

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.

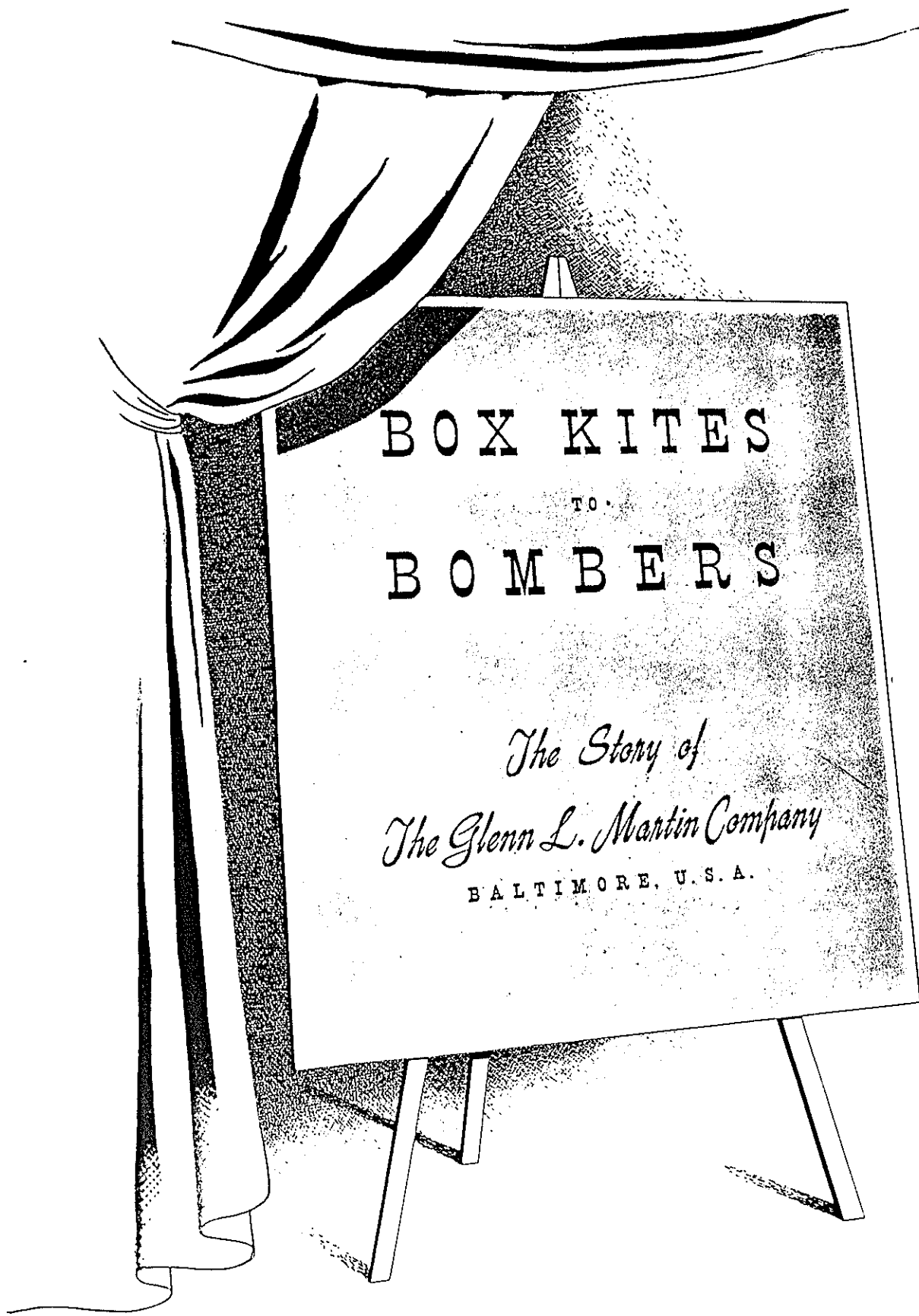
The contents are scanned here in the following files (separated to be a manageable size):

“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.



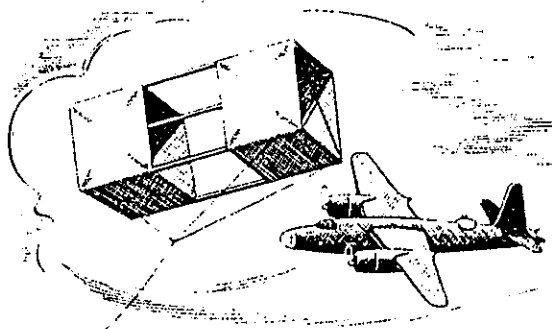
BOX KITES

TO

BOMBERS

*The Story of
The Glenn L. Martin Company*

BALTIMORE, U.S.A.



BOX KITES *to* BOMBERS

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 rested much of the responsibility for the survival of civilization in a darkened world.

It is a poignant story that spans the 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 recent 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 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, Farquhar Fish, Howard Gill and the rest. He set world records. He flew the first airmail. He was among the first to demonstrate the practicability of air express. He did much to develop the parachute. He made the first 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. 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-engine bomber, which was standard of the Army for years—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 second world war. It revolutionized 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.

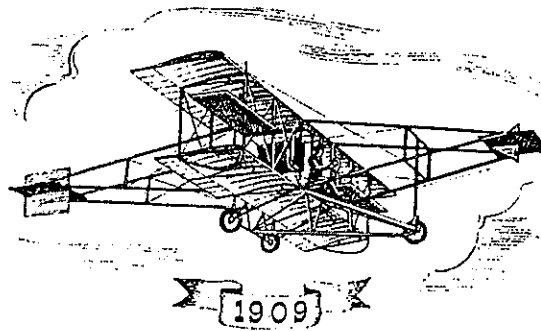
And through it all has come a commanding figure—Glenn L. Martin. It is interesting to note that the least perishable asset of any great industry is the

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.

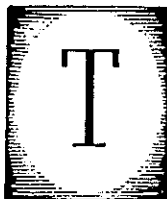
A few kept their hands on the controls, steered their names and their companies to the pinnacles of success—duPont, Edison, Ford. In this exclusive category belongs Glenn Martin, the young garage man who harnessed the winds in his youth, developed the fire of technical genius, and had the gumption to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





Part One

THE EARLY YEARS 1909-22



HE 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. Harness the winds he did, to his undying fame—at first only with boyhood toys, but the seed was sown and from it grew one of the earlier airplanes to waver aloft behind the Wrights. From this, in turn, were to evolve ever-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 Arminta 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.

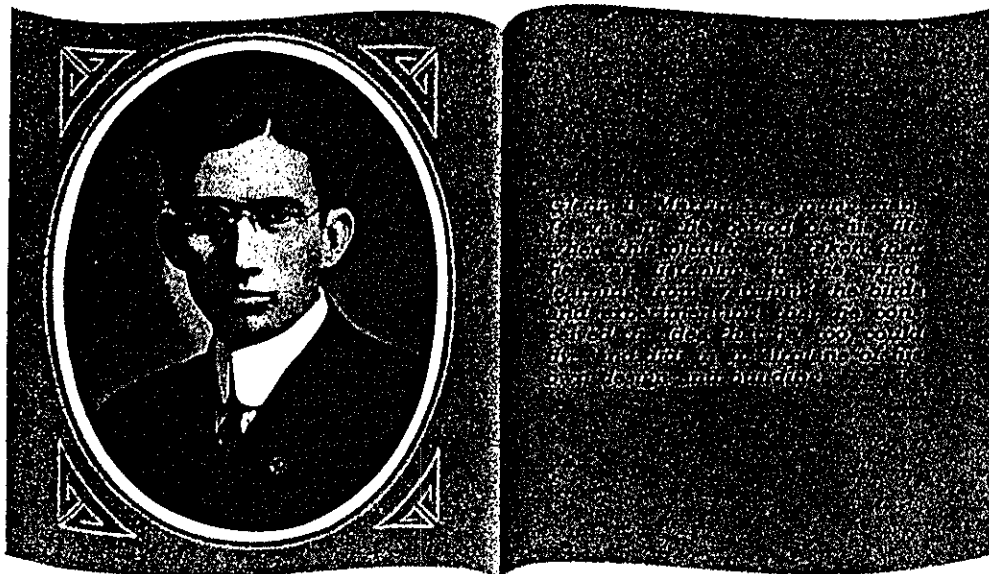
It is not recorded what Liberal folk thought of the little fellow's manifest interest in the prairie winds. They themselves had learned practical value from them. Every house had its creaking windmill, but

inspiration stopped there. When the 4-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 6 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 then called the kites airplanes).

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 the boy was 9, 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). There 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 usually took off upwind 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 manguided power—they were to guide him and guard him from the perils that struck down those who knew them not.

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 horn 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 con-

sidered 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 hypphens 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 Lillienthal experiments, the kites and sails of Liberal, the behavior of the birds. But one day, early in 1903, 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 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 an 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.

But young Martin was leading a double life. The grip of flight was still upon him, and secretly he sketched biplane designs—weird drawings of kites with wheels and motors. His mother was his only confidant. By 1907 the townfolk 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 dawn.

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 lamplight 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 was the progenitor of a proud line—a delineation that arrived, more than thirty years later—mighty monsters bearing destruction toward the enemies of civilization during World War II, and a stupendous ship with wings which, in turn, presaged navies and argosies of the air.

One who stands today in the giant assembly halls of The Glenn L. Martin Company and looks back nearly forty years to the first Martin factory may well

smile. Buildings designed to assemble the colossal flying vessels of today could swallow as a tidbit the old Southern Methodist Church of Santa Ana.

Yet when Glenn Martin rented the little edifice in 1908, he did so because it was the only large 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 were 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.

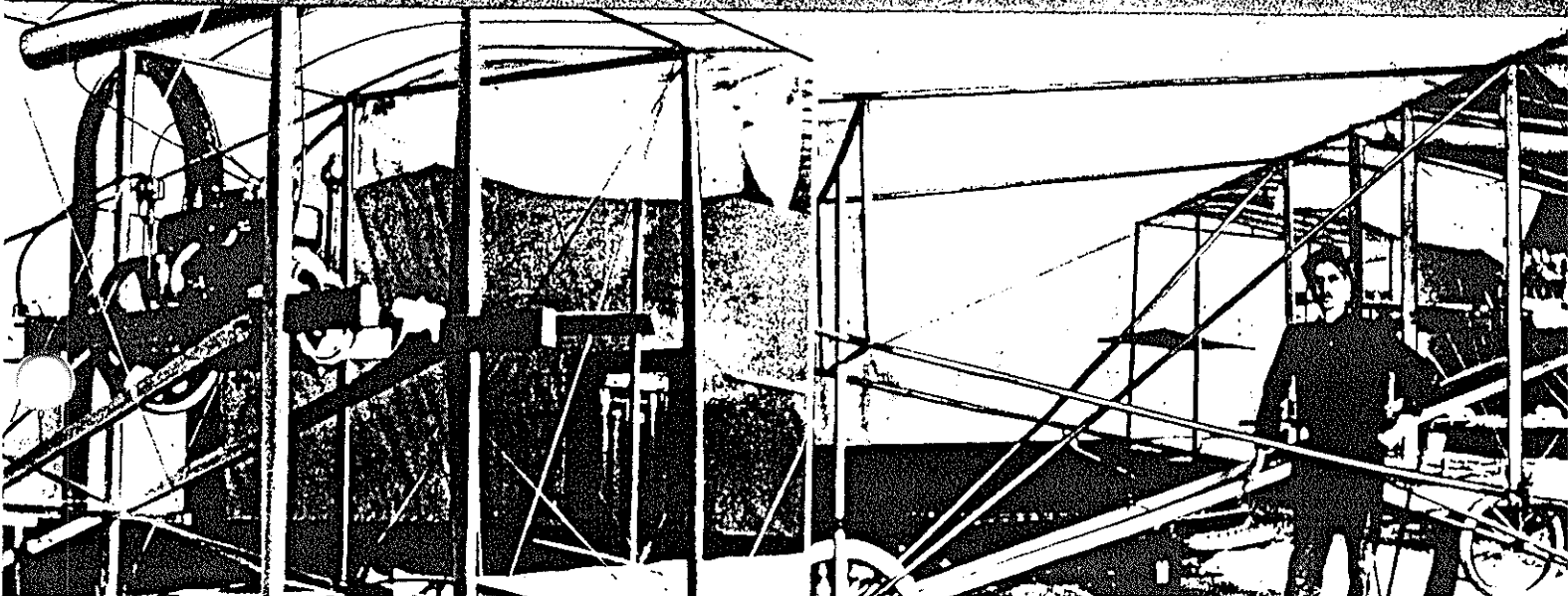
He used fine spruce for the central structure and wing-supports. The tail booms and outriggers were of selected bamboo. The skin was of muslin. He lightened the engine as much as possible, paring it of all but essentials and using a copper crankcase, instead of the heavy cast-iron one. He whittled a 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 cent that could be reserved went into this experiment.

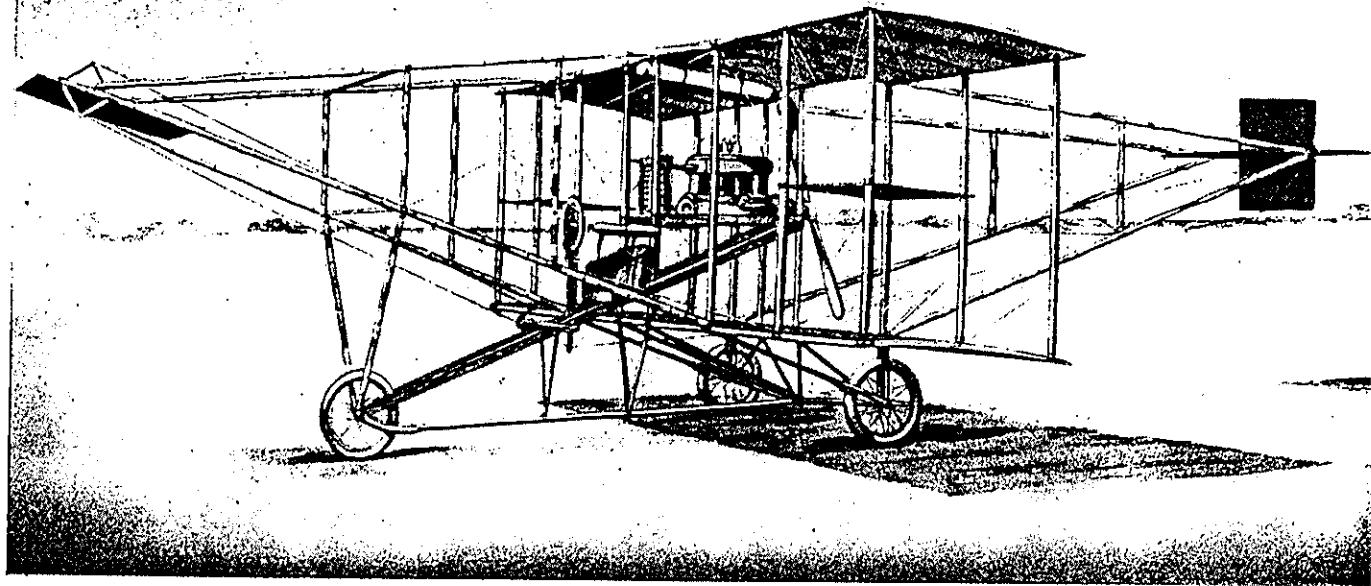
Santa Anans were mercifully spared the shock of emergence of the apparition. In the dead of night the widened doors of the old church opened and the biplane was wheeled forth. A car from the Martin garage took it in tow and quickly, cautiously, the odd procession of car, plane, Martin and a couple of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

The interior of the old Southern Methodist Church at Santa Ana, Calif., and the first Martin plane. The whole had to be built by rule of thumb, handmade. Its construction closely resembled the

boxkites with which Glenn Martin had played as a boy, and many of which he made and sold to other youngsters on the Kansas prairies. Even the propeller had to be carved by hand, a long, laborious job.





Drawing of the first Martin plane (built in 1909). The pilot sat forward, the engine at the rear with pusher-type propellers. High load capacity was a primary aim. The ship had forward as well as aft stabilizer. Recent experiments in the air have shown the point of possible return of the stabilizer to be near the center of the ship.

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. Just as he was about to despair, there was a hop, a lift—and 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 enother 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 Eldridge 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 townfolk who had jeered his idea of flight now clamored at his parents to curb him. The family physician, Dr. H. H. 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.

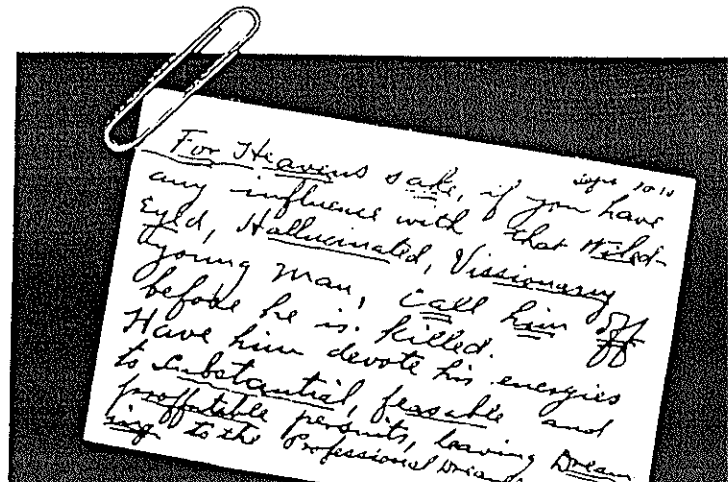
The note sent by Dr. Sutherland to Mrs. Minta Martin protesting young Glenn's experiments in flying.

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 near-by 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, but would extend his exhibition activities and pour his money back into the business.

The Glenn L. Martin Company was on its way, but back in Santa Ana anxious eyes were focused on its chief during the early exhibition days. When his name hit the headlines, all was well, for it meant money in



For Heavens sake, if you have
any influence with that ^{wise} ~~head~~
eyed, Hallucinated, Visionary
young man, call him off
before he is killed.
Have him devote his energies
to substantial, feasible and
profitable pursuits, leaving ~~dream~~
ing to the professional dreamer.

the till, pay rolls for employees 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 later 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-Pacific 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, Bud Mars, Phil Parmalee 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 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.

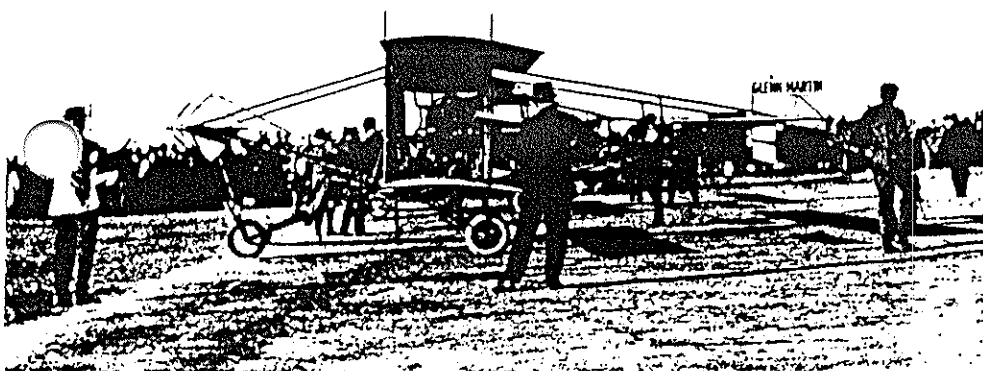
He affected a flying costume of black leather coat, black helmet and goggles and whipcord breeches, where most of his competitors still wore the nondescript clothing and reversed checkered caps of the motor-dromes. Movie stars paid handsomely for their first rides. Martin took Valeska Surratt aloft. 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, as 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 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 already 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, however. 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 innertube for a life preserver.

