

# Martin Company History

When the Lockheed Martin – Denver library shut down in 2013, employee Josh Hopkins saved a 3-ring binder with photocopies of documents about Martin company history. In 2022 after several moves, the contents of the binder were scanned so that they could be shared more widely and to increase the odds that at least one copy might survive.

The contents are scanned here in the following files (separated to be a manageable size):

“Boxkites to Bombers, The Story of the Glenn L Martin Company,” a history book produced by the company around 1946.

“The Glenn L Martin Company: What it did for the growth of Baltimore” by Lisa Fallon, a report written by an employee for a class in 1985

A collection of magazine articles (including a Time Magazine cover story), advertisements, and a company list of all aircraft types and quantities produced.



A selection of Martin Star newsletter excerpts from 1942-1943.

Boxkites

To

Bombers

From: Martin Star

Vol. I, No. 1 February, 1942

Thru Vol. II, No. 8 September, 1943

# BOX KITES TO BOMBERS



## How Nation's Oldest Plane Firm Became Also One of Largest

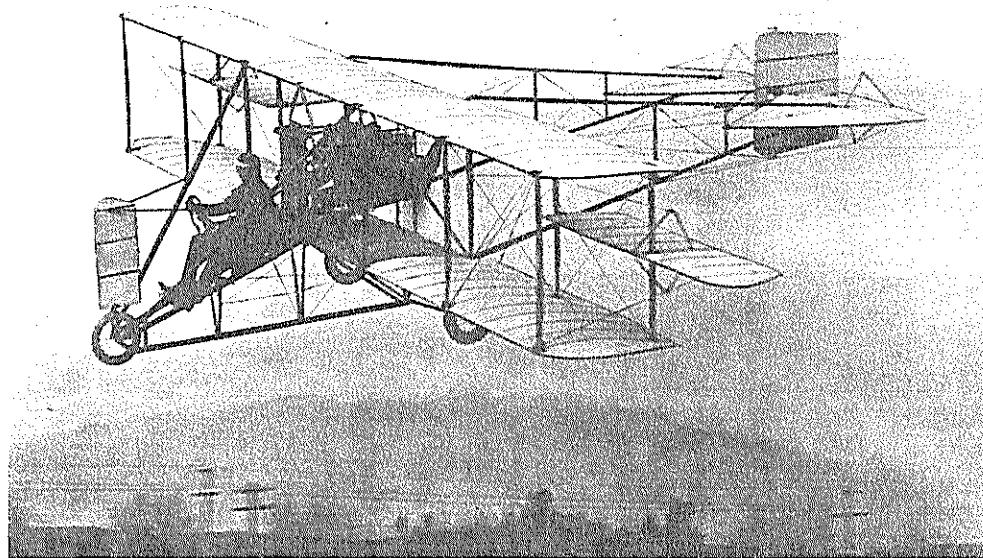
### INTRODUCTION

This is the story of a pioneer and the wavering little company he built into one of the most powerful industrial forces in the world—a keystone on which, today, rests much of the responsibility for the survival of civilization in a darkening world.

It is a poignant story that spans the 33-year interval between that day in 1909, when Glenn L. Martin wheeled a frail airplane from his first factory (an abandoned church!), and the turbulent present, with its titanic battles raging above the earth, its far-flung commerce speeding through the skies and its visions of a mighty world trade on the wings of future peace.

Those years saw a struggle against odds that at times seemed insuperable. It was a struggle against the laws of nature, with a terrible penalty for failure. It was a struggle against human emotions—superstition and fear. It was a struggle against old and reactionary institutions that saw only disaster higher than a man could jump. It was a struggle to reconcile three unfriendly old factors — lightness and strength and power.

Yet Glenn L. Martin and the Glenn L. Martin Company rode it out together. Long before the company broke fully into public consciousness, Martin as a personality had become widely known. He was one of the world's most famous aviators. He had taught himself to fly. He competed with the other greats—Lincoln Beachey, Glenn Curtiss, Farnum Fish, Howard Gill and the rest. He set world records. He flew the first air mail. He was among the first to demonstrate the practicability of air express. He did much to develop the parachute. He made the first



Glenn L. Martin preparing to land in one of his early airplanes.

extended over-ocean flight (which his China Clipper was to reenact 25 years later when it became the first over-ocean transport). The public didn't know it, but he threw the first bombs from an airplane in the Army's closely guarded bombing experiments in 1913.

Meanwhile, he poured his prize money back into the company and its little factories grew progressively until, during and shortly after World War I, it became a considerable enterprise and started on its way toward the mighty manufacturing unit it is today. Even before World War I, it had built the first multi-passenger airplane and, with its building of the Army's first training and bombing ship, had launched itself along triple lines as a manufacturer of military aircraft for the United States Army and Navy and for friendly nations.

The brilliance of Martin leadership in development was easily seen. Veritably, its evolution traces the major steps in progress of bombardment aircraft. The company built, among other ships, the best of early Army and Navy training planes. In the war period it built the first twin-engined bomber, which was standard of the Army for a decade—the original Martin bomber. It pioneered the night mail planes. It built the first all-metal seaplane, the first air-cooled-engine bomber, the first alloy steel fuselage, the first successful large plane for aircraft carriers. It brought forward successful torpedo-bombers, and then came through with the first practical dive-bomber, with which the Navy developed the technique which Hitler was to put to such dreadful purpose in the present war. It revolution-

ized military aircraft by producing a bomber 100 miles an hour faster than the fastest bomber of its day and actually as fast as most standard pursuit ships. On the commercial side, it pioneered over-ocean commercial air transport with the famous China Clipper and her sisters.

Such were the major steps, unadorned as yet with the adventure, the strong personalities, the discouragements, the unalterable determination that formed the backdrop of this industrial drama.

And through it all has come a commanding figure—Glenn L. Martin. It is interesting to note that the least perishable asset of any great industry is the name of its pioneer. True, the man himself may be forgotten, even while the multitudes pronounce his name as glibly as ever he did himself.

Some personalities brighten the pages of industrial history along with their names — Watt, McCormick, Franklin, Fulton, Bell, Morse. They are immortal, though they never saw their brain children grow to maturity. Others watched from the shadows of obscurity as their names were emblazoned—pioneers of automobiles, typewriters, engines, sewing machines and such.

A few (oh, so very few!) kept their hands on the controls, steered their names and their companies to the pinnacles of success—duPont, Edison, Ford. In this exclusive category belongs Glenn Martin, the young garage man who harnessed the winds in his youth, developed the fire of technical genius, and had the gumption to develop, as well, his flair for business administration and leadership.

Glenn L. Martin, the boy, champion kite-builder of the Kansas Prairies.

In the next issue will begin the dramatic story behind the history of the Glenn L. Martin Company.





Glenn L. Martin as a young man—he listened to the wind.

## How Prairie Winds Carried the Destiny of Glenn L. Martin

### CHAPTER I

The story of the early influences which ultimately brought into being the Glenn L. Martin Company and its mighty bombers and Clipper ships properly begins on the wind-swept prairies of Kansas where a little boy, bending his weight against the gales, marveled at their power.

How could he harness this force? How could he make it work for him? Child though he was, Glenn Luther Martin thought seriously about the problem. And harness the winds he did, to his undying fame—first with boyhood toys, but the seed was sown and from it grew one of the earlier airplanes to waver aloft behind the Wrights. And from it, in turn, were to evolve better winged craft and from these one of the largest (and now the oldest) aircraft firms in the United States.

Glenn L. Martin was born at Macksburg, Iowa, January 17, 1886, the son of Clarence Y. and Armintha DeLong Martin. When he was only two years old, his father, a hardware merchant looking for promising new fields, moved his family to the little town of Liberal, Kansas. It was far from being a luxurious settlement and little Glenn soon learned, as did most of the children there, to take responsibility.

It is not recorded what Liberal folk thought of the little fellow's manifest interest in the prairie winds. They themselves had learned practical value from

them. Every house had its creaking windmill, but inspiration stopped there. When the four-year-old tot rigged one of his mother's sheets on his little red express wagon and sailed to inglorious upset, the episode was worthy of no more than a good laugh. But from this experience Glenn Martin learned that the air was tricky—not to be trusted entirely. It was to be a valuable lesson. He attracted more envious attention when he sailed over the ice pond on skates, scudding effortlessly before the breeze. He even rigged a sail to his safety bicycle, with fair results.

But it was when he was six years old that this amazing boy gave the unseeing townfolk their first chance to glimpse an as-yet-unseen future; for in that year he tossed into the wind a strange biplane kite. All the prairie lads flew kites, but they were chiefly the old single-plane affairs that wagged rag-bow tails in the general direction of the horizon. Glenn Martin's kite sailed high, riding the zephyrs smoothly.

The effect among the Liberal youngsters was electric. They wanted to buy his kites. Very well, he would sell them—for a quarter. And thus began, in a corner of Mrs. Martin's kitchen, a thriving little airplane factory (only no one called these kites airplanes then).

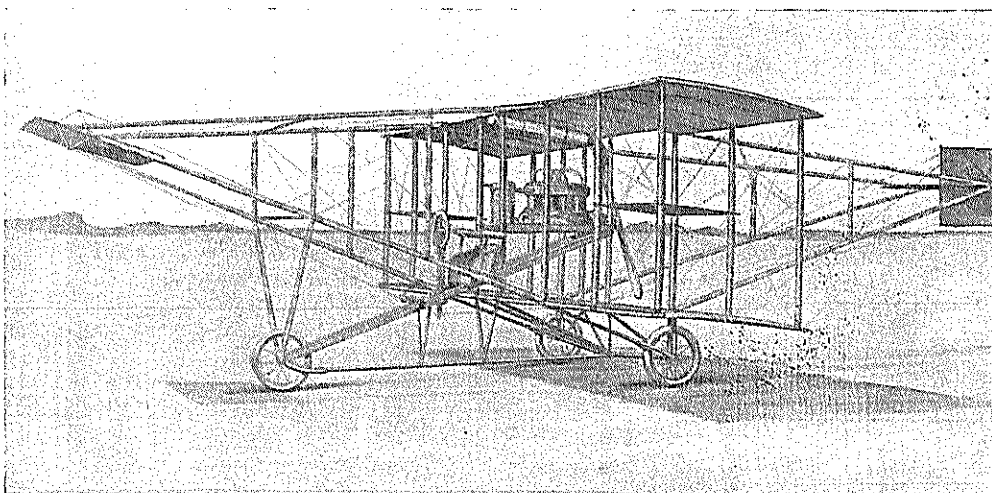
Glenn Martin had also shown an early appreciation of mechanical things—a very real factor in his future. His father—for years afterward an objector to his interest in flight—was pleased, even when the boy one day took the cultivator apart and made off with the wheels on some childish project. That interest in and ready knowledge of mechanics increased. When he was nine, the Martins moved to

the thriving little city of Salina, where Glenn went to school. While he was in high school, he got a job in a bicycle shop (the Wrights and Glenn Curtiss were bicycle mechanics, too, it is recalled), and when the automobile invaded Salina shortly after the turn of the century, the boy was consumed with interest and promptly got a job in David Methven's "garage" (a fancy word in those days). Thus he learned the secrets of the internal combustion engine—lore that was to serve him well in his career.

It was in Kansas that young Martin marked another principle that was to have its bearing on his future conquest of the air. As a boy he was a crack shot with his shotgun and he loved to hunt (even today, it is his favorite recreation). He studied with intense interest the flight of the birds he stalked. He marked well that the prairie chickens, with their wide, stubby wings, rose rapidly, but could fly only short distances and at fairly slow speed. The ducks, on the other hand, had short, tapered wings. They rose slowly, but once under way, flew rapidly and for prodigious distances. He watched the reactions of the birds to the wind, saw that they always took off up-wind and landed the same way.

Strange that all of these things should have pointed so surely to one who was to conquer the air; who was to fly, untutored, into those winds whose pranks he had studied, almost as if by plan. The lessons of mechanics, of aerodynamics, of man-guided power—they were to guide him and guard him from the perils that struck down those who knew them not.

In the next issue will be recounted the story of the first Martin airplane and the first Martin factory.



When Pioneer Martin drew plans for his first plane, it was one of his Kansas kites, much enlarged, with an engine in it.

# OX KITES TO BOMBERS



## Leads of Kitty Hawk... First Martin Plane A Kite With Motor

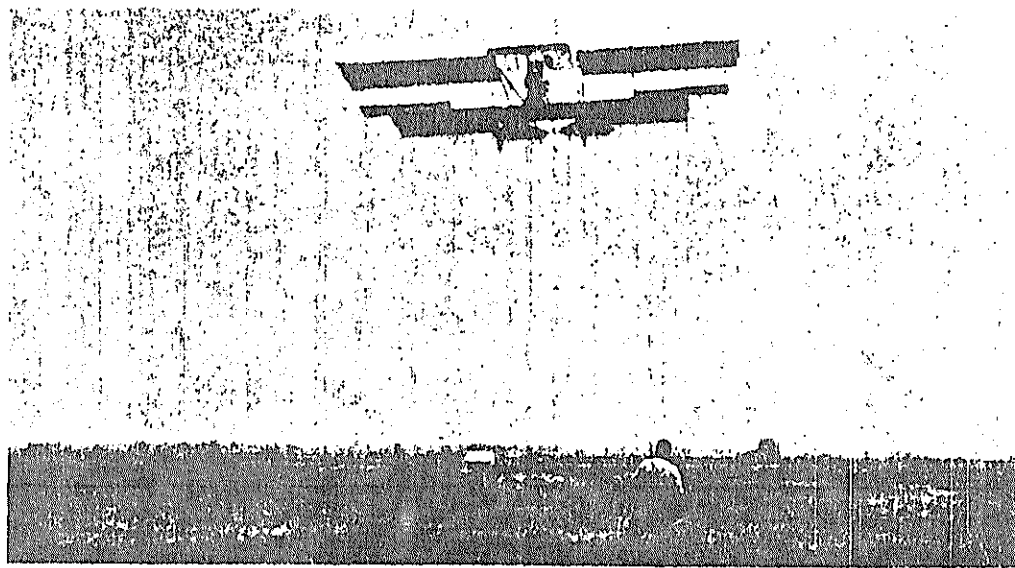
### CHAPTER II

One final piece that fitted precisely into the career of Glenn L. Martin was his business economics course at Kansas Wesleyan University while the Martin family was living at Salina. The lad was a born mechanic, and his summer-vacation jobs in David Methven's garage had convinced him that there was a future in horseless-carriages. There was not a cotter-pin on the smelly, noisy gas-buggies that he did not know; not a moving part that he did not understand.

It was characteristic of young Martin that he considered the necessity of learning how to conduct a business. It was to be his salvation. He would not join the brilliant technologists who, having wrested and bullied a new principle to the point of profitable use, had to stand aside while business brains took over. His flair for management was to make him a successful industrialist; his name would not be surrounded by hyphens nor lost in high-sounding amalgamations.

In the surge of interest in automobiles and internal-combustion engines, Glenn Martin had all but forgotten the old urge of the winds. Chased from memory were the stories his mother had read him of the Chanute and Lillenthal experiments, the kites and sails of Liberal, the behavior of the birds. But one day, early in 1905, they rushed back. Salina papers carried a story that two brothers named Wright had stayed aloft one minute and forty seconds at Kitty Hawk, N.C.

"I was tremendously excited," Mr. Martin recalls today, "more excited than



One of Glenn L. Martin's earliest flights—in a field at Santa Ana, Cal.

at anything I can remember. This was not aerial hopscotch—it was sustained flight, at last."

It was to his mother that young Martin hurried with the newspaper—the mother who had encouraged him in his kite-building ventures in her kitchen at Liberal.

"It's like one of my kites, with a motor in it," he explained to her. "They are using a big, light wood propeller to push the machine." The boy was becoming more excited. "I am going to fly, too," he blurted out.

"Of course you will!" Minta Martin rejoined, and today she explains it all with "I have always had confidence in Glenn." There is that old story of a dream Mrs. Martin had shortly before her son's birth—a dream of flying through the air. Preordination? Mother and son only smile, enigmatically.

It was later in 1905 that the Martins moved to Santa Ana, Cal., the head of the family to take a position with a hardware firm. Clarence Martin scoffed at his son's new interest in flight. He was to be a difficult convert.

Santa Anans looked with approval at young Glenn Martin. He bade fair to become one of their most successful citizens. Only 19, he worked for a time in a garage as a mechanic, and then he made his bid. He opened a garage of his own and secured a dealership for Ford and Maxwell cars. He was a good salesman, and soon he was netting around \$4,000 a year—extraordinary money for a small-town lad in those days. It seemed to kind neighbors that nothing could upset the equilibrium of this youth, even if he was wont to drive his cars a mite too fast.

Ah, but young Martin was leading a double life. The grip of flight was still upon him, and secretly he sketched bi-

plane designs—weird drawings of kites with wheels and motors. His mother was his only confidant. By 1907 the town folk heard disturbing rumors about him—rumors of big kite-like affairs in the Martin garage. There were stories of a shadowy figure, with silken wings spread, racing and skimming over Santa Ana's gentle knolls in the dim light of dawns.

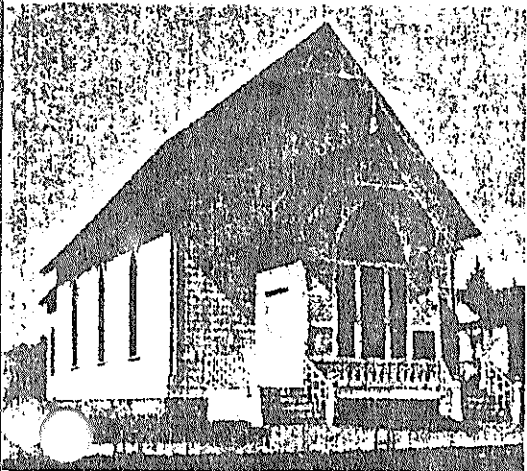
Glenn Martin did not know it, but the Wright brothers had also experimented with gliders before they arrived at powered flight. From such maneuvers one learned a bit of the behavior of wings in air currents. But the real reason for the gliders was that he lacked the cash for an engine.

Still more disturbing were the rumors of 1908, when the old Southern Methodist Church, which had been abandoned for a prouder edifice, inexplicably lost its vestibule in favor of a wide door, and its windows glowed an opaque white from lamp-light each night. Into the church after dinner would go Glenn Martin and his mother, to emerge late and turn tired steps homeward.

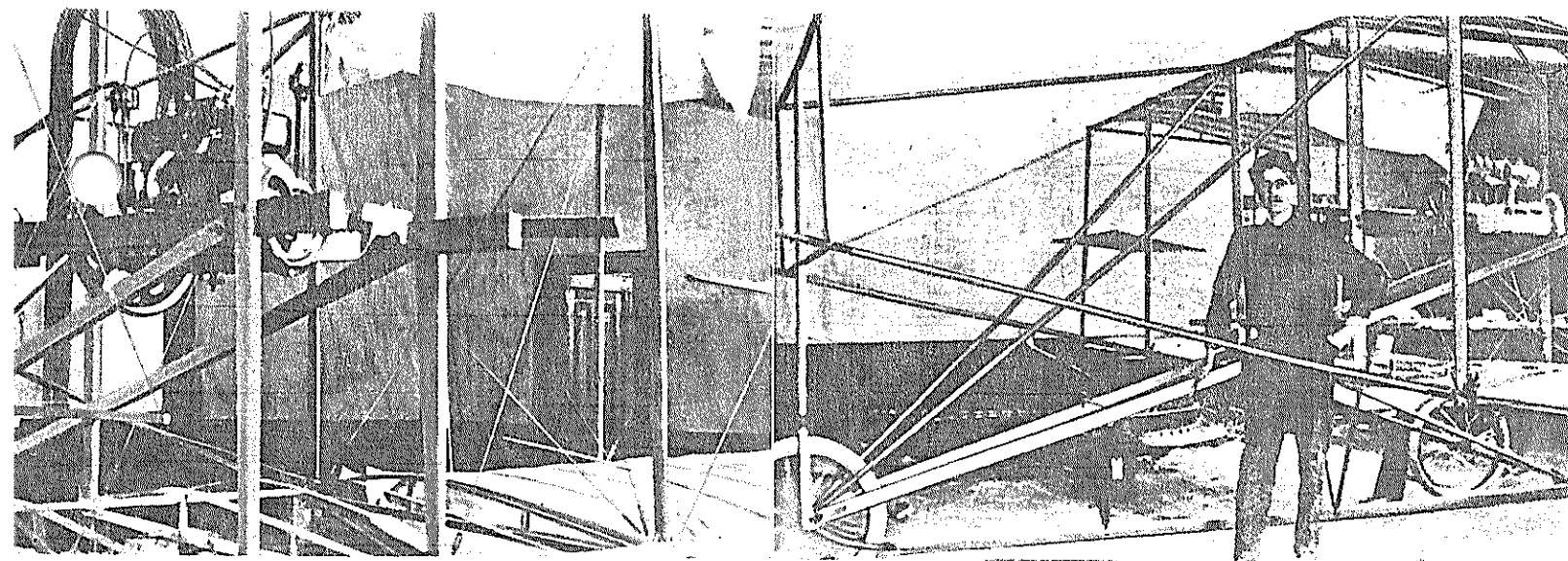
Properly, that old church was the first Martin factory, for inside it was taking form a frail little airplane of bamboo and silk and gossamer wires. Amidships was a Ford four-cylinder, 12-horsepower engine and behind that a long, hand whittled airscrew.

Here, then, was the progenitor of a proud line—a delineation that arrives, after thirty-three years, at mighty monsters bearing destruction toward the enemies of civilization, and a stupendous ship with wings which, in turn, presages navies and argosies of the air.

The next chapter will follow Glenn L. Martin into the air and mark the beginning of the Glenn L. Martin Company.



First factory—a church. Here the first Martin plane was built.



FROM OUT OF THE PAST. When Glenn L. Martin recently opened a letter and from it tumbled two ancient photographs, there ended a search which has lasted for years—for they were pictures of the first Martin airplane taken inside the tiny church at Santa Monica. The pictures, which are reproduced above, were sent by Harold Hendrickson, now in the laboratory tool room of the Spencer Thermostat Company, Attleboro, Mass., who worked for Mr. Martin in the building of the ancient ship and is, as a matter of fact, the figure in the right-hand picture. These are the only known photographs of the plane taken in the interior of the church.

## A "Must" Delivered

(Continued from Page 5)

weapons have been extremely effective at very high altitudes, where the slightest physical effort causes exaggerated fatigue. Thus, enemy pursuit pilots find themselves running into a stream of heavy-calibre fire, regardless of altitude or direction of approach.

Martin's rise in the power-operated turret field has been vertical and swift. The original concept of a turret, far back before the present war, was a manually-operated 30-calibre machine gun within a transparent enclosure on the deck. The gunner was to stand on the floor and walk about under his gun as he manually rotated it from side to side or moved it up and down. He was expected to overcome by physical strength the pressure of high-speed air on the gun barrel.

Before manufacture of this early turret could be begun, the design was changed to have two 30-calibre guns, working as a unit, replace the one 30-calibre gun.

Meanwhile Europe had gone to war. Reports from the front caused our Army to call for larger calibre weapons. It was indicated that the solution would be in a turret housing one 50-calibre gun. It was to be power-operated in azimuth, thus balancing at least part of the air resistance. The gun was still to be elevated and depressed manually.

When Lieut. Gen. H. H. Arnold, Chief of the Army Air Forces, issued his famous "must" list in the Spring of 1940, two top items were power-operated turrets and self-sealing fuel tanks. Martin's pioneering in both fields placed it in the position of having both items figuratively at the door. The Navy already had the country's first power-operated turret on the Martin PBM-1—a hydraulic device mounting a rapidly firing gun. The Com-

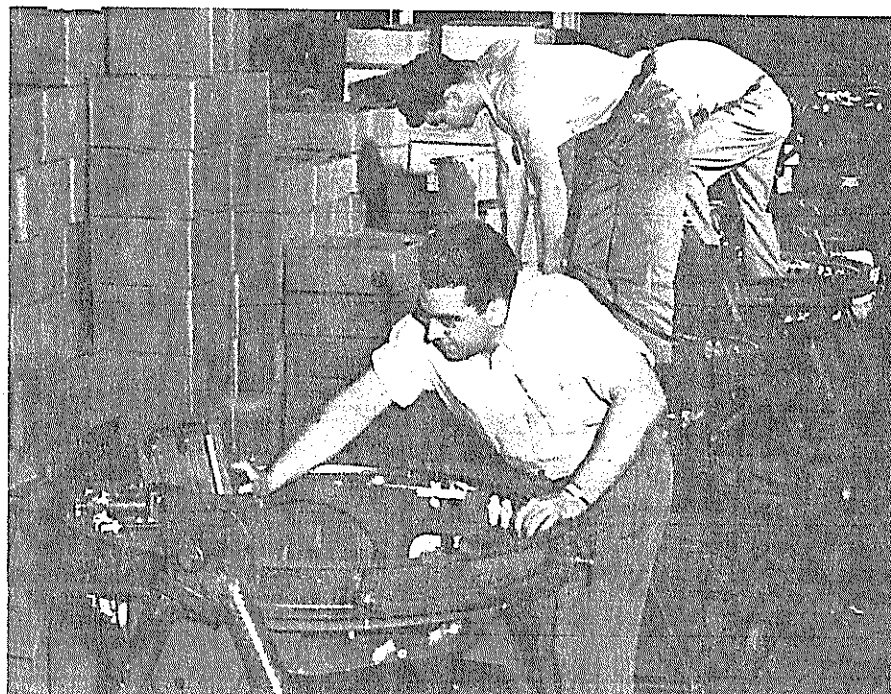
pany added to its contribution by creating the Army's first power-operated turret. It contained two 50-calibre guns operated both horizontally and vertically by electricity, a seat for the gunner, continuous ammunition supply, and armor plating to protect the gunner from enemy fire.

MEANWHILE, Martin engineers were on the job of turning out the hundreds of production drawings necessary to put the turrets into high speed factory production. During this phase several novel features were designed and introduced. One was the casting of the inner ring as a single piece weighing 75 pounds. Another was the one-piece casting of the "chassis" of the turret.

An important feature of these turrets, next to their effectiveness in battle, is the speed with which their simplified design allows them to be assembled. The assembly fixture or jig moves slowly along a pair of channels in the factory floor, drawing behind it a line of similar fixtures, thus resembling a slowly moving train of railroad flat cars. As each fixture comes to a given station, the crew of that station steps aboard and performs its function, steps off at the end of the station, and walks back to board the fixture just arriving.

At the end of the line guns are placed in the turret and it is tested by being run through its paces. The turret then gets its coat of war paint, is crated and shipped to the point where it will be installed on the plane.

On a moving assembly line the turrets rapidly take form.





## The First Plane And First Plant of Martin Company

### CHAPTER III

One who stands in the giant assembly halls of the Glenn L. Martin Company and looks back over thirty-four years to the first Martin factory may well smile. Buildings designed to assemble the colossal flying vessels of the future could swallow as a tidbit the old Southern Methodist Church of Santa Ana, Cal.

Yet when Glenn Martin rented the little edifice in 1908, he did so because it was the only unobstructed floor-space the town afforded. It had no pillars, and there was ample space for the frail airplane that grew within as the young garage mechanic toiled late at night, his mother holding an oil lamp so that the gleam might fall just right.

The ancient and honorable term of "kite" for airplanes was not without foundation. The first Martin craft was definitely a kite in fundamental design—fashioned after the biplane wonders the lad had sailed over the Kansas plains. But in stress arrangement it was a bridge. There was no engineering data on airplanes, of course, but Santa Ana bookshelves did contain bridge drawings. So Martin turned them upside-down and adapted them for structural bracing.

He used fine spruce for the central structure and wing-supports. The tail booms and outriggers were of selected bamboo. The skin was of muslin. He lightened as much as possible the Ford four-cylinder twelve-horsepower engine, paring it of all but essentials and using a copper crankcase, instead of the heavy cast-iron one. He whittled a propeller from hickory and Oregon pine, balanced it perfectly. Thirteen months had passed. Three thousand dollars had been spent. Hard-earned money, that! There was not much butter on Martin's bread, for every



PRODUCTION LINE, 1911 VERSION. Two airplanes on the floor all at one time! The Glenn L. Martin Company soon outgrew the little church, moved into an abandoned cannery at Santa Ana.

cent that could be reserved went into this experiment.

