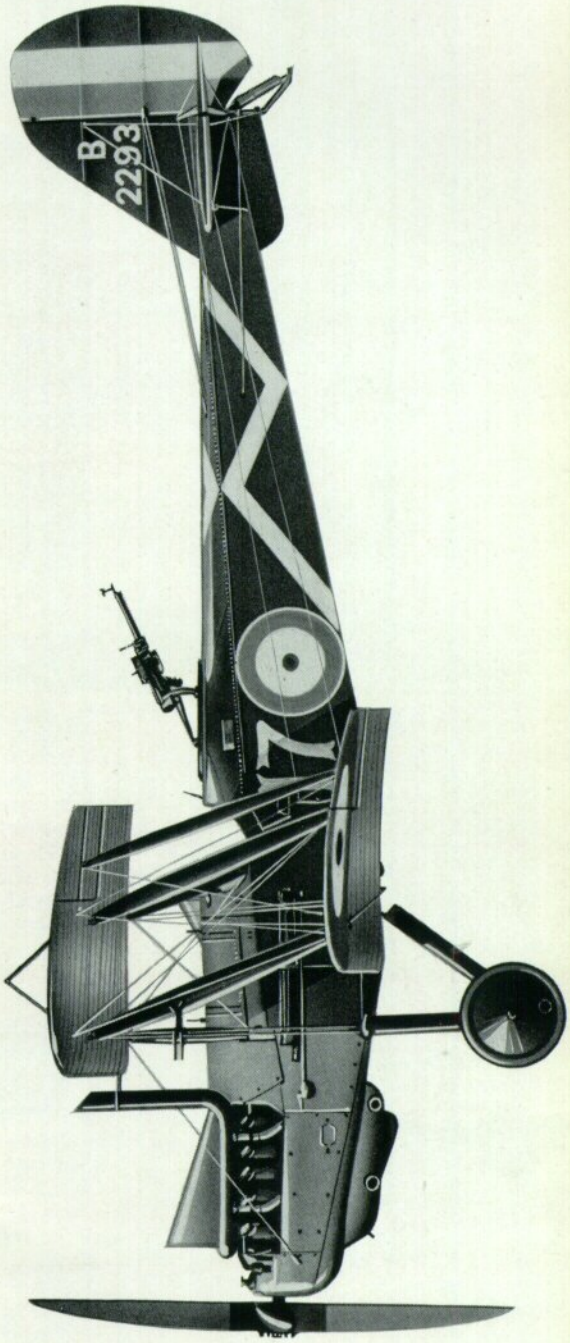
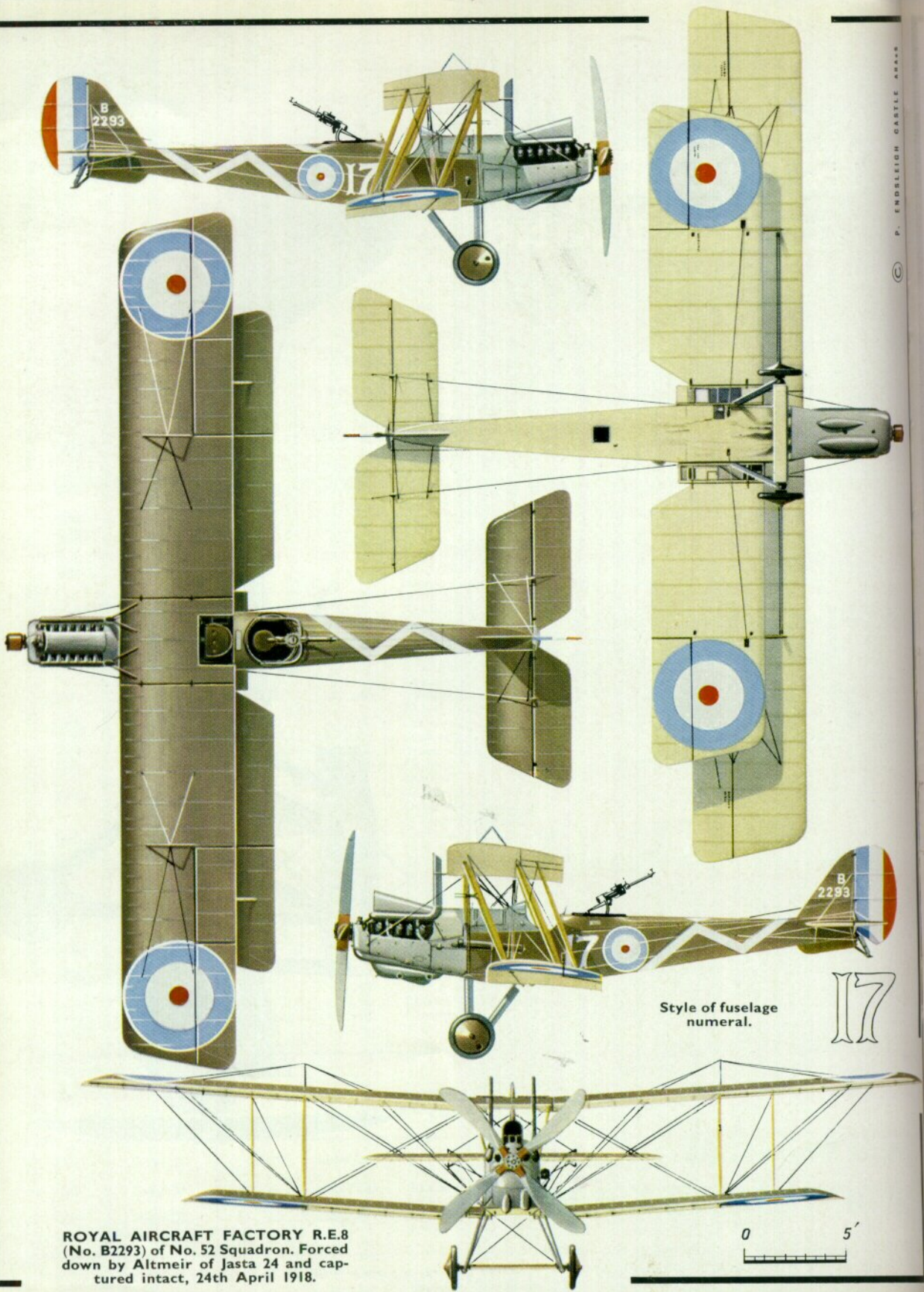
PROFILE
PUBLICATIONS

The R.E.8



NUMBER 85

TWO SHILLINGS



Style of fuselage numeral.

17

ROYAL AIRCRAFT FACTORY R.E.8 (No. B2293) of No. 52 Squadron. Forced down by Altmeir of Jasta 24 and captured intact, 24th April 1918.

0 5′

The R.E.8

by J. M. Bruce

The first prototype, 7996, photographed at Farnborough on 28th June 1916. (Photo: Crown copyright)

The eighth type in the Royal Aircraft Factory's Reconnaissance Experimental series was designed to meet an Expeditionary Force request, made in the autumn of 1915, for a replacement for the B.E.2c, 2d and 2e for corps reconnaissance and artillery spotting duties. It had been specified that the new type must be capable of defending itself. The B.E.s were inherently stable aircraft, this characteristic being an inheritance from the pre-war belief that military aeroplanes were flying observation posts and therefore had to be as stable as possible. By the autumn of 1915 it was beginning to be realised that inherent stability was a disadvantage, for it denied the reconnaissance aircraft the agility that was needed in order to elude the Fokker monoplanes.