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

"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 takeoff, "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 route 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.

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 con-

fidently 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* contain 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 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 building 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.

To keep the company going, Glenn Martin kept 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 carrying a bundle of *Fresno Republican* newspapers to Madera, 24 miles away.

In 1913 the 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 officers 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.

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, recently delivered to the

Army was assigned to the experimental project.

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 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 after ward."

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!"

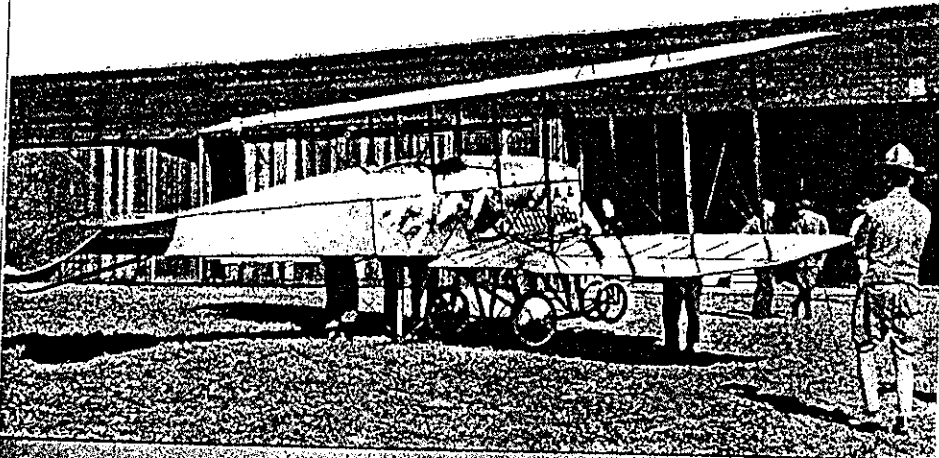
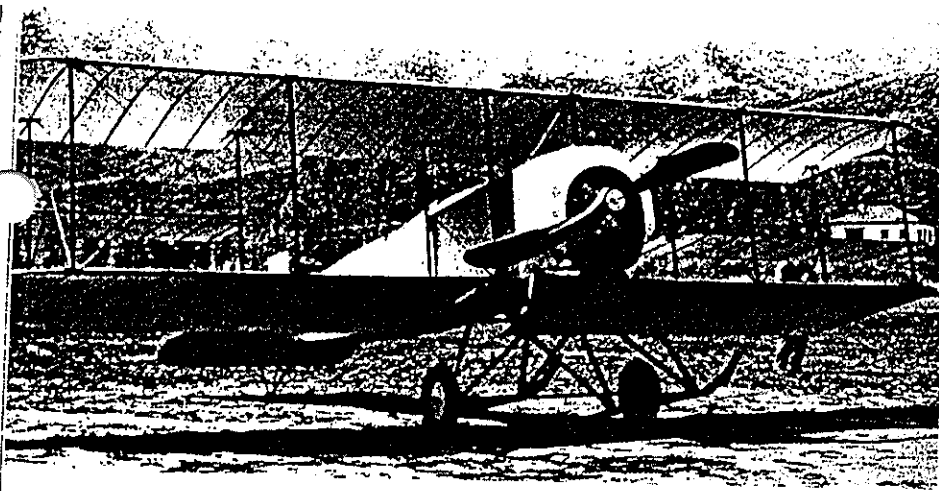
Gradually Martin gained confidence, learned to trust the sight. Soon the explosions were rattling the teeth of the Ordnance expert and he departed to make his report.

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





Two early ships made by the infant Glenn L. Martin Company for the Army in 1913. At top is an early trainer, below the first armored plane. The Army has been buying Martin airplanes for over 30 years.

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.

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.

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 world's 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. The exposed engine and pusher propeller behind the pilot had given way to a tractor propeller jutting from a motor in front of the pilot.

The ship was an adaptation of the Model TT and was expected to be the first aerial ferry. The firm of Gorat and King, of Portland, Ore., had ordered a seaplane version of the TT to fly passengers across Coos Bay, Washington, but the young enterprise died for lack of passengers. The ship 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 motordromes!

When Glenn Martin soared over Los Angeles with three passengers in the plane, 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 Miss Broadwick 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 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, the reporter 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. Brig.-Gen. Robert Wankowski, who was there with his aide, commented:

"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."

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

Prophetic? Yes. During World War II newspapers screamed vindication. The word "paratroop" was added to the language.

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 World War I were booming balefully when the president of "the largest aircraft factory in America" wrote in the newspapers a prophecy which came only too true. 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 marching into Serbia.

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



Miss Tiny Broadwick, daredevil girl stunt flyer in the early days of aviation, greatly helped Glenn Martin in developing the first free-fall parachute. She is shown on the side of a ship piloted by Mr. Martin, though the chute is not of the free-fall type, but another early development. They made a great fair attraction.

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 develop 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. 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 as a racked bomb inexplicably exploded on the field and the pilot, standing nearby, was covered with debris.

While 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.

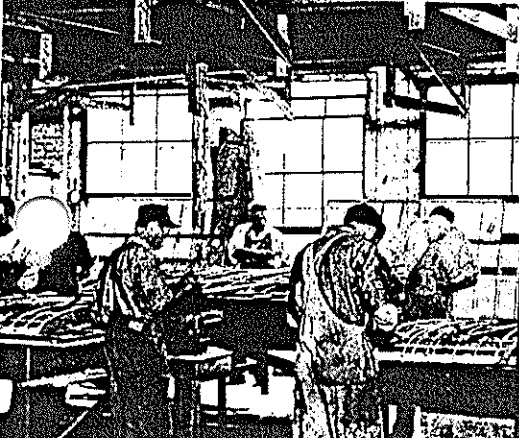
For Ter Poorten, as representative of Queen Wilhelmina's government, The Glenn L. Martin Company built two military airplanes. The lieutenant-aviator was so pleased with them that he persuaded his government to order twenty more. Thus the Dutch East Indies became Martin's first important foreign customer 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 received 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 professing 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."



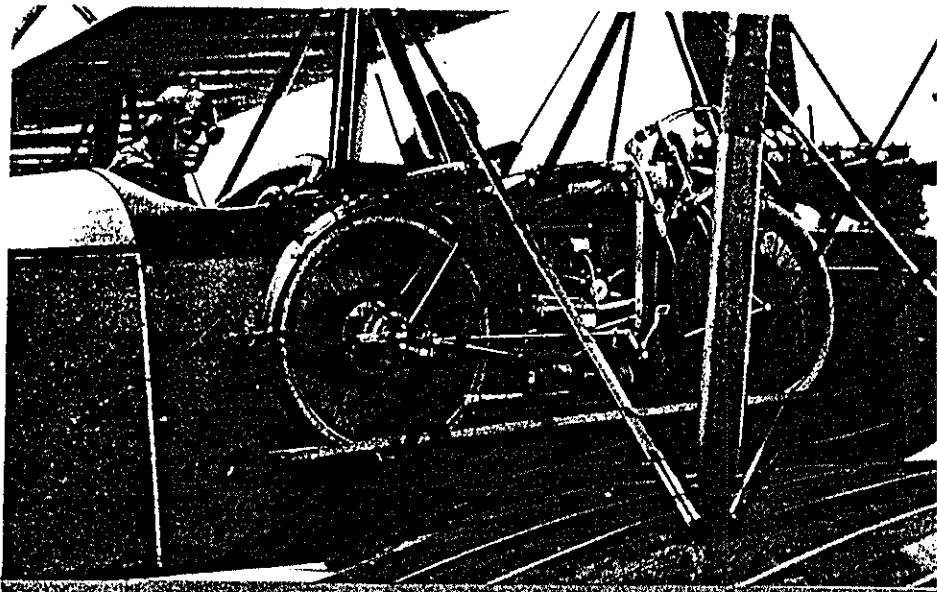
The Sun's fears might have been allayed. The threatened octopus was to be dismembered very soon, through a series of circumstances that was to confuse American aviation and slack its efforts through the intrusion of a new octopus.

Martin had three types of trainers in production at the time of the merger—the Model "T," side-by-side bi-plane-type trainer used extensively by the Army and in which a number of our now-famous generals originally learned to fly; the Model "S," 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. 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 themselves. The airplane had established itself as a mighty weapon of war. When America jumped into the maelstrom, the Aircraft Production Board, manned by automotive tycoons, decided



Early version of paratrooping with the Martin Model R. The bomb was to be dropped by parachute during the emergency maneuverability when it landed. World War II saw the technique perfected.

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 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, so far as production was concerned. The 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.

At the imposing new plant, Martin evolved an outstanding design—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 Pro-



Two Glenns Martin and Curtiss, with the Curtiss-Martin Company, were the first to produce the Army's first airplane.

duction 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.

On January 17, 1918, 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 many years.

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

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.

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 president of Brewster Aeronautical. And there were others who carved places for themselves in the aero-

nautical 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 introduce America's first self-sealing tanks.

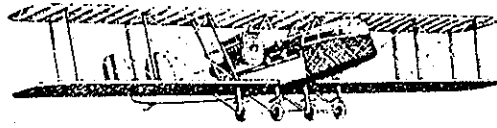
Anxious to hurry the new ships into action, Martin pushed the flight tests hard, and in only two weeks the first plane was pronounced ready for Army inspection. Glenn Martin, Eric Springer and Donald Douglas packed suitcases, climbed aboard and sailed away for McCook Field, at Dayton, 200 miles away.

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 regarded suspiciously. 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.

But already the Cleveland production lines were humming. Seven ships, in various stages of completion, were spread over the factory floor. Many variations of that ship were to be built by the Company, and though the Armistice came before the MB-2s could see combat, it was the standard bomber of the Army for many years.

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.



✧ [1919] ✧

Part Two

BETWEEN TWO WARS

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-2s. 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-2s 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 years.

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 aviation 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.

Martin had been running advertisements in the *Saturday Evening Post*, touting commercial travel, but turned away. He made market studies, with poor results.

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.

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 airplane 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, or 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 *piece de resistance* 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-Ls 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.-5s swished over and dropped 25-pound fragmentation bombs "to clear the decks." Then twenty-eight

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.

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 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-Ls and Marine DeHavilands 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-2s had been fitted out to carry them.

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

The rest is history. The MB-2s 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 Sep-

tember 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.

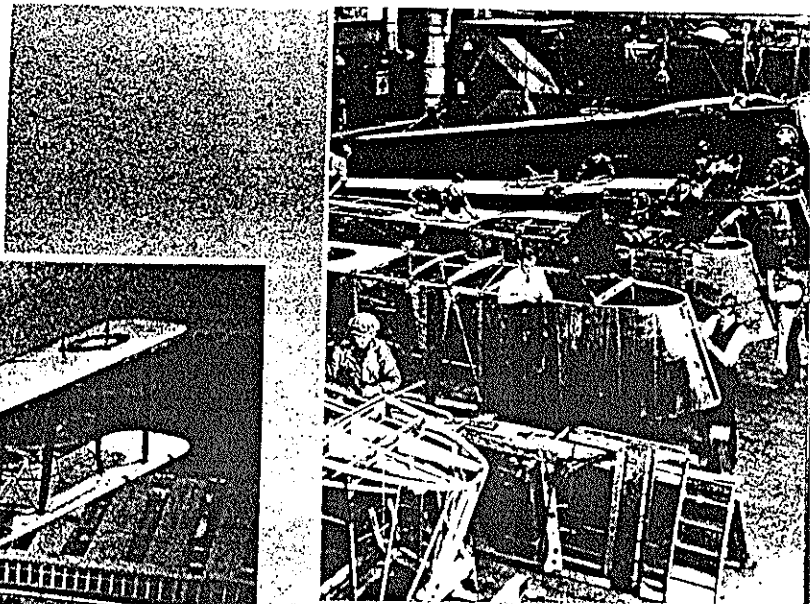
That the *Ostfriesland* incident was the germination of the Navy's real air forces is not to be doubted. The new Bureau set about without delay to explore the capabilities of the winged weapons. And it explored them very thoroughly, for in the next few years numerous "X" (experimental) projects were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

The 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.

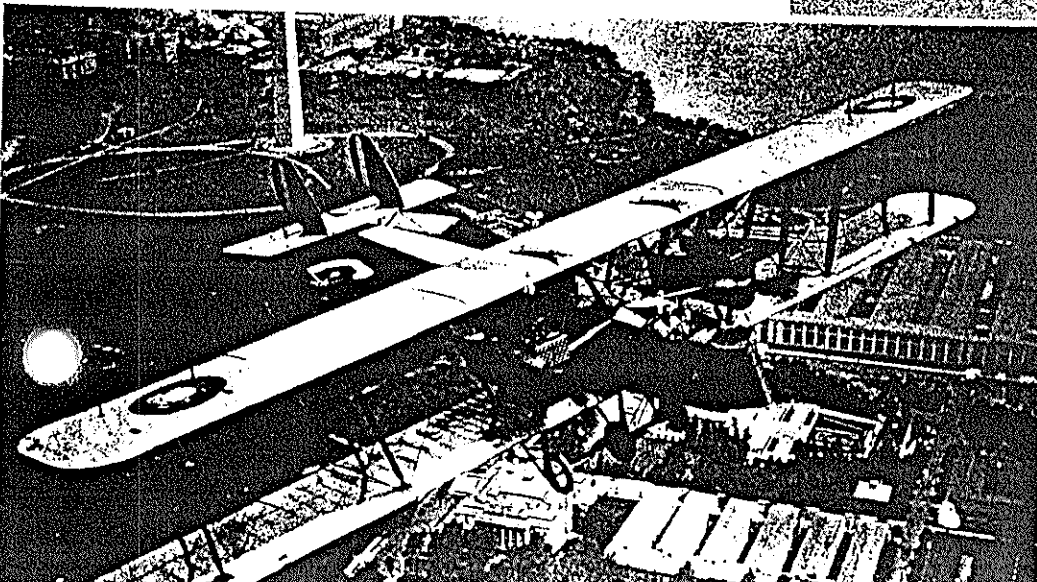
These MO ships were unusual indeed. Designed to mount either landing wheels or floats, they were amphibious in character. But that was not all. Experiments proved that it was practicable to catapult the airplanes from battleships. The Navy had previously catapulted smaller airplanes from the decks of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



Left: Martin Model MB-2 over Washington in 1919. This versatile ship was standard with the Army for years. Above: Production line in Cleveland plant in 1918. Ships are Model MB-2.

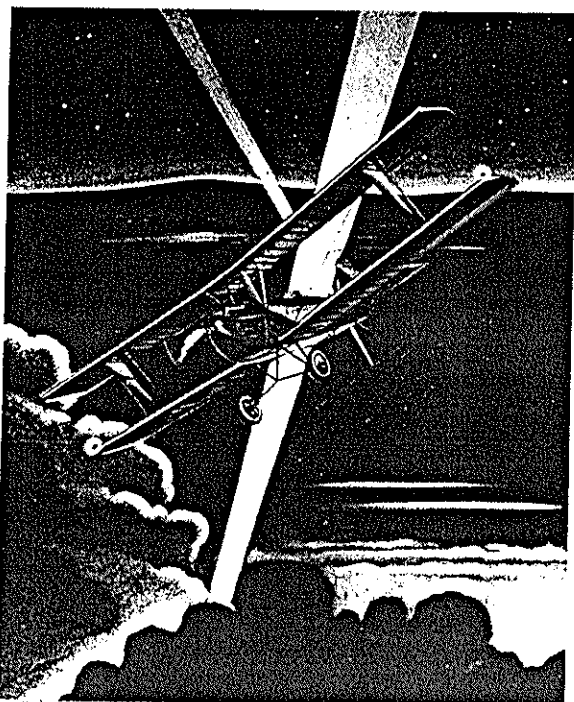


credible parachute record from 24,206 feet over McCook Field at Dayton. That was in June of 1922, and in August Lieut. Leigh Wade took it to 23,350 feet for a new altitude record for an airplane with three passengers.

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-1s, the little submarine scouts which were intended to range ahead of submersibles, 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 closed to it. They looked for all the world like an aerial cow and calf.



Carrying of night mail was made possible with the use of the Martin Model MB-2. Today night flying is accepted as the regular thing, but in the early '20's it was a hazardous experiment.

The Navy developed a technique for use of the submarine scout. The submersibles 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 Martin 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.

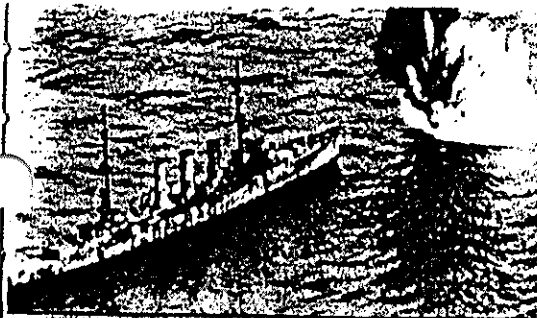
Then came another important development in naval aviation. Without knowing it, the United States Navy was beginning the development of a set of techniques that the war lords of a new World War were to copy with devastating effect.

Torpedo operations with airplanes was not new. The Navy 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.

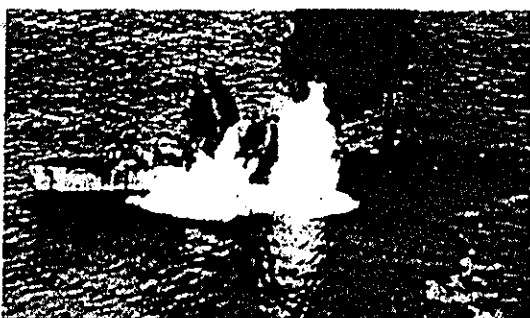
This spraddle-legged beauty, slinging a vicious torpedo between its specially-built landing gear, was a formidable weapon indeed, and before the contract was more than half finished, Martin had an order for forty more of an improved type, the SC-2. These were succeeded in 1926 by the famous "TM" ships—"three-purpose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

Of the T3M-1s 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-purpose 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



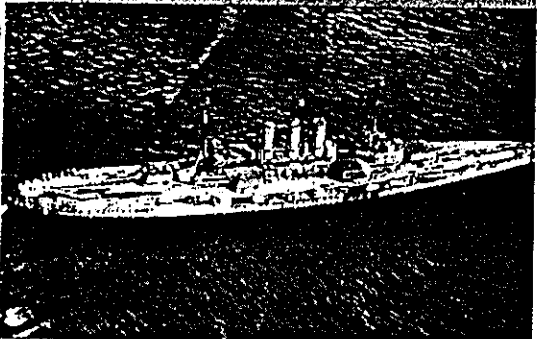
Six views of the experiments off the Virginia Capes in 1921 which established



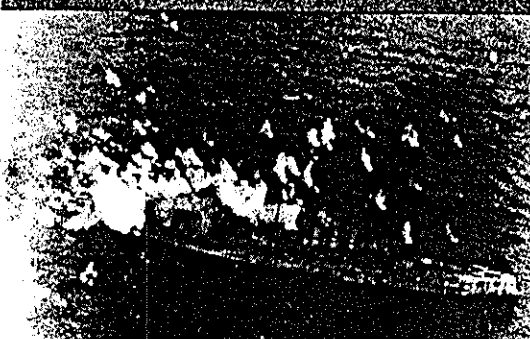
the supremacy of air power and vindicated the contentions of General Billy



Mitchell are shown in these six photos. The planes used in the experiments



Martin MB-2s. The old German prizes of war used as targets were sunk with



our trace. In World War II Martin Martinor patrol planes were the scourge of



German U-boats, definitely sinking several, with a number of probables.

devastating art of dive-bombing several years later.

