

List of Aircraft on Display

Sir W. G. Armstrong Whitworth Aircraft, Ltd.

METEOR N.F.14 (two Rolls-Royce *Derwent* jet engines). First flew 21.4.53. Two-seat, radar-equipped night fighter. In service with the R.A.F. Span 43 ft. ; length 49 ft. 11 in.

Armstrong Siddeley Motors, Ltd.

HUNTER F. MK. 2 (one Armstrong Siddeley *Sapphire* jet engine). First flew 30.11.52. Ordered for the R.A.F. Span 33 ft. 7 in. ; length 45 ft. 9 in.

SAPPHIRE CANBERRA (two Armstrong-Siddeley *Sapphire Sa.7* jet engines). First flew 1951. Experimental engine test-bed. Span 63 ft. 11 in. ; length 65 ft. 6 in. This version is being built under licence in the U.S.A. as the *B-57A* and *B* which are light bomber and intruder aircraft, respectively.

Auster Aircraft, Ltd.

AIGLET TRAINER (one 130 h.p. de Havilland *Gipsy Major* piston engine). First flew 1951. Elementary trainer. Two seat (side-by-side) dual control, fully aerobatic, clipped-wing version of standard *Aiglet*. Majority of components interchangeable with those of other Auster types. Span 32 ft. ; length 23 ft. 2½ in. ; maximum all-up weight 2,200 lb. ; maximum speed 132 m.p.h.

AUSTER A.O.P.9 (one 180 h.p. Blackburn *Cirrus Bombardier* piston engine). First flew 19.3.54. Two/three seat artillery observation and light liaison aircraft. Span 36 ft. 5 in. ; length 23 ft. 8½ in. ; height 8 ft. 11 in. ; all-up weight 2,100 lb. ; maximum cruising speed 110 m.p.h.

Blackburn & General Aircraft, Ltd.

BEVERLEY (four 2,480 h.p. Bristol *Centaurus 171* piston engines). First flew 14.6.53. Developed from the Hercules-powered *Universal* Freighter. The first British aircraft designed for the dropping of heavy army equipment for which role the rear loading doors are removed. Carries nearly 20 tons of payload in a hold of nearly 6,000 cu. ft. capacity. Twenty on order for the R.A.F. A civil version which will carry six cars and five motor cycles in the freight hold and 42 passengers in the tail is under development. Span 162 ft. ; length 99 ft. 2 in.

Boulton Paul Aircraft, Ltd.

BALLIOL T.2 (one 1,245 h.p. Rolls-Royce *Merlin 25* piston engine). First flew 24.3.48. Two seat advanced trainer. In service with the R.A.F. Also supplied to Ceylon. A deck-landing version, the *Sea Balliol T.Mk. 21* is in service with the Fleet Air Arm. Span 39 ft. 4 in. ; length 35 ft. 1½ in. ; all-up weight 8,410 lb. ; maximum speed 288 m.p.h.

The Bristol Aeroplane Co., Ltd. (Aircraft Division)

BRITANNIA 100 (four Bristol *Proteus 3* turboprop engines). First flew 16.8.52. Carries up to 104 "tourist" class passengers. Pressurized fuselage with track-mounted seats enabling passenger accommodation to be varied quickly. Three lengthened and more powerful versions of the Britannia with an all-up weight of 155,000 lb. will be available for delivery in 1956/57. Thirty-five on order for B.O.A.C., ten of which will be lengthened passenger versions and another five, freight aircraft. Qantas Empire Airways has also signed a letter of intent to buy six of the bigger *Britannias*. In addition, the possible sale of *Britannias* to other operators is under negotiation. The Canadian Government has ordered a substantial number of a maritime reconnaissance version. Span 140 ft. ; length 114 ft. ; has an all-up weight of 140,000 lb. and can carry a 25,000 lb. payload over a distance of 3,650 statute miles, in still air, at a mean cruising speed of 360 m.p.h.

TYPE 171, SYCAMORE (one 525/545 h.p. Alvis *Leonides 73* piston engine). First flew 1950. Four/five-seat helicopter. In production for the British Services and Royal Australian Navy as the *Sycamore 14*. A civil model, the *Sycamore 3A* is used by B.E.A. The following particulars apply to the *Mk. 4* which is the current production version for passenger and freight work. Main rotor diameter 48 ft. 7 in. ; length (rotor folded) 46 ft. 2 in. ; all-up weight 5,400 lb. ; level speed 141 m.p.h. ; vertical climb 800 ft./minute.

TYPE 170 FREIGHTER (two 2,040 h.p. Bristol *Hercules 730* piston engines). First flew 2.12.45. Military and civil transport. Over 175 in use by military and civil operators in Britain and overseas. The *Mk. 32* long-nosed version, which can carry three cars instead of two, or more passengers, is also in service. The following particulars apply to the standard *Mk. 31 Freighter*: Span 108 ft. ; length 68 ft. 4 in. ; height 21 ft. 6 in. ; all-up weight 44,000 lb. ; maximum speed 224 m.p.h.

TYPE 173 (two 550 h.p. Alvis *Leonides 73* radial, air-cooled, piston engines). First flew 3.1.52. Ten-thirteen-seat, twin-rotor, passenger-carrying helicopter. Rotor diameter 48 ft. 6½ in. Overall length (rotors folded) 78 ft. 2 in. ; all-up weight 10,600 lb. ; max. level speed at sea level 158 m.p.h. Three prototypes of the *Mk. 3* version fitted with stub wings have been ordered by the M.O.S. This version will be powered by two 850 h.p. Alvis *Leonides Major* engines and will cruise at 138 m.p.h. carrying 16 passengers. The model shown at Farnborough this year is the *Mk. 2* without stub wings and in much the same

form as the forthcoming anti-submarine version of which 100 have been ordered for the Fleet Air Arm.

The Bristol Aeroplane Co., Ltd. (Engine Division)

OLYMPUS-CANBERRA (two 9,750 lb. static thrust Bristol *Olympus* jet engines). First flew 5.8.52. Experimental engine test-bed. On 4th May, 1953, this machine set up a new world altitude record by climbing to 63,688 ft. Span 64 ft. ; length 65 ft. 6 in.

PROTEUS-AMBASSADOR (two 3,320 s.h.p. plus 1,200 lb. static thrust Bristol *Proteus 705* turboprop engines). Experimental engine test-bed version of the 40-47-seat *Elizabethan* passenger transport used by B.E.A. Span 115 ft. ; length 82 ft.

The de Havilland Aircraft Co., Ltd.

CHIPMUNK (one 145 h.p. de Havilland *Gipsy Major 10* piston engine). First flew in 1947. Two-seat civil and military elementary trainer. Designed by the de Havilland Aircraft of Canada. Standard elementary trainer of the R.A.F.V.R. Some hundreds on order and in service overseas. Also built in Portugal under licence. Span 34 ft. 4 in. ; length 25 ft. 8 in. ; all-up weight 2,000 lb. ; maximum speed at sea level 140 m.p.h.

COMET 2 (four 6,500 static thrust Rolls-Royce *Avon* jet engines). Prototype first flew 16.2.52. Long-range, 44 seat version of the *Comet 1*. Thirty-three *Comet 2's* are now on order, 12 of them for B.O.A.C. The first production B.O.A.C. *Comet 2* made its first flight on 27.8.53. Span 115 ft. ; length 111 ft. ; all-up weight 145,000 lb. ; typical performance, 500 m.p.h. for 2,200 miles at 40,000 ft. with 13,450 lb. payload.

COMET 3 (four Rolls-Royce *Avon RA-16* jet engines of over 9,000 lb. static thrust each). First flew 19.7.54. A larger and faster version of the earlier *Comets*, designed for transatlantic flights carrying 58/76 passengers. Ordered by B.O.A.C., Pan American World Airways and Air India. Span 115 ft. ; length 111 ft. 6 in. ; all-up weight 145,000 lb. Maximum cruising speed more than 500 m.p.h. Maximum range approximately 4,000 miles. Altogether, world operators have options for 100 *Comet 2's* and *3's* in addition to orders already placed.

