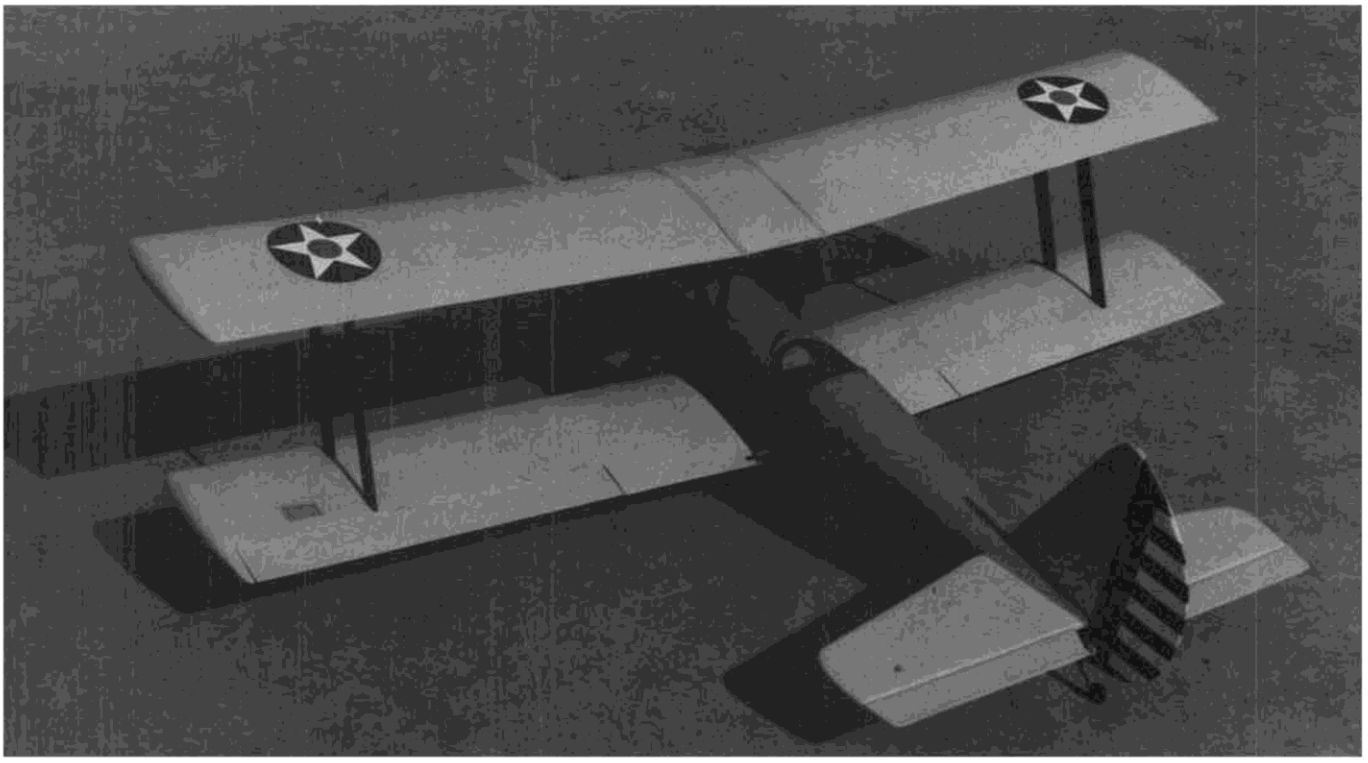

DUSTER

By BILL NORTHROP . . . One of the most popular designs by MB's editor, the Duster is a smaller version of the ever-popular Big John. Article includes tips on how to modify the appearance to suit your tastes.

• Back in April of 1964, at supposedly an early age (42) for such happenings, we experienced a myocardial infarction. Translated into clean English, that's a heart attack. Although such an occurrence is unquestionably serious, in our case, we walked into the hospital following the attack and didn't know for sure that it had happened until our doctor examined the EKG and convinced us that a hospital stay of several weeks was definitely in order.

The point of giving you the above sad tale is to bring out the fact that one bright spot during the enforced bed rest was a note from M.A.N.'s Walt Schroder saying that ourcurrent pride and joy, the "Duster", a 7/8 size version of our prototype Big John, was to be published in the September issue of that year. Incidentally, credit for the Duster idea goes to R/C pioneer Walt Good, who suggested that a smaller version of B.J. might attract more serious builders, as in those days, good .60-size engines were in the minority.

