THE INTER SERVICES

AIRCRAFT RECOGNITION

Journal

New Series

FEBRUARY 1948

Vol. 2. No. 7


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THE INTER SERVICES

AIRCRAFT RECOGNITION JOURNAL

(NEW SERIES)

Colour and Life

ONE of the big problems of teaching aircraft recognition during the war was to overcome the drabness of the method of instruction and of the materials used. Pupils were asked to swot an endless number of colourless shapes, and, with the aid of other colourless devices, were exhorted to make the aircraft they were learning into the real " live " things of colour and movement they really are. For some this was easy, but for the majority it was not ; and as a result the subject acquired, in some quarters, an unwarranted reputation of being a bit of a bind.

In those days the main trouble was time. It was impossible to give instructors long experience to enable them to make the best of the materials which were supplied. It was a case of pressing on at top speed and hoping for the best.

In these days there is not the urgency of war forever stabbing at the time factor and, although time *is* important, we are at least able to study the problem and to apply a remedy. In point of fact, if we tackle this drabness problem resolutely, we shall go a very long way towards improving the all-round efficiency of recognition instruction and relieving the heavy burden of study besetting pupils.

Everyone is attracted by colours and brightness, by life and movement, especially in these dull days. It was never so important to brighten up study in every possible way, and the infusion of colour and life into the dullness and blackness of the silhouettes, and into the greyness of the half-tones and of the models, is something which all of us must tackle energetically.

There are two sorts of "colour" and "life." There are those which are the product of the fertile and lively imagination of the instructor, in his utterances, in his writings and, indeed, in his attitude to and treatment of the whole subject.

In war-time instruction, the use of interest matter—the " glamour," as many will recall it—was, in part, an attempt to meet the problem of monotony, but it was not used properly nor was it exploited fully, and in many cases became so stereotyped in content and presentation as to defeat its own object.

Presentation is part of the colouring of instruction and is very important. The lively talk, the humour, the vigorous discussions which the imaginative instructor produces for his class, pay positive dividends in the quality of inspiration which he imparts : for, remember, the teacher never teaches, he merely inspires his pupils to learn. The lively and imaginative instructor is, indeed, one of the keys to the solution of the drabness problem, which problem must be and is, in fact, being killed. An instructor who fails to inspire his class through lack of colour, which usually means lack of effort, is like the spiv—he creates nothing himself and is a drag on everybody else.

Then there is the more tangible—the outward and visible—use of colour to brighten reading material, class-rooms, models, photographs, information rooms, etc. We cannot do without silhouettes, photographs, and models, and to produce them in colour would be impossible—at least in present circumstances ; but in our use of them we can greatly reduce much of the dullness inherent in the continuous study of monochrome shapes and forms.

In this direct use of colour there is much the individual instructor can do to help himself and his pupils. Although it is mostly in small ways, when considered together it amounts to a lot. By way of example, the liberal use of coloured chalks during lecturing, both for sketching and lettering on the blackboard, will render aid both in illuminating the atmosphere of his talk and, if functionally used—that is to say, in delineating special shapes and forms—will aid the pupil's digestion of the facts.

For projection work the use of colour-photos of aircraft is an extremely valuable aid. It is true that these are at a premium, but more and more aeronautical publications are producing them, and the introduction of the odd one here and there is a valuable contribution to the brilliance of a lecture. It is a matter of great regret that the JOURNAL cannot, as yet, go this far in its photographic matter.

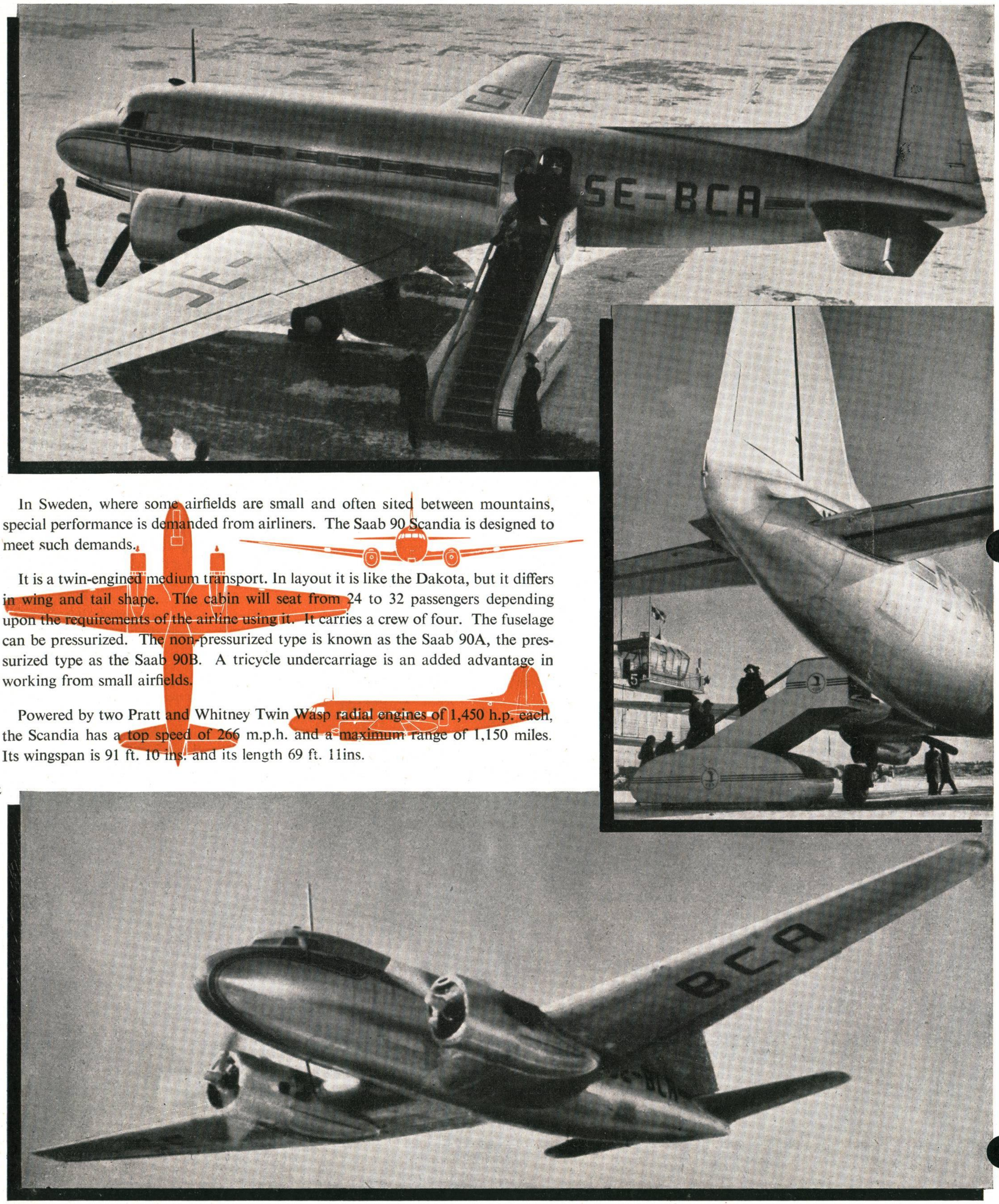
In photo-displays in information rooms, the use of coloured reproductions in the layouts ; the tying up of certain types of aircraft or groups of types with definite colours ; the careful brightening of layouts with such things as coloured arrows and other indications drawing attention to special features ; or the careful emphasis, by colour, of smaller differences in similar types of aircraft—all have a positive brightening effect upon the monotones of the photographs, and help the pupil to absorb knowledge.

