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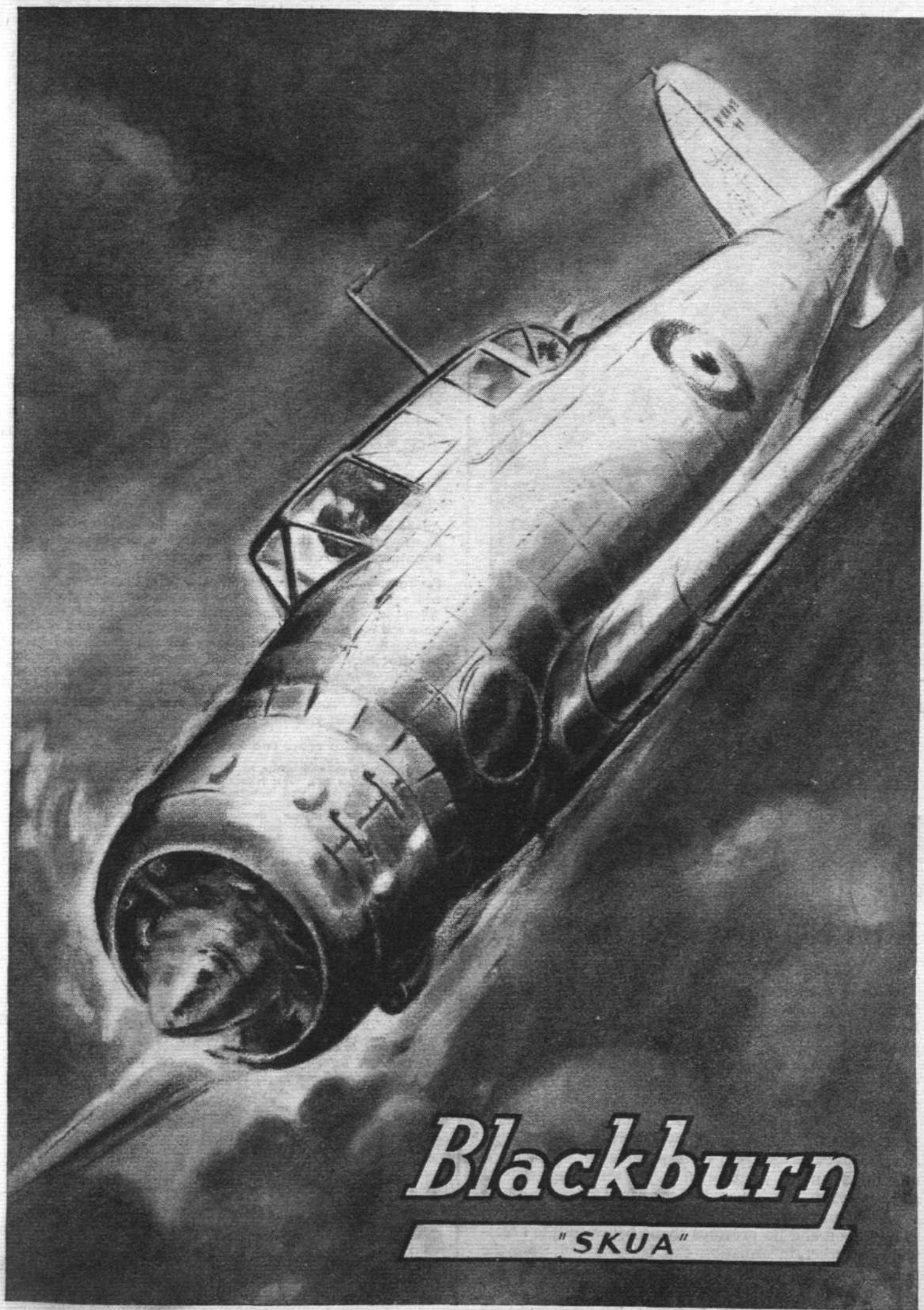
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THE BROOKLANDS BULLETIN: No. 5



CAPT. H. DUNCAN DAVIS,
A.F.C., Managing Director,
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(LAUGHTER!)

History records the story of a barrister, rather addicted to his glass, when he appeared before a Judge famed for sobriety.

In a final, despairing effort to shake an impassive witness, the wearer of silk thundered: "Tell me, Sir, are you never surprised at anything? For instance, would you not be surprised if I told you that I once saw his Lordship going into —ahem—a Public House?"

The general amazement in Court was cut by a clear voice from the Bench: "Surely, Sir Robert—coming in? Coming in?"

All of which has remarkably little to do with aviation, but illustrates the well-known axiom that wherever one goes, someone else seems to have got there first!

Particularly is this true of people who fly at Brooklands. Time and again have I listened to the veterans swapping stories of when they first flew within the concrete circle. I warn readers, once and for all, that it's no use competing in this kind of conversation. Things are usually going hot and strong, and some pre-War member has got himself happily convinced that he knew Brooklands Aerodrome before anyone else present, when a quiet voice from the corner chips in "But do you remember in '09. . . ." And away we go, all over again, with an even older inhabitant presiding!

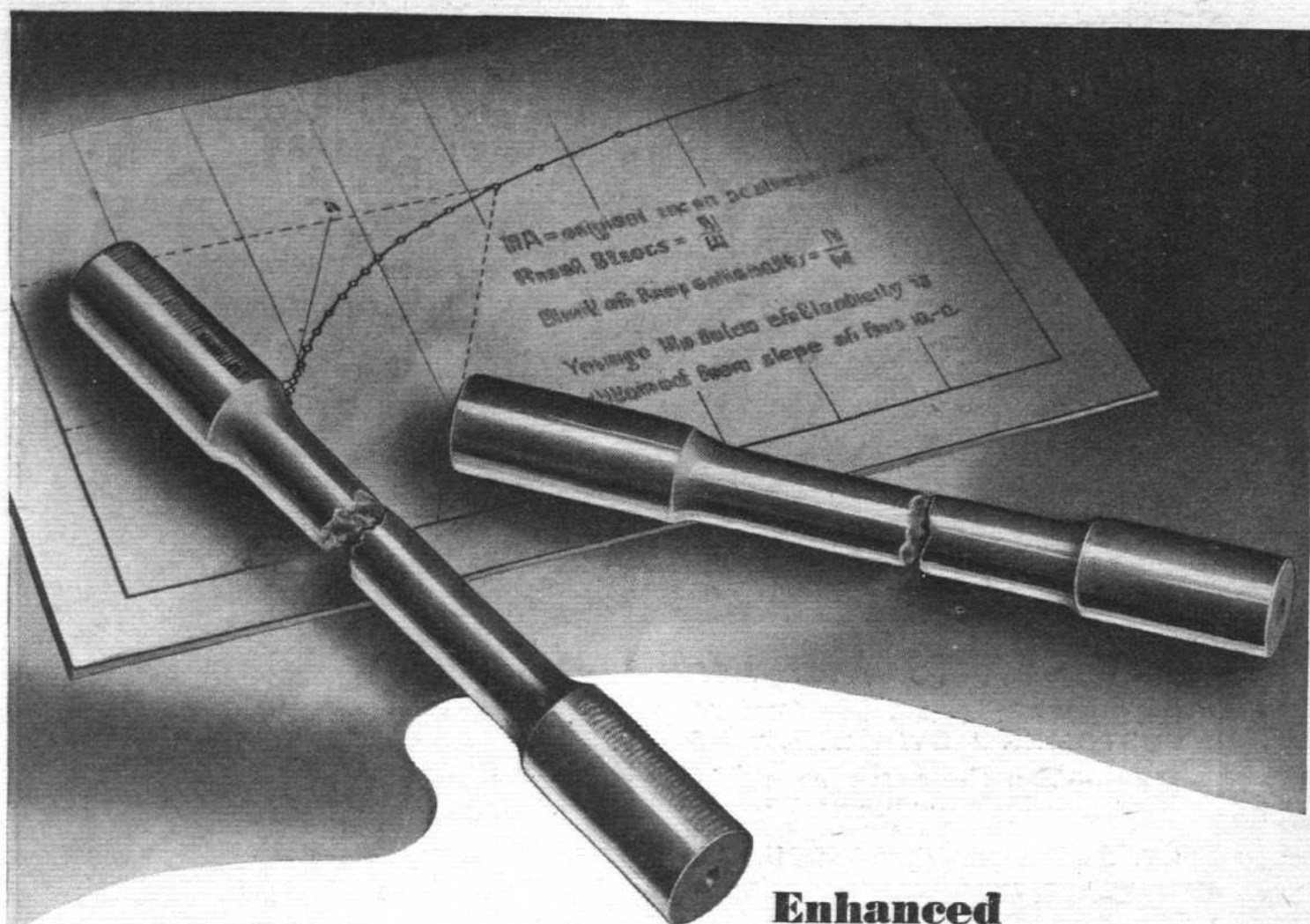
Which seems to prove two things:

- (i) That Brooklands pilots, on the whole, are remarkably clannish and clubbable folk. This I know to be true; many a friendship started here has lasted through 20 years or more, and the way in which overseas members regularly keep in touch with us is in itself a tribute to the "Brooklands spirit." Though perhaps I should add, in case you should visualise us as exclusively a company of pre-Wars, that the younger generation joins in just as cordially—and, in point of fact, probably constitutes the majority these days.
- (ii) That our members live long. And without throwing too many bouquets to Ken Waller and his predecessors, it seems a safe bet that this must, in some way, be due to the particular brand of efficient instruction that is handed out here.
Verb. Sap.!

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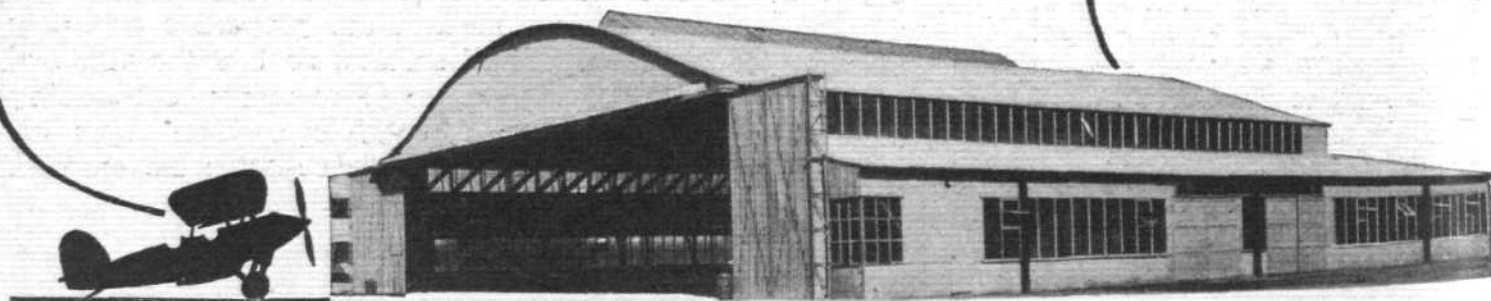
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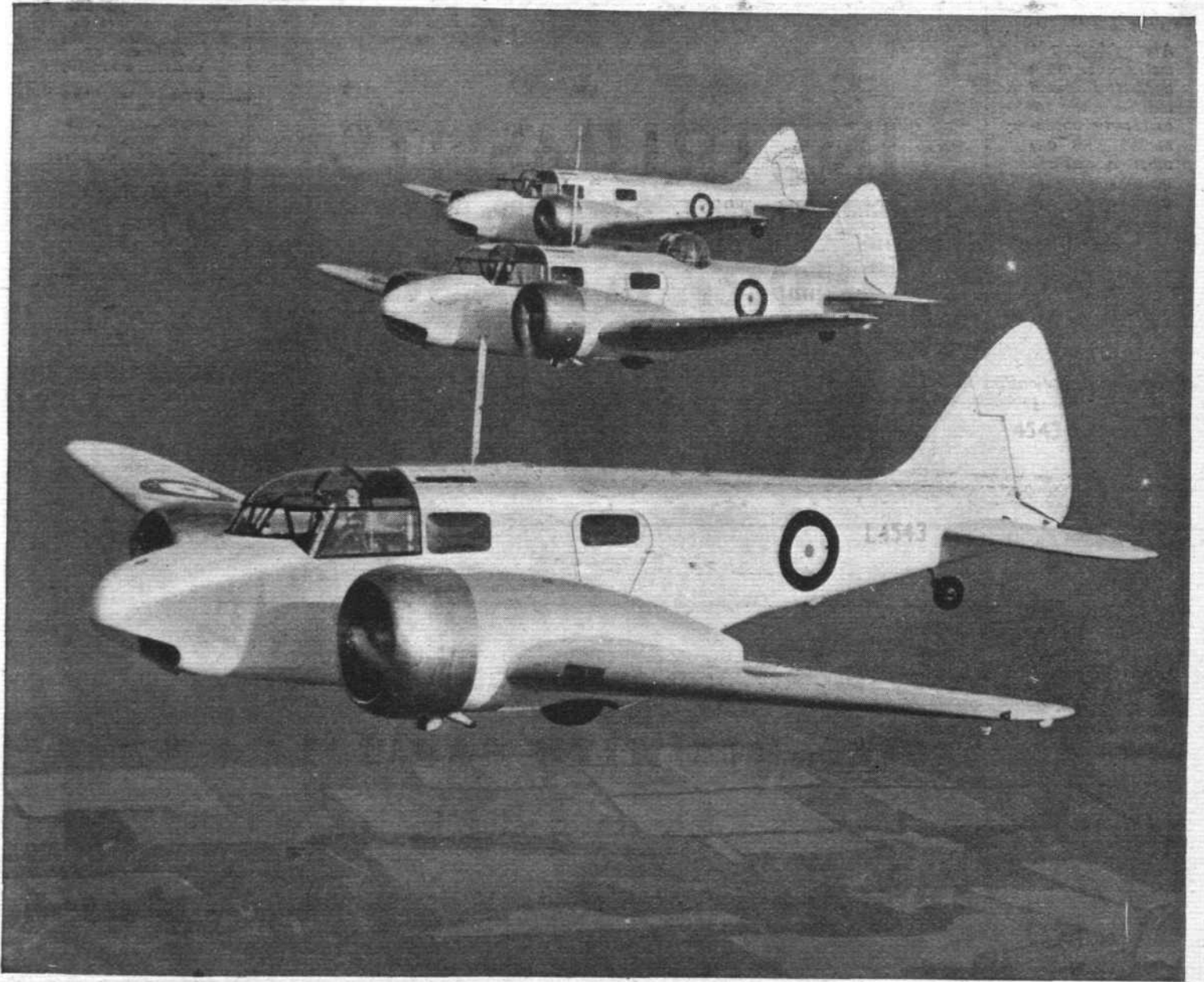
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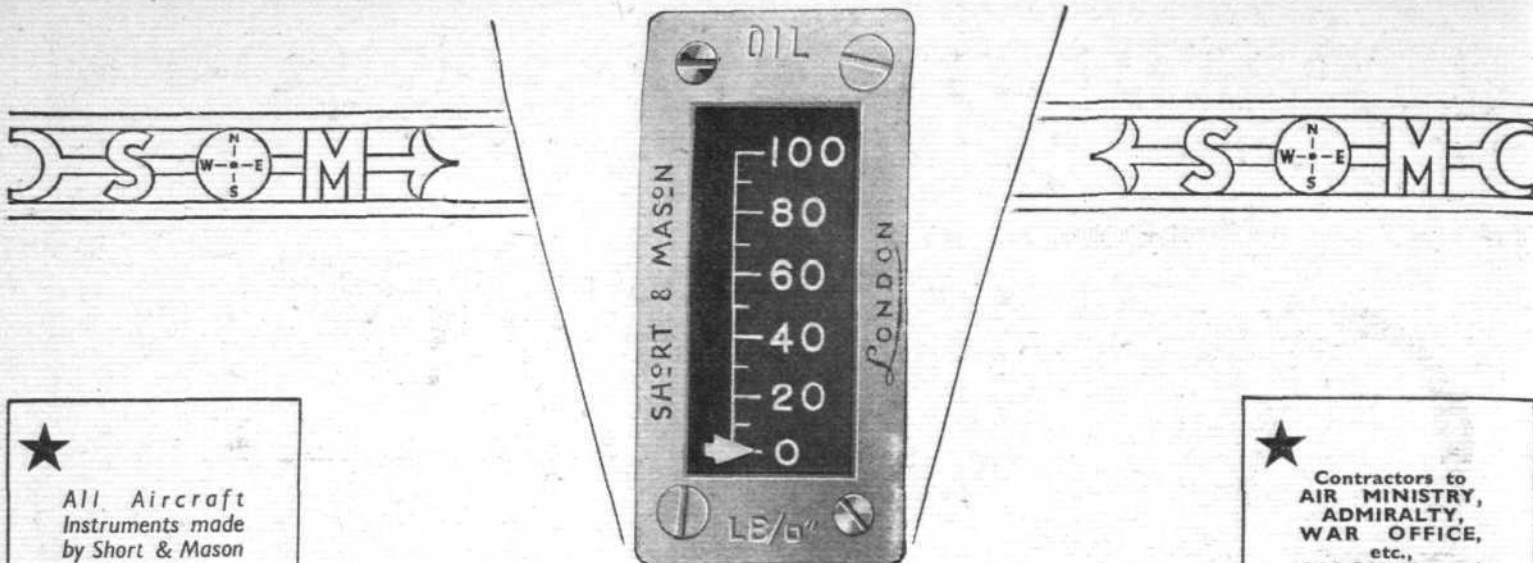
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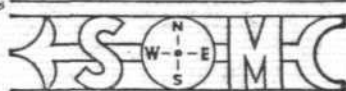
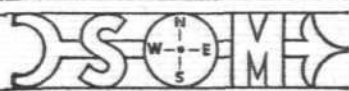
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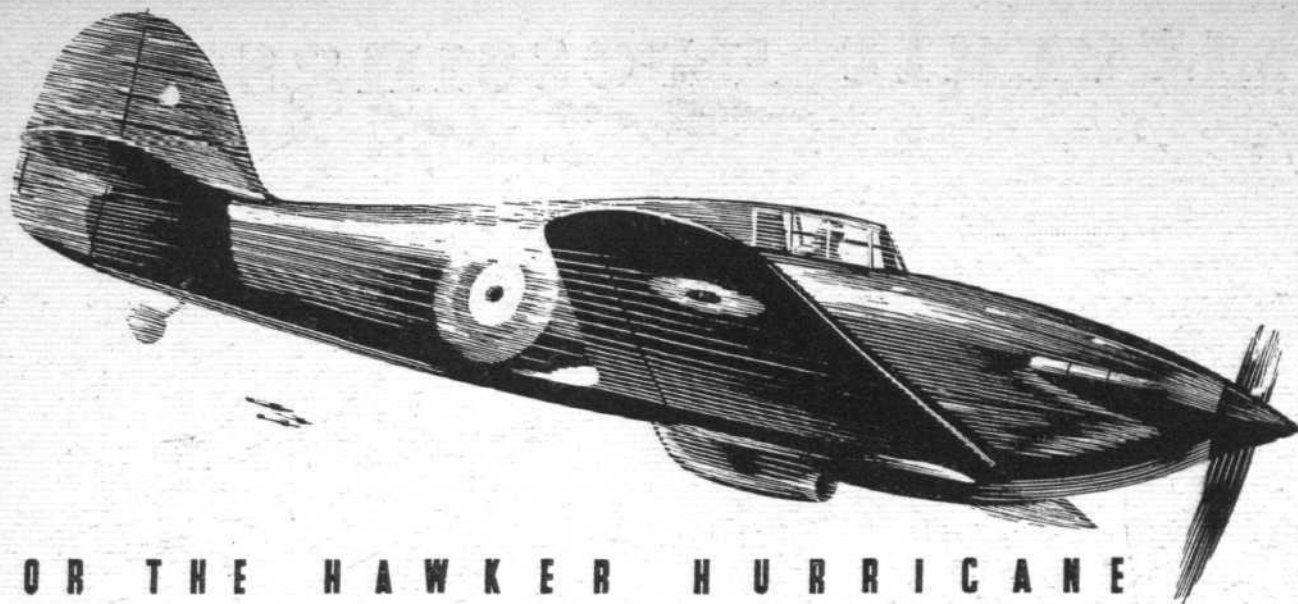
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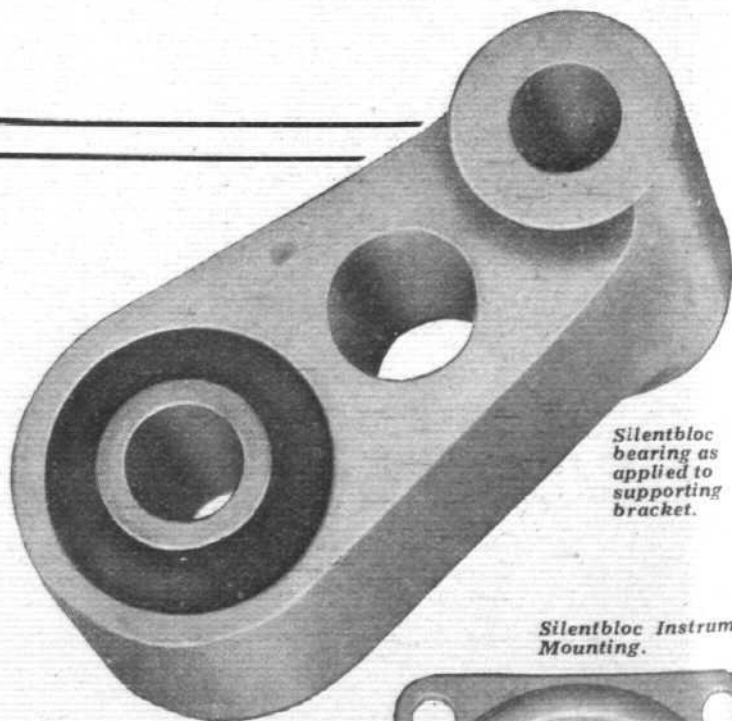
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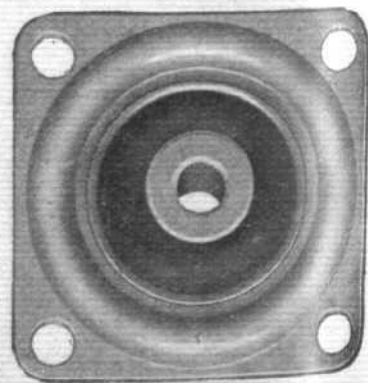
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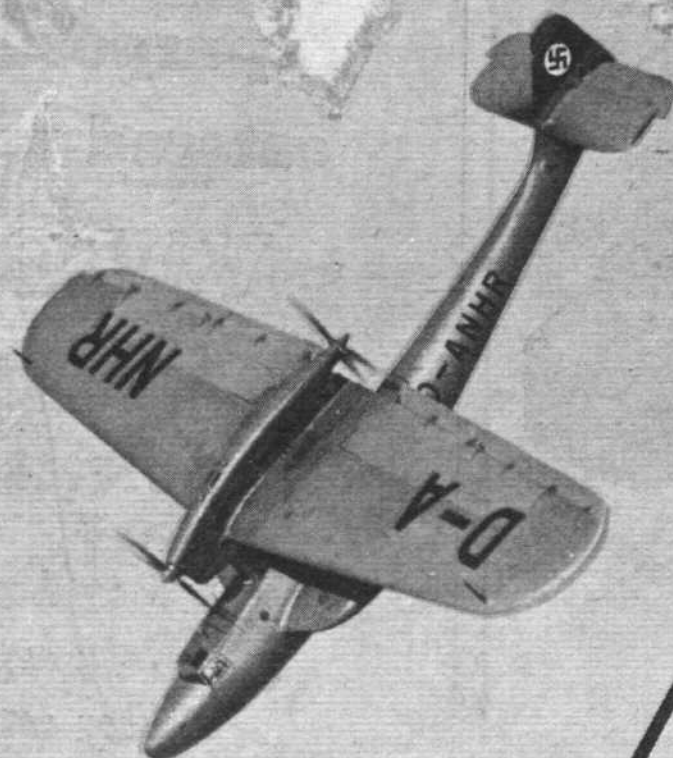
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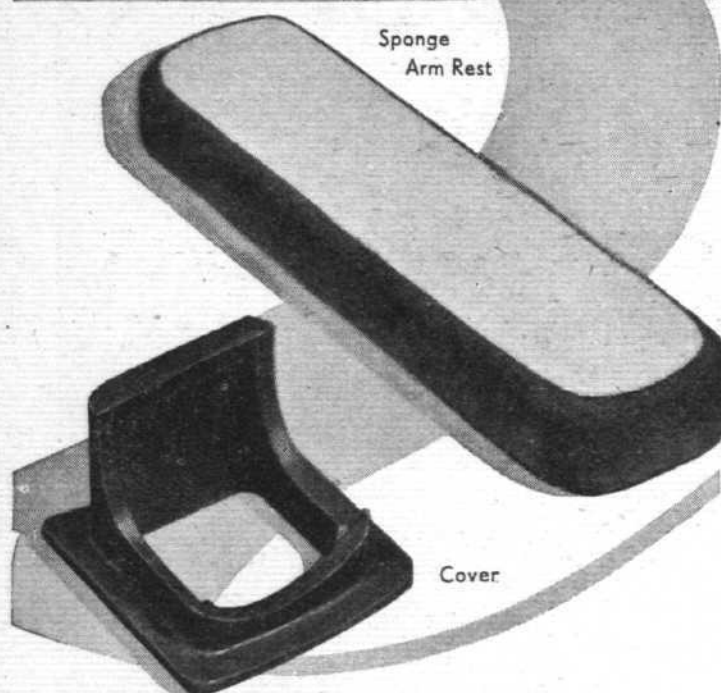
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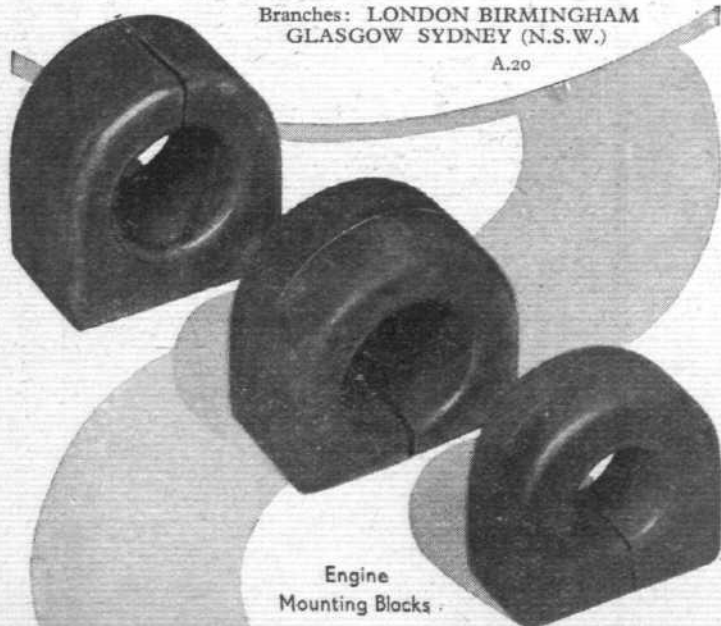
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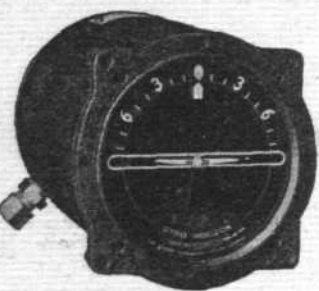
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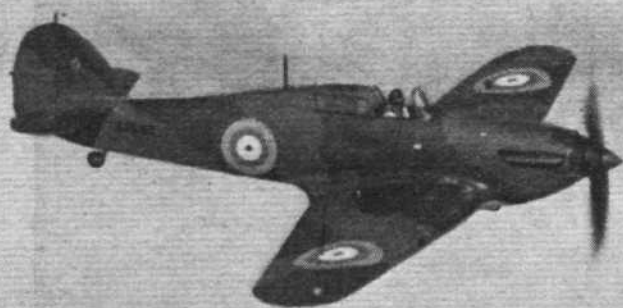
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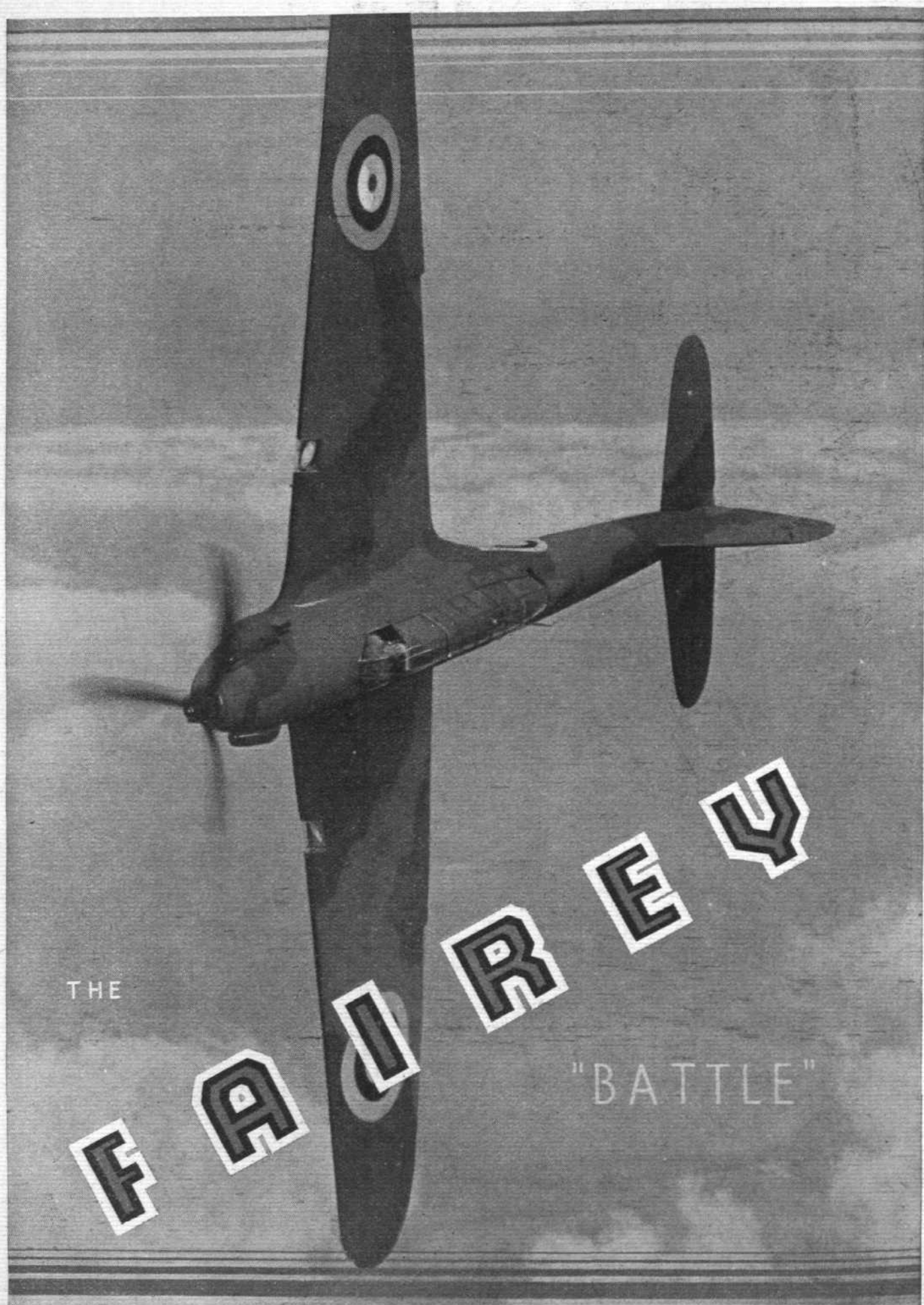
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The
AIRCRAFT ENGINEER
AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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MAY 12, 1933.

