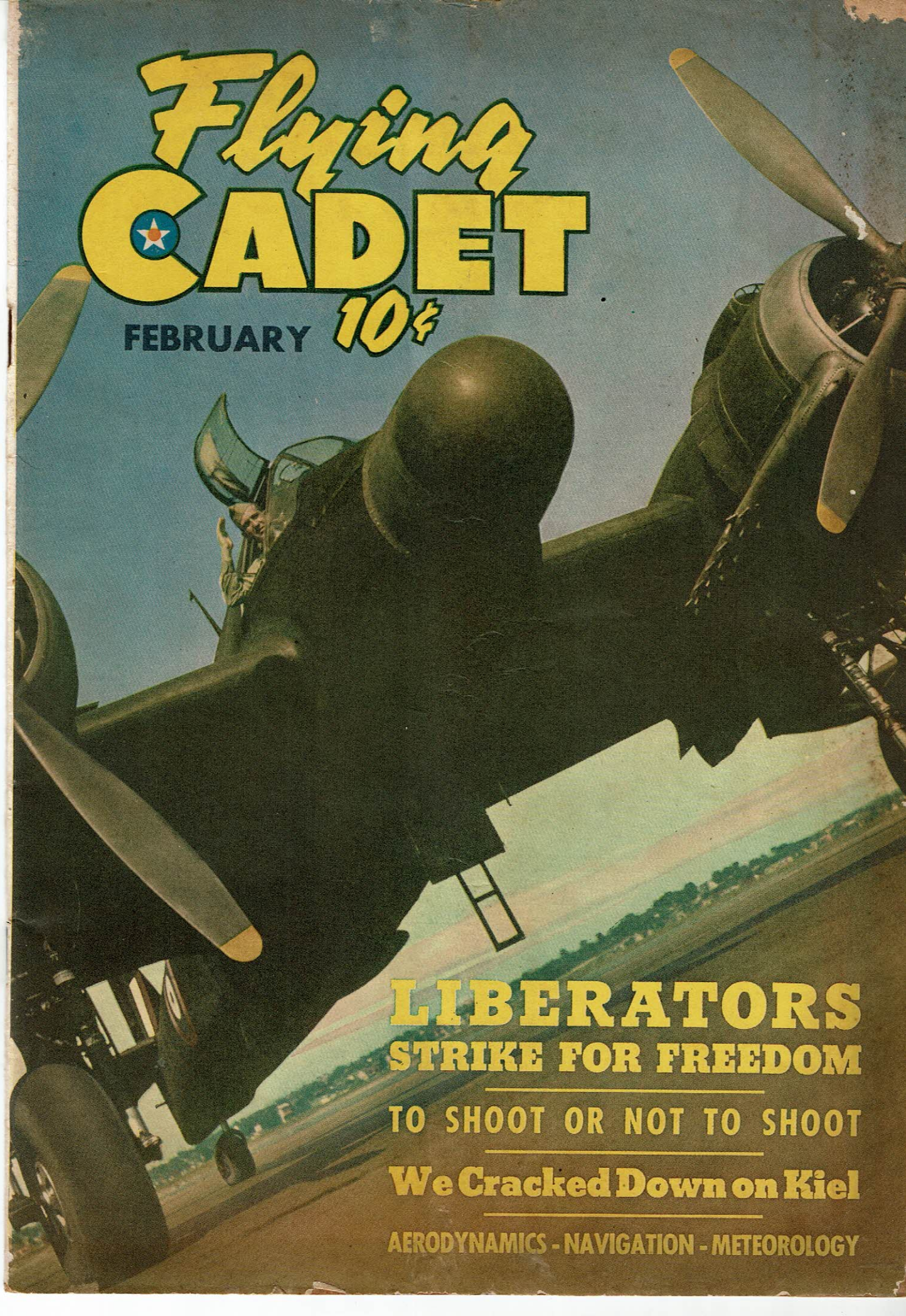
Flying CADET

FEBRUARY 10¢



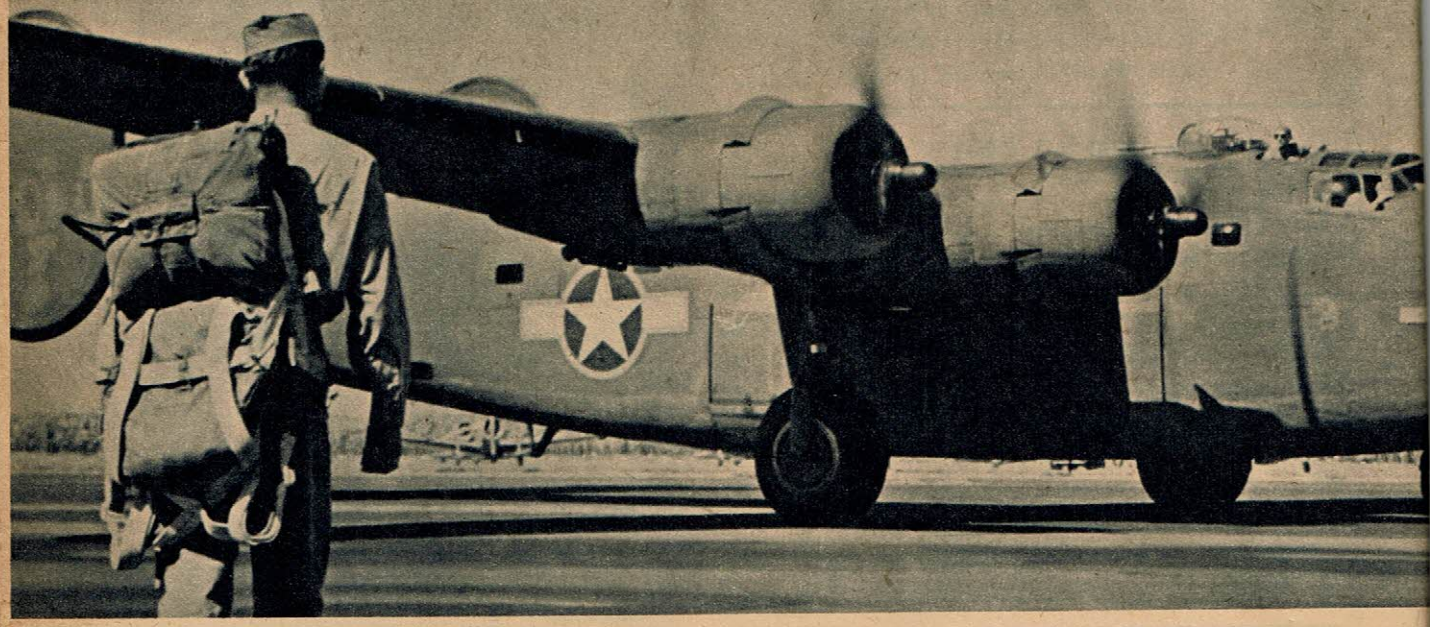
LIBERATORS STRIKE FOR FREEDOM

TO SHOOT OR NOT TO SHOOT

We Cracked Down on Kiel

AERODYNAMICS - NAVIGATION - METEOROLOGY

LIBERATORS
STRIKE FOR FREEDOM



"LIBERATOR!" A great name, well attuned to the huge, gleaming silver bombers which at this very moment in all parts of the globe are roaring off into the blue on their missions of liberation. Glorious winged giants of the skies are these B-24 *Liberators*, bringing a message of hope and freedom to the oppressed peoples of the world.

And, indeed, their very name was coined by our brothers and allies, the British people, to whom, in their darkest hour, a small vanguard of six *Liberator* bombers brought comfort and hope for the future. For, back in those desperate days of the German blitzkrieg, as Hitler's ruthless hordes waited silent and ominous on the shores of France, poised for large-scale invasion, this handful of American B-24s winged their way over a stormy ocean.

Six new B-24s—a mere gesture, a token of friendship and loyalty from America—but nevertheless a harbinger of help and support to come—a concrete evidence of American faith and American power. And so, in a surge of appreciation and enthusiasm, the British people called these new bombers *Liberators*.

Does the *Liberator* deserve its proud title? A glance at tomorrow's newspaper will tell you. And tomorrow will be a very unusual day if you have to look beyond the front page. For *Liberators* are making the front page war news. Everywhere in the world these mighty fire-breathing battle steeds of the twentieth century are plunging ahead, striking blow after blow against the foes of freedom.

Ploesti — Wiener - Neustadt — Paramushiru — Balikpapan. All these and hundreds of other strange-tongued place names are among the targets for the grim death-dealing missions of the B-24s.

