



**T**HIS is *Archie*, the model we have had so much fun developing, building and flying. We set out to provide a model which would do the impossible and please all of the people all of the time, and we think we have succeeded!

For the average to skilful pilot *Archie* is a perfect relaxer for a lazy afternoon in the sunshine, as the bees drone and the wispy clouds drift lazily across the sky. Although it is relatively slow flying, it is far from loath to perform simple manoeuvres, such as loops, rolls, inverted flying and similar aerobatics, but it will not spin easily because the stall is almost non-existent, which is as it should be, so that it can be "held off" for those satisfying three pointers, or touch and go's. Also, if you fancy a brief chat to your next-door pilot, *Archie* will fly itself around quite happily for a circuit or so, yet send a control and it will respond. In other words then, a model to have fun with.

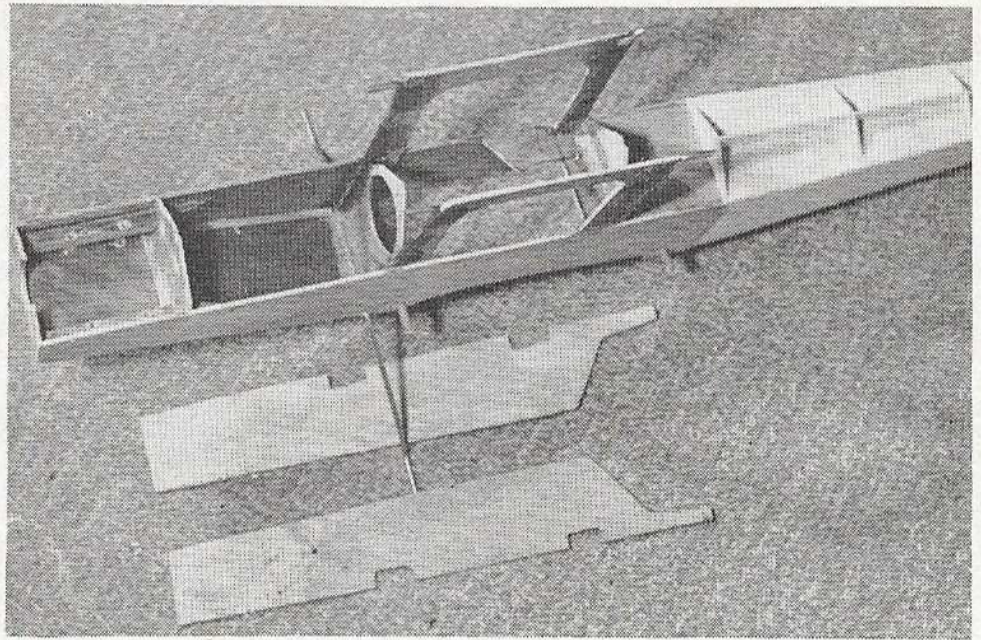
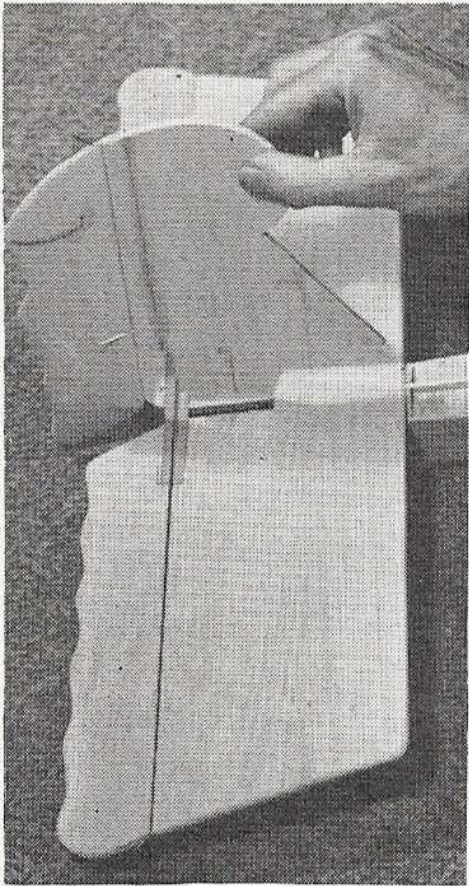
What, however, if you are not a practised pilot? Well *Archie* is still for you, because it is a trainer which is not outgrown as soon as one has mastered the rudiments of flying. We do not recommend *Archie* as a trainer to someone who is going it absolutely alone from scratch—not because it is not as docile as other trainers, but because, if one does make an error, as all beginners do, then, being a biplane, there is more of it to break! However, for the tyro who has the help of someone who, as a minimum, knows how to take-off and land, *Archie* can be recommended as a happy choice to ease your way into solo flying.

