Flittermouse

Here's a classic beginners model to get you started in electroflight!

The model

'Flittermouse' has been produced as an introduction to electric-powered flight not only for beginners to radio controlled flying, but also for converts from other areas of aeromodelling.

The traditional layout for a beginners' aircraft has always been the high wing cabin monoplane; these are relatively easy to build, afford good access to a sizeable radio compartment and can be very stable in flight. The main control functions are the rudder which turns the model, and the elevator which makes it climb and dive.

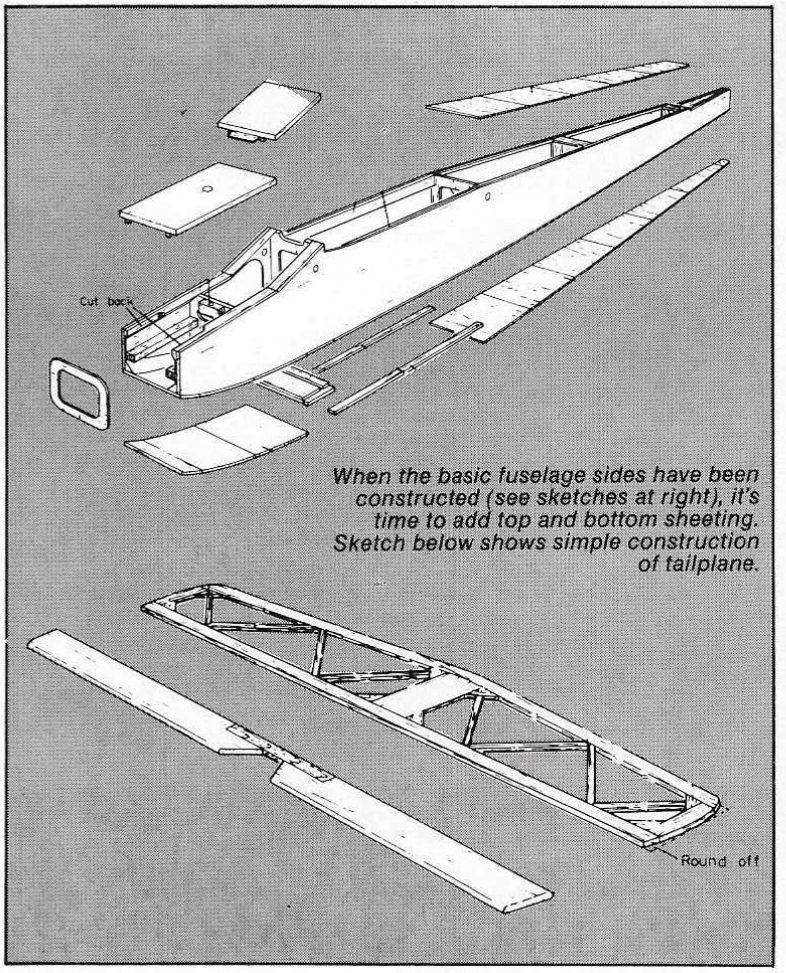
The size of the model is largely dictated by the power available to fly it, and the weight of the motor, battery pack and radio gear. A typical figure for the equipment is around 30 ozs, leaving 18 ozs for the complete airframe if we are to stay below the design weight of 3 lbs. By careful wood selection it is possible to build the model to around 2.1/2 lbs, and better performance will result.

If you are more used to model aircraft designed for glow power and the structure seems rather flimsy, don't rush to add bits of ply and balsa everywhere! Remember that an electric motor produces no vibration, and that models should ideally bounce and bend in an unplanned 'arrival' – they do not need to be built like brick outhouses to survive!

