

THE INTER



SERVICES

# AIRCRAFT RECOGNITION

*Journal*



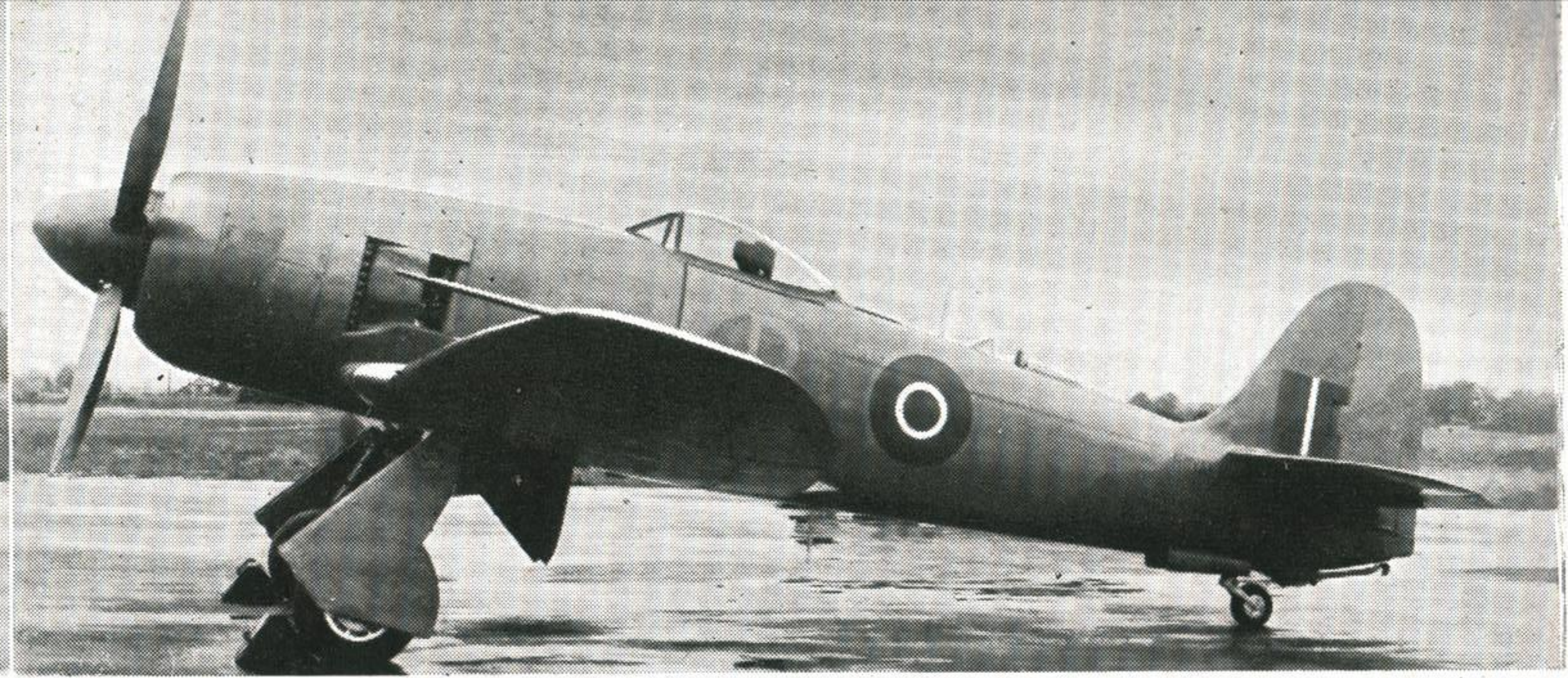
New Series

OCTOBER 1946

Volume I. No. 4



**HAWKER FURY F.Mk.I** (Napier Sabre VII, 3,000 h.p. plus)—Leading edge "slot" type radiators reduce frontal area and permit neater and closer engine cowling.



**HAWKER SEA FURY F.Mk.X** (Bristol Centaurus XVIII, 2,400 h.p.)—A large spinner minimises the effect of the blunt motor cowling: note the detail differences between this Naval fighter and the R.A.F. Fury.



**SUPERMARINE SEAFIRE F.Mk.47** (Rolls Royce Griffon 88, 2,050 h.p.)—Embodying lessons of Seafire 45 and 46, the wing fold is now outside the cannon.



**SUPERMARINE SEAFANG F.Mk.32** (Rolls Royce Griffon 69, 1,540 h.p.)—Differs from Seafires in its angular wing, shallow radiators, inward-retracting wheels, and larger tailplane.



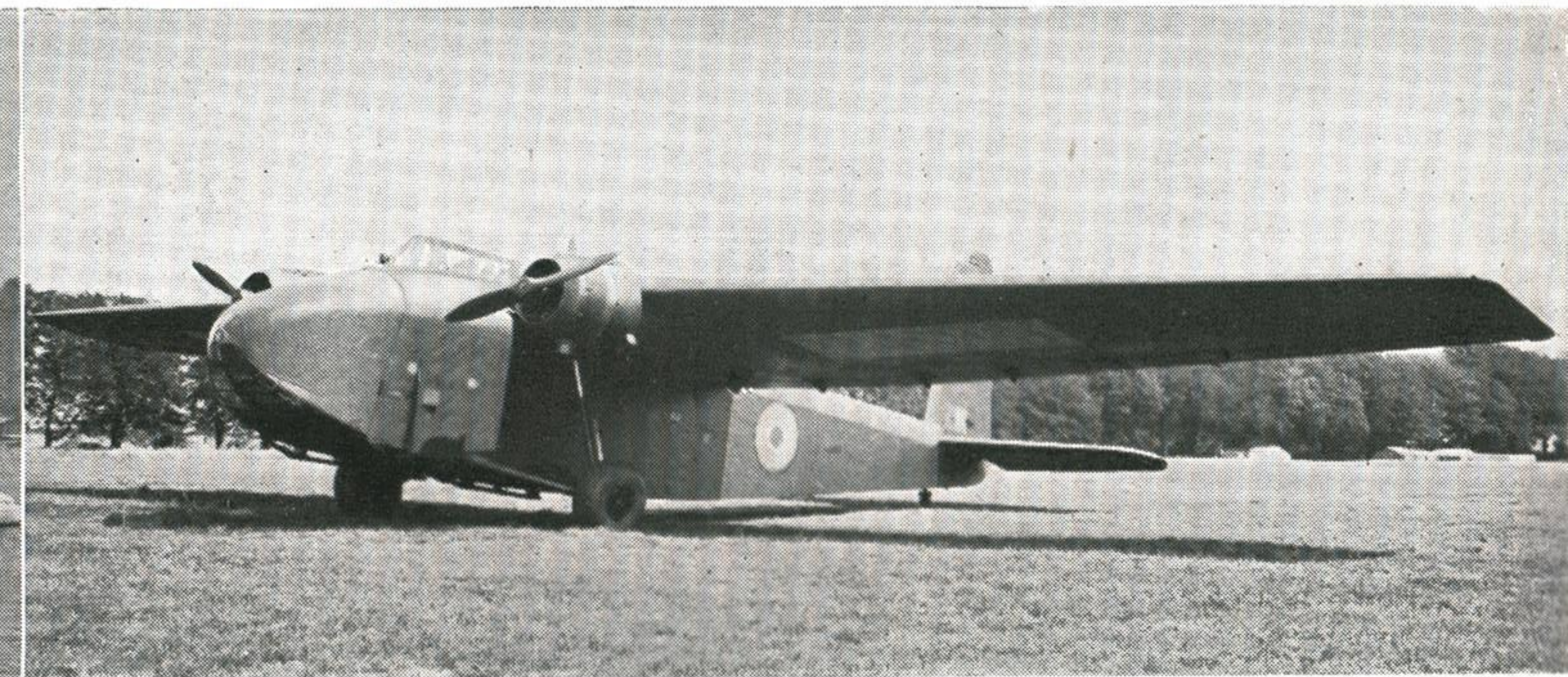
**AUSTER Mk. VI** (D.H. Gipsy Major VII, 142 h.p.)—A taller undercarriage, slightly revised cabin and large, projecting flaps distinguish this model of the Auster.



**MILES MONITOR T.T. Mk. II** (Wright Cyclones, 1,750 h.p.)—This mark of Monitor target tug for the Navy differs from the R.A.F.'s Mk. I in its naval equipment, dive brakes and a different cupola.



**SHORT SEAFORD Mk.I** (Bristol Hercules XVII, 1,740 h.p.)—Originally the Sunderland IV; has enlarged fin and rudder and a longer rear step, among other things. Civilianized, it is the Solent.



**GENERAL AIRCRAFT HAMILCAR Mk. X** (Bristol Mercury 31, 965 h.p.)—This powered glider carries 21,500 lb. in towed flight, 7,000 lb. in solo flight. A few are flying in this country.

**P** Prototypes



THE INTER



SERVICES

# AIRCRAFT RECOGNITION JOURNAL

(NEW SERIES)

## DID YOU KNOW . . . ?

The **Boulton Paul P.108**, built to T.7/45 specification, is the R.A.F.'s first prop-jet trainer and has a Rolls-Royce Dart engine, with the jet outlet from the lower starboard rear fuselage. Seating is provided for instructor, pupil and passenger. An indication of its Naval possibilities is the inclusion of folding wings and an arrester hook. Span 39 ft. 4 in., length 34 ft. 4 in.

The **Tudor I** is now flying with the modified fin and rudder as on the Tudor II.

The new **Vickers-Armstrongs Supermarine E.10/44** jet fighter, which uses the Spiteful wings, armament and undercarriage, made its first flight on 27th July, powered by a Rolls-Royce Nene. Span 36 ft. 11 in., length 37 ft. 4 in.

Built to the same specification as the Vickers V.C.2 mentioned in the August issue, the **Armstrong Whitworth Brabazon IIB** will be a 24/30 passenger, low wing transport, powered by four Armstrong Siddeley Mamba prop-jets. Loaded weight 35,000lb.

Current **Martin** activities include guided missile research; design of a new U.S. Army transport to carry 136 fully equipped troops, using the JRM-1 Mars wing and engine installation; and the construction of the XB-48, a six-jet heavy bomber.

The **Northrop XB-49** is a development of the XB-35 all-wing bomber—or "Flying Salami", as the Americans call it. The XB-49 will have four jets giving a total of some 10,000 lb. static thrust, instead of the 3650 h.p. Wasp Majors of the XB-35. Fifteen of the latter are being built at Northrop's factory at Hawthorne, California. Northrop engineers say that this bomber is expected to have twenty-five per cent better range and load and will travel "substantially faster" than a comparable aeroplane of orthodox design.

France continues to press on with the production of numerous prototypes of civil aircraft, both light and medium, as well as some heavier stuff. Many of these will be seen at the Paris

Aero Show in November. We hope to publish pictures and information concerning French activities in the near future.

**Republic** have three new jobs on the way—the Landbee, a landplane version of the Seabee amphibian; the Twinbee, a twin-engined, five-passenger monoplane; and the Beebee, a 2-seater trainer.

The **Bell XS-1** supersonic aircraft has been flown, but apparently only as a glider. With power, it is expected to fly at 80,000 ft. The pilot has a special pressure suit, resembling the Michelin man.

At an Air Display near Moscow, the following aircraft, among others, took part:—YAK-3, LA-5, PO-2 biplane, TU-2, PE-3, IL-2. Also on view was a helicopter and the new **Iliuchin IL-12**, a 2-engine transport in the same class as our Viking.

The **Douglas AD-1 Skyraider** is in production for the U.S. Navy. A carrier-based dive-bomber, it is a single-seat, low-wing monoplane powered by a 3650 h.p. Pratt and Whitney Wasp Major R-4360 motor. Span 50 ft., length 39 ft. 4 in.

**Ayrshire** is the name given to the R.A.F. transport version of the Airspeed Ambassador. It differs in having large doors opening upwards and in its internal layout.