We have flown *Archie* "full house"—that is aileron/rudder/elevator/motor—and on rudder/elevator/engine only, with equally pleas-

ing results. It responds well to either directional control, but does need the elevator to "pull" it round a turn—so don't be tempted to try rudder-only! Obviously motor control is dispensable, but if we had to make a choice, when using three-function gear, we would opt for throttle in preference to aileron, as half the fun of flying is low power fly-bys, touch and go's, and controlled landing approaches.

At one time biplanes were considered too difficult a subject for all but the expert. As we have said, this just ain't so; however, there is rather more constructional work, but aren't the end results worth it? The wings themselves are identical—apart from the ailerons—and easy to build as indeed is the whole model. Throughout the aim has been—simple, practical, strong, light—with a lot of emphasis on the latter, because a light model will "bounce"—a test which every trainer has to undergo!

Struts, frequently offputting to modellers who like speedy construction, are no problem with *Archie*. Plywood cabane frames locate the top wing incidence correctly, and the interplane struts—essential for atmosphere—are simply strips of garter elastic (*honi soit . . .*) but most realistic from a few feet away. Wire bending and soldering is, we know, a deterrent to many modellers and, on *Archie*, you will find less to do than with many a typical functional design. As we have said, the basic cabane structure is plywood, while the undercarriage is of the torsion-bar type, the front strut being a "dummy"—again from elastic. By rights, *Archie* should have had a tailskid, but practicality won over aesthetics and the steerable tailwheel



Left: slotting in the fin; above; fuselage with top halves.

gives impeccable ground handling.

In the air, and even on the ground, *Archie* has been mistaken for many a different "oldie," which is half the fun. As you can see, we used the scalloped trailing edges with British markings, which makes for originality, but would have looked better with a Cross Patee as *Fritz*. Use your originality here and dress *Archie* (or *Fritz*) up with the colour scheme, dummy engine, pilot, machine guns, bombs and whatever of your own personal squadron!

In other words start the fun before you even start flying.

## CONSTRUCTION

### Fuselage

The front side panels are cut from  $\frac{1}{8}$  in. ply. (If you could not

find the fretsaw and managed to cut them out with a tenon saw and file, don't give yourself a pat on the back—nearly all the lines are straight!) The top and bottom panels are  $\frac{1}{16}$  in. or even 0.8mm. ply, so can be cut with old scissors or tin-snips. Cockpit floor, F1 and F2 are also  $\frac{1}{8}$  in. ply as is the front fuselage panel ("nose-ring?")

The rear sides are  $\frac{1}{8}$  in. balsa with scrap  $\frac{1}{8} \times \frac{1}{4}$  in. strip "longerons and spacers" fixed on before joining to the ply sides with hard  $\frac{1}{2}$  in. sheet doublers. The grain of these *must* run fore-and-aft! The engine is mounted on a Tufnol plate. This was temporarily bolted to the bearers to act as a jig when assembling the sides to the formers and tail block. After cutting out the cabane frames, mark the position of the top of the sides on them before gluing them in place. (While this assembly is setting you can start on the wings). Sheet the rear fuselage top and bottom, leaving the tail seating open for pushrod installation.

