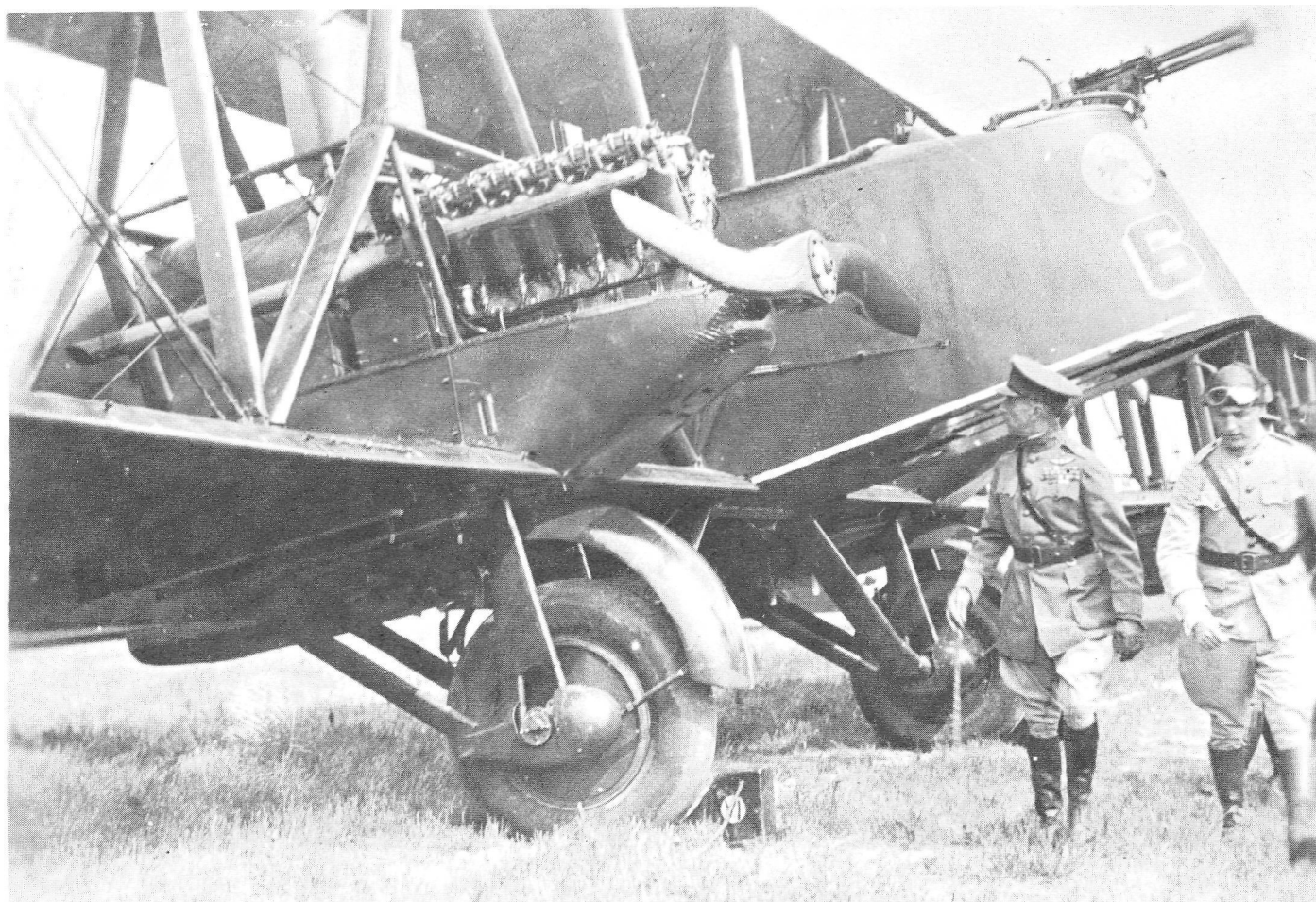




General William Mitchell inspecting the 2nd Bombardment Group at Langley Field, Va., 1921. (Photo - Olmsted Collection)

THE ERA OF THE MARTIN BOMBER

By MERLE OLMSTED

When Martin Company test pilot Erie Springer lifted a large twin-engined biplane bomber off the ground at Cleveland in August of 1918, the era of the Martin bomber had begun. Although these aircraft, conventional in layout and construction, and with an unspectacular performance, were too late to see action in WW-I; they were to soldier on in the U.S. Air Service for a period far beyond a normal operational life.

The post WW-I Martin bombers were of two distinct types, the so-called MB-1, of which the army bought only ten, and the later and better known MB-2. Both types were powered by a pair of 400 horsepower Liberty engines.

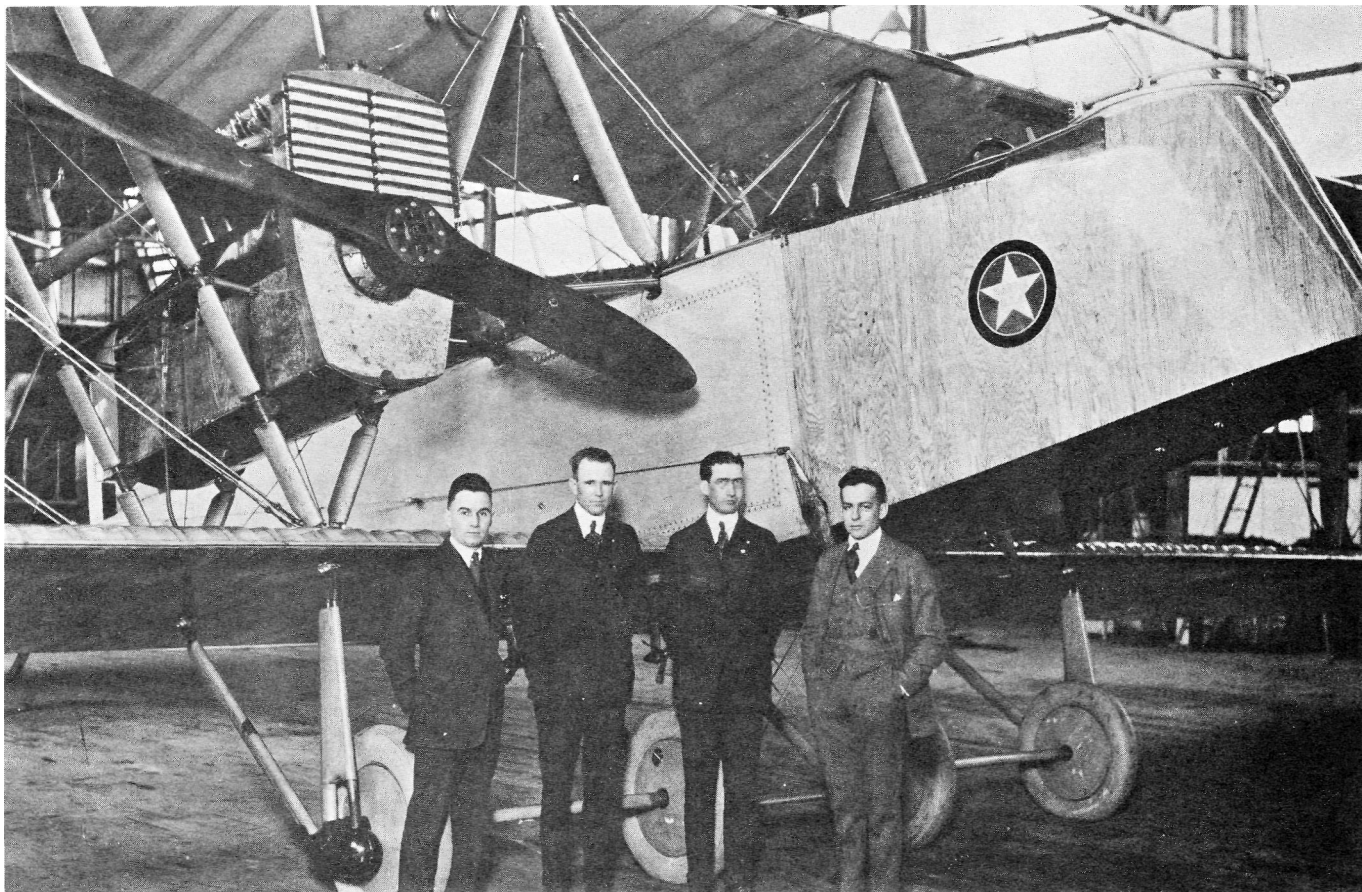
A month after its first flight, Eric Springer had taken bomber #1 to Wright Field for Air Service tests. Performance test results for this machine (A.S. serial 39055) are not available, but a report on the fifth bomber (A.S. serial 39059, McCook Field No. P-104) provides a good indication of the performance of the type. This report is dated 27 October 1919, and Lt. Harold Harris was the pilot. With no operational load except 225 gallons of gasoline, maximum sea level speed was 104.4 MPH, absolute ceiling was 14,200 feet, and climb to 12,300 ft. took 38.5 minutes. When laden with 1000 lbs. of bombs, ceiling dropped approximately 2000 feet.