As to models, only those who have seen the magnificent display at the Central School of Aircraft Recognition of correctly coloured model aircraft against natural-coloured backgrounds of sky, sea, and landscape will realize just how valuable colour is as an inspiration to pupils. The inspiration value of correctly coloured models is incalculable. The official models cannot be produced in colour mainly for financial reasons, and since colourings change it would be difficult to keep them up to date anyway, but there is every reason why instructors and others should colour as many as possible of those in set displays. In the arrangement of models, considerable "life" can be imparted even to the colourless ones.

As far as the JOURNAL is concerned, we have tried to keep in step with this important matter of colour. Layouts are made to form part of photographic displays. Centre-spreads have been made as much like posters as possible. We shall continue to do all that is possible in this respect.

Remember, aircraft recognition is not, never was, and never can be, just a matter of learning masses of shapes parrot-fashion. It just cannot be done. It is parrot-like repetition which produces monotony. Aircraft recognition is a broad study of aviation, the underlying background of which is shot through with colourful and inspiring incidents directly connected with individual aeroplanes—and right at this very moment aviation is upon the threshold of one of its most fascinating advances. Make the most of it ! Select your material carefully and present it in glorious technicolour ! You will then have much less difficulty in selling it.

Saab SCANDIA



In Sweden, where some airfields are small and often sited between mountains, special performance is demanded from airliners. The Saab 90 Scandia is designed to meet such demands.

It is a twin-engined medium transport. In layout it is like the Dakota, but it differs in wing and tail shape. The cabin will seat from 24 to 32 passengers depending upon the requirements of the airline using it. It carries a crew of four. The fuselage can be pressurized. The non-pressurized type is known as the Saab 90A, the pressurized type as the Saab 90B. A tricycle undercarriage is an added advantage in working from small airfields.

Powered by two Pratt and Whitney Twin Wasp radial engines of 1,450 h.p. each, the Scandia has a top speed of 266 m.p.h. and a maximum range of 1,150 miles. Its wingspan is 91 ft. 10 ins. and its length 69 ft. 11ins.

Boeing Looks Ahead

by Raymond G. Satchler

AFTER a visit to the Boeing aircraft works, Lord Knollys (ex-Chairman of B.O.A.C.) wrote : " The amount of research and development work you do struck us very much." Indeed, in common with other U.S. manufacturers, Boeing does seem to lavish expenditure on planning for tomorrow.

Big Stuff

At one end of the scale, Boeing is producing a quota of conventional designs such as the 14,000 h.p. B-50 heavy bomber development of the B-29 Superfortress, and the 67½-ton C-97 Stratofreighter and civil Stratocruiser ; and the heavy but swift XF8B-1 Navy fighter with six-blade " contra-prop " and 3,500 h.p. Wasp Major engine. At the other end, the Wichita branch has built the unconventional XL-15, designed for observation, artillery spotting, and other jobs with the ground forces. This little machine carries its twin fins and rudders " upside down " on a boom extending from the top of the crew nacelle. And the even more radical XB-47 six-jet long-range heavy bomber with swept-back wings is now flying. The XB-47 design represents a complete break with previous Boeing practice, but is a logical step forward. (Pictures overleaf.)

Smaller Stuff

A little known aspect of Boeing's work is that on the propulsion side. Boeing engineers are working on turbo-jets, turbo-airscrews, ram-jets, and rockets. In June, 1943, an active study into jet propulsion was inaugurated ; two gas turbines have been built, and others are projected. First to run was the Model " 500," a 150-lb. static thrust turbo-jet weighing only 85 lbs.; it can be used on pilotless missiles and small aeroplanes, or as an auxiliary plant on larger types. Model 502 followed, delivering 200 shaft h.p. to an airscrew. It uses many of the parts of the 500, and weighs only 140 lbs. At Renton, Washington, under U.S.A.A.F. auspices, an extensive research programme on ram-jet engines (athodyds) is under way, though little can be said about this work at present.

Mention can be made of the work on guided missiles. " Old Needlenose," as they call Boeing's GAPA (ground-to-air-pilotless-aircraft), is an electronically-controlled missile of somewhat similar appearance to the infamous German A-4 (the V.2). Much of the more than two years' study already completed is still shrouded in official secrecy, but it is known that the project calls for a supersonic missile capable of seeking and destroying a target flying at high speed. Defence against atom-bombers immediately springs to mind. Boeing's Vice-President W. E. Beall has said : " The principles involved in this weapon may have far-reaching effects on the design of future aircraft."

The very tall fin and rudder of the Stratocruiser and B-50 presented a problem ; most hangars in use were not high enough to allow the exit and entry of the aircraft wearing them. So Boeing engineers evolved a system whereby the fin-and-rudder is hinged and could be tilted to one side, thus reducing considerably the overall height.

Boeing has also been making use of the Air Force's " Climatic Hangar " in Florida, a ten-million dollar 200 × 250 ft. hangar fitted with refrigerating, etc., equipment to give temperatures from −70 deg. to +165 deg. F. Every kind of weather can be reproduced there from arctic fog to tropical cyclone. " Sourdough," a guinea-pig Boeing B-29, had already served two winters in Alaska and soaked up the sun of Florida. She stood up well to the equally trying " Climatic Hangar."

Little Stuff

This extensive research is not confined to the fields of aerodynamics and propulsion ; all relevant matters concerned with the aircraft they are building are gone into very thoroughly. For example, roughly half a million dollars and 100,000 man hours were expended on the development of a chair for the Stratocruiser. The result is that the chair is convertible to a sleeping berth and combines the maximum of comfort with utility.

Plastics have not been neglected at Boeing, some six years' research having been done. Over 270 air ducts of nearly 200 different shapes and sizes in the Stratocruiser, for example, are made of resin-impregnated " Fiberglas " fabric. They represent a weight saving of some 40 per cent over metal. An important use of plastics on the same aircraft is in the form of pipes for the drinking water supply. Metal pipes produce unpleasant tastes under the varying climatic conditions likely to be encountered.

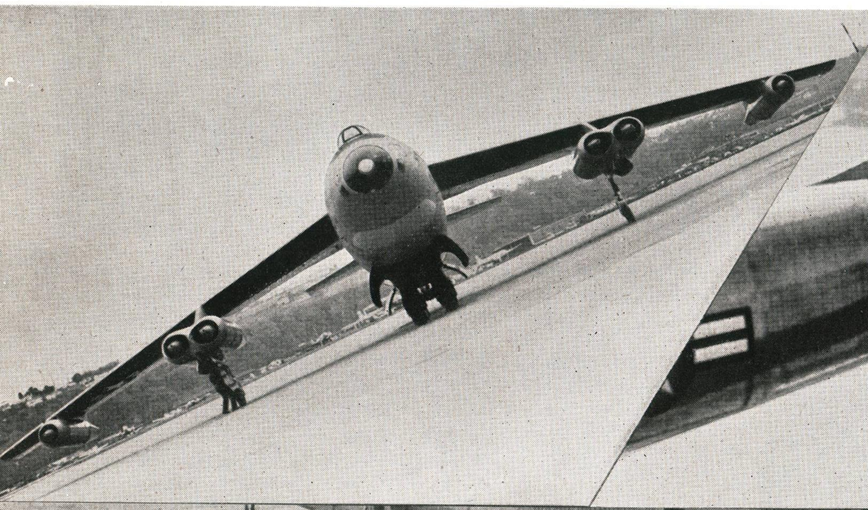
Air conditioning, illumination, acoustics, etc., each receive attention in their own special laboratories.

