Aviation feature

by John W. R. Taylor

WHEN the 1914-18 war ended, the Royal Air Force had 22,647 aeroplanes and more than 13,500 trained pilots. Flying was no longer a hazardous sport for supermen, as it had seemed to be in pre-war days, and many people expected a boom in civil aviation after the fighting had ended. They were soon disillusioned. A few airlines began flying between the major cities of Western Europe, using converted bombers; but most members of the public were either afraid to fly or could not afford to do so.

The same was true of private flying, until the *Daily Mail* newspaper decided to do something about it by organising a competition for light aeroplanes. The aim was to find a small, inexpensive and easy-to-fly machine that almost anyone could afford to own. A first prize of £1,000 was offered for the aircraft that flew furthest on one gallon of petrol. Other people added prizes for speed and altitude.

With their eyes on the main prize, Britain's designers concentrated on achieving a low fuel consumption, at the expense of almost everything else. To save weight, they scaled down their aircraft to the smallest possible size, used the lightest known methods of construction, and fitted the machines with converted motor-cycle engines. Undercarriages were often no more than a pair of tiny wheels, half-buried in the bottom of the fuselage to reduce drag in flight.

About 15 types were completed in time to take part in the competition, at Lympne Airport in Kent, on October 6-13, 1923. The Secretary of State for Air, Viscount Templewood, went to see them and described them later as "a curious collection of small single-seaters that were more like toys than dependable means of transport". This was fair comment; but the aircraft were impractical only because the organisers of the competition had put too much emphasis on low-cost flying, and not through any failure on the part of their designers.

Bicycle wheels

Gloster's Gannet biplane was one of the best-looking aeroplanes sent to Lympne. Unfortunately, it had an untried two-stroke engine which could not be persuaded to run for more than a few minutes at a time, so it had no chance to show its paces.

The Avro 558 biplane (Ray Malmstrom's model of which is described on pages 23-25) had better luck. Two prototypes were built, with different engines. The first, which carried the competition number 5 on its rudder, had a B & H two-cylinder Vee direct-drive motor-cycle engine and was flown by Bert Hinkler, one of the most famous pilots of the time. The second 558, registered G-EBHW and given the number 11, had a 500 c.c. Douglas horizontally-opposed two-cylinder engine, which drove the propeller through a chain reduction gear. Flown by H. A. Hamersley, it managed to complete four circuits of the 12½-mile course, without landing, on the first day of the contest and later won the second prize of £100 in the altitude contest by climbing to a height of 13,850 ft.

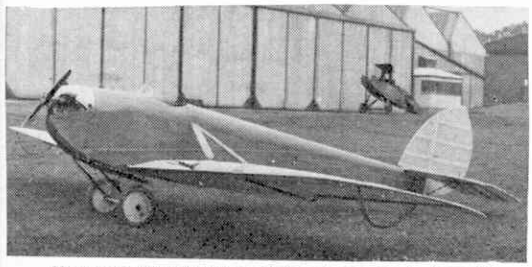
Some trouble was experienced when landing in long grass or on rough surfaces, because the two bicycle wheels that made up the undercarriage were half-inside the fuselage, bringing the lower wing close to the ground. After the competition, both 558's were given a taller undercarriage, with the wheels carried on struts under the fuselage. No. 5 was, at the same time, re-engined with a 698 c.c. Blackburne Tomtit.

In its new form, the second 558, G-EBHW, took part in the Royal Aero Club's Light Plane Demonstration at Hendon, on October 27, 1923. Flying low and precisely, despite a high wind, Hamersley finished third in the race; but it was clear that aircraft as small and low-powered as the 558 had no future for everyday flying and little more was heard of it. For the record, it spanned 30 ft., was 19 ft. 6 in. long and weighed only 294 lb.—less than one-quarter the weight of a Mini-Minor car.

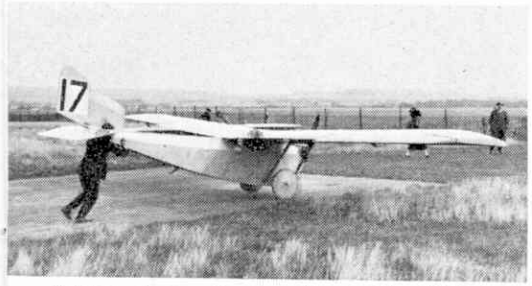
The two aircraft that shared the £1,000 main prize at Lympne were monoplanes. One of them, the English Electric Wren, was even lighter than the Avro 558, with

Here's the little Avro 558 with its longer undercarriage

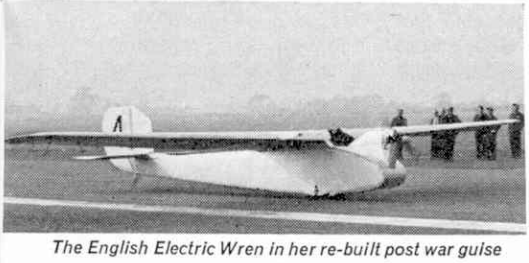
they flew 57 miles for 1s.