This particular machine later became the most unusual of the breed, when a third "Liberty 12" engine was installed in the nose. The two outboard engines were replaced by Wright Model E engines and the pilot's cockpit moved to a position just forward of the tail group. The purpose of this alteration is unknown but it must have been extremely odd to fly!

The ten aircraft of this first contract are now generally called Martin MB-1, but they were not so designated during their service life, the first seven machines being designated GMB (Glen Martin Bomber). The 8th bomber was a long range machine designated GMT (Transatlantic). This was possibly one of the two bombers entered in the Transcontinental Reliability Test in October, 1919.[1] Both of these machines were wrecked, the first with Lt. C.R. Colt at the controls. Enroute to Mineola, N.Y., on the 5th of October, 1919; a faulty engine forced Colt to land at Busleton Air Mail Field, Philadelphia. The big Martin overshot the field, blew its tires on rough ground, turned over and was badly wrecked.

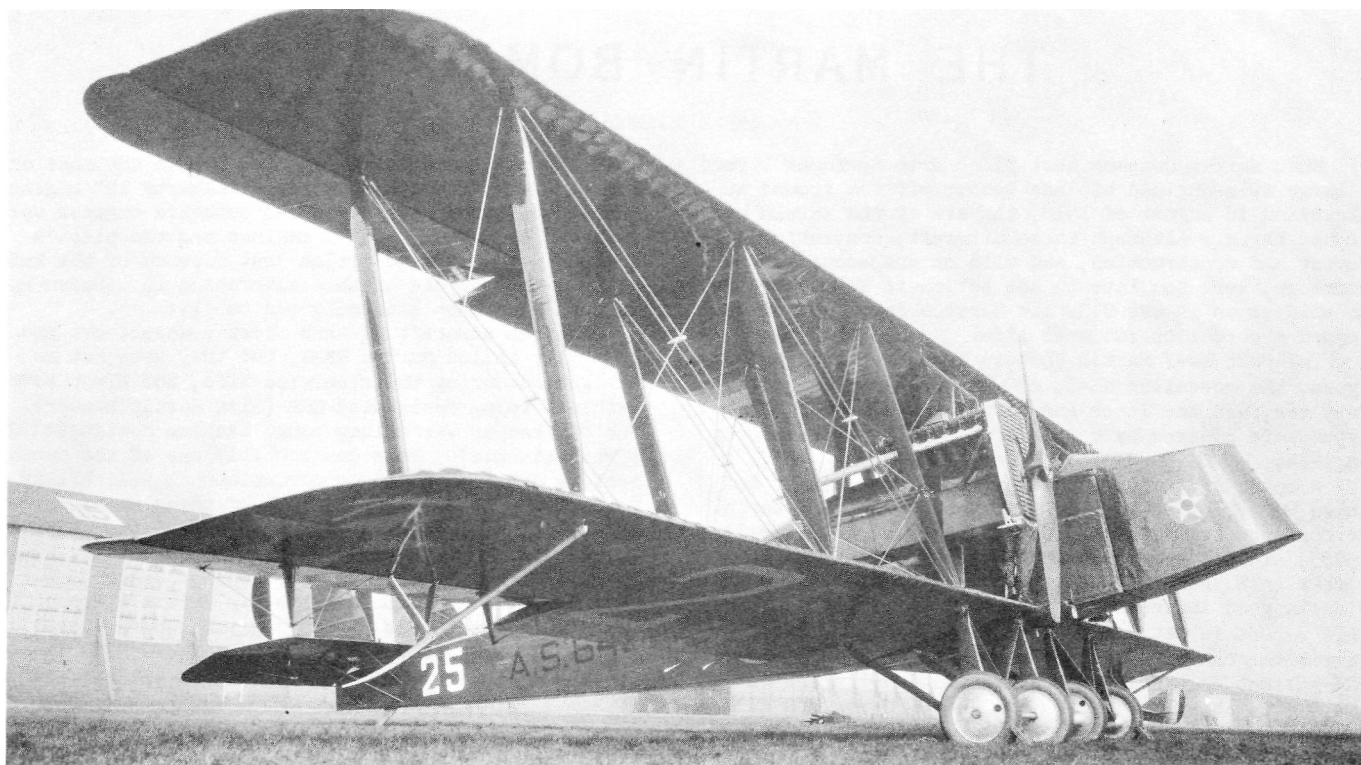
The second Martin, with Lt. Roy N. Francis as

© JOURNAL of the A.A.H.S., Volume k, No. 1, (Spring 1959) PP. 16-33.



This photo, from the collection of the Douglas Aircraft Co., (El Segundo), supplied through the courtesy of Member Harry Gann, shows Lawrence D. Bell, Eric Springer, Glen L. Martin, and Donald Douglas by the prototype GMB on 21 February 1919. (Photo - ES 96060 Douglas).

Below, an early GMB with wing skids, possibly in the group 64200 to 64213. (Photo - USAF, Wright Field No. 15409)



pilot, had reached the vicinity of Omaha in the test where it was wrecked by collision with telephone lines during a forced landing.

The ninth aircraft (A.S. serial 62950, McCook Field No. P-106) was standard except for a 37 m/m cannon on a flexible mount in the front gunner's pit and was designated GMC (Cannon).

