

MIDWAY'S AVENGER



OBVIOUSLY it is much too early to determine accurately if the recent battle at Midway Island in which an air force, unaided, defeated a sea force, has actually broken the backbone of Japanese naval power. Certainly the "Nips" lost a huge amount of fighting tonnage in that encounter which, coupled with other known losses, has made a gaping hole in the Japanese Navy.

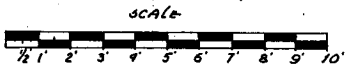
That she had placed a primary importance upon her fleet of ten aircraft carriers as a basic unit in her task forces is logically assumed from a study of the tactical organization which attacked Midway Island. The force was discovered about 600 miles west of the U.S. Pacific stronghold, and this distance indicates the extreme range of the continuous offshore patrols of our Navy's PB's. It consisted, actually, of a main force and a reserve group. In the former were four carriers, three battleships and a supporting group of

cruisers and destroyers. According to official Navy reports this attacking force had assumed the following tactical formation: four aircraft carriers, inline, protected on either beam by heavy cruisers and by a large force of swift destroyers continually changing bearing so as to cut back and forth in an effort to scare off lurking submarines. The three battleships followed this battle line at a distance of some 50 miles, and they too were inline protected by cruisers and destroyers. This was the standard task force battle-line with one important and comparatively radical change: the carriers were in the vanguard rather than trailing behind the fire-power of the battleships.

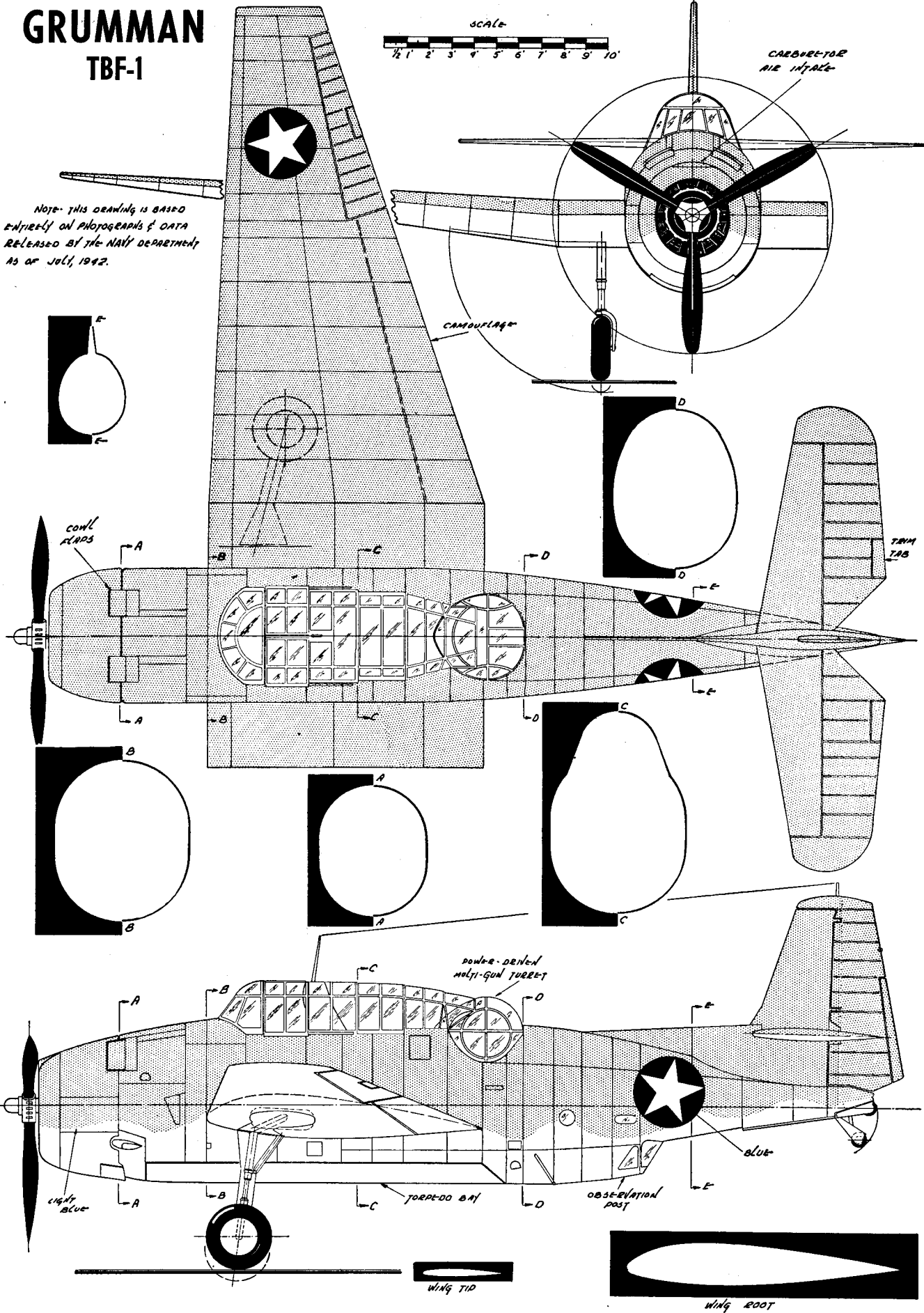
Thus the pattern indicated that the initial phase would comprise a devastating air attack upon the island by bombers protected by fast-climbing fighting planes followed by