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The Outlook

I.T.P.

MEMBERS of both Houses will have an opportunity to-day of discussing the question of aircraft production. The Debate may, in fact, be said to constitute the equivalent of the Air Ministry's "I.T.P." For the benefit of the uninitiated it may be explained that in the aircraft industry, when negotiations between an aircraft constructor and the Air Ministry have reached a certain stage, the constructor receives "Instructions To Proceed." Parliament has long desired an opportunity to challenge the Air Ministry about the progress of the R.A.F. expansion, and doubtless the Opposition will try to make the most of to-day's opportunity.

That an attempt will be made to make political capital out of the present position may be taken for granted. It is hardly to be expected that the Air Ministry's critics will bother to remember that the difficulties with which the aircraft industry is faced are not the fault of any one man, of any one department in the Ministry, of any one firm or group of firms in the aircraft industry. They date back to the time when Great Britain was so busy "setting an example" to the rest of the world; an example which, needless to say, was not followed by anyone.

The number of orders was few, in those days, and the aircraft industry as a whole led a hand-to-mouth existence. Some twenty firms with designing staffs composed the industry. Realising that it would be dangerous to let these firms die, the Air Ministry did its best to keep them all alive by trying to spread the few orders reasonably among the firms. But it was inevitable that at any given moment one or two firms should be busy while others had practically no work. Then the busy firm would finish its orders and would be slack for a period, another firm having, in the meantime, received orders for a new type of aircraft.

That most firms had the very greatest difficulty in keeping their technical staffs together is not to be wondered at. Equally serious was the fact that the workers could never be sure of steady employment for any length of

time. Two alternatives were available: either the workers could travel from one part of the country to another, following the orders, or they could leave the aircraft industry and secure steady employment elsewhere. Some followed one course and some the other, but obviously neither did the aircraft industry any good.

In the circumstances it is scarcely surprising that when the industry was faced with panic expansion difficulties arose.

It would be well if to-day's critics in Parliament would bear past history in mind. There is plenty to criticise, but the blame for the present delays in production must be laid at the door of past disarmament policies, framed by several different Governments and agreed to by many of those who are now loudest in their allegations of inefficiency. The trouble lies in the system rather than with individuals. The system worked well enough in the days of small orders and hand-made aircraft. It has broken down under the stress of quantity production.

Reorganisation

NOTHING in this world is easier than to criticise. That things are not going too well all admit.

What is needed is a reorganisation not only of the Air Ministry's technical departments, but of the aircraft industry itself. In this week's issue of *Flight* we publish an article by a production engineer, whose previous articles have explained some of the present troubles. This week he offers a suggestion for such reorganisation. *Flight* does not necessarily agree with all the suggestions. We do not even say that "Production Engineer's" scheme is sound or workable. But unless someone provides a basis for discussion we shall never get anywhere.

Our contributor makes suggestions for speeding-up Air Ministry procedure, chiefly by a system of decentralisation, thereby hoping to cut out the vast amount of inter-office correspondence which at present causes delays in giving decisions.

His proposed reduction of types to seven will doubtless be opposed in some quarters, but as our contributor

states in an epigrammatic remark "It is better to have 100 per cent. output with 95 per cent. efficiency than 25 per cent. output with 100 per cent. efficiency."

At first sight the suggestion that the number of parent firms should be reduced to not more than ten appears not a little startling. But when one comes to analyse it there is certainly something to be said for it from the point of view of production efficiency.

Some years ago such a system would have been downright dangerous in that it would have limited the number of skilled design staffs and robbed the industry of the incentive of keen competition. In present circumstances, however, there is no competition; or, rather, the competition is not for orders, of which there are ample, but for skilled men, of whom there are too few.

Actually, if one looks around the British aircraft industry it is found that, purely by a natural process of evolution and not by the rather arbitrary selection suggested by our contributor, firms have specialised to a large extent on certain types or classes of aircraft. Certain firms have for years been associated with large bombers; others with single-seater fighters; others again with Fleet Air Arm machines, and so forth. So that the limitation proposed is not quite as drastic as it may appear to the reader at first sight.

That there would be difficulties and objections may be admitted, but "needs must when the devil drives." Specialisation in design and manufacture is needed if the desired output is to be obtained. There are other ways than that suggested by the production engineer who contributes to our columns, and we shall be glad to have the views of people in the aircraft industry who have alternatives to put forward.

As an instance of how specialisation was not merely suggested but put into practical operation one may quote the early days of all-metal construction. One of the first firms to specialise on rolling and drawing spar sections in strip steel was Boulton and Paul, Ltd. They standardised a certain number of spar flanges and a certain number of webs. By various combinations of these, and using slightly different gauges of strip, a range of spars was provided wide enough to cover all possible requirements. The idea was not adopted, and all the other firms spent time and money on producing their own spars, but fundamentally the scheme was quite sound. A modern equivalent of it would do much to help production.

Royal Interest

THE Royal Air Force and the British aircraft industry have good cause for being grateful for the great interest which His Majesty King George VI is taking in their work. The visits to R.A.F. stations early this week, described on p. 474, were a continuation of the series of inspections being made by His Majesty, which began with a visit to Cranwell in January and to the shadow factories in March, in addition to visits to several aircraft constructors' works. Everywhere those honoured by his visits have been impressed by the King's obvious knowledge of the subject and by his appreciative interest.

They do not forget that His Majesty first became associated with the service in 1917, when he was posted to Cranwell, nor that the following year he joined the Headquarters Staff of the Independent Air Force in France, afterwards taking a course of flying instruction at Croydon and qualifying as a pilot. Nor do they overlook the subsequent career of the King in the Royal Air Force, culminating in his appointment to Marshal of the R.A.F. in December, 1936. What surprises and impresses is that, amid his innumerable other duties and interests (His Majesty is one of the hardest-worked men in the country to-day) he should still be able to keep himself so thoroughly well-informed and up-to-date in all aviation matters.

It would obviously be impossible for the King to visit every R.A.F. station in the country, and his recent visits to four were carefully planned to represent one station in each of the R.A.F. Commands at home, viz., Fighter, Bomber, Coastal, and Training Commands. On these visits His Majesty met the chiefs of the different Commands and other officers of the R.A.F. and thus strengthened his already close association with the Service, a fact which must be a source of gratification to every officer and man in the R.A.F.

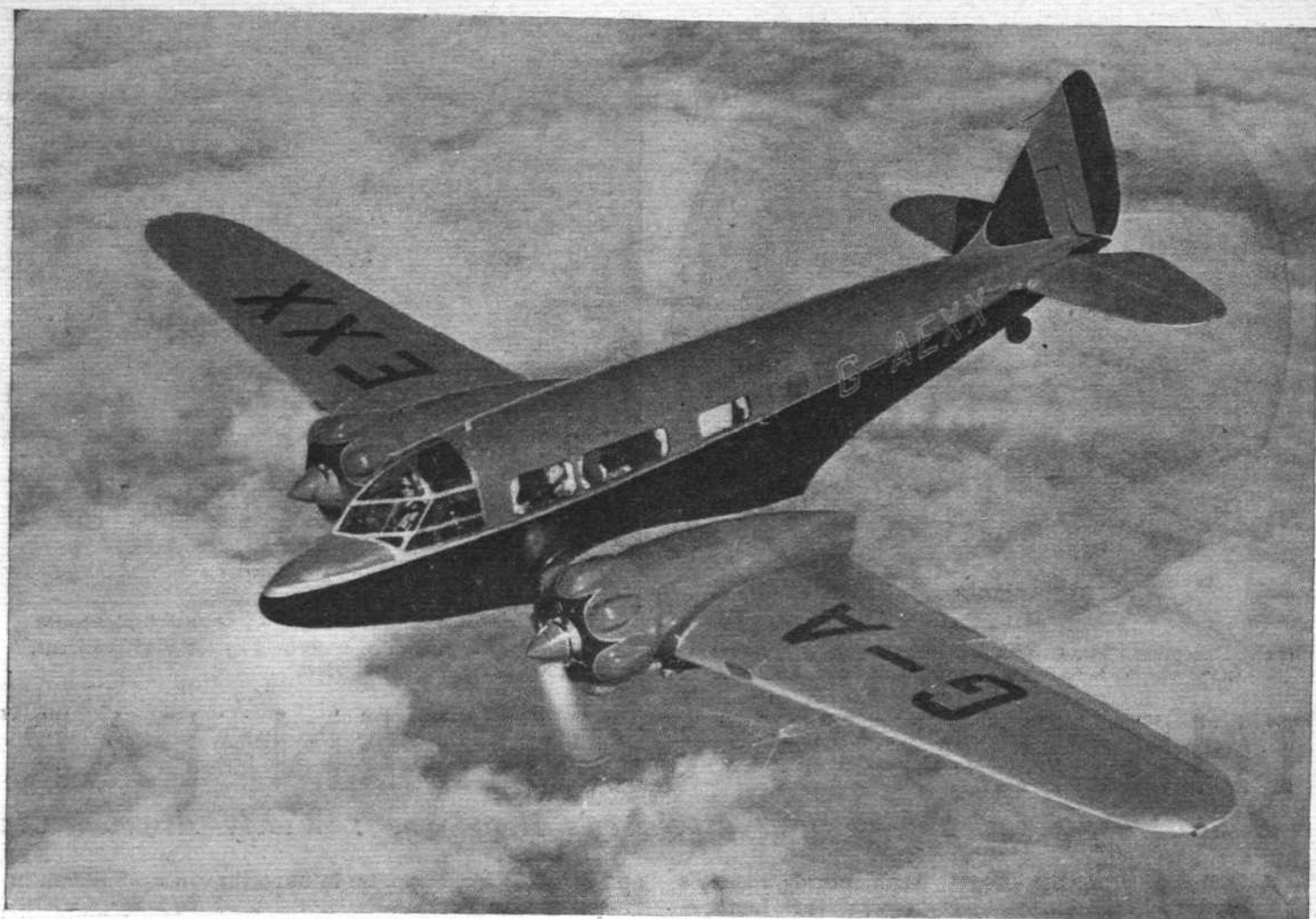
At the conclusion of his tour by air His Majesty sent the following message to the R.A.F.:—

"I have spent an interesting and enjoyable day with the Royal Air Force and I would like them to know how impressed I am with all that I have seen.

"I congratulate them on the determined and successful way in which they are meeting the heavy demands made upon them by the expansion of their service, and I send them my best wishes."



OUT AND UP: This unusual picture by a *Flight* photographer shows the Armstrong Whitworth Ensign tucking-up her wheels as she takes off from her makers' aerodrome. She was due to go to Martlesham yesterday.



THE KING'S ENVOY: A pleasing impression of the Royal Airspeed Envoy (two Armstrong-Siddeley Cheetah IX), in which, as related elsewhere in this issue, His Majesty toured between four representative Royal Air Force stations last Monday.

Formidable

THIS week it has become possible to describe in detail the latest single-seater fighter to go into service with the R.A.F. The Hawker Hurricane can be definitely claimed to be not only the fastest fighter in service in the R.A.F. but in the world. Official performance figures are not available, but it is estimated that the Hurricane's top speed at its operational height is in the neighbourhood of 330 m.p.h.

Nor is performance the only attribute of the machine. It carries a formidable armament in the form of eight Browning 0.303in. belt-fed guns, placed in the wings. As these guns are essentially similar to the type MG-40 which the Colt company has been exporting to various countries over a period of years, it may be taken that their rate of fire is in the region of 20 rounds per second, so that even with the short bursts of fire which are all that modern air fighting is likely to afford, something like 150 projectiles converge on the target in every second the trigger is kept depressed. It will take a staunch crew in a bombing aircraft to face such a hail of concentrated fury.

So far as can be gathered, comparable fighters now going into service abroad have two or four machine guns. The French Morane has two wing guns and a 20 mm. shell-gun on the Hispano engine, and the older, gull-winged Polish P.Z.L. P.24 as supplied to Turkey has two shell-guns in the wings and a pair of synchronised machine guns in the fuselage. The latter machines are, however, said to be tricky to land and have caused the Turkish pilots considerable difficulty, whereas the Hurricane, with its flaps and well-harmonised controls, is relatively easy to land.

The wing structure of the Hurricane is very sturdy, and should the Air Ministry decide to adopt shell-guns, these could, presumably, be installed.

Other End of the Telescope

AS we have remarked in *Flight* before, there seems to be in this country a naïve sort of belief in American production capacity, a feeling that it is unlimited. That view we do not share, and it is interesting to find confirmation in this month's issue of our contemporary, *American Aviation*. On the subject of the British mission at present visiting the United States, that journal says: "Immediate delivery cannot be guaranteed by any manufacturer, and it is only too well known that, in case of war, exports would likely be shut down by the State Department."

Commenting on the fact that French and Italian missions are also in America at present, our contemporary says that, "while it appeared likely that some orders would result from the visit, . . . it was pointed out that nations engaging in large purchases usually do so with utmost secrecy, and that the British are not likely to load up with U.S. airplanes with all the attendant difficulties of replacement, training, etc." Which is precisely what was pointed out in last week's *Flight* article by "Production Engineer."

"Manufacturing representatives," *American Aviation* continues, "were in one accord in welcoming the visitors, but were not inclined to get over-excited. Expansion of plant facilities is costly when replacement orders are not to be forthcoming, and most plants are working at near capacity. [The italics are ours.] Canadian factories could supply many types of U.S. military aircraft through previous purchases of designs and production rights."

The answer to the last sentence is that there would be no point in Canadian factories supplying U.S. types. If Canadian factories are to be roped in for production purposes, as obviously they should, the logical thing to do is to put them on producing British aeroplanes.



(Left) Reception : Mr. Griffith Brewer, veteran R.Ae.S. member and still a private-owner pilot, welcomed by the Vice-President, Mr. F. Handley Page, and Mrs. Handley Page. (Above) A general view.



"Flight" photographs.

THE R.Ae.S. GARDEN PARTY

A Still Bigger and Better Affair at Fairey's Aerodrome : Widely Assorted Civil and Military Aircraft on Display

YEAR by year the Royal Aeronautical Society's Garden Party—last Sunday's was the fourth—becomes less and less of a garden party and more and more of a flying display on the grand scale.

True, an official reception, a very nicely served tea, and a (theoretically) restricted *entrée* are retained. But May has proved so fickle at the Great West Aerodrome during recent years that garden-party frocks are at a discount; escorts seem to prefer green Tyrolean pork-pies to toppers;

and even the band appears to have thrown up Sullivan in favour of Cole Porter.

Not that the annual curtain-raiser to the flying season has suffered one whit by this onslaught of informality. It is accepted that everybody comes to see the newest and best in British aviation, civil and military, to meet old friends, and to enjoy himself or herself generally.

Among the 4,000-odd guests were the Secretary of State for Air, Lord Swinton; ambassadors, ministers, chargés



"Flight" photographs

All in the picture : Westland Lysander over Vickers Wellington, and Bristol Blenheim over Fairey P.4/34.



Military Aircraft Entertain 4,000 Visitors

d'affaires and air attachés of a dozen nations; members of the Parliamentary Air Committee; and high officers of the Air Council and Royal Air Force.

And among the aeroplanes—but where to begin amid such a wealth of fabric, metal and wood shining in cool, intermittent sunlight? By force of numbers, a line of six Bristol Blenheims of No. 61 (B.) Squadron, from Hemswell, Lincoln, at once took the eye. Yet perhaps it would be wisest to commence with the aircraft which were demonstrated for the edification of the visitors on Mr. C. R. Fairey's expansive greensward.

Where flying characteristics permitted, demonstrations were given in pairs. The Cub Sport (40h.p. Continental)—late Taylor Cub—and the Chilton monoplane (32 h.p. Carden) led off. Mr. P. B. Elwell, in the former, put this cabin tandem-seater into a nice variety of postures to prove its controllability, his offerings including a series of tight loops and some aileron turns. Mr. R. L. Porteous, evidently determined to consolidate the favourable opinions which had been centering round the pretty single-seater Chilton as it stood on the ground, indulged in a series of "shootings-up" at high speed and negligible altitude, the little Carden humming as sweetly as any sewing machine. At one time he "dusted" the grass at a good 100 m.p.h.

It was a stroke of showmanship to put something as big as the Vickers Wellington (two Pegasus) next on the list. Looking a "heavy" rather than the "medium" which (until such classification was recently abandoned) it was officially designated, it made a grimly inspiring sight as Flt. Lt. Summers took it skyward in a series of steep climbing turns, the sunlight glinting dully on camouflage and windows; perhaps it was as well that Mr. B. N. Wallis was not with us, earlier, to overhear an observation by a sweet young thing after a close study of the geodetics through the fuselage windows: "I wonder why the window frames are so strong and complicated? It must be to prevent the glass blowing in when the thing is going fast."

Percivality

The programme returning to pairs again, Capt. Percival flew his new Q.6 (two Gipsy Sixes) in company with a Vega Gull (one ditto) in the hands of Mr. D. M. Bay. Never can a family resemblance between two aircraft of different types from the same factory have been more clearly marked. Most people were seeing Capt. Percival's little airliner for the first time, and most, one feels, liked its looks. In spite of the established cult of retractability there is something pleasing about the appearance of a neatly trousered undercart on a twin-engined low-wing monoplane. The "Q ship," by the way, cruises at 183 m.p.h.

Mr. H. W. Skinner was down to fly the Phillips and Powis Kestrel-engined trainer, but the machine was an absentee, and he took up a Magister instead, putting it through a convincing series of aerobatics which included two longish spins.

There followed the tricycle-wheeled Monospar, now sold to the Air Ministry for research and wearing R.A.F. colours. Mr. Hollis Williams persistently took it off and put it down—hard, from a variety of angles—in order to prove that from such treatment the new redesigned undercarriage emerges not only unbroken, but also unbent. He showed, too, how the ground-handling qualities of the tricycle resemble those of a car rather than of an aeroplane.

Performing at the same time was the Taylorcraft, which is,



"Flight" photograph.

Somebody wanted to know if *Calpurnia* had been well greased underneath—just in case.



"Flight" photograph.

Some personalities : (left to right) Gliding enthusiasts—Miss Amy Johnson and Mrs. Kay Petre; Sir Harry Brittain and the misses Mary, Anne and Elizabeth Handley Page; the Duke of Richmond and Gordon, Mr. E. Hordern, and Mrs. Tyndall.



"Flight" photograph.



so to speak, the other branch of the diversion from the original Taylor Cub. This is quite a luxurious little side-by-side-seater with the 40 h.p. Continental flat four, and a car-like instrument panel from which project two control wheels. Mr. Field-Richards demonstrated it for the concessionnaires, Prentice Air Services, of Ipswich.

Next came Flt. Lt. Christopher Staniland with the slim Fairey P.4/34 (1,000 h.p. Rolls-Royce Merlin), which is the younger and rather smaller sister of the Battle. At past R.Ae.S. Garden Parties, S.B.A.C. Displays and so forth, Staniland's demonstrations have been a star turn, consisting as they have of vertical turns, rolls and so forth performed at an almost indecently low altitude. This year, one imagined, he had been asked to apply the soft pedal lest, perchance, some member of the Parliamentary Air Committee or other valuable guest expire of heart failure. So his usual act was performed at rather greater height, which did not mean that his roll-off-loops, climbing rolls, rocket loops or what-have-you were any less perfectly executed. The Merlin, too, did its best to make up for any lost spectacular value by occasionally emitting an inspiring series of bangs, with puffs and streamers of black smoke, when the throttle was cut.

Mr. A. H. C. A. Rawson delighted the crowd with the little Kay Gyroplane (75 h.p. Pobjoy R), the constructors of which were Odie, Bradbury and Cull, of Southampton Airport. He demonstrated an almost direct take-off, although the machine, with its controllable-incidence rotor blades, makes no claim to "jump start" capabilities. His subsequent display of the Gyroplane's controllability contrasted curiously with the fact

that (according to the programme) lateral control is by *socking* action of the stick.

Came the first tea interval, and so great was the crowd that even a whole squadron of marquees could not engulf the onslaught. The London Gliding Club put up a fine show of modern sailplaning methods, though, unfortunately, in such a remote corner of the aerodrome that it was witnessed mainly by urchins who had climbed in by the back way.

Miss Amy Johnson, and others, were winch-launched in the Kirby Kite, a process which can be a little jerky and hectic, for it appears that the rules of the game encourage the O/C. winch to change gear while the sailplane, kite-like, is climbing steeply on the end of its string.

Mr. Dudley Hiscox, in the shapely Slingsby Gull, was aerotowed, and so was Mr. Philip Wills, British distance-record holder, in the Minimoa, a sailplane that is as graceful as its name. Cast off, both found thermal currents and circled slowly upwards and away out of sight. Mr. Hiscox landed at Northolt some two hours later; of Mr. Wills there was still no report by the end of the afternoon, though it transpired that he had put down at Heston.

A strange, self-sufficient but delightful race, these sailplanists. Listening to them on Sunday, we began to feel convinced that long experience has enabled them to *see* their precious thermals, possibly as long, quivering, reddish-black columnar affairs, to be pursued and jumped upon at all costs.

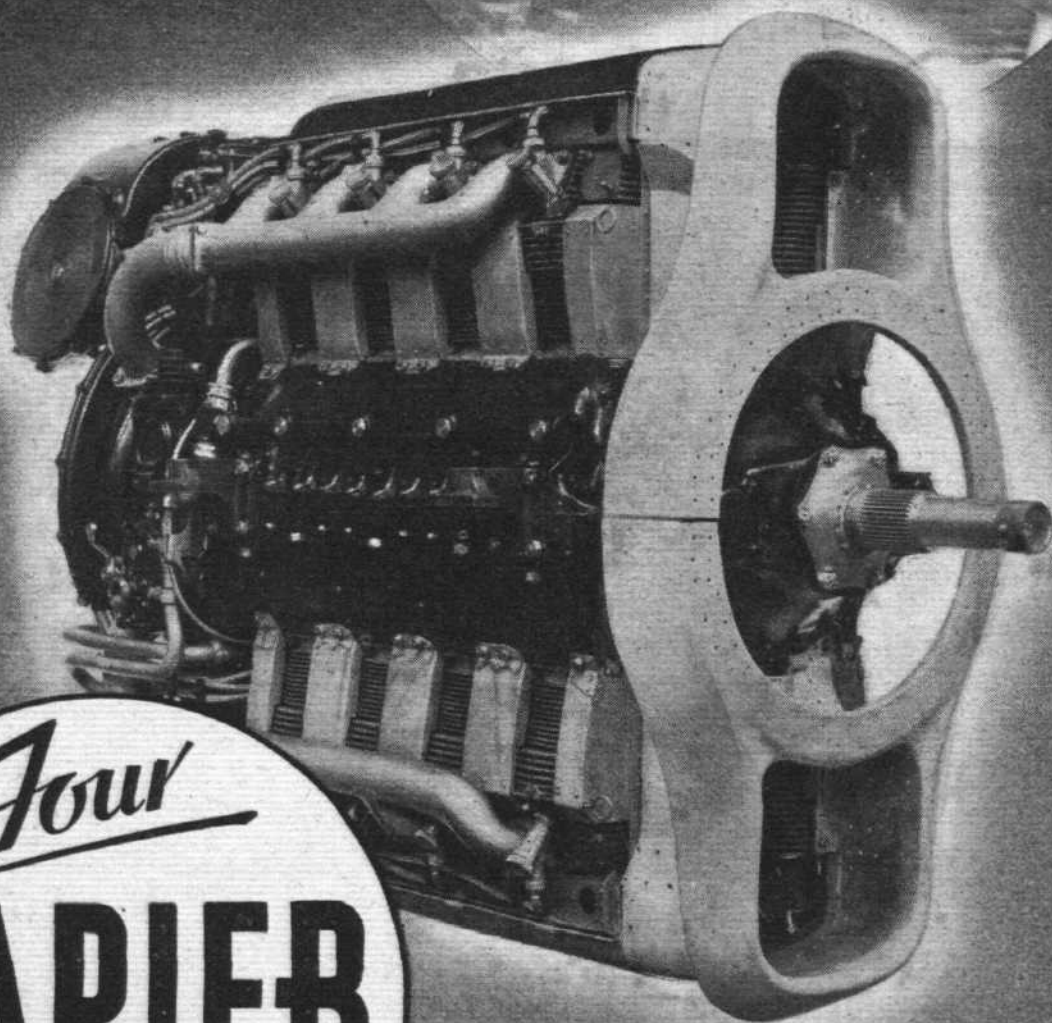
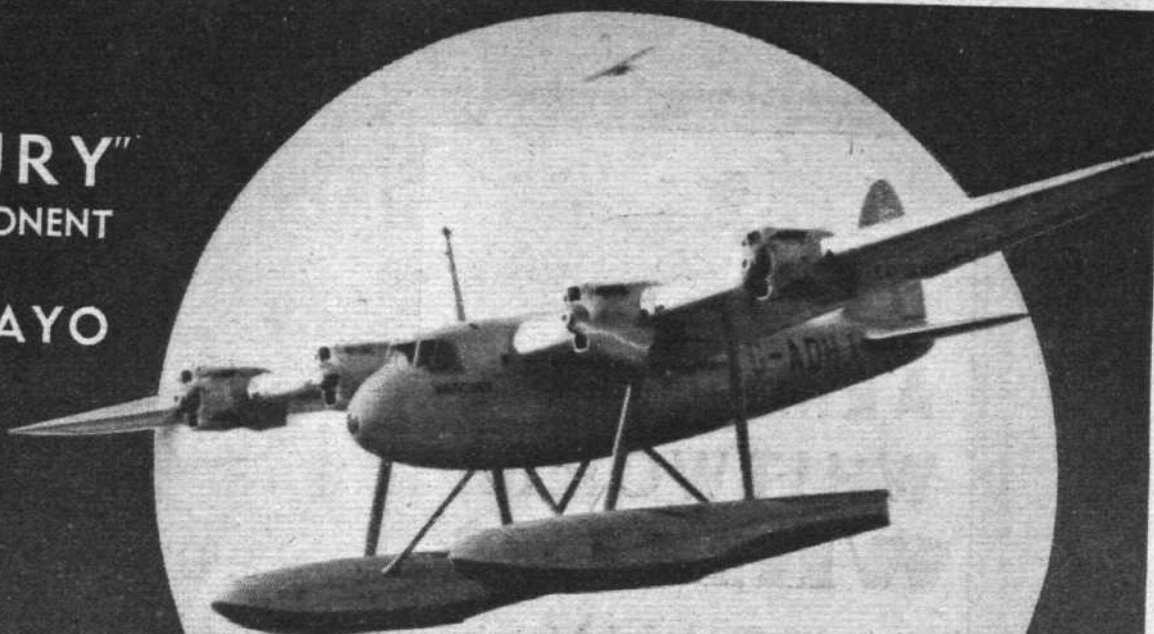
The Gipsy-engined Cadet in which Mr. Mark Lacayo had been doing the aero-towing, coming in over the boundary with the long towline trailing below, connected with the roadside



"Flight" photograph.

Making its public bow: The Marendaz Mark III, not quite finished but looking eager to go somewhere quickly. It seats four, and the motor is a Gipsy Six.

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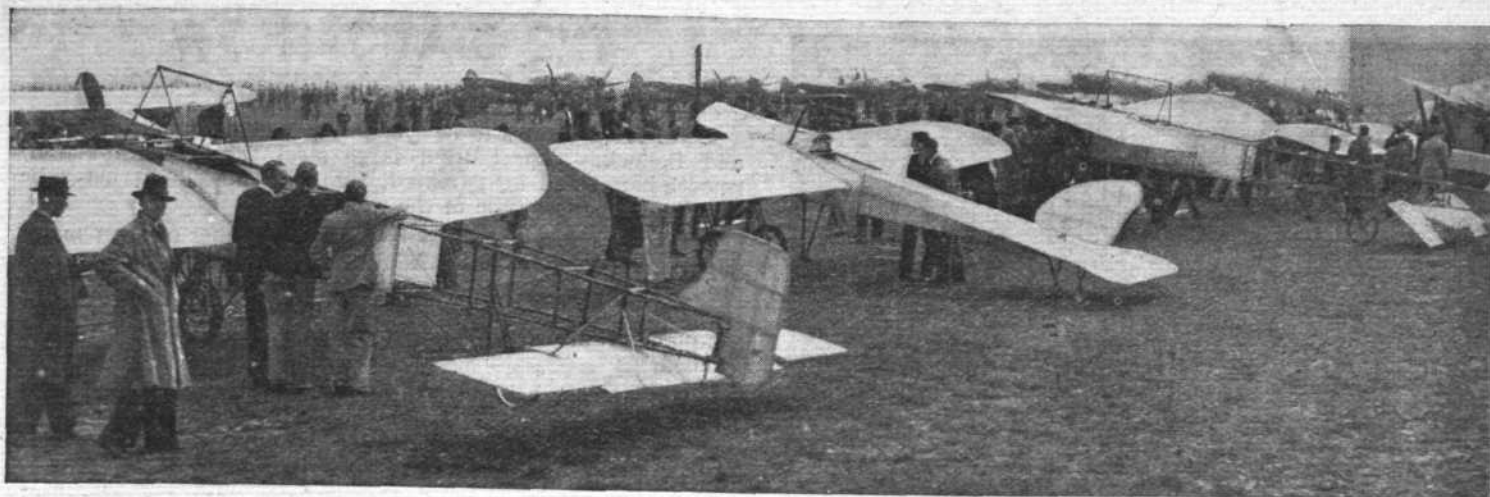


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Back to those happy-go-lucky days: the old-timers' park, with the Gordon-Bennett Bleriot flanked by two less racy Bleriets.

telephone wires, to their not inconsiderable detriment.

And so back to this grim and earnest power-flying business, as exemplified in the Bristol Blenheim (two Mercury VIII). Flt. Lt. C. A. Washer gave a most impressive demonstration of this popular (if the word can be so used) medium bomber. His dives, fly-pasts and climbs gave tangibility to such figures as: "Top speed, 280 m.p.h. at 15,000ft.; climb, 20,000ft. in 13 min." In one long, soaring climb he rocketed straight up towards one of the high-flying sailplanes, and only turned away when—so it looked from the ground—comparatively near. It would be interesting to know how much Mr. Wills (or was it Mr. Hiscox?) saw, and heard, of that little incident.

A second tea interval was occupied by demonstrations of historical aircraft, such as can be "comic old crocks" only to those too young to recognise and remember the bitter-sweet smell of castor oil and the *thratter-thratter-thratter* of a rotary engine.

It was a brave reunion of veterans, some rebuilt but none modernised. Mr. R. G. J. Nash had a 1909 Bleriot (22 h.p. fan-type Anzani) of the kind in which its designer flew the Channel, together with a positively racy-looking Bleriot of 1911 vintage, actually a Gordon-Bennett race machine capable of over 80 m.p.h. with a 50 h.p. Gnome seven-cylinder rotary.

