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## In this issue:



# Trainer Ideals

SOME four years have passed since the R.A.F. announced details of the revised plans which had been worked out for the training of Service pilots and for the building of new training aircraft. It was recognized then that pilots had a great deal more to learn during their training, particularly about applied flying, but for economy it was necessary to avoid multiplication of stages, aircraft types and training units. For that reason a new training curriculum was introduced and the simple elementary trainer had to give way to the larger, better-equipped basic, and the intermediate to the specialized advanced machine.

Trainers conceived at that time are now either in service or may shortly be introduced, and many instructors have been able to assess the qualities of the "basic" design when applied to its rigorous routine job, and to obtain some idea of the qualities of the "advanced" types. Of the aircraft it may be said that, built to a very exacting and rigid specification, they achieve admirably the aims of their designers. However, requirements and ideas alter in the case of trainers almost as quickly as they do for first-line military and civil aircraft.

Recently, preliminary information about two new "heavy" basic-trainer designs was made public, and many of the most experienced and knowledgeable instructors are now asking just what effect these aircraft will have on the standard of flying. Among other points, too, they are wondering where the delicate balance of favour as between tandem and side-by-side seating lies at present. There has undoubtedly been a slight strengthening of the tandem-for-basic cause in the Service during recent months. The new side-by-side basic trainers are to have more power, and this will be welcome; but, even though extreme simplicity of control and landing can be features of a comparatively large aircraft there should be a practical limit to the size and complication of the machine in which a pupil is asked to make a first solo or, later, learn aerobatics. Moreover, there is a definite risk of turning out a new generation of "ham" pilots, unable to appreciate and produce the sensitive movements needed to fly and land a light aircraft correctly. An interesting comparison will be afforded if the R.A.F.V.R., using Chipmunks, the logical successors to the elementary Tiger Moths, resumes the training of pilots from the *ab initio* stage.

In pre-war days a large proportion of R.A.F. pilot recruits took their first steps into the air with the aid of the civilly administered E. & R.F.T.S.s and this, incidentally, proved to be the most economical way of giving trainees their first fifty hours of flying. Is there not, perhaps, again a case for an initial course which would give elementary instruction up to, say, a few hours of solo before the R.A.F. takes over with its more elaborate basic aircraft?

Of the advanced piston-engined trainers which are intended to replace the Harvard, it is true to state that some instructors regard the specification with reserve, although this implies no reflection upon the designers. Do these types lead logically to the squadron aircraft, it is asked, and are they not unnecessarily complicated? Why do they have tailwheel undercarriages, and are they suitable for high-speed, high-altitude training in handling and navigation? Accepting that they are, in fact, right for the job, what is the place of a trainer such as the Derwent-powered Dutch Fokker S14?

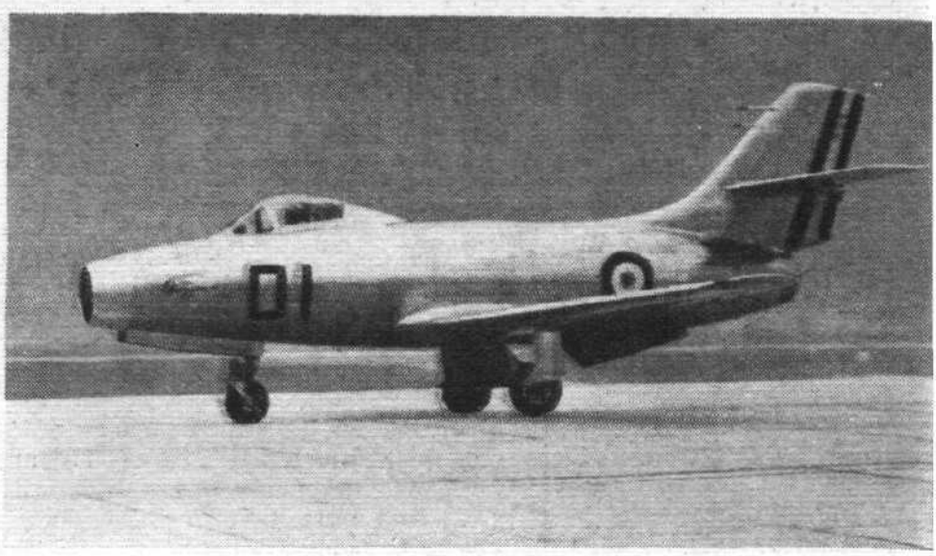
The attitude *vis à vis* turbojets and airscrew-driving power units has changed considerably, and for advanced training purposes the turbojet now seems to have much to offer in the way of inherent simplicity, ease of control and good maintenance qualities. An extremely high utilization is required of a trainer, while its method of operation—short flights, violent manœuvres, clumsy landings and unsympathetic use of flying and engine controls—is liable to result in minor unserviceabilities. The turbojet has proved itself to be rugged and reliable.

The speed of first-line aircraft and the amount of equipment carried have been doubled in ten years, but the machines themselves have not necessarily become more difficult to handle. On the contrary, some of the new jet fighters are easier to fly than were their wartime counterparts. The aim should be to prepare for them with the simplest possible training aircraft having *similar* characteristics.

# THE FRENCH AIRCRAFT INDUSTRY

## A Critical Analysis of Airframe and Engine Production Plans.

### PART I: Factors Leading to the Present Position



Designed and built in a year: The Marcel Dassault Ouragon (Hispano-Suiza Nene) adopted by the French Air Force.

*DURING the years since the war the aircraft industry of France has come in for a good deal of criticism by observers in other countries, some of it almost amounting to derision. In this review, prepared by one who has been closely connected with French aircraft construction, an unbiased picture is presented of an industry which has had to contend with difficulties of a unique kind, and the author's observations suggest that many of the acknowledged shortcomings are the direct legacy of such obstacles rather than of the weaknesses inherent in a nationalized industry.*

*As will be explained in the second part of the article, airframe and engine manufacture are now in process of complete reorganization—which, incidentally, includes the limitation of state-owned companies to three only. Prototypes seen at the Paris Show and the Orly Display give promise—as we pointed out at the time—of belated but real technical progress.*

IN order to appreciate the present situation in the French industry it is first necessary to review what has happened since the Liberation. Even in the preceding decade the industry had been showing signs of a certain technical stagnation. In the engine field France, which had produced the excellent 180 h.p. Hispano and had been very successful with the 500 and 600 h.p. Hispano models, did not, in general, manage to pass the 800 h.p. mark with production units. Also, with regard to equipment and instruments, the lead taken by other countries was equally manifest.

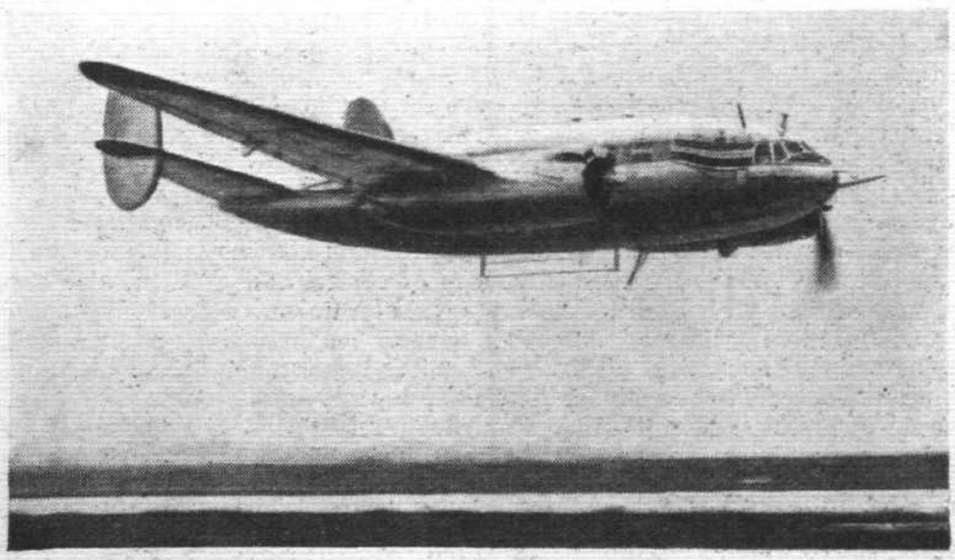
From the outset this situation caused all manner of inconveniences. The aircraft designers, who had to adapt their projects to the available engines, did so by decreasing the weight of their airframes with a view to equalling the performances achieved abroad with more powerful engines. Such measures were carried to extremes, and serious consequences resulted. Also, they streamlined so thoroughly that the engines, enclosed in too-narrow cowlings, were insufficiently cooled (the Bloch 152 fighter was an example).

Similarly, weight was saved on the equipment, with the result that its strength was reduced, and, even when airframes were good, performance and general efficiency were unsatisfactory. A considerable effort was, however, made during the war, and in May and June, 1940, delivery of large numbers of fighters and bombers—types introduced in 1938 and 1939—began. But the effort was too late, though this material did assist the Air Force, after its forced withdrawal to North Africa, to begin training.

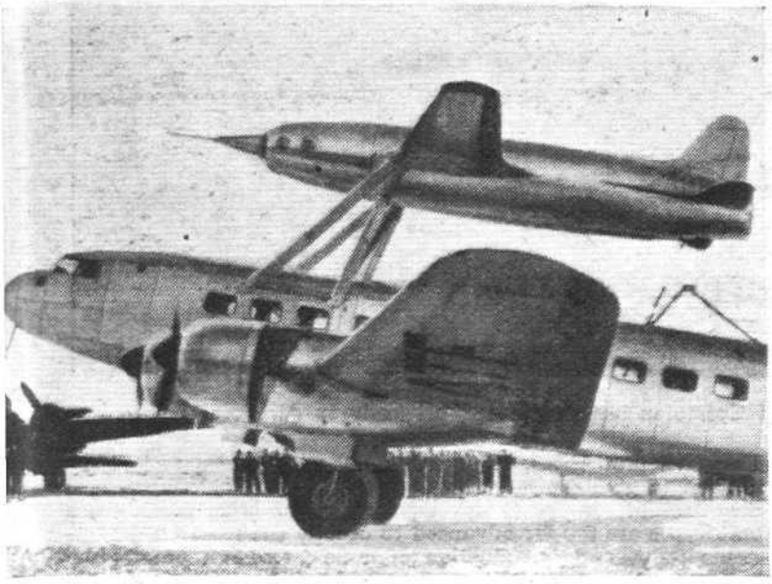
During the German occupation the number of workpeople in the industry fell from 225,000 to 100,000, while the research departments were more or less broken up and only a few engineers continued their work clandestinely. The factories occupied by the enemy either turned out older German and French types, such as the Junkers Ju 52 and LeO 451, or later types, like the Heinkel He 174.

Less than a week after the Allies entered Paris the Air Minister organized a meeting to discuss the conditions under which the industry might be revived. At the beginning of September, 1944, the first orders were placed. This haste, perfectly justifiable for meeting the exigencies of the moment, proved a burden on the country's future aeronautical development.

Let us recall the situation in the industry at that time. The number of workers had dropped to fewer than 40,000; moreover, personnel who had for years been putting a brake on production had acquired working practices which it was extremely difficult to discard. As regards facilities, at least half the buildings had to be replaced or repaired, and not more than 500,000 square metres of floor area was available in the whole country. The machine-tool inventory, it is true, had suffered less and in value was not far behind that of May, 1940. But, above all, the industry was up against four years of technical isolation during which aircraft development abroad had progressed by leaps and bounds. Technicians had not been able to keep *au*



S.O. 30P Bretagne, now in production.



The air-launched, ram-jet-powered Leduc 010 research aircraft.

*fait* with this evolution; few realized the degree of complexity attained in modern design and production, the high aircraft performance efficiency obtained, the degree of development of equipment and instruments, and, in particular, the progress achieved with regard to endurance of medium- and high-powered engines. Finally, jet propulsion had in the meantime been introduced and developed, first in Great Britain and then in the United States; France had to her credit nothing but "undercover" research carried out with inadequate means.

Two possibilities therefore presented themselves to those charged with giving the industry a new impetus:—

(1) To admit the wideness of the gulf existing between national achievements and those of the Great Powers leading in aeronautics, and to try to obtain licences for manufacture of approved designs, or even to purchase foreign aircraft and to prepare for the future by development work on the basis of the most advanced.

(2) To maintain and increase the existing production potential and therefore to build a large series of available models while endeavouring to make good lost ground.

The second solution was chosen, and an effort made to minimize the disadvantages by simultaneously continuing research and test work. So the assembly lines which were in action during the occupation were again set in motion, the production programme devised in 1941 and 1942 was resumed and even pre-war models were ordered in large numbers.

At the end of the year 1945 the production programme was considerable: it allowed for more than 3,000 light aircraft, for the most part developed from the German Me 108 and from the Belgian Stampe; 1,000 single-engine trainers; 700 light twin-engine types; 200 fighters; and more than 500 transports, ranging from 70-ton flying boats such as the Latécoère 631 and the S.E.200 to the three-engined Ju 52 and the four-engined Bloch 161. To-day we are able to measure the significance of this decision. The aircraft thus produced proved to be of very uneven value. Some were the source of great disappointment; others, such as the veteran German Ju 52 and certain light aircraft, gave (and are still giving) excellent service.

As regards engines, most of the pre-war models were readopted. To these were added some of German design, such as the two Argus low- and medium-power models and the Jumo 213. It was thought that with the Renault 6Q (220 h.p.), the Argus 12 S (575 h.p.) and the S.N.E.C.M.A. 14N (1,100 h.p.) and 14 R (1,600 h.p.), the whole range of low- and medium-powered engines was provided for. Above 1,600 h.p., designers were studying the question of coupling German engines to attain outputs of the order of 4,000 h.p. Future developments were taken into account by working on engine designs of great originality, this task being undertaken by the technical departments of S.N.E.C.M.A.

As regards jet propulsion, after studying the available German models it was not difficult for the French technicians to convince the Air Minister of the necessity for acquiring the licence of the Rolls-Royce Nene. At the same time researches were continued on a very interesting German design, the axial-flow Oestrich. As it turned out, this policy was ultimately the cause of disappointments and many users now regret that no other licences were obtained.

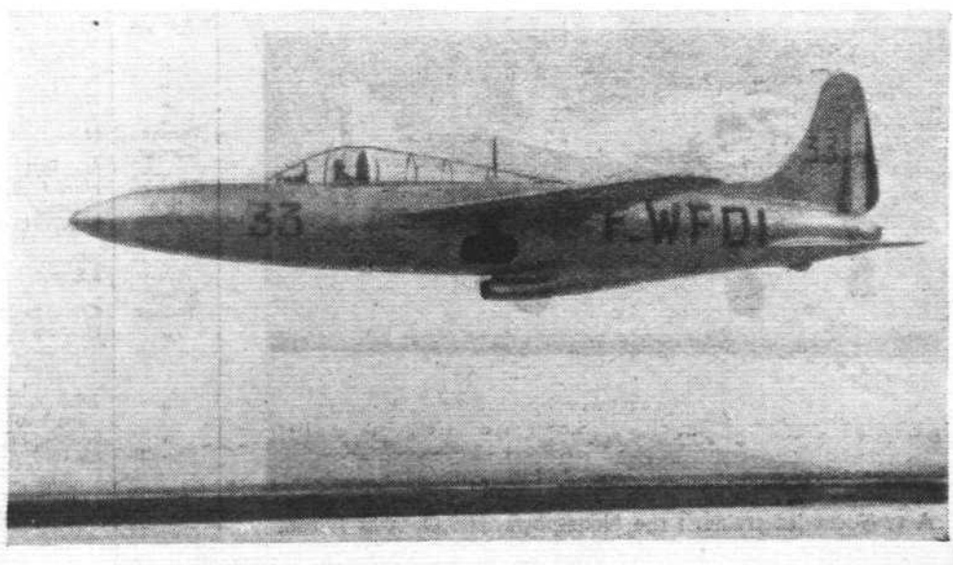
But when passing judgment it should be borne in mind that at the moment when these decisions were taken the war was still on and France was ardently desiring to make the greatest possible contribution in the final struggle at the side of her allies. She was sorely in need of aircraft and, as she was not yet in a position to build first-line types, she made every effort to supply transport, trainer and liaison machines.

### First Post-war Phase

As was to be expected, the cessation of hostilities brought about a modification of the wartime programme. From January, 1946, onwards, orders had to be reduced, and the Air Ministry already envisaged a reform of the industry with a view to a concentration of the state-owned companies and development of reconversion activities.

In the meantime, the number of employees had risen from 37,000 to almost 100,000, and machine tools had been purchased and considerable reconstruction work undertaken. The structure of the industry was determined. Between the four nationalized airframe factories (S.N.C.A.S.O., S.N.C.A.S.E., S.N.C.A.N., S.N.C.A.C.), and the national engine works (S.N.E.C.M.A.) on the one hand, and the private companies (Breguet, Morane, Hispano, etc.) on the other, a system of rivalry was established and wages and production times standardized in the two private sectors. Further, the Air Ministry had at its disposal a state arsenal for carrying out certain special research, for building prototypes and for exploring production methods, while also the Atéliers Industriels de l'Air (A.I.A.) were particularly charged with carrying out repair work and, if need be, manufacturing spare parts.

The whole system, however, soon proved too cumbersome for dealing with the needs of the civilian and military users. It was difficult to organize production in large series before thoroughly testing the prototypes and the types which were only just in course of construction. The commercial airlines—semi-nationalized (Air France) or private (charter companies)—found that they could still

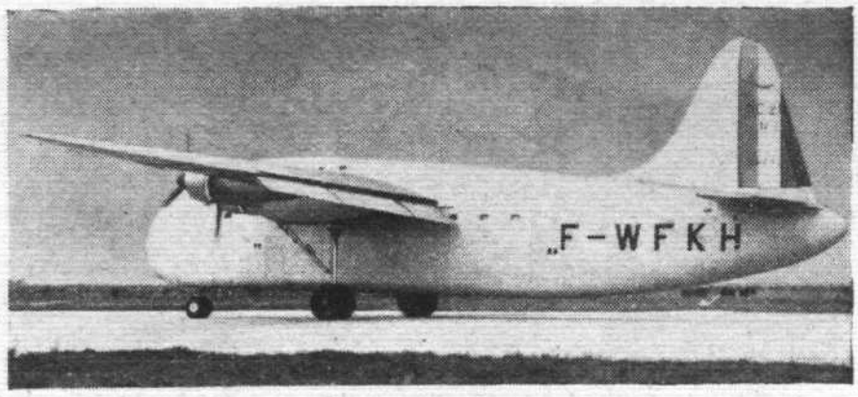



Another Nene-powered fighter: the S.O. 6020. Redesign is contemplated.

# THE FRENCH AIRCRAFT INDUSTRY . . .

use only British or American aircraft, while the military authorities had to avail themselves of the aircraft ceded to them by their allies during and after the war.

Nevertheless, because it is more difficult to scale-down an industry than to develop it, because the French technicians under-estimated the difficulties of modern aeronautical design, and also because the factories had to be kept going, it was decided to order certain types "off the board." Such a procedure is risky, and in this instance it had consequences which contributed to the present difficulties. In nearly all cases, not only with complicated aircraft (i.e., heavy types or new jet fighters), but even with absolutely standard types, construction was hampered by unforeseen difficulties, chiefly in respect of engines, equipment and accessories. Credits given were exceeded, delivery dates not observed, and, when at last put into service, the aircraft required considerable modification.




The N.C.211 Cormoran heavy freighter, originally an Air Force transport.

This was the case with the Arsenal V.B. 10 series of heavy fighters with their coupled engines, production of which had to be suspended after two accidents that happened in the testing stage. In the instance of the Morane single-engine trainer, built on recognized lines, flight-testing proved to be extremely tedious and laborious. The same remark applies to the S.O. 30, a very fine transport, the test flights of which were delayed by the inconsistency of the users in specifying their requirements and by absence of an engine of suitable size. Finally, on the occasion of its first trial flight, the first of the N.C. 211 Cormoran series crashed on account of inadequate tail-surface design in relation to wing-flap effect.

Even the oldest types, such as Bloch 161, a prototype of which had already made flights before the war, were refitted by Air France with Pratt and Whitney engines in place of the 14 N, and the company had to spend nearly one billion francs for re-equipment, particularly the improvement of the landing gear. No customers could be found for some other types and, as it happened, suitable engines were not available and production had to be abandoned; the 70-ton S.E. 200 flying-boat was one example.

These aircraft belonged to what is commonly called the "old programme" (1945). Their manufacture had chiefly been put into effect with the aim of giving the factories work, and they bore the marks of the four years of war-time stagnation.

During this period, however, the research departments and the factories continued very actively with production of prototypes for the new programme (1946-49). This was an ambitious plan, inasmuch as it aimed at meeting almost all national needs and embraced a great number of types with designs based on extremely modern principles. Table 1, in the adjacent column, gives the main points of the programme.

To the aircraft listed must be added about twenty types of light aircraft (Nord 1100, Nord 1200, S.U.C. 10, S.O. 7010, S.I.P.A. 70 and 90, N.C. 850 and associated types, Morane 700, etc.); ten types of rotary-wing aircraft; and the experimental models, such as Nord 1600, Leduc 010, N.C. 271 and S.O.M. 2.

At present this vast experimental and production programme is in various stages of development. In the factories, activities are concentrated upon completing the series S.E. 2010, S.O. 30, Breguet 761, Nord 1400, S.I.P.A. 11, M.S. 472/475, S.E. 1010 and M.D. 315 (of which last almost 300 had been ordered).


A two-seat jet trainer: the Nene-powered S.O. 6000 Triton.

The other prototypes, however, cannot yet be released for production to give the factories full employment, chiefly because they are not completely developed. On the other hand, these prototypes are too far advanced to occupy the research departments fully, and introduction of a new research programme is therefore urgent. This, in turn, is very much more difficult to initiate, because world technical development is making such rapid strides while France, on account of the war, is still without wind tunnels and other test plant.

Beside this there is the paralysing uncertainty which still dominates engine development. Even if the power of the Argus 12S almost attains design requirements, the 1,100 h.p. 14N is definitely too low-powered, and the 1,600 h.p. 14R is equally critical in its output. The S.N.E.C.M.A. test department is working on the 14U type of 2,000 h.p., but everybody knows that many years are required to prepare an engine of this kind for commercial exploitation, and it is hardly probable that the 14U will be available for installation in aircraft before another three or four years have elapsed.

On the other hand, the situation as regards jet units is more favourable. Besides the Hispano Nene, which comes off the assembly line in fair quantities, there is the Atar, with axial-flow compressor. This unit has successfully passed its first tests and, partly on account of its small diameter, is a design which justifies some hope for the future.

*(To be concluded next week.)*

**TABLE 1: THE 1946-9 PROGRAMME**

| Category | Type | Approx. A.U.W. (metric tons) | No. of Engines | Series | Recipient |
|---|---|---|---|---|---|
| Passenger transport | S.E.2010 Armagnac. | 70 | 4 | 25 | Air France (figuring in 1945 programme). |
| " | S.O.30 Bretagne... | 18.5 | 2 | 40 | " |
| " | Latécoère 631 flying-boat. | 70 | 6 | 10 | " |
| " | S.O.94.95 ... | 6 | 2 | 75 | " |
| " | Nord 2100 ... | 4.5 | 2 | Prototype | Civil |
| " | M.D.315 ... ... | 5.7 | 2 | " | Air Force |
| " | S.C.A.N.30 (amphibian). | 2 | 2 | " | Civil |
| Cargo transport | N.C.211 ... ... | 42 | 4 | 65 | Air Force |
| " | Breguet 761 ... | 42 | 4 | 15 | Civil |
| " | Breguet 890/892... | 16 | 2 | Prototype | Civil and military |
| " | Nord 2500 ... | 17 | 2 | " | Air Force |
| " | C.M.100 ... ... | 7.3 | 2 | " | Civil |
| Fighter | S.O.6020... ... | 7.5 | 1 (Nene) | " | Air Force |
| " | M.D.450 ... ... | 5 | " | " | " |
| " | S.O.8000... ... | 6.5 | 1 | " | Navy |
| " | N.C.1080 ... | 7 | 1 (Nene) | " | " |
| " | Nd.2200 ... ... | 7.5 | " | " | " |
| " | V.G.90 ... ... | 8 | " | " | " |
| Torpedo Carrier | Nord 1500 ... | 12 | 2 | " | " |
| " | N.C.1071 ... | 12.5 | 2 (Nene) | " | " |
| Observation | Nord 1400(amphibian). | 19 | 2 | " | " |
| Medium bomber | N.C.270 ... ... | 26 | 2 (Nene) | " | Air Force |
| " | S.O.4000... ... | 26 | " | " | " |
| Heavy fighter | S.E.2400 ... ... | — | " | " | " |
| Trainer | S.O.6000... ... | 4 | 1 (Nene) | 25 | " |
| " | M.S.472/475 ... | 3 | 1 | 500 | Air Force and Navy (old programme) |
| " | S.C.A.N.20 (flying-boat) | 2.5 | 1 | Prototype | Navy |
| " | S.I.P.A.10 & 11 ... | 2.5 | 1 | 50 | Air Force |
| High-altitude photographic aircraft | S.E.1010 ... ... | 31 | 4 | 3 | — |

# THE TRANSPORT PICTURE

## Some Frank Observations by B.E.A.'s Deputy-Chairman

SEVERAL pertinent comments on the attributes—and the shortcomings—of various modern transport aircraft were made by Mr. Peter Masefield when, on September 21st, he addressed members of the Aircraft Recognition Society in the R.Ae.S. Library on the occasion of the opening of their 1949-50 session.