This was back in the days of off-set printed full-size plans, which meant that one large size order of prints was made, and when those were sold out, the plan was simply no longer available. We became aware that M.A.N.'s supply of Duster plans was sold out several years ago when letters began arriving at **MB**'s office, asking if original plans were available.

Our main reason for not republishing plans sooner was that we needed a model for photos to go with a new article. Oddly enough, we have had a Japanese kit for the Duster, using an exact copy of the M.A.N. plans, and renamed the "Flying King", but have never had the time to build it. (It's now being constructed by Editorial Assistant Phil Bernhardt.) Stupidly, we had completely forgotten about a completed Duster belonging to local modeler Tom Laurie, one which we actually test flew soon after moving to California! All of the photos, therefore, are of Tom's Duster, now powered by an O.S. 60, with Futaba radio, and blue and yellow doped silk finish.

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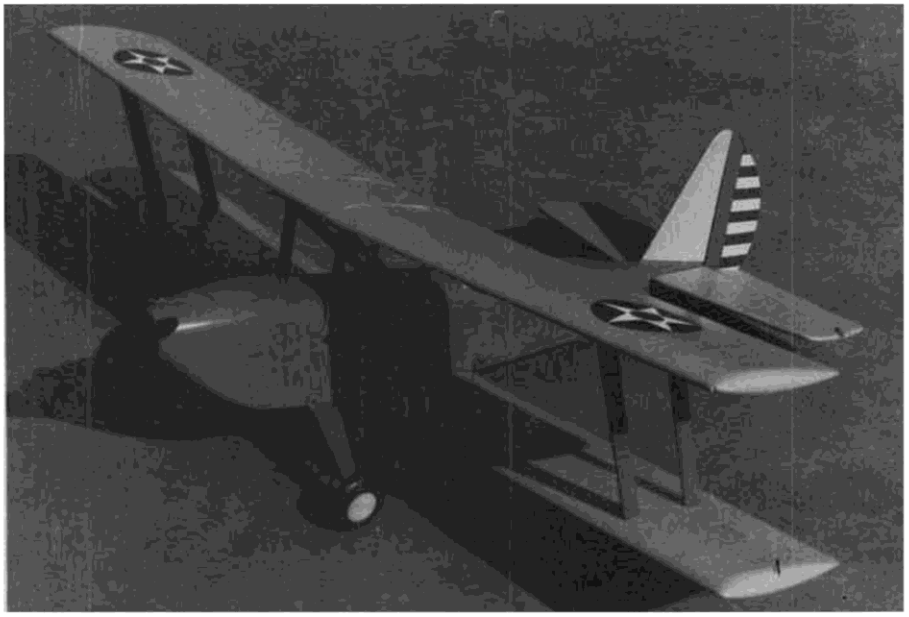
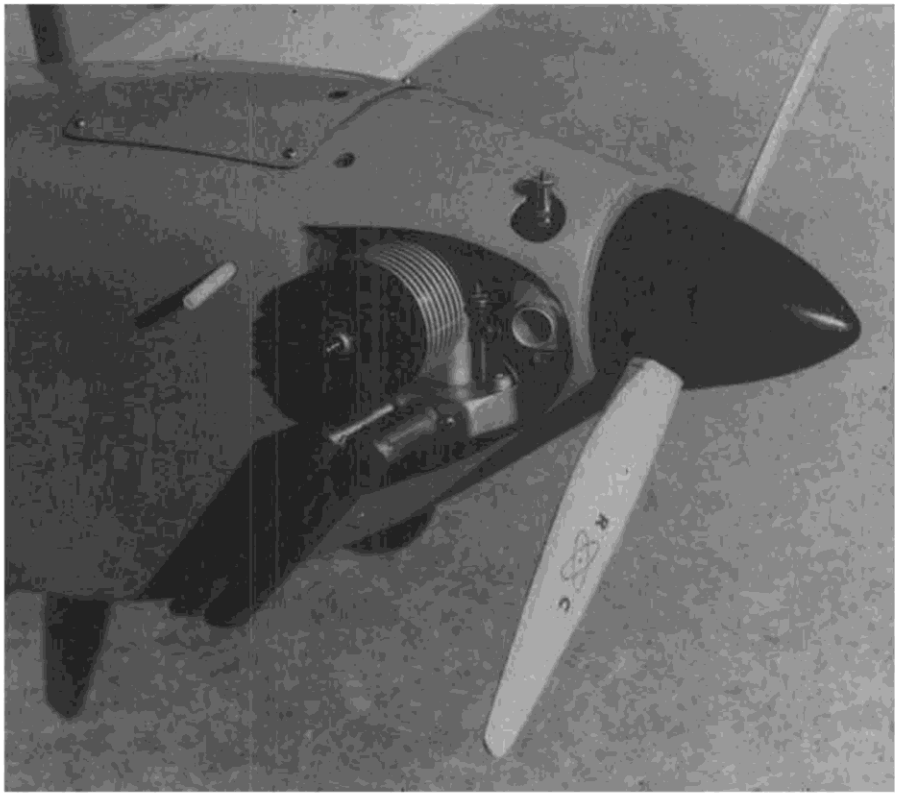
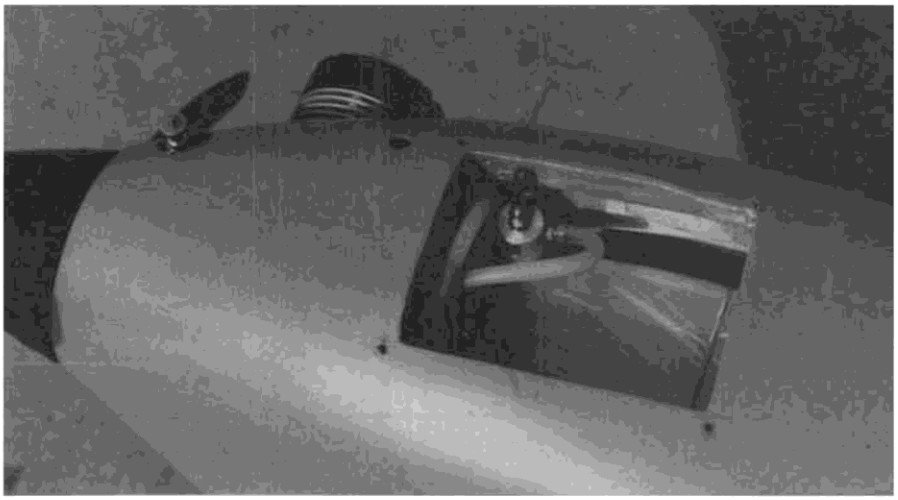


