

THE INTER



SERVICES

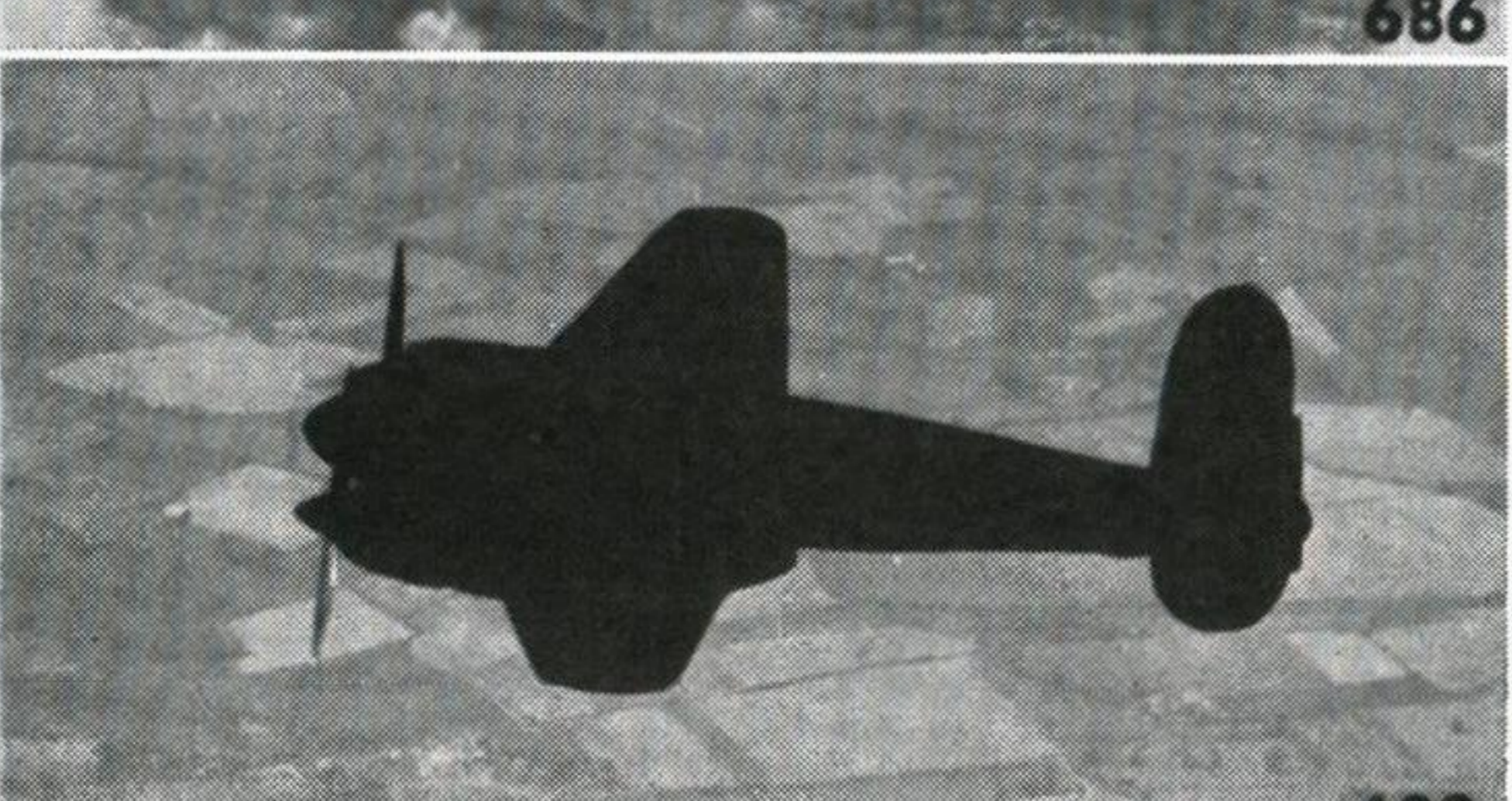
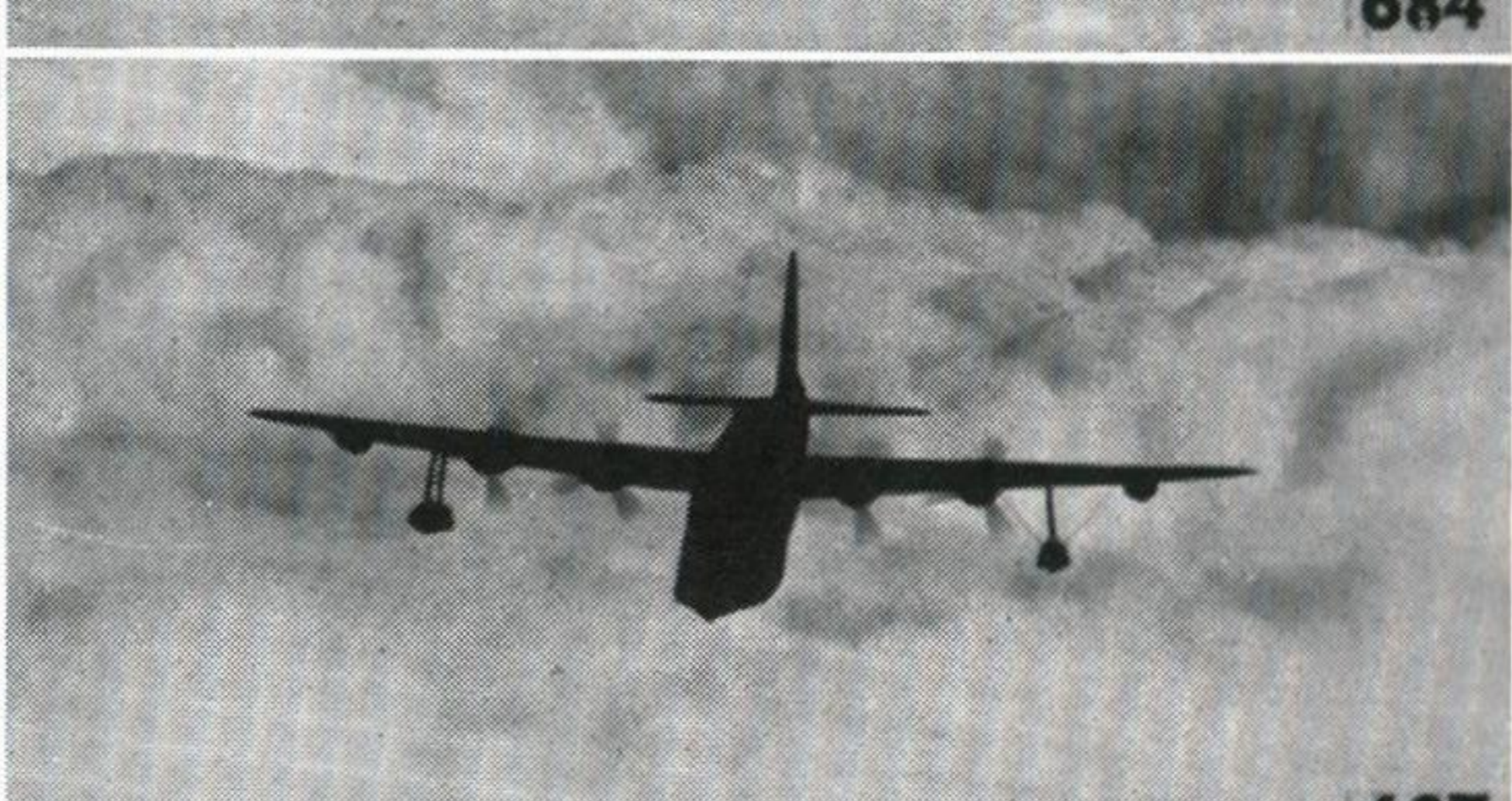
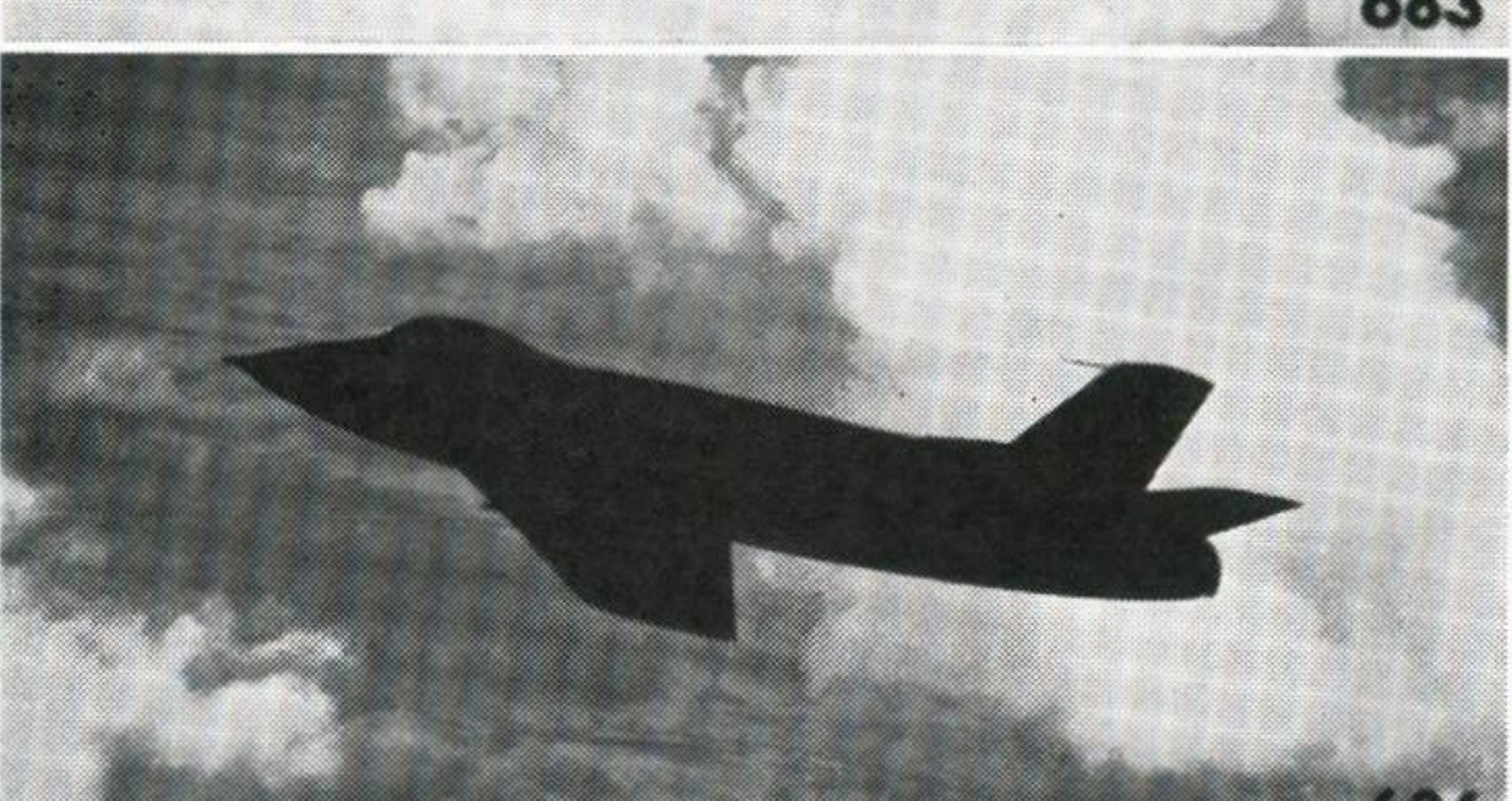
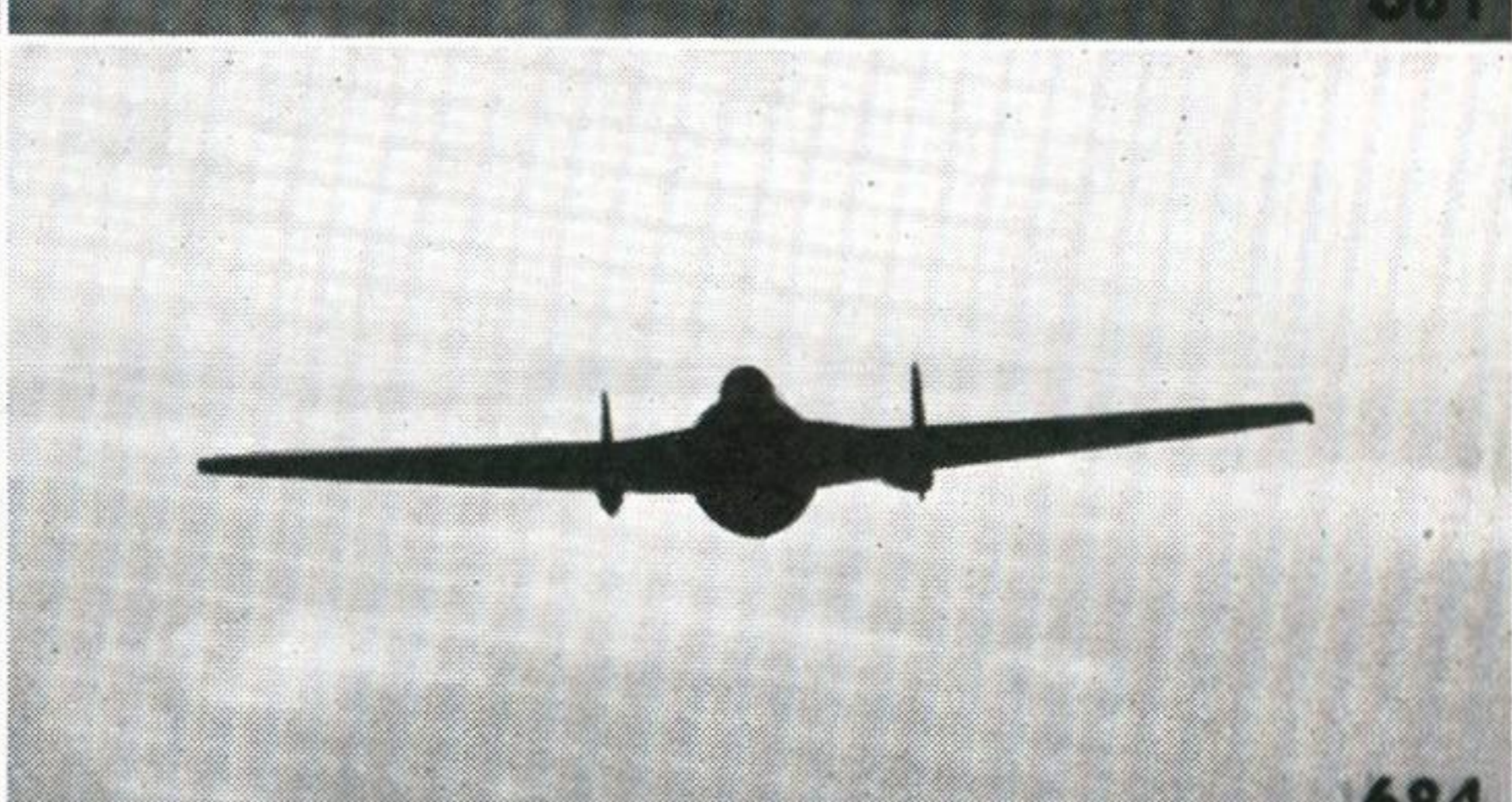
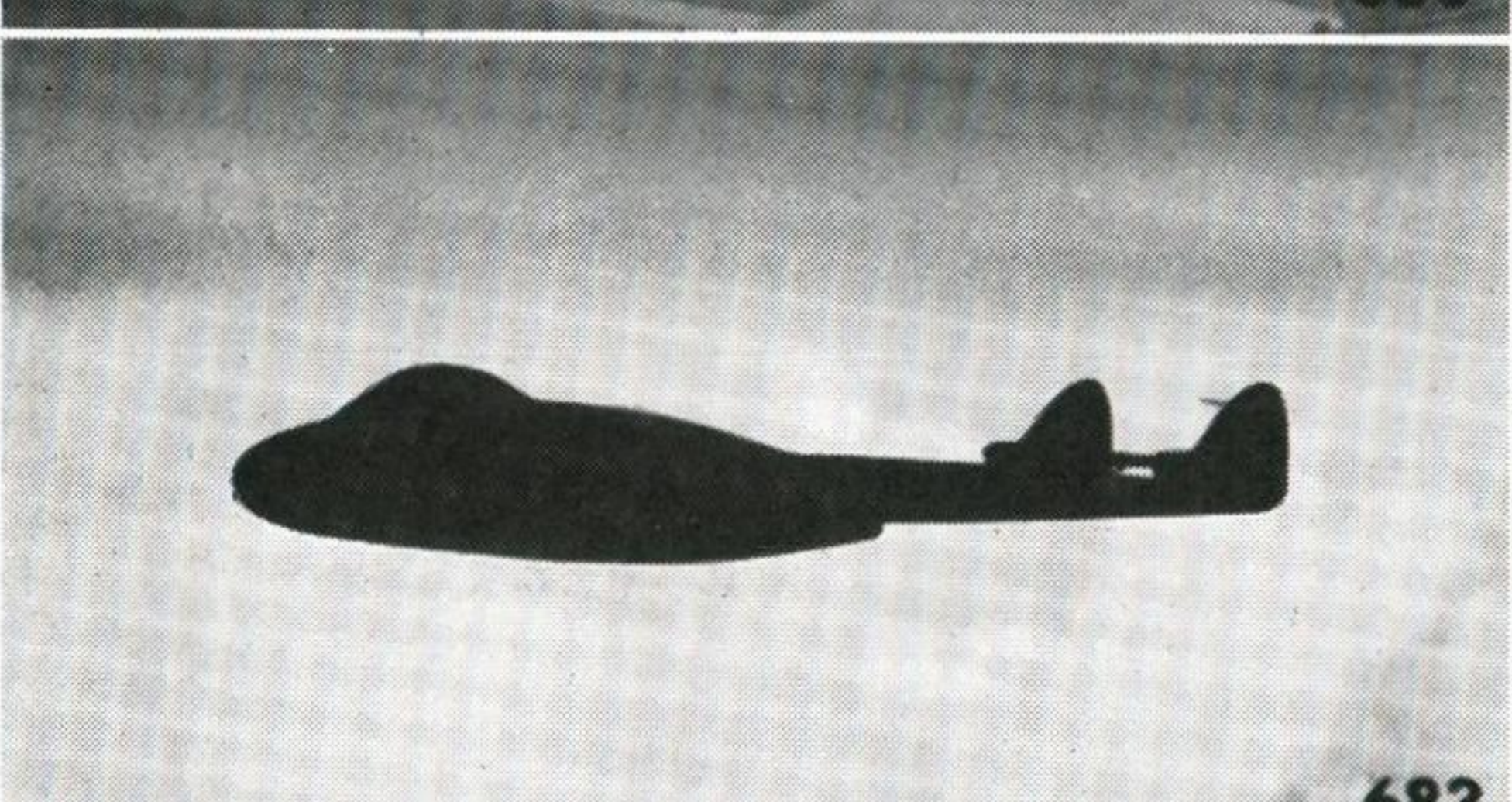
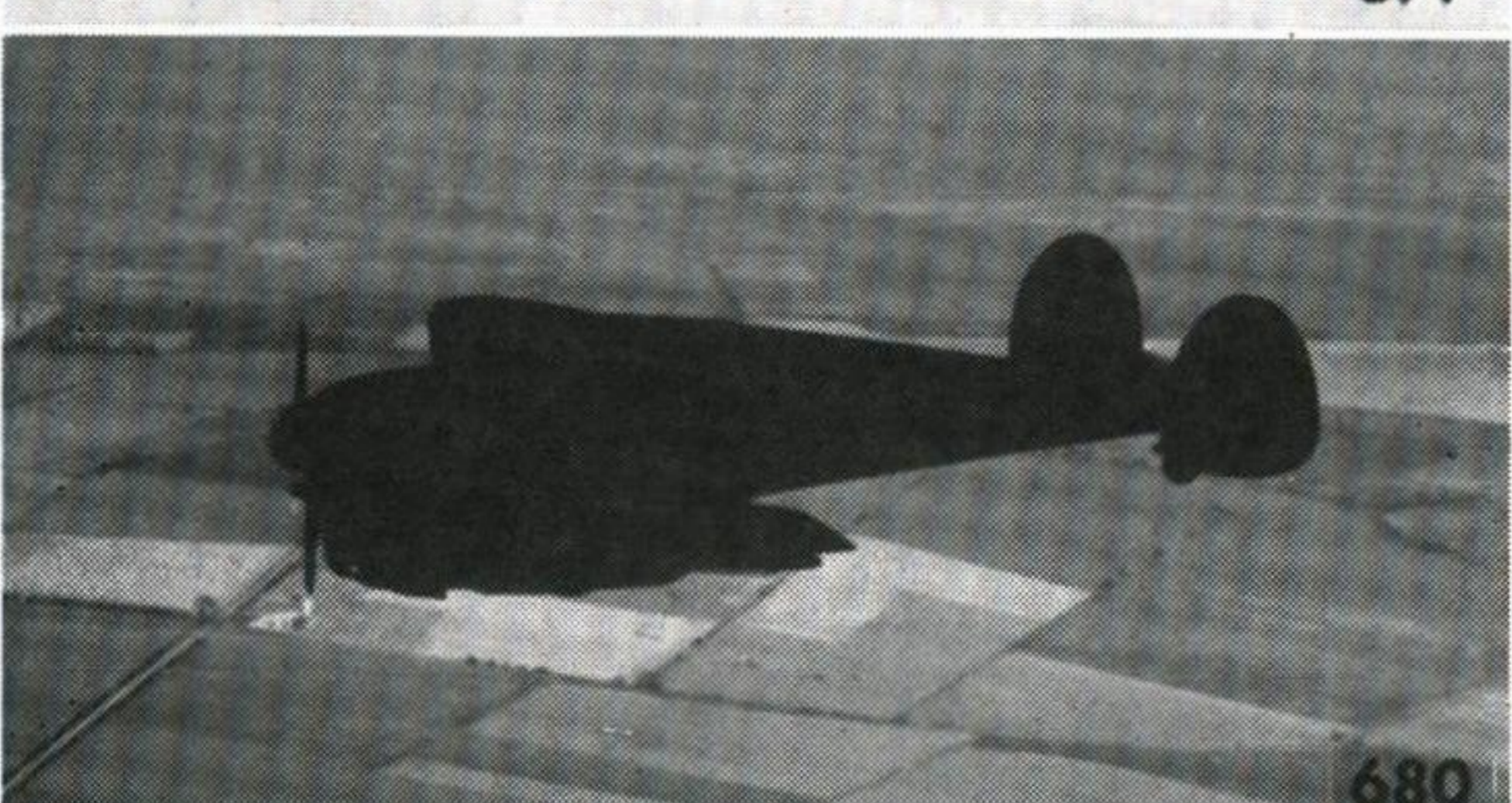
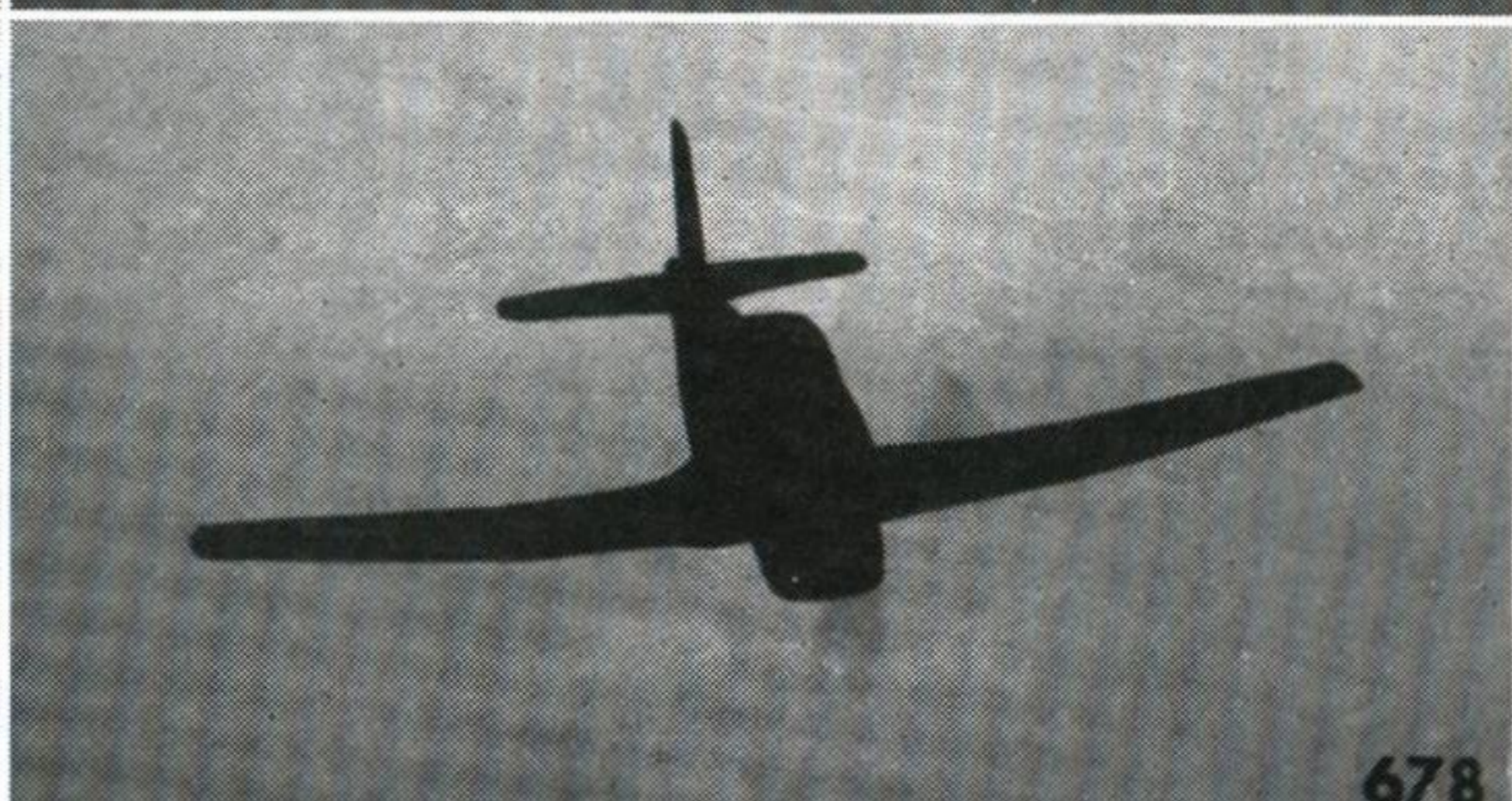
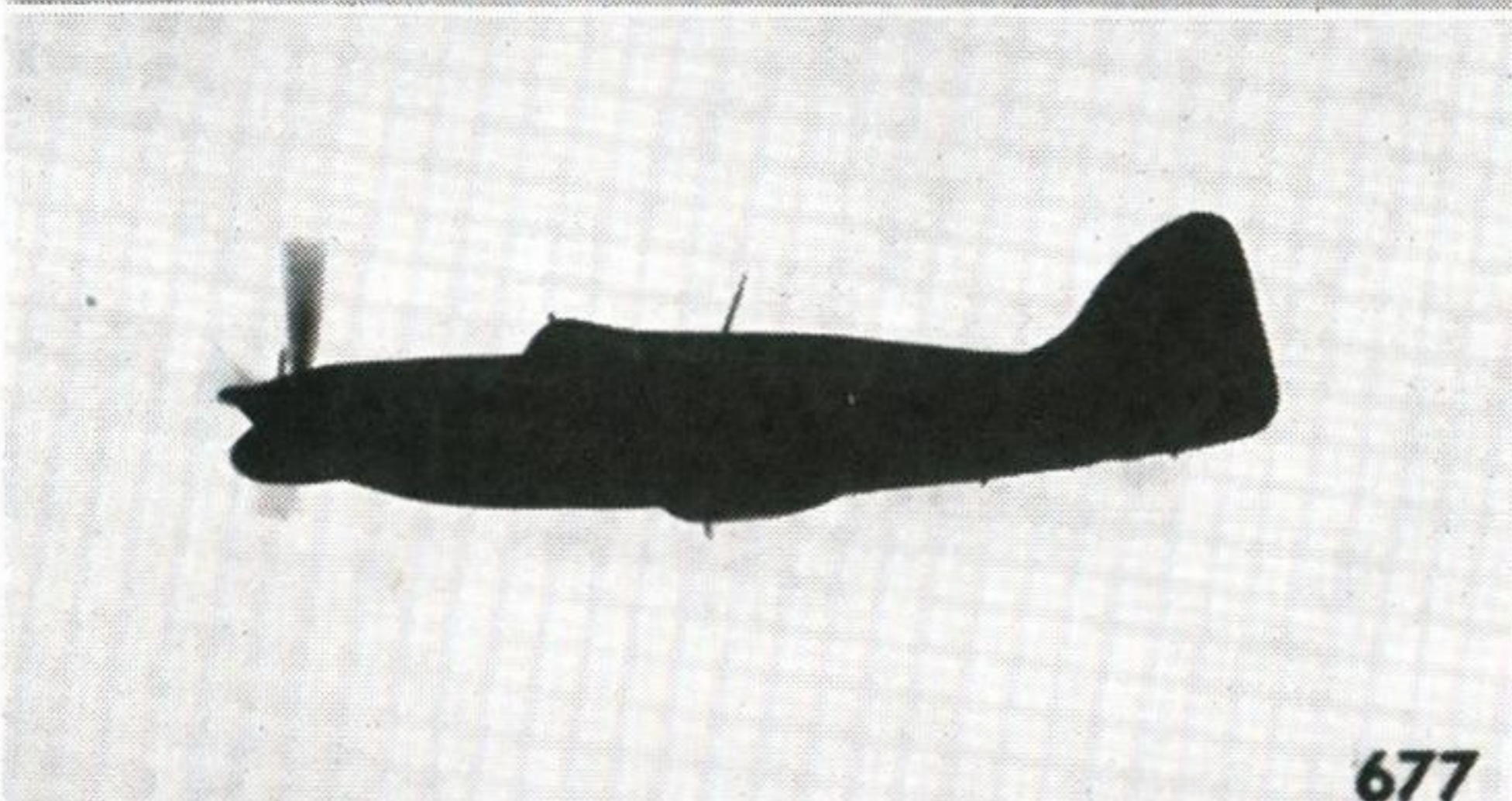
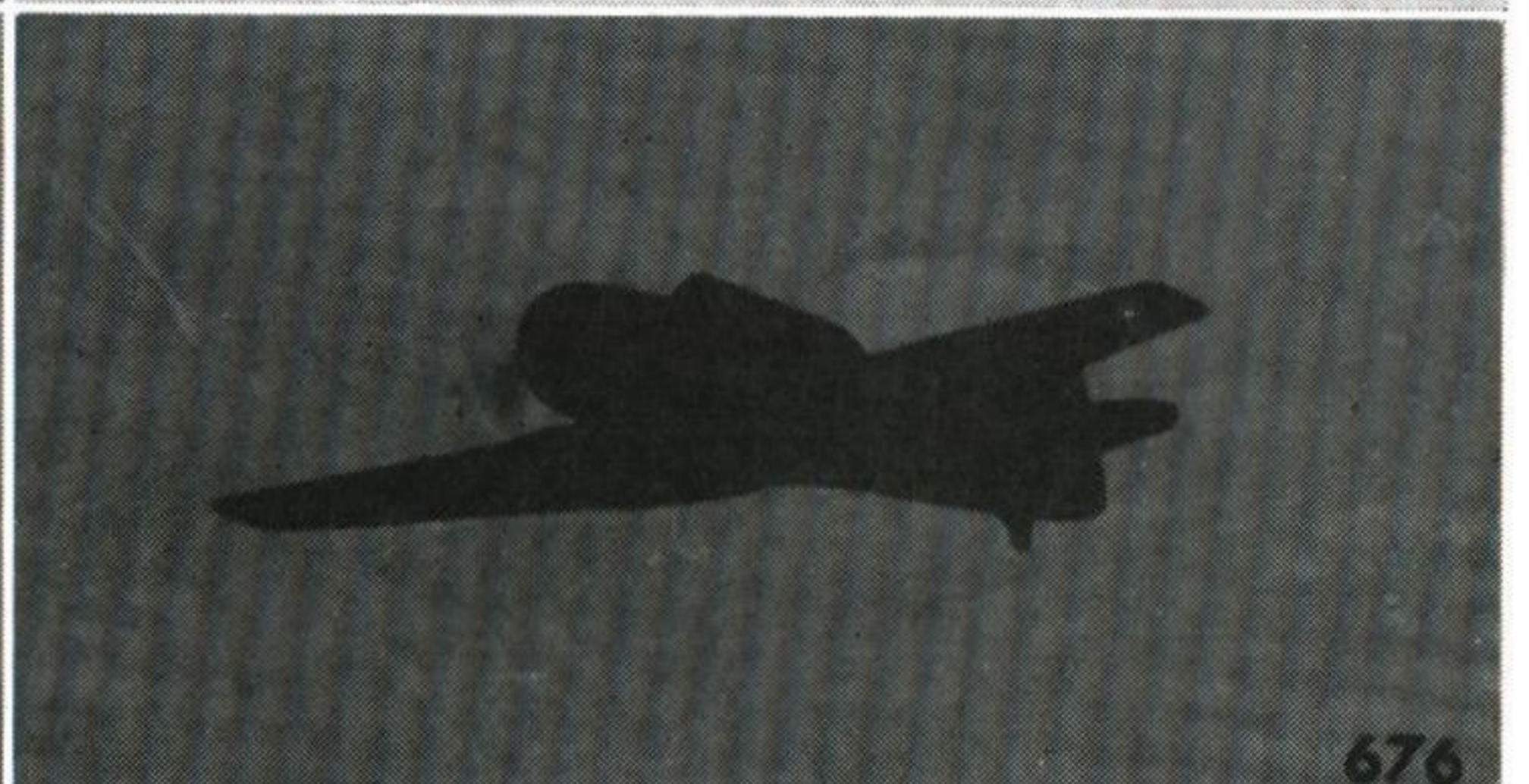
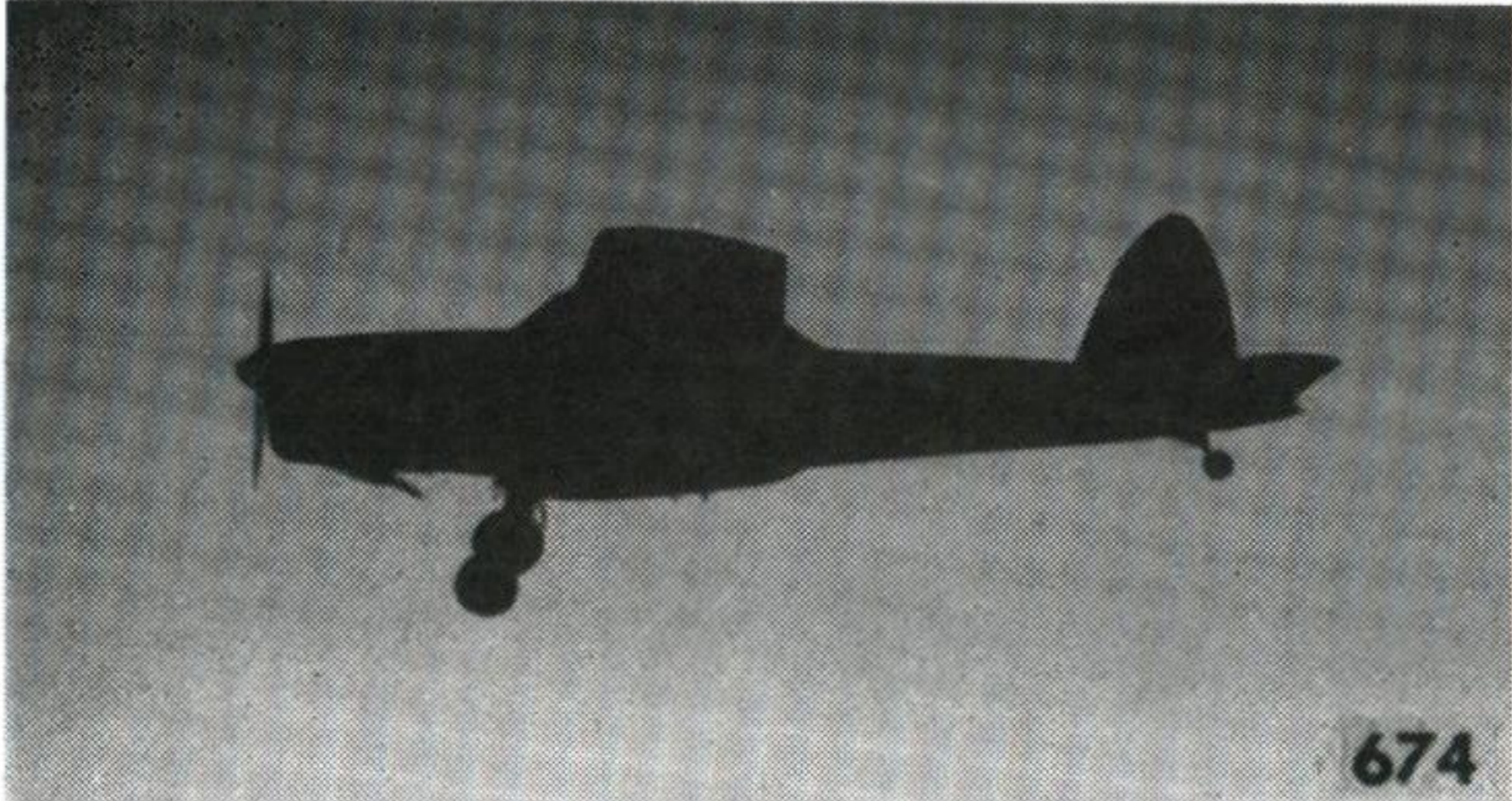
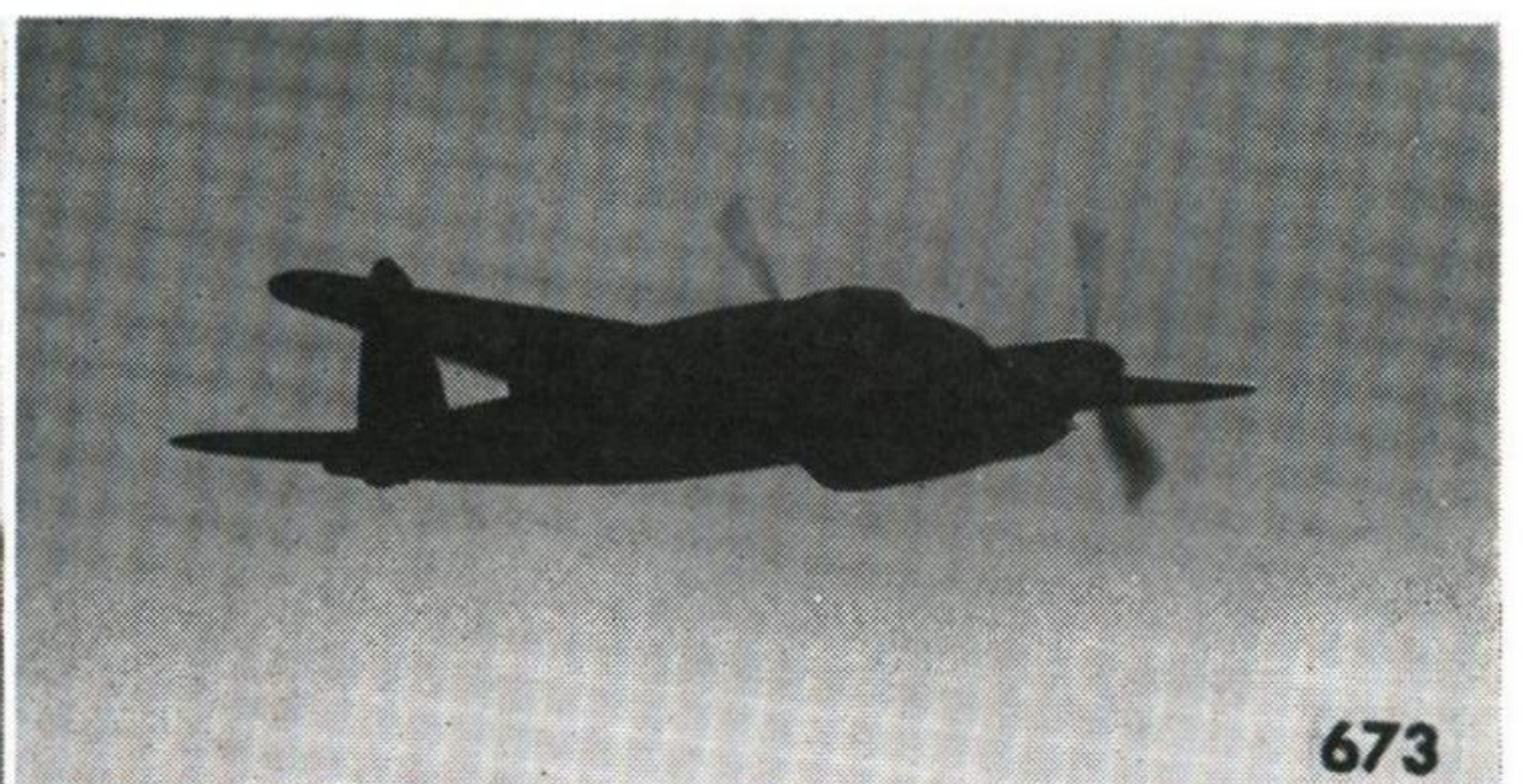
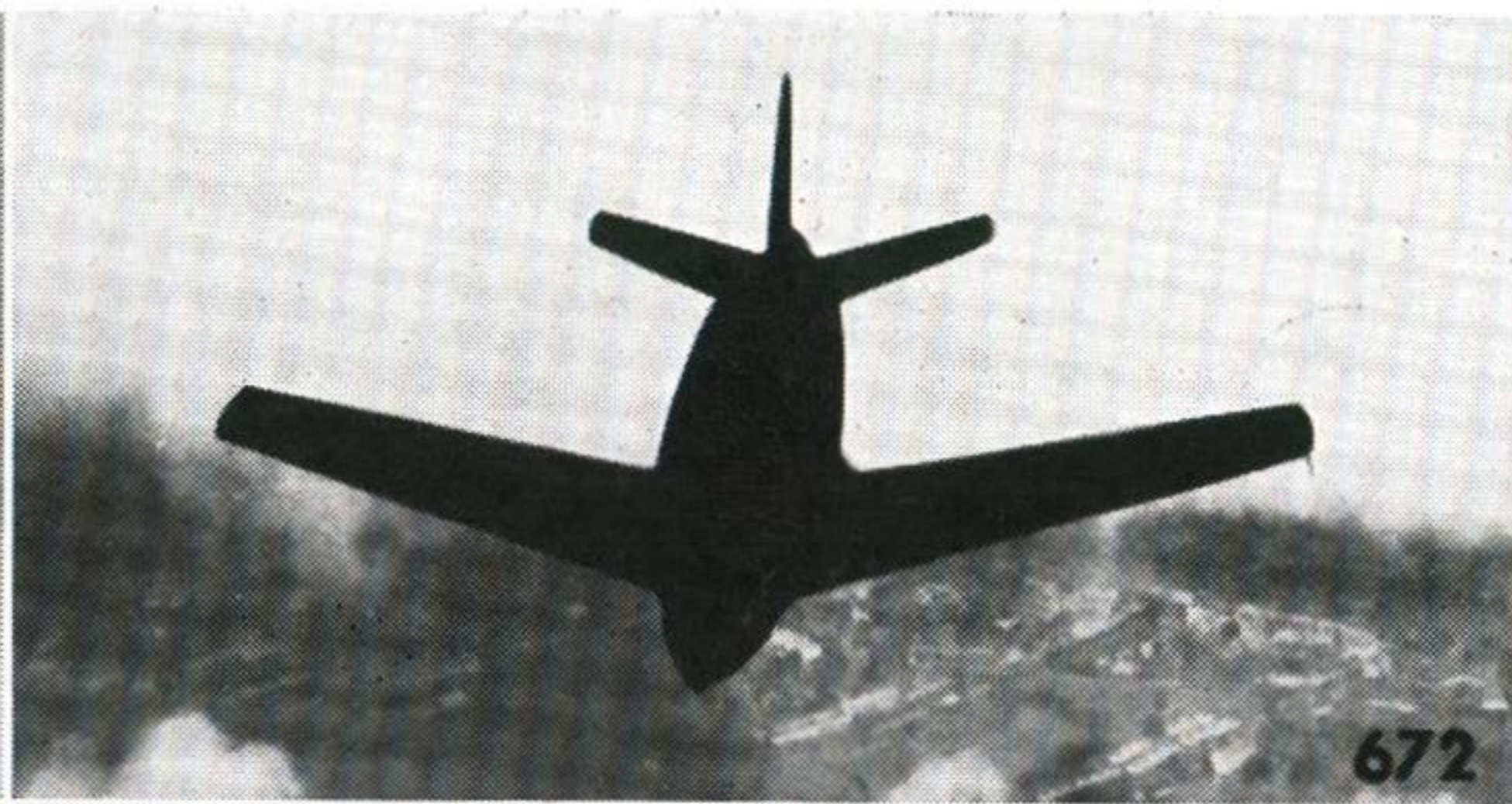
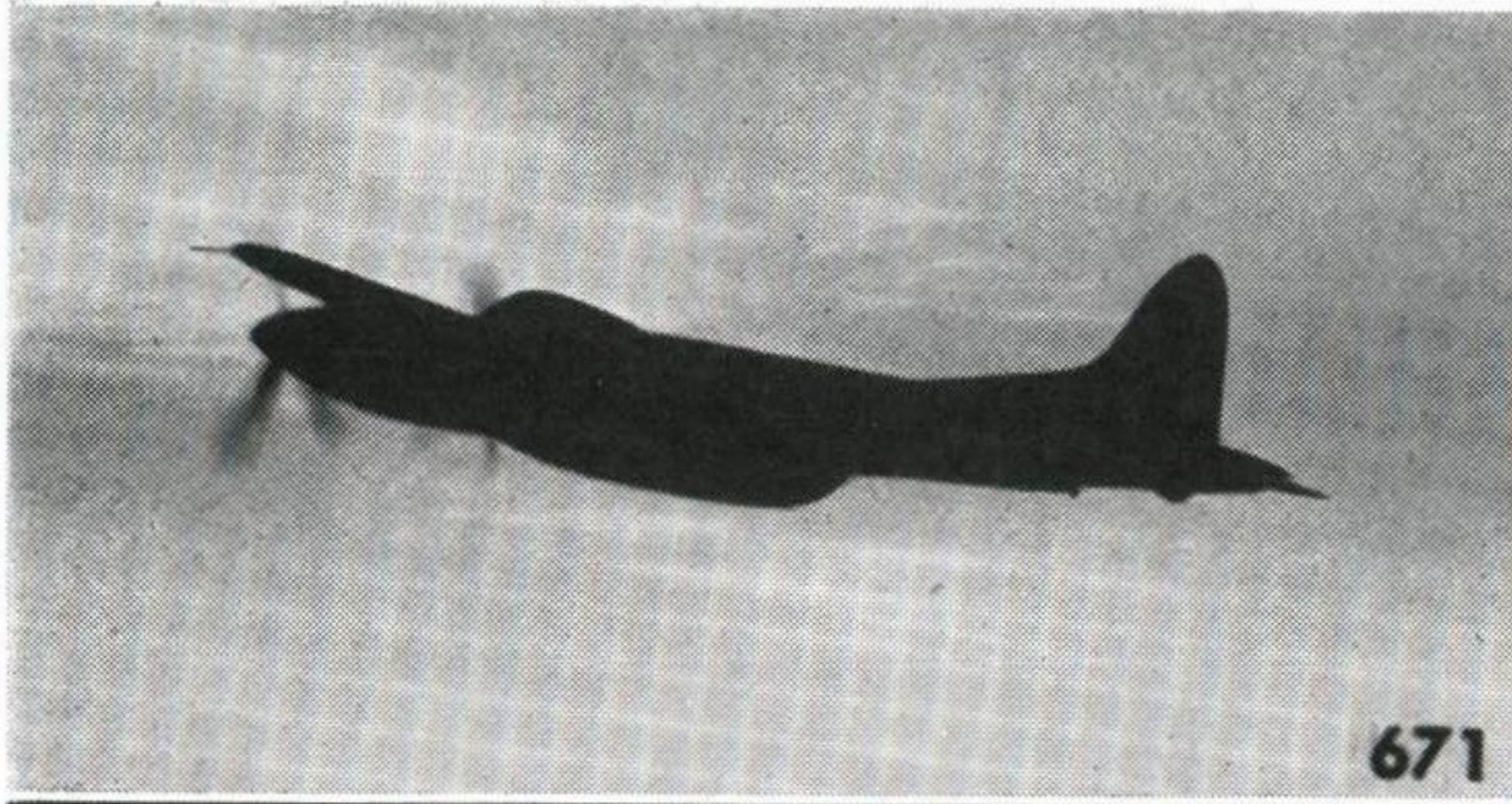
AIRCRAFT RECOGNITION

