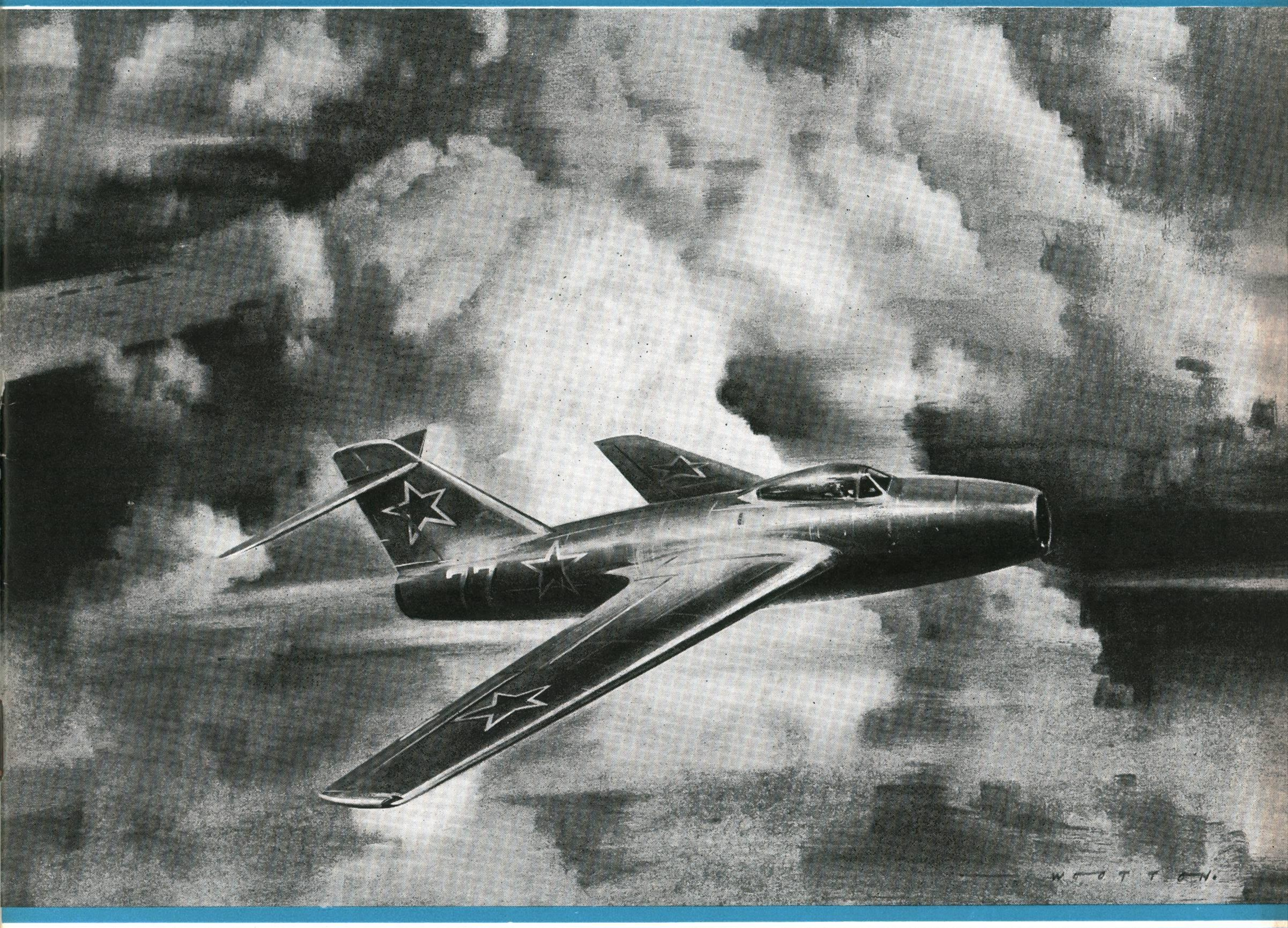
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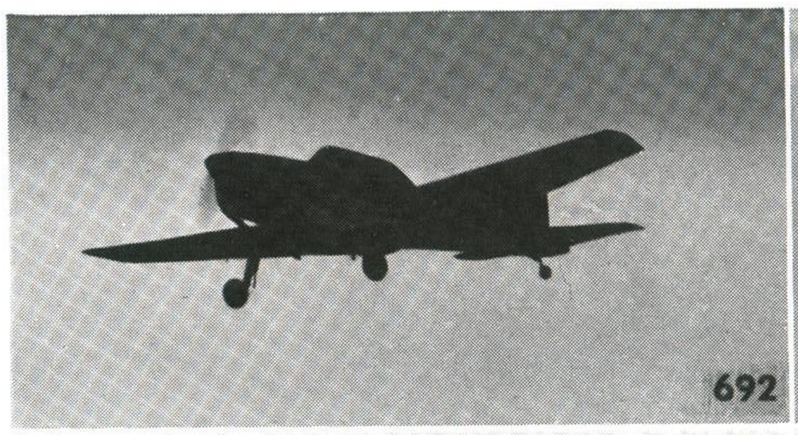
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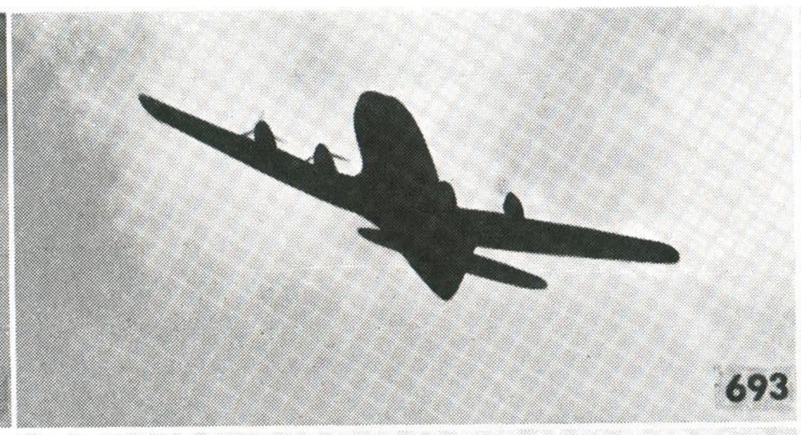
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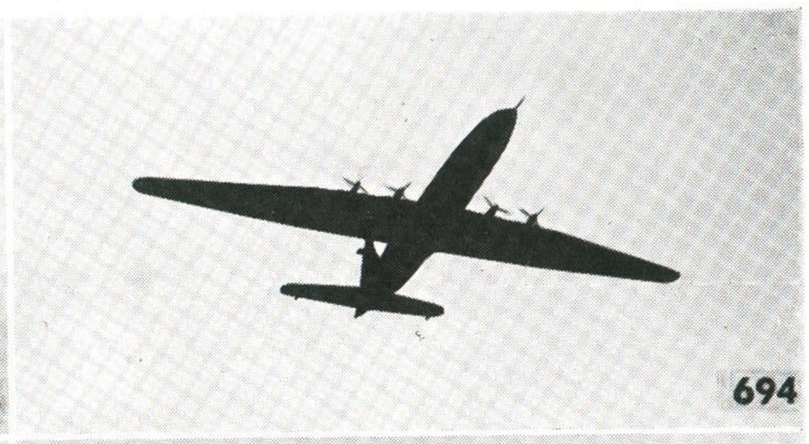


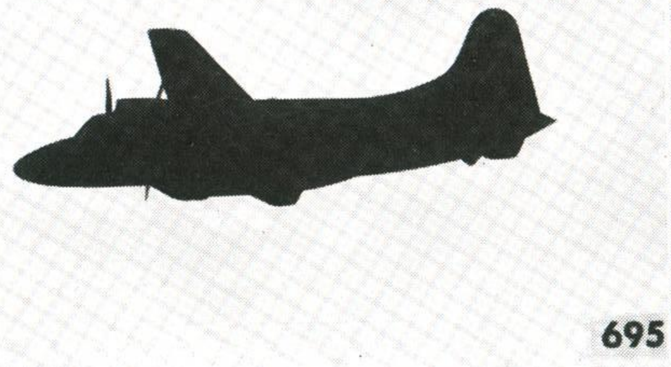
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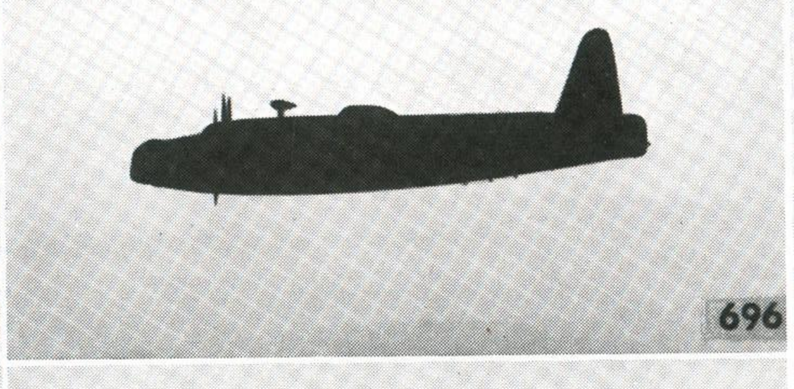
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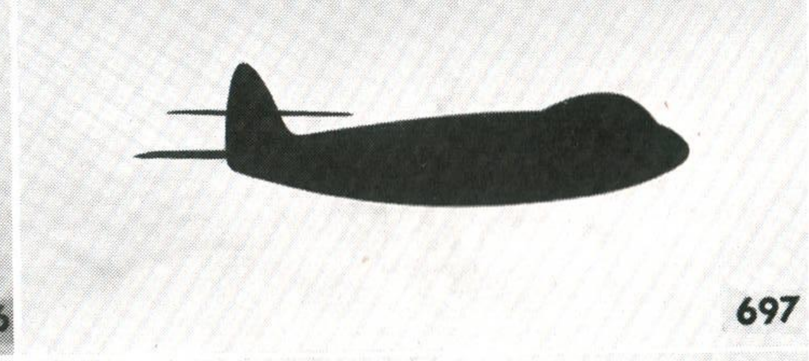

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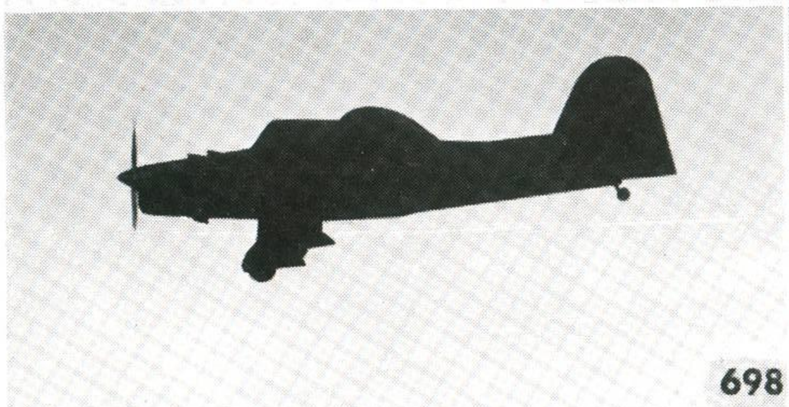

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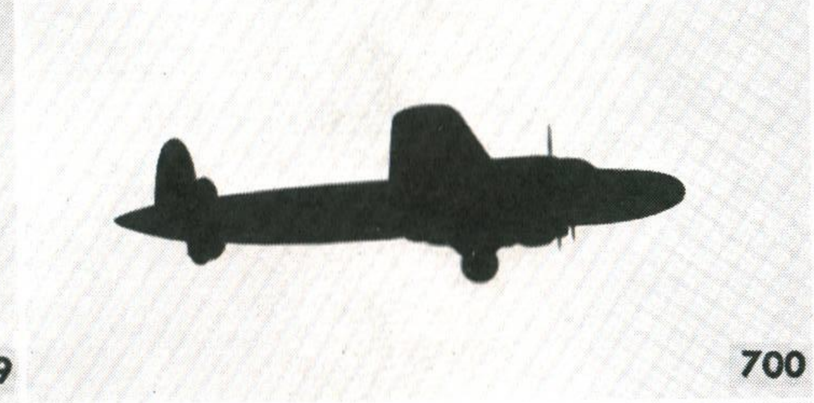

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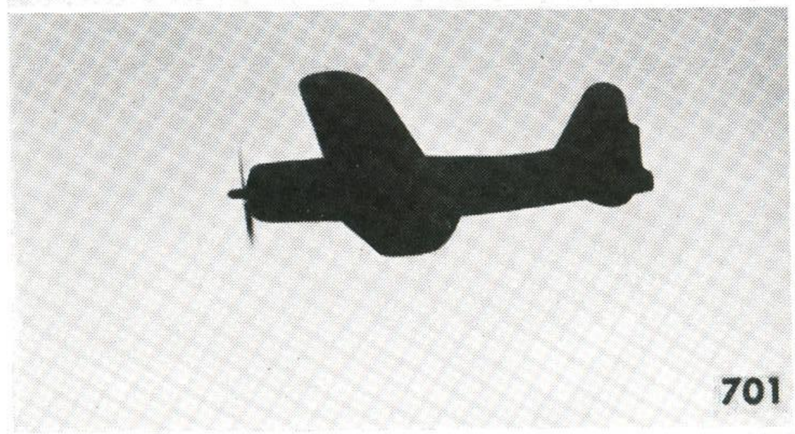

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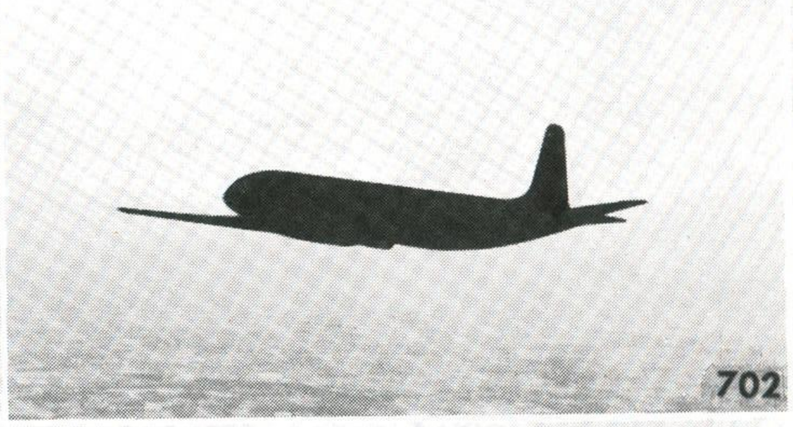

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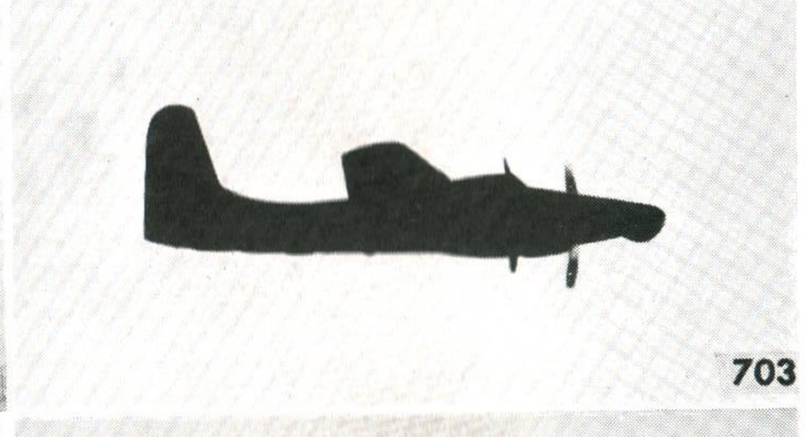

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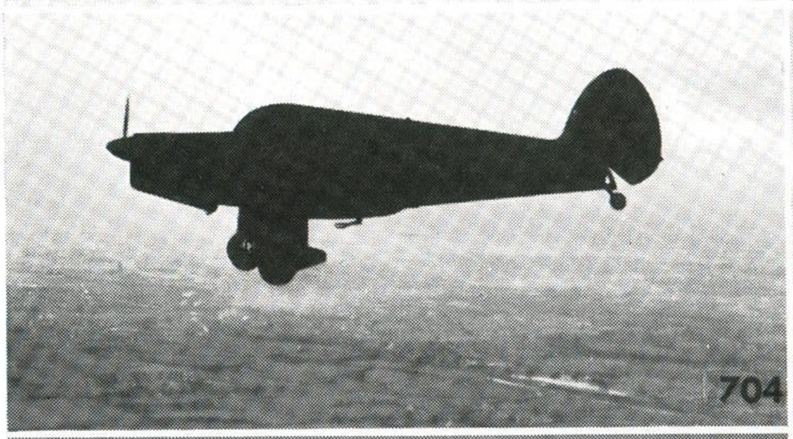

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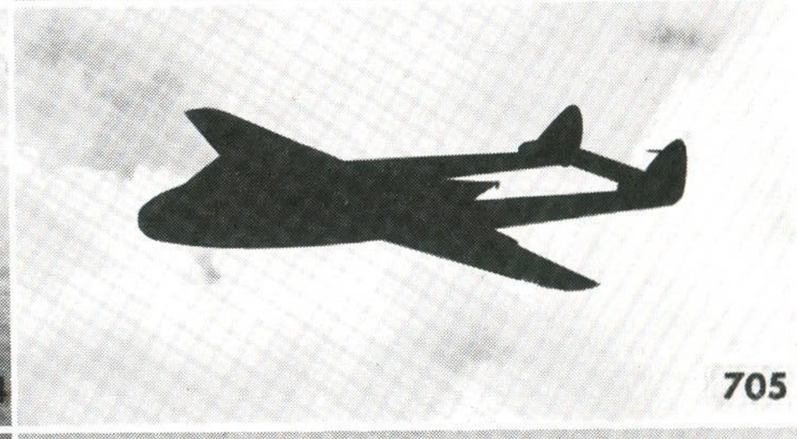

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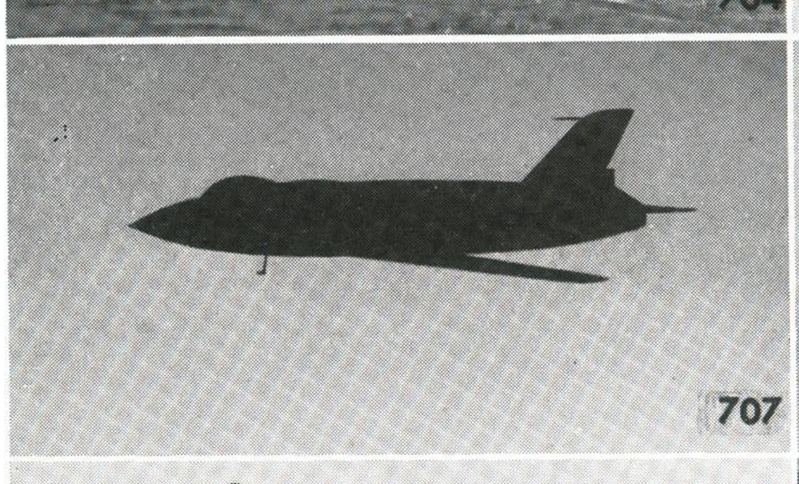

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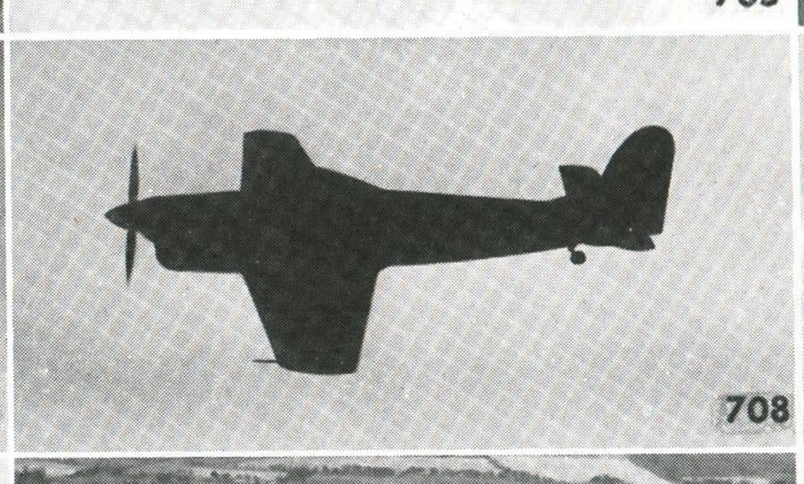

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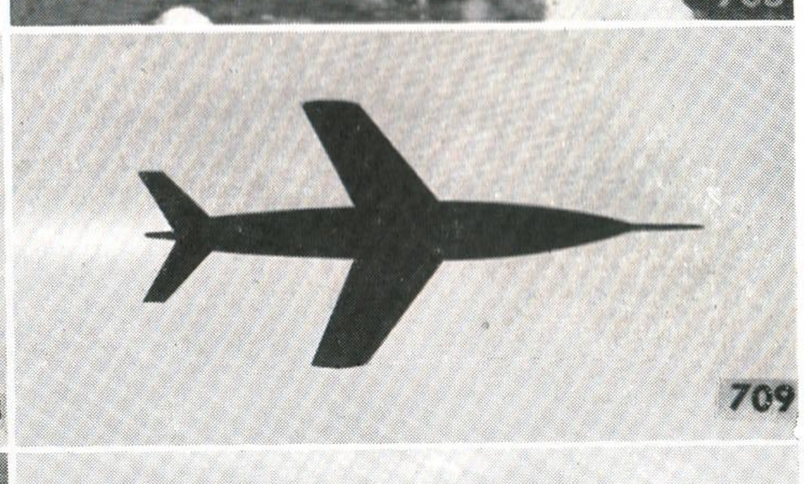

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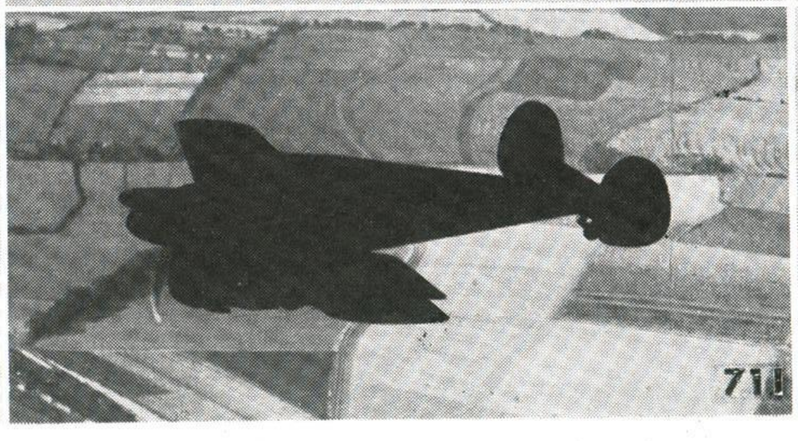

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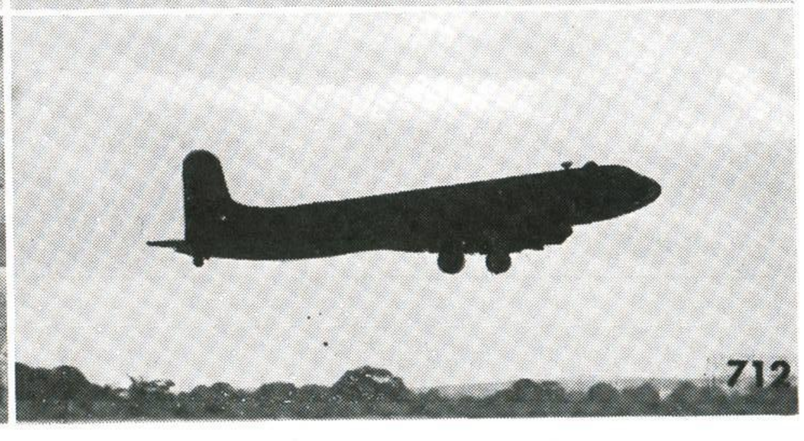

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THE INTER SERVICES

AIRCRAFT RECOGNITION JOURNAL

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MOVING PICTURES

THE GREATEST NEED in aircraft recognition training—as ever—is inspiration. We thought some sort of inspiration might be derived from this quotation, which is taken from the *Journal* for August, 1943 :

" Recent researches into the records on this subject reveal that almost without exception, every type of allied aeroplane in service has been shot at by its own side from the air or from the ground, and a large number, which even includes such familiar types as the Lysander and the Anson, has been shot down."

