

# **AIR** *Pictorial*

and **AIR RESERVE GAZETTE**

JANUARY, 1958

The INTERNATIONAL AVIATION ENTHUSIASTS' Monthly





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## Other Roads . . .

LAST month's editorial "Away with Runways" aroused great public interest, and the Air League has been warmly congratulated on its attempt to get people thinking about the future of this aspect of air transport operations, for it seems patently foolish to go on producing aircraft which require longer and longer runways of far greater strength than today, costing enormous sums of money which few countries can afford. Nevertheless, some of our correspondents have taken us to task on the grounds that we were encouraging too great a technical "bite" by looking so far ahead. Therefore, we feel it is only fair to take a look at the other side of the coin.

First, though, a word on the background. The scientific and technical scene in general, and the aeronautical one in particular, has since the war presented such confusing and conflicting aspects as often to border upon the chaotic. The greatest difficulty is to establish a technical time-scale, to assess the lead-time required between scientific research and its everyday engineering application. One might instance supersonics. Dr. Mach established his significant ratio away back in the 'nineties. Most countries had supersonic wind tunnels before World War II. Mach 1 was first exceeded by an aeroplane in 1947. Yet only in the last two years has level supersonic flight become practical—and that for relatively small aeroplanes for a few minutes at a time.

It would not be too sweeping to say that the actual rate of progress to true supersonic flight confounded all the prophets. Mostly it was slower than expected, but some few of the speculators were proved to be pessimistic. The reasons for the difficulties of forecasting are because of the many "arts" concerned; not aerodynamics alone, but powerplants, structures, special materials and so on. A hold-up here, such as the unexpectedly slow development of reheat, which took almost ten years although it appeared to be workable in 1945, a "breakthrough" there, such as the so-called area rule which eased the transonic drag "barrier" (just as engines became so powerful that its dimensions had shrunk to those of a little fence) can completely change the estimated time scale.

Thus the picture is very, very complex and it is, as always, one where the judgment of the human mind is supreme, for the answers cannot be computed since there are

too many variables to make a programme. Worse still, the essence of the matter is cash and its allocation is in the hands of laymen who cannot be expected even to grasp the most tenuous threads of the arguments for and against a project. All the interests, too, are decidedly vested and there is no way of differentiating between the honest but misguided enthusiast, the true genius, or even the glib self-promoter. In this situation, and faced with signing bills for millions, it is scarcely surprising that the responsible politician usually adopts the advice of the slow and steady expert.

But, to return to our muttons; we have had it pointed out that there is little point in crying "Away with Runways", since they are already there, and they will remain there because some hundreds of large, heavy, subsonic jetliners ordered by the world's flag carriers will require them well into the 'seventies—so why be extravagant and build the runway into the aircraft? To this we reply that the M.2.5 VTOL jet-lift convertiplane is the first—and as far as we know—the only project for preventing the extension of runways and of getting a supersonic aircraft into and out of the air without a terrifyingly long, fast ground-run. The Air League feel it is a scheme which should be explored to the uttermost of its possibilities, with all-out backing from the Exchequer.

There are, however, other roads along which Great Britain has equally outstanding leads in invention and initial research, but where the lead is in danger of being lost entirely because of lack of development effort—i.e. cash.

It is strange that, when the dream of the pioneers, removal of the turbulent boundary layer, is within reach of realisation, there should be no apparent interest in halving the fuel costs of an airliner or of doubling the range of a bomber. Dr. G. V. Lachmann of Handley Page Ltd. has been doing research on a shoestring for years. His system has been flight-tested on an experimental section of wing, special ducted and perforated structures have been evolved, numerous global-range paper aircraft have been designed; but nothing seems to be forthcoming for the only possible worthwhile development—a trial batch of aeroplanes designed and built to get the most out of laminarisation and to prove the proposition in practice.

The Air League believes there is a great

opportunity here to combine business and research by designing a long-range jet executive to scoop the huge, lucrative U.S. market at present served by piston and turboprop.

The National Gas Turbine Department's jet flap is a more recent invention, which has now reached the stage where it should be tried in a specially designed aeroplane. Due to its unfortunate title, the jet flap is confused (even by aircraft designers) with flap blowing and jet deflexion—both devices which can be applied to conventional aeroplanes. However, although born out of a wedding of these ideas, the jet flap is, in fact, an entirely new flight system and is the first true integration of airframe and powerplant. The Air League is strongly of the opinion that the jet flap flight system can only be evaluated on specially designed aeroplanes—turbojet and turboprop variants would be significantly different—when its abilities as perhaps the ideal STOL configuration could be established on a practical operational basis.

There is, even today, a vast world market for STOL aircraft that can carry a paying load of passengers and freight, as is being proved by the rising exports of the Scottish Aviation Twin Pioneer—which has no present rivals although several imitators are on the way.

Does it pay to be radically different? Yes, provided your basic assessment of the situation is sound and you have the determination (and cash) to hold on grimly until events prove you right. The Twin Pioneer is one recent instance, the Conway by-pass turbojet is another. Based upon a brilliant twenty-year-old concept of Sir Frank Whittle, the by-pass principle was praised by theorists, but eschewed by all aero-engine manufacturers, save Rolls-Royce, whose tenacity, personalised by Lord Hives and imaginatively backed by the M.O.S., has triumphed to the infinite advantage of our jet airliners and bombers—and in the end to the Public Purse.

### THIS MONTH'S COVER

THE Zlin 126 Trener II is used extensively by the Czech Air Force and flying training schools. It is a tandem two-seater powered by a 105-h.p. Walter Minor engine, and has a maximum speed of 127 m.p.h.



# The Commonwealth of Satellites

By G. V. E. Thompson, B.Sc. (Eng.), A.R.C.S., F.R.I.C.

THE space age has begun! The launching of the two Russian Sputniks is an indication that emphasis is passing from aeronautics to *astronautics*. Having mastered the air, man is now taking the first steps towards the conquest of space—a much more difficult task. As we shall see, the difficulties are such that it is unlikely that manned space flight in even its simplest aspects will take place for some years yet. But with two Russian surprises following in swift succession it would be unwise to make any definite statement concerning the time scale for the development of spaceflight. There may be other surprises in store for us, and things happen so rapidly that it is not unlikely that this article may be out of date by the time it appears in print.

These "surprises" are only such as regards their existence and timing: the practicability of satellites and spaceflight has been known for several decades and the details of various projects have been worked out by the British Interplanetary Society, the American Rocket Society, the Gesellschaft für Weltraumforschung, and other members of the International Astronautical Federation. The trend of future developments can be seen today; how soon they come about depends only on the effort and money which governments are prepared to expend in this field.

The current political situation ensures that these developments will take place. At the moment the Russians are well in the lead, but America will obviously try hard to catch up. The first U.S. attempt to establish an earth satellite was unsuccessful, but such teething troubles are not unusual. The Russians may also have had initial launching failures—we just do not know.

## Establishment of Earth Satellites

To place a satellite in any particular orbit about the earth, three requirements must be fulfilled. It must be raised to the height of the orbit, given an appropriate velocity, and this velocity must be in the correct direction. Once the propulsive power ends, the satellite moves freely under the influence of the earth's gravitational pull, provided it is at a height great enough for air resistance to be neglected.

The force of gravitation varies with the distance from the earth's centre according to Newton's inverse square law, being reduced to one-quarter if the distance from the centre (4,000 miles) is doubled (4,000 miles altitude), to one-ninth if it is trebled (altitude 8,000 miles), and so on. For a circular orbit about the earth, the gravitational pull will be substantially constant (there are minor variations due to the distribution of land masses and the departure of the earth from a true sphere), but to put the

satellite in such an orbit it is necessary to fix the velocity precisely. The Sputnik must obviously be travelling in the circular path when the power is cut off, and the necessary speed is fixed purely by the geometry of the problem, i.e. by the altitude. It does not depend on the size or mass of the satellite. In the vicinity of the earth the speed needed for a circular orbit is 18,000 m.p.h., or 5 miles per second.

If the velocity is less than that, the body will fall towards the earth in an elliptical path. The statement in school textbooks that projectiles travel in parabolic paths is strictly untrue, but is made because the mathematics is simpler—it involves the convenient assumption that the gravitational forces along the path are all parallel. For a shell from a gun, that assumption is justifiable (particularly in comparison with the other assumption that air resistance is negligible), but it is not acceptable where the motion of satellites or long-range rockets is concerned.

If the velocity is greater than 18,000 m.p.h. when the Sputnik is travelling "parallel to sea-level", it will again follow an elliptical path, but in this case the ellipse will extend farther away from the earth instead of approaching it. As the velocity is increased still further, so the ellipse will become more and more elongated.

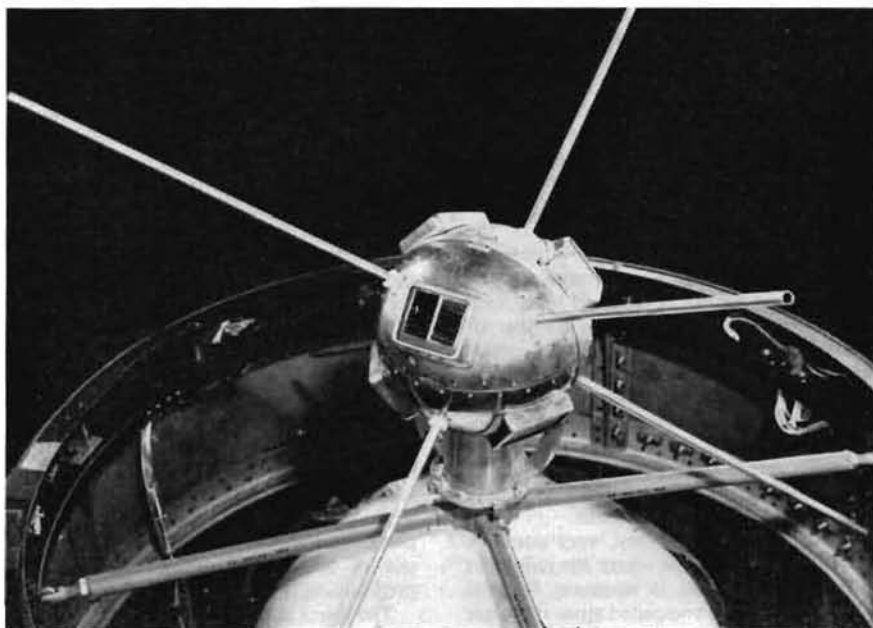
The satellite would also travel in an elliptical path if it were given the correct circular

speed (18,000 m.p.h.), but the direction of projection was incorrect. It is obviously necessary to attain quite a high degree of precision in both projection velocity and elevation to achieve a circular orbit, and for that reason elliptical orbits have been used by the Russians and will continue to be employed.

If the projection speed is as great as 25,000 m.p.h. then the orbit becomes parabolic, i.e. the body is no longer a satellite, but escapes from the pull of the earth. This is true spaceflight, and we are obviously well on the way to achieving it with small payloads. Indeed, the U.S.A.F. have claimed that they have fired two small aluminium pellets out into space, but the evidence for this is not conclusive.

To attain these velocities, the rocket must be used, firstly because it is the only propulsive engine capable of working in the vacuum of interplanetary space, and secondly because it is capable of high power outputs. It is also necessary in practice to use multi-stage rockets, in which the rocket carrying the satellite payload is itself the payload of a somewhat larger rocket (i.e. another "stage" or "step"), and that assembly in turn is the payload of an even larger vehicle, and so on. After the propellents of the bottom step have been burnt, the whole step separates, and the engine of the next stage takes over. In this way it is not necessary to raise the whole mass of the structure to the final height against the earth's gravitational pull nor to give it the necessary acceleration. For present satellites the vehicles are of either two- or three-stage construction. Some reports have suggested that the Russians are employing "super-propellents" (e.g. boron hydrides or liquid hydrogen), but most experts think that a conventional combination is more likely (alcohol and liquid

A model of the American 6.4-in. baby satellite is shown installed atop the third stage of the Vanguard launching rocket.



oxygen, with solid propellants for the last stage).

### Air Resistance

In the above discussion the effect of air resistance has been neglected because it is of little consequence during ascent. Drag is small at low speeds, but rapidly increases with increasing velocity. However, it also depends greatly on the density of the air. When a rocket takes off in a near-vertical path, by the time it has reached a velocity high enough for drag to become appreciable under sea-level conditions, it has risen above the greater part of the atmosphere.

The ascent of a satellite vehicle is therefore initially vertical, but when the rocket is travelling at a height great enough for drag to be small, the path is made to curve over more and more until it eventually blends into the circular orbit.

The Russian Sputniks are high enough for drag to be quite small—even smaller than had been predicted previously. However, there is sufficient drag to bring them down eventually. Drag is naturally greatest when they are passing through the denser layers of gas at their nearest approach to the earth (perigee of the orbit), and the energy lost at this stage causes the orbit to become less elliptical. After many revolutions the orbit will be circular, and the satellite will then begin to spiral down to earth.

In a paper published in the *Journal of the British Interplanetary Society* for November-December 1956, D. G. King-Hele of the Royal Aircraft Establishment was able to prove the apparent paradox that drag should make the spiralling satellite speed up, and this prediction has been verified with Sputnik I. When this separated from the last stage of its rocket, the two were travelling in much the same orbit. Drag on the cumbersome rocket section was naturally greater than that on the spherical Sputnik, but the rocket soon began to pass the satellite, and has since lapped it several times. The explanation of the "paradox" is simple: while drag might be expected to cause a reduction in speed, immediately this begins to happen the orbit alters and the satellite falls towards the earth, speeding up in the process, due to the loss of potential energy. The potential energy given up in the loss of altitude is more than sufficient to balance the energy absorbed by drag, so the net result is an increase in speed.

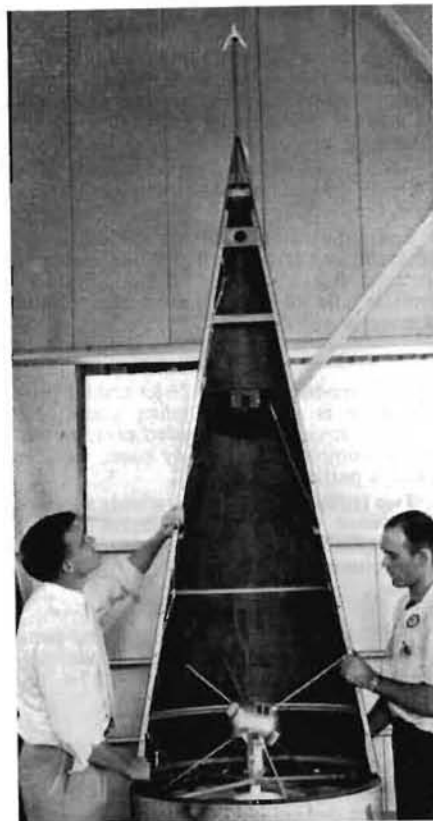
### The Re-entry Problem

The conditions are obviously quite different from those experienced by the ascending rocket: the satellite speeds up as it enters denser air. The energy absorbed by drag thus increases continuously, and much of this energy appears as heat. The same thing happens with meteors entering the earth's atmosphere—although most of these are smaller than a pin's head, the frictional heat generated is sufficient to raise them to incandescence so that they are as bright as the stars. Meteor speeds are nearly ten times those of the Sputniks, but even 18,000 m.p.h. will suffice to raise the temperature of the satellite to a white heat. It is thought that they will be destroyed during re-entry

—the last stage of Sputnik I has already suffered this fate.

This might be considered an advantage in the present case, for it will lessen the (already slender) possibility that damage to life or property might be caused by descending satellites. Nevertheless, for manned satellites or ballistic missiles it is an undesirable effect, since the heat might harm the crew of the former or detonate the warhead of the latter. Heating is greatest at the nose and at the leading edges of any wings or fins.

There are several ways by which it might be possible to solve the re-entry problem. At a press conference on 7th November, President Eisenhower exhibited a missile nose cone which he said had returned intact from outer space. It is believed that this cone had a refractory ceramic coating. The use of heat-resistant materials (high-temperature alloys, cermets, refractories, or



The baby satellite is protected during the rocket's ascent through the earth's atmosphere by a phenolic asbestos nose cone, which is jettisoned soon after the second-stage rocket starts to fire.

special coatings) is an obvious way of tackling the problem, and one which would almost certainly be used in addition to any other method. Current U.S. statements would appear to indicate no complete solution has yet been found—the technique used with the missile mentioned by President Eisenhower might well be unsuitable for a manned satellite or orbital ferry vehicle.

