

# DRAGON MAGIC **Part II**

The conclusion of our two-part feature on the model which won "Best of Show" at the Q.S.A.A. Fly-In.

By George Harlan

J. R. Naidish photos

In the last installment (April), we discussed the initial construction phases of the de Havilland D.H.89a Rapide. I explained how the complex cabin was built and installed, as well as some other important construction features. Most notably,

the reader should heed my remarks about the strength of the spars, as well as the need to fly the model using functional rigging wires.

The Dragon is a superb project, for it offers the thrill of a twin, and the excitement of a biplane, all in

one package. Although the model is only 2-inch-scale, the span is a rather large 96 inches. While it's not true quarter-scale, it does qualify for the Q.S.A.A. Fly-In by virtue of its span. The model won the "Best of Show" award last year, which was a real thrill for me.

Without further ado, let's continue with the construction and flying of the Dragon.

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Before we get into the construction, I must pause for some comments on Bob Sweitzer's plans for



the Rapide. Without reservation, they are the most magnificent plans to come off a draftsman's table. There are four large (3 x 9 feet) sheets, packed with fantastic detail sketches, isometrics, markings, etc. I have done a lot of scratchbuilding, and I can honestly say that this is one of the few sets of plans I've ever used which didn't disappoint me. The parts all fit with absolute precision and there was nothing vague or confusing anywhere. It really speeds and simplifies construction if you don't have to sit there and scratch your head wondering what the draftsman had in mind.

Bob also sells all of the accessories needed to build the model, such as the nose light, canopy, cowls, etc. He even has some documentation photos of the full-size machine, as well as a copy of the original maintenance manual. While some may balk at paying \$99.50 for the plans and accessories listed above,



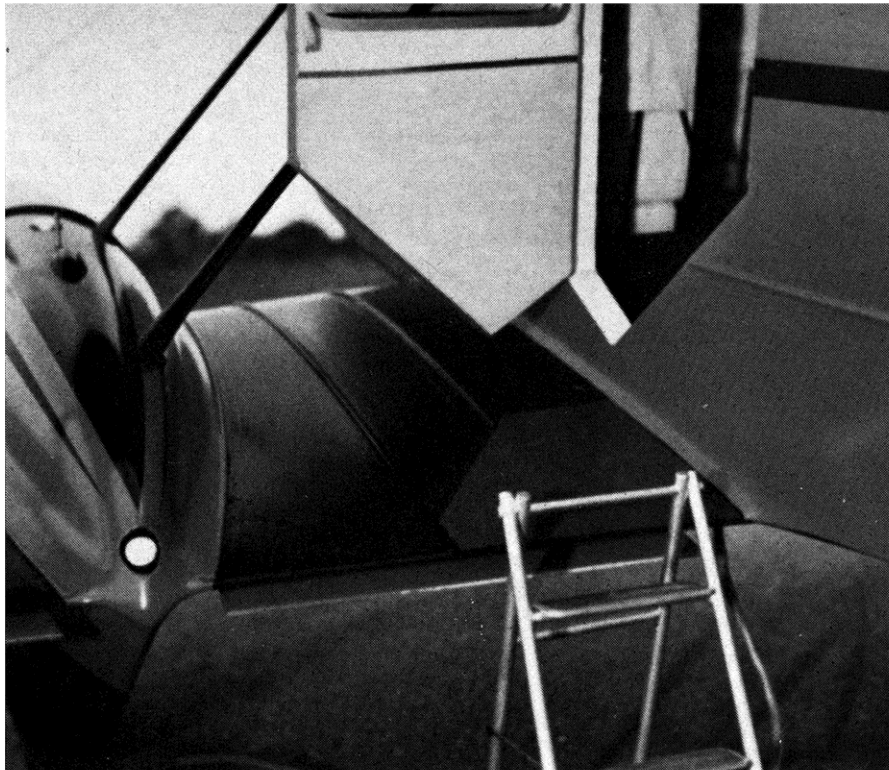
*The Rapide has a top wingspan of 96 inches, being 2 inch-to-the-foot scale.*



