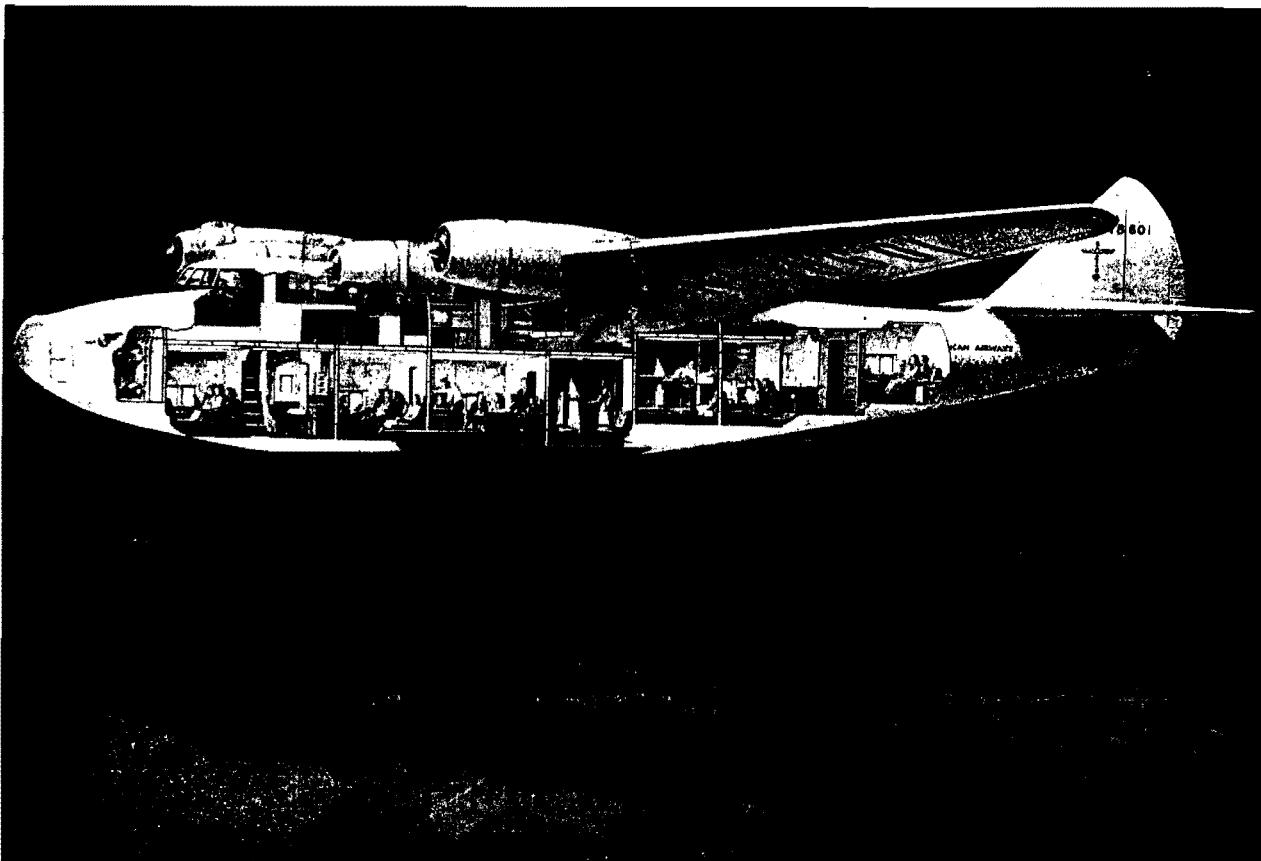


Boeing Four-engined Flying Boat



»» Designed to make transoceanic air transportation practical on a large scale, the new four-engined Boeing Model 314 "Clipper" will carry more passengers and cargo over a greater flight range than any other airplane in service in the world. It accommodates seventy-two passengers on daytime flights or forty in commodious sleeping compartments at night, in addition to its crew of eight. Space is available in cargo holds for five tons (4536 kgm.) of mail and air express.

