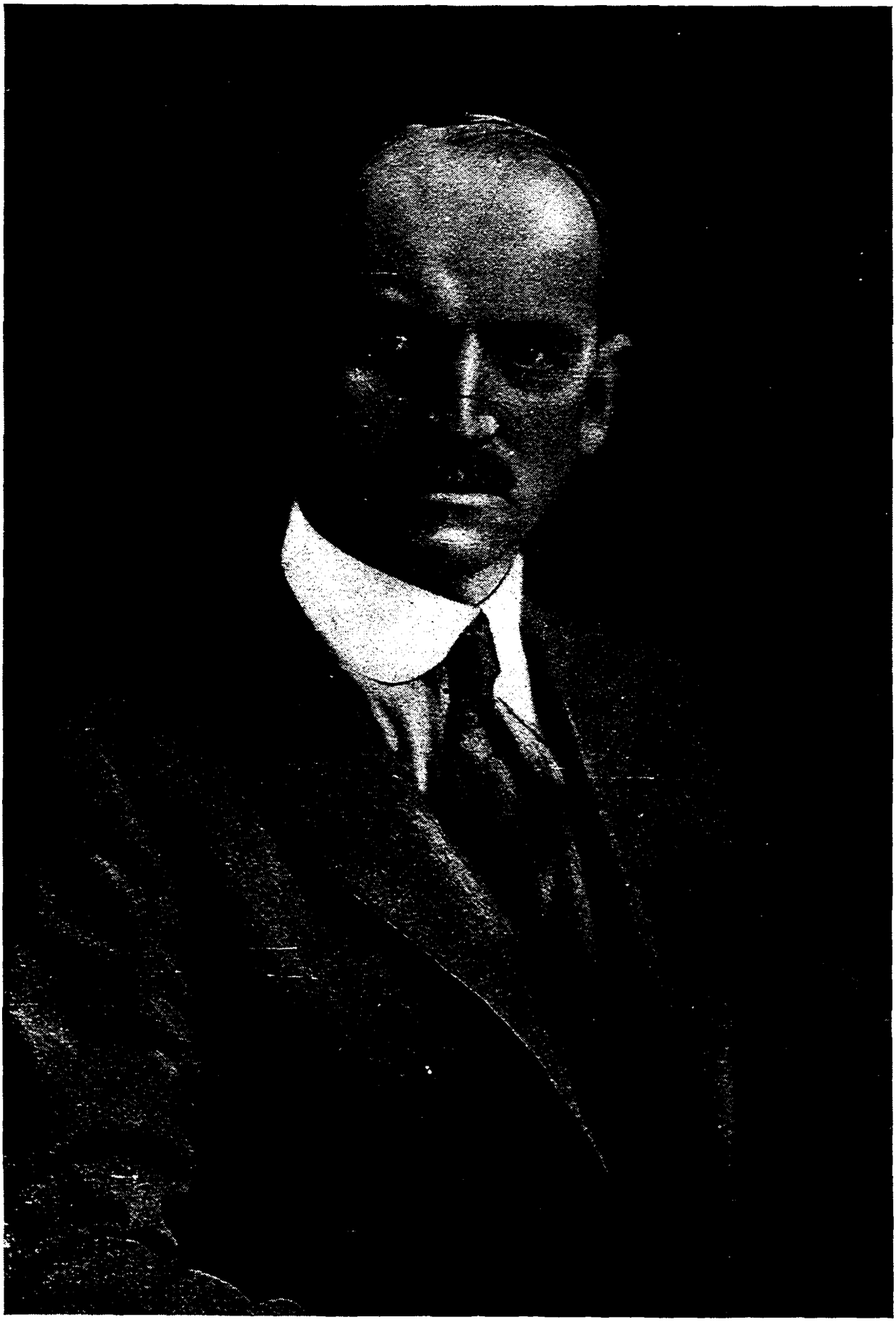

GLENN H. CURTISS

FLYING PIONEERS

at Hammondsport, New York.

A Very Brief Outline of the History of
"THE CRADLE OF AVIATION"
and of the Work of Invention, Development and
Demonstration of Aeroplanes done there by
Glenn H. Curtiss Alexander Graham Bell
The Aerial Experiment Association
and their associates between
1908 - 14

Written for the
Finger Lakes Association and the
Better Hammondsport Club,
by Lyman J. Seely

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NINETEEN TWENTY-NINE
LYMAN J. SEELY

FOREWORD

"THE CRADLE OF AVIATION"

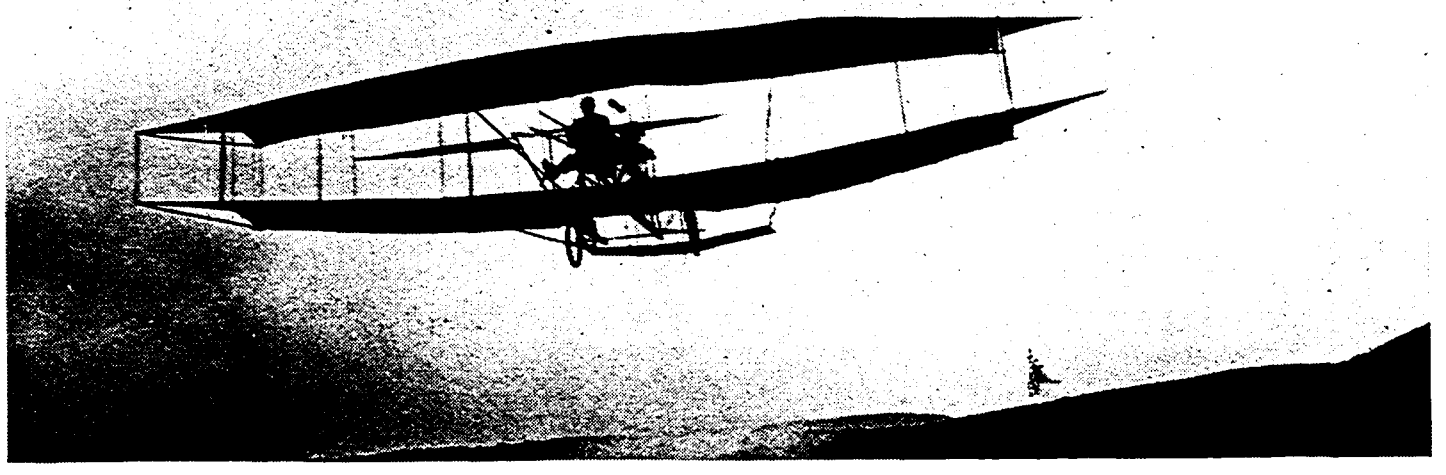
THIS brief chronology is designed to show the very important part played in the development of the aeroplane and the technic of flying at Hammondsport, N. Y., by Glenn H. Curtiss and various groups of associates, from the time of the first public demonstrations of man flight until the opening of the World War.

This booklet is sponsored by the Better Hammondsport Club and the Finger Lakes Association (an organization representing some 250,000 residents of the Finger Lakes Region) because they feel that if the public of New York State in particular and of the United States in general comes to realize the part this country played in giving aviation to the world, and the claim to recognition that New York State has for its part in the development of this mechanical fledging, between birth, so to speak, and its adolescence, they will approve the project of establishing a Glenn H. Curtiss Commemorative Airpark in the Pleasant Valley, near Hammondsport, where the early experimental and demonstrational work was accomplished. The project has the endorsement of the civic organizations of almost every city, village and town in the region, not only because of the scientific results obtained, but also because so many aviation pioneers gave their lives for a cause so well deserving recognition. Hammondsport is known as the "Cradle of Aviation," not because aviation was born there, but because there it was nurtured and developed until able to command world recognition for itself.

"THE CRADLE OF AVIATION"

MECHANICAL flight is the outstanding accomplishment of the present age. Thousands had worked at its problems during hundreds of years. It remained for an outstanding astronomer, Samuel Pierrpont Langley, of the Smithsonian Institution, after a decade of scientific study and experiment, to make the first actual demonstration of the practicability of mechanical flight. On May 6th, 1896, over the Potomac River, one of his flying machines made two circular flights of approximately half a mile each; self-powered, self-balanced, self-guided. The flights were observed and photographed by Dr. Alexander Graham Bell, inventor of the telephone. The news was given to the world by Dr. Bell in a communication to the Institute of France, and later by Dr. Langley through an article published in McClure's Magazine for June, 1897.

For five years little happened. At least nothing much happened to interest the general public. Government engineers, however, were convinced of Langley's success and of the possibilities of this new means of conveyance. Langley was commissioned by the United States Government to construct a machine capable of flying with a human pilot. Most of the five years passed in searching for motive power, which was finally designed and built by Langley and his chief assistant, Charles M. Manley. Unfortunately the large machine was wrecked in launch-



Glenn H. Curtiss in the "June Bug"

ing and the entire project was so ridiculed by the press and people that Congress refused to appropriate further funds. Only a few weeks later, in December 1903, the Wright Brothers were reported to have made some short flights at Kitty Hawk, N. C. Little credence was given to the report by the newspapers and the general public at that time, but scientific journals and students of flight believed, and experimenters all over the western world renewed their efforts to conquer the air. In France, Santos Dumont, Farman, Bleriot and Latham tried and tried again. In England A. V. Roe and others designed and constructed one machine after another. All had some success. But the world paid little attention to the aeroplane and concentrated its attention on the dirigible balloon then beginning to prove its possibilities.

In 1908 an incredulous world was forced to recognize the "bird-man" as an accomplished fact, for in July of that year, Glenn Curtiss flew over the Pleasant Valley at Hammondsport, winning the first leg on the Scientific American trophy for the first pre-announced and officially witnessed flight of a kilometer; in September of that year Wilbur Wright flew publicly in France; a few weeks later Orville Wright flew for U. S. Government officials at Fort Meyer, Virginia. (The world at large was not impressed by the reports of the first flights by the Wrights. When the twenty-fifth anniversary of those flights was celebrated in December, 1928, some New York papers, notably The World, reprinted their announcements of 1903 to call attention to the lack of appreciation shown at that time. It is unfortunate for historical reasons that the first Wright machine was destroyed by a wind storm a few hours after the flights were made).

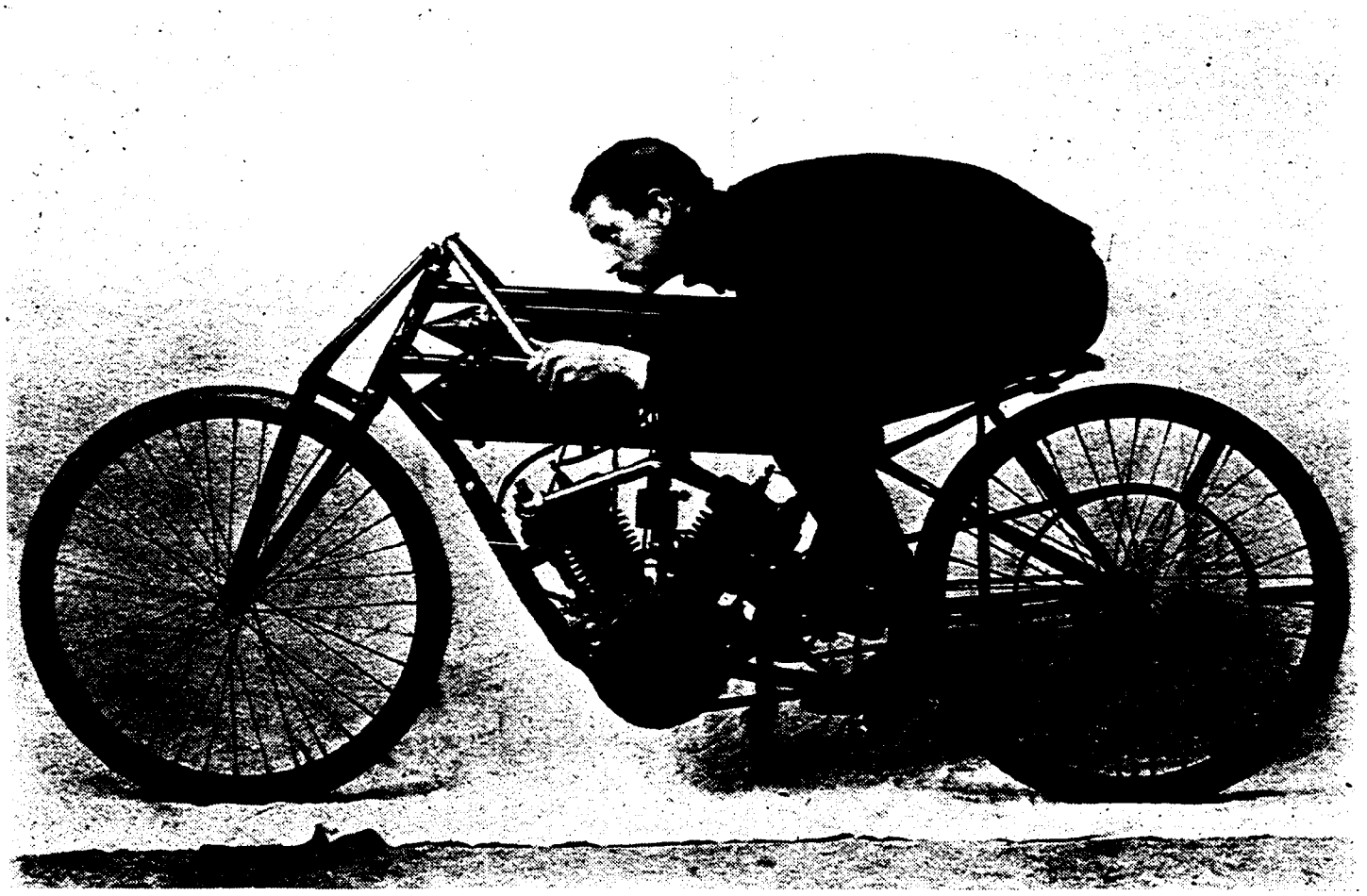
The Work at Hammondsport

Hammondsport entered the aeronautical picture at an early date for two reasons; first, because its terrain was well adapted for experimental flying for either dirigible balloons or aeroplanes; but second, and much more largely, because one of its citizens was outstandingly prepared to take part in the work of mastering the air. Without any knowledge of, or desire to have anything to do with, the then unknown art of aviation, Glenn H. Curtiss' life had given him the best possible preparatory course for his future destiny. It began with his experience as a bicycle racer, from which he acquired an instant co-ordination and automatic sensory adjustment to varying speeds and distances. It developed his interest in mechanics, and particularly his interest in internal combustion motors. Naturally he moved up from the bicycle to the motorcycle. Soon he was building his own motorcycles, and building them so well that very early in motorcycle history he began to acquire National recognition; first, on the race track as a rider and very soon thereafter as a designer of the fastest motorcycles in the world. Some of his exploits on the race tracks and, later, in the air, made people

regard him as a dare-devil, but those who knew him realized that his was the daring of knowledge and not that of recklessness. Years of observant experience had taught him what he could or could not do with a motorcycle. Later the same faculties stood him in good stead with the aeroplane.

Beginning with 1901 Curtiss constantly improved his knowledge of motors of light weight and high speed. Year after year he won important events with his own Curtiss machines and Curtiss motors. In 1902 he first participated in an event of State wide importance. The New York Motorcycle Club offered a silver loving cup and a gold medal to the winner of their open road race. The world at large was invited to participate and the entry list included the best of American and foreign machines and riders. Curtiss, with his own motorcycle, embodying principles afterwards developed in his aeronautical engines, won. In 1903 he won the gold medal offered by the New York Motorcycle Club and on the same day won his first National championship.

Curtiss made his first world's record in January, 1904, when at Ormond Beach, Florida, he rode ten miles in 8 minutes 54 seconds. After that national championships and world's records became an established habit with him until 1906, when at Ormond Beach he established a one mile record that stood for a



Glenn H. Curtiss as Motorcyclist Champion circa 1903.

The Harry M. Champlin race track where early flights were made.

Flying field at head of Lake Keuka site of Navy and Curtiss hydro-aeroplane camps.

generation. Using a specially designed motorcycle, driven by his first eight-cylinder V-type, air-cooled aeronautical engine, Curtiss rode a measured mile in the time of 26 2/5 seconds, or at the rate of nearly 140 miles per hour. No man had ever before traveled at anything like such speed, unless he had happened to fall from a balloon without a parachute. It was many years before any man in any sort of machine traveled over the earth at so fast a pace. The accomplishment demanded the peculiar combination of faculties later to make Curtiss pre-eminent in aviation; physical and moral courage, mechanical knowledge, and the right equipment. The record definitely put Hammondsport on the map as the place where very unusual things were produced.

THE FIRST DIRIGIBLES

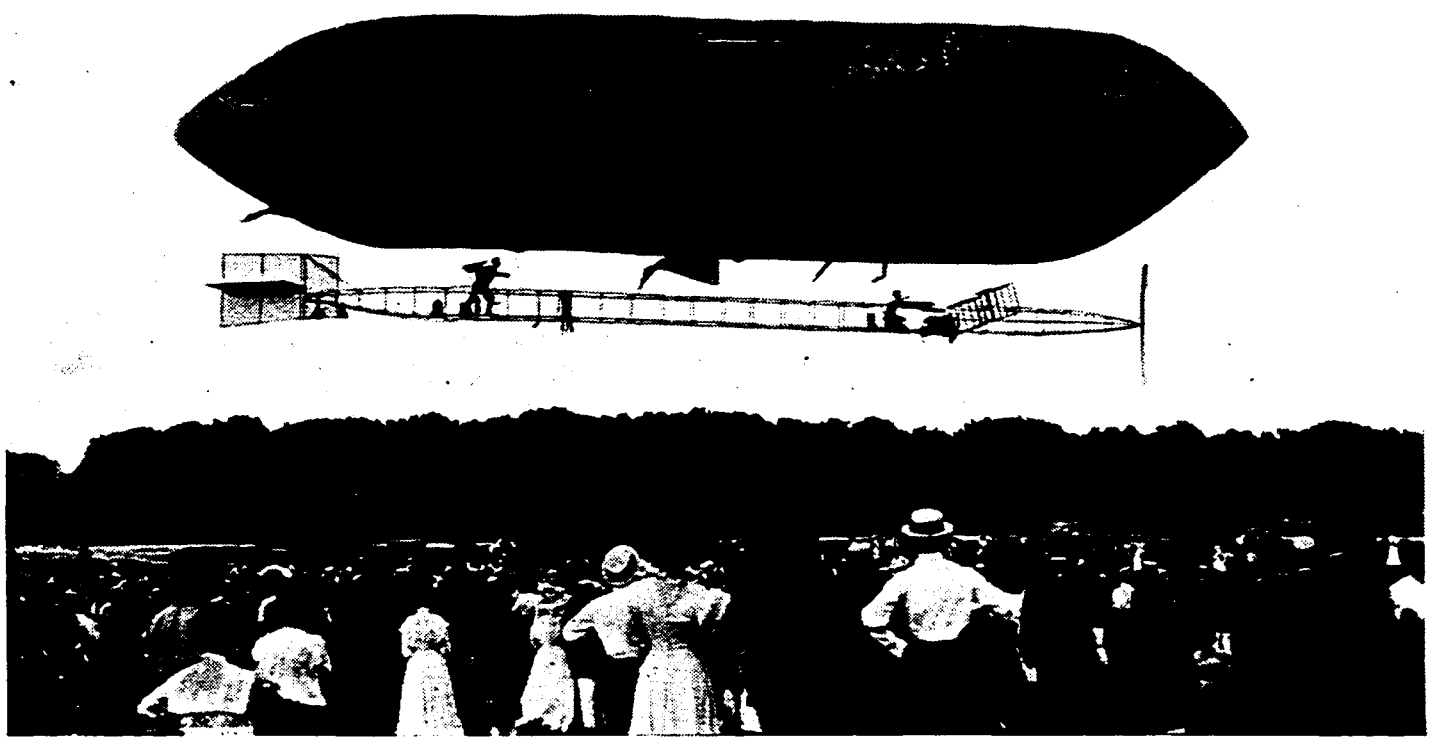
Hammondsport, for its isolation at that time, might almost as well have been Emerson's famous hut in the woods where his hero was to have been sought for his mouse traps. It seemed an out of the way place, but there were too many men in the world looking for what Glenn Curtiss was able to produce in the way of power-for-weight engines, to remain unfound. His light could not be hidden for long; and while Curtiss still kept his mind on the motorcycle business as his best promise for the future, experimenters in other lines began to look him up to see what he could do for them. The late Major Thomas Scott Baldwin was among the first to recognize the possibilities for aeronautical work of the light motors built by Curtiss. "Captain" Baldwin, as he was generally known before the war, was a manufacturer and an operator of balloons. LeBaudy, in France, was beginning to have some success with navigable balloons, and Baldwin formed the idea that the Curtiss motors might be adapted to the purpose of driving his own gas bags. Baldwin visited Curtiss in Hammondsport and in 1904 installed a Curtiss motor in his ship called the California Arrow. This is said to have been the first navigable airship in America to make a circular flight, a feat accomplished at Oakland, California, in August, 1904.

