RM TEST REPORT

Schlüter's HELI-BABY

a delightful mini-copter for .40's

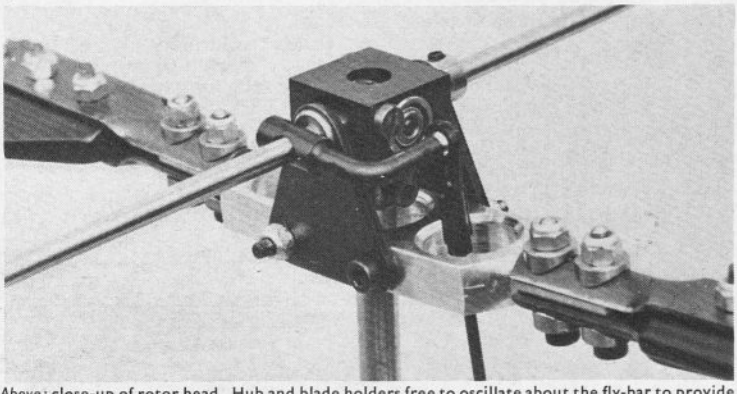
by TONY BRAY

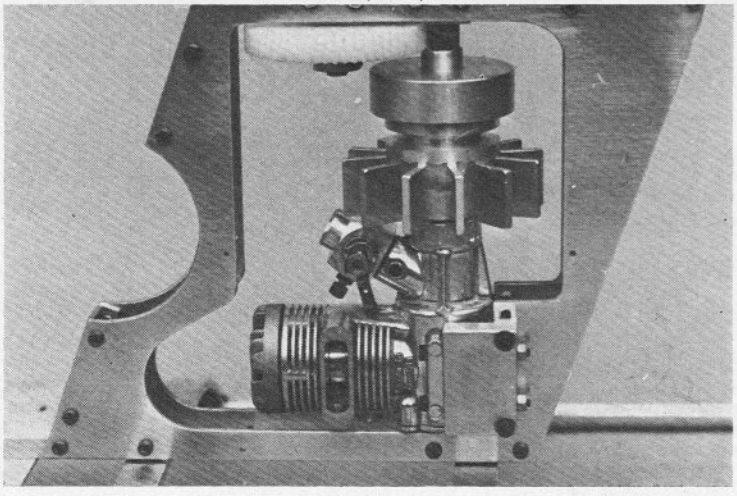
THE LATEST helicopter from that master of simplicity, Dieter Schluter, is a compact and attractive model designed for the beginner and sport flier. It is now being brought into the U.K. in increasing numbers by Ripmax.

The model

The main rotor is 39½in. diameter (1,000 mm.) and the overall length, with rotor blade in line with fuselage, is only 49in. (1,240 mm.), It is designed to use four function radio and a .40 cu. in. (6.6c.c.) capacity motor.

The *Heli-Baby* is novel in a number of respects. It is produced mainly in metal; the tail rotor is belt-driven, and the main rotor is driven through a 6:1 single spur reduction. The chassis consists of two 12g. (2.5 mm.) aluminium alloy frames with channel aluminium spacer 25/32in. (20 mm.) wide. This carries the motor, with the cylinder horizontal, the head facing forward and the crankshaft vertical. The drive is through a standard size Schluter clutch and cooling fan to a ten-toothed steel spur gear which mates with a sixty-toothed nylon gear on the main rotor shaft. The primary and main rotor shafts both run on ball bearings. The tail rotor is driven at motor speed through a flat nylon belt $\frac{5}{16}$in. (8 mm.) wide, which runs inside the tubular tail boom. The tail rotor shaft runs on needle rollers and pitch control is by means of the now familiar slotted plate.

