

The first Boeing 314, which had a small, single tail, was launched in May 1938. It outweighed the XB-15 bomber, from which it was derived, by 12,000 pounds. But despite its greater bulk, the 314 had a 30-mph higher cruising speed. In-flight engine access was possible through a passage in the wings.

The Boeing 314 Clipper

With a bomber's wings, a boat's hull and a liner's luxury, the 314 had everything except speed.

BY PETER M. BOWERS

One of the most luxurious airliners of all time, the Boeing Model 314 Clipper, came very close to never being built. In February 1936, Pan American Airways invited several American aircraft manufacturers to submit proposals for a large transoceanic airliner with four engines of 900 to 1,200 horsepower. The airline already had scheduled transpacific flights but needed larger and faster airplanes to increase the essential payloads and to speed up its flight schedule.

The Boeing Airplane Company of Seattle, Washington, received an invitation but let the expiration date go by without doing anything about it; such a large aircraft would crowd the company's already full facilities, and besides, money was tighter than Pan Am's deadline.

Soon after the expiration date, a young Boeing engineer, Wellwood E. Beall, returned from a sales assignment in China. When he saw the expired Pan American request, which reflected some strong ideas of his own for civil flying boats, he took his ideas to top management and asked them to contact the airline about an extension of the deadline. Beall also pointed out that a lot of engineering and tooling costs could be saved by using the wing and tail of a giant four-engine experimental bomber—the XB-15—that Boeing was then building for the U.S. Army. The project virtually would be a case of replacing the narrow bomber fuselage with a roomy flying-boat hull.

Boeing management liked the idea, Pan American agreed to extend the deadline,

and Beall was authorized to go ahead with the proposal.

This became more than just a normal working-hour effort. He worked late at night and even had his wife, an interior decorator, design cabin interiors and make presentation paintings for Pan Am.

Putting an unproven engine in a new civil airplane was a major risk, but Beall

selected the new 1,500-hp Wright GR-2600 Double Cyclone for his design. He figured the expected performance benefits would be worth the risk. Also, the engine took advantage of two state-of-the-art advances, full-feathering propellers and 100-octane fuel (the first in civil use).

Pan Am settled on the Boeing design, and a contract for six 314s, with an option for six more, was signed on July 21, 1936. Design and construction went ahead in Se-

Sleeping berths were available for up to 40 passengers. The berths were at right angles to the line of flight, not parallel as in other sleeper aircraft of the time.



continued

attle at a frantic pace, and the first airplane flew on June 7, 1938. Transpacific service with 314s on the existing San Francisco to Hong Kong route began March 29, 1939. The first transatlantic survey flight with mail was made on May 20 that year, and passenger operation began on June 28.

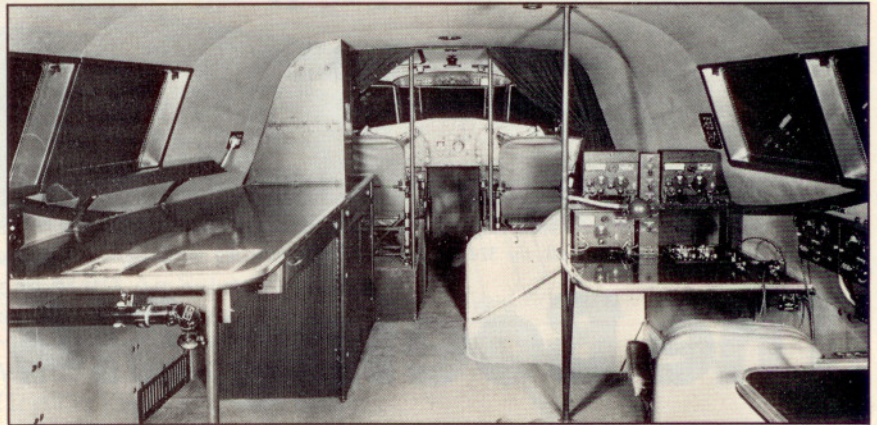
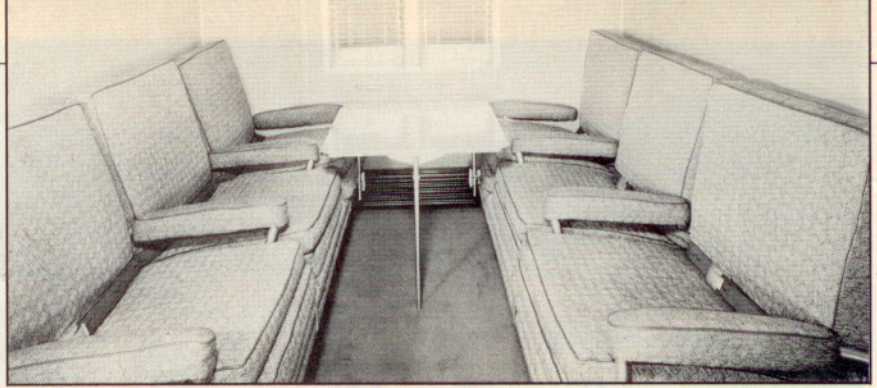
The popular term "Boeing Clipper" was not a Boeing name, as "Flying Fortress" was for the B-17; it was the airline's trade name. All of Pan Am's flying boats had been given various *Clipper* names since the first, *American Clipper*, in 1930. The airline had—and still has—a copyright on the word and frequently has stopped aircraft manufacturers and other firms from calling their products "Clippers."