By now things were getting too hot for the St. Clair Avenue plant at Cleveland. It was crowded to the doors and 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 tidewater. He wanted to be near Washington. He walked out of his busy office, packed a suitcase and headed for the Atlantic coast.

He wanted both an airport and a good water facility at the plant. 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 today except it is a bit modest—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 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 was to be used for many years to come.

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 of the Martin Company, 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

The Martin Model MO...
...stapling from the deck of...
...of...
...USS...
...1933...

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.

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!

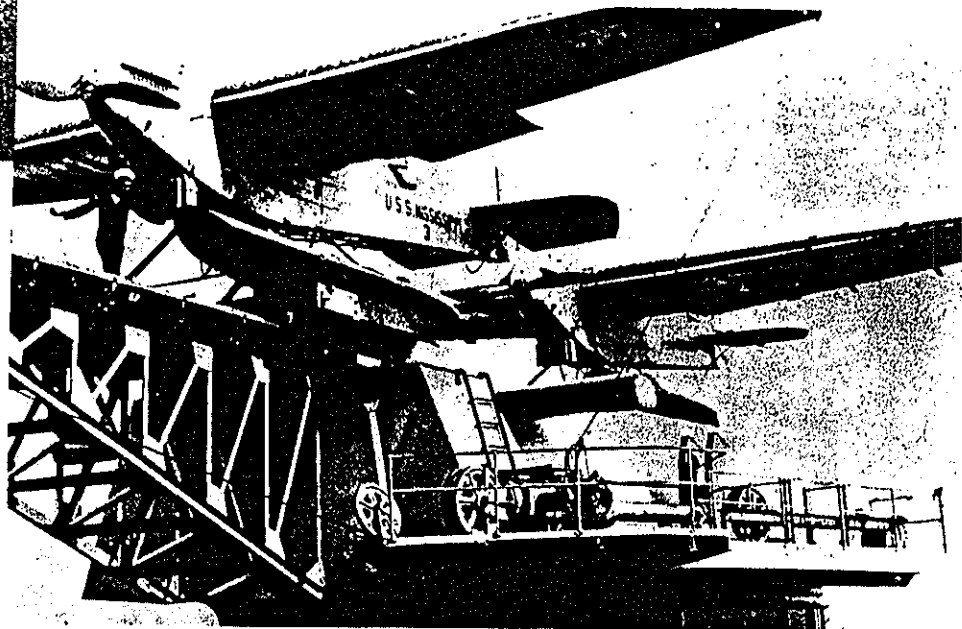
The whole business was cloaked in secrecy as the ship flew out to Wright Field to be put through the Army's gruelling paces, but soon it came out. Here was a bomber nearly 100 miles per hour faster than the service bombers of its day! At a stroke it made obsolete nearly all the world's military aircraft. 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 was 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-10s. They were followed by the YB-10A, the YB-12, 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 fire-power 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 139Ws (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 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 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 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 Martins 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 Messerschmitts. And when the dozen warbirds were silenced, it was not in combat, but by enemy bombs which found their secret airfield.

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 bombsight 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, 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 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.

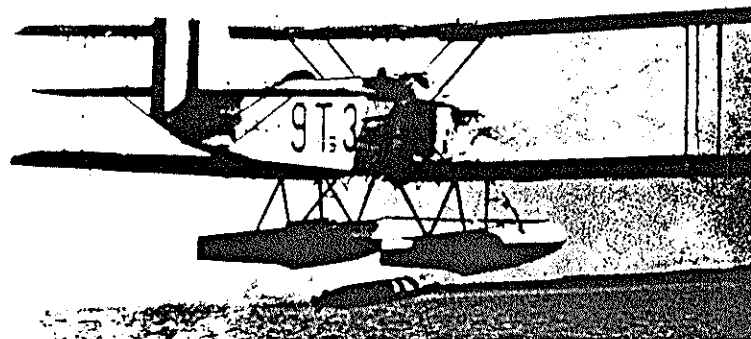
A newshawk approached Glenn Martin where he sat in an automobile with his mother.

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

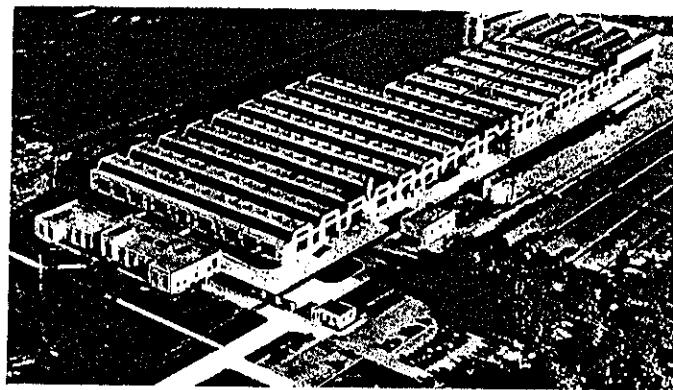
"I'm interested in those ducks," Martin smiled easily, eyes gazing toward a flock skimming low. "They don't worry about flying."

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

Torpedo practice with a Martin seaplane version of the Model T4M-1.



*Aerial view of the original
Martin plant at Middle
River, Md.*



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 hydronic reactions. Presently Ken opened the throttles, the leviathan leaped forward. In a few seconds 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 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.

The din of publicity over the China, Philippine and Hawaii Clippers had hardly died down, however, when

word leaked out of an even greater flying boat under construction at Middle River. This was the Soviet Clipper.

Weighing 63,000 pounds (11,000 more than the earlier Clippers), the Soviet took to the air for the first time on November 27, 1937, with the same old test crew under Ken Ebel to put it through its paces. Three months later the airplane was delivered in New York. Dismantled and packed tightly in crates, the Soviet Clipper set sail for Europe on the deck of a freighter.

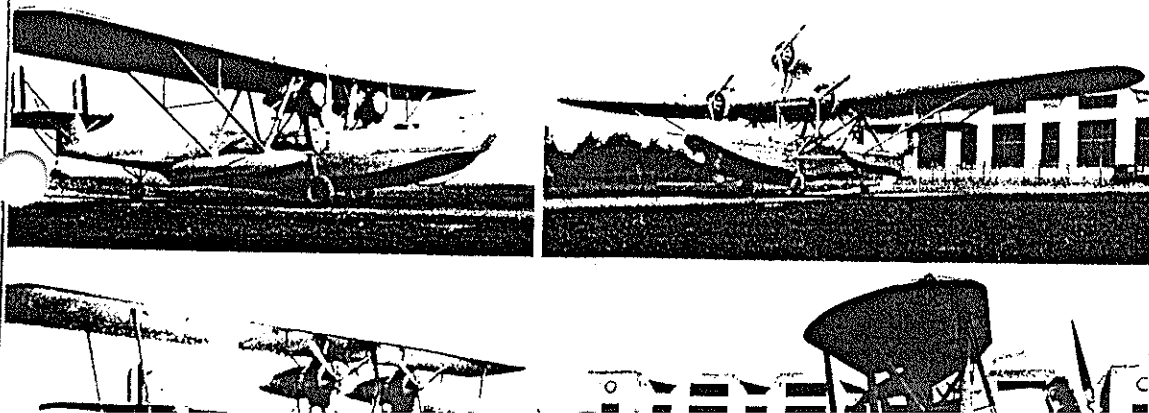
But this airplane was only part of The Glenn L. Martin Company's interest at the time. The factory floor was crowded with fuselages and wings of Martin 139s (evolution of the famed B-10s). The Dutch East Indies, China, Siam, the Argentine Army and Navy and Turkey had taxed Martin's facilities heavily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

By the time war in the Pacific broke into full fury and the Japs began their march down the islands toward Australia, the B-10 was already an obsolete ship, but the pitiful handful of them still in service in the Dutch East Indies gave a valiant account of themselves and delayed the advancing Japs sufficiently for reinforcements to reach the battle front.

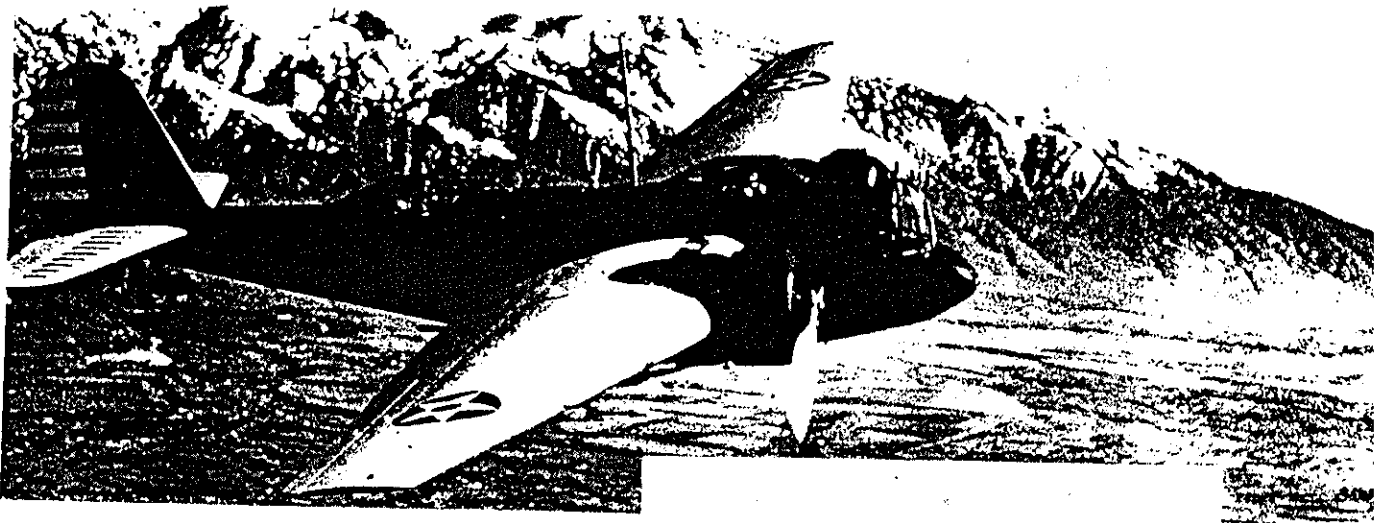
In combat, the swift bomber had lived up to every expectation, and, hopelessly outnumbered, went down fighting all the way.

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 lithe bombers and mighty leviathans of the air, building a pursuit ship?

THE mystery was partially solved about the time the last of the Clippers 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



*Four planes made
at Middle River
during the early
30's. Top left
P3M-1; top right
XP2M-1; lower
left: PM-1; lower
right: BM-2.*



new-born calf after its mother, it followed a giant 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.

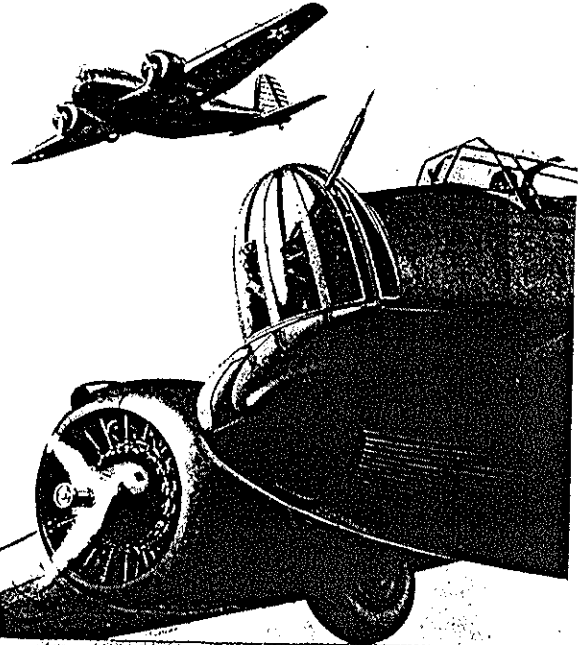
"Of what?" the reporters persisted. There were only shrugs in answer.

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 Fbel and L. D. McCarthy stepped from the dignified 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.

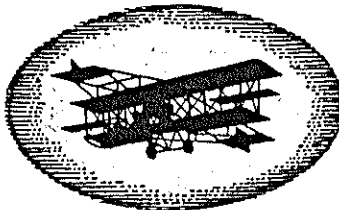
Meanwhile, the production of the PBM-1 was moving apace. Here was another step in Martin's progress in developing big patrol boats for the Navy—heavy, long-range craft, with living and dining accommodations aboard for the crews on long-range patrol missions. No one knew it then, but these craft were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

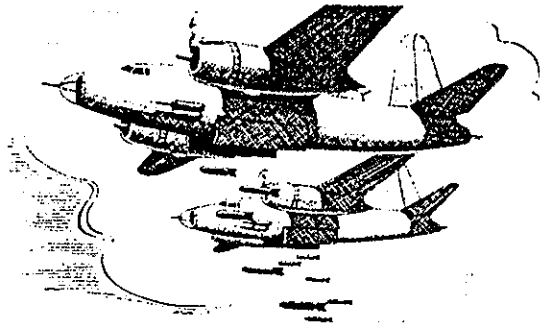
Meanwhile, Experimental had another project afoot. Another walled space was guarded. The prototype of



Martin Model B-10, the ship that made obsolete practically every military aircraft in the world and won for the Martin Company the Collier Trophy in 1932. Above: Close-up of nose turret which, with modifications and addition of power, became standard equipment on bombers during World War II.

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.





Part Three

A SECOND WAR—AND PEACE



MARTIN contributions to scientific development during the eventful 'thirties included many things in addition to airplanes. When, in 1936, the Engineering Department brought forth America's first power-operated gun-turret, no one got particularly excited. As it was a secret, the public knew

nothing about it and even the Navy, for which it was built, could hardly foresee the vast importance it was to have in a coming world conflict.

The same was true of another development called the Mareng ("Mar" for Martin, "eng" for Engineering) Cell. The cell was simply a synthetic rubber bag which could be stuffed into a wing aperture and be filled with gasoline much in the manner of inflating a football bladder with air. The thin bag belled out to every crevice of the aperture and if, by accident, it were ruptured or hit by a bullet, it could be pulled through a trap in the wing and another stuffed in its place without having to remove the wing or any section of it.

These two devices were to give American air power a definite edge over that of the enemy in the conflict which was even then brewing and play no small part in the final victory.

In fact, the Martin Company became the largest builder of aircraft power-operated turrets in the world, an operation which necessitated taking over an old foundry building in Baltimore and converting it into what was known as the Sinclair Division—a build-

ing where sudden death to our enemies was built wholesale.

Most famous was the Model 250CE, an electrically-operated turret of which more than 40,000 were built at Sinclair and several hundreds at the still-to-be-constructed Glenn L. Martin-Nebraska Company plant on the Fort Crook reservation near Omaha, Nebraska.

As finally perfected, the 250CE had two cal. .50 machine guns projecting through a plastic dome which stood out only a few inches above the fuselage of the aircraft. The guns could be elevated up and down and the turret turned rapidly a full 360°. The entire unit, including the firing of the guns, was electrically controlled by a gunner seated within the framework.

The 250CE was standard equipment on the Martin *Marauder* medium bomber, on the Martin *Baltimore* during the latter stages of production, was used on several other planes of American manufacture and a number of British craft. Of all the turrets used during World War II, the 250CE was without doubt the most successful.

Two other turrets were designed and engineered at Martin's but built by contract for the Martin *Mariner* flying boats used by the Navy.

The Mareng cell has been credited with the saving of thousands of lives of American airmen and hundreds of aircraft because of the self-sealing feature. Instant closing of any hole caused by bullets, even incendiaries, prevented leaks of gasoline and the attendant danger of fire as well as preventing loss of fuel needed

to get back to base.

Mareng cells also offered the added advantage of quick replacement as compared with the integral wing tank, where a leak or puncture repair can be a long and tedious operation that might ground a ship for several days. Changing a Mareng cell is a matter of only a few minutes' work.

The cells have likewise been used in the transport of liquids in box cars and other railroad equipment. Their use was accelerated by the shortage of tank cars during the early months of the war, when the pipe lines from mid-continent and Texas oil fields had not been completed and hauling petroleum by tanker was a hazardous and uncertain undertaking.

The safety features and quick changeability of the Mareng cell have been carried over into peacetime commercial aircraft manufacture and more uses for the cells are constantly being discovered.

EARLY March, 1939, the doors of Final Assembly rose, curtain-like, to reveal a lean, powerful bomber of a radically new design—the Model 167, later to win its spurs in Africa where it was known as the *Maryland*.

Martin men looked proudly on this silver beauty as it was wheeled onto the apron. It was the center of a storm of activity around Middle River. It was the forerunner of a hurry-up project that was to astound not only the aircraft field but the industrial world generally, 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 aircraft industry was to become, in a few short months, the greatest of all.

France had awakened suddenly to the drums of an onrushing war beating in her ears. From behind the 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 to the core from the labor strife of the Blum régime, with her people in a woeful state of mind through the long and insidious divide-and-conquer campaign of the Goebbels propaganda machine in

Berlin, France screamed to industrial America for help.

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

The Martin Company was one of the first to hear the call. Under the urgent pleas of French emissaries, Glenn Martin held a council with his executives. As a result of these talks, on Thursday, February 9, 1939, he picked up his telephone and rushed through a call to the late Albert Kahn, the famed Detroit industrial architect.

"Mr. Kahn," he said, "we must double the size of our plant at once. We must have 440,000 more square feet of floor space and it

must be finished in eleven weeks!"

There was a stunned silence at the other end of the line, but Albert Kahn had cracked plenty of tough nuts in his time. Presently his voice, calm as ever, came back over the wire.

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

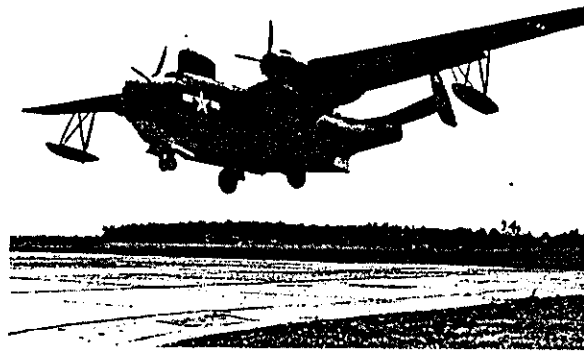
Next day, Friday, an airliner landed at the Airport and a group of engineers, headed by Mr. Kahn, trooped into the Martin plant. All night long the windows in the Engineering and Administration Buildings at Middle River were jewels of light. From time to time contractors were called in for consultation.

Next morning a weary-eyed excavating contractor burst out of the executive offices and sped Baltimoreward, followed by an harassed steel official who reached for the nearest telephone and yelled for long distance.

"Finish everything we have on the books by Monday," he ordered his office. "We're starting to build steel for the Martin plant."

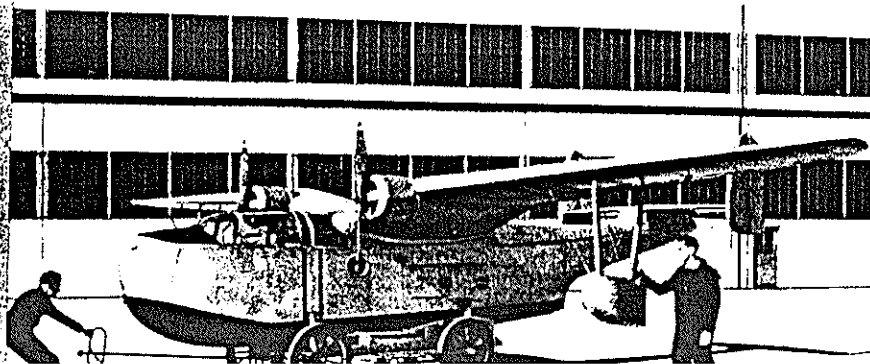
All day Saturday and on into Sunday the offices echoed to the sound of haranguing, of cryptic orders, of protests shouted down in the stern necessity for speed. Men crowded in and emerged shortly with contracts. A rigid schedule of deliveries was set up and on each supplier had been imposed almost impossible requirements. Each must deliver just so much on each stated date—none before, none after. It was a mighty challenge to American industry and ingenuity, but the challenge was met in every detail.

