PRONTO-G

Your Ab Initio Trainer

60in. wingspan simple basic trainer for 30-40 engines and three function radio.

Designed by David Boddington

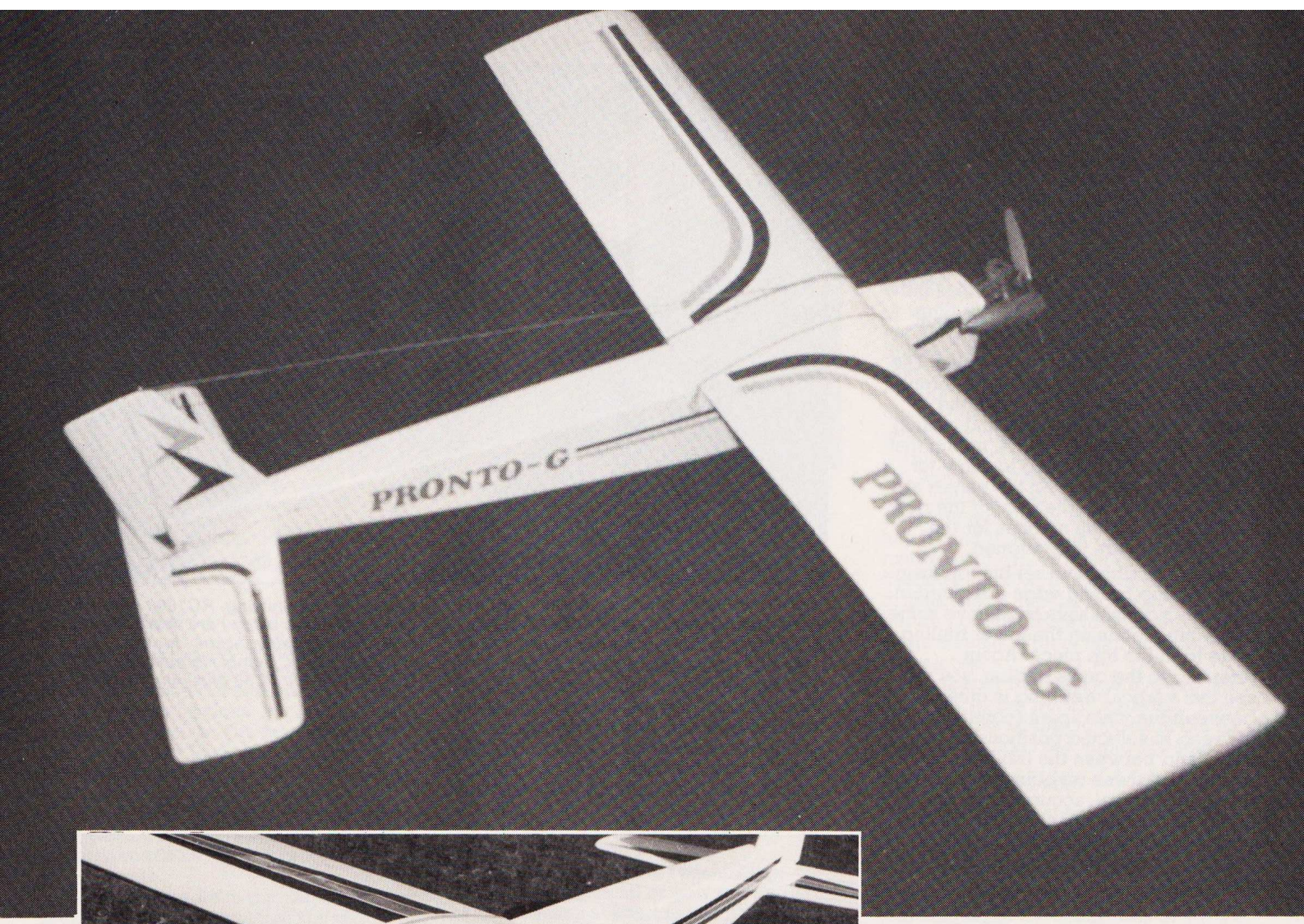
BUILDING THE 'PRONTO G' WILL probably be your first venture into constructing a flying model so we will make it as painless as possible. You will see that the fuselage is a simple sheet box structure (its only function in life is to support the engine, wings, tailsurfaces and undercarriage at the required positions). Tailsurfaces are similarly simple, being from sheet balsawood. A built-up wing construction is retained, the alternative is to use veneer covered foam cored wing panels, but these are definitely heavier and for that reason less suitable for our trainer. As mentioned before – and will be emphasised many times – weight is the enemy of flight and we must always strive to keep all parts of our aeroplane as light as possible.