Journal



Vol. 4 FEBRUARY 1950 No. 6

SILLOGRAPHS





THE INTER SERVICES

AIRCRAFT RECOGNITION JOURNAL

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HIGH LIGHTING

ARTICLES in the *Journal* are intended to achieve at least one of the following objectives: to instruct, to provoke thought, discussion and comment, and, if possible, action. The fact that our article "Non-Identical Twins" (December, 1949 *Journal*) is the subject of not-too-serious complaints, as having caused cricks in a number of necks, is regarded as good evidence of its having gone some way to achieving these objectives.

Here we must briefly "recap" the points in the article which have been the indirect cause of "pains in the neck" to a number of ground observers. Sunlight at high altitudes is constant, strong, sometimes diffused and often reflected upwards from clouds. Aeroplanes flying in these regions are therefore lighted from several different directions at once, which circumstance tends to confuse shadows and to destroy dark silhouette shapes, particularly if the aeroplanes are in "natural" metal or light coloured finishes. At the same time the background against which they are seen is often of similar tone.

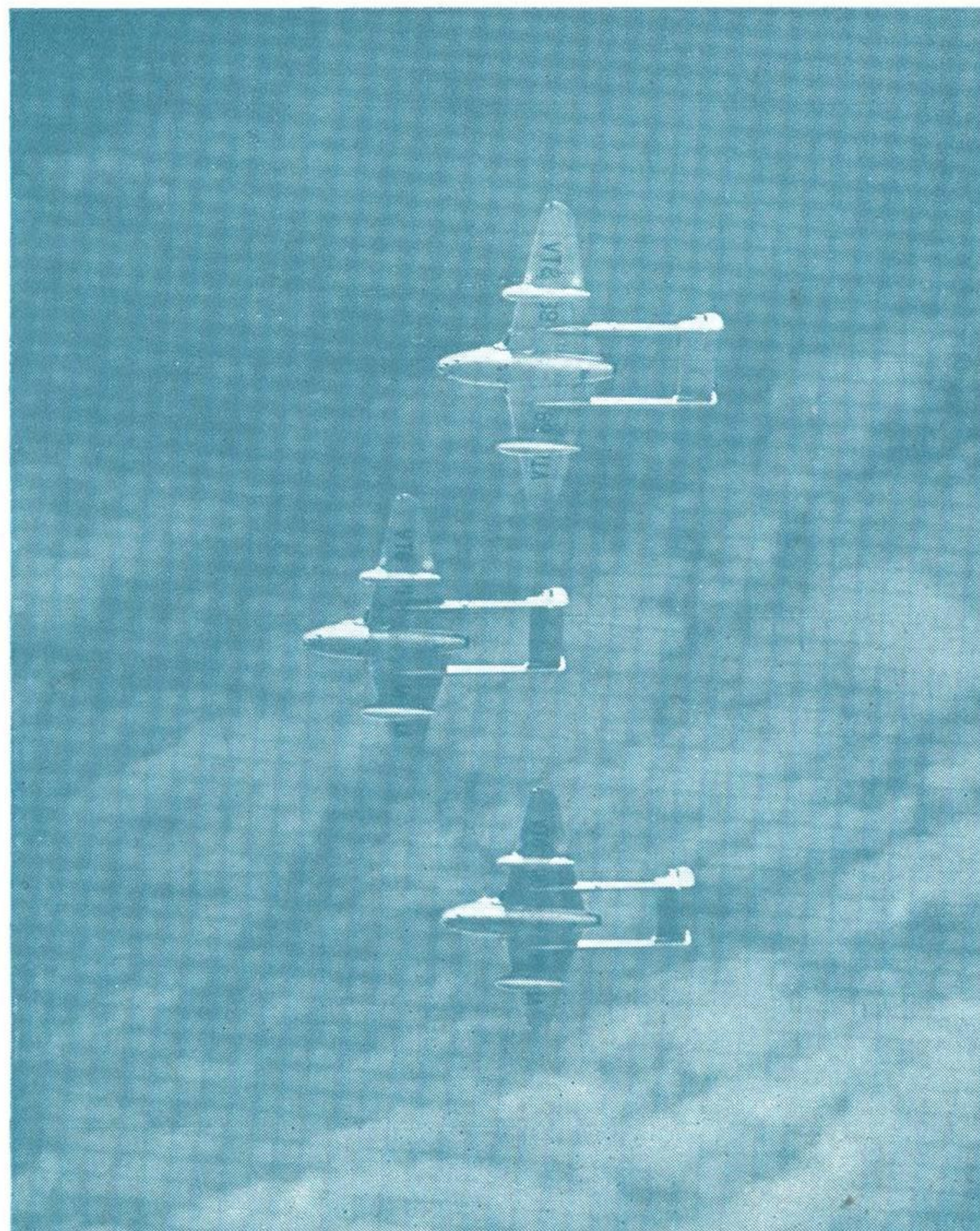
The blue skies of 1949 gave greater opportunities than usual for observing these lighting phenomena, especially during the intensive flying of the air exercises. Many readers will have

noticed that high flying aeroplanes viewed from the ground appear either as white silhouettes (when low cloud reflects the sun upon their undersides); or, as patterns in light grey tones of varying intensity, sometimes so pale and delicately traced as to have an unreal almost ethereal transparency; strikingly beautiful to see but difficult to recognize as whole aeroplanes.

One redeeming feature of the problem is that the high flying aeroplane usually presents itself in or near the plan view—hence the light and shade pattern drawings which accompanied the aforementioned article. These tone drawings are intended to supplement the information given in the normal silhouette views and generally to give a better idea of the appearance of aeroplanes flying at extreme visual altitudes. Incidentally, we intend to publish further drawings of this kind of all aircraft liable to operate at these heights.

Meantime, although we do not wish to be responsible for initiating a new occupational disease called "Spotters' Neck", we shall be pleased to receive further complaints of cricks in necks especially if relieved by readers' comments reflecting on the various aspects of this recognition matter in the light of their observations during the coming months.

A tone-study of de Havilland Vampire F. Mk. 3s.
(Photo by courtesy of Central Press Photos Ltd.)





Mark 4

Meteor Modes

BY

Obs. ROY McLEAVY, 19/Z.3, R.O.C.

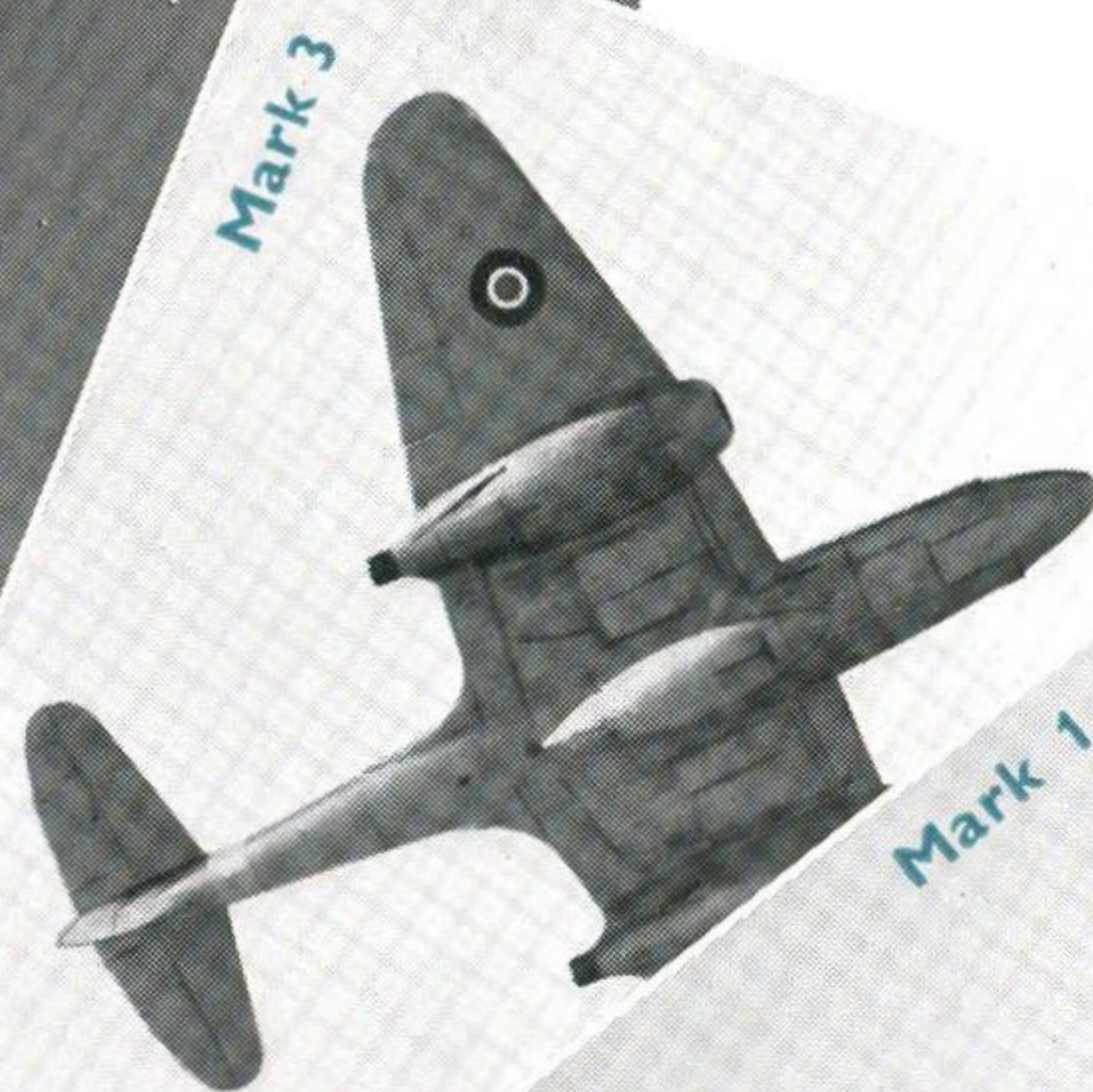
CURRENTLY in large-scale service with fighter squadrons of the Royal Air Force, Royal Netherlands Air Force and the Belgian and Danish Air Forces, the Gloster Meteor virtually forms the backbone of Western Europe's air defence system. Latest variants of the Meteor rank as the most highly developed and formidable interceptors in the world.

The original Meteor airframe was evolved largely as a result of experience gained by Mr. W. G. Carter, Gloster's Chief Designer, and his staff, during the development of the famous E.28/39. Designed primarily as a test-bed for early Whittle jet units, the E.28/39 made its initial flight in May, 1941, achieving the distinction of being the first really successful aircraft in the world to fly with a turbojet.

Prior to the completion of this aeroplane, Gloster's were actively considering the design of a single-seat jet-fighter conforming to Specification F.9/40, issued by the Air Ministry in November, 1940. Partly due to the low thrust available from early turbines, the specification called for a twin-jet layout to provide the high performance required from a fighter aircraft.

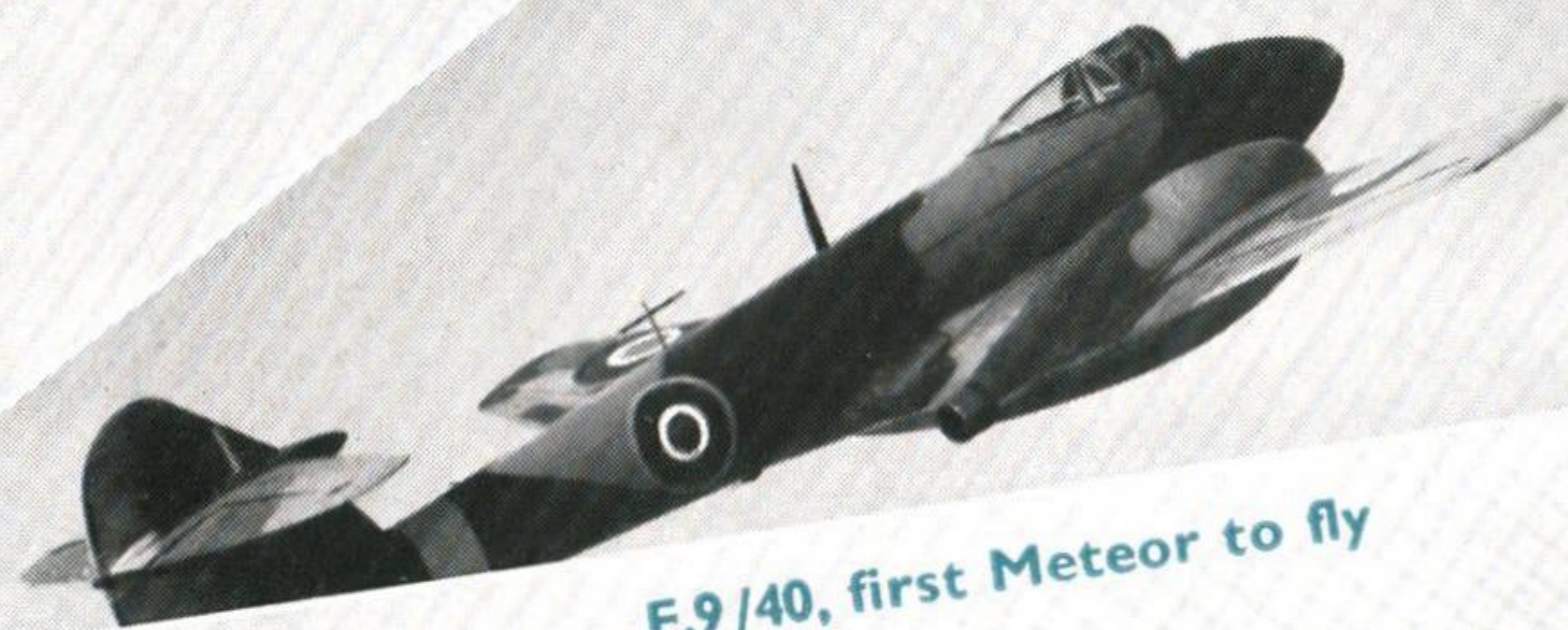
In February, 1941, an order was placed for twelve F.9/40 Meteor prototypes, followed by a production order for twenty Meteor F Mk. 1s in September of that year. Originally christened "Thunderbolt", the F.9/40 was re-named Meteor following the introduction of Republic's P-47, Thunderbolt.

The first prototype was initially fitted with two 1,000 lb. s.t. Rover W.2B turbojets, but due to the low thrust originally produced by these units, tests were limited to taxiing trials. On March 5th, 1943, the first F.9/40 to fly took-off from Cranwell in the hands of Michael Daunt. It was powered by two Halford H.1 units—predecessors of the present De Havilland Goblin series. Units installed in the remaining prototypes included the Rolls-Royce B.23 and 27, Power Jets W.2/500 and 700 and the Metrovick F.2, which was underslung. F.9/40s carried no armament and were constructed without the torpedo-shaped fairing at the intersection of the tailplane and fin; a feature found on all later variants.

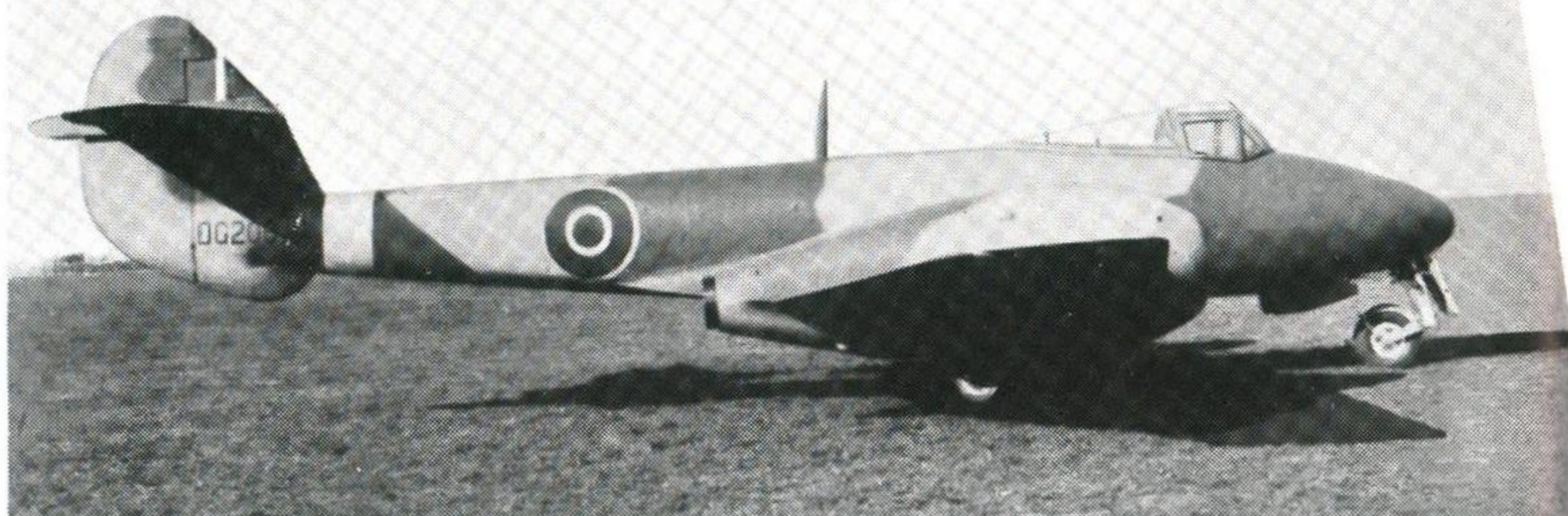


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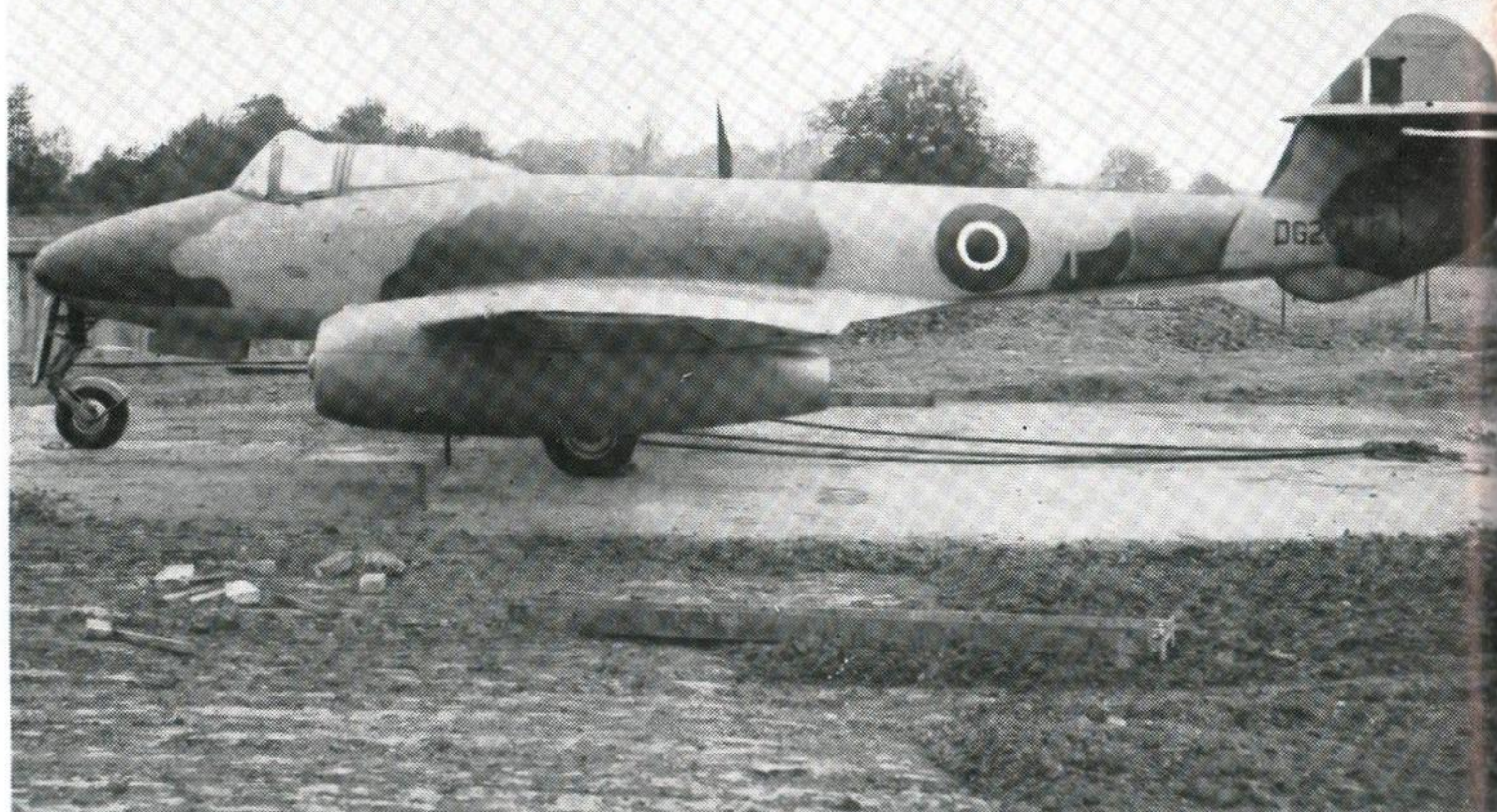
Mark 1



F.9/40, first Meteor to fly



F.9/40 with Metrovick F.2 turbojets
3rd prototype



F.9/40, 1st prototype Meteor



Mark 1 with Mark 4 nacelles



Mark 1 without under-fin fairing



Meteor F Mk. 1s started their operational career on July 12th, 1944, when the first two were delivered to No. 616 Squadron. On July 27th, the Meteors joined A.D.G.B. in their onslaught against the Fieseler Fi 103 flying-bombs, gaining pride of place as the first jet aircraft to be employed by the Allied Air Forces. Credit for the first "kill" went to Flying Officer Dean of No. 616 Squadron, who deflected a flying-bomb into the ground with a wing tip of his aircraft on August 4th.

Powered by two Rolls-Royce Welland 1 turbojets, the Meteor 1 was armed with four 20 mm. cannon in the nose, and had a maximum speed of 410 m.p.h. at 30,000 ft. Two were adapted during 1944 for flight-testing the first reheat or "afterburning" systems to be developed in this country. It was considered that reheat units would assist Meteors to combat the flying-bomb; the scheme, however, was still in an experimental stage when the menace ceased.