Bend the undercarriage from 10g. piano wire and bind the two torsion

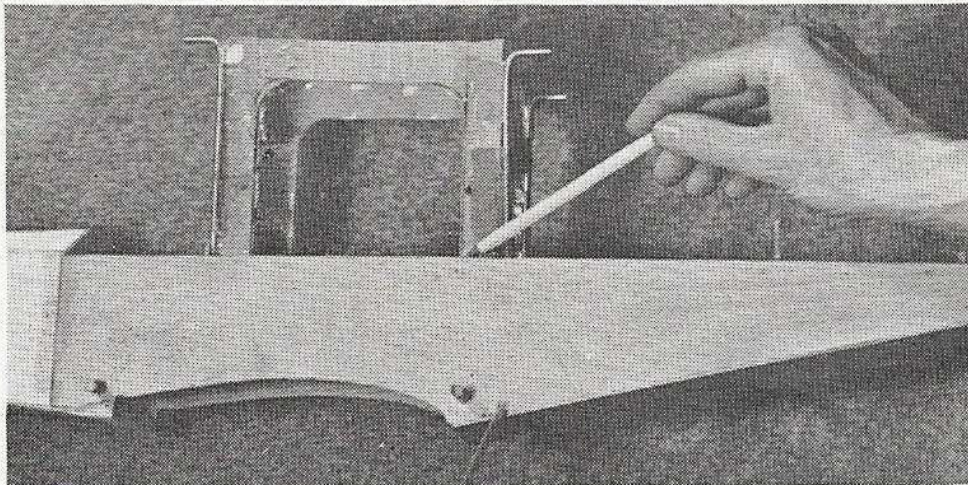
bars together with Sellotape. Push the u/c up through the bottom of the fuselage and glue the ply fuselage bottom panel in place. (Back to the wings for a bit . . .). Now, without removing the tape on the torsion bars, lay glass-fibre bandage fillets over the torsion bars to bond the u/c to the fuselage and F2. (The Sellotape allows the torsion bars to twist correctly). Use more resin to bond the wire to the cabane frames and cover with light bandage or even bind with thin wire. Fix the rear cabane wire to the servo plate/cockpit floor and F3 in the same way. An ounce of resin should be enough—more will have "gone off" by now.

Take out the engine plate and mix more resin. Slosh it all around the engine and tank bay, not forgetting the underside of the top ply panels, which should have first been tried for fit. The resin also bonds these at the top to a  $\frac{3}{16}$  in. stringer between F1 and F3. Put rubber bands around the fuselage while the resin cures. Apart from adding the rear stringer and its fillets to the fuselage top, aft of the cockpit, the fuselage is now complete.

### Wings

All the ribs are cut from the same template, and are pinned together to be sanded and notched. Lay down a bottom mainspar and the sheet trailing edge. Glue the ribs, fitting the t.e. webs as you go, to keep them upright. Add the top mainspar and leading edge.

When building the bottom wing, crop the ribs as shown, and glue the  $\frac{1}{4} \times \frac{3}{16}$  in. "rear spar" strip over the



Align wooden cabane frames with fuselage top to set incidence.

