georgians and Greeks.

A large part of the cattle-raising population follows the herds, men, women, and children carrying their chattels from one grazing ground to the next. In the worst months of winter these Abkhaze take refuge near the sea, where there seldom is frost.

Moisture in the winds from the Black Sea condenses on the south side of the west Caucasian chain, and rainy days are frequent in the Abkhaz territory. Sometimes the rain is so abundant that one really thinks of building an ark and landing on Mount Ararat. The frequent rains account for the extraordinarily luxuriant vegetation in this district.

#### Peasant's Palate Collects a Specimen

As we sat in our tent on one of these rainy days, Abkhaz peasants came to visit us. They looked over my plant collection, which I was at pains to keep dry, and let water run down on it from the broad brims of their white felt hats.

The pride of my collection was a particularly beautiful *Exobasidium* (parasite of the Pontian rhododendrons), a great rarity in herbariums. Suddenly one of the peasants took my *Exobasidium*, told me it was a delicacy, and, before I realized what he was up to, swallowed it.

Having damaged my plants and swallowed my prize specimen, they announced the purpose of their visit. They had come to ask us, on the basis of our scientific knowledge, if we knew whether or not there was a God.

In this region, the valleys less than about 3,000 feet in altitude were infested with malaria until the recent draining of swamps. Sometimes virtually the whole population of a village was taken sick.

Here, as elsewhere in Russia, quinine was exceedingly hard to obtain, and since we had plenty of it with us, we were soon known as the great medicine men.

Old and young came to us with all sorts of pleas and ailments. We helped them as best we could. Our most difficult case was a doddering old woman who asked us for a medicine that would give her children.

We left Abkhazia with the promise to come back. On every subsequent trip we were amazed at the change in the country. Each year a new strip of jungle was deforested and cultivated. The trees were burned down and a simple wooden hut erected, often on stilts on account of the dampness of the soil. The first crop was always corn and was followed by more valuable crops.

The Svans, more than some other Caucasians, have broken the spell which for a thousand years seems to have chained them to their mountain homeland. Now they spread out and settle. The Government is giving them schools and clubs.

Today parents ask their children to write letters for them: "Anton dearest, we are alive and well. . . ." "Can you write that already, son?"

#### Prince Becomes a Government Clerk

Even in Svanetia proper, which I crossed again with my American friend, Rand Herron, great changes have taken place. As we were driving our donkeys across the steep, sunny mountain slopes, a group of armed riders came toward us.

After the "whence and whither" with which every conversation begins here, one of the riders whispered to me significantly: "Do you know who that is who spoke to you? He is a prince."

It turned out that the speaker was actually the ex-Prince of West Svanetia, Prince Dadish Kiliani, whose father once presented Ushba, one of the most beautiful mountains in the country, as a souvenir to a foreign woman mountaineer, confirming his gift with a kiss.

Since only members of the Communist Party had the right to bear arms, I asked the Prince how he managed to ride around openly with a rifle. It turned out that he had joined the Communist Party in preference to going unarmed. He had accepted a job as clerk in the new government building.

A few years later we might have met Dadish Kiliani in a motorcar. By 1939 tourists were traveling by truck to this territory, which was previously accessible only on foot or horseback, and that only three months of the year.

Despite rapid changes in living and travel conditions, the Caucasus has retained much of its picturesque quality. Although little is done to preserve them, the battlements and embrasures of medieval Svanetian fortresses still stand.

Svanetia is naturally suited to fruit growing and cattle raising, and its climate is one of the best for the cure of tuberculosis. Yet in



Hartman

### A Daughter of Daghestan in the Caucasus Offers a Drink of Cool Mountain Water

Her brass water jug is an example of old North Caucasus craftsmanship. For generations these mountaineers have excelled in metalwork. Most celebrated are their exquisitely hand-wrought silver daggers, swords, and cartridge cases.

famine times as much as a fourth of the population has been tubercular as a result of hunger and bad living conditions.

In winter the lack of food caused a large part of the male population to migrate to the lowlands and hire out for work in the vineyards. Recently, however, the men have begun to work at home as lumbermen.

#### Funeral and Marriage Feast Combined

We learned from Svan acquaintances in Taurari that an old man had just died and that my former donkey driver had married. The result was a banquet in celebration of both the funeral and the wedding.

The food for a banquet is provided in common by the whole village, since the villages are for the most part clan settlements in

which everyone is related. Long tables and benches are set up in the open before the church, facing the mighty snow-capped mountains. The whole village is invited to partake of Cousin Uman's stuffed barley bread, old Anton's baked squash, and real Russian tinned fish.

The tables were not even cleared in the afternoon when the funeral was transformed into the wedding. The only change was that the priest now performed a religious service, which I did not understand, and the women mourners who had sobbed, beaten their breasts, and sung in falsetto tremolos long enough, were allowed to go home.

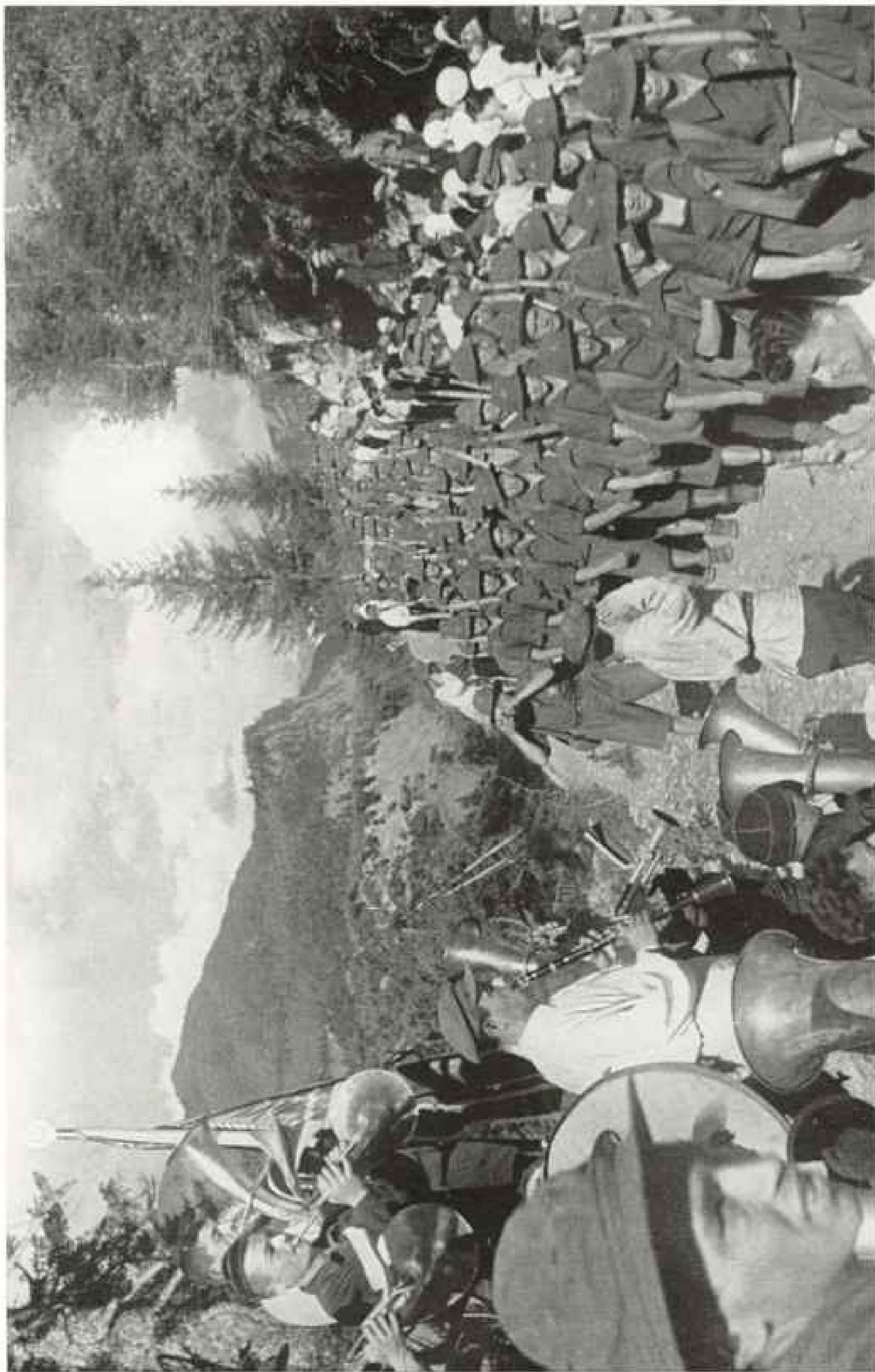
I was amazed at the immense quantities of food which the Svans consumed in one day, perhaps to compensate for leaner times.



Reefite

**Journey's End in Sight—A Pack Train Nears the Twin Peaks of Lofty Mount Elbrus**

The mountain climbers are members of a Soviet sports society on a mass excursion to the double-headed, snow-capped cone. The western peak, 15,471 feet above sea level, is slightly higher than the eastern. Both summits are the funnels of ancient craters, now filled with snow and ice (page 94).



1917-18

**Svan Mountaineers Turn Out with a Brass Band to Serenade a Sports Society at an Alpinist**

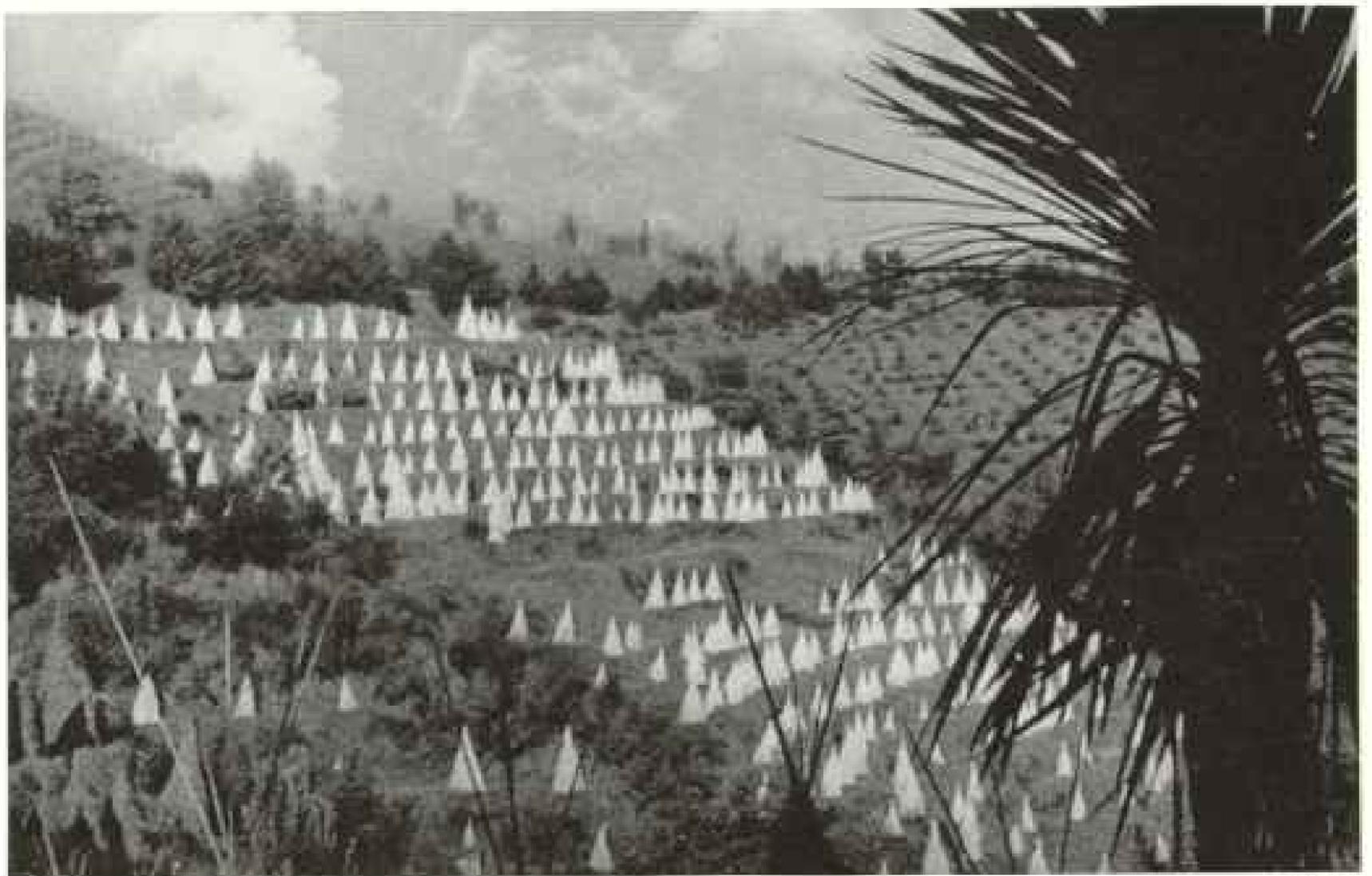
The mountain festival is part of the 20th anniversary observance of the founding of the Workers' and Peasants' Red Army and Navy. In the days of the tsars, such a parade in Svanetia would have been the signal for bloodshed, for the mountain folk bitterly resented the intrusion of outsiders.



Seydora

### Streamlining Comes to Europe's Highest Peak, Mount Elbrus

Although this blimp-shaped hotel in the Caucasus is almost 14,000 feet above sea level, it is still nearly a mile below the summit. With steam heat and electric lights, the hostelry is the welcome Refuge 11 for hardy climbers on their way to the top (page 94).



Seydora

### Winter Bivouac—Not Tents for a Regiment, But for an Orchard of Lemon Trees

Three layers of white cheesecloth keep off frost during winter months. Fruits thrive near the Black Sea, and this coastal zone of Abkhazia forms a gigantic natural hothouse (page 107).

In the evening we were invited to the house of Roba, the donkey driver and bridegroom. *Raki*, a liquor made from corn or more frequently from elderberries, was served. Everyone present, a man and woman alternating, drained a glass at one gulp, made a speech invariably greeted with laughter or applause, and then sprinkled the remaining drops on the fire.

We were applauded as wildly as the previous speakers, although no more than two or three of the guests understood a word we spoke.

In one of the mountain villages our donkey driver invited us to a Balkar meal. To make the hospitality complete he had the numerous women of his family stand before us in a row and invited us to choose the ones we liked best for the last day of our stay. He hinted that he would by no means reject a return present in the form of a fur cap. It was very hard to decline.

The sequel was that we had to waste two days finding a new driver.

