



MAN of the MONTH

Glenn L. Martin, aviator in 1909, bomber builder in 1941

## *From Barnstorming to Bombers*

### A Pioneer Plane Builder Sees His Prophecies Come True

By ROGER BURLINGAME

"THE AEROPLANE will practically decide the war in Europe. Veritable flying death will smash armies, wreck mammoth battleships, and bring the whole world to a vivid realization of the awful possibilities of a few men and a few swift aerial demons. For the old-time war tactics are no more. The generals who realize this quickest and fight first with flying death, will win."

I read this last week in the office of Glenn L. Martin at Middle River, Md. It was a

clipping in a scrapbook. That queer word "aeroplane" made me look up at the date-line. August 7, 1914!

But that was the day of "crates," of cat's-cradle construction, of wooden struts and fabric wings, when the only recognized use for the military "aeroplane" was reconnaissance and observation—perhaps the direction of artillery fire. If bombs were to be dropped, they must be carried by lighter-than-air ships.

I looked out the window and came back, suddenly, to 1941. Out there lay some 40

acres of buildings forming one of the biggest and newest aircraft plants in the country—working three shifts through a 24-hour day for American defense. The factory was owned by the man that made that uncanny 1914 prophecy—Glenn Luther Martin.

The prophecy gave me a key to the mystery of Glenn Martin's astonishing career. It helped me span the years between the 26,625-pound bombers, motored with twin 18-cylinder, 1,850-horsepower motors that come steadily off the Martin production line today, and the fabric-winged, kitelike machines he was making for war use in 1914. It helped me, too, over the years between those crates and a box kite flown in the Kansas wind by a boy of six in 1892.

**S**TANDING out from the prophecy and proved by any investigation of the steady course of this man's life is one all-important fact. From the start, he saw the potentialities of the heavier-than-air flying machine as a war weapon. In all his work with civil aeronautics, he has never lost this early vision or failed to come back to defense as the guiding reference line of his life.

A second fact that must be remembered about Glenn Martin is that, before everything, he has been a manufacturer. The public lost sight of this for a time during his spectacular career as an expert and "daredevil" flyer. Glenn Martin never, for an instant, lost sight of it. He learned to fly because he wanted to understand the design and manufacture of planes. He flew in hundreds of public exhibitions and contests because he wanted to create public confidence in the airplane and so stimulate demand and build markets for the industry. His personal performance in this period is one of the most remarkable demonstrations on record of a manufacturer's faith in his product. Through it all, his factory never stopped producing.

From the present Glenn L. Martin Company plants with their 5,000,000 square feet of floor space and their \$400,000,000 backlog in defense orders to the kite factory in the corner of Mrs. Cyrus Martin's kitchen in Salina, Kans., we must go back nearly half a century. Salina boys had seen the box kite of Glenn's own design and manufacture flying high over the prairie and they wanted kites like it. At six, Glenn Martin began producing them. He worked his production up to three a day and his price to 25 cents.

In his teens, the news came to him of the success of the Wright Brothers at Kitty Hawk. Secretly, then (for such things were not thought healthy-minded), he built himself gliders and prepared himself to make a motored plane.

By his early twenties, he had saved some money. His family had moved to California. In Santa Ana, in 1908, he was ready for his great experiment. He could not make his plane outdoors without danger of being led off to the doctor for a mental test. So he looked for a building with a large room. There must be no posts. Anyone who has seen the Martin plant buildings of 1941 with their 40-foot clearances and their 400-foot steel trusses supported only at the ends, knows what kind of a building he wanted in Santa Ana. He found it. It was a church.

He rented the empty, abandoned Southern Methodist Church for \$12 a month. He painted the windows to keep out spies on his sanity and worked there at night. In the daytime, he was in the automobile business, making money and learning about internal-combustion engines. His mother, who has always been (and still is) a partner in his enterprises, held a kerosene lamp for him to see around, inside and under his machine.

In something over a year, he had completed his first biplane and mounted in it a Ford 15-horsepower automobile engine, adapted for lightness. "I don't know where all those fifteen horses were," he told me. "I never seemed to be able to get them all into the engine at one time." He had to tear out the vestibule of the church to get his plane out. With this machine, highly reminiscent of the box kite, he learned to fly. Then he built another, doubling the horsepower.