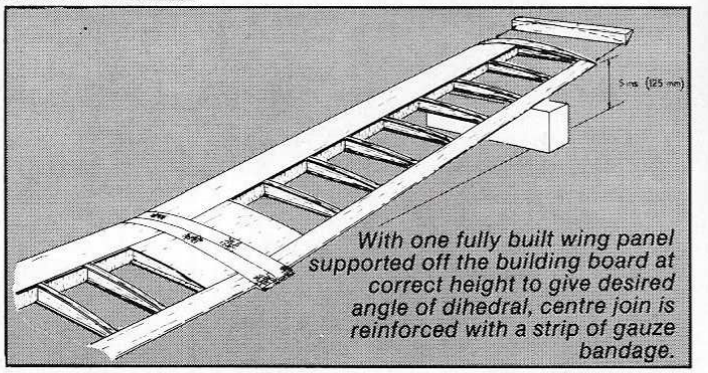
The fuselage

Start by clearing your building board and cutting out the fuselage sides from 3/32in medium balsa. The sides are nearly 5in high, so you will have to glue two pieces of 36in long balsa together before cutting them out. Then cut out the 1/32in ply doublers, not forgetting to cut the lightening holes in them – it really is worth doing!

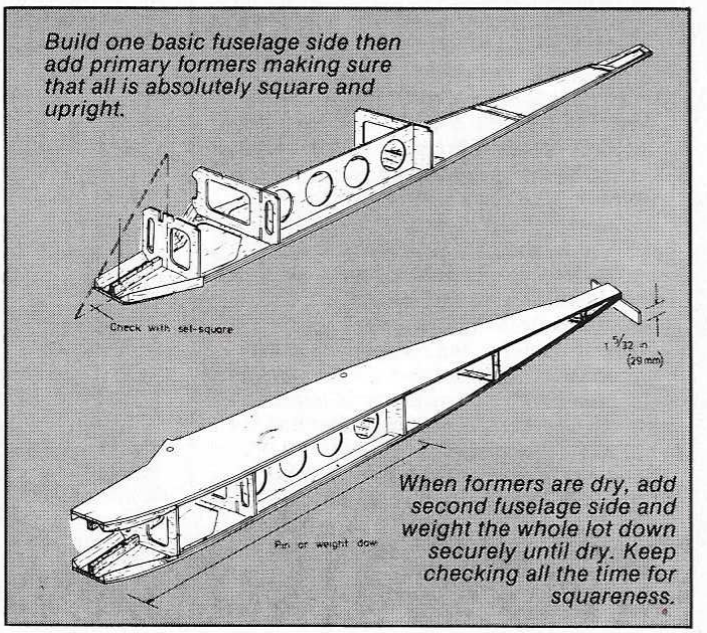
Cover the plan with thin polythene sheet to stop excess glue sticking to it and pin one fuselage side down over the side view of the fuselage p.v.a. glue the 1/8in square lower longeron in place, holding with pins. While this is drying, hold the ply doubler on the side and mark its position for glueing. Mark the positions of the formers and motor bearer on the doubler and apply Evo-stik to both the doubler and the areas of the fuselage side previously marked. When dry, bring the two together – carefully! Fit the



When the basic fuselage sides have been constructed (see sketches at right), it's time to add top and bottom sheeting. Sketch below shows simple construction of tailplane.



With one fully built wing panel supported off the building board at correct height to give desired angle of dihedral, centre join is reinforced with a strip of gauze bandage.



Build one basic fuselage side then add primary formers making sure that all is absolutely square and upright.

When formers are dry, add second fuselage side and weight the whole lot down securely until dry. Keep checking all the time for squareness.