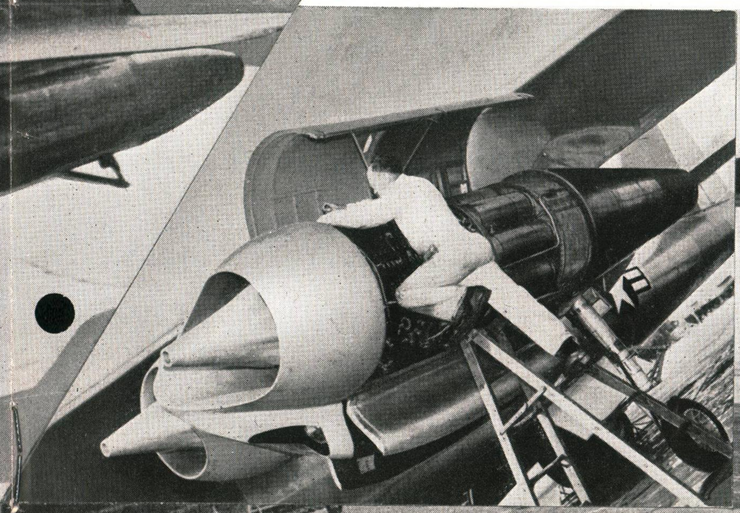
Exhaustive and extensive research work such as this will pay big dividends in years to come. Britain must be sure that she is not left behind.

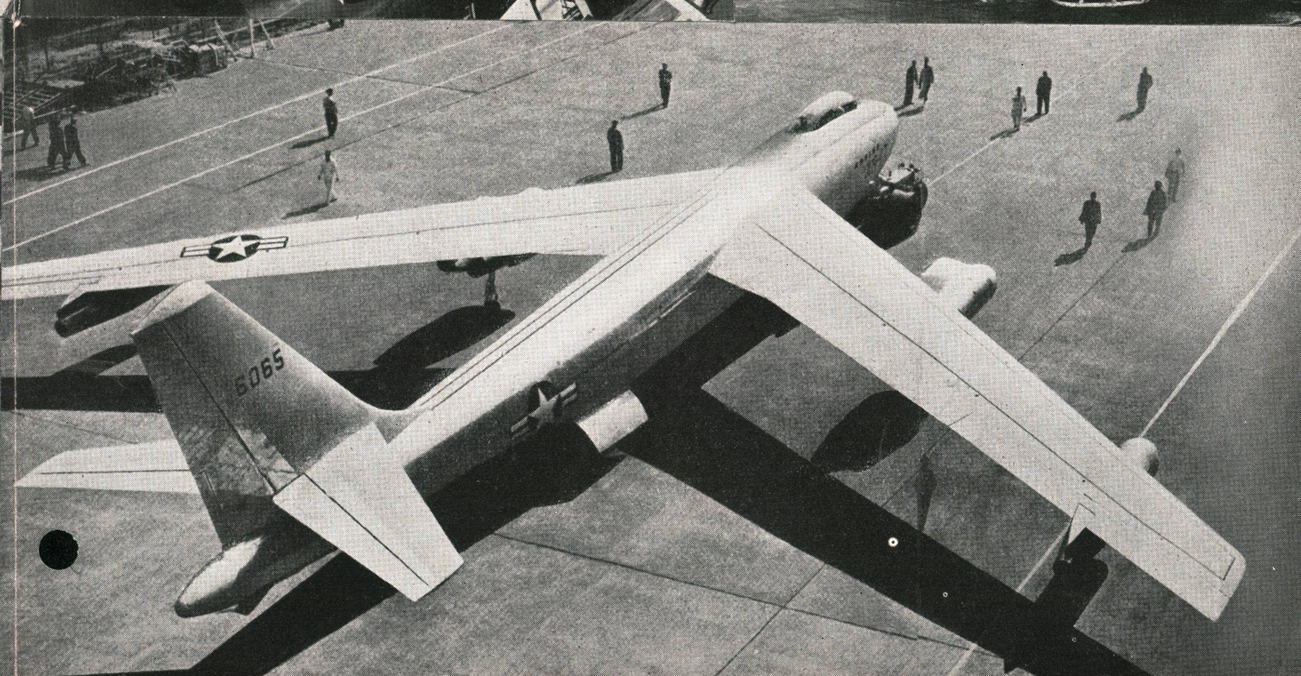
Boeing Bigwigs, including W. E. Beall, vice-president engineering (centre of three standing), test a Stratocruiser sleeping berth for comfort.

Boeing XB-47 "Stratojet"

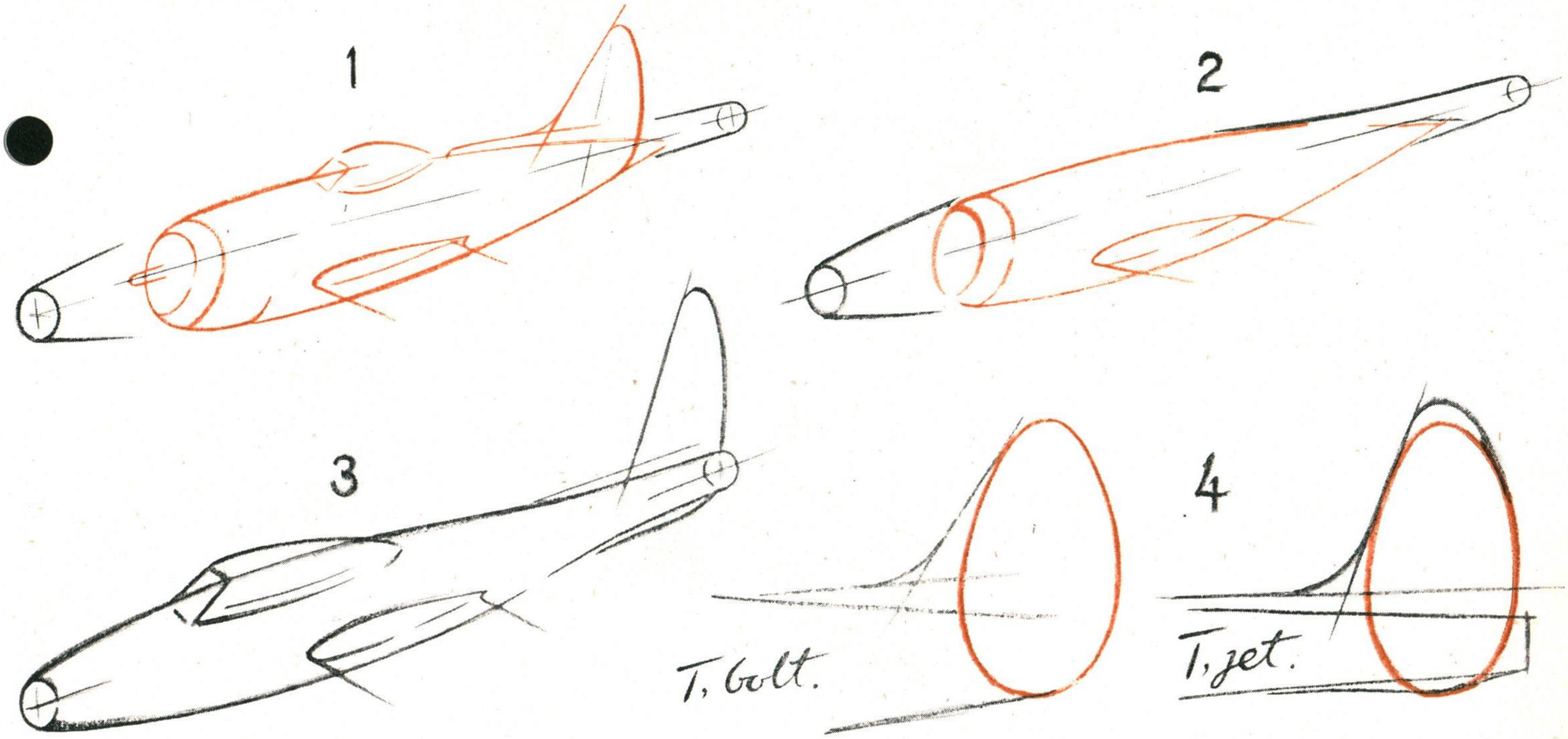
In October, Boeing wheeled out of its hangar at their Seattle plant the most interesting and strikingly advanced design of jet-bomber that the world has yet seen. On the 17th December, 1947, it was taken into the air by test pilot Robert Robbins and co-pilot Scott Osler. Powered by six turbojets—General Electric Allison TG-180s of 4,000 lbs. s.t. each—the "Forty-seven" is not only revolutionary in the layout of its flying surfaces, but also in the arrangement and the method of mounting its power units. The designer has taken full advantage of the flexibility of installation of this type of power plant, and the suspension of pairs of jets below and forward of the main wing is doubtless designed to obtain the maximum smoothness in the airflow over the back-swept wing. At rest, it will be seen that the extremely thin main wing has a decided droop; in flight, it will flex a certain amount of dihedral into it and the tips will rise about three feet. Among many other novel features in this jet-bomber is the built-in JATO gear, in the sides of the fuselage—nine rockets a side. As each rocket develops 1,000 lb. static thrust, the total thrust available in rockets and jet-power is in the region of 42,000 lbs. The designed gross weight of the aircraft is 125,000 lbs. It can carry about ten tons of bombs. *(See back cover for silhouette.)*