Mr. R. O. Shuttleworth had assembled a Bleriot XIV (20 h.p. fan-type Anzani); a 1911 Deperdussin monoplane (25 h.p. Y-type Anzani replacing original fan type); a Sopwith Pup (80 h.p. seven-cylinder Le Rhone); and a Hanriot (110 h.p. Le Rhone).

Hands-off

Mr. Shuttleworth and Mr. A. J. Edmunds both put up fine shows on the "Dep," making a number of circuits at about 45-50 m.p.h. and several hundred feet, but the Bleriot XIV was sulky, and refused to do more than hop. Mr. Shuttleworth told us that the Deperdussin can be flown quite easily hands-off.

Sqn. Ldr. A. N. Wheeler flew the Pup and the Hanriot, throwing a loop on the former. Both those war-time fighters had a distinct family resemblance; the Hanriot factory built Sopwiths under licence. The French machine, in particular, had a climb that almost suggested the modern fighter; it could certainly outclimb the average club trainer of to-day.

An interested (and one, suspects, slightly wistful) spectator watching the veterans was Mr. A. E. Grimmer, who in pre-war days owned and flew the Deperdussin and one of the Bleriets. It was in his store-yard that Mr. Shuttleworth found the components with which to reconstruct the machines.

The snail of a v.p. airscrew recalled us to the present day; to watch Mr. H. J. Penrose taking up the Westland Lysander (Mercury XII) at the most incredible angle, straight off the ground; and thereafter flying it, slow and fast, in equally improbable attitudes, all made possible by its slots and flaps; the latter come into operation automatically at the bidding of the full-length leading-edge slots. Later Lysanders are to have the Bristol Perseus.

And then came what was undoubtedly the most impressive moment of the day. The soft, booming roar of 3,000 h.p. of Pegasus XC drew all eyes skyward to see the Short Empire boat *Calpurnia* approaching at low altitude. She crossed the aerodrome at a bare roof., circled, and came along in front of the enclosures even lower—certainly her keel cannot have been more than 50ft. from the grass. Her pilot—Capt. L. A. Egglefield, of Imperial Airways—then climbed, made a number of steep turns, and took his charge back whence he had come.

No. 61 (B) Squadron departed, Blenheim by Blenheim, to reform above the aerodrome and treat us to a brief display of

formation drill; a trio of Mikron-engined two-seater Topsy monoplanes (Messrs. Brian Allen, Ward and Birkett up) gave a lively display, collectively and individually; and Mr. G. N. Wikner put the Wicko monoplane through some aerobatics (including a spin) which came oddly but convincingly from such an eminently comfortable and civilised cabin aeroplane.

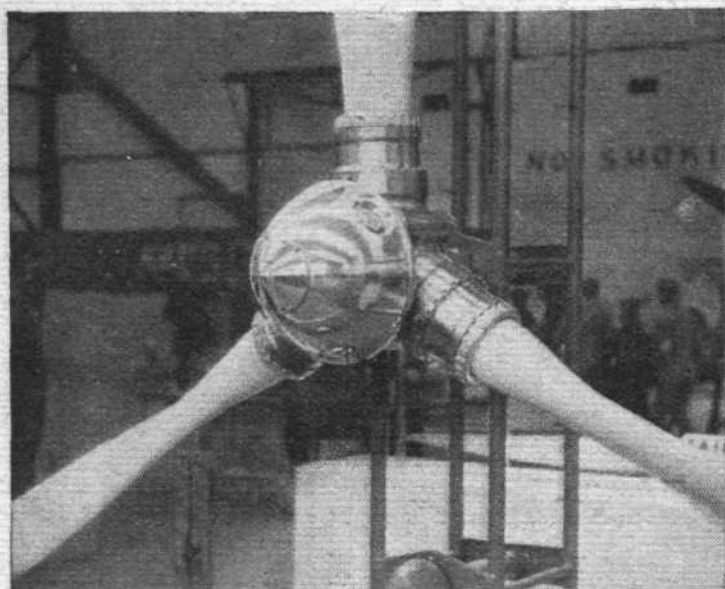
The Luton Buzzard single-seater Anzani vee-twin-engined monoplane appeared in a new and pleasing form, a transparent cockpit cover fairing neatly into the pusher engine and airscrew mounting, with a large airscrew spinner to complete the aerodynamic form.

Mr. Robert Kronfeld acted as demonstrator, but had been in the air for only a few minutes when he had the wretched luck to crash, fortunately without the slightest injury to himself. We did not witness the mishap, which occurred on the far side of the aerodrome, but Mr. Kronfeld said afterwards that another machine went into a steep turn immediately in front of him, forcing him into an equally steep turn at a low altitude in order to avoid it. The Buzzard touched the grass with a wing-tip at about 75 m.p.h. and cartwheeled, breaking its tail. Mr. Kronfeld, as we have said, was quite unhurt (which speaks well, in a negative sort of way, for ultra-lights in general), but was naturally upset at the occurrence; he had only tried the Buzzard for the first time that day, or possibly the day before, and expressed himself charmed with its qualities.

Thus ended the flying display, but few moved for the car parks until they had seen the *grand finale*—a vast petrol-fed bonfire piled against a wall of Dürasteel. The wall remained a wall and apparently transmitted practically no heat to the far side, in spite of temperature of 2,500 deg. F. or so. This material figured in the static show, which is dealt with on pages 462 and 463.



Power quiescent: Bristol engines in the "static" show, with a sleeve-valve Aquila in the foreground.



The new Fairey fully-feathering airscrew. It is hydraulically operated.

Among the scores of aircraft present—there were over 100 private-owner and/or club machines alone—were some which deserve mention, they were not (so far as we could see in the slightly rehashed scheme of things) actually demonstrated, but they toed the official lines.

Thus, in the line-up of fifty-odd machines, one found such new types as the Miles Monarch and the Marendaz. The Monarch (which was illustrated in *Flight* of March 24) may be regarded as a successor to the Whitney Straight, being powered with a 130h.p. D.H. Gipsy Major (fixed-pitch airscrew) and having similar main dimensions. There is, however, a third seat, increasing the loaded weight by 150 lb. Cruising (130 m.p.h.) and maximum (145 m.p.h.) speeds remain the same as those of the Straight. With a comfortable and luxurious interior, the Monarch embodies several other features the details of which remain, for the moment, undisclosed; among them is a device best described as a glide control.

A Newcomer

The Marendaz Mark III is a complete newcomer, a wooden cantilever monoplane designed by International Aircraft, of Barton, Beds, as a luxury private-owner or charter type. Powered with a 200 h.p. Gipsy Six, it seats four, and has a number of interesting detail points. There is a retractable undercarriage, dual wheel control, Marendaz full-span flaps, and a cabin enclosure giving plenty of "daylight." The example shown, which arrived by road with dope barely dry, was obviously experimental, with a much-tabbed and rather incomplete-looking tail unit, but its general lines give promise of sound performance.

Walking down the line, one found such varied types as Mr. A. J. Walter's Cub with Everel single-blade airscrew (which, Mr. Bill Shackleton tells us, has just received Department of Commerce approval for all American engines up to 165 h.p. and which is the subject of a U.S. Government 500 order for training types), a Cygnet, bearing the name of its new parents, General Aircraft; assorted airline equipment in the shape of a Jersey Airways' D.H.86, an Olley Air Service Rapide, and a Short Scion Senior; the Monospar ambulance; the Arpin pusher, described on page 479 of this issue; the Lockheed 12A *John Knox*, shown by Brian Allen Aviation; the Hordern-Richmond Autoplane; and—representing the host's house, so to speak—a Fairey Swordfish and three Battles, two of them displaying Belgian colours, and the differences of finish and equipment favoured by that country.

So much for machines, though a visit to the visiting-aircraft park would have provided a story in itself had space permitted, which it does not. It seems apposite to pass from the "dynamic" to the "static" part of the party by way of an exhibit which might be said to fall nicely between both—wind-tunnel work on top of a car, as represented by Mr. W. E. Gray's mobile outfit for testing an improvement on Mr. H. B. Irving's "book-form" flap. Mr. Gray has added a small servo trailing edge, which reduces the control-stick loads almost to vanishing point, yet gives flap stability at all speeds.

And so to the big hangar for a look round the "statics." The show was, metaphorically, in the nature of a museum; by which we mean nothing derogatory to the exhibits—simply that everything was shown "By courtesy of Messrs. So-and-so" rather than on a prominently signboarded trade stand.

THE STATIC SHOW

Metals in Aircraft

Metal tubing seems to be "as putty" in the hands of Accles and Pollock. Apart from large steel tubes, manipulated, smooth-bored and heat-treated, the firm showed ratchet tube and "the smallest tube in the world."

Perhaps for fear of disappointing one or other of their many departments, High Duty Alloys, Ltd., brought along some product from each. It was impossible to single out for mention any particular exhibit from the engine stampings, alloy samples, or macro and micro specimens; all were of equal interest.

Nitralloy steels have been developed by Thos. Firth and John Brown, Ltd., and they are produced by low-temperature treatment in ammonia gas. A nitrided cylinder was displayed as an example of this surface-hardening treatment.

Stainless steels (now used extensively in many aircraft—fleet types in particular) are chosen for, among other properties, their resistance to corrosion. Parts of the Supermarine Walrus were shown among steel stampings, valves and other products by Firth Vickers Stainless Steels, Ltd.

Well-executed examples of welding in the form of tail wheel forks, exhaust pipes, etc., were shown by the Harborough Aircraft Construction Co., Ltd.

Coolers and Heaters

Taking excess heat from the engine and putting it into the cabin is the mission of Robertsons Oil Coolers, Ltd. A light alloy combined cooler and heater fitted to the Westland Lysander was shown as an example.

Although cabin heaters and combined oil and glycol radiators formed part of their display, considerable interest was shown in the cut-away anti-surge tank, the design of Gallay, Ltd. The baffles move with the opening of the filler cap and prevent air locks.

Aero Engines, Airscrews and Accessories

From their range of motors, Armstrong Siddeley, Ltd., chose the medium-supercharged 355 h.p. Cheetah IX engine for exhibition. The engine has direct drive and was in this case cowled in the characteristic partly helmeted style.

As usual, the superb finish of the Bristol Aquila and Pegasus XVIII engines was greatly admired. Those who had previously been privileged to visit the Bristol engine works at Filton recalled that the production engines are just as well finished, although not, perhaps, quite so artistically painted.

Perhaps the most successful small aero engine in the world, the Gipsy Major I was well chosen to represent De Havilland Aircraft in the Gipsy engine section. It followed, too, that the smallest v.p. airscrew produced in the world should have a central position. An example of the 1,000-size model could be seen slowly alternating between coarse and fine pitch.

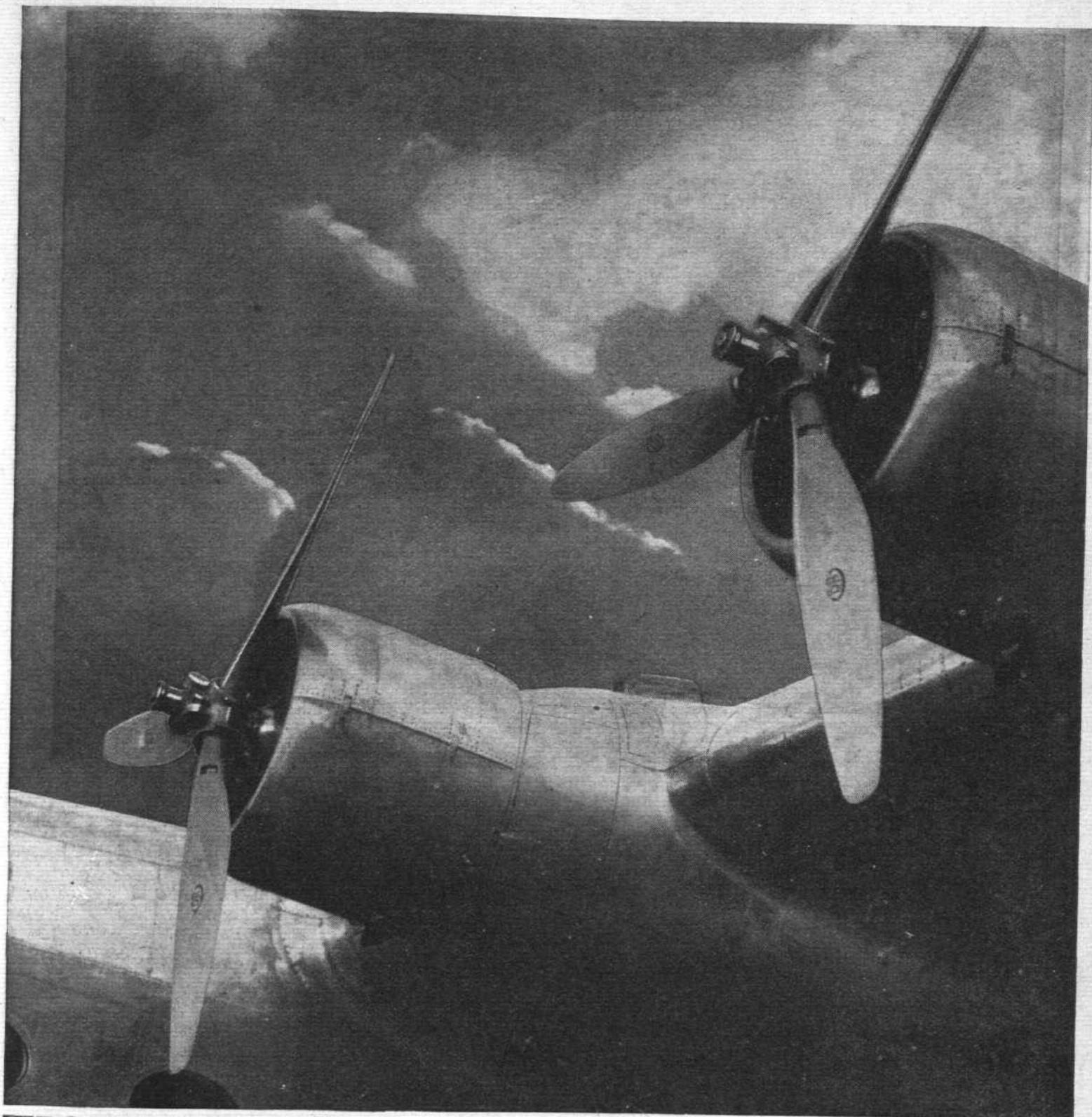
For those who did not know the inner working of the 24-cylinder "H" shaped Napier-Halford Dagger, a show-case contained the complete "movement" in mesh. Photographs showed recent Napier installations, and a *Flight* drawing predicted the appearance of the Handley Page Hereford with two Dagger VIII engines.

Merlin installations were to be seen in the aircraft park in Battles, Belgian and English, and in the Fairey P.4/34, while in Rolls-Royce's own section the familiar vee-twelve-cylinder engine lines were represented by a highly polished 990 h.p. Merlin.

The large three-bladed size 1,000 controllable-pitch airscrew on the Fairey stand seemed to indicate that the Fairey Aviation Co., Ltd., has been making progress with the work which the company has now had in hand for several years. This particular specimen has an extremely neat hub, which is applicable to metal or wooden blades. It is of the hydraulic type, with 360 deg. movement, and blades can be removed for inspection without upsetting the pitch setting.

The beautiful finish of the "Rexford" blades of airscrews for Gipsy Six and Gipsy Twelve engines drew favourable comment from visitors to the Bakelite stand, and next door J. Burns, Ltd., showed something of what can be done with Bakelite components on aircraft. That plastics will play an increasing part is becoming quite obvious.

Readers of *Flight* who were familiar with the airscrew products of Jablo, Ltd., found interesting visual confirmation on the stand, where the process was well illustrated. The finished and part-sectioned blade of compressed and improved wood was particularly convincing, as were also the test specimens and test results.

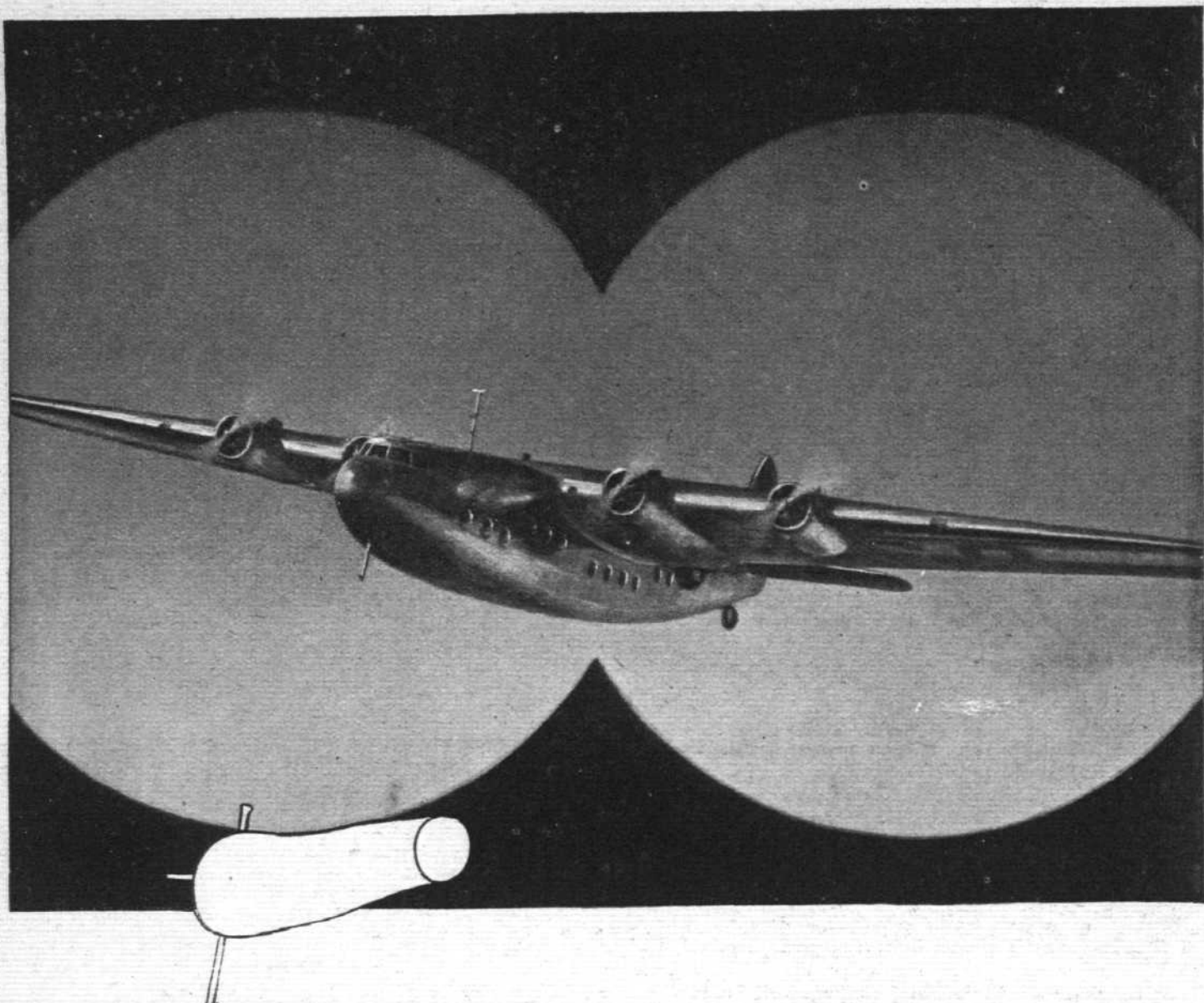


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Carburettors for high-powered engines grow more compact and complicated, but their controls become, if anything, simpler and more automatic. It is doubtful whether the uninitiated gathered much concerning the carburetter's construction from the large example shown by H.M. Hobson Components, Ltd., but they were able to be told about the inside of, and see the outside of, the main units, and work the throttle and inter-control levers.

Parts which even the most ardent aircraft enthusiast is apt to leave to the other man are the electricalities. Rotax, Ltd., however, deal adequately with these, and their examples of starters, motors, fuse boxes and cut-outs left no doubt as to their solidity of construction and quality.

Wheels, Brakes and Tyres

The sheer size of the demonstration unit attracted most visitors to the stand of Aircraft Components, Ltd., but George Dowty's new pre-selector flap control was spotted instantly by the more discriminating as a development worth watching. The advantages of being able to select in advance the flap position one wants and then, when the time comes, merely to "press the button" is obvious. Nor is this new development confined to flap control.

Among the extensive selection of hydraulic equipment shown by Automotive Products, Ltd., it was interesting to find the hand-pump outfit for operating the bolts of wing-folding gear. Gone are the days when one struggled with recalcitrant wing-folding bolts. A few strokes of the pump, and the bolts in both wings move in and out smoothly. This equipment is fitted on, among other aircraft, the Blackburn Fleet Air Arm machines.

The Avery brake, which is of the disc type, was shown in section, and its neatness was thus well brought out. More of a novelty was the self-sealing coupling which enables a pipeline to be quickly "broken" and connected up again. When one joint is broken, the coupling automatically seals the particular section of pipeline.

Twenty-five years of aero wheel development were covered by the 1913 600x100 wheels and the 1938 1120x380 wheel shown on the Palmer stand.

A huge Dunlop wheel and tyre as fitted to the Ensign class of airliner was certainly a striking exhibit, but closer interest was shown in sections of leading-edge carrying Dunlop anticreep equipment; the method is the percolation of an anti-freeze liquid through specially prepared fabrics spread over the leading edge.

Of the pneumatic, hydraulic and mechanical air brakes produced by Bendix, Ltd., a mock-up of the D.H. Albatross pneumatic braking system was chosen as an example and the differential control mechanism between rudder and brakes was sectioned for closer examination.

Tools and Equipment

As lubrication equipment experts, Tecalemit, Ltd., showed several fittings, oil guns, filters, etc. Their recently introduced oil pump also featured, as a component in the Tecalemit hydraulic actuating system, and a refuelling nozzle was demonstrated.

In a show-case containing as fine a selection of Desoutter drills as one could see, there rested a minute 1.2 c.c. internal-combustion engine made for experiment by Mr. C. Desoutter. It develops 1/28th h.p. at 6,000 r.p.m.

A very handy transportable air compressor spraying plant was shown by Grice and Young, and on this stand was also exhibited a wooden airscrew made by the newly formed Hordern-Richmond concern.

Those visitors whose special interest lay in works equipment

found much to be admired in the riveting machines shown by the Bifurcated and Tubular Rivet Co., Ltd. One was for flush-riveting skin plates, and the other demonstrated normal riveting with semi-tubular rivets.

Instruments and Radio

The name Marconi has ever been linked with pioneer work, and the tradition was maintained by the A.D.67 transmitter used by Imperial Airways on the experimental transatlantic flights last year.

An ingenious working model illustrated the automatic pilot on the stand of the Sperry Gyroscope Co., Ltd. The pilot controlled a model aircraft of 3ft. span, and a miniature instrument panel showed exactly what was happening.

Modesty seems to have been the keynote in planning the stand of Smith's Aircraft Instruments, Ltd., for but a very minute percentage of the firm's huge range was shown. Aircraft designers who visited the stand were probably most interested in the new "chassis indicator." In spite of several years' experience, there is still a little uncertainty about retracting undercarriages, and the new indicator should be a welcome auxiliary.

The name Kollsman figured prominently in the range of altimeters and rate-of-climb indicators on the stand of Kelvin, Bottomley and Baird, Ltd. An electrical tachometer was so sensitive that a steady reading could not be obtained with the hand-turned demonstration model.

Among the interesting instruments shown by the Cambridge Instrument Co., Ltd., the recording vibrograph was much appreciated. This instrument determines the extent and periodicity of vibrations in aircraft structures and thus has many applications.

Buildings

Air raid protection is among the business of Nissen Buildings, Ltd., and carefully planned structures, shown in model form, of shelters, first-aid posts and cleansing stations gave rise to many a speculative remark among the visitors.

Specially prepared protection panelling by Durasteel Roofs, Ltd., used in conjunction with corrugated iron and steel framework can be used to withstand even a one-kilogram incendiary bomb. Examples of construction for such work could be seen, and later, as already recorded, a convincing demonstration was given on the aerodrome.

Dope

That the need for dopes and protective finishes did not disappear with the coming of stressed-skin construction was revealed by a visit to the Celson stand, where some of the most up-to-date processes were shown.

Enclosures

Perhaps the outstanding impression formed by a visit to the stand of I.C.I., Ltd., and Mouldrite, Ltd., was the great progress made in forming Perspex to quite sharp double curvatures without getting bad optical distortion.

Fire Protection

Smart suiting for use on the fire tender, as supplied to the Air Ministry, and large and small portable asbestos screens, were witness to the continued war on fire waged by Bells' Asbestos Co.

Aircraft

After the excellent flying display of the Vickers Wellington, visitors were specially interested in the excellent model of this machine and in two more of the Wellesley and Supermarine Spitfire.

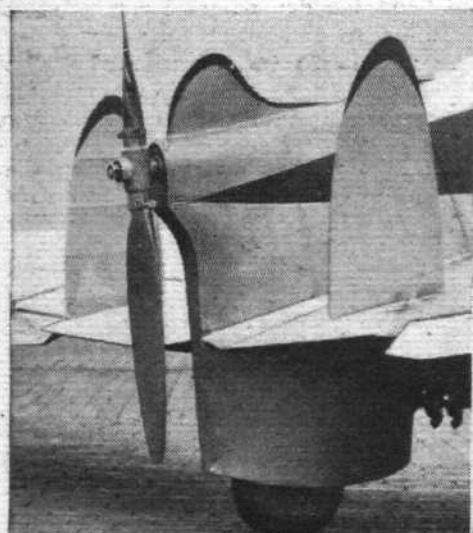
Forthcoming Events

May 14-22. Finnish Aero Show, Helsinki.
May 17. Air League of the British Empire: Annual Dinner, Grosvenor House, London.
May 17. Aero Golfing Society: "Flight" Trophy, Royal Ashdown Forest.
May 28. Air League of the British Empire: Empire Air Day.
June 4-6. Manx Air Races.
June 11. Bristol and Wessex Aeroplane Club: Garden Party.
June 18 and 19. Brooklands Four-club "At Home."
June 22-28. F.A.I. Conference, Berlin.
June 25. Official opening of Wolverhampton Airport.
June 25. Air Display, Gatwick Airport.
June 25-July 1. Magyar Pilota Picnic, Budapest.
June 30. Aero Golfing Society: Jubilee Cup, Prince's, Sandwich.
July 2. R.Ae.C.: King's Cup Race.
July 9. Ipswich Aero Club: Flying Meeting.

July 9-17. National Gliding Contests, Dunstable.
July 16-18. Deauville Rally.
July 16. Official opening of Luton Municipal Aerodrome by Secretary of State for Air.
July 17-24. Third Littorio Rally, Italy.
July 23. County Flying Club: Flying Meeting at Rearsby Leicester.
July 30. Official opening of Exeter Airport.
July 30. Folkestone Aero Trophy Race, Lympne.
August 27-28. Southend Flying Club: Flying Meeting.
September 3. Cinque Ports Wakefield Cup Race, Lympne.
September 10. Cardiff Aeroplane Club: London-Cardiff Race.
September 11-18. Swedish Civil Aviation Week, Stockholm.
September 21. Aero Golfing Society: Celson Trophy Richmond Golf Club.
November 13-December 4. Paris Aero Show.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



According to *l'Intransigeant* the three Bristol sleeve-valve engines, Aquila, Perseus and Hercules, are to be manufactured under licence by Alsthom, the French Thomson-Houston Company.

ANOTHER PUSHER: Developed by Tuscar Metals, Inc., of New Philadelphia, this tailless two-seater cabin pusher is now under test. It is said to do 120 m.p.h. with a 95 h.p. engine.



A PAIR of the new Heinkel He.116 transports, with four 240 h.p. inverted-vee engines, have been delivered to Japan for the Manchurian service.

A French army observation balloon was struck by lightning recently, and its two occupants were killed when it fell in flames at Bitche, near Strasbourg.

Miss Phyllis Dorothea Verdon-Roe, eldest daughter of Sir Alliot Verdon-Roe, is to be married to Flt. Lt. J. H. G. Sarll at Hamble on August 24.

A special Koolhoven F.K.49, which looks very much like a large Short Scion, has been supplied to Turkey. It is particularly interesting, because it is intended solely for survey work and is powered with two of the new Ranger inverted-vee engines driving v.p. Hamiltons.

Among the honours awards to be made by Bristol University is Mr. A. H. R. Fedden, who will receive the degree of D Sc. in Engineering.

The international aerobatic championship at Saint Germain was won by Count Otto Hagenburg, on his Bückerflugmeister. A Czech was second, and Cavalli, the French test pilot, third.

The Philippine Army has ordered nine Boeing machines. Six will have Pratt and Whitney engines, three machine guns each, bombing apparatus and wireless. The others will be for training.

Dick Merrill has been awarded the 1937 Harmon Trophy for the second consecutive year for his Atlantic flight with Jack Lambie last May. President Roosevelt made the presentation at the White House.

A ten-foot motor dinghy was flown from Croydon to Brussels last week in one of the Curtiss Condors of International Air Freight. The freightage was £2 and the insurance 1s. 3d. The boat had been ordered only the previous day.

Mr. Philip Wills, of the London Gliding Club, recently flew from Heston (aeroplane-launched) to St. Austell, Cornwall, a distance of 206 miles. The British long-distance gliding record has been broken three times in as many weeks.

A new aeroplane factory is being built at Malton Airport, Toronto, by the National Steel Car Corporation. Work will be commenced by mid-summer on a Canadian Government order. Some 300 hands will be employed and large commercial and military machines will be constructed.

Lockheed Aircraft have put up a specially constructed six-seater transport adapted from the 12a for the U.S. Army Air Corps competition. It has a top speed of 230 m.p.h. with two P. and W. Wasp Juniors. The use of the machine is for transport of Army personnel or for training in multi-engine operation.

Dr. Eckner, accompanied by Dr. Issel, manager of the Zeppelin Co., is now in New York on business connected with the future of transatlantic air services and the smoothing out of difficulties in connection with the export of helium gas. He will be received by President Roosevelt. The U.S. Government has refused to supply the gas on the ground of its "military importance."

Twenty-five Years Ago

(From "Flight," May 10, 1913.)

"The great hydro-aeroplane built by Maurice Jeannson was tested at Triel on the Seine on April 29 and made one or two short flights on subsequent days, Colliex being the pilot. The machine is said to have attained a speed of 62 m.p.h. when carrying three passengers, and during one test it carried a useful load of 1,600 lb."



ATTACHED: Imported for the use of Col. Vincenzo Coppola, the Air and Military Attaché to the Italian Embassy in Washington, this Cant monoplaner has three 110 h.p. inverted four-cylinder Fiat engines. It was assembled at the Floyd Bennet Field.

CUTTING the RED TAPE

Some Further Constructive Suggestions on the Reorganisation of the British Air Ministry and Aircraft Industry to Facilitate Production

By A PRODUCTION ENGINEER



THE production of aircraft in this country is being mismanaged because it is in the hands of politicians and Service people who have not had the requisite training or experience to tell them what effects the decisions they give may have upon a large engineering industry.