"AIR-WISE" HAMMONDSPORT

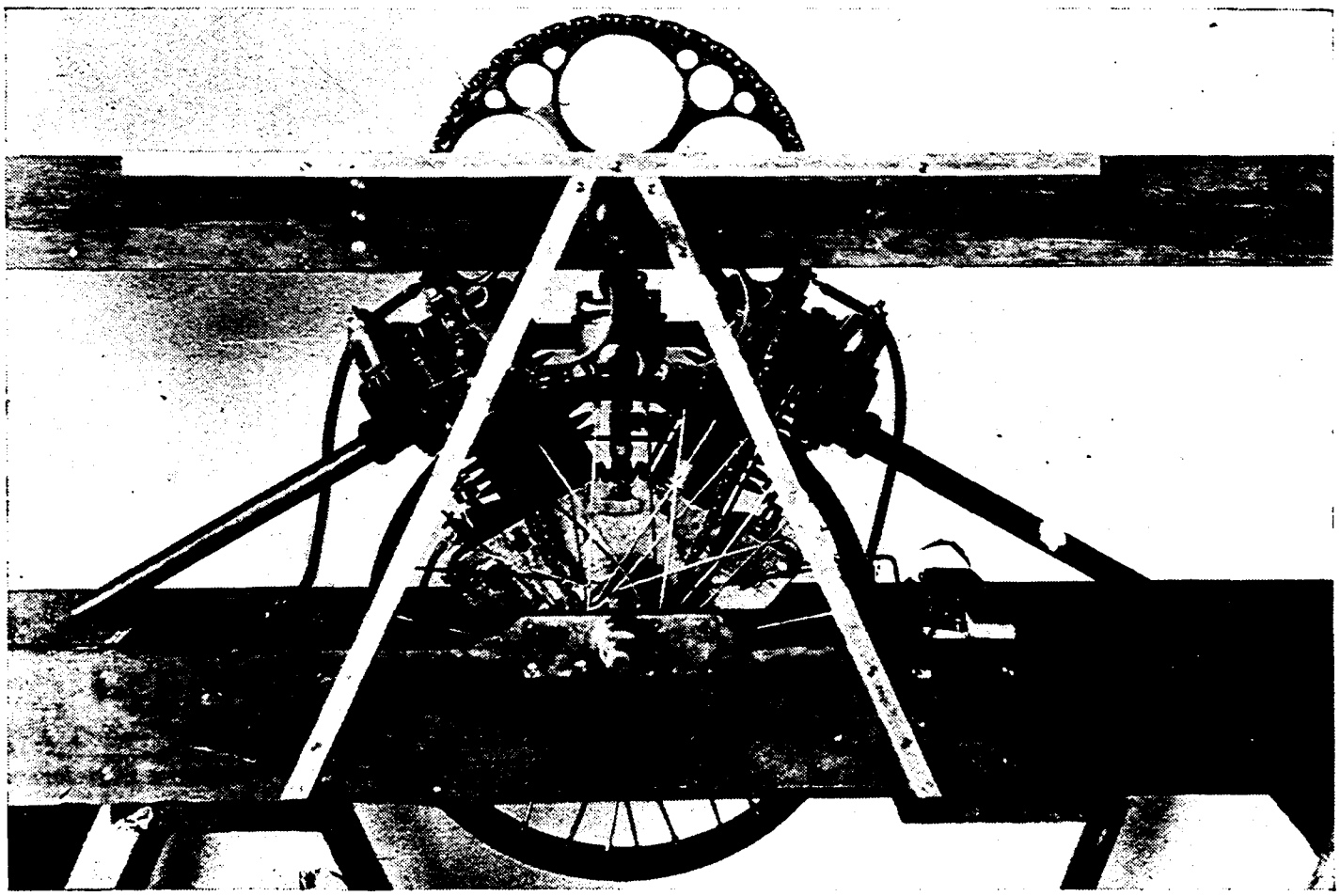
Hammondsport began in that year to become what is now commonly called "air-wise." Soon all the airships engaged in exhibition work in this country were equipped with Curtiss motors. Power combined with light weight and reliability were basic requirements for either aeroplanes or dirigible balloons, and it seemed that Curtiss alone could at that time supply this combination of requisites.

European experiments with navigable balloons stirred the Signal Corps of the United States Army to enter the aerial field, and the first contract for a navigable balloon given by the United States Government went to Thomas Scott Baldwin. It was to be constructed at Hammondsport and to be equipped with a specially designed Curtiss motor. It was an ambitious undertaking because for that day the requirements seemed very severe. Most difficult was the production of a motor, light enough in weight and of sufficient power to meet the requirements, that could be kept in continuous operation for two hours in the air without overheating. For this purpose Curtiss designed his first water cooled aeronautical motor. The balloon was completed, the motor installed and the ship was tested by Curtiss and Baldwin over the fields near Hammondsport. On its official trials at Washington it met every specification and its two hour flight over the hills in the vicinity of Fort Meyer stood for years as the longest continuous flight made by an airship in this country.

The success of the Baldwin-Curtiss Government dirigible and that of the California Arrow now began to attract to Hammondsport many others interested in aeronautics either as a science or as a sport. A number of balloons were built and flown here and many early types of flying machines were projected and produced. The first helicopter (a machine designed to lift itself straight up) to raise a man from the ground was built and tested at Hammondsport. The first ornithopter (a machine designed to fly with flapping wings) was built and tested in the "Cradle of Aviation."



Official test. Curtiss and Baldwin flying Government Airship.



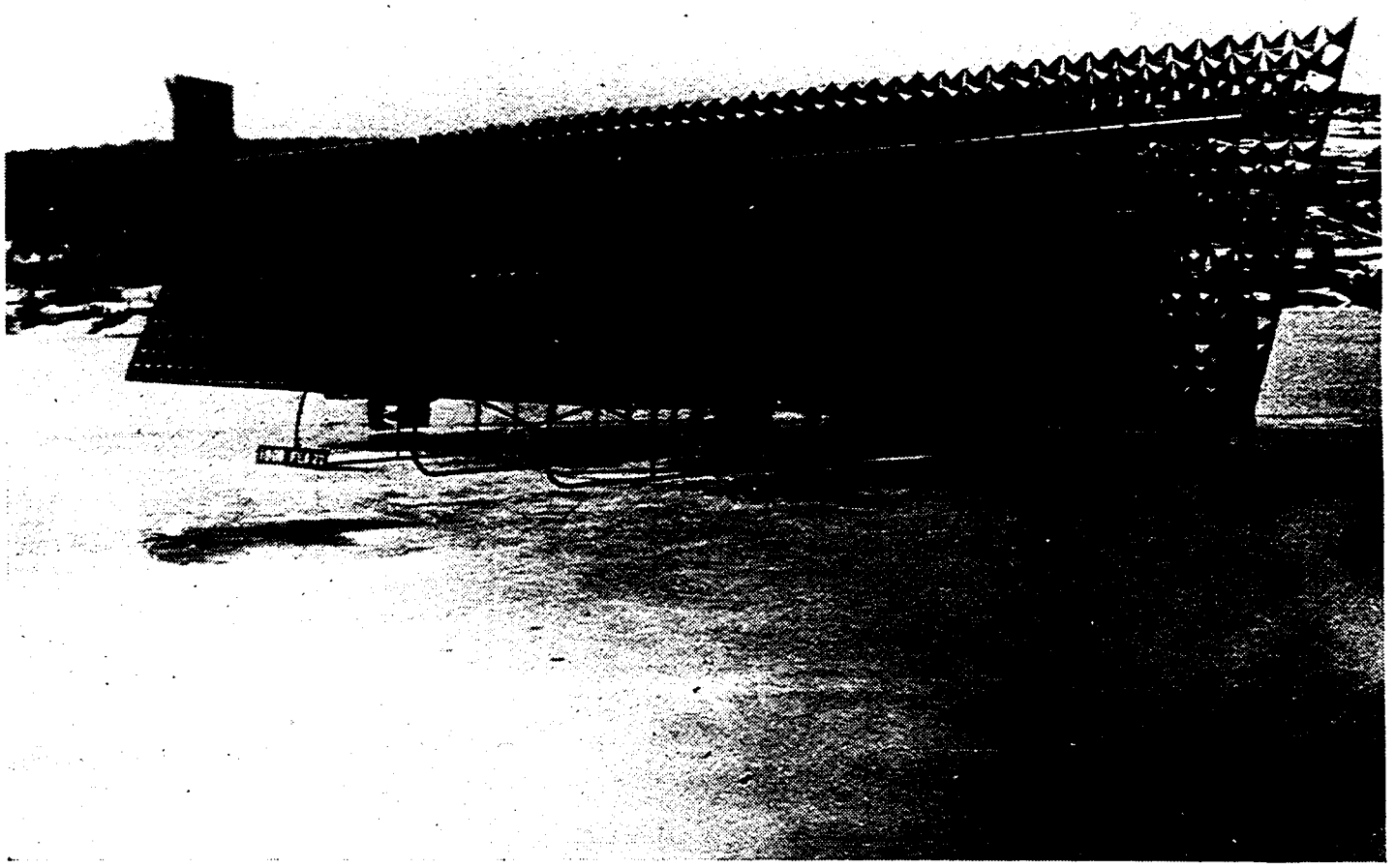
First Dirigible Balloon Motor built for Captain Baldwin.

THE AERIAL EXPERIMENT ASSOCIATION OF TWENTY YEARS AGO

Left to Right: "Casey" Baldwin, Lieutenant Thomas Selfridge, Glenn H. Curtiss, Dr. Alexander Graham Bell, J. A. D. McCurdy of the A. E. A. and Augustus Post, of the Aero Club of America.

DR. ALEXANDER GRAHAM BELL

Among those early interested in the possibilities of Glenn H. Curtiss was the well known scientist, Dr. Alexander Graham Bell, inventor of the telephone. Dr. Bell as the close personal friend of Dr. Langley, and one of the observers of the flights of the early Langley machines, was one of the few scientists in the country who had first hand knowledge that mechanical flight was an accomplished fact. Curtiss first met Dr. Bell in New York in 1905. The venerable scientist knew of the success of Curtiss motors in airships and asked Curtiss to build a motor for use in an experimental aerodrome, or tetrahedral kite plane, he was making at his summer place, near Baddeck, in Nova Scotia. He asked Curtiss to visit him there but Curtiss was too thoroughly occupied at that time to visit Dr. Bell's experimental ground and it was not until the summer of 1907 that he found himself in Baddeck.



One of Dr. Bell's Tetrahedral, man-carrying kites at Hammondsport, 1908

There Curtiss met Mrs. Bell, F. W. (Casey) Baldwin, Jr., J. A. D. McCurdy and Lieut. Tom Selfridge, of the United States Army. Baldwin and McCurdy were young Canadian engineers engaged by Dr. Bell to assist in his experiments. All of the men were interested in aeronautics and soon all were convinced that it had now become feasible "to build a practical aeroplane which will carry a man and be driven through the air by its own power."

Mrs. Bell seems to have been as enthusiastic for the project as any of the men and she agreed to finance the work of an organization to be known as "The Aerial Experiment Association." The officers of the organization were Dr. Bell Chairman; F. W. Baldwin, Chief Engineer; J. A. D. McCurdy, Assistant Engineer and Treasurer; Lieut. Selfridge, Secretary. Glenn H. Curtiss, because of his experience with aeronautics and particularly because of his knowledge of aeronautical motors, was selected to be Chief Executive Officer and Director of Experiments.

FIRST FLIGHTS AT HAMMONDSPORT

The first work of the Aerial Experiment Association was to conduct a series of experiments at Baddeck using the large tetrahedral kites designed by Dr. Bell. Tests were also made with air propellers on boats, with planing surfaces under boats, and with various other details connected with aviation. But Baddeck proved to be too far from the base of supplies for rapid progress with the experiments. Machines and mechanics were required to provide the new equipment constantly needed so in the fall of 1907 the association moved to Hammondsport, where Dr. and Mrs. Bell made their headquarters at the Curtiss homestead on the hillside near the Curtiss plant.

In foreground, roofs of the early Curtiss plant. In distance, U. S. Navy's hydro-aeroplane Camp on Lake Keuka, near Hammondsport.

The first few weeks were spent by the members of the association in experimenting with a Chanute type of biplane glider until the embryo flyers satisfied themselves they could go no further with that. Lieut. Selfridge alone seems to have desired to continue work with the glider but the popular vote was against it. What particular style was to be adopted for their first power machine evoked so many conflicting suggestions it was finally decided that each member of the association should assume engineering responsibility for one aeroplane; all of the

other members were to contribute freely of suggestions and assistance but the sponsor of the machine was in no way bound to accept their recommendations. Lieut. Selfridge was responsible for the design of the first machine. It was completed early in 1908 and made its first flight with Casey Baldwin at the wheel on March 12, 1908. The flight was made over the frozen surface of Lake Keuka near Hammondsport. It was undoubtedly the first aeroplane flight made in New York State. Selfridge would have held the controls but he was out of town and the others dared not risk losing the ice. Baldwin's flight was short but he undoubtedly rose from the ice and upset only because Selfridge had provided neither mechanical nor inherent means of balance. That machine was christened the Red Wing.

Casey Baldwin was sponsor of the second machine built by the Aerial Experiment Association. He named it the White Wing. It differed in minor details from the Red Wing but principally in the fact that the expensive silk coverings for the wings were discarded in favor of cotton. This material proved so porous the machine had no lifting qualities and is said to have forced the discovery of a new element in aviation, a liquid filler or "dope" for the wing surfaces; for they varnished the cotton and at once secured the desired lift.

For weeks the association experimented with the White Wing until in May Curtiss made in it a flight of 1,008 feet landing safely and without damage to the machine in a plowed field adjoining the Champlin race track in Pleasant Valley whence he had started. That gave the Aerial Experiment Association two reasonable successes out of two starts; a score of nearly 100% for this little group of well prepared men, while the rest of the world striving to the same end, (barring only the Wright Brothers, who alone were known to be flying successfully at this time) continued to score practical blanks. To accomplish this the Curtiss-Hammondsport group were obliged to develop with home talent the arts of brazing, welding, enameling, wood treatment, cloth filling, wire fastenings, turnbuckles, et cetera, and, most important at the time, to invent a new method of lateral balance. Some of the wood was cut and seasoned on the hills near Hammondsport. For bamboo to be used in the out-riggers they had to send to Japan. Supply houses for such material were non-existent and every detail of the machines had to be planned, engineered and manufactured.

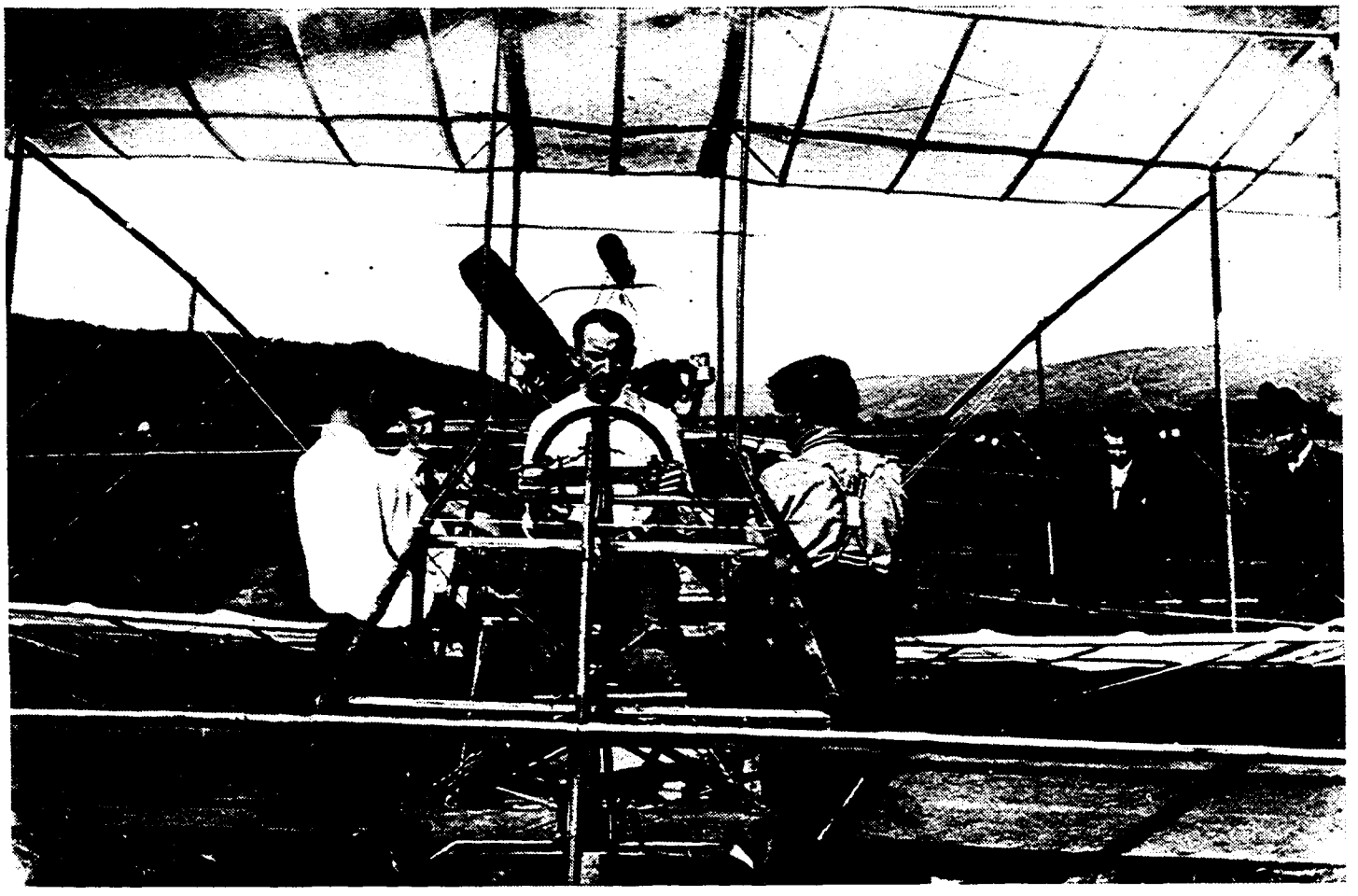
Red Wing (March 1908).

Curtiss' First Aeroplane

It was now the turn of Glenn H. Curtiss to accept responsibility for the design and production of an aeroplane, and a study of the June Bug, as compared with its predecessors, shows the educated eye some changes. From the beginning it proved a great improvement, for it was faster and better controlled than either of the others.

Up to that time, it seems safe to say, aerial experimenters in general had sought the greatest possible area of wing surface consistent with structural strength and not prohibitive weight. Large surfaces gave them slower flying speeds but less control. Curtiss seems to have realized that an aeroplane, like a bicycle or a ship, needed forward speed or steerage way to make it easily controllable so he used less wing surface and greater speed; a characteristic exclusive with his machine for years to come. Lateral control was effected by the use of small horizontal rudders at each wing tip; soon to be developed into the ailerons now universally used for lateral control.

No other of the pioneer methods of securing lateral balance in an aeroplane outlived the acid test of the World War.



A close-up of Curtiss in the "June Bug."

THE FIRST FLYING TROPHY

At that time, 1908, the Scientific American had offered the first trophy to be put up in this country for aeroplane flights. It was to become the property of the flyer taking it three years in succession. Conditions for the winning of the trophy were to be changed from year to year to meet advances in aviation.

In 1908 the winner was to be the first to fly a distance of one kilometer. The flight must be officially observed, public and on a pre-announced date. Curtiss decided to compete for it, made his entry and selected July 4th for the trial.

The announcement that Curtiss proposed to fly for the trophy served to draw students and observers of aeronautics from many distant places. Among the names well known nationally were the following:

Stanley Y. Beach, editor of Scientific American; Alan R. Hawley and Augustus Post, of the Aero Club of America; Charles M. Manly, chief engineer for Dr. Langley and the first man to attempt to fly in a power driven machine; C. G. Lake of submarine fame; A. M. Herring; Geo. H. Guy, Secretary of the New York Society of Engineers; E. L. Jones, editor of Aeronautics; Wilbur R. Kimball, New York Aeronautical Society. There were others, unrecorded and too numerous to list, who took places on the banks overlooking the fields now known as the "Cradle of Aviation." It is, of course, a matter of well known history that Curtiss flew the required kilometer, and for good measure, continued beyond the measured course to complete a full mile. He might have continued further but for the fear of having to land on rough ground and perhaps smashing up the June Bug. So much publicity was given this flight that the world was obliged to believe that mechanical flight by man was an accomplished fact.