Other possibilities are the incorporation of a cooling system in the more vulnerable sections of the structure, the use of better aerodynamic shapes, and auxiliary braking. This may be done either by use of large wings of suitable design, or by employing rocket braking. Additional rockets would be mounted in the vehicle so as to operate in the reverse direction, i.e. nozzle forward. The weight and complexity of these is such that they would only be employed with a large vessel, such as a manned satellite. Rocket braking will be essential for a lunar landing, however, where the absence of an atmosphere cuts out re-entry heating, but also prevents the use of aerodynamic braking with wings and dive brakes.

### Future Developments

We may well see the Russians launching a Sputnik per month in future. Each would carry a different selection of instruments to provide information about upper atmosphere conditions, solar phenomena, etc. The first U.S. satellites are to be comparatively small ones, but the full-size Vanguard spheres are to be launched next spring.

The next major step forward would be the manned satellite, but even the most optimistic of the American spokesmen doubt whether they could attempt that in under four years, making their most determined effort. With the lead the Russians possess, it is possible that they might do it in less, if their plans have already been put into operation.

A lunar flight is much more difficult. With their present launching vehicle the Russians already have the capacity to hit the moon with a small payload, but they may not have well enough advanced navigational techniques to do this. But in this connection "hitting the moon" means what it says; it does not imply a gentle landing. A manned flight could not be attempted until a safe return was assured, and that necessitates ability to land on and take off from the moon, and a complete mastery of re-entry, to say nothing of such matters as navigation, space medicine, etc. There is obviously much work to be done with satellites first.

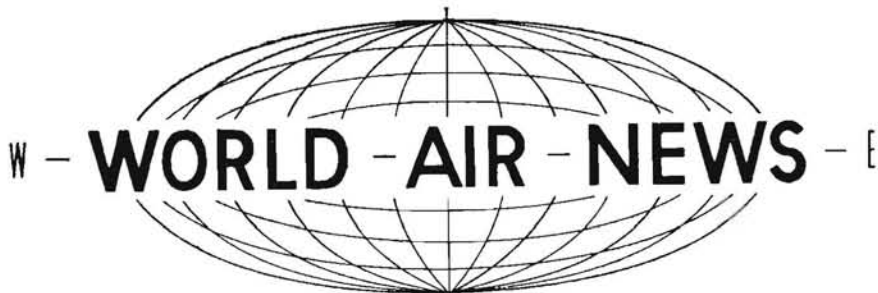
### DATA ON SPUTNIKI I AND II

#### Sputnik I (launched 4th October)

Mass	184 lb.
Diameter	23 in.
Initial altitude	125-570 miles
Original orbital period	96 min.
Rate of decrease of period	2.2 sec./day
Rotational speed	7 r.p.m.
Inclination of orbit to Equator	64° 40'

#### Sputnik II (launched 3rd November)

Mass (including third stage of rocket)	1,118 lb.
Initial altitude	400-1,050 miles
Original orbital period	104 min.
Inclination of orbit to Equator	155°



## W - WORLD - AIR - NEWS - {

## DEVELOPMENTS IN AVIATION

## GREAT BRITAIN

NEW engine by de Havillands is the D.G.J.10 Gyron Junior, which is probably slated for use in the Saunders-Roe P.177.

Deliveries of the Handley Page Victor to the R.A.F. have now begun, and the first aircraft are to form an operational Conversion Unit at R.A.F. Gaydon, Warwickshire.

The Swiss Air Force has chosen the Hawker Hunter 6 as its new ground-attack aircraft. One hundred Hunters will be ordered and be delivered during 1958-59.

Fison-Airwork has ordered two Twin Pioneers from Scottish Aviation with delivery scheduled early this year.

An American report states that de Havilland Aircraft may re-engine the Dove with turboprop engines.

## CANADA

THE Canadair CL-44, transport version of the CL-28 Argus patrol-bomber, will be offered to the commercial market. As a passenger transport it will be known as the Canadair Liner, and as a cargo aircraft the Canadair Freighter.

## EAST GERMANY

THE medium-range jet transport (first mentioned in our October 1956 issue), reportedly designated the Baade/Bonin B-152, is expected to be ready for test flying in May.

Fitted with two General Electric T-58 turboshaft engines the Vertol H-21D helicopter is now being flight tested. Normal H-21s are powered with a single piston engine. A second turbine-powered H-21D is being used for ground tests.



## FRANCE

IT is reported that the English Electric Thunderbird surface-to-air missile may be built under licence by Sud Aviation. The French Air Ministry is currently studying the English Electric design.

Work on the second prototype of the Leduc 022 ramjet interceptor, which is nearly complete and scheduled to fly early this year, may be stopped owing to the cut-back in funds from the Government.

The Breguet Company is negotiating with Dornier for the licence-production of the Dornier Do 27.

Sud Aviation and Fiat are said to be co-operating in a project to design and construct a "super fighter" designated 5091. The aircraft is said to be a "combination of the Baroudeur and the Fiat G.91".

## ITALY

THE Aer-Macchi MB.326 jet trainer prototype is now undergoing static and dynamic stress tests. A second prototype is nearly complete and will fly soon, while a third is partially assembled.

Two Italian missiles were recently successfully tested. They are the Contraves C-7 air-to-air missile and the radio-guided MR-27 surface-to-air missile.

## NETHERLANDS

THE Aviolanda AT-21, a ground-controlled target drone, was successfully flight-tested recently. The AT-21 is recovered by parachute.

## SPAIN

THE first Hispano HA-1110-Mil two-seat aircraft is now carrying out test flights fitted with a Rolls-Royce Merlin engine. The aircraft is normally fitted with a Hispano Suiza engine.

## POLAND

THE official Polish Airline P.L.L. Lot have placed an order for the twenty-passenger four-engined MD-12 transport. The new machine is due to fly for the first time this year and is designed to meet a demand on Poland's internal routes. It will have four WN-3 radial engines of 320 h.p. each, a cruising speed of about 180 m.p.h. and a range of 400 miles. Dimensions are: Span 69 ft. 10½ in., length 51 ft. 8 in., height 19 ft. A larger fifty/sixty-passenger version, powered by two 1,000-h.p. Narkiewicz turboprops, is under consideration.

## RUSSIA

SOME of the designations and details have been released on the Soviet missiles. They are as follows: T.1 (M.101), fore-runner and test vehicle for intermediate-



A provisional drawing of the Tu-114. The turboprop engines are said to develop 12,000 h.p. each.

range ballistic missile powered by a motor of 77,000-lb. thrust; T.2 (M.103), another intermediate-range missile with a 228,000-lb. thrust motor; T.3 (M.104), intercontinental ballistic missile; T.3A, Sputnik launcher, modified from the T.3; T.4, hypersonic bomber test vehicle; T.4A, hypersonic bomber with an engine of 800,000-lb. thrust.

Further details are now available regarding the new Russian glider, which incorporates a disc-shaped wing and is called "Discoplan". This machine was designed by Sukhanov, and demonstrated in flight at Tushino earlier this year in the hands of well-known test pilot W. Ivanov. The "Discoplan" is a single-seat experimental glider. An enclosed and streamlined cabin is fitted under the leading edge of the wing, which is of near circular shape in plan view, and incorporates wingtip ailerons. A vertical surface is added to increase directional stability, while a fixed simple two-wheel undercarriage and tail skid (fitted under the trailing edge of the wing) aids ground handling. Data: Span 11.44 ft., wing area 107.63 sq. ft., weight (total) 550 lb., limiting maximum speed 80.73 m.p.h.



The Il-18, which was the prototype of the Il-18P "Moskva", designed by S. Iliushin and W. Bugayski, was fitted with four air-cooled radials of unspecified make, and fully evaluated in the year 1947. The new P type, named "Moskva", fitted with turboprop engines, has already completed flying evaluation trials, with a government technical commission on board. It was announced in Moscow that the production of a considerable number of "Moskva's" is under way.

## U.S.A.

**C**ONFIGURATION of the North American air-to-surface missile planned for the B-52 is said to resemble the XSM-64 Navaho, intermediate version of the cancelled intercontinental missile project. The new missile is said to have a delta wing with canted rudders, and the fuselage is about 40 ft. long. Canard surfaces are fitted.

McDonnell Aircraft is working on a three-four-ton transport convertiplane proposal, utilising much of the experience gained with the McDonnell XV-1. The company is also constructing a small pressure-jet helicopter of about eight-passenger capacity. Prototype of this machine, designated the 120D, is expected to make its first flight early this year. It will have single rotor of 35 ft. in diameter.

Air Force contract for the WS-110A chemical bomber may be divided between the Boeing Airplane Company and North American Aviation Inc.

Lockheed Pied Piper reconnaissance satellite will use a Convair Atlas intercontinental ballistic missile, minus warhead, as the initial boost stage.

New Northrop project is a "counter air fighter", a supersonic aircraft twin-jet aircraft designated the N-156F. It is said to resemble the T-38 trainer and would be able to operate from roads or small airfields.

Republic Aviation has prepared a four-turboprop transport design which bears the name Rainbow, and details have been circulated to major airlines throughout the world. (This is the second four-engined aircraft by Republic to be named Rainbow, the first being a four-piston engined Photo-Reconnaissance type designated the XF-12.)

The Air Force has ordered fifteen RC-130s, photographic-reconnaissance versions of the Lockheed C-130 Hercules. They will be equipped as photographic and map-making aircraft.

This Vertol HUP-2 has been made completely amphibious by sealing the fuselage and fitting a pair of floats to the fuselage. Vertol is currently building Model 44 (improved 21s) for the Swedish Navy with amphibious hulls and floats.



The Lockheed Q-5, a ramjet target missile, is being developed to test the accuracy and destructive power of America's defensive weapons. It is instrumented to score theoretical hits, it is recoverable, and can be used for several missions. It has a span of 10 ft., a length of 39 ft., and it weighs 7,600 lb.

An attempt is to be made on the world's speed record this month by the McDonnell F-101 Voodoo, which is powered by two Pratt & Whitney J57 turbojets.

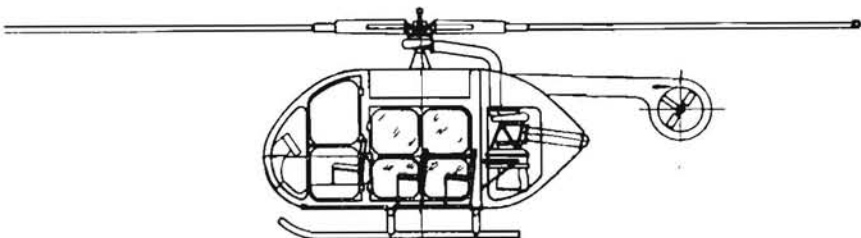
Naval designation of the Grumman Mohawk observation plane is VOF. It will see service with the Marine Corps.

Development of a two-seat version of the Inflatoplane is well advanced at Goodyear Aircraft and first flight is expected on 1st

equipped with the Douglas MB-1 Genie atomic air-to-air missile are due to begin in the near future.

Prototype of the Boeing 707 jet transport is having a Pratt & Whitney J75 turbojet engine installed in the number two position in the port wing for tests.

The Chance Vought F8U-2 is now in the final stages of construction and will soon be



The Fiat 7002 helicopter, now in the project stage, is powered by the Fiat 4700 turbo-air generator. Cabin can accommodate six passengers and pilot. Fuselage length is 20 ft. 1 in.; height 9 ft. 5 1/2 in.; rotor diameter 39 ft. 4 1/2 in. Maximum speed 100 m.p.h. Range 160 plus miles. Gross weight 11,150 lb.

February. Four- and five-seat versions are being considered.

Rocketdyne Division of North American Aircraft is developing a rocket engine of under 10,000-lb. thrust with a firing time of up to ten minutes for aircraft.

The Navy is sponsoring the development of a four-rotor drone helicopter for anti-submarine work. Piasecki Aircraft will build the machine, which is omnidirectional due to its square configuration.

Tests of the Lockheed F-104 StarFighter

rolled out for flight testing. The new fighter is a modified version of the F8U-1. The F8U-3 is expected to be ready for flight-testing during the summer. It is an all-weather carrier fighter powered by a dual powerplant consisting of a Pratt & Whitney J75 turbojet engine and a rocket motor.

An air turbo-rocket propulsion system, now under development by Aerojet, may be supported by the Air Force.

General Electric Company has developed a lightweight gun-and-rocket pack for Army helicopters. Pack carries two 23-lb. M-60 ground guns, and eight 3.5-in. fixed fin, armour-piercing rockets.

The North American F-108 will have a capsule escape system instead of the normal ejection seat. The company is also working on capsule systems for other aircraft.

Boundary-layer control for the Lockheed F-104 cuts the landing speed by 20 m.p.h. and the landing distance by one-quarter. The high-velocity air from the engine is blown over the upper surface of the wing flap through fifty-five slots.

A new business-executive aircraft is being developed by the Crescent Aircraft Corp. Known as the Crescent Executive it is a twin-engined low-wing monoplane with a tricycle undercarriage. It has accommodation for eight, including pilot. Dimensions are Span 45 ft., length 39 ft. Maximum speed 300 m.p.h. Engines are two 520-h.p. Lycomings.

# BOOK REVIEWS

By Gerald J. Pollinger

**Zero! The Story of the Japanese Navy Air Force, 1937-1945**, by Masatake Okumiya and Jiro Horikoshi with Martin Caidin (Cassell, 30s.).

**M**A RTIN CAIDIN, a young American aviation journalist, has put together the stories of Okumiya, a war-time Japanese naval staff officer, and Horikoshi, Mitsubishi's designer of Claude, Zeke, Jack and Sam (to give them the Allied code names so familiar at that time). Vital assets to a book of this sort are maps, illustrations and appendices covering the aircraft used by both sides; the publishers are to be congratulated on including these ready reference items, as well as an excellent index and an explanation of Japanese aircraft numbering and nomenclature which often baffles the layman. The book, told in a readable style, deals with the rise, the decline and the fall of Japanese air power with the Mitsubishi A6M Zeke as the linking *motif*. It will come as a surprise to many to learn of the strength with which Japan went to war; the difficulty in obtaining a replacement to the Zero fighter, due to abysmal failure of the early versions of the J2M "Raider", to meet the rapidly designed and produced Hellcat is put forward as one of the reasons for defeat. Then earthquakes (both natural and Superfortress-made) ruined any chance of the A7M1 "Reppu" taking its place in the front line. This is an important book of the Pacific War.

**"The Gee Bee Story"**, by Charles G. Mandrake. (Longo, U.S.A.) (Hersant, 17s. 6d.).

**A**UTHORS are now turning from reference books on numbers of aircraft to books dealing with individual types or a particular series; first in a new American series is the story of the Granville Brothers—the initials have become more famous. Zantford, Robert, Mark, and Edward Granville designed, built and flew their first aircraft in May 1929, but the early series of biplanes are not nearly so well known as their racer monoplanes with the strutted low-wing, large radial engines, and cockpit faired into the low aspect-ratio fin and rudder. This booklet is copiously illustrated and crammed with facts and figures about every machine of the line that made speed and racing history in early 1930's. Unfortunately the author cannot write as well as the story deserves, but this book is a useful item for the specialist. The next book in the series is *The Ford Story* by William T. Larkins, whose name is not unfamiliar to *Air Pictorial* readers.

**"Midway"**, by Mitsuo Fuchida and Masatake Okumiya (Hutchinson, 25s.).

**W**E have met the second of these authors before, in his contribution to the fascinating story of the Mitsubishi Type O Carrier Fighter ZERO! which was recently published by Cassell. Now he joins another ranking officer of the Imperial Japanese

## AIR PICTORIAL'S

### Book of the Month

**"Three Steps to Victory"**, by Sir Robert Watson-Watt (Odhams Press, 30s.).

**S**UB-TITLED "A Personal Account by Radar's Greatest Pioneer", this is both an autobiography of a man whose invention saved this country and thus the world from destruction some seventeen years past, and the story of the trials, the tribulations, and the successes of those many ingenious radio and electronic devices which bore code-names derived from many sources.

Although in the main, in this very long book, the author follows a chronological history, he frequently refers backwards and forwards to dates that were important or have some relevant bearing on the subject under particular discussion. His "Three Steps" are the Instantaneous Visual Radio Direction Finder (known as CRDF or "Huff-Duff") which was used particularly by ships to locate U-boats; Radar, which was originally called R.D.F. and was put to many uses in various guises; and Operational Research, which covers a multitude of experiments and subsequent developments. To these three is added Very High Frequency Radiotelephony (VHF R/T) which was used by Fighter Command, R.A.F., to such telling effect during the Battle of Britain.

