Hanriot-Biche H-110 Pursuit

by Dick Sarpolus

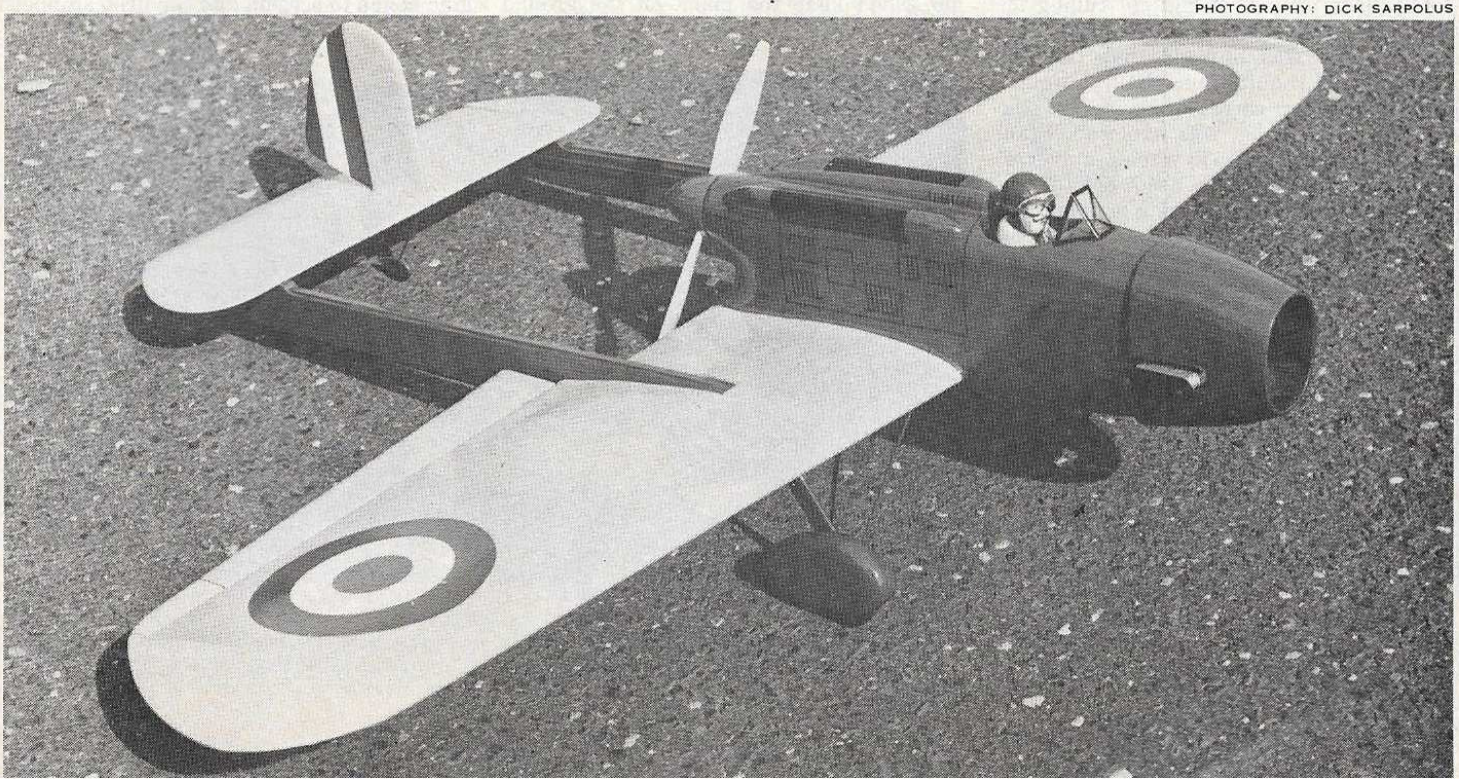
It was a great idea in 1934. An unusual Stand-Off Scale controliner using Octura's shaft, flywheel and universal.

