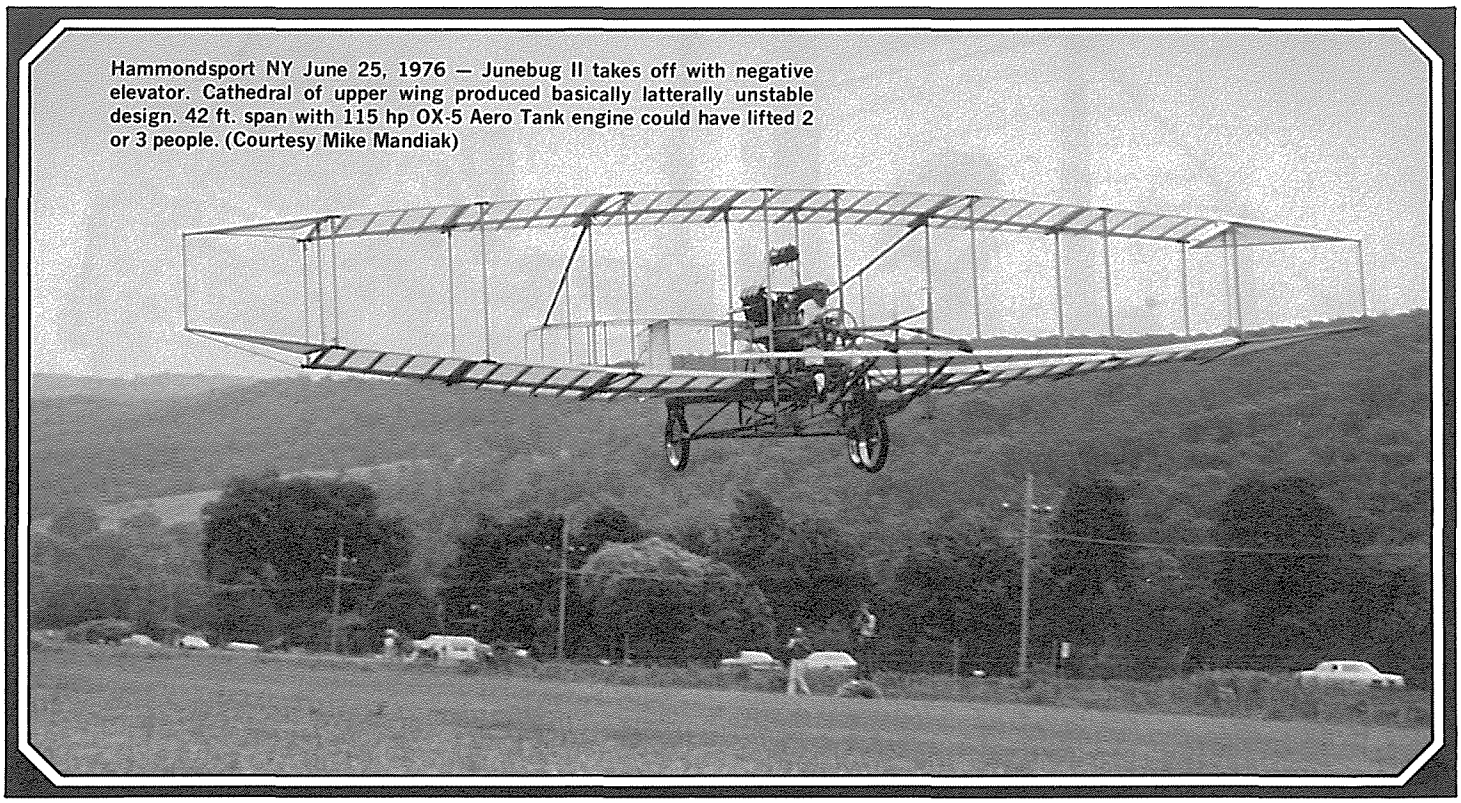


Hammondsport NY June 25, 1976 — Junebug II takes off with negative elevator. Cathedral of upper wing produced basically latterally unstable design. 42 ft. span with 115 hp OX-5 Aero Tank engine could have lifted 2 or 3 people. (Courtesy Mike Mandiak)

June Bug II

by Herman L. Schreiner

With Charles Foster Willard having "gone West" one year ago on January 31, 1977 at age 94, the AAHS dedicates this account of the "June Bug II" to him. The first successful student[1] of Glenn Curtiss, he became recognized as U.S. Airman No. 4[2] in 1909 as the first exhibition pilot to use Curtiss planes beginning with Curtiss No. 1 the "Golden Flier."

During the past several years, Charles had become a great admirer of David Fox, IBM engineer and pilot for Cole Palen at "Old Rhinebeck", for his ability to fly such a wide variety of antique aircraft. During the development of the replica "June Bug II," Fox received much information from Willard invaluable to him in anticipation of what the flight characteristics of this bird would be.

Perhaps the following poem, "Exaltation" written by Margaret Woodin Couche, a writer from Newport Beach, California who was a neighbor and close friend of Willard since 1928, best captures the zest for life which he felt.

EXALTATION
(To Charles Foster Willard)

I know the joy of eagles in the sky . . .
I too have wings my brother made to fly
A shell of armor with a roaring heart
For me to pilot. . .lift off and depart
At rocket speed through Heaven's dazzling space . . .
Above the storms that wash earth's troubled face . . .
While climbing rainbow clouds in man's creation
My senses throb with God-like exaltation.

Catching on the first half swing of the wood pusher prop, the OX-5 engine springs to life. David Fox, venerable flight instructor of over 40 years of flying and daring pilot for Cole Palen of Old Rhinebeck Aerodrome, twisted the motorcycle-like throttle on the control wheel and the 115 H.P. Aero Tank version of the OX-5 thrust the June Bug II down the strip of Bath-Hammondsport N.Y. airfield.

It was June 23, 1976, and in observance of the Bicentennial, a re-enactment of the July 4, 1908 Glenn Curtiss June Bug flight at Hammondsport which won for him not only the Scientific American Trophy for a flight of over 1 kilometer but also pilot license No. 1 from the Aero Club of America in recognition of the first "officially observed and recognized publicly announced flight in America." With the aid of the Curtiss designed steerable nose wheel, Fox swung the replica gracefully into the wind, conscious of the several years of planning and 19 months of volunteer construction it represented.

Though the historic craft had been flight tested some 11 days earlier on the airfield at Dansville, he was fully aware of her capricious nature. While the tests had garnered a flight of 15½ minutes at an average 50 MPH and reached 500 ft. altitude, a far cry from Curtiss's flight of 5,090 ft. in 1 minute 40 seconds . . . nevertheless her extremely tail heavy tendency and reluctance to drop her nose had resulted in a bent landing gear with a sagging brace wire chewing up the precious wood pusher prop.