Santa Anans were mercifully spared the shock of emergence of the apparition. In the dead of night the widened doors of the old church opened and the biplane was wheeled forth. A car from the Martin garage took it in tow and quietly, cautiously the odd procession of car, plane, Martin and a couple of his mechanics moved to a pasture at the edge of town.

In the first flush of the rising sun of August 1, 1909, Glenn Martin swung his craft into the face of a light wind and climbed into the seat. A mechanic twirled the pusher propeller gingerly. The engine coughed croupily and settled to a roar.

With set jaws Martin opened his throttle wide. The ship waddled forward, lurched in a cross-gust and straightened away, gaining speed. The nose-wheel of the tricycle landing gear lifted slightly as the pilot raised his elevators, trying to pull his craft off. But just as he was about to despair, there was a hop and a lift. He was off the ground!

Glenn Martin did not soar away into the blue on this pioneer flight. He rose only a few feet, skimmed only a hundred or so and promptly landed. He had flown, and now he had to learn how to fly. There was no one to teach him. So, wisely, he took his time. In the light of many another dawn he skimmed the weed-tops, stretching his flights little by little. Then, one morning, he cleared a fence at the end of his field and landed in the next pasture. The ship was sluggish.

"I must have another engine," he told himself. Weight had been little of an object in gasoline motors of that day. Carefully he examined all available power-plants and finally chose a three-cylinder Eld-

ridge marine engine. He was delighted. With little additional weight he could squeeze thirty horsepower out of it.

In almost no time Martin was in full flight. No longer was he skimming fences. Gradually he worked up until he was hundreds of feet in the air, banking and turning. And townsfolk who had jeered his idea of flight now clamored at his parents to curb him. The family physician, Dr. Sutherland, penned a picturesque protest. Fellow members of the church were severe with Mrs. Martin. Their Presbyterian theory of predestination went only so far, they argued. This was flying in the face of Providence. Mrs. Martin only smiled. Her boy was all right, she insisted.

Soon the airplane was returning to Martin some of the money he had spent. People paid to see him fly. From Los Angeles they came by auto, train and buggy to see the wonder. His fame spread. Soon he was hopping to nearby towns for exhibitions. Others aspired to flight, a few commissioned him to build planes.

The little Methodist Church would no longer suffice. The Glenn L. Martin Company moved to larger quarters—an abandoned cannery at Santa Ana. Here was a real factory. There were even two airplanes on the assembly floor at one time!

And to keep the struggling little enterprise going, Glenn Martin planned his course. He would not yet solicit private capital. He would extend his exhibition activities, pour his money back into the business.

The Glenn L. Martin Company was on its way.

How Glenn Martin became a world-famous aviator and advanced the little Glenn L. Martin Company will be told in the next issue.

*copy 20-10*  
For Heaven's sake, if you have any influence with that stupid eyld, 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 Wanderer. H.H.S.

Dr. Sutherland's famous message to Glenn Martin's parents.



# BOX KITES TO BOMBERS

## Prize Monies Kept Martin Firm Afloat... The Catalina Flight

### CHAPTER IV

The little Glenn L. Martin Company back in Santa Ana focused anxious eyes on its chief during the early exhibition days. When his name hit the headlines, all was well, for it meant money in the till, payrolls for employes and more materials for the new planes.

Yet there were times, before Glenn Martin ranged far to the east, when prize money was scarce. Charlie Day, the company's first chief engineer and more recently an aircraft manufacturer for the Chinese Government and now a technical adviser to the Canadian Government, recalls those times when he would approach his chief in extremity.

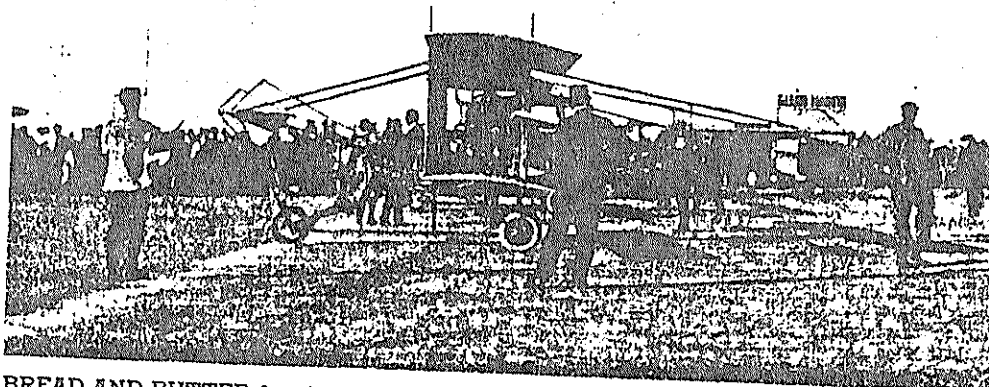
"We can't pay off the men, Glenn," he would say.

Martin would frown, search through his pockets pessimistically and head for the garage. Usually, Day remembers, he would turn up next day with the cash for his abilities as an automobile salesman generally wound up with some Santa Ana owning a chugging horseless carriage and Martin a bit of margin against the next prize money.

The Los Angeles area was fairly lucrative for the aviator. The Panama California Exposition yielded a tidy sum. San Francisco paid him \$2,000 for carrying a message by air from its mayor to the mayor of Oakland across the Bay. A two-month trip eastward, from Texas to Kansas and Iowa, brought \$12,000. He broke world records, then broke them again. He competed against such leading aeronauts as Glenn Curtiss, Lincoln Beachey, Howard Gill, the Baltimorean, Bud Mars, Phil Parmelee and Cliff Turpin, and he more than held his own. On August 9, 1911, he qualified for his international pilot's license, and the Aero Club of America awarded him Expert Pilot's License No. 2. Soon he was flying in the big centers of the eastern seaboard.

It was "easy come, easy go" for most of the stunting fraternity. But not Glenn Martin. He still clung to the quaint notion that there was a market for airplanes. There was, within limits. Wealthy young bloods of the day found the air more attractive for risking their necks than polo ponies. Other youngsters, entranced by the new sport, came to work in the Martin Company shops and poured their earnings and spare monies into the airplanes they helped build.

In 1912 the Martin Company was removed from the Santa Ana cannery to Los



**BREAD AND BUTTER** for the struggling Glenn L. Martin Company was won by its chief by exhibition flights and air races. Above: On the line.

Angeles, at Tenth and Los Angeles Streets. Commodious quarters, these. Their support demanded even greater hippodrome efforts by the "Flying Dude," as the fair-ground crowds had already learned to call Martin. He affected a flying costume of black leather coat, black helmet and goggles and whipcord breeches, where most of his competitors still wore the nondescript clothing and reversed checkered caps of the motordromes. Movie stars paid handsomely for their first rides. Martin took Valeska Surratt aloft. Nell Brinkley gushed over her excursion to the clouds. Famous Players paid him \$700 a day for himself and plane when he played opposite Mary Pickford in "The Girl of Yesterday." He carried an intrepid cameraman up for some of the earliest air movies—a difficult feat for aviator and airplane, for cameras then weighed about as much as their operators. He threw a baseball into a catcher's mitt; dropped flowers into the lap of a May queen.

May 10, 1912, will ever remain a marked page in aviation history. It was on that date (whose thirtieth anniversary was passed last month) that Glenn Martin made the first considerable over-ocean flight—from Newport Bay to Avalon, on Catalina Island. Thirty-four miles away, Catalina was a speck on the Pacific horizon, yet the aviator made it in thirty-seven minutes and then turned around and flew back.

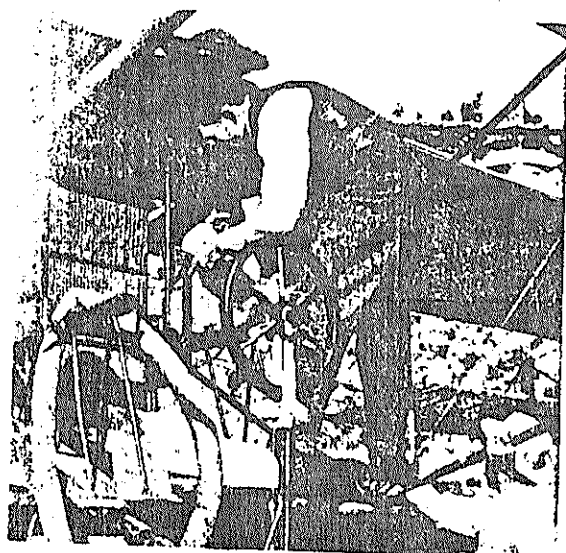
Martin had long since experimented successfully with water aircraft, had launched a plane through the Pacific surf and had mastered the tricky art of landing and taking off on protected waters. He had even demonstrated that he could pick up a man from a motor boat in open water.

It was a tense crowd that waited on the beach at Balboa that day. Many thought

the attempt was suicidal. There were low-hanging clouds. Less tense than most was a slim, smiling woman whom aviation had already learned to know and admire—Mrs. Minta Martin. Her son had said the voyage was feasible; that was enough for her, even though her husband, Clarence Y. Martin, was patently disturbed. Roy Knabenshue, Martin's exhibition manager, and Charlie Day busied themselves with last-minute preparations. When all was in readiness, the pilot climbed into the fresh-air seat, strapped a barometer to one knee and a compass to the other. Around his shoulders he hung an inflated bicycle inner-tube for a life preserver.

The frail little craft scudded over the water and lifted smoothly into the air. In

*Continued on page 18*



**OVEROCEAN.** Glenn Martin gasses up (with a pitcher!) for return from historic flight to Catalina Island. The inner-tube was his life-preserver. He didn't



# New Women Engineers

A mere drop in the bucket, so far as the total number of engineers employed at the Martin plant is concerned, are the thirty-odd women now engaged in exacting engineering work on Martin bombers.

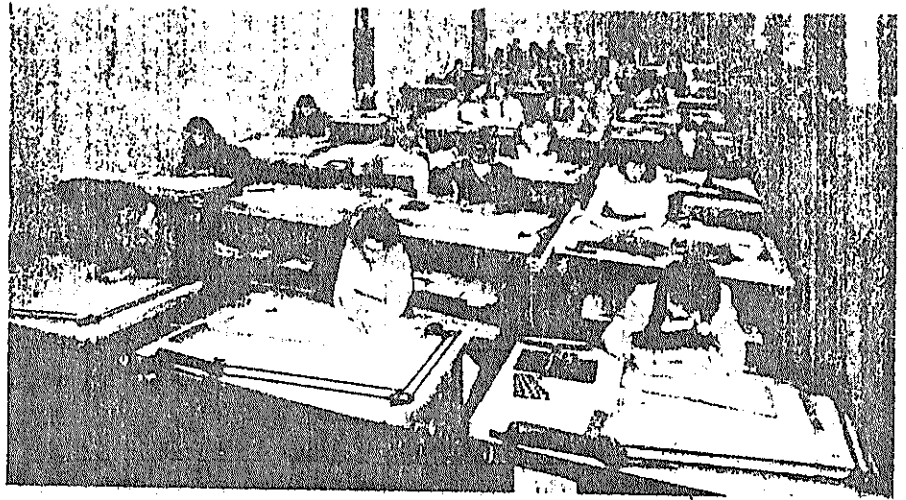
Pioneer of the group is Mary Elizabeth Miller, a graduate in Chemical Engineering of the University of Maryland. Miss Miller's job is to aid in the development of and to test the various types of finishes for Martin planes. Another important phase of materials engineering is work in synthetic rubbers. Jane Hutson, a comparative newcomer to the plant, is actively engaged in this work.

Two other young women, Frances Dodge and Elizabeth Summers, are doing full stints as chemists.

G. T. Willey, Executive Engineer, is liberal in his estimate of the work being done by the women under his supervision. In the past, Mr. Willey points out, the T-square and triangle and test tube were considered primarily in the realm of men's occupations.

Among the jobs women engineers are doing are detail drafting on aircraft structures, computing and tabulating weights, writing engineering releases, making mathematical analyses for vibration and aerodynamic studies and running chemical and physical analyses.

Before entering into actual service in the Engineering Department, the women are required to take a three-months course in aircraft fundamentals and Martin methods at the Glenn L. Martin Engineering Training School. Here they learn how the Martin engineering system works and how to handle the tools of the



Some of Martin women engineers at work.

trade. During the training period, they are paid full-scale salary and are required to attend classes for eight hours a day.

The Martin Company is keeping a sharp lookout for more women engineering workers.

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## BOX KITES

*Continued from page 14*

a few moments it was lost in the clouds, and the aviator was "on instruments," depending on his compass to guide him and his barometer to tell him his altitude. It was an early instrument flight.

A wildly-cheering group of Catalinians received the aeronaut as his biplane swooped down to touch its single pontoon lightly in the shadows of Avalon's hills. But they were too enthusiastic. Eager hands grasped the bamboo outriggers and beached the plane so vigorously on the pebbles that the thin shell of the pontoon

was ruptured. A crude patch was made and, with many misgivings, Martin turned into the wind for his take-off.

"Just as I got off I felt the patch let go," Mr. Martin recalls. "I knew I was in for it then. So I followed the steamer lane, realizing that I would have a better chance of being picked up if I had to land."

There is a story about his landing at Balboa. Martin had turned over a highly-prized watch to Charlie Day just before his first take-off, "just in case I decide to go swimming." When the biplane returned to the spot, the excited crowd failed to observe the damaged pontoon, and when Martin stalled in perilously close to the shore for his landing so that he might be in shallow water, the ship began to sink immediately. Valiantly Day dived and began to swim frantically toward the gesticulating Martin. When he reached the craft, its lower wing was barely awash and the pontoon was on bottom. Martin was looking at him reproachfully.

"Charlie! What have you done with my watch?" he groaned.

Glenn Martin expanded to newshawks on the new possibilities of ocean patrol. He foresaw a new observation platform for the Navy high in the clouds—a platform which would extend the horizon and serve as a spotter's perch for gunfire.

What he could not see was that twenty-five years later to the day he would return triumphantly to Catalina in a monster airplane of his own company's making—the Martin China Clipper, first airplane to enter transoceanic commercial service, traveling over the 8,000-mile Pacific with the greatest of ease. And on that later day, the slim woman, gray-haired now but smiling still, did not stand on the beach at Balboa. She sat in a luxurious seat aboard the airliner.

The United States Army's first bombing experiments and how the Glenn L. Martin Company began its long development as the leading manufacturer of military and naval aircraft will be described in the next issue.



Pioneer Airplane Builder Glenn L. Martin was the guest recently of Pioneer Auto Builder Henry Ford. Pictured above during Mr. Martin's visit to the Ford Willow Run plant are, from left to right, Mr. Ford, Industrial Architect Albert Kahn, who designed both Martin and Ford plants, Mr. Martin and Charles E. Sorensen, Ford Vice-President in charge of production.



# BOX KITES TO BOMBERS

## How Glenn Martin Opened New Vista of War With Bombs

### CHAPTER V

It took courage and an incurable optimism to win through those early days of aviation. The best prospects the Glenn L. Martin Company had in 1912 would hardly have been considered a good business risk by even the most liberal banker. Insurance underwriters paled at the very thought of policyholders even so much as sitting in one of the contraptions; indeed, a ride in one was sufficient grounds for cancellation. Safety seemed remote.

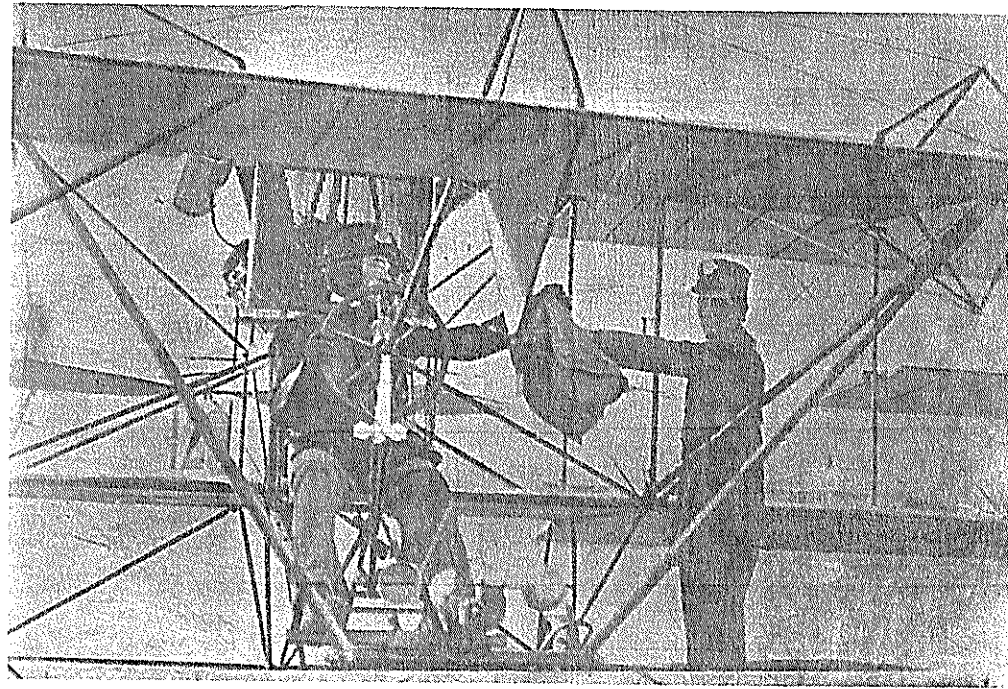
Still, Glenn Martin hoped and worked. The airplane, he held, was safe (he smiles at this confident assertion today). Some day people would ride in them as confidently as they did in automobiles—which was none too confidently, even then, if the truth be known. Moreover, young Martin was obsessed with the idea that the man-made wings had military value. From his lofty position in the clouds he could see vast distances—far greater, for example, than the distance of artillery fire.

And that was not all. What was to prevent him from throwing explosives from his flying machine? After all, was he not carrying passengers aloft? Were not the Martin ships bearing heavier and heavier loads with each new model? Experimentally, the pilot dropped dummy bombs on isolated spots, rigged rough cross-hairs for a bomb-sight and improved his aim with practice. But he could not go around dropping live bombs into pastures.

It was not yet that Glenn Martin was to become the first man in America to drop real military bombs from an airplane. That was a year away, but already he was sounding out the United States Army on the idea. He got an interested ear. However, such a revolutionary development needed study.

Meanwhile, out of these solitary experiments came a grand idea for the lucrative exhibition stunts. Into the ears of Lincoln Beachey and Howard Gill he poured the scheme. They were enthralled.

So it is that the age-yellowed files of the *Los Angeles Tribune* contains an anachronism of history. It records in page one headlines and photograph the lurid story of the night bombing of a mock fort near the city on January 25, 1912, by the intrepid aviators, Glenn Martin and Lincoln Beachey (Gill's machine balked that night and he could not get off the ground). Martin, the story proclaimed, scored three hits out of four attempts, and Beachey four out of six. Searchlights



EARLY MAIL FLIGHT—Glenn Martin off from Dominguez to Compton with sack.

from warships in the harbor pierced the skies and the rattle of blank cartridges from infantry rifles challenged the aerial intruders as they lunged through the darkness, visible by Martin's red flares, Beachey's acetylene white lights and the occasional glare of the searchlights as they picked up the planes. The din of the bombs was terrific and soon the wooden "fort" was in flames. The great crowd thrilled to its toenails and gasped at the dreadful significance of this new wrinkle in the grim visage of war.

Today iron-gray Glenn Martin laughs a bit at the old clipping.

"Hippodrome stuff," he admits. "We wouldn't have dared drop live bombs that close to such a crowd. Our missiles were loosely-sewn sacks of flour. The rest of it was done by electricity, setting off black powder and flares inside the fort. But the gate receipts were gratifying and the demonstration did serve to attract a lot

of attention to the possibilities of aerial bombardment, which was what I wanted."

The Army was already interested in the Martin planes. Back in the Los Angeles factory there was abuilding the first training and bombing airplane of the United States armed forces. It was to be the progenitor of a long line of notable military and naval aircraft—a line that stretches down to the present day.

Glenn Martin was still on the exhibition circuit. He staged coyote hunts from the air; helped in the first aerial manhunt, chasing two desperados up a California canyon (they got away); he was selected in 1912 to defend the James Gordon Bennett Cup for America at Cicero, Ill., and walked off with the lion's share of the prize money. He flew a sack of air mail from Dominguez, California, to Compton in record time (one of the first air mail flights) and blazed a trail of air express by

*Continued on page 18*



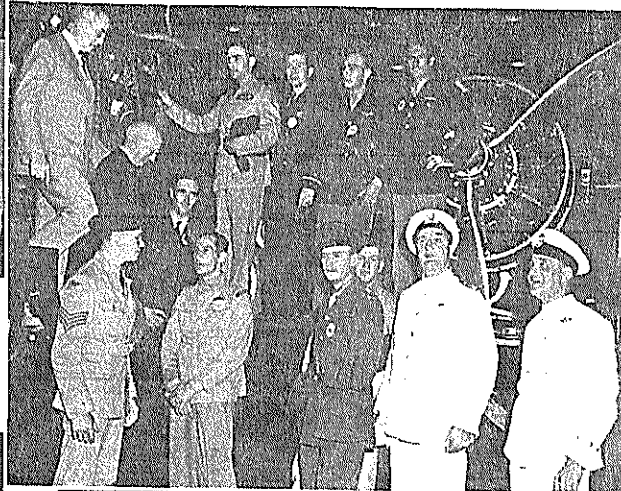
FAMOUS MODEL TT—The Army's first training plane.

# WE HAD WITH US YESTERDAY ★

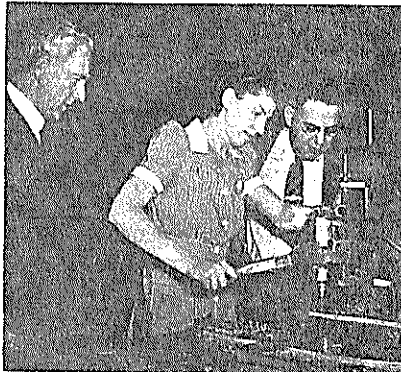


John Humpstone, Contract Administration, and British Wing Commanders Lord Forbes and Gordon Finlayson, look to the air for Victory.

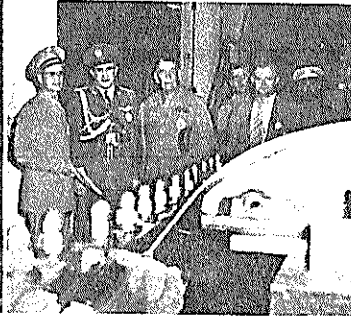
American and British war heroes inspect newest tools of their profession with Glenn L. Martin as host. "Saw ships, liked same," paraphrased famous author of "Saw sub, sank same," as the group left to open the War Show at Baltimore Stadium.



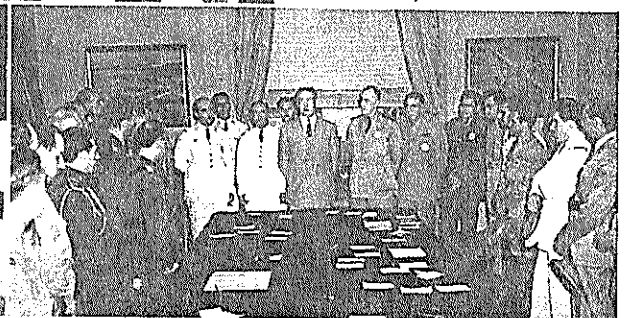
W. E. Wood of British Technical Staff (left) explains Martin Baltimore to Flt. Lt. Graeme Nicholl of British Ministry of Economic Warfare.



Sir Walter Citrine, of British Privy Council and Ministry of War Production (left), is deeply interested in Personnel Director Siemon's explanation of Martin women's efficiency.



Conducted Tour. J. C. Scott, Superintendent of Plant 2, gives Generals Winship (U.S.A.) and Toro (Bolivia) an idea of what's cooking for the Axis.



Official greetings. Mr. Martin addresses members of the Inter-American Defense Board on their first visit to a war plant. He assured them we will furnish the tools for hemisphere defense and victory.

## HOST TO THE HEMISPHERE

Military leaders from all twenty-one republics of this hemisphere, comprising the Inter-American Defense Board planning in Washington the defense of the Americas, visited on June 12 the great aircraft plant of The Glenn L. Martin Company at Middle River. This was their first sight of defense workers in action, and Mr. Martin, in greeting them, assured them they were "by far the most important delegation that has ever honored us with such a visit."

"We are particularly anxious at this time," he went on, "that you have an opportunity to see what we are doing, as we are 100 per cent for the defense of the Americas."

The officers, colorful in the uniforms and insignia of our sister republics, first attended an informal luncheon tendered them by Mr. Martin, after which he and ranking executives led them on a tour of inspection of the plants.

Fifty-nine officers made the tour. Ranking members of the party were Gen. David Toro, of Bolivia, Vice-Admiral Alfred W. Johnson, U.S.N., Major Gen. Blanton Winship, U.S.A., and Col. Juan Jones-Parra, of Venezuela.

"I marvel at the great effort being carried out for the purpose of achieving the program of the United Nations," General Toro observed. "The effort is so great that no one should have a doubt that it will lead to victory."

The immensity of the plant operation astounded Col. Juan Jones-Parra.

"The organization of men, machinery and buildings to produce the final product along such gigantic lines," he declared, "makes certain that the air power of the United States and her Allies will likely exceed all expectations in a short time."

Vice-Admiral Alfred M. Johnson, speaking for the Board as a whole, thanked Mr. Martin for the opportunity of seeing such overpowering evidence of production.

"Such plants," he said, "are the best guarantee the hemisphere could have against the enemy."

## BOX KITES

*Continued from page 16*

carrying a bundle of Fresno *Republican* newspapers to Madera, 24 miles away.

It was in 1913 that the Glenn L. Martin Company delivered to the Army the first of the famous Model TT trainers. It was an advanced ship indeed—a biplane with an enclosed fuselage and open cockpits, with dual controls. The pusher propeller had been abandoned for a tractor blade and the engine was in the nose.

It was from this ship that Glenn Martin conducted the Army's first bombardment experiments at San Diego in 1913—tests that were kept secret for a long time. There was no air arm of the Army at that time, so it was the Ordnance Department which sent an officer across the continent to see the effect of Martin's bombs.

Martin did not know it, but he was opening a Pandora's Box whose fury was to change the whole course of warfare.

Details of the bombing experiments and the evolution of the first multi-passenger airplane will be contained in the next issue.

## Martin's Bomber Showed Army the Future --- in 1913

### CHAPTER VI

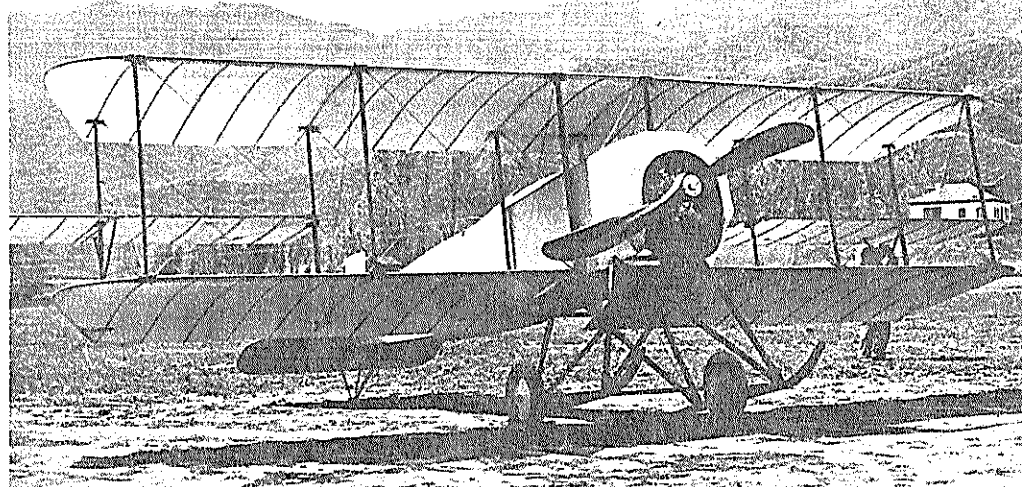
An official War Department letter, which he opened in his Los Angeles office on a warm day in 1913, broke the accustomed calm of Glenn Martin. The United States Army, he read, intended to conduct experiments in aerial bombardment and he was invited to help with the tests. Officers of the Ordnance Department and Signal Corps had been detailed to conduct the demonstration and observe the effects.