As might be anticipated, the complete details of the first uses of such equipment as A.I. (Airborne Interception Radar) in a Heyford in 1937, A.S.V. (Airborne search for Surface Vessels) in an Anson in 1937, I.F.F. (Identification, Friend or Foe) in 1939, and H2S (Terrain, Discrimination) in 1942, are described, together with their first operational uses and successes. Reference is made to the missions of night fighter aces, to the exploits of No. 617 Squadron, and to the dash of the *Scharnhorst* and *Gneisenau* up the Channel.

The publication of this book is long overdue, for it makes clear many of the missing gaps in a considerable number of other books which lightly fringed the subject. The background is now supplied to many other books of the air war between 1939 and 1945, both British and American, for the use of radar in places as far apart as Honolulu and Hamburg are dwelt on. Quite apart from the value of having the actual story told by the inventor, the details contained in the work make it an invaluable source of reference.

For this great invention, the author received £52,000. Perhaps these pages show that success is its own reward.

Navy to tell the story of the vindication of General Billy Mitchell's thesis—the five minutes in which aircraft smashed a powerful navy, an event which led to the eventual destruction of all the Japanese naval forces operating in the Pacific.

Although the story is in essence a naval one, the dominating theme is the conquest of the sea by the air. Aboard the Japanese carriers confusion ranged as they tried to exchange torpedoes for bombs, tried to hoist new aircraft to the decks, and take the damaged aircraft below to the hangars; and at the precise moment when all the Japanese aircraft returned for refuelling the American dive-bombers struck. Without radar and without the initiative they had shown on earlier occasions, the Nipponese were doomed. Less than a year after their aircraft had dealt a great blow to the U.S. Navy at Pearl Harbour, the Japanese were themselves destroyed in a naval battle fought by aircraft. Told from the Japanese point of view, this history is well worth comparing with other accounts of the operations in the Pacific theatre.

**"Operation Vanguard"**, by Werner Buedeler (Burke, 16s.).

**P**UBLISHERS have been racing to get out books dealing with artificial moons. The first two had barely appeared on the bookstalls when "bleeps" were heard from the Russian satellite on radios. This book contains a brief but lucid account of why they are being launched and how they are being launched. The illustrations and diagrams complement the text. Now that man has taken the second step into space—the first was the rocket—we can expect to hear more "bleeps" and see more books.

**The Helicopter**, by Jacob Shapiro (Muller, 21s., 269 pages, illustrated).

**N**OW is the time of the rotary wing aircraft. Although vertical flight has been attempted for hundreds of years, the Chinese had toys that whirled into the air at the same time they invented gunpowder and the fabulous Leonardi da Vinci produced a workable design in the late 1400s, it is only within recent memory that autogiros and helicopters have proved successful. A number of books on the subject have been published within the past few years, but Shapiro has endeavoured to collate all the available information on the history, construction, flying, and uses of this aircraft. Read by itself it is a useful treatise; read in conjunction with other works it is a valuable addition. The future of the helicopter is controversial, but it cannot be denied that progress has been made in a short span of years which deserves both mention and explanation.

## LIBRARY LIST

**"Flight To-day"**, by J. L. Nayler and E. Ower (Oxford University Press, 12s. 6d.).

A book for the younger generation, copiously illustrated, which will provide a basic grounding on the what, where, how, and why of aeronautics.



# The Martinsyde F.4 Buzzard

By J. M. Bruce

THE Martinsyde F.4 could trace its design ancestry back to the Martinsyde R.G., a clean, single-seat fighter of late 1916 which in turn had been developed from the G.100/102. The R.G. was flown with both the 190-h.p. Rolls-Royce Falcon I and 275-h.p. Falcon III engines and had an excellent performance.

The next Martinsyde single-seat fighter was the F.3, which inherited characteristics of both the R.G. and the F.2 two-seat fighter. The F.3 was first tested in November 1917 with an experimental Falcon engine which gave 285 h.p., but later a standard Falcon III was fitted. The fabric-covered, wire-braced wooden structure was typical of the period. The single-bay wings were of unequal span and the interplane struts had a slight outward rake. The pilot sat high, in line with the trailing edge of the upper wing; consequently the fuselage had an unusually deep top decking. Two fixed, synchronised Vickers guns were mounted within the top decking in front of the cockpit.

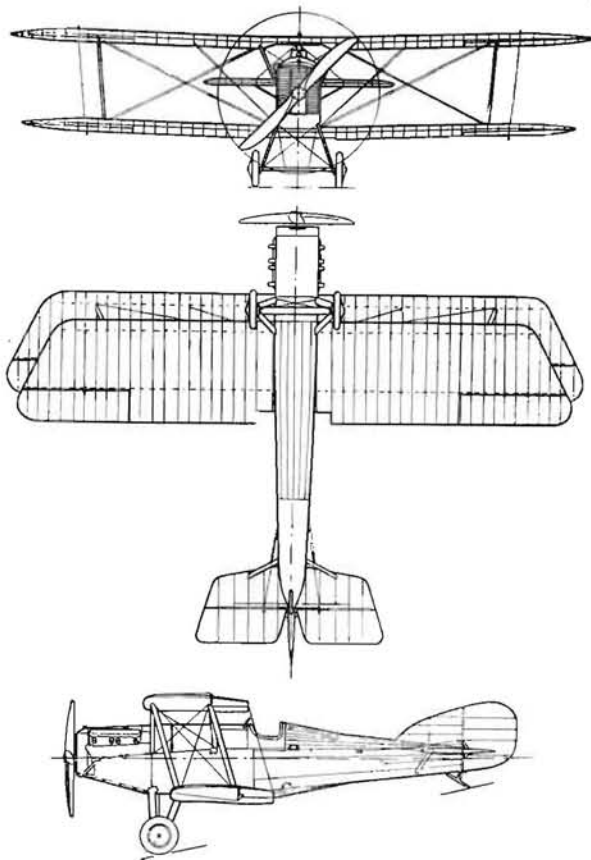
The performance of the F.3 was remarkably good, and quantity production of the aircraft was ordered. Unfortunately, the supply of Falcon engines was already insufficient to provide power units for the Bristol F.2Bs, which were in large-scale production, and the Martinsyde F.3 design had to be modified to have the 300-h.p. Hispano-Suiza engine.

In its modified form the aircraft was redesignated Martinsyde F.4. Its airframe differed very little from that of the F.3; apart from the new engine installation the only external difference lay in the position of the pilot's cockpit which, on the F.4, was farther aft. At least one early F.4 had a Falcon engine.

The F.4's official trials took place in June 1918, when the aircraft returned excellent performance figures. The type went into production in two forms and with the name Buzzard; the Buzzard Mk. I was the standard F.4, and the Mk. Ia was a special long-range version which was apparently intended to become the standard escort fighter of the Independent Force. (The Sopwith Snipe Mk. Ia was regarded as a stop-gap only.) About fifty Buzzards had been completed by the time of the Armistice and plans for large-scale production in America had been prepared.

But the Martinsyde never formed the equipment of any British unit. Production stopped soon after the end of the war, by which time about one hundred had been built. The few production machines used by the R.A.F. found varied employment. Two were used as high-speed couriers by the R.A.F. Communication Wing in 1919. At least four were used by the Irish Air Corps, and one was sent to Japan in 1921 as a sample single-seat fighter.

Surplus Buzzards were sold by the Aircraft Disposals Co. That



concern fitted several machines with Armstrong-Siddeley Jaguar radial engines and redesignated the aircraft Martinsyde A.D.C.1. Finland bought several and used them to equip single-seat fighter units.

At least one Buzzard was fitted with twin floats; another, with its nose fitted with a plain blunt cowl, had twin Lamblin radiators between the undercarriage legs. The Buzzard which went on to the civil register as K.152 (later G-EAES) had a 275-h.p. Rolls-Royce Falcon III, and there are indications that a 230-h.p. Siddeley Puma was also fitted to a Buzzard. Two-seat developments appeared as the Martinsyde F.4a (in both landplane and seaplane forms), and F.6, and a two-seat fighter variant also appeared.

With the demise of the Martinsyde company, all development of the Buzzard ceased. As a type it marked, in design and handling characteristics, the transition from the lightly-loaded agile scout to the heavier fighter of the inter-war years.

**Manufacturers:** Martinsyde Ltd., Brooklands, Byfleet.

**Power:** 300-h.p. Hispano-Suiza; 275-h.p. Rolls-Royce Falcon III. **Crew:** One.

**Dimensions:** Span, upper 32 ft. 9½ in., lower 31 ft. 2½ in.; length 25 ft. 5½ in.; height 10 ft. 4 in.; wing area 320 sq. ft.

**Weights (production F.4 with Hispano-Suiza):** Empty 1,811 lb.; loaded 2,398 lb.

**Performance (production F.4):** Maximum speed 132.5 m.p.h. at 15,000 ft. Climb to 10,000 ft. in 7 min. 55 sec.; to 15,000 ft. in 14 min.

**Number built:** Uncertain, probably over one hundred. By 31st October 1918 fifty-two Martinsyde F.3s and F.4s were on charge with the R.A.F.

**Service use:** No R.A.F. unit was equipped with the Buzzard. A few were flown by the Irish Air Corps, at least six went to Spain, and the Jaguar-powered Martinsyde A.D.C.1 was flown by the Finnish Air Force.

Photo: Imperial War Museum



**REGISTRATION G-AOXY**, formerly reserved for a Cessna 180 (Air Pictorial, September, p. 308), has not been taken up and will appear instead on Tiger Moth T6388 now being converted at Croydon by Rollason Aircraft and Engines Ltd. The owner of Auster 5, G-APIC, recorded last month, should be amended to I.Aw who possibly intends to take it to Malaya, as it arrived at Southend bearing this inscription on 2nd December. Details are also available of Independent Air Travel's second Skymaster, G-APID, which was delivered at Hurn on 10th November, and shows signs of a U.S. Navy Air Cargo inscription on its nose. Its previous history is probably complex, the constructor's number 10408 indicating its origin as a C-54A-DC, serial 42-72303. It has recently been flying in the U.S.A. as N75337, but in 1954 a machine answering to this description was in service with Aerovias Venolanas S.A. as YV-C-EVB.

The loss of the B.E.A.C. Viscount 802, G-AOJA, at Nutts Corner on 23rd October has resulted in an order for a replacement, an 806, G-APIM (c/n. 412), and will no doubt be followed by another to replace G-AOHP. This made a forced landing at 4 a.m. on 17th November in a field six miles from Kastrup and is understood to be a write-off. Two machines which can never be replaced left London Airport at the end of November. These were the veteran Yorks, G-AGJC and 'SO, which have been sold to Skyways Ltd., thus severing B.O.A.C.'s thirteen-year-old association with this ancient work-horse. Elsewhere in the transport field the third Viscount 732, G-ANRT (c/n. 76), has finally reverted to Hunting Clan Air Transport Ltd., and Rapide 4, G-AOZG, converted from naval Dominie X7486 by Hants and Sussex Aviation Ltd., has gone to Lagos for service with the West African Airways Corporation.

Crop Culture (Aerial) Ltd. of Bembridge are also in the news with two new crop-spraying Auster J-1Ns, G-APIK and 'IL (c/n.s 3375 and 3386). Tiger Moths, G-AHNC (ex-DF132), just overhauled at Portsmouth, and the newly converted G-ANRO (ex-T7917), are also for this firm, while G-ANNI (ex-T6953), now being restored at Portsmouth, would also appear to have an agricultural future.

At a time when Twin Pioneer production is gaining tempo, we record with regret the crash of G-AOEO in Tripoli on 8th December, with the loss of a crew which included D. F. McIntyre, who was one of the famous Mt. Everest pilots. Three Twin Pioneers (c/n.s. 521, 523 and 526), previously earmarked for Trabajos Aereos y Enlaces de Bilbao, have been released to British operators: c/n. 521 to be G-APIR for Scottish Airlines Ltd., while c/n.s 523 and 526 will be G-APJJ and 'JK for Fison-Airwork Ltd. The latter will be delivered at the end of January and will go to Nigeria for use in the swamp-and-jungle area of the Niger Delta under contract to the Shell/B.P. Petroleum Development Co. The second Borneo Airways machine, VR-OAF (c/n. 519), made its first flight on 7th November, followed by EP-AGB, 'GC and 'GA (c/n.s 513, 515 and 516) for the Civil Aviation Club of Iran, on 12th and 20th November and 5th December, respectively.

The flying clubs are already equipping for the 1958 season. Tiger Moth T7391 has just become the property of Coventry (Civil) Aviation Ltd. as G-APJR for club flying at Baginton, and another, G-AOGS (c/n. 3815) goes to the Luton Flying Club. Two Hawk Trainer 3s have also changed hands, G-AJDR (ex-T9976) to the Denham Aero Club Ltd., and G-AKKR (ex-T9708), which has been sold to Miss J. I. Jones, is replaced at Elstree by the Chipmunk 22, G-AOSO (c/n. CI/0227). The Aviron Club fleet at Panshanger is increased by the Auster 4, G-ANHL (ex-MT133), and two new

The prototype Hanworth-built B.K. Swallow, EI-ADS (c/n. 1, ex-G-ACMK), still flies at Weston, near Dublin. It is twenty-four years old and became Irish in June 1947. Now Pobjoy-powered, it first flew with a Salmson radial. (Photo: Ulster Archives.)



Twin Pioneers, G-APHX and 'HY, are now operated in Kuwait by B.I.A.L. on behalf of the Kuwait Oil Co. and are used for survey work and the transport of mining equipment to inaccessible areas.

private groups have been formed, the R.A.F. Flying College Flying Club and the Ulster Aeroplane Group. The former now flies at Strubby with Tiger Moth, G-ANIY (ex-T7750), and the latter at Newtownards with Proctor 4, G-ANYS (ex-NP250).

Private-owner activity is at a seasonal low ebb, but Proctor 5, G-AHBH (c/n. Ae.37), has been bought by Dorset private owner W. Stevens; Taylorcraft Plus D, G-AHVR (c/n. 170) by F. Musgrave and J. Hercus of Welwyn; Southend-based Balfour (Marine) Engineering Co. Ltd. now have the former Air Charter Gemini 1A, G-AKDD (c/n. 6284), to replace the Marathon G-AMGX; Tiger Moth, G-ANEJ (ex-DE638), is now kept at Speeton by H. N. Medforth; and finally Proctor 3, G-ANWY (ex-Z7212), is being flown to Australia by its new owner, R. H. S. Williams of Sydney (see *Bahrain News*). The Gemini 1A, G-AJWH (c/n. 6293), awaits a new owner, having passed into the hands of W. S. Shackleton Ltd.

## REGISTER REVIEW



Independent Air Travel's first Skymaster, G-APCW, is now fully engaged on charter work, and although based at Hurn, regularly frequents London Airport, Blackbushe and Ringway. (Photo: C.B. Aviation, Bournemouth.)

### Production Line

The appearance of new aeroplanes continues, with the arrival of Britannia 312, G-AOVC (c/n. 13231), at London Airport on 15th November to inaugurate a B.O.A.C. delivery rate of approximately one a fortnight. El Al's third, the 313, 4X-AGC (c/n. 13234), passed through on 29th November. Viscounts in transit have been: OD-ADD (c/n. 243, ex-G-APCD) to M.E.A.L. on 13th November; PH-VIG and 'VIH (c/n.s 178 and 179) to K.L.M. on 23rd and 28th November; VP-TBS (c/n. 235) to B.W.I.A. on 21st November; VT-DIH and 'DII (c/n.s 195 and 196) to Indian Airlines on 13th and 27th November.

### Registrations Cancelled

The Tiger Moths, G-AIDB and G-AOIU (ex-DE979 and T6167), have been sold in West Germany, and although the Cub J-3C-65, G-AIYU, has also been sold abroad, its destination is uncertain. G-ANVP, now known as the Napier Eland Convair Series 2, has gone to the U.S.A. as N340EL, as stated in *Airport News*, and now that the Cyprus Airways network is to be handled by B.E.A.C., the new Viscounts, G-APCD and 'CE, have been disposed of to M.E.A.L. as OD-ADD and 'DE, respectively. Three aircraft destroyed are the Hawk Trainer 3, G-AJJI (ex-T9698), which swung into growing corn when landing at Elstree as long ago as 19th August 1956; the ill-fated Solent 3, G-AKNU (S1299), which

(Continued on page 11)

**A**lthough there has been a usual seasonal decline in aircraft movements, there has been much of unusual interest going on. The Royal Canadian Air Force and the German Luftwaffe continue to produce surprises, the latest being the S-58 and the Noratlas while the award of a contract to photograph 200,000 square miles of Burma to Fairey Air Surveys Ltd. has resulted in the movements of Dakotas G-AHCT, 'LWC and 'MCA at home and the passage of Dove G-AMKS through Bahrain. News from this outpost on the Persian Gulf is becoming increasingly original and we would welcome information from other such key points on the world's trunk routes.

