Rosenberg of the P37

The magnificently restored Bleriot as it appears today in the main exhibition building of the
Bradley Air Museum (UTC)

The Connecticut Aeronautical Historical Association acquired its Bleriot in 1975, having been purchased from Mr. Shirley Wardle, of Jerome, Idaho, through the generosity of United Technologies and its suppliers. A circa 1911 aircraft, our Bleriot is a more advanced version than the one made famous by Louis Bleriot when he crossed the English Channel in 1909. It has a Morane or Farman type landing gear, sturdier and less troublesome than the original Bleriot gear, and a modified cabane.

Wardle had first purchased the airplane in 1967 with the intent of restoring it to flying condition so that he could spend his retirement years touring the country and putting on exhibition flights.

For safety, many of the old parts were removed and replaced with new parts. More and stronger wires were installed. New, stronger fittings replaced the original ones. Some rotten wood was also replaced. Modern fabric replaced the old. Finally, a modern 65-hp, four-cylinder Continental engine replaced the old 30-hp, two-cylinder Detroit Aero engine. This necessitated a change in the location of the pilot's seat to keep the aircraft center of gravity within acceptable limits.

However, Wardle had the foresight to preserve all of the old parts and pieces in the event that the aircraft was ever converted back to its original configuration, when its flying days were over.

When the Museum acquired the Bleriot, a decision was made that the aircraft would no longer be flown. While some minor modifications were made to bring the aircraft back to its original configuration, the major restoration effort, replacing all of the old components, was delayed so that the Bleriot could immediately be put on exhibit, a position it was to enjoy until that fateful afternoon in October 1979.

The Bleriot had been suspended from the hangar roof just inside the entrance to the indoor exhibit when the tornado ripped the roof off of the building. The force of the wind snapped off both wings and tore the engine loose.

In the aftermath of the storm, the Bleriot was disassembled and put into storage while the more urgent requirement of reopening the Museum became paramount. Restoration of the Bleriot was delayed. Neither manpower nor finances were available.

Providentially, the Bleriot restoration did not have to wait very long. Malcolm "Nick" Nichols, a long time member and skilled in aircraft restoration, offered to take the Bleriot to his home in Southington and re-
store it. Museum officials eagerly accepted this very generous offer. His wife, Jean, a journalist with a local newspaper, wrote the following account of his effort, which we are proud to reproduce below. Jean's photographs complement the article.

We owe a sincere debt of gratitude to Nick Nichols and his small crew of dedicated helpers for their magnificent restoration. Once again the Bleriot is able to enjoy a position of honor in the new Museum, the first aircraft the visitor will see upon entering the new exhibition building.

* * * *

RESTORATION OF THE BLERIOT
by Jean Nichols

The completed Bleriot, assembled for the last time in Southington, prior to being transported to the Bradley Air Museum.

I can't believe its gone! After two years and approximately 2,000 manhours, the 1909 Ernest Hall-Bleriot airplane has been restored. It has left my home and will once again be on display at the Bradley Air Museum.

There are not very many people who can boast of having a real airplane in their house, and believe me, it caused many people passing by the open garage to do a double take.

The Bleriot was one of the many airplanes severely damaged by the October 3, 1979 tornado that hit the Windsor Locks area. The Bleriot had been hanging from the ceiling in the indoor museum building and the wood and fabric airplane was almost destroyed when the tornado took the roof off the building.

My family has been a member of the Connecticut Aeronautical Historical Association, which operates the Bradley Air Museum, for many years. My husband, Nick, volunteered to restore the Bleriot as his contribution to the rebuilding effort after the tornado.

With the wings, tail and rudder in the basement playroom, and the fuselage in the garage (oversized, thank goodness), my husband gathered his volunteer crew, which met every Wednesday evening.

When the weather was cold, the crew worked on the wings in the playroom. When the weather was warm enough, the crew moved to the garage and worked on the fuselage.

The Bleriot displayed in the old Museum had been modernized by its former owner, Mr. Shirley Wardle, who had kept all of the original parts, which were turned over to the Museum when the aircraft was acquired. The plane was restored to its original configuration as built by Ernest Hall based on pictures of Hall in his plane and using the original parts.

The restoration took 7,800 metal tacks to hold the 80 yards of cotton fabric, hard-ened by 15 gallons of dope, to cover the wings, tail and rudder.