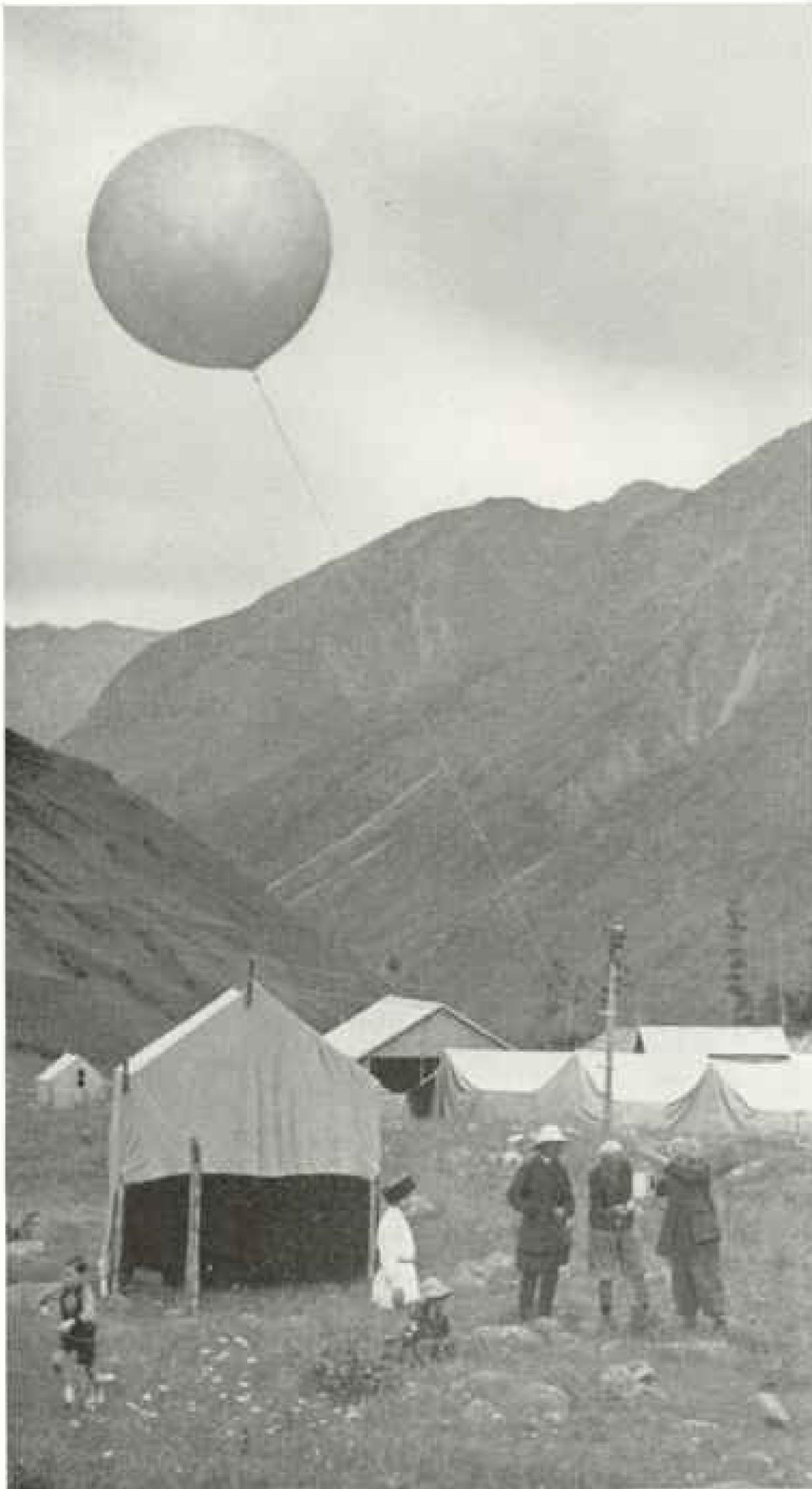
The Caucasus is a plant hunter's paradise. Never have I seen such luxuriant vegetation as in the Seskhvir Valley, for example. We had to cut our way through the woods with our knives and ice axes, and in the meadows bushes growing to a height of seven to ten feet hid us from one another.



ARTHUR F. BARNARD

### Fearless and Independent Is the Svan Mountaineer with His Ready Blade

His tribe, suspicious of strangers, clung to its rugged homeland in the Caucasus for a thousand years. Now many have adopted modern ways, expanding into near-by valleys and clearing wilderness for cultivation. The government has set up clubs and schools for them, and children have learned to write letters for their parents (page 100). A few Svans remain unchanged, and banditry in some areas persists.



### With a Radio Sounding Balloon, They Study Air Currents Amid Caucasian Peaks

On the slopes of Mount Elbrus, in the Caucasus, an annual expedition of the Soviet Academy of Sciences has set up its camp. Its members learn about aerial currents, physical texture of clouds, and optical properties of fog (page 96). Physiologists study the reactions of the body, particularly the heart, at high altitudes. From their experiments they have learned how to combat mountain sickness.

The plants were incredibly colorful, particularly the impressive *Telekia*, which looks like a sunflower, and the ten- to twelve-foot high *Heracleum mantegazzianum*, a gigantic cow parsnip.

The moldy dampness of the forest floor was an eldorado for millions of mushrooms, and on the shores of the brooks were large quantities of bear dung, although we never saw a bear.

We had to cross the rushing, unbridged Seskvir River several times. The donkeys waded belly-deep in the gushing water, while we ourselves crossed on a huge Nordmann's fir that had fallen over the stream.

Once, in the excitement, our donkey foal escaped me and fell into the water. Fortunately, he soon grounded on a sandbank. After this experience he developed a sad fear of water. At every little rivulet he hesitated, filled with terror.

### Copper and Molybdenum Found

Even today, all the higher Caucasian peaks have not yet been climbed and explored. However, new data about the mountain groups, compiled in Soviet cartographic institutes, is now available, and I am told a new map of the Caucasus has been prepared. But the latter is kept a dark secret lest it fall into the hands of foreign general staffs.

One of the most in-

adequately explored sections of the Caucasus was the region about 55 miles southeast of Elbrus along the border between Ossetia and Balkaria. In 1929 a German expedition was there at the same time as ours. This we learned from Balkars whom we met on a narrow, perilous road hewn out of rock in the deep ravine of the Cherek.

"What are they looking for up there? It must be copper," the Balkars mumbled.

They were not far wrong, for geologists did find molybdenum and copper in east Balkaria a few years later. Where in 1929 there had been a lonely Balkar village, today there are miners' settlements and a newly built highway over which trucks carry the ore to the valley.

After two to three months' climbing in the high mountains, sleeping in uncomfortable tents, doing scientific work in the virgin forests, and engaging in linguistic struggles with the Svans, Balkars, Abkhaz, and Ossetians, it felt good to turn toward the comforts of the cities and resorts of the south.

#### Down to the Black Sea

The closer we came to the seashore the more tropical the vegetation became, in the forest as well as in the cultivated sections. There were wild figs and chestnut trees in the forest, and fruit of almost every kind in the gardens and experimental plantations. Here, side by side with more northerly varieties, pomegranates, figs, melons, persimmons, oranges, tangerines, and even bananas thrive (page 104).

Nearly every year some new plant is acclimatized. Recently, for example, the gutta-percha tree has been successfully introduced to this section.

Farther inland, rice and tea are grown in large quantities. Native Caucasian tea culture has developed to such an extent that it meets much of the enormous Russian demand.

The Caucasus is an old wine country. We often met Georgian wanderers who offered us a swallow of new wine from a flask slung on their shoulders.

As soon as we reached a city, the invitations began. At every glass of wine—and the host sees to it that there are many—Georgian custom requires a toast.

The Caucasian cities vie with one another in hospitality, as far as political and economic conditions permit. In Sukhumi (formerly Sukhum Kale, meaning Water-Sand-Fortress in Turkish) a Georgian innkeeper refused to accept money for large quantities of Kakhetinian wine we had consumed. His only demand was: "When you get home,

tell them the Georgians are good people."

This was in 1928. Since then the circumstances of the Georgians have changed considerably. Here, as everywhere in Russia, private inns have disappeared, there is no room in the hotels, and foreigners are looked on with suspicion.

We continued our journey along the Caucasian Riviera to the Crimea by ship. Beyond Sukhumi deep green banks descend steeply to the bright blue sea. We passed Byzantine ruins, castles built by Russian grand dukes, white villas, sanatoria with broad terraces.

From the little village of Khosta the Caucasian Nature Preserve extends inland. It is about 60 miles in diameter and embraces the southern slopes of the mountain range as well as the west Caucasian peaks.

#### Train with "Artificial Climate"

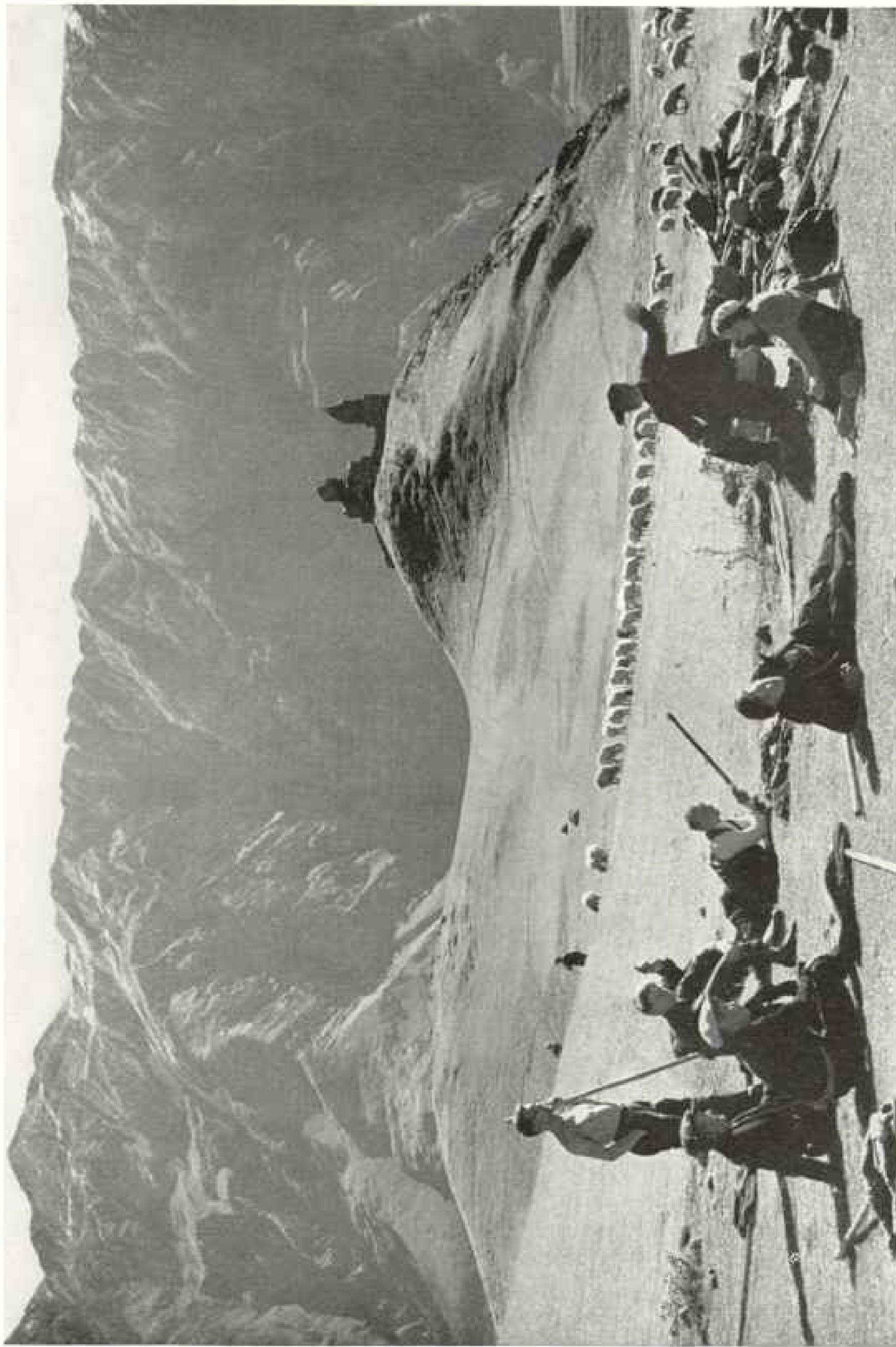
Near the city of Adler the railroad begins again. It is the only line that crosses the watershed of the Greater Caucasus, and it goes over the western end, where the mountains and passes are not so high. The Moscow-Adler line was the first in Russia with air-conditioned trains—trains "with artificial climate," as the Russians call them.

As we went westward, the mountains grew lower. After leaving Novorossisk, which produces enormous amounts of cement for the Soviet Union's hydroelectrical developments and industrial plants (page 113), the ship no longer followed the coast, but headed straight for the southern tip of the Crimea, for Yalta or Sevastopol.

A few years later, in 1939, the tourist associations began to give out prospectuses for a trip in these waters on the "fastest passenger ship in the world," a strange, shallow-draft, double-bottomed craft made entirely of plastic and capable of carrying 150 persons at a speed of 45 miles an hour (p. 117). At the moment it is no doubt engaged in troop transport.

For many years there has been regular airplane service along the Black Sea Riviera. I was intending to repeat my journey by air, when once again I learned that in the Orient—and the Caucasus is purest Orient—there is no use making plans, for they rarely turn out as expected. An accident on the newly built Zugdidi-Kutaisi railroad stretch made me miss the plane, which later crashed into the Black Sea.

Service was suspended while the cause of the accident was being investigated, and I was forced to take the train. The only rail route, then as now, is around the whole Caucasus, from the subtropical Black Sea regions to the deserts of the Caspian Sea area, and back



Caucasus Vacationists Pause in Green Pastures Before Tackling 16,541-foot Kazbek, with Its Eight Mighty Glaciers

Photo 1011



ARTHUR P. HANCOCK

### By Covered Wagon, Cattle Herders Move to New Grazing Grounds in the Caucasus

With the approach of winter, other mountain families travel, in their bullock carts, in their bullock carts, in their bullock carts. There they escape the intense cold, and the men work in the vineyards. Recently, the growth of the lumber industry has meant winter jobs for the men at home, thus cutting down the number of migratory workers.



Julius Hesse from Black Sea

**Mountain Farmers Go to Market on the Ossetian Military Highway, One of Three Main Roads Across the Crest of the Caucasus**

Southern terminus of this route is Kutaisi. Farther east runs the famous Georgian Military Highway to Tiflis. To the west a third route goes to Sukhumi, on the Black Sea. For the Nazis to invade Transcaucasia by these land routes would be a tremendous task. Rugged mountains and narrow passes are natural fortifications.