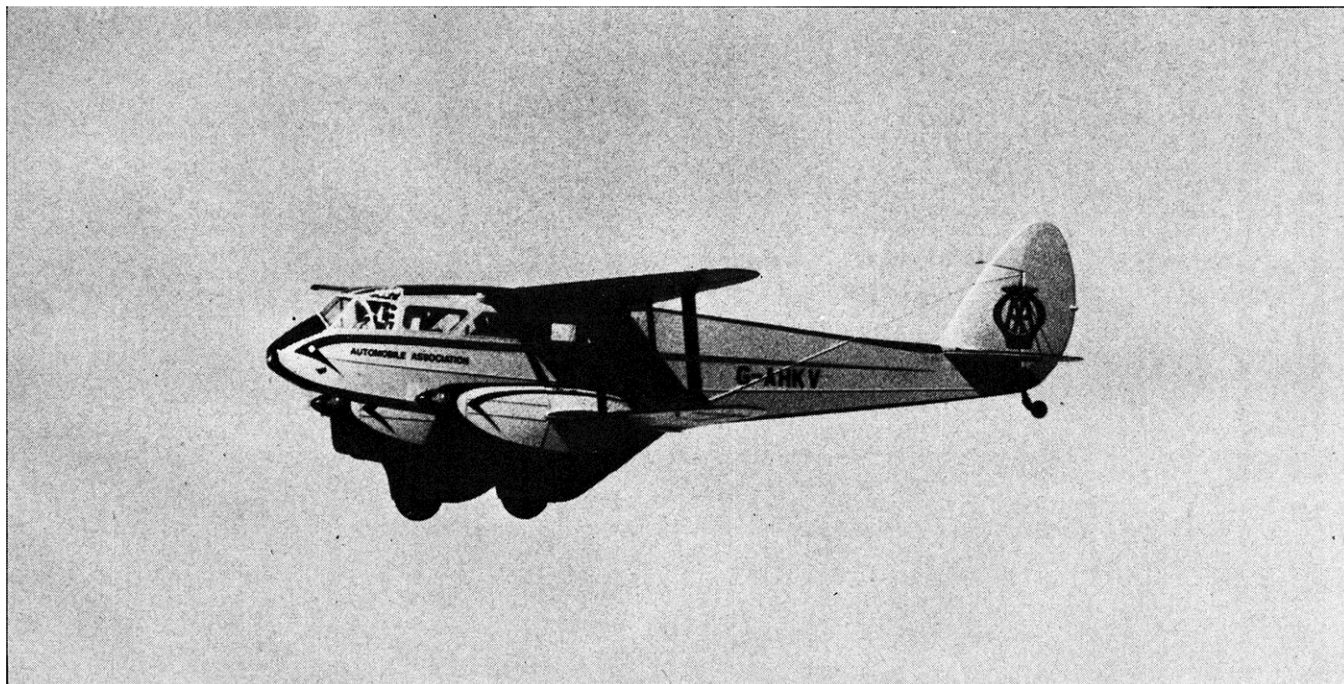
it actually is a very reasonable price. Bob sends the plans rolled, in a mailing tube, and he'll even Air Mail them (for an added \$3.00).

In the last issue, we had framed up the fuselage, and had fitted the flaps to the wings. Next, we tackle the engine nacelles, which pose somewhat of a logistics problem for proper installation. You will have to cut a vertical slot in N-4 and N-5, upward from the spar. These are slipped in place from the bottom, and held in place by the spars and ribs. All the rest of the parts are then prefitted, and temporarily held in alignment with pins, tape, clamps or anything else that works. Check the alignment to be sure that the thrust angles are correct, then epoxy N-6, N-7, N-2 and N-1 together. Proceed to glue all remaining components in place.

