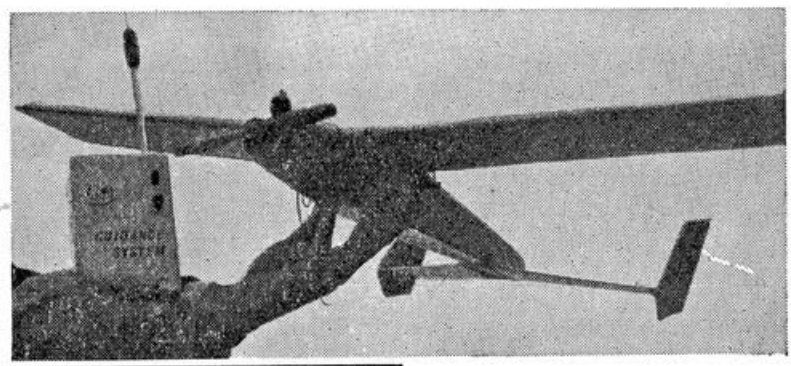
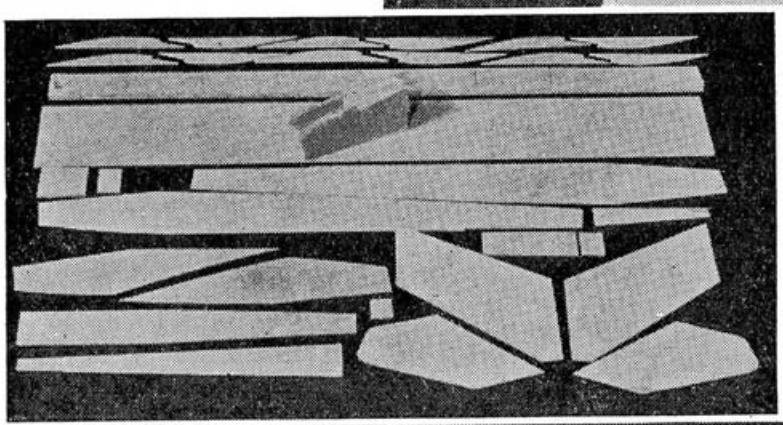
"Twophin"

Designed by PETER HOLLAND

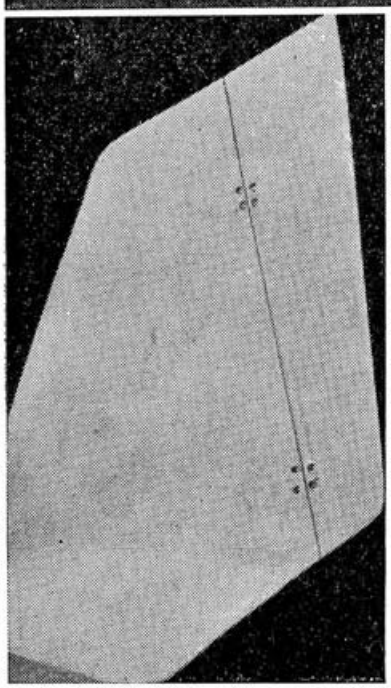
MAKE THIS FREE PLAN MODEL YOUR INTRODUCTION TO REALLY EASY R/C : QUICK, STRONG AND SIMPLE

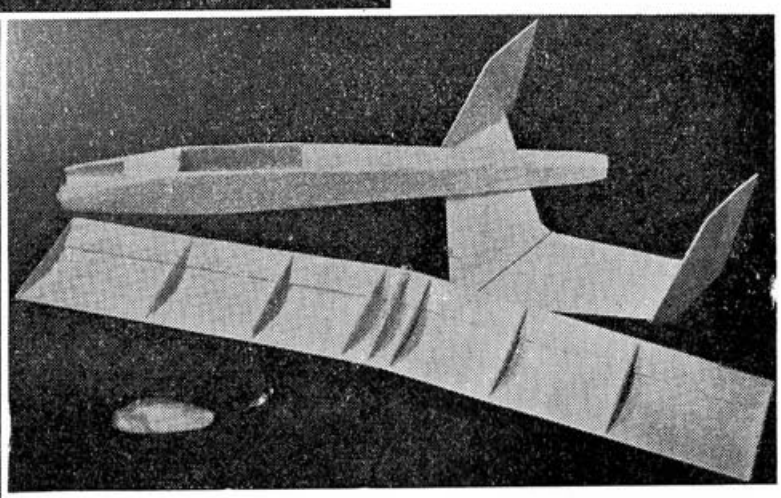


Right : Completed "Twophin" carrying an R.C.S. "Guidance System", the engine is a .5 c.c. "Dart" with a 6 x 3 in. prop. Modellers who had never flown radio before found the model docile and relaxing to fly. No pulsers, no ulcers !