This full-cantilever high-wing all-metal monoplane has two full decks: an upper deck containing the elaborate flight control section, and a main deck with passenger compartments, lounge or dining salon, private stateroom, galley and dressing rooms. It is designed throughout to give complete comfort and relaxation to passengers and crew on sustained flights.

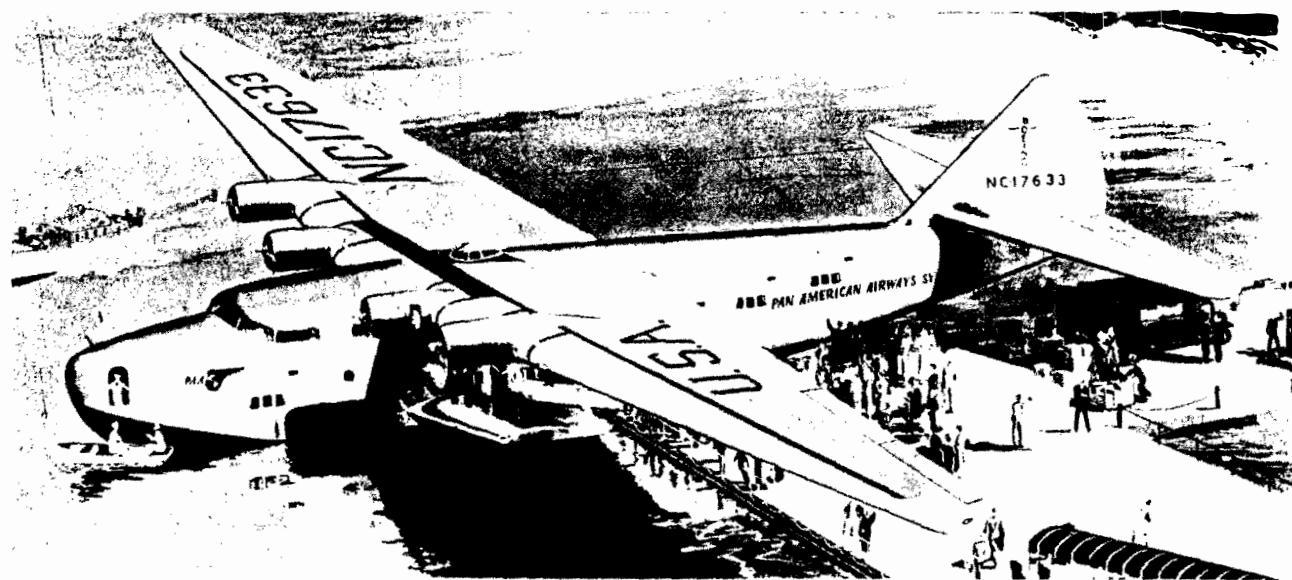
Power is supplied by four 1500-horsepower Wright engines, any two of which are sufficient to maintain flight. Engine nacelles are accessible during flight by way of wing companionways.

The giant ocean air cruiser has a top speed close to 200 miles per hour (322 kph.) and a maximum cruising range approximating 5000 miles (8045 km.) with reduced payload, or a normal operating range of more than 3200 miles (5149 km.) with fifty passengers aboard.

Boeing has always built tomorrow's airplanes today!

Era is here!



BOEING—continued.

A drawing of the Boeing 314 Trans-Oceanic Flying-boat.

PERFORMANCE: (Pratt & Whitney "Wasp" 1830-C engines). Maximum speed at 10,000 ft. (3,050 m.) 250 m.p.h. (400 km.h.). Cruising speed at 10,000 ft. on 2,500 h.p. 214 m.p.h. (342.4 km.h.). Service ceiling 24,600 ft. (8,700 m.). Service ceiling on three engines 19,900 ft. (6,070 m.). Absolute ceiling with any two engines 12,300 ft. (3,750 m.). Maximum range at 10,000 ft. (3,050 m.) at 50 per cent. power 1,700 miles (2,720 km.) at 184 m.p.h. (294.4 km.h.).