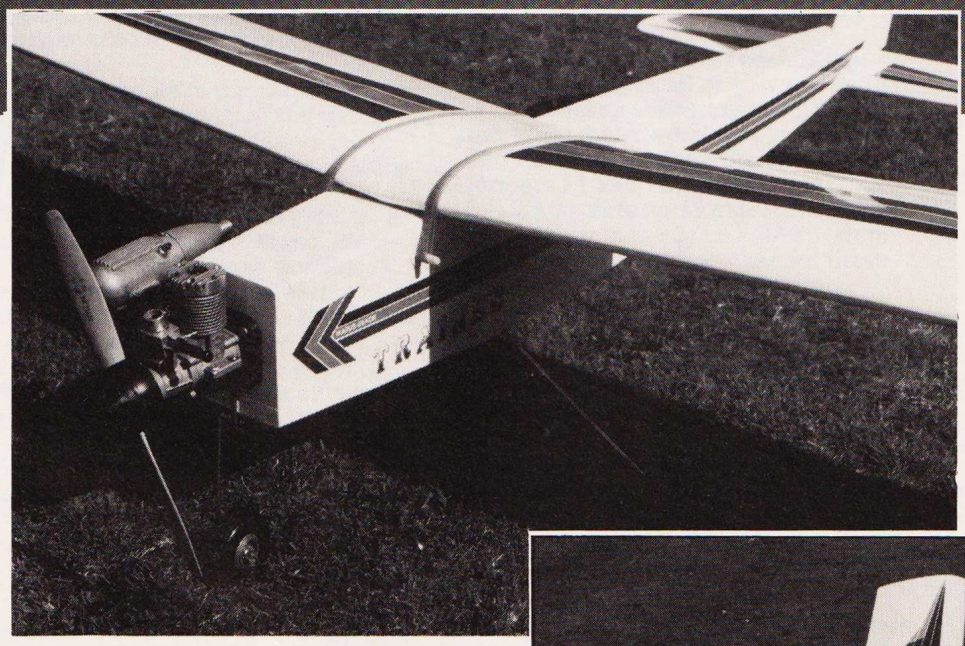
You will notice that the wing has a flat bottom wing section, based on the ubiquitous Clark Y aerofoil section. As with many aspects of designing a basic trainer the selection of wing section is something of a compromise. A bi-convex (often called semi-symmetrical) section would allow the model to be flown in higher strength winds and minimise the effect of 'ballooning' – the nose rising and model climbing after a diving turn has built up excess speed. However, the flat bottom section produces a lower stalling speed i.e. slower safe flying speeds, but most importantly, the wing can be built flat on the building board. Constructing the wing panels flat and leaving the glue to dry thoroughly before removing the structures from the board, helps to ensure that there are no twists in the finished wing (warps). It is still possible for warps to be induced at the covering stage, unless care is taken, but at least the wing structure is sound. Having to wait a while for the right flying conditions is a small penalty to pay for having the right model, it may also prevent you from trying to fly when the conditions are unsuitable for the raw beginner.

