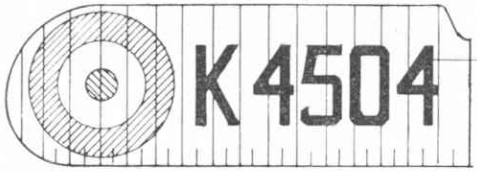
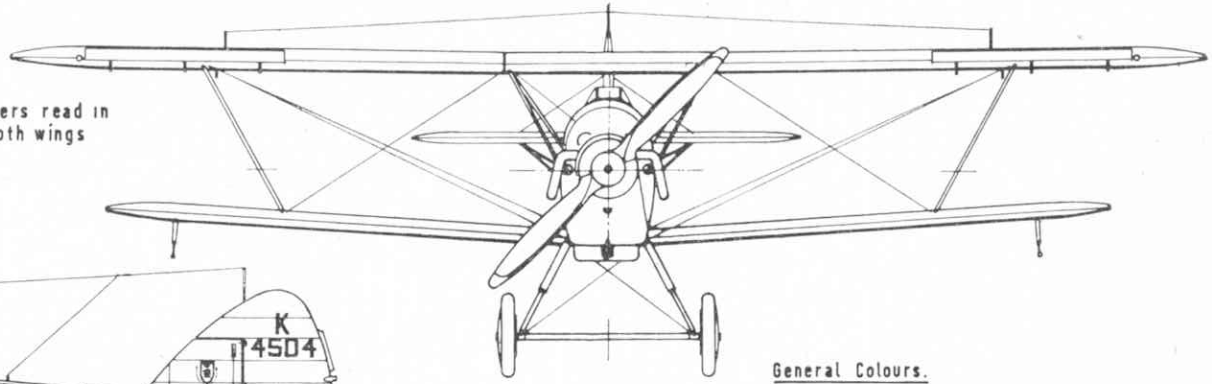
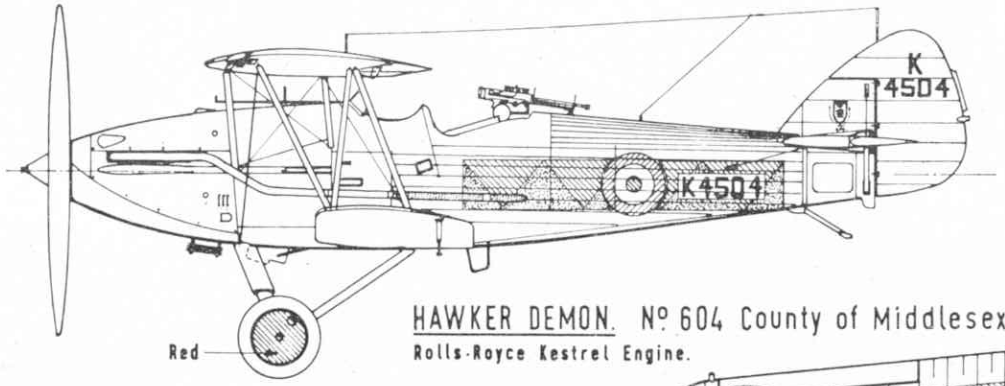


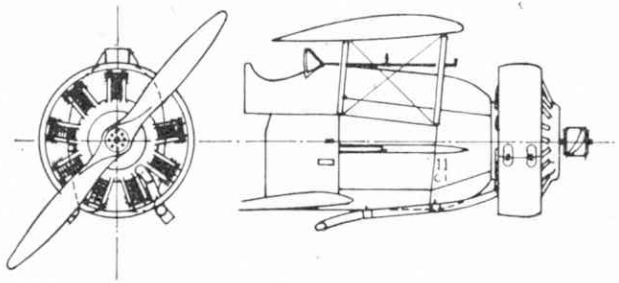
Aircraft numbers read in from tip on both wings