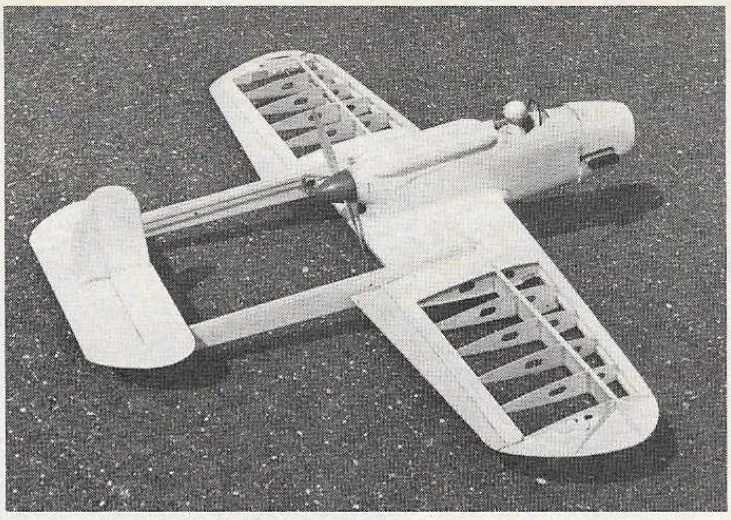
"It's a Henry O. what? How come the needle valve is up there and the prop is back here?" These are some of the comments heard at the field concerning this model, one of the more unusual projects I have had the pleasure of developing. Most scale fans are always looking for that "different" ship to model, and when I saw pictures and 3-views of this one in an old July 1934 issue of Universal Model Airplane News it looked like an interesting challenge. One thing to be sure, it is not something you will see at every flying field.

In 1934 this was the latest state-of-the-art; a monoplane that could fly over 240 m.p.h.! At that time, data on its performance and top speed had been kept secret by the French government. It was powered by a geared and supercharged 600 m.p. Hispano-Suiza engine, water cooled with the radiator mounted in the nose, enclosed in an N.A.C.A. cowling. The gas tanks were located in the center-section of the wing, and in case of an emergency could be dropped free of the plane. I would think dropping the gas tanks would just place the pilot in another sort of emergency.

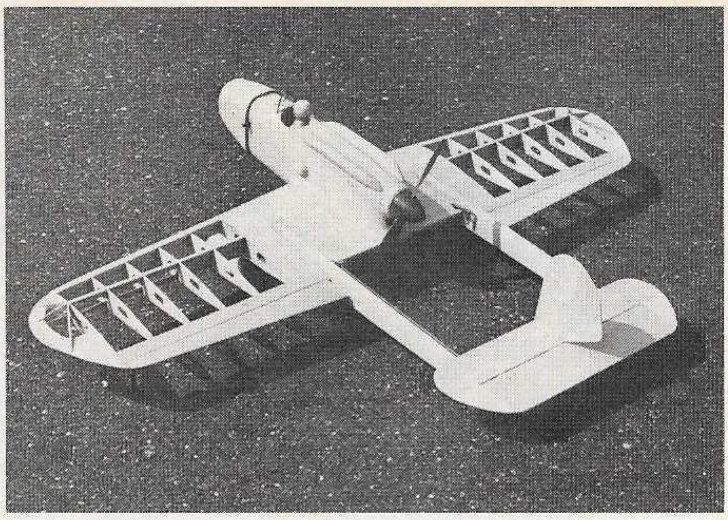
Dick and his H-110. It's an unusual configuration, one that ignites the enthusiasm for building. **Below:** Almost jet-like in looks, yet a 1934 aircraft. Engine's up front, extension shaft to prop.

PHOTOGRAPHY: DICK SARPOLUS





Exhaust muffler and forward needle valve are clues to the 13" extension shaft used to bridge the space between the inverted Fox .35X and prop.



