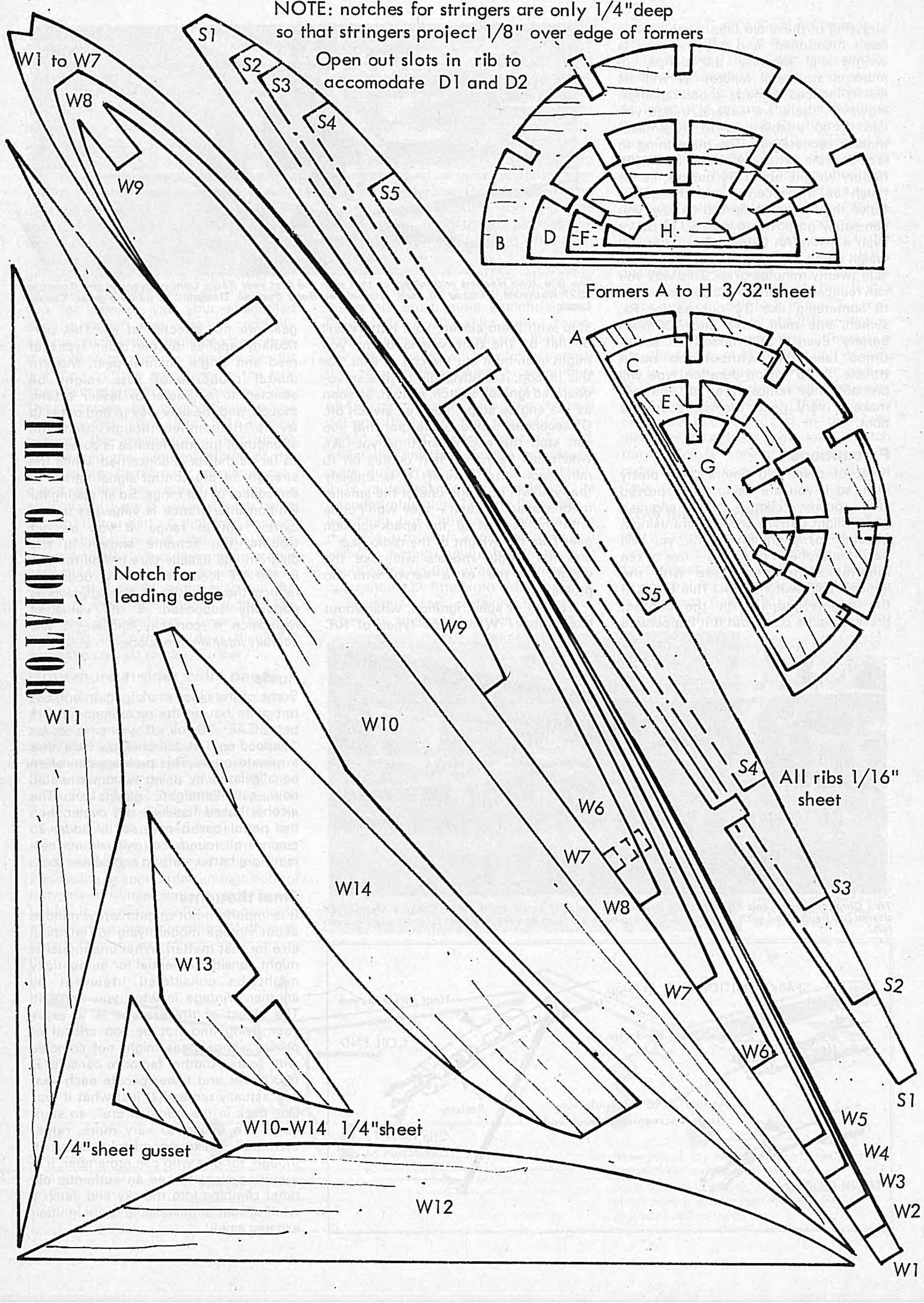
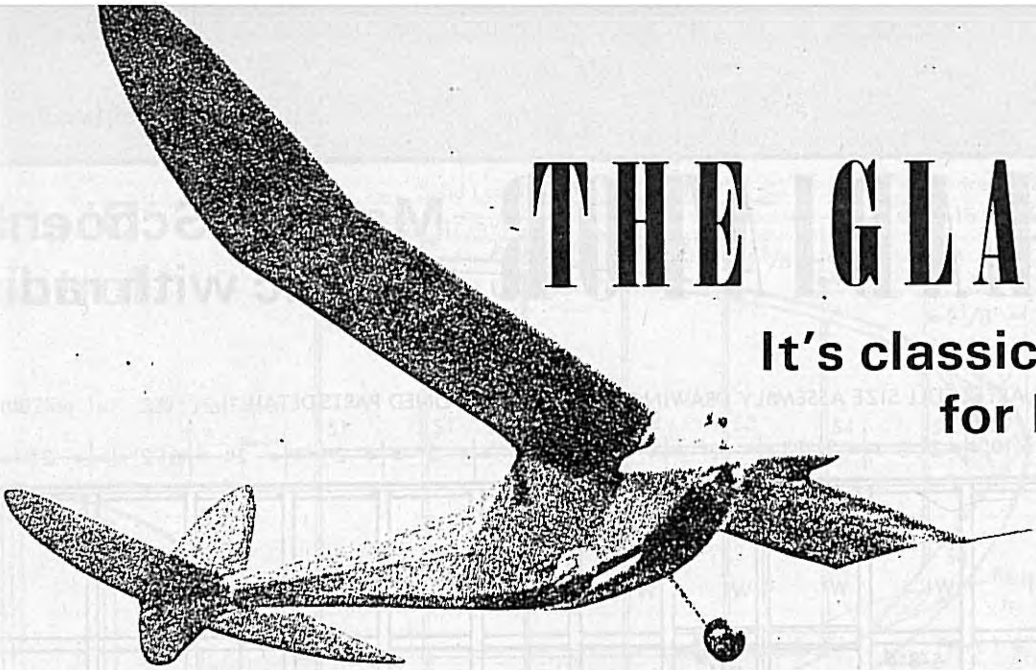

