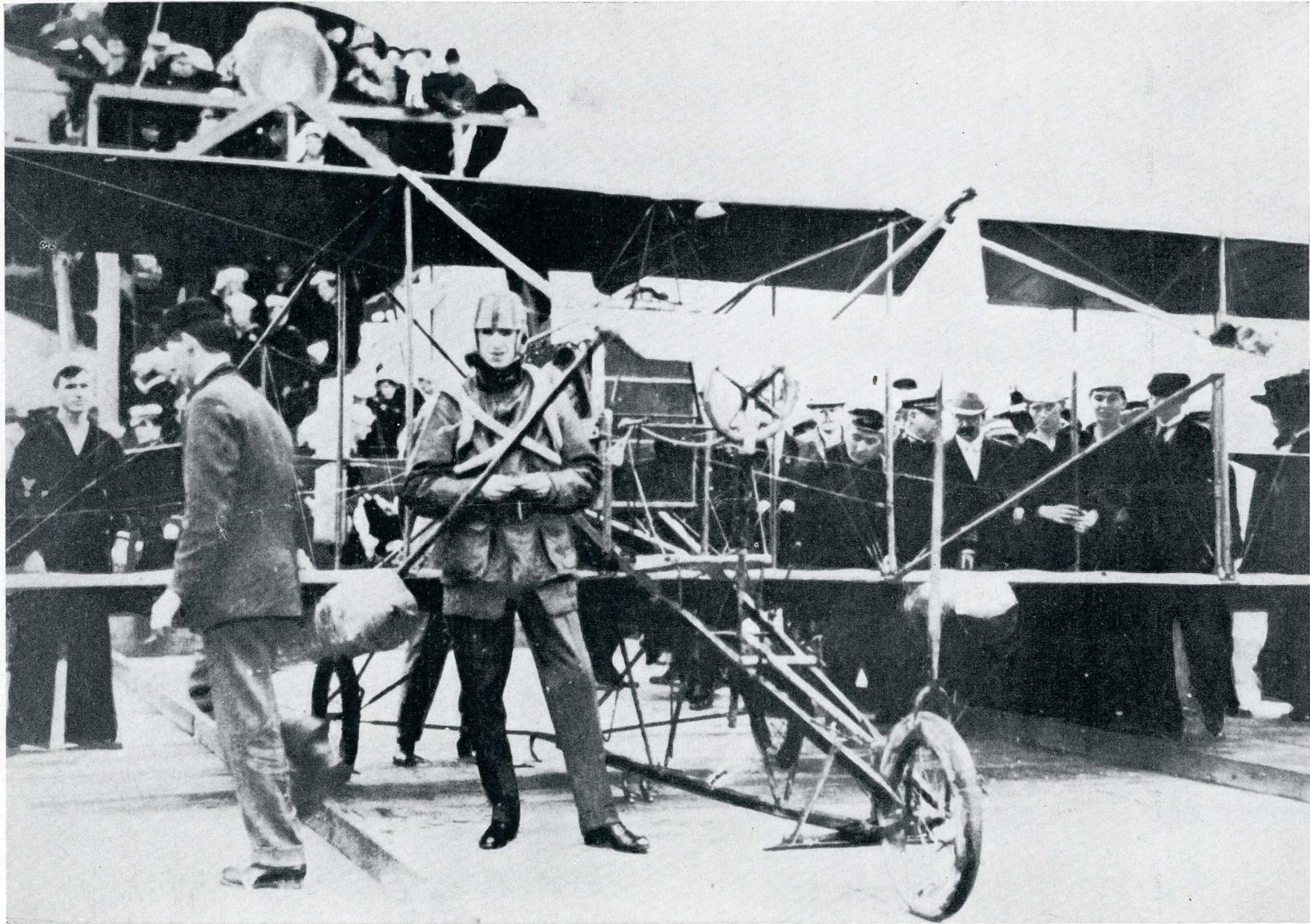


*Amelia Earhart
1931-1935*



ON THE DECK OF THE USS "PENNSYLVANIA" AFTER THE LANDING

The Airplane Has Been Turned Around and is Ready for the Takeoff. The Special Airplane Equipment and the Safety Provisions are Well Illustrated. Visible are the Rear Hook (Between the Pilot's Legs) and the More Forward Double Hook (to the Right of His Left Foot), the Spray Board or Hydro Plane Just Aft of the Forward Wheel, the Emergency Pontoons Outboard of the Center Section, the Bicycle Tubes Worn by Ely as Life Preserver, and the Football Helmet

