

GEORGE HARDIE, JR.

## The Birth of NAVAL AVIATION

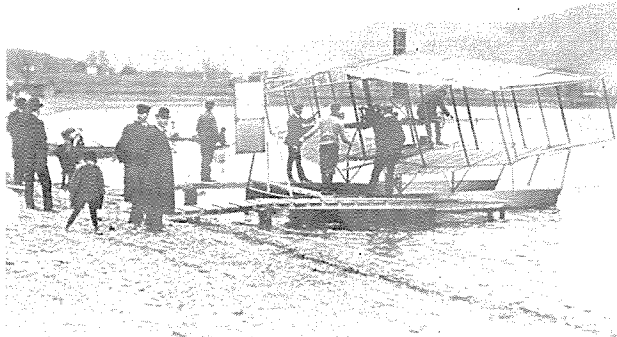


Lt. John H. Towers (left) and Lt. Theodore G. Ellyson at the controls of the A-1 at Hammondsport - July, 1911. (Photo - U.S. Navy)

"The machine has worked. It seems to me worthwhile for this government to try whether it will not work on a large enough scale to be of use in the event of war. For this purpose I recommend that you appoint two officers of scientific attainments and practical ability, who in conjunction with two officers appointed by the Secretary of War, shall meet and examine into this flying machine, to inform us whether or not they think it could be duplicated on a large scale, to make recommendation as to its practicability and prepare estimates as to the cost. I think this is well worth doing."

These words were written to the Secretary of the Navy on March 25, 1898 by the dynamic Theodore Roosevelt, then Assistant Secretary, and are regarded as the first evidence of Navy interest in heavier-than-air flight. The machine referred to was Prof. Samuel P. Langley's Aerodrome No. 5 which had made several successful flights from a house-boat on the Potomac River in 1896. The joint Army-Navy board as recommended by Roosevelt was set up and its chairman, Commander C. H. Davis, reported on the proposed aircraft:

"Although its usefulness in its present stage in naval operations would be limited, in military operations its effect would be revolutionary in questions of strategy and offensive warfare."



The "Loon" at Hammondsport - 1908 (U.S. Navy photo)

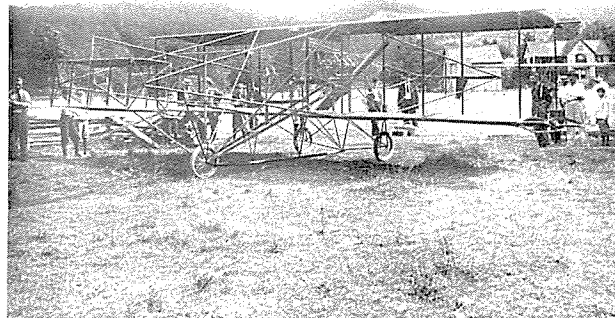
With the Spanish-American war looming on the horizon, the feasibility of every possible military weapon had to be explored. The board recommended that a man-carrying flying machine be sponsored by the government "in view of the great importance which, if successful, it would have on military operations." After much persuasion, Prof. Langley

agreed to construct a full-size Aerodrome along the lines of his successful model. Work on this machine was not completed until late in 1903. Two trials, on October 7 and December 8, resulted in failure and brought censor from the Congress. It appeared that the value of aviation to military science lay far in the future.

But the undying persistence of the experimenters kept alive the appeal of the potential usefulness of flight to the Army and Navy. On February 8, 1908, the War Department accepted the bid of the Wright Brothers to supply an aircraft in response to advertised specifications. The official trials of the Wright Flyer took place at Fort Myer, Va. during September, 1908, with Orville as pilot. Although a crash on September 17 took the life of Lt. Thomas Selfridge and severely injured Orville, the success of the aircraft was obvious. In reporting the details to Wilbur, who was in France demonstrating another Flyer, Orville wrote on November 14, 1908:

"The Signal Corps people are very enthusiastic. Major Squier\* says this is just the beginning of business with us. He says the U.S. is going to be our best customer. The Navy Department also is

\*Major Carl O. Squier, U.S.A. Director of Training.



The Rheims Racer at Hammondsport - August, 1909  
(Photo - Paul R. Matt)

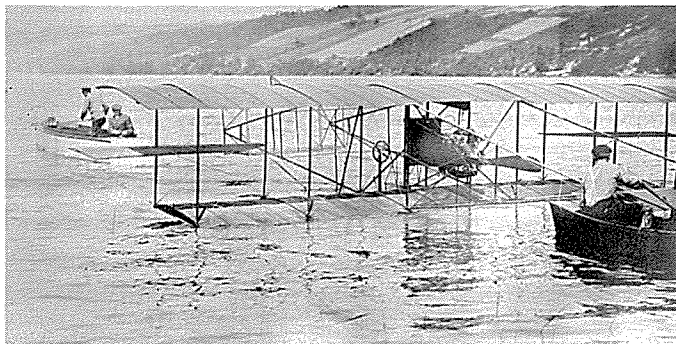
much interested. Some of the officials were expecting to buy some of our machines out of funds allotted to 'equipment' of vessels, but the legal department notified them that that fund could not be used and that an appropriation from Congress would be necessary."

The appropriation did not materialize, however. The successful flights of the rebuilt Wright Flyer at Fort Myer in June-July, 1909 brought acceptance by the Signal Corps and naturally caused some envy in the Navy Department. But a request for authority to advertise for the construction of "two heavier than air flying machines" was disapproved on August 16, 1909 by the Acting Secretary of the Navy with this comment:

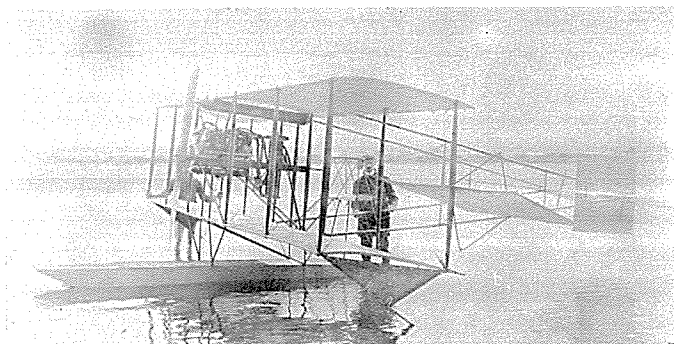
"The Department does not consider that the development of an aeroplane has progressed sufficiently at this time for use in the Navy."

Meanwhile other experimenters had met with some success. At Hammondsport, N.Y. Glenn H. Curtiss, a motorcyclist whose reknown for building reliable engines led to his association with the famed inventor, Dr. Alexander Graham Bell, had acquired aircraft design experience through his work with the Aerial Experiment Association, formed in 1907 by Dr. Bell. On June 26, 1909 Curtiss personally delivered his first commercially produced aircraft to the Aeronautical Society of New York City. On July 17, in this machine, he won the Scientific American Trophy for the second time by flying 25 kilometers in 32 minutes. On August 29, in a machine equipped with a specially designed eight-cylinder engine, Curtiss gained world fame by winning the first Gordon Bennett race at Rheims, France.

On returning to the U.S. shortly thereafter,



Rheims Racer mounted on a canoe, Lake Keuka, 1909.  
(U.S. Navy photo)



Tractor type hydro used in flight to PENNSYLVANIA, January, 1911. (Photo - Paul R. Matt)

Curtiss participated in exhibitions at St. Louis and Los Angeles, adding further to his fame and bringing demands for his flying and his aircraft. On May 31, 1910 he electrified the country by making a flight from Albany, N.Y. down the Hudson River to Governor's Island in New York harbor. This set a record for distance and enabled Curtiss to win the Scientific American Trophy for a third time, giving him permanent possession. Other exhibitions at Atlantic City and Cleveland brought more reknown. The participation of Curtiss-trained aviators at a big air meet held at Sheepshead Bay race track near New York City in August, 1910 attracted even more attention. The outstanding performance of Curtiss aircraft at this Meet, at another held at Boston, Mass. by the Harvard Aeronautical Society in September, and a third at Belmont Park on Long Island in the latter part of October, established Curtiss as one of the leading aircraft designers of the period.

That Curtiss was well aware of the military possibilities of aviation is evidenced in an article he authored for the Saturday Evening Post's issue of October 1, 1910, entitled "The Commercial Side of Aviation". Of naval aviation of the future, Curtiss wrote prophetically:

"Owing to its adaptability to over-water flights, the aeroplane will undoubtedly take a part in future naval battles, and because of its comparatively small cost it would not be surprising if the military development of the aeroplane should result in the abandonment of costly battleships and perhaps aid greatly the general movement for disarmament."

All of this early aviation progress was not lost on officials of the Navy Department, for officers stationed nearby were directed to attend aviation meets and submit reports. Lt. Charles Blakely, commanding the First Torpedo Division, attended the Harvard-Boston meet, where he flew as a passenger with Charles Willard, one of the Curtiss aviators. He was much impressed with his experience and enthused over the possibilities of aviation for naval use, pointing to advantages in bombing and scouting. He was particularly impressed that "every machine readily responded to the will of the aviator and all who came to the grounds as sceptics went away marveling."