NOTE: notches for stringers are only 1/4" deep
so that stringers project 1/8" over edge of formers
Open out slots in rib to
accomodate D1 and D2
W1 to W7
W8
W9
S1
S2
S3
S4
S5
B
D
F
H
Formers A to H 3/32" sheet
A
C
E
G
S5
W9
Notch for
leading edge
THE GLADIATOR
W11
W10
S4
All ribs 1/16"
sheet
W6
W7
S3
W8
W14
W13
W7
S2
W6
S1
W5
W10-W14 1/4" sheet
1/4" sheet gusset
W4
W3
W12
W2
W1

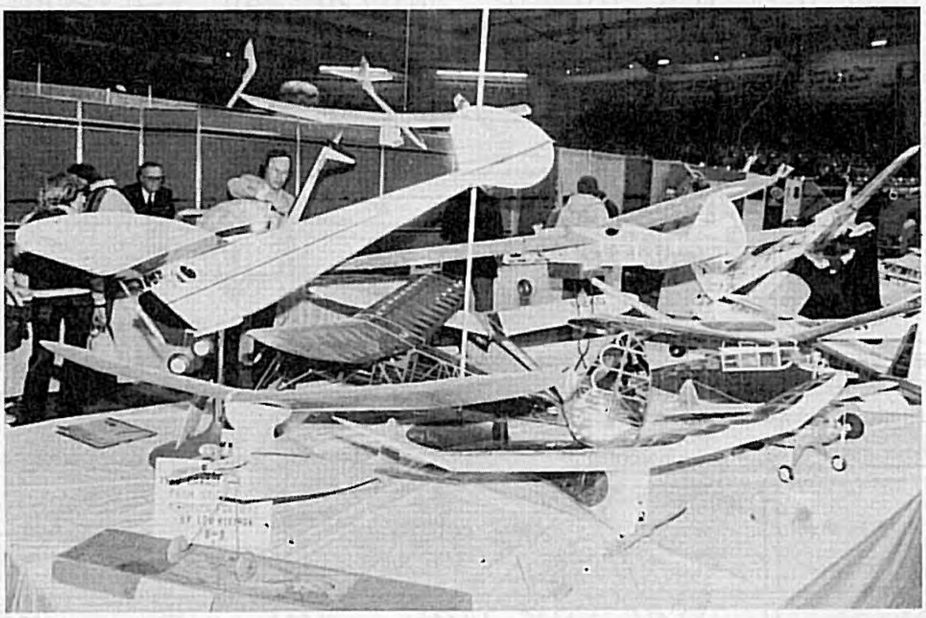


THE GLADIATOR

It's classic vintage – ideal for R/C conversion

HERE'S A CLASSIC – a superb performer from the 40's by Maurice Schoenbrun, as it appeared in 'AIR TRAILS' of March 1941 after a celebrated introduction to the free flight contests in USA during 1940. Now with converted tail surfaces for radio assist as used by Tom McCoy. The GLADIATOR returns as a vintage design supreme – over to the original story as written 43 years back!