It will probably never be known whether the operational disadvantages of inherent stability were made known to the design staff at Farnborough. If they were, the warning was ignored, for the R.E.8 embodied the Factory's ideas on stability and was far from tractable. Possibly it was felt that the terms of the Expeditionary Force specification had been met by placing the pilot in the front cockpit with a fixed forward-firing gun, the observer behind with a Lewis gun on a rotating mounting.

Early thoughts on the R.E.8 are depicted in an R.A.F. drawing dated 9th March 1916. This shows that the airframe was conceived as a conventional wire-braced, fabric-covered wooden structure with unequal-span wings; the aerofoil section was apparently to be R.A.F. 6. In the light of later events, one of the most significant features of this early drawing is its provision of a fin and rudder of generous area. The selected engine was the 140-h.p. R.A.F. 4a, an air-cooled V-12; and an adjustable tailplane was envisaged. Military equipment included a camera and a wireless transmitter, for which Morse keys were to be provided in both cockpits.

An interesting commentary on the state of the art of aircraft armament in early 1916 is provided by the fact that the original forward-gun installation was to consist of a Lewis gun mounted on the starboard inner side of the front cockpit and, for want of a British synchronising mechanims, steel deflector plates were to be fitted to the airscrew blades in the line of fire as in the Saulnier device pioneered in combat by Roland Garros (see *Profile* No. 38, pp. 4 and 5). As the gun was to be mounted relatively low down in the cockpit there was provision for a trigger lever on the upper longeron, connected by Bowden cable to the trigger on the gun. Apparently it was not considered remarkable that the pilot would have to fly left-handed while firing his gun. Five 47-round drums of ammunition were to be provided for each gun.

A mock-up of the R.E.8 was in existence by 8th April 1916 and work on two prototypes, to be numbered *7996* and *7997*, was put in hand. The first was submitted for its final pre-flight inspection on 16th June 1916; its engine at that time was an R.A.F. 4a made by the Siddeley-Deasy Motor Car Co., No. W.D.1635/S.D.202, driving a T.28008 airscrew. Perhaps the most interesting feature of the official records relating to this aircraft is that they indicate that the pilot's gun was a Lewis (No. 7632). The airscrew bore no deflector plates, however.

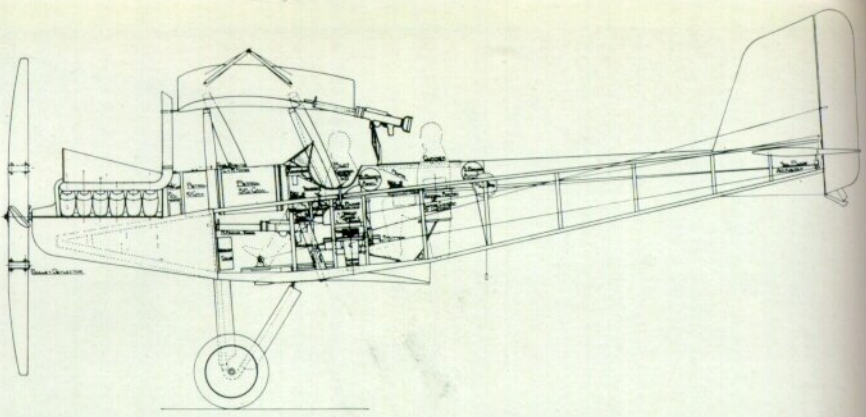
With Capt. F. W. Goodden at the controls, No. *7996* took off on its first flight at 8.30 p.m. on 17th June 1916 and landed ten minutes later. Goodden flew the aircraft on all its early flights. On 1st July the rear cockpit was occupied by Brigadier General W. Sefton Brancker, when Goodden flew him to Hounslow.

The second prototype, No. *7997*, underwent its final inspection on 28th June 1916; apparently it had a different airscrew of new design. The first recorded flight of this aircraft was made on 5th July, with Goodden as pilot. On 16th July No. *7997* was flown to France by Goodden with Capt. F. M. Green in the rear seat. Against the date 18th July 1916 Maurice Baring recorded:

> The R.E.8 is at the A.D. Its camera needs a larger case. The machine is to be kept a fortnight so that the gun-mounting and camera can be altered to what we want.*

By the time the prototypes were built the R.E.8 design has been extensively revised. The fuselage

**Flying Corps Headquarters 1914–1918*, page 161.



Royal Aircraft Factory drawing No. A9429, dated March 1916, showing the large vertical tail assembly originally designed for the R.E.8. The pilot's Lewis gun and the deflector plates on the airscrew can be seen. At this time it was intended to mount the gun upright on the starboard side of the cockpit; later the gun installation was modified, the weapon being fitted at an inward angle of 33 deg. from the vertical.
(Photo: Crown copyright)

structure was modified in detail, the aerofoil section of the mainplanes had been changed to R.A.F. 14, and a completely re-designed fin and rudder were fitted. The new rudder was of slightly greater area than that of the original design but was of lower aspect ratio; the fin was about half the size. The tail skid was faired into the lower end of the rudder.

Why it was considered necessary thus to reduce the vertical tail area of the R.E.8 is one of the mysteries of the war period. It becomes even more incomprehensible when one remembers that it had been found necessary to fit an enlarged fin to the B.E.2e, that surface being subsequently adopted as standard for B.E.2c's, 8a's, 12s, 12a's and 12b's also. In the case of the R.E.8 the use of the small fin was to cause many accidents.

Several features that were typical of Royal Aircraft Factory designs appeared on the R.E.8. Its mainplanes and ailerons were virtually identical with those of the B.E.2e, apparently differing only in detail; the tailplane and elevators were standard B.E.2e components but had the refinement of an adjusting mechanism. The wings were heavily staggered and had pronounced dihedral; the engine drove a large four-blade airscrew, was surmounted by a large air scoop, and its exhaust manifolds terminated in two tall funnel-like stacks that led the efflux up above the centre section.

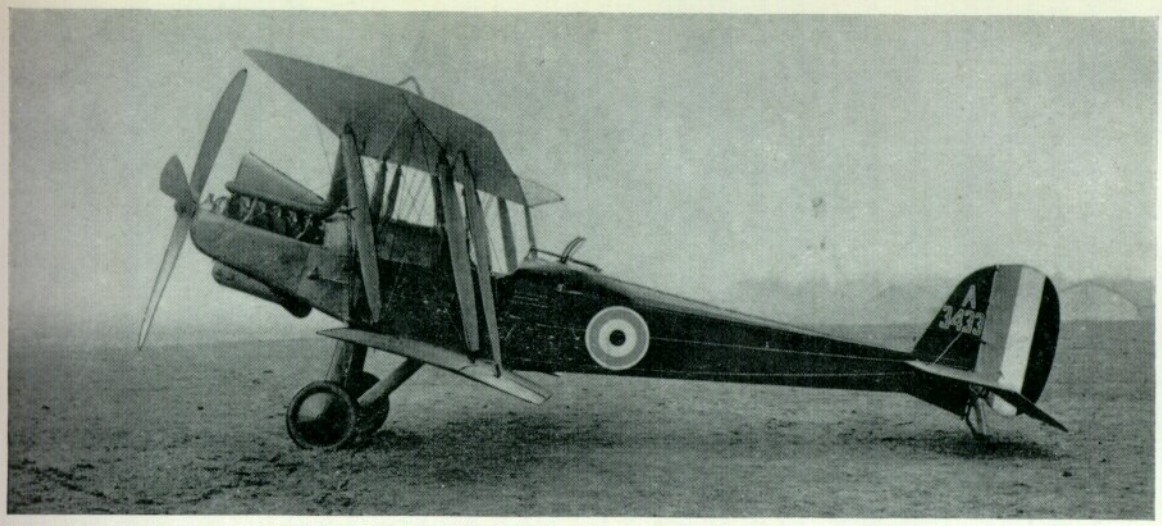
A peculiarity of the fuselage structure was the termination of the longerons at the points of attachment of the forward centre-section and undercarriage struts: the engine bearers were separate from and several inches closer together than the longerons.