Humming Bird EBHX as it was in the beginning with Douglas engine



Winner of several prizes—the toy-like ANEC I



The English Electric Wren in her re-built post war guise

The de Havilland Humming Bird today, preserved by the Shuttleworth collection

an empty weight of 232 lb. Its 398 c.c. ABC engine gave it a top speed of only 50 m.p.h., but used so little petrol that Flt. Lt. Walter Longton was able to fly 87½ miles on one gallon of petrol. As petrol cost 1s. 6½d. a gallon in those days, this meant that the Wren could fly 57 miles on a shillings-worth of fuel.

By a strange coincidence, the ANEC I, powered by a Blackburne Tomtit engine, covered exactly the same distance on a gallon of petrol. But its winnings were not limited to £500, as it also carried off the altitude prize of £200 by reaching a height of 14,400 ft., and came second in the speed contest, with a maximum of 74 m.p.h. The £500 first prize for speed went to another monoplane, the Parnall Pixie, which clocked 76·1 m.p.h. with a 736 c.c. Douglas engine.

Two English Electric Wrens took part in the 1923 Lympne Trials. They may not have been very practical as private aircraft, but they must have been well built as one was restored to an airworthy condition a few years ago and, as part of the Shuttleworth Collection of vintage aeroplanes, began flying again at air displays.

Present-day visitors to the Shuttleworth Collection, at Old Warden Aerodrome, Bedfordshire, can see another of the aeroplanes that flew at Lympne more than 40 years ago — the de Havilland Humming Bird G-EBHX. Although it did not win a prize, this little monoplane caused a sensation when test pilot Hubert Broad looped and rolled it. Aerobatics of this kind had never before been attempted in a light aircraft, and the Air Ministry was so impressed that it ordered eight Humming Birds for the R.A.F. They were used as communications aircraft, for cheap flying practice and for experiments in which they were carried and launched in flight by the British airship R-33.

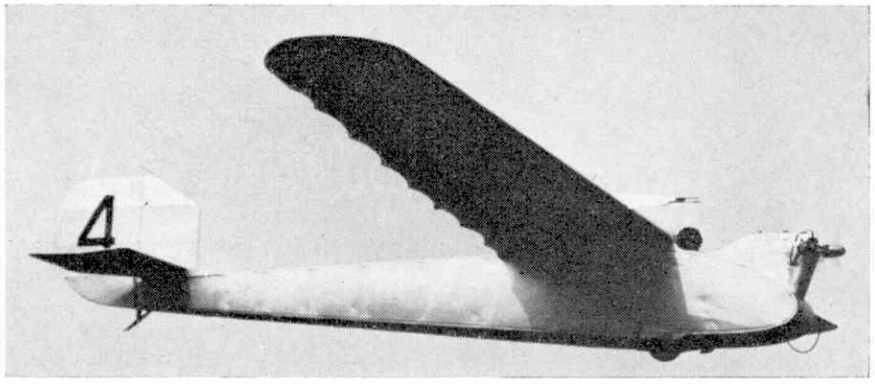
The Humming Bird was, perhaps, the best of the 1923 Lympne light planes, but it was not a particularly good best. Captain (later Sir) Geoffrey de Havilland realised that private flying would never be safe and practical while people thought only in terms of the lowest-possible cost, at the expense of structural strength and performance. He persuaded Major Frank Halford to design a new 60 h.p. four-cylinder engine known as the Cirrus. Round this engine, he drew up a two-seat biplane which he named the Moth. The rest of the story is history....

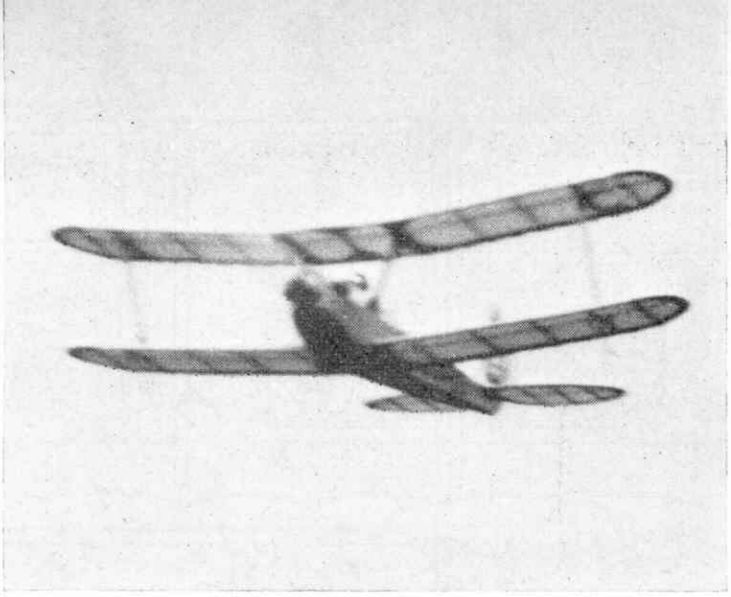
The Moth put the young de Havilland Aircraft Company on its feet and started the private and club flying movement throughout the world. Its descendants flew to Australia and across the Atlantic, and were used to train most of the pilots who won the Battle of Britain in 1940 and who carried out the great R.A.F. bomber offensive against Germany.