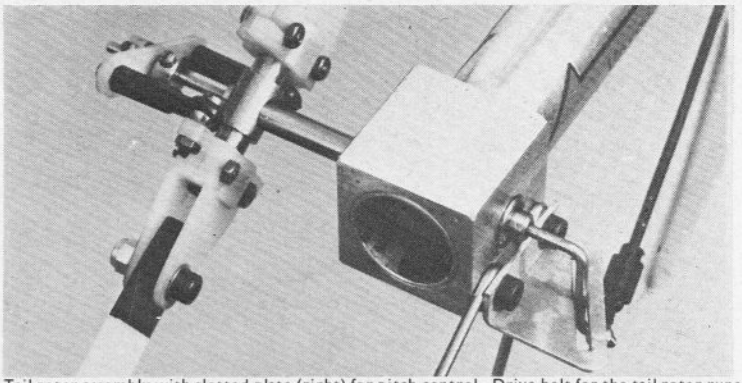




Above: close-up of rotor head. Hub and blade holders free to oscillate about the fly-bar to provide teetering. *Below:* engine installation (Webra .40) before cooling duct fitted. Note 6:1 spur reduction for primary drive

The cabin comprises a 2 mm. ply floor and back with a moulded transparent plastic bubble. The back of the cabin carries the servos for pitch control of the tail rotor and tilt of the swashplate. The throttle servo is fixed to the cabin floor, while the fuel tank is mounted through the cabin back so that the level may easily be observed during flight. A moulded plastic seat is provided to enclose the servos and the part of the tank protruding into the cabin. (A figure of a pilot, to the correct scale is available as a separate item.)

The rotor head is of the simple Hiller type, with fixed pitch, but it is fitted with a teetering hinge. The tail rotor runs at engine r.p.m. and the main rotor at 1/6 of this speed. They are, consequently, relatively small for a model weighing 6.6lb. (3Kg.). As mentioned earlier, the diameter of the main rotor is 39½in. (1,000 mm.) and 1 $\frac{9}{16}$in. chord (40 mm.), and the tail rotor 7in. diameter (178 mm.) with a $\frac{7}{8}$in. chord (22 mm.). The disc loading is relatively high, then, at 12.4oz. per square foot.



Tail rotor assembly with slotted plate (right) for pitch control. Drive belt for the tail rotor runs inside the tubular boom.

The kit

Complete with the exception of radio equipment, engine, tank, finishing materials and—rather surprisingly—two clips for the outer tube of the tail rotor pitch control wire. A full-size side elevation, a pictorial step-by-step instruction sheet and a 14-page manual are supplied. The latter contains useful building hints, together with elementary and advanced flying instructions.

Assembly

Building the *Heli-Baby* is very straightforward and the main structure of the model is simple mechanical assembly. The model is designed for a .40 motor and the German Webra fits without modification. As I have a preference for Schneurle ported motors for helicopters, however, I considered the possibility of fitting the Austro-Webra Speed 40 and the HP40.

The Webra needs the prop driver reducing in diameter for fit, the recess in the cooling fan, and the cap screws which retain the crankcase cover need to be replaced by countersunk screws. It is also necessary to file a small flat on the carburettor body, but this in no way affects its operation.

The HP is even more simple, simply requiring the blocks which form the engine mounts reducing by 0.04in. (1 mm.) to reduce the mounting centre by 0.08in. (2 mm.). Also, a spacer is required between the prop driver and the fan. Ideally, this should a turned collar, approx. 0.2in. (5 mm.) thick, which is what I used, but steel washers could be used provided they were flat and burr-free so that they did not spoil the true running of the fan relative to the crankshaft.

The motor can be started using a length of the plastic cord supplied or, if an electric starter is available, as in my case, by a "v" belt. The belt supplied for the *Cobra* is just right, I found, and should be looped round the pulley before the clutch drum is fitted.

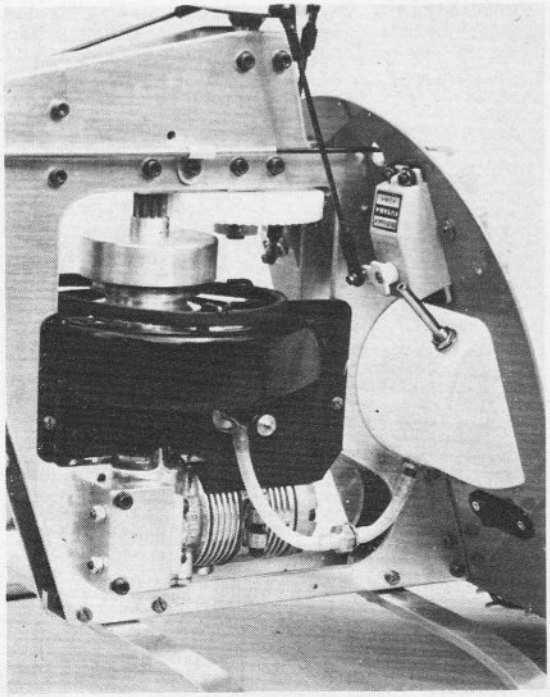
The construction of the cabin and rotor blades is "conventional aeromodelling". Plywood for the cabin floor and back has to be profiled and "cut-outs" made for the tank and servos. The bubble is vacuum formed in two halves which have to be joined. The rotor blades are preshaped from ramin but require sanding, the ends painting and covering with the self adhesive plastic film supplied. Evidently considerable care is taken in the grading of these blades as, in the two kits examined, the blade weights were within 500mg. before balancing.