Aviation Enters New Period

This public flight of July 4th, 1908, marked a distinct turning place in the world's aviation history, and it is interesting to turn back in the files of the Scientific American and other journals to see just what significance attached to the flight at that time. Before filing his entry for the Scientific American test Curtiss had flown more than a kilometer on June 25th. This trial had been witnessed and observed, and of the flight on that day the Scientific American said:

> ".....the June Bug on June 25th made the two longest flights that had ever been publicly accomplished by a heavier-than-air flying machine in America at any accessible place."

In this same issue is a note to the effect that M. Bleriot, of France, succeeded on June 29th, in flying his monoplane a distance of 600 meters!

Of the flight of July 4th, 1908, the Scientific American reports:

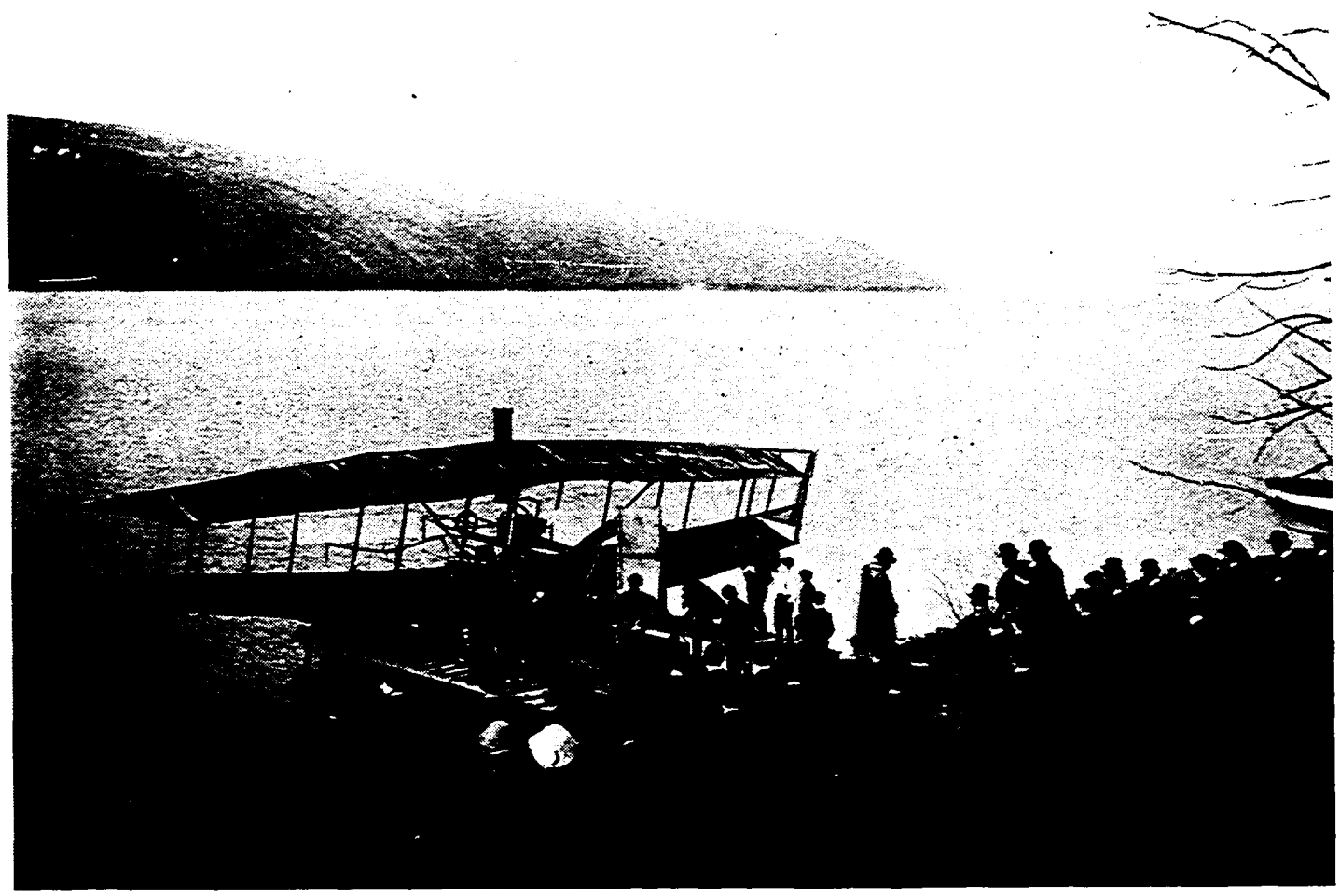
"The successful flight made by Mr. Glenn H. Curtiss was the culmination of carefully planned and patiently and intelligently carried out efforts for the winning of the trophy....."

"....the course started on one side of an old half-mile race track and passed directly through a vineyard and several fields. It was also necessary for the machine to cross several barbed wire fences before it could fly over the finishing post....."

"The instant it was released the aeroplane shot forward with constantly increasing velocity. It required only 12 seconds and a distance of 100 feet before the machine rose into the air. As he approached the end of the track, Mr. G. H. Curtiss, the aviator, steered his machine to the left in order to pass around the vineyard.....The machine kept rising.....it sped rapidly on at a height of some 20 feet. As it neared the finishing post it dropped to a height of 15 feet, and then continued onward making a wide sweep to the left. The distance traversed was easily a mile. We congratulate him on his success in winning our trophy for the first time, and we hope that progress in aviation will be so rapid that he will stand an excellent chance of winning it again in the future and much more difficult contests to be held."

(A prophetic hope, for Curtiss won it again in 1909, and for the third and last time he won by his dangerously dramatic flight down the Hudson River from Albany to New York in 1910).

During the remainder of 1908 the Aerial Experiment Association devoted itself to designing its fourth and last machine, the Silver Dart. Curtiss had his motorcycle business and the new work of designing and building aeronautic motors to occupy his attention, but flying over grape stakes and barbed wire fences in a day when unintended descents were more numerous than otherwise turned his mind to flying over water; consequently the first experiments with floats attached to an aeroplane were made with the June Bug during 1908 on the waters of Lake Keuka near Hammondsport. The floats were not adapted for "planing" but valuable tests of balancing devices for machines running on the water were made. With its pontoons the June Bug was rechristened "The Loon."



Launching the Loon

FEDERATION AERONAUTIQUE
INTERNATIONALE

AERO CLUB OF AMERICA

No. 1

The above-named Club, recognized by the Federation Aeronautique Internationale, as the governing authority for the United States of America, certifies that

Glenn H. Curtiss

born 21st day of May 1878

having fulfilled all the conditions required by the Federation Aeronautique Internationale, is hereby licensed as Aviator.

Dated June 8th, 1911.

Augustus Post
President.

G. L. Campbell Wood,
Secretary.

[SEAL]

Signature of Licensee :

Glenn H. Curtiss

Pilots License No 1 issued to Glenn H. Curtiss by Aero Club of America

A WORLD FIGURE IN AVIATION

VERY early in 1909, Dr. and Mrs. Bell decided that the objectives of the Aerial Experiment Association had been attained. The organization had produced four machines that were capable of flight carrying a human pilot. As a method of balance they had invented the aileron, the lateral steering and balancing device now used, in modified and modernized form, by practically every aeroplane in the world; and one of the machines flown by one of their members had won the first great American aviation trophy. The organization disbanded. McCurdy and Baldwin returned with Dr. Bell to the Baddeck estate, and flew there hundreds of miles with the machine known as the Silver Dart.

Interest in aviation had been aroused in many quarters. Scientific bodies, experimenters, sportsmen looking for a new thrill, wrote or journeyed to Hammondsport to ask Curtiss for assistance in their ambitions. The first order for an aeroplane given to an American manufacturer went to Glenn H. Curtiss for a machine and motor to be constructed at Hammondsport and demonstrated at Morris Park track, New York City, for the New York Aeronautical Society. In this machine, which was completed in June, 1909, Curtiss developed the aileron. He increased its surface and placed these opposed lateral rudders midway between

the main planes of the machine. He demonstrated it first at Morris Park track and on July 17th of that year he flew it at Hempstead Plains in competing for the second leg of the Scientific American trophy.

So great had been his advance in the designing and flying of aeroplanes that instead of a mere mile straight away, which had aroused the country a year earlier, Curtiss on this occasion flew nineteen times around a closed circuit for a distance of 24.7 miles. In addition to increasing his hold on the Scientific American trophy this flight also won for Curtiss the Cortlandt Field Bishop prize of $250 awarded by the Aero Club of America, and the honor of being chosen to represent America and the Aero Club of America in the first international aviation meet in the world's history. This was held at Rheims, France, in August of 1909.

The First International Aviation Trophy

James Gordon Bennett, then editor of the New York Herald, and sponsor for many international balloon races, had offered an international speed trophy for heavier than air flying machines and the contest for this trophy was the principal event of the meet. All the world was interested in the race. There were nearly a score of entries from France, England, Italy and America; all recognized types of monoplanes and biplanes were there, but the speed contest soon settled down to four flyers and the real race was finally between Curtiss of America and Bleriot of France.

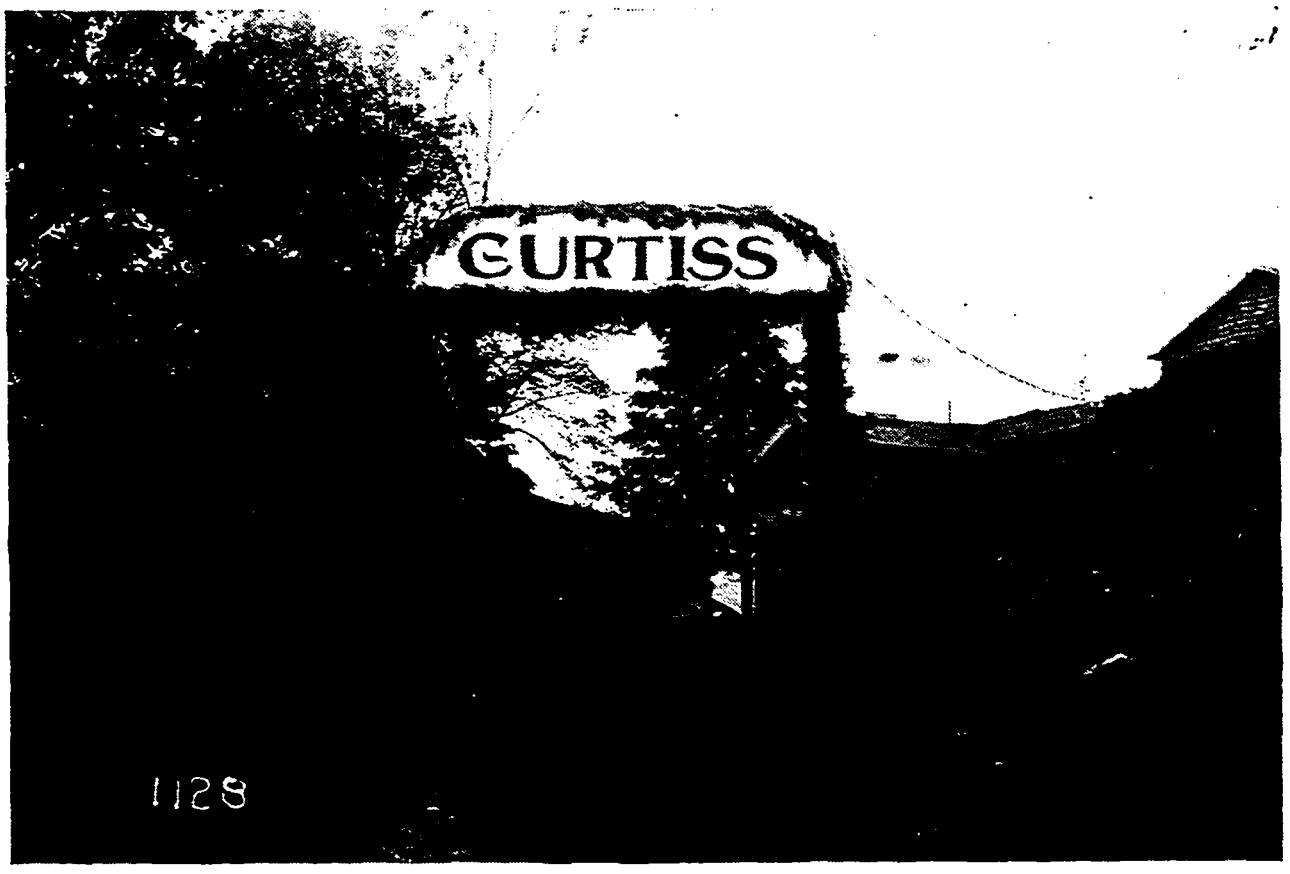
Most of the machines entered were twice the size and weight of the tiny Curtiss biplane. Its power was an eight cylinder, "V" type, water cooled Curtiss motor of 50 h. p., completed only in time to be packed and shipped to France without flying tests. Curtiss had but one aeroplane and one motor on the ground. Bleriot had five machines and one of them, built after word had been published of the eight cylinder Curtiss motor, was equipped with a "V" type motor of 80 h. p. Bleriot made some laps of the course faster than Curtiss' best time for any single lap, but in the actual race Curtiss proved faster by about 6 seconds, and so from a field of the world's best flyers and machines Curtiss brought to America and to Hammondsport the world's first international speed trophy, the Gordon Bennett cup.

In addition to the international race for the Gordon Bennett cup, Curtiss also won the prix de la vitesse, details of which are quoted from the Scientific American of September 11th, 1909.

> "The results of the Prix de la Vitesse were as follows:
> "First, Glenn H. Curtiss with his 60 h. p. biplane.
> "Second, Bleriot .
> "Third, Hubert Latham, with 'No. 29' Antoinette monoplane.

"Fourth, Tissandier, with his Wright biplane.
"Fifth, Lefebre, with a Wright biplane.
"Sixth, Count de Lambert, with a Wright biplane.
"Seventh, Latham, with 'No. 13' Antoinette monoplane.
"Eighth, Paulhan, with a Farman biplane.
"Ninth, Bunau-Varilla, with a Voisin biplane.

In the face of such international competition the win by Curtiss attracted the attention of the world to his aeronautical work. New York City welcomed him with acclaim; a great banquet was given in his honor. The winning machine was exhibited for months by John Wanamaker and the Aero Club of America awarded him a gold medal. Hammondsport, of course, was jubilant and welcomed Curtiss with a triumphal arch and a celebration.



Welcoming Arch for G. H. Curtiss. Erected at the time of his return from winning the Gordon Bennett Aviation Speed Trophy in France, 1909.

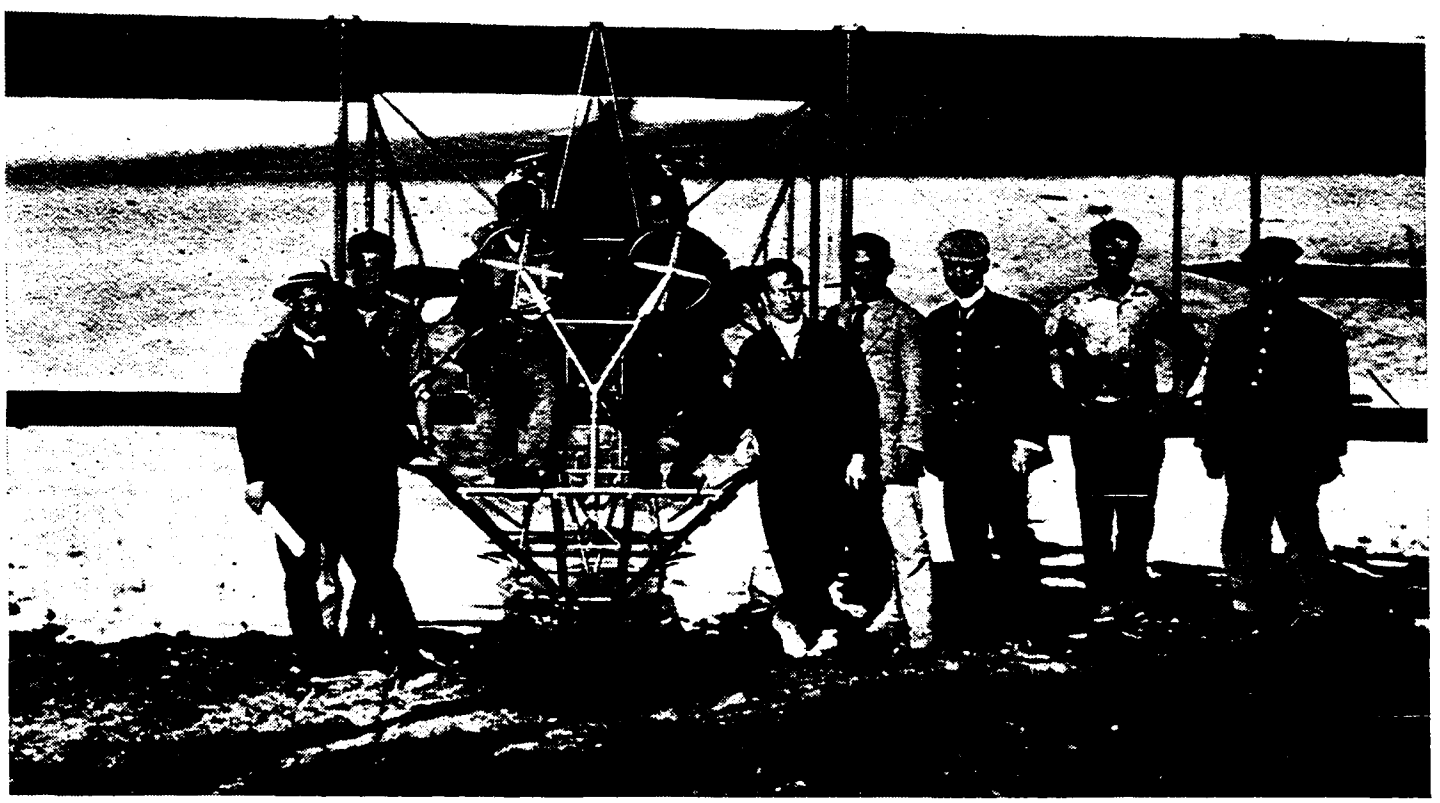
Strenuous Years for Curtiss

The activities of Glenn H. Curtiss during the ensuing three or four years were so numerous and diversified they cannot easily be given in chronological order without losing the significant developments of each individual line of endeavor. In the order of their importance we may treat them as follows:

1. Invention, development and manufacture of aeroplanes and motors.

2. Instruction of Army and Navy officers of the U. S. A. in the technique of flying, of aeroplane design and construction, care and operation of aeronautical motors.

First Army and Navy Officers detailed to Aviation



Group of Japanese student officers, 1912

3. Exploiting the new business of flying, or aviation, to the general public through the medium of exhibition flights.

4. Instructions of officers of foreign Armies and Navies.

5. Instruction of pilots from civilian ranks.

6. Fighting against great financial and social influences to maintain his right to a place in aviation history.

To carry on along all these lines concurrently, and successfully, demanded what only a genius, or a fanatic, could have given; unwavering singleness of purpose. For years Curtiss breathed, thought, ate, dreamed, discussed, worked on nothing but aviation. His mind was completely filled with details of flying machines and engines. If after two or three hours of technical discussion some visitor tried to introduce a side line conversation of politics, business or domestic felicities, Curtiss turned dumb; his eyes lost expression; he was lost in contemplation. Perhaps in the midst of the visitor's pet elocution Curtiss might burst out with:

"That's it! I'll bet we could do it that way!" a remark not having the slightest reference to the subject matter in discussion.