Perhaps the greatest achievement of those strange little, frail, underpowered light planes of 1923 is, therefore, that there might never have been a Moth if they had not proved to be so thoroughly useless !

Above: The partly submerged bicycle wheels of the dainty Avro 558 are clearly shown in this view. Here's an alternative marking scheme for your model too

Below: Buzzing overhead, the delicate Wren displays her single landing wheel. She was little more than a powered glider





Shades of 1923! The Avro 558 flies again—in model form

After reading John Taylor's account of the Lympne Trials, you will be eager to build this exciting model of the

AVRO 558

An unusual biplane of yesteryear, modelled exclusively for Meccano Magazine

by Ray Malmström

OVER 40 years have passed since the full size AVRO 558 felt the rush and surge of wind under its wings. There is no doubt, however, about the fascination of building a flying scale model of such an unusual aeroplane. The original AVRO 558 caused quite a stir among aircraft enthusiasts way back in 1923, and you can be sure of attracting a lot of attention when you take your model AVRO out for an afternoon's flying in 1966.

The plans are full size, and if you follow the 'easi-build' sketches you will find construction quite straightforward, so we will not take up precious space by detailing building procedure in these notes. Accurate alignment of the centre-section struts is important, as is wing incidence and dihedral. Time and care taken in construction will result in a very flyable little model.

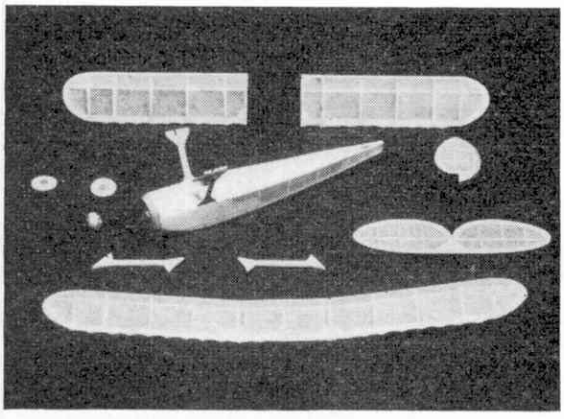
Flying Notes

You will need some weight in the nose to achieve correct balance. Recesses are provided in the nose for pieces of sheet lead, lead pellets, or folded cement tube. When you have carefully balanced your model, these recesses can be covered with $\frac{1}{32}$ in. sheet balsa, or tissue stuck on the front of the model. With the rubber motor installed, suspend the model from the balance point shown on the plan. Your AVRO 558 should hang level or slightly nose down. Avoid any tendency for the model to hang *tail* down.

Choose a calm day and some long grass for first glide and power tests. Check the balance, and freedom from warps of the wing, tailplane and fin. If there is a slight breeze launch your AVRO 558 from shoulder height directly into wind. Launch gently, with a follow-through movement of the arm, and with the nose of the model level or pointing *slightly* downwards. Never *throw* the model. It should glide down and land about 20 ft. ahead of you. If it turns sharply either to left or right, correct this by bending the trim tab on the fin slightly in the opposite direction to the turn. Obtain a straight glide and you are ready for your first power-on flight. Before winding, check that the propeller (incidentally the propeller is a 5 in. diameter Keil Kraft plastic one, obtainable from your aeromodelling shop price 11d.) is pointing downwards, and towards the right (model viewed from the rear). *These adjustments are most important.* Do not neglect to see you have built them in correctly as shown on the plan. Well lubricate the rubber motor (special rubber lubricant costs 6d. per tube) and then wind on 150-250 turns. Launch gently, as for glide tests. Model should climb away, cruise for a short distance, and then glide in to a landing. If your AVRO 558 turns violently to the left *increase* the propeller off-set angle. If it stalls, increase the degree the propeller shaft is pointing downwards. A gentle climbing turn to the left is fine. You can increase the turns with each successful flight up to a maximum of 580. These turns are best put on with a hook fixed in the chuck of a drill (gearing about $3\frac{1}{2}:1$). Pull the rubber motor well out, and stretch it as you wind on the turns. And now a small tip. Give an added 30-40 turns *by hand* before launching. These hand turns give just the necessary boost for a good climbing take-off.

I am sure you will get lots of fun from this little AVRO 558. Perhaps some keen aeromodeller will scale it up to say $22\frac{1}{2}$ to 30 in. span, when power could be a Cox T.D. 010 or 020 glo-motor. (*Full size plans are on the next two pages*)

1



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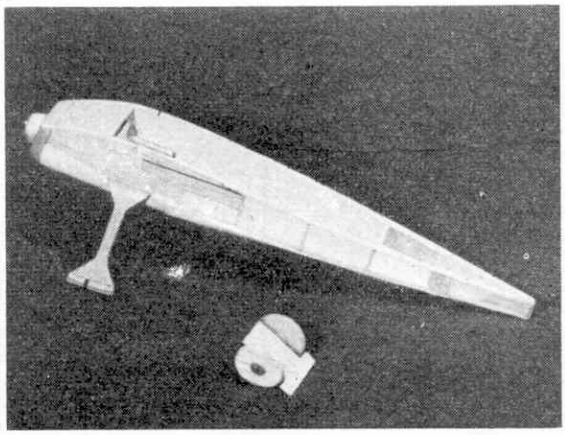

