



Joe Boquel at Ocean Beach, San Francisco, 1915.

The Sky Dragon

By WILLIS L. NYE

Editor's note: The late Willis L. Nye, a founding Director of A.A.H.S., was one of the most prolific draftsmen with a great interest in the pioneer aviators as well as the airplanes of later decades. His portrayal of the Christofferson Looping Biplane, shown at the end of this article, was the result of many discussions between himself and pioneer aviator Harry Christofferson, and resulted also from the great admiration he had for the troupe of fliers at Ocean Beach, San Francisco, which included Joe Boquel, alt of whom he knew. (Nye was equally proficient in the making of U.S. Navy Destroyer drawings, especially the four-stackers.) We are fortunate in having something of the sense of flying in the early days, as well as the shape of the machines in this article, submitted shortly before his untimely death in June 1971.

In 1915 and 1916 the City of San Diego staged an international exposition in competition with the City of San Francisco, which was then celebrating the opening of the Panama Canal with its Panama Pacific International Exposition. San Diego's was not as pretentious an affair, but it did equal the San Francisco's effort in presenting some famous aviator exhibitionists. Two of America's premier aerobatic pilots were star attractions, Arthur Roy Smith, and Joe Boquel. This will not concern the exhibition except as it relates to the tragic death of Joe Boquel.

Both of the pilots had performed under contract at the San Francisco fair, and indeed were on the friendliest of terms, having shared in the work at the Harry Christofferson school. Both of them were to die in their professional work, Art Smith in flying the U.S. Mail in later years, and Boquel in doing an aerial exhibition in San Diego. And both had flown the Christofferson Looping Biplane. Art Smith had several hundred hours flight time whereas Boquel had less than 200.

Joe Boquel learned to fly with Harry Christofferson. He had run away from his home in France at age 14 and made his way as a crew man on windjammers for several years, partly as a deck hand, later as cabin boy. After an enlistment in the U.S. Navy he tried professional boxing for a while, never achieving notoriety nor fame, and giving it up with a number of scars. In 1911 he was a laundry driver in San Francisco, at age 27, when he heard the sound of engines and propellers as he passed Sunset Field. Frank

Bryant and Harry Christofferson had erected hangars here, on the estuary that once separated Oakland from Berkeley, and set up a flying school operation. Both had exhibition biplanes, and it was the sight of these that determined Boquel to learn to fly.

Boquel approached Silas Christofferson, then part of the operation, with an offer to work for his flying instruction. Apparently Silas took to the young man, and asked Harry to work it out with him. Joe had a wife and daughter to support, and the laundry truck driving was not greatly lucrative, but over the next three years Boquel did his work for the Christofferson Brothers, and took his instruction as payment. He learned the mechanics of engine care at the same time.

The school biplane on which Boquel learned was a dual control Christofferson-built machine, with water-cooled engine and pusher propeller. The student sat next to the instructor and could watch every action. When Boquel was not taking instruction he was repairing or handling the airplane for other students, or building parts for new machines to be sold by the Christoffersons.

As plans for the Panama Pacific Exposition progressed the flying school was moved to what is now the foot of Sloat Boulevard in San Francisco.¹ Boquel had soloed, and was gaining experience, and also was getting to know other Christofferson students such as Lyman Doty, Lloyd Bertaud, George Walsh, and Thor Polsen. Under the patronizing eye of William Randolph Hearst, publisher of the San Francisco *Examiner* the local aviation activities were being given good coverage. Carl Wallen, a news reporter, was particularly friendly with both of the Christofferson brothers, and made flights with them on occasion. The free publicity helped the flying school to become profitable.

The management of the Exposition obtained the services of Lincoln Beachey, with some help from promoter Bill Pickens, to fly at the opening day and throughout the Fair. Beachey came to San Francisco again in 1914, while the Fair was still in construction, and flew a succession of loops in his Looping Biplane as recorded by Carl Wallen.² Throughout latter 1914 and early 1915 he was booked for exhibition all over California, and was a frequent visitor, with his mechanic Art Smith, at the Christofferson Brothers school. As usual with professionals in the same business there grew a number of friendships between Beachey and others, including Joe Boquel.

