

The Morane brothers, Robert and Leon, along with their associate Saulnier, became famous just after the turn of the century for their monoplane designs. The 1913 "Parasol" was one of their early successes, and, in its type "L" variation, was even credited with shooting down a Zeppelin.

Powered by an 80 horse Gnome rotary engine, the Parasol featured the trademark aluminum "horseshoe" cowling and wide chord wings with pleasantly raked tips. Lateral control was by means of wing warping. Control wires ran over and under the wing surfaces and were supported by pylons. Through a system of cranks and pulleys the warping wires were connected to the control stick in the cockpit. The fuselage itself was a tapered box girder with plywood front covering and fabric over the remainder. Tail surfaces were moveable and amazingly small in proportion to the wing area.

According to *Fighter Aircraft of the 1914-1918 War*, L-type Parasols were responsible for numerous victories early in the war and were flown extensively by the British Expeditionary Force in France, to some degree by the R.N.A.S. in the Aegean, and even by a few Russian units.

The model presented here was developed from Bjorn Karlstrom drawings which appeared in a 1973 NASA magazine. Specifically, the rudder and stabilizer were enlarged 20% to compensate for the aforementioned tiny surfaces of the full-size aircraft. Other than that enlargement and the addition of dihedral (since the model was designed to fly in windy conditions), no other scale deviations are incorporated.

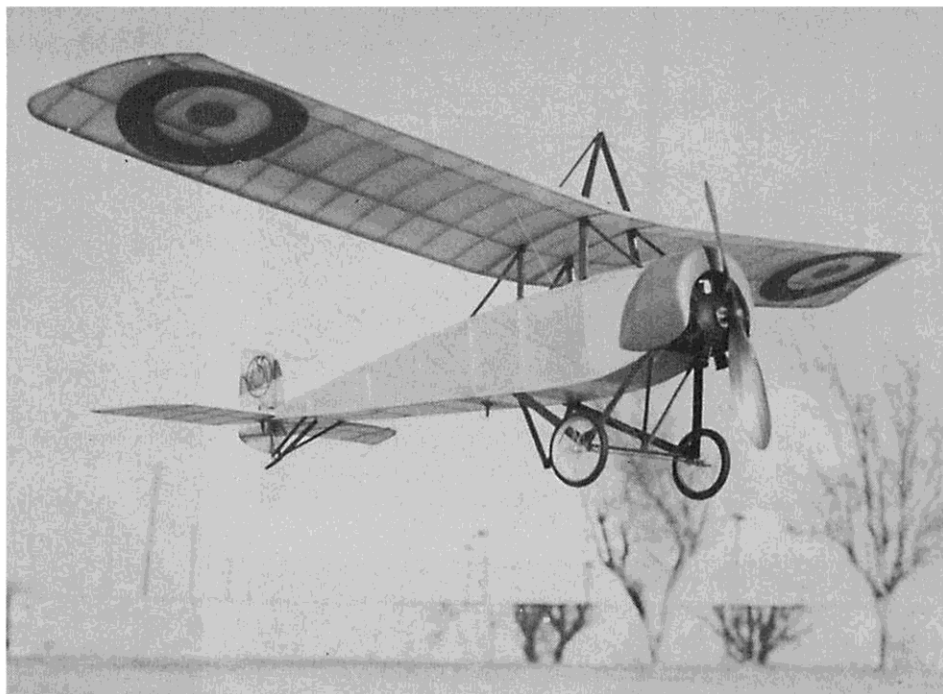
Structurally, the model duplicates rib-for-rib, longeron-for-longeron, and upright-for-upright the craft depicted in Karlstrom's drawings. Again, the only deviation evident is in the structure of the stabilizer for the sake of strength and warp resistance.

### Construction

Basswood plays an important part in the structure of this aircraft. So that you don't get stalled during any phase of the building process, you may want to pre-form the basswood tips of the wing, stabilizer, and the rudder outlines.