Up-Hill Fighting

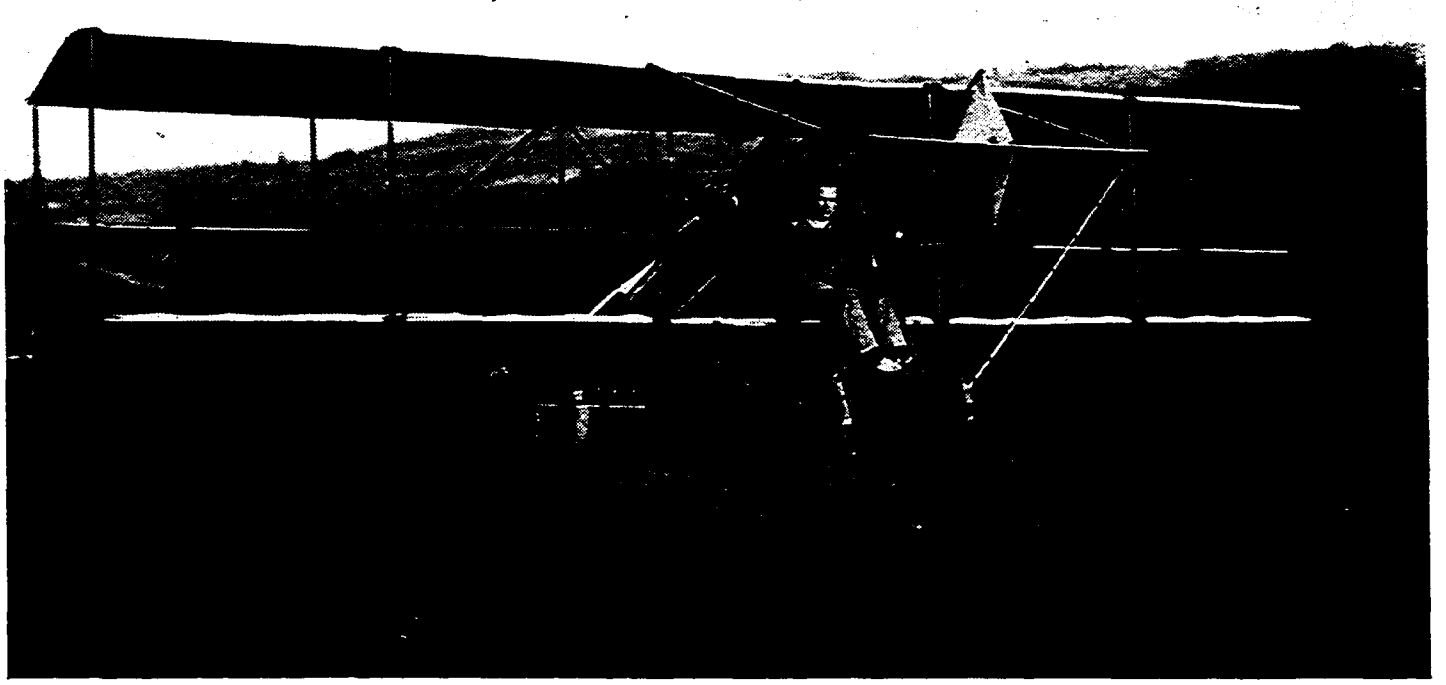
Being the hero of the aviation world in 1910 was not much healthier than being the Lindbergh of 1927. On the one hand the success of his machines and of his flying excited emulation and Curtiss aeroplanes and motors were copied ad lib by jack-knife carpenters all over the world. On the other hand his success brought forth efforts, legal and ultralegal to encompass his annihilation. The Wright Brothers had sold their patent claims to a group of wealthy and influential men. The company they formed was strong financially, but stronger still in social and political influence. Curtiss was hounded by day and by night with law suits and injunctions. Anyone with a heart of less than international championship caliber must have broken under the strain. Far from that; Curtiss continued his aviation work along half a dozen lines apparently unruffled. When others copied his machine and sold them openly as "Curtiss type," instead of using time trying to block the wheels of aviation progress Curtiss paid practically no attention to the infringers, but each time produced a far better machine than the one the copyists were building.

He was surrounded by fanatics, fakers, get-rich-quick promoters and stunt performers, ballyhoo artists and come-on men. Practically all of the mob were looking for something and none of them with anything to give; small wonder if at times he found it difficult to separate the occasional grains of wheat from so many bushels of chaff. But Curtiss was so pre-occupied with the things he wanted to do he really paid but slight attention to what others were doing either to him or for him.

U. S. Army Students with Lieut. Ellyson, U. S. N. and G. H. Curtiss, 1911

G. H. Curtiss with Army, Navy and Civilian students, 1911

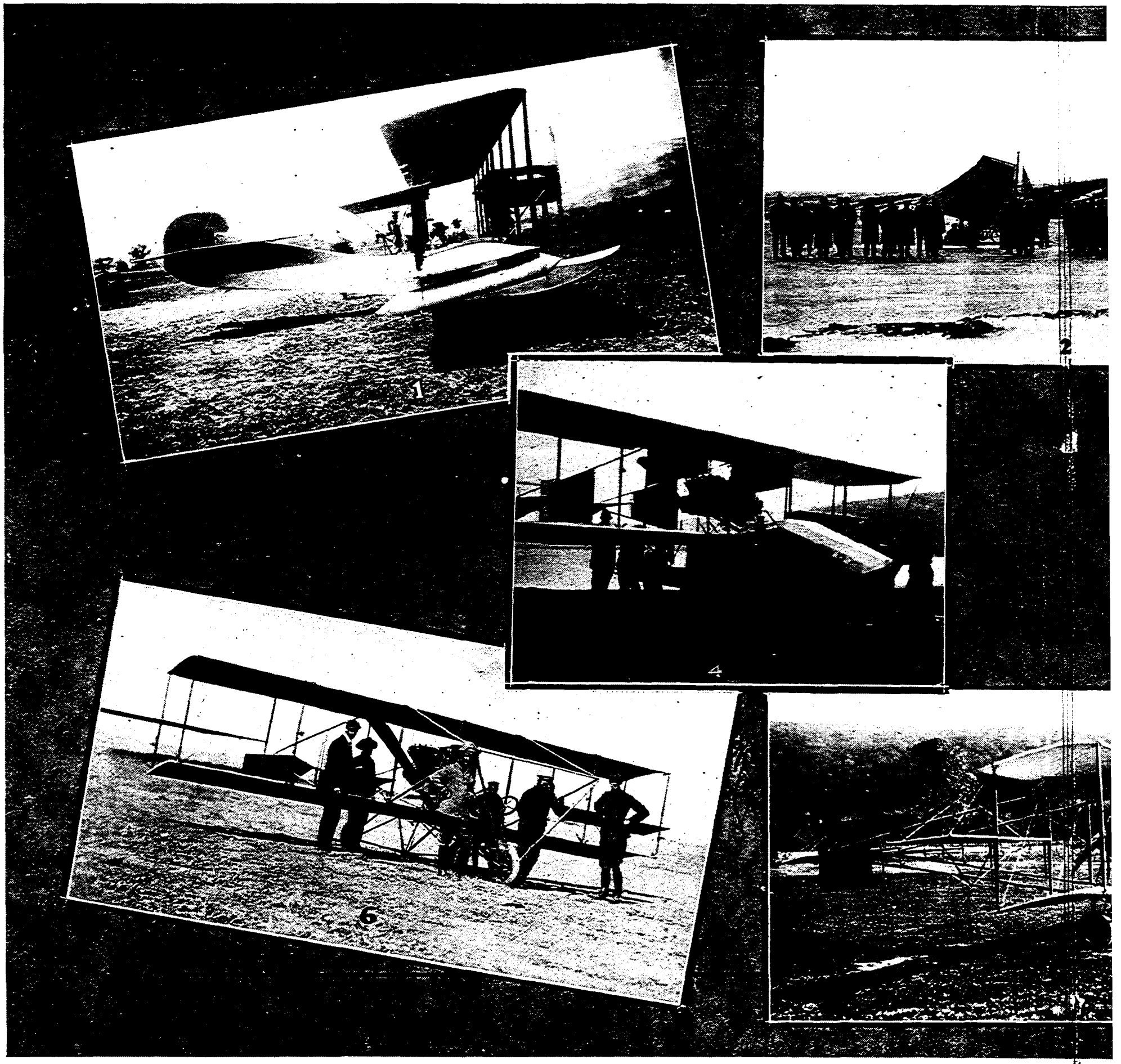
Invention had complete possession of Curtiss, but he was too practical to overlook production. In 1910 we find him doing several things at once. The most spectacular at the moment was the planning and building of a machine for a flight down the Hudson River from Albany to New York. The New York World



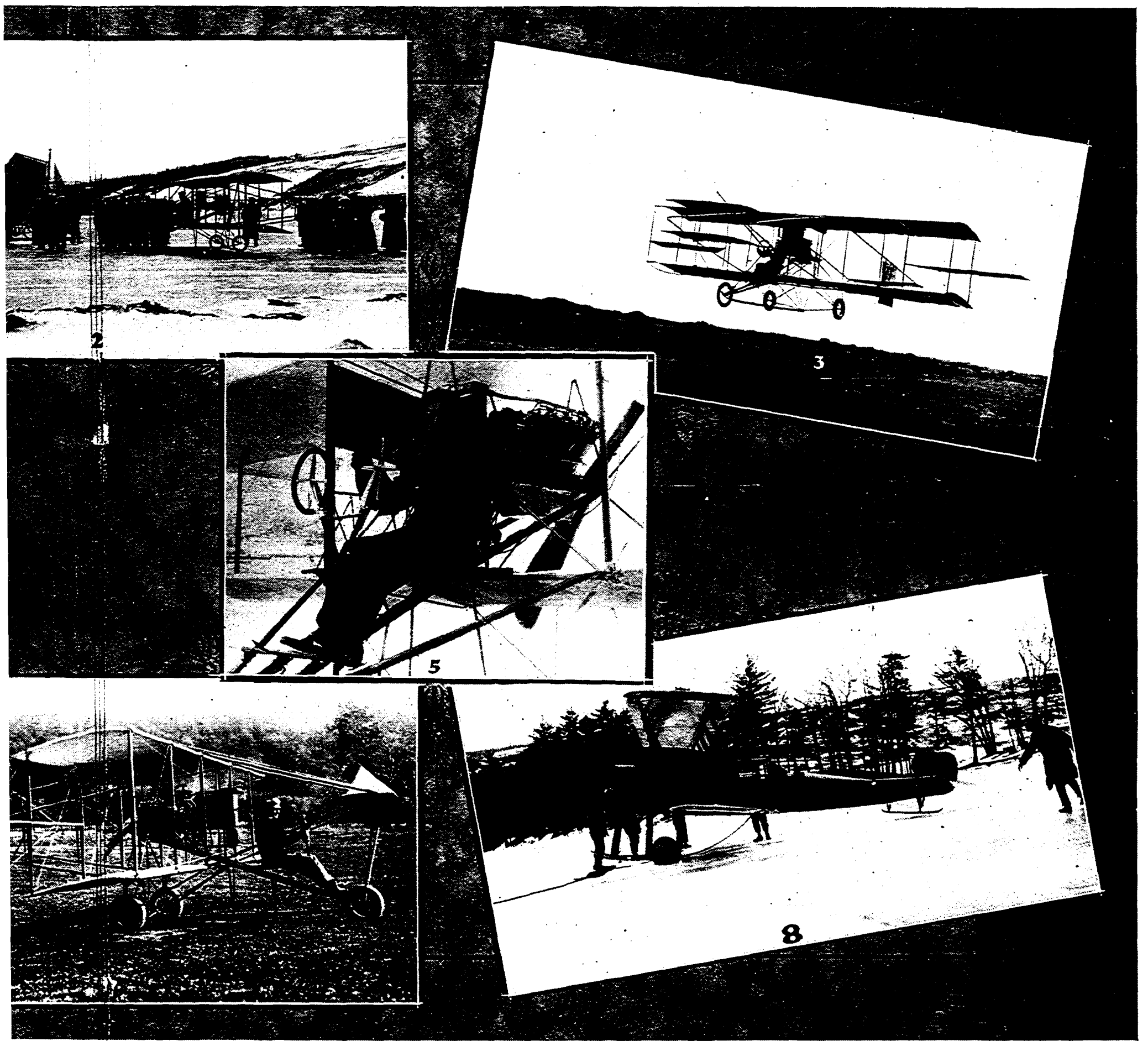
Commander Towers in Curtiss Albany to New York flier. Note pontoons.

had offered a prize of $10,000 for this flight. In making it Curtiss established a world's record for the longest distance travelled in a continuous flight by an aeroplane. And as the conditions for the Scientific American trophy contest of 1910 required the longest flight of that year Curtiss thereby made his third and final win of the coveted award.

The difficulties attending the trip were at that date almost as great as those attaching to Lindbergh's epic flight to Paris. Special trains followed the flying machine down the Hudson River and numerous reporters telegraphed their stories to the world from each stopping place. New York went wild over the almost unbelievable feat. By telephone and telegraph a banquet was arranged for the successful flyer at the Astor Hotel. William J. Gaynor, then Mayor of New York, presided and between the courses read the scores of telegrams of congratulations that poured in from all over the world. Among the speakers of the evening were Mayor Gaynor, Hudson Maxim, President of the Aeronautical Society;



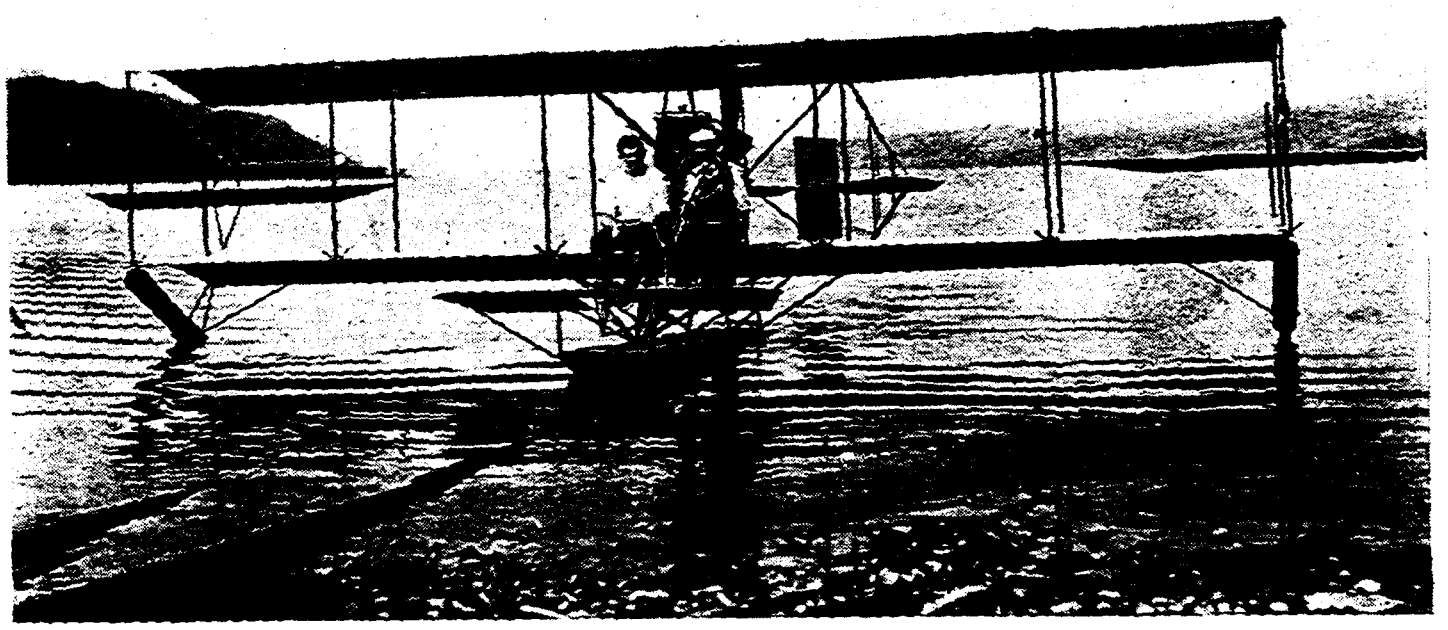
1. The First Tractor Flying Boat. 2. Experimental flying over ice on Lake Keuka, 1910. 3. Captain Be!k "
B. L. Smith, U. S. Marine Corps. 5. Tom Gyun, first Chinese aviator in Curtiss Hydro.
8. The first R being tried on



Captain Beck "Military Aviator" No. 1 in early Curtiss machine. 4. The second Naval Hydro-aeroplane with Major Curtiss Hydro. 6. Glenn Curtiss with Army student aviator. 7. Curtiss exhibition machine, 1911. R being tried on ice, January 1914.

Samuel H. Valentine, Vice-president of the Aero Club of America; Don Seitz of the New York World and the Hon. James M. Beck.

To cap this spectacular performance, less than two weeks later Charles K. Hamilton, flying with a Curtiss biplane and Curtiss motor, made the round trip from Gouvernors Island, New York, to Philadelphia and return on June 13th, 1910. It was the first round trip ever made by aeroplane in one day between two large cities, and a new American cross country record.

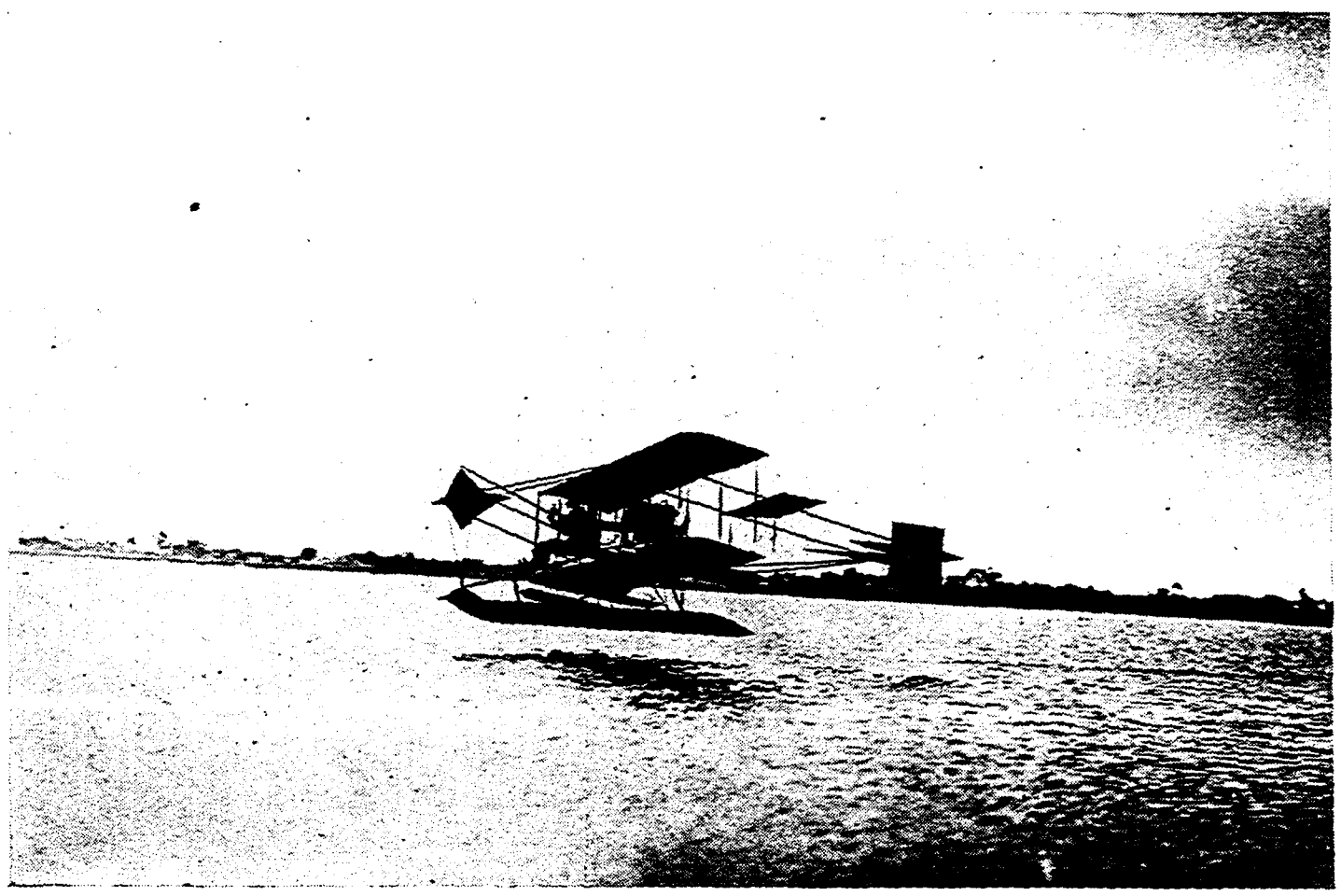


Curtiss and Ellyson in early hydro-aeroplane with dual controls.

THE HYDRO-AEROPLANE

In addition to extensive experimental development work and the operation of his factory, Curtiss was obliged to give a large part of his time to the defense of the suit for injunction filed by the Wright Brothers. Much time was given to experiments to prove that the ailerons, or lateral rudders between the planes, were not as the Wright Brothers claimed, an equivalent of the warping wing system they inaugurated and which required the use of the rudder to counteract the turning effect which occurred when the wings were warped. Between these problems Curtiss had a plenty to occupy his mind.