Boquel had, by early 1915, flown the Christofferson Flying Boat as well as the school machines, and the Christofferson Looping Biplane, intended to outrival Beachey, was being built with his

help. When it was finished the Christoffersons, Beachey, Art Smith, Charles Niles, and Joe Boquel each tried it out in the air. Joe had also flown two biplanes built by Art Smith, and had in a remarkably short space of time, become a proficient acrobat in the air. In fact, he learned aerobatics somewhat secretly at first. While practicing one day he made a loop, but it was within sight of Harry Christofferson, who admonished him when he landed about the dangers of doing acrobatics in a school machine of limited structural strength.

Although skilled pilots, neither of the Christoffersons was an exhibitionist, but they considered it good business to build the Looping Biplane. Finished in late 1914, it was of the usual Christofferson design with enlarged upper wing, and large ailerons on a negative raked wingtip. It was test flown by both of the brothers and both pronounced it good. It was felt there would be a good market for leasing it to aerobatic pilots. At the same time, Warren Eaton was building for Beachey the monoplane, the Little Looper, which was to be Beachey's last airplane and the one in which he was killed. Beachey kept the machine at the Christofferson's but flew it little until after the opening of the Fair.

The Panama Pacific International Exposition opened on February 15th, 1915 with a great opening performance by Beachey. As the star attraction he performed nearly every day, and was persuaded by the Fair officials to use his Little Looper, though he reluctantly consented. On March 14th he was killed in it when the wings folded and he crashed in the San Francisco Bay, an event witnessed by thousands of fairgoers.³

Soon afterward, Art Smith, who had been Beachey's mechanic but was also a pilot of some skill, was signed to perform at the Fair, as were Charles Niles and Silvio Pettrossi, and Joe Boquel. Joe leased the Christofferson Looping Biplane for his performances, and between the several pilots there was a daily performance before the Exposition. Art Smith tried an innovation of his own, not previously done by Beachey, flying at night with Roman candles tied to the wings. Takeoffs and landings were made on the 2,000 foot grassy field alongside the Exposition grounds, near the foot of the present Golden Gate Bridge. Boquel, by now confident and not to be outdone, did the same.

The Exposition closed in December 1915, and aviation, at least the exhibition feature, was in the doldrums. The Bay Area had been temporarily worked out, so Boquel took his performances

to the California valleys, with a memorable performance at the California State Fair in Sacramento in 1916, and one at Tanforan, south of San Francisco, in which he set a new world record for successive loops.

Shortly after his Tanforan performance, Boquel leased one of the Art Smith biplanes. Smith had gone to Japan, leaving one biplane in custody of the Christoffersons, one which was more powerful than the Christofferson Looping Biplane. At a night performance on the beach near San Francisco he crashed. The engine quit at the top of a loop, and unable to start the engine by diving, he failed to recover quite in time and the resulting crash, seen by his wife and daughter, was thought to be his last. However, when the watching crowd rushed forward they found Boquel standing up relatively unhurt. The Smith biplane was later rebuilt.