An incredible corps of excavating machinery moved in on Monday and the land to the east of B Building



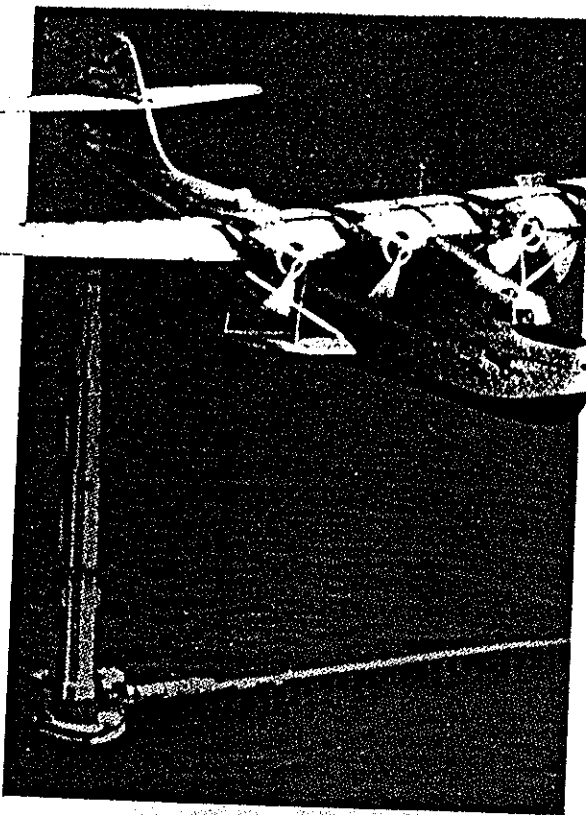
Martin XPBM-5A, largest amphibian in the world, was conceived and started during the war for air-sea rescue work. It's shown taking off from Martin Airport, using retractable tri-cycle landing gear.

Flying model of the Martin PBM-3. A unique adventure in aerodynamics and hydrodynamics testing the use of the flying model made possible the development of two of the Navy's most



widely used and staunchest aircraft during World War II—the PBM-3 and the PBM-5. The model now hangs in the Middle River factory beside a towing basin model of the later Mars.

The China Clipper outbound from San Francisco on its first trip to the Orient. The still-unfinished Golden Gate Bridge in background.



(then called the Navy Building) soon looked like a battlefield. Railroad spurs were run in and as day followed day a steady stream of materials was unloaded from this siding. Never were the piles allowed to get very big—deliveries were scheduled so that workmen were ready to use each item as it was brought in. Foundation concrete ran in rivers. Raw, red steel girders rose like magic. Floor, 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 for a job well done, sent in its shipment three weeks ahead of time. The material was promptly sent back with instructions to deliver as ordered. The builders didn't have time to bother storing the stuff until they were ready to use it.

On the seventy-seventh day—the deadline—the first steps in the manufacture of the production version of the Model 167 were being taken at one end of the huge structure (first known as the French Building, later as C Building), while the builders were closing in the other end. A world record for building construction had been set.

Martin engineers were not outdone by the contractors, however, because the entire first order for the Model 167, 115 ships for the French Government, was completed in ten months and three days. It was an unparalleled record in those days, a record which left the industry gasping.

She was a beauty, that 167—a lithe attack bomber of high speed, carrying a bomb load of almost a ton and wing guns which allowed her to fight like a pursuit ship.

When France fell in the Spring of 1940, the British, also hard-pressed for aircraft, immediately took over the model and construction continued with accelerated speed while Martin engineers and British tacticians, benefiting from

experience in combat, quickly designed its successor, the Model 187, named the *Baltimore*.

The British needed this aircraft for service in Africa, and it was especially designed for operations there. It was faster than the *Maryland*, carried a heavier bomb load and had more fire power.

Nearly 1600 of this swift craft were built to fill the needs of the RAF in the Mediterranean area. Like its predecessor, the 187 was, for a long time, completely built at Middle River, then disassembled into large units which were crated and shipped overseas by steamer. Reassembled in England or in Africa, they were soon ready for combat. Finally, however, when a ferry route from Brazil to the west coast of Africa was opened, the *Baltimores* were flown from the factory direct to the theatre of operations.

The usually reserved British, whether from England or the Dominions, were high in their praise of the *Baltimore* performance, and these swift bombers were one of the main deciding factors at El Alemein when Montgomery broke out of the hole into which he had been forced and began the long march across the top of the continent, a march that ended only with the driving of the final remnants of the German army into the pocket at Tripoli.

Although the earlier *Marylands* had suffered heavy battle losses, many were still in operation during this campaign and played their part alongside the *Baltimores* in Rommel's defeat. Once Africa was cleared of the Nazis, the craft were sent across the Mediterranean to Sicily and Italy and followed the Allied Armies until the final surrender, but their role in Italy was less important than that of another Martin bomber, the *Marauder*, because the *Baltimore* was not designed for use in the colder climate of Italy. Numbers of *Baltimores* also served in the eastern end of the Mediterranean and carried out bombing expeditions in Greece, Cyprus and other islands in the Aegean Sea.

When the British contracts expired, the model was taken over by the United States Army Air Forces, which gave it the designation of A-30, but all aircraft continued to be sent to the British under lend-lease.

IN the early days of the war and just before hostilities broke out, the Martin organization had another expansion program to lick, another building-up to do quickly and efficiently—and it was done in as competent and thorough a manner as was the building of new structures and the designing of aircraft.

When war broke out in Europe in the fall of 1939, there were but 3900 aircraftmen on the payroll at Middle River. By the end of 1940 there were 13,000. By Christmas, 1942, the total had reached the staggering figure of nearly 53,000! In addition to the Middle River plant, Martin was then operating the Omaha plant, which had another 17,000 employees.

Most of these craftsmen had never before been in an aircraft factory—had never seen an airplane closer than when one flew low over their heads. They had to be trained to do their particular job, even though they

might already be experienced sheet metal workers, machinists or assemblers.

In cooperation with the Baltimore City Schools, classes in almost every type technical skill were opened, and trainees were taught free of charge. They learned riveting, welding, sheet metal work, assembling. Young men and girls, housewives, older men and women who had nominally retired to enjoy their declining years in peace, answered the call "To arms!" and learned to do their bit.

In ever-increasing numbers women responded to the call. Some 35 per cent of Martin employees were women at the peak of employment. They came from every nearby State, from the South, the Mid-West and New England. Housing developments were quickly constructed, small, comfortable dwellings, and soon the area surrounding the Middle River plant, if combined into a corporate unit, would have been the second largest city in Maryland.

The needs of the armed forces kept draining off many of the Martin men and women, more than 30,000 of whom saw active service in the Army, Navy, Marine Corps, Coast Guard, Merchant Marine and every other active group.

THE United States Navy was quite as interested in the Martin expansion and plans as were the Army, the French and the British. Martin had long been a naval contractor and had supplied that service with some of its finest aircraft.

The PBM-1 flying boats, named the *Mariner* in the service, had proved to be everything that was claimed for them, but they needed to be larger, able to fly longer, be more heavily armed. The Navy was to use them principally for submarine search, and at that job they proved a most effective weapon.

From the drawing boards came the design for the improved *Mariner*, the -3, which was one of the most widely used of all naval air patrol boats. Gull-winged like its predecessor, the -3 could cruise for hours longer over hundreds of miles more of trackless ocean. It was provided with gun turrets on the deck, in the nose and

tail in addition to large bomb bay racks in the engine nacelles in the wings.

Mariners were among the very first American aircraft to be equipped with the infant called radar, the use of which has often been credited with saving England during the Battle of Britain and the Nazis' break-through of the Low Countries.

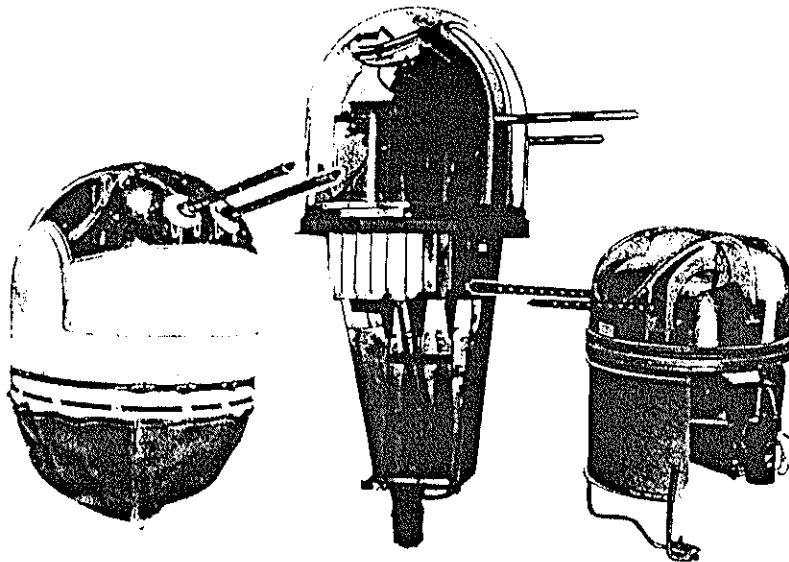
Several definite kills are credited to Martin *Mariners*, one of which resulted in the capture of Kaptänleutnant Frederick Guggenberger, skipper of a Nazi sub which sank HMS *Ark Royal* early in the war.

Hundreds of *Mariners* searched the Atlantic from ice cap to ice cap and hundreds more saw service in the Pacific in the war against Japan. Thousands of tons of Jap shipping were sunk by *Mariners*, hundreds of rescues of downed airmen were made by ships assigned to "dumbo" (rescue) operations. *Mariners* followed close on the heels of the fleet and the assault boats clear into Tokyo harbor, where a base was set up only a few days after occupation of the Japanese capital.

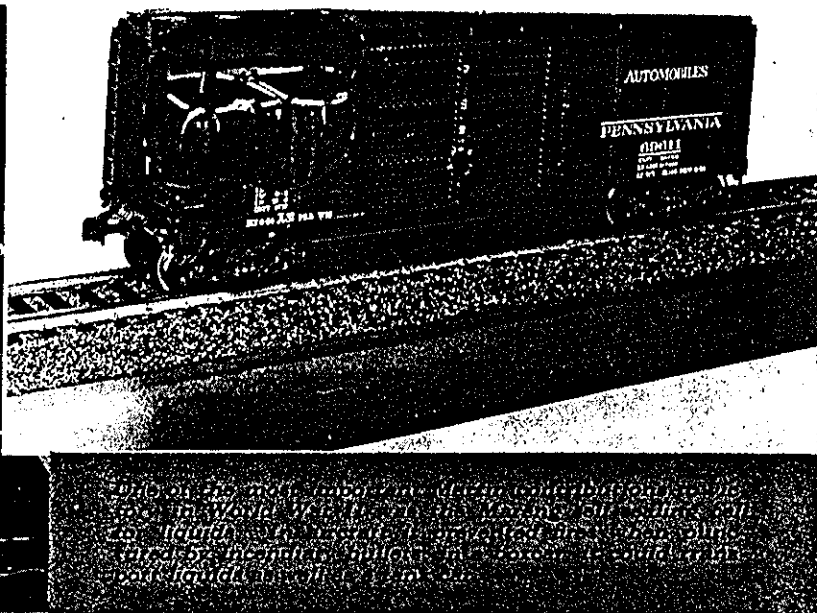
War-weary veterans were returned to the factory in large numbers for overhaul and assignment to transport duty. Unarmed against possible attack, these ships, usually painted a brilliant white as against the blue and white or black of the combat ships, plied the skies all over the world, carrying critical materiel, men and mail to the far stations at which American fighting men were engaged.

Shortly before the close of the hostilities against Japan, the model -5 made its appearance, its chief difference from the -3 being that it had far more powerful engines, and was capable of carrying heavier loads a greater distance. To help the big boats get into the air when heavily loaded, they were equipped with JATO (Jet Assisted Take-off), bottles of the heavily compressed propellant being securely anchored to the hulls of the ships and giving it a tremendous kick which enabled the ship to become airborne, when the regular engines could take over. Without JATO, many of the rescues effected in open seas, often in heavy swells, could never have been effected.

A variation of the *Mariner* was developed at the Martin plant for the special purpose of making air-



During World War II the Martin Company became the world's largest manufacturer of power-operated turrets for aircraft. Three are shown in the picture, of which the Model 250CE (on right) was most widely used, over 40,000 having been manufactured and used on a dozen different warplanes of both American and foreign makes. 250CEs also showed up on flak boats, at the atom bomb test in New Mexico as camera turrets, and in a lot of other odd places.



sea rescues more quickly and getting patients to hospitals. It is known as the PBM-5A and is the same as the combat PBM-5 except that wells have been sunk into each side of the body and a bay built into the forward hold. Into these is fitted a retractable tricycle landing gear, which enables the ship to land or take off on water or at any land airport. The -5A is the largest amphibious airplane being built today. So successful were tests of the experimental amphibian *Mariner* that the Navy placed an order for 24 more of them for use in air-sea rescues, Arctic patrol and numerous other purposes.

THE Martin Company has been credited with many "firsts," but one of the most startling and revolutionary in the aircraft industry, was the building of its most famous airplane, the B-26 *Marauder*, without constructing a prototype and testing it thoroughly.

The B-26 had won an industry-wide competition in 1939 for a medium bomber. The Army Air Forces had set up specifications which seemed incredible at the time and the ingenuity of engineers was taxed to the limit.

Usually it was a year and a half to two years from the time of the design of an airplane before production started. But that, of course, was in peace times before the war. In 1939 and 1940, there was no time for trying things out. You had to guess—and heaven help you if you guessed wrong.

When the B-26 won the Army competition, tooling for mass production got under way. Materials were bought by the tens of thousands of pieces and tons. There was no place in the old plant to build the ship, so the Government erected what became known as Plant No. 2, a mile or so to the east of the original Martin buildings at Middle River.

When, on November 25, 1940, Ken Ebel taxied the first *Marauder* onto the Airport, pride glowed in the eyes of the men who watched her first taxiing tests. After a few runs up and down the field, Ebel went to the far end of a runway, headed the ship into an icy northwest wind and opened the throttles.

The big Pratt & Whitney engines roared with a sound hitherto unheard, a sound of defiance to the

despoilers of peace, a sound which they were to hear with growing intensity and dread in the months to come. The *Marauder* skimmed swiftly and ever more swiftly over the hard runway. In a few moments the air took hold of her short wings and she was airborne!

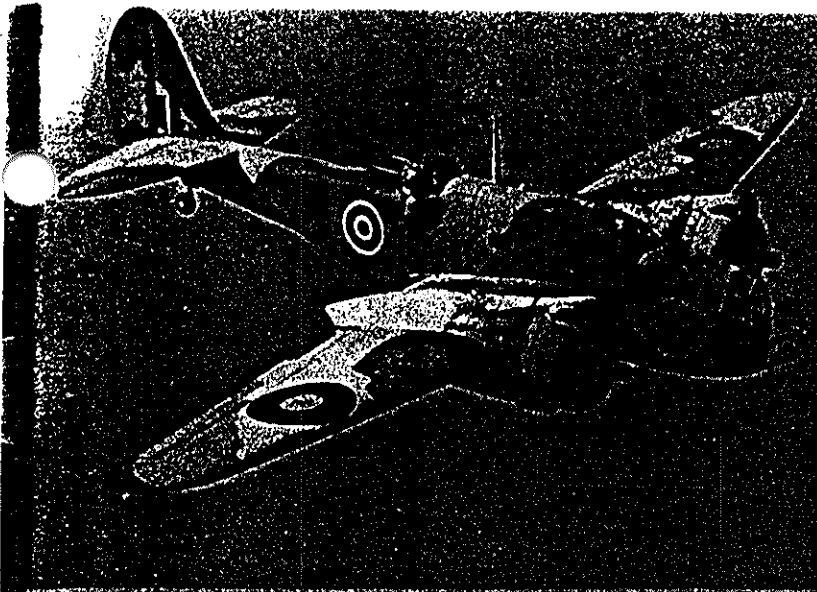
Wild shouts of joy rose from the group of spectators and newspapermen who watched that flight, but their joy was no greater than that of the Army Air Forces men who had selected the ship as a winner. At last they had a medium bomber which carried a heavy bomber's load at pursuit-plane speed. In the *Marauder* were Mareng self-sealing fuel tanks, the first Army power-operated turret, the first all-plastic bombardier's nose, one of the first tail turrets. Machine guns bristled from her, but she was to later be even more heavily armed.

For a while, the *Marauder* had rather rough sailing. Such a heavy airplane with such tremendous speed spelled trouble for more than one young Army pilot whose confidence in his ability to fly anything on wings was greater than his caution when caution was called for. But steady refinements during manufacture got rid of the bugs and long before the close of the war, the *Marauder* was regarded as one of the top bombers of the AAF.

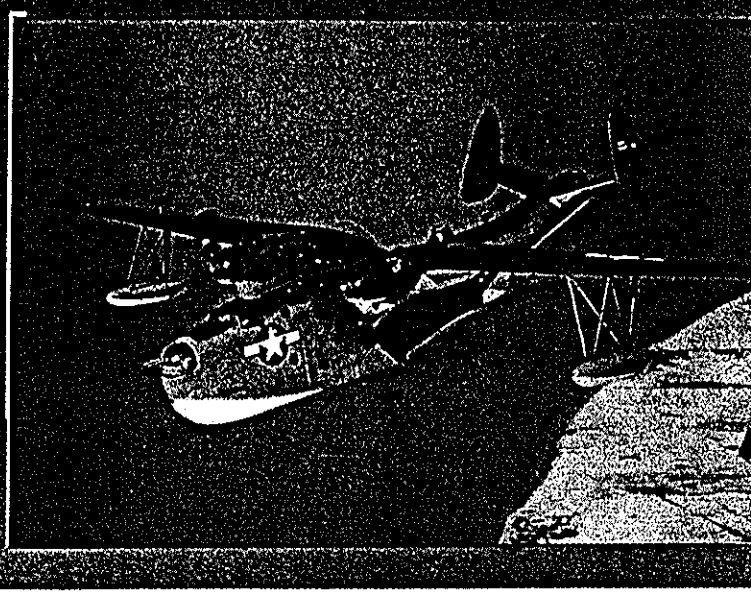
When the Japs struck at Pearl Harbor on that fateful December 7 of 1941, a squadron of *Marauders* stationed in Florida (the only unit ready to give combat, too) was despatched to the Pacific and there fought the Japs all the way down to New Guinea, although they were not designed for the work they were called upon to do.

At the Battle of Midway, *Marauders* turned up as torpedo bombers and wrought heavy destruction to the Jap navy and supply ships. Japs in Alaska and the Aleutians felt the sting of the *Marauder's* power, too, but it was in the European Theatre of Operations and in the Mediterranean that the *Marauder* wrote a vivid page of American military aviation.