Victoria Selts

**Stone Refuge Towers, with Windowless Houses Snuggling at Their Bases, Overlook All Approaches to the Svanetian Town of Gebi**

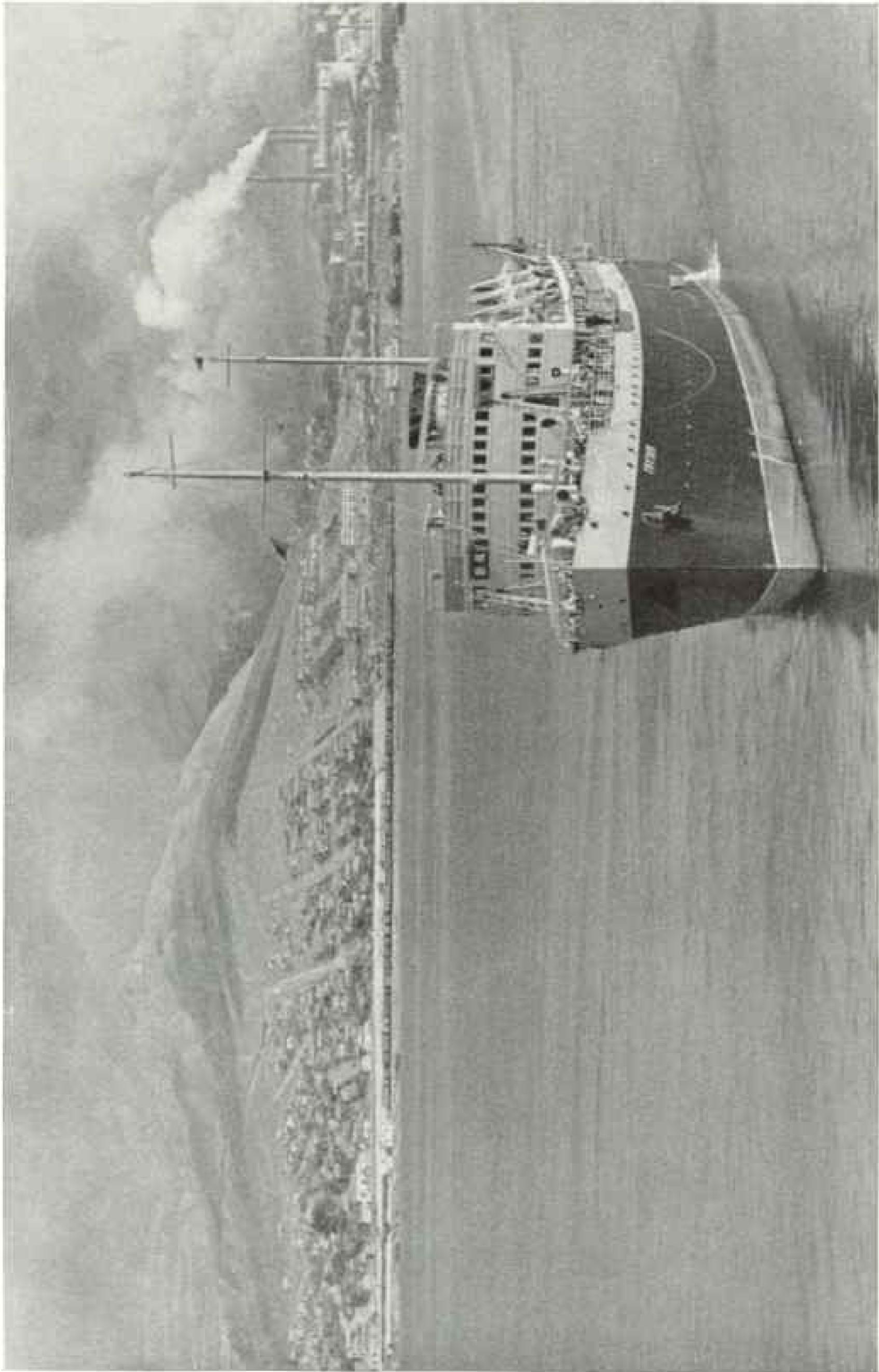
Relics of a vanished lawless era are these square, loopholed columns found in many villages near the crest of the Caucasus Mountains. Many are built of granite blocks. Nearly all are whitewashed. When invaders took a community by assault, the surviving inhabitants would flee to the towers and defend themselves to the last.



Julien Bryan/Corbis Black Star

### Freighters and Tankers Come to Batumi, Black Sea Port, for Oil Piped Across Transcaucasia

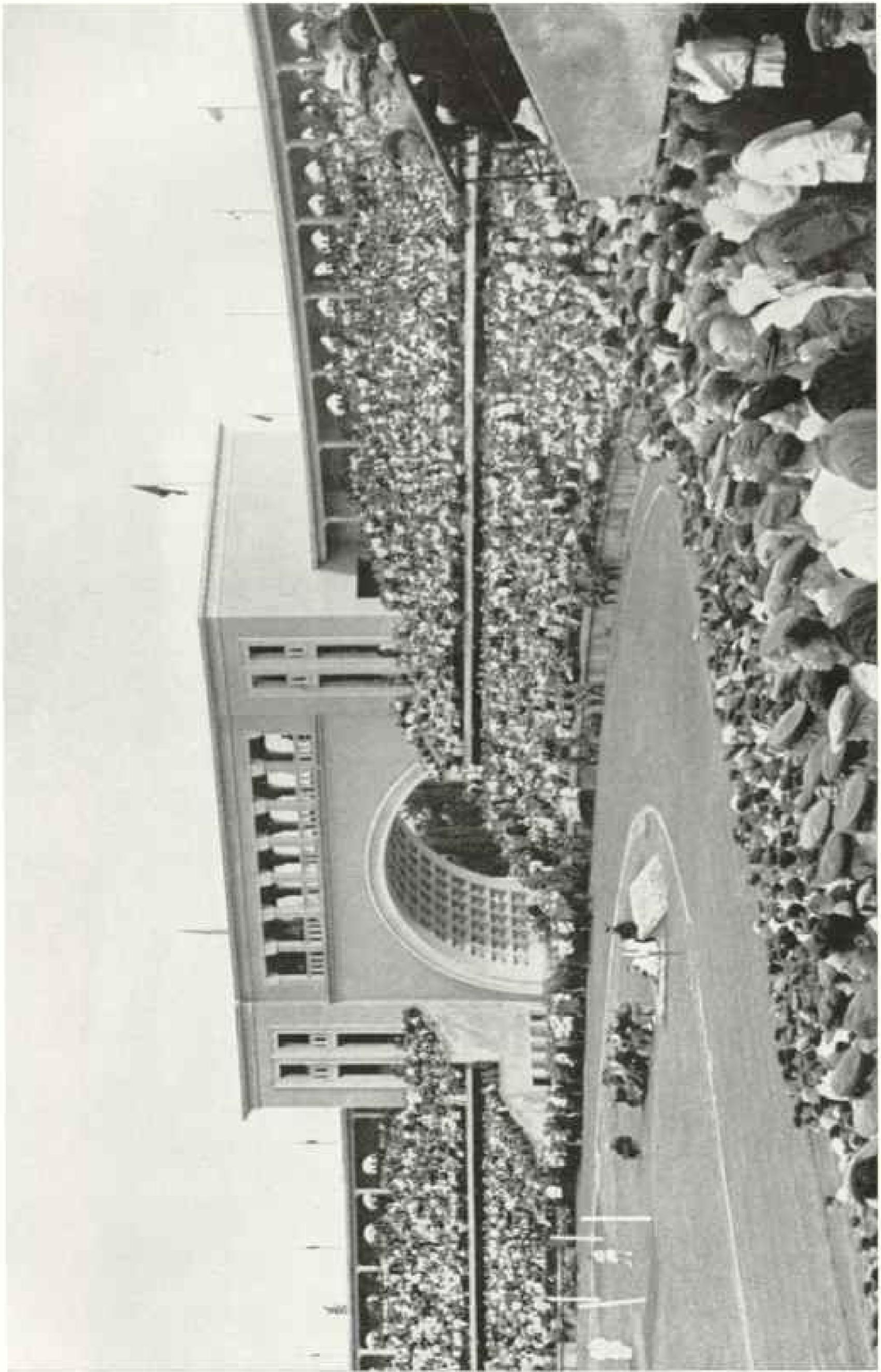
The 510-mile pipeline, completed twelve years ago, ends close to the water front, at huge refineries built by the Government. Special harbor pipes carry the fuel from the refineries to the ships. Batumi leads all other Soviet ports in exportation of oil. The sign in the center of the picture indicates that this is a passenger pier.



Harbin

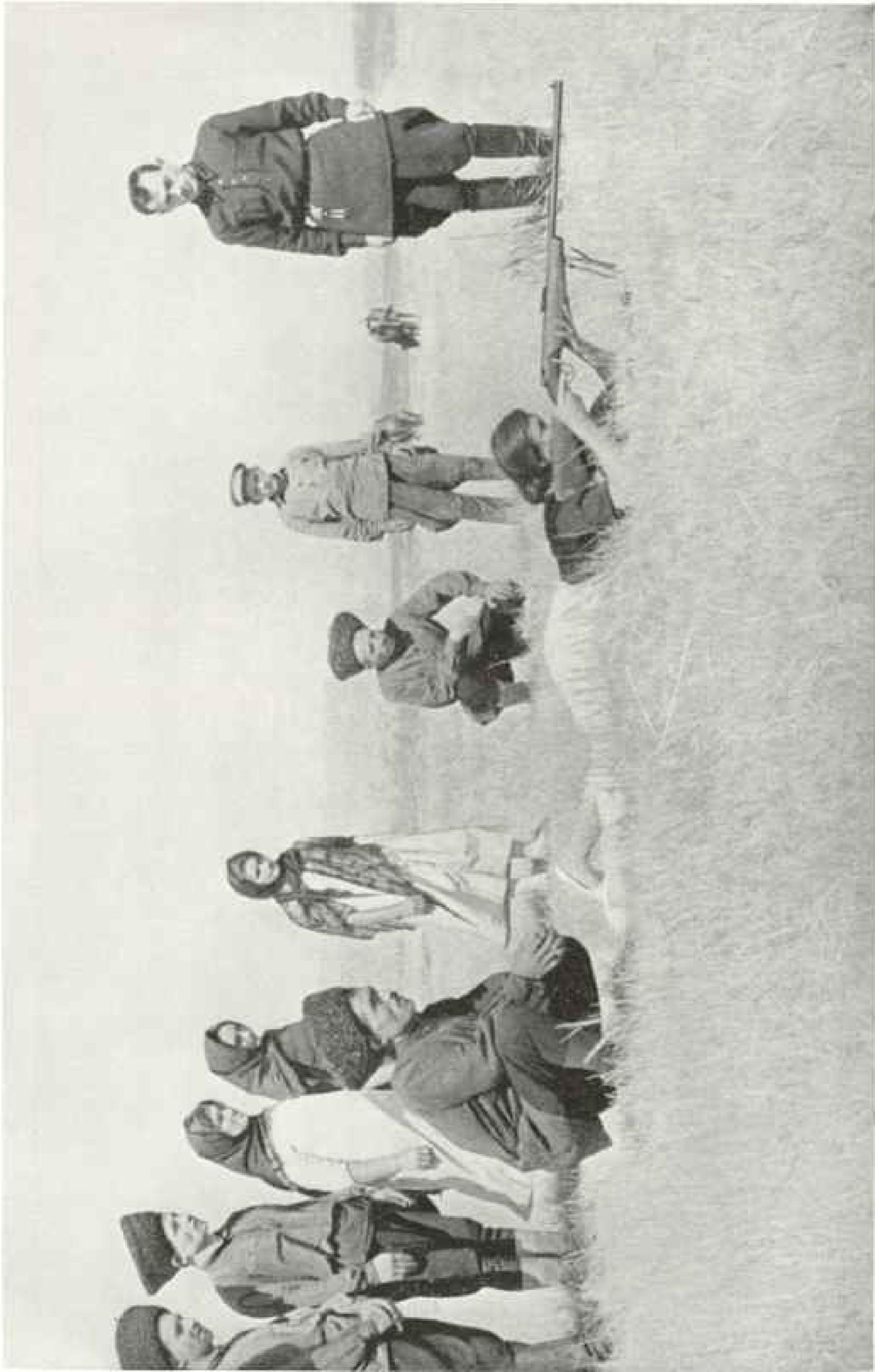
**Wheat and Champagne Go to Sea from the Harbor of Novorossisk**

The grain comes from the North Caucasian steppes and is stored in a huge modern elevator with a capacity of more than 55,000 tons. The champagne comes from 500 acres of vineyards which surround the city. Some years more than 775,000 quarts of the wine are exported. In foreground, the Soviet steamer *Gruzia*.



In the New "Dynamo" Stadium, Tiflis Celebrates the 20th Anniversary of the Georgian Soviet Socialist Republic

The huge amphitheater is named for the sports society responsible for its erection. The Republics of Georgia, Armenia, and Azerbaijan make up the Soviet's "Deep South" below the Caucasus Mountains. Tiflis is the capital of Georgia (pages 118 and 120).



APR 1918

**Maiminat Saibutdinova, Girl Tractor Driver, Takes Time Out for Target Practice at a Daghestan Farm Machine Station**

With her fellow workers she learns guerrilla warfare tactics to be used if the Nazis invade her homeland. These young highlanders thus add export knowledge of modern weapons to their centuries-old mountain-fighting heritage. Daghestan lies on the northern side of the Caucasus and stretches along the Caspian Sea.