DOVE 6 (two 380 h.p. de Havilland *Gipsy Queen 70, Mk. 2* piston engines). First flew 25.9.45. Eight/eleven seat feederline transport. Some 450 in world-wide use. Span 57 ft. ; length 39 ft. 3 in. ; all-up weight 8,800 lb. ; maximum speed 210 m.p.h. The example displayed is the four-seat executive version, the *Series 6*. Another executive version, the *Series 5*, seats eight/eleven passengers.

HERON 2 (four 250 h.p. de Havilland *Gipsy Queen 30* piston engines). Retractable under-carried version of *Heron 1* which first flew May, 1950. Fourteen/seventeen seat feederliner. More than 50 *Heron's* have now been ordered by several overseas operators. Span 71 ft. 6 in. ; length 48 ft. 6 in. ; all-up weight 12,500 lb. ; maximum cruising speed 177 m.p.h. at 3,000 ft.

SEA VENOM N.F. MK. 21 (one de Havilland *Ghost 104* turbo-jet engine). First flew 1951. Two-seat all-weather naval fighter. Similar to the *NF Venom* but also has an arrester hook and folding wings. In quantity production for the Fleet Air Arm and the Royal Australian Navy, and also being produced under licence in France. Span 41 ft. 9 in. ; length 35 ft. 3 in.

VENOM (one de Havilland *Ghost* turbojet engine). First flew 2.9.49. Two versions in production for the R.A.F. *FB.Mk. 4* single-seat day interceptor and fighter-bomber ; *NF.Mk. 3* two-seat night fighter with pilot and radar operator seated side-by-side in the fuselage nacelle, and search radar in the nose. Both versions are developments of the *Venom FBI* and have a new and more powerful control system. The *NF Venom* has also been supplied to the Swedish Air Force. Built under licence in Italy and Switzerland. Span 41 ft. 9 in. ; length (*FB.Mk. 4*) 33 ft., (*NF.Mk. 3*) 35 ft. 3 in.

TYPE 110 (two Rolls-Royce *Avon* jet engines). First flew 26.9.51. Two-seat, radar-equipped, all-weather and night fighter. Wings fold. Was the first two-seat operational fighter in the world to exceed speed of sound (on 9.4.52). Has recently been fitted with an "all flying" tailplane to improve control and manoeuvrability at transonic and supersonic speeds. Under development for Fleet Air Arm. Span 51 ft. ; length 52 ft.

VAMPIRE TRAINER (one 3,300 lb. static thrust de Havilland *Goblin 35* jet engine). First flew 15.11.50. In production for the R.A.F. and the Air Forces of 13 countries overseas. Also being built by de Havilland in Australia for the R.A.A.F. Span 38 ft. ; length 34 ft. 6 in. ; maximum speed 530 m.p.h.

The de Havilland Aircraft Co. of Canada, Ltd.

BEAVER 2 (one 520 h.p. Alvis *Leonides* piston engine). A British power plant has been installed in this Canadian-designed and built seven-passenger, light, all-metal transport. Over 500 *Beavers* have now been produced in Canada and are in service with the U.S. Army as well as with civil operators in 26 countries. The *Beaver 2*, with its 20 per cent. power increase and all-round improvement in performance, is particularly intended for military use. Span 48 ft. ; length 30 ft. 3 in. ; cruising speed 147 m.p.h.

The English Electric Co., Ltd.

CANBERRA (two Rolls-Royce *Avon* jet engines). First flew 13.5.49. Built by English Electric Co., Shorts, Handley Page and A. V. Roe. High-speed, high-altitude, medium bomber. In production overseas for United States Air Force and Royal Australian Air Force. Also supplied to the Venezuelan Air Force and the Centre d'Essais en Vol, Bretigny, France. The R.A.F.'s *B.Mk. 2* tactical bomber and *P.R.Mk. 3* high-altitude, photo-reconnaissance aircraft are now being joined in service by the longer, more powerful *B.Mk. 6* and *P.R.Mk. 7* versions. The latest *Canberra* to be announced is the *B.Mk. 8* which first flew on 23.7.54. While primarily intended for a long-range night intruder role, the *B.Mk. 8* can readily be adapted to the *Canberra's* normal high altitude bombing role. For night intrusion carries forward-firing armament in a fairing beneath fuselage. Among numerous speed records set up by *Canberras* since 1949 are the first double crossing of the Atlantic in August, 1952, and the London-Australia record in January, 1953. Span 63 ft. 11 in.; length (*B.Mk. 6* and subsequent Marks) 66 ft. 9 in.

The Fairey Aviation Co., Ltd.

DELTA (one Rolls-Royce *Derwent* jet engine). First flew 10.3.51. Experimental delta-wing research aircraft. The smallest British delta form of piloted aircraft. Span 19 ft. 6½ in.; length 26 ft. 3 in.

FIREFLY 8 (one Rolls-Royce *Griffon 59* piston engine). Radio-controlled, pilotless, target-drone aircraft. For test purposes and guided-missile observance, the machine can be flown by a crew of two—pilot and observer. Weapon-assessment cameras are housed in wing-tip fairings.

GANNET (one 2,950 s.h.p. Armstrong Siddeley *Double-Mamba* turboprop engine). First flew 29.9.49. Anti-submarine search and strike aircraft. In "super-priority" production for the Fleet Air Arm. Also on order for Royal Australian Navy. Retractable radome beneath rear fuselage, sono-buoys and other war equipment can be carried beneath the wings. The *Gannet T.Mk. 2* is a two-seat, dual control trainer. Wings fold. Span 54 ft. 4 in.; length 43 ft.

Folland Aircraft, Ltd.

MIDGE (one 1,640 lb. static thrust Armstrong Siddeley *Viper A.S.V.5* jet engine). First flew 11.8.54. First prototype of the *Gnat* single-seat, lightweight fighter which is ultimately expected to be powered by the Bristol *Orpheus*—an engine of three times the power, now under development. With an all-up weight of about 6,000 lb. the *Gnat* is expected to have the speed and rate of climb of conventional fighters and although it will have fewer instruments and armament, it will carry all the essentials of the high speed fighter—radar ranging for the guns, cannons, V.H.F. radio,

armour, ejection seat, etc. The light fighter is one third the weight of the conventional machine and man hours required to produce it are only one fifth. Span 20 ft. 8 in.; length 28 ft. 9 in.; height 9 ft. 3 in.; all-up weight approx. 4,500 lb.

Gloster Aircraft Co., Ltd.

JAVELIN F.(A.W.) Mk. 1 (two Armstrong Siddeley *Sapphire* jet engines). First flew 26.11.51. Two-seat long-range, day and night, all-weather, radar-equipped fighter. The world's first twin-jet engined delta. In "super-priority" production for the R.A.F. Carries a tail braking parachute for slowing the landing run. Capable of flying faster than sound. Span 52 ft.; length 57 ft.; height 17 ft.

METEOR T.MK. 7 (two 3,500 lb. static thrust Rolls-Royce *Derwent 5* or *8* turbo-jet engines). First flew 19.3.48. Two-seat (tandem) unarmed trainer version of the *Meteor F.Mk. 4*. Full dual controls. In production for the R.A.F. and overseas Air Forces. Span 37 ft. 2 in.; length 43 ft. 6 in.; height 14 ft. 9 in.; all-up weight 14,000 lb.; maximum speed 586 m.p.h. at sea level.

Handley Page, Ltd.

VICTOR (four Armstrong Siddeley *Sapphire* jet engines). First flew 24.12.52. Four-jet crescent-wing bomber. In "super-priority" production for R.A.F. Bomber Command. The span of the *Victor B.1*, the production model, will be 110 ft.; length 114 ft. 11 in.; height 26 ft. 9 in.

Hawker Aircraft, Ltd.