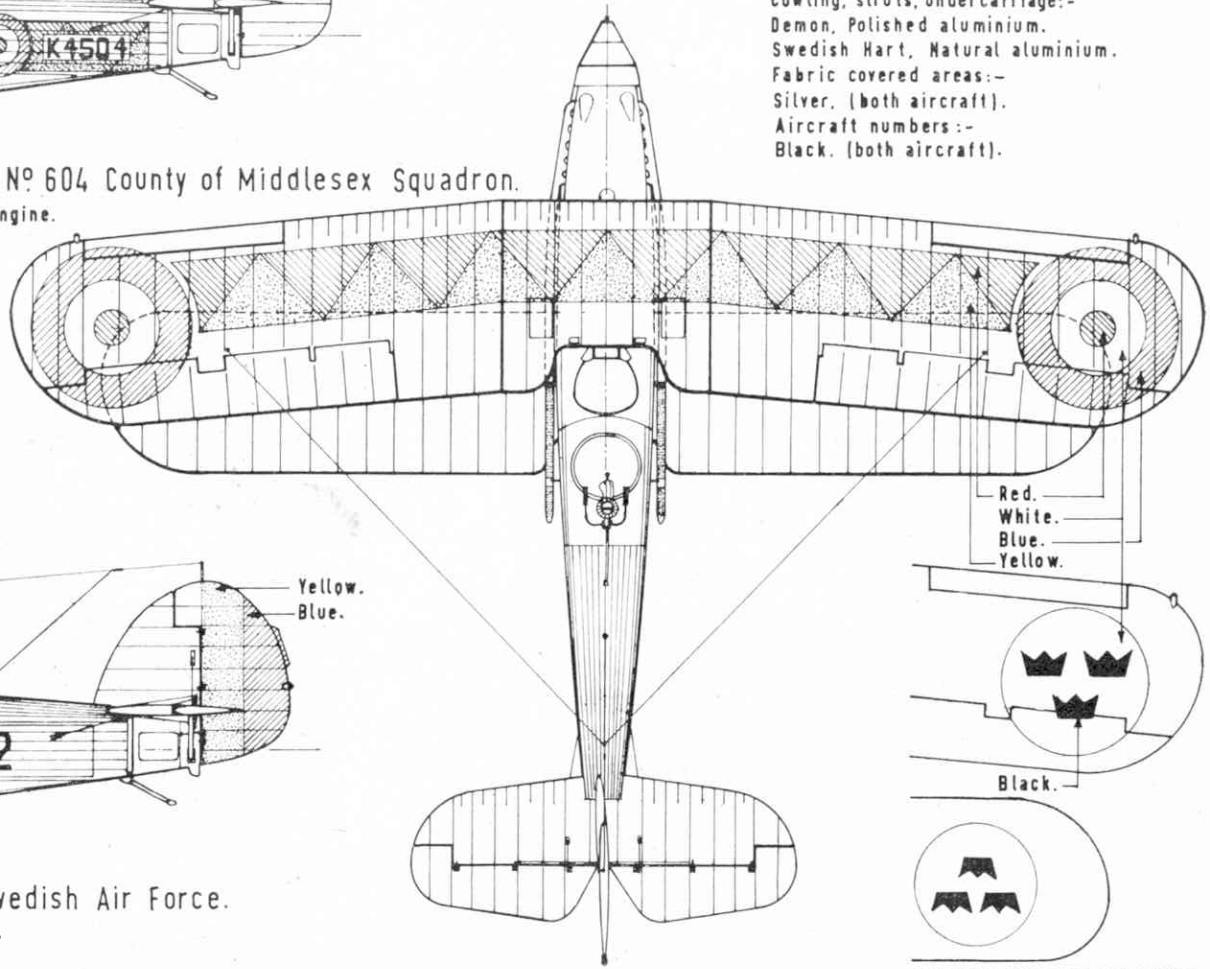


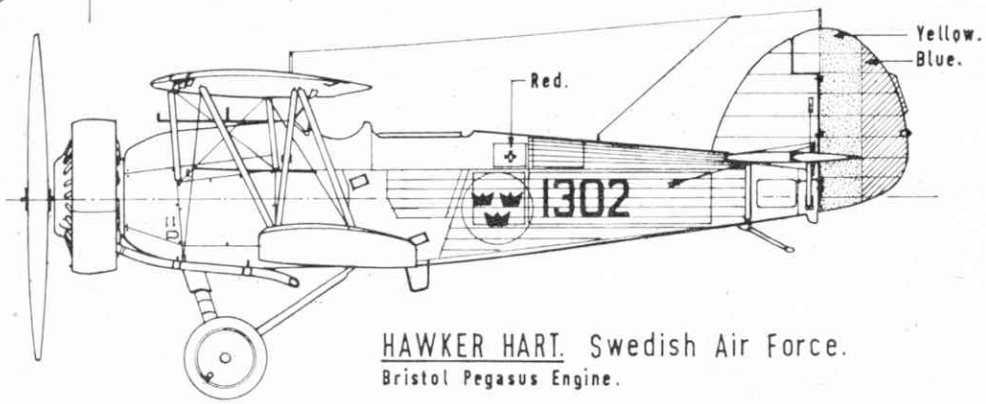


HAWKER DEMON. Nº 604 County of Middlesex Squadron.
Rolls-Royce Kestrel Engine.