Here was vindication! After a year of bomb-throwing and hippodroming, he was to see his contentions officially proven. He replied with alacrity, and was promptly ordered to report to San Diego.

At the North Island military base Martin met the two Signal Corps officers assigned to help him—Lieutenants Scott and Goodyear. An Ordnance colonel, they told him, was coming from the East to observe. One of the four Martin TT's, the Army's first training planes which his company had recently delivered, was assigned for the work.

It was Lieutenant Scott who worked out the first Army bombsight, built especially for the tests. It was a crude affair—a set of cross-hairs in a tube—but it had an excellent technical foundation, with proper regard for altitude, speed and gravity.

All was in readiness when the Ordnance colonel arrived. It was his business, he told them, to study the effects of the bomb impacts and fragmentation and to determine the potential damage of the explosives. The site for the target had been



A delivery to the Army in 1913

selected—a lonely spot on the reservation, where a misdirected missile could do no damage—and here the colonel had a bombproof built—a fairly deep trench with earthworks on one side.

"I shall stand in the trench and you will drop your bombs behind the earthworks," he ordered. "I can watch the fragments fall in front of me and we will study the effects of the impacts and explosions afterward."

Reasonable enough. Lieutenants Scott and Goodyear piled into the TT with Martin; the colonel jumped into his bombproof. Soon the biplane was making its run-up and the first bombs were released from racks under the wings. They fell far behind the bombproof and there was a heavy explosion. The plane circled and made for the spot a second time. Martin's eyes were glued to the bombsight.

"Release!" he commanded, and again

missiles whistled earthward, to strike near the spot where the first ones had hit.

The colonel was plainly irritated as he approached the trio after the landing.

"They were too far away," he complained. "How do you expect me to watch the fragments if you throw your bombs way back there?"

"Sorry, colonel," Martin apologized, "but every time I look into the bombsight, all I can see is you!"

"Never mind me!" was the crusty reply. "You get those bombs closer!"

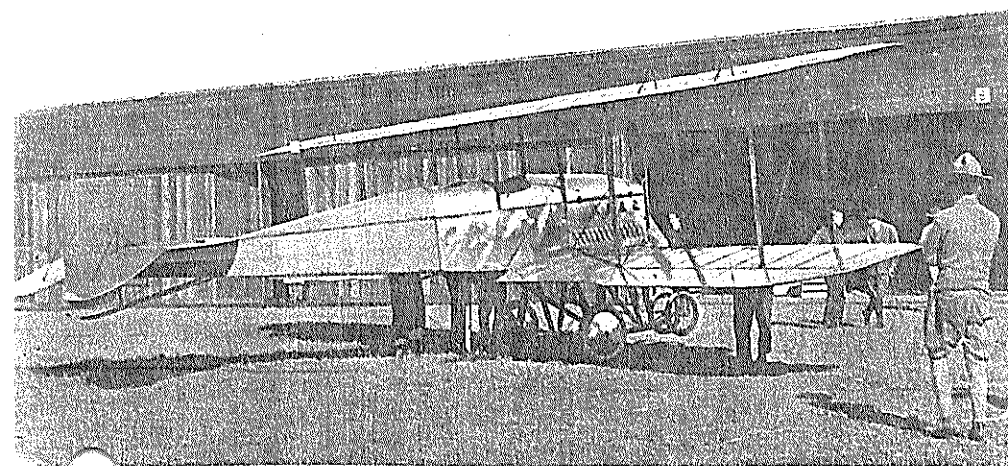
Gradually Martin gained confidence, learned to trust the sight. Soon the explosions were rattling the teeth of the Ordnance expert and he departed to make his report.

Martin waited eagerly. The officers had seemed happy about the results. But no word came back. The tests themselves had been secret. Now the Army records were secret.

Meanwhile, significant news had come out of Mexico; something that excited Glenn Martin greatly. Some months before he had sold a Martin plane to Didier Masson, the French stunt pilot, who presumably was headed back to the exhibition circuit. But the first word of him had come in a dispatch to the Los Angeles papers from the beleaguered and much bewildered city of Guaymas. The Federals had been holding well against Huerta's troops when a demoralizing thing happened. From behind the rebel lines there appeared an airplane—Masson's Martin—and as soldiers and civilians watched, it swooped low over the city and loosed a cluster of missiles.

"Bombs fell in the principal streets, causing some loss of life and much damage," the dispatch read.

*Continued on page 16*



A Martin first—the armored plane of 1913



Twenty years of service were fittingly honored July 14 at a party for Mrs. Adeline A. Parris, secretary to Treasurer Myron G. Shook. Shown (left to right) at the Longfellow Hotel are Mrs. John Garrett, Mrs. Shook, Glenn L. Martin, Mrs. Minta Martin, John Humpstone, Mrs. Parris, Presley B. Parris and Mrs. Joseph T. Hartson. Miss Blanche Bell arranged the party—beautifully!

## Mars Points Way To New Cargo Era

*Continued from page 5*

when Henry J. Kaiser, dynamic west coast shipbuilder, declared publicly that he believed the large flying ship is the answer to shipping losses to submarines and settled upon the *Mars* type as the best present answer. He declared he would seek to obtain license to build the flying ships in his shipyards. He was followed immediately by Andrew Jackson Higgins, prominent New Orleans shipbuilder who declared that he, too, would attempt to get contracts for the *Mars* type.

In reply, Mr. Martin said:

"We are anxious to make every possible contribution to the rapid development of a vital air cargo transport fleet. If the Government wishes us to follow the suggestion of Mr. Kaiser and license the shipbuilding companies to help manufacture the *Mars* type of air vessel, we shall be glad to do so and to extend our full cooperation.

"It must be left to the judgment of the Government authorities which organizations will be called upon to aid in building up the important air cargo service. Many things must be determined before the program can be launched.

"We are extremely pleased with the performance of the *Mars*. The type is ready immediately to be placed in production, either as war vessels or cargo ships, and we are awaiting the Government decision.

"However, The Glenn L. Martin Company already has a design for a much larger air vessel—a 250,000-pound transport—and ships of even larger size are possible now. Such vessels as the *Mars* and the larger types can easily assume the chief burden of ocean transport because of their high speed and greater frequency of movement. Since we are losing surface ships much faster than we can build them, because of enemy submarine activities, the air cargo program is of extreme importance at this time."

One of the most distressing aspects of present surface shipping operations is the necessity of convoying groups of from 20 to 30 cargo ships. This requires heavy assignments of naval strength, which is slowed to the pace of the slowest freighter in the group. Air cargo ships, Mr. Martin points out, require no convoys, being able to take advantage of a wide variety of routes and altitudes and cloud cover. Furthermore, the large flying ship has unlimited landing areas and take-off space. Therefore, it is possible for them to cross the oceans by easy stages.

\* \* \*

## BOX KITES

*Continued from page 15*

Small wonder Martin was agitated. It was what he had been trying to prove, and one of his ships had turned the trick. Today the clipping is prominent in his old scrapbook. Was it the first aerial bombardment in warfare? It is a moot point. Some accounts have claimed that Konz-Kartaus, Germany, was the first city bombed when the French lighter-than-air ship "Fleurus I" dropped four 155-millimeter cannon shells on it in the first month of World War I. But Masson's raid ante-dated this by a full year!

Still following his convictions that the airplane was a powerful weapon of war, Martin completed in 1913 the first armored airplane—a tractor plane whose engine and cockpits were sheathed in bright metal and whose wings were transparent to make it difficult to see at higher altitudes.

Earlier in 1913, the Martin Company had built the world's first multi-passenger commercial ship—a hydro-airplane variation of the Model TT to carry four passengers. It was built to the order of the firm of Gorat and King, of Portland, Oregon, to serve as an aerial ferry across Coos Bay, Washington. Martin had carried three passengers in it in demonstration on April 20

Next month: The world's first multi-passenger ship and early experiments in the use of parachutes.

## Gherardini's 70 Leads 162 in Golf

Ray Gherardini led the second and third shift section of the Martin Golf Tournament with a par 70, a stroke ahead of Luther Manchey. In the first shift section, Bill Jenkins shot a 74 for the medal, with Eddie Semler second by a stroke. Qualifying scores in the eleven flights follow:

### FIRST SHIFT

*First Flight*—Bill Jenkins, 74; Eddie Semler, 75; Earle Fowler, 76; A. F. Oberender, 76; Earl Martin, 78; E. Lee Smith, 78; John Manley, 78; C. A. Dinsmore, 78; Chester DeWinn, 79; Arthur Jones, 79; John W. Deaton, 79; William Scott, 79; D. J. Weatherby, 80; W. Halleck, 80; T. Lageman, 80; Ralph Phipps, 89.

*Second Flight*—John J. Dehaven, 80; Buford Hill, 83; D. Young, 83; Robert D. Meyer, 84; Russell Porter, 84; Gene Thornton, 84; David J. King, 85; A. E. Fouch, 85; C. D. Barnhardt, 85; Herman Pearce, 85; Robert Dobres, 86; C. Hartley, 86; William P. Booth, 86; William H. Cosins, 87; R. J. Clifford, 87; J. C. Emory, 87.

*Third Flight*—F. B. McGinnis, 87; Fred A. Gross, 87; Milton McAllen, 87; John Dengler, 87; Harry M. Turner, 87; D. J. Mackey, 88; Harry L. Hahn, 88; Robert Scott, Jr., 89; V. Cheney, 89; Vernon Williamson, 89; J. Fitzpatrick, 89; Jim Moran, 89; Robert W. Stewart, 89; C. M. Beam, 90; Earl F. Wolfe, 90; Henry Hessler, 90.

*Fourth Flight*—Edgar Gilmor, 90; W. E. Rehnert, 91; R. M. Siagle, 91; W. McGrary, 91; Don Price, 92; Donald Drennan, 92; Milo Sheets, 92; James A. Goodman, 92; A. F. Mason, 93; William Grape, 94; Joe J. Phillips, 95; McLaren Pardew, 95; Gordon Weglein, 96; J. Elders, 96; Anthony J. Engle, 96; J. B. King, Jr., 96.

*Fifth Flight*—G. W. McGee, Jr., 95; George Kaye, 97; Jim Straight, 97; Fred Konig, 97; Harvey Johnson, 97; R. Hargest, 98; Ralph E. Steltzer, 98; Joe E. Hotschek, 98; Walter Bankard, 99; Robert Clapper, 99; Murray Rixides, 99; Warren Heatwole, 100; D. R. Ford, 100; William Isaak, 100; James O'Reilly, 102; Donald Watts, 103.

*Sixth Flight*—Howard C. Nell, 105; Jack Hallstrom, 107; Ernest Javins, 106; Edward F. Brewer, 107; J. O'Neill, 107; W. S. Stein, 110; Henry Prenger, 110; Bernard Neivert, 112; Raymond Thirwin, 113; W. H. McClure, 113; Burt McKinnie, 114; Paul J. Munkasey, 115.

### SECOND AND THIRD SHIFTS

*First Flight*—Ray Gherardini, 70; Luther Manchey, 71; Chuck Beehler, 72; Jack Muend, 76; George Stewart, 77; Ira Scott Wood, 77; Jesse Drew, 79; J. B. O'Neill, 79; John W. Jacob, 80; James Thompson, 81; William C. Greeley, 81; Anthony J. Rose, 81; D. Carson, 82; William F. Norwood, 82; Jack Anderson, 84; Charles Boteler, Jr., 84.

*Second Flight*—Edward Crane, 84; Harry Cox, 85; Albert Peters, 86; Samuel Roffensparger, 86; Gene Antonelli, 86; Roy W. Smith, 86; F. Gross, 86; Ernest Wolfe, 86; W. C. Ayers, 86; Andy Gerda, 86; Ed Gunn, 87; R. Snyder, 87; Ken Enderland, 87; V. Kennedy, 88; F. J. Mueller, 88; Al Strolmer, 88.

*Third Flight*—Charles Thoit, 88; Howard Thomas, 88; C. Wehner, 89; Robert Stewart, 89; Thomas Lehan, 90; R. Nelson, 90; M. J. Clark, 90; W. J. Alexander, 90; R. J. Brewer, 91; Earl Anderson, 91; Henry Marks, 91; J. B. Hoffman, 91; John J. Meade, 92; Richard Reese, 93; Clyd Ball, 93; J. Buschman, 95.

*Fourth Flight*—Bye; Eugene L. Greth, 96; Jim Strait, 97; Woodrow Walker, 97; John Chose, 97; Thomas Stefanski, 97; Delmar Wood, 98; E. B. Snyder, 99; A. Stepanski, 101; John Lowman, 101; Jack Feldman, 101; Kenneth Snyder, 103; N. Hadaway, 103; H. Chenowith, 105; Harry G. Romers, 105; H. F. Bordley, 106.

*Fifth Flight*—Joseph M. Karl, 106; J. Schweiger, 107; John D. Davis, 110; A. H. Adams, 111; T. Buckley, 113; Ernest Ruby, 119.

\* \* \*

### THIRD SHIFT'S 10% CLUB

One way to bury the Axis is to buy as many war bonds as possible. Realizing that every dime adds one more nail to Hitler's coffin, nineteen men working in the Machine Shop, third shift, have formed a "Ten Per Cent Club."



# BOX KITES TO BOMBERS

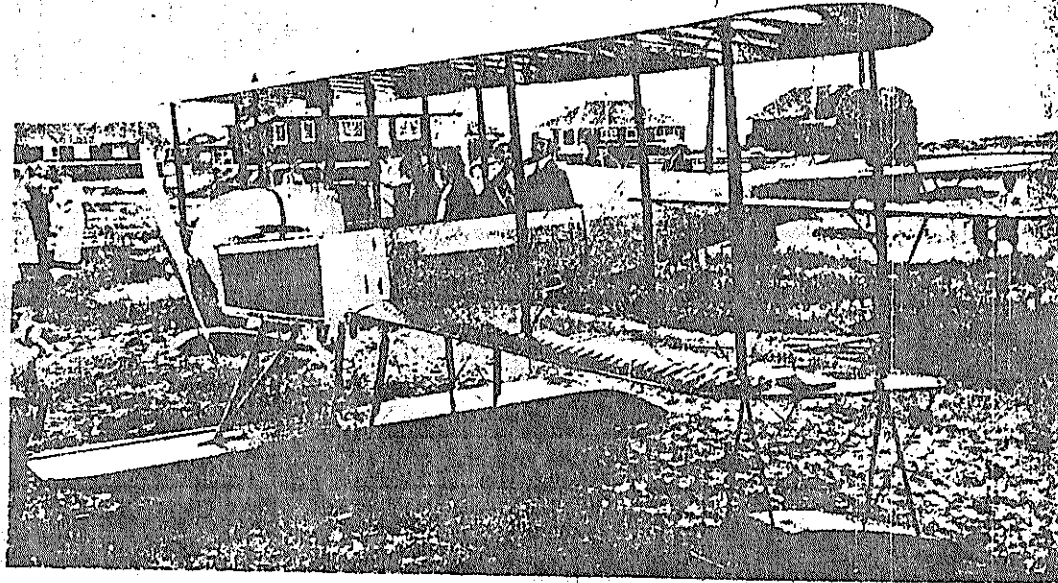
## Multi-Passenger Plane and First Free-Fall 'Chute

### CHAPTER VII

War clouds that were gathering over Europe in 1913 seemed as remote to America as did those of 1938—more remote, perhaps, for the oceans seemed broad and the annihilation of distance by speedy aircraft was yet far away. Therefore, the bombardment experiments of Glenn L. Martin and the Army Signal and Ordnance Arms were regarded with hardly more than academic interest.

Much more interesting to the public as a whole were the Martin antics and developments in that year that caused people to wonder whether, after all, this brash liberty with the laws of nature and gravity, the aeroplane, might not be made safe and useful.

For example, there appeared the first multi-passenger airplane. Wheeled from the Martin hangar at Griffith Park, Los Angeles, the craft looked strange. In place of the bamboo outriggers and fresh-air seats, there was an inclosed body which was not to be known as a "fuselage" for another year and a half. And the exposed engine and pusher propeller and the pilot had given way to a



America's first multi-passenger plane built by The Glenn L. Martin Company in 1913. Glenn Martin at the controls.

tractor propeller jutting from a motor in front of the pilot.

The ship was an adaptation of the Model TT Martin had built for the Army and it was expected to be the first aerial ferry. The firm of Gorat and King had ordered a seaplane version to fly passengers across Coos Bay, Washington, but the young enterprise died for lack of passengers. It weighed 1,450 pounds and its top speed of 80 miles an hour was recorded in an incredulous public press, always with the qualification "according to Mr. Martin." Even Barney Oldfield couldn't make that speed on the motor-dromes!

When Glenn Martin soared over Los Angeles with three passengers, the event was chronicled under the largest type the newspapers of the day could muster. Here was the beginning of an epoch—the airplane was forecast as a common carrier of the future!

Notables raced to garner the publicity of a flight with the "gull man." Movie stars vied for Martin favor. Roald Amundsen, still basking in the spotlight as discoverer of the South Pole, took his first trip aloft with Martin, soaring over snow-covered peaks of the Sierra Madras, at which he gazed with more or less nostalgia. He was to live and die by aircraft in Arctic wastes years later.

The new type of ship earned Glenn Martin national acclaim. He broke speed and altitude and reliability world records, many of which were already his own. In Chicago he set up the fad of "air yachting," carrying wealthy ladies and gentlemen for rides over Lake Michigan. He won the Curtiss Marine Trophy for

covering the largest number of miles in a single day.

And it was in this plane also that Martin made another momentous contribution to aeronautical science—the free-fall parachute, a device on which he held the original patents.

The whole thing had started as a hippodrome stunt when the aviator-manufacturer had engaged the services of Tiny Broadwick, an intrepid girl parachutist who had been dropping from hot-air balloons to thrill fair-ground crowds. They made a great team, and the money rolled in. It was badly needed, for the Martin experiments were costing dearly.

Martin had rigged a special trap-seat alongside the fuselage and Mistress Tiny would dangle there from the take-off until the point at which the pilot would cut her loose. She would float down, lightly as a feather, under her gaily-colored umbrella.

But from the very start, Martin had sensed that this might be to aircraft what the life-preserver was to ships. When vessels were in distress, their crews and passengers floated about on cork rings. When airplanes were in trouble their pilots and passengers were at the mercy of the frail wings and the aviator's skill. The elements were different, but could not the solution be the same?

Glenn Martin pondered. Parachutes rigged to the plane offered little opportunity in the split seconds of distress. Why not rig the parachutes to the person? Then one could jump free of the airplane, just as passengers jumped free of a sinking ship. He must figure some way for the

*Continued on page 17*



Glenn L. Martin and Tiny Broadwick in the pre-free-fall 'chute days.

# ARNOLD THE TOPIC OF YOUR B-26

## Too Tough for Japs to Handle, He Says

So far as the Japs are concerned, B-26's are too hot to handle. This fact was made clear in a recent press conference held by Gen. H. H. (Hap) Arnold. In part he said:

"In the B-25 and the B-26, the United States has a pair of medium bombers that definitely outclass anything in the world. They carry about two tons of bombs at speeds of over 300 miles per hour and are very heavily armed. Other U.S. medium bombers such as the Lockheed Hudson and Ventura and the Martin *Maryland* and *Baltimore* have been going to the British and have been used with very great success. . . . The *Marylands* have made a great name in the Middle East.

"The B-26 is regarded as a very advanced type. Reports from the Japanese theater show that it has speed and firepower enough to make it self-sufficient and that it can conduct raids over heavily protected enemy territory without fighter protection.

"At Lae, New Guinea, July 4, ten B-26's were intercepted by 15 Zero fighters. Four Zeros were shot down and one more probably shot down. Four of the B-26's were damaged but returned. One B-26 was lost by having the wing knocked off by a falling Zero that had been shot down by another B-26.

"The B-26's demonstrated their versatility by going into action as torpedo planes at Midway and in the Aleutians, with very successful results."

Other American-made bombers came in for their share of praise, when General Arnold declared that "American bombing planes have established themselves as superior to anything thus far shown by the enemy."

The Boeing B-17, Consolidated's B-24 and the Douglas A-20 were listed among the "bright stars in the galaxy of American bombers."

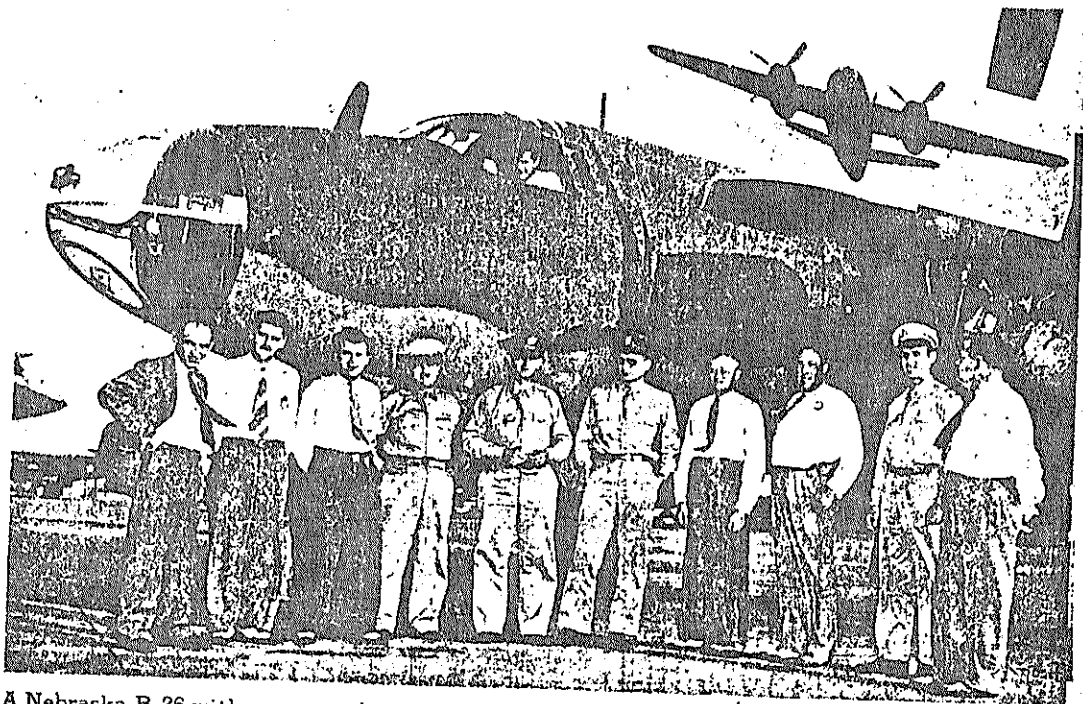
\* \* \*

## CALL FOR PRODUCTION

Carl Snively, assistant supervisor of production for the second shift, woke up a long ago to find a flat tire on his car. Nothing daunted, he leaped upon his daughter's bicycle and peddled courageously to work. He arrived in good time, albeit a little ruffled.

\* \* \*

Carl Snively: "I'll Take Back What You Said, But Not What He Heard."



A Nebraska B-26 with a group who get 'em flying. Left to right: William K. Ebel, Ralph Bell, Curt Miller, Col. H. C. Cook, Col. Harmon, Lt.-Col. Frank Cook, Harry F. Vollmer, Lincoln Scafe, Capt. Cuddeback and Mr. Shealy. Inset: In the air.

## BOX KITES

*Continued from page 13*

umbrella to open without being fixed to the plane itself.

Oddly enough, the newspapers failed to recognize the significance of the event one day in mid-June of 1913 when Tiny Broadwick, with a mysterious pack on her back, climbed over-side the airplane above suburban Los Angeles and sprang free. Seventy-five feet she fell before the silk streamed out above her, and the big 'chute opened agonizing seconds later. It was recorded, of course, but the old clippings show it simply as another exhibition stunt.

It was not until January 10, 1914, that the national press awoke to the importance of the discovery. Martin had not been satisfied with the first experiment of his "life vest." With Charles Broadwick, Tiny's husband, and Floyd Smith, one of the Martin technicians, he had set about perfecting the device. The weight of the knapsack was cut to eleven pounds, the harness made stronger. And then Martin beat the tom-toms of publicity.

Came a great crowd to Griffith Park on the appointed day. Many were spurred by the Roman-holiday aspect; a girl stepping into space thousands of feet up. But there were sober-faced Army officers in the crowd as well. A girl reporter of the *Los Angeles Times* boarded the plane with Martin and Miss Broadwick to record the event from above. At 3,000 feet Tiny stepped over the side, smiled at the reporter and leaped free.

The brave little figure hurtled downward. There was a strained silence on the

field. Above, Miss Glessner turned away, but glanced down a few seconds later to see the silken umbrella below, with Martin spiralling steeply around it in triumph.

When it was all over, people had things to say. Said Brig-Gen. Robert Wankowski, who was there with his aide:

"The demonstration was successful and there is no question in my mind but that aviation would have a much smaller list of victims had the life vest been used before."

Said the *Los Angeles Times*, under the heading "Triumph of Aviation":

"We may be permitted to hope that no longer shall the demons of the air pluck sacrificial victims from the bird-men. One of the greatest triumphs of aviation since the sons of men learned to fly came at the Griffith Aviation Field last Friday when a brave girl stepped from the biplane of Glenn Martin and dropped a thousand feet to earth—dropped as lightly as one jumps from a table at play. Martin had staked a courageous human life in his game with death, and won by a device of silk and cord, woven under his directions and according to plans of his own."

Said Glenn L. Martin:

"The new device should prove useful in war operations also. An aviator could fly over a certain point, drop off a scout and return to camp without having to land."

Prophetic? Yes. Today newspapers scream vindication. The word "paratroop" undoubtedly will appear in the next edition of Webster's Dictionary.

The World War I period and Martin's first foreign order will be the subjects of the next chapter.

# BOX KITES TO BOMBERS



## Martin Prepares to Send Bombers to World War I

### CHAPTER VIII

The aeroplane will practically decide the war in Europe. Veritable flying death will smash armies, wreck mammoth battleships and bring the 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 the flying death will win.

—Glenn L. Martin, in Los Angeles  
*Herald*, August 7, 1914.

The first guns of the first World War were booming balefully when the president of "the largest aircraft factory in America" wrote these words. Already the Los Angeles plant of The Glenn L. Martin Company was turning out many new airplanes for the United States Army. Already word had flashed back that winged scouts had been seen over the Austrian columns as they marched into Servia.

It was a dreadful prophecy—too fantastic to be true, of course! The nettling thing about it was that the California aviator-manufacturer was not given to wild prognostication. He had been the soul of conservatism.

The airplane did not decide that war in Europe. It was a powerful factor, finally, but it remained for another struggle two decades later to fulfill Glenn Martin's forecast. One part of that story, however, came true in the second year of World War I.

"A battle between two airplanes in mid-air means death," he had written. "This machine, with its rapid-fire gun, could rake an enemy's column. It could dislodge soldiers in ambush and harass whole armies at night."

These were not idle comments. Martin and his company had worked hard to de-



ANOTHER MARTIN FIRST. Winchester-armed pursuit plane, 1913.

velop the air weapon as a powerful force for the United States Government. As we have seen, the company had built the first bombing airplane and from it Martin had thrown the first bombs. And only four months before the war flamed in the Balkans, the pioneer had wheeled onto his Griffith Park Field at Los Angeles a unique machine, with a gun mounted in its nose! True, it was only a Winchester rifle, but it was a gun and it was mounted.

Martin called the plane the "Aeroplane Destroyer." Having introduced the bomber, he now introduced the craft designed to bring it down—the pursuit plane. Crude? Certainly, when one thinks of the machines of today, or even those which whined in dog-fights a couple of years later over European skies, machine-gun bullets spitting between propeller blades. For his purposes, the Californian had been compelled to drop back to the pusher propeller in order to give clear shooting range forward.

