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May 12th, 1949

Thursdays, One Shilling

The Outlook

The Impossible Achieved

WITH the lifting to-day of the Berlin blockade, air transport will have added a glorious chapter to the history of flying. When the Russians stopped all rail, road and barge traffic from the Western Zones nearly a year ago, the Western Powers were faced by the seemingly impossible task of providing some two million people in Berlin with food, coal and all manner of essential supplies.

When "Operation Plainfare" was begun, few believed it would be possible to transport by air sufficient supplies to keep the Berliners alive, let alone to give them a tolerable level of existence. But gradually the Air Lift got into its stride, and steadily the scale of operations increased until it reached its peak last Easter. The U.S. Air Force, the R.A.F. and civil operators attacked the problem with determination, and they succeeded in a way which has caused open admiration the world over and, one suspects, secret admiration (and certainly surprise) in the Soviet camp.

Never in the history of flying has there been a comparable example of splendid organization; not even during the war. The intensity of traffic became such that split-second timing had to be applied, and the flight crews as well as the controllers have earned the very highest praise. It will be a long time before ordinary civil air transport can hope to emulate the example set by the Air Lift. The same strict discipline will have to be imposed, and the same uniformity of procedure will have to be applied before that can come about.

The lifting of the blockade will not mean the instant cessation of the Air Lift. The Western Powers will want to make certain that sufficient stocks are accumulated to guard against unforeseen hold-ups in subsequent negotiations. There are many thorny problems ahead, but as General Sir Brian Robertson said, the way may not be

clear, but at least it is open. And for that we can thank the Air Lift. In the phrase of the Royal Air Force: "Good show, chaps."

Model Aeronautics

FROM the earliest days of flying, models have played an important part in the development of aviation.

The Wright brothers made innumerable tests on small models in a wind tunnel. Gustave Eiffel built his laboratory and tested models for many of the early experimenters, but there were even larger numbers who could not afford Eiffel's fees, and who had to be content with testing home-made models in free flight. Several who have since achieved fame began as models enthusiasts, among them being "A. V." (Now Sir Alliott) Verdon-Roe.

We have often felt that insufficient credit has been given to the early model experimenters, who did good work and who were instrumental in first getting many young men interested in flying. Not a few of our present chief designers started by making and flying models, and thus one can trace back the parentage of modern British aircraft to such pioneers as E. W. Twining and T. W. K. Clarke, to mention but two. And there was W. Cochran, who was the first to make use of corrugation for stiffening thin sheet metal. It would be a fine gesture if some form of recognition could be given to these pioneers, several of whom are, we believe, still living.

Model flying is a sport which now attracts thousands of youngsters, and many not so young. Some very advanced work is being done, and one type of flying which has become popular during recent years is that known as control-line flying. In its simplest and crudest form, this comprises merely a "solid" model aircraft, driven by a small engine and constrained by a cord from the near wing-tip to fly in circles. Other cords lead

to the controls, and some manœuvring can be done.

So far this form of flying has been mainly spectacular in character, but the basic idea is capable of application to "serious" work. The American Air Materiel Command has established a base at Dayton, Ohio, at which a tower is used as the pivot for the circling models. Instead of sitting in the tower and being made giddy, the controller sits outside the circle and controls the model. A ciné camera is supported on the cable, so that it is always at the same distance from the model and aimed at it.

Hitherto, our American friends have, we gather, confined experiments to fairly low speeds, but the tower system is considered capable of development into the sonic region.

The whirling arm has been in use for airscrew testing since the early days. Control-line model flying might be turned into an instrument of scientific research as well as an entertaining pastime.

Remembering the Past

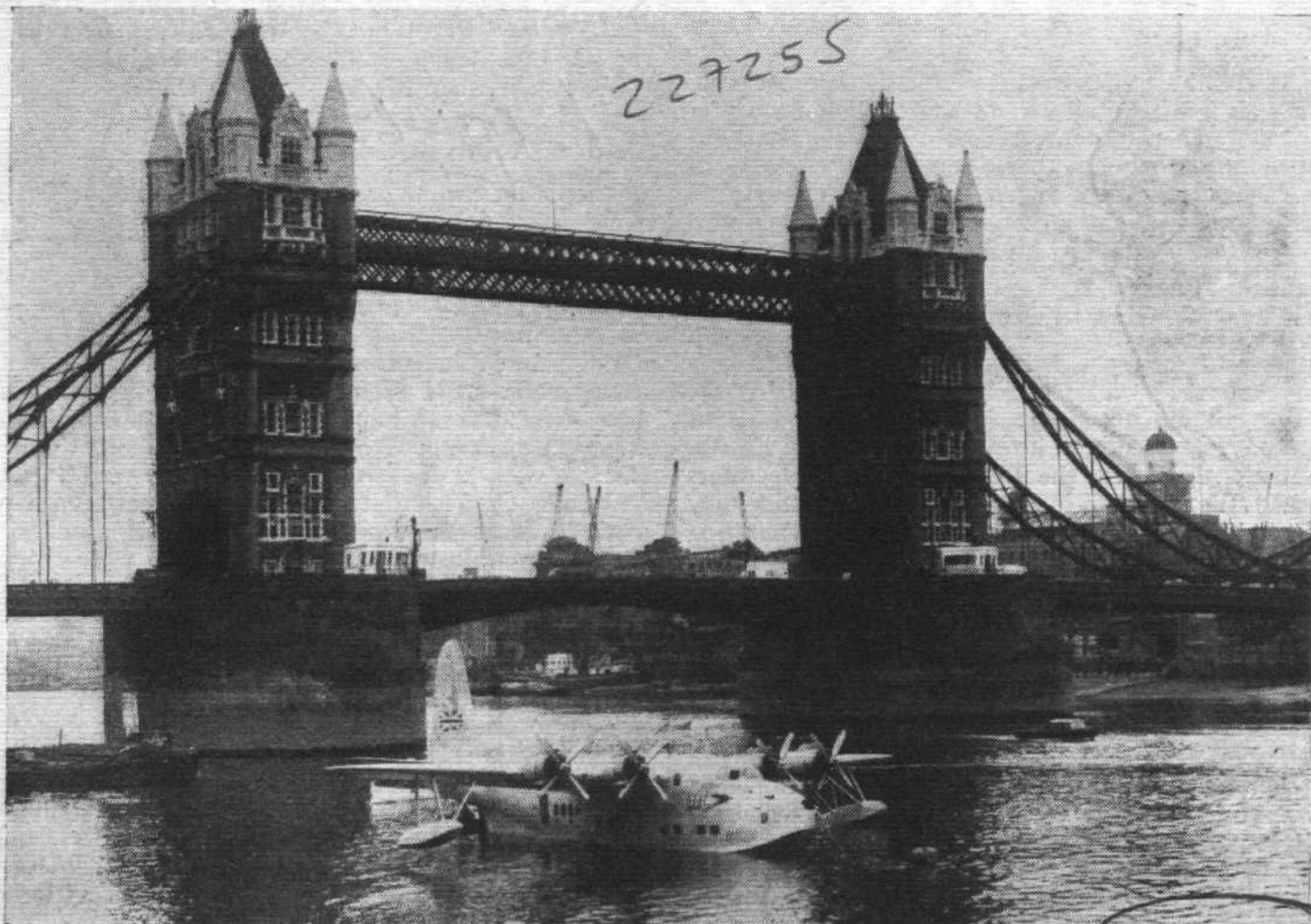
TWO events have happened recently which have served to remind British aviation of the days of its birth. Last Saturday Mr. Oswald Short was at long last remembered by the Council of Rochester, when he was made an Honorary Freeman of the City. While applauding the action, one may wonder why this honour was so long deferred. Horace and Oswald Short transferred their works from the Isle of Sheppey to Rochester in 1913, and until Sir Stafford Cripps decided on the unnecessarily drastic action of transferring the

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ownership to the State, Shorts were the mainstay of the Medway city, and Mr. Oswald Short himself was a good employer as well as a generous citizen.

At White Waltham, on Sunday, the Royal Aeronautical Society celebrated the granting to it of a Royal Charter by a Garden Party which is estimated to have attracted some 4,600 members and their guests, and at which a number of aircraft of the earliest types were shown and, one may say, flown, if flown be defined by the original test of lying down in the grass to see if daylight was visible between the wheels and the ground.

The attendance at White Waltham, and the eagerness with which these old flying machines were examined, appear to show that the younger generation is not altogether unmindful of what it owes to the pioneers.



"Flight" photograph

THAMES-BORNE: As part of the commemoration of the thirtieth anniversary of British air transport, a B.O.A.C. Short Solent flying boat has been flown into the heart of London for public inspection. The Flight Captain of No. 4 Line, Southern Region, Capt. J. L. M. Davys, alighted in Limehouse Reach and taxied the aircraft to moor off Tower Pier, where it will remain until the 15th. Last Tuesday the Lord Mayor named the aircraft "City of London."

Salon Studies

Further Notes from the Grand Palais on French Aircraft Power Units

THE preliminary survey of the 18th Paris Aeronautical Salon appearing in the preceding issue can now be supplemented by a more intimate study of selected exhibits.

Among the French machines, the jet-propelled military and research aircraft and *avions légers* have come in for the closest scrutiny by British visitors. Two new fighters—the Marcel Dassault M.D. 450-Ouragan and Sud-Ouest S.O. 6020 Espadon—are positioned (whether by design or accident was not admitted) adjacent to each other on opposite sides of a gangway, and are generally referred to as the “tubby one” and “long, pointed one” respectively. With other military and research types these are discussed below.

Marcel Dassault M.D. 450 Ouragan Fighter.—Conversation with M. Dassault and Colonel Rozanoff supplemented the somewhat sketchy information hitherto available on this interceptor. The first prototype, flown by the Colonel, has attained 595 m.p.h. in level flight and has climbed to 26,250ft in five minutes. Initial rate of climb is quoted as 7,800ft/min. Ten hours' flying have sufficed for preliminary trials and the machine will now be delivered to Bretigny—the French Farnborough—for official tests. With tip tanks and full wing-tankage, the range should be more than 1,100 miles, sufficient for a Mediterranean crossing and return. Four 20 mm guns (French or British are interchangeable) with 120 r.p.g. fire through ports low in the nose. Pending the perfection of a French ejector seat, a Martin Baker is installed. In its present form, the Ouragan can use full thrust only on the climb. Thinner wings, raked at 30 deg, are foreseen.

Colonel Rozanoff reports good handling qualities and has had no trouble from the narrow-track undercarriage.

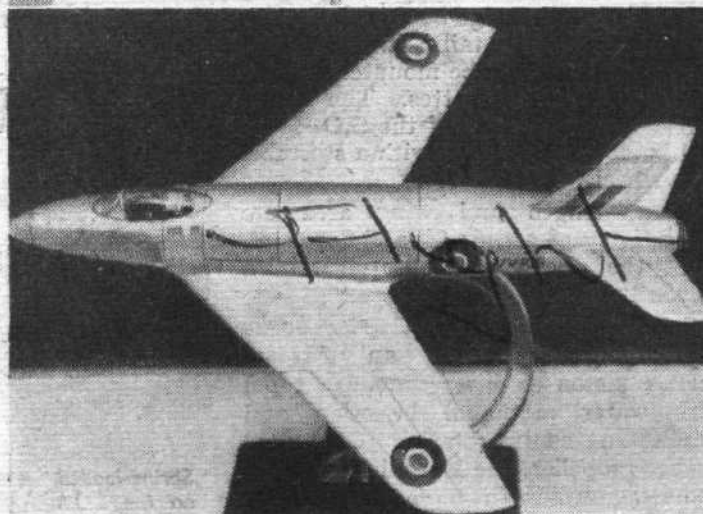
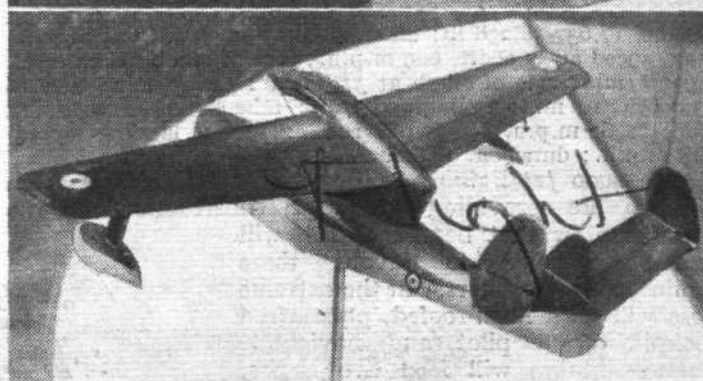
Tested at Farnborough

Sud-Ouest S.O. 6020 Espadon Fighter.—Design studies for the Espadon were started by M. Servanty in 1945, and M. Rastel, chief pilot of Sud-Ouest, made the first flight on November 12th last year. Twenty flights, totaling 12 hours, have been completed. A wind-tunnel model, displayed with the second prototype, was tested at the Royal Aircraft Establishment, Farnborough.

The unusually large fuselage and cockpit of the Espadon have led many Salon visitors to believe that the type is a two-seater; it is, in fact, *monoplace*, but the fuselage is capacious enough to house a very heavy armament of six 20 mm guns, the unusually large main wheels, and 473 gall of fuel. No external tanks will be carried but a reconnaissance version can have two supplementary fuselage tanks of 175 gallons each. The belt boxes for the guns are approximately over the c.g. and are mounted fore-and-aft, so that the belts must be twisted for feeding to the guns. Above and below each gun-port, in the nose of the fuselage, is a small slot through which the muzzle blast can escape to provide a muzzle-brake effect. An unusually high cockpit enclosure results from a French Air Ministry decision to fit an ejector-seat parachute, causing the roof to be raised six inches. The ventral location of the intake for the single Nene may permit ingress of unduly large



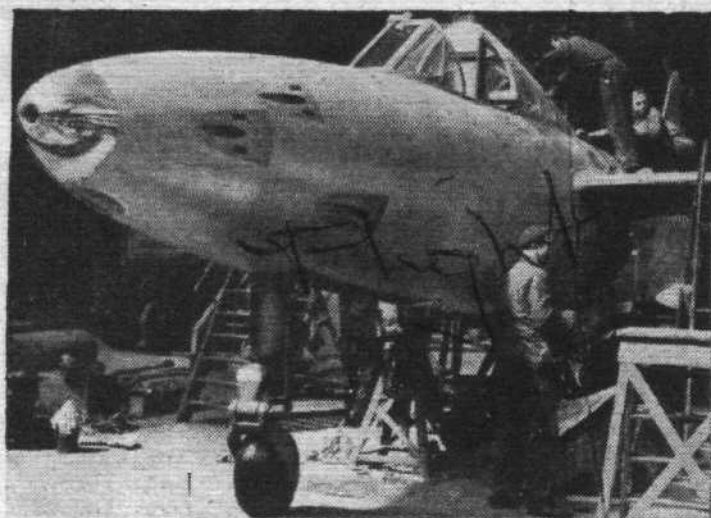
The Fokker display, with the S.11 and S.12 trainers, lies in the forefront of the general view above. Three Vickers models—the Varsity, Seagull and 510—are grouped below. On the 510, the large-area ailerons and leading-edge slats will be noted.



Salon Studies



Cockpit of the S.O.M2 research aircraft, showing the retractable windscreen, used for take-off and landing, in the stowed position.



Business end of the S.O.6020 Espadon, showing the six gun-ports, with flash-eliminator slots, and the large cockpit enclosure.

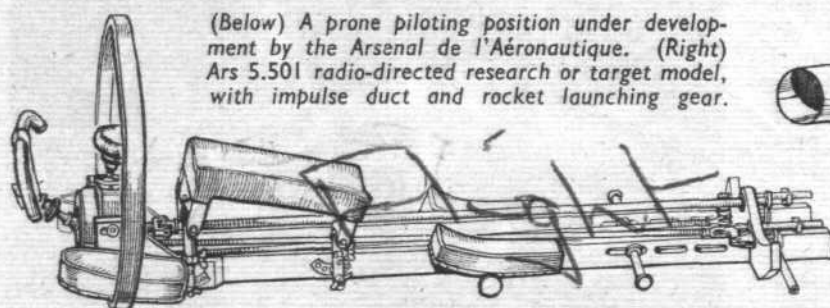
quantities of dirt and occasion appreciable duct losses.

The swept-back wing has a single spar, and the fuselage, with a 2 mm skin, has no stringers. Structural design was undertaken with a view to large-scale production in shadow factories. The first prototype has been seen with a greater fin area than that of the show aircraft, and with a dorsal extension.

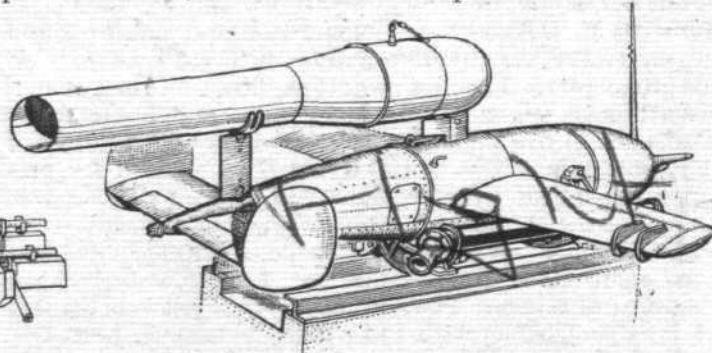
A maker's specification includes the following figures:—Span, 34ft 9in; length, 49ft 3in; wing area, 271 sq ft; gross

and tricycle undercarriage. It first flew on April 1st this year, and is designed for fighting, bombing or attack duties from French aircraft carriers. Characteristics are: span, 35.8ft; length, 40ft; wing area, 280.5 sq ft; gross weight, 15,430 lb; estimated max. speed, 444 m.p.h.; range, 2,800 miles. A photograph shows large flap-guide fairings.

S.O. 6000 Triton Jet Trainer.—The latest version of the S.O. 6000, the first example of which was on view in the previous Salon, is fitted with a Hispano-Suiza Nene 100,



(Below) A prone piloting position under development by the Arsenal de l'Aéronautique. (Right) Ars 5.501 radio-directed research or target model, with impulse duct and rocket launching gear.



weight, 17,637-18,298 lb; max. speed at sea level, 624 m.p.h.; max. speed at 33,000ft, 609 m.p.h.; rate of climb at sea level, 5,900ft/min; rate of climb at 32,800ft, 1,570 ft/min; time to 33,000ft, 10 min; ceiling, 39,370ft; take-off speed with full load, 136 m.p.h.; take-off run, 2,790ft; landing speed, 118 m.p.h.; duration, 1½ hours.

S.O. 4000 Jet Bomber.—The S.O. M1 and M2 research aircraft are providing data for construction of the S.O. 4000 twin-jet bomber which will closely resemble in layout these diminutive forerunners. In the extreme nose will be a flush-roofed, pressurized cockpit for a pilot and navigator. Lateral intakes will feed two Nenes, housed in the fuselage behind the tanks, and ejecting at the tail. Two remotely-controlled guns will be mounted in each of two wing-tip barbettes. The undercarriage—unlike that of the S.O. M2—will be of tricycle type, with a steerable nose-wheel.

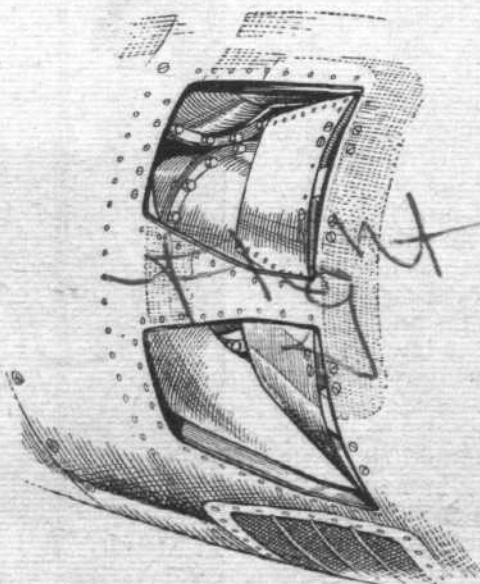
Span, length and wing area are respectively 58.3ft, 64.6ft and 807 sq ft, and the designed all-up weight, 19,700 lb.

S.O. 8000 Narval Carrier-borne Fighter.—Powered by an Arsenal 12HO2 piston engine (Jumo 213 type) with water methanol injection and driving a contra-rotating Chauvière pusher propeller, the Narval is of twin-boom layout, with high-set tailplane

with supplementary intakes on the fuselage sides. The two occupants have ejector seats. A maximum speed of 590 m.p.h. is claimed and the full-load take-off speed and landing speed are given as 130 m.p.h. and 112 m.p.h. The wing area is 161 sq ft and the all-up weight 10,050 lb, so that the wing loading (which might appear excessive, due to the relative sizes of wing and fuselage) is about 62 lb/sq ft.

S.O. M2 High-speed Research Aircraft.—This little swept-back monoplane is generally similar in design to the S.O. M1 air-launched research glider shown at the Salon in 1946 and is likewise a means of acquiring data for the construction of the S.O. 4000 jet bomber. It is, in fact, a piloted, half-scale model of the bomber. The first flight (with a temporarily raised cockpit roof) was made last month.

A single Rolls-Royce Derwent 5 turbo-jet is fed by laterally disposed intakes, standing proud of the fuselage sides, but whereas the S.O. 4000 will have two outlets—one for each Nene—the M2 has a central efflux, flanked by two small outlets for turbine-cooling air. The main undercarriage embodies three tandem retractable wheels, stowed in the central fuselage, and a relatively large nose-wheel. Small jettisonable wheels are attached to the retractable wing-tip skids for take-off. Skin of 3 mm thick-



Spring-loaded plenum-chamber doors on the S.O.M2 (Rolls-Royce Derwent).



Model of the Czech Aero 145, a good-looking five-seater with a 185-m.p.h. cruising speed. The engines are Walter Minors giving a combined output of 320 h.p.



The projected S.E.4000 amphibian is designed to meet I.C.A.O. requirements. This scale model shows the mounting of the nacelle for the Mathis engine.

ness is used for the remarkably smooth wing. For take-off and landing, the pilot can raise his seat and improve his vision by means of a retractable windscreen. The cockpit roof, embodying this screen, is a brilliant piece of work in Perspex.

Data are: span 29.79ft, length 32.5ft, wing area 193.6 sq ft, equipped weight 8,465 lb, pilot 200 lb, fuel 1,430 lb,

small enough—having a span of only 27ft—to be mounted in the big Chalais Meudon wind tunnel for comparative tests. By means of strain gauges, the loads on various sets of wings may be measured in flight. The all-up weight is 3,050 lb, and fuel for a two-hour endurance is carried.

The Arsenal V.G.70 high-speed research aircraft, with raked wing and tail surfaces, displayed in the previous Salon, has been flying with the Jumo 004 turbojet, but a Derwent 5 may later be installed.

GAS TURBINES

In the space available for last week's review of the outstanding show exhibits only a few salient features of each power unit could be mentioned. Considerable progress has been made with gas turbines in France, and some additional information about them can now be given. The Rolls-Royce Nene built under licence by Hispano-Suiza remains the most important turbojet in France and it is the one which powers all important jet aircraft.

S.N.E.C.M.A.—Within this organization are two turbine-building subdivisions, Voisin and Rateau. The former, under the supervision of H. Oestrich, have produced a turbojet known as the Atar 101.B. Bench

tests—and, later, flying tests—are to be carried out at the new test establishment at Villaroche.

The intention has been to produce a unit in the 5,000lb-thrust class with the minimum diameter. The compressor is of the seven-stage axial type and the airflow is straight through the engine. The compressor drum comprises a series of alloy discs, and both rotor and stator blades are

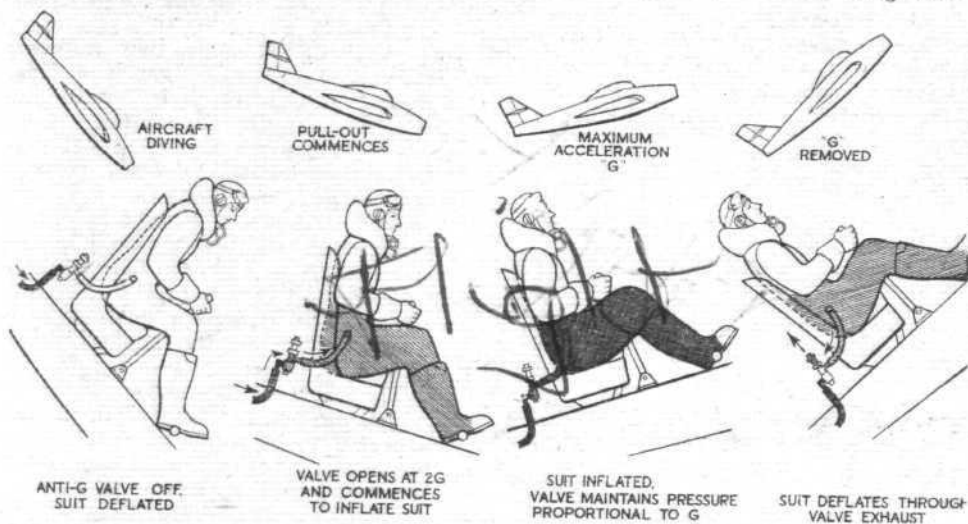
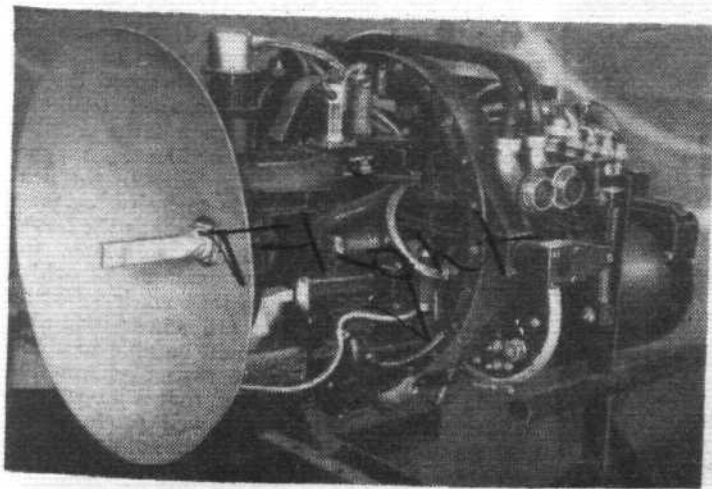


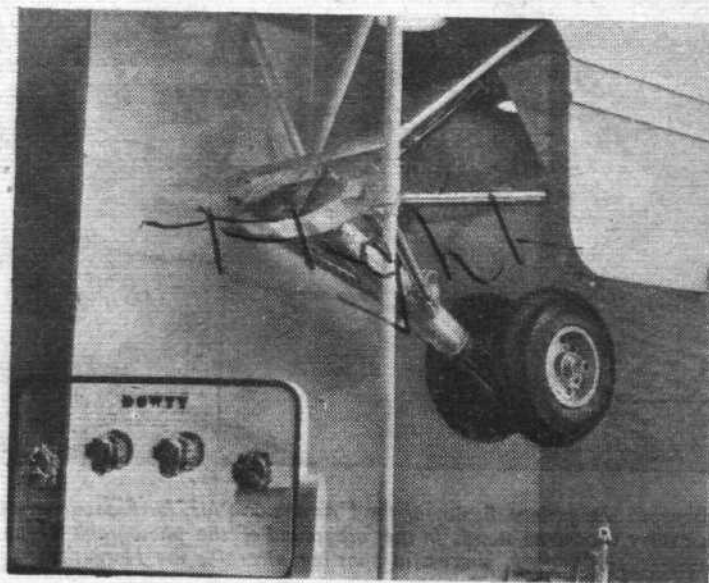
Diagram based on a Ministry of Supply exhibit illustrating operation of the R.A.E. anti-G inflatable suit.

test equipment 265 lb, all-up weight 10,360 lb.