Movements of used aircraft provide rich material for students of airline history and it is reported that some of the B.O.A.C. Constellations are being de-cocooned at London Airport for possible sale in the U.S.A. Elsewhere Convairs are in the news, the first of the former Sabena 240s having recently arrived at Warsaw as SP-LPA in full L.O.T. colours. Lufthansa have also announced that their four new 440s have now been joined by the five original 340s which have been remodelled up to 440 standard.

<b>London</b>	
4/11 N88903	Skymaster (c/n. 10455, ex-42-72350)—Pan American Airways
5/11 I-LOVE	Douglas DC-6 (c/n. 43217)—Alitalia
YI-ACU	Viscount 773 (c/n. 331)—Iraqi Airways; dummy approaches
7/11 4X-AGA	Britannia 313 (c/n. 13232)—El Al Israel International
8/11 G-ANWM	Freighter 32 (c/n. 13261)—S.C.A.L.; charter to Shannon for P.A.A.
9/11 I-LAND	Douglas DC-6B (c/n. 44419)—Alitalia
F-BGNF	Lockheed 1049G Super Constellation (c/n. 4515)—Air France
CCCC-1891	Ilyushin Il-14 (c/n. 146000715)—Aeroflot
CCCP-1435	Ilyushin Il-14 (c/n. 147001579)—Aeroflot; double-door freighter, doors on port side
N34959	Douglas DC-6A (c/n. 44075)—Flying Tiger Line
12/11 I-DUVA	Douglas DC-7C—Alitalia; proving flight
OO-SDC	Douglas DC-6 (c/n. 43064, ex-OO-AWC)—On charter to El Al
IU-684	Viscount 730 (c/n. 80)—Indian Air Force "Raj Humsa"
13/11 OD-ADD	Viscount 754 (c/n. 243, ex-G-APCD)—Middle East Air Lines

## AIRPORT NEWS



A number of Lockheed P-38 Lightnings are still airworthy and are engaged on photographic missions in Europe and the Near East. A typical example is EC-ANU, shown here in its ferry markings, EC-WNU.

15/11 N1866C	Skymaster—Civil Aeronautics Authority
18/11 LN-FOR	Commando—Fred Olsen Air Transport
19/11 OO-SDE	Douglas DC-6 (c/n. 43149, ex-OO-AWW)—On charter to El Al
PH-DSD	Douglas DC-7C (c/n. 45183)—K.L.M. "Zwarte Zee"
PH-LKB	Lockheed 1049G (c/n. 4554)—K.L.M. "Positon"
20/11 CF-MCA	Skymaster (c/n. 10457)—Returning to Canada (L.A.P. News, 13/10)
3/11 VT-DII	Viscount 768D (c/n. 196)—Indian Airlines Corporation
N4900C	Lockheed 749 Constellation—Capitol Airlines
24/11 CF-TGE	Lockheed 1049C (c/n. 4544)—T.C.A.; fitted with tip-tanks
27/11 G-AOYH	Viscount 806 (c/n. 311)—B.E.A.C.; dummy approach
VP-TBU	Viscount 754 (c/n. 237)—B.W.I.A.; dummy approach
26/11 G-AOVA	Britannia 312 (c/n. 13207)—Left for Singapore for modified engine testing
28/11 N1007C	Lockheed 1049H Super Constellation—Seaboard and Western
G-ALWC	Dakota 4 (c/n. 13590, ex-42-93654, ex-KG723)—Approaches
30/11 N88921	Skymaster (c/n. 10334, ex-42-72229)—Pan American Airways
N34953	Douglas DC-6A (c/n. 44677)—Flying Tiger Line
VH-EAP	Lockheed 1049G—QANTAS Empire Airways "Southern Zephyr"

<b>Blackbushe</b>	
9/11 51-0059	Grumman SA-16A-GR Albatross—U.S.A.F., Prestwick
1516	CS-2F-1 Tracker—Royal Canadian Navy; H.M.C.S. Bonaventure
D-ANUK	Skymaster (c/n. 10452, ex-42-72347, ex-N95407)—K. Herfurter
F-BELG	Skymaster (c/n. 10392, ex-42-72287, ex-NL-307, ex-PH-TAH)—T.A.I. du Maroc
12/11 55-6382	D.H. C.2 Beaver L-20—United States Army, Brussels
G-AHCT	Dakota 4 (c/n. 12308, ex-42-108846, ex-KG313)—Air Survey Co.
685	Dakota—Royal Danish Air Force
G-ANVS	Freighter 32 (c/n. 13252)—Air Charter Ltd. "Vigilant"
14/11 1509	CS2F-1 Tracker—Royal Canadian Navy; H.M.C.S. Bonaventure; in company with 1519
19/11 HZ-AAG	Skymaster—Saudi Arabian Airlines; from Rome; to Tollerton for overhaul 22/11



Napier's Eland Convair 340, G-ANVP, being run up prior to take-off from Prestwick on 15th November en route to Santa Monica, California. There it will become N340EL while engaged on C.A.A. airworthiness trials.

22/11 WH241	Meteor T. Mk. 7—R.A.F.; from St. Athan to Odiham
23/11 51-7218	Grumman SA-16A-GR Albatross—No. 67 A.R. Squadron, U.S.A.F., Prestwick
VT-DGM	Lockheed 1049C (c/n. 4548)—Air India "Rhani of Ind"
26/11 WD157	Valetta C. Mk. 1—R.A.F. Flying College, Manby
27/11 147	Marcel Dassault M.D.315 Flamant (c/n. 147)—Call sign F-RAJY
683	Dakota—Royal Danish Air Force
G-AMXM	York C. Mk. 1 (ex-MW323)—Hunting Clan Air Transport Ltd.
28/11 22123	Fairchild C-119F—R.C.A.F. (United Nations); from Naples
<b>Northolt</b>	
9/11 XJ348	Sea Devon C. Mk. 20 (c/n. 04406, ex-G-AMXX)—Royal Navy
12/11 CP-32	Fairchild C-119G—Belgian Air Force; call sign OT-CBL
14/11 WL353	Meteor T. Mk. 7—Royal Air Force; blue nose cap
WD494	Hastings C. Mk. 2—No. 99 Squadron, R.A.F.; 494 on fin
19/11 93797	Dakota 3 (c/n. 13747, ex-42-93797)—R.N.A.F.; coded BW-L
22/11 WT332	Canberra B (I) Mk. 8—Royal Air Force
28/11 XL923	Pembroke C. Mk. 1—R.A.F.; broad orange band through fuselage
<b>Hurn</b>	
5/11 N1029V	Stratocruiser (c/n. 15929)—P.A.A. "Clipper Golden Eagle"
G-ANTX	Stratocruiser (c/n. 15965, ex-N 1275)—B.O.A.C. "Cleopatra"
9/11 G-ANGF	York C. Mk. 1 (ex-MW254)—Hunting Clan; G.C.A. approaches
10/11 G-APID	Skymaster (see Register Review)—Arrived on delivery 3 p.m.
11/11 9633	Sikorsky S-58—Royal Canadian Air Force; coded 633
N6535C	Douglas DC-6B (c/n. 43535)—P.A.A. "Clipper Mercury"
18-20/11 CF-IMA	Mosquito—Broken up for spares
19/11 G-AKWJ	Proctor 3 (ex-R7539)—Independent Air Travel; silver/blue
23/11 G-APCE	Viscount 754 (c/n. 244)—Cyprus Airways Ltd.
<b>Eastleigh</b>	
3/11 G-AOYD	Dove 2 (c/n. 04092, ex-VT-CKE)—Mitchell Engineering Ltd.
14/11 G-AKDC	Gemini 3C (c/n. 6496)—Left for Tanganyika to become VR-TBP
20/11 G-AOCY	Autocar J-5P (c/n. 3258)—Bristol Aircraft Ltd., Filton
22/11 XK409	Auster A.O.P. Mk. 9—ARMY, camouflaged
27/11 XK991	Whirlwind—ARMY, camouflaged
<b>Exeter</b>	
4/11 G-AKJG	Dove 2 (c/n. 04071, ex-VP-YGP)—Helliwells Ltd., Elmdon
8/11 XF261	Dragonfly H.R. Mk. 4 (c/n. WA/H/107)—Benson to Culdrose; personal mount of Prince Philip during Cornish visit
WW346	Washington—R.A.F. Watton; local flying, whole day
10/11 XL715	Tiger Moth (c/n. 85403, ex-DE395, ex-G-AOIK)—To Roborough
13/11 XG583	Whirlwind H.A.R. Mk. 3 (c/n. WA/H/78)—H.M.S. Ark Royal

(Continued on page 11)

Four/five-seater twins of two generations are housed together at Bankstown, Sydney. Monospar ST-12, VH-UTH (c/n. 36), owned by L. G. Taylor, was delivered in 1935, while the Peel River Mining Co.'s Apache, VH-PKA, is of 1957 vintage. (Photos: N. Shennan.)







## *Jet Provost*

The only jet trainer in the world to have been accepted for ab initio and basic military flying training, the Jet Provost has been ordered into production for the Royal Air Force.



## **HUNTING AIRCRAFT LIMITED**

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## *Pembroke*

In service with the Air Forces of seven nations, the Pembroke is a versatile general purpose military transport. Passenger seats are quickly removable for conversion to the roles of freight carrying, supply dropping, ambulance, aerial survey, or flying classroom.





Old Avro—1. This delightful shot of one of Plane Advertising's Lynx-engined Avro 504Ns, G-ACOM (ex-E430), was taken at Ford in 1937, and shows the underwing banner rollers. (Photo: J. K. Springett.)



Old Avro—2. Formerly NZ203, ZK-APC is the last of the pre-war R.N.Z.A.F. Avro 626s. Owned by J. Frogley, it still flies at Christchurch, New Zealand. (Photo: D. O. Huggard.)

## Register Review (Continued)

crashed at Shalcombe, I.O.W., with the loss of forty-five lives on 15th November; and the Britannia 301 prototype, G-ANCA (c/n. 12917), which crashed three miles south-east of Filton and disintegrated on impact with the loss of fifteen lives on 6th November. Another recent and most regrettable accident occurred to the Rolls-Royce V.T.O.U., XK426, at Hucknall on 28th November, when Wing/Cdr. H. G. Larsen was killed during a tethered flight. The final civil cancellation is to B.K.S. Gemini 1A, G-AMEJ (c/n. 145), withdrawn from use at Southend.

## Overseas Registrations

The normal Eirann register shows a reservation, EI-AJT, for Irish Air Charter's second Apache, but following recent practice, a new series has been started for the Aer Lingus Fokker F-27 Friendships. These are to be EI-AKA to 'KG inclusive, with constructor's numbers 10105, '07, '09, '10, '11, '19 and '20.

The Kenya register has also progressed since last mentioned (*Air Pictorial*, August 1957, p. 265). Campling Bros. and Vanderwal

Ltd. of Nairobi have not only acquired the old Kenya Police Force Pacer (c/n. 22-997, ex-VP-KPF), re-registered for charter flying as VP-KOB, but also three new Cessna 182s. These are VP-KOC, 'OD and 'OE (c/n.s 34417, 34384 and 34385). A fourth Cessna 182, VP-KOF (c/n. 34386), is privately owned by Ringdate Estates Ltd., Oldcani. VP-KOG and 'OH are not yet allotted, but 'OI and 'OJ are the former B.O.A.C. Canadair 4s, G-ALHF and 'HM (c/n.s 152 and 159), respectively, now operated by the East African Airways Corporation. Last of all comes the Taylorcraft 20 Topper, VP-KOK (c/n. 12-004, ex-N3662), used for crop-spraying by Spartan Air Services (Eastern) Ltd. of Nairobi.

In the neighbouring territory of Tanganyika five new aircraft have been registered, including the King's Cup winning Gemini 3C, G-AKDC, now VR-TBP (see *Eastleigh News*), and the Cirrus Autocar, G-ANVN, now VR-TBR (*Air Pictorial*, November 1957, p. 388). Two of the remaining three, a Chipmunk 22, VR-TBO (c/n. CI/0344, ex-WG280), formerly flying in Kenya as VP-KLM, and a Bristol 171 Mk. 3 helicopter, are owned by Williamson Diamonds Ltd. of Nairobi. Details of the Bristol 171 are expected shortly. To round off an interesting selection, VR-TBT has been reserved for nothing less than a Dorrier Do. 27B.

## Airport News (Continued)

14 II G-AKXP Auster 5 (ex-NJ633)—From Croydon to Staverton, en route to Stavanger  
23 II G-AOUY Tiger Moth (c/n. 3796, ex-N6459)—From Lulgate to Rhoose  
28 II WZ586 Vampire T. Mk. 1—From R.A.F. Benson to Odiham

Elmdon  
8 II 1523 Tracker—Royal Canadian Navy; from H.M.C.S. Benaventure, Belfast  
9 II GB-107 Noratlas—Luftwaffe; from Southend, left for Manston  
10 II 4X-AGC Britannia 313 (c/n. 13234)—EI AL; I.L.S. approaches  
G-ANXA Heron 1B (c/n. 14044, ex-G-5-11)—B.E.A.C. "John Hunter"  
11 II 1531 Expediter—Royal Canadian Air Force  
23 II G-AMWH Bristol 170 Mk. 3A (c/n. 13069)—B.E.A.C. "Sir Geraint"

Ringway  
17 II N90444 Skymaster (c/n. 10389, ex-42-72284)—U.S. Overseas Airlines; from Hamburg; left for Shannon 26/11  
18 II N1005C Lockheed 1049H (c/n. 4557)—Seaboard and Western Airlines  
19 II WM899 Firefly Mk. 8—Test flight  
22 II WB307 Firefly U-9—First test flight  
24 II N1009C Lockheed 1049H }—Seaboard and Western Airlines; service families flights  
28 II N1010C Lockheed 1049H }

Squires Gate  
3 II G-AMKX Prince 4B (c/n. P.35)—M.T.C.A. Flying Unit, Stansted  
7 II XK897 Devon C. Mk. 1 (c/n. 04474)—From Anthon  
10 II 9633 Sikorsky 5-58—R.C.A.F.; from Nutts Corner; left for Hurn 11/11, returned from North Luffenham 13/11  
24 II G-AIME Freighter 21 (c/n. 12795, ex-ZS-BVI, ex-R-38, ex-XF663)—Air Kruike Ltd.; from Dublin

Ronaldsway  
13 II VP958 Devon C. Mk. 1 (c/n. 04209)—Royal Air Force  
15 II XK910 Westland S-55 Mk. 7—Royal Navy; coded A; from Lee-on-Solent to Eglington in company with XK933 (S), XK934 (T) and XK935 (X)  
18 II XF544 Provost T. Mk. 1 (c/n. 275)—To and from R.A.F. Jurby, I.O.M.

Turnhouse  
5 II WS806 Meteor N.F. Mk. 14—Coded D  
16 II XK633 Vampire T. Mk. 11—Coded NA  
30 II O-434450 Douglas B-26—U.S.A.F.; coded BC-450

Renfrew  
6 II HB-AAR Viking 1B (c/n. 217, ex-G-AIVD, ex-D-ADAM)—Balair; brought supporters for the Scotland v. Switzerland football match  
9 II 9700 Freighter 31 (c/n. 13249)—R.C.A.F.; with Sabre spares  
22 II WDI54 Valetta C. Mk. 1—Royal Air Force

Croydon  
25 II F-BHMF Jodel D.117 (c/n. 382)—Jean Chatelain, Chateaudun



The Prototype Boeing 707 outside Boeing's Renton plant for the first time on 28/10/57.