Fortunately, Ray Hegy of Marfa, Texas, noted prop expert, had advised Fox of an effective epoxy mix and the concoction

David Fox in the "cockpit." Vane airspeed indicator located on left forward tubular support. Control wheel has rear rudder control wires, engine controls — connected to "push pull" fwd elevator (foot stirrups nonfunctional). Tachometer and oil pressure instruments on left side of seat are read from mirror image. Shoulder yoke controls tip ailerons. Fox is wearing Early Bird cap loaned by Smithsonian's Louis Casey. Bamboo exterior tubing houses inner steel tubing structure. (Courtesy Mike Mandiak)

"It's a wonder Glenn Curtiss didn't kill himself." Test pilot David Fox at Dansville.

had successfully mended the damage even to the extent of "balancing out."

It was an historical moment publicly. He glanced down to his left in the mirror in which were reflected the readings on the tach and oil pressure gauge which the FAA had required.

Adjusting his goggles and tightening his 'Early Bird" colorful checkered cap made famous by the late Charles F. Willard, he looked down the strip aware of such luminaries in Hammondsport's "Cradle of Aviation" Bicentennial reviewing stand as the Smithsonian's Louis S. Casey, Mrs. Florence Illig, former secretary to Curtiss, Mrs. Otto Kohl, wife of the former Curtiss Museum founder, C.R. Rosenberry, Curtiss biographer, Dale Crites, 69-year veteran Curtiss 1911 Pusher Builder/pilot, and his ubiquitous 'dogfighting" associate Cole Palen.

Grasping the wheel firmly he settled himself into the aileron control yoke seatback, pushed the elevator control forward to compensate for the tail-heaviness and gave the throttle control a twist. No full throttle here, as Curtiss needed to get the original 40 H.P. bug airborne. After a 100 foot run the 42 foot span 1200 lb. craft lifted easily and amid the din of the crowd climbed in the direction of Bath. Leveling off at 400 feet about 1½ miles out, Fox executed a shallow turn toward historic Keuka Lake, thence a "first" right hand turn and a let down with a flare-out to a touch down on the strip, cutting the switch directly in front of the speakers platform.

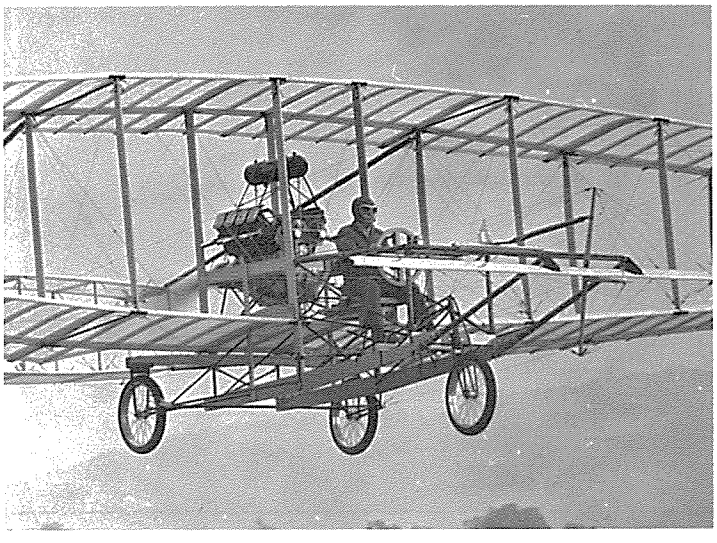
Appropriately, the great Glenn Curtiss or "G.H." as Hammondsporters called him, lies interred beneath the verdant memorial park adjacent to the end of the airstrip. Likewise, Stoney Brook Farm, site of the epoch[3] making flight is located just off the present airfield strip.

The idea of constructing a static replica of the "June Bug" evolved at a meeting of the Glenn H. Curtiss Museum board of directors in October 1974. The "June Bug" was the third of four planes built by the Aerial Experiment Association (AEA) which consisted of Dr. Alexander Graham Bell, Glenn H. Curtiss, two Canadians, J.A.D. McCurdy and Fredrick W. "Casey" Baldwin and Lieutenant Thomas Selfridge, on loan from the U.S. Army.

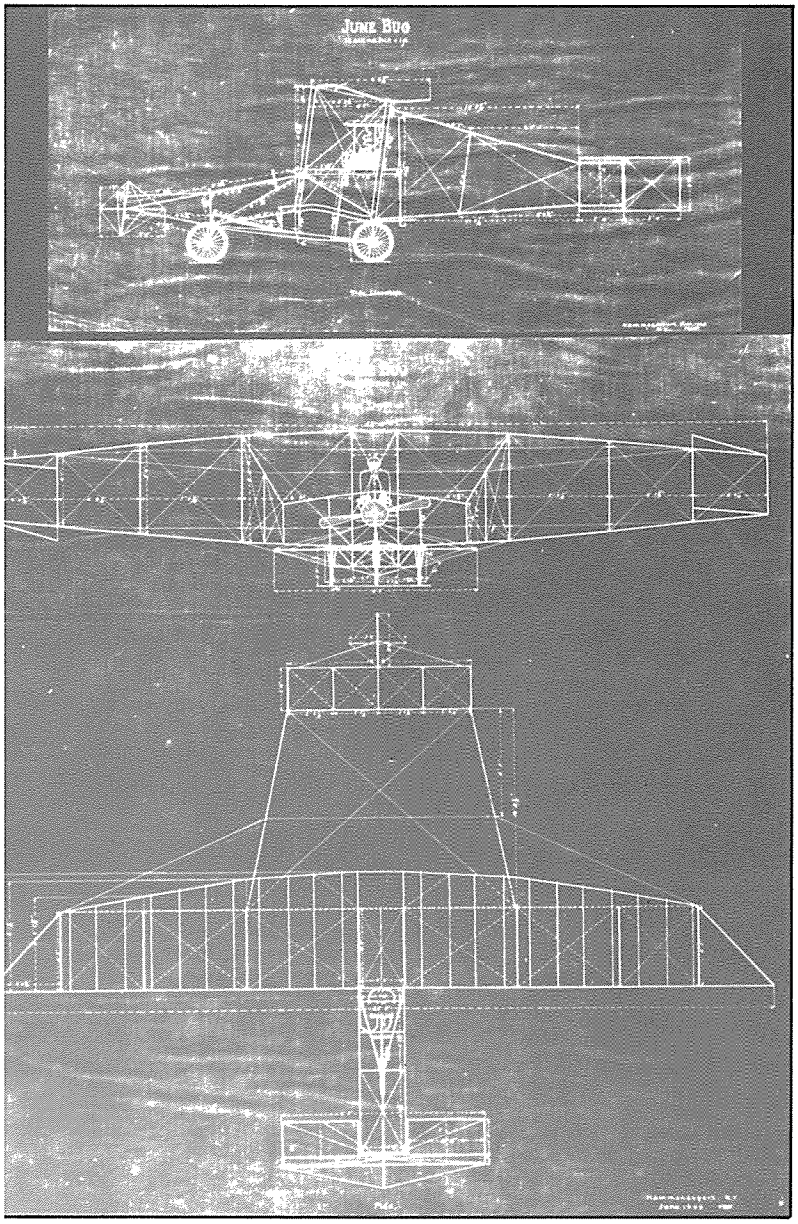
In searching for background information, it was found there were no blueprints of the "bug" at the museum, only patent sketches. Available photos were not clear on the

