

THE BOEING B AND W

By JAMES A. MORROW

This presentation has necessarily been based upon documented information and correspondence from persons actually involved in the B and W history. Inconsistencies and, possibly, inaccuracies exist. In all cases, an attempt has been made to weigh all inconsistencies as carefully as possible. In some cases, personal conjectures were made and, where this is the case, it is stated that these are the opinions of the author. An attempt has been made to keep this presentation of a general nature, and yet present both a technical and personal cross section of the first Boeing airplane.

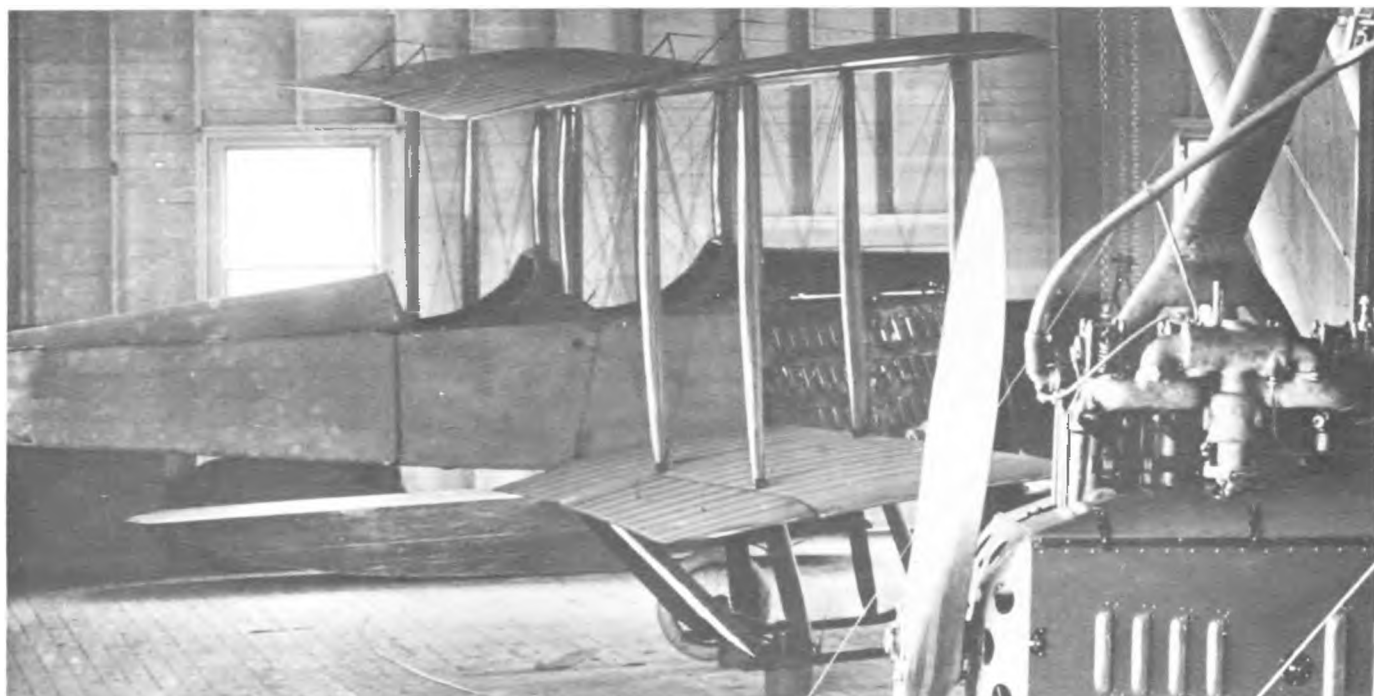
PART I THE DESIRE TO FLY

The Boeing Company, as it exists today, has one man to thank for its inception. That man is Mr. W. E. Boeing. This may seem a little dramatic, but Mr. Boeing was probably the only man in the Northwest who possessed