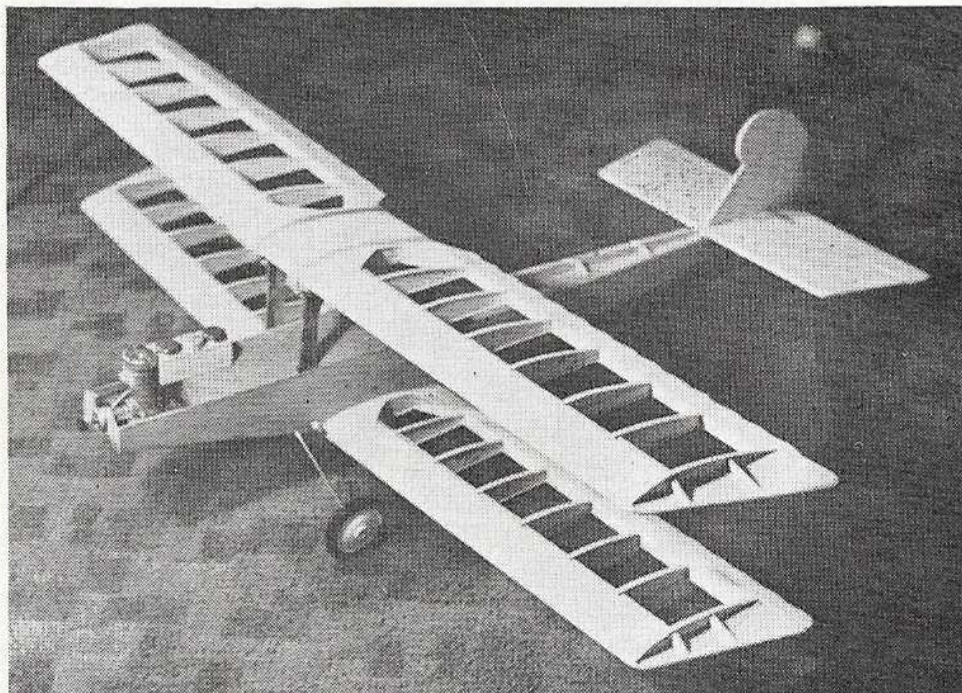
bottom t.e. sheet before adding the ribs. Apply the top t.e. sheet before removing the structure from board. Each wing is made in two halves, so by dividing your time between fuselage and wing construction, there is no waiting involved.

To complete each wing half, sand the l.e. and sheet cover the l.e. back to the spars top and bottom. Join the halves using ply braces, then sheet right across the centre bays in one spanwise length, using  $1\frac{1}{2}$  in. wide strips of  $\frac{1}{16}$  in. sheet. Cap strip all ribs on the open area, and add the tips and gussets.

The strip ailerons are made from hard  $1 \times \frac{1}{4}$  in. t.e. stock with a strip of  $\frac{3}{4} \times \frac{3}{8}$  in. added to the front. This is sanded to section and chamfered back to give clearance for top hinging.

We prefer to hinge with adhesive iron-on film. It is continuous, avoids local stress points in the t.e. and gives a smooth airflow on the top surface, whereas continuous hinges centrally placed are difficult to apply without resorting to wide chamfers on both edges. Yes, there is a fairly wide chamfer underneath, but then this is also found on inset ailerons which sometimes have the same hinge method . . . so why worry? . . . it works well and, for this wing section, seems quite "clean."

One important point to watch is the fact that the strip aileron torque-rod unit *must* be in line with the hinge, *i.e.* level with the top surface. This is also convenient for covering and assembly when using iron-on film coverings. Leave the installation of the torque-rods until this later covering stage.



### Tail surfaces

The tailplane, elevators, rudder and fin are all from  $\frac{1}{4}$  in. sheet of medium grade. The tailplane is slotted to allow part of the fin to pass down onto the bottom of the fuselage, to provide extra rigidity. A strip of  $\frac{1}{4}$  in. sq. spruce is inset to reinforce this point, and a similar strip serves as an elevator joiner. Chamfer the bottom edges of elevators and tailplane at the hinge in a similar manner to that of the wing/aileron joints, for the elevators are also top hinged.