Clear the bench

So, we have looked at the drawings and photographs, read through these instructions, cut out all the parts,

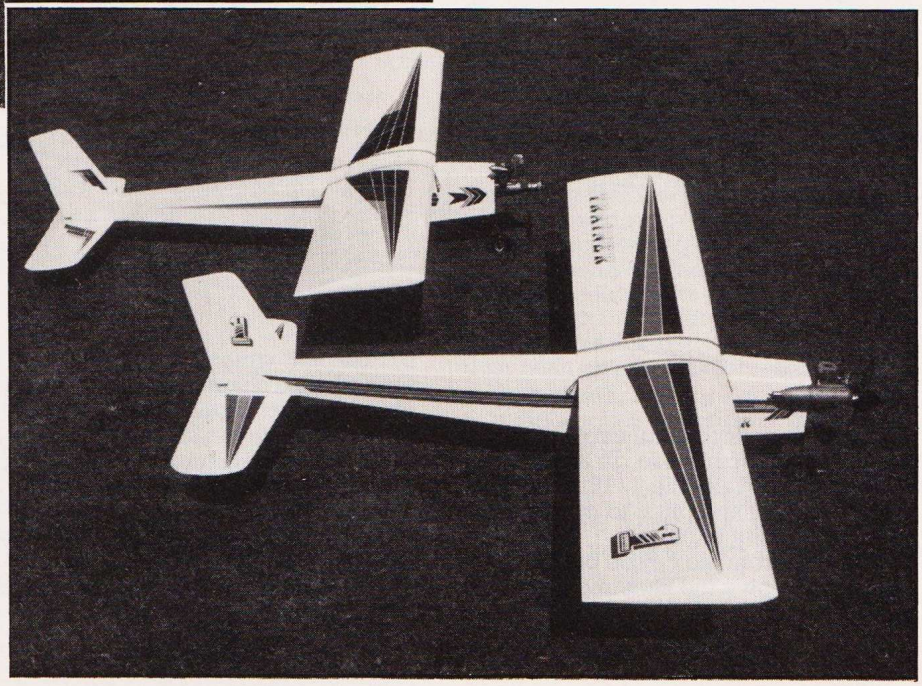
Ikarus colourful trim stickers (imported by Ripmax Models and available from model shops) transform a plain white model into passably attractive models. Editor's wife has many tasks, (apart from nurturing and mothering), transmitter control one day, holder of models next day – thanks Jill.





Original Pronto-G was used as a basis for Gyro tests (see Gyro Stability) and is now being used as a standard trainer. Finished in Solarfilm and Solartrim.

Far model, below, is fitted with a OS40 Surpass four-stroke engine. This type of engine is not normally used on trainers, but it does have the advantage of sounding less frenetic – particularly when the model is in a dive.



pinned down and protected the plans – on a nice flat building board – and we are ready to go. If you are using a relatively slow drying glue for most of the construction it is as well to plan the building programme. If, for instance, you construct one wing panel you will want to leave this on the board, at least overnight, and to be able to carry on with some of the other building.