His body was equally active in establishing a new series of records, and speed contests, quick starting attempts and other notable aviation feats. During the year he won numerous cups and other trophies. He made the first flight over the ocean that year when he flew a distance of fifty miles over salt water from Atlantic City on July 4th.



The first Hydro-aeroplane takes to the air.

Bomb Dropping

At the instigation of the New York World and for the benefit of the officials of the Army and Navy Curtiss gave a series of demonstrations of the possibilities of dropping bombs from an aeroplane. Lead weights with streamers attached served as "bombs." Aeronautics of 1910 quoted Curtiss as follows:

> "Mr. Curtiss gives it as his opinion that to accurately drop bombs in actual warfare one man would have to be carried for the purpose of dropping the bombs as it was impossible for the pilot to make accurate calculations of angle and speed."

Other Demonstrations

To emphasize the various possibilities of the aeroplane Curtiss, during the latter half of 1910, demonstrated the possibility of sharp-shooting from an aeroplane in flight; done at Sheepshead Bay in August: the sending and receiving of wireless messages of an areoplane in flight, done by J. A. D. McCurdy in a Curtiss biplane at Sheepshead Bay. Another Curtiss machine, with C. F. Willard as pilot, established a record by carrying three passengers. Curtiss broke his own over-water flight record on August 30th when he flew from the City of Cleveland over Lake Erie to Cedar Point, Ohio, a distance of 64 miles. Working with the as-

Curtiss and group of "Early Birds" at Hammondsport.

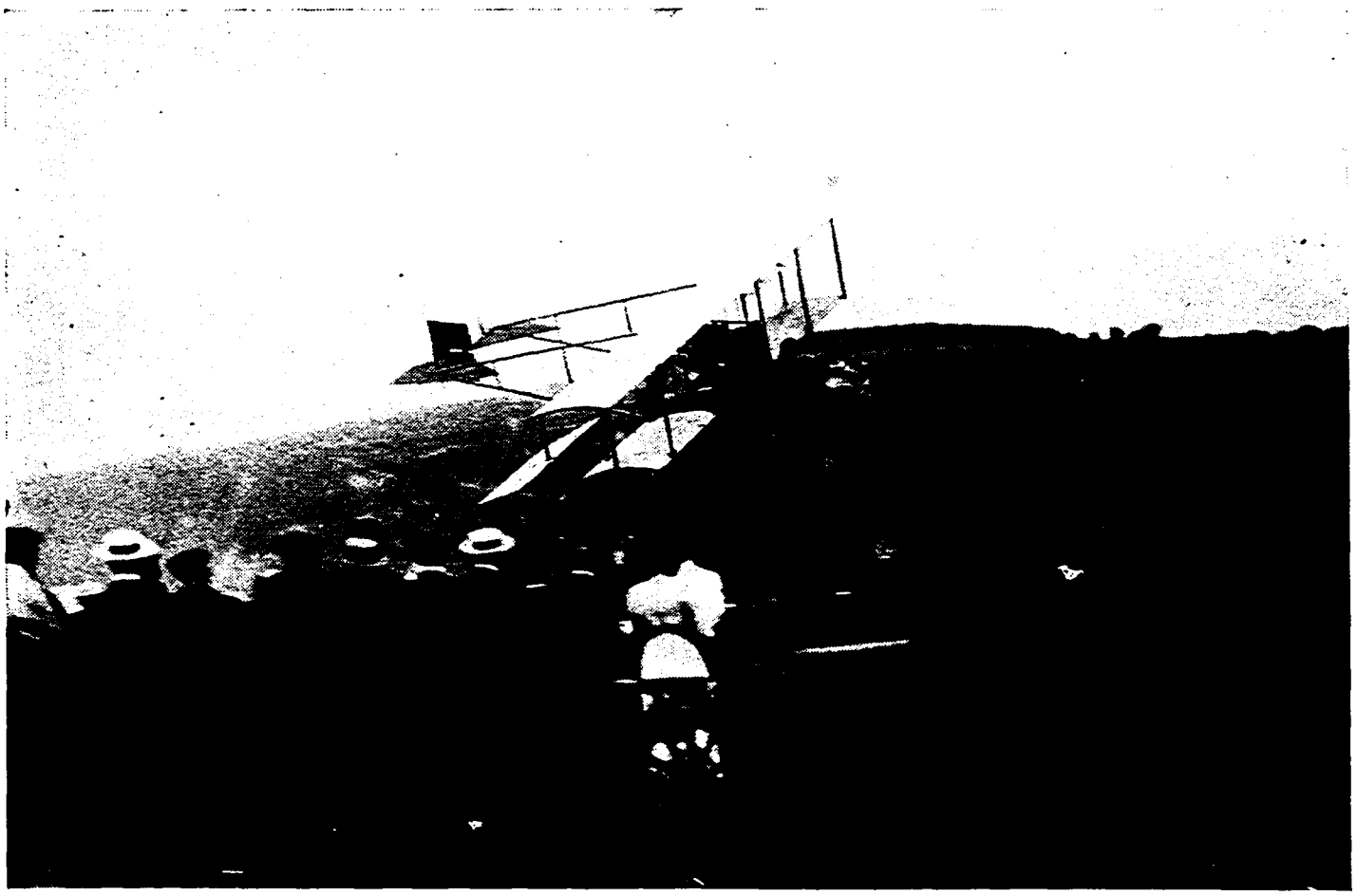
sistance of the Navy, Eugene Ely, in a Curtiss machine, made the first successful flight from a battleship, leaving the deck of the U. S. armored cruiser Birmingham at Hampton Roads and landing on shore.

The First School of Flying

Under the auspices of the Curtiss Exhibition Company, which was incorporated in September, 1910, America's first open flying school was inaugurated at Hammondsport. (This has now developed into one of the greatest aerial transportation systems in the world). To it flocked serious students of aviation, the merely curious, the parachute jumper, the stunt man looking for a novelty. The story of the Curtiss flying schools at Hammondsport, N. Y., San Diego, California, and Miami, Florida, would fill a large volume. Most of the well known pioneer aviators learned to fly at the Curtiss schools, and many of them were at the heads of flying schools started by our own and foreign governments during the World War. At that time these early graduates were found serving as instructors or demonstrators in America, England, Italy, Spain and Russia, not to mention their experiences in South American countries.

Before the war ended the Jennies had been built by thousands and had brought tens of millions of money into the state.

Attendance at the Hammondsport school began each spring almost before the



Lincoln Beachey. Stunt flying at Hammondsport, 1913

snow was off the ground; the so-called bird men drifted in as casually as the migratory birds make their reappearances. To name all of those who helped to make aviation history would take too much space, but we cannot overlook such unusual flyers as Lincoln Beachey and Eugene Ely among the more spectacular; and to those who took aviation more seriously, Beckwith Havens, Charles C. Witmer, J. Lansing Callan, Hugh Robinson, David McCullough, W. E. Doherty, Charles Willard; and later, such sportsmen as J. B. R. VerPlank, George U. von-Utassy, Harold F. McCormick, G. M. Hecksher, Jack Vilas and William Thaw. All of them outstanding names in their respective fields of aviation endeavor. Between them they helped to make the nation fairly air-wise. Without them aviation would have been nowhere in America at the beginning of the World War.

Training Officers

Curtiss almost alone of early aeroplane inventors had visions of the part aviation was to play in wars then to come, and once securely established, one of his early gestures was to invite the Army and Navy Departments of the United States to send a limited number of officers to him for free instruction in flying. So it was that Hammondsport's flying field at the head of Lake Keuka became the site of the U. S. Navy's first aviation school and camp. Among the first officers of the Navy to be sent here for instruction were the present Commander John H.

Towers, the late Lieut. Commander T. G. Ellyson. Commander Towers has since become one of the outstanding figures in military aviation and was in full charge of planning and directing the only fleet of trans-Atlantic flyers on record to date.

Other early representatives of the Navy to be trained by Curtiss were Commander H. C. Richardson, Commander P. N. L. Bellinger and Lieut. Chevalier. Officers studied not only flying but aeronautical engineering and aeroplane construction. Petty officers, mechanics and machinists were instructed in the setting up, overhauling and repairing of both aeroplanes and motors.

Captain Paul N. Beck was the first officer assigned by the U. S. Army for instruction under Glenn H. Curtiss. He later came to be the first "Military Aviator" when that title came into use. Among other pioneer military flyers who received Curtiss instructions and who later achieved prominence in military aeronautics was Major B. L. Smith, the first officer assigned to aviation from the Marine Corps.

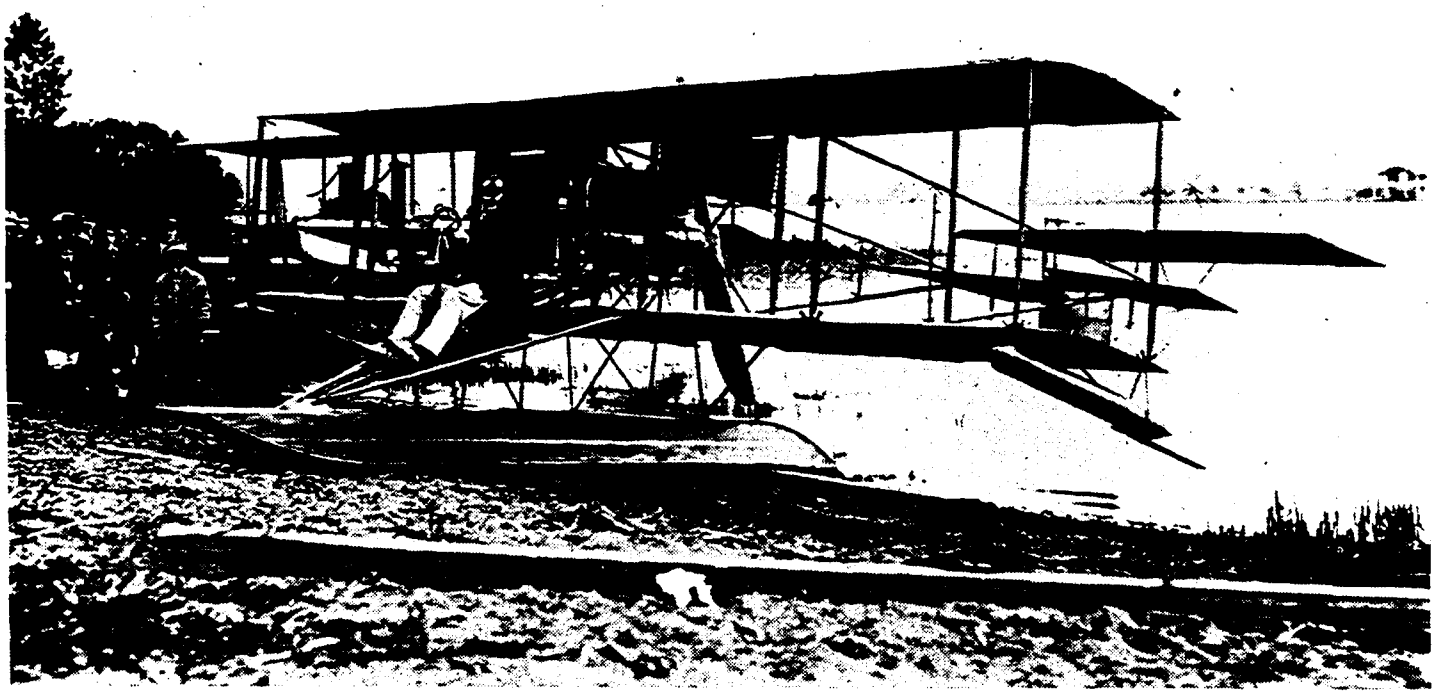
Of civilian and military students from foreign lands there were many. In the first two years of the Curtiss school there were represented among the pupils the following nationalities: English, French, Scotch, Irish, Germans, Russians, Spaniards, Mexicans, Greeks, Chinese, Japanese, Cubans and one Hindu. Not only did they learn to fly, but returned to their own countries and helped to spread interest in aviation developments in America. It is notable that the Japanese pilots who learned aviation at Hammondsport are now at the head of the Japanese Naval Aviation Service.

FLYING OVER WATER

Curtiss made the first great advance over the primitive types of flying machines when he invented the hydro-aeroplane. Not content to wait for spring he established a camp at North Island, near San Diego, California, in the winter of 1911.

With him went the then Lieut. Ellyson of the Navy and Captain Beck of the Army. Events proved that much remained to be done. Day after day Curtiss started out with the water flying machine on the waters of the bay, alterations and adjustments often being made nights, hopeful each time that he might find the trick of "unsticking" the pontoon from the water. The machine usually ran beautifully on the water and quickly attained what Curtiss knew to be flying speed, but at the eventful moment when he should have lifted into the air something always seemed to hold the pontoon to the surface. Many changes were made in the machine. One idea after another was tested and failed, and then one morning the hydro-aeroplane rose easily from the water and that problem was solved.

It was a great forward step for aviation at that time, for men flying in home-made, crudely-designed, poorly constructed machines were smashing up all over the country. Aviation received its worst set-backs in January, 1911, only a few weeks before Curtiss succeeded in making his hydro-aeroplane arise from and alight on the water. Moisant, a famous French aviator, starting out for an endurance record at New Orleans, in an overloaded plane, made altitude too slowly and was killed trying to pass a fringe of trees about the aviation field; and Archie Hoxie, seeking an altitude record on the Pacific coast, at almost the same time, dove to his death. Both were well known flyers and the dual catastrophy frightened scores of inventors, would-be aviators, and their financial backers out of the market. Many orders for aeroplanes and aeroplane motors were cancelled. Manufacturers of aeroplanes and aeronautical motors thought the end had come, that aviation had no commercial future; bankruptcies were the rule. Very few of the pioneer manufacturers survived the crash. Production costs were high in this business where practically every machine was a new model; profits were very narrow; Government appropriations amounted to next door to nothing, and a large share of what Curtiss and his associates gained by risking their lives in exhibition work and spectacular contests was spent on further experimental work.



Evolutionary type. All controls at rear, 1912

Selling Air-Mindedness

The hydro-aeroplane and Curtiss' abiding confidence in the future of flying really saved the day for American aviation. It demanded heroic courage, in the face of commercial calamity, to push forward his new invention. Curtiss knew that used rationally the hydro-aeroplane was as safe at least as an automobile. He finally convinced the Army and Navy of this truth. The U. S. Signal Corps at that time was inclined to pessimism.

Curtiss re-sold air-mindedness to the Army and Navy and Marine Corps at this time by personal demonstrations with the hydro-aeroplane. He flew out to a battleship in San Diego Harbor, alighted safely alongside, was hoisted aboard with his machine, lunched with the officers and later being lowered to the water he flew back to the camp on North Island. Hugh Robinson introduced the hydro-aeroplane to Europe where at Monaco he won the first world trophy for a contest between hydroavions.

Designers and builders of aeroplanes recognized the value of the invention and the Curtiss hydro-aeroplane was copied in this country and abroad, but the disasters of early 1911 with their accompanying pessimistic editorials had left the general public indifferent or antagonistic to aviation. Attendances at public flying exhibitions were fairly good, for there was always the alluring possibility of witnessing a fatality, but there were no buyers of machines for private use. Only the Curtiss machines to that date had an absolutely clear record and the "Aircraft" magazine during the fatal month of January, 1911, called attention to the fact that during the years 1908, 1909, 1910, just ended, "not a single fatality resulted from the use of Curtiss machines."

Army Appropriations

When matters, commercially speaking, seemed at their worst the Congress of the United States voted the sum of $125,000 for American aeronautics, and because of his success with the demonstration of the hydro-aeroplane Curtiss, from this money, was given an order for two of the new water flying machines. Aeronautical journals were inclined to give Curtiss credit for this unprecedented action of Congress. "Flying" published an article by Thomas T. Tuttle, in which he said:

"Epoch-making Achievement of Glenn H. Curtiss
Performances of Hydro-aeroplane Cause Sensation in Aeronautical Circles"

"It is probable that no single influence has had more telling effect upon Congress than the work of Glenn H. Curtiss and the aviators flying his machines. The Army and the Navy were already interested when Eugene Ely, co-operating with the Navy, flew from the deck of the U. S. Cruiser Birmingham on November 14th, last. Even then a number of critics said: 'All that is very well. That was easy; but can he land on a warship?'

One of the first army squadrons equipped with Curtiss pushers

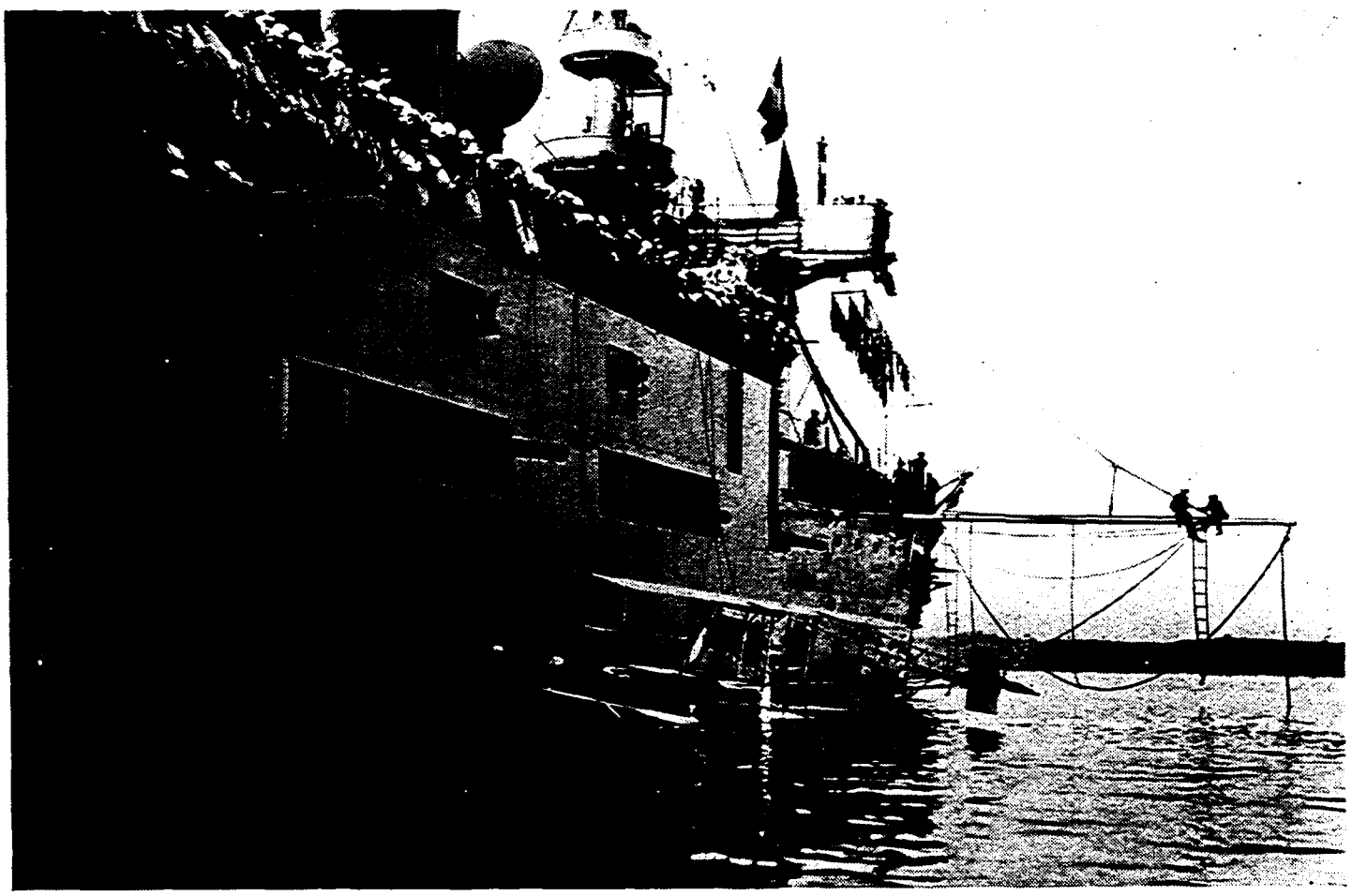
"Eugene Ely answered this in the most satisfactory way on Wednesday, January 18th, when he flew thirteen miles from Camp Selfridge, and alighted safely upon the platform built on the deck of the U. S. Cruiser Pennsylvania in San Francisco Harbor. The flight was made in eleven minutes. After taking luncheon with the officers of the Pacific Squadron he again mounted his machine, which is the latest Curtiss model, and after making a beautiful start from the deck of the warship and circling the other ships in the harbor, he returned to the aviation field, after an absence of an hour and a half.

"Besides instructing officers in flying Mr. Curtiss is giving them the benefit of participating in his experiments. One of the first of these and probably the most important is the development of the hydro-aeroplane.