Julien Bryan

### Machines Are Replacing Manpower, But Human Muscle Still Finds Plenty to Do

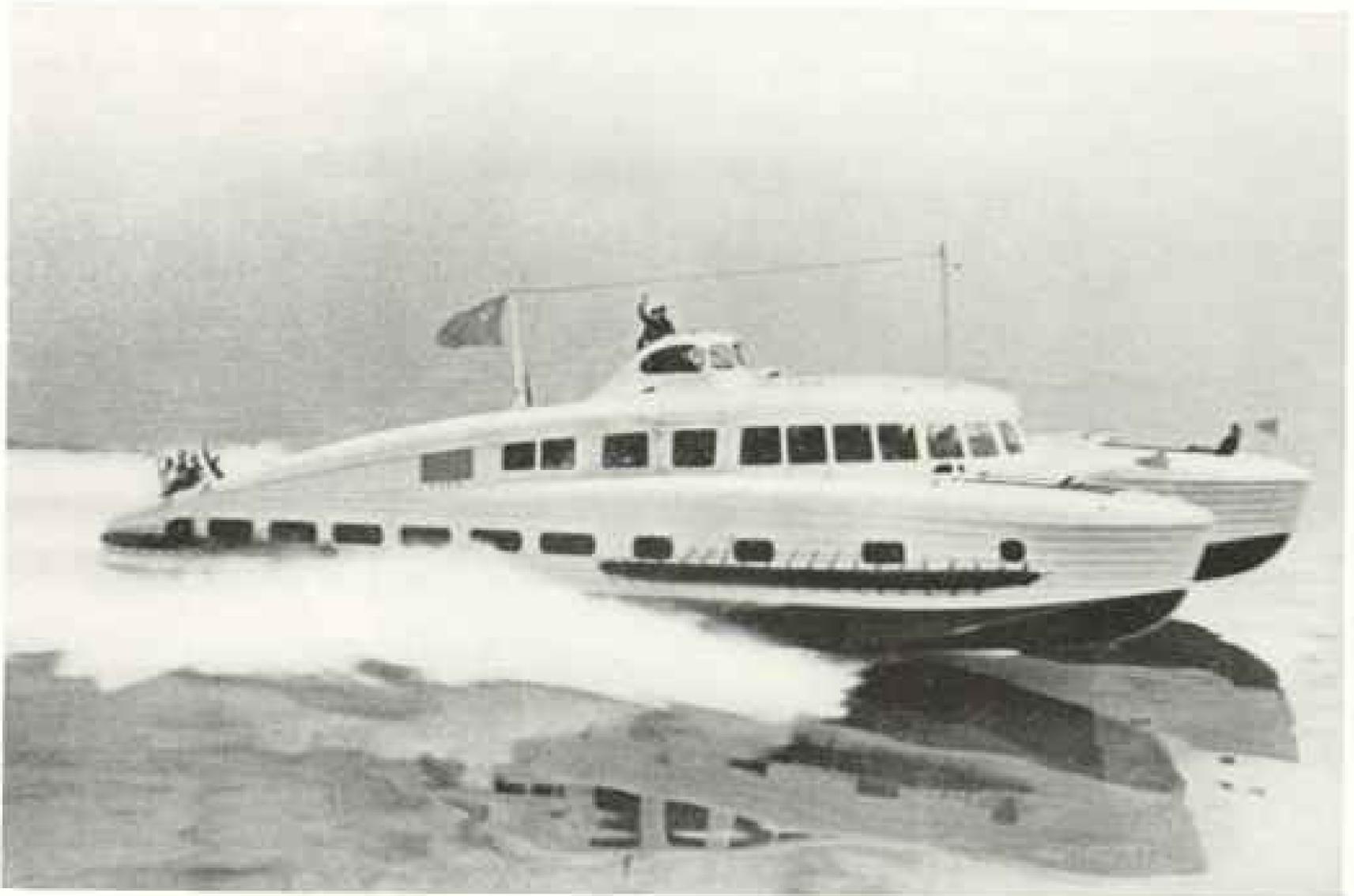
On a collective farm two Georgians hand-haul a wickerwork wagon laden with newly threshed wheat. Ten million acres of land in Russia's Georgia are devoted to collective farming, with many tractors and other machines to lighten the drudgery.



Bryan

### Into Sterch-Kertch the Mountaineer Rides to Post a Letter

He carries the traditional Daghestan silver cartridge cases in his breast pockets. Today they are more ornamental than useful. Like his forebears, he wears a warm lamb's-wool cap and long wool coat.



**With 150 Passengers, This Glider Cuts the Waves at 45 Miles an Hour**

Powered by two 675-horsepower engines and two smaller auxiliary motors, this 78-foot Black Sea speedster has a cruising range of 373 miles. The glider makes the 75-mile trip from Sochi to Sukhumi, an eight-hour voyage for a Diesel-engined express boat, in two hours (page 107).



**Sturgeon from the Mouth of the Kura River Go by Air to City Markets**

The rushing Kura enters the Caspian Sea about 80 miles south of Baku. From here comes world-famous Russian caviar, salted roe of the sturgeon.



#### *Ashugs of Azerbaijan Sing Century-old Songs.*

When the tsars were in power, these folk bards were persecuted because they sang of freedom. Today they are favorites throughout the countryside and take part in the concerts of the Azerbaijan State Philharmonic Orchestra.

again westward to Rostov, along the steppes of the North Caucasus.

After I had made myself comfortable in the practical bunk, it occurred to me that the change in route might have some advantages. The train would take me through regions far more interesting to the modern world than the luxuriant vegetation of Abkhazia or the lonely mountain peaks.

#### Millions of Tons of Manganese

I was awakened early in the morning by the cry: "Shorapani! Change for Chiatura!" To whom do these names of Georgian provincial towns mean anything? Yet they are exceedingly important from an industrial point of view.

Near the obscure little town of Chiatura are the largest deposits of high-grade manganese in the world. Manganese is required for making steel.

Long, empty freight trains roll daily through the Kvirila Valley to the pits and return full of ore, which normally is carried to Poti, a Black Sea port, for shipment.

The manganese reserves in Georgia are estimated at 140 to 150 million tons of crude ore—enough for several mechanized world wars, or for immense peaceful progress.

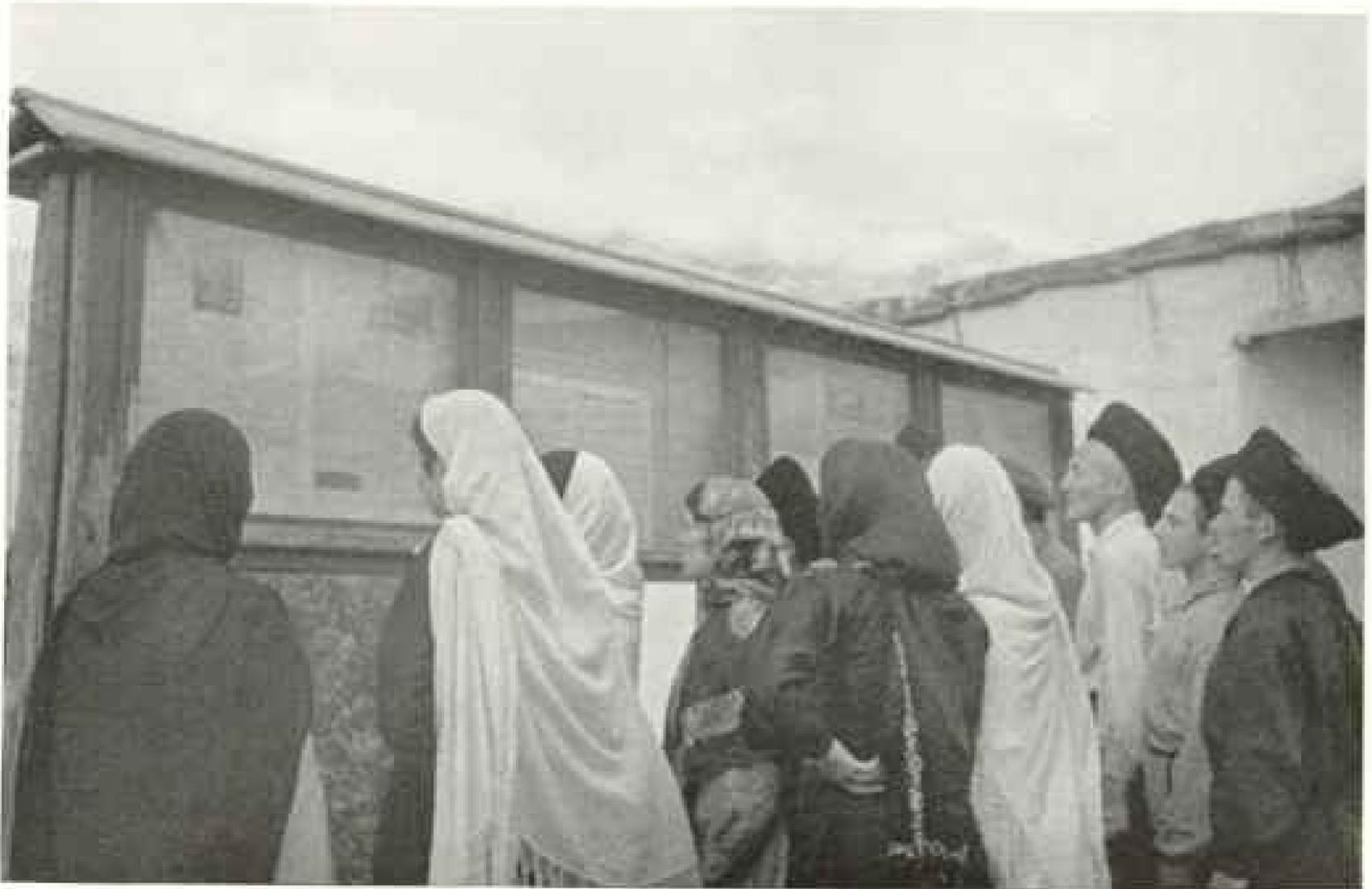
The next interesting stop is Tbilisi, the official name of the capital of Georgia, second largest city in the Caucasus. Outside of Russia, the Russian name, Tiflis, is more familiar, but the Russians prefer to use the Georgian name to emphasize the Georgian character of the city.

The population takes pride in being the best dressed in any city of the Soviet Union. Caucasian national costumes of all sorts mingle with modern

fashions in the restaurants and theaters. The national Georgian opera, second only to those of Moscow and Leningrad, is in Tiflis (pages 114 and 120).

Scarcely any other city in the world has such a babel of languages. One hears Georgian and Russian most often, but there is also plenty of Jewish, Armenian, Turkish, Greek, Iranian, and German, as well as the languages and dialects of some fifty Caucasian peoples who frequent the city. Arab geographers had good reason to call the Caucasus "Mountain of Languages."

In the last few years, Transcaucasia has been faced with the problem of keeping the power supply adequate to the increasing demands of heavy industry. The organization



#### How Goes the Battle? News from the Front Reaches Daghestan

Harfina

Townpeople gather before Agvall's newsstand to read the latest bulletins. Before the Russian conquest, in the 19th century, none of the 30 tongues spoken by the mixed tribes of this Caucasus Mountain district had been reduced to writing. Today 52 newspapers are published in 10 different languages.



#### Shahnazarov, Village Schoolmaster, Reads the News to Old Daghestan Farmers

Harfina

In their youth they had no opportunity to learn to read or write. Here, on the Gergzil Collective Farm, they are kept informed by younger men. Their grandchildren often write letters for them.



—Tiflis

### Students Compare Notes from a Vantage Point Overlooking Tiflis' Square of Heroes

The plaza is a memorial to distinguished scientists, men of letters, and soldiers of the Soviet Union (page 115). Joseph Stalin, Soviet Premier, was born in the village of Gori near this city. His father was a Tiflis shoe factory worker. Here Stalin, as a youngster, first led revolutionary movements against the tsars.

of defense industries in the United States involves the same problem.

The Georgian authorities solve it in typically Soviet fashion: Whenever there is a current shortage due to the power demands of new factories, private consumption of power is rigorously throttled. In the last few years it has not been unusual for a traveler to arrive in Tiflis by the light of oil lamps.

At such times the streetcars run only at predetermined hours, and other means of transportation become frightfully overcrowded.

#### Forest of Oil Derricks Near Baku

From Tiflis one can either take a bus directly northward on the Georgian Military Highway, the only highway that crosses the main chain, to Ordzhonikidze, the capital of northern Ossetia, or take the train around

the whole East Caucasus in a wide circle along the Caspian Sea. I decided to take the train.

After Tiflis the landscape becomes steadily drier, the woods gradually vanish, and the train travels for almost a whole day through desert country, all the way to the Caspian Sea.

In the night shadows of this waste land, we saw a strange forest, the first in 1,000 miles. It turned out to be a forest of oil derricks, extending about ten miles northeast of the so-called "Black City" of Baku. Almost half a million of Baku's 810,000 inhabitants live directly or indirectly from petroleum.

Oil and manganese are the two great magnets drawing the attention of the world to the Caucasus.

From 80 to 90 percent of the crude oil produced in the Soviet Union comes from Caucasian wells. The annual production is



**Ships Refuel at Floating Filling Stations Far Out in the Caspian Sea**

Oil tankers from Baku have anchored along the route of southbound vessels. The tankers thus avoid the long, tortuous passage through the Volga Delta into the port of Astrakhan. Skippers leave Astrakhan with little fuel, knowing that the oil boats will be waiting for them. Baku, on the Caspian, is the center of the Soviet Union's richest oil-producing region. This modern city is as populous as St. Louis.

estimated by experts at approximately 30,400,000 metric tons, or 212,800,000 barrels—about as much as California's annual output.

Baku has the character of a modern industrial city. It is surrounded by pleasant new suburbs with parks and playgrounds. Donkey-riding peasants, for whom time is still the cheapest thing on earth, are a picturesque contrast amid the rushing buses and electric suburban trains. The variety of Caucasian nationalities gives the city a gay stamp.

The railroad continues northward along the shore of the "bluest of all seas," as the Russians like to call the Caspian, past the wheat-fields and herds of cattle in Daghestan, past fishing boats and picturesque old cities. Most memorable of these hoary towns is Derbent, vivid against the mountain slope with its in-

numerable motley-colored towers and walls.

From Makbach Kala, capital of the Republic of Daghestan, and the northernmost of the coastal oil fields, it is about 550 miles over North Caucasian steppes back to Rostov. Over this vast area the train traveler sees pastures, herds, lambskin caps, hilly steppes, Cossack settlements with sunflower plantations, tractors and combines working on broad fields, and here and there Red Army soldiers maneuvering.

Here he is most aware of the vast monotony of the Russian landscape, the endless distances. After a bumpy night, he looks out of the window and sees seemingly the same grazing horse, the same small hut he saw at twilight, alone against the violet profile of the distant heights.



**History Repeats Itself as Diggers and Yanks Swing into Step Once More**

Just as their fathers did in World War I, Aussies and Americans have become bosom friends. Here United States sailors with Australian infantrymen and airmen stride down a street in Darwin.



**From a Camouflaged Emplacement an 18-pounder Spits Lead at a Sea Target**

Back shoots the breech with lightning recoil and husky gunners prepare to reload. With binoculars the officer judges the accuracy of fire. This mobile gun can be rapidly rolled where needed on Darwin's beaches.

# Life in Dauntless Darwin

A National Geographic Staff Writer Gives a Vivid Description of the Australian Town That Guards the Continent's Northern Door

BY HOWELL WALKER

*With Illustrations from Photographs by the Author*

DARWIN stiffened to sirens wailing the alert for an air raid. Electrically swift as a tropic storm, enemy planes burst out of the blue. Two minutes later Japanese bombs split the Australian peace wide open. Strafing fighters followed, spitting a vicious hail of lead.

For the first time in history the Continent of Australia, on February 19, 1942, had actually experienced the shock of attack. This land that had never rumbled under battle now thundered with the rest of the world at war. As the continent's most northerly military post, Darwin was first to feel—and return—the blow.