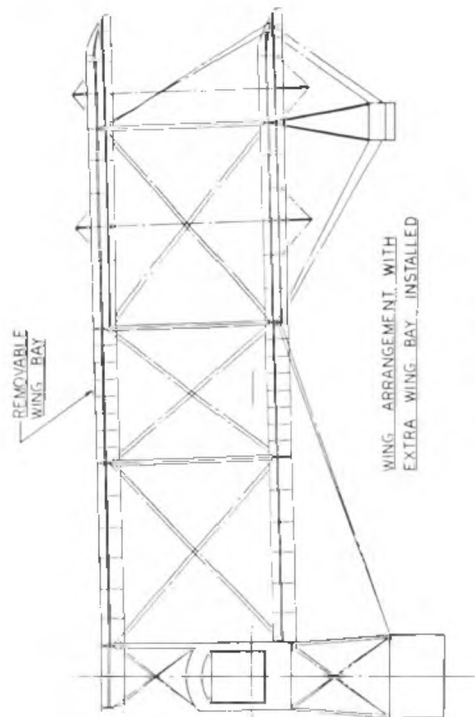
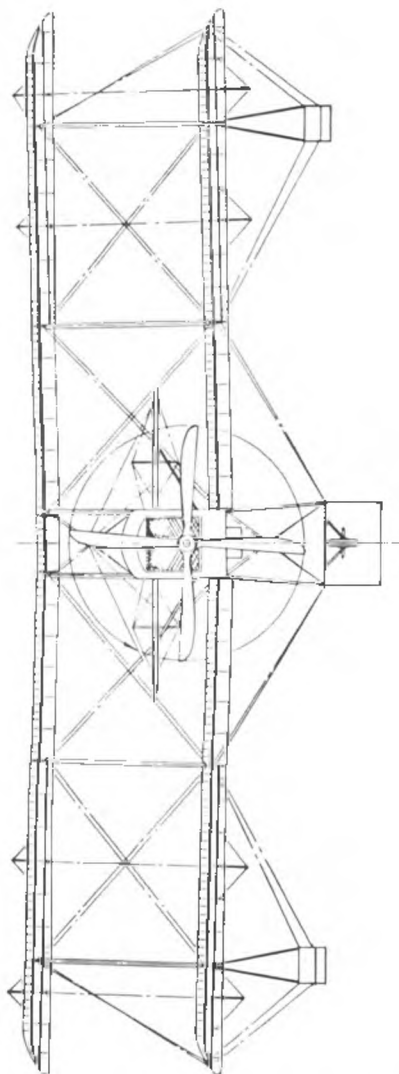
a keen interest in flying, the financial ability to undertake aircraft construction, and the foresight, capability and business experience to form an operable company.

Mr. Boeing started his active flying career by traveling to the Los Angeles area where he took lessons at the Glenn L. Martin School. Glenn L. Martin was later the founder of the Glenn L. Martin Company of Baltimore, Maryland. Floyd Smith was Mr. Boeing's instructor at the Martin School. Upon completion of his training, Mr. Boeing purchased a Martin TA to be used in Seattle, Washington. (2)

The Martin TA was shipped to Seattle and, upon its arrival, uncrated, assembled and flown. On one of the flights from Lake Union in Seattle, the airplane crashed causing enough damage to require considerable rebuilding. The cause of the crash was attributed to the excessive weight of the airplane equipped with floats. For this



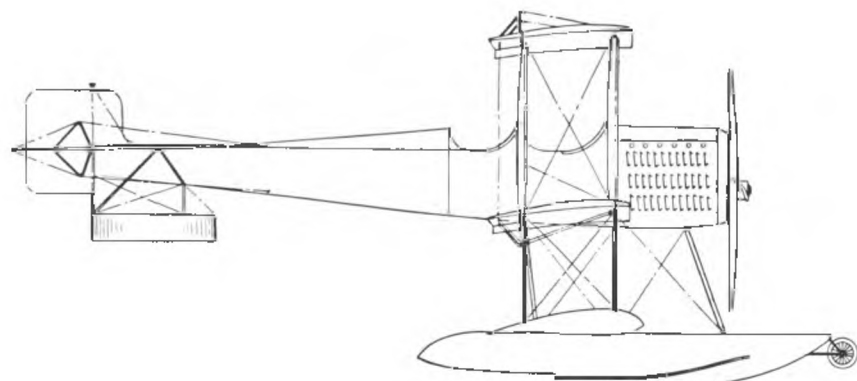
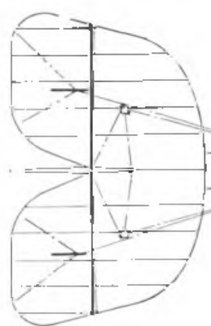
Upper left, Martin TA similar to one W. E. Boeing purchased from Glenn L. Martin. Upper right, Mr. Boeing in his Martin TA with removable wing bay just inboard of ailerons. Bottom, latter in Lake Union Hangar. (Martin/Boeing)