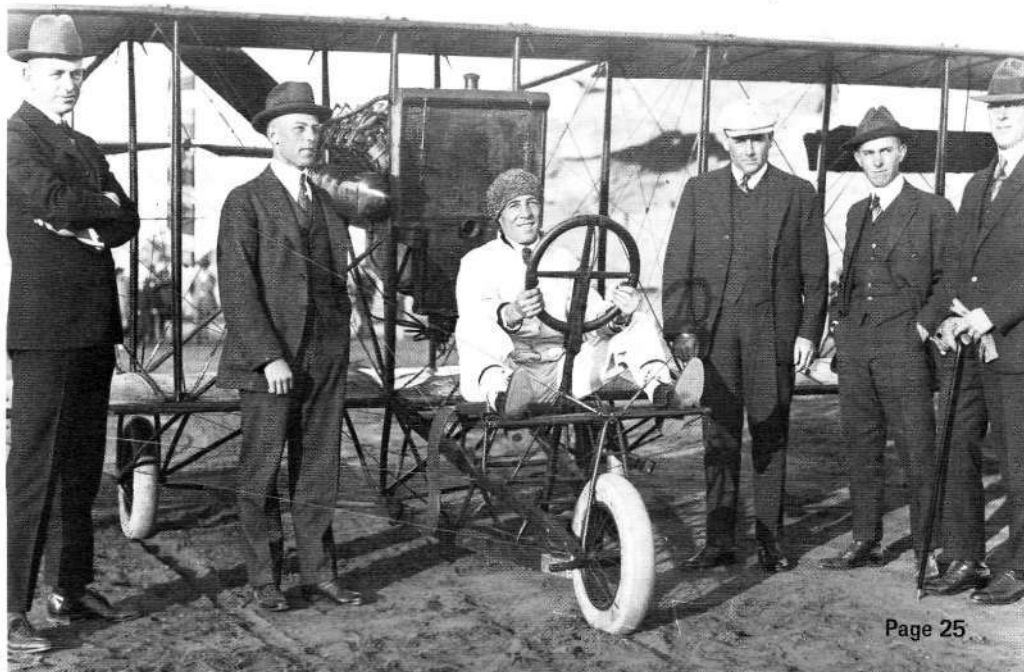
In a publicity stunt, to revive interest in aerobatic performances, Boquel landed on the lawn of the City Hall in San Francisco, and was promptly accosted and cited by a waiting police officer. The event, although staged, did receive wide publicity.

Art Smith returned from Japan, having cut the tour short because of serious injuries in an uncontrolled landing. He was already contracted to race an auto at Tanforan, and Joe took his place. Smith had also signed to perform at the San Diego Exposition in 1916 as the aerial attraction but this time, after a few days he took up a contract for exhibition flights in the Mid-West because they were more lucrative, recommending Boquel, again, in his stead. Boquel was then under the management of promoter Billy Bastar, who handled the bookings for Art Smith, and he leased one of Smith's biplanes as well as taking on Steve Oliver as mechanic. Steve was a former Art Smith mechanic.

By latter 1916 Joe Boquel's bag of tricks, his aerial performance, was much the same as other pilots in routinely describing a series of steep turns, spirals, loops, dives and stalls, sometimes flying close to the viewing public, and making fast landings. Art Smith had, on his second appearance at the San Francisco Exposition the year before, added a new one, a climb to the top of a loop, then steeply diving and rolling several turns before recovery into the bottom of the loop. This was not a tailspin, since most of the early pusher machines would not perform a true tailspin. Joe decided to use the maneuver in his routine at San Deigo.

Boquel flew regularly in September and October at the San Diego Exposition which was to close in early November. He had made

Joe Boquel and friends at San Diego Exposition, 1916. At left is Lt. William Ord Ryan, later Major General, USAF (Ret). He and Lt. J.R. Altontain were then assigned to Rockwell Field. Boquel is seated in the Art Smith Biplane in which he was killed on Nov. 4th. Oscar Brindley, another famous pre-WWI pilot is third from right, with Lts. L.S. Churchill and C.C. Benedict 2nd and 1st respectively. (Photo — Historical Collection, Title Insurance & Trust Co., San Diego)





Art Smith, who traveled extensively with Lincoln Beachey as mechanic, later performed in his place at the San Francisco International Exposition of 1915 in this biplane of his own make. Smith was killed after World War I in an airmail accident. (Courtesy of Author)

numerous friends among the City fathers, as well as flying officers at the Naval Air Station on North Island, and as a result of his continued good performances, Exposition officials planned to give him an award of commendation before his contract was finished. It would be presented to him on Saturday, November 4th at the conclusion of his performance in the afternoon by the President of the Fair association.