TBF-1

NOTE: THIS DRAWING IS BASED ENTIRELY ON PHOTOGRAPHS & DATA RELEASED BY THE NAVY DEPARTMENT, AS OF JULY, 1942.



CARBURETOR
AIR INTAKE

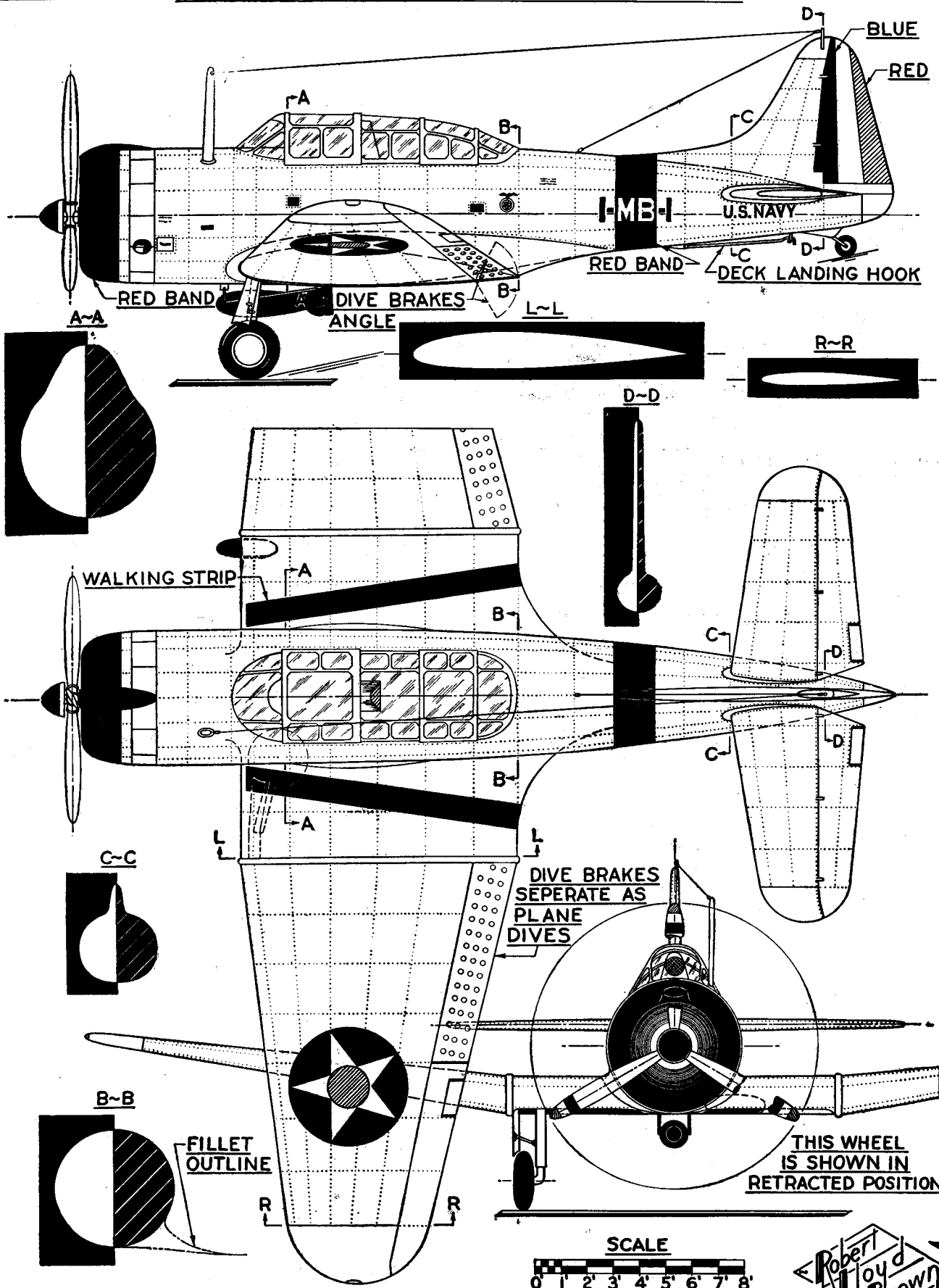


WING TIP

WING ROOT

THE DOUGLAS SBD-1 DIVE BOMBER

THIS SHIP OUTPERFORMS THE GERMAN STUKAS



the heavy guns of the battle-ships after the defenses of the island had been reduced.



In the supporting force were another carrier, several cruisers and destroyers and a number of laden troop transports which would have been landed and the island captured after the smashing gun fire of the battleships had eliminated organized resistance.

Certainly the plan was well plotted, the strength and power of the fleet was considerable and, under favorable circumstances, the attack would most certainly have been made good. The Navy has said nothing of the defending sea forces of the island, although an aircraft carrier has been mentioned. Therefore, assuming that the seaborne defending power was slight, the chances of Japanese success, based on strength, plan and defences of the objective, were excellent. But one small Dutch Boy jammed his finger in the dyke: American Naval Air Power! And the heart of this power was a secret war weapon about which both the enemy and our own home forces (U.S. citizens at large) knew nothing: the Grumman "Avenger" TBF-1 torpedo-bomber.