All this time he was leading a double life. Part of the time he was a persuasive salesman of Ford and Maxwell cars. With the money he made at this, he was able to start a factory with two or three assistants.

I talked with Charley Day, his first mechanic, who is now Supervisor of Aircraft Production for the Canadian Government.

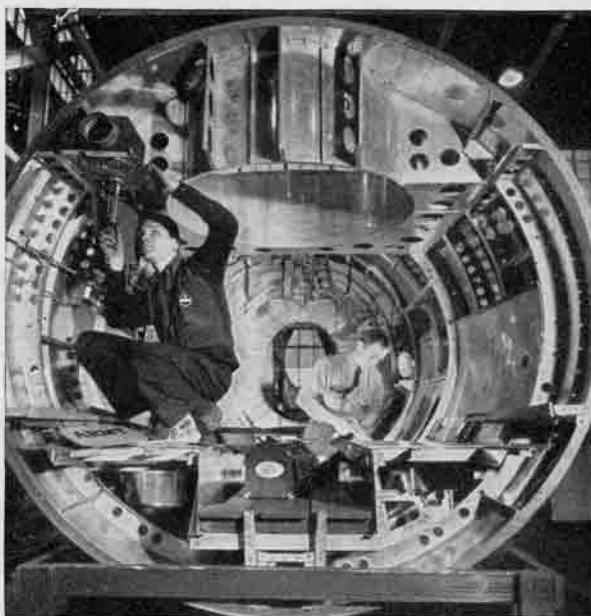
"**G**LENN used to neglect the automobile business terribly," he told me. "When Friday came around, I used to remind him of our payroll. Glenn would go through his pockets, shake his head, frown, and spend the afternoon selling cars. He always came back with our pay."

In the summer of 1910, a reporter, walking south on Main Street in Santa Ana, saw a queer winged machine on the mesa of the San Joachim Rancho and Martin found himself in the next morning's paper. By that time he had no fear of being called crazy. He could fly as well as the Wrights. The publicity broke just right for him and started him on a long showman's career.

For the next two years the papers were full of his exploits. Before great crowds he staged spectacular flights. He had hundreds of hairbreadth escapes. Sometimes, flying

in fog at night, he was given up for lost. Working always for publicity, not for himself but for the airplane, he threw baseballs from the air, took up cameramen and occasionally (though this was against his monastic tastes) an actress. In sharp contrast to his apparent recklessness in the air, Glenn Martin was the quietest of youths; he never smoked, drank, danced, or swore; he dressed and looked like a Methodist minister, and women alarmed him more than fog over Lake Michigan.

By 1912, flying was a sport. There were many races and other contests which offered cash prizes. Among the competitors, Martin



Instruments and controls of the Martin B-26 bomber requires two miles of wiring. Here workmen are installing equipment in the tail section of one of them

Here's how the B-26 looks when it leaves the factory. A medium bomber, it has greater speed than most of the pursuit planes now fighting Europe's air battles



Another example of Martin's genius for combining speed and maneuverability with load-carrying power is the B-187. Like the B-26, it carries on the tradition of the B-10 which made a sensation in 1932



For the Navy Martin builds giant flying-boat patrol bombers. Designed for defense service in midocean, they have long range and great carrying capacity. The craft shown is the PBM-1





Clad in a fireproof suit, heavy metal shoes, and a helmet that looks like the headpiece of a deep-sea diver, a worker at the Martin plant near Baltimore pours molten metal to be used for die-casting. This is a little-known phase of Martin's job of filling defense orders for aircraft that run into nine figures

was exceptional because he was a manufacturer—indeed he led the field in the industry. His trade mark was on many of the contesting planes. So when he won prize money as a pilot, he had a definite use for it. Every penny beyond the needs of a very frugal living went into the factory, which he had moved, in 1912, to Los Angeles.

Long before the threat of the first World War, Glenn Martin had foreseen the military airplane. In the earliest of the news stories, we find him quoted as recommending flying reconnaissance and observation. But by 1911, he had clearly seen the bomber vision. The U. S. Army, as always, was hard to convince. Martin knew that he must begin by a spectacular public demonstration.