Arsenal 0-101 Research Aircraft.—This *avion laboratoire*, exhibited by the Arsenal de l'Aéronautique, appears at first sight to be a single-seater, with the cockpit very far aft, but examination discloses that an observer is housed in a tiny flush-roofed cabin ahead of the pilot. The machine has a Renault 12S engine, a fixed undercarriage, and is



Above is the cloud and collision warning equipment—another item on the M. of S. stand. (Right) Dowty steerable nosewheel undercarriage assembly for the Brabazon.



Salon Studies

secured by their prismatic roots. At 8,050 r.p.m. the compression ratio is 4.2:1. Hot air for de-icing is passed through the compressor entry guide-vanes, around the inlet duct and through its supporting vanes.

Twenty individual burners are arranged evenly around the annular combustion chamber; they have high-pressure atomisers and discharge downstream.

Primary air is fed through the burners while secondary air jets from concentric rings of slits placed a few inches beyond the burners continue the mixing and combustion process. There are two starting jets and two igniter plugs.

Hollow Turbine Blades

The turbine is of the single-stage type, but carries 53 hollow air-cooled blades. The nozzle guide vanes, 29 in all, are also air-cooled. They are made from steel sheet material and carry an insert to direct the air stream against their inside surfaces. The designers' views accord with opinion in France that this type of blade, apart from being very light, has much promise and offers possibilities for increase of working temperatures in subsequent engines. Blade attachment is by means of a Laval root as illustrated.

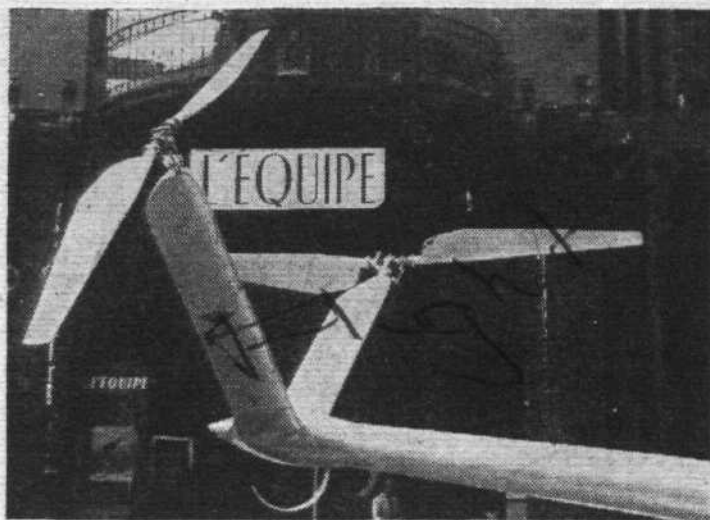
The turbine is carried in a single roller-bearing and is described as having an elastic-toothed coupling to the main drive shaft.

The jet-nozzle area is variable, the inner cone moving under automatic control to take full advantage of the attainable thrust under varying conditions. Water-methanol injection and after-burning are provided for in the design.

Fuel is fed by a high-pressure gear-type pump through a governor unit. The engine is under single-lever control, speed and gas temperature being maintained at their optimum values by control of fuel supply and jet-nozzle area. The gas temperature is measured indirectly on rate of fuel flow and compressor pressure.

Associated with the Atar 101.B is a starter and auxiliary gearbox unit known as the Atar 5000 and incorporating the Atar 501 25 h.p. two-stroke petrol starter engine. The gearbox unit drives the turbojet or is driven from it by a shaft with universal joints. Positioning of the auxiliaries is almost entirely at the convenience of the airframe designer. Prior to the starting of the turbojet the petrol engine can drive the generator, vacuum and hydraulic pumps and compressor for a short period to save idling the main power unit for the sake of the auxiliaries. Then, when the main starter switch is operated, a clutch engages and the turbine is started up. As speed builds up, it takes over the drive and the two-stroke engine is cut out.

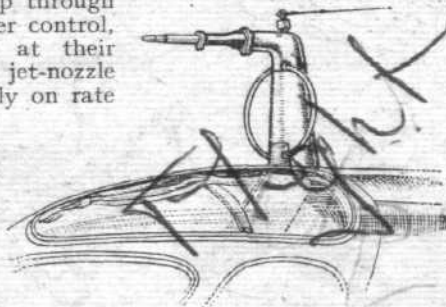
Atar 101.B data include the following: Maximum static



A development of the experimental single-seat S.E.3101, the new S.E.3110 two-seater transport helicopter (200 h.p. Salmson) has novel features. The twin tail-rotors have four duties—anti-torque, added lift, and fore-and-aft and directional control.

thrust at 8,050 r.p.m., 4,850 lb; dry weight, 1,875 lb; diameter overall, 34.9 in; specific consumption, 1 lb/hr/lb thrust; length, 10.66 ft; maximum continuous thrust (at 8,050 r.p.m. at 29,500 ft at 560 m.p.h.), 2,070 lb.

S.N.E.C.M.A. TB.1000.—One of France's two full-scale turboprops, the TB.1000 is a long, slim, straight-through unit of S.N.E.C.M.A.-Rateau design. Simplicity of construction and small diameter were features specially borne in mind when the TB.1000 was conceived. It has a nine-stage axial-flow compressor, six conventional-looking combustion chambers fed directly from it, and a two-stage turbine follows. The reduction gear ratio is 0.109:1. An electric starter is employed.



The Courlis carries on its cabin roof a neat plastic unit combining aerial mast, loop and pitot head.

This new unit, many details of which are still confidential, is not expected to be ready for its first run for several months, but its appearance is already in its favour. It is to be

fitted with a three-blade feathering and braking airscrew, but not with a ducted spinner. The following data are given:—

Overall diameter of engine and cowl, 27.5 in; frontal area, 4.1 sq ft; length, 8.94 ft; dry weight, 1,058.2 lb; total weight, equipped, 1,433 lb. Power (S.L. static at 14,000 r.p.m.), 1,240 s.h.p., plus 550 lb thrust; maximum for take-off (at 15,400 r.p.m.), 1,450 equiv. s.h.p.; cruising at 13,000 ft (14,000 r.p.m. and 310 m.p.h.), 1,055 s.h.p. plus 190 lb thrust; specific consumption, 0.66 lb/h.p./hr.

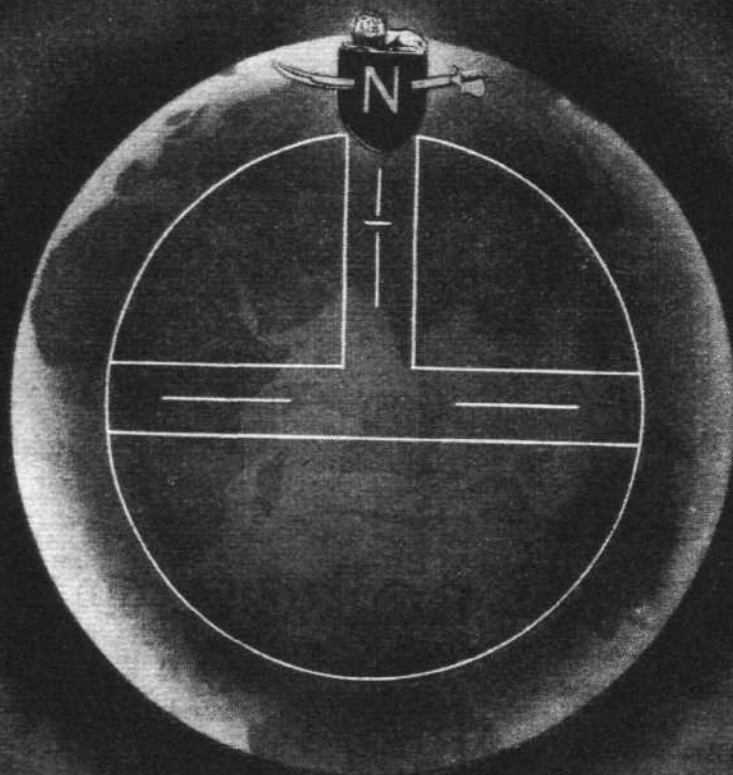
Turbomeca.—An intriguing, if diminutive, turbojet, the Turbomeca TR.011 built under Szydlowsky patents appears to have retained the complete simplicity for which the early Whittle turbojets were noted. Its 200-odd pounds of thrust are produced at 37,000 r.p.m. but in spite of this high speed the six units now running have behaved well and have successfully completed a large number of hours on test without incident. A type-test is shortly to be attempted. In the next week or two the TR.011 is to fly (using for a start about 60 per cent of thrust) as the power unit of a high performance sailplane, the Mauboussin Cyclone, an example of which with jet unit mounted on its back is a feature of the Paris Salon. On full power it is estimated that the Cyclone will be able to climb to 30,000 ft and to fly at 185 m.p.h. on the level. It has been suggested that a jet-assisted glider such as this might well prove useful for training fighter pilots, its handling characteristics being much more like those of a modern fighter than are those of most existing trainers. The price, in the region of £3,000, would not be excessive for such a purpose, and operating costs would be very



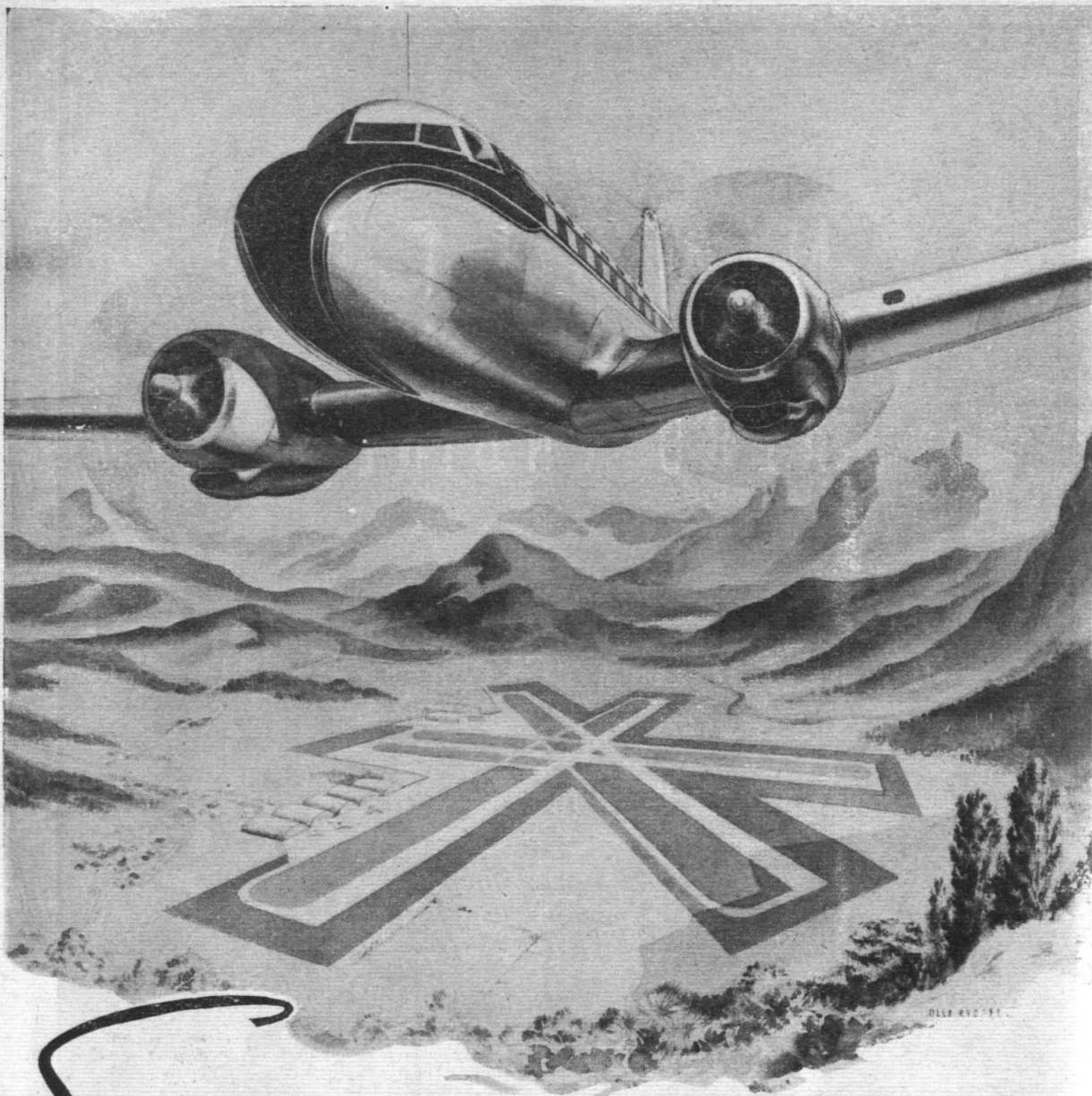
Beneath the gallery display of the L'Armée de l'Air, Air France have their striking and cleverly conceived stand. In the foreground of the photograph is one of France's most successful sporting aircraft, the Norécrin.

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AERO ENGINES



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Scandia takes off...

with perfect safety even from small and obstructed airports.

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PERFORMANCE

All figures refer to standard atmosphere

	Airfield altitude:	
	Sea level	5,000 ft
Max. take-off weight	32,408 lbs	30,650 lbs
CAR runway length for take-off	3,690 ft	5,055 ft
Max. landing weight	31,967 lbs	29,700 lbs
CAR runway length for landing	2,950 ft	3,070 ft
Stalling speed (T.A.S.)	78 MPH	83 MPH
CAR 180° min. turn radius (completed in 15 seconds)	650 ft	

Salon Studies

economical for the performance which is obtained.

There is also a proposal for mounting two TR.011s in the rear end of the main-engine nacelles of a twin-engined transport. The addition of nearly 400 lb of thrust for use on take-off, and as circumstances dictated in the air would, no doubt, amply compensate for the weight increase of around 100 lb per unit. As reported last week, the diameter of this small turbojet is 15.7 in and the length 31.5 in.

The layout of the TR.011 is very straightforward. A single-sided radial compressor feeds air to the annular combustion chamber and the gases then transfer a proportion of their energy to the single-stage turbine before passing out of the relatively long tapering jet pipe. Unlike the larger French gas turbines, the Turbomecas have solid turbine blades. The compression ratio is 3.5:1, and the fuel/air ratio by weight in the combustion chamber is given at 65:1.

A unique feature is the method of supplying the paraffin to the combustion chamber. A single delivery jet feeds the fuel into the hollow mainshaft at its front end. Attached to the shaft is an injection wheel which has holes spaced around its periphery. At the high running speed fuel is passed along the shaft into the wheel and flung out of the holes with sufficient force to cause atomization, and so the need for any form of high-pressure delivery pump is obviated. Normal delivery pressure is approximately 3 atmospheres. Idling and low-power running are achieved by the use of a controlled by-pass permitting pressure variation. This novel form of centrifugal injection has, it seems, served admirably. Specific consumption varies between 1.1 and 1.4 lb/hr/lb thrust according to



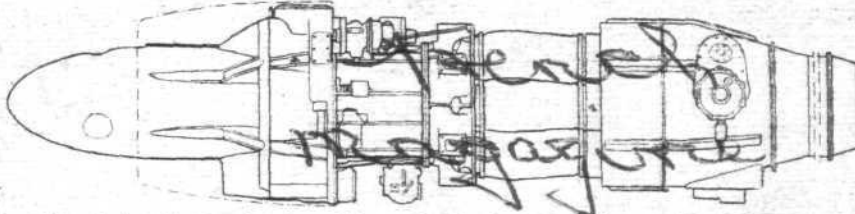
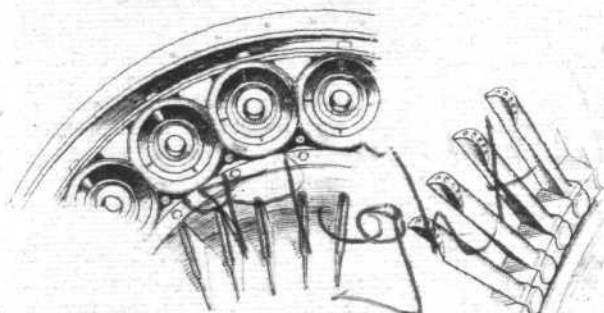
The S.N.E.C.M.A. Vaisin Atar 101.B turboprop is designed to produce 4,700 lb thrust. It is provided with a remote starter-cum-auxiliary-drive gearbox.

With its own starter and accessories and a gear for reducing the 35,000 r.p.m. operational speed to 6,000 r.p.m. for accessory drives, the unit weighs 165 lb. A governor is provided which is claimed to control speed to 1 r.p.m. per thousand.

A TT-782 unit recently completed a 250-hour special test run comprising 45 cycles as follows: Start, 20 min. at 110 s.h.p.; 4 hr. 20 min. at 100 h.p.; 20 min. at 110 h.p.; stop. This was followed by five cycles: Start, 15 min. at 110 h.p.; 45 min. at 100 h.p.; 1 hr. at 50 h.p.; 1 hr. idling; 1 hr. 45 min. at 100 h.p.; 15 min. at 110 h.p.; stop. The oil consumption during the test was 1 litre per 20 hours. The maximum design power is 138 s.h.p. at 36,000 r.p.m. with gas temperature of 750 deg C at the turbine entry. At 20,000 r.p.m. (650 deg C) the power output is only 20 s.h.p.

Several larger Turbomeca units are at the design stage.

S.O.C.E.M.A.—More will be heard in the future of the TGA-1008 turbojet and its development the TR.1008 which is designed to deliver 5,500 lb thrust. The large turboprop

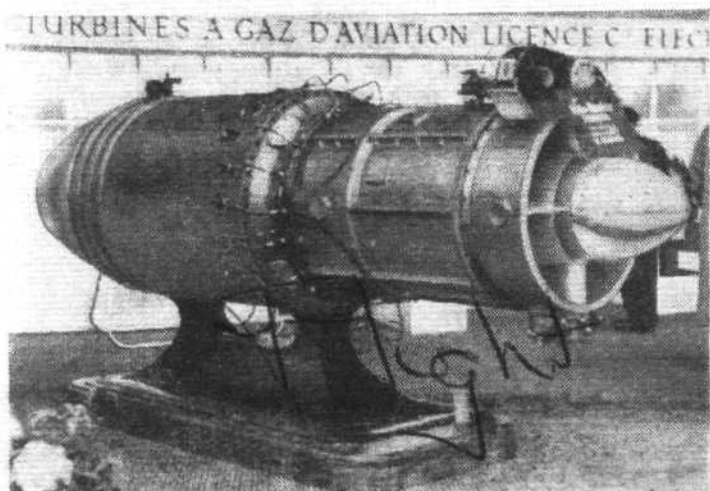


(Above) Installation drawing of France's Mamba-like turboprop, the S.N.E.C.M.A. Rateau TB.1000. The six mounting points are indicated. The length, spinner to turbine rear face, is 8ft. 11 1/2 in. (Left) Details of burners in the annular combustion chamber and of the air-cooled turbine blades of the Atar 101.B.

conditions and power. A representative figure would be 1.2 lb/hr/lb thrust.

Starting is carried out by means of a separate portable electric motor. A shaft with pick-up, carried by the motor, is inserted into the socket provided at the front of the turbojet and the starter is held in engagement until a start is obtained.

Another earlier Turbomeca unit upon which the TR.011 turbojet is based is known as the Type TT-782. This was produced primarily for driving auxiliaries on large, high-altitude aircraft, but it is also to be considered as a very small turboprop power unit. It is similar in most respects to its development but has a second turbine stage and a reduction gear.



Both turbojet and turboprop units are produced by S.O.C.E.M.A. Above is the 4,850-lb-thrust TGA-1008 development unit. Last week a sectioned TGA-Ibis turboprop was illustrated.

also built by the organization is the TGA-Ibis. It is in the 2,000 s.h.p. class. Briefly, the TGA-1008, which is designed to produce 4,850 lb thrust, has an eight-stage axial-flow compressor, an annular combustion chamber and a single-stage turbine. The TR-1008 is basically similar, but there will be several modifications, including the redesign of the turbine mounting with an additional bearing. The turboprop TGA-Ibis has an axial-flow compressor with 15 stages (not 12, as mentioned last week), an annular combustion chamber and a four-stage turbine, and is designed to produce a static sea-level output of 2,415 h.p. plus 1,210 lb thrust.

FLIGHT-INFORMATION REGIONS

IN connection with the map showing the air-traffic plan of the British Isles, published in the photogravure section of the April 28th issue, it should be recorded that certain minor amendments were announced by the Ministry of Civil Aviation after the map had gone to press.

Boundaries of two of the five flight-information regions have been slightly altered. The western boundary of the Central Scottish Region has been extended westward from 59°N 08°W to a point 56°N 13°W, rejoining the former boundary at 55° 30'N 08°W.

The southern boundary of the South-Eastern and South-Western Regions now runs more centrally down the English Channel and to a point farther westward; from 51° 30'N 02°E the new co-ordinates are 51° 07'N 02°E; 50°N 02°W; 48° 50'N 08°W; 49°N 09°W; the old boundary is rejoined at 52° 10'N 05° 30'W.

It should also be mentioned that, in the reproduction of the same map, certain routes to and from Manchester were inadvertently shown as terminating at, or passing through, Barton. In point of fact there are no scheduled operations at that airport, the whole of Manchester's traffic being carried by Ringway. There are now a dozen-odd services operating from Ringway, including a number to the Continent.

GRAND AEROSTATIC FÊTE

*R.Ae.S. Charter Garden Party
with a Period Flavour*

Illustrated by "Flight" Photographs

CAPTAIN J. LAURENCE PRITCHARD, the Royal Aeronautical Society's Secretary of twenty years' standing, is to be congratulated on the idea of limiting aircraft demonstrated at the Society's Garden Party to those with a speed of less than 200 m.p.h. Imposed in order to preserve the authentic garden-party atmosphere, this restriction confined the types to light aircraft, and to machines of pre-first war and inter-war vintage.

White Waltham, placed at the disposal of the R.Ae.S. by the Fairey Aviation Company for the occasion, is a pleasant spot, especially when the weather is kind, as it was on Sunday. Considerably more than 4,000 R.Ae.S. members and their guests gathered to celebrate the Royal Charter recently granted by His Majesty to the Society.

Royal Charters go back a long way in history, and it was appropriate that details of the flying programme should be set out in the form and style of an old-fashioned broadsheet, and that the event should be described as a "Grand Aerostatic Fête." The programme booklet was illustrated by several colour plates from the Hodgson-Cuthbert Collection, and the text contained many sly digs and quips, all in keeping with (and many in the phrasing of) the days of ballooning, which was the only form of aerial locomotion when the Society was formed. A commentary was broadcast by Major Oliver Stewart, and the Fairey Aviation Works Band provided the music.

The organization at White Waltham was excellent, and the many flying events were on time, a fact which was apt

to be disguised by the leisurely gait of most of the performers. Many light aircraft of the

inter-war period were demonstrated very effectively, and served to recall the less hectic days before

the second war, when quite a few people were able to own their own aircraft

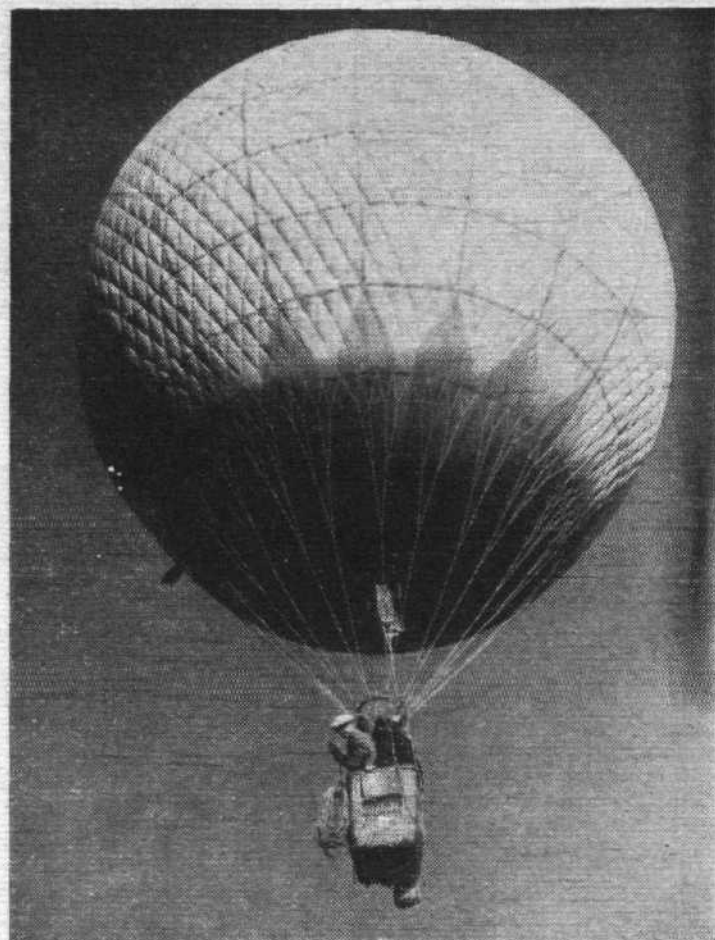
and to fly them extensively at home and to far-distant corners of the world.

Heavy taxation

and the petrol restrictions have to all intents and purposes eliminated the British private owner, but it was pleasant to be reminded of happier days.

In view of the contribution to the light aircraft industry made by de Havillands, it was regrettable that this firm was not better represented.

*The President and
Mrs. Roxbee Cox
receive their guests.*



Dr. Roxbee Cox departs from the fête by balloon, piloted by M. Charles Dollfus. The flight was limited to an eight-mile journey to Winkfield, at a height of 1,500ft.

Apparently no one has thought of preserving some of the Moths and variants which made flying history.

There is little doubt that most attention was given by the younger as well as by the older generation to the real old-timers, such as the Bleriot monoplane of the type on which the famous French pioneer flew across the Channel in 1909, and the Deperdussin monoplane on which many learned to fly at Hendon in 1911-12.

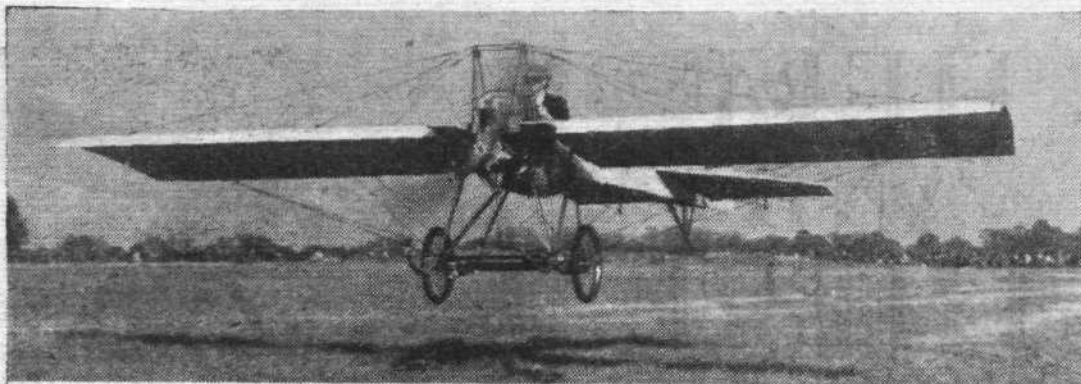
The Bleriot was an exact replica of the type which made that historic Channel crossing, except for the Dunlop tyres. The Anzani engine was of the so-called "fan" type, of about 20 h.p., and the elevators formed the tips of the tailplane. Minor changes had also been made in the casting undercarriage, chiefly in the method of centring the wheels.