Daily the war log grows:

WAKE ISLAND — *Liberators* drop 24,000 pounds of bombs on Jap-held Wake Island.

NORTH AFRICA—*Liberators* in powerful formations blast the Messerschmitt factory at Wiener-Neustadt near Vienna . . . a round trip of 2600 miles.

ITALY—*Liberators* cross Alps to wreck a ballbearing factory at Annecy and to isolate German troops in Italy from their sources of supply.

NORWAY—*Liberators* destroy the world's largest electrolysis plant which supplies the German war machine.

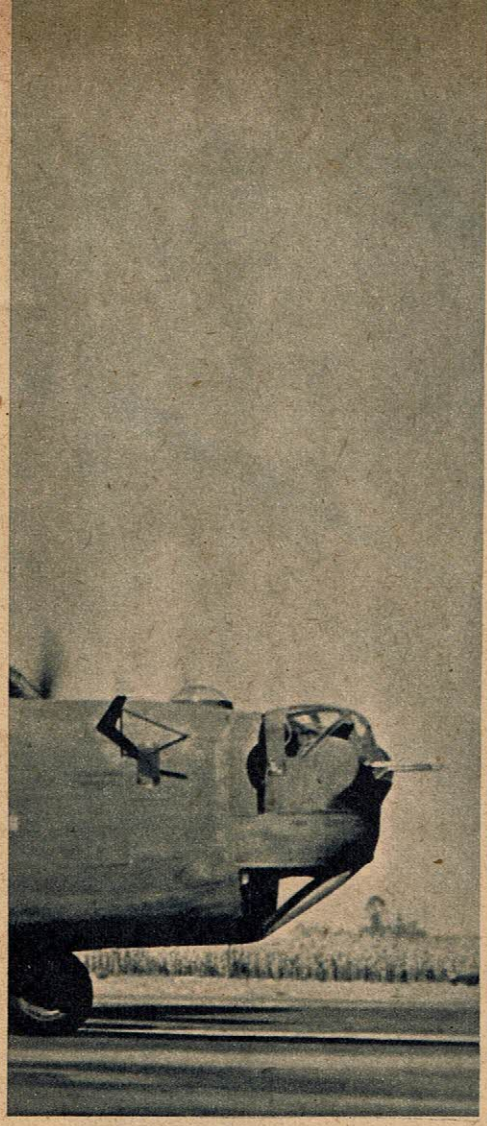
GERMANY—*Liberators* bomb Wilhelmshaven again in one of the heaviest attacks of the war.

MIDDLE EAST—During six months, long-range *Liberators* based in this area engaged in more than 5000 separate sorties totaling over 21,000 flying hours. They dropped more than 8,500,000 pounds of bombs, definitely sank 49 enemy ships, probably sank 25 others, damaged an additional 28. They definitely destroyed 99 enemy aircraft, probably destroyed 41 others, damaged 59.

And these are only a few of the jobs that *Liberators* are doing every day on every front.

But why is the *Liberator* a great airplane? What makes it a leader —a potent and forceful weapon of war?

Among the major reasons for the Liberator's almost incredible performance is the famed Davis



wing, one of the most efficient airfoils used by any heavy bombardment aircraft in the world today. This 110 foot tapered wing, which has remarkably low drag and high lift characteristics, lifts the 28 ton airplane, supports the four 1200 hp. engines, houses the oil and fuel tanks, and carries the 2500 lb. landing gear. Underneath the aluminum skin of this wing, an intricate network of spars, bulkheads, stringers and braces provide the structural strength necessary to withstand the stress and strain of combat flying. Power-operated flaps which are installed on the trailing edge, slide out to increase wing area when needed.