In addition to my husband, the volunteer crew included Richard Hassick, of Plainville, and Leon Kuszik, of Forrestville. Both of these men are former pilots who not only have a great love of aircraft but much patience.

The volunteer crew also included Francis

The flying wires are being installed in preparation for attaching the wings. From left to right; Nick Nichols (supervising the effort, Leon Kuszik, Richard Hassick, and Andy Nichols.
When it came time to cut and sew the fabric, a woman's touch was needed, so Lynda Livermore, of Southington, joined the Wednesday evening crew, in addition to spending many hours at her sewing machine in her home. To be authentic, the fabric has to be sewed on the bias with French seams.

The copper tacks, placed an inch apart on each wing rib to hold the fabric in place, had to be covered with strips of material frayed at the edges. Fraying strips of cloth while watching television became a family pastime.

The worst part of the whole restoration project was the application of the dope. The smell of this liquid penetrated the whole house on the cold winter evenings when the doors could not be open. Putting up with watery eyes was one of my contributions to the effort.

Another of my duties was to provide coffee and cookies for the crew every Wednesday evening.

The caned chair which served as the pilot's seat in the Bleriot was also damaged during the storm, and Mrs. Livermore assumed the responsibility for its repair. Since she was unable to find anyone who would tackle this phase of the restoration project, she did it herself, splicing and weaving the fibers together.

My son, Andrew, also contributed his time to the project whenever he could and his most notable achievement was the lettering on the plane.

Saturday, September 26th, was the finale. The crew worked from morning until dark putting all of the pieces together, and believe it or not, they fit. The wires were attached and all of the movable parts moved as they should.

The Detroit engine had also been restored to display condition.

It was a beautiful sight to behold, but we all agreed that it would take more courage than any of us had to fly a 1909 Bleriot.

When the Bradley Air Museum dedicated its new Exhibition Building on Friday, October 2nd, almost two years to the day after the tornado almost put us out of business, and when the doors open to the public on Saturday, the Bleriot will be on display, a center of attraction once again.

Thanks, Jean, for an enlightening account of the restoration effort.
RESTORING THE BLERIOT

by Nick Nichols

Restoration complete, the assembled Bleriot sits in front of the Nichols home in Southington before it is transported to the Museum.

Everyone says that the tornado that destroyed the Bradley Air Museum was a terrible thing. It was for many people. However, there is a bright side to everything, and for me it provided a wonderful opportunity. The aftermath of the storm kept me busy and out of trouble for several years.

My son, Andrew, and I had been working at restoring the Museum's Burnelli CBY-3 for seven years. We arrived at the stage of the project where we needed extensive equipment before we could proceed. Andy went off to the Citadel, the Military College of South Carolina, and was left without a crew. (He is now an Air Force pilot.) There was not much more that I could do with the Burnelli restoration until the organization had a great deal of money and people to assist me.

I got into building and flying radio controlled model airplanes and then my wife and I purchased a cabin cruiser. CAHA and the Bradley Air Museum became a pleasant memory.

After the storm, as Don Murray and I were walking through the wreckage of the Museum, Don offered me the choice of projects to work on. Incidentally, he did not ask if I wanted to do anything. The Bleriot looked like the least of the evils and I agreed to start on it after the holidays.

In early January 1980, I informed my wife that some of the Museum guys would be coming to the house after supper. Later in the day, she told me that a big truck was backing into our drive and demanded, "What the heck is going on?" I had to tell her about the project and we stayed married.

The wings, tail feathers and engine went into the cellar. But my wife, Jean, made such a fuss when we started to take the sliding glass doors out of the playroom, that we put the fuselage in the garage.

Together with the airplane, I received a 1910 book, "HOW TO BUILD AND FLY AN AUTO-PLANE," five 1911 photographs of Ernie Hall and his Bleriot, and some correspondence. These were my plans for the restoration.

Next I needed people to assist in the project. I recruited a group from the Central Connecticut Radio Control Club. I was fortunate in getting excellent, dedicated people -- Dick Hassick, a former pilot who is a tool and die maker; Leon Kuzik, another former pilot who is an A&P mechanic; Lynda Livermore, our seamstress and all round hard worker; and Francis Cichowski, another tool and die maker who just liked the project. Fran left us mid-way through the project because of business obligations. Pete Carroll cut all of the lumber for us.

We worked almost every Wednesday evening from 7 p.m. until 10 p.m. Then we would have coffee and goodies and a bull session.