HUNTER F.MK. 1 (one Rolls-Royce *Avon* jet engine). First flew 20.7.51. Single-seat, swept-wing fighter. Armed with the 30mm. *Aden* cannon. In "super-priority" production for the R.A.F. and the air forces of Sweden and Denmark. The *Hunter* is also being built under licence in Holland and Belgium under a U.S. off-shore contract. Established a world air speed record of 726.6 m.p.h. near Littlehampton on 7th September, 1953. An experimental variant of the *Hunter F.1* is also appearing in the Display.

SEA HAWK F.B.MK. 3 (one 5,000 lb. static thrust Rolls-Royce *Nene 4* turbojet engine). First flew 31.8.48. Carrier-borne jet fighter. In production for the Fleet Air Arm. In addition a U.S. off-shore order for *Sea Hawks* has been placed in this country. Has folding wings and is armed with four 20 m.m. cannon in the lower forward fuselage. All development work and production is now being undertaken by Armstrong Whitworth. On 29th July, 1954, a *Sea Hawk F.B.3* flying at standard service loading and piloted by Lt. J. R. F. Overbury established a London—Amsterdam speed record (subject to F.A.I. confirmation) by flying from Bovingdon to Schipol at a speed of 571.5 m.p.h. Span 39 ft.; length 39 ft. 7 in.; wing area 278 sq. ft.

Hunting Percival Aircraft, Ltd.

JET PROVOST (one 1,640 lb. static thrust. Armstrong Siddeley *Viper A.S.V.5* jet engine). First flew 26.6.54. The world's first basic jet trainer, designed expressly to train pilots from the very beginning of their flying careers. Ordered by the R.A.F. Span 35 ft. 5 in.; length 31 ft. 11 in.; height 12 ft. 8 in.

PEMBROKE (two Alvis *Leonides* piston engines). First flew 20.11.52. Eight-seat service transport. A development of the *Prince 3* and *Sea Prince*. Has increased wing span and rearward-facing passenger seats. Can also be used as an ambulance and training aircraft. In production for the R.A.F. Has also been ordered by the Air Forces of Belgium, Southern Rhodesia and Sweden. A civil version known as the *Prince Series 5* is under development. Span 64 ft. 6 in.; length 46 ft.; height 16 ft.; maximum speed 220 m.p.h.

PROVOST (one 550 h.p. Alvis *Leonides Mk. 2500* piston engine). First flew February, 1950. Two-seat side-by-side basic trainer for Service and Civil use. In quantity production for the R.A.F., Southern Rhodesian, Burmese Air Forces and also Eirean Air Corps. The *Provost 53* weapon-training variant is capable of carrying two .303 in. machine guns with 600 rounds each in the wings and a ciné-camera in the starboard wing-root, together with any of the following combinations of external stores: two 250 lb. bombs; eight 25 lb. bombs; eight 25 lb. bombs and four 60 lb. rockets; six 60 lb. rockets. The following particulars apply to the standard *Provost T.Mk. 1*: span 35 ft. 2 in.; length 29 ft.; all-up weight 4,400 lb.; maximum speed 200 m.p.h.

D. Napier & Son, Ltd.

ELAND-VARSITY (two Napier *Eland* turbo-prop engines). Experimental engine test-bed version of the *Varsity* "flying classroom" R.A.F. aircrew trainer. It should be noted that the existing firewalls of the *Varsity* have precluded the installation of cowlings of the proper minimum-drag size which the small diameter of the *Eland* makes possible. Span 95 ft. 6 in.; length 67 ft. 6 in.

A. V. Roe & Co., Ltd.

SHACKLETON M.R.2 (four Rolls-Royce *Griffon* piston engines). First flew 17.6.52. Maritime reconnaissance bomber. More powerfully armed and more streamlined version of the *Shackleton M.R.1*. Both are in service with R.A.F. Coastal Command. Carries a crew of ten. A further improved version with a tricycle undercarriage—the *Shackleton M.R.3*—is now in production and has also been ordered by the South African Air Force. Dimensions: (*M.R.2*) span 120 ft.; length 87 ft. 4 in.; height 16 ft. 9 in.

VULCAN (four Armstrong Siddeley *Sapphire* jet engines). First flew 31.8.52. World's first delta-wing, four-jet bomber and in "super-priority" production for the R.A.F. The first prototype which is being displayed originally flew with four Rolls-Royce *Avon* jet engines but has now been fitted with four Armstrong Siddeley *Sapphires*. The production *Vulcan*, the *B.Mk.1*, has Bristol *Olympus* engines. Span of the *B.Mk. 1* is 99 ft.; length 97 ft. 1 in.; height 26 ft. 6 in.

Rolls-Royce Ltd.

SOAR METEOR (two 3,500 lb. static thrust Rolls-Royce *Derwent* jet engines plus two 1,810 lb. static thrust Rolls-Royce *Soar* engines). Experimental flying test-bed. Can maintain height on its wing-tip-mounted *Soar* engines alone.

Saunders-Roe, Ltd.

SKEETER 6 (one de Havilland *Gipsy Major 30* piston engine). A development of the *Skeeter 1* which first flew in October, 1948. Two seat light helicopter for civil use. Powerplant is a re-designed *Gipsy Major* engine incorporating direct fuel injection bringing the horsepower up into the 200 category. The *Mk. 5 Skeeter*—also for civil use—is powered by a *Cirrus Bombardier 702* engine of slightly less horsepower than the engine fitted to the *Mk. 6*. Both machines can be fitted with a skid landing gear as an alternative to the tricycle undercarriage. Rotor diameter 32 ft.; length 31 ft. 2 in. The following particulars apply to the *Mk. 6*: all-up weight 2,200 lb.; disposable load 610 lb.; maximum forward speed 101 m.p.h.

Scottish Aviation, Ltd.

PIONEER 2 (one 520 h.p. Alvis *Leonides* piston engine). First flew June, 1950. Four/five seat light transport for civil or service use. In production for the R.A.F. and in service in Malaya. A two-engined *Twin-Pioneer* is now being built. Span 52 ft. 6 in.; length 34 ft. 4 in.; maximum all-up weight 5,400 lb.; maximum speed 173 m.p.h.

Short Brothers & Harland, Ltd.

SB.5 (one Rolls-Royce *Derwent* jet engine). First flew 2.12.52. Adjustable-wing research aircraft designed to investigate the low-speed characteristics of the English Electric *P.1* supersonic fighter in flight. Fixed undercarriage. Wing can be set at 50, 60 or 69 degrees of sweep-back, and the tailplane can be positioned high or low on the fin and set to any desired angle of incidence between 10 degrees above or 10 degrees below the horizontal. After appearing in the Display, the *SB.5* will continue its research flying programme with its wings in the 69 degree position—a greater degree of sweep-back than on any other British aircraft. Span (50 degrees configuration) 35 ft. 2½ in.; (60 degrees) 30 ft. 6 in.; (69 degrees) 25 ft. 11 in.; length 47 ft. 4 in.; height (high tailplane) 16 ft. 7 in.

SEAMEW (one Armstrong Siddeley *Mamba* turboprop engine). First flew 23.8.53. Light, anti-submarine aircraft specifically designed for operation with escort carriers of N.A.T.O. forces. Fixed undercarriage. Span 55 ft.; length 41 ft.

SHERPA (two 350 lb. static thrust Blackburn-Turbomeca *Palas* jet engines). First flew 4.10.53. Single-seat experimental aircraft with the aero-isoclinic wing. This is a swept-back wing in which the angle of incidence remains constant under flexion, thus giving good performance at great heights without the penalty of increased weight and stiffening. Span 38 ft.; length 31 ft.; height 9 ft. 1 in.

Vickers-Armstrongs, Ltd.

VALIANT B.2 (four Rolls-Royce *Avon* jet engines). First flew 4.9.53. A special development of the *Valiant B.1* which first flew in May, 1951, and which was the first of the R.A.F.'s trio of four-jet bombers ordered "straight off the drawing board" for Bomber Command.