THE BOEING 314.

TYPE: Four-engined flying-boat for trans-oceanic passenger, mail and cargo transport.

WINGS: High-wing cantilever monoplane. Structure same as for Model 307.

HULL: Semi-monocoque structure, divided into eleven sections by truss-type bulkheads. Hull includes an upper or control deck, a main or passenger deck, and a series of watertight compartments below the floor structure, with flush riveting on the bottom skin. Cantilever two-spar stabilizers integral with the hull.

TAIL: Unr. Cantilever monoplane type. Aluminum-alloy framework, with smooth sheet covering on fixed surfaces and fabric covering on movable surfaces. Trimming-tabs in elevators and rudder.

POWER PLANT: Four 1,500 h.p. (take-off rating) Wright "Cyclone" double-row fourteen-cylinder radial air-cooled geared engines, in semi-monocoque nacelles in the leading-edge of the wings. Engines accessible during flight through wing companionway. Hamilton-Standard full-feathering constant-speed airscrews. Fuel tanks in wings and stabilizers.

ACCOMMODATION: On two decks, upper or control deck, and main or passenger deck. Crew of eight (including two stewards) and seventy-two passengers. Standard passenger compartments, convertible into sleeping compartments, with upper and lower berths for forty passengers. Special dining saloon, galley, separate dressing rooms and latrines. *for men and women, and a private drawing room.* Wide-vision windows, soundproofing, controlled heating and ventilation. Space available for approximately 5,000 lbs. (2,270 kg.) of mail and cargo.

DIMENSIONS: Span 152 ft. (46.36 m.). Length 109 ft. (33.24 m.). Overall height 28 ft. 6 in. (8.69 m.).

WEIGHTS: Weight empty 48,805 lbs. (22,185 kg.). Weight loaded 82,500 lbs. (37,455 kg.).

PERFORMANCE: Estimated maximum speed 200 m.p.h. (320 km.h.). Estimated maximum range 5,000 miles (8,000 km.).

BREWSTER.**BREWSTER AERONAUTICAL CORPORATION.**

HEAD OFFICE AND WORKS: LONG ISLAND CITY, N.Y.

President and General Manager: James Work.

Vice-President and Chief Engineer: Dayton T. Brown.

Secretary and Treasurer: John R. Hunt.

The Brewster Aeronautical Corp., formed in 1932, took over the equipment, plant, designs and goodwill of the Aircraft Division of Brewster & Co., Inc., a company which has been manufacturing carriages and, later, automobile bodies since 1810. This Company is now chiefly engaged in the construction of seaplane floats, wings and tail surfaces.

More recently, the Company has been developing two experimental aircraft for the U.S. Navy. Brief details of these two types are given herewith.

THE BREWSTER XSBA-1.

The XSBA-1 is a scout-bomber which was, at the time of writing, undergoing trials with the U.S. Navy. It is an all-metal mid-wing cantilever monoplane, fitted with a Wright "Cyclone" G engine developing 1,000 h.p. and driving a three-bladed

controllable-pitch airscREW. The N.A.C.A. cowling appears to have two annular outlets.