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DEPARTMENT OF ECONOMIC PLANNING

Eugene B. Ely, 34 Years Ago, First Proved Practicability of Aircraft Carrier

Story of First Airplane Takeoff from Battleship and Safe Return to Deck

COMDR. A. F. BONNALIE, USNR

This article has been made as factual as possible, considering the lapse of time since the events chronicled and the contradictions that exist in contemporary accounts and material published since. Many sources were consulted and Mrs. Richard Pierce, of San Francisco, widow of the late Eugene B. Ely, assisted greatly by answering the author's questions as to specific detail from her extensive scrapbooks and excellent memory. The author's knowledge of the time and events has been used mainly to insure consistency rather than substance.—EDITOR'S NOTE

EUGENE B. ELY, on January 18, 1911, made the first landing of an airplane ever made on a ship and the second takeoff. This event was the first demonstration of the possibilities of the aircraft carrier, now a most important force in naval warfare. The naval and amphibious actions of this war have been marked time and time again by the enormous power of the carrier striking force. The Navy has announced that a hundred carriers of all classes will be in service soon. This is therefore the thirty-fourth anniversary of the first carrier experiment.

As near as can be determined, the germ of the idea of how airplanes could operate with the fleet from carriers first occurred to Naval Constructor William McEntee and Lieut. George C. Sweet, when Orville Wright was demonstrating the U. S. Army airplane at Fort Myer, in 1909. McEntee was thoroughly convinced that a platform adequate for the takeoff of an airplane could be made a part of a naval vessel. During the fall of 1910 he was given an opportunity to construct one.

In the meantime the Navy Department had assigned Capt. Washington I. Chambers, USN, the duty of observing the development of Aeronautics. George C. Sweet, Lieutenant, USN, had been assigned as an observer and been made a member of the board of officers for the War Department that conducted the trials of the Wright Flyer. Later, after two Army officers had been taught to fly, Sweet was a passenger in that same airplane with Lieut. Frank P. Lahm, at College Park, Md., shortly before the world's first military flying school was closed for the winter of 1909-1910. The appointment of Captain

Chambers, however, marked the first serious attention paid by the Navy to the new science. The Navy was most skeptical about aircraft, and while Captain Chambers soon became an enthusiast he found little encouragement from his brother officers or in the Department.

Chambers was convinced of aviation's naval future, but realized that the airplane would have to prove itself at sea with the fleet. To do so it would have to be able to operate from a ship or go to sea on its own float. McEntee's and Sweet's ideas were advanced, approval for an experiment was granted, and the *USS Birmingham* was assigned to him for it. This ship was a scout cruiser which could correspond to what is now called a light cruiser. She was commissioned in 1908 and was on the Navy list until 1930, was of 3,750 tons and credited with a speed of 26½ knots, the fastest in the Navy of her day of equal or greater tonnage.