What can be done? The only thing to do is to take production out of their hands and to put it into those of competent engineers—men with years of experience behind them; men who understand the necessity of reducing to a minimum the present intricate organisation and the mass of details in which it is involved.

Wastage of the time of highly paid officials by attending conferences and carrying on heavy inter-office correspondence must be cut out; and such officials must be forced to take responsibility and assured that they will not be black-listed if they occasionally make a mistake—so long as it is not the same mistake twice.

Finance control of Air Ministry contracts should be put on the same basis as that of the Admiralty.

The first step towards rationalisation would be to cut down the number of types of aircraft, and the following is the author's idea as to the types that are essential. It is realised that these aircraft may not have the maximum efficiency for the duties they have to perform, but is it better to have 100 per cent. output with 95 per cent. aircraft efficiency than 25 per cent. output with 100 per cent. efficiency? Surely numbers count more than maximum efficiency in times of emergency!

- (1) Elementary training machine, built of wood. Older Service types could be used for advance training.
- (2) Land-type fighter.
- (3) General-purpose aircraft designed to carry out Army co-operation, short-range bombing or coastal defence.
- (4) Bombing aircraft so designed that they could act as long- or short-range bombers or troop carriers.
- (5) Fighters for naval use.
- (6) Bombing and torpedo-carrying aircraft for naval use.
- (7) Long-range flying boats for naval use.

The Service side and the engineering side of the Air Ministry should be put under separate control so far as supplies are concerned. The Service side could deal with all matters relating to aerodromes, buildings, uniforms, transport, domestic items and the like which do not require a highly technical training, leaving to the engineering side the design and supply of aircraft, engines, guns, bombs and bomb gear, wireless, instruments, etc. Each side would have its own contracts, inspection, costing and production departments. There would naturally be a few Service officers posted to the engineering side for co-ordination duties and so forth.

The engineering side should be under a fully qualified civilian engineer with a seat on the Air Council. He should be a good organiser, with commercial training and some years' experience in the design and production of aircraft. He should have a personality which would command the respect of the Service side as well as of his own staff. He should be of a forceful character, able to give decisions and to stick to them. He should be responsible to the Minister for Air for the work of his departments—not to the Chief of the Air Staff.

His staff at headquarters would consist of:

- (a) Four first class principal assistants:
 1. Secretary from the higher civil service.
 2. An engineer in charge of organisation and personnel.
 3. An engineer in charge of land-type aircraft.
 4. An engineer in charge of naval aircraft.
- (b) The following second-class principal assistants:
 1. Seven engineers, each of whom would specialise and be in charge technically of one of the types of aircraft enumerated above.
 2. An engineer in charge of engines.
 3. An engineer in charge of armaments.
 4. An engineer in charge of wireless, instruments, etc.
 5. An engineer in charge of inspection.
 6. An engineer in charge of production.
 7. An engineer in charge of research.
 8. A chief contracts officer.
 9. A chief costing and accounting officer.

A certain number of junior engineers and clerical staff would also be required at headquarters.

Decentralisation

It would be the chief engineer's first duty to divide the country up into areas (e.g., London District, Southern, Western, Midland, Northern, Scottish, Irish). To each of these areas he would appoint an assistant engineer with much the same training and experience as his own. These men would be of same rank as the second-class principal assistants and would have absolute charge of all work going on in their respective areas. Each would have offices at a convenient place in his area, with necessary technical inspection, production, contracts, costing and accountancy staffs to deal with all the work in the area under his control.

The principle of decentralisation should be carried as far as possible. Area officers should deal direct with one another in all routine matters affecting inspection, contracts, supplies, etc., without reference to headquarters, the object being to leave the headquarters staff free to deal with major matters and for planning ahead. To make

the scheme a success the area engineers must have full responsibility given to them.

At first sight it may be thought that this scheme of organisation would add to the cost of administration. Actually, however, whilst adding to the number of higher-paid staff, it would at the same time release a large number of the junior staffs. Such juniors staffs as were retained and posted to the various areas would be more in touch with the practical side of their jobs and would be receiving training to fit them for higher posts.

Moreover, office rents and rates of pay are lower in the provinces, and more work can be obtained per unit of staff, as personnel do not have to spend, perhaps, two hours per day in travelling to and from the office. In addition, there should also be a considerable saving in travelling time and expenses on the part of both the Air Ministry and the contractors' staffs. Queries relating to contracts could be settled more quickly and production generally speeded up. Incidentally, the natural advantage that firms in the London district have over those in the provinces by being within easy access of the Air Ministry would be minimised.

The chief engineer should certainly revise the system of placing contracts. The present "time and line" basis is demoralising to the staff of any firm, as they know that whatever time or money is spent on a contract, it will be recovered plus a fixed rate of profit. If they cannot see much work ahead the tendency is to spin out what they have in order to keep the staff and workpeople together, and this certainly does not help output. All contracts should, as far as possible, be placed on a fixed-price basis with, possibly, a bonus for early deliveries and penalties for late ones. It is realised that a settlement of penalties may be difficult, but the resulting discussion will be the means of ventilating causes of delay and should be helpful in future contracts.

Profit Scale

For such contracts as must be placed on a "time and line" basis there could be a sliding scale of profit allowed, depending on how deliveries are kept.

The chief engineer would also see that his staff did not interfere in any way with the managerial function of any firm. They should not be allowed to bring pressure to bear to have any official removed from his job.

With regard to the aircraft industry, the number of parent or designing firms should be reduced to not more than, say, ten. These concerns should be induced to specialise on not more than two of the types required by the services, so that they would become experts on those types; that is to say, there would be about three firms concentrating on each type, which would be sufficient competition to ensure the best designs being obtained, while the lucky firm would obtain the reward. These parent firms would primarily be engaged on experimenting, designing and testing of new types, and in the manufacture of first batches for use in the Services, the main production orders being placed with firms not in the parent circle.

The remaining concerns in the industry should then be divided up into main contractors and sub-contractors according to their facilities. They would not have to keep up expensive designing staffs and would be able to concentrate on manufacturing.

The main contractors should have aerodromes and testing facilities and would receive large production orders

for approved types developed by one of the parent firms. At the same time as the parent firm receive their orders for first batches, the main contractors work would consist principally of buying units and parts from sub-contractors and assembly of the complete aircraft.

Sub-contractors should be developed as specialists; they would not need aerodromes and their works could be in the towns convenient for labour. They would receive large orders from the main contractors and would specialise in the production of certain units and parts, such as wings, bodies, hulls, undercarriages, floats, controls, gun gear, bomb gear, seats, tanks, pressings, etc., in the same way that we already have specialists in engines, instruments, wireless, airscrews, A.G.S. parts, etc. This organising of production on specialist lines should be carried as far as possible, so that the staffs of such firms became, in time, experts at their jobs, and would be able to advise even the designing firms how to obtain the maximum efficiency in construction with the minimum of cost.

There is nothing new in these proposals. Many of the most successful motor car factories are nothing more than large assembly plants where designers wed together the items produced by various specialist works. In some instances the specialist firm is a subsidiary of the main firm but the principle still applies, i.e., concentrating your available brains and plant on a relatively small field. The technical and production sides of aircraft form a very wide field—much wider and more involved than with any motor car. Thus, if the best results are to be obtained this principle must be applied to the aircraft industry.

Responsibility

With regard to the Air Ministry staff stationed at any given works, one good senior technical man who can take responsibility and give decisions with the aid of two or three good assistants should be able to deal with all technical inspection and contract matter; and it is to be hoped that the method of placing contracts will be revised so that the large numbers of costing and accountancy staffs from the Air Ministry will not be required. Nothing is more annoying and demoralising to a firm's staff and workpeople than the presence of a host of Government officials in the works, many of whom do not know their jobs and do not conform to works rules, hours or discipline. They smoke and drink tea at all hours and work only about half the number of hours that their corresponding numbers on the firm's staff do. Instead of the Government trying to supervise and inspect every petty detail, surely it is better to make the contractors wholly responsible for their products, and see that they have properly organised technical and inspection departments.

Why not make it a contract condition that firms are responsible for their products and that any part proved defective after a given period in service must be replaced free of charge? The aircraft industry should be made responsible for its products in the same way as motor car manufacturers are.

The aircraft industry should be given as free a hand as possible. It should be encouraged by Air Ministry officials to use its brains, and rewarded for good work by a proper flow of contracts at prices that are remunerative. And if the industry is to obtain the best men it should be able to offer salaries equal to those paid in other branches of engineering.

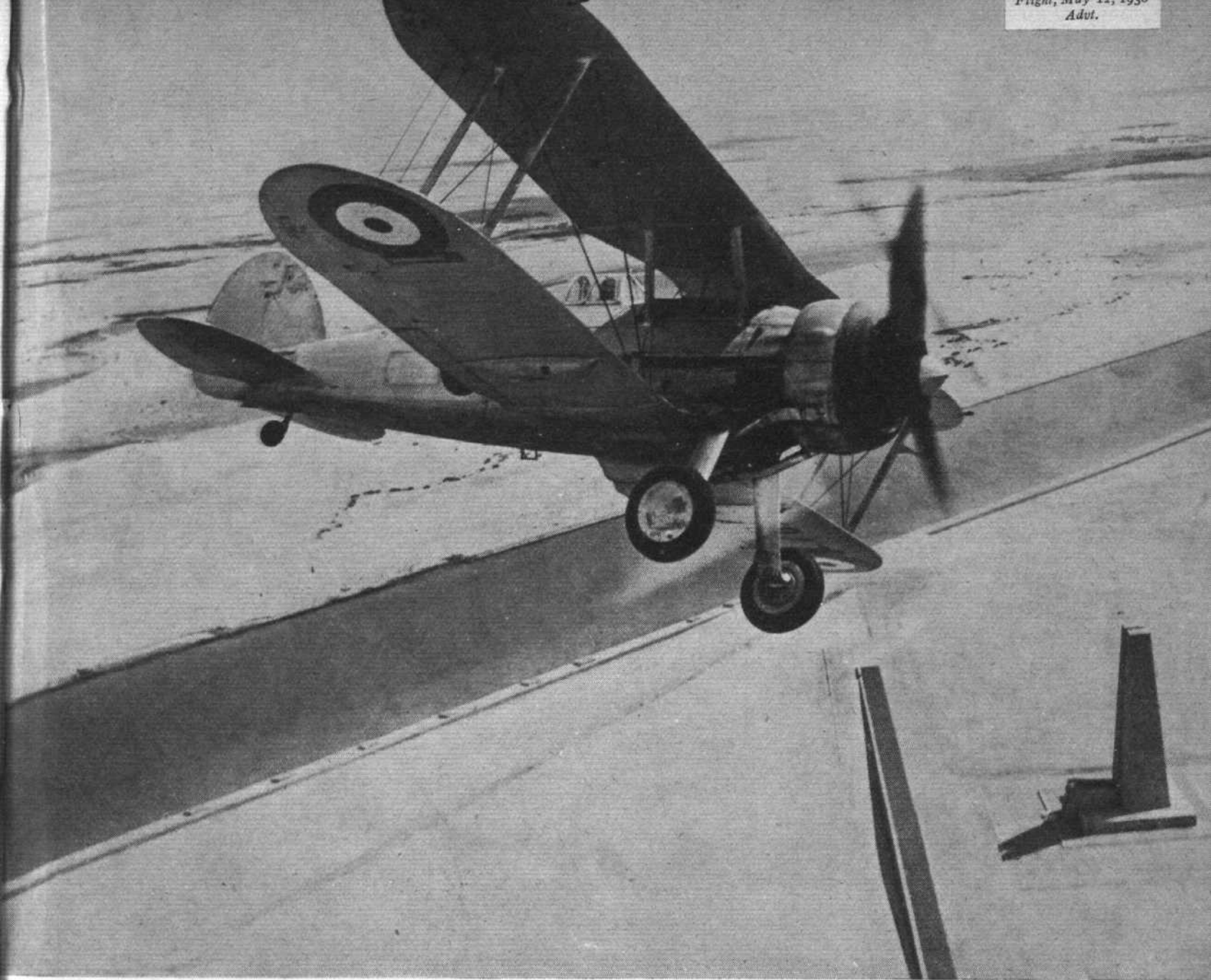
PROPHETS WITH HONOUR

THE aviation section of the Forum Club held a dinner on Monday night in honour of aeronautical journalists, and made Mr. Victor Ricketts the guest of the evening as representing both the lions of the flying world and the Press representatives who helped to lionize them. Mrs. Ivor MacClure, who presided, justified the occasion with the remark that as the section had already drunk the health of every flying heroine it was fitting that at last they should drink the healths of the makers of heroes and heroines.

Mr. Ricketts in acknowledgment, related some of the personal and intimate experiences of the flight he made to New Zealand and back with F/O. Clouston in the Comet. One was the tale of how, at Charleville, there was only one key to

the only available bathroom and of how, after searching the town to find it and having the much-needed baths, they took off next morning for Sydney and Auckland; on arrival in the latter place they found that the indispensable key was still in the pocket of one of them!

Mr. Ricketts also told the tale of the unlucky take-off, on the first abortive attempt, from the boggy aerodrome at Adana, in Turkey. The only take-off runway was 400 yards of road with a ditch on each side. The Comet really needed a 1,200-yard run, but Clouston got her off before the end of the road was reached and then had the ill-luck to touch the bridge parapet with one of the wheels, and so to crash when he came to make his next landing in Cyprus.



WINGS OVER SUEZ

A Gloster Gladiator flying over the pink granite Gebel-Mariam monument erected to commemorate the successful defence of the Suez Canal in 1915. Gladiators form part of the strengthened air defence of the important Suez Canal Zone.



HAWKER AIRCRAFT LTD.,



Helliwells Ltd

DUDLEY

for

SUPERSTRUCTURES

A "FLAT" ENGINED TRANSPORT

The Alcor Junior : Unusual Motor Arrangement and Composite Construction

In a side view the Alcor C-6-1 does not appear to be unusual, although the forward position of the two airscrews is apparent. The Alcor Junior Transport seats eight.



THE latest Alcor C-6-1, designed by Alan H. Lockheed, is an entirely new model, although as far back as 1930-31 the same designer had produced a machine based on the Lockheed Vega with a substantially similar and unorthodox type of engine installation. In 1934 the first high-wing Alcor appeared and this, too, had the same "prone" twin-engined arrangement.

The construction of the new Alcor Junior Transport, as it is termed, is composite. Laminated spruce, steel tubing and alloy sheet are each used where it can have a definite advantage. The spruce is used for control surfaces and in the

outer wing sections, while chrome-molybdenum steel tubing is employed at the points of heavy local stresses such as landing gear attachment, engine mounting and at the wing roots. The wing, which is fully cantilever, has two spars and is covered with a three-ply skin except around the fuel tanks, where sheet Duralumin is attached by screws as a protection and to facilitate inspection.

Hydraulically operated trailing-edge flaps are provided and the ailerons are of Frise type with ball bearings. The under-carriage is, of course, retractable, and turns aft through a 90 deg. arc into wheel wells in the underside of the wing.

In the semi-monocoque fuselage the nose portion and pilot's cockpit are made up of steel tubing covered with alloy sheet, which is easily detachable. The main section is a two-ply shell of Alcor manufacture moulded under pressure, the longerons and formers being of spruce. The tail surfaces are fully cantilever and similar in construction to the control surfaces. The whole of the machine is covered with lightweight fabric and lacquered to give an aerodynamically efficient finish.

The cabin can be arranged to carry four or six passengers, and full dual control is provided for the crew of two.

The unorthodox engine installation is designed to give minimum head resistance and to secure high efficiency on one engine in case of a motor failure. Two 250 h.p. supercharged Menasco C6S-4 inverted, in-line, air-cooled, six-cylinder engines are mounted on their sides, cylinder banks inboard. Cowlings and air-cooling scoops are faired into the front structure of the fuselage as well as into the wing, top and bottom.

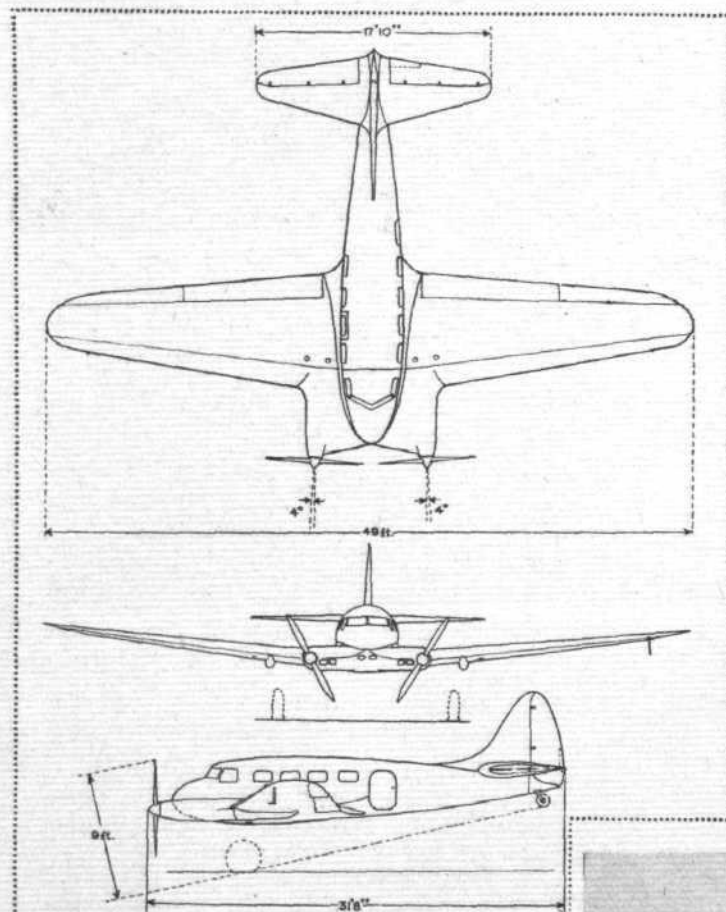
The main engine mountings are secured to the front wing spar, and extensions of the steel tube cradles pass back to the rear spar. Cantilever torque arms restrain each engine at approximately its mid-point.

Constant-speed Hamilton Standard airscrews are used, with Arens controls. The tip clearance between the two airscrews is only twelve inches and their thrust line, in reference to the centre line of the machine, is toed out 4 deg.

Behind the cabin are the toilet and baggage compartments. The radio equipment is also carried, entirely enclosed, in the rear section of the fuselage.

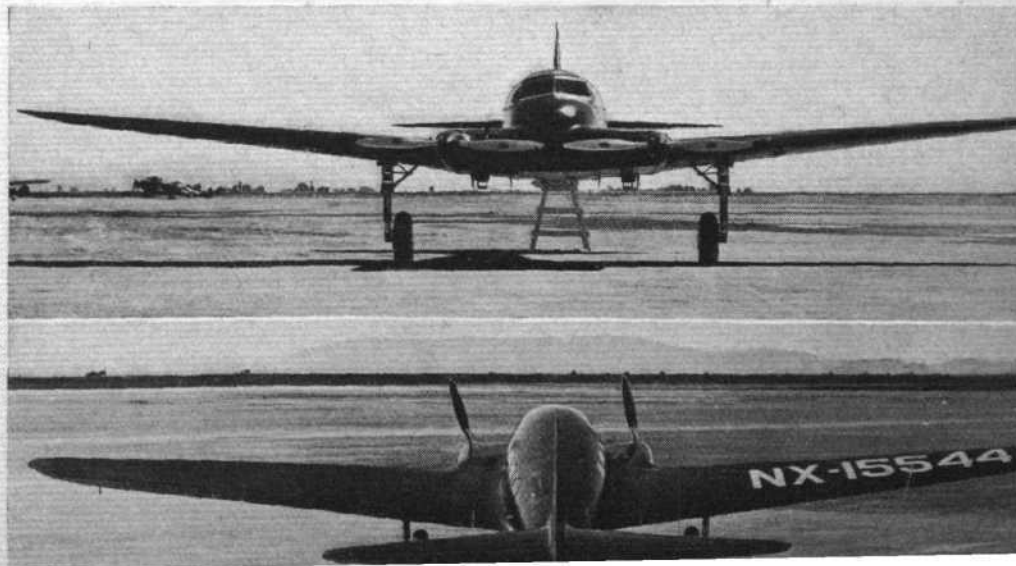
The single-engine performance of the Alcor is said to be quite exceptional, and the particular type of engine mounting makes it possible to fly the machine "hands off" on one motor. The performance in these circumstances includes a ceiling of 12,000 ft., climb of 300 ft./min. and speed of 174 m.p.h.

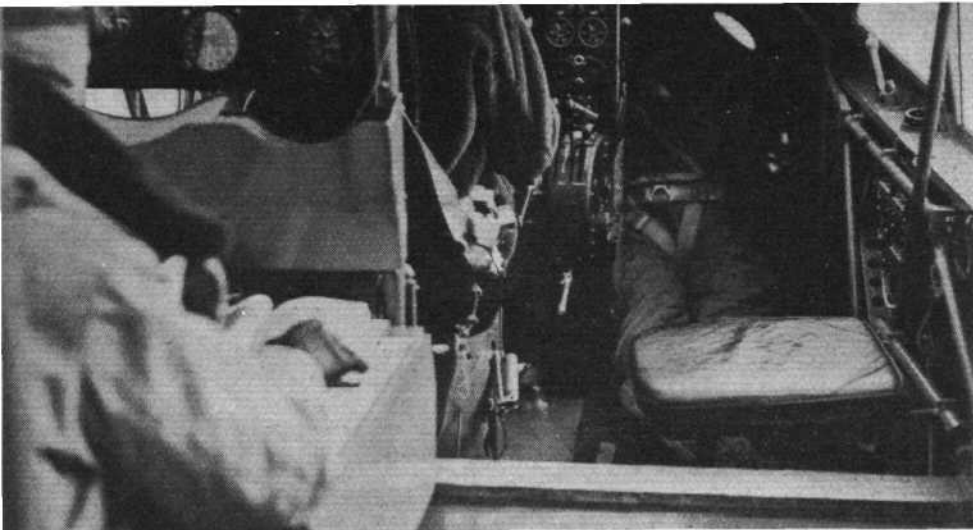
The track of the Alcor is wide for the machine (13 ft. 2 1/2 in.) and the general ground handling is said to be very good.



ALCOR C-6-1 TRANSPORT.
(Two 250 h.p. Menasco C6S-4).

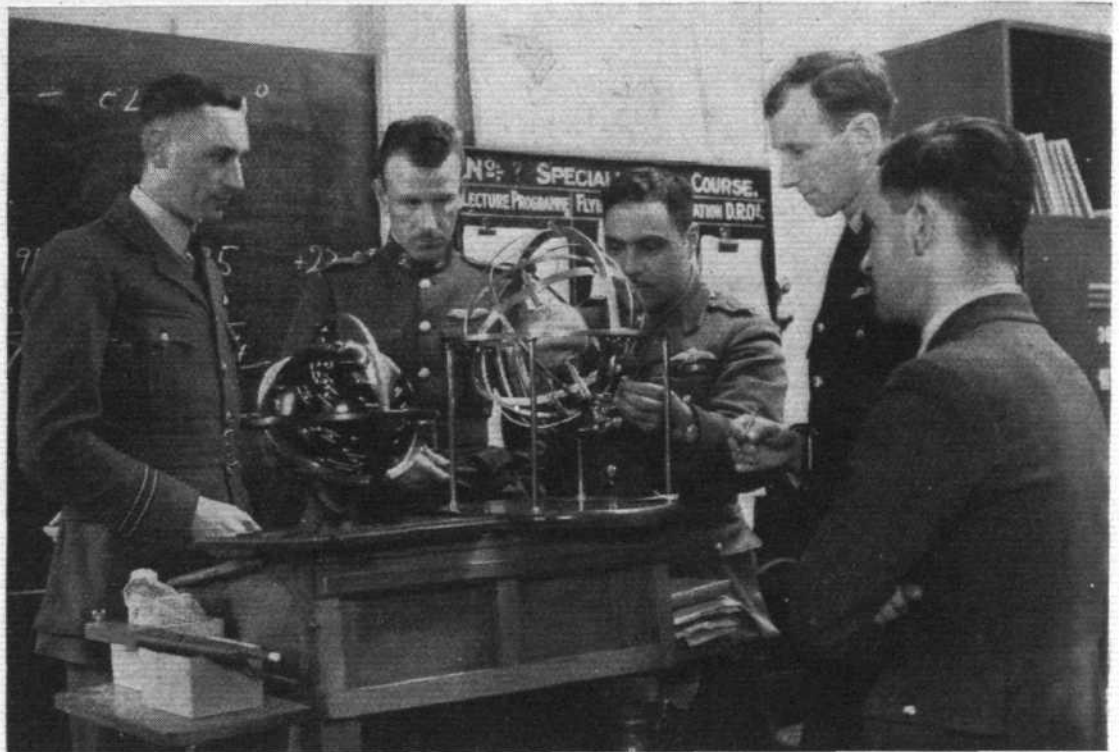
Empty Weight = 4,141 lb. Gross Weight = 6,200 lb.
Wing Area = 318 sq. ft. Wing Loading = 19.5 lb./sq. ft.
Power Loading = 12.2 lb. sq. ft. Range = 675/835 miles.
Max. sea level speed = 196 m.p.h. at 2,300 r.p.m., 240 h.p.
Max. speed at 5,500 ft. = 211 m.p.h. at 2,300 r.p.m., 250 h.p.
Cruising speed at 5,500 ft. = 191 m.p.h. at 2,000 r.p.m., 187 h.p.
Cruising Consumption: fuel = 37 gal./hr., oil = 1.25 qt./hr.
Cruising speed at 10,000 ft. = 200 m.p.h. at 2,000 r.p.m., 187 h.p.
Max. sea level climb = 1,350 ft./min. Ceiling = 20,000 ft.





In the air with one of the Ansons, looking forward. The navigator is at his chart table (with chart pockets and essential instruments in front of him) on the left, and a pupil is using the course-setting bomb sight in the nose.

The New Scheme at Manston : Full Navigational Training for All Service Pilots



Astronomical navigation grounding : One of the instructors, Flt. Lt. K. W. Niblett (left), four pupils (including one from Eire and one from Iraq), a star globe and a spheroscope.

BEFORE very long it will be impossible for the most ardent critic to say that the Royal Air Force does not fully appreciate the importance of a thorough grounding in theoretical and practical air navigation for all flying personnel. In due course every Service pilot will, before being posted to his Squadron, pass through the School of Air Navigation at Manston, Kent. There he will receive a course of training which, while being approximately equivalent in standard to the civil Second Class Navigators' licence training, will also include extensive practical work which is necessarily impossible in the case of civil pilots.

During the past year the School has provided a ten-week Short Navigation Course; a sixteen-week Navigation Reconnaissance Course; a twenty-six-week Specialist Navigation Course; and a three-week Short Astronomical Course.

The new scheme will naturally involve a tremendous amount of work, both when it is in operation and during the change-over, which is expected to take place this summer. Already the instructors for the Navigation Reconnaissance Course have moved to new and (from what we hear) extremely luxurious quarters on Thorney Island, where they will be part of No. 17 (Training) Group in the Coastal Command. There they joined the personnel of Nos. 22 and 42 (Torpedo Bomber) Squadrons.

The duly augmented staff at Manston will still, however, need to instruct for the Specialist Navigation and the Short Astronomical Courses as well as for the new one. This takes the place of the Short Navigation Course which, *inter alia*, has been designed to turn out squadron navigation officers who, in turn, impart their knowledge to the flying personnel at their different stations.

Even with the present instructional work going on at Manston the instructors have a very busy time, and a glance at the pupils' charts, which are kept by the Commanding Officer, Wing Cdr. P. D. Robertson, A.M., makes it quite clear that the new scheme will require very careful organisation and a considerable increase in staff under the chief instructor, Sqn. Ldr. R. J. Cooper. Luckily, the quarters at Manston appear to be fairly well suited for expansion, at least, so far as the instructional arrangements are concerned, and any pupil from a civil school of air navigation would be extremely jealous of the amount of equipment which is even now available for practical and demonstration work.

Instructional Museum

As an instance of the latter, the equipment in the temporary Watch Office may be cited. Here, in the museum section, are all manner of navigational devices of different flying eras, from the originally conceived C.D.C. to the modern computer, and from early drift sights to the Gatty stroboscopic device—which, incidentally, was considered by Farnborough to be rather too complicated and expensive for normal use. An examination of this museum gives one a true idea of the amount of effort and ingenuity which has been applied to the business of producing accurate, robust and suitable navigational instruments for aircraft use. The C.S.C., which is the standard computer used by the R.A.F., has been designed so that, once the wind and air speed have been correctly set, its operation is almost entirely automatic and it can easily be set by gloved hands. The problems can be solved exceptionally quickly and the instrument is robust and well suited to instructional work.

In the Watch Office, too, there is a large wall map which, with the aid of coloured pins at different aerodrome positions, acts as a quickly understood guide to the conditions at these aerodromes. If one is about to fly, for instance, to Grantham, a coloured pin at that point may demand the reading of a certain *Notice to Airmen* or other circular explaining that an area, perhaps, is at present being resurfaced or is flooded. In due course the Watch Office will be arranged in more commodious premises.

So far as practical equipment is concerned, the School carries stocks of such things as range-finders, drift sights of different types, restrained and free gyro instruments and sensitive altimeters, while theodolites, cinematograph projectors, star globes and spheroscopes are also there for necessary demonstrations. A great deal of such material is available, and the list certainly does not finish there.

The pupils of the ten-week Short Navigation Course, which may be taken as being more or less equivalent to that which will in the future be given to all pilots, cover all the usual civil examination subjects with the emphasis, as far as D/R work is concerned, on radius-of-action and interception problems, which must obviously need to be solved very often by pilots of Reconnaissance and Fleet Air Arm units. In view of modern equipment and needs it is worth noticing that the instrument section of the course includes a study of the operation of free gyro instruments and sensitive altimeters, while the radio section includes an elementary understanding of the Lorenz blind-approach system, which may therefore be considered as that on which the standardised Service system will at least be based.

During the Short Course pupils usually put in between forty and fifty hours' flying by day and up to ten by night, though these flying periods are tending to increase. They navigate on progressively more difficult circuits, first overland with "million" maps and more or less "empty" charts and then on routes over the Channel and in the North Sea which involve the interception of Channel steamers and the picking-up of lightships. The final flight in the course is from Manston to Montrose and Aldergrove by day, and back from Aldergrove to Manston during the hours of darkness. Although the pupils make a general study of radio and D/F, the machines carry trained operators and the pupils merely make use of bearings handed to them by these operators.

The Short Navigation Course is primarily designed to instruct navigators for bomber squadrons; the pupils, however, give lectures themselves towards the end of the course and these lectures are marked by the instructors with the idea of selecting possible future instructors. After five weeks or so there is a mid-term examination in order to weed out those who are unfit for this somewhat specialised work.

This is the fourth year of the twenty-six-week Specialist Navigation Course, which is usually covered after the Short and the Navigation Reconnaissance courses have been taken. This course is naturally a very much more advanced one and involves the study of astronomical navigation and tactical problems. Furthermore, the pupils carry out serious survey work, visit the Map Sections of the Air Ministry or War Office, the Admiralty Compass Observatory at Ditton Park, Slough, and various instrument factories. In this course the pupils put in some seventy hours' flying.