Martin had also resumed his private bombing tests and was rapidly improving his technique. He almost lost his life, however, on April 4, 1914, when one of his planes practically blew up in his face when a racked bomb inexplicably exploded on the field and the pilot, standing nearby, was covered with debris.

As the war clouds gathered, the Martin planes were attracting attention everywhere. Capt. W. I. Chambers, in command of the Navy's new aeronautics branch, enthusiastically suggested the name *Owl* for the Martin "flying yachts"—a contraction of "On Water and Land." The Army was buying large numbers of trainers. Foreign governments were inquiring and sending representatives to watch the ships as they sailed over the California coastal region.

Good materials were a Martin mania, even then. Wood and metals had to be of

first quality. The company was using vanadium steel for its fittings—a steel of much greater strength and higher resistance to crystallization than ordinary steels.

A month before the war began Martin's rapid progress won him a coveted honor—the Medal of Merit of the Aero Club of America, given for "outstanding development of aviation." The Californian journeyed all the way to New York to receive this honor at the Aero Club's annual dinner.

By fateful August of 1914 the company was swamped with orders. The United States, determined to avoid foreign entanglements, did not increase military orders, but kept to its schedules. Britain and Holland were offering to contract for the entire Martin output.

There came to Los Angeles one Lieut.-Aviator H. Ter Poorten, of the Netherlands East Indies. Another quarter century was to see him high commander of the gallant Dutch in a last-ditch fight against the yellow hordes of Japan.

For Ter Poorten, as representative of Queen Wilhelmina's government, The Glenn L. Martin Company built two military airplanes. The lieutenant-aviator was so pleased with them that he persuaded his government to order twenty more. Thus the Dutch East Indies became Martin's first important foreign customer and even up to the beginning of World War II it standardized on Martin bombers.

As the war waxed hotter and the airplane became a recognized weapon, the Los Angeles factory hummed day and night. Army orders began to increase as war nerves in the United States tightened. More and more trainers in which to school American aviators were built.

In the spring of 1916 Glenn Martin re-

[Continued on page 17]

The Los Angeles factory





# MARTIN MEN

Three Martin men, bomber experts in the field, have been given the highest commendation possible for civilians for their tireless work in the South Pacific battle area, according to a dispatch dated August 7.

The men are William P. Alcock, Thomas B. Walter, and Alfred W. Drew, serving at an advance base which may not be named. The commendation, signed by the Air Corps Major Commanding, reads as follows:

"Since having arrived at this base, William P. Alcock, Thomas B. Walter and Alfred W. Drew, have given their services willingly and at all times to keep all types of aircraft serviceable.

"Not only did they work on Martin airplanes, but any and all airplanes requiring maintenance and repair. Their specialized knowledge and training which they were very willing to impart to all members of the Engineering Department, served in numerous cases to fly out aircraft before the estimated time of serviceability. They worked willingly at all hours in conjunction with the engineering personnel, never complaining of the type of duties assigned to them. They were on hand at all hours of the day or night to help and in some cases worked most of the night to complete work in which the engineering personnel was untrained.

"In view of the assistance and unhesitating effort of these men to assist this detachment in every way possible, I wish to express my appreciation for their aid and commend them for their efforts."

The communication went along to Headquarters, which added this comment:

"This Headquarters wishes to add to the basic communication its statement of commendation of the civilians mentioned. It has been found that this personnel was always ready and willing to assist in any possible way, at any hour whatever. Their friendly cooperation and technical knowledge have been of great assistance to this Air Base Group on many occasions."

Finally to top it off, Major Gen. Rush B. Lincoln, Commander of the United States Air Services, expressed his personal appreciation of the work the Martin men had done in the struggle for the Pacific.

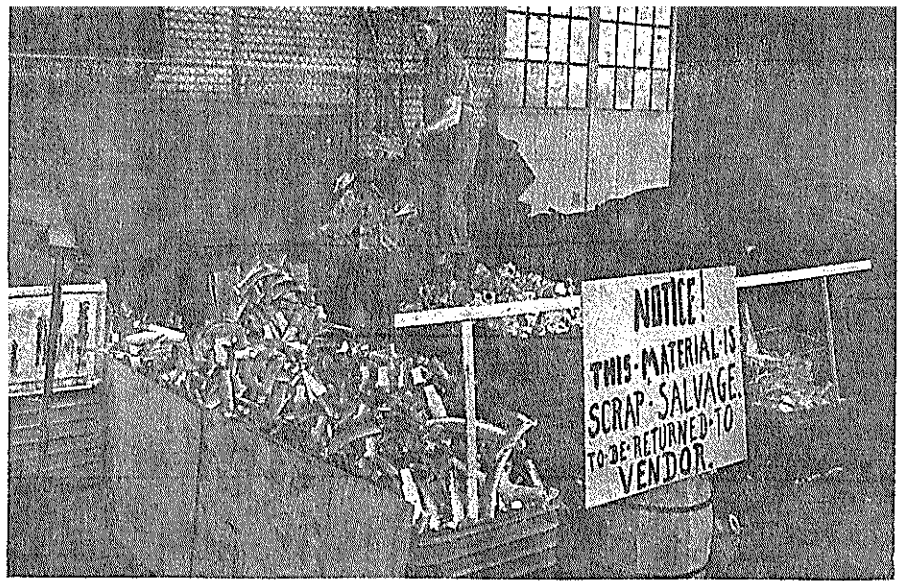
"I have noted the foregoing with pleasure and desire to add my commendation for your splendid work.

"Copy of this communication is being forwarded to your Company."

\* \* \*

## ADVICE TO HARVESTERS

Defense workers should have Victory Gardens, but shouldn't talk about plant life. Remember, even the corn has ears.



SAVING THE SCRAP—or No Small Part of War.

## HEATING PADS FOR BOMBERS

The boys of Surface & Floats are proud of a machine they have which has moved heat therapy out of the hospitals and into the aircraft industry.

Invented by Harry F. Kniesche, assistant factory manager, the device solves one of the major difficulties in the riveting of aluminum "skins" over spars and ribs to form wings. That is the unavoidable wrinkling and buckling of the skins under the pounding of riveting hammers. Such wrinkling and buckling, even when slight, interfere with the smooth flow of air over and under the wing. This impairs the efficiency of the wing and thus of the whole plane.

Mr. Kniesche's system of "heat therapy" works like this:

The several sheets of aluminum that make up a skin are riveted together on a wood frame that has the exact shape of the wing. Full now of unavoidable wrinkles and buckles, the skin is laid on the wing of the ship. The skin heater, a sort of oversized version of the electric

### INGENIOUS

*An ingenious device for testing before flight the accuracy of the instruments on the pilot's and flight engineer's control panels has been devised and put into use by T. G. Bell, engineer in charge of the instruments and electrical laboratories group.*

*The device resembles an ultra-complicated tea wagon. Rolled up to a new plane, it checks dials for oil, fuel, manifold pressure, R.P.M.'s and other gauges.*

heating pad people apply to a sore muscle, is laid on top of the skin. The heater fits snugly, for it has the contour of the wing.

The electricity is turned on. Soon the skin runs a temperature of 140 degrees—enough to cause sufficient expansion to rid it of all irregularities.

## BOX KITES

*Continued from page 16*

ceived a summons from the Secretary of War. It was necessary for the War Department to take stock of the full import of the airplane. The Secretary appointed Martin to membership on a War Aviation Board.

It was while he was working in this new official capacity that Martin was approached by the Wrights, who proposed a merger with The Glenn L. Martin Company in a \$10,000,000 corporation. The deal was made in August and the Wright-Martin Aircraft Corporation was set up in New York, with Edward M. Hager as president and Martin as vice-president in charge of aircraft production.

The new corporation looked powerful to aviation in those days—too powerful to some. Even the San Diego *Sun*, still protesting friendship for Glenn Martin, warned the Government in a front-page editorial that "great oaks from little acorns grow, and Uncle Sam isn't hankering for an airplane trust."

The *Sun's* fears might have been allayed. The threatened octopus was to be dismembered very soon, through a series of circumstances that was to confuse American aviation and slack its efforts through the intrusion of a new octopus.

America's entry into the war, the Aircraft Production Board and the birth of the Martin Bomber will be described in the November issue.

# Box Kites to Bombers ☆

## World War Aircraft Debacle and the "Martin Bomber"

### CHAPTER IX

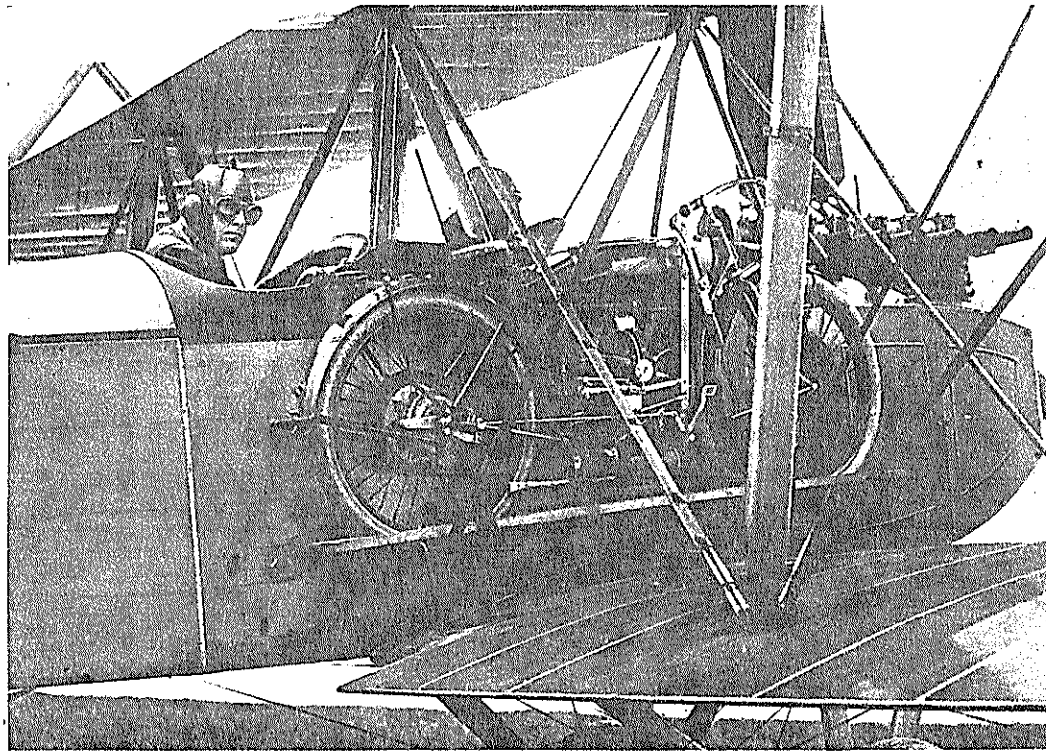
The Glenn L. Martin Company of California, prior to its merger with the Wright-Martin Aircraft Corporation, had already won fame for its bombing and reconnaissance planes for war work and for its acrobatic planes for exhibition purposes, but the larger portion of its business was from the sale of training planes to the Government services and to the Netherlands East Indies Government.

Martin had three types of trainers then in production. The Model "T" was a side-by-side biplane-type trainer used extensively by the Army and in which a number of our now-famous generals originally learned to fly. The Model "S" was a tandem-seat single-float seaplane trainer, and the Model "R" an advanced type trainer-observation plane which had some tricky equipment for military use. One of the items was an arrangement for carrying a motorcycle that could be landed by parachute. The rider would go down in a separate chute, or the plane could land in open fields near a highway and the crew could quickly mount the motorcycle for highway travel.

In addition, Glenn Martin had himself been one of aviation's most expert schoolmasters. In his pilot's school at Griffith Park, in Los Angeles, he had taught many people to fly, some of whom were to be leading aviators of the early days. Among his pupils had been William Edward Boeing, a wealthy Seattle lumberman, who promptly bought a Martin seaplane and, a short time later, went into the airplane manufacturing business himself, founding the Boeing Aircraft Company.

The Wright-Martin set-up looked handsome indeed to youthful aviation.

**TWO GLENNs.** Martin and Curtiss, pioneers, watch performance of Army plane.



Model R, a Martin observation type with motorcycle ready to be parachuted or to permit fast ground action by crew.

Glenn Martin, as vice-president in charge of aircraft manufacture, planned great things and launched into a projection of his successful operations. Interestingly enough, his agreement had stipulated that his Glenn L. Martin Company plant at Los Angeles continue operation, thus preserving the integrity of the company, which today is the oldest aircraft manufacturing concern in the United States.

Then the blow fell. It had been threatening for some time. Automotive interests, sniffing the winds of onrushing war, had taken preliminary steps toward cutting out the aircraft business for itself. The airplane had long since established itself as a mighty weapon of war. When America jumped into the maelstrom, the Aircraft Production Board was established, manned by automotive tycoons. It was decided that, instead of calling upon American aircraft engineering and manufacturing experience to create combat aircraft, American industry would only "improve" foreign craft and engines at the direction of the Aircraft Production Board.

It was a \$640,000,000 program and it was whacked up among the automotive companies as the great exponents of mass production. The pioneer aircraft people were left out in the cold, as far as production was concerned. The Aircraft Production Board loudly proclaimed that American industry would produce 100,000 military airplanes in two years.

Actually, only 213 American-built planes got to Europe, and only a few of these got to the front.

By this time the Glenn L. Martin Company of California (a Wright-Martin subsidiary) was delivering one training plane per day. The Aircraft Production Board asked Martin how many airplanes he could deliver per day within six months. He informed the Board that the maximum that could be obtained would not exceed three per day.

"Not enough," was the reply of the Board. "As a matter of fact, Mr. Martin, we have more sources of supply for aircraft than the aircraft program requires, so unless you could step up to, say, twenty planes per day by the end of the year, we think your facilities should be devoted to engines and the production of aircraft be stopped when the present order in your California company is completed." This suited Martin not at all. He was an aircraft manufacturer. He knew his business. He knew he could build airplanes—the best airplanes in the world—and it rankled that he was not allowed to do so.

Came a parting of the ways. Martin had already made up his mind to relocate the Glenn L. Martin Company. He resigned from the Wright-Martin Aircraft Corporation and moved eastward where he found patriotic capital to go along with his own money and a good location at Cleveland, Ohio.

[Continued on page 18]



# AN APPEAL FOR SAFETY

"A sick soldier is a useless soldier until he gets well, but an injured factory worker may be worse than useless if the act which causes his injury results in damage to equipment."

So wrote Under Secretary of War Robert P. Patterson in an article in *This Week Magazine*. His appeal was a simple one: Let the workers of the country declare war on accidents!

Twenty thousand Americans will have died at their posts, 90,000 will be permanently disabled and 2,000,000 laid up for varying lengths of time before the year is over if the present rate of increased industrial accidents continues, according to War Department estimates.

Thoughtlessness, inexperience, over-anxiety and too often just plain "don't care" are among the leading causes of accidents, says Mr. Patterson, and he goes

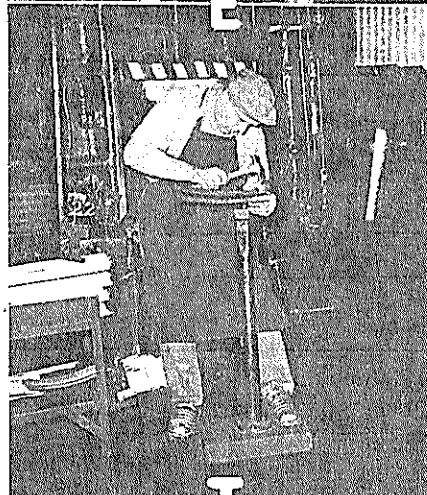
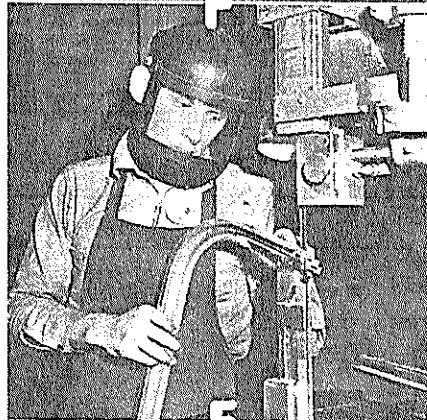
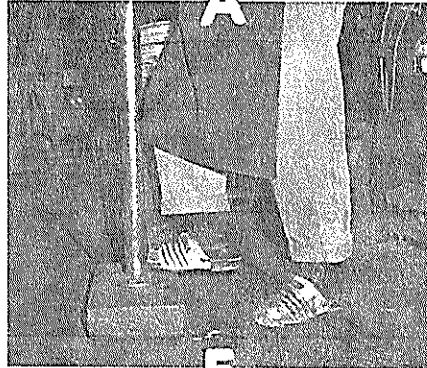
## THIS, FOLKS, IS SAFETY

*It is no accident that the accident rate at Martin's stands well below the national figure for aircraft plants. To starboard you see devices that help make this possible. Shown are the special non-canister mask for work around toxic fumes, the steel toes that are smart wear around drop hammers, the face shield that stops metal flying from shapers and bandsaws, another suit of steel toes, and the fibre skull caps that shield heads from the bumps lurking above them.*

on to list nine cardinal safety rules for the guidance of workers. They are:

1. Find the safe way to do a job and do it that way until it becomes a habit. (If in doubt, ask your leader or foreman.)
2. Use all machinery guards and protective equipment possible.
3. Report or eliminate hazards of every sort. (Do it right away. Tomorrow may be too late.)
4. Watch out for the safety of fellow workers.
5. Work with safety committees in shop and community. (There is a safety committeeman in every part of the Martin plants.)
6. Keep physically fit; now more than ever one should have regular habits of sleeping and exercising, and should eat the right amounts of the right foods.
7. Drive and walk, as well as work, carefully.
8. Eliminate the dangers of death and injury in the home, the worst place in the world for accidents.
9. Guard against fire everywhere.

"This struggle for safety is a whole war in itself," the Secretary says. "We must win it—we will, if each one vigilantly and unflinchingly does his part!"



# PRODUCTION RATE SHOWN

Those bombs have been zooming down the Progress Charts in all Martin Divisions, and the War Production Drive Committee is proud to announce the September winners.

PLANT 1: Surface & Floats PBM-3—Ribs & Small Parts; Surface & Floats 187—Ribs & Small Parts; Body PBM-3—Small Parts; Body 187—Center & Tail Section Assemblies; Detail Manufacturing—Drop Hammer.

PLANT 2: Surface & Floats—Spars; Body—Tubing, Electrical & Cable; Detail Manufacturing — Drop Hammer; Final Assembly—Engine Installation.

CANTON: Operations No. 1217 and No. 1294—Bomber's Enclosure.

\* \* \*

## BOX KITES

[Continued from page 15]

At its imposing new Cleveland plant, The Glenn L. Martin Company evolved an outstanding design. It was a fast, twin-engine biplane bomber that looked extraordinarily good.

Off to Washington went Martin, plans in pocket. Impressively he laid them in front of the Aircraft Production Board. He was waved away. New designs were not wanted, he was told. America was building only foreign-type planes. From office to office went the manufacturer, vainly seeking attention. No one paid him heed.

The beginning of 1918 saw the Aircraft Production Board in very hot water because of its grandiose statements of production and no airplanes were being produced by the great automobile concerns. Congress was asking embarrassing questions. It was also being pointed out in Washington that they were not utilizing available aircraft experience. It was January 17, 1918, that Martin was sent for by the Aircraft Production Board and given a contract for Liberty twin-engined biplane bombers that were destined to become famous as the standard bomber for the United States Air Corps for almost twelve years.

Out went the old board; in came a new one. The new members called in the aircraft manufacturers. Martin, Loening, Thomas Morse, Chance Vought and others were told to go to work on new airplanes.

In a record of seven months Martin had built the first of his great MB-2 bombers and plans made for important production. Here was the bomber that no one would even look at in 1917. Here was the ship that was to make the words "Martin" and "bomber" all but synonymous.

[More about the Martin bomber will be told in the next issue, along with the events of the post-war period.]

# Box Kites to Bombers ★

## World War I Record-- Rabbit Out of Hat

### CHAPTER X

The way to build aircraft or do anything else worth while is to think out quietly every detail, analyze every situation that may possibly occur, and, when you have it all worked out in practical sequence in your mind, raise heaven and earth, and never stop until you have produced the thing you started to make.

So said Glenn L. Martin when a Cleveland newsman came around for an interview in January of 1918, while Martin was awaiting acceptance of his resignation as vice-president in charge of aircraft manufacture for the Wright-Martin Aircraft Corporation. Cleveland then knew that the manufacturer was moving his Glenn L. Martin Company east from Los Angeles. He had a site, ample financial backing. He was ready to go.

The Glenn L. Martin Company had to live by those rules in the next few months. It did "raise heaven and earth," first to get its great bomber design accepted, then to get it built and, finally, to get it into the Army.

World records of building construction, world records of airplane construction were called for, and then came a heart-breaking stymie that only sheer ingenuity could break down.

Just look at the record!

Between January 9 and February 18, 1918, building plans were drawn, production plans perfected, tools bought.

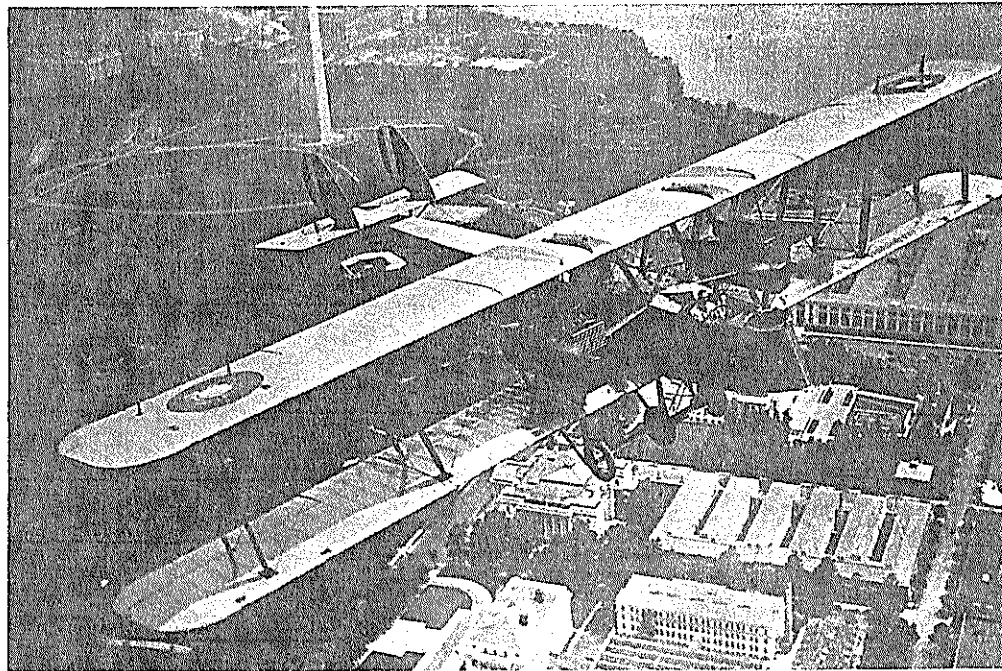
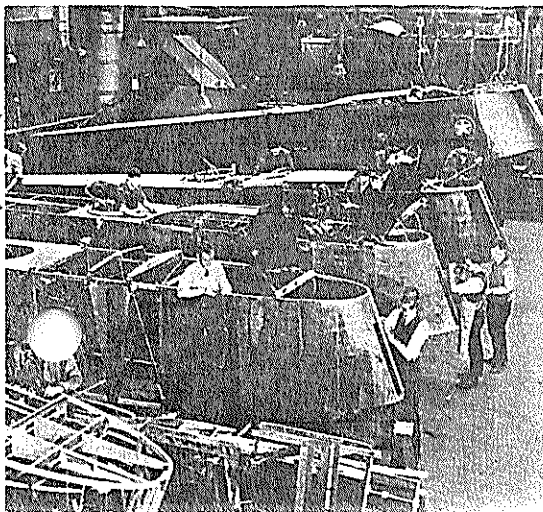
On February 18 ground was broken for the new plant.

On May 1, the three-unit factory, totaling 66,000 square feet of floor space, was in operation.

On August 17, the first huge MB plane—the famed "Martin Bomber"—took to the air.

By October, the production line was in full swing.

### WORLD WAR I PRODUCTION LINE— Martin MB-2's being rushed in 1918.



**THE GIANT THAT FLEW**—the MB-2, first of the "Martin Bombers," threw a bombshell.

It was a pattern that was to be followed twenty-one years later, when, heeding the desperate pleas of war-imperiled France, Martin built nearly half a million square feet of new floor space in the unheard-of time of seventy-seven days, and flew the first of its Model 167 bombers in six months from drawing board.

So swift was the rise of this revitalized company of 1918, so remarkable the first fruit of the new assembly line, that it caught the Government procurement agencies completely off guard. The whole performance was incredible. Yet today, looking back on that achievement, Glenn Martin smiles knowingly.

"I had the ablest and most experienced men in the industry to help me," he says.

He had, indeed—men who in a recrudescence of war, more than a score of years later, were to steer other great companies in an industrial effort without parallel in all history.

A few of these experienced men were Lawrence D. Bell, the general manager, now president of Bell Aircraft Corporation; Donald W. Douglas, the chief engineer, now president of Douglas Aircraft; J. A. (Dutch) Kindelberger, now president of North American Aviation, and C. A. Van Dusen, later general manager and now president of Brewster Aeronautical. And there were others who carved places for themselves in the aeronautical world that was to grow great in the following years.

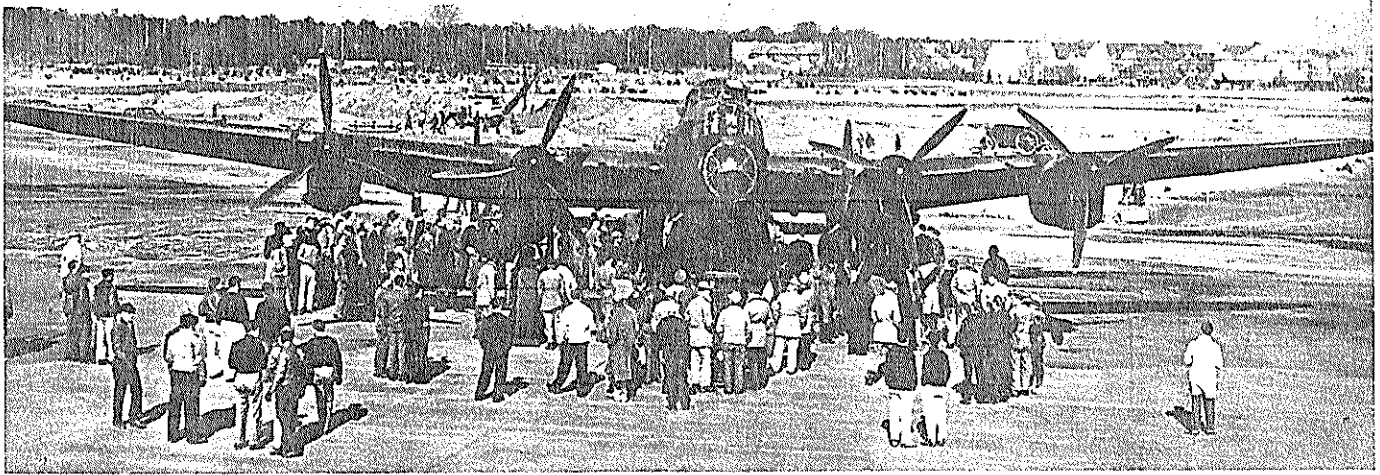
Enthusiasm at the Cleveland plant was unbounded when the first giant bomber,

after a few taxiing runs under the handling of Test Pilot Eric Springer, roared across the Martin Airport and lifted its bulk into the air with great ease. A tremendous cheer broke from the crowd. They knew their product was good—"the most formidable fighting plane ever built and the first battle-plane of all-American design," as the Cleveland *Plain Dealer* proclaimed.