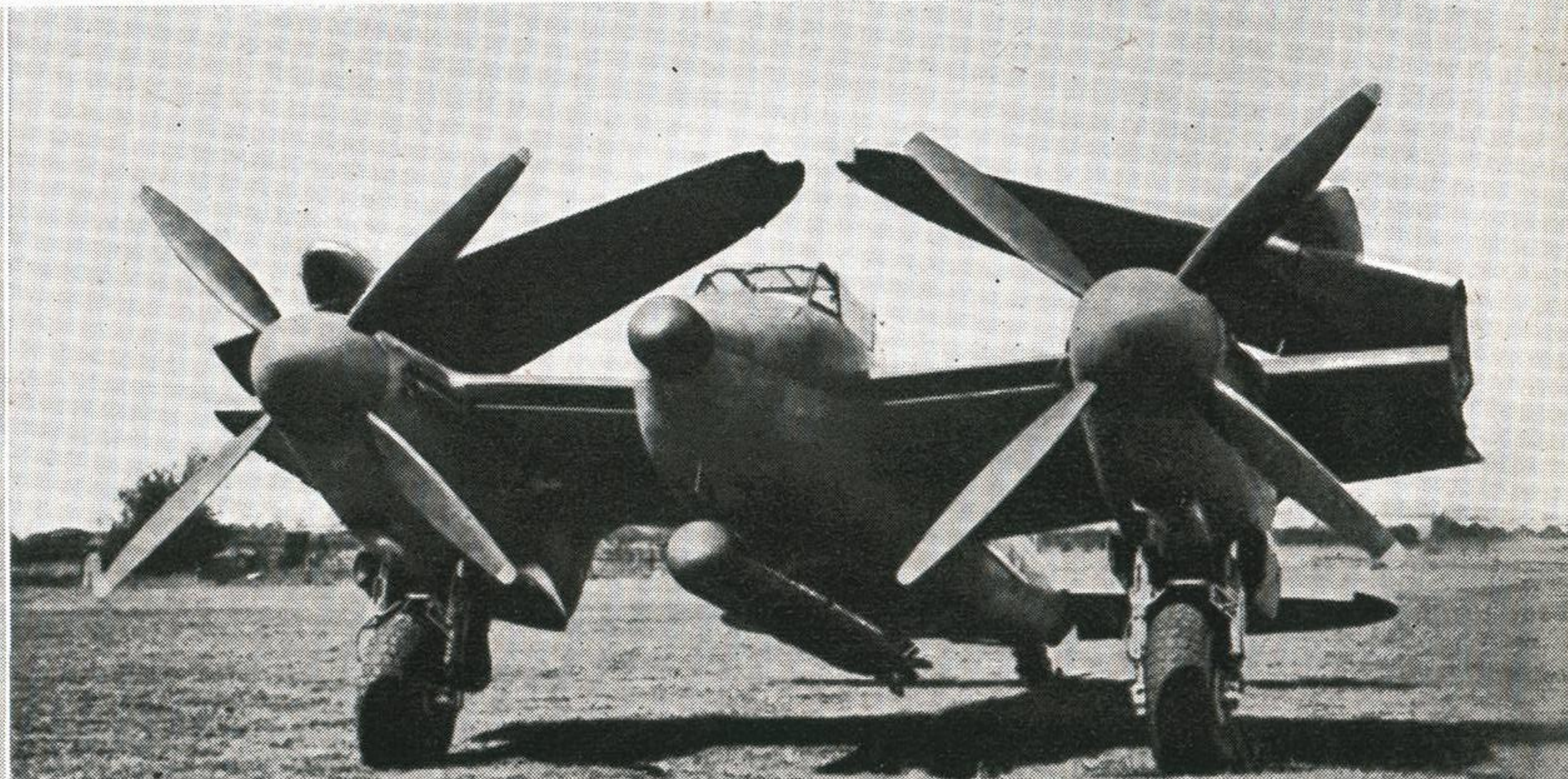
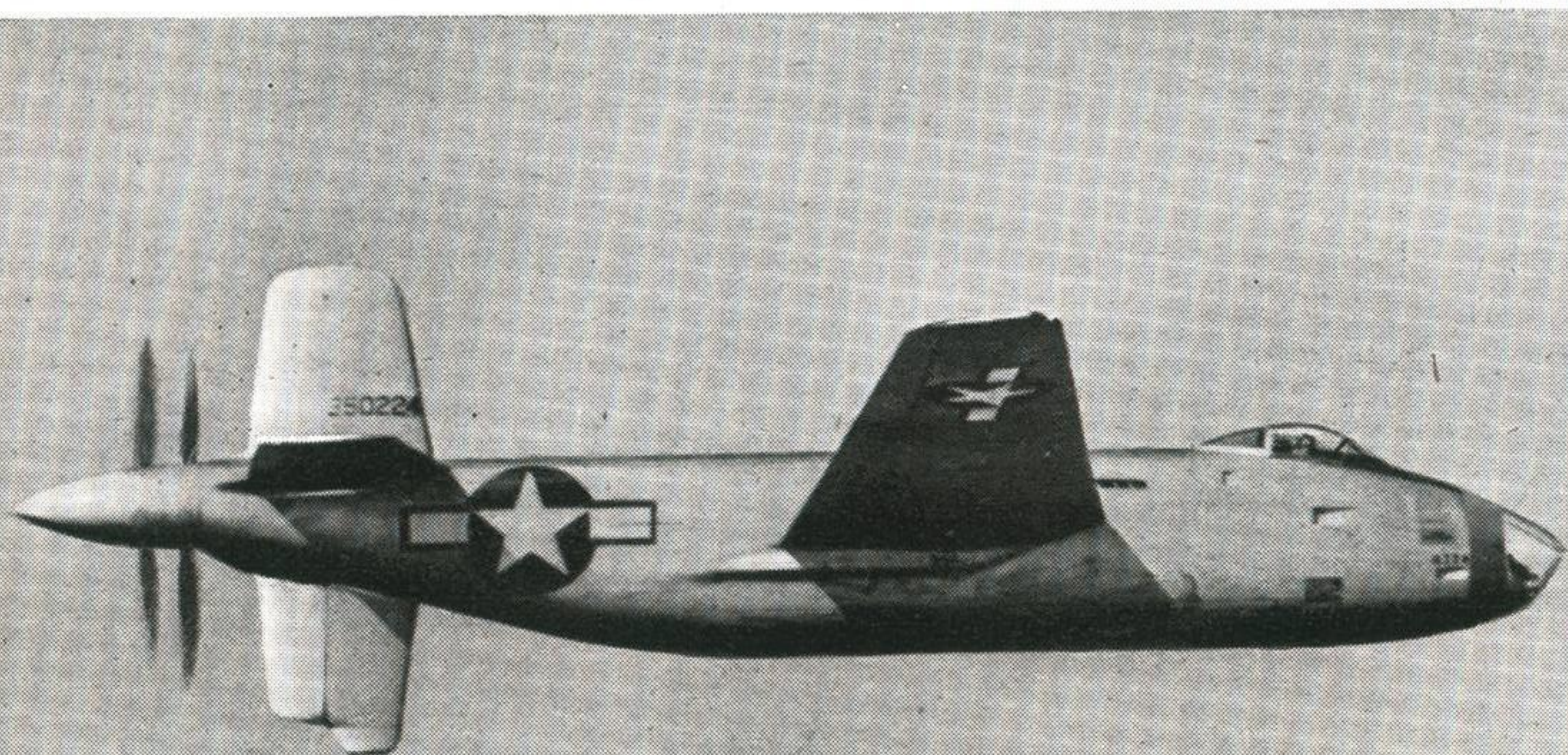
**Napiers** have produced a novel form of spinner for a special test-bed Tempest. The spinner covers the whole of the front of the engine but it has a large opening in front to permit air to be driven through the radiators.