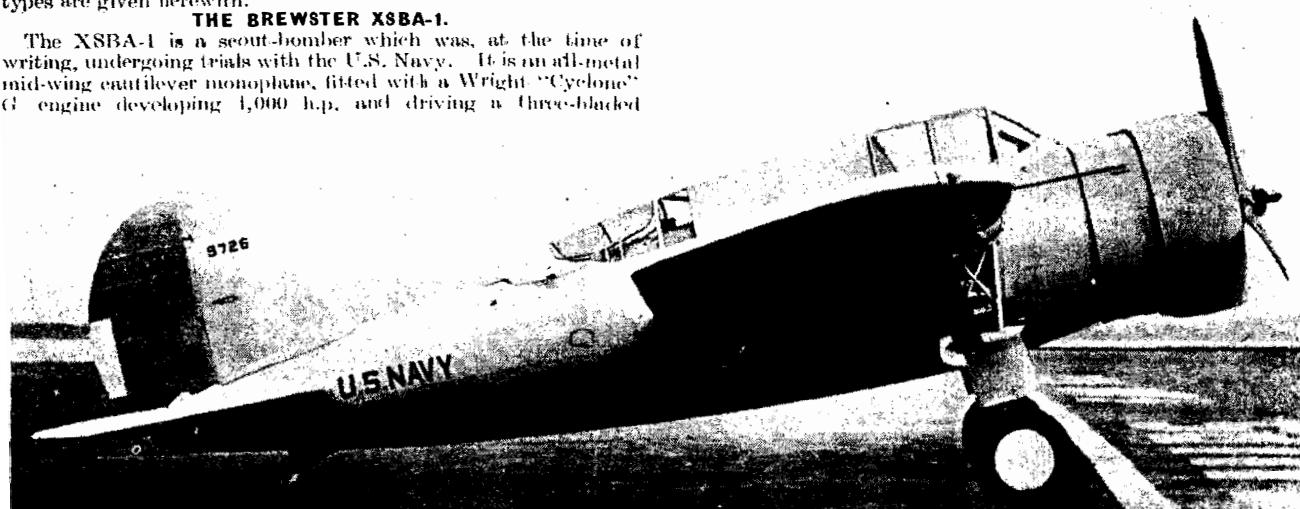
It has an interesting form of retractable undercarriage in which the struts fair into the lower wing surface and the wheels into the sides of the fuselage below the wings.

The crew of two are accommodated in enclosed cockpits, the pilot ahead of the leading-edge and the gunner-observer over the trailing-edge. Details of armament are unknown.

Further particulars of this machine have not yet been released by the U.S. Navy Department.

THE BREWSTER XF2A-1.

The XF2A-1 is an all-metal single-seat fighter monoplane which, at the time of writing, was nearing completion. No details of this machine are available for publication.



The Brewster XSBA-1 Two-seat Scout-bomber Monoplane (1,000 h.p. Wright "Cyclone" engine).

BOEING—continued.

The Boeing PBB-1 "Sea Ranger" Patrol-Bomber Flying-boat (two 2,000 h.p. Wright "Cyclone 18" engines).

ARMAMENT.—Twelve .5-in. and one .303-in. machine-guns. Two each in the two Sperry electrically-operated turrets, one above and one below the fuselage; two in the extreme tail, two on hand-operated mountings, one on either side of the fuselage between wings and tail, one on each side of the nose and one firing through the top of the fuselage just behind the pilot's cockpit. The one .303-in. machine-gun is in the bomb-aimer's compartment.

DIMENSIONS.—Span 103 ft. 9 in. (31.6 m.), Length 73 ft. (22.26 m.), Height 15 ft. 6 in. (4.72 m.), Wing area 1,486 sq. ft. (138 sq. m.).

WEIGHTS AND PERFORMANCE.—No data available.

THE BOEING PBB-1 "SEA RANGER."

The Boeing PBB-1 is a long-range twin-engined Patrol-Bomber flying-boat, the prototype of which first flew in 1942. It is fitted with two 2,000 h.p. Wright "Cyclone 18" engines. No details of this flying-boat have been released for publication.

THE BOEING 314-A "CLIPPER."

TYPE.—Four-engined Trans-oceanic flying-boat.