Both the Bleriot and the Deperdussin had been treated with loving care by Warden Aviation and Engine Co., and the wing fabric was better applied and much tighter than in the original machines, no doubt due to development in dopes since those days. The Deperdussin had the so-called "Y" type Anzani, with the three cylinders arranged radially instead of fanwise. In the old days we used to

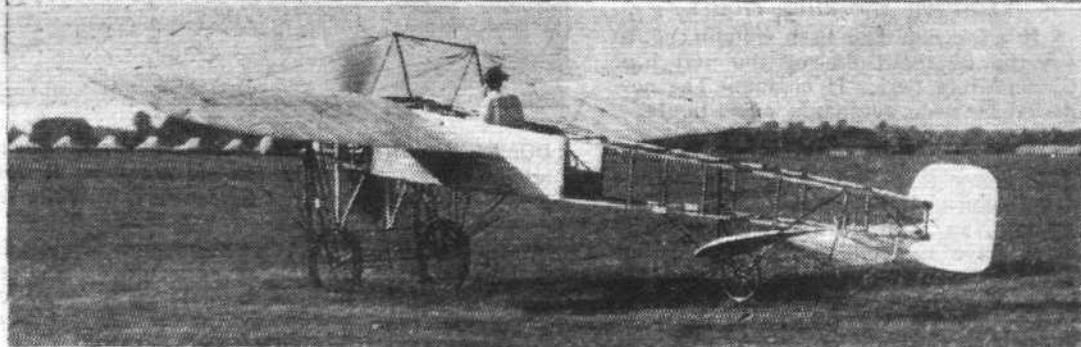
General view of the fête at White Waltham.



Right (top) W/C. J. A. Kent "in full flight" on the 28 h.p. Anzani-engined Deperdussin of 1912 vintage. Take-off run was in the region of 30-40 yards.

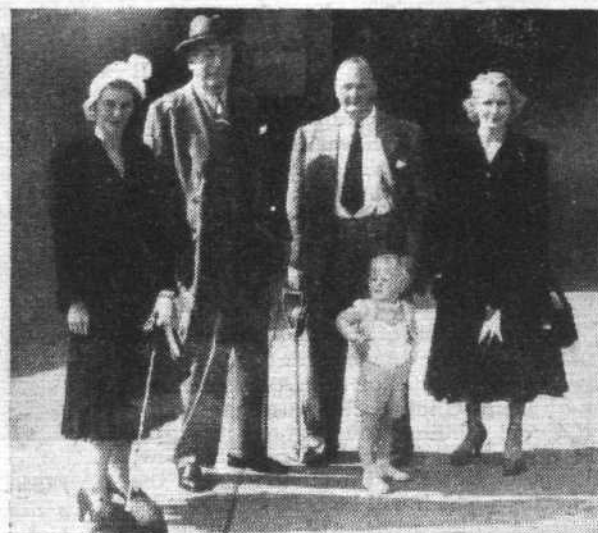


Right (below) Jeffrey Quill forsakes his Spitfires and Attackers and tries his hand at a 1912 Bleriot with 22 h.p. fan-type Anzani engine. He found the lack of power reserve somewhat trying.



(Below) H. A. Marsh on the Cierva Skeet helicopter lent a more modern touch. He is seen using a Tasker trailer-lorry as an adequate airfield.

(Bottom) G/C. A. H. Wheeler taxiing out his 1916 Sopwith Pup brought back vivid memories of the 1914-18 war, when the Pup was one of our best fighters.



The airfield was used by permission of Sir Richard Fairey. With him are (left) Lady Fairey and (right) Mr. and Mrs. Richard Fairey. In the front row is the third generation, Charles Richard.

call it a 30 h.p., but it is doubtful if it developed more than about 25.

When it came to flying these two old monoplanes, the surface of the airfield was rather against anything more than straight hops. The grass was long, and after the first few yards the ground sloped upwards, a handicap which prevented the pilots from getting proper flight. A longer take-off run, and possibly a slightly more gentle handling of the elevator control, would have made a great deal of difference. However, even the short "hops" were appreciated, and they brought back memories of Hendon and Brooklands in the 1910-12 era.

The modern touch was lent by two helicopters: the Sikorsky R-4 (Hoverfly II) and the Cierva Skeeter. Mr. H. A. Marsh handled the latter superbly, ultimately landing it on a trailer. Flt. Lt. Meyrick did wonderful things with the Hoverfly, a much larger helicopter with an engine of only 235 h.p. Later Mr. Marsh showed that he had not forgotten how to fly the Autogiro.

Finale of the Garden Party was an ascent by M. Charles Dollfus in his balloon. He carried as his passenger Dr. Roxbee Cox, who thus made an unusual exit from White Waltham and from the Society, the presidency of which he is relinquishing.



HERE AND THERE

Longer Working Hours

AN extension has been announced to the overhaul life of the 100 h.p. Cirrus Minor Series II engine. The new period between overhauls is 800 hours.

Australian Civil Survey

IN connection with the £2,500,000 scheme to build weirs on the Darling River, New South Wales, Adastra Airways have received a contract for an aerial survey of the river. Ansons will be used for the survey, which will be undertaken in the winter months, to avoid dust haze.

Revised Reunion Date

IT is learned from the organizers of the second annual reunion of No. 3B F.T.S. (R.A.F.) late of Miami, Oklahoma, that the date originally announced by them for the reunion was erroneous. The meeting will be held on Saturday, May 28th, at the Connaught Rooms, and tickets (17s 6d) may be obtained from H. V. D. Hallett, 142, Southampton Road, Eastleigh, Hants.

1949 Gliding Competitions

THE Council of the British Gliding Association announces that it has accepted the offer of the Derbyshire and Lancashire Gliding Club to organize the National Gliding Competitions for 1949 at their site at Camphill, Great Hucklow, Derby. Rules and regulations for the meeting—which will be held from August 10th-26th inclusive—will be published next month.

Neptune at Northolt

COMMEMORATING the 30th anniversary of the U.S. Navy's first Atlantic crossing by air, the record-breaking Lockheed P2V Neptune *Truculent Turtle* was due to arrive at Northolt



DOMINION VISITOR: The sturdy D.H. Beaver, though built to the Canadian bush formula, retains many traces of its Hatfield ancestry. It was displayed at last Sunday's R.Ae.S. Garden Party at White Waltham.

at 3 p.m. yesterday. This machine holds the international long-distance record, set up in October, 1946, with an 11,236-mile flight from Perth, Australia, to Columbus, Ohio. Its pilot on that occa-

stop from New York to Lisbon via the Azores and from Lisbon to England by way of Plymouth, partly followed the same course as the earlier aircraft.

Benevolent Fund Appointment

GROUP CAPTAIN S. J. BAILEY, C.B.E., has been appointed Secretary of the Appeals Committee of the R.A.F. Benevolent Fund.

Reappearance

FOR the first time since August, 1939, the *Air Force List* will shortly be on sale to the public. An "open" version of the List—normally the April issue—will henceforth be published once a year; the other three quarterly issues will remain "restricted." It will contain complete seniority lists for all branches of the Services as well as the Auxiliaries and Reserves. Priced at 12s 6d, the *Air Force List* contains some 600 pages and will be obtainable from His Majesty's Stationery Office. The last public issue had just under 550 pages; some wartime issues exceeded 2,000 pages.

R.A.F. at Olympia

IN this year's Royal Tournament, which will be held at Olympia from June 16th to July 2nd, a parachute training display and a police dog demonstration will be the highlights of the main R.A.F. events. Representing the varying types of pupil taught at the R.A.F. Parachute Training School, Upper Heyford, will be an airwoman, a nursing sister, and three Army paratroops, together with one of the School's R.A.F. instructors. As the height of the Olympia roof is insufficient for free descent, they will make controlled jumps with parachutes already open.

Gipsy Gemini

A SPECIAL Gemini, powered by a pair of Gipsy Majors, has now logged some 15 hours' flying, and it is expected that a C. of A. will be granted shortly. The machine, originally a Miles project, has now been taken over by a private owner. Gipsy Major Xs were installed for the first ten hours' flying, but high-compression Major ICs are now fitted, giving together a maximum of 280 h.p. Performance has not been measured accurately, but an initial rate of climb of 1,500ft/min has been recorded, and indications are that the best cruising speed will be 150 m.p.h. and the maximum about 170 m.p.h. While this Gipsy version is strictly a "one-off" special



FRENCH POLISH: Picturesque type puts a show finish on the wing of the S.O. M2 high-speed research aircraft, one of the most discussed exhibits in the Grand Salon.

sion, Cdr. T. D. Davies, U.S.N., also flew the *Turtle* on its Atlantic crossing.

Rear Admiral A. C. Read, U.S.N. (retd.), who made the 1919 crossing in a Curtiss NC-4 flying-boat was a passenger in the Neptune, which, flying non-



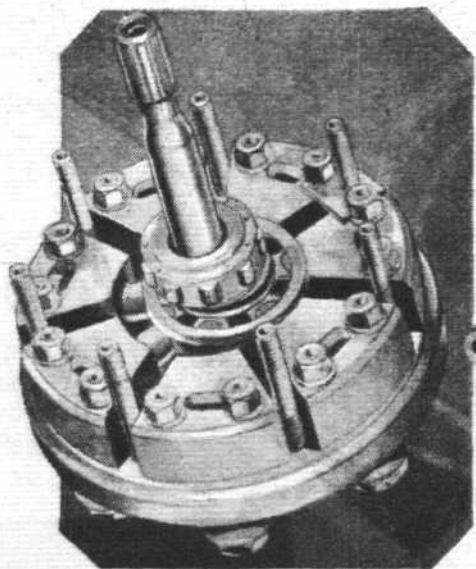
MINE'S A MAJOR: As related in the adjoining paragraph, a Gemini has lately been adapted to take two Gipsy Majors in place of the Cirrus Minors normally fitted. As these comparative views show, the Gipsy version (right) is not easily distinguished, as a basically similar nacelle profile has been retained.

"SERVODYNE"

POWER ASSISTANCE FOR FLYING CONTROLS

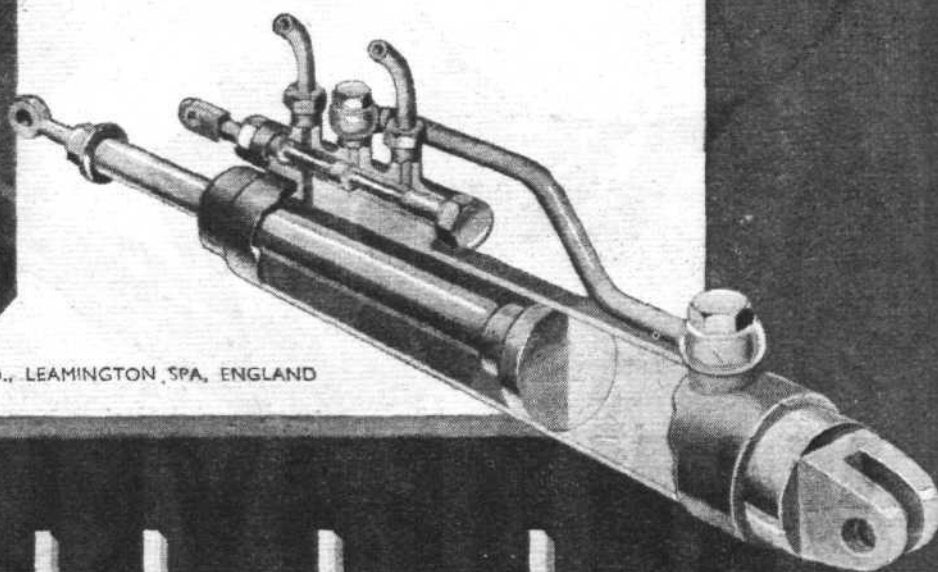
The "Servodyne" is the ideal solution to the servo problem because it provides the necessary power assistance while allotting a small share of the effort to the manual control if desired; thus the controls still retain their sympathetic and informative 'feel'. The proportion between the servo and manual efforts can be easily pre-determined, and the assistance given — due to the patented principle involved, is positive and immediate.

Among other valuable features, the "Servodyne" is simple, light, and 'self-lubricating' due to the hydraulic fluid; it is practically frictionless and thus does not hinder manual effort if the pressure is off. As the fluid in the system is 'pre-loaded', low-rate 'give' is avoided.



Below, at right, a diagrammatic "Servodyne" jack, showing the simple patented valve system.

At left, the Lockheed Mark VI pump, generally used with the "Servodyne".



AUTOMOTIVE PRODUCTS COMPANY LTD., LEAMINGTON SPA, ENGLAND

ALL-BRITISH
Lockheed hydraulics
REGD. TRADE MARK

A FURTHER DEVELOPMENT IN THIN WALL BEARINGS

the three-layer bearing...

1 STEEL

**2 COPPER
BASE ALLOY**

**3 SOFT ALLOY
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STEEL — Flexibility with strength

COPPER BASE ALLOY — Reinforcing
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SOFT ALLOY OVERLAY — Precision
controlled thickness overlay. This
remains throughout life of bearing—
it is not simply a running-in medium

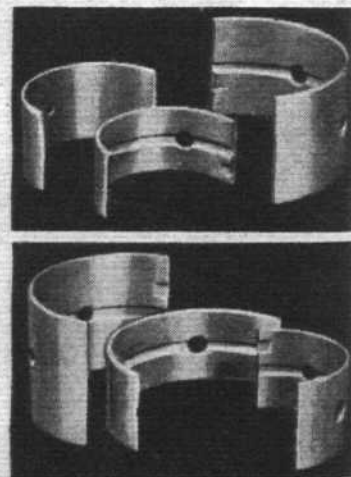


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HERE AND THERE

aircraft, plans for a conversion with 125 h.p. Continental engines are now being drawn up at Redhill. The combined costs of engines and installation are expected to be in the region of £1,200.

Meteor Flight-refuelled

A GLOSTER METEOR jet fighter, loaned by the Ministry of Supply to Flight Refuelling, Ltd., has been refuelled in the air on many occasions. Sir Alan Cobham foresees no trouble in transferring fuel at 500 m.p.h. should sufficiently fast tankers become available. Jet bombers, rather than fighters, are likely to benefit from high-speed refuelling.

Internationals by Air

BRITISH European Airways were due to "lay on" two extra Vikings on the Stockholm service last week, to carry a 50-strong party of footballers, officials and sports writers to the opening game of a series of international matches at Stockholm, Helsinki, Oslo, Amsterdam and Paris. All intermediate trips during the series, which ends on May 28th, will be made by air.

Canadair-Northrop Agreement

MR. OLIVER WEST, president of Canadair, Ltd., of Montreal, announced on May 4th that his company has acquired a licence for production of the three-engined Northrop Raider assault transport. The agreement provides for development of the basic design by Canadair which has the right to manufacture, sell and service the Raider and derivative models to all available world markets except the U.S.



ROBES OF OFFICE: Mr. E. W. Hives, managing director of Rolls-Royce, Ltd., receives the honorary degree of Doctor of Science at the University of Nottingham. He is seen with Lord Trent, Chancellor of the University. At the ceremony, the Public Orator, Prof. Spratt, spoke highly of Mr. Hives' encouragement of technical education.

CHALLENGER: Hovering at Cleveland before setting up a new (but as yet unconfirmed) helicopter speed record of 129.616 m.p.h. is the Sikorsky S-52-1, flown by Mr. H. E. Thompson.

Aircraft Exports Increase

DURING the first three months of this year the value of exported British aircraft reached a total of £9,377,091—a higher figure than for any previous quarter since the war. In March the total was £3,417,217. (Detailed figures month by month have appeared in past issues of *Flight*.)

South Atlantic Rocketry

DISCUSSIONS are being conducted in Washington between British and U.S. authorities towards the establishment of a new guided missile range in the South Atlantic. At an estimated cost of £50,000,000, the scheme will involve the construction of launching sites in Florida and radar tracking stations in the Bahamas.



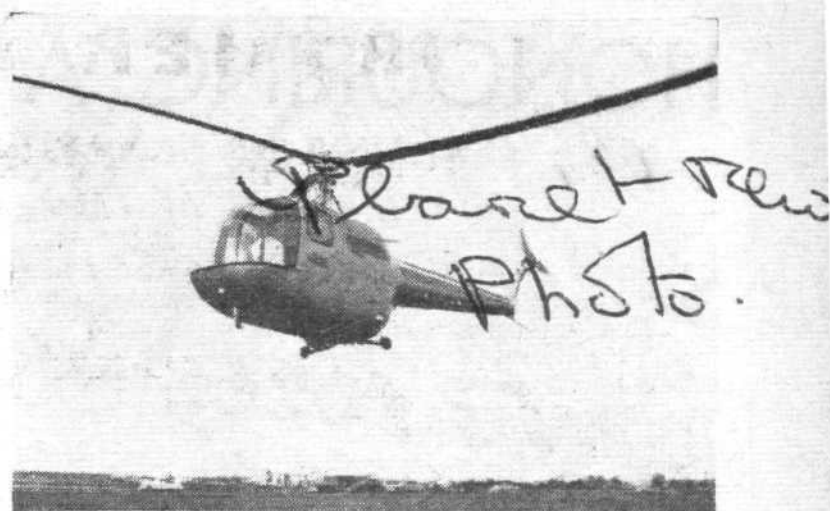
EARLY BIRD: Mr. Neville Duke, a Hawker test pilot, was due to leave London Airport in a Sea Fury early yesterday morning. Further details of this attempt to break two point-to-point records are given below.

Hawker Record Bids

FLYING a standard Hawker Fury Centaurus - engined fighter, Mr. Neville Duke, No. 2 experimental test pilot at Hawker Aircraft, Ltd., was due last Wednesday to attack the London-Rome speed record, held by a D.H. Vampire. All being well he was to go on to attack the London-Karachi record. Next Saturday Mr. T. S. Wade, Hawker's chief test pilot, hopes to transfer the Hawker P.1052 (Nene) from London to Paris in the space of an exceedingly few minutes.

A Hawker Siddeley Mission

SIR FRANK SPRIGGS and Sir Roy Dobson, chief executive and director, respectively, of the Hawker Siddeley Group, sailed for America in the *Queen*



Elizabeth on May 6th. They will tour several important aircraft factories in the United States, and, in Ottawa, will discuss aviation matters with Canada's Minister of Trade and Commerce, the Rt. Hon. C. D. Howe, and Air Marshal W. Curtis, Chief of Air Staff, R.C.A.F. Close attention will be paid to progress of the Group's Canadian subsidiary, A. V. Roe Canada, Ltd., which is developing the C-102 jet airliner, the C-100 jet fighter, and the Chinook and Orenda turboprops.

Helicopter v. Colorado Beetles

THE Ministry of Agriculture has decided that the major part of Britain's contribution to the work of the International Committee for Colorado Beetle Control will be undertaken by spray-equipped helicopters. A contract has been placed with Pest Control (U.K.), of Bourn, Cambridge, and operations will begin on May 25th in Northern France.

Westland-Sikorsky S-51s will be used. Pest Control has now taken delivery of the third machine of this type, and has made modifications to the spraying equipment, the spray-bars now being placed aft of the pilot. F/L. J. E. Harper, A.F.C., will be in charge of flying. His wide experience of crop spraying includes contract work in England, on cotton in the Sudan, and on tobacco in Rhodesia.

News in Brief

AMERICAN pilots have recently reported seeing Russian Mig-9 twin-jet fighters in and around the Berlin air corridors.

As we go to press it is learned that the Sikorsky S-52-1, illustrated in the photograph above, was looped seven times by its pilot, Harry Thompson, last Monday.

The U.S. Navy's experimental Viking rocket (a replacement for the V-2 in carrying scientific instruments above the earth's atmosphere) last week reached a height of 52½ miles, and a speed of 2,250 m.p.h., in a trial flight at White Sands, New Mexico.

One of the current series of free public lectures at the Science Museum, South Kensington, deals with the history of aircraft to 1903. It will be delivered on Monday, May 16th, by Mr. G. Tilghman Richards, M.I.Mech.E., F.R.Ae.S., and will be followed by a short film.

HONOURING A PIONEER

Mr. Oswald Short Becomes a Freeman of the City of Rochester

SOME years ago Mr. Oswald Short was referred to as "the only idealist left in the British aircraft industry." There was more than a grain of truth in that statement, for not many of the pioneers of British aviation have managed to retain that spirit of the earliest days which urged them on through a love of the game rather than with any thought of financial gain.

Something of this was brought out when, last Saturday, Mr. Hugh Oswald Short was made an Honorary Freeman of the City of Rochester at a ceremony at the Guildhall, and in the speeches afterwards at a luncheon in the Corn Exchange. At the Guildhall, the Mayor of Rochester, Alderman A. C. Lyle, J.P., referred to the many services which Mr. Short has rendered the city, and which were further elaborated by the Deputy Mayor, Mr. Alderman R. W. Dale, J.P., and by Mr. Alderman Washford, J.P. Mr. Short then took the oath and was presented with a casket containing the certificate of admission. Mr. Short referred to the great assistance which he and his firm had received from the city of Rochester, when they transferred the works from Eastchurch.

At the luncheon the Deputy Mayor referred to the courage and foresight shown by the brothers Short in the early days, and described the work of Mr. Oswald Short as an inspiration to the young. It was not merely that a great aircraft industry was built up during the first world

war, but when the slump came between the wars, Oswald and Eustace Short found other work which kept the technical staff and many of the workers together so that when rearmament for the second war began, Shorts were ready to go into action.

In his reply Mr. Short also referred to this fact. It seemed, he said, that we always went into war unprepared, and that our people liked narrow escapes. Perhaps the explanation was that we liked to give the enemy a chance at the start, and having done that, we set to work and knocked him out.

During some reminiscences of the early days, Mr. Short recalled that he and his brothers started with very little capital, only some £600, and nothing was brought in from outside until the firm was floated as a limited company many years later. Any profits they made were put into the purchase of land, buildings and equipment; there was very little liquid capital.

At Leysdown Mr. Horace Short, who had by then joined Oswald and Eustace, met Mr. (now Sir Francis) McClean. That was the real start of the firm, for shortly afterwards Mr. McClean wrote a letter on board a ship while he was on his way to the East, and in that letter he ordered an aeroplane, the first to be built by them other than as an experiment.

Two of those who helped Short Brothers to success were present at the luncheon, Mr. Short pointed out; Mr. Jones, who was their first employee and who became the first aeronautical draughtsman, and Mr. Wood, for a great many years the secretary of the firm.

Sir Francis McClean recalled his flight up the Thames in 1912, when he had to fly under bridges because the machine would not climb over them! But when more powerful engines became available Short machines were good; they were always well built.

Mr. "Jimmy" Wood expressed his pleasure at the honour now shown Mr. Oswald Short. It was an honour long overdue. He had been associated with Mr. Short for a long time, and regarded him as the perfect employer. "I could tell you a lot about his good deeds," Mr. Wood said, "but he would not thank me for that."



Mr. H. O. Short



The casket containing the Certificate of Admission as an Honorary Freeman of Rochester.

THE FREIGHTER ACCIDENT

IT is with the most profound regret that we have to record the loss on Friday, May 6th, of one of the Bristol Aeroplane Company's development Type 170s, together with the lives of all the seven men aboard. It is rarely that a crash with a development aircraft exacts such a heavy toll and it is therefore all the more appalling when such a thing does happen.

As we go to press, no information is available as to the cause; the aircraft itself was a normal Type 170 Freighter, used by the B.A.C. as a development machine, and at the time of the crash was engaged on a test flight. The pilot was J. A. C. Northway and with him were John Radcliffe, R. M. Pollard (Engine Division) and E. J. M. Archbold, J. L. Gundry, C. Flook and R. H. Daniels (all of the Aircraft Division).

All who knew "Dick" Northway will feel his death as a bitter personal loss. His quiet reserve, coupled with an engaging sense of humour, gave him a personality at once attractive and eminently likeable. His qualities as a pilot were high and, backed as they were by useful technical knowledge, made of him a test pilot of the utmost value.

Aged 42, James Arthur Charles Northway was born in Ceylon and came to England when eleven years old. He began flying at the age of 19 at the Reserve School at Filton and in 1935 joined the Cotswold Aero Club as an instructor. Two years later, he went to the Bristol Aeroplane Company, also as a flying instructor, and then, in 1939, became a member of the flight test staff. He became assistant chief test pilot in February, 1947.

Mr. John Radcliffe, aged 47, was head of the Flight Research Department specially set up in 1949 to deal with the flight tests of the Brabazon I. Mr. Radcliffe had logged over 760 hours of test flying as flight engineer in prototypes, mostly with Vickers-Armstrongs with whom he was for twelve years chief aerodynamicist and flight test engineer. He joined the Bristol Aeroplane Company in 1936 and during nine years as experimental manager was responsible for building prototypes of the Beaufort, Beaufighter, Buckmaster, Brigand and Type 170. He also undertook the duties of flight test engineer when required and included in his record of seven maiden flights in prototypes those of the Brigand and Type 170.

No 8

Mamba

memoranda

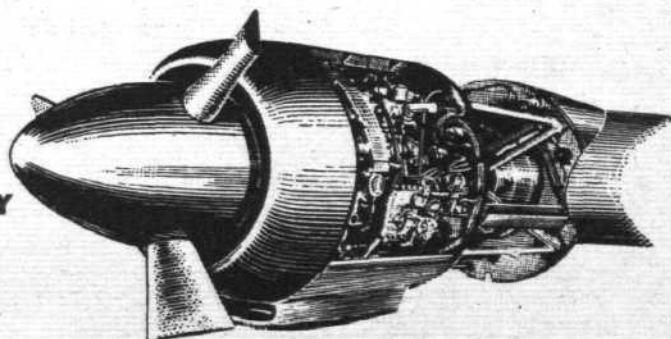
COMPACTNESS AND COMPLETENESS

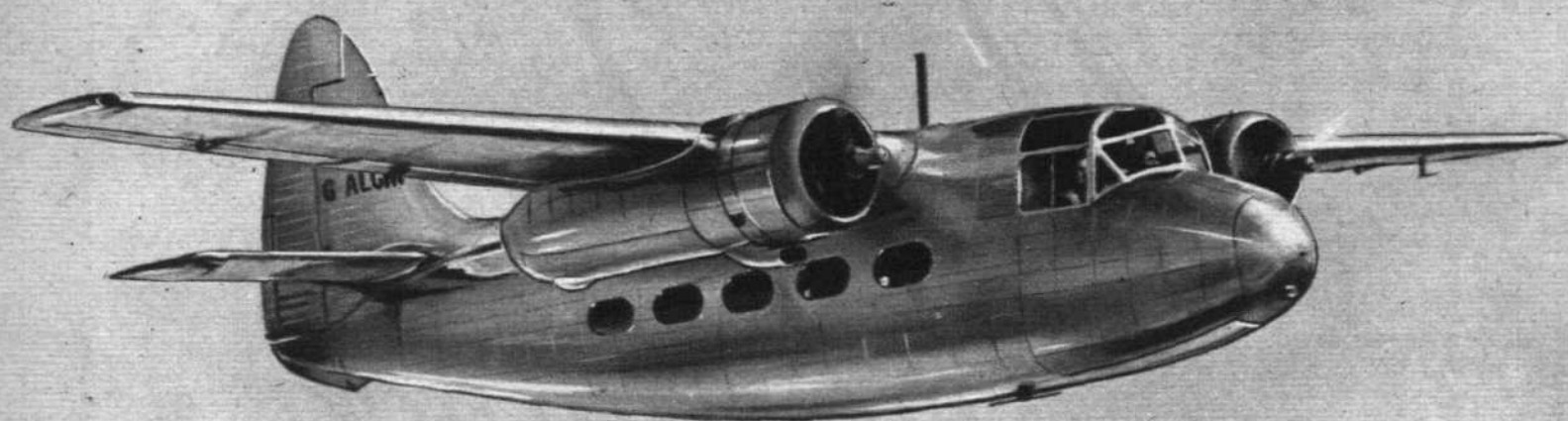
Despite the small diameter of the Mamba (under 30" cowed) all the aircraft and engine accessories are housed in the nacelle. The oil system too, complete with oil tanks, is incorporated and no external cooling is necessary. The Mamba is a completely self-contained power unit.