The design was far advanced. The ship was America's first twin-engined bomber, powered by two 400-horsepower Liberty engines (power galore, for those days). It was a biplane, with a wingspread of 72 feet. It could carry aloft a ton of bombs in its enclosed bomb-bay, and at the remarkable speed, then, of 125 miles per hour. It was heavily armed, with four machine-guns, and it carried a four-man crew in open cockpits—a gunner-bombardier in the nose, pilot and co-pilot seated side-by-side in the control cockpit and a rear-gunner aft of the wings. Its size was accentuated by the twin rudders and the four main landing wheels on a single shaft.

It is interesting also to note that the crew members of the bomber were protected with armor, and that a 37-millimeter Baldwin cannon was mounted experimentally on the plane—two items that were regarded as "innovations" in the war that was to envelope the world years later. It is interesting, also, that Martin was experimenting even then with bullet-proof fuel tanks, although it was to be another war that saw the Company

[Continued on page 18]



**WE HAD WITH US YESTERDAY.** Piloted by Capt. Clyde Pangborn, pioneer aviator and member of the RAF Ferrying Command, a late model British Lancaster heavy bomber visited the Airport last month so Martin engineers could see this latest product of English manufacturers. It carries the 4,000-pound "block-busters" which have been hurled at Germany and Italy.

## BOX KITES

[Continued from page 13]

introduce America's first self-sealing tanks.

Anxious to hurry the new ships into action, Martin pushed the flight tests hard. And in only two weeks it was pronounced ready for Army inspection. Glenn Martin, Eric Springer and Donald Douglas packed suitcases, climbed aboard and sailed away for McCook Field, at Dayton, 200 miles away.

Without warning, the giant swooped down onto the field. There was great excitement. The Martin men were arrested, a guard thrown over the plane. The landing had been unauthorized. The radical-looking plane was highly suspect. Aircraft Production Board officials frankly regarded it as dangerous. No one was allowed to fly it.

Strenuously Martin pleaded for a chance, told of its test flights, gave an account of its behavior. Finally, Capt. "Shorty" Schroeder, one of the Army's great pilots, took the controls and pulled the bomber off easily. In an hour he asked the big ship every question he wanted to know about, and it answered handsomely.

Schroeder returned to give vigorous approval. There seemed little else the civilian inspectors could say. Martin got the green light.

But already the Cleveland production lines were humming. Seven ships, in various stages of completion, were spread over the factory floor. Variations of that ship were to be built by the company for the next decade for, though the Armistice came before the MB-2's could see combat, they were to be the standard bomber of the Army for all that time.

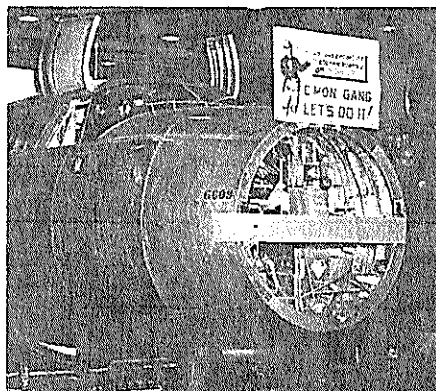
It was a triumph for the young aircraft industry—a photo-finish that was to be remembered when another war was thrust upon peace-loving America.

[The post-war period and General "Billy" Mitchell's experiment will be described in the next issue.]

## QUICK MOVE

As the result of a masterly job by the Field Department, plus some pretty fast footwork on their own part, about 500 Martineers have moved with their desks, chairs, filing cabinets, adding machines and other paraphernalia from offices in Plants 1 and 2 to equally handsome and commodious quarters at Fallsway and Lexington Street. The shift took place in less than a day, and with a minimum of lost time or motion.

The building is of four stories, with about 10,000 square feet to the story. A few weeks ago it housed a book bindery, a clothing establishment, and a concern that sold batteries, tires and automobile parts. Paul Tignor's Field Department took over and in record time cleaned out the whole building, painted it throughout, and installed sanitary and ventilation facilities, fluorescent lighting, acoustical ceilings and blackout curtains.



**SUCCESS DEPARTMENT.** Body Division, Installation Department, gave this B-26 the works on their recent production pledge. With signs attached to nose, center, and tail sections to remind them the ship became a beehive of activity. The pledge became reality on November 16—one day ahead of the self-imposed deadline.

## THREE SAFETY ENGINEERS GIVEN CERTIFICATES

Safety Engineers Ethel M. Knecht, Bruce E. Drawbaugh, Jr., and Joseph A. Mooney, Jr., have completed a 96-hour course in their field at the University of Maryland and were awarded certificates by Dean S. S. Steinberg at a luncheon of the Baltimore Safety Council Board of Control on October 19.

Edward Burhorst, head of the Safety Department, reports that their graduation makes his staff of safety engineers 100 per cent graduates of this special course. The other engineers are Earl Fresh, Joseph Perzella and Oliver Jordan.

Mr. Burhorst reported recently that accidents in the plant had fallen below the national figure for the industry, and that first-aid cases had showed a marked decline.

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## INTERDEPARTMENTAL BASKETBALL LEAGUE TEAM ENTRIES

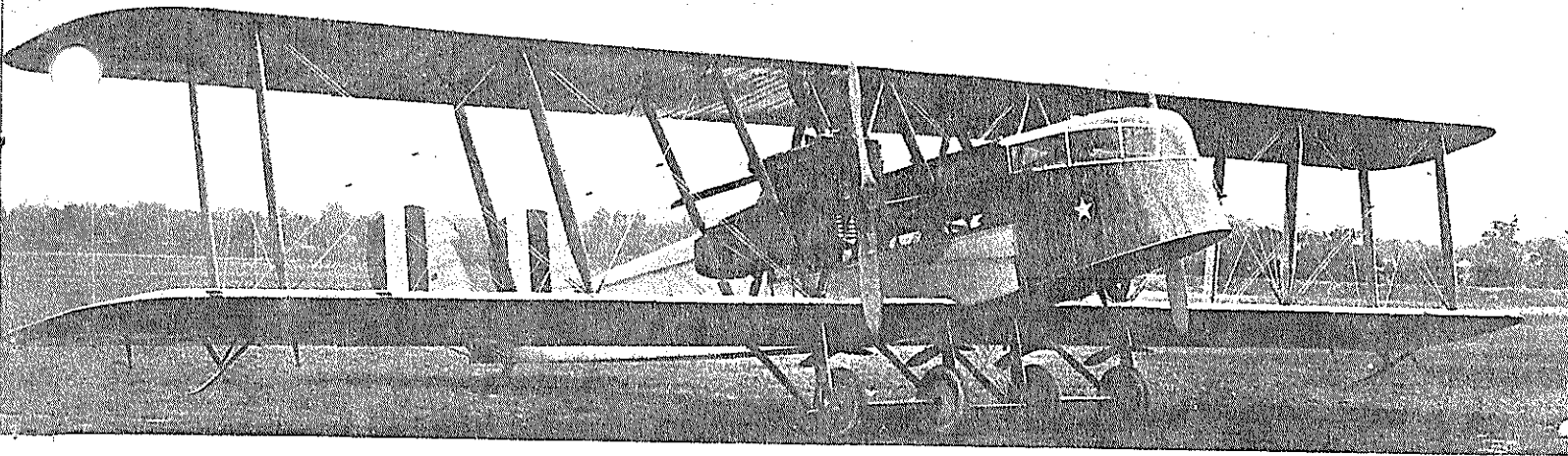
First and third shift teams (play at night 7 to 10 P.M.)

Wings of Engineering	Metal Bench
Sheet Metal Machines	Sinclair Division
Navy Bombers	Metal Bench No. 1
Engineers	Center Section
Body Inspection	Drop Hammer No. 1
Rejectors	Raw Stores A
Tool Room & Inspection	PBM-3 Flyers
Sheet Metal Cowling	Redwood Division
Final Assembly Hangars	26 Labor Control
Metal Bench & Welding No. 2	Static Test
Final Assembly	Final Inspection
Sheet Metal Bench No. 9	Tool Room Group 14
A-30 Final Inspection	Sheet Metal No. 2
Tool Room No. 22	Tool Design No. 2
Body 3 BXB	Tubing Electrical
Finishing & Plating No. 2	3 BX Bombers
Inspections Spartans	Experimental Wing
Canton Division	Hangar Tailspinners
Raw Stores	Outer Wing B-26
Machine Shop	Production Third
Tool Storage	Body Department
	Sheet Metal
	Body Third

Second shift teams (play mornings starting at 10 A.M.).

Body Division No. 2	Sheet Metal Bench
Drill Press	Sheet Metal Machines
Canton Inspection	Body Department
Tool Room No. 22	3 CU Division
Experimental	PBM-3
Pre-flight Hangars	Inspection

# Box Kites to Bombers ☆



Twelve-passenger Martin transport of 1919.

## Transport By Air Takes a Pioneer Into New Field

### CHAPTER XI

There are still those who scoff at the idea of commercial application of the airplane, in spite of the remarkable development the war has brought. I mean operation in competition with other carriers—railroads and automobiles—at a profit. A most important and valuable application not yet encouraged is the carrying of passengers.

The first immediate commercial application will be transporting aerial mail. Too much stress cannot be put upon the importance of every city in the United States having in close proximity to its centers an aerial landing terminal. Inventors are at work on navigation instruments. I believe the solution will come through a development of the radio compass and radio communication.

—GLENN L. MARTIN, in *Cleveland Plain Dealer*, Feb. 2, 1919.

Once again history was to vindicate a prophecy of this pioneer. It was to take its time about it, but things turned out in just about the order predicted.

When the war ended abruptly on November 11, 1918, Martin was ready. Already on the drawing boards of the company were designs for commercial

ships—a mail plane and a passenger-express transport, both using the basic design of the famous MB-2.

But meanwhile, Martin factories were still busy on military ships. When the furor of McCook Field had settled down and the Army realized that it had the greatest bomber in the world, a contract for fifty of the twin-engined giants was handed The Glenn L. Martin Company. The Cleveland plant was just beginning to hum with this order when the great news was flashed around the world. The war was over!

In the middle of the delirium, Martineers sobered. What now? War contracts were being cancelled right and left. Would airplanes go back to being expensive playthings for wealthy sportsmen? Were their jobs gone?

Glenn L. Martin steadied the boat. "Hold tight," he advised. "We'll come out all right. A great future lies ahead of us." They held, and almost immediately came cheering news. Martin's fifty-ship contract was to be cut, but the Army wanted ten of them anyway. The Air Corps was to become a part of the Regular Army.

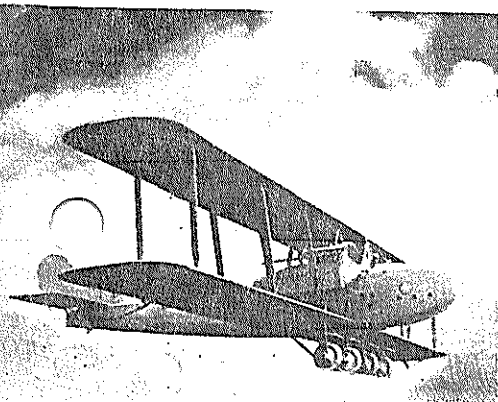
In another six months the Army asked for 200 more of the big MB-2's. There was joy in Cleveland, but it was short-lived. The rest of the industry had to be considered, even though the Martin bomber was accepted as standard of the service. Bids were asked from other companies on the MB-2's and, finally, the number was cut again when America settled down to the millenium of peace (*sic*). But there were to be other orders for this type. It was to be Martin bread and butter for a whole decade.

In the meantime, things were happening in the front office. The Cleveland financiers who had backed The Glenn L. Martin Company for patriotic reasons during the war failed to see the future. They wanted to liquidate the company. This suited Glenn L. Martin not at all. He promptly bought them out, offering them return of their capital and 6 per cent interest within an agreed period, since he had made no money out of the war. Once again Martin owned his entire company, and once again he discharged every obligation.

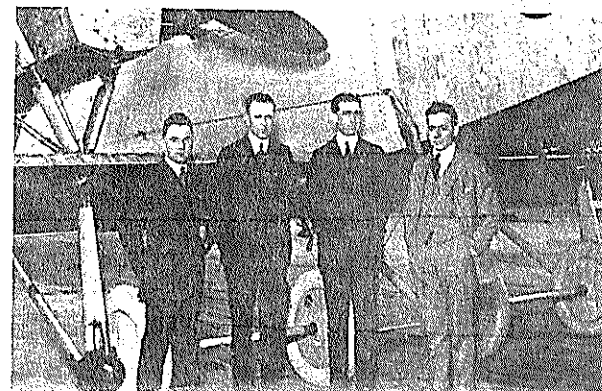
The year 1919 saw Martin setting out to fulfill his dream of a sound and sane development of commercial aviation. In the spring there came out of final assembly doors the first of the big mail planes that were to set up a regular service between New York and Chicago. There were five compartments in the twin-engined ship, each with a trap-door through which it was originally intended that mail be dropped by parachute at way stations. The plane had a capacity of 1,500 pounds of mail and Martin had hoped that it might also carry air express, but he was thinking too far ahead of commercial operations. Six of these ships went into service.

On the way was another ship that might have brought the nation air passenger service much earlier had not avia-

[Continued on page 18]



Right—Larry Bell, Eric Springer, Glenn Martin and Donald Douglas stand by a Martin bomber of 1919. At left is a Martin mail plane of 1919, which carried 1,500 pounds of mail.



## Martin Company Gives John Hix Cartoon Ideas

The December issue of *Coronet* magazine carried an article on John Hix and his "Strange as it Seems" oddities cartoons. It seems that besides turning out some mighty powerful fighting ships, the Martin Company is turning out some of the world's best eyebrow raisers. The article gives us credit for furnishing Hix with hundreds of ideas for his startling facts department.

For fifteen years, the thirty-four-year-old, mild-mannered, pipe-smoking Hix has been a specialist in what's odd, strange, and bizarre in the news. His daily cartoons are backed up with documented proof, telling of such oddities as these: cats cannot see in the dark, steel is more elastic than rubber, lipstick is made from bodies of insects, and the Martin Company shrinks skin on airplane wings.

Mr. Hix recently wrote: "THE MARTIN STAR is on my list of preferred reading material, for I find it a splendid source for ideas."

\* \* \*

### STAKING OUT CLAIMS

Did you ever wonder how hundreds of engineers can design one airplane without running into one another?

Martin engineers solve the problem with an outline sketch of the ship, tacked on a wall in the Engineering Building. An engineer working on a particular section of the design marks out a numbered circle on the sketch which, roughly translated, means: "No trespassing. I'm working this beat!"

\* \* \*

### MOTHER OF 8 BUILDS BOMBERS

Mrs. Louise Bowie, Sheet Metal, Plant 1, first shift, drives home to Severna Park every day after work to look after her two boys and six girls. Cooks their supper, too. Youngest child is 11 months old.

\* \* \*

### NEW TENANTS

The 187 and PBM-3 engineering projects have moved into the Fallsway Building.

# BOX KITES TO BOMBERS

[Continued from page 13]

tion received one of its many set-backs. Even while the twelve-passenger closed-cabin biplane was taking form, newspapers over the nation were chronicling disaster. Back from the wars had come hundreds of young pilots with palms itching for the throttle and stick. Hundreds of military training planes had been thrown on the market and were gobbled up at used-car prices. Barnstorming and fair-hopping offered more excitement and better money than office or factory jobs. An enthusiastic public cheerfully paid \$15 for fifteen minutes in the air.

It wasn't so bad at first, but the lads had no ground crews now. Planes got out of repair and the overworked and overaged crates began falling out of the skies like ducks in a Maryland December. Public enthusiasm froze up, not to be thawed again until the Lindbergh episode.

Even the great feat of Col. R. S. Hartz and Lieut. Ernest E. Harmon in flying a Martin bomber 9,283 miles completely around the rim of the United States, with a hundred landings in thirty-one states, failed to distinguish between safe and dangerous flying. Airplanes, in the public eye, were still airplanes—and they were dangerous.

So the Martin transport, with its comfortable seats in its windowed cabin, failed to create the public demand that had been expected. The single ship wound up as an efficient Army transport, its first assignments being to carry the McCook

Field baseball team to its scheduled games.

The year 1920 saw more military business, including an adaptation of the MB-2 as a torpedo-bomber for the United States Navy. Here was something new! This ship, the MBT, had a divided landing gear to accommodate a 2,000-pound torpedo. It ushered in a weapon of war that our Navy was to use in a technique to be perfected into a terrible menace in another war.

Sadly Glenn Martin shrugged off his dream of "the heavens filled with commerce" and turned his whole attention to the building of military airplanes. He had long contended that the airplane was the mightiest weapon of modern warfare. The World War had not proven the point conclusively, by any means.

So it was that Martin found himself absorbed in the strenuous contentions of General "Billy" Mitchell, of the Air Corps, that bombers could sink battleships. And the pioneer was enormously pleased when General Mitchell selected the Martin bomber to demonstrate.

He proved his point, and thereby precipitated a long debate. In July, 1921, Mitchell sent Martin MB-2's from Langley Field on a series of missions off the Virginia Capes. There they sank two battleships, a cruiser and a destroyer!

**More about the Mitchell experiment and other Martin airplanes of the 1920's will be described in the next issue.**

## TROPHIES AWARDED TO TOURNAMENT WINNERS

[Pictures on Page 17]

The winter sports program got off to a flying start last month when sixty basketball teams went into action and the huge swimming pool at Baltimore City College was opened for use of Martineers. The pool, one of the largest in the East, is attracting hundreds of Martin people.

At the ceremonies attending opening of the pool, trophies to winners in the Glenn L. Martin golf tournament and softball leagues were awarded as follows:

### Glenn L. Martin Golf Tournament 1942

First Shift	Winner	Runner-up
First Flight	Earle Fowler	John Deaton
Second Flight	C. D. Barnhart	A. E. Fouch
Third Flight	D. J. Mackey	Robert Stewart
Fourth Flight	Donald Drennan	Joe Phillips
Fifth Flight	Ralph Stelzer	Murray Rhodes
Sixth Flight	Jack Hallstrom	Leo Riley

2nd & 3rd Shift	Winner	Runner-up
First Flight	George Stewart	Chuck Bechler

Second Flight	Ed Gunn	Ernest Wolfe
Third Flight	Howard Thomas	J. B. Hoffman
Fourth Flight	Jack Feldman	W. Walker
Fifth Flight	Thomas Buckley	Joseph Karl

Special Flight winner: Ed Vinroe

Glenn L. Martin Championship Playoff Match winner: George Stewart.

### Glenn L. Martin Softball League Winners 1942

Division	Winner	Manager
League 1	Sheet Metal	Russel F. Miller
League 2	Turret Lathe	N. I. Gernert
League 3	Turrets	Chas. Van Court
League 4	Protection No. 2	Grant C. Ridgely
League 5	B-26—Cowling	John D. Davis
League 6	Sheet Metal Bench	J. DiPasquale
League 7	Burr Knockers	Tony Gullace
League 8	Canton No. 2	Samuel Bonomo
League 9	Canton No. 1	Charles Hauer
League 10	Sheet Metal Mach.	Thomas Magee
League 11	190 Wings	R. C. Hogenson
League 13	Project Group No. 2	R. J. Weis
League 14	Hull Installation	C. Porter
League 15	3 C. U. Dept.	Chas. Millward
League 16	Tool Design	Herman Erkes
League 17	Tool Design No. 2	Ed Roache
League 18	Bec Wing	Robert Krieger
League 20	Fin. & Plat. No. 2	Edward Rassa
League 21	Tool Room No. 22	Roy Dzierwa
League 23	M. S. Extrusion	Joseph Crawford
Girls League	Fin. Dept. No. 2	J. Scanlon

Glenn L. Martin Championship Series winner: Canton Division No. 1, Charles Hauer, Manager.

\* \* \*

### UP THE LADDER

Recent promotions in PBM-3 Final Assembly include the appointment of Michael Ennis as assistant superintendent, Charles W. Donker as labor coordinator, and Elton D. Carter as production coordinator.

**CHRISTMAS V's.** The Bond Department gathers around the Yule tree and displays a three days' supply of war bonds---1,500 of 'em. It won't be so happy for the Axis.



# Box Kites to Bombers

## Bomb Heard 'Round World Dropped From MB-2

### CHAPTER XII

"A bomb was fired today that will be heard around the world!"

Maj. Gen. Clarence C. Williams, Army Chief of Ordnance, did not overstate. Indeed, the reverberations of that explosion of July 21, 1921, were to be heard completely around the world twenty years later.

It was a stunned group of Army and Navy officers and newshawks who stood on the decks of the naval transport *Henderson* that blazing day off the Virginia Capes to see the last act of one of the greatest of military dramas.

A few minutes before the tremendous bulk of the prize German dreadnought *Ostfriesland* had reared itself over the undulating green carpet of ocean. Now there was nothing to be seen, except a V of seven dots in the sky—seven Martin MB-2 bombers which had unleashed terrible bolts from their blue element. The ariplane had proven that it could sink a battleship!

High in the sky a man exulted. Several thousand feet below him he found an echo. Brig. Gen. William Mitchell, Assistant Chief of the Army Air Service, had proven a hotly-debated point. Now he sat at the controls of the lead Martin bomber, while Glenn L. Martin watched proudly from a ship deck as his winged giants wheeled back toward Langley Field.

Six months before, "Billy" Mitchell had started a tempest by telling the House Appropriations Committee that the airplane had "obsoleted" the battleship. He was asking for \$60,000,000 for the Army Air Service, and the equivalent, in cost, of a battleship and a half.

It had been seven years before—in August of 1914—that Martin had predicted that airplanes would sink battleships.

As the fire of controversy blew hotter, fanned by national press that sensed sensational events, the pressure was put on

Washington to prove or disprove the point. So it was that Navy Secretary Josephus Daniels and War Secretary Newton D. Baker arranged the test.

It was to be an elaborate affair. Four ex-members of the German imperial fleet were chosen as the targets. These ships had fallen to the United States when the remnants of the German navy were divided among the Allies. There was the submarine *U-117*, which had sunk American shipping a few years before. There were the destroyer *G-102* and the light cruiser *Frankfurt*. But the *pièce de résistance* was the 22,800-ton *Ostfriesland*, a powerful battleship that had played a major role in the Battle of Jutland.

The Navy got the first crack. Three of its F-5-L bombers were to attack the *U-117* on June 21. It was all over so quickly that it left the watchers blinking. Using only twelve 163-pound bombs, the F-5-L's literally smothered the sub-surface raider and in sixteen minutes it lay on the bottom of the Atlantic.

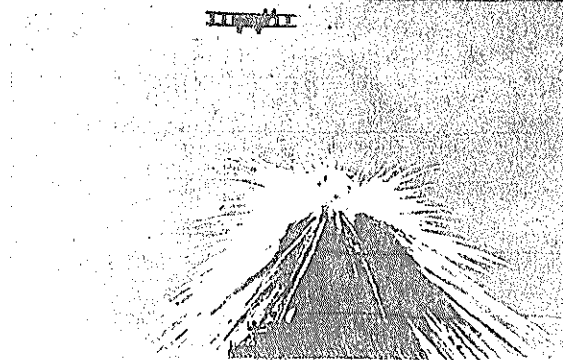
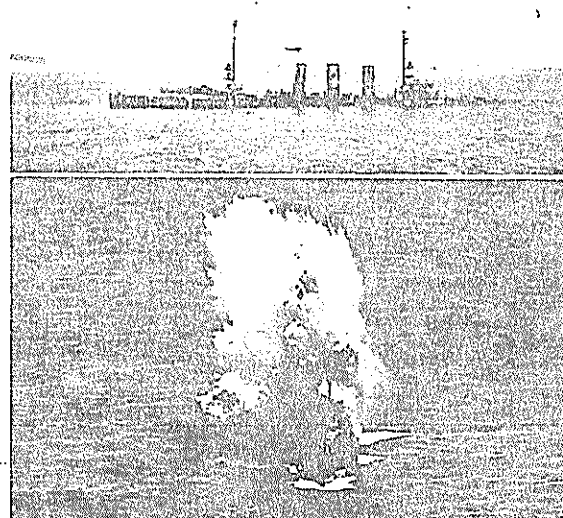
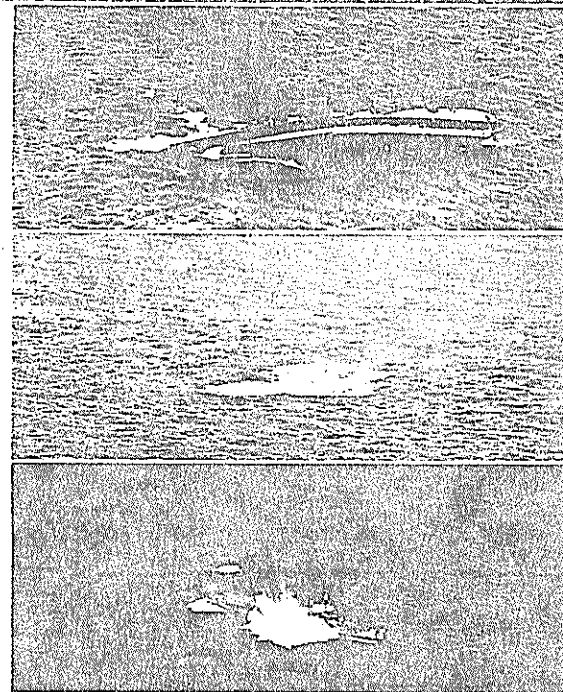
That was all for the day. But a sub was a frail craft. Just wait until they got to the bigger ships!

So on July 13 the destroyer *G-102* was towed out. It was General Mitchell's turn, and he led out his planes to simulate actual war conditions. Eleven low-flying S.E.-5's swished over and dropped 25-pound fragmentation bombs "to clear the decks." Then twenty-eight Martin bombers, carrying 300-pound demolition bombs, appeared at 1,500 feet. Down rained the bombs and nineteen minutes from the time the first was dropped, the *G-102* had sunk.

So far, the airplane had a perfect score. But what about heavier ships? The *Frankfurt*, for instance? Here was a stout cruiser built to stand major combat. She lasted just thirty-five minutes. On July 18 three Martin bombers swooped over, dropped eleven bombs and down went the *Frankfurt*.

Revealing though they were, these  
[Continued on page 22]

**MAKING HISTORY.** Martin bombers played a leading role in the 1921 sinking of warships from the air, shown in progressive steps in the border of photographs.





# BOMB HEARD ROUND WORLD SINKS SHIPS

## Martin Bombers Display Strength of Planes

[ Continued from page 9 ]

tests were but preliminaries. Then came the main event. Two days were allotted to the *Ostfriesland* attacks. The Armed Services wanted to see the effect of various sizes of bombs. On July 20 Army Martin bombers, Navy F-5-L's and Marine DeHavillands showered 230-pound, 520-pound and 600-pound bombs on the dreadnought, but the effect was hardly more than the tattering of her superstructure.

The big day was July 21. For this General Mitchell and Glenn Martin had been saving a surprise. There had been developed 2,000-pound bombs and the MB-2's had been fitted out to carry them.

When only seven of the Martin's appeared to administer the *coup de grâce*, some observers smiled. Seven puny Davids against an especially able-looking Goliath!

The rest is history. The MB-2's put four of the bombs alongside, a fifth directly on the deck and the other two at some distance. A series of flashes and explosions and great geysers of water deluged the great ship. As the water and smoke cleared, the *Ostfriesland* was seen sinking by the stern. A few moments later her bow reared toward the heavens and she rolled on her side and then slid beneath the waves. The whole business took only twenty-one and a half minutes.

The reaction was immediate.

"We must put planes on battleships and get aircraft carriers immediately," said Rear Admiral William A. Moffett. "That is now the great need. We must get them and quickly. We must put aviators on all our battleships to enable them to ward off air bombing attacks in the event of war, pending the time we get aircraft carriers."

In the same year the Navy Bureau of Aeronautics was organized, with Admiral Moffett as its first head.

An anti-climax to the whole business came in September of 1921, when the Army conducted further experiments with the old battleship *Alabama*, using gas, smoke and explosive bombs to study effects. Even when, on September 26, a single 2,000-pound bomb was dropped by a Martin bomber to send the dreadnought to the bottom, no one paid much heed.

The "impossible" had already been achieved.

Unique aircraft developments by The Glenn L. Martin Company will be described in the next installment.



WINNER. Glenn L. Martin presents the *Aero Digest* monthly award to Harry Kneische, assistant factory manager, as T. B. Soden, factory manager, looks on. Mr. Kneische won the prize for a suggestion to speed up production.