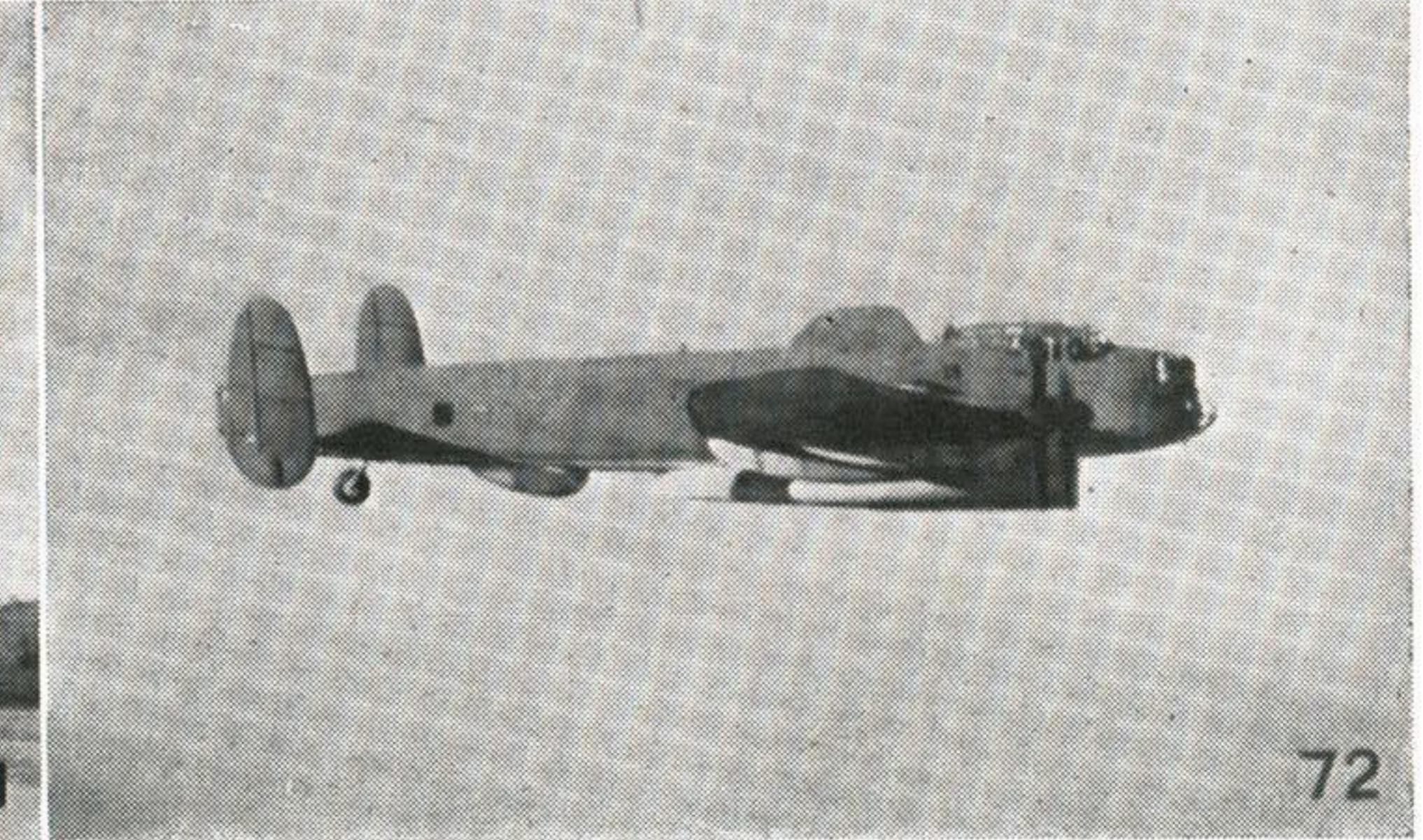
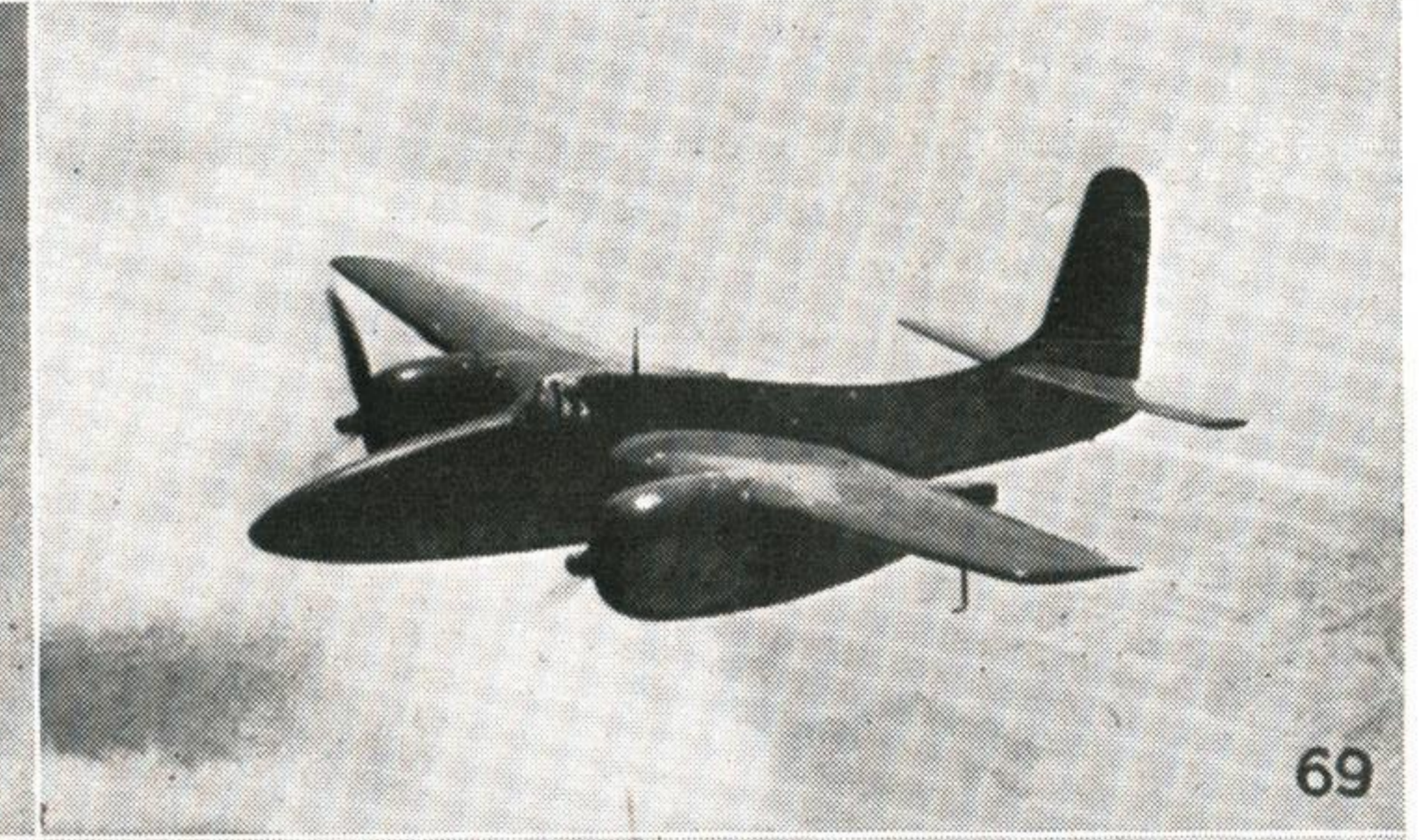
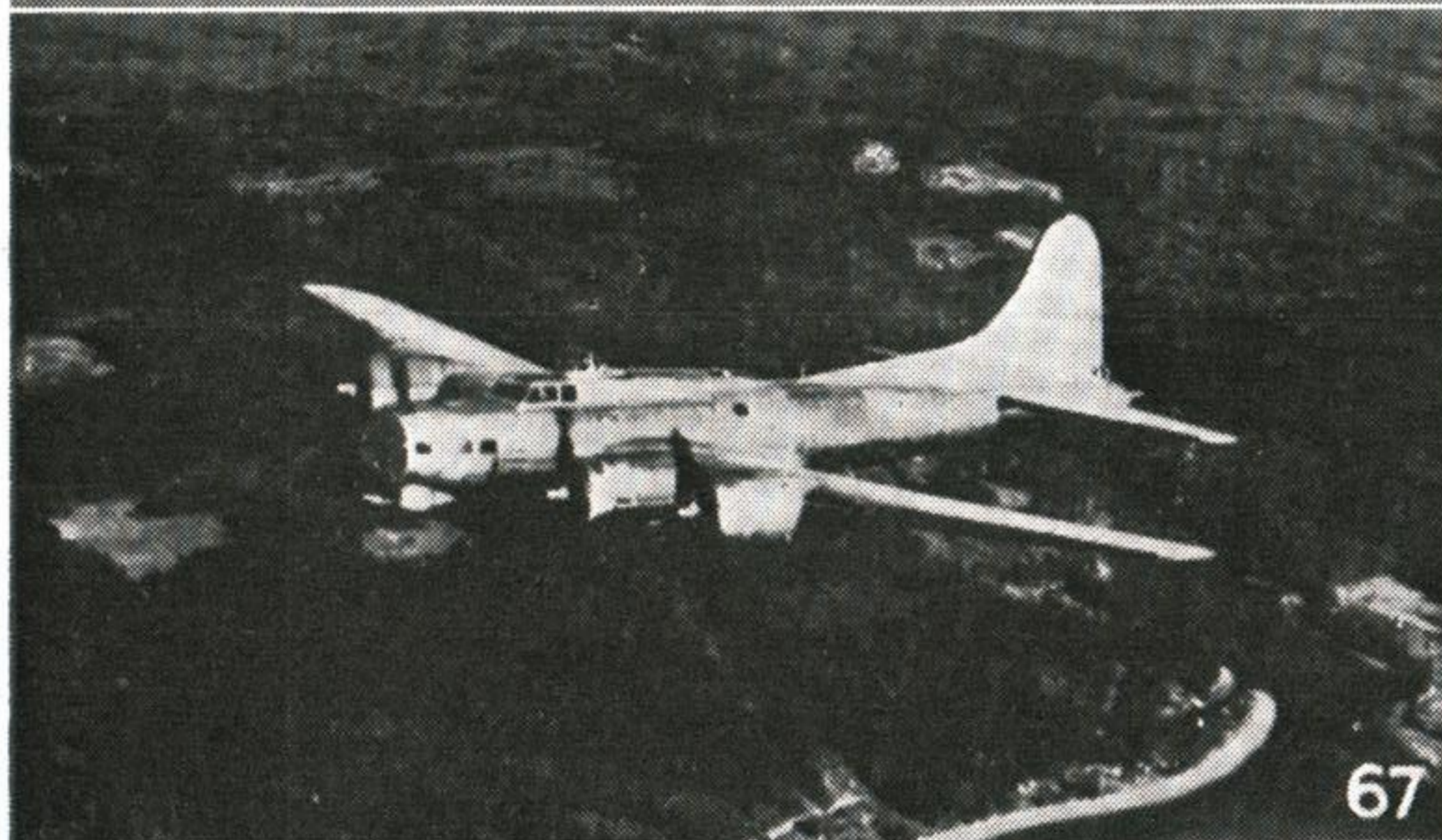
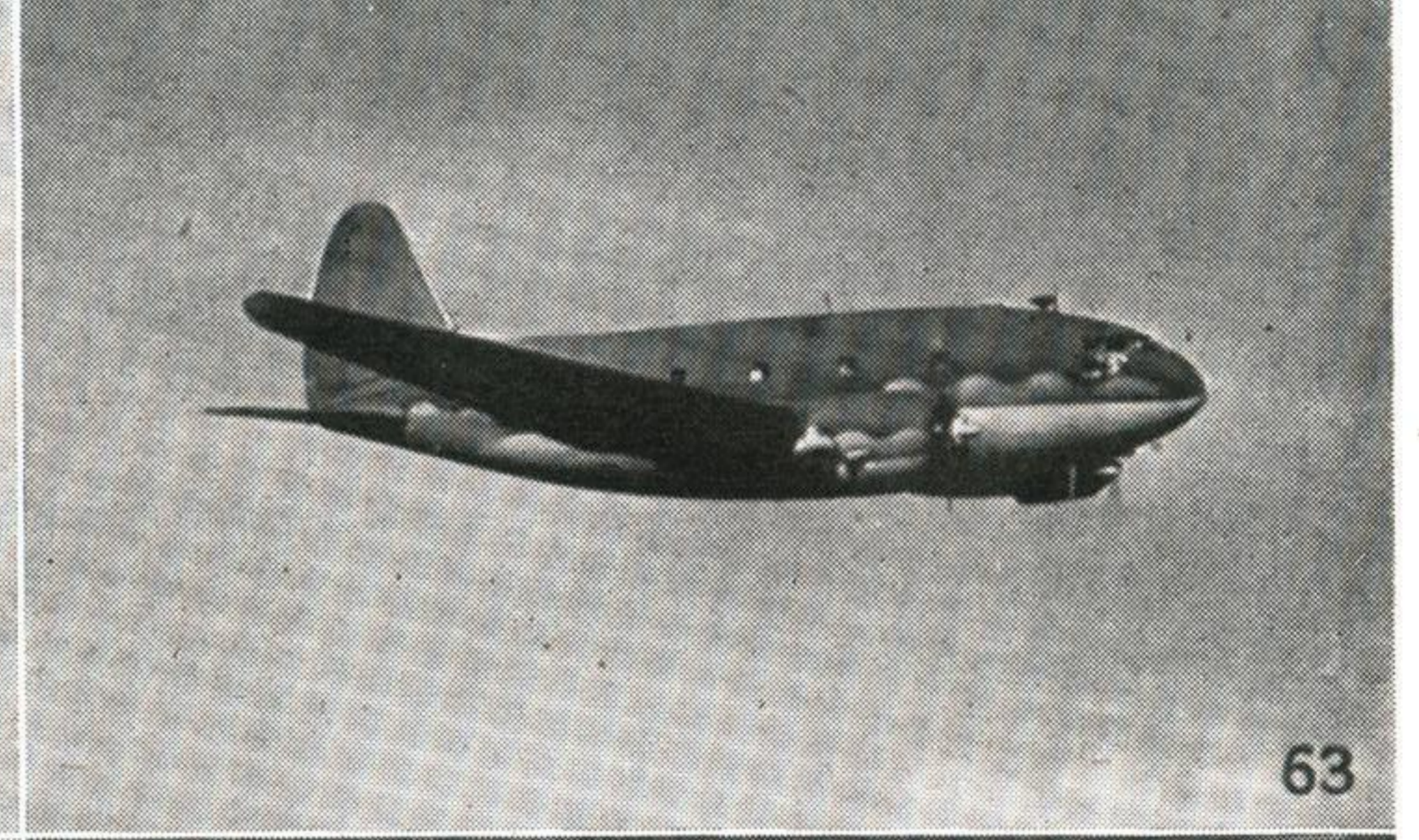
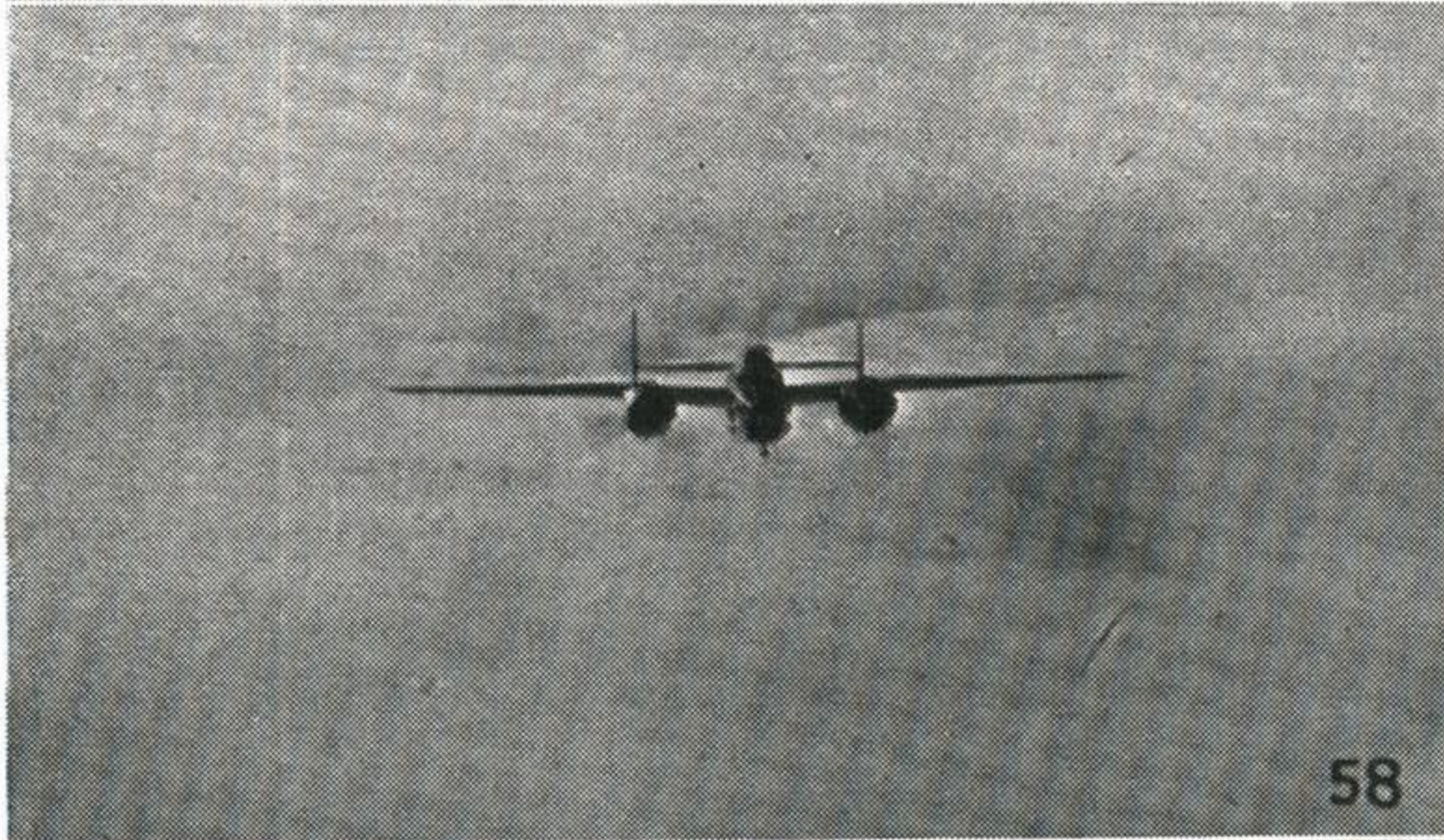
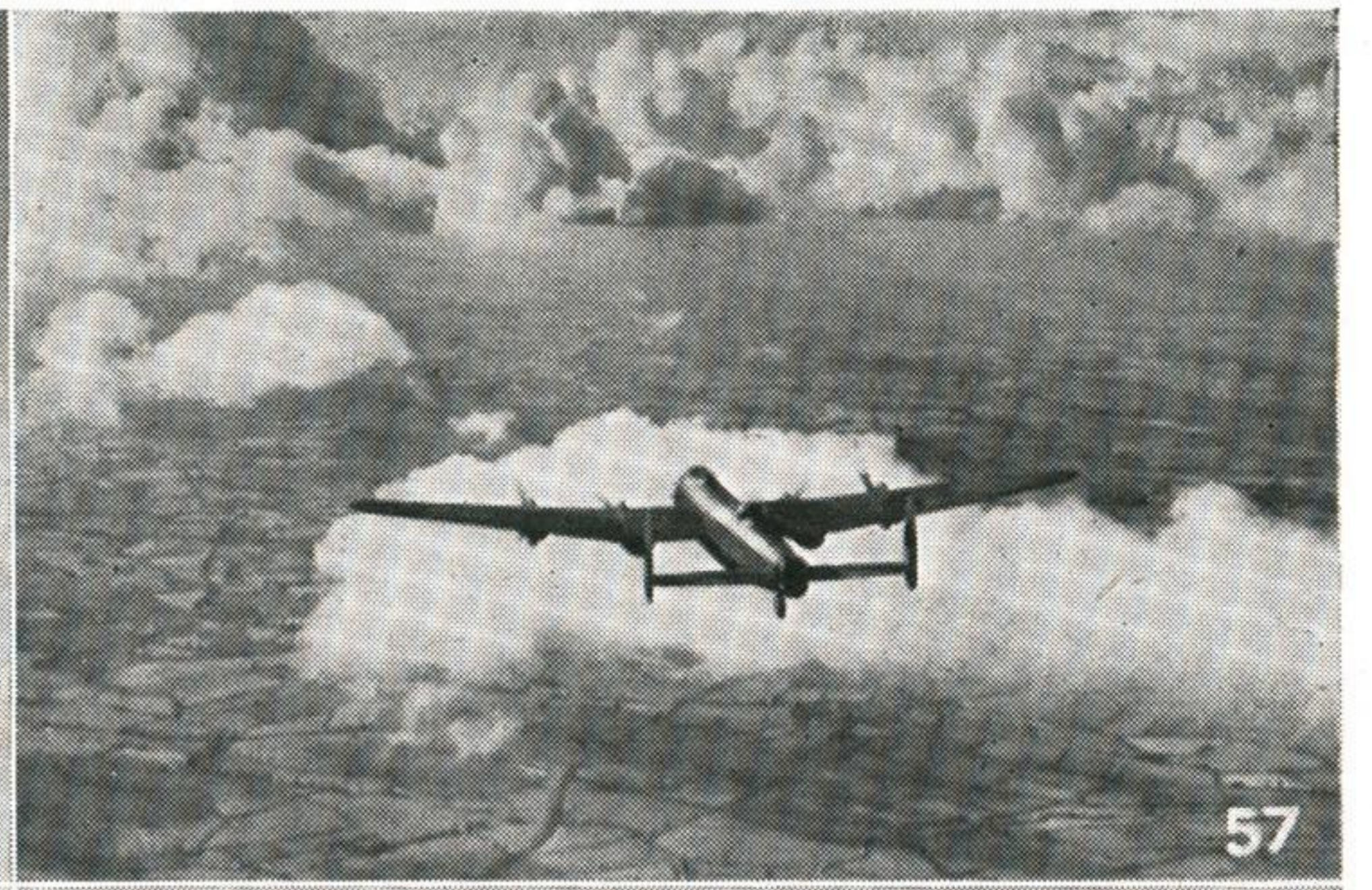
A **General Aircraft** project is a high wing, four engine transport called the **Universal**. In appearance it could be said to resemble the Miles Aerovan except that it is longer, has twin fins and rudder and is more angular.

The terms "Fleet Air Arm" and "Naval Air Arm" have been replaced by the term "**Naval Aviation**" according to a recent Admiralty ruling.

**Douglas XB-42 "Mixmaster"** (2 Allison V-3420 W-type motors, 2600 h.p. each)—This "bug-eye" version of an unorthodox aeroplane is another example of the variety of layouts which add interest to Aircraft Recognition. The XB-42A has a normal 2-seat cabin.

**De Havilland Sea Mosquito T.R. Mk. 33** (Rolls Royce Merlin 25, 1635 h.p.)—A naval development of the F.B. Mk. VI Mosquito, the Sea Mossie has a nose radome, the inevitable hook, and Rocket Assisted Take-Off Gear (RATOG to you).





**ELEMENTARY SPOTTING**

# THE Yak-3

by Flight Lieutenant J. B. POW

WHEN this flyweight fighter was designed, the most powerful engine available was one which developed only 1300 h.p.—the M.105. One can begin to appreciate, therefore, the problems confronting Engineer Lieutenant-General Yakovlev in his task of producing a fighter comparable with the Focke Wulf Fw 190.

Wooden construction and almost total lack of armour protection, aided by the scantiness of radio and other equipment (all somewhat primitive, by our standards) resulted in the lightest fighter of the war, while the span of 31 feet, when compared with the Hurricane's 40 feet and the 35 feet of the Fw 190, demonstrates still further how the designer compensated for lack of engine power.

Another major influence on design—applying to most Russian aircraft—was the simplicity of maintenance demanded by Eastern Front conditions, while the notoriously low technical ability of Russian mechanics must have given the designer much food for thought.

Suitability for easy mass production by highly unskilled workers was another factor which had to be considered, and here again there is little doubt that Yakovlev was very successful.

From remarks made by experienced pilots, the YAK-3 appears to be an easy machine to fly—a rather necessary quality, considering the limited training of the average Russian fighter pilot.