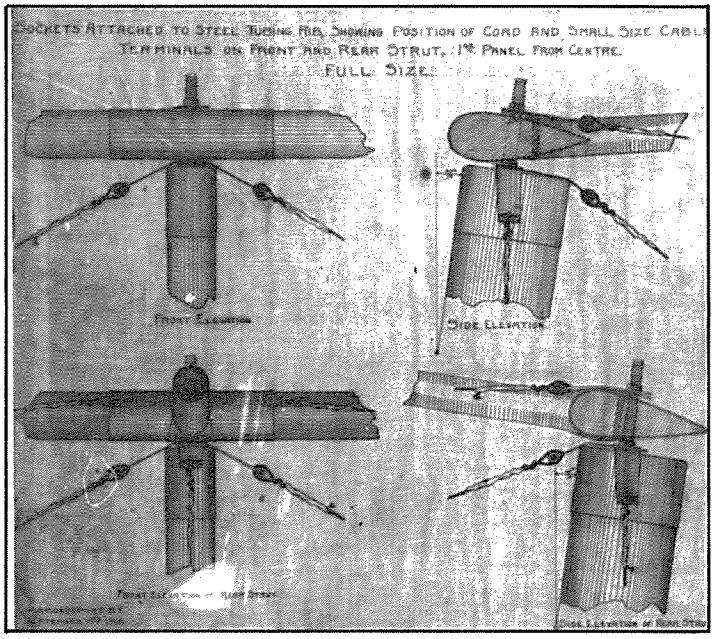
Test flight of June Bug II—Dansville, NY, June 11, 1976. Note horiz. stabilizer cellule ends still covered and excessive amount of down front elevator necessary. (Courtesy Steven Havill, The Chronicle-Express, Pen Yan, NY)

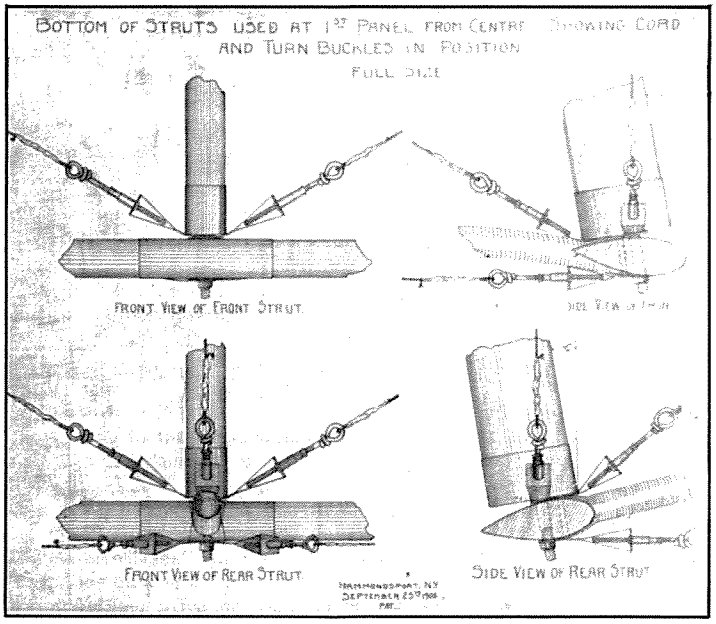
June Bug, David Fox at the controls, lifts off from Dansville Municipal Airport (approximately 30 miles from Hammondsport, which did not have a runway that Fox felt was proper for testing purposes). The test flight, not publicly announced, was attended only by a very excited group of Mercury Aircraft employees and probably an even more excited photographer from a local newspaper.



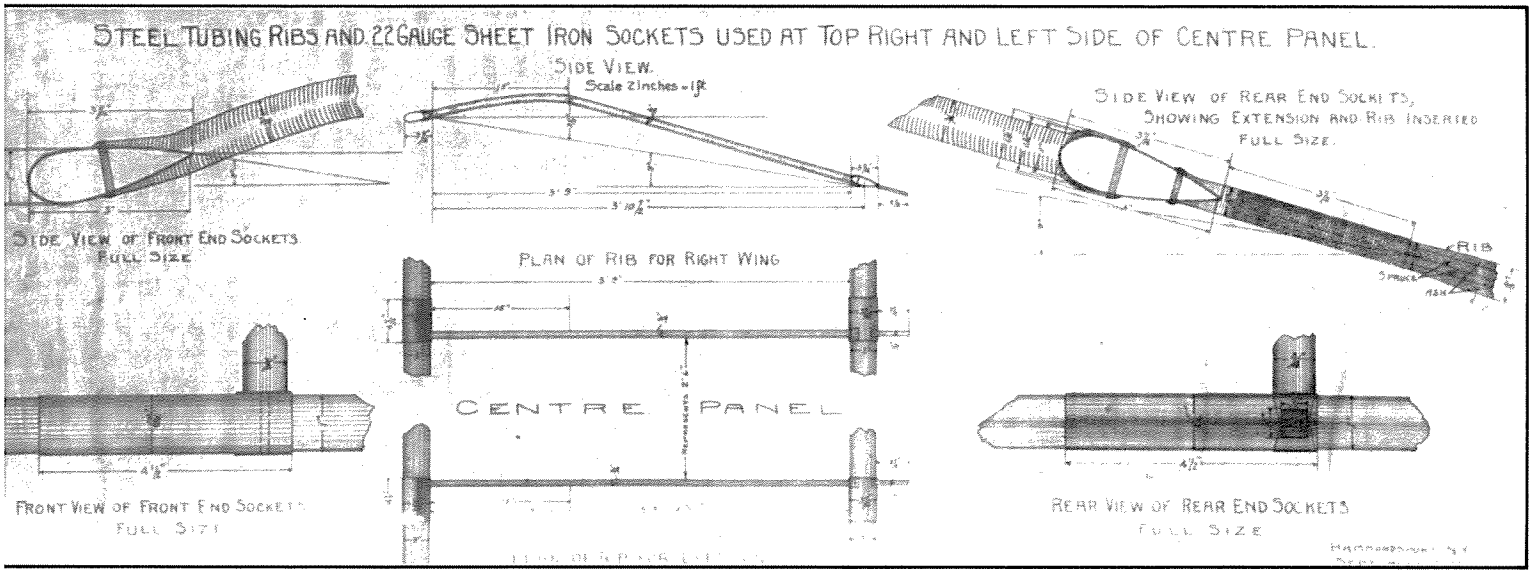
Dave Fox at Hammondsport, June 1976. Checkered cap is Paul Garber's Early Bird Cap. It was copied from Charles Willard's Early Barnstorming Cap. (D.R. Fox).