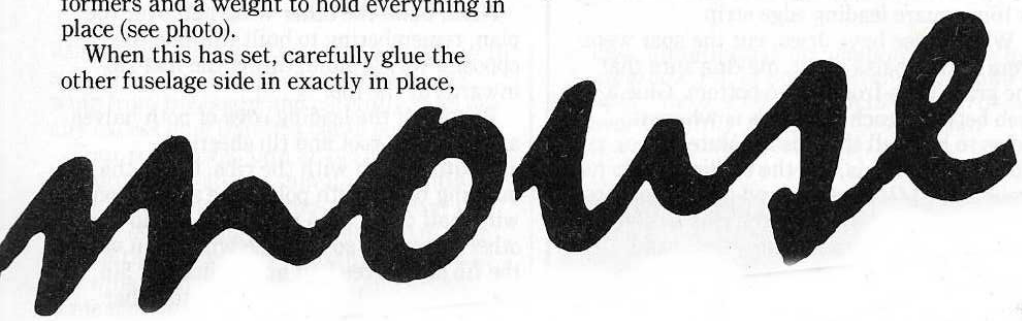
1/8in sq upper longeron, the 3/16in x 1/8in tailplane seat and the uprights. Next fit the three 3/8in triangular section fillets at the front, noting that the lower one hangs over the edge (it's sanded off later). Having got this far, make another fuselage side in exactly the same way – making sure you make one left and one right hand side!

While the sides are drying, cut out the three formers and the radio bay floor from 1/8in Lite-ply. Cut away all the lightening holes and check the fit of the lugs on the radio bay floor in the slots in F3 and F4. Now pin one of the fuselage sides down on the building board again and glue the hardwood motor bearer in place using epoxy glue. Glue the other bearer in place on the other side. When dry, glue the firewall (F2) in place, checking that it is upright using a 90 degree set-square. Glue the other formers and the radio bay floor to each other and to the fuselage side in the proper place, and weight the whole lot down using a piece of plywood about 4in x 15in to bridge all the formers and a weight to hold everything in place (see photo).

When this has set, carefully glue the other fuselage side in exactly in place, weighting it down again until set. While this is drying, cut a piece of scrap balsa exactly 29mm wide and use it to prop up the rear of the fuselage, making sure that the weights are holding the side forward of F4 flat to the board. Carefully draw the top side down to touch at the rear, and glue the two fuselage sides together where they touch. Ensure that the two sides meet accurately or the tailplane will not sit squarely in place. When this is dry, cut the four spacers from 1/8in x 3/8in balsa and glue in place. Leave the fuselage to set thoroughly.

Cut out the various pieces of 1/8in Lite-ply that form the undercarriage mounting and glue them together as shown on the plan. Drill two 4mm holes for the legs and glue the assembly to the fuselage, at the same time gluing in the small gussets which locate the u/c legs.

Now using a sanding block and 100 grit paper sand all the way along the fuselage sides at the top and bottom to prepare the sides to receive the top and bottom sheeting.



Also sand the lower nose fillets back flush with the sides. Starting flush with the front of F4, cut and glue pieces of 3/32in x 3in balsa sheet to form the lower rear fuselage sheeting. Note that the grain of this sheet runs ACROSS the fuselage. Cut all the pieces slightly oversize, to allow for sanding later. Cut and fit similar pieces to the nose area in front of the u/c mounting plate. Cut two pieces of 1/8in x 1/4in balsa and glue them to the fuselage, starting flush with the front of F4, with 3/32in sheet in the same way as the underside, finishing in front of the tailplane seat.

Cut out the nose former from 1/16in ply. When the front sheeting is dry, sand the front face of the fuselage and glue this former in place. Glue the 1/8in x 3/8in balsa wing seats in place flush with the top of the fuselage. Make the two hatches and fit the tabs and block which hold them in place. The front hatch is held by a small screw through the hatch, while the rear hatch has a tab under the front one, and a small elastic band across the front wing dowel secures the top.

At this stage the fuselage is almost complete but requires sanding to shape. Look at the sections on the plan and sand the front of the fuselage (including the hatches) to a nice rounded shape, and sand