VISCOUNT (four 1,400 s.h.p. plus 365 s.t. Rolls-Royce *Dart R.Da. 3* turboprop engines). First flew 18.7.48. Forty/fifty-nine passenger airliner. Opened the world's first turboprop airliner service in April, 1953, with B.E.A. One hundred and forty-nine have been ordered by 17 different operators in Britain and overseas. In addition various operators have options for many more. A new version, the *Viscount 700D* will be powered by four *Dart R.Da. 6* engines which will give an improved performance throughout the range scale but particularly at the extremities—that is, on short-haul and long-haul operation. The first *Viscount 700D*'s are destined for Central African Airways who will operate them over their

List of Engines on Display

Alvis, Ltd.

LEONIDES LE.23HMV. Nine-cylinder, air-cooled, vertical radial piston engine for use in helicopters; single-stage, single-speed supercharger. Unlike fixed-wing version has no reduction gear but has a cooling fan and clutch. Weighs 642 lb. dry, and measures 41.5 in. long by 41.5 in. wide by 32.8 in. high. Has compression ratio of 6.8 and is of direct drive type. Take-off power at sea level is 550 b.h.p. at 3,200 r.p.m.; maximum emergency, 570 b.h.p. at 3,200 r.p.m. at 4,000 ft.; and maximum continuous cruise 410 b.h.p. at 2,800 r.p.m. at 9,750 ft. Fuel consumption is 31.5 g.p.h. and oil consumption five pints per hour, both at maximum cruising power.

Installed in Types 171 and 173.

routes by 1956. Larger versions of the *Viscount* are also being developed. Span 94 ft.; length 81 ft. 2 in.; the *700D* has a maximum all-up weight of 60,000 lb. Cruising speed 310-320 m.p.h.; still air range with maximum payload (12,800 lb.) 1,450 miles.

Vickers-Armstrongs, Ltd. (Supermarine Division)

SWIFT F.MK. 4 (one Rolls-Royce *Avon* jet engine with reheat). First flew 1.8.51. Single-seat, swept-wing fighter. In "super-priority" production for the R.A.F. as the *Swift F.Mk. 4*, armed with the new 30mm. *Aden* cannon. Set up a London to Paris record of 19 min. 5.6 sec. on 5th July, 1953, and world air speed record of 735.7 m.p.h. at Idris, Tripoli, on 25th September, 1953. Span 32 ft. 4 in.; length 41 ft. 6 in. A photo-reconnaissance version, the *Swift F.5* has been announced.

TYPE 525 (two Rolls-Royce *Avon* jet engines). First flew May, 1954. Single-seat, swept-wing naval fighter. A derivative of the *Type 508* straight-wing naval fighter prototype of 1951, and the almost identical *Type 529*, the *Type 525* is an interim development towards an even more advanced single seater for the Royal Navy.

Westland Aircraft, Ltd.

S.55 (one 800 h.p. Alvis *Leonides Major* piston engine). A new British powerplant has been installed in this particular *S.55* which is a Sikorsky design built under licence. Other Westland-built *S.55*'s or *Whirlwinds* as they are known, are in service with the Fleet Air Arm. Rotor diameter 53 ft.; length 41 ft. 8½ in.; all-up weight 6,800 lb.; maximum speed 110 m.p.h.

LEONIDES MAJOR. Fourteen-cylinder, air-cooled, two-row radial piston engine for use in improved versions of aircraft in which the *Leonides* is already fitted, in new aircraft which need an engine of about 50 per cent. greater power, and in helicopters. The horizontal crankshaft version weighs 1,060 lb. dry, measures 70.9 in. long by 38.9 in. diameter. Has compression ratio of 6.8:1 and incorporates a low-pressure fuel injection system, enabling the engine to be controlled by a single lever. Take-off power at sea level is 870 b.h.p. at 3,000 r.p.m.; maximum continuous power 700 b.h.p. at 2,900 r.p.m. at 7,000 ft. and maximum weak mixture 515 b.h.p. at 2,600 r.p.m. at 11,000 ft. Fuel consumption is 525/555 pints/b.h.p./hour, and oil 6-10 pints per hour at maximum continuous power.

Installed in Whirlwind.

LEONIDES 502/4. Nine-cylinder, air-cooled, radial piston engine; single-stage, single-speed compressor. Weighs 790 lb. dry and measures 54.4 in. long by 41.5 in. wide by 41.5 in. high. Has compression ratio of 6.8 and reduction gear of 0.625. Take-off power at sea level is 570 b.h.p. at 3,000 r.p.m. at 2,000 ft.; and maximum cruise 460 b.h.p. at 2,900 r.p.m. at 8,000 ft. Fuel consumption is 38 g.p.h. and oil consumption six pints per hour, both at maximum cruising power.

Installed in Provost (Type 503/6), Pembroke, Pioneer (501/4) and Beaver 2 (502/4).

Armstrong Siddeley Motors, Ltd.

MAMBA ASM.3. Turboprop with ten-stage axial compressor, two-stage twin-disc turbine and six combustion chambers. Airscrew drive: epicyclic reduction gear driven by quill shaft from front of compressor. Is 87.3 in. long, and 29 in. in diameter, weighing 780 lb. dry and having a weight/power ratio of 0.52. Develops 1,320 b.h.p. and 405 lb. thrust at 15,000 r.p.m. at sea level, and cruises at 1,050 b.h.p. plus 355 lb. thrust at 14,500 r.p.m. at sea level. Fuel consumption is 0.67 lb./e.s.h.p./hr. and oil consumption 2 lb. per hour at 350 m.p.h. and 14,500 r.p.m. at sea level. First ran April, 1946. Powered the first single-engined prop-jet aircraft to fly and the world's first axial-flow turboprop airliner. The *ASM.3* forms the basis of the *Double Mamba*. A new and more powerful *Mamba* is the *ASM.6* which is still largely secret.

Installed in Seamew.

DOUBLE-MAMBA. Coupled turboprop with ten-stage axial compressor, two-stage turbine and 12 combustion chambers. Airscrew drive; epicyclic reduction gears driving independent co-axial shafts. Is 98.7 in. long, and 52.8 in. in diameter, weighs 2,000 lb. dry and has a weight/power ratio of 0.68. Develops 2,640 b.h.p. and 810 lb. thrust at 15,000 r.p.m. at sea level, and cruises at 2,100 b.h.p. and 710 lb. thrust at 14,500 r.p.m. at sea level. Fuel consumption is 0.67 lb./e.h.p./hr., and oil consumption is four pints per hour at 300 m.p.h. at sea level. One of the coupled engines can be shut down completely allowing an aircraft to fly on only one bank of the motor. The engine can run on kerosene, high-octane or ships' diesel fuel, or any mixture of the three.

Installed in Gannet A.S.1 and T.2.

SAPPHIRE. Jet with axial-flow compressor and annular combustion chamber. The *Sapphire Sa.6* is 134 in. long and has a diameter of 37.4 in.; weighs 2,600 lb. dry and has a weight/power ratio of 0.35 and a maximum thrust of 8,300 lb. at sea level at 8,600 r.p.m. with specific fuel consumption of 0.85 lb./hr./lb. thrust. Being built under licence in America by Curtiss-Wright as the *J65*.

Sapphire Meteor holds international records for climb up to 40,000 ft. in three minutes.

Installed in Javelin, first prototype Vulcan, Victor, Hunter F.2, and experimentally installed in Canberra (Sa.7).

VIPER ASV5. A long-life version of the *ASV3* expendable jet engine which powers the Australian-built *Jindivik Mk. 2* pilotless target aircraft which is being built in France under licence. One of the simplest and cheapest turbojets in the world. Has a seven-stage compressor, annular combustion chamber and single-stage turbine. Mass flow 31 lb./sec. Overall diameter 28 in.; length 65.83 in.; dry weight 465 lb. Maximum thrust 1,640 lb. at 13,400 r.p.m. with specific fuel consumption of 1.09 lb./hr./lb.

Installed in Jet Provost and Midge.

Blackburn and General Aircraft, Ltd.