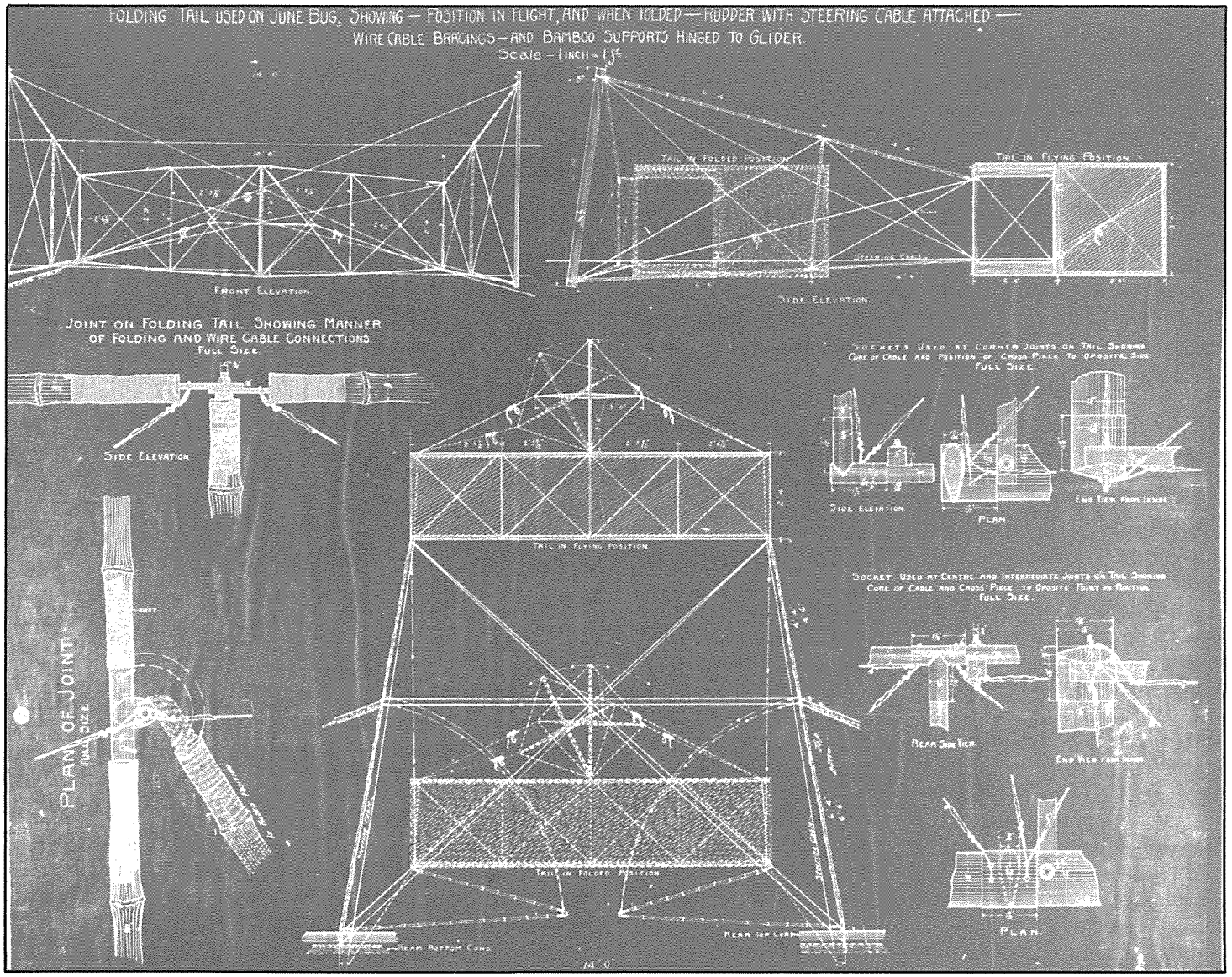


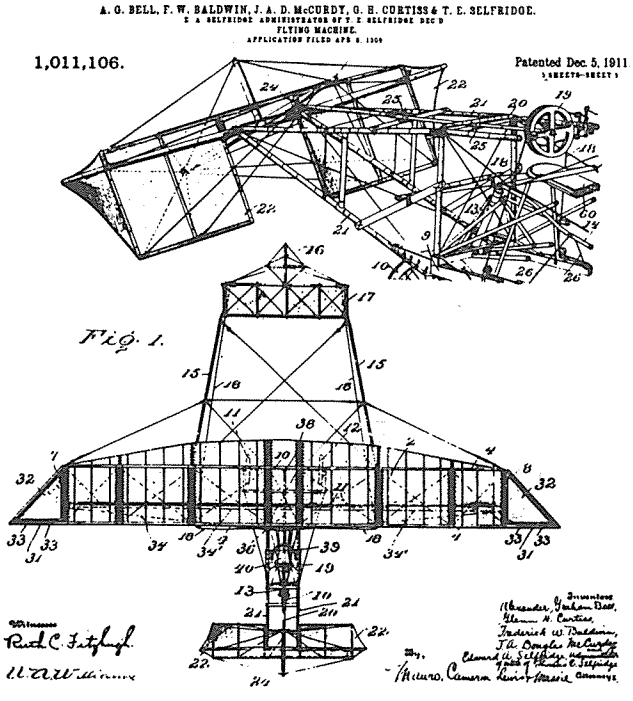




Original plans for June Bug. (Courtesy Louis Casey, Smithsonian)







construction details. A check of the Smithsonian's Air & Space Museum rewarded the group with the detailed patent sketches and supporting information ... but still no blueprints.

The Canadian National Museum, repository for the "Silver Dart", the fourth and final AEA aerodrome which has the original Curtiss "June Bug" engine, was then contacted with a resultant set of photos and blueprints with fine detail. However, it was questionable how much of this information could be utilized toward the construction of the earlier built "June Bug."

Finally, an article on the AEA written by Curtiss July 17, 1909, was unearthed which provided considerable dimensional data. And then, wonder of wonders, as the word began spreading about Pleasant Valley that information was needed about G.H.'s "June Bug," old photos began appearing from attics and trunks. These plus the Lynn Bauter Collection were loaned to the Board. It was the "blowups" from these photos which ultimately provided the much needed details of the front end and tube framing construction.

Enter Cole Palen. While visiting Hammondsport he learned of the project which he endorsed with a major

reservation. The implacable airman was heard to say – "It isn't an airplane unless it flies!" Palen's statement put the project in a new light and it could only be resolved by his being asked if he would fly a working replica. With his affirmative answer, the project was begun in earnest.

W.W. Babcock Company in Bath donated seasoned Sitka spruce. Bamboo was obtained in Hoboken, New Jersey, from the same company that had supplied Curtiss. Since such material records no longer existed, many samples had to be tried before settling on a smoked Japanese bamboo that had a minimum of cracking.