General Colours.
Cowling, struts, undercarriage:-
Demon, Polished aluminium.
Swedish Hart, Natural aluminium.
Fabric covered areas:-
Silver, (both aircraft).
Aircraft numbers:-
Black. (both aircraft).







HAWKER HART. Swedish Air Force.
Bristol Pegasus Engine.

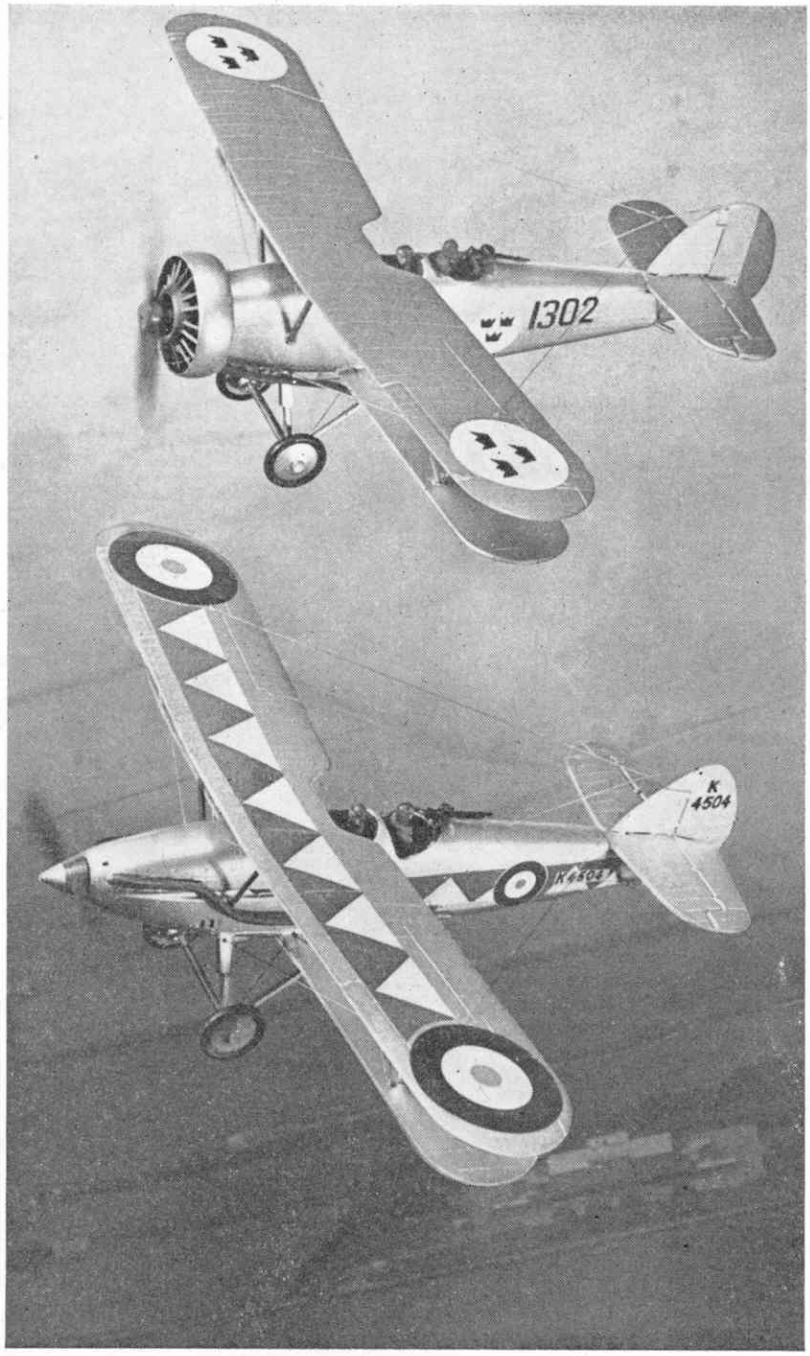
SWEDISH INSIGNIA ON WINGS.

HAWKER DEMON AND SWEDISH HART.

DRAWN BY IAN R STAIR.

SCALE _ FEET.