A direct descendant of the Halford-powered F.9/40, the Meteor 2 would have been powered by two D.H. Goblins, but the production order was cancelled.

In January, 1945, No. 616 Squadron were re-equipped with the first full-scale production version, the Meteor 3. Experience with the Meteor 1 under operational conditions had brought to light a number of requirements, many of which were incorporated in the Mk. 3. Modifications included provision for the use of a 180-gallon ventral drop-tank, provision of air brakes and a revised cockpit canopy designed to slide backwards instead of being hinged on one side. Like the Meteor 1, the first 15 built were fitted with Welland 1 turbojets, but subsequent models had two 2,000 lb. s.t. Rolls-Royce Derwent 1s. The last 15 off the assembly lines possessed long nacelles, similar to those in current use. Performance of the Mk. 3 showed a considerable improvement on that of its predecessors, and the maximum speed was increased to 475 m.p.h. at 30,000 ft.

Development of the Meteor continued at an amazing rate, and later in 1945, the Mk. 4 was introduced. A pressurized version, the Mk. 4 first appeared with the long-span, tapered wings of its forebears. Shortly after production commenced however, the wings were clipped by 5 ft. 8 in. to improve the rate of roll, and the Meteor

finally emerged in its standardized and now familiar form. Power on both the earlier Mk. 4s and the present version is provided by the 3,500 lb. s.t. Derwent 5s.

Capabilities of the Meteor 4 were amply demonstrated on November 7th, 1945, when a long-span version, flown by Group Captain Wilson established a world's air speed record of 606 m.p.h. Group Captain Donaldson, flying a similar Meteor 4 in September, 1946, raised the record to 616 m.p.h. Best known of all Meteor variants, the Mark 4 is at present the standard equipment of Fighter Command.

Characterized by a long, slender fuselage, with the cockpit well forward; low, square-cut wings with two long, centrally mounted nacelles, and a high-mounted tailplane to avoid the jet-exhausts, the Mk. 4 is easily identified. General particulars are :

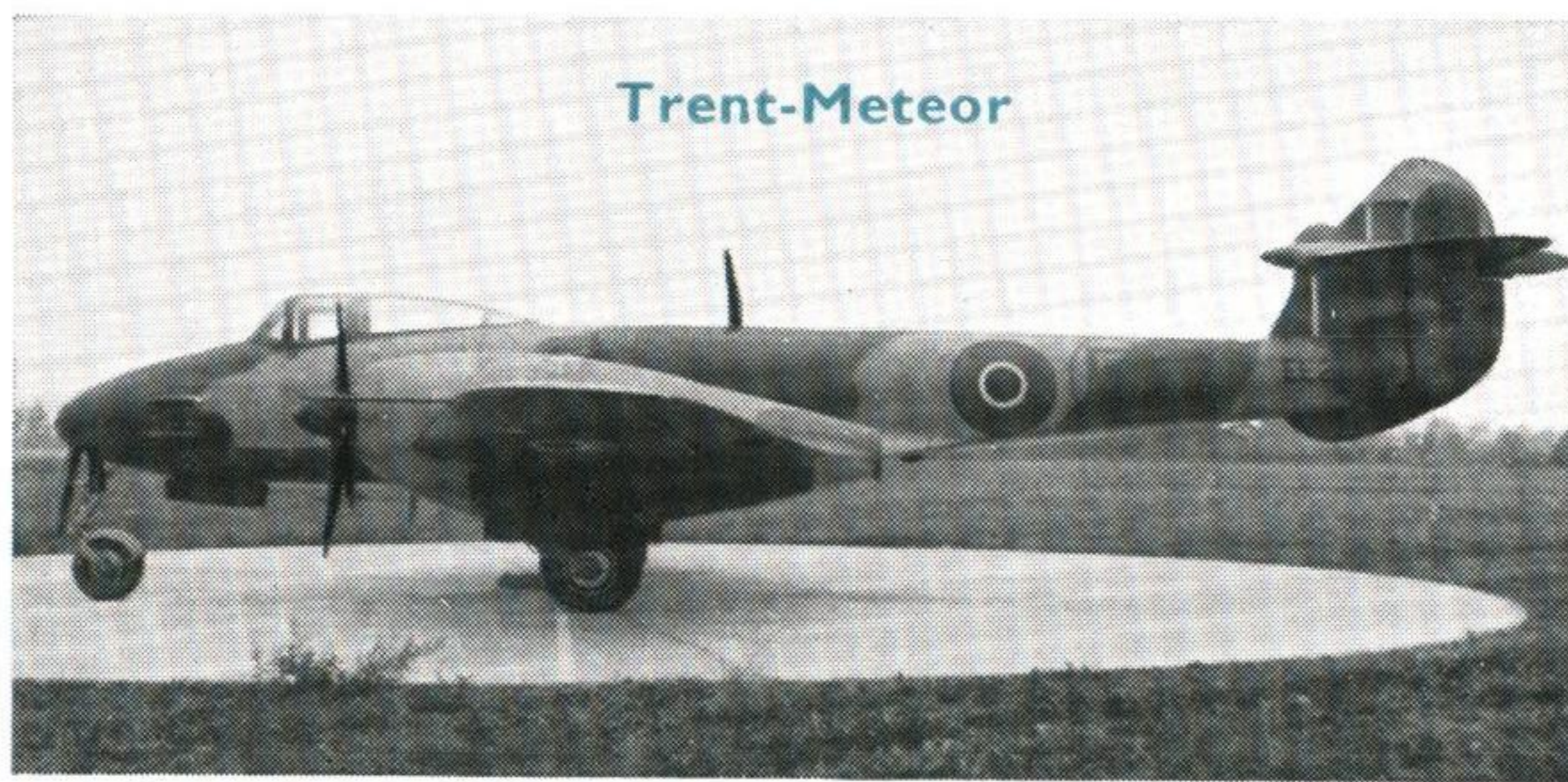
Span : 37 ft. 2 in ; length : 41 ft. 0 in. ; wing area : 350 sq. ft. ; normal loaded weight : 15,175 lbs. ; max. speed at sea level : 585 m.p.h. ; max. still air range : 950 miles at 450 m.p.h. at 30,000 ft. ; service ceiling : 44,500 ft.

Although the Meteor F Mk. 4 is normally operated in its primary rôle of high-altitude interceptor, it is also suitable for use as a fighter-bomber, ground-attack fighter, or reconnaissance aircraft. As on earlier versions, the fixed armament comprises four 20 mm. cannon mounted in the nose, but in addition, two 1,000 lb. bombs or eight 90 lb. rocket projectiles may be carried beneath the wings.

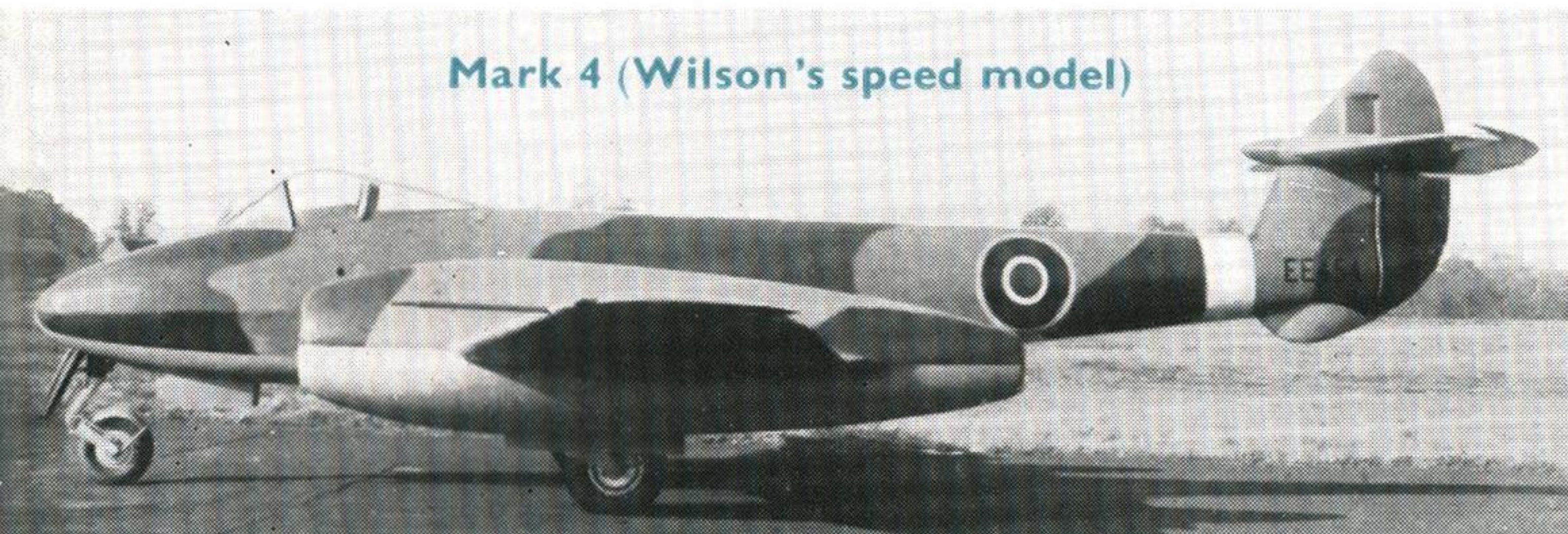
Three experimental Mk. 4s include a version fitted with two Metrovick Beryls, the Meteor demonstrated at Farnborough in 1949 with two 6,000 lb. s.t. Rolls-Royce Avons, and the standard version with reheat units. By far the most powerful single-seat aircraft in the world, the Avon-Meteor has a phenomenal performance, with a rate of climb approaching 10,000 ft. a minute. The appearance of Rolls-Royce reheat units brings to a successful conclusion the experiments begun in 1944. Meteors fitted with reheat units, which serve to assist take-off, rate of climb and combat performance, are distinguishable by their greatly extended nacelles.

The enormous strides made in the development of operational jet aircraft have necessitated the design of a

Trent-Meteor



Mark 4 (Wilson's speed model)

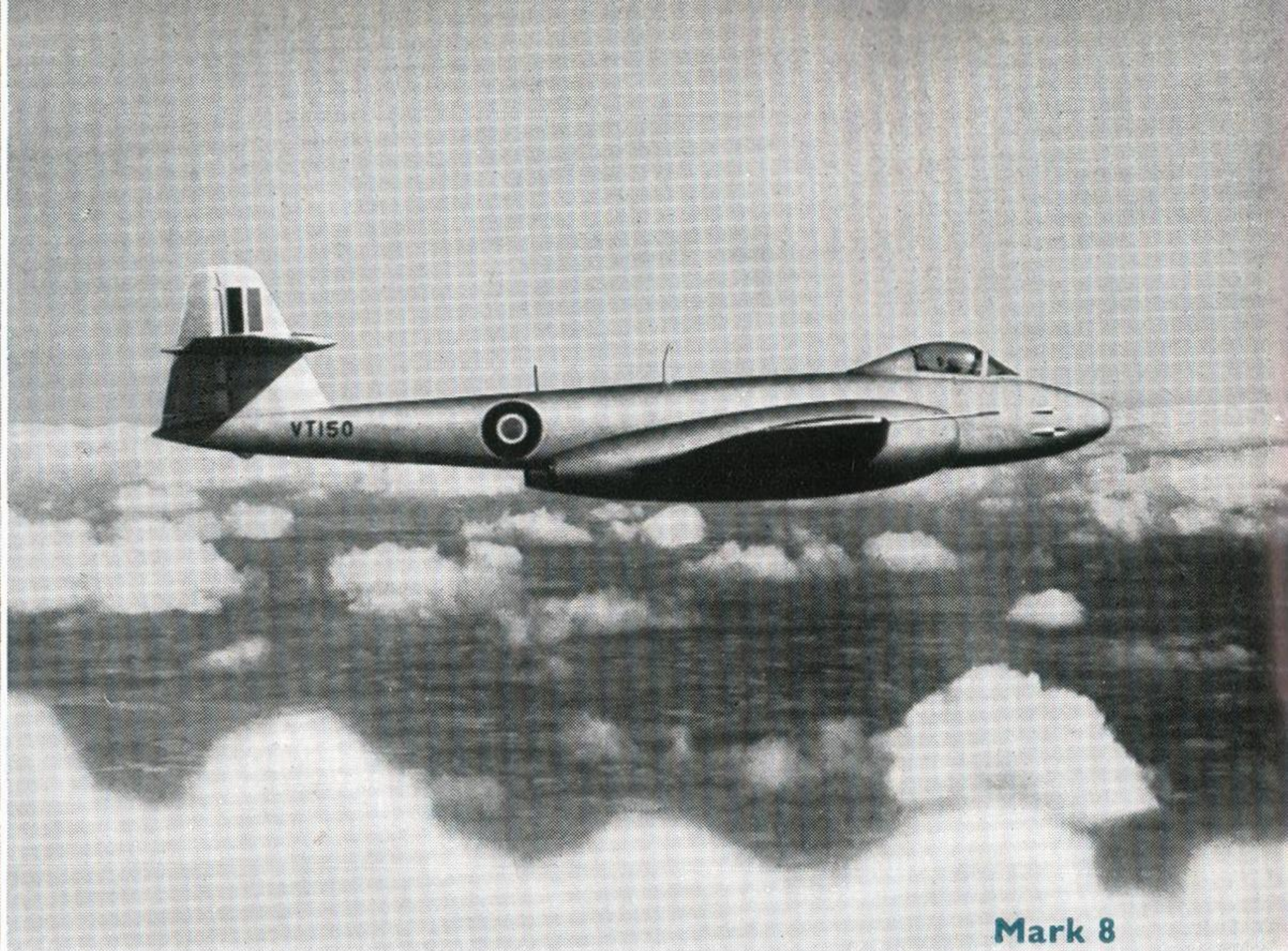


Mark 7





Mark 4



Mark 8

suitable two-seat dual control jet-trainer, enabling pilots to undergo a safe conversion course from aircraft with piston engines. Achieving this end, the Meteor T Mk. 7 is now used by the R.A.F. and the Air Forces of Western Europe to familiarize fully-fledged pilots with the flying and navigational techniques associated with high-performance jet-fighters. In this country the T Mk. 7 has also been introduced to convert trainee pilots from basic trainers and Harvards to Meteors and Vampires. A lighter aircraft than the Mk. 4, the T Mk. 7 follows the long-nose trend set by its immediate predecessor, but an additional seat and duplicate instruments occupy the position of the extra fuel tank. No armament is carried on the trainer version and the lengthened cockpit canopy has been revised to hinge sideways.

Representing the first complete breakaway from the original F.9/40 design, the Meteor F Mk. 8 is the last of the line on which information is available. Outwardly, the most striking difference lies in the redesigned fin, rudder and tailplane, but a further departure in outline may arise from the fitting of wing drop-tanks in addition to the ventral fuselage tank.

The Mk. 8 incorporates the lengthened nose of the two previous versions and has a single-piece cockpit cover of improved aerodynamic form. A Martin-Baker ejector seat originally tested in a converted two-seat Meteor Mk. 3 is fitted.

It is expected that the handling qualities of the Mk. 8 at high altitudes will be a great improvement over those of previous versions. Two Derwent 5s are fitted and the armament remains the same as on the Mk. 4.

Details of the Mk. 8 so far released are :

Span : 37 ft. 2 in. ; length : 44 ft. 7 in. ; height : 13 ft. 10 in. ; max. speed : 600 m.p.h. plus.

Extensive research and flight-development tests with the Meteor to meet service requirements, have brought into existence a number of experimental derivatives. During 1945 a modified Mk. 1 was used to flight test the Rolls-Royce Trent turboprop. Small inset fins were fitted to the tailplane, and the undercarriage struts were lengthened to provide the airscrews with sufficient ground clearance.

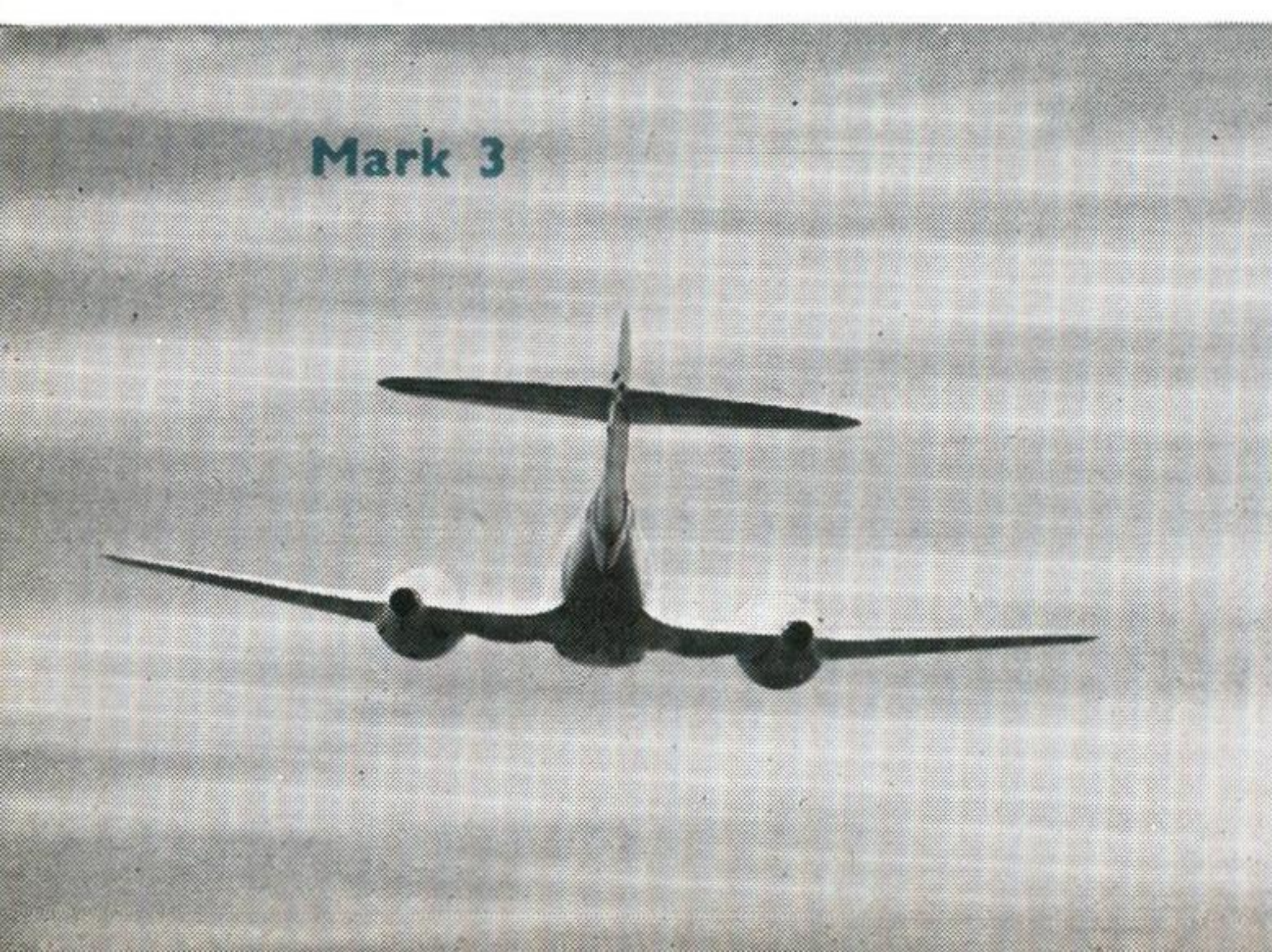
Later, in 1948, a suitably navalized Meteor successfully complete deck-landing trials held on board H.M.S. Implacable and H.M.S. Illustrious. The naval Meteor was basically a Mk. 3 airframe, powered by Derwent 5s as installed on the Mk. 4, and fitted with a deck-arrester hook.

Potential value of the Meteor as a long-range escort fighter, when used in conjunction with tanker aircraft, was forecast by the successful flight-refuelling experiments, culminating on August 7th, 1949. A Meteor was then maintained in the air for twelve hours by a Lancaster adapted by Flight Refuelling Ltd., as a tanker. Flying a total distance of roughly 3,600 miles, the Meteor was refuelled ten times.

Concluding this brief survey of Meteor modes, it remains to affirm the belief that the Meteor, in successively improved versions, will remain in service for many years hence. There is little doubt that it will be recorded in the history of military aviation as one of the greatest aeroplanes ever built.



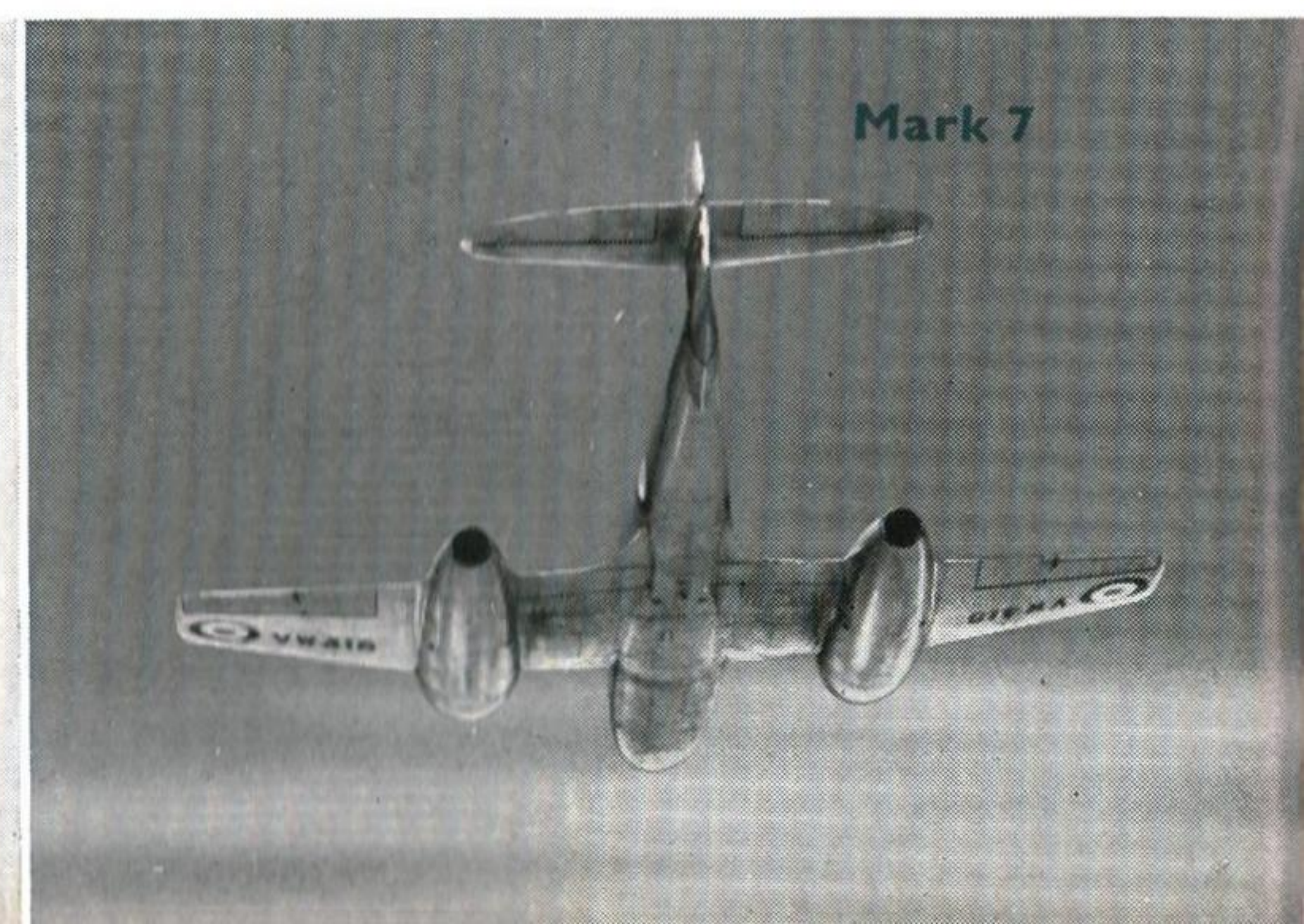
Mark 8



Mark 3



Mark 4



Mark 7

TURBOJET FUEL ECONOMY

Present-day airliners are the spotter's daily bread. We may expect less spotting practice from jet airliners (though there will still be plenty of chance to see them at low altitudes) because they prefer to fly high to work efficiently. This article, based upon material supplied by the Society of British Aircraft Constructors, explains why.

THE PRELIMINARY TRIALS of the de Havilland Comet jet airliner are moving unusually fast and have exceptionally wide scope. Normally aircraft manufacturers make tests to satisfy themselves that a new aeroplane handles well and fulfils its specification before sending it to a Government airfield for test by official pilots and flight observers. After that if the official tests satisfy the authorities that the airliner is safe under normal conditions of flight they issue it with a Certificate of Airworthiness and the next stage—that of proving its suitability for airline service—generally falls upon the airline operator who is to use it.

Much new ground in manufacturers' tests has been broken with the Comet. It has made landings at London Airport and has flown from London to Castel Benito (Tripoli) and back—two radical departures from common practice. There is the prospect too that de Havillands will themselves undertake the first proving flights over the routes over which the Comet will be operated as well as tropical trials and performance tests from high altitude airports.

At London Airport the Comet was put into the traffic circuit and "brought in" with the help of the normal airfield navigational aids. These included Ground Controlled Approach, in which the aeroplane is "talked" down by radio-ed instructions to the pilot.

The trip to Tripoli was the first of a number of long-distance flights which the Comet is scheduled to make in the course of fuel consumption tests. No official figures in connection with the first flight have been issued, beyond those for cruising height (35,000 ft.) and the average speed (450 miles-an-hour).

Fuel costs in airline operation are heavy and every device, mechanical or operational, is used to cut them down. Big airliners like the piston-engined Hermes, Tudor and Canadair, average, roughly, about a mile per gallon. Jet-propelled airliners, like the Comet, developing far more power, might in some circumstances cover only three-quarters or even half-an-mile to the gallon.

Safety demands that airliners always start with (or be in a position to pick-up in flight from an airborne tanker) a large fuel reserve, over and above the quantity required for the journey, in order to guard against unforeseen delays and diversions. On short stages this sometimes means that the reserve exceeds by a large margin the amount required for the journey.

It is sometimes necessary to provide against a diversion of 100 miles at the end of a stage; then for a second diversion of the same distance; then for a 45-minute "stand-off" waiting to land. These safeguards are less burdensome on long stages, but every gallon of petrol that need not be carried saves seven pounds in dead weight and every gallon of kerosine—the fuel commonly used by turbojet and turboprop engines—saves eight.

Both turbojet and turboprop engines naturally have optimum operating conditions—as have piston engines—in which they do best work for the fuel burned. Long-distance flights by the Comet, equal to the stage lengths it will fly in service, have disclosed its optimum conditions. Cruising speed is 490 miles-an-hour at 40,000 ft. What has to be discovered, among other things, is whether better fuel consumption comes from a gradual climb to 40,000 ft. (taking advantage of the fall in the aeroplane's all-up weight as fuel is burned), or from a quick climb to 40,000 ft. without waiting for the weight to drop. The best method of coming down from 40,000 ft. for best consumption will also emerge from flight tests.

If a jet airliner is unduly delayed in landing at the end of its journey because of traffic congestion or bad weather its much higher rate of fuel consumption compared with the piston-engined airliner's puts it at a great relative disadvantage.

Piston-engined airliners can cruise at a low but safe flying speed using up fuel slowly while waiting. This technique is particularly difficult for the jet-propelled airliner, which gets a poorer yield from fuel burned the lower and slower it flies. The problem must be met by adapting the air traffic control system to the jet airliner's characteristics.

On the other hand, turbo-prop-engined airliners—certainly those with four engines giving an ample power reserve—can reduce fuel consumption while waiting their turn to land by shutting down two of their engines completely. The drop in speed does not send up fuel consumption to any appreciable extent because the propellers of the turboprop keep up a high percentage of their propulsive efficiency even at a comparatively slow forward speed.

Jet engines, however, are sensitive to speed as well as to height but there seems every reason to believe that shutting down two engines would result in fuel saving without imperilling the safety of the airliner. The new traffic control system which the jet may impose upon the airways might be able to set the lowest "stacking" level far above that commonly used for piston-engined airliners today—in which case the jet engine would not suffer so great a disadvantage as that which it would undoubtedly have to accept if the level remained unchanged.

Economy in fuel consumption is not achieved only by operating under optimum conditions. The pursuit of better results goes on ceaselessly in design offices and at the benches of the aero-engine firms. Advancing slowly, by mere fractions of pounds per horse-power (or per lb. of thrust), the engineers are steadily diminishing the thirsts of turbojet and turboprop engines. Refinements, better fuels, higher compression ratios, improved metals, smoother airflows—all are making their contributions.