I read the news story of this show. It was in January, 1912. Lincoln Beachey and Howard Gill, famous flyers of the day, took part along with Martin. The exhibition was at night in a great field near Los Angeles in which stage-scenery forts and the "forbidden city" beyond, had been constructed. The paper said that bombs were dropped with the greatest accuracy, destroying the targets while searchlights from warships in the harbor picked out the planes. I found the

story hard to believe and I asked Martin about it.

"It was a fake, of course," he told me. "We couldn't take that kind of chances with an audience as close as that. The bombs we dropped contained no explosives. But I had mines planted under the forts. Every time we dropped one of our harmless bombs, someone would throw a switch and detonate one of the real ones. The real ones had cans of powder attached so there would be plenty of smoke and flame. But it was a realistic demonstration of what plenty of people would see some day."

And the show did what it was meant to do—it attracted the Army. A year later an ordnance officer asked for a private demonstration of real bombing and Martin gave it to him. The colonel built himself a lean-to shelter with an earth parapet so that he could watch the fragmentation.

"I had a pretty primitive bomb sight," Martin told me. "Just a couple of intersecting cross-hairs. When the intersection came over the target I was supposed to let go."

When he came down the colonel said it was fine but asked why the bombs had gone so wide of the target.

"Because every time I looked through the sight," Martin explained to him, "all I could see was you!"

But in that same month of May, 1913, some astonishing news came from Mexico where the Huerta revolution was going on. On the 28th, the besieged city of Guaymas was bombed from the air, causing great property damage and even loss of life. "The attack of this dragon of war," says the paper, "created a reign of terror such as the city has never seen." This seems to have been the first recorded bombing of a city from a heavier-than-air machine. The aviator was Didier Masson and his ship was a Glenn Martin plane bought in Los Angeles.

That year, 1913, before the world was war-minded, saw the swing of Martin production toward warplanes. The results were the first armored plane and the famous Model TT, a training plane built for the Army. From that point, the armies and navies of the world were his best customers.

Meanwhile, his pioneer work with sea-planes had established the reputation which the U. S. Navy recognizes today in its large contracts for PBM-1 "flying boats." In May, 1912, he made the first over-ocean flights

from the California coast to Catalina Island and back. The total distance was 76 miles. On the way back, he encountered fogs. While these cannot be called "instrument flights" in the modern sense, Martin made full use of what instruments he had and, when the flights were over, he announced that "a perfect course can be followed with clocklike precision."

In July, 1914, on the verge of the World War, the U. S. Army ordered four Martin war planes. Less than a year later, Martin announced, "I have twelve seaplanes ready for Uncle Sam in case of war." In 1916, he forecast recent German tactics by making a plane designed to carry a motorcycle which was to be used for scouting after landing, or to be dropped by parachute.

In the later years of the war, Martin saw his bombing prophecies come true in Europe. He was already working on a bomber for the United States. But he was never satisfied with makeshifts. Rather than turn out a hurried job, he was content to let the Army use the Handley-Page machines developed by the British. So the celebrated "Martin bomber" did not appear until August, 1918. This biplane had a span of 71 feet, 5 inches, was motored by two 400-horsepower Liberty motors, carried a bomb load of 1,500 pounds, four machine guns, a cannon, and a crew of four, had a sea-level speed of 118.5 miles an hour and a range of 635 miles. These were remarkable specifications in 1918. Since that year, when he thoroughly mastered basic bomber technique, Glenn Martin has steadily raised these dimensions.

Having read his 1914 prophecy, I was not surprised to learn that as early as 1919, he had the plans for a torpedo plane for use against ships. This could take off from the deck of a carrier. Two years later, in July, 1921, in a demonstration off the Virginia Capes, Martin bombers sank a battleship, a cruiser, and a destroyer.

Martin reminded me, as I talked to him, that dive bombing, made famous by the German Stukas, was first practiced in the United States. Picking up one of the little models from the table in his office, he showed me precisely how the dive was made, the bomb released and the recovery effected. The first dive bomber which suc-

cessfully carried a 1,000-pound bomb in a terminal-velocity dive was the Martin XT5M-1, which made its first flight on May 17, 1929. After that, the United States unfortunately did not follow up its own invention with the full concentration it merited until Germany had perfected the technique.