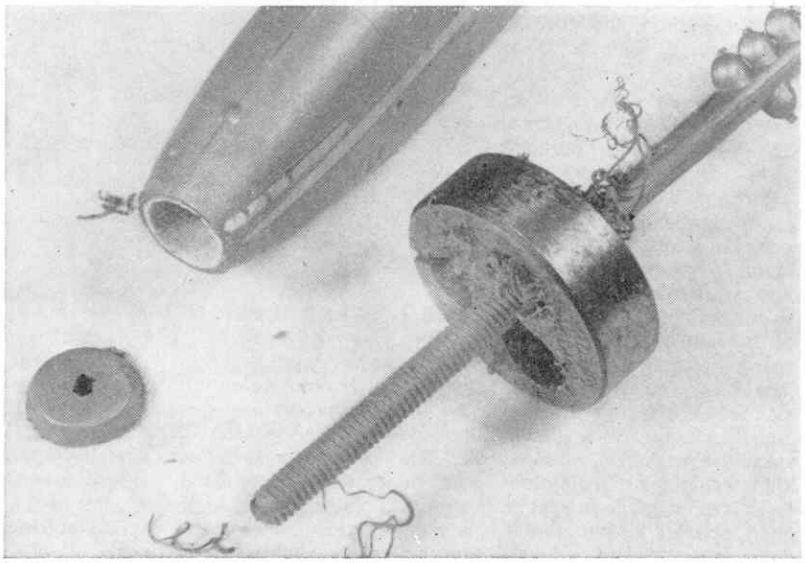
DEMONIC HARTS



The Airfix Hawker 'Hart' kit is not a new one, but when it appeared some years ago it set new standards for low priced plastics with its finely engraved rib lines and thin-section wings. It still compares quite favourably with many of the current releases and makes fine raw material for the kit converter.

Ian Stair's drawing provides all the data required for Doug McHard's two projects this month—the Hawker 'Demon' and the more complicated Swedish 'Hart' with its built-up radial engine.

When, in the May issue we adapted the Westland 'Wallace' to make a 'Wapiti', we were left with an unused radial engine cowl ring. Also, the brief mention in the June, Fokker FVIIa feature, of a suggested method of building up radial engines from threaded plastic sprues, inspired a number of requests for further details. The Swedish 'Hart' project this month not only provides an ideal opportunity to use that cowling, but it also enables us to enlarge on the business of dummy radial engine building.



THE SWEDISH 'HART'

To be really accurate, you should cut off the whole front end of the Airfix 'Hart' fuselage and rebuild it to the outline shown on our drawing. You *could* then use a *complete* 'Wallace' engine and cowling to complete the job, but it seems a bit wasteful to go about it in this way, so a more economical, though rather less accurate method is here described. The finished product is, nevertheless, quite effective as our 'flying' photo amply testifies.

1 Make a start by sawing off the front $\frac{1}{8}$ in. of the fuselage and re-cement the cut-off piece *inside* the fuselage about $\frac{1}{4}$ in. back from the new front face. Fill in the gun trough on the fuselage side and also the exhaust ports with Humbrol Body Putty (see May issue) .When quite dry—it will take several hours—sand it flush with fine abrasive paper, finally finishing off with No. 400 Wet-or-Dry paper.

Continued overleaf —▶

Slice the knobs off the plastic moulding sprue to make a smooth rod, and down it run a $\frac{1}{8}$ in. Whitworth die to produce a threaded rod which will eventually be used to represent engine cylinders.

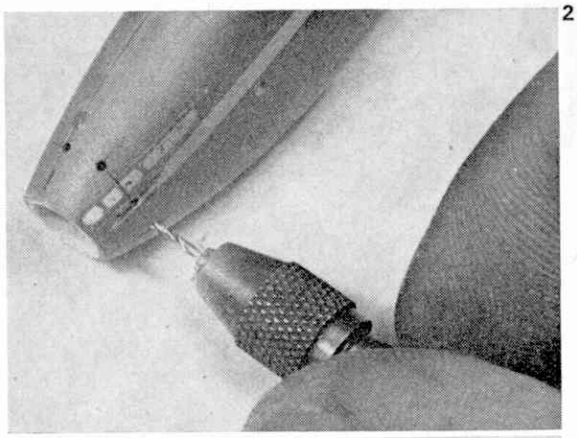
2 Carefully mark out and drill nine equally spaced $\frac{1}{16}$ in. diameter holes around the nose, as shown, using the drill in a small pin chuck. Start with the top cylinder hole which must be on the exact centre line.

3 Open out the holes with a larger drill or gimlet, adjusting the spacing of the holes if necessary. Cut the threaded sprue into nine pieces—rather longer than needed—and cement them in position to represent the engine cylinders. If you're really keen, you can thread the holes with a $\frac{1}{8}$ in. Whitworth tap and screw the cylinders in!
Other details revealed in this photograph: the underside radiator and the little oil cooler have both been cut off and the inside of the nose is slightly built-up with Body Putty. When dry, the front rim is rounded off.