The last aircraft of this contract was designated GMP (Passenger). This machine was the Air Service's first large transport and like most transport aircraft, it was a very useful machine during its lifetime. It finally suffered the same fate as other Martin bombers before and after; one engine failed, and the aircraft could not maintain flight on the remaining power. With Major Follet Bradley and Lt. Stanley Smith as crew, and four enlisted men aboard, 62951 was enroute from Mitchell Field to Chanute Field when the left engine threw a rod in the vicinity of Fort Hamilton, 5 March 1923. Major Bradley made a crash landing in a vacant field where it shed the landing gear and turned over. Lt. Smith died of injuries shortly after the crash but the others were not seriously injured.

One of the most interesting of all operations of the pioneer Martins was the Round-the-Rim Flight. The aircraft was the number two machine (A.S. serial 39056) and the crew included Lt. Col. R.S. Hartz, 2nd Lt. Ernest Harmon, and MSGTs Jack Harding and Jerry Dobias. Other than the excellent training and publicity value, one of the major purposes of the flight was the survey of possible landing fields along the bomber's route and a careful listing of these was made throughout the flight.

The flight got under way at 10AM on 2k July 1919, when 39056 departed Boiling Field and flew to Augusta, Maine without incident. Takeoff from Augusta was on 26 July, bound for Cleveland, but this goal was destined not to be reached until late in August. After crossing Lake Champlain, very bad weather was encountered and their compass went out of action. Unable to break through the clouds after climbing to 12,000 feet, after fighting the elements for two hours, Lt. Harmon let down through a hole in the clouds and landed in a valley near Jay, New York. The landing would have been without incident, but a previously damaged strut in the right main undercarriage collapsed, with a resulting ground loop and nose-over.

Anyone familiar with present day procedures for repairing an Air Force aircraft down away from its base will be interested in the extensive repairs done on 39056 in that wet valley in New York state. Although the aircraft was rather badly damaged, the Air Service did not feel it was necessary to supply any maintenance personnel. Required material including new landing gear parts and a complete new nose assembly, was shipped to the crew by rail and they proceeded to rebuild the aircraft themselves. Colonel Hartz, in his final report recommended that pilots be better trained in maintenance so that they would not be so handicapped when down without their ground crews.

Thirty-one days later, the Liberty engines coughed into life again and 39056 was successfully flown out to Cleveland. From then on the flight proceeded around the rim of the U.S. covering almost 10,000 miles. Six further forced landings, five due to bad weather, occurred but all were successful. On November 9th, 1919, 39056 touched down again at Boiling Field, still with its original two engines after 1k6 hours of operating time. After this flight it was hoped that 39056 would go to the Smithsonian Institution but the transfer never took place.

In 1919, the Navy became interested in the Martin bomber and ordered ten machines, serial numbered A-57H through A-5720 under contract #48908. The first two aircraft, similar to the army GMB, were designated MBT (Torpedo) with landing gear modified to allow a 1650 lb torpedo to be slung under the belly. The remaining eight airplanes were further modified and designated MT. The engines were mounted on the lower wings, and high

lift wings of Albatross airfoil section were installed. The switch in engine location also resulted in a change in the inboard interplane strut layout.

In January 1920, Commander Jerome Hunsaker wrote to Colonel Thurman Bane at McCook Field requesting the army receive the first Navy aircraft and conduct preliminary trials on it. Whether this was done is not known, but Navy records show that the first aircraft was delivered on 23 April 1920 and the last one on 9 March 1922.

Apparently, it was felt that the machines were better suited for Marine Corps use as at least six of the ten were in use by the Corps, where they served with the 1st Aviation Group at Quantico and the 2nd Aviation Group at San Diego. During their service years the aircraft were used for torpedo work, laying smoke screens with the fleet, and at least one, with Lt. W.S. Hallenberg as pilot, took part in the National Air Races at St. Louis in 1923. A BuAer technical note for 30 October 1924 shows six of the original ten still on hand. When they finally went out of service is not known.

Only a few months after its formation in August of 1918, the U.S. Air Mail Service of the Post Office Department showed a definite interest in the Martin GMB as a possible answer to its equipment problem. Up to this point, the Air Mail Service had been operating mostly with "Hisso Jennies" and a few Curtiss R-4s and DH-4s. The Department, under its chief, Otto Praeger, was anxious to acquire new aircraft with greater range and load carrying capabilities. It was natural that they should have been interested in the Martins. In June 1919, Mr. Praeger wrote to Colonel Bane at McCook Field, requesting data on single engine performance. Colonel Bane replied that the type had been successfully flown with a load on one engine and this possibly influenced the Department, which ordered six Martin Mail planes. There is some indication that there was a further order for four aircraft, but it seems doubtful if they were ever delivered. The six delivered were basically GMB, and appear to have been numbered 200 through 205; detailed information on these aircraft is not available.

The first of them were delivered in the early Fall of 1919, and part of them went into service on the Chicago-Cleveland-New York route. As it turned out, they were a dismal failure in the Air Mail Service; one reason, the small fields from which the Post Office Department airplanes operated. In addition single-engine performance was unsatisfactory. Number 203 was washed out at Heller Field, Newark, on the evening of 30 January 1920, while landing on its first mail flight into that field. Number 204 was wrecked at an unknown time and place; the Post Office Department soon disposed of the lumbering giants and went back to DH-4s. At least one of the remaining Air Mail machines was turned over to the Army. This was Number 202 and it was delivered to Fairfield Air Intermediate Depot in very poor condition in the spring of 1921. Each in May it returned at the Martin plant for overhaul. One of the ex-Air Mail aircraft was involved in the battleship bombings in July and it is probable it was Number 202. Chances are it was also the same machine which won its race event at the National Air Races in St. Louis in 1923 and again at Dayton in 1924.

With no further orders for their bomber, Martin embarked on a major redesign to conform to Air Service specifications dated 10 June 1920. The first of the new bombers was flying late in the year and showed a much more refined layout than its predecessors. Engine installation was much cleaner, the Liberty engines being mounted flush with the lower wing, and the complicated multi-wheel landing gear had given away to a very neat two-wheel layout. The equal span wings stretched 74'2", but could be folded back along the fuselage, reducing the span to just over 37'. There was an internal bomb bay some 5'-6" long, capable of holding a normal bomb load of about 1800 lbs. In addition, there were pro-

visions for carrying two 1000 pound bombs on external racks. A Michelin or Wimperis bomb sight was provided and all aircraft were rigged with an intercom and a radio-telephone set.

Defensive armament included five .30 caliber Lewis machine guns; later Brownings were sometimes installed. These were disposed as follows; two on a ring mount in the nose gunners cockpit, two on a similar mount in the aft gunners pit and the other gun on a floor mount to sweep the area not covered by the upper guns. Racks were provided for ten Lewis magazines, four each for the forward and aft guns and two for the floor gun. The aft upper guns had an interesting arrangement of clips which allowed the guns to be snapped into a fixed position facing directly aft and permitted firing through the clear area between the twin fins and rudders.

This new aircraft was designated "Martin Bomber #2", or MB-2, and few other military aircraft have burst on the peacetime aviation scene in the spectacular manner that the MB-2 did. In that Spring of 1921 General Mitchell was gathering together his 1st Provisional Air Brigade at Langley Field for the show of the decade, the ship bombing trials off the Virginia Capes. This was a collection of most of the Air Service's combat strength, and included everything from S.E.5a's to a pair of Handley Page 0/400s and a lone Caproni bomber. General Mitchell says in his book, Winged Defense, that he had thirty of the new Martin bombers direct from the Cleveland factory. This would appear to be in error since the Martin contract called for only twenty aircraft. It seems certain that a few of the earlier GMB type were present, and at least one ex-Air Mail Martin was on hand, but it is doubtful if the total number of all Martin bomber types could have reached thirty.