Actually the *Liberator* is the only military airplane today with the Davis airfoil—and while this airfoil is not the magical phenomenon we might be led to believe, it is of just the size, shape, and mathematically precise curvature to be remarkably efficient at certain angles of attack with a certain speed range. This advantage piles up many added miles, especially during a long distance flight.

So, the Davis wing enables the *Liberator* to carry a heavier load of bombs to more distant targets in less time than any other bomber in action. It has carried *Liberators* over both the Atlantic and Pacific oceans to establish world records for these crossings. A fully loaded *Liberator* has crossed the Atlantic in six hours and twelve minutes . . . which should make it evident that she's a pretty speedy ship!

Another outstanding feature of the *Liberator* is the tricycle or three-wheeled landing gear. This gear is usually found in fighters rather than in bombers. The wheels are directly under the inboard engines and with their supporting struts, are hinged to fold outward into the bottom of the wing. The reason that this gear is possible on the *Liberator* is that the ship sits very low and close to the ground. Tricycle landing gear help the ship to land on an even keel and also facilitate take-off. They are particularly good for cross-wind landings or take-offs and enable the ship to maneuver more easily when on the ground.

The *Liberator* is powered by Pratt & Whitney Model R-1830-43 1200 hp. engines, equipped with turbo-superchargers. She uses Hamilton hydromatic quick-feathering, three-blade propellers. The high and low pitch of these propellers corresponds to the high and low gear on an automobile. The blades are of the wide paddle type. When pilots wish to synchronize these propellers they have only to look out and watch the shadow effect on the blades as they adjust the throttles. The pitch angle at which the blades are set determines the distance that the plane would travel forward in one revolution of the propeller if nothing extraneous interfered. The power needed to rotate the propeller also depends on the pitch angle of the blades. This hydromatic propeller utilizes the oil pressure in the engine-lubricating system to change the pitch of the blades during flight. The flow of oil to and from the propeller is regulated by a valve connected to the pitch-control lever in the pilot's compartment.

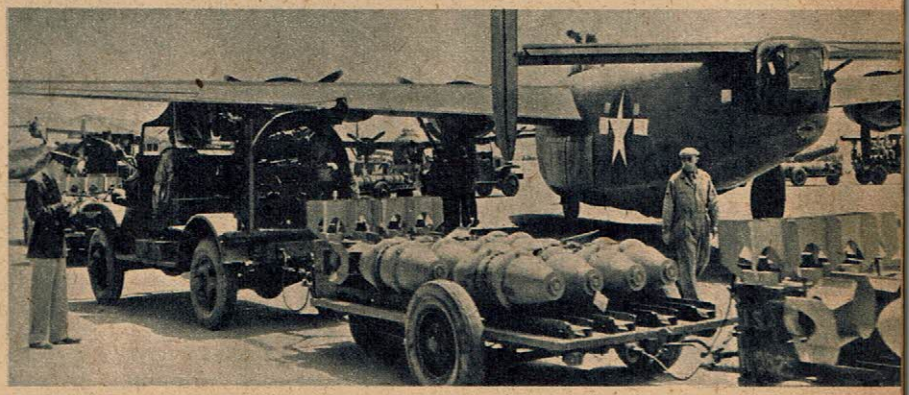
The latest *Liberators* are equipped with ten to twelve .50 calibre machine guns which can hurl a terrific barrage at hostile fighter planes. Production models now have four power turrets—top turret, tail turret, nose turret, and retractable bottom ball turret. In addition to the turrets, two .50 calibre machine guns are mounted for firing from the side. Sometimes, as many as fourteen guns are carried!

The retractable bottom ball turret affords the gunner an entirely clear field of vision on all sides, not being restricted by having bomb doors in the way. Instead, the bomb doors slide up around the fuselage and the turret gunner can fire on all sides. This retractable bottom turret has two .50 calibre guns.

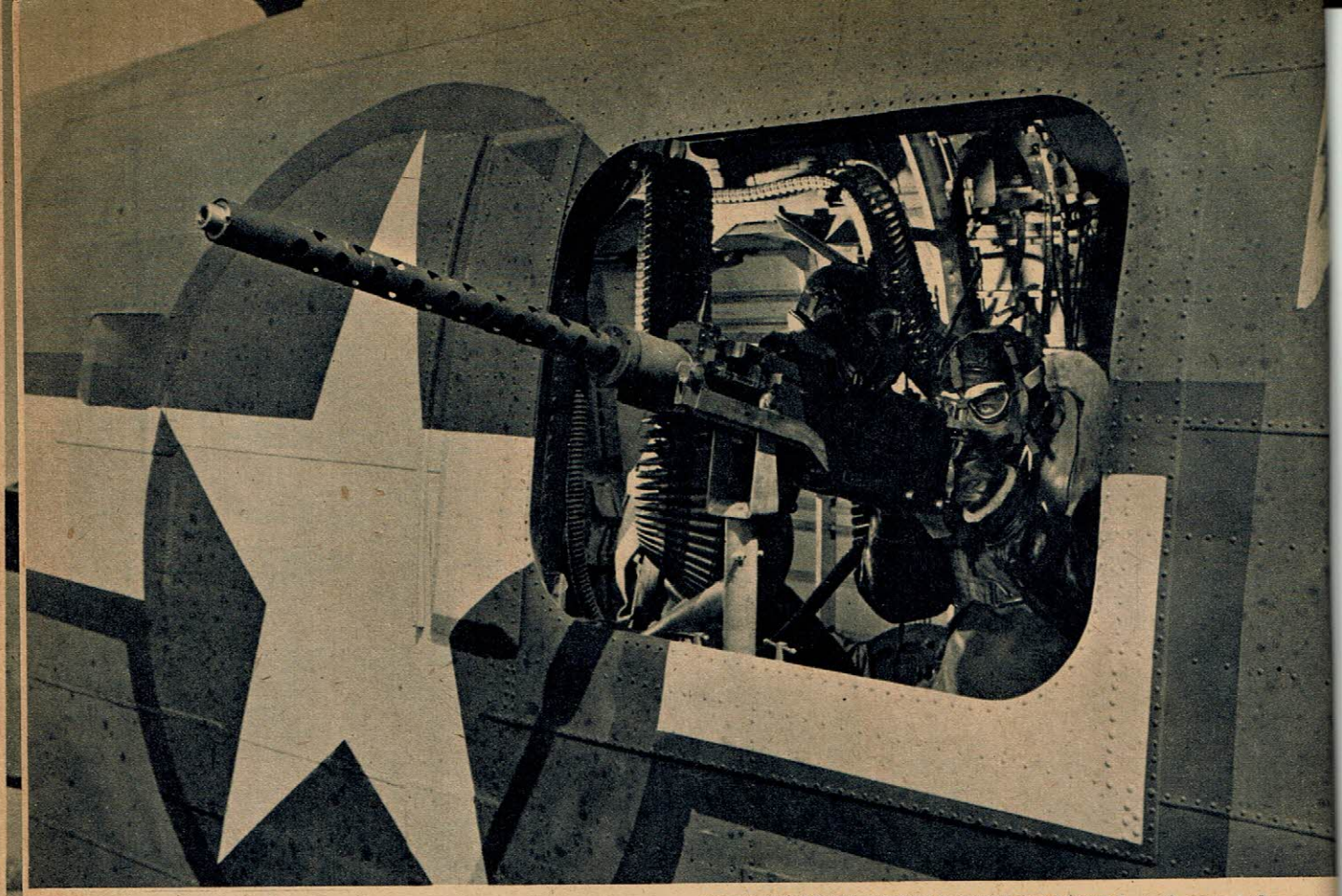
Furthermore the nose and rear gunners cover an exceedingly large field of fire. The nose turret gunner can cover an angle of 130° in a vertical arc and the rear gunner a vertical arc of 114° and horizontally, 125°. The field of coverage of a *Liberator* rear gunner is therefore very extensive.