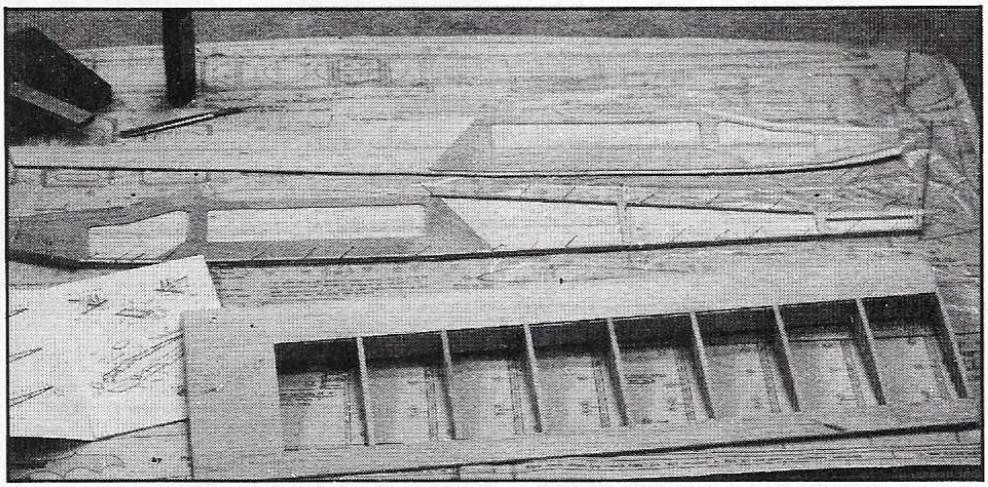
all the way along the rear corners of the fuselage to round them slightly. Blow off all the dust and put the fuselage to one side until the other parts are done.

Tail surfaces

Cover the plan with polythene again, and pin down the tailplane trailing edge – use a piece of medium-hard 3/16in x 1/2in balsa for this. Cut the centre piece from medium 3/16in sheet and glue in place. Cut and fit the leading edges and glue the tip strips into place, making sure that the joints are sound. While this is drying, cut out the elevator parts and glue the spruce joiner in place. Pin down, making sure that the leading edge is straight, and leave to dry.

Cut the eight 3/16in balsa gussets carefully to shape, noting the grain direction. Glue them into place. Cut and trim the 3/16in square diagonal braces and glue them in place. When set, sand both sides of the tailplane smooth, round off the tips to shape, and sand the leading edges and tips to a smooth radius. Chamfer the front of the leading edge of the elevator, round off the ends and taper the thickness towards the trailing edge.

Build up the fin in much the same way as the tailplane, and cut out the rudder from light 3/16in sheet as shown on the plan – don't forget the small cut-out to allow the elevator joiner to pass through! Sand the fin and rudder in a similar fashion to the tailplane, and cut out the triangular fin strake and sand to section.



Below, basic wing construction under way. Above, one wing panel complete and fuselage sides in progress.

Building the wings

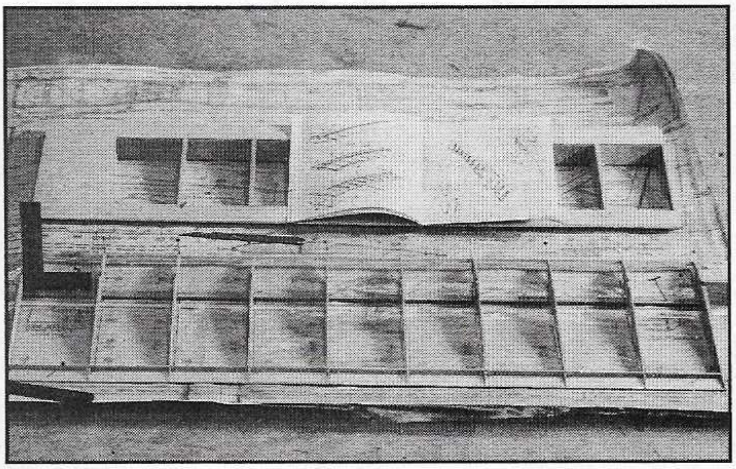
The wings are built in two halves, and the first job is to cut out twenty-two ribs from hard 1/16in balsa – it helps to use a template to ensure that all the ribs are the same. Lay a piece of 1/16in x 1/4in under the polythene on the plan to pack up the ribs at the front. Cut the lower spar exactly to length from 1/8in x 3/8in spruce and pin into place on the plan. Cut the 1/16in x 1in lower trailing edge to length and pin this into place too. Cut a template from card according to the plan. Glue two ribs together to form one 1/8in thick rib and glue the joined ribs at the root end of the wing as shown, angling the top inwards using the card template to obtain the correct angle. This is to allow for the correct dihedral when the wings are assembled. Glue nine of the 1/16in ribs into place, using the set-square to ensure that they are all upright. When dry, remove the template and glue in the upper spruce spar and the 3/16in square leading edge strip