27 II VS652 Prentice T. Mk. 1—Vendair Ltd.  
G-ABVE Arrow Active 2 (c/n. 2)—Arrived by road for Rollasons  
28 II VP-KNV SCAN-30 (c/n. 19, ex-F-BGTD)—Lake Air Charters Ltd., Mwanza  
30 II N2718A Aero Commander 520 (c/n. 520-66)—In transit  
AP-ADT Super Ace (c/n. 114, ex-G-AKVf)—Left by road, dismantled

Southend  
8 II GB-107 Noratlas—Luftwaffe; left for Elmdon  
11 II F-OANR Heron 1B (c/n. 14038)—U.A.T. Aeromarine  
CA-012 Dakota—Luftwaffe  
13 II G-AOBN Douglas C-53D (c/n. 11711, ex-42-68784, ex-SE-BAU, ex-F-OAIF)—Air Kruike Ltd.  
LN-BDS Heron 2E (c/n. 14103)—Vestlandske Luftfartsselskap, Bergen  
14 II XK990 Whirlwind—From Lee-on-Solent to test portable hangar  
17 II G-AHNL Super Trader 4B (c/n. 1345)—From Gander; diversion from Stansted  
22 II SE-BUU Lodestar (c/n. 2076, ex-G-AGBT, ex-VP-KFA)—Dagens Nyheter A.B.  
2, 12 G-APIC Auster 5 (c/n. 1668, ex-TJ651)—"MALAYA" on fin  
F-BAVT Auster 5A (c/n. 863)—Aero Club d'Enghien-Moiselles

Bahrein  
18 II G-ANWY Proctor 4 (ex-Z7212)—Delivery to Australia by owner Williams  
19 II N5017N Boeing B-17G—Aero Services Corp., Philadelphia, to Far East  
22 II IQ997 Canberra T. Mk. 4—Delivery flight to Indian Air Force  
24 II VT-AXA Dakota 3 (c/n. 19874, ex-43-15408)—Indian Airlines; monkey charter, Delhi to Prague

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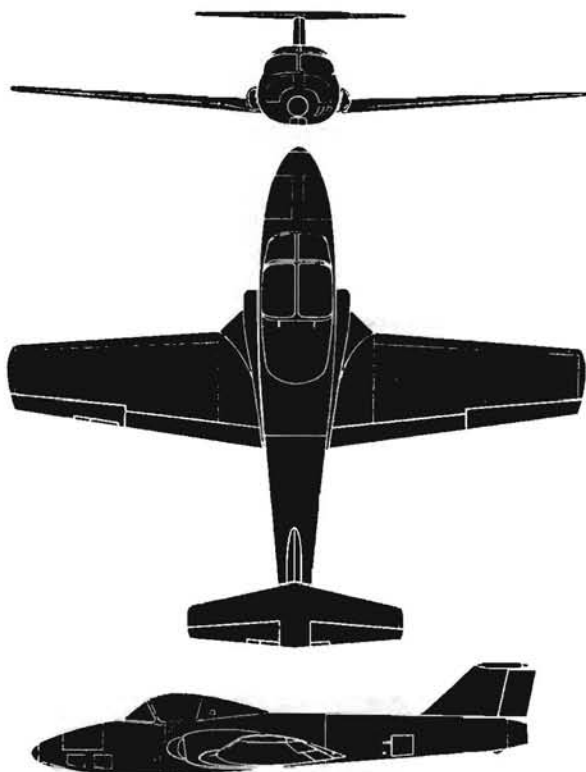
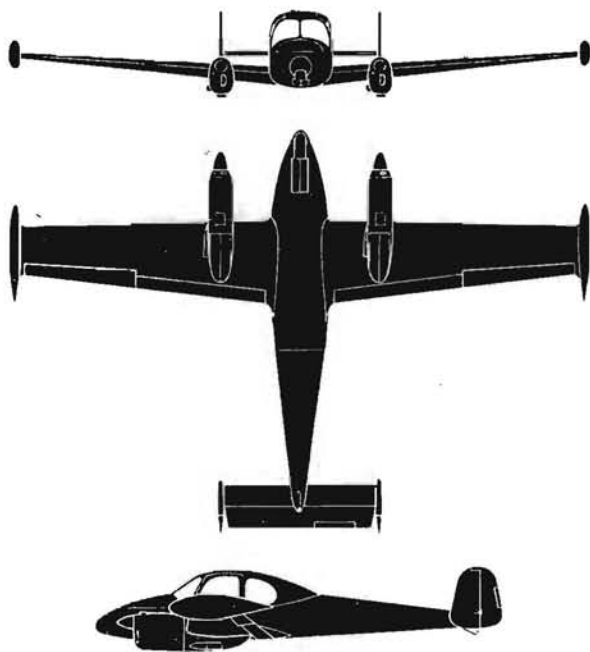
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## AERO L-200 MORAVA

The Aero L-200 Morava is the latest aircraft to come from the Czech aviation industry, and follows on the heels of the Super Aero 45, which, like the L-200, was designed by Ladislav Smrcek (formerly of Zlin) and built at the Kumovice factory. Profiting by the latest techniques of Western design and incorporating all the refinements that its possible rivals might have, the L-200 may prove a formidable contender in the world market for twin-engined business aircraft. The low wing is a two-span unit, built entirely of metal, with Frise ailerons with a maximum deflexion of 30 degrees and trailing-edge high-lift flaps, with normal setting of 15 degrees for take-off and 30 degrees for landing. Built into the leading edge is a warm air de-icer system, which discharges through slots near the trailing edge. Fuel tanks on each wingtip feed auxiliary tanks inside the wing, just outboard of the engines, by gravity—thanks to a 6-degree dihedral of the wing—but auxiliary pumps inside the lower tanks may be used as well. Either engine may be fed by any tank. The engines are two Walter Minor III-6 of 160 h.p. each, driving metal fully-feathering variable-pitch V-406 propellers of 6.2 ft. diameter—fluid de-icers are fitted to the blades. The cabin is entered by forward-opening doors on each side, and has two forward seats and a bench-type seat in the rear measuring 4 ft. 3 in. in width—hardly wide enough to justify the claim that the aircraft is a five-seater, though it is a very roomy four-seater. Full dual control is fitted and there is provision on the instrument panel for complete navigational and blind-flying instrumentation. Either Lear or Radiostall radio-compass can be fitted, and there is a VHT transmitter/receiver with stand-by Sonair HF set. The electrical system is 24 volts with two 600-watt generators. The most unusual feature of the L-200 is the "bubble"-type cabin which would have necessitated a tall single fin and rudder. Each rudder is mass-balanced, and all tail control surfaces have twin tabs operated from the cabin. The tricycle undercarriage is retractable; the main wheels are fitted with brakes, and the nose-wheel is steerable with a lock of 60 degrees each side of the centre line.

The L-200 made its first flight on 8th April 1957. Span 39 ft. 4 in., length 27 ft. 6 in., height 7 ft. 4 in. Maximum speed 186 m.p.h., cruising speed 162 m.p.h., landing speed 65 m.p.h. Range 994 miles. Weight, empty 2,480 lb., loaded 4,079 lb.



## CANADAIR CL-41

Development of a modern side-by-side basic jet trainer, known as the CL-41 or Canadair Trainer, is now under way at the Canadair plant at Montreal. Two flying prototypes of this aircraft, which has been completely designed and developed by Canadair, are now under construction and are scheduled to make their first flights towards the end of this year. It is intended that the CL-41 will take the student pilot from the *ab initio* through to the basic flight training stages. Some of the aircraft's features are ejection seats with a jettisonable canopy sequenced into the ejection escape system, cabin pressurisation, two blind-flight panels and a "bird-proof" glass windshield. Preliminary design is now under way for the inclusion of an armament pack, not only for training but to give the aircraft a ground-support role. Later planes include the redesigning of the cockpit with seating for four. It could then be used in the communications and light transport roles.

Salient features: A low-wing, twin-seat *ab initio* trainer powered by a single turbojet engine of about 2,000 lb. thrust. In some respects the CL-41 resembles the Cessna T-37 trainer, now in service with the U.S.A.A.F.

Dimensions: Span 36 ft. 4 in., length 31 ft. 11 in., height 9 ft. 0½ in., wing area 220 sq. ft. Gross weight 6,250 lb. (approximate). Take-off run 1,000 ft., landing run 1,100 ft. Fuel load of 2,000 lb. allows a two-hour training flight. Maximum speed at sea-level 400 m.p.h. (approximate). Range 800 miles.



**QUADRIPARTITE.** Left: One of the aircraft types used at Woomera rocket range in Australia is the R.A.A.F.'s Commonwealth CA-27 Sabre, powered by a C.A.C.-built Rolls-Royce Avon Mk. 20. Illustrated is the twenty-second production Avon-Sabre (A94-922) which, apart from being a test carrier for two de Havilland Propellers' Firestreak ("Blue Jay") infra-red homing air-to-air missiles, has a new belly tank.

**SOMETHING NEW ON NEW AND OLD.** Left: A recent photograph taken at Dorval Airport, Montreal, illustrates one of the "on loan to United Nations" Fairchild C-119F Flying Boxcars (serial: 22118) of R.C.A.F. A.T.C., with a modified nose extended to house cloud-collision radar. The U.N. markings are now reversed, white on blue background—compare with C-119F photograph on page 46, February 1957, *Air Pictorial*. Right: Described as an "Electronics Test Ship", this Boeing ETB-17G Flying Fortress (serial: 0-48543) is currently on loan to the Federal Tele-Communications Corp., Teterboro Airport, N.J. Note wingtip "devices". (Photos: G. A. Fuller, Montreal, and F. G. Freeman, Jr., Flushing, N.Y.)



**SPORTING FRENCHMEN.** Left: An attractive two-seater, the Draine D-61 Condor (F-BBIZ; c/n. 3) is a logical, higher-powered development of the popular D-3 Turbulent and D-5 Turbi single- and two-seat ultra-lights. Power is a 65-h.p. Continental A65 flat-four. Cruise, about 100 m.p.h. Right: The Lignel 46 Coach (F-BCZJ; c/n. 1) dates from 1948 and is a four-seat sports-tourer, powered by a 200-h.p. Mathis 8G-20 flat-eight, giving a maximum speed of 170 m.p.h., and cruise of 150 m.p.h. for range of 621 miles. Note the unusual shape of engine cowling.



**OVER-THE-BORDER AMPHIBIANS.** Left: An ex-U.S. Navy Grumman J4F-2 of 1944 recently converted to Super Widgeon standard by McKinnon-Hickman Company of Portland, Oregon. Note that this cream-and-blue Super Widgeon (CF-HAC) has three-blade airscrews in place of the earlier two-blade variety. Engines are Rangers. Right: Another ex-U.S.N. civil conversion is this Grumman G-21 (U.S.N. JRF-6) Goose powered by two 450-h.p. Pratt & Whitney (Jacobs-built) R-985-AN-14B Wasp Juniors. Colours: white and two shades of blue. Both amphibians are at Montreal.



**MORE MARKINGS.** Familiar types in unfamiliar guise are, left: A de Havilland D.H.104 Dove (D.16), one of nine, plus a D.H.114 Heron and a Douglas DC-3, operated by the Belgian Congo's A.F.P.—Aviation de la Force Publique. Lower, left: One of six Douglas DC-4 Skymasters belonging to Indian Airlines Corp'n. Note identification "India" on fin and I.A.C. badge on the nose. Below: An R.A.F.-surplus de Havilland Vampire NF Mk. 10 (serial ID1605; ex-WM731) en route to the Indian Air Force from Benson.





**SKY HOOK AND SINKER.** Left: Last autumn the demonstration Westland S-51 Srs. 2 Widgeon prototype (G-ALIK; c/n. WA/H/3; 1949) undertook a series of water tests at Calshot utilising a new type of flotation gear. Tests have now been completed and the Widgeon has reverted to conventional land undercarriage. Right: First photograph to show the Bell GAM-63 Rascal "stand-off" nuclear guided-bomb in flight. The test carrier in this case is a Boeing DB-50D-BO Superfortress of Holloman A.F. Squadron service carrier is the Boeing DB-47E Stratojet.

Air Pictorial's  
JANUARY 1958

## PHOTO-REVIEW



**BOWLER-HATTED.** Above: One of the first examples of the North American T-28A Trojan basic trainer which has now been declared surplus to U.S.A.F. training requirements. Note crude obliteration of "U.S. Air Force" and buzz no. "TL492" on rear fuselage. (Photo: W. M. Bodie, Van Nuys, California.)



**U.S. TURBOPROPENSITY.** Two Lockheed four-motor transports have the 3,750-e.h.p. Allison Model 501-D13 turboprop in common. Upper: The prototype Lockheed Model 188 Electra (N1881; c/n. 1001) was rolled out of its assembly area one month ahead of schedule and took to the air for the first time on December 6th. Lower: Meanwhile, a 1,000-hour engine flight-test programme is being speeded up by means of the Rohr Aircraft-converted R7V-2 Super Constellation (BuAer. 4162), which is nicknamed the "Elation".



**NOTHING IN COMMON.** Above: The Max Holste M-H1521 Broussard (Bush-flier) six-seat utility aircraft built for the French Army is now finding a market overseas. The Argentine has purchased ten, and one has recently been delivered to the Sudan. The Sudanese Broussard (SN-ABJ) arrived at Khartoum on 4th November, piloted by M. Pinaud. Power is a 450-h.p. Pratt & Whitney Wasp Junior. Right: In the October 1957 Photo Review appeared a multi-emblazoned Gloster Meteor F. Mk. 8 with two sets of squadron markings. The pilot, Wing/Cdr. Maurice Shaw, of R.A.F. Church Fenton, has gone one better and now his Meteor (WF677) sports an additional marking, that of No. 85 (F) Squadron. Lower, right: Not a Grumman Widgeon—see opposite page—but a Republic of Korea mixed wood-and-metal construction flying-boat powered by two 213-h.p. Continental O-470-11 flat-sixes. This unnamed flying-boat is built by the Chinhae Naval Shipyard. Note r.p. rails under wings and fixed 300-in. machine gun in the nose. (Photo: U.S. "Naval Aviation News".)







The Vickers Wellesley, K7772, with a Hercules engine—the only Wellesley so fitted and not previously illustrated.

## The Journal of a Roving Spotter

A YEAR ago, I was rash enough to forecast some of the new types which British spotters could expect to log during the year. My prophecy, I see, has not been wholly fulfilled, for the Convair F-102 and McDonnell F-101 have not reached Europe—and, in fact, the Convair F-102, as equipment for the U.S.A.F. Tactical Air Command, may not do so. The Bulldog G-ABBB has not yet been restored to air-worthy condition, but, for the rest, the types I mentioned have duly put in an appearance.

Thus encouraged, I will gaze once more into the crystal ball to bring you "Aerobscribe's" exclusive forecast for 1958. We may well see, I fear, diminishing air activity over this country as the front line strength of the R.A.F. runs down and at the time of writing there is not a single wholly new type of aeroplane on the stocks for the R.A.F. Best event of the year therefore will be the appearance of the Blackburn N.A.39 for the Royal Navy. There will be a few new variants, such as the production form of the Canberra P.R.9, the Victor B.2, the Gannet A.E.W.3 and just possibly the Jet Provost T.3. In the field of helicopters, the Westland Westminster will be taking the air and the Bristol 192 will be the latest and probably the last of that company's tandem-rotor line; I do not expect to see Gazelle-engined Wessex anti-submarine 'copters from Yeovil until 1959, however.

In the civil field, the first flight of the Vanguard G-AOYW will be one of the year's most significant events. Much earlier in the year, we will welcome G-APDA, the first Comet 4, and by the end of 1958, perhaps half the B.O.A.C. fleet of these will have flown. The prototype Herald, G-AODE, will be reappearing in its twin-Dart form and at the small end of the range, the Auster Atlantic will be getting around. It would be unwise to count on seeing the Arrow Active G-ABVE in the air in the next twelve months—but we can keep hoping!

What we can expect from abroad is more difficult to say. None of the "new generation" American transports will be seen in 1958 except perhaps the prototype Boeing 707. There is every reason to expect, on the other hand, the KC-135 to become a regular visitor, if not actually based here. A fascinating, but rather smaller, exhibit from the U.S.A. to be demonstrated during January is the Hiller XROE-1 Rotorcycle. Douglas B-66Bs will join the RB-66s already stationed here.

Almost any aeroplane flying on the Continent must be reckoned to be a possible "spot" in this country nowadays, but I do not foresee any new types becoming regular visitors until the Friendship gets into service with Aer Lingus and the Caravelle with Air France, towards the end of 1958.

On the debit side, the year has seen a further dwindling of some of our more interesting types, for various reasons. Crashes robbed us of the only Britannia 301, G-ANCA; the flagships of the B.E.A.'s Viscount 700 and 802 fleets, respectively G-ALWE and G-AOJA; one of the few remaining Solents, G-AKNU, and the second of Rolls-Royce's Flying Bedsteads, XK426. The departure of three Elizabethans for Australia marked the beginning of the end of the B.E.A. fleet of this type, but there is a good chance that some of the fleet will remain in this country with other operators for many years.