Before discussing individual types, Mr. Masefield expressed the opinion that future aircraft would, generally speaking, enable operators to reduce the present fare of 7½d. per passenger-mile to 4d by 1955; the ultimate aim of the airlines was to reduce fares to the level of 3d a passenger-mile. He stressed the significance, in the commercial success of an airline, of revenue obtained from inter-line traffic bookings. British European Airways alone, he said, were receiving about $500,000 a year, in dollar currency, through inter-line bookings.

The speaker went on to say that the cruising speeds of transport aircraft, as usually represented to the public, were very different from the speeds actually obtained in everyday airline use. Pointing out that the cruising speed of an airliner at its all-up weight shortly after take-off was lower than the cruising speed at the end of a journey, he quoted the initial and final cruising speeds of some well-known transports already in service. His figures are given in the table below (the mean cruising speeds are those calculated by the writer):—

| Aircraft | Cruising Speed at All-up Weight (m.p.h.) | C.S. after majority of fuel has been consumed (m.p.h.) |
|---|---|---|
| DC-3 ... ... ... ... | 160 | 180 |
| DC-4 ... ... ... ... | 200 | 222 |
| Canadair Four ... ... ... | 205 | 235 |
| Constellation 249 ... ... | 248 | 280 |
| Constellation 749 ... ... | 250 | 290 |
| DC-6 ... ... ... ... | 265 | 290 |
| Convair-Liner ... ... | 240 | 250 |
| Stratocruiser ... ... ... | 290 | 318 |

Mr. Masefield then went on to give the probable operational speeds of three types of aircraft which would shortly be coming into service:—

| Aircraft | Cruising Speed at All-up Weight (m.p.h.) | C.S. after majority of fuel has been consumed (m.p.h.) |
|---|---|---|
| Marathon I ... ... ... | 150 | 180 |
| Ambassador ... ... ... | 260 | 275 |
| Super DC-3 ... ... ... | 240 | 250 |

The speaker discussed briefly some salient—but perhaps not so widely known—operating problems and advantages of the leading transport aircraft of the world. The Canadair Four, he said, was a very efficient aircraft, although operational cruising speeds were lower than generally thought. The aircraft was noisy, but he thought that the cross-over exhaust system which was now being fitted to all Canadair Fours would overcome this problem. The Constellation was still, in his opinion, the best transport aircraft in the world, and he thought that it would be in service for some years to come. Operators had come up against a lot of snags with the Wright Duplex Cyclone engines, but the majority of these troubles had now been minimized, and as a result of increases in the all-up weight (from 86,000 to 107,000 lb) since the end of the war, the aircraft was becoming more efficient as it grew older. There had been much controversy as to whether the DC-6 or the Constellation was the better aircraft, but K.L.M., who were operating both types, preferred the Constellation, one of the great shortcomings of the DC-6 being its lack of baggage space. There was a tendency to tail-wag in turbulent air.

The Stratocruiser was indicative of the trend towards bigger airliners. Its size, however, was rather deceptive, as the greater part of the space in the lower deck was cluttered-up with radar and pressurization equipment and was of little commercial value. By the clever use of mirrors, the lower cocktail lounge had been made to look more spacious than it really was. At its present all-up weight, with a wing loading of 84 lb/sq ft, the Stratocruiser took a long time and a lot of power to climb to its operational height of 20,000ft, and continued to use high power to maintain this height. The Stratocruiser, also, suffered in turbulent air from tail-wagging.

The Constitution, too, supported his belief that commercial aircraft would grow bigger. Unlike the Stratocruiser, the Constitution really did utilize both decks for passenger carrying, and he thought that it was an excellent example of the next step in aircraft size. It was unlikely that the machine would see either commercial or further military service, as it was very much underpowered. If it could be fitted with large turboprops, it would be a magnificent aircraft.

Mr. Masefield emphasized that he was not one of those who thought that the Brabazon was a white elephant. The Brabazon II, with Proteus engines, would be a paying proposition; it could carry 70 passengers from London to New York and 100 passengers eastwards to London, and if it could be refuelled off the coast of Ireland, it could make the westbound crossing with a full load of 100 passengers. Should the Brabazon be unable to make contact with the tanker aircraft it could use Shannon for an emergency return landing base. The popular impression that the machine alone had cost £12 million to develop, and that if it was a failure all of that money would be wasted, was most misleading. That sum covered the cost of two aircraft—one of which would operate commercially—and also the runway and the hangars. Both the runway and the hangars would be a national asset, irrespective of their connection with the Brabazon; the runway would be invaluable for many years for the testing of fast jets and other large aeroplanes, and as a diversion landing-ground for large transports unable to use London Airport. The hangar, too, would still be the only structure in Great Britain where giant aircraft could be assembled under cover.

Turning to flying-boats, the speaker said that the Solent had overcome its early difficulties, and now that wing-float and engine cowling troubles had been put right, it was giving excellent service. He considered that the Saunders-Roe Princess would be a real winner when used on the South Atlantic service, but he did not think that it would be suited to North Atlantic conditions.

The Convair-Liner was at last settling down, but K.L.M. was operating this machine with the pressurization system disconnected. One of its main troubles was its low fuel capacity, which had caused some concern even when the aircraft was flying from Amsterdam to London with 40 passengers.

### Inter-City Jets

He did not agree with Mr. Atkin, chief designer of A. V. Roe (Canada), that the pure jet transport was ideal for inter-city services with journey-lengths of from 300-700 miles; B.E.A. were convinced that the most suitable types of aircraft for such routes were transports fitted with turboprops.

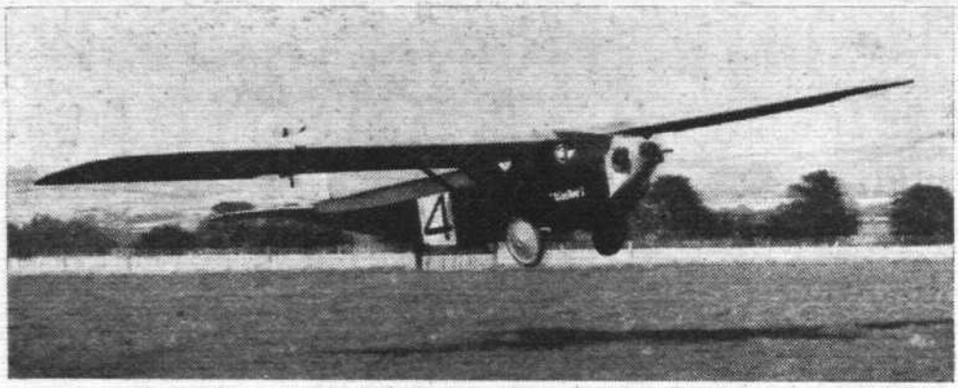
British European Airways' bread-and-butter machine, the Viking, was behaving very well. There had been initial trouble with the Hercules, which had been developed as a military engine, but it was now giving good service. B.E.A. were running six Hercules over a period of 850 hours between overhauls, and if these tests proved satisfactory all Hercules engines would be approved for an overhaul period of 850 hours. The six engines would then be run for 1,000 hours in an attempt to raise the overhaul time for the Hercules to that figure.

The Ambassador, which would be used by British European Airways as a 49-seater on short-stage routes, such as that from London to Paris, would make a lot of money. The first production aircraft, said Mr. Masefield, was expected to be delivered to B.E.A. in January, 1951, and the type was generally expected to be in service by the late summer of that year; it was now starting pressurization and de-icing tests. B.E.A. were interested in two other versions of the Ambassador—one to be fitted with four Rolls-Royce Darts, and another as a freighter version, with a square fuselage and rear loading doors. The Corporation was not worried about the failure of the wing under recent tests. The Ambassadors to be delivered to B.E.A. were intended to have a useful life of 10 years.

Many tests had yet to be made with the Viscount, and it would not be operated by B.E.A. until 1953. Tests were recently conducted with "Harry," a stuffed dummy, to see what would happen to the passengers if one window blew out when the cabin was pressurized. "Harry" leapt smartly out of

(Continued at foot of page 461.)

# HERE and THERE



"Flight" photograph.

VINTAGE: As reported on this page, a 1924 Beardmore Wee Bee (Bristol Cherub) will shortly be flying in Australia. The picture above, a quarter of a century old, shows the general features of the type.

## End of an Achievement

OPERATION *Plainfare*, the R.A.F. share of the Berlin Air Lift, came to an end on September 23rd; the final flight was made by a Dakota, which, by carrying passengers on the outward journey, brought to 91,000 the total of German civilians "backloaded" from Gatow to the Western Zones. The Air Lift itself officially ended at midnight on September 30th. It was to have continued for a further month, but sufficient stocks of supplies had been built up in Berlin to justify the conclusion of the operation.

## Wing-spar Failure

PROCTOR owners who may be concerned about the report of an accident in the Yorkshire area will be interested to read the following comments provided by Percival Aircraft, Ltd. It was reported in the daily Press, they state, that Douglas fir was "used as a substitute for spruce" in the wing spars of the aircraft but, in fact, fir was specified; the actual timber used in this particular aircraft was, however, below specification. The machine, they add, was not constructed by themselves, but by sub-contractors, who built a total of 400. This is the first structural failure to have occurred in the air.

## Spicer Memorial Prize Awarded

THE Society of Licensed Aircraft Engineers announces that the 1949 Dorothy Spicer Memorial Prize Essay Contest has been won by Mr. R. A. Fry, who is the chief ground instructor of Airspeed, Ltd., and an associate member of the society. His prize-winning paper was entitled: *The Servicing and Maintenance of Aircraft*. Mr. Fry—first recipient of the award—will receive the full prize of £25 at a formal presentation in London on November 19th.

Miss Spicer (Mrs. Richard Pearse), who was killed in an air accident on December 23rd, 1946, was a contemporary of the late Amy Johnson and Pauline Gower. As a founder member of the S.L.A.E., she had a particular interest in maintenance, and was the first woman to hold A, B, C and D maintenance engineer's licences.

## Canadian Ceremony

"THEIR shoulders held the skies suspended; they stood, and earth's foundations stay" are the words etched on the approach to the memorial gates which, presented to Canada by the three other nations which took part in the British Commonwealth Air Training Plan, have been erected at R.C.A.F. Station Trenton, Ontario, in commemoration of the Plan. The presentation ceremony took place on Saturday last, October 1st.

Mr. St. Laurent, Canada's Prime Minister, received the presentation, which was made by Mr. Arthur Henderson, the British Air Minister, and Mr. F. M. Forde and Mr. J. Thorn, the Australian and New Zealand High Commissioners in Canada. Those present included Marshal of the R.A.F. Lord Tedder, and, among Canadians who took a prominent part in the Air Training Plan, Mr. MacKenzie King; Mr. C. G. Power; Mr. C. Gibson; Air Chief Marshal L. S. Breadner and Air Marshal R. Leckie.

## Supersonic Skyrocket

IN the attainment of high speeds, competition between the U.S. Air Force and the U.S. Navy has assumed an almost international aspect. The world's speed record of 670,981 m.p.h., by an F-86 fighter, is actually held by the U.S.A.F., but considerably higher speeds have been reached by special research aircraft. As far back as 1947, the Air Force's Bell X-1 exceeded the speed of sound—it was the first aircraft to do so—and there has since been a report that it has flown at 1,000 m.p.h.

Recent news from America tells of equally significant progress by the Navy, whose Douglas D-558-2 Skyrocket is stated to have exceeded supersonic speed on several occasions, and to have a "design capability" of 1,820 m.p.h. at 75,000ft, compared with the 1,000 m.p.h. at 60,000ft of the X-1. At Muroc, California, last July, the Skyrocket flew at 710 m.p.h. in level flight. The Skyrocket has swept wing and tail surfaces, and is compositely powered by a J-34 turbojet and a Reaction Motors rocket unit; it may be regarded as a more advanced design than the earlier X-1.

## Jets for Italy

ITALY'S Defence Minister, Signor Pacciardi, stated recently that, under a large rearmament programme, the country would apply for licences to build British jet aircraft. As there is inevitably a considerable time-lag before such arrangements come to fruition, Italy is likely to buy new jet fighters from Britain in the meantime.

## Indestructibility Plus!

FOLLOWING a recent paragraph on the apparent indestructibility of a Comper Swift, information has come to light of an even older light aircraft which is still active. This is a Beardmore Wee Bee, which flew for the first time in July, 1924, rather more than 25 years ago. Mr. W. S. Shackleton, the original designer, has received a request from Mr. Vincent Boyes of Victoria, Australia, for performance data. He has just purchased a model of this little aircraft and is hoping to obtain a C. of A. in the near future. It was last flown in 1939 and is still in good condition, although needing some fabric replacement. Past records show that the Wee Bee was reputed to have the remarkable ceiling of 21,000ft, and a speed range of 36 to 86 m.p.h.

## Solent Delivered

THE first Solent to be delivered for service in New Zealand with Tasman Empire Airways, left England on September 22, as reported last week, and has completed an uneventful and highly successful flight to Auckland. The journey took 66hr 45min, this flying time being spread over six days. This incidentally, constitutes an unofficial flying boat record for the journey. The official record is held by a Lancastrian, which completed the journey in 59hr 50min flying time during a three-day

SOVIET STRAFERS? Poor quality notwithstanding, no apology is made for the publication of this photograph, showing what is believed to be a recent type of Ilyushin ground-attack aircraft in service with the Soviet Air Force. By comparison with the Il-2 Stormovik the wing is of entirely new plan form, thin and relatively long in span; the broad tailplane has a straight leading edge.

## HERE AND THERE . . .

overall journey. The crew of the flying boat, R.M.A. *Ararangi*, were stated to be extremely pleased with the performance of the Solent, which, Mr. G. N. Robertson, manager of Tasman Airways, has announced, is likely to be the last piston-engined aircraft to go into service with the airline.

### Scandia Developments

FOLLOWING extensive market analyses in the U.S., the Swedish Saab concern has offered to American airlines and manufacturers (in view of possible production under licence) two developments of the Saab-90 Scandia transport. As a passenger-carrying aircraft, the Scandia can be regarded as a potential DC-3 replacement.

The new versions, the 90A-3 and the 90B-3, have been designed specifically to meet U.S. requirements, and are distinguished primarily by increased passenger-capacity; they will have accommodation for 30-38, compared with the 24-32-seater standard version, the 90A-2. It is intended to equip the Scandia 90B-3 with a pressurized cabin, entailing slight re-design of the fuselage.

### Vampire's Australian Record

A VAMPIRE piloted by F/L. I. R. Olorenshaw recently flew from Sydney to Melbourne and back in 2hr 2min. The Sydney-Melbourne leg took 67min, and the return trip 55min. This is the fastest time between the two cities, the previous best being 1hr 22min by a Constellation.

The first Australian-built Vampire (R-R. Nene) was recently accepted for the R.A.A.F. by the Commonwealth's Air Minister, Mr. A. S. Drakeford, who announced that his Government were also watching closely the development of jet bombers. There have been reports for some time that the English Electric Canberra is to be built in Australia, together with the Hawker P.1040 interceptor, but no official statement has yet been made.

### An Altitude Record Broken

SUBJECT to confirmation, a climb to 26,400ft in a Piper Cub by Mrs. Muriel Zimmerman, of Reading, Pennsylvania, has established a new American altitude record for light aircraft. The previous record, 21,900ft, was set up a year ago by Miss Betty Skelton.

### For Happier Landings

UNITED AIRLINES, of Chicago, recently made extensive tests of dramamine, a drug claimed to prevent all types of travel sickness. Almost complete success was claimed, and the drug is now available to all U.A.L. passengers. Col. A. D. Tuttle, the airline's medical director, states that of every 1,000 passengers, only six are liable to airsickness, and that each passenger in this minority can be immunized by taking one tablet of dramamine before commencing his or her journey.

### Agrarian Aeronautics

MR. J. W. TOMKINS, a pilot of 20 years' experience, received sympathetic treatment at the hands of the Coleshill magistrates last week, when he was summoned for contravening the special regulations in force for the duration of the National Air Races. As many of the spectators saw, he landed his Tiger Moth in a nearby meadow used as a car park, rather than at the nearest official airfield for visitors' aircraft, 12 miles away; later, being under the impression that the last racing aircraft had left, he took off for home. Mr. Tomkins—who, incidentally, was said to have been the first farmer to sow his fields by aircraft—was "discharged without sentence" on payment of 20s costs.

## NEWS IN BRIEF

AIR Chief Marshal Sir Arthur Barratt (R.A.F., ret.), was married to Mrs. J. C. Horsley, the widow of Mr. Terence Horsley, the gliding expert, in London on October 2nd.

* * *

At the first lecture of the winter session of the R.Ae.S. (Brough Branch), Mr. Mike Byrne, publicity manager of Blackburn and General Aircraft, Ltd., spoke on the 1949 S.B.A.C. Display. His talk was followed by the showing of 1,000ft of film, largely in colour, taken at the display by the firm's photographer, Mr. Fairbairn.

* * *

Members of the Channel Islands Air Advisory Council visited Northolt on September 28th, and a luncheon was given in their honour. Lord Douglas, the chairman of B.E.A., presided.

* * *

Three new directors have been appointed to the board of the Glenn L. Martin Company, of Baltimore; they are Mr. H. J. Gunderson, Mr. C. F. Hockley and Mr. D. A. Evatt.

* * *

Specialists and enthusiasts in the fields concerned are reminded that four of the well-known reference diaries published by Iliffe journals are now available for 1950 at prices ranging from 3s 1d to 3s 4d. They comprise those for the *Amateur Photographer*, *Wireless World*, *The Autocar* and *The Motor Cycle*.

* * *

The College of Aeronautical and Automobile Engineering at Chelsea, which now has facilities for 500 students, has published a brochure to celebrate its 25th anniversary; it contains an excellent diagrammatic drawing by G. H. Davis depicting the layout of the newly completed workshops.

* * *

The West London Aviation Club, formed two years ago to encourage interest among young enthusiasts, now meets on larger premises and can accept more members; details are obtainable from the hon. secretary, Mr. Frank Hudson, Fulham Men's Institute, Lillie Road, London, S.W.6. On November 4th, at 7.30 p.m., Mr. Geoffrey Dorman is giving a talk (subject: "The Pioneer Days"), to which young men living in West London are invited.

DE-BRIEFING: Peter Lawrence (centre), Blackburn and General Aircraft test pilot, discusses with Capt. Norman Blackburn (left) and Mr. G. E. Petty (chief designer) the characteristics of the new Y.A.5 anti-submarine prototype, shortly after making the first flight. Mr. Lawrence was "highly satisfied" with his trip.

LOOKING FOR A LAKE: The floatplane version of the D.H.C. Beaver bush transport makes a trolley-assisted take-off from a runway, thereby further demonstrating the versatility of a truly "rugged" aircraft.

# AMERICA'S AIR RACES

## *The Contests at Cleveland : A Six-hour Air Display*

LATELY returned from America, Colonel R. L. Preston has made a comprehensive report on the recent National Air Races at Cleveland, at which he acted as an observer in his official capacity as secretary-general of the Royal Aero Club. Col. Preston plays an important part in the organization of our own National Air Races, and was clerk of the course when they were held for the first time at Elmdon last August. The following summary of the happenings at Cleveland is based on his account.

Cleveland—the world's largest civil airport—has been the scene of the races for eleven years. Permanent stands have been constructed there, accommodating 75,000 people. Attendance on the three successive racing days was as follows: Saturday, September 3rd, 36,300; Sunday, 58,700; Monday ("Labour Day," equivalent to a Bank Holiday), 75,600; this made a total of 170,600, supplemented by many others watching outside the airfield. Numerous private aircraft—there were 1,000 at Cleveland, and an estimated 4,000 more at outlying airfields—and 75 special airliners carried some of the race-goers to the venue. Even so, the racing occupied only about one-third of Cleveland Airport's 1,040 acres, of which 500,000 sq yd are of runway and tarmac, and normal commercial traffic was kept up throughout the week-end.

There were two courses for the closed-circuit races. That for the Goodyear Trophy Race was completely inside the airport, and was of $1\frac{3}{4}$ miles, around six pylons, while the 15-mile course for the high-speed events was a circle described around seven pylons.

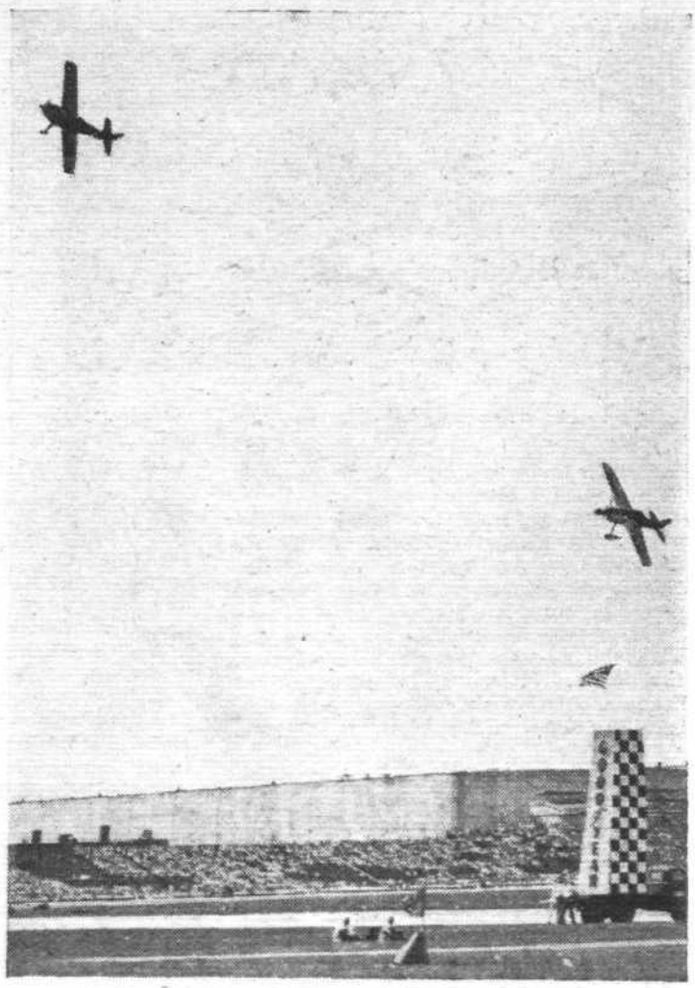
In direct contrast to the methods employed at Elmdon is the American "racehorse" starting system for the closed-circuit races. There is no handicap, and a predetermined number of entrants is selected in order of maximum speeds reached during qualifying trials. Inside position is awarded to the fastest. When the starter's flags are dropped competitors take off line abreast, at 75ft intervals, from a tarmac apron so large that most of the aircraft, other than jets, are airborne before passing its edge.

They then make a complete left-hand circuit of the course, but are not timed as having started until they cross the line—actually at the end of this first lap. It is observed that had this method been employed at Elmdon, instead of timing from a standing start, the speed of the Hawker P.1040—to quote one instance—in winning the S.B.A.C. race would have been given as over 556 m.p.h. instead of 510 m.p.h. The circular American course, also, is probably conducive to higher speeds than Birmingham's 20-mile quadrilateral course.

### Canadian Vampires Displayed

On the first day at Cleveland there was a long and varied programme of demonstration interspersed with the first of the racing events and occupying six hours in all. Among the display types already familiar in this country were three Vampires, which gave an especially good performance in the hands of R.C.A.F. pilots; Betty Skelton's Pitt Special; the tiny Wee Bee; and the D.H. (Canada) Beaver. Twelve U.S.A.F. pilots demonstrated the world's fastest squadron-service fighter—the F-86 Sabre—and there were fly-pasts by 36 B-50s and three Convair B-36s. There were also excellent formation aerobatics by teams of U.S. Marine Corps Banshees and U.S.A.F. F-80s.; Shooting Stars demonstrated dive-bombing and ground attack; and an outstanding performer was the U.S.A.F.'s new basic trainer, the Beech T-34 Mentor, its aerobatics including outside loops.

Sunday's items included a spectacular show by the U.S. Navy's "Blue Angels," a permanent aerobatic team now equipped with Grumman Panthers in place of its Bearcats. Trailing red, white and blue smoke, the Panthers performed against a background of further aerobatics by 16 Corsairs. Other Navy aircraft present included Douglas Skyraiders, a McDonnell Phantom, Martin Mars, and the Lockheed Constitution and Neptune. The previous days' demonstrations were repeated on the Monday, the main race day, and, additionally, two Goodyear airships flew over.