Although many of the combat aircraft of both the Army and the Navy were taking part, the Martins were General Mitchell's big punch. The U-boat U-117 and the destroyer G-102 were sunk with light bombs, but the cruiser FRANKFURT and the battleship OSTRFRIESLAND were tougher propositions. The Martins with their 1100 and 2000 lb. bombs were the decisive factor in sending these two ships to the bottom. At least one of these new aircraft was lost during the bombing trials. Destroyer G-102 went down on 4 June 1921, and on this same date, Lt. Dunlap had an engine failure fifty miles at sea. Losing altitude, he made the shoreline where he landed on the beach but lost control; the aircraft turned into the water where it broke up.

As with the so-called MB-1, confusion existed as to the correct designation for the new bomber. A McCook Field memo, quoting A.S. Circular #6, 16 January 1922, states that the new designation NBS-1 applied only to aircraft built by Curtiss and L.W.F., none of which had been delivered to the station by that date. The correct designation for the Martin built machines should remain MB-2.

Because of the Army contract policies in the post-war years, most of the Martin Bombers were not built by Martin. The contract with the Glenn L. Martin Company called for only twenty machines while L.W.F. built thirty-five and Aeromarine, twenty-five. Curtiss got the largest allocation of fifty machines probably because of their greater production facilities. The Curtiss-built airplanes were serial numbered in the 68,000 range and most of them were delivered to the squadrons of the 2nd Bomb Group at Langley and Aberdeen late in 1922.

The most interesting of the Curtiss aircraft were those equipped with turbo-superchargers. The use of this equipment had been planned from an early date and included in the 1920 Army specification for the MB-2 was the installation of a General Electric turbosupercharger on each engine. Although a great amount of effort was put into the installations, the superchargers were not a success on this airplane. In December 1920, when Lt. Harris ferried one of the first of the

MB-2s to McCook Field from Cleveland, it was without the superchargers which had not been available for installation. The aircraft was, however, equipped with inverted carburetors designed for use with the superchargers and these gave constant trouble on the flight, almost resulting in a forced landing. When MB-2, (A.S. serial 64195, McCook Field number P-162) was tested on 6 May 1921, it was still without superchargers and its absolute ceiling was 9,900 feet with a full load. Weighing in at 10,383 lb. with a light load, ceiling was 13,100 feet.

By December 1921, P-162 was equipped with the long awaited exhaust-driven superchargers and test flights during that month showed a considerable increase in ceiling. Early in the month, the first flight was made but only at a low altitude to check the operation of the superchargers, the engines, controls, etc. On the 7th, an attempt was made to reach the aircraft's ceiling; Lt. Leigh Wade was pilot with Roy Langham (observer), Mr. T. Jones and Mr. Gregg (both of the Power Plant Section, McCook Field) as the remainder of the crew. No oxygen was carried, as a result, Langham lost consciousness at 20,000 feet and the altitude test was discontinued. The engines and superchargers had functioned very well, the only difficulty being an accurate adjustment of the blast gate controls due to slack in the control cables.

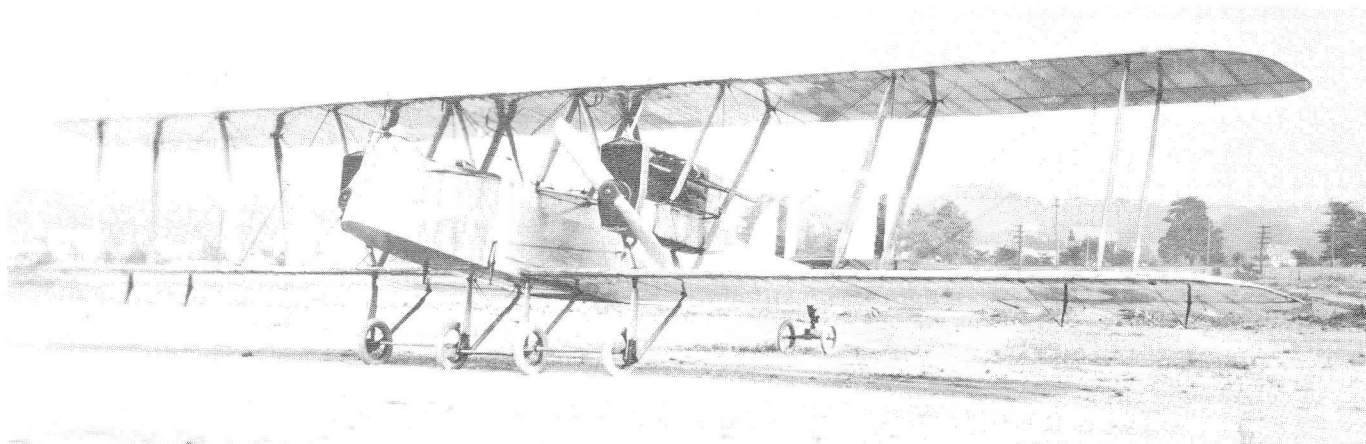
The next day another attempt was made to reach the aircraft's ceiling, this time with oxygen equipment installed. At 23,000 feet the oxygen lines froze at the mouthpieces, Lt. Wade complaining in his report that it was like holding an icicle in the mouth. A letdown was made to warmer altitudes until the lines were cleared and climb was resumed to 25,600 feet. At this point a letdown and landing was made due to low fuel supplies.

A great amount of discomfort was encountered at these altitudes in the exposed cockpits which did not have the benefit of a warm engine in front of them. Cockpit temperature at maximum altitude was -35 degrees C., as compared with -5 degrees C. in the cockpit of the LePere at the same altitude earlier the same year.

June 1922 again found P-162 in the frigid upper reaches over Dayton, the objective this time a high altitude bailout by the versatile Capt. A.W. Stevens. Lt. Leigh Wade was pilot again and Sgt. Langham made up the rest of the crew. Capt. Stevens jumped at 24,000 feet and the parachute opened immediately after bail out. During the descent Capt. Stevens became sick from the chute oscillations and he injured a foot on landing but otherwise the jump was uneventful. The barographs showed an altitude of 24,206 feet at bailout.

On 1 August of the same year, P-162 followed the now familiar path to 24,830 feet, with the same three-man crew, for a three man multi-engine FAI record even though the right supercharger turbine was "dragging". [2] Although the blowers had been operating in a very satisfactory manner during these tests, there was much trouble ahead for the supercharged Martin bomber. It was two years later before Bombers equipped with turbos began to be delivered to the 2nd Group at Langley. These aircraft were from the Curtiss contract and while the first few machines were being ferried down to Langley from Mitchel Field early in 1923, two of them had forced landings, one resulting in a complete wash-out. Later investigation revealed that the superchargers were not involved in either of these incidents. In April, Leigh Wade was ordered down to Langley to look into the situation and found it very bad as far as the turbosuperchargers were concerned. All personnel concerned had no confidence in them; they were worried about fire hazard, did not like the greatly increased takeoff run and the poor climb performance at low altitudes. Lt. Wade instituted a series of lectures for air and ground crews to explain the operation and advantages of the superchargers while comparative tests

[2] Federation Aeronautique Internationale.