A loss of another kind, which saddens all of us, occurred while the Vimy in which Keith and Ross Smith flew to Australia in 1920 was being moved to its new home at Adelaide. A fire caused severe damage to this historic aircraft, which may prove to be beyond repair.

Most of the aeroplanes which appear at the S.B.A.C. Display year by year are

prototypes or demonstration models which remain in the public eye for much of their life. A diverting pastime is to try to follow the subsequent histories of some of the less notable aeroplanes which also take their place in the show. I make my own small contribution to this pastime by printing here a photograph of the prototype Vickers Varsity, VX828, which appeared at the S.B.A.C. Display in 1949, and was photographed recently in service with the Empire Test Pilots School—also at Farnborough.

\* \* \*

I have written, on another occasion, of the fascinating study which can be made of the group of aeroplanes used for engine test purposes. From the earliest days, aeroplanes have of necessity been set aside for the development in flight of production and experimental engines. In some cases, these aircraft fly with the powerplant around which they were designed, but frequently in some experimental model: for instance, the dozens of Spitfires used by Rolls-Royce at Hucknall during the war for Merlin and Griffon development. Much more interesting are the installations of non-standard engines purely for development flying purposes, and between the two wars especially, many military prototypes ended their days usefully in this role.

One of my illustrations this month shows the Vickers Wellesley K7772, which was used in Hercules development and was also a useful "hack" at the R.A.E. in the early days of the war, for general engine accessory flying and investigation. This was, I believe, the only Wellesley flown with a Hercules and to the best of my knowledge it has not previously been illustrated anywhere.

Non-standard installations of this kind were fairly easy to spot, even if the particular engine installed could not always be identified. Nowadays, however, buried jet installations make it possible for engine changes to go unnoticed. For instance, I know of no

obvious means of distinguishing between Avon, Sapphire, Olympus and Conway installations in the Vulcan and we now depend, therefore, on the reliability of press handouts coupled with a note of the serial numbers of aircraft known to be used for test purposes.

Another aeroplane in the engine test-bed category is the Comet 2X G-ALYT, which was a Comet 1 airframe fitted with four Avons for development flying prior to completion of the first Comet 2. This Comet is still flying—one of the few remaining Series 1 airframes—and has recently had an Avon R.A.29 fitted in the starboard outer position for some general investigation into engine icing problems. A water-spray rig is on the side of the fuselage.

Other Comet 1s still flying are the two used by the R.C.A.F.—actually 1As and now fully modified in the light of the Comet investigation—and the three Air France machines, also 1As. One of these, F-BGNZ, was in this country for modifications when the Comet 1s were grounded, and was registered G-APAS for a ferry flight to Farnborough. The other two were ferried back from France in 1956 under temporary British registrations G-AOJT and G-AOJU with the designation 1XB, and are also to be used at Farnborough as “hacks” for equipment development at high speeds and altitudes. The other two French machines, F-BGSA and F-BGSB used by U.A.T., are still at Le Bourget, and their future is not yet decided.

The following few notes on designations of various kinds may be of general interest:

Westland will produce the Wessex under their type designation W.B.5. This designation accords with S.B.A.C. recommended procedures. As I have previously noted, other Westland helicopter designations include W.A.5, the Whirlwind, and W.B.1, the Widgeon. The Wessex now flying in Britain as XL722 was first flown, incidentally, as G-17-2 and was basically an HSS-1.

The P.D.18 designation applicable to the Short freighter (referred to in *Air Pictorial* last month) based on the Britannia, is in that company's series of Project Designs. Others were the P.D.11 (the original layout of the S.C.1 vertical riser) and the P.D.16, Short's design for a turboprop freighter in the same class as the Armstrong Whitworth A.W.650. It seems likely that the series of drawing references which has ranged from S.A.1 to S.C.1 will in future be used only for the types which are built.

Among recent Avro civil projects are reported to be the Type 735, a supersonic transport derived, no doubt, from the Type 730 bomber project, and the Type 740, a design to meet the B.E.A. requirement for a jet transport.

From the U.S.A. there is news of the Kaman H-43A, a crash-rescue helicopter for the U.S.A.F. with R-1340 engine (I



The Vickers Varsity prototype, VX828, exhibited at Farnborough in 1949, is back there now in service with the Empire Test Pilots' School.

have already mentioned the H-43B with Lycoming T53); of the RC-130, a photo-survey version of the Lockheed Hercules; of the F-105E, newest production version of the important Republic fighter-bomber; and of the North American GAM-77—designation of the WS131B air-to-surface missile.

Many aviation enthusiasts, at some time or another, go through the model-making stage and I would guess that a high proportion of the readers of this column have made scale or flying models, even if their interests have later centred on other aspects of the hobby. As a creative pastime, modelling brings delights not easily equalled by pure collecting or plain interest, and there is in my opinion no finer example of the modeller's art than the solid scale replica.

As one who has created scale model aircraft from solid wood, I regard with some suspicion the plastic model kits which are now flooding the market. Indeed, in the days when I was modelling actively, I would have scorned the artifice of pre-moulded components in wood or plastic and few would dispute, I think, that the plastic kit removes from the modeller much of the opportunity to show his skill.

However, I have to admit that some of the kits now available are very good value for money, have been produced with great thoroughness and care, and provide the basis for attractive and accurate models. For those of us who can no longer spare the time for genuine modelling they provide a means of producing replicas which, if carefully finished, are worthy to adorn any den or desk.

Finishing these models provides an outlet still for special ability—and calls for development of new techniques involving special cements and paints. A good deal of research is often necessary, too, to discover precise details of colours and markings.

Favourite subjects for the plastic model manufacturers are the aircraft of the two world wars—naturally enough—but I have been pleased to see some inter-war period types appearing, such as the Bristol Bulldog and the S.6B, Gladiator, Comet (D.H.88) and Hind. The last three mentioned—the cheapest on the market—also happen to be some of the best and have the important

advantage that all are to 1/72nd scale.

In wishing my readers “good spotting” in 1958, I also take my leave of them, for this must be the last column I write in the present series. From time to time, I hope, I shall have the opportunity to contribute to these pages, articles of interest to collectors. Meanwhile, I would like to thank once again all who, for the past three and a half years, have through their encouraging remarks, made the preparation of this series so pleasant a task. To some I have written personally. The others will understand, I hope, that it has not been possible to deal direct with all the correspondence; and I ask them to accept, instead, this acknowledgment.

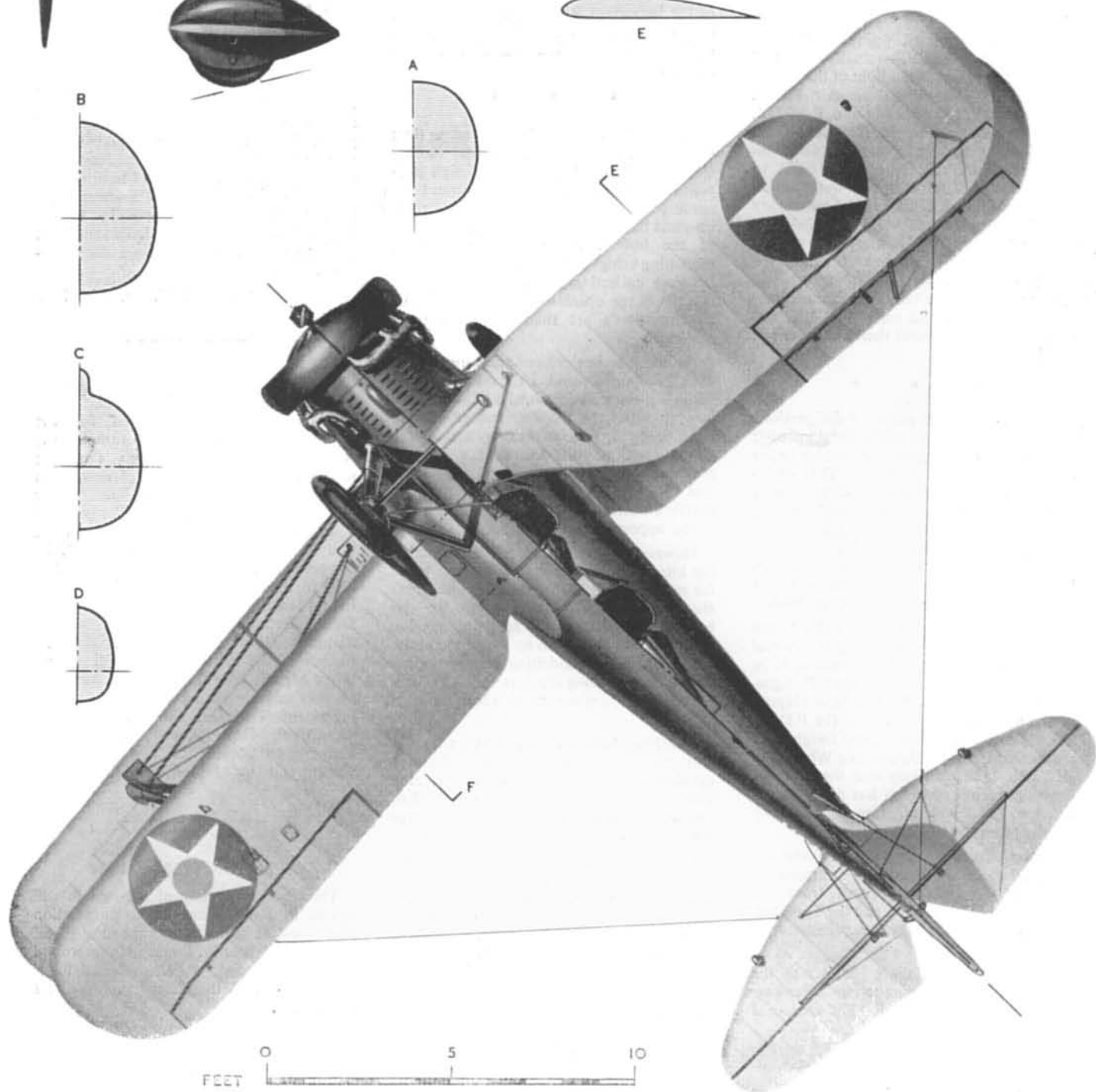
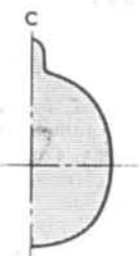
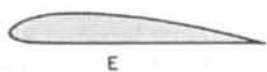
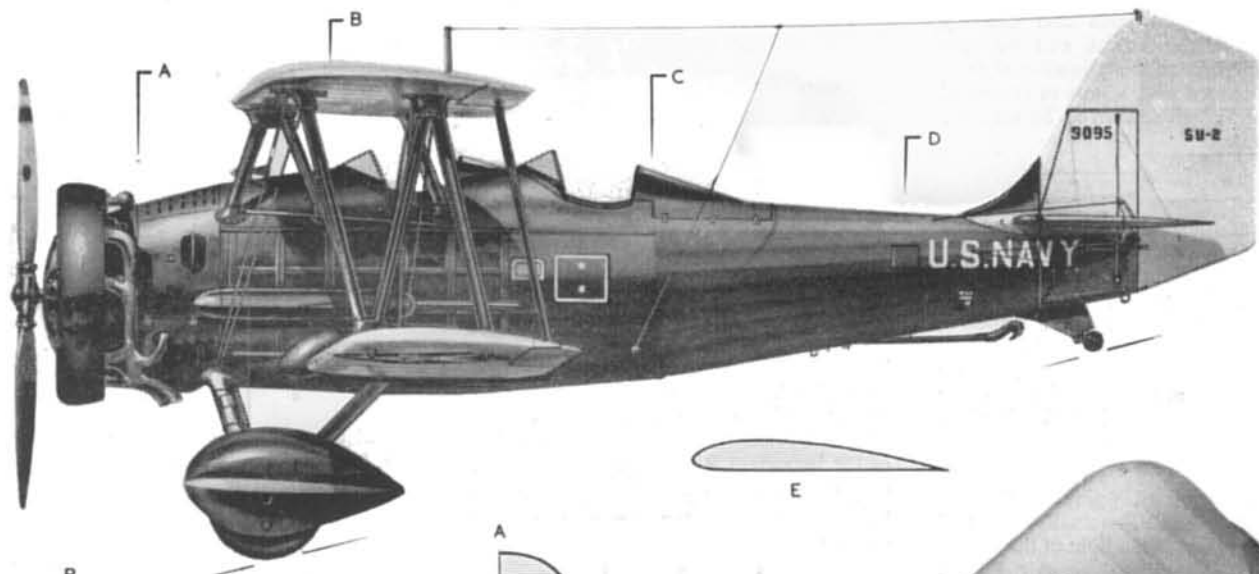
“Aeroscribe”, December 1957

## Recognition Competition

ENTRIES are now invited for the Eleventh Annual Competition for the Aircraft Recognition Society's Trophies; namely: The “Air Pictorial” Trophy, The “Silver Heracles” Trophy, The “Silver Hurricane” Trophy, The B.E.A. “Viscount” Trophy. This year an entirely new trophy, The “Bristol Britannia” Trophy, will be competed for. The 1958 competition will be held in the Lecture Theatre of the Royal Institution of Great Britain, 21 Albemarle Street, London, W.1, at 2.15 p.m. on Saturday, 18th January 1958. The Air League of the British Empire will present Silver Medals after the contest to members of the teams winning the Heracles and Hurricane Trophies. For further details write to the Hon. Secretary, The Aircraft Recognition Society, 15 Tavistock Street, Covent Garden, London, W.C.1.

## AVIATION FILM SHOW

The London Society of Air-Britain will devote its January meeting to an aviation film show at their regular meeting place, Caxton Hall (near St. James's Underground Station), London, S.W.1. The date is 1st January and the time 7 p.m. Visitors are invited.







# THE CORSAIR STORY

By Roy Cross

## CONCLUSION

**T**HE XSU-4 Corsair was purchased and delivered to the U.S. Navy in 1933, twenty production SU-4s being completed the following year. Nineteen thirty-three was a busy year for Chance Vought, for their other deliveries to the U.S. Navy and Marines included forty-four SU-2s, twenty SU-3s, and thirty-two O3U-2s, and they also produced the V-70, V-80, and V-90 series, each with various models, and the SU-1 Special (illustrated below).

The latter model and the SU-2 Special were smarter versions of their respective service counterparts, used mainly as executive aircraft for Navy V.I.P.s. The SU-2 featured in the general arrangement drawing opposite is coloured dark blue overall except for white tail surfaces, silver wings, and a silver flash on the wheel spats. The card holder below the rear cockpit coaming carries the two-star rank badge of a rear-admiral. The exhaust ring is polished metal, and the fuselage lettering is in white. There

are black walkways on each lower wing root, and a dark stripe extends spanwise from the base of the front N wing strut inboard to the walkway. Note the deck hook, radio antennae, and slinging gear on the top wing centre section.

Deliveries during 1934 included the twenty SU-4s, forty-three O3U-3s, some O3U-4s, and the first XO3U-6. That year also marked the introduction of the V-100 Corsair Junior, which although similar in basic design and structure to the main Corsair line was an easily-maintained, lower-powered, lighter training and general-purpose type of lower cost, produced with a shrewd eye on the export market. The two main variants were the all-purpose trainer with a TB Wasp Junior, giving 225 h.p. at 1,810 r.p.m. at sea-level, and the heavier general-purpose military model with the SB Wasp Junior of 400 h.p. at 2,200 r.p.m. at 5,000 ft. Respective figures for the two types were: Span 34 ft. 6 in. (35 ft.); length

*(Continued overleaf)*

**Top:** An O3U-6 of Marine Squadron VO-8M, this machine being the second-section leader, aircraft no. 4, with white-painted cowling, fuselage band, and top wing chevron. **Below:** The half-silver, half-blue fuselage of this SU-1 Special indicates that it is a Navy Staff executive machine.





(Upper, left) Navy O3U-4, and (right) the V-100 Corsair Junior all-purpose trainer; (lower, left) the XO3U-5 with a cold-weather cowl, similar to that used on some Russian aircraft (right) the V-135.

### The Corsair Story (Continued)

27 ft. 3 in. (26 ft. 8 in.); wing area 326 (328.8) sq. ft.; gross weight 3,032 (3,559) lb.; top speed 110 (155) m.p.h.; and service ceiling 10,100 (20,500) ft.