4 When the cement has thoroughly set, the cylinders are sanded to length and the previously mentioned 'spare' Wallace cowl ring is cemented on. Alternatively you can make up a cowl ring from 60 thou. thick Plastikard wrapped round a suitable former. Short lengths of thinly stretched sprue (see May issue) are then cemented in place to represent exhaust pipes. Longer and thicker pieces are used for the main exhausts—the drawing gives you the size and shape of these (see also photo 7).

5 The enlarged fin and rudder are cut from 60 thou. thick Plastikard sanded to correct section and the rib lines scored with a sharp knife.

6 Here's an easy way to make 'Swedish' transfers. Take a piece of 'Yeoman' white transfer sheet, and using a pair of dividers (one point sharpened to a knife-edge with an oilstone), cut suitably sized white discs, supporting the pivot point on a piece of card or celluloid to prevent too deep a hole being pierced.
The black 'crowns' can be painted on using a small brush or they can be drawn on with a mapping pen, using thin enamel or *waterproof* ink. The finished transfer is then applied in the normal manner.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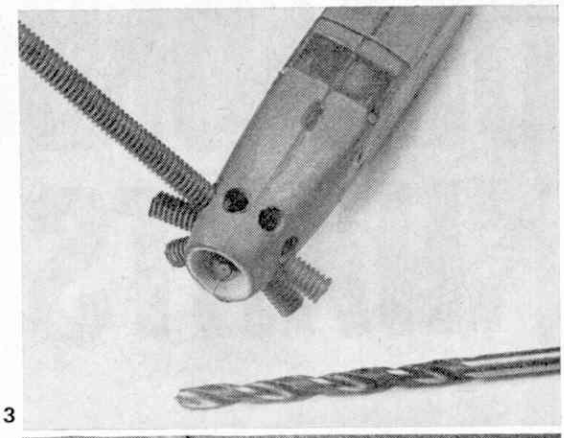
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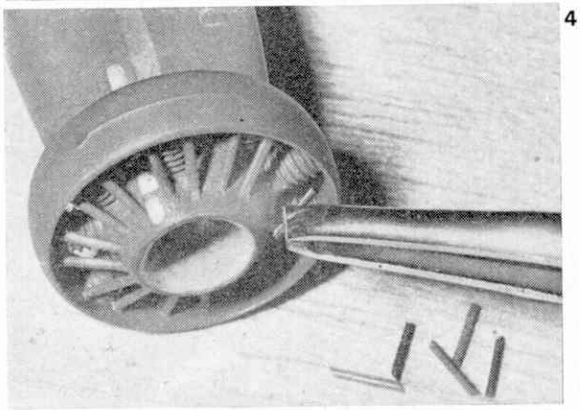
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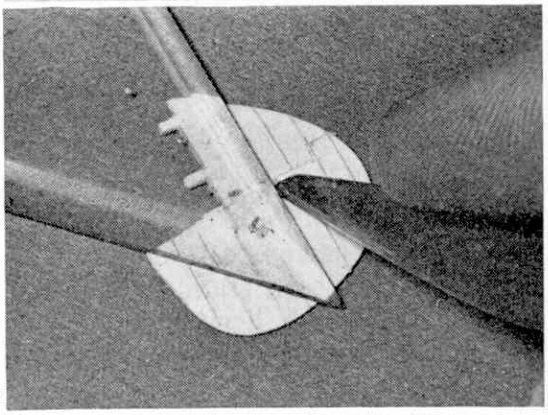
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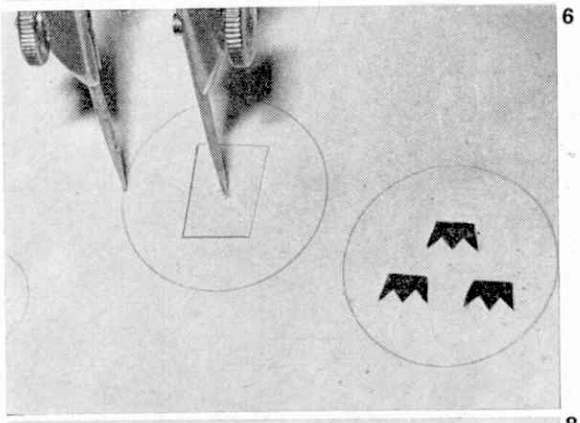
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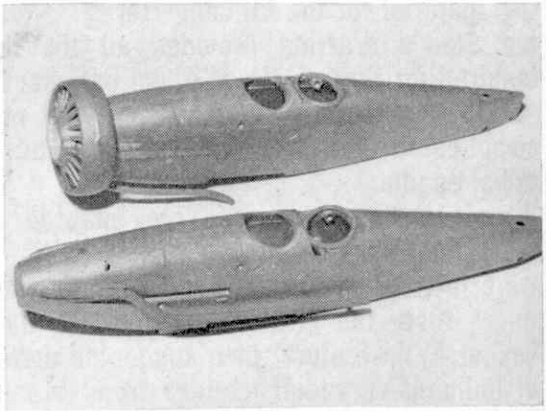
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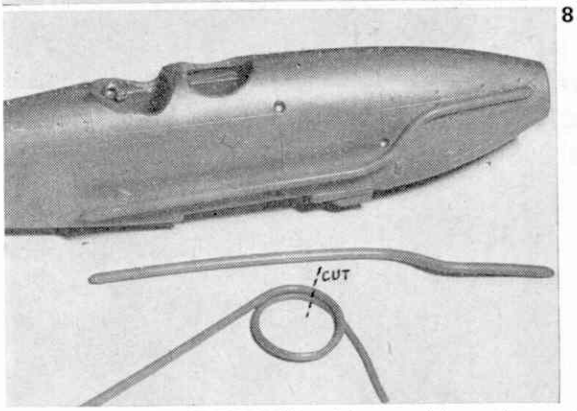