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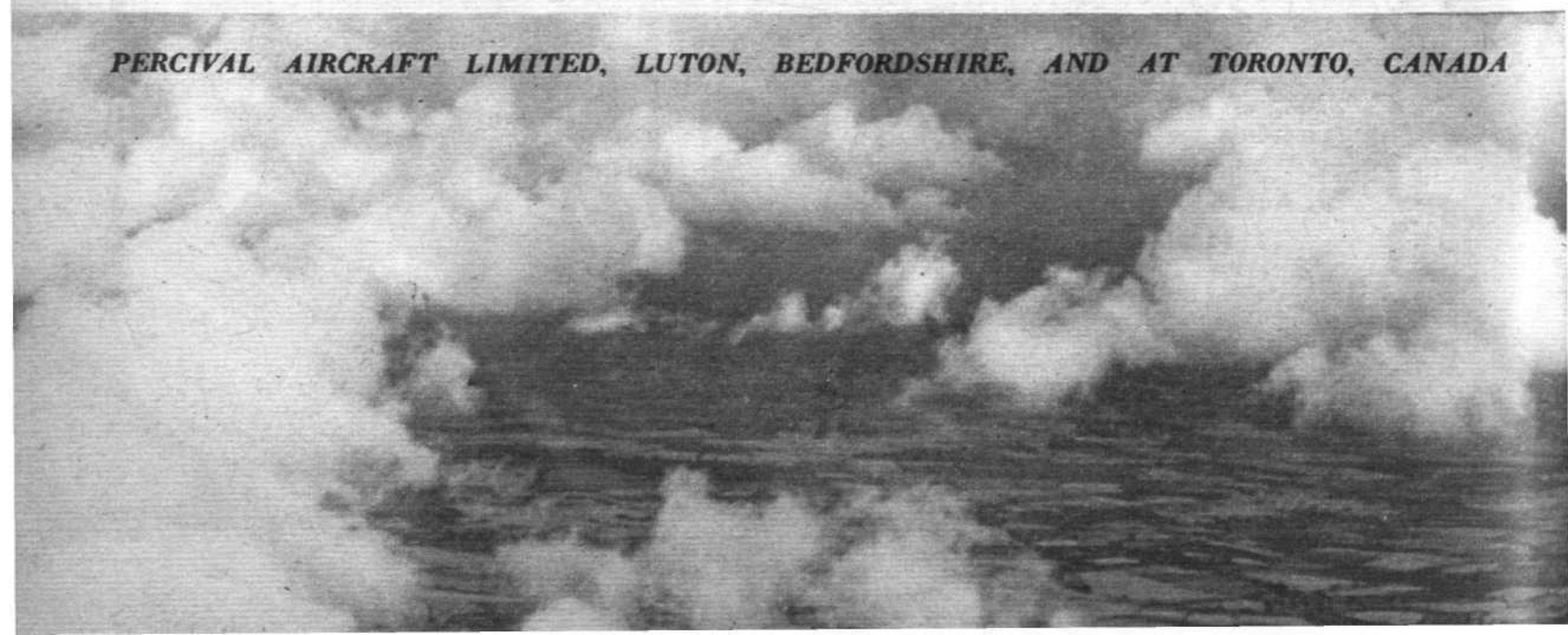
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Background of the Soviet Air Force

Designers, Scientists and Establishments

By Lt. Col. Dipl. Ing. G. A. TOKAEV

PRESENT-DAY warfare is primarily a scientific and technical struggle between the rival parties or, in Molotov's words, "a war of engines." Consequently the scientific and technical potential becomes one of the decisive factors which pre-determine the development of the conflict. This potential must include scientists and technicians, a sound basis for experiment and research, appropriate industrial backing and, finally, experience. The following is an unprejudiced account of the actual condition of these branches in the U.S.S.R. The author wishes to emphasize that details which might appear irrelevant under normal conditions abroad may in the U.S.S.R. play practically a decisive role, though this is not always obvious.

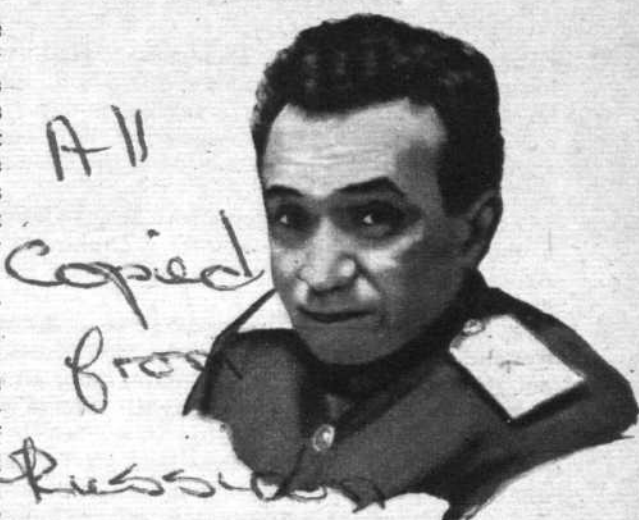
Russian scientific thought holds a high position in the history of aeronautical development; the name of Professor N. E. Zhukovski, for instance, is familiar in aviation circles throughout the world and is encountered in practically all courses of aerodynamics in all languages. Zhukovski was an outstanding mathematician and aerodynamicist who was studying the problems of flight as long ago as the eighteen-nineties. He was the author of a number of works of fundamental importance, in one of which he presented the famous Kutta-Zhukovski formula for lift. In 1909 he founded an aviation society, members of which became prominent figures in Russian, and later in Soviet, aviation. The best-known of these are noted below.

B. N. Yuriev is a famous Soviet aerodynamicist—a specialist on helicopters, one of the founders of practically all Soviet aerodynamic institutes, and the author of well-known text-books on experimental aerodynamics and the theory of airscrews. Ranking as a Lieutenant General of the Air Force, he is an Honorary Scientific and Technical Worker, Academician, and Deputy Head of the Zhukovski Air Force Engineering Academy for scientific and educational work. Twice he has been awarded the Stalin Prize.

A. N. Tupolev is the Soviet's most famous designer of heavy aircraft, notable among which were the ANT-1, ANT-9, ANT-14 (five-engined), TB-1 (twin-engined bomber), TB-3 and TB-7 four-engined bombers, and the TsAGI-25 single-engined, long-range aircraft used by Chkalov and Gromov for their Moscow-America flight in 1937. The Tu-2 is the best of the Soviet twin-engined attack bombers and the Tu-70 very-long-range bomber is based on the Boeing B-29 Superfortress. Tupolev is a Hero of Socialist Labour, Stalin Prize Winner, Professor, and Lieutenant General of the Air Force.

A. A. Mikulin, designer of the widely used liquid-cooled AM aircraft engine, is an Academician and Stalin Prize Winner.

B. S. Stechkin, the most brilliant specialist and theoretical worker on reaction propulsion, had produced a theory on jet propulsion in the nineteen-thirties. At the present time he is head of the jet department of the Zhukovski Air Engineering Academy, a Professor, and Corresponding Member of the



Four talented designers of aircraft now in service with the Soviet Air Force—Lt. Gen. Tupolev (top), Major Gen. Mikoyan, Col. Gen. Yakovlev, and Lt. Gen. Lavochkin.



Lt. Gen. Iliushin, designer of the "Il" series.

*Copied
from
Journal*

U.S.S.R. Academy of Sciences. Had he not been imprisoned for a long period, the U.S.S.R. might have had its own gas-turbine units in service to-day.

V. Ya. Klimov is a designer of liquid-cooled aircraft engines as installed in Yak fighters, the Tu-2 and Pe-2, and is a Stalin Prize Winner.

V. S. Kulebakin, academician, Major General of the Air Force and Professor at the Zhukovski Engineering Academy, is a highly qualified specialist on electrical engineering for aircraft.

V. P. Vetchinkin, Professor at the Central Aerohydrodynamic Institute (TsAGI), is the foremost Soviet specialist on aerodynamic calculations and author of a well-known course on the dynamics of flight. He is a Stalin Prize Winner.

G. N. Musinyants, a Professor at TsAGI, is the best qualified Soviet specialist in the design of test and measuring equipment for aerodynamic establishments.

aerodynamic laboratory (of which the author was at one time in charge) and is equipped with one large, one medium and four comparatively small wind tunnels for educational purposes. Also available are two high-speed tunnels—one subsonic and the other supersonic.

Though the Academy is evidently out of favour with the authorities, it will be difficult to find a central industrial or other establishment in the system of the Soviet Air Force which is not headed by one of its former pupils. Until 1933 the principal was Khorkov, a member of the Revolutionary Military Council, who held a military rank equivalent to a Marshal. He was arrested by the People's Commissariat for Home Affairs (NKVD). His place was taken by Corps Commander Todorski, who was highly spoken of by Lenin himself. In 1937 Todorski was also arrested by the NKVD in connection with the Tukhachevski plot. Todorski in turn was replaced by Division Commander Pomerantsev, who was removed from his post in 1940. Next came Lieutenant General of the Air Force Sokolov-Sokolenok, who retained his post until 1947, when he too was dismissed. Since that date the head of the Academy has been Major General of the Air Force Volkov, a rather colourless individual without sufficient ability to run an establishment of such importance.

As regards the quality of its work, the Academy is obviously going downhill, and this is bound to reflect on the strength of the Soviet Air Force. Coming events will confirm this.

On the eve of the second world war the Leningrad Air Force Academy was founded. Here military engineers are trained to maintain Air Force material, including airfield equipment. The standard of specialists, however, is definitely lower than at the Zhukovski Academy. The author has always thought that the establishment of the Leningrad Academy was a thoughtless move on the part of the Soviet government, since the Academy's practical resources are insufficient for it to deal successfully with the problems set before it. The principal reason for this is the lack of highly qualified and capable professors and

Background of the Soviet Air Force

K. A. Ushakov is likewise a TsAGI Professor, and is a leading specialist in experimental aerodynamics. He was awarded a Stalin Prize for his work.

Under Zhukovski's leadership the society had by 1910 constructed the first wind tunnel in Russia. This, to Russia, was what Stanton's wind tunnel was to England, Prandtl's to Germany and Eiffel's to France. It had a rectangular working section measuring 1.5 x 0.3 metres. After the October revolution, with Lenin's direct support, the technicians of Zhukovski's group founded the Central Aerohydrodynamics Institute (TsAGI), now equipped with first-class wind tunnels, including what is claimed to be the world's largest, having a working section of 24 x 18m.

Due to the efforts of Zhukovski and his pupils, and with the energetic support of Lenin, the Moscow Institute for Engineers of the Red Air Force was organized. In 1923 this became the Zhukovski Air Engineering Academy (V.V.A.Zh.) and it is now in the front rank of all Soviet aeronautical establishments. It has played, and continues to play, a very important role not only in the training of air engineering and scientific personnel, but in the solution of aeronautical engineering problems. It can quite deservedly be called the heart of Soviet aviation, and particularly of the air force. Almost all Soviet aircraft designers were trained here. The Academy is also responsible for instructing specialists (military engineers) in the following branches: engine and aircraft constructors (up to 1938); maintenance engineers for aircraft and engines; specialists in all types of aircraft armament; a limited number of aerodynamic specialists; and specialists in electrical engineering, radio and radar. The best professors and lecturers are on the staff, and concentrated at the Academy is the finest laboratory equipment available, though certain essential items are lacking. To be a professor, lecturer or instructor at the Academy is considered an outstanding privilege. The V.V.A.Zh. has its own

lecturers, and deficiencies in laboratory equipment. The Academy was founded on the former Leningrad Civil Air Fleet Institute, so that the latter ceased to exist and civil flying in the Soviet Union was struck an irreparable blow, the results of which are felt to this day.

After the end of the second world war the Soviet government—"longing for peace"—founded the Riga Air Force Engineering College to train military engineers in the maintenance of Air Force equipment. As in the case of the Leningrad Academy, this college was staffed chiefly by the less able professors and lecturers from the Zhukovski Academy. The opening of two more such colleges is proposed. The Kuibyshev Military Engineering Academy has a section for airfield construction, and thus also trains military engineers for the air force.

The total number of military air force engineers trained at the academies and colleges can be assessed at 300-350 men annually. These are quite sufficient to fulfil air force requirements, and in the event of a war the Soviet Air Force will not be lacking in maintenance engineers for operational units, acceptance tests, etc.

The largest centre for training air force officers (other than technical staff) is the Air Force Officers' and Navigators' Academy (now called simply the Air Force Academy) at Monino, near Moscow. Until 1937 a faculty of the Zhukovski Academy, this is now an independent establishment. Among its students—former pilots and commanders of air force units—there are some 250 Heroes of the Soviet Union. The professors and lecturers are the leaders of Soviet thought on strategy and tactics. Among them is Lieutenant General of the Air Force Professor Tartarchenko—the "Soviet Douhet"—a luminary in the field of air tactics.

The Frunze Military Academy, Voroshilov General Staff Academy and Voroshilov Naval Academy (Leningrad) have air force departments, and there are numerous flying

schools which contribute to the supply of officers.

Although officers are being trained for the air force in sufficient numbers, the standard of training—demonstrated in the second world war—is, excepting the Monino Academy, comparatively low. All flying and administrative training is undertaken with the reserve forces in mind. Numbers again are ample.

Of the numerous aviation colleges in the U.S.S.R. those listed here are the most important. The Ordzhonikidze Moscow Aviation Institute (M.A.I.) is the largest of the non-military institutes, and trains specialists in the same subjects as the Zhukovski Academy, though only for the Ministry of Aircraft Production. The institute is very well equipped and staffed. Holding a lower position than the M.A.I. as regards the numbers and standards of pupils, the Moscow Aviation and Technological Institute (M.A.T.I.) instructs engineers and technicians for all branches of the aircraft industry. Also similar to the M.A.I., but on a smaller scale, are the Aviation Institutes of Kazan, Kharkov and Kiev. Only the second of these offers the high standards of the M.A.I. The Rybinsk Aviation Institute trains engineers, almost exclusively in aircraft-engine construction.

Though there will be no lack of industrial engineers for the Soviet aircraft industry in the event of war, the qualifications of these men are comparatively low, and this will continue to be reflected in the effectiveness of the Soviet Air Force.

By the 1930s the U.S.S.R. had four aerodynamic institutes, the chief of which were the TsAGI and the Laboratory of the Zhukovski Air Engineering Academy. In 1938, however, a new TsAGI was constituted, with which no other experimental research centre in the Soviet Union can now compete. The old TsAGI is in Moscow (Ulitsa Radio House 16) and the newer one in the environs.

Farnborough Rivalled

The new establishment is first class in all respects and rivals not only Farnborough and Chalais-Meudon, but America's N.A.C.A. Prominent in the new TsAGI is a large wind tunnel with an elliptical working section measuring 24×18 metres and a flow speed of 60 to 70 metres/sec. This has entirely automatic control and measuring system, enabling extremely varied experiments to be undertaken. Also available is a large tunnel, 7 metres in diameter and having two working sections. Flow speeds of up to 120 metres/sec are obtainable, and the control and measuring systems permit experiments with complete power units, fuselages, etc. There are, moreover, a vertical tunnel with a working section of about 3 metres, a series of tunnels with elliptical sections (approximately 2.5×3.2 m), having flow speeds up to 100 metres/sec, and a high-speed aerodynamics laboratory with several tunnels, some of which can be classed among the world's best.

The pride of the new TsAGI is its laboratory for static and dynamic strength tests, equipped for experimentation in all types of vibration, undercarriage drop-tests, structural tests, etc. Regulations specify that no Soviet aircraft may be accepted for service until it has been tested here, and since the new TsAGI is the only establishment of its kind, it is a serious bottleneck and causes frequent disputes between constructors. During the war Yak aircraft were in the large wind-tunnel most of the time since Yakovlev was not only a designer but the Deputy Minister of Aircraft Production.

Among other experimental centres is the aerodynamics laboratory of the Air Forces Scientific Experimental Institute (N.I.V.V.S.S.), situated in a small place called Chkalovskaya, near Moscow. Here is one tunnel of elliptical section (2.5×3.5 m approximately) and with a speed of 80-90 m/sec; within this is a subsonic high-speed



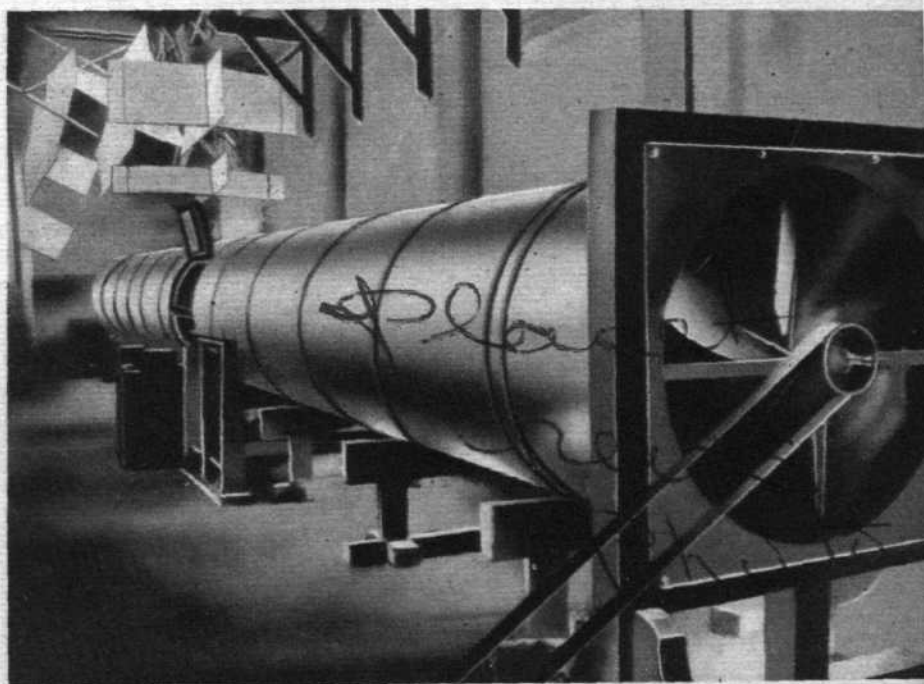
A model is mounted for wind-tunnel tests.

tunnel. There is a similar type of laboratory at Novosibirsk, two large tunnels at the M.A.I., one in Kazan, one in Kharkov, and one in Voronezh. Certain aircraft factories have their own tunnels. The aerodynamic laboratory of Junkers at Dessau, and all aerodynamic research equipment (apart from the concrete casings of the tunnels) from the D.F.L. and other German centres in the Russian zone of occupation, have been transported to the U.S.S.R. Several new laboratories are being designed, and building has already started, but these will not be ready before 1953-60.

The present lack of experimental and research centres seriously limits the development for the air force, and apart from TsAGI and the Zhukovski Academy, the existing centres lack fully qualified aerodynamic workers, equipment and resources.

Mathematical development in Russia (which plays an important part in aerodynamics) is at a commendably high level. The most prominent theoretical worker in the field

Russia's first wind tunnel, completed by Zhukovski in 1910.



of aerodynamics was Academician Chaplignin, who died in 1942. Following him in order of importance among theoretical workers with a strong mathematical inclination are Arzhanikov (M.A.I.), Golubev (Zhukovski Air Academy), Streten-ski, Kibel, Kochin and Franl. Their theoretical work, however, has no direct effect on the air force since it is dedicated to general problems and not to the solution of specific technical questions.

The most outstanding figure in the field of high-speed aerodynamics is undoubtedly Khristianovich. Alone, and in conjunction with his colleagues, he has provided a foundation for the development of jet propulsion in the U.S.S.R.. Practically all his accomplishments are secret. The principal workers in the field of applied (experimental) aerodynamics for medium speeds are Yuriev (V.V.A.Zh.) and a number of TsAGI professors. The names Vetchinkin, Pyshnov, Ostoslavski and Zhuravchenko, together with those of certain professors and lecturers from TsAGI and V.V.A.Zh., are outstanding in the field of aerodynamic calculation and the dynamics of flight. Specialists in the theory of engines are Professor Maslennikoy, lecturers Bugrov and Zaikin, and several

talented young aerodynamicists now starting on their careers will, in the near future, make good the lack of aerodynamic workers. A very different state of affairs, however, is apparent in engine construction.

Reference has already been made to Tupolev, the best-



A new photograph of La-9s—best of the Soviet piston-engined fighters.

Background of the Soviet Air Force

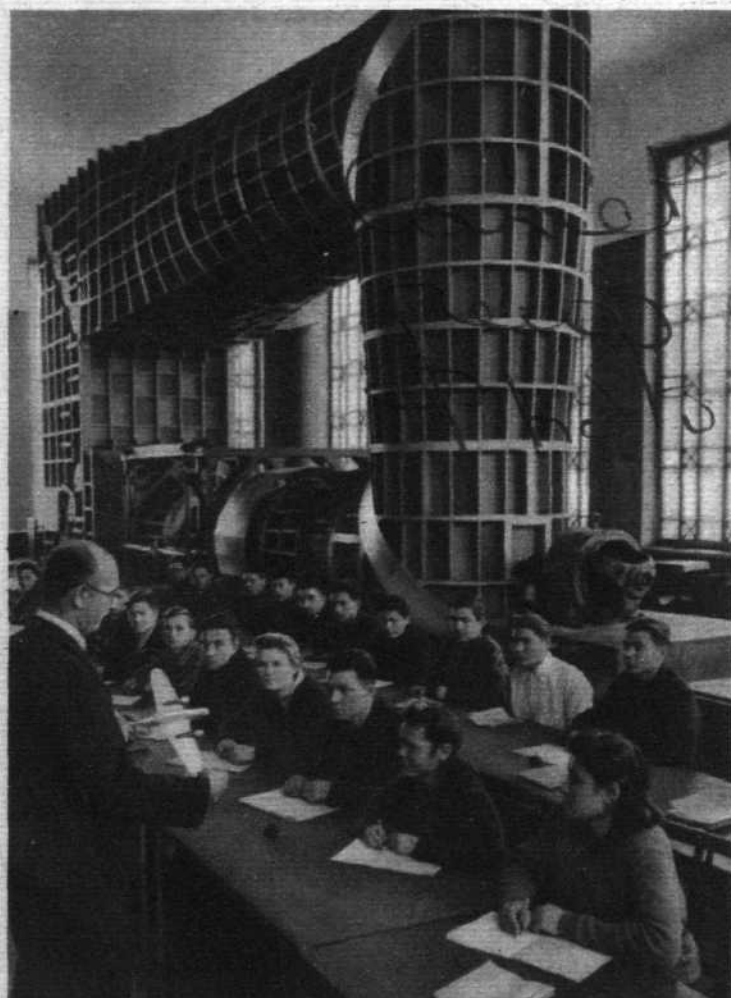
members of the Central Institute of Aero Engine Construction (Ts.I.A.M.).

Despite the obvious lack of personnel, the U.S.S.R. is abreast of the latest foreign aerodynamic achievements and promises to develop quite successfully. The number of

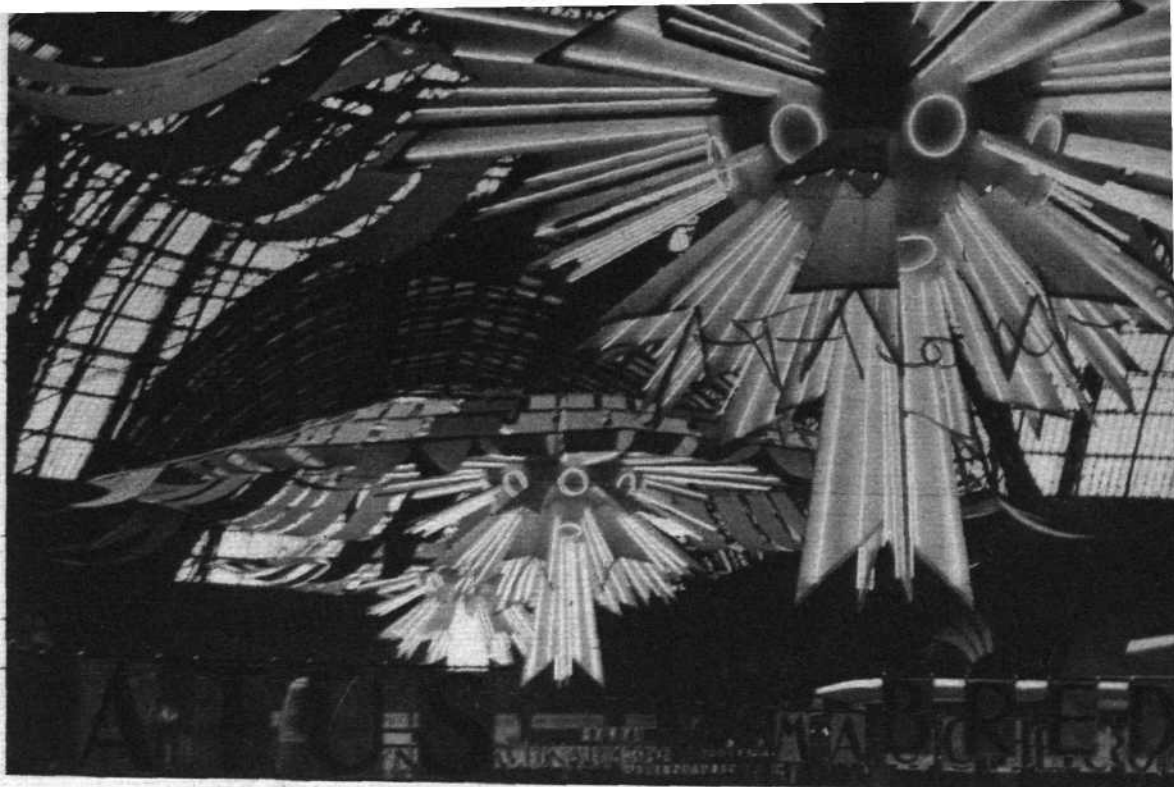
known of all Soviet aircraft designers. The names Yakovlev, Iliushin, Lavochkin and Mikoyan are little less famous. Yakovlev—a Colonel General of the Air Force—designed the Yak-1 and Yak-3 fighters, the twin-engined Yak-4 which did not see active service, UT-1 and UT-2 trainers, Yak-6 light twin-engined passenger aircraft, Yak-7 two-seat fighter trainer, Yak-9 (one of the best Soviet fighters), Yak-12 light cabin monoplane, and Yak-15 jet fighter. Lieutenant General of the Air Force Iliushin designed the Il-4 twin-engined bomber (formerly DB-3F), the famous Il-2 Stormovik anti-tank and ground attack aircraft, Il-10 (development of Il-2), Il-12 twin-engined transport, and Il-18 four-engined long-range passenger and freight carrier. Best known among the designs of Lavochkin—another Lieutenant General of the Air Force—are the Lagg-3, La-5, La-7 and La-9 piston-engined fighters (the last-named is the best Soviet piston-engined fighter in service), and the La-15 jet fighter. Major General of the Air Force Artem Mikoyan was responsible (with Gurevitch) for the Mig-1 and Mig-3 piston-engined fighters and the Mig-9, the best of the Soviet jet fighters.

Given suitable power plants, all these men can design excellent aircraft. A certain number of talented designers are at present in disgrace, but if the Government should change its attitude towards them they might prove equally capable. A vital part is being played by the German designers introduced into the U.S.S.R. by the Ministry for Home Affairs.

The author is firmly of the opinion that an almost decisive factor is the lack of suitable power plants. If the problem of providing engines—particularly turbojets—is not solved two to three years before a possible conflict, the Soviet Air Force will have to rely primarily on numerical superiority to save the situation.



Third-year students of both sexes are lectured in their aerodynamics laboratory. The small-capacity wind tunnel is used for routine demonstrations.