Southern California modeler Tom Laurie finished his Duster in the blue-and-yellow colors of the early WW-II primary trainers. The design lends itself well to different color schemes.



Business end of Tom's Duster shows exhaust extensions on Tatone manifold on O.S. .60 Blackhead. Pipes are brass tubes silver soldered together. Tank hatch is fiberglass.



Tank compartment holds 12-oz. Sullivan tank and canister-type filter. Tank is wrapped in plastic to prevent fuel from getting to the radio battery underneath, in the case of an unnoticed leak.

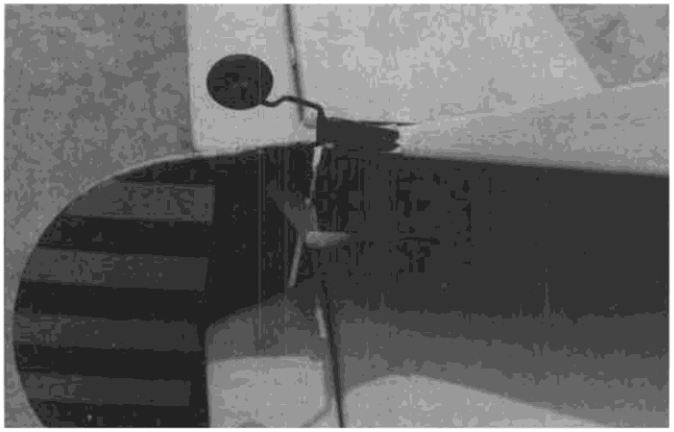
outboard wing struts. Though not needed for strength, they improve the appearance. Tom uses 1/16 dowels in the ends of the struts, which plug into holes in ply inserts set flush with the wing surfaces, where needed. This method isn't too good, as the wings can spread out, allowing the struts to pop out during maneuvers and/or when handling the assembled plane on the ground. An added hazard is that the loose strut end can (and does) punch a hole in the fabric when the wing panels come back to their normal position.