A small town with a big harbor on Australia's north coast, Darwin bakes under the vertical sun or mildews in the monsoons. It lives an isolated outpost life in a rankly tropical corner of a country as vast as the United States. It lies almost as near to Jap-grabbed Manila and Singapore as to Canberra, Commonwealth capital. From Japanese bases on Java to Darwin means a mere breakfast-to-lunch air flight.

With Singapore and Hong Kong, Darwin once formed a strategic triangle for British Far Eastern operations and defense. I saw it standing bravely alone—no longer a link in the Empire's Oriental chain of vital war stations.

In streamed civilian refugees from Malaya, Singapore, and the Netherlands Indies. Fighting forces poured out. No Maginot complex about Darwin. It thinks in terms of offense.

## Swift Evolution of Darwin

Last take-off for attack northward and first hope of defense against southward invasion, the town has developed into a modern fortress. I watched it grow stronger daily—an amazing transformation from sleepy mangrove community to energetic battle station.

All Aussies, including officers, wear short sleeves, open necks, and short trousers. It means that much less clothing to get sweat-soaked in the trying tropical climate.

According to regulations, every member of the Army has to carry with him at all times his steel helmet and respirator, even to the movies or to call on his girl—if he can find

a girl and the time out. Respirators make such nuisance bundles that they soon were christened "perspirators."

Over sandbagged emplacements antiaircraft guns poke long snouts as if sniffing to locate a bad smell. Army trucks rumble through the streets.

From headquarters at "the most modern barracks in the Southern Hemisphere," streamlined staff cars whisk officers through the district. Military messengers roar about on motorcycles. Like sleepless hawks, airplanes continually circle over the town, riding with the sun by day, with moon and stars by night.

## The Indomitable Darwinian

Limited numbers of civilians allowed to remain in Darwin literally fought for that privilege. They had confidence. I asked a young lady refugee from the recent bombings whether she would return if permitted.

"I'd go this afternoon," she replied decisively.

Air-raid alarms proved civilians a mass of excess luggage. Unwittingly, they slowed up soldiers who had jobs to do. During a night alarm one house turned on lights to attend to a sick kitten having a hemorrhage. I can still hear the husky voice shouting, "Put that bloody light out!"

On another dark occasion an antiaircraft gun fired at a suspected plane; the "ka-boom" brought hundreds into the streets, impeding lampless military traffic.

The caretaker of the building where I lived knocked on my door.

"Sirens haven't sounded yet, but the Japs are reported to be 40 miles off Darwin," he said quietly, and shuffled away on his flat feet.

I had just sat down to my typewriter. In only a pair of short trousers at the time, I hastily pulled on a shirt. Meanwhile, I reviewed briefly the few things I could take with me: notebook, camera, letter of credit, cigarettes and matches.

Down on the street, friends joined me. We started walking out of town. Everyone in Darwin seemed to be on that street, some going one way, others the opposite.

Soldiers—hundreds of them—rushed past



### Darwin's Geography Makes it a Defensive Outpost and Spearhead for Attack

From a sleepy north Australian frontier town, Darwin has developed into a modern fortress facing the Jap-occupied Netherlands Indies.

to their posts. Many were laughing and wisecracking. I saw one stout A. I. F.\* man reach into a brown paper bag his "cobber" (pal) carried, extract a round yellow pie, and munch delightedly.

"It's about time something happened to this place," a big, tin-helmeted fellow grunted.

In short, the circus had come to town, and everyone was going for all the fun that could be had. I could excuse the attitude of the soldiers. They had remained inactive for so long that they welcomed this opportunity finally to get into some sort of serious action.

For the first ten minutes every one in our party at the Botanical Gardens amused himself by watching a dozen planes circling over the town. I watched the faces of these persons. They showed impatience. Like a critical audience at a play, they kept waiting for something more exciting to develop, and began to look as if they wanted their money back because nothing did. The planes disappeared.

Rules of the air-raid game for civilians say to remain in one place until the "all clear" sounds. As we milled about, looking for more planes, a soldier approached on a motorcycle and shouted, "Sit down under the trees and stay still!"

I talked with two of the women. One had been living in Darwin for the past seven years.

\* Australian Imperial Force.

Until recently, she operated a frock shop. The other had come here several years ago. So I got them to talk of Darwin.

The first woman left when the Japs entered the war. After 16 days away, she couldn't stick it out any longer. Her husband, also in the south, pleaded with her to remain there. But the Darwin urge won out. She obtained permission to return.

"Take anyone who has spent six months here," said this woman. "If he leaves for the south, that longing to return north hits him; hits him hard; he usually comes back."

She admitted that Darwin did not have much to offer in the way of the general amenities of life, certainly nothing compared with southern cities. Still, it appealed. No trams to catch; no rigid business hours; no silly conventions. One breathed freely, lived more romantically. No one expected much of anyone.

A bevy of brilliantly colored mountain parrots flocked to a tall clump of lightly leaved bamboo near us. Their squawking seemed ridiculously incompatible with the beautiful plumage. Interrupting her talk on Darwin, the woman remarked on the hue-flashing feathers.

"There used to be innumerable varieties of exquisite birds here," she commented. "But they seem to have evacuated with the outbreak of war. So many soldiers and guns and planes and lorries."

"Alert" for this expected air raid sounded at about 4.30 p.m. Two bombless hours later, the "all clear" wheezed.

"Now, wouldn't it——," intoned the more talkative of the two women. She rose from the ground, stretched, and yawned. "What a swindle!"

### Soldiers Eager for Action

Several days later, a soldier drove me in a staff car to an antiaircraft unit stationed in a jungle clearing. Crews, stripped to waists, stood by their 3.7 guns. Steel helmet, shorts, and sturdy boots made up the uniform of the hour. Generally, bush soldiers wore less. From brawny brown shoulders hung knapsacks containing respirators.

Lined up in two orderly rows, a ground force, fifty strong, received instructions from a young officer. They blocked our entrance into camp. While we waited, I thought how thoroughly the men performed their drills.

An older officer approached and said, "Sorry, but you won't be able to move for a bit. The air-raid alarm has sounded. We might have some messing around to do. Better stay where you are."



#### From an Elevated Swivel-chair a Darwin Spotter Scans the Skies for Jap Planes

Armed with binoculars, the Aussie soldier lolls back in his seat, commanding a view in all directions. Within shouting distance is a crew of antiaircraft gunners, ready to man the batteries at an instant's notice. No hills break the horizon, for Darwin's plain is flat as a football field.

Behind the car, keen, clear eyes in a strong bronzed face tested the sights of a machine gun nested among sandbags.

Across the area, in a larger sandbagged emplacement, gun-position experts warmed up the apparatuses which constitute the nerve center of antiaircraft strategy. Two men bent to a height and range finder while a third kept it revolving slowly. Another group concentrated on a detector. One operator hovered over an apparatus for telescope identification to verify type and nationality of planes sighted.

All information brought down to earth by these machines went to the G.P.O. (gun-position officer), the brains of the system. Through a megaphoned soldier standing beside him, he relayed orders that slammed guns into action.

Time passed; nothing happened. The ground force got restless; their officer permitted them to sit down. I overheard one soldier in a group say to the others, "The theory of antiaircraft fire is not to score direct hits, but to keep the enemy planes high enough to prevent effective bombing. But, of course, if you do blast the bloke, that's one for you."

#### Gun Crews Crave a "Dinkum Go"

I talked to a man who had been with the officer in charge of the battery during this "raid." My informant told me that the captain actually prayed out loud that the Japs would come over, that the raid would really materialize. And I believe that every member of the gun crews was in the same frame of mind. They were all dying to let



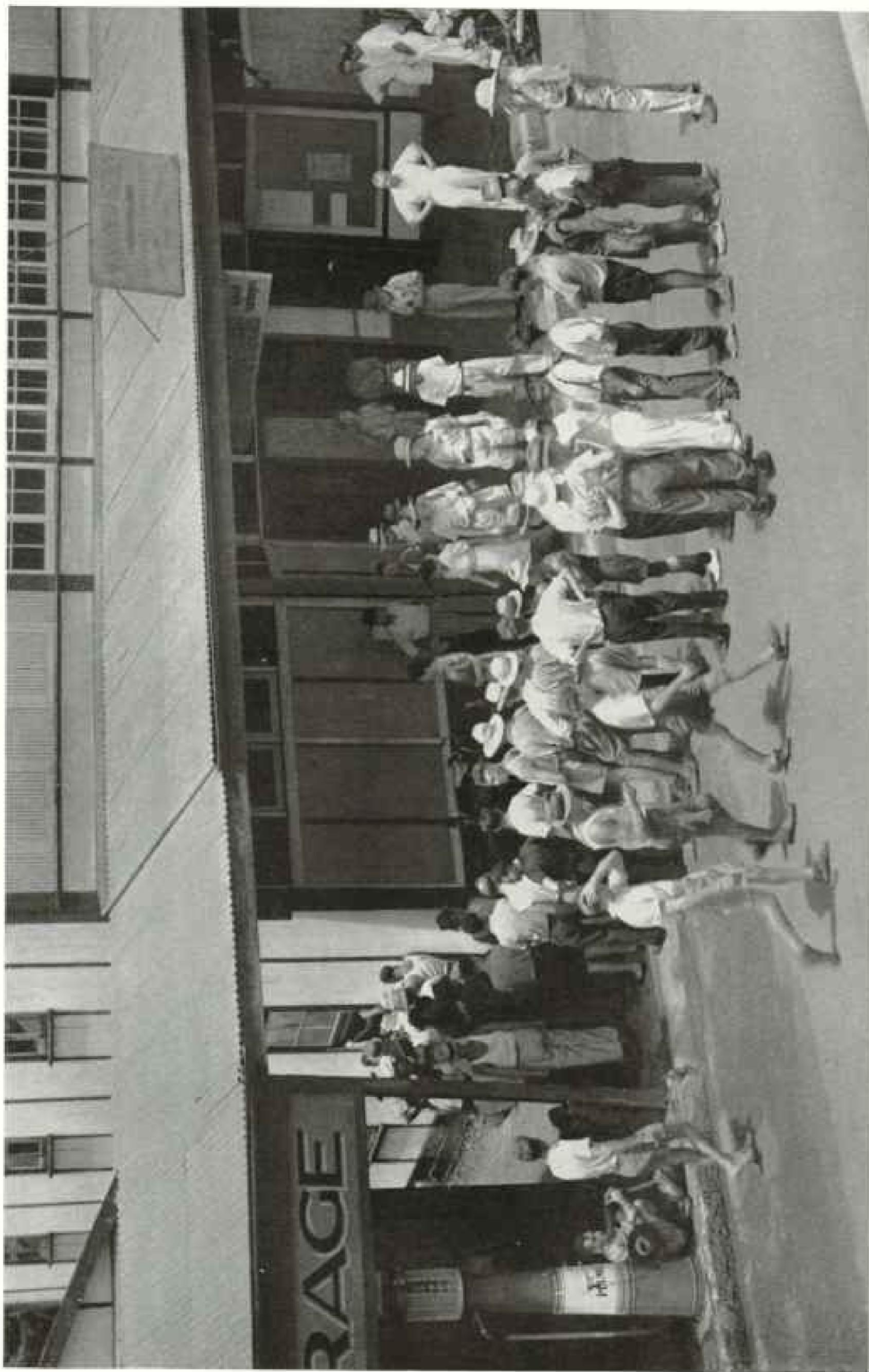
Wool Week/Time Press Association

**The Yanks Are Coming! American Expeditionary Forces Arrive at an Australian Port Ready for Action**



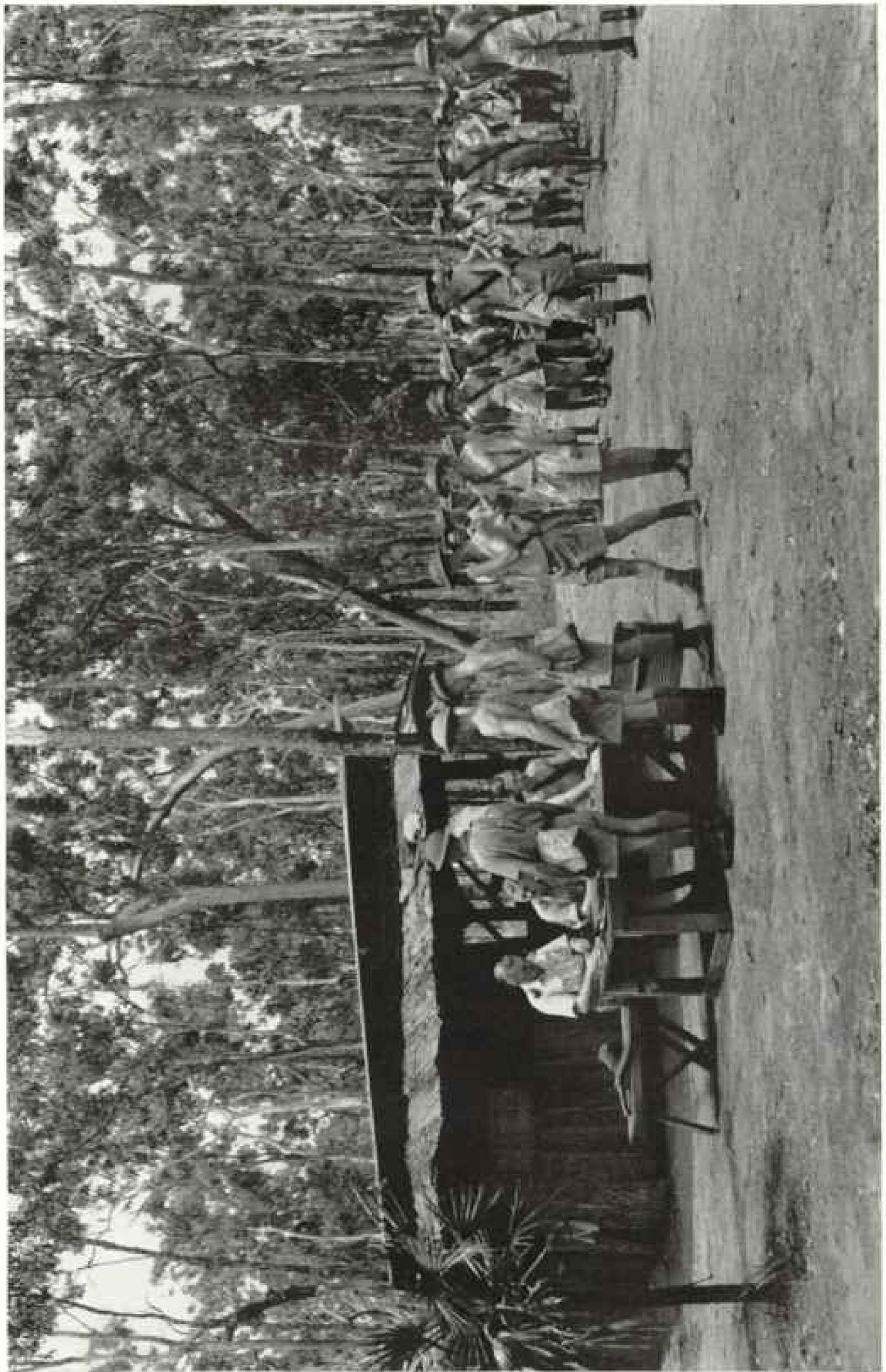
© British Empire

**Munitions and Supplies Reach Darwin by Rail and Truck up the New Defense Highway (Map, Page 124)**



**Smoke-famished "Diggers" Hustle into Line When a Ship Brings Cigarettes to Darwin**

Tobacco is a wartime rarity here, for munitions and food get transportation priorities. When a shipment of smokes arrives, a half-block-long queue quickly stretches down the main street from the canteen window. Purchasers are limited to a single packet.