Now there appeared on the scene a man who was to play a major part in the foundation of naval aviation. Captain Washington Irving Chambers, a veteran of 34 years in the Navy, was relieved of his command of the battleship "Louisiana" and ordered to duty in Washington to keep the Navy "informed of the progress of aeronautics with a view to advising the Department concerning the adaptability of such material for naval use . . . and to gradually provide the Navy with suitable equipment for aerial navigation and to instruct the Navy personnel in its use. . ."

Capt. Chambers had attended the Belmont Park meet and came away impressed with the tremendous military potential of the airplane. He was especially firm in his belief that aircraft for naval use should be seaworthy but since such types were not available, Chambers recommended that "the aeroplane has reached such a stage of development that active steps should be taken to obtain one or more of them in order to develop their use for naval purposes."

The Navy Department remained aloof, however, and Chambers was forced to continue the up-hill battle to overcome this opposition. Shortly after the Belmont Park meet he attended another at HALETHORPE, Md. where he witnessed demonstra-

tions of bomb dropping. Radio communications had been demonstrated by one of the Curtiss aviators, J. A. D. McCurdy, at the Belmont Park meet and, together with the bombing demonstration, these events set the fertile mind of Capt. Chambers at work. More than ever he was convinced that the Navy needed airplanes.

Glenn Curtiss, who with Capt. Chambers was primarily responsible for the early establishment of naval aviation, now became directly involved in proving its value to Navy Department officials. The story is told in the words of Curtiss himself in the CURTISS AVIATION BOOK, published in 1912, quoted herewith:

"A new line of thought - or to express it more accurately, the following out of a very old one - was taking my interest and a great part of my time. The experiments I had in mind involved the problem of flying from the water and alighting on the water."

"The season of 1910 was now far advanced and it was time to make plans for the winter. Flying meets were to be held at Los Angeles again, and also at San Francisco, and California seemed the best place to go, for the weather there would be most favorable not only for winter flying, but also for carrying on the experiments which I had in mind. Meantime, when it seemed as if all the paths were open to the aeroplane over the land, and it was only a question of development, not of pioneering, it was suggested to me by the 'New York World' to launch an aeroplane from the deck of a ship at sea and have it fly back to shore carrying messages."

"The Hamburg American Steamship Co. offered their ocean liner 'Pennsylvania' for this test and I sent a standard Curtiss biplane to be operated by J.A.D. McCurdy. The ship was fitted with a large platform, erected on the stern, a platform sloping downward, and wide enough to allow an aeroplane set up on it to run down so that it could gather headway for its flight. The plan was to take McCurdy and the aeroplane fifty miles out to sea on the outward voyage from New York, and then launch them from the platform."

"A mishap at the last moment upset all the well-laid plans. In trying out the motor just as the 'Pennsylvania' was about to leave her dock at Hoboken, an oil can, carelessly left on one of the planes by a mechanic, was knocked off and fell into the whirling propeller. The result was a broken propeller, and as the ship could not delay its sailing long enough for us to get another, the attempt was abandoned."

"In the meantime, however, the Navy became interested in the sea experiments and offered the armoured cruiser "Birmingham", then at Hampton Roads, to be fitted up with a similar platform for launching an aeroplane. This was accepted and Eugene Ely, who was flying at a meet at Baltimore and already in the vicinity of Norfolk, took his Curtiss biplane over to the "Birmingham" for the test, fired with enthusiasm by McCurdy's attempt. On November 14 the "Birmingham", equipped with a platform for starting the aeroplane, awaited good weather for the flight. The good weather did not come and after waiting impatiently on board for some time, Ely determined to risk a start, even though there was a strong wind coming off shore carrying a heavy mist that made it almost impossible to see more than half a mile. The ship was at anchor, but starting up his motor he flew off with the greatest ease, slightly touching the water with the wheels of his machine, but quickly rising and flying straight to shore, where he landed without difficulty."

Still Curtiss was not satisfied. It must be demonstrated that an airplane could fly to a ship, land on it and return to shore. Again it was Ely who was called upon to perform the demonstration, and again a Navy vessel was used in the test. An inclined platform had been erected on the stern of the battleship "Pennsylvania", moored in San Francisco Bay. Sand bags were at either ends of a series of ropes placed one after another along the platform. Two wooden rails raised these ropes several inches above the boards. On each side of the platform tarpaulins were placed to catch the aviator in case of accident. The plan was to extend hooks, located on the main landing gear beam of the aircraft and normally used as a ground brake on landing, which would catch the ropes anchored to the sand bags, thus slowing the aircraft sufficiently to land in the small space. The design of this pioneer arrester system was the work of Hugh Robinson, one of the Curtiss aviators who was to figure prominently in the later development of the hydro and flying boat.

The success of this experiment was a tribute to the expert flying of Ely. At 10:45 A.M. on the morning of January 18, 1911 he left the flying field and headed for the battleship. He had been delayed in getting off and now the tide had swung the ship until it was headed in the wrong direction, requiring a downwind landing. With consummate skill Ely guided his aircraft up to the stern of the vessel and dropped neatly onto the platform, catching the ropes and stopping with room to spare. The flight had taken 16 minutes. Three-quarters of an hour later the aircraft was turned around and Ely took off successfully, returning to the flying field without incident. Naval aviation history had been made.

Curtiss and Capt. Chambers were especially elated at the success of this experiment. Now the Navy would surely be interested in obtaining aircraft. Curtiss confidently stated, "This ably demonstrates the value of aircraft to the Navy in time of need." Even Capt. Charles F. Pond, in command of the "Pennsylvania", was enthusiastic in his support and stated, "As a result of this experiment and of my observations of the aviation field, I desire to place myself on record as positively assured of the importance of the aeroplane in future naval warfare."

But Curtiss and Capt. Chambers both realized that what was needed was a truly seaworthy water machine, and Curtiss had definite plans for producing such an aircraft. In fact, during November, 1908 the successful "June Bug", with which he had won the Scientific American Trophy for the first time, had been mounted on two floats and re-named the "Loon". Of the failure of this design Curtiss wrote in his book:

"We made many attempts to rise from the water in the 'Loon', but owing to the great weight were unable to make any real flights, although the observers on shore were sure that the pontoons were sometimes clear of the water. By the end of November our experiments had convinced everyone of us that we needed more power - and more time than we had at our disposal just then."

No reference can be located on the experiment with the Rheims type ship mounted on a canoe. It can be surmised that this experiment took place on Lake Keuka during the fall of 1909 or sometime in 1910. Evidently this was not successful, for it would seem that the displacement of the canoe was insufficient to support the weight of the airplane and pilot when attempting take-off.

Curtiss had decided that the time had come for

action. On November 29, 1910 he wrote to the Secretary of the Navy:

"My own experiences and the results attained by several of the aviators operating machines for me, justify me in venturing to prophesy that the military branches of the government, in the very near future, will find an aeroplane equipment absolutely essential. To be of some assistance in developing the adaptability of the aeroplane to military purposes, I am leaving for the Pacific coast, where I have established a winter experimental station at which it is my intention to conduct a number of exhaustive tests and experiments. That this may be of some practical value to your department, I am prepared to instruct an officer of the Navy in the operation and construction of the Curtiss aeroplane. As I am fully aware that the Navy Department has no funds available for aviation purposes, I am making this offer with the understanding that it involves no expense for the Navy Department other than the cost of detailing an officer to the aviation grounds in Southern California."

Curtiss had directed a similar letter to the Secretary of War, offering to train an Army officer. Writing of this episode in his book, Curtiss stated:

"I believed the time had arrived when the Government would be interested in any phase of aviation that promised to increase the usefulness of the aeroplane for military service . . . I made no conditions. I asked for and received no remuneration whatsoever for this service. I consider it an honor to be able to tender my services in this connection."