\* \* \*

## A TRIBUTE

"Flying conditions in the Southwest Pacific theater demand the best in equipment and we have the best. But it takes proper maintenance to keep it that way. Here the ground crews are doing a remarkable job. None of us could fly without them. In our April raid on the Philippines from Australian bases, I personally saw how vital they are to flying.

"The B-26 has a splendid combat record over Lae and Salamaua. In one raid that I recall, the B-26's, without fighter escort, shot down fifty per cent of the Japanese who attacked them.

"Too much credit for the success of that operation cannot be given to the combat crews who not only faced the dangers encountered throughout the trip to, from and during the raids, but who helped in most of their own maintenance and rearming once we arrived at secret bases in the Philippines. Their brilliant success, however, depended on the work previously done by the Air Force ground troops in Australia. He who does not pay tribute to the boys who keep them flying isn't much of an airman."

Excerpt from "Combat Notes from Down Under" by Maj. Gen. Ralph Royce, Commanding General, Southwest Army Air Forces Training Center, appearing in *January 1943 issue of Air Force*.

\* \* \*

## FALLSWAY'S SEMI-FORMAL

A big social project was engineered the night of January 22 in the Lord Baltimore ballroom, when Fallsway's PBM-3 and 187 Project groups held a semi-formal dance there.

# Martin Turret Wins Praise in Pacific Theater

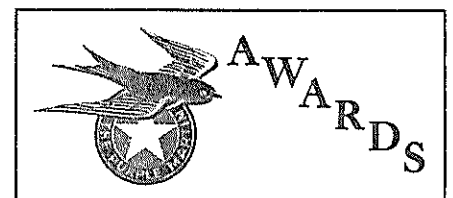
The B-26, with its Martin-built turrets, together with our system of supplying spare parts and sending out trained service men to keep the planes in battle condition, have made the name of Martin especially popular with our fighting forces in Australia and New Guinea.

That is the word brought back from Down Under by Henry Escher, Jr., General Electric turret expert, after a six-weeks' tour of inspection in Australia and New Guinea. General Electric makes the control and drive equipment of the famous Martin electric turret. Mr. Escher spoke recently to the entire force at Sinclair Lane and to selected personnel of Plants 1 and 2.

"Your turret is especially popular with the boys out there because it is so easy to operate and maintain," he declared. "Maintenance of aircraft, you know, is a major problem, and it is especially difficult in Australia because of the fine red dust that blankets so much of the north of that continent and gets into everything. I am not permitted to go into detail, but I can tell you that your B-26 and your turrets are doing a handsome job under trying conditions."

Civilians at home, Mr. Escher said, have no idea of the discomforts cheerfully borne by our men in the Pacific, or of the ingenuity they show in fighting our extremely resourceful enemy.

\* \* \*



[ Continued from page 8 ]

to be combined in any desired valve arrangement.

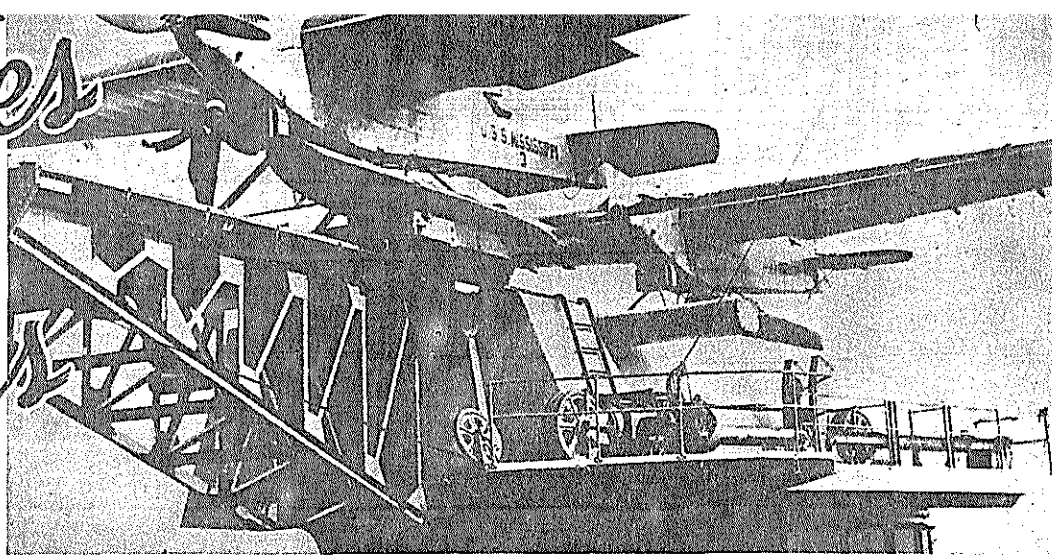
RALPH L. BELL (19)—variable train release switch adapted for control of bomb-dropping apparatus.

HARRY M. SHEALEY (15)—improved seal for fuel containers.

ANDREW A. ANDRAKE (21)—scuttle valves for fuel tanks; improved lubrication system; improved fuel tank supports; method of manufacturing cowlings; improved tanks for storage of hydrocarbon products.

HARRY A. CRAMER, JR.—electrical switches which prevent damage due to over-travel in automatic switches.

# Box Kites to Bombers



## CHAPTER XIII

That the *Ostfriesland* incident was the germination of the Navy's real air forces is not to be doubted. Airplanes could sink ships—that had been demonstrated, so the new Bureau of Aeronautics set about without delay to explore the capabilities of the winged weapons. And it explored them very thoroughly, for in the next few years numerous "X" (experimental) projects were instituted with aircraft manufacturers.

The Glenn L. Martin Company was in the van, and the nineteen-twenties saw some interesting developments. In April, 1922—a few months after the sinking of the warships off the Virginia Capes—the Navy awarded the Company two contracts, one for three M20-1 observation planes and another for six MO-1 observation planes.

These MO ships were unusual indeed. Designed to mount either landing wheels or floats, they were amphibious in character. But that was not all. Experiments proved that it was practicable to catapult the airplanes from battleships. The Navy had previously catapulted smaller airplanes from the decks of warships, but this was the first time it has used ships of considerable size.

The MO-1 was the first all-metal seaplane and there was some excitement about it. In fact, a new contract for thirty more was signed three months after the first one flew. It was a high-wing, cantilever monoplane, powered with a Curtiss D-12, 375-horsepower engine and it was

used in short-range observation with the fleet, as well as in shore-based missions. It carried a crew of three.

It was about this time, incidentally, that another milestone was marked by Martin in the development of a supercharged airplane—a special MB-2 Army bomber—in which Capt. A. W. Stevens made his incredible parachute record from 24,206 feet over McCook Field at Dayton. That was in June of 1922, and in August Lieut. Leigh Wade took it to 23,350 feet for a new altitude record for an airplane with three passengers.

Early in 1923 Martin also developed the N2M-1, a new-type training plane for the Navy, and almost simultaneously won a contract from the Air Mail Service for three night mail planes of special design. All of this in addition to the continuing production of MB-2 models for the Army.

The Navy was overlooking no bets. Having acquired airplanes that could be used as the eyes of the battleships, it decided to explore the possibilities of eyes for submarines.

On April 17, 1923, the huge doors at the Cleveland plant, which had discharged many a twin-engined leviathan, opened and a tiny mouse of a seaplane scuttled out. It was the first of a half-dozen MS-1's, the little submarine scouts which were intended to range ahead of submarines, find victims and then fly back to be taken aboard. "Ducky" Pond, the test pilot, grinned appreciatively as he all but pulled the plane on over himself as he took his seat. But the little ship, its three-cylinder radial engine chattering

noisily, took off nicely and Clevelanders got a belly laugh when a giant MB-2 swooped close to it. They looked for all the world like an aerial cow and calf.

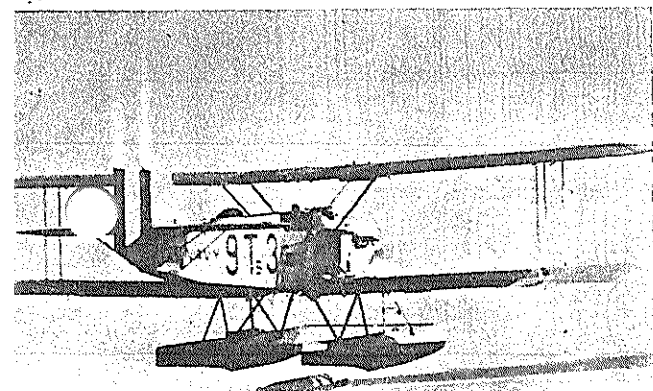
The Navy developed a technique for use of the submarine scout. The submarines would submerge partially and bring their decks up under the floats of the MS-1 lifting it high and dry. The removable wings would be lifted and the fuselage would slide into a special tank-like container on deck and the wings placed in after it. The tank would be closed and the sub would move off on its mission, reversing its procedure to launch the scout. The MS-1 had a wingspan of 18 feet and an overall length of 17 feet. It stood 7 feet 6 inches high on its tall little pontoon structure and it had a speed of 100 miles per hour.

The Glenn L. Martin Company facilities at Cleveland were being used to the last square foot of floor space by now. With Army and Navy production lines crowded and Experimental constantly toiling with new specifications, business was booming.

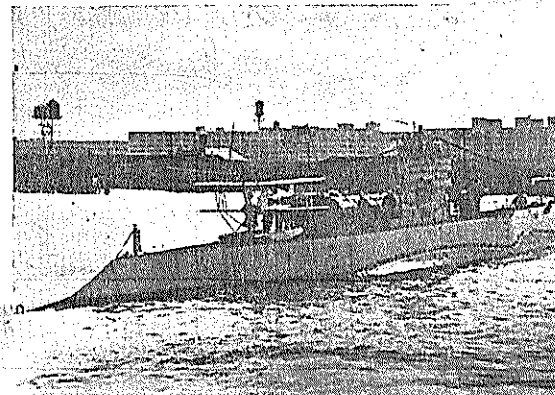
It was at this point that Glenn Martin's financial backers imposed on him the soubriquet "The Grounded Falcon." He had been one of the world's greatest flyers, but bankers and insurance men thought it ill became the president of a big company to be flying tricky new military airplanes around. Besides, they weren't sure it was safe.

Then came another important development in naval aviation. Without know-

[Continued on page 22]



FOR THE NAVY. Two MO-1's perched on the deck of the U.S.S. *Mississippi*. At left the T4M-1, the first successful large plane for aircraft carriers. To the right is the submarine scout plane, model MS-1.



# Four Complete 100 Years' Service

[ Continued from page 5 ]

Thomas B. Soden, who as director of industrial relations has the task of looking after the happiness and welfare of his thousands of fellow-Martineers, came to Martin's as a woodcraftsman. The route lay through Kilmarnock in Scotland through the Cape of Good Hope, Cleveland, Panama and then back to Cleveland. His first job here was making wood detail parts; soon he was foreman of the entire wood shop.

The all-metal plane came. Mr. Soden taught himself to work metal, taught his fellow woodcraftsmen to work metal. The first order of all-metal planes went out on schedule.

When the plant moved to Baltimore, he became general foreman, then assistant superintendent, then superintendent, then factory manager, and now director of industrial relations.

Henry J. Kramer, general foreman of Small Parts Division, PBM-3, is another woodcraftsman who weathered the shift from wood planes to metal ones. He started out helping make wooden wing ribs, soon took charge of the whole rib department.

Then the old story: wood out, metal in. Mr. Kramer stuck with the job—stuck so well, in fact, that he hasn't missed a day's work in his twenty-five years. When the Navy called for the PBM-3, he was right there. Today he builds their center wings and detail parts that go elsewhere in the plane.

Walter C. Pike, superintendent of Maintenance, has held that job twenty-four of his twenty-five years. That doesn't mean he's been standing still twenty-four years: where he and a handful of men used to look after one building in Cleveland, he and his staff now handle the maintenance of Plant 1, the B-26 Army Division, and a number of buildings in town.

Mr. Pike and his men and women set up factory machinery, repair electrical breakdowns, keep plumbing working, and keep in working order such contraptions as heat-treat furnaces, time clocks, auto call system, elevators, overhead cranes, electric trucks, lighting systems, typewriters, buzzers and cash registers. His phone is usually busy.

Ladies and gentlemen, we give you a hundred years on the job: Mr. Vollmer, Mr. Soden, Mr. Kramer, Mr. Pike.

\* \* \*

## HOLD DINNER-DANCE

A dinner-dance was held by 154 members of Finishing & Plating, first shift, Plant 1, at Sellmayer's Hall. The music of Bill Yaeger and unusual refreshments featured the proceedings. Vance Stitt was the committee chairman, aided by Jim Shepling and George Homberg.



VISITORS. Maj.-Gen. Oliver P. Echols, Chief of Materiel Command, and Lt.-Gen. William S. Knudsen, Chief of Procurement, recently visited the plants and talked with William K. Ebel, Maj. H. F. Saehlenou, Harry T. Rowland, Glenn L. Martin and H. F. Vollmer.

## VICTIM OF CRASH

Friends and former associates recently learned of the death in an airplane crash of Lieut. Edward T. Layfield, Air Corps, U.S.A. Layfield was a final assemblyman in Plant 1 from December 2, 1940, until August 28, 1941. Born in Hampton, Va., Layfield attended Charles City High School and later attended Vocational in Baltimore, graduating in 1936. He matriculated to the University of Baltimore, where he studied law two years.

# Box Kites to Bombers

[ Continued from page 11 ]

ing it, the United States Navy was beginning the development of a set of techniques that the war lords of a new World War were to copy with devastating effect.

Torpedo operations with airplanes was not new. The Navy had tried it out with several types of airplanes, including a variation of the Martin MB-2. But now specifications were laid down for a bomber designed especially for torpedo launching. Martin won the contract for thirty-five of these ships, which were designated the SC-1, and seven months later "Cy" Caldwell, famed test pilot and now the revered silver-haired writer and authority on aviation affairs, took it up for its first tests.

This spraddle-legged beauty, slinging a vicious torpedo between its specially-built landing gear, was a formidable weapon indeed. And before the contract was more than half finished, Martin had an order for forty more of an improved type, the SC-2. These were succeeded in 1926 by the famous "TM" ships—"three-purpose airplanes," suitable for torpedo craft, bombers or observation planes. The Navy was going in for these ships in a big way.

Of the T3M-1's Martin built a hundred. Then the Bureau of Aeronautics pyramided its discoveries. Why not a torpedo bomber that could be launched from a carrier? So Martin was ordered to build a variation, the T4M-1—still a three-pur-

## HILMER IN CHARGE OF MODIFICATION CENTER

William Hilmer, superintendent, Body Department, has been appointed superintendent of the new Modification Center for "Mariners" near Annapolis. Alexander J. Brescia, his assistant, is acting superintendent in his absence.

Mr. Hilmer was first employed by the Martin Company in 1929. He has been a carpenter, woodworker, assistant foreman, foreman and superintendent. Mr. Brescia arrived a year later and has been with the Company, excepting for an eighteen-month period, ever since as mechanic, leader, sub-foreman, foreman, night supervisor and assistant to Mr. Hilmer.

\* \* \*

## USES INGENUITY

Vernon Morris, Body, Army Division, first shift, took quite seriously his instructions to report for work the day after the shutdown. Morris called every taxi company in the city. The answer was the same everywhere. No. So he called the Office of Defense Transportation. They secured a cab for him and he put in his usual day's work.

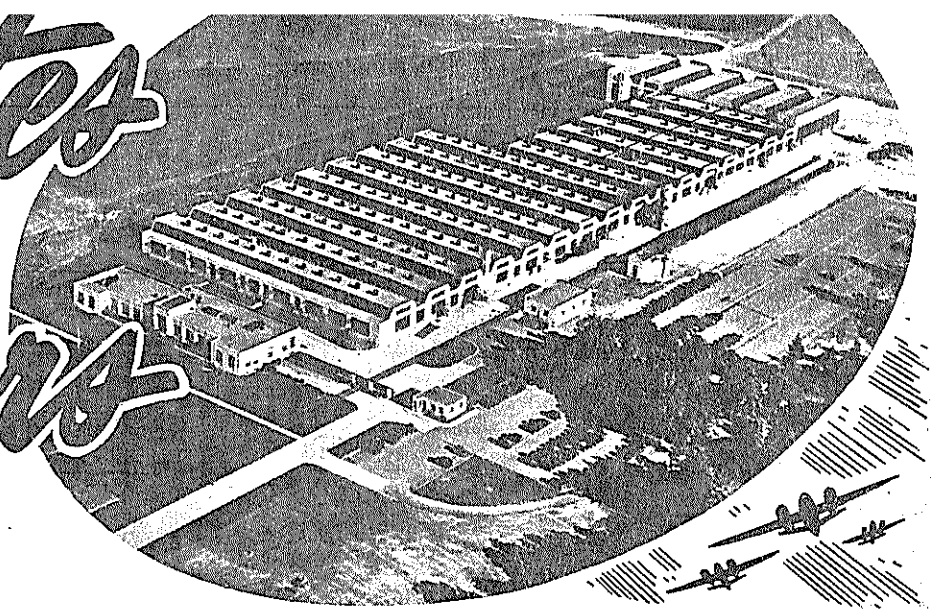
pose airplane, but with the carrier operation as an added feature. It was a success and a contract for 102 of the biplanes was signed.

Meanwhile, the Navy had been experimenting with a new idea—dive-bombing. It was an unfamiliar term, but it developed, as history was to prove. The first early trials had been with small bombs carried on airplanes not feasible for the job. Now Martin came into the picture with a new plane, the XT5M-1, built especially as a dive-bomber to carry demolition bombs, and the first airplane to carry a 1,000-pound bomb in a terminal-velocity dive. This was to lead to the famed Martin BM-1 and BM-2 ships, which really set up the devastating art of dive-bombing several years later.

But things were getting too hot for the St. Clair Avenue plant at Cleveland. It was crowded to the doors and now it was apparent that the Navy was to go heavily into patrol boats, and Martin was to build them. Besides, Glenn Martin was thinking of much bigger boats—craft that would fulfill his old prediction of a score of years before. He wanted to be on tide-water. He wanted to be near Washington. He walked out of his busy office, packed a suitcase and headed for the Atlantic coast.

The move to Baltimore, the patrol bomber era and Martin's own "secret weapon" will be described in the next installment.

# Box Kites TO Bombers



## CHAPTER XIV

The Glenn L. Martin Company's move to the Atlantic Coast was not achieved without a few headaches. Glenn Martin didn't want just another plant site; his specifications were exacting.

He wanted both an airport and a good water facility at the plant. He wanted to be near Washington, the wellspring of his contracts with the Government. He wanted to be in an industrial center with a good supply of craftsmen, yet he wanted enough elbow room for the future he saw for his company. He wanted a moderate climate, with year-round flying weather.

And he wanted good railroad connections at his plant.

Along the seaboard the pioneer ranged eyes roving for his ideal site. He settled upon the Chesapeake Bay country. Word got around. He was the center of attention. He was escorted to this airport and that while gesticulating officials expounded their virtues. He could have anything—for a fancy price.

Then, one day, Martin found his spot near Baltimore. It was where the broad estuary of Middle River reached a narrow finger until it almost touched the main line of the Pennsylvania Railroad, twelve miles out of the Maryland metropolis.

Martin marked the spot carefully on a road map, handed it to W. A. Crenning, the company purchasing agent, with a laconic instruction to "get us a thousand or so acres there." Then the wily Martin never went near the place again. He was much in evidence around Maryland, followed by newshawks, while Crenning was quietly buying up the land—1,260 acres of it. Land sharks never got a look-in, and the price was favorable.

"Why did you buy so much property?" Martin was asked.

"We will need it some day," he replied. "Besides, we hope that the day will come when we will have a thriving residential community here."

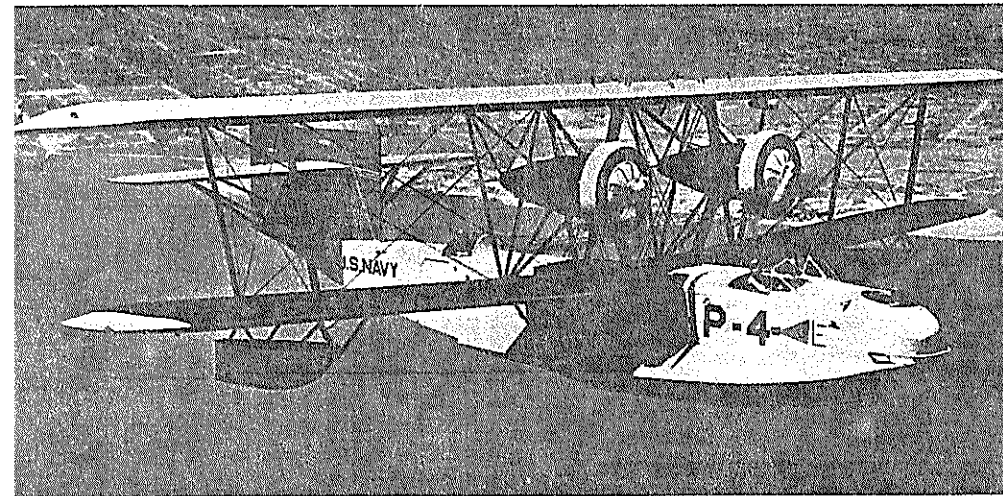
Architects went to work to lay plans for the factory. After numerous conferences with Mr. Martin, they came up with perspective drawings of the layout. They showed a tremendous factory, airport, hangars. An ambitious project indeed!

"Of course, we will build only a small section of it now," Mr. Martin confided, "but it is our master plan for the future."

Today that 1928 drawing hangs on a wall of the Administration Building. It is a fairly accurate picture of the Martin factories of 1943, except it is a bit modest—the Army Division is not even on the original plan! And all of that took place in fifteen years!

The first Martin unit was a single long, one-story, daylight structure. It was an entire airplane factory in 1929, but it was ultimately to be only a shop in the full

{ Continued on page 22



**MOVE TO BALTIMORE.** Above is the original factory of The Glenn L. Martin Company as it looked in 1932. At left are first two models produced in the new plant for the Navy: the PM-1 (at top) and the BM-1.

## DEVICES BRACKET WHICH CUTS INSTALLATION TIME

(Photo on Picture Page)

It used to take an hour and 50 minutes to install a working platform support or bracket on the front spar of a PBM-3 center wing. Thomas Selway, 26-year-old veteran of four years' service in the Surface and Floats Department, decided to do something about it. Clamps had to be put on the outer ends of the bracket and it had to be splined in with the rib at the forward and aft ends. Too much time was wasted.

So Selway devised a wood tool at his home which cuts installation time to 40 minutes. The bracket is built inside the walls of this V-shaped tool. If it fits the tool, it will fit properly onto the spar. Once built the installation problem was simple.

\* \* \*

## MODEL BUILDER PUTS EXPERIENCE IN USE

Mike Lapauski, Surface & Floats, Army Division, a Martineer of two years, has always had a deep interest in airplanes. He likes to build planes. As a boy, building model planes was his chief hobby. Six years ago, with the aid of his brother, Mike turned out his first sport job. Yes, he was ready for his first flight in a plane that he had created himself. However, due to some unbalancing of the engine he discovered he would have to wait a while longer.

Two years later, still assisted by his brother, he completed another plane, a much improved one because of his previous trials. The engine balanced to precision and a thinner, better material for wings was used.

Today, Mike is doing the kind of work in which he has always been interested. He feels it a privilege to follow-up a life long hobby by actually working on the real bombers.

—LUCILLE MANNING

\* \* \*

## Sets Unofficial Record

Bill Robinson, second shift inspector in Surface & Floats, Army Division, rolled a score of 255 to set an unofficial ten-pin record. Stopping in to bowl a game at Aero Acres the other day, he began with an 8 in the first box, got a 7 in the next, and then really let out. He made a strike in each of the following boxes to chalk up the 255.

\* \* \*

## 100% Blood Donors

The War Production Drive Committee in Surface & Floats, first shift, Army Division, volunteered 100% to give blood to the Red Cross Blood Donor Project. Not to be outdone when several came up with slight colds and were turned down by the Red Cross, they produced husbands, wives, and friends to more than make up for the loss.



STUDENTS. Future members of Inspection and Engineering are taking special courses at the Johns Hopkins University. Here they are listening to a lecture by Thomas Hubbard.

## The Cover

During the Middle Ages when battle was waged on a man-to-man basis and the chief weapon was the sword, the armorers of ancient Toledo in Spain made the finest, most flexible, most durable of them all. The possession of a "Toledo Blade" was a source of pride to those ancient warriors and are treasured items today among collector's trophies. The Martin Baltimore is such a weapon in modern warfare—sturdy, reliable, capable of downing a worthy foe when in the hands of a competent fighter.

The cover was photographed in Kodachrome over the Martin airport by W. Neal Siebold, STAR staff photographer.

\* \* \*

## RADIO SINGER MAKES BOMBERS THAT HUM

(Photo on Picture Page)

Mrs. Ruth Wilson Dashiell is a vivacious, pretty blonde who combines charm with vocal ability. A former radio singer, she is now in Final Assembly.

With the name of "Bunch of Dynamite," this pert lass from Crisfield sang over WSAL in Salisbury. Her specialty was blues singing and her theme song was "How'm I Doin'."

She has sung several times with such orchestras as Blue Barron and Gray Gordon and has also performed at club parties, churches, banquets and dances all over the Eastern Shore.

At the Glenn L. Martin Company since February, 1942, she has given up singing and can operate the Erco machine and electric drill as well as the other tools required for her job. Her husband is in the Army.

\* \* \*

## Must Be The Gremlins

George Vieller, guard at Fallsway, isn't superstitious, but can't help wondering why the number 13 plays so vital a part in his life. He was born on a Friday, the 13th, his mother died on April 13, his son was born on May 13th, and there are 13 letters in his name.

## Practices What She Preaches

Evelyn Karpovitch, Surface and Floats, Plant 1, was moved by the "Sleeping Tool" campaign. When she arrived more than a year ago she was prepared for mechanical work with this new set, but her superiors discovered she had an uncanny knack for remembering numbers, so was placed where she handled parts and found no need for her kit. Today the tools are in service in the hands of several of her S & F colleagues, present from her.

\* \* \*

## Box Kites to Bombers

[Continued from page 9]

scheme of things. Today it is "A" Building of Plant 1.

The new plant was still under construction when the Company first moved to Baltimore. Manufacturing operations had to go on, so Martin leased space in the Canton warehouses—space which now is one of the divisions of the Baltimore group.

It was at Canton that work was started on the BM-1—the first practical dive-bomber. It was with a fleet of these ships, carrying 1,000-pound bombs, that the United States Navy developed the tactics which the German Luftwaffe was to copy with world-shaking results a few years later.

So new were ships and technique that the first two airplanes of this great line crashed, one killing Ed Ritchie, crack Navy test pilot, and the other carrying Ken Ebel, one of the world's greatest test-pilots and now vice-president of engineering, within a few hundred feet of the ground before he could shake free and crack his 'chute. From both of these accidents came engineering knowledge that was to be invaluable to military airplanes and aviators.

The major portion of the BM-2 (second edition of the BM-1) contract was completed at the new Middle River plant. At the same time, Martin began production of another new type for the Navy—the PM-1, a twin-engine patrol boat designed for coastal and ocean patrol and protection. As many of these lithe craft were built for the Navy, they marked Martin as a manufacturer of naval flying boats which ultimately were to develop into large ocean-crossing ships packing heavy loads of bombs on long-range missions.

Meanwhile, important developments were afoot. Martin was working on a ship that was to revolutionize military aviation and render obsolete practically all of the world's aircraft.

[The Martin B-10 and its impact on military aviation will be described in the next chapter.]

# Box Kites TO Bombers

## CHAPTER XV

Startling the world was nothing new to Martin; man and Company had been doing it for almost a score of years when 1931 rolled around. But there was a definite thrill when a sleek metal monoplane soared over the upper reaches of the Chesapeake and screamed along at an "incredible" speed, well over 200 miles an hour!

The whole business was cloaked in secrecy as the ship flew out to Wright Field to be put through the Army's gruelling paces, but soon it came out. Here was a bomber nearly 100 miles per hour faster than the service bombers of its day! At a stroke it made obsolete nearly all the world's military aircraft. Not only did it carry a heavy bomb load, but it travelled at speeds greater than the pursuit ships of that day.