The Japanese attackers were spotted in late afternoon, and darkness overtook the action before extensive tactics could be recorded. Three Flying Fortresses, under command of Lt. Col. Walter C. Sweeney Jr., attacked the fleet before dusk and reported that a cruiser and a transport had been hit. The next morning Sweeney's men returned to the scene only to miss the main fleet, discovered by Midway's patrol planes just 125 miles west of the island. Then the mid-Pacific rocked with the thunder of screaming motors of exploding bombs, with cannon fire and machine-gun slugs, as U.S. Naval Air Power went into action. Sweeney's men raced to the attack and Marine Corps dive-bombers dropped towards the leading cruisers and destroyers. Make-shift Army torpedo-planes (four in all) swooped down low against the Jap ships as the Nips carrier-based fighters rose in a swarm for battle.

And through this maelstrom of death and destruction rode the fierce new naval weapon, the Avengers wrath tearing holes in the leading vessels. These fiery aerial steeds blasted their way through the swarms of Japanese fighters, smashing them aside with the power of their power-driven turrets, plunged down to the very wave crests and let loose their terrible missiles of death : torpedoes!

In haste the Japanese planes were forced to withdraw from the vicinity of the island to protect the fleet, quickly being hammered to destruction. With the threat to Midway relieved, the Americans

proceeded to pound the Japanese fleet unmercifully until, in full retreat, the vessels disappeared over the horizon leaving four of the carriers useless hulks and forcing many of the Jap planes to land in the sea and on the island's airport in abject defeat.