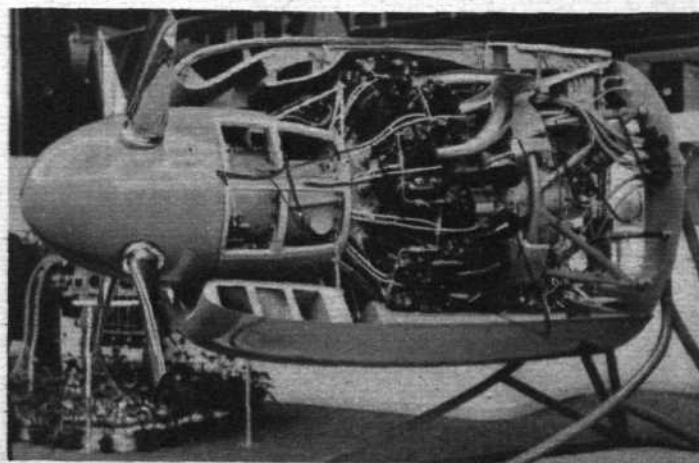
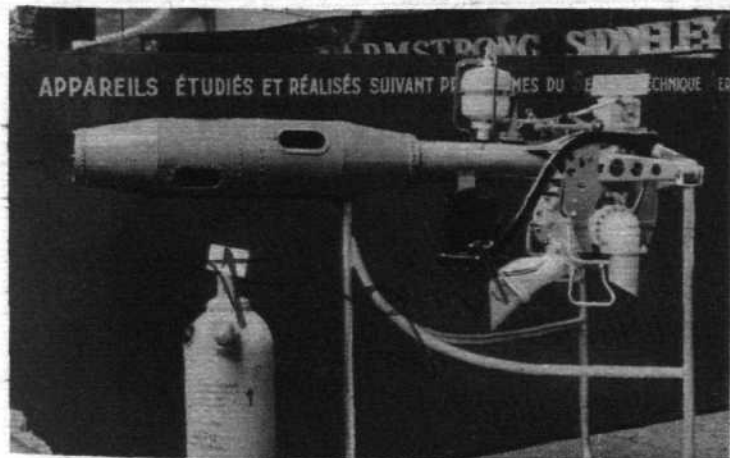


Projects and Actualities

A Pot-Pourri from the Paris Show

THE splendour of the ceiling ornamentalations (upper right) is once again a characteristic of the aeronautical Salon. At the foot of the page all four of the French jet aircraft on view may be seen together. On the left is the half-scale model of the S.E.2410, with the Dassault M.D.450 Ouragon beyond it. Recognized by its unusually large cockpit enclosure is the S.O.6020 Espadon, and on the right the S.O. M2. The three first-named types have R.R.-Hispano Nenes and the S.O. M2 a

Derwent. (Below left) Built in France by S.E.P.R. is the American Aerojet rocket motor developing 1,650 lb thrust. The longer nose portion of the new two-speed supercharged S.N.E.C.M.A. 14U results in part from the incorporation of a torquemeter. The power output is 2,200 h.p. at 2,600 r.p.m. A choice of fuel systems—*injection carburettor or direct fuel injection*—is given. The cylinder barrels have cast light alloy fins attached by a new patented process.



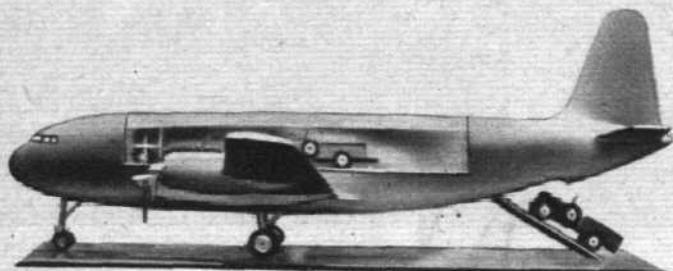
Projects and Actualities



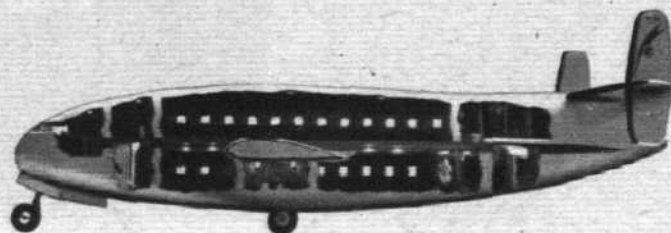
Features in which the Douglas Super DC-3 differs from its forerunner are shown by this model. Note the squared-off wing tips.



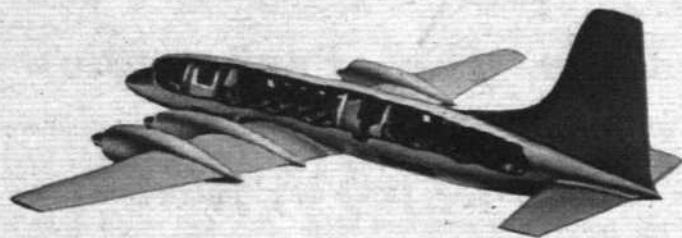
The model Bristol Brabazon II (eight Proteus turboprops) is most impressive. A multi-wheel main undercarriage will be fitted.



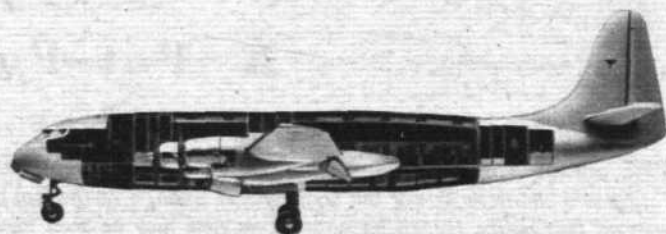
The loading ramp of the Piaggio P.140 (four Bristol Hercules engines) is at a steep angle. This type is developed from the war-time P.108.



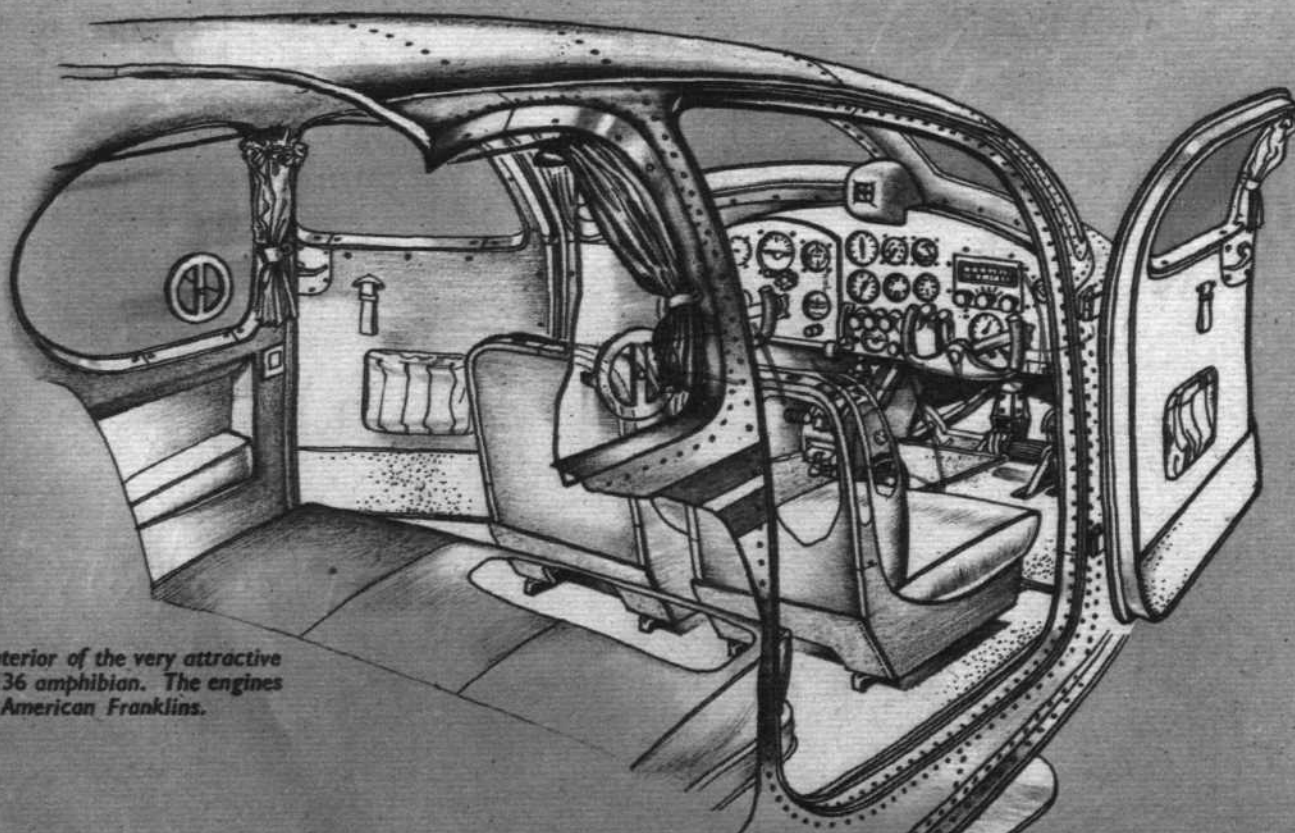
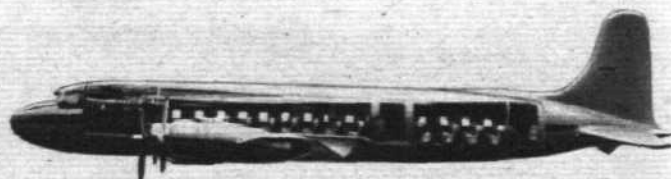
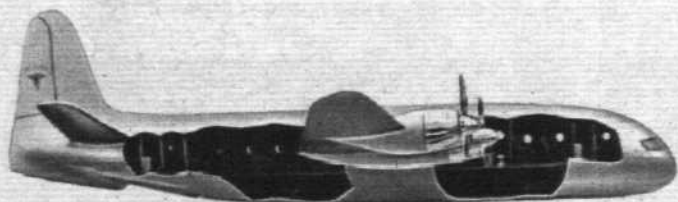
Proposed passenger layout of the Bréguet 763, a development of the 761.



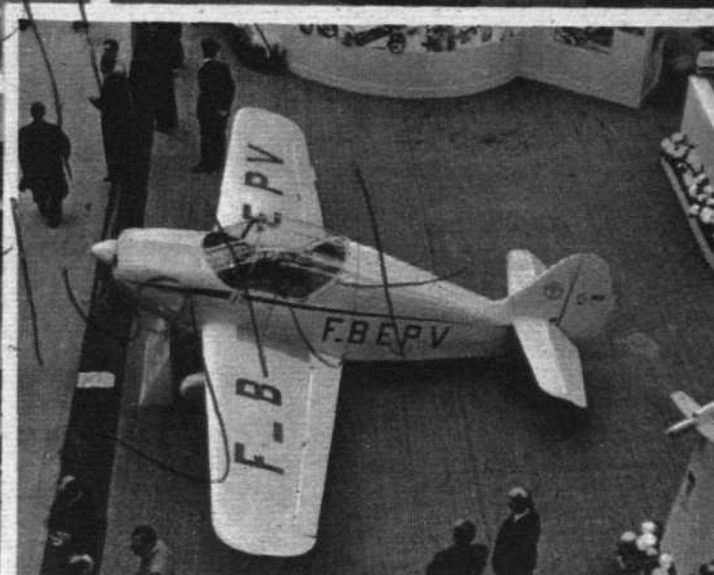
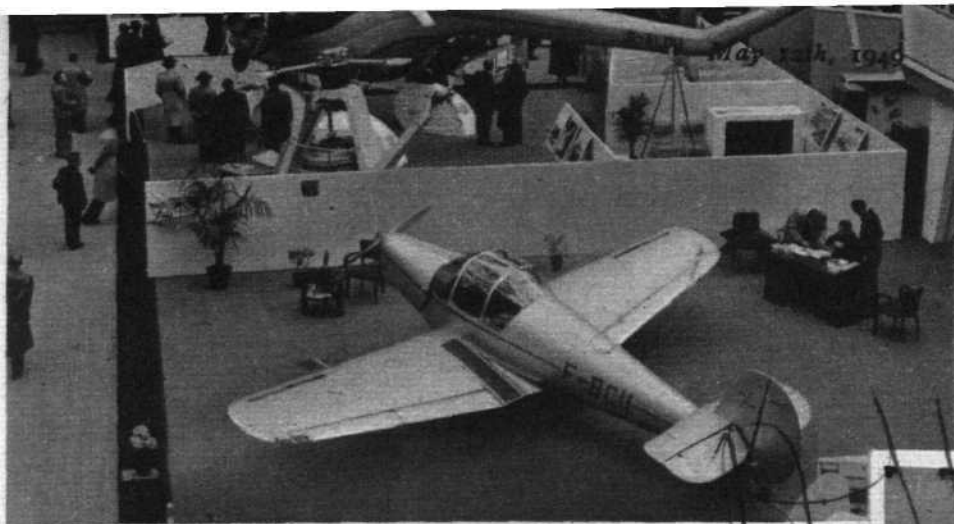
Bristol show a model of the Type 175 (above). Below is the S.E.1030, a possible development of the S.E.1010 high-altitude survey aircraft.



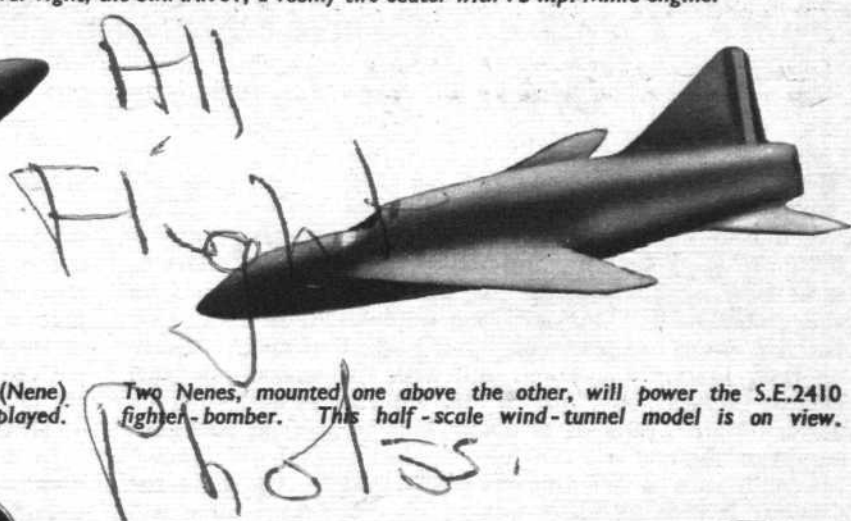
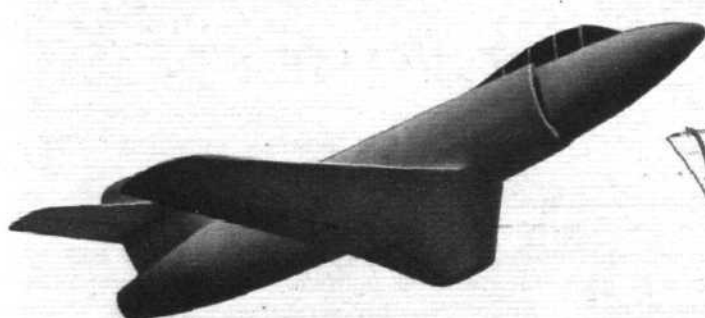
Intended for Air France transatlantic services, the S.E.2010 Armagnac (above) has four Wasp Majors. Below is the Douglas DC-6.



Car-like interior of the very attractive Piaggio P.136 amphibian. The engines are American Franklins.

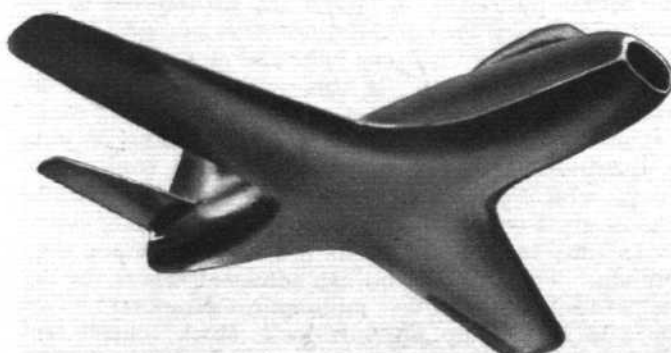


Representative of the many attractive and practical light aircraft displayed in the Salon : Top left, the Starck A.S.57 with 105 h.p. Walter Minor engine. Alternative power units are the Minié, Mathis, Regnier and Continental. Below, the Macchi Varese (Continental C.85) floatplane variant of the M.B.308, beyond which can be seen the landplane version with nosewheel. Top right is a shining example of the S.O.7060 Deauville three-seater powered by a 105 h.p. Walter Minor and, lower right, the S.I.P.A.901, a roomy two-seater with 75 h.p. Minié engine.



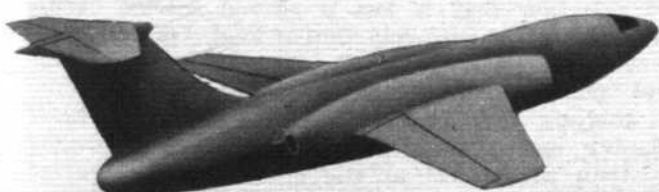
A high-set tailplane distinguishes the N.C.1080 naval fighter (Nene) from the Supermarine 510 a model of which is also displayed.

Two Nenes, mounted one above the other, will power the S.E.2410 fighter-bomber. This half-scale wind-tunnel model is on view.

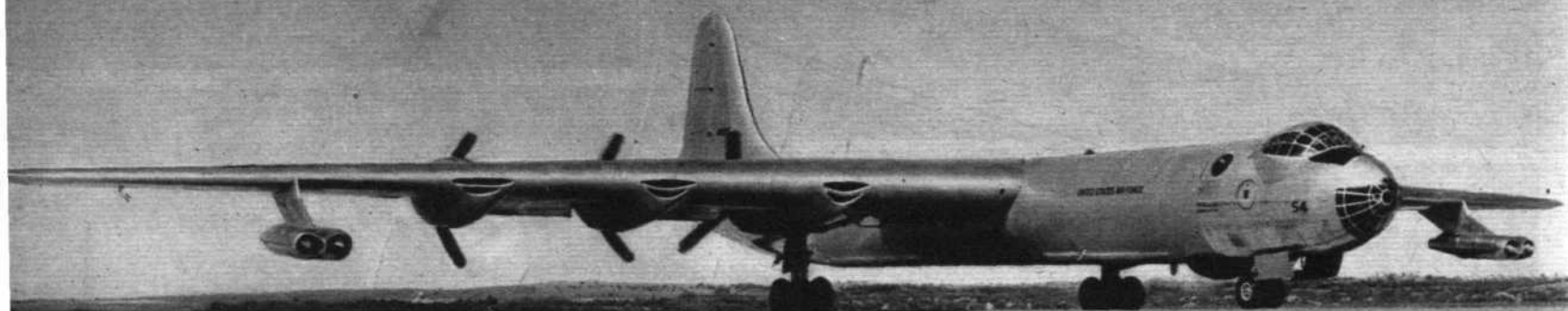


Another Nene-powered naval fighter, shown by a model, is the Nord 1601 (above). Below is the twin Derwent N.2500 research aircraft.

The very attractive Fokker S.14 trainer (Derwent) is shown by the above model. Below is the N.C.1072 all-weather fighter.



Stanley
Convair



The Asymptotic Bomber

Prototype Convair B-36D with wing-tip J-35 turbojets; the production version will have 5,000-lb s. t. J-47 jets.

Some Further Comments on U.S. Air Policy and its Effect on Long-range Bomber Design

IN our previous comments* on U.S. strategic-bomber policy we have

By "Favonius"

hinted that the Americans may be throwing away a lot more good money after bad in a determined effort to save face by putting the big piston-engined bomber on the global map. One gets the impression, in fact, that the Air Force top planners, having spent so much already on their favourite weapon, and with the 10,000-mile goal clearly in sight, are loth to cut their losses and start on a fresh trail. Judged, of course, by present jet fuel consumption figures, one can fully appreciate their dilemma—although it is a tolerable certainty that by the time the Convair B-36 is in full operation, the pure jet bomber will have reduced the range gap to a negligible quantity.

Range, undoubtedly, is the red warning light that now overshadows American global air strategy and, clearly, from the military planners' viewpoint it cannot be lightly brushed off. From the design standpoint, too, it is like a recurring decimal—difficult to shake off and forget; the more you keep pushing up the tankage, the poorer becomes the relative military load, and the bigger and clumsier the airframe. One penetrating sidelight on this is that a 10,000-mile piston-engined bomber is forced to carry an oil tankage of greater weight than its own bomb load. The XB-36, for example, was originally designed to accommodate 1,200 U.S. gallons of oil weighing some 9,000 lb, while the B-36B is millstoned with at least 11,000 lb.

Before looking closer at range performance, however, we must blow away some of the publicity smoke-puffs mentioned in our last article. Actually, it is not difficult to make a reasonably accurate performance comparison of the Convair B-36 *vis-à-vis* the Northrop B-49 on the basis of officially published drawings and data. Once the respective

gross weights, powers, propulsive efficiencies, wing areas, wing spans, parasite-

drag coefficients and fuel and bomb loads are known or computed, the fundamental performance parameters fall into ordered mathematical relationship—without fear or favour of high- or low-level politics, whether Democratic or Republican. About the only serious guess in the whole performance "guestimation" is the rated critical height of the piston-engine supercharger and the corresponding power at altitude.

In the article published on March 3rd we referred to the bombshell caused by the cancellation of orders worth more than \$300 million for jet fighters, light and medium bombers, and that some \$290 million of this credit balance will be expended on a new batch of Convair RB-36 long-range reconnaissance bombers, and on improving existing B-36As by the substitution of Wasp Major R-4360-41 engines.

Convair, which previously had got only a few crumbs from the original 70-Group rearmament programme, therefore looks like having orders to the tune of more than \$300 million. The wizard who has achieved this is the big boss of Consolidated-Vultee millionaire promoter Floyd Odum, who bought up Convair lock, stock, barrel and flock a year or two ago on a falling market. (Convair lost a further \$12 million in 1948, when the rest of the industry was well out of the post-war red.)

One of the cloudiest claims made for the Big Stick is the repeated assertion that it has a proved service ceiling exceeding 40,000 feet with full combat load. (More recent claims even go as high as 46,000 feet!) It all depends, of course, upon the weight definition. According to our analysis, the B-36B is physically (i.e., aerodynamically) incapable of reaching a service ceiling of more than 28,000 feet at the initial gross weight of

* See "Scribes and Pharisees," "Flight," March 3rd, 1949.



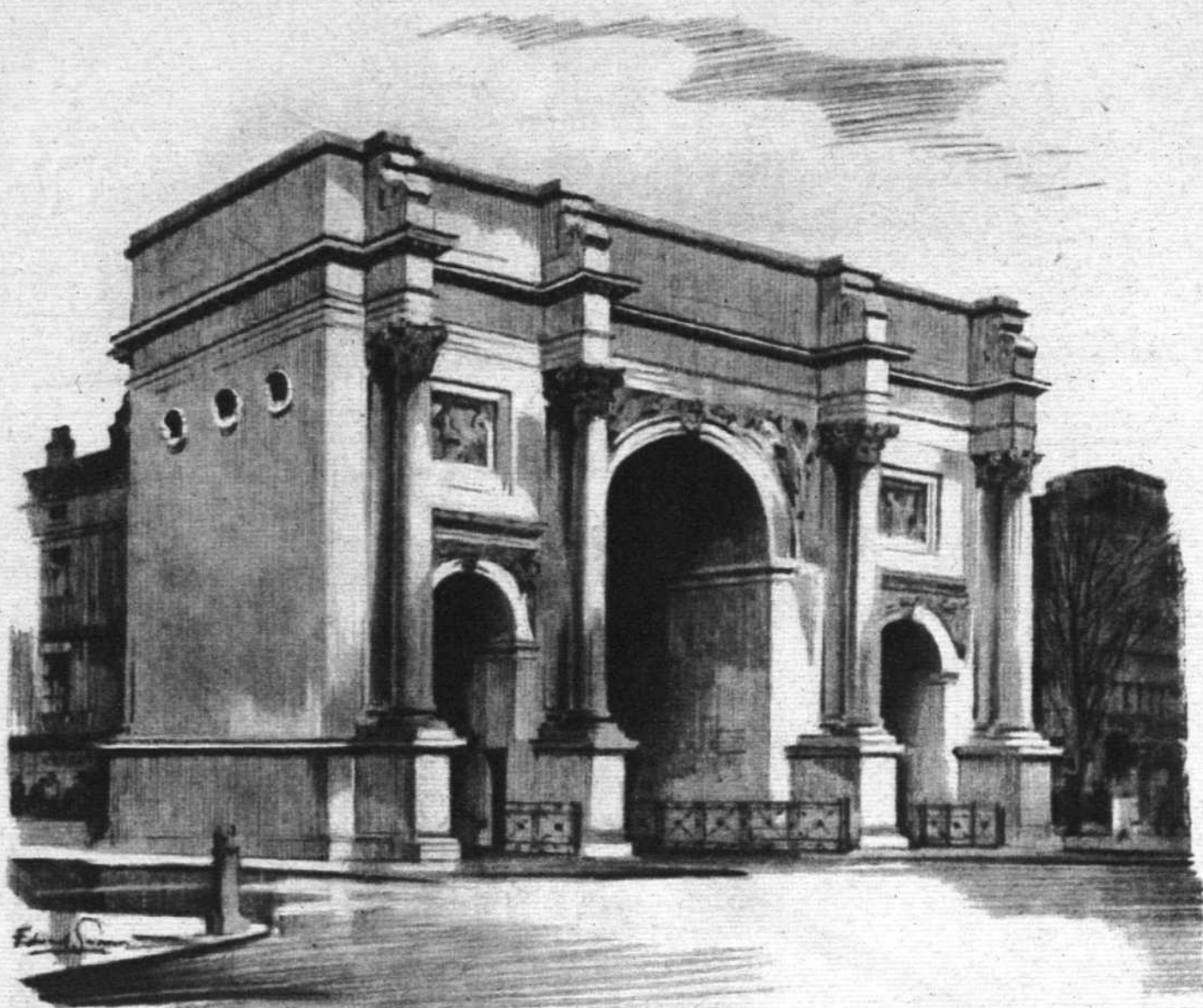
The Hawker N.7/46



The latest British Fighter which is powered
by the Rolls-Royce "Nene" engine

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THE MARBLE ARCH

This famous arch was intended by George IV to form a gateway to Buckingham Palace, but by a miscalculation it was made too narrow to admit the State coach. In 1851 the Marble Arch was placed in its present position at the north-east corner of Hyde Park.

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The Asymptotic Bomber

326,000 lb at which this version is now flying. Admittedly, however, the take-off-weight condition is not a sound criterion of combat performance in the case of a 5,000-mile-radius bomber, so let us examine the situation nearer the target.

At the absolute target radius of 5,000 miles (after consumption of just over 60 per cent of the fuel load and immediately before the 10,000 lb bomb load is released), the gross weight is down to about 216,000 lb, and the most optimistic figure-juggling on our slide-rule indicates that the B-36B will then reach a service ceiling of approximately 39,000ft. We say "optimistic" because our figuring is postulated not only on a low parasite drag coefficient of 0.016, but on the assumption that the Wasp Major R-436C-41 engines now installed in the B-36B can deliver a normal continuous output of 2,650 b.h.p. up to a critical supercharger height of 35,000ft. (The wet-boost take-off power, of course, is 3,500 h.p.)

The above-quoted drag coefficient assumes, for example, that all gun turrets are retracted, and while this assessment may be fair enough for an unmolested long-range mission, it is almost certainly on the low side under combat conditions. Such possible power dividends as intake ram-effect and exhaust thrust-augmentation are considered to be nullified by the cooling drag, and this balancing of debit and credit is probably on the optimistic side again. Airscrew propulsive efficiency at 35,000ft has been estimated at 0.73 because, although this engine has a low airscrew-reduction gear ratio of 0.38, the blade-tip speed at full power and corresponding maximum aircraft speed is well into the supersonic range at $M=1.1$. (At cruising powers, however, the propulsive efficiency has been taken at 0.84, since M does not exceed 0.9.)

But granted the B-36B can reach a height close to 40,000ft in the region of the target, this is really an escape ceiling rather than a combat altitude, since the manoeuvrability of a 160-ton bomber must be evanescent at its service ceiling. We need, also, to take a look at the speed-altitude chart (Fig. 1) to get a better idea of how such a long-range bomber is likely to approach the target. Studying first the maximum speeds, our figures show 290 m.p.h. at 20,000ft at the starting weight of 326,000 lb, rising to approximately 360 m.p.h. at 35,000ft at the target ($W=216,000$ lb). In the latter condition, the maximum speed will drop off to about 340 m.p.h. if the aircraft is pushed up to its service ceiling. Therefore, 35,000ft can be taken as its best fighting altitude with the gate wide open.