**Payday at a Bush Camp in Darwin's Hinterland Means Plenty of Money but No Place to Spend It**

This company guards an ammunition distributing center well out of the town. The paymaster's table stands before the Orderly Hut, built by the soldiers from the bark of eucalyptus trees. Such camps tend largely for themselves, relying on the jungle for construction materials. Even bedsteads are made of young timber.



**Aussie Soldiers from the South Visit Darwin's Natural Wonders—Giant Magnetic Anthills**

The termite mounds rise like mammoth gravestones in fields a few miles from the town. Some are 12 feet tall. They are called magnetic because the thin edges invariably point north and south. During dry season, from April to the end of November, they are a dull gray. In the wet season they turn almost black.



#### Sentries and Sandbags Protect Larrakeyah Military Barracks in Darwin

All army orders for the Seventh Military District, the Darwin area, are issued from headquarters set up in this building. Beneath the cupola are housed the sirens which warn the warning of approaching enemy air raiders.

off steam, to have a "dinkum go" at the enemy.

Into the town from its peripheral jungle, Australian and American forces on a few hours' leave trooped in trucks or on foot. Some "Yanks," as United States soldiers are called over here, tried to hitchhike, of course. Together they came, Australians and Americans; together they stuck, like old school-boy friends.

Aussie or Yank, the uniformed man in the street was as full of steam as a double boiler. Some crowded the movies; others took turns "shouting" (standing expense) for drinks; many exchanged caps and hats, a symbolic gesture of heads that thought alike.

Quieter types went to the Salvation Army building to read and write, play billiards, and drink as many cups of tea or coffee as they wished—all for the one penny that a Yank said was so big he now understood why there was a copper shortage.

As I paid for a cup one evening there,

the man behind the cash register remarked:

"You make customer number 1,037 for today."

Almost half that count numbered American soldiers, sailors, and airmen.

#### Munich Affected Distant Darwin

A contingent of Australian soldiers reached Darwin as early as 1939. Events in faraway Munich stimulated reinforcements for this remote Empire outpost. When the appeasement bubble burst on the other side of the earth, more and more young men in uniform went north to Darwin.

As the conflict grew and spread, these movements steadily increased to keep in step with war. Troop train after troop train arrived; soldiers flowed from cattle trucks like New Yorkers from rush-hour subways. Freight cars discharged tons of bombs, guns, ammunition, Bren gun carriers, 3-ton army trucks, and food supplies.



### Want a Clean Shirt in Sticky Darwin? Wash It Yourself!

As the military population skyrocketed and the civilian population dwindled, the perspiring newcomers rushed the few professional laundries out of business. That meant everyone had to do his own washing, as this couple soon discovered. One Navy wife was most furious against the Japs because their machine-gun bullets had riddled her wash (page 157).

Even before the Japs struck, all was activity as I watched from a window overlooking the harbor. With pink of early morning on their wings, a squadron of bombers flew north. Over the harbor tornadoed torpedo planes; their undercarriage gave them the appearance of sharks shadowed by pilot fish. Noisy training and fighter planes droned about in all directions, and a single, silent reconnaissance craft flew high in the blue above all the others.

Through palms and poincianas I glimpsed a naval cruiser slipping gray and ghostlike out to sea. A destroyer drifted in, as smoothly as a champion winning an easy race. A submarine sneaked by like a water snake. Close insbore idled several pearling luggers, the Japanese crews shut up on land like frightened oysters in their shells.

Not many days after the bombing of Pearl Harbor, American warships appeared mysteriously

off the cliffs of Darwin. Long-trousered United States sailors in snowy uniforms amazed laundry-limited Darwinians who had forgotten that clothes could be washed so white.

### American Sailors, Soldiers, and Slang

As our sailors thronged the streets and shops, their drawling voices and accentuated R's infected admiring Australians. The newcomers brought back to me familiar phrases and forgotten slang.

Then came American troops to establish the first headquarters for United States Army forces in Australia. Up went the Stars and Stripes over a new building originally intended for shops and flats. Colonels and majors, captains and lieutenants moved in with complete office equipment. Even to the smell of tobacco, a nostalgic atmosphere filled this corner of America in Australia.



### Darwin's Stilt Homes Foil the Eat-all Program of a Hungry Termite Army

Such elevation also has many other benefits. Air circulates under the house, keeping it cool. In wet weather the family wash can be hung beneath the living room. The garage problem solves itself. Finally, grasshoppers, reptiles, and other annoying ground creatures have to do fancy high-jumping to enter windows or doors.

Outside United States Army headquarters, staff cars, jeeps, blitz buggies, and six-wheeled trucks parked in the shade of poinciana trees or tore along rust-red roads, their windy wakes blowing brilliant blossoms off bougainvillea bowers. Some troops pitched camps in neighboring jungles.

#### Familiar Fragrance of Pork and Beans

One unit raised a canvas village near the heart of town. Behind this soldier settlement, land fell away to the tide-heaving harbor. Near by grew palms and frangipani, red and yellow canna lilies, blooming bird-of-paradise bushes. But I could still smell pork and beans when I passed by.

Darwin now is known around the world and is one of the most talked-about towns in the Commonwealth. But when I first headed north, before the Japanese attacks, I found reactions differed widely.

"To Darwin? But why?" wondered an influential gentleman.

"Darwin, eh? Well, be careful, son," warned an elderly soul.

"That bloody hole!" exploded one fellow.

"To miss Darwin while in Australia," re-

marked another, "would be like visiting Egypt without a trip to the Pyramids."

But Darwin today is as different from pre-war Darwin as Radio City from the Bowery of the nineties.

In 1839 the *Beagle*, in which Charles Darwin had previously sailed, nosed into the port, and the commander named it for the proponent of evolution. For the next thirty years waters of the townless harbor lapped lazily against melancholy mangroves and lonely stony beaches.

Finally, in 1869, a surveyor from South Australia laid out a town eventually called Darwin. Spreading over a small plain, flat as a football field, it threw an irregularly featured cliff face toward a vast harbor some 70 feet below.

First boon to the little community came with its selection as cable terminus on the north Australian coast. For an inkling of Darwin's subsequent development, listen to an Australian author:

"The evolution of the cable-terminus town has caused as much controversy as the *Origin of Species*. Its potentialities have been boosted, explored, and deplored by graziers,



#### Self-service Is the Rule Today in Darwin's Once Cosmopolitan Hotel

In the doorway stand refugees from Malaya, Netherlands Indies, and Singapore. A week after this photograph was made, they had fled southward, and with them went most of Darwin's civilian population.



#### Australian and American Fighting Men Take Over Darwin's Main Street

Here, from left to right, an Australian seaman and soldier, then a U. S. sailor, another Digger, and an Aussie tar spreadeagle the sidewalk. All are eager for action. When Darwin's first air-raid alarm sounded, the military population of the town joyfully rushed to battle stations. "It's about time something happened to this place," the author heard one big, tin-helmeted fellow grunt (page 124).



### "Bush" Camp Soldiers Observe Payday with the Australian Game of "Two-up"

They have just received their wages (page 128). Bets are laid on the ground and a player tosses two coins into the air. When the coins come to rest they must match, or not, depending on how the bets are made.

gold-diggers, acre-grabbers, buffalo-hunters, crocodile-catchers, political popeyes, and hokey-hawkers of every variety, spilling a plenitude of propaganda."

Such a versatile, industrious, resourceful population would certainly require rail connections with the busy south. The first move for a transcontinental railway from Darwin to Adelaide was made in 1883.

Forty-six years later a 3 foot 6 inch-gauge affair reached southward through jungles and anthills to Birdum, a distance of 315 miles. Certainly the going was tough, but so was legislation.

#### Defense Highway Now Penetrates Australia's "Dead Heart"

By 1929 a line of the same gauge stretched northward from Adelaide to Alice Springs over a thousand miles of gibber plains,\* salt-bush and bluebush, spinifex and scrub, some purely desert country and plenty of just plain bush.

This left an unrailed stretch of 335 miles in the "dead heart" of the continent; it's still there, but the Birdum-Alice Springs gap is now

bridged by a military highway, "Australia's Burma Road," an engineering miracle rushed to completion by the end of 1940 (map, page 124).

Shortly after World War I, Darwin gleamed as lodestone for long-winded aviators flying from England to Australia. On December 10, 1919, Sir Ross Smith fluttered to an epic landing near the town.† Others followed, including Amy Johnson (May 24, 1930) and our own Amelia Earhart on her last ill-fated flight, June, 1937.

Darwin won its wings when air transport came of age. Until recently, four different passenger and mail services routed flying boats and landplanes to or through Darwin. The civil airfield, built in 1919, put the town on every map of Australia. Later came radio beam direction-finding equipment and lighting for night landing.

Over the runways rolled craft from all cor-

\* An aboriginal word for small red-brown stones, polished by wind-blown sand. They cover much of the plains of central Australia.

† See "From London to Australia by Aeroplane," by Sir Ross Smith, K.B.E., NATIONAL GEOGRAPHIC MAGAZINE, March, 1921.



Wide World from Press Association

**"Now Back in the United States . . ."**

This United States Army Air Corps man lost no time in striking up a friendship with an admiring Australian "WAAF." Like Britain, the continent down under has its uniformed Women's Auxiliary Air Force.

ners of the Commonwealth. Here continent-connecting air routes converged. Darwin had the joy stick in hand; it climbed to a cosmopolitan stratosphere.

Before Pacific war storms grounded air-minded Darwin, the new Darwin Hotel could have competed with any in Geneva when the League was in town. In the ballroom ladies and gentlemen of the Orient moved to Western waltzes. Australian officers chatted with Britishers from Singapore. Their wives danced with Dutch airmen. A journalist from Melbourne sipped with an Americanized Hungarian novelist.

After roving the warring East, a representative of a United States broadcasting system swapped yarns with a Sydney movie photographer. An oil prospector relaxed with a fine cigar; possibly he saw in its smoke the steaming "rice table" he'd have for dinner tomorrow in Soerabaja, Java. The Chinese girl at the reception desk handed me a cable from America as a Welshman mailed a letter to England.

Yet, not so very long before, Darwin had been virtually static. Spasmodic breezes rus-

ted palms. High tides quietly swamped motionless mangroves; low tides exposed neglected, still-primitive shores. Exotic blossoms, unappreciated, fell to a glowing-hot, rusty, empty earth.

Recently, the air scene shifted to the new military aerodrome. The Royal Australian Air Force took the leading part in Darwin's high-flying drama. Japanese scissored the Singapore skyline and other overseas airways. Raiders ruptured schedules of civil planes to and from the south.

**American-built Planes Scour the Sea**

Training and reconnaissance craft, bombers and fighters ominously darkened Darwin's balmy blue heaven. American-built metal monsters skirted and scouted the ragged northern coast. Ever alert, they scoured the tiniest of coves and scanned the gulfs and seas for possible danger.

They were the eyes of northern Australia. They were the "No Admittance" sign on the national door.

With the Japanese threat looming ever closer, Darwin ceased to exist as a civilian town.



**Nurses Led Their Patients Into the Jungle When Jap Planes Machine-gunned This Hospital near Darwin on February 19, 1942**

Those too ill to move far crouched on the floor under mattresses and pillows while the enemy strafed them with a vicious hail of lead. One seriously wounded soldier was shot in the back of the head and killed. Here in the surgical ward the commanding officer, right background, is talking with the hospital matron.

I don't mean martial law was established. Officials simply ordered the evacuation of women and children. Most left reluctantly. Only those in essential work directly or indirectly allied to defense had permission to remain.

I watched the polyglot population dwindle. Australians left by planes, trains, and boats. Under hampers bigger than themselves, Chinese labored aboard first- and second-class carriages. Aboriginals went "walkabout." Half-castes and quadroons just disappeared. Diverse Europeans and undecipherable Asiatics cleared out somehow, anyhow.

Not a single waitress remained in hotel or restaurant. Customarily, I took meals at a well-staffed guest house. Toward the end of my stay in Darwin, I lined up with others outside the kitchen. Only because I was on crutches due to an accident, a Chinese cook took my plate and cup of tea back to a table in the dining room.

Distinguished guests at the principal hotel had to make the best of self-service. Even the commander of American troops in Darwin waited in a queue for a kitchen handout.

If you wanted clean clothes, you washed the soiled ones yourself. And you made a fire under a big black pot in the back yard to get enough hot water. I did see a Chinese laundry, but it met an apoplectic death with the rush of business.

Formerly, a Jap operated one of the biggest laundries. Surprised with sudden internment, he left a shop which billowed with bed linen, towels, uniforms, and clothes in general. They bulged from windows and doors in every stage from intake to ready-for-delivery. Officers spent much spare time bundling through the soiled confusion to locate their own uniforms, which looked like all the others.

#### Japanese Planes Ruined Her Wash

After the air raids on Darwin, I talked with the wife of the chief naval intelligence officer stationed there. She seemed quiet about the harrowing experience in a slit trench under machine-gun fire. But she spoke passionately of the sheets she had scrubbed and hung out that day to dry. Japanese bullets had riddled them.

Darwin did not cater to civilians; they had been advised to leave town. Naturally, the need of food in a region that produced none created a problem. Boats and trains were rightfully monopolized by supplies for the rapidly growing number of military mouths.

No civilian went hungry, however. Beef and mutton hung to menus like a shipwrecked sailor to his raft. But one rarely tasted fresh

vegetables or fresh fruit. It was a case of worship the tin can and like it—as long as it lasted. Often I sat down to a meal of meat only, looking lonely and melancholy on its plate.

Such luxuries as tobacco became almost nonexistent. When a ship came in with cigarettes, men waited outside the smoke shop in a queue half a block long (page 127).

The Japs set a certain time—a specific date—to attack Darwin. A particularly stormy period of the wet season may have broken the appointment. Night and day during the month before bombs actually fell, we all expected a raid.