REMOVABLE
WING BAY

WING ARRANGEMENT WITH
EXTRA WING BAY INSTALLED

WING TIP LOCATION WITH
EXTRA BAY ADDED

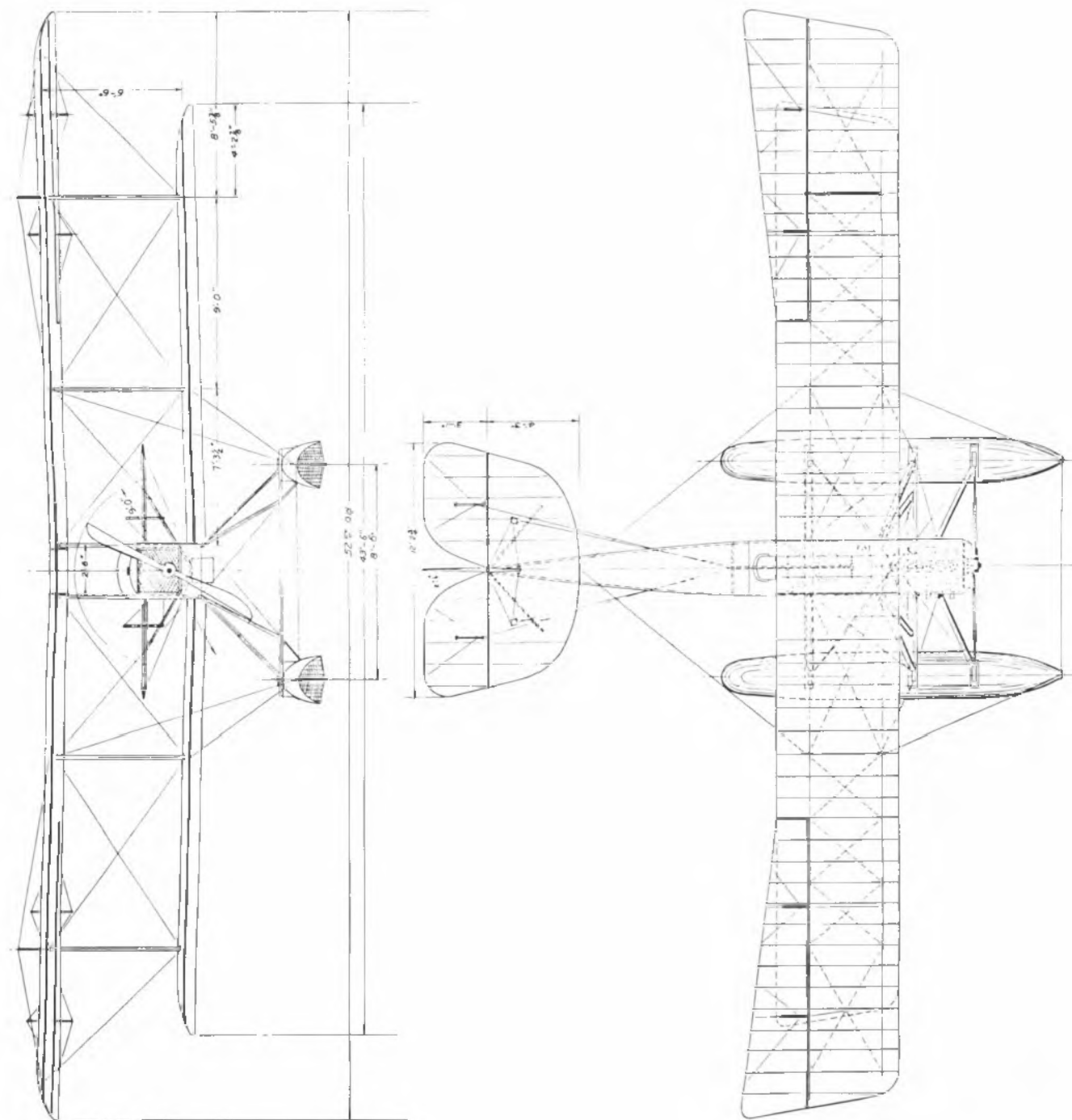


W. E. BOEING'S
MARTIN 'TA'
GENERAL ARRANGEMENT

PROVISIONAL

Drawn by Jim Morrow December 1965

SPRING - 1966

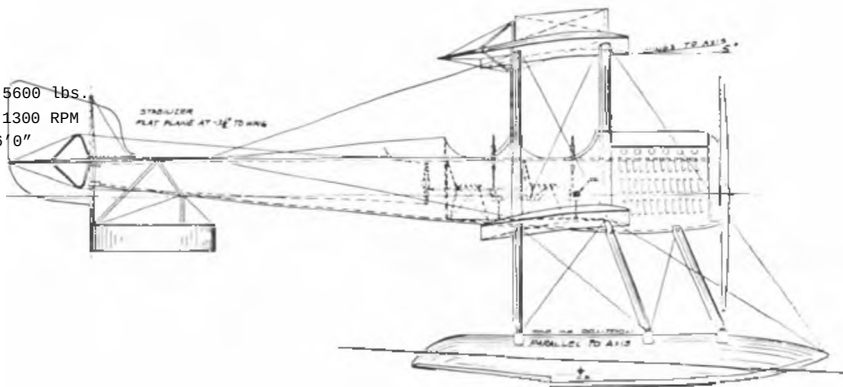


BOEING B AND W

Span, Mean	47.1	Ft Pontoons, Twin, Displ. F.W.	5600 lbs.
Gap	6.5	Ft Engine, Hall-Scott	125 hp, 1300 RPM
Chord	5.75	Ft Propeller Diam	9'0" Pitch 6'0"
Aspect Ratio	8.1	Weight in Service	2800 lbs
Area, Upper Plane	248 SqFt	Weight Bare	2100 lbs
Area, Lower Plane	232 SqFt	Speed, Min 40 - Max,	75 mph
Area, Ailerons	64 SqFt	Radius	320 mi.
Area, Stabilizer	40 SqFt	Control, Dual Duperdussin	
Area, Elevators	30 SqFt		
Area, Rudder	14 SqFt		

GENERAL ARRANGEMENT

Scale 1/24 Aug. 27, 1916
Seattle. Wash.



reason, it was decided to equip the TA with wheels in place of floats and sell it. CD The engine was removed and the airplane sold to Percy F. Barnes. Mr. Barnes installed a Hall Scott engine and literally wore the airplane out, amassing a total of more than 3,000 hours flying time before surveying the airplane. At this writing, the steering wheel of the Martin TA was still in existence. [3]