BLACKBURN-TURBOMECA PALAS. Jet with single-sided centrifugal compressor, annular combustion chamber with rotating fuel injector, and single stage turbine. Diameter 16.1 in.; length 47.2 in.; dry weight 159 lb.; mass flow 6.8 lb./sec.; pressure ratio 4:1; maximum thrust 350 lb. at 34,000 r.p.m. with specific fuel consumption of 1.1 lb./hr./h.p.

Installed in Sherpa.

CIRRUS BOMBARDIER. Four-cylinder air-cooled in-line direct injection piston engine, unsupercharged. Weighs 354 lb. dry and measures 45.27 in. long by 17.2 in. wide by 31.1 in. high. Has compression ratio of 7.0 direct drive to airscrew. Take-off power at sea level is 180 b.h.p. at 2,600 r.p.m.; maximum emergency 180 b.h.p. at 2,600 r.p.m. at sea level and maximum cruising 158 b.h.p. at 2,300 r.p.m. at 1,250 ft. Fuel consumption is 10.8 g.p.h. and oil consumption 1-3.5 pints per hour, both consumptions at maximum cruising power.

Installed in Auster, A.O.P. 9 and Skeeter.

The Bristol Aeroplane Co., Ltd.

CENTAURUS 661. Eighteen-cylinder, air-cooled, two-row, sleeve-valve radial engine with single-stage two-speed supercharger. Weighs 3,300 lb. dry and measures 74.6 in. long by 57.75 in. in diameter. Has a compression ratio of 7.2 and reduction gear ratio of 0.40. Take-off power at sea level is 2,600 b.h.p. at 2,500 r.p.m. at 13,000 ft., and maximum cruising 1,755 b.h.p. at 2,500 r.p.m. at 13,000 ft. Fuel consumption is 108.5 g.p.h. and oil consumption 11 pints per hour, both at maximum cruising power (continuous). Produced during end of war and still in production.

Installed in various military and civil aircraft, including Sea Fury naval fighter and Ambassador (Elizabethan) medium range airliner now in service with B.E.A. A slightly modified version, the

2,850 b.h.p. Series 173 with a single-speed supercharger, powers Blackburn Universal Mk. 2.

HERCULES 730 SERIES. Fourteen-cylinder, air-cooled, two-row, sleeve-valve radial engine with single-speed supercharger. Weighs 2,100 lb. dry and measures 62.25 in. long by 52 in. diameter. Has a compression ratio of 7.0 and a reduction gear ratio of 0.444. Take-off power at sea level is 2,040 h.p. at 2,800 r.p.m.; maximum emergency 2,090 h.p. 2,800 r.p.m. at 3,000 ft. and maximum cruising 1,215 h.p. at 2,400 r.p.m. at 10,750 ft. Fuel consumption is 75.0 g.p.h. and oil consumption is nine pints per hour, both at maximum continuous cruising power. Post-war development of the war-time *Hercules* of which 57,400 were built to power such famous types as the *Beaufighter* and *Halifax*. The various series *Hercules* engines are widely used in civil and military aircraft. It is also being built under licence in France.

Installed in Type 170 Freighter (Hercules 734).

OLYMPUS. Jet of the two-spool type—basically a low pressure unit and a high pressure unit, each having an entirely independent axial compressor and turbine. The low pressure unit acts as a supercharger to the high pressure compressor, and each is driven through concentric shafts by its own separate turbine. This arrangement gives all the advantages of handling and easy starting obtained with engines of medium compression ratios, but yields the much lower fuel consumption made possible by the use of high compression ratios. Is 124 in. long and has a diameter of 40 in., weighs 3,520 lb., consumption lb./lb. t./hr. 0.766, maximum thrust 9,750 lb. Built under licence in the U.S.A. by Wright, as the J67.

Experimentally installed in Canberra which holds the world's altitude record.

PROTEUS 705. Turboprop with axial and centrifugal twelve-plus-one stage compressor, three-stage turbine and eight combustion chambers. Airscrew drive; free turbine and epicyclic gear. Is 113 in. long, 39 in. in diameter and weighs 2,850 lb. dry. Has a maximum continuous power rating of 3,320 s.h.p. plus 1,200 lb. jet thrust at 11,700 compressor r.p.m. More powerful and compact development of *Proteus 600* which powers the *Princess* in both single and coupled-unit form. A unit of even higher power, the *Proteus 755* which will provide 3,650 s.h.p. plus 1,320 lb. jet thrust is under development and *Proteus 705's* are already running at this rating on development tests. This engine will power all versions of the *Britannia* after the Mk. 100.

Installed in the Britannia. Also experimentally installed in Ambassador.

The de Havilland Engine Co., Ltd.

GHOST 50. Jet with centrifugal single-stage compressor, single-stage turbine and ten com-

bustion chambers. Is 121 in. long and 53 in. in diameter, weighs 2,218 lb. dry and has a weight/power ratio of 0.44. Develops 5,000 lb. thrust at 10,250 r.p.m. at sea level and cruises at 3,350 lb. thrust at 9,000 r.p.m. at sea level. Fuel consumption is 1.33 lb./lb. t./hr. and oil consumption two pints per hour, both at 500 m.p.h. First pure jet engine to power a civil aircraft, the de Havilland *Comet*. Established an international height record for aeroplanes when a *Ghost*-engined *Vampire* reached 59,446 ft. on 23.3.48. Also built in Italy, Sweden and Switzerland under licence.

Installed in Venom series (Ghosts 103 and 104).

GIPSY MAJOR 10/2. Four-cylinder, air-cooled, in-line piston engine; unsupercharged. Weighs 312 lb. dry and measures 45.4 in. long by 20.1 in. wide by 30.6 in. high. Has compression ratio of 6.0 and direct drive to airscrew. Take-off power is 145 b.h.p. at 2,400 r.p.m. at sea level. Fuel consumption is 11 g.p.h. and oil consumption two-five pints per hour at maximum continuous cruise. A redesigned *Gipsy Major*—the Mk. 30—incorporating direct fuel injection bringing the horsepower up into the 200 category, is now being flight tested.

Installed in Chipmunk and Aiglet Trainer. Also installed in Skeeter 6 (Gipsy Major 30).

GIPSY QUEEN 30/2. Six-cylinder, air-cooled, in-line piston engine, unsupercharged. Weighs 560 lb. dry and measures 61.5 in. long by 19.6 in. wide by 33 in. high. Has a compression ratio of 6.5 and direct drive to airscrew. Take-off power at sea level 250 b.h.p. at 2,500 r.p.m.; maximum cruising power 250 b.h.p. at 2,500 r.p.m. at sea level. Fuel consumption 13 g.p.h. and oil consumption three-seven pints per hour at maximum continuous cruise.

Installed in Heron.

GIPSY QUEEN 70/2. Six-cylinder, air-cooled, in-line piston engine. Single-stage, single-speed supercharger. The most powerful of all present de Havilland piston engines. Weighs 670 lb. dry and measures 71.75 in. long by 19.56 in. wide by 33.23 in. high. Has a compression ratio of 6.5 and reduction gear ratio of 0.711. Take-off power at sea level is 380 b.h.p. at 3,000 r.p.m. and maximum cruising 356 b.h.p. at 2,700 r.p.m. at 4,400 ft. Fuel consumption is 17.5 g.p.h. and oil consumption two-six pints per hour at maximum continuous cruise.

Installed in Dove.

GOBLIN 35. Jet with centrifugal single-stage compressor, single-stage turbine and 16 combustion chambers. Is 100.5 in. long and 49.9 in. in diameter, weighs 1,629 lb. and has a weight/power ratio of 0.46. Develops 3,500 lb. thrust at 10,750 r.p.m. at sea level and cruises at 2,320 lb. thrust at 9,500 r.p.m. at sea level. Fuel con-

sumption is 1.47 g.p.h. and oil consumption 1.6 pints per hour, both at 500 m.p.h. The *Goblin* first flew on 5.3.43. Passed British type test in new Gas Turbine Category in January, 1945, and holds Approval Certificate No. 1. In 1950 a *Goblin* completed 1,000 hrs. of simulated combat sorties without attention. Also being built under licence in Italy and Sweden.