However, after setting it down we realized that it was simply cold, hard—and somewhat brutal—historical fact, bereft of glamour and lacking inspiration. After further reflection we also realized that the passage of time had taken much of the sting out of this sort of reminder, and that the mere hurling of harsh facts at our readers, whilst it probably acted as a reminder of the importance of our subject, did not positively inspire. It was too dated. It was dead. The need was, and is, for something vital—something alive—something moving. If only we could reproduce moving pictures of the events which inspired us during the war.

It was only then that it dawned upon us that there were such pictures ; and we had recently seen two of them. They were : " Task Force " and " 12 o'clock High." Both are American war-films. Both can be said to show harsh historical fact : but they are alive—real—convincing. They move—in every sense.

" Task Force " is a story of the development of the aircraft carrier in the United States Navy, and reaches its terrific climax in the Pacific war. " 12 o'clock High " is the story of an Amercan B-17 bomber group, stationed in England, operating against German targets in daylight.

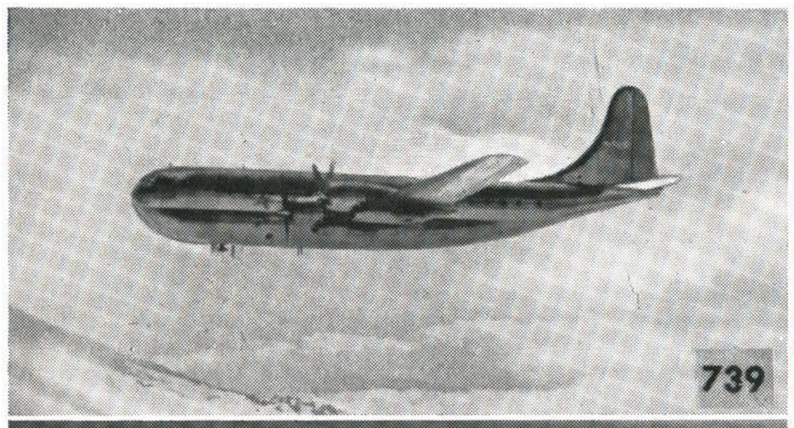
Fine sequences of combat " shots " fit realistically into the climaxes of both films, providing some excellent recognition practice on high speed targets for those who knew their friends and enemies in the air in either the European or Pacific Theatres of War. Incidentally, some aircraft types occasionally violate the interests of history, tactics, and plain common sense. But this licence is easily excusable and both films provide vivid glimpses of combat conditions under which war-time aircraft recognition was often weighed in the balance—and *too* often found wanting.

If, when seeing these films, it is remembered that the speeds of many types of combat aircraft have nearly doubled since those days, one gets an idea of the conditions under which aircraft recognition could again be tested.

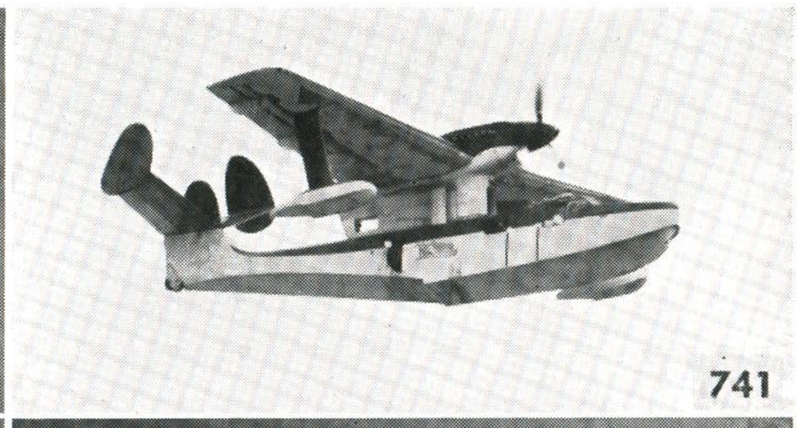
We should have enjoyed seeing more reference to the Royal Air Force in " 12 o'clock High," and to the Royal Navy in " Task Force." Nevertheless these films will be an object lesson, if not an inspiration to all who patiently plod at aircraft recognition in these less (recognitionally) stimulating times.

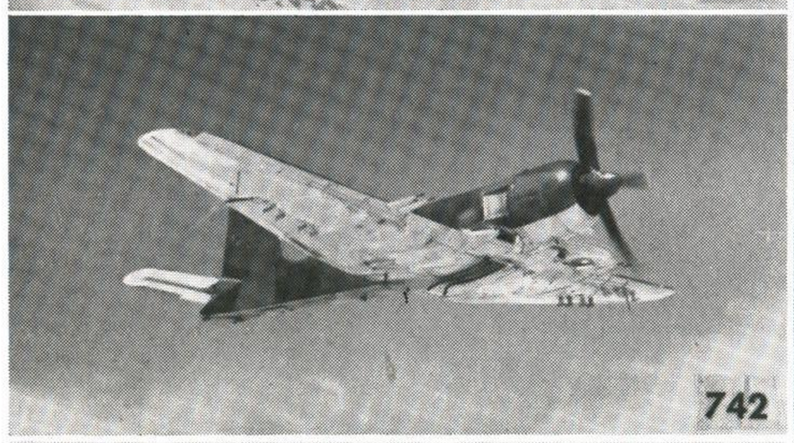
Two Meteors at 12 o'clock high.

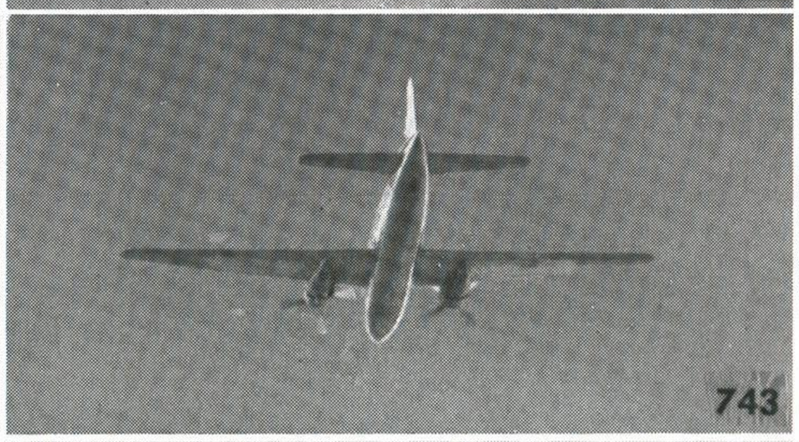
ELEMENTARY SPOTTING


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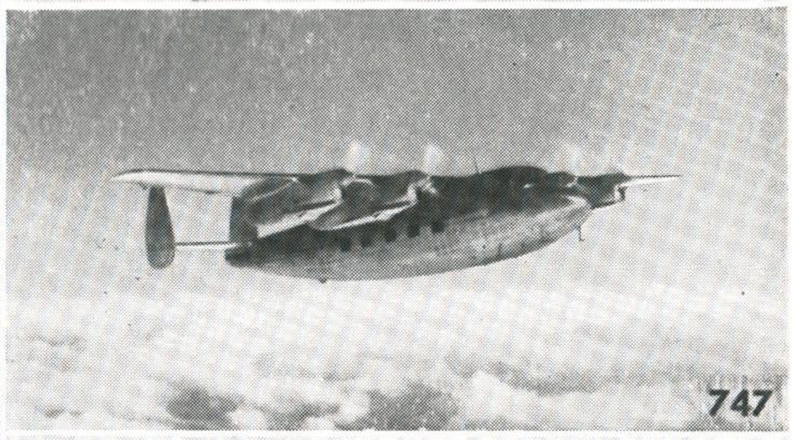

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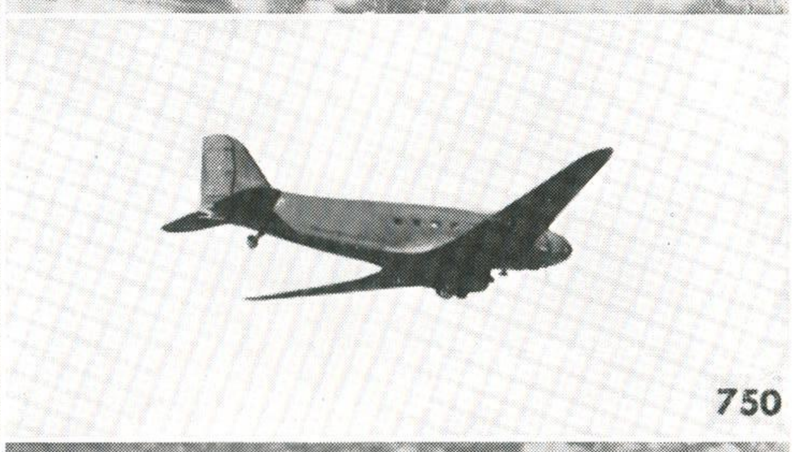

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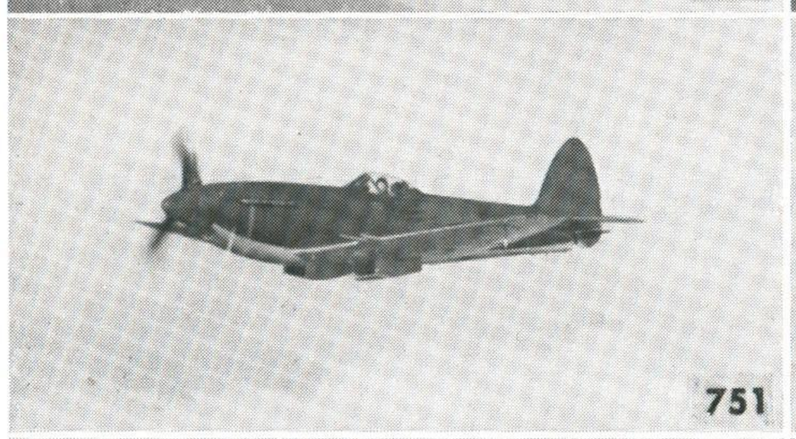

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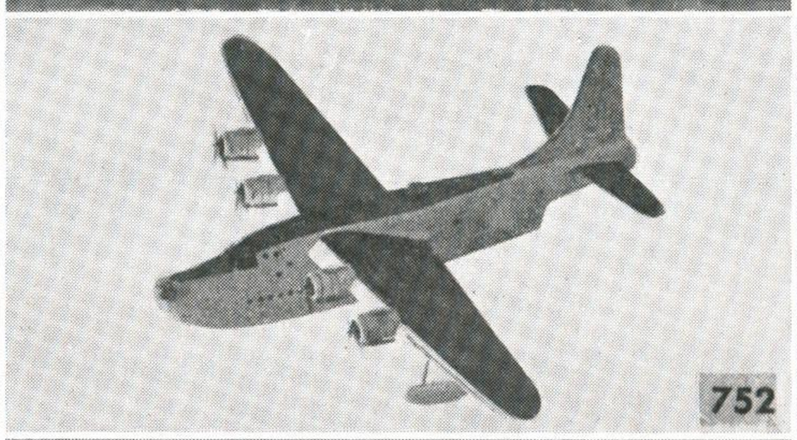

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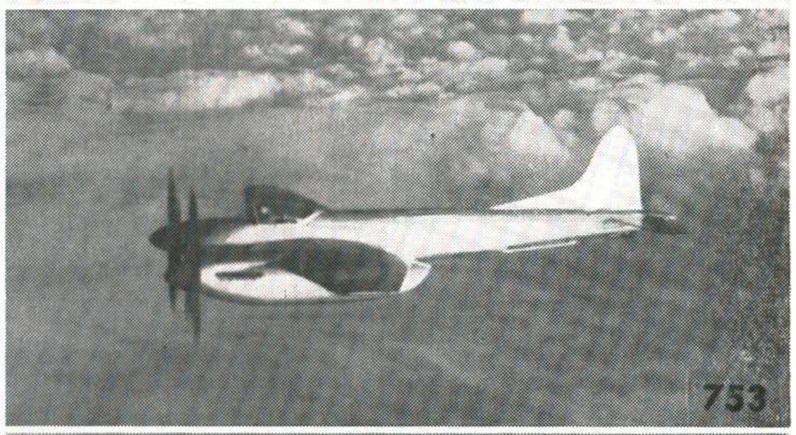

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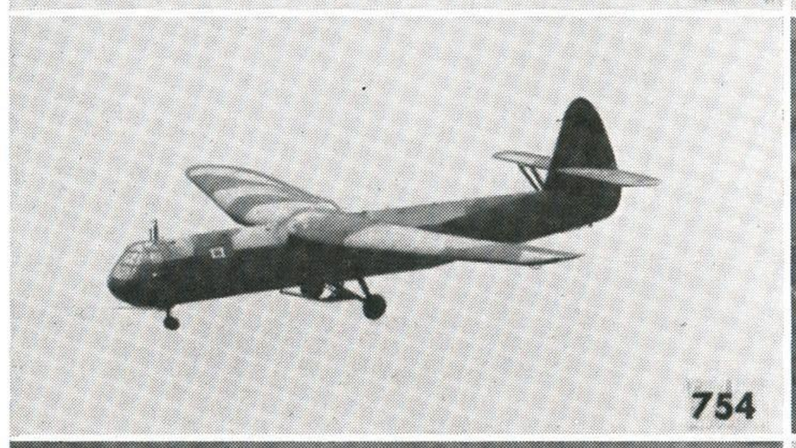

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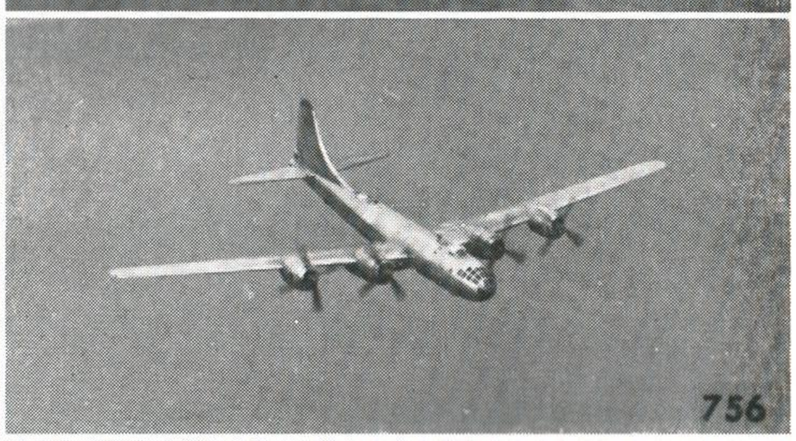

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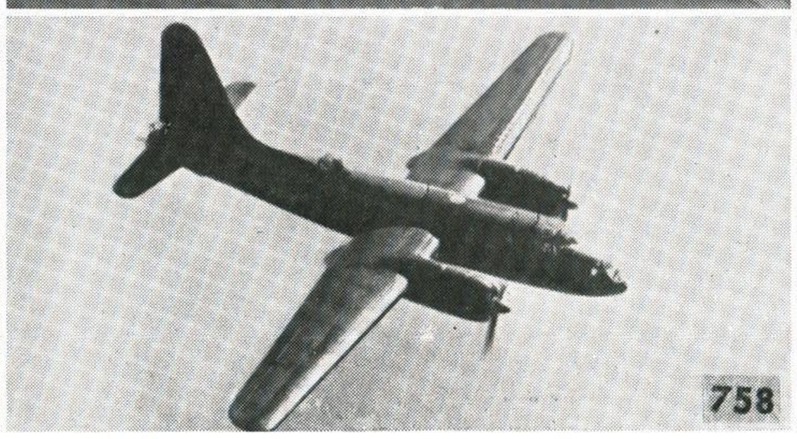

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CHARACTER STUDY

No. 2—The Sea Hornet NF Mk. 21

THIS is an impertinent smooth-bellied fish that has thumbed a ride on a flying wing. What is more it is a muzzled fish, muzzled securely and completely with a thimble. For in this aircraft there is an extraordinary visual divorce between the fuselage and the wing-engine combine. The handsome squared-off wings with the two huge power plants are the very essence of speed and flight. But the fuselage doesn't seem to belong. It seems indeed a passive passenger. With its sniffy thimble nose, carried high and aloof, the fuselage bumps its way back to a tail that gives itself airs and rides along high and handsome. At any minute one feels that the fish will give up and slip off into the sea.

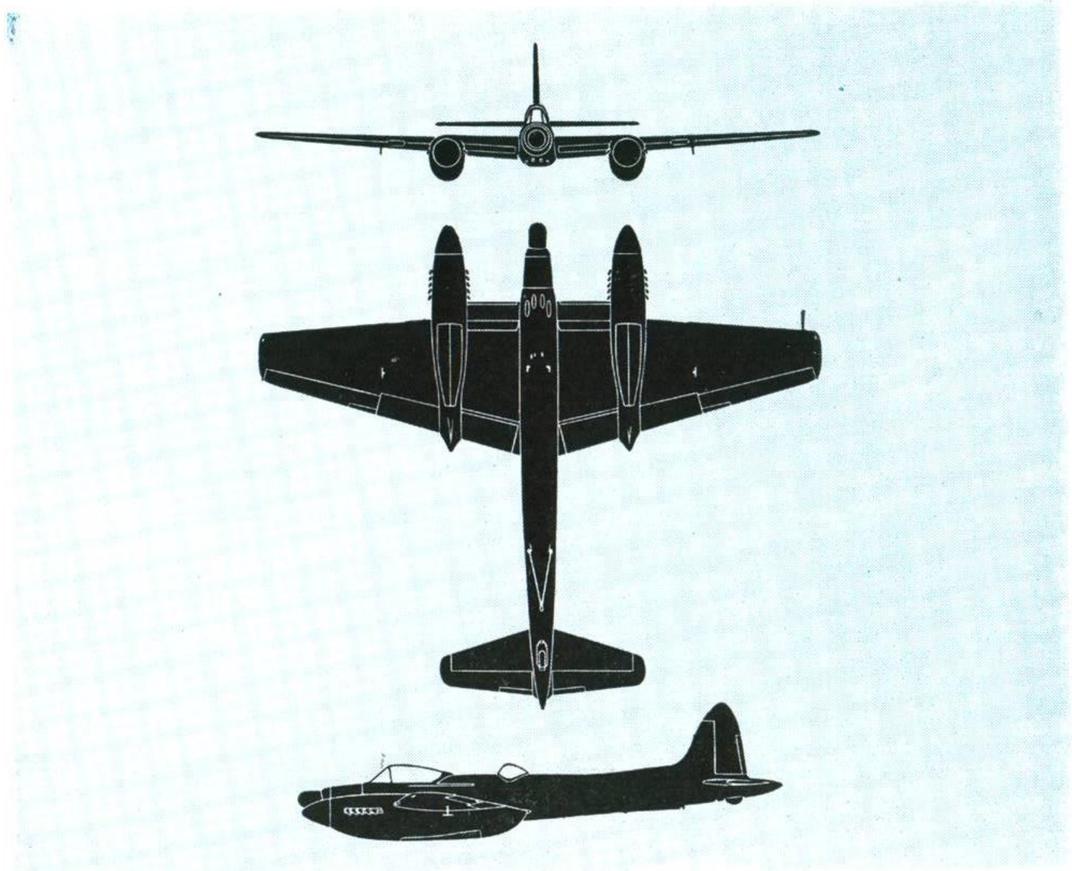
The Sea Hornet is engine-dominated. The two great motors and their nacelles impose themselves from all angles ; they thrust their bulk out in front ; they belly out beneath, and they ride the air with smooth aggressive power. What is more, the up-sweep to the spinners combined with the high-set thimble nose gives the whole machine a nose-high personality from many views.

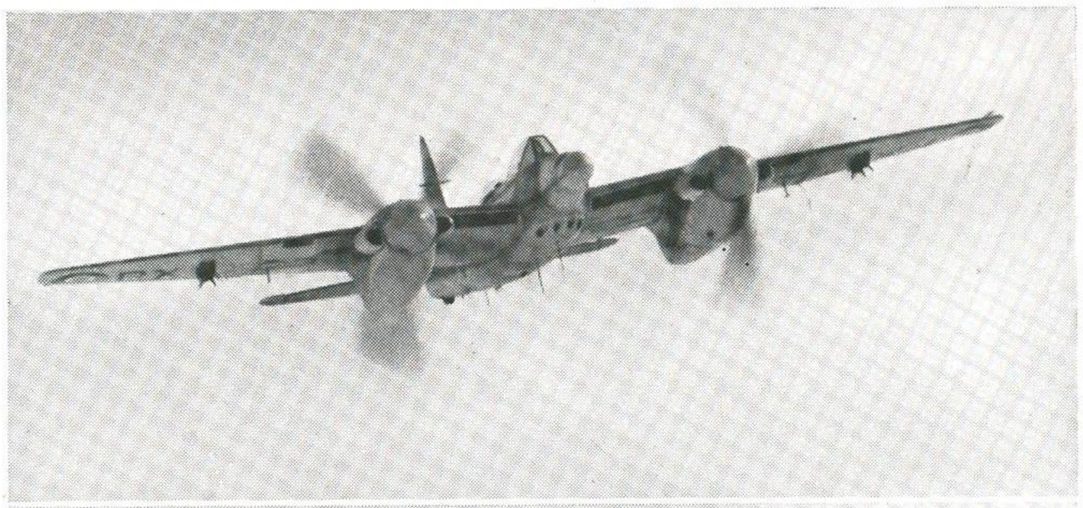
The typical and graceful D.H. wing forms should not be paid too much attention—they are like other of their handsome relations. The fuselage, except for the thimble nose, is also not very significant. The radiator extensions on the leading edge of the wings between the motors and the sharp trailing-edge taper go even further to dwarf this nondescript feature.

But the tail assembly, with the rearwards jutting fuselage tip, is a striking collection of shapes. (The jutting tip, by the way, is almost invisible from directly beneath or above.) The familiar high-pointed fin and rudder, the shark-look, so long almost a D.H. trademark, has in the Sea Hornet been radically modified. The large extended fin has many and varied visual results. It kicks up the whole tail in " feel ", it thickens out the fuselage at three-quarter and side views ; and at certain three-quarter views it has a curious way of merging and confusing the wing shapes. This is especially true of approach views from ahead and below ; and approach from astern and above. Finally, as for the tailplane, it often looks as if it has been left behind.