We prefer the system used on Big John and the Spruce Goose (T'Winger). In this case, the strut ends are shaped into plugs as part of the strut. These are about a 1/4 inch square. Ply inserts, with strut sockets cut out, are glued flush with the wing surfaces, at the appropriate locations, and a small wire hook is inserted and epoxied just forward or aft of each strut socket. After the struts are sprung into position, a rubber band is stretched between the top and bottom hooks to hold the wings together, keeping the plugs in the sockets.

Everyone likes to create some of their own modifications to a basic design, and to assist, we've added some suggestions for nose and tail variations. By cutting the nose off flush with the firewall, and shaping sheet aluminum brackets, a radial cowl may be added to the Duster. Our original model carried one of these, and the appearance was very striking. Unfortunately, we've not been able to locate a photo of this version. Also, we've included a sketch showing three fin and rudder variations, based on the Curtiss "Fledgling", the Curtiss Hawk series, and the deHavilland biplanes. Add different stab and wing tip shapes, wheelpants, etc., and you'll probably be able to claim a model of your own design!

And now, with a considerable amount of correction and a whole lot of deletions (we were even "windier" back in 1964), here is part of our Duster article from the September 1964 issue of Model Airplane News.

Most of us, ahem, older fellows have a mania for biplanes, stemming from some pleasant association in the dim, dark ages of pre-war (II) aviation. If it



Tail wheel and rudder hook-up details. Tom's tail wheel bracket is bent from sheet aluminum, but a nylon one would be OK.

To get a stiffer landing gear, Tom Laurie added a spreader. Rubber bands at center provide some "give", if needed.

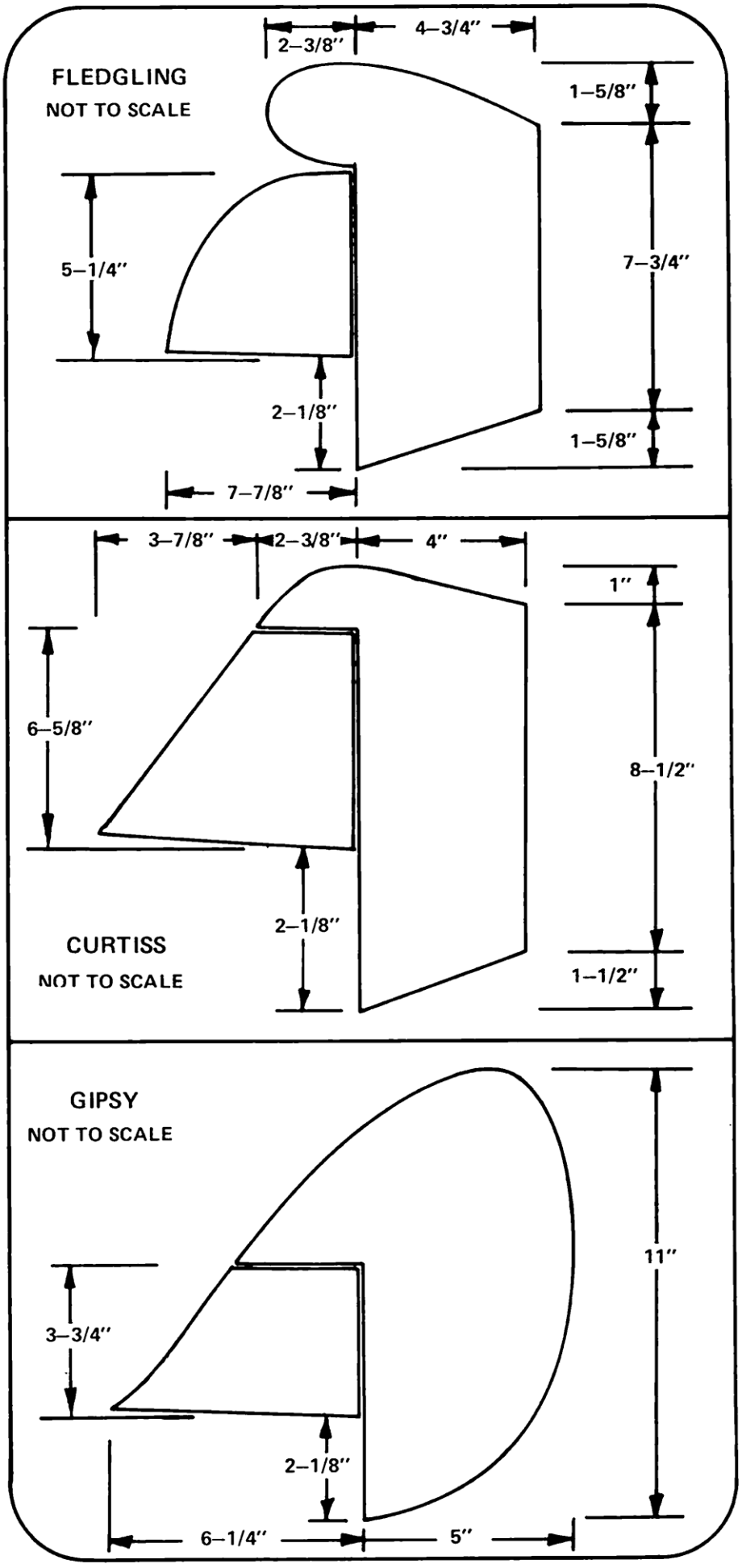
Radio installation. Note spring override on throttle servo. Five-channel Futaba system.