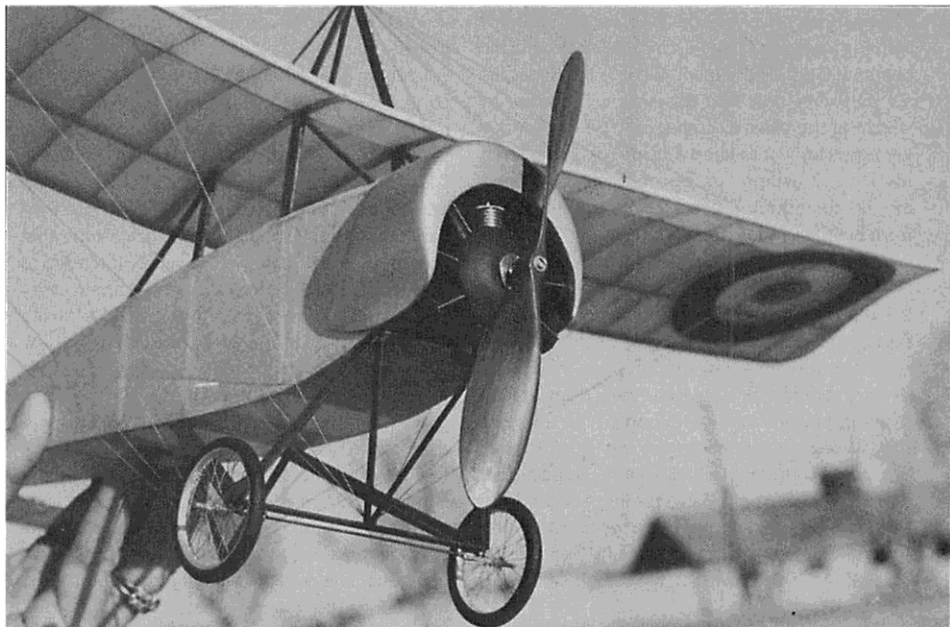
Soak 3/32" wide strips of 1/32" basswood in hot water for about 30 minutes. Draw these strips around previously prepared balsa wood templates covered with Saran wrap. As each strip is drawn around the form it should be coated with an aliphatic glue like Sig-Bond and held in place with your fingers. When the last strip is in place, the entire lamination can be held tightly with pins spaced closely around the outside until it dries. Usually overnight is best.

The wing tips present special problems, since they employ a compound curvature. When they are dry, unpin them and sand them carefully. Now, here's a part you'll like. To get the airfoil curvature, use your tongue and gently wet the top side of the lamination while applying pressure to the underside with your thumbs. Go at the process slowly and carefully. There is a chance to crack the lamination if you're too rough with



# 1913 Morane-Saulnier Parasol

Little CO<sub>2</sub> powerplants inspire scale projects. This pre-WW I machine performs well/Larry Kruse



it. When you've obtained the proper curvature, pin each tip upside down on the workbench and block up both ends until it is once again dry.

Wing ribs can be stack-sawed from 1/32" contest balsa. Ribs to accept the cabane struts are of firm 1/16" C-grain. Tip ribs are identical to main ribs, except that they are merely moved back with excess material being cut from the rear of the ribs. It's probably best to shim up the rear of the leading edge and the front of the trailing edge 1/32" and glue the ribs in place with Sig-Bond. An aliphatic or cellulose glue is necessary here because there is so little gluing surface available. After the rib and LE/TE framework is dry, turn the wing over and install the spars. Hot Stuff is good in this

bound and soldered to the axle.