At about 3:40 p.m. Joe took off in the Smith biplane to do his usual routine of aerobatics. Going into his loop/spiral maneuver at an altitude of about 1,500 feet, he apparently misjudged his altitude. The machine pulled partially out of the bottom of the spiral but not in time, and he crashed sickeningly. A doctor got to the scene, but Joe was already far gone, and he died before he could be moved to the hospital. The San Francisco Examiner of November 6th, 1916 stated:

'...While a crowd of more than 10,000 persons stood horrified as they realized he rode on the wings of death, Joe Boquel, the aviator, whose daring flights earned him the sobriquet of the "Sky Dragon," fell to his death in the Exposition Grounds shortly before 4:00 P.M. this afternoon. Boquel was hurled to the earth from an altitude of 2,000 feet just after he had completed a series of aerial corkscrews.

As the intrepid aviator attempted to right his machine in coming out of a long spiral, the biplane was seen to be unmanageable. For a moment it swerved in the lofty air lane, then, like a plummet, it dashed toward the earth. The machine fell on a hill just north of the Puente Cabrillo, the concrete bridge which is part of the main Exposition entrance. Guards and spectators rushed to the spot and found Boquel's crushed body under the wreckage of the plane...

Joe Boquel was more than an ordinary daring aviator. . ."

The Art Smith biplane in which Boquel crashed was powered by a Curtiss OX-2 engine of the latest type, and employed a unique

system of flight control patterned after the Nieuport type. The foot pedals controlled the ailerons, and the rudder was operated by turning the control wheel. The elevators were moved by fore and aft motion of the control wheel. While Boquel was quite familiar with the type of control, he may have overcontrolled and not been able to recover in the remaining altitude out of the spirals. Boquel may have held a presentiment of his impending death. Most of the famous aerial exhibitionists were dead when he fell in San Diego that November, as he talked about according to an article in the *San Diego Union* of Nov. 5th. Three days prior to that his good friend Silas Christofferson had crashed to his death near Redwood City, Cal., and Joe had sent a telegram of expression of sorrow to the family. Nevertheless the *Union* reported that he was undaunted by the news, and went out to give one of his best performances to date.

The reference, in the *Examiner*, was to his publicity name. Two days before he was killed Boquel had been announced by the Exposition publicity department as going to write the name of the next president of the United States, and gave full play to the name "Sky Dragon." However, Joe wasn't to be caught off base that way. When he did perform in the afternoon he did a complete series of aerobatic maneuvers, living up to the best of his reputation, but failed to write who would become President. We cannot know if it would have indeed been "Woodrow Wilson." To those who made enquiry later he merely smiled and replied, "Am I that bad a penman?"