An early GMB. (Photo - M.45 from B. R. Martin Collection)

were also conducted in an effort to change the 2nd Group's collective opinion. These efforts were only mildly successful, but during June, July and August 1923, sixteen supercharged "bombers" were ferried from Mitchel to Langley. These aircraft, Air Service serial numbers 68512 through 68527 were put into storage after arrival at Langley to await the solving of cooling problems which had continually occurred.

A number of different radiator installations had been tried in an effort to overcome the cooling problem. Besides the normal position above and behind the engine, these included a single radiator just below the nose of the engine at the leading edge of the wing and dual radiators, one on each side of the engine. In addition, Lamblin type coolers were recommended as were Curtiss wing radiators. As far as is known the problems were never solved and the supercharged Bombers in storage at Langley never did go into service.

There was no MB-2 modification to match the unusual three-engined GMB, but some showed various modifications such as the new tail unit with three fins and rudders which was installed at McCook Field on Boiling Field based machine #64205. This was in the summer of 1922; although this tail unit was considered permanent and the aircraft returned to Boiling Field with it, there are no available photographs of it. It was destroyed in April 1923.

The tail unit of all Martin Bombers was a source of concern to air crews because of twisting and weaving in flight. Apparently, none ever failed in flight but the visual effect was called "terrifying" in one official report of 1921. An effort was made to strengthen

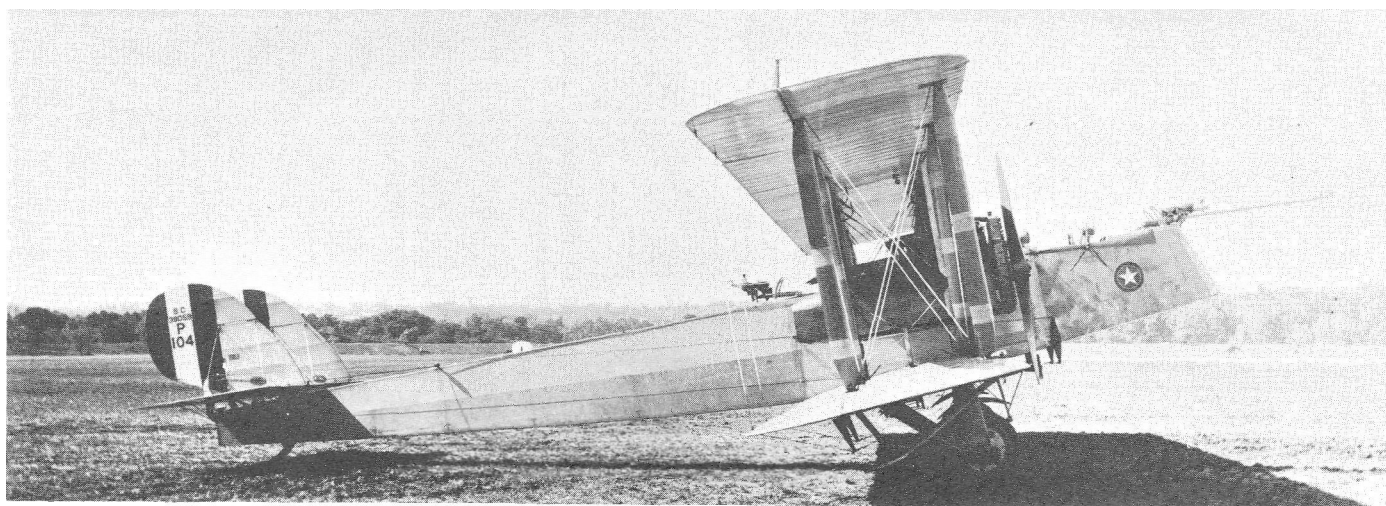
the rear fuselage on the Curtiss built aircraft but resulted in no improvement and the weaving and twisting of the tail was no doubt present until the last flight.

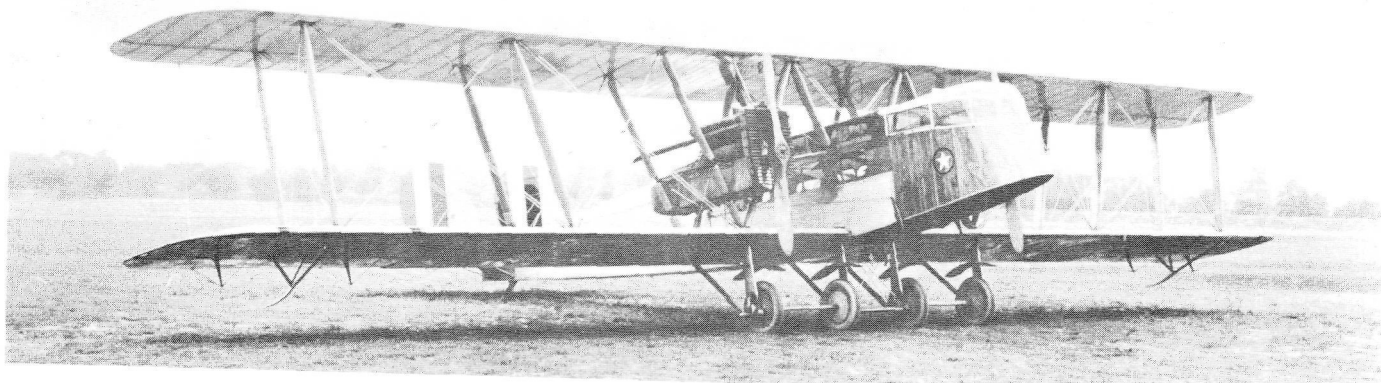
The first contractor to build the MB-2/NBS-1 type, other than Martin, was the L.W.F. Engineering Corporation, College Point, N.Y. Early in May 1921, the Engineering Division of the Air Service entered into a contract with this company for the construction of 35 bombers. The first aircraft was scheduled for delivery in November of that year, but numerous difficulties with drawings and materials delayed the completion of the contract by some nine months. The first machine (A.S. serial 68437) was completed in the spring of 1922 and was left uncovered to use as a model.

The first airplane accepted by the Army was L.W.F. Number 11, A.S. serial 68447. After a short testing program at nearby Mitchel Field, it was delivered to Aeromarine at Keyport, New Jersey for use as a physical model on their contract for 25 aircraft. The serial number range assigned to the L.W.F.-built machines was 68437 through 68471 and the majority of these were crated and shipped overseas; divided almost equally between the 5th Composite Group (23rd and 72nd Bomb sqdns) at Luke Field in the Hawaiian Department and the 6th Composite Group (25th Bomb Sqdn) at France Field, Canal Zone. Four were built as dual-control trainers, Air Service serial numbers 68460 through 68463. The first two were among the Hawaiian shipment and the other two went to France Field.