It is probable that by 1929, the possibility of dive bombing had occurred to others besides Glenn Martin. But I wonder how many had thought of it in 1914? In that prophecy which I have quoted, he had written:

"It is possible for one man, driving an aeroplane laden with high explosives, to dive like a plummet upon the bows of a great warship and destroy it."

As the thirties came in, military experts were busy discussing speed versus load capacity and it was generally conceded that a bomber must be a slow, lumbering affair in order to carry an effective load. This necessitated a considerable escort of fighter planes so as not to be at the mercy of pursuit ships. But in 1932, the Martin company produced an explosion in all this theory with its B-10, which flew 100 miles per hour faster than any bomber to date and considerably faster than all but a few pursuit planes despite its loaded weight of 17,000 pounds. This performance has been improved in the B-10's immediate successors, the B-10B and the 167, and reaches new peaks



Like a modern Jonah emerging from a flying whale, a workman crawls out of the tail of a B-26 awaiting its turn on the assembly line

# Here's My Story—Glenn L. Martin's Career, Shown Here in Photographs, Parallels Growth of Aviation



Around 1910, crowds gasped at Martin's "dare-devil" exhibition flights in rickety crates like this



His first plane factory was an abandoned church at Santa Ana, Calif., which he rented for \$12 a month

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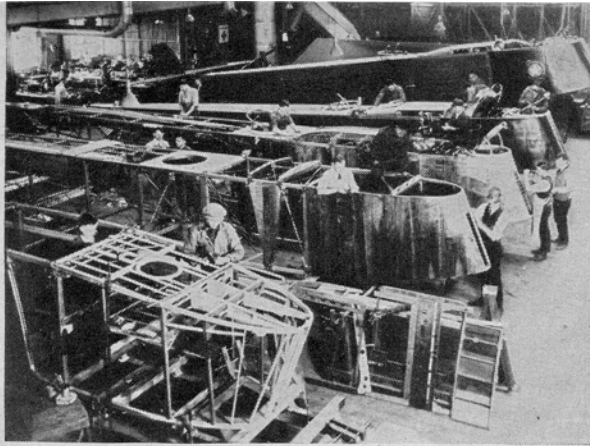
*For Heavens sake, if you have any influence with that Wild-eyed, Hallucinated, Visionary young man, call him off before he is killed. Have him devote his energies to Substantial, feasible and profitable pursuits, leaving Dreaming to the Professional Dreamers. H.H.S*

Flying was not considered sane in those days. The family doctor expressed his unqualified disapproval

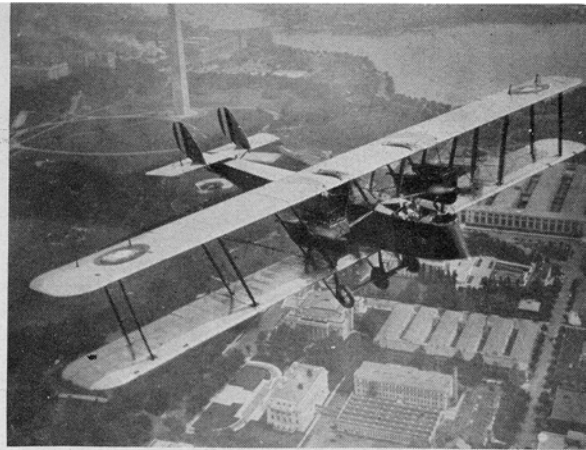
The first "newsboy of the air," he flew 100 papers from Fresno to Madera, Calif. (24 miles) in 1912

Three years later, he appeared in a movie with Mary Pickford, drawing \$700 a day for himself and plane