REPUBLIC P-84



Republic P-84 Thunderjet

THE Republic Aviation Corporation produced 15,329 P-47 Thunderbolts of various denominations for World War II. Between them they flew not less than 545,575 operational sorties and did enormous damage to the enemy. It is not surprising, therefore, that the U.S.A.A.F., in an attempt to improve upon this achievement, made a request to Republic, and the designer, Alexander Kartvelli, to try out the Thunderbolt with the TG-180 turbojet. It is never wise to try to "gild the lily" and, to cut a long story short, the deliberations which took place between Republic and Air Materiel Command of U.S.A.A.F. ended in a decision to produce an entirely new design of jet-fighter.

The design, started in November, 1944, was designated the XP-84 Thunderjet. It not only retained part of the name of its famous elder brother, but also some of its design characteristics. It took the air for the first time under its own power on the 28th February, 1946, but it was airborne some days earlier than that, in the hold of a Boeing C-97 which took it from Farmingdale to Muroc. As Boeings say, " it is probably the first time any aeroplane ' flew ' before it flew."

The Bottle-Club

Nick-named the " Winged Wind Tunnel," the P-84 is, in fact, just that. Its fuselage form, roughly like a bottle—some prefer to liken it to an Indian club—is open at both ends and takes in air at the front, burns it in the turbojet in its belly, and ejects it at the rear. It is the simplest form of jet-propelled aeroplane that anyone could devise. It is in its fuselage form that we find characteristics of the P-47. If you look at figures 1, 2 and 3 above, you will notice that the basic fuselage lines of the P-47 when extended form an air scoop, as in the P-84 : whilst if a tube is let into the rear and faired in we create the jet-pipe : so, after all, the P-84's form is not so very far removed from that of the P-47. The fully-fashioned rear view cockpit canopy is perched almost on the nose of this bottle-like—or club-like—body form.

The Plank

In wing shape, however, the two aircraft differ very much. The P-84 has a stub-wing, which is equi-tapered and has blunt tips. It is very thin in section. It is low-mid mounted, and is set rather far back. Main under-carriage wheels retract into wings (the nose-wheel into the nose), there are no root fillets at all. Tip-tanks may be carried.

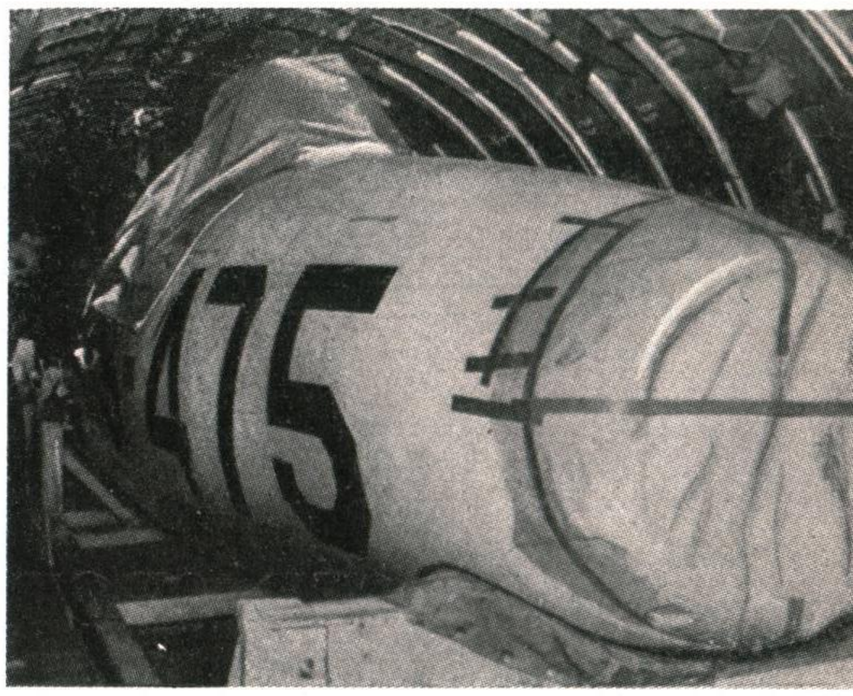
The Pear

Fins and rudders of both P-47 and P-84 appear to have a common origin in the pear-shape (see Fig. 4). The P-84's fin-fairing is very long and extends into extremely fine proportions and fades out just behind the cockpit. Extra keel-surface is also provided along the bottom of the fuselage.

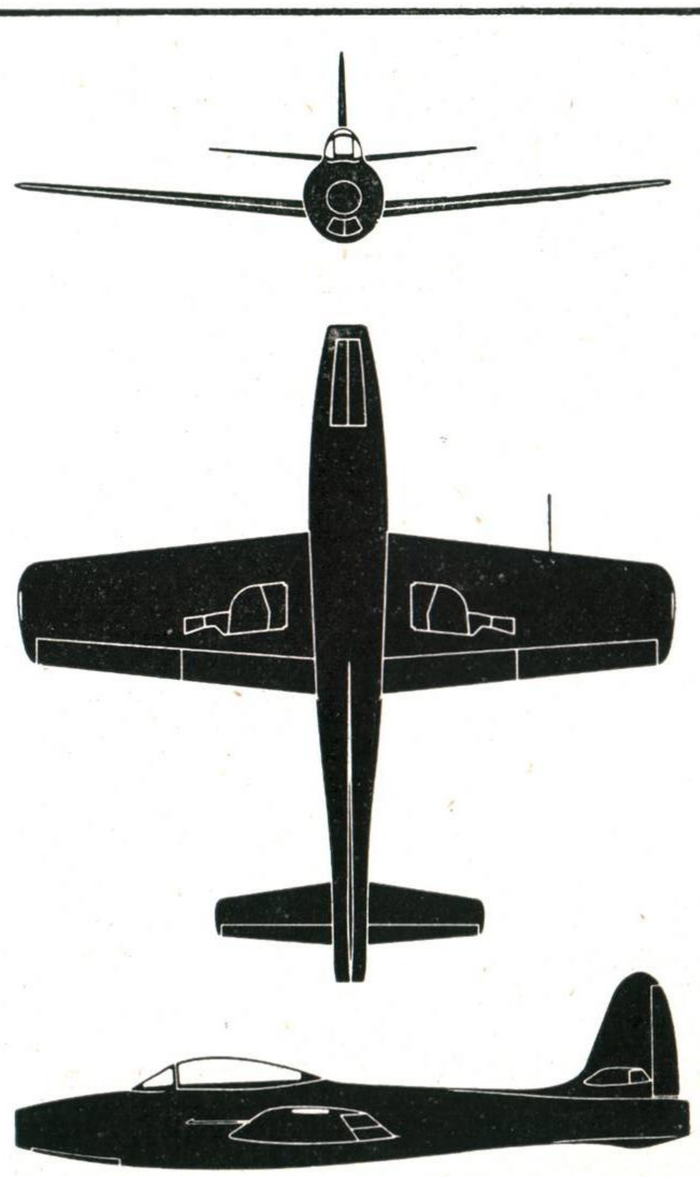
The slightly tapered-back tailplane which has a wide span, and blunt tips, is mounted on the fin, clear of the fuselage, and has a slight dihedral angle.