When it was found that all bamboo cracks to some extent, Dale Crites, veteran builder of a 1911 Curtiss Pusher was contacted. His comment was, "Why do you think we use all of that black tape on the joints?"

Although Cole Palen offered the use of a water-cooled OX-5 type engine, this would not have been authentic. Fortunately, an air cooled Aero Tank version of the OX-5 was located in a Curtiss Robin at the Hammondsport Glenn Curtiss Museum.

David Fox, who has been flying one airplane or another since his first ride in a Curtiss Jenny in 1921, was high in his praise for Joe Meade, Jr., president of Mercury Aircraft Inc., of Hammondsport, whose company was directly descended from the Aerial Service Company formed in Hammondsport in 1920 by Henry Kleckler, Curtiss's revered mechanical engineer. Meade provided the funds for the noble experiment and several of his personel donated hundreds of hours of time. Notable among the volunteers was Harry Saltsman whose untiring mechanical genius converted the Museum Aero Tank engine into the ultimate power plant. Other dedicated volunteers included Ray Tillman and Karl Kohl, (museum founder Otto's son), Joe Baroody, Lynford Junt, Bud Keeler, Gordon Gray, Fordyce Slater and Jim Francis, all employees of Mercury Aircraft, were involved in the construction.

Avid aviation buffs have directed a barrage of questions regarding flight characteristics toward Fox based upon his surviving some 10 flights and the only pilot to fly the "June Bug," since Cole Palen's schedule prevented him from being involved in the testing. Joe Meade and others had the satisfaction of testing the wily bird to the point of lifting her off the strip. But her unpredictable nature and the desire to preserve her for the ultimate exhibition in Glenn Curtiss Museum dictated the wise policy of restricting the flying to such a specialist as Fox.

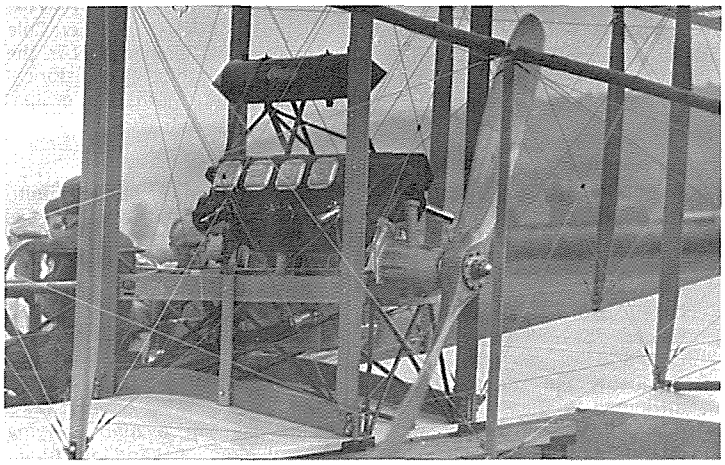
Fox, being an active instructor with Commercial, Instrument and Flight Instructor ratings, lectures at the Smithsonian on the "History of Aircraft Control Development." He has a healthy respect for the forces which govern performance in the air. His comments have included the following: "All flights are at 3/4 power. I've had it up to 62 MPH and that is about as fast a speed as it was ever designed for. The drag from all those wires and struts plus all the bracing under the wings produces an unbelievable 'flat-plate" area – no problem in slowing the bird down."

"But the controls are something of a problem," Dave said. "Flying at 50 MPH I "shoulder yoke" the aileron in and then I wait – sooner or later something happens." Queried about the most violent maneuver executed, Dave chuckled and we learned that to come out of as much as a 20 degree bank he found he had to "crank in" full top rudder with the wheel and dive to get out of the turn. No small wonder that Fox was quoted as saying, "The real miracle is that Curtiss didn't kill himself." He was reaching this conclusion comparing his experience based on over 40 years of flying versus Curtiss's perhaps no more that several minutes of flying time at this point since he had only been flying a couple of months and the flights were often only of 20-30 seconds duration. Perhaps his saving grace could have been that his reflexes had been honed to a keen edge from the participation in his many motorcycle competitive events and from his superb physical conditioning, bicycling up and down the hills of Hammondsport. He was akin to race driver Rickenbacker in this respect.

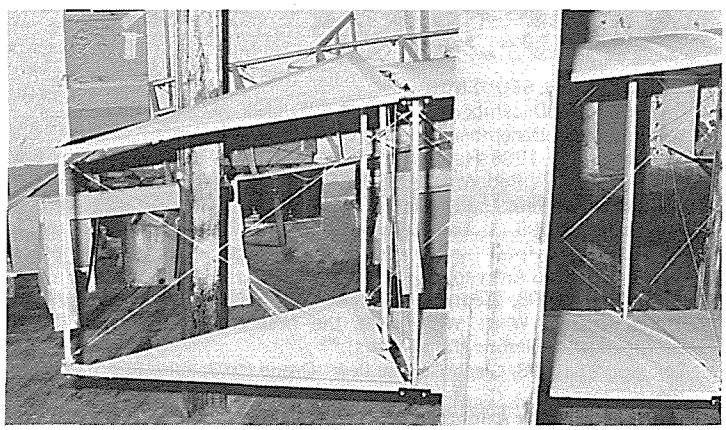
A veteran. Old Rhinebeck ace, Cole Palen, who made a special effort to perform his best in honor of the June Bug.

The nemesis of this bird is air turbulence. Dave points out that because of the tail heaviness inherent in the design, the elevator being out front wants to pivot up, hence the "June Bug" wants to nose up in turbulent air and it becomes a task to get that nose back down. In fact, landing her is a paradox. Instead of slowing her down, he has to increase flying speed to 40 MPH, get the nose down and then approach at about 35 MPH. She stalls at 32 MPH. As a result of all this testing, Fox has the externally mounted vane airspeed indicator "red-lined" at 55 MPH.

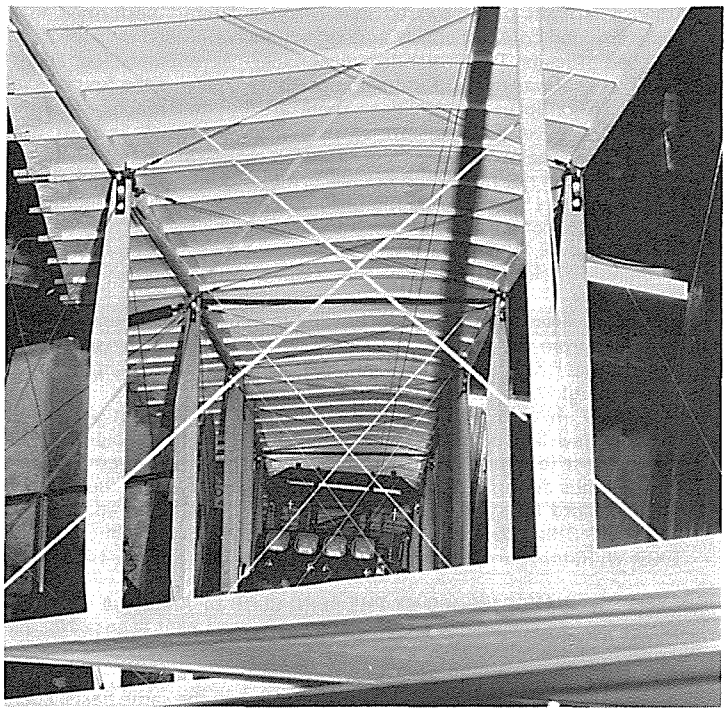
The lack of control doesn't really surprise Fox, since Curtiss was working basically in the dark as far as aeronautical knowledge was concerned. However, perhaps the most amazing find has been to learn from studying the gamut of photographs brought in by the dedicated inhabitants of the valley which produced a daily if not almost hourly progress report of Curtiss' test and resultant design modifications, is