The vast majority of the nearly 5,500 B-26s built saw service in either the ETO or the Mediterranean, where they formed the backbone of the 9th and 15th Air Forces, respectively. Tens of thousands of sorties were flown all over France, the Low Countries, Ger-



A patrol bomber and search plane, the *Mars* (left) and the *Clipper* (right) were built at the Glenn L. Martin Company plant in Baltimore, Md. The *Mars* was built for the Army and the *Clipper* for the Navy. The *Mars* was built in 1941 and the *Clipper* in 1931.



The *Martin* company made more than 1,000 of the *Marauders* for the Army. At Baltimore, Md., the *Marauders* were built. They fought all over North Africa and in Europe. The *Marauders* were built in Italy and Italy. They were also used for the job of aid and did not follow the troops. They did the flying over the Italian coast. The *Marauders* were built in Baltimore, Md.

many, Italy and Austria. Destruction of enemy communications and manufacturing facilities was enormous.

When D-Day arrived, it was the ever-faithful *Marauder* which spear-headed the invasion forces from the air, softening up the Nazi defenses for the landings which had been so carefully rehearsed. All across France and into Germany the cooperation between the *Marauders* and the ground forces spelled success for American arms. As the Allied forces worked their way up the boot of Italy, it was *Marauder* squadrons which blasted the pathway for the soldiers in tanks, jeeps and on foot.

So rugged, so swift, so dependable were the *Marauders* that by war's end the loss ratio was the lowest of any bomber in the ETO and the ship had set a high mark for others to shoot at.

Shortly after the B-26 had proved its worth and the need for more aircraft became acute, the Federal Government erected on the military reservation at Fort Crook, Nebr., near Omaha, an almost exact duplicate of the Middle River plant where *Marauders* were made. The Glenn L. Martin-Nebraska Company was organized to operate the plant and build B-26s there too. In an incredibly short time, complete bombers were rolling out the Final Assembly doors at Omaha and a huge modification center had been set up to make changes dictated by battle experience.

After some 1500 B-26s had been built at Omaha, however (and because loss ratio had proved so low), that plant was changed over to the manufacture of the B-29 Boeing *Superfortress*, the emphasis by then being on the long-range bomber. Martin continued to build the *Superforts* until the end of the war, and it was an Omaha-built B-29 which dropped the first atomic bomb on Japan. With V-J Day, the need for the Omaha plant ceased and its affairs were quickly closed out.

DURING those busy years just before and during

World War II, so many things were happening around Middle River that it's impossible to try to present each event chronologically. You can't, for instance, just stick in a paragraph somewhere that on such-and-such a date the *Mars* was launched and later try to pick up the thread of the story.

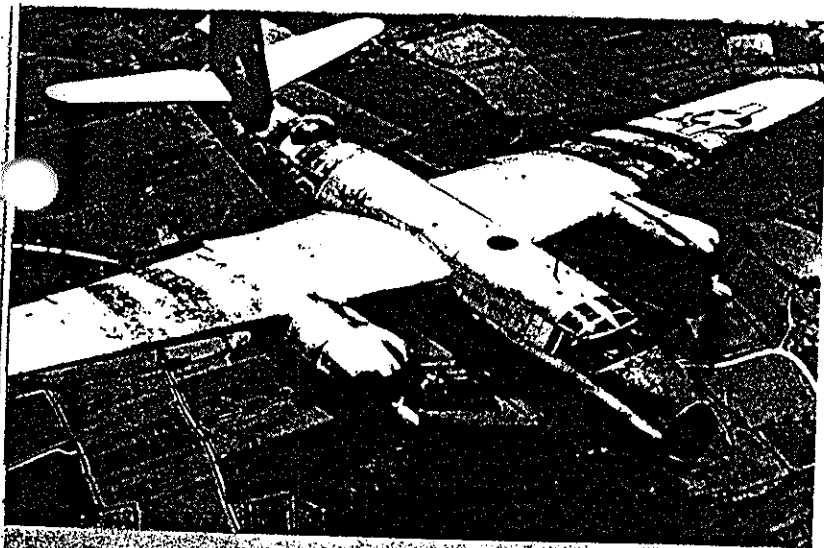
The *Mars* was one of Glenn Martin's dreams come true, a dream that had started 'way back in the days of aviation's infancy and been only partly realized with the building of the famous *Clipper* flying boats in the mid-'30's.

The *Mars* was, at the time of its building, the largest flying boat in the world, a huge mass of aluminum pulled through the air by four powerful engines, capable of flying the Atlantic and back non-stop.

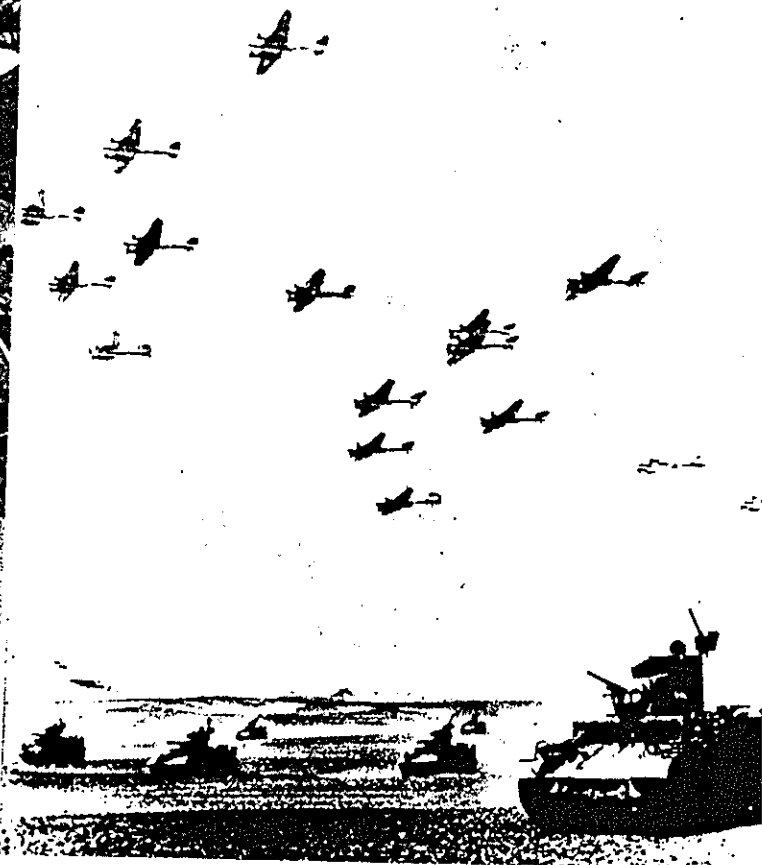
The gargantuan ship was built for the Navy as an extra-long-range bomber and in its original construction was heavily armed as well as having huge bomb bays. On November 8, 1941, the *Mars* was launched in a unique ceremony, launched just like naval surface and undersea craft have been sent down to the sea since time immemorial. Mrs. Artemus L. Gates, wife of the Under-Secretary of the Navy for Air, sponsored the ship and broke the traditional bottle of champagne across her nose. Guests included some of the highest ranking officers of the Navy and Army as well as Maryland and Baltimore public officials.

The *Mars* never got a chance to drop a bomb on the enemy, however, as the Navy decided its relatively slow speed in the ever-increasing tempo of air war, would make it too vulnerable a target. But it would make an excellent transport, carrying vital materiel and men to almost any place in the world swiftly and in large quantities—so long as it stayed away from the shooting aspects of the war.

The armor was ripped out, bomb bays closed in and the *Mars* was on its way to establishing a number of air records. On an endurance test October 6-7, 1943, the ship flew a closed course for 32 hours, 17 minutes, cover-



Most famous of the Martin planes in World War II was the B-26 Marauder, a fast, heavily armed twin-engine bomber which saw most of its activity in Europe and the Mediterranean. More than 6,000 of this model were built and its loss ratio in combat was the lowest of any bomber. The Marauder above was photographed on D-Day on its way to a target in northern France. At right is pictured a flight of Martin Model 167 ships, which saw duty in North Africa.



ing a distance of approximately 4600 miles. Delivered to the Naval Air Transport Service a month later, the *Mars* took off from Patuxent Naval Air Station, Maryland, for Natal, Brazil, on November 30, 1943, and flew the distance (4250 statute miles) in 28.3 hours, the longest over-water flight made to that time. Gross load was the greatest ever flown then, too—148,500 pounds.

Shortly after its return to Patuxent, the *Mars* was assigned to service between Alameda, Calif., and Honolulu, and for more than a year shuttled back and forth between the terminals, carrying vital cargoes in both directions and speeding important military and civilian personnel on their way.

The economy and reliability of the big flying boat were so outstanding that the Navy contracted with Martin for the construction of 20 more ships of the type, slightly modified and having a gross weight 5,000 pounds greater. These were designated Model JRM by the Navy and were given the names of groups of islands in the Pacific—*Hawaii Mars*, *Philippine Mars*, *Marshall Mars*, and so on.

The contract had not been completed by V-J Day and only five of the type were made. They were assigned to carrying mail, wounded and personnel between the Pacific area and the California mainland, making two round trips each way weekly between Alameda and Manila.

Operated by the Naval Air Transport Service, the first four set a number of records in this operation. On Easter Sunday, 1946, for instance, the *Hawaii Mars* landed at Alameda with 128 passengers aboard, 100 of them Naval casualties being brought to the mainland for hospitalization. Medical attendants and plane crew made up the balance of the group, the largest number

of people ever to be flown in a single plane for any considerable distance.

JATO was experimentally tried on the *Philippine Mars* with such success that its use was recommended for the others. This powerful aid to quick take-off materially cut down time and shortened distance needed to become airborne, just as it had done on the smaller PBMs and other aircraft.

The fifth and last of the JRM type, designed -2, was powered with the new Pratt & Whitney R-4360 engines, then the most powerful aircraft engines in the world. Lines of the airplane were the same as the predecessors but the new engines enabled this fifth *Mars* (as yet unnamed in the fall of 1946) to take off at a gross weight of 82½ tons, ten tons more than the previous ships.

Thus Glenn Martin's dream of huge flying boats circling the globe in frequent service was coming ever closer and closer to realization.

DURING the closing days of World War II work was being rushed on another Navy airplane, a swift, deadly dive and torpedo bomber designed to operate from the decks of large aircraft carriers. Experimental ships were designated the BTM, although the production model was known as the AM-1.

Built around the same Pratt & Whitney engine used on the JRM-2, the *Mauler* never got into action, but production was pushed ahead though the order was somewhat cut back after the cessation of hostilities.

The heaviest and largest airplane ever built for operation from a carrier deck, the *Mauler* has a gross weight of 19,500 pounds, including 2,000 pounds of bombs carried under the wings in shackles. Offensive armor

includes four 20-millimeter cannon mounted in the leading edges of the wings.

Built to fly in the over-350-miles-per-hour class, the *Mauler* is designed to withstand vertical dive speeds of more than 500 miles per hour. A new type dive brake is included in the *Mauler's* specifications—intermeshed fingers forming a portion of the trailing edge when in normal flight, but opening out on both sides of the wing in three seconds at 400 mph. speeds. These brakes slow the airplane more swiftly than conventional dive brakes and the pilot does not have to trim ship to compensate for unusual drag.

An entirely new technique in dive and skip bombing was forecast with the advent of the *Mauler*, as the airplane could strike at a target from more deceptive angles than conventional dive bombers, at the same time making itself a difficult target because of its great maneuverability and speed.

WHEN the war against Japan ended, American industry was geared to its highest pitch for production of war materials and none higher than the biggest of them all—the aviation industry.

Its leaders had long foreseen the inevitable, of course, and plans had been laid to meet the challenge of a suddenly stopped market. Since it is a matter of months and years to get into production of a new aircraft design, the outlook was none too bright for the first months of reconversion.

At V-J Day, the personnel at the Middle River plant numbered slightly less than 34,000—at the Omaha plant

about 14,000. Within a month there were less than 10,000 at the Maryland factory, but they were busy.

There were the engineers, working swiftly on new designs for commercial air liners which had been dreamed of only slightly during the war, but must now be rushed to completion for the only large market left—the air lines of the world. Hundreds of men and women were engaged in the laborious task of taking inventory of the vast supplies of materials and equipment acquired for the war and getting them ready for disposal.

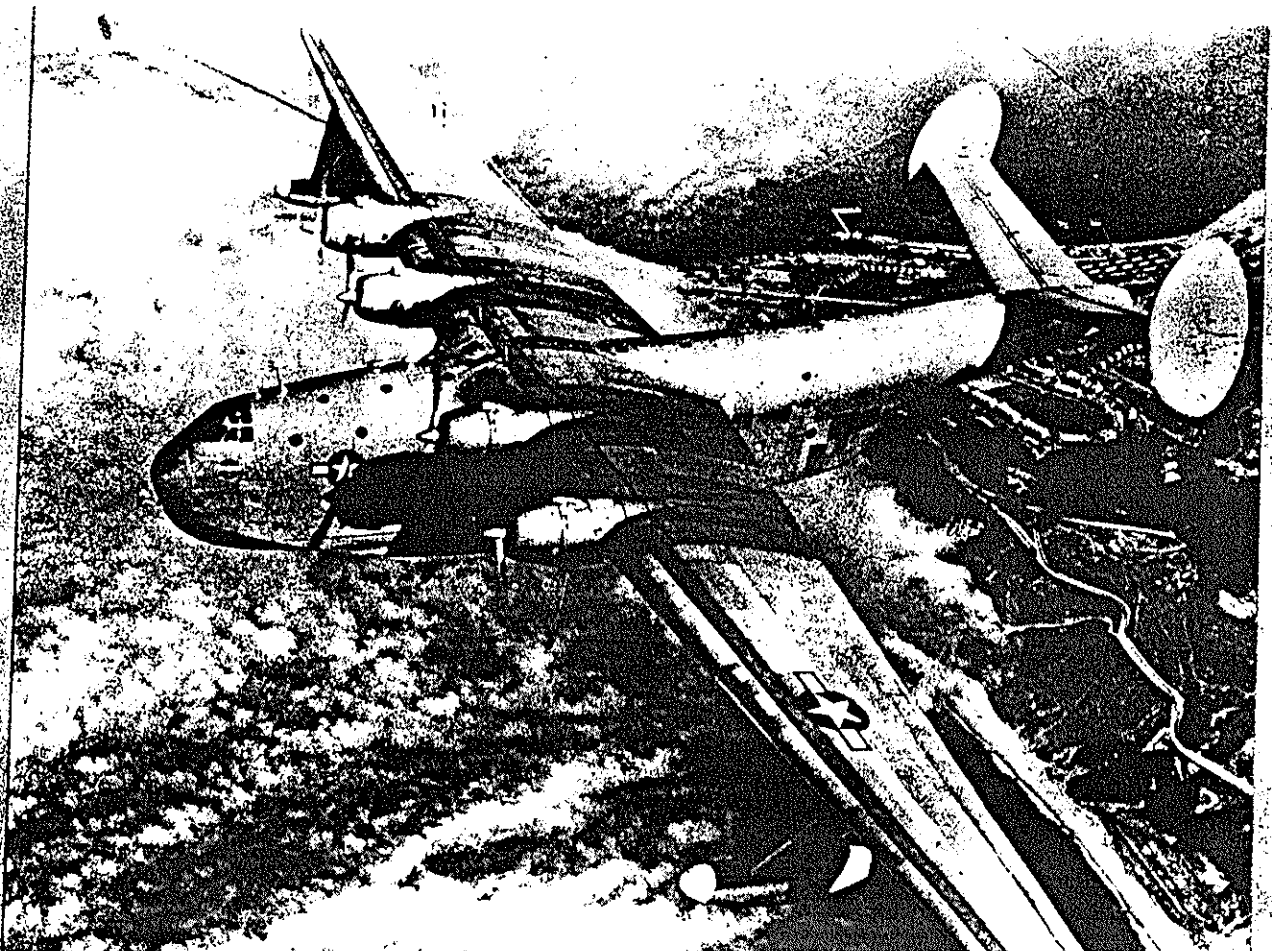
Within a few weeks, however, the results of the careful planning and designing began to bear fruit. The Martin Company announced its design for a high-speed, twin-engine luxury air liner—a design which scooped the industry.

The Martin Company, during its long and honorable history, has been primarily a military contractor and for it to enter vigorously into the commercial field surprised almost everyone.

But the air lines of the country liked the Martin design and within a matter of only a few months after the announcement, twelve of the country's largest commercial carriers had contracted with Martin for the airplane or a variation of it.

The Martin 2-0-2, which is the basic design, is a twin-engine, low-wing monoplane capable of nearly 300 miles per hour, seating 30 to 42 passengers and carrying cargo. Its principal use is on routes up to 700 miles. In its design, every consideration was given to passenger comfort and safety, quick servicing at intermediate stops, low cost of operation and maintenance. It is

The Martin Mars, the largest flying boat in the world when built and prototype of a fleet of even larger flying boats made for the U. S. Navy.



equipped with radio and many war-developed safety devices.

When flying is required at altitudes over 10,000 feet, a sister airliner, known as the Model 3-0-3, has pressurized cabin, auxiliary engine jet thrust and many other innovations, many of them perfected during the war.

A third design is the Model 3-0-4, a turbo-jet-prop high speed air freighter which will be given thorough tests in cargo handling before being used in passenger service.

A modern, high-speed air freighter was needed before the 3-0-4 could be designed, built and tested, however, so Martin engineers redesigned the interior of the 2-0-2 for cargo only. It met with an instantaneous response from operators and orders began pouring into the Middle River plant.

No competitive aircraft manufacturer had sold anywhere near as many new post-war ships as had Martin. The prestige of the Martin name in military aircraft, the ingenuity of Martin engineers and the reliability of product had carried the Company right into the lead of the commercial field for twin-engine aircraft.

Practically every major air line in the United States purchased the new Martin aircraft, and the export business was good. Operated in combination with the big four-engine airplanes bought by most airlines for long flights, the Martins provided 300-miles-per-hour service for almost every city in the United States on an air route.

WHILE booking of all this business on new aircraft was gratifying and made the future outlook rosy, there was still the problem of giving immediate employment to thousands of production workers who had been furloughed on V-J Day. Martin had the idea that the huge Middle River plant should furnish permanent

work for between 18,000 and 20,000 people.

The commercial air lines, their equipment overworked during the war and in sad need of replacements, needed more, bigger and faster aircraft—quickly. The Army Air Transport Command, which had established ferry routes all over the world, announced that several hundreds of its big four-engine planes would be declared surplus and sold at attractive prices to operators.