Like most wartime Soviet aircraft, the YAK-3 had a poor performance at altitude, but the tactical role of the Red Air Fleet rendered this less of a handicap than might at first be imagined, while the manoeuvrability of this diminutive fighter served to compensate for an obvious vulnerability; indeed, it is claimed that in combat below 16,000 feet, the YAK-3 was more than a match for the Fw 190s and Me 109s normally encountered.

In the absence of fighter opposition—an increasingly prevalent condition as the war drew to a close—YAK-3s switched to ground attack in support of the IL-2s and PE-2s normally escorted.

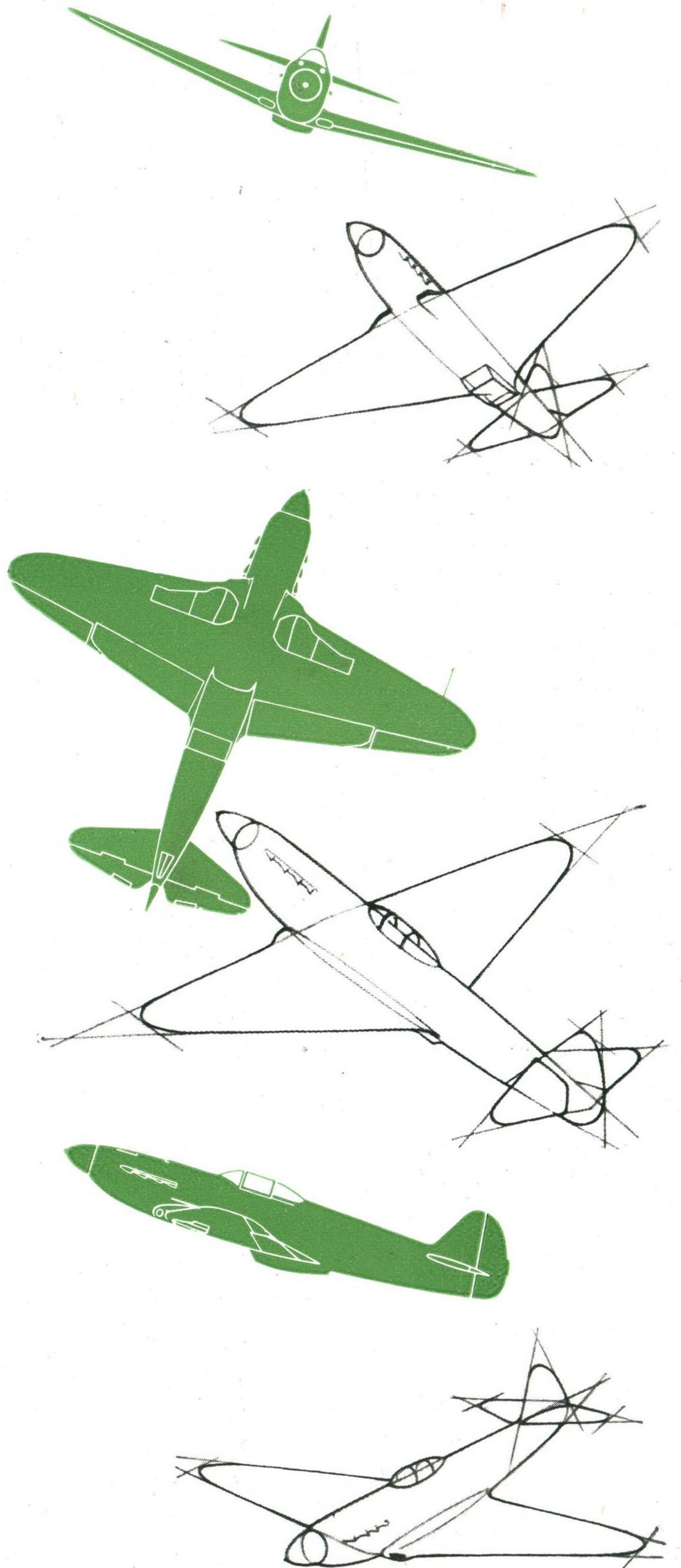
The French "Normandie" Squadron, which operated on the Eastern front during the war, has been presented with the YAK-3s it flew, and these are now with the French Air Force.

The 12-cylinder upright Vee engine—of Hispano Suiza design, built in Russia under licence—carries the rather light armament. A 20 m.m. cannon, mounted between the cylinder banks, fires through the propeller hub, while two synchronized machine guns, on top of the fuselage nose, fire through the propeller disc.

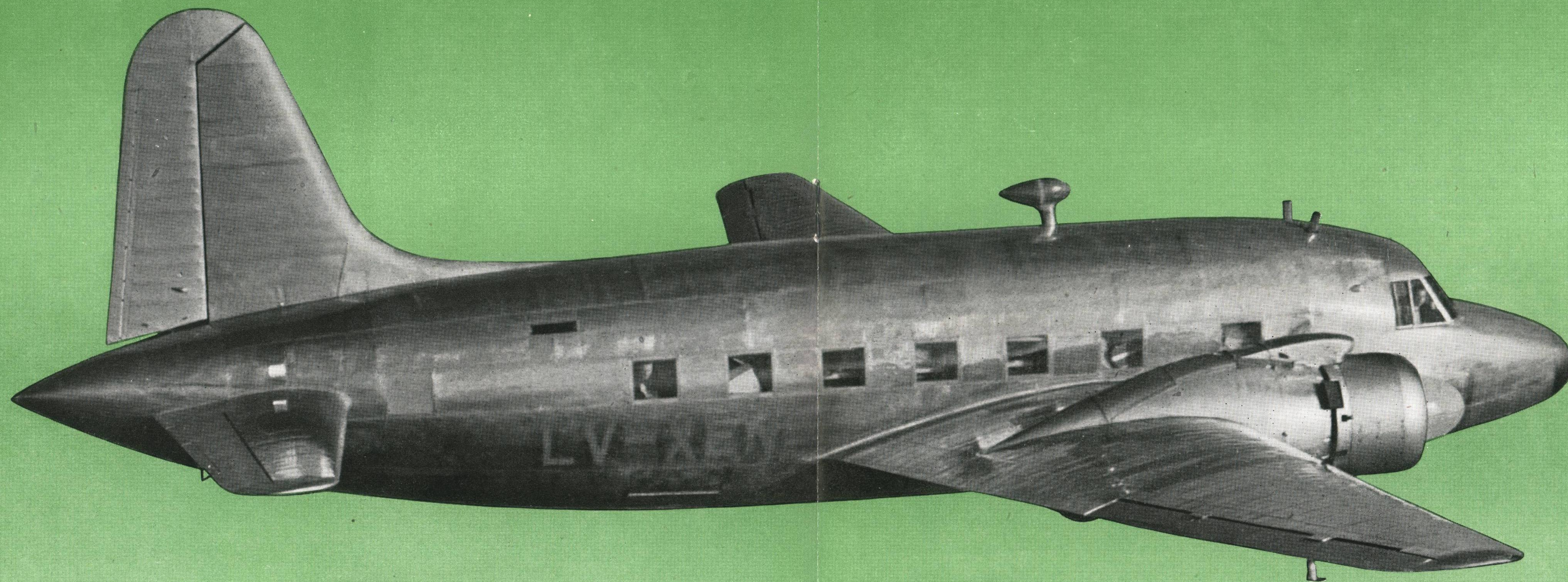
The performance of the YAK-3 is enhanced by highly polished surfaces, maximum speed being in the region of 360 m.p.h.

Good photographs and reliable information concerning Russian aircraft are not often available—when they are we shall publish them.

We present on this page an accurate and informative article on a fighter, which, although obsolescent by our standards, is a typical Russian aircraft of its class.



The French "Normandie" Squadron operated with the Russians on the Eastern Front during the war. Above is one of their Yak-3s which the Russians have presented to them. This Squadron now forms part of the French Air Force.



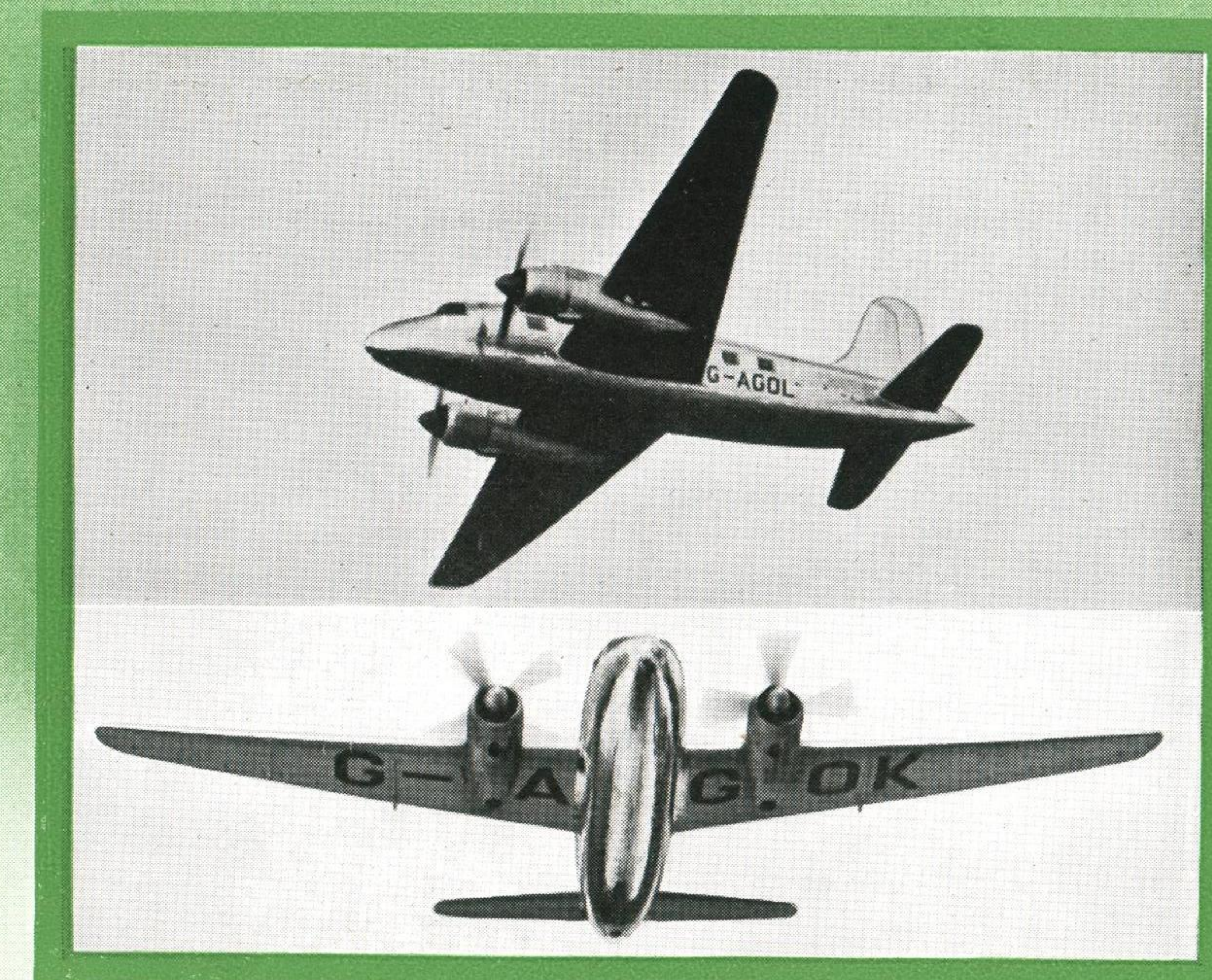
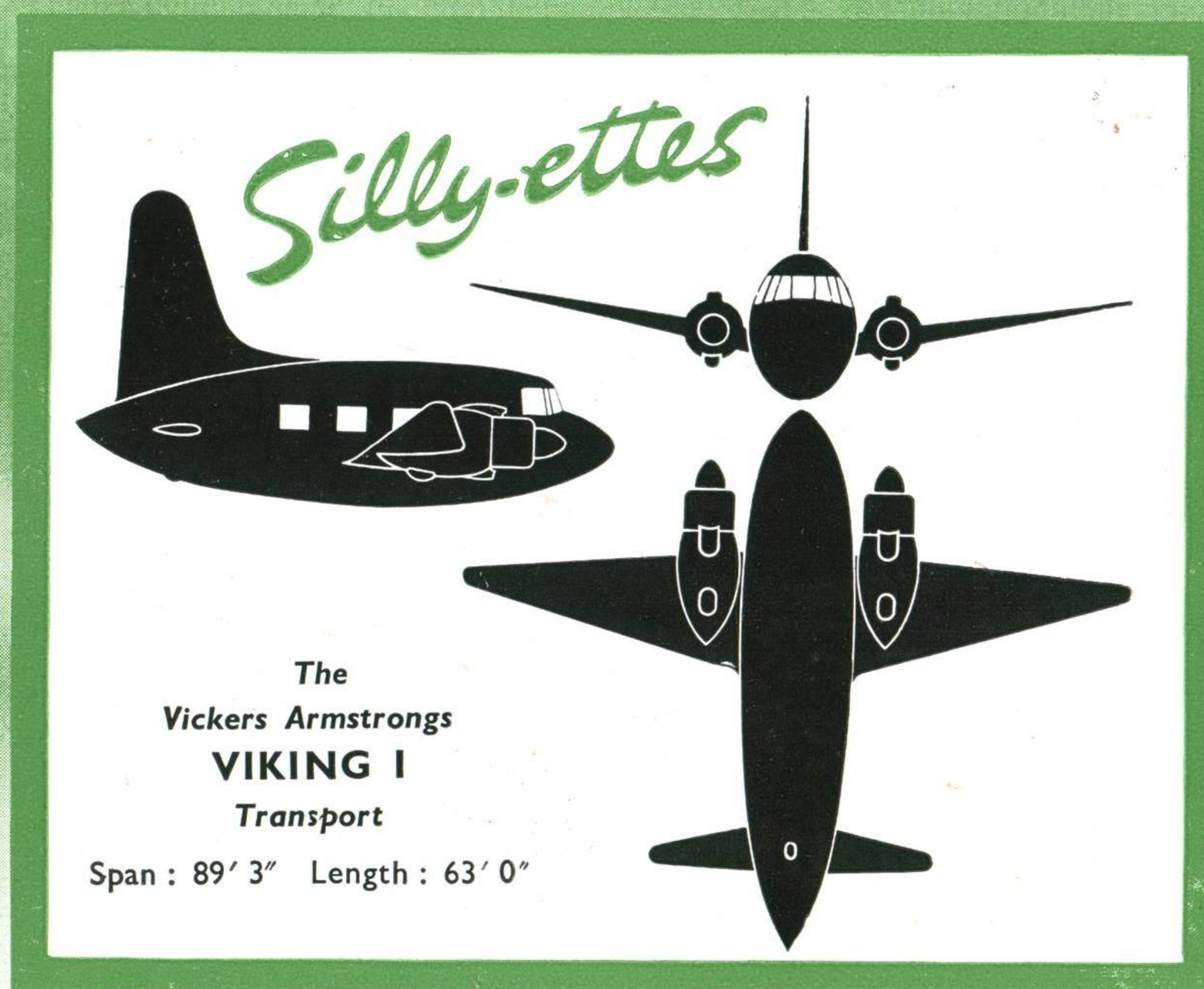
# VIKING

VICKERS ARMSTRONGS

**T**HE VIKING, in various forms, is being built in considerable numbers for the R.A.F., the King's Flight, B.O.A.C., B.E.A. and many foreign air lines. It is also proposed to use it for certain specialized functions.