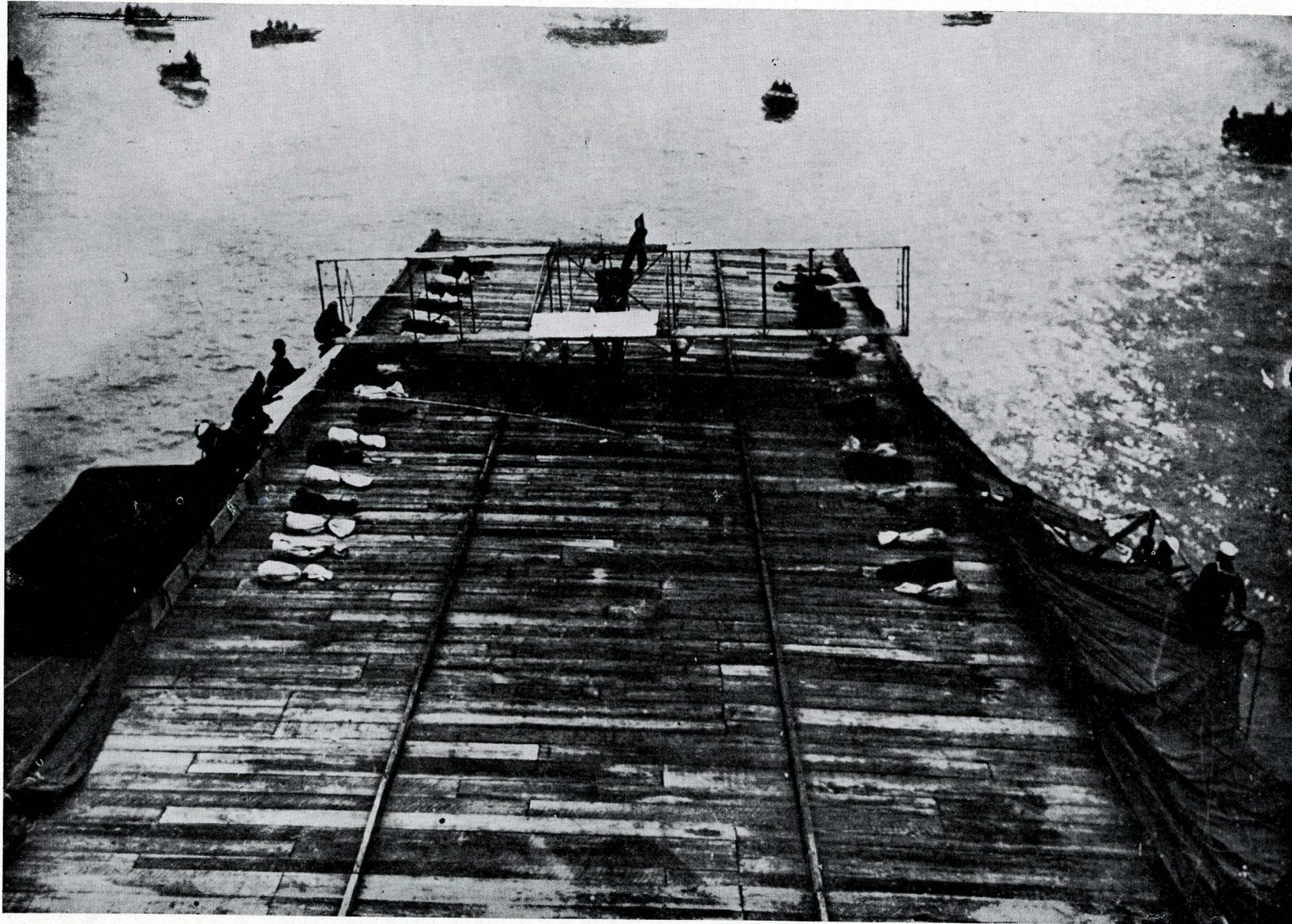
THE NAVY, represented by Captain Chambers, McEntee and others, was not alone in the desire to prove that the airplane was a naval weapon. Commodore John Barry Ryan, head of an organization called the Aeronautical Reserves, personally offered a prize of \$5,000 to the first member of his organization who would make a takeoff from a ship. The *New York World*, Joseph Pulitzer's paper, announced that an airplane would, under their auspices, carry a bag of mail from ship to shore. A platform was built under the direction of J. A. D. McCurdy, a Canadian associate of Glenn H. Curtiss and Alexander Graham Bell, who was to make the flight on the stern of the *SS Kaiserin Auguste Victoria* of the Hamburg-American Line. The sailing day, November 5, 1910, had weather that made the flight impossible. A few days later the *SS Philadelphia* of the same line was similarly equipped, but on a test run-up of the engine an oil can left on the wing fell through and wrecked the propeller of McCurdy's airplane and the test was abandoned.

Captain Chambers in the meantime had a ship but no airplane or aviator. An aviation meet was in progress at Halethorpe, Md., a few miles southwest of Baltimore. There Captain Chambers saw Eugene B. Ely, an aviator he had met at the great International Aviation Meet of 1910, a few weeks previously, at Belmont Park, New York. In those days the business side of aviation was in swaddling clothes. There was, however, big money in certain phases of it, mostly from an amusement angle, but many of the circumstances gave it a sporting aspect. There were several "factories" building aeroplanes, as they were then called. The Wright Company at Dayton, Ohio, and Curtiss at Hammondsport, New York, were the leaders.

The exhibition flyers of these two companies were bitter rivals and represented much of the competent aviator talent of the country. There were, however, certain independents who were doing notable things. Capt. Tom S. Baldwin was the leader of a group; Charles F. Willard, Earle Ovington and several Europeans such as Hubert Latham, of France, and James Radley, of England, were touring the country.