Included among the carriers known to have been destroyed was the very latest "mystery" vessel of the Japanese Fleet, the Ryukaku. This mighty vessel, launched during 1941 from the Kawasaki shipyards at Kobe, had a displacement of 17,000 tons and a length of more than 800 feet (Enterprise and Yorktown class, approximately).

One of three of its type, the Ryukaku had the latest equipment for launching aircraft, adequate armor protection and secret anti-plane defenses supplied to them from the German naval offices. It was armed with sixteen 5-inch guns and was the pride of the Japanese Navy.

Thus the victory assumes important proportions, for this was no mere converted "tub" our Naval aviators sunk, but the latest and most powerful vessel of its type afloat. More significant, however, is the fact made clear in reports that no American naval vessel was in sight or even in range of the Japanese Fleet at any time during the action. This was entirely a battle between air power and sea power on war's proving ground of steel against steel with no holds barred, no rules or regulations, no methods of scoring other than death and destruction. That no naval vessel can operate against the enemy without adequate

aerial protection has been thus proven in blood and fire. The hammering our torpedo planes and bombers gave the four Japanese carriers is testimony to the superior fire-power, maneuverability and destructiveness of the modern military airplane. And testimony to the strength, speed and utter potency of the new Grumman "Avenger," now Pride of our Naval Aviation—and our Plane-on-the-Cover this month.

With this plane, aviation has proven its case, for the airplane is the only weapon used by our Navy which did not get a chance to prove itself in the last war. As we told you in the May 1942 issue ("Axis Devastator") the torpedo-carrying airplane was not born until after it had missed its chance for battle on Armistice Day November 11th 1918. Its development continued erratic but determined through the 'twenties until 1936 when Douglas produced his famous "TBD" type now known as the "Devastator." For its day it was a remarkable airplane, hauling a torpedo, three men and standard equipment into the air at a speed better than 200 miles per hour. In the early months of the war, particularly in the Coral Sea battle as well as in the Macassar Straits, the TBD did gallant work with the carriers of the U.S. Pacific Fleet. But progress has forced it to make way for a newer, faster and far more deadly plane of its type, the Avenger.

Chief drawback to torpedo-carrying airplanes in the past, in addition to the terrific 1,000-lb. weight of the torpedo, was the necessity for fitting the awkwardly

long and thin capsule to the underside of the ship where it not only caused considerable trouble from the standpoint of weight and balance (affecting maneuverability), but it increased the drag of the airplane tremendously. The TBD succeeded in stowing the bulky torpedo partially on the interior with only about three feet of its snout protruding out into the air; but the new Avenger carries its deadly package completely within its spacious belly, the first plane of the type to do this. Thus, its exterior lines are not interrupted and speed is thereby increased.

The Avenger is a mid-wing monoplane of all-metal construction powered by a single radial-air-cooled double-row engine and providing accommodations for a crew of either three or four. The comparatively large crew is a vital necessity for it is mandatory that one man be detailed to handle the torpedo prior to its launching, starting its engine, setting the various controls and seeing that it is freed from the plane properly. In addition, the conventional crew of a pilot and gunner must be carried; and the Avenger, with its lower rear gun emplacement requires a fourth man to act as belly gunner on a full-scale tactical mission.

The monoplane wing is built up on a framework of three spars, ribs, spanwise stiffeners and skin plating flush riveted throughout. The wing consists of a center section (spars only continuing through the fuselage), two outer panels and two tip sections. "Square" tips are again used as a result of recent wind tunnel investigations proving the

superiority of this "chopped off" design over other types at high speeds. Tip losses are said to be lessened to a marked extent, and most new designs carry this feature on not only the wing tips but the tail surfaces as well.

Conventional ailerons of the slotted types are carried, as well as split, trailing edge flaps running between the ailerons to the wing outer panel attachment angles on the center section. Fixed slots are mounted in the leading edge of the outer panels just forward of the ailerons to provide a larger stalling angle and consequent lower stalling speed, giving the ship good handling characteristics even at the slow speeds necessary for dropping torpedoes.