While a patient in the hospital, I hobbled out of the building on crutches with a nurse who showed me where to go in an emergency. Days later I mistook a sudden crash of thunder for a bomb burst; forgetting my broken leg, I sprang up boldly, only to fall back sheepishly.

Almost every civilian lived on edge, whether he knew it or not. Soldiers, sailors, and airmen remained steady and sharp as a ready guillotine. You couldn't call it fear; it was desire for something to break, a constant longing for real action. It keyed up the military. They felt like more than a home guard.

#### Humor Even in the Hospital

For months—over a year in many instances—A.I.F. men thought Australia forgot they had enlisted for active service. "What's the good of sending us here to mildew?" seemed the general attitude.

But now their steps had a spring. Tropical languor vanished. They no longer drank out of boredom. They toasted the future: whatever it held they could take.

Patients in the civil hospital faced the future with a nervous sense of humor. One day a convalescent group gathered around my bed.

"Assume the Japs made a landing at Darwin," proposed a fellow recovering from tropical fever. "What could we in the hospital do? We have no weapons. I ask you: what steps could we take?"

"Just steps—and last ones," snapped a bald-headed man with a boil.

No, Darwin wasn't a town for civilians now, but for fight-hungry soldiers—Aussie and Yank.

Against a wall in the Salvation Army building hung a large poster. It showed a kangaroo about to spring onto a map of Australia. A Salvation Army shield covered the heart of the outlined continent.

In bold red letters the caption leapt, "Make



#### Bronzed "Diggers" Train a 6-inch Gun Seaward and Itch for a Jap Target

They make up one unit in Darwin's coastal defenses, strengthened daily since the threat of Japanese invasion came to Australia's front-line fortress. Steel helmets, shorts, and sturdy footwear are regulation uniform in this tropical clime (page 125).

Yourself at Home—Hop In." Under it sat, from left to right, an American soldier, Australian sailor, another Yank, and a Digger (Aussie soldier).

#### Door Swings Both Ways

Australians hopped in long ago. And now the Yanks were making a broad jump from America. Both proved their spirit of comradeship right here in a peaceful building. Both knew that bond would hold in bat-

tle. After all, *they* were the *real* salvation army.

Together they guard Darwin, northern door to Australia. And this is a portal that swings both ways, like the doors of its hotels.

Australia slammed its defensive north door against the gale. An increasing Allied offensive out of the south burst it open again.

And so it swings, hinging on the no-longer-lonely Australian-Imperial-American outpost that stands for Darwin and democracy.

# Western Front Map Embraces Three Continents

**A**S A notable addition to the long list of National Geographic maps now aiding the Nation's armed forces and enlightening our membership of 1,165,000, The Society presents with this issue an extraordinary supplement, "Theater of War in Europe, Africa, and Western Asia." \*

Really three maps in one, this unusual presentation makes it possible to follow on a single sheet the vast storm of war which centers around its guilty place of origin in Central Europe but reaches out into the steppes of Russia, the deserts and jungles of Africa, and the icy seas of the Arctic.

Military planners, armchair strategists, those who make the news and those who follow it with maps, will find it no longer necessary to struggle with three or four large sheets. Here on one sheet, 26½ x 31 inches, they can watch the limits of Hitler's world begin to close in about him.

In this war of immense distances the entire area might be designated as the Western Front as contrasted to the Eastern Front, shown in The Society's recent map "Theater of War in the Pacific Ocean" (February, 1942).

In view of the growing A. E. F.'s and President Roosevelt's recent statement that American bombers would be carrying the war to the enemy, this front will become increasingly familiar to American fighting men.

Showing principal railroads, canals, oil pipe lines, and oil fields as well as cities, the area contains many a potential "target for tonight." Numbers of military centers have already been repeatedly battered by the Royal Air Force in the greatly intensified British aerial offensive, or raided by the daring, dexterous Commandos.

## No Such Map, So We Made One

The new map was undertaken to meet a demonstrated need, to fulfill a function that no other single map serves.

Behind it lies a story which begins some six months ago, about the time of Pearl Harbor. Like many other officers in the Nation's armed services, a keen young United States Army Air Force lieutenant (now a major), came to the headquarters of the National Geographic Society in quest of geographic information.

His needs were promptly filled—except one. He requested a map which would show the entire theater of war against Hitler on a uniform scale—not only Europe, the Mediterranean, and the Near East but also the sea and air approaches from America, much of Asia, and Africa all the way to its equatorial jungles.

No such map existed, but in view of the

obvious need among laymen as well as military men, the Editors of the NATIONAL GEOGRAPHIC MAGAZINE assigned the crack cartographers of The Society to the task of preparing one.

From Newfoundland Airport, through which the flooding stream of American bombers pours out to Europe, the map area extends to Irkutsk, busy Soviet industrial center in the Lake Baikal region of Siberia. From the North Pole it reaches to below the Equator, touching Diégo Suarez in Madagascar and extending eastward to India's Karachi and Khyber Pass. The western edge includes Dakar, the Cape Verde Islands, Canaries, and Azores.

The map is made on an azimuthal equidistant projection centered at 20 east longitude, 40 north latitude, which is in Albania and squarely in the center of the map area. From this focal point in the vital Mediterranean battle region, all distances and directions are true.

## An Hour's Bomber Flight to the Inch

The scale of the new map is 1:15,000,000. This is 236.7 miles to the inch, which is approximately the hourly cruising speed of the modern bomber. Thus with a ruler the user of the map can closely approximate the flying time from point to point, allowing one inch to the hour.

In other important respects this map will appeal to the skilled United States airmen who have long been using Geographic maps. Many of them have aided in its making. One of the first officers to see the original layout prepared by Chief Cartographer James M. Darley was Brigadier General Martin "Mike" Scanlon, then chief of Army Air Corps Intelligence in Washington but recently reported to have led a successful bomber raid on Rabaul in faraway New Britain.

By merely glancing at this map the flyer can tell the type of terrain toward which he is heading, for elevations are shown by contour lines and distinct tints instead of by the hachures ordinarily used.

High mountains (above 2,000 meters, or 6,562 feet) are indicated by a conspicuous brown tint which makes the ranges stand out clearly. In addition to the contours showing approximate heights, the map includes many

\* Members wishing additional copies of the new map, "Theater of War in Europe, Africa, and Western Asia," may obtain them by writing the National Geographic Society, Washington, D. C. Prices, in United States and Possessions, 50¢ on paper (unfolded); \$1 on linen; Index, 25¢. Outside of United States and Possessions, 75¢ on paper; \$1.25 on linen; Index, 50¢. All remittances payable in U. S. funds. Postage prepaid.

spot elevations—specific points labeled with their exact altitude.

Also helpful is a table of great circle distances between important points. It shows, for example, that Newfoundland Airport is 2,360 miles from London and that the London-Berlin distance is 577 miles.

#### 780 Distances Figured by Trigonometry

As in similar tables on other Geographic maps, the Army Air forces aided The Society in the selection of points to be shown in the table of distances. Made on the familiar triangular cross-reference plan, this table lists 40 strategic points on the mapped area, which gives a total of 780 distances.

Some idea of the amount of painstaking work that goes into a map such as this is gained when one realizes the time and effort required merely to prepare this table, a single feature of the map. Each of the 780 distances involves the solution of a spherical triangle, a fairly complicated computation, and to insure accuracy each is done twice. That means 1,560 problems in spherical trigonometry, a nightmare for the average student of higher mathematics and at least eight weeks' work for a competent computer.

Principal railways, including new projects, are shown. They include the French-Nazi route under construction from the Mediterranean across the Sahara to Dakar.

Red lines indicate the oil pipe lines, and red triangles mark the oil fields. These are principally in Romania, the Caucasus, and the Middle East, although Mussolini has a small one in Albania. The need for oil dominates most of Hitler's moves, and all the fields toward which he might reach are located here.

Blue tick lines show the major canals.

Ruins, too, are indicated on this map, but the symbol is reserved for ancient ones like Persepolis and Thebes, not recent ones like Germany's bomb-raided Baltic war supply centers, Lübeck and Rostock.

#### Articles Bring Map Places to Life

For word pictures and photographs of key countries, cities, islands, and seas in this vast panorama of struggle, the members of the National Geographic Society have only to turn to their files of *The Magazine*. Any desired article can be readily located with the aid of *THE GEOGRAPHIC'S* indexes.\*

Consider Malta, for example, called "the most blitzed spot on earth." King George VI recently conferred upon the island and its 270,000 people the signal honor of awarding the fortress of Malta itself the George Medal "for heroism and devotion." Never before

had a whole people received such an award from a British King.

To members of the National Geographic Society, historic Malta and its courageous people were already familiar, for the island has been described in four different articles in *THE GEOGRAPHIC*.\*\*

*GEOGRAPHIC* readers were not surprised to learn of the island's marvelous system of air-raid shelters, for they knew that Malta is honeycombed with underground streets and tunnels. The limestone is comparatively soft but hardens upon exposure to the air. Prehistoric man built chambers and temples in this subterranean labyrinth, and such underground vaults have long been used for storing grain.

#### "Shield of Christendom"—and Democracy

This island where the Apostle Paul was shipwrecked won the name of "the shield of Christendom" when the valiant Knights of Malta beat back the infidel hordes 400 years ago.

In 1942 Malta proved itself once more, this time as a shield of democracy. This unimpressive-appearing piece of land has been no less doggedly heroic than Mother England herself in weathering the worst that modern air war has to offer.

As a base for British attack upon Italy-Africa convoys, Malta has taken a heavy toll of supplies bound for Rommel's German-Italian army in Africa. Large numbers of planes have been sacrificed by the Axis in determined efforts to knock it out. Malta has had more than 2,300 air-raid alarms. But though bombs shook the island they could not shake the grim resolution of the British and the brave Maltese.

Actually the area within the compass of this map is not one front but many fronts. It includes not only the land and air fronts in western Russia and northern Africa, but also the scene of bitter air and naval war in the Arctic waters off Norway, Finland, and Russia, where the Germans have been trying desperately to stop huge convoys of British and American war supplies to the Soviet Union.

\* *Geographic Index, 1899-1941*: 16,350 references to countries, places, maps, nature subjects, authors and titles appear in *The Geographic Index, 1899 to 1940*, and the accompanying supplement covering 1941. Indispensable for instant location of material in 516 numbers of the *NATIONAL GEOGRAPHIC MAGAZINE*, 575 pages, including an illustrated foreword on the history of The Society. \$1.75 in U. S. & Poss. Elsewhere \$2. Postpaid. In addition The Society issues semi-yearly indexes free to members who have their copies bound.

\*\* See "Races of Europe," by Edwin A. Grosvenor, December, 1918; "Malta, the Halting Place of Nations," by William Arthur Griffiths, May, 1920; "Maltese Islands," by Sir Harry Luke, November, 1935; and "Wanderers Awheel in Malta," by Richard Walter, August, 1940.

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To carry out the purposes for which it was founded fifty-four 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 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

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

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

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

The Society granted \$25,000, and in addition \$13,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

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



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You are sitting out on the edge of space. Ahead of you a couple of million stars are blinking. It is dark below you. The earth is down there. Six miles down.