A thermal anti-icing system—a complicated device by which warm air from the engine's exhaust gases is circulated through the wings and empennage—girds the *Liberator* against that much-feared danger, wing-icing, which

CONTINUED ON NEXT PAGE

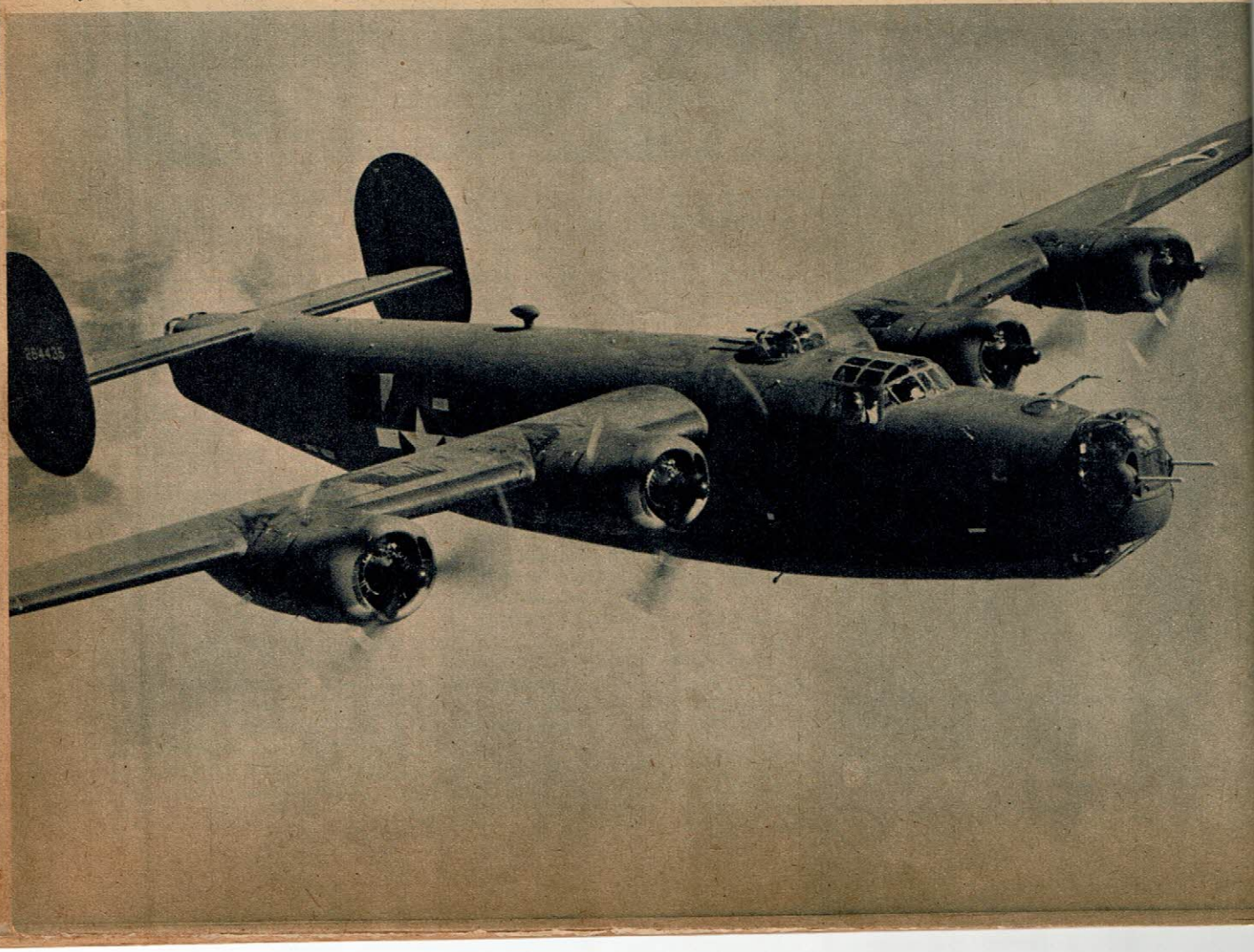


LOADING LIBERATOR WITH BOMBS. Amid all the hustle and bustle of preparation for a mission, each does his own job with strictest precision.