The second prototype had returned to Farnborough in August 1916 and by the 31st of that month it had been modified in various ways, doubtless as a result of its sojourn in France. Its rudder, tailskid and tailplane adjusting gear had been modified; the Lewis gun (presumably the pilot's) had been removed, thus permitting the transfer from the port side of the cockpit to the starboard of the R.L. Tube (a chute with an electrical priming device; through it could be dropped 3·45-in. anti-aircraft incendiary bombs, smoke marker bombs, signal flares or parachute flares). The gunner's seat was lowered, and the centre section was covered with transparent Cellon.

By that time production had begun. A batch of fifty, *A66–A115*, was started at the Royal Aircraft Factory, but large-scale production was entrusted to other contractors. Contract No. 87/A/488, dated 25th

Left: *The first production R.E.8,* A66, *photographed at Orfordness; no fixed gun is visible in this photograph.* A66 *later crashed at Orfordness and was quite extensively damaged.* Right: A73 *with Vickers gun installed inside the fuselage. The firing port and the connecting rod of the Vickers-Challenger interrupter gear can be seen.*
(Photo: Imperial War Museum Q55991)

Left: *On* A3186 *the area of the upper fin was slightly increased, but the underfin remained its original size.* Right: *Subject of the official performance test report quoted in the table on page 12,* A4716 *had the standard design of upper fins and underfins fitted to all operational R.E.8s until the end of the war.*
(Photos: Imperial War Museum Q56852 and Q63817)



Built by Siddeley-Deasy, A3433 *had the original small fins but a Scarff ring-mounting had replaced the earlier type of rotating mounting.*

August 1916, called for 100 R.E.8s (*A3169–A3268*) to be built by the Austin Motor Co. Five days later, *A3405–A3504* were ordered from the Siddeley-Deasy company under Contract No. 87/A/486; this order was augmented on 6th September by 87/A/785, which was for *A3681–A3830*. By the end of September 1916 a further 850 had been ordered from the Austin, Daimler, Napier and Standard companies and the Coventry Ordnance Works.

The Royal Aircraft Factory built only 44 R.E.8s: there is no record of *A110–A115*, nor of the second R.A.F. batch *A3506–A3530*. This curtailment may have been attributable to the findings of the Burbidge Report. The first R.A.F.-built production R.E.8, *A66*, was inspected on 13th November 1916; *A67* and *A68* followed next day, *A69* on 18th September; then a full month elapsed before *A70–A73* were passed. Thereafter deliveries continued regularly until 17th January 1917, when *A109* underwent its pre-flight inspection.

These early production R.E.8s were similar to the prototypes, having the same small-area fin. The tail-skid was hinged to the stern-post separately from the rudder, which was modified in shape to clear the tail-skid. The Thornton-Pickard camera (of a type that had been specially designed for the R.E.8) was installed behind the observer's cockpit instead of under the pilot's seat, as was originally intended. A rotating mounting for the observer's Lewis gun, similar to that on the prototypes, was fitted to the Factory-built R.E.8s; but the first few at least seemed to have no visible provision of armament for the pilot. Surviving records show that a Vickers gun and interrupter gear had been installed in *7997* by 11th October 1916, but it is not certain that this was the first such installation.

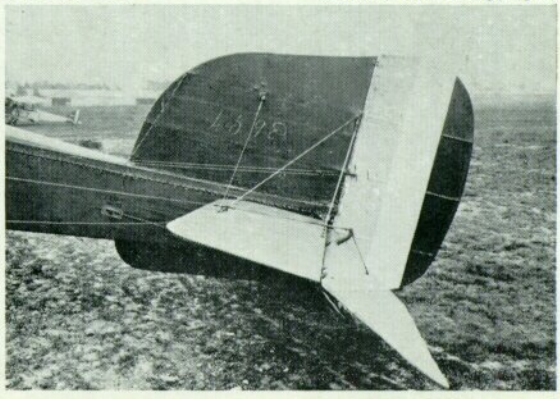
Late in 1916 an installation of the Le Prieur gun sight was designed for the R.E.8. This device was an elaboration of the ring-and-bead sight, embodying a traversing bead sight, presumably to enable adjustment to be made to allow for deflection. The sight was to be mounted nine inches to starboard of the aircraft centre line. It was a large, clumsy device that was too complex to be adjusted in combat as was apparently intended, and would have been a source of facial injury to the pilot in the event of a crash. It was not developed.

When a Vickers gun was installed in the R.E.8 for the pilot, advantage was taken of the difference in width between the engine bearers and longerons to mount the gun inside the fuselage, on the port side. It fired through a long triangular slot in the metal panel that faired the engine cowling side panels to the fuselage sides. The gun was fitted with the Vickers-Challenger interrupter gear, a mechanical system in which a long connecting-rod ran along the outside of the fuselage.

This armament arrangement would have led to maintenance difficulties in the field and it was short-lived. By 5th November 1916, *A75*, *A76*, *A77*, *A78* and *A82* had their Vickers guns mounted on the outside of the fuselage; within the next three days a similar modification on *A73*, *A74*, *A79*, *A80* and *A81* had been inspected. The second prototype, *7997*, had

A3406 *fitted with the enlarged fin and balanced rudder designed for the R.E.8 but almost indistinguishable from the corresponding surfaces designed for the R.E.9 and R.T.1.*

The 12 sq. ft. fin fitted to A4598. *This photograph is dated 10th May 1917* (Photo: Crown copyright)



R.E.8s used by training units were frequently fitted with greatly enlarged fins. The profile of the curved leading edge varied somewhat, but the basis of these enlarged fins seems to have been the standard B.E.2e fin, the variation in contour depending on the length and shape of the piece of steel tubing used to take the leading edge up to the top of the R.E.8 rudder post. This R.E.8 also has a transparent cut-out in its centre section, and the wooden undercarriage V-struts that replaced the original faired steel-tubing components.

also been modified in this way by 13th December 1916.

Contractor-built R.E.8s began to appear in December 1916: on the 8th of that month, *A4306* was reported to be at Farnborough. The first Austin-built aircraft, *A3169*, was at Farnborough on 14th January 1917. Hence, the R.E.8s that were issued to No. 52 Squadron, R.F.C., must have come from the first eighteen or so built by the Royal Aircraft Factory, for the unit went to France on 16th November (*A85* was inspected on 16th November, *A84* on the 20th, but the latter aircraft was subsequently subjected to structural tests at Farnborough; *A86* onwards were inspected between 22nd November 1916 and 17th January 1917).

The R.E.8's operational début was disastrous. Doubtless the aircraft could be handled successfully enough by pilots of the calibre of Frank Goodden, but its idiosyncrasies were too much for many of the sketchily-trained young men of No. 52 Squadron. A series of accidents, several caused by spins, had such a damaging effect on squadron morale that in January 1917 the squadron exchanged its R.E.8s for the B.E.2e's of No. 34 Squadron. Presumably it was thought that No. 34's pilots were, by virtue of their greater experience, more likely to be able to cope with the R.E.8.