Left : All the parts cut from four sheets of $\frac{1}{32}$ x 4 in., and half a sheet of $\frac{1}{8}$ x 3 in. A little $\frac{1}{32}$ in. plywood and a scrap of block balsa. The simple lines (nearly all straight) are easily transferred from the plan to the wood.





Above : The wing fuselage and tail unit assembled and ready for tissue covering. Note how the wing ribs notch around the leading edge strip. The tailplane joiner can also be clearly seen. Left : the neat hinge installation, there's practically nothing to see, in fact, four pins hold each scrap of polythene and a smear of cement over their heads makes them secure. Clip the other ends of the pins off flush with the wood.

WHY not build a manual pulse model? The system has quite a lot to recommend it in terms of simplicity, both from the constructional point of view and piloting technique. Our two free plans use the same radio installation so that if one chooses to make both, it is simple matter to transfer the complete control pack from one model to the other. In fact all that is necessary is to hook a piece of nylon on to the actuator crank and then switch on.

The "Twophin" is a lightweight sports aircraft for 0.5 c.c. to 0.8 c.c. there being a variety of suitable diesel or glow motors either radial or beam mounted. The fuselage nose is just a lump of block balsa sandwiched between the basic sheet sides and $\frac{1}{32}$ ply doublers. This form of construction not only provides excellent "thump resistance", but allows a variety of engine installations to be used. The best way of adapting the model to suit a different power unit, is to mount the motor of your choice on short scraps of hardwood engine bearer and lock the bolts with a strip of wire soldered across the heads. If the motor is of the radially mounted type, a similar procedure is used for locking the bolts into a piece of $\frac{1}{8}$ in. or $\frac{3}{16}$ in. plywood. In this case the plywood should be cut to fit between the sides of the fuselage ($1\frac{9}{16}$ in. wide). Make the block shorter to allow the ply to butt against it when the engine is placed in position with the prop driver just clear of F1. A small hollow may then be made behind the bulkhead in the top surface of the block, to accommodate a small fuel tank. The removable cockpit canopy, which has its own balsa baseplate, serves to cover the tank and generally tidy up the nose of the model, which sometimes tends to look rather like an afterthought on some functional machines.

The solid block nose also makes a firm anchorage for the piano wire skid. If the upper end of the wire is wound with cement coated thread and cemented in with a hole drilled in the block it will be held quite firmly. If one flies from a grass field, undercarriages on models this size are of very little use for take off and a skid is quite adequate for landing, thus saving drag, weight, expense, time and those inelegant nose-overs when the wheels become entangled with grass.

Features of the Design

The use of twin fins enable the rudder to be placed out of the slipstream, this serves to make the model more docile and give it an almost similiar characteristic on power or glide. The rudder need only be on one fin, simplifying the linkage.

If one wished to use an escapement, a half-span push rod could be used, as in Fig. 1, but the model being designed primarily for manual pulse would need a slightly increased rudder area. The hinge line should be moved forward to $\frac{3}{8}$ in. for this purpose and the corner of the tailplane cut to allow its movement.

The rudder is hinged on scraps of polythene. The "Mylar" hinges, used on some of the new American radio control kit models, prompted experiments in this direction, and five thou. polythene proved to be nice and flexible and quite strong enough for smallish models.