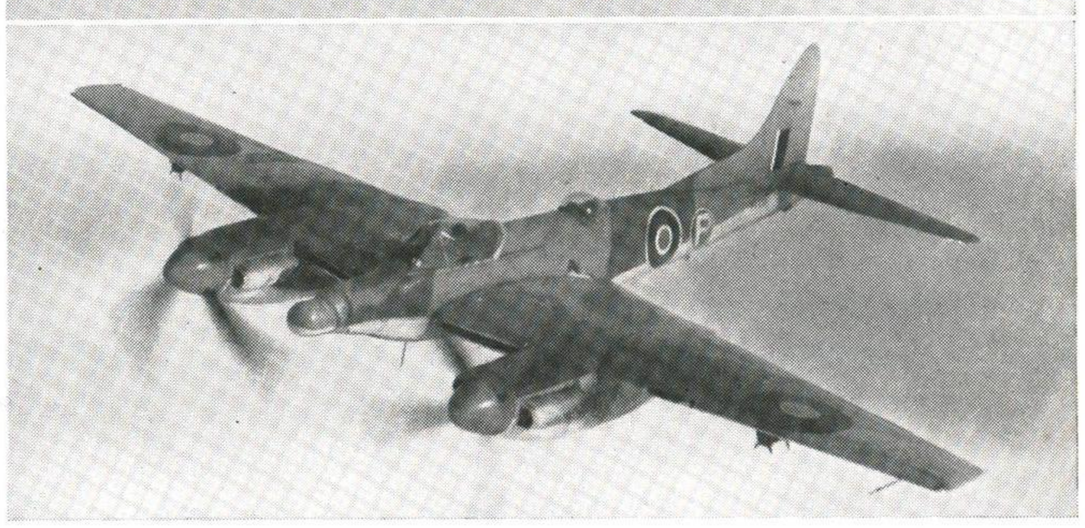
Basic facts about the Sea Hornet NF Mk. 21 are : *Origin :* Great Britain. *Length :* 38 ft. *Span :* 45 ft. *Max. speed :* 430 m.p.h. *Maker :* de Havilland. *Engines :* 2 Rolls-Royce Merlins. *Armament :* Four 20 mm. cannon in underside of nose. Two 1,000 lb. bombs under wings and racks for rockets. *Functions :* Carrier-based medium-range two-seat Night Fighter-Reconnaissance-Strike Navigator used by Great Britain.

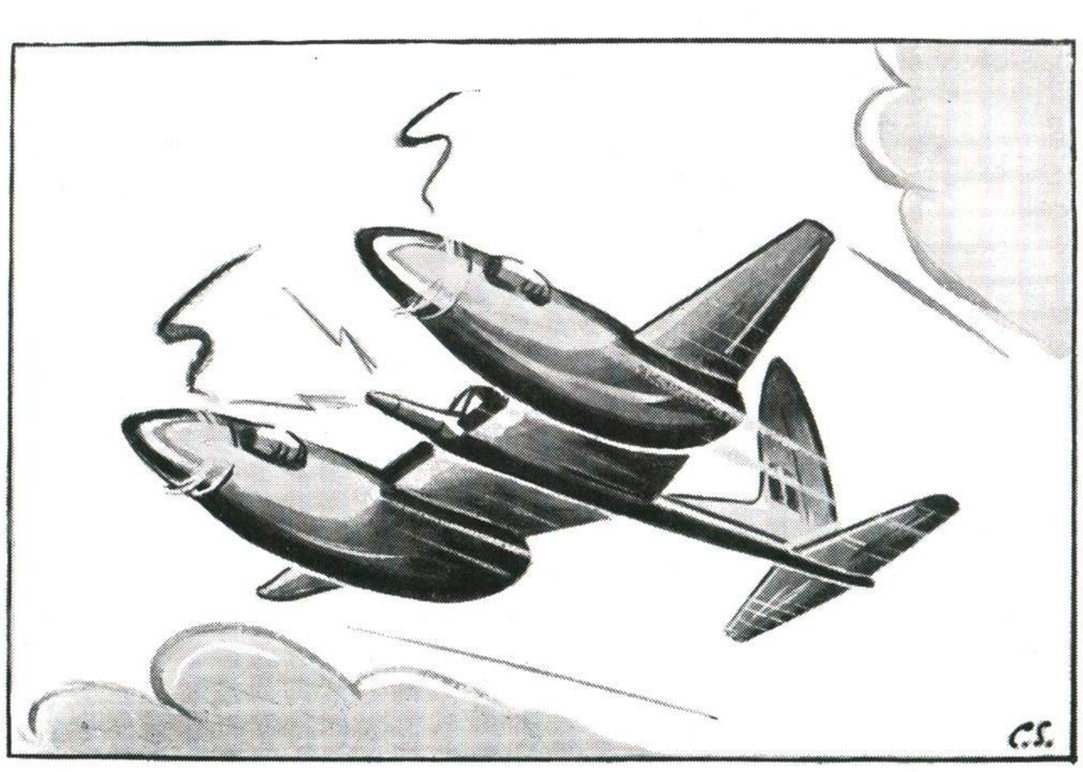
C. H. GIBBS-SMITH

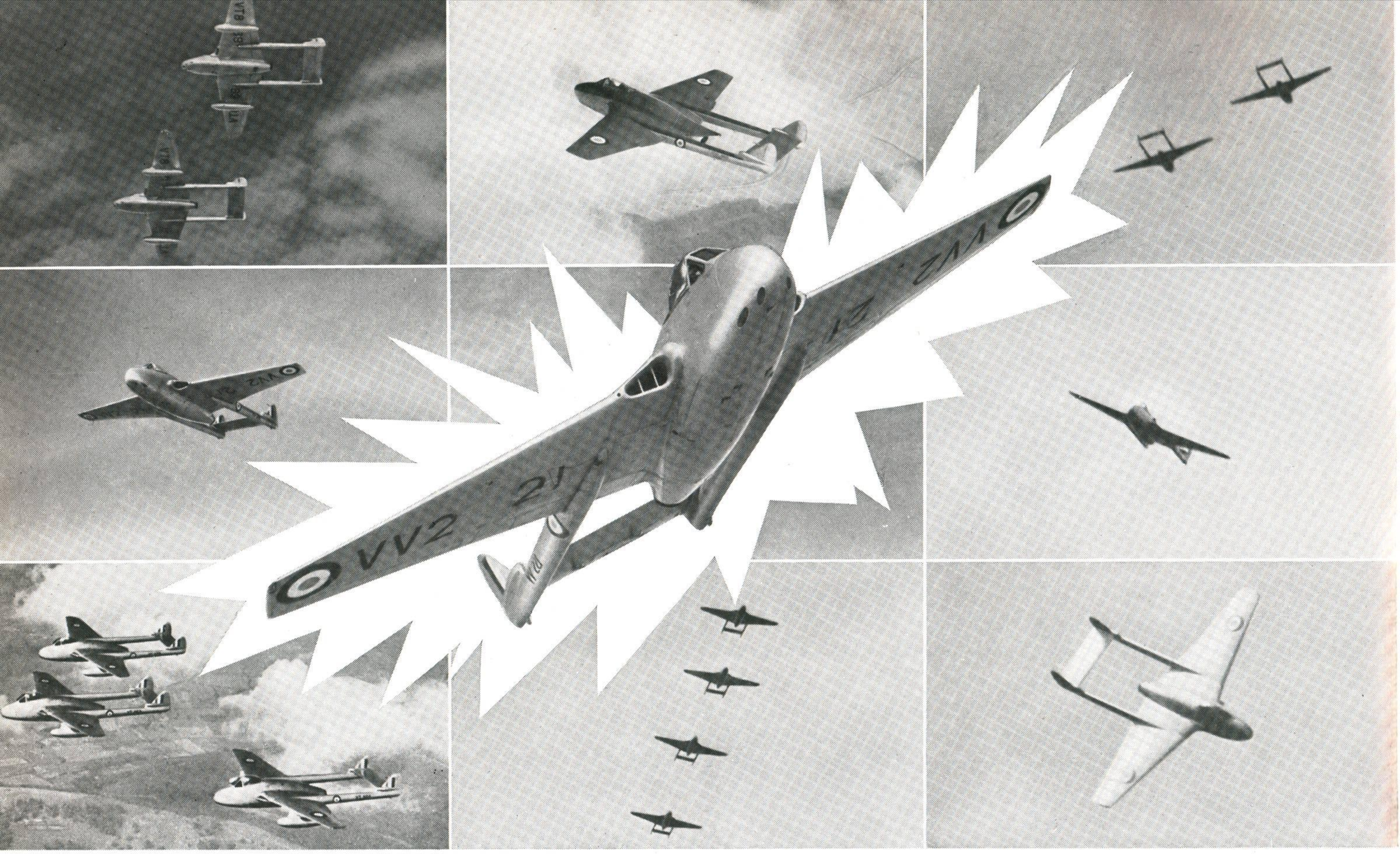












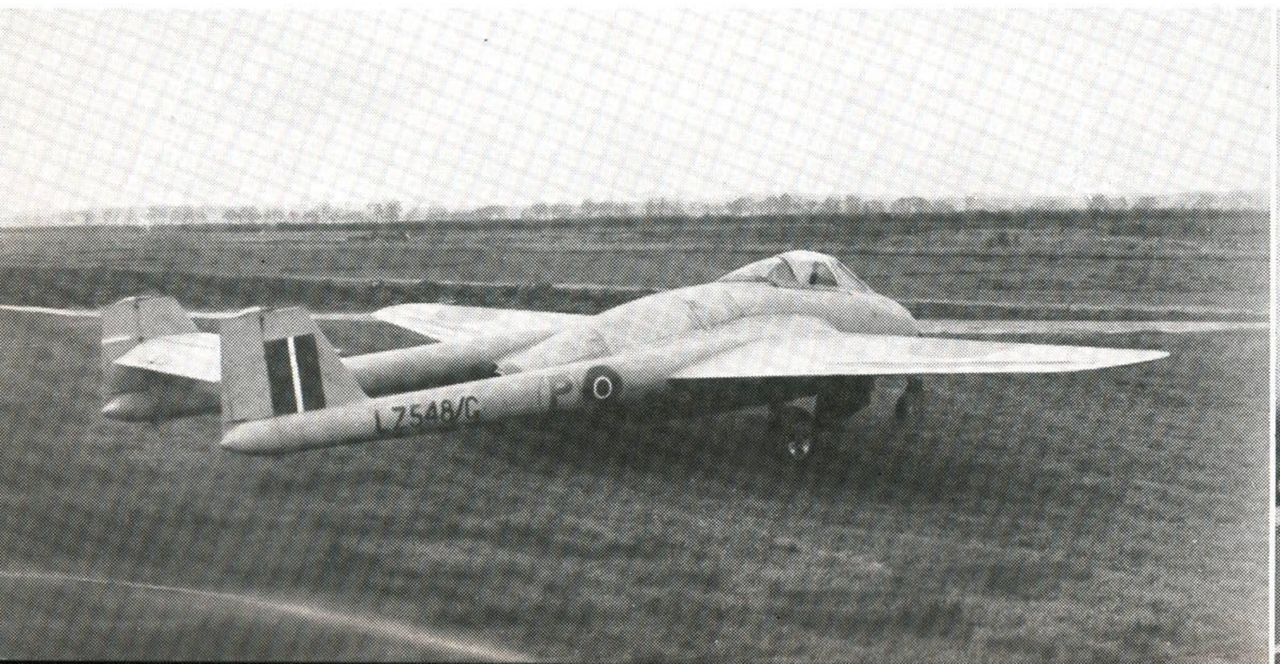
VAMPIRE VARIANTS

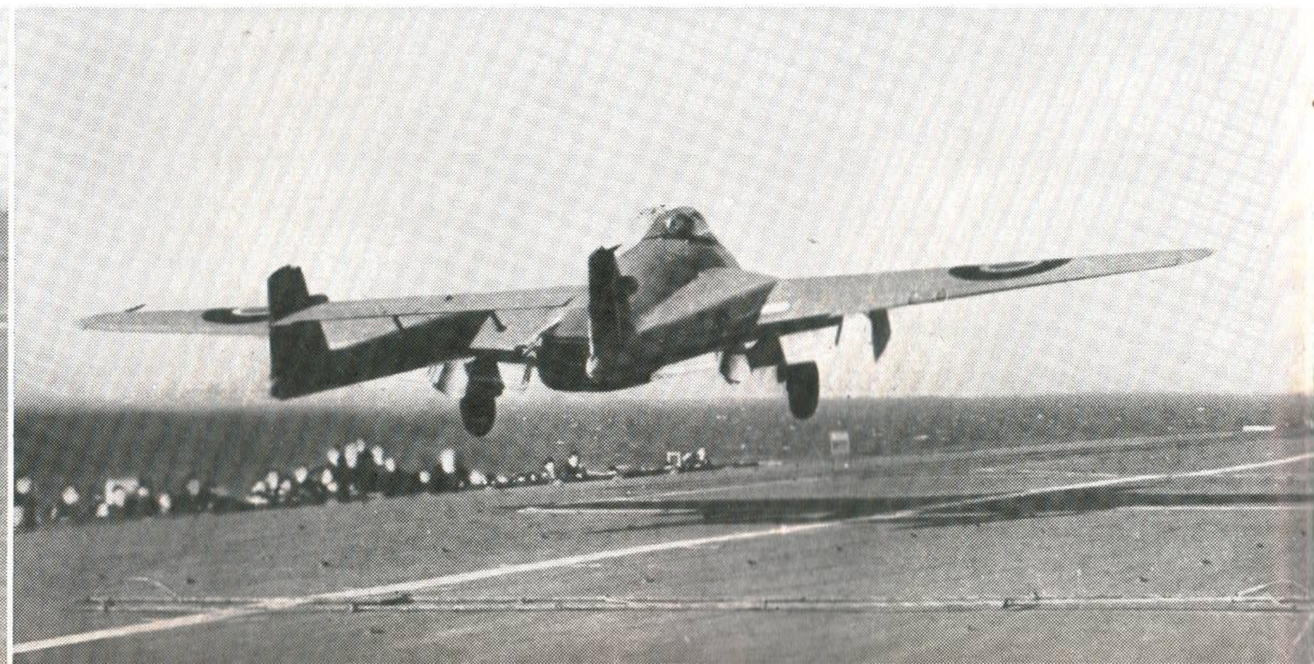
by R. W. THOMAS, B.Sc.

THE PROTOTYPE D.H.100 Vampire LZ548, first flew from Hatfield on 26th September, 1943, with the late Geoffrey de Havilland at the controls. This first aircraft was very similar to the later Vampire 1 but it originally had pointed, typically de Havilland, fins and rudders and its somewhat unusual appearance, particularly when landing, quickly earned it the unofficial name "The Spider Crab." As it was found that this first tail unit had too much rudder area, the top was removed and the now well-known square tail resulted. Three prototypes were built at Hatfield and then production was handed over to the English Electric Co. at Preston, to leave the de Havilland factories free to cope with their other commitments. The first Preston-built Vampire flew in April, 1945, and production then went full swing. The first fifty Vampires were non-pressurised but every subsequent Vampire has had this equipment installed. Later in 1945, some were delivered to the R.A.F. and first went into service with No. 247 Squadron.

There is little point in enumerating the recognition features of the Vampire series generally as its unorthodox layout, together with the characteristic whistle of the Goblin turbojet, makes confusion with other types unlikely. Thus the object of this article is to clarify the

Above (left to right and top to bottom) Vampires: F 3, FB 20, F 1, FB 5, FB 5, 2, F 3, F 3, FB 5. Below (left) the first prototype, (right) the first Sea Vampire.





(Left to right) **Vampire F Mk.5, Sea Vampire FB Mk.20 and D.H.113.**

variations, showing how they may be distinguished from one another.

The Vampire 1 is usually picked out by its square fins and rudders and high tailplane, but it should be pointed out that some of the earlier versions of later marks also had this tail unit although they have probably been brought up to date by now. The first forty Vampires had the Goblin 1 motor, but all later production models had the Goblin 2 giving 3,000 lbs. S.T. Maximum speed was 531 m.p.h. at sea level and this type had a still air range of 845 miles at normal cruising. The armament was four 20 mm. cannon under the nose and this is one feature that is common to all Vampires.

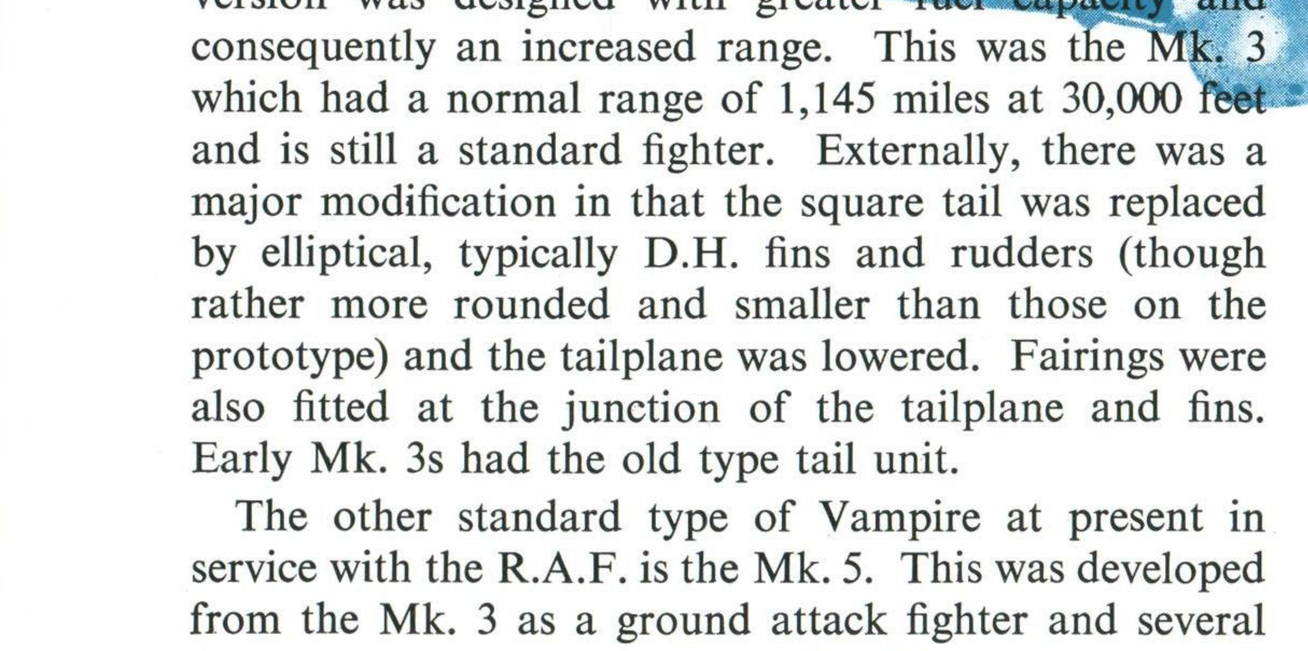
In order to keep the Vampire in front-line use, a new version was designed with greater fuel capacity and consequently an increased range. This was the Mk. 3 which had a normal range of 1,145 miles at 30,000 feet and is still a standard fighter. Externally, there was a major modification in that the square tail was replaced by elliptical, typically D.H. fins and rudders (though rather more rounded and smaller than those on the prototype) and the tailplane was lowered. Fairings were also fitted at the junction of the tailplane and fins. Early Mk. 3s had the old type tail unit.

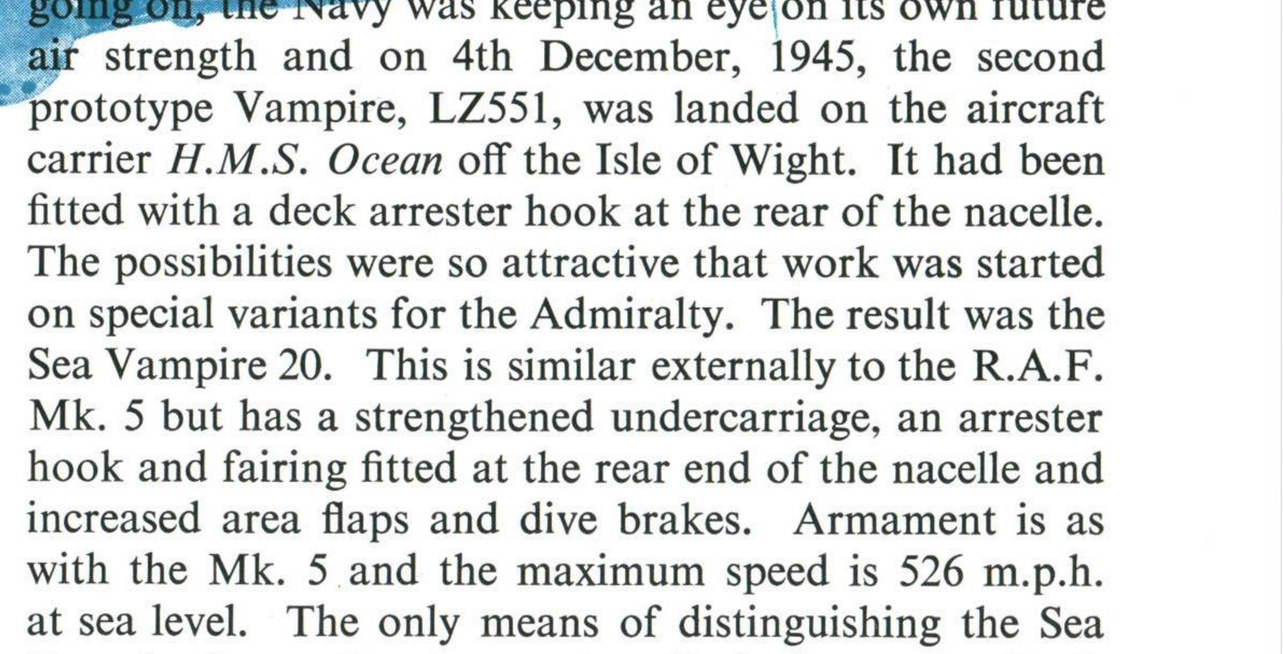
The other standard type of Vampire at present in service with the R.A.F. is the Mk. 5. This was developed from the Mk. 3 as a ground attack fighter and several modifications were incorporated. Most important of these from the spotters' point of view was the clipping of the wings to a span of 38 feet. Other changes included the strengthening of the top wing skin and the installation of provision for external bombs and rockets. Thus, either two 1,000 lb. bombs or two 500 lb. bombs and eight 60 lb. R.P.s may be carried. Both the Mk. 3 and the Mk. 5 have the Goblin 2 engine and speeds are similar to that of the Mk. 1 despite the increased weight.