The first twenty were produced with geodetic flying surfaces but the more normal stressed-skin form of structure was used thereafter. As with most aircraft, prototype tests resulted in minor modifications, including larger fin area and a 3 inch wider tailplane. Bristol Hercules 634 motors now replace the Hercules 130s originally fitted. Some Vikings have a slightly longer nose—28 inches—increasing the 21-24 seats to 27. In its various forms, it has the Vickers-Armstrongs designation of V.C.1 (Vickers Commercial). A jet-powered version, conforming to the Brabazon IIB specification, will be known as the V.C.2.

In all its forms, the Viking retains the same basic recognition features. It will be used widely, both for civil and military purposes, so you spotters should know the Viking at a glance.

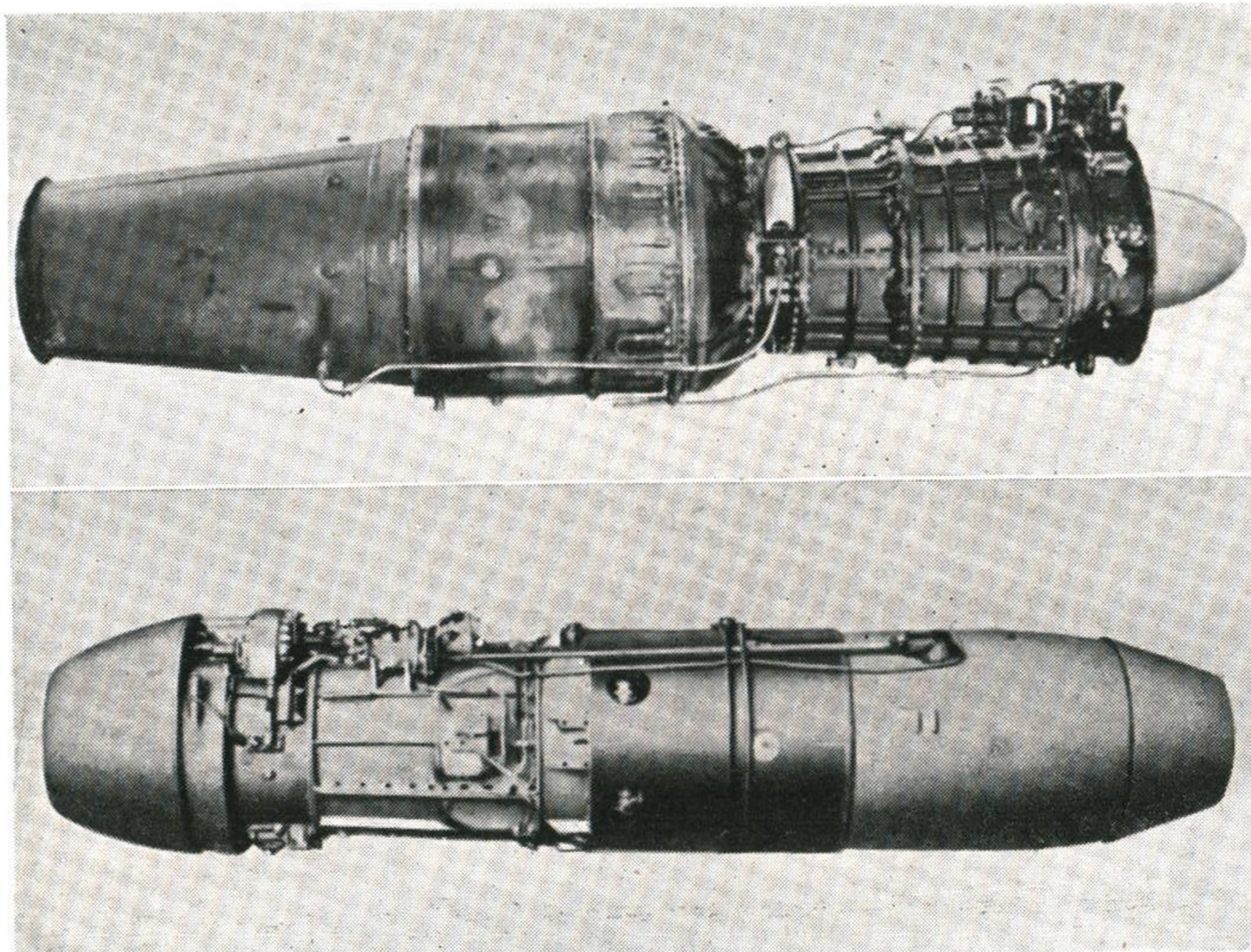


# INSPIRED DEVELOPMENT

by Flight Lieutenant W. J. BRETT

**T**HERE is no doubt that the Luftwaffe was decisively beaten by the superiority of men and machines of the Allies. However, it is interesting to observe that many technical ideas and developments, on which German technicians did the spade work and used in combat on their aircraft and engines, have since been put to good account by the Allies themselves. Of course, some of the ideas were being developed along parallel lines in this country, but to the Germans must go the credit for initial exploitation and development to an operational standard.

It is generally acknowledged that Germany was ahead of us in the turbo-jet field, not perhaps in actual performance, but at least in the production of turbo-jet units, and their operational application. Germany subordinated even performance to ease of production in an effort to obtain quick technical superiority in the later stages of the war.

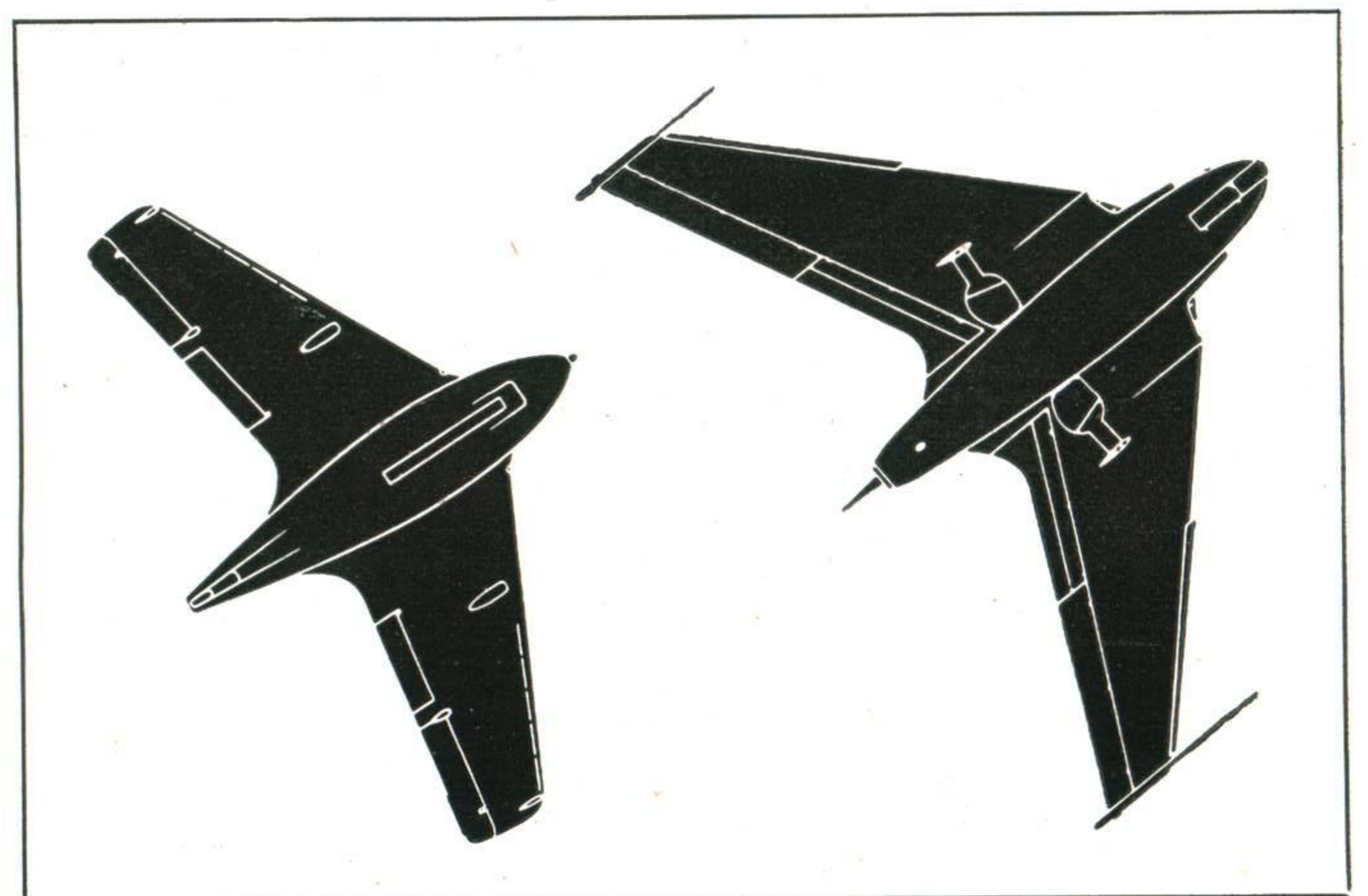


**Axial Flow Turbo-Jet Units**—(above) The Metropolitan-Vickers F2 and (below) the Junkers Jumo 004.

The German technicians decided upon an axial compressor for their turbo-jet units from the outset and, to quote one example, the axial-flow P 3302, the forerunner of the BMW 003, first flew in June 1941. It is certain that we shall soon have to concentrate on the axial compressor if we are to increase thrust above the present values. The Metropolitan Vickers Company, in the design of their F2 Series I and IV turbo-jet units, have already decided upon an axial compressor, and no doubt other firms will follow suit. Their F2 Series I was the first British axial-flow unit to fly, which it did on June 29th, 1943, installed in a Lancaster. Already the Saunders-Roe fighter flying boat has been announced, powered by two Metro-Vickers axial-flow turbo-jet units. The Westinghouse Company of America is also concentrating on the design and manufacture of axial-flow compressors, and the McDonnell FD-1 (Phantom) is now fitted with two of their turbo-jet units.

Leading British technicians have paid tribute to German supersonic research, especially in relation to swept-back

wings for high speed flight. An early German example of the swept-back wing theory is the DFS 194 experimental reaction-propelled aircraft which was designed in 1937 and flew in 1940, attaining a speed of 340 m.p.h. This aircraft was the forerunner of the well-known Me 163 liquid rocket-propelled aircraft which is reliably credited with a speed of 620 m.p.h. at 13,000 feet during test flights. The swept-back wing for high-speed flight is now becoming generally accepted, and recent examples of this trend are the D.H. 108 jet-propelled experimental aircraft and the Bell L-39 (modified P-63) aircraft for high-speed research.



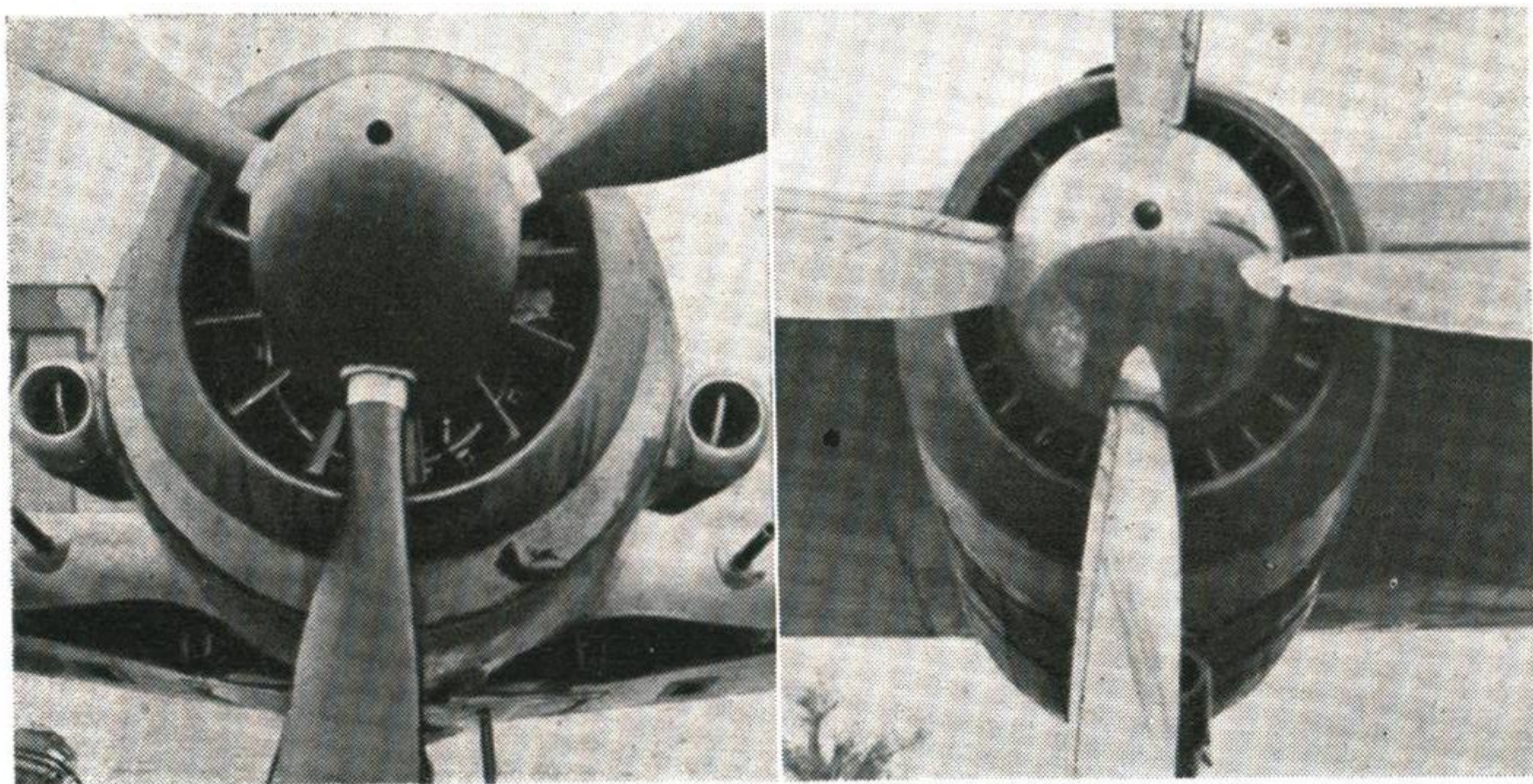
**Supersonically swept back**—The Messerschmitt Me 163B fighter and (right) the de Havilland D.H. 108 experimental tail-less type

One outstanding achievement of the Germans, which had no parallel in any other country, was the development to operational status of the bi-fuel rocket unit for aircraft propulsion, notably the HWK 509 unit installed in the Me 163B. This unit enabled the Me 163B to climb to 30,000 ft. in 2.6 minutes, an amazing performance judged by any of the standards prevailing in 1944. The liquid rocket unit was scheduled for installation in many other home-defence aircraft such as the Me 263, the Junkers EF 127 and the Bachem BP 20 Natter (Viper) target defence interceptor. In this country the liquid-rocket unit, using the German fuels, is being utilized for supersonic research. It is installed in the Vickers research model which is a scaled down version of the Miles M.52. The model is to be carried up to 36,000 feet by a Mosquito, and a speed of 880 m.p.h. 70 seconds after release is hoped for.