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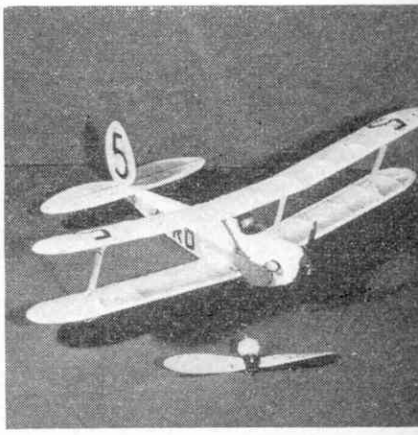
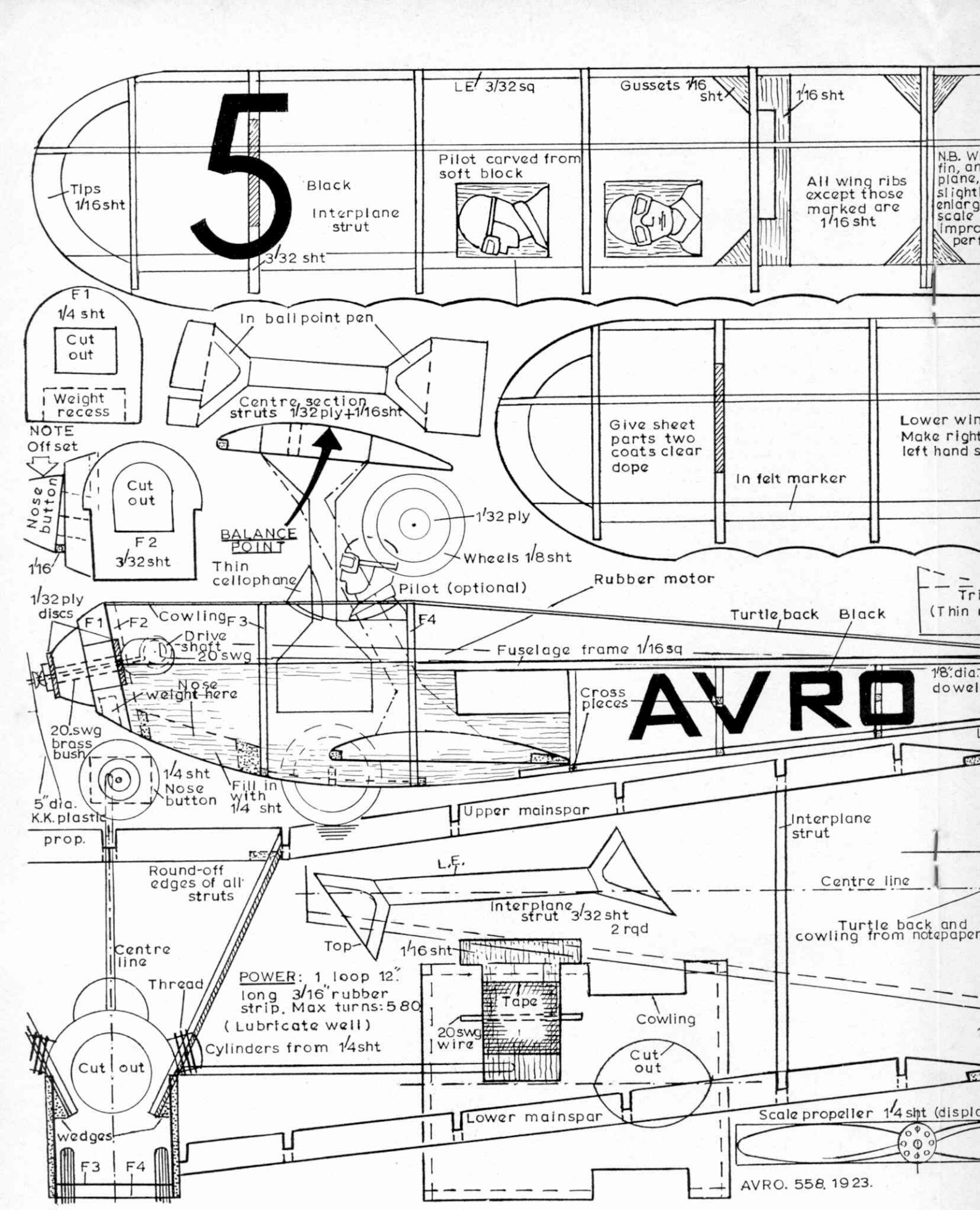