After some trial and error fitting of the engine mount framework on the wing. When everything looks right permanently join the engine mount framework to the wing. At this point, the landing gear wires can be formed and soldered together. The top of the nacelle framework can then be assembled, and



*The author is noted for his exquisite handwork. Note the ladder to accommodate passengers.*



*On a fly-by, low and slow. The de Havilland proved to be a very stable model, with an exceptionally low wingloading.*

filler pieces can be used in N-4 and N-5. Once this is done, the bottom framework of the nacelles can be completed. Make sure that the landing gear alignment is correct, since there will be no way to make ad-

justments after the planking is installed. Avoid doing any planking until the throttle linkages, engines and gear installations have been finalized and tested. Once everything is buttoned up, the only way

to get in there is to start cutting!

On any scale model, there's always the practical aspect of hiding things like switches, engine starting clips, etc. My radio switch is disguised as the fuel overflow vent

tube on the nacelle. Pull up the vent tube to turn the radio on, and push it down to turn off. The charging jacks are hidden in the bottom wing's center section.

For engine starting, the fuel filler caps are removable. Beneath them are small phone jacks, into which the mating plugs from an external battery are connected.

One of the biggest concerns with a twin is to lose an engine. Most authorities agree that the best pre-

*The author recommends using heavy duty spars in those thin tapered wings, and to be sure that the rigging is functional.*



caution is to use an internal battery supply to keep a constant 1.5 volts to the glo-plug when the engines are at idle. I installed a "C" cell Ni-Cad in each nacelle, and I use a micro-switch to actuate this. The micro-switch is set so that the battery is only heating the plug when the throttle is at 1/4 or less. Of course, the battery must be wired into the switch harness which turns the radio on and off, and there must be separate charging jacks for the batteries.

The engines I used were stock K & B .61s. Since the plane only weighs 16 pounds, a set of good .40s would be more than enough. Usually, the model is flown at just  
56 scale r/c modeler

a little more than half throttle. The C.B. Enterprises' 1 3/4 inch spinners are just perfect, and the C.B. 4 inch wheels are a good choice. The tail-wheel is a 1 inch Fox.

Other little details are that the nav lens caps are made from pill capsules, with 12 volt grain of wheat bulbs for illumination. As noted, there's some 15 feet of wiring in this model.

For linkages, I used a fiberglass arrow shaft for the elevators, and No. 90 stainless steel coated fishing line for the rudder.

To conceal the radio installation, I fabricated a compartment forward of the wing leading edge, between formers FB-4 and FB-5. Screws hold

this in place. The top wing latch detail shown on the plans was used, and found to be quite good. Because of the full cabin interior, I had to route all wires and linkages around this module.

My aileron servo attachment method is different from that shown on the plans. I simply attached the balls from ball-links to each end of the servo arm, then use aileron pushrods with the corresponding cap. It's easy to snap the ball-links together, and I made a special tool (it looks like the claw of a tiny crowbar) to pop the caps off the links when removing the wing.