The professional flyers of the United States used one of three engines. The Wright group used Wright engines and airplanes, the Curtiss group the Curtiss airplane and engine. Tom Baldwin and his group used Hall-Scott engines and his own airplane. Exceptions to this were Charles Willard and Earle Ovington, who used the French seven-cylinder aircooled rotary *Gnome* of 50 h.p., as did Radley. Latham used another French engine, the *Antoinette*. The *Gnome* rotary was then recognized as the lightest engine for its power and one of the most satisfactory aircraft engines.

The Wright Flyers, Johnstone, Hoxsey, Coffyn, Brookins, Welch and Parmalee, were in the papers almost daily. Likewise the Curtiss group, including Hamilton, Ely and McCurdy, were equally well known. Baldwin and Mars, Ovington, Willard and other independents were getting their share of publicity. Most of the



THE LANDING OF EUGENE ELY IN HIS CURTISS BIPLANE ON THE USS "PENNSYLVANIA" ON JANUARY 18, 1911
The Arresting Gear Arrangement is Clearly Visible. The Hook on the Undercarriage is Just Picking Up its First Line. The Engine Has Been Switched Off and the Elevator is Hard Down to Hold the Airplane on the Deck. The Extra Panels in the Wings Can Be Seen Inboard of the Ailerons

time exhibition flights were made by one or more members of the several groups as they traveled through the country. At the larger cities meets were scheduled in which representatives of all gave combined exhibitions and contests. These meets built up the sporting and competitive side with prize money offered for new records or local achievements. Such a meet was the one at Halethorpe. The preceding one at Belmont Park had been a much larger affair with the International Gordon Bennett Trophy race for speed as a major event.

ELY OFFERED TO COOPERATE with Captain Chambers, in fact he volunteered to assist in the costs, for the Navy had specified "at no cost to the Navy." John Barry Ryan joined in on the financial side, for while Ely was not at this time a member of his Aeronautical Reserves, Ryan wanted to see this demonstration completed as a further proof of the military importance of the airplane.

Most of the flyers of that day were primarily showmen. Many of them had been in the amusement business as parachute jumpers, circus acrobats and in similar activities. Parachute drops from hot air filled balloons had been a regular spectacle for circuses, fairs and amusement parks for years. A few of the flyers were serious students, keenly interested in exploring the potentialities of this new thing. They cashed in on their ability to fly but their major interest was experiment, research and development. Among these latter was Ely, although he had also raced automobiles which had been an outlet for his mechanical talent and interest. His mental energy and mechanical abilities were now completely absorbed in the airplane. He was skilful to a high degree and daring to the point of complete submergence of emotion when something new was to be done.

Ely had great interest in the Navy. His ambition as a boy had been to be a naval officer. His appointment to Annapolis was nullified when he failed on the physical examination, being underweight. His naval interest was strange, too, for his was an Army family. His father was a captain in the Spanish-American War and a colonel in the Adjutant General's office during World War I. Two uncles, Hanson Ely and Eugene Ely, rose to the rank of general before retirement. Eugene Burton Ely was born in Williamsburg, Iowa, October 21, 1885, so was just past 25 years of age at this time. This was the

man who teamed up with Captain Chambers for this experiment, now so historic.

THE AIRPLANE USED BY ELY FOR THIS FLIGHT was the one that had been used by Curtiss on the Albany to New York flight. It was what was then called a pusher biplane, single surfaced. Well out in front was a biplane elevator supported on bamboo outriggers. Then came the main wings in biplane position of equal span and area. The wings were covered with cloth on the top only, the ribs being inserted in pockets in the cloth. This left much of the wing structure exposed. There was a single fixed horizontal tail, also on bamboo outriggers, and a single vertical rudder. The ailerons were separate surfaces located between the wing-tips at the front of the wings. They overhung the span of the wings by a couple of feet.

A tricycle undercarriage, all wheels on fixed axles, two of them being directly below the rear spar conformed to the usual Curtiss design. The engine was a watercooled eight cylinder 90° Vee of about 60 h.p. located about half way between the upper and lower wings with a pusher wooden propeller. The trailing edge of the wings was cut away in the center section for propeller clearance. A rectangular radiator was ahead of the engine and the cylindrical fuel tank was overhead on one side. The pilot was ahead of the wings, the seat supported on two wooden members that braced the engine bearers to the first front wheel of the undercarriage. The control system was a wheel for steering which also operated the elevators. The ailerons were connected to a yoke around the pilot's shoulders and operated by the pilot leaning from side to side.

