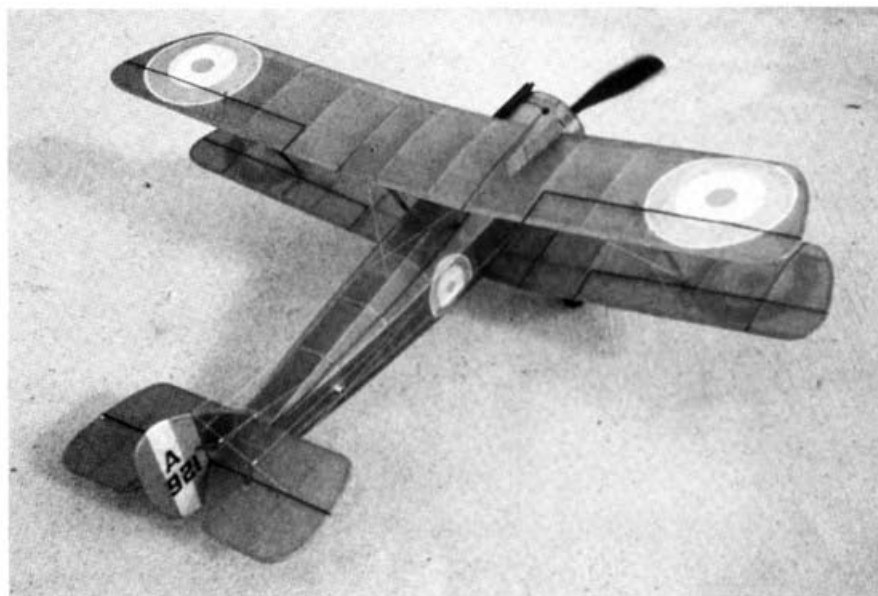




In this quarter profile shot of the D.H. 5 (above), you can easily see its negative stagger, especially in the rear rake of the interplane struts. Note also the fair amount of scale external rigging, for both control surfaces and bracing. This top view (below) shows how the single machine gun is offset to the left.



The cross section of the D.H. 5 fuselage is a little unique, starting with the tubby round cowl up front, transitioning, just aft of the cockpit, to a hexagonal shape all the way to the tail.

Although considered to be the least successful of DeHavilland's designs, the DH-5 presents a unique modelling change of pace. Its strange, reverse stagger layout was an attempt to improve forward and upward visibility which had been enjoyed only by pusher biplanes, and so, the DH-5 became the next tactical development after these pushers.

The DH-5 was one of the early types which received the more reliable machine gun synchronizer that allowed forward firing through the prop arc. However, as the new DH-5s began replacing inferior aircraft on the front lines, many of the air crew were skeptical of their performance due to its unconventional appearance. These fears were largely unfounded, but for some reasons, high altitude performance was poor, maybe justifying some of the skepticism. This resulted in all front line DH-5s being relegated to ground and trench strafing. It was during the large infantry battles at Ypres and Cambrai that the aircraft distinguished itself. Shortly afterwards, most of the DH-5s on the western front were phased out in favor of the superior SE-5As.

At best, the DH-5 bridged the technology gap between the flimsy pusher and the later, rugged gun platforms like the SE-5s and *Camels*. At worst it was an average aircraft with a few shortcomings magnified by illogical pessimism.

I have always been intrigued by the reverse stagger wing layout insofar as its trim characteristics might be for flight. So, I had to answer my own question: just how would a reverse stagger fly as a model?

### Construction

As far as biplanes go, this model is a straightforward WWI aircraft. The fuselage is unique, though, due to the transition of its cross section — circular at the cowl, changing to octagonal all the way back to the stab. However, on the plus side, the wing panels are simple and identical without "windows" or trailing edge cutouts.

Rather than detail the basic construction of this model, I am going to highlight a number of unique (for me) construction methods, related to probable, troublesome areas.

**Cabane struts.** For years I never built biplanes because I could never get the cabane struts mounted securely or looking right! Even formed from wire and sewn to fuselage cross pieces, these appeared awkward and were difficult to align. The following method now works well for me: where the cabane struts attach at the fuselage, securely wrap and glue two lengths of  $\frac{1}{32}$  I.D. aluminum tubes. Have each end protrude slightly past the outside of the upper longerons. Bend two sets of  $\frac{1}{32}$  cabane struts from music wire. One is for the right side and one for the left. Bend in an inverted "U" shape with two  $\frac{3}{4}$ -inch long right angle bends. These fit into the fuselage tubes.

The top of these inverted "U" shaped cabane wires fit into grooves cut into the bottoms of the sandwiched ribs of the top wing. Match up the pair. The legs on each pair should be the same. You can adjust the bend to get as accurate as you need. Plug the cabane wires into their respective tubes and temporarily mount the top wing with cabane wires into the slots. Check alignment and adjust as necessary. As you can see, this method allows fore and aft, up and down, and more or less incidence as necessary for true alignment.