Finally, there is now a four-weeks' Short Astronomical Course which is designed solely to "cram" in order that the pupils may have a rule-of-thumb understanding of the subject. With present-day books of tables and the use, in particular, of the new *Air Almanac*, it is possible to be a thoroughly efficient astronomical navigator without the need for a very heavy foundation of mathematical theory. The course simply teaches pilots how to do the job and not why certain numerical combinations produce certain results. In fact, the ability to use a bubble sextant and to obtain readings therefrom is not learnt immediately, and once this ability has been obtained the rest is comparatively simple work.



(Above) In an instructional Anson again, this time looking towards the tail. The radio operator is seen at work, and a pupil is using a bubble sextant.



(Right) Desk work: A Specialist Navigation Course class wrestling with its daily problems.



The present instructional staff at Manston. Back row, left to right: Flt. Lt. F. C. Scott; F/O B. S. Brice, A.F.C. (Ret.); Flt. Lt. W. P. Welch; Flt. Lt. L. G. Martin, R.A.F.O.; Cdr. W. A. Willock, R.N. (Ret.); Flt. Lt. P. A. McWhannell; Lt. Cdr. S. R. Sunnocks, R.N. (Ret.); Flt. Sgt. Proctor. Middle row: Flt. Lt. A. V. Bax, A.F.M.; Flt. Lt. K. W. Niblett; Sqn. Ldr. R. J. Cooper; Wing Cdr. P. D. Robertson, A.M. (Commanding Officer); Flt. Lt. J. E. Allen; Flt. Lt. F. A. Pearce; Flt. Lt. W. E. Oulton. Front row: F/O J. R. Leggate and F/O T. I. Davies.

So far the practical work at Manston has been alluded to merely as "flying," and it should be explained now that the machines used are Avro Ansons of No. 48 (General Reconnaissance) Squadron, from which unit the pilots are also on loan. The commanding officer of No. 48 is Wing Cdr. T. A. Langford-Sainsbury, D.F.C., A.F.C. An article on the work of this squadron appeared in *Flight* of December, 3, 1936.

In the course of a short trip in one of these Ansons it was possible to realise their particular virtues for this kind of work. The Ansons are sufficiently fast to provide useful experience, and the number of windows in the fuselage permits, if necessary, several pupils to take sights at the same time. Furthermore, the low-wing arrangement tends to make it difficult for anyone but the pilot to make use in his navigation of any convenient landmarks which are available. Special mountings are arranged for the use of bearing compasses and drift sights, though, as previously explained, the normal work is done with the aid of a course-

setting bomb sight which is mounted in the nose of the machine.

The instrument layout includes, of course, the new Service blind-flying panel which was described in *Flight* of August 19 last year, and behind the pilot the navigator has a reasonably expansive chart table with various pockets for essential instruments. Behind the navigator, also in the left of the fuselage, are the radio equipment and the radio operator's seat. There is, consequently, an unimpeded walkway down the fuselage from the nose to the rear gun-turret. Incidentally, the operator works only with Service radio transmitters.

Although No. 48 Squadron was actually the first to take the Bristol Fighter to France, it was disbanded at the Armistice and only reformed in 1936, when, in January of that year, the School of Air Navigation was transferred to Manston from Calshot, where the School was part of that for Navigation Reconnaissance and flying boat training.

H. A. T.

Air Mail Record

IN the first quarter of 1938 more than 212 tons of letters were carried into and out of Southampton by the Imperial Airways flying-boats operating on the Empire routes.

Ninety-seven tons (approximately 6½ million letters) were carried on the service to India, Malaya and Australia, and one hundred and fifteen tons (over 7½ million letters) were carried on the African service. The greater African total is accounted for by the fact that surcharge on that route was discontinued last July, whereas the non-surcharge scheme was not adopted on the service between England, India and Malaya until February 23. Surcharge is still payable on mails to China, Australia and New Zealand, and when these countries come into the all-up scheme the total figures will be considerably larger.

The figures show that an average of over 13 tons of letters a week was carried on the Indian and Eastern route, and an average of over 9 tons a week on the African route. These averages do not include mails carried between intermediate points, but despite this limitation the present total average of 22 tons of air mail a week has never been approached by any other company engaged in air-mail transport.

"Cell-faced" Piston Rings

OF particular interest to aero engine manufacturers and users is a new type of piston ring lately brought out by Wellworthy Piston Rings, Ltd., Lymington, Hants.

In aero work, with nitrided or chromium-coated cylinders, the bedding-in of rings is a lengthy business, which designers, have sought to avoid in the past by using rings of reduced bearing area with a one-degree bevel. Now the Wellworthy Company have produced what is known as a cell-faced ring, which, while apparently of large bearing area, actually consists of thousands of minute cells, clearly observable (as an example submitted to us shows) with a powerful magnifying glass or microscope.

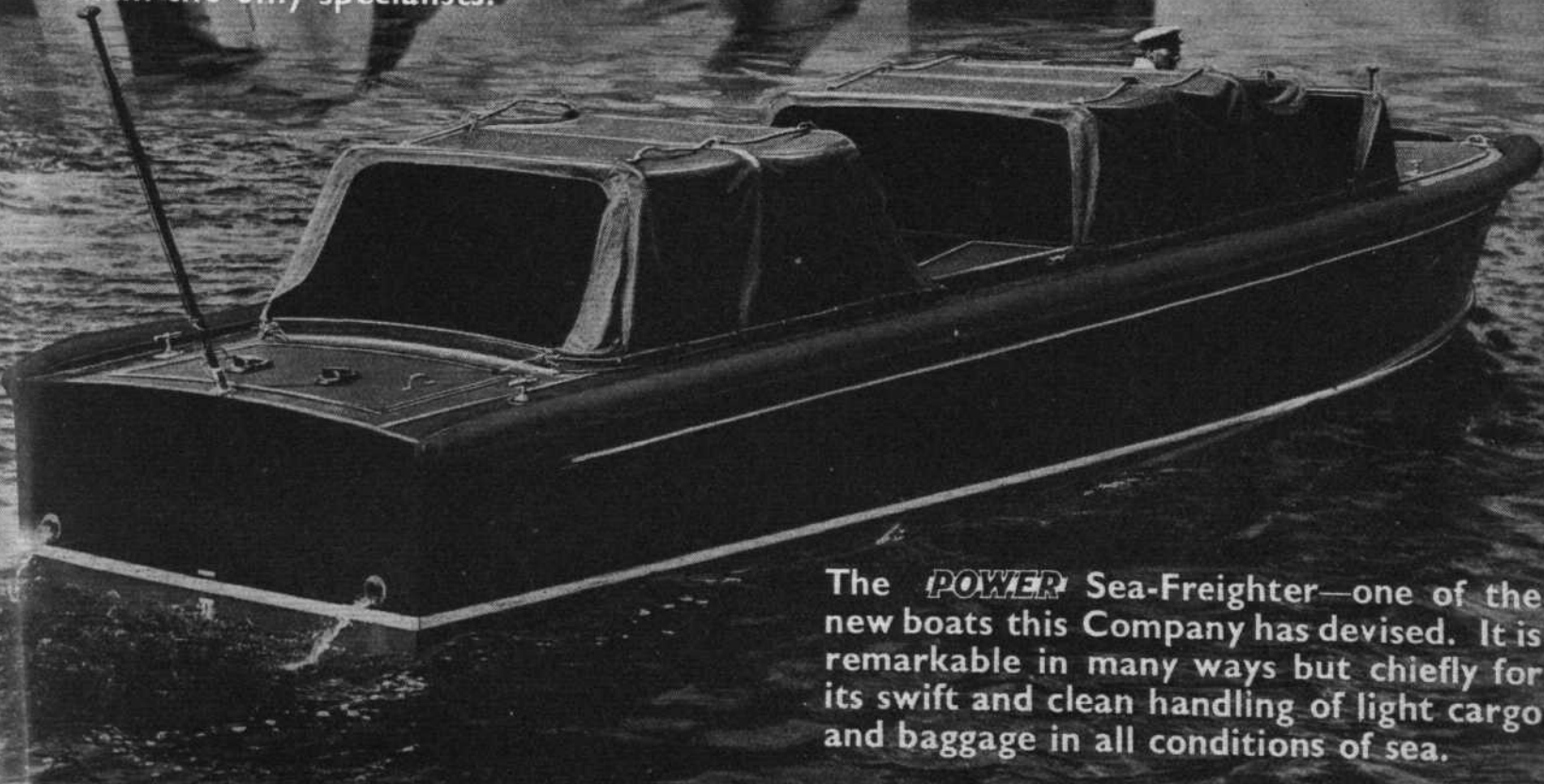
As the whole of the surface of the ring is composed of these pockets, each retaining oil, there is no "scuffing" either of the ring or the barrel during the bedding-in process.

The process of manufacture is a Wellworthy patent by which certain of the softer elements in the ring, such as the iron itself, together with the graphite, is dissolved out of the surface, leaving the phosphide network standing out from the main body of the material.

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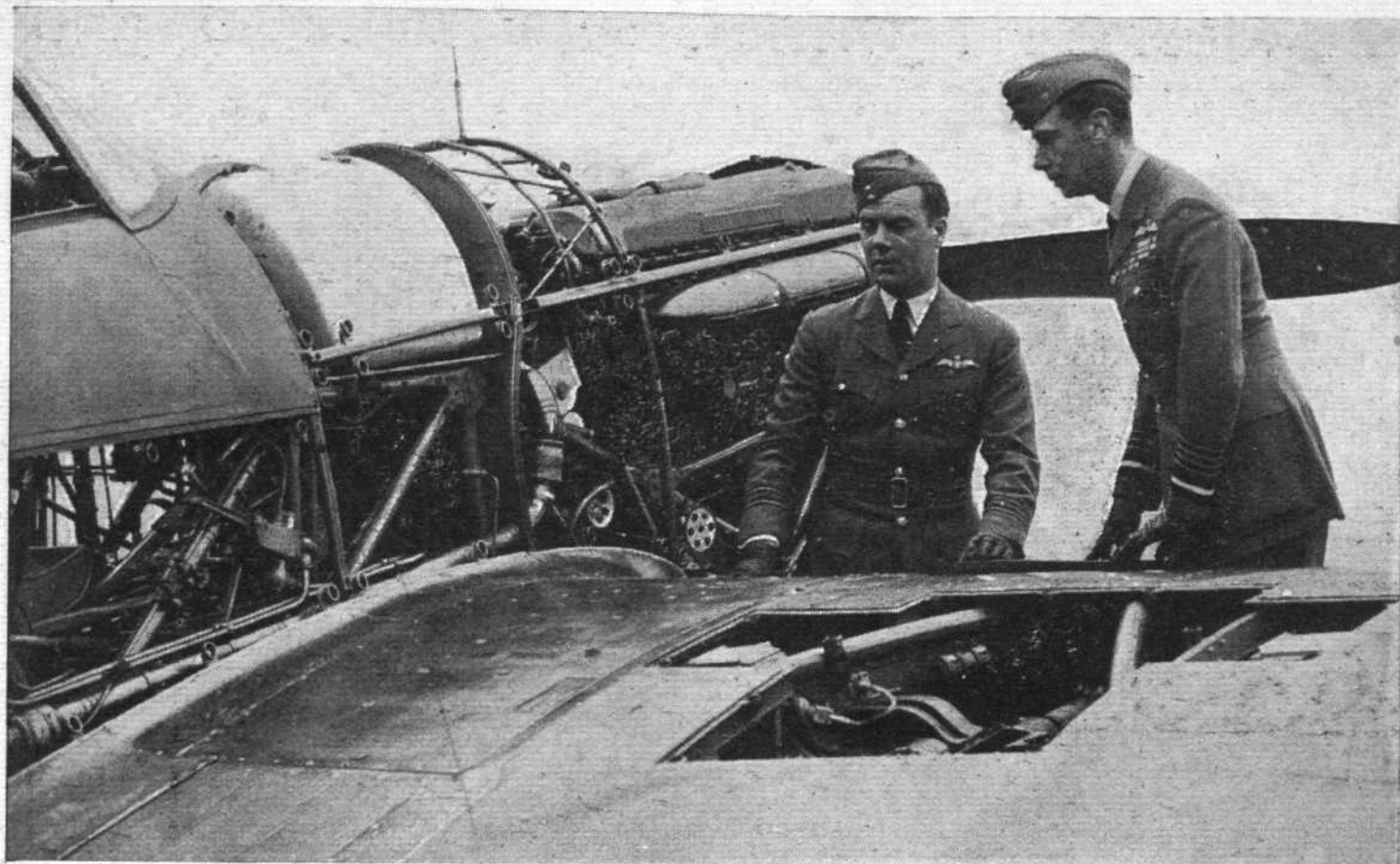
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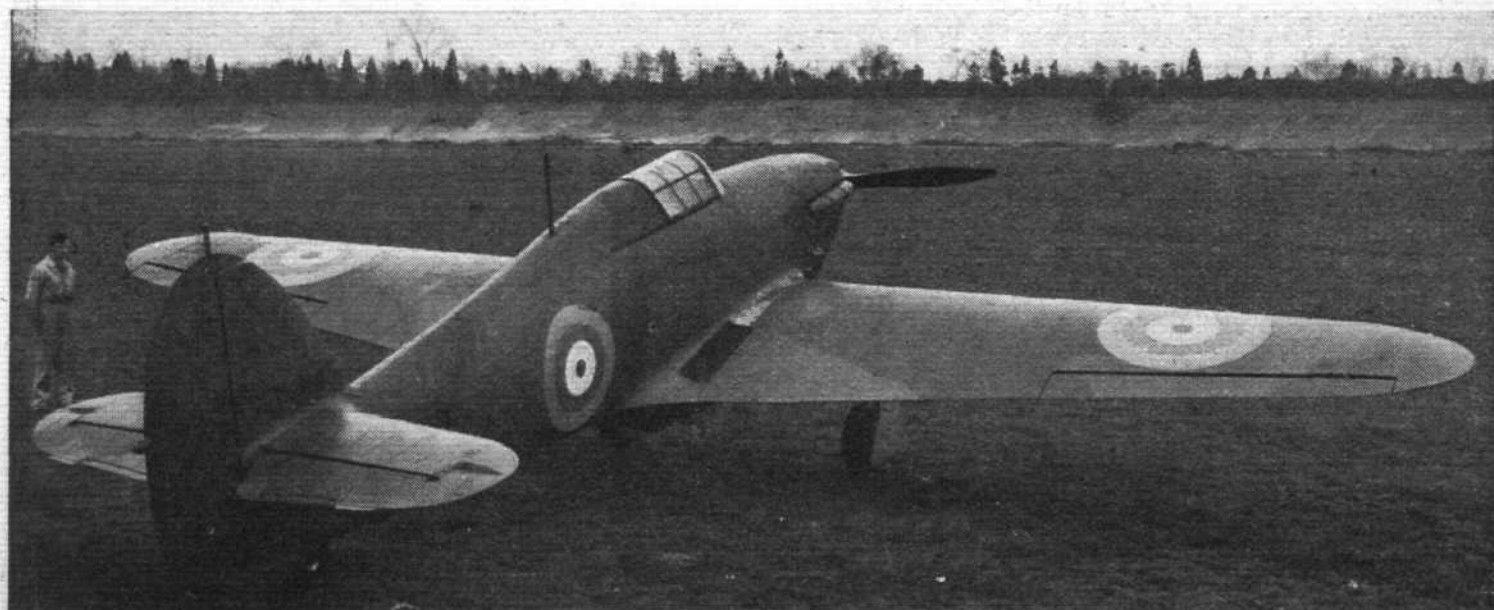
ROYAL APPROVAL: H.M. King George VI inspects one of the Hawker Hurricanes at Northolt. With His Majesty is Sqn. Ldr. Gillan, who flew a Hurricane from Edinburgh to Northolt at more than 400 m.p.h. The general view below shows the clean lines of the Hurricane.

THE HURRICANE UNVEILED

A Detailed Description of the Fastest Fighter in Service in the World: Latest Aerodynamic Design Combined with Well-tried Construction

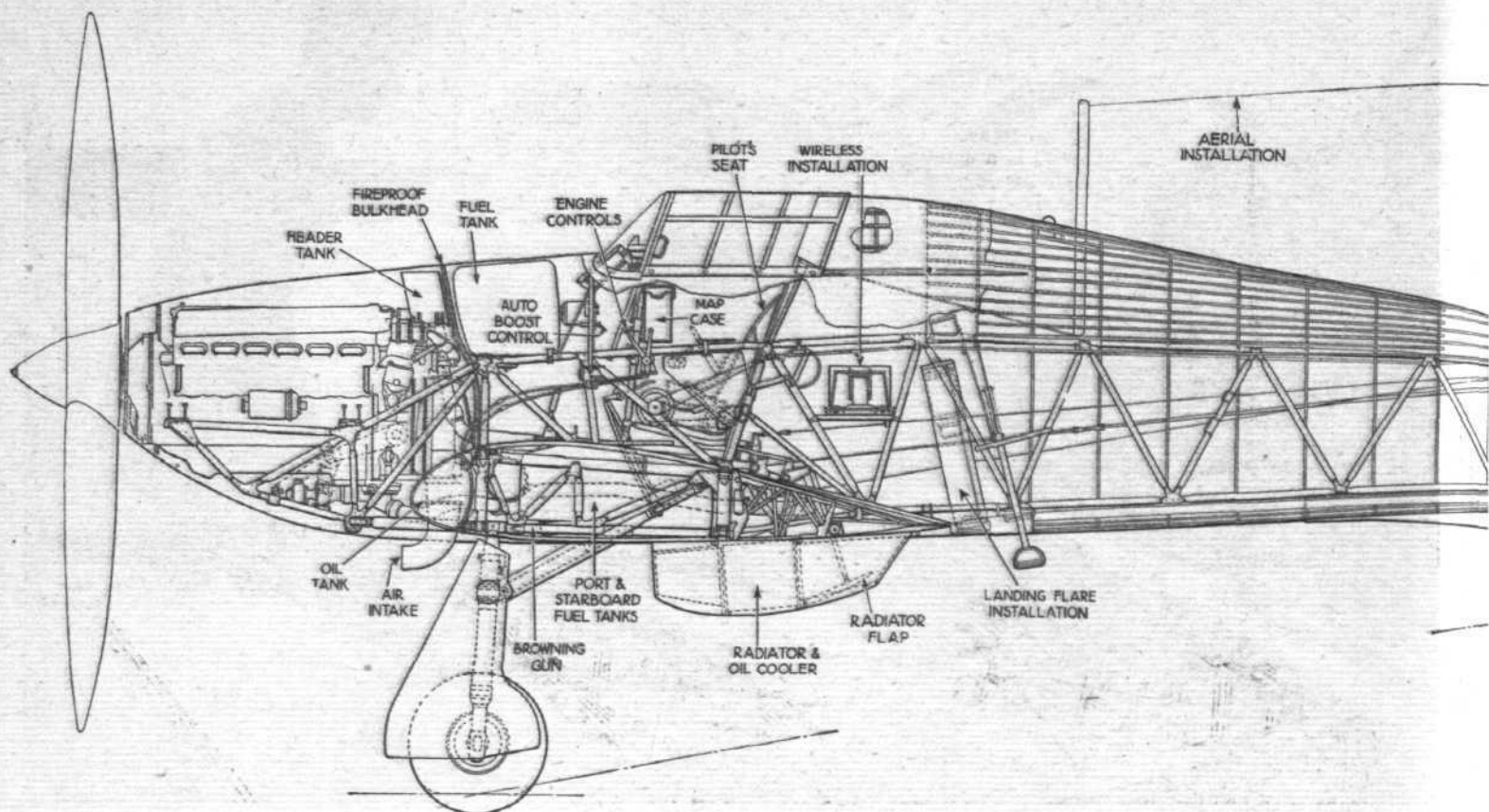
WHEN Mr. Sydney Camm and his staff began to plan their new eight-gun single-seater fighter, they had to make one very important decision before the design work could commence: Should they "go the whole hog," so to speak, and design a stressed-skin machine, of which they had at that time no experience, or should they try to marry the latest ideas in aerodynamic design to the type of structure with which they were familiar and of which they

had years of successful experience? Many factors and considerations had to be taken into account. On the one hand, would the production of jigs and tools for stressed-skin construction, having to proceed parallel with the design of the machine, lead to such delays that deliveries by a certain date became problematic? On the other, if the older type of construction were adopted, could they be sure that the fabric covering would stand up to the speeds contemplated?



"Flight" photograph.

THE HURRICANE WITHIN: SOME DETAILED AND



There were scores of other problems, but these were fundamental. In the end the familiar type of construction won, and the justification for the decision is to be found in the fact that the Hurricane is now in service with several R.A.F. squadrons, and that so far the fabric covering has not given any trouble. The performance is up to estimates, and, best of all, the young pilots who have to fly the machines have found no difficulty in handling them after a brief training on Miles Magisters. That the machines have to be treated with respect is but natural. For instance, an aeroplane as clean as the Hurricane picks up speed very quickly, and it does not do for the pilot to go wool-gathering and to let the machine get into a dive without him realising it. Otherwise he is apt to lose a lot of height before he is aware of the fact, and to get up to very high diving speeds. This is, of course, more particularly risky when the altitude is not great. But provided he remembers that he cannot stand the machine on its nose for many seconds, there is nothing in the handling of the Hurricane to worry the younger generation of pilots.

General Layout

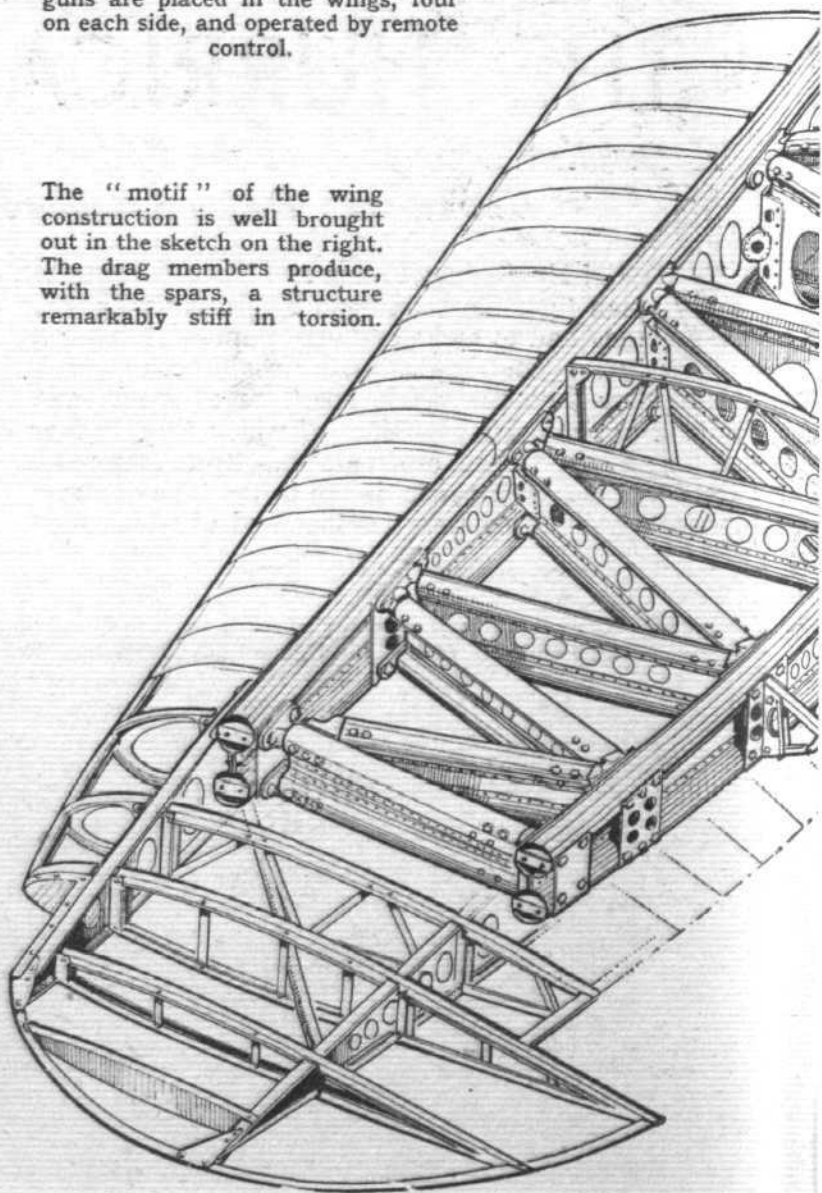
The external appearance of the Hurricane is already well known to readers of *Flight* from the photographs published from time to time, and particularly the double-page picture in last week's issue. The machine is a low-wing cantilever monoplane with retractable undercarriage, a cabin roof over the pilot's cockpit, and a Rolls-Royce Merlin II liquid-cooled engine beautifully cowed.

Intended as it is for day and night flying, the Hurricane carries a very extensive military equipment, and its armament consists of no fewer than eight machine guns, which are housed inside the wings, four on each side. Fuel for something like two hours at full speed of the Merlin engine amounts to a good deal, and the ammunition for the machine guns is no small item either, so that, for a single-seater fighter the Hurricane is neither very small nor very light. Its loaded weight is in the neighbourhood of 6,000 lb., and the wing span is about 40ft.

It has already been mentioned that structurally the Hurricane follows those general principles which have been such a successful feature of the long series of Hawker machines which began with the Hart and all its variants and were employed in the Fury biplane, the fastest of the Hawker family until the advent of the Hurricane.

In the side elevation above but a small percentage of the equipment of the Hurricane can be shown. For instance, the eight machine-guns are placed in the wings, four on each side, and operated by remote control.

The "motif" of the wing construction is well brought out in the sketch on the right. The drag members produce, with the spars, a structure remarkably stiff in torsion.



REALING "FLIGHT" DRAWINGS

The centre-section of the wing (below) is a single unit bolted to the fuselage at four points. It carries the retractable undercarriage.

Steel and duralumin take their place side by side in the Hurricane, each according to its suitability for a particular purpose. In the fuselage, for example, the longerons are steel tubes, but the diagonal struts which form the bracing in the sides are of duralumin in the rear portion.

Little need be said of the fuselage construction, which has been familiar for many years, beyond recalling that use is made of circular-section tubes for the longerons, this section being turned into a square section with rounded corners at the points where the struts are attached by flat plates and bolts or tubular rivets. The struts run zig-zag fashion between top and bottom longerons, so that there is no wire bracing, but the struts in the top and bottom panels run transversely, and bracing is by streamline tie-rods.

As the primary structure of the fuselage is of rectangular section, it has been necessary to add a secondary structure to give the rounded shape. This secondary structure

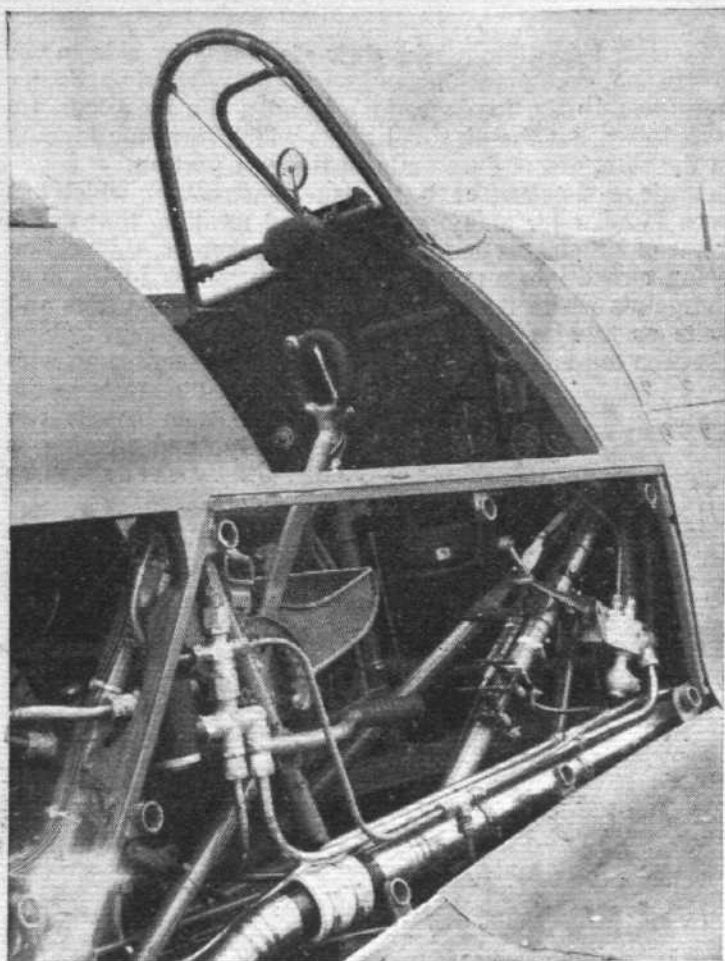
consists of wooden formers and stringers, the formers being attached to the longerons by metal clips, and the stringers carrying the fabric covering. The stringers are closely spaced, so that the external form is, strictly speaking, polygonal, although it approaches closely to a smooth section. This fabric covering extends from the sternpost to about the level of the pilot's seat. In front of this point the covering is in the form of light-metal panels which continue the smooth curves of the engine cowlings.

From a practical point of view there is much to be said for the girder fuselage. Apart from the advantage, in the case of the Hawker company, of using a familiar form of construction, there is the question of installing the equipment, which is a complicated business in the modern military aircraft. Obviously in a small fuselage, such as that of a single-seater fighter, there is very little room for fitters or electricians to wield their tools, and to make the installation of equipment possible the design has to be so planned that either the fuselage is built in longitudinal sections, so that the men can reach in from each end, which introduces problems of connecting up the numerous pipe lines, electric leads, and so forth, or the fuselage has to be so constructed that the top portion forms a "lid," which can be left off until all the equipment has been installed. With the girder type a greater number of men can be concentrated on one fuselage, as they can reach into the interior between the members of the girder (the stringers, fabric and metal panels are, of course, left until most of the equipment has been installed and connected up).

The wing construction of the Hawker Hurricane is an ingenious adaptation of old methods to new requirements. In the old biplanes the spars were made of steel strip, with polygon-section booms and spanwise corrugated webs. The great depth necessitated by the cantilever wing of the Hurricane introduced certain problems, notably in connection with twisting stresses in the wing. In the biplane these are, of course, taken mainly by the incidence bracing.

Details of spar construction and wing rib attachment. The bridge piece is used over the rear spar only. Sheet metal covering is used over the leading-edge, and extends over the top of the front spar.

J.P.



Why aircraft production is a slow business : This view of the pilot's cockpit gives some idea of the complexity of the equipment of a modern fighter.

The manner in which Mr. Camm solved the problem is very interesting.