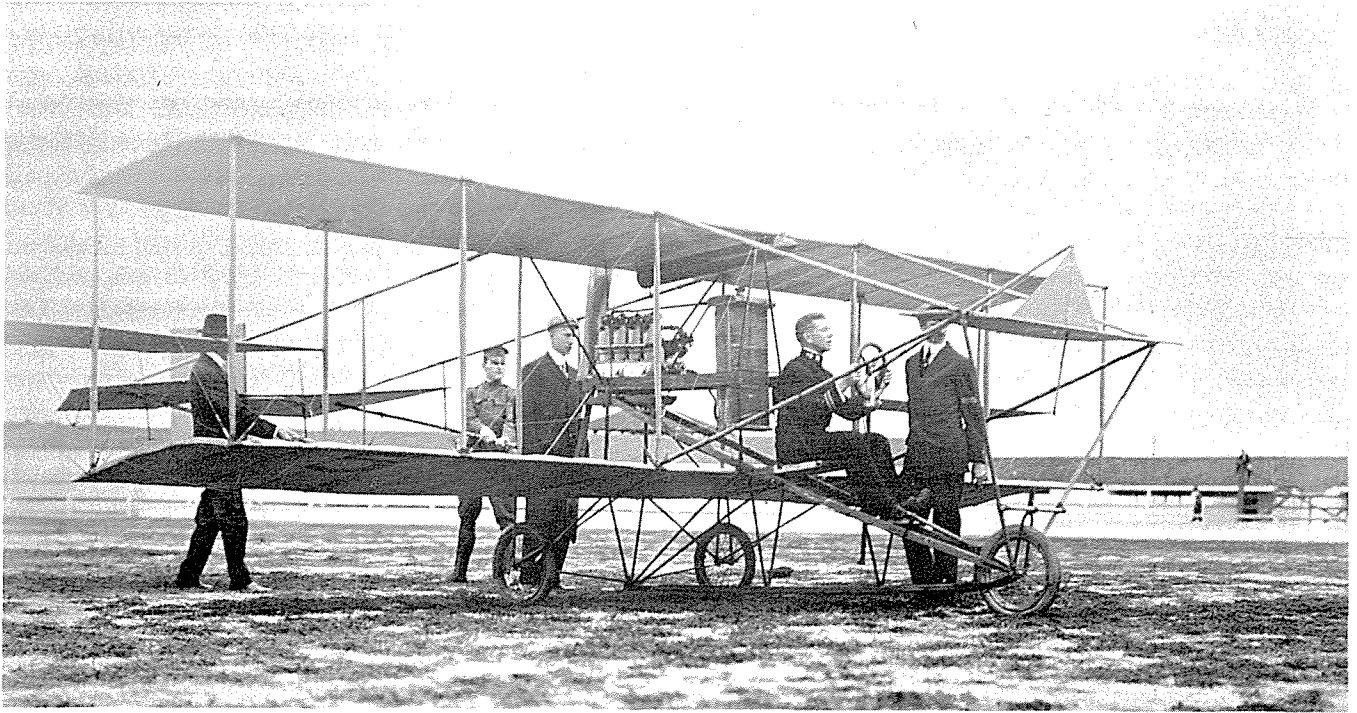
On December 23, 1910 the first naval officer ordered to flight training was directed to report to Curtiss in Los Angeles. Lt. Theodore G. Ellyson, then in the submarine service at Newport News, Va., thus became Naval Aviator No. 1. He was to play a very important part in the development of the hydro-aeroplane, and devoted the rest of his life to naval aviation.

The scene of this early development work in naval aviation took place on a barren stretch of ground across the Bay from the city of San Diego, California. Today it is the North Island Naval Air Station, but in 1911 it presented an entirely different picture. It is interesting to review how Curtiss came to choose this site, as he wrote later in his book:

"It was important to find a location where it would be possible to work along the lines I had mapped out - a place where I might be free from the pressing calls of business and the hampering influence of uncertain climatic conditions. In short I wanted a place with the best climate to be found in this country, with a field large enough and level enough for practice land flights by beginners, and with a convenient body of smooth water for experiments with a machine that would start from or land upon water.

"Above all I wanted a place not easy of access to the curious crowds that gather wherever there is anything novel to be attempted; for a flying machine never loses its attraction to the curious. Mankind has been looking for it ever since the beginning of the world, and now that it is actually here he can't get away from it, once it is in sight . . .

"San Diego was brought to my attention as affording every advantage for experimental work in aviation. A study of the weather bureau records here showed a minimum of wind and a maximum of sunshine the year around. I visited that city in January, 1911, and after a thorough inspection of the grounds offered as an aviation field, decided to make that city the



Lt. Ellyson made his first flight at the Coronado aviation meet, January 23, 1911.  
(Photo - Union Title & Trust Co., San Diego, Calif.)

headquarters for the winter and to carry on the experimental and instructional work there.

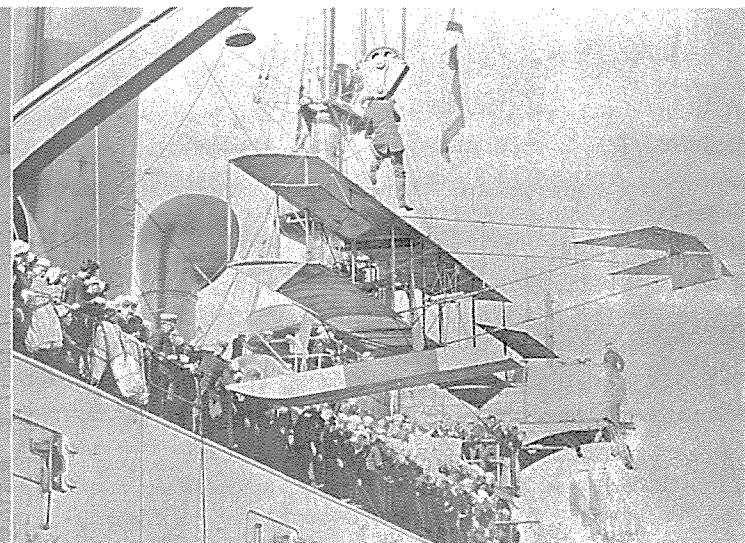
"North Island, lying in San Diego Bay, a mile across from the city, was turned over to me by its owners, the Spreckels Company. It is a flat, sandy island, about four miles long and two miles wide, with a number of good fields for land flights. The beaches on both the ocean and bay sides are good, affording level stretches for starting or landing an aeroplane. Besides, the beaches were necessary to the water experiments I wished to make. North Island is uninhabited except by hundreds of jack rabbits, cottontails, snipe, and quail. It joins Coronado Island by a narrow sand spit on the south side, which is often washed by the high tides. Otherwise the two islands are separated by a strip of shallow water a mile long and a couple of hundred yards wide,

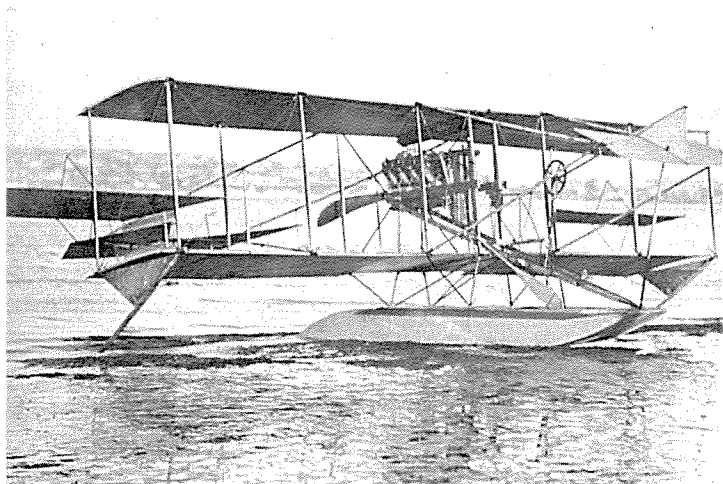
Curtiss disembarking alongside the PENNSYLVANIA, February 17, 1911. (Photo - U.S. Navy, #438644)

called Spanish Bight. Thus the island on which we were to do our experimenting and training was accessible only by boat and it was a comparatively easy matter to exclude the curious visitor whenever we desired to do so. There was no particular reason for excluding the public other than the desire to work unhampered by crowds, which is always a distracting influence . . .

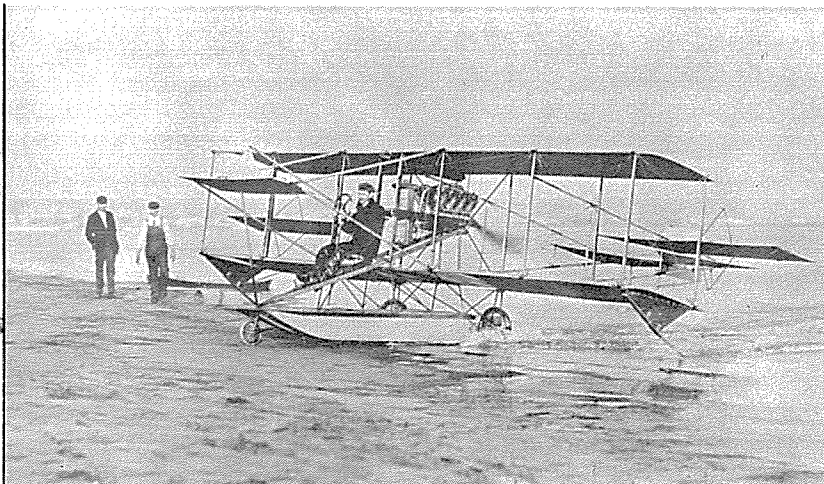
"There are a dozen good landing or starting fields on North Island, but we chose the one on the south side, which gave us easy access to the smooth shallow water of Spanish Bight. A field was cleared of weeds and sagebrush, half a mile long by three or four hundred yards wide. Sheds to house the machines were built by the Aero Club of San Diego, and landings put in for the small boats that carried us to and from the city. The Spreckels Company gave us every assis-

Curtiss being hoisted aboard the PENNSYLVANIA. (From historical files of Union Title & Trust Co.)





First pusher hydroaeroplane with long pontoon, North Island, February, 1911.(Union Title Ins. & Trust Co.)