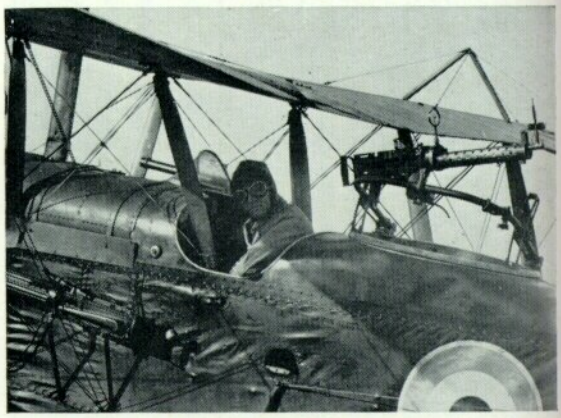
Both squadrons were in the Third (Corps) Wing. On the staff of the Wing at that time was Major J. A. Chamier, D.S.O., who had earlier commanded No. 34 Squadron. Early in 1917 he issued some notes on the R.E.8 for the guidance of pilots. The following extracts speak for themselves:

> This is a splendid flying machine but it is not a perambulator and requires at first a little care. . . .
>
> In the R.E.8 the chief thing to remember is that the machine gives very little indication of losing its speed until it suddenly shows an uncontrollable tendency to dive which cannot be corrected in time if you are near the ground.

All the recent accidents in R.E.8s can be equally divided into two classes:

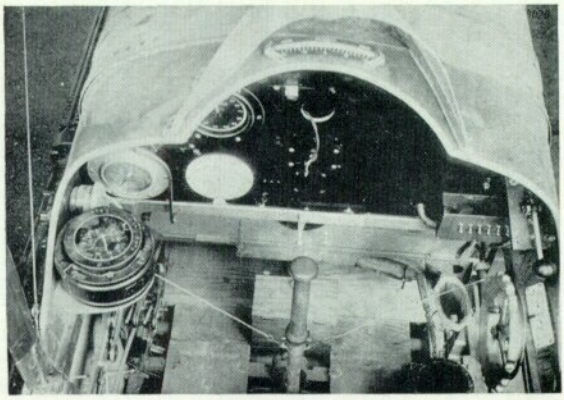
(a) With the engine pulling.
(b) With the engine off.

(a) With the engine pulling the machine will not stall at 50 m.p.h., but it is not advisable to get the speed as low as this. The only accident which is likely to occur with the engine on is spinning, or more correctly swinging tail. This is caused by having too little bank for the

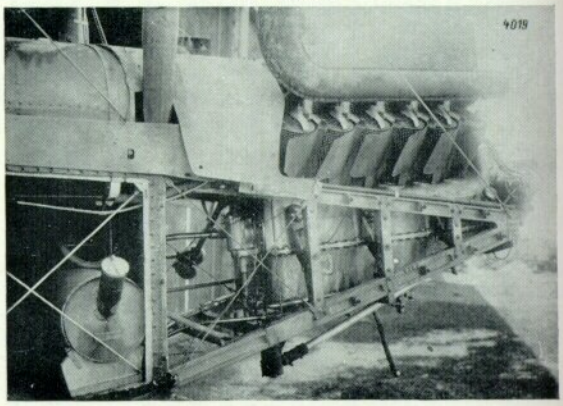


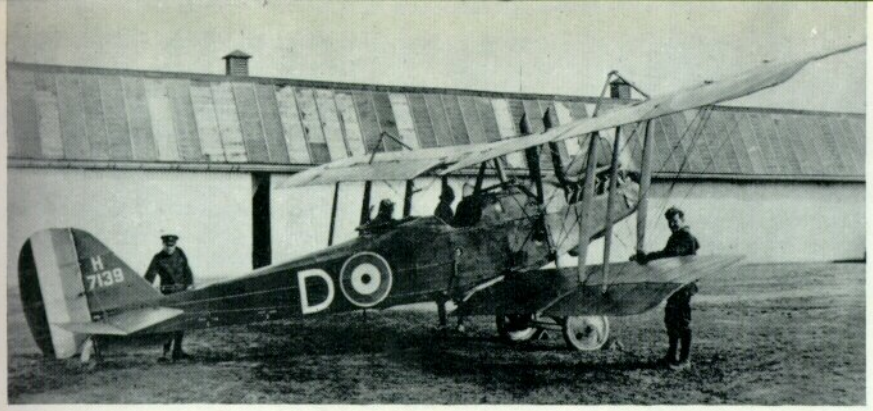
The cockpits of an R.E.8 fitted with the Constantinesco C.C. gear for its Vickers gun. The pilot's Aldis optical sight is mounted to starboard of his windscreen.
(Photo: Imperial War Museum Q67969)

The pilot's cockpit of an R.E.8 captured by the Germans. The pilot's morse transmitting key and the tail-trimming wheel can be seen to starboard.



The engine installation on the same aircraft. As the cowling panels have been removed from both sides of the fuselage the drive of the Vickers-Challenger interrupter gear can be seen on the port side.





Seen at Bickendorf in 1919, this R.E.8, H7139, *was one of many rebuilt by Aeroplane Repair Depots.* (Photo: Royal Aeronautical Society)

amount of rudder used. It can be stopped immediately by increasing the bank and taking off the rudder. . . .

You will find the rudder control in every case of spinning or swinging tail will become very stiff, and you may not be able to get it very central but you should aim (without putting on sufficient pressure to break anything) to do this.

(b) With the engine off the only thing to avoid is gliding too slowly. I have already told you that with the engine on the machine will not stall at 50 m.p.h., but at 65 m.p.h. or below, when gliding, the machine suddenly loses speed. This is particularly the case when making a turn to enter the aerodrome as the extra resistance caused by the rudder is sufficient to bring down the pace. . . .

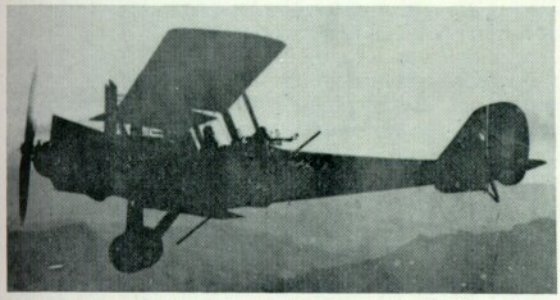
One more point as regards losing speed. Observers must be cautioned that when an aeroplane is gliding down from work over the lines they must not stand up in order to look over the pilot's shoulder for the fun of the thing, as the extra head resistance caused may lead to the aeroplane falling below its critical gliding speed, and so bring about an accident.

Major Chamier's note was a sensible and necessary measure at the time, but something had to be done about the R.E.8 itself, for it was a bad and dangerous aeroplane in the conditions of early 1917. The situation was described thus in the official history:

> The early R.E.8's, especially in the hands of new pilots, had a marked tendency to spin, and there were fatal accidents, at home and overseas, before this tendency was checked by adjustments in the design. If a bad landing threw the aeroplane on its nose there was almost a certainty of fire. The engine was pushed back into the emergency and main petrol tanks, so that the whole of the spirit flowed over the engine, and in the fires which resulted many pilots and observers perished. The evil reputation of the R.E.8 spread throughout the Royal Flying Corps. . . . Under the direction of the deputy-controller of the technical department of the Air Board, a series of investigations and trials of the aeroplane were undertaken, and so numerous were the modifications in the design that the R.E.8 emerged almost as a new type. It outlived its bad reputation and survived to the end of the war as the standard aeroplane for the corps squadrons in France.†

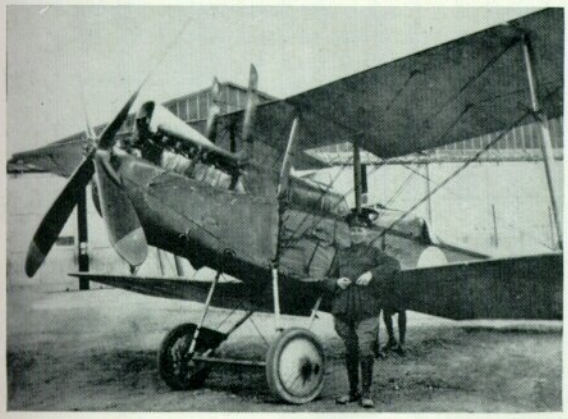
It is rather too much of an exaggeration to say that the modifications made to the R.E.8 made it "almost a new type", but a good deal of effort was directed towards making it a safer and more manageable aircraft. The first modification was a modest enlargement of the main fin, produced by taking its leading edge

†*The War in the Air*, Vol. III, pp. 351–352.