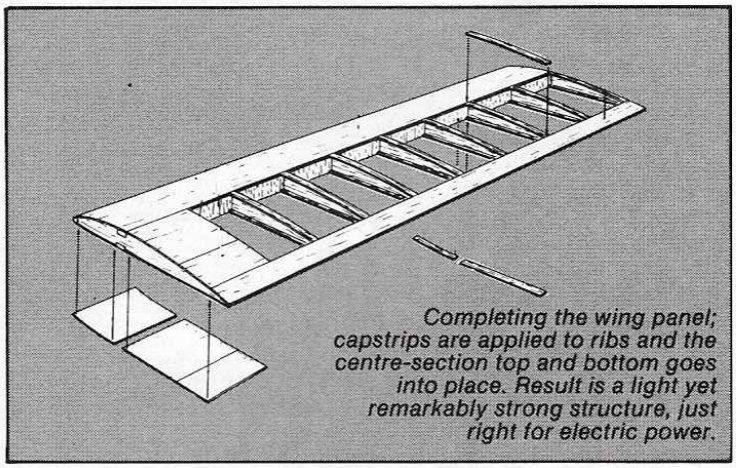
When these have dried, cut the spar webs from 1/16in balsa sheet, making sure that the grain runs from top to bottom. Glue a web between each rib – this is where it helps to have all the ribs absolutely upright! After this, cut the trailing edge webs from 1/16in sheet, and glue them into place between the rear of the ribs as shown on the plan. When absolutely dry, sand lightly the tops of the webs to make sure they are flush with the tops of the ribs – don't go overboard though and re-shape the ribs in the process! Mark out the positions of the ribs, spar and leading edge on the leading edge 1/16in sheeting, and glue it to the ribs, etc, using Evo-stik. Make sure that it is firmly glued to all ribs and to the leading edge and spar. Add the upper centre sheeting over the first two ribs, and finally the upper trailing edge. Let these dry for a while, and then cut and fit the 1/16in x 1/4in cap strips to the top of all the remaining ribs. The easiest way to stick these down is to run a bead of p.v.a. along the rib, and put a drop of cyano at each end. the cap strip is firmly held by the cyano until the p.v.a. (which is much stronger) has set.

When the glue has fully dried, take the wing off the board and add the lower centre sheeting and the lower cap strips. The front edges of the lower cap strips and centre sheeting are chamfered to meet the leading edge strip and glued in place as before.

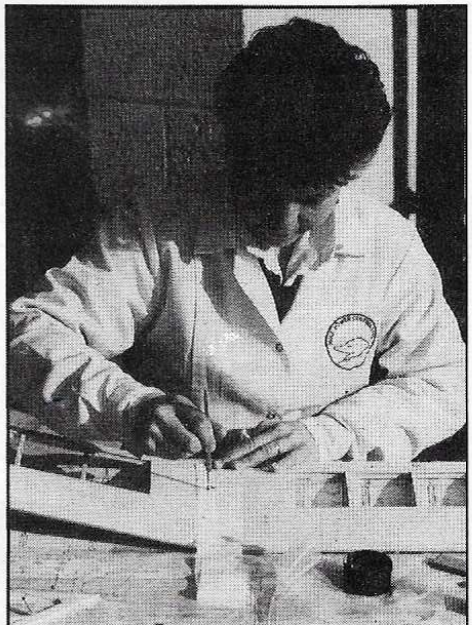
Next, build the other wing half over the plan, remembering to built this one the opposite way around, tilting the root rib inwards at the top!