PART II FOR THE NAVY

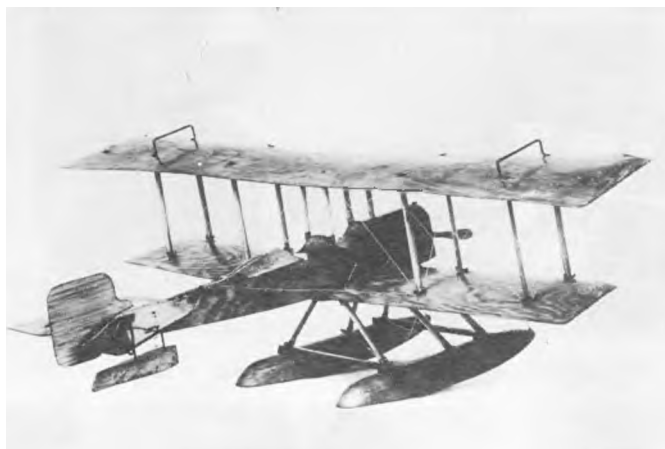
The crash of the Martin TA brought about the decision late in 1915 by Boeing and Westervelt to build two new airplanes of their own design along the lines of the Martin TA. They would call them B and W's. Conrad Westervelt, who, at that time, was assistant naval instructor, U.S.N., at the Moran Shipyard in Seattle, was a graduate of Massachusetts Institute of Technology in naval architecture (M.S.). [4] It was decided that, to correct the apparent overweight condition of the TA, the B and W would have a greater wing area and be of lighter construction. The span of the lower wing of the B and W was retained at about the same span as that of the TA, while the span of the upper wing was increased. The ailerons were located in the upper wing only on the B and W, instead of both upper and lower, as on the TA.

The vertical tail surfaces were also increased to improve the lateral stability lacking in the TA. Due

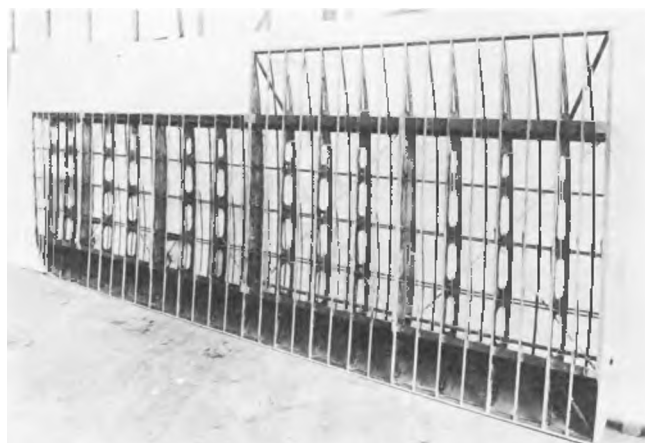
to Boeing and Westervelt's thoroughness, it was decided that stress calculations and wind tunnel tests would be conducted on the B and W's. MIT was selected because of Westervelt's familiarity with MIT facilities and staff capabilities. The analysis and tests were conducted under the direction of Mr. J. I. Hunsaker and Mr. T. H. Huff. Construction of the two B and W's got under way. The wind tunnel test model of the B and W arrived at MIT on January 21, 1916. The general arrangement drawing and component drawings were sent to MIT the following month. [5]

The construction of the B and W and analysis work at MIT were being conducted simultaneously, and the coordination over the great distance between construction location and the analysis location, often created difficulties such as the one encountered with the first B and W Spar.

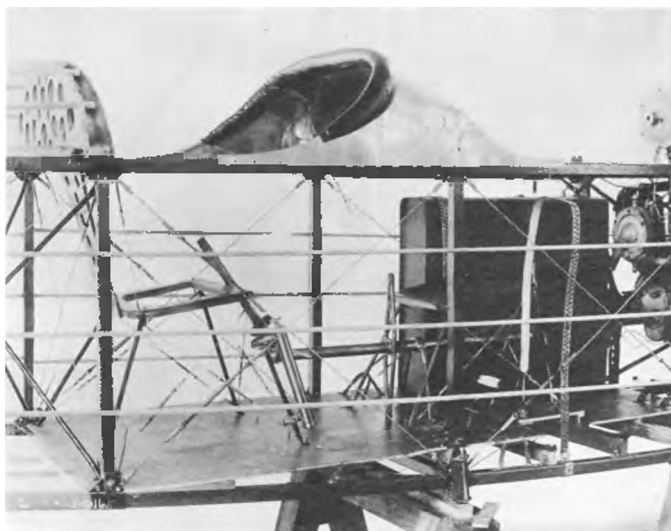
In a campaign for lightness, the webs of the wing spars were routed out. In a letter from J. I. Hunsaker at MIT to Mr. Boeing, it was stated that the practice of holes in the spar web as shown on B and W drawings was considered unsafe. The fact that analysis had fallen behind the construction was evident in the reply from Mr. Boeing on March 1, 1916. The reply stated that the wings were complete except for covering, and the spars could not be removed without building new wings. It was decided, therefore, that shear webs would be provided by wrapping the spars with tape over their full length. [5] Thus, the stage was set for a move by Mr. Boeing to ob-