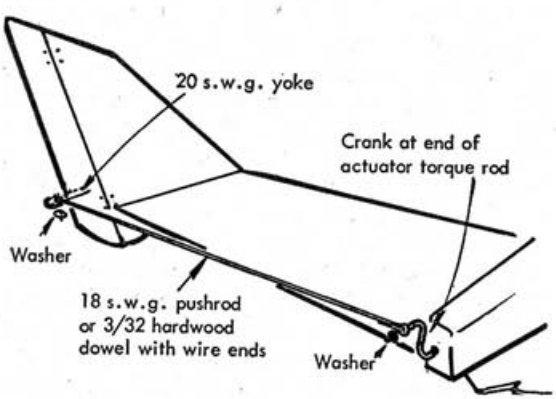
Some of the tough non-stretching tracing film like Permatrace, or if movement is not particularly large, Kodatrace would be a suitable alternative.

The tailplane is swept for three reasons:

1. A greater effective chord.
2. Longer fin and tailplane moment.
3. A longer fuselage does not fit on the plan!

The two halves of the tailplane are joined by a narrow strip of sheet, which must have its grain running across (spanwise). This is planted on top of the tailplane and serves to key it into a recess at the rear end of the fuselage. The fins and tailplane being cemented together serve to prevent each other warping and the joint is reinforced with a piece of scrap $\frac{1}{4}$ in. strip cut diagonally to form a triangular section fillet.

FIG. 1



Wing

The designer has broken away from the usual all sheeted wings on this model, to save a little weight, whilst retaining protection against leading edge damage by the use of a piece of $\frac{3}{8}$ in. sheet $1\frac{1}{2}$ in. wide. Quite soft $\frac{3}{32}$ in. sheet is used for the top surface and only a few ribs need be used. Tissue covered bottom surface adds sufficient rigidity on a model this size.

Fuselage

The fuselage is a simple $\frac{3}{32}$ in. sheet box with ply doublers stuck to the inside face of the sides, held square by glueing on to the nose block. Formers F2, 3 and 4 are added, pinned in place and the top and bottom sheeting A, B and C cemented between the sides. Hey Presto! One fuselage ready for the engine and F1 to trim the front end.

Radio Installation

All the radio gear is carried in a removable box, making it a little more crash resistant and permitting its transfer from one model to another without any soldering or modification. Even the switch has been eliminated by the use of snap fasteners taken from an old P.P.3 battery. It is possible to check the condition of the radio and battery without taking the wing off the model, simply by placing the meter probes on the two snaps which dangle from under the wing sheeting. Snap the connectors together, switch on the transmitter and everything ticks . . .

Trim

Having completed the model and checked that the centre of gravity is not more than $\frac{1}{4}$ in. away from that shown on the plan, test glide the model which should turn off quite sharply to the left. As soon as it starts to turn, key the transmitter until it has straightened out, then release and key again as soon as it returns to left. You will probably get in two or three pulses on such a test glide. Continue in this way, packing the tailplane if necessary, to get a reasonably flat glide. Do not be misled by the increasing speed when the model turns. The next test is to launch without keying so that the model peels off to the left and will probably bounce quite hard (it is designed to take it). Repeat the procedure, holding signal on. It should now turn to the right on about the same diameter spiral. If it does not, adjust the stop on the motor crank or the length of thread. A little experiment with tension of the rubber band and length of the control horn may be carried out when power flights are made. There is nothing difficult about manual pulse, just a steady series of signals to correct the natural left turn. It should only take two or three flights to get into the groove and one does not have to remember a sequence of keying, necessary when using a two position, two neutral escapement.

There is no need to try and keep the rudder swinging near neutral. Just key fast enough to obtain a fairly straight flight. With practically no practice you should be able to make smooth gentle turns and recover from tight turns more or less by instinct, and the lack of "twitch" is due to the fact that the rudder is out of the slipstream. All this for very little outlay; the model will probably cost around 10/- to produce. The geared motor for the actuator costing £3.8.0d., a little more than a good quality escapement, add £5.0.0d. for a receiver kit and about the same amount for a Tx kit if you do not already have a commercial system to hand. A few shillings for the batteries completes the control system. One saves on switches and plugs by soldering the battery connections and receiver and motor leads. Most people carry, or should carry, a battery driven soldering iron. This makes battery changing the work of a few minutes, but one is quite sure of the reliability of the equipment by this method. One can terminate the battery leads in a plug and use leads on the batteries connected to spare sockets. Whichever method is used, the ends of leads at the soldering joints should be protected by a short piece of plastic sleeving or fuel tube.

Go build a "Twophin" it's fun.