Two of the Goodyear Trophy "midgets" in action. As many as six aircraft take a pylon simultaneously in this outstanding event; the standard of flying is excellent.

### The Racing

The *Bendix Trophy Race*, a 2,008.2-mile dash from Rosamond Dry Lake, California, to Cleveland, is divided into two parts, the "R" (reciprocating-engined) and "J" (jet) divisions. As in all other jet events, the latter division was for Service pilots only, and there was no competition between different types—a major detraction from the interest and spectacle of the U.S. races by comparison with those at Elmdon.

**Result.**—"*R*" *Division*,—1, J. de Bona (North American F-51 Mustang), 470.136 m.p.h.; 2, S. H. Reaver (Mustang), 450.221 m.p.h.; 3, H. R. Salmon (Mustang), 449.214 m.p.h.

"*J*" *Division* (for Republic F-84 Thunderjets).—1, Maj. V. A. Ford, 529.614 m.p.h.; 2. Capt. J. Newman, 524.620 m.p.h.; 3, Lt. Col. L. Moon, 524.551 m.p.h.

In the *Navy Jet Carrier Race*, four McDonnell Banshees took off from the Carrier *Midway* and flew the 432 miles to Cleveland non-stop.

**Result.**—1, Lt. Laird, 548.978 m.p.h.; 2, Lt. Cdr. Biggars, 544.805 m.p.h.; 3, Lt. Sedaker, 536.776 m.p.h.

Limited to the ten aircraft which won the first odd-number places in the high-speed close-circuit races, the *Sohio Trophy Race* consisted of seven 15-mile laps after a mass start.

**Result.**—1, W. P. Odom (Mustang), 388.393 m.p.h.; 2, D. R. Puckell (Goodyear F2G Corsair), 384.866 m.p.h.; 3, C. Tucker (Bell F-63 Kingcobra), 381.529 m.p.h.

The *Tinnerman Trophy Race* was of the same length and entry conditions as the Sohio event, except that the starters (there were seven out of ten entrants) had won even-number places in qualifying races (i.e., 2nd, 4th, etc.).

**Result.**—1, W. McKillen (Corsair), 386.069 m.p.h.; 2, W. V. Newhall (Mustang), 379.735 m.p.h.; 3, J. H. G. McArthur (Supermarine Spitfire 18), 359.565 m.p.h.

The *Women's Trophy Race* was limited to standard training aircraft, and consisted of five laps of the 15-mile course.

**Result.**—1, Grace Harris (Harvard), 216.673 m.p.h.; 2, Kathleen Landry (North American SNJ-3) 214.876 m.p.h.; 3 Helen McBride (SNJ), 210.097 m.p.h.

The *Navy Climbing Event* was a race to 38,000ft between two Banshee jet fighters and two Bearcats. Although outclimbed initially, the Banshees had an easy victory.

Roughly equivalent to our Auxiliary squadrons, four U.S. National Guard squadrons (one from each Command) were represented in the *Allison Jet Trophy Race*, a 259.98-mile cross-country contest between four F-80c Shooting Stars.

**Result.**—1, Lt. Rew (California), 594.806 m.p.h.; 2, Lt. Fugate (Nebraska), 590.007 m.p.h.; 3, Lt. Coleman (Georgia), 550.643 m.p.h.

Probably the most constructively useful, and at the same time spectacular, of the Cleveland annual events is the *Goodyear Trophy Race*. The competing aircraft are designed and constructed to rigid rules by test or private pilots and aeronautical colleges, and must be powered by an engine of capacity not greater than 190 cu in. In practice, the Continental C-85 is used exclusively. Twelve aircraft take-off together and fly 12 laps of the 1¾-mile course on the airfield, thus being visible throughout the race.

**Result.**—1, W. Brennard (Wittman Buster), 177.340 m.p.h.; 2, K. Sorensen (Deerfly), 176.726 m.p.h.; 3, S. J. Wittman (Wittman Bonzo), 176.244 m.p.h.

Undeniably the world's fastest air race was the jet division of the *Thompson Trophy* contest. The entrants were four F-86 Sabres, and the course was over ten 15-mile laps. One aircraft failed to start and a second dropped out after its pilot's seat broke loose. The two remaining Sabres both suffered structural damage through *g* forces, but completed the course, the winner making one lap at 635.444 m.p.h.

**Result.**—1, Capt. Cunningham, 586.173 m.p.h.; 2, Capt. Johansen, 580.125 m.p.h.

The piston-engined division of the same event was marred by the death of Bill Odom, whose Mustang crashed after a high-speed stall. Although established in 1929, to foster high speeds, combined with safety and manœuvrability, the latter characteristic is now generally achieved by drastic reduction of wing-spans and "hotting-up" of engines; special aircraft are no longer designed for the race, as in pre-war years. Consequently, the suggestion that a race for aircraft with 500 cu in engines might be established in its place appears to be sound. In this connection, however, it is pointed out that in the Goodyear and Thompson races, all-up weight limitations would produce more international participation, as the relevant conditions are appropriate to American engines only.

The ten piston-engined aircraft which fly fastest in the qualifying trials qualify for the "R" Division, which is flown over fifteen laps of the 15-mile course.

**Result.**—1, C. Cleland (Corsair), 397.071 m.p.h.; 2, R. Puckett (Corsair), 393.527 m.p.h.; 3, B. McKillen (Corsair), 387.567 m.p.h.

Summing up impressions of the races, Col. Preston states that they constitute a well-established business organization, and that the promoters are masters of showmanship and crowd-appeal. Cleveland also becomes a great meeting place for aircraft constructors, pilots and senior officers of the U.S. air services—the Navy, Marine Corps and Air Force—all of which gave outstanding support to the show. American opinion maintains that only by settling on a suitable location, and thereafter making it a permanent annual venue for the event, can national air races be made to pay.

Concerning the racing itself, Col. Preston expresses the view that although the mass-starts are spectacular, the British handicap system gives a far more exciting race and finish. He feels that, in future, our handicap races should have two prizes, of equal value, one for the winner and the other for the fastest aircraft. More frequent progress reports on the Cleveland cross-country races would, he feels, have made these events far more interesting. The air display items were varied and of excellent quality, and such entertainment is essential to retain the crowd's interest, but the six-hour programme was definitely too long; three and a half hours would have been sufficient.


Typical in its ingenuity—though not in configuration—among designs entered for the Goodyear event was the Lawrence Special pusher, the product of a technical college aeronautical class. Flown by C. B. Ambler, a senior student and ex-fighter-pilot, it did not qualify for the final, but averaged 128 miles m.p.h. in the "consolation" race.

## THE TRANSPORT PICTURE (Concluded from page 457)

the window and completely cleared the wing tip. A handkerchief placed on the adjoining seat merely rose two or three feet and then gently subsided.

The Comet was our great white hope. It was started in 1946 as a somewhat smaller aircraft; originally, it had no tail and the wings were swept back at a much greater angle than those on the present machine—it looked, in fact, like a large D.H. 108. De Havillands had always been a cautious firm, believing in efficiency rather than sensationalism, and it was decided to proceed with the more conventional design. The Comet would not immediately fly the Atlantic: in all probability, it would at first be used on the run to Cairo, and subsequently to Australia, the route for which it was really intended. If it were flown in the England to New Zealand Air Races in three years' time it might reach Christchurch in 24 hours.

Lockheed Aircraft Corporation could certainly be expected to have an aircraft similar to the Comet flying within the next 18 months or two years—there was no doubt about it. Boeings might also produce a civil version of the XB-47, but they would have to find another position for their tandem undercarriage, as it would absorb valuable passenger space if left in the fuselage. By 1955, with the possible aid of flight refuelling, the Comet might be ready for Atlantic service, and we should be leading the world irrespective of any Lockheed competition.

Mr. Masefield did not feel that the Dart-Dakota was a commercial proposition; it drank too much fuel, did not carry enough load, and was overpowered and under-tanked. He would, however, like to see some of these machines used commercially as freighters so that experience could be gained with the Rolls-Royce Dart engines. He believed that the Marathon II had no commercial future: it had a service ceiling of 42,000ft and an operational ceiling in excess of 30,000ft, but in its present unpressurized version it was only suitable for the purpose for which it was designed—that of a flying test-bed.

For the Hermes V he saw little airline future. He did not think that B.O.A.C. could be expected to order these machines to replace their Hermes IVs—they had already decided on the Bristol 175, and no airline could afford to buy every good aircraft just because it was good.

Nor did he see any future for the single-engined helicopter as a passenger carrier. He thought that what was needed was a 30-seat, 120-m.p.h. helicopter powered by two Rolls-Royce Darts, and capable of flying from the centre of London to the centre of Paris. The Bristol 173 helicopter was a two-engined 14-seater and should fly late in 1950.

Concluding his talk, Mr. Masefield said that no fewer than 16 British aircraft firms had submitted tenders for the four-engined B.E.A. Rapide replacement.

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## VICE-ADMIRAL SIR THOMAS TROUBRIDGE

IT is with regret that *Flight* records the death of Vice-Admiral Sir Thomas Hope Troubridge, K.C.B., D.S.O., R.N., at the age of 54. A descendant of one of Nelson's sea-captains, Admiral Troubridge served continuously at sea from the opening stages of World War II until the final month, when he was appointed Fifth Sea Lord (Air) and a Lord Commissioner of the Admiralty. His more recent appointments included those of Flag Officer (Air) Home, Flag Officer (Air) Mediterranean, and Second in Command, Mediterranean Fleet.

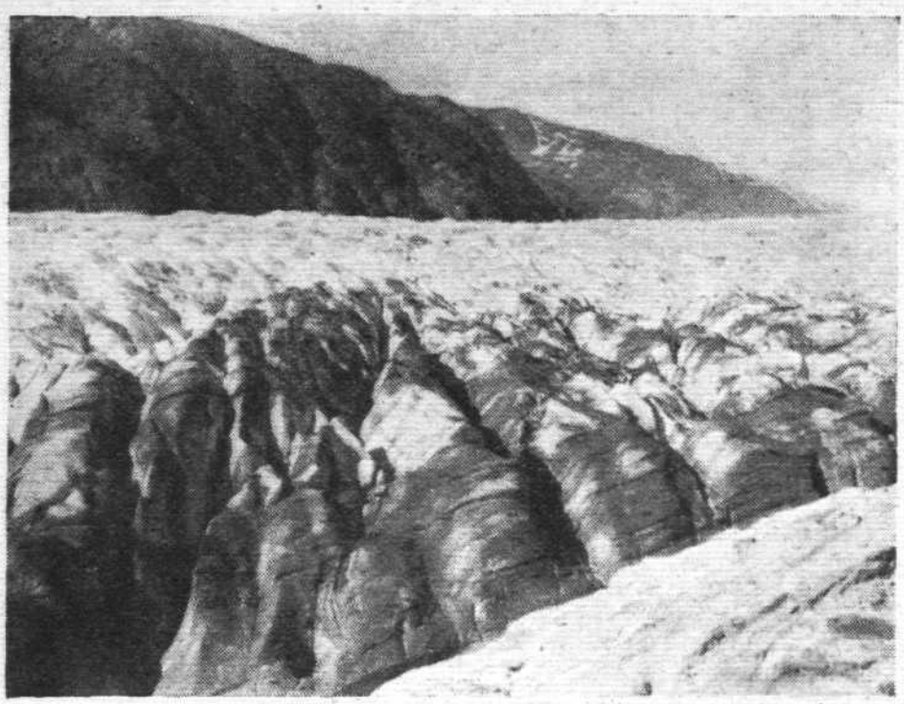
Born in 1895, Admiral Troubridge entered the Royal Navy in 1908 as a midshipman and was a captain in command of the aircraft-carrier *Furious* at the outbreak of World War II. He subsequently had command of the battleship *Nelson* and the carrier *Indomitable*, and a year later, in 1943, became Rear Admiral Combined Operations and Flag Officer Commanding Overseas Assault Forces.

Admiral Troubridge won the D.S.O. when taking one of the vital convoys through to Malta in 1942, and a bar to the D.S.O. for his part in the North Africa landings. He was also awarded the American D.S.M. in 1943.

# BETTER LATE . . .

## *The Story of a "Valiant"*

## *Conclusion to a World Flight*



The very opposite of a runway: the surface of the Narsarssuak Glacier, near the U.S.A.F. Greenland base known as "Bluie West 1."

By MICHAEL TOWNSEND, R.A.F.V.R.

TO the keen navigation types who followed my account* of the North Pacific crossing in our Proctor, *Thursday's Child*, I must issue a warning. What follows is not another scholarly discussion of the navigational problems affecting those who essay ocean crossings in light aircraft; rather is it a rounding-off of the story which, as far as I remember, left pilot and navigator disconsolately wandering around the wreckage of their machine in mid-Alaska, in a temperature of 30 deg below zero.

The interval of seven months between the forced landing and my return to navigate *Next Thursday's Child* across the Atlantic could really best be described by the pilot, Mrs. Morrow-Tait. However, a second-hand account may answer a few of the more obvious questions.

The U.S.A.F., who had one of their own aircraft down near the scene of our mishap, agreed to collect the Proctor and take it to Fairbanks. This was 200 miles in the wrong direction, but beggars cannot be choosers. In Fairbanks, volunteers were obtained to dismantle and crate the Proctor and drive it, by truck, 2,000 miles along the Alaska Highway to Edmonton. All this having been satisfactorily arranged, we thumbed a ride in a Flying Fortress on its way to the States, dropped off at Edmonton, and there arranged with a former R.A.F. Transport Command colleague to repair the Proctor on its arrival. The repair would evidently take some time to effect, and my Alma Mater had given me to understand that, if I did not return for the Lent Term, I need not come back at all. A precipitate, if somewhat ignominous, return to England by boat followed, after calling at Toronto and Montreal to arrange respectively for new parts for *Thursday's Child* and a new navigator.

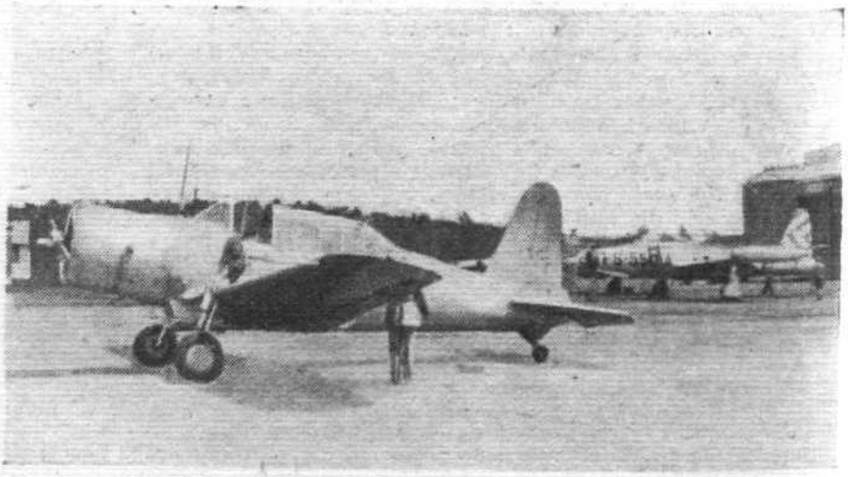
The truck bearing *Thursday's Child* had to wait for the Smoky River—normally a ferry cutting the Alaska Highway—to freeze hard enough to drive over, and did not reach Edmonton until February. To say that the Proctor had been "damaged in transit" would be an understatement. It had been practically annihilated. My pilot's righteous indignation must have been considerable. She hitch-hiked the odd two thousand miles through the snow back to Alaska to seek an explanation from the culprit. The latter, however, divided into several, each of whom passed the buck to someone else. Some clue to the cause of the damage was gleaned from overhearing a truck-driver say, "Aw, hell, it fell right out of the sky, another three feet couldn't hurt it any more!"

After this heart-breaking finish, we had been daily expecting Mrs. Morrow-Tait back in England; though on April 1st, this astonishing cable arrived from Seattle, where she was staying with old friends: "Flying home BT-13. Tank installation Edmonton. Got navigator, drift gauge, possible radio compass. DIKKI." Apparently, a group of air-minded fans had raised five hundred dollars to buy a war-surplus BT-13 or Vultee Valiant. An ex-U.S.A.F. instructor chose it from a large number for sale, checked Mrs. Morrow-Tait out on it and sent her off to Canada. Her navigator, Jack Ellis, was a former R.A.F. pilot wanting a cheap trip back to his wife in England. The airscrew and the blind-flying instruments were overhauled at Vancouver and the pair flew north to the scene of the Proctor's forced landing; then back, via Watson Lake in the Yukon and Fort St. John, British Columbia, to Edmonton. There, North West Industries, Ltd., installed a very neat 60-gallon overload petrol tank in the bottom of the fuselage and supervised Mrs. Morrow-Tait's work on the 100-hr inspection of engine and airframe.

From Edmonton the flight proceeded in short stages to Buffalo, where Ellis abandoned ship and joined his wife, who had by this time arrived in Toronto from England.

The period which followed my arrival in Buffalo affords a lesson on the pitfalls which await the unfortunate private flier who attempts international navigation inadequately cleared beforehand. The Proctor, a British-registered civil aircraft, flown by a British-licensed pilot, was cleared right round the world through official channels. The Valiant was an American-registered ex-military aircraft, and had to have an American citizen owner and an American-licensed pilot. Mrs. Morrow-Tait had already obtained an American pilot's licence before my arrival and had procured a reluctant citizen of

* "*North Pacific Navigation*," "*Flight*," *June 30th*, 1949.

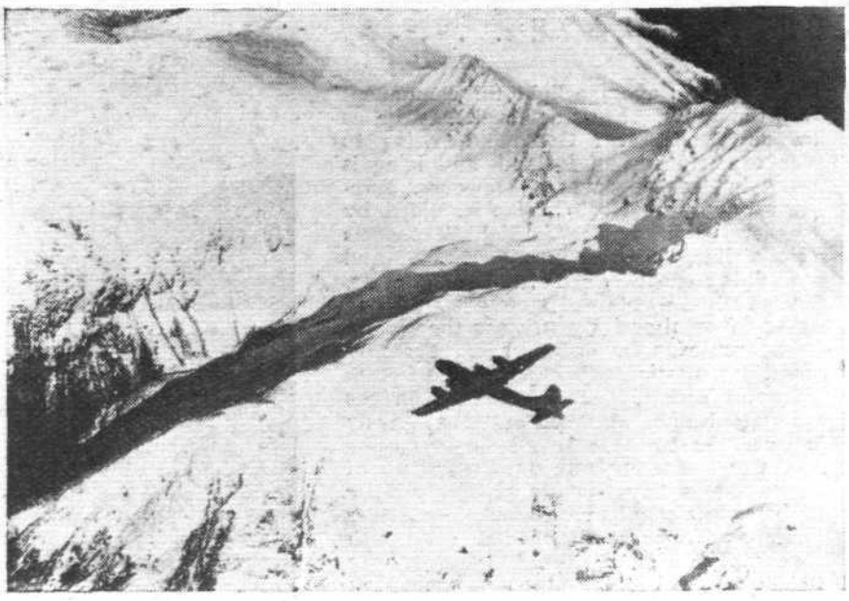


The BT-13 Vultee Valiant, *Next Thursday's Child*, at Dow Air Force Base, Maine, U.S.A.

# BETTER LATE . . .

Niagara Falls, New York, as registered owner. The onus of ownership, incidentally, cost him one dollar. Before leaving Buffalo, *Next Thursday's Child* had a brand-new C. of A. (in an experimental category to allow for the overload tank), an export licence which had cost ten dollars in 'phone calls to the State Department, and the blessing of the American Civil Aeronautics Administration.

On July 9th we crossed Lake Ontario and flew up the St. Lawrence to Montreal, where we were stopping to collect navigation kit and obtain Department of Transport permission to land at military airfields in Canada. We also had to await a "Hold Harmless" and official permission from H.Q.U.S.A.F. to land at American bases in Greenland. This latter came through in due course, but, far from receiving help from Ottawa, we awoke next morning to find ourselves grounded by the Department of Transport. The senior Department of Transport official at the airport appeared delighted to be of service in telling us that no American "X" registered aircraft could fly in Canada, nor could even a private single-engined machine fly over the Great Lakes, the St. Lawrence Estuary or the sea. "I don't really see quite how you can fly to England with these limitations," he blithely concluded. This after 11 months of struggling! Then ensued a battle more exhausting and more exacting than any ocean-crossing. The first stage ended on July 30th, when, after trying every official channel and appealing to the highest authorities in Ottawa, the net result was a Ferry Permit to Burlington, the nearest Customs airport across the United States border. The elaborate formalities before our departure must have been amusing to an onlooker. We were evidently dangerous customers, for an official dipped a measuring stick into our fuel tanks to ensure that no more than 40 gallons were carried on take-off. The jettisoning of even the five gallons excess was rather disheartening in view of our very meagre supply of dollars.



One of the most grimly beautiful scenes in the world—the Greenland ice-cap. In this picture is an RB-29, the reconnaissance Superfortress.

## Unwanted Adornment

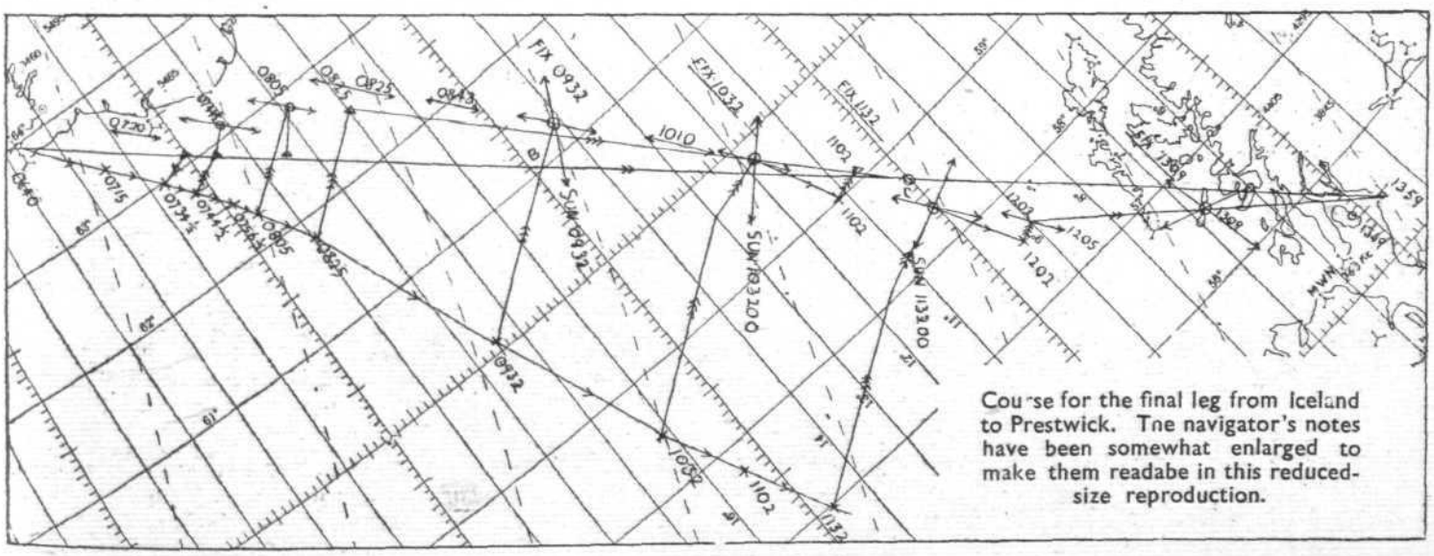
One of the official objections of the Department of Transport was that they believed our Valiant to be un-airworthy. I certainly concede that, by appearances, they were perhaps justified. Every stop en route from Alaska had added some daub of paint, picture or signature, with the result that the aircraft looked more like something out of a circus than a sober air-force trainer with only 250 hours since overhaul. Accordingly, we removed every vestige of disfigurement before leaving for the States. This was just as well, as our next night-stop was at Dow Airforce Base, a U.S.A.F. jet-fighter station in Maine. As at other American bases en route, their help and hospitality were splendid, and the advice of men who had actually flown in and worked on the Valiant was especially welcome. From Dow, we cleared to Old Town, the civil field nearby. Departure from there was planned for dawn of August 3rd; destination was Presque Isle, 120 miles to the north.

Old Town Municipal Airport can be considered as the real starting-point of the Atlantic flight. Once in Labrador there was no going back—even if, as nearly happened, there was no pressing on either. Four flights of approximately seven hours each made up the trip from the United States to Scotland, all completely free from mechanical trouble. This was in an aircraft which the British newspapers evidently believed to be something dragged off a scrap-heap. Perhaps a first-hand description of *Next Thursday's Child* is appropriate at this point before dealing with the sea crossings.