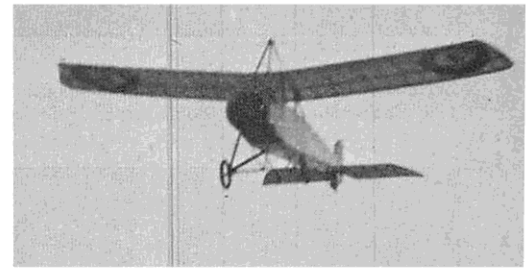
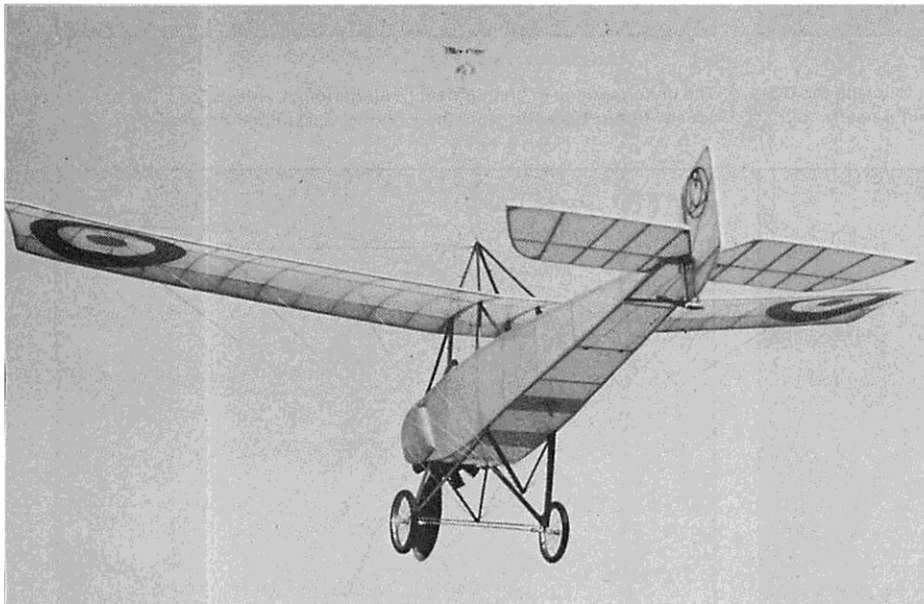
The engine installation is next. The spacer-block shown is necessary if you're using a Telco CO<sub>2</sub>. It may have to be modified if you go with a Shark or Brown. The tank cradle is adequate unless you opt for a 6 cc tank or larger. Beef it up if you think it necessary.

The filler is fitted into an 1/8" balsa "box" which is adequate to withstand the pressure of the filler gun. I considered just hanging the filler outside the cockpit, but I think this is a much better, and, above all, a much neater installation.

Cover the nose area with 1/32" balsa and then cut out the cowl pieces. The cowl itself is made of 1/8" formers and then wrapped with 1/32" A-grain dampened on the outside

caution. One coat of thinned dope is sufficient.

The cabane struts and landing gear struts are all made of basswood. I'm rather pleased with the way they turned out. The wood grain showing through gives a very realistic appearance and is quite easy to accomplish. Cut appropriate widths from 1/16" and 1/32" basswood, sand all edges round, and then using a clean, soft, rag wipe on one coat of Glidden Spred Interior Latex Walnut Stain. Rub it in thoroughly, removing any excess by buffing with a clean cloth. All cabane pieces and struts can now be cut to length and epoxied to the fuselage. Note that the landing gear struts do not come in contact with the landing gear, but serve only to hide the wire from view. Give the basswood



Alone in the blue. CO<sub>2</sub> thrust tapers off slowly for a realistic idling approach. **Left:** Strung on a sky hook here we'll admit, but nevertheless the photo gives a good idea of the ship in flight. An old bird, with all the rigging of a clipper ship. Tail surfaces enlarged slightly, simple to frame. **On facing page, top:** In a flight-like attitude, a modeler should find this ship hard to resist. The design recalls the early roots of aviation, state of the art before hostilities. Not often seen as a model, overshadowed by the later fighter types. **At bottom:** Close-in look at the tiny Telco motor.

instance if the spar slots are relatively snug.

Saw the spars off at their correct length and install the tips. The total wing structure can then be sanded gently and the dihedral installed. Bracing anchors are glued in place with Hot Stuff and then pre-drilled to accept the bracing thread. The wing can then be covered with white tissue, shrunk with rubbing alcohol, and given three thinned coats of nitrate dope. Roundels are made of tissue, also.

Tail surfaces present no real construction problems; however, you should note that the rudder is formed as one outline, totally constructed, and then separated to allow for hinging and installation.

The fuselage sides are built over the plans and then built into the usual box structure by the addition of cross-pieces, fillers, and formers. Maintain alignment throughout the construction sequence by constantly checking and re-checking the overall shape as you add each crosspiece. The landing gear is sandwiched between formers first, then

to negotiate the curvature.