The propeller was a two-bladed type hand carved from a laminated block. It was directly driven at about 1,200 revolutions a minute. It was the most fragile part of the airplane as shown when it was severely damaged from the spray that resulted when the undercarriage tipped the water on the takeoff.

The *USS Birmingham* was prepared for flight at the Navy Yard at Norfolk. A wooden platform 24 feet wide and 83 feet long was built sloping towards the bow at an angle of 5°. The lip of the platform was 37 feet above the water's surface.

The weather was bad and promised to get worse on the 14th of November, 1910, the day scheduled for the flight.

Most of the day was spent at anchor off Old Point Comfort, hoping the weather would clear. Ely was particularly anxious, for exhibition contracts required him to go elsewhere soon. Once destroyers were sent to guard the way to Newport News, the planned destination of the flight, only to be recalled as the weather got worse. Then late in the day a short break developed.

Preparations were made to get under way. The destroyers again set out. Ely had his engine started and took his seat. The intention was to steam into the wind to get a ten-knot breeze over the bow. Before the ship could get under way it was apparent to Ely that the weather was closing in. He gave the signal to his mechanic to release the hold back and let him go. With only a little over fifty feet to run and no help from a wind over the deck he didn't have flying speed when he passed the edge of the deck. The airplane swooped low, the wheels tipping the water before he could pull up. The propeller was damaged to an extent unknown to Ely, so he landed on the first beach, Willoughby Spit, right where the Navy seaplane operations are now conducted at Naval Air Station, Norfolk.

The interest aroused was enormous. Secretary of the Navy G. V. L. Meyer wrote, in part, the following to Ely:

On behalf of the Navy, I desire to thank you for the services you have performed, gratuitously, in demonstrating the possibility of using an aeroplane, from a ship, in connection with the problem of naval scouting. . . .

Your achievement, which was actuated by purely zealous and patriotic motives, is much appreciated.

The Navy further assumed more of the costs and Ryan gave Ely \$500 for the damaged propeller. Ely then determined to complete the demonstration by landing on a ship. He was scheduled to appear at his home city, San Francisco, at a meet from January 7th to 16th, 1911. This would make it possible for him to make the flight where he most desired to do it, before his friends.

The armored cruiser *USS Pennsylvania*, on the Navy list as the *USS Pittsburgh* until 1931, was of 13,680 tons and had a speed of 22.4 knots. She was assigned to the Pacific Fleet based at San Francisco. The Captain of this ship, C. F. Pond, was a friend of Captain Chambers who arranged for a meeting with Ely. Arrangements were quickly made, for in Captain Pond was an enthu-

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Ely Proved Practicability of Aircraft Carrier

(Continued from page 15)

siasm second only to Ely's and Chambers'. The ship went to Mare Island for the necessary gear and Ely spent much of his time consulting with the naval constructors and getting the airborne gear ready for the airplane. Incidentally, the costs of flotation pontoons, other emergency gear, the hooks, sandbags, and so on, were all borne by Ely. It is believed that much of the cost of other material was shared by Ely and Captain Pond.

The platform built on the *USS Pennsylvania* marked a considerable advance over the one that had been on the *USS Birmingham*. It was longer (120 feet), wider (32 feet), and included arresting gear to bring the airplane to a stop and hold it to the deck. The inboard end was over the after turret of the ship and it sloped five feet to a point near the stern where it broke sharply at an angle of thirty degrees for a short distance. Tarpaulins were draped over turret and over the spaces between platform and hull to add safety features in case of over running the platform or going over the side. The arresting gear consisted of carefully weighed bags of sand on lines lying athwartship of the flight deck, held about six inches off the surface with longitudinal rails between which the airplane was to land. Twenty-two lines spaced three feet were provided with 50 pounds on each end. Hooks on the undercarriage were designed to pick up these lines one by one, thereby increasing the drag on the airplane progressively. These lines and their weights together with the rails were removed for the takeoff.

The arrangement for the arresting gear was worked out by Ely after many experiments on the ground. The hooks on the undercarriage were tried out several times to be sure they would pick up the weights properly.