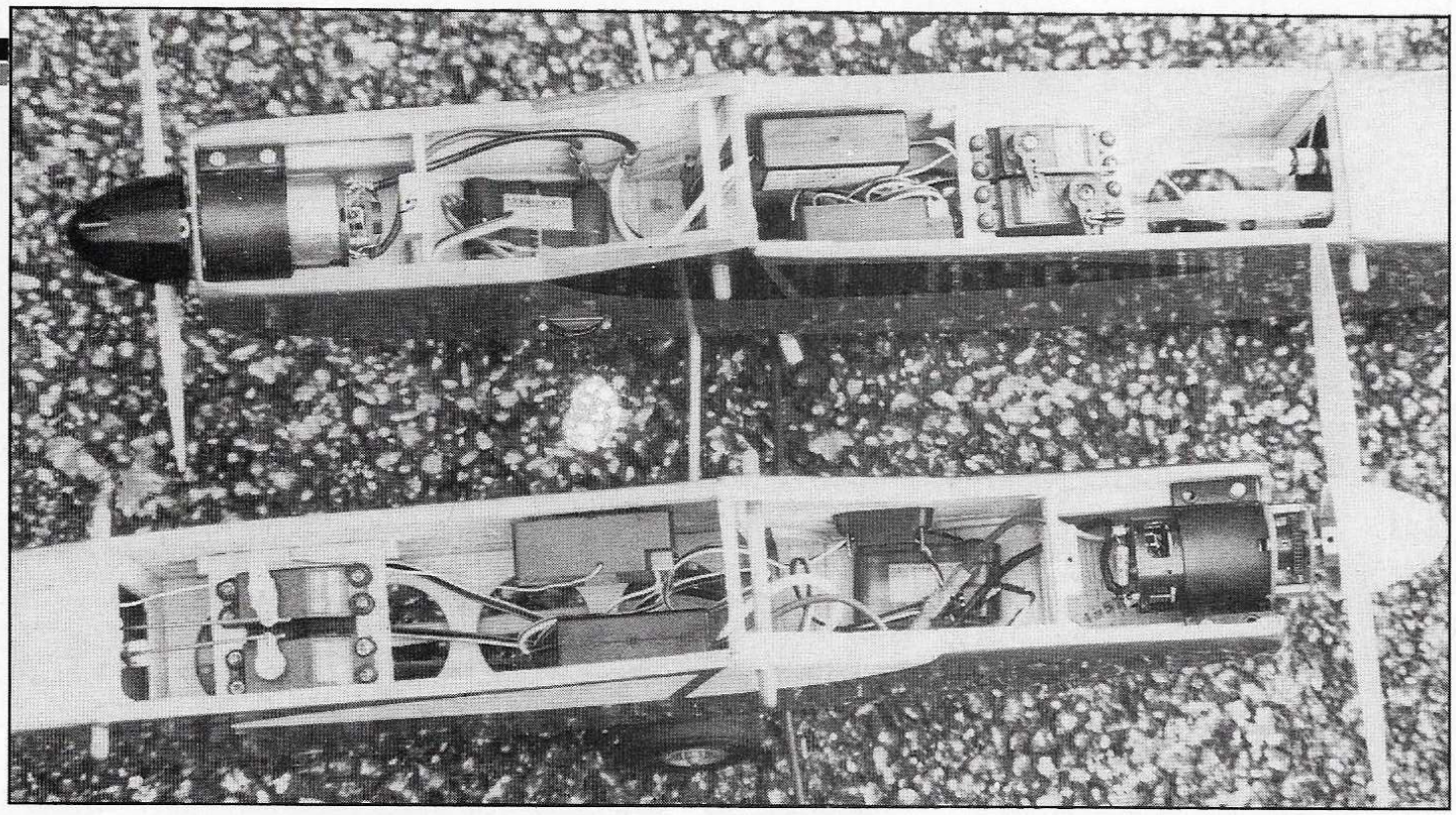
Round off the leading edge of both halves and sand the root and tip sheeting absolutely flush with the ribs. Cover the building board with polythene and pin one wing half down onto the board. Jig up the other wing half so that the wings join with the tip of the free half approximately 5in above the board. Join the wings together