Curtiss landing in the first "Triad", North Island, February 26, 1911. (Union Title Ins. & Trust Co.)

tance in fitting the place up, and the people of San Diego, anxious to make the island the permanent home of an aviation experimental station and school, were prompt to lend a hand and to impress upon us the climatic advantages of their city."

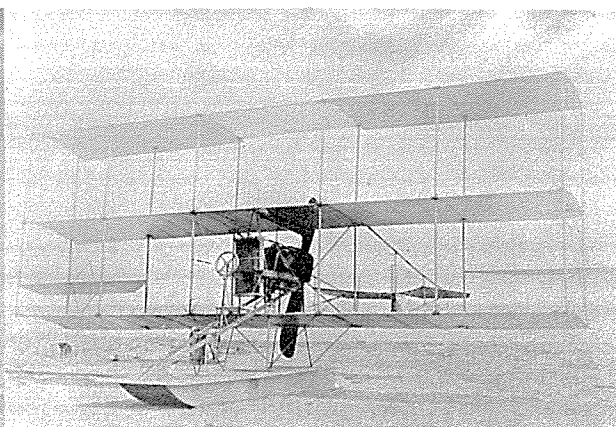
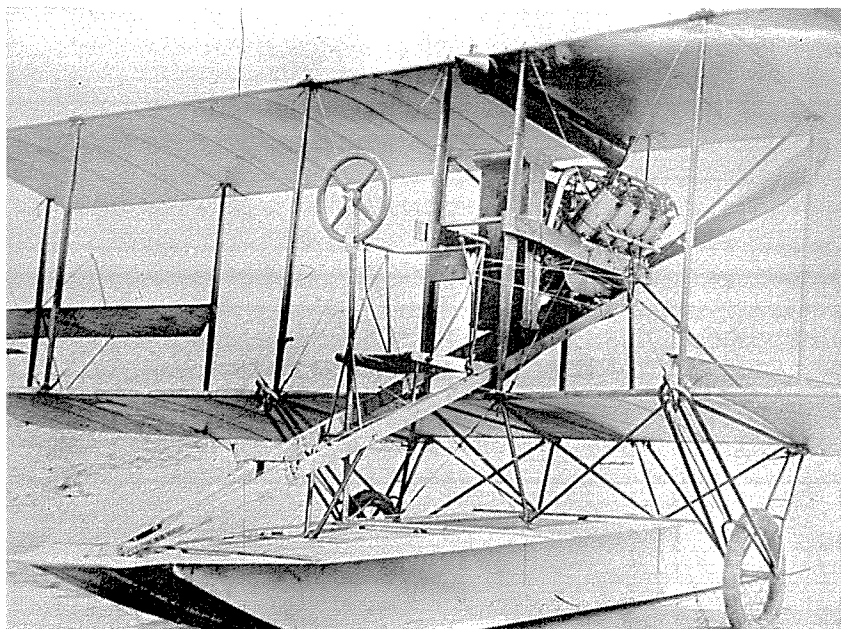
The camp was opened on January 17, 1911, with Lt. Ellyson representing the Navy and Lt. Paul W. Beck and Lt. John C. Walker, Jr. representing the Army as military pupils of the Curtiss school. Besides Curtiss, such early airmen as Lincoln Beachey, Eugene Ely, Hugh Robinson and Charles Willard gave demonstrations and instructions. The daily routine was soon established - the early mornings and late evenings, when the air was still, were devoted to student training in "Lizzy", the low-powered pusher which barely enabled the pupil to make short straight-away hops on the long runway. At the end of each hop the embryo pilot jumped from his seat, faced the aircraft in the opposite direction and tried another hop. He repeated this procedure until he gained confidence and ability to risk actual flight. Thus our pioneer aviators received their flight training.

When the weather was not suitable for student training, all hands pitched in to help with the ex-

perimental work. A revealing insight to the atmosphere prevailing at the camp is presented in Lt. Ellyson's part of the CURTISS AVIATION BOOK:

"What is not generally known is the hard work and many disappointments encountered before the hydroaeroplane was a real success. Mr. Curtiss had two objects in view: First, the development of the hydroaeroplane, and secondly, the personal instruction of his pupils. The latter was accomplished early in the morning and late in the afternoon as these were the only times when the wind conditions were suitable, and the experimental work was carried on during the rest of the day, and, I think, Mr. Curtiss also worked the best part of the remainder of the time, as I well remember one important change that was made as the result of an idea that occurred to him while he was shaving. No less than fifty changes were made from the original idea, and those of us who did not then know Mr. Curtiss well, wondered that he did not give up in despair. Since that time we have learned that anything that he says he can do, he always accomplishes, as he always works the problem out in his mind before making any statement.

"All of us who were learning to fly were also interested in the construction of the machines, and



Above - The Triplane Hydro experiment, North Island, February, 1911.(Photo- Paul R. Matt)  
Left - "Triad" with retractable landing gear at North Island, April, 1911.(Curtiss-Wright)

when not running 'Lizzy' (our practice machine) up and down the field, felt honored at being allowed to help work on the experimental machine. You see it was not Curtiss, the genius and inventor, whom we knew. It was 'G. H.', a comrade and chum, who made us feel that we were all working together, and that our ideas and advice were really of some value. It was never a case of 'do this' or 'do that', to his amateur or to his regular mechanics, but always, 'What do you think of making this change?' He was always willing to listen to any argument but generally managed to convince you that his plan was the best. . ."

Work on the hydro went ahead rapidly. The first version tested at San Diego was the standard Rheims type with a large float mounted directly below the engine section. Dimensions of this float were 7 ft. 1 in. long, 6 ft. 1 in. wide, and 10 in. deep at the deepest part, tapering to the front and back. This was undoubtedly patterned after the float used by Fabre of France, who had risen from the water on March 28, 1910 in the first successful flight of a hydroaeroplane. In addition to the large main float, Curtiss mounted a smaller one in place of the front wheel. At the extreme front of the machine he mounted a framework holding a small hydrocurve surface and a canvas spray shield. These were later discarded.

After many revisions and adjustments, on January 26, 1911 Curtiss finally succeeded in becoming airborne from the water in this version of his hydro-aeroplane. He made three flights, on one of which he flew for two miles and circled the Bay. Prof. Twining, president of the Aero Club of Southern California, described the landing as follows:

"Upon alighting the floats cause it to skip, much as a flat stone skips when thrown along the water, until finally it settles and skids along like a duck that makes a quick descent upon the water."

Curtiss was not satisfied with this float arrangement, however, and designed another, this time a long, flat-bottomed, scow-shaped boat, 12 ft. long, 2 ft. wide and a foot high. The bow was curved upward and the stern curved downward, and the float was mounted so that the weight of the aircraft caused it to slant slightly upward, giving the angle necessary for hydroplaning action at flying speed. He decided upon another experiment at the same time, mounting the pilot's seat behind the engine and reversing the position of the propeller, making the aircraft a tractor type.

Upon receiving Curtiss' report of Ely's flight to the battleship and return, Secretary of the Navy Meyer had written:

"When you show me that it is feasible for an aeroplane to alight on the water alongside a battleship and be hoisted aboard without any false deck to receive it, I shall believe the aeroplane of practical value to the Navy."

Curtiss was never one to pass up an opportunity. On February 17 he sent word to Capt. Pond on the Pennsylvania, moored in San Diego harbor, that he was ready to make a flying visit. The reply came immediately, "Come on over!" Curtiss took off from Spanish Bight and in a few minutes had landed alongside the ship. Lt. Ellyson was waiting in a ship's launch and towed the aircraft to the side of the battleship, where it was hoisted aboard with a boat crane. After a ten minute stay, the aircraft was lowered to the water, the propeller was cranked by Lt. Ellyson, and Curtiss made the return flight to his camp. In less than half an hour another test had conclusively demonstrated the practical application of aviation to naval use.

Curtiss was not pleased with the tractor arrangement of this version of his hydro because of the reduced visibility and propeller blast, so he reworked it to a pusher configuration. On February 23 he carried Lt. Ellyson on the first flight of a hydro with a passenger. Next he tried an experiment that would dramatically prove the versatility of his aircraft. With the help of Hugh Robinson and Damon Merrill he mounted wheels below the wings of the hydro to permit operation from land. Curtiss wrote of this experiment:

"I believed we should go further and provide a machine that would be able to go from one to the other - from water to land and land back to water - before it could be said that all the difficulties of making the aeroplane adaptable to both Army and Navy uses had been overcome. This was of comparatively easy accomplishment, and on Sunday, February 26, I made the first flight from water to land and from land back to water. Starting from North Island, on the waters of Spanish Bight, I flew out over the ocean and down the beach to a point near Coronado Hotel, where I came down on the smooth sand of the beach. Returning, the machine started from the beach and came back to the water on Spanish Bight, whence I had started."

Thus the amphibian was born. It was not called by that name at first, however. The cumbersome title of "hydro-terra-aeroplane" was first used. This gave way to "Three-in-One" - land, sea and air - and finally became "Triad". Further experiments developed a retractable feature and Curtiss could now confidently state:

"With these achievements it seems to me the aeroplane has reached the point of utility for military purposes - either for the Army or Navy. ."