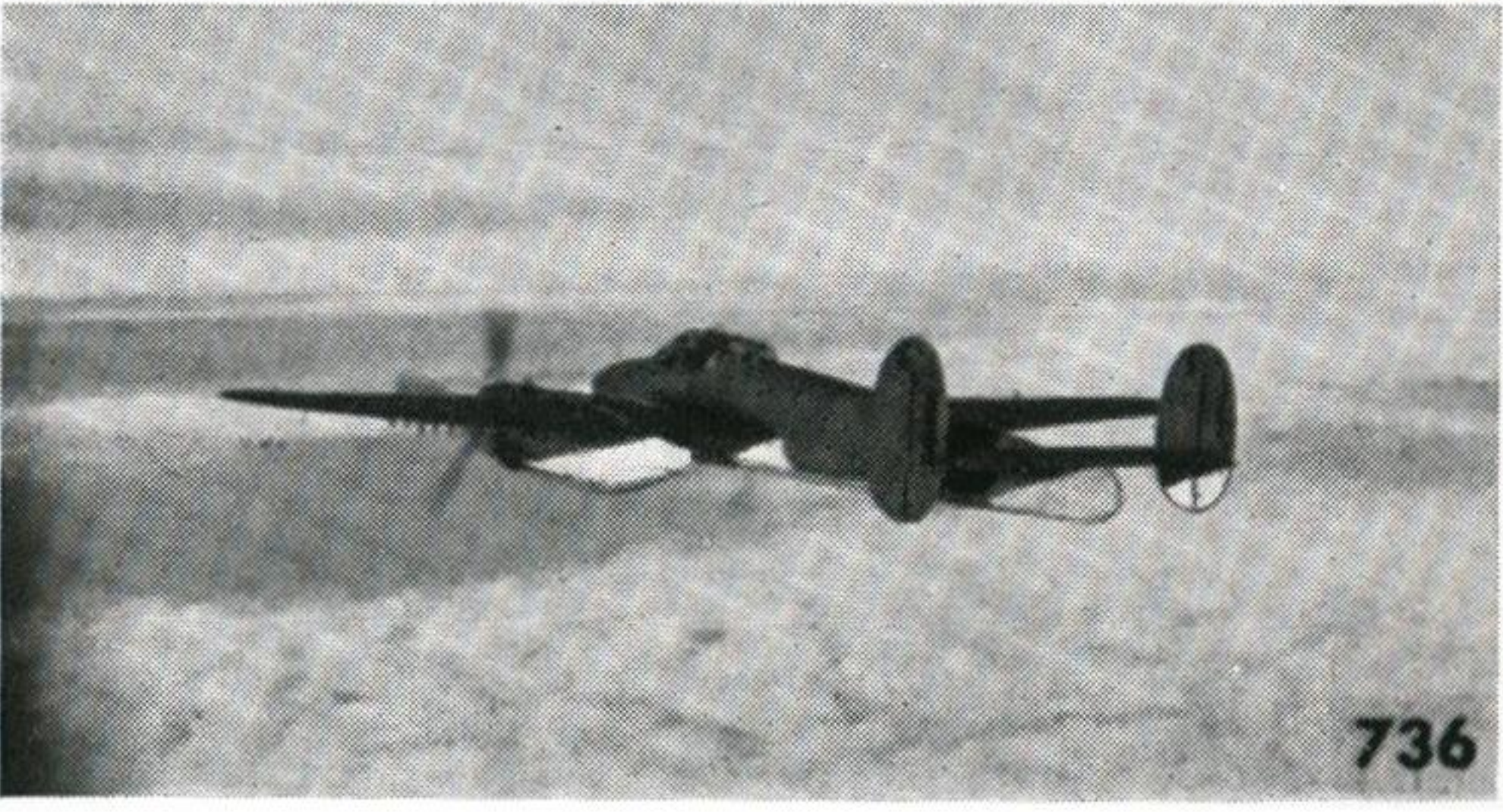
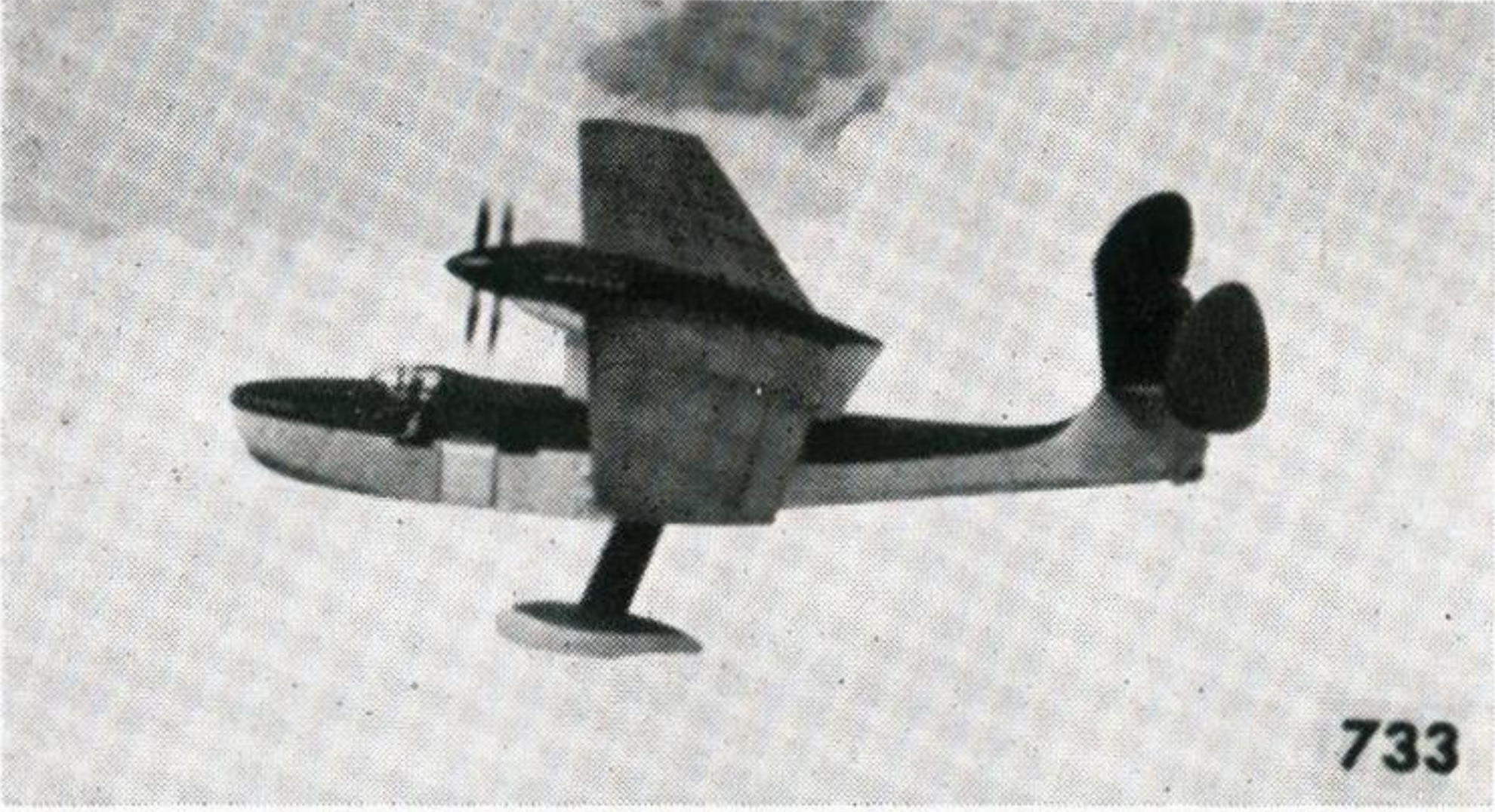
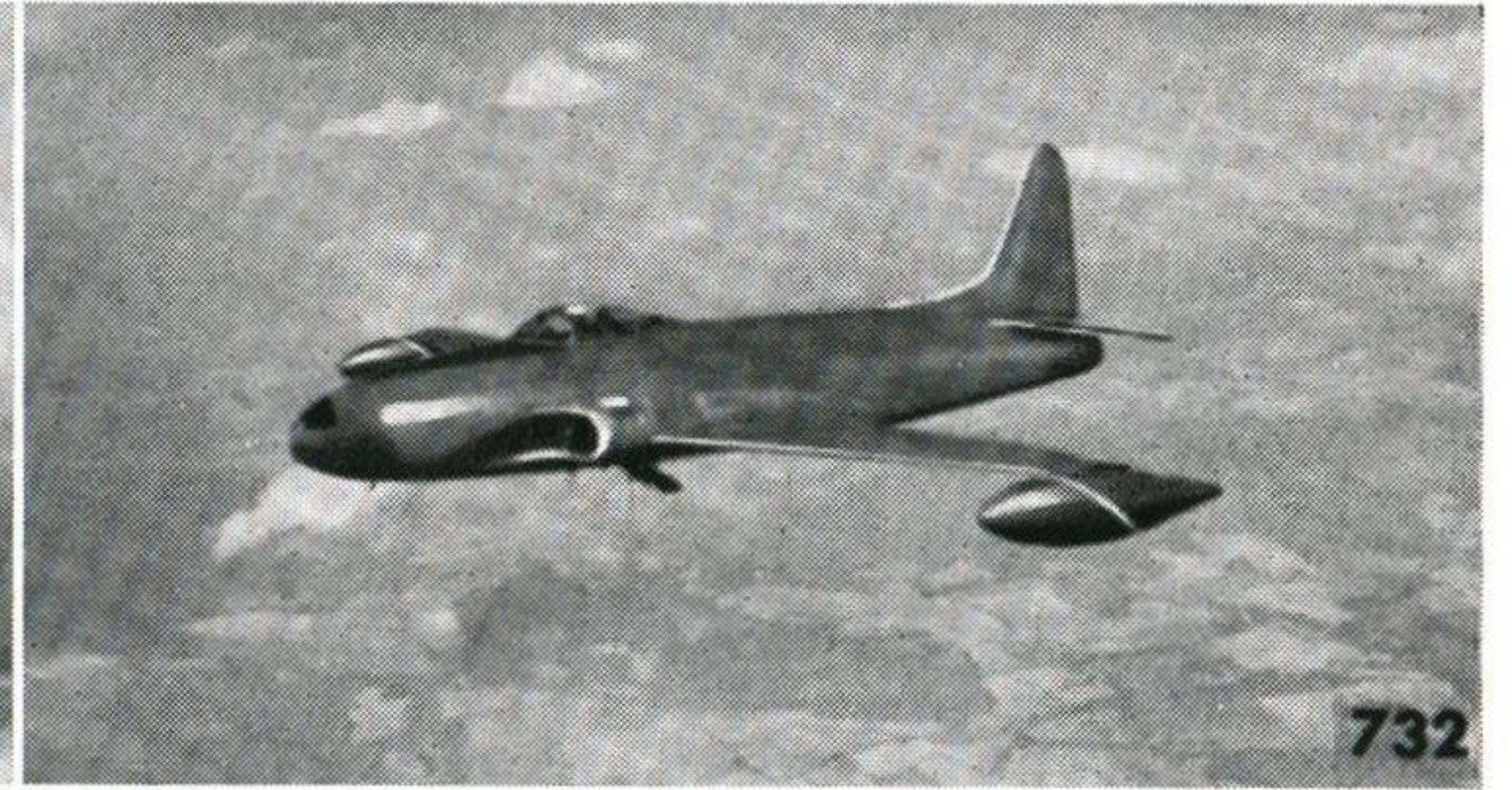
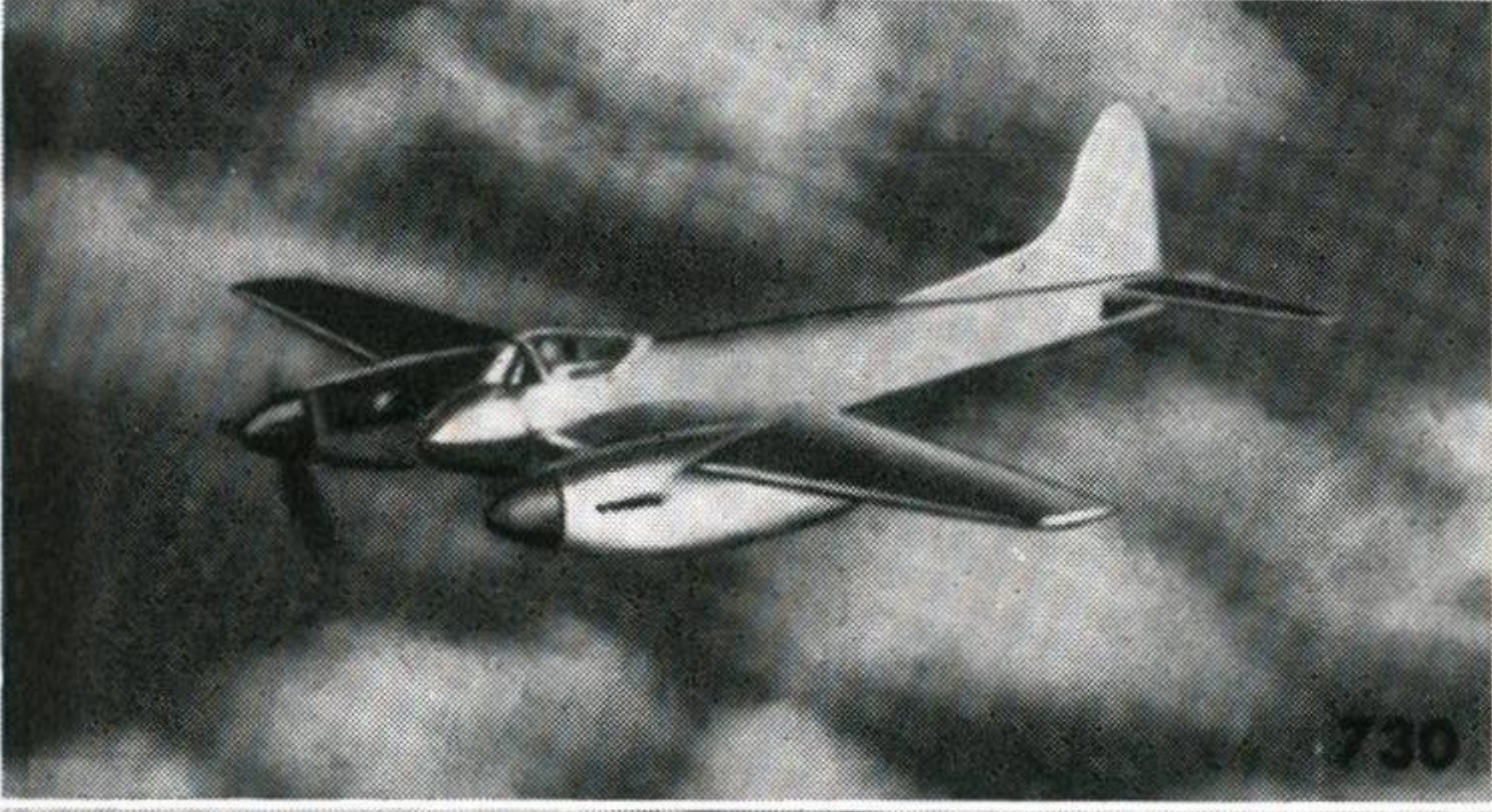
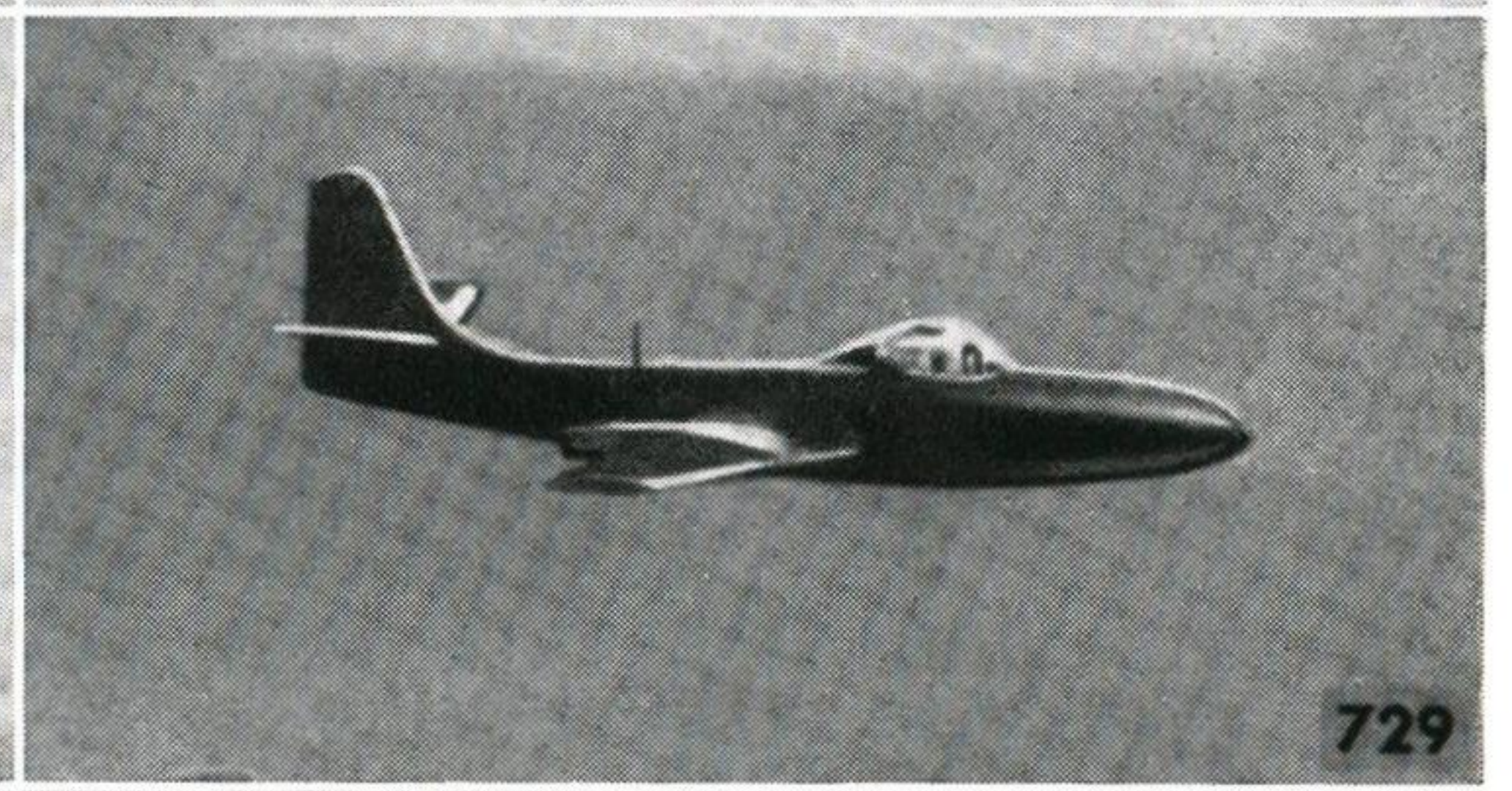
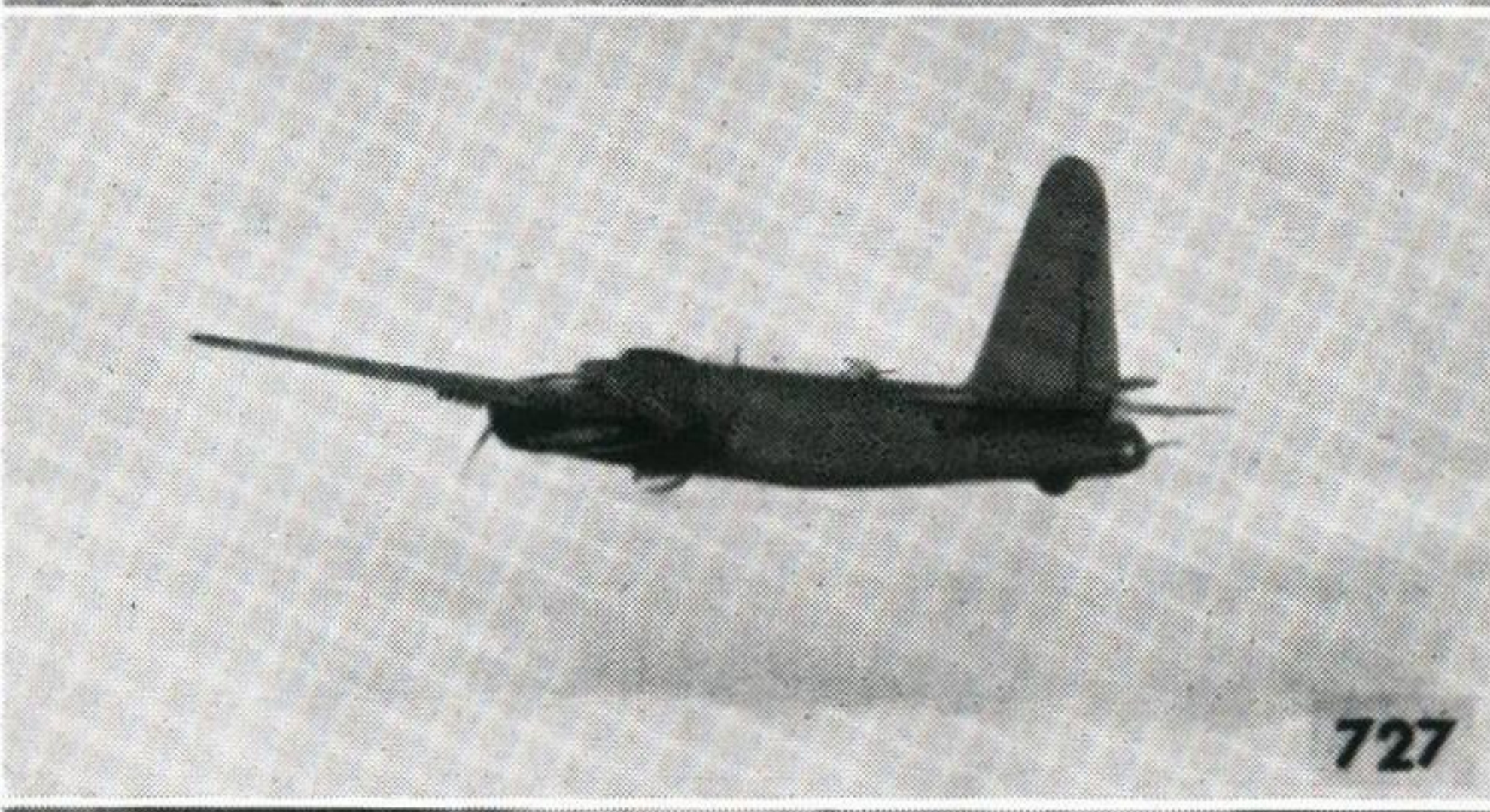
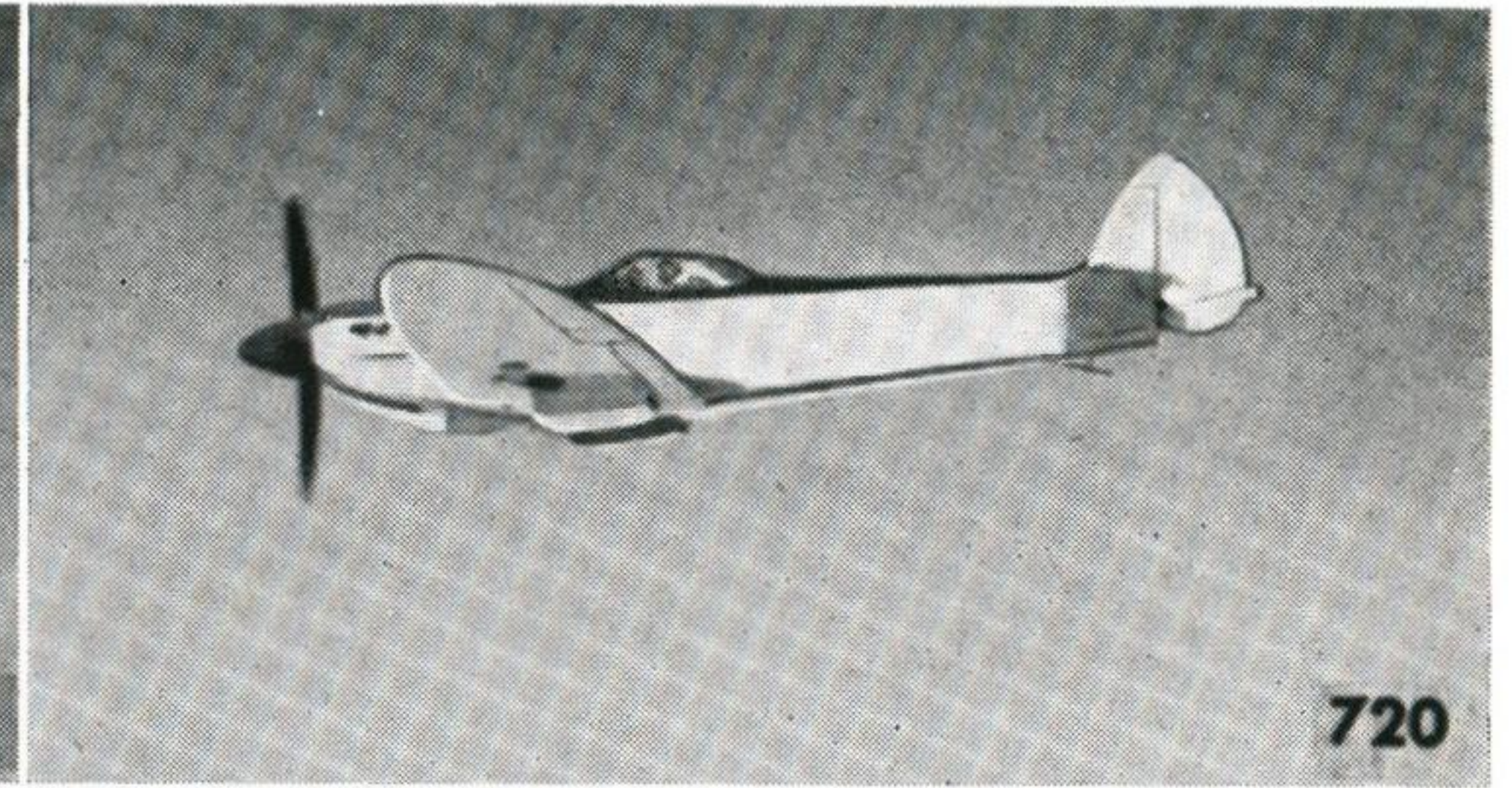
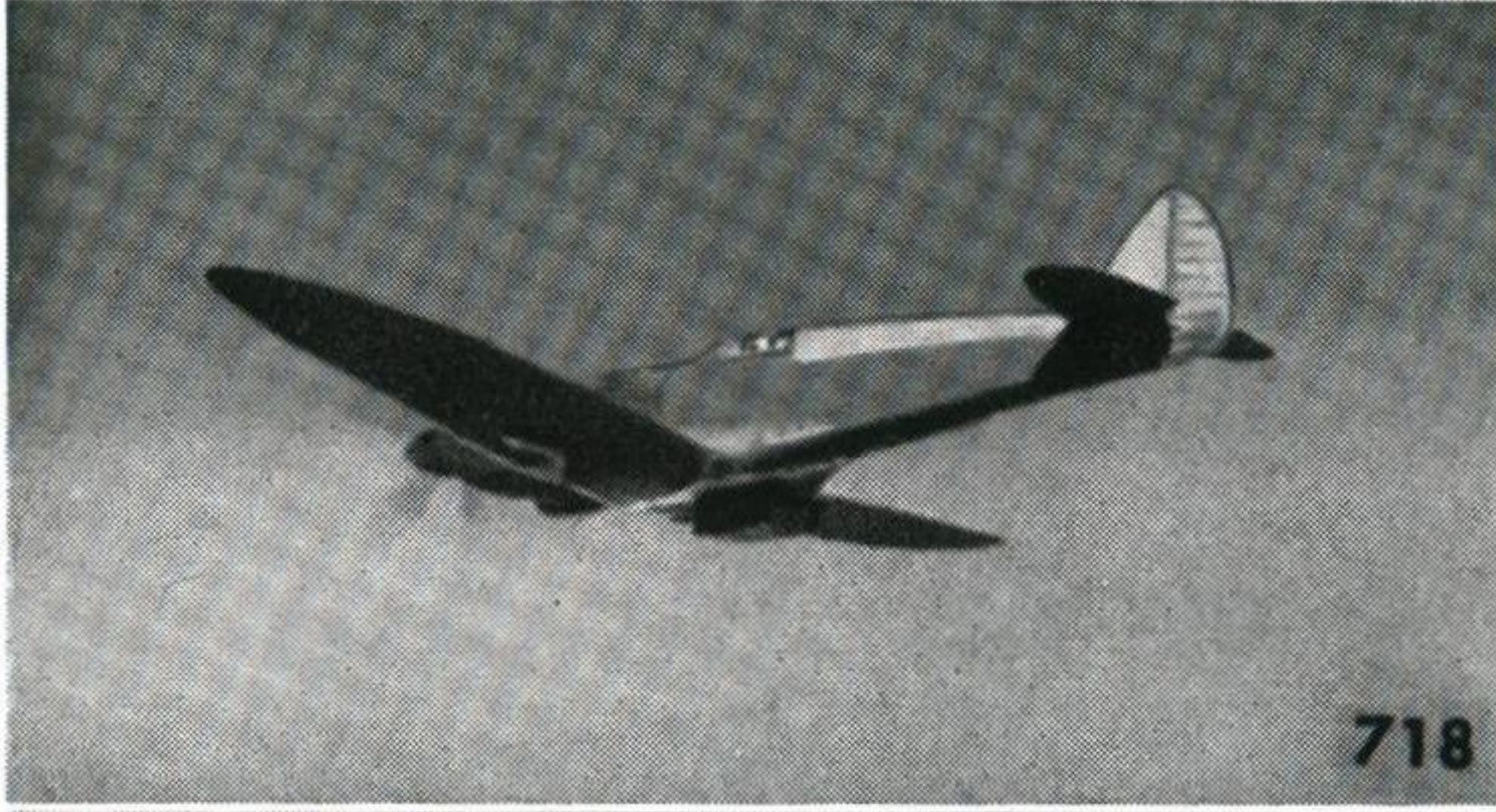
High fuel consumption is the price that has to be paid for high power and high speed. Combined, the Comet's four Ghost turbojets give 20,000 lb. static thrust, which is the equivalent of 20,000 horse-power at 375 miles-an-hour. At higher speeds it means greater power, but thrust normally falls off with height because of the drop in air density and the consequent impossibility of maintaining high output. The world's most powerful piston-engined airliner can develop no more than 14,000 horse-power, and cruises at a much lower rating.

The principal merit of a the jet airliner is its ability to fly fast. Its peculiar characteristics also require it to fly high to give the best results, and this confers a boon upon the traveller. He flies through air that is seldom disturbed and agitated by the vertical ascending and descending currents which, on occasion, can take all the pleasure out of air journey at lower levels.

In transportation, speed invariably brings its own reward. Jet-propelled airliners will cut present-day schedule times by half on many—though not all—air routes, and will cover twice the distance flown by contemporary airliners in a given time. By halving schedules they will double earning capacity, and change the whole structure of airline economics as understood today. In prospect, the benefits loom large.

De Havillands had such faith in the jet-propelled airliner that in contracting to build a fleet of Comets they accepted the risk of severe financial penalties should the new airliner fall short of stipulated performance. This probably explains why the manufacturers' trials are assuming their unusually broad character. De Havillands are clearly resolved to discover for themselves all that they need to know about the Comet before entrusting its testing to other hands. And of all the tests they have made and will make, none is more important than those relating to fuel consumption.

ELEMENTARY SPOTTING



CANBERRA

by Obs. R. A. McLEAVY,

19/Z.3 R.O.C.

VANGUARD of Bomber Command's jet-propelled striking force, the English Electric Canberra B Mk. 1 is now in quantity production for the Royal Air Force. The first prototype made its initial flight on 13th May, 1949 in the hands of Wing Commander R. P. Beamont.

A strikingly elegant twin-engine, mid-wing monoplane, the Canberra was designed under the direction of Mr. W. E. W. Petter, Chief Engineer of English Electric Aircraft Division. Mr. Petter was previously responsible for designing the Westland Lysander army co-operation aircraft and the Whirlwind fighter-bomber.

The Canberra has been developed from the outset to meet the requirements for a two-seat, high-altitude bomber, which would rely entirely on speed and high-performance at its operating altitude for defence. To obtain the best results it was decided to employ a low aspect-ratio wing with a light wing-loading, and also a smooth construction, devoid of the excrescences which normally house the "ironmongery" associated with the many demands imposed on modern service aircraft. The innumerable mechanisms have been satisfactorily embodied in the Canberra's spacious fuselage, and even the use of external aerials has been avoided. Wing sweep-back was considered unnecessary at the mach numbers normally to be attained by the Canberra when carrying a useful military load.

In the light of U.S.A.F. standards, it seems probable that the Canberra will be classified as a light bomber.

Power is provided by two Rolls-Royce Avon turbojets mounted in a "mid" position. Their small diameter has enabled them to be buried largely within the wing thickness. Two Rolls-Royce Nenes have been fitted experimentally to the second prototype. The turbojets are mounted just forward of the main spar and possess removable cowlings and inspection panels to facilitate maintenance. Engine replacement is straightforward and is accomplished by removing the detachable cowlings and lifting the engine bodily on a sling.

"Finger-type" dive brakes are fitted outboard of the nacelles and when in use, extend vertically from both upper and lower wing surfaces.

The fuselage, an all-metal stressed-skin structure, is circular in shape and built in three sections; the pressure cabin, centre fuselage and rear fuselage. Situated well ahead of the mainplane and the engines, the cabin is unusually quiet and is enclosed by a jettisonable teardrop

canopy. Access to the cabin is gained through a door on the starboard side of the fuselage. Pilot and navigator are seated in tandem; the navigator's position is externally apparent only by the window in the dorsal escape hatch. Cabin pressure is automatically controlled, but the temperature of the air is regulated by the pilot. The cabin is sealed off from the remainder of the fuselage by a pressure bulkhead; both pilot and navigator have ejector-seats for an emergency escape.

To minimise drag, the bomb doors are fitted with rollers which slide on curved tracks so that they retract well into the fuselage. They are operated through the medium of hydraulic jacks. Although the actual bomb load has not been revealed, it may be judged as being fairly substantial by the size of the bomb doors, which are about 22 ft. long. During well over 100 hours of flight testing carried out since the Canberra's maiden take-off, the bomb bay has been occupied by an automatic observer, which has provided valuable data concerning the aircraft's behaviour in flight.

Most unconventional feature of the Canberra is the variable incidence tailplane, introduced to give positive control at high speeds. The incidence is varied by a powerful electrical actuator which ensures irreversibility of control under any conditions of flight. Quick changes may be made in the fore and aft trim during take-off, flight and landing.

A nose-wheel type undercarriage is fitted with inward-retracting main wheels. The nose unit has two fully-castoring wheels—keyed together to prevent shimmy—and retracts rearwards to a hold aft of the cabin.

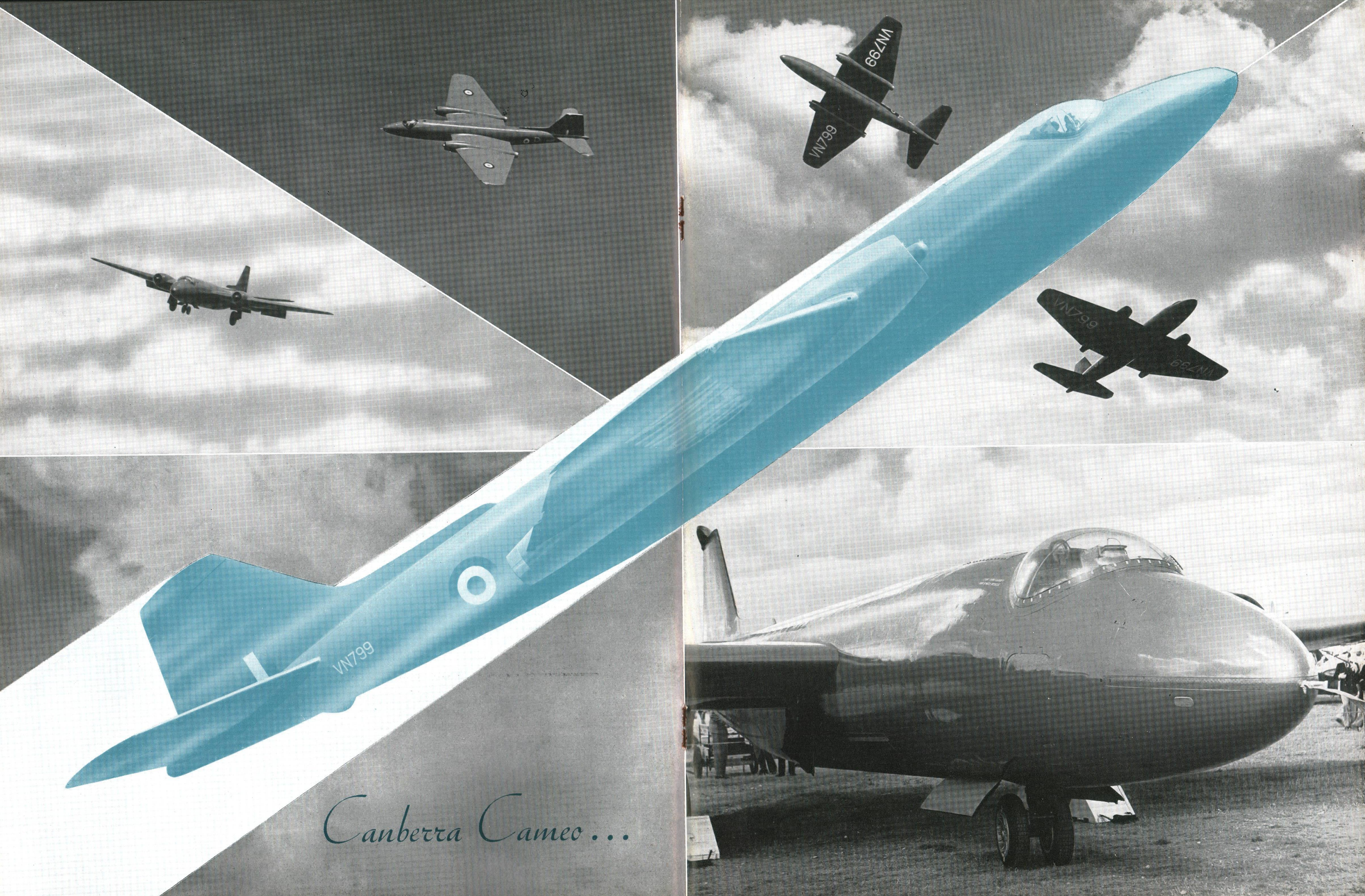
A readily apparent similarity in profile between the Canberra and the Meteor has, in certain instances, caused difficulty in recognition. Careful study of illustrations of the two aircraft at comparative angles of flight, should however, reveal the numerous differences in structure and outline, and persistent spotting practice merge detailed differences of each into its own characteristic identity. Main features of the Canberra are the cigar-shaped fuselage with turned-up tail and a small bubble canopy in the nose; wide-chord, equi-tapered mid-wing, situated half-way along the fuselage and mounting two small diameter turbojets; and the square-cut "Petter" fin and rudder. The tailplane has moderate dihedral to avoid the jet exhausts.

Jettisonable auxiliary fuel tanks may be fitted at the wing tips, and are discarded by means of explosive bolts.

The public demonstration of the Canberra at the S.B.A.C. Exhibition at Farnborough last year, left no doubt as to its remarkably high performance and fighter-like manoeuvrability. The future shines brightly for the Canberra, whose long awaited arrival should do much to maintain the prestige of the Royal Air Force in the rapidly advancing jet era.