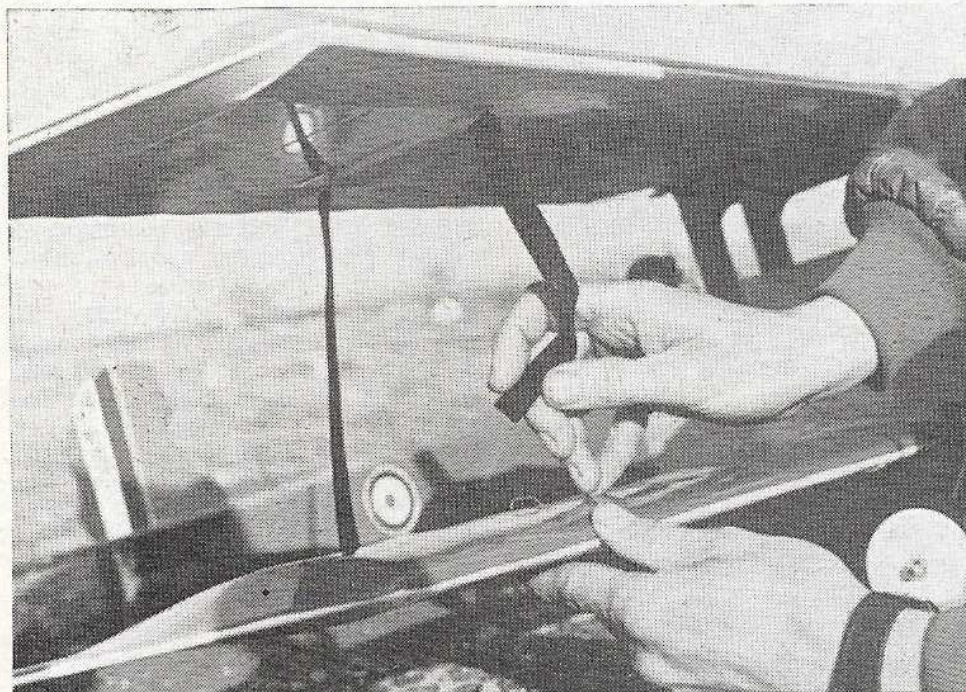
The rudder is centre-hinged with mylar strips epoxied and pinned

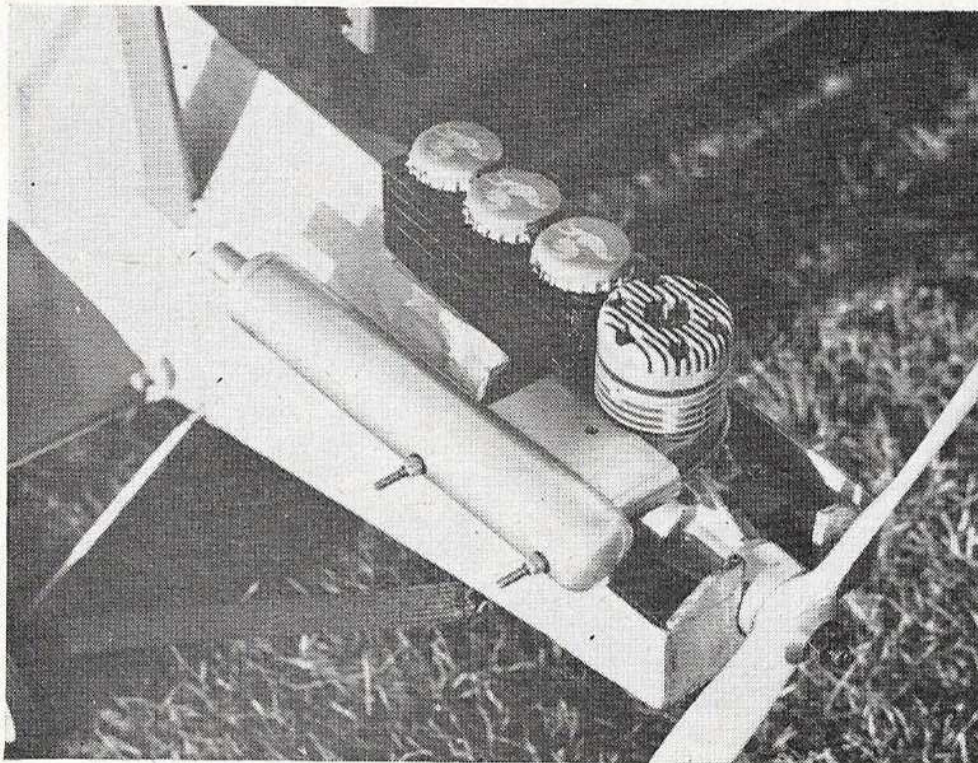
The garter elastic struts look realistic enough from a short distance away, and are eminently practical, in that they will not knock holes in your wings in the event of a rough landing.