Another interesting experiment was made at this time by adding a third wing above the biplane, making a triplane hydro. This flew successfully, enabling the carrying of 200 lbs. additional weight. It later crashed and the design was abandoned as a freak.

Meanwhile, Capt. Chambers had been exerting great efforts to convince his superiors that the Navy Department should acquire aircraft and train aviators. In fact, he had been in constant touch with Curtiss during his experiments and kept suggesting ideas to improve the design and utility value of the hydro. Chambers had always been keenly interested in engineering and, never content with things as he found them, was constantly seeking improvement of Navy equipment. For a long time he was practically the only advocate of naval aviation in the Navy Department. His important role in this early pioneering period was later recognized in Navy records:

"This officer struggled with the many difficulties which always present themselves to those to whom fate assigns the difficult task of injecting new ideas and a new activity into a staid and elderly organization. The Navy as a whole was not interested and Capt. Chambers worked alone and unassisted to build up a naval aviation establishment."

Evidently Chambers' constant bombardment of reports and implorings had some effect, for the Naval Appropriations Act of 1912, passed March 4, 1911, provided \$25,000 for experimental work in the development of aviation for naval purposes. Capt. Chambers was assigned to duty with the Bureau of Navigation and was directed to devote full time to aviation. The assignment did not include a title, however, and he was still handicapped by lack of authority, no clerical assistance, and even had

difficulty in obtaining space in which to work. At one time he was asked to do his work at home because no desk space was available.

On April 12, 1911 Curtiss reported the progress of Lt. Ellyson's flight training to the Secretary of the Navy:

"I have the honor to report that Lt. Ellyson is now competent to care for and operate Curtiss aeroplanes and instruct others in the operation of these machines. Mr. Ellyson is a hard worker and has acquired considerable knowledge of the art of aviation. He has been especially successful in operating the machine and is easily capable of qualifying for a pilot's license. It is a pleasure for me to recommend Mr. Ellyson as a man who will make a success in aviation."

In May Curtiss moved his school and experimental operations back to Hammondsport. On May 8 the Navy Department placed an order for two Curtiss aircraft, one hydro convertible to land type, later designated the A-1, and a land type, four-cylinder engine, designated the A-2. Specifications for the A-1 read as follows:

"One Curtiss eight cylinder biplane or 'Triad' fitted for rising from or alighting on land or water, including land equipment, water equipment, and combination equipment, fitted with engine panels and chassis and four other interchangeable wing panels, covered with rubberized linen on top and tight woven special sail cloth on the bottom. One main pontoon and pair of balancing hydroplanes, with pontoons and hydro-surface to enable the machine to float when alighting on the water with land equipment attached. Landing wheels with suitable rims and clincher tires, capable of being housed above or extended beneath the line of the main pontoon by the aviator during flight. Subject to alterations if approved by the Naval Inspector at the Factory. All complete with metal tipped propeller designed for a speed of at least forty-five miles per hour. The same to be fitted with a capacity for one passenger seated alongside the pilot and with double controls so that either the pilot or the passenger may operate the machine."

At Hammondsport Curtiss and Ellyson were hard at work, constantly seeking to improve the hydro. The front elevator had been moved to a position on the bow of the float, thus improving visibility. The dual control system called for in the Navy specifications had been proposed as the result of the need to carry a passenger and provide instruction in flight. As installed on the Navy "Triad", the control column was hinged so that the upper half mounting the control wheel swung on a quadrant and could be locked in position in front of either pilot. This allowed changing control in flight.

The Curtiss machines ordered by the Navy incorporated all the design improvements that had been worked out on the original hydro "Triad", both at San Diego and Hammondsport. The wing surfaces were enlarged to handle the increased load and more powerful engine. The A-1 design later became known as the Model E-8-75 "Triad" passenger-carrying hydroaeroplane. The specifications given on the "Aero & Hydro" drawing list this machine as having an overall wingspan of 37 ft. 2 in. and a length of 27 ft. 8 in. Weight was 1400 lbs. fully loaded and power was the 75 h.p. Curtiss Model "O" engine. Speed was 65 m.p.h. Price given in the 1912 Curtiss catalog was \$6,000, but the Navy contract price was given as \$5,500.

At this time it was necessary for Curtiss to fill some engagements to augment his income. The

magazine "Aero" carried news of his activities:

"Hammondsport, N. Y., Friday, June 9 - Lieut. T. G. Ellyson made a flight in the Curtiss hydro-aeroplane, while Glenn Curtiss watched him from the shores of the lake. This is the first time Curtiss has ever been a spectator while someone drove the triad."

"Cleveland, O., June 15 - The severest test to which a Curtiss hydroaeroplane has ever been put was in the flights made by Glenn H. Curtiss at Cedar Point, O., near Akron, O., yesterday and today . . . On one of his flights today he took up as a passenger Lieut. T. G. Ellyson, of the U. S. Navy, who is himself now flying the hydro-aeroplane for the Navy."

"Fall River, Mass., June 24 - Glenn H. Curtiss made two flights here today, once using his hydro-aeroplane . . . Lieut. Theodore G. Ellyson was on hand to watch the flying . . . The flights were the first ever made in this vicinity."

The day was now fast approaching when the Navy would at last include airplanes and airmen. On June 27, 1911 Lt. (jg) John H. Towers reported at Hammondsport for flight training. (Destined to become Naval Aviator No. 3, Towers gave 41 years of distinguished service to the Navy - 35 of them in naval aviation. He retired on December 1, 1947 with the rank of Admiral from his position as Chairman of the General Board, Navy Department. He died on April 30, 1955.)

On the same day that Lt. Towers reported, Lt. Ellyson was busily engaged in block testing the Curtiss V-8 motor for the A-1. The day-to-day account of getting the Navy's first aircraft into the air is revealed in entries made in the Aviation Log of the A-1 by Lt. Ellyson:

"June 27 - Set up engine for A-1 in block and ran it 14 times in periods of from 30 sec. to 7 min. Total time run 37 min. The engine was hard to start owing to the spark being advanced 13/32", did not throttle well, and the water jackets on all cylinders except #3 and #4 leaked badly. The engine received too much oil, owing to the stand pipes in the splash pan being too high. Thrust 470 lbs. Rev. 1170, Propeller 8' diam. 6' pitch. Lieut. (jg) Towers, J. H., U.S.N., reported.

"June 28 - Disassembled A-1 engine and thoroughly overhauled same. Bronze had been used for the caps of all bearings. It was found that these had started to rub the shaft, so babbitt bearings were substituted. The crank pin bearings had slightly rubbed the splash pan, so the latter was lowered 1/4 inch. A slight flaw was found in #5 cylinder, and a new one was substituted. The compression was too great owing to insufficient clearance, so 1/8" risers were inserted under each cylinder.

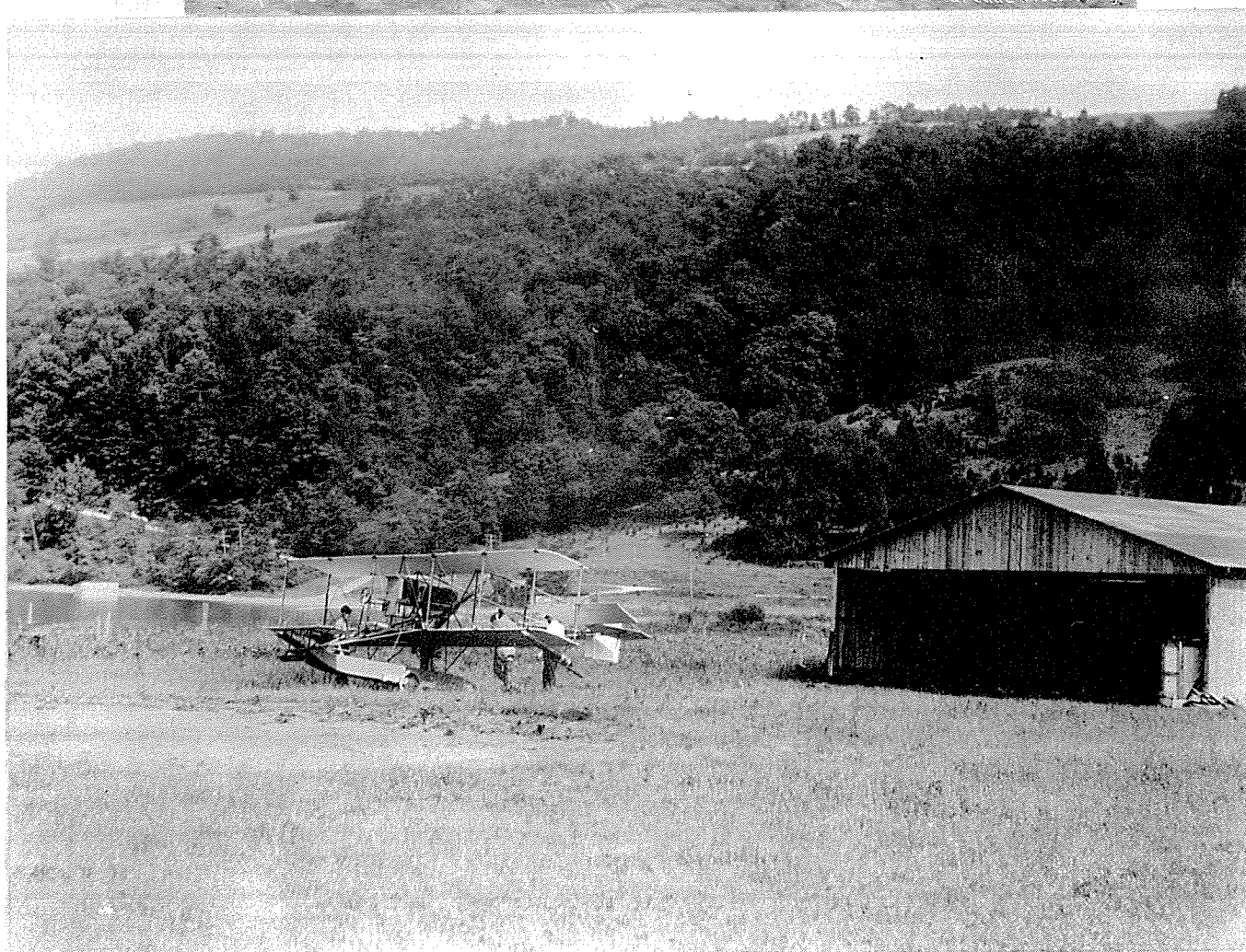
"June 29 - Started to set up A-1 machine and installed standard Curtiss 50 h.p. motor.