Slip-fit it into position. It should have a slight friction fit. Carve out the back former to clear the engine and tubing and carve the side filler blocks to shape. The cowl surface was given four coats of sanding sealer and then sprayed with Aero-Gloss silver to simulate the aluminum cowl of the full-scale ship. Set it aside until test flying is completed before you install it permanently. The same holds true for the dummy engine. I carved the crankcase from balsa and fitted William's Brothers cylinders to it. It, too, is a slip-fit over the CO<sub>2</sub> engine and is held in place with small dowels on both sides. Two coats of Floquil "Griny Black" simulate the engine color very well.

Having completed the fuselage main structure, cover it with white tissue, shrink it with alcohol, and dope it as you did the wing. Tail surfaces are treated the same way, but don't forget to install the wire hinges before covering. Obviously, pinning the tail surfaces down while they dry is a good pre-

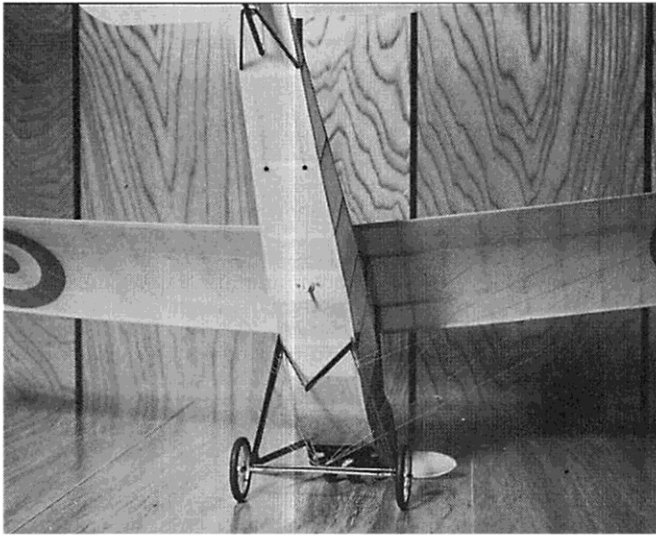
pieces four to seven coats of dope, or until a sheen develops that brings out the grain.

Attach the wings to the fuselage by using epoxy in the cabane slots. Auxiliary struts and wing warping pylons are next. Drill out the pylons with a pin drill to accept the silk thread wing bracing.

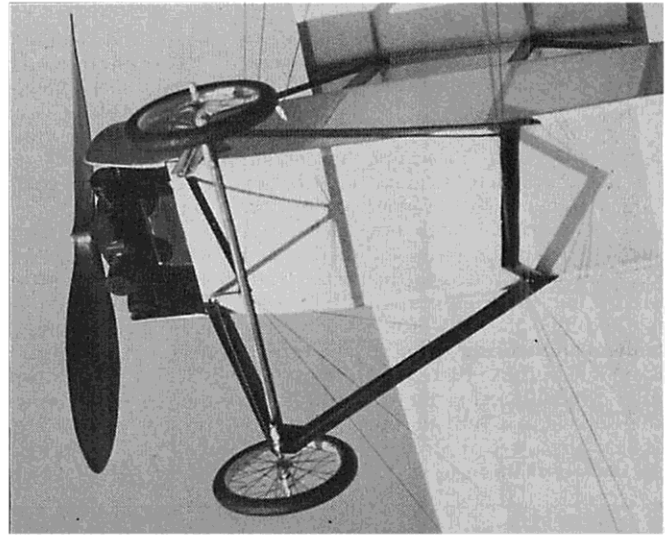
Starting with about 15 feet of silk thread, tie it to the bottom wing warp pylon and then begin a methodical under/over sewing of the rigging, moving from the front bottom pylon, up through the pre-drilled anchor holes in the wing, through the top pylon, through the top of the other wing and back to the rear bottom pylon. Adjust the tension of the rigging as you go. Once all twenty-four wires are installed, a drop of Hot Stuff at each rigging point and pylon will suffice.