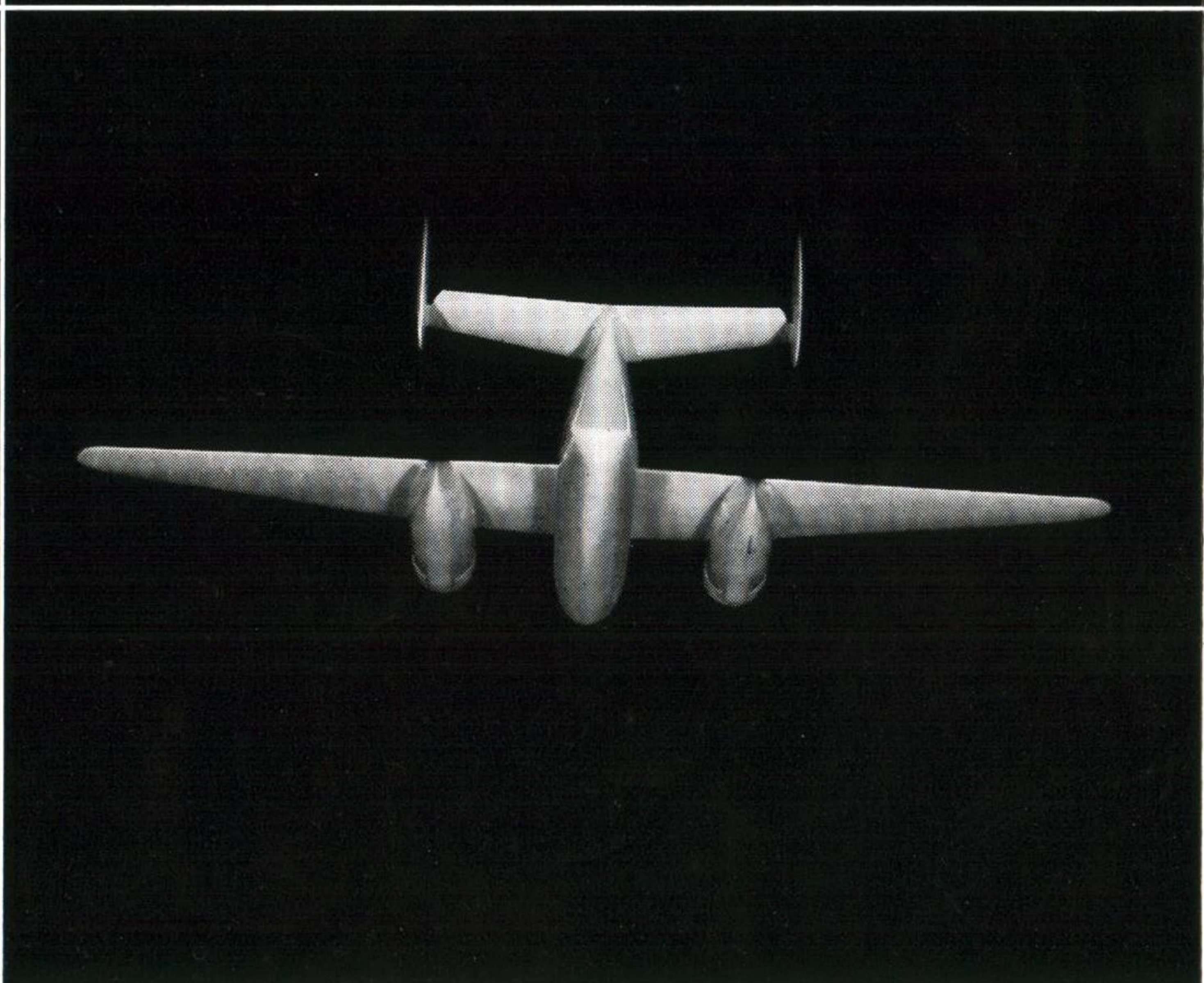
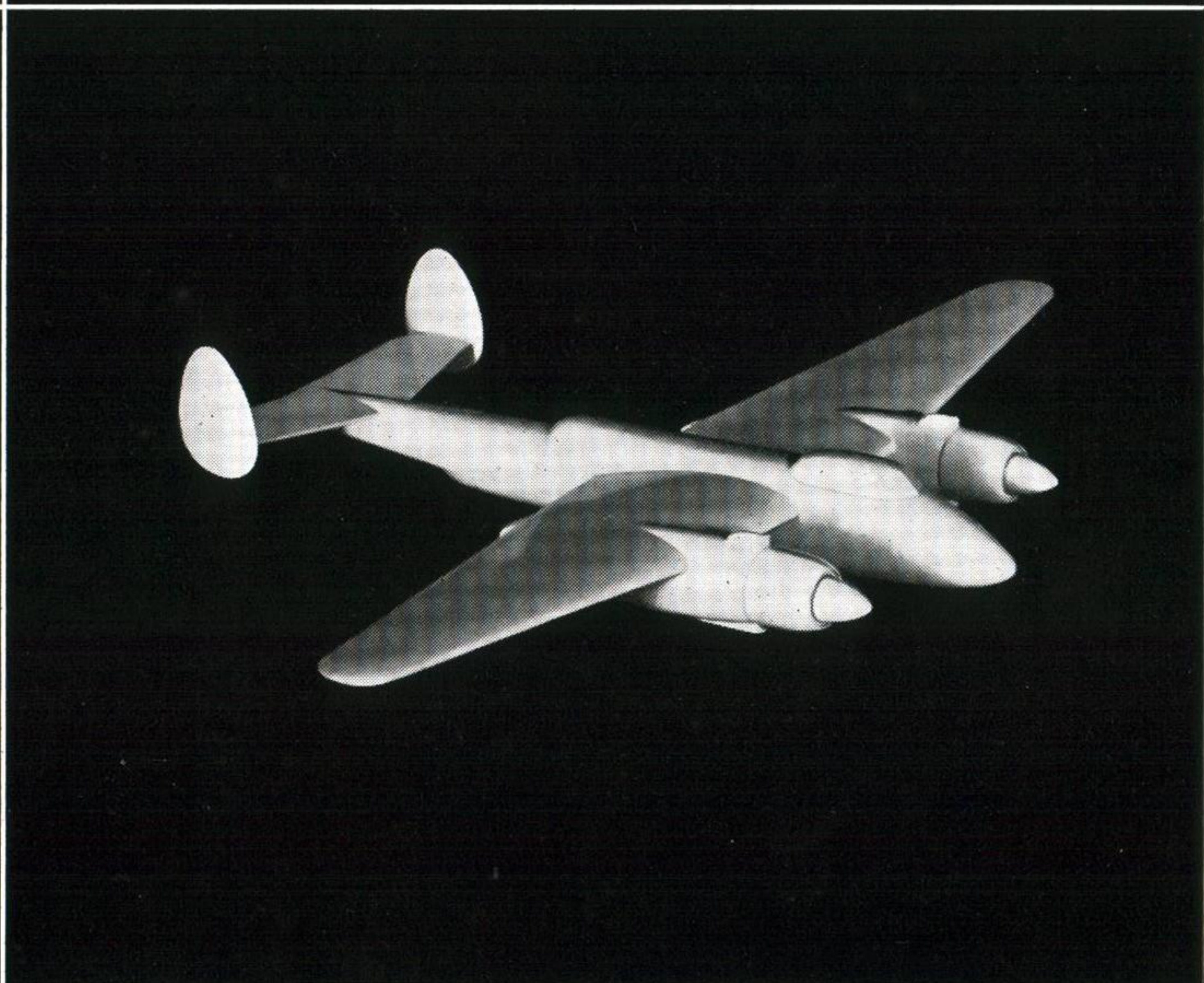
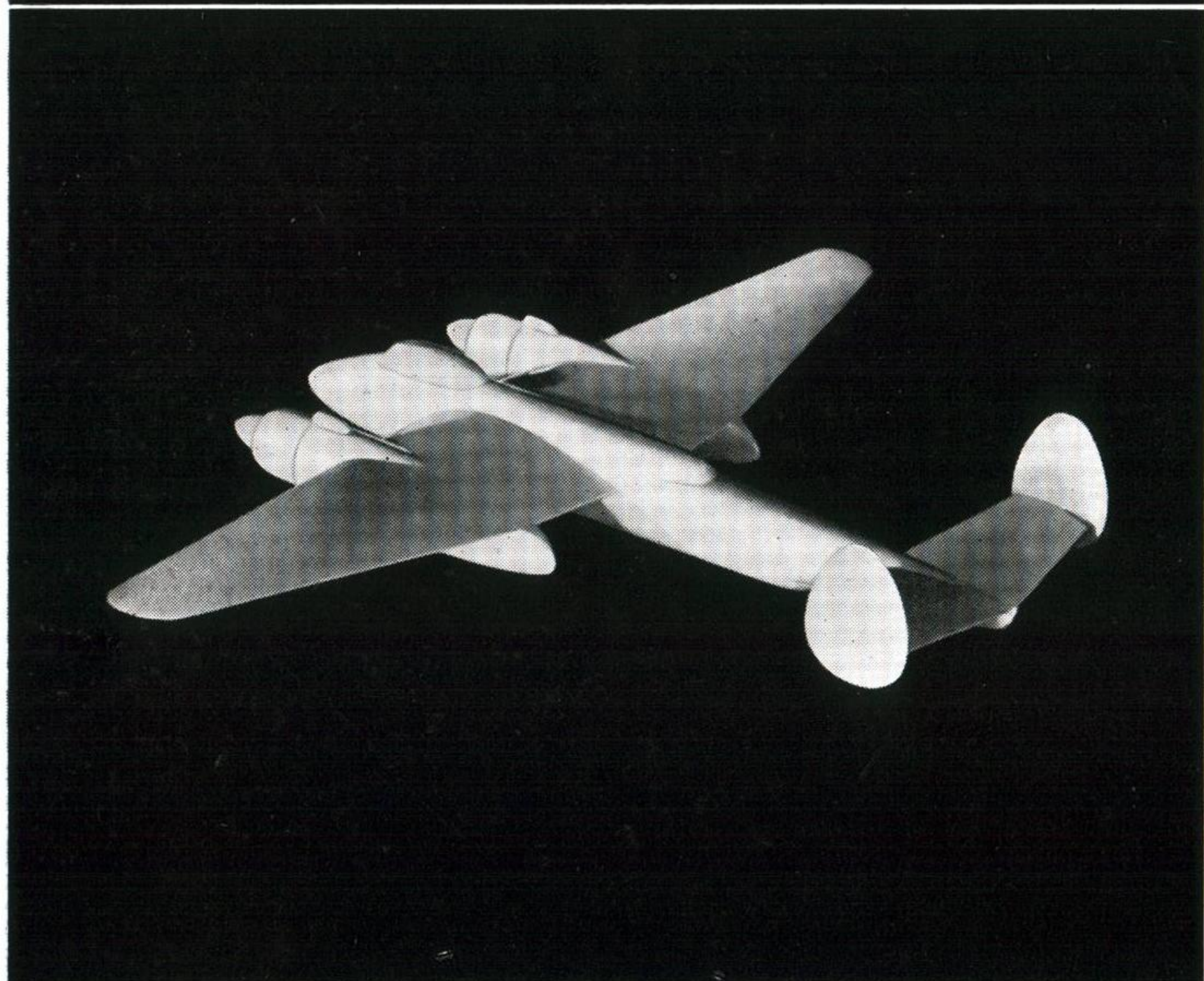
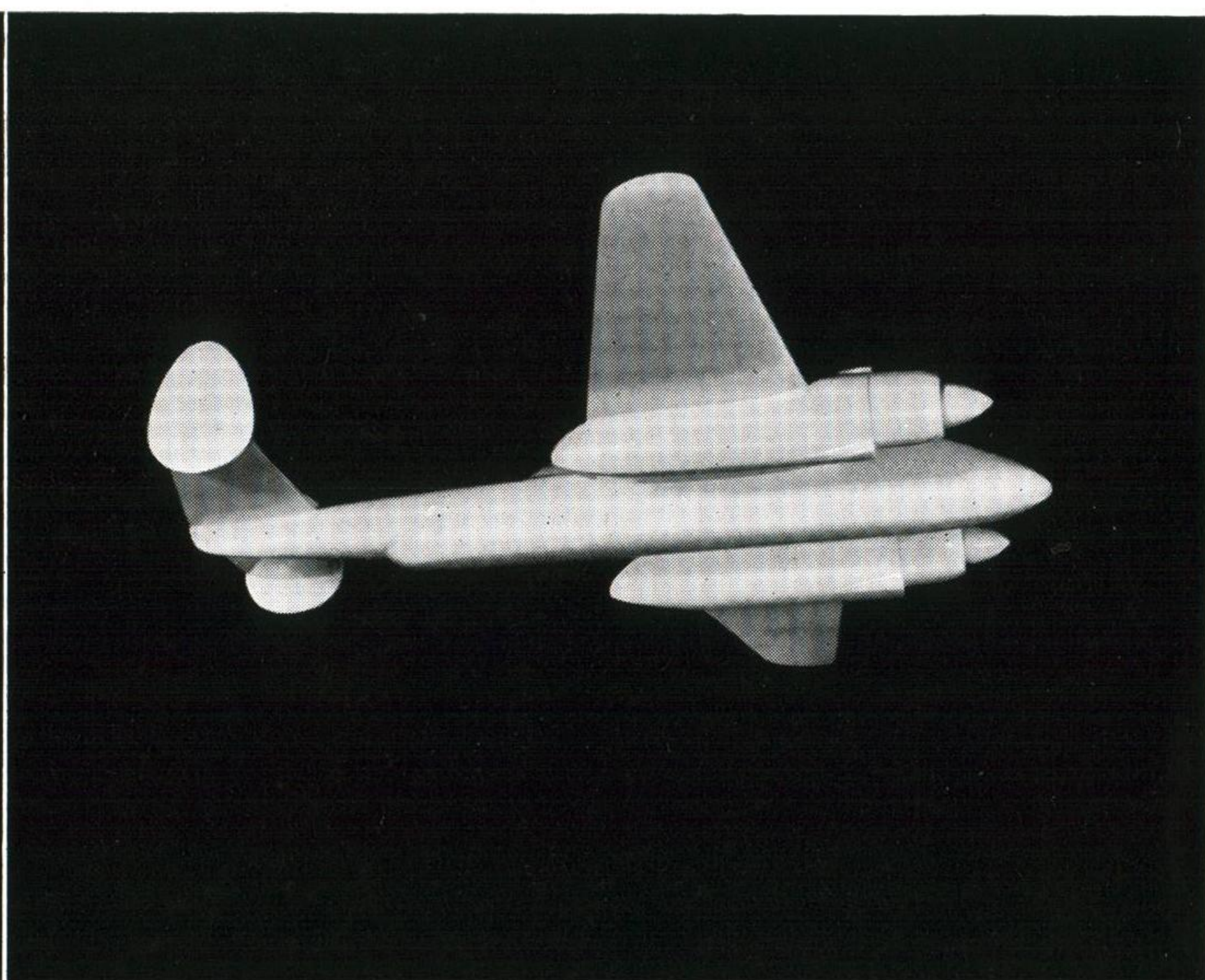
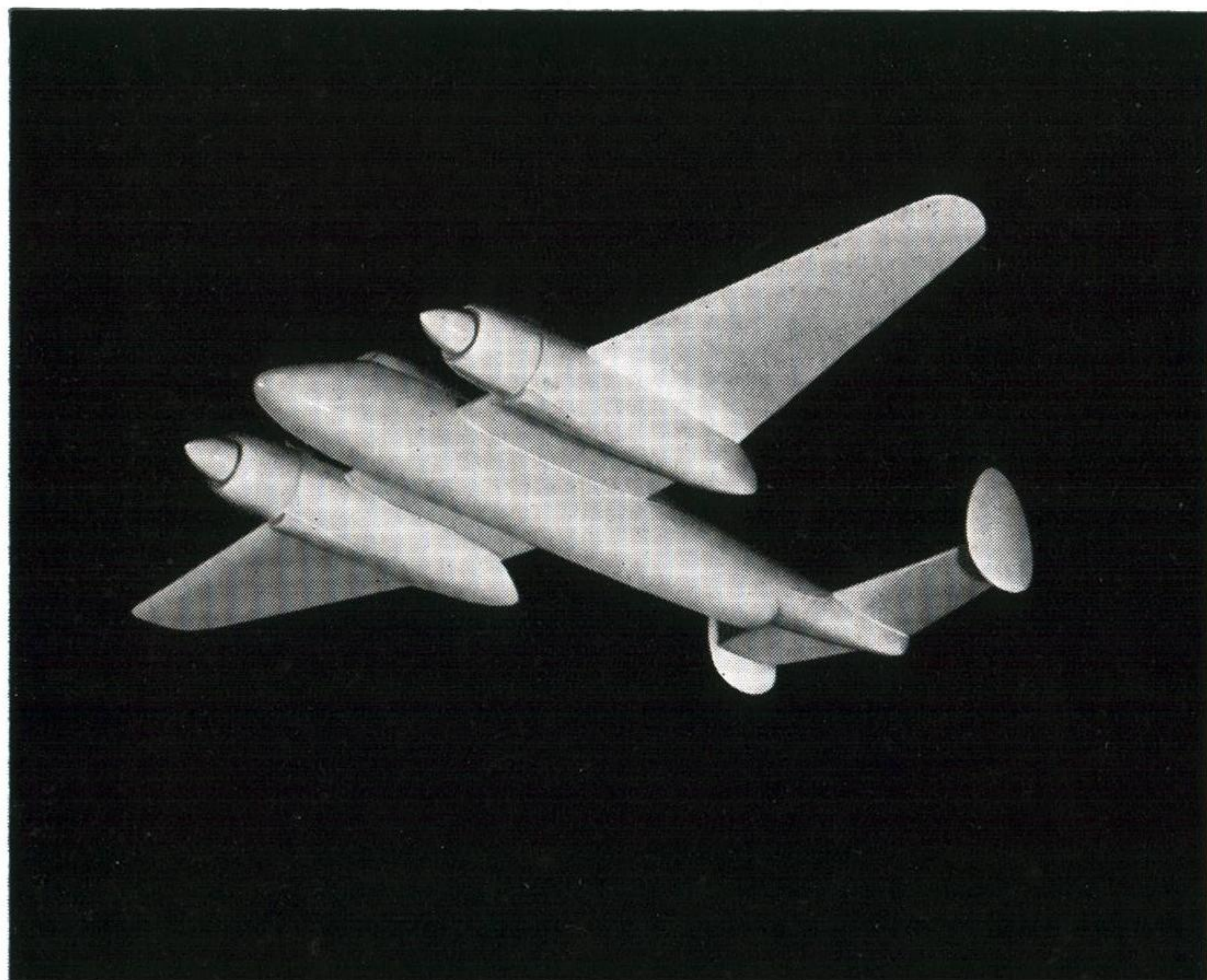
Leading particulars :

Span : 64 ft. ; length : 65 ft. 6 in. ; height : 15 ft. 7 in. ; gross wing area : 960 sq. ft. Aspect ratio : 4.3. No details of weights or performance are at present available.



Canberra Cameo...

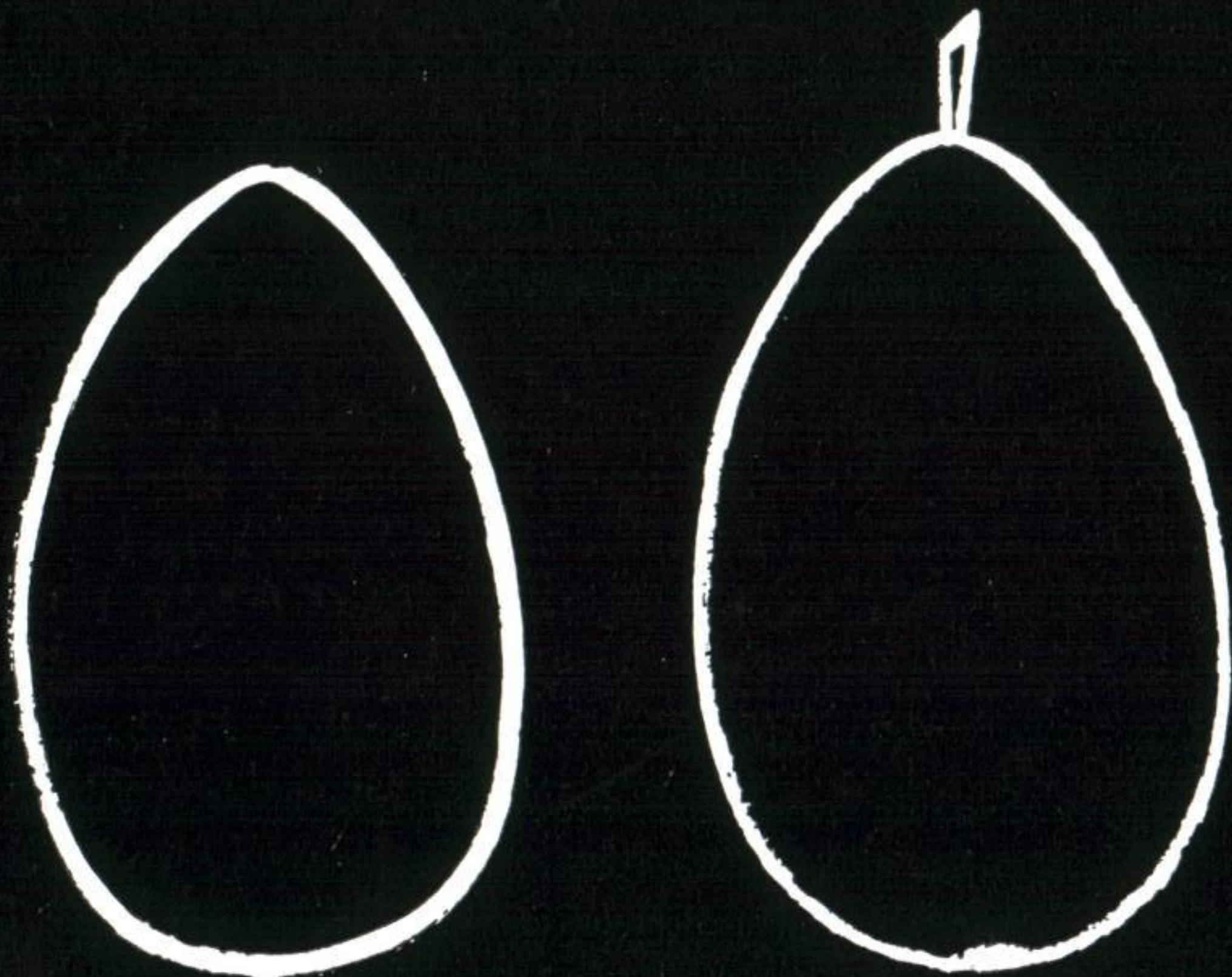
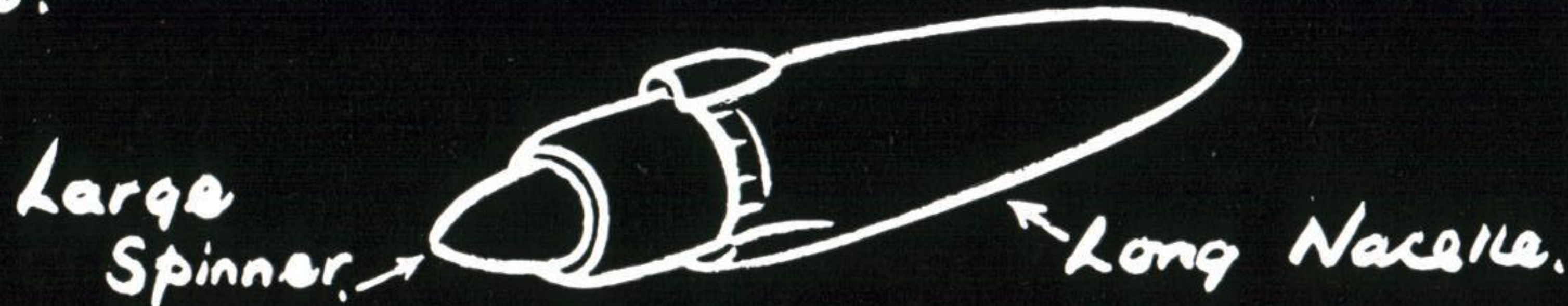
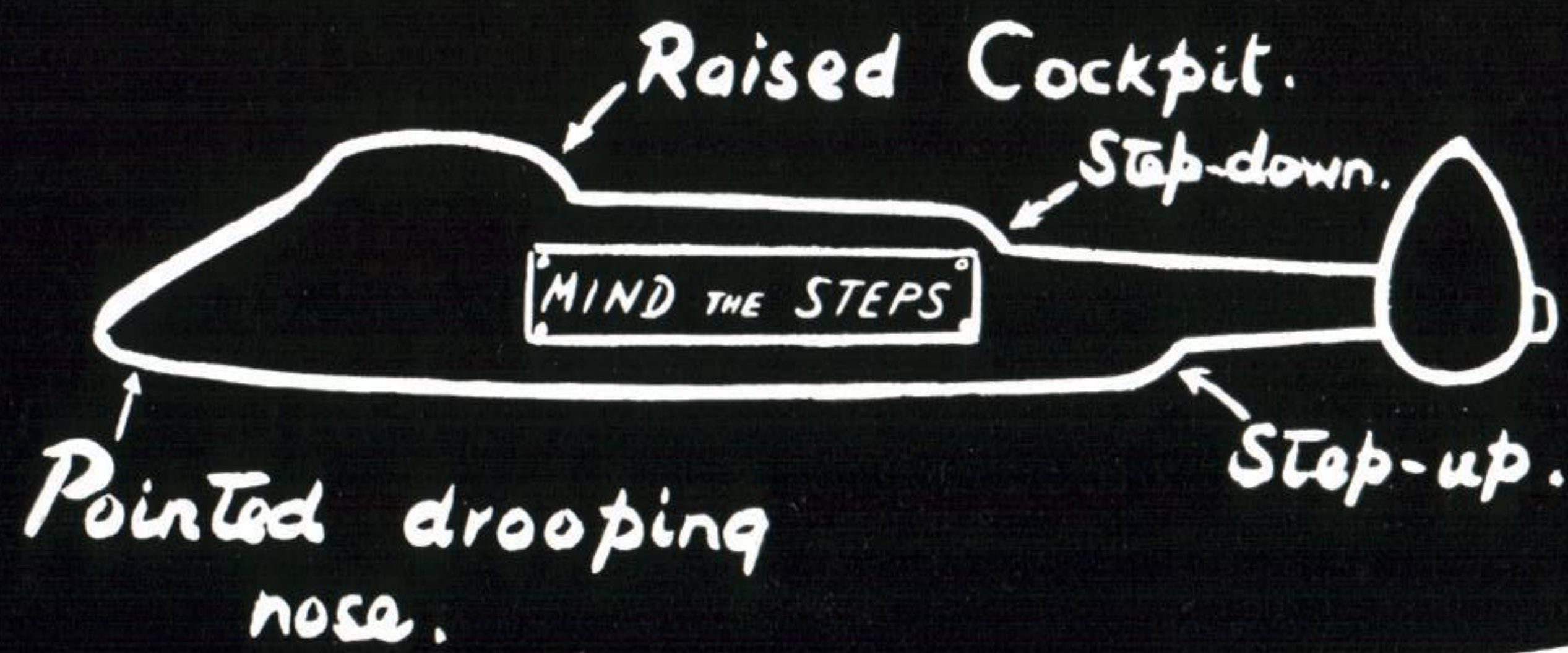
TUPOLEV TU-2



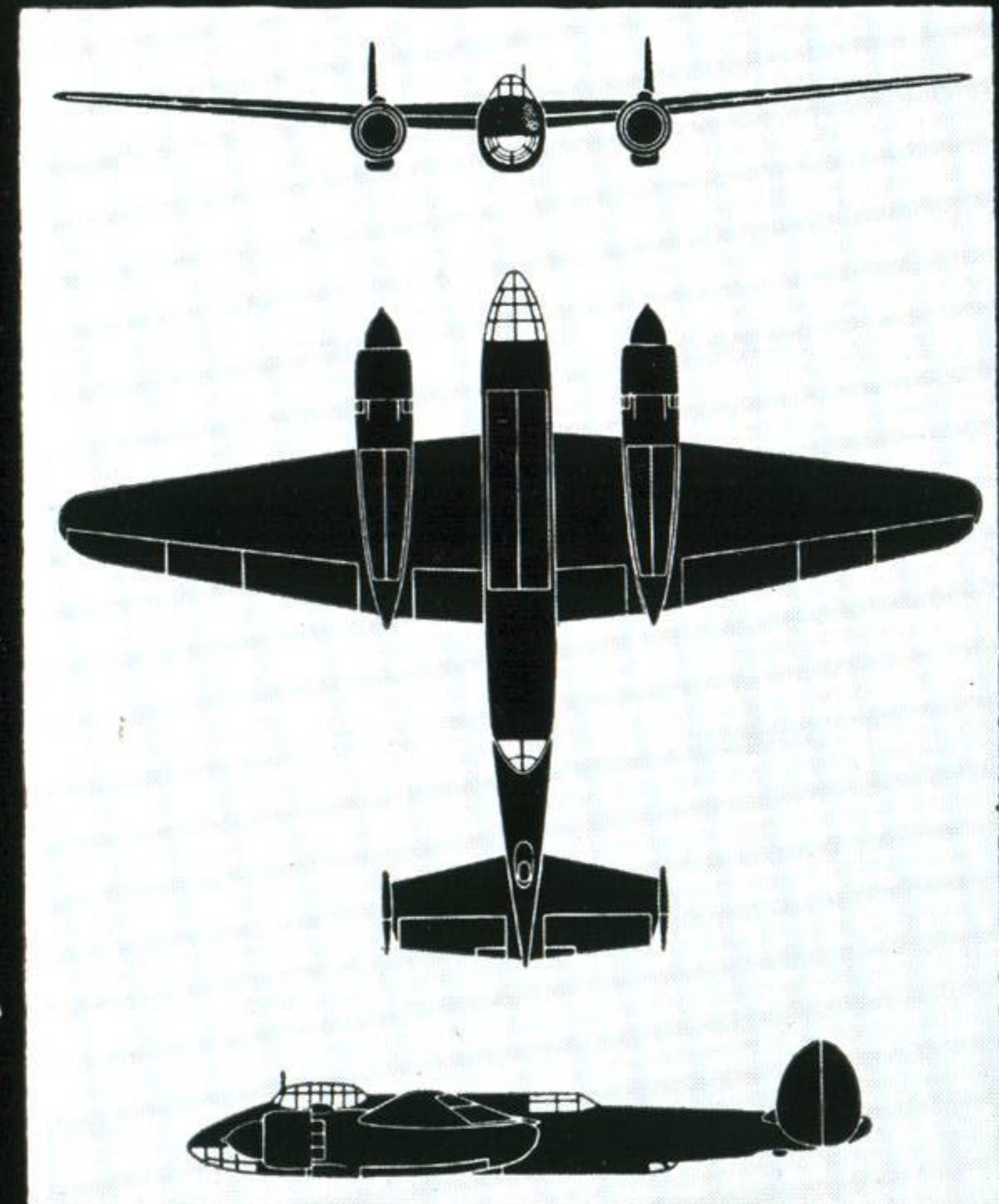
LECTURETTE

TU.2. (TY.2.)

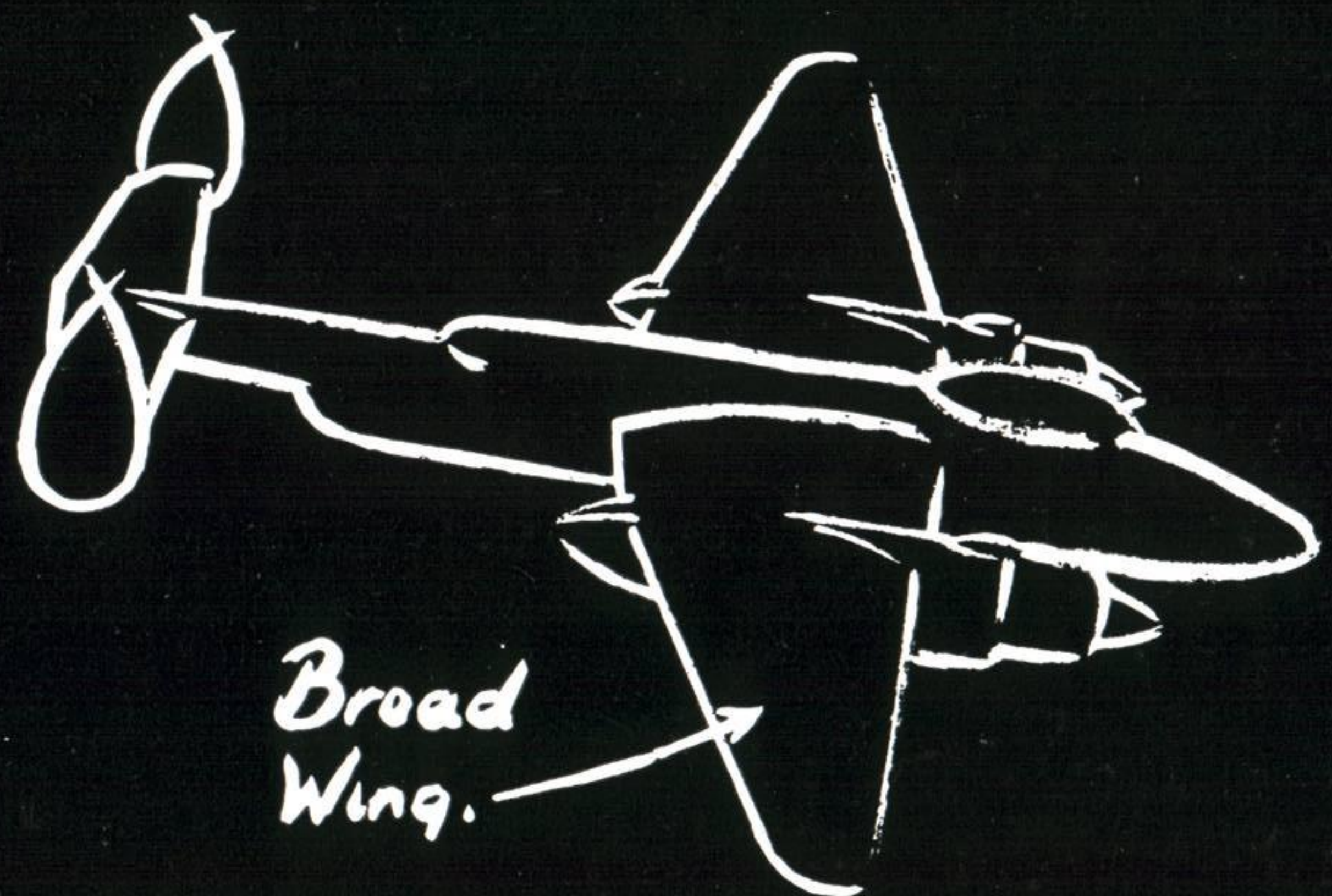
MAINLY FOR INSTRUCTORS.



Pear-shaped fin and rudder.



SPAN 60' 11"



Lieutenant General Andrea Nikolaevich Tupolev has designed a large number of aircraft ranging from small single-engine types to multi-engine transports. He brought out his first design, the ANT-1, in 1922. However, during the War he produced only one design, the TU-2, which won him the "Stalin Prize" for 1943. This does not mean he was resting on his laurels. No doubt his war years were busily occupied by a study of the problems of jet propulsion, the full results of which we have yet to see, for this very versatile Russian designer could scarcely be allowed to vegetate upon airscrew designs in a jet era.

Though the TU-2 was designed as a medium bomber and an attack type, it is undoubtedly in the "light" category as these types go today. By war-time standards it is a very good weapon for its job; and, by Russian standards, is one of their best equipped.

It is believed that there are approximately 1,000 TU-2s in operational service with units of the Soviet Air Force; and is, in fact, still regarded as a first-line aircraft.

In our drawings of it we have emphasized the rather "mountainous" nature of its fuselage form. The distinctive tail-unit should also be noted and the unusual length and slenderness of engine-nacelles hanging beneath its diamond-shaped wing. The photographs opposite illustrate these features in characteristic impressions.

TECHNICAL DATA :

- Type : Mid-wing, twin-engine monoplane with twin fins and rudders.
- Duties : Medium Bomber.
- Designer : Tupolev, A. N.
- Engines : Two ASH-82 FNV 14 cylinder radials of 1,850 h.p. each.
- Performance : Max. speed : 345 m.p.h. at 19,000 feet.
Max. range with 3,300 lb. bomb load : 1,000 nautical miles.
- Armament : 2 20 mm. cannon in wing roots and 3 12.7 mm. machine-guns (behind pilot, dorsal position and ventral position)
Max. bomb load : 5,000 lbs.

RECOGNITION DETAILS :

- Wings : High mid-set, wide centre-section, roughly diamond-shaped, rounded tips.
- Engines : Underslung, large radial cowlings and spinners, nacelles just breaking line of trailing edge.
- Fuselage : Wide and shallow, top and bottom lines broken by gun positions.
- Tailplane : Wide chord, slight dihedral, back-tapered.
- Fins and Rudders : Pear-shaped twin fins and rudders.
- Main Features : Pointed nose, large underslung nacelles, near diamond-shape wings, tail boom effect of rear fuselage, twin "pear-drop" fins and rudders.

INTELLIGENCE

IL-12

Faired Fin. As mentioned on this page in the January Journal, the IL-12 of Ceskoslovenské Aerolinie (C.S.A.) which visited Northolt, had a small but distinctive modification in the shape of a fin fairing as shown in photograph below. Aircraft with this fin fairing have been designated, in some sections of the press, IL-12Bs.



BOEING B-50

Wing Tanks. Latest version of the Superfortress is the Boeing B-50D. Under each wing outboard of the engines the B-50D can carry either two 70 gallon fuel tanks which increase maximum range to over 6,000 miles, or two 4,000 lb. bombs which augment the maximum bomb load to 28,000 lb. These extra decorations should help to disclose the difference (particularly from underneath and behind) between the B-50D and brothers B-29 and B-50 (see cover and page 64 of December, 1949, Journal).

LOCKHEED F-80

Prone Pilots. Flight test programme for the U.S.A.F. is to include experiments with yet another version of the Lockheed F-80 "Shooting Star". This particular model will be fitted with a prone position pilot's cockpit and a re-tailored transparent fuselage nose.