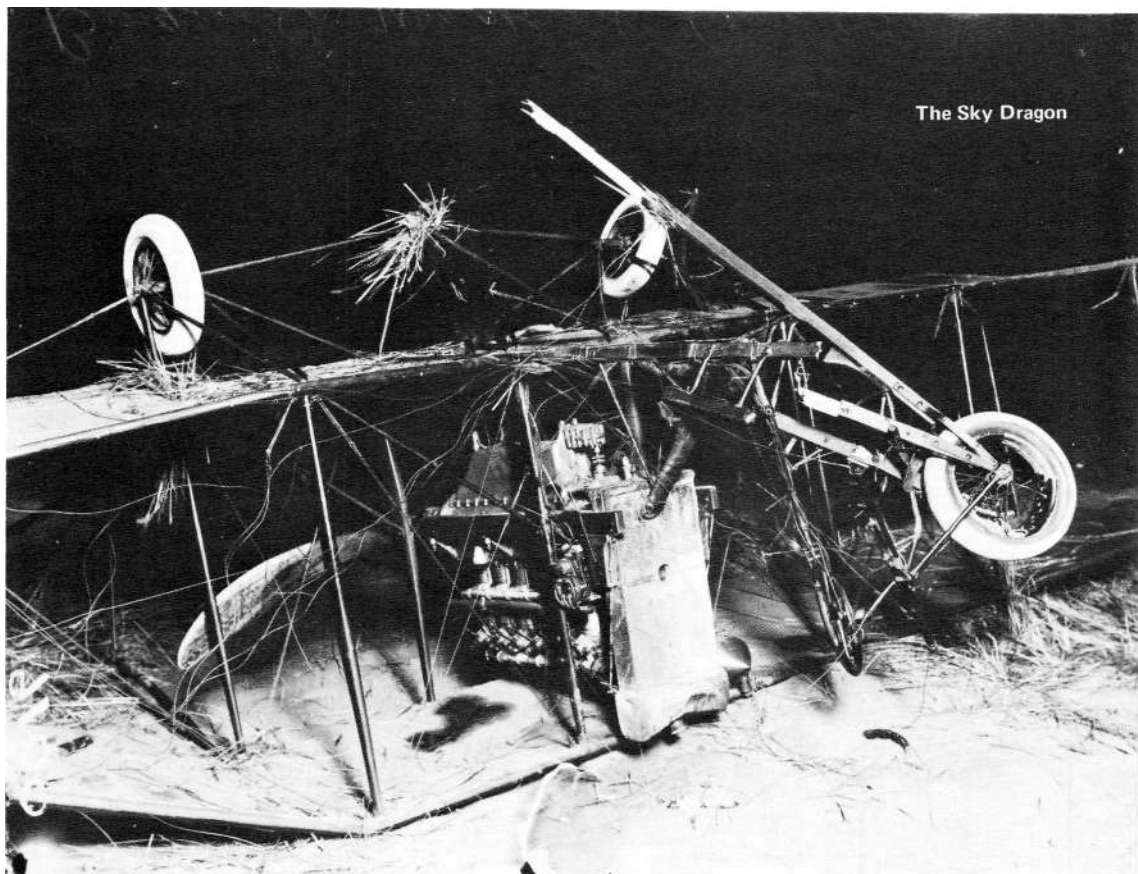
ACKNOWLEDGEMENT

The assistance of the staff of the San Diego Public Library is greatly appreciated.

NOTES:

1. Named for Commodore Sloat, USN.
2. See also photo of Beachey looping over San Francisco Exposition by Carl Wallen in JOURNAL - AAHS, Spring 1973, p. 49.
3. See "Lincoln Beachey's Last Ride," by E.D. Weeks, JOURNAL - AAHS, Summer 1961 (Vol. 6) p. 105.

The wreckage of the Art Smith biplane in which Joe Boquel was killed at the San Diego Exposition of 1916. He was performing a loop with spiral dive maneuver and attempted recovery too low. Boquel was signed up at the time to perform in the Midwest at a large figure.



CHRISTOFFERSON LOOPING BIPLANE

The accompanying drawing by Willis L. Nye was made from notes of a series of conversations with Harry P. Christofferson, and no original drawings nor specification data are thought to have existed elsewhere. The origin of the Looping Biplane can be traced to the friendly rivalry between the Christoffersons, Silas and Harry, and Lincoln Beachey. Beachey's Little Looper served as a pattern, but the Christofferson design had much less performance due to lower engine horsepower, lighter wing loading and higher weight. In the hands of the skilled Art Smith, Charles Niles, Joe Boquel and Lincoln Beachey it performed well but not spectacularly.

The airplane had a useful life of less than 60 hours, and was flown for the Panama Pacific International Exposition in 1915 by Charles Niles; it was also used by Boquel to set a new record of 30 consecutive loops in 1916. After 1916 it was dismantled and the parts were used for other Christofferson airplanes.