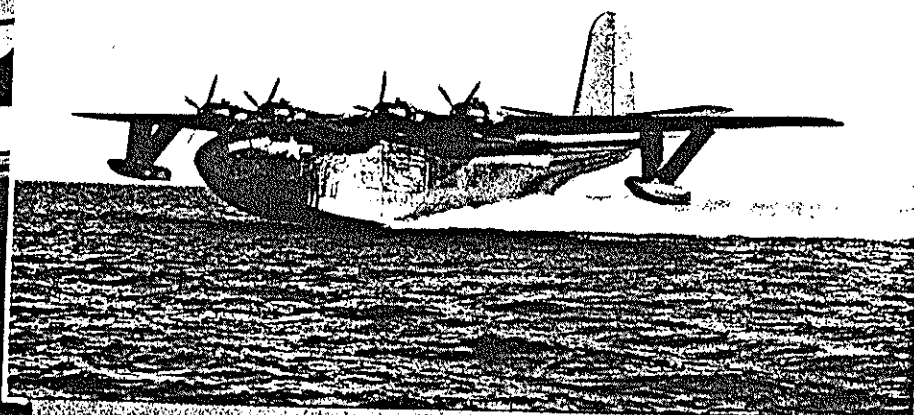
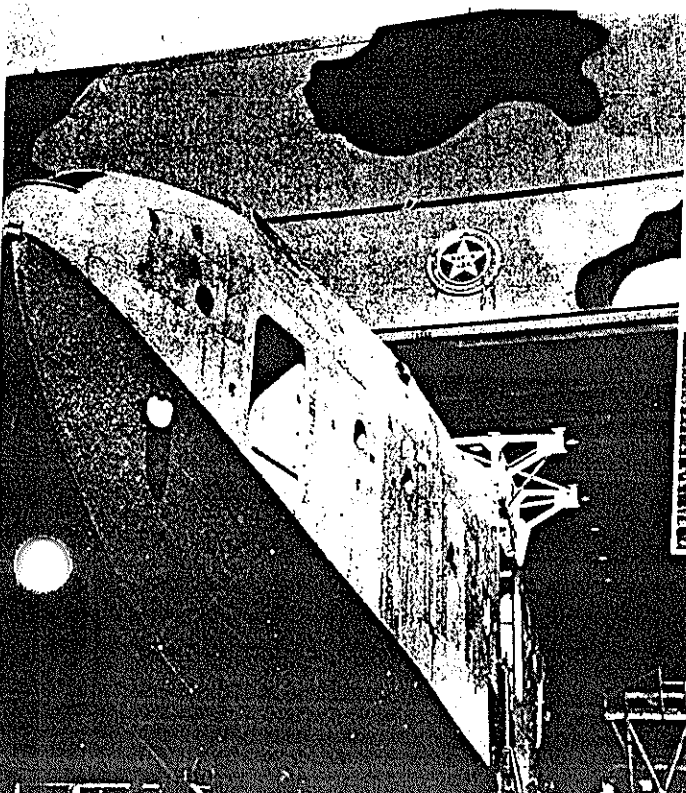
Martin went after the business of converting these ATC ships to commercial use, went after it so successfully that soon the aprons at the Airport were crowded with C-54 planes in various stages of conversion and the huge buildings at the main plant, only a few months ago housing *Mariners* and *Mars* flying boats, were crowded to the doors with the former Army aircraft.

Nearly every domestic air line and several foreign carriers contracted with Martin for this conversion work, a job which brought many new aspects and kept together the nucleus of the expert craftsmen assembled during the war who were to be vitally needed when production started on the all-new airliners.

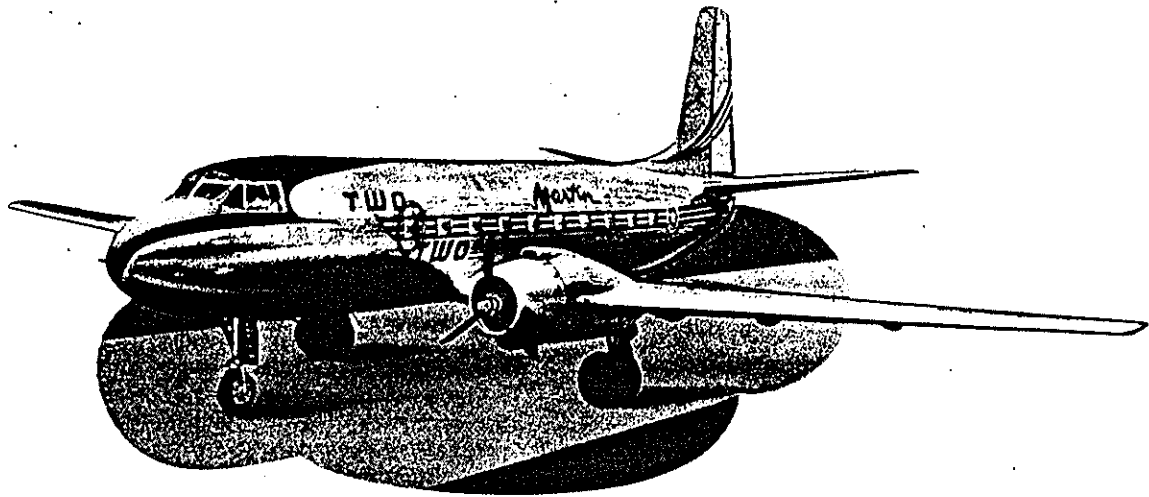
Various types of ground handling equipment for airports were designed and quickly went into production—passenger ramps, freight handling trucks and many other specialties which gave employment to hundreds. Most American airports are, to some extent, at least, equipped with Martin-built products to help speed passengers and freight.

WORLD WAR II produced many inventions and products whose use had to be confined to the war effort until the cessation of hostilities before the public generally could enjoy their benefits, and of all research and experiment which went on from 1939 to 1944, few organizations came up with more usable ideas than the Martin Company.

During the war, of course, there were hundreds of



At left: First of a fleet of giant 72½-ton JRM Mars-type flying boats leaves its assembly fixture at the Middle River plant. Above: One of the JRM Mars boats taxiing on the Chesapeake Bay near the Martin plant, preparing to take off for test flight.



Soon after the close of World War II, the Martin Company announced its first post-war commercial transport, the Model 202. So radically new, efficient and better was the Model 202 than any other twin-engine airplane, and the impetus for the leading twin-engine transport in domestic airlines and was purchased by many foreign carriers.

suggestions made to speed production and many of the ideas submitted by employees were so good and had such a wide application in industry, that patents were obtained on many of them and licenses granted to other manufacturers.

Four products now available to the public and industry generally, however, were the result of long and painstaking research in the Martin laboratories. These are Marvinol resin, a new photographic emulsion, a method of photo lofting and a honeycomb lightweight construction material.

Marvinol resin is a vinyl plastic from which may be made waterproof sheeting for raincoats, shower curtains, soles and heels for shoes, gloves, handbags, umbrellas, tubing and hundreds of other products. The finished products are to be made available to the public through manufacturers who will purchase the prepared powders from the Martin Company, which does not plan actual fabrication. A plant located near Cleveland, Ohio, was erected for the exclusive manufacture of Marvinol resin.

The photo emulsion and the photo lofting process are closely allied. The latter makes possible the accurate reproduction on metal, wood or almost any other surface, of drawings to size or scale. As templates these reproductions replace blueprints in the shop, are easier to handle, not subject to tear and offer many other advantages. Assembly fixtures and jigs can be built directly on such templates, saving precious hours in the manufacture of such equipment.

The emulsion with which these metal templates are sensitized was placed on the market for the use of amateur and professional photographers alike. The emulsion will adhere to almost any surface—metal, wood, plastic, cloth, leather—and may be printed by contact or projection from either line or continuous tone negatives. The amateur photographers of the country welcomed the product with open arms and the

sales quickly outstripped the facilities for the manufacture of the product.

The honeycomb material is a lamination of sheets of metal, glass, plastic or other flat, hard surfaces, to a "honeycomb" of plasticised paper or cloth, the whole forming an extremely rigid sheet of light weight and great strength. While its first use was confined almost wholly to transportation—airplanes, railroads, automobiles and trucks—further uses in the home and industry were quickly found.

A year after V-J Day, then, the outlook for the future was the brightest it had ever been for Martin.

The steady stream of orders for the new commercial airliners, new orders for military aircraft, for the developments of the laboratories and for ground handling equipment had built up a backlog of nearly \$200,000,000, rivaling the largest in the industry and one of the most diversified. A dozen different types of airplanes were under construction or development at the same time, with radically advanced new projects on the drawing board promising greater things to come. Even in wartime, there hadn't been such wide variety, so many projects under way at the same time.

A PIONEER and still the only early aviator and aircraft builder to head his own company, Glenn L. Martin wanted to do more than just provide jobs for thousands of people building airplanes and allied products. As a science and industry, he wanted his life work to continue and grow ever greater in its benefits to mankind.

To this end, in December, 1944, the Company made a grant to the University of Maryland at College Park for the establishment of the Glenn L. Martin Aeronautical Research Foundation, which was planned as the finest school of its kind in the world. A second grant was made later and additional funds were sup-

plied by the State of Maryland.

Thus the pioneer is assured of the carrying on of his work and ideas by the eager young engineers who will study there in the years to come, when new and ever brighter pages in the history of aviation will be written and the name Martin will trace the growth of a vast traffic of people and goods in a fellowship of nations.

IN the sprawling plant at Middle River, too, research and invention continue to grow apace. It was realized that the great discoveries of World War II have even greater potentials in peace than in war and immediately after the cessation of hostilities the laboratories were vastly expanded to dig deeper into the mysteries of electronics, the possibilities of plastics, chemistry, metallurgy and all the other sciences which enter even remotely into the construction and operation of aircraft.

Jet engines were just becoming prominent when the war ended, and Martin's went wholeheartedly into testing their possibilities. Engines were mounted in conventional airplanes and taken aloft to try their merits under every conceivable condition of flight. Work was rushed on the first Martin designed and built all-jet military airplane, the XB-48, a long-range bomber of extreme speed, powered by six jet engines.

Another long-range bomber, a land-based job for the Navy, designated XP4M-1, a combination of conventional engines and jet, was ready for test flying a little

more than a year after V-J Day.

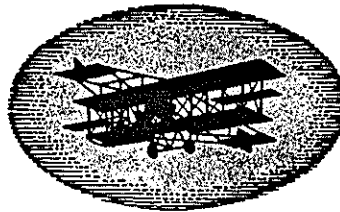
In closely guarded laboratories and testing grounds, Martin engineers worked at top speed to develop guided missiles and other remote-controlled weapons. Much of this work strongly resembles Buck Rogers adventures, yet the ingenuity of man was bringing the highly imaginative cartoon to fruition, primarily as a part of a determination of the United States to enforce the peace if possible, but to be ready for war if war should come.

The age of flight became almost overnight the age of super-flight, with airplanes and missiles flying through the air reaching ever further beyond the earth's surface, carrying goods and people at accelerated paces to more distant places.

Through the aviation pioneering of Glenn L. Martin and his associates the promise of a myriad of good things for the peoples of the world is being fulfilled. Swift, dependable, comfortable transportation has long since erased the barriers of distance; exotic foods and flowers once found only in a small area are now obtainable almost everywhere; mail and packages wing to the far corners of the world in a matter of hours instead of days.

And back of these developments still stands the tiny white-walled church in Santa Ana, where Glenn Martin built his first airplane. The lantern his mother held aloft while he worked in the murky darkness has become a symbol of flight.

THE

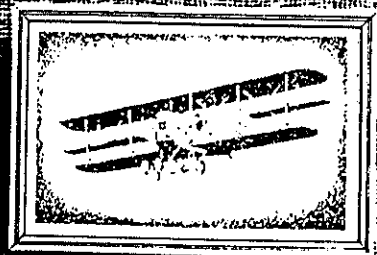
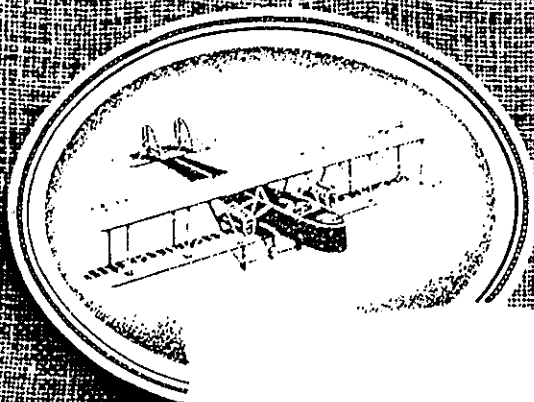


END

—Official photo, Corps of Engineers, U.S. Army.

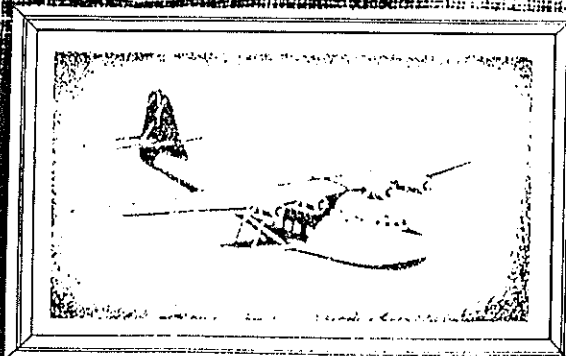
Aerial view of the Middle River plants of the Glenn L. Martin Company, made during World War II when camouflage was partly completed. Plant 1 in the center; the Airport in left upper center, and Plant 2 in upper left corner. The Strawberry Point Delivery towers had not been completed when this photo was taken.



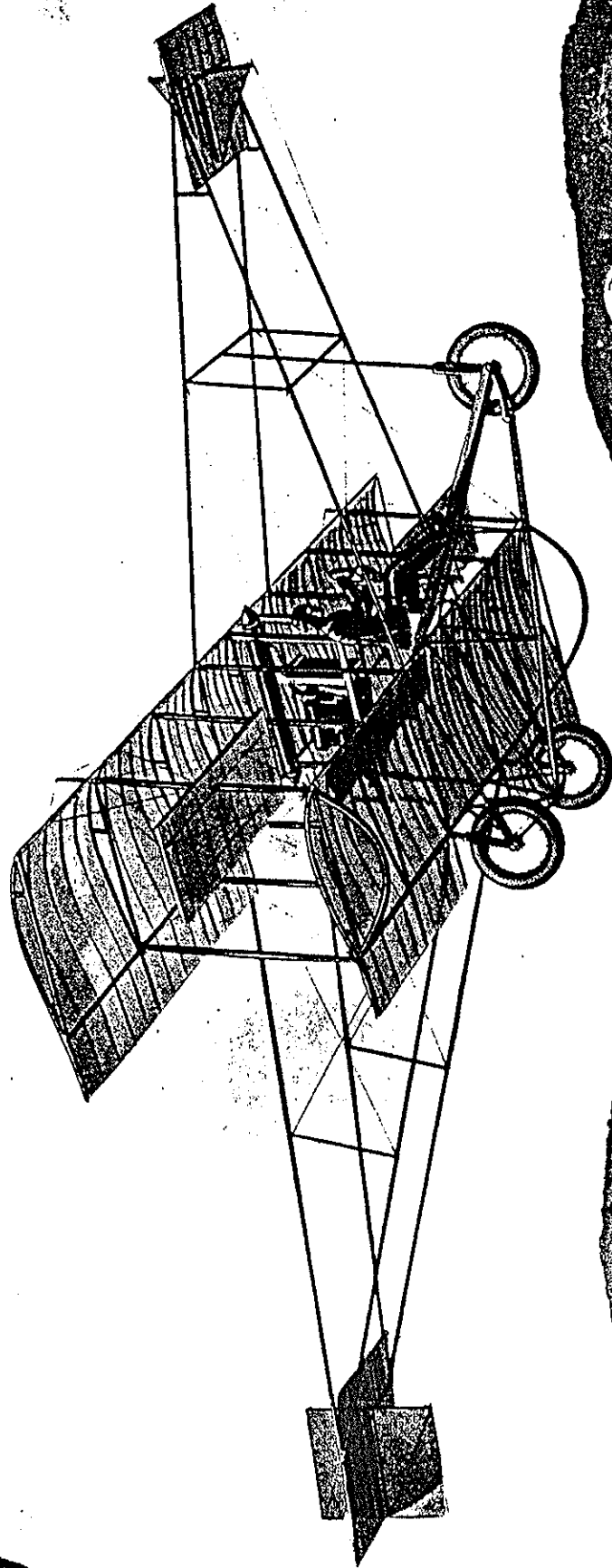


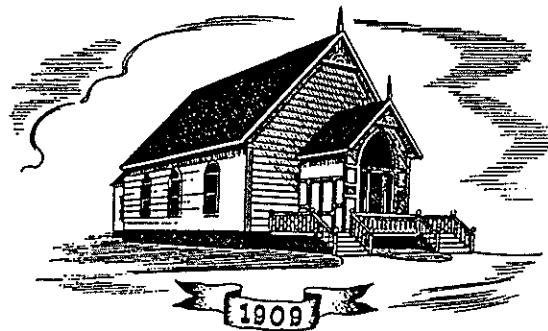
A Folio of
HISTORICAL
AIRPLANES

Built by
The Glenn L. Martin Company



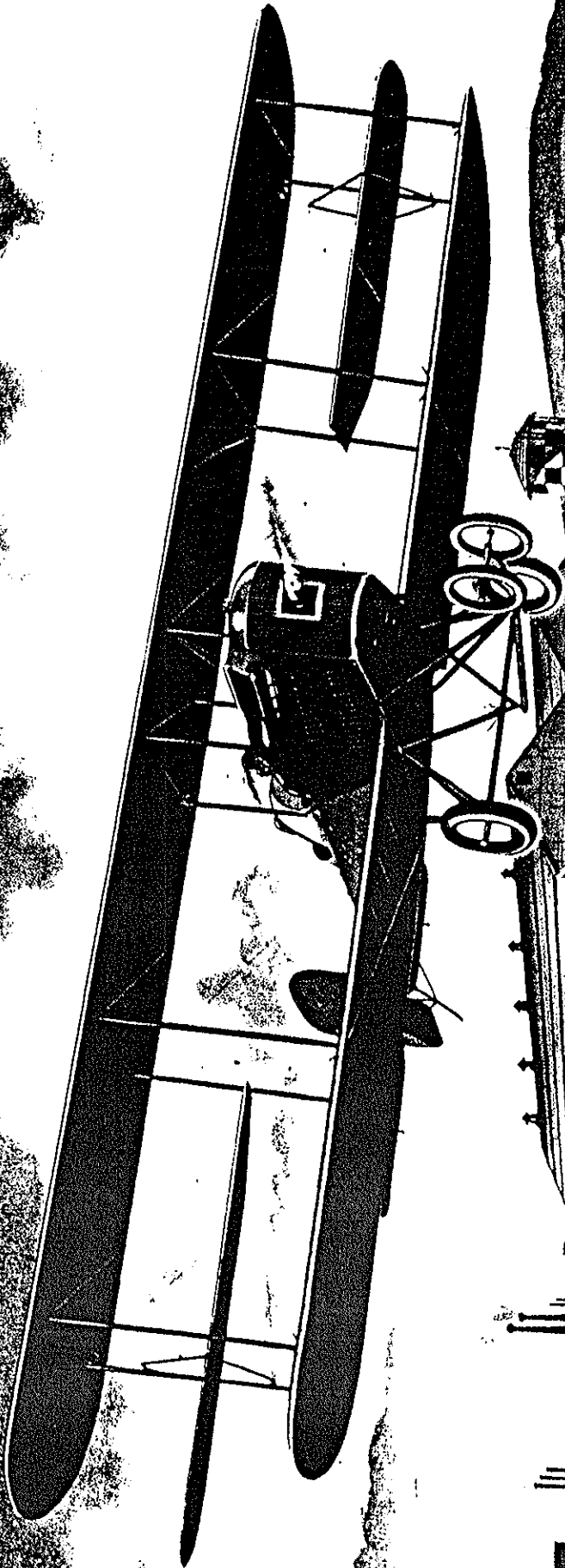
The
FIRST MARTIN AEROPLANE
Built at Santa Ana, California
1909



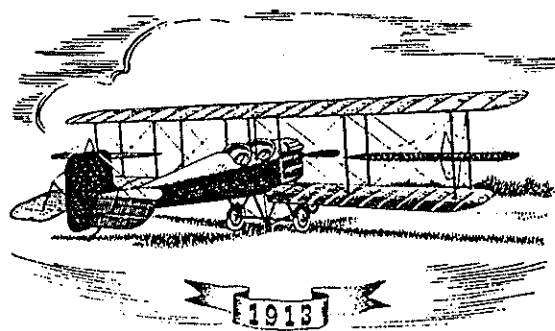


The First Martin Aeroplane

THE faint flickerings from an oil light which had been seen for weeks and months in the old Methodist Church at Santa Ana, Calif., finally brought forth the first Martin aeroplane, a frail craft of wood and cloth powered by an old Ford four-cylinder, twelve-horsepower engine. But in that plane Glenn Martin flew, taught himself by experiment the many things he had to know about flying and building stronger, sturdier aircraft. The painting on the opposite page, by John Gorsuch, is an accurate portrayal of one of the early flights. Youngsters did hang over the fences as Glenn Martin flew and waved encouragement to the fledgling flyer. The Graflex camera was new then, and newsmen used it to take pictures of young Martin in flight, because with that camera they could follow him better and keep the ship in focus.