Construction is simple, about what you'd hope for. You'll need a pusher prop, they're available. It relies on airspeed for cooling, launch fast.

It had a three bladed, adjustable pitch prop. Twin machine guns fired through the bottom of the cowl. Flight controls were push-pull rods, passing to the tail through the tail booms on ball bearings. It was planned to have the landing gear retractable on subsequent versions. Apparently the H-110 Pursuit was not too successful; at least I have never heard of the aircraft, except in this magazine. The issue did contain a three-view drawing, a photo of the aircraft, and the full color cover painting depicted it in action.

Three years passed before I began work on the plans for the model, then another year before construction was started. Once begun, the model was completed in three months. It must be classed Stand-Off Scale, as I wanted it sized and proportioned for hopefully aerobatic capabilities. Coupled flaps and elevator called for the double bellcrank arrangement due to the center-section notch in the wing. The extra linkage required is another bellcrank, it's mounting provisions, pushrods, and another flap control horn. An adjustable lead-out guide was built in to aid in trimming the ship.

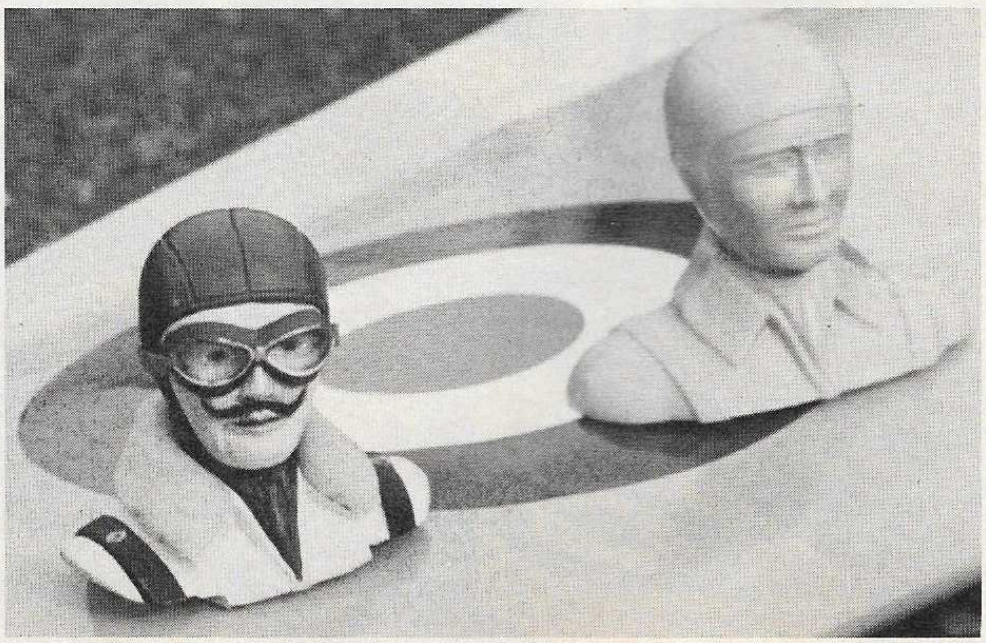
The plans were first laid out calling for the engine to be located over the wing trailing edge—it was obvious that this approach would require much ballast weight in the nose for correct balance, so the extension shaft idea was explored. Standard boat hardware; flywheel, universal joints, shafting, could be used, but the big problem was the rear bearing support and prop drive arrangement. To keep it simple, an old engine was sacrificed—the cylinder, piston, etc., were discarded and the crankcase casting cut off above the case itself. The crankshaft was modified to accept a universal joint by welding a stub shaft into the back end and turning off the counterbalance and connecting rod pin. This provides a standard prop drive arrangement and mounting lugs for easy installation. The best solution would be to use sealed, grease lubricated bearings on the shaft. Depending on your machining capability many methods could be used for fabrication of this extension shaft assembly.