The wing structure consisted of four panels, bolted together at the center line. The front and rear spars were of solid straight grain spruce routed to an I-beam cross section. Main structural ribs at the strut connecting points were of solid spruce with a routed web; the intermediate ribs were of plywood with formed capstrips glued on. The covering was cotton fabric, taped and sewn to each rib. The interplane struts were of solid spruce, streamlined, and fitted into mild steel (plated) metal fittings on the spars.

The engine was bolted to bearers made of ashwood, supported by streamlined spruce struts. The fuel tank was made from light-gauge steel terne plate and secured to the cabane struts with steel strips. The main landing gear struts were of ash, and the outrigger struts were of spruce. The tail structure was spruce framework, fabric covered. The propeller was made from laminated black walnut.

The flight controls were operated by the wheel and with shoulder

harness. As the pilot leaned left the left aileron went up, the right oppositely. Pushing forward or pulling upon the wheel operated the elevators, and the rudder turned with the wheel. Ailerons were rigged best with a small droop to the wing surface.

The finish of the airplane was natural color cotton fabric on wings and tail group, sealed and varnished. Woodwork was natural color, sealed and varnished. On the rudder was "CHRISTOFFERSON AERO MFG. CO."

Specifications, as determined by Willis Nye with Harry Christofferson, were:

Wing span, Upper	372"
Lower	268"
Airfoil — Christofferson	
Gap	67"
Stagger	none
Incidence angle	4.5°
Length	230"
Landing gear tread	60"
L.G. Wheel length,	77"
Fuel capacity	21 gal
Wing Chord	60"
Wing area, incl. ailerons	266.6 sq.ft.
Aileron Area	27.0 sq.ft.
Stabilizer area	12.87 sq.ft.
Rudder area	11.5 sq. ft.
Elevator area	16.0sq. ft.
Weight Loaded	1 350 pounds
Wing loading	5.5 lbs. sq. ft

The above data was originally traced upon the vellum by Willis Nye but it was felt that the reduction to 8-1/2 x 11 inch page size would render the lettering too small to read, thus was transcribed here. Editor.

The Willis L. Nye Award was established by the Directors of the Society for outstanding contribution to the purposes of the JOURNAL, awarded this year to K.M. Molson for his article, "The JN-4(CAN)." Presented in Volume 17, No. 4 (Winter 1972).

THE ORIGIN OF THE CHRISTOFFERSON LOOPING BIPLANE CAN BE TRACED TO THE FRIENDLY RIVALRY WHICH EXISTED BETWEEN THE FAMOUS BROTHERS AND LINCOLN BEACHEY. BEACHEY'S LITTLE LOOPER SERVED AS A PATTERN FOR THE LOOPING BIPLANE SHOWN HERE. HOWEVER, IT HAD A MUCH LESSER PERFORMANCE DUE TO LOWER ENGINE POWER, LIGHTER WING LOADING AND HIGHER WEIGHT. AS A LOOPING BIPLANE FLOWN BY AN EXPERIENCED PILOT, IT HANDLED SATISFACTORILY IN AEROBATIC MANEUVERS. THE LOOPING BIPLANE WAS FLOWN IN THE SAN FRANCISCO BAY AREA. IT WAS BUILT BY HARRY AND SILAS CHRISTOFFERSON TO THEIR OWN DESIGN. THESE PLANS WERE MADE USING PHOTOGRAPHS AND VERBAL INFORMATION FROM HARRY CHRISTOFFERSON. NO ENGINEERING DATA EXISTS.