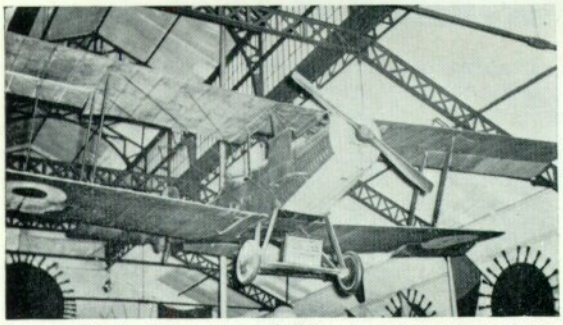
The Davis-gun R.E.8 in flight over inhospitable country. Although seen here in silhouette only, this photograph gives a clear impression of the gun's enormous length.
(Photo: Imperial War Museum Q67950)

An R.E.8 of a training unit with deep nose cowling, no fairings on the undercarriage V*-struts and no armament.*
(Photo: Imperial War Museum Q67948)



In Mesopotamia one of the R.E.8s of No. 30 Squadron was fitted with a Davis non-recoil gun. The gun was mounted on the starboard side of the fuselage and was apparently intended to be used as a ground-attack weapon; loading was evidently the responsibility of the observer.
(Photo: Imperial War Museum Q67951)

An immaculate R.E.8 of the Aviation Militaire Belge.
(Photo: Jean Noël)



Preserved in the Musée Royal de l'Armée et d'Histoire Militaire in Brussels is this Hispano-Suiza-powered R.E.8. It had been used by the 6me Escadrille *and was brought down by ground fire on 11th August 1918 while being flown by Adjudant Simonet with Lt. Piron as his observer.*

farther forward on the fuselage. This was followed by an increase in the area of the underfin that produced the characteristic outline of the vertical surfaces.

Unfortunately the dates on which these modifications were introduced are not known. Farnborough's efforts did not stop there, however. By 5th May 1917 *A4598* had been fitted with a greatly enlarged fin, 12 sq. ft. in area, and *A4572* with a new type of fin and balanced rudder. At the same time *A3468* was fitted with an enlarged fin similar to that of the B.E.2e.

First flight tests of *A4598* were made on 7th May 1917; *A4572* and *A3468* were tested next day. Other aspects of the R.E.8 were also tested on 8th May: *A4599* was flown with its engine mounted horizontal instead of being tilted rearwards as on the standard aircraft; the first prototype *7996* was also tested with "increased lateral control". The nature of this last modification is not known; nor indeed is the precise form of *7996* itself at that time, for early in February it had been fitted with wings of R.A.F. 18 section. This aerofoil was unusually thin, and it is probable that the wings fitted to *7996* may have been of increased chord in order to obtain the necessary spar depth.

A4598 did not keep its large fin long: on 19th May 1917 it was again inspected, having been fitted with a new type of fin and balanced rudder. At least two types of balanced rudder were tested on 22nd May: *A4598* had a product designed by the R.A.F. drawing office; *A4572*'s balanced rudder had been made by K Dept. of the R.A.F.

It is not known whether there was any connection between *A3468* and the adaptation of a B.E.2e fin evolved by No. 42 Squadron in 1917. A standard B.E.2e fin was bolted to the normal R.E.8 rudder-post, its leading edge faired smoothly up to the top of the rudder-post by a length of 1-in. outside-diameter 22 S.W.G. steel tubing.

As early as 23rd May 1917 an installation of a 200-h.p. R.A.F. 4d engine was made in an R.E.8, *A3406*. The aircraft was flown on that day, and on 12th June it set out for France. It got no farther than Lympne, however, and returned to Farnborough that same day. This R.E.8 was still in use in 1918, by which time it had been fitted with the fin and horn-balanced rudder seen in the illustration on page 5.

In spite of all the work that Farnborough did on the vertical tail surfaces of the R.E.8, the standard service version retained the plain rudder and slightly enlarged upper and lower fins that resulted from the basic modifications. In this form the R.E.8 remained in operational use until the end of the war, the most numerous British reconnaissance two-seater in service. Greatly enlarged fins of slightly varying shapes were fitted to R.E.8s used by training squadrons, however. Despite the variations in profile there can be little doubt that many were made by employing the No. 42 Squadron B.E.2e fin adaptation.

As time went on, modifications of structure and armament were made. In July 1917 Farnborough tested a revised form of undercarriage embodying wooden V-struts. This was standardised for later production aircraft, as was the Constantinesco gun-synchronising mechanism when it became available in sufficient quantities.

By mid-1917 well over 800 R.E.8s had been delivered to the R.F.C. Replacement of the B.E. two-seaters had progressed as R.E.8s became available. No. 21 Squadron re-equipped in February 1917, Nos. 6, 13, 42 and 53 in April, and in the May–June period No. 4, 5, 7, 9, 12, 15 and 16 acquired R.E.8s and No. 52 Squadron reverted to the type. On 23rd February No. 59 Squadron had arrived in France equipped with the type, and No. 63 Squadron arrived with its R.E.8s at Basra in Mesopotamia on 13th August 1917. Last in the field was No. 69 (Australian) Squadron, which arrived in France on 9th September 1917.

The B.E. two-seaters had always been easy prey for the fast and manœuvrable German single-seat fighters, but any hopes that the R.E.8 might bring some

The R.E.9 A4600 *at Farnborough, 24th September 1917, with enlarged upper fin.*
(Photo: Crown copyright)

improvement to the fortunes of the corps reconnaissance squadrons were disappointed. April 1917 was the R.F.C.'s worst month for casualties, and the 13th of that month was a black day for No. 59 Squadron. Six of its R.E.8s set out at 8.15 a.m. to photograph the Drocourt–Quéant switch line; near Vitry they were attacked by Manfred von Richthofen and five of his pilots of *Jasta* 11. All six R.E.8s were shot down at once, *A3190* falling to von Richthofen himself; ten of the twelve pilots and observers were killed.

After Arras the R.E.8s continued their artillery observation, contact and counter-attack patrols and photographic duties through the Battles of Messines, Ypres, Langemarck and Cambrai. Ypres introduced the R.E.8 to night bombing, Cambrai to ground-attack work. Many R.E.8s were shot down, but the enemy did not have things all his own way. On 16th August 1917, two Albatros single-seaters attacked an R.E.8 of No. 7 Squadron over Poelcappelle: one was shot down by the observer; the other dived away. Later that afternoon eight Albatroses attacked another of No. 7's R.E.8s; sixty rounds from the observer's Lewis gun shot down one of the enemy; the others made off without attempting to attack again. Five days later Oberleutnant Eduard Ritter von Dostler, commanding officer of *Jasta* 6, victor in 26 combats and holder of the *Pour le Mérite*, was shot down by the R.E.8 *A4381*, flown by Lts. N. Sharples and M. A. O'Callaghan of No. 7 Squadron.