A long-range bomber, however, must perforce spend practically all of its time cruising at its optimum-range speed, otherwise it cannot make its specified range, and, unfortunately, this is where the piston-engined bomber falls down, since the optimum cruising speed is way below the maximum.

Aerodynamically, the aircraft must be flown at its maximum lift/drag ratio while, thermodynamically, the engine must be run at its most economical speed for minimum specific fuel consumption. Thus, in all the long-range flights of the B-36 to date the average (i.e., the overall) cruising speed has been of the order of 230 m.p.h. Actually, this is somewhat lower than the cruising regime appears to warrant, and it is possible that this figure can be improved to around 250 m.p.h. as the cruising technique is developed.

Incidentally, the B-36B is so heavily overloaded at the start that it cannot fly at its minimum-drag attitude until it has consumed some of its fuel and oil load. Our own analysis indicates a maximum L/D ratio of 20.5; but during the initial stage of a long-range mission it can achieve the requisite lift coefficient only by flying higher up the lift curve at a wing incidence beyond that of the aircraft maximum L/D—that is, the drag is above the minimum assumed in the Bréguet range equation. Although in this particular case the increased drag is of no serious consequence, such a point is occasionally overlooked when juggling with M. Bréguet's classic (and exceedingly useful) formula.

Nevertheless, in view of the undeniable fact that the B-36B has recently flown a 9,600-mile mission with a 10,000 lb bomb

load over the outward run, we can accept without quibbling the claim that it is now potentially capable of meeting its original specification range of 10,000 miles, albeit with some extra 6,000 gallons of fuel in the bomb bay. Under the most favourable conditions (airscrew propulsive efficiency 0.84, specific fuel-plus-oil consumption of 0.50 lb/b.h.p./hr) an absolute maximum range of 10,600 miles can be shown to be theoretically possible with a fuel tankage of roughly 27,000 U.S. gallons.

Parasite

There are a couple of points to bear in mind in this connection. First, an absolute range of 10,600 miles represents a practical service target radius of not more than 4,000 miles under normal operational conditions, allowing for all the usual contingencies. The second fly in the amber is also quite a bug—literally as well as figuratively. If a large part of the bomb bay is used for fuel cells (and it is difficult to see how the above-quoted range can be achieved without them) what happens to the bug on the flying trapeze, the McDonnell XF-85 escort fighter? And even if such

a parasite can still be accommodated in the bomb bay it needs a lot of imagination to conceive its effectiveness in the face of an overwhelming jet-interceptor attack from several quarters of the compass.

Assuming the approach to the target is made at a weight of 216,000 lb, flying at a height of 35,000ft at maximum L/D attitude, the appropriate cruising speed is approximately 290 m.p.h.—which is a leisurely gait likely to bring considerable joy to the heart of any aggressive jet-fighter pilot, especially in view of the immense target presented. For remember that the bomber must stay on the job and slug it out, while the fighters (very much in the plural) can break off at will and then re-form. Moreover, if they keep it up long enough to harass the bombers into opening up their engines to full power for any length of time, the bombers may never get home to fight another day, because of excessive fuel consumption. The fighters, on the other hand, fall on native soil and may rise again—as witness the Battle of Britain.

A counterfeit note has been injected into this hoary argument by top U.S.A.F. admission that current jet fighters—presumably American—appear incapable of dealing with the B-36 at its highest bombing altitude, which apparently is claimed to be at least 40,000ft, although our analysis shows otherwise. It may be news to some people in England that R.A.F. and U.S.A.F. pilots have been interchanging their respective fighter mounts and the R.A.F. verdict on American jet fighters confirms these altitude shortcomings. Whether this is mainly due to high wing-loading or power deficiency at stratospheric levels, or a combination of both, we cannot say at this time, but the finding seems to be reflected in the recent boosting of the B-36 programme and the cut-backs in the Republic F-84 and North American F-86 and F-93 jet-fighter production.

The flaw in this U.S.A.F. thinking is that it is predicated on the thesis that "enemy" jet-fighter design has necessarily

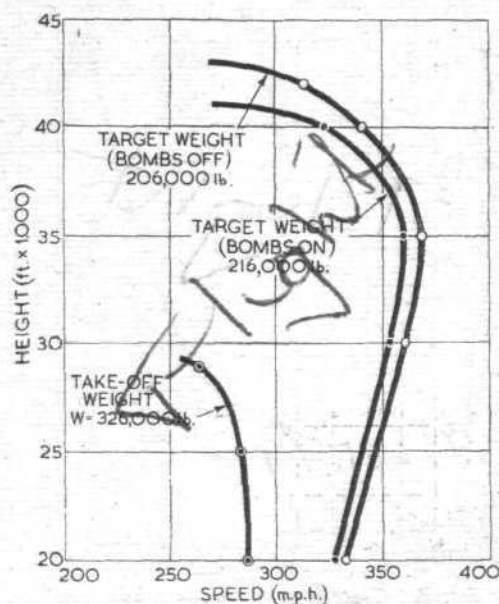


Fig. 1. Convair B-36B: speed performance with bomb-load of 10,000 lb.

AERODYNAMIC DATA—CONVAIR B-36B

Characteristic	Symbol	Value
Take-off gross weight ...	W_1	326,000 lb
Target gross weight (bombs on) ...	W_2	216,000 lb
Target gross weight (bombs off) ...	W_3	206,000 lb
Landing gross weight ...	W_4	136,000 lb
Wing area ...	S	4,772 sq ft
Wing span ...	b	230ft
Aircraft efficiency factor ...	e	0.77
Geometric aspect ratio ...	$A = b^2/S$	11.1
Effective aspect ratio ...	$A_e = eA$	8.55
Parasite drag coefficient (min.) ...	C_{D_p}	0.016
Parasite drag area ...	$f = C_{D_p} S$	76.4 sq ft
Aircraft lift/drag ratio (max.) ...	L/D	20.5
Normal rated power ($N=2,550$ r.p.m.) ...	P	2,650 b.h.p.
Supercharger critical height ...	H	35,000ft
Airscrew diameter (3 blades) ...	D_s	19.0ft
Airscrew rotational speed (gear ratio, 0.381) ...	n	16.2 r.p.s.
Airscrew propulsive efficiency (Y max.) ...	η_m	0.73-0.77
Airscrew propulsive efficiency (Y cru.) ...	η_c	0.84
Specific fuel + oil consumption (aver.) ...	c	0.50 lb/b.h.p./hr

The Asymptotic Bomber

followed American practice based on high speed and high wing-loading, rather than the British characteristics of lighter wing-loading giving fast climb for rapid interception and agile manoeuvrability upstairs, as exemplified in the D.H. Ghost-Vampire. The latter can climb to 40,000 feet in about 8 minutes and still do most of its fighting from there on, up to well over 50,000 feet, since its service ceiling is higher than 56,000 feet. It is hard to believe, then, that a Russian counterpart of this type of defensive weapon would have much trouble in knocking down such a ponderous target as the B-36, however heavily the latter might be armed. We fancy that our American friends are prone to underrate the height of the Iron Curtain.

An odd news-commentary that meshes into the discussion at this point is the announcement that the North American F-86A Sabre will be manufactured in Canada for the R.C.A.F. under a Government licensing agreement with the manufacturer. Current indications are that Canadair will be given an initial contract to build 100. The oddness, to this writer anyway, is why the Canadian Government—still presumably, a member of the British Commonwealth—should select an American fighter (admittedly the world's fastest, but not automatically the best) in preference to, say, Ghost-Vampires built at de Havilland's Toronto plant. Apart altogether from the technical merits of the case, this sort of deal strikes us as unfair to people in the land of austerity, since it obviously does not bring home the Canadian bacon in return for British skill and (dare we say?) intestinal fortitude.

Boost by Jet

But to return to the B-36. The latest attempt to keep this heavyweight in the ring is the piston-cum-jet B-36D, now under flight-test at Convair's Fort Worth plant. This composite mixture—a potion popular only in America—now sprouts the addition of four Allison J-35 (4,000 lb s.t.) jet barrels suspended well outboard on wing stalks, apparently in an effort to boost the sluggish take-off and for use in combat emergency. (Production B-36Ds will be equipped with the G.E. J-47 5,000 lb s.t. turbojet.) Since the top speed at the target weight is likely to be Mach-limited to about 460 m.p.h. at 35-40,000 feet ($M=0.70$), with the J-47 jets, it will still be no match for the modern stratospheric jet-interceptor patterned after British design practice. The gross weight of the B-36D is reported close to 360,000 lb, which means that the fuel tankage is still rising. We also suspect that the take-off load factor is not to be whispered abroad.

This barnacled decapod is one more reminder to the American taxpayer that the U.S.A.F. is still riding its favourite hobby-horse in high pursuit of the public purse. Indeed, as we write, a further batch of 39 has just been ordered. This follows by one week a previous order for 36, bringing the total now ordered up to 170, of which about 60 have been delivered to date, with current production at an average rate of one per week. All the signposts indicate that the U.S.A.F. intends to standardize on the B-36 as its long-range strategic bomber to the exclusion of everything else now over the horizon. Psychologically, we suspect that the top military planners of the Air Force, having got themselves deeply "sold" on this project, now haven't got the nerve to pull out.

Technically, we think the Air Force strategists are trying to buck the law of diminishing returns—a principle which holds good in engineering as well as economics. Indeed, one might well look upon this cherished dream of the ultra-long-range bomber as an illuminating study in asymptotic weight-lifting—the last few thousand miles on the range chart (Fig. 2) are fantastically out of proportion to the effort expended. All this straining of the camel to carry a gnat may possibly be justified if the atomic football can be lofted over the goal line with any reasonable certainty (say, even 50 per

cent); but to this observer, the evidence is largely against it.

Just in passing—since we have introduced the sportive element—one of our tame scientific friends tells us that the estimated atomic explosive charge of the A-bomb works out at around 30 lb and its size is roughly that of a football; also that calculations indicate that each bomb costs approximately one million dollars; that production is probably at the rate of one a week, based on three plants each operating at a rate of one million kilowatts producing two pounds of fissionable material a day; and that the current stockpile is anywhere between 100 and 200. Our own slide-rule is not long enough to check these figures, so we pass them along with reservations.

A long career in engineering, plus middle-aged experience of *genus homo*, has taught us that technical merit must often play second or even third string to political and psychological dynamics—a situation which is particularly true in the U.S.A. at this time. Politically, as we have hinted earlier, there are clear signs of an influential Democratic darky in the Washington woodpile, while a strong psychological motive is the intense inter-service rivalry between the Air Force and the Navy, especially over this question of A-bomb delivery.

Boost on Paper

Psycho-political motives play a dominating rôle in national and international affairs just the same as they do in more personal relationships; hence the Air Force having publicly told the world that "with the B-36 operating at 40,000 feet it can now reach 70 selected targets in Russia without much interference," it must now perforce try to measure up to its own boost gauge. Accordingly, during the next few months we may expect to see a tremendous drive by the U.S.A.F. to bolster an aggressive case for the B-36. Perhaps the crowning jest of this performance so far is the news that Goliath will now be christened *The Peacemaker*. Let none say that, after dressing up the A-bomb as the New World dove of peace, our American friends are lacking in the more subtle brands of humour.

Obviously, in such circumstances, the technical merits of the case are masked by the purple patches of the Service publicity blurbists, each intent on catching the public ear and the Congressional vote for the biggest dollar. Also, the technical observer senses the dilemma of Service chiefs in knowing—or rather in not knowing—which way to jump in the new jet Air Age now opening up the latter half of the twentieth century. The rival merits of turbojet and turboprop still confuse the designer's canvas and when Wright Field swings back from one side of the pendulum to the other, and then back again, progress on the pure jet bomber is bound to be slowed up and the piston-engine to take another deep breath.

To confuse the militarists still further, two other moves are now in play on the global chessboard. These are the strategic implications of forward bases on friendly soil and the technique of aerial refuelling. The former may be seen in the Atlantic Alliance, while the pioneer work of Sir Alan Cobham has finally paid off with the globe-girdling flight of the B-50 *Lucky Lady-II* a few weeks ago. Both these events presage the passing of the ultra-long-range bomber and a return to sounder range economics of the order of 6,000 miles. Although this may dampen the intoxicating and costly vision of the long-range bomber operating only from American territory, it makes better sense in the political sphere and reintroduces a note of reality into the technical picture.

Perhaps we have said enough for the moment to show that the ultra-long-range piston-engined bomber is at least a doubtful basket for the carriage of an atomic egg to the target. Furthermore, such additions or revisions as supplementary turbojets or piston-turbo compound engines cannot be seriously treated as anything other than temporary stop-gap solutions to save the vast amount of effort already expended on the world's biggest pre-jet airframe. To this writer they look like power-plant patches on the B-36's breeches, for the jet engine has practically obsoleted conventional airframe conceptions. In our next article we hope to show how the airframe must measure up to the imagination of the genius who gave us the new power-plant.

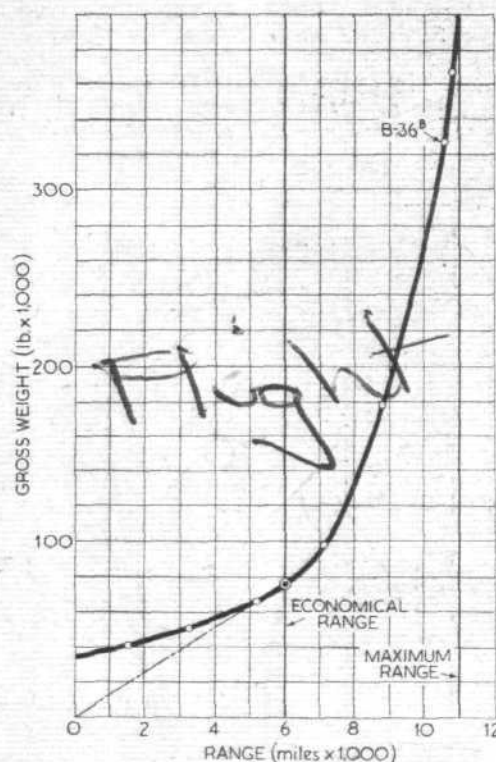


Fig. 2. Gross weight versus range. Bomb-load: $W_b = 10,000$ lb.

CIVIL AVIATION NEWS



MOORING-MAST? The P.A.A. Stratocruiser America recently paid a preliminary visit to France. The regular trans-Atlantic service between New York and London with this aircraft is due to start on June 2nd.

FAST FLYING-BOAT SERVICE

B.O.A.C. York services BO 153-154 to Nairobi are being withdrawn and Short Solents will fly from Southampton to Lake Naivasha, for Nairobi, three times a week. The first outward service is due to leave Southampton on May 15th, and the first homeward-bound aircraft will leave Nairobi on the 17th. Stops will be made at Augusta, Alexandria and Khartoum for refuelling and elapsed time for the journey will be only 27½ hours.

B.O.A.C. have taken delivery of three Solents modified to accommodate 39 passengers. The increased capacity has been achieved by extending the passenger accommodation aft on the upper deck, which will now hold 17 passengers. The space was previously used for freight stowage. R.M.A. City of London, which is at present moored in the Thames, is one of the three 39-seaters. The Corporation already have 12 Solents with accommodation for 34 passengers and it is not yet known whether they will be converted. Eleven Short Plymouths are at present operating services to the Far East, but the eventual introduction of Canadairs will cause a complete revision of all flying-boat services. It has already been decided to replace Plymouths by Solents on services to Singapore.

ATLANTIC TOURIST FARES

PAN AMERICAN AIRWAYS recently submitted a plan to the U.S. Civil Aeronautics Board for tourist fares to be introduced on trans-Atlantic routes, and the proposal was to be considered by the I.A.T.A. meeting which started in Nice on May 10th. The "air coach" services which provide non-luxury flights at cheap rates within the United States have proved highly successful and P.A.A. had planned to introduce a tourist fare of about £56 for one-way flight across the Atlantic, as compared with the present fare of about £87 10s. The return tourist fare would be about £100.

The competing airlines, American Overseas Airlines and Trans-World Airlines, would have been at a disadvantage from the point of view of equipment, because the plan depended largely on the use of 75-seater Stratocruisers now being delivered to P.A.A. All three airlines would have to support the plan to make its acceptance likely, and strong opposition from other airlines operating Atlantic routes could result in its rejection by I.A.T.A.

C.A.B. Rejects Tourist Fares : Freight - Market Competition : Servicing in Egypt

The Civil Aeronautics Board has opposed the suggested plan and even suggested an increase in the existing fares between New York and London during the summer months when traffic reaches its peak. The Board was sympathetic towards the introduction of cheap tourist fares but considered that with present types of aircraft the fares for tourist services could not be appreciably reduced without causing a financial loss to the airlines. Moreover, the Board considered that in order to operate a new service, some aircraft would have to be withdrawn from the normal passenger services which were already overburdened with bookings for this year.

I.A.T.A. TECHNICAL MEETING

FROM May 17th to 28th the third annual Technical Conference of the International Air Transport Association will be held at Burgenstock, near Lucerne, Switzerland. Some 150 engineers and technicians will hear reports on the Berlin Air Lift, on new power plants and on aviation medical problems. Another feature will be a symposium on the maintenance of the Douglas DC-6, in which engineers of airlines using that aircraft will compare notes with representatives of the Douglas Aircraft Corporation, the Pratt and Whitney Engine Company and the Hamilton Standard Propeller Company. The latest developments in engineering and the maintenance of aircraft, operations, ground facilities, landing aids, and communications will be examined. Recommendations made by the Conference will be passed to the airlines for study and individual action.

AIR CHARTER

ALTHOUGH latest reports suggest that the Berlin Air Lift will continue for the time being, there has been considerable speculation as to the effect on the air freight market when it finishes. It is certain that sometime in the near future numbers of large-capacity aircraft will be released to the market, and already those operators engaged on the Berlin Air Lift are turning their attention to the charter market. The only steady traffic at the moment is in the import of fruit from France, Spain and Italy, and certain French, Spanish and Belgian operators have seized the opportunity of quoting large aircraft at low rates for existing fruit enquiries. If British aircraft are suddenly released from the Berlin task they will be forced to compete with these very low freight rates which the foreign operators are quoting.

Activity in the air freight market during April has been disappointing compared with similar periods in the post-war years. Three major reasons have been given for a decline in fruit traffic, the first being bad weather on the Continent which has delayed ripening; secondly the importers appear to have been unable to assess the home market, and there is evidence that high retail prices will not be paid this year even for early shipments. The shortage of heavy British aircraft to compete with the foreign operators has resulted in loss of business overseas. There is also a serious threat to aircraft by the improvement in refrigerated rail and shipping services.

Demand for export cargoes has been poor, but during April there has been some slackness in business generally.

The International Chamber of Commerce is meeting in Paris this week to discuss questions with regard to the scope and co-operation of the various air freight exchanges and their usefulness to users of international air transport. It is understood that representatives from the Baltic Exchange will attend.

T.W.A. PRESIDENT HERE

TRANS WORLD AIRLINE'S new president, Mr. Ralph S. Damon, is making a tour of inspection of his company's overseas bases and facilities and took time off to meet a number of agents and other interested parties in London at a cocktail party last week.

T.W.A. does not operate into England, its European land-falls being at Shannon and Lisbon, continuing from there to Paris, Geneva, Milan, Rome, Athens and Cairo in the former

case, and to Madrid and Rome in the latter. At Madrid another route branches off to Algiers, Tunis, Tripoli, Benghazi and Cairo. After merging at Cairo the eastward extension of the routes takes in Jerusalem, Basra, Dhahran, Bombay, Colombo and Calcutta.

Mr. Ralph Damon has been connected with aviation since 1922, first with Curtiss and later Curtiss-Wright. He entered the air transport business in 1936, when he became vice-president of American Airlines, Inc. During the war he was lent to Republic where he supervised mass production of the P-47 Thunderbolt. After the war he became president of American Airlines, a post which he left to become president of Trans World Airline in January of this year. Mr. Damon, incidentally, doubts whether the amalgamation of Pan American World Airways and American Airlines will take place, at least in the form contemplated at present.

ASSOCIATES TO FLY ABROAD

IT is now announced by British European Airways that agreements have been signed by nine British charter companies to operate 16 scheduled air services, not only within the United Kingdom, including the Isle of Man, Isle of Wight, Channel Islands and Belfast, but also one service to Le Touquet. In addition, 23 charter companies have received provisional approval, but have not yet signed agreements, to operate 44 new services, among which are several to Belgium and France. Details of services so far approved are given in the table below.

Operators have lost no time in taking the necessary steps to put their agreements into effect. Typical, no doubt, of several such informal ceremonies was one which *Flight* was privileged to attend on Wednesday of last week—the

opening of the Southampton (Eastleigh) to Cowes service by Solent Airways, operating under contract to Somerton Airways, Ltd. G-AGPI, one of three Rapides with which the route will be worked, carried a party which included the Mayor and Mayoress of Southampton and which was received at Cowes by the chairman of the Isle of Wight County Council. The aircraft was flown by Solent's chief pilot, Capt. S. Richardson.

On this route seven outward and eight inward services are being flown daily, with extras to give an "every hour on the hour" service at week-ends. The day return fare is 18s. Solent Travel Services, at Southampton Airport, handle bookings, as do B.E.A.

Type of Service	Route	Charter Company	Type of Aircraft
Pass., fgt. Pass., fgt.	BIRMINGHAM (Elmdon)/I.O.M. (Ronaldsway) LEEDS/BRADFORD (Yeadon)/I.O.M. (Ronaldsway)	Patrick Aviation, Ltd. Lancashire Aircraft Corpn., Ltd.	D.H.89. Wayfarer, D.H.86, Consul, D.H.89.
Pass., fgt.	MANCHESTER (Ringway)/I.O.M. (Ronaldsway)	Sivewright Airways, Ltd.	D.H.89, D.C.3, Anson.
Pass., fgt.	MANCHESTER (Ringway)/I.O.M. (Ronaldsway)	North West Airlines (I.O.M.), Ltd.	D.C.3, Dove, D.H.89.
Pass., fgt.	BLACKPOOL (Squires Gate)/I.O.M. (Ronaldsway)	Lancashire Aircraft Corpn., Ltd.	Wayfarer, D.H.86, Consul, D.H.89.
Pass., fgt.	BLACKPOOL (Squires Gate)/SOUTHPORT (Woodvale)	Lancashire Aircraft Corpn., Ltd.	Wayfarer, D.H.86, Consul, D.H.89.
Passenger Passenger Pass., fgt.	LONDON (Croydon)/LEA (Sandown) SOUTHAMPTON (Eastleigh)/COWES (Somerton) LONDON (Northolt)/LEEDS/BRADFORD (Yeadon)	Air Enterprises, Ltd. Somerton Airways, Ltd. Lancashire Aircraft Corpn., Ltd.	D.H.89. D.H.89. Wayfarer, D.H.86, Consul, D.H.89.
Pass., fgt.	LONDON (Northolt)/BLACKPOOL (Squires Gate) via SOUTHPORT (Woodvale).	Lancashire Aircraft Corpn., Ltd.	Wayfarer, D.H.87, Consul, D.H.86.
Pass., fgt. Pass., fgt. Passenger	BIRMINGHAM (Elmdon)/JERSEY LYMPNE/LE TOUQUET LONDON (Hendon)/BIRMINGHAM (Castle Bromwich) LONDON (Croydon)/BIRMINGHAM (Castle Bromwich)	Patrick Aviation, Ltd. Silver City Airways Patrick Aviation, Ltd. Air Enterprises	D.H.89. Wayfarer. D.H.89. D.H.89 and Consul.
Passenger Passenger	CARDIFF/BIRMINGHAM (Castle Bromwich) LONDON (Hendon)/BIRMINGHAM (Castle Bromwich)	Cambrian Air Services International Airways	D.H.89. Rapide, Consul.

EGYPTIAN SERVICING ENTERPRISE

A NEW aircraft servicing enterprise, the Egyptian Aircraft Engineering Company, with headquarters at Almaza Airport, has been formed. B.O.A.C. have a financial interest in the concern and, having agreed to provide technical management, have seconded W/C. M. D. Day, O.B.E. (previously chief engineer of Airways Training, Ltd.), to be the technical manager for three years; Mr. A. E. Drage, for many years senior foreman of B.O.A.C.'s engine overhaul base at Treforest, is supervisor of the engine-overhaul department.

In conjunction with International Aeradio, Ltd., the new company has opened a fully equipped radio overhaul and test shop giving 24-hour service at Almaza, Farouk and Mariut (Alexandria) airports. Later, it is proposed to open servicing departments for airframes and instruments and the company will undertake all servicing, including complete overhauls. The de Havilland Company has seconded an engineer for the purpose of supervising the overhaul and repair of both de Havilland and Hamilton airscrews. At present work is in hand for SAIDE, Aden Airways and the Royal Egyptian Air Force.

BREVITIES

IT has been announced in Canberra by the Minister of Civil Aviation that the Australian Government will spend about £11,120,000 sterling during the next three years on improvements to 134 Government-owned airfields. The Kingsford Smith Airport (Mascot) and Essendon Airport, are to be installed with instrument landing systems and other major airfields will later be equipped. It is also proposed to introduce airfield-control radar.

After 31 years in aviation, Capt. G. I. Thomson, D.F.C., Inspector of Aircraft Safety at B.O.A.C., has retired. During the 1914-18 war he flew with the R.F.C. and in 1928 became a pilot with Imperial Airways. In 1932 he was loaned to the Iraq Petroleum Co., as managing pilot of their aviation section, and in 1933 became operations manager and chief pilot of the newly formed Rhodesian and Nyasaland Airways. From May, 1940, until his appointment some years ago as Inspector of Aircraft Safety, Capt. Thomson was acting superintendent of B.O.A.C. Technical Development and Production.

Trans-Canada Air Lines introduced their summer schedules on April 1st with a daily return flight from London to Montreal. On Wednesdays, Fridays and Sundays the flights call at Prestwick. From June 1st the frequency will be increased to two daily return flights, one from London and one from Prestwick. By a through booking agreement with

FROM REYKJAVIK TO NORTHOLT: the inaugural DC-4 service of Iceland Airways brings B.I.F. visitors. A once-weekly return flight is being made.



A Commonwealth contribution to the R.A.F.