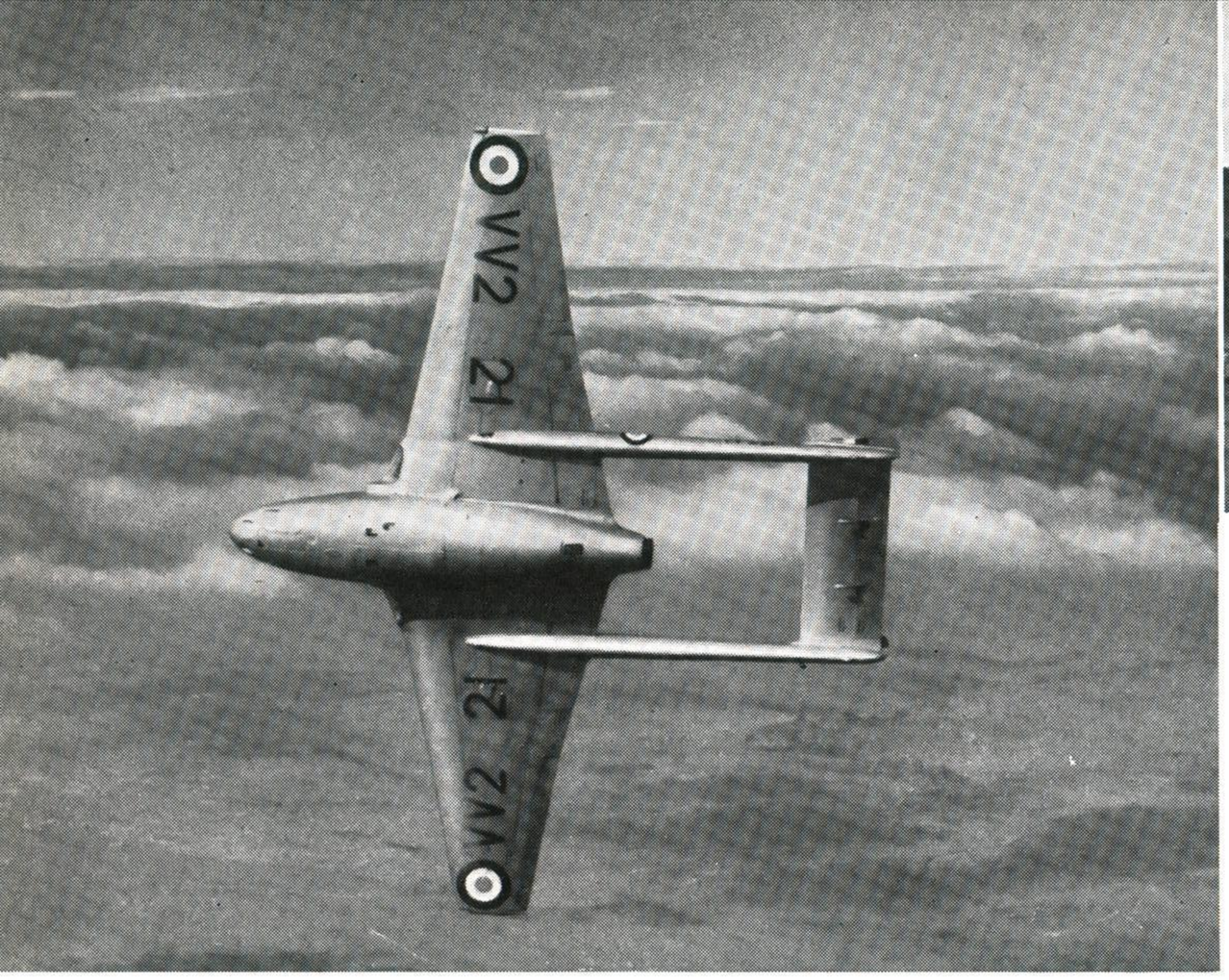
All the Vampires in service with the R.A.F. may be fitted with long range fuel tanks fitted under the wings so spotters should not be confused by Vampires carrying these, when seen at a distance in the head-on view (which is the only one in which the Vampire presents any recognition difficulties at all).

At the same time that this fighter development was going on, the Navy was keeping an eye on its own future air strength and on 4th December, 1945, the second prototype Vampire, LZ551, was landed on the aircraft carrier *H.M.S. Ocean* off the Isle of Wight. It had been fitted with a deck arrester hook at the rear of the nacelle. The possibilities were so attractive that work was started on special variants for the Admiralty. The result was the Sea Vampire 20. This is similar externally to the R.A.F. Mk. 5 but has a strengthened undercarriage, an arrester hook and fairing fitted at the rear end of the nacelle and increased area flaps and dive brakes. Armament is as with the Mk. 5 and the maximum speed is 526 m.p.h. at sea level. The only means of distinguishing the Sea Vampire from other types externally is the arrester hook and fairing. A new naval version about which little may

(Centre) **Vampire F Mk.3. Below (left) Mk.51 (right) Mk.2.**







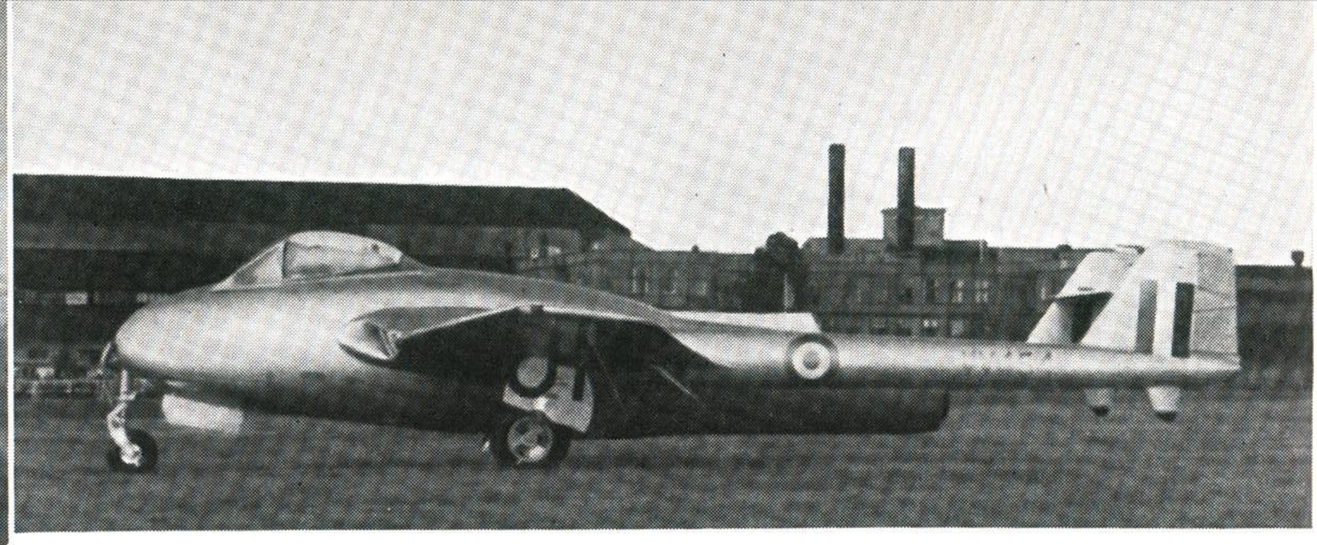
Vampire FB 5.

be said is the one which has been undergoing tests in which it is landed on a flexible deck on an aircraft carrier, without the use of a normal undercarriage. Dispensing with this saves about 5 per cent. of the total weight. It may then be catapulted off again.

Apart from these production Vampires there are several types which have been used experimentally. One of these is the Mk. 2, which is a Mk.1 airframe fitted with a Rolls-Royce Nene turbine giving 5,000 lbs. S.T. As the latter has a two sided impeller, some means of feeding air to the rear side of it was required so two air scoops were fitted above the fuselage, aft of the cabin, and these may be clearly seen. Performance is improved and it was to have gone into production as the Mk. 4 but this idea has now been dropped. However, the Nene-Vampire has not been forgotten as will be seen later.

Another well-known type is a Mk. 1 airframe fitted with the 5,000 lbs. thrust D.H. Ghost turbojet. One of these aircraft, TG278, with extended wing tips, gained the world altitude record of 59,446 feet on 23rd March, 1948. The experience with this type proved invaluable in the development of the Venom. One of the more recent experimental Vampires is one fitted with a Goblin and afterburner, which gives much increased thrust for short periods. This was demonstrated at this year's S.B.A.C. Show.

Also seen for the first time at Farnborough were the D.H. Venom and the D.H. 113. The former, also known as the D.H. 112, is a development of the Vampire with a D.H. Ghost engine. It first flew at the beginning of September and on its maiden flight, the pilot, John



Reheat Vampire.

Derry, did two quick rolls at low altitude. It uses the Vampire fuselage and tail unit but has a thinner wing with moderate sweepback. Large wing-tip tanks may be fitted. As nearly all the factory tooling for the Vampire can be used for the Venom, little development time should be needed.

The D.H. 113 is a night fighter version of the Vampire from which it may be distinguished by the large bulging nose carrying radar equipment. It carries a crew of two, side by side, with the radar operator slightly aft of the pilot. The cockpit is based on that of the well tried Mosquito night fighters. It has a later type of Goblin turbojet. No details of performance of either the Venom or D.H. 113 (which is incidentally a Private Venture) may be given but both carry four 20 mm. cannon.

Apart from these versions which are all flying in this country, Vampires are used in many other countries. An entirely new version is the Mk. 6 in use in Switzerland. This is basically a Mk. 5 airframe with a Goblin 3 (giving 3,300 lbs. S.T.) which give an improved performance. For example, climb to 40,000 feet is reduced by five minutes. This type is also being used by the Swedish Air Force as the Mk. 50 and the Royal Norwegian Air Force as the Mk. 52. Other new types are the Mks. 30 and 35 which are being built in Australia. They are fitted with the Nene engine and are similar externally to the Mk. 2 having the " elephant's ears " intakes. The first Australian-built Vampire flew on 29th June, 1949. Vampire 5s are being delivered to France, but a version using French-built Nene motors is to be built by the S.N.C.A. Sud-Est as the Mk. 51. In addition, India and Canada are using the Vampire 3, and South Africa the Mk. 5. Vampires have recently been delivered to Venezuela, Egypt, and also Italy, where they will be built under licence. This means that the Vampire is being used in eleven different air forces in addition to this country. Thus it is a type that not only British spotters but also spotters of Europe and the Empire must know thoroughly.

De Havilland Venom.

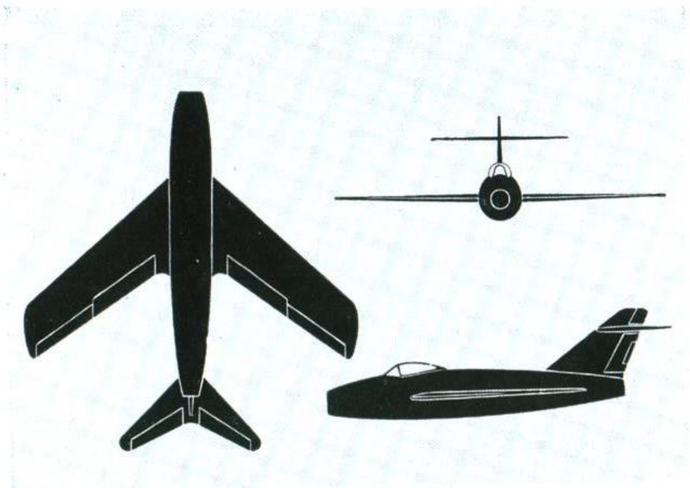


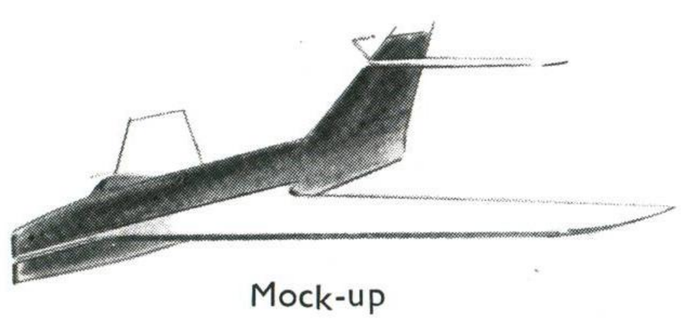
STUDY FORM!

PART 2—Three Dimensions from Two

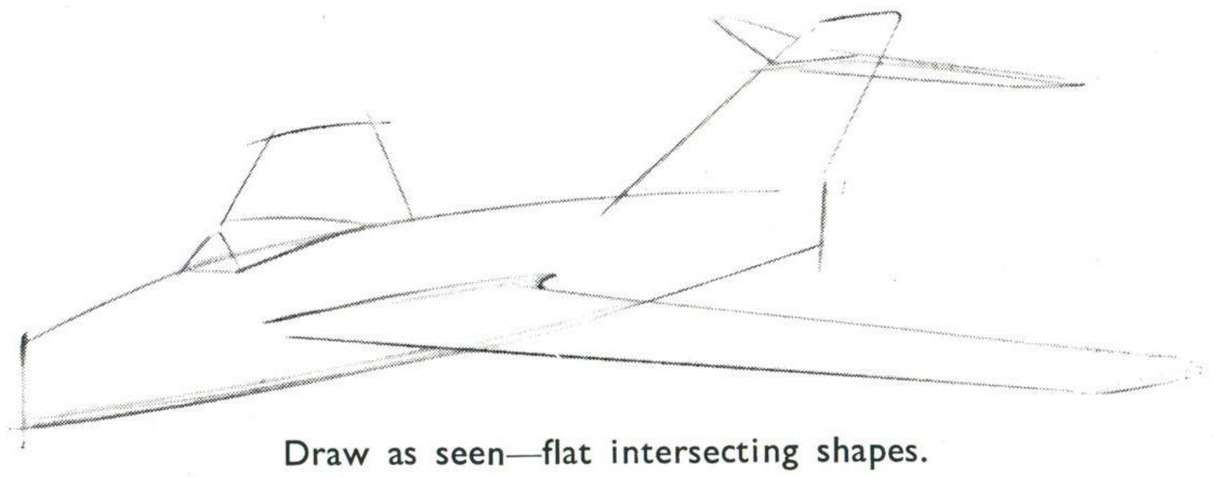
by FRANK WOOTTON

As there is no data available on this nameless swept-wing Russian jet fighter we thought many readers would like to try making their own drawings of it. In this, his second article, Frank Wootton explains, first how to build the mock-up from the three-view silhouette, and then the principal drawing stages to the finished study. It is interesting to note that the principle of construction illustrated here is used by manufacturers when preparing mock-ups of prototype aeroplanes.





Mock-up



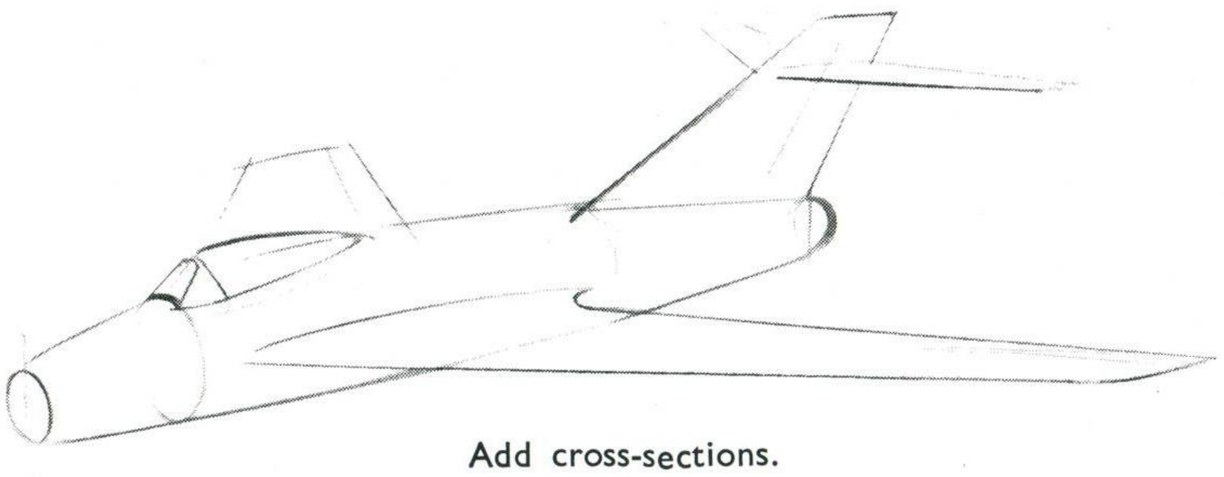
Draw as seen—flat intersecting shapes.

I PROPOSE to explain in this article how to construct a three dimensional drawing from plan and elevation only. It is sometimes the case that this is all that is available. The cover picture of this edition of the Journal was made in this way.

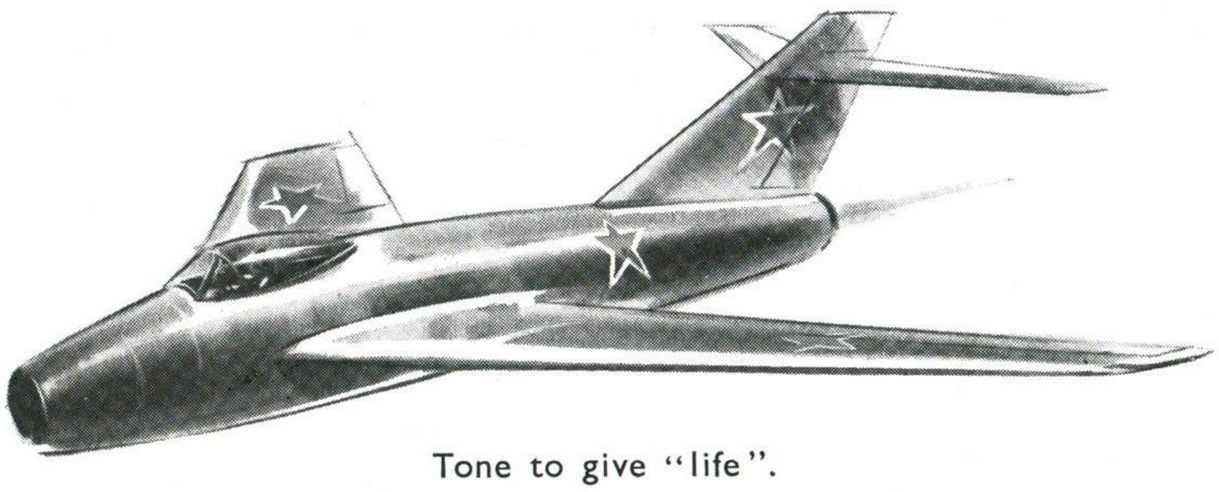
A three-view general arrangement drawing is ideal ; so is the three-view silhouette. If you use the one shown above it would be better to enlarge it first. The procedure is to mount the plans on thin card to stiffen them. Then cut out the plan and side elevations carefully and assemble them in correct relationship by reference to the end elevation (in your case, the head-on view). If you are making a mid-wing aeroplane, slots must be cut in the fuselage (side view) to take the wing : this also applies when fitting the tailplane.

When completed, set up the model and draw it exactly as you see it—that is, as two thin shapes of card intersecting at 90°. Upon this frame, with the aid of the head-on view silhouette, can be drawn sections, to give the fuselage form. The canopy over the cockpit can be drawn in the same way, and slight thickness added to the wing and tail assembly.

The outline of the original drawing should then be removed where it is not required, and the drawing completed with whatever detail is desired. Tones will give it solidity.



Add cross-sections.

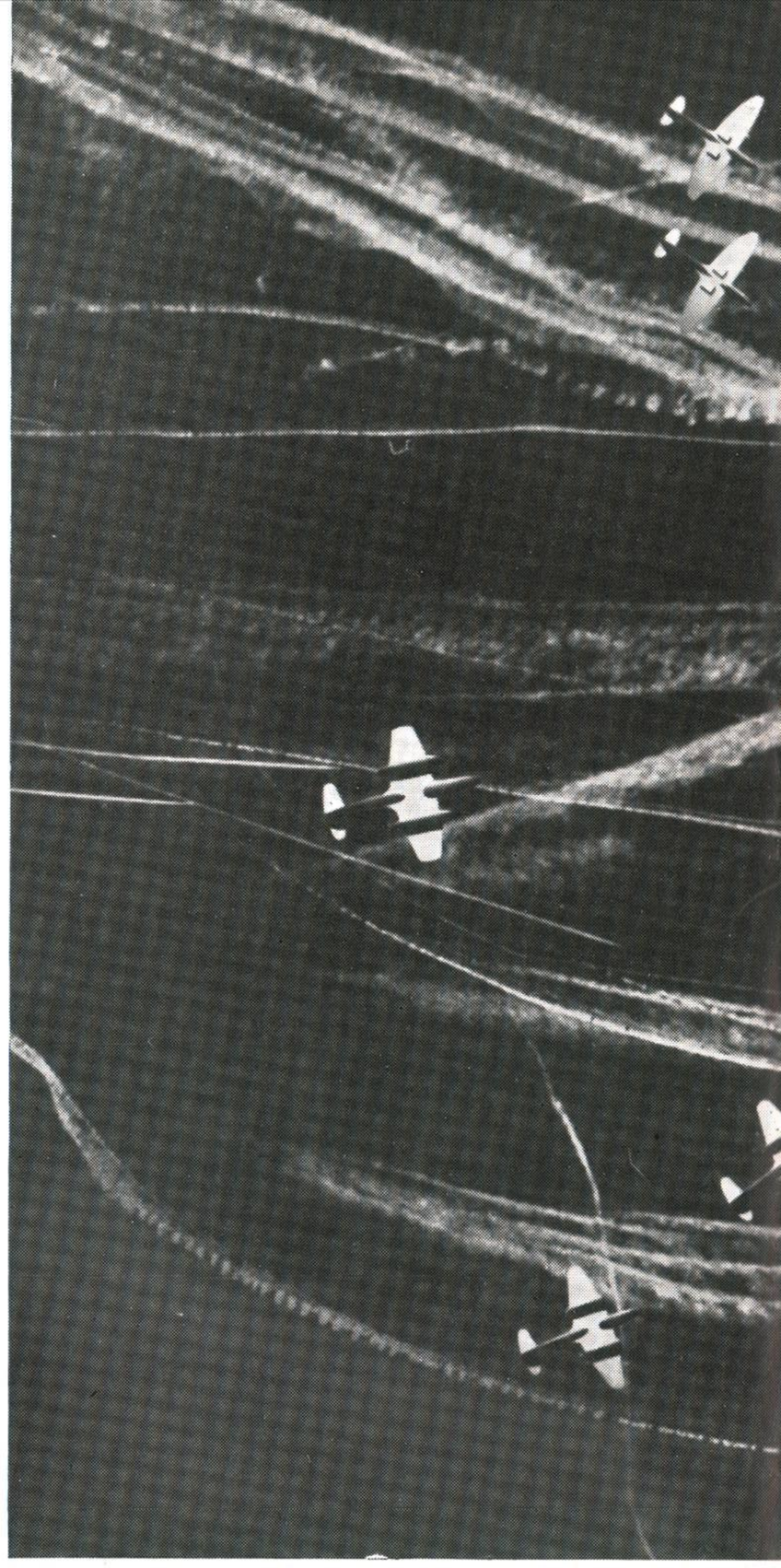


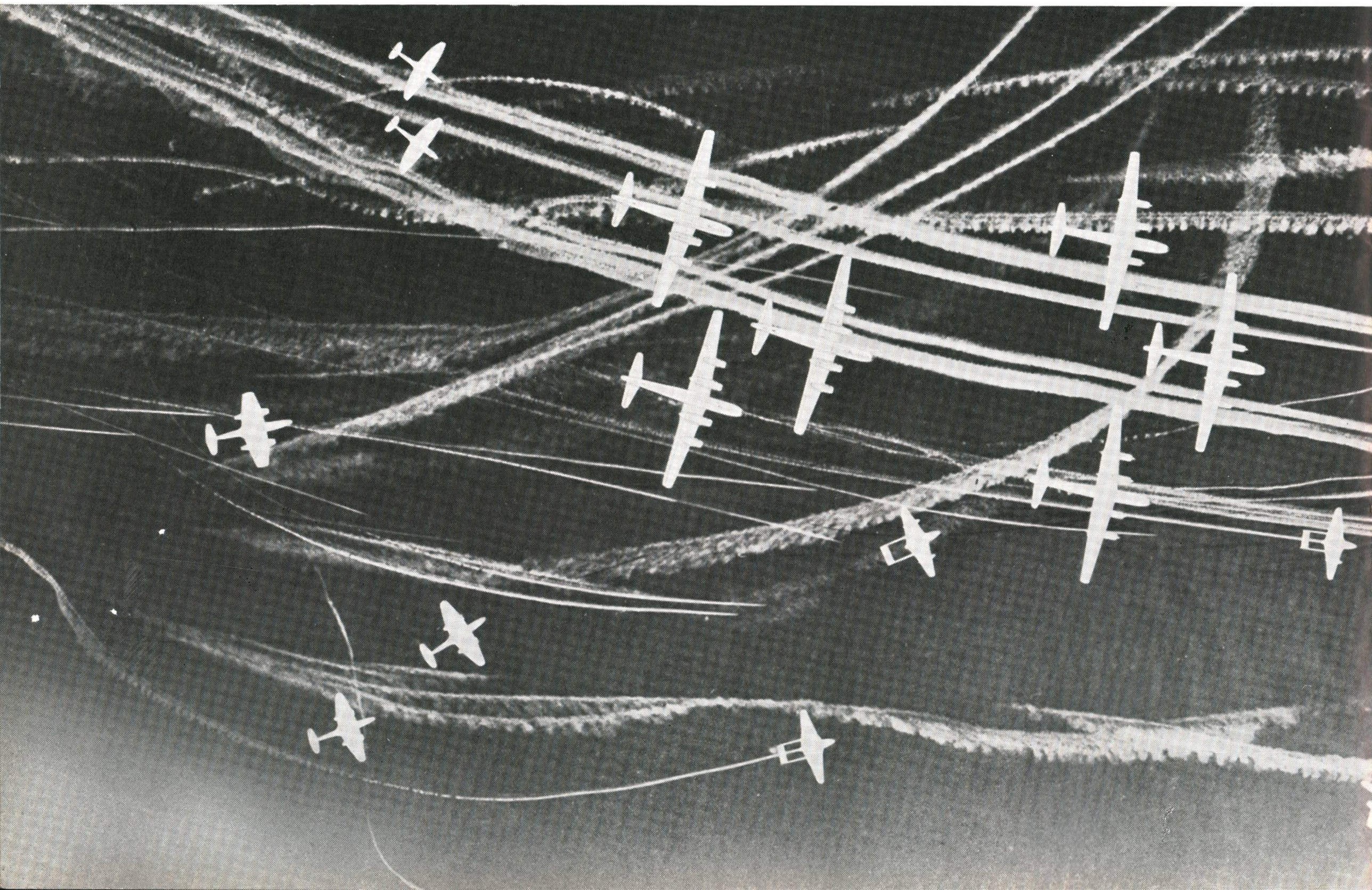
Tone to give "life".