The Vultee Valiant, an all-metal tandem-seat basic trainer, comparable in size to the Harvard, has a fixed undercarriage and a 450 h.p. Pratt and Whitney Wasp Junior, one of the most well-tried engines in the world. The two 60 U.S. gallon wing-tanks were supplemented by an extra 60 gallons carried in the fuselage below the pilot's feet. Maximum endurance at an economical cruising speed of 120 m.p.h. was then 1,200 miles, thus giving a margin of well over a third on each North Atlantic hop. The radio consisted of an M.F. and H.F. receiver and a single-channel H.F. transmitter, whilst navigational equipment included three magnetic compasses, an astro-compass, a Mk. II drift recorder and a Mk. IXa sextant.

The route originally planned was from Montreal to Croydon *via* Goose Bay, Fort Chinno in Northern Quebec, Frobisher Bay in Baffin Land, Stromfjord in West Greenland and Ikateq in East Greenland. From Ikateq the route passed through Keflavik and Hornafjord in Iceland and Stornaway in the Hebrides. The longest non-stop flight would then be the 487 nautical miles from Frobisher to Stromfjord. This meant that we should be able in every case to reach our destination and return if it was closed-in by fog.

The most prevalent summer weather situation affecting this route is perhaps represented by the semi-permanent "high" over Greenland, flanked by two recurrent "lows," one centred south of Baffin Island and the other north-west of Iceland.




Course for the final leg from Iceland to Prestwick. The navigator's notes have been somewhat enlarged to make them readabe in this reduced-size reproduction.

## BETTER LATE . . .

These give an average light tail-component over the route. Freezing level may be as low as 3,000ft near Greenland, rising to over 10,000ft east of Iceland, and icing is likely in frontal zones. However, forecasting over the North Atlantic, aided by weather ships and "in-flight" reports from airliners, is reasonably reliable; and good flying weather, even for light aircraft, can usually be obtained merely by waiting for any frontal activity to clear the section of the route to be flown next. Terminal conditions, particularly important in Greenland and Iceland, depend largely on the wind circulation. A south-westerly is likely to close the entrance to all fjords on the West Coast of Greenland, but the heating of the mountain slopes in the summer usually disperses low cloud by midday. A weather officer at Narsarssuak told me that both his own base and Bluie West 8, in Stromfjord, had ceilings in excess of 10,000ft for fifty per cent of the time. Keflavik ceilings are frequently very low, but the surrounding terrain is fairly flat; and Kassos, at the head of a North Coast fjord, is usually found to be clear when Keflavik and Reykjavik are both closed in.

The approach to Narsarssuak Air Force Base along Tunugdliarfik Fjord.

The alternative route from Montreal was *via* Goose Bay, Narsarssuak (Bluie West 1) in Greenland, Keflavik and Prestwick. This would have the advantage of slightly better weather, but with a longest flight of 740 nautical miles. Mapping and survey had been very inadequate during wartime over both routes, but the Canadian Department of Mines and Resources has recently issued a reliable series of eight-miles-to-the-inch topographicals of the far North, and the Danes are conducting an aerial survey of the coast of Greenland.

Circumstances beyond the control of the crew made the southern route inevitable. The only bad weather encountered on the entire trip compelled us to make an emergency landing at Goose Bay. Take-off from Old Town Airport had been delayed two hours due to the sudden and baffling inability of the engine to manage more than 1,500 r.p.m. on run-up. Plugs, magnetos, compression and petrol filter having been checked and found O.K., we were just beginning to believe it an "act of God" when a local mechanic diagnosed carburettor icing! The air was as warm as an English spring morning, but very damp. Anyway, with the aid of sunrise and full carburettor heat, we soon had take-off revs. Old Town seemed to be the only spot in the Maritime States free from fog and low cloud. Presque Isle was closed in and the Radio Range weather broadcasts reported one after another of the airfields in Eastern Canada and the States with dangerously low ceilings

### Six Hours in Cloud

After hitting a clear patch over the St. Lawrence an attempt was made to map-read at low level over the barren, ice-scarred region on the way northwards to Knob Lake; this was a private landing-strip operated by the Hollinger-Ungava Mining Company, but had no Radio Range and, as clouds were covering the hills on either side of the river valley which we were following, Knob Lake was abandoned in favour of Goose Bay, which was reported as having "5,000ft broken."

After seven hours' flying, six of which had been in cloud, the familiar sandy plateau of Goose Bay hove in sight with its neat triangle of forest marked out by three great runways. The landing was obviously a case of *force majeure*, and the R.C.A.F. gave us a warm welcome. It was not long, however, before Ottawa sent through a signal insisting on a Catalina escort for us to Greenland. This was promptly offered by the U.S.A.F. Squadron at Goose Bay, only to be cancelled later by a higher authority, the American official attitude being that if Ottawa were not satisfied with the normal air/sea rescue facilities, they could provide a Canadian escort. This was not available, and after a week we decided that, rather than overstay our welcome in Labrador, we should move on.

The Canadian rule against American experimental aircraft flying over Canadian territory made it quite impossible to return either to the United States or to Canada. On the other hand, we had been cleared to land in Greenland. A hurried 'phone call to "met." told us to expect a 20-knot headwind —giving a flight plan of over 8 hours—and a clear entrance to Tunugdliarfik Fjord.* After five hours of easy cruising between high scattered and low broken cloud, we saw the West Coast of Greenland appear on the horizon like a jagged battlement. Another hour brought us to the mouth of our fjord, where the water and lower slopes of the mountains were completely covered by cloud. However, after we had pushed on inland for a few minutes, the cloud cleared, a familiar landmark was picked up and, after only 6½ hours from leaving Goose Bay, we were stepping out at U.S.A.F. Base, Narsarssuak. As navigator, I must sheepishly admit that we flew the whole way across the Davis Strait on the Radio Range.

We had a slight leak in our starboard wing tank, and the American Base Commander, insisting that he was responsible for our safety, made us take four days' rest whilst his men gave the Valiant a thorough inspection. The delay was aggravating, as it caused me to miss a geographical expedition to Norway. However, his plan was obviously the wisest, and three days of brilliant sunshine and temperatures well into the sixties gave us an opportunity to make two very useful expeditions to study glaciers and their accompanying landforms.

The normal route to Iceland was either direct at 13,000ft under Instrument Flight Rules or over 150 miles farther, via Cape Farewell, under Visual Rules. Our morning of departure, August 17th, was so brilliantly clear, however, that we tacked up and down the fjord for 45 minutes and set course over the aerodrome at 9,000ft direct across the Ice Cap. That flight across Greenland is perhaps the most beautiful in the world. The two lines of snow-capped peaks along either coast converging to a chaotic mass of frost-scattered hörns and corries in the south and converging on either side of the dazzling dome of ice to the north, present a picture almost impossible to describe. But it is a very cruel beauty.

A pinpoint was obtained on the east coast and drifts and sun shots kept us fairly well on track until Keflavik Radio Range was picked up four and a half hours out. The last two and a half hours of the flight to Iceland took place at 7,000ft between 7/8th to 8/8th layers of cloud, and a Range let-down was made to bring us to Keflavik below a 1,000ft ceiling. Flight time, including the 45 minutes' climb, was seven and a quarter hours.

Keflavik, formerly Meeks Field, is now operated by Lockheed Overseas Corporation, and the Lockheed manager was the first to welcome us and offer us free landing (normally there is a fixed forty-dollar fee) and hospitality in the excellent, modern airport hotel. The President of Iceland himself did us the honour of asking us to meet him on the day after our arrival. Incidentally, this was the only day we were held up by weather during the whole Atlantic flight.

At 6.40 a.m. next day we took-off for Prestwick in drizzling rain below a 600ft ceiling, climbed to 7,000ft, and were in brilliant sunshine. The 740 n.m. flight from Keflavik to Prestwick was the only one on which serious navigation turned out to be necessary, and the weather was so perfect that it was a pleasure. Friends in Trans-Canada Airlines' Montreal office had persuaded me, rather against my will, to try using the Consol radio D/F. system, and had given me a set of co-

(Concluded on page 477)

* The 50-mile-long West Greenland fjord leading up to Narsarssuak.


# METEOR 8

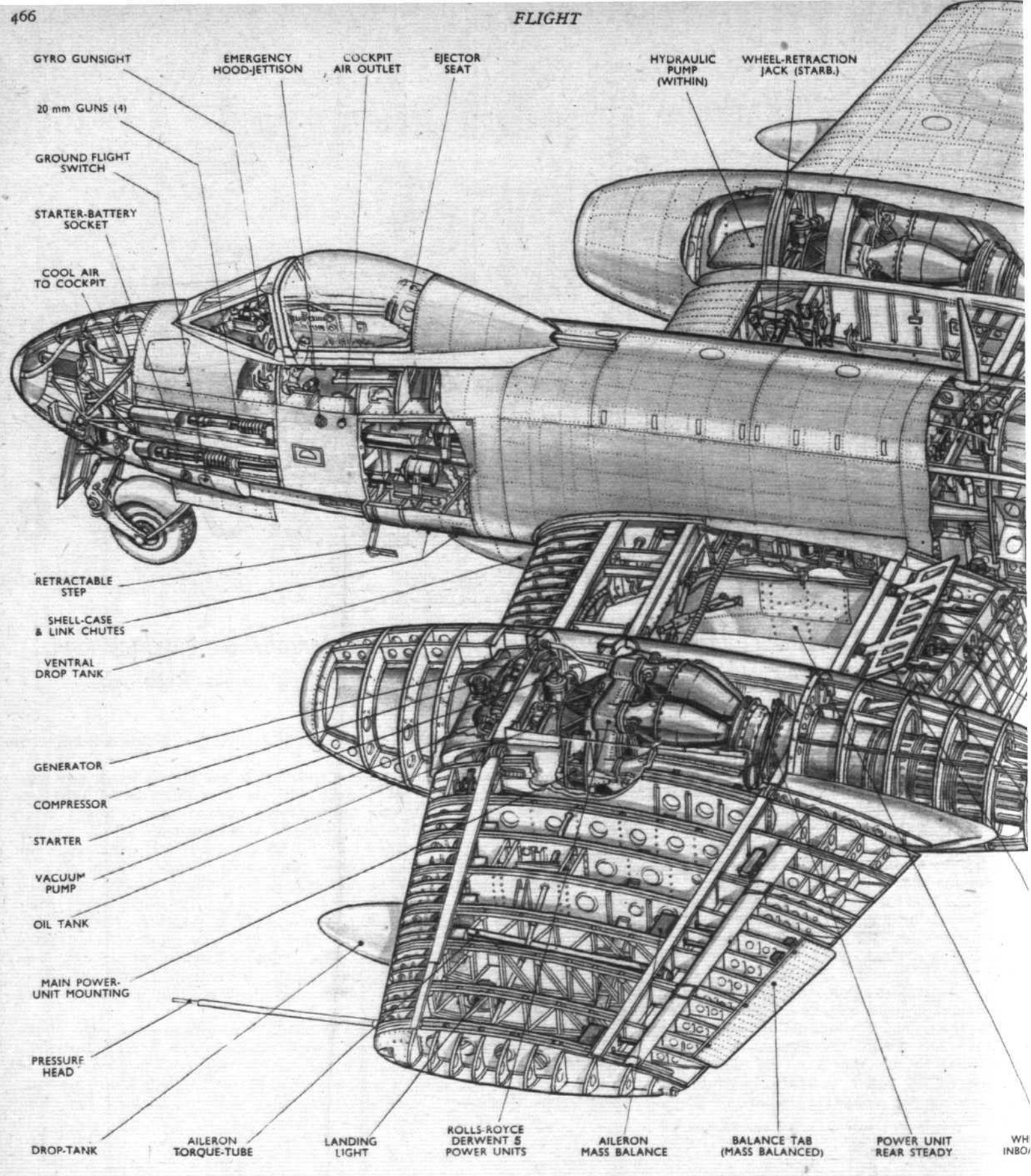
## *Gloster Twin-jet Fighter of Distinguished Parentage : Lengthened Fuselage and Completely New Empennage : Rolls-Royce Derwent Turbojets Retained*

AMONG the spectators at last month's S.B.A.C. Display were some who remembered the old Meteor 1 and its experimental precursor the F.9/40, and who contemplated Zurakowski's performance in the latest Meteor with undisguised astonishment; for so completely does the Mk 8, as the newest variant is styled, transcend the performance of the earliest models that only with difficulty can its kinship with the F.9/40 be believed. Yet both designs bear the same familiar stamp.

The exact degree to which performance and handling are affected by the new tail unit—chief of the distinctions between the Mks 4 and 8—may not be divulged, but behaviour at high Mach numbers and high altitudes seem likely to benefit. Nor is it permissible to disclose, or even speculate upon, the use made of the extra 30 inches of fuselage; but reference will later be made to a Meteor 4 development of which details were disclosed at Radlett in 1947 and which, except for its tail unit, was externally similar to the Mk. 8. This model is best considered in relation to other variants; accordingly it will take its place in the following outline of Meteor history, which prefaces such information as may be disclosed relative to the newest mark.

The prototype of the Meteor was known by its specification number F.9/40 and the first airframe of this type was completed towards the end of 1942. Rover W.2b turbojets of 1,800 lb thrust were installed. The first prototype actually to fly (in March, 1943) was fitted with two power units of the Halford H.1 type, which may be regarded as the prototype of the Goblin. During 1943 other F.9/40s were fitted, and flown, with Rolls-Royce B.23, Power Jets W.2/500 and W.2/700, and Metropolitan-Vickers F.2 units. These early machines were not fitted with the now-familiar "torpedo" fairing at the cruciform intersection of the tailplane with the fin, and all control surfaces were fabric covered. The ailerons had external horn balances.

The Meteor 1 was basically a militarized version of the F.9/40, powered with Rolls-Royce B.23c turbojets. Though not fully operational, the first two machines of this mark were delivered to No. 616 Squadron on July 21st, 1944; two days later these were followed by five fully

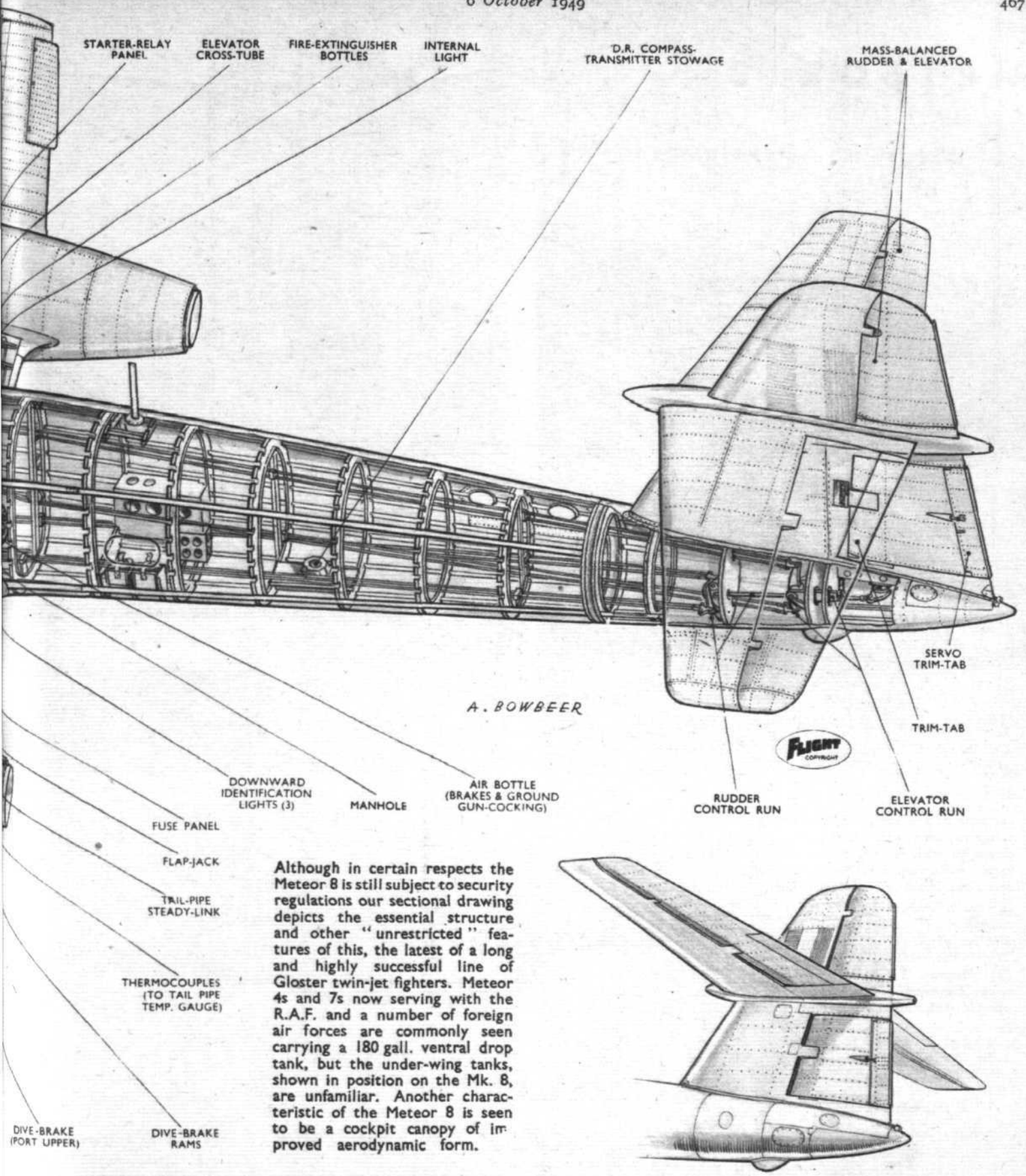



## METEOR 8 . . .

operational machines. The first confirmed victory by a Meteor was recorded on August 4th, against a V.1 flying bomb; the pilot, F/O. Dean, caused the bomb to crash by upsetting it with his wing tip. Sideways-folding cockpit hoods, as on the F.9/40, were standard on the Meteor 1s. The Meteor 2 was a similar machine, adapted for the D.H. Goblin, but only one example was completed.

The first full-scale production version of the Meteor was the Mk. 3, deliveries of which started in January, 1945. Meteor 3s were operated by No. 616 Squadron of 83 Group, 2nd T.A.F. and later 504 Squadron was similarly equipped. At the time there was little air opposition and the Meteors were chiefly engaged on ground-attack duties. Rolls-Royce Welland turbojets were fitted but later Mk 3s were powered with Derwent 1s. The final fifteen Mk 3s had experimental long nacelles, similar in outline to those standardized on the Mks 4, 7 and 8. Other Meteor 3 features were the sliding-type cockpit hood, slotted air brakes and ventral drop-tank. Meteor 3s were engaged on the first tropical jet trials at Khartoum in September, 1945, and on the first "winterization" trial at Edmonton, Canada, during the following year. One example was delivered to each of the Air Forces of Australia, New Zealand and the Union of South Africa for experimental flying and operational testing.

Basically an improved version of the Mk 3, the Meteor 4 was initially fitted, like the preceding marks, with tapered long-span wings, and in this form established two world's air-speed records. Towards the end of 1945 this mark was in production with new short-span wings, and the first




**Although in certain respects the Meteor 8 is still subject to security regulations our sectional drawing depicts the essential structure and other "unrestricted" features of this, the latest of a long and highly successful line of Gloster twin-jet fighters. Meteor 4s and 7s now serving with the R.A.F. and a number of foreign air forces are commonly seen carrying a 180 gall. ventral drop tank, but the under-wing tanks, shown in position on the Mk. 8, are unfamiliar. Another characteristic of the Meteor 8 is seen to be a cockpit canopy of improved aerodynamic form.**



machine so fitted was demonstrated before military authorities in Switzerland.

A large model of a "long-nosed Meteor 4" development, displayed prominently at the S.B.A.C. Display two years ago, was described by *Flight* in the following terms: "This modification (the lengthened nose) eliminates several hundred pounds of ballast hitherto carried and the extra 30 inches allows space for another fuel tank, holding 100-120 gallons. The Martin-Baker ejector seat is fitted in this latest version and the model showed the machine carrying a 180-gallon ventral drop-tank and two 100-gall wing tanks." A cockpit canopy of improved aerodynamic form, similar in outline to that of the Meteor 8, was a feature of the model displayed at Radlett.

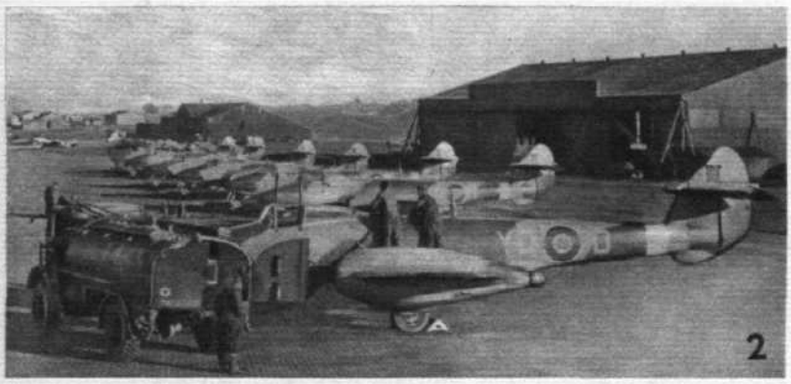
Embodying a lengthened nose, like the variant described above, the Meteor 7 two-seat, dual-control trainer was introduced to assure a more gradual and safer introduction to the handling and navigating of high-speed jet aircraft than was afforded by current piston-engined trainers. With full equipment the Meteor 7 weighs appreciably less than the Mk 4 fighter, and the initial rate of climb approaches 8,000ft/min. The maximum speed at sea-level and at 10,000ft is 585 m.p.h., and with drop-tank fitted an endurance of 2.3 hr is attainable at 30,000ft.