makes you wince to hear someone identify a bipe as a "double-winger" or a "plane-with-a-wing-up-top-too," then you know what we mean.

As a kid, we came away from visits to the local airports with our memory compartment full of Wacos, Fleets, Eaglerocks, Travelaires, Great Lakes, etc. Each one was a thing of functional beauty.

Its fabric-covered surfaces gave off glistening, symmetrical reflections as the covering stretched tautly from rib to rib or from stringer to stringer. The beautiful solid colors of black, orange, yellow, red, white and blue weren't chopped up with meaningless, angular, jagged, multi-colored "decorations." The engines, usually sticking out in the breeze, were big, gutsy, slow-revving, fire-breathing monsters which ran with a deep, throaty, chest-thumping, ear-bursting sound; not much bhp, but having tremendous torque with which they could push a big wooden prop around as if it were a yardstick.

On the ground a bipe might rock and bump and stumble around on its two-wheel gear like a wounded duck, but that's only while taxiing to and from the flight strip. Once it was storming and high-tailing down the runway for a long, smooth, gradual climbout into its proper element, it became a thing of graceful beauty. And who could have lived in that era without remembering, as a biplane maneuvered for a landing, the haunting sound of taut flying wires, as they sang above the whispering chug of the idling engine, interrupted now and then by an occasional burst of the throttle to keep the plugs clear. As the biplane slowly drifted and slipped to a smooth touchdown, its bowlegged wheels would spread as the big bird rather reluctantly settled its full weight on the bungee shocks, and the wings relaxed on the tension of the landing wires . . . brother, you had to be there, no one short of a Hemingway could even begin to describe it.



Well, that's our main reason for building bipes, but there are two other more concrete motives. One is the challenge. Many people say they like bipes, but they haven't seen one that flies well. That's enough to make any self-respecting model designer head for the drawing board. The other reason is really an extension of the first. After all, if a bipe is designed to fly well, why shouldn't it qualify as a contest type airplane? Of course, some of us realize that nine-tenths of a winning combination is the flyer. Most people, and our manufacturers seem to bank heavily on this, feel that they're nine-tenths of the way toward being ace fliers if they have a duplicate of the champion's plane, engine, and radio. I hope some red-hot contest flyer will latch on to the Duster and give it a try. Unfortunately, not being part Checker Cab, the Duster will have a difficult time with the exaggerated importance of ground handling now called for in the AMA rules (not as bad now, as when this was written). *As to its performance in the air, though, think of what type of airplane has won most all major world aerobatic championships since Wilbur and Orville quit fixing bicycles; and what kind of airplane is used for low-level crop dusting, particularly of small fields surrounded by tall trees and power lines where immediate control response is so important? You bet your boots, buddy. Bipes!*

Show me a man who loves bipes, but won't build one, and I'll show you a guy who hates cutting out ribs and/or building wings. Before we go any further, let's clear up this situation. There are several cures for these problems. As for the ribs, use the sliced bologna method, as follows: trace the rib pattern on a light balsa block around 3½ inches thick. Cut out the rib blank, including the spar notches, on a band saw, and sand smooth. Now set gate on band saw to the rib thickness required and make like the local delicatessen! A block this thick will