All the activities required of the R.E.8s were demanded in even greater measure during the German offensive that began on 21st March 1918. But for the failure of the Sunbeam Arab and Hispano-Suiza engine production programmes the R.E.8s would have been replaced in April 1918 by Bristol Fighters with those engines; but as early as August 1917 the Air Board felt obliged to postpone the change until September 1918. In fact the Bristols never materialised and the R.E.8 had to soldier doggedly on, its inadequacies compensated by the determination and gallantry of the men who flew it. At the time of the Armistice the R.E.8 equipped fifteen squadrons of the R.A.F. and one of the Australian Flying Corps in France, two R.A.F. squadrons in Italy, two in Mesopotamia, and four in Palestine.

It may have been the Air Board's decision on the Bristols that led to the Rolls-Royce Eagle being specified in Contract No. A.S.28127, dated 2nd October 1917, as the power unit of 75 R.E.8s (*D4811–D4885*) ordered from D. Napier & Son. But Eagles were scarce and sorely wanted for D.H.4s and Felixstowe flying boats, and none could be spared for the R.E.8s. The aircraft were apparently built as standard R.E.8s, together with *D4886–D4960*, which had also been ordered from Napier, but under Contract No. A.S.35980 dated 15th December 1917.

The Royal Aircraft Factory had pursued a programme of development from the basic R.E.8 design, but surviving records are so confused that it seems doubtful whether the proper sequence of development can now be traced.

An alternative version of the design, designated R.E.8a, had been drawn up as early as October 1916, before production aircraft began to appear. It was designed for the 200-h.p. Hispano-Suiza engine, for which a flat frontal radiator installation was planned; the pilot's Vickers gun was on top of the fuselage, to port of centre, and was installed as on the S.E.5. The airframe was identical with that of the standard R.E.8. In December 1916 *A95* was converted into an R.E.8a and was probably the only specimen of this variant. It was still powered with a Hispano-Suiza engine (No. 27942-100038) on 17th September 1917, when it was reported as an R.E.9. (Yet at that time it was fitted with the lower mainplanes that had belonged to *A4600* at a time when that aircraft was recorded as an R.E.8.) A remarkable feature of *A95* at this time was the use of a T.6296 airscrew with the Hispano-Suiza engine: this was the standard type of airscrew fitted to the R.A.F. 4a engine.

Considerable confusion exists over the R.E.9 and R.T.1 designs. It seems that the Royal Aircraft Factory design staff recognised the need for a stronger wing truss at an early date. Starting on 19th June 1917, *A4600* was flown with B.E.2d wings; on 8th August, still with these mainplanes, it was also flown with elevators of reduced area. A note dated 12th September 1917 in an official inspection record states that *A4600* had been converted to an R.T.1; elsewhere it was recorded as an R.E.9 two days later.

There can be no doubt that the Royal Aircraft Factory had a hand in the design of the R.T.1: so many components were designed for the R.E.9 and R.T.1 jointly that it seems likely that the two types were designed as alternative replacements for the R.E.8. One official A.I.D. publication unequivocally records the R.T.1 as a Royal Aircraft Factory type. Nevertheless the two types differed considerably.

The reference to *A4600* as an R.T.1 is probably a simple confusion between the two, then-new, two-bay developments of the R.E.8; but it is of some interest because the recorded use of this designation thus occurred a full three weeks before the arrival at Farnborough of the first Siddeley-built R.T.1—which was then recorded in Farnborough records as "R.E.9/R.T.1".

The true R.E.9, as delineated in the Royal Aircraft Factory drawings Nos. A17249 and A17250 dated November 1917, consisted of an R.E.8 fuselage fitted with two-bay wings of equal span (38 ft. 3·6 in.) and chord (5 ft. 6 in.); it appears that the R.E.9 and R.T.1 were intended to have the same fin and balanced rudder, respectively 7 sq. ft. and 10·35 sq. ft. in area. These tail surfaces were very similar to one of the designs for a revised fin and balanced rudder for the R.E.8. The design drawings show ailerons appreciably narrower in chord than those of the R.E.8, hinged to

R.E.9 A3561 *with Sunbeam Maori engine, 23rd September 1918.*
(Photo: Crown copyright)

The first Siddeley-built R.T.1, B6625, *with 200-h.p. Hispano-Suiza engine. The pilot's gun was a Lewis above the centre section. The external gravity tank was somewhat similar to that of the early production S.E.5.* (Photo: Crown copyright)

The third Siddeley-built R.T.1, with R.A.F. 4a engine, photographed at Farnborough on 30th October 1917. This photograph provides an interesting comparison with the R.E.9 A4600. (Photo: Crown copyright)

a subsidiary spar a few inches behind the rear spar.

Several R.E.8s were converted to be R.E.9s. Apart from *A95*, the true configuration of which is not known, these were *A3909–A3912*, *A3542*, *A3561* and *A4600*; as noted above, *A4600* was recorded as an R.E.9 on 14th September 1917, and *A3909–A3912* and *A3542* were inspected between 9th October and 2nd November 1917. By 5th December *A3909* had been fitted with a 200-h.p. R.A.F. 4d engine; *A3911* was tested with short-span ailerons on 9th November; *A3542* was flown on 29th December with reduced dihedral.

Perhaps the most interesting modification of the R.E.9 was the fitting of experimental cockpit enclosures to *A3911*; these were tested on 13th March 1918. This aircraft and *A3909* were still flying at the R.A.E. in 1919. In September 1919 *A3542* was fitted with a R.A.F. 4d engine, to which it was intended to fit a variable-pitch airscrew.

Neither *A4600* nor *A3561* had the standard fin and balanced rudder that had been designed for the R.E.9 and R.T.1. On 13th June 1918 *A3561* was submitted for pre-flight inspection, having been fitted with a Sunbeam Maori engine (No. 1/250/19379). The installation was remarkably clumsy and ugly, and the engine gave a good deal of trouble. Severe longitudinal-trim difficulties were experienced with the aircraft itself.

Tests with elevators of different areas and a variable centre of gravity were made on *A3909* from 16th July 1918 onwards.

The R.T.1 aircraft built by the Siddeley-Deasy Motor Car Co. were very different from the R.E.9. Span was 41 ft. 9 in., upper chord 6 ft. 6 in., lower 4 ft. 9 in.; and the gap was reduced to 4 ft. 8½ in. The fuselage was basically that of the R.E.8, but a deeper top decking was fitted. The pilot's armament was a Lewis gun mounted above the centre section. Six aircraft, *B6625–B6630*, were built; they were the last machines of the batch *B6451–B6630*, originally ordered as R.E.8s. The first, *B6625*, arrived at Farnborough on 11th October 1917; it had a 200-h.p. Hispano-Suiza engine with a frontal radiator, the entire installation closely resembling that of the same engine in the S.E.5a. *B6626* and *B6627* were powered by the 140-h.p. R.A.F. 4a; but by 5th December 1917 *B6627* had been fitted with a 200-h.p. R.A.F. 4d. On 9th November 1917 *B6626* and *B6629* were tested with balanced ailerons; in April 1918 *B6629* was subjected to structural tests at the R.A.E. The last R.T.1, *B6630*, had a 200-h.p. Hispano-Suiza with an underslung radiator; it was tested at Martlesham Heath in March 1919.