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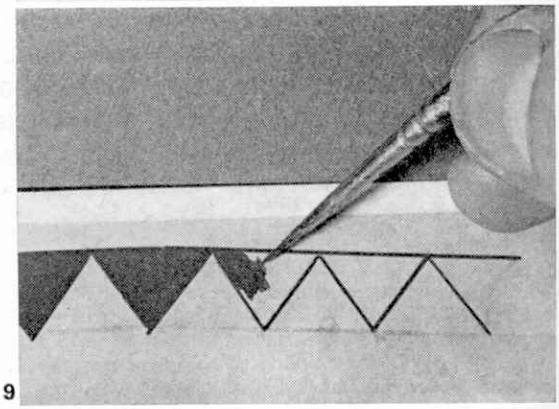

9

THE HAWKER 'DEMON'

This is a simpler job to tackle and is rather more colourful.
7 The two finished fuselages are seen here side by side.
8 The long exhaust pipes are bent from heated and stretched plastic sprues. After heating, stretch slowly to produce a fairly thick rod. A thinner rod is used to produce the gun-mounting ring for the re-shaped rear cockpit. The ring is bent as shown in the foreground and cut where indicated to form a perfect circle. If the rod is first curled around a small paintbrush or similar handle, it will then spring out to about the right size.
9 The colourful squadron markings are quite easy to make using yellow 'Yeoman' transfer sheet on which the design is traced from the full size plan. The red outline is marked using an enamel-charged ruling pen and then filled-in with a small brush. Cut out the dry transfer, and apply in the usual way.

John W R Taylor looks back to the 'thirties' when

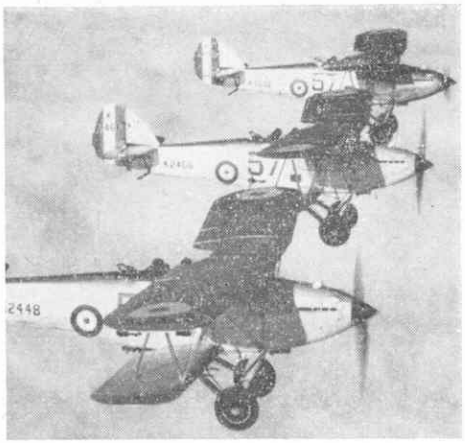
HARTS WERE TRUMPS

SIR SYDNEY CAMM, greatest of all British aircraft designers, who died a few months ago, is remembered mainly for his series of world-beating fighters. Yet, back in the early 1930s, it was a bomber that first demonstrated his ability as a creator of sleek, high-speed combat aircraft. That bomber was the Hawker Hart.

We are so accustomed to seeing streamlined, jet-powered monoplanes nowadays that the Hart, an open-cockpit two-seat biplane, must appear thoroughly antiquated to the average youngster. But it is not difficult to convey the effect that the arrival of the Hart had on military flying. First R.A.F. Squadron to equip with it, in January 1930, was No. 33, based at Eastchurch. Within three months its crews had mastered their new machines well enough to take second place in the annual Bomber Command proficiency contest.

Shortly afterwards, in an air exercise, they completely outflew the Siskin single-seat fighters of the defending forces. This so worried the Air Ministry that they re-equipped one flight of No. 23 Fighter Squadron with Harts, specially equipped as two-seat fighters. During the 1931 air exercises, this flight was the only unit in the Royal Air Force that could intercept Bomber Command's Harts. No. 33 Squadron demonstrated its invulnerability on one famous occasion by crossing the South Coast near Bognor Regis and flying at 8,000 feet to Northolt aerodrome, which it attacked with a shower of tennis balls, each labelled 'bomb'.