HIGH LIGHTING . . .

ORDER OF "BATTLE" 1950. The backgrounds of these illustrations are photographs of one of the typical, brilliant "battle-patterns" made by fighter and bomber aircraft during Exercise Bulldog last year. The aircraft shown are those expected to take part in this year's Air Exercises. Many different lighting effects are possible on high flying aircraft particularly when above cloud. Our artist has shown two possible variants. On the right aircraft forms appear in sharp relief, as they might when lit by a low sun. Below is the formless silhouette effect seen when aircraft, in natural metal or light finish, fly over cloud reflecting strong sunlight to their under-surfaces. At bottom right we have tried to present the same pictures with as much realism as is possible with one colour. A key to aircraft identities is given on the rear cover.

(Note: This "battle" scene is imaginary and is not intended to be an accurate portrayal of a tactical situation. Our object is to show possible lighting effects upon high flying aircraft.)





THE OBSERVER CORPS GAZETTE

Vol. 3 No. 2 MARCH 1950

THE OFFICIAL ORGAN OF THE ROYAL OBSERVER CORPS

Approach to Training

The Individual and the Team

THE OLDER ONE GETS the more one realises how much in life is taken for granted, as for example, when it comes to the question as to how one acquired the " know-how " of one's employment. A few moments of quiet thought will however, bring the realisation that, in the days gone by, the teaching that was given, together with the ability to seek for information, were factors that made it possible to undertake so naturally the tasks which fall to the line of endeavour one follows in earning a livelihood. Add to these thoughts about teaching or training the fact that there has been continual practice in the manner in which these tasks are performed and one comes to the point when a man or women is described as " being good at the job ". But, follow these thoughts further and it is found that where a person is always seeking additional information and putting the knowledge gained thereby into practice, there then, one finds the expert—the " master craftsman".

These observations are not confined to the art of earning a livelihood, they apply with equal force to a person's activities outside his daily employment. See how eagerly some people seek information (merely another form of training) to improve themselves in, say, their golf or gardening, and how willingly they will spend hours in hard endeavour to perfect themselves in whatever activity they have chosen to follow when the day's work is done.

Within the Royal Observer Corps service, the same observations, it is suggested, hold good. Members who are serving look to the Corps as a form of activity, distinct and apart from their daily business, and in accepting this outlet for their energies in part-time service to their country they have each tacitly appreciated the need they have for training in this particular sphere. This training falls into two broad categories, that which must be imparted by teaching and that which is gained by the search for further information by the individual.

Today, we are fortunate in having a vast experience upon which to call. It was not always so. In the years before the second World War, the information based on experience from which we could draw was very meagre and as a consequence the actual training we received was concentrated mainly on repetitive actions. At the Posts, this was met by continual practice in the assembly of the Post Instrument and the occasional Calibration Exercise when we could plot the few aircraft that were flown for our benefit. Then the Centres, this concentration took the form of plotting dummy tracks, time and time again, with the plotting of the aircraft in the above-mentioned Calibration Exercises as a task of supreme importance. In spite of the scanty knowledge vouchsafed to us of the purpose of our service there was, nevertheless, an earnestness and a willingness to be taught.

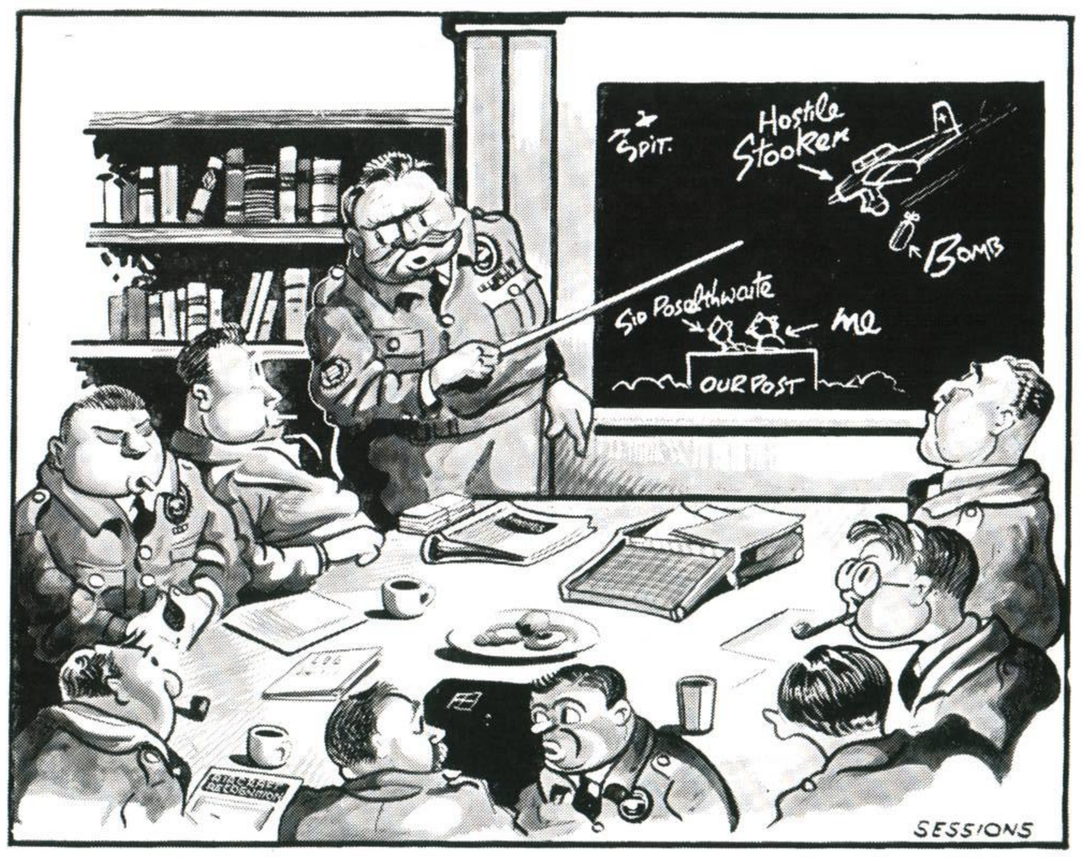
So through the Emergency, the War and Stand-down periods, our store of knowledge increased which has been continuously put to some practical use. Thus



See how eagerly some people seek information.

we have become practised exponents of " our job ".

Even so new problems arise and new vistas of training open up. The problems that face us today arise from two main factors. Firstly the considerations of blending all sources that furnish air information so that overlapping and duplication are avoided, and secondly, the need to direct the activities of those who take part



Today, we are fortunate in having a vast experience upon which to call.

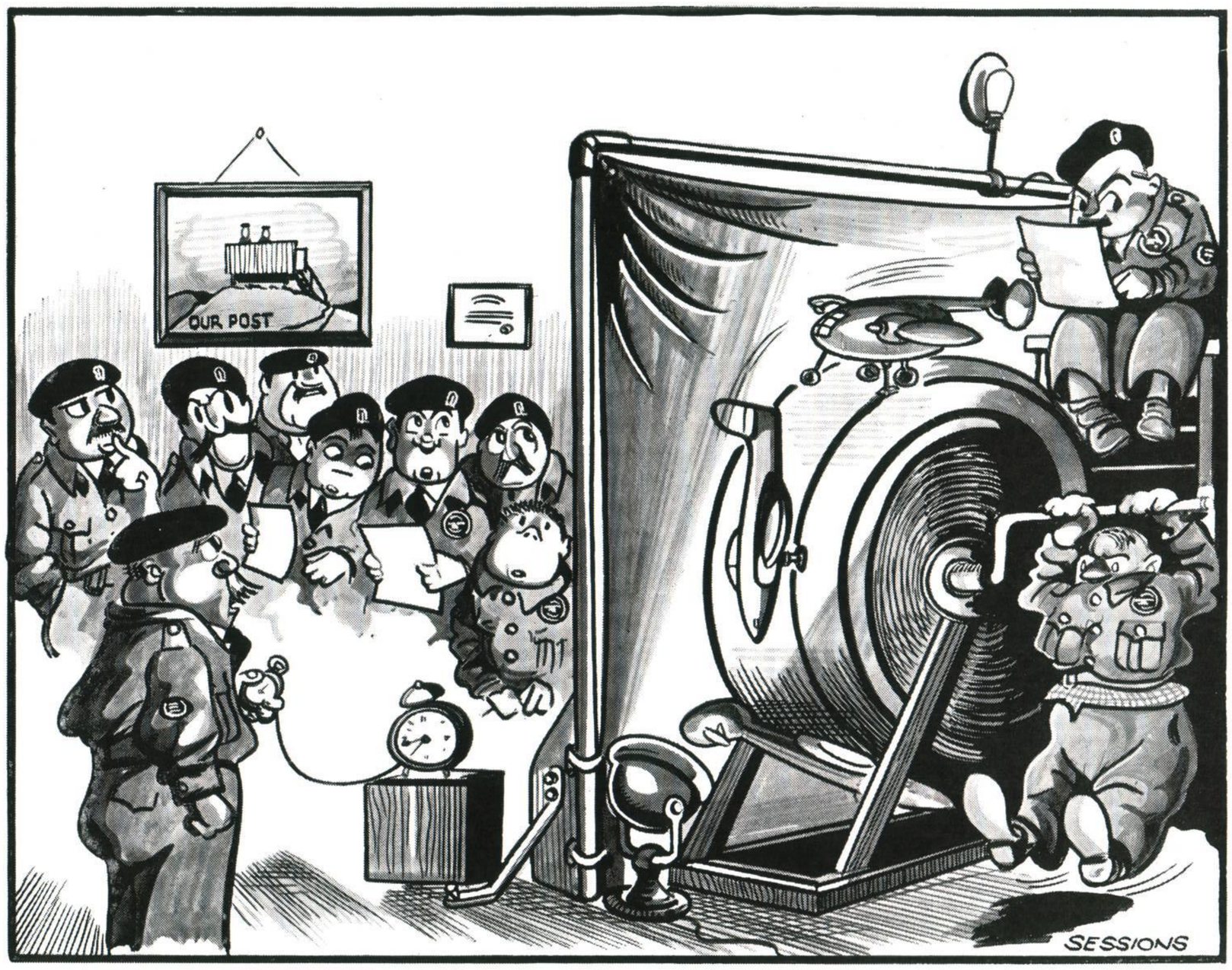
in intercepting and destroying the hostile forces so that the effort of, say, the fighters, shall be used to strike with the utmost effect without impinging on the efforts of the Anti-Aircraft Gun defences. These are the main air defence problems, but mixed up with these are the needs for suitable forms of control of fighter aircraft and for accurate information on the position of our own and friendly aircraft when they are in flight. Our tracking and reporting is a part of the machine which does something to solve and overcome these problems and difficulties but it can only do so if the personnel teams which work it are trained efficiently to implement the measures that have been planned to meet the problems.

You who serve today start off with the advantage that you are more aware of the purpose of the activity you have chosen than did those who served earlier. This is but a natural development. The enlightened views of today are in your favour, for it is realised that with the advent of radar—with the improving technique of tracking aircraft movement overland—together with the greatly increased flying speed of the modern aircraft, everyone will have to know more and more in order to give the most effective service.

Training, therefore, is correspondingly more elaborate and in every way more interesting. The responsibility for making your minds receptive to training is as great as is your responsibility for presenting yourselves for training.

In recognising these points, it is as well to understand the salient aspects of the present day approach to training. Foremost, of course, is that of the Royal Observer Corps organisation within the Royal Air Force Fighter Command Control and Raid Reporting System. This must always be the subject of teaching. Secondly, comes the question of practising repetitive actions, actions that must of necessity be performed so frequently that each of you will work more naturally when you are called upon to operate under active conditions. Finally, what is perhaps one of the least stressed of the training aspects, that of " off-duty " study. To meet this requirement a personal issue of the Royal Observer Corps Training Manual will be available for you shortly.

You may well ask " From whom do I receive the teaching or training that has been stressed here ? " The answer is a commonplace one " From those who by virtue of their experience and ability are able to impart knowledge ". There is also a distinction in this answer, because, with one exception, the members of this citizen force who undertake this teaching or training, are like



. . . training, therefore, is correspondingly more elaborate.

yourselves prepared to devote their spare time to the study of their subjects and to give you the benefit of their knowledge and " know-how " again in their spare time at the training meetings. They have undertaken a task of no small magnitude and although a few are trained in the art of teaching those who are not so fortunate overcome this handicap by their ability and enthusiasm.

Within the Royal Observer Corps organisation there are what may be termed two sides : The Observer Post and the Operations Room. Both have problems peculiar to themselves. Let us take the Post side first. The responsibility for the initial training of the Post crews and their recruits falls upon the Post Instructor. He undertakes the teaching of Aircraft Recognition. A fascinating subject and one that can never become stale. It is generally assumed that all people are aware of the startling changes in aircraft forms when compared with aircraft as recently as five years ago. The instructor must, therefore, be acutely conscious of the subtle differences in the shapes of modern aircraft in order that he may teach you how to approach the study of this part of your vital work. Recognition of an aircraft today moving at a speed of something in the neighbourhood of 500 miles an hour is so important that your individual responsibility for continuing your studies when you have left the training session may be likened to that of the seeker after additional knowledge. The instructor can only teach you how to read and understand the basic silhouette ; how to distinguish certain features in different photographic views of an aircraft in flight ; or at best, what a new aircraft should look like —both in shape and " sit " so that you do not err when first you see this aircraft.

This is but the beginning of the Post Instructor's task. He is called upon to instruct you in the intricacies of the Post Instrument, how to use it to the greatest advantage and then how to report the information you have at hand to the plotter in the operations room. In fact he is ready to instil into you the practice and procedure of the unit around which the Royal Observer Corps system revolves—that of the Post Observer.

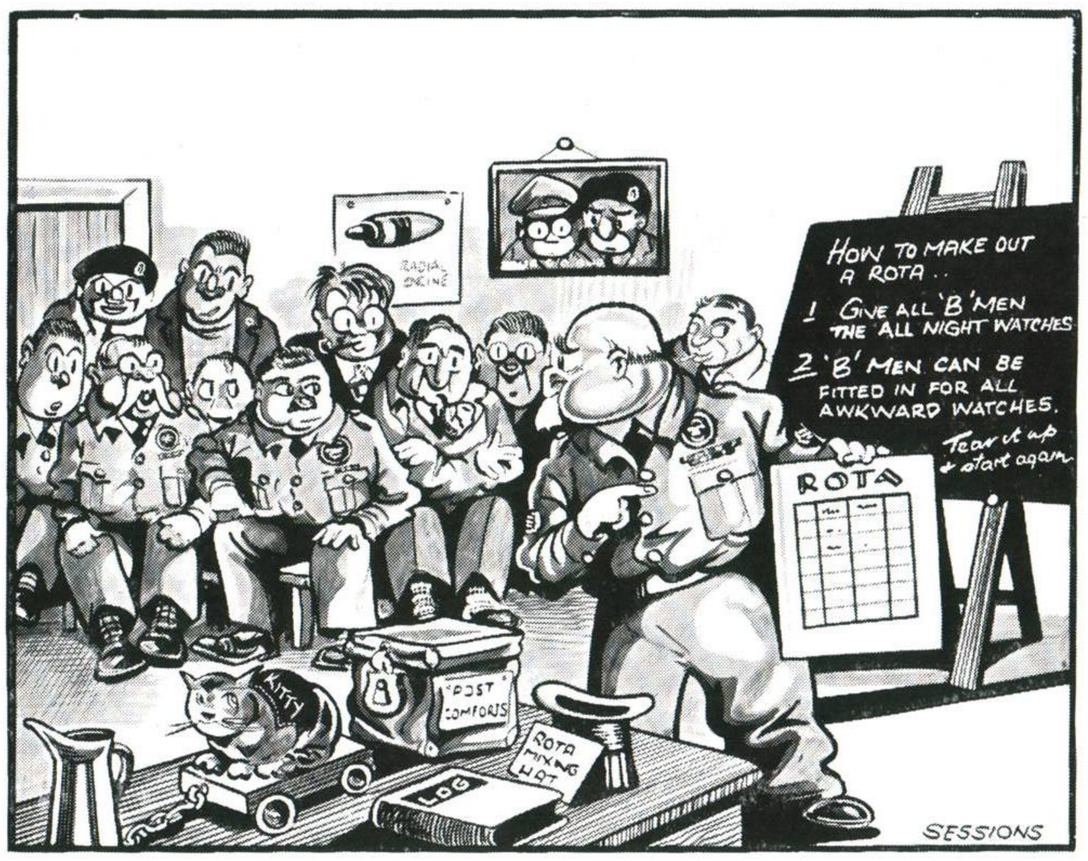
At that stage he is responsible to the Group Officer who is in charge of a sub-group of posts.

This Officer's undertaking is to give you training along more advanced lines, to add to the knowledge that you have already received in practice and procedure and recognition technique and then to see that you are informed on the ramifications of the Corps and the part that it plays in the Air Defence of this country. He is there to encourage those who are slower to learn so that the whole team of the post members can work efficiently.

In the Operations Room the motif is the same, the only difference being in the mode of application. Here, in this nerve-centre, all the information that comes from the Observer Posts is accepted, sorted out (or filtered) and finally displayed in differing forms to provide a picture, that is termed as the " air situation " over that particular Observer Group's territory at that precise moment. Here, instead of a single instructor you will meet a panel, each member of which has undertaken to give you instruction on subjects in which he is competent. The subjects will range from the system of map reference used, the correct methods of plotting the information received, the purpose of the resultant display, the correct method of passing on information that is required in the Royal Air Force Operations Rooms, why these methods are used and other kindred subjects. From them you will go on to the actual physical actions needed in the operations room. The proficiency you obtain is governed by the amount of hard practice that you give.

The Duty Controller in the Operations Room when you become a member of an established crew assumes the responsibility for more advanced training, arranging

(*Concluded overleaf*)



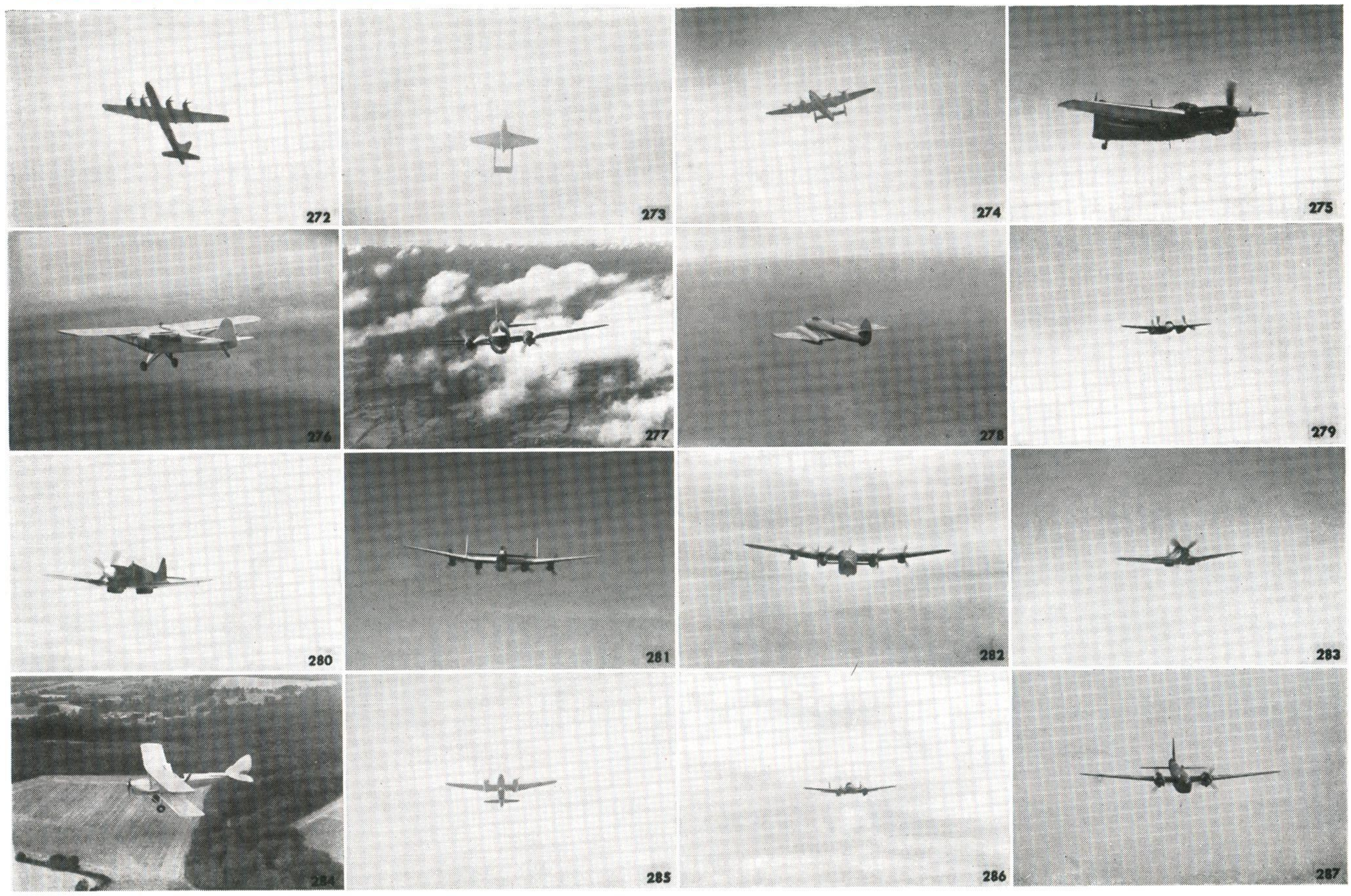
. . . from those who by virtue of their experience and ability are able to impart knowledge.