Neither the R.E.9 nor R.T.1 was adopted for general use, nor were any of the experimental modifications of the R.E.8 introduced. Modified elevators were tested on *B738* and *A4599*; the former aircraft was flown on 31st August 1917 with what Farnborough described as a "small balanced rudder"; on 16th September it was tested with a narrow-chord rudder and elevators. By 11th October it had acquired a 200-h.p. R.A.F. 4d engine; in March 1918 it was fitted with a Rateau turbo-compressor and the R.A.F. variable-pitch airscrew, an enormous air scoop being installed above the engine. In this form *B738* was flown nine times, but on 4th May 1918 the turbine failed at 13,700 ft. and wrecked the engine and supercharger installation beyond repair.

Tests of experimental ailerons were conducted from about September 1917 onwards, when *A4598* was fitted with ailerons having wash-out of incidence. The tests covered ailerons of standard (24-in.) and reduced (16-in.) chord, with incidence washing out by 9 deg. towards the tip, and with chord tapering to only 8 in. at the tip. These last-mentioned surfaces had areas of 13·6 sq. ft. on the upper wings, 7 sq. ft. on the lower.

Of all the allies only Belgium used the R.E.8. Twenty-two were supplied to l'Aviation Militaire Belge in 1917; the type was used by the *6me Escadrille* from July 1917, but later that year most of the Belgian R.E.8s were re-engined with 150-h.p. and 180-h.p. Hispano-Suizas. Replacement of the R.E.8 by the Spad XI began in May 1918.

After the Armistice a few R.E.8s lingered on: in Russia with the R.A.F. Contingent at Archangel, at Basra with No. 6 Squadron from 18th July 1919 until the following year, and in Ireland, where one R.E.8 was on the strength of No. 141 Squadron in 1919. Some were flown at the R.A.E. for a time, notably *B738*, with which tests of variable-pitch airscrews were conducted in 1919. The R.E.9s *A3909* and *A3911* were still flying at Farnborough in 1919.

To all who flew in those days this aircraft was known as the Harry Tate, an ever-present feature of the wartime sky from the spring of 1917 until much too late in 1918. Only two survive. One, *F3556*, hangs in London's Imperial War Museum; the other is in the Musée Royal de l'Armée et d'Histoire Militaire in Brussels.

PRODUCTION

In addition to the two prototypes, 4,430 R.E.8s were ordered under wartime contracts. Of these at least 112 were cancelled or not completed. By the end of 1918 a total of 4,077 R.E.8s had been accepted for service with the R.F.C. and R.A.F.

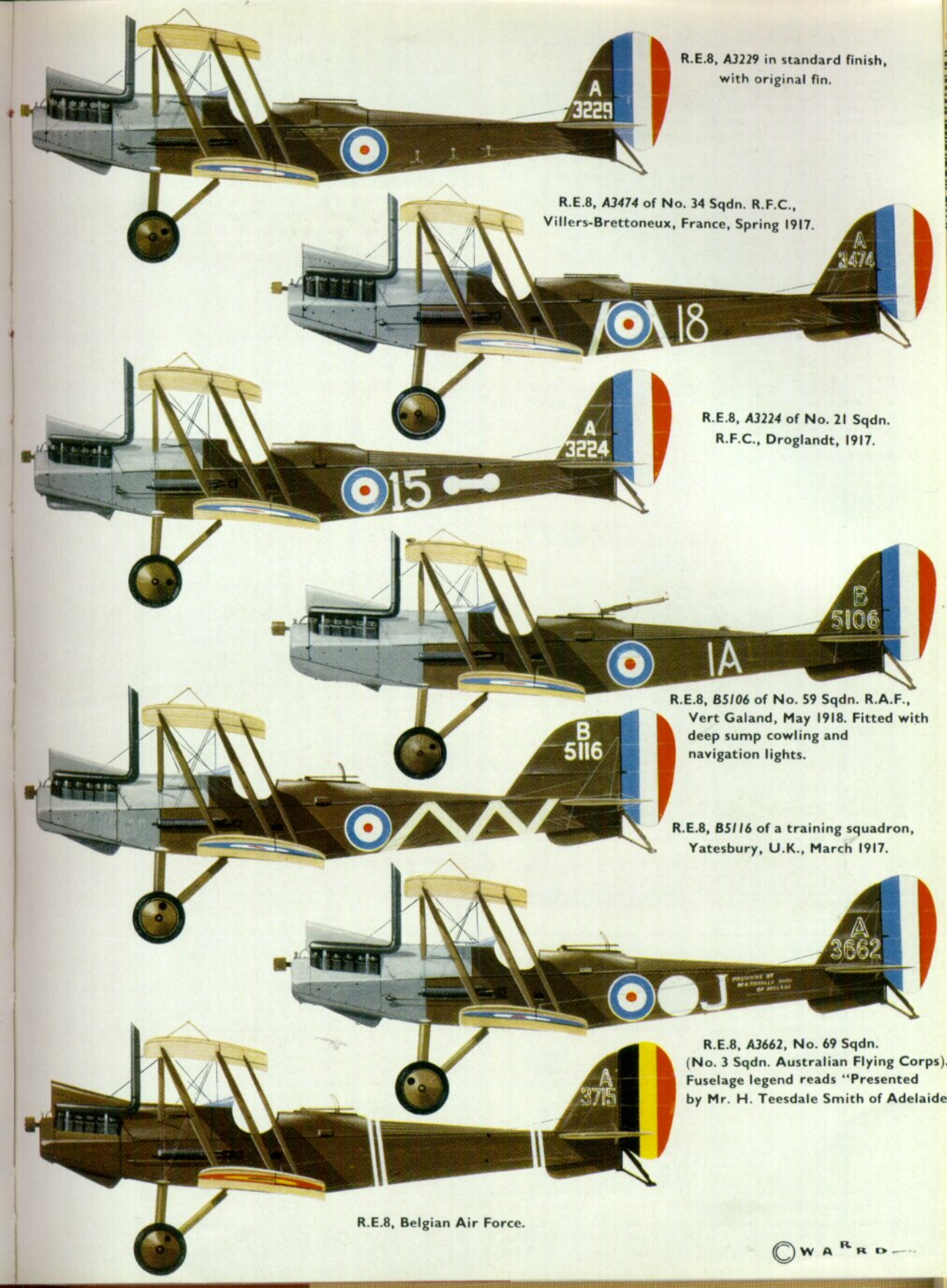
Royal Aircraft Factory, Farnborough, Hants—*7996–7997, A66–A115, A3506–A3530* (*A110–A115* and *A3506–A3530* were not built).

Austin Motor Co. (1914) Ltd., Northfield, Birmingham—*A3169–A3268, A4261–A4410, B5851–B5900.*

Coventry Ordnance Works, Ltd., Coventry—*A4664–A4763, B6631–B6730, C5026–C5045, C5046–C5125, D6701–D6850.*

Daimler Co., Ltd., Coventry—*A3531–A3680, A4161–A4260, B3401–B3450, B5001–B5150, C2231–C3080, F3548–F3737.*

D. Napier & Son, Ltd., Acton, London, W.—*A3832–A3931, B2251–B2300, C4551–C4600, D3836–D3910* (cancelled), *D4811–D4885, D4886–D4960, E1101–E1150.*



R.E.8, *A3229* in standard finish, with original fin.

R.E.8, *A3474* of No. 34 Sqdn. R.F.C., Villers-Brettoneux, France, Spring 1917.

R.E.8, *A3224* of No. 21 Sqdn. R.F.C., Droglandt, 1917.