Installed in Vampire Trainer.

SUPER SPRITE. Assisted take-off rocket motor. Development of the *Sprite* "cold" rocket motor and intended primarily for use with military aircraft. Employs hydrogen peroxide with kerosene or petrol injection and a solid catalyst which replaces the liquid potassium permanganate used in the *Sprite*. The catalyst breaks down the hydrogen peroxide into water, in the form of steam, and free oxygen, thus providing the bulk of the thrust. The injection of kerosene or petrol—drawn from the aircraft's main tanks—and its combustion in the free oxygen in the exhaust stream increases the rocket's energy, and this additional energy can be used either to increase the thrust or to extend the duration of run. This year the *Sprite* is exhibited for the first time as a fully equipped unit complete with container, dropping mechanism, parachute, and landing-shock absorber. Empty weight of the motor only is 600 lb. Weighs 1,900 lb. complete in pack. Maximum thrust 4,200 lb. and total duration about 40 seconds. Total impulse 120,000 lb./sec.

D. Napier and Son, Ltd.

ELAND. Turboprop of single-shaft type with ten-stage compressor driving a single-rotation constant-speed propeller. Axial compressor, six combustion chambers and a three-stage weight, approximately $\frac{1}{4}$ lb. per h.p., length from front of airscrew shaft to end of tailcone 122 $\frac{1}{2}$ in. Maximum diameter 36 $\frac{1}{8}$ in., weight 1,575 lb. dry and has a specific weight of 0.525 lb. per h.p. Take-off power at sea level 3,000 e.h.p.

Experimentally installed in Varsity.

NOMAD. Compounded gas turbine/diesel engine. Two-stroke liquid-cooled piston engine with 12 sleeve-valve cylinders, coupled with axial compressor and exhaust gas turbine, all delivering power at a single airscrew shaft. The advantage of the composite power plant such as the *Nomad* lies in its low fuel consumption which means extra range for long-distance civil and military aircraft. The latest version of the *Nomad*, the *NNm6*—a development of the earlier *NNm3* which first flew in 1951 as an experimental installation in a *Lincoln*—delivers 3,135 e.h.p. and weighs 3,580 lb. dry. Is 119 in. long, 53 in. high and has a frontal area of only 19.25 sq. ft.

Rolls-Royce, Ltd.

AVON. Axial-flow jet engine. The first *Avon* to be revealed in 1948 developed 6,000 lb. static thrust. Since the *RA3* went into production in June, 1950, the *Avon* has undergone continual development, the thrust having increased to 7,500 lb. (with reheat) in the *RA.7* and to 9,500 lb. (without reheat) in the *RA.14*—the latest type-tested version to be announced and the highest world figure. Production and delivery of this engine has already begun and newer versions are being developed in flight to give jet higher powers, well into five figures. A civil version of the *RA.14*, the *RA.16*, will power the long-range *Comet 3*. Six different production lines are making *Avons* in Britain, and it is also being built under licence in Australia, Belgium and France.

Installed in Canberra, Valiant, Hunter F.4., Swift, Type 525, Comet 2, Comet 3 and DH.110. Experimentally installed in Meteor.

DART R.DA.3. Turboprop with centrifugal two-stage compressor, two-stage turbine and seven combustion chambers. Airscrew drive, epicyclic reduction gear from compressor shaft. Is 95 in. long and 38.5 in. in diameter, weighs 929 lb. dry and has a weight/power ratio of 0.63. Develops 1,400 b.h.p. and 365 lb. thrust at 14,500 r.p.m. at sea level and cruises at 1,120 b.h.p. and 295 lb. thrust at 13,800 r.p.m. at sea level. Fuel consumption is 0.94 lb./e.h.p./hr. and oil consumption one pint per hour, both at sea level. The *Dart* was the first engine designed as an airscrew turbine to fly and made its first flight in October, 1947. The *Viscount*, fitted with four *Dart* engines, was the world's first prop-jet powered airliner to fly and to go into scheduled service. A newer version of the *Dart*, the *R.Da.6* which powers the latest *Viscount*, develops 1,550 s.h.p. for take-off. The completely new *R.Da.5* with an even greater design rating is scheduled to power the lengthened *Viscounts* now under development.

Installed in Viscount.

DERWENT RD.8. Jet with double-sided centrifugal-type single-stage compressor, single-stage turbine and nine combustion chambers. Length 83 in., 43 in. in diameter, weighs 1,280 lb. dry and has weight/power ratio of 0.356. Develops 3,600 lb. thrust at 14,700 r.p.m. at sea level and cruises at 3,090 lb. thrust at 14,100 r.p.m. at sea level. Fuel consumption is 1.45 lb./lb. t./hr., and oil consumption one pint per hour, both at 500 m.p.h. Also built under licence in Belgium.

Installed in Meteor T.7, SB.5 and Fairey Delta.

GRIFFON 57. Twelve-cylinder vee liquid-cooled piston engine, two-speed, single-stage supercharger and gearing for contra-rotating propellers. Weighs 2,100 lb. dry and measures 83.5 in. long by 31.8 in. wide. Has a compression ratio of 6.0 and a reduction gear ratio of 0.442.

Take-off power at sea level 2,450 h.p. at 2,750 r.p.m.; maximum emergency 1,985 h.p. at 2,750 r.p.m. at 1,500 ft. and maximum cruising 1,360 h.p. at 2,400 r.p.m. at 6,000 ft. Fuel consumption (specific cruising) 118 g.p.h.; and oil consumption 4-20 pints per hour. The *Griffon* is a similar type of engine to the *Merlin* of war-time fame, but of larger capacity.

Installed in *Shackleton* (*Griffon 47*) and the *Firefly 8* (*Griffon 59*).

NENE. Jet with double-sided centrifugal-type single-stage, compressor, single-stage turbine and nine combustion chambers. Is 97 in. long, 49.5 in. in diameter, and weighs 1,620 lb. dry. Develops 5,100 lb. thrust at 12,500 r.p.m. at sea level and cruises at 4,090 lb. thrust at 11,800 r.p.m. at sea level. Fuel consumption 1.06 lb./lb. t./hr., oil consumption one pint per hour. Also built under licence in Australia and France.

Installed in *Sea Hawk*.

MERLIN 35. Twelve-cylinder vee liquid-cooled piston engine; single-speed, single-stage supercharger. Weighs 1,515 lb. dry and measures 75 in. long by 33.6 in. wide by 49.1 in. high. Has compression ratio of 0.471. Take-off power is 1,280 b.h.p. at 3,000 r.p.m. and +12 lb./sq. in. boost and maximum cruising 1,050 b.h.p. at 2,850 r.p.m. at 8,000 ft. Fuel consumption (specific cruising) 112 g.p.h.; and oil consumption three-ten pints per hour. Development of the famous war-time *Merlin* which powered the *Hurricane*, *Spitfire*, *Lancaster* and many other outstanding aircraft of all categories. The *Merlin* engine has been produced in large numbers and over 150,000 have been built.

Installed in *Balliol*.

SOAR. Axial-flow, lightweight turbojet. Is only 15½ in. in diameter, 62½ in. long, and weighs only 267 lb. Is rated at 1,810 lb. thrust, although it has passed a type-test at 1,860 lb. thrust.

Experimentally installed in *Meteor*.

British Aircraft and Engines Built Overseas under Licence

ARGENTINA

RR *Derwent* jet engine. For Argentine-built fighter.

AUSTRALIA

DH *Vampire* fighter. DH *Vampire* trainer.
RR *Nene* jet engine. EE *Canberra* bomber.
RR *Avon* jet engine. Fitted to EE *Canberra* and F-86.

BELGIUM

†Gl. *Meteor F-8* fighter } Assembly only—air-
†Gl. *Meteor T-7* trainer } frame built in Holland.
RR *Derwent* jet engine.
H *Hunter* fighter. RR *Avon* jet engine.