To discover how Sydney Camm was able to gain such a lead over other designers, we need only study the single-seat fighters of 1930. Best of those in R.A.F. service were the Siskin IIIA, Gamecock and Bulldog. All were fine manoeuvrable aircraft, but their big uncowled radial engines created so much drag that they



had a top speed of only 156 m.p.h., 155 m.p.h. and 174 m.p.h. respectively. The Hart, with its closely cowled Rolls-Royce Kestrel in-line engine, was 10 m.p.h. faster than even the Bulldog and highly manoeuvrable as well.

Another clue to its high performance lay in its method of construction, which combined strength with light weight to a remarkable degree. Fully loaded with pilot, observer, 83 gallons of fuel, two machine-guns and 520 lb. of bombs, it weighed a mere 4,554 lb. Thus, a whole squadron of Harts weighed little more than one of the modern R.A.F.'s Lightning single-seat fighters.

BATTLE OF BRITAIN

The Hart's fuselage was built up as a 'box' of round-section steel and duralumin struts, each rolled to a square section at the ends. This meant that joints could consist merely of two flat side plates between which any number of struts could be bolted or riveted, even though the struts were of different diameters. This not only saved money and weight compared with the usual welded structure, but made it much easier to replace any strut that became damaged in service—a factor that helped to win the Battle of Britain in 1940, as the same method of construction was used in the Hurricane, making it easy to repair and get back into action.

Hawker's patented metal fuselage structure had been used first in the prototype Heron fighter of 1925. Camm devised a new method of wing construction specially for the Hart. Each spar consisted of top and bottom booms of rolled steel strip, joined by a light-gauge plate web. No other company could build wings combining such great structural strength with such light weight.

Even with the advantages offered by these new techniques, Hawker had known that they were tackling an almost impossible task when they set out to meet the demands of official Specification 12/26, issued in May 1926. As a start, the Specification called for a top speed of around 160 m.p.h. at a time when the average bomber had its work cut out to reach 115-125 m.p.h.

The best engine available for the new aircraft appeared to be the 450 h.p. Rolls-Royce Falcon, and the original design for the Hart was based on use of this power plant. Then Rolls produced their revolutionary F.XIB engine, in which some 60 lb. of weight were saved by having the cylinder blocks cast in one piece instead of using a separate casting for each 'pot'. Camm redesigned the Hart prototype around the F.XIB, which became the 525 h.p. Kestrel, and the rest of the story is history.

From the Hart sprang a family of military biplanes that, at one period in the early 'thirties, not only outnumbered all other aircraft in the R.A.F. but served also with 20 other air forces. Those first Hart fighters of No. 23 Squadron were followed by a genuine two-seat fighter derivative named the Demon.

The performance of the Hart had wiped out with a single blow a whole new generation of radial-engined fighters designed to Specification F.20/27. To fill the gap, Camm designed a Kestrel-engined single-seat fighter named the Hornet, which went into production as the Fury, and its naval counterpart, the Nimrod.

There followed a succession of army co-operation and general-purpose biplanes based on the Hart—first the Audax and then the Hardy, Hartbees for South Africa, naval Osprey and Hector. In this last type, Camm had to switch to a Napier Dagger air-cooled in-line engine, as all available Kestrels were needed for the R.A.F.'s new Hind day bomber which was, unashamedly, an up-dated Hart.

Meanwhile, the Hart itself had gone through more transformation scenes than the cast of a pantomime. Quite apart from acting as a flying test-bed for most of the ideas incorporated in other members of the family, it had sprouted at various times floats, gun turrets and an evaporative cooling system that necessitated a primitive semi-enclosed cabin to protect the crew from a hail of super-cooled water droplets.