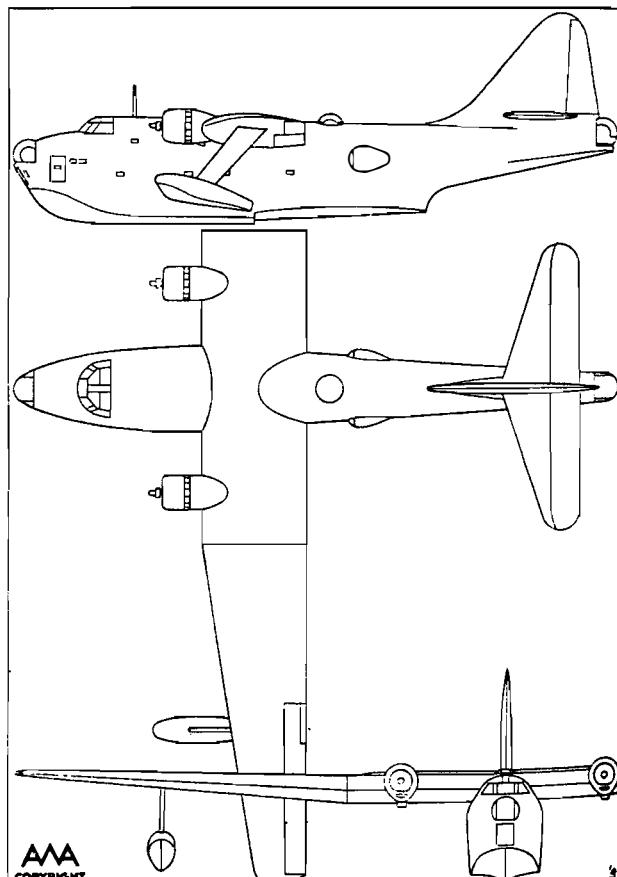
WINGS.—High-wing cantilever monoplane. Structure same as for Model 307 (which see).

HULL.—Semi-monocoque structure, divided into eleven sections by truss-type bulkheads. Hull includes an upper or control deck, a main or passenger deck, and a series of watertight compartments below the floor structure, with flush riveting on the bottom skin. Cantilever two-spar hydro-stabilisers.

TAIL UNIT.—Cantilever monoplane type with three fins and rudders. Aluminium-alloy framework, with smooth sheet covering on fixed surfaces and fabric covering on movable surfaces. Trimming-tabs in elevators and rudders.

POWER PLANT.—Four 1,600 h.p. (take-off rating) Wright "Cyclone" 709C-14AC1 double-row fourteen-cylinder radial air-cooled geared engines, in semi-monocoque nacelles in the leading-edges of the wings. Engines accessible during flight through wing companion-way. Hamilton-Standard full-feathering constant-speed airscrews. Fuel tanks in wings and hydro-stabilisers. Fuel capacity 5,408 U.S. gallons.

ACCOMMODATION.—On two decks, upper, or control, deck and main, or passenger deck, providing accommodation for crew of eleven (including two stewards) and sixty-eight day passengers and 36 sleeping passengers. Aft of the control cabin on the upper deck are the main cargo, mail and baggage holds with combination cargo-loading hatch and navigator's observatory above. Additional cargo space is provided in the bow of the hull. Mail and cargo holds have a total capacity of approximately 5 tons.