OPERATIONAL LIFE
THIS AIRPLANE HAD AN OPERATIONAL LIFE OF LESS THAN 60 HOURS. HOWEVER, IT WAS FAMOUS BECAUSE THE FOLLOWING PILOTS, IN ADDITION TO SILAS AND HARRY CHRISTOFFERSON, FLEW THIS PLANE ALL OF THE FOLLOWING BEING AEROBATIC PILOTS:

LINCOLN BEACHEY
ART SMITH
JOE BOQUEL
CHARLES NILES

JOE BOQUEL FLEW THIS PLANE ON NUMEROUS OCCASIONS OVER THE SAN FRANCISCO BAY AREA. CHARLES NILES LEASED FROM THE CHRISTOFFERSON BROTHERS TO PERFORM AEROBATIC EXHIBITIONS AT THE PANAMA-PACIFIC INTERNATIONAL EXHIBITION AT SAN FRANCISCO IN 1915. IN 1916 THE PLANE WAS DISMANTLED AND THE PARTS WERE USED FOR OTHER CHRISTOFFERSON AIRCRAFT. THOR POLSON ALSO MADE A FEW FLIGHTS IN THIS BIPLANE. ART SMITH, CHARLES NILES, LINCOLN BEACHEY AND JOE BOQUEL PERFORMED AEROBATICS WITH THIS BIPLANE. NO PERFORMANCE DATA REMAINED IN THE CHRISTOFFERSON RECORDS.

CONSTRUCTION SPECIFICATIONS

WING STRUCTURE: THE WING STRUCTURE CONSISTS OF FOUR PANELS. THE TOP AND BOTTOM WING PANELS ARE BOLTED TOGETHER AT THE CENTERLINE OF THE WING CELLULE CONFIGURATION. THE WING PANELS HAVE A FRONT SPAR AND REAR SPAR MADE OF SOLID STRAIGHT GRAIN SPRUCE ROUTED IN THE WEB TO AN I-BEAM CROSS SECTION. THE INTERPLANE STRUTS WERE STREAMLINE IN CROSS SECTION. STRUCTURAL RIBS TO SPACE WING SPARS WERE LOCATED AT EACH STRUT POINT. THE RIBS WERE MADE OF SPRUCE WITH A ROUTED WEB IN BETWEEN THE WING SPARS. THE INTERMEDIATE WING RIBS CONSISTED OF A PLYWOOD WEB FORMED TO THE AIRFOIL PROFILE WITH FORMED CAP STRIPS GLUED TO THE WEB. THE WING RIB WEB WAS PROVIDED WITH CIRCULAR LIGHTENING HOLES. THE INTERNAL DRAG BRACING CONSISTED OF RIGID SPRUCE "X" STRUTS BETWEEN THE STRUCTURAL WING RIBS TO WHICH THE INTERPLANE STRUTS ARE ATTACHED. COTTON FABRIC TAPED AT EACH RIB AND SEWN TO EACH WING RIB COVERED THE TOP AND BOTTOM OF WING PANEL. THE WING FITTINGS WERE MADE FROM MILD STEEL AND PLATED. THE INTERPLANE STRUTS WERE MADE OF SPRUCE. **ENGINE BEARERS:** THE ENGINE WAS BOLTED TO ROUTED ASH EN-BEARERS WHICH WERE SUPPORTED BY SPRUCE STRUTS. **FUEL TANK:** THE FUEL TANK WAS MADE OF LIGHT GAUGE STEEL TERNE PLATE. THE TANK WAS SECURED BY STRIP SHEET STEEL STRAPS ATTACHED TO THE CABANE. **INTERPLANE BRACING:** THIS BRACING CONSISTED OF FLEXIBLE PLATED CABLES LOCATED IN THE PLANE OF THE FRONT AND REAR WING SPARS. THE CABLES WERE SINGLE.

LANDING GEAR: THE LANDING GEAR STRUCTURE CONSISTS OF A TRICYCLE CONFIGURATION OF ASH. THE STRUCTURE FUNCTIONED TO SUPPORT THE ENGINE AND PILOT SEAT. THE TIRES WERE A HIGH PRESSURE TYPE MOUNTED ON WIRE WHEELS.