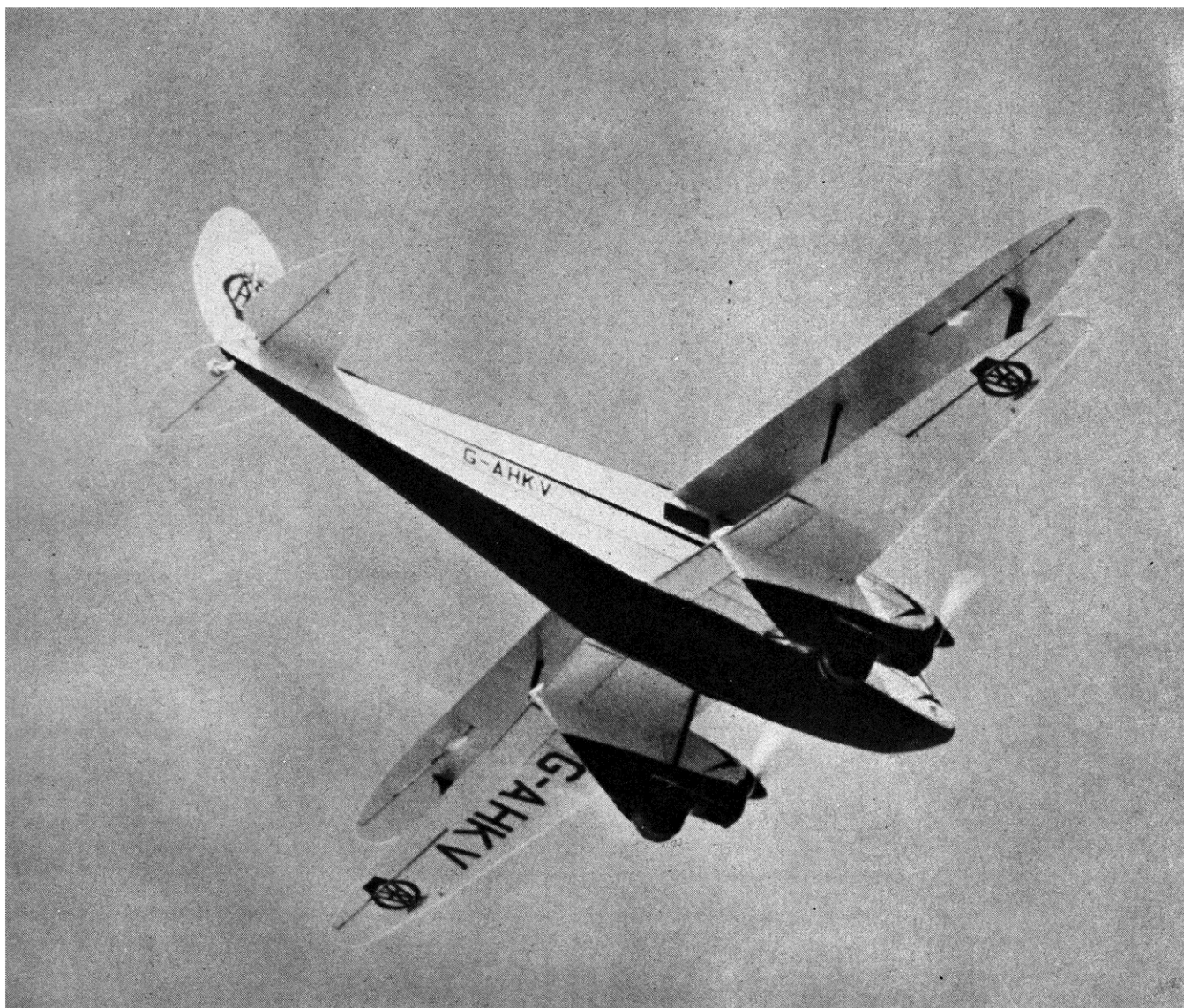
Because of the functional rigging, and all the linkages and parapher-

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The all-up weight of the Rapide is only 16 pounds, and it cruises at partial throttle.



nalía which must be attached when assembling the model, it takes a half hour to get the Rapide ready to fly after arriving at the field. Obviously, this is not a weekend fun-fly machine!

One last item of significance was the control surface hinging system. I didn't want any exposed hinges, so I used the Condor Hobbies' "Swingee" hidden hinges. While these are totally invisible, I was surprised that they had quite a bit of "slop" once in place. So far, there seems to be no tendency toward

flutter, but I generally don't like loose linkages.

As mentioned, the model was covered with Hobby Shack's Solartex, and then primed and painted using acrylic lacquers. The choice of lacquers was strictly a personal preference. There's a patina and depth to a lacquer paint job that just can't be matched by anything else on the market. I wouldn't be too concerned about weight, since the model seems very tolerant of a few added pounds. After all of the gadgetry, cockpit, cabin detail, func-

tional rigging, etc., which I heaped on my model, I was shocked to find that it weighed only 16 pounds. That's not to say that I advocate piling on the garbage and adding unnecessary weight, but I see no need to strive for the featherweight class which most twins demand for optimum performance.