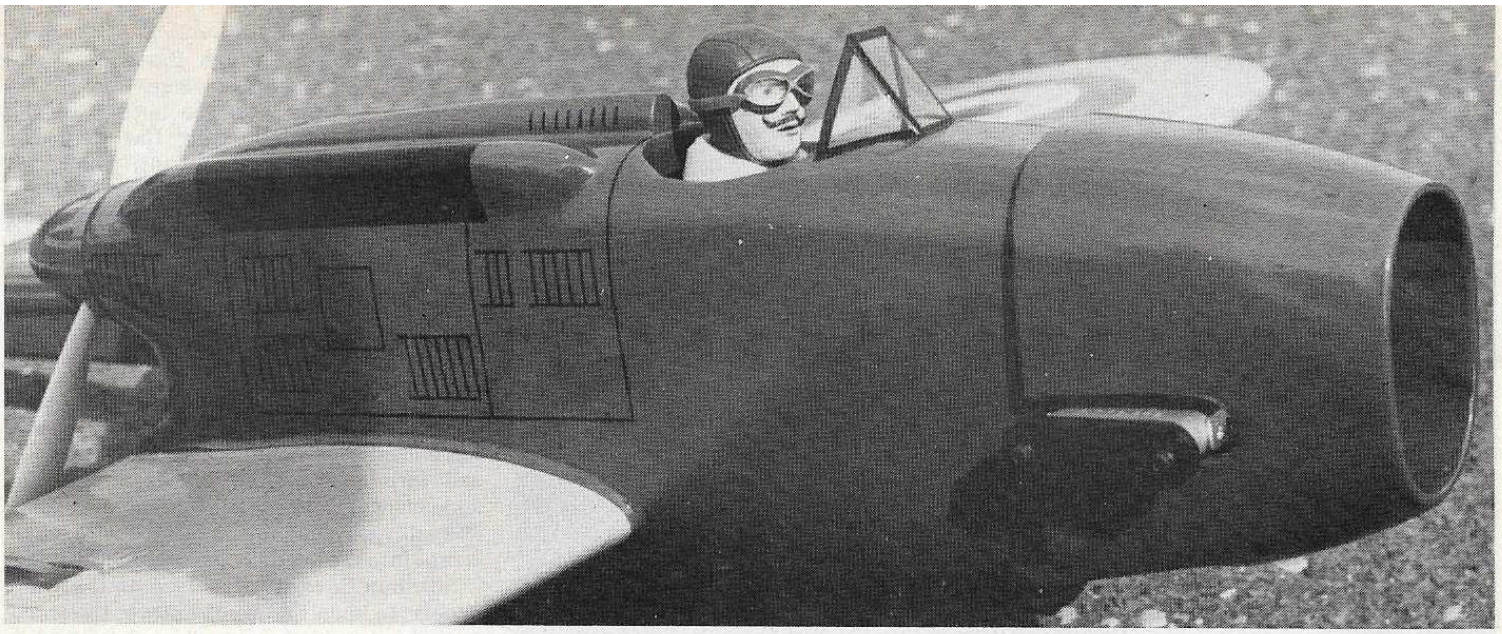
Construction is basic; built-up wing with full depth notched spar, sheet balsa tail booms, sheet tail surfaces. The fuselage is built up with 1/32" plywood doublers and has long 3/8"x1/2" maple motor mounts which take both the engine and the rear bearing support; this simplifies alignment. The fuselage does require quite a bit of carving; the rear end fairs into the spinner, engine cowlings and headrest on the top, and the front cowling all must be built on and shaped. Details as the wheelpants, landing gear fairings, fuselage air scoops, all add to the finished appearance.