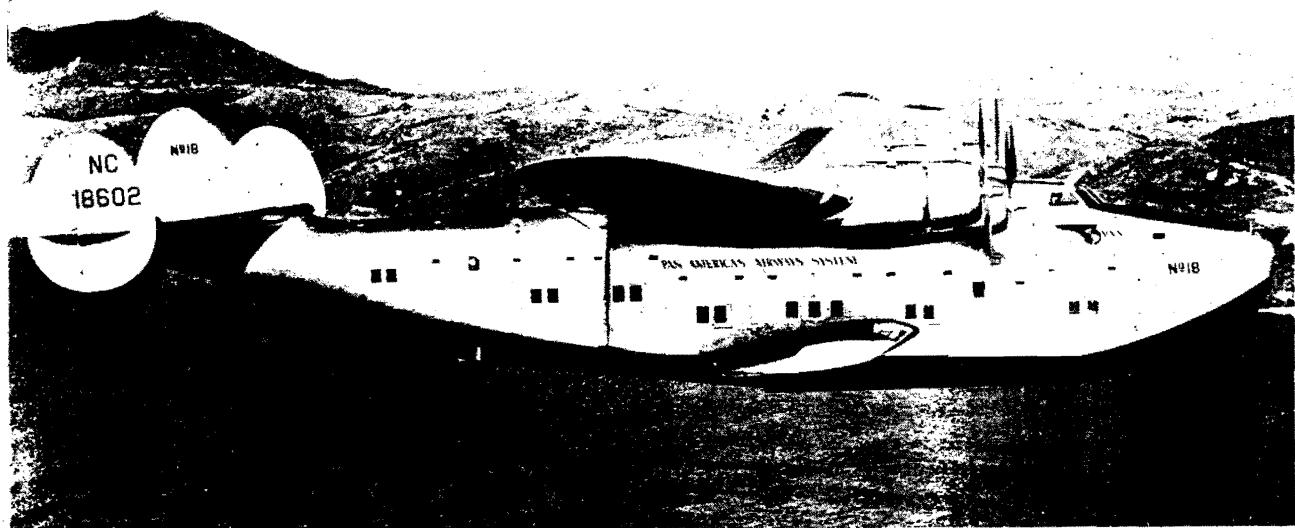


The Boeing PBB-1 "Sea Ranger."



The Boeing 314-A "Clipper" Flying-boat (four 1,600 h.p. Wright "Cyclone" engines).

BOEING—continued.



The Boeing 314-A "Clipper" Trans-Oceanic Flying-boat (four 1,600 h.p. Wright "Cyclone" engines).

The passenger deck is divided into nine sections, including a lounge or recreation room seating twelve passengers, six separate passenger compartments, a specially furnished de-luxe compartment, galley and rest rooms and lavatories for men and women. The two decks are interconnected by staircase. Complete radio, interphone and signal light systems. Soundproofing, controlled heating and ventilation.

DIMENSIONS.—Span 152 ft. (46.36 m.), Length 106 ft. (32.33 m.). Height 20 ft. 4 $\frac{1}{2}$ in. (6.22 m.).

WEIGHTS.—Weight empty 48,400 lbs. (21,930 kg.); Weight loaded 84,000 lbs. (38,136 kg.).

PERFORMANCE.—Maximum speed 210 m.p.h. (336 km.h.) at 6,200 ft. (1,880 m.), Cruising speed at 66½% rated output 188 m.p.h. (301 km.h.) at 11,000 ft. (3,355 m.), Normal cruising range 3,685 miles (5,896 km.), Maximum cruising range at maximum loaded weight 4,900 miles (7,840 km.).

THE BOEING 307 "STRATOLINER."

U.S. Army Air Forces designation: C-75.

TYPE.—Four-engined Air-liner.