My biggest problem with my crew was that they are all excellent mechanics and I had to constantly remind them to stop doing such a good job, and to be more sloppy and try to think like an airplane builder in 1911 who really did not know what he was doing.

WINGS AND TAIL

The wings received the most damage from the storm. The spars, trailing edge and 75% of the ribs were broken. Wardle had made many changes from the original design. He covered all flying surfaces with a modern heat shrink covering. He replaced all but four of the original ribs. Those he replaced. He also changed the construction. We removed all of the new ribs and replaced them with ribs of the original construction.

Rib construction was unique. The ribs were not formed ribs as we think of them today. They are a series of blocks glued and nailed to the backs of the spars. Rib caps one quarter inch by one and a half inch are then glued and nailed to the blocks. The rib caps are not fastened to the spars. This makes the wing extremely flexible and easy to warp. Wardle had made a two strip laminate of the rib caps on all but the original ribs.
The right wing, showing the damage sustained during the storm.

We discovered the broken spar that Hall discussed in his letter. The repair was shocking. We had merely cut out another piece, ran it along the broken one and nailed it. It was more amazing to see that Wardle had left it that way when he flew it in more modern times.

Since the side by side method was the proper splice for the times, we spliced all spars that way, except the main spar. The main spar was spliced in the modern method because we felt the Hall method would not hold.

We also discovered that the way to splice a rib cap was to cut out the break and stick in a new piece. That is the way we spliced the original ribs. A variety of fasteners were used originally -- box nails, finish nails, horseshoe nails and tacks of all sizes. We used carpenters glue and one inch brass brads.

When we repaired the left wing tip, we carefully made two of everything because the right wing tip was also damaged. As we progressed to the right tip, we discovered that the pieces were quite different from the left wing although the outside configuration was the same for both.

After the wings were completed, we applied three coats of varnish to the woodwork.

Lynda Livermore cut and sewed the cloth with 45 degree seams. We stretched the material on to the framework and tacked it with a #3 copper tack, one tack went into each rib and the trailing edge every one and a half inches on top and every inch on the bottom. The fabric was then soaked with water so that it would shrink properly. The tacks then had to be taped. Lynda cut the tapes and we all helped to peel off the threads to fray the edges. The wings then received eight coats of butrate dope. The last coat of dope contained an ultra violet screening agent.

The tail was hardly damaged. It was stripped and recovered and treated the same way as the wings.

We don't want the serious aero historians to think that we goofed during the restoration. If you look closely at our aircraft at the Bradley Air Museum, you will note the left wing warps down in the trailing edge. This was done purposely. The wings were badly damaged internally when we received them, but they had held their shape. We rebuilt the wings on a jib made from the original shape. The warp was in the left wing when we received it and we built it back in.

The instruction book said to cover the wings and tail with sail cloth and varnish them. It also said to cover the components just before you flew the airplane. We did not think that this procedure would stand up over the years. Examination of the Hall Bleriot at the Air Force Museum shows that the fabric has deteriorated badly in a relatively short time. Consequently, we used cotton cloth and dope.

ENGINE

The engine on our Bleriot is a Detroit Aeroplane Company propulsion system of two opposing cylinders, six inch bore, developing about 30 hp. The Museum received the engine almost complete. Missing were the carburetor, magneto and part of the timing mechanism.

The tornado somehow removed the motor
from the airplane and dropped it to the cement floor. The Bleriot has been suspended from the ceiling in the hangar about eight feet from the floor. The right cylinder head, valves and valve lifters and push rods were badly damaged.

The engine was taken apart and the damaged parts repaired. The engine was reassembled. Strangely, it was found that the wrist pins are made of wood.

I was fortunate to be able to obtain a correct carburetor. Nick Birbarie, of the Branford Marine Railway, was the donor. We also discovered the spark system was similar to that of the Ford Model "T". However, we do not have definite proof of this, so nothing was done further with this wiring. The engine repair was quite straightforward, with only the discovery of the wooden wrist pins being exciting.

**FUSELAGE**

The fuselage had been modified considerably by Mr. Wardle during his restoration. He moved the pilot's seat forward, changed the complete control system, added a modern engine, covered the forward area with fiberglass panels, replaced the vertical and horizontal dowels with new members and replaced all hardware and flying wires with modern equipment, all of which was safety wired. Wardle had felt that all of these modifications were essential for safety in flight.

Fortunately for us, Wardle saved all of the original parts, including the nuts and bolts and flying wires.