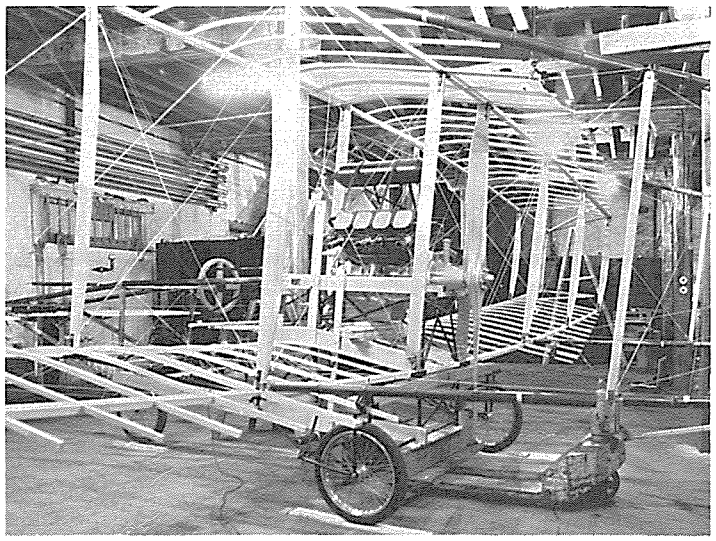
OX-5 Aero Tank Installation—115 hp engine and pusher prop furnished by Glenn H. Curtiss Museum of Local History, Hammondsport, NY. Harry Saltsman of Mercury Aircraft Inc., Hammondsport, made new intake manifold, rebuilt carburetor with OX-5 parts, adjusted magnetos and added new spark plugs. Engine weighed 400 pounds vs. 200 pounds of 1908 model. 115 hp/1650 rpm vs. 40 hp/1200 rpm (for 90 seconds) in 1908 model. (Courtesy Steven Havill, The Chronicle-Express, Penn Yan, NY)

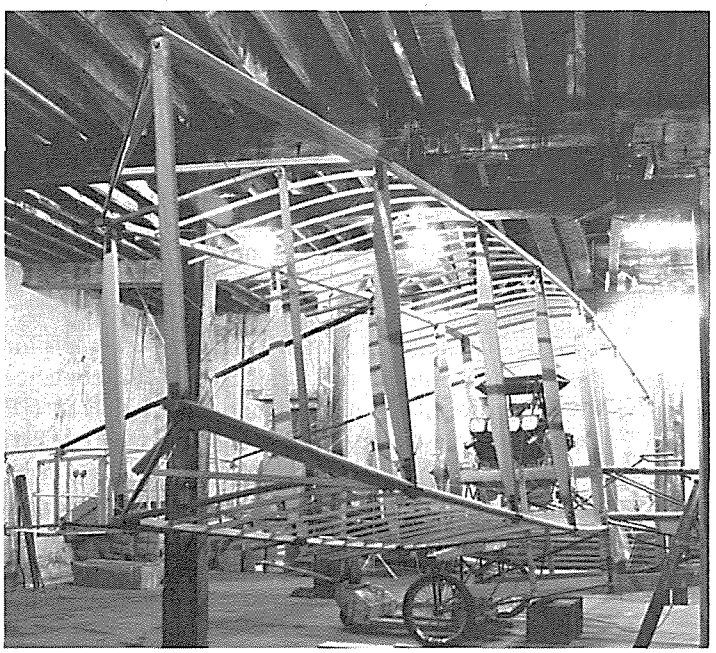


June Bug II showing aileron arrangement. (Photo courtesy of Glenn H. Curtiss Museum of Local History.)

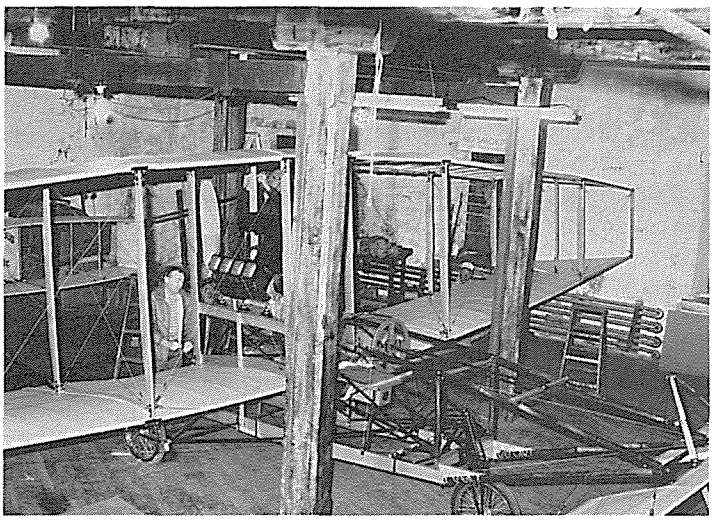


Detail of wing construction on June Bug II. (Photo courtesy Glenn H. Curtiss Museum of Local History).

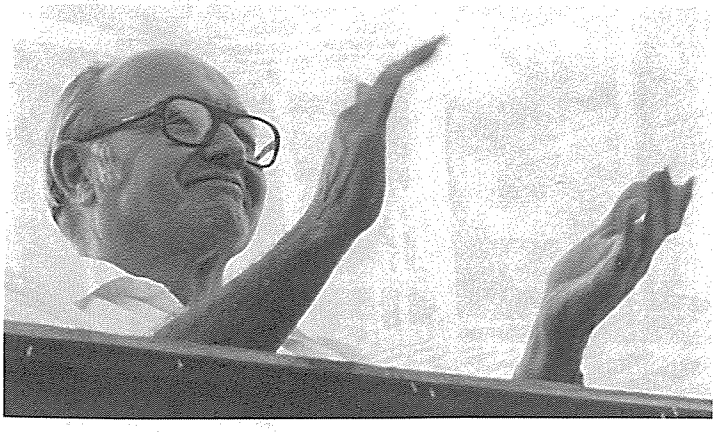




June Bug II preliminary set up of wings prior to covering. (Photo courtesy Glenn H. Curtiss Museum of Local History.)