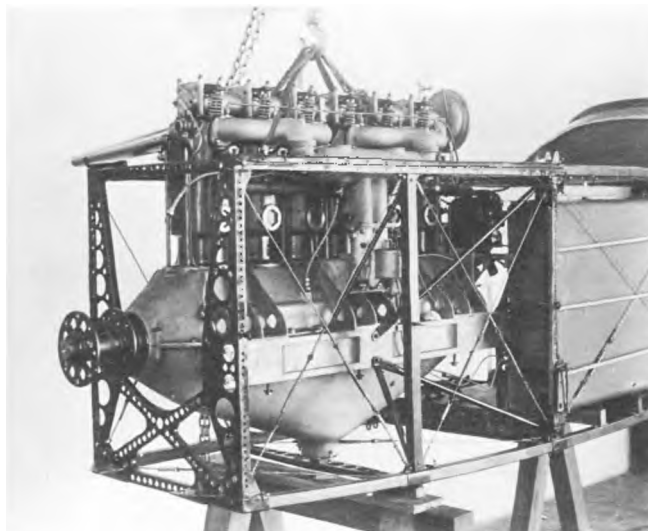
B and W model shipped to MIT, January 1916. (Boeing P29)



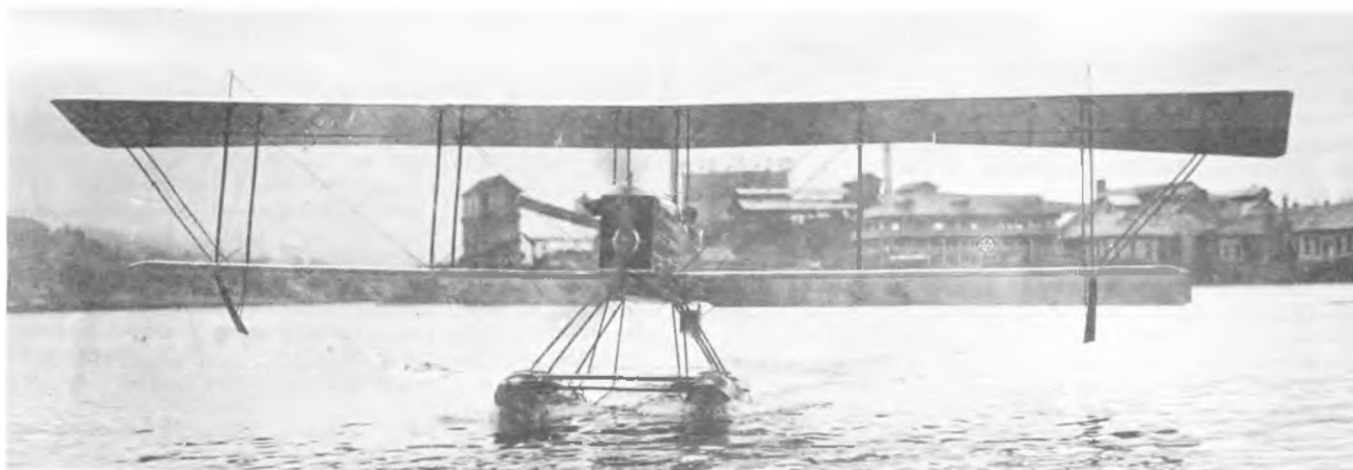
Wing structure for Boeing B and W. (Photo - Boeing P8)



Cockpit area fuselage structure on B and W. (Boeing P2)



B and W's Hall Scott engine installation. (Boeing P12)



The Boeing B and W taxiing in to dock at the Lake Union Hangar in Seattle during 1916. (Photo - Boeing Co, P21)



With Knox Martin in the cockpit, B and W is pulled into the Lake Union Hangar in 1916, (Photo - Boeing 97169)



Knox Martin at the B and W controls inside Lake Union Hangar. (Photo - Harold Jensen via The Boeing Co. P32376)

tain his own design and analysis personnel.

It is evident from the outset that Boeing and Westervelt had hoped to interest the Navy in airplanes starting with the B and W's. Correspondence shows that B and W drawings had been forwarded to the Puget Sound Navy Yard on April 8, 1916, a date when the B and W's had not yet been completed. [6]

The construction of the B and W's continued and, as problems arose, they were settled by correspondence with the MIT staff. The pace with which the B and W's progressed is evident from a progress report from J. C. Foley, manager of the B and W program, to Mr. Boeing on April 8, 1916. [7] The report revealed that the wings were covered, doped and soon would be varnished and moved to Lake Union from Heath Shipyard. Also at Heath, the Martin pontoons were being finished. At the Lake Union hangar the B and W fuselage was nearly completed, and the second fuselage was only a little behind the first. In March, Westervelt had been called away by the Navy and was aboard the *USS Wyoming*, leaving Boeing to carry on with the B and W's in Seattle. By the end of May 1916, the B and W airplanes were nearly ready for flight testing and, on June 29, 1916, the first flight was made in a B and W from the Lake Union hangar.