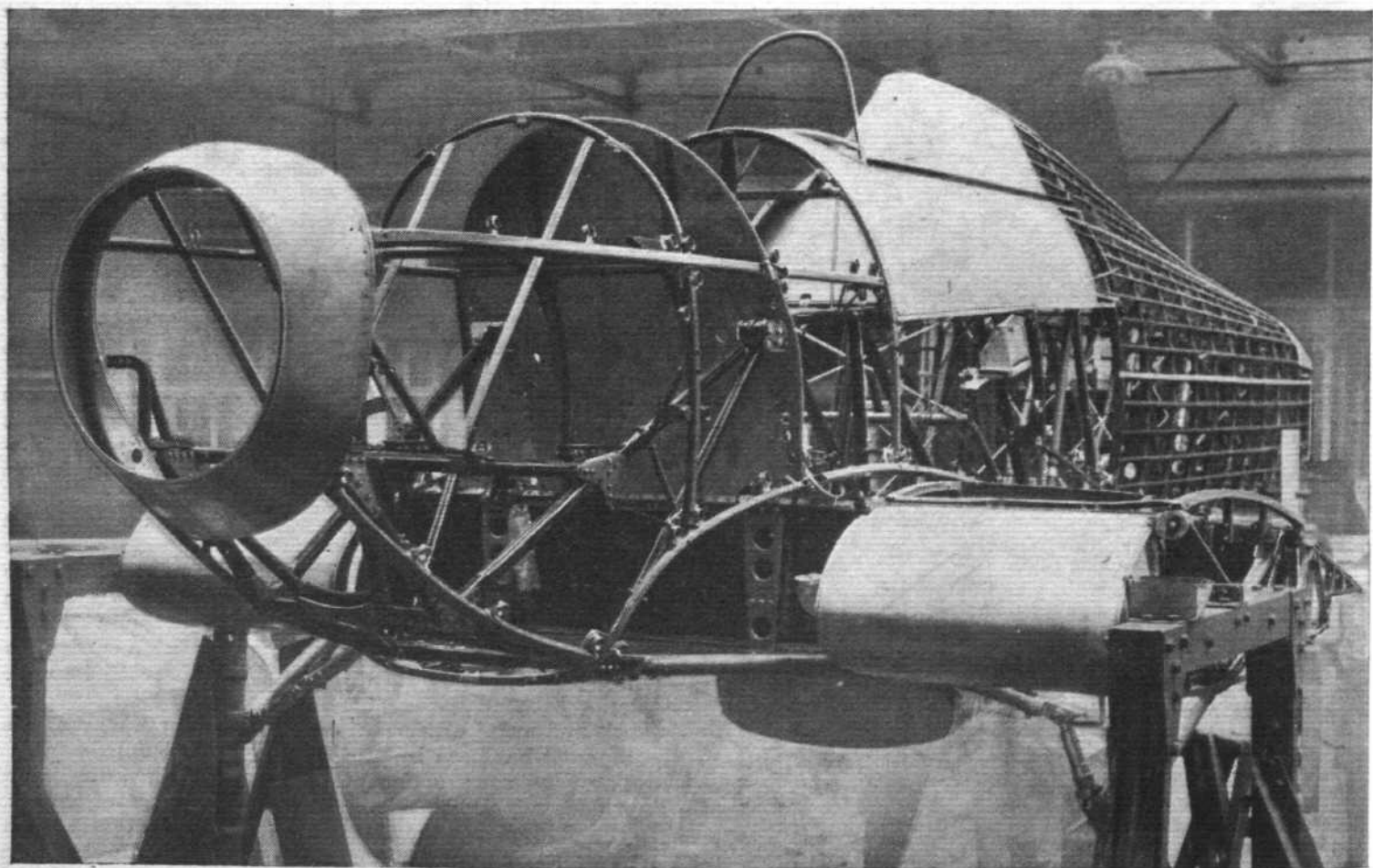
In a general way the spars of the Hurricane resemble those of the earlier biplanes. That is to say, they have



"Flight" photographs.

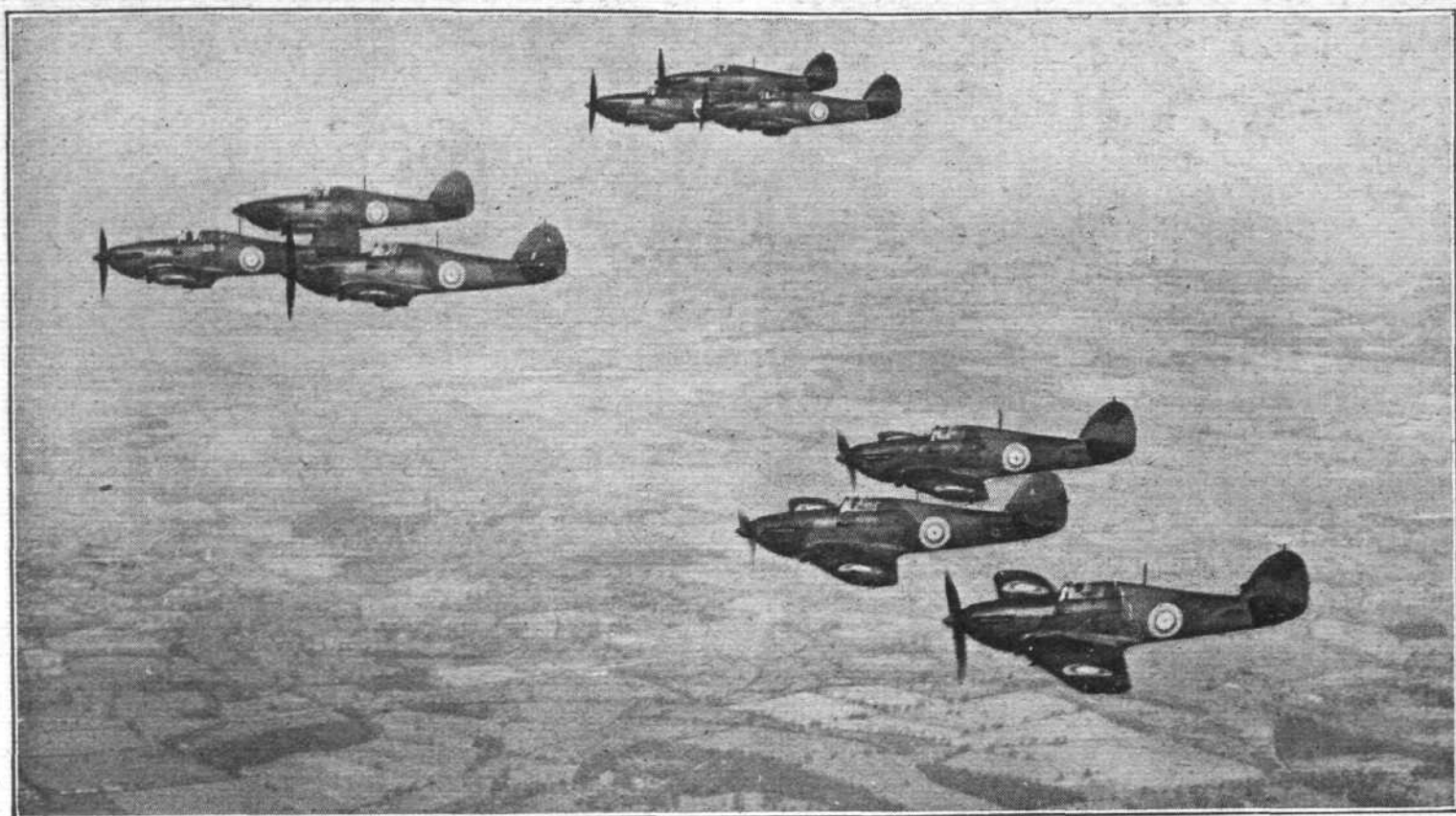
The retractable undercarriage is raised laterally and inwardly, and the fairings cover the openings completely, leaving a smooth surface.

bulbous steel booms of polygonal section (much larger, of course, than those of the biplanes) at top and bottom, and a central web of flat sheet is riveted into the inwardly pointing open sides of the booms. In the centre section,



The Hurricane fuselage in skeleton. The construction is of the type used by the Hawker Company with great success for many years.

"Flight" photograph.



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I r v i n s u i t

S U P P L I E D T O T H E R . A . F .

THE HAWKER HURRICANE

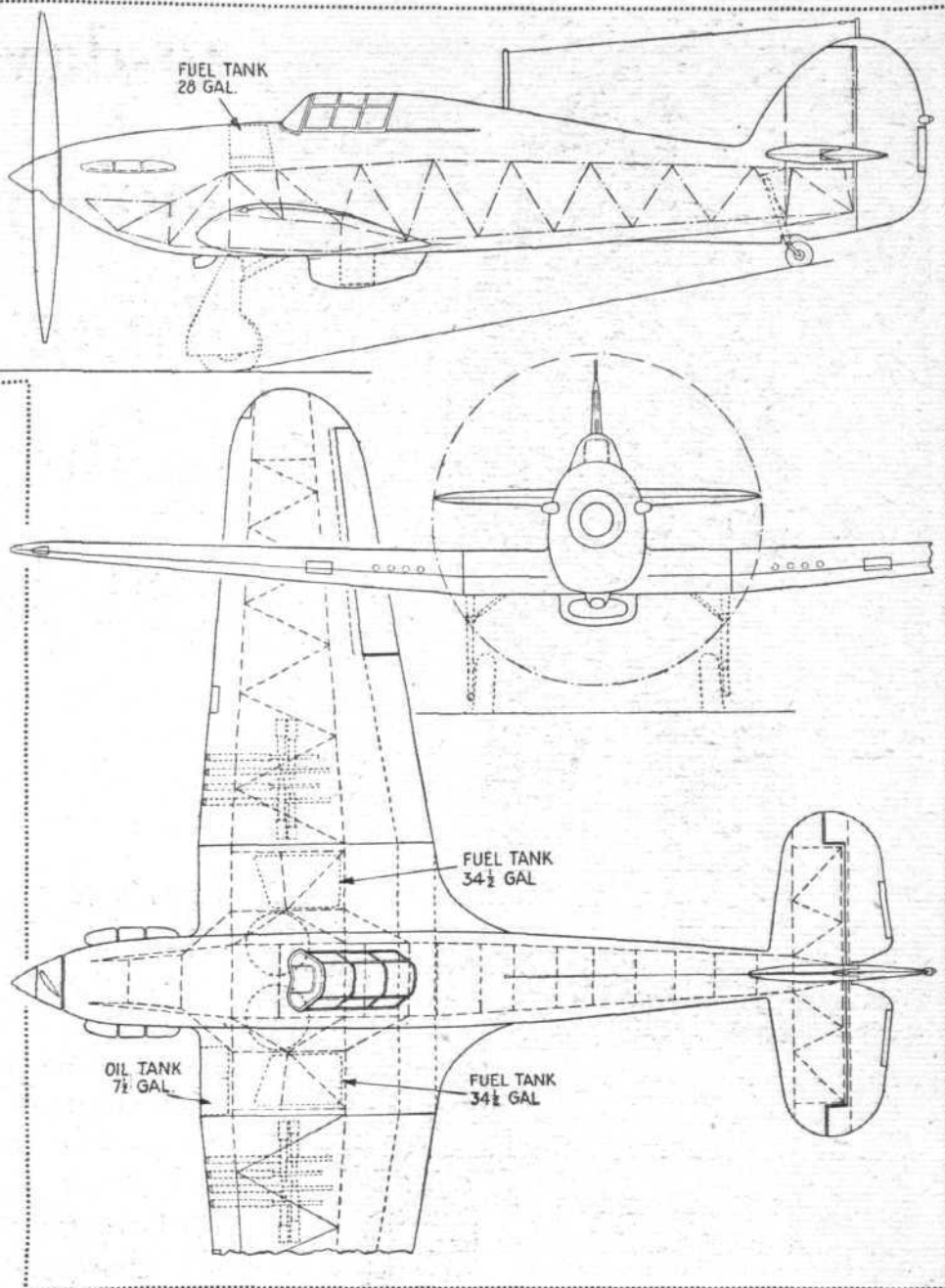
(990 1,050 Rolls-Royce Merlin Engine)

DIMENSIONS.

Length o.a.	31ft. 5in.
Wing span	40ft. 0in.
Span of tailplane	11ft. 0in.
Wheel track	7ft. 10in.

AREAS.

	sq. ft.
Main planes (gross)	257.5
(net)	231.5
Ailerons (total) ..	19.6
Tailplane	19.78
Elevator	13.46
Fin	8.79
Rudder	11.86



which is a single unit extending about three feet on each side of the fuselage, the web is solid and stiffened by riveted-on vertical channels. In the outer wing portions the web has circular lightening holes with their flanges turned out for stiffness.

It is, however, in the drag bracing that the Hurricane "motif" differs most from the biplane wings. The drag members are almost identical with the spars as regards their form and construction, but slightly smaller. They run zig-zag fashion between the spars, and are bolted to top and bottom spar booms via substantial forgings, which are fastened to the spar booms by horizontal bolts. Thus the primary structure of the wing forms a frame, braced and stiffened by the diagonal drag members. The resulting structure is enormously strong and, what is just as important, is remarkably stiff in torsion. As a manufacturing job this arrangement is very simple. The zig-zag drag members, held together by the forgings at their ends, form one unit. In vertical jigs, which are merely brackets on the wall, the two spars are attached and the primary structure is ready to receive the wing ribs.

These are of very simple type, and have ties or bracing members of circular-section tubes, while the flanges are simple channels with their free edges turned inwards. The bottom of the channel is not flat, but also forms a trough, the edges of which are rounded because the section is rolled or drawn from a single

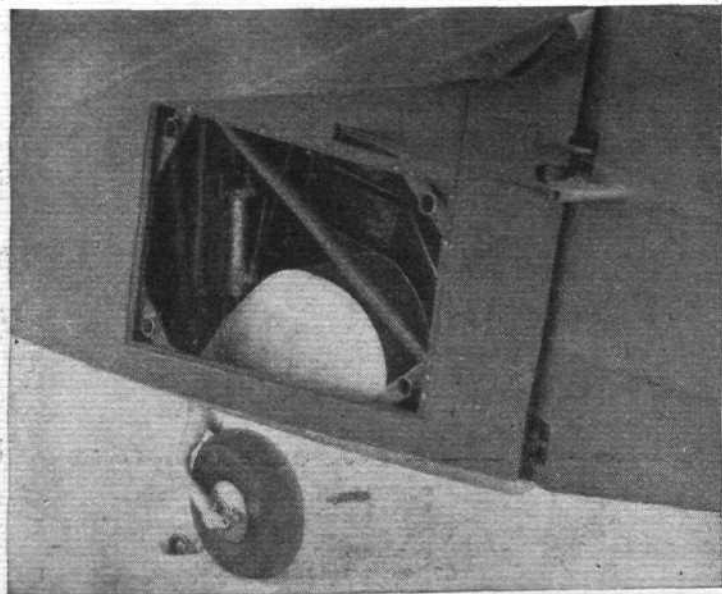
strip. The result is that the outer edges do not cut the wing fabric, which rests on them. The attachment of the wing fabric to the ribs is extremely strong. When the fabric has been placed over the wing, a metal strip is placed over each rib channel and secured to it by Simmonds elastic stop nuts. As these are tightened up the fabric is drawn into the channel of the rib and instead of being held only at a few places, as in attachment by lacing, the fabric is held by the whole area of the strips.

Only over the inner wing portions, where it is often necessary to walk on the wings, is the covering of light-metal sheet. Here the wing rib channels have a plain smooth back for the attachment of the metal covering.

The nose and trailing-edge ribs are attached to the spar booms by horizontal bolts, and form separate units. Over the rear spar a short length of channel continues the contour of the rib, but on the front spar the ribs stop short at the spar boom. That is because the leading edge is covered with sheet metal, the rear edge of which passes over the spar booms.

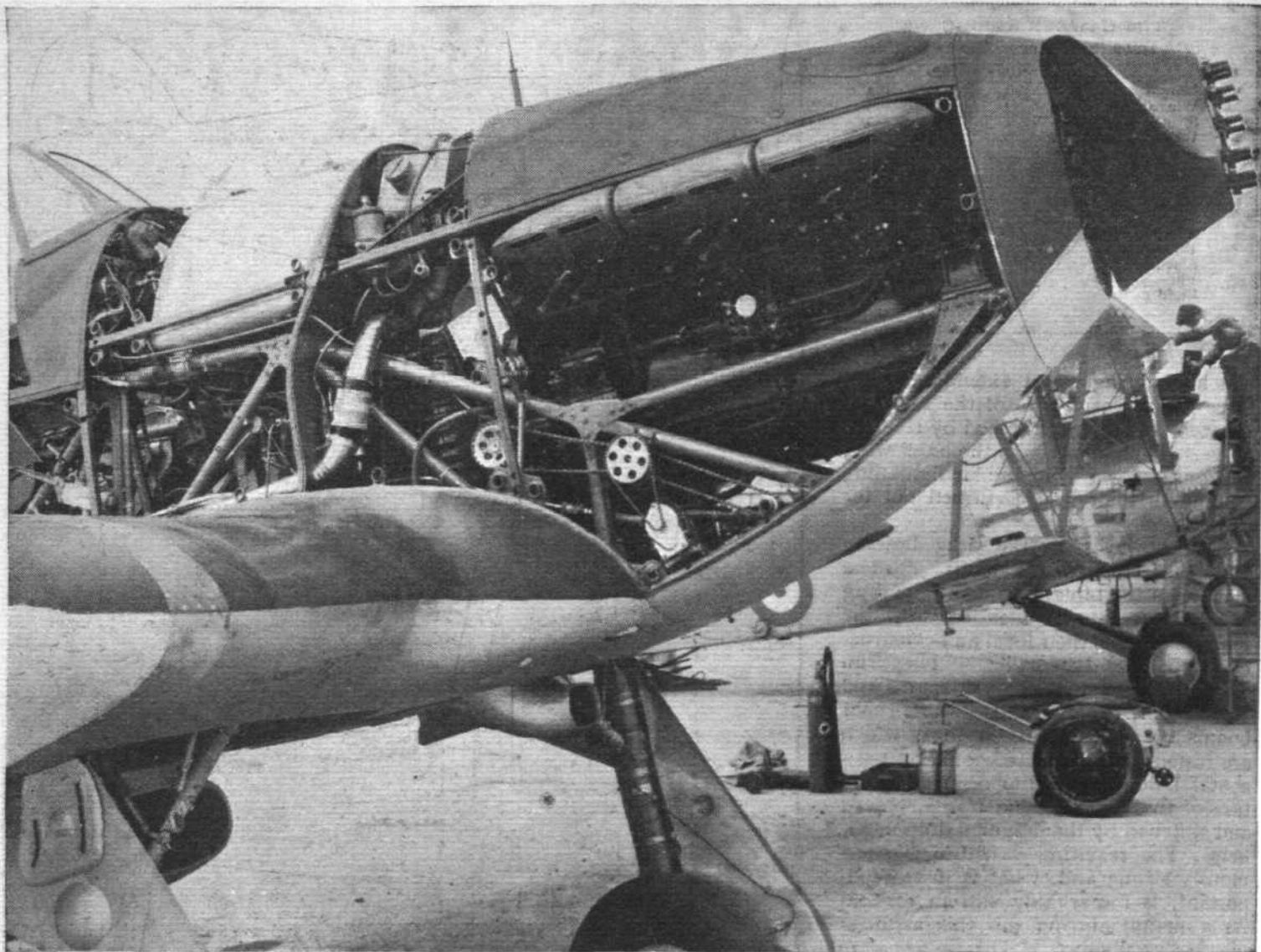
Split trailing-edge flaps are fitted at the inner end of the wings. These are of the "single-surface" type, with a sheet-metal bottom surface stiffened by ribs from the operating torque tube. A notice in the cockpit tells the pilot not to use the flaps at speeds in excess of 120 m.p.h. The flaps are hydraulically operated. The ailerons are of the Frise type and are fabric covered.

The undercarriage is of the laterally retracting type. In the case of the Hurricane the wheels retract inwardly. By this arrangement a very wide wheel track is obtained.



"Flight" photograph.

The tail wheel retracts into the casing seen in the stern of the fuselage.

*"Flight" photograph.*

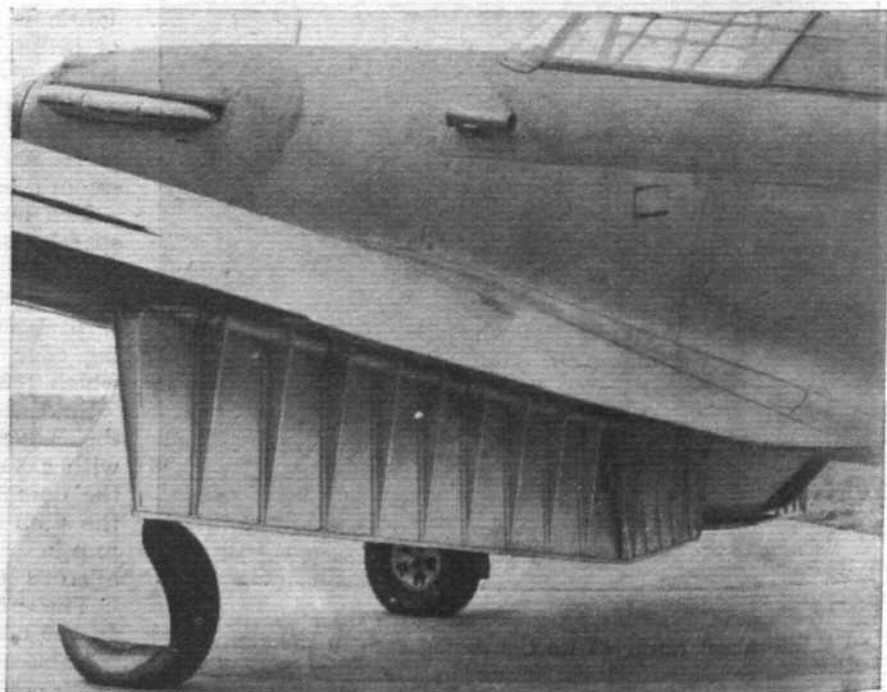
When the large detachable panels are removed there is very free access to the Rolls-Royce Merlin engine. The large tungum pipe shown is part of the Glycol cooling system.

so that the machine is very stable on the ground and can be turned in a small circle at quite high speed without turning over. The telescopic leg, a Vickers oleopneumatic, is hinged to the bottom boom of the centre-section front spar. One member braces it in a fore-and-aft plane and another in a lateral plane. The hydraulic jack operates the latter, which is of the "broken" type. When this strut is "broken" by the jack, the telescopic leg swings inwards, and as the drag strut of the undercarriage is pivoted around a higher centre, it brings the wheel back as well as inwards. This is necessary in order to enable the wheel to clear the front spar when retracted. When the wheel is down it is in the plane of the spar. Fairings attached to the outside of each undercarriage close the opening in the wing surface when the undercarriage is retracted.

Two independent systems of operation are provided for the undercarriage. The main system is power operated and has hydraulic transmission. The auxiliary system is also hydraulic, but is hand operated. Should anything go wrong with both systems there is an arrangement of cocks whereby the pilot can release all pressure in the hydraulic systems and release the catches which hold the wheels up. The weight of the wheels then brings them into the "down" position.

The Rolls-Royce Merlin II engine is mounted

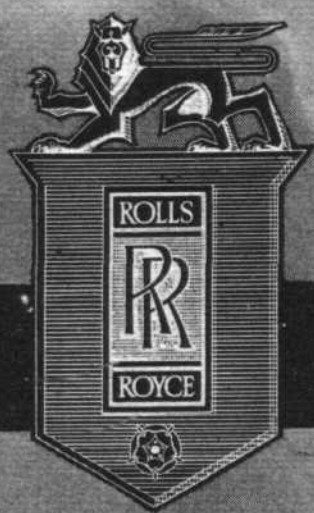
on a simple steel tube structure in the nose of the fuselage. Large detachable panels in the cowling give access to most of the parts of the engine likely to need inspection or adjustment. The radiator of the liquid-cooling system is placed under the fuselage, with an oval entry in front of the radiator and a rectangular opening aft of it. The opening in the aft end of the radiator housing is covered with a hinged flap by means of which the pilot can vary the amount of cooling. An interesting feature of the cooling system is the use throughout of tungum pipes.

*"Flight" photograph*

The split flaps of the Hurricane extend from radiator casing to root of aileron. They are hydraulically operated.

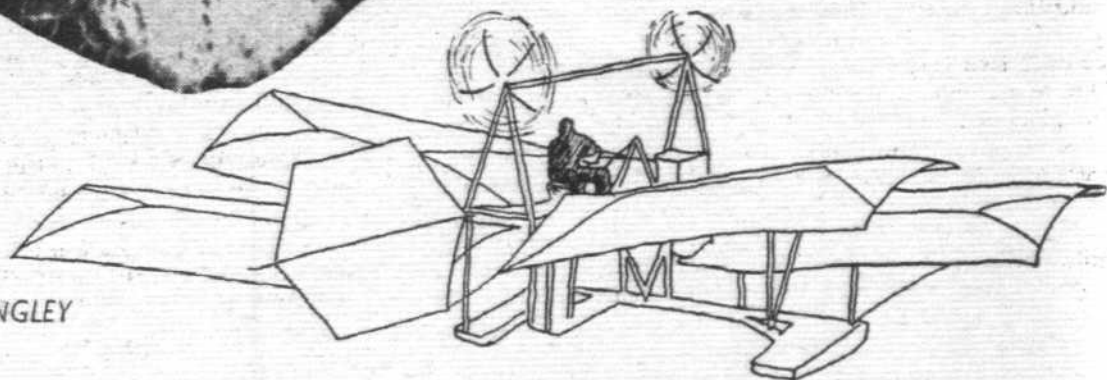
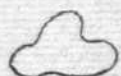
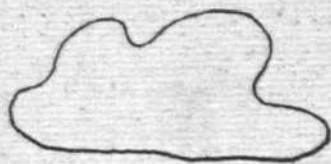
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AERO ENGINES



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FOR SPEED AND RELIABILITY



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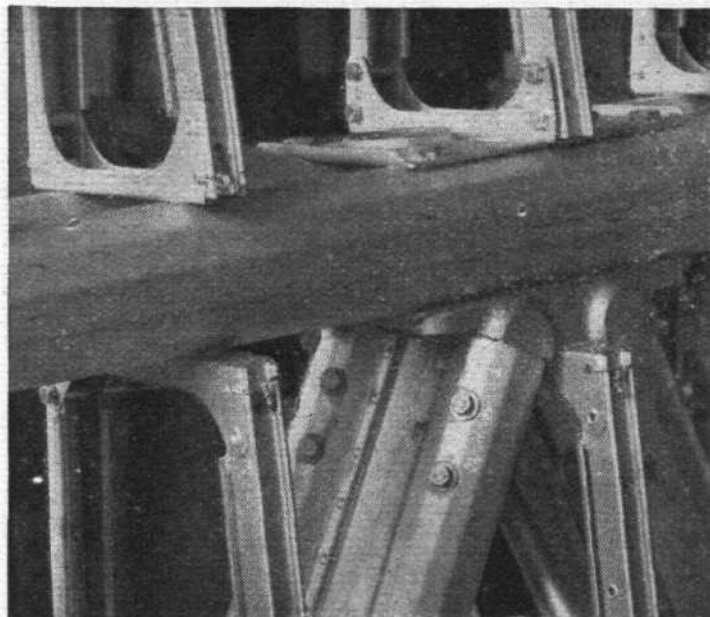
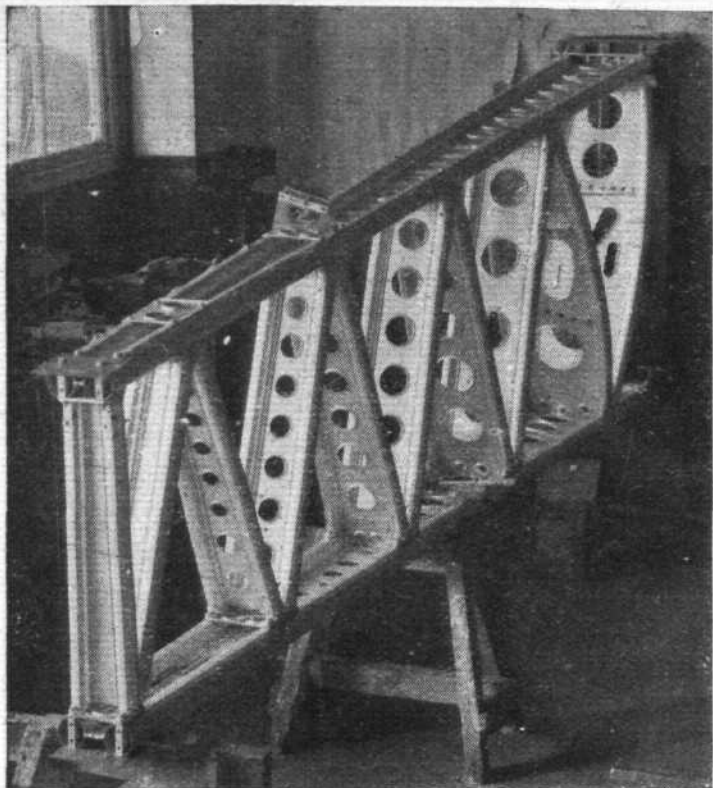
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"Flight" photographs.
Forgings are used for attaching the diagonal drag members to the wing spars. On the left, a wing panel is seen in its jig.

Many have expressed surprise that the Hurricane is not fitted with variable-pitch airscrews. The answer is that it has such a tremendous reserve of power that even with the airscrew stalled at the beginning of the take-off run the acceleration is reasonably good, and the wooden airscrew is, of course, a great deal lighter.

Of the equipment and armament of the Hurricane little may be said. This machine is, as already mentioned, intended for day and night flying, so that it is provided with navigation lights, Harley landing lights and so forth. In addition to the latter it also carries two parachute flares. Complete blind-flying equipment is carried, and, of course, two-way radio.

The armament consists of eight Browning machine guns placed inside the wing. The idea is that in modern fighting the pilot will get but a very short opportunity for getting his target in his sights, and the multi-gun arrangement is designed to make the most of the short period. Firing of the guns is, of course, by remote control, which introduces a complication, but, on the other hand, there is no interrupter gear.

"The Aircraft Engineer"

OWING to the fact that *Flight* of May 26 is to be the special Royal Air Force Number, *The Aircraft Engineer* monthly supplement will appear one week earlier than usual, i.e., in next week's issue, May 19.

A Display at Gatwick

FEELING it is to be presumed, that Empire Air Day does not fill the gap left by the abandonment of the Royal Air Force Display, the *Daily Express* intends to sponsor a display at Gatwick Airport on Saturday, June 25, and to hand the proceeds to the R.A.F. Benevolent Fund. It is understood that R.A.F. aircraft support has been secured, and some well-known Continental aerobatic experts are to appear.

A World Airline Map

THE map "Airlines of the World" prepared by *Flight* in photogravure and published with our Commercial Aircraft and Airlines Number (April 28), has drawn immense appreciation from the aircraft industry, airline operating companies and readers generally. It is now to be seen hung in the offices and various prominent centres.

A few copies still remain for any readers who desire them, and application should be made to the publishers of *Flight*, Dorset House, Stamford Street, London, S.E.1, enclosing 2d. in stamps for postage.

For the present, detailed performance figures cannot be given for the Hurricane. It should be realised that only the prototype has been fully tested at Martlesham; certain minor modifications made in the production machines have resulted in a considerably improved performance. It has been authoritatively stated, as pointed out in last week's issue of *Flight*, that the Hurricane has the very remarkable speed range of 6:1. As the landing speed is about 60 m.p.h., and the actual minimum stalling speed is rather less than this, one is not far wrong in estimating the top speed at something like 330 m.p.h.

It is customary to give the duration of a fighter in terms of top-speed range. That is because the duration can obviously be increased very greatly by throttling. Probably the Hurricane carries petrol for nearly two hours at full throttle (it would not be of much practical use if it carried *much* less), and a top-speed range of about 600 miles appears a reasonable estimate.