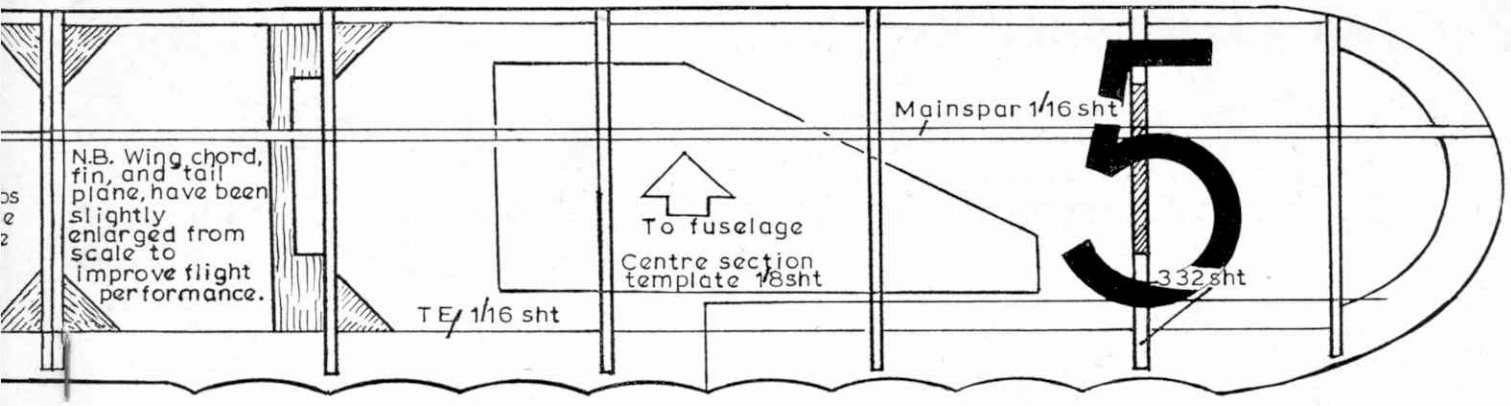
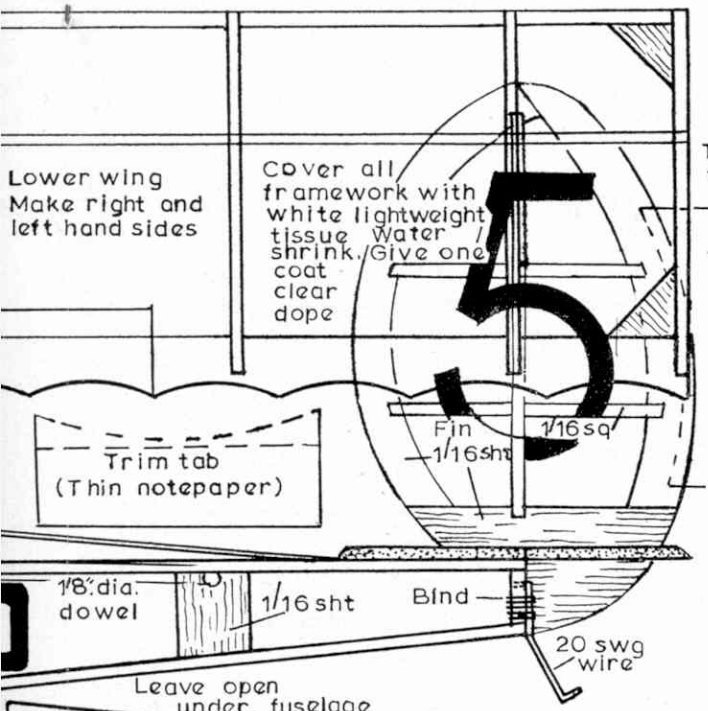
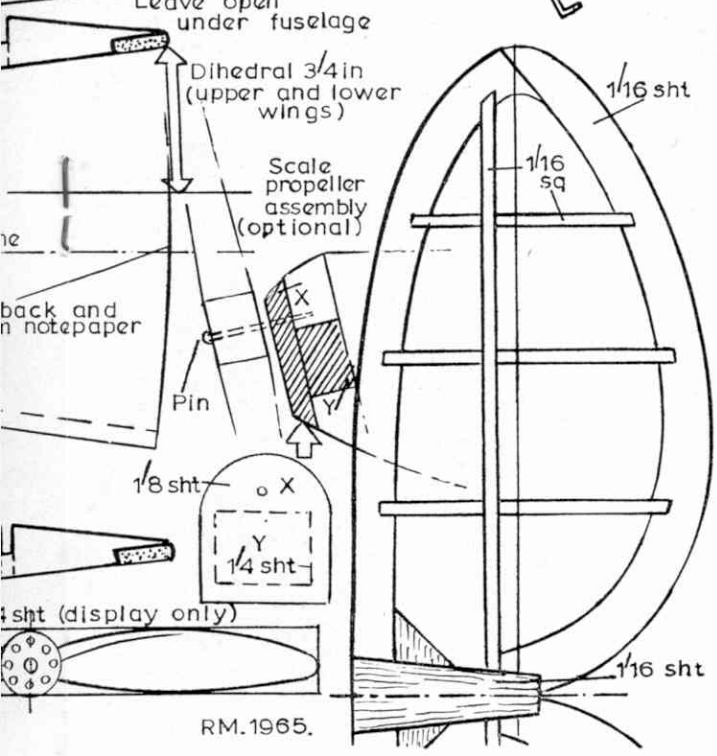