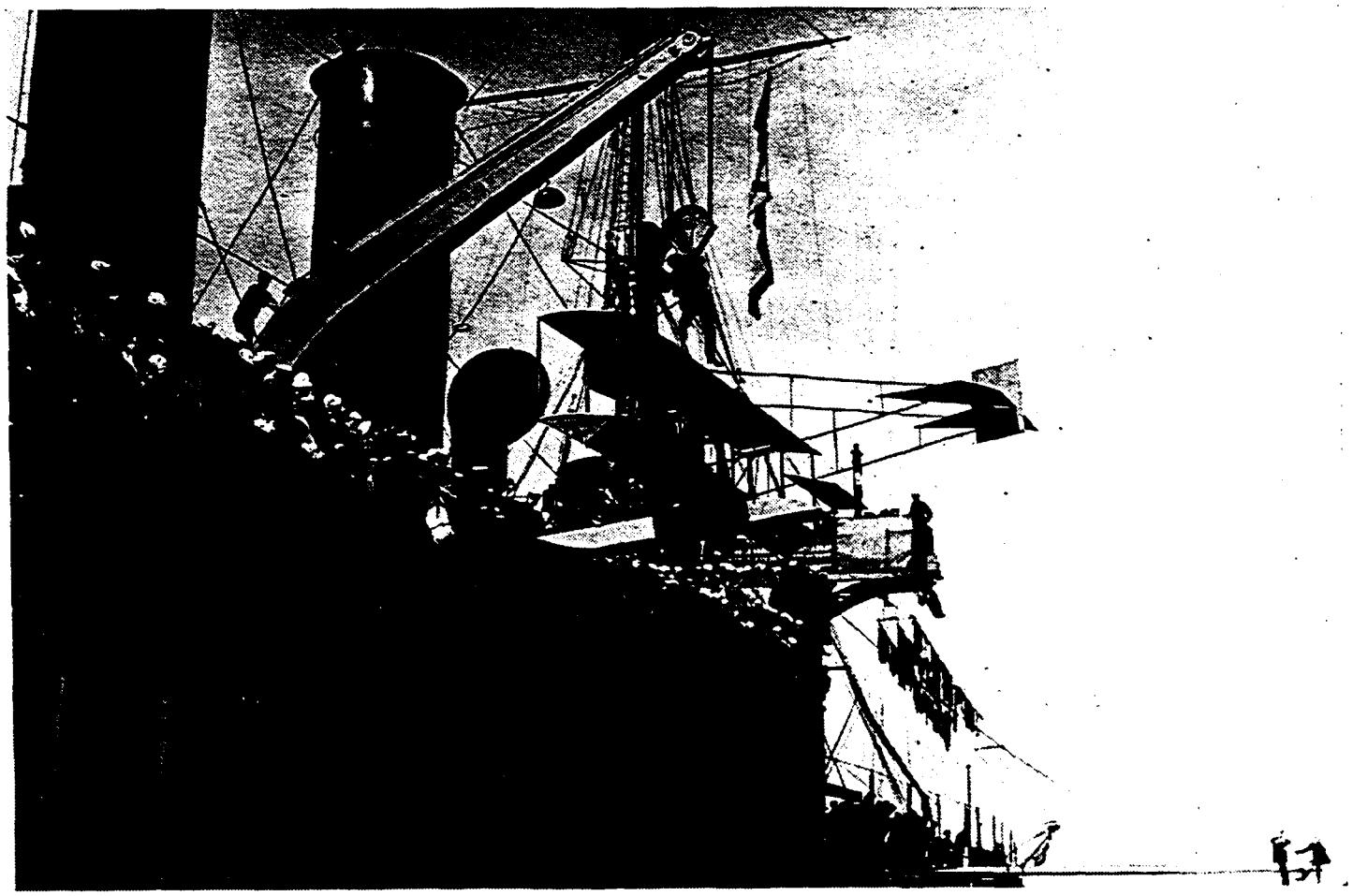
"Major George O. Squier, the authority on aviation not only of the Army but of the Nation, declared recently that the importance of this experiment is incalculable. He said, 'I doubt if Mr. Curtiss himself fully realizes the vast importance of the work he is accomplishing. I consider his hydro-aeroplane the greatest vehicle yet developed.'"

The U. S. Navy followed the Army's lead in seeking an appropriation for aviation and secured the then imposing sum of $25,000. Captain Chambers, of the Navy, then in charge of aviation, is quoted in contemporary journals as saying,

"Rising from and alighting on the water is the most important development of the flying machine from the standpoint of the Navy Department yet made. The Navy has decided to purchase ONE of the Curtiss machines."



Curtiss landing alongside a battleship.



Curtiss in hydro-aeroplane being hauled aboard ship at San Diego, Cal.

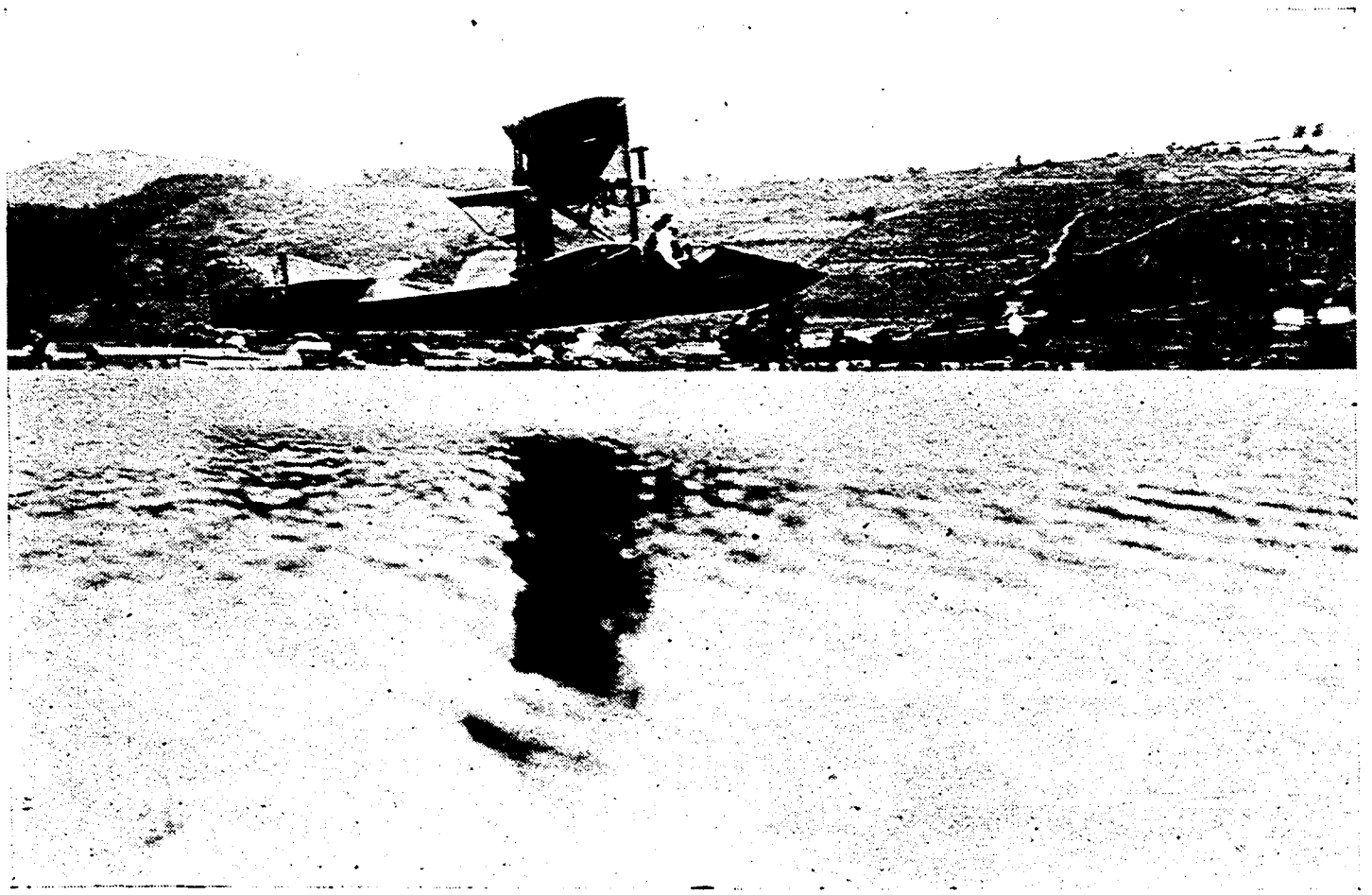
The powers that be in Navy aviation, at that time, could not, however, see any way in which so large a sum as $25,000 could be expended to advantage in one short year, and a surplus was reported as returned to the Treasury.

Flying the Mails

In his constant search for methods of demonstrating to the public the practical possibilities of the aeroplane Curtiss, at an early date, trained exhibition fliers at Hammondsport in the business of mail carrying. Many of the demonstrations were mere stunt flights serving no practical purpose beyond the education of the public. Because of lack of landing fields, and frequent forced landings in the early days, it was unsafe for the pilots to get far beyond gliding distance of the baseball parks and other small fields from which they started.

It is worthy of record, however, that the first official mail was carried in this country by Captain Paul Beck, U. S. Army, flying a Curtiss machine and under Curtiss auspices. Not only was this flight authorized by the then Postmaster-General, Frank H. Hitchcock, but that gentleman flew with the mail bag on his knees from Nassau Boulevard to Mineola, L. I. That mail consisted of 1,440 post-cards and 162 letters.

Hugh Robinson, flying an early Curtiss hydro-aeroplane, October 9th, 1911, made the longest mail carrying flight of that year. He flew from Minneapolis to



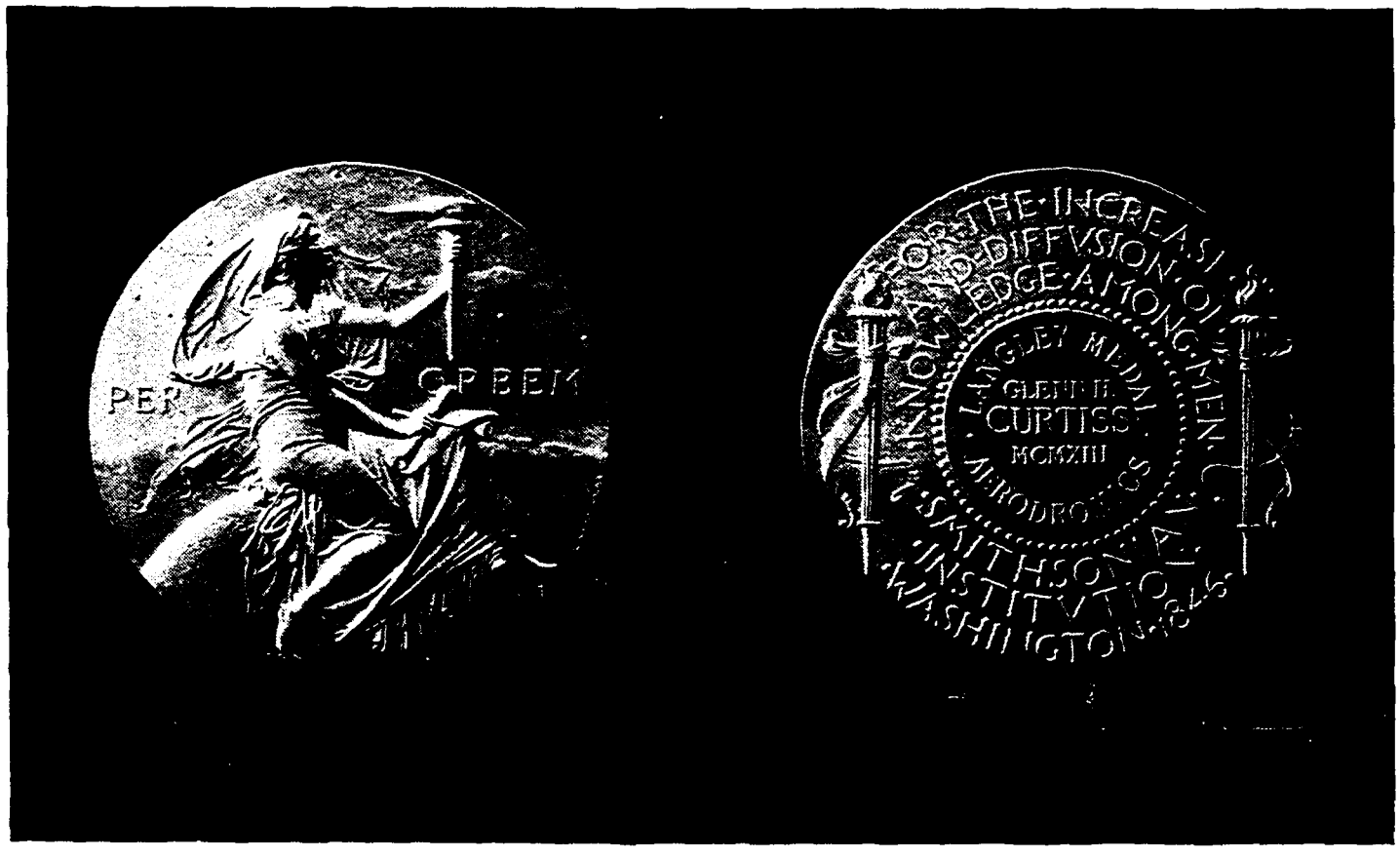
Curtiss with Augustus Post, Secretary Aero Club of America

Rock Island, Illinois, delivering and picking up mail at Winona, Minnesota; Prairie du Chien, Wisconsin; Dubuque and Clinton, Iowa; and Rock Island. The distance flown was 375 miles.

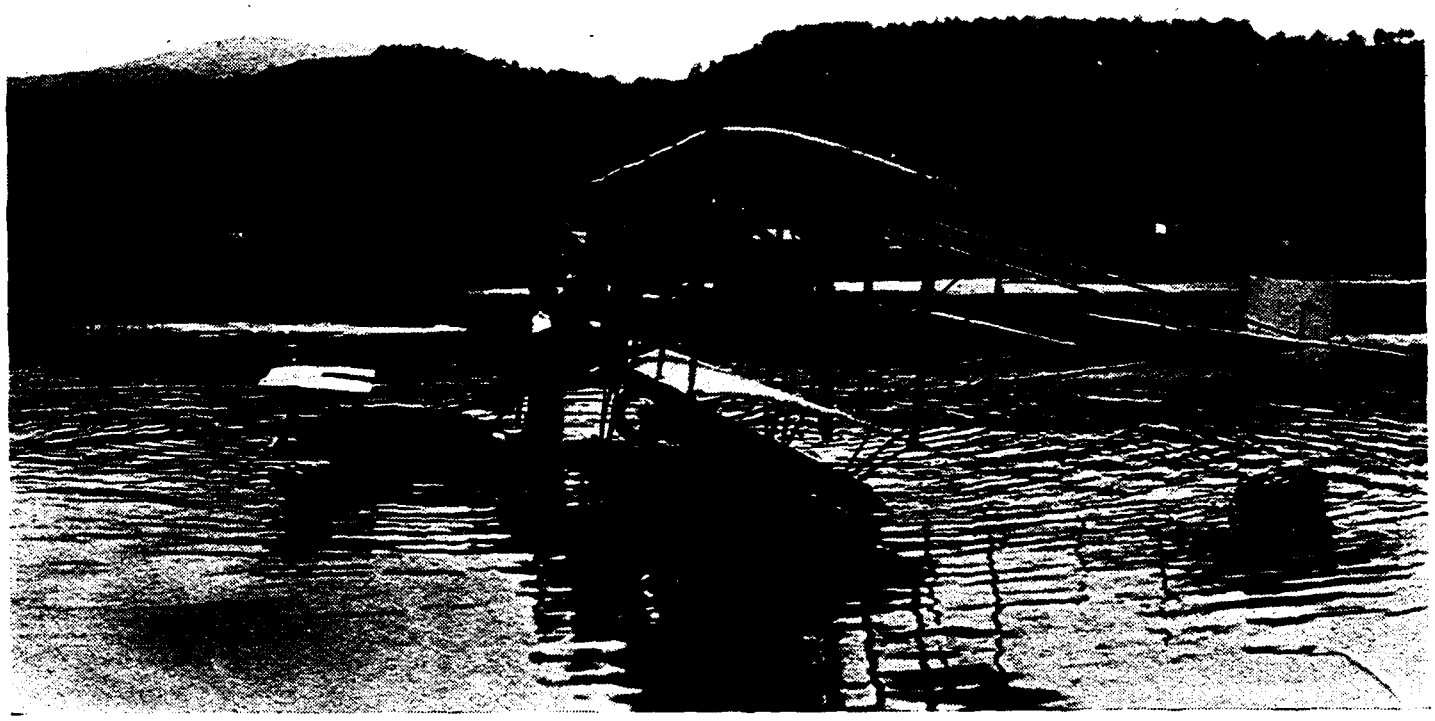
Other fliers of 1911 who were authorized to carry mail were Lincoln Beachey, Bexkwith Havens, Earl Ovington, Dewitt Milling, Charles C. Witmer, Eugene Godet, Charles F. Walsh, Arnold; all associated with Curtiss and flying Curtiss machines.

Then the Flying Boat

Little daunted at the lack of public or private support, Curtiss continued steadily with his development of the water flying machines. He produced for the Army a machine which he called the Triad, equipped with both wheels and pontoons. At a later date he produced the first real amphibian, with a boat-like pontoon and retractable wheels. Recognition was accorded him by technical and scientific bodies. The Aero Club of America awarded him the Club medal and the Collier trophy for the invention of the single float hydro-aeroplane; later the same organization awarded him the Aero Club gold medal for 1911 for "the greatest advance in aviation during the year 1911." A little later the Smithsonian Institution awarded Mr. Curtiss the Langley Medal, theretofore held only by Gustave Eiffel.



Langley Medal awarded to Glenn H. Curtiss by the Smithsonian Institution, 1913



First Land and Water Machine with Retractable Wheels.

How relatively little financial reward was to be hoped for from official sources by American aeroplane inventors may be judged by the amounts appropriated for this work by the leading nations of the world during 1912:

France	-	$7,400,000.00	Great Britain		2,000,000.00
Germany	-	2,250,000.00	Italy -	-	2,100,000.00
Russia	-	5,000,000.00	Japan -	-	600,000.00
		United States of America			140,000.00

Captain Chambers of the U. S. Navy urged increased appropriation for aviation and insisted that, "we will soon be at a great disadvantage if greater sums are not made available for our use this year.

"In hydro-aviation the United States (or Curtiss) has maintained her lead from the beginning. France, Russia, Germany and Japan have purchased our hydro-aeroplanes and they will probably continue to improve them as we continue to do. The time has come, however, when substantial encouragement to our manufacturers is needed if we would not find ourselves out-stripped in this line of endeavor also."

Harold F. McCormick and Jack Vilas of Chicago, early sport flyers of boats, 1913.

Like the hydro-aeroplane, the flying boat, developed in 1912, quickly convinced the cognoscienti that here indeed was another important achievement. It was of real use both from a military and from a sporting standpoint; probably the greatest sporting vehicle the world had ever known; but the public remained shy.

Curtiss went to Europe and established some agencies; came back with a very few contracts; but it was a discouraging business. His associates in Hammondsport were pretty thoroughly disheartened. Ahead they could see nothing but law suits, bankruptcy, disaster. Constant struggle with no appreciable reward.