AS PART OF HIS TRAINING for the event, Ely practiced spot landings daily. A meet was in progress at Selfridge Field, a temporary flying field set up on meadowland not far from the town of San Bruno on the San Francisco Peninsula, about ten miles from where the ship would be. This field was so arranged that takeoffs were made to the northwest and the landings of the more skilled pilots were to the southeast. A row of temporary hangars on the south obstructed the

best part of the field which was directly in front of the grandstand. To the north a rather deep swale cut across the field and many of the unskilled came to grief on its sloping sides.

Soon it was known as calamity gulch. The normal winds, however, of January are relatively light in this area and the experienced flyers had no difficulty. Opposite the northwest end of the grandstand Ely put some whitewashed lines. These were the plan of the ship's platform and each landing, regardless of wind direction, was made parallel to the grandstand headed southerly and right onto the lines. No one knew their import but many observed their presence. This practice was in good stead for the landing on the ship was made with a slight down wind.

The airplane selected for this flight was the newest design of Curtiss pusher. It marked a considerable improvement over the one used at Hampton Roads two months previously in that the wings were now covered both top and bottom with fabric. The long nose biplane elevator had been shortened and made a single surface and tail elevators were fitted as well. The ailerons were moved to the rear struts. For this flight certain special modifications were made. The hooks to engage the arresting lines were attached between the two rear wheels of the tricycle undercarriage.

A splash board was fitted to the front of the undercarriage. Hitting the water on takeoff from the *Birmingham* indicated the desirability of this feature and it was hoped that if a water landing became necessary it would reduce the tendency to go up on the nose, a particularly bad thing with a pusher engine. The gross

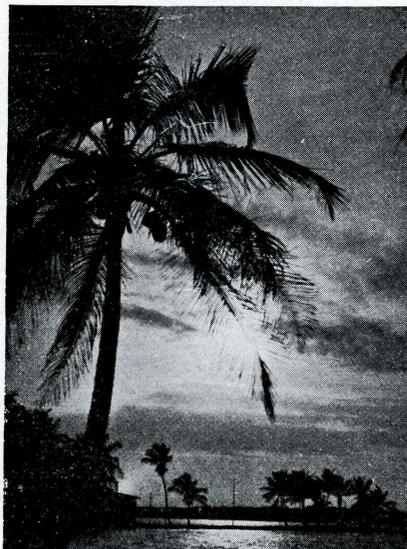
weight of this airplane was about a thousand pounds. The span of the airplane was increased by inserting additional short bays in the wings, thereby increasing the wing area appreciably and reducing take-off and landing speed as well. Emergency flotation was provided with two "cans" under the lower wing having conical ends. Ely wore a couple of inflated bicycle tire inner tubes around his shoulders and body and a well padded football helmet. Most of these things can be seen in the pictures accompanying this article.

WHEN ALL WAS READY, there were several days of bad weather. Ely watched the winds and tides carefully for it had been decided that it would be impossible to have the ship underway in the limited area of the harbor. On the 17th the promise for the morrow was good and Ely announced his intention to make the flight.

The flight was made on the 18th at the time announced in the papers. The ship swung at anchor, on the ebbing tide, her stern toward the Golden Gate. Captain Pond fired up his boilers a bit so the smoke would show the strength and direction of the wind. Ely came aboard. He missed the first eleven lines and then picked up the remaining, stopping as the twenty-second was engaged.

A couple of hours later a takeoff was made and he flew back to the field. Every essential feature of the aircraft carrier had been demonstrated. Nothing more was done in this country for more than ten years. The British, however, carried on and by 1918 had three aircraft carriers. Their arresting gear was a very complicated system of both longitudinal and athwartship wires on the deck. We adopted this gear for the *USS Langley*, a converted collier our first carrier, and it was installed on the *USS Saratoga*, and *USS Lexington*, converted Battle Cruisers. Shortly after these latter ships were put into service the longitudinal wires were abandoned and only the athwartship ones retained with their energy absorption system. Thus by a long somewhat devious road we returned to essentially Ely's arrangement.

Eugene Burton Ely, however, didn't see all this. He crashed and was fatally injured at Macon, Ga., October 19, 1911. Years later he was posthumously awarded the Distinguished Flying Cross, for the flying man one of the most coveted of decorations.



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