The original flight log [8] shows the first flight was made 6-29-16 by Knox Martin; VISION and AIRCRAFT YEARBOOK for 1920 lists W. E. Boeing as making the first flight on 6-29-16, while the Harold Jensen diary [9] credits Knox Martin with the first flight on 6-27-16.

The first B and W had made 82 flights by the end of 1916, with a total flight time of 29 hrs 47 minutes. These flights included one by W. E. Boeing and the remainder by W. Knox Martin and Herb Hunter. The types of missions flown included testing, instructional, familiarization and demonstration tests for the Navy. [8] For the initial tests and Navy trials test pilot W. Knox Martin was employed. [9] For ballast during the test flights, W. Knox Martin used C. W. Latta and H. Jensen as passengers. The Navy Trials commenced August 10, 1916, [10] just three weeks after the formation of the corporation, Pacific Aero Products, by Boeing. The corporation became The Boeing Airplane Company on April 30, 1917. On March 26, 1917, the B and W's were offered to the U. S. Navy as trainers for \$10,000 each, F.O.B. Seattle, crated. [11]

The Navy acknowledge receipt of the offer of the two B and W's, "Bluebird" and "Mallard", and subsequently accepted the B and W's. However, on arrival at Squantum, Massachusetts, Naval Air Station, they were declared unsuitable for training purposes. The Boeing Airplane Company was notified of the B and W's unsuitability on May 24, 1917 [12] and the two airplanes were returned to Seattle. They remained in storage until purchased by the New Zealand Flying School at Auckland, New Zealand, for \$3,750 each, plus \$1,700 for a spare engine, F.O.B. Seattle. [13] The B and W No. 2 had never been flown prior to this transaction. [14]

PART III TO NEW ZEALAND

The two B and W airplanes remained in storage after their return from the Navy as they had been replaced by the "C" series of airplanes, which had better flying characteristics. In the latter part of 1918, the two B and W airplanes were shipped to New Zealand, arriving at the New Zealand Flying School late in 1918 or very early in 1919. The first B and W built ("Bluebird") was assembled and used to a considerably greater extent than B and W No. 2 ("Mallard"). [15] The "Bluebird" was assigned the letter "F" at the flying school, and one of the earliest uses for it was at the Auckland Anniversary Day Regatta Air Race. On January 29, 1919, the B and W was raced against two school-built flying boats, "B" and "C". Since the speed of the B and W was 75 mph and the flying boats 65 mph, a two minute head-start was allowed for the flying boats. The Boeing seaplane came in first. Shortly before the regatta, on January 25,



Harold Jensen in Knox Martin's flying jacket. Only 16 at the time, he was used for ballast during B and W performance trials. (Harold Jensen via Boeing Co. P38454)

1919, G. B. Bolt, early pilot at the flying school, set a New Zealand altitude record of 6500 feet in the B and W. The B and W airplanes were used at the flying school for various purposes during 1919. Some of the exploits included meeting incoming troop ships, participating in parachute jumping exhibitions and sale of passenger rides. [16]

In late 1919, authorization was made to carry mail by air on a trial basis and, on December 16, 1919, George Bolt flew the first official air mail in New Zealand, from Auckland to Dargaville and return, in a B and W. The airplane had "Royal Mail" painted on the side. Leo Walsh, co-owner of the New Zealand Flying School, accompanied George Bolt. This trial was successful enough to cause the government Post and Telegraph Department to issue an extended trial contract. The mail flights were run intermittently over a six months' period, two trips a week to Dargaville and three trips a week to Whangarei. Various other first mails were carried by the B and W airplanes, but were never continued. Air Mail did not prove economical and, on July 30, 1921, air mail Service was discontinued. The New Zealand Flying School was finally forced to suspend operations because of financial problems and, in late 1924, the Government took over the school from the Walsh brothers and closed it down. The aircraft were disassembled and stored at North Head Fort at Auckland, and so closed the chapter of the B and W airplanes with the New Zealand Flying School. [16][17]

As mentioned, most of the flying was done with the first B and W built, "Bluebird", and in correspondence with George Bolt it was disclosed that the flying characteristics were much better than with the second B and W, "Mallard". As a result, the second B and W was modified to include ailerons in the lower wings, aileron tabs between the wings and a fixed fin to improve the



B and W Number 1, the "Bluebird", as "F" in New Zealand Flying School service. (G. B. Bolt via Boeing Co. P17278)

stability. Both airplanes had excellent water-handling characteristics, even in rough water and open sea.