For the first few seasons of gas-model building, from the very start of the hobby up until the 1939 season, the majority of motors manufactured were in the Class C bracket. As a result, throughout the USA there were thousands of model builders with Class C motors of around .6-cubic-inch displacement who were absolutely flabbergasted by the new (then, 1940) rules. After hours of brainwork designing two-pound ships for these motors, at once they were compelled to build three-pound ships – according to the rules.



Standing high on its pedestal, a winner among superb models, Tom McCoy's R/C converted Gladiator at the Toledo R/C Expo shows those beautiful lines, the combination of curves with efficient proportions which made Maurice Shoenbrun's model a design leader.

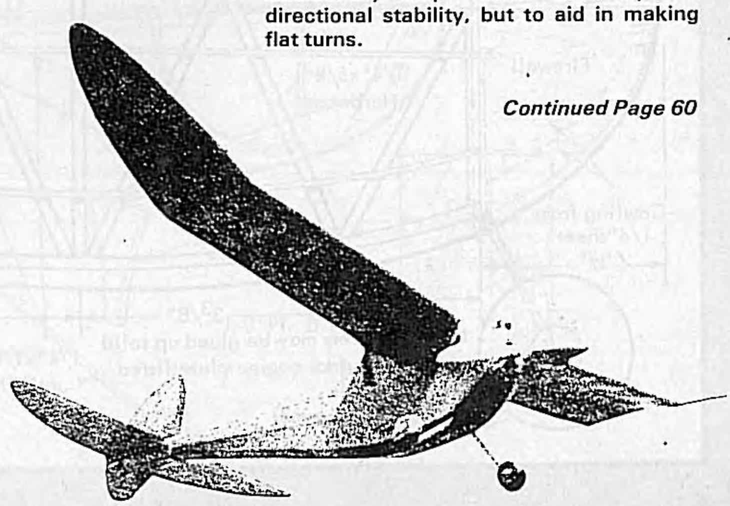
Take a good look at those rules again. In order to each a minimum wing loading of eight ounces per square foot, one must use at least six square feet of area. Now that's a lot of wing. Therefore, the ship on which it is used must be of very clean design, and the airfoil must have high lift and a relatively low drag, so that the motor will not have to "strain" in pulling the ship into the thermal territory.

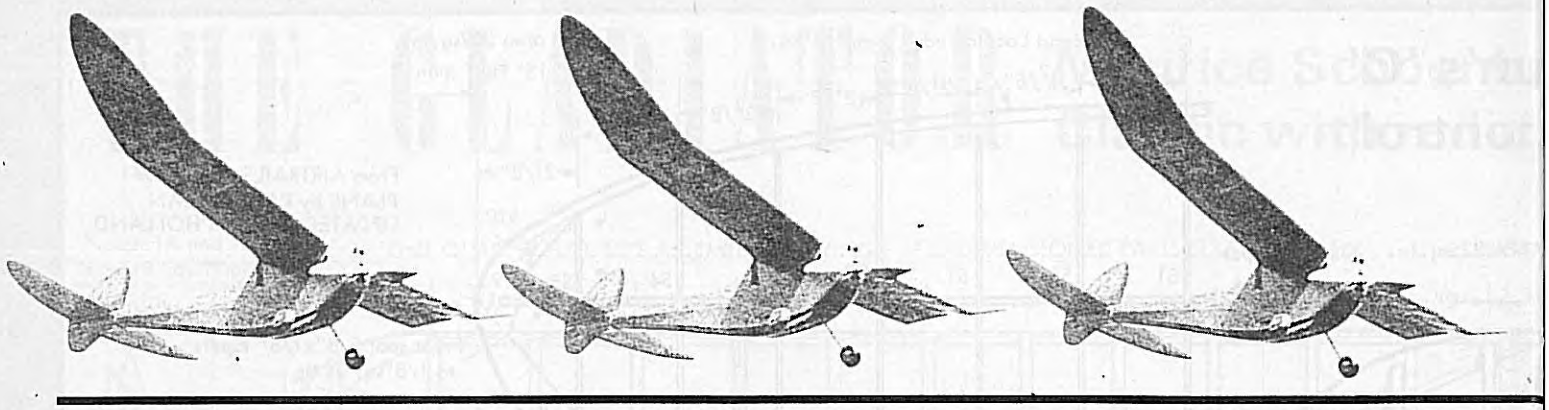
The ship is of clean design. A turtleback fuselage with stringers, and additional stringers on side and bottom of the same, give a streamlining that reduces drag to a minimum. The wing has slightly less than the six square feet and has a thin airfoil to reduce the drag and aid the climb. The tail moment arm is a bit out of the ordinary, and in it lies the secret of the phenomenal performance. The added length of this lever will cut down the climb slightly, but the pancake glide more than compensates for the loss in climb. The Gladiator practically stands still after the motor has cut, must in contrast to many speed demons that haunted Class C.