#### OPPOSITE PAGE

Above - The Navy A-1 at Hammondsport, Lt. Ellyson at the controls, Lt. Towers at left wing, George Hallett at prop, July, 1911.

Below - Military class at the Curtiss School, July 1911. (L. to r.) - Lt. J.W. McClaskey, USMC; Instructor Glenn H. Curtiss; Lt. Paul W. Beck of USA; Lts. John H. Towers and Theodore G. Ellyson, USN. (Photos - U.S. Navy)





## OPPOSITE PAGE

Above - The first Curtiss hydroaeroplane at North Island, January, 1911. (Photo - Courtesy of Union Title Ins. & Trust Co., San Diego, California.)  
Below - Curtiss hangar and The "Triad", Hammondsport, May, 1911. (Photo - U.S. Navy)

"June 30 - Finished setting up A-1 machine.

"July 1 - G. H. Curtiss tried out A-1 machine, 50 h.p. motor, and found balance on the water and in the air perfect. He then took Lt. T. G. Ellyson as a passenger, and found the balance with extra weight perfect. Lt. Ellyson tried for pilot's license in A-1, but did not qualify as the judges later decided that he had not been given proper instructions.

"July 1 - Capt. W. I. Chambers, U. S. Navy, in charge of naval aviation, arrives on inspection trip.

"July 2 - Lt. T. G. Ellyson, U.S.N., qualified for aviation pilot's license. Lt. T. G. Ellyson, with Captain W. I. Chambers, U.S.N., attempted to fly from Hammondsport to Penn Yan, N.Y., 22 miles, 50 h.p. motor. There was no wind and it was impossible to leave the water, but the trip was made on the water. Stopped at Keuka, 8 miles from Hammondsport, then made rest of the run without mishap. The return trip to Hammondsport was made by Lt. Ellyson alone. Stopped at Keuka after dark for oil. It was very dark when Hammondsport was reached, and as there was no light as an aid, the distance from the water was very misleading. The first attempt to land was a failure, the machine striking the water and rising again. On second attempt a normal landing was made."

Lt. Ellyson was granted License No. 28 by the Aero Club of America, official representative in the U. S. for the Federation Aeronautique Internationale located in Paris, then recognized as the only official licensing organization for aviators. The magazine "Aero" reported further on events of that day:

"Capt. Chambers was delighted with his experience and declared when he got ashore that he considered the hydroaeroplane the greatest development in aviation as regards safety . . . in writing of his experience to persons in Washington, Capt. Chambers declared that he considered the hydroaeroplane

a thoroughly practical machine, and one which would prove a great incentive for the use of aircraft for purposes other than that of purely spectacular flying."

Now the Navy had an airplane and a qualified pilot. Naval aviation had been born! The struggle to maturity was to cover many years of up-hill work by these and other pioneers, many of whom were to give their lives to advance the science of naval aviation.

The remaining months of 1911 saw many significant events in the history of Naval aviation. The second Navy-Curtiss airplane, the A-2 was test-flown by Curtiss and Lt. Ellyson on July 13, and was accepted by the Navy. On July 15 the Wright B-1, third Navy aircraft, was flown for the first time by Orville Wright at Dayton, Ohio, and Capt. Chambers was given a demonstration ride. On August 3, Lt. John Rodgers, Naval Aviator No. 2, was granted Aero Club License No. 48 and set up camp at Annapolis, Md. with the B-1.

Meanwhile Lts. Ellyson and Towers had been making flights at Hammondsport with the Curtiss airplanes, familiarizing themselves with the problems of maintenance and experimenting with various ideas to adapt the aircraft to the Navy's needs. One experiment in particular gave further encouragement to the placing of airplanes aboard the Navy's battlewagons. Lt. Ellyson was responsible for devising the system and carrying it forward to its successful conclusion.

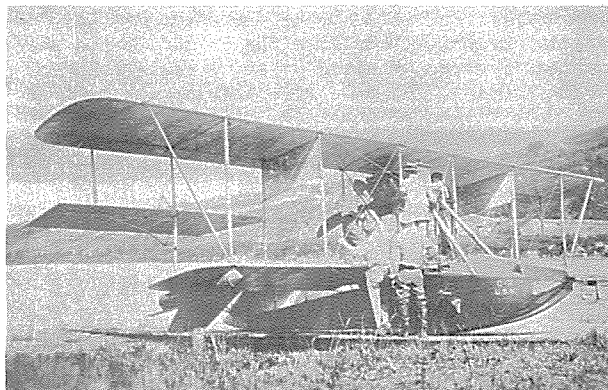
Navy officers had objected to the installation of the landing platform above the stern gun turret as used on Ely's flights because of its restriction on the fire power of the battleship. Lt. Ellyson decided that this objection could easily be overcome by installing a wire cable stretched from the boat deck of the ship forward to its bow. The airplane could then be slid down this cable, taking to the air without delay and avoiding the danger of take-off in a rough sea. An experimental installation of this system was built on the shore of Lake Keuka, and on September 7, 1911 Lt. Ellyson successfully demonstrated his idea. Another step had been taken in sending aircraft to sea.

On September 14, Lt. Towers became Naval Aviator No. 3 by passing his flight test for Aero Club License No. 62. On September 27 he and Lt. Ellyson were busy setting up camp at Annapolis, where the two Navy-Curtiss aircraft had been taken. Thus the Navy's first aviation training camp was offi-

Continued on Page 72



Left - Lt. H.C. Richardson's crash of the A-1 at North Island, April, 1912. (Photo - Paul R. Matt)  
Below - The Curtiss C-2 Navy Flying Boat at Hammondsport, 1913. (Photo - Fred C. Dickey, Jr.)

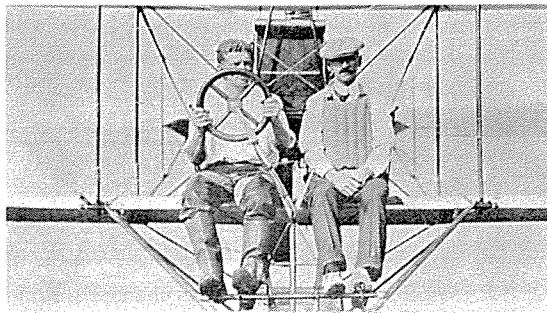


DR. GERALD E. WHEELER

## Training the FIRST NAVAL AVIATOR



Lt. T.G. Ellyson (Photo- Curtiss-Wright Corp.)



Ellyson and Curtiss (Curtiss-Wright Corp.)

Theodore Gordon Ellyson was the Navy's first designated "Navy Air Pilot", a designation granted officially on January 21, 1915. He had been an aviator for four years when he was so recognized. In its letter of transmittal, the Bureau of Navigation wrote that:

"It was considered that owing to your excellent work in connection with aeronautics in its very infancy in the Navy that you were deserving of the first certificate issued."

Along with most young graduates of the Naval Academy class of 1905, Ellyson spent the first six years of his new career at sea. He saw service in battle-ships as a passed midshipman, then turned to submarines where he had begun to make his name as a submarine expert when the aviation "bug" bit him. He was at the Norfolk Navy Yard on November 14, 1910 when Eugene Ely flew a Curtiss biplane off a deck improvised on the Cruiser BIRMINGHAM. Stealing a march on a classmate, Kenneth Whiting, Ellyson wrote a letter to Captain Washington Irving Chambers, USN, and offered his services for aviation duty. In fact, he presented the letter personally. His timing was excellent.