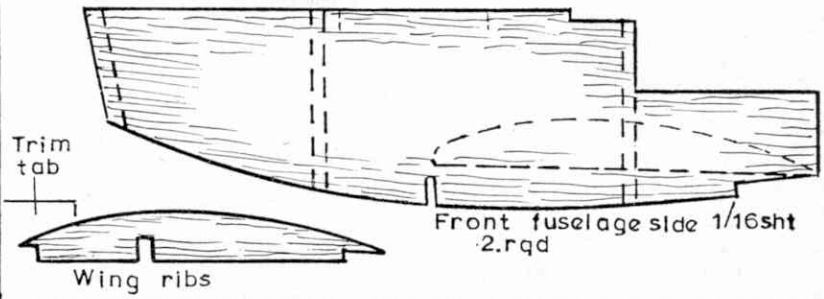
1 *Flying surfaces etc. ready for assembly to the fuselage structure.* **2** *The undercarriage unit ready for assembly to bottom of fuselage.* **3** *The Avro 558 with scale display propeller, flying prop. in foreground*

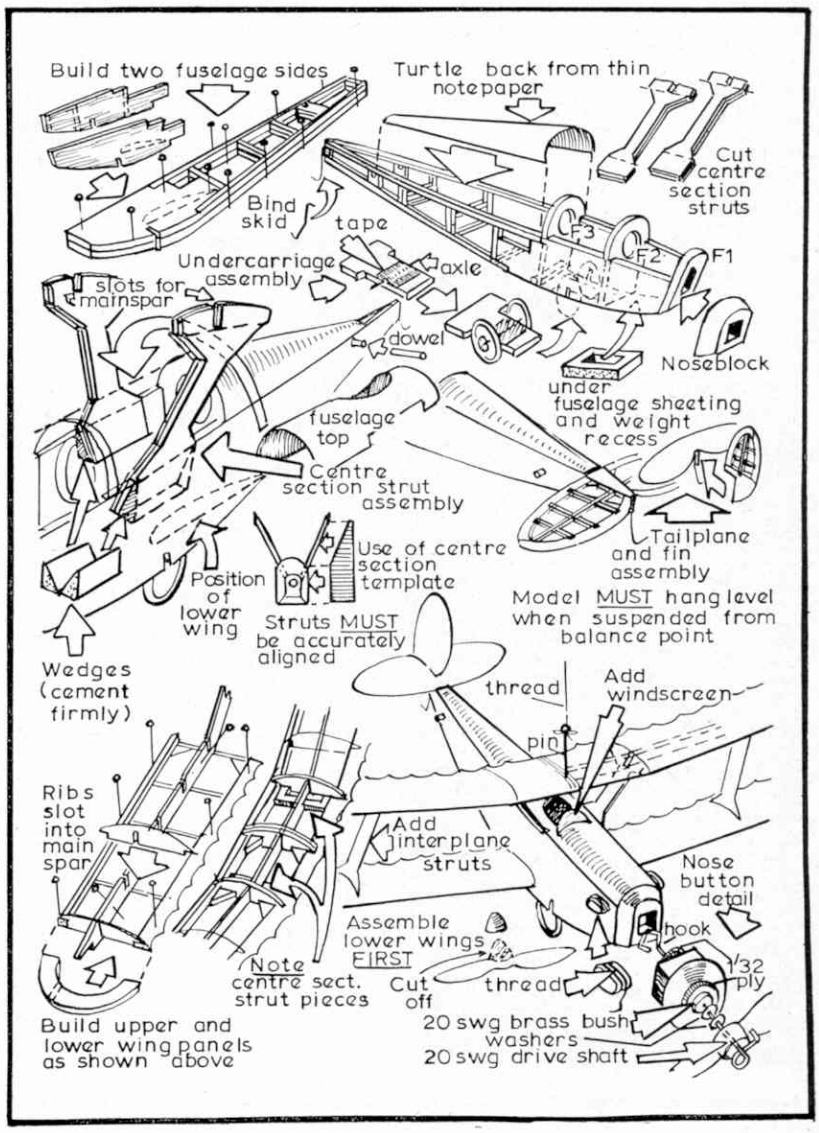

5
LE 3/32 sq
Gussets 1/16 sht
1/16 sht
Tips 1/16 sht
Black
Interplane strut
3/32 sht
Pilot carved from soft block
All wing ribs except those marked are 1/16 sht
N.B. W
fin, ar
plane,
slightl
enlarg
scale
impro
perf
F1
1/4 sht
Cut out
Weight recess
In ball point pen
Centre section struts 1/32 ply + 1/16 sht
NOTE
Off set
Nose button
1/16
Cut out
F2
3/32 sht
BALANCE POINT
Thin cellophane
1/32 ply
Wheels 1/8 sht
Pilot (optional)
Rubber motor
Give sheet parts two coats clear dope
In felt marker
Lower win
Make right
left hand s
1/32 ply discs
F1
F2
Cowling
F3
F4
Drive shaft 20 swg
Fuselage frame 1/16 sq
Turtle back
Black
Tri
(Thin
Nose weight here
Cross pieces
AVRO
1/8" dia.
dowel
20 swg brass bush
1/4 sht
Nose button
5" dia. K.K. plastic prop.
Fill in with 1/4 sht
Upper mainspar
Interplane strut
Round-off edges of all struts
L.E.
Centre line
Interplane strut 3/32 sht 2 rqd
Turtle back and cowling from notepaper
Top
1/16 sht
Centre line
Thread
POWER: 1 loop 12" long 3/16" rubber strip. Max turns: 580
(Lubricate well)
Tape
20 swg wire
Cowling
Cylinders from 1/4 sht
Cut out
Cut out
Lower mainspar
Scale propeller 1/4 sht (displ
wedges
F3
F4
AVRO. 558. 1923.


N.B. Wing chord, fin, and tail plane, have been slightly enlarged from scale to improve flight performance.
Mainspar 1/16 sht
To fuselage
Centre section template 1/8sht
TE 1/16 sht
3 32sht


Lower wing
Make right and left hand sides
Cover all framework with white lightweight tissue. Water shrink. Give one coat clear dope
Trim tab
Fin 1/16sq