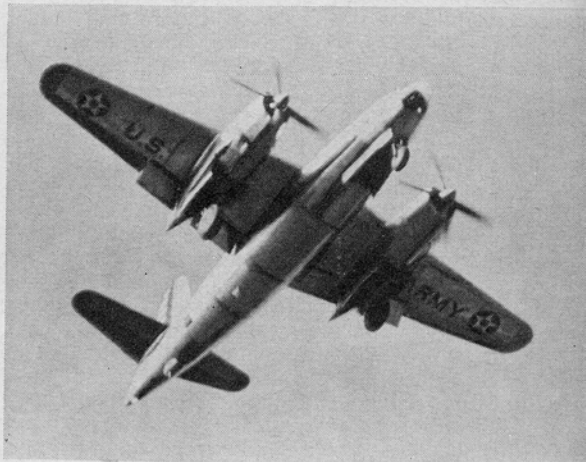
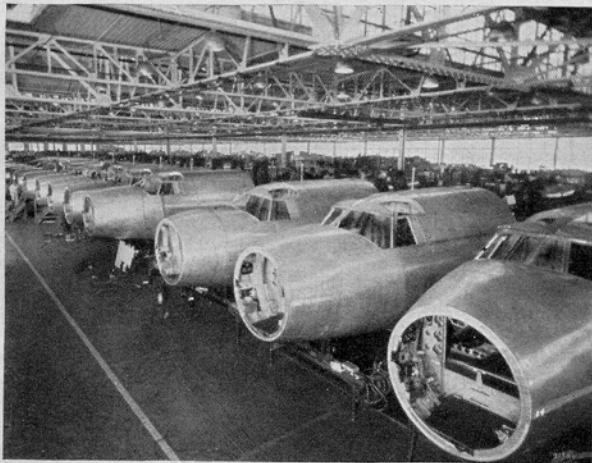




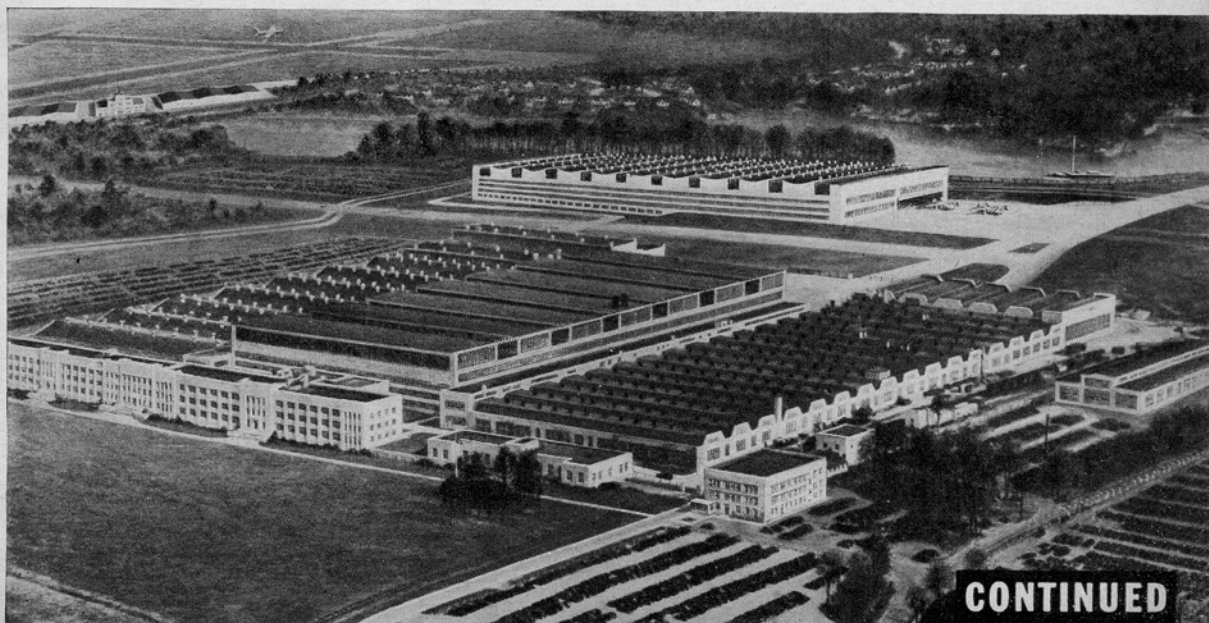
Manufacturing—then and now. Above are shown MB-2 bombers being assembled in 1918. In the view below, nose sections for B-26's are seen lined up in the modern Martin factory. Methods of production have changed as much as planes



... as you can see by comparing the MB-2 in flight above, with its modern descendant. The MB-2 was quite a ship in its day, however, with its two 400-horsepower Liberty motors and its armament of four machine guns and a cannon



Plant No. 1 of the Glenn L. Martin Company at Baltimore. With its forty acres of buildings it employs about 18,000 men working three shifts through a 24-hour day. There is another plant at Omaha, Neb.