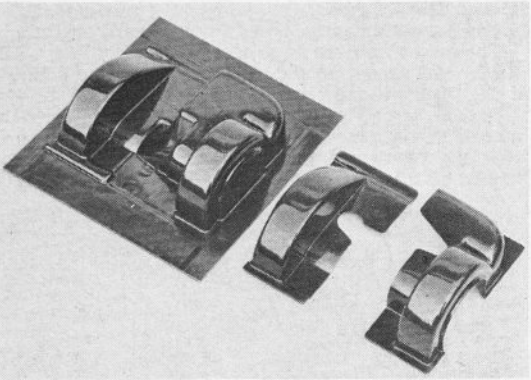
The seat and instrument console are cut from a single moulding and assembled using the polystyrol adhesive supplied. Building the cooling duct is probably the most difficult operation involved in the whole job. It is in two halves and these are cut from a single moulding in tough black plastic. Great care is necessary, first in deciding where to cut and then in the trimming, so that the halves are a good fit round the engine and the main chassis.

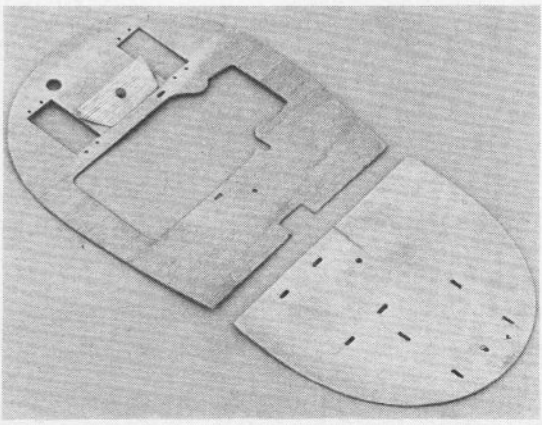
There is considerable room inside the plastic seat for the servos and radio but the neatest installation can be made if modern miniature servos are used. I chose Futaba 'M' series, and two black label servos are needed for the swashplate and a red label one for the throttle. As the pitch control linkage for the tail rotor is reversible, either type is suitable.

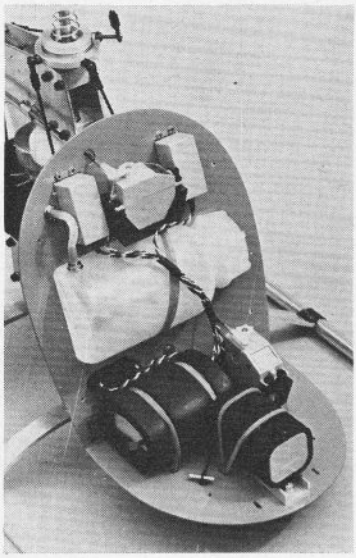
The main rotor hub is supplied ready assembled, and the remaining fitting together is quite straightforward. Care is needed, however,

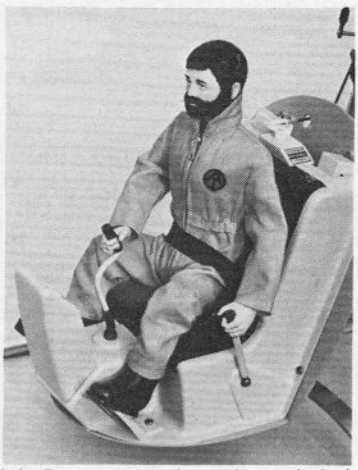
Below: cooling duct, cabin back, etc. fitted. *Right:* mouldings for duct cut from sheet. *Below:* only wood, apart from rotor blades!