Designed and built by The de Havilland Aircraft of Canada Ltd., the Chipmunk is now entering production in England as the new basic trainer of the R.A.F.V.R. and will be available for the markets of the world from both British and Canadian factories

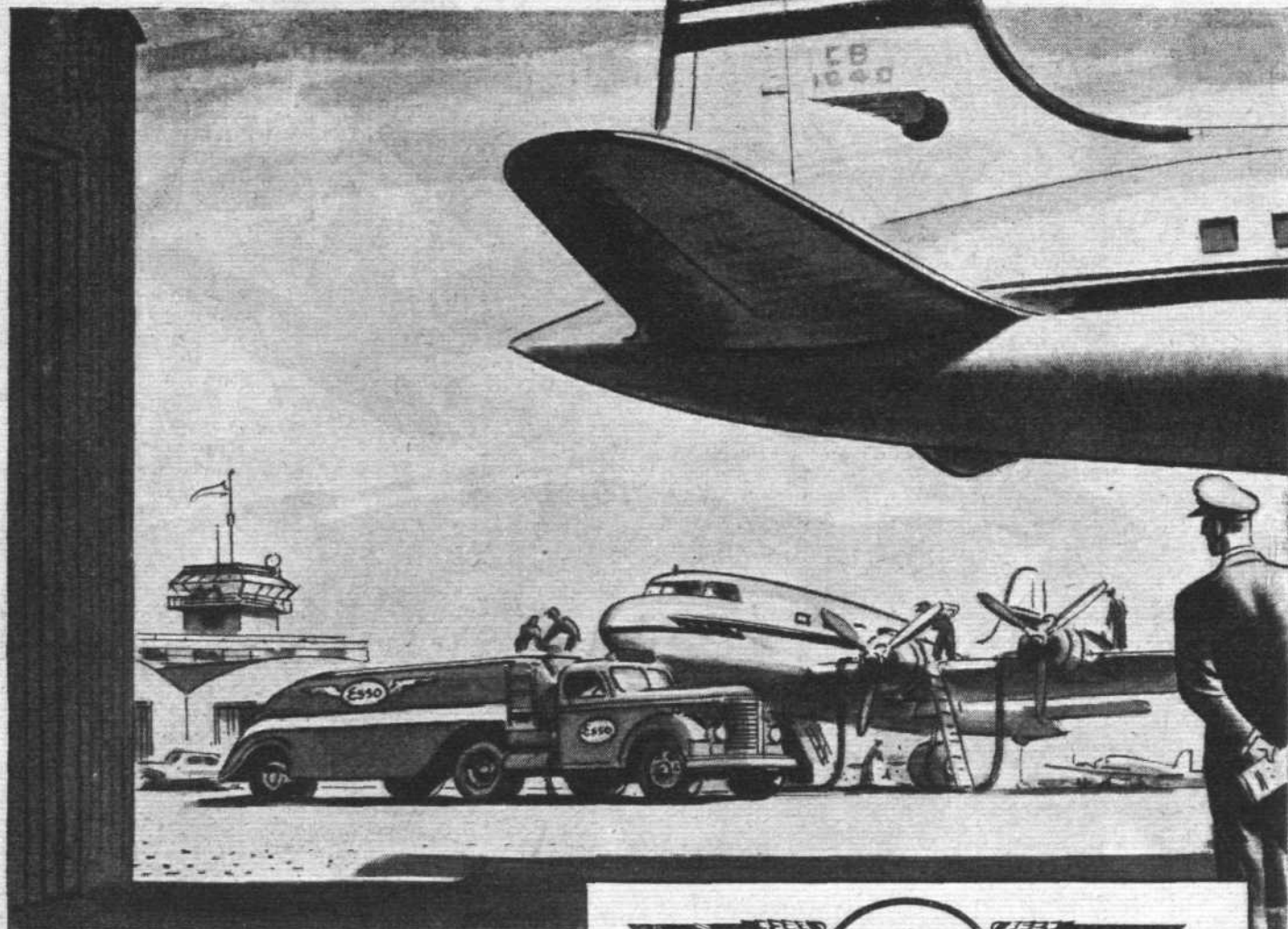
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Civil Aviation News

Colonial Air Lines, passengers can now fly to New York via Montreal. Return fares are: London to New York, £156 7s; Prestwick to New York, £146 10s.

K.L.M. have appointed Mr. F. von Balluseck—(assistant vice-president in charge of the central traffic group) (Europe, Africa and Near Middle East divisions)—to be manager of the traffic directorate in succession to Mr. J. Martin who retires on June 1st.

It is reported from Australia that Qantas Empire Airways will probably introduce a Catalina flying boat into service on routes between New Guinea and the adjacent islands. Based on Port Moresby, the Catalina will serve the east and west coast of Papua, Buka, Rabaul, and on a number of other routes where there are suitable alighting areas.

In answer to a question in the House of Commons recently, Mr. G. S. Lindgren, Parliamentary Secretary to the M.C.A., said that it was not possible at present to introduce cheap fares on all air services, but the introduction of cheaper mid-week rates in an effort to ease the week-end peak traffic was a possibility. Mr. Lindgren also said that it was impossible at present to re-start the Orkney-Aberdeen-Edinburgh service. Grimsetter would be developed as Orkney's future airport.

Pan American Airways' Stratocruisers (known as America-class Clippers) will begin a thrice-weekly service between New York and London on June 2nd. The aircraft will leave New York on Mondays, Thursdays and Fridays at 1600 hr, arriving at Gander at 2205 and reaching London Airport at 1000 the next morning. Actual flying time will be 13 hours, 50 minutes faster than any previous schedule.

Mr. W. N. Cumming, O.B.E., D.F.C., A.F.R.Ae.S., F.R.Met.S., recently joined the Lancashire Aircraft Corporation and, assisted by Mr. W. N. Marshall and Mr. L. D. Chapman, the chief engineer, has taken charge of the company's airlift

operations. Their Halifax fleet on the Air Litt was recently increased to 18 and modified to carry an increased load of oil. In order to fulfil a heavy summer programme the company has increased its fleet of light aircraft to 12 Rapides, 12 Proctors, five Consuls and six Austers. Mr. D. R. Morgan, until recently chief engineer, has been appointed technical manager.

Lympne Airport, Kent, has been offered to the Folkestone Corporation for purchase or lease. It is seven miles from the town and is the nearest airport to France.

On April 29th Finland became the fifty-second member nation of the International Civil Aviation Organization, and the fourth Scandinavian nation to join: Denmark, Norway and Sweden are already members.

Information Circular No. 73, issued by the M.C.A., gives notification of the change of address of the Aeronautical Information Service. The address is now: Ministry of Civil Aviation, Aeronautical Information Service, Tolcarne Drive, Pinner, Middx. The telephone number is Pinner 9420 and the international telegraphic address is Notams Phone Pinner. The aeronautical telegraphic address is Gara Notefl.

Out of 393 pilots employed by K.L.M. at the beginning of the year, 149 were from Great Britain or the Empire. There were 72 British pilots, 47 Canadians, 22 Australians and eight South Africans, 207 Dutch pilots, 19 Americans, eight Swedes and ten of other nationalities. Other flying personnel, mostly Dutch, were 302 radio operators, 228 flight engineers, 145 stewards and 132 air hostesses—a total of 1,200 flying personnel.

Aer Lingus opened a direct service between Dublin and Birmingham on May 2nd. For the moment the frequency is one return flight each week-day, but it will probably be increased as traffic develops. The addition of this service makes five cross-Channel Aer Lingus daily routes to Britain—London, Liverpool, Manchester, Glasgow and Birmingham. On May 1st the Dublin/Isle of Man seasonal service reopened. During May and June there will be three return flights each week, on Fridays, Saturdays and Sundays, and frequencies will be increased later in the season.

FROM THE CLUBS

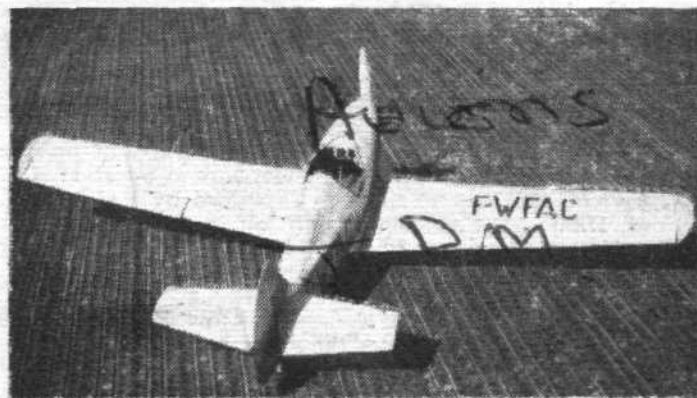
AS reported in *Flight* of April 14th, the South Coast Flying Club held a dance on April 9th; it proved so popular with the members that the committee has arranged another, to take place on Saturday, May 28th. There will be dancing from 2000 hr onwards, and it is hoped that there will be an extension in the bar until 2330; tickets are 4s each. This will probably be the last dance of the season as the committee does not propose to organize any during the summer unless there is a particular demand.

THE Midland Aero Club has regretfully announced that the air display, which was to have been held at Elmdon Airport on June 25th, has been cancelled, owing to the fact that Service aircraft will not be able to take part, and to the proximity to the National Air Races.

Thanks to the excellent weather at Easter, the Club's aircraft were airborne for the majority of daylight hours and 60 flying hours were logged, four members obtaining their "A" licences.

SINCE the opening of the Bembridge and Sandown Aero Club last August a membership of over 100 has been attained, of which total more than 40 are actual flying members, and the Club has become a popular week-end rendezvous with private owners in many parts of the country. Over Easter the C.F.I. was kept particularly busy and logged 24 hours' flying in the four days' holiday. The clubhouse has recently been enlarged and dances will be held each week-end. Local accommodation for visitors can be arranged through the Club at any time. Bembridge Airport, incidentally, has been extended, and a run of 1,000 yards is now available in each direction.

On June 4th and 5th the Club is holding a flying week-end, with air races round the island, to which all Club members and private owners are invited. On the Saturday there will be a dance (with cabaret by the Windmill Girls) at the Royal Spithead Hotel. An inclusive charge of £2 12s 6d is being made



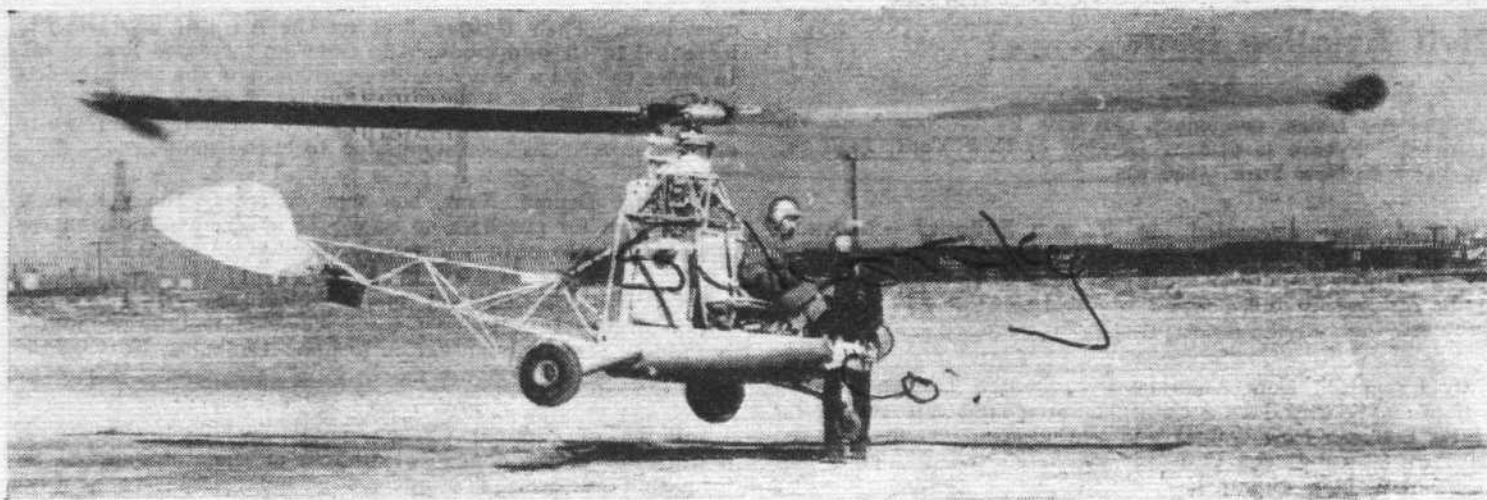
FRENCH LIGHTWEIGHT: "Le Roitelet" (The Wren), a single-seater, with 25 or 35 h.p. engine, built by Avions J. D. M. to sell at under £500. It is on view at the Paris Salon.

for the week-end, and this figure covers two nights' accommodation and the dance.

A flying holiday is an innovation which is proving popular; it operates on the principle of an inclusive charge for accommodation and flying tuition.

FOUNDED during 1948, the Denham Aero Club logged 2,700 flying hours in its first year of operation, during which time 66 "A" licences were obtained and 22 licences renewed.

Now, at the start of the second season, the fleet consists of three Piper Cubs, a Magister, an Auster J.4, and a C.W.A. Cygnet. The present membership is just over 400, and in spite of the discouragement of the new licensing regulations, many enquiries are being received from prospective members. On Sunday, May 15th, a Dawn Patrol has been arranged, and private owners and members of all flying clubs are invited to test the Denham defences between 0900 and 0930. An eggs-and-bacon breakfast will await the crew of the winning aircraft.



The jet-propelled rotor being tested on the fuselage of a Sikorsky R-6. The production model will be quite different.

A PULSE-JET HELICOPTER

America Developing a Short-range Weight-lifter

TORQUELESS single-rotor drive is a problem which has intrigued many helicopter designers. It was the basis of the Isacco conception many years ago, when the designer attempted, not very successfully, to achieve it by mounting Bristol Cherub engines on the blades of his Helicogiro. Before and during the war, the Germans made several types in which this feature was aimed at in different ways: Doblhoff by a central engine driving a compressor which supplied air to jets at the blade tips; Flettner, Nagler and Rolz by small engines in the Isacco manner.

Since the war, American designers have pursued the subject of jet-propelled rotors, Marquardt and McDonnell using ram jets, which require a high rotor-tip speed for efficient work.

The machine illustrated here employs the pulse-jet system which became well but unfavourably known to Londoners from the V1 flying bombs. In this, the explosions are intermittent, air being admitted through small flap-valves opened automatically when the outrush of gases causes a partial vacuum, and closed by the pressure of the next explosion. The XA-5, designed and built by American Helicopter Company,

Inc., of Manhattan Beach, California, is merely a flying test-bed for the rotor and power system, having the fuselage of an old Sikorsky R-6. The production model will look very different, although the rotor will probably retain most of the features of the experimental machine, which is known as "Top Sergeant."

Both the rotor and the pulse-jets were designed by American Helicopter Company. The jets have a diameter of 8.75 in and a length of 44 in. The maximum static thrust is 95 lb, and each jet weighs 23 lb. To this should be added 10 lb for the five accessories: fuel pump, throttle and master shut-off valves, fuel meter, and rotary seal. Total power-plant weight is 56 lb for a static thrust of 190 lb. Firing frequency is 150 pulsations per second. A slotted panel supports 16 laminated steel reeds.

The rotor blades have steel spars to take the centrifugal pull of the jets, while the section is formed of plywood. Rotor diameter is 33 ft to centre line of jets, but the blades are rather wide—namely, 20 in. The tip speed has been chosen to suit the jets and is from 300 to 325 ft/sec.

SUNDERLAND'S SORTIES ON THE YANGTSE

THE Air Ministry has released some information on the flights made by an R.A.F. Sunderland to assist H.M.S. *Amethyst* on the River Yangtse. Captained by F/L. K. H. Letford, D.S.O., D.F.C., the aircraft left its base at Kai Tak on April 1st to fly direct to the sloop, but a diversion order from H.M.S. *London* caused it to touch down at Shanghai. Admiral Madden then requested that an R.A.F. doctor, a Naval doctor and medical stores be transported to *Amethyst*, so the Sunderland took off again later the same day, located the ship and alighted nearby. There was no sign of Communists, and Nationalist troops were digging-in on the south bank. A sampan had taken F/L. Fearnley, one of the M.O.s, aboard when shelling began, and the aircraft was forced to take off down-wind, and down a 7-kt current.

With the intention of evacuating wounded members of the ship's company, the Sunderland flew to *Amethyst* again the following day. A Communist battery was seen to have moved to a position only 2,000 yd from the ship, instead of 3,000 yd, as was previously believed. Visual signalling to the ship was unsuccessful, and the Sunderland again touched down alongside. Accurate shell and small-arms fire began immediately. The dinghy for transferring the sailors to the flying boat had been swept away at touch-down and hits were made on the flying boat, which was forced to take off. Remaining in the area for 45 min, it saw *Amethyst* get under way and steam out of range of the Chinese guns. At Naval request, the aircraft made a 1½ hr reconnaissance of Chenchiang. A patrolling Mosquito was seen, whereupon all the Sunderland's guns were manned. Returning to Shanghai, it sighted six Mustangs, and lost height to 200 ft. Small-arms fire broke out again from the ground, one bullet ploughing through the second pilot's tunic sleeve. The flying boat climbed to cloud-base level, and when the rear gunner reported that a twin-engined aircraft was following, ascended into cloud, where it remained for the rest of the journey.

On April 23rd, the Navy asked for a reconnaissance of the river up to Nanking. Some four miles from the former naval base of Kiang Yin, and flying at 400 ft, the Sunderland was hit by machine-gun fire. The port main tank was holed and fuel streamed out, filling the hull with petrol fumes; the rear turret also became "U/S." As the fuel load was low, the Sunderland returned to Shanghai, where it was found that an aileron control was nearly severed, and 300 gallons of fuel had been lost. One bullet had lodged in the navigator's computer. No casualties were suffered among the crew. Maintenance of the Sunderland during its stay at Lung Wha was greatly assisted by the staffs of B.O.A.C. and Messrs. Jardine Matheson.

INTERNATIONAL GLIDING CONGRESS

DURING the first week of the Paris Aero Show delegates from some sixteen nations attended the second congress of OSTIV (Organisation Scientifique du Vol à Voile), held at the Aero Club de France.

On the opening day of the congress, May 3rd, M. Allez (president of the A.C.F.) received the Secretary of State for Air, M. Moreau, and a number of speeches followed, including a most informative one by M. Jarlaud, the well-known sailplane designer of the Arsenal de l'Aéronautique. On the Wednesday and Thursday a dozen-odd papers were read, some in English and some in French, followed by translations in other languages. On the Friday there was a general assembly and election of new officials, and on the Saturday the delegates visited the Beynes gliding centre, where the latest French sailplanes were demonstrated to them.

British interests were represented at the congress by M. Jacques Cochemé. The Organisation will meet again in Sweden next year.



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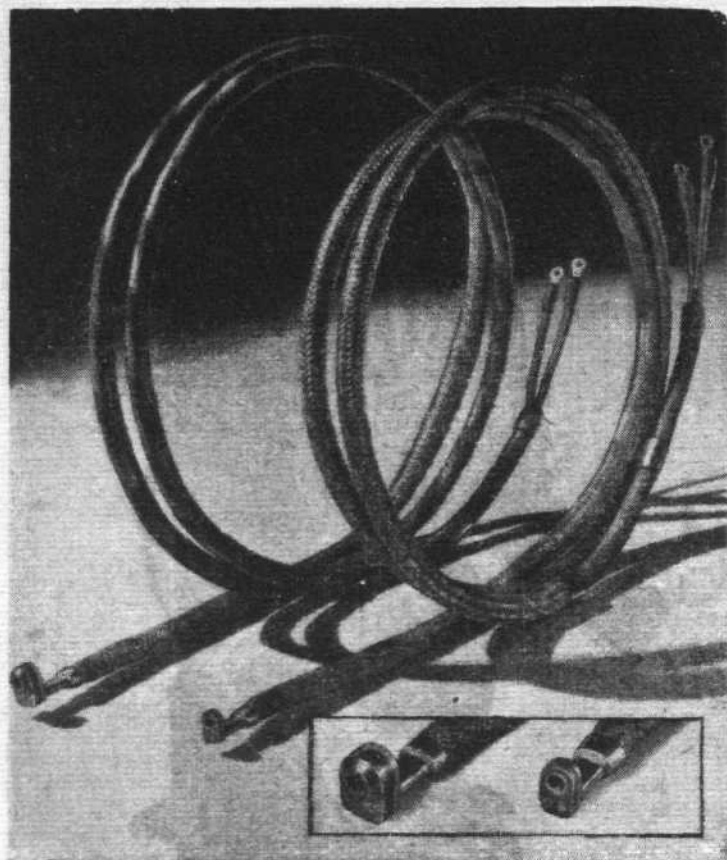
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WESTON

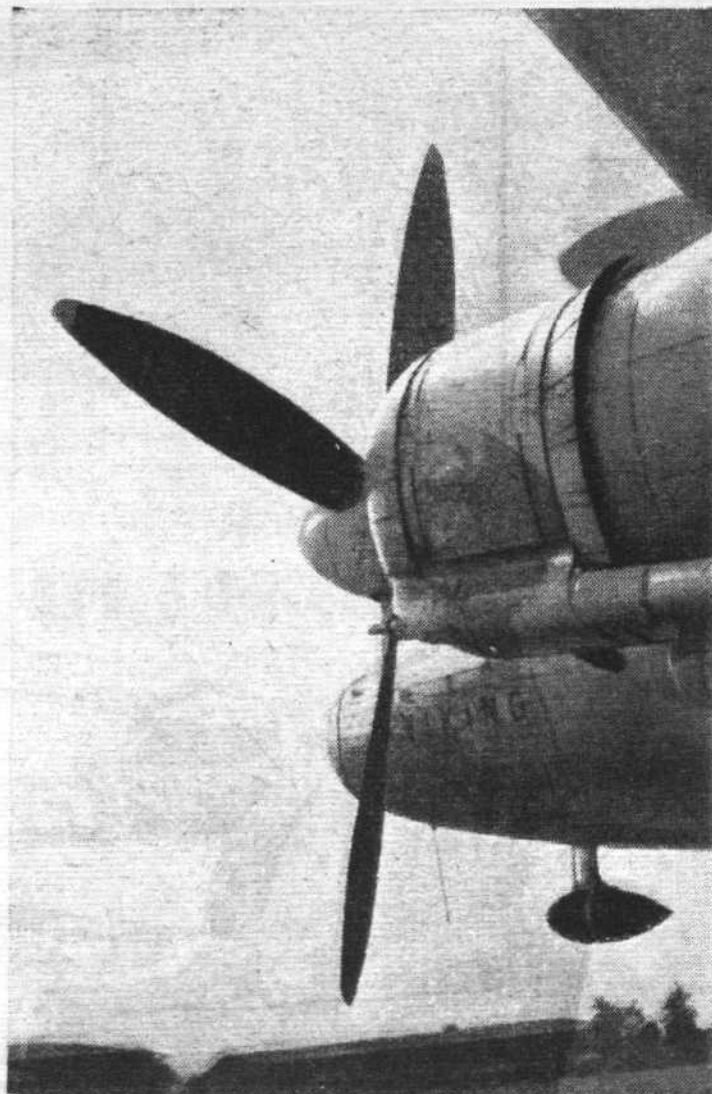
Thermocouple Assemblies

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AT THE B.I.F.

Some Exhibits with Aeronautical Associations

THE greatest single trading concourse which assembles each year in this country is the British Industries Fair. This year, as previously, the exhibition is divided into three sections—at Earls Court and Olympia in London, and at Castle Bromwich, Birmingham.

Perhaps naturally, in that the aeronautical field is comprehensively accommodated by the annual S.B.A.C. show, aeronautical interests of a specific kind form a very small proportion of B.I.F. exhibits. There are, of course, numerous items to be seen which have application in aviation, but only in so far as they have similar application to other fields; machine tools offer an excellent example.

At Olympia, Short and Mason, Ltd., are showing a display of varied instruments, their meteorological triumvirate consisting of wind-speed indicator, wind-direction indicator and special sensitive aneroid barometer. Dial-type indicators for registering oil, coolant and ambient air temperatures are exhibited by the British Rototherm Co., Ltd. Cloud-and-collision radar warning equipment for aircraft is shown by E. K. Cole, Ltd., which company also display Ekco two-channel and four-channel V.H.F. ground and airborne communication equipment. The Plessey Co., Ltd., have on view models of their cartridge engine-starters, which are now used in many fields other than those of military, civil and commercial aircraft application.

Up at Castle Bromwich, where the engineering section of the B.I.F. is accommodated, there are, somewhat naturally, rather more items of aeronautical interest to engage attention.

Electro-Hydraulics, Ltd., are showing an interesting little unit for which there should be an assured future; it is an ultra-light-weight solenoid valve. Rated for one minute at 29v D.C., it will operate on 4,000 lb/sq in hydraulic fluid, and the weight is only 0.17 lb. Another actuating device is the "Thruster" exhibited by the British Thomson-Houston Co., Ltd.; this is an electro-hydraulic device designed to replace A.C. solenoids for many heavy-duty purposes. "Thrusters" are available in a range of from 40 lb thrust through a 2in stroke to 800 lb thrust through a 12in stroke; flame-proof types can also be supplied.

The Saunders Valve Co., Ltd., are showing examples of their well-known range of diaphragm cocks and multi-way fuel cocks for aircraft use and the Hymatic Engineering Co., Ltd., although not featuring any aircraft compressors, are showing a range of their mobile and static compressor sets, the mobile units employing petrol engines, whilst the static units are electrically powered.

The Chloride Electrical Storage Co., Ltd., makers of Exide batteries, have on view examples of their new 24v battery for civil aircraft. For a full weight of only 43½ lb the battery has a capacity of 25 ampere-hours and is suitable for use in high-voltage D.C. electrical circuits in large aircraft, and also as a normal 24v unit in helicopters and light aircraft. Londex, Ltd., are exhibiting flare-path marker floats for seadromes, each complete with green fluorescent lamp, battery and transformer unit, the 6v D.C. battery of 40 to 80 A/h capacity giving a light output of 400 to 600 lumens.

WORK OF THE S.L.A.E.

FOLLOWING the publication, in last week's issue, of a brief review of the various organizations and associations concerned with air transport, the Society of Licensed Ground Engineers feels that it, too, has a just claim to inclusion.

The S.L.A.E. was formed in 1943 as a technical society of licensed aircraft engineers and is devoted to the advancement of aeronautical engineering with particular reference to the promotion of aircraft maintenance engineering. It is also "devoted to the promotion of honourable practice in the profession, to making available to manufacturers and operators of aircraft the experience of maintenance engineers, to improving the technical knowledge of members engaged in the profession, and to maintaining an employment bureau for the profession."

The General Council of the Society has set up a series of panels and committees to provide various services for members and to advise, when so requested, the Ministry of Civil Aviation and Air Registration Board, or any other body, on all aspects of aircraft maintenance engineering. These sub-organizations include the S.L.A.E. Technical and Publications Panel (answering technical queries, compiling technical reports on aspects of aircraft maintenance engineering for the consideration of the industry, and providing material for publication), the Educational and Students' Panel (assisting student

and other members in their studies, and organizing the Society's Manufacturers' Courses of Instruction scheme), and the Licensing Panel (handling the majority of negotiations with the authorities).

Branches have been established at fifteen centres in the United Kingdom and at six centres abroad, the latter at Dublin, Singapore, Tripoli (Levant), Cairo, Salisbury (Southern Rhodesia), and Trinidad (British West Indies). Branches organize technical lectures and discussions, and visits to places of aeronautical interest. The Society has established a main technical library at its head office and branch libraries at the majority of its overseas branches.

The chairman is Mr. D. W. Richardson, M.B.E., A.F.R.Ae.S., M.S.L.A.E., the vice-chairman is Mr. N. Luke, A.R.Ae.S., M.S.L.A.E., and the general secretary is Mr. Peter F. Murray. Headquarters are at Finsbury Circus House, Blomfield Street, London, E.C.2.

K. W. BEAR

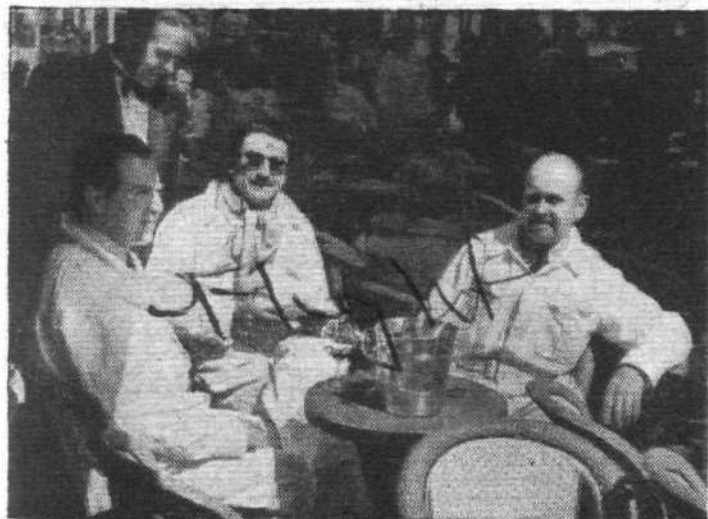
MR. K. W. BEAR, killed on the 27th April whilst practising for the international road race in Jersey, was best known behind the scenes in aviation as an underwriter member of Lloyd's and chairman of Lionel Sage and Co., Ltd., Lloyd's brokers, who handle aviation business in this country and abroad. A memorial service was held for him on May 10th at St. Andrew Undershaft, St. Mary Axe, London, at which his many friends and colleagues from both motor racing and aviation spheres were present. He leaves a widow and two daughters.