CANADA

Bristol *Britannia* maritime reconnaissance aircraft.

EGYPT

DH *Vampire* fighter. DH *Vampire* night fighter.

FRANCE

Bristol *Hercules* piston engine.
DH *Vampire* fighter.
RR *Nene* jet engine. Fitted to several types of experimental jet aircraft and French-built DH *Vampire* (*Mistral*).
RR *Tay* jet engine. Fitted to Dassault *Ouragan* S/S interceptor fighter and Dassault *Mystere 2* supersonic fighter.
DH *Sea Venom* naval fighter.
AS *Viper* jet engine. RR *Avon* jet engine.

HOLLAND

†Gl. *Meteor F-8* fighter. H *Hunter* fighter.

INDIA

DH *Vampire* fighter. Percival *Prentice*.

ITALY

DH *Vampire* fighter.
DH *Vampire* night fighter.
DH *Goblin* jet engine. DH *Venom* fighter.
DH *Venom* night fighter. DH *Ghost* jet engine.

PORTUGAL

DH *Chipmunk* trainer.

SWEDEN

DH *Ghost* jet engine. Fitted to SAAB 29 fighter.
DH *Goblin* jet engine.
RR *Avon* (for SAAB *Lansen* fighter).

SWITZERLAND

DH *Vampire* fighter. DH *Venom* fighter.
DH *Ghost* jet engine.

TURKEY

DH *Gipsy Major* piston engine.

U.S.A. Bristol *Olympus* jet engine
EE *Canberra B2* bomber (built by Martin as B-57A).

RR *Tay* jet engine (built by Pratt & Whitney as J-48 *Turbo-Wasp*). Fitted to Grumman F9F-5 *Panther* and F9F-6 *Cougar*, North American F93A *Sabre* and Lockheed F-94C *Starfire*.

RR *Nene* jet engine (built by Pratt & Whitney as J-42). Fitted to Grumman F9F-2 *Panther*.
AS *Sapphire* jet engine (built by Wright as J-65). Fitted to Republic F-84F *Thunderjet* and RF-84F, B-57A (*Canberra*), Douglas A4D *Skyhawk* and Lockheed F-104.

*AS *Python* turboprop.

*AS *Mamba* turboprop.

*AS *Double Mamba* turboprop, Bristol *Olympus* jet engine (built by Wright as J-67).

AS *Viper* jet engine.

Abbreviations : H—Hawker; DH—de Havilland; EE—English Electric; AS—Armstrong Siddeley; RR—Rolls-Royce; Gl.—Gloster.

† Production complete.

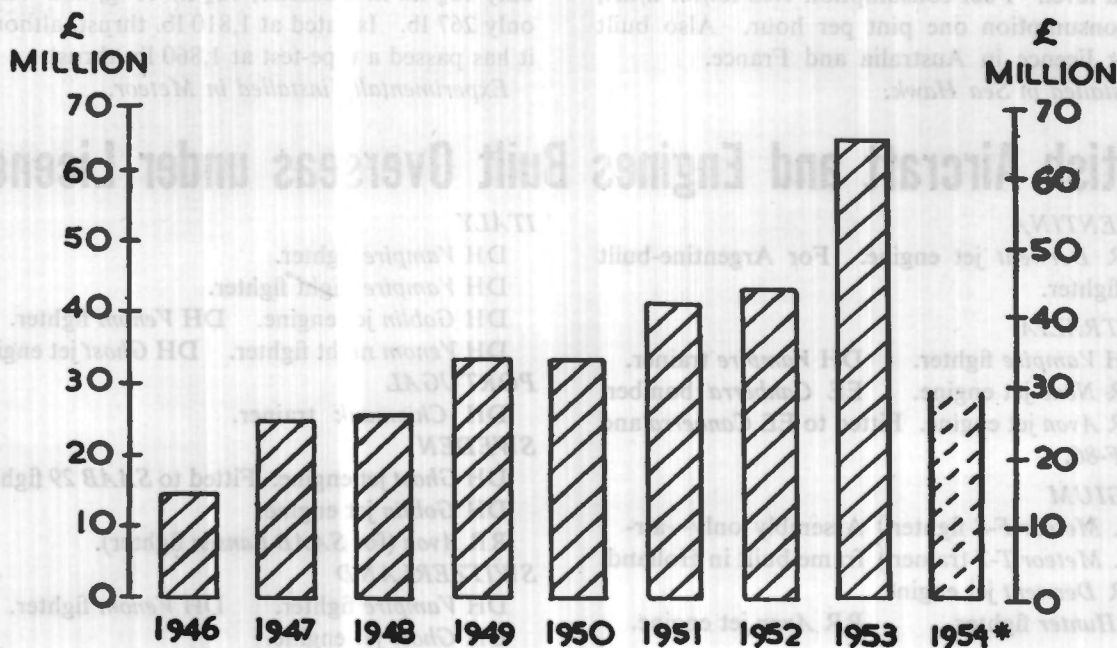
* Production not yet started.

Aviation Exports

The total value of aero exports from 1946 to 1953 inclusive was nearly £300m. In 1953 the value of aero exports reached £65½m.—an increase of £21½m. over the previous year's total. Up to the end of June, exports in 1954 had reached £30m.

Aviation exports now rank second in the broad category of general engineering products.

An important point to note is that the export totals up to and including 1952, although showing a progressive rise, had not yet been influenced by the export of the new gas turbine aircraft, of which deliveries abroad only began in 1953. On the other hand, the rising curve of exports up to the end of 1953 includes certain sales of Service aircraft abroad, and was therefore influenced by the expanding armament programmes of our allies.