A reassuring feature of the clean single-seater fighter is that it can remain in the air on very little throttle, so that when patrolling for invading bombers its duration could probably be increased to something like four hours. That is a point often overlooked when discussing the relatively short top-speed duration of fighters.

WORK OF THE ROYAL AIR FORCE

THIS year there is no Royal Air Force Display at Hendon, though a wider public will be able to see the Service "at home" at some fifty stations on Empire Air Day, May 28.

All regular readers of *Flight* have come to look forward to the annual *Royal Air Force Number*, hitherto published at the time of the Hendon Display, as an issue of exceptional interest.

The loss of the Display does not mean that they will be deprived of that special review, for two days before Empire Air Day, i.e., on Thursday, May 26, a greatly enlarged ROYAL AIR FORCE NUMBER will appear.

It will contain articles and illustrations of outstanding merit, dealing with many different aspects of the work of the R.A.F. at home and abroad. At the present time, when the Royal Air Force is such an important factor in Empire security, it behoves everyone to have a clear understanding of its organisation, equipment and duties. That information will be imparted in—

THURSDAY
WEEK

FLIGHT

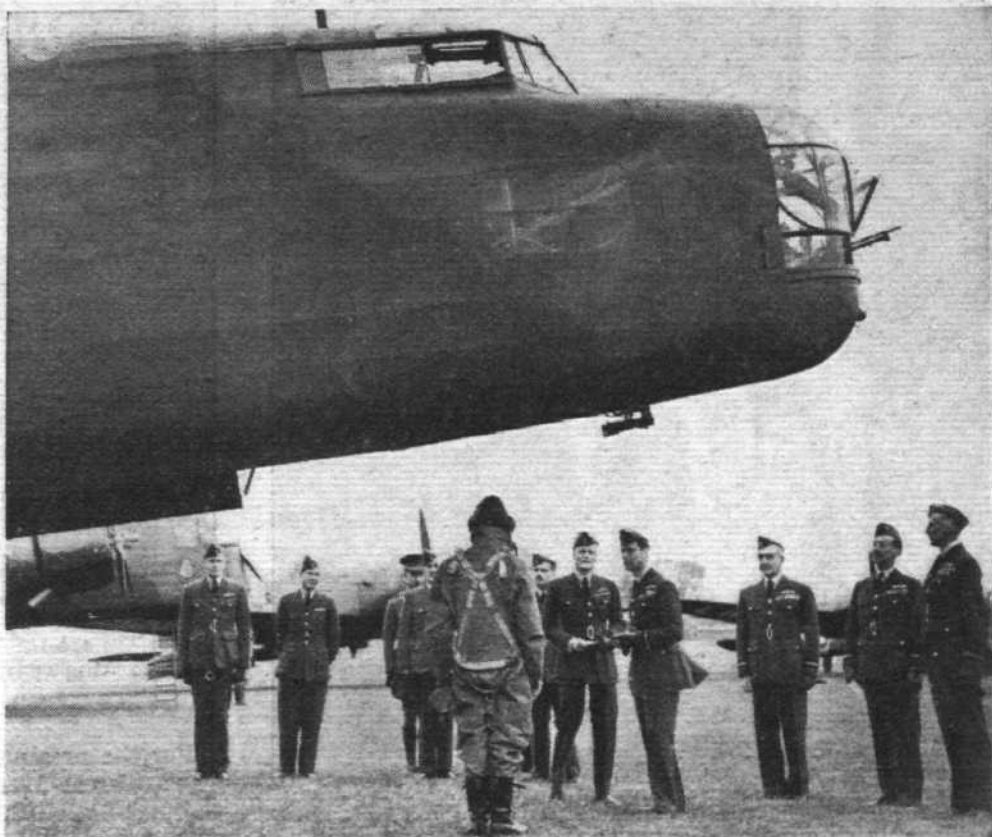
MAY
26

SERVICE AVIATION



*Royal Air Force and
Official Announcements :
Fleet Air Arm News :
Military Aviation Abroad*

The King inspects machines of the Bomber Group. Above him towers the nose of a Harrow, and behind can be distinguished a Whitley, Wellesley and Blenheim.



THE KING'S TOUR

LAST Monday, May 9, making one of a series of tours of inspection of the work of the Royal Air Force, His Majesty the King visited four stations—Northolt, Harwell, Upavon, and Thorney Island. Each station is representative of one of the Home Commands, namely, Fighter, Bomber, Coastal and Training.

Northolt.—His Majesty arrived at Northolt from Windsor in his Airspeed Envoy at 10 o'clock and was received by the Chief of Air Staff, Air Chief Marshal Sir Cyril L. N. Newall. The following officers were then presented to the King: A.O.C. in C., Fighter Command, Air Chief Marshal Sir Hugh C. T. Dowding; A.O.C., No. 11 (Fighter) Group, Air Vice-Marshal E. L. Gossage; and the Station Commander, Northolt, Group Capt. A. H. Orlebar.

His Majesty inspected the aircraft and crews of No. 111 and No. 23 (Fighter Squadrons), which are equipped with the Hurricane and the Demon I and are commanded by Sqn. Ldr. J. W. Gillan and Sqn. Ldr. R. Y. Eccles respectively. Following this, the sector operations room and the cine-camera gun section were inspected.

Before His Majesty left for Harwell, accompanied by the Chief of Air Staff and piloted by Wing. Cdr. E. H. Fielden, Capt. of the King's Flight, A and B flights of No. 111 Squadron, each composed of six Hurricanes, took off for a fly-past.

Northolt Aerodrome first opened in 1915 and several war-time Squadrons were formed there. In recent history, it was the first station to receive Hurricanes.

Harwell.—On his arrival at Harwell, Berkshire, a station of No. 1 (Bomber) Group, His Majesty had presented to him the A.O.C. in C., Bomber Command, Air Chief Marshal Sir Edgar R. Ludlow Hewitt; the A.O.C., No. 1 (Bomber) Group, A. V.-M. P. H. L. Playfair; and the Station Commander, Wing Cdr. L. G. Maxton.

The King inspected one flight each from Nos. 105 and 226 (Bomber) Squadrons equipped with Battles and No. 107 (Bomber) Squadron equipped with Hinds. At the same time representative bomber types, including Harrow, Blenheim, Wellesley and Whitley aircraft arrived for inspection from other stations.

A short tour of the station was made before His Majesty left for Upavon.

March, 1937, saw the opening of Harwell Aerodrome, which is a bomber station planned in the expansion programme.

Upavon.—The Central Flying School at Upavon, Wiltshire, is part of No. 23 (Training) Group and is for the training of flying instructors. Four officers were here presented to the King on his arrival from Harwell: The A.O.C. in C. Training Command, Air Marshal C. S. Burnett; the A.O.C., No. 23 (Training) Group, A. V.-M. L. A. Pattinson; the Commanding Officer, C.F.S., Group Capt. J. M. Robb; and the Chief Instructor, Sqn. Ldr. D. D'A. A. Greig.

His Majesty, after the presentation, made a tour of the school, and took lunch in the Mess. He also inspected the Link Trainer and the training machines in use at the station—Tutors, Hart Trainers, Furies, Ansons and Oxfords. All personnel paraded on the tarmac for the King's departure, and an impromptu high-speed aerobatic display was given by two Furies.

Upavon was one of the earliest stations of the R.F.C. and was authorised as a joint military and naval training centre in 1912 under the title of the Central Flying School. The C.F.S. was moved from Upavon in 1926 and did not return until 1935. In the meantime, several squadrons, including Fleet Air Arm units, were stationed there.

Thorney Island.—The King's fourth and last visit was to Thorney Island, Hants, a coastal reconnaissance station in No. 16 (Reconnaissance) Group.

The A.O.C. in C., Coastal Command, Air Marshal Sir Frederick Bowhill; the A.O.C., No. 16 (Reconnaissance) Group, A. V.-M. H. M. Cave-Brown-Cave; and the Commanding Officer, Group Capt. J. C. Russell, were presented.

A tour of the station, including the torpedo section, the schools of navigation and reconnaissance and general quarters, was made, and representative aircraft types were viewed. These were the Vildebeest, Anson, Walrus, Swordfish, Shark, Osprey, and Nimrod. The King took tea in the Officers' Mess, and left by air at about 4.30 p.m.

The aerodrome at Thorney Island is one of our most modern and was opened last February for two Torpedo and four Fleet Air Arm Squadrons. Nos. 42 and 22 (Torpedo Bomber) Squadrons moved there from Ponibristle in March and the School of General Reconnaissance was formed last April. As part of the expansion, the whole of Thorney Island was taken over by the Government.

During his tour the King inspected almost every aircraft type at present in service.

No. 72 Fighter Squadron Badge

THE Squadron Badge will be presented by the Commander-in-Chief Fighter Command on Tuesday, June 14, to No. 72 (F.) Squadron. The Squadron will be very happy to see any personnel of the old 72 Squadron who can find time to attend the ceremony; they will be guests of the Squadron at Church Fenton.

Any member of the Squadron who is able to attend should notify Capt. A. G. Lamplugh, at Lloyd's Building, 3-4, Lime Street, London, E.C.3, at the earliest opportunity.

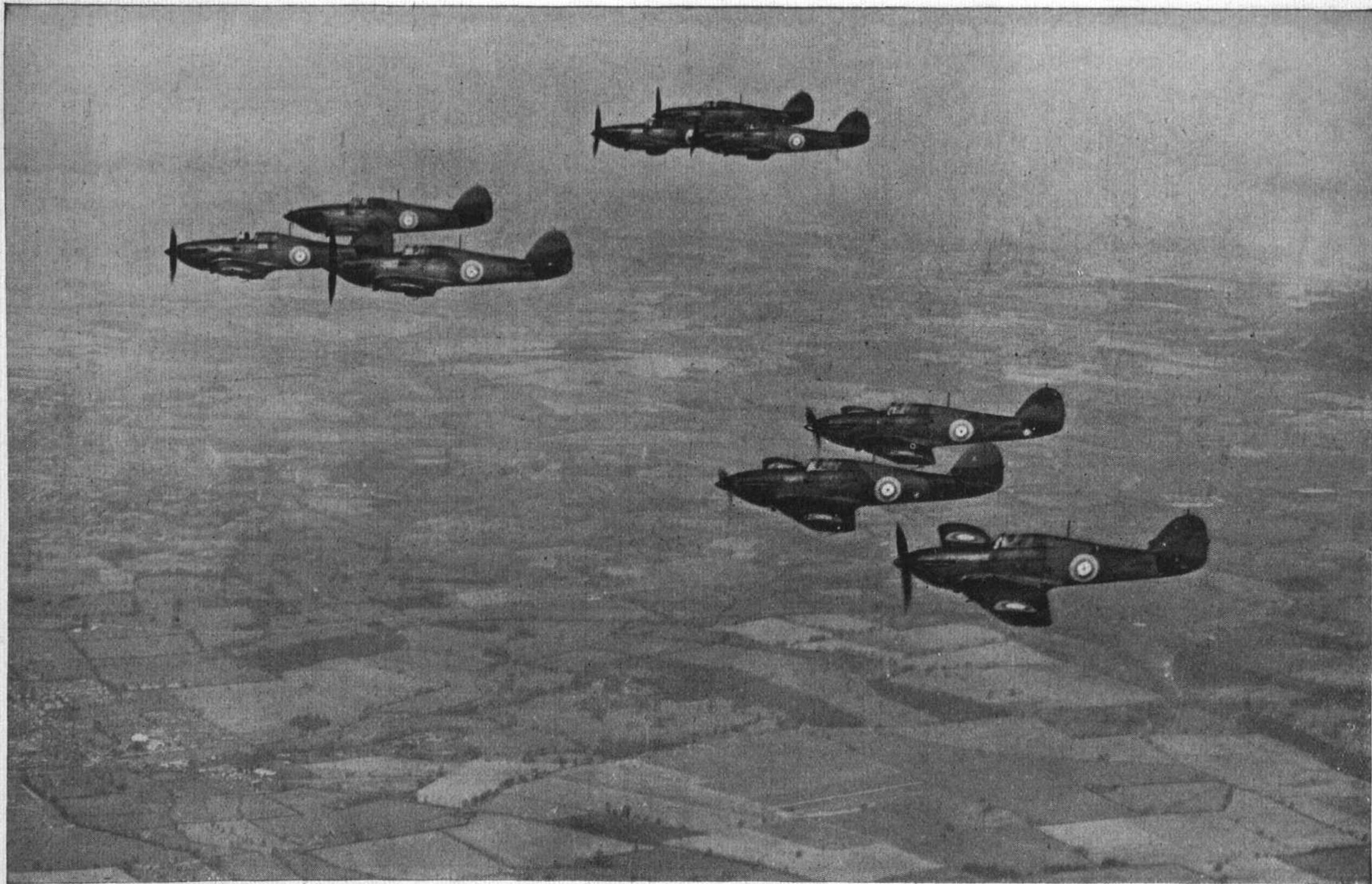
New-type Pegasus in Wellesley

THE Vickers Wellesley which was to have appeared at the Royal Aeronautical Society's Garden Party last week-end was listed as being fitted with a Bristol Pegasus XXII engine. Wellesleys in

service have either the Pegasus X or XX, the former being moderately and the latter fully supercharged. The XXII engine may be regarded as a development of the X and is the first production-type Pegasus to give over 1,000 h.p. for take-off. The maximum for all-out level flight is 975 h.p. at 6,250ft. Incidentally, the special fairing behind the Long-Range Wellesley's engines might improve performance for the standard model.

Air Force List

THE May issue of the *Air Force List* has now been published. It can be purchased (price 4s.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.



Hawker Hurricanes (Rolls-Royce Merlin) of the No. 111 (Fighter) Squadron. One of the Squadron machines recently flew at an average speed of 408 m.p.h. from Edinburgh to Northolt.

BURBERRY

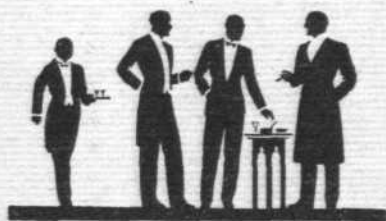
R.A.F. KIT



Undergraduates and other gentlemen intending to take up permanent or short service commissions in the Royal Air Force are advised to apply to Burberrys Ltd. (appointed outfitters to the Royal Air Force College) for particulars and prices of Kit.

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SERVICE AVIATION (CONTINUED)

Royal Air Force Gazette

General Duties Branch

Air Comdre. A. G. R. Garrod, O.B.E., M.C., D.F.C., is appointed Director of Equipment, Air Ministry, vice A.V.-M. J. S. T. Bradley, O.B.E. (March 31).

The following F/O.s are promoted to the rank of Flt. Lt. on the dates stated:—A. M. Mulliken (A.Flt. Lt.), V. H. A. McBratney, K. Capel-Cure (A.Flt. Lt.) (April 1); C. G. R. Lewis (April 3).

F/O. W. I. Scott is granted the acting rank of Flt. Lt. (February 24); Air Comdre. G. R. Bromiet, D.S.O., O.B.E., is placed on the retired list at his own request (April 25).

The following P/O.s on probation are confirmed in their appointments and promoted to the rank of F/O. on the dates stated:—E. G. Farthing, W. R. Ford, R. V. B. Franklyn, P. N. Sowman (January 1); A. R. Chrisp (April 12).

Group Capt. G. Laing, C.B.E., is promoted to the rank of Air Comdre. (May 1).

Accountant Branch

Sqn. Ldr. E. W. Horncastle is placed on the retired list at his own request (April 30).

Auxiliary Air Force

General Duties Branch

F/O. J. W. Martin (late R.A.F.) is granted a commission as Flt. Lt. (March 14).

No. 608 (NORTH RIDING) (FIGHTER) SQUADRON.—Flt. Lt. H. C. Newhouse relinquishes his commission (March 28).

Auxiliary Air Force Reserve of Officers

General Duties Branch

H. C. Newhouse is granted a commission as Flt. Lt. in Class A (March 28).

Royal Air Force Appointments

General Duties Branch

Air Vice-Marshal.—H. R. Nicholl, C.B.E., to H.Q., R.A.F., Middle East, Cairo, Egypt; on appointment as Air Officer Commanding, 27.3.38.

Wing Commanders.—C. F. Horsley, M.C., to R.A.F. Station, Ambala, India; to command, 1.4.38. A. D. Pryor, to R.A.F. Station, Linton-upon-Ouse; to command, 20.4.38. J. G. Walser, M.C., to H.Q., R.A.F., Far East, for Air Staff (Intelligence) duties vice Wing Cdr. A. G. Bishop, O.B.E., A.F.C., 15.4.38. D. V. Carnegie, A.F.C., to R.A.F. Station, Wittering; to command, 21.4.38. J. Blackford, to Directorate of Staff Duties, Air Ministry, vice Wing Cdr. D. V. Carnegie, A.F.C., 21.4.38.

Squadron Leaders.—A. H. Owen, M.C., to Aeroplane and Armament Experimental Establishment, Martlesham Heath, for Administrative duties, 23.3.38. D. C. Prance, to Armament Training Station, Leuchars; for flying duties, 11.4.38. R. T. Taaffe, to R.A.F. Station, Nairobi; to command, 1.3.38. G. B. Keily, to No. 216 (B.T.) Sqn., Heliopolis, Egypt; for flying duties, 1.4.38. S. R. Ubee, to No. 3 (Indian) Wing, H.Q., Chakala, India; for Air Staff duties, 1.4.38.

Flight Lieutenants.—R. C. Mead, A. McD. Bowman, to R.A.F. Station, Ambala, India, 1.4.38. A. W. Geoghegan, to R.A.F. Station, Dhibban, Iraq, 1.4.38. R. V. McIntyre, to Communication Flight, Dhibban, Iraq, 4.4.38. F. A. J. Pollock-Gore, to No. 148 (B.) Sqn., Stradishall, 9.4.38. J. A. Tester, to No. 26 (A.C.) Sqn., Catterick, 11.4.38. P. Haynes, to No. 74 (F.) Sqn., Hornchurch, 10.4.38. A. C.

Watson, to R.A.F. Station, Catterick, 25.4.38. W. R. Sadler, to No. 113 (B.) Sqn., Grantham, 24.4.38. H. F. Chester, to No. 108 (B.) Sqn., Bassingbourn, 22.2.38. A. E. Cairnes, to No. 7 A.T.S., Acklington, 11.4.38. R. J. F. Craig, to No. 83 (B.) Sqn., Scampton, 28.3.38. A. G. Strutt, to No. 2 F.T.S., Brize Norton, 11.4.38. P. H. Wilcox, to H.Q., Training Command, Market Drayton, 20.4.38. E. N. A. Crowe-Browne, to Directorate of Equipment, Air Ministry, 15.4.38.

Equipment Branch

Group Captain.—R. W. Thomas, O.B.E., to Directorate of Equipment, Air Ministry, for duty as Deputy Director of Equipment (General), vice Group Capt. C. G. Smith, O.B.E., 2.5.38.

Squadron Leader.—T. G. Bowler, to Directorate of Equipment, Air Ministry, vice Group Capt. R. W. Thomas, O.B.E., 27.4.38.

Accountant Branch

Squadron Leader.—B. G. Drake, to No. 9 F.T.S., Hullavington, for Accountant duties vice Sqn. Ldr. E. W. Horncastle, 27.4.38.

Medical Branch

Squadron Leader.—G. M. Anderson, to R.A.F. Station, Bassingbourn; for duty as M.O., 22.4.38.

Flight Lieutenant.—S. R. C. Nelson, to R.A.F. Depot, Middle East, Aboukir, Egypt, 16.3.38.

Dental Branch

Flight Lieutenant.—H. Keggins, to R.A.F. Station, Cranwell, 5.5.38. J. J. Lawson, to R.A.F. Station, North Weald, 2.5.38.

FOREIGN SERVICE NEWS

Two New Breguets

INITIAL test flights are being made with the Breguet 730 naval flying boat (four Gnome Rhône 14-No) and the fighter-light bomber 600 (two small-diameter Gnome-Rhône or Hispanos). It was found necessary to arrange for induced draught in the cabin of the latter machine to prevent asphyxiation of the crew by the exhaust gases.

Trouble in the States

IT is reported that following two fatal accidents, said to have been due to engine trouble, thirty-five Seversky pursuit monoplanes, one of the latest and fastest machines in the U.S. Army Air Corps, have been grounded at the Selfridge Field. The P/35 is a 300 m.p.h. machine comparable with our Hurricane, and is powered with a 1,000-h.p. Pratt and Whitney Wasp. It seems

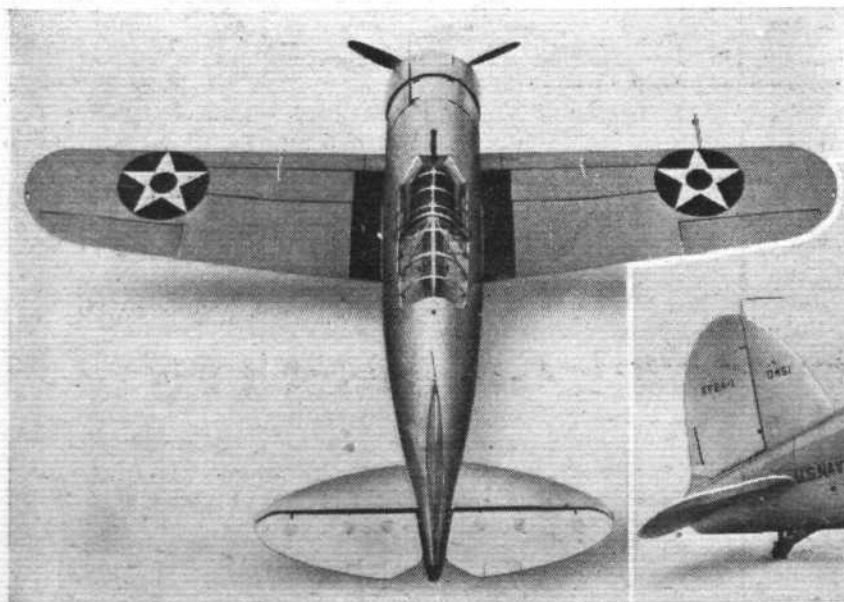
strange that a well-tried engine such as this should be the sole cause of the trouble. The machines were unable to take part in the air manoeuvres which commenced on Wednesday of last week.

Afghan Air Force Pupils

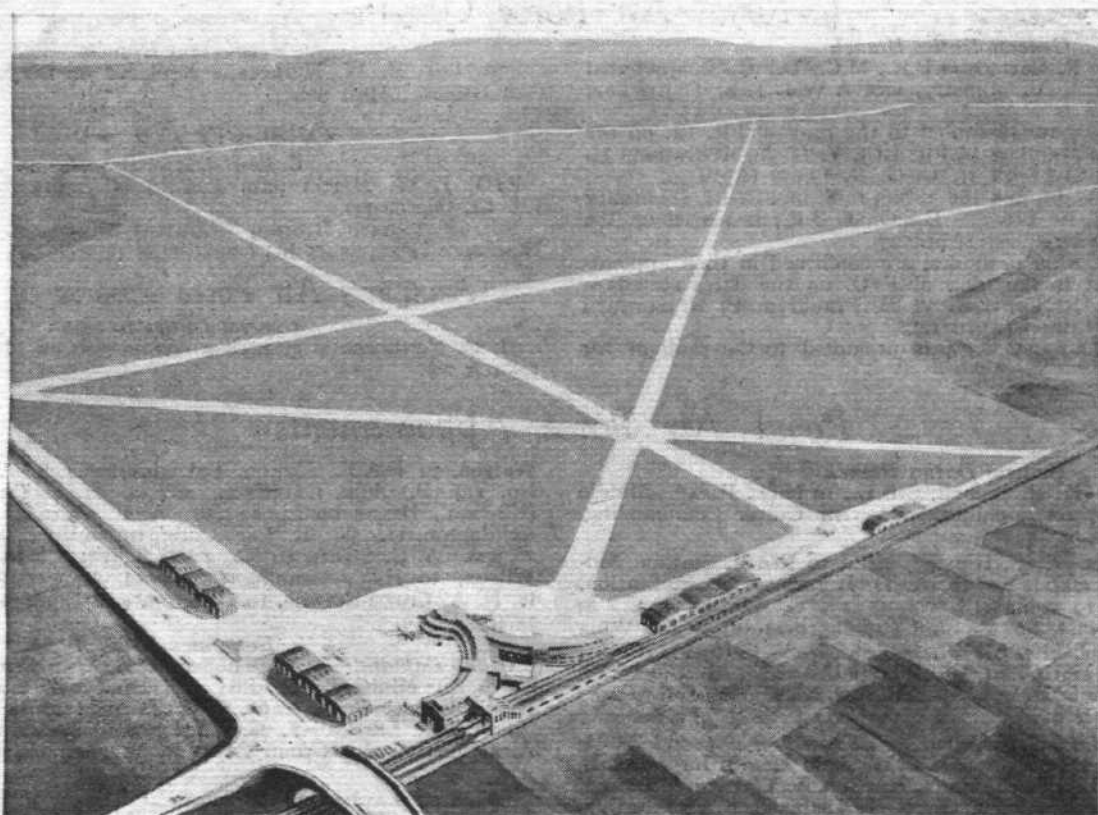
AT the request of the Afghan Government the Indian Government has agreed to train thirty Afghan students for the Afghan Air Force. Eight will be trained as pilots, eight as observers, and twelve as mechanics; of the remaining two, one will train as a wireless operator and the other as a meteorological officer.

Towards the end of their training the student pilots will be attached to squadrons in different parts of India for the four months' advanced course. The observers and mechanics will have four months with the R.A.F. Squadrons, and the meteorological officer will be under the Director-General of Observatories at Poona.

NAVAL CORPULENCE: The new Brewster single-seater fleet fighter for the U.S. Navy powered with a Cyclone G. Points to note are the method of retracting the undercarriage, the pilot's headrest and the slinger ring-spinner over the hub of the Hamilton airscrew, which is likely to be of the new reversible-pitch type to retard speed in a dive.



COMMERCIAL AVIATION



THE NEW GATWICK: An artist's conception of the proposed improvements, referred to in a paragraph on page 477.

THE WEEK AT CROYDON

"A. Viator's" Causerie on Airline Affairs at London's Main Terminal and Elsewhere

NOW that the Ensign and Albatross are imminent additions to the Imperial Airways fleet (as I am credibly informed), I may be permitted to mention that there have been those, even within the fold, who began to suspect *Heracles* and Co. of a slight disposition to linger.

After all, that class of aircraft was definitely comfortable and what Dickens described as "a comfortable woman" was never the sort you would have suspected of a turn of speed.

Suspensions of this loiterability were recently strengthened when a well-known weekly illustrated paper produced a picture of sundry camels being overtaken by *Hanno*, somewhere in Africa.

The camels are understood to have lodged an objection through their solicitors, Messrs. Oonts, Oonts, Oonts, Hairy, Scary, Oonts and Oonts, on the grounds that it was not a race and they were not trying, and, moreover, that a tail wind does not help them but merely ruffles them the wrong way and chills the backs of their ears. Official circles are reserved, the only comment being to the effect that any remark about matters in the East would be premature at present—and probably too late if made to-morrow.

Somebody wrote in the Correspondence columns of *Flight* last week to say that one of the railway companies gave him full details of the air service on the Penzance-Scilly Isles run of Olley Air Service, Ltd., which I said in *Flight* of April 21st was still under the Railway Clearing House ban. He should now pop in at a rail booking agency office and try to book an air seat from Penzance to Scilly. If they accept his money the fact will be that the company has lifted the ban by stealth, and he will find them blushing a pillar-box red at their fame. If not, what the heck is the use of sending him full details of the service?

Somebody seems to have really done something beneficial for the average airline pilot at last. This is a pleasing contrast to all the public verbiage bemoaning the

pilot's lot for him (and eminently calculated to enhance the orator's personal publicity) which we have heard lately.

The only document which enables an air pilot to earn his living is his "B" licence, and through a remarkably comprehensive insurance scheme, F. W. Jones and Partners have enabled the pilot to insure against loss of that licence. I understand that the premiums are very considerably cheaper than for even the less complete schemes of a vaguely similar nature which have existed in the past.

Whether the idea is sound or not may best be left to the judgment of those it most nearly affects, and it is only necessary to say that although the scheme has hardly been in operation for a week, almost every Senior Captain of the big companies has signed on the dotted line. Many First Officers have followed suit and the rush still continues. There is an arrangement known to the vulgar as "the never never" whereby monthly instalments will be accepted. There is no shadow of doubt that to have such a policy in the ditty-box beats all the syrups of the East as a means of sleeping sound o' nights, both for the average "B" licence pilot and for his wife, who (God bless her!) gets most of the worry, after all.

Cdr. E. B. Fielden, of British Airways, has now flown over 100,000 passengers without so much as bruising the very tenderest of them. A lot of his flying was done in the early joy-ride days, operating from small fields, and when chief pilot to Sir Alan Cobham's circus he once took up 768 people in a day. He was one of the first British Airways pilots to fly the night mail to Germany, and during the first six months of the service he made 106 night journeys between England and Germany.

Tons and tons of gold have been reaching England lately, mostly by Sabena from Belgium. Belgium, however, seems to be but a clearing house and the mystery still remains. Where does it come from and, moreover, is it staying in this country or going out again, possibly by boat? They estimate that about three tons a day has been coming in here for the past two weeks.

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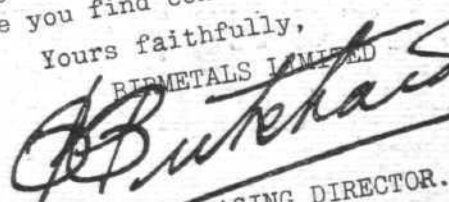
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COMMERCIAL AVIATION (CONTINUED) : WORLD NEWS

Control at Southampton

SINCE April 30 the Air Ministry has been responsible for air traffic control at Southampton Airport. Previously, corporation officials have been carrying out the necessary duties. This is a further move in the "implementation" of the Maybury Committee's recommendation that the Government "should provide, maintain and operate a comprehensive air traffic control organisation adequate to secure the safety of air communications." Air Ministry control stations already exist at Croydon, Heston, Manchester (Barton), Portsmouth and Doncaster.

Atlantic Preparations

ALTHOUGH France has not yet obtained the necessary authorisation from the Portuguese Government for the flying boats of Air France Transatlantique to use the Azores as a stopping place, preparations for trial flights by that route are proceeding and the *Lieutenant de Vaisseau Paris*, after carrying out various tests with Air France's star South Atlantic pilot, Guillaumet, in charge, is being fitted with the new Hispano engines which she will use across the North Atlantic. Meanwhile, Guillaumet has returned to Dakar to resume his job on the South Atlantic service.

London-Prague in 5½ Hours

SINCE May 2 Air France, in co-operation with C.S.A., have been operating two services daily to Prague from Paris and two services in the reverse direction. Air France are using Bloch 220s and C.S.A. Savoia-Marchetti S.73s. The services leave Le Bourget at 8.00 and 15.00 hours. Passengers from London utilising the first of these services must stay in Paris overnight, but if they use the second they need not leave Croydon before 13.30 hours, which service gets them to Prague at 19.00 hours. This is the only afternoon service to Prague from London. A stop is made at Strasbourg, thus providing the first direct link between London and that town in a single day.