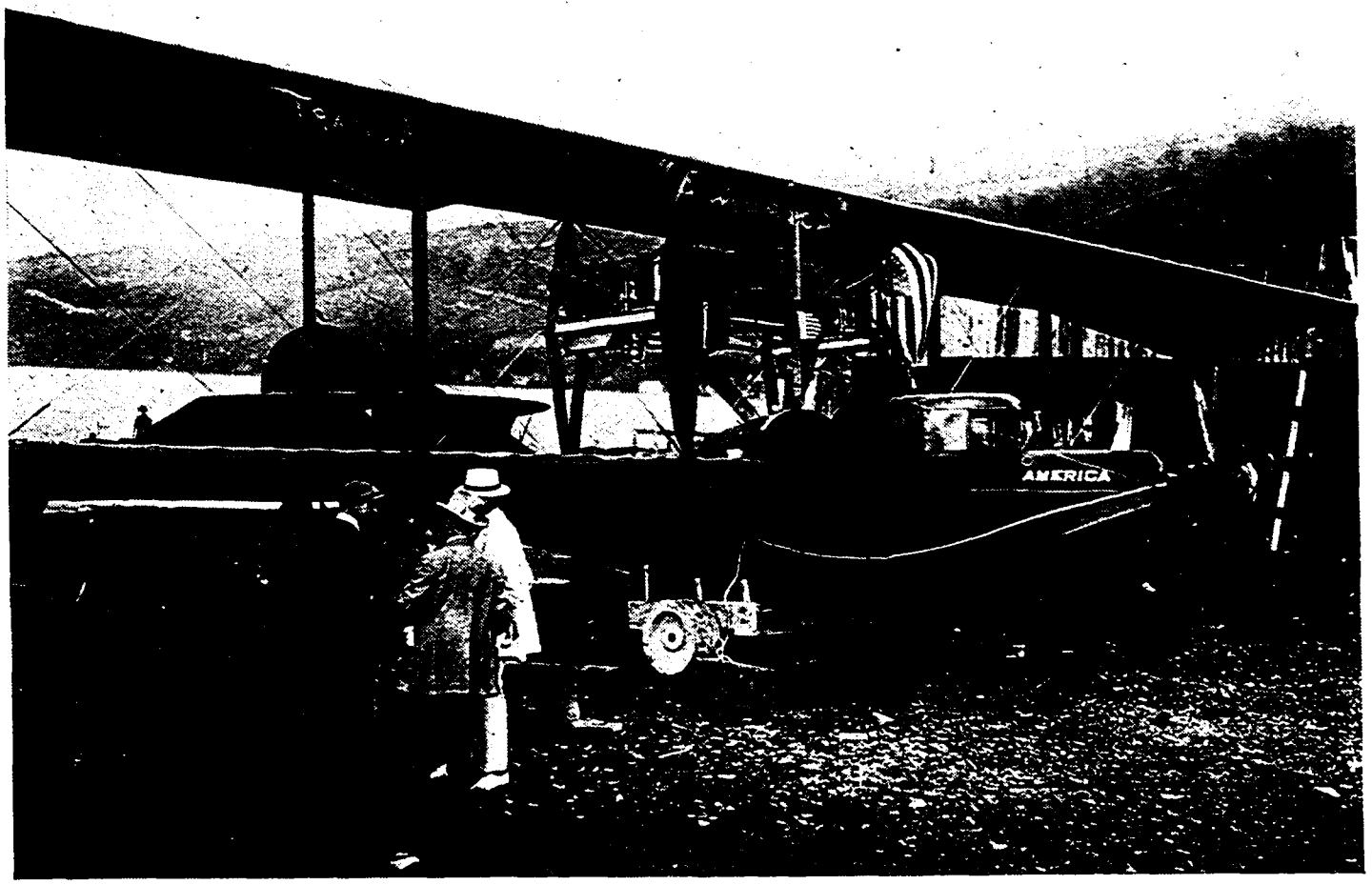
The list of Curtiss demonstrations of all kinds, the records broken, the feats accomplished, during these very lean years of 1911 and 1912, if given alone, might suggest that the life of a famous aviator inventor was but one grand thrill after another; instead of which in reality it was a case of work and pray both night and day.

Roofs as Flying Fields

The possibility of using the roofs of large buildings in cities where no open spaces were available was demonstrated by a Curtiss flyer at Portland, Oregon, June 12th, 1912, when Silas Christoferser flew from the roof of the Hotel Multuomah.

The First Glimmer of Hope

Early in 1913 a ray of light broke through the clouds. A man whose name was of enough importance to demand the attention of the country, decided to be the world's first business-sportsman to commute with flying boat between his country estate at Lake Forest and his offices in Chicago. That man was Harold F. McCormick of International Harvester fame. Mr. McCormick desired to fly from his suburban estate at Lake Forest to his office near the basin of the Chicago Yacht Club. He visited Hammondsport, flew with Curtiss in the flying boat, and was quickly converted. Soon his frequent trips along the Chicago lake front attracted the attention of the newspapers and magazines of the country. Here was no scatter-brained youngster, but a man ranking high in the business and financial world. Mr. McCormick's lead brought other important names into the picture; among them George U. vonUtassy of New York; G. M. Hecksher of New York; William Scripps of Detroit; J. B. R. VerPlank of Poughkeepsie, N. Y.; Jack Vilas, of Chicago; William Thaw, of Pittsburgh, and many others; men all prominent in various walks of life. At one time there were some twenty-two flying boats for private use going through the Curtiss factory at Hammondsport. The flying boat was a great success. Here was a flying machine that might be used with real safety.



The Rodman-Wanamaker Trans-Atlantic Boat "America" at the time of her launching, 1914

The Trans-Atlantic Flyer "America"

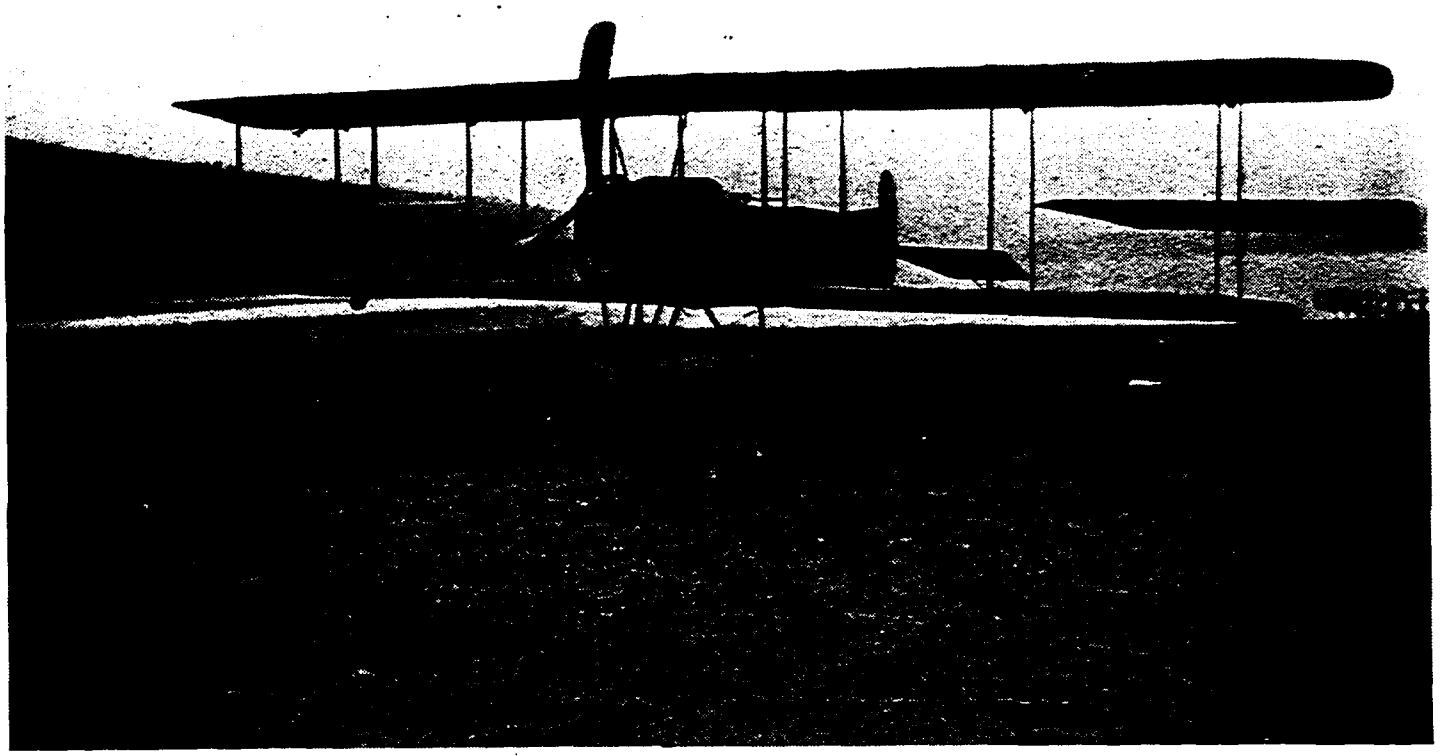
The late Rodman Wanamaker sponsored the first flying-boat designed for trans-Atlantic flight. Among aviators of international standing whose attention was attracted by the new Curtiss Flying Boat was Lieut. John Cyril Porte, retired, of the British Navy. Porte had been invalided out of the British Submarine Service because in under-seas work he had developed a serious case of pulmonary tuberculosis. He turned his attention to aviation, flew the Deperdussin monoplanes, won the first "around London" prize flight, and became the British agent for that well known machine. He had many important flights to his credit. One of his ambitions was to fly the Atlantic, but until the Curtiss Flying Boat supplied the idea no reasonably safe way had offered. Porte met representatives of Mr. Wanamaker and convinced them his project was feasible. Then they hunted out Glenn Curtiss, who was in England at the time. Curtiss at first demurred but finally agreed to design and build a flying boat according to Porte's ideas.

Another man greatly interested in over-water flying was the then Lieut. Towers, of the U. S. Navy. He probably had had more experience with seaplanes than any other man in the world, and at Curtiss' invitation was assigned to duty at Hammondsport, there to co-operate with Curtiss in developing the trans-Atlantic boat. Captain Richardson, Commander Bellinger, and other naval officers interested in hydroaviation also were assigned to Hammondsport that year.

The First Army Tractor

While one group was busy during 1913 with plans for the trans-Oceanic flyer, Curtiss had other important developments in hand. He had undertaken the design of a tractor fighting machine for the U. S. Army. Up to that time this country had really known practically nothing but the "pusher" types of machines. European monoplanes were of the tractor type and one or two decidedly embryonic tractor biplanes had been essayed in America, but nothing had appeared here like the machine Curtiss proposed to build.

The specifications were severe. At the head of the Signal Corps of the U. S. Army (and the Signal Corps was in charge of aviation then) was Major Reber. He knew what he wanted and it was not his business if the design and production of the machine cost the manufacturer several times what the Government was willing to pay for it. Curtiss produced the machine, forerunner of the famous "Jenny." The experimental work probably cost him $10,000.00 and the Government paid him approximately $6,000.00 for the machine after satisfactory tests had been passed. He was then commissioned to produce another tractor but the specifications demanded a complete set of drawings, including stress diagrams, and all the engineering data imaginable. A 6 to 1 sand load factor of safety



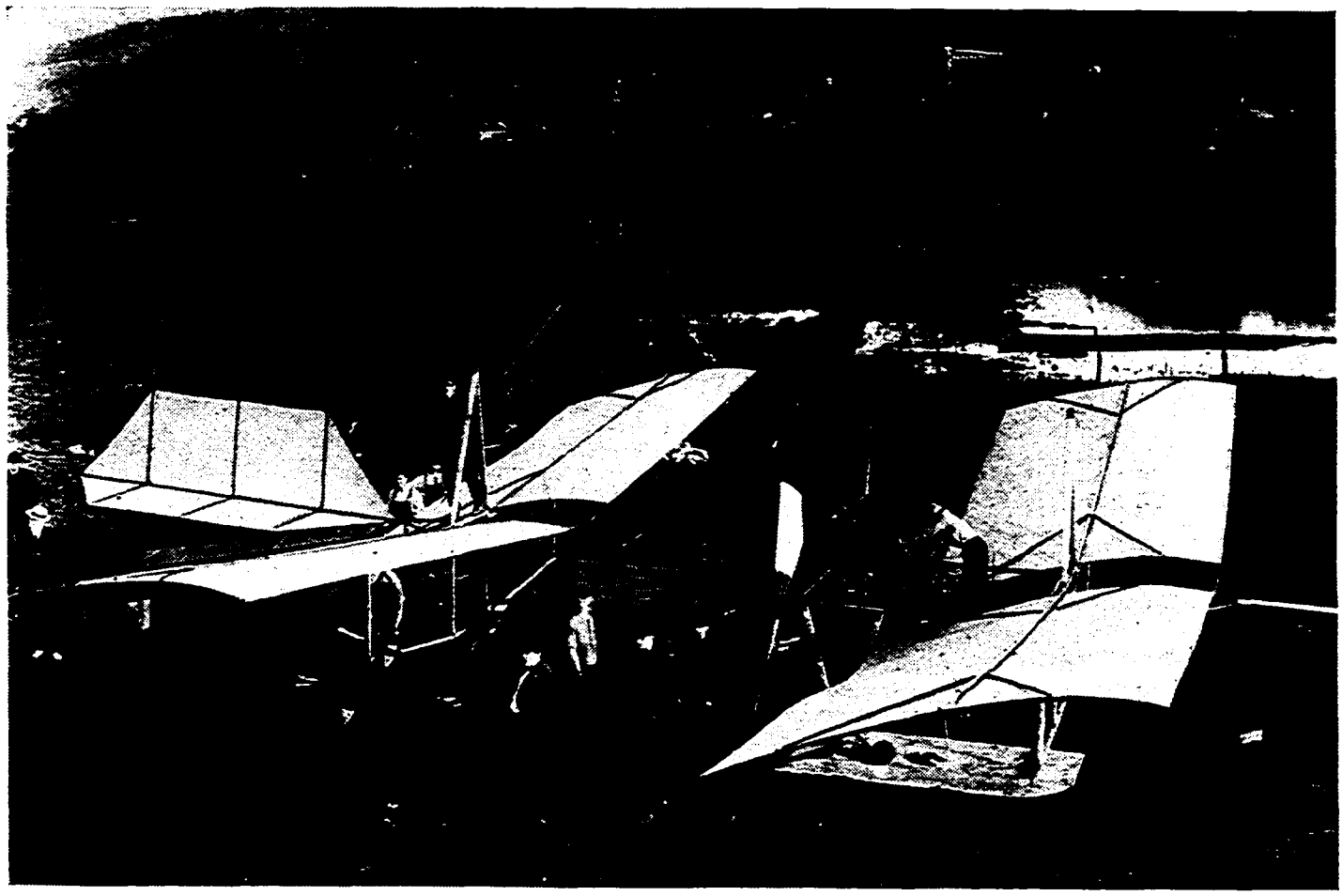
First Military Tractor designed by Curtiss. Forerunner of the "Jenny."

was among theretofore unheard of demands of the contract. The job cost Curtiss far more than the Government paid him for it, but the net result was the financial salvation of Curtiss, as will be shown.

Doing Many Things at Once

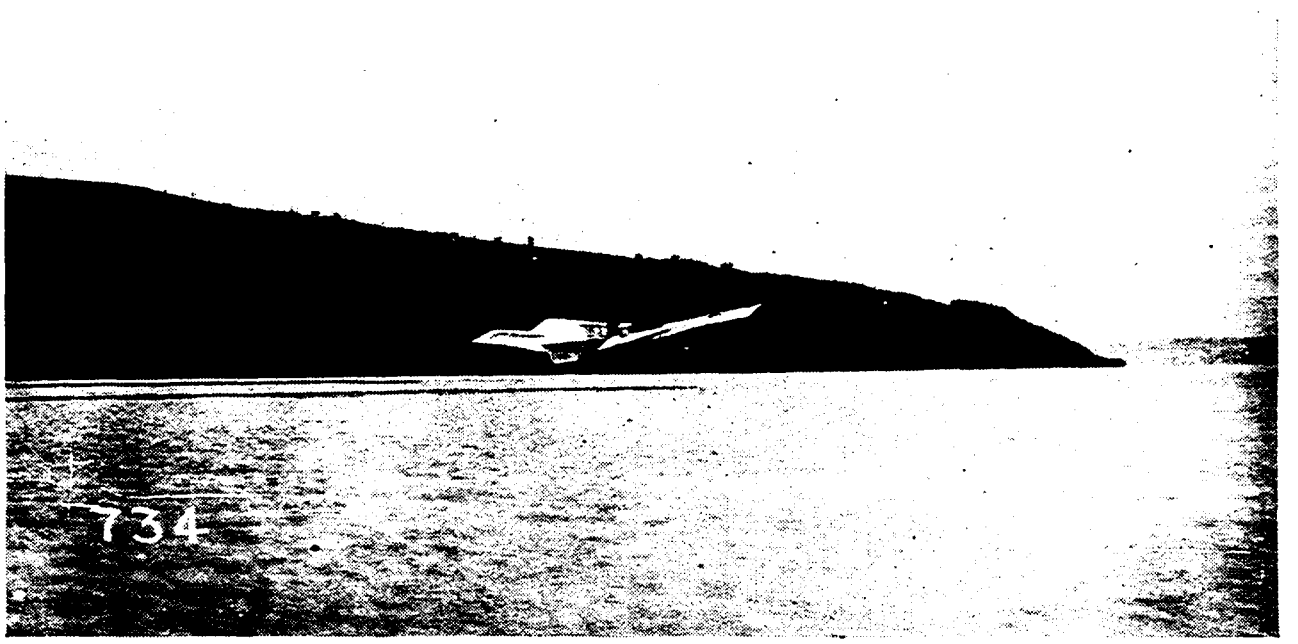
Curtiss then worked simultaneously during 1913 on the Army tractor (afterwards to become the world famous "Jenny"), a tractor monoplane flying boat, a greatly improved biplane flying boat and on the Rodman Wanamaker trans-Atlantic twin-motored flying boat. Before these undertakings were completed he was at work on the rehabilitation and final demonstrations of the original Langley machine from the Smithsonian Institution. He added to this work personal supervision of his flying schools at Hammondsport and San Diego, Calif. It seems as though he must have had the faculty of working steadily with little rest or recreation. Certainly his pre-occupation was remarkable. He seemed able while conversing with San Francisco or Washington, or dictating cablegrams, to engage his sub-conscious mind in checking blue prints or sketches of the various machines he was working on.

Out of this seeming chaos finally emerged, early in 1914, the first J. N. Army tractor, the restored Langley machine, and the Rodman Wanamaker trans-Atlantic flyer. Porte was there to try the trans-Atlantic flyer; Dr.



The rehabilitated Langley machine with its original motor and twin propellers.

Walcott, Secretary of the Smithsonian Institution, was there to see the trials of the Langley, and there were Army and Navy men in constant succession to see how their machines were progressing. Hammondsport was alive with newspaper men. First Lincoln, later Herbert Swope, of the New York World, Clark of the New York Sun, Stiles of the New York Tribune, Eppelsheimer of the New York Herald, Joey Toy of the Boston American, Jack Binns of the New York American, and many others from smaller cities. All were anxious to make good on this important assignment and the younger men spent much time working out scoops on one another. Some of them failed to realize that Curtiss was a man far more interested in what he was trying to accomplish than in what other people thought or said about him, and they were grieved to find that the ordinary ritual employed in bluffing a politician into making statements he does not wish to make brought no statements from Curtiss. In some way one of them did scoop the crowd by listening in on a conversation in which it was revealed that Porte planned to fly to Europe via New Foundland, the Azores and Spain, instead of the long hop from New Foundland to Ireland on which most of their calculations were based.



Langley Machine in Flight. Restored by Glenn H. Curtiss and flown by him over Lake Keuka in May 1914.