The whole aeroplane is composed of the simplest forms.

The pictures on the opposite page, save the small right-hand one, are by Harold G. Martin of New York. So is the one overleaf. The aircraft is, in fact, a YP-84, but production models do not differ.



The prototype XP-84 in the hold of the Boeing C-97 transport which took it to Muroc from Farmingdale.



Technicalities

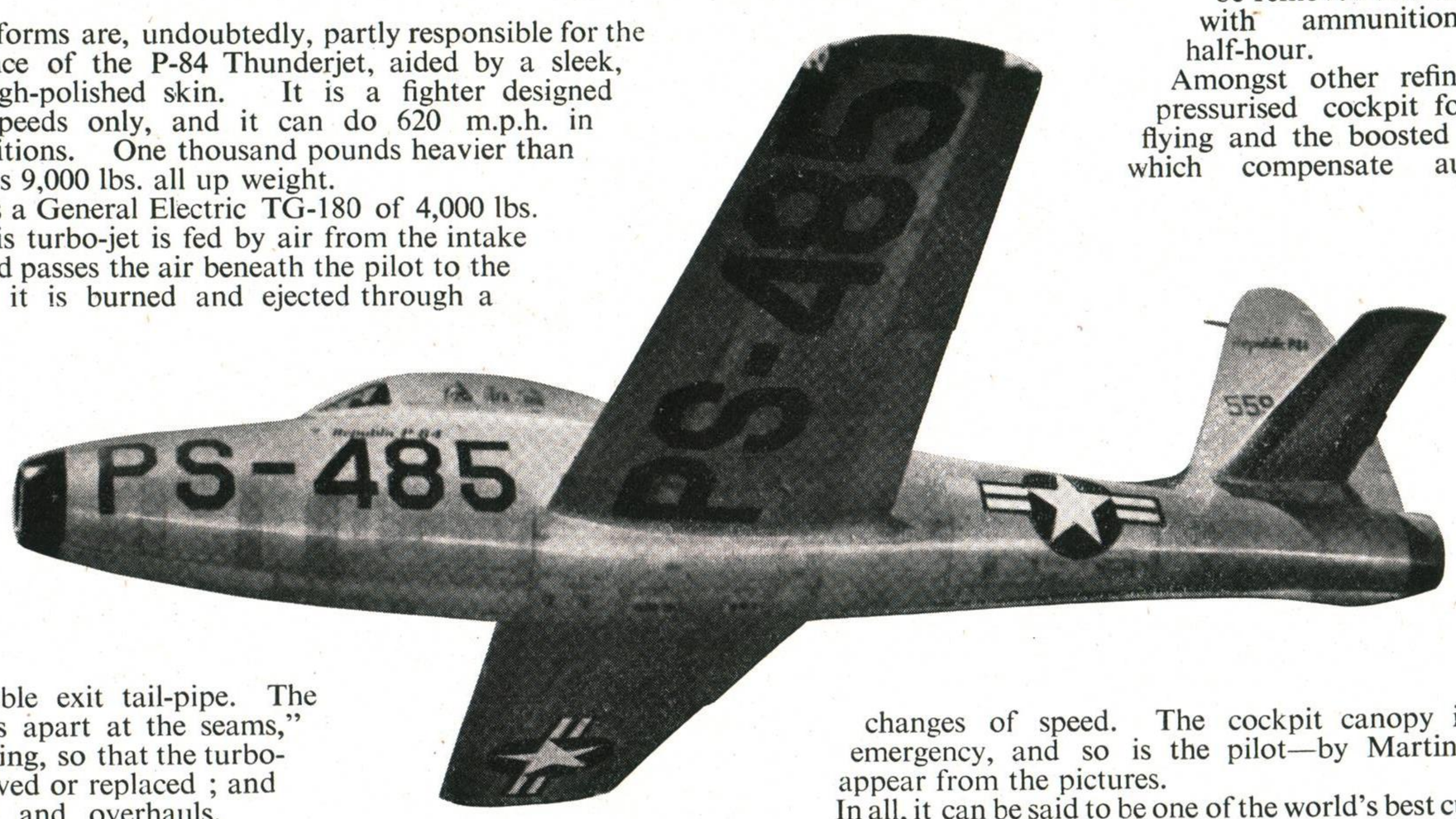
These simple forms are, undoubtedly, partly responsible for the good performance of the P-84 Thunderjet, aided by a sleek, flush-riveted, high-polished skin. It is a fighter designed for sub-sonic speeds only, and it can do 620 m.p.h. in reasonable conditions. One thousand pounds heavier than the P-80, it scales 9,000 lbs. all up weight.

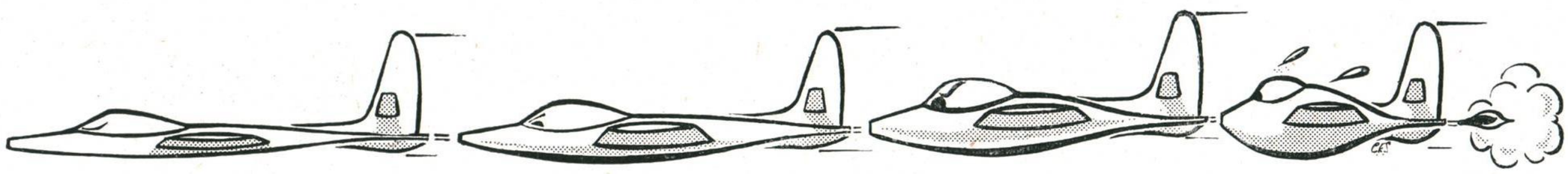
Its turbo-jet is a General Electric TG-180 of 4,000 lbs. static thrust. This turbo-jet is fed by air from the intake which divides and passes the air beneath the pilot to the turbojet, where it is burned and ejected through a controlled variable exit tail-pipe. The fuselage "comes apart at the seams," just aft of the wing, so that the turbo-jet can be removed or replaced ; and for inspections and overhauls.

The P-84 carries an armament of six guns in the nose which can be removed and replaced complete with ammunition within the half-hour.

Amongst other refinements, are the pressurised cockpit for high altitude flying and the boosted aileron controls, which compensate automatically for changes of speed. The cockpit canopy is jettisonable in emergency, and so is the pilot—by Martin Baker it would appear from the pictures.

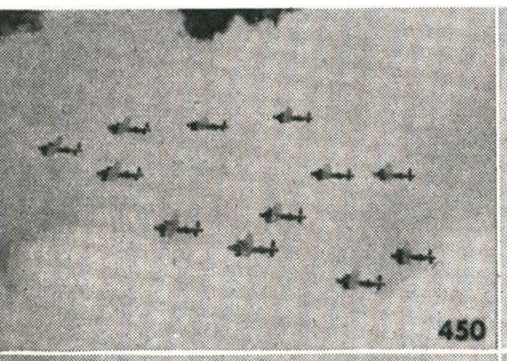
In all, it can be said to be one of the world's best current jet-fighters, and the faith that the U.S.A.A.F. have in it can best be judged by the fact that they have ordered, so far, no less than 550 of them.—C.E.S.