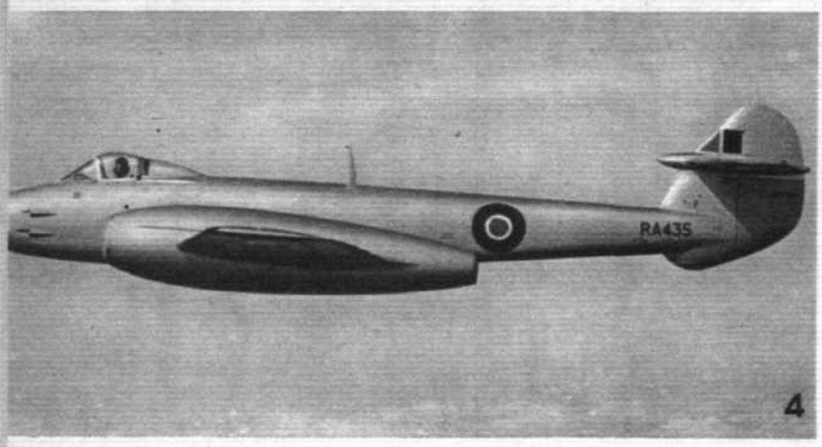
Miscellaneous Meteors adapted for experimental and development flying have included a Mk 1 fitted with Rolls-Royce Trent turboprops; a Mk 3 (Derwent 5s) having arrester gear for deck-landing trials; Mk 4s with modified centre-section spars to take the Metrovick Beryl and Rolls-Royce Avon; and a Derwent-powered Mk 4 adapted for reheat equipment. The Avon-Meteor, so memorably

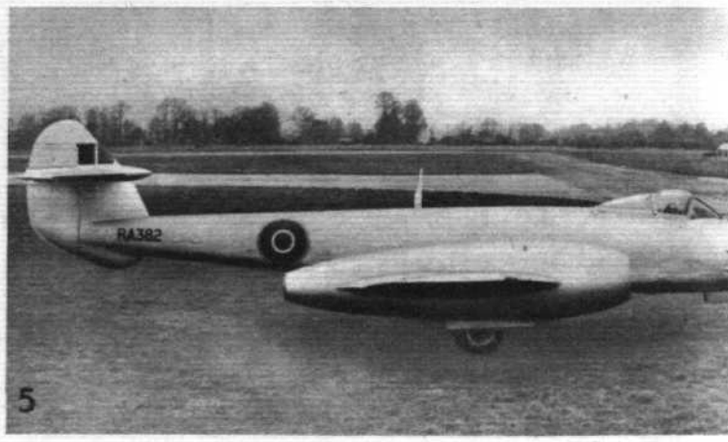
(*Continued on p.* 469, *after Meteor photographs* (*p.* 468))

# METEOR 8 . . .

## *Steps in Development*



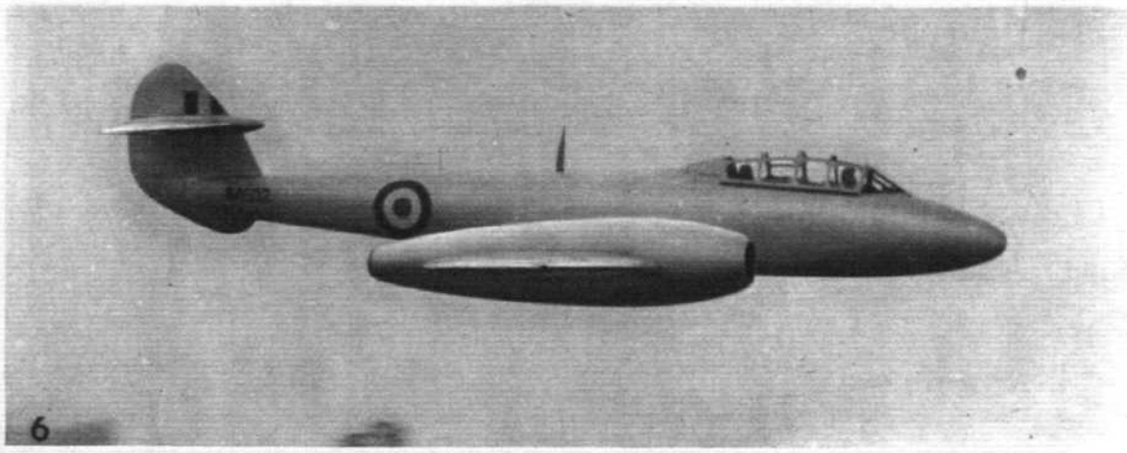



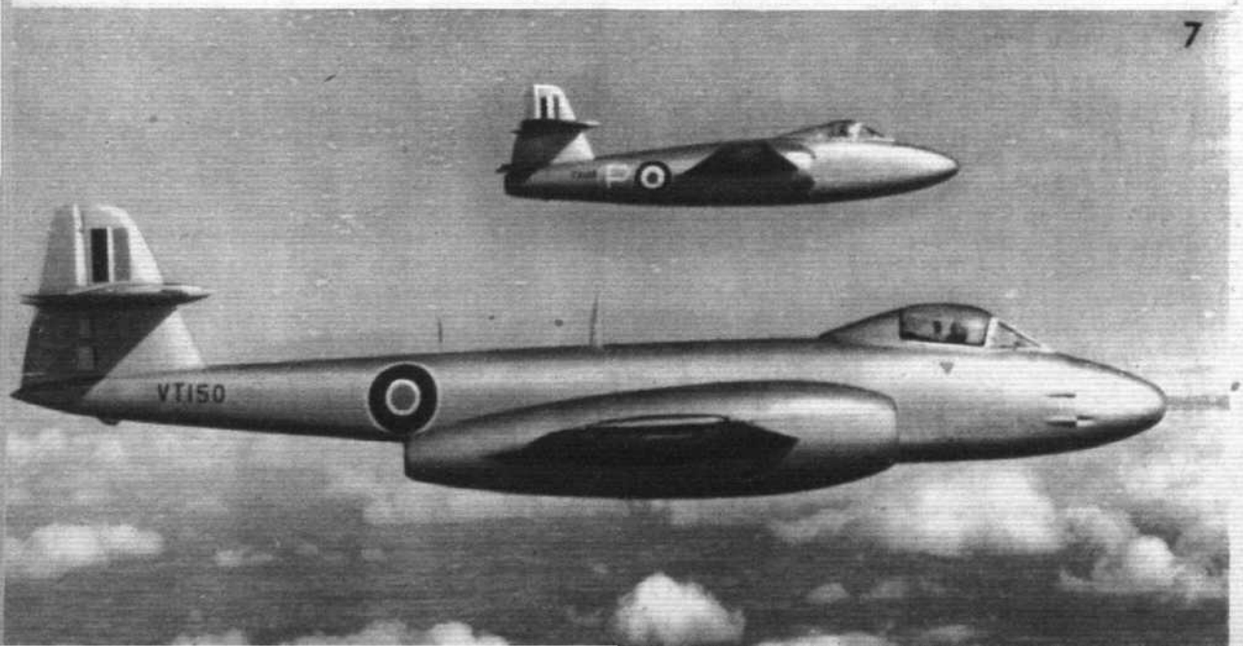




(1) One of the early F.9/40 prototypes, variously powered with Rover, Halford, Rolls-Royce, Power Jets, and Metrovick units.

(2) Early Meteors in R.A.F. service; in the foreground of this view is a Welland-powered Mk. 1.

(3) Meteor 3, powered with Derwent 1s (later Mk. 3s had long nacelles).



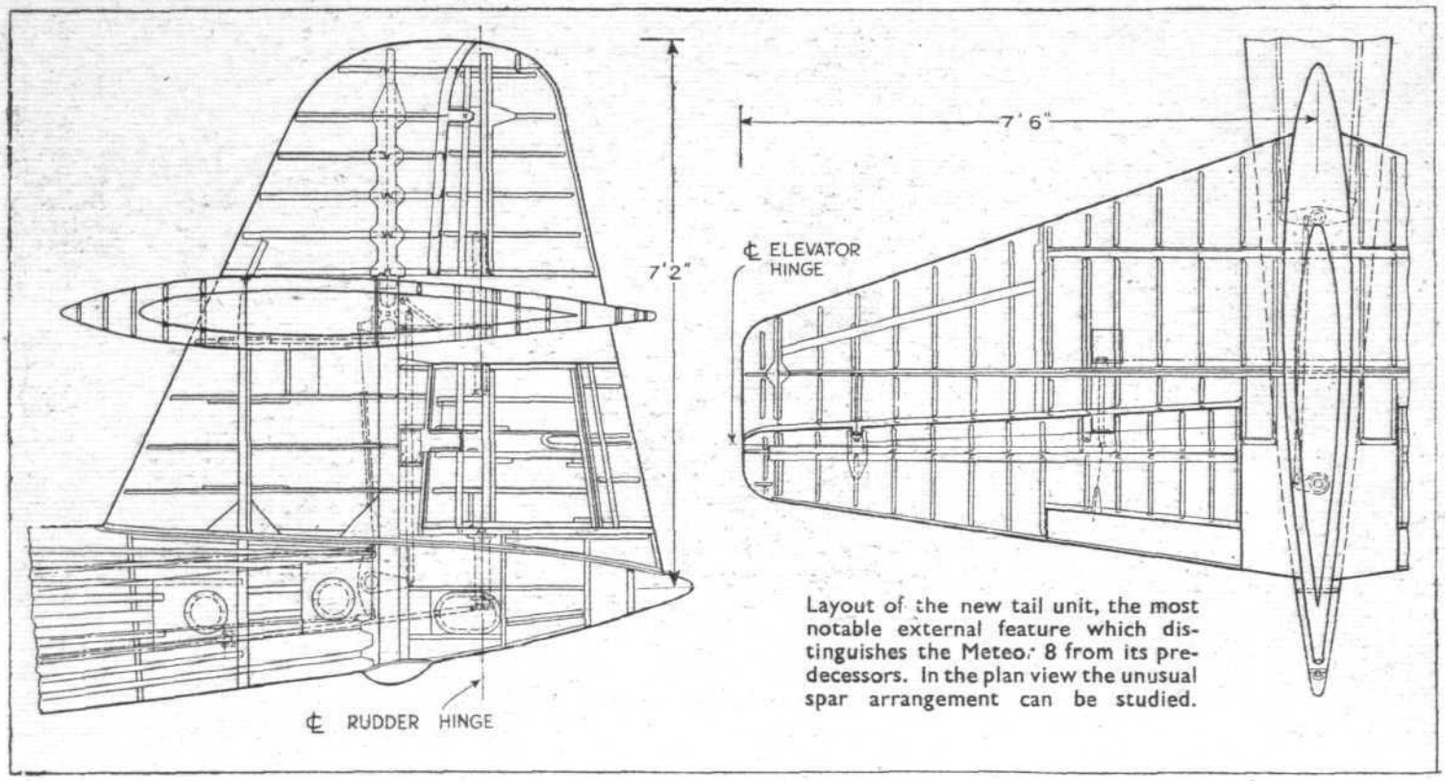



(4) Meteor 4 (Derwent 5s)

(5) "Long-nosed Meteor 4" (Derwent 5s)

(6) Meteor 7 Trainer (Derwent 5s)

(7) The Meteor 8 (two Derwents) is presented for comparison with an E.10/44 experimental fighter (Nene) It will be seen that both machines have the same type of tail unit.




Layout of the new tail unit, the most notable external feature which distinguishes the Meteor 8 from its predecessors. In the plan view the unusual spar arrangement can be studied.

## METEOR 8 . . .

demonstrated at Farnborough last month, is the most powerful single-seater in the world and climbs to 40,000 ft in little more than four minutes.

Characteristics which distinguish the Meteor 8 from the standard Mk. 4 include a completely redesigned tail unit; lengthened fuselage; revised cockpit enclosure and wing-root fillets of different contour. The leading edge of the tailplane has a pronounced sweep-back and the tailplane/elevator assembly is square-tipped. Elevator and rudder areas have been decreased and, from one degree, tailplane incidence has been reduced to zero. The sections of all surfaces are thinner than formerly. Familiar on all earlier Meteors, the lower fin-cum-skid has been deleted, but the upper fin has been correspondingly increased in area and, as our illustration shows, completely changed in outline. The fuselage now terminates in a cone-shaped fairing. Revision of the wing-root fillets was undertaken in the interests of production and has no aerodynamic significance.

The new clean-lined cockpit enclosure is electrically opened and closed by a push button, and a Martin-Baker ejector seat is standard equipment.

Dimensions of the Meteor 8 are: span, 37 ft 2 in; length, 44 ft 7 in; height, 13 ft 10 in.

# PYTHON TYPE-TEST

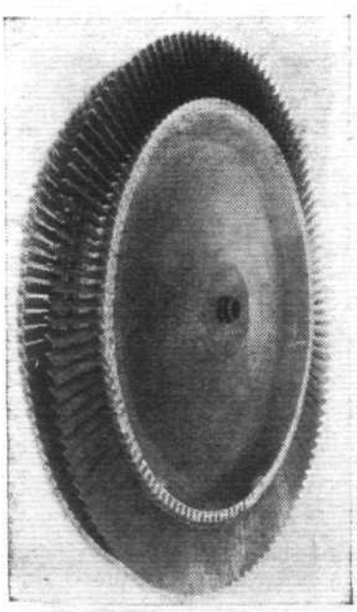
## *Armstrong Siddeley Turboprop's Strenuous 194 Hours*

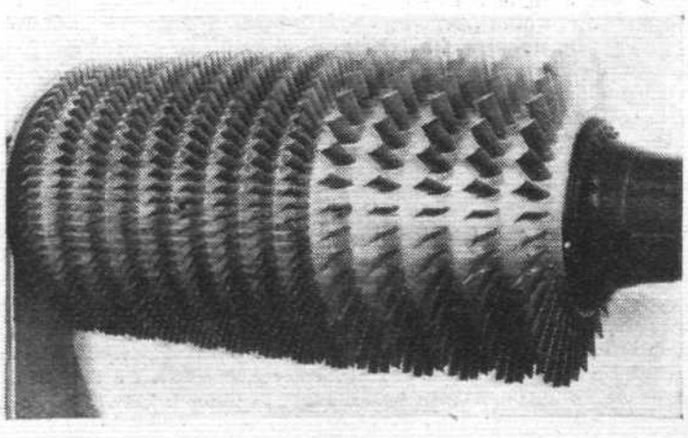
FOLLOWING the recent conclusion of the 150 hours' civil/military type test on the Armstrong Siddeley Python, it is now possible to give a *résumé* of the test. The actual running time on test was 194 hours with the power unit mounted in the hangar test-bed and driving a 14ft-diameter, eight-bladed Rotol contra-rotating airscrew. The schedule of running was as follows:—

7½ hr at minimum idling speed = 4,000 r.p.m.
7½ hr at minimum flight idling speed = 6,400 r.p.m.
45 hr at intermediate cruising speed = 6,400 r.p.m. to 7,600 r.p.m.
80 hr at maximum cruising speed = 7,600 r.p.m.
10 hr at maximum climbing speed = 7,800 r.p.m.
10 hr at maximum take-off conditions = 8,000 r.p.m.

During the course of the test, which was made under official supervision, 160 accelerations from minimum power to take-off power were made, whilst the total number of starts made was 100. Maximum take-off power for the type test was over 4,000 equivalent horse-power, although 4,350 e.h.p. was developed during the overspeed test (at 8,300 r.p.m.) included in the schedule. In this connection, rated maximum powers of such an order are comfortably within the Python's capacity, for powers of very nearly 5,000 e.h.p. have been recorded during development running.

Understandably enough, type-test conditions are of considerably greater severity than those normally found in flight; some indication of this is given by the calculation that, with the Python installed in a modern fighter aircraft, the amount of running under scheduled test conditions was equivalent to 50,000 miles' flying. An extremely severe Parthian shot after 180 hours' running was the conclusion with 10 hours at maximum climb conditions. Assuming an initial rate of climb of 5,000ft/min, this is equivalent to the aircraft making 100 continuous climbs to 30,000ft. The condition of all the components, when the unit was completely stripped after test, is officially stated to have been excellent.





The cleanliness of these (untouched) principal components of the type-tested Python is indicative of the unit's quality.

# CIVIL AVIATION NEWS

PUBLIC ENCLOSURE: The local population shows keen interest at Gusau as a West African Airways Corporation Dove refuels. The airline, which also operates two Wayfarers, covers routes from Lagos, along the coast to Dakar and inland to Kano.

## TUDOR FREIGHTERS TO SPARE

THE announcement that B.O.A.C. would not require the ten Tudor freighters converted to the order of the Ministry of Civil Aviation comes as no surprise. The conversion order was made when Tudors were prohibited from carrying passengers, in the hope that the British Corporations would make use of them. Since B.O.A.C. has in the meantime re-equipped with Argonauts and other new types are coming along, Lancastrians and Yorks will slowly become available for freight operations and the Corporation feel it would be uneconomic to purchase special freighters.

The M.C.A. has not yet decided what shall be done with the aircraft. It has been suggested that other Tudors still in the Avro factory will be scrapped. The disposal of these aircraft is the concern of the Ministry of Supply, who indicated to the manufacturers some time ago that construction should end, and certain parts of those machines not completed have been disposed of. The completed aircraft still remain intact, however, and their future has not yet been decided.

## I.A.T.A.'S FUTURE PLANS

THE whole field of airline operation was discussed by representatives of 54 airlines from 38 countries during the 30th Anniversary meeting of I.A.T.A. at The Hague last month.

The activities of the Association's committees and conferences during the past year were approved, but more important were the broad plans for the future which were agreed. The delegates faced problems associated with the future operation of jet transports, and the various technical committees recognized the need to prepare now for the kind of airports, services and facilities which the new technique in airline operation would demand. Although agreement had been reached on many technical matters, it was apparent that lighting aids at airports still required much attention. One delegate, in stressing the need for approach lighting, described it as the vital link between the electronic approach-aid and the runway itself, and as a pre-requisite to all-weather operation. An appeal was made to governments for the installation of efficient lighting at all airports.

The present standard fare for all types of aircraft flying on specified routes was said to inflict hardship upon operators who were competing against airlines who were not members of the Association and who were using slower and older equipment. A broad study of differential fares depending upon the type of equipment had, it was reported, been undertaken by the Traffic Committee. If the conferences found that the idea was practicable it should mean that air transport would be brought to within the economic reach of many peoples who were unable to use air transport, provided they were content with slower and less luxurious services.

The airlines expressed themselves anxious that commercial rights for air transport should be exchanged on a more liberal basis so that the industry could attain full growth and accommodate itself to the new forms of propulsion and so make them available to the travelling public. I.A.T.A. was throwing its full weight behind the efforts of I.C.A.O. in reducing the number of border controls. They had also invited operators of all other forms of transport to join in a campaign to eliminate discrimination between carriers by means of national currency control.

An interesting idea was put forward for an international registry of aircraft which would allow airlines, regardless of nationality, to interchange equipment and so help each other during the peak traffic periods and obtain the utmost economy. Another indication of international co-operation was the decision to study an all-inclusive universal insurance cover.

As a safety measure, the Association agreed to ask I.C.A.O. to express in its Standards and Recommended Practices on Accident Investigation Procedures the basic right of the airline and aircraft manufacturer to participate in government investigations. It is hoped that by this means investigations will have the full benefit of the experience of those who construct and maintain transport aircraft.

Airlines also expressed a desire, now that traffic conditions were more settled, to fix rates and fares on an annual basis.

## I.C.A.O. FLIGHT STANDARDS

TWO additional sets of I.C.A.O. International Flight Standards—on Airworthiness of Aircraft and on the Facilitation of International Air Transport—came into effect on September 30th. The purpose of these standards is to ensure that flying on international air routes is carried out under uniform conditions designed to improve air safety and efficiency of operation. Airworthiness standards are planned to ensure that transport aircraft are sound both in structure and performance and facilitation standards to minimize time- and money-consuming formalities required in border crossings.

Other I.C.A.O. standards already in effect are designed to ensure, among other things, that aircraft will always carry enough fuel to complete their journey to their destination, or to an alternative destination in the event of unfavourable weather at the first airfield; that adequate weather reports are made available to pilots for planned routes; and that the pilot and other members of the crew have adequate experience, knowledge and skill, and are physically fit.

Nine standards are now in effect: Personnel Licensing; Aeronautical Maps and Charts; Operation of Aircraft on International Scheduled Services; Aircraft Nationality and Registra-

tion Marks; Airworthiness of Aircraft; and Facilitation of International Air Transport. These standards were originally drafted by I.C.A.O. members' representatives and then examined and adopted by a 21-nation council. Such adoption of a set of standards gives them legal effect as an Annex to the Convention on International Civil Aviation, and they are then submitted to the member-nations for approval. If the majority of members approve, the standards become final and each nation must put them into effect in its own territories, or notify I.C.A.O. of the differences so that other nations may at least be warned of discrepancies.

The United Kingdom agreed to the I.C.A.O. Airworthiness recommendations and incorporated them as standards in the A.R.B. British Civil Airworthiness Requirements issue published on January 1st, 1948. Those standards then applied to all British civil prototypes requiring Certificates of Airworthiness subsequent to that date.

Standards and recommended practices for the Facilitation of International Air Transport were adopted by the council on March 25th, 1949. They include the adoption of standard documents and procedures to facilitate and expedite the navigation of aircraft between member-states, and to prevent unnecessary delays to aircraft, crews, passengers and cargo, especially in the administration of laws in relation to immigration, customs and clearances.

## AIR FRANCE ANNIVERSARY

THIS year Air France is celebrating the 30th anniversary of the starting of three of its routes Paris-London, Paris-Brussels, and the first service between Europe and Africa, Toulouse-Casablanca. The two routes from Paris were opened by Messageries Aeriennes, now incorporated with Air France. The route from Toulouse was started by Aeropostale (now also amalgamated) on September 21st, 1919, and later extended by degrees to Dakar and thence across the South Atlantic to Brazil and Argentina.

The usual winter curtailment of the company's services in the Northern sector of its European network has been compensated by an increased frequency on the African routes as well as by an increase in seating capacity. Thirty-three-seater Languedocs are being replaced by DC-4s, carrying between 44 and 55 passengers, for work between Marseilles and Tunis, Bone, Algiers and Oran, and on the Algiers-Tunis and Casablanca-Tunis routes. The only service in North Africa continuing with Languedocs will be Casablanca-Algiers.

## M.C.A. AT RADIOLYMPIA

ON several stands at Radiolympia (which remains open until October 8th) are to be found examples of radio and radar communications and navigation equipment to which reference has been made in several recent issues of *Flight*. Though they are naturally overshadowed by the less austere domestic radio sets with which the show is principally concerned, the Ministries of Civil Aviation and Supply are attracting interested crowds to their radar exhibits.

The M.C.A. presents a G.C.A. demonstration: A working model of the main runway at London Airport, complete with approach runway and taxiway lighting glowing attractively in the semi-darkness of the stand, is used in conjunction with a full-scale control console with radar screens. A model airliner, with lights shining through its windows, is made to "take off" from the runway, make a circuit and land again, and its 3½-min flight is accompanied by a recorded commentary explaining the procedure and a typical talk-down. Spectators can see on the screens the radar signals on which the G.C.A. director bases his instructions. Although artificially generated, the signals are actual "blips" and indicate to a high degree of accuracy, at every stage of the approach, the actual position of the model in relation to the runway. The airport model was constructed by Hunting Aerosurveys, Ltd., and the mechanism was designed and constructed by M.C.A. staff at Blackbushe airport. This model is being demonstrated to 30 persons at each session for 11 sessions in each hour, and the exhibition is open for about 11 hours each day.

The Ministry of Supply demonstrates search radar by means of a rotating aerial in a water tank in which are obstructions: These objects are indicated by "blips" on an accompanying cathode-ray screen.

The R.A.F. stand includes a model of a typical Service station, and at certain times during each day demonstration landings are made by means of model aircraft. Officers and N.C.O.s are ready to answer questions on the R.A.F. radar and radio equipment which is also on view.

## SCANDINAVIAN TOUR

THE Short Sealand destined for a demonstration tour of Scandinavia, left Belfast on Monday, September 26th, piloted by F/Lt. McCall. Also in the aircraft were Mr. George Puddicombe, Shorts sales representative, and Mr. Adams, flight engineer. The tour will include demonstrations at Amsterdam, Hamburg, Stockholm, Helsinki, Oslo, Stavanger, Bergen, Alesund, Trondheim and Antwerp, and the aircraft will be away for about seven weeks.

## SOUTH AFRICAN NEWS

DURING the past year the monthly passenger load carried by South African Airways has increased by about 2,000. In June this year 16,030 passengers were carried on trunk, regional and internal services, compared with 14,397 in June, 1948. On September 1st S.A.A.'s new timetable came into operation, providing same-day connections with other services in the Union, Rhodesia and South-West Africa. The Skymaster service between Johannesburg and Cape Town has been increased to daily frequency and the service linking Cape Town and Port Elizabeth now flies daily instead of twice weekly. Twenty-four-seater Dakotas are to replace the 12-seater Lodestars previously used on services between the Union and South-West Africa.

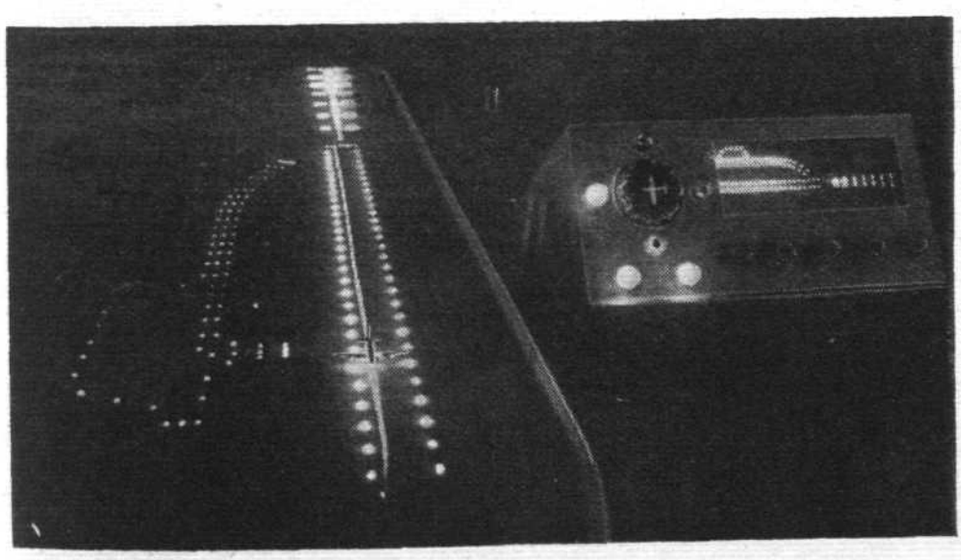
## DAKOTA-ANSON COLLISION

IN a report* on an accident involving a B.E.A. Dakota and an R.A.F. Anson at Exhall, near Coventry, on February 19th, 1949, the Chief Inspector of Accidents states that the cause was a mid-air collision in clear visibility, neither aircraft, apparently, having seen the other. The Dakota, G-AHCW, left Northolt at 0913 hr under V.F.R. conditions on a scheduled flight to Renfrew, carrying six passengers and a crew of four. The aircraft passed a departure message to A.T.C. Uxbridge at 0922 hr saying that it was flying over Rugby at 4,500 ft V.F.R. and requested permission to contact the Northern Flight Information Region Control Centre, Preston. Permission was granted at 0944 hr and the Regional QFF was given as 1015 mb. The message was acknowledged and no further communication with the aircraft was made.

The Anson left Middleton St. George, Yorks, at 0809 hr on a cross-country navigational training flight via Shrewsbury and Chatteris, carrying a captain, wireless operator, navigation instructor and pupil. At the time of the collision the Anson was on its way to Chatteris. Both aircraft were flying at about 4,500 ft, the Dakota in a N.W. and the Anson in an E.S.E. direction. On collision, both aircraft disintegrated and some of the wreckage from the Dakota fell to the ground in flames. There were no survivors.

