BUILD A 3/4 in. TO THE FOOT G.A. CYGNET

By WILLIAM A. DEAN

Photo by courtesy of "The Aeroplane"

An "up-to-the-minute" model that should appeal to all. Those of our readers who have criticized the absence of drawings in which all details are full-sized will find their requirements fully met this month.

IN the "Cygnet," General Aircraft Ltd. have produced a machine that combines good flying qualities with maximum safety and comfort. The original design had a single fin and a conventional undercarriage. The present nose wheel undercarriage has simplified both take off and landing problems. In fact, it is the boast of the makers that the "Cygnet" lands perfectly with hands and feet off. Take-off and taxiing have been made easy by means of the novel undercart, insomuch that the "Cygnet" is very easy to handle on the ground, there being no sign of swing as with most aircraft. Even taking off cross wind is quite simple, whilst perfect visibility is afforded, as the cowling lies flat and well below eye level.

Construction is all metal, the wings and tail-plane being stressed skin, whilst the rear oval part of the fuselage is monocoqued. Power is either a Cirrus Major 150 h.p. or a Gipsy Major 130 h.p. engine. The interior of the "Cygnet" is not unlike that of a car, allowing plenty of leg room and ample luggage space behind the side-by-side seats. All the switches are within easy reach from either seat, although the pilot usually sits on the left.

The maximum speed is 135 m.p.h., whilst the cruising speed on 70 per cent power is 115 m.p.h. Instead of a landing speed the "Cygnet" has a "landing range," that is a coloured sector marked on the air-speed indicator. All the pilot has to do is to keep the needle of the air-speed indicator within this sector. This is very simple, as the "safe" area is between 60 and 85 m.p.h.

The range is 445 miles on 27 gallons of petrol. When fully loaded the weight is 2,200 lb., and when empty 1,475 lb. Service ceiling is 14,000 ft. with either engine. All the other performance figures are with the Cirrus Major, those with the Gipsy Major being slightly lower except for the range, which is 460 miles.

Considerable numbers of "Cygnets" have already been exported to Australia, India, Brazil, America, and other countries which still enjoy civil flying.

The author's main reason for choosing the "Cygnet" was that it presented some really interesting features, as well as making a good flying model. The scale of $\frac{3}{4}$ in. to the foot makes quite a large-sized 'plane of 25$\frac{1}{2}$ in. This scale proved almost too large for THE AERO-MODELLER's pages. As the reader will see, the plans have cut through the border at several points.

A glance at the plan will make clear the advantages of this 'plane as a flying model, ample dihedral and the twin fins both going to make it unusually stable. Before commencing the model the plans should be traced, "A" "A" and "B" "B" being joined together. In order to save time only the ribs and bulkheads need be traced, waxed paper being placed over the plan to protect it. Begin by cutting out all the ribs and bulkheads from medium balsa. Only the four $\frac{1}{16}$ in. by $\frac{1}{8}$ in. slots are cut in the formers, the remainder being lightly marked in pencil. The four main stringers can now be cut from $\frac{1}{16}$ in. sheet, the portion between F3 and F5 being included. Next add the remainder

of the stringers and cut away the parts of the two main side stringers shown in broken lines. The two main spars are next cemented in place to F4 and F5, and the four W1 ribs slotted on to them. The leading and trailing edges, together with the fairings, are fixed in position, and the fuselage between F3 and F6 covered with $\frac{1}{32}$ in. sheet.

The cabin frame provides a large part of the strength of the fuselage, so that if a flying model is going to be made this part should be made a fixture. If a non-flying model is chosen the portion between F4 and F5 can be made to slide on a U-shaped aluminium runner. On the real machine this part is made in two separate sections, which can be opened independently of each other.

The nose-block is roughly carved to shape and finished off after being fixed to F1. The propeller shown on the plan is a 5¼ in. scale one. A 6 in. duration type should be substituted for flying or gears should be introduced. The front nose wheel consists of a $\frac{1}{8}$ in. round piece of birch slotted at one end to fit over the main lower longeron and a piece of $\frac{1}{16}$ in. sheet cemented between F2 and F3. The fork is made from a piece of $\frac{1}{32}$ in. sheet aluminium, and kept in position with a small screw or brad. Finally, the fairing of plastic wood is made.