On April 30th, 1939, Flugkapitan Wendel, flying an Me 109R, powered by a DB 601 12-cylinder liquid-cooled inverted-vee engine, captured the world's speed record by attaining 469.2 m.p.h. It is not generally known that this speed was made possible by injecting methanol mixture into the supercharger of the engine. This injection system was used by the Germans during the war to obtain short periods of increased power, at first on the Me 109G with a DB 605AM engine, and later it became a standard fitment for fighter aircraft. Most of our latest piston-engined fighter

aircraft are now equipped with methanol injection, in particular, the Hawker Fury Mk. I with a Napier Sabre Series VII engine. The Americans used water injection in 1943 on the Pratt & Whitney R2800 engine, and to-day the R4360 28-cylinder Wasp Major is fitted with a methanol injection system.

The Fw 190A, the radial-engined German fighter, caused some astonishment by its excellent performance when it appeared at the beginning of 1942. Its close-cowled BMW 801 14-cylinder air-cooled radial engine was extremely neat in appearance, and provided with an engine-driven cooling fan to accelerate the cooling air over the cylinders. The fan was an entirely new departure in radial engine design. The fan-cooled BMW 139 engine, the immediate predecessor of the BMW 801, was ready to be tested at the outbreak of the war, and the BMW 801, with the cooling fan as standard fitment, was used throughout the period of hostilities. Towards the end of the war some



**Fan assisted cooling**—(left) the B.M.W. 801 and (right) the Bristol Hercules, fitted with the Rotol cooling fan, in the Wayfarer.

of our aircraft appeared with radial engines complete with cooling fans, and the Americans also developed the idea. Several of our latest aircraft, among which are the Shetland (Centaurus 11), Bristol 170 (Hercules 131), Warwick C Mark III (Sabre VI), Hastings (Hercules 101) and the Seaford (Hercules XX) now have this refinement.

Throughout the war the Germans utilized annular coolant and oil radiators. The radiators were mounted around the reduction gear of the engines, and the engines, when cowled, were often mistaken for radial engines. The Ju 88A aircraft, introduced at the end of 1939, was fitted with annular nose radiators to the Jumo 211 12-cylinder engines, and this system became almost standard German practice. The He 177 (2 × DB 610 engines), Fw 190 D-9 (Jumo 213A), Ta 152H (Jumo 213E), Ju 88 G-2 (2 × Jumo 213), Ju 188 G-2 (2 × Jumo 213A), Ta 154 (2 × Jumo 213A), Ar 240 (2 × DB 603), He 219 (2 × DB 603) and the Do 335 tandem motored fighter (2 × DB 603E) are some outstanding examples of aircraft with the annular radiator arrangement. The Hawker Tempest, recently fitted with annular radiators, gained approximately 14 m.p.h., when this arrangement was adopted for the Napier Sabre VI engine.

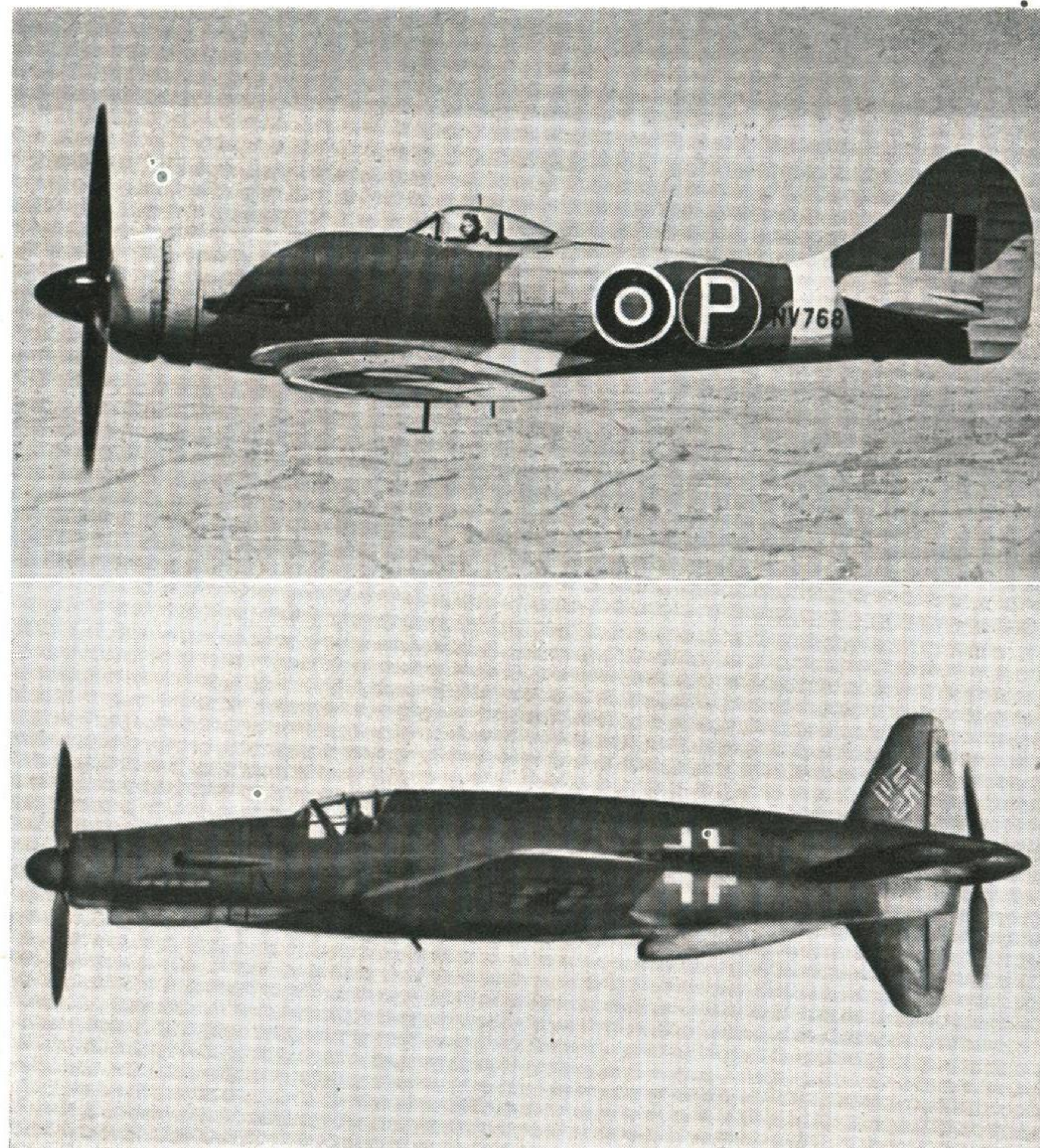
Before the late war, Germany acquired the licence to build the 9-cylinder radial Pratt & Whitney "Hornet". This engine was developed by the Germans and was eventually designated the BMW 132. One of the more important refinements was the employment of individual cylinder fuel injection and from that time onwards the carburettor was discarded on German high-performance engines. The engine which powered the record breaking

aircraft of 1939 had direct fuel injection. We ourselves are now gradually discarding the carburettor, replacing it at the moment with fuel injection into the eye of the supercharger (Merlin 620 and Gipsy-Queen 71), but there is no doubt that direct fuel injection will ultimately be used. The direct injection system has some advantages, one of which is reduction of fire risk, an important feature for civil aircraft.

High speed flight brought its own peculiar problems, apart from the aerodynamics involved. One of these was the baling-out of pilots in high speed flight, and for this purpose the Germans evolved the catapult seat which ejected pilot, parachute and seat out of the aircraft at the pull of a lever. By the end of the war this system had been installed in at least two operational aircraft, the He 219, He 162, and in other aircraft which were about to become operational, such as the Do 335. In the Do 335 aircraft the need for a catapult seat was dictated not only by its high speed, but also by the presence of a rear propeller. Several British firms are now considering fitting catapult seats to their high speed aircraft.

It is evident, then, that German technicians have contributed many excellent items to the science of aeronautics, items of which we, not unnaturally, are making good use. The tendency has been to disparage any German development simply by arguing on the lines that as we won the war there can be little to learn from them, but it has been shown that we are indebted to the German technician for many ideas, not all of which have been mentioned here.

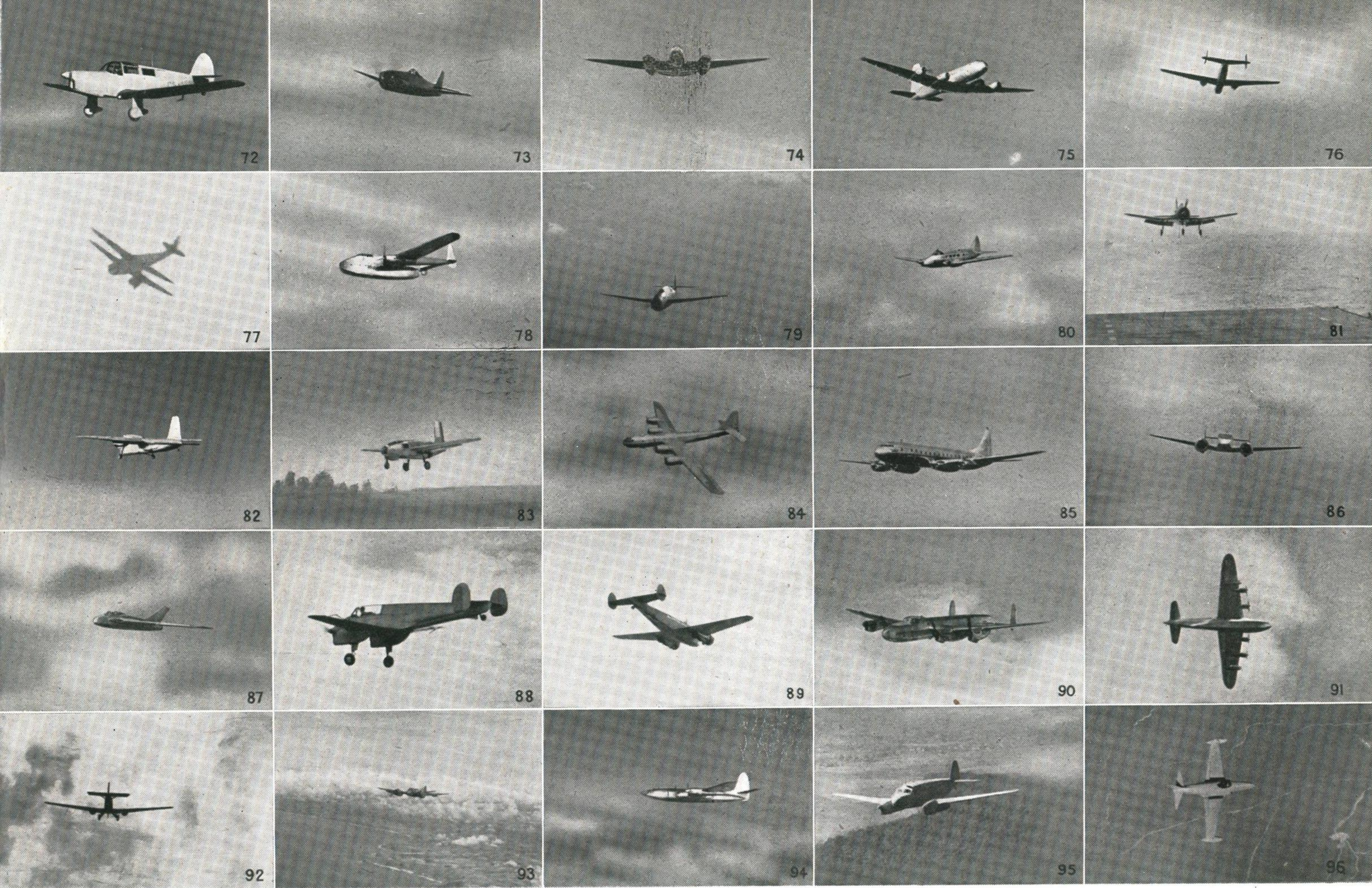
On the other hand, the Germans were full of admiration for some of our engine and aircraft developments, and were particularly amazed that the Merlin engine doubled its power during the war years whilst retaining the same cubic capacity.



**Annular Cooling**—(above) The Tempest VI fitted with the Sabre VI engine and annular cooling radiators. The Junkers Ju 88s were the first German war machine to be fitted with this arrangement. The lower picture shows the arrangement on the Do 335A, which was about the latest German aircraft to have it. The Do 335 also had a catapult seat for baling out at high speed.