NEW A.D.A. PRESIDENT

AT the recent annual general meeting of the Aluminium Development Association Mr. Kenneth Hall was elected as the new president of the council. Mr. Hall is managing director of the Northern Aluminium Co., Ltd., and a director of Aluminium Laboratories, Ltd., and in January 1948, he succeeded the late Mr. P. W. Rolleston as the representative of the Aluminium, Ltd., group of companies on the council of A.D.A. Mr. Hall was associated with Aluminium, Ltd., of Canada, for over twenty years, and came to this country in 1936 as manager of the Northern Aluminium Company's Birmingham Works. In 1938 he became managing director of the newly formed Indian Aluminium Co., Ltd., and in 1946 he returned to England to assume his present position with Northern Aluminium.



Mr. Kenneth Hall



SHARP PRACTICE: Overalled for the job are Mr. Selwyn Sharp (centre), Mr. Jack Hart (right) and Mr. Lew Keen, who found the building of Armstrong Siddeley's stand in the Grand Palais a dry job.

CORRESPONDENCE

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

"CITY OF LONDON"

Thames-visiting Solent Recalls Memories of Instone Air Line

(From Capt. Alfred Instone, J.P., one of the founders of Instone Air Line)

I WAS very interested in your announcement of the Lord Mayor's intention to name a Short Solent Flying Boat City of London while it is moored in the Thames. When you add, however, that this is "thus reviving the old Imperial Airways custom of naming certain aircraft after towns," perhaps in the interests of historical accuracy you might like to recall what happened in the pioneer days of aviation.

It was the Instone Air Line which was the first company to name its aircraft after cities. Starting in 1919, every aeroplane in its fleet was named after a city. These included the famous Vickers Vimy G-EASI, which carried 12 passengers and pilot.

This was the first aircraft to be named City of London; it gained universal popularity with the public at Croydon and became a favourite cross-channel machine in those days. We also had aircraft named after the cities of New York, Paris, Glasgow, Cardiff, Newcastle, Chicago, Antwerp, etc.

London E.C.3.

ALFRED INSTONE.

RE-JOINING THE R.A.F.

A Question of being "Reduced to the Ranks"

ENCLOSED is a copy of an item of news which was published by a South African newspaper [see footnote—Ed.]. We are all fully aware that many changes have taken and must take place with regard to the policy to be adopted towards the Royal Air Force, but this particular policy is surely hitting very much below the belt. That the pundits and soothsayers in the Air Box should have the nerve to expect a wing commander to leave the officers' Mess and join the sergeants' Mess only one month after release must seem astounding, even to the most ignorant. A squadron leader who has had command of his own squadron for anything up to three years is expected to return to the Service as an N.C.O. and start taking orders from some sprog flying officer who has possibly seen two or three years' service.

If this is supposed to be a vote-catching move to keep the present Government in power, it is my suggestion that the persons responsible for issuing this information to the public (and in particular to the Royal Air Force) should receive psychological treatment.

I, as an ex-squadron leader with over ten years' service, view this policy with alarm and despondency, and assume that other released officers must feel much the same. In any case, why stop at wing commanders? Why not group captains and all the other higher ranks?

These are very trying days for any released officer and jobs are often hard to come by. Is it to be assumed that this brainstorm by the Air Ministry is a scheme to get experienced men who can't find jobs back into the Service at cheap rates of pay? If there are too many officers and not enough N.C.Os. then by all means release the officers as they become due for release, but for heaven's sake don't kick a man when he is down by asking him to volunteer to be "reduced to the ranks."

Durban.

L. M. O'LEARY.

[Our correspondent quotes the newspaper report as reading as follows:—

"Regulars of the Royal Air Force who served during the war years are to be offered the rank of non-commissioned officer if they rejoin the regular Air Force within one month of the end of their release leave, the Air Ministry announces.

"For the assessment of their new N.C.O. rank and seniority, each year as an officer up to flight lieutenant will count as one and a half years' N.C.O. service, each year as squadron leader will count as one-and-three quarters years' service and each year as wing commander as two years' service."

"Use in this report of the word "served" instead of "were commissioned" tends to give a misleading impression. Invited to comment, the Air Ministry has replied to the effect that these conditions were adopted in order to provide a means of accelerated promotion for emergency-commissioned Regular airmen who were considered ineligible for either permanent or extended-service commissions when the war ended.—Ed.]

A NATIONAL AERONAUTICAL MUSEUM?

An Appeal for Co-operation

THE date of Man's first powered flight is too recent to be "historic," but the subsequent development of aircraft has been—and continues to be—so rapid that much of value to us and to future generations is being irretrievably lost in the flood.

Although there are a few enthusiasts engaged in rescuing relics as and when they see them, no large-scale attempt has been made anywhere in the world to preserve items relating to the history and development of aeronautics. Many of the existing collections will eventually be dispersed at sales, due to the lack of an organization with the same relationship to the cause of aviation as some of our large museums have to their own specialized subjects.

I feel that a genuine effort should be made now to try and remedy this omission. As a beginning I am appealing for as many people as possible in the following categories to contact me:—

- (1) All those who consider that active steps should be taken towards the formation of a national centre where items and records relating to the history of flight can be assembled. Suggestions to this end will be welcomed.
- (2) Those who possess items of any size, number or worth which have a bearing on aeronautical history. This applies to everything from personal trinkets up to complete aircraft.

All catalogues and lists which I am permitted to copy will be returned within a few days. In this way it is hoped that a national-wide dossier can be built up which will pinpoint every article relating to the subject, irrespective of its country of origin.

- (3) Those who have knowledge of complete or partly disintegrated aircraft of any vintage or nationality.

Numerous reports have appeared in our aviation journals giving details of veteran aircraft or odd components which lie in fields or are tucked away in sheds. Reports on the type, condition and exact location of these relics will be most useful.

- (4) Those who own books, plans, documents, prints, pictures and models of historical interest.
- (5) Those possessing or having knowledge of R.F.C., R.A.F. or R.N.A.S. squadron histories, etc.

Once the details above have been supplied and sifted it should be possible to gauge the feasibility of the scheme and enable me to make a further report. The ultimate success of this venture may well depend upon the measure of public support forthcoming. Will readers please send all correspondence to the undersigned at the address below?

50, Lovett Road,
Coprior, Portsmouth.

D. S. GRIFFIN.

FORTHCOMING EVENTS

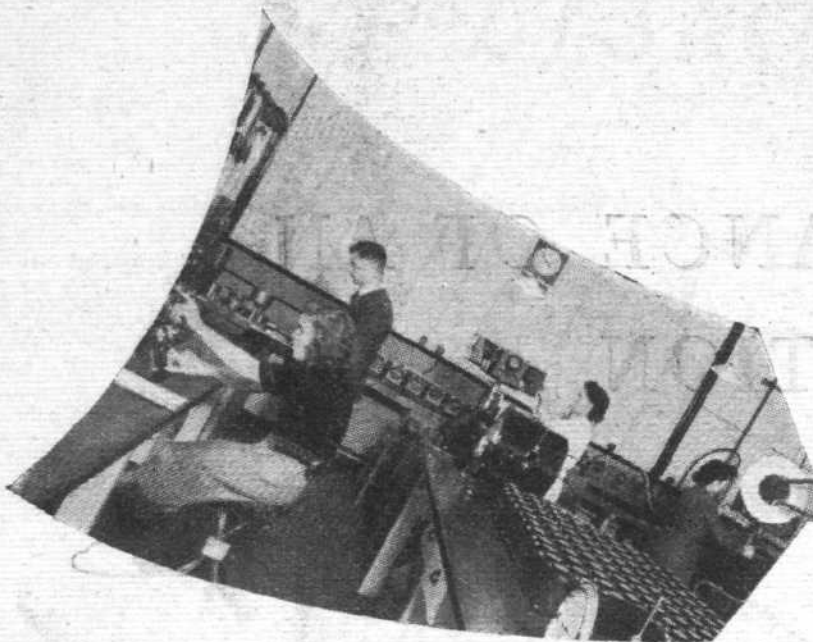
- May 12th.—R.Ae.S. (Graduates and Students' Section): "Pressure Cabins," D. Cardwell, B.Sc., A.C.G.I., A.F.R.Ae.S.
- May 18th.—R.Ae.S. (Weybridge): Branch Members' Junior Prize Lecture.
- May 18th.—Aircraft Recognition Society: Talk by C. G. Grey.
- May 21st.—Northamptonshire Aero Club: 21st Anniversary Air Display.
- May 21st.—Aero Golfing Society: Summer meeting and "Flight" Trophy, Ashridge Course.
- May 26th and 27th.—National Physical Laboratory: "Open Days" May 26th for representatives of industrial organizations and May 27th for members of university staffs and government departments.
- May 28th.—Wolverhampton Aero Club: "At Home" and Air Display.
- May 29th.—Ultra Light Aircraft Association: Air Rally Derby Airport. (Cancelled).
- May 29th.—Leicestershire Aero Club: Air Day and "At Home," Ratcliffe airfield.
- Just 1st.—R.Ae.S. (Luton): Discussion evening.
- June 1st.—R.Ae.S. (Weybridge): Annual General Meeting.
- June 4th to 6th.—Bembridge and Sandown Aero Club: Flying Week-end.
- June 4th-6th.—Aero Club d'Epervay: Third International Air Rally. (Private invitations.)
- June 11th and 12th.—Royal Air Forces Association: Annual Conference, Margate.
- June 11th to 17th.—R.A.F. Small Arms Association: the 23rd Annual Championship Meeting.
- June 11th.—Darlington and District Aero Club: Air Display, Croft airfield.
- June 11th to 13th.—Yorkshire Aeroplane Club: International and Club Invitation Rally.
- June 18th.—R.Ae.S. (Brough): Flying meeting and Cirrus Trophy race, Brough.
- June 19th.—Air League of the British Empire (Portsmouth): Garden Party, The Airport, Portsmouth.
- June 22nd to 24th.—Institute of Transport: Congress at Buxton.

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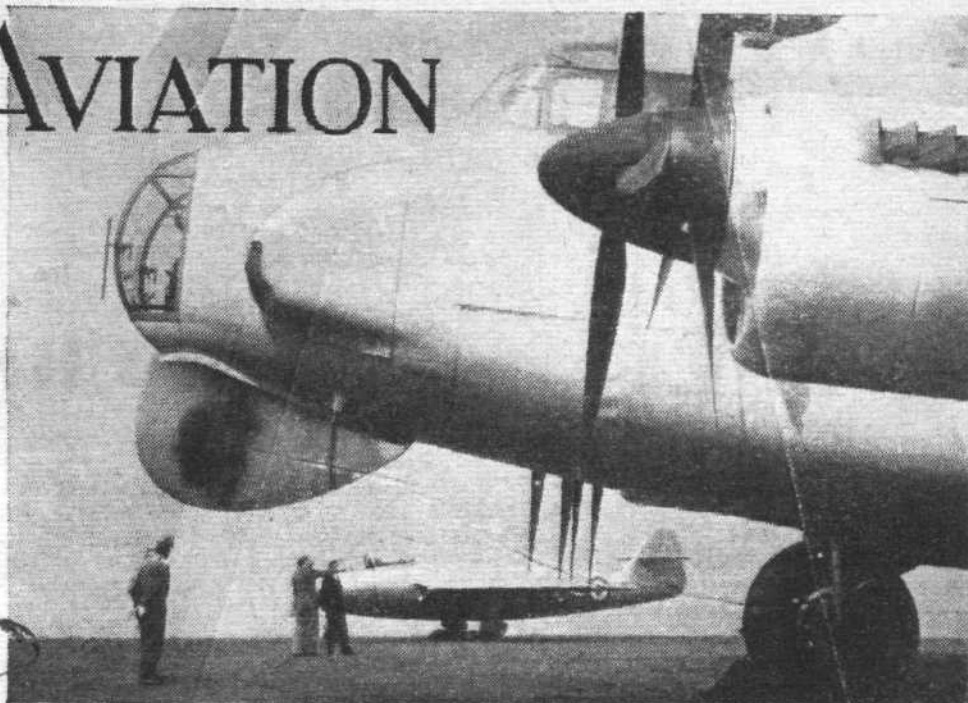
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SERVICE AVIATION

Royal Air Force and
Naval Aviation News
and Announcements

"GROUP'S" NEWEST: The two latest products of the Hawker Siddeley Group pictured together at the recent Woodford display. Framed by the pugnacious nose of the Avro Shackleton reconnaissance bomber is the Hawker P.1052 experimental fighter, due shortly to attack the London-Paris record.

"Flight" photograph.



C.F.S. Reunion

A REUNION dinner for past members of the staff of the Central Flying School will take place this year at R.A.F. Station Little Rissington, Glos. Past members who have not received invitations are requested to forward their addresses to the Hon. Sec., C.F.S. Reunion, at the above address. Those unable to attend are asked to send addresses for record purposes.

Cambridge "At Home"

THE successful show held at Cambridge Airport last Sunday by No. 5 Reserve Centre opened the "At Home" season for the R.A.F.V.R. Three Spitfires of No. 615 (County of Surrey) Squadron, R.Aux.A.F., flew from Biggin Hill to start the display; their appearance was followed by a demonstration of the Prentice. In both the annual formation flying and spot landing competitions between Tiger Moths of Cambridge University Air Squadron and No. 22 Reserve

Flying School, the visitors were victorious. C.U.A.S. won the first event with 87.5 per cent, and the spot-landing contest with F/O. Park's two touch-downs of 80yd mean error.

With a total of 375 marks to the School's 225, the University thus holds the team trophy—a silver bowl with a capacity of one gallon. High-speed flight was represented by a Meteor 4 from Duxford, and personnel of the Parachute Training School, Upper Heyford, jumped from a balloon. A gliding display was given by No. 105 A.T.C. Gliding School and Cambridge University Gliding Club. In some events, pilots' R/T commentary was relayed.



INSTALLED: Formerly A.O.C.-in-C. Fighter Command, Air Marshal Sir William Elliot has now taken up his new appointment as chief staff officer to the Minister of Defence. He is seen at his office at the ministry.

New Barracks Opened

THE first of a new type of barrack block was opened by Mr. Arthur Henderson, the Secretary of State for Air, at the Central Flying School, Little Rissington, on Friday, May 6th. Housing 100 airmen in 84 single-berth and four four-berth cubicles, the block was described by Mr. Henderson as a very great improvement on anything which had previously been known in Service life. He announced that a total of 53 such buildings should be completed within 12 months, and plans had been made to build more.

The cubicles of the new block contain single beds and built-in fittings including Compactum wardrobes, writing desks, cabinet radiators and bed-head lighting.

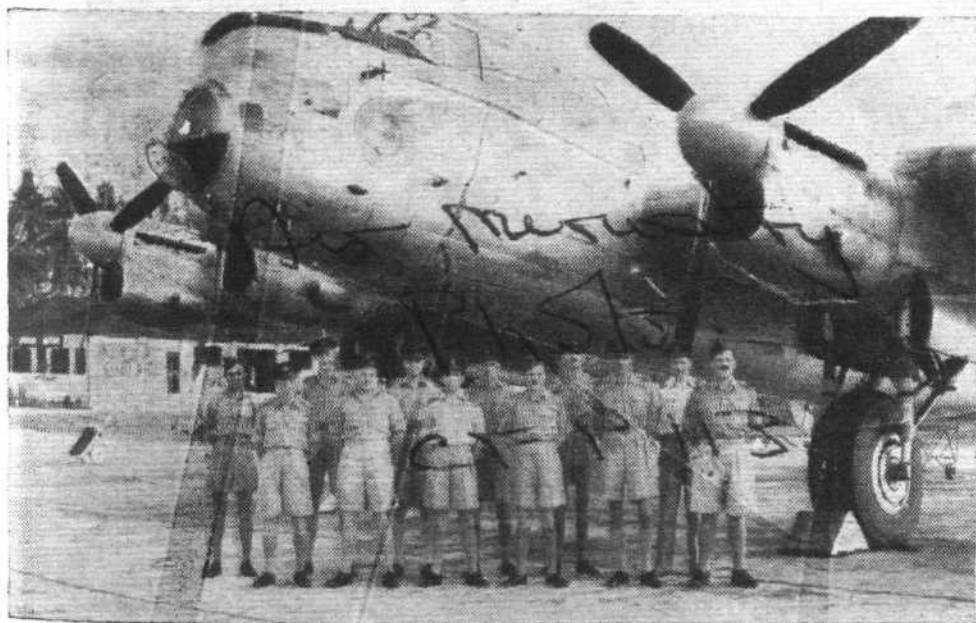
There had been a tendency in the past, said Mr. Henderson, to look upon the Services as something separate and distinct from the civilian community. That was not so. Servicemen were, after all, but citizens in uniform, and were just as much a part of the community as their civilian counterparts. They would be provided with standards of accommodation comparable with those in civil life.

R.A.F. Appointment

IT is announced that A.V.M. T. C. Traill, C.B., O.B.E., D.F.C., has been appointed Director-General of Personnel (II) at the Air Ministry.

Last December, A.V.M. Traill became Air Officer in Charge of Administration at Maintenance Command H.Q., before which he had commanded No. 12 Group, Fighter Command since May, 1946.

Before taking charge of No. 83 Group, B.A.F.O., at the end of the war, he was Director of Tactics at the Air Ministry for 18 months. A.V.M. Traill is 50, and joined the Navy as a midshipman in



RADIO INSPECTORS: Seen at Negombo, Ceylon, are members of the Inspectorate of Radio Services, with the crew of the Lancaster Iris in which they toured the Far East recently. Those shown are:—(Back row, L. to R.) Sgt. Billing, fitter; F/L Barber, navigator; W/C Bone, I.R.S. II (Staff); F/L Stone, captain; F/L Faraday, I.R.S. III (Staff); S/L Ward, Air Ministry. (Front row) F/O Austin-Clarke, engineer; F/L Robertson, signaller; G/C Boon, Inspector of Radio Services (Staff); A.V.M. Addison, Director-General of Services (Staff); G/C Blair, A.C.F.E.; W/C Irvin, I.R.S. (Staff).

Service Aviation

1914, transferring to the R.F.C. three years later.

Until recently A.O.C. R.A.F. Station Manby, A. Cdre. J. G. Franks, C.B.E., has been appointed to Flying Training Command as Senior Technical Staff Officer. His previous posts include those of Director of Armament Research and Development (Air) at the Ministry of

Supply, and Superintendent of Armament Tests at Boscombe Down. He was commissioned from Cranwell in 1924.

Far East Leave Centre

SEA- and sun-bathing, hiking, climbing, cycling, moonlight picnics, and a great variety of games, amid striking tropical scenery, are available to airmen and airwomen of Air Command, Far East, who visit the new R.A.F. Leave Centre at Tanjong Bungah, a small

island off the Malayan coast. A holiday there costs then 1s 4d a day.

Run by the N.A.A.F.I., with W.V.S. assistants, the Centre comprises a large, well-built house, standing amid flowers and trees, with its own private bathing beach. In addition to dining room, lounge, drinks counter, and a rest-room for airwomen, the building has sleeping quarters for eight airwomen. Outside, in the grounds, 70 airmen are housed in well-appointed quarters.

R.A.F. MODELLERS MEET

No. 22 Group Stages Successful Field-day at Ternhill

CREDIT for the R.A.F.'s first large-scale, officially sponsored gathering of aeromodellers must go to the Headquarters of No. 22 Group, Technical Training Command. This Group, which is responsible for the administration of all recruit training centres, is commanded by A.V.M. P. E. Maitland, C.B., M.V.O., A.F.C., who felt that useful and instructive off-duty pastimes should receive the fullest encouragement.

The modellers' field day was held on "sports afternoon" (Wednesday) of last week on the airfield at R.A.F. Station, Ternhill, Salop. Though possessing excellent office and messing accommodation at nearby Buntingsdale Hall, 22 Group does not boast a landing-ground of its own. Ternhill was made available for the occasion by the Station Commander, G/C. Gandy. Before flying began, inspection was made of an exhibition of solid model aircraft, photography, drawing and painting, leatherwork, woodwork, rugmaking, dressmaking and needlework. Entries in the latter classes were, of course, mainly by members of the W.R.A.F. Among the exhibits, which were of remarkably high standard, special mention should be made of the work of Cpl. Young (West Kirby). His hand-illustrated flying log, containing some fine cameo paintings of aircraft, was an example of painstaking keenness. In the *concours d'élégance*, a small-scale model of the Nieuport Scout won the first prize for Sgt. Coates, of Hereford.



Undiscouraged by a somewhat severe accident-rate, competitors retained a most enthusiastic spirit throughout the afternoon. Flying a 58in-span sailplane of his own design, A/C. Winkley (Wilmslow) returned the two most successful flights in the first event, with times of 88 sec and 56 sec respectively. One of the most unfortunate of entrants was Cpl. Barker (Wytholl), whose model appeared to be making the most of the thermals when its flight was cut short by a hangar. Many other casualties were caused by "spinning in" on the launch.

The largest aircraft seen, which landed uneventfully, was the Anson carrying Air Marshal Sir John Whitworth Jones, K.C.B., C.B.E., the A.O.C.-in-C., Technical Training Command. Sir John spent much of the afternoon examining models and chatting with their owners, and appeared greatly impressed by the value of the meeting.

In the free-flight duration contests that followed, for rubber- and motor-powered models, many competitors were hampered by unserviceability, or performance drops through rushed repairs. Pre-meeting eagerness was obviously responsible for a number of "prangs." A/C. Morgan (Bircham Newton) scored in the rubber-powered event with a time of 53 sec, while Sgt. Boxer's diesel-driven model encouraged the Padgate contingent with a prizewinning flight of 69 sec. The waspish buzz of miniature power-units had persisted loudly throughout the opening events, but temperament asserted itself during the eagerly awaited control-line contests, and engine-failures caused some despondency. Marks were allotted according to the number of aerobatics performed, and on this count A/C. Gaffney (Bridgnorth) scored easily. His distinctly "dicey" loops and inverted circuits, performed with complete confidence, won a total of 41 points.

The concluding event was a more "professional" exhibition, but one that,



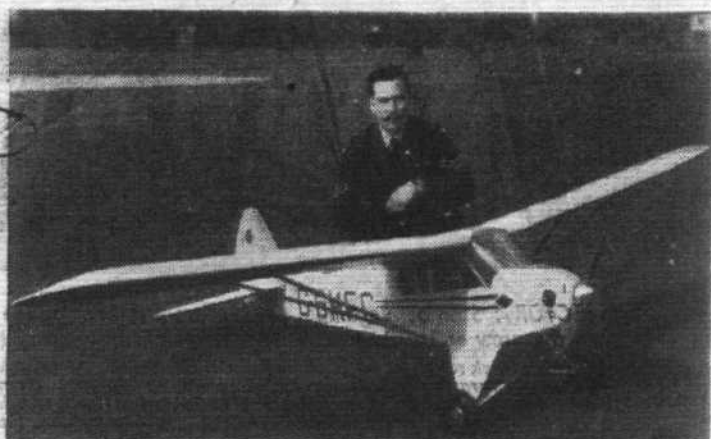
Air Marshal Sir John Whitworth Jones (left) and A.V.M. P. E. Maitland were enthusiastic spectators at the Ternhill meeting.

nevertheless, had its snags, by members of the Mersey and Wallasey Model Flying Clubs, who had given good services in judging and timekeeping. Mrs. Maitland, the wife of 22 Group's A.O.C., then presented prizes to individual winners, and a large trophy for the most successful station (Wilmslow). At intervals during the afternoon, the Central Band of the R.A.F. Regiment, under the direction of F/O. T. E. Davies, played some excellent selections.

Following this first encouraging occasion, 22 Group plans to hold similar meetings each year. It may now be hoped that other units will give similar support to the R.A.F. model movement, the enthusiasm of which denotes the commendably close interest in aviation shown by members of all branches and trades.

(Left) Good performances by A.C. Winkley's 58-in span sailplane won the Victor Ludorum trophy for Wilmslow. "Flight" photographs.

Winner of the second prize in the *concours d'élégance*—Cpl. Barker's 10-ft span $\frac{1}{2}$ h.p. Piper Cub. It was designed for radio control and took 12 months to build.



LIGHTWEIGHT



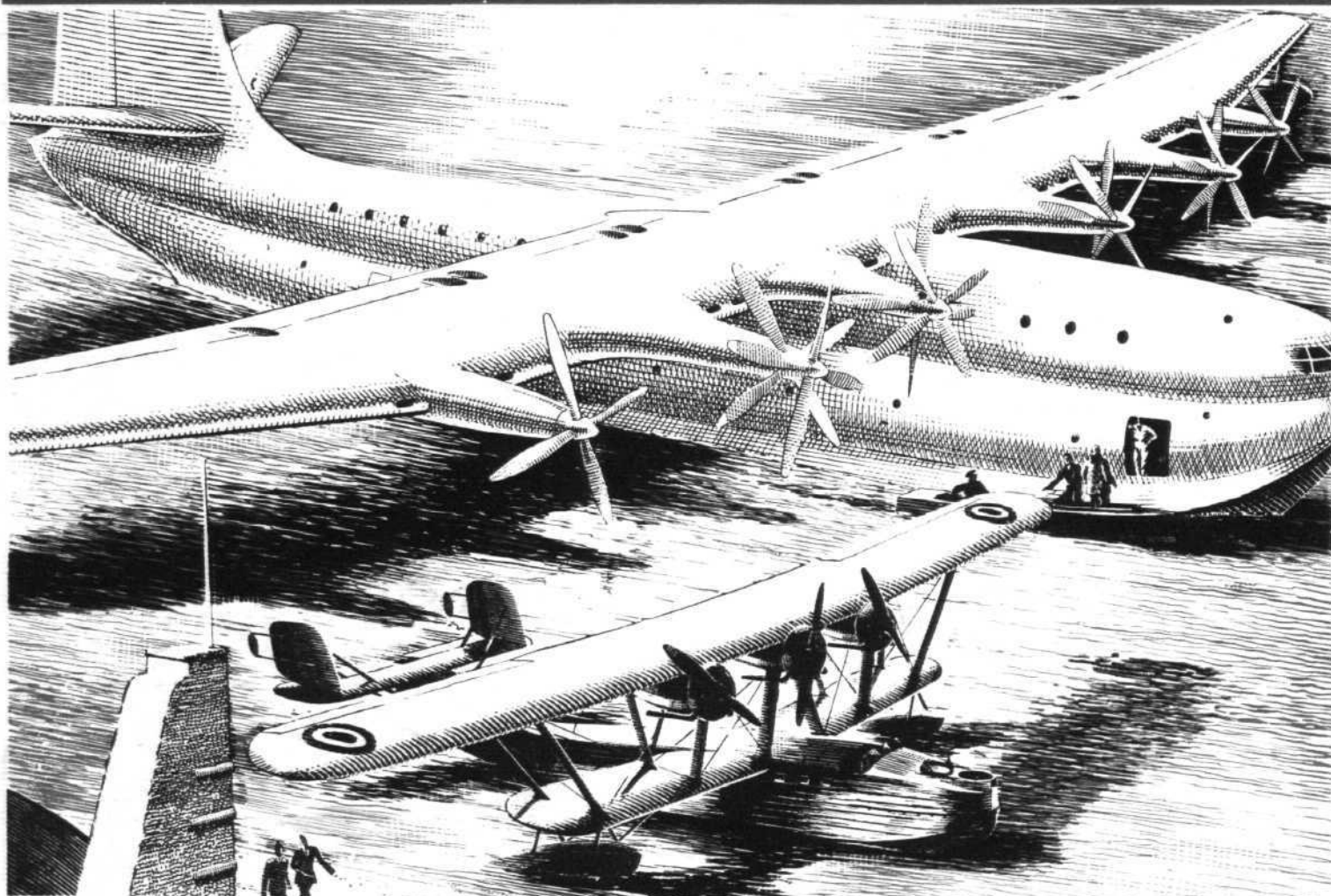
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140 ton flying boats are under construction and they too will be powered with Bristol engines—ten “Bristol” Proteus propeller turbines, the engines which will also power the “Bristol” Brabazon Mark II.