TAIL SURFACES: THE TAIL SURFACES WERE FABRIC COVERED. THE FRAMEWORK STRUCTURE WAS SPRUCE.

TAIL OUTRIGGERS: THESE WERE MADE OF SPRUCE.

FUEL SYSTEM: THE FUEL WAS SUPPLIED TO THE CARBURETOR BY GRAVITY. A HAND THROTTLE AND A FUEL SHUT-OFF COCK WERE USED.

FLIGHT CONTROLS: THE AILERONS WERE ACTUATED BY SIDEWAYS MOTION OF THE PILOT'S SHOULDER RESTS. THE PILOT'S SHOULDERS FITTED INTO SHOULDER STRAPS. THE PILOT LEANED INTO THE DIRECTION OF THE TURN MOVING ONE AILERON UP AND THE OPPOSITE ONE DOWN. THE CONTROL CABLES WERE FLEXIBLE RUNNING OVER STEEL BULLEYS. THE AILERONS WERE INTERCONNECTED. THE ELEVATORS WERE RIGGED AT ZERO DEGREES TO THE HORIZONTAL STABILIZER. THE HORIZONTAL STABILIZER WAS GROUND ADJUSTABLE. THE AILERONS WERE RIGGED WITH A SLIGHT DROOP.

PROPELLER: THE PROPELLER WAS MADE OF LAMINATED BLACK WALNUT. THE HUB WAS PLATED STEEL.

ENGINE INSTALLATION: THE ENGINE WATER COOLING RADIATOR WAS MOUNTED AT THE AFT END OF THE ENGINE. IT COOLED THE WATER BY THERMO SYMPHON ACTION. THE ENGINE WAS A WET SUMP TYPE LUBRICATING OIL SYSTEM. A SINGLE MAGNETO IGNITION SYSTEM WAS USED WITH A SINGLE SPARK PLUG FOR EACH ENGINE CYLINDER.

CONTROL WHEEL: TURNING THE CONTROL WHEEL RIGHT OR LEFT MOVED THE RUDDER ACCORDINGLY. FORE AND AFT MOVEMENT OF THE CONTROL STICK ACTUATED THE ELEVATORS.

FINISH: THE PLANE WAS FINISHED IN THE NATURAL COLOR COTTON FABRIC ON THE WING AND TAIL AREAS. THE FABRIC WAS SEALED AND VARNISHED. THE INTERPLANE STRUTS, TAIL OUTRIGGERS AND LANDING WERE SEALED, STAINED AND VARNISHED.

BIPLANE

TECHNICAL SPECIFICATIONS

WING SPAN (UPPER).....	372"
WING SPAN (LOWER).....	268"
AIRFOIL.....	CHRISTOFFERSON
GAR.....	67"
STAGGER.....	NONE
ANGLE OF INCIDENCE.....	45°
LENGTH OVERALL.....	230"
LANDING GEAR TREAD.....	60"
LANDING GEAR LENGTH (CL TO CL).....	77"
ENGINE.....	CURTIS OR-2 65 H.P. WATER-COOLED VEE-8
PROPELLER.....	CHRISTOFFERSON
FUEL CAPACITY.....	21 GALLONS
WING CHORD.....	60"
WING AREA INCLUDING AILERONS.....	266.66 SQ. FT.
HORIZONTAL STABILIZER AREA.....	129.75 SQ. FT.
RUDDER AREA.....	115.30 SQ. FT.
ELEVATOR AREA.....	160.50 SQ. FT.
WEIGHT WITH PILOT AND FUEL.....	1350 POUNDS
POWER LOADING.....	14.8 LBS. SQ. FT.
WING LOADING.....	5.31 LBS. SQ. FT.
AILERON AREA.....	270.50 SQ. FT.

CHRISTOFFERSON LOOPING BIPLANE

GRAPHIC SCALE 0 1 2 3 4 5

DRAWN FOR A.A.H.S. BY WILLIS L. NYE