That was the XB-907—forerunner of the Martin B-10 and B-10-B series, the famous "Flying Whales." Martin had started the airplane "on spec."—that is, if it was a good and acceptable airplane, all was well; if it were not good, its high development cost would be written off as loss. But before the job was done, the Army recognized its possibilities and Wright Field cooperated closely during construction and offered an experimental contract which shared the development expense.

As was customary, a "service order" for thirteen ships then was given the Company by the Army (so the Air Corps could observe them in actual service). These were known as the YB-10's. They were followed by the YB-10A, the YB-12, and the YB-12A and the YB-14, totaling some thirty-five more ships before the big production order for the B-10-B came through.

What a sweetheart she was! With the cleanest lines ever seen on a military ship, the latest Martin Bomber had

more to offer than her great speed and striking power. She was the first large all-metal monoplane (up to that time bombers had been of tubular steel framework with fabric covering and most of them had been biplanes), and she had firepower that was immense for her day.

In addition, the B-10-B carried the first enclosed turret for a gunner—a revolving affair that was to be widely copied and reached its culmination when Martin developed America's first power-operated gun-turret later in the decade. The experimental model had had an open gunner's cockpit with a windshield, like other bombers of its day, but it became readily apparent with the great speed of the airplane that no gunner could stand in that air stream and operate machine-guns with any degree of accuracy. Hence the enclosed turret was devised by Martin engineers to solve the problem.

And there was an extra thrill for Glenn Martin. He was notified that he had won the Collier Trophy, aviation's highest award! In 1933 Martin and his Mother stood in the White House in the presence of a distinguished gathering while the pioneer received the great trophy from the hands of President Roosevelt, for achievement in 1932.

In the next several years Martin Bombers again were the most familiar

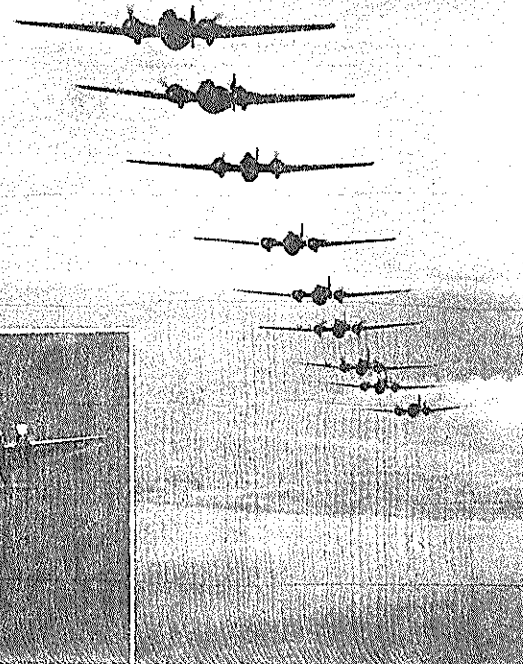
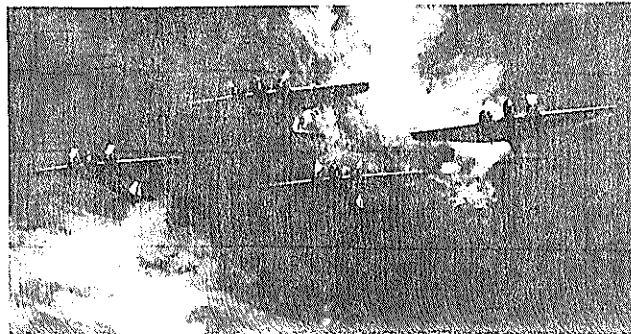
ships on American military airfields. The world was re-shaping to the new capacities of bombardment aircraft. A clamor was set up for the B-10-B in other countries, and in 1936 the Army released the type for export.

First prospective customer to come forward was Spain, and it seemed that Martin 139W's (export version of the B-10-B) were going to swarm the peninsular nation. But suddenly the negotiations were cut short; civil war flamed, and the Spanish Revolution was in full blast.

But that was an interlude; other countries were knocking at Martin doors. Argentina had let the world know that she was in the market for military aircraft, and in August, 1935, a Martin pilot went to South America in a B-10-B. Test Pilot Ellis D. Shannon took off in a 139W and performed

[Continued on page 22

IN FLIGHT. At right and below are two of the most famous pictures of the B-10 in formation flight. At top, close-up of the revolutionary bomber.



## SHIELDED ROOM TO TEST RADIOS

A shielded radio test room, in which the aircraft system can be accurately tested for interference from the plane's motors, generators, voltage regulators, and other electric noise-making equipment, has been designed for installation at the plant.

The outstanding feature of the room is its absolute insulation from all outside electrical fields. An engine or a gun turret may be wheeled into the room and operated simultaneously with the radio, the engine to be driven by an electric motor, so that the source of radio interference can be definitely established. Corrective methods can then be engineered. Without such a shielded room these tests are of little value due to the high electrical noise level in the vicinity of the plant.

The shielding is achieved in the construction of the room, which is actually two shielded chambers, one within the other. The inner chamber is built of maple and lined with copper sheeting and is mounted on pillar type insulators. Its inside dimensions are 20 by 12 by 8 feet. The chamber inclosing it is a few inches larger in each direction and is built of similar materials, except that the copper sheeting is on the outside.

The room is so designed that it can be located in the basement of an existing building or set up as a structure by itself. Lynn Cobb, of Engineering, devised the room under the direction of Dr. Edward E. Minor, Development Section, and Kenneth R. Smythe, Design Engineer in Charge of Radio.

This project is now under construction and it is expected that the new equipment will greatly facilitate the engineering of satisfactory noise-free radio installations.

★ ★ ★

### BLOOD DONORS

The first group of blood donors from Body, Plant 1, first shift, went in thirty strong to Red Cross donor headquarters recently. They were all Body Production Coordinators, gave nearly four gallons.

★ ★ ★

### The Covers

The front cover on this month's Star was taken in a PBM-3 jig in "B" Building and pictures four workers performing some of the initial steps in the construction of a Mariner hull. Taken in Kodachrome by W. Neal Siebold, the picture shows Leona B. Fraley, Loraine Hlaston, Myron O. Mack, and Barbara J. Bobst.

On the back cover is pictured a Marauder at the airport upon completion of a test flight, propellers still whirling to the deep-throated roar of its mighty motors and landing lights gleaming in the rapidly falling dusk. Fred Parker took the photograph, which has already been widely reproduced.

## "Pinky" Knows the Alaskan Airfields

[Continued from page 5]

Small wonder, then, that Pinky and the other service men had to use a lot of guess work at first in making plans for Aleutian operations. They gradually learned to deal with an entirely new set of flying conditions.

"If something goes wrong, it's blamed on the weather man or the plane manufacturer," says the young Martin representative, who started working in final assembly six years ago before joining the Service Department a few years later.

Like all good service men, he knows his planes thoroughly, is an efficient trouble shooter. Pinky worked with the Air Corps Supply crew in Alaska

on shipment of parts, followed the *Marauders* there wherever they went, listened to enlisted men and officers as they unburdened themselves of flying problems as well as their own domestic troubles. It was a twenty-four hour a day job most of the time, with the aid of very little equipment.

"They're happy when they're beefing up there," says Pinky. "And I guess there's plenty to beef about; mud, dust, mosquitoes, rain, not a tree anywhere."

The men lived in tents, later in Army huts. Umnak and Anchorage were desolate. Everyone carried gas masks, life preservers, iron hats, on guard for a surprise visit from the Nips. Pinky grew a beard and moustache, "Just a pastime, not to keep warm." They passed the long winter evenings reading six-month-old magazines, playing cards, discussing the good meals they would have when they got back to the States.

## Box Kites to Bombers

[Continued from page 7]

a feat amazing for its day. He flew down the coast of South America, lifted the lithe ship over the hump of the Andes and breezed into Buenos Aires.

But Shannon was not alone. Germany and Italy had rushed their best bombers in for competition, and Argentina then was reputed to be under a strong German influence. But in the ensuing trials, the Martin was so far ahead of its competitors that it was selected by both the Argentine Navy and the

Russia is reported to have copied the model.

The ease with which the Baltimore firm turned out and delivered several hundred airplanes to foreign countries was a revelation to the aircraft industry. The answer was easy; Martin knew the B-10-B as an outstanding ship and was confident that many of the type would be built. The emphasis would be on speed of production, so the plant was tooled as no plant ever before had been. It was a trick that was to be used again when a world conflict was imminent and the Company once more was to have a revolutionary type.

But perhaps the greatest testimony to the B-10-B and its sister 139 was the performance of these ships two full years after the beginning of World War II, when Japan struck its cowardly blow at the United States and turned to gather in the lands of other Asiatics. Valiantly, effectively did the Martin Bombers fight when the Yellow Peril struck at the Indies. There will ever be emblazoned on the pages of history the gallant stand of a dozen Martin's and a handful of Dutch pilots who sank twenty-six Japanese ships, including a battleship, accounted for some 26,000 Nipponese lives and a good quota of the famous Jap Zero fighters and German Messerschmitt's. And when the dozen warbirds were silenced, it was not in combat, but by enemy bombs which found their secret airfield.

But Martin's name was spreading in another direction during these busy '30's—over the world's peaceful airways, as winged monsters soared across the vast Pacific to set up the world's first transoceanic commercial airline.

The story of the China Clippers, an old dream come true, will be told in the next installment.

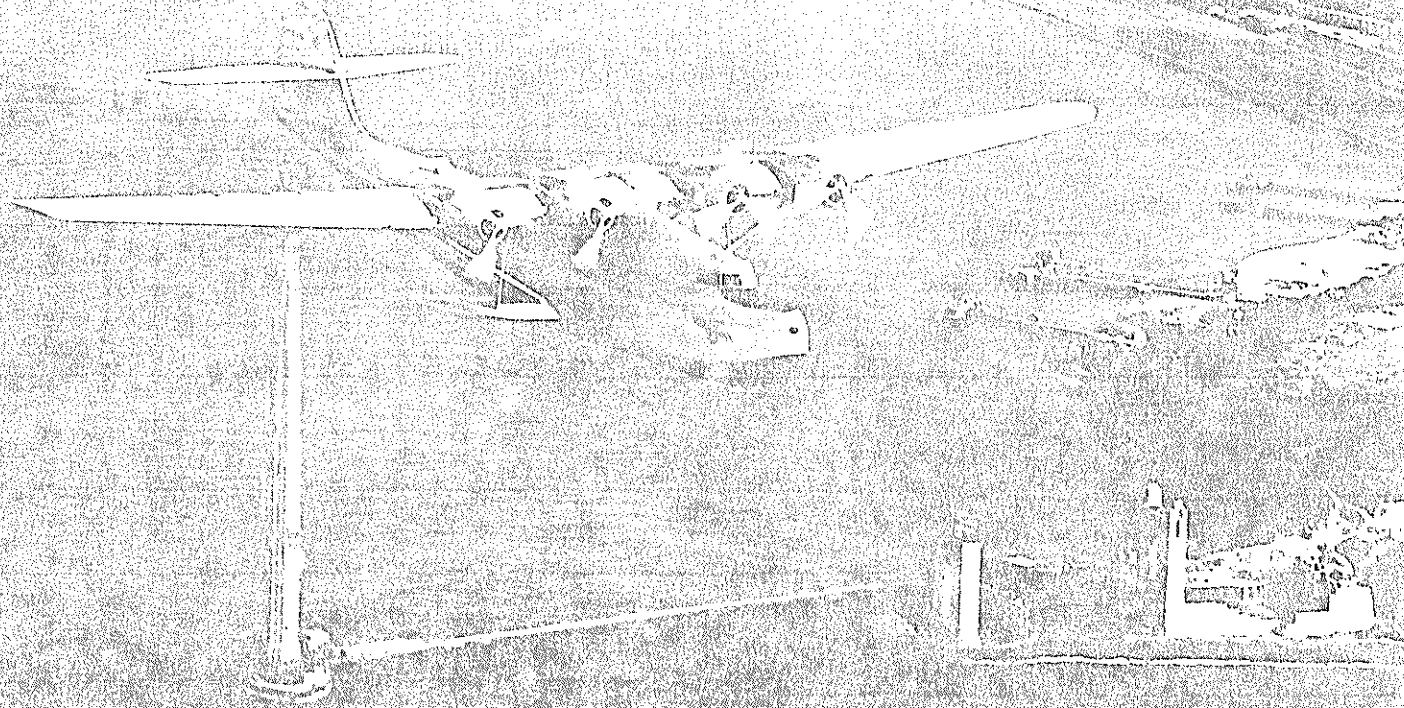


GLENN L. MARTIN receives the Collier Trophy from President Roosevelt at the White House in 1933.

Argentine Army. Clearly, it was the foremost bomber in the world, and contracts with both services of the country were signed.

But the first and largest foreign customer was the Dutch East Indies Government, which had been Martin's first foreign customer back in 1913. Again the Martin Bombers were to be the backbone of the defense of the East Indies. China, Siam, Turkey then placed substantial orders and Russia bought one airplane (which is supposed to account for the so-called "Martin Bombers" which appeared in the early news dispatches of World War II) for

# Box Kites to Bombers



*The China Clipper Heads West on Her First Scheduled Flight*

## CHAPTER XVI

During the early days of Martin operation at the new Baltimore plant, the company played an important part in both Army and Navy developments in the air arms. The evolution of the B-10 as the world's outstanding bomber had its counterpart in the first practical dive-bomber and an advanced type of patrol plane for coastal operations.

The BM-1, with its 1,000-pound bomb, drew the eyes of the entire military world as Navy pilots developed a new technique of bombardment—a technique that later was to languish in America when the new high-precision bomb-sight was to alienate interest to high-level bombing. But Germany was to appropriate the technique, hold it in secrecy and confound Europe with smashing dive-bombing attacks in a new world war. The PM-1, a shark-like twin-engine flying boat, was an important tool for the Navy's herculean task of patrolling the vast shorelines of our continent. Large numbers of both of these types were produced at the same time that the B-10 was being turned out in quantity production for the Army.

But Glenn Martin was not satisfied,

even with these highly successful evolutions. There was another field yet to be tilled—the transoceanic commercial. For many years Martin had believed that the airplane ultimately would take up the burden of ocean transport.

Down in the Caribbean a fascinating development was taking place. The breakneck boys had ceased to dunk themselves in the ocean; public interest in stunt flying of the oceans had waned, and the adventure was no longer profitable. Now Pan-American Airways was doing a conservative but, withal, spectacular job of over-water commercial operation. It had shuttled down the West Indies; it had jumped to the South American mainland and had pushed its line deep into the South, carrying passengers, mail and express—and showing an operating profit. Its safety record was impressive. Its crews were highly trained in aviation. The public was showing a remarkable confidence in multi-engine flying boats.

Here, then, was the laboratory of ocean flying. Martin cast eager eyes at it. So it was when Pan American asked for airplanes that would span the oceans with safety and still allow a profit, Martin was one of only two aircraft manufacturers who jumped at the

chance. The Martin design won, the while sage engineers gazed upon it and shook their heads.

"It can't be done," they said. "Such a ship can't be built, much less fly."

But as months rolled by there began to take form in the Martin factory (now A Building, given over entirely to shops) a great hulk of a boat. The idea of putting wings on such a monster seemed fantastic. How could it ever get into the air? To this day, some of the older Martin craftsmen admit some misgivings, but there were none in the Engineering Department and none in the front office. Two other similar hulks were taking form.

"They will fly," said Glenn Martin, Ken Ebel and L. D. McCarthy, the project engineer.

Then came a red-letter day. The huge China Clipper started her short journey down the ramp for Middle River, her great wings flashing back the sunlight, her four big engines reaching forward. A great crowd stood on the banks and a cheer went up as the giant slid into the water and strained at her ropes. Cameras clicked, reporters jumped for telephones.

A newshawk approached Glenn Mar-

*[Continued on page 22]*



## Write Your Man In The Service

[Continued from page 10]

as possible. A letter done neatly on nice-looking stationery is cheering even before the first word is read. Send snap shots of yourself, the family, friends, and pets. He'll love them and proudly show them off to friends.

Be yourself, but only to the extent that that person is a happy, confident self. A boy who has spent the last three nights in a fox hole, snatching only a little troubled rest between bombing raids and eating only his Army Ration C won't be much impressed with petty whining over gas rationing and the high price of clothes. He might feel that his suffering and perhaps dying is not appreciated.

Encourage the men of the family to write. Letters from wife, mother, or sweetheart are his very life, but he needs the "man talk" news from Dad or brother or his pal at home. As for Dad, tactfully censor his letters for opinions on the horrible state of the Government, rationing, tires and the other troubles of civilian life. After all, Dad is voicing an *opinion*. Your service man is fighting for his life and yours.

Reading beautiful letters written by others is inspiring. Imitating them is a mistake. Be yourself and imagine you are talking face to face. Write as if you were talking to him—the way you will be talking to him one day soon.

## Box Kites to Bombers

[Continued from page 7]

tin where he sat in an automobile with his mother.

"Is there any doubt about her flying?" he asked.

"I'm interested in those ducks," Martin smiled easily, eyes gazing toward a flock skimming low. "They don't worry about flying."

Presently the crew went aboard—Ken Ebel, one of the world's greatest test pilots, and then Assistant Chief Engineer of the company; McCarthy, the project engineer and co-pilot; Benny Zelubowsky, the flight engineer and foreman of Experimental, who was to be mentor to many other flight engineers of big flying boats.

The engines sang a mighty quartet, the China surged forward slowly to taxi toward the river mouth. Ebel was cautious. Turning this way and that, he and his crew studied the hydronamic reactions. Presently Ken opened the throttles, the leviathan leaped forward. In a few second she was "on the step," swimming easily.

Eyes that strained from spectator boats bulged when, a few seconds later, the great ship soared into the air and

sailed steadily along 30 feet over the water. Ebel eased her off, set her down as lightly as a feather. She had flown on her very first trip! The ship that couldn't fly had confounded her critics.

Through the long grind of test, the China Clipper and her sisters, the Philippine and Hawaiian Clippers, behaved beautifully. Then came a momentous day—November 22, 1935.

A throng of people stood on the banks at San Francisco. Before them the China, her four engines turning, strained at her moorings. Before a knot of national dignitaries, Pan-American's president, Juan T. Trippe, turned to Capt. Edwin Musick, the China's first skipper.

"Captain Musick, proceed to Manila," he ordered.

A few minutes later the China Clipper, with a blue-ribbon passenger list, soared aloft, circled the harbor, crossed the Golden Gate, and stood majestically out to sea.

Said President Roosevelt, in Washington.

"I thrill to the wonder of it all!"

## The Cover

Another "first" is established on the cover of this issue of The Star, which is a reproduction of a water-color by John T. Gorsuch, of the Art and Development Group.

His work has frequently appeared in this magazine in the form of pen-and-ink sketches and numerous lay-outs,



JOHN T. GORSUCH

but this is his first color assignment, though by no means the last.

A native of Baltimore and a graduate of the Polytechnic Institute, John studied art at the Maryland Institute. All day long he is making paintings, draftsmen's drawings, perspectives and the other art work required, then goes home for relaxation; he—yes, you guessed it—paints. Other interests include a charming wife and one child.

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## Marauders Home

### From War Fronts

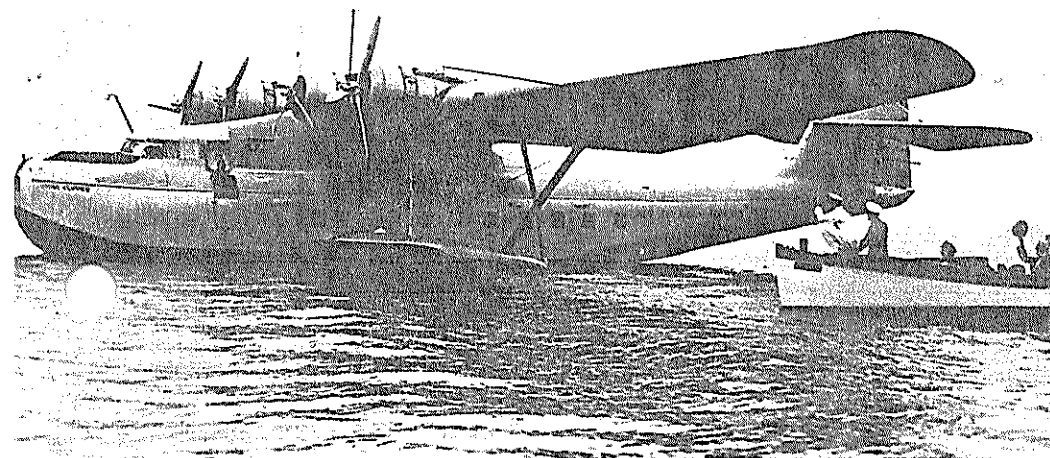
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He was flying "Old 93" in those days. He's mighty proud of that ship. One favorite story of his is how he took off under a hail of enemy bombs—a 1000-to-1 shot. His ship was fairly blown into the air under a hail of shrapnel, thrown by Japs on the New Guinea Airdrome.


Three hours later he brought her down in a smooth landing, despite the 200 shrapnel holes in her. The automatic controls for salvoing bombs were shot out; one propeller control was destroyed; the right wheel and tire were out of commission; holes ranging in size from a finger-tip to a foot were stretched from the props to the trim tabs.

Gammon's bombardier, Tech. Sergt. Michael Bauman, of Plymouth, N. H., helped to save their lives by opening the bomb bay doors by hand and jettisoning the bombs and putting out the flames which were sweeping the bomber. For this he received the Silver Star.

"The main purpose here is to tell you how all-important your work is. You're not building an airplane, you're building a lethal weapon."



The China Clipper At Rest



# BOX KITES TO BOMBERS

## Chapter XVII

THE national ear was glued to radio speakers during that first trip of the China Clipper. Newspapers screamed her progress in headlines, and when she landed safely at Manila, a roar of acclaim went up. It reverberated through the world, until lowly peasants in distant and picturesque lands knew of the great silver birds which carried people and mail and goods across the vast Pacific.

Then began the long grind that was to last for many years, as the Martin China, Philippine and Hawaiian Clippers shuttled between San Francisco and the Orient. The Hawaiian was lost in an unexplained accident, but the other two kept on, and the regularity of their travel made it quite commonplace for people to step aboard them for Hong Kong.

The name of Martin stood forth. People who had sniffed a bit at the "crackpot" prophesies of the pioneer who had dared, years before, to say that "eventually airplanes will carry passengers, mail and express across the oceans" now hailed his genius.

Thus there journeyed to Middle River a group of Russian civilians. They represented, they said, the Amtorg Trading Corporation, a purchasing agency for the Soviet Government. Out of the closed-

door conferences there came engineers and executives to hurry back to desks and drafting tables, and ere many months had passed, there began to take shape in the Martin plant (now A Building) a leviathan of even more heroic proportions than the Pan American Clippers.

Soon the cat was out of the bag. Martin was building a 63,000-pound flying boat (11,000 pounds heavier than the China Clipper) to be known as the Soviet Clipper. It was to be the first commercial aircraft capable of a non-stop transatlantic hop with a useful load. When the great ship was moved outside the plant for final assembly, private planes from fields far and near swarmed above the Martin ramp as pilots and passengers gazed down in awe.

THE Soviet Clipper had many of the same lines of the Pan American Martins. She had the sea-wings which the company had pioneered to take the place of wing-tip floats (these sponsons are not practical, however, for military patrol boats, since bombs are dropped from engine nacelles), but she had a double-rudder tail, where her predecessors had a single-rudder tail. Her interior appointments—lounges, sleeping compartments, etc., were beautiful.

It was on November 24, 1937, that the leviathan followed the trail of the China down the concrete ramp to Middle River.

It was the same old crew that went aboard, headed by Ken Ebel. There were no qualms this time, and the cries that went up when she flew were only of admiration, not astonishment.

It was in the dead of winter (January 20, 1938), less than three months after its first flight, that the Soviet picked up a passenger list of forty-five dignitaries of Baltimore and Russia at the Municipal Airport and churned into the wind. Ebel opened the four throttles and the mighty ship soared into the air after only a 35-second run. The Russians aboard felt perfectly at home as they gazed at the white and icy prospect below as the ship circled Manhattan and settled down in Jamaica Bay. Here she was partially disassembled and placed on the deck of a huge surface freighter for her journey to Russia. With her went manufacturing rights, which the Soviet Government had purchased. After her went the equivalent, in parts, of two other ships which the Russians were to assemble.

But this airplane was only part of the Glenn L. Martin Company's interest at the time. The factory floor was crowded with fuselages and wings of Martin 139's (evolution of the famed B-10's). The Dutch East Indies, China, Siam, the Argentine Army and Navy and Turkey had taxed Martin's facilities heavily with demands for the famous "Flying Whale."

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# Box Kites To Bombers

(Continued from Page 7)

And over in Experimental a fascinating development was taking place. Guards kept strict watch over a tiny, walled-off space where men were busily at work. Visitors who watched from afar were puzzled. What was this: Was Martin, the great exponent of little bombers and mighty leviathans of the air, building a pursuit ship?

THE mystery was partially solved about the time the Soviet Clipper was going through her paces. There appeared on the ramp a strange apparition. With all the lines of a big flying boat, including twin rudders and twin engines, it was hardly as large as a Piper Cub. It had gull-shaped wings and wing-tip floats. Like a new-born calf after its mother, it followed the giant Soviet Clipper down the ramp and took to the water with hardly a ripple.

Newsmen were intrigued. The comparison between the two craft was amusing indeed. But Martin people only shook their heads.

"It's the world's first flying model," they said.

"Of what?" the reporters persisted. There were only shrugs in answer.

The secret was kept for a long time—until the giant new B Building, largest assembly floor in the world was beginning to fill with full-grown hulls of Navy's new PBM-1, a long step forward in patrol bombers.

The flying model, it developed, was built to test the characteristics of this radically new type of flying boat. It proved invaluable in showing the hydrodynamic behavior of the type as Ebel and L. D. McCarty stepped from the dignified Soviet Clipper to the cockpit of the tiny craft to ride tricky water and air currents. It had only a single Martin motor in the hull, with belt drive to the twin propellers in nacelles. Today the little model hangs, all but forgotten, on the

ceiling beams of A Building Final Assembly.

Meanwhile, the production of the PBM-1's was moving apace. Here was another step in Martin's progress in developing big patrol boats for the Navy—heavy, long-range craft, with living and dining accommodations aboard for the crews on long-range patrol missions. No one knew it then, but these craft were to play an important part in the greatest of all wars, in which they would sweep the sealanes in search of enemy forces and would send to the bottom the marauding submarines of the Axis powers.

Meanwhile, Experimental had another project afoot. Another walled space was guarded. The prototype of another airplane that was to play a big part in a war whose clouds were already gathering was being rushed to completion. And in the new Engineering Building design engineers were drawing plans for another "impossible" airplane—thrice the size of the China Clipper.

(Martin's bombers and buildings in the prelude to war will be described in the next chapter.)

★ ★ ★

## All Purpose Plane

One of the Martin Service Men just back from Africa tells the following story illustrating the all purpose qualities of Martin planes. While the service group was in Gura, Eritrea, the wings of a badly shot-up Martin Maryland were shipped down from the Lybian Desert for repair. When the service men asked where the rest of the plane was, they were told that it was still in service up on the desert as a reconnaissance car.

Shortly after the wings were sent back, the engines were brought down for overhaul. This time the story went around that while the engines were being fixed, the ship was still being kept on active duty as a glider.

## Mother Builds,

## Son Flies, B-26's

She's mighty proud of her trim, spare, 21-year-old son Upton; he pilots a B-26 Marauder somewhere in North Africa. She, Mrs. Henry G. Ramsey, helps inspect the ship.

She gave up a Government teaching job, which she had held nineteen years, instructing home economics in the States, Alaska and the Aleutian Islands, to help her son, who had left the University of Utah after Pearl Harbor to volunteer for the Army Air Corps.

Although she hardly knew a bolt from a nut, she was very quick to learn. She started out as an inspector of upholstery and sound-proofing, but as her knowledge of things mechanical grew, she became in addition an inspector of Marauder rudders.