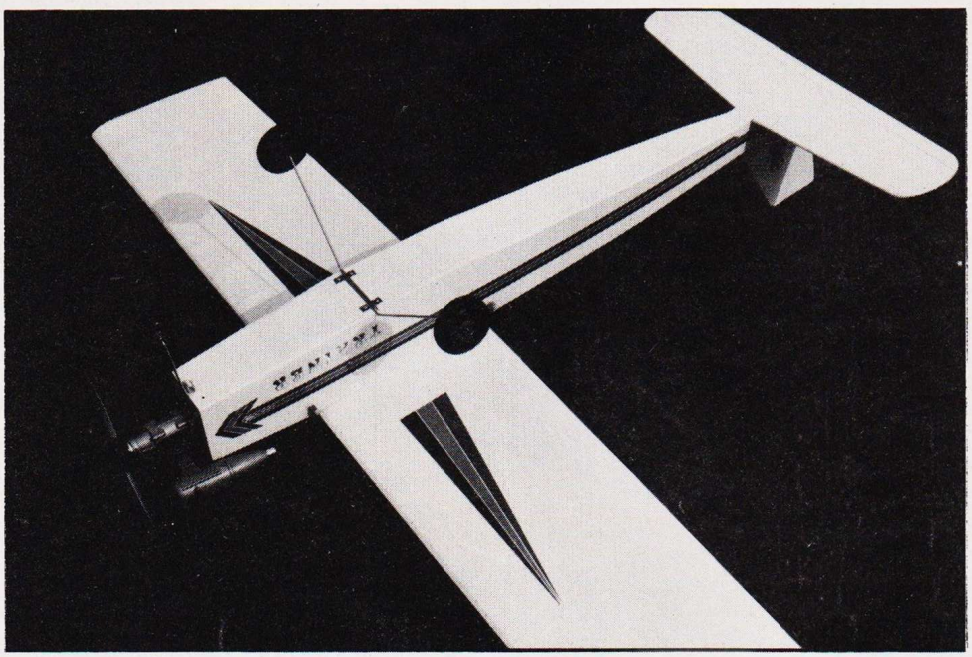
Wing

The wing structure is built in two separate panels (make sure you build a left and right hand panel) which, after shaping and sanding, are glued together and joined with dihedral

braces. Note the wing cross section shown on the drawing, this is taken at the centre area of the wing where additional 1/16in. top sheeting is included to take the load of the rubber band wing retainers. If you are unable to obtain 5/16in.sq. balsawood for the leading edge (you can cut the 1/4 × 5/16in. main spars from hard 1/4in. sheet) use 3/8in.sq., but plane down the top edge before the 1/16in. leading edge sheeting is added.

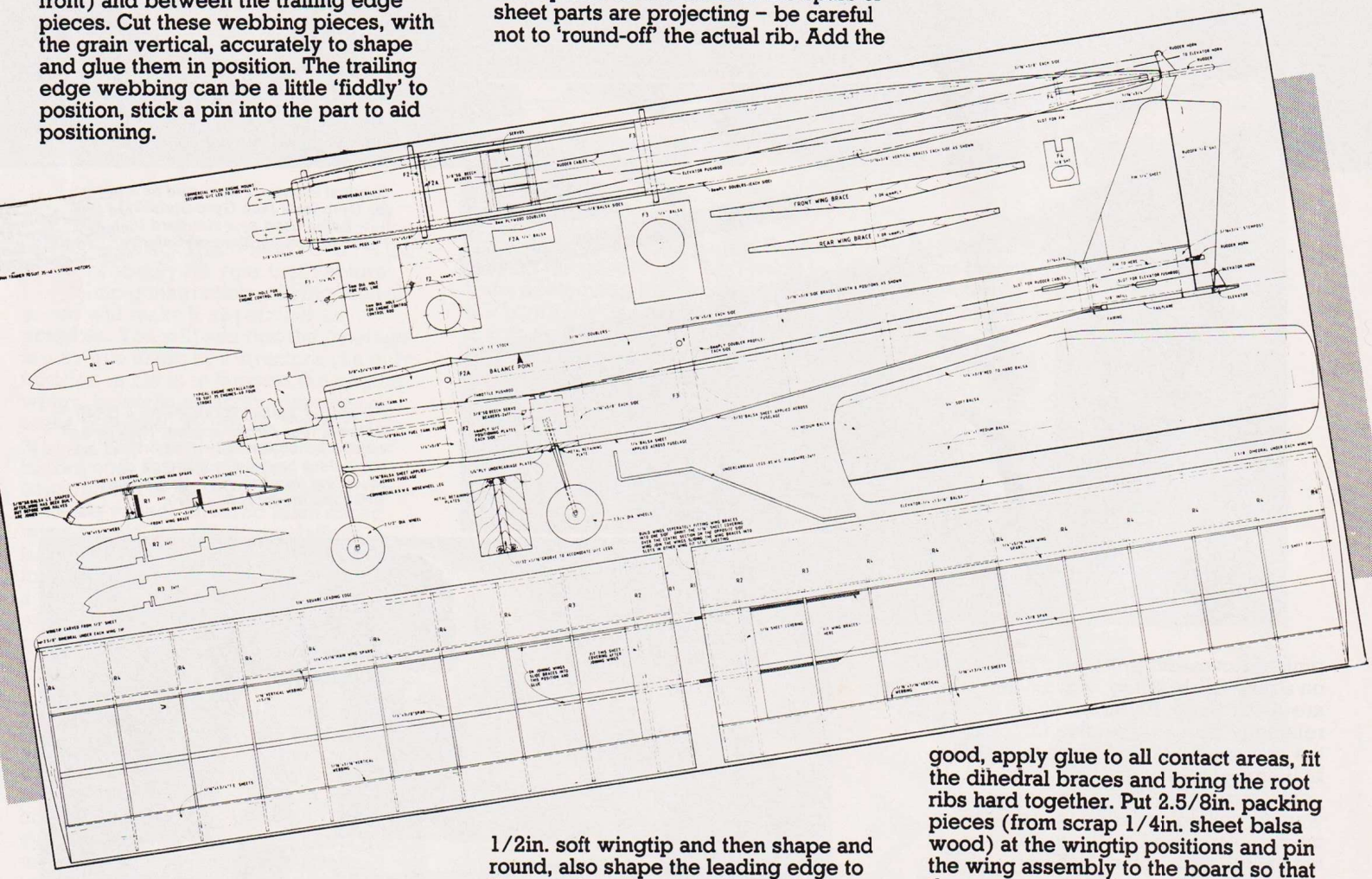
Start by pinning down lower main spar, rear spar and lower 1/16 × 1.3/4in. trailing edge over the plan. The pins can be pushed at an angle through the sides of the spars and into the board. Glue onto the spars and trailing edge all wing ribs R1 to R4, noting that the root rib, R1 is angled to allow for the wing dihedral when the panels are joined. Look down the front of the ribs and ensure that the notches for the leading edge are fully aligned.