WHITE STAR packs a wallop, as side gun gets going. Anyone on receiving end will see STARS, *in the plural.*

NEW NOSE ELECTRIC GUN TURRET has changed the face of the B-24, which now really seems to breathe fire.



test flight of the *Liberator* was considered highly successful. In successive rigid flight tests, furthermore, the performance in speed, weight carrying capacity, and range was so remarkable that orders were immediately placed for quantities of them.

The first combat reputation of the *Liberator* was earned with the British and the original orders were increased many times over. Then, after the fall of France, there was only one question in the United States. How could Liberator production be multiplied in the shortest possible time?

In order to produce the number required, Consolidated engineers built the first mechanized assembly line for heavy bombers. Later, as the gravity of the war became apparent, the government looked for additional manufacturing facilities to build *Liberators* by the thousands. The manufacturing experience and resources of the Ford Motor Company, Douglas Aircraft Company, and North American Aviation, Inc., were called upon to cooperate with Consolidated Vultee Aircraft Corporation in producing the quantities ordered. Expensive plants were built and organized, and now B-24s roar off the assembly lines by the hundreds every month.

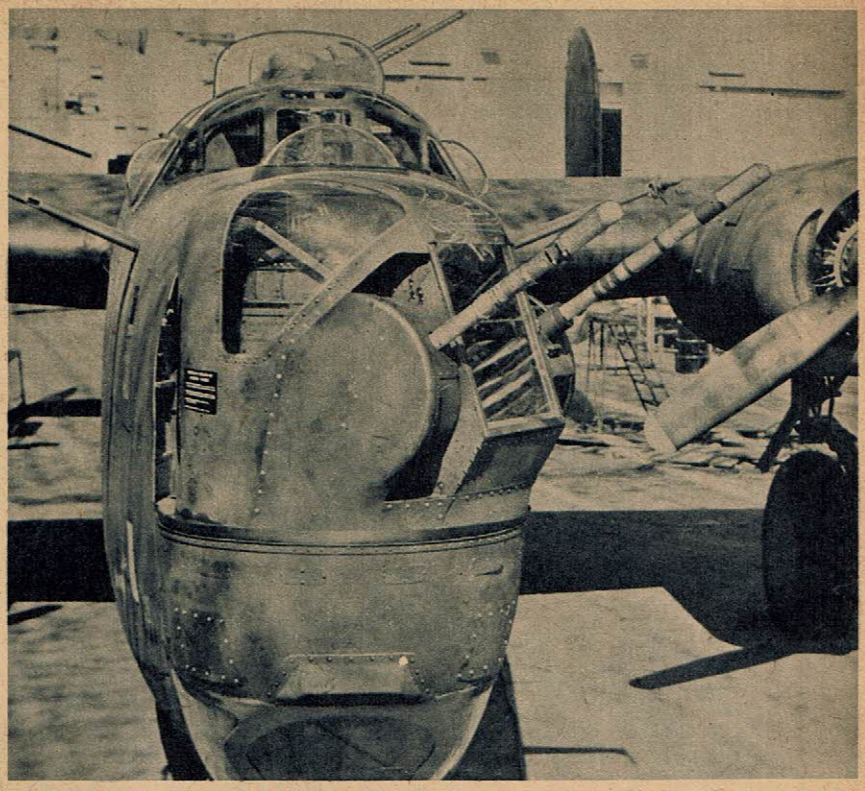
Building a *Liberator* is a great production venture. A two-ton chunk of lead smashing down on a thin sheet of aluminum—that, in a phrase, is how they are made.

Parts are formed from flat blanks of metal in the Drop Hammer Department. Doing the job are the heavy lead and kirksite dies of the drop hammers, the rubber pads of the big hydropress, and the tools of the department's other branches—foundry, planishing, die grinding, yoder hammer, band saw, shaper, drill press and burr bench.

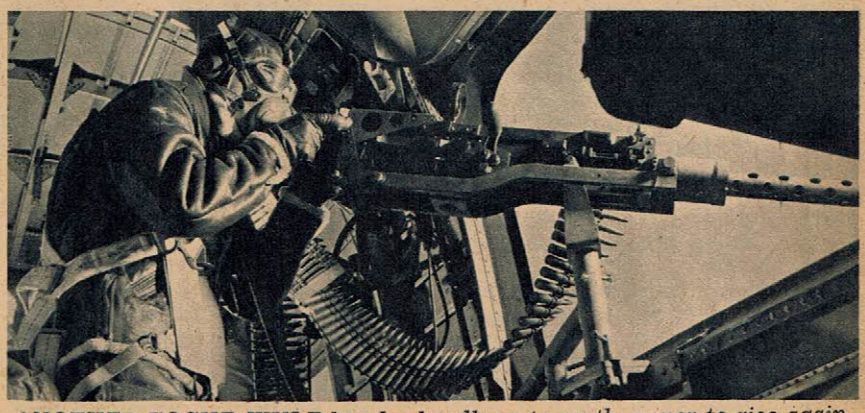
They stretch and squeeze the metal into the curves of a window frame or the angular bends of a heater duct, making an entire part with all kinds of complex contours out of one flat piece. It's just as if you would take a sheet of paper and without wrinkling it or tearing it, force it into the shape of a cup.

Biggest part of this job is done by drop hammers and hydropresses. They literally stretch the metal into the curves of the finished part, the drop hammers by smashing the flat sheet between a die and a punch, the hydropresses by squeezing the piece around a form with a rub-

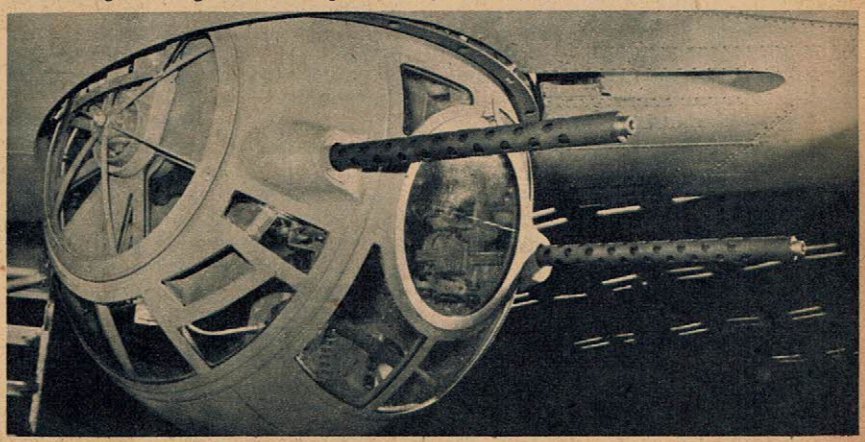
CONTINUED ON NEXT PAGE



NOSE TURRET GUNNER IS PROTECTED by ½" metal armor and 2½" bullet proof glass which move as guns are swung, providing constant cover.