The B and W era with the flying school was not without its interesting incidents, however. At one time, when a fuel filter became blocked, George Bolt was forced to land in the open sea in very rough water. At times, when he was trying to clean the filter, three to four feet of the wing tips would be under water due to the rolling of the airplane in the waves. After the filter had been unclogged, George Bolt climbed back into the B and W and attempted a take off. However, a wave smashed against the propeller and broke it. A steamer passing by threw him a line and the B and W was towed into harbor from 70 miles out. The propeller blade was washed up on shore three or four years later. [15]

The steamer was not the only conveyance that towed the B and W. It also was towed by a locomotive and a team of horses. This incident, like the one with the steamer, occurred during the air mail flights. It hap-

pened when George Bolt was landing on the Northern Wairoa River and his float struck a submerged log. He immediately headed the airplane into shore and beached it. Since these were tide flats, the B and W needed to be drawn up farther into the mud. As it happened, the crew of a locomotive operating alongside the river had witnessed the accident and attached a line to the stricken B and W, towing it up to about the three-quarters' tide mark. A new float was immediately dispatched from the flying school and arrived the next morning. It became necessary to get the new float on before the next high tide. The only real problem encountered was extracting the damaged float from the three-foot deep mud. A man driving a horse and cart came along the road and offered assistance. The rope was attached to a wheel of the jacked-up cart, and, with the aid of the horse and man-power on the wheel, the float was winched out of the mud. The new float was attached and on the next high tide the B and W was off.



"F" flanked by school boats "A" and "C" at the New Zealand Flying School. (Turnbull Library, Wellington, NZ)



The B and W when it carried New Zealand's first air mail from Auckland to Dargaville and return. (Boeing P17276)



B and W Number 2, "Mallard", with ailerons in lower wing and small ailerons between the wings. (P17282)

PART IV THE QUESTION

It was not until the approach of the Fortieth Anniversary of the first air mail flight in New Zealand that the question was seriously raised as to the disposition of the airplanes that had been purchased from the Walsh brothers, founders of the New Zealand Flying School. The Government purchased the School assets for 10,000 pounds Sterling. The search was intensified and rumors began to grow. People were contacted, memories strained, records perused, and bits and pieces began to fall into an intriguing pattern. In June 1959, just six months prior to the Fortieth Anniversary of the first air mail flight, the pattern showed that the Government had taken over the airplanes in 1924 and dismantled and moved them to the fort in 1925. There was no definite policy on aviation in New Zealand, so the aircraft were placed in storage.

The B and W's were two of about ten airplanes stored. Others included DH-9s, Avros, a Supermarine flying boat and school-built flying boats. It appeared that the intentions were to store the airplanes in an underground passage or passages in the fort, with a vent to the sky to keep them in good order. It was definitely established that the aircraft were parked at the fort. In 1959, searches for possible underground passages where the airplanes could be parked were unsuccessful. It was supposed that when these passages were sealed, they were made to look like the main passage walls. One person who had been there throughout the period of time in question, when contacted by George Bolt, stated that he was quite sure the airplanes were put in tunnels and not taken out and destroyed. Another remembers burning three DH-9s, but not the rest of the airplanes. The two believe that only the three were destroyed. Thus, the position in 1959 during the anniversary was one of hope and renewed vigor for the search. [15]

It might be well to mention here that the Royal Aeronautical Society branch in New Zealand had begun to collect old aviation material for the museum in 1957 and had placed the late George Bolt in charge of collecting the material because of his intimate knowledge of New Zealand aviation. Mr. Bolt, at the time he was placed in charge of history search, was chief engineer of Tasman Empire Airways Limited (TEAL).

It finally developed that the ultimate goal for finding the B and W airplanes was to sell one of them back to The Boeing Company and use the proceeds for the Walsh Memorial Fund. [18]

As the story began to unfold and Boeing officials met with George Bolt and Mr. D. A. Patterson, talk of a reward for finding the B and W's or discovering their disposition helped stimulate the search. Hopes were that one of the B and W's could be placed in a museum in the Seattle area.

In 1961 the pattern began to change and as various people were contacted a new story began to unfold. It cast a sad shadow over the fate of the B and W's.

Mr. Patterson of R.Ae.S. received permission from the Minister of Defense to search the catacombs of North Head. Patterson and Bolt checked old Army records. It developed that Mr. Schnackenberg, Ministry of Works engineer, had seen parts on the beach at Fort Cautley Army Base, North Head. Mr. Bolt was put in touch with retired Major George Salt, R.N.Z. Artillery who, it turned out, had gone to the flying school to remove the material the Government had purchased and clean up the site. Records show the Government bought:

- 5 Avro 504K's on floats
- 3 DH-9s on wheels, never flown
- 1 Supermarine flying boat
- 2 B and W's on floats

Major Salt was in charge of the launch that removed the Avro 504K airplanes to Hobsonville where they were equipped with wheels and flown to Wigram. Further information was received that Colonel Duigan was at Hobsonville when all Avro floats were condemned and burned except two, which the Colonel gave to his sons to make a catamaran.

Major Salt also towed the barges with the remaining aircraft to Artillery Yard. He stated that the Supermarine was fully assembled on beaching wheels and the mine store was bricked with a flat arch, it probably led to the story that the aircraft were stored in a tunnel. It was further stated that the remaining aircraft, crated, were stored on the outer seawall at Artillery Yard for several years. The engines were taken to the Artillery Yard separately and sold or given to various persons and authorities. The Supermarine boat was later sold and its engine re-sold and wings burned. Major Salt indicates that about 1927 the decision was made to burn the crated aircraft. The crates were dumped over the seawall and burned on the rocks at low tide. [17]

Some of these parts, badly corroded, were discovered



The late George B. Bolt, New Zealand Flying School pilot, in front of B and W. (G. B. Bolt via Boeing Co P17283)

and collected by Mr. Bolt and Major Salt and sent to the Boeing Company via Hr. W. A. Stevenson Esq. of Howick, New Zealand.