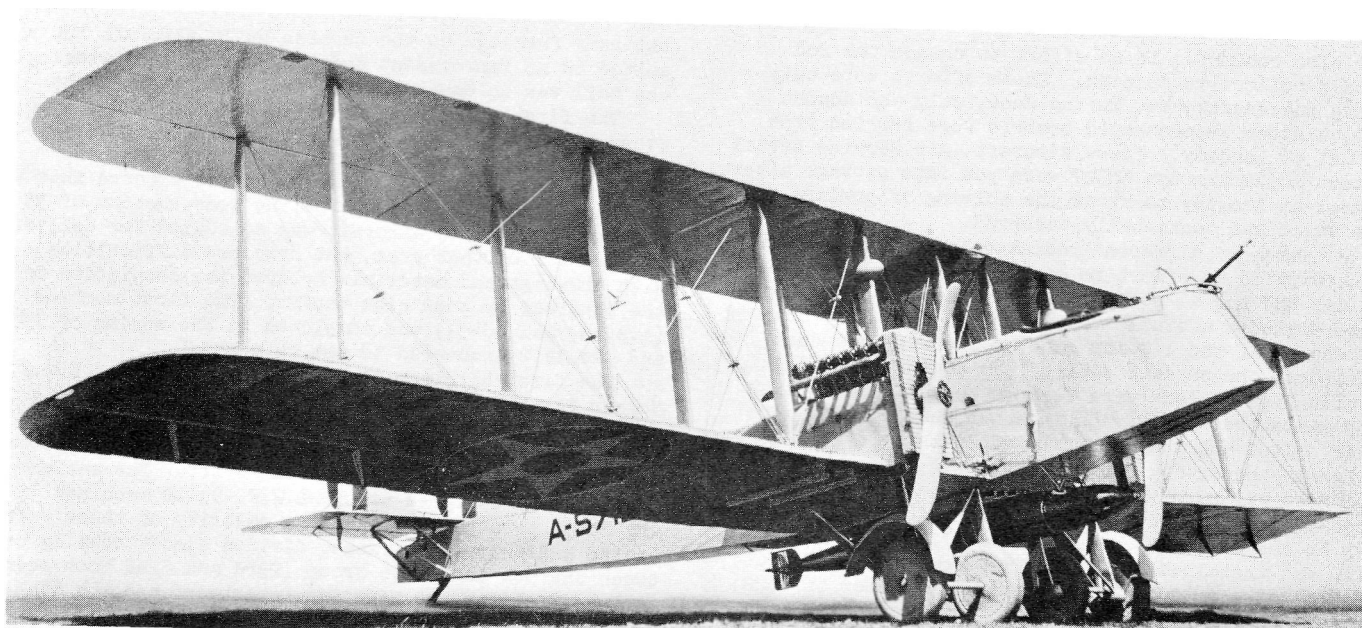
The last contractor to build the Martin bomber was the Aeromarine Plane and Motor Company of Keyport, N.J. Most of this company's experience had "been with flying

The fifth production GMB, A.S. 39059; used at McCook Field as project airplane P-104.

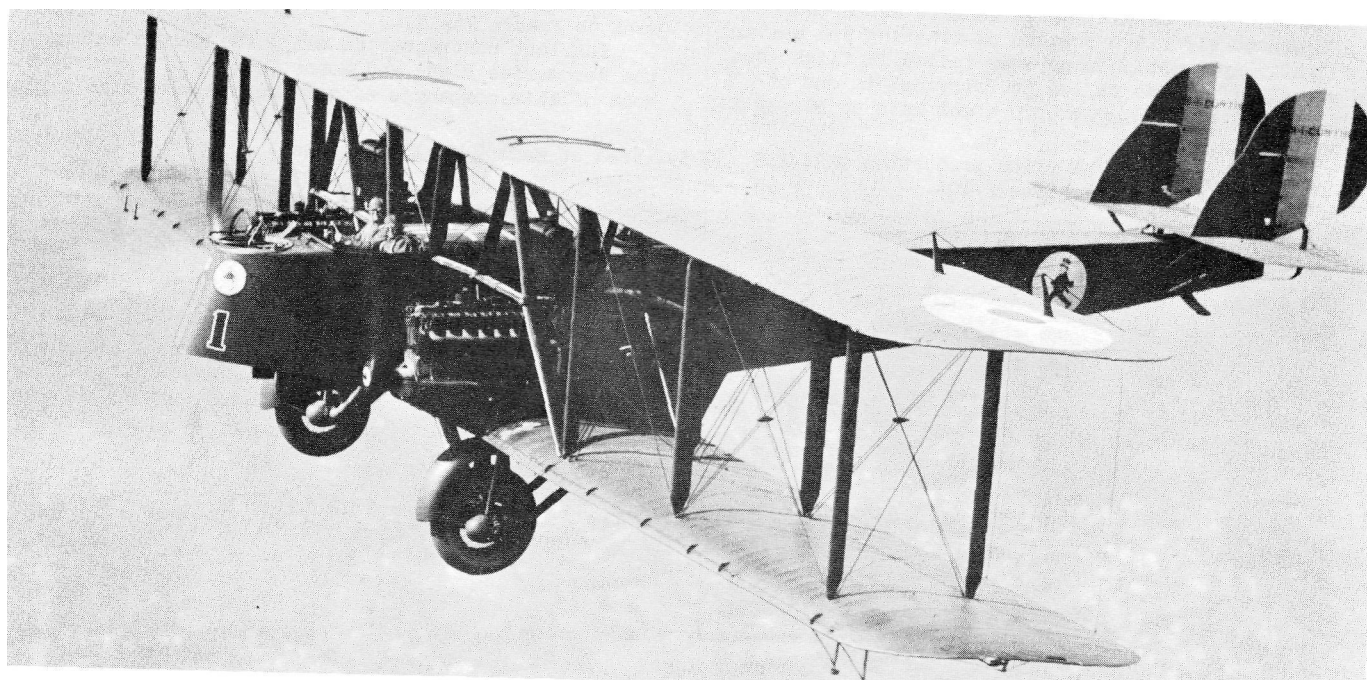




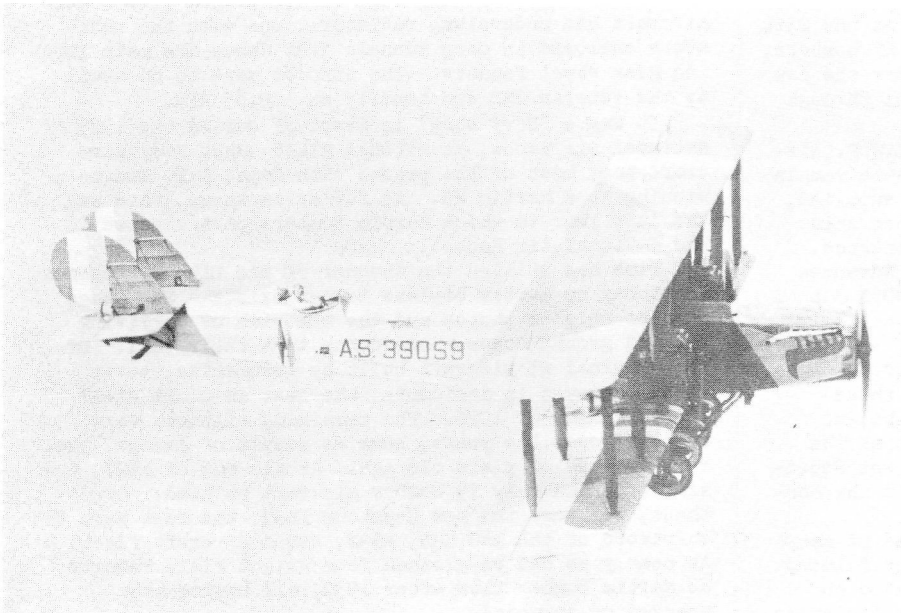
The GMT. (Photo - USAF, Wright Field No. 4174)