ANOTHER FOCKE-WULF hurtles headlong to earth, never to rise again, as B-24 gunner gets on his gun and feeds it with deadly .50-cal. bullets.



RETRACTABLE BOTTOM SPERRY BALL TURRET gives gunner unrestricted field of vision and he also has clear field of fire on all sides.

ber blanket and 4500 tons of pressure.

Then, take the larger portion of 200,000 airplane parts, half a million rivets, 3,000 feet of wiring, 2,000 electrical and plumbing connections, 2,000 feet of tubing and 7,000 nuts and bolts. Add a maze of pulleys, valves, instruments, pedals, knobs and buttons. Put together bit by bit in a series of jigs, and bucks and assembly lines; inspect well—

And you'll have a fuselage nose section, nerve center of the giant *Liberator* bombers.

Into this section of the airplane, from the front end back to the wing, are packed a multitude of gadgets needed by the pilot, bombardier, navigator and radio operator in controlling the four-engined ship as it hurtles through the air at better than 300 miles an hour.

Add the fuselage tail section, "living quarters" of the 28-ton *Liberator*, and you'll have the 66-foot body of the airplane. This section carries the crew, a large part of the ship's armament and whatever pay load may be on board.

In between these two sections is the bomb bay, installed under the wing.

The two large tires on every *Liberator* contain enough rubber to completely outfit six automobiles with four new 6-ply tires each. But then, instead of running along smooth pavements, the big 16-ply *Liberator* tires take a terrific jolt every time one of the 24-ton loaded bombers comes in for a landing.

Plexiglass domes, windows, enclosure, provide shatterproof visibility. Six miles of wire are crowded into the stubby length of the plane—huge spools of wire are transformed into cables and harnesses that carry sound and energy to radio and ship controls. More than 100 uses are found in *Liberators* for rust-proof zippers —tiny ones on the pockets in the pilot's compartment to giant 87 in. zippers on covers for the four big motors. Curtains, parachute bags, life preservers, doors, cushions—zippers on all these.

Spare parts for maintenance of the huge craft roll out of the Fort Worth plant at a rate of 800 tons a month and are shipped by rail, truck, boat and air express to all parts of the world. These are made up in "echelon pack-ups" consisting of enough parts to maintain a given number of *Liberators* for three months or more.

Having rolled off the assembly line, the *Liberator* is ready for final artistic touches. What these will be depends entirely upon the front for which the plane is destined. Special camouflage and equipment are planned for each battlefront, according to the particular needs. And when the great battleship of the air is finally pronounced ready to fight, off she sails, stately and majestic, flying under her own power to the place where she is to meet the enemy.

SIZE AND TAPERING OF DAVIS WING are so calculated that the B-24 can carry a greater load farther and faster than any other bomber.

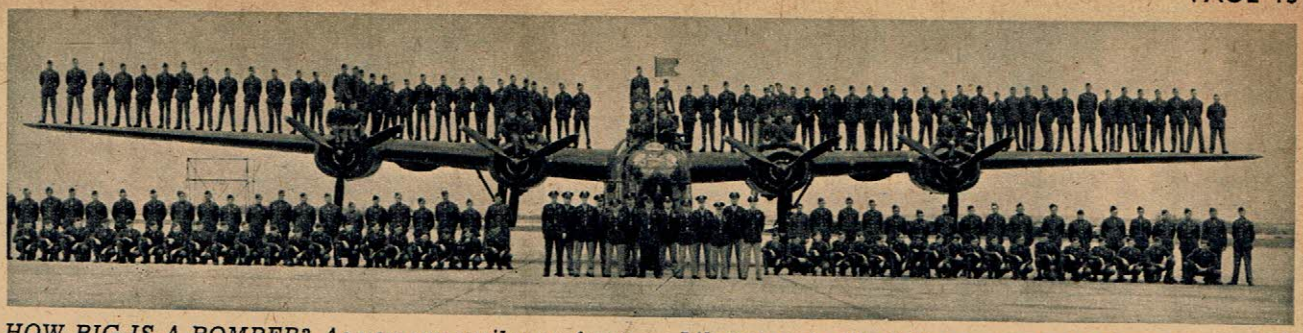
We have seen what tremendous quantities of material go into the making of one *Liberator*. We have visualized the infinite and concentrated efforts of scientific research, the tireless, painstaking devotion of specialists, the numberless man hours and spirited but back-breaking toil of the factory workers, the endless small deprivations of civilians—all these which go into the making of a *Liberator*.

We have looked upon these planes as peerless products of American resources and American power—as our emissaries of faith and good will to the conquered and harassed peoples of an embattled world.

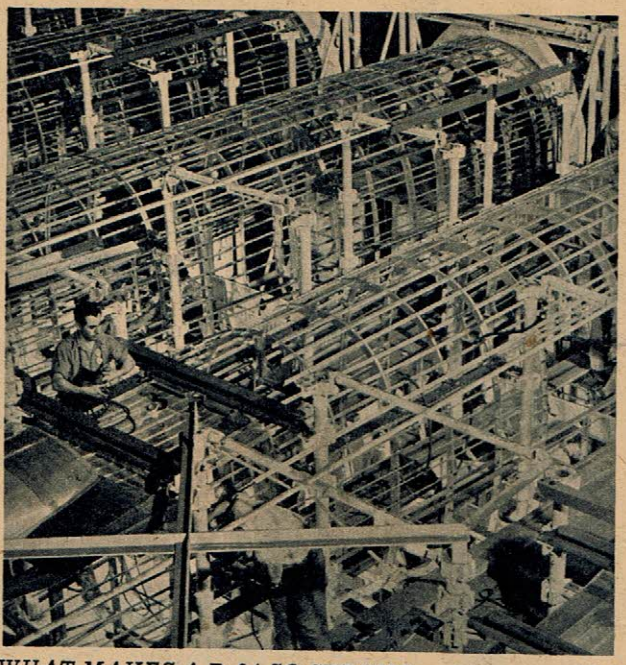
But still we have not seen them in the most important of all their roles—we have not stopped to think of what the *Liberators* mean to the boys who fly them.