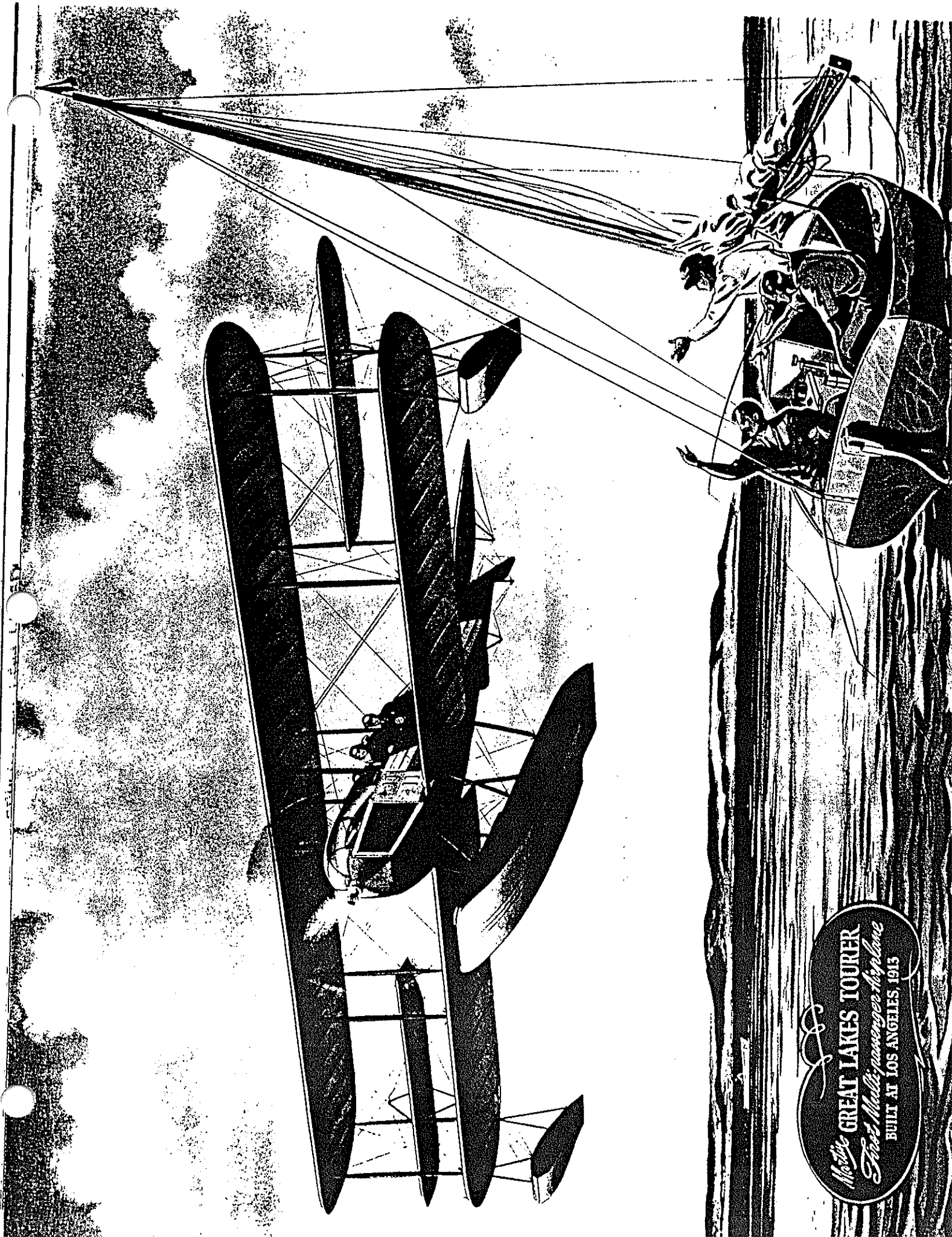


M
MARTIN MODEL I-T
First Army Training Plane
BUILT IN LOS ANGELES, CAL. 1915

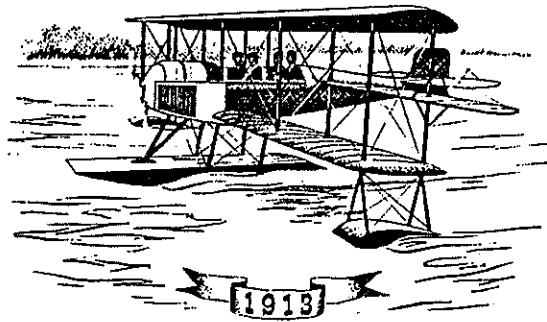


The First Army Trainer

HUNDREDS of pioneer flyers in the Army Signal Corps, which embraced the early air branch of that service, earned their wings in a Martin airplane, the Model TT. First aircraft ever designed and built especially as a training plane, it served the Army well for a number of years and in its design was a far cry from the first Martin plane, though the TT was being built only four years later. Artist John Gorsuch, in the painting on the opposite page, has caught the spirit of the times at an early air base, with a Model TT taking off on a training flight. Hangars and other field equipment are typical of the times.

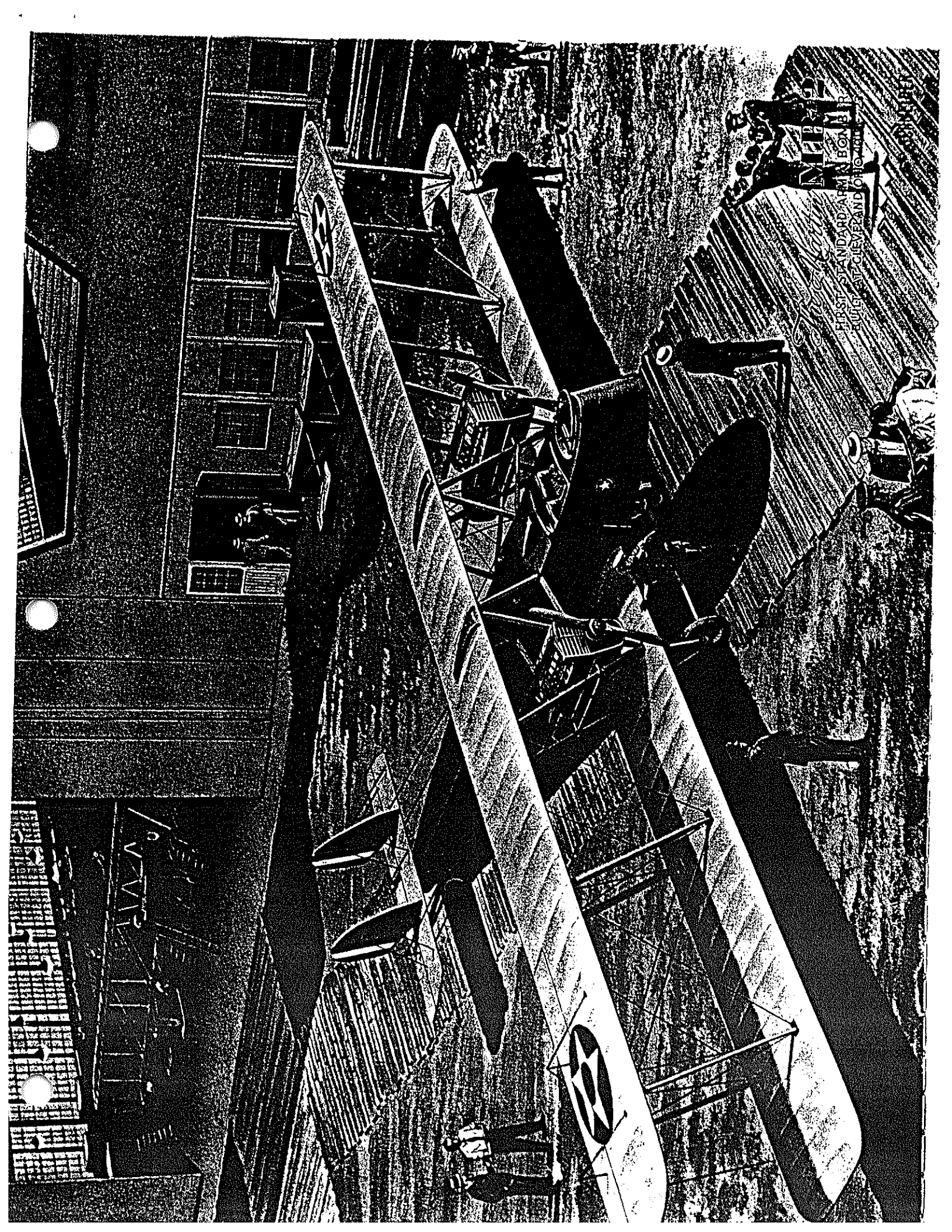


McGee GREAT LAKES TOURER
First McCallie passenger airplane
BUILT AT LOS ANGELES, 1913

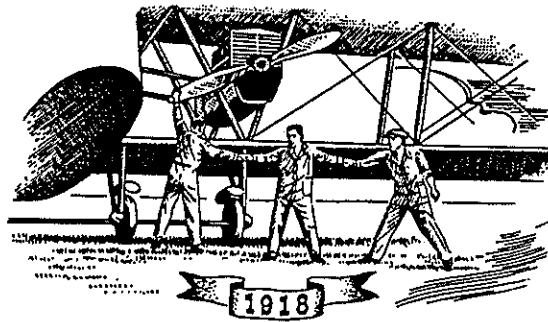


That Many Could Fly

WHILE the Martin Company has always been primarily a military contractor, even back in the early days the almost limitless possibilities of passenger service were given thought and in 1913 Martin produced the first multi-passenger aircraft. It was built to order specifically for a venture which failed, but the plane did prove that passenger handling could be profitable and safe and experiments in this field were conducted through the years. Present Martin passenger transports couldn't even fly at the top speed of the Great Lakes Tourer of 1913—but in 1913 the Tourer was tops in its field. Artist John Gorsuch's drawing shows Mr. Martin at the wheel of the Tourer with three passengers enjoying the sea breeze. It was some time before the cabin was enclosed.

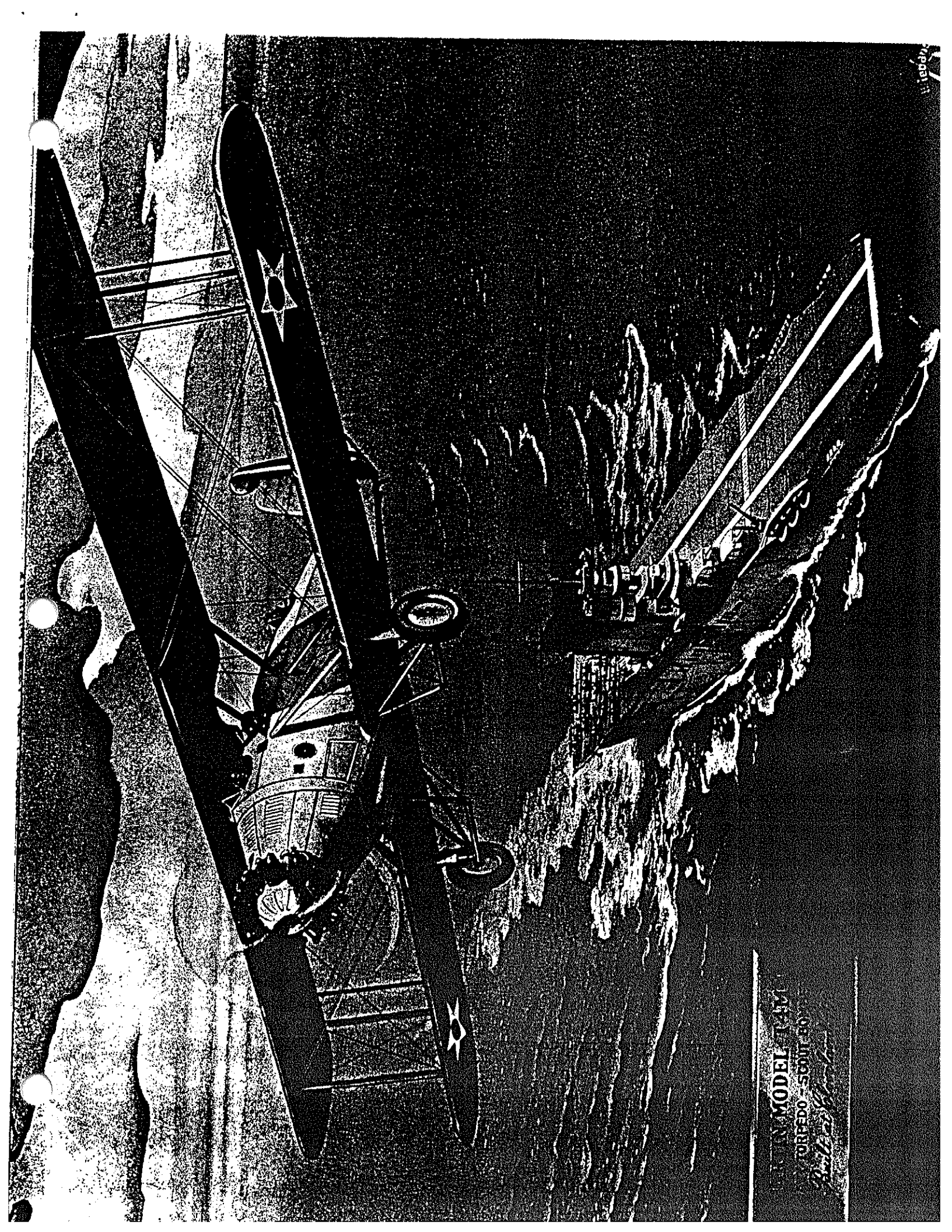


STANDARD BOND
CITY OF CLEVELAND, OHIO



Pioneer of Destruction

THE Martin Model MB-2 was developed too late to take part in World War I, but it set the pattern for bombing airplanes for years to come and was the standard Army bomber until the mid-twenties. It was the first twin-engine bomber, but the design was so sound that the basic version was used for many other purposes, too—carrying the mails, night flying, multi-passenger. In an MB-2 Army flyers made an historic flight around the rim of the United States. The Navy was so pleased with the design that it ordered MB-2s modified slightly to its own needs. Probably no airplane has ever served so many needs as the MB-2. In the picture on the opposite page, Artist Moreland Schneider portrays one of these ships “on the line” at the Martin plant in Cleveland. Boards laid on the bare earth served as taxiways to get the ships to the runways.

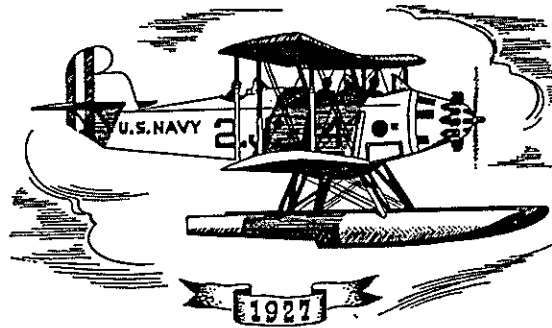


PLANE MODEL 1-41

ORFEDO SCOUT 80

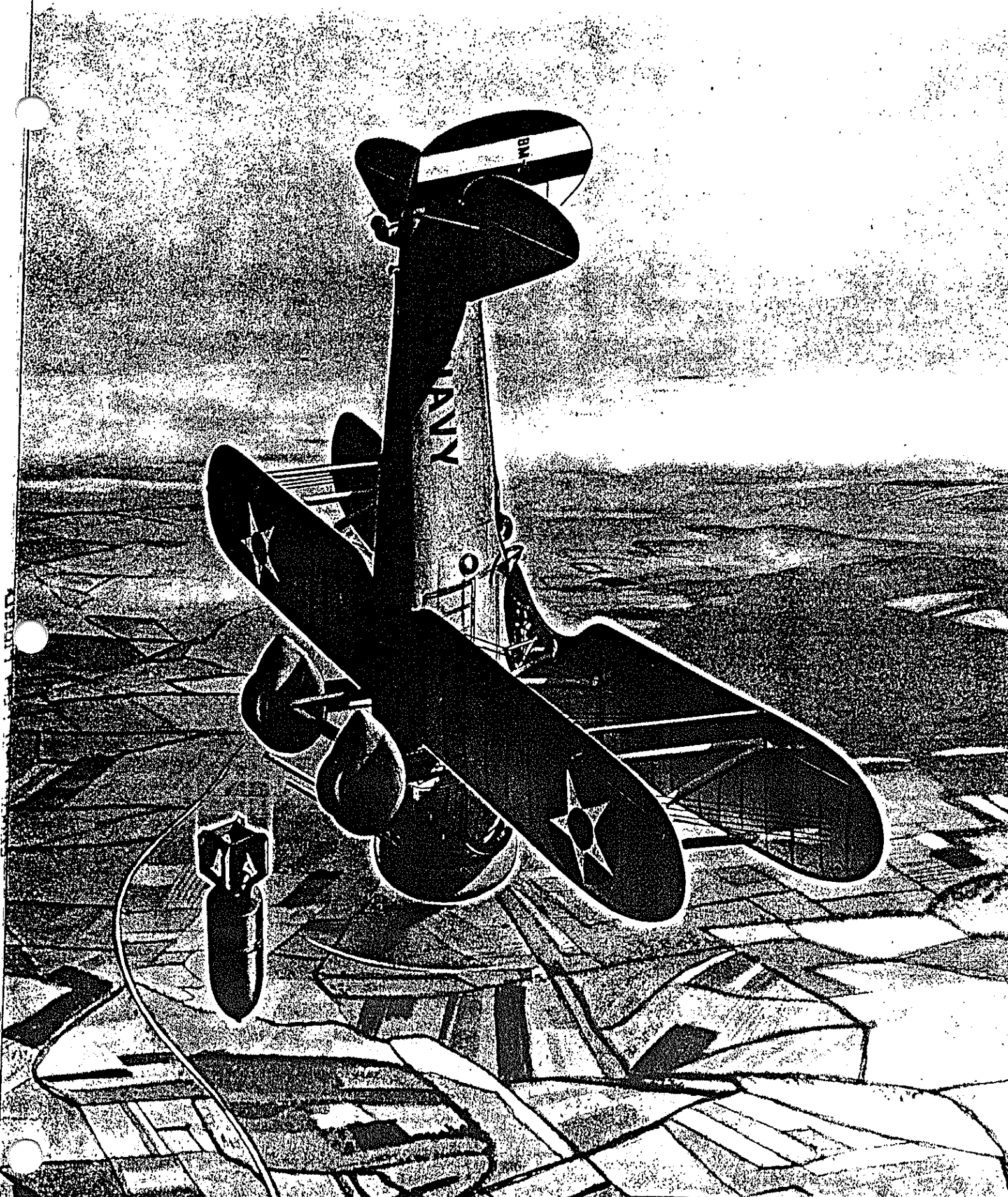
Orfeda Scout 80

1941



Aerial Eyes for the Navy

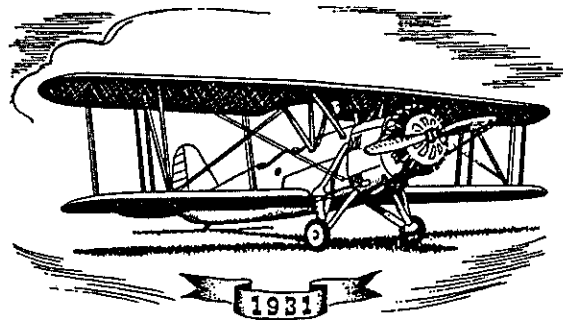
THE value of aerial observation for both the Army and Navy was recognized in the early days of aviation, but with the aircraft being of limited range, the problem of such "eyes" far from shore presented problems which were finally solved with the now familiar "flattop" aircraft carrier and small, swift ships which could take off and land on its long deck. The Martin Company was an experimenter in the field of carrier borne planes and in 1927 came up with the Model T4M-1, a torpedo scout bomber which helped make naval aviation history. In Artist Charles Weigand's drawing on the opposite page, a T4M-1 is pictured a few moments after taking off from an early carrier, whose lines are not too different from similar craft of today. The Model was one of the last built at the Cleveland plant.