1/16sht
Trim tab (Thin notepaper)
1/8" dia. dowel
1/16 sht
Bind
20 swg wire
Leave open under fuselage

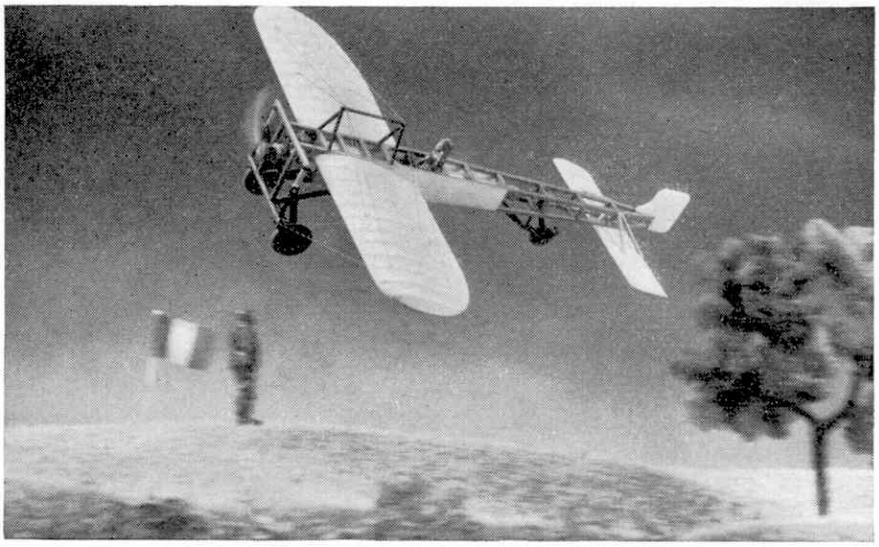

Dihedral 3/4in (upper and lower wings)
Scale propeller assembly (optional)
back and n notepaper
Pin
X
Y
1/8 sht
1/4 sht
sht (display only)
1/16 sht
1/16 sq
1/16 sht
RM.1965.


Trim tab
Wing ribs
Front fuselage side 1/16sht 2.rqd


Build two fuselage sides
Turtle back from thin notepaper
Cut centre section struts
Bind skid
tape
F3
F2
F1
Undercarriage assembly
axle
slots for mainspar
dowel
Noseblock
under fuselage sheeting and weight recess
fuselage top
Centre section strut assembly
Tailplane and fin assembly
Use of centre section template
Position of lower wing
Struts MUST be accurately aligned
Model MUST hang level when suspended from balance point
Wedges (cement firmly)
thread
Add windscreen
pin
Ribs slot into main spar
Add interplane struts
Nose button detail
hook
Assemble lower wings FIRST
Note centre sect. strut pieces
Cut off
thread
1/32 ply
Build upper and lower wing panels as shown above
20 swg brass bush washers
20 swg drive shaft

Antique Frenchman

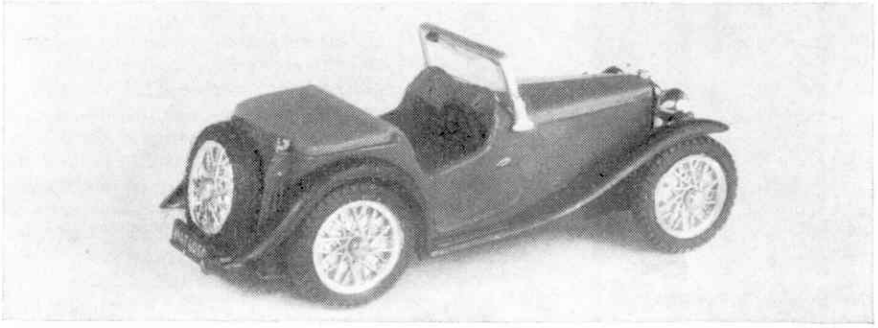
Latest addition to the Frog 'Trailblazer' series is this fine little Bleriot XI. It is, of course, a model of the first plane to fly the English Channel. The kit includes a very fine standing figure, a Tricolour and flagpole, and a 'patch of grass' on which to stand the completed model. In our picture, the pilot brings his plane down low to buzz the flag which is here being used as a race marker! Everyone who has seen that fine film 'Those Magnificent Men in their Flying Machines' will want to build this model—but be warned—you need lots of patience and a pair of tweezers! The results are, however, most rewarding. Price: 2s. 6d.



have you seen?