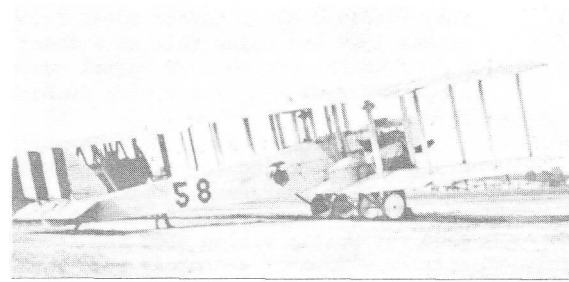
The MTB. (Photo Martin Information Services No. M236)



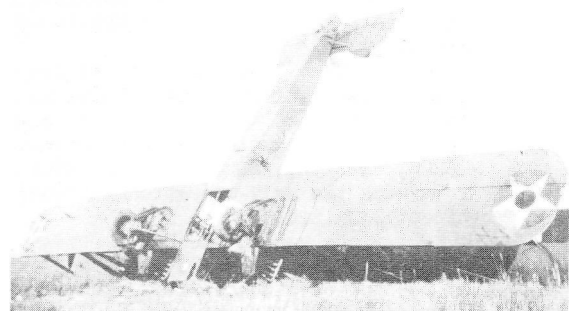
Curtiss NBS-1 of 20th Bomb. Sqdn. (Photo - USAF, No. 28184 A.C.)



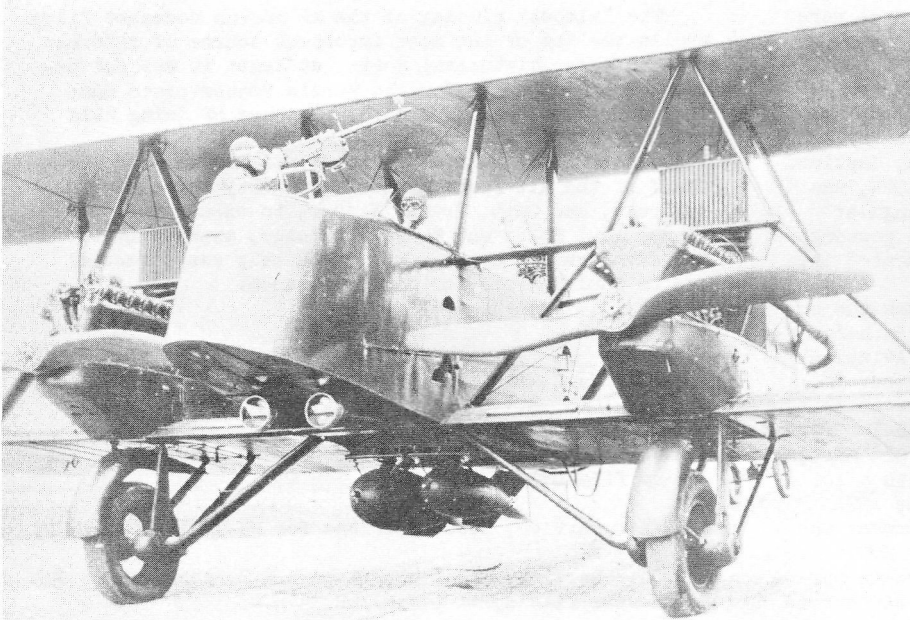
Modified GMB. Fuselage engine, "Liberty 12". Wing engines, Wright-Hispano Model E. (Photo - Capt. Marion Havelaar, U.S.A.F.)



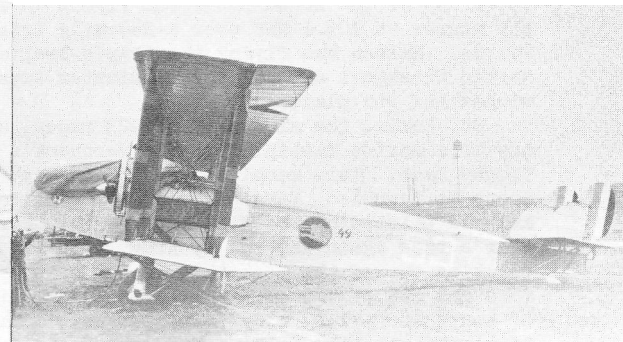
Top: U.S.M.C. Martin GMT of the 1st Aviation Group, Quantico, placed 3rd in the Merchant's Exchange Trophy Race at the 1923 National Air Races, St. Louis. (Photo - Capt. Truman C. Weaver, U.S.A.F.)



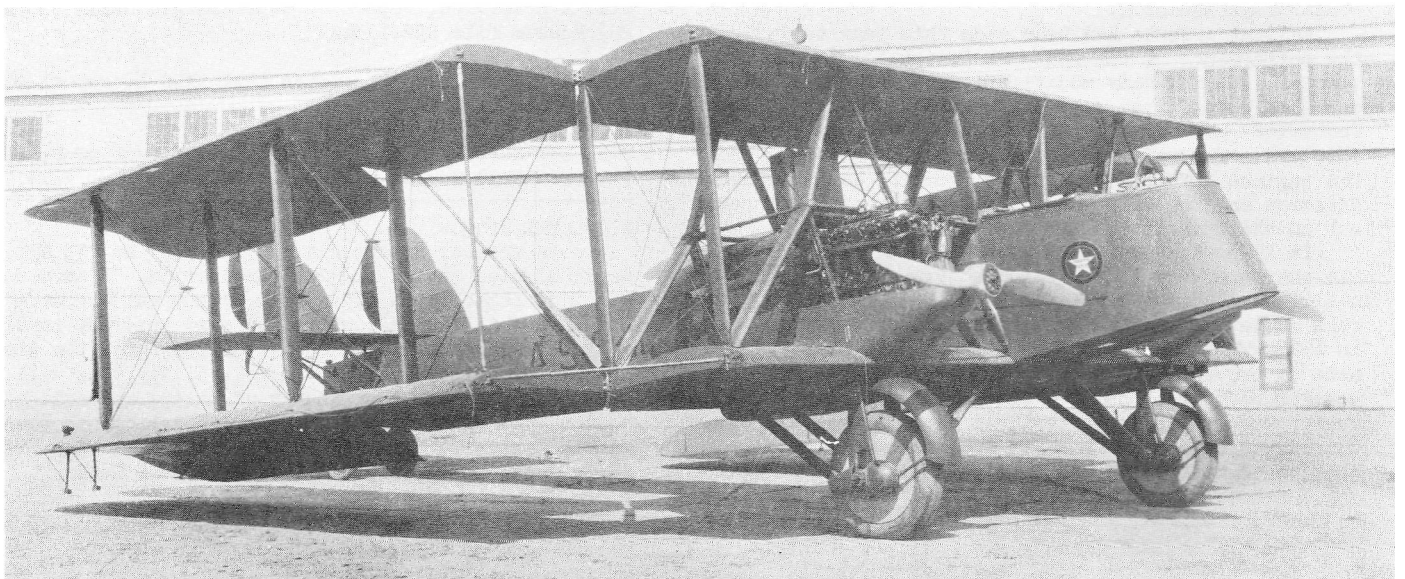
Above: Crashed MB-2 of the 96th Bomb Sqdn., Langley Field. (Photo - Olmsted Collection)



Above - MB-2 with all equipment, about 1923. (Photo - Olmsted Coll.)
Below - GMB with wings folded. (Photo - USAF)



Above, the GMB, S/N 64308, of 49th Bomb Sqdn., winner of Chamber of Commerce Trophy at National Air Races, Dayton, 1924. (Photo - Charles Mandrake)



boats but they had also rebuilt 125 DH-4s for the Army. They received NBS-1 number 68447 from L.W.F. on the 25th of May 1922 and using this as a model, built 25 bombers, all of which carried 1922 serial numbers (under the new numbering system). These were numbered 22-201 through 22-225.