To the men of the Army Air Forces, *Liberators* are in a very real sense the twentieth century's trusty steeds of battle. These men know exactly what can be expected of their plane and how it must be handled in order to get the best results. They know their plane can take it. They have heard the story of the *Liberator* that struck a mountainside, crumpling eleven feet of the starboard wing, but managed to land safely in the desert; the one that flew to a safe landing with twelve feet of one wing completely off; and other stories of the great endurance and stamina of these B-24s.

Our men know that their *Liberator* bombers are the product of the best united effort of



HOW BIG IS A BOMBER? As you can easily see from the picture, this magnificent ship—a Consolidated B-24 Liberator—is all of 75 men wide and three men high. The photograph was taken at Tarrant Field, Texas.



WHAT MAKES A B-24 SO STRONG and impregnable? Just have a look at the steel structure of the fuselage.

FINAL ENGINE ASSEMBLY for Liberators. Pratt & Whitney 1200 HP. engines mean power with a capital P.

their country—and so they are endowed with that most necessary of all battle equipment—faith and confidence in their plane.

The *Liberator* bomber was actually designed for high altitude daylight bombing at exceedingly long range and for precision work in conjunction with the Norden and Sperry bombsights. The Ploesti mission proved that it can carry out precision attacks with the accuracy of a skilled surgeon guiding his knife.

In an article recently written for the Official Service Journal of the Army Air Forces, Captain John S. Young has told the story of the all-Liberator raid on the Ploesti oil refineries. One hundred and seventy-seven B-24s flew 2400 miles for a low altitude precision attack. Excerpts from his account give us a good idea of what was what.

Captain Young explains that before the raid, those who were to participate examined hundreds of still photographs, saw motion pictures taken from the air, attended series of lectures given by a former manager of the plants, and bombed a replica of the fields over and over again for weeks.

"When we finally did get over the real Ploesti our movements were almost automatic. . . .

Our *Liberators* were modified considerably for the mission. An extra releasable fuel tank was added in the bomb bay. The top turret guns in the lead planes were arranged so that they would fire forward so the first ships could strafe the entire area, with the following planes protecting their rear. Extra fifties were mounted in the noses of the lead planes. . . .

We flew a flat V, wing tip to wing tip—no plane in the entire formation was more than 25 feet away from another plane.

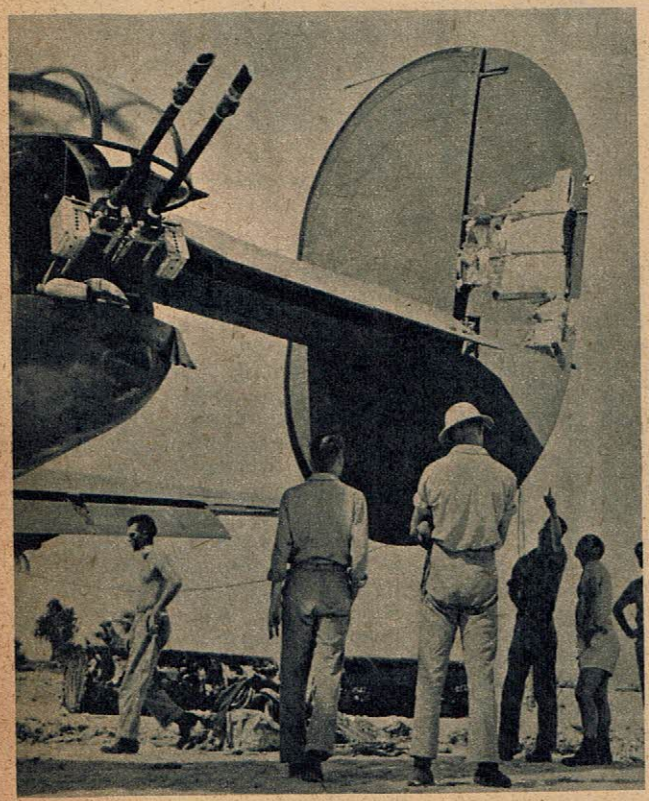
We had forty-eight planes in our element, flying in sections of five. The first four sections had ten planes each, with an eight-plane section bringing up the rear. Each of the first twenty ships carried 1000 pound bombs with sixty-minute delayed action fuses. . . . Each plane in the last three elements carried 500-pounders with 45-second delayed action fuses. . . .

About 35 minutes from our target, we lowered to twenty feet off the ground. And I mean twenty feet. We were coming in so low our plane actually had to pull up to avoid hitting a man on a horse. That horse probably is still running."

(Considerably later in his story, appending some hints for men who may go on similar raids, Captain Young suggests, "Don't be afraid to hug the earth. A B-24 will fly ten feet off the ground and you'll find real safety there.")

CONTINUED ON NEXT PAGE

THE REAL MC COY is what you see in this picture. No, it's no stage set—but a scene showing Liberators undergoing repairs on an airfield at Guadalcanal. Look closely and see the different types of work carried on.



DAMAGED LIBERATOR RUDDER was the work of a Jap 20-mm. cannon shell during action on Nauru.

YES, LIEUTENANT, quite a hole you brought back from Italy. But you left plenty to worry the Nazis!

"About two miles from the target, the flak guns bellowed out a reception comparable to none I had seen in 330 combat hours against some heavily defended targets. Most of it was 20 mm. stuff, with some 40 mm. and a lot of machine guns. The fire was plenty accurate.