CHIPMUNK T Mk. 10

Chip In. First of a long line of de Havilland Chipmunks now in quantity production in Canada and this country has been delivered. Canadian-built models, as well as going to the Royal Canadian Air Force, will be delivered to the Egyptian and Siamese Air Forces. Most of the British Chipmunks are destined for the R.A.F.V.R. but some will go to the Danish Air Force. There are several minor modifications made to the Canadian DHC-1, to meet R.A.F. requirements but the main external structural difference is in the undercarriage, which has been moved slightly forward to compensate for the weight of extra radio and blind flying equipment installed. The cockpit will be slightly enlarged, with "bubbles" to give increased all-round view. The lines of the Chipmunk indicate its de Havilland breeding, the fin and rudder (in fact copied from the Mosquito) retaining the "spearhead" shape which has become synonymous with DH design. (Silhouette page 116.)

AVRO CF-100

Canadian Fighter. Twin-jet two-seater fighter the Avro CF-100 is now reaching flight test stage in Canada. Two Rolls-Royce "Avon" turbojets will provide power from the wing roots. Nose armament will comprise four 30 mm. cannon. Other features include a single fin and rudder and a

tricycle undercarriage. Pilot and radar operator ride in tandem. The CF-100 will be used for all-weather long-range interceptor night-fighter duties.

MARTIN XB-51

"T"-Type Tail, tandem wheels, and twin jets hugging the body (and a third inside exhausting through the tail-cone) are but a few of the features of this unusual type of ground support aircraft now being test flown for the U.S.A.F. Other characteristics include swept wing (with tip-wheels and variable incidence) and swept tail surfaces. Wings droop (anhedral angle) when the machine is at rest but become straight in flight. Turbojets are General Electric J-47s: Glenn L. Martin Company are the builders.

MARTIN P4M-1 MERCATOR

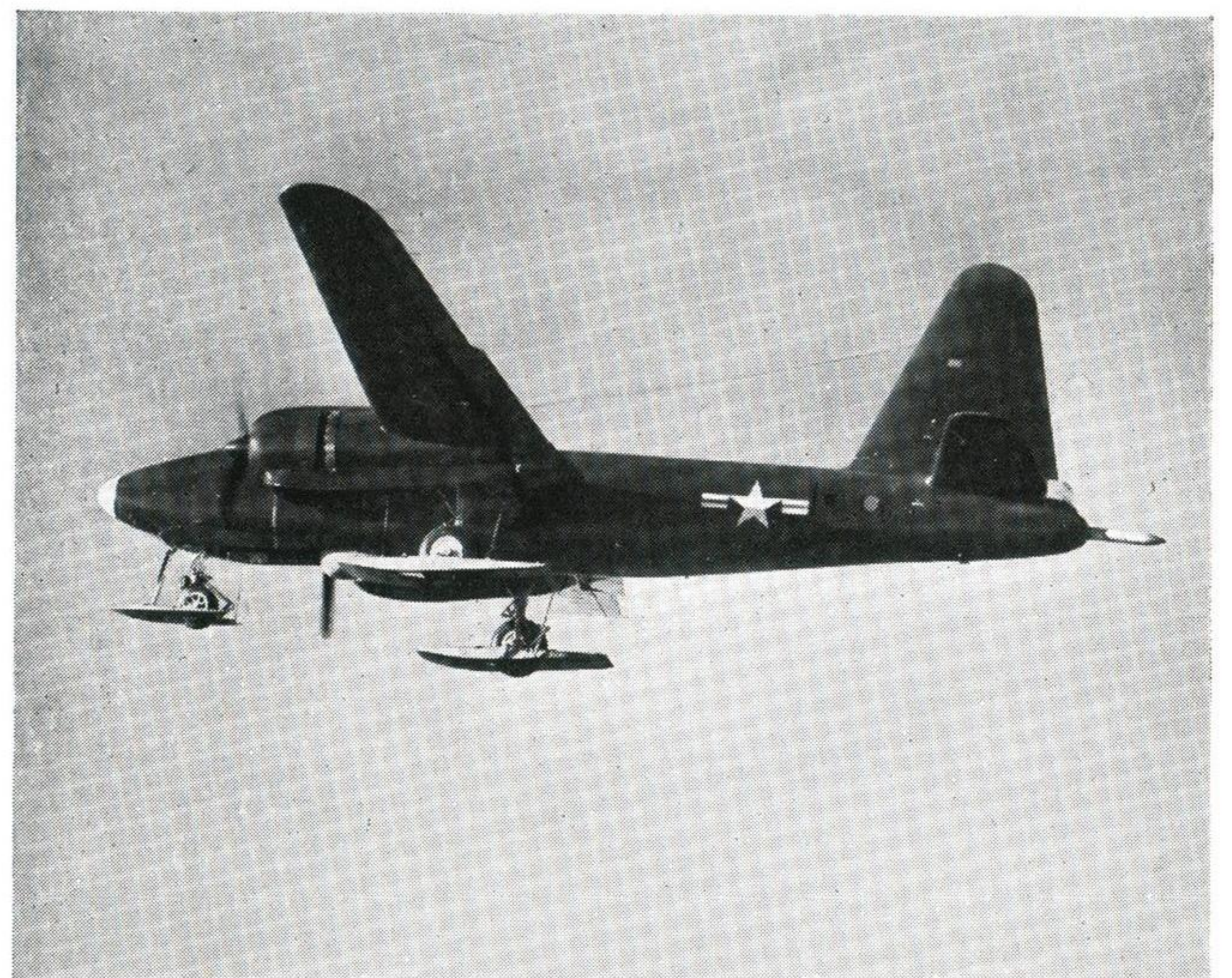
Miscellaneous Maritime Missions including mine-laying and photo-recce seem to sum up the functions of Glenn Martin's P4M-1 Mercator. Though looking like a twin-engine aeroplane each of its nacelles contains a Pratt & Whitney Wasp Major radial engine and an Allison J-33 turbojet for use as required. Air-intakes take the form of large ventral scoops beneath the nacelles. Glenn L. Martin announces a production batch of nineteen for the U.S. Navy. Mercator's top speed is 300 m.p.h., take-off weight 80,000 lbs., and range over 2,000 miles. The wing span is 114 feet, its length 85 feet. A crew of nine is carried.

DOUGLAS C-124

Cargo Colossus. The C-124, called by its makers the Globemaster 2, is designed for global mobility. Large clam-shell doors in nose open into cavernous fuselage, which is said to hold 50,000 lbs. of payload. Almost any type of military vehicle or field gun can be carried. Quick conversion to double decks provides accommodation for 200 troops and their equipment. U.S.A.F. orders for the Globemaster are said to number thirty. Its four Pratt and Whitney radials give it a radius of action of 850 miles with full payload.

LOCKHEED P2V NEPTUNE

Neptune in Snow Shoes. For long-range search and rescue operations over desolate arctic wasteland, the Lockheed Neptune is equipped with "snow-shoes" and carries full rescue equipment. Skis do not prevent operation from normal runways. They retract into special fairings built under the nose and on nacelles. The giant "pencil" extending from the tail-turret is some form of radar device. The "fowler-type" flap is extended here disguising shape of narrow, straight tapered wing. (For details of standard Neptune see Journal for October, 1949).

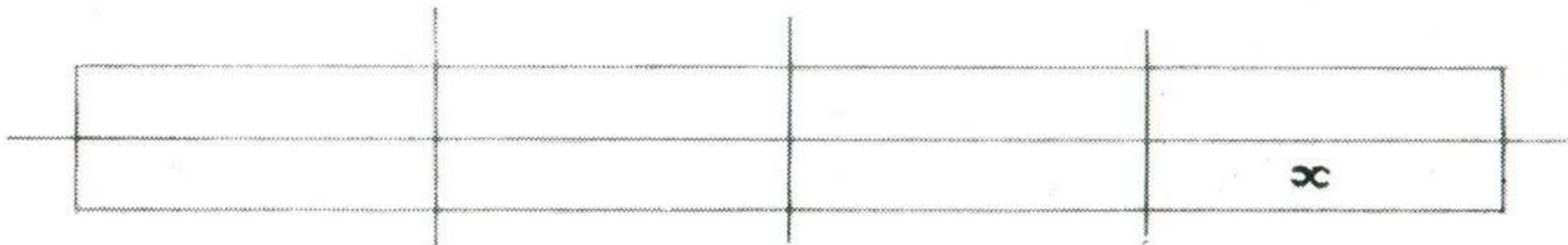


GET INTO LINE!

This pair of thoroughbreds from the de Havilland stable have much in common; yet, after drawing these side views, you will know where the differences lie. Hornets and Sea Hornets are in service with the Royal Navy and the R.A.F.; the Mosquito NF 38 with the R.A.F., whilst many hundreds of different marks of Mosquito are in service in all parts of the World.

SEA HORNET PR Mk.22

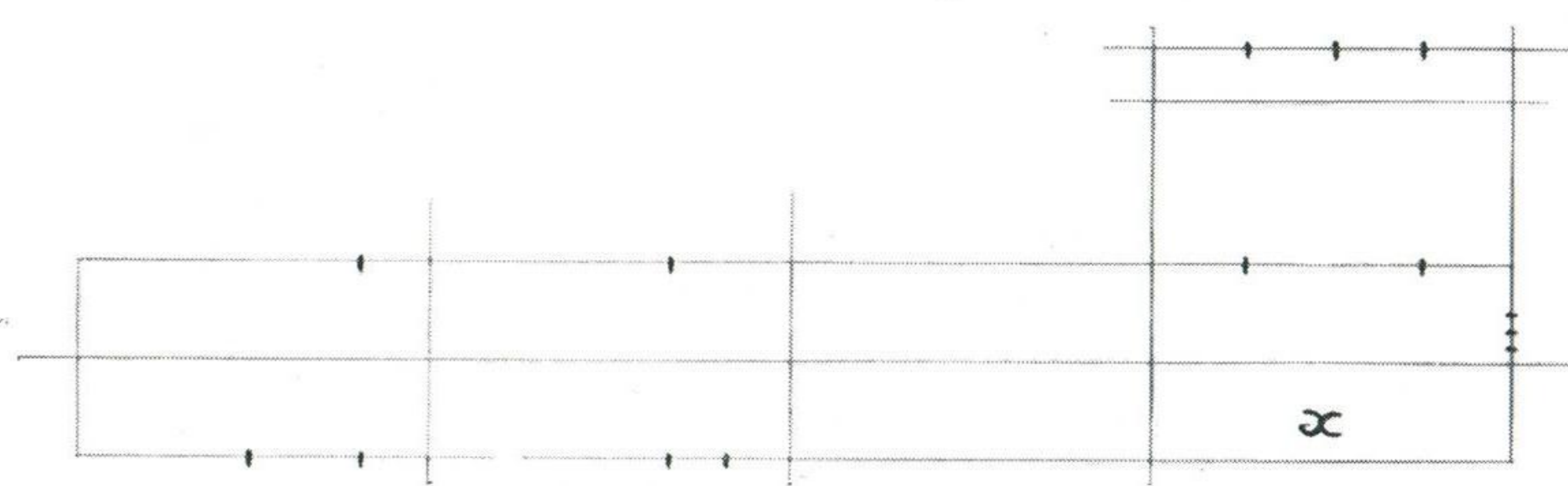
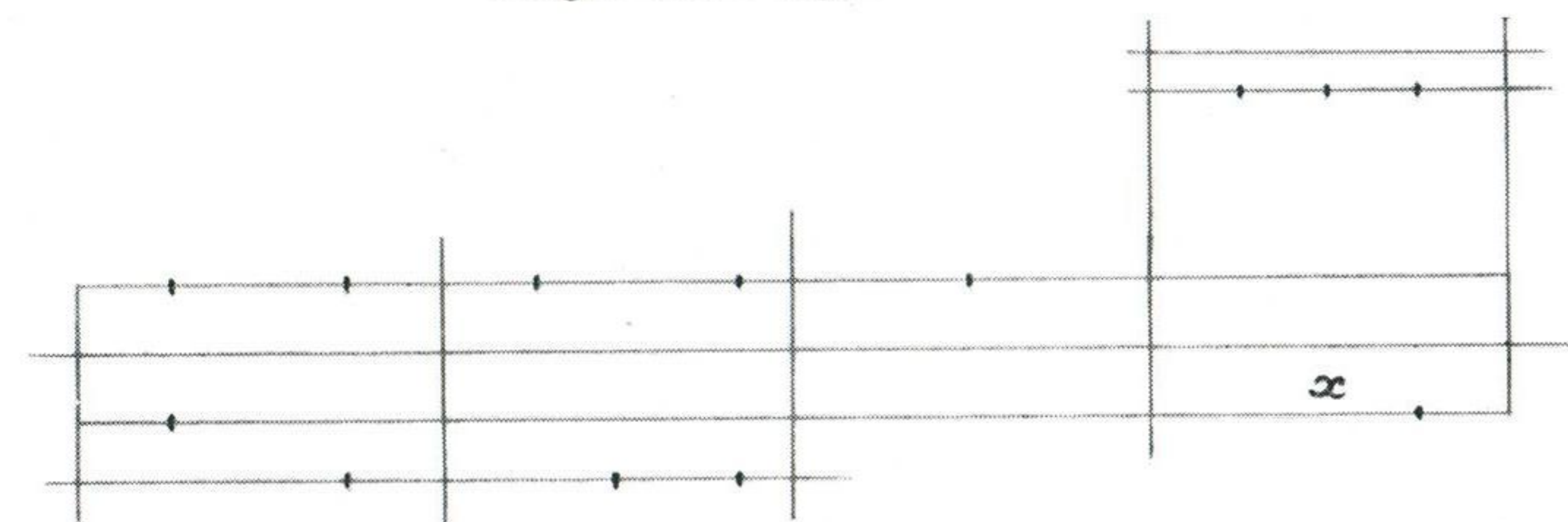
MOSQUITO NF Mk.38



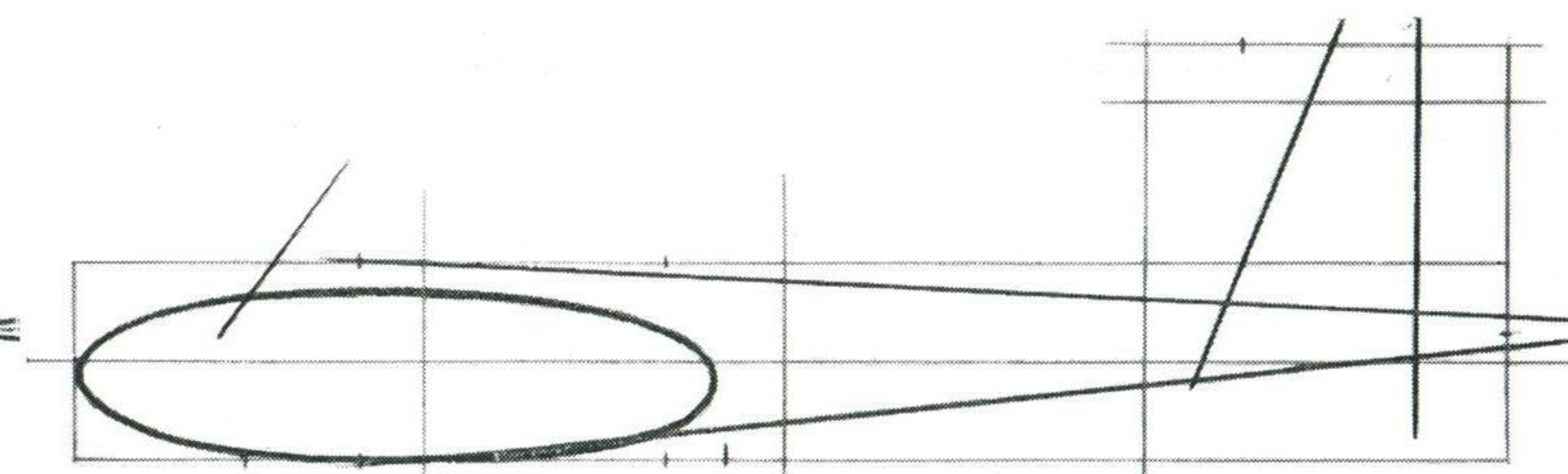
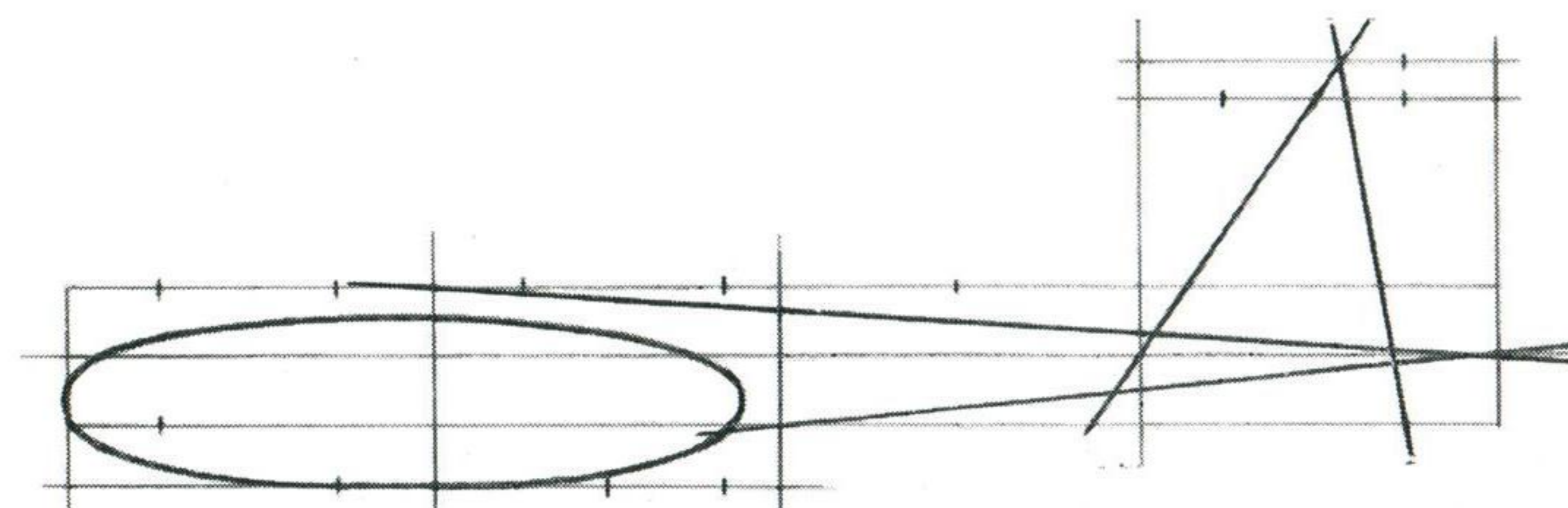
Stage 1. Draw this 10 times longer than high.

Sub-divide it into equal parts as shown here.

Draw this $7\frac{1}{2}$ times longer than high.

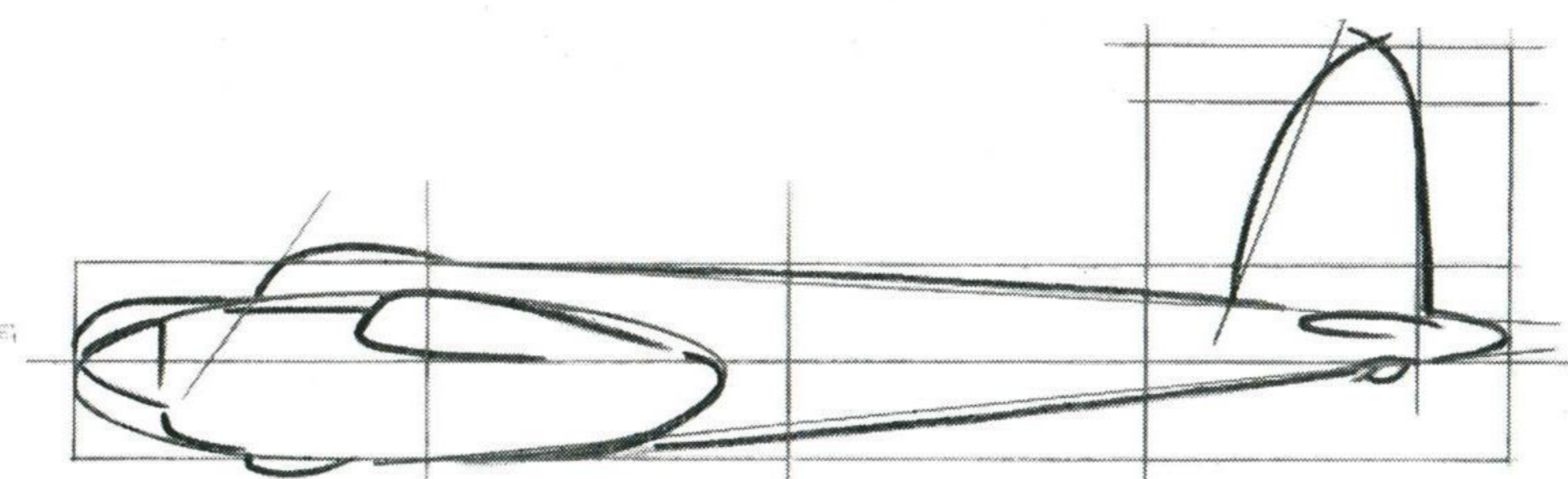
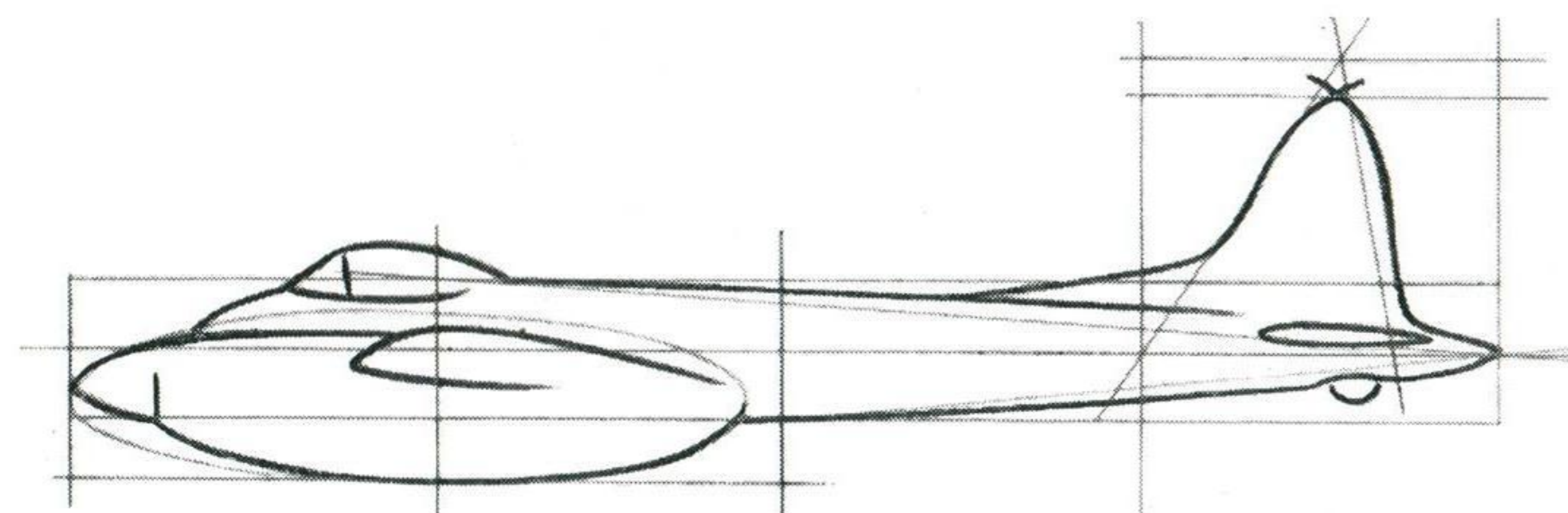


Stage 2. Enlarge sub-division "X" into a square, add guide marks as indicated. Enlarge front frames of "Hornet" as shown.



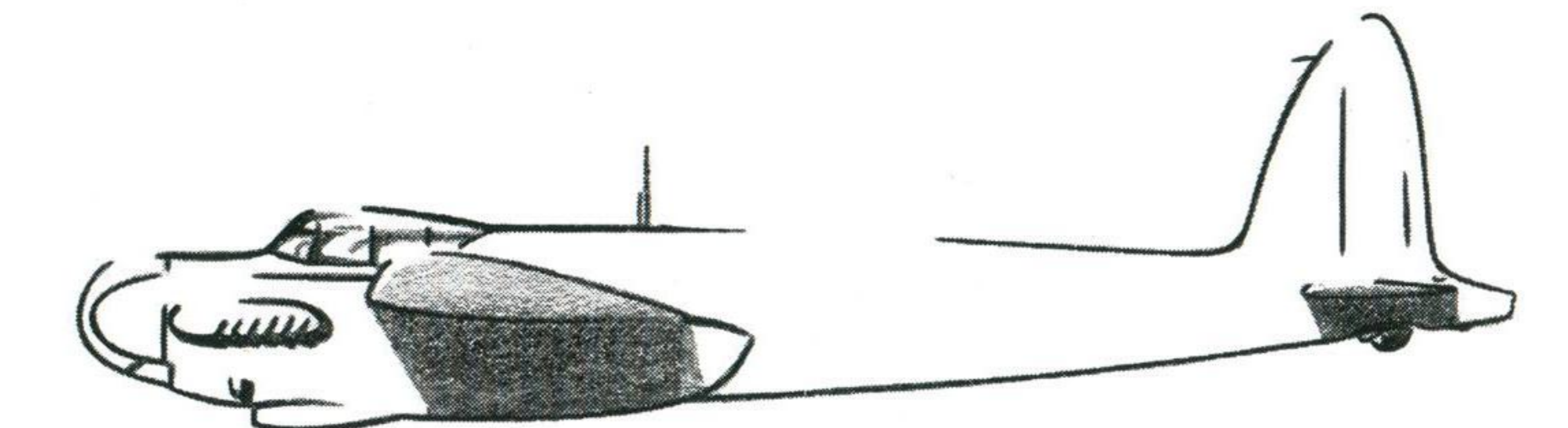
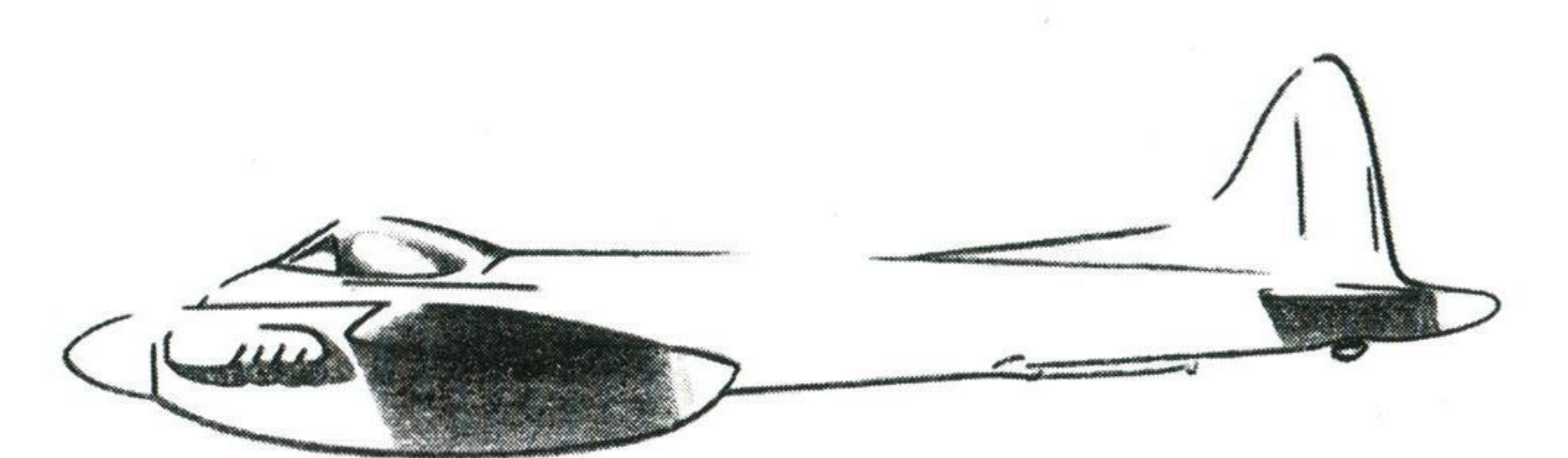
Stage 3.

Add main straight lines, and ellipse upon which to construct engine.



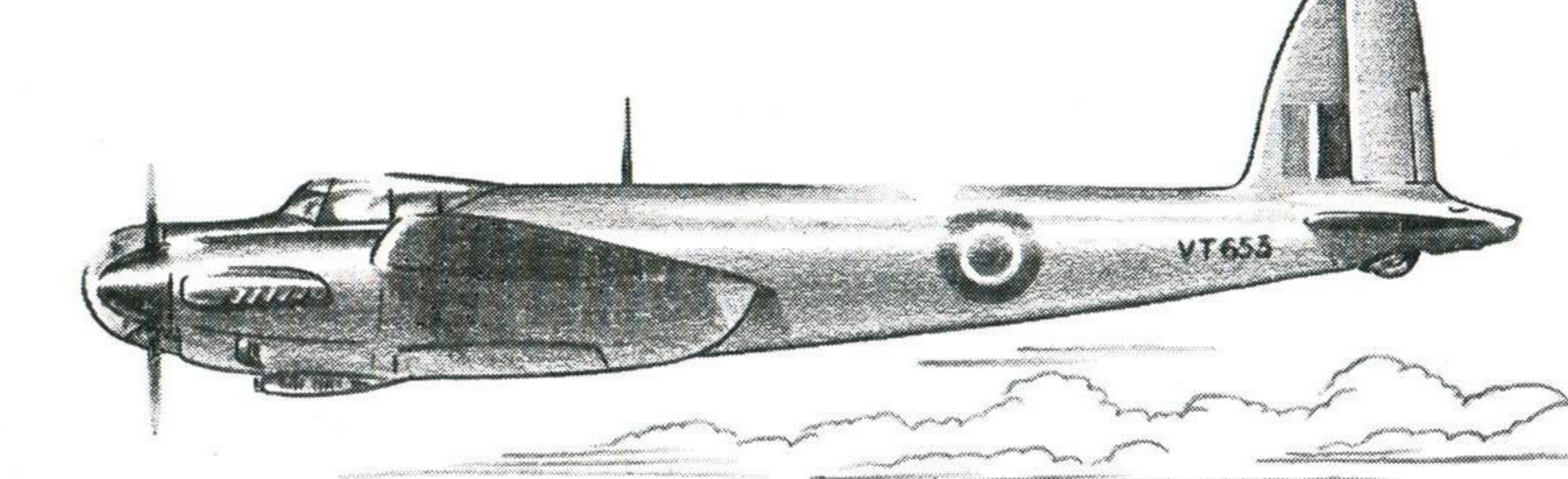
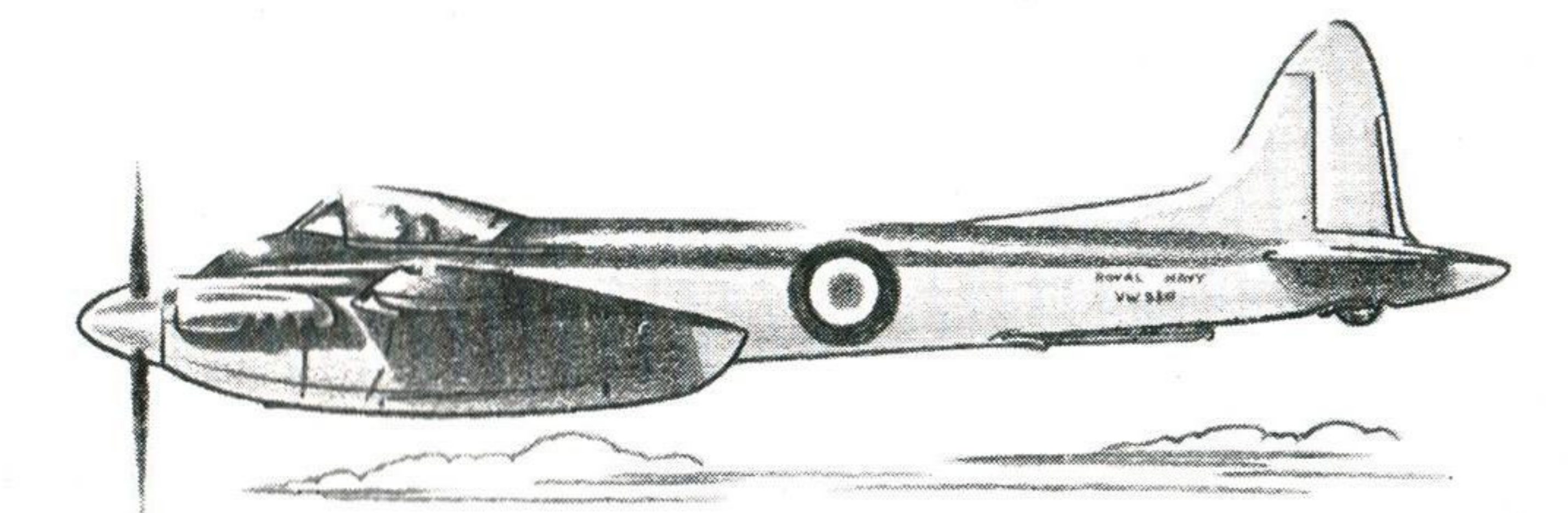
Stage 4.

Complete Outline.



Stage 5.

Remove construction lines and add main shadows.



Stage 6.

Complete as desired.