The fuselage is of oval shape and is extremely "fat" through its middle in crosssection vertical height to accommodate the torpedo bay, the wing and crew one atop the other. The lower mold line breaks sharply at the aft end of the torpedo bay to provide for the belly gun emplacement. The aft portion of the fuselage tapers sharply, giving it a soup spoon appearance.

The tail surfaces are of conventional static and dynamically balanced design and the vertical stabilizer has been extended forward along the upper fuselage to provide better longitudinal control and stability as well as better spin-recovery characteristics. The rudder, elevators and ailerons are aerodynamically balanced by controllable trimming tabs.

The upper forward portion of the fuselage is completely enclosed in a

moulded transparent plastic material of sliding hatches and fixed enclosures for the crew. The pilot is protected by a laminated plate glass windshield. He is located high and well forward affording him vision in a large angular dimension. He is protected by a sturdy turn-over structure mounted just behind him. This latter is an integral portion of the fuselage and consists of an extension of the vertical fuselage frames as well as a canted member. This over-turn structure also supports the antenna mast at its forward end. This arrangement made necessary a fixed member above the pilot's head along which the sliding enclosure moves. The slit along its centerline moves around the mast.

Aft of the pilot is the radio operator and torpedo officer whose seat is collapsible, permitting him to go below to handle the torpedo when a launching is anticipated. Immediately aft of him on a special pedestal within the enclosure is the radio compass loop. The aft portion of the enclosure is faired into the upper gun turret, a large, plastic hemisphere mounted on a special roller mechanism which permits it to operate through 90° elevation and 360° azimuth. This installation varies in different models, the standard type carrying a single .50 caliber machine-gun, the turret hydraulically operated or "boosted" by the gunner's controls. Later models are believed to have special multi-gun power driven turrets installed mounting two .50 caliber weapons or four .30 caliber machine-guns.

The lower gun turret, which consists of a conventional fixed

socket arrangement, mounts a .30 caliber machine gun and also serves as an observation post for the lower gunner to record the extent of damage done to enemy ships after the torpedo has been launched.

Power is supplied by a single Wright Double Row Cyclone model R-2600 engine which develops 1400 horsepower at 2400 rpm at 11,500 feet and has 1600 horsepower available for takeoff. This giant engine is equipped with a two-stage two-speed supercharger, the auxiliary blower having a "Low," "High" and "Neutral" position. This type supercharger works similar to the gear shift on an automobile and makes additional power available at high altitudes. It has a cruising horsepower of 1,000, the maximum power available just a short three or four years ago.

The Avenger has a top speed of more than 280 miles per hour, better than 50 miles per hour faster than the Douglas type which it is fast replacing. It has a range of 1,400 miles and a load capacity of either a single torpedo or 2,000 pounds of bombs, making it possible to use the big ship also as a bomber. It has a fighting ceiling of more than 25,000 feet, providing high altitude operation when attempting to surprise an enemy fleet as well as eluding the prying eyes of protecting fighters.

The Avenger is not a suddenly conceived and executed design, for it has been under construction in experimental form for two years. The XTBF-1 was thoroughly tested and many radical changes made before the final production design was arrived at. However, once the type

was in production no time was lost in getting it into service and only four months elapsed between the time the first production airplane rolled from the Grumman Aircraft factory and Avengers were on duty with the fleet at Midway Island.

Many will remember the graphic account of the Midway Battle given by Ensign George H. Gay, Jr., who witnessed the battle while floating in the sea after his Avenger had been shot down. Ensign Gay successfully delivered his torpedo into a Nipponese aircraft carrier and was pulling up and away when a Japanese fighter caught his ship square in its gun-sights.

Large numbers of the Grumman Avengers are now rolling off the production line and are being hurried into service with our greatly expanded carrier fleet. It is a truly powerful and deadly airplane and will most certainly play its part in the coming battles in the Pacific, battles of torpedo-carrying airplanes against the battleships, cruisers and destroyers of "Hirohito's Heels." And if the swift work it has done to Japanese ' aircraft carriers is any indication, the Jap Fleet is in for a terrible shellacing at the hands of this merciless Avenger.

VICTORY

Model Airplane News, September 1942