After 10 and a half months of rather concerted effort, the Rapide emerged in all of its glory. I had built a miniature gasoline carriage, with small fuel lines, etc. A stewardess was fabricated from a doll, and

even a small step ladder at the wing was made to achieve total realism. Some modelers find little "gimmicks" like these a bit hokey, but I feel that they add to the overall realism of the model, by setting a mood like a diorama.

"Big John" Elliot was elected as test pilot, since I don't trust my objectivity after so many long hours in the workshop. The engines, which had been run in to assure their reliability, were fired up, and some preliminary taxi tests were made. I didn't anticipate any problems, with the wide gear stance on this biplane . . . and I was not disappointed. The de Havilland was a perfect lady on the ground. The K & Bs sounded so sweet and synchronous that my heart was humming to their same beat.

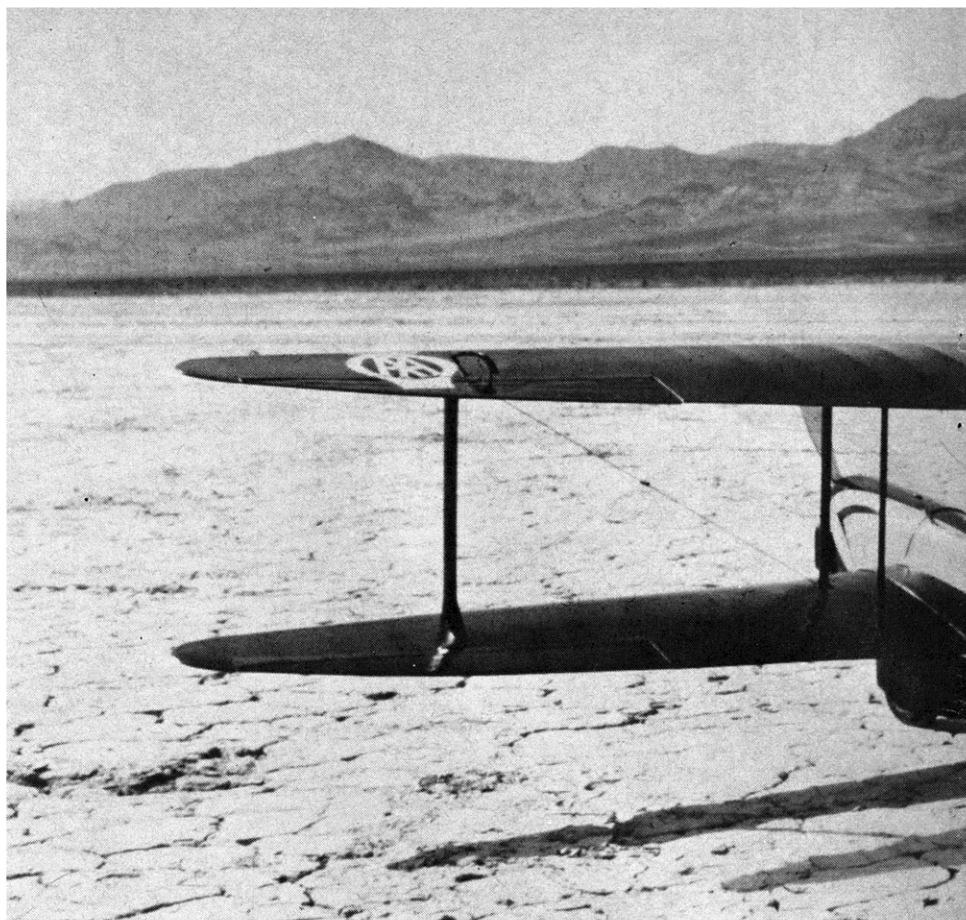
As John revved the engines, I was holding my breath so tightly that I could have burst. The Rapide did not exactly pickup speed quickly. Rather, the big airplane was suddenly airborne and climbing after only 3-4 plane-lengths of takeoff roll! The light weight of the plane, combined with the efficiency of that high aspect ratio wing and the excess power of the .61s was enough to give some convincing STOL demonstrations.