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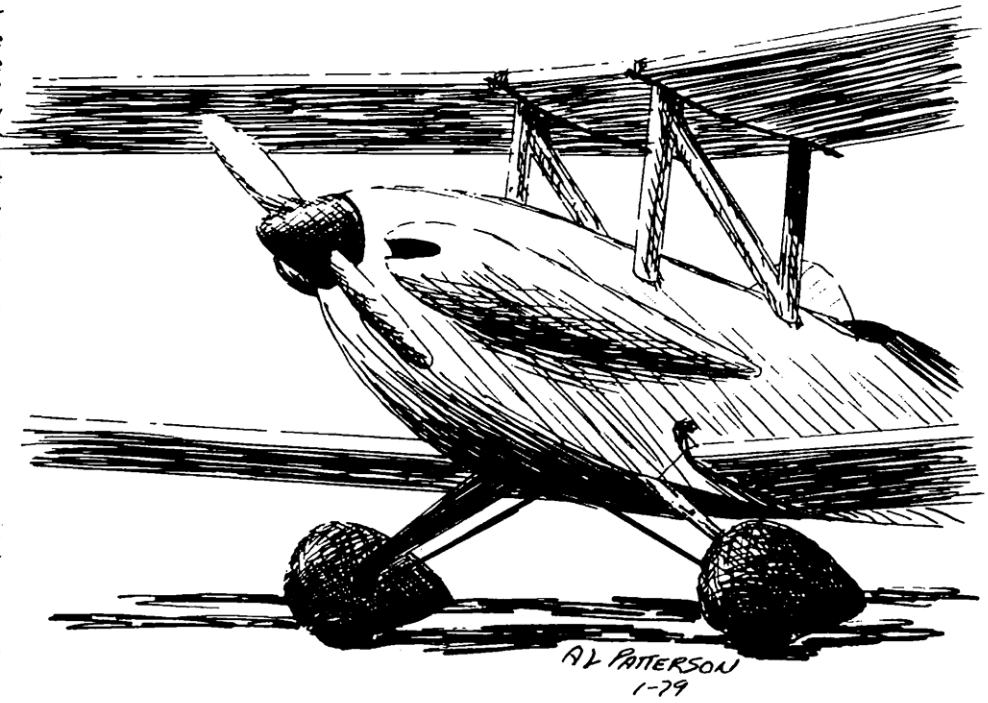
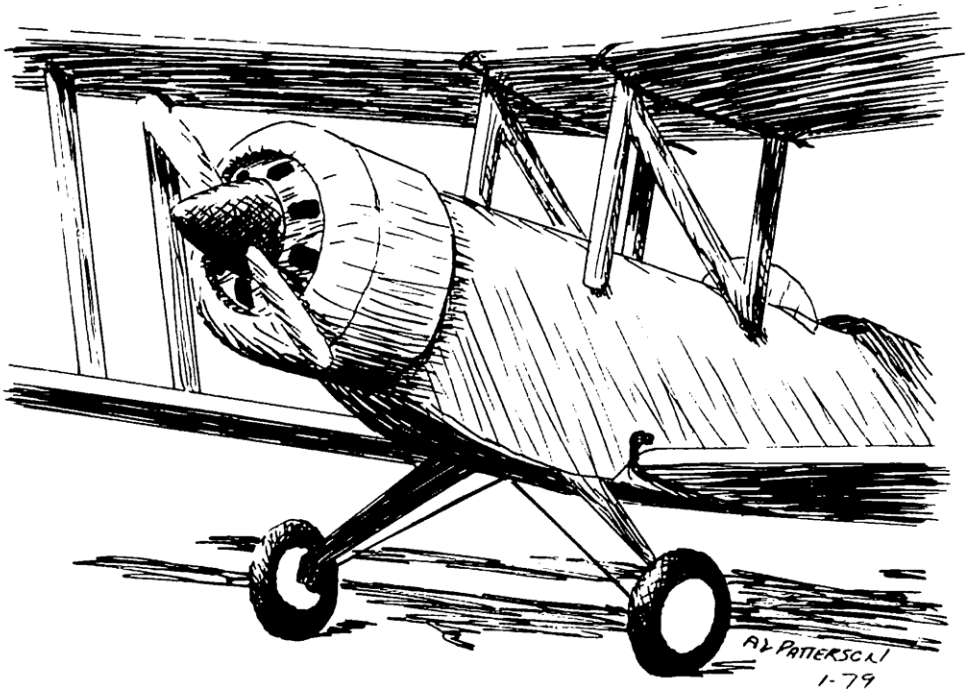
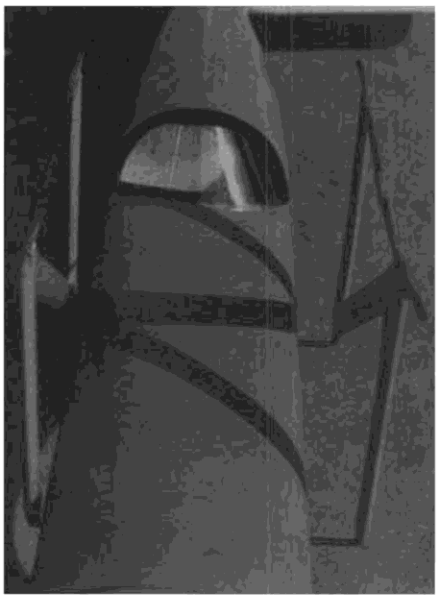
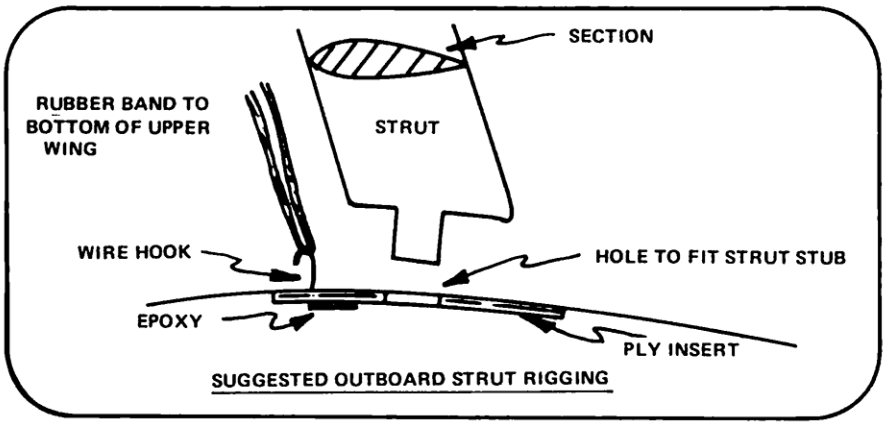