This Officer's undertaking is to give you training along more advanced lines.

AIRBORNE HEADACHES

No. 13



The answers, headed "Airborne Headaches No. 13" must be sent on a postcard to reach Group Headquarters by 22nd April, 1950. Group Headquarters will forward answers so as to reach Area Training Officers by 29th April, 1950.

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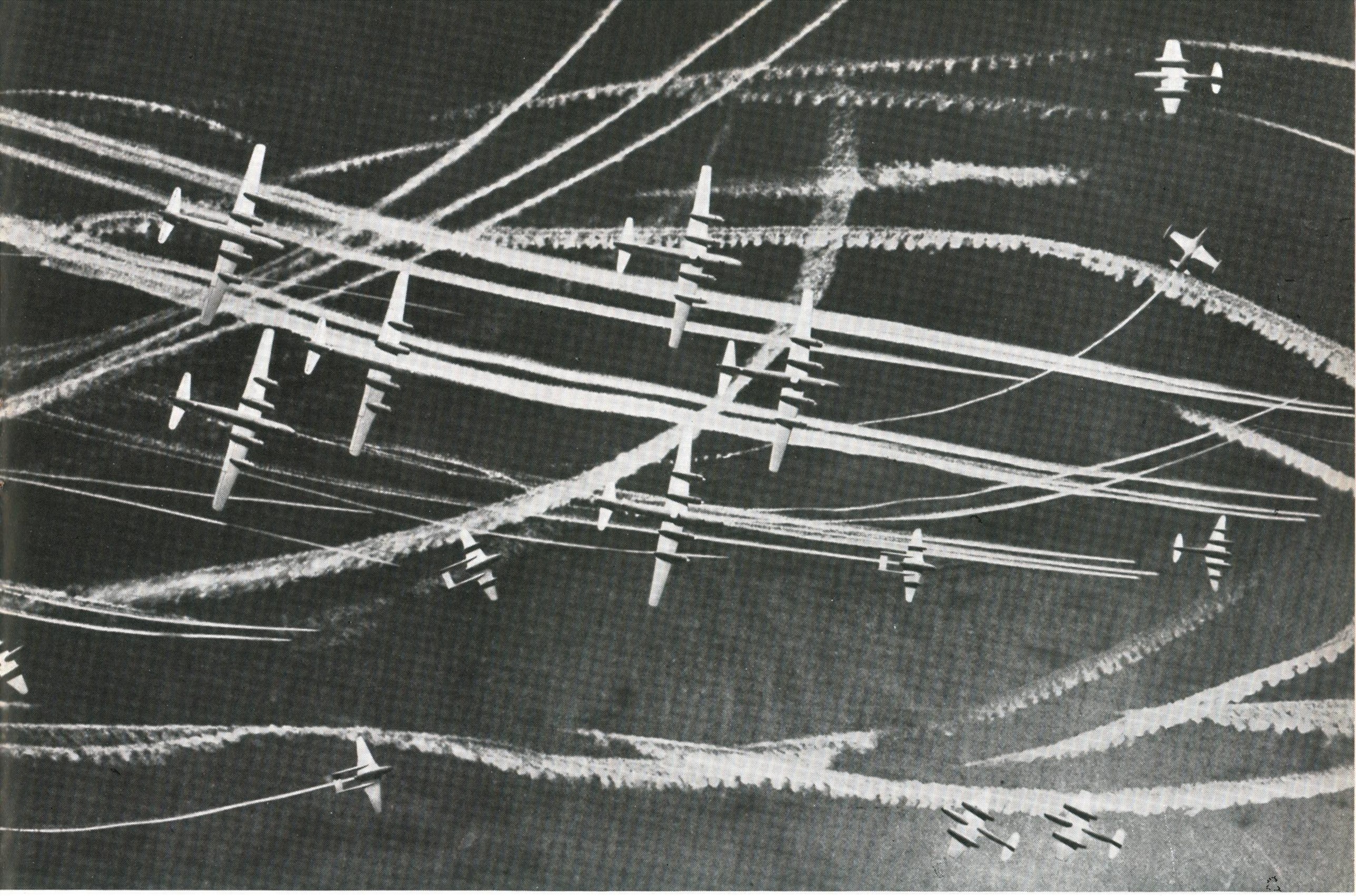
his tuition in such a manner that you are informed on all aspects of the Control and Raid Reporting system and so to the point that all the members of the duty crew are operationally sound.

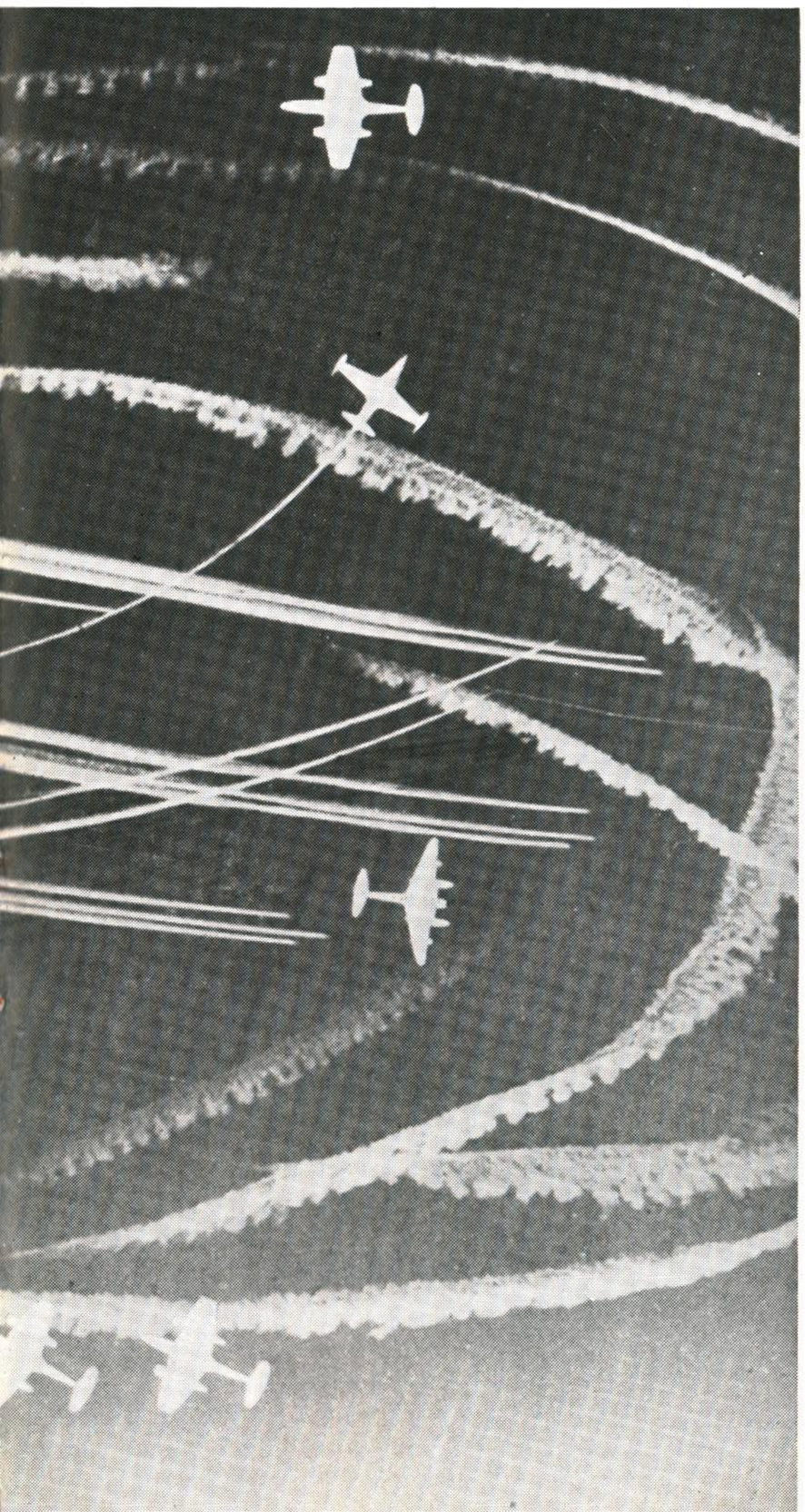
At the head of each Observer Group are, finally, the Group Commandant and the Deputy Group Commandant (the latter being the one exception, in that he is fully employed in the service of the Royal Observer Corps). These two Officers in their respective ways make a contribution to your training, until at last you are ready to test the knowledge you have gained against the Question papers that have been prepared for this purpose, in one or the other of the Tests. In this article, I have tried to set out for you a brief approach to this question of training which is so important when related to the activity you have chosen to follow in your part-time service. The filling in of the detail must be left to yourself and those who give the training. What is important is that the individual should strive to perfect himself (or herself as the case may be), so as to make a full contribution to the team which in the ultimate resolves itself into the Royal Observer Corps.

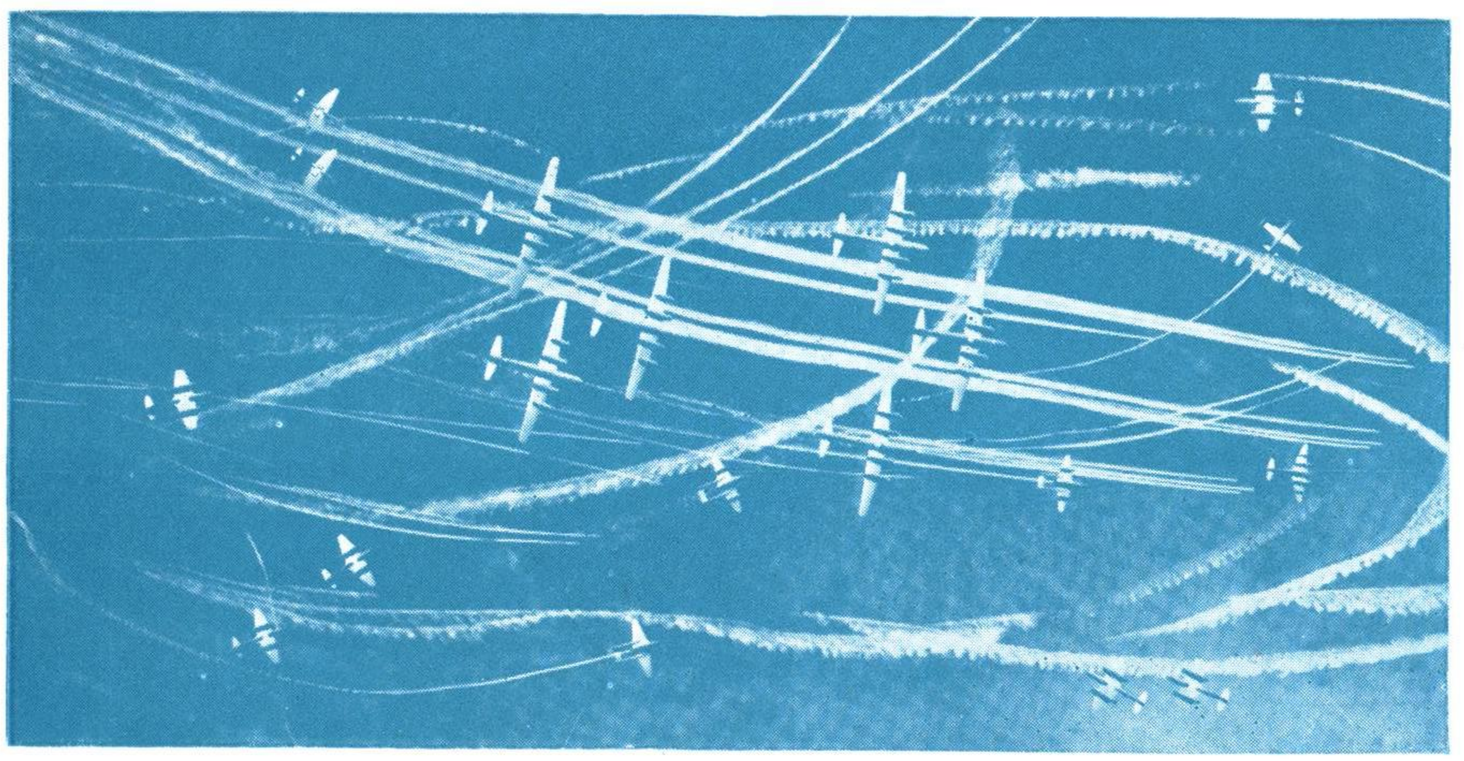
For the benefit of those who did not hear the present Commander-in-Chief, Fighter Command, when he addressed the Camp last September this extract is given: " You were ready at the outbreak of the last war, you were efficient ; see to it that you are efficient and ready should another war come, you have a much greater responsibility today ".

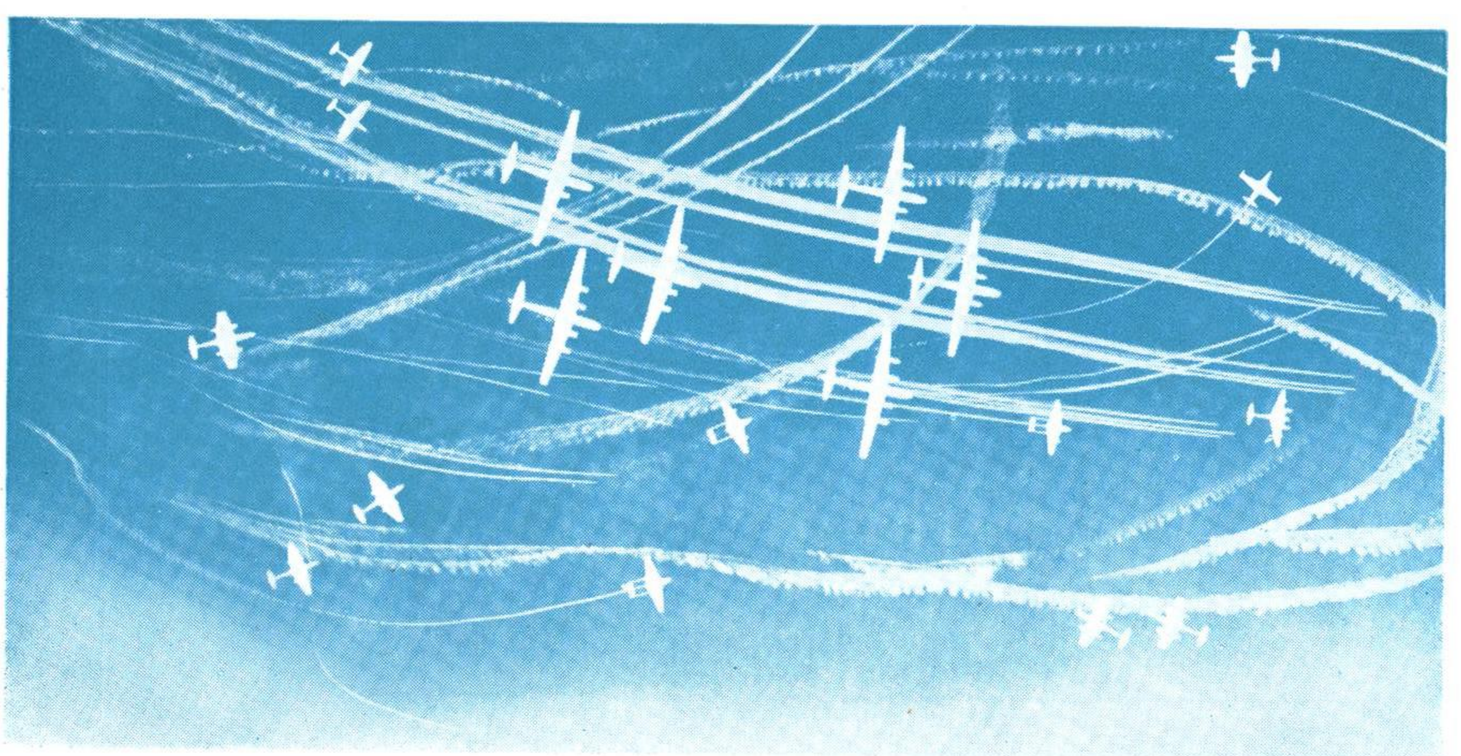


. . . the members of the duty crew are operationally sound.



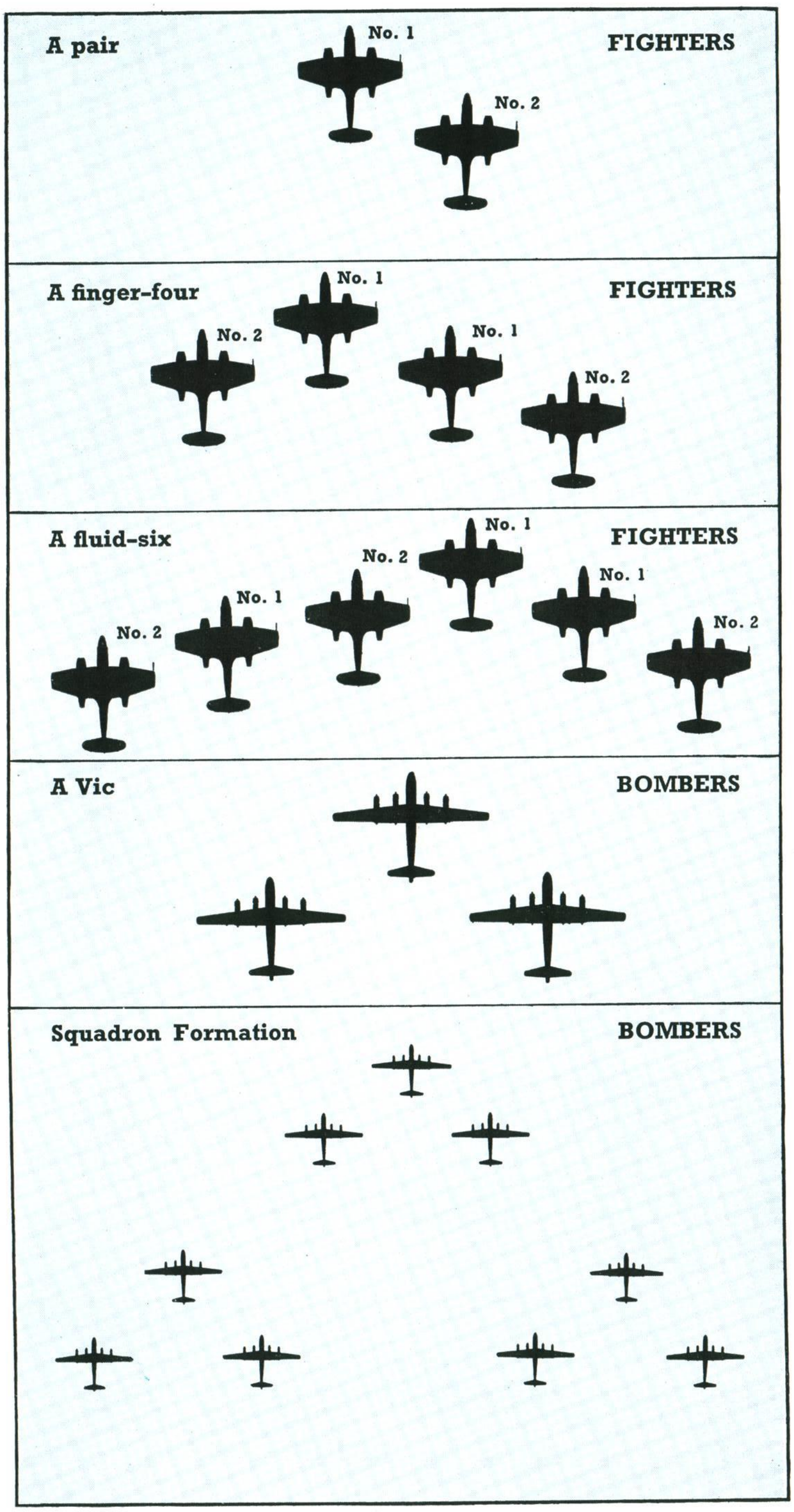






THOUGH fighters and bombers fly in basically different battle formations, all formations are designed for maximum tactical efficiency. During air engagements, in exercise or in earnest, aircraft may lose formation, and straggling bombers and lone fighters will be seen. There may also be observing aircraft about during an exercise. Nevertheless a knowledge of some of the battle formations currently practised by the R.A.F. and the U.S.A.F., will add interest and aid recognition. For the approaching exercise "season" therefore, we present some

TYPICAL BATTLE FORMATIONS



Fighters

The basic unit of all fighter formations is a pair of aircraft, a leader known as No. 1, and behind and to one side, his No. 2. The No. 2 of the pair may be on either side of his leader depending upon the tactical situation. Most fighter formations seen during exercises will be pairs or multiples of pairs. In preparing to attack bombers, larger fighter formations may split up, but every endeavour is made to keep pairs intact throughout the battle.

Fighter squadrons usually "scramble" in pairs and climb in a "snake of pairs" (one behind the other well spaced out) until it is convenient to form into a larger formation. The next larger formation to a pair is known as the finger-four, so called because fighters are spaced as the tips of the fingers of one hand. The second pair in a finger formation may be either to right or left of the leading formation according to the tactical situation, but No. 2 of the second pair will always be on the "outside" of the formation. Multiples of finger formations may be seen in line abreast, though there are occasions when they can be seen in line astern.

Another variant of the principle of pairs is what is called the "fluid-six". The No. 2 men of the outside pairs fly on the outside of this formation. No. 2 of the leading pair flies on one side or the other of the leader, according to the tactical situation.