Neon Control

ACCORDING to a recent *Notice to Airmen* the strip neon ground lights at Croydon—which, unfortunately enough, lie more or less across the usual blind approach line—will only be switched on when a machine is about to land unless the pilot makes a specific request to the contrary. They will not be switched on for take-off purposes except, again, on special request.

These lights provide a very useful assistance to pilots in gauging their height above the aerodrome when landing at night or in conditions of bad visibility. One or two sections at the north-east end of the strip may occasionally, and for experimental purposes, have green lights substituted for the normal orange lights from time to time.

Gatwick Once More

SOME time ago we published a paragraph briefly describing the way in which Gatwick Airport could still be extended and improved for use as London's terminal airport. Since then the plans have been rather more thoroughly considered and Airports, Ltd., have made some further suggestions.

Their scheme involves the purchase of adjoining land, which is, in fact, for sale, the extension of the present terminal building towards the railway station; the laying of concrete or earth-stabilised runways; and the building of more hangars. In its extended form the airport would have runs varying between 1,800 and 2,500 yards—the latter, in the north-west to south-east direction, to be used, of course, for approaches and landings in bad visibility.

Airports, Ltd., point out that Gatwick is in the best position for Continental traffic, and, with the co-operation of the Southern Railway, would be closest to London in point of time. The surrounding country is comparatively flat, and, as the proposed extension would automatically provide for the cutting down of all trees, possible objections on this score would be dealt with. The company claims that the airport is second only to Gravesend in its freedom from fog. Needless to say, the provision of runways would remove the sort of difficulties which have previously been experienced with soft turf, and it would seem that, in any case, it will be necessary for runways to be laid in future at any airport which is being used by the heavier and faster machines now being developed.

Feverish

NEW regulations, which are designed to prevent, as far as possible, the introduction of infectious diseases into this country through the medium of airborne traffic, will come into force on July 1. In general, these regulations resemble those for seaports which were introduced in 1933, and apply to all Customs aerodromes. Details will be found in the *Statutory Rules and Orders No. 299 of 1938*.

Oslo's Land-Sea Airport

WORK on the new Oslo airport at Fornebu is being speeded up, so that, it is now hoped, it will be in use next summer. So far well over 800,000 cubic metres of rock have been blasted away, while an aggregate of 70,000 square metres of runway and tarmac have been completed. By next summer the area will total 130,000 square metres, and this will mean that the first stage of the construction has been completed. A later effort will be the completion of an adjacent sea airport at Rolfstangen.

R.A.S. Empire Exhibition Service

RAILWAY Air Services' special London-Glasgow service for the Empire Exhibition is proving popular. Operated by D.H.86s, the route gives a tarmac-to-tarmac time of 3½ hours. Northbound machines leave Croydon at 9.30 a.m., arriving at Renfrew at 12.50 p.m., and the southbound service, leaving Renfrew at 8.45 a.m., arrives at Croydon at 12 noon. An intermediate stop is made at Speke, and calls on request are made at Birmingham and Stoke-on-Trent. The service is confined to week-days.

New Zealand Correlation

BETWEEN January 16, 1936, and February 25 this year, Union Airways of New Zealand have carried a total of 19,808 passengers on their combined Palmerston North-Dunedin and Wellington-Auckland services. During this time more than 7,000 hours have been flown by the company's D.H. 86 and Lockheed Electras with a regularity percentage of 98.99.

Earlier this year we explained the co-ordinated airway plan now in operation in New Zealand. East Coast Airways, using D.H. Dragons, are operating their Gisborne-Palmerston North run and have just started a feeder service between Palmerston North and Wanganui. Cook Strait Airways, using D.H. Rapides, are flying from Wellington to Hokitika, while Air Travel (N.Z.), using two D.H. Fox Moths and a Dragonfly, take the passenger on from Hokitika to the Franz Josef and Fox Glaciers.

In the meantime, the Mt. Cook Tourist Co. propose to operate a service from Christchurch to the Hermitage and, according to information from New Zealand, it seems that they may use a Miles Peregrine—presumably one of the two prototypes.

Portugal and Africa

A FEW weeks ago we gave details of the plans of the Portuguese Government air service in East Africa. D.E.T.A. Airways, as the operators are known, already run a service between Lourenço Marques and Johannesburg, and on April 11 the coastal service between Lourenço Marques and Quelimane was opened. This service is being run on a definite schedule with stops at Inhambane and Beira, and the D.H. Rapides leave Lourenço Marques on Mondays and Thursdays and leave Quelimane for the return journey on Tuesdays and Fridays. The all-in time for the run in each direction is about eight hours.

The Johannesburg service, incidentally, has been designed, as far as possible, to link up with the Imperial Airways boat service calling at Lourenço Marques. The D.E.T.A. services leave Lourenço Marques on Sundays, Wednesdays, and Saturdays, and leave Germiston, Johannesburg, on Mondays, Thursdays and Saturdays. Negotiations are in progress with Imperial Airways to arrange the necessary co-operation in case of any slight delay in services on which the connection is made on the same day. The Sunday north-bound boat leaves Lourenço Marques fairly late in the morning so that passengers arriving by D.E.T.A. on the Saturday service will not need to arise at any unearthly hour.

In addition to the four D.H. Rapides, the Dragonfly and the Hornet Moth used by D.E.T.A., three Junkers Ju. 52 are on order. The agents are Parry, Leon and Hayhoe, of 2, Conduit Street, London, W.1.



PRIVATE FLYING

Topics of the Day

This England

IN this country it is almost customary for private owners and amateur pilots generally to treat flying as a rather haphazard means of personally conducted transport, and to treat winter flying in particular as a pastime demanding the utmost attention to weather reports. During the past six weeks or so—at least until the break in the weather—it has been possible to make real use of a normally equipped aeroplane on practically every day. Furthermore, it has generally been possible to fly without concentration and without the necessity for continuous map-reading. And that is what flying should be.

On one day at the beginning of last month I spent an afternoon wandering about the Midlands under a blue sky with visibility of the ten-mile order. In these circumstances maps were merely a comfort and the compass a useful device to encourage straight flying, but neither was in the least necessary. It would have been possible to fly on any old map.

In fact, there are more days of this kind during the year than most people imagine, and the depressing weather reports which are so often obtained are usually found, and rightly so, to be somewhat on the pessimistic side.

The ability to make a detour on the spur of the moment off a predetermined track without feeling slightly worried about one's whereabouts or about the weather in different parts of the country make flying for sheer amusement very well worth while. The track which is drawn between A and B, and which must be so closely followed in rain or poor visibility, appears very rarely to pass over any places of real interest. With little deviations from time to time a very ordinary cross-country flight, made however earnestly on business bent, can be made much more amusing.

A few years ago I used to fly with an owner—alas! no longer with us—who was very keen on archaeology, and the result was that map-reading developed a new interest. Such things as the sites of Roman villas usually show up very well from the air.

Spectatorial

DURING this particular trip I had a look at the London Gliding Club centre near Dunstable and was not really surprised to find such a large number of parked cars and spectators of one kind or another. Not only is the spot a pleasant one in the ordinary course of events, but there really is something to see in this soaring business. In the old days people used to come out to watch the flying at aerodromes, but nowadays the power-driven devices simply go up and down—and there is nothing very new about that.

There is, however, still something surprising about a flying machine which goes up and stays up without the help of some form of motive power, and the spectators, generally speaking, appear to realise that sailplanes stay up by virtue of skill, and skill alone.

All this spectatorial business is a good thing, since one out of every hundred visitors will want to try his hand at the sport, and those flying clubs at which the membership is tending to fall off might attempt to attract the casual watcher. In the early days of the club movement people came quite automatically because

the sight of any solid matter well and truly adrift from the earth was an unusual one; nowadays, any club which wishes to attract the lay visitor must put on something special in the way of a show, and the risk here is that we shall go back to the absurd position when practically every club in the country ran some sort of display. The same visiting pilots put up the same demonstration show at every one of them, and no organiser appeared to be able to think of anything new. Spectators, consequently, became bored.

While on the subject of dropping membership, one or two very honest secretaries and other dignitaries have told me that they cannot reasonably put too much of the blame on to the Reserve system, since the great majority of Reserve pilots would not otherwise have been able to afford to fly. Unfortunately, the man or woman who has a sufficiency of spare cash is so often beyond the years when he or she cares to take up something entirely new and apparently (if one reads the papers) dangerous. Nevertheless it should still be possible, with a little effort, to attract new-comers from the class of people who are either ineligible for the Reserve or who do not feel inclined to tie themselves down in this way.

Ground Transport

ONE of the least encouraging features of flying is the fact that aerodromes are necessarily not only a long way from the town centres, but also rather off the beaten track, and about a year ago I suggested that somebody might seriously consider the idea of organising a vast car-hire system for all reasonably busy aerodromes.

The airline people, of course, arrange their own ground transport for their passengers, but the private owner and club pilot who has just travelled two hundred miles in less than a couple of hours often has to waste at least another hour at an aerodrome before obtaining, at fabulous cost, some mediocre form of transport to take him to his real destination.

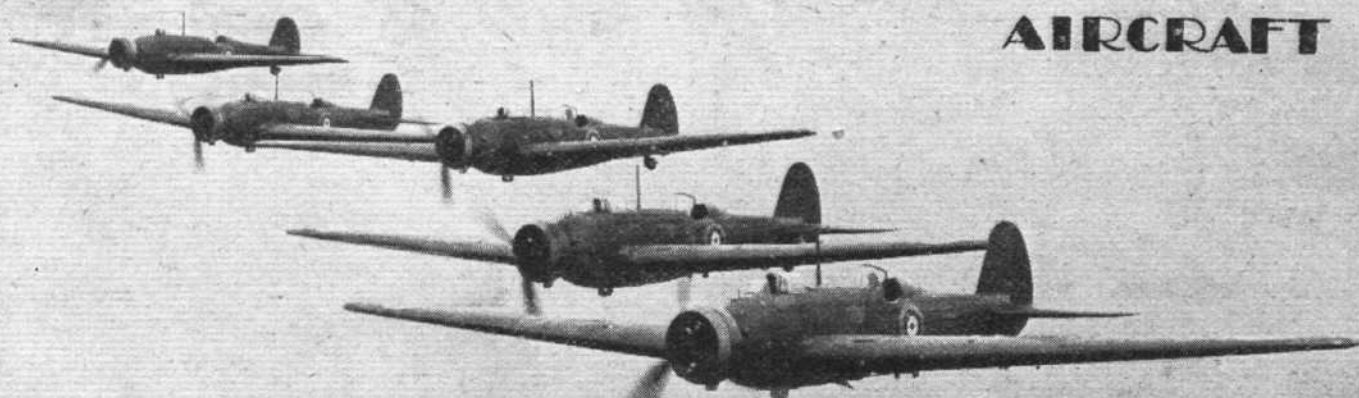
My idea really consists of an attempt to make the best of both worlds; to use an aeroplane for the long distances and yet to have a car always available for short-distance travelling. The non-flying traveller is, of course, in exactly the same position. He can choose between the effort involved in driving a car a very long way and the nuisance, if he decides to go by rail, of being without a car at the other end. The only difference is that the traveller by train is at least disgorged in the centre of things, where wheeled vehicles are obtainable at reasonable prices, whereas the pilot parks his aeroplane and either hopes for a lift or rings up some taxi-rank ten miles away.

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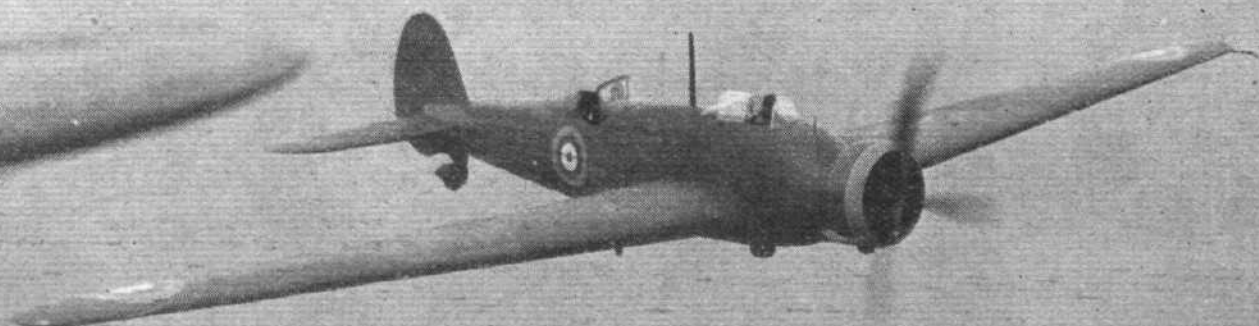
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COMBINED VIRTUES

The Arpin Monoplane Makes Its Public Appearance : A New Pusher Type with a Tricycle Undercarriage

TOWARDS the end of last year we gave some details and published a scale drawing of a new private-owner type which was being made by M. B. Arpin and Co., of Longford, West Drayton, Middlesex. During the last few weeks the prototype has been nearing completion, the final assembly and finishing work being done at Rollasons at Hanworth, and the machine came out into the open in public for the first time at the R.Ae.S. Garden Party.

For a prototype the Arpin A.1 monoplane is certainly very well made and finished. A great deal of attention has been paid to detail work and such items as control leads are of a sturdy and workmanlike type such as one expects to see only on larger machines. Apart from what is still an unconventional general layout, the structure is comparatively orthodox. The wing is of plywood-stressed skin with a single spar, which, though in three pieces for dismantling purposes, is virtually continuous. What used, in the old days, to be called the nacelle is a particularly capacious box structure in which the pilot and the passenger are seated in tandem beneath a transparent "lid" giving more than ample headroom. The three-piece windscreen must be nearly two feet in depth and, since the machine is of the pusher type, the view in all the essential directions should be as good as is possibly obtainable.



"Flight" photographs.

These two views, and the one in the heading above, give a good idea of the appearance of the prototype Arpin. The engine at present fitted is a 68 h.p. British Salmson.

The two fully cantilever booms which support the tail unit are built up of four members in diamond section with plywood stiffening. The tailplane and the two fins are each again of ply-stressed construction and the control rods for the elevator and rudders pass through the centre of the port and starboard booms respectively. There is, in fact, no exterior control mechanism and the entire machine is as clean as the attention to personal comfort in the nacelle will permit.

The three-piece trailing-edge flap extends from aileron to aileron and each section is a double-surfaced structure.

The engine fitted to the prototype is an A.D.9 R. British Salmson radial with a maximum output of 68 b.h.p., in which a four-bladed airscrew is driven through a reduction gear. The slow airscrew speed should permit good efficiency at the lower end of the speed range. The fuel tanks are arranged in the centre section on the starboard side, and there is a gravity tank for direct feed to which fuel is pumped by means of a handle in the cockpit. This tank has a capacity sufficient for three-quarters of an hour's flying, and beside the pilot there is an overflow indicator to tell him when he has duly filled it up. In all, the fuel capacity is such that the estimated endurance at cruising speed is as much as five hours.

Since it is obviously possible to break any undercarriage by either gliding it or allowing it to sink into the ground at a high vertical velocity, Mr. Arpin has not attempted to give the tricycle undercarriage anything very exceptional in the way of travel. He feels that a machine should normally be landed in a more or less orthodox fashion and the tricycle arrangement is designed in this case merely to give the pilot, so to speak, a second chance and to improve the ground characteristics generally. The Arpin's undercarriage is, in effect, a rationalised tricycle. The casting front wheel is steerable.

A brief test flight was carried out last week-end by Mr. Wynne Eyton, but no actual performance figures are yet available. The estimated maximum speed of the Arpin is 108 m.p.h., the cruising speed (at 65 per cent. power) is expected to be 95 m.p.h. and the landing speed, with the flaps down, rather less than 40 m.p.h.

London-I.O.M. Entries

SOME interesting entries have already been received for the London to Isle of Man Race which takes place on Saturday, June 4. Lord Wakefield has entered the De Havilland Technical School's T.K.2, which, as reported recently in *Flight*, is being considerably modified by the students, the modifications including cutting down of the wing area.

Mr. Giles Guthrie is to fly a Mew Gull and Mr. W. Humble a Sparrowhawk, while Herr Seidemann, the German pilot who was awarded first place last year with a Messerschmitt Taifun, will also take part.

Private Flying**FROM the CLUBS and SCHOOLS****LONDON**

THE flying time for last week was 49 hr. 5 min., and Messrs. T. Phelan, A. J. Cormack and M. Birchenough were new members.

MARSHALL'S

During the last week in April 33 hours' flying was put in and cross-country flights were made to Hatfield, Speke, Ipswich, Reading and Hanworth.

STRATHAY

Recent splendid weather having proved an inducement, a total of 56 hours' flying was put in. Several new members have joined, including Mr. Charles Thornton, who has very definite "A" licence intentions.

BORDER

Cross-country flights covering a wide area bounded by Newtownards, Abbotsinch, Rentrew and Newcastle were made during April and 112 hr. 15 min. were flown. Arrangements for Empire Air Day are well forward.

NORTHAMPTONSHIRE

The South African lady golfers are to be entertained to dinner at Sywell on May 31, after which they will be flown to Stratford-on-Avon. The flying hours are steadily improving and several new flying members have joined.

READING

In spite of thick weather at the beginning of the week and the high winds at the end, the machines were kept busy. Cross-countries in the Miles Whitney Straight included Luton, Bokesbourne, Portsmouth and several to Brooklands.

BOURNEMOUTH

With cross-country flights made by members to Harwell and Hayling, a satisfactory flying total of 24 hours was achieved. Mr. J. T. W. Avis was successful in making his first solo and new members—Messrs. Hartley and Gisborne—were welcomed.

REDHILL

Five machines went in formation with Brooklands to lunch at Lympe. On Sunday, the Chilton monoplane was demonstrated to members. "A" licence tests were passed by Messrs. P. Nathan and H. G. Venables, and a total of 44 hr. 10 min. flying was put up.

BROOKLANDS

A luncheon visit to the Cinque Ports Club was made by seven machines from Brooklands and five from Redhill. Arrangements are being made for a flight to Glasgow in order to visit the Empire Exhibition. During the last week Cdr. Stewart made his first solo and Mr. Longmore executed his night cross-country for "B" licence tests.

HAMPSHIRE

Night flying instruction was taken by Messrs. J. L. Gregory and M. R. Ingle-Finch, the former also making his "B" licence night flight from Croydon to Southampton. Mrs. Anne Budd, aged 93, made a flight in the Club Leopard over the *Queen Mary*. A total of 32 hr. 5 min. was flown during the week ended May 6. For the month of April, 206 hr. 45 min. was put in.

BRISTOL AND WESSEX

The garden party of the Bristol and Wessex Flying Club will be held on Saturday, June 11, when an arrival competition for all aircraft landing between 14.30 and 15.30 will carry prizes of £10 (first) and £5 (second). Flying during April was well up to average and 89 hr. 15 min. was logged for the month. In addition, 11 hr. 25 min. was put in during the week ended May 6.

A Vega at St. Moritz

IT may be recalled that a rather attractive heading photograph in a recent issue of *Flight* showed a Vega Gull on the St. Moritz Airport—the first English privately owned machine to land there. Actually, we understand, the machine was the property of Mr. Ian Williamson and had been flown there by Mr. Vernon Motion; the photograph was taken by Mr. Andrea Badrutt.

Amateur Proficiency

IN the fifth number of the Herts and Essex Club's house magazine a new proficiency scheme which has been developed by the club is outlined.

This scheme involves the issue of a special proficiency badge for those members who wish to reach a high standard, but who are either debarred from obtaining, or who do not wish to obtain, their "B" licence. The qualifications involve the completion of 100 hours and the passing of tests (including one for blind flying, but excluding a night flight) similar to those required of "B" licence applications.

On the whole, the idea is an extremely good one, and should not only encourage members to do more flying, but also help to bridge the gap which at present exists between the quite nominal "A" licence and the "B" licence.

BARTON (BEDS)

Visitors to the Bedford School of Flying during last week included two mass formation flights from Hatfield. Sir Arnold Wilson, M.P. for Hitchin, called in to inspect the club and was profuse with his congratulations to the general manager of the airport on the good progress made. A new member was Mr. B. R. Turner, of Bedford.

BOMBAY

The Bombay Flying Club put in 141 hours for the month of April, during which cross-countries were made to Deolali, Poona, Himatnagar, Junagadh and other places. Messrs. L. Hirachand and H. S. B. Tyabjee obtained their "A" licences. A speed-judging competition was held for the cadets of I.M.M.T.S. Dufferin when they visited the club on April 13, and the winner was awarded a joy-ride.

YORKSHIRE

Several flights were made carrying Press photographers wishing to secure pictures of the moorland fires in Derbyshire and Yorkshire. Among charter trips were visits to Glasgow for the Empire Exhibition. Notable visitors included F/O. C. F. Hughesdon and his wife, Miss Florence Desmond. The total flying for April was 202 hr. 15 min. and for the week ended May 6 a further 58 hr. 35 min. was flown.

NORFOLK AND NORWICH

The fruits of the flying scholarship recently awarded to one of their employees by Mann Egerton and Co. are now being reaped, the winner having made his first solo flight. Twenty-two hours' flying was recorded by pupils and pilots for the week ended May 4, a large proportion of this time having been spent in cross-country flights. The gliding section is proving very popular, and quite long flights are being made. Plans for Empire Air Day are well in hand.

CINQUE PORTS

On Sunday last, visiting aircraft from Brooklands and Redhill dropped in for lunch. Mrs. Davis, Mr. Du Port and Mr. A. J. S. Morris flew to the R.Ae.S. Garden Party, Mr. David Llewellyn went to St. Inglevert in Lord Patrick Crichton-Stuart's Hendy Hobo to give a demonstration, and Mr. A. J. S. Morris flew to Manchester in the Leopard. Mr. B. K. Scrivens made his first solo. High winds still prevailed at Lympe during the last week and only 40 hours' flying was logged.

HERTS AND ESSEX

Throughout the fortnight to May 5 extremely rough weather persisted and suspended flying on several days, including attendance at the Shoreham Dawn Patrol on May 1. The first competition of the season—a cross-country event for the Margaret Blackshaw challenge cup—was flown off on April 24, when Mr. Geo. Parker was winner, with Mrs. A. R. Frogley and Mr. D. C. Mason second and third respectively. Mr. G. L. Parbury sailed on April 29 for South Africa to take up the position of assistant instructor to the Rand Flying Club.

PENANG

On the 6th of the month the Penang Flying Club held its annual rally and display which, owing to the wholehearted co-operation of the Royal Air Force from Singapore, the Fleet Air Arm, the Straits Settlements Volunteer Air Force and the Malayan Flying Clubs, proved an unmitigated success. Fifty-seven machines took part, including every available civil aircraft in Malaya. The display consisted of formation flying, an aerial combat by No. 36 (T.B.) Squadron and the S.S.V.A.F., and some spectacular dive bombing by eighteen Swordfish from H.M.S. *Eagle*. During March several machines from the other Malayan flying clubs visited Penang, and the usual cross-country flights helped to swell the flying times of 109 hr. 40 min. Mr. White did his first solo flight, and has since completed all the tests of the Straits Settlements "A" licence.

R.Ae.C. Official Notices

DEAUVILLE Rally.—The Royal Aero Club is anxious to have a large gathering of private owners on July 16-18 at Deauville, where they will be the guests of the Aero Club of Deauville during the week-end. The invitation is open to all, and those who wish to take part should apply to the Royal Aero Club for particulars.

King's Cup Air Race.—Intending competitors are reminded that entries close on May 28. The race will take place at Hatfield on July 2 over a course of 1,000 miles, consisting of twenty laps of a triangular circuit of fifty miles, starting and finishing at Hatfield Aerodrome. The prizes, in addition to the cup presented by His Majesty the King, amount to £2,000 offered by Viscount Wakefield.

Full particulars and entry forms can be obtained on application to the Royal Aero Club.

Elections.—Mr. W. Lindsay Everard, M.P., has been elected chairman and Mr. F. Handley Page, C.B.E., vice-chairman of the Club for the year 1938.

Captain R. L. Preston and Mr. Kenneth Davies have been elected to the two vacancies on the committee.

H. E. PERRIN, Secretary.



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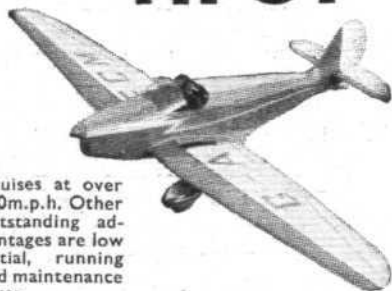
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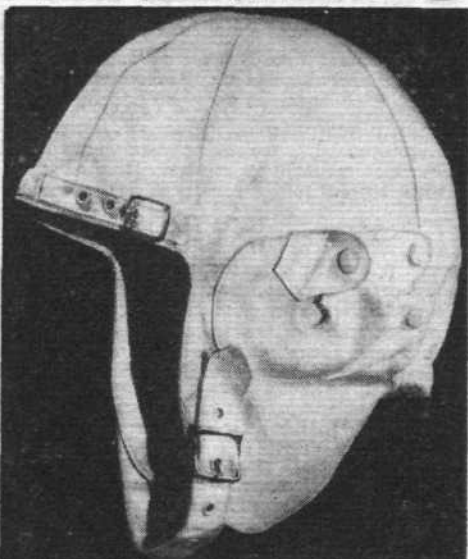
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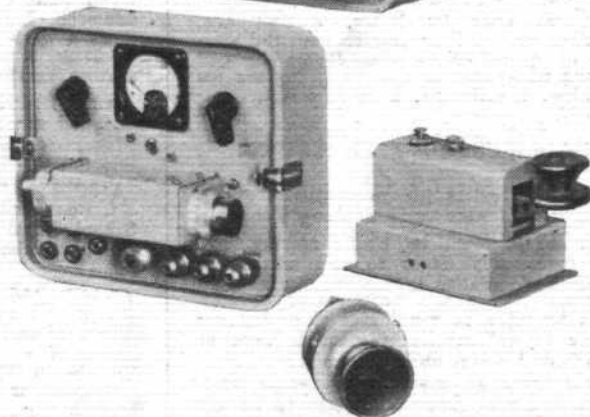


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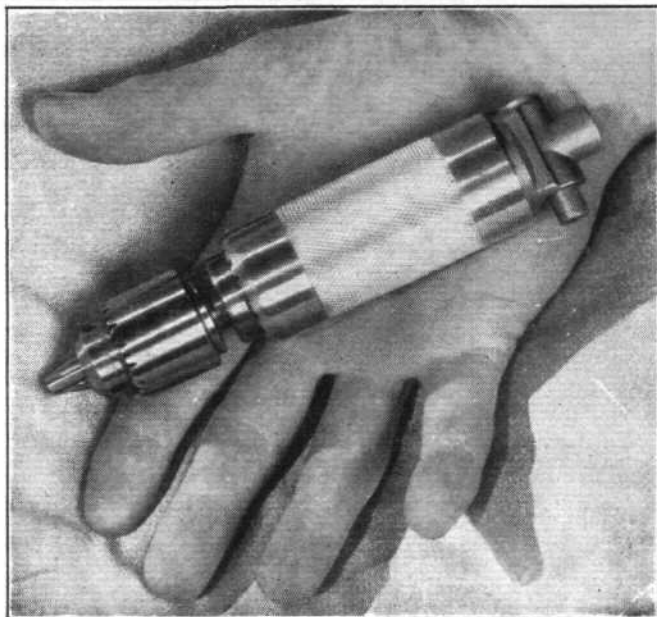
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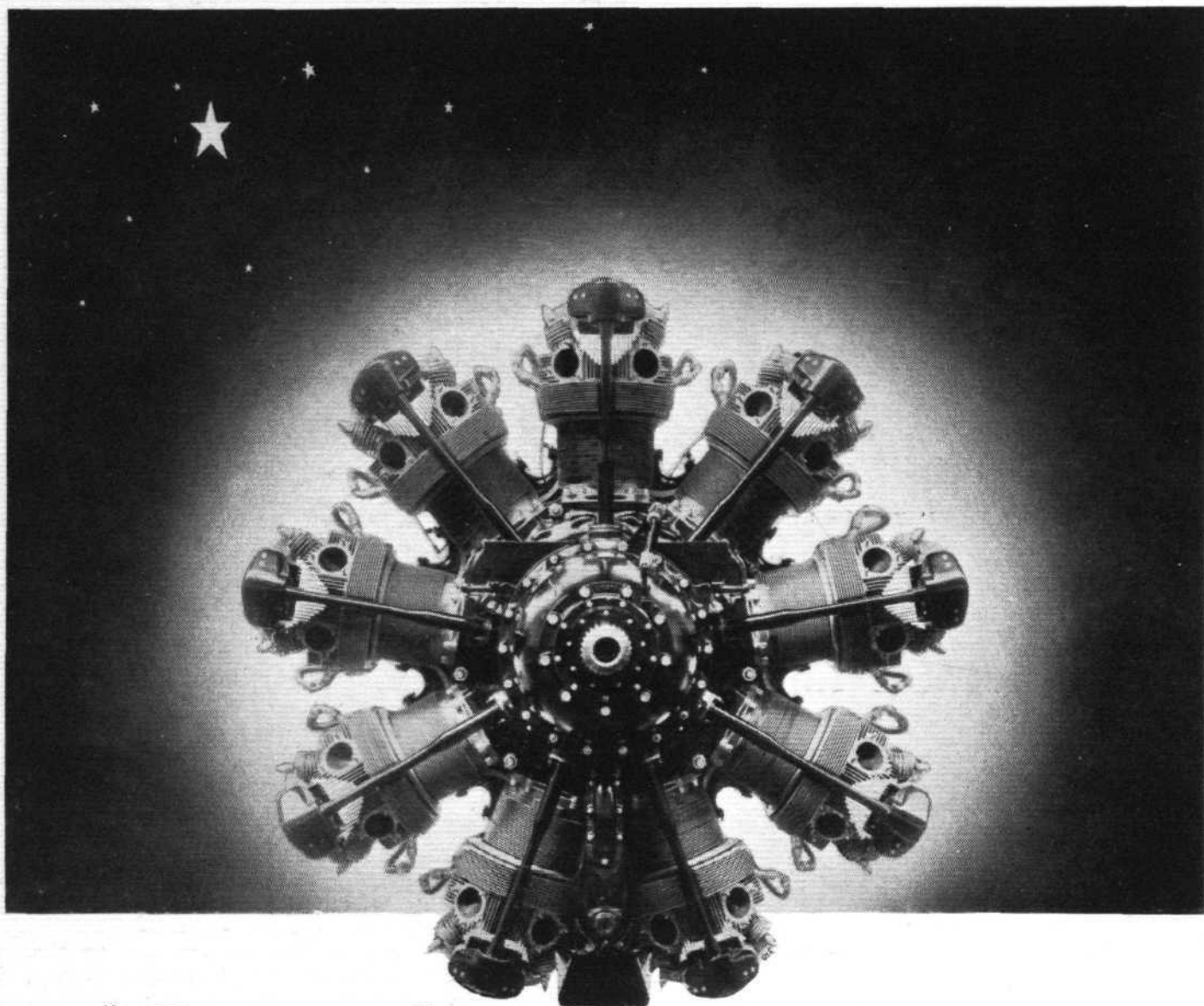
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