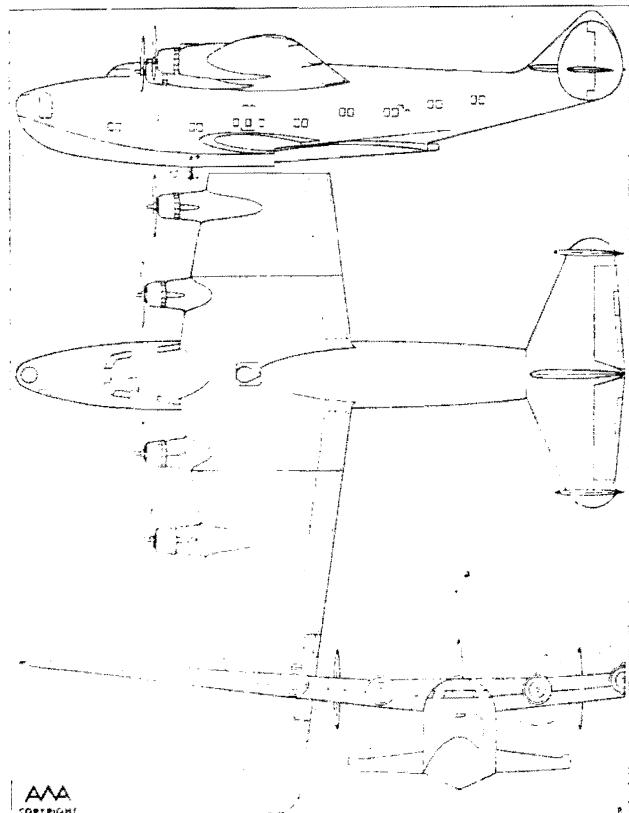
WINGS.—All-metal low-wing monoplane. Wing in six sections, consisting of two inner sections, two outer sections, and two tips. Structure mainly of aluminium-alloy, built up of two spars, ribs, and stressed-skin covering. Split trailing-edge flaps on Model 307. Slotted flaps on Model 307-B. Leading-edge slots near wing-tips. Trimming-tabs in ailerons. Flaps and ailerons are fabric-covered.

FUSELAGE.—Semi-monocoque structure of circular cross-section. Structure consists of aluminium-alloy ring and partition bulkheads, longitudinal stiffeners and circumferentials, the whole covered with smooth "Alclad" skin. The fuselage is sealed for high-altitude operation with moderate supercharging. Automatically-controlled supercharging and pressure-regulating equipment provide for operation at altitudes of 14,000-20,000 ft. (4,270-6,100 m.), with a pressure differential of 2 $\frac{1}{2}$ lbs./sq. in. between outside atmospheric pressure and inside pressure. At an actual height of 14,700 ft. (4,449 m.) cabin conditions are equivalent to a height of 8,000 ft. (2,449 m.).

TAIL UNIT.—Cantilever monoplane type. Aluminium-alloy framework, fixed surfaces covered with smooth metal skin and movable surfaces with fabric. Trimming-tabs in elevators and rudder.

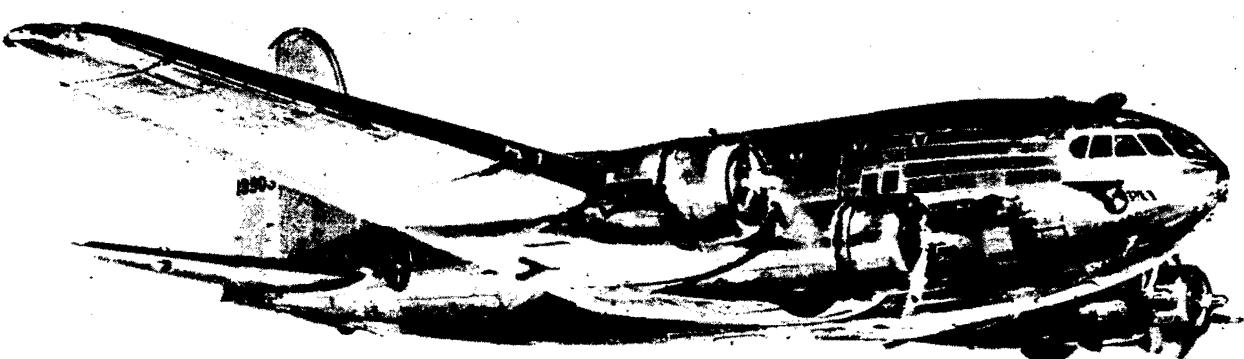
LANDING GEAR.—Retractable type. Electrically-operated, with auxiliary manual control. Hydraulic brakes. Retractable tail-wheel.

POWER PLANT.—Four 1,100 h.p. Wright "Cyclone" GR-1820-G102 (Model 307) or GR-1820-G105A (Model 307-B) radial air-cooled engines in semi-monocoque nacelles in the leading-edge of the



The Boeing 314-A "Clipper."