**CONTINUED**

in the B-26 and 187 in present production.

To the public, which reads of these achievements, they seem like sudden brainstorms—flashes of inventive genius which come magically at the needed moment. But Glenn Martin does not work that way. His planning is steady and far ahead of demand. Just as, while he was making his first successful "daredevil" flights, he was dreaming of military aircraft, so he knew about the B-10 years before it came. It is well known at the Baltimore plant that the master plan of the B-26 for which the Army contracts now run into nine figures has been lying in the office for some ten years. So, perhaps, if you knew where to look, you could find the working drawings for the 250,000 pound, 80,000-pound bomb-load, 3,000 mile-range plane which is reported to be a Martin project. Martin won't talk about it, beyond the statement that it is a technical possibility. But this long-term planning is as characteristic of him as his silence. With it, he is able to give his engineers full opportunity for production tooling.

**S**PEAKING of tooling, "mass production" is a term which must be applied with caution to airplane manufacture. The plane does not lend itself to the "straight-line" moving-conveyor pattern of the automobile factory, where the chassis is the basic element and parts are successively attached to it. The structure of the plane requires that sub-assemblies shall move in more of a radial pattern toward a central point. This is not a wholly accurate description but it suggests the difference.

But mass-production methods are followed as fully as possible in sub-assemblies, and tooling has been carried far enough to bring great reduction in the comparative number of skilled workers in the Martin plants. Working drawings are made full size on the ship-loft principle, and photographed directly by a giant camera on the metal which is used for jigs and patterns. Every part which is turned out is completely interchangeable with every other similar part so that any wing can be fitted without change into any center fuselage section and so on through the assembly. Martin people boast that the B-26 had no prototype—no experimental hand-built model—but the first ship made was a production ship.

The Martin plants at Baltimore (Middle River) and Omaha are now fully engaged in the production of three types: the B-26, medium bomber for the U. S. Army; the B-187, ("Baltimore") medium bomber for the British and PBM-1, patrol bomber called a "flying boat" for the Navy. Production figures are forbidden (except in terms of dollars) as are the data on speed

and performance. Plans for the immediate future are wholly shrouded in silence.

But Glenn Martin talked more readily about the far future—the time when the emergency will be over.

"I do not see this slump people are talking about," he said. "Such progress in research, in increased efficiency of performance has taken place in the war period owing to the extreme pressure, that when it is over, there will have to be a complete replacement of existing aircraft throughout the world.

"Every government will have to remake its military air force. But in commercial aviation too, there will have to be replacement to adjust to the progress made in war performance."

In other words, the research into the carrying of bomb loads at great speeds has opened up, for instance, long vistas of possibility in the carrying of passenger or cargo loads. Forced fuel economies, maneuverability—a hundred other war necessities make possible immense advances in peacetime transportation. The ability of aircraft to stand up and maneuver under wartime attack and danger will greatly increase their peacetime safety. All these things will help the obsolescence of the present commercial planes.

But when I asked what directions commercial aviation would take after the war, I saw the curtain of silence begin to fall.

"My competitors would like to know what I think about that," he said with a smile. "But I can say this: I have about 18,000 men employed now at this plant. By the end of the year, I expect to have 42,000. But when the emergency is all over, I am confident that I shall still keep 18,000 as a starter for peacetime work."

**I** LEFT him then and went back to the 1914 prophecy. Then I made a prophecy of my own. Whatever his competitors may do, and however great the temptation of commercial aircraft, when the present emergency is over this strange genius will continue to concentrate primarily on the work to which the whole direction of his life has led him. He may digress as he did when he made the Pacific Clippers in 1935. But mainly he will stick to the job that his prophecy forecast—the job that has given this Government such confidence in the planes that bear his name.

He will follow the same dream that has beckoned him on since the days when flying was considered a sport for fools and when military men scoffed at the idea of planes being useful in a war. He will go on building bigger, faster, longer-range bombers.

Glenn Martin will stick to defense.