and fitted after the rest of the model is complete. Linkage to the steerable tailwheel is by means of a short push-rod, via a small nylon adjustable clevis to a brass horn soldered to the tailwheel wire leg. The other end of the pushrod has a "joggle" and fits in the outer hole of the main rudder horn. This gives a greater angular throw to the wheel for tight ground handling. (A "joggle" is a simple double right-angle bend—see the Propo Book). The tailwheel wire passes through a scrap of plastic tube epoxied into the rear of the fuselage and a washer is soldered on top before fitting the tail.

### Covering

The prototype is covered in iron-on film, in dark green on top and white below. When covering the wings, first hinge the ailerons back with long strips, folding the ailerons back as described in the Propo Book. Leave the area immediately around the torque rods, uncovered for the moment. Now, slit just under the top sheet at the centre section for the lugs of the torque-rod tubes, groove the hinge edge of the ailerons and make a  $90^\circ$  groove for the bent end of each torque rod unit. Pin and epoxy these in place and finish covering over them. Seal inaccessible parts with fuel-proofer. The reason for this whole procedure is that it enables the ailerons to be flipped up and over whilst covering and forming the hinges and ensures that the torque rods are correctly aligned. It would strain the torque rods to turn the ailerons right over for ease of covering if they were to be installed first. Ply plates of  $\frac{1}{32}$  in.

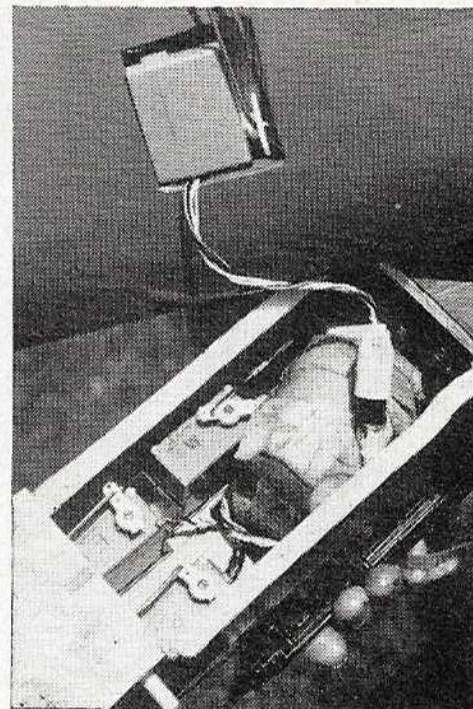




Right: the spring clip mounted Remcon servos. One needs a reliable outfit to test fly a new model, so what better than our Quantum Six with three years trouble free service to its credit?

Above: the Courage beer engine!

may be epoxied over the torque-rod ends where they fix to the ailerons if desired but a good epoxy job has been found to hold well on other models without such reinforcement. The rear fuselage sides were left