The ship, in early stages, was quite a problem as far as the position of the centre of gravity was concerned. First models had the CG placed eight-five percent behind the leading edge of the wing. In theory the lifting stabilizer of large area would keep the tail up, but to our sorrow we found that $\frac{1}{4}$-inch positive was needed in the stabilizer to obtain a good glide. Under power this adjustment caused the ship to dive rather horribly, so we immediately sought a cure. The CG was moved to the position indicated at present which is forty percent behind the leading edge, and immediate improvement was noted. The incidence was removed from the stabilizer and this improved the climb tremendously, and made the glide even flatter.

Directional stability is assured by the large rudder, which is necessary to bring the CLA (centre of lateral area) back to its present position. Rudder, by the way, is extremely important not only for directional stability, but to aid in making flat turns.

Continued Page 60





Continued from Page 57

After preliminary flights to make adjustments, the Gladiator began living up to expectations. Many witnesses will testify that the ship consistently turned in three-minute flights on a twenty-second motor run entirely without benefit of thermals. The surprising part of this performance is the fact that the motor (a Dennymite) had never been opened to more than half throttle. This conservation of power aids in making the ship a splendid all-weather performer, and its soaring qualities make it lift to the slightest riser.

At the 1940 Nationals in Chicago, the Gladiator was flown on a twenty-second motor run in a test flight and was lost for the remainder of the day after thirty-five minutes in the air.

During the "Record Trials", conducted during the winter of 1940 by the Metropolitan Model Airplane Council, the Gladiator turned in a flight of 8:50. It took second in the annual gas-model meet of the Richmond Flying Club at Staten Island in August, averaging three minutes, third at the Trenton Gas Meet, averaging three and a half minutes, and has consistently scored in other club contests throughout the East. A similar ship, built by Carl Cecil of the Sky-Scrapers, was lost on a *two-hour* flight during September, although the motor run was but fifteen seconds.

Construction

Too many articles describing the building process have made the beginner shy away from construction, but believe us, the construction of the Gladiator is as simple as the squarest box ever called a model. In the first place, note the heavy construction of the fuselage – all of which is $\frac{1}{4}$" square hard balsa. Both sides of the fuselage are the same, of course. To build them exactly the same in all respects the sides should be built one atop the other. Here's how:

Start with that long piece of $\frac{1}{4}$" square which is located on the thrust line and is known as the main longeron. Take two pieces of $\frac{1}{4}$" square, each one long enough to reach the firewall to the tail. Place one piece on top of the other and pin them to the plan, first resting the plan upon a table top (preferably *not* mahogany). After this (or these) pieces have been pinned in place over the plan, do the same with the bottom longeron. The top longeron of the cabin is placed next. If your plans are drawn correctly, you will note that the front of the cabin is $\frac{1}{4}$" higher than the rear. After all three longerons are in place, cement in the pieces of $\frac{1}{4}$" vertical braces beneath the cabin, behind the firewall (which has not been placed) and between the main and bottom longerons. The Warren truss bracing which extends from the rear of the cabin to the tail is formed of $\frac{1}{4}$" square soft or $\frac{1}{8}$ x $\frac{1}{4}$" hard pieces, and should then be cemented in place.