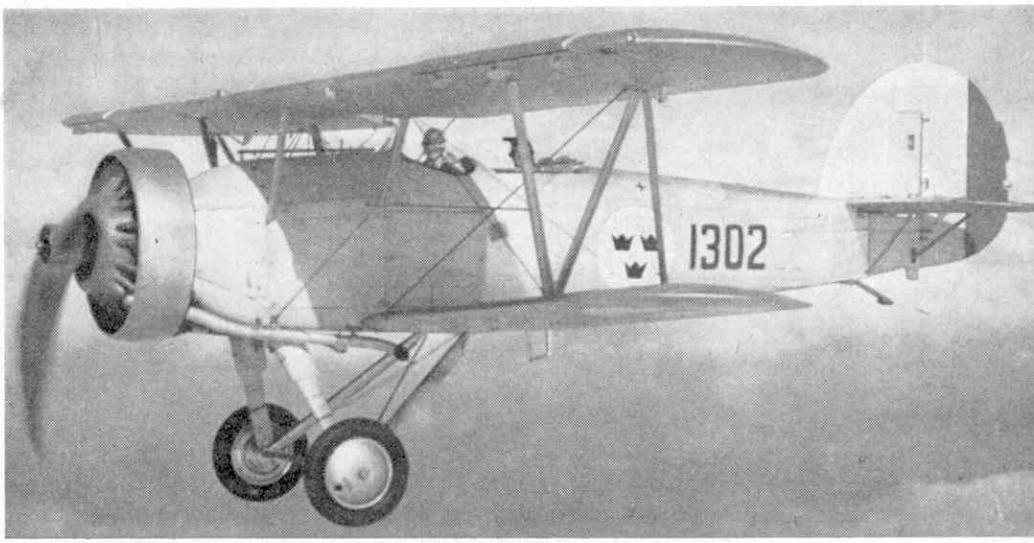
Some foreign customers still preferred radial engines, so Harts flew experimentally or in service with the Bristol Jupiter, Pegasus, Perseus and Mercury and Armstrong Siddeley Panther, to which must be added the foreign-built Lorraine Petrel and Hispano-Suiza 12X in-line engines, the Dagger, the Rolls-Royce P.V.12, prototype of the famous Merlin, and even the Merlin itself!

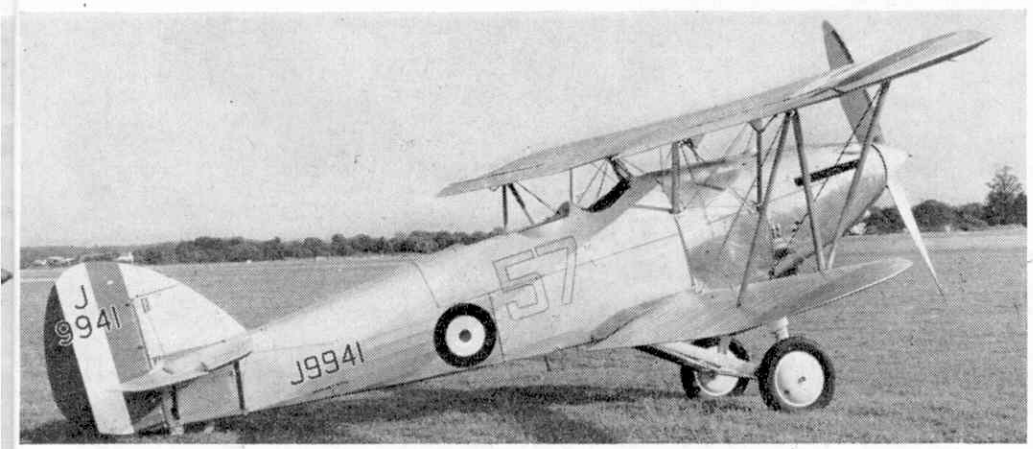
Altogether, 1,042 Harts were built, including 507 Hart Trainers, which remained in service until 1939. Total production of the whole family of Hart/Fury variants was 3,341 —more than 15 times the total of all aircraft built by Hawkers in the 10 years before the Hart entered production.

One Hart remains airworthy today, known affectionately as 'Gab-Emma' as it carried the civil registration G-ABMR for most of its life. First flown in 1930, it was fitted at various times with every conceivable mark of Kestrel and sported wheel spats temporarily in 1932. Other items fitted experimentally included the type of message pick-up hook used on the Audax, the modified tail unit developed for the Osprey, the low-pressure tyres specified for the Hardy and the tail-wheel introduced on the Hind. It was a favourite mount of air photographers and donned a coat of camouflage as a ferry pilot transport in World War II. Post-war, it acquired a blue and gold paint-scheme and took part in several air races.

IMMACULATE

Twenty-six years of faithful service ended miserably when it was damaged in a forced landing; but months of care and effort, plus a determined search for spares, restored G-ABMR to immaculate condition, and it is flying today in the insignia of No. 57 Squadron, with the military serial J9941. Few aircraft could tell such a story.





Opposite page: three Hawker Hart I's flying in formation, and a Demon of 604 squadron. This 'Flight' photo emphasises the clean lines of the machine and the heading picture shows another variation of the top wing markings. Ten Demons would weigh about the same as ONE B.A.C. Lightning, its present day RAF equivalent!

This page above: a Swedish Hart with Bristol Pegasus 1M2 radial engine (see our plastic kit conversion on page 10).

Left: 'Gab Emma', the only surviving airworthy Hart, as she is today, restored to original condition and carrying the insignia of 57 squadron.