R.E.8, *B5106* of No. 59 Sqdn. R.A.F., Vert Galand, May 1918. Fitted with deep sump cowling and navigation lights.

R.E.8, *B5116* of a training squadron, Yatesbury, U.K., March 1917.

R.E.8, *A3662*, No. 69 Sqdn. (No. 3 Sqdn. Australian Flying Corps). Fuselage legend reads "Presented by Mr. H. Teesdale Smith of Adelaide"

R.E.8, Belgian Air Force.

Siddeley-Deasy Motor Car Co., Ltd., Park Side, Coventry—A3405–A3504, A3681–A3830, B6451–B6480, B6481–B6630 (B6225–B6630 delivered as R.T.1s), B7681–B7730, E1–E300, E1151–E1250, F1553–F1602, F3246–F3345.
Standard Motor Co., Ltd., Cash's Lane, Coventry—A4411–A4560, A4564–A4663, D1501–D1600, D4661–D4810, F1665–F1764.
The serial numbers *A6801–A7000* were originally allocated for R.E.8s to be built by the British & Colonial Aeroplane Co., Ltd., but the Bristol company declined the contract and the serials were re-allocated.
A.R.D. rebuilds included the following: *B737, B738, B742, B750, B765, B814, B821, B832, B836, B845, B853, B7808, B7893, B7917, B8884–B8887, B8900, D4980, D4998, F5879, F5897, F5902, F5909, F6016, F6018, F6044, F6049, F6050, F6277, H6843, H7018, H7022–H7027, H7033, H7038, H7042, H7055, H7057, H7139, H7262, H7265.*

Examples of R.E.8s used by operational squadrons:
No. 4 Sqn.: C2411.
No. 4(A) Sqn.: C2491.
No. 5 Sqn.: B7893, F1679, F6044.
No. 6 Sqn.: A3198, A3849, A4270, A4316, B5013, H7038.
No. 7 Sqn.: A4381.
No. 9 Sqn.: A4366 (Aircraft 21), *F6049.*
No. 12 Sqn.: A3631, B832, B6512, C2559, E270, F5909.
No. 13 Sqn.: B5070.
No. 14 Sqn.: B6604.
No. 15 Sqn.: B742, B836 (15), *B2276* (13), *B3412, H7018.*
No. 16 Sqn.: A3196 (14), *A3839* (16), *B5010* (17), *B5028* (15), *C5048* (25), *D4688.*
No. 21 Sqn.: A3224 (15), *A4351* (B).
No. 30 Sqn.: A4352, A4357.
No. 34 Sqn.: A3474, E130.
No. 52 Sqn.: A81, A87, A3489, A3868, A4417 (15), *C2341.*
No. 53 Sqn.: A3538, C2548, C2901, D6801, F5897, H7033.
No. 59 Sqn.: A3190, B5106 ("1A").
No. 63 Sqn.: A4346.
No. 69 Sqn.: A3662 (J), *A4397* (D), *B7917, F6016* (K), *H7042* (J).
Headquarters Communication Squadron, R.A.F.: B6573, C4560, C4579.
R.A.F. Contingent, Archangel: D4960, D6792.

SERVICE USE

Wartime

Western Front: R.F.C./R.A.F. Squadrons Nos. 4, 4(A), 5, 6, 7, 9, 12, 13, 15, 16, 21, 34, 42, 52, 53, 59; No. 69 (Australian) Sqn., R.F.C., later No. 3 Sqn., Australian Flying Corps; HQ Communication Sqn.; one R.E.8 with No. 56 Sqn., R.F.C., March 1918. L'Aviation Militaire Belge: 6me Escadrille.
Italy: R.F.C./R.A.F. Sqns. Nos. 34 and 42.
Palestine: R.F.C./R.A.F. Sqns. Nos. 14, 113, 142; No. 67 (Australian) Sqn., R.F.C.
Mesopotamia: R.F.C./R.A.F. Sqns. Nos. 30 and 63.

The R.E.8 B738 *with supercharged R.A.F. 4d engine, R.A.F. variable-pitch airscrew and balanced rudder similar to that of* A3406. *The tall figure immediately to the right of the airscrew is Lt. Harold Elliott who was then in charge of the Engines Flight at Farnborough and flew as flight observer in this aircraft and in the Maori-powered R.E.9* A3561.

Home Defence: R.F.C. Sqns. Nos. 50, 76 and 77.

Post-war

Russia: R.A.F. Contingent, Archangel.
Mesopotamia: No. 6 Sqn., R.A.F., Basra.
Ireland: One R.E.8 with No. 141 Sqn., R.A.F.

SPECIFICATION

Power: R.E.8—140-h.p. R.A.F. 4a, 200-h.p. R.A.F. 4d, 150-h.p. Hispano-Suiza, 180-h.p. Hispano-Suiza. *R.E.8a*—200-h.p. Hispano-Suiza.

Dimensions: Span (upper) 42 ft. 7 in., (lower) 32 ft. 7½ in.; length (R.E.8) 27 ft. 10½ in., (R.E.8a) 27 ft. 7 in.; height 11 ft. 4½ in.; chord 5 ft. 6 in.; gap 5 ft. 6 in.; stagger 2 ft.; dihedral 3 deg. 30 min.; incidence 4 deg.; span of tail 14 ft.; wheel track 5 ft. 9¾ in.; types 700 × 100 mm.; airscrew diameter (T.6296) 9 ft. 9 in.

Areas: Wings 377·5 sq. ft.; ailerons, each upper 21 sq. ft., each lower 11·5 sq. ft., total 65 sq. ft.; tailplane 24 sq. ft.; elevators 22 sq. ft.; fin originally 5 sq. ft., later 6·75 sq. ft.; rudder 9·5 sq. ft.

Armament: One fixed 0·303-in. Vickers machine gun with Vickers-Challenger interrupter gear or Constantinesco C.C. synchronising mechanism, Hyland Type C loading handle, and Aldis and ring-and-bead sights. The bomb load could consist of two 112-lb. or four 65-lb. bombs, or a combination of (e.g.) one 112-lb. and four 25-lb. Cooper bombs; the bomb racks were under the fuselage and lower wings. C.F.S. 4b bomb sight.

WEIGHTS AND PERFORMANCE

Aircraft	7996	A4716		R.E.9	R.E.9 A3561	R.T.1 B6626	R.T.1 B6630
Engine	R.A.F. 4a	R.A.F. 4a		R.A.F. 4a	Maori	R.A.F. 4a	200-h.p. Hispano-Suiza
Bomb load	Nil	Nil	Two 112-lb.	Nil	Nil	Nil	Nil
Weights (lb.):							
Empty	1,622	—	1,803	—	—	1,773	1,803
Military load	232	185	351	—	—	185	185
Crew	360	360	360	—	—	360	360
Fuel and oil	378	—	355	—	—	272	359
Loaded	2,592	2,678	2,869	2,800	—	2,590	2,707
Max. speed (m.p.h.):							
at 6,500 ft.	99	102	98	—	—	101	—
at 10,000 ft.	93	96·5	92·5	—	—	98·5	108
Climb to:	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.
5,000 ft.	8 10	11 25	— —	11 20	6 45	7 45	— —
6,500 ft.	11 40	15 50	21 0	— —	— —	10 30	10 35
7,000 ft.	13 0	— —	— —	— —	10 15	— —	— —
10,000 ft.	22 0	29 5	39 50	35 40	— —	19 10	18 30
Service ceiling (ft.) ...	13,500	13,500	11,000	13,000	—	16,000	18,000
Endurance (hrs.) ...	4¼	—	—	—	—	—	—

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