The Extension Shaft

Engine starting is accomplished with an electric starter and small V-belt over the engine flywheel, as is done on many R/C helicopters. The original model turned out quite heavy; I haven't weighed it as I really don't want to know just how heavy it is. The extension shaft hardware naturally adds weight, and at the time construction was underway, I just couldn't find any lightweight balsa for that fuselage. The weight of course hurts the aerobatic capability, but it does fly quite well. If you keep the weight down it would be even better. An old model Fox .35X was used with a Tornado 10-6 pusher prop; it does a good job.. Don't keep the plane on the ground very long after the engine has been started, as it must be moving to get air flowing over it for cooling.

The first flight was more interesting than most trial flights, due to the extension shaft setup. Starting with the electric starter below the aircraft through the belt loop was easily done. We had intended to tuck the excess belt loop up into the fuselage after the engine was running but decided to leave it alone. In the air it is not noticeable. Due to the distance from the engine to the pusher prop, the exhaust is not blown away—it stays near the plane, adding to the confusion. Very noticeable is the different noise, from the engine and from the propellor. As the engine is leaned out, the noises blend together; it still sounds different from a conventional model. It is also unique adjusting the needle valve a foot away from the prop. The vibration level seemed no higher than that with a normal prop-on-engine configuration. The model seemed to take off slower than expected; possibly due to less air blast over the wing; but once in the air it flew, and responded just as any conventional model. With the fuel almost gone, the engine began to scream and the prop stopped





—we landed, obviously, and before anyone could get to the overrevving Fox, it stopped. Disassembly revealed a loose universal joint on the extension shaft.

The whole extension shaft assembly must be handled properly—file flats on the shafts where the setscrews hit, and assemble all setscrews with loctite. To be doubly sure after that first flight, I silver soldered all universal joints onto the 3/16" dia. wire extension shaft. I can't be sure about the life of the joints, but they are readily available and easily replaced. Silver soldering definitely keeps them in place. Rubber tubing over the universal joints retains grease to keep them lubricated. As mentioned before, the best propeller shaft mount would be one with sealed ball bearings—but using an old engine crankshaft and crankcase, of any type, makes the project easily handled. Long life of the bearings isn't too important as a model of this configuration probably won't be flown constantly anyway.

Subsequent flights have shown that some better method of lubrication must be provided for the rear prop shaft. Suggestions have been to put a grease fitting in the ex-air intake position, or to run a piece of tubing from the muffler to carry exhaust oil to that rear shaft. We intend to try the oil line idea.

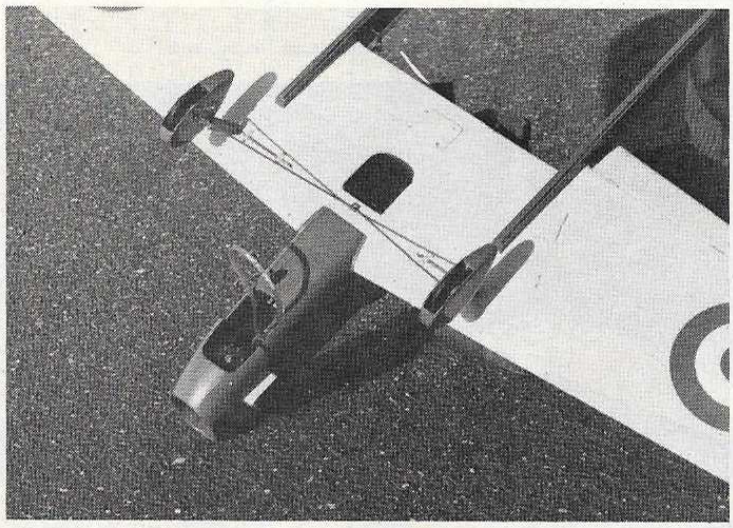
Construction

Starting with the wing, the ribs can be cut individually from the templates on the plans, or sanded to shape sandwich style between root and tip rib patterns, whichever method you prefer. The spar is 1/8" sheet balsa, notched for the ribs. Block up the ribs on your building board to keep the leading and trailing edges level for a warp-free wing. Plywood rib doublers strengthen the landing gear block installation and plywood bellcrank mounts are epoxied in. The dual bellcrank flap controls must be completely installed before sheeting the wing center-section. The adjustable lead-out guide is not a necessity for a sport ship, but I feel it is worth the effort to aid in trimming.