During 1935 the last service Corsair, the O3U-6, was produced for the Marines, a feature being the sliding canopy over the pilot's and part of the observer's cockpits. First service use was made on this machine of an improved cowl design evolved by Rex B. Beisel of Chance Vought, which featured pressure baffling around the cylinders, contoured cowl interior to assist internal airflow, and adjustable cowl flaps to regulate the amount of cooling air passing over the engine. The new cowl contributed to an improved flight performance,

especially top speed and full-throttle climb.

Corsair variants from 1934 onwards are illustrated on this page. At the top are the Navy O3U-4, and the lower-powered version of the V-100 Corsair Junior, designed for all phases of training from primary to advanced bombing and gunnery. The 400-h.p. version had a shorter nose with an N.A.C.A. cowl, but otherwise was similar. The V-100 wings were modified in plan form with less-rounded tips and were no longer of equal span, the lower plane being six inches shorter at each tip.

Immediately above (left) is a rare picture of the XO3U-5 (1935), shown here with an odd type of total enclosure for the radial engine. The single-seater (right) is the powerful V-135 of 1936 with well-staggered wings

and a Pratt & Whitney twin-row radial in a long-chord cowl.

Despite the V-98 designation retouched on to the tail, the seaplane (below, left) is thought to be a V-92C, largely a floatplane version of the O3U-6. The 1936 XOSU-1 observation scout (right) was in fact an O3U-6 modified with special high-lift flaps (incorporating ailerons) along the entire trailing edge of both wings. Bottom left is the V-97 version of the O3U-6, showing well the cockpit canopy, rounded tail, and big wing root fairing. No deck hook is fitted to this export model. Practically the last Corsair version built, the V-99M (bottom, right) was supplied to Mexico in 1937/38 with the twin-row Pratt & Whitney radial engine.

(Upper, left) a floatplane equivalent of the O3U-6, (right) the XOSU-1; (lower, left) the V-97, and (right) the V-99M.



# The Curtiss XP-55 Ascender

**D**URING the latter part of World War II the U.S. Army Air Force were evaluating a number of aircraft which, for their day, were of unorthodox design. Among them was the McDonnell XP-67A, a twin-engined experimental fighter powered by two Continental I-1430, twelve-cylinder engines each driving a four-bladed propeller. The turbo-exhaust of these engines was ejected through an annular aperture in the tail of each engine's nacelle giving additional thrust much in the same manner of the present-day turboprop. As well as an unusual powerplant the XP-67's centre fuselage was merged into the outer wings by means of large fairings, the object being to test "flying-wing" design.

Another experimental fighter was the Fisher XP-75A Eagle, a large single-seater powered by a 3,000-h.p. Allison engine driving contra-rotating airscrews. It was expected to have a maximum speed of 430 m.p.h.

Third of the experimental fighters was the Vultee Model 70, XP-54, a twin-boom pusher single-seater with a Lycoming R-2470 engine. Only one prototype was constructed primarily of magnesium alloy, and it is not known if it ever flew.

Strangest aircraft of the quarter was the Curtiss XP-55 Ascender, a swept-wing, canard single-seat fighter, powered by one Allison V-1710-95 engine of 1,275 h.p.

The XP-55 was developed at the St. Louis factory of the Curtiss-Wright Airplane Division and was flown for the first time in July 1943, but it was not until April 1955 that details were released. The name Ascender was given to the aircraft because of its high angle and rapid rate of climb. It had many design peculiarities such as the location of the engine in the rear of the fuselage, a low, swept-back wing with fully-movable rudders near the tips of the wing, and an elevator at the extreme end of the nose. The airscrew was provided with a release mechanism which enabled the pilot to jettison it in



This hitherto unpublished photograph of the Curtiss-Wright CW-24B aerodynamic test-plane for the Ascender was taken at the Test Centre at Muroc Dry Lake (now Edwards AFB) before 1941. Note the old-style American insignia and the fuselage fins. The CW-24B was powered by a Ranger V-770, twelve-cylinder in-line engine of 520 h.p. driving a pusher airscrew. (Photo: Warren M. Bodie, California, U.S.A.)

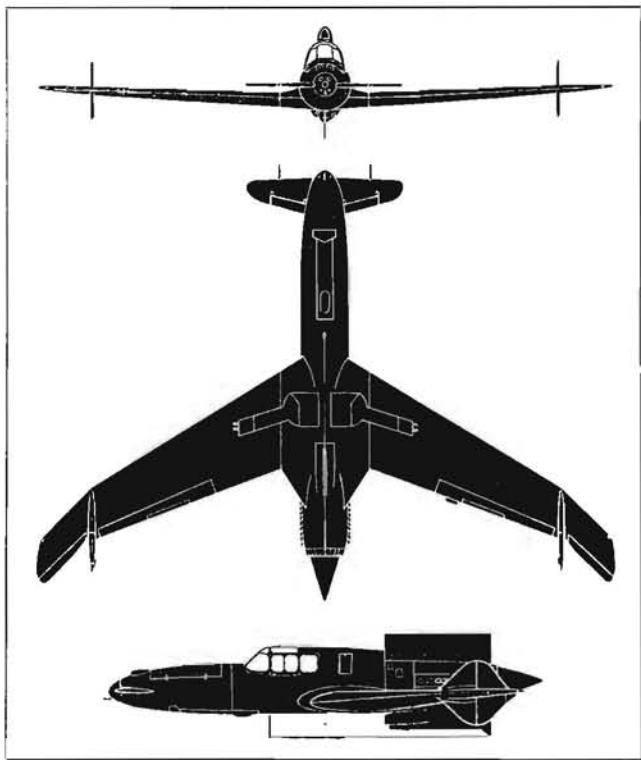
the event of an emergency so that it would not hit him when he baled out. Armament consisted of two 20-mm. cannon and four 12.7 machine guns in the extreme nose.

Four prototypes were completed plus an aerodynamic test-plane designated CW-24B, a photograph of which is published here for the first time. It is evident from this photograph that the Ascender design was being studied long before America entered the war in December 1941. This is borne out by the old-style markings of the white red-centred cross in a blue circle on the wings and the red and white bars on the rudders.

Despite its early promise development of the Ascender was abandoned as it suffered from a vicious stall, and take-off was abnormally long.

Dimensions: Span 41 ft. 0 in., length 29 ft. 7 in., height 11 ft. 0 in. Gross weight 7,931 lb. Maximum speed at sea-level 450 m.p.h. (approximate).

*Below, top to bottom:* Three of the Ascender prototypes, serialled 278845, 278846 and 278847. Minor differences are noticeable in all three aircraft.







# *An open letter*

## TO PARENTS OF AMBITIOUS YOUNG MEN

**From: Air Marshal Sir John Whitley, K.B.E., C.B., D.S.O., A.F.C.**



AIR MINISTRY (GR3),  
ADASTRAL HOUSE,  
THEOBALDS ROAD,  
LONDON, W.C.1.

Dear Sir,

Suggesting a career is always a big responsibility—not least for parents with a son growing up. In the final analysis, the choice must lie with your son himself. But you can help him in his choice.

Here, therefore, are some facts about one career which is particularly attractive to an ambitious young man. I refer to a flying career in the Royal Air Force.

First, let me assure you that flying will continue in the Royal Air Force for as far as can be foreseen. The Royal Air Force has the prime responsibility for the air defence of this country. For young men therefore who are trained to tackle the problems of the air in the air, there will be more—not fewer—opportunities in the missile age. This is especially true of those who qualify now for a permanent or short service commission and come successfully through their Pilot's, Navigator's or Air Electronics Officer's training.

It is a well-paid job. In how many callings can a man of 25 earn £1,500 a year? It is a job of high responsibility. Quite apart from flying and its fascinating skills, there are the manifold duties of an officer; to men under him; in staff, liaison or training jobs; and, perhaps, in high command.

You know yourself if your son has the character, intelligence and fitness for this magnificent (but exacting) life. If he is over 17½ and has G.C.E. or equivalent to the required standard, you may be doing him a service if you write to the Air Ministry for fuller information.

Let me add that the country needs the right kind of young men for this vitally important job, and it needs them now.

Yours faithfully,

Air Member for Personnel.

TO ANY YOUNG MAN WHO WANTS TO FLY... In this letter, it is not possible to give full details about this worthwhile career. For further information write to: Air Ministry (GR3), Adastral House, Theobalds Road, London, W.C.1.



**PLAIN AND FANCY.** Left: A test for recognition experts of an older generation, the one-off Vickers Fighting Biplane Type Eight of November 1915. Although apparently big, the F.B.8 had a wing span of only 38 ft. 4 in. (8 in. less than the Hawker Sea Hawk), but while fast for its day (98 m.p.h.), the F.B.8 was cumbersome, and this two-seater was soon abandoned. The gunlayer stood in the nose and fired a single .303-in. Lewis gun. Right: A Westland-built D.H.4 bomber of No. 202 Squadron (formerly "Naval Two") stationed at Dunkirk in the winter of 1918 displays much artistry, from the "red devil long-nose" on the fin to the "blue bird" surmounting the letter "M" on the nose of N5997.

## PHOTOS BY REQUEST

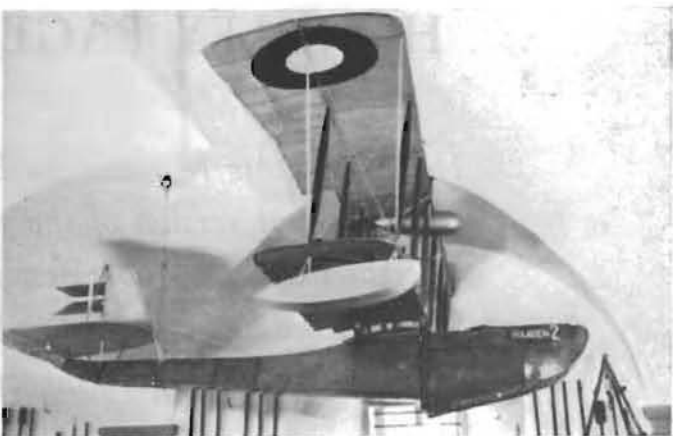


**SIAMESE SINGLE.** Above: According to North American Aviation's *Los Angeles Skywriter*, this attractive single-seat fighter in Siamese markings is not the NA-50A but the NA-68. Six were built for Siam in 1940-41 and shipped out to Pearl Harbour. The war with Japan brought about the fall of Siam and the NA-68s were shipped back to the U.S.A., and were used by the U.S.A.A.C. as advanced trainers (P-64) for American and Chinese cadets. One is still flying as XB-KUU.

**COULD FLY BACKWARDS** was the boast of this wartime Fleet Shadower (above), the General Aircraft G.A.L.38, built to the naval specification S.23/37. Only one was built (P1758), and the four 130-h.p. Pobjoy Niagara V radials were displaced along the wing to give maximum lift on the Bowles principle. The photographs show 115-m.p.h. (maximum speed) G.A.L.38 in its original form with triple fins and two rudders, and endplates on the lower stub wings. The later modifications resulted in a tall single fin and rudder.



**ODD MAN OUT.** Before the single-seat Sopwith 7F.1 Snipe assumed its final production form the design underwent several major changes in wing and tail assembly configuration. This rare photograph illustrates the fifth prototype (B9966) with an experimental swept tailplane to increase manoeuvrability in conjunction with the newly-adopted and later standardised horn-balanced ailerons. Note extra hinges at front spar.



**IT LOOKS FAMILIAR.** In the May 1957 *Photos by Request* was published a side view of the Donnet Leveque flying-boat of 1913 in Swedish naval markings. It is worth comparing it with this Danish (1915) patrol boat built by Orlogsvaerftet, Maagen 2 (c/n. 4).



THE  
ROLLS-ROYCE  
CONWAY  
BY-PASS TURBO JET

*has completed an official  
British Ministry of Supply  
type test in accordance with the  
combined U.S./U.K. test schedule  
at a rating of*

**17,250 lb. THRUST**

*and is in production for the*  
**HANDLEY PAGE VICTOR BM<sub>K</sub>.2.**

*The British Air Registration Board have already confirmed  
that a civil version of the same engine has successfully  
completed a 150 hour test run in accordance with the  
combined U.S./U.K. Civil Type Test Schedule at a  
dry take-off rating of 16,500 lb. thrust.*

**ROLLS-ROYCE AERO ENGINES LEAD THE WORLD**



# Letters to the Editor

LORD BALFOUR OF INCYRE  
WRITES:

PERHAPS the answer to Mr. Peter M. Bower's possession of a photograph of a British monoplane painted overall with feathers (see *Air Pictorial*, November) is the enclosed in my scrap book (see photograph, right).

This aircraft (a Bristol M.1.—Ed.) was painted by the late Mr. Shepperson the then well-known PUNCH artist, whose son was a Flight Commander (killed sky-writing in U.S.A. after the war) at No. 3 Fighting School, Bircham Newton (later Sedgford) early in 1918, at which school I was Chief Fighting Instructor.

On this scrap book page is also a Sopwith Triplane painted up with, on left, Lt. Hastings Deering, now head of a big Ford car and tractor business in Sydney, Australia.

On another page is a Pup painted in blue-and-white check. It was the Chief Instructor's aircraft, known as the "animated bathroom".—**Balfour of Inchyre.**

(The pages of Lord Balfour's scrap book contain several fascinating aircraft decorated in various colour schemes, which we are unable to publish owing to lack of space.—Ed.)

## BIZARRE COLOUR SCHEMES . . .

MUCH interest has recently been shown in the bizarre schemes applied to World War I aeroplanes. It would seem doubtful that such colour schemes were ever used on operational aircraft, but it is a fact that a curious embellishment was officially mooted in 1918 for operational use. This was a finish designed to create an optical illusion in order to conceal the true centre of the wings, which was an obvious aiming-point for the guns of enemy aircraft. Here are two such examples of this finish as applied experimentally to Sopwith Camel wings (see below). The idea was not adopted.—**Bruce Robertson, London, S.E.4.**

## . . . WERE THE FASHION

PERHAPS the enclosed photograph of No. 10 (Naval) Squadron's Camels (see overleaf) will prove to Mr. Whetton that the cherry-red cowlings on No. 209 Squadron machines were not the only examples of individual or squadron colour schemes used operationally, as he would have had us believe in his original letter (November 1956) on this subject.

No mention of the R.F.C. using colourful aircraft was made in my letter of June 1957, as Mr. Whetton has recently asserted, but I must reiterate (and these facts are proved by photographs and discussion with an ex-R.N.A.S. pilot who flew them) that Nos. 5, 9 and 10 Squadrons, R.N.A.S., flew machines which had, in the last two units, quite considerable areas of the wings and fuselage painted with multi-coloured designs in



A Bristol M.1 fighter of World War I painted overall with feathers is another of the strangely-decorated aircraft of the period. For further variations of the unusually-decorated aircraft see photographs at the foot of this page and on page 28. This photograph was generously loaned to *Air Pictorial* by Lord Balfour of Inchyre.

squares, circles and bands, and in the bomber squadron coloured or striped cowlings, propellers and spinners.

Although practically every aircraft was so decorated it must be agreed that these squadrons were the exception rather than the rule when taken over the whole strength of the R.F.C. and R.N.A.S. at that time, but I would not dismiss these as being just "odd examples" when, in support of my contention that the R.N.A.S. were allowed considerable latitude, one considers the total number of Naval squadrons deployed at that time.

Can anyone tell me whether Sopwith Dolphin, C.3785, with shark's tooth markings, was used operationally, and if so with which squadron?—**G. Stuart Leslie, Scarborough.**

## FOR THE RECORD

THE concluding article in the series "U.S. Aircraft in the British Services, 1914-55" was up to the standard of the preceding instalments, but there were one or two omissions which I would like to fill in.

**Sabre F-4.** At least three aircraft were delivered in October 1952, through Prestwick, with R.A.F. markings and R.C.A.F. serials. They were 19378, 19384 and 19404. The next eight followed in December 1952 with R.A.F. serials. Subsequent deliveries were made through Kinloss.

**Neptune MR-1.** When these aircraft were delivered through Prestwick they carried R.A.F. markings and a U.S.A.F. serial, and were flown by U.S.A.F. ferry crews. These are now in the process of being returned to the U.S.A. and carry both the R.A.F. and U.S.A.F. serials, the latter being carried on the fin in an abbreviated form. The modifications incorporated in many of them (i.e. M.A.D. tail and unarmed transparent nose) suggest a standard comparable with the U.S.N. P2V-5s.

**Skyraider AEW 1.** Some of the aircraft have been seen at R.N.A.S. Abbotsinch bearing serials outside the ranges published in the article. They include WT112, WT115, WV181 and WV184. Unusual was WT097. The only suggestion I can offer for this is its original serial was one of a group allocated to Hunters and then modified to avoid confusion.