Finishing touches are made to June Bug II in an old wine cellar at Hammondsport, N.Y. All materials and labor were donated for the project. Construction took place at the Mercury Aircraft Plant at Hammondsport Airport. Engine is an Aero Tank 100 HP from the Curtiss Museum Collection. (Photo courtesy Glenn H. Curtiss Museum of Local History.)



A very thankful, satisfied Joseph Meade Jr. It was his project from beginning to end.

that the 3 major design changes we have made are the same which Curtiss had to invoke: 1) we found we had to eliminate the fabric covering the rear horizontal end cellules since this produced a "choke" effect resulting in an almost zero rudder effect. (see photo); 2) a "trim tab" was added to the left vertical rear trailing edge of the double horizontal stablizer, which was almost like adding another small rudder. (see photo); 3) the elevator "push-pull" control ratio was reduced to 1/3 of the previous ratio to prevent "over controlling."

Fox has been quoted as realizing now, more than ever before why back then, they flew just before dark and just after dawn when the air was still. "If cigarette smoke drifted, it was too windy." Imagine the small margin of error left for Curtiss when he encountered the same effects of turbulence with his 40 HP powerplant versus Dave Fox with 115 HP "mill." "During our tests the wind was blowing 10 MPH. That is as high a wind in which the "June Bug II" could be expected to fly."

The tip ailerons, a distinct departure from the Wright brothers' wing warping technique, are connected to tie rods at the extreme tip. It was found that the first 3" of "lean" of the shoulder yoke had to "slack" – a precautionary modification to prevent setting up the controls too tightly and being unable to reverse the ailerons quickly in an emergency.

As one element of the national recognition accorded to Dave Fox, he has been requested to present his multi-media audio visual on the "History of Aircraft Control Development" several times at the Smithsonian as well as at several aviation historical associations such as the N.E. Aero Historian's meeting in Ottawa, October 7-8, 1977.

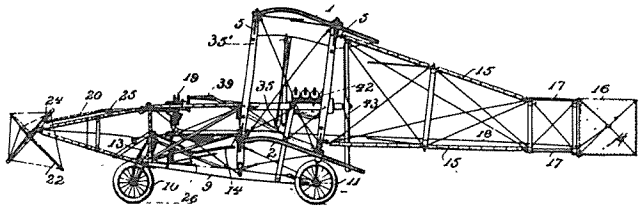
In parting comments with this modern "Wizard of the Air" we asked what was left, if anything, to complete the tribute to the genius of Curtiss. Without hesitation he replied, "Didn't Curtiss have to go to Rheims in 1909 to achieve world recognition for Yankee aerial ingenuity by winning the Gordon Bennett Trophy?" Fox's hopes to realize somewhat of a "repetition of history" did not materialize at the 1977 Paris Airshow. Instead of a flight demonstration of the June Bug II, it was decided to settle for a static display of a Ryan B1 modified to represent the "Spirit of St. Louis."

ACKNOWLEDGEMENTS

The following dedicated buffs and members of AAHS have contributed photos and information to make this article possible:
Merrill Stickler, Curator, Glenn H. Curtiss Museum, Hammondsport, N.Y.; Steven F. Havill, Sports Editor, "The Chronicle-Express," Penn Yan, N.Y.; Mike Mandiak, Staff Photographer, Glenn H. Curtiss Museum; David Fox, IBM engineer and test pilot of the "June Bug II" and AAHS member; Cole Palen, proprietor of the "Old Rhinebeck Aerodrome," Rhinebeck, N.Y.; the late Charles F. Willard, for first suggesting we recognize this historical achievement and for furnishing newspaper accounts, photos and evaluation.

NOTES

1. The first student of Glenn Curtiss, Alexander Williams of the Aeronautical Society of New York, stalled out in his first attempt in the Curtiss "Golden Flier", on July 18, 1909 at Mineola, N.Y. He damaged it severely enough to require Curtiss to repair it back at the Hammondsport, N.Y. plant (Tape interviews with Charles F. Willard, July 1975, bulletin No. 5 The Aeronautic Society of N.Y., July 1908-Dec. 1909.) Studer, "Sky Storming Yankee" Pg. 163, Scharff and Taylor, "Over Land and Sea", Pg. 91.
2. To justify the chronological sequence for flight solo qualification attributed to Willard, the author has used the following criteria: (a) a qualified solo flight by an American civilian in a man carrying heavier-than-air powered aircraft with lateral, directional and longitudinal control and of substantial duration.