In the August 1949 Journal we listed a number of aircraft worthy of recognition. Further silhouettes have now become available and, in style and arrangement as previously used, we present them here

FOR THE RECORD



De Havilland
CHIPMUNK T Mk. 10
 (One Gipsy Major 10 engine)
 Span 34' 4" Length 25' 8"



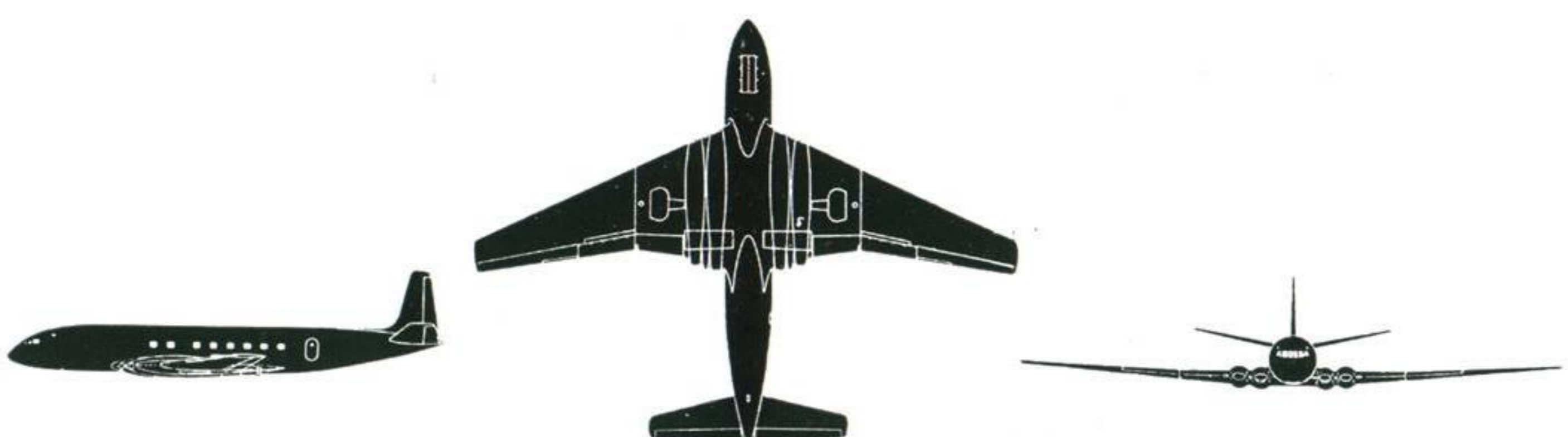
Avro
ATHENA T Mk. 2
 (One Merlin 35 engine)
 Span 40' 0" Length 37' 6"



Avro
TUDOR 2
 (Four Merlin 621 engines)
 Span 120' 0" Length 106' 7"
 (Tudor 5 is the same except for circular windows)



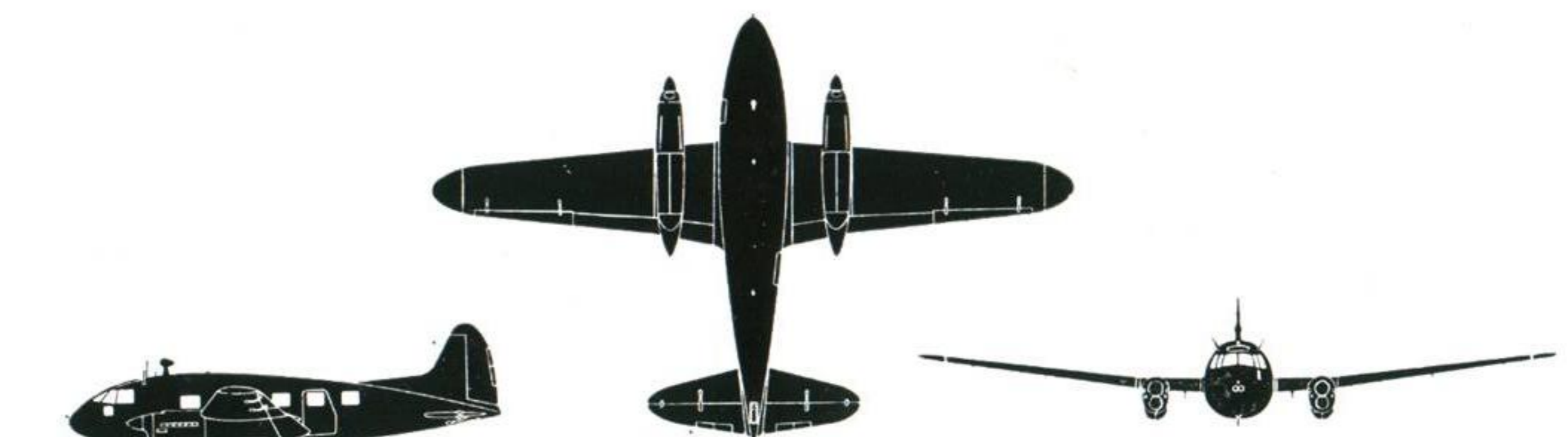
English Electric
CANBERRA B Mk. 1
 (Two Avon engines)
 Span 63' 11" Length 66' 3"



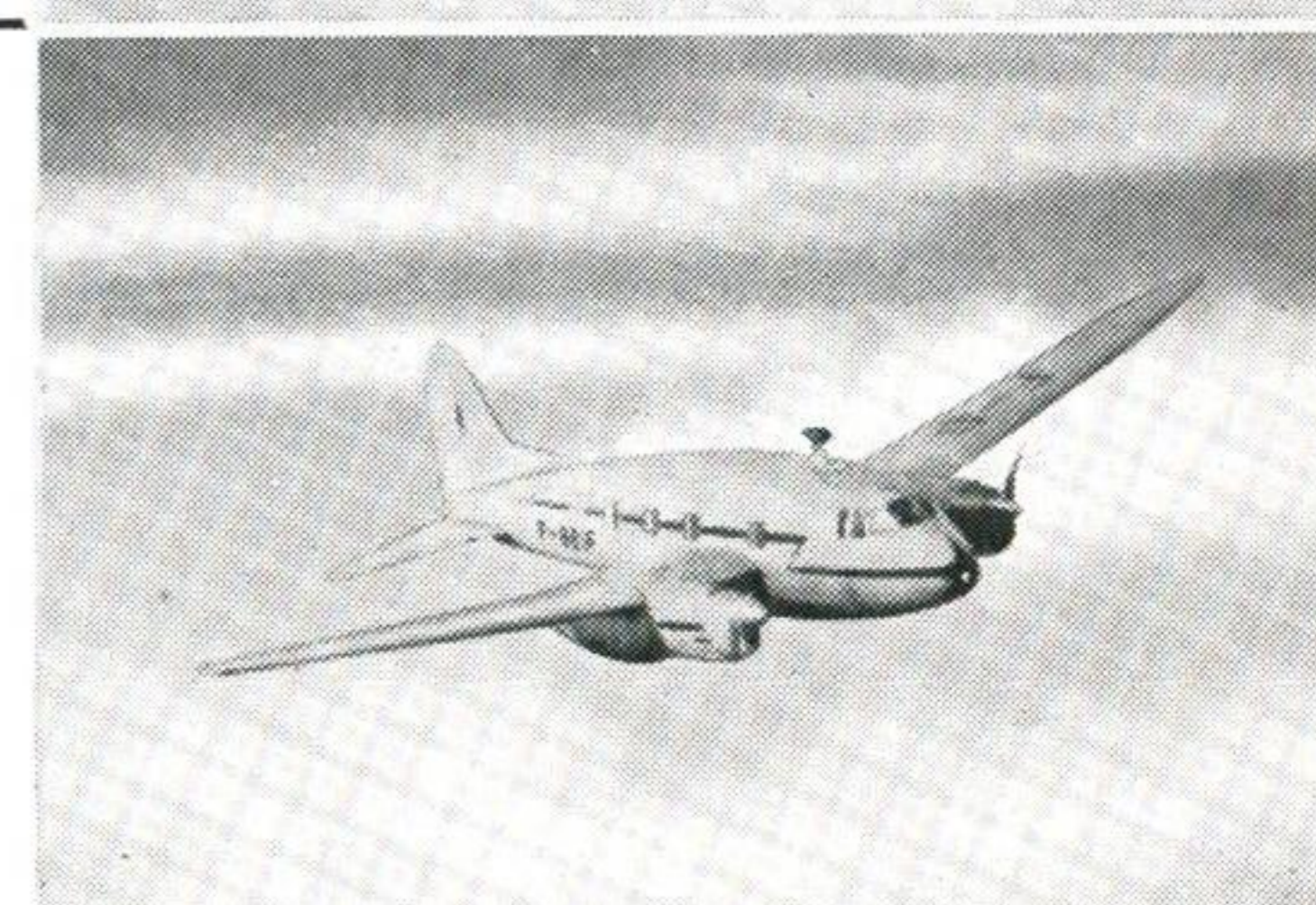
De Havilland
COMET
 (Four Ghost engines)
 Span 115' 0" Length 93' 0"



Westland
WYVERN TF Mk. 2
 (One Python 1 engine)
 Span 44' 0" Length 42' 0"



S.N.C.A.S.O.
95 CORSE II (Transport)
 (Two Renault 12s engines)
 Span 59' 0" Length 40' 5"





Facing It !

Flight Lieutenant Yates-Walmsley of R.A.F. Station, Ismailia, Egypt, is facing his recognition problems in good style and sends us some of his impressions of well-known aircraft. Impressions are always a matter of the individual's own idea ; it is quite possible that those shown here will not be recognized or even approved by some readers. Personally, we think they are good. But whether you like them or not, recording your own impressions in this way is a

Daily Spotting Scores—New Record

NAVIGATOR III J. B. DUNFORD, of R.A.F. Station, West Malling, Kent, has bettered the list of 8 different types (22 aircraft) seen and recognized in one day, which we mentioned on this page in the July Journal. On December 2nd last he recognized 18 different types (21 aircraft). They were : three Mosquitoes, one Brigand, one Buckmaster, one Lancaster, one Anson, one Meteor, one Valetta, two Spitfires, one Seafire, one Vampire, one Tiger Moth, one Hermes, one Freighter, one Constellation, one Stratocruiser, one (and only !) Brabazon, one Proctor, and one Magister.

No Excuse

There can be no excuse for failing to recognize the main subject of our cover picture last month, for it was clearly labelled on the side of its needle-nose " F-90 ".

Britain's Spotting Possibles

To the list published in the December, 1949, Journal the undermentioned may now be added as having been seen and recognized over Great Britain within recent months.

- | | | |
|-----------|------------------|-----------|
| Bellatrix | Junkers Ju 52/3M | Liberator |
| Mentor | Norécrin | Sentinel |

Wreck-cognition



(Answer on rear-cover.)

The Blinking Dakota

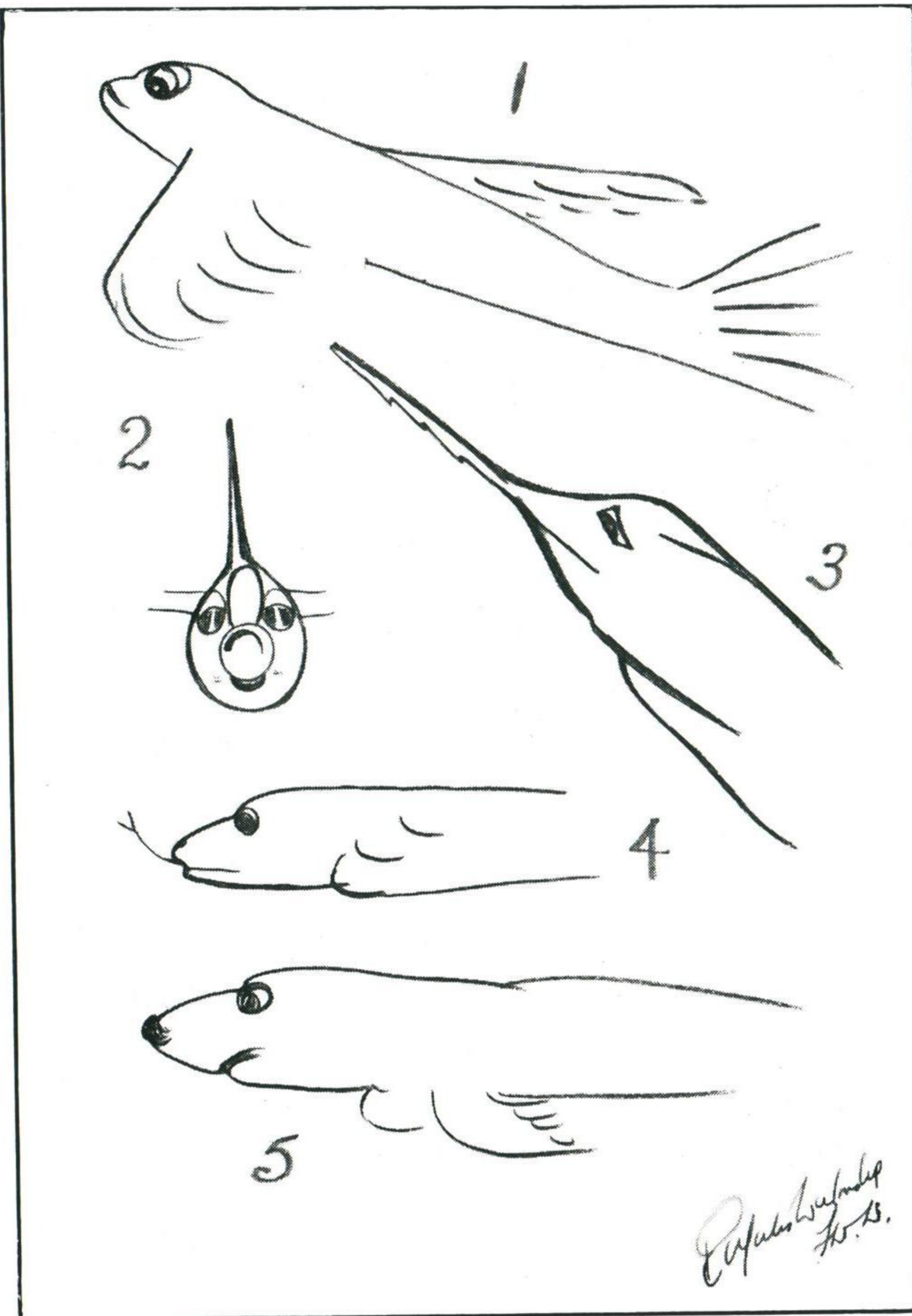
A press report from the United States says that experiments are being made with an oscillating forward warning light in the nose of a DC-3 designed to provide a continuous in-flight warning to other aircraft. An 8-10,000 candle-power beam visible from 18 to 20 miles oscillates 60 degrees either side of forward to produce a blinking warning to other aircraft.

This Month's Nonsense

The Air Ministry News Service recently made the following announcement : " R.A.F. search for ship. After two lifeboats and an R.A.F. Lancaster had searched for a vessel reported missing, the ship returned to port without incidence." We should like to know what happened to its dihedral too.

Flash !

We recently received a letter from a correspondent in the United States asking us for photos and details of England's new electric bomber.



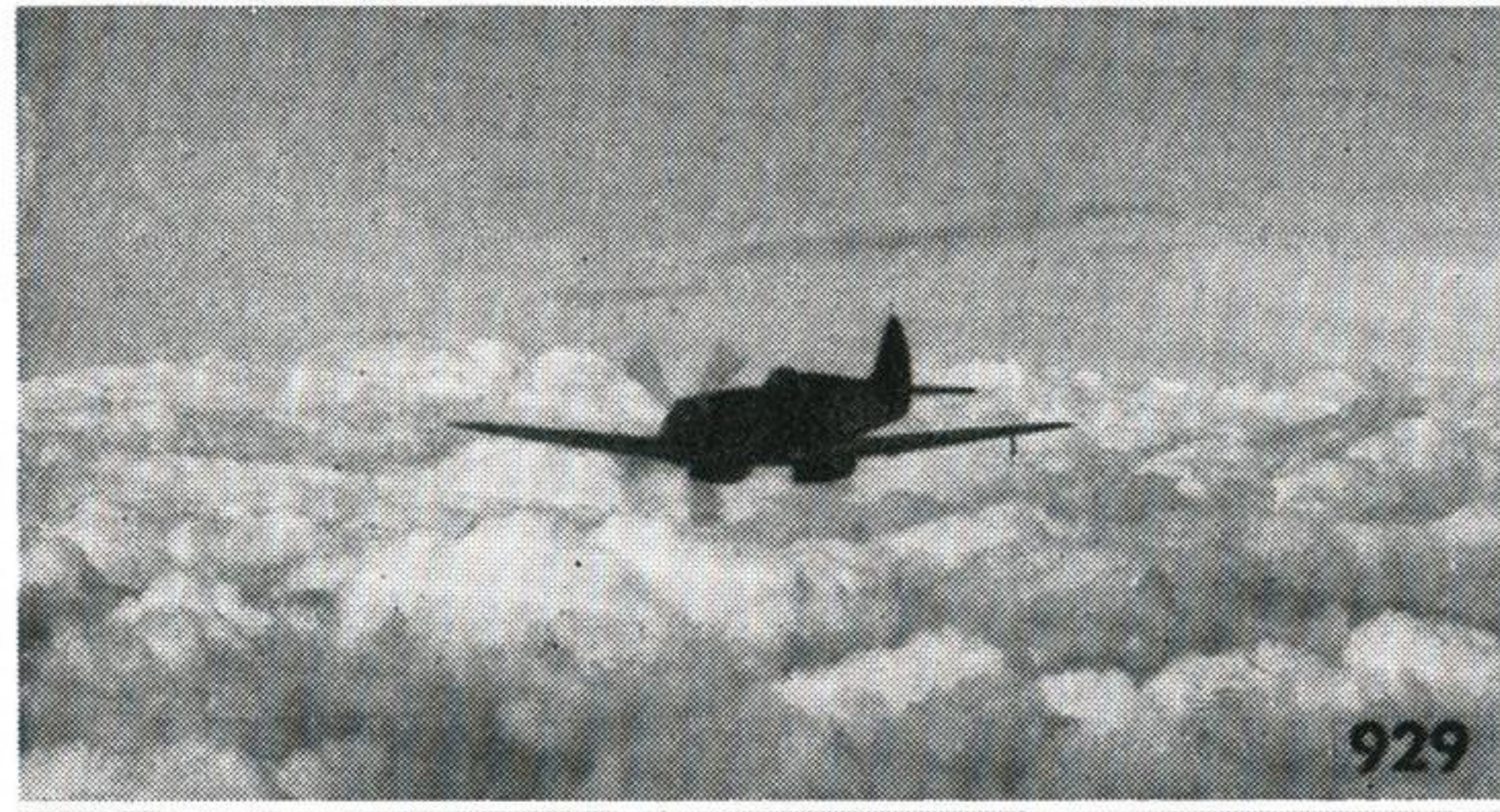
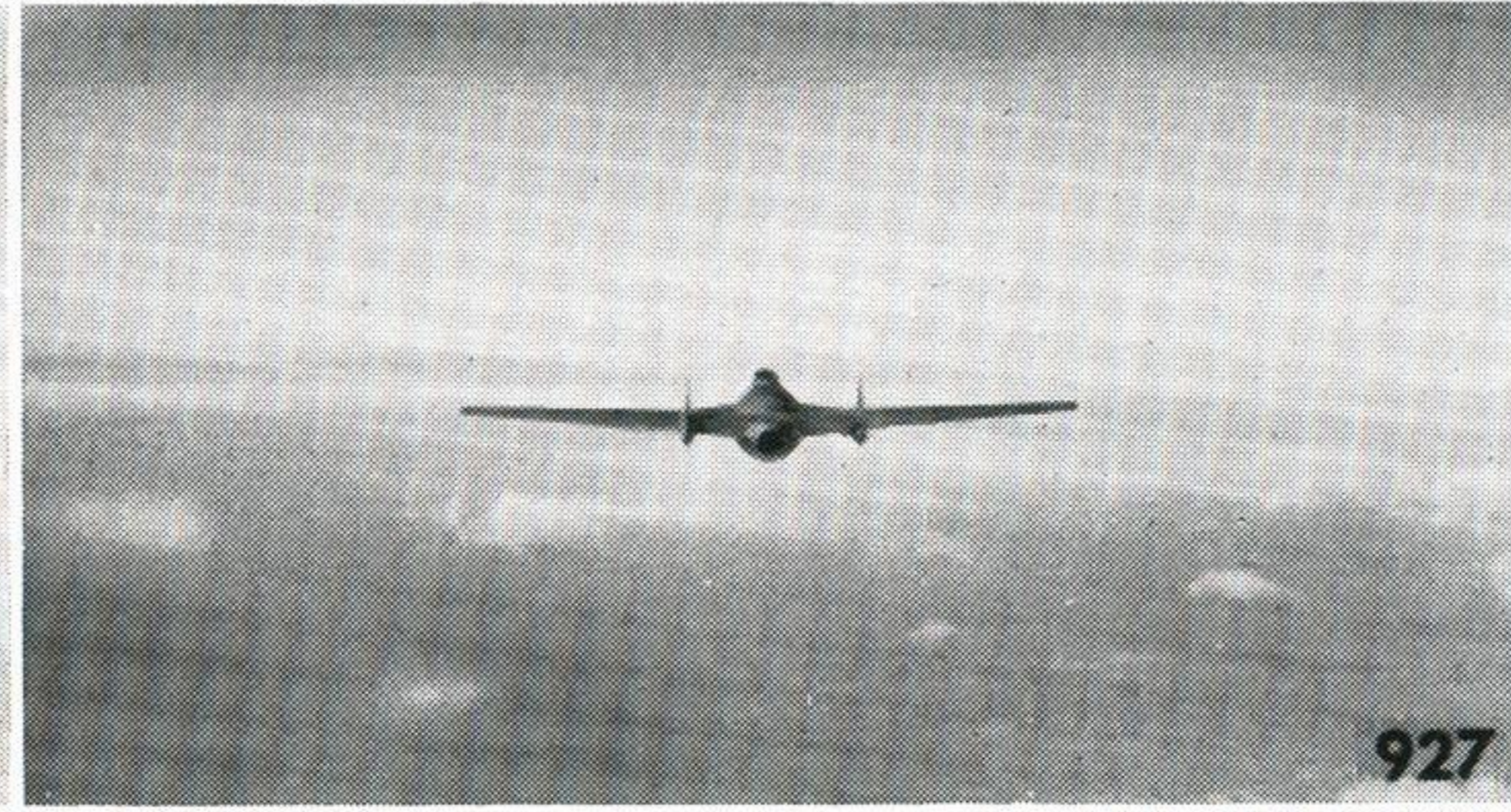
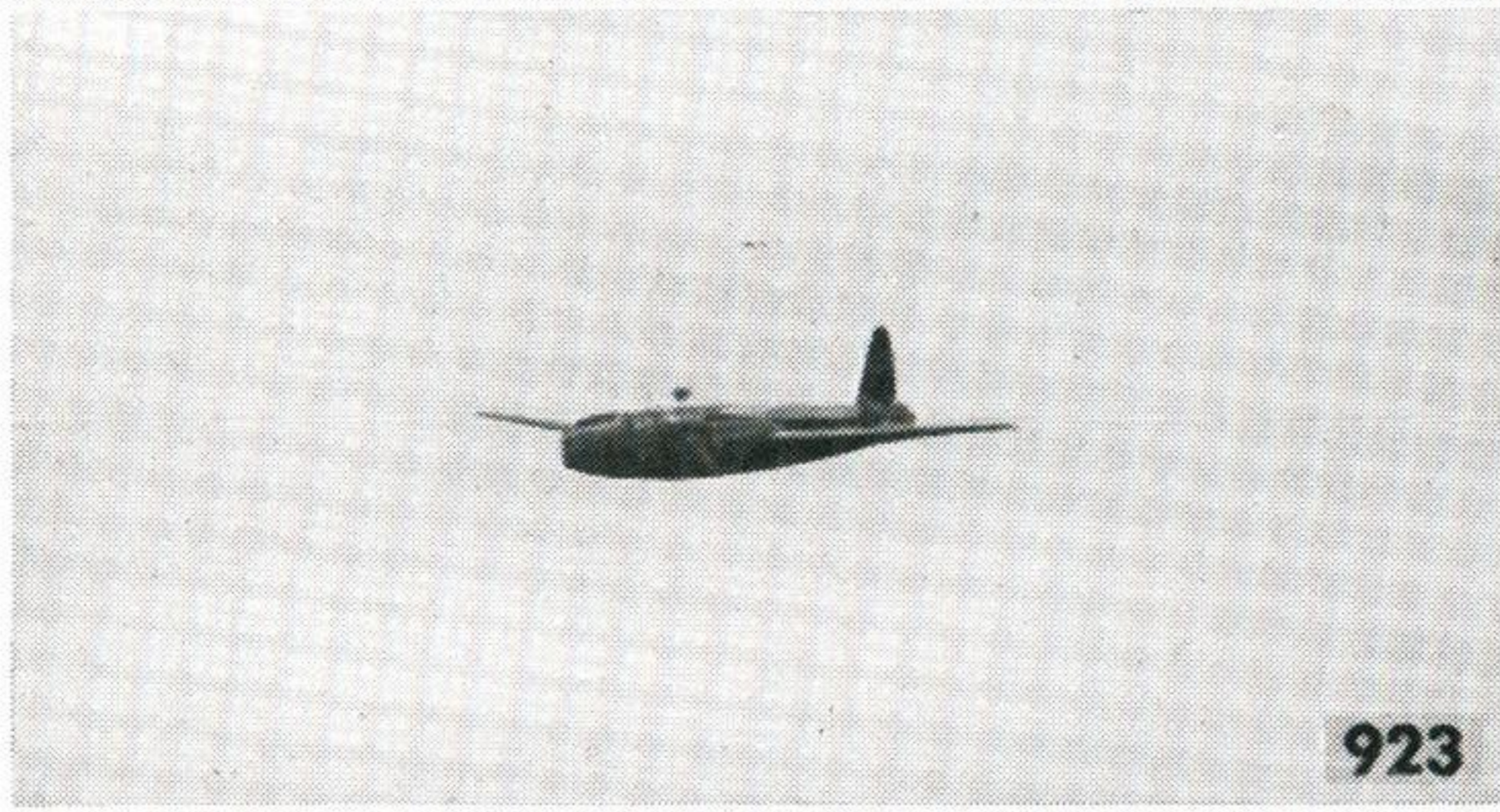
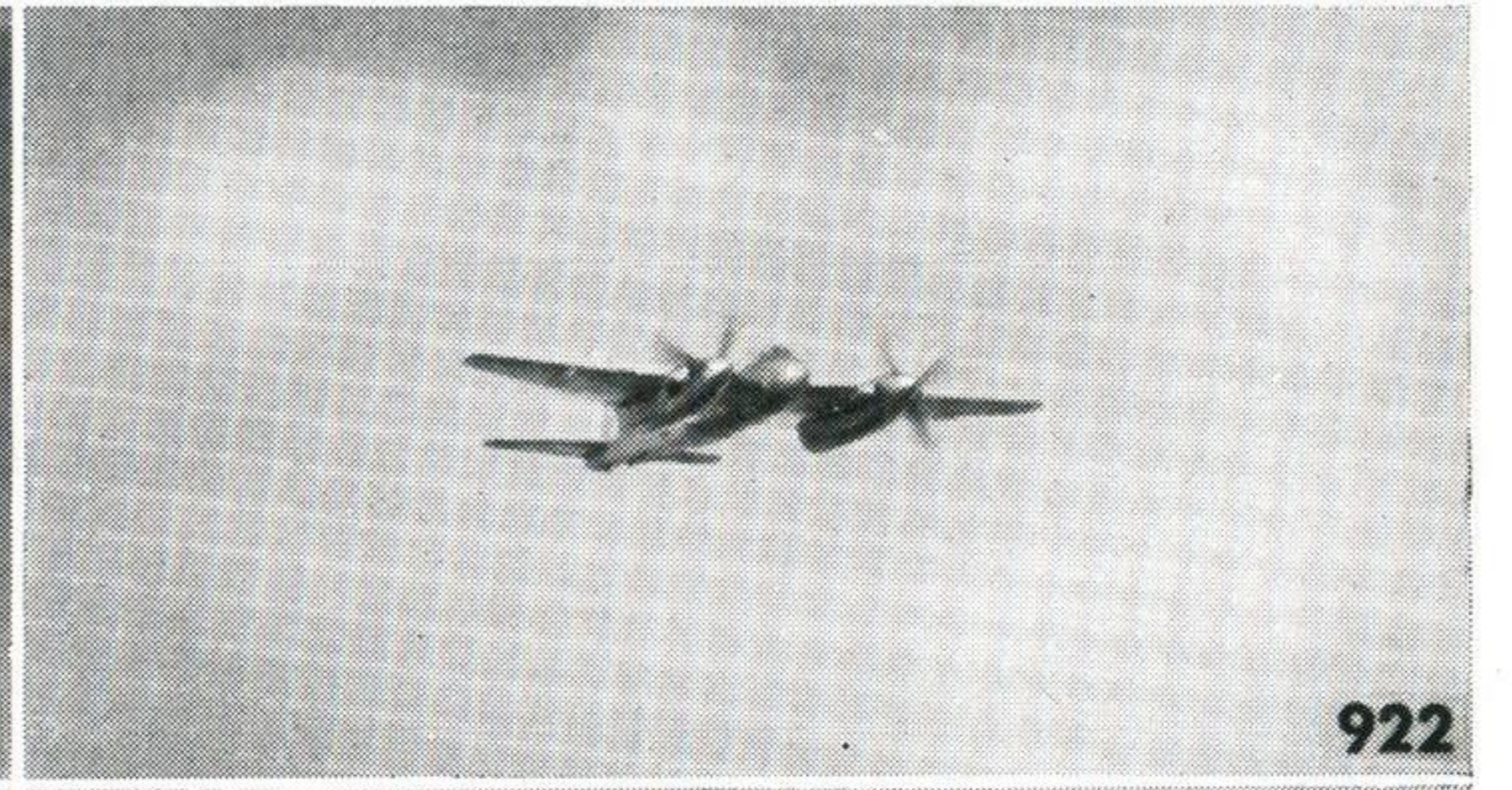
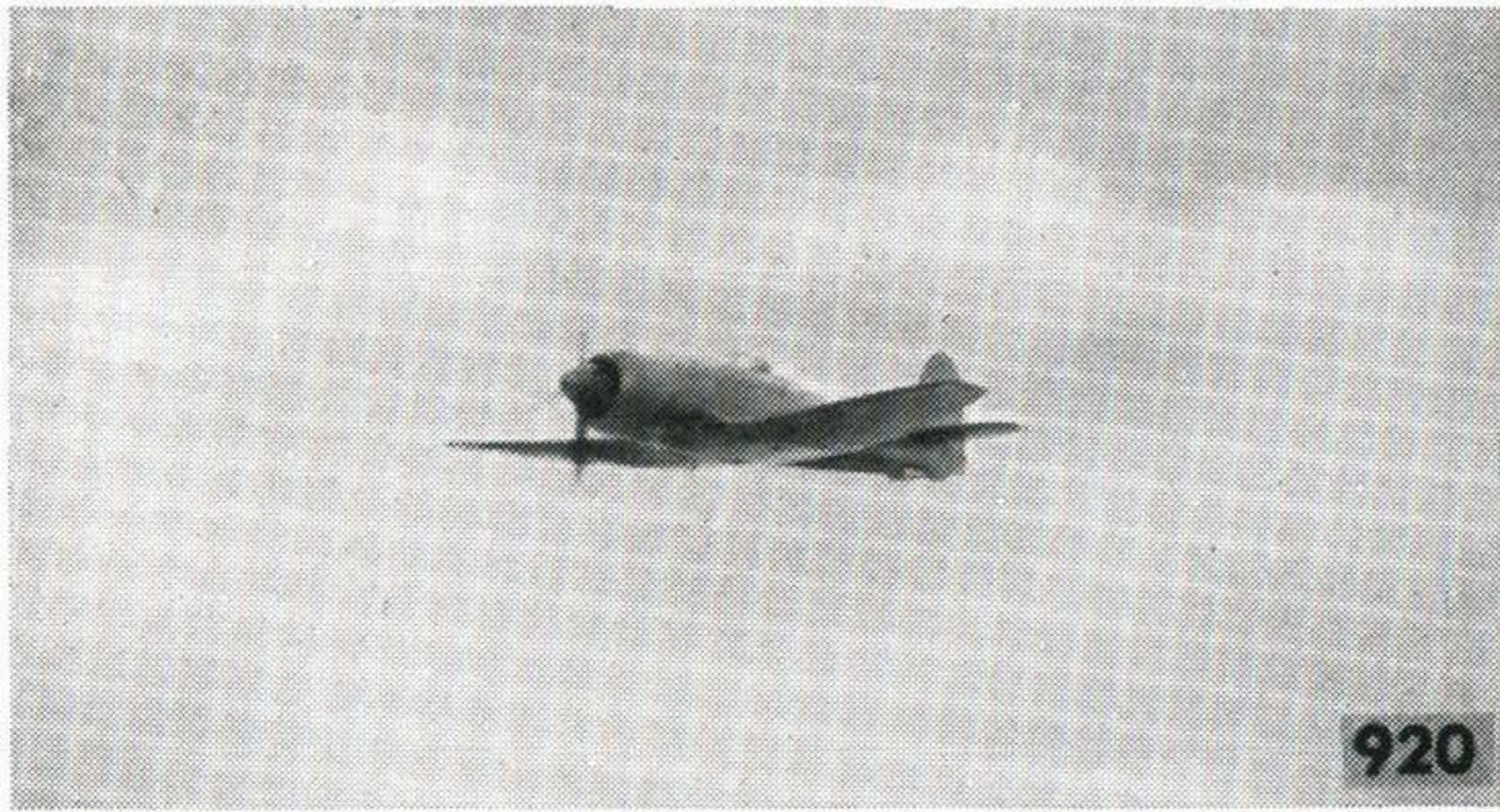
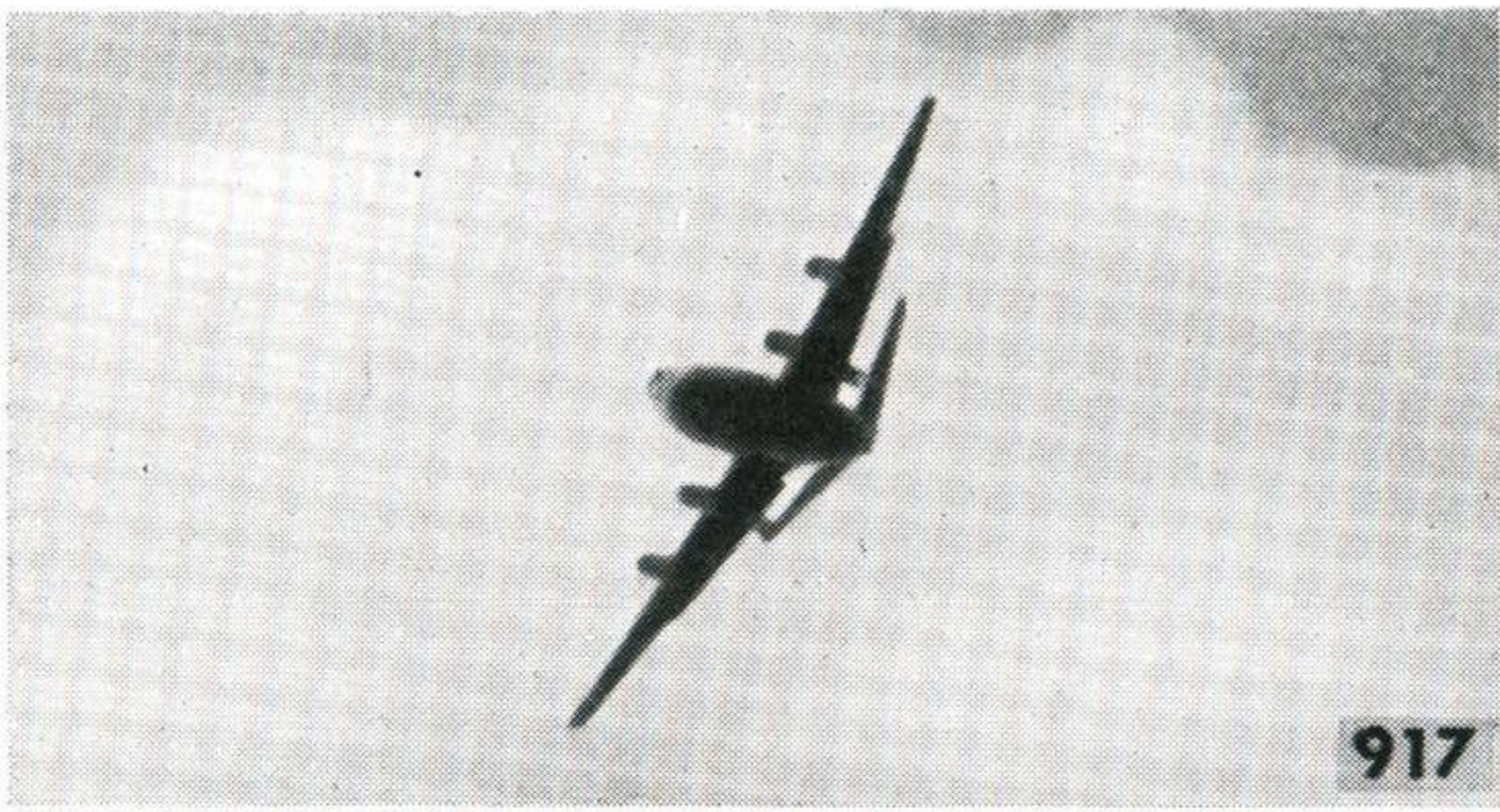
valuable help to *you*, and we want further ideas from readers. Flt. Lt. Yates-Walmsley's impressions are of : 1. The Hawker P. 1052; 2, Boeing B-47 Stratojet; 3, Chance Vought XF7-U1; Cutlass ; 4, Douglas DC-4 Skymaster ; and 5, Boeing B-47 Stratojet.