Bombers

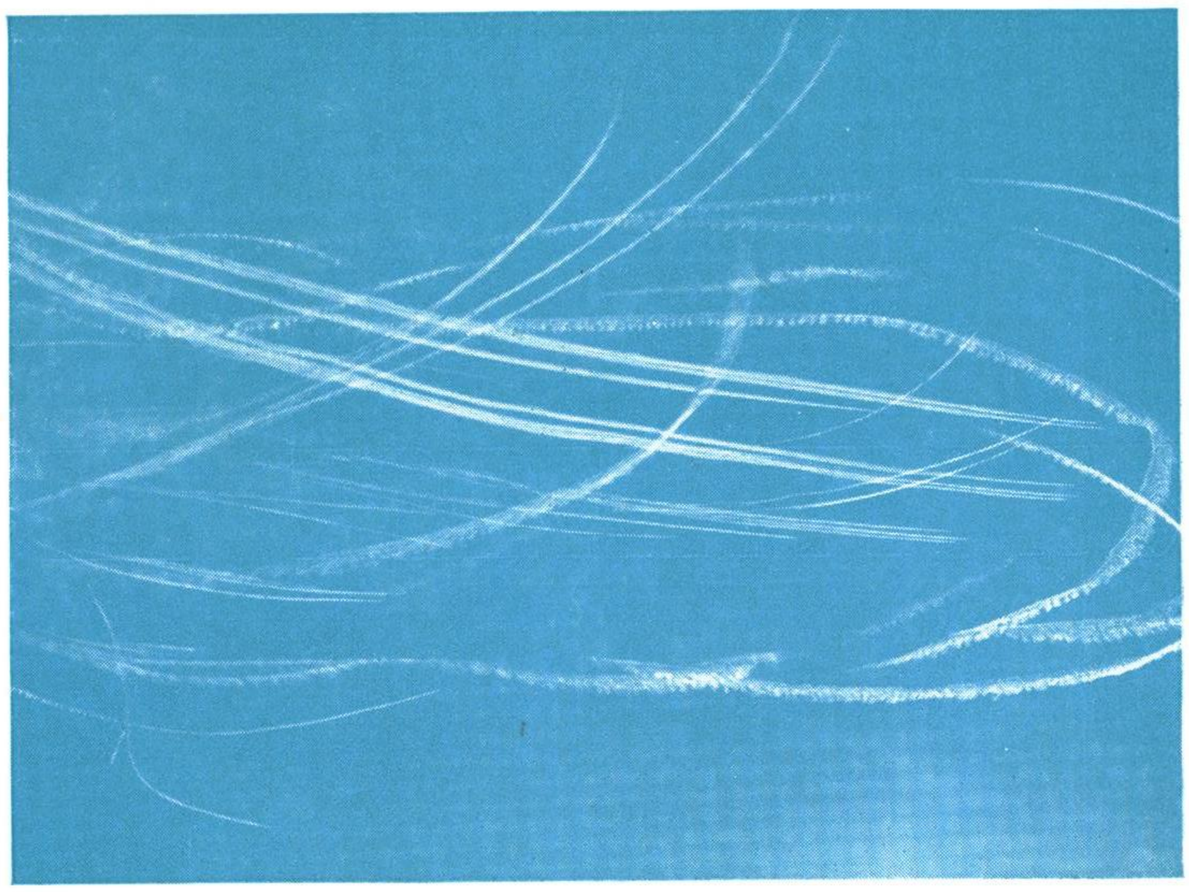
The common basic unit of a bomber formation in daylight is a vic of three aircraft. Larger formations of bombers are made up of multiples of vics. The B-29s and B-50s of last year's exercises were seen to operate in formations of two or three vics in line astern. Another favoured arrangement is a vic of vics, or what is more correctly called a squadron formation.

Some of the formations we mention are illustrated in the interpretation of the vapour trail photograph reproduced herewith. The steady track of the squadron formation (vic of

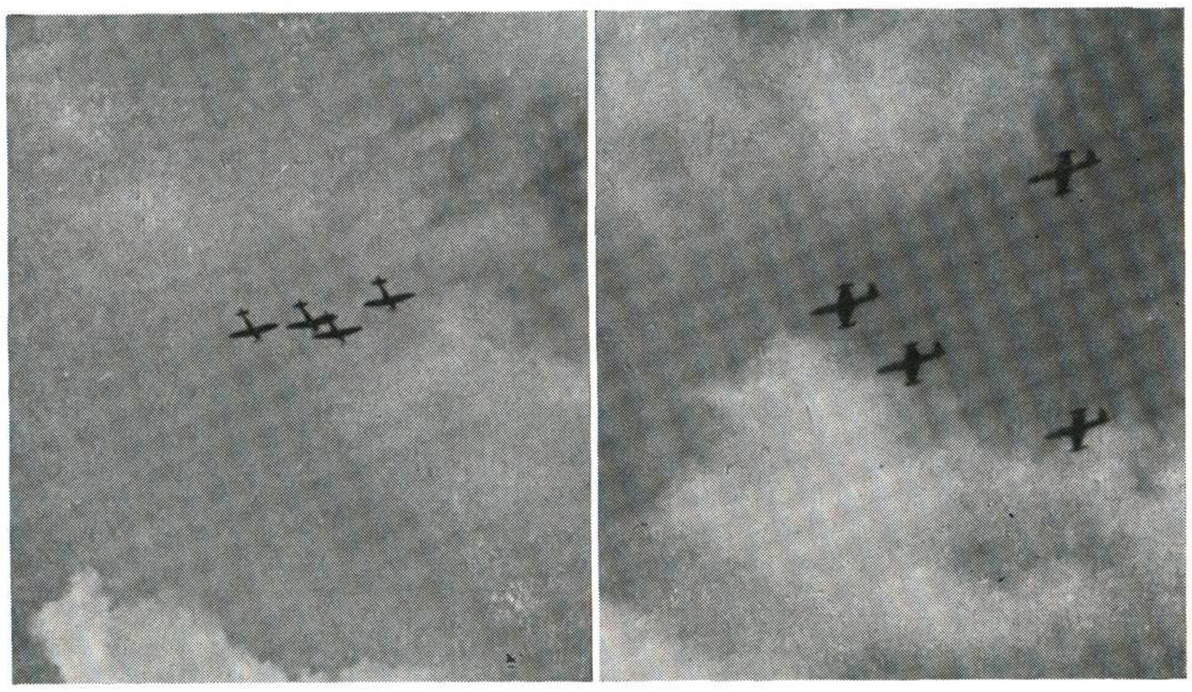
vics) of B-50 bombers (with one straggler) can be clearly seen, whilst most of the fighter formations are extremely loose and in some cases have been completely lost. The Meteor attacking the observing B-50 (bottom right annotation) is probably part of the formation noted as having attacked at " X " and " Y ", and which are hauling out to a position for a quarter attack. The six Meteors indicated on the left of the interpretation may have been a fluid-six to start with ; some still remain " paired ".

A Vic of B-29s

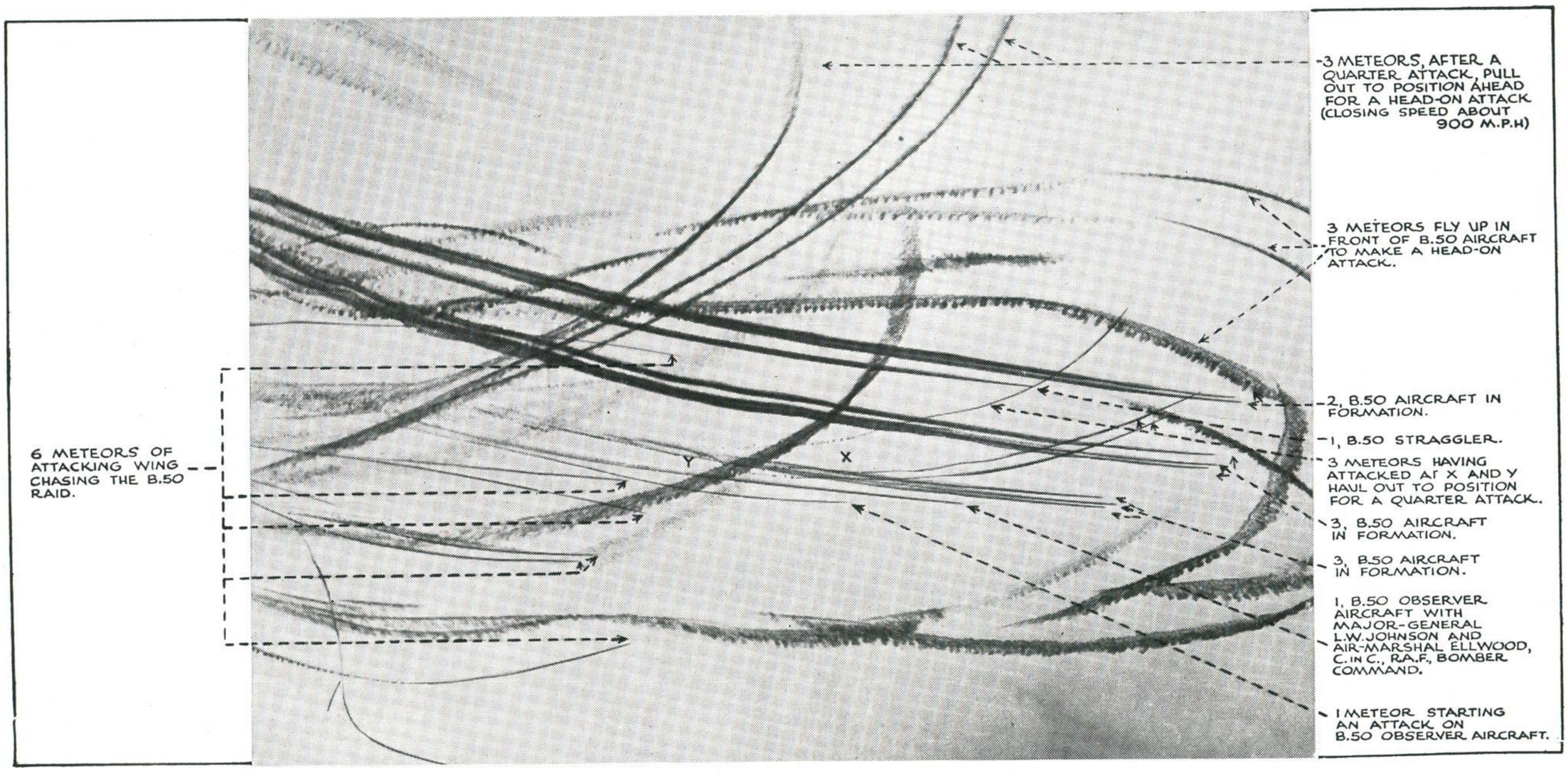




This picture, taken during Exercise Bulldog, illustrates the value of knowing something of battle formations and tactics when raids are being reported. The key to this tactical situation is given in the reverse print below.



Finger-Fours of Spitfires F Mk. 21 and F-80s



Martin

MERCATOR

A SUB-HUNTER in days of "snorts" and radar must be "quick on the draw", hence Mercator's nacelles each contain a radial engine and a turbojet. The jets are used at take-off and for closing the target. Mercator's narrow, straight-tapered shoulder wing is set halfway along the fuselage, which has gun positions (waist), turrets (top, front and rear) and radomes of different kinds (bottom). Its tailplane has dihedral.



TECHNICAL DATA

Duties : Long range naval patrol.

Engines : Two P. & W. Wasp-Major radials plus two Allison J-33-4 jet units.

Guns : Nose, mid-upper and tail turrets.

Performance : Max. speed : over 350 m.p.h. at 16,400 ft.

Span : 114 ft. Length : 85 ft. 2 ins.



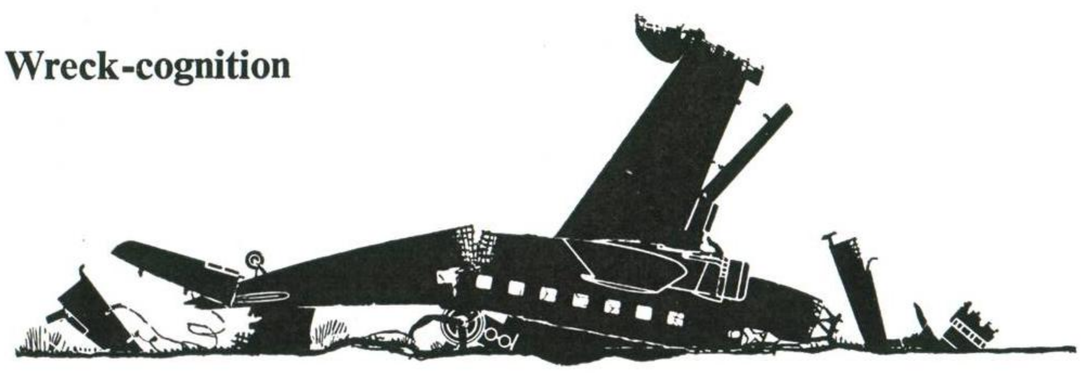
Daily Spotting Record Again Advanced

Observer T. P. Hillier of 4 Group/S.3 logged 25 different types of aircraft, as under, on the 2nd December, 1949 :—

Stratocruiser	Skymaster	Dominie
Constellation	Oxford	Balliol
Tiger-Moth	Lincoln	Meteor
Spitfire	Canadair Four	Firefly 4
Dakota	Lancaster	Expeditor
Horsa	Hastings	Vampire
Halifax	Tempest 2	Brigand
Anson	Mosquito	Hermes IV
Wellington		

Can YOU beat this for variety in a day's spotting ? If so, send us details.

Wreck-cognition



(Answer on Rear Cover)

Twenty Questions

1. What is unusual about the wing (in head-on view) of the North American B-45 Tornado ?
2. What is the name and span of the World's largest aeroplane ?
3. What are the names of the American aircraft bearing these designations :—
   F-86, C-119, F-80, B-45 and P2V-2 ?
4. What is a feature common to the following aircraft : C-82, Packet ; C-119 Packet ; de Havilland Vampire ; de Havilland Venom ; F-15 Reporter ?
5. What is the wing-span of the B-50 ?
6. Which has the larger fin : the B-29 or the B-50 ?
7. Is it in the B-29 or the B-50 that all engine nacelles extend to the trailing edge ?
8. What two features have the following aircraft in common : F-86 Sabre, P.1052, B-47, Vickers 510 and Tiger Moth ?
9. What twin-engine transport has a forward built centre-section between engines and fuselage ?
10. What are some of the essential differences in appearance between the Balliol Mk. 2 and the Athena Mk. 2 ?
11. What jet-fighter is called to mind by the word " droop-snoot " ?
12. And by the expression " Winged-bullet " ?
13. What is the Short Sealand and what is the Short Seaford ?
14. Which of the following aircraft have high wings, which shoulder wings, which mid-wings, and which low : Barracuda ; Hornet F Mk. 1 ; Devon ; Hastings ; P.1040 ; Vampire F Mk. 3 ; B-36 ; P2V-2 ; Neptune ; and Brabazon ?
15. What are the distinguishing characteristics (appearance) of the turboprop installations in the Apollo and the Viscount ?
16. Mate these aircraft : The Sea Fury 11, Firefly 4 and Firebrand 5 correctly with these wing spans : 51 ft. 3 ins. ; 41 ft. 2 ins. ; and 38 ft. 5 ins.
17. What Viking variants are called to mind by the expression
    (*a*) " Parson's Nose ", and
    (*b*) " Belly Bulge " ?
18. Why have the Fairey 17, the Blackburn Y.A.5 and the Wyvern abnormally large spinners ?
19. The undercarriage of the Chipmunk is fixed or retractable ?
20. An Orenda is (*a*) a high wind encountered at extreme altitudes ; (*b*) a Chinese balloon ; (*c*) the name of a jet-unit produced by Avro Canada.

Have a Heart !

The last paragraph of a letter from an enthusiastic observer at Patton Hall, near Kendall, Westmorland, dated 2nd Feb., 1950 reads : " And there's another thing that just cropped up. Would the Brabazon be flying over here today ? About ten o'clock this morning ? Flying East ? I didn't see anything myself, but I was asked about it and couldn't say definitely."

We understand she wasn't.—ED.

New Aircraft Recognition Material

The undermentioned new Air Diagrams and Models are now available and initial distribution has been made. Applications for supplies should be made through normal official channels, quoting reference numbers as shown below :

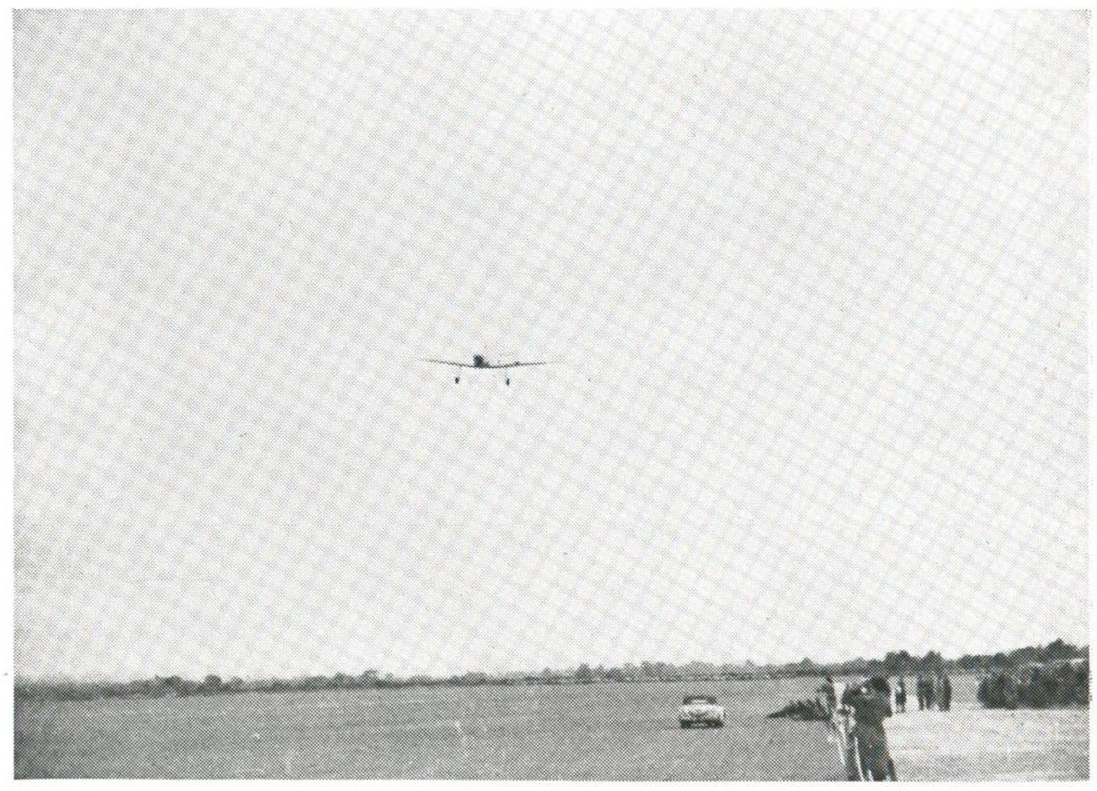
1/72 SCALE MODELS.

Stores ref. 52/832 B-50 Superfortress.
52/904 AD-1 Skyraider.
52/912 Auster 6

NIGHT SILHOUETTES.

A.D. 4907 Attacker F Mk. 1.
4908 Meteor F Mk. 3 and 4.
4909 Vampire F Mk. 3.
4924 Auster 6.
4925 Firebrand TF Mk. 5.
4926 Firefly T Mk. 2.
4927 Prentice T Mk. 1.
4928 Seafire F & FR Mk. 17
4929 Tempest F Mk. 6
4930 Tempest F Mk. 2
4931 Sea Fury F Mk. 10.
4932 Mosquito PR Mk. 34
4937 Lancastrian Mk. 2
4938 Marathon.
4939 Viking.
4940 Lincoln.

Aerogram



Pink Chum (Answer on rear cover)

BOOK REVIEWS

by JOHN W. R. TAYLOR

Harald Penrose, Westland's popular Chief Test Pilot, is an ornithologist. In **I Flew with the Birds** he also reveals himself as a very fine writer, for whom each flight is an adventure in a natural wonderland of colour and beauty. You will not find anything about aircraft recognition in this book, but we make no apology for reviewing it here, for Harald Penrose has captured something of the intangible poetry of flight, which can only enrich the knowledge and enthusiasm of his readers. This is a book about birds—English birds like the lapwing, gull, chiff-chaff and peregrine—about their habits and their use of air currents to assist them in flight. But it is far more than that. Take, for example, this lovely description of the first signs of Spring in Wessex :—

> " I remembered the chiff-chaff and saw how tree and shrub no longer showed like brushmarks of dull brown—everywhere had changed to glowing tints of madder struck with green, where buds, swelling with new life, hesitated before blossoming into flower and leaf. Renewed and lovely, the things of the earth had found youth again. As the aeroplane droned on, my thoughts ebbed and flowed with the synchronous surging beat of the two engines. They were sad thoughts ; for I could not forget that for men and women spring comes but once—and how for some there is no more than the first bright dawning, with no high summer."

Harald Penrose, in the high summer of his life, leaves little doubt that he has found great happiness in living. It is a happiness well worth sharing in this book.

From bird flight to gliding is but a short step, for glider pilots, like birds, depend on air currents to sustain their flight. For that reason, they claim that gliding is *real* flying, whereas even a brick would fly if one stuck a big enough engine on the front.

In **Gliding and Power Flying,** published by the Oxford University Press, the reader is told in a fascinating and easy-to-understand manner not merely *how* aircraft fly, with and without motors, but how to fly them. A description of an exciting cross-country glider flight is followed by a well-illustrated chapter on " Why Aircraft Fly ", after which the reader is invited to " join " a gliding club himself, take an armchair flight in a two-seater and then begin flying lessons. " The Story of the Weather " comes next, followed by " Second Lessons in Flying ", " Learning to fly Powered Aircraft " and a chapter on " Airmanship ". As a general introduction to flying, this is almost certainly the best value for the money on the market. For anyone about to join a gliding or power-flying club it is a " must ".

Lastly, we come to the only book concerned with aircraft recognition that we have received this month—**The Observer's Book of Aircraft** by Joseph Lawrence. It is an attractive little volume, but the Convair XC-99 is illustrated with silhouettes of the B-36 ; the Republic Rainbow transport is included, although it was never built ; the Hawker N7/46 is said to be " generally like the D.H.108, but has a tailplane ", and . . . but perhaps we have written enough for this time.

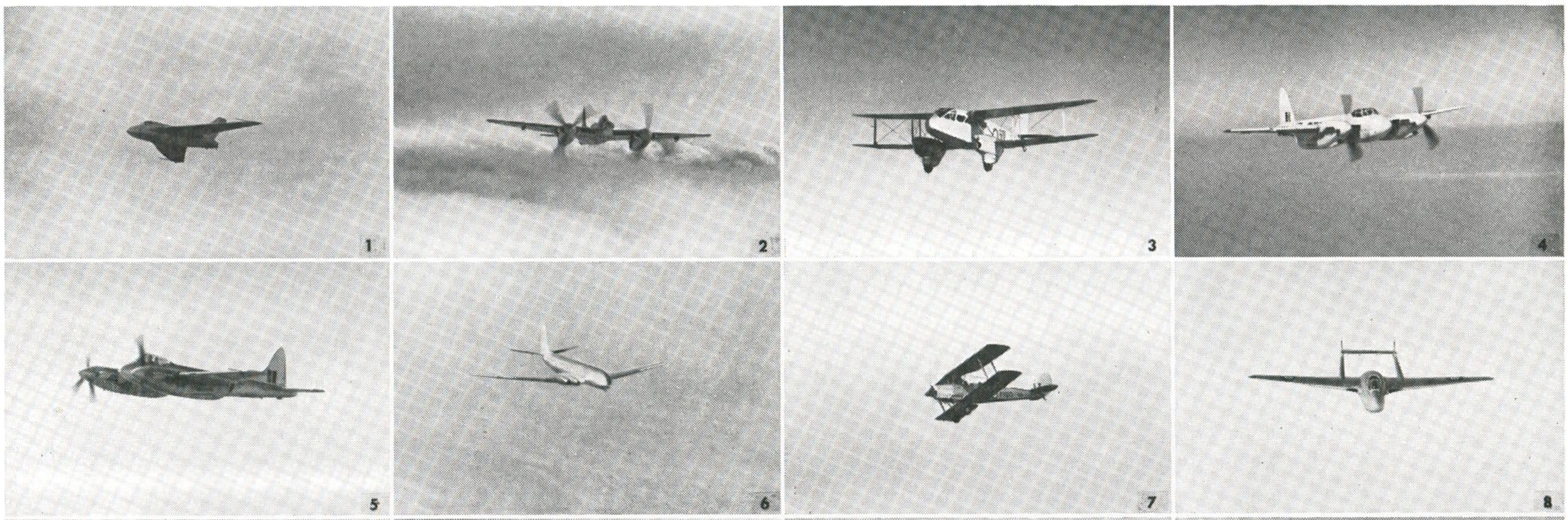
" I Flew with the Birds ", by Harald Penrose. Country Life, Ltd. 206 pp. 18s. net.