As a flying boat, the 314 was thoroughly conventional for its time, with all-metal construction except for fabric covering the movable control surfaces and the rear half of the wing. It was the interior arrangement of the 314 that made it a supreme transport. The amount of cabin space per passenger was the highest of any airliner before or since, and with a cabin width of 12.5 feet, it was the first of the "Wide Bodies" (long before the term was invented). Seating was not in the traditional rows, but in facing sets of seats in 18 separate sections opening on a central aisle. There was room for 74 passengers by day, and accommodation for 40 passengers in berths at night. The berths were set up spanwise instead of fore and aft as on Pullman cars and contemporary landplane sleeper airliners. There was space for separate men's and women's dressing rooms, a soon-discontinued honeymoon suite and a dining room that served as a recreation area between hot meals.

The pilots, radiomen, navigators and flight engineers enjoyed the roomiest control cabin of any airliner. The six- to 10-man crew was accommodated on a spacious upper deck accessible from below by a spiral staircase. There were even sleeping accommodations for the off-duty crewmembers carried on long flights. Cargo and mail compartments totaling 1,036 cubic feet were on this deck as well.

The 314 was the largest production airplane built in the major assembly building of the old Boeing Plant I, which had been built in 1917 for World War I aircraft production. Final assembly took place on a wooden ramp outside the factory, after which the airplanes were launched down a slipway (the factory had been a yacht works) into the river. It was too dangerous to taxi the airplanes down the river to Seattle Harbor for takeoff, so they were tied alongside a barge, which was towed to the harbor. After the first takeoff, further shakedown flights were made from a Boeing base on fresh-water Lake Washington.

As originally designed, the 314 used vertical tail surfaces based on those of the XB-15. These proved to be inadequate on the



first flight, due mainly to the increased side area of the huge hull. Test pilot Eddie Allen had to resort to differential power settings in order to turn the craft on its first flight. A new double tail was designed and built, but it, too, was inadequate. Finally, a center fin, equal in area to the original fin/rudder combination, was added and the directional control problem was resolved.

The six-airplane option on the original contract was picked up in 1939 for improved 314A models. These had 1,600-hp engines and 1,200 gallons more fuel, plus other minor improvements. The first six soon were modified to 314As.

The outbreak of World War II in 1939, so soon after the start of 314 operations, had a

major effect on the airplane's subsequent career. One transpacific 314 that was in New Zealand at the time of Pearl Harbor had to fly westward around the world to return to the United States.

Before Pan Am took delivery of its last 314A in January 1942, it sold three to British Overseas Airways Corporation (BOAC) for essential transatlantic war work. Late in 1941, the U.S. Army drafted four of Pan Am's remaining nine Model 314s and designated them C-98s. The Navy drafted the other five airplanes and soon took over the C-98s as well but operated them all under the Boeing model number instead of a naval designation; these were operated by airline crews under contract to the Navy. Three of the Clippers were loaned back to

Pan Am for its own use, but the Navy retained ownership.

The 314's postwar service life with Pan Am was very short. When the Boeing Clipper was designed in 1936, the principal long-range airlines of the world were using flying boats, and for good reason. Most airports of the time were inadequate for the long takeoff runs of large long-range airplanes; flying boats were capable of operating for unlimited distances on open water. Besides, most major cities of Africa, South America and Asia were on or near suitable bodies of water.