Completing the wing panel; capstrips are applied to ribs and the centre-section top and bottom goes into place. Result is a light yet remarkably strong structure, just right for electric power.





using epoxy glue and hold down firmly until set. When the epoxy has set, remove the wing from the board and carefully sand off any excess glue that has oozed out.

Pour some p.v.a. into an old cup, add a few drops of water to thin it sufficiently to allow it to be brushed and apply a coat to the top of the wing joint for about 1in each side of the centre. Lay onto this a length of 2in wide open gauze bandage, and brush some more p.v.a. into the bandage to stick it down firmly. Turn the wing over and repeat the process on the underside. Leave until set, then trim off any surplus bandage.

Glue the 1in triangular soft balsa wingtips in position, and sand them to section. This will produce the wingtip shape as shown on the plan. Sand the whole wing smooth and check that it fits in the space on top of the fuselage.

Assembling and covering

It's easier to cover all the various parts before they are finally assembled. Cover the model with Solarfilm, following the instructions supplied with the film. It will be necessary to remove the film at the various points where the parts are glued together, which is best done carefully with a new scalpel blade, taking care not to cut into the wood beneath the film!

Using a straight-edge placed across the wing seat, put the tailplane onto the rear fuselage, and 'sight' it along the straight-edge to check that the tailplane sits level with the wing seat. Lightly sand the tailplane seat until it is level. Now mark the centre of the tailplane trailing edge and line the mark up with the exact centre of the rear fuselage. Push a pin though this point, and adjust the tailplane until the tips are exactly the same distance from a centre point marked on the top of F4. Glue the tailplane in this position and leave to dry hard.

Next glue the fin in place, checking with the set-square that it is vertical. When this is dry, cut and glue the two 3/8in triangular fin supports in place, as well as the fin strake and the Lite-ply underfin.

Continued on page 43

Above, **Flittermouse** *installations. Lower example has Mole MT-18 cobalt motor and MT-72 gearbox. Pic at bottom shows fuselage formers drying under pressure from suitable weight – here, a nice chunk of North Yorks rock from the Settle area... Below, Mole Power Controls' Bridgette Smith straps in a fresh power pack on one of the company's test aircraft; model has been responsible for introducing hundreds to electroflight... and it can do the same for you!*

Flittermouse

Continued from page 19

Hinge the elevator to the tailplane using mylar hinges. Don't forget to roughen the surface of the hinge before glueing. Fit the control horn, and then fit the rudder in exactly the same way. Drill through the wood and the hinge on each surface and glue a small peg made from a cocktail stick in the hole to hold the hinges in place. Trim off any excess glue and make sure both control surfaces move each way without sticking or binding.

Bend up two undercarriage legs from 8g piano wire and fit them to the u/c plate using saddle clamps. Fit the wheels.

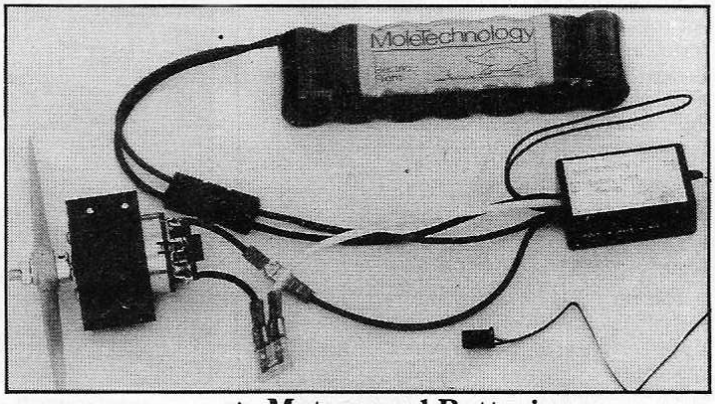
Fir the radio gear and the motor in the positions indicated on the plan, and then hold the battery pack in place temporarily, moving it forwards and backwards in the battery bay until the model balances at the balance point slightly nose down. The battery dowel sockets may then be glued in place.