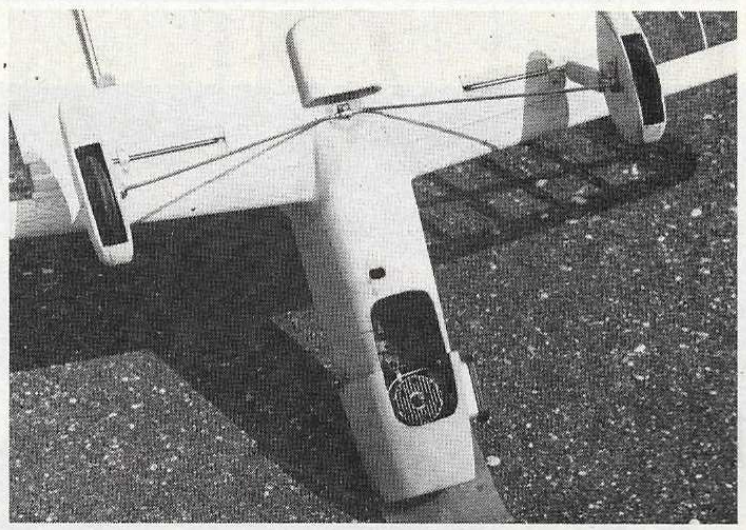
The tail surfaces are simply sheet balsa. The tail wheel and its mount are built up of 1/16" dia. wire sandwiched in the middle layer of the 1/16" plywood pieces; a real wheel and wheelpant could be used if you wish to go to that trouble. For a more rugged setup, a wire skid could be added to each tail boom, long enough to keep the center mounted tail wheel just off the ground. This way the horizontal stab would not have to take the tail wheel shocks. The tail booms are cut from 1/2" balsa; the 1/8" x 1/4" pieces top and bottom are added to simulate the shape of the original aircraft.

The tail booms are epoxied to the wing, and the tail assembly epoxied to the booms. Alignment is important; tail booms mounted perpendicular to the wing trailing edge, and parallel to the wing center line so the horizontal stab and the wing are both level. If you get to this point and lose interest in the fuselage you can always put an engine on the wing and have a combat model.

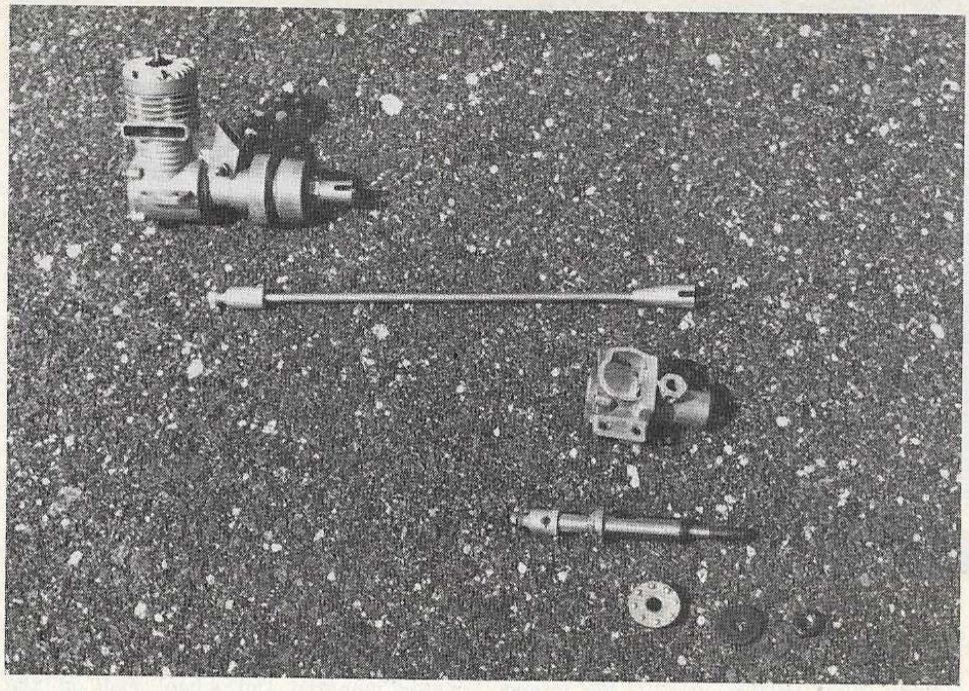
The fuselage is built up of 1/8" sheet balsa sides with 1/32" plywood doublers. We epoxied the 3/8"x 1/2" maple motor mounts, with their 3/8"x 1/2" balsa side spacers, to the three plywood fuselage bulkheads. At this point we drilled the bolt holes for the engine and the prop shaft mount, installed blind nuts for their mounting, and then added the fuselage sides. The top blocks, front and rear cowling pieces, are added and cut and sanded to shape. No engine hatch is required as the engine and shaft