Next install the motor bearers, which are $\frac{5}{8}$ x $\frac{1}{4}$" (Pine, bass or even plywood). Be sure and cement these bearers thoroughly to the under side of the main longeron, which you will note extends to the very front of the plane, other longerons (those on the bottom) extending only to the firewall. When two sides of the fuselage are completed, cut the cross pieces as shown on the plan and form the fuselage proper. The fuselage *must* be $3\frac{5}{8}$" wide or the ship will not make the cross-section rule. Cut the formers behind the cabin of $^3/_{32}$" sheet and cement them in place. When thoroughly dry, cement the stringers of $\frac{3}{8}$ x $\frac{1}{8}$" in place. These insert $\frac{1}{4}$" into the formers and protrude $\frac{1}{8}$".

When the fuselage is completely formed, cut the firewall of $\frac{1}{8}$" birch plywood and cement the landing gear in place before installing the firewall in the fuselage. Note that the firewall only extends to the top of the motor bearer. Former A extends from the top of the motor bearer to the window.

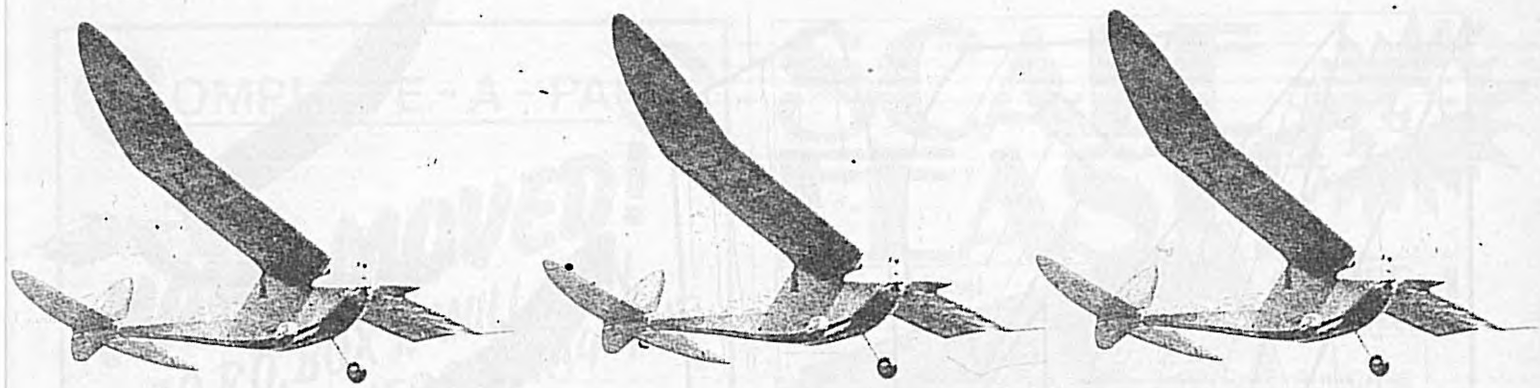
The cowl is quite conventional to form. Side pieces are of soft $\frac{1}{4}$" sheet balse, while the centre of the cowl is of soft block balsa. The side pieces are cemented to the bottom of the motor bearer and to the firewall. The block is cemented to the side pieces and the firewall, and after the cement has dried, liberal applications of sandpaper and elbow grease will result in a fine cowl.

The under rudder is built separately, the curved portions being cut out and cemented, then the whole assembly is cemented to the fuselage in the proper place, struts cut as shown being used as bracing.