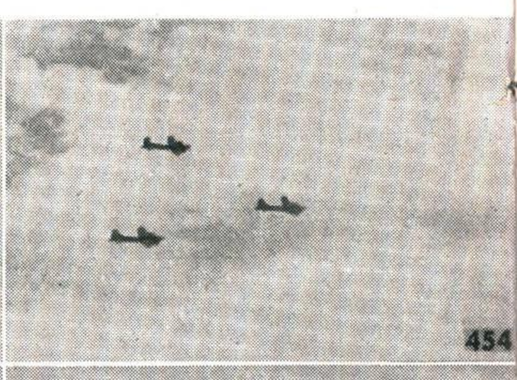


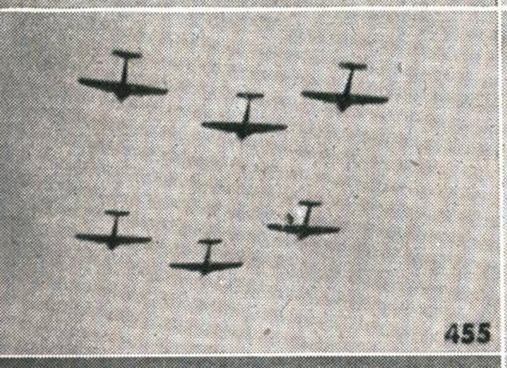


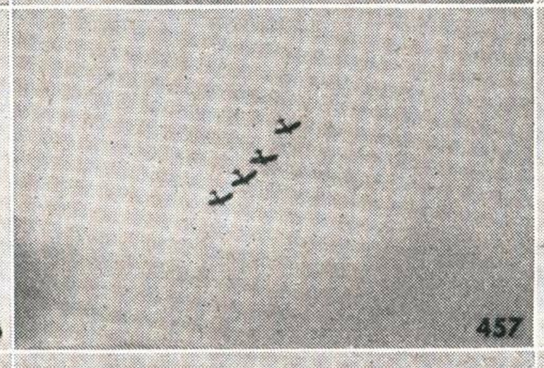
ADVANCED SPOTTING

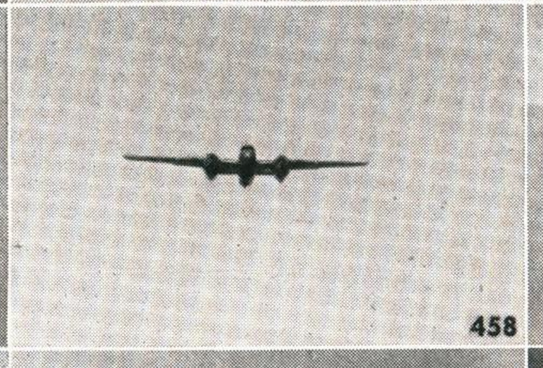
Recognition Test No. 56

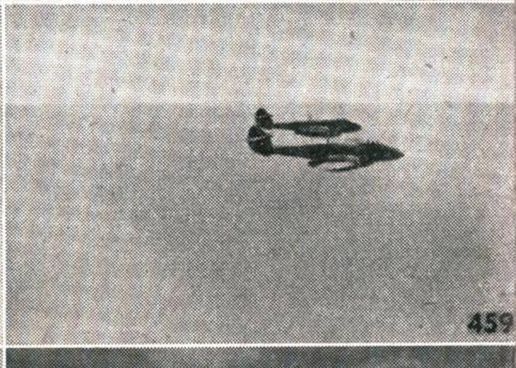


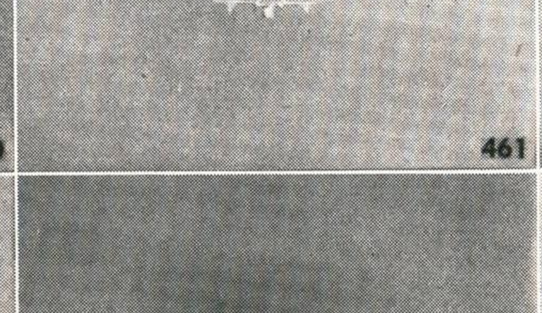


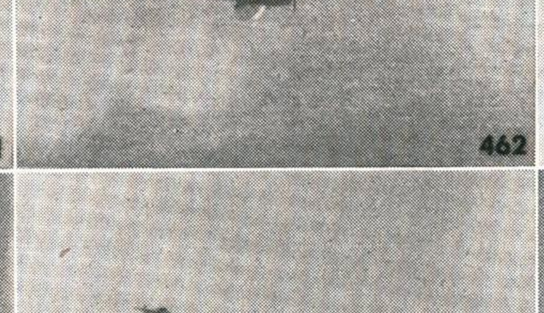


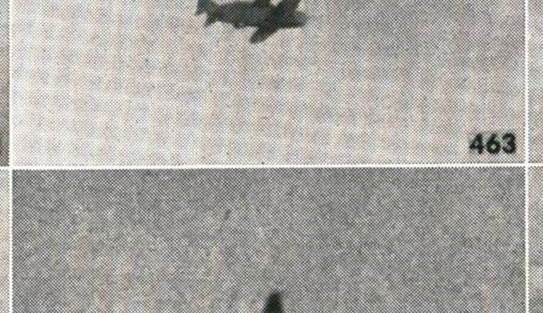


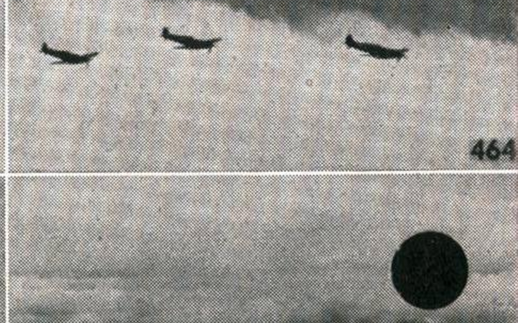


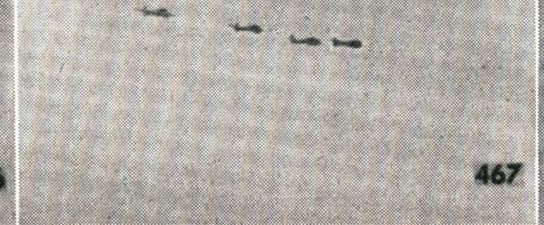




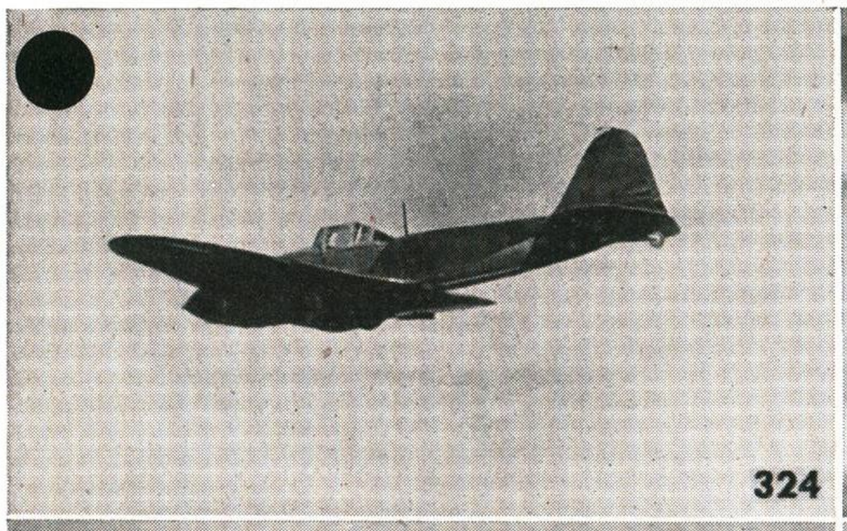