Cabane struts plug into tubes in fuselage, are held in place with J-bolts, can be removed.



give you around 30 ribs 3/32 thick, enough for one Duster wing. A complete set of ribs for two wings shouldn't take more than an hour to produce, and man, they're uniform!

All of which, at long last, brings us to the main subject of this article. The Duster is an exact 7/8 copy of Big John. It was felt that this size would put it in the range of most engines from a .45 on up. Though enough to make the purist snort with disgust, the rather extreme thrust offset was found to be the correct amount for both ships.

Being a designer from the eyeball school, there is not much we can honestly say about such things as the choice of rudder area vs. dihedral, the location of the CG, the amount of stagger, incidence, etc., except that all these things have been ascertained on a trial and error basis. In our opinion, the only difference between this method and the use of aerodynamics is that it takes less time to explain why you did something a certain way if you just say you tried it and it worked. This, and the search for an easily built, yet sound structure, pretty much dictated the design. The only other rule to follow is, "If it looks good, it will fly good." Of course everyone has a different idea of what looks good, so. . .

CONSTRUCTION NOTES

The construction of the Duster is pretty much straightforward and only a few points peculiar to this ship need be detailed.

In order to keep the weight down, Sig Contest balsa should be used where light wood is practical. Sig is specified because it is noted that several brands are labeling their standard weight balsa as "Contest." White glue should be used for all major construction joints. Where laminating sheets with white glue, wet the side opposite the glue with water to prevent curling during the drying process. Avoid, where possible, having white glue joints on the outside surface. It has a nasty tendency to swell up from moisture, thus leaving a raised line.

WINGS

The quickest and most accurate method of making a big batch of ribs has already been described. If you cannot beg, borrow, or steal a band saw then you will have to make an aluminum template and whack them out one at a time. Punch about three holes through the template with a small brad. The flash around the holes will provide a grip on the balsa while you are making the cuts. Don't leave out the webbing between spars. It adds tremendous strength with negligible weight penalty. The ply dihedral gussets may be two-piece, since they are glued to the center-section spars.