# a staggering DH-5

"A unique modelling change of pace." **By Mike Midkiff**



PHOTOGRAPHY: MIKE MIDKIFF

After covering, assemble the cabane wires in the fuselage tubes and mount the top wing in place on the wire cabanes. Realign carefully and "hot stuff" the wires into the wing slots only, *not the tubes!* Pop out the cabane wires from the tubes in the fuselage. Make four cabane strut balsa fairings, stain, groove and "hot stuff" to the cabane wires.

This whole assembly now can be sprung and re-assembled to the fuselage tubes. This assembly can be removable until interplane struts and rigging are permanently attached. There you are, a solid, alignment-proof, take-apart cabane strut assembly.

**Landing gear.** In like manner, I haven't liked the various landing gear assemblies that I've built in the past. When constructed from balsa strips, alignment is a problem, and the gear is very fragile. When formed from wire, scale appearance suffers. The method I have chosen to use on the DH-5 seems to have plenty of strength, and is scale appearing.

First, make up two identical landing gear "V"s from laminated basswood per the patterns on the drawing. Align these "V"s together and drill a hole through both for the spreader dowels and the axle at the point of the "V". Cut the "V" from the bottom up to this hole to form the axle slot which provides shock travel. Now you can sand these struts to shape and apply walnut stain. Form the two  $\frac{1}{32}$  music wire braces which join the top sides of the landing gear legs and also fit into the fuselage "sandwiches". Groove the back side of each landing gear leg to accept the ends of the music wire braces. Epoxy the wire ends into these grooves.

Cut two spreader bars from dowel or bamboo and stick them into the drilled holes, allowing  $\frac{1}{4}$  inch to stick out on the outside of the landing gear "V"s. This provides four stubs to attach the "bungee" cords (dental rubber bands). Cut to length a  $\frac{3}{64}$  diameter music wire axle and stab through the axle



PHOTO: LARRY KRUSE

**Before you get to this stage (power launch) with your newly completed model, test the glide with the prop assembly off. The text describes how to set the balance and then get ready for power launch.**

slots. Loop a couple of dental bands on the stubs and over the axle. The bands retain the axle and allow scale-like shock absorption. Stick on a couple of wheels and you have yourself a neat, strong, scale landing gear assembly.

**Covering.** I prefer using color tissue throughout to retain the delicate translucency which seems to capture that WWI nostalgia. Use a good grade of Japanese tissue to cover the entire model. Cover all of the underside surfaces of the wings and stab with white tissue first, also the rudder portion of the fin/rudder framework. Cover the balance of the structures in brown tissue. If you don't have brown Japanese tissue available, white tissue can be dyed. Domestic brown tissue, which is generally available, can also be used. Spray with alcohol to tighten the tissue. Do not use water, it will be too much shrink. I prefer to use thinned SIG Lite Cote to dope the model's covering. Its shrinkage seems to be minimal when thinned out to 60% thinner, 40% Lite Cote. I dope the wings and the fuselage with three coats of the above mix. The stab and rudder receive two coats. Use color tissue roundels and rudder bars cut to size and attached with dope thinner. Apply a coat of the 60/40 mix over each of the color tissue insignia.

### Flying

Repeatedly test glide your model over a grass cushion. Do not glide with the prop assembly in place. Keep adding clay to the inside of the cowl to move the center of gravity forward. Continue hand gliding and adding clay ballast until a nice, gentle, straight away glide results. Now mark the wing tips on the top wing where the balance point is. Install a braided motor and the prop and re-check the balance. Add or remove clay to bring it back to your original wing tip marks. Add 4° to 5° of downthrust to the nose block by adding shims to the top of the nose plug opening. Glue these in place.

Commence powered flights by adding 150/200 turns and launching straight out into the

PHOTO: LARRY KRUSE

After wondering how stable a negative stagger biplane would be, Mike was pleasantly surprised with the stability of the D.H. 5. It can easily climb straight ahead, or to either side. Text details the trim procedure.

prevailing breeze. Look for stalling; if it does, add more down thrust. If it doesn't, add more power and launch again. Use down-thrust only to cure a stall; do not fiddle with the stab or rudder.

This model is so stable that it can climb either right or left, even straight away. After you are satisfied that all stall tendencies are cured, wind up to near max winds and launch. Look again for any stalling. If it occurs, add even more down thrust; if not, check its flight path. Does the model turn or fly straight ahead? If it turns to either side in the cruise and glide, that's okay. However, if it flies straight away, add some rudder to the side with the least amount of wing washout.

But now you must also add some side thrust to counteract the turn under power that the rudder will cause.

If you added right rudder, shim the nose block to give more side thrust to the left; vice versa, if you gave left rudder. Ideally, under full winds, your model should climb out in a shallow ascent. As the power burst dies, it should commence to cruise in wide circles to right or left.

Now, all that's left to be done is just to imagine in your mind's eye the muddy and desolate western WWI front — the ground chopped up by front line trenches, and infantry cowering as your DH-5 looks for targets of opportunity!