Not-so-antique Englishman

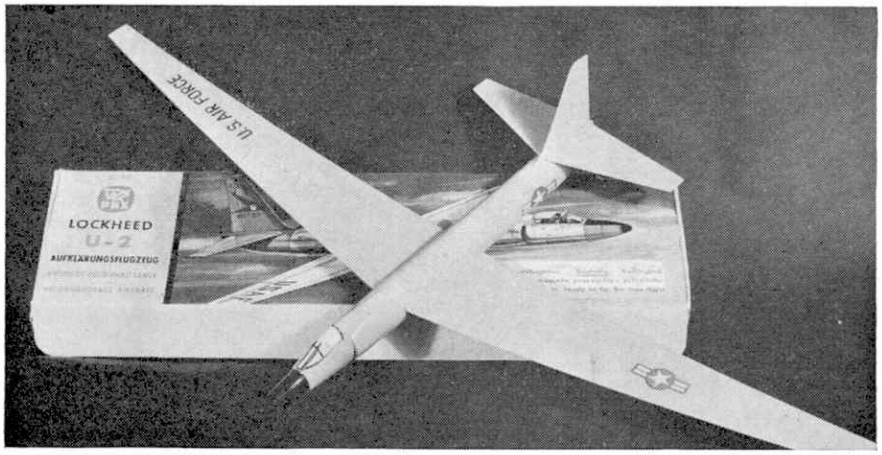
1935 to be exact. That's the date of the nippy little MG. P. B. Midget chosen as the prototype for the latest Spot One 1/42nd scale model. This is a real beauty, complete with plated spoked wheels, 'glass' in the bulbous headlamps and it even has minute corrugations on the steering wheel rim! We painted a narrow silver frame round the windscreen of our model and also painted the windscreen wiper motor black. It is easy to do and just adds that little finishing touch. Price: 5s. 11d.



High Flying Spy

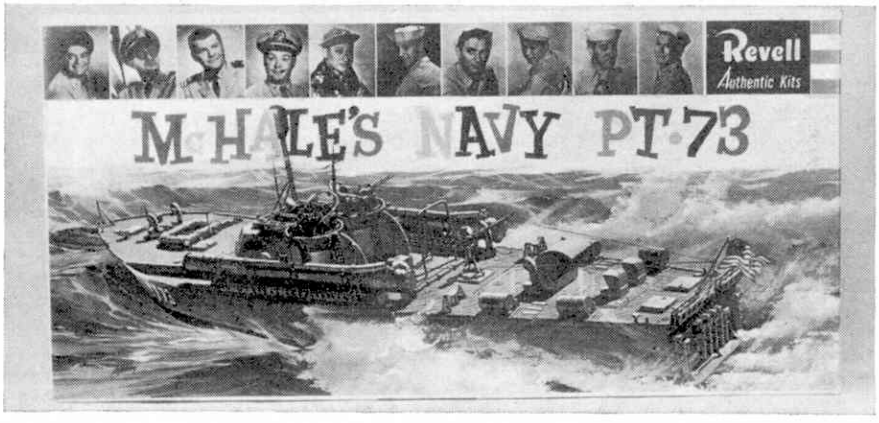
Finished moulded in self-colour (grey) plastic and ready-to-fly, this is an accurate flying scale model of the famous (or notorious!) American high altitude reconnaissance jet aircraft with a performance to match its realistic appearance. Launched by a rubber catapult (supplied with the model), this U-2 flies at speeds up to 60 m.p.h., or more, climbs to an almost unbelievable height and is readily capable of flights of 20 to 40 seconds duration. The nose section is moulded in soft rubber—a safety feature welcomed by anyone standing in the way of a low level beat-up!

Definitely a real flying model—not a toy—and its price is 8s. 11d., from model shops. Distributors are Ripmax Models & Accessories.



Crazy American

Fortunately for the U.S. Navy, McHales PT 73 is purely fictitious. This imaginary character appears on the television screen with regularity, placing himself in the most unlikely situations. Revell have now produced a plastic construction kit of the vessel used in this series. It is a PT boat fitted with four 50-calibre machine guns, a 20 mm, anti-aircraft gun, four depth charges and torpedo tubes. This detailed kit costs 10s. 6d., complete with stand. It is interesting to note the similarity of hull design to our own Project 66. Give you ideas?



Shoot the reviewer

Who, in this page last month mis-titled the magnificent new SUPERQUICK Railway Terminus kit! Readers will be pleased to know that next month's issue will contain a picture-feature on building these superb scale models.