Captain Chambers, just two months before, had been designated by the Navy Department to keep it informed on progress in the aviation field. He read deeply, collected books, corresponded with aviation organizations like the United States Aeronautical Reserve, visited aviation meets held on the East Coast, and made sure that he met most of the great flyers of that day. After attending several large aviation meets, Chambers recommended that the Navy buy one or more planes "in order to develop their use for naval purposes." He convinced the Department that it should take part in the experiment to launch a plane from a ship; and with the experiment a success he suggested to Glenn H. Curtiss that he offer to train a pilot or two for the Navy. Curtiss could see the possibilities for him in aircraft sales to the Navy and jumped at the suggestion. On November 29, 1910, he invited the Secretaries of War and Navy to send

officers to San Diego for him to train in flying. On January 2, 1911, Lieutenant Theodore G. Ellyson was ordered to join Curtiss on the West Coast.

Though Ellyson has been dead 32 years, having perished in a crash on his 43rd birthday (February 27, 1928), and despite the fact that there is no full biography of him, an excellent account of his flight training exists in a series of letters exchanged between him and Captain Chambers. Ellyson wrote weekly to Chambers describing his activities as a student and later as officer-in-charge of the Navy Aviation Camp at Annapolis. These letters, preserved in the "W.I. Chambers Papers" at the Library of Congress, give the aviation historian today a wonderful view of flight instruction in its earliest form and suggests why early aviators were generally described as "daring" or "death defying".

When Ellyson joined Curtiss in Los Angeles in early January, 1911, the famed airman was looking for a place to establish an air field for flight and experimental work. Curtiss loved Hammondsport and the Lake Keuka region of New York, but he despised the heavy winters. He needed good flying weather, a location close to water for hydroplane (hydroaeroplane) experiments, and a climate warm enough to work out-of-doors. The San Francisco region was ruled out because of weather. Los Angeles had some appeal, but the lack of open country and a sheltered water area made it undesirable. In San Diego, however, Curtiss found everything he needed and selected a site on North Island for a training camp.

The aviation camp was set up in the middle of January by Curtiss' employees from Hammondsport, with W.J. Shackelford doing most of the work. All hands cleared stretches through the underbrush to provide training areas, and tents were erected along the estuary between North Island and Coronado known as Spanish Bight. Besides Ellyson from the Navy, Curtiss had three Army officers assigned to him: Lt. Paul W. Beck, Lt. C.E.M. Kelly, and Lt. John C. Walker, all from West Coast Army units. Charles Witmer, a civilian, was also at the San Diego camp for instruction. Eugene Ely and Hugh Robinson, both Curtiss demonstration pilots, were at the camp off and on, thus Ellyson received his instruction from

the finest Curtiss airplane pilots in the business.

Having Ellyson as a pupil had its advantages for Curtiss. Because of his Academy engineering training, Ellyson knew machinery. He was a good mechanic, both practical and inventive. He had determined that he would learn everything about the aviation business he could and not confine himself just to flying. This naval officer worked on the aircraft engines until he could almost "field strip" the Curtiss 4 cylinder and also the 8-cylinder engines with the ease of cleaning a service revolver. He kept a daily journal and noted everything he learned from work and from conversation. With Ellyson's attitude and willingness to get dirty, Curtiss quickly turned to him for assistance in his "hydro-aeroplane" design experiments. William Gilmore, a San Diego boat builder, did most of the float fabricating and Ellyson and the other students provided the muscle-power whenever Curtiss tried his "hydros" in the bight. On January 26, 1911, Curtiss finally lugged his biplane hydro into the air and flew it safely back to the water. Ellyson learned a great deal about the "trial and error" approach to experimental work, and the Navy had a new frontier to explore.

Ellyson was taught to fly in a manner that had become fairly well standardized with Glenn Curtiss. He had three or more planes available at North Island and kept one of his 8-cylinder planes equipped with a 4-cylinder engine. The heavier plane with a lower horsepower engine was hard to get airborne, and thus Curtiss kept his pupils pretty well tethered to the ground until he was positive they were safe to begin flying at any altitude. To prevent "accidental" flights Curtiss inserted a block in the throttle control so that half-power was about all the student could get out of the engine.

Curtiss taught aircraft control through straight-away grasshopper-type flights, a technique called "grass-cutting." After carefully explaining the use of each control and how to use power, Curtiss and his student would move up and down the cleared area on North Island in short hops, never more than a foot or two off the terrain. Once directional control, that is holding the plane straight, was achieved through fast taxiing, then Curtiss would move the block and allow a little more power to be applied and the "hopping" phase began. This forced student concentration on the elevators and the control of attitude. Because of the controlled engine performance, Curtiss did not have to ride on every instructional flight. Once the student understood the functions of the elevators, rudders, and inter-plane ailerons, he could "grass-cut" alone. Occasionally the neophyte students became accidentally airborne, but seldom for any great distance. Ellyson had this occur in his second week of instruction and he experienced his first, but not last, crash. Neither he nor the plane was badly hurt, and it did teach him a bit about "air holes" and turbulence. To avoid rough air, Curtiss had his pupils do most of their flying in the three hours following dawn and the hour before sunset. It did mean a long day for Ellyson and the rest.

Among a host of good qualities, safety-consciousness was one of Curtiss' most important. He drove this into Ellyson. Every flight was preceded by a careful examination of the plane. Because each plane was a product of hand labor, the pilots came to know every wire, piston, and square-inch of fabric. Within six months Ellyson had developed a written set of instructions to be followed in checking a plane for acceptance by the Navy. He also developed a standard pattern for inspecting a plane before each flight.

Back in Washington, Captain Chambers came to value Ellyson's inherent caution and conservatism. Aviation throughout the country was being heavily criticized because of the large number of deaths from exhibition flying. Ellyson himself began his training just a few weeks after the death of one of the great exhibition pilots, Arch Hoxsey. Thus when Curtiss wrote to Chambers that Ellyson "... will make an excellent instructor, being conservative and using rare judgment as to what the aviator should and should not attempt to do," Chambers knew he had a man he could trust. Later he was to offer Ellyson the position of Director of Naval Aeronautics, an offer which Ellyson politely refused.

Though still a student, Ellyson had the responsibility of advising the Navy Department on how it should proceed with aviation training. Curtiss could not be expected to train every pilot in the future. In the end Lieutenant Ellyson suggested a duplication of the Curtiss approach. He recommended that the Navy buy a 4-cylinder plane for approximately \$4,000 and an 8-cylinder model, equipped for water flying, to cost around \$7,000. Relaying an idea of Curtiss', he suggested to Chambers that the Navy establish an aviation camp near Washington. This would be close enough to Hammondsport to get help from Curtiss when needed, and it would be a good location to sell the more conservative naval officers on the values of aviation. Ellyson also recommended that Chambers ask the Wrights if they would like to train a pilot for the Navy, and sell the Navy a plane as well. Chambers convinced the Navy Department on the wisdom of Ellyson's suggestions; and by the fall of 1911 the Navy had its own training camp across the Severn from the Naval Academy. It had received \$25,000 to purchase two Curtiss and a Wright plane, and Lieutenant John Rodgers was being trained in Dayton, Ohio, by the Wrights.

Ellyson was a bit concerned about his own progress. Curtiss had kept one 8-cylinder model tied up with experiments and thus Ellyson was still flying the 4-cylinder model by the first of March. At Curtiss' instigation, he asked Chambers if he could go East to Hammondsport with Curtiss when he closed his camp in San Diego. There he would be able to study the building of planes and engines more thoroughly by being at the Curtiss factory, and he could get full instruction in the hydroplane, "Triad" (an amphibian hydro), and new 8-cylinder models as they were developed. Chambers wanted Ellyson in the East for advice on establishing the camp at Annapolis and thus readily agreed to his proposition.

Curtiss did get around to instructing the naval officer in the 8-cylinder plane before the San Diego camp was closed. Ellyson described his 8-cylinder flights in glowing terms. The plane was extremely sensitive to the controls, in fact it took determination to hold it down. To reduce the plane's power Curtiss had blocked the throttle and added a panel to the top wing, but the plane, particularly when flown solo, was still a lively performer. In one letter Ellyson described the problems of controlling the tendency of the 8-cylinder plane to "Dutch-roll". In today's parlance the lieutenant was experiencing torque and then over-controlling; the result was a rolling motion about the plane's longitudinal axis as it flew. Curtiss also insisted that his students learn how to handle his biplanes in gliding flight since engine failures were fairly common. He forced them to descend without power from ever-increasing heights and constantly preached the doctrine of remaining

## BIRTH OF NAVAL AVIATION (Continued from Page 13)

cially established. The Navy aviators now applied themselves to the task of testing in actual practice the numerous ideas being advanced on the uses of aircraft in naval warfare. That this work was hazardous and replete with frustrating delays and failures is evident in this typical entry by Lt. Ellyson in the Aviation Log of the A-1:

"Oct. 11 - Started on flight to Old Point Comfort, Va. At 12:30 PM landed and ran on beach 30 miles below Annapolis on West Shore 8 miles below Chesapeake Beach. Safety wire on after end of gasoline tank broken and one bolt out of after hanger on same. Underway at 1:00 PM Lt. Towers driving from right seat. At 1:20 PM landed on water off Cedar Point and ran on beach. Bracket on carburetor adjuster broken. Underway at 1:30 PM Lt. Ellyson driving. Landed at 2:05 PM at Smith's Point, Va., owing to #3, #4, #7 and #8 crank bearings burnt out. Total distance 79 miles in 35 minutes. Disassembled the machine and placed it on the U.S.S. Bailey which had been summoned by wireless, and returned to Annapolis, Md."