When the ribs have set the top main spar and top trailing edge are glued in position, you will have to remove some of the pins retaining the lower trailing edge to fit the top piece. Again referring to the cross section, you will see that vertical webbing is glued between the main spars (continuous on the rear, in selected positions on the front) and between the trailing edge pieces. Cut these webbing pieces, with the grain vertical, accurately to shape and glue them in position. The trailing edge webbing can be a little 'fiddly' to position, stick a pin into the part to aid positioning.



tops of the ribs, pinning to each rib position and ensuring that the sheeting is truly contacting with each rib.

Finally, the sheeting is fixed to the leading edge, using pins and clips. When thoroughly set, remove the panel from the building board, sand the root and tip ribs so that none of the spars or sheet parts are projecting – be careful not to 'round-off' the actual rib. Add the



Apply slow drying adhesive to the top of the top spar, nose rib areas and leading edge. Take the 1/16in. leading edge sheeting and pin it to the top spar, use plenty of pins.

Working from the centre of the panel, pull down the sheeting over the 1/2in. soft wingtip and then shape and round, also shape the leading edge to the round as shown on the section.

When both panels are completed 'dry-fit' them the centre section and ensure that the plywood dihedral braces slot in freely.

Also check that the root ribs mate snugly throughout their length.

When you are satisfied that the fit is good, apply glue to all contact areas, fit the dihedral braces and bring the root ribs hard together. Put 2.5/8in. packing pieces (from scrap 1/4in. sheet balsa wood) at the wingtip positions and pin the wing assembly to the board so that the centre section is touching the board and the tips are pinned down to the dihedral packing pieces.

'Eyeball' the assembly to make sure that there are no twists in the wing. You can use the exposed root ribs for clamping (with clothes pegs) the panels together, the 1/16in. top centre

Homing in after another training flight, note the 'dead-stick' approach, the Pronto-G is quite happy as a glider and retains good control authority.

section sheeting is added afterwards. Give the completed wing a final sanding smooth.

Fuselage

Construction of the fuselage commences by making two fuselage sides, again one left and one right hand – it may seem obvious, but we have all made this mistake. The fuselage sides are longer than the standard 36in. balsawood sheet and wider, at 4.1/2in. It is possible to purchase sheets (40in. × 5in. × 1/8in.) from such companies as 'The Balsa Cabin' and you will find their advertisement in the rear of *RCM&E* every month.

If you are unable to purchase the larger sheets you must join standard sheets – try to match the sheets for equal density and bending qualities for the opposite sides.