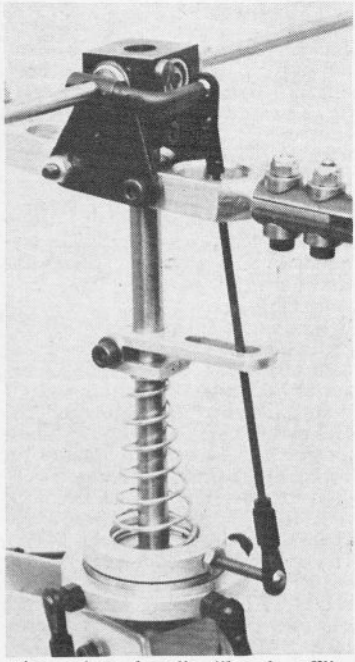








Left: Four servos, tank, receiver and nicad all go under pilot's seat moulding (*above*). Close-up, right, shows how swashplate is held down onto a spherical bearing by a conical spring.



to ensure that the teetering hinges are free. These are plain bearings, steel on steel, and the bores need to be carefully de-burred before fitting.

With the nicad in the most forward position possible, the pilot—weight about ½lb. (250g.)—was necessary to bring the c.g. onto the centre-line of the rotor-shaft. The model is so stable due to the height of the rotor above the c.g. that, when checking the c.g., it is not satisfactory to hang the model from the flybar, but better to support it on the bottom end of the main rotor shaft.

Setting up and flying

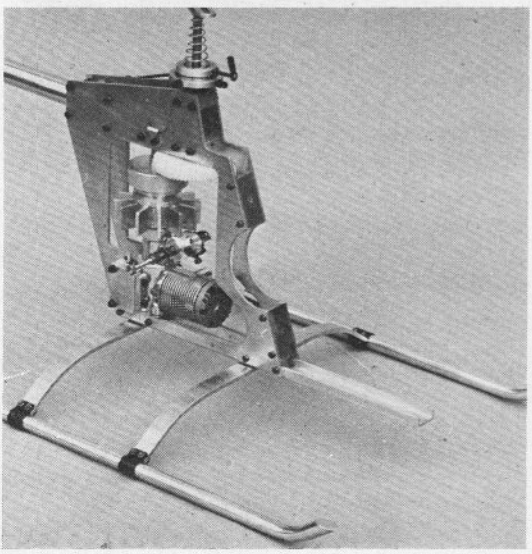
The servos were set up to give the movements shown on the plan, and at the main and tail rotor incidence 2° and 8° respectively, as specified. When I flew the model, I found that full left trim was necessary for "hands-off" hovering. Reducing the pitch to 5° put matters right. The need for this adjustment was due to the fact that the kit originally contained a round section belt for the tail rotor drive and the pulleys were of dissimilar size so that the tail rotor ran at less than engine speed. The flat belt used was a modification and this was supplied with equal diameter pulleys giving a higher tail rotor speed. Schluter recommended reducing the tail rotor diameter but, as the blades had been covered and balanced, I preferred not to do this.

The model is particularly stable in lateral and longitudinal directions and, because of the very good throttling of the Webra, it is very easy to control vertically. It is sensitive in yaw—due, probably, to the low moment of inertia and lack of air-damping abouf the main rotor shaft—the latter due to the bubble and boom layout. It is easily trimmed to handle "hands off"—and I was able to fly hands-off circuits, both left- and right-hand, in still air.

Summary

Its simple, robust construction and docile flying characteristics make the Schluter *Heli-Baby* very suitable as a trainer and I can highly recommend it, with just one exception. For the absolute beginner, either the floats or wider skids should be fitted, to increase ground stability.

Manufacturer: Ing. Dieter Schluter, Muhlheim am Main, W. Germany.
Importer/Distributor: Ripmax Models, Green Street, Enfield, Middx.



Left: the complete mechanical assembly (with H.P.40 shown in this shot). *Below:* "It's nice to fly," says Tony, "but a little sensitive on yaw—especially when landing."