**Avenger AS-4.** Very few, if any, have been returned to the U.S.A. At least thirty still remain cocooned at Abbotsinch, while twenty were put on board a French carrier last July.—**R. A. Watt, Prestwick, Ayrshire.**

THE following serial numbers were missing from the last instalment of "U.S. Aircraft in the British Services":

**Washington B-1:** WZ966-968. **Sabre F-4:**

(Continued overleaf)

Somewhat after the style of the camouflage applied to the Navy's Dreadnoughts are these variations painted on the wings of Sopwith Camels. (Photos: Imperial War Museum via Bruce Robertson.)



## Letters (Continued)

XB647-649, XB770-779, XB853-855, XB912-940, XB991-999, XD782-784. **Nep-tune MR-1:** WX492. **Skyraider AEW-1:** WT943-969, WT982-987, WV102-109, WV177-185, WT761, WT112, WT849, WT097. The latter is obviously a mis-paint of a U.S.N. buzz number, 124097 being its U.S.N. serial. **Avenger AS-4:** XB296-405, XB434-449.—A. C. Grey, Buxton.

SOME four Washingtons are still in service with the R.A.F. at C.S.E. Watton, Norfolk, the serials being WW346, WZ966-968. The latter have red fins and carry a variety of black radomes beneath the rear fuselage. The presence of these aircraft in England is interesting as the last Washington was officially returned to the U.S.A. on 16th March 1954.

Another interesting Washington was WF498, which was based at Marham and had black undersides with white serial numbers.—H. C. Wilden, Southey, Norfolk.

### SHORT S.30 STORIES

I HAVE read with great interest both your notes on the "Empire Flying-Boats" in the June issue of *Air Pictorial*, and also the observations contained in the letter from Nigel B. Leicester, printed in the November issue. May I, as one who spent some considerable time with these aircraft, add a few further points of interest?

A certain amount of confusion seems to have arisen over the three S.30 boats ordered by Tasman Empire Airways. It must be pointed out first of all that G-AFCX ("Clyde") was always an Imperial Airways aircraft, and was wrecked early in the war during a gale at Lisbon. There are no records of it having been allotted a corresponding New Zealand registration.

The three T.E.A.L. aircraft were: G-AFCY ("Awarua"), registered in New Zealand as ZK-AMC. G-AFCZ ("Australia"), registered in New Zealand as ZK-AMB. It was this aircraft which struck a sandbank in the Shatt-al-Arat at Basra in July 1939, while on its way to the Far East. The subject of one of the most interesting on-site repairs ever carried out, the complete nose, which had been smashed in some six feet or so, was rebuilt in jigs taken out to Basra by a Short Bros. working party. The aircraft was eventually flown back to the U.K., where, due to the outbreak of war, it was absorbed into the B.O.A.C. fleet, being given the "C" class name "Clare". She was eventually lost under tragic circumstances, as Mr. Leicester points out, off West Africa while flying to Free-town in the summer of 1942. G-AFBA ("Aotearoa"), registered in New Zealand as ZK-AMA.

One aircraft whose fate I can account for was G-AETX ("Ceres"). She was destroyed by fire while undergoing maintenance at Congella, Durban, in the summer of 1942.

With reference to the QANTAS aircraft, I agree with Mr. Leicester that G-AEUH ("Coria") was registered in Australia as VH-ABD. For the record, the complete



More colour schemes, this time on No. 10 (Naval) Squadron's Camels. See letter "Were the Fashion" on the previous page. (Photo: via G. Stuart Leslie, Scarborough.)

fleet originally was: G-AEUG ("Coogee"), registered in Australia as VH-ABC; G-AEUI ("Corio"), registered in Australia as VH-ABD; G-AEUL ("Coorong"), registered in Australia as VH-ABE; G-AFBJ ("Carfewtaria"), registered in Australia as VH-ABA; G-AFBK ("Coolangatta"), registered in Australia as VH-ABB; G-AFBL ("Coore"), registered in Australia as VH-ABF.

To the above list can be added those aircraft, quoted by Mr. Leicester, which were "caught" at the far end of the "Horseshoe Route" when the Japs overran the East Indies in early 1942.—Arthur H. Shaw, Cranleigh, Surrey.

### FINNISH 504

I HAVE had a number of inquiries requesting further gen about the stored aircraft in Finland, with special emphasis on the Avro, after my letter was published in the October issue of *Air Pictorial*, page 368. I am herewith enclosing a shot of the Avro (AV-57) as it appeared when in use in the 1920s. The upper and lower wings, of course, had the light blue swastika on them.

All the aircraft are dismantled (sans wings) and many are minus engines and instruments. However, most could be restored and would make a fine museum.

Other questions asked are about the photograph of the Blenheim shown. This is not the last Blenheim in Finland, but there is one other, BL-199, at Tampere and is a long-nosed Mk. IV version. Both of these planes are Finnish-built! A third Blenheim

had crashed in northern Finland last spring. I did not find the number of this one, but perhaps one of your many readers might be able to supply this.

BL-173 may now be in England, as it is destined for some British museum. Again, maybe, some of the readers have further gen.

The only active museum activity to my knowledge at present in Finland is, that a room at the War Museum in Helsinki will be devoted to accurate scale models of all the types used by the F.A.F. And here I will add that this tiny little air force has had as wide a variety of types as any in the world.—M. A. Salo, Rivera, California, U.S.A.

### VINTAGE AIRCRAFT— HART G-ABMR

YOU may know that some months ago we had the misfortune to force land this aircraft due to engine failure. Ever since that time we have been endeavouring, without success, to obtain replacement super-charger casing for the Kestrel engine.

It occurred to us that possibly some of your enthusiastic readers might know where a serviceable Kestrel is located, and if so we shall be most pleased to have this information.

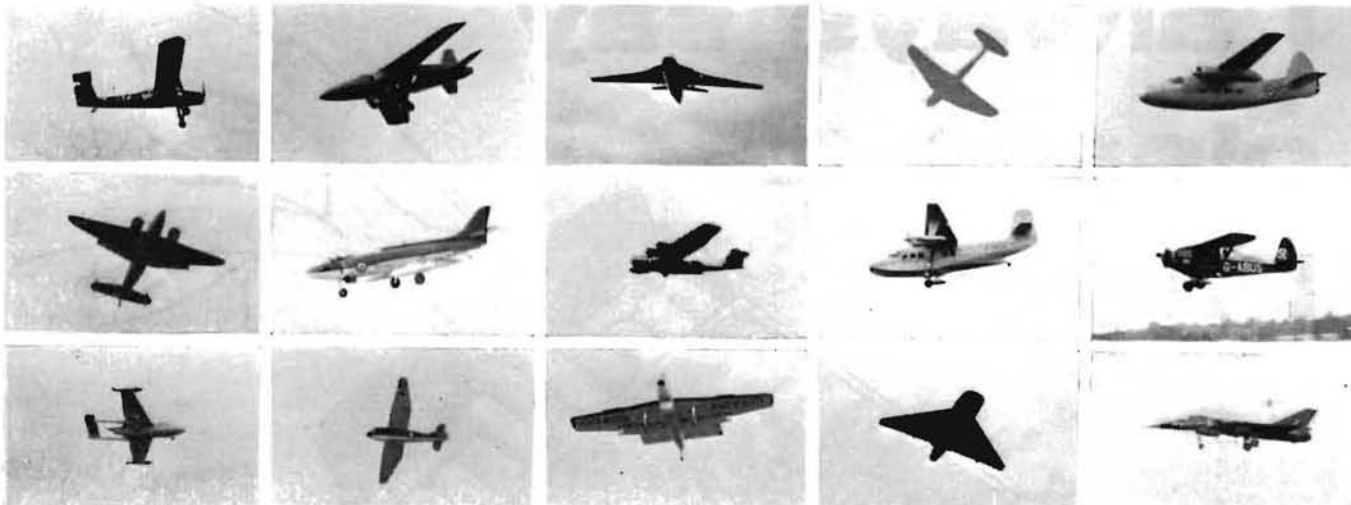
Any help you can give us in this matter will be most welcome.—E. Rowe, Experimental Supervisor, Hawker Aircraft Ltd., Richmond Road, Kingston-upon-Thames, Surrey.

(All letters to Mr. E. Rowe of Hawker Aircraft please.—Ed.)

Rare photograph showing an Avro 504 of the Finnish Air Force. (Photo: M. A. Salo, California, U.S.A.)



# "Elementary Teasers" (See next page for Answers)



## BRITISH REGISTRATIONS IDENTIFIED

by F. A. Hudson,  
British civil register specialist

- G-ACSZ Chilton DW.1A (c/n. DW11); W. L. James, Hadleigh; crashed at Grange Farm, near Felixstowe, 24.5.53
- G-AFUL Pou de Ciel (c/n. THF1); T. H. Foulds; cancelled 16/12/46
- G-AHOI Junkers 52G8E (ex-VN744); Ministry of Civil Aviation and operated by B.E.A.; withdrawn and scrapped
- G-AHVD Proctor 1 (c/n. H7, ex-R7491); Island Air Charters Ltd.; sold as F-BFPN 1950
- G-AHVK Proctor 1 (c/n. H58, ex-BV551); W. S. Shackleton Ltd.; sold as F-BFKB
- G-AIBJ Autocrat (c/n. 2145); Auster Aircraft Ltd.; cancelled 1947
- G-AIOH Halifax 8 (ex-PP240); Bond Air Services Ltd.; Gatwick; crashed at Barcelona 0/47
- G-AIVJ Viking 1B (c/n. 223); named "Victoria" and "Lord Jellicoe" while with B.E.A.; sold by Overseas Aviation Ltd. as D-ABIR
- G-AJHJ Auster 5 (ex-NJ676); B. Arden, Exeter; withdrawn at Exeter 1956
- G-AJHV Auster 5 (ex-MS941); J. L. Heagerty, Birmingham; crashed at Hanover, Germany 30/12/53
- G-AJGK Messenger 2A (c/n. 6373); R. C. Cox, Chobham; sold in Australia
- G-AJXX Dragon Rapide (c/n. 6457, ex-R5921); Lancashire Aircraft Corp.; sold as AP-AGI Consul (ex-HN717); Airspeed Ltd.; sold as F-BEDT
- G-ALDJ Hermes 4A (c/n. HP8111); Britavia Ltd.; crashed while landing near Blackbushe 5-6/11/56
- G-ALDK Hermes 4A (c/n. HP8112); Britavia Ltd.; carried serial XJ281 while on troop flight; crashed on landing at Karachi 5/8/56
- G-ALDW Hermes 4A (c/n. HP8123); Skyways Ltd.; sabotaged and burnt out at Nicosia 4/3/56
- G-AMCX Oxford (c/n. 5247, ex-PH517); Airspeed Ltd.; sold as EC-AGE
- G-AMXA Comet 2 (c/n. 06023); B.O.A.C.; to R.A.F. as XK655
- G-AMXE Comet 2 (c/n. 06027); B.O.A.C.; to R.A.F. as XK663
- G-AMYS Dakota 4 (ex-KK104); Aviation Servicing Ltd.; sold as VP-YKO
- G-ANJC Dove 6A (c/n. 04449); de Havilland Aircraft Co. Ltd.; sold to Oilfield Aviation Ltd. as N1563V 1954

- G-AOFK Hiller 360 (c/n. 745); Air Service Training Ltd.; crashed at Hamble 4.10.55
- G-APAC Chipmunk 22 (c/n. C1.0167, ex-WB715); Luton Flying Club Ltd.; currently registered
- G-APAD Edgar Percival EP-9 (c/n. 27); Edgar Percival Aircraft Ltd.; currently registered

## FOREIGN REGISTRATIONS IDENTIFIED

by F/Lt. D. A. S. McKay, D.F.M.,  
overseas civil register specialist

- D-AGIL Viking 1B (c/n. 219, ex-G-AIVF); Deutsche Flugdienst G.m.b.H.
- D-EBUM Cub J.3C (c/n. 12078, ex-HB-OIV, HB-OEV, HB-OBS); Fliegerschule Weichelt
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- I-HAWK Pasotti Sparviero (c/n. 02); Ludovico Wild
- I-LOMA C.A.P.4 Paulistinha (c/n. 686); Aero Club di Firenze
- I-LUDO Breda 395 (c/n. 254); D. Balestra
- I-PAIN Ambrosini Super-7 (c/n. 1-01, ex-I-RAIN); S.A.I. Ambrosini
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- VP-YPN Cessna 310B (c/n. 35560); Commercial Air Services (Rhodesia) Ltd.
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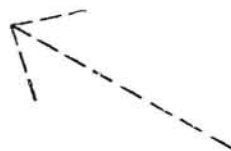
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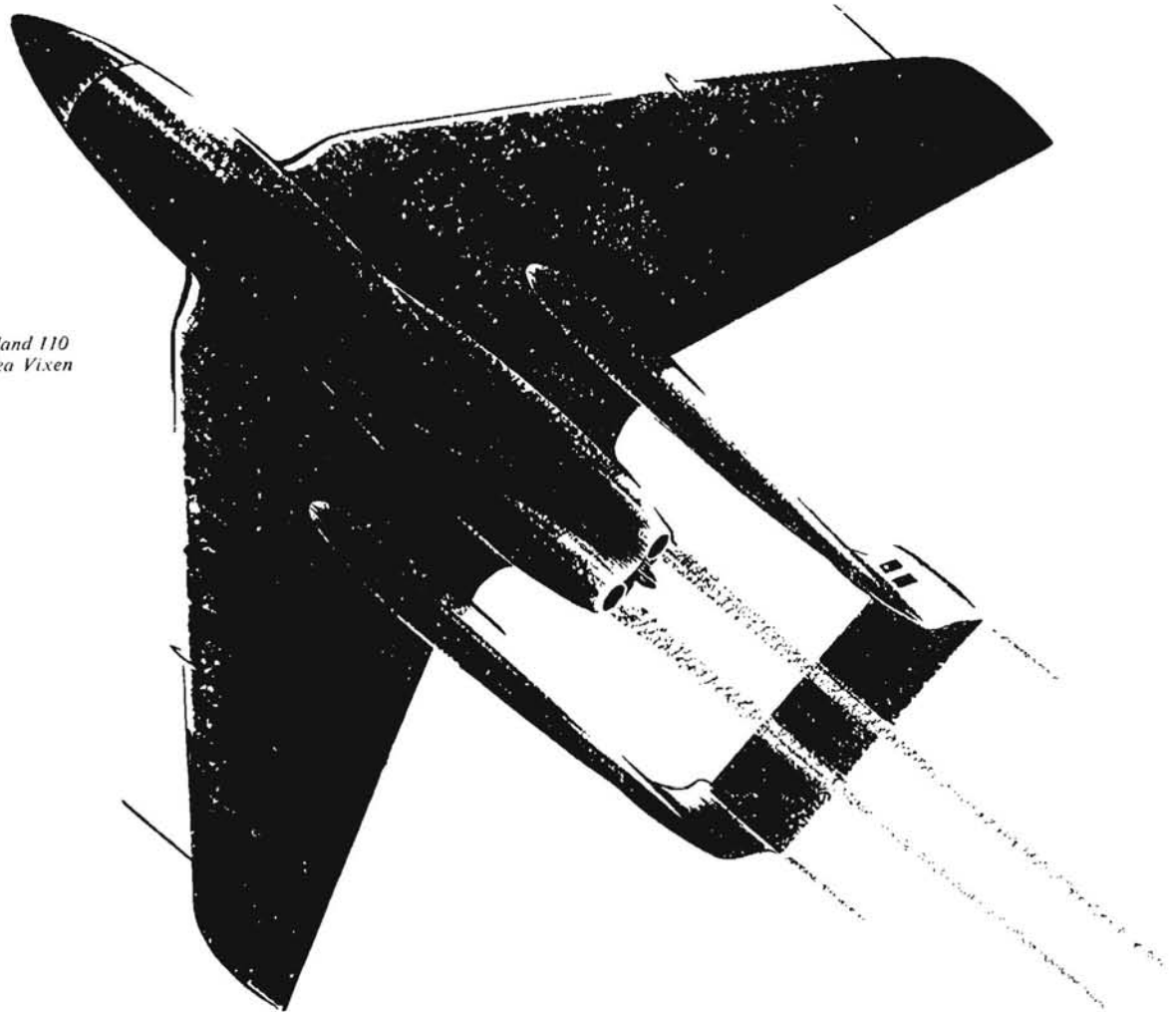
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