ELEMENTARY SPOTTING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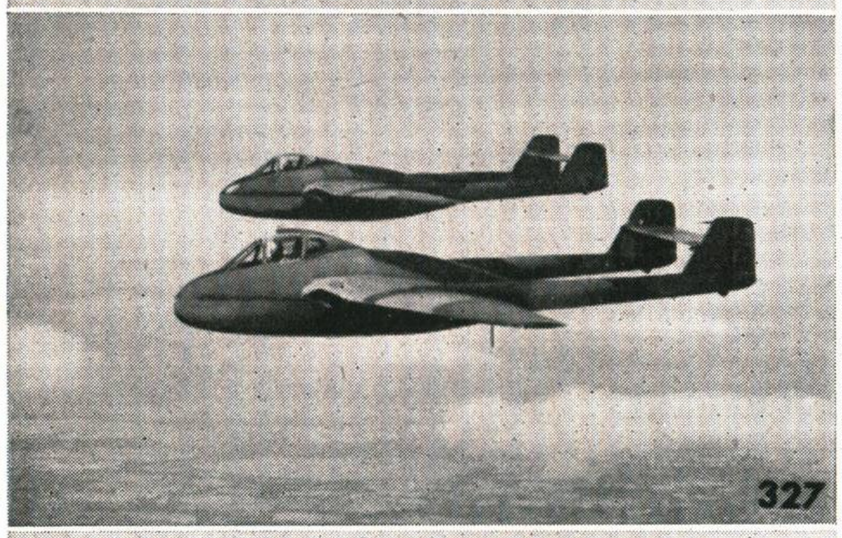
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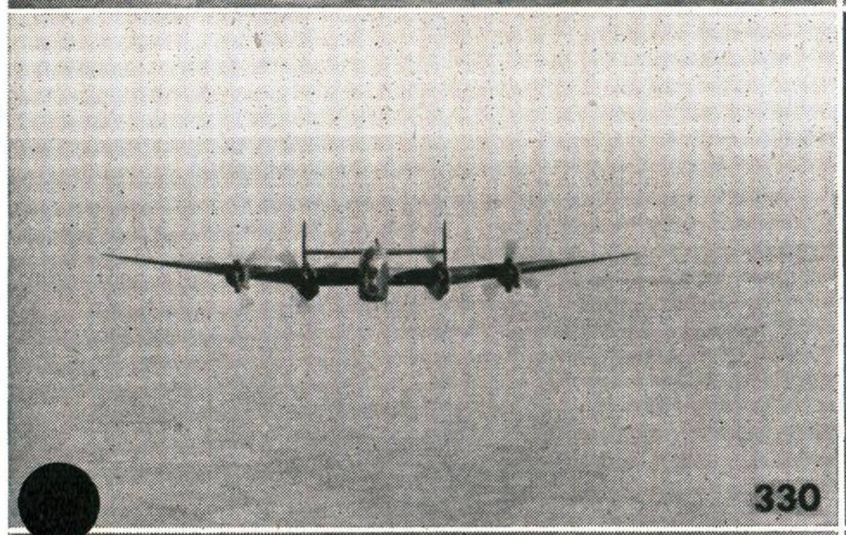
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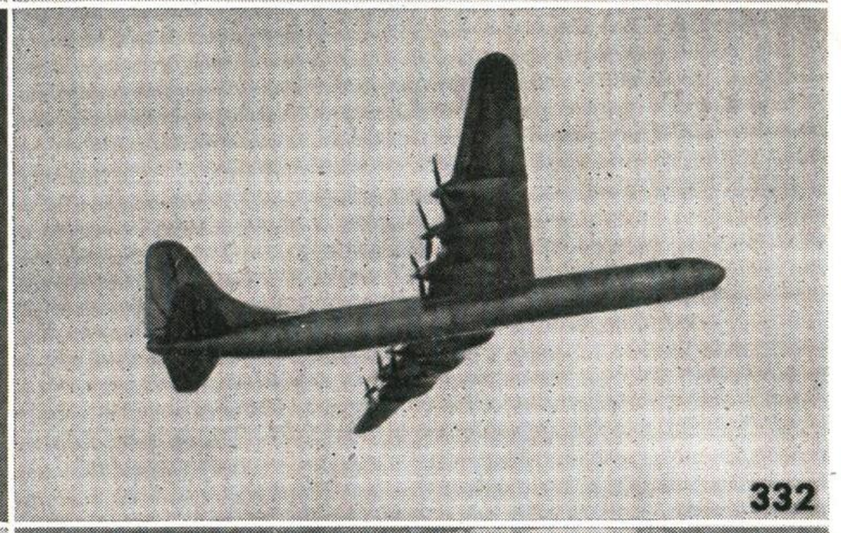
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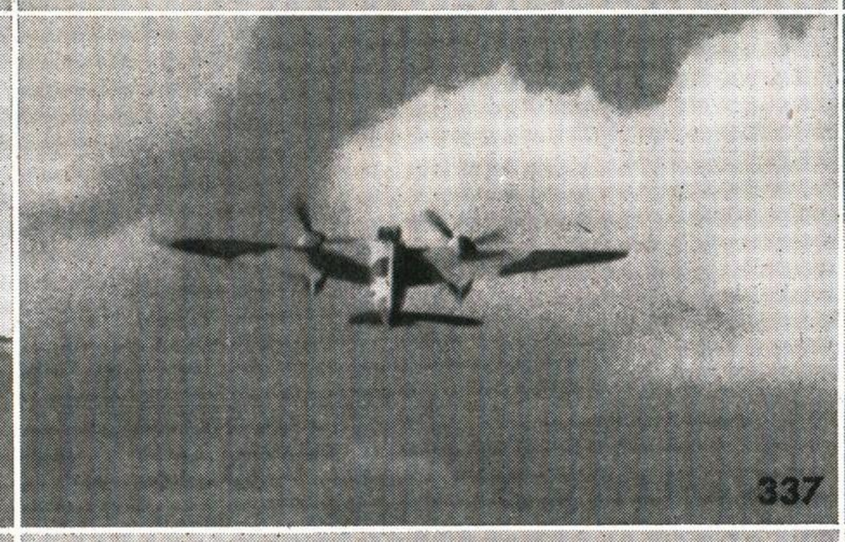
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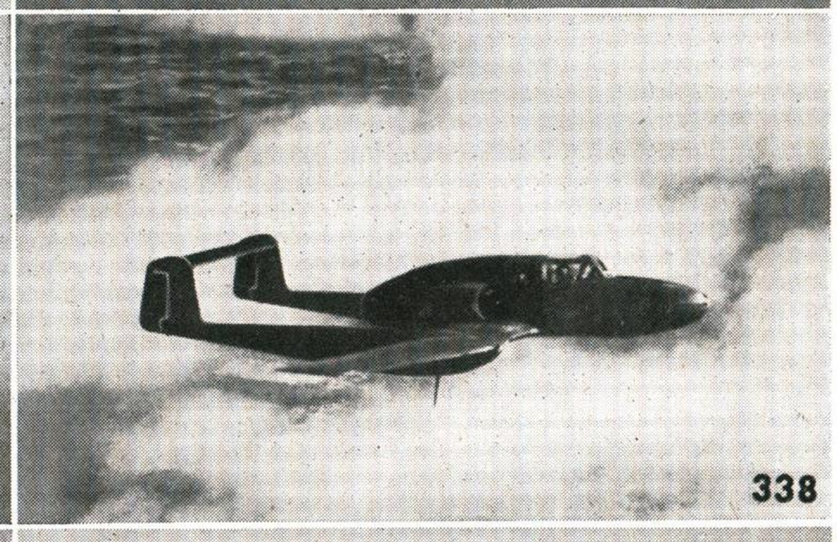
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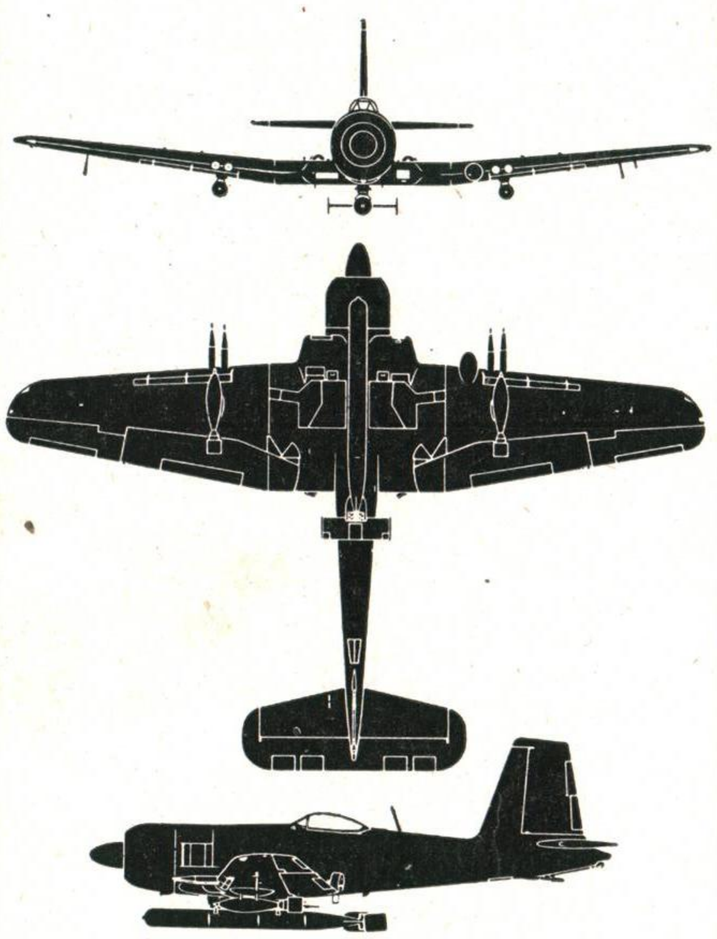
BLACKBURN FIREBRAND V