The next attempt brought success. On October 25, Lts. Ellyson and Towers again took off from Annapolis and flew to Buckroe Beach, Va., a distance of 145 miles in 147 minutes. This set a record for distance flown in a hydro. Ellyson wrote of this flight in the Aviation Log: "The purpose of the flight was to determine and eradicate the weak points of the machine, to determine the physical strain caused by a long trip, and to thoroughly test the shift control." To Curtiss he wrote:

"I steered for the first half hour and then Towers steered for the same length of time. At the end of an hour the water connections on top of the radiator began to leak and water went on the magneto, causing the engine to miss. Towers climbed over and repaired the leak the best he could and had to hold the water pipe in place, which he did for over an hour while I drove."

"After two hours of flying, having covered 147 miles, the oil gauge seemed to be getting low and we decided to land. This we accomplished in a six-foot surf with a 20 mile wind behind us. I ran the machine high on the beach, coming in at full speed, just touching the crests of the waves. Much to our surprise the boat was not injured in the least."

Secretary of the Navy Meyer revealed the current official Navy policy on aviation in an article in "Aircraft", November, 1911:

"The only use of the aeroplane seriously contemplated, as yet, by the Navy is as an aid in scouting, in reconnaissance and in communicating between ships, or between ships and a cooperating force on shore . . . It has been our chief aim, so far, to develop a machine that will be as nearly independent of a ship's deck and of the land as possible, particularly on rising into the air, not only for possible service in war but for the more frequent demands of training at all times, for of course its development must be accompanied by the training of the personnel in its use, care and repair."

"The hydroaeroplane, or 'Triad', developed at San Diego, Calif. and at Hammondsport, N.Y. by Mr. Glenn Curtiss, while in cordial cooperation with the Navy, meets this demand fairly well, but is regarded as capable of further improvement in respect to the practicability of using it in the comparatively rough water of a harbor. Its principal uses for the present will be confined to training

and experimental purposes, it being confidently expected that this training will eventually proceed as a regular routine from the ship as a base."

Capt. Chambers summed up the situation in "Aeronautics," December, 1911, when he stated: "Aviation is barely out of the crawling stage of its infancy, although many would like us to assume that we must judge of the future by present performances."

During 1912 there occurred several events significant to the advancement of naval aviation. On January 10 Curtiss flew for the first time in his flying boat, a design which he soon abandoned in favor of his successful pusher type flown for the first time at Hammondsport in July. This was the forerunner of a long line of flying boats which later figured prominently in naval aviation development.

On June 28, 1912 Lt. Towers made a moonlight flight from the fleet at anchor in Baltimore harbor to the aviation camp at Annapolis, a distance of 26 miles in 28 minutes, carrying Lt. Dortch as passenger. On October 6, Towers set an endurance record in the A-2 by remaining aloft for an official time of 6 hours 10 minutes 35 seconds. The flight covered approximately 389 miles at altitudes ranging from 200 to 1200 ft. He was forced to descend when his fuel supply ran out - he had used 42 gallons.

Capt. Chambers was insistent that a reliable method for launching aircraft from ships should be developed, and he directed Naval Constructor Lt. H. C. Richardson, among others, to come up with the answer. The first model tried at Annapolis in July failed, but on November 12, 1912 the first successful catapult launch of an airplane was made at Washington Navy Yard with Lt. Ellyson at the controls. It was now practical to station an airplane aboard ship, although much development work was necessary before this was perfected.

In his report for 1912 Capt. Chambers viewed the status of the art in these words:

"Aviation has reached a stage of development wherein methods of scientific engineers have replaced the crude efforts of the pioneer inventors."

He went on to urge the establishment of a National Aerodynamic Laboratory and recommended that a commission be set up to report to Congress. On December 19 President Taft created a "Commission on Aerodynamic Laboratory" and appointed 19 members, including Capt. Chambers. On February 13, 1913, the Langley Field Aerodynamic Laboratory project was officially inaugurated.

Development of naval aviation was now an established policy of the Navy Department. In October, 1913 a board of officers headed by Capt. Chambers was directed to "draw up a comprehensive plan for organization of a Naval Aeronautic Service." Although many of the recommendations made were not carried out because of insufficient funds, those adopted carried the work forward until such time as the impetus of war emergency proved the wisdom of the planners.

By 1914 the Navy Department at last recognized that aviation had come of age. A press release on January 10 carried this message:

"The Secretary of the Navy has decided that the science of aerial navigation has reached that point where aircraft must form a large part of our naval force for offensive and defensive operations. This country has not fully recognized the value of aeronautics in preparation for war, but it is believed that we should take our proper place."

Continued on Page 73

The work and sacrifice of the pioneers was not in vain. The groundwork had been laid for the foundation of a naval aviation force second to none, which was to serve the country invaluable in two World Wars and during the intermittent periods of uneasy peace.

#### ACKNOWLEDGMENTS

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#### LINDBERGH (Continued from Page 37)

Lindbergh and the mail arrived at Belize, British Honduras at 11:50 A.M. on February 11th, 24 hours early. They had bypassed an overnight stop at Tela, Honduras. Co-pilot for the trip from Managua to Belize, and Miami, was Marine Lieutenant Christian F. Schilt. A Congressional Medal of Honor winner and a skilled jungle pilot, Schilt had been loaned to Pan American Airways for three months as Division Superintendent. Schilt's duties would be to help set up routes and schedules through the remote Central and South American airways. Merritt stopped at Tela for several hours and then followed Lindbergh to Belize. When Merritt landed at Belize, Lindbergh noticed that the plane was getting a flat tire and it was quickly repaired.

The flight to Havana, Cuba arrived six hours late on the 12th. Exploring for future routes and refueling delays contributed to the late arrival which caused some concern for their safety. Lindbergh had landed at Coxumel Island, Mexico for fuel, but a heavy sea made refueling difficult. It took four hours

to refuel as it was necessary to work from a small boat tossing in the waves.

Late that afternoon they made a fuel stop at Le Fe Cuba, 100 miles to the west, and took off for Havana. They arrived in the dark over Havana at 7:48. Lindbergh flew over the field and they turned on all manner of improvised runway lights, gathered on the spur of the moment out of necessity. Circling the field three times, Lindbergh brought his Sikorsky in for a perfect landing.

Merritt, not exploring for future routes had landed much earlier in the afternoon. His crew consisted of: John Donchue as mechanic, and his co-pilot was Chief Petty Officer Frank E. Ormsby of the Navy.

It was on the 12th, in Mexico City, that the United States Ambassador Morrow and his wife announced the engagement of their daughter, Miss Anne Morrow, to Colonel Charles A. Lindbergh.

The arrival in Miami on the 13th was anticlimactic. On hand to greet the return of the first round trip airmail flight was a cheering crowd of 3000. However, after completion of brief formalities, Lindbergh was off again.

The return to the United States with the airmail from the Panama Canal arrived without incident, a tribute to a well planned flight, the skill of pilots and crews, and the dependability of the airplane.

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NYT; 2/9/29, P. 9. "Lindbergh Soars from Ship to Canal".  
NYT; 2/10/29, P. 10. "Lindbergh Rested as Guest of Navy". P. 1, Sec. 6 Rotogravure. Photos, "Back in his old job as mail plane pilot" and "The Gateway to the air highway through the West Indies".  
NYT; 2/11/29, P. 3. "Lindbergh Reaches Managua on Return".  
NYT; 2/12/29, P. 13. "Lindbergh Flies Direct to Belize".  
NYT; 2/13/29, P. 1. "Colonel Lindbergh Betrothed to Miss Anne S. Morrow; Lands in Cuba after Delay", also "Lindbergh Reaches Havana in Evening".  
NYT; 2/14/29, P. 2. "Lindbergh Back, Hunts Lost Flier". P. 1. "Miss Morrow Gets Flood of Messages".  
NYT; 2/24/29, P. 1, Sec. 7 Rotogravure. Photos show "The Most Famous Postman in the World Delivers the Mail" and "The End of Another Brilliant Chapter in the Lindbergh Epic" which shows the crowd at France Field, Canal Zone when he landed there.  
The Bee-Hive, March 1929, Pgs. 3-5. "Lindbergh 'Flies the Mail' to Panama".  
Sikorsky Amphibian S-38 (1930 Model), References on Pg. 5 of this Sikorsky sales literature.

NOTE: The inconsistencies of type boldness on this and other pages arise because your Editor has not yet mastered all the printing techniques involving such simple acts as changing a typewriter ribbon.