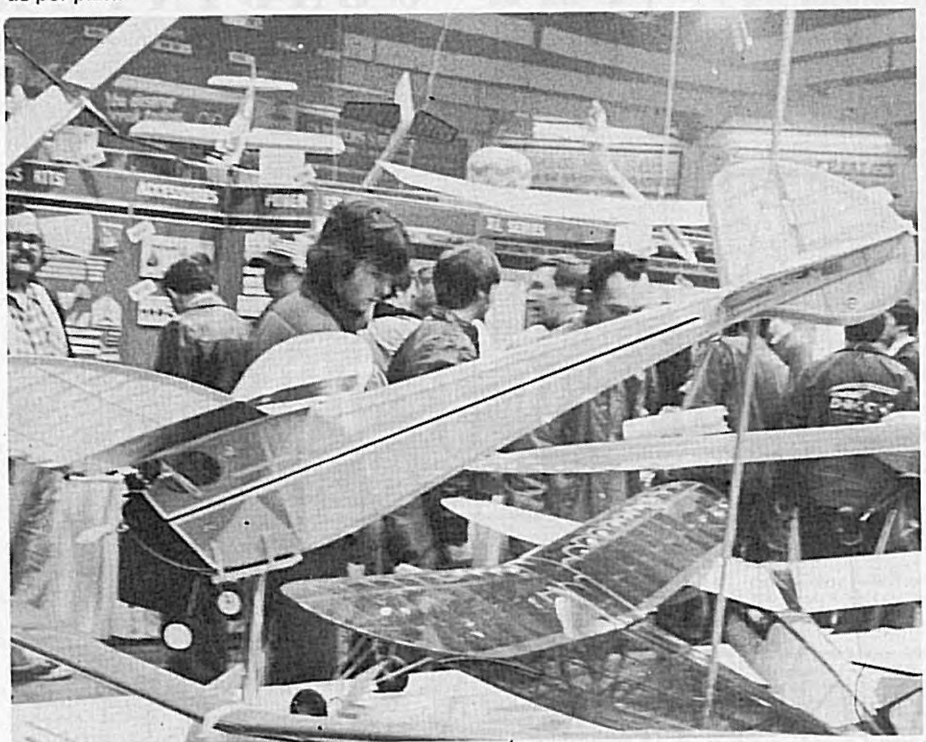
Stringers on the sides of the fuselage, which are indicated on the plan, are of medium $\frac{1}{8}$ x $\frac{1}{4}$" balsa. After being cemented in place and allowed to dry they are sanded. An integral part of the fuselage design is a strip of $\frac{1}{8}$" square, which is cemented on the outside of each main longeron for the entire length from the firewall to the tail. As in the case of other stringers, this piece is sanded flush with construction at the firewall and at the tail. An additional stringer of $\frac{1}{2}$ x $\frac{1}{8}$" balsa is used on the bottom of the fuselage, this being tapered into the underslung rudder, as will be noted.

Now for the wing. Seventeen No. 1 ribs and two of all others are required. Note that spar notch at rear of ribs 7 and 8 is not as deep as the others. The wing should be

More views of the Gladiator made by Tom McCoy and exhibited at the Weak Signals Club of Toledo Ohio Expo, but wait a mo' – who's that character on the left just taking a look at the five R/C assist models? It's none other than Benny Shereshaw, pioneer in power model designs and maker of the famous Bantam engines – he had a soft spot for the Gladiator too.



laid out in its entirety (both sides) and built directly over plan. The flat centre section is built first. Careful attention should be paid to the cut-in portion, which is illustrated on the drawings. After the centre section is built, proceed with the tips. All wood sizes are indicated, and a little careful work will result in the same alliptical tips shown. They are *not* hard to duplicate, once the parts have been carefully cut out as per plan.



On to the tail section. Note that the Gladiator has a lifting tail. It's a good tail, and we're proud of it, but there are two "tricks" in duplicating the original. First – scaling the ribs. The leading and trailing edges are both of $\frac{1}{4}$" stock, the leading edge of $\frac{1}{4}$" square and the trailing edge of 1 x $\frac{1}{4}$". Cut the ribs the same, and here's that "scaling down" process. Memorise it carefully for it will aid you in building similar construction in other ships.

The sample rib is used for five of the ribs, the only change being the slight sanding required on the leading edges. In forming the next two ribs (the third ribs from the centre line), follow this plan. First cut the ribs to proper lengths. Then measure from the top of each rib down $\frac{1}{4}$" at both leading and trailing edges. Draw a horizontal line connecting the points thus established and cut along that line; the result will be a perfect airfoil in smaller size. This is repeated for each rib in the tail section. See the full size parts – we've done it for you!)

Bill of materials

Fuselage
(All wood specifies is 36" length unless otherwise stated)
4 $\frac{1}{4}$" sq. 60" longerons (hard balse)
2 $\frac{1}{2}$ x $\frac{1}{4}$ x 15" gumwood motor mounts
6 $\frac{1}{4}$" sq. cross members (medium)
12 $\frac{1}{4}$ x $\frac{1}{8}$" stringers and cross members (medium)
1 $\frac{1}{8}$ x 3" sheet formers (medium)
1 $\frac{1}{4}$ x 18" cowling sheets (soft)
1 block 3$\frac{1}{4}$ x 4 x 5" centre cowling block (soft)
1 $\frac{1}{2}$ x $\frac{1}{8}$ x 60" bottom stringer (hard)
1 3$\frac{1}{4}$ x 4$\frac{1}{2}$ x 2" birch plywood firewall
1 3' length $\frac{1}{8}$" wire for landing gear