British Naval Fighter
One Centaurus Radial. Span : 51 ft. 3 ins.
New Silhouette

FIREBRAND FEATURES : Short blunt nose—forward tapered wing, dihedral in outer panels—backward tapered tailplane—deep narrow, slightly humped fuselage—broad-based " fez " shaped fin and rudder.

FORTY-SEVEN FACTS: Exaggerated sweep-back to all flying surfaces—down and forward mounting of pairs of inner jets—single jet units almost at wing tips—long clean, almost circular section fuselage, tapering up towards rear—cockpit on nose.

BOEING XB-47

American Bomber
Six TG-180 Turbojets. Span : 116 ft.
New Silhouette

SOLUTIONS TO RECOGNITION TESTS IN THIS ISSUE :

FRONT COVER : *North American XP-86*

DIM VIEWS No. 2

29. Auster
30. DC-4 Skymaster
31. S-51
32. Ambassador
33. Lincoln
34. Lancaster
35. Vampire
36. Lincoln
37. Constellation
38. Tiger Moth
39. Bonanza
40. Hornet
41. Mosquitoes
42. B-29 Superfort
43. Dakota
44. Lancaster
45. Tempest
46. Firebrand
47. Lockheed 14
48. Firefly IV
49. Halifax A.IX
50. Anson
51. P-61 Blackwidow
52. Oxford
53. Me 262

No. 56 (ADVANCED):

450. Lancaster VII
451. Mosquito
452. Spitfire
453. Harvard
454. Fortress B 17F
455. Firebrand
456. Shetland
457. Tiger Moth
458. Mitchell
459. Meteor
460. Superfortress
461. Mariner
462. Firefly and Seafire
463. Thunderbolts
464. Spitfire
465. Thunderbolts
466. Beaufighter
467. Meteor III
468. Caudron Goeland
469. Vampires

No. 57 (ELEMENTARY):

324. IL-2
325. P-61 Blackwidow
326. Firecrest
327. Vampire
328. Chipmunk
329. Bristol 171
330. Halifax A.IX
331. Dove
332. B-36
333. P-51 Mustang
334. Ambassador
335. Anson XIX
336. Spitfire 21
337. Mosquito
338. Saab J21R
339. Horsa
340. Harvard
341. Lancaster

ACKNOWLEDGEMENT

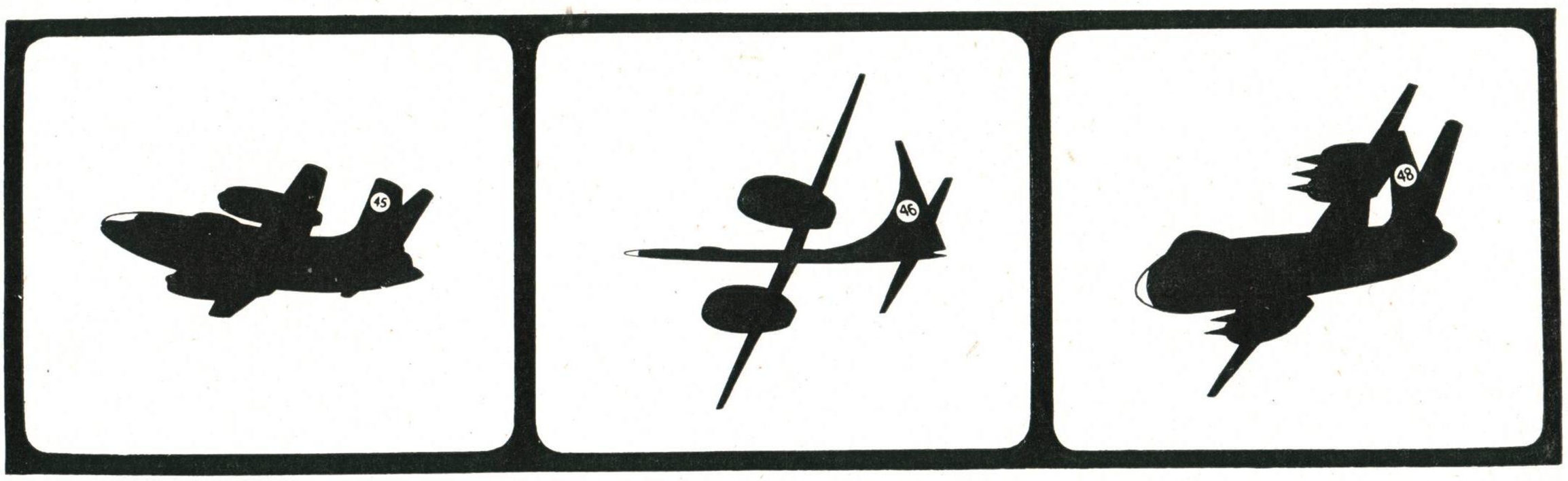
The originals of the photos numbered 450, 459, 469, were taken by Charles E. Brown.

WE REGRET

to find that pictures 8, 9 and 10 of FORMATION SPOTTING (December *Journal*, page 59) did not tie up with the clues. The answers to the test did, however. Also in the January number (page 65) our picture labelled PE-3 is, in fact, a PE-2. The difference is in the position of the radio mast and the introduction of a gun at the rear of the cockpit of the PE-3.

AS WE SEE THEM :

A shady set of sillygraphs—A silly set of shadygraphs—A set of silly shadowgraphs—call them what you will—of U.S. jet-bombers. Having sorted that out all that remains is to sort out the differences between the North American XB-45, the Convair XB-46 and the Martin XB-48. Their shapes—we think—speak for themselves. There will be little difficulty in distinguishing any of them from the XB-47, of which a very correct and completely sober silhouette appears above. They are set out in numerical order which is incidentally the order of their first flights.



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