Flying!

'Flittermouse' has proved to be a most versatile model. As a basic trainer, using the Mole MT-101 'Basic' Power Pack, the model is forgiving and stable to fly, leading the absolute novice safely towards mastering the intricacies of radio controlled flying. Fly the model using the MT-102 'Expert' Power Pack, and it becomes a much more lively performer, combining looping and barrel - rolling manoeuvres with ease. Modify the wing to include ailerons, maybe also shorten the span, and a fully aerobatic 'Flittermice' for several years now, using customers have been flying their 'Flittermouse' for several years now, using up to ten cells and a variety of motor and gearbox combinations.

For the novice, for whom this model was primarily intended, the following brief notes may be of help. Make sure that the model is assembled true, and that the wings and tail surfaces are free from warps, and set the control surfaces to neutral. Choose a calm day, with a slight wind and an area where there is plenty of long grass and no obstructions. Switch on the radio, and without turning on the motor, launch the model gently straight ahead and level into the wind. The model should gently glide down to a perfect landing some 10-20 yards away. If the model dives straight down, adjust the elevator slightly upwards, and if it climbs a little from launch, before falling to the ground, adjust the elevator slightly downwards. Adjust the rudder similarly to correct any tendancy to turn. When you are satisfied with this powerless glide, you are ready to try a powered flight.

With the radio switched on and a fully charged battery in the model, switch on the motor and launch the model as before. Your 'Flittermouse' will climb away steadily, and when it is about as high as a house, try moving the rudder stick a little to turn the model. If the nose starts to drop while the model is turning, gently pull back on the elevator stick a little to keep it up. Just fly the aeroplane around in large circuits until your nerves have calmed, keeping it upwind of you all the time, and then you will be ready to set the model up for landing. Position the model a little downwind and switch off the motor. Fly the model straight towards you, losing height all the time, and don't make any sudden or large movements with the controls. Aim to have the model fly past you at about head height, and allow it to land straight ahead. As you become more used to flying your 'Flittermouse' you can practise turns to left and right by flying figure-of-eight circuits and practice landing approaches by turning the motor on again just before landing and climbing away for another go.



Here's the hardware we're offering, in association with Mole Power Controls Ltd., to get your **Flittermouse** *airborne in double-quick time! Pack includes Mole's MT-54 motor, nicad pack, motor switch, mount, prop and adaptor.*

Motors and Batteries

Because motors and batteries differ so much in performance, we have arranged with Mole Power Controls Ltd., the UK's leading electric flight specialist, the supply of a motor and 'Power Pack' for the 'Flittermouse'.

The package (Part No. MT-101) includes a Mole MT-54 motor, MT-32 Ni-Cad battery pack, MT-95 motor switch, motor mount, propeller and propeller adapter. The price of the package is £69.95 and it can be ordered via our Readers Services Department at 9 Hall Road, Maylands Wood Estate, Hemel Hempstead, Herts HP2 7BH (telephone 0442-41221). Payment can be by cheque payable to ASP but you can either telephone your credit card number (Barclaycard or Access) or send your order through the post if your 'flexible friend' agrees! The pack is especially tailored to the 'Flittermouse' and is supplied ready wired with 'Powerpole' connectors; all you have to do is install the equipment, switch on and go.

Mole Power Controls also offer a wide range of electric flight 'goodies' including high performance packs for the 'Flittermouse'; why not write to them at The Sidings Industrial Estate, Cammock Lane, Settle, N. Yorks BD24 9RP for their excellent *Electric Flight Manual* which costs just £2.50 and includes a copy of their fully detailed catalogue?

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