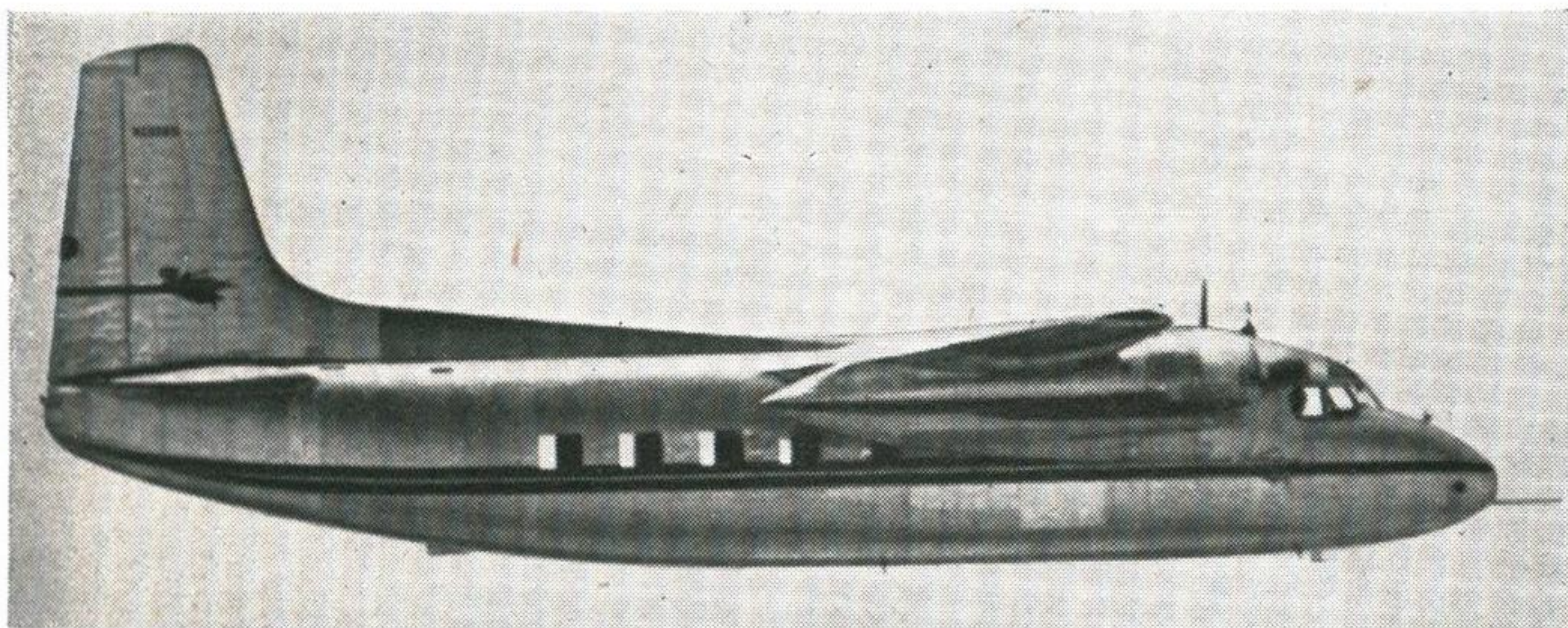
**SILLOGRAPHS**



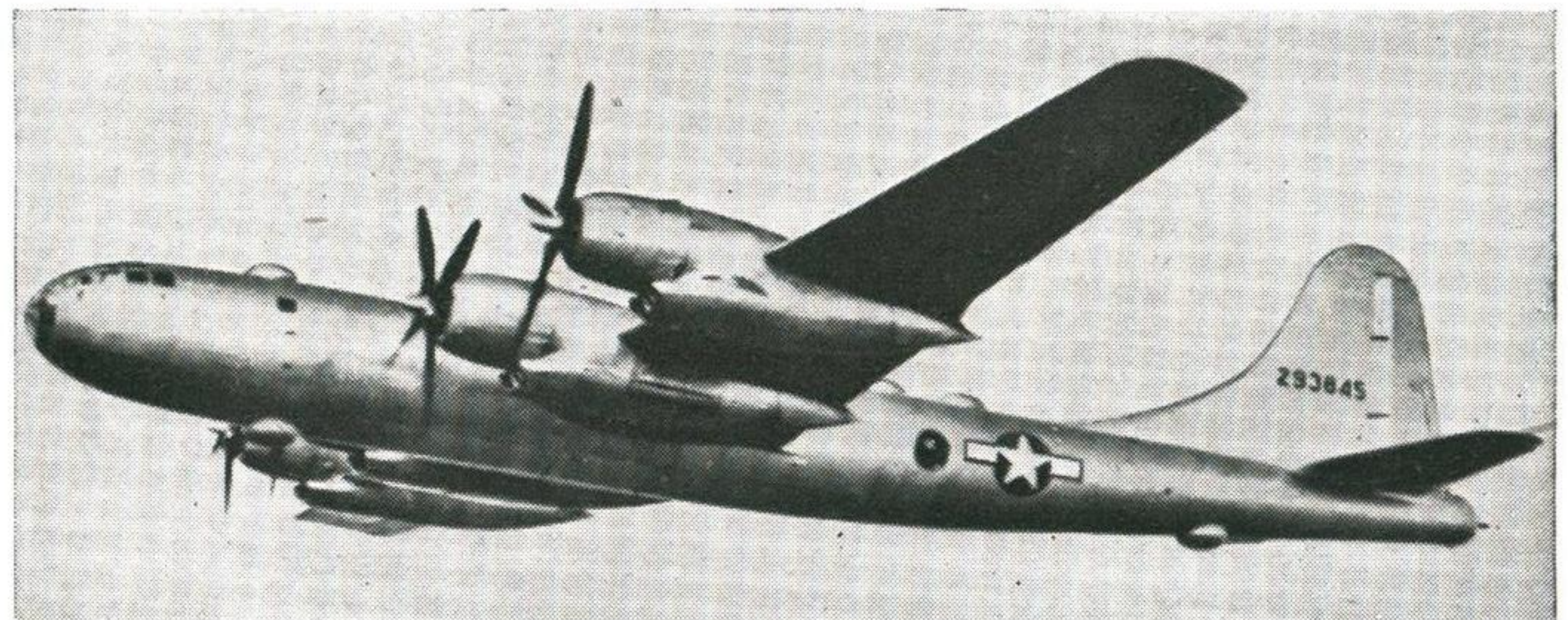
## ADVANCED SPOTTING

Recognition Test No. 13

### From the U.S.A.



**LOCKHEED SATURN**—(2 Continental 600 h.p. motors or 2 Wright Cyclones 800 h.p.) Top speed approximately 280 m.p.h. A high wing improves accommodation. The Saturn is a feeder-line type carrying 14 passengers and is in a class with our Miles Marathon.



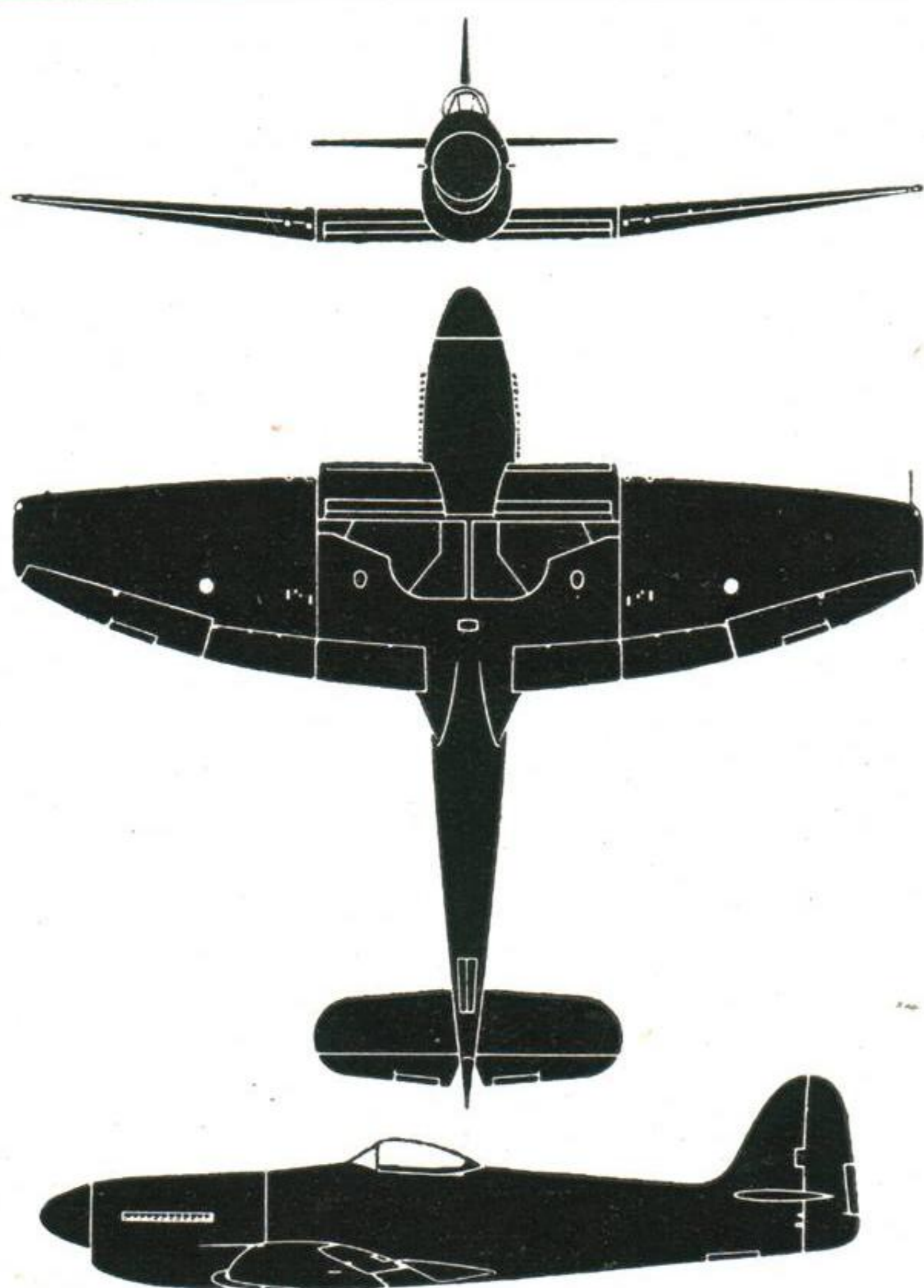
**BOEING XB-44 SUPERFORTRESS** (ex B-29)—(4 Pratt and Whitney Wasp Majors, 3,500 h.p. each)—An interim model between B-29 and B-50. Recognisably of the Superfort class, it is distinguished by the enormous air intakes beneath the motors.



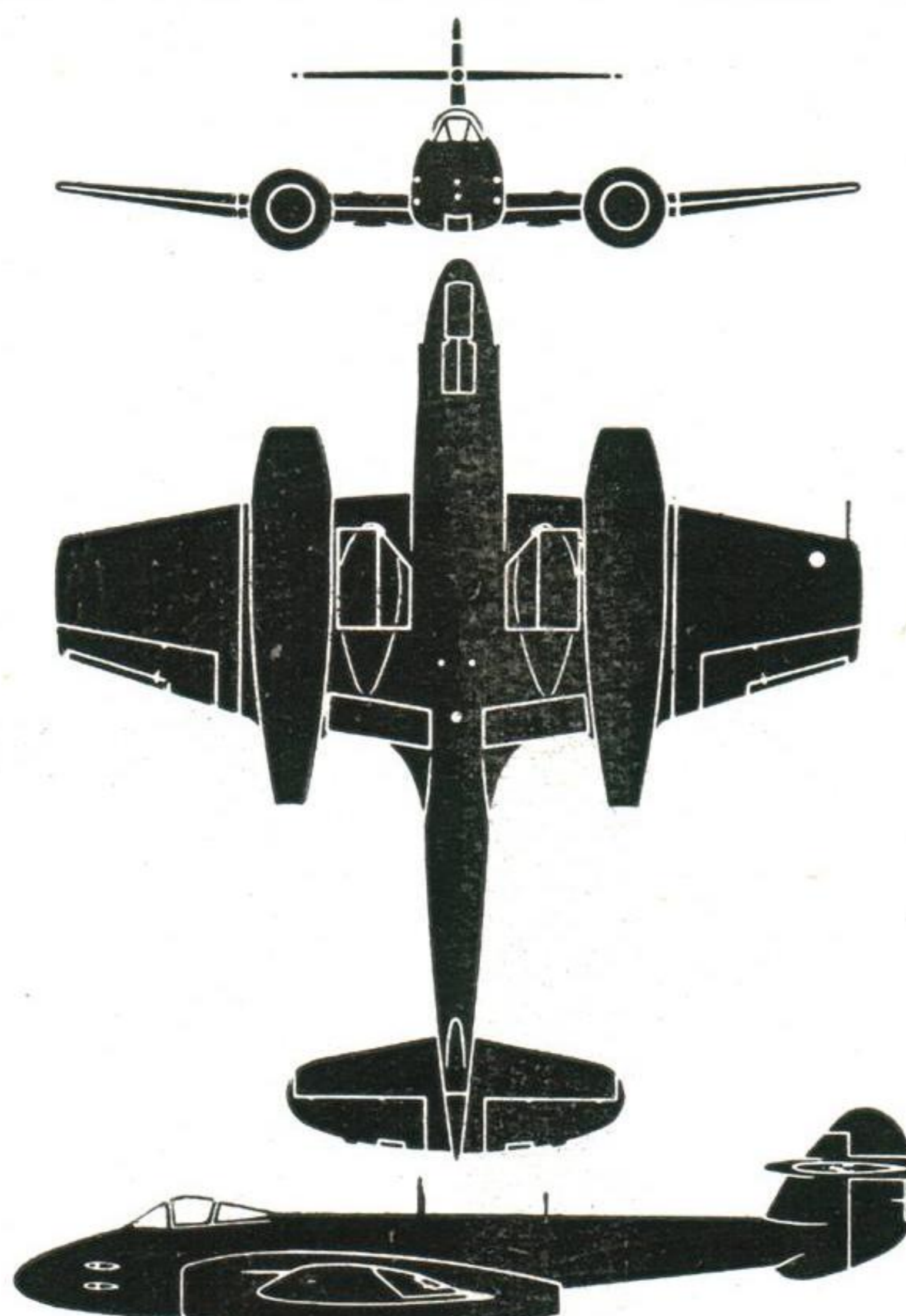
**LOCKHEED CONSTITUTION.** This 92-ton double decker aeroplane will take 180 passengers for 6,000 miles at 300 m.p.h. The total horsepower is 14,000 from 4 Pratt and Whitney Wasp Majors. Its highest peak, the fin-tip, is 52 ft. from the deck.