As mentioned above, the majority of the L.W.F. aircraft were supplied to Panama and Hawaii. There remained one other overseas bombardment unit to be supplied, the 28th at Clark Field in the Philippines, and this need was mostly filled from the Aeromarine contract. Airplanes from this company also went to the Advanced Flying School, Kelly Field, assigned to the 40th School Sqdn. A few of the Curtiss NBS-1s were also at Kelly Field.

Other than these far-off Pacific units and the 40th School Sqdn, the only other units to operate these bombers in quantity were the four sqdns. of the 2nd Bomb Group at Langley Field. Throughout most of the 1920s, the 11th, 20th, 49th and 96th Bombardment Squadrons were the only operational bomber units in the continental United States.

Over the years, the big Martins were tried at many odd jobs. One, (possibly two) was used in the filming of the motion picture *Wings* with cameras mounted on gun rings. In the late summer of 1921, after finishing off the ALABAMA in another battleship bombing test, a squadron of MB-2s plus one of DH-4 were used as transports to ferry ammunition, medical supplies and tear gas into West Virginia where the military forces were involved in suppressing domestic troubles.

Martin bombers were used by all three of the military services in the National Air Races during the first half of the 1920s. In 1922, at Selfridge Field, all five entrants in event #2 were Army Martins carrying race numbers 22 through 26. Lt. E.H. Nelson, destined to be one of the Round-the-World Flyers in 1924, was the winner at 105.1 MPH over a 240 mile triangular course. Nelson was flying the Army's twelve passenger Martin transport and only seven minutes separated the winner and 5th place.

St. Louis, the site of the 1923 races, saw the entry of a Marine Martin MT in the Merchant's Exchange Trophy Race. This machine was from the 1st Aviation Group at Quantico, Virginia, carried race number 58, and was piloted by Lt. W.S. Hallenberg. However this year's race again was won by Army, with Lt. H.L. George piloting one of the most interesting of the old Martins. This was one of the ex-Air Mail machines, with a lot of hours and miles, plus participation in the 1921 battleship bombing tests. Its Army serial number was 64308, and had probably been Air Mail number 202. Some modification work had been done to increase performance, the most obvious change being the new curved decking along the top of the fuselage. The race number for No. 64308 this year was 44 and Lt. George had no trouble in winning at 114.28 MPH. Prominent on the fuselage sides were the markings of Langley's 49th Bombardment Squadron.

Valiant efforts had been made this year to improve the performance of the newer MB-2s; number 46, in particular, showing many modifications. The gunners' cockpits had been faired over, stub exhaust stacks had been installed, plus new, cleaner engine cowls and propeller spinners. The radiators were relocated and slung under the engines. This aircraft was from the 11th Bombardment Squadron and Lt. Wade was the pilot, but it was forced out of the race in the 3rd lap.

In 1924 when the races were held at Dayton, again all entrants were Army Martin Bombers. Subsequently, old 64308 repeated her victory of 1923; this time with race number 53 and Lt. D.M. Myers at the controls. As in 1923, what must have been desperate efforts, were made to prevent "old 64308" from again disgracing her younger brothers, the MB-2's. At least three of the latter were fitted with cowlings which completely enclosed the engines. Race #55 had its engine nacelles lengthened at the rear so that they protruded several

feet beyond the trailing edge of the wings. Two other aircraft had underslung radiators, one with the radiators enclosed in deep tunnels just above the main landing gear wheel fenders. The efforts were to no avail as the veteran GMB won handily at 109.85 MPH.

It was a "Navy show" in Event #7 during the 1925 National Air Races, at Mitchel Field, when Navy aircraft took most of the prizes with Capt. L.H. Bourne winning in a Martin MB. As far as is known, this was the last year in which Martin Bombers participated in the National Air Races.

Time has stilled the thunder of the Liberty engines and today no Martin biplane Bomber exists. The image remains only on photos and the memories of surviving air and ground crews. Accidents took their toll. Of the original 25 aircraft built by Aeromarine, seven were destroyed in accidents, the last at Clark Field in the summer of 1928. The remaining eighteen were surveyed over the years, some as result of damage, the rest because of plain old age. At the end of 1927, the Air Corps had only 75 bomber aircraft on hand. Of these, ten were the new Keystone LB-5; the rest were the survivors of the 140 GMB, MB-2, NBS-1 aircraft fleet. As nearly as can be gleaned from Wright Field reports, no Martin Bomber flew after 1930, all having been wrecked or surveyed.

AUTHOR'S NOTE

The "almost" closing of the AF museum document files spells the end of our most important source of information on these historical years, at least it was for me. Most of the material for the Martin Bomber piece came from here. At least I had the pleasure of doing this research before the end came.

Grateful thanks are due to Mr. Royal Frey and the staff of the Air Force museum, Mr. Marty Copp, Charles Mandrake, and Capt. Truman Weaver, to ex-air mail personnel Paul Smith and H. G. Blakeslee, especially to Bob Cavanagh of Dayton, Ohio whose help was essential and to Paul Stevens for his assistance.

SOURCES

Bowers, Ray L. "Aviation on Trial", *Air Power Historian*, Vol. 8, (Jan. 61) p50 and Vol. 8, (Apr. 61) p93, 94.

U.S. Air Service, contract with Curtiss Airplane Co. AF Museum file D52. 1/562.

U.S. Air Service, Specifications for MB-2 (10 June 1920).

U.S. Air Service, Final report on L.W.F. contract (4 Jul 23) Museum file D52.1 L.W.F./62.

U.S. Air Service, performance test NBS-1 (29 Sept 22) Doo 12M/2046.

U.S. Air Service, report on supercharged NBS-1 (28 Aug 23) Museum file D52.1/562.

U.S. Air Service, Performance test, NBS-1, report #58 (6 May 21).

U.S. Air Service, report on altitude flight of .P-162 (19 Dec 1921) Museum file D52.1/20.(Cont'd on Page 204)

ABOUT THE AUTHOR

'As a founder of the A.A.H.S., Member No. 7, Sgt. Merle Olmsted stated in his Introduction, "I am a collector of photographs of any old or unusual aircraft". But with this he has combined an avid interest in Air Service history of the 1920's. He presented the story of Army Airship Operations in Vol. 5, No. 4 as well as being a consistent contributor of photos and comments to the Mail Sack pages. The current article on the Martin Bomber is very timely as a prelude to the Martin Story, soon to appear, compiled by Willis L. Nye.