With the basic 1/8in. side cut-out mark on the rear position of the .8mm (or 1/32in.) plywood nose doubler. The doublers should be glued into position with contact adhesive, leaving the glue to reach a touch-dry state before attempting to join the parts.

With contact adhesive you only get one chance to position the parts – once they touch they bond. To help with accurate positioning, place a piece of greaseproof or tracing paper between the two glued surfaces. You can then accurately position the doubler over the fuselage side, slowly withdraw the paper and press down the surfaces as they become exposed.

Mark the position of the formers, uprights and other doublers onto the insides of the fuselage sides and glue all but the formers in position. It may be helpful to temporarily use a former for positioning the uprights on the sides. With the sides complete and dry, glue formers F3 and F2 (with F2A glued to it) to the fuselage sides, placing the sides upside down on the building board, check that the formers are square with the sides. Leave to dry and then add F1 (drilled to receive the engine mount) and F4.

The curvature of the two fuselage sides must be equal or you will end up with a banana shaped fuselage. Cut out the 1/8in. balsawood fuel tank floor and trim until it neatly fits between formers F1 and F2, you can use 3/16in.sq. side supports for the floor if you wish. Join the 3/16 × 3/4in. stem posts, you will have to chamfer these pieces for them to join accurately.

To complete the box the top and lower sheeting is added, excluding of course the wing and tail seating areas. With the exception of the top nose hatch and the rear top sheeting at the fin position the grain of the balsawood goes across the fuselage, in the other cases the gain is lengthwise. Start by gluing the grooved plywood undercarriage block in position, lining up the holes for the undercarriage with the slots in the plywood side doublers. Incidentally, if you do not have a means of forming the groove the plate can be formed from two separate thicknesses of 3 or 4mm plywood. Add the remainder of the lower balsawood sheeting, pinning in position until the glue is dry, remember the additional fairing just ahead of the tailplane. Do the same with the rear top sheeting. Cut the 1/4 × 1in. fairing at the front wing seating position from scrap balsa or trailing edge stock, it will need to be cut in the centre to allow for the dihedral angle. The front top hatch is removable, if it shows any signs of warping glue 1/4in.sq. strips to the underside, in a box shape, so that they will fit into the fuselage opening.

Holes have to be drilled to receive the wing retaining dowels (also for the front hatch unless you devise a different method of holding down the hatch) and these must be accurately marked and drilled from each of the fuselage sides. When the holes are drilled check that the dowels fit neatly but do not glue them in position at this stage – remove them until covering is completed.

Sandpaper the fuselage overall, the corners can be 'pencil' rounded i.e. with a radius similar to a pencil but all surfaces should be completely smooth.

Tailsurfaces

Comprising of sheet and strip parts glued together it is important to select wood which is as light as possible for these parts. This does not mean that the wood has to be 'pulpy,' it should be firm and light. Having pieces of strip at the leading and trailing edges of the tailplane means that you can use a soft centre core. The leading edges of the fin and tailplane are rounded off and the elevator and rudder are tapered to a rear edge thickness of about 1/16in. Cut a slot in the top rear fuselage sheeting to house the fin, check the fit but do not glue in at this stage.

Because the elevator and rudder have to move it is necessary to double chamfer the leading edge of these components (see sections) and this is best done with a razor plane, but making the centre line with a pen first. Hingeing is not undertaken until after the covering.

Wait and see

The principle construction of the airframe is now complete and we have the covering and installation still to do. This is where you need a little patience (assuming that you have rushed ahead with the building of the 'Pronto G') – as we will be detailing covering methods and radio and engine installations in the free booklet with the December issue. Hang on. it won't be long arriving and it is better to get it right than push on and make a mess.

Next month, for those of you wishing to build a smaller version of the trainer, we shall be presenting the Mini-Pronto (for 15-20 sized engines) as a free pull-out plan. This will also contain step-by-step illustrations for building the Pronto and could be of assistance in building this Pronto G!

Proving you build light, a 30 sized engine will suffice, a 35 or 40 will give you a better reserve of power.