EMPENNAGE

The stabilizer and fin may be permanently fixed, or strapped on, depending on your transportation facilities. It is suggested, in the interest of keeping the tail light, to fill the grain and finish without any covering material. As the original was to be finished with Hobbypoxy, all surfaces, both covered and uncovered, were filled with Hobbypoxy "Stuff," thinned one part "Stuff" to two parts Hobbypoxy thinner. Regular butyrate dope may be used over it, if preferred.

FUSELAGE

There is nothing particularly offbeat about the construction of the body. First, the doublers, longerons, diagonals, uprights, and plywood doodads are added to the 3/32 inch sides. The basic structure is then blocked and squared up, using bulkhead "B", the 1/4 x 1/2 inch hardwood crosspieces that fit in the 3/32 plywood sockets, bulkhead "D", and the two 1/4 inch square crosspieces just aft of the bottom wing trailing edge. The 1/8 balsa cockpit floor should be put in at this time to help alignment. The forward deck can be sheeted in two pieces, but remember to make the birdcage (cabane struts) first.

When gluing up the nose blocks, follow this procedure: glue the 1/2 inch sheets to the front of bulkhead "B" and to the inside of the fuselage sides. Next come the 1/4 inch sheets that go inside of the 1/2 inch sheets. However, at this time, the length of the engine you are going to use must be determined so that bulkhead "A" will be located at the proper distance from the front 1/8 ply ring. Resist the temptation to decrease the engine offset shown. Bulkhead "A" is not detailed since it is a simple rectangle with its height determined by the engine length and its width as shown in the top view of the nose section.

LANDING GEAR

A Sig 2 x 18 inch aluminum alloy blank was used on the original because a tread of around 15 inches was desired, and to the best of our knowledge, no preformed gear this size is available. A word of warning . . . this stuff is HARD and will take the skill of an expert metal-bender to put it into shape. The bends must be radiused at least a half inch. It would be worth an additional 50 to 75 cents to the average consumer to have these available pre-bent.

CABANE STRUTS

The so-called "birdcage" is usually considered a big pain to make. This one is easier than most for the simple reason that it is perpendicular to the body. Several years ago, we came across a handy little gadget which, with some experience, takes the sweat and swearing out of the wire-bending task. It's called the "Handi-Bender" (wonder how they ever thought of that), and consists of an aluminum block with various common sized slots (1/16, 3/32, etc.) and five holes to take 1/4 inch dia. steel pins which can be shifted around to suit the situation.

The whole operation should be performed before the forward cowl sheeting is glued in place. Bend, bind, and solder the whole thing into one unit as follows: for alignment sake, mount the front and rear struts to the body using spade bolts. Bind on the saddle pieces next, then the diagonals. This is the time to make your alignment check, while the whole thing can be pushed and pulled into shape. When everything checks out, solder the entire mess together with a high tensile solder such as Willoughby. Loosen spade bolts and remove birdcage from the body. Cut apart in the middle. Later, when the fuselage is completed, the struts can be inserted from each side and joined with 5/32 O.D. tubing as shown on the drawing.

FLYING NOTES

It seems a shame to close off without saying something about flying the Duster. We won't waste words trying to tell anyone how to fly it. If you go so far as to build the ship and install proportional multi-equipment, you've probably already logged enough air time to tell us how to fly it. If you're nuts enough to build the Duster as your first multi ship, or even worse, your first R/C job, there's no use trying to tell you anything either.

It might be helpful, however, to mention a few flight characteristics of the Duster. The most notable difference from the average stunt ship is the roll rate. It's slow. On the other hand, it's a much prettier and realistic maneuver when done this way. Don't come roaring down wind, on the step, and expect to whip up three fast axial rolls. The rate could undoubtedly be quickened by chopping ailerons in the top wing, but it seems pointless.

With the original Duster, vertical eights are a piece of cake. The ship weighs an even 8 pounds, and the ST .56 is actually more than enough power. The maneuver can be done as tight as a Ukie stunt pattern, or opened up. In either case, it is possible to do consecutive verticals, limited only by the pilot's ability to keep a heading.

Takeoffs are point-getters. There is no noticeable breakaway. With neutral stick, the Duster simply bores tail-up down the runway and leaves the ground at some unknown moment. There is absolutely no tendency to ground-loop.

Landings in windy weather are best made by flying right down to the ground for a two-point wheel landing. In calmer weather it is a little safer to attempt a three pointer.

One more suggestion. When you go to the local field with your Duster, take some poles, barbed wire, and a Model T coil. Everybody wants to get a close look at "that there double-winger." •