Two pieces of $\frac{1}{8}$ in. by $\frac{1}{4}$ in. hard balsa 2 in. long are used for the rear undercarriage legs with 1 in. pins glued and bound to them for axles. The method of fixing them to the wings can be seen from the plan, scrap balsa being used to fill in round them. 1 in. celluloid balloon type wheels are fitted, and the emergency tail skid of $\frac{1}{16}$ in. round bamboo cemented in position. The four lower stringers on one side of the fuselage between F11 and F12 are cut away for access to the elastic, and a piece of $\frac{1}{32}$ in. sheet fitted in their place with tissue hinges.

The two wing halves are next made in the usual manner, making sure that they line up with the wing roots, the two W1 ribs only being fixed lightly in position until the correct dihedral has been ascertained, after which the birch dowels and paper tubes can be cemented in place. As the dowels are intended to be fairly tight fits it is advisable to cover the wing ribs up to W2 with $\frac{1}{32}$ in. sheet to protect the covering when the outer wing panels are removed for transport.

The reader will observe that both flying and scale tail-planes are given in the plans, the former having the elevators attached by means of aluminium hinges, and the latter having them marked in Indian ink. For flying purposes the fin template should be enlarged by $\frac{3}{16}$ in. all round. The tail-plane is permanently fixed to the fuselage at F11 and F12, using plastic wood fairings.

The dashboard can be either redrawn or cut out and then pasted on to F3, although in the flying model the elastic passes through the middle of it, so a small portion must be omitted accordingly. Lastly, the cabin is covered with 1-128 in. sheet celluloid, and cellophane pasted on the inside of the rear panels, after which the model is ready to receive the covering.

The present "Cygnets" are finished off in Alice blue. The registration letters are silver with dark blue edgings, and are painted on the top wing surfaces and fuselage sides. This colour scheme is very attractive, and one which the reader will do well to follow, providing an accurate copy of the production machine is desired.

Before covering, the model should be gone over with a piece of "00" glasspaper to ensure a smooth foundation for the tissue. Three coats of clear dope are applied first of all to the tissue, after which it is lightly sanded and one coat of coloured dope given (in the case of the flying model two coats). The registration letters are cut from tissue with the aid of a razor blade and doped in position.

All that now remains is to add the pitot tube and exhaust tube. These are both made from scrap pieces of birch or balsa and cemented in position. The motor, which consists of 4 yards of $\frac{1}{8}$ in. flat rubber arranged in 4 loops, is well lubricated before it is installed in the model.

Holding the model by the wing tips it should balance at about 1 in. back from the leading edge, but if it does not do so weight in the form of a piece of old lead tubing should be cemented inside the nose block.

The model is now ready for test flying. First of all it should be glided amongst thick grass until the correct trim has been obtained and then given about 100 turns, and r.o.g.'d. As the model is already in the "tail high" take-off position the run is necessarily very short. Gradually increase the number of turns until the maximum of about 500—600 has been reached. When this figure has been reached flights of between 35 sec. to 45 sec. may be expected.

At the time of writing details have just been released of the "Owlet Night and Day Trainer." This machine has been developed from the "Cygnet," the main difference being the fuselage, which presents a much smaller frontal area, the cockpits in this case being open and in tandem. Apart from the blunter wing tips, the general design closely follows that of the "Cygnet." Performance is slightly higher, and the machine is reputed to be somewhat lighter on the controls. The makers' aim in producing the "Owlet" is a machine in which the flying student can be introduced to night flying right from the start of his training. Bearing in mind the advantages of the tricycle undercarriage it will be seen that one of the most hazardous features of night flying has been overcome, that of landing. No longer will the pilot of an "Owlet" have to judge the exact moment when to pull up his nose prior to making a three-point landing. Providing that he knows that he is over his landing field and fairly near to the ground the machine will do the rest.

In conclusion, I should like to copy Mr. J. E. Elwell's offer, which appeared in the Christmas issue, in which he invited readers who experienced any difficulty in making his model to write to him. So if any point is not quite clear in the construction I shall be only too pleased to help in every way possible. Just drop me a line, c/o THE AERO-MODELLER, and please enclose a stamped addressed envelope.