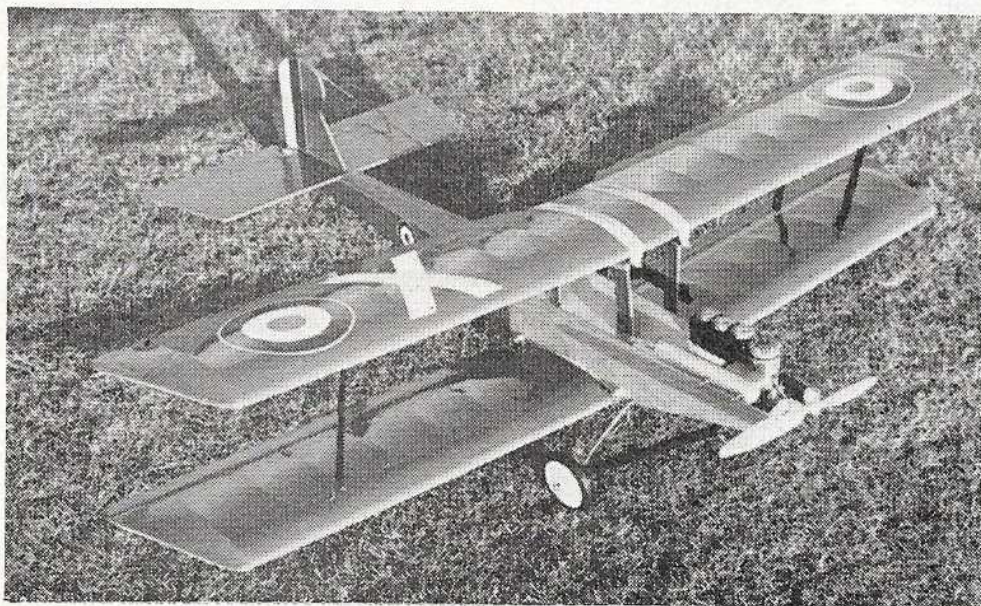


uncovered until after the installation of the radio system.

**Installation**

As designed, the model came out a fraction nose-heavy, due to light tail stock and a weighty motor. In any case the best place for the servos is right up to former F4. The rudder and elevator servos are close to the sides. Using our Remcon outfit, we screwed the servo mounting clips to the ply cockpit floor, but other types could be bracket-mounted on the sides. There is a gap between these servos for the aileron push-rods. The throttle servo is also against the side, forward of the rudder servo, and the Deac, being a flat twin pack, taped to the side in front of the elevator servo. The receiver sits up well clear in the upper part of the top decking, with the switch.

On other models with fairly thin wings, we normally have the aileron servo laid flat, and saw no reason to depart from this, our usual method, on *Archie*. The servo does not get swiped if the wing is displaced. It is necessary to re-drill the lower part of the servo disc at 45° to provide differential and to compensate for the angle of the lower pushrod. The horn, which is of the threaded rod, adjustable type, was bent forward to give the correct geometry (Propo Book, and all that). The shape of the wing box depends on the servo and whether it is clip or lug mounted but the actual size should be as small as possible consistent with push-rod clearance.



Tail linkages are traditional, but we found that pieces of 1in. panel pin made excellent joggles. Be sure to cut them off  $\frac{3}{16}$  in. from the head as this part has been work hardened. Scraps of brass tube enable a neat solder joint to be made to fix them to the usual 16g. wire push-rod ends which are, in turn, bent and bound to the  $\frac{3}{8}$  in. sq. balsa rods. The panel pins are just the right diameter for the servo lever or disc holes.

After the tail-end wires of the linkage had been bent and checked for clearance, the pushrods were temporarily withdrawn and the rear sheeting completed, fuselage sides covered, and the tail glued in place. All the ply areas are left bare, in the style of some "Oldies." Three coats of clear polyurethane brings up the colour and grain pattern and is fuel-resistant.