Rudder
1 $\frac{1}{4}$" sq. x 12" hard, leading edge
2 $\frac{1}{8}$ x $\frac{3}{8}$ x 36" medium, spar and ribs
1 $\frac{1}{4}$ x 1" sheet, rudder outline

Stabilizer
3 $\frac{1}{16}$" x 2" sheet, medium, ribs
1 $\frac{1}{4}$" sq leading edge (hard)
1 $\frac{1}{4}$ x $\frac{5}{8}$" leading spar (hard)
1 $\frac{1}{4}$ x $\frac{1}{8}$" trailing spar (medium)
1 $\frac{1}{4}$ x 1" outline (soft)

Wing
15 $\frac{1}{16}$ x 2 x 26" sheets for ribs (medium)
2 $\frac{1}{4}$" sq. leading edge (hard)
3 $\frac{1}{4}$ x $\frac{5}{8}$" leading spars (hard)
3 $\frac{3}{16}$ x $\frac{3}{8}$" trailing spars (hard)
3 $\frac{1}{4}$ x 1" trailing edge (soft)
20 $\frac{1}{4}$ x $\frac{1}{16}$" capstrips (medium)

Miscellaneous
1 sheet celluloid
1$\frac{1}{2}$ pints cement
2 pints dope
1$\frac{1}{4}$ pints colour dopes (4oz chocolate, 1 pt orange)
5 feet ignition wire

You will note that the notches for the spars are tapered from $\frac{5}{8}$ to $\frac{1}{4}$". Notches for the spar are cut $\frac{5}{8}$" deep but are cut $\frac{5}{32}$" wide. This allows $\frac{1}{8}$" spars tofit into the notches rather loosely. They are cemented in place lightly in first stages of construction. When the assembly is complete it is turned bottom side up, and additional cement is "plastered" on all rib and spar joints. The unit is then allowed to dry over a radiator, or similar warm place. The contraction of the cement and the loose fit of the spars permit bending, giving the required undercamber – thus the lifting tail. Rudder construction is conventional. When the construction is complete it is cemented to the elevator.

Flying

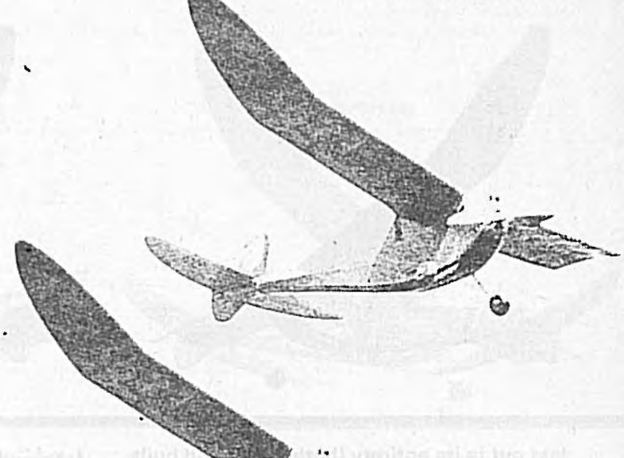
The Gladiator, when complete with motor, batteries, timer, coil, etc., etc, should balance (as previously stated) forty percent of the back of the leading edge of the wing. To get the ship to balance in this position, everything must be mounted as far forward as possible, and heavy batteries should be used.

First flights should be made on a minimum of power. However, no flights should be made until adjustments are complete. Hand-glide the model first, giving it a slight amount of right rudder. A proper glide should be flat, slow, and the ship should have a slight right turn. With a small amount of left thrust in the motor, the ship will have a left turn under power, and a right circle when in the glide.

It is important to use wing warp in adjustments. Looking from the front, the right wing should be washed in $\frac{1}{4}$" at the trailing edge. This means that the trailing edge should be $\frac{1}{4}$" lower than the leading edge.

After several flights under low power, the Gladiator may be given gradually, increasing amounts of power until the builder becomes accustomed to its flying abilities. When properly built and adjusted, the Gladiator will prove to be one of the best contest ships the builder has ever tackled. Good luck!

Well – wasn't that something to take ol' timers back nearly half a century and a mystery for the newcomers. Imagine $\frac{1}{4}$in balsa being classified as 'heavy' construction; or building to fuselage cross-section rules; or acquiring the tail under camber by deliberate warping on a radiator! Happy days! – ED.



THE GLADIATOR