Mr. Ramsey was already inspecting PBM-3 Mariners in D-Building, when she came here last October. Since the day she punched in, she has never been absent or late, another way in which she is able to aid her son.

Recently she heard from her boy, who has flown two B-26's, one named the "Green Hornet," the other, "Martin Baby."

"I guess that kind of makes me grandmother to that plane," Mrs. Ramsey commented with a twinkle in her eye.

Upton's letter reads:

"Dear Mom and Dad—Your letter received yesterday. It was good to hear from you. I have been very busy for the past week. Jerry pays us a visit now and then. However, he does not do much harm. I got my second Jerry yesterday with my 'Martin Baby.'

"These B-26's really bring home the bacon. Are you and Dad helping to build them? If you are, you are building a plane that keeps Jerry guessing all the time. With her speed, she really splashes the African mud. You and Dad and others back there keep building 'em and we will fly them and get this thing over in a hurry.

"Keep on sending them to us. If the people will buy 'em, we will fly 'em. Received my Christmas presents in the mail yesterday. Thanks for everything. Will go now. Lots of love to both of you.

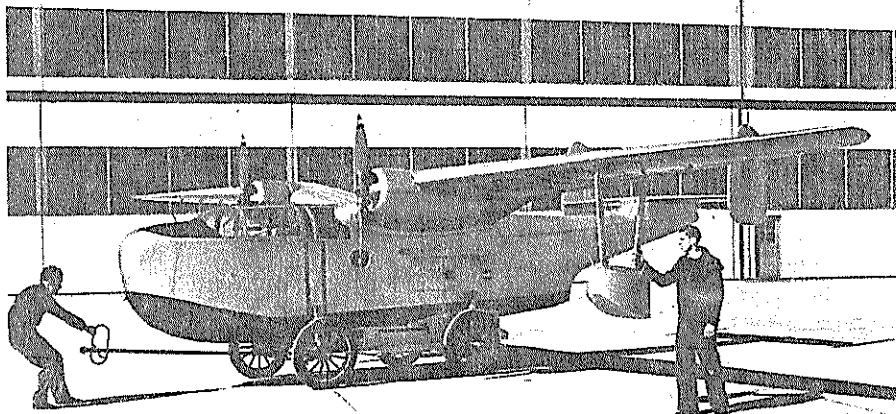
"UPTON."

★ ★ ★



As the men stationed at the Service Training School near Army Division stood at attention for retreat, Photographer William Neal Siebold took the cover on this month's STAR.

It is at this school where ground crews are given intensive training for the maintenance of Martin Marauders all over the world. The complete story of the school will be told in pictures and text in the August issue of the STAR.



The PBM-1 Flying Model

# Box Kites to Bombers

A PBM-1 taxiing for take-off.

## CHAPTER XVIII

MARTIN'S contribution in these eventful 'thirties was not only airplanes. When, in 1936, the Engineering Department brought forth America's first power-operated gun-turret, no one got particularly excited. The public knew nothing about it, for it was built, but even the Navy, for which it built, could hardly foresee the vast importance it was to have in a world conflict.

The same thing was true of another development, called the Mareng ("Mar" for Martin, "Eng" for Engineering) Cell. The principal idea at that time was a fuel tank which not only increased carrying capacity, but sliced maintenance time on tanks to a fraction. The cell was simply a synthetic-rubber bag which could be stuffed into a wing aperture, and filled with gasoline as a football bladder is inflated. The thin bag bellied out to every crevice of the aperture, and, if ruptured by accident, or hit by a bullet, could be pulled through a trap in the wing and another stuffed in without removing the wing.

How was anyone to know that this was to be the base on which the nation's first self-sealing (bullet-proof) fuel tank was to be built to answer the crying need of a future war? Here were two enormously important inventions emerging from the same building.

Early in March, 1939, the Final Assembly doors rose, curtain-like, to reveal a lean, powerful bomber of radically new design the model 167. Martin men looked pridefully on this silver beauty as it was wheeled onto the apron. It was the center of a storm of activity around the River. Well under way was a

hurry-up project that was to astound not only the aircraft field, but the general industrial world, and particularly the field of building construction. The way was being shown to the industrial miracle that was to take place less than two years later when the lusty young aircraft industry was to become, in a few short months, the greatest of all.

France had awakened suddenly with the drums of the onrushing war beating in her ears. From behind her supposedly-impregnable Maginot Line, she looked fearfully at the skies as Germany began flashing her new air might before a horrified world. With no air force to speak of, with her own industry rotten at the core from the labor strife of the Blum regime and with her people in a woeful state through the long and insidious divide-and-conquer campaign of Goebbels' propagandists, France screamed to industrial America for help.

"Airplanes— we must have airplanes, quickly, quickly!"

THE Glenn L. Martin Company was one of the very first to hear the call. Under the urgent pleas of French emissaries, Glenn Martin held a council of war with his executives.

It was on Thursday, February 9, 1939, that Martin picked up his telephone and rushed a call through to Albert Kahn,

the famed industrial architect, at Detroit. "Mr. Kahn," he said, "I want to double the size of our plant, at once. We want 440,000 square feet of floor space, and we want it finished in eleven weeks."

There was silence at the other end of the line. Presently Kahn's voice came back over the wire.

"What you ask is impossible, of course, Mr. Martin," he said. "But we'll do it."

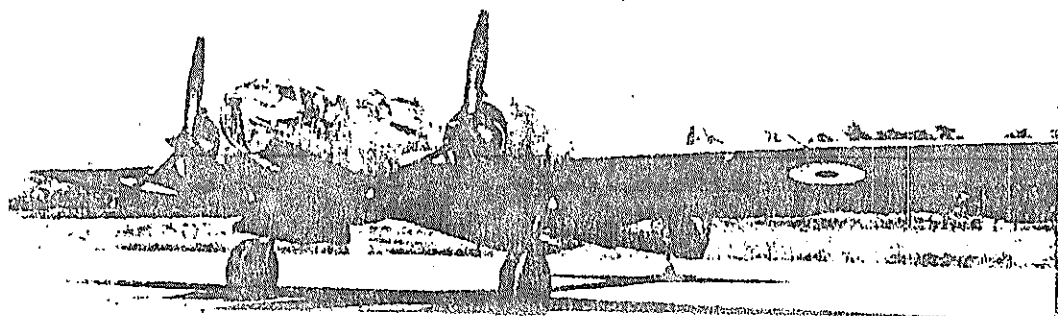
That was Thursday. On Friday an airliner disgorged a procession of engineers, led by Kahn, who trooped into the Martin plant. All night long the office and engineering windows of the Middle River plant were jewels of light. On Saturday excavation contractors burst out of executive doors and sped cityward, followed by a harassed steel official, who grabbed the nearest telephone and yelled for long-distance.

"Finish up everything we've got on the books by Monday," he barked. "We're starting on building steel for the Martin plant."

All that day and Sunday the scene was confused. Men crowded in and emerged with contracts. On every one of them had been imposed almost impossible requirements. Each must deliver according to schedule—so much on this date, so much on that; none before, none after.

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Right: The Martin 167 Maryland.



Glenn L. Martin Co.

## Looking to the Future

(Continued from Page 5)

THE new van Zelm cargo airplane differs from aircraft now being used for that purpose in that it has been specifically designed for cargo carrying and is not merely an adaption of a conventional airplane. Not only is it capable of carrying the tonnage involved, but its design eliminates many of the difficulties now encountered in the handling of aerial freight. Structural members have been planned to provide easy access to the cargo compartment. Loading and unloading equipment has been integrally incorporated. Ramps and winches for running self-powered freight and hauling other cargo aboard and stowing it without the use of outside cranes or loaders are provided within the plane itself, thus opening the way for the rapid handling of cargo at any airfield where the plane can get in and get out, and making aerial freight service economically practical even to areas where the volume of business did not warrant the elaborate loading equipment now required.

The two versions of the van Zelm cargo airplane for which designs have already been drawn up by Martin engineers are respectively a two and four engine low-wing monoplane with a tricycle landing gear. Unlike the conventional transport of the present day, however, the tail surfaces or empennage are not attached to the fuselage, but are supported by twin booms running out from the wings. This leaves the aft end of the fuselage in which the cargo compartment is located clear to be opened up like a door by means of hydraulic arms for the easy loading of freight.

The same hydraulic mechanism used to raise this cargo door also extends a collapsible loading ramp which can be adjusted to run either to the ground or to the back platform of a truck. This ramp is equipped with adjustable jacks which run to the ground from a point close to where the ramp hinges to the body of the plane. These jacks sustain the weight of the cargo during the time that it is on the ramp, relieving the plane, itself, of this strain. Due to the tricycle landing gear, the plane remains in level or flight position throughout the loading operation, simplifying the task of stowing cargo so that it does not tend to shift when the flight begins.

**A**UTOMOBILES, wagons, trailers and other wheeled freight can be run or pushed directly up the ramp into the plane, and since they are loaded in through the tail along the main axis of the fuselage, little or no juggling is required once they are aboard. The whole operation, in fact, is as simple as and similar to the loading of automobiles on a ferryboat. In the case of boxed freight, a winch is provided, which is op-

## Box Kites to Bombers

(Continued from Page 7)

It was a mighty challenge to American industry. It was met in every detail.

On Monday an incredible corps of excavating machinery moved in and the land east of B Building looked like a battlefield. Railroad spurs were run in,

hydraulic mechanism used to open the tail door withdraws the ramp back into the plane, lowers the after end of the tail into place and locks it in closed position.

There are no limits as to maximum size or cargo carrying capacity in the van Zelm design. Similarly, wing area, wing position, number of motors and overall dimensions can be varied just as in present types of aircraft in accordance with the same governing factors. In the two models designed to date by Martin engineers, the smaller two engine version has a gross weight of 60,000 pounds, which would make it larger than either the Martin Mariner patrol bomber or the famous China Clipper, while the larger four engine version runs to a gross weight of 80,000 pounds and would be capable of carrying a useful load of 36,870 pounds of which 27,000 pounds or 13½ tons would be cargo payload.

Not as radical in design as the van Zelm cargo carrier, but destined to play as great or greater a role in the drama of aerial freight are the famous Martin flying boats—the Mars, the 125 ton Leviathan, and the 250 ton monster, as yet unnamed, which is now taking form on the drawing boards of Martin engineers. The first of these flying Liberty ships—the Martin Mars—has already bridged the chasm between dreams and reality. Raising its 70 ton bulk off the waters of Chesapeake Bay with the seeming ease of a seagull, it has proved beyond doubt in repeated tests the practicality of the super flying boat, and has demonstrated that it is, in fact, the most efficient aircraft per pound of material, per horsepower and per gallon of fuel that the world has ever known.

The age of aerial destruction will soon be over, and the cargo air age will arise to take its place. When this new era does dawn, the men and women of The Glenn L. Martin Company will be waiting for it, prepared to assume the same position of leadership that they have held in building the bombers which are making this new era possible by blasting the Axis off the face of the earth.



Taken from a speedboat heading down Middle River, the cover picture, a Kodachrome, shows a PBM-3 Mariner taxiing away from the ramp preparatory to taking off for a test flight.

The ship was almost opposite Stans-

and as day followed day piles of materials were unloaded on the siding. Never were there big piles; only as much as could be gobbled up by working crews at once. Foundation concrete ran in rivers. Raw, red steel rose like magic. Floors, ceiling beams, roofing—all appeared with such astounding rapidity that it seemed the days and weeks had been telescoped. Only one contractor—an electrical fixtures firm—got off the schedule, and in the heat of enthusiasm sent in its shipments three weeks ahead of time. They were promptly sent back, with instructions to wait for delivery date. Martin couldn't bother with storing things in those days.

**F**IELD marshal of this remarkable achievement was Paul E. Tignor, Martin's vigorous field engineer, riding herd on contractors and suppliers, pushing, goading, pleading, and bedeviling to get the job done on time.

On the seventy-seventh day—the deadline—the first steps in manufacture of the Model 167 were being taken at one end of the huge building while frantic builders were closing in the other end. A world record of building construction had been set.

And, not to be outdone, the Martin engineers and craftsmen launched forth for another record—a record that saw the first airplane of the 167 flown six months from drawing board, and the entire first order of 115 of these ships for the French Government completed in ten months and three days. It was an unparalleled performance all the way around.

She was a beauty—that lithe attack bomber, with her high speed, her bomb load of almost a ton, her wing guns which allowed her to fight like a pursuit. She was to play a spectacular part in the war that was coming. She was to be the tower of strength of both the French and the British air forces on African soil.

And while all this was going on, the tempo in the B Building was increasing. The big PBM-1 20-ton patrol bombers were progressing on the largest aircraft assembly floor in the world.

As 1939 waned and the volcano of war that had been smoldering in Europe burst into flame, The Glenn L. Martin Company was the largest aircraft company in the United States. It had performed an amazing feat of expansion and engineering and production. And then it had turned to perform another miracle of training. At the turn of the year only 3,500 craftsmen were employed at the Baltimore plant. By the end of the year there were 13,000! A training program without precedent had been carried to a successful conclusion.

And in the month that war broke, a great Martin bomber design won an Army competition.

# Box Kites to Bombers!



Glenn L. Martin turns the first spade of earth for the vast expansion program as Company officials look on.

## CHAPTER XIX

MARTIN was not caught unawares by the war. In 1938, when Europe presented a fairly tranquil surface, Glenn Martin had sniffed brimstone in world affairs, and he didn't like it. He could ill afford the time, but he packed up and journeyed across the Atlantic to see what he could see. He saw plenty!

Germany was about ready. The mailed fist was just beginning to show through the velvet-glove, and when the distinguished American industrialist arrived in Berlin, the Nazis opened formerly secret doors to him. What he saw brought him up with a jolt. Here was what he feared most. He knew the might of air power, had preached it for years—and Germany had air power in staggering quantity! Even Italy was preparing busily.

Martin looked at the aircraft industry and air forces of France and England and winced. He stared tragedy in the face. In England and America he warned seriously of the threat, and hurried back to Baltimore to do what he could.

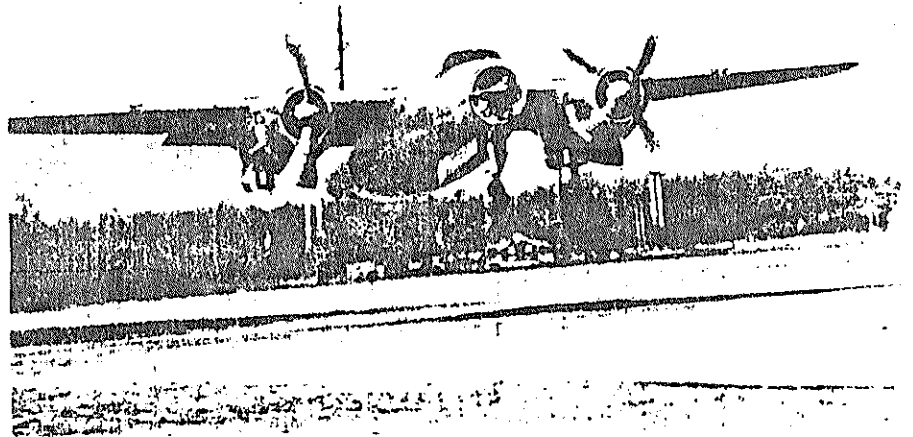
So when the eruption finally came, The Glenn L. Martin Company had already had the experience of rapid expansion of facilities and personnel. Even while the Company was turning out Marylands for the French, Martin engineers were rush-

ing another bomber which was based on the early tactical experience of the war. British and French engineers sat in and dictated the requirements. Tool rooms were pressing to finish the tools for the new B-26 for the Air Air Corps. The plans for a successor to the PBM-1 were already under way. Architects were already drafting plans for an enormous plant expansion, even though there had been no call for it. Personnel was studying earnestly the means of training vast numbers of craftsmen, while Manufacturing was perfecting plans to break down highly-skilled operations so that semi-skilled people might handle them.

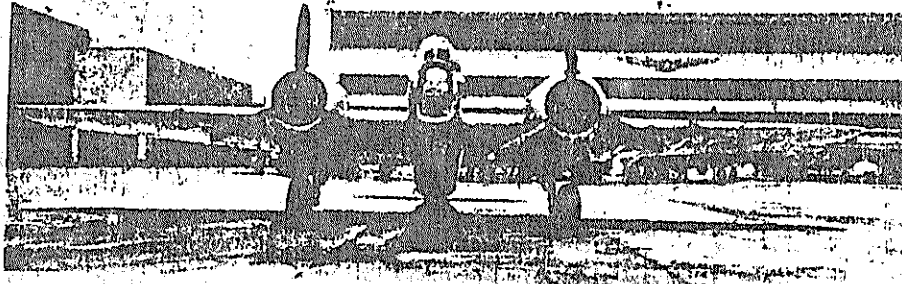
WHEN France fell in the spring of 1940, the British took over the Model 167 contracts and those for the new Model 187, which was to be named the "Baltimore." When the President declared a state of emergency and it was definitely known that America would rearm, Martin was ready. Even while American industry waited for emergency plant facilities contracts with which to expand, The Glenn L. Martin Company directors decided to go ahead, without waiting for such contracts. Time was of the essence.

So it was that on September 4, 1940, Glenn Martin turned the first spade-full

*(Continued on Page 22)*



Right: The first Marauder takes off on its initial test flight.



The 187 Baltimore

## Boxkites to Bombers

(Continued from Page 9)

of earth in the vast expansion, and Martin became the first large aircraft to embark on the program. The great project was launched with Martin money. In incredibly short time the main plant grew. A mile and a quarter away, the big Army Division building got under way and called to completion by the next mid-summer. Later, when the Government decided to decentralize the aircraft industry as much as possible, the plans for the Army Division were used in building the Omaha plant.

Meanwhile, the B-26 project was moving apace. This magnificent medium bomber, which had won an industry-wide competition in 1939, was to break all precedent in manufacture. There was to be no prototype; it was to go directly into production, so that the first airplane to be produced would be a production airplane.

Long since Martin had decided that the advent of war would make the demand for this ship immense. Glenn Martin asked his directors to do an unheard-of thing—to authorize a huge expenditure for tooling, far out of proportion to the size of the original Army contract. It was done, and soon Martin was installing tooling that was a marvel of efficiency.

When, on November 25, 1940, Ken Ebel taxied the first mighty ship onto the airport, pride glowed in the eyes of the men who watched her as she skimmed along the runway in taxiing tests. Presently Ebel backed her to the end of the runway, faced the icy wind and pressed open the throttles. The big Pratt and Whitney's roared with a sound hitherto unheard, the ship skimmed over the ground, cocked her nose-wheel into the air and in a moment was in full flight. Her landing gear retracted, the B-20 showed her aerodynamic beauty to her makers.

**T**HE Army was elated. Here was a medium bomber which carried a heavy bomber's load at pursuit-plane speed. On her were America's first self-sealing gas tanks, the Army's first power-operated gun-turrets, the first all-plastic bombardier's nose, one of the first tail-turrets. Later she was to startle the world as a torpedo-bomber, the fastest of all. And if her fire-power was unheard-of for her time, she was to have much more later.

Then came the new Navy patrol bomb-

er, the PBM-3—a larger, heavier, more powerful ship than her predecessor. And then the gargantuan Mars, largest flying boat in the world, built for the Navy as a patrol bomber and capable of flying across the Atlantic and back, non-stop; able to carry 150 armed men on a mission. On November 8, 1941 she was launched in a unique ceremony, with Mrs. Artemus L. Gates, wife of the Under-Secretary of the Navy for Air, and in the presence of some of the highest rank in the Navy and Army. Later the "flying battleship" was to be converted to a cargo carrier when the desperate need for fast movement of critical war supplies to distant war theaters became apparent.

Meanwhile, the "Baltimore" had justified the hopes that Britain had pinned on her. Larger than the "Maryland," she was faster, more heavily armed and protected by self-sealing fuel tanks. Early in her tests, Test Pilot Ellis Shannon set an unofficial world's speed record for bombers by traveling 560 miles per hour in a shallow dive.

From the very start of the world war, Martin bombers left their marks deeply on the Axis nations. The Maryland were used by the French in every conceivable way, even as pursuit planes, and they carried most of the British bombardment load in Africa in the early stages of the war on the Dark Continent. When the Japanese struck their first treacherous blow, the aged Martin B-10's and B-13's proved towers of strength, even though they were rated obsolete. They had already fought well, although there were pitifully few of them, for the Chinese. The Dutch pilots did astounding things with them in the East Indies, and they were used in combat in the Philippines.

The Marauders have had spectacular records from Midway and the Aleutians to the Southwest Pacific, Africa, Sicily, Italy and over the Continent from England. The Mariners have been a scourge to the German submarines and have spelled safety for many a convoy plowing through infested waters. The Baltimores have been a bane to Rommel, and, as one British pilot expressed it recently, "If the Baltimore's hadn't been in Africa, Rommel would still be there, and he'd be a fair distance east, too."

It has been a proudfest record. The army of Martin craftsmen and craftswomen, even at this busy time, can look back with satisfaction on a work well done. They have served vitally in the war, and history writes their record in Axis blood on every page of the conflict.

Meanwhile, the only one of aviation's pioneers still left at the head of his company, looks ahead, even while his craftsmen strain with the vital business of winning the war. And when new and brighter pages of aviation history are written in the tranquility of peace, the name of Martin will trace the growth of a vast traffic of people and goods in a fellowship of nations.

THE END

### THIS MONTH'S COVER

Marauders go through their ground and flight tests and are flown away so fast that it's seldom there are enough of them around to get a picture like the one on this month's cover.



Photographers Charles Cignatta and Fred Parker were in the photographic ship (likewise a Marauder), busily snapping both black and white and color shots of the formation. Whose was selected for the cover is not certain, so they'll have to take joint credit for the job. The two are shown above after the flight was completed, Charlie on the left.



The PBM-3 Mariner

# Martin Records

1. First Bomber, and first armored plane; built for the U. S. Army, 1913.
2. First Trainer Plane, Model J.T., a biplane with an enclosed fuselage, open cockpit, and dual controls, 1913. This was the first plane designed and built especially for training purposes; built for the Army.
3. First Bombardment Experiments Conducted for the U. S. Army at San Diego, Calif., on May 23, 1913. There was no air arm of the Army at that time, so it was the Ordnance Department which sent officers across the continent to witness Martin's demonstration of aerial bombing.
4. The First Free-Fall Parachute was launched on June 21, 1913, from the Model J.T. Glenn L. Martin held the original patents on this type of parachute.
5. First Pursuit Plane, April 24, 1914.
6. First Twin-Engine Bomber of the U. S. A., the MB, which for years was standard with the Army, 1918.
7. First Use of Cannon on Aircraft—a 37 mm. on the MB-2 in 1918.
8. First Leakproof Fuel Tank for airplanes, 1919.
9. Seven Martin MB-2 Bombers Were the First to demonstrate that a battleship could be sunk by airplanes, when they sank the German dreadnought *Ostfriesland* off the Virginia Capes, July 21, 1921.
10. First Experimental Night Mail Plane, 1922.
11. First All-Metal Monoplane, the MO-1, an observation plane built for the U. S. Navy, 1922.
12. First Plane to Carry a 2,000-lb. Bomb, MB-2, 1922.
13. First All-Metal Seaplane, the MS-1, a submarine scout.
14. First Bomber with Air-Cooled Engine, and first plane with alloy metal fuselage, 1926.
15. First Successful Large Plane (Model T4M-1) designed to be launched from carriers, 1928.
16. First Practical Dive Bomber (BM-1). This was the first airplane to carry a 1000-lb. bomb in a terminal velocity dive, March 22, 1930.
17. First "Modern" Bomber, the B-10, which obsoleted all other military aircraft by traveling 100 mph faster than the fastest bomber, and as fast as most pursuit planes, 1932.
18. First Transoceanic Plane for Commercial Flights—the China Clipper, November 22, 1935.
19. First American Power-Operated Turret (hydraulic power), installed on XPBM-1, 1936.

20. First Power-Operated Turret (electrically operated) for Army, 1940.
21. First Self-Sealing Fuel Tank (Mareng cell), 1940.
22. First All-Plastic Nose for bomber (B-26 nose).
23. First of the world's largest Operational Flying Boats, the XPB2M-1 Mars, set a then world's record for a non-stop flight from Patuxent River, Md., to Natal, Brazil, 4,375 miles, Nov. 30-Dec. 1, 1943. A later version, the JRM-2 Caroline Mars, beat this record in August, 1948, flying 4,748 miles non-stop from Honolulu to Chicago (still the record for seaplanes). The Caroline also holds the world's seaplane record for weight of cargo, flying 68,263 pounds from Patuxent River, Md., to Cleveland a few days after establishing the non-stop record. A sister ship, the Marshall Mars, holds the world's record for any type aircraft in total number of people taken up on one flight, 301 passengers and seven crew members having been flown between San Diego and Alameda, Calif., on May 19, 1949.
24. A Navy AM-1 Martin Mauler Holds the Unofficial Record for total all-up weight for a single-engine airplane, having taken off in April, 1949, at a gross weight of 29,332 pounds.
25. First Six-Jet Bomber in the World was the USAF XB-48. It incorporated in a new design for the first time the bicycle type landing gear which had been developed after World War II on a USAF B-26 Martin Marauder.
26. First Optimum Length-to-Beam Ratio Seaplane was the Martin research model M-270 in 1952. Hull is 15 times as long as beam is wide.
27. First Tactical Missile was USAF TM-61 Martin Matador. Development of this aircraft started shortly after World War II and it became the initial weapon of the first Air Force Pilotless Bomber Squadrons to be activated. These squadrons are now deployed in Europe.
28. First Successful Ram-Jet Pilotless Aircraft was the Navy Martin Gorgon IV, built as a test vehicle for the "stovepipe" power plant. Radar tracked, radio controlled.
29. First Successful High Altitude Research Rocket was the Martin-designed and built Viking, developed in cooperation with the Naval Research Laboratory. Holds world's record for single-stage rockets—158.4 miles, established in 1954.
30. First Multi-Jet Attack Seaplane, the Navy XP6M-1 Martin SeaMaster, 1955.
31. First Zero-Length Launch of Fighter Aircraft. Using platforms mounted on trucks, the world's first flights of conventional jet fighters (F-84-G Thunderjets) without preliminary takeoff runs were announced, January, 1955.



# Famous Martin Silhouettes Cover More Than 45 years



MODEL 1, FIRST AIRPLANE (1909)



GREAT LAKES TOURER (1913)



MODEL TT ARMY TRAINER (1913)



MODEL R. (1916)



MB BOMBER (1918)



MO-1 FIRST ALL-METAL MONOPLANE (1922)



MODEL 69, FIRST NIGHT MAIL (1922)



MS-1 SUBMARINE SCOUT (1923)



T4M-1 CARRIER BASED (1927)



T5M-1 CARRIER BASED (1927)



PM-1 FLYING BOAT (1930)



XP2M-1 FLYING BOAT (1931)



XP2M-2 FLYING BOAT (1931)



P3M-2 FLYING BOAT (1931)



BM-1 DIVE BOMBER (1931)



B-10 BOMBER (COLLIER TROPHY WINNER 1932)



CHINA CLIPPER (1935)



OVERSEAS FLYING BOAT (1937)



PBM-1 MARINER (1938)



PBM-3 AND PBM-5 MARINER (1939-1944)



167 MARYLAND (1939)



B-26 MARAUDER (1939)



XPB2M-1 MARS (1939)



A-30 BALTIMORE (1940)



AM-1 MAULER (1943)



JRM MARS (1944)



P4M-1 MERCATOR (1944)



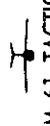
XB-48 SIX-JET BOMBER (1945)



PBM-5A MARINER AMPHIBIAN (1946)



P5M-1 MARLIN ANTI-SUBMARINE SEAPLANE (1948)



TM-61 TACTICAL MISSILE (1949)



XB-51 TACTICAL BOMBER (1949)



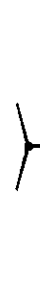
4-0-4 LUXURY AIRLINER (1950)



B-57 TWIN JET (1951)



P5M-2 MARLIN WITH "T" TAIL (1953)



XP6M-1 SEAMASTER (1955)



1.1

1.2



1.3

1.4