Tail surfaces can now be attached. Begin with the front position of the rudder and epoxy it into the slot at the rear of the fuselage. Install the stabilizer by inserting the hinge wires into their pre-drilled holes and Hot Stuff them into position. Don't be

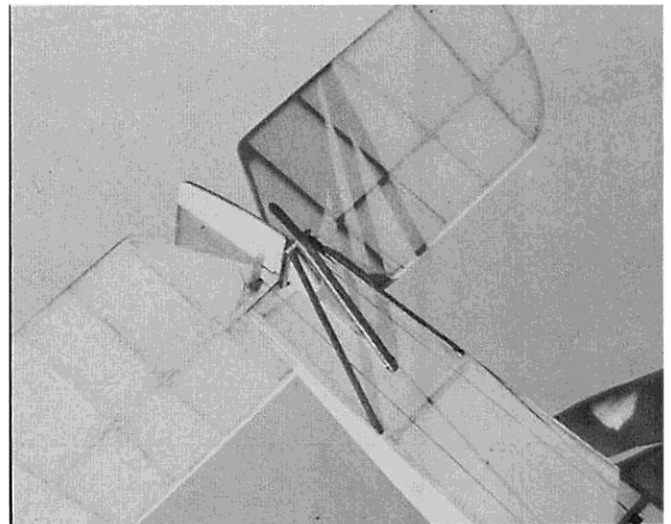
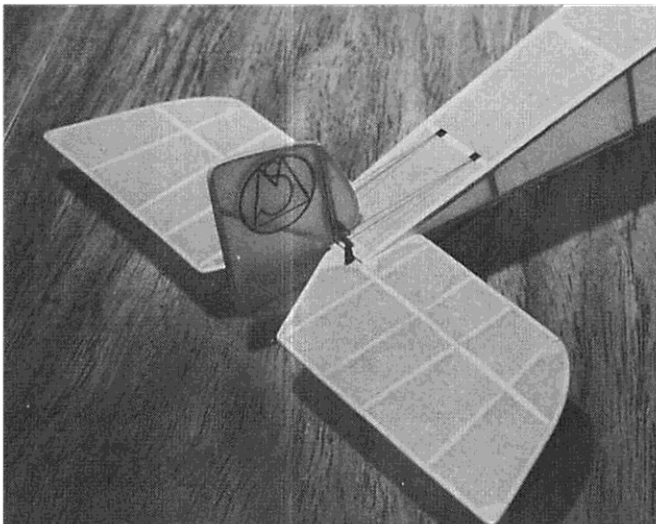
# 1913 Morane-Saulnier Parasol



Average 1913 landing. Spies will find this photo helpful to locate the CO<sub>2</sub> filler tube position. **Below:** Rigging to control horns. Build it neatly.



The undercarriage in greater detail. Hungerford's wheels add the antique touch. **Photo beneath:** Note the working tailskid and the rigging.



sloppy with the Hot Stuff. You will want to make adjustments later. Treat the rear portion of the rudder the same way.

The working tailskid is made from basswood, aluminum tubing and shirring thread. All pieces can be assembled using Hot Stuff, but need to be pre-stained in the manner of the cabane and landing gear struts before assembly. Once basswood has absorbed any type of glue, it will not accept stain.

Final items include basswood horns for rudder and stabilizer and silk thread rigging for the tail surfaces. A Williams Brother's propellor painted flat brown will serve well for scale judging purposes, but the Telco prop furnished with the engine is a better choice for actual flight. Hungerford wheels are the crowning touch that makes the little bird really come to life.

## Flight Procedures

With the cowl and the dummy engine removed, begin flight testing over the universally available tall grass. Check the C.G. to make sure it is as indicated on the plan. The prototype required no additional weight either fore or aft, but wood availability may alter that circumstance.

Rather than doing any test gliding, *per se*, I began with very low-powered flights launched toward the end of the engine run.

With its generous wing area and ample moments, the Parasol flew very well from the outset, requiring only a bit of left rudder and a bit of down in the elevator. If your model stalls and the C.G. is correct, bend in a small bit of down into the elevator. If the plane shows a tendency not to climb, bend the elevator up just a little. If it flies in a

straight line about 1/16" left offset in the rudder should give it some left turn. Left turn is generally preferable to a right turn in order to avoid the threat of a gyroscopic spin after the power wanes.

When everything looks comfortably safe in the flight, add the dummy cylinders and the cowling, Hot Stuffing both in place. Check the C.G. again. In all probability, it will not require correction. If it does, though, some clay discreetly wedged in the tailskid bracket should resolve the problem.

Full-powered flights typically are in gentle left turns, climbing to about a fifty or sixty foot altitude and then circling slowly to earth as the power runs out. Predictability and consistency are two of the Parasol's virtues. I hope you'll be pleased with your version of the ship.