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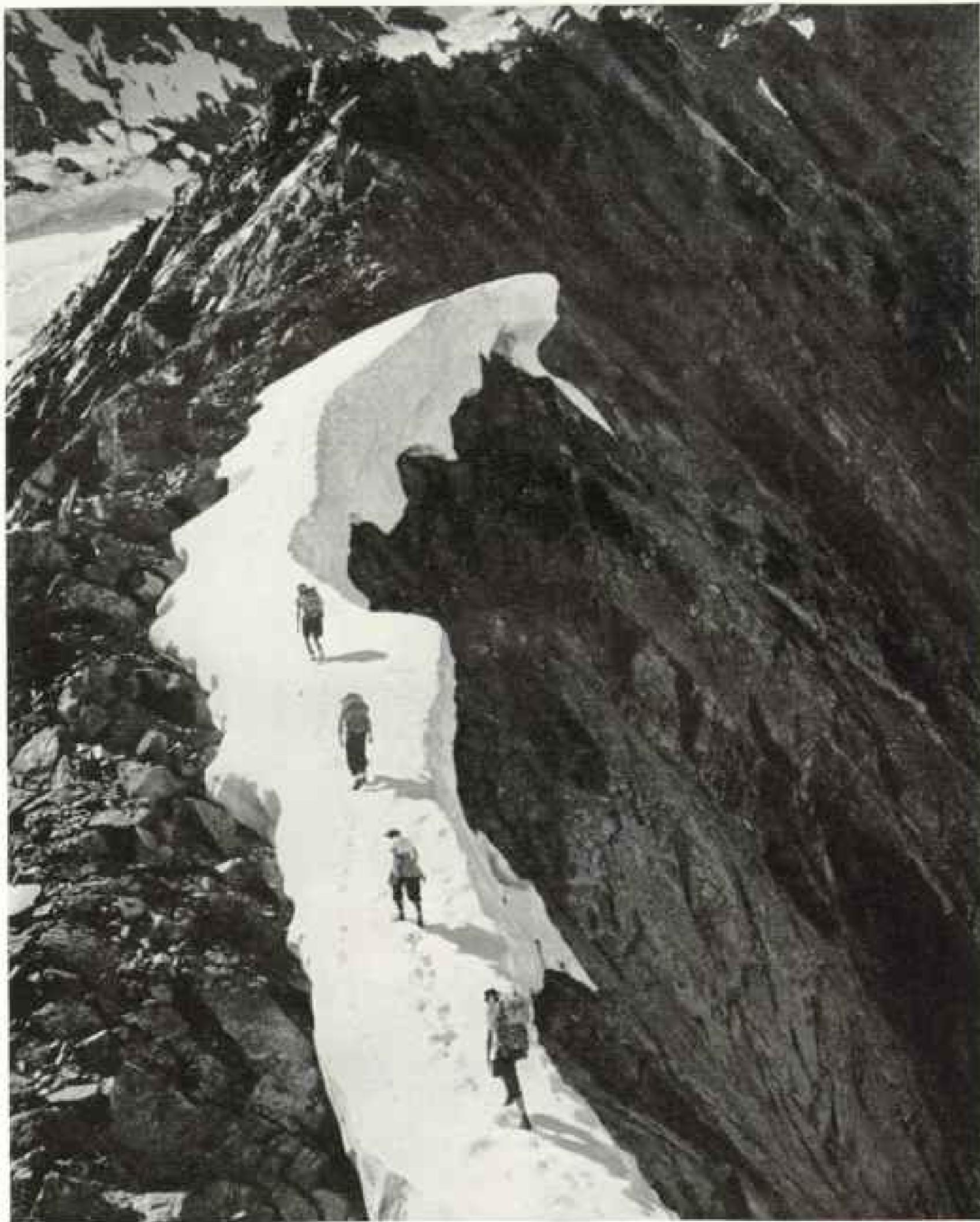
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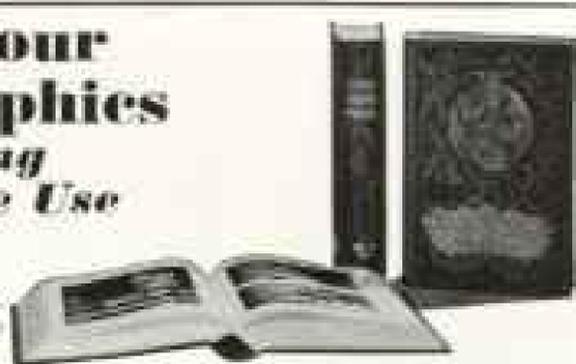
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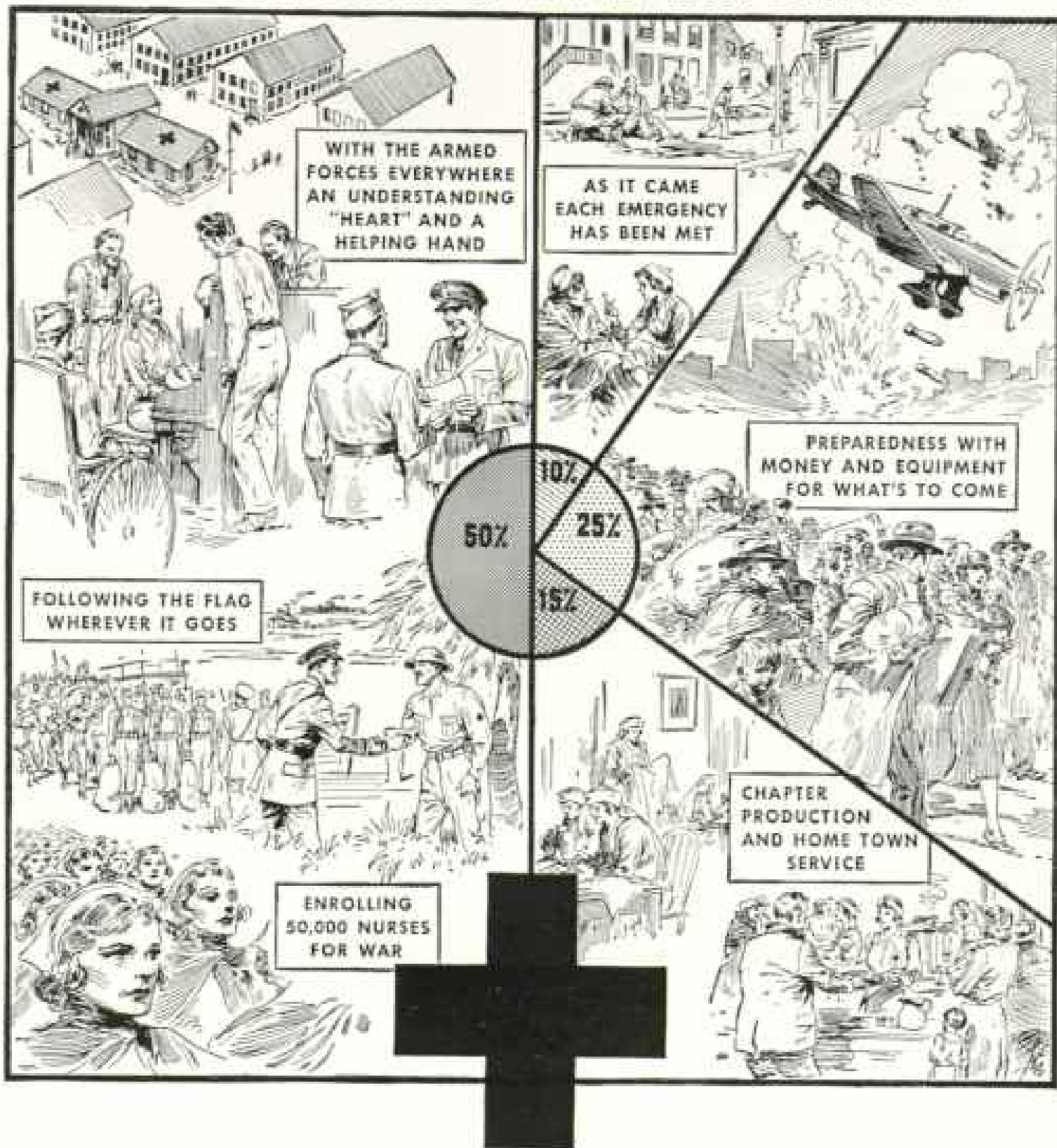
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*were Untrue to  
Grandma Gray*

**BUT THE KIDS ALL LOVE HER NOW!**

*The kindness of Grandma Gray  
Made kiddies all adore her.  
No wonder she was hurt when they  
Decided to ignore her.*



*The truth was that they rather banned  
The "aroma" and the sight  
Of Granny's FALSE TEETH;  
though by hand  
She scrubbed them day and night.*



"Use POLIDENT!" her dentist said,  
"Its action can't be beat.  
You neither scrub nor rub; instead  
You *soak* plates *clean* and *sweet!*"

Since Granny has, the kiddies make  
Her life serene and nice,  
If *you* wear PLATES, you too should take  
This POLIDENT advice.



Cleans, Purifies Without Brushing  
Do this every day: Add a  
little POLIDENT Pow-  
der to half a glass of wa-  
ter. Stir. Put in plate or  
bridge 10 to 15 minutes.  
Rinse, and it's ready to  
use.



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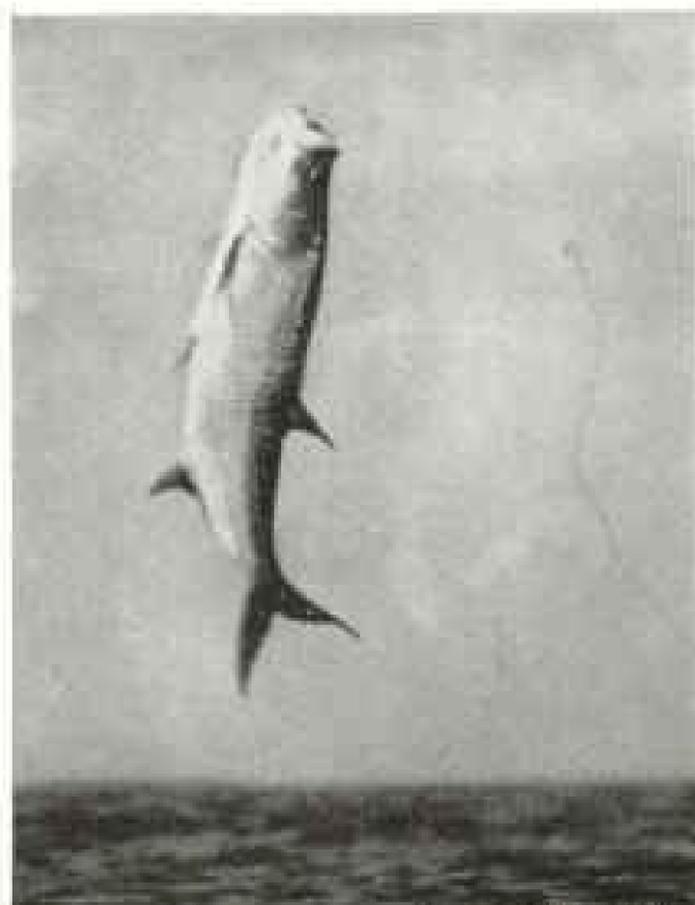
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A. W. and Julian A. Hensick

THE one that got away—but not from the photographer! Leaping defiantly, this salmon shook the hook.

National Geographic Society \_\_\_\_\_ 1942  
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**FRUITS**—Every part of the body needs vitamin C. Oranges, grapefruit and tomatoes—fresh or canned—are rich in this vitamin. Nutritious menus may include one or more of these, or their juices, every day. Tomatoes may be added to soups, stews and gravies. Serve one other fruit daily—fresh fruits in season, canned fruits or cooked dried fruits. Canned and quick-frozen fruits retain their vitamins.



**VEGETABLES**—Plan your menus to include one or more servings daily of potatoes and two servings of other vegetables—a leafy, green one frequently. It is suggested that some vegetables be served raw. Chefs advise cooking all vegetables in small amounts of water, in covered vessels, and only until tender. Use the juices, too. Canned and quick-frozen vegetables retain their vitamins.



**MILK**—The best source of calcium is milk. Calcium is the mineral most used by nature in building our bodies. Use milk, fresh, evaporated, dried, or in the form of cheese and ice cream. Five ounces of American cheese equal a quart of milk. Adults require the equivalent of a pint of milk daily, children a quart. Count the milk used in cooking, too.

## How to serve better meals—and help Uncle Sam

**O**NE OF the most effective ways to cooperate with the wartime nutrition program is to increase your use of fruits, vegetables, milk and its products.

Governmental and private health agencies have two good reasons for wanting every family to eat more of these foods in addition to the meats, breads, cereals and other elements which should continue to be a substantial part of a good American diet.

First, *your health*. Fruits, vegetables and milk contain an abundance of the elements which help to protect us from disease, and also to attain that robust good health which enables us to do our work more effectively.

Second, *our war effort*. Responsible officials tell us that using more fresh fruits, vegetables and milk, especially those produced locally, will release shipping facilities. It will also help provide larger reserves of easily transported foods such as meats and various dehydrated foods, for shipment to our armed forces and to our allies.

Even though you think that your family is already well fed, *make sure* that they are eating enough fruits, vegetables and milk, along with the other essential foods. There are some suggestions on this page for getting more of them into your family's diet. Metropolitan will send you a free booklet, 72-N, "Three Meals a Day." It contains much information about planning nutritious meals.

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## The fish that convoys its young

**T**HE BULLHEAD or horned pout has a well-worked-out method of protecting its fry.

When the young fish venture out from their home in some secluded cove, both parents accompany them.

One parent, by swimming around the fry in a small circle, keeps them herded into a compact group about the size of a derby hat, while the other parent swims around them in a much larger circle.

At regular intervals, the father and mother fish meet for a moment, exactly as though they were reporting to each other, and change jobs. The inner guard also crosses and criss-crosses through the school.

By this method the bullhead convoys its brood through the dangers of the water, with a minimum of casualties from picketed, water snakes, and other submarine threats.

It wouldn't be such a bad idea if every time we went out for a little trip, we had a convoy system, too, in order to keep mishaps away.

But we haven't. And particularly when we're

traveling in our car, misfortune can pounce on us with a vengeance.

When this happens we can thank our lucky stars if we have the next best thing to a convoy system, insurance. For although insurance won't keep misfortune at bay, it certainly softens its blows. Think of this:

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HOT  
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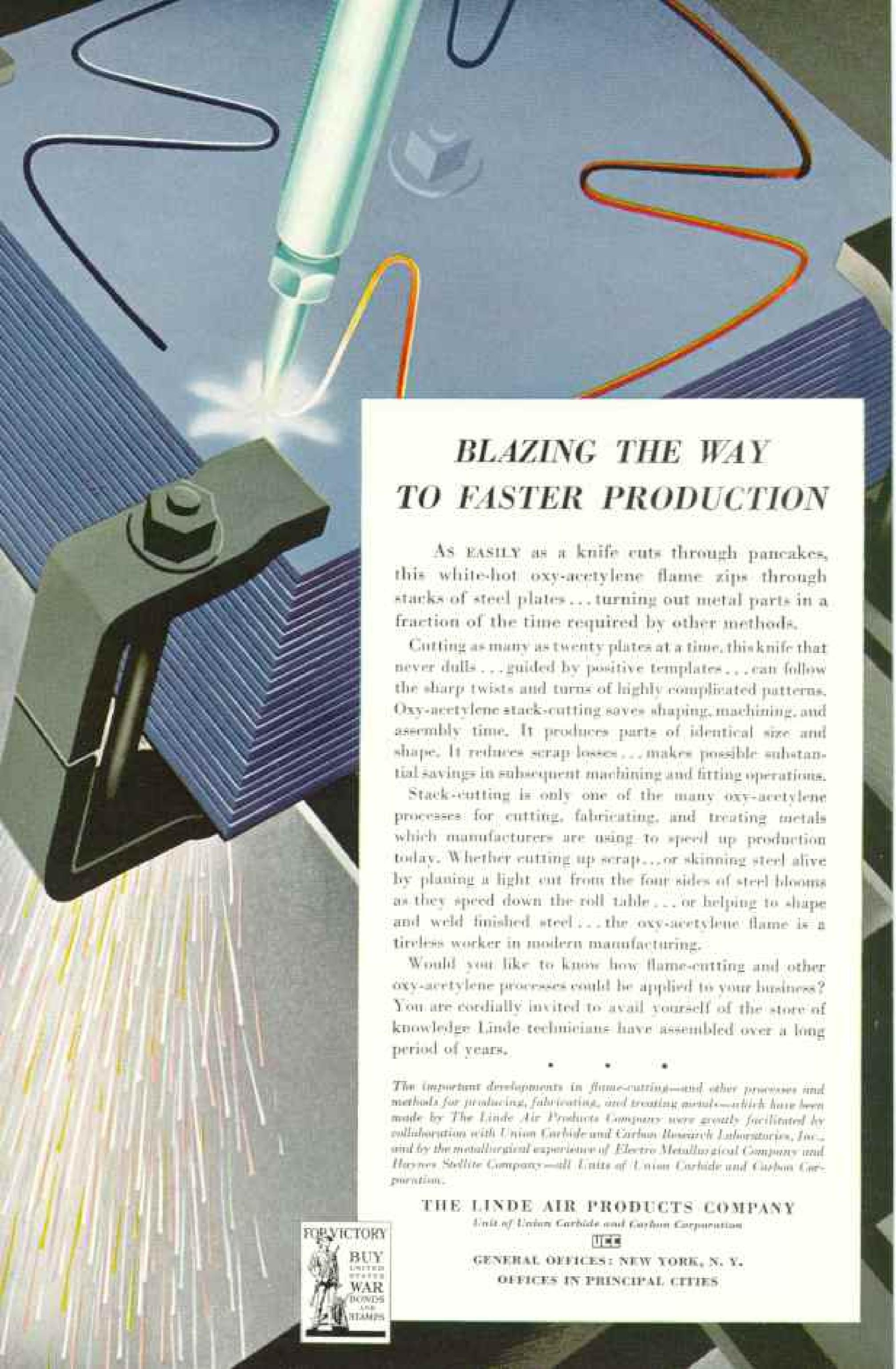
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