The boats also had a very significant safety advantage—in case of engine failure

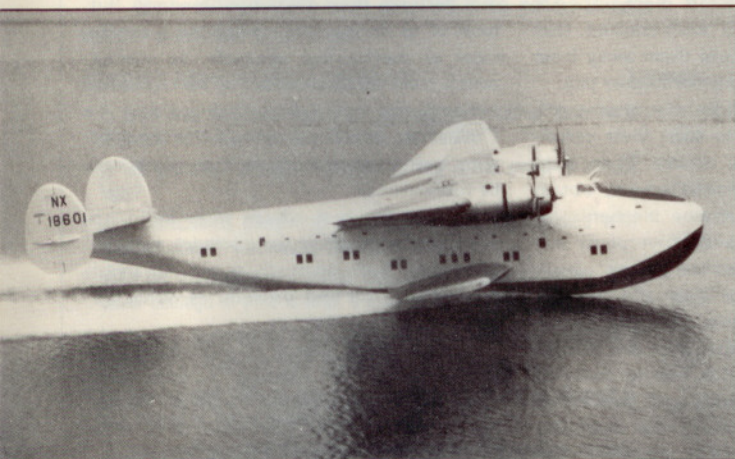
given power and payload. With equal performance and capacity, a landplane has major economic advantages over the flying boat because of the latter's inherent problems with maintenance, servicing, docking, boarding, haul-out and aircraft protection when based on water. The Boeing boats and others then in airline service soon would have been replaced by a new generation of landplane designs had the war not changed the procurement situation for the airlines. The new airliners built from 1940 through 1942 were not available to the airlines until the end of the war.

As it was, the war helped the landplane cause even further through the world-

had to be sunk. However, all these airlines failed in the face of competition from higher-performance war-surplus landplane transports.

By 1951, all but one Boeing Clipper had been scrapped. BOAC's *Bristol*, sitting in Baltimore Harbor, finally was sold to a minister who intended to use it to fly to Russia to discuss peace with Stalin. But the peaceful mission was thwarted when Baltimore Harbor was hit by a hurricane in 1951, and the last Boeing Clipper sank. □

Intrigued by airplanes long before his first ride in a Travel Air at age 10, Peter Bowers, AOPA 54408, has since logged more than 4,200 hours.



YESTERDAYS • WINGS

The photographs on the facing page are representative of the 314's spacious interior. In the nine-by 21-foot control cabin, the navigator's table was to the left and the radioman's and flight engineer's station to the right. A curtain, just beyond the spiral staircase leading to the lower decks, could be drawn at night so that the other crewmembers could work with light. And though unconventional by today's standards, the 314 actually had a dining room. On this page, the 314 is shown with the latter two of its three tail configurations. The twin-fin rudder above did not give the 314 the control that was needed. The final tail configuration combined the original fixed center fin, p. 87, with the twin-fin rudder as shown in the photographs on the right. Also notice the window positions aft of the wings; because of the sloping hull, the rear compartments had progressively higher floor levels.



they could set down on the water with a very good chance of survival. This feature paid off for Pan Am once. A double engine failure over the Pacific resulted in a forced landing at sea; everyone aboard was rescued but the airplane had to be sunk by gunfire because it could not be towed home on the heavy seas.

By the end of the 1930s, the era of the flying boat clearly was finished. It was heralded by the nonstop flight of a four-engine landplane, the German Focke-Wulf "Condor" transport, from Germany to New York in August 1938. With four engines, the increased reliability factor pretty well ruled out a forced landing at sea, and the clean landplane design allowed much higher cruising speeds with comparable

wide proliferation of airstrips capable of handling heavy bombers. Cities that previously could be served only by seaplanes now could receive large landplanes.

Pan Am's last Atlantic flight with a 314 was on January 6, 1946, and the last Pacific flight was on April 9, 1946. The Navy-owned 314s were sold by the War Assets Administration to various small operators who converted them to high-density seating. (They were offered first to Pan Am, but the airline refused them.) Most of the BOAC models also were sold. The new operators put them into transoceanic service under somewhat less than top airline maintenance and operation standards. One ran out of gas and landed at sea; again, everyone was rescued, but the airplane

BOEING 314A Specifications

Powerplant	4 Wright GR-2600 Double Cyclones
	1,600-hp takeoff @ 2,400 rpm
	1,350-hp maximum @ 2,300 rpm
	1,200-hp normal @ 1,200 rpm
Wingspan	152 ft
Length	106 ft
Wing area	2,867 sq ft
Wing loading	29.3 lb/sq ft
Power loading	13.1 lb/hp
Empty weight	49,641 lb
Gross weight	84,000 lb

Performance

High speed	199 mph
Cruising speed	184 mph
Landing speed (flaps)	70 mph
Initial climb	930 fpm
Service ceiling	19,800 ft
Range	5,200 sm