Aerogram



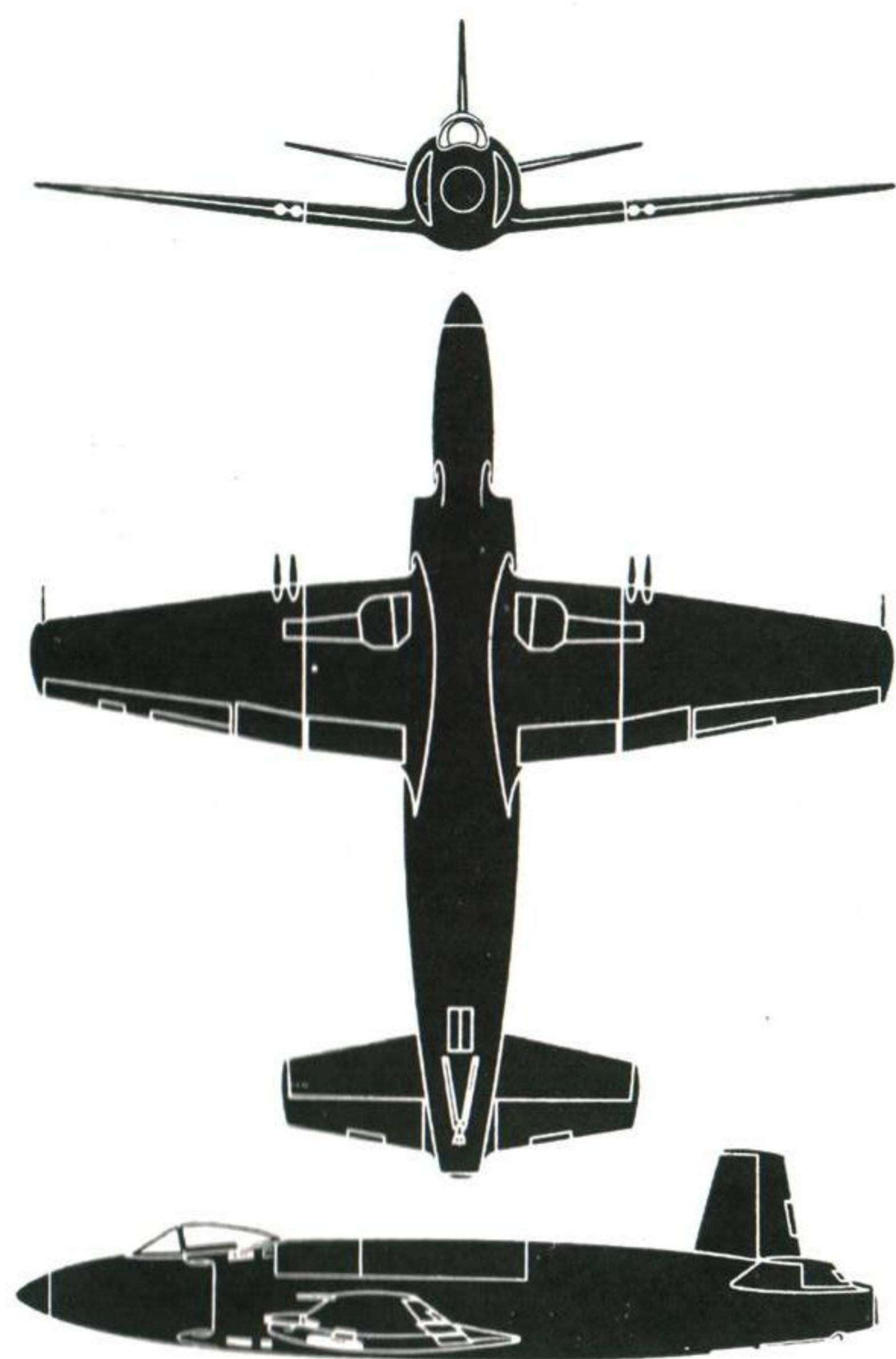
A Polo Law (Answer on rear cover.)

ADVANCED SPOTTING



SILHOUETTES—SINGLE-JET FIGHTERS

VICKERS ATTACKER F Mk. 1



British Fighter

Engine : One Rolls-Royce Nene turbojet
Span : 36 ft. 11 ins. Length : 37 ft. 6 ins.

Recognition Points :

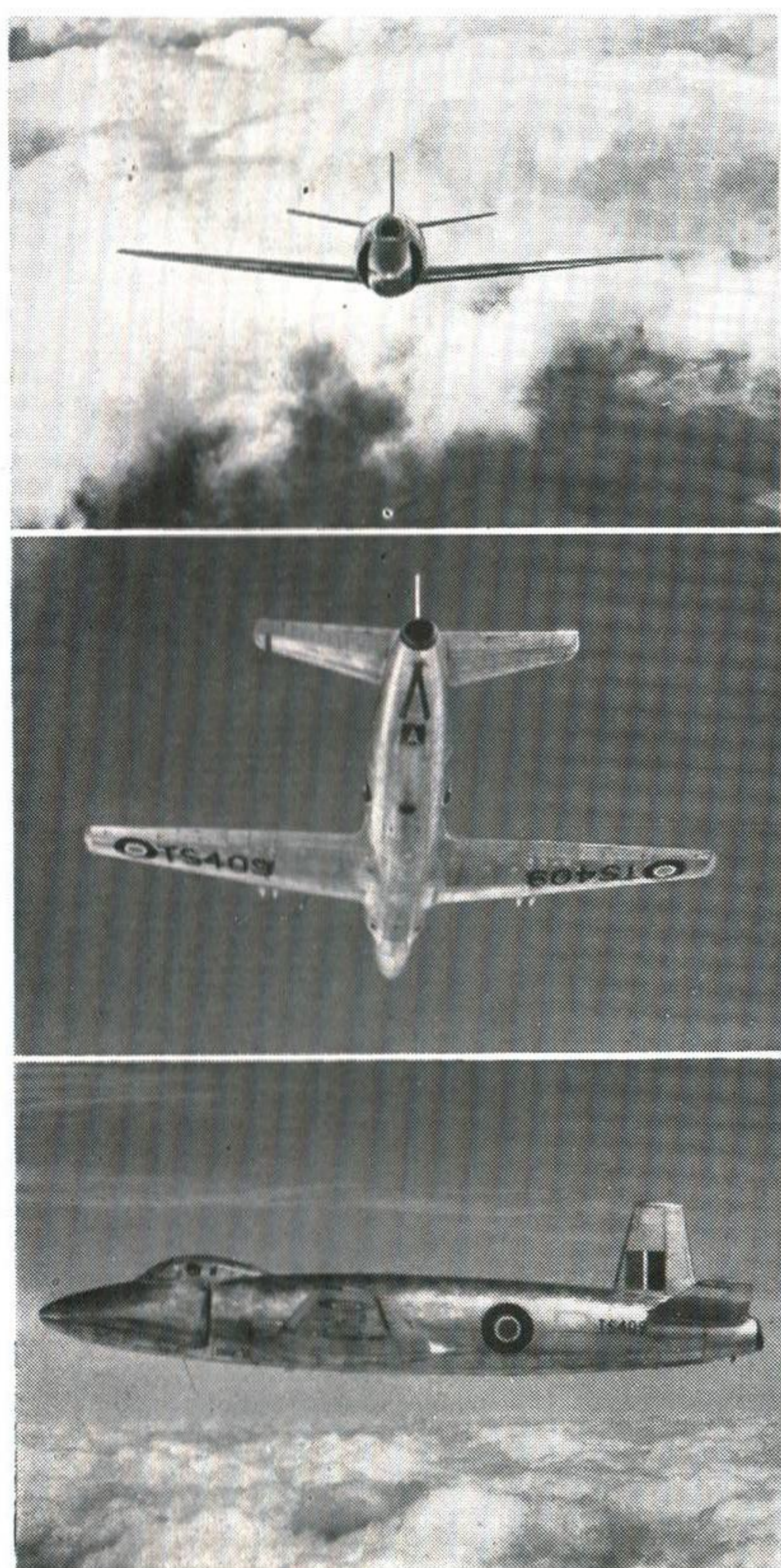
Wings : low-set, moderate dihedral, narrow chord, short span, straight broken taper, blunt tips.

Engine : "cheek" intakes forward of wing.

Fuselage : "birds-beak" nose, "bullet" body form, "cheek" intake shoulders noticeable in plan view, jet pipe aft of tail.

Tail Unit : tailplane ; large (in proportion to wing), tapered edges, square tips, marked dihedral, short square-cut fin and rudder set well forward.

Detail : bubble cockpit set forward on nose.



LOCKHEED F-80A



American Fighter

Engine : One General Electric turbojet
Span : 38 ft. 10 ins. Length : 34 ft. 6 ins.

Recognition Points :

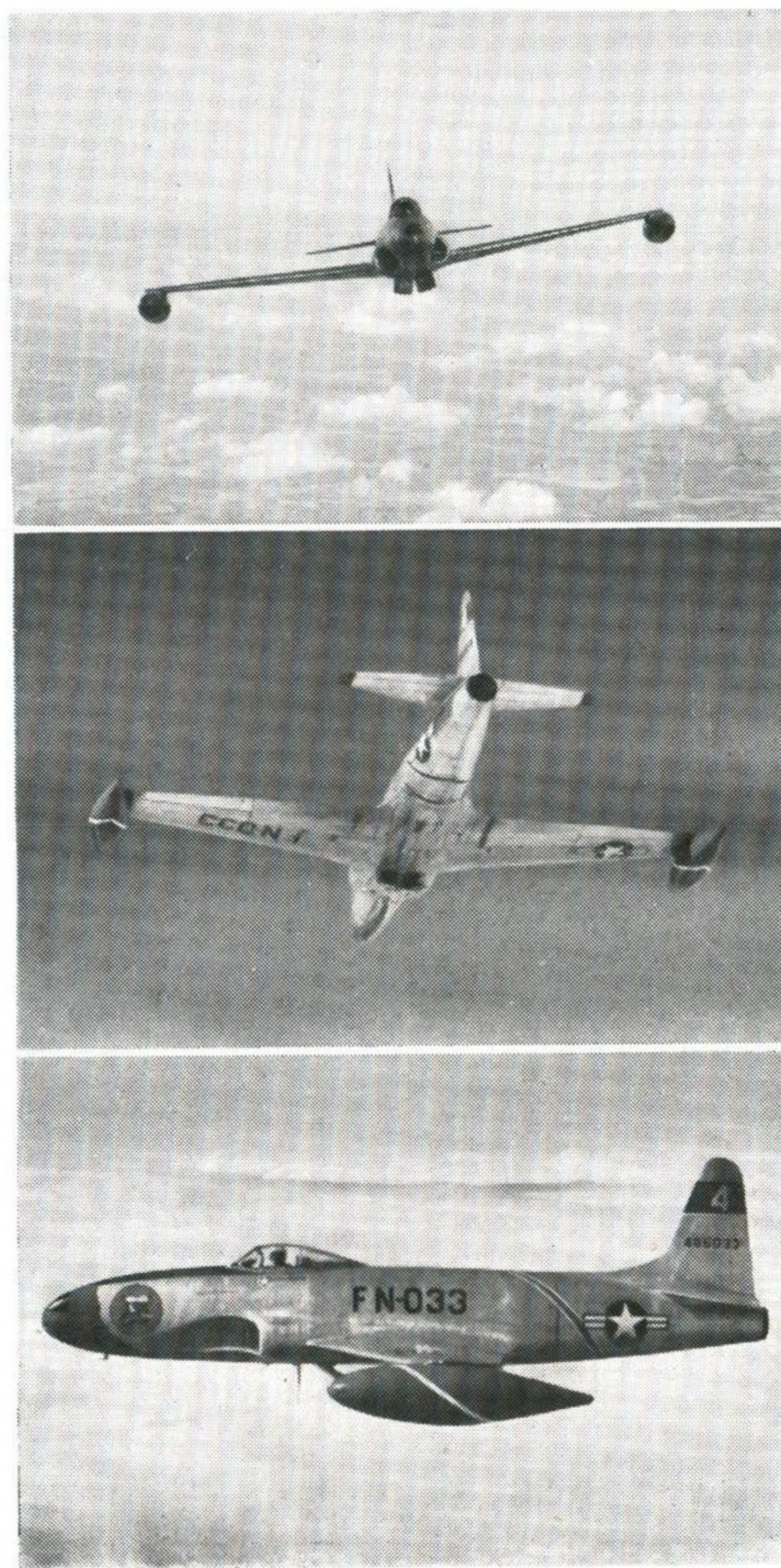
Wings : low-set, nearly half way along fuselage, slight dihedral, near-diamond shape, faired to fuselage at roots, wing-tip drop tanks.

Engine : extended intakes forward of wing roots.

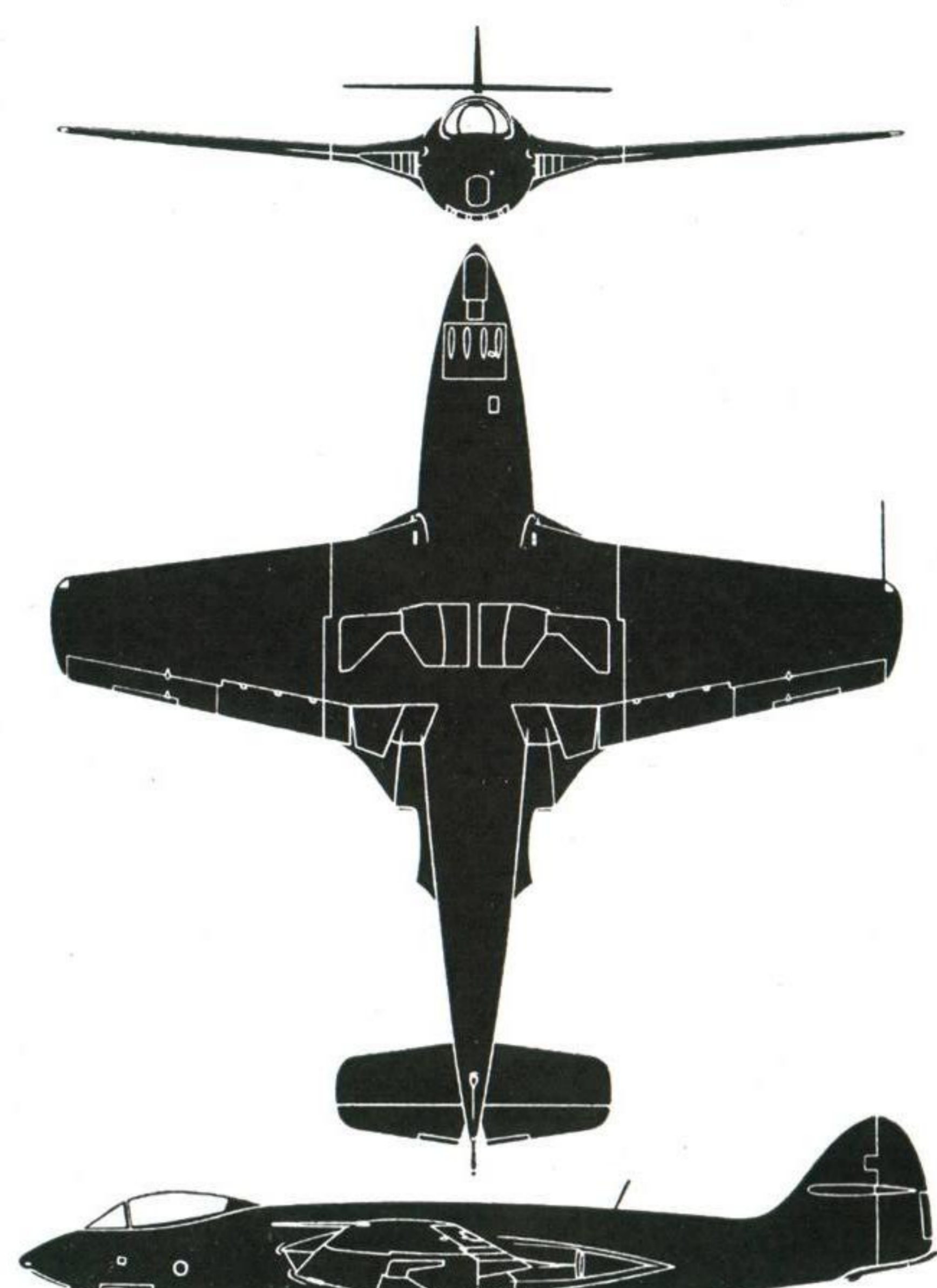
Fuselage : long nose—cigar-shaped in side view—pointed in plan view, jet pipe aft of tail.

Tail Unit : tailplane ; diamond shape, duo-curve tips, set across top of jet-pipe, tall triangular fin and rudder faired to fuselage, duo-curve tip.

Detail : bubble cockpit set back from nose.



HAWKER SEA HAWK F Mk. 1



British Fighter

Engine : One Rolls-Royce Nene turbojet
Span : 36 ft. 6 ins. Length : 38 ft. 4 ins.

Recognition Points :

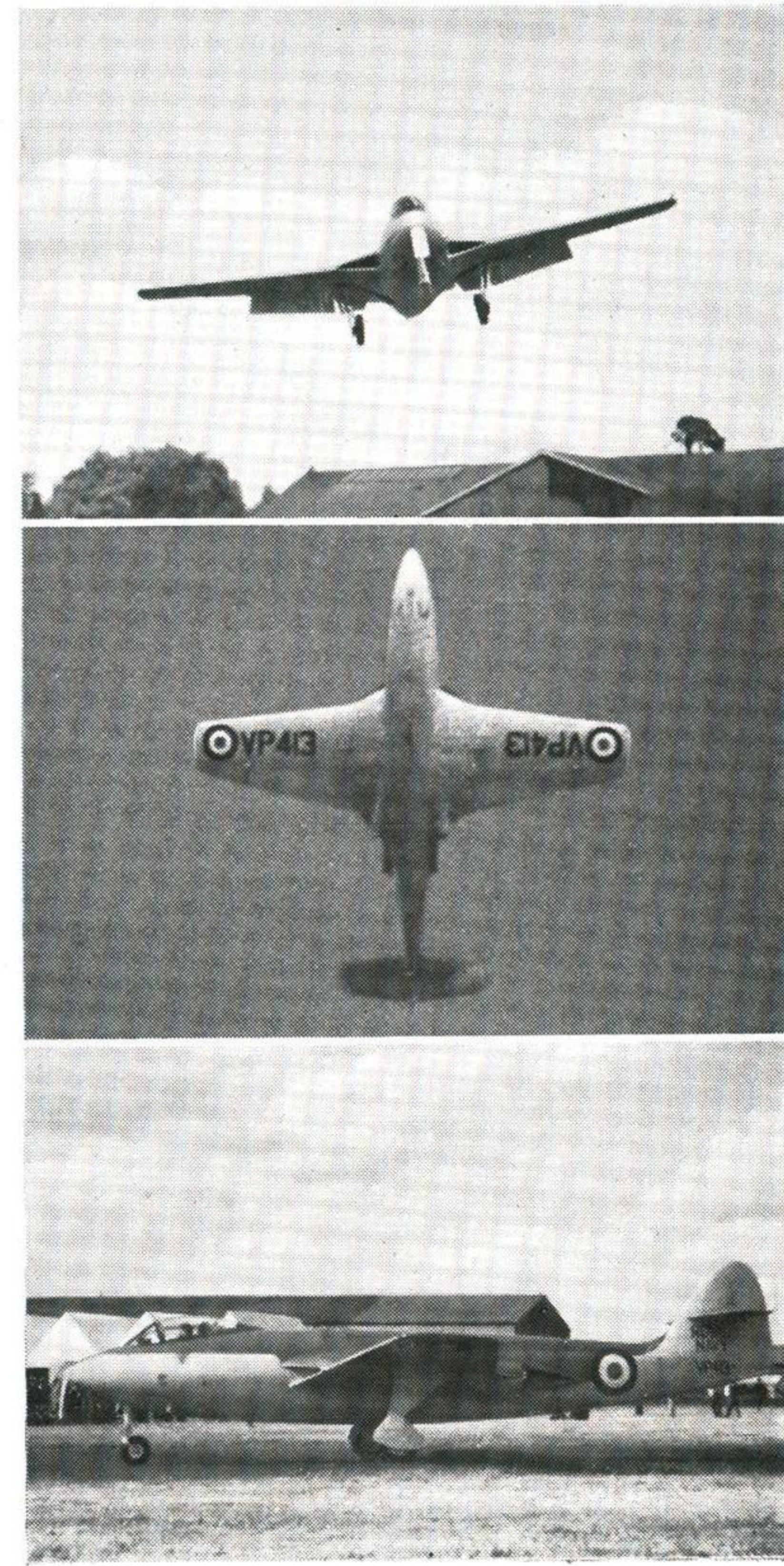
Wings : mid-set, slight dihedral, short span, wide chord, straight-taper, blunt tips.

Engine : intakes and outlets faired into wing-roots forming swollen centre section.

Fuselage : long, symmetrical streamlined, conical nose.

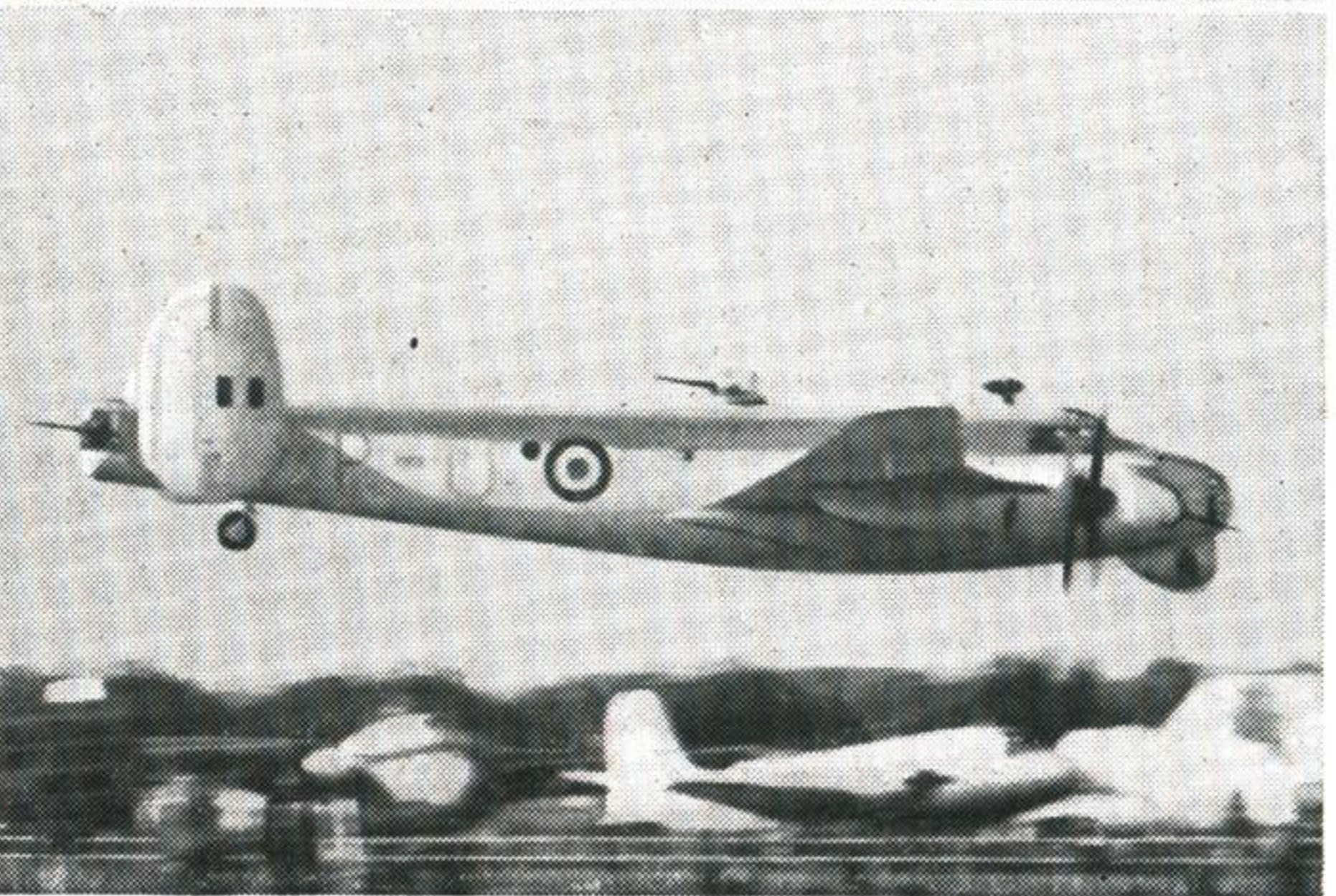
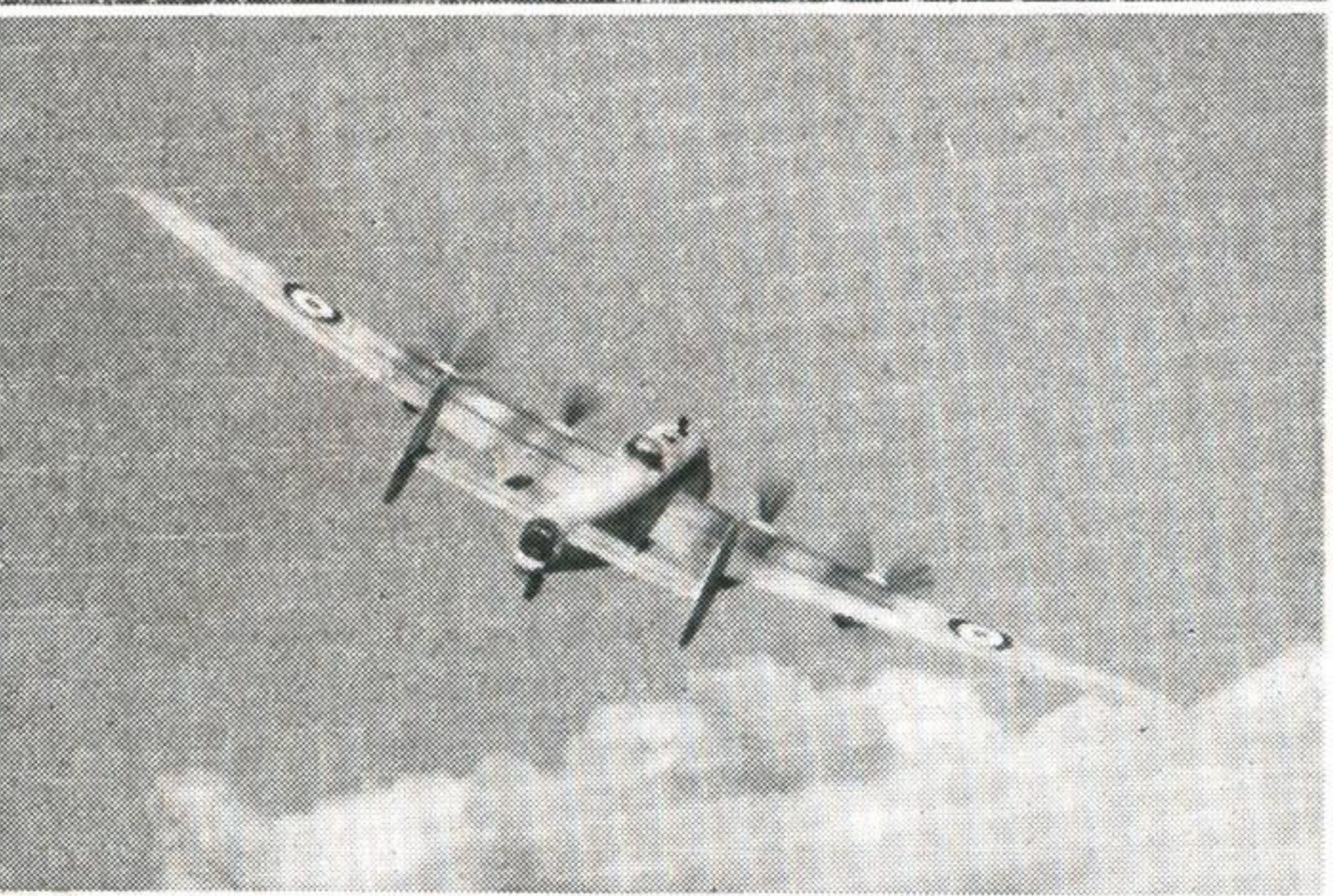
Tail Unit : Tailplane ; equi-taper, blunt tips, set half way up fin and rudder, rounded triangular fin and rudder, trailing edge forming sharp angle with fuselage baseline.

Detail : bubble cockpit streamlined to upper nose.





Cover Photo: Billowing clouds (and crowds) form a dramatic backcloth for this Avro Shackleton GR Mk. I seen taking-off at Farnborough last year. Views below show the Shackleton with open bomb-doors; its "stings" (tail and mid-upper); the deep fuselage; the outsize fins and rudders; and the distinguishing "wart" under its nose.



SOLUTIONS TO RECOGNITION TESTS IN THIS EDITION:

SILLOGRAPHS

- 671. Sea Hornet PR Mk. 22
- 672. Vickers 510
- 673. Mosquito T Mk. 3
- 674. Chipmunk T Mk. 10
- 675. P. 1052
- 676. Harvard T Mk. 2
- 677. Firefly FR Mk. 5
- 678. Balliol T Mk. 2
- 679. Firebrand TF Mk. 5
- 680. Gemini
- 681. Athena T Mk. 2
- 682. Wellington T Mk. 10
- 683. Sea Vampire FB Mk. 20
- 684. Vampire FB Mk. 5
- 685. Viking IB
- 686. Vickers 510
- 687. Sunderland GR Mk. 5
- 688. Hastings C Mk. 1
- 689. Buckmaster T Mk. 1
- 690. Horsa 2
- 691. Sea Fury F Mk. 10

ELEMENTARY

- 718. Spitfire PR Mk. 19
- 719. Vampire FB Mk. 5
- 720. Seafire F Mk. 17
- 721. Canberra B Mk. 1 (P)
- 722. Convair XC-99
- 723. Sikorsky S-51
- 724. Spitfire F Mk. 21
- 725. Sea Hornet NF Mk. 21
- 726. Sea Hornet PR Mk. 22 (P)
- 727. P2V-2 Neptune
- 728. Seafire FR Mk. 47
- 729. FH-1 Phantom
- 730. Hornet F Mk. 3
- 731. Prentice T Mk. 1
- 732. F-80A Shooting Star
- 733. Seagull ASR Mk. 1 (P)
- 734. Proctor T Mk. 4
- 735. Hastings C Mk. 1
- 736. Brigand TF Mk. 1
- 737. Stratocruiser
- 738. Sunderland GR Mk. 5 (P)—Prototype.

ADVANCED

- 917. Viscount
- 918. Marathon 2
- 919. Auster AOP 6
- 920. Sea Fury F Mk. 10
- 921. Prentice T Mk. 1
- 922. Sea Hornet PR Mk. 22
- 923. Wellington T Mk. 10
- 924. B-47 Stratojet
- 925. Convair-Liner
- 926. Varsity T Mk. 1
- 927. Vampire FB Mk. 5
- 928. Horsa 2
- 929. Spitfire PR Mk. 19
- 930. Proctor T Mk. 4
- 931. Auster AOP 6
- 932. F2H-1 Banshee
- 933. Hermes 4
- 934. Tiger Moth T Mk. 1
- 935. Meteor T Mk. 7
- 936. B-29 Superfortress
- 937. Buckmaster T Mk. 1

WRECK-COGNITION

DC-4 SKYMASTER

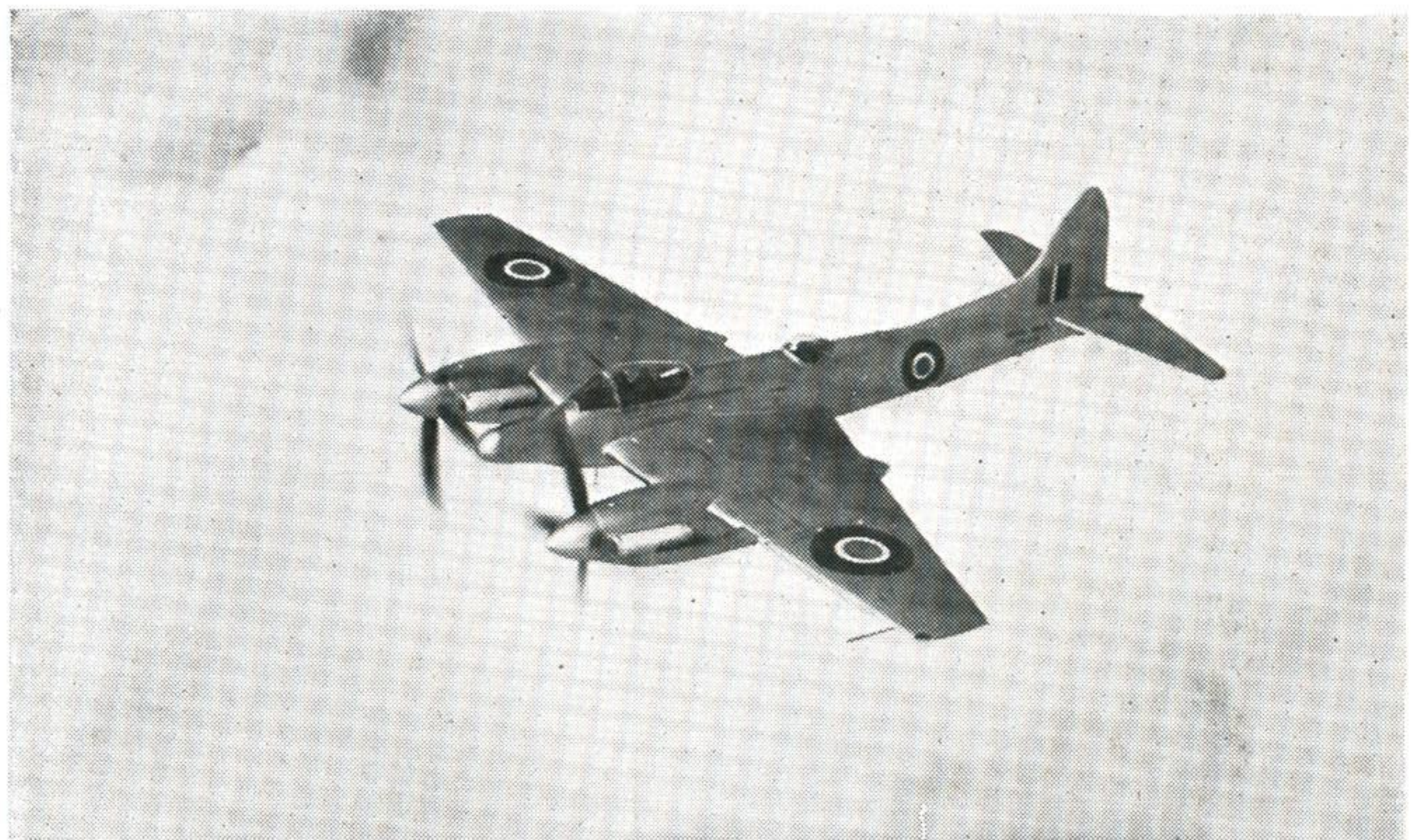
AEROGRAM

A POLO LAW=A. W. APOLLO

TRICKY TRIO

Left to right: Convair B-36; Bristol Brabazon; Convair C-99.

Hungry Hornet. The D.H. Sea Hornet NF Mk. 21 assumes the aspect of a hungry insect with its huge power-units, sensitive looking nose, a delicate fuselage and tail-up sit.



TRICKY TRIO