In his report, the Chief Inspector stated

* *M.C.A. Publication No. 76. Price 6d. H.M. Stationery Office.*



**RADIOLYMPIA TOWER; The operation of night-landing devices at London Airport was shown by means of a working model on the M.C.A. Stand at Radiolympia. Both the lighted runway and the Radar screens can be seen. The model was built by Hunting Aerosurveys, Ltd.**

## CIVIL AVIATION NEWS . . .

that both aircraft were airworthy and their documentation in order; the members of both crews were qualified; Air Traffic Control was not involved, as the collision occurred outside any Control Area or Zone; the weather was cloudless with good visibility—estimated at six miles—and there was a bright sun. As no apparent avoiding action was taken by either aircraft it was concluded that the pilot of the Anson (Plt. II K. Suwala) did not see the Dakota, owing to the glare of the sun, and that the pilot of the Dakota (Capt. S. McDermott) did not see the Anson. This was attributed to failure on the part of the captain of each aircraft to ensure the maintenance of an effective look-out.

## "MET" DEVELOPMENTS

THE annual report of the Meteorological Office, published recently,* reveals that several photo-electric visibility meters have been installed at selected stations as a means of measuring visibility at night. Preliminary reports have shown satisfactory results. Work has also been started on the development of an instrument to measure oblique visibility. It is intended primarily for obtaining observations from which it should be possible to advise pilots at what distance they should be able to see airfield lighting.

Of great navigational importance in view of impending jet-aircraft operation is the news that the first draft of the charts of the upper winds have been produced and manifolded. These charts give information as to the mean winds and wind variability up to 30,oooft for most of the world, and up to 50,oooft for the northern hemisphere. In addition, research is being carried out to determine the magnitude of wind and temperature variations with time, height and place. Temperature variations, particularly, are of obvious importance in the operation of jet aircraft. The existence of narrow, high-velocity air-streams in the upper air is being studied and statistics of cloud in the upper atmosphere are being collated.

The report reveals a slight reduction in the number of reporting stations in the British Isles making regular synoptic observations. To supplement reports received from meteorological offices some 50 auxiliary reporting stations are maintained, particularly in the more remote districts. At these centres part-time observers undertake to make regular observations in accordance with a programme. Further progress has been made in implementing the international agreement to establish 13 weather stations in the North Atlantic. Five more stations commenced operating in September, bringing up to 11 the total number of ocean weather stations from which regular surface and upper air observations are received.

* *Price 9d, H.M. Stationery Office.*

## *British Airways' Operating Statistics for May, 1949*

(Figures for the corresponding period in 1948 are given in parentheses)

| | B.E.A. All Divisions | B.E.A. Continental Division | B.E.A. British Division | B.O.A.C. All Divisions | B.O.A.C. Western Division | B.O.A.C. Eastern Division | B.S.A.A. |
|---|---|---|---|---|---|---|---|
| Passengers carried ... ... ... | 61,982 (52,319) | 27,908 (18,503) | 34,074 (33,816) | 11,944 (10,682) | 3,446 (3,133) | 8,498 (7,549) | 1,537 (1,363) |
| Cargo carried : | | | | | | | |
| Mail (tons) ... ... ... | 266.3 (146.7) | 167.1 (52.2) | 99.2 (94.5) | 131.8 (147.0) | 33.0 (25.6) | 98.8 (121.4) | 13.1 (14.9) |
| Freight (tons) ... ... ... | 513.9 (331.7) | 364.2 (236.2) | 149.7 (95.5) | 303.0 (274.5) | 54.1 (41.5) | 284.9 (233.0) | 35.5 (51.7) |
| Overall revenue load-factor (per cent) ... ... ... | 61.3 (58.0) | 62.9 (66.5) | 56.9 (45.3) | 59.8 (60.5) | 59.3 (48.8) | 60.0 (64.0) | 38.0 (61.0) |
| Average load : | | | | | | | |
| Passengers (No.) ... ... | 14.5 (12.6) | 15.4 (15.8) | 13.0 (9.3) | 17.8 (15.3) | 29.1 (20.6) | 16.0 (14.2) | 9.7 (10.4) |
| Total (lb) ... ... ... ... | 3,233 (2,719) | 3,581 (3,595) | 2,529 (1,774) | 5,273 (4,535) | 6,306 (5,654) | 5,070 (4,340) | 3,236 (4,082) |
| Average capacity : | | | | | | | |
| Seats (No.)... ... ... | 23.1 (20.9) | 23.9 (23.4) | 21.7 (18.3) | 26.6 (23.3) | 41.0 (42.6) | 24.3 (19.6) | 20.3 (18.1) |
| Total (lb) ... ... ... ... | 5,278 (4,689) | 5,691 (5,402) | 4,443 (3,919) | 8,812 (7,491) | 10,627 (11,584) | 8,454 (6,778) | 8,512 (6,695) |
| Average length of haul (miles) : | | | | | | | |
| Passenger ... ... ... | 294 (264) | 438 (467) | 173 (151) | 2,845 (3,038) | 2,187 (2,286) | 3,111 (3,348) | 1,958 (3,378) |
| Mail ... ... ... ... | 474 (348) | 656 (718) | 172 (144) | 4,762 (4,550) | 3,766 (3,488) | 5,095 (4,774) | 5,161 (5,538) |
| Freight ... ... ... ... | 510 (514) | 642 (652) | 190 (174) | 3,686 (3,177) | 2,997 (2,952) | 3,836 (3,216) | 4,607 (5,254) |
| Hours flown : | | | | | | | |
| Revenue : Passenger services ... | 8,317 (7,802) | 4,712 (3,318) | 3,605 (4,484) | 9,338 (11,118) | 1,033 (1,421) | 8,305 (9,697) | 1,461 (2,106) |
| Cargo services ... | 591 (276) | 591 (276) | — — | 1,073 (904) | 470 — | 603 (904) | 310 (55) |
| Charter and special flights ... ... | 178 (52) | 12 — | 166 (52) | 201 (644) | — (148) | 201 (496) | 879 (35) |
| Non-revenue ... ... ... | 739 (314) | 128 (119) | 186 (118) | 772 (1,893) | 122 (606) | 650 (1,287) | 322 (178) |
| Equivalent annual utilization (revenue hours flown) per aircraft ... ... ... ... | 1,272 (1,263) | 1,460 (1,416) | 1,077 (1,163) | 1,272 (1,177) | — — | — — | 1,762 (1,418) |
| Unduplicated route miles in operation at end of period ... ... | 13,383 (11,680) | 10,441 (9,173) | 2,942 (2,507) | 65,340 (60,554) | 7,700 (8,523) | 57,640 (52,031) | 16,217 (18,378) |
| Percentage regularity ... ... | 97.8 (97.6) | 96.9 (98.9) | 98.3 (97.2) | 98.2 (99.1) | 100.0 (98.6) | 97.9 (99.2) | 98.9 (98.0) |
| Average length of stage flights (miles) ... ... ... ... | 203 (173) | 365 (381) | 113 (112) | 1,035 (947) | 1,086 (1,138) | 1,026 (920) | 987 (1,115) |

LOAD ton-mileage (passengers, mail and freight) flown by the British Airways Corporations in May, 1949, amounted to 7,220,000, an increase of 8.5 per cent over the corresponding month last year. Passenger-mileage increased by 8.3 per cent and freight and mail ton-mileage by 2.4 per cent and 17.4 per cent respectively. Traffic carried by B.S.A.A. declined, but B.E.A. reported substantial increases and their overall revenue load-factor rose from 58 per cent in May, 1948, to 61.3 per cent in May, 1949; the greatest increase was shown by the British Division, whose load factor rose from 45.3 to 56.9 per cent. The number of passengers carried by B.E.A.'s Continental Division during the month established a record. Hours flown by B.E.A. aircraft on training flights at Aldermaston in May, 1948, and Cranfield in May, 1949, are included above in "Non-revenue hours flown" under the heading "B.E.A. All Divisions," as they cannot be divided between the Divisions.

Statistics for the operation of scheduled services in association with B.E.A. show that 498 passengers were carried during April, 1949, and 2,444 in May, with an overall revenue load factor of 27.5 and 38.8 per cent respectively. During the two months the respective percentage regularity was 95.5 and 99.5 per cent. In issuing these last figures the M.C.A. stresses that as the statistics are compiled on the basis of returns received from operators at the time of publication they may therefore be incomplete.

MEXICAN ANNIVERSARY: Compania Mexicana de Aviacion, a subsidiary of Pan American Airways, recently celebrated its first 25 years of operation. The company started in 1924 with three 150 h.p. Lincoln Standard biplanes. The C.M.A. fleet now consists of 12 DC-3As and five DC-4s (one of which is seen here) and flies over 5,137 miles linking Mexico City with Los Angeles, Havana and 22 cities in Mexico.

# BREVITIES

THE Government of Lebanon has ratified the Convention on international civil aviation, and this month the State will become the 55th member of I.C.A.O.

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The fourth conference of the International Federation of Air Line Pilots' Associations will be held in Copenhagen from October 10th to 13th at the invitation of the Danish Air Lines Pilots' Association.

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The Argentine Ministry of Transport has opened a number of new airports with full customs facilities, in order to encourage international air traffic. They are: Tartagal (Salta), Gualeguaychu (Entre Rios), Alvear and Santo Tome (Corrientes), San Carlos de Bariloche (Rio Negro), Lago Buenos Aires and Lago Argentino (Santa Cruz) and Esquel (Chubut).

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According to American statistics, one-third of the number of airline passengers who fly the Atlantic from Europe to the United States are carried by Pan American Airways. Of the 21,457 passengers landing at American entry airports between August 21st and September 20th, Pan American carried 6,086.

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Lambert Brothers, Ltd., announce that they are to act as agents in Great Britain, Ireland, Gibraltar and Tangier for the well-known Norwegian company, Braathens South American and Far East Airtransport. Besides passenger and freight charter flights, Braathens S.A.F.E. operate a weekly service from Oslo to Hong Kong, and arrangements are being made for passengers from Britain to join the Company's aircraft at Amsterdam.

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Six pilots are among some 90 members of the staff of Australian National Airlines who are being dismissed within the next few weeks. The cut is stated to be due to the restrictions, previously mentioned in these columns, on the use of petrol by airlines. A.N.A. also announce that the two Bristol freighters which recently arrived from Britain will be used immediately to relieve the heavy freight commitments on inter-state routes.

* * *

At the invitation of International Aeradio, Ltd., experts of nine countries recently met in London to consider the desirability of standardizing specifications of route manuals in order to facilitate their production, compilation and amendment. The meeting approved the recommendation that a representative committee should be formed to examine specifications and methods of production in detail. It was also agreed that such a pooling of resources would be of great value to international airlines.

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Announcing its third major fare reduction in 11 months, Aer Lingus has cut the return fare on the Dublin-London route by a further £2 10s. Fares on the Liverpool, Birmingham, Manchester and Glasgow routes have also been reduced, together with that for the once-weekly Isle of Man service, which now stands at £4 return. The fare from Dublin to Paris has also been reduced, to £23 return. These reductions are intended to stimulate traffic during the winter season, when loads are usually very light. In each case return fares are valid for a 17-day period.

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It has been unofficially reported that since the four Argentine airlines, Aeroposta, Alfa, Fama and Zonda, were taken under Government control a short time ago, they have incurred even greater financial losses than in the past.

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Passengers flying on British Commonwealth Pacific Airlines' routes between North America and Australia or New Zealand may now send airgram cables to any part of the world while in flight. Rates are considerably less than existing cable rates, and messages may be paid for in any standard currency.

* * *

G/C. W. N. Cumming, O.B.E., D.F.C., A.F.R.Ae.S., has been appointed general manager of Lancashire Aircraft Corporation, and will conduct business from the company's London office, 11, Berkeley Street, W.1. Mr. Eric Rylands remains chairman and managing director, but A.V-M. H. H. McL. Fraser has resigned from his position as sales director of the Corporation.

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The Peruvian Government has honoured two officials of Panagra for their part in pioneering and developing air transport between Peru and the U.S. Mr. Harold J. Roig, former president and now a director of the airline, and Mr. Douglas Campbell, vice-president and general manager, were decorated with the "Order of the Sun," the country's highest civilian decoration. This month Panagra is celebrating its 21st anniversary of continuous service along the west coast of South America.

# FROM THE CLUBS

LUTON Flying Club, now under the management and control of Britavia, Ltd., is still operating in its old premises. Negotiations are well ahead, however, for redecorating and opening the original club house, and it is hoped to have it ready in time for the winter social activities. Mr. J. D. G. Bishop, D.F.C., who was chief pilot with Air Malta, is now the C.F.I. and Manager.

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MONTH by month the London Aeroplane Club flying average has been slightly above that of last year. The club premises were inspected by the M.C.A. on September 1st and official recognition as an approved school is expected shortly. Forced-landing competitions have been organized for the coming week-end. The Club's annual dinner and dance will not be held in London this year, but negotiations are under way for holding it in St. Albans some time in January.

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WITH the dark evenings rapidly approaching, the South Coast Flying Club is organizing social events for the winter, and as a forerunner an informal dance is to be held on Saturday, October 15th. All members and their friends are invited to attend and are advised to apply early for tickets. A suggestion has been put forward that some members would welcome the opportunity of trying their hands at gliding, and accordingly, two parties are being made up to visit Redhill, one on a week-day and one on a Sunday; the cost will be in the region of £1 per head.

# HELICOPTER ECONOMICS

## A Survey of Rotary-wing Potential in Terms of Profit and Loss

POTENTIALITIES of the helicopter for scheduled airline operation, with particular reference to the London-Paris route, were discussed by Mr. L. S. Wigdortchik, A.F.R.Ae.S., in a paper (briefly referred to in *Flight* last week) which he read before the Helicopter Association of Great Britain on September 24th. The lecturer, a senior Experimental Engineer of the B.E.A. Helicopter Unit, entitled his paper *Some Economics of the Helicopter—Present and Future.*

In introducing his lecture, Mr. Wigdortchik made the point that, with its predominantly civil future, the helicopter must pay its way to a degree hitherto unknown in aviation, and that therefore, in preparing the text of the lecture, his aim had been to adopt the viewpoint of an impartial businessman who would back only a sound proposition. The helicopter would support itself at the present time in specialized operations such as agriculture and the carriage of mails, but in five to ten years it should be able to support itself in certain passenger transportation activities over particular routes.

The commercial operations of helicopters came under the heading of producer business in that the operations produced ton-miles, passenger-miles or pounds of insecticide per acre, and so forth, all of which were units of production. Analysis of this aspect indicated that the rate of doing work combined with the limiting utilization would govern the yearly turnover and, through this, the profit. Thus, consideration had to be given to the cost curves, the rate of doing work and the capital investment in relation to the amount and nature of work required in the time concerned, the limiting utilization per helicopter per annum, and the revenue per sold ton-mile.

It had been demonstrated that the Sikorsky S-51 and the Bell helicopter possessed a degree of mechanical reliability permitting them to be employed on scheduled operations and with utilizations of at least 1,000 hours per annum. The operating costs of these machines had stabilized to a known figure and there were fields which could afford to pay the charges concerned. The all-important need to extend permissible operations into I.F.R. conditions was already well on the way to solution, as were the requisite ground aids.

To facilitate examination of the fields of application, Mr. Wigdortchik considered four possible types of helicopter, namely: Type 1, 200 h.p.; Type 2, 500 h.p.; Type 3, 1,000 h.p.; Type 4, 2,500 h.p., and made an analysis of their physical and economic performance. He then went on to state that, in order to carry existing traffic, the helicopter had to enter into *direct* competition with other vehicles. Speed and cost were the most important factors to the traveller, assuming that reliability was of a high order. For distances up to 300 miles, the helicopter was faster than any other vehicle, but at the average figures of 7d to 8d per revenue passenger mile, the helicopter was so expensive that it was approached only by first-class rail/steamer and airline travel for U.K./oversea routes. Whilst, therefore, the helicopter could compete favourably on such operations, on internal routes it could compete only on terms of speed.

### Potential Traffic

The lecturer thought that a figure of 6s 8d per hour would produce fares which would attract traffic, but this would mean fares at a maximum of 4½d per revenue passenger mile. In considering potential traffic, it was necessary first to determine how much traffic would be needed to support the helicopter under its most economic conditions. Potential traffic was governed by (i) the average frequency, time and cost of alternative transport, (ii) size, distance apart and economic characteristics of the centres concerned, (iii) relationship between traffic and capacity passenger costs, and the effect on cost of time saved. No investigation is required more urgently, observed Mr. Wigdortchik, than one dealing with potential traffic for the helicopter within the United Kingdom.

On the availability of Type 4 (2,500 h.p. multi-rotor) helicopters in a reliable and operable form, it would be possible, in the lecturer's opinion, to make a profit on all existing routes at present served by rail/ship or airlines from this country to the Continent and up to 250 miles in length. These would be the first routes to support themselves at existing costs. On the availability of Type 3 (1,000 h.p., multi-rotor) helicopters, in a reliable and operable form, it would be possible to operate cross-country routes and eventually to stimulate sufficient traffic fully to occupy them. A subsidy would be required to bring the cost of fares down to a rate of 3½d and no more than 4½d per passenger mile if traffic was to be attracted.

To present an evaluation of the helicopter for a particular operation, the lecturer chose to discuss a passenger service between the centres of London and Paris. The basic assumption was that there would be available a Type 4 helicopter of at least the same mechanical reliability as the S-51. The study was divisible as (i) physical performance of the Type 4 helicopter between London and Paris, (ii) the potential traffic and price and (iii) the stability of the Type 4 and the organization behind it to satisfy the market and make a profit at its price. Final performance depended on the winds; available data showed that a block speed of 95 m.p.h. was possible in summer, with a block time of 2 hr 15 min and, in winter, a block speed of 90 m.p.h. (2 hr 20 min). Taking all influences into consideration, a summer regularity of 94 per cent and a winter regularity of 91 per cent appeared possible. The weather minima for the route are 550 yards visibility and a ceiling of 500ft above the ground at the rotor stations.

### Potential Passengers

Of those passengers who could afford to travel either by airline at 8d or by first-class rail and ship at 6¾d per passenger mile, those who elected to travel by aircraft could be said to express a "readiness-to-use-air-transport" factor. This factor, suggested the lecturer, could be applied to second-class passenger rail and ship traffic, at 5¼d. per passenger mile to assess the number of second-class passengers who would travel by air if the fare approached 5¼d; and it could be demonstrated that the traffic at 8d per passenger mile was roughly doubled when the fares were at 6d. Present-day aircraft services averaged 3 hr 35 min from centre to centre, whereas the equivalent time for the helicopter would be 2 hr 15 min; thus the helicopter passenger would save at least an hour over the passenger in the conventional aircraft. The latter was geared to a schedule of bus; formalities; aircraft; formalities; bus, whereas the helicopter passenger's progress was controlled only from the time he entered the helicopter to the time he left it.

On the score of convenience, it was enough to state that the helicopter was the only *non-stop* means of progress between the centres of London and Paris. Regarding the production of suitable schedules of operation to meet the market, the cost curves of the Type 4 helicopter exemplified that at utilizations of 2,000 hours per annum the fare rate of 8d should permit a profitable margin at a load factor of 65 per cent. On this basis, the lecturer had evolved a schedule (A) designed to saturate the market at 8d, and also a schedule (B) based on a fare rate of 8d in the summer and 6d in the winter, in order to offset the seasonal drop in traffic—one of the major problems of operation on this route.

The peak summer schedule was the same in each case and was designed to provide 36 flights a day and a total booking capacity of 936 seats. A turn-round time of 30 minutes was assumed, which meant that seven aircraft were required daily, each with a mean flying time of 11½ hours. It was, incidentally, interesting to note that, were it possible to have a turn-round time of 15 minutes, a similar schedule could be operated with six aircraft. In order to be able always to meet the operational requirements, a fleet of 11 aircraft was necessary in both instances to compensate the time unserviceable on the ground and reserves against defects. In this connection, Mr. Wigdortchik emphasized that the maintenance requirements upon which the fleet size depended were assumed to be at least as good as those of the S-51.

Considering only schedule A, the characteristics of the operation showed that the capital required was £1,660,000 to cover 11 aircraft and the working capital. The annual booking capacity was 256,600 passengers and annual totals of 21,000 hours and 9,500 landings were made, this giving an annual utilization of just under 2,000 hours. The total annual cost was £1,076,400, of which hourly flight represented 38 per cent, take-off and landing 16 per cent, fixed annual overheads 28 per cent, and general overheads 18 per cent.

As to profit and loss, it could be shown that the revenue varied as a straight line with load factor. Below 65 per cent, the costs were reduced progressively by flight cancellation, whereas they were increased above 90 per cent by adding flights. The potential profit was seen to be high, since the

## HELICOPTER ECONOMICS . . .

break-even load factors were of the order of 55 per cent. The gross return on capital investment for schedule A varied from 3 per cent at 60 per cent load factor to 24 per cent at 80 per cent load factor.

Mr. Wigdortchik then went on to say that, from the foregoing, it could be concluded that:

(i) Given Type 4 helicopters of the price, performance and reliability stated, the route could be physically operated as outlined.

(ii) Subject to that premise, the helicopter at the fare rate stated was better in almost every respect than all other vehicles on the route. It had virtually *no competition*.

(iii) The helicopter had a good chance of operating the route with a high return for investment. It was probably the best helicopter route in the world.

(iv) Offering, as it did ,a major profitable and unsubsidized operation, the London-Paris helicopter service would serve to establish and advertize the British helicopter industry before all eyes. It could be the keystone of our future.

# BULLDOG'S TAIL

## *The Bomber Exercise : Summary of the Concluding Actions and Official Appreciation*

THE closing phases of Exercise *Bulldog* had not taken place when last week's issue of *Flight* went to press. Now, however, a narrative of the concluding sorties can be given, together with the official appreciation of the exercise as a whole. It should be emphasized, of course, that such an appreciation must, of necessity, be only a preliminary one and that it will be a matter perhaps of months before operational research enables the final and complete assessment to be made.

Following on the activities of the Sunday night (September 25th), the prospect of good weather conditions enabled Bomber Command to call on a large force of aircraft to operate against widespread targets on the Monday. Flying Training Command provided their largest effort, and attacks were made by Wellingtons, Mosquitoes and Ansons in addition to the carrying out of no fewer than 400 sorties by Harvards and Prentices flown by instructors and pupils.

Operations started with a strong force of Meteors—simulating bombers and escorted by other Meteor fighters—carrying out attacks on a number of targets from heights of between 30,000 and 40,000ft. Interceptions were made south of Dover and again between Reading and London, but only the fighter escorts were attacked. German-based B.A.F.O. Mosquitoes made a number of intruder attacks on airfields in S.E. England.

At 1230 hours, two forces of F.T.C. Mosquitoes attacked two fighter airfields simultaneously, whilst a third force of similar aircraft raided a military installation on the south coast half an hour later. No combats took place and the attacks were reported as successful. At the same time, an attack was being delivered by a force of Wellingtons on a target near Birmingham, and two forces of Ansons made simultaneous attacks on targets near Sheffield and Coventry; the Wellingtons were engaged by R.A.F. Vampires and Belgian Meteors, but the Anson crews reported no combats.

Later in the afternoon, Mosquitoes attacked aircraft and installations on fighter airfields in the southern counties, and, at 1500 hours, "bomber" Meteors made a high-level attack on a target in the Newark area, but as the formation crossed the coast near Clacton, on its way to the target, interceptions and attacks were made by Meteor fighters operating from an airfield in Kent.

The French Vampire squadron at Odiham made 50 sorties during Sunday and Monday, and had it not been for bad weather at their base, this figure would doubtless have been higher. The French squadron operated very efficiently, both in wing operations with the R.A.F. and as a squadron on scrambles.

The threat of fog in some base areas made it necessary to cancel the operation of a few of the aircraft taking part in the final (Monday night) phase of the exercise. Despite this, a large force of Bomber Command Lincolns, Lancasters and Mosquitoes took part in a heavy attack on a target near Newark, whilst a medium force of Lancasters and Wellingtons of Flying Training Command made diversionary attacks on the Enfield area of London. In addition, a force of American B-50s made high-altitude attacks on a target near Windsor.

The main bomber force reached its target by way of a route outward bound from Flamborough Head to Holland, thence turning back across the North Sea to cross the East Anglian coast and proceed to Cambridge before turning north to the target. (This practice of sending attacking bomber forces out to a Continental "starting point" as a preliminary to the attacking incursion was followed throughout the exercise. In most cases, after having delivered their attack, the bombers again flew out to sea before heading back to their bases, but on some occasions deterioration in the weather caused this practice to be abandoned and the aircraft returned to base direct from the target.)

Once again, the simulated Pathfinder technique of target marking was used and, directed by a master bomber, main-force crews were able to identify and bomb the target in clear weather conditions. Throughout the operation, both on the approach to and withdrawal from the target area, crews reported a number of combats with night fighters. The flight plan of the diversionary force was designed with the object of drawing as many night fighters as possible away from the main force—a policy attended with some success, in that a number of interceptions and combats were reported.