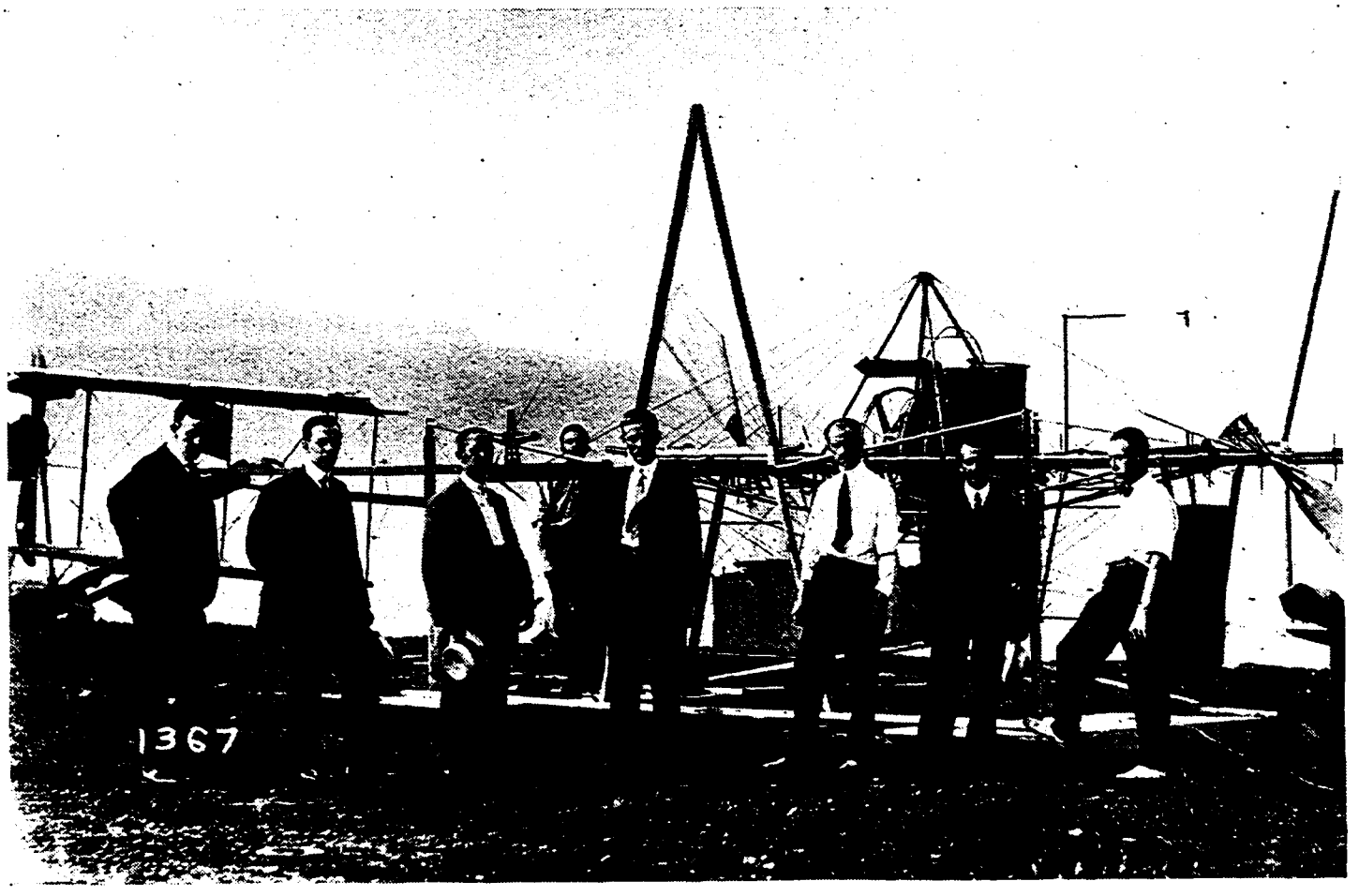
THE LANGLEY TRIALS AT HAMMONDSPORT

Trials of the Langley machine deserve much more attention than can be devoted here. They have been the background of the most persistent and the most misleading propaganda ever attending a scientific test. The machine was as nearly in its original condition as was possible after its years of disuse. At least half, perhaps more than half, of the original ribs were intact; the frame work or fuselage of the machine was in its original condition. The engine merely required cleaning and a new set of dry cells. To read some of the stories that have been broadcast the casual reader might easily be lead to believe there was something unfair about the Langley trials because Curtiss did not use the eleven years old set of dry batteries that operated the spark when the Langley machine was dumped into the Potomac River in 1903.

The simple facts are that when Curtiss was asked to test the aerodynamic value of the Langley machine, the Smithsonian Institution could afford but $2,000.00 for the experiment. Even with the low prices of labor and material prevailing in 1900, it cost nearly $50,000.00 to build the machine. Curtiss could not afford to replace the broken ribs of laminated wood; they were merely duplicated in form with spruce. They were heavier and less efficient than the orig-

inals. The original light oiled silk covers were torn and rotted. These were replaced with cotton or linen. Charles M. Manly, who had worked with Dr. Langley in constructing the machine and engine, was in 1913 working as an engineer-manufacturer of hydraulic trucks. As he knew more about the details of the Langley machine than any other man in the world he was asked to supervise its rehabilitation, and to again put in working order the original engine which he had designed and constructed. Dr. Albert F. Zahm, also of the Smithsonian Institution, was called into frequent consultation. The Hammondsport workmen merely did what the scientists told them to do. All of the work was open to whomsoever cared to observe it. There was no secrecy connected with it; so far from it that every New York newspaper was advised in advance from day to day of the work in progress and that in prospect.

Instead of improving the original design it was necessary, for the protection of the machine, to add pontoons weighing some 350 pounds in order to launch it from the water. Despite this greatly increased load the old machine, with the original engine, proved its ability to fly. The hops were short. The engine was



Assembling the Langley Machine. In center, Glenn H. Curtiss, next at right, Charles Manley chief assistant engineer to Dr. Langley and original pilot of Langley machine. At left, Dr. A. F. Zahm of the Smithsonian Institution.

not developing more than three-fourths its original horse power. Nevertheless the Langley machine lifted itself clear of the water and proved the correctness of its aerodynamics. Photographs taken that May morning, 1914, when the tests were witnessed by various scientific observers, proved that point. Later in the year, after the trials of the trans-Atlantic America had been completed, the Smithsonian Institution consented to the substitution of a modern Curtiss motor for the original engine, and several flights of considerable extent were made by William Elwood Doherty. Instead of the short hops that have been attributed to Walter Johnson, Doherty flew at one time for upwards of half an hour, a trip from Hammondsport to Gibson's Point, a distance of nearly ten miles against a twenty mile breeze, in a machine designed to make not more than 30 miles per hour in still air. The flights made by Walter Johnson were merely technical demonstrations of the machine's capability of flying. Doherty was then in Italy and Johnson, who had no acquaintance with the machine or its peculiarities, was asked only to make safe, short jumps, to prove to the Smithsonian officials who observed them, what the machine could do with greater power.

Doherty's statements regarding the control of the machine should be taken by a committee of aeronautical engineers who would understand from them that Langley had accomplished what he sought in the way of inherent stability as opposed to the maneuverability demanded by flyers of fighting machines and stunt pilots.

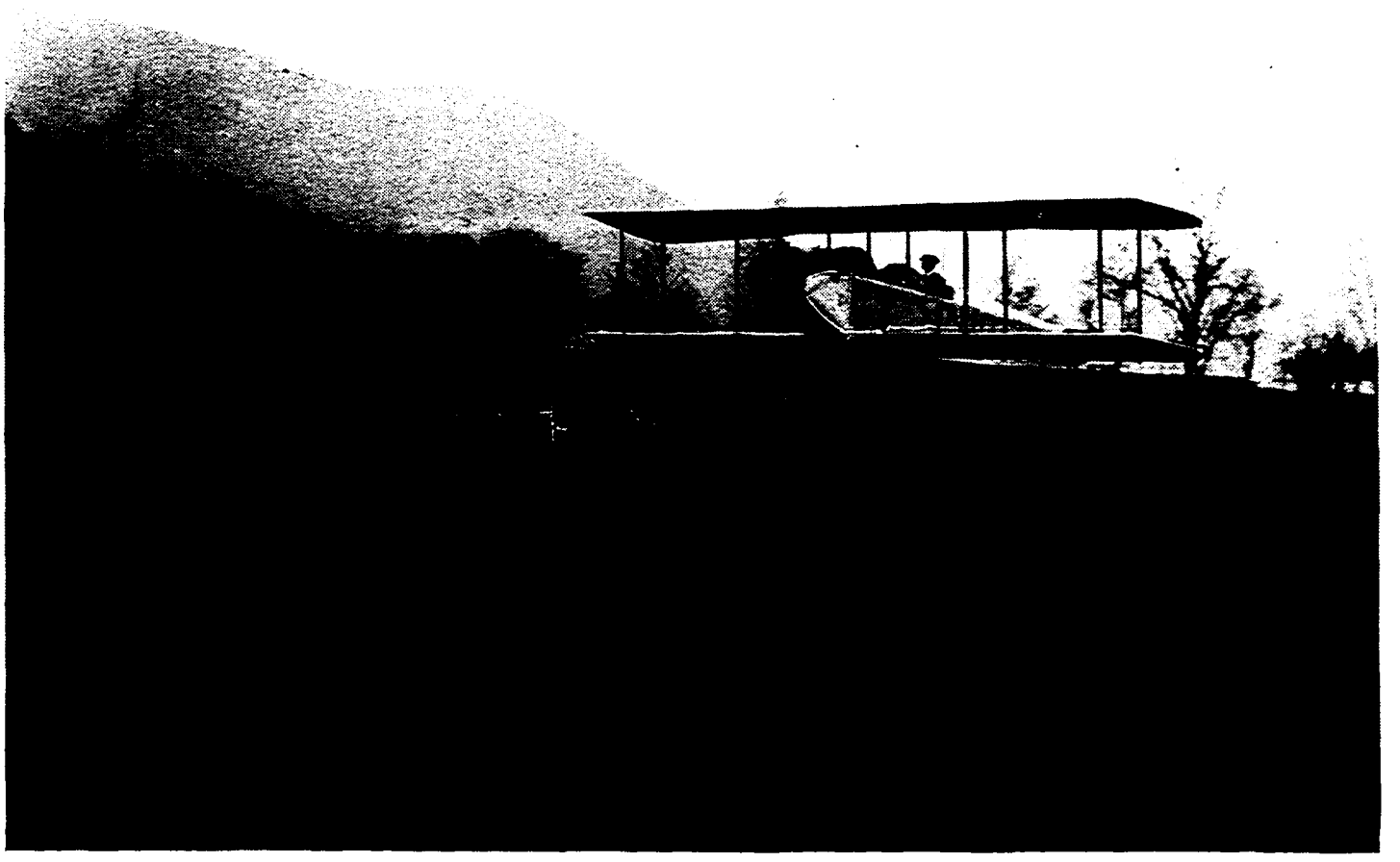
UP TO THE WORLD WAR

The trials of the "America" were completed late in June, 1914. The machine was being packed for shipment to New Foundland when Lieut. Porte suffered a severe hemorrhage and was sent to the Adirondacks to recuperate. Before he was again on his feet the war in Europe had broken out and Porte, on the reserve list, was recalled to England for active duty. The America laid in the Curtiss shops. Curtiss, thinking little of the war, went to the west coast to demonstrate the first JN. When advised by one of his associates that the European demand for fighting machines might mean fortune as well as fame, Curtiss replied, "you are too visionary." (His prime interest was creation; commercial outlook he called visionary). He remained where he was trying to convince the U. S. Army that a machine on which he had spent $10,000.00 for diagrams and engineering was worth $6,000.00 to the Government. The elaborate and highly technical drawings for the JN, however, served their purpose. The U. S. Government paid for one machine at that time, but when British engineers examined the "Jenny" in detail they pronounced it the most nearly perfect accomplishment in aeronautical engineering they had seen. British officers were sent to America to look into the possibilities of Curtiss production and engineering. They reported

to Winston Churchill, then First Lord of the Admiralty. His answer was in effect, "accept everything America can produce to these specifications."

At first the British air-men look askance at the Jenny. The price of the machine, complete with engine, was said to have been less than British builders were charging their Government for machines without engines. To be sure their machines had a highly polished piano finish for the wooden parts, where the Curtiss machines were but substantially varnished. At first the British said:

"Just like the Ford automobile."



First flight of the "Jenny."

Sooner or later generals of many armies left their Rolls Royces embedded in mud holes and were glad to use the good old Ford to get along with, and after a little more than a year the Jenny, with its Curtiss motor, was the most respected aeroplane, because of the distance flown and its general durability, in the British aeronautical training services.

IN CLOSING

To complete the record of the Curtiss Hammondsport accomplishments it is necessary to go a little beyond the World War. Overlooking the fact that the machine produced and used in geatest numbers by World War aviators was the little Jenny, there remained one thing Curtiss had started which was not accomplished until after the war. That was the trans-Atlantic crossing in comparative safety.

Following the Armistice the U. S. Navy assigned Commander John H. Towers to prepare a fleet of flying boats to make a crossing of the ocean from America to Europe. This was not to be a desperate hop in the dark but the flight of a squadron of machines to make the trip on schedule. He worked with Commanders H. C. Richardson, Y. C. Westervelt, J. C. Hunsaker, U. S. Navy, and they, with the advice of Mr. Curtiss produced the fleet of N-Cs or Navy-Curtiss flying boats. Years proved the Curtiss theory of relative safety in over-water flying with the right equipment.

Starting from New Foundland the N-Cs 1, 3 and 4 flew safely to within a short distance of the Azores. There they encountered fog and two of the boats descended to the water to find their bearings. The sea was so rough these two were unable to rise. The N-C 4, in command of Lieut. Commander A. C. Read, reached Horta in safety. One of the other boats, damaged, was picked up by a near-by ship, all occupants unharmed. The flagship, under command of Commander Towers, missed the islands in the fog and over-flew them by a hundred miles, but after several days and still travelling under its own power, it finally made the port of Ponta Delgada in safety. The N-C 4 continued the flight to Spain and thence to England without mishap; the first time a scientifically scheduled trip across the Atlantic had been made with a flying machine.

This is a brief outline of what the flying fields at Hammondsport have seen developed. It will appear monumental if this list of accomplishments is compared with that of any other man or group of men in the history of aviation. Flying fields in different parts of the country have been dedicated to several Curtiss pupils. Why should not this park commemorate the master?

Glenn Curtiss has been inactive in aviation for some years. The sponsors of this book feel that the establishment of a Curtiss Commemmorative Airpark, partly devoted to experimental work in aviation, might help to reclaim the attention of his inventive genius for some of the many aeronautical problems still to be solved.

A chronological record of important events follows:

A BRIEF CHRONOLOGY OF THE INVENTIONS AND ACCOMPLISHMENTS of GLENN H. CURTISS AND HIS ASSOCIATES AT HAMMONDSPORT, N. Y. BETWEEN 1901 AND 1913

1901, September—Company established to build Curtiss motors and motorcycles.

1902, May 30—Won New York Motorcycle Club's trophy and medal in open road race, defeating best American and foreign machines and riders.

1903, May 30—Glenn H. Curtiss won New York Motor Cycle Club gold medal in open hill-climbing contest, both cycle and motor made by him at Hammondsport.

Same day, with twin cylinder built at Hammondsport, won N. C. A. National Championship at Empire Track.

1904, January 28—Established world's 10-mile motorcycle record at Ormond Beach, Florida. Time 8 minutes, 54 2/5 seconds.

1904, August 3—Captain Thomas Scott Baldwin accomplished first circuit flight in a navigable balloon equipped with Curtiss motor at Oakland, California.

1904—In open competition with foreign and American navigable balloons Baldwin, with his Curtiss motor, was the only one to make a successful flight at the Louisiana Purchase International Exposition, at St. Louis.

1905, Spring—Curtiss and Baldwin built and demonstrated at Hammondsport the first dirigible balloon bought by the United States Government. For it Curtiss produced the first water cooled aeronautical engine.

1905, Summer—Curtiss and Baldwin make two-hour test flight for officials at Fort Meyer, Va., the longest flight in this country by dirigible for many years.

1906—Curtiss and his machines established many new motorcycle records on road and track, and received the highest award for his motors at the Lewis & Clark Exposition, at Portland, Ore. The fastest mile ever travelled was made by Curtiss at Ormond Beach, 26 2/5 seconds, upwards of 140 miles per hour, with a specially designed eight-cylinder air-cooled Curtiss motor.

1907, October—Aerial Experiment Association was formed for the purpose of scientific experiments with flying machines. Glenn H. Curtiss was elected director of experiments. Dr. Alexander Graham Bell was president of the organization.

1907-'08, Winter—The Aerial Experiment Association moved to Hammondsport and began experiments with gliders, tetrahedral, kites, and power-driven aeroplanes.

1908, March 12—First public flight in a motor-driven, heavier-than-air machine, made by Casey Baldwin in the Red Wing over the ice of Lake Keuka. Machine designed and built by Aerial Experiment Association; motor by Curtiss.

1908, May 22—Curtiss flew the "White Wing" a distance of 1017 feet in 19 seconds, landing without damage.

1908, July 4—Curtiss, with the A. E. A., third plane known as the June Bug, won the first leg of Scientific American Trophy, flying one kilometer before official witnesses at a pre-announced time and place.

1908, August—Curtiss motors and motorcycles won all events in the F. A. M. National Endurance Contest.

1908, August 10—Work was begun at Hammondsport on the fourth Aerial Experiment Association aeroplane. The "Silver Dart," also successful.

1908, November—First experiments made on Lake Keuka with an aeroplane equipped with floats. Only balancing and planing were attempted.

1909, July 17—With the first commercial machine built at Hammondsport, Curtiss flew 19 times around a circular course, a total distance of 24 7/10 miles, at Mineola, N. Y., in a machine made for the New York Aeronautical Society. This, longest flight of the year, won the second leg of the Scientific American Trophy.

1909, August 29—With an aeroplane designed and built by himself at Hammondsport, the Gordon Bennett Cup, first International Speed Trophy for aeroplanes, was won by Curtiss at Rheims, France, under the colors of the Aero Club of America.

1910, May 31—Curtiss aroused the Nation by flying down the Hudson River from Albany to New York, winning third and final leg of the Scientific American Trophy for the longest flight of the year, and also the New York World's $10,000 prize.

1910—Curtiss and Eugene Ely made the first flights to and from the decks of battleships.

1910, November—The Secretary of the Navy accepted Curtiss' invitation to send an officer to Hammondsport for free instruction in flying.

1910—Many experiments made at Hammondsport and several planes exhibited throughout the United States.

1911, January 26—Curtiss makes the first successful flight with hydro-aeroplane.

1911, February 17—Curtiss demonstrated the value of the hydro-aeroplane to the Navy, flying to a battleship, being hoisted aboard, and later returning to the water and flying home.

1911 February 23—Curtiss demonstrated the first Amphibian type of aeroplane equipped with wheels and floats. He flew from the land, alighted on the water; arose from the water, and landed at the camp.

1911, March—Curtiss demonstrated the first hydro-triplane. The addition of a third wing-surface increased the lift of the machine by 200 pounds.

1911, March 17—U. S. Government, after tests, accepted the first military aeroplane designed by Curtiss.

1911, May—Curtiss installed a newly-devised system of dual control in a Navy hydro-aeroplane, enabling two aviators to shift control from one to the other while in flight thereby making the instruction of new pilots simpler and safer.

1911, June 8—Curtiss given Aviator License No. 1 by Federation International Aeronautics.

1911, June 28—Lincoln Beachey in a Curtiss machine flew over Niagara Falls, down the Gorge and under Suspension Bridge.

1911, August 20—Beachey, flying a Curtiss machine, established a new world's altitude record of 11,642 feet.

1911, September 7—Lieutenant T. C. Ellyson launcheed a Curtiss hydro-aeroplane from a wire cable stretched from a platform near the shore of Lake Keuka, at Hammondsport.

1911, September 23—Captain Paul Beck, U. S. Army, flying a Curtiss machine, gave the first official demonstration of mail carrying by aeroplane.

1911, October 9—A new mail-carrying record was established in a Curtiss machine by Hugh Robinson in a flight from Minneapolis to Rock Island, Ill., a distance of 375 miles.

1911—Lieutenant (now Commander) J. H. Towers was awarded Pilot's License No. 62, passing his test flights at Hammondsport, over Lake Keuka.

1911, December—Letter Patent were granted for the A. E. A. Hinged Aileron, now in universal use for balancing aeroplanes.

1911, December—In 1911 Curtiss was awarded the Collier Trophy for the greatest accomplishment in aviation during that year.

1911—The Aero Club year book shows that Glenn H. Curtiss was the first licensed aviator in America; his certificate being No. 1.

1911, December—For "the greatest advance in aviation during 1911" Curtiss was awarded the Aero Club of America gold medal.

1912, January 10—Curtiss perfected and demonstrated his new Flying Boat, a real boat-hull equipped with wings, in contrast to the aeroplane equipped with floats.

1912—In 1912 Curtiss was awarded the Aero Club of America Medal for the second year in succession for "the greatest advance in aviation," during the preceding year.

1912, March 25—Hydro-aeroplane built at Hammondsport and operated by Hugh Robinson was awarded a silver plaque for his demonstrations at Monaco, France.

1912, August 2—Curtiss sailed for Europe where he closed contracts for hydro-aeroplanes and flying boats in England, Germany, France, Italy, Russia and Japan.

1912, Fall—Representatives from Japan were sent here for courses in flying at the Curtiss School at Hammondsport. They also studied design and construction.

1913, February—Curtiss made contract with the late Rodman Wanamaker to design and construct flying boat capable of crossing the Atlantic. The machine was virtually complete when war began, and saw much service in channel patrol for the British.

1913, May 6—The Langley Medal was awarded to Mr. Curtiss by the Smithsonian Institution for his successful development of the hydro-aeroplane and the flying boat.

1913, May—Curtiss completed and demonstrated a new type of amphibian with retractable wheels. It was flown by Lieut. B. L. Smith of the Marine Corps.

1914, June 2—The rehabilitated Langley machine, claimed by many to have been the first power-driven machine in the world's history capable of sustained flight carrying a man, was tested and demonstrated over Lake Keuka by Curtiss, for the benefit of officials of the Smithsonian Institution.

1914, June—Tests of the trans-Atlantic machine, "America" were continuous, attracting large crowds to Hammondsport.

1914, July—The first of the J. N. or "Jenny" military tractors, designed by Curtiss for the U. S. Army, was completed. Later it became the best known machine in the world and was flown by thousands of pilots both during and for years after the World War. Equally well known were the "OX" aeronautical motors developed by Curtiss at Hammondsport that year.