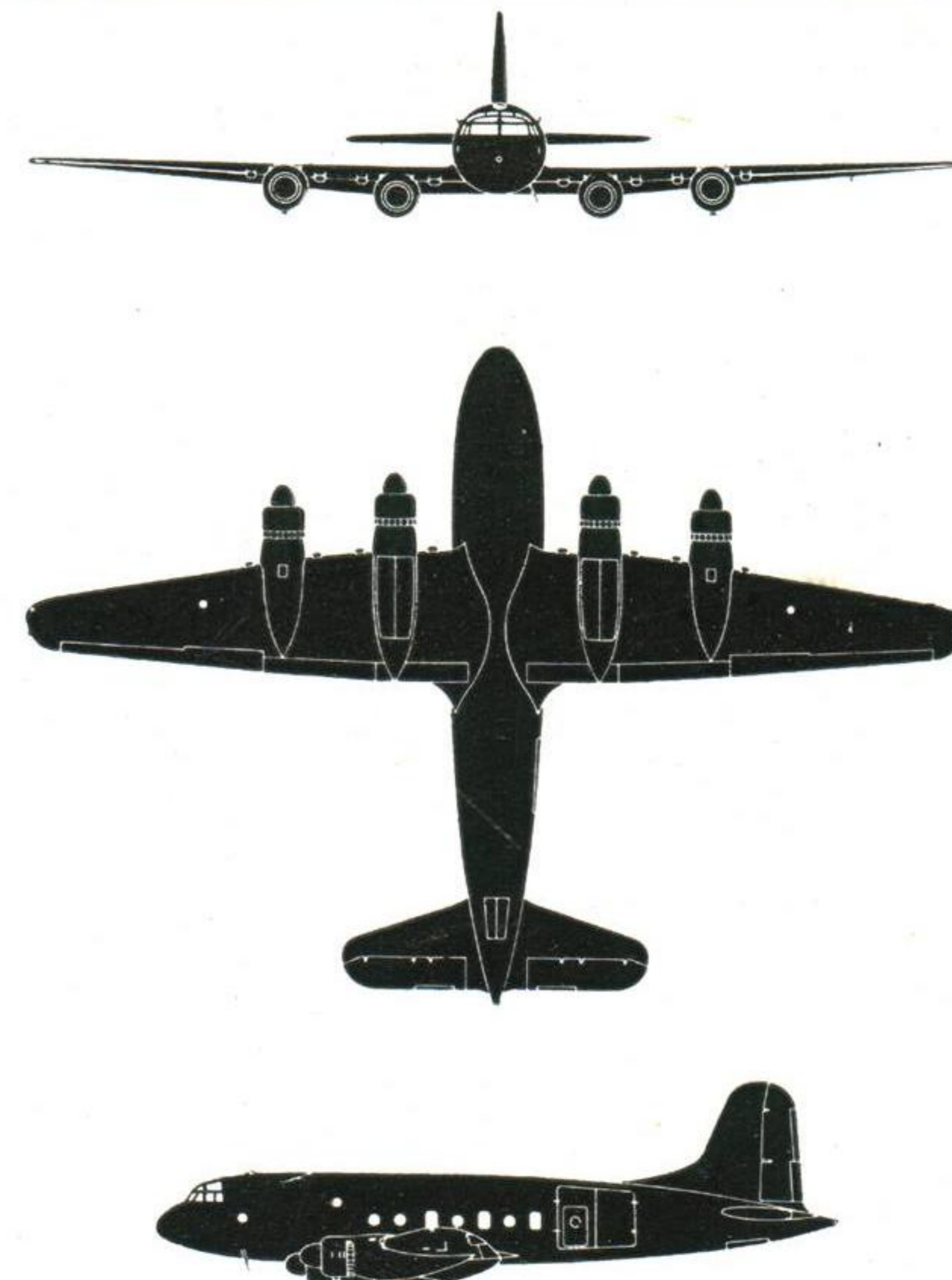
**GLOBE SWIFT**—(Continental C-125, of 125 h.p.)—Top speed 150 m.p.h. This handy 2-seater private owner low-wing monoplane, to be seen in Great Britain, is a native of Texas. It has a dihedral tailplane and a retractable undercarriage to help recognition.



**HAWKER FURY F. Mk.1**  
British Fighter  
(Sabre) Span 38 ft. 4 in.



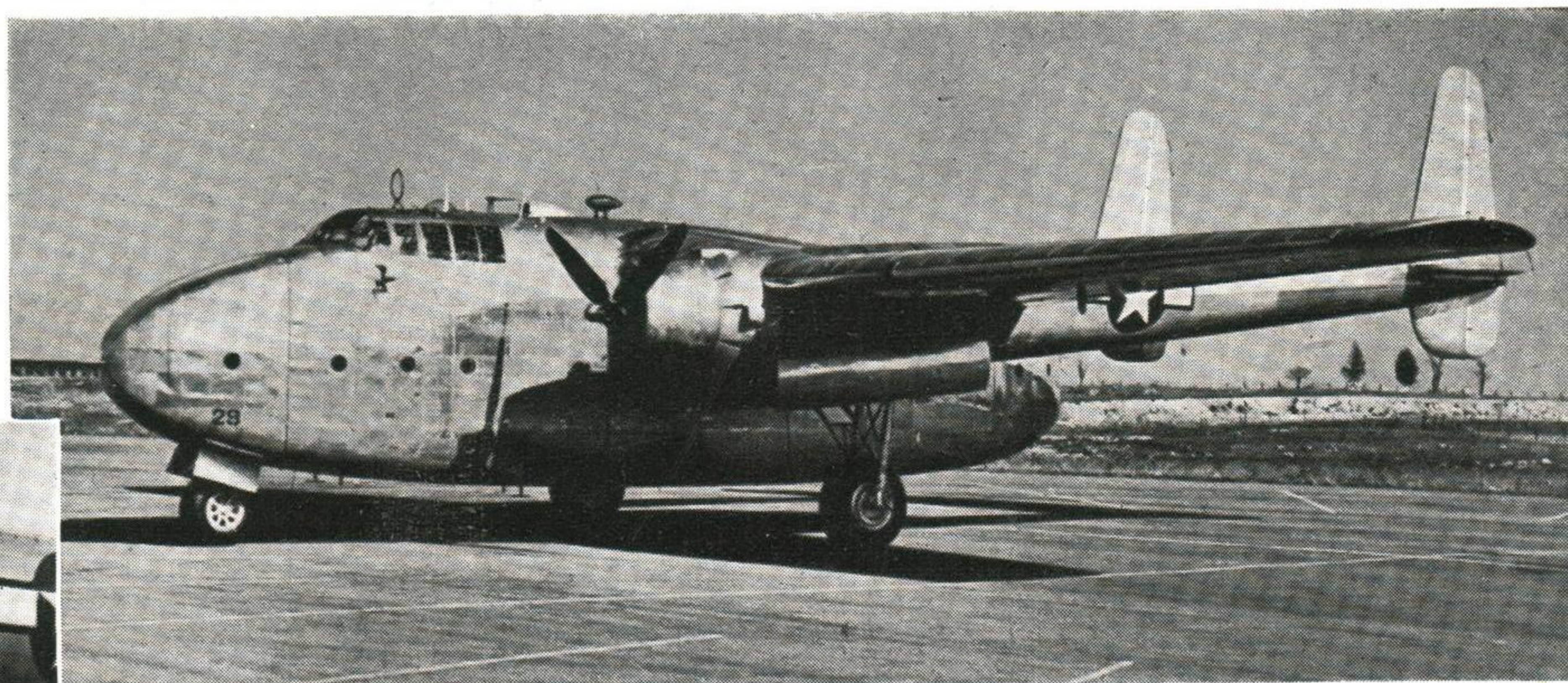
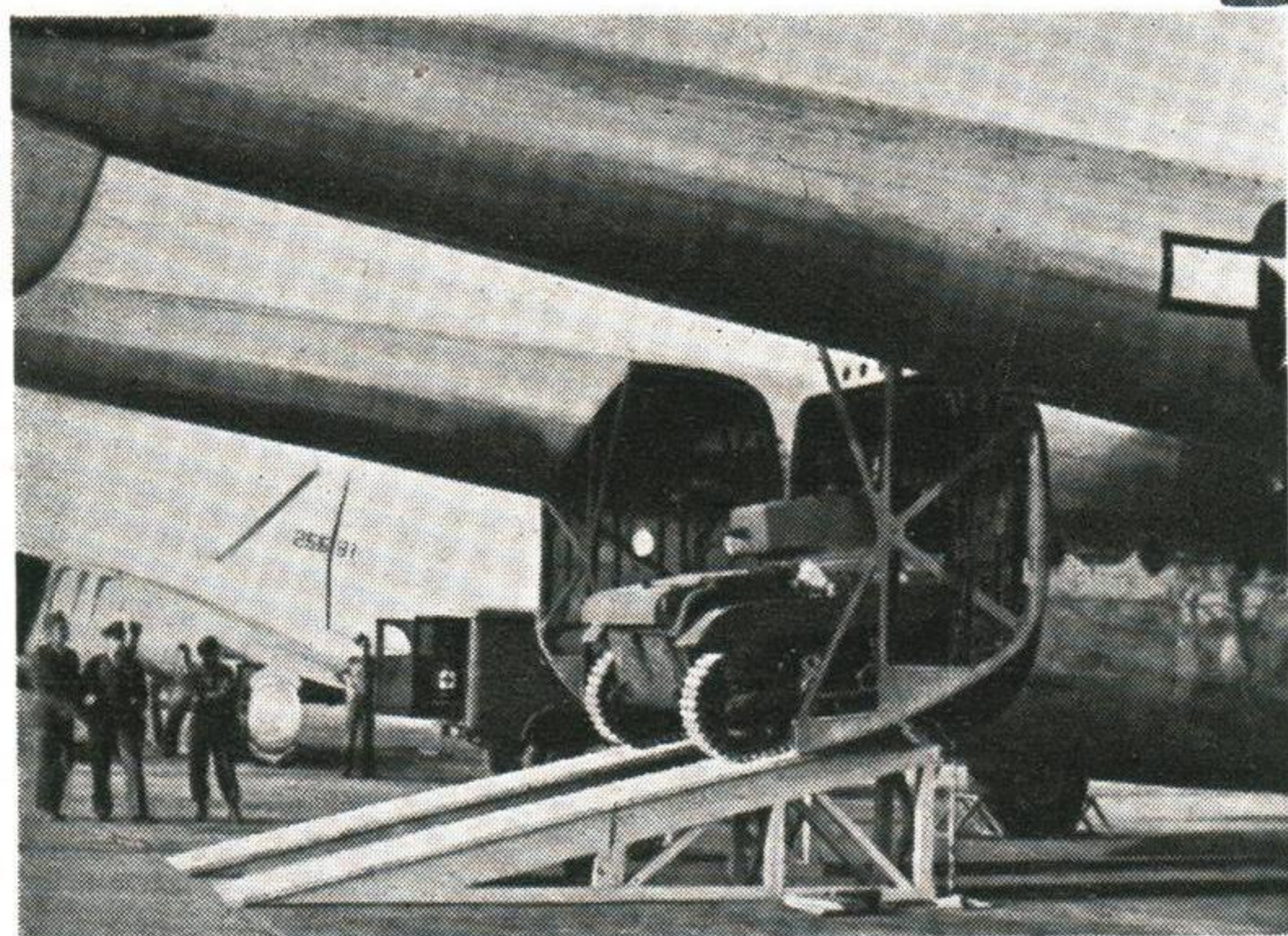
**GLOSTER METEOR F. Mk.IV (Clipped)**  
British Fighter  
(2 Derwent) Span 37 ft. 2 in.



**HANDLEY PAGE HASTINGS C. Mk.I**  
British Transport  
(4 Hercules) Span 113 ft. 0 in.

## WEIGHT LIFTER ★ ★

A payload of 9 tons or 42 paratroopers can go into the Fairchild C-82 Packet, one of which toured Europe recently. It has two 2100 h.p. Pratt and Whitney motors, a range of 4000 miles, a military crew of 5, a commercial crew of 2.



**EDITORIAL NOTE.**—The Aircraft Recognition Journal is an Official Issue and is not for sale. Articles, photographs, and suggestions are welcome and should be addressed to:—The Editor, Aircraft Recognition Journal, Air Ministry, T.Lit., London, W.C.2.

**ACKNOWLEDGEMENT**—The photograph of the Tempest with the annular radiator, on Page 45, is published by courtesy of *The Aeroplane*.

## SOLUTIONS TO RECOGNITION TESTS IN THIS ISSUE :

### FRONT COVER : York

### No. 11 (ELEMENTARY SPOTTING)

- |                        |                              |
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| 56. Firebrand IV       | 66. Dove                     |
| 57. Lancaster II       | 67. B-17 Fortress            |
| 58. Mitchell III       | 68. Beaufighter X            |
| 59. Mosquito P.R. XVI  | 69. F7F-3 Tigercat           |
| 60. PE-8               | 70. PE-2                     |
| 61. Sandringham        | 71. Prentice                 |
| 62. Firefly IV         | 72. Lancaster A.S.R. Mk. III |
| 63. C-46 Commando      |                              |
| 64. P-80 Shooting Star |                              |

### No. 12 (SILLOGRAPHS) :

- |                          |                        |
|--------------------------|------------------------|
| 71. D.H. 108             | 84. Hornet I           |
| 72. YAK-6                | 85. York               |
| 73. S.C.A.N. 20 (French) | 86. Sandringham        |
| 74. Wayfarer             | 87. Mosquito N.F.30    |
| 75. F7F-3 Tigercat       | 88. Halifax C.VIII     |
| 76. Meteor IV (Clipped)  | 89. Prentice           |
| 77. Dove                 | 90. Brigand I          |
| 78. Norseman             | 91. P-80 Shooting Star |
| 79. Horsa                | 92. P-47N Thunderbolt  |
| 80. Spitfire 22          | 93. YAK-3              |
| 81. LA-5                 | 94. FR-I Fireball      |
| 82. C-82 Packet          | 95. Proctor V          |
| 83. Seabee               |                        |

### No. 13 (ADVANCED SPOTTING)

- |                        |                        |
|------------------------|------------------------|
| 72. Proctor V          | 85. Tudor II           |
| 73. F8F Bearcat        | 86. Expediter          |
| 74. PE-2               | 87. D.H. 108           |
| 75. C-74 Globemaster   | 88. Desford            |
| 76. Albemarle          | 89. Lockheed 10A       |
| 77. Dominie            | 90. Lancastrian        |
| 78. C-82 Packet        | 91. Sandringham        |
| 79. TBF Avenger        | 92. Junkers Ju 52      |
| 80. Dove               | 93. Beaufighter X      |
| 81. FR-I Fireball      | 94. Republic F-12      |
| 82. Wayfarer           | 95. Caudron Goeland    |
| 83. Douglas XB-43      | 96. P-80 Shooting Star |
| 84. B-29 Superfortress |                        |

The Inter-Services Aircraft Recognition Journal is a monthly publication, prepared and produced by Air Ministry, T.Lit., in collaboration with the Ministry of Supply, A.R.Mat. The subject matter is decided by an Editorial Committee consisting of the following members—AIR MINISTRY : T.Lit., Wing Commander G. G. N. Barrett, A.F.C. (Chairman) and Flight Lieutenant E. A. Wren (Secretary and Editor) ; T.O.5, Squadron Leader R. H. Adams, O.B.E., A.I.2(g), Flight Lieutenant J. L. Newton ; ROYAL NAVY : Lieutenant (A) J. A. O'Dwyer, D.F.M., R.N.V.R. ; ARMY : Captain F. B. Crosse, R.A. ; MINISTRY OF SUPPLY : A.R.Mat., Mr. A. E. Dollery ; ROYAL OBSERVER CORPS : Observer Commander R. R. Poole ; AIR TRAINING CORPS : Mr. J. A. Coubrough, Civilian Instructor.