MARTIN MODEL BM-1

First Practical Navy Dive Bomber

BUILT AT BALTIMORE, 1930



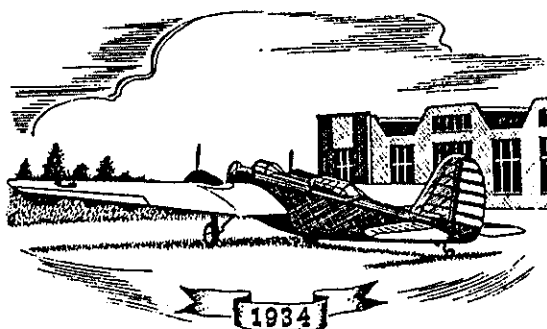
Navy Dive Bomber

THE services and aircraft manufacturers spent many weary years searching for an elusive type of aircraft—a dive bomber that could develop terrific speeds downward to a target, release bombs aimed at that target, then pull out and get away from the explosion. The Martin Company came up with the first practical ship of this type in the Model BM-1, which was the first plane developed at Baltimore after the plant was moved there in 1929. Foreign observers were free to watch the tactics employing the BM-1's, tactics which made possible later the terrible *Luftwaffe* of the Nazis, who used dive bombers patterned after the BM-1 and its successor, the BM-2.



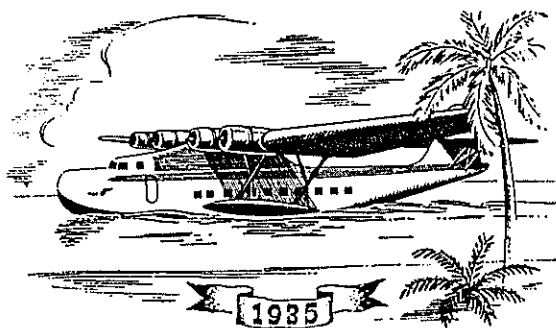
The **COLLIER** Trophy

AVIATION'S MOST COVETED AWARD MADE ANNUALLY BY THE NATIONAL AERONAUTICAL ASSOCIATION FOR THE GREATEST CONTRIBUTION TO AVIATION DURING THE PRECEDING YEAR. COLLIER TROPHY WAS AWARDED GLENN L. MARTIN IN 1932, FOR THE B-10 HIGH-SPEED BOMBER. THE PRESENTATION WAS MADE BY PRESIDENT ROOSEVELT....



Milestone in Bombers

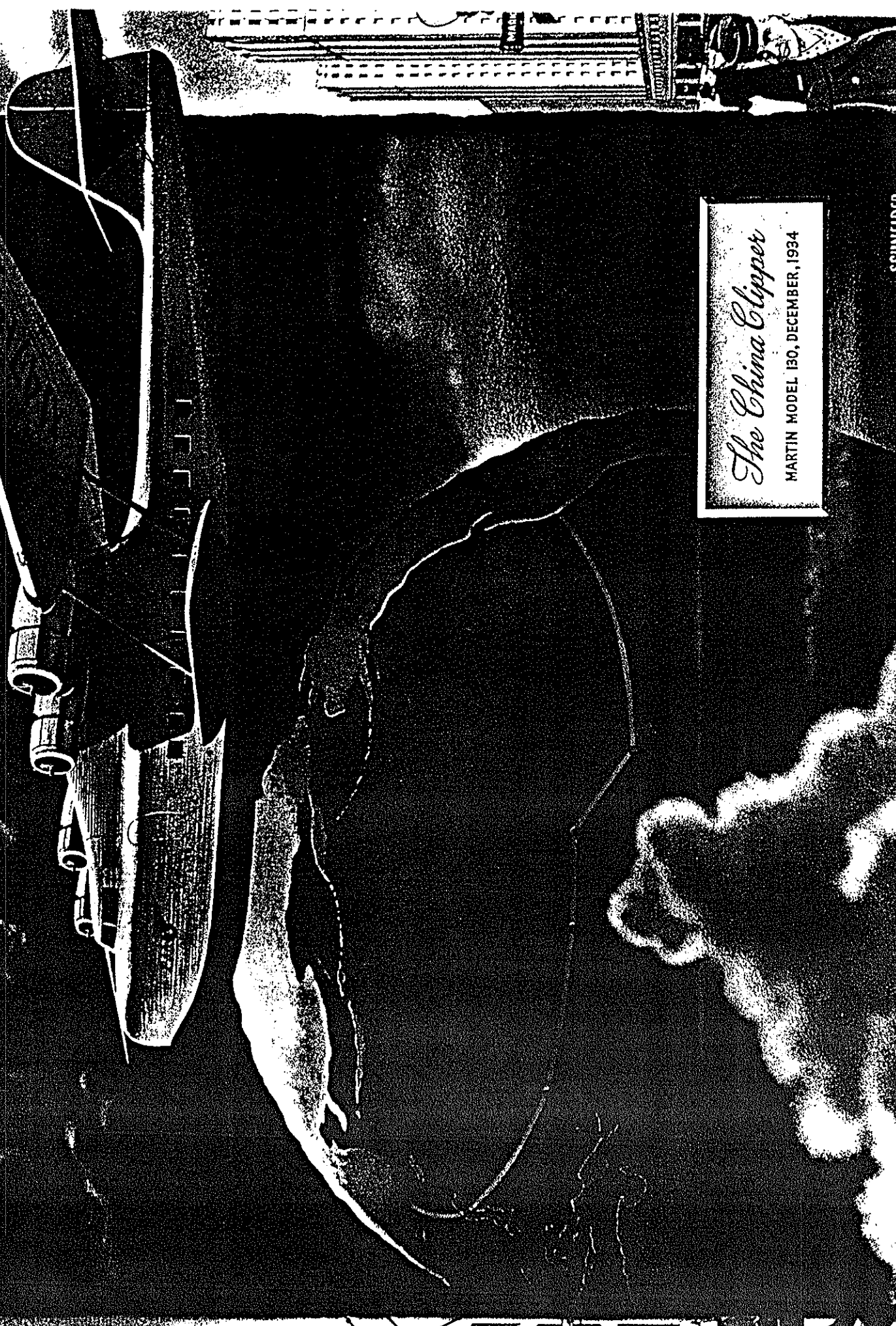
OVERNIGHT, the Martin Model B-10 made every military aircraft in the world obsolete. This twin-engine bomber was faster by 100 miles per hour than even the best pursuit ships. On the B-10 was developed a machine gun turret which, with improvements, became standard equipment on all bombers in World War II. For development of the B-10, Glenn L. Martin received the Collier Trophy, aviation's highest award, in 1932.



First Overocean Luxury Liner

SINCE the early days of his flying, Glenn L. Martin had dreamed of a big flying boat that could go hundreds and thousands of miles over the oceans, connecting continents in a few hours and providing swift transport for passengers, cargo and mail. His dream came true in 1934 when the China Clipper, first of the big flying boats destined to fly the Pacific Ocean to Asia, made its test flight. For many years the China, together with the sister ships Hawaii Clipper and Philippine Clipper, flew from the West Coast to China.

(Color picture on next page)



The China Clipper

MARTIN MODEL 130, DECEMBER, 1934

SCHNEIDER

© 1934 THE SCHNEIDER COMPANY

SUPPLEMENT I - BOX KITES TO BOMBERS
PUBLIC RELATIONS DEPARTMENT
THE GLENN L. MARTIN COMPANY
BALTIMORE 3, MARYLAND
DECEMBER, 1947

For most industries, one year is hardly distinguished from another. Not so in the fast-moving aircraft industry. Changes are wrought almost overnight as manufacturers strive to keep pace with the advancements of science, the increased needs of customers.

A year is time enough to produce major changes, and the year 1947 wrote whole new chapters into the 39-year saga of The Glenn L. Martin Company. It marked many Company highlights in a period filled with industry highlights.

Probably no peacetime year was fraught with so many perils and problems for a major industry. Great progress was made, but it was a hard-won progress, a sort of "two-steps-forward, one-step-back" progress.

In its three major divisions ---military planes, commercial airliners, and non-aircraft activities---the Martin Company's report for the year looked something like this:

Brightest new Star in the Martin firmament was the Martin 2-0-2, twin-engine high-speed luxury airliner which, by the end of 1947, was well on its way to becoming standard on the airlines.

The 2-0-2 in 1947 attained full stature, after a thorough period of development. During the year, it started and completed official Civil Aeronautics Administration tests, received an NC commercial license, was delivered to, and placed in service on Northwest Airlines, and spread its operating efficiency to South America.

Chronologically, the picture starts in November, 1946. On a bleak, chilly afternoon, a small group of Glenn L. Martin Company personnel---men who had struggled through the birth pains of the 2-0-2---stood at the Martin airport and watched O.E. (Pat) Tibbs lift the new plane off the runway, circle Baltimore, and return.

This was an important milestone in the Company's history, and an important one for the airlines as well. From that day, every effort was exerted to speed the 2-0-2 program through to its logical conclusion---service on the airlines.

In May, 1947, after Martin test crews had thoroughly checked it, the CAA began official certification tests. This test program was based on the CAA's more stringent postwar regulations (CAR 04.b), designed to assure an airliner's safety and dependability. As the first fully postwar airliner to reach test status, the 2-0-2 pioneered this rigid proving program.

On a hot July 26, the 2-0-2 began the final phase of CAA tests, having successfully completed all other requirements. This was a unique 17,000 mile aerial odyssey which carried the new airliner into 34 cities in 17 states and the District of Columbia, from California to Florida, from Minnesota to Louisiana.

Termed an "accelerated service test" by the CAA, it was set up to prove new airliners' ability to stand up under rugged day-in, day-out airline use. The 2-0-2 was the first airliner to make the accelerated service test flight.

Eight days later, its crew---CAI officials and Martin personnel---brought the 2-0-2 home, the proving run successfully completed. On August 3, an approved type certificate was recommended for the air-

liner and on September 3, after CAA officials in Washington had thoroughly checked all test data, Type Certificate No. 795 was awarded the 2-0-2.

With more than 500 hours of logged test flying, and structural test equivalent to 25,000 hours of actual airline use, the 2-0-2 was easily the most thoroughly tested airliner in history.

Although airlines in general were beset by financial worries which made new equipment programs difficult to arrange, progressive, efficiently run Northwest Airlines had held to its plans to put the 2-0-2 into service. In September, the first of NWA's initial fleet of 10 2-0-2s was delivered. During succeeding weeks, more planes rolled off the "D" building assembly lines and flew to Minneapolis for crew training and route familiarization.

In October, NWA began integrating 2-0-2s into its schedules and by November 15 was offering full 2-0-2 fleet service over its entire route from Billings, Montana, to New York.

Passenger and crew enthusiasm was almost unbelievably unanimous for the new airliner. Pilots were impressed by its handling characteristics and passengers by such new features as the built-in loading ramp; quiet, luxurious cabin; extra large windows, added speed. NWA cut scheduled time sharply with the 2-0-2s. From Chicago to Minneapolis-St. Paul, for instance, the scheduled time dropped from two hours, by non-stop four-engine airliners, to an hour and 30 to 40 minutes by twin-engine 2-0-2.

NWA officials were so pleased with their new airliner that they immediately began negotiating for more.

Late in the year, the 2-0-2 carried its message of speed, dependability and efficiency into South America. Linea Aerea Nacional,

Chile, took the first of its fleet of four 2-0-2s in November and Linea Aeropostal Venezolana, Venezuela, started service with its first 2-0-2s in December.

Almost weekly, additional operating improvements were added to the 2-0-2 performance sheet. Its runway length requirements under full CAA restrictions, for instance, were reduced to a point where they are shorter than any other postwar airliner. This enabled 2-0-2s to offer express service to many cities formerly served only by the slow, obsolete prewar twin-engine airliners.

Early in the 2-0-2 development stage, Martin engineers had designed a cargo and a military version, offering unprecedented operating efficiency and payload. The 2-0-2 was demonstrated to high ranking officers of the Navy, Air Force, Marine Corps in December.

Because the 2-0-2 in service proved itself fully capable of meeting airline needs, The Glenn L. Martin Company decided in December to discontinue its 3-0-3 project and concentrate full engineering and production resources on further improving the 2-0-2. Plans for the 3-0-4, the prop-jet engine airliner, had been shelved earlier when it became evident a suitable jet turbine was not available.

At the end of 1947, the Company's military activities showed similar progress.

AM-1s had been delivered to various Navy test centers and the assembly line was rolling Maulers out for delivery to the fleet.

Two XP4M-1s---which the Navy christened "Mercator"--- had been flying rigid test flights since early spring, and the Navy had placed an initial production order.

An assembly line had been set up in "C" Building for PBM-5As and the first of the initial order for 36 of the huge amphibians was nearing completion.

On July 3, the Martin XB-48 became the first of the Air Force's six-jet engine bombers to fly. With Tibbs at the controls, the sleek new ship made a 37-minute hop from the Martin airport to the Patuxent River Naval Air Station. The fast powerful bomber by year's end was well into its test program, and a second XB-48 was under construction.

The JRM-2 Mars, with more powerful engines and heavier payload than the JRM-1 Mars, was delivered in April to Naval Air Transport Service at Patuxent River.

Also in production at The Martin plant were 10 Neptune experimental rockets for the Navy, designed to probe ionosphere secrets 235 miles above the earth, as well as guided missiles, highly advanced, still secret new aircraft and other closely guarded military projects.

Other developments in The Martin Company's widespread activities included:

Vast progress in the construction of the Chemicals Division plant at Painesville, Ohio. This division formerly was known as the Plastics and Chemicals Division. The plant was scheduled to begin production early in 1948, with an eventual production capacity of 25,000,000 pounds of Marvinol vinyl resin raw material per year.

Start of flight experimentation work on Stratovision, the re-broadcasting of television from the air, a joint project of The Martin Company and Westinghouse Electric Corporation. An arrangement was made with the Air Force for use of a B-29 in order to attain higher altitudes for experimental work.

Discontinuation of the Multi-Mulsion photo emulsion project.

Near-completion of the wind tunnel at the Glenn L. Martin
College of Aeronautical Engineering at the University of Maryland, making
it one of the most advanced aircraft testing facilities in the world.

UNITED STATES AIR FORCE MUSEUM
WRIGHT-PATTERSON AF BASE, OHIO 45433-6518

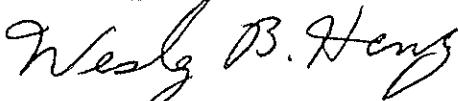
DATE 10 July 1987

MEMORANDUM FOR: Mr. Scott Gilles

Enclosed you will find a copy of Martin Release #910-L as requested.

Thank you for your inquiry.

Sincerely,



WESLEY B. HENRY
 Research Division

A1
 B-10/char

NY

139W, 146, 166)

bombers. Built in 1932
 as high-performance and
 in most pursuit planes.
 President Roosevelt
 nations. The Dutch
 in the Netherlands

75 ft. (GLM-146)

10B) 16,330 (GLM-146)
 11,268 (GLM-146)
 sq. 22.25 lbs.-sq.ft.
 hp. 10.20 lbs. per hp.
 00 ft.
 .8 min.
 ne Type
 10B)
 740-800 hp. ea.

n.

r

Range 1,400 miles (YB-10 and 12) 1,860 (B-10B)

Special Features Mechanically retractable landing gear; 3 or 4 seat. Could carry one 2,000-pound bomb; de-icing eqpt. and automatic pilot and droppable auxiliary tanks on B-10B. Model 166 added a continuous cockpit enclosure. Model 139W was the export version for -- Holland, Turkey, Argentina, Siam and China. Air Corps purchased various models including YB-10, YB-12, YB-12A, and XB-14. YB-12 was equipped with floats. B-10B had split flaps. Nearly all models had water-tight wings and stabilizers. The #146 had Fowler flaps.

MORE 3, MARYLAND

RELEASE #910-L

A1
B-10/char

HISTORICAL PLANES OF THE MARTIN COMPANY

B-10, YB-10, YB-12, B-10B (GLM Models 123, 139, 139W, 146, 166)
FIRST MODERN BOMBER

The B-10 and its allied types were the first modern bombers. Built in 1932 and up to 1935, it obsoleted all previous bomber types by its high-performance and speed. It was the fastest bomber of its era and faster than most pursuit planes. For it, Glenn L. Martin was presented the Collier Trophy by President Roosevelt in 1933. It was used by the Air Corps and numerous foreign nations. The Dutch were still using the B-10 in the early part of World War II in the Netherlands East Indies against the Japs.

Year	1932-35		
Type	High-performance monoplane bomber		
Span	70 ft. 6 in.		75 ft. (GLM-146)
Length	44 ft. 8½ in.		
Height	11 ft. 5 in.		
Wing Area	678 sq. ft.		
Gross Weight	12,882 lbs. (YB-10, YB-12)	14,887 lbs. (B-10B)	16,330 (GLM-146)
Empty Weight	7,726 lbs.	9,681 lbs.	11,268 (GLM-146)
Wing Loading	18.91 lbs. per sq. ft.	21.96 lbs. per sq. ft.	22.25 lbs. per sq. ft.
Power Loading	9.50 lbs. per hp.	9.92 lbs. per hp.	10.20 lbs. per hp.
High Speed	215 mph @ 6,500 ft.	238 mph @ 11,900 ft.	
Cruising Speed	196 mph.	196 mph.	
Climbing rate	10,000 ft. in 7 min.	10,000 ft. in 6.8 min.	
Service ceiling	25,000 ft.		
Engine Type	Two Wright Cyclone (YB-10); 2 P & W Hornet (YB-12)	2 Wright Cyclone Type SGR-1820G9 (B-10B)	
Engine Power	650 hp. each	700 hp. each	740-800 hp. ea.

Construction

Fuselage or Hull riveted aluminum alloy monocoque

Wings al. alloy construction; full cantilever fin.

Tail Surfaces tapered mid-wing monoplane, full cantilever

Range 1,400 miles (YB-10 and 12) 1,860 (B-10B)

Special Features Mechanically retractable landing gear; 3 or 4 seat. Could carry one 2,000-pound bomb; de-icing eqpt. and automatic pilot and droppable auxiliary tanks on B-10B. Model 166 added a continuous cockpit enclosure. Model 139W was the export version for -- Holland, Turkey, Argentina, Siam and China. Air Corps purchased various models including YB-10, YB-12, YB-12A, and XB-14. YB-12 was equipped with floats. B-10B had split flaps. Nearly all models had water-tight wings and stabilizers. The #146 had Fowler flaps.