### The Official Appreciation Summarized

BOMBER Command was, of course, the predominant partner in the attacking force. It is unnecessary to emphasize the importance of an efficient air striking force; the counter offensive is the best defence, and it is important that the air striking force shall be of the highest quality. The exercise has presented an opportunity of experimenting with new tactics and affording practice both to crews and staffs.

As yet there are, of course, no jet bombers in service, but the Chief of the Air Staff said recently: "Rightly or wrongly, it was decided for many reasons to go for and, if necessary, to wait for the new generation [of jet bombers]. . . . May it never be forgotten that the striking force is the very essence of air power." Bomber Command expects that some of the lessons learned from Exercise *Bulldog* will be of value when it gets "the new generation."

On behalf of the Third Air Division, U.S.A.F., Major-General Leon W. Johnson, Commanding General, stated that: "With the conclusion of the third joint R.A.F.-U.S.A.F. exercise, since the Third Air Division arrived in England a little over a year ago, the value of such mutual efforts has been clearly demonstrated. The lessons learned in *Dagger*, *Foil* and *Bulldog* have furthered the efficiency of all concerned, not only the aircrews who flew the missions, but also the ground and administrative personnel. We have made attacks against highly skilled defences manned by the French, Belgians and Dutch, as well as the British. We have accomplished the purpose of the exercise. We have furthered our training."

Flying Training Command, the third partner in the attacking forces, pulled a very strong oar in the exercise and from it have gained practice, and experience, of the greatest value.

Mosquitoes from B.A.F.O. Command played an important part in the overall plan in contributing sorties both by day and by night, whilst operating from their German bases.

On the defence side, plans (which before the exercise existed only on paper) for the more efficient operation of the air defence system were given a concrete form and trial—in many instances with complete success. On the final afternoon of the exercise, the A.O.C., No. 11 Group, issued an order that all commanding officers were to be regarded as casualties, and for most of the day subordinate officers at all levels took over the duties of those next senior to them.

Operations carried out by the Western Union forces were of the utmost value in giving experience of wing operations with Fighter Command squadrons, co-operation on the ground and integration of personnel in the control and reporting organizations. The Netherlands and Belgian squadrons were more fortunate in the area of operations where interceptions took place, but the French squadrons made up for it by more intensive flying on the first two days.

For the first time in a major air exercise, a complete Fighter Sector was manned both by R.Aux.A.F. squadrons and Fighter Control Units. A large number of F.C.U. airmen and airwomen were flown to the exercise area by Transport Command, and were similarly taken back to their home towns on Sunday evening. A Royal Naval Air Squadron based in Kent flew some 50 sorties and made many interceptions.

Some 5,000 men and women observers of the Royal Observer Corps were on duty, and for many who came from South Wales and the West Country, it provided the first experience of full-scale peace exercises. The results show that they have lost none of the skill they displayed during the war, and, viewed from the R.O.C. raid-reporting angle, the exercise was very successful.

# SPECIALIST PRINCES

## *New Variants of Percival Feederliner for Survey and Military Training*

IMMEDIATELY the first particulars of the Percival Prince were published it was evident that here was an aircraft of exceptional adaptability. Credit for this virtue was largely attributable to the capacity of the fuselage, rendering it amenable to the installation of a remarkable variety of equipment. It is hardly surprising, therefore, to learn that the manufacturers are now constructing a version specially equipped for air survey (designated P.54) and have made a design study for a military trainer version (P.57); this in addition to design studies for ambulance and pest-control versions designated respectively P.50/3 and P.50/5.

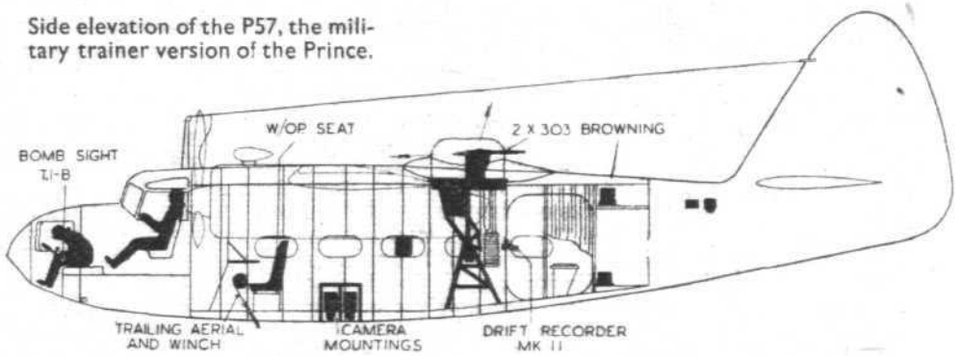
The air survey P.54 will operate normally with a crew of three: pilot, navigator/observer, and camera/radio operator. A seat is provided for an extra man, who might be a geologist or a crew member under training. All four positions have oxygen and intercomm. points.

Having studied very carefully the requirements for a survey aircraft the makers observe that the pilot of this class of machine must have the ability to come out of a turn, or course correction, exactly on to a pre-determined course without the need to wait for a compass needle to settle down or to correct a directional gyro for precession. Moreover, it is essential that the aircraft can be flown without undue fatigue, straight and level, on parallel flight lines, for hour after hour. To assist the pilot in this the survey Prince has a Smiths S.E.P.1. electric autopilot and Hughes G.3 gyro magnetic compass. On long, straight, flight lines it is intended that the autopilot shall be monitored on the pre-set course by the G.3 compass.

The navigator/observer's post is in the nose and allows a view ahead, from well above the horizon to a point 10 degrees aft of the point vertically below the aircraft. Side panels allow a panoramic view of the country ahead. Just forward of the seat is a periscopic aiming sight, such as the Aldis, for determining the photographic coverage of the camera and, if required, measuring ground speed and drift. At his left hand the navigator has the master unit for the G.3 compass; at his right, an inching unit, which allows him to make minor alterations of course in azimuth while the autopilot is in control. On the port side are instruments, the intervalometer and camera controls. The operator's seat can be raised or lowered or slid backwards or forwards; it is also possible for the operator to bring his feet up to the bulkhead on which the seat rests, or stretch his legs in front of him. Alternatively he can lower the back of the seat and kneel on the cushion. This generous measure of adaptability allows maximum efficiency in the operation of the camera.

In the main cabin on the starboard side is the camera/radio operator's post. Aft of the normal radio operator's seat is another seat alongside the main vertical camera, and within easy reach of this position is a sighting point for determining drift and ground speed. A special effort has been made to allow for the widest possible variety of camera combinations, and a 24-volt power supply is maintained by two 1,500-watt engine-driven generators. In the floor are two rectangular camera hatches, one on the c.g. and another about 4ft aft, both on the centre line. Manually operated camera doors lie flush with the outer skin to protect the cameras from dust or mud on taking off and landing; they also help to maintain cabin temperature on the way to the photographic area or between runs. Flexible ducts from the main Delaney-Gallay steam heater system lead hot air to the vicinity of the camera stations. The provision of two vertical camera hatches allows for the simultaneous exposure of cameras of different focal length, similar cameras using different films or filters, or split camera installations. Cameras of any make, such as Williamson O.S.C., Williamson Eagle IX, Fairchild K.17, Wild R.C.5, Wild R.C.7, Poivilliers Som., etc., can be provided for in accordance with customers' requirements.

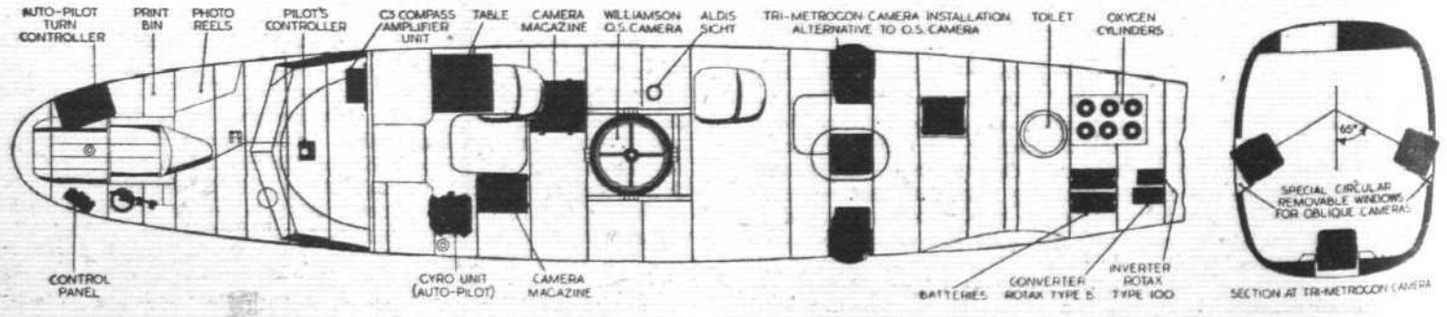
Side elevation of the P57, the military trainer version of the Prince.




On each side, aft of the wing, are two circular 17-inch ports, permitting—for oblique photography—a view of the ground from almost directly below the aircraft to above the horizon. (A flat glass panel in the nose allows photographs to be taken forwards from the navigator/observer's seat.) The two circular ports can be used in conjunction with one of the vertical camera hatches to permit simultaneous horizon-to-horizon photography of the tri-metrogon type to be undertaken with cameras such as the Eagle IX/6-in, K.17/6-in, or F.24/3½-in. Provision is made for mounting cameras rigidly in these ports. Having regard to the circumstances under which air survey is frequently undertaken it is comforting to know that the survey Prince can maintain height with full load on either engine at 10,000ft.

The carefully studied layout of the P.54 is, clearly, a direct outcome of the close association between the manufacturers and Hunting Aerosurveys, Ltd.; both, of course, are members of the Hunting Group.

In order that full advantage may be taken of favourable photographic weather the standard tankage has been increased to 226 gallons. Using 41 per cent take-off power at 10,000ft the Prince will fly for nearly 8.4 hours at 155




Plan of the layout of equipment in the air survey (P.54) version, now under construction. The prototype was shown at Farnborough.

m.p.h. With full load it will climb to over 23,000ft, reaching 20,000ft in 35 minutes. At this height a true air speed of 160 m.p.h. can be maintained with the Alvis Leonides engines using just under 14 gall/hr.

The military trainer development—the Prince P.57—has been considered in six different forms—radio and navigation trainer; bombing trainer; solo crew trainer; twin-engined pilot trainer; bombing and free-gun trainer; and photographic trainer. All these arrangements could, it is stated, be embodied in a basic aircraft.

The radio and navigational trainer has stations for a pilot, instructor and four pupils, with alternative positions for two pupils. Gee, W/T and Rebecca are fitted. With a lengthened nose, housing the Mk.14 bomb-sight and computor, the Prince becomes a bombing trainer; bombs are carried beneath the outer wings on standard R.A.F. 100/1,000 lb carriers, which are removable to allow the fitting of practice or smoke bombs.

Concerning the solo crew trainer, it is envisaged that after the training stage in the "flying classroom" the time arrives when the pupil navigator, radio-operator or bomb-aimer must be left to his own resources. As each crew member is part of a team in the bomber or reconnaissance aircraft which will eventually employ him, it is logical to train the team together and then post it complete to an operational unit. In the solo crew trainer the team comprises first pilot, bomb-aimer, navigator and radio-operator, all with appropriate equipment.

### Pilot Training

In the twin-engined pilot trainer rôle the Prince affords an excellent introduction to twin-engined aircraft with nosewheel undercarriage. Another design layout—for a bombing and free-gun trainer—has the bomber-type nose, but, in addition, a Boulton Paul electro-hydraulic turret, mounting two 0.303in Browning guns with 550 rounds apiece, and having a maximum angle of depression on the beam of 3½ deg and an elevation of 75 deg. A gyro gun-sight is fitted, together with interrupter gear to protect the aircraft structure. In place of the Brownings a G.45 camera gun can be fitted.

A suggested arrangement for a photographic trainer, based on the bombing and free-gun trainer, provides the normal photographic equipment for aircraft employed in the tactical rôle. This comprises split or vertical F.24 cameras with adjustable mountings for 5, 8, 14 or 20in (telephoto) lens in the fuselage, at about mid-wing position, and alternative mountings at the third-window position for rearward-facing oblique cameras.

In the bombing-gunnery-photographic rôle the Prince will not have dual control, but will be provided with the normal full blind-flying and night-flying equipment and with V.H.F. R/T.

Not only the spaciousness of the cabin interior but the particularly large (5ft 2in by 4ft 2in) entry door makes the Prince especially well suited for employment as an air ambulance. Another favourable aspect in regard to this duty is the exceptional quietness under cruising conditions.

In the normal ambulance version of the aircraft, four standard Air Ministry-type stretchers are installed in tiered pairs on each side of the cabin, together with two passenger seats for medical attendants. The aircraft is equipped with oxygen points for the patients and medical attendants—as well, of course, as for aircrew. Although the standard toilet and luggage compartments are retained, an additional 15-gallon water tank is mounted in the roof to serve with hot and cold water supply a hand basin carried on the starboard wall. The hot water is obtained by means of a boiler installed over the basin, and waste water is piped to a 20-gallon tank fitted with a dump valve. A medical cabinet is also fitted for the accommodation of surgical equipment and supplies. Beam approach and MF/HF radio equipment, together with the standard STR 12 VHF is installed, although alternative sets may be fitted.

With the full complement of four patients and two attendants in addition to two crew, there is 236 lb available for medical equipment, such as oxygen bottles, blankets, and so forth, in making up the take-off weight of 10,650 lb. The two 520 b.h.p. Alvis Leonides engines give the aircraft a sea-level maximum true air speed of 211 m.p.h., which increases to 222 m.p.h. at 5,000ft I.C.A.N. Representative maximum continuous rich mixture and most economical weak mixture cruising speeds at 5,000ft I.C.A.N. are 203 m.p.h. and 135 m.p.h. respectively, whilst for 10,000ft I.C.A.N. the comparable speeds are 216 m.p.h. and 145 m.p.h. Cruising at 5,000ft at the most economical weak mixture setting (34 per cent T.O. power) the endurance is given as 5 hours, 31 minutes, which is equivalent to a (still air, no allowances) range of 743 miles.

For pest control work, the P50/5 version of the Prince employs two cylindrical tanks, each of 105-gallon capacity, carried in cradles on the cabin floor. Alternative methods of disseminating the insecticide are available, (i) with the fluid pumped under pressure from the base of the tank out to the exhaust collector ring and thence down a tail pipe to emerge as smoke or, (ii) by gravity feed to venturis carried externally low down on each side of the fuselage and through which the fluid is dispensed in an atomized form.

This scheme applies to the conversion of a standard passenger-carrying Prince, but if the sound-proofing and normal wall furnishings were deleted the weight margin thus made available could be absorbed by the carriage of extra spray fluid. Similarly, a greater amount of fluid could be carried if the range demand was reduced. The performance of this crop-spraying version of the aircraft is similar to that of the versions already dealt with.

## BETTER LATE . . . (Concluded from page 464)

ordinate tables and a Lambert Conformal Chart upon which long-range radio bearings could be plotted as straight lines. To my surprise, Bush Mills Consol beacon came in loud and clear directly after take-off, and the complicated tables turned out to be absurdly simple to use. The system is absolutely ideal for light-aircraft navigation. No special radio equipment other than a Range receiver is necessary, and any pilot or navigator who knows how to count, and can tell the difference between a dot and a dash, can obtain an almost instantaneous accurate position-line. The Bush Mills radio position-lines gave a track check the whole way from Keflavik to the landfall, and fixes were obtained at hourly intervals with the aid of sun shots. From the chart it will be seen that the navigation was made ultra-simple by taking the sights and fixes at exact hourly intervals and calculating D.R. positions at the exact intervening half-hour. The vectoring system was used in calculating wind velocities in order to keep abreast of unforecast changes in speed or direction.

After 5¾ hours the higher peaks of the Outer Hebrides appeared, projecting above the solid layer of low cloud; a 180-deg turn was made, but the attempt to descend below cloud over the sea ended at 300ft in fog. A climb back to 4,000ft was necessary, but fortunately breaks began to appear below, and a second descent, this time through a hole, brought us down off the coast of Arran, only 17 miles west of Prestwick. Prestwick had been calling us frantically on 6,440 kc/s but our transmitter was unserviceable, so they must have been quite relieved when we touched-down.

After dropping in about once a month at Prestwick with a Lancaster or Liberator from Montreal during the war and being practically ignored, it seemed ridiculous to be the subject of so much fuss and photography in a travel-stained, insignificant-looking trainer.

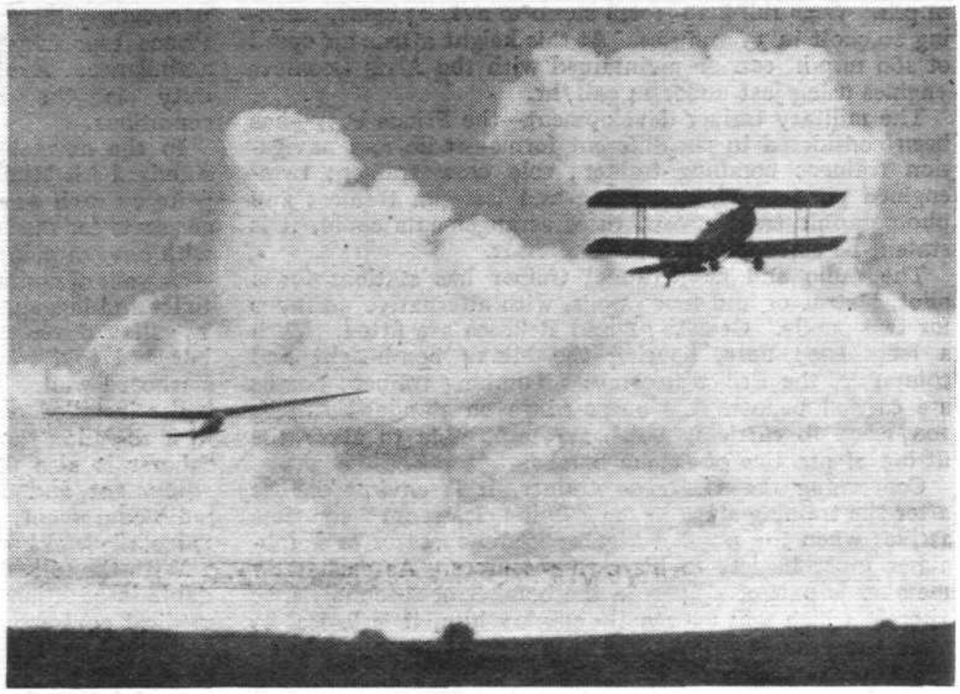


## BABY ROTOL AIRSCREW

THE power range of the new small Rotol combined airscrew and governor unit, which was displayed for the first time at Farnborough this year, has now been revised. The airscrew, which is designed for No. 1 size standard shafts, is suitable for use with engines in the 120-200 h.p. category, and in its two-bladed, constant-speed, feathering form, incorporates the governor unit with the pump mechanism.

# SWEDEN'S FLYING CLUBS

## *Accent on Gliding : How the Government's Subsidy Operates : Strict Official Control*



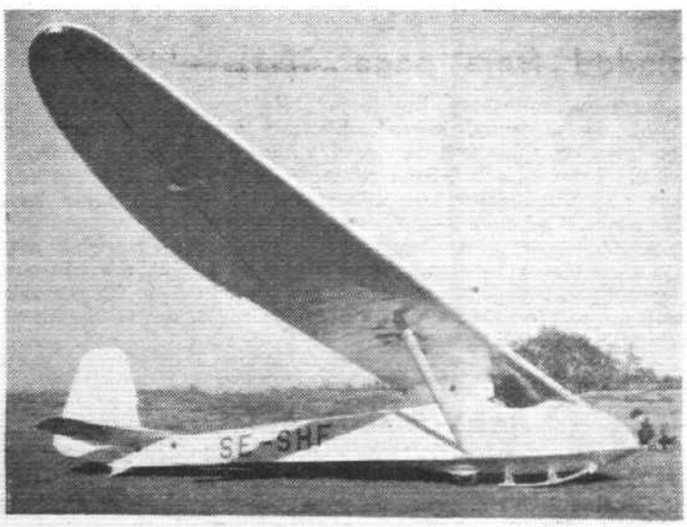
The Tiger Moth is a popular glider tug in Sweden. The sailplane in this photograph is a Weihe.

*IN the light of our own Government's refusal to subsidize club flying it is interesting to see what is happening in a Continental country, in this instance Sweden. Though it would appear that gliding is supported at the expense of power flying, Swedish enthusiasts may consider themselves fortunate in receiving a very fair degree of official encouragement from a Socialist Government. The subsidies are administered by the Royal Swedish Aero Club, an official of which has provided the information for the accompanying notes.*

PRIVATE flying in Sweden may be said to have come into its own in 1937, when Kungl. Svenska Aeroklubben (K.S.A.K.), the Royal Swedish Aero Club, agreed to act as a central organization for the flying clubs. Its primary object was to represent private flying in negotiations with official departments, but it also set out to assist in the development of private flying through the creation of new clubs for power-flying, gliding and aircraft modelling. Its work included technical and economic investigations of flying-club activities, the organization of schemes for assisting in the training of private pilots, and planning for the encouragement of private aviation. From the very beginning, the new federation was actively supported by the Government, and subsidies were granted—though initially only for power-flying—to assist in the purchase of aircraft and to reward pupils who gained their pilot certificates.

During the war, when all private power-flying had been stopped, the Government appointed a committee to inquire into the conditions of private aviation as a whole and to investigate its value to the Air Force. This committee delivered its report at the beginning of 1943, and it was adopted with effect from July 1st of that year. The proposals included subsidies for gliding and model flying, on the plea that they formed the best means of interesting young people in aviation. Subsidies for power-flying were not included and subsequent requests that the grants should be enlarged for this purpose were not approved.

Again, the K.S.A.K. was commissioned to plan, lead and control the new State-aided activity on condition that its statutes were approved by the Government, that representatives of the Air Force and the Civil Aviation Board were accepted as observers, and that the accounts for the subsidies were kept separate from the rest. A further condition was that all questions concerning purchase of material and the operation of training schools should be examined and approved by the Air Force in collaboration with the Civil Aviation Board, the latter body acting mainly as financial adviser.




One of five Slingsby T-21Bs which form part of the Soaring Club equipment. This British type was introduced into the country in 1948.

### Subsidy Details

The subsidies were divided into two principal parts. The first was to procure gliders for training and advanced soaring, together with the necessary ground equipment; the sum amounted to kr. 700,000 (approximately £46,700) spread equally over three years. The second consisted of an annual grant to be divided as follows: At a central administrative organization salaries were to be paid to a chief gliding instructor and three assistants, one model instructor and an administrative staff; for these the total cost was kr. 150,000 (£10,000). No grants were given to flying clubs for administrative purposes, but kr. 75,000 (£5,000) was granted towards the cost of training courses for instructors at the central school and pupils in gliding schools. Individual subsidies to be paid to gliding-school pupils were fixed as follows:—

| | |
|---|---|
| "A" diploma ..... | kr. 60 (£4). |
| "B" diploma ..... | kr. 60 (£4). |
| "C" diploma ..... | kr. 120 (£8). |
| Soaring certificate ..... | kr. 200 (£13 6s). |

To qualify for these subsidies pupils are required to spend a fixed number of hours in building gliders. Kr. 30,000 (£2,000) was granted for model-making equipment and to cover such overhead expenses as rental of premises. Club instructors were given the opportunity of keeping in good practice, for which purpose kr. 35,000 (£2,330) was set aside. With kr. 100,000 (£6,660) for renewing flying equipment, the total annual grant amounted to kr. 390,000 (£26,000).

K.S.A.K. is in itself a club which was founded in 1900 and is affiliated to the F.A.I. Certain sub-organizations are under its control, and these include the Central Soaring School at Alleberg, which was formed in 1941 as the centre of Swedish soaring. The school, open for only four months a year, has an instructional and maintenance staff and all necessary buildings, which include two hangars to hold about twenty gliders of different types, and two power-aircraft. At Alleberg also is the Central Instructors' School, with facilities for training soaring and gliding instructors who are intended for employment with club training schools. These club instructors are


The Saab Safir, to which frequent reference has been made in *Flight*, is a Swedish-designed-and-constructed private-owner aircraft.

selected volunteers and receive no salary. The instruction in the Central School is free, but the instructors in residence have to pay for their lodgings.

Affiliated flying clubs, at present numbering some 55 and spread all over the country, have a standard organization, recommended by the K.S.A.K. and following the treble arrangement of power, gliding and model-flying sections, though there are certain clubs in which one or two sections are inoperative. Of the 55 clubs, only 30 are granted subsidies, in order to concentrate the assistance instead of spreading it over the whole number. All the State-aided clubs have their own gliding schools, but the remainder, despite lack of subsidy, succeed in keeping their training going. Registered model-flying clubs, at present numbering about 400, have, on an average, a membership of 20 each. In order to provide them with well-trained instructors, the Central Organization has arranged a number of model-flying-instructor courses, mainly at Alleberg.