A mile and a half from the refineries, we opened up with our fifties, aiming at the oil tanks which held about 55,000 gallons of oil. They started to explode, throwing smoke and flames about 500 feet into the air. There we were, buzzing in at twenty feet, doing 200 miles per hour, flying through intensive flak and bouncing around between oil fires. Play that on your harmonica sometime.

Our particular targets were the Orion and Astra Romana refineries. They had smoke stacks about 210 feet high, so we had to climb to about 250 feet to drop our bombs. Flames were biting in through the bomb bay doors, the heavy smoke fires made visibility difficult, and the flak fire was beating a hellish tattoo all over our ship, but with all the practice under our belt we had no difficulty picking out our targets. We laid our bombs down the middle.

Forty of the 48 planes in our element got over the target.

After the bombs were away, we dropped back to twenty feet and about fifty ME-109s and 110s jumped on us from the right. We were flying so low they couldn't dive on us, but they did lazy eights all over our formation and caused us plenty of trouble.

The housing around the propeller and three cylinders of our No. 4 engine were shot out. Two feet of the prop on the No. 1 engine was smashed, tearing a foot and a half hole in the left aileron. The motor was vibrating like a bucking bronco. And we had a wing cell leak in No. 3. . . .

The fighters kept coming in and we accounted for three. They attacked for about twenty minutes and we just put the ship on the ground and ran like hell.

We muddled through the fighter attack and staggered away from the target on two and a half engines. About 200 miles south of the refineries, we realized that we couldn't return over the Mediterranean with our battered ship. We decided to hug a land route going back. . . .

In order to gain altitude to cross a mountain range, we threw out everything that was movable. We released the extra gasoline tank and tossed out oxygen bottles, gas masks, ammunition, radio equipment, and anything that a screw driver could dismantle. . . ."

Someone called to inquire: 'What the hell are you doing, redecorating?'

We finally got up to 6,600 feet, but we needed 7,000 feet to cross the mountains. By picking our way through canyons and ravines and with some lucky updrafts, we managed to get over.

The plane was hobbling along now at 130 miles per hour and we knew that it might stall around 125 m.p.h. It was still flying, however, and we kept plugging along. We had a choice of putting her down on land or flying across open water to the nearest Allied landing field. The colonel and I realized that there was a good chance the ship would flop into the water, but we had come too far to worry about that. . . .

We had to crash land the plane, but nobody was hurt and the first thing I did after we got away from the ship was to kiss the navigator. Yes, I really kissed him."

* * *

Quite a story, Captain Young. Bet if you'd thought of it, you'd have kissed your *Liberator*, too.

An extraordinary tale? To us it surely seems so. But to the boys of the A.A.F. it's all in the day's work. Such stories are lived every single day of this vicious war. Such grim dramas are being enacted at this very moment, as you sit snugly at home, reading your magazine, or loll in the barracks waiting to be called for duty. Such matter-of-fact heroism is rampant on all our far-flung battlefronts—and such planes are peopling the war-reddened skies in all parts of the globe.

Such planes—yes—such planes as *Liberators*—B-24s which have a range of about 3,000 miles and can carry a four-ton bomb load farther and faster than any other heavy aircraft now in production;

Whose bombs are dropped with calculated and fatal precision to demolish the enemy target;

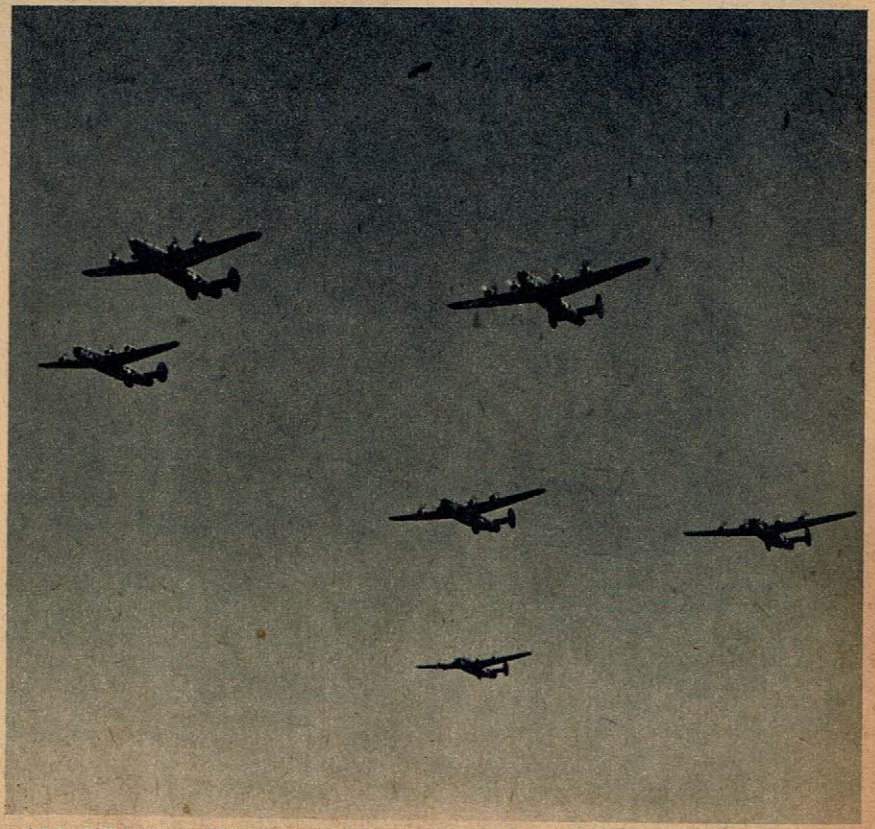
Whose fire power metes out deadly punishment to attacking enemy fighters, knocking them from the skies like clay pigeons;

Whose protective armor offers a challenge to Axis ammunition experts;

Whose speed and maneuverability enables it to extricate itself from the most wicked fray—

Wherever the great battle must be won, there you will find a *Liberator* to fight it.

With Consolidated B-24s to pioneer for us on the road to victory—how can we help but win?



ALL BEAUTY AND MAJESTY is this flight squadron of huge Liberator bombers. They seem to "float through the air with the greatest of ease."