These parts were received at The Boeing Company about the first of November 1961, and were turned over to Mr. E. P. Kaiser, Director, Quality Control, Headquarters, to determine if they were B and W parts. At the same time a search of the historical files and old drawing records was undertaken. [19]

The Boeing Company was able to establish proof that these parts could not be identified as B and W parts, and so notified the proper people in New Zealand. [20]

The question remains as to the final disposition of the B and W airplanes. Are they still in existence somewhere?

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 [4] Letter of September 24, 1963, from Mr. J. G. Hunsaker to Mr. Thomas R. Riedinger, The Boeing Company
 [5] Document A1BD1-D1- "Correspondence and Computations" The Boeing Company, 1916
 [6] Letter of April 8, 1916, from Capt. R. E. Coontz, U.S.N. to Mr. W. E. Boeing
 CD B and W Progress Report of April 8, 1916, by Mr. J. C. Foley
 [8] Original Flight Log, containing records of Early Flights by Boeing Airplanes
 [9] "First Flights," Boeing News, Vol. XI, No. 7, July 1941
 [10] Listing of Required Performance Trials for B and W Aircraft, August 10, 1916
 [11] Letter dated March 26, 1917 from J. C. Foley, Manager Pacific Aeroproducts to Commandant Puget Sound Navy Yard
 [12] Squantum N.A.S. Inspection Report of B and W Airplanes, dated May 24, 1917
 [13] Letter dated July 16, 1918, from E. N. Gott, General Manager, The Boeing Airplane Company, to I. M.

Ortman, Purchasing Agent

[14] Letter dated May 27, 1918, from E. N. Gott, General Manager, The Boeing Airplane Co., to Mr. Lee Scott, Secretary, Hall-Scott Motor Car Co.

[15] Letter dated June 23, 1959 from the late George Bolt to James A. Morrow, author.

[16] David Mulgan, THE KIWI'S FIRST WINGS, Wingfield Press, Wellington, N.Z., 1960

[17] Letter dated October 17, 1961, from Mr. E. C. Schnackenberg, Ministry of Works, Auckland, N.Z., to Mr. W. A. Stevens, Esquire

[18] Whites Aviation Magazine, Vol. XVII, No. 201, December 1961, Whites Aviation Ltd., Auckland, N.Z.

[19] Letter dated November 8, 1961 from F. P. Laudin to G. W. Taylor

[20] Chester Chatfield "Mystery Solved?" Boeing Magazine, Vol. XXXII, No. 3, March 1962

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ABOUT THE AUTHOR: Jim Morrow, of 1327 44th Ave., S.W., Seattle, Washington, is a design engineer for The Boeing Company and has been with them for fifteen years. The story of the B and W's has stemmed from two sources. Several years ago he developed a deep interest in old Boeing aircraft which led to his preparing a manuscript for a book on Boeing's first ten aircraft. A few months ago he received an assignment for Boeing's Fiftieth Anniversary to do a detailed study of the first of the ten, the B and W. Blending the two brought forth this article.

Jim's first aviation interest was in WW I aircraft, stemming in great measure from the fact his father was a DH-4 gunner with the 91st Aero Squadron in the U. S. during the Great War. As his aviation interest grew he began taking photos of aircraft and today has a large collection including some three to four thousand color slides. During WW II he was a navigator on B-17s and B-29s, Boeings, what else, in Training Command.

LIFETIME MEMBERS

In the Fall 1965 JOURNAL Lifetime Memberships, at one hundred dollars each, were first announced, and it was stated that in this issue the names of the first "ten" would be published. However, the response has far exceeded our fondest hopes so that it is possible, in the listing below, to announce the first twenty-one Lifetime Members. Within the next month or two, these men will receive a special plaque attesting to their lifetime association with the American Aviation Historical Society and will, of course, receive all regular and special future publications of the Society.

The Lifetime Members from One thru Twenty-one are:

- | | |
|----------------------------|---------------------|
| 1 Walter M. Jefferies, Jr. | Hollywood, Calif. |
| 2 Thomas M. Boyle | Bennett, Iowa |
| 3 Dr. S. H. Kleiser | Lebanon, Penna. |
| 4 Robert H. Vreeland | Hawthorne, Calif. |
| 5 Allen D. Trask | Hudson, Ohio |
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- 13 John G. Lowe
- 14 David H. McConnell
- 15 William F. Yeager
- 16 John R. Ellis
- 17 Edward J. Boss, Jr.
- 18 Lloyd W. Gross
- 19 John C. Barber
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- 21 Ted Homan

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 Stamford, England
 El Segundo, Calif.
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 Peterborough, Canada
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In a later JOURNAL this year further Lifetime Members will be announced. It should not be overlooked that each and everyone is doing the Society a great service in giving it the firmest base it has ever had on which to grow. Lifetime dues assure a continuing fund to guarantee the Society's power to overcome any financial rough spots that might occur in the coming years and, more importantly, the resources to develop new and better special services and an ever improving JOURNAL.