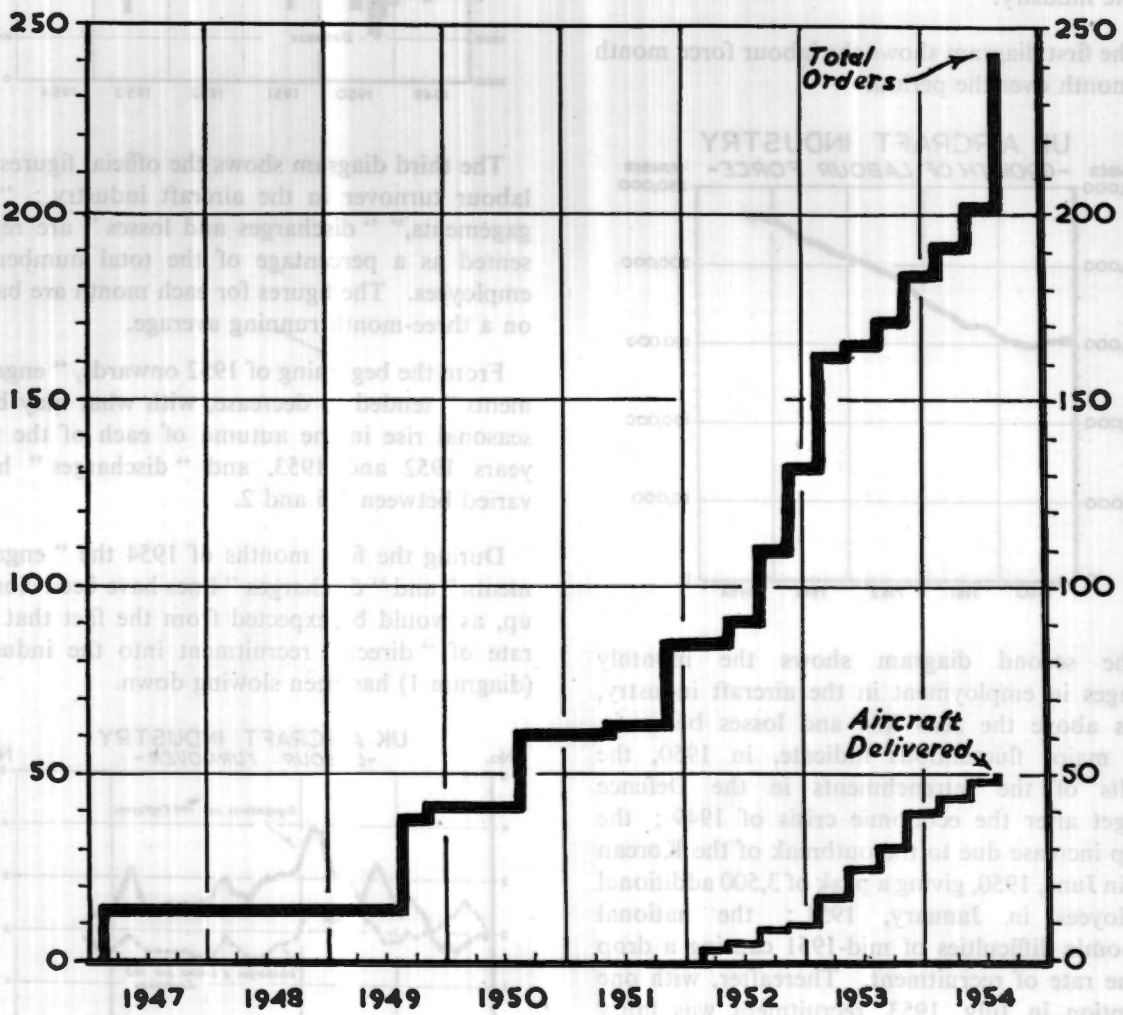


* January to June only.

Orders for Turbine-Powered Airliners

The diagram below shows cumulative curves of the numbers of British gas turbine airliners ordered by and delivered to airline operators up to 12th August, 1954, the date of the announcement that Capital Airlines had exercised its option to order 37 *Viscounts* in addition to three ordered previously. Thus the upper line of "total orders" shows at any point in time the total number of gas turbine airliners which had been ordered, whether for British or other airlines, up to that date. Similarly, the lower curve shows the numbers which had been delivered at a given date. Orders for and deliveries of prototype aircraft are *not* included in the diagram.

These diagrams are based upon a compilation of those orders and deliveries which have been publicly and authoritatively announced by the firms concerned in the Press.

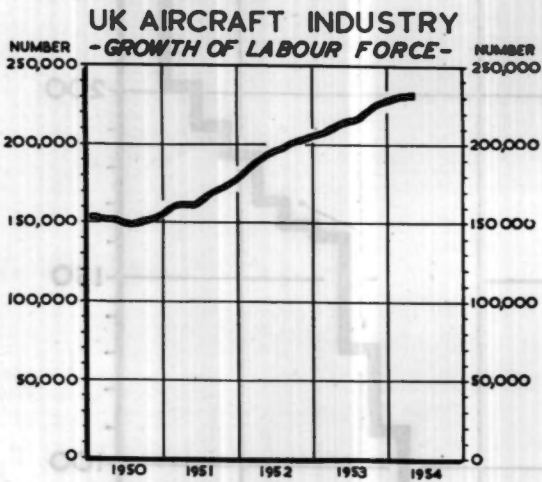


Aircraft Industry Manpower

The (direct) labour force in the Aircraft Industry rose from 149,900 in June, 1950, to 231,700 at the end of May this year, the latest month for which figures are available.

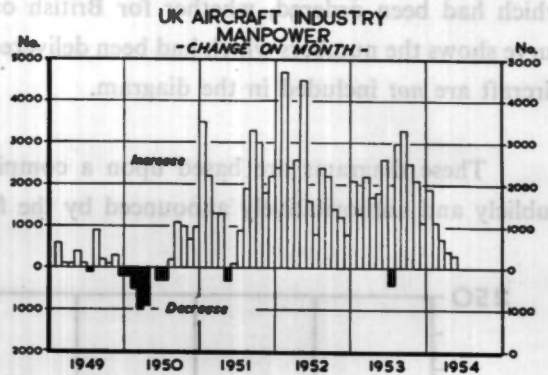
NOTE.—These official statistics cover employment in the companies manufacturing airframes, engines, undercarriages and propellers and are therefore referred to as "direct" employment; they exclude employment figures in other companies making parts and accessories, and subcontractors. They probably cover about two-thirds of the aircraft industry as a whole, and are a fair index of trends though not a measure of the whole industry.

The first diagram shows the labour force month by month over the period.



The second diagram shows the monthly changes in employment in the aircraft industry, gains above the zero line and losses below it. The major fluctuations indicate, in 1950, the results of the retrenchments in the Defence Budget after the economic crisis of 1949; the sharp increase due to the outbreak of the Korean war in June, 1950, giving a peak of 3,500 additional employees in January, 1951; the national economic difficulties of mid-1951 causing a drop in the rate of recruitment. Thereafter, with one exception in July, 1953, recruitment was fairly steady until the decline in 1954. There was an average monthly intake in 1953 of 1,920. During

the first five months of the current year there was an average monthly intake of 880, but, as the diagram shows, a diminishing monthly increase—a gain in the numbers employed of 1,900 in January, falling to 300 in May.



The third diagram shows the official figures for labour turnover in the aircraft industry; "engagements," "discharges and losses" are represented as a percentage of the total number of employees. The figures for each month are based on a three-month running average.

From the beginning of 1952 onwards, "engagements" tended to decrease, with what may be a seasonal rise in the autumn of each of the two years 1952 and 1953, and "discharges" have varied between 1.5 and 2.

During the first months of 1954 the "engagements" and "discharges" lines have been closing up, as would be expected from the fact that the rate of "direct" recruitment into the industry (diagram 1) has been slowing down.



S. B. A. C. FLYING DISPLAY

Flying will begin

at 14.30 hours on 6th, 7th and 8th September

Group demonstrations

Presented by

Proteus Ambassador	Bristol Aeroplane Company Limited
Pembroke	Hunting Percival Aircraft Limited
Heron 2	The de Havilland Aircraft Company Limited
Eland Varsity	D. Napier and Son Limited
Beaver 2	The de Havilland Aircraft Company Limited
Provost	Hunting Percival Aircraft Limited
Auster A.O.P.9	Auster Aircraft Limited
Pioneer 2	Scottish Aviation Limited
Gannet A.S.1	Fairey Aviation Company Limited
Balliol	Boulton Paul Limited
Soar Meteor	Rolls-Royce Limited
Canberra P.R.7	English Electric Company Limited
Hunter F.1	Hawker Aircraft Limited
Olympus Canberra	Bristol Aeroplane Company Limited
Sea Hawk F.B.3	Sir W. G. Armstrong Whitworth Aircraft Limited
Sapphire Canberra	Armstrong Siddeley Motors Limited
Sycamore 4	Bristol Aeroplane Company Limited
Bristol 173	Bristol Aeroplane Company Limited
Skeeter 5	Saunders-Roe Limited
Skeeter 6	Saunders-Roe Limited

Individual demonstrations

Presented by

~~Victor~~ 4
Meteor N.F.14

Handley Page Limited
Sir W. G. Armstrong Whitworth Aircraft
Limited

Gannet T.2
Sherpa

Fairey Aviation Company Limited
Short Brothers & Harland Limited

~~Jet Provost~~

Hunting Percival Aircraft Limited

~~Canberra B.8~~

English Electric Company Limited

Seamews (two aircraft)

Short Brothers & Harland Limited

~~Midge~~

Folland Aircraft Limited

~~Vulcan~~ 5

A. V. Roe & Company Limited

Delta 6

Fairey Aviation Company Limited

525

Vickers-Armstrongs Limited

~~Swift F.4~~

Vickers-Armstrongs Limited

~~Valiant B.2~~ 7

Vickers-Armstrongs Limited

Hunter

Hawker Aircraft Limited

~~Hunter F.2~~ 8

Sir W. G. Armstrong Whitworth Aircraft
Limited

Comet 2

The de Havilland Aircraft Company
Limited

~~Comet 3~~

The de Havilland Aircraft Company
Limited

DH.110

The de Havilland Aircraft Company
Limited

Javelin

Gloster Aircraft Limited