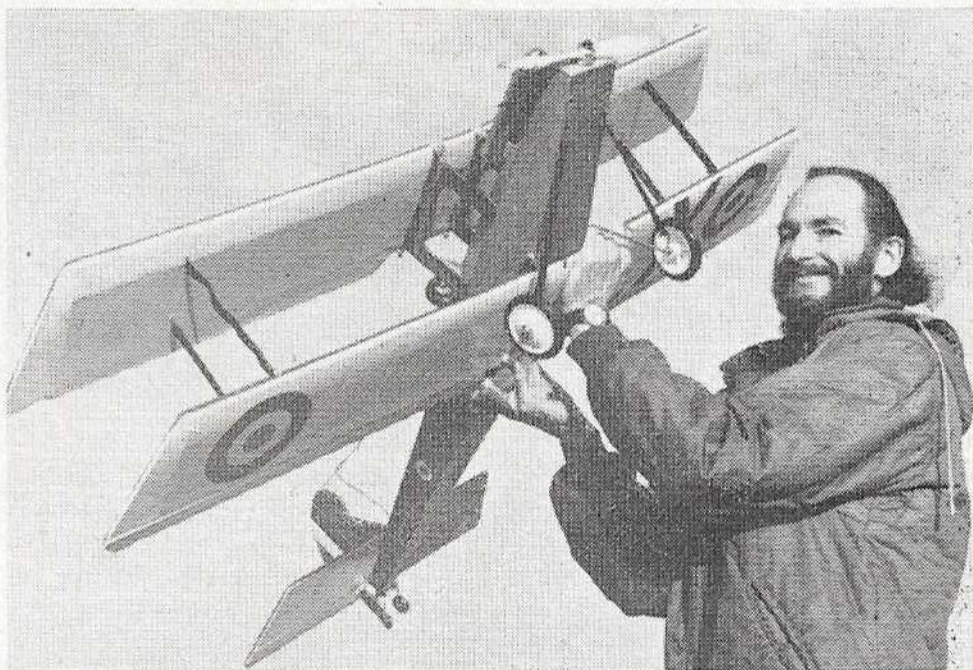
### Details

A small wheel from a toy car was chosen for the tailwheel, because it has a narrow tyre. The main wheels can be scale or semi-scale types—but please don't use balloon wheels!

The struts are made slightly under-length; dimensions shown on the plan are *after* forming loops at each end by epoxy bonding and clipping temporarily with a clothes peg. The 18g. wire hooks are epoxied into holes drilled in the  $\frac{3}{16}$  in. wing ribs after covering. Make a fillet of epoxy onto the covering to prevent fuel seepage.

*Archie* must have a pilot. Size was a problem, so a table-tennis-ball-headed lump of balsa was carved and suitably embellished to form a caricature type "Archie" pilot.

A card and dowel machine gun can easily be made and bolted to the cabane frame on the port side. The engine has a dummy cylinder block mounted behind its "pot." We did not choose to model a full-size job... but made what is now known as a "Beer Engine," on account of the three dummy cylinder heads which are unadorned bottle tops! Have



fun, that's what this model's all about!

### Flying

The first flight was "straight off the board," dead easy and with an atmosphere of "Shuttleworth." As time progressed and the .40 engine became more run-in, flying in all sorts of weather conditions showed that here was a model that would fly hands-off, almost take itself off, float along on low throttle, yet zip out of trouble easily and plod steadfastly into a strong wind at full bore. In designing this type of model, it is not surprising that it should behave rather like a full-size machine of similar general appearance. Gently applied aileron and elevator initiates a turn with the nose up slightly, so put on a few knots with elevator first and be ready to correct any drop with a touch of up. Again, like a full-size machine of this type, co-ordinated rudder helps to really bring the tail round, particularly at low speed.

We mentioned earlier that *Archie* can be used on rudder/elevator, and as such is very stable. Savour the experience of really flying rather than "playing the same old tune" on a typical aerobatic machine. *Archie* is aerobatic and flies in the full-size "Oldie" manner: nose

well up when inverted, crabby turns when you want them. Judicious use of the throttle in loops and like manoeuvres add realism, yet you have a machine that can just fly around without much mental effort on your part. A relaxing fun model. You will find that everyone wants to have a go with *Archie*, so you'd better get someone else to build a second one, not only for fun "dog fights," but so that *you* get a chance to fly your own model!