The view from underneath. Twin booms make it easy to fabricate. Note the v-belt protruding, the engine starting procedure is a simple operation. **Facing page:** Chuck Roedel customized Dick's stock Williams Bros. pilot with angled head, deeper sculpted features, fleece (foam) collars, etc.



Close in on the landing gear mounting, all rather typical. Note torsion type main strut straps to hardwood channel, spreader bar, wheelpants. **At top:** Jacques-Pierre all snuggled in, ready to catch pneumonia. Near the end of the open cockpit era. This aircraft is a conversation piece.



General hardware components. Fox .35 powerplant, Octura boat hardware and an old engine crankcase. **Beneath:** All connected up. Engine electric starts with a v-belt. Bearing needs some lubrication.

can be installed through the access hole in the bottom of the fuselage. We used a small access hatch on the bottom of the wing to permit tightening the mounting bolts for the rear shaft mount, which can be installed through the spinner opening. The fuselage can be completely assembled, shaped, and sanded before being epoxied onto the wing. The scale engine cowling blocks, air scoops, headrest, all are shaped and filleted in place.

Finishing Up

The wheelpants are built up and sanded to shape; narrow Williams Bros. wheels were used. The landing gear strut fairings and wire spreader bar add greatly to the appearance of the model. The landing gear assembly is removable, mounted with small straps into the hardwood blocks in the wing.

Silkspun Coverite was used on the wing panels; to keep the weight down, the wood surfaces received only clear dope and a few coats of fillercoat, all sanded well, before the color dope was sprayed on. The color scheme depicted on the magazine cover was used; yellow wings and tail surfaces, red fuselage and booms, and of course the French red, white, and blue roundel insignias. A drafting pen was used to add fuselage detailing and trim tab lines. The roundels were painted on, no masking tape used, by utilizing a drafting compass with dope in the inking tip to draw outline circles for each color; it was then painted in by hand, within the circle lines. The entire plane received two coats of clear dope sprayed on to protect the detailing.

Adding greatly to the overall appearance, I feel, is the pilot; in this case, Jacques-Pierre. He is a considerably reworked Williams Bros. item—the head has been turned at an angle, the face carved, contours changed, moustache added, and a fleece collar added to his flying suit for the high altitude cold. This craftsmanship was performed by good friend Chuck Roedel, little known Captain of the often-overlooked Flying Fools of the Air group; all unsung heroes of the Monmouth MAC.

If any reader would like a copy of the Hanriot-Biche 1934 3-view drawing and picture I used to develop this model, send a stamped, self-addressed envelope to me, care of this magazine and I will be pleased to provide the drawing.