The tornado was merciful to the fuselage. Relatively little damage was sustained. The back of the wicker pilot's seat was smashed. The top longerons just forward of the rudder were smashed with two feet of material missing on each.

We discovered the longerons to be three piece laminates. This made the repair relatively easy. Pete Carroll cut the strips. We dove-tailed the joints, laminated the new pieces and stained them. Except for the slight color change, the repair is hardly noticeable.

The remainder of the fuselage was not so easy. We wanted to use as many of the original parts as possible. We had the five 1911 photos blown up as we needed all the help we could get.

Now, the project really slowed down. Some nights were spent replacing one or two parts. We used the photographs and the pieces and our best detective abilities to put things back where they belonged. Often,

The Bleriot restoration team recovers the wing. Left to right, Leon Kuzik, Lynda Livermore, a neighbor, Dick Hassick, and Nick Nichols.

after installing a part, we would all decide it was wrong and take it off and start over. Several evenings we were so discouraged that we retired to the coffee and goodies very easily.

Once a part was in its proper position, we rummaged through a box of original nuts and bolts attempting to find the proper hardware and used that. This often took as much time as fitting the parts to the airframe.

Hall's floor boards went back to their original position. The steering column and rudder bar were returned to the 1911 configuration. All of Wardle's dowels were replaced with original pieces.

All safety wires and modern aircraft bolts were removed and replaced with either the original bolts or plain hardware store nuts and bolts. We ran out of old bolts about one third through the project. All metal parts including the landing gear were painted silver. The original bottom cabane was installed for the wing warping mechanism. Hall's tail skid was put into its proper position replacing Wardle's steerable tail wheel.

The most difficult part of the project was the installation of the wires. Wardle had saved all of the original wires, but they were a tangled mess. The photos showed the landing gear clearly. We were lucky to find
Dick Hassick and Leon Kuzik hard at work repairing the right wing of the Bleriot. They replaced the correct wires and installed them using Hall’s turnbuckles.

The wire bracing from the pilot’s seat to the tail was even more of a problem. We had the original wires. However, the photographs were not clear enough to show them in position. We finally gave up and left Wardle’s wire in place because we could not verify their placement accurately.

Lynda Livermore replaced the back of the pilot’s seat. We all tried contacting every basket weaver and caning expert in Central Connecticut to have the seat restored. No one would touch it. One woman tried to buy the seat for her living room. She said it was the most beautiful wicker seat she had ever seen. So we stuck “fearless” Lynda with the job. When everything was in place, the fuselage received several coats of clear varnish.

The rudder and elevator controls were amazing. The original rudder bar looks like the steering bar from an old sled. Close examination showed the wires leading to the rudder were twisted around the bar. The wood was well worn where the wire had cut into it. The wires went directly to the rudder horn where the slack was taken up with bed springs.

The elevator was similar. Two holes were cut into the steering column above and below the floor boards.

The wires went directly aft to the elevator horn. Moving the column back and forth moved the elevator. The horn itself was a masterpiece. It was an extremely fine two-piece aluminum casting. I showed the horn to several knowledgeable people who said it was an absolutely superb piece of work.

The wing warp wires went from the spokes of the steering wheel through the floor boards to the mechanism on the bottom cabane. Again, we could see where the wire cut into the wood.

CONCLUSION

Several things come to mind about this aircraft. The literature, correspondence and photographs certainly prove that this is the Ernest Hall No. 1. The question remains, where did Hall get it? I believe that either Hall purchased a kit or a wreck and modified it.

The wings, tail and fuselage from the cockpit forward are pure Bleriot. The workmanship on these parts was quite good for the times. Even the turnbuckles are amazingly simple but functional. Hall explains the landing gear in his letters. He frequently broke the original gear, so he made a new one. However, the after portion of the fuselage is very odd. The Bleriot "U" bolts are gone. The assembly is a series of dowels and wires in a very odd arrangement, all with quite shoddy workmanship. This leads us to believe that Hall had a partially built aircraft, a partial kit or a wreck. He then added the dowell arrangement as best he could. This is purely an educated guess.

Our restored Hall-Wardle-CAHA Bleriot is now complete. What you see is a completely original engine with a new propeller. The fuselage is 95% original including the landing gear. The tail is 10% Hall, 90% Wardle. The wings are 15% Hall and 85% CAHA. The covering is 100% CAHA.

This had been a big project, but of