AAA
CORPORATION



The Boeing 307 "Stratoliner" (four Wright "Cyclone" engines) as supplied to Pan-American Airways.

Boeing 314 Yankee Clipper

The golden age of the commercial flying-boats was abruptly interrupted by the war. However, before this interruption, when the development of such aircraft was directed towards the precise needs of the military, there was one last great 'clipper' which managed to make a considerable contribution to the development of civil aviation. This was the Boeing 314 (christened Yankee Clipper), a gigantic four-engined flying-boat which represented the highest development of the formula which had started out in the form of the Sikorsky S.42 in 1935. The Boeing 314 was the first aircraft to make a regular service across the North Atlantic. This route is still the most prestigious of all today despite the immense growth of the airlines. On May 20, 1939, Pan American World Airways, at whose request the Yankee Clipper had been designed, inaugurated the first transatlantic mail service, and on June 28 inaugurated the first regular passenger service, from New York to Southampton, via Newfoundland. These developments were, however, overshadowed by the

first signs of the war in Europe. Even though the outbreak of war led to the cancellation of these services, the 12 Boeing 314s built (nine went to the Pan American company and three to BOAC of Great Britain) continued to carry out vital tasks across the Atlantic and Pacific oceans until the hostilities were at an end.

The Yankee Clipper project dated back to 1935, with the start of a series of negotiations between Pan American and Boeing for the production of a flying-boat capable of guaranteeing transatlantic passenger flights with a high degree of safety, comfort and speed. On July 21 of the following year this major airline company signed a contract for six aircraft, the first of which (designation Model 314) took to the air on June 7, 1938. When it made its appearance this flying-boat was the largest civil aircraft in service. It had a central hull and adopted the wing and engine assembly of the experimental Boeing XB-15 heavy bomber. In the place of the traditional floating stabilizers at the wingtips, sponsons

USA

Boeing 314A Yankee Clipper – 1941



mounted on the sides of the hull were used, based on the formula developed by the German engineer Dornier. These sponsons also contained fuel-tanks, the capacity of which (together with those situated in the wings) totalled almost 3,525 gallons (16,000 litres). In the spacious fuselage there was ample room for 74 daytime passengers, or for 40 passengers in reclining seats for long night-flights.

The first six models were all delivered in the first half of 1939 and in view of their success Pan American ordered another six. These (designation 314A), were considerably improved in their carrying capacity (77 daytime passengers), engine power, and increase in fuel capacity by about 1,000 gallons (4,500 litres). The first of these aircraft flew as a prototype on March 20, 1941, but the war was now in full swing, only half the order went to Pan American. In fact three models were bought by the British government and allotted to BOAC for use as transport aircraft. These aeroplanes were

Aircraft: Boeing 314A Yankee Clipper
Manufacturer: Boeing Aircraft Corp.
Type: Civil transport
Year: 1941
Engines: Four Wright GR-2600-Cyclone, radial with 14 air-cooled cylinders, 1,600 hp each
Wingspan: 152 ft 0 in (46.33 m)
Length: 106 ft 0 in (32.31 m)
Height: 27 ft 7 in (8.41 m)
Weight: 82,500 lb (37,422 kg) (Loaded)
Cruising speed: 183 mph (294 km/h)
Ceiling: 13,400 ft (4,085 m)
Range: 3,500 miles (5,630 km)
Crew: 10
Passengers: 77

well known for the fact that they carried Winston Churchill on his intercontinental journeys, and survived the war to be returned to the United States in 1948. The career of the Yankee Clippers, five of which were purchased by the U.S.A.A.F. and the U.S. Navy, was also a lengthy one. Apart from three which were destroyed in February 1943, November 1945 and October 1947, the others remained with Pan American until April 1946. They were then used by various small charter companies and not withdrawn from service until 1950.