Although the Government has not yet seen fit to renew its annual grants for power-flying, there are about 15 clubs which have obtained the permission of the Civil Aviation Board to establish and operate schools.

Gliding, since it is subsidized, naturally forms the larger part of the club movement, and a brief review of activities may be of interest. The elementary gliders, which, as a rule, are delivered to the clubs in assembly kits, are put together by the pupils themselves under the supervision of fully trained instructors, usually during the winter months, when, also, equipment is repaired and made ready for the summer season. The programme for the flying season is arranged by K.S.A.K. and is sent out to the clubs, which prepare from it their syllabus for courses and programmes of competitions and displays. In some districts, schools continue to operate during the winter if nearby frozen lakes can be used.

As a rule, the summer season begins in May, when the Central Soaring School at Alleberg opens with courses for beginners and also for more advanced pupils. Alleberg is in an ideal position geographically, with two suitable slopes for soaring, good thermal conditions and ideal surrounding country for landings.

Since they began operations, the club schools have produced about 4,400 "A," 2,500 "B" and 1,500 "C" diplomas, 650 soaring certificates, and 170 silver "C" and 3 gold "C" distinctions. In 1946 a course was arranged in collaboration with the Air Force for young soaring pilots who were in the advanced stage of flying training at the Cadet School at Upsala, in order to discover what direct advantages might be obtained from soaring as a preliminary stage in Service flying training.

Launching a "primary" from one of the long slopes at Ålleberg.

During the year club competitions include: a national soaring contest which is run from May to September; a contest for the soaring championship, with entrants both from the clubs and from the Air Force, which takes place at Alleberg or other suitable locality and lasts about ten days; and a team competition for pilots without certificates for power-flying.

Model flying is likewise encouraged by competitions, which spur the boys on to working hard and studying technical conditions with a view to constructing new types for the contests. To augment the interest, five different kinds of distinctions have been established: iron, bronze, silver, gold and "élite." Apart from the small inter-club contests there are a few yearly competitions arranged by the K.S.A.K., such as the National Model Flying Competition, which runs for about two months and results in the "survival of the fittest," who then assemble to show their skill in a final contest; a Championship in Model Flying, open only for picked competitors (i.e., those holding an "élite" distinction); and a winter competition arranged in more or less the same way as the championship.

As a whole, the K.S.A.K. has succeeded in creating an organization to encourage air-mindedness amongst the people, which is its primary function. It has also succeeded in its secondary function of supplying good personnel material for the two main branches of aviation, the Air Force and the civil air lines, and in providing opportunities for useful and entertaining activity by young people in their leisure time.

## S. E. ESLER

A SEVERE blow was sustained by British aviation in the accident to the Avro 707 delta-wing research aircraft on September 30th and the resulting death of Avro's deputy chief test pilot, Mr. Samuel Eric Esler.

Esler, who was 31, leaves a widow. He joined A. V. Roe and Co., Ltd., in June, 1948, and was responsible for a great deal of flying on Tudor aircraft; especially notable was his climb to 40,000ft in 47 min. in the jet-propelled Tudor 8. In the absence in Canada of Avro's chief test pilot, Mr. J. H. Orrell, Esler was made responsible for all flying on the Type 707.

A Belfast man, Esler was educated at Skegoniel School and Belfast College of Technology. Before the war he was a car salesman in Belfast and a sergeant in the R.A.F.V.R. Commissioned in May, 1942, he served in No. 120 Squadron, Coastal Command, and was awarded the D.F.C. on December 4th, 1942, the citation recording that he had damaged two enemy submarines and that on three occasions he had taken part in operational sorties necessitating almost continuous blind flying owing to extremely bad weather.

The Avro 707—a vital link in the chain of British aeronautical research—began its taxying trials at Boscombe Down on September 3rd, and during one of these tests made a short hop a few feet above the ground. The first flight was delayed by an unfavourable wind until the following evening, when Mr. Esler was airborne for twenty minutes. On September 6th the 707 arrived at Farnborough for static exhibition at the S.B.A.C. Display and at the time of the accident it was on a flight from the Royal Aircraft Establishment. The crash—the cause of which is not known—occurred near Blackbushe and the aircraft is understood to have been almost totally destroyed by fire.

Avro research with delta-wing aircraft will continue.

# CORRESPONDENCE

*The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.*

## AIRLINE PILOTS' STATUS—

THE note on pilots' pay which appeared in *Flight* of September 8th prompts me, as a charter pilot, to state my views on an aspect which you did not mention. Before, during and immediately after the last war, commercial and service pilots enjoyed a status comparable with that of professions in which the highest qualifications were required, and, with the increasing activities and influence of the Guild of Air Pilots and Air Navigators and, later, the formation of the Institute of Navigation, it looked as if the profession would be put on a sound footing and accorded full recognition.

In the past two or three years, however, the airline pilots have tried to increase their influence by making demands of an industry which was suffering from the effects of the war and which required several years of hard work and co-operation among its members to regain its feet. When the demands could not be met, instead of adopting a dignified professional attitude the pilots, through B.A.L.P.A., used methods to which we have in this country unfortunately become accustomed, and reduced the art of flying for reward to the level of a skilled trade.

Liverpool. INDEPENDENT.

## —AND PAY

IT is good to know that the writer of the note "Pilots' Pay" appearing on page 289 of the September 8th issue of *Flight* is normally sympathetic towards pilots. One would not think so from his opinions. He suggests, for instance, that Corporation pilots enjoy high salaries. The salaries of Corporation pilots are no higher—and in certain cases less—than those of other companies engaged in international air transport at the present time.

Where I do seriously differ from him, however, is in his statement that B.A.L.P.A. is apparently "thinking nothing of the future." It was precisely for this reason—the future of civil aviation and of its members with charter companies—that B.A.L.P.A. was moved to attempt to sort out the chaotic conditions of service that obtained amongst such companies; it was not because of an academic observance of section 41 of the Civil Aviation Act as your correspondent states.

What stability and future is there for pilots employed by most of the charter operators? Pilots are highly skilled professional men who, by virtue of their profession, are specialists very rarely trained for any other form of professional occupation. Yet there is an ever-increasing tendency to treat them as casual labourers.

The charter operator has been badly spoiled during these last few years in having readily available a supply of highly skilled, fully trained pilots to the cost of whose training his contribution as an operator has been no more than to fit the pilot to operate his aircraft. This supply is rapidly drying up. Pilots are not prepared to be "casual labourers," hired for the summer months and then left to their own devices for the remainder of the year. The Berlin Air Lift only put off the day when a decision had to be made whether to quit at an age when it was possible to make one's way in a profession other than civil aviation or to continue on that chancy basis.

It is because this Association believes that there is a place in civil aviation for the charter operator that it desires to see those operators with permanent staffs engaged on a contract of service guaranteeing, as far as can be guaranteed in this uncertain age, security of tenure and a fixed salary.

Your contributor appears to think that there should always be a body of men imbued with the desire to fly to the exclusion of all other considerations. That state of affairs may suit the operators, but it means disaster for a man who has family responsibilities and who, after he has passed the age of 30, becomes increasingly conscious that he will sooner or later have to carve out a new future for himself at an age when his family responsibilities are at their greatest and when other men are fully established.

No, sir, if there are "disastrous consequences" as a result of the recent award of the Industrial Court that will not be because of any action on the part of the Association, but in spite of it. Incidentally, who has to pay a 10½ per cent premium on insurance cover for a pilot when the Corporations and some charter operators obtain worldwide cover for their pilots for approximately 2½ per cent? And why does he have to do so?

D. FOLLOWS,
Secretary, British Air Line Pilots Association.

London, W.1.

## CIRCUMLOCUTORY BEDFELLOWS

ADVERSITY makes bedfellows of us all, and one must therefore not be surprised at the weird assortment of one's bedmates in these penurious times. But in its *Information Circular No. 120 of the Year* 1949, the Ministry of Civil Aviation has discovered an ally of a most peculiar and disturbing nature. Too much publicity cannot be given to room-mates of this sort. The Ministry explains that it has found it impossible to handle the ever-increasing volume of signals traffic with the efficiency and expedition which should be accorded to the various priorities "due to temporary manpower shortages, allied to misuse of the Aeronautical Fixed Telecommunication Network by passage of messages whose texts cannot be considered eligible under strict I.C.A.O. definition"—no mean mouthful for even the most temporary manpower shortage to find itself united to.

How right the Ministry is to strive for efficiency, expedition and a strict adherence to I.C.A.O. definitions! Yet one may doubt whether *Information Circular No. 120 of the Year* 1949 is the best medium for revealing officialdom in such a dazzling light. After all, one should make some allowance for the intellectual level of the flying types and not unwittingly increase the strain upon their thinking powers. Recently a pilot, who could read English, was approached and was asked what he thought about the ever-increasing volume of signals traffic, to which he made the terse reply, "Cut out the cackle and it'll be O.K."

Whilst hesitating ever to criticize the terminology of any government department (and especially of a Ministry which has agreed to call aerodromes aerodromes, and not by that bastard wartime Americanized journalese term "airfield"), one feels bound to admit that this pilot had attained a conciseness of expression which would have struck a responsive note amongst his bedfellows of the air. Some, no doubt, may have been able to plumb the hidden depths of *Information Circular No. 120 of the Year* 1949; they deserve an honoured place in civil aviation. But for less accomplished plumbers, like your obedient servant, could we please, please, have our instructions from on high transcribed in simple English?

London, W.1. JOHN GRIERSON.

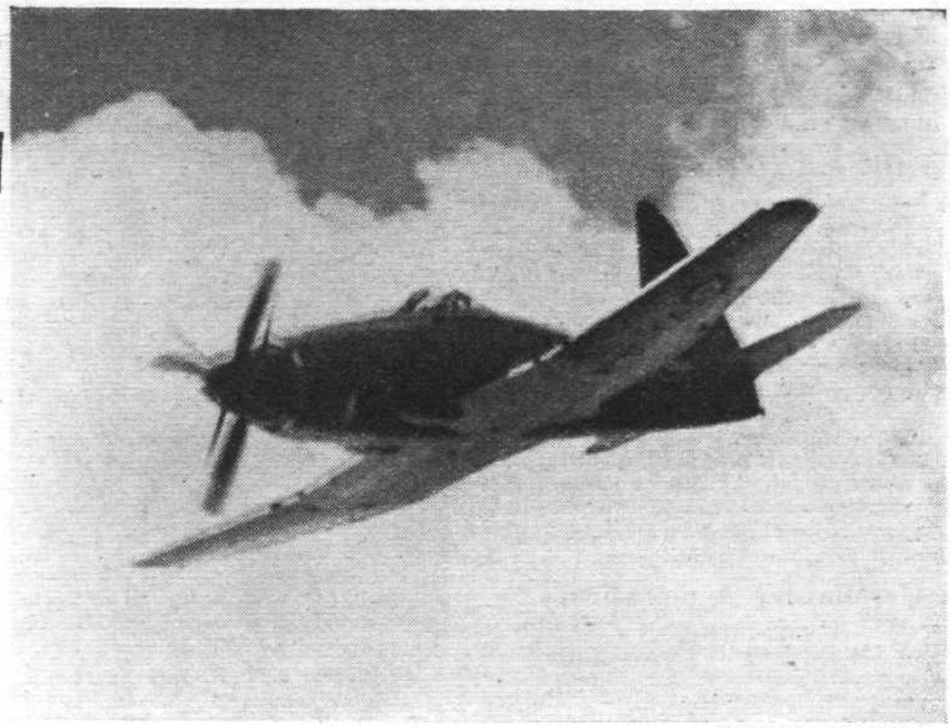
[Even speaking as moderately expert plumbers, we could not agree more: nevertheless, we do not mind "airfield" and, indeed, use it ourselves in contradistinction from "airport."—ED.]

### FORTHCOMING EVENTS

Oct. 6. R.Ae.S.: "Design Analysis Methods in Research Division of Bureau of Aeronautics, U.S.N. Department," I. Driggs A.E., F.I.Ae.S., F.R.Ae.S.
Oct. 13. R.Ae.S. Graduates: "The Time Scale in Aeronautical Engineering," Sir John S. Buchanan.
Oct. 14. Colleges of Automobile and Aeronautical Engineering: Dance.
Oct. 18. R.Ae.S. Section Lecture: "Flutter Problems" E. G. Broadbent, M.A., F.R.Ae.S.
Oct. 19. R.Ae.S. (Reading): "Atomic Energy," A. G. Salmon, B.Sc., A.Inst.P.
Oct. 19. R.Ae.S. (Weybridge): "Aircraft in Future Warfare," Air Marshal Sir Robert Saundby, K.B.E., C.B., M.C. D.F.C., A.F.C.
Oct. 19. R.Ae.S. (Brough): "Operating Factors Effecting Design of Civil Transports," by C. Dykes, M.A., M.Sc., M.I.Ae.S.
Oct. 25. R.Ae.S. Section Lecture: "New Methods of Stressing." J. Hadji Argyris, A.F.R.Ae.S.
Oct. 26. Society of Instrument Technology: "Fifty Years in the Optical Industry." by F. Twyman, F.R.S.
Oct. 27. R.Ae.S. Graduates: "High-lift Devices," R. R. Duddy, A.F.R.Ae.S.
Oct. 29. Helicopter Association: "Jet Propulsion of Rotor Blades," A. Stepan, Dipl. Ing.
Oct. 31. R.Ae.S. (Derby): "Cierva Air Horse," by J. S. Shapiro, Dpl. Ing., A.F.R.Ae.S.
Nov. 2. R.Ae.S. (Luton): "Gas Turbine Development."
Nov. 3. R.Ae.S. Graduates: "Hydraulic Analogy of Compressible Flow," H. Ritter, B.Sc. (Eng.).
Nov. 8. R.Ae.S. Section Lecture: "Resonance in Aerodynamics," by R. A. Shaw, M.A., F.R.Ae.S.

# SERVICE AVIATION

## *Royal Air Force and Naval Aviation News and Announcements*



" Flight " photograph.

USEFUL RECRUIT: Probably the world's fastest torpedo-carrying aircraft, the Westland Wyvern T.F. 2 promises to increase greatly the striking strength of Naval Aviation. Fitted with an Armstrong Siddeley Python, it is Britain's first front-line, turboprop-powered military aircraft.

### M.R.E.S. Disbands

AFTER five years of splendid and painstaking work, the R.A.F. Missing Research and Enquiry Service has been disbanded. The unit, which located and identified the graves of nearly 23,000 missing Allied airmen, was commanded from its inception—in Paris, in November, 1944—by G/C. E. F. Hawkins, D.S.O., O.B.E., who has now retired from the R.A.F. At its peak, the Service employed 200 search officers, working in five missing research units throughout Europe. No fewer than 82 per cent of those buried in graves marked "Unknown Airman" were finally identified after every possible clue had been investigated. Despite the arduous, and often unpleasant, nature of the task, not one officer of the M.R.E.S. ever requested a change of employment.

### 210 Squadron for Far East

SIX Lancasters of No. 210 Squadron, Coastal Command, will leave their home base in Cornwall on November 1st for a visit to the Far East, during which they will train under the operational and administrative control of Air H.Q., Far East Air Force. They will follow the normal Transport Command trunk route, flying *via* Luqa, Habbaniya, Karachi and Negombo, and are due at Tengah, Singapore, on November 5th. Spares and equipment and such servicing personnel as do not travel in the Lancasters, will be flown to Singapore by Transport Command. Each of the 210 Squadron "Lancs" is expected to complete 50 hours' flying on exercises and visits while in the Far East. They will return to England on December 11th.

### Last Look Round

BEFORE succeeding Lord Tedder as Chief of the Air Staff, on January 1st next, Air Chief Marshal Sir John Slessor is making an extensive tour of R.A.F. units of the Middle East and Far East Air Forces. He left Northolt last Sunday in a York of No. 24 (Commonwealth) Squadron, Transport Command, which will be his means of transport for almost the entire tour—except during a journey between Singapore and Hong Kong, which will be made in a Far East Air Force Dakota. Sir John is accompanied by his personal staff officer, W/C. P. W. Wiseman-Clarke, and two A.T.C. cadets, who will act as air quartermasters.

Places to be visited on the tour, which is due to end on December 3rd, include Gibraltar, Malta, Greece, Cyprus, Egypt, Khartoum, Nairobi, S. Rhodesia, S. Africa, Aden, Pakistan, Ceylon, Malaya, Hong Kong, Delhi, Iraq, the Jordan and North Africa. Sir John Slessor recently completed an inspection of units of the B.A.F.O., Germany.

### Essay Prizes Awarded

THIRTY-SIX entries, mostly from officers of the R.A.F., but including one from a warrant officer and one from a flight-sergeant, were received for the Gordon Shephard Memorial Prize Essay Competition this year. Prize-winners were: First (£50), G/C. E. E. Vielle, O.B.E.; second (£35), W/C. J. R. Gordon-Finlayson, D.S.O., D.F.C.; third (£20), W/C. J. B. Tait, D.S.O., D.F.C. The following were highly commended: W/C. J. S. Rowlands, G.C., M.B.E.; S/L. E. Coton, D.F.C., A.F.C.; S/L. J. F. Davis, D.F.C.; G/C. H. P. Broad, C.B.E., D.F.C. Commendations were gained by F/L. J. R. Every; W/Cs. E. P. Wells, D.S.O., D.F.C.; A. A. N. Nicholson; and H. R. P. Patterson, O.B.E., M.A.; and S/L. J. S. R. Muller-Rowland, D.S.O., D.F.C. The names are given in order of merit.

The subject set for the essay was: "The increased speed and ceiling of modern aircraft and the introduction of new weapons and methods of defence are factors likely to affect all operations of an Air Force in any future war. Examine these factors and consider how they are likely to affect the operational employment of the R.A.F." Air Vice-Marshals E. J. Kingston-McCloughry, L. Darvall and P. H. Mackworth, who were the referees, reported that the standard of the first 12 competitors, both in writing and Service knowledge, was high. The Chief of the Air Staff, Marshal of the Royal Air Force Lord Tedder, has noted with satisfaction the interest shown in the competition and the high standard of the results. First awarded by the Air Ministry in 1919, the Gordon Shephard Memorial Prizes were established by Sir Horatio Hall Shephard in memory of his son, Brigadier-General G. S. Shephard, who was killed in France in 1918.

### R.A.F. Reserves Club Dinner

AIR Chief Marshal Lord Dowding will be the guest of honour at the first annual dinner of the R.A.F. Reserves Club, which is to be held at Simpsons-in-the-Strand, London, tomorrow (Friday, October 7th) at 1900 hr. Members are invited to bring potential members as guests, and may bring other male guests. Tickets (22s 6d) may be obtained from the hon. secretary of the club, c/o. the R.N.V.R. Club, 38, Hill Street, London, W.1.

The president of the club, Air Chief Marshal Sir Guy Garrod, will take the chair, and among other important guests will be Air Marshals Sir Hugh Saunders, Sir Leslie Hollinghurst and Sir John Baker, and Air Vice-Marshals R. M. Foster and A. C. Sanderson.

### Blackburn Y.A.5

STUDY of the two recently released official photographs (published in *Flight* last week) of the new Blackburn and General Aircraft Y.A.5 Naval anti-submarine prototype will confirm the statement that a turboprop type of power unit will be fitted, although a Rolls-Royce Griffon is installed for initial flight trials. Below the twin cockpits, on each side of the fuselage, are jet-pipe outlets, presumably of the bifurcated type, and the surfaces of the dihedral tailplane would be clear of the jet efflux. The multiple ducts in the nose will doubtless disappear when the later power plant is installed. In view of the firm's experience of power-controls, with the Firebrand and S.28/43, it appears likely that the Y.A.5 will be likewise equipped.

### Manston Crested Ties

FORMER members of R.A.F. Station Manston may now obtain crested ties, in red, with seven winged-horse badges in gold, at a price of 12s, from the Mess Secretary, Officers' Mess, R.A.F. Manston, Kent. For all members who have officially represented

## SERVICE AVIATION . . .

Manston at a recognized sport there are blue ties, with one crest, at 9s. The ties are sold on a non-profit basis.

### Earlier Re-engagement

MEN and women serving in ground trades of the R.A.F. and W.R.A.F. who have outstanding records are now eligible for re-engagement for long service in their fifth or sixth year of initial engagement, instead of in their ninth year, under a new procedure announced by the Air Ministry. This enables them to apply for re-engagement after four years' service, whereupon their suitability will automatically be reviewed twice a year, if necessary, until they are due for discharge. The minimum qualifying time for the award of a pension is 22 years' total service, and the normal upper age limit is 55.

### Air Ministry Appointment

GROUP CAPTAIN C. M. CHAMPION DE CRESPIGNY has been appointed Deputy Director of Air Support and Transport Operations at the Air Ministry in succession to G/C. F. F. Rainsford, C.B.E., D.F.C., who has joined the directing staff of the R.A.F. Staff College, Bracknell, Berks. For the past two years G/C. de Crespigny has been employed on air staff duties at Transport Command headquarters, having previously commanded an air navigation school. At the outbreak of war he commanded No. 61 (Bomber) Squadron at Hemswell, Lincs. Between 1940 and 1942 he was engaged on instructional duties, after which he spent three years in India, where he held various posts, including the command of No. 169 (Beaufighter) Wing.

G/C. Rainsford was at the Air Ministry for just over two years, and his responsibilities included the operational policy for the Berlin air lift, for which services he was awarded the C.B.E. Previously he had served at Transport Command H.Q., and had held several station-commander posts. In 1941-42 he commanded one of the famous Middle East Wellington night bomber squadrons engaged on the Benghazi "mail run." He graduated at the Staff College in 1942 and afterwards commanded a Lancaster squadron.

*"Flight" photograph.*

WEST TO EAST . . . Taking part in Exercise *Bulldog*, No. 501 (County of Gloucester) Squadron temporarily moved from the West Country and operated with Regular Vampire Squadrons from Odiham, Hampshire. Pilots of "501" shown above are (left to right): F/O. E. Beddow; F/L. J. C. Steele; F/O. G. A. Kidd; F/O. A. White; F/L. N. E. D. Lewis; F/O. R. G. C. Russell; and F/O. M. Colfings.

### Far East Fly-Past

THREE Sunderlands led a fly-past over Singapore by 33 aircraft of the Far East Air Force on Battle of Britain Day, September 15th. Taking off at 0700 hr, the aircraft—Dakotas, Spitfires, Mosquitoes, Harvards and Sunderlands—assembled in the air over Babi Point, about 10 miles out of Singapore, and flew over R.A.F. Stations Changi and Seletar at about 0800 hr. After flying over the other R.A.F. bases on the island they appeared over Singapore town in excellent formation.

*"Flight" photograph.*

. . . AND EAST TO WEST: Another Auxiliary Squadron involved in the intricacies of *Bulldog* was No. 500 (County of Kent), Meteor Is of which flew from West Malling to Colerne, near Bath, for the operational week-end. Among the Squadron's pilots at Colerne were (left to right): F/O. P. Tubb; F/L. C. P. Key, O.B.E.; F/O. H. H. Muntham; F/L. R. W. Bunyan, A.F.C.; F/L. R. W. Leggett; and Plt. Il D. E. Helmore.

### Pathfinders' Party

IN connection with their annual Ball, to be held on Saturday, December 3rd, 1949, the Pathfinder Association has announced that tickets may now be reserved. The function will be held at the Dorchester Hotel, London, and the programme includes a cabaret and the usual lavish supper. Tickets, price 32s 6d may be reserved by completing the application form to be found in the monthly issue of the Pathfinders' magazine *The Marker*.

### Air Experience for Recruits

DURING the first eight months of this year, some 3,000 recruits of the R.A.F. and W.R.A.F. have been given air experience by Technical Training Command's Communications Flight. The unit has also flown hundreds of A.T.C. Cadets, in addition to its basic duty of providing "air lifts" for Command staff officers.

Based at Wyton, the Flight consists of a Devon, for the use of the A.O.C.-in-C. (Air Marshal Sir John W. Jones, K.C.B.), three Ansons and three Proctors. It was formed at the same time as Technical Training Command itself, in 1942, and during the war undertook a wide variety of duties. During the latter part of the war its aircraft were used to take medical supplies and personnel to the advancing armies in Europe, often landing in fields, where the crew slept at night beneath their aircraft. One aircraft, a Dominie, was over Arnhem at the time when the British Airborne forces were fighting in the town below and came under fire from the enemy ground defences. A number of wartime pilots received the Air Force Cross or Medal.

### Reunion

THE fourth reunion and dinner of No. 236 Squadron, R.A.F., will be held on December 3rd, 1949, at the Chez Auguste Restaurant, Old Compton Street, London, W.1. All ranks are invited. Details from H. L. Karby, 73, Lake Rise, Romford, Essex.