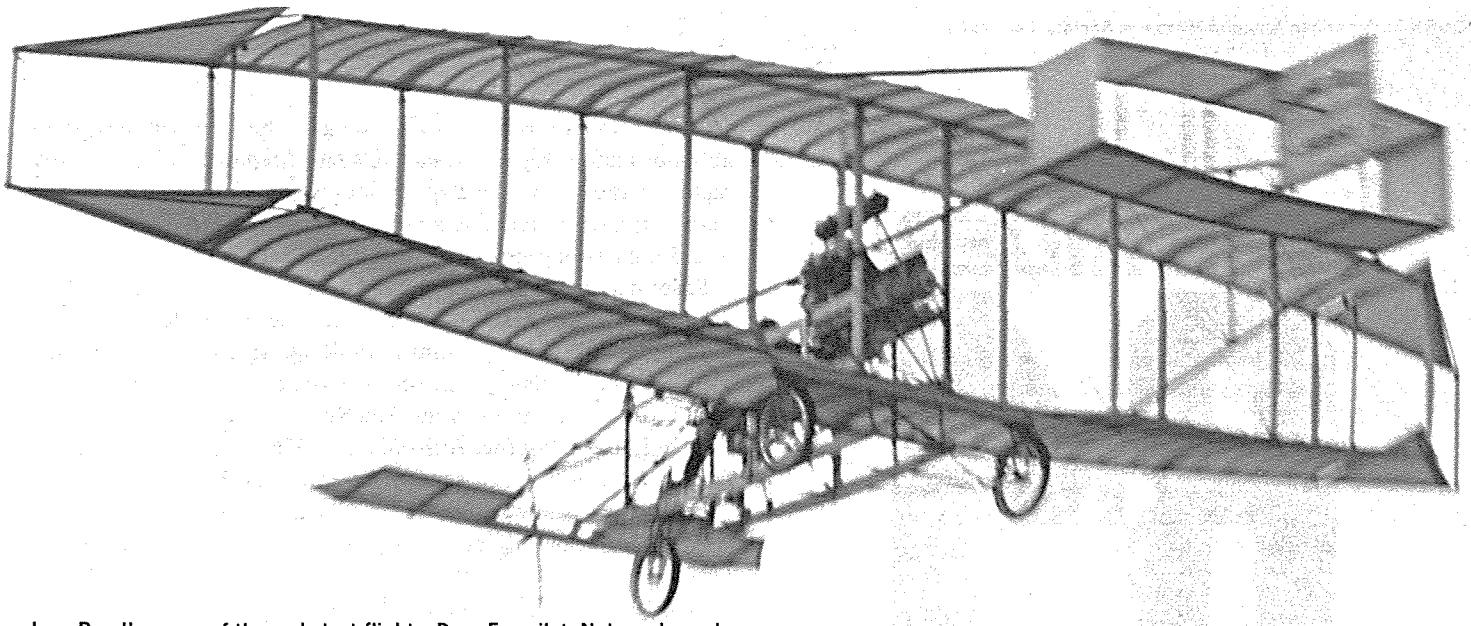


CHRONOLOGICAL SEQUENCE

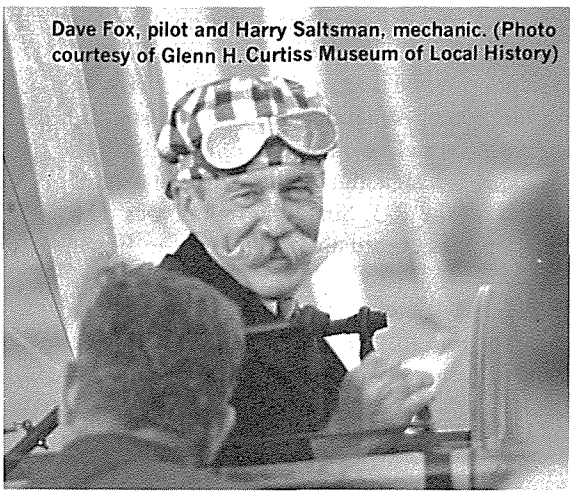
1. Orville Wright, December 17, 1903 at Kittyhawk, N.C.
2. Wilbur Wright, December 17, 1903 at Kittyhawk, N.C.
   On March 12, 1908 Hammondsport, N.Y. Casey Baldwin flew A.E.A. "Drone No. 1" "Red Wing" 318 ft. However, Baldwin was a Canadian and the "Red Wind" had no lateral control.
   On May 19, 1908 Lt. Tom Selfridge flew A.E.A. "Drone no. 2" "White wing" 2 flights totalling 20 seconds and 340 ft. Selfridge was the first officer of the US Army to fly.
3. On May 21, 1908, Glenn Curtiss flew the "White Wing" 1017 ft. in 19 seconds. The "White Wing" was the first plane in America to be equipped with ailerons (tip ailerons).**
   On June 21, 1908, Glenn Curtiss flew "Drone No.3, June Bug" 3 flights, the longest 1266 ft. The "June Bug" 5090 ft, to win the Scientific American Trophy. All of Curtiss' flights were announced and witnessed publicly.
   **J.A.McCurdy flew the "White Wing" next but he was also a Canadian. Epoch is appropriated in this context since this was the first time in America a flight of a powered man-carrying aircraft performed to a predetermined criteria publicly announced and witnessed by public and qualified officials. The British technical paper "Aeronautics" commented: "This trial was really of utmost importance as it was the first official test of an aeroplane in America. There are but two machines in the world that have traveled farther in public, those of Farman and Delagrange. The Wright brothers have far outflown this in private so that America is not far behind France as might be imagined. The official flight was the 15th made by the machine. All have occurred under far more adverse conditions that those encountered by French machines."
4. ***On July 18, 1909 Charles F. Willard a student designated by the Aeronautic Society of N.Y. flew the "Golden Flier" approximately 1/2 mile.
5. Ultimately even Wright aircraft resorted to ailerons for lateral control, departing from the wing warping used by the Wrights extensively. The Wright Model K Observation Seaplane and the Model L Military Scout were the first Wright craft equipped with ailerons.
   ***Willard in a taped interview July, 1976 insists that Alexander Williams flew first on July 18, 1909 and damaged the "Golden Flier." Willard went to Coney Island to hone his reflexes on amusement rides several times during the ensuing two weeks it took to repair the "Golden Flier". Willard feels this actual first flight may have occurred closer to August 3. Other claimants to US Airman No. 4: S. Vaughn, May 23, 1909; W. Raton, June 2, 1909; and Waldo Waterman, July 1, 1909.

LICENSE SEQUENCE ISSUED BY THE AERO CLUB OF AMERICA

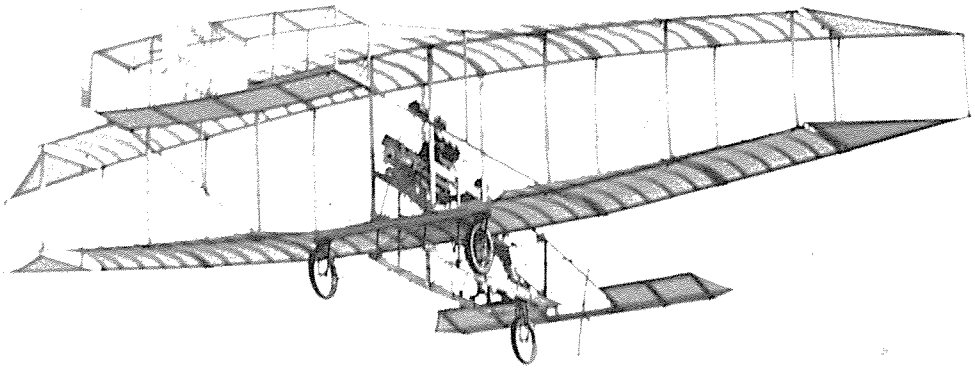
I. Glenn Curtiss (The Aero Club of America issued pilot license No. 1 to Curtiss on the basis that he was the first American citizen to make a publicly announced flight in the USA.)
   (Curtiss was issued French pilot License No. 2 on the same basis. Louis Bleriot had license No. 1.)
10. Charles F. Willard.



June Bug II on one of the early test flights, Dave Fox pilot. Note end panels on horizontal stabilizer. They were removed and a trim tab added. (Photo courtesy Glenn H. Curtiss Museum of Local History.)



Dave Fox, pilot and Harry Saltsman, mechanic. (Photo courtesy of Glenn H. Curtiss Museum of Local History)



Hammondsport, NY, June 23, 1976—June Bug II with end cellules of horiz. stabilizer removed for more effective rudder control. Note vertical trim tab on L.H. end of horiz. stabilizer. (Courtesy Steven Havill)

June Bug II tests under way with Cole Palen, pilot. (Photo courtsey of Glenn H. Curtiss Museum of Local History.)

Joseph Meade, Jr., tests June Bug II chassis at Hammondsport in March of 1976. Note stearable nose wheel adapted by Curtiss from his motorcycles. The control wheel turns rudder and nose wheel making ground handling very easy. (Photo courtesy of Glenn H. Curtiss Museum of Local History).

June Bug II about to make the first flight at Dansville, N.Y. Cole Palen pilot, Joseph Meade, Jr. (standing), president, Mercury Aircraft Co. Inc., at Hammondsport, NY, and Chairman of June Bug II Construction Committee. (Photo courtesy of Glenn H. Curtiss Museum of Local History).