There seemed to be a slight torque problem, but a touch of left rudder trim took care of that. Once at altitude, some gradual turns were tried. It was pretty obvious that the ailerons were a bit on the sluggish side. This had nothing to do with the Swingee hidden hinges, but because there just wasn't enough room at the servo for a larger output arm.

The Rapide really looked sharp. It was so mild mannered that low fly-bys were tried immediately. The light loading was apparent for, when the throttles were chopped, the plane began to behave more like a powered sailplane than a twin. How many twins can you complain about because they are too *lightly* loaded?!

Landings are a simple task. The flaps are amazingly effective, and the Rapide can be literally slowed to a walk. Of course, the light wing loading helps here, too. Keep some power on and fly the plane to within a foot of the ground, so that wind gusts don't upset it. Bleed off speed with a flare out, then settle in for either a two- or three-pointer.

If I were to fly the model in contest conditions, I'd be tempted to have some ballast handy which could be mounted at the C.G. In turbulent air, increasing the wing loading will help penetration and



the sink rate at landing. Those long wings require lots of aileron throw, so don't be afraid to get excessive when designing the linkages. With most of today's transmitters, you can use the dual rate function to select the aileron sensitivity you need.

I can't report on any maneuvers,

because there simply isn't enough aileron throw to try anything fancy. But, the full-size machine wasn't a stunt aircraft, and I believe in total flight realism. Watching the Rapide come down the runway at a gracefully slow pace is the real thrill. The sound of the twin engines is like a love song . . . it's almost as if the

Dragon is weaving a magic spell.

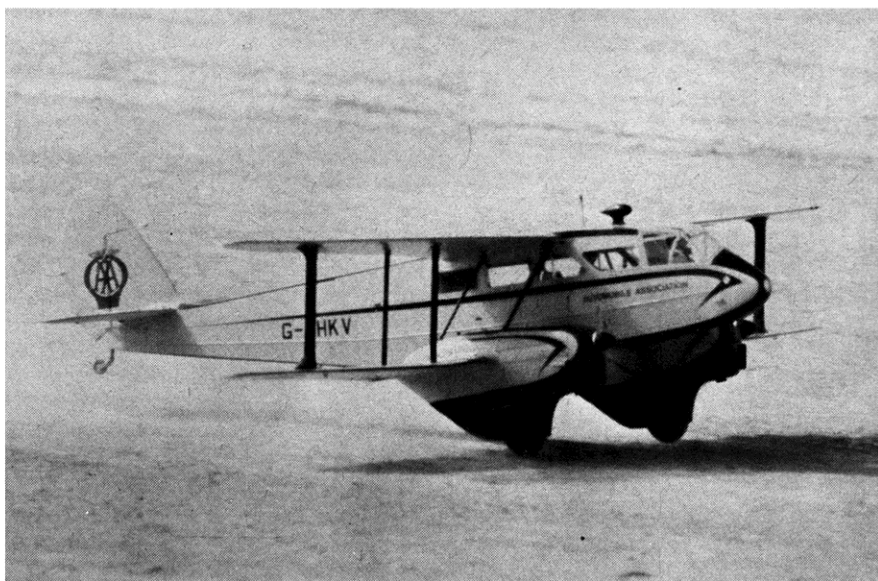
I thoroughly understand that the de Havilland D.H.89a isn't the model for everyone but, if you are looking for a proven scratchbuilding project—one which will give you a lot of latitude in building procedures and materials, then Rapide deserves your strong consideration. Bob Sweitzer's

plans won't be disappointing, and the finished product will be one of the best twin-engined projects you've ever flown.

A closing note about the reference to this plane as the *Dragon*. One of the most famous Rapide's ever to take wing had a huge dragon emblazoned along the entire length of

the fuselage. That plane is the one most remembered when the Rapide is discussed, and it has sort of become synonymous with the airplane. □

*The de Havilland 89a Rapide is perhaps the penultimate twin-engined biplane. Every line is flowing and graceful.*



*Off on another hop, the model exhibits very docile ground handling characteristics, and can be slowed down to a crawl for landings.*