" Gliding and Power Flying ", by " String-bag ". Oxford University Press. 152 pp. 6s. net.

" The Observer's Book of Aircraft ", by Joseph Lawrence. Frederick Warne & Co., Ltd. 256 pp. 4s. 6d. net.

FAMILY FAVOURITES

(Answers on rear cover)



PO 2

by L/Obs. DENYS J. VOADEN
21 Group, R.O.C.

ONE of the "maids-of-all-work" in the U.S.S.R. aviation is a little biplane, first flown as long ago as 1927, yet which is still in service in very large numbers. This is the PO-2 (formerly U-2) of Nikolai N. Polikarpov, designer of the R-5, R-10, I-15, I-16, UT-4 and the TsKB-19, born 1892, died 1944.

The first version of the U-2 was a 2-seat trainer-wood-and-canvas with the usual 100 h.p. 5 cylinder M-11 radial motor. This normal trainer showed some variation in wheels, fuel tanks and upper centre-section through the years, but continued in production almost unmodified until 1944, and in its latest form is in service today in the U.S.S.R., Czecho-Slovakia, Yugoslavia, Poland and Rumania.

A central float version was in use in 1932-1933 but no more news of this has since appeared.

Three-seat versions of the U-2 began to appear in about 1930. There was one with three open tandem seats and another with two passenger seats in an enclosed cabin.

Ambulance variants seem to total four. In pre-war days a U-2 ambulance had a built-up rear fuselage (short " hump ") and bore Red Cross markings. At the beginning of the war another version had a shallow hinged decking on the rear fuselage and open cockpits.

The most unusual version had a " pannier-nacelle " on each lower wing, and so was capable of taking two stretcher cases.

Post-war ambulances had the " hump " of the built-up portion along the whole of the fuselage (almost to the fin) and are flown with civil or military markings. Some of them also appear to be used as freight carriers.

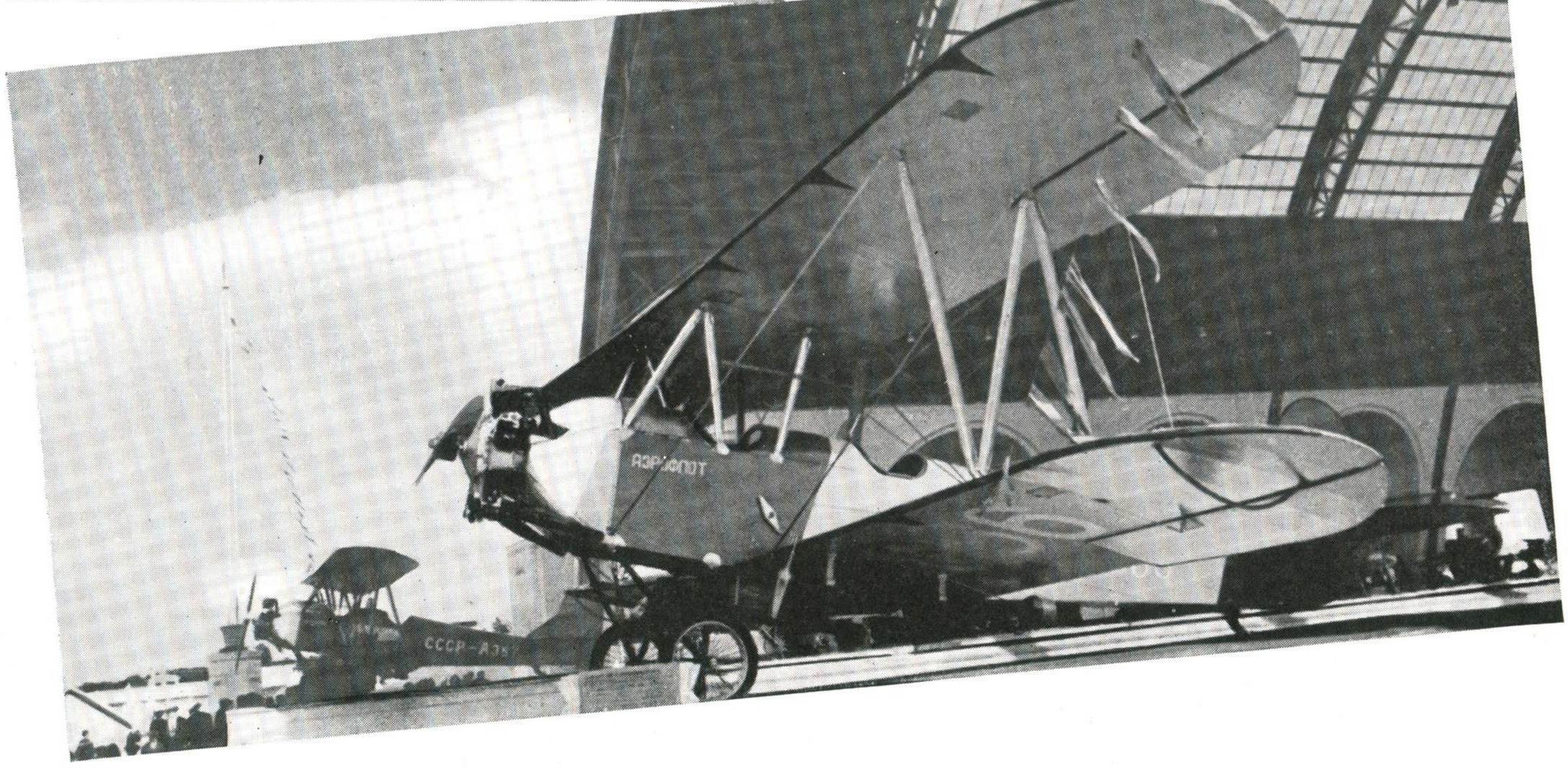
The PO-2 did much work of a reconnaissance nature during the war, and was also used as a night bomber. On the racks of some there were placed rockets, and such assault versions of the PO-2 were used in the final battle for Berlin.

Another role fulfilled by the U-2 is that of glider-tug. Typical gliders are the Sh(a)-10 and the US-5 (OKA-32), both two-seat trainers.

On the large collective farms of the Soviet, spraying of the ground or crops with fertilizers or insecticides is often carried out from the air, and it is only natural that the U-2 (in two or three different forms) has been pressed into service.

On Aviation Days up to 1948, mass numbers of PO-2s flew over Tushino in star formation or spelling out " Glory to Stalin ". However, in 1949 they were replaced by Yak-18 and Yak-14 high wing monoplanes towing banners. The PO-2, though still used as a glider-tug, is at last beginning to fade from its position in the forefront of Soviet light planes.





INTELLIGENCE

ENGLISH ELECTRIC CANBERRA

Canberra's Down Under. Recent news of English Electric's sleek jet-bomber is that it will be produced under licence in Melbourne, Australia. In Britain the 3rd prototype Canberra may now be seen flying in Bomber Command colours (dark underside) and minus the dorsal fin.

PIASECKI HRP-2

Sagging Sausage. Improved performance figures, say the Piasecki Helicopter Corporation, for the Piasecki HRP-2 are made possible by the low structural weight of its aluminium body, and the full use which is made of the engine to drive the "fans" (contra-rotating to minimise torque) at each end of the "sausage". The versatility of helicopters is well



known, and this one, built for the U.S. Navy, can be tucked away with folded rotors below deck on board a carrier, or take off from the deck with a crew of two and return together with eight passengers. Recent reports say that the HRP-2 can accommodate as many as twelve litter (stretcher) patients in its twenty feet long cabin space. Thanks to the large centre of gravity range permitted by the fore and aft rotors passengers may move about more or less as they please and sea rescue operations can be performed in hovering flight by the pilot without assistance.

NORTH AMERICAN YF-86D and XF-93

Spurious Spinner. More powerful successor to the North American F-86A "Sabre" (the F-86A already holds the official world's speed recrod of 670.981 miles per hour) is the YF-86D. The YF-86D has its air intake under its spinner shaped nose instead of in the centre, and is slightly larger than the F-86A. Afterburning equipment is also fitted.

The North American XF-93 which is another development of the F-86A, has flush intakes in the fuselage and is somewhat heavier. It is said that production versions will be equipped with a Pratt and Whitney J-48 (U.S. built Tay) capable with afterburners, of 8,000 lbs. static thrust. The prototype XF-93 is now undergoing initial flight tests.

ARGONAUTS

Canadair DC-4Ms (Argonaut Class) are now operating from London Airport on B.O.A.C. services to the Middle and Far East. Record delivery of these DC-4Ms was made over a period of eight months, the last aircraft being delivered during November 1949. B.O.A.C. are also introducing Argonauts on the route between London, the East Coast of South America and Chile. The journey to Rio de Janeiro will take 30 hours. By the time readers receive this Journal it is expected that all the York aircraft at present employed on this route will have been replaced by Argonauts.

METEOR 8

In Production. The Gloster Meteor F Mk. 8 which was given its first public airing last year at Farnborough is now in full production for the R.A.F. This Meteor has a lengthened



fuselage, a new cockpit canopy of cleaner form, beneath which is fitted a Martin-Baker ejector seat and, last but most important, a redesigned tail-unit. Points to remember are that both the fin and rudder and the tailplane have square-cut tips and the leading edge of the tailplane has pronounced sweepback. The familiar under-fin of previous marks has disappeared, and to sum up, the tail-end has suffered a "short back and sides, with a little off the top".

FAIREY 17

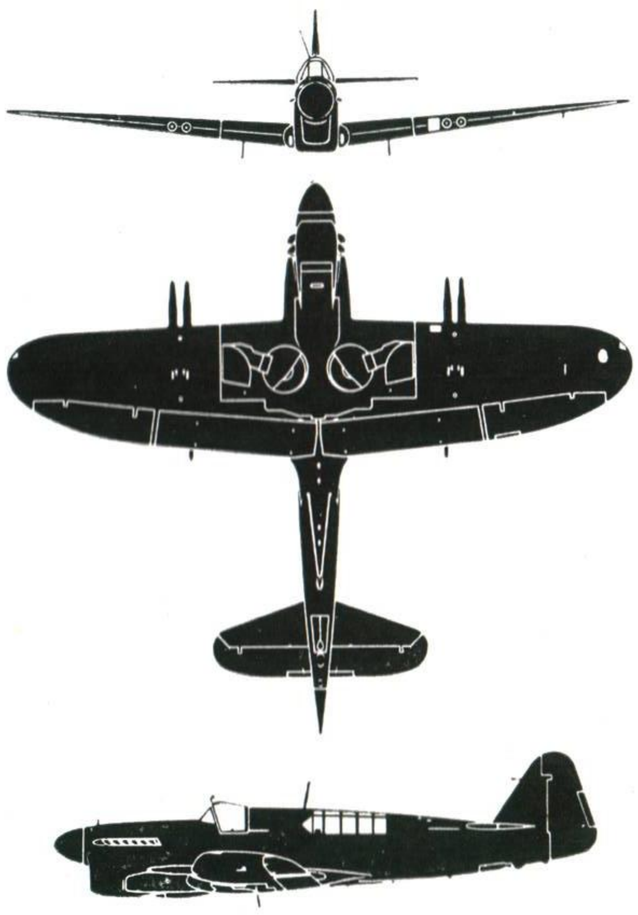
Anti-Sub Tub—which, we hasten to add, relates only to our first impression of its recognition character and not its performance, which is probably in the opposite sense. This is the first air-to-air photograph of the Fairey 17 anti-submarine



aircraft "showing its nose" (and looking like a baby seal, we think) above a sea of cumulus. Neatly encased behind the long pointed spinner and mouth-like intake, is an Armstrong Siddeley "Double Mamba", which is designed to give many of the advantages of twin-engine performance. The Fairey 17 can be flown with either of the contra-rotating propellers stopped.

FAIREY FIREFLY SILHOUETTES

FIREFLY F Mk. 1



British Fighter

Engine : One Griffon 2

Span : 43 ft. 10 ins. Length : 37 ft. 8 ins.

Recognition Points :

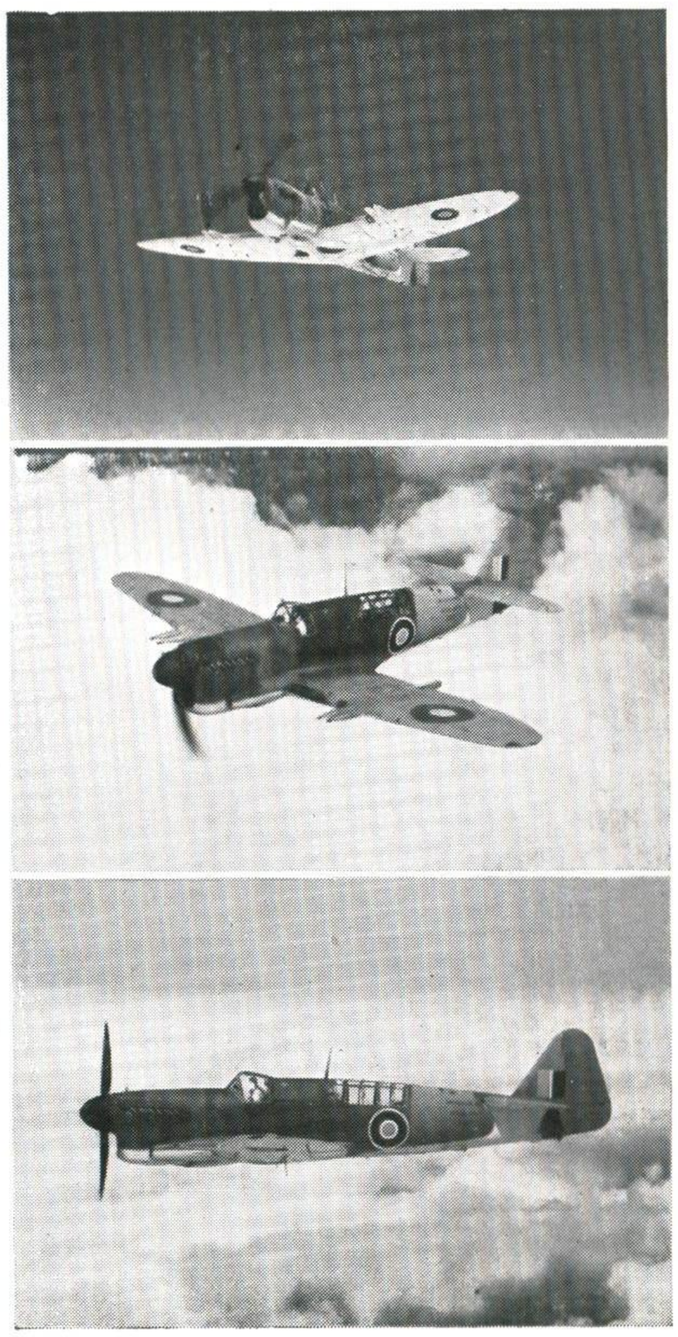
Wings : low, elliptical, moderate dihedral.

Engine : pointed, with large intake below spinner.

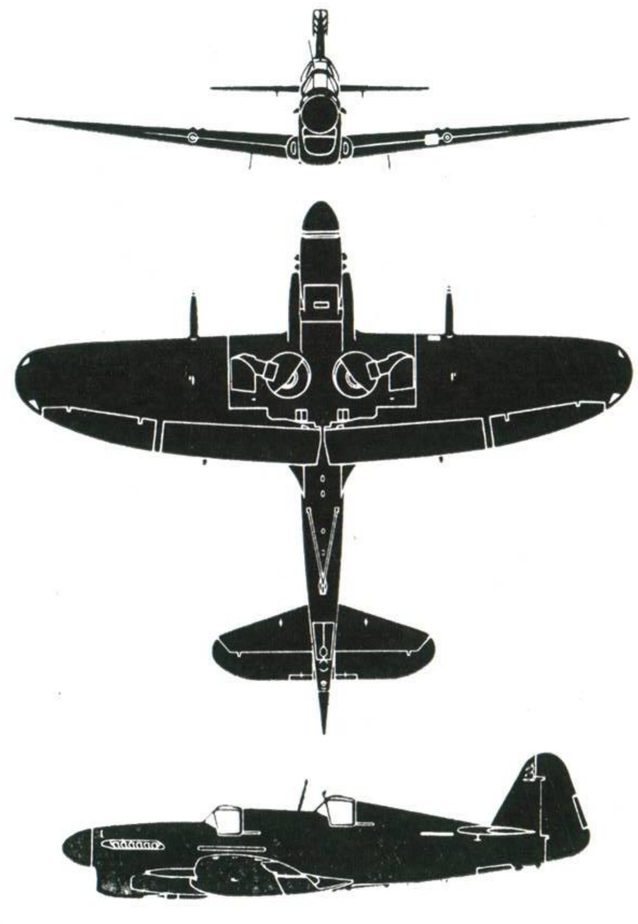
Fuselage : deep near-straight baseline forming angle with fin and rudder, straight top aft of stepped-up cockpit.

Tail : tailplane set well forward on fuselage through fin base, near-triangular with marked taper on leading edge, pointed tips, triangular fin and rudder.

Detail : " glasshouse " aft of cockpit, two cannon in each wing.



FIREFLY T Mk. 1



British Trainer

Engine : One Griffon 2

Span : 44 ft. 6 ins. Length : 37 ft. 7 ins.

Recognition Points :

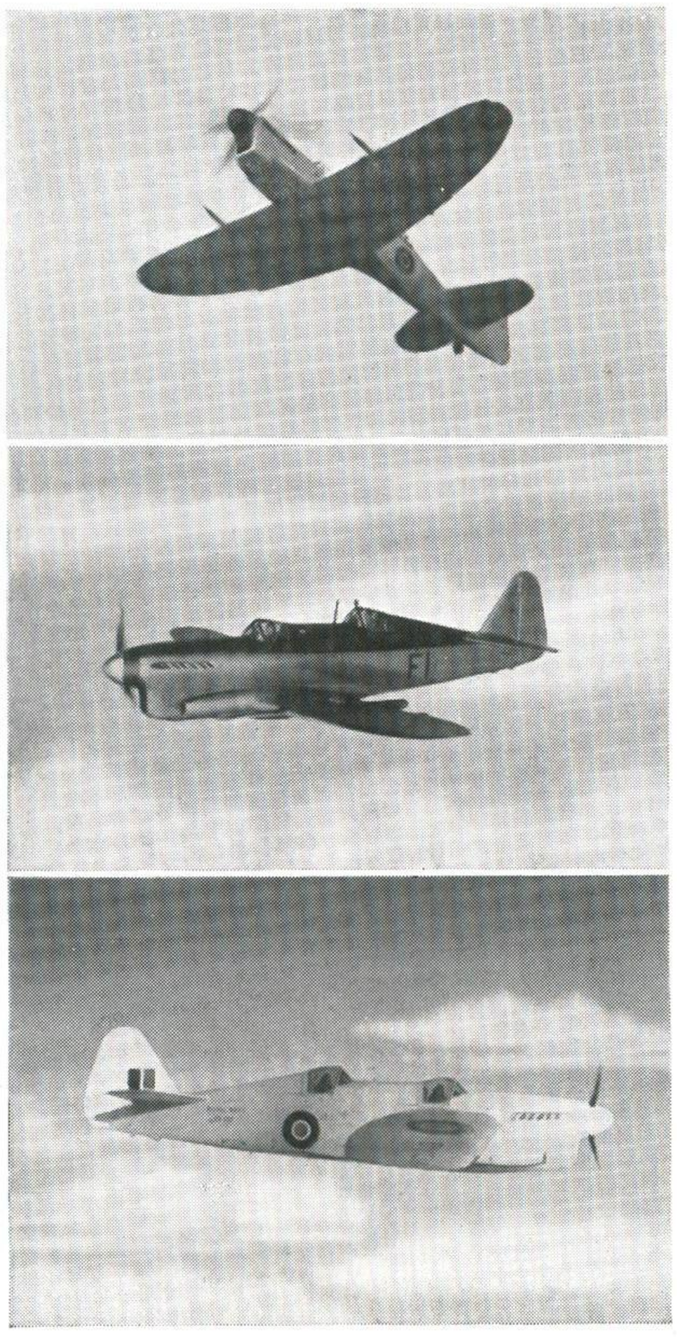
Wings : low, elliptical, moderate dihedral.

Engine : pointed, with large intake below spinner.

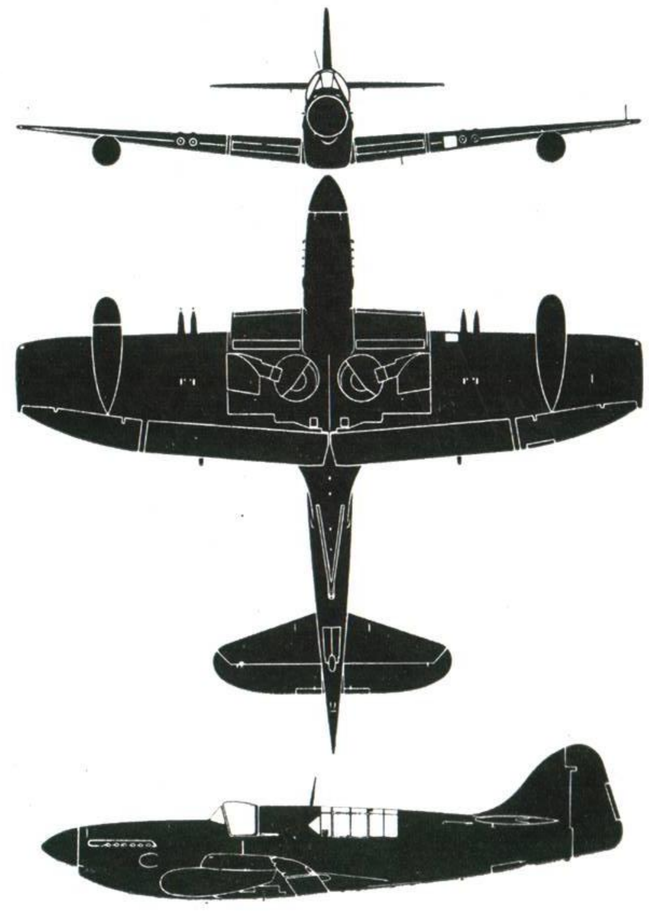
Fuselage : deep, near straight baseline forming angle with fin and rudder, stepped-up cockpits in " tandem " breaking top line of fuselage.

Tail : tailplane set well forward on fuselage through fin base, near-triangular with marked taper on leading edge, pointed tips, triangular fin and rudder.

Detail : one cannon in each wing.



FIREFLY FR Mk. 4



British Reconnaissance Fighter

Engine : One Griffon 74

Span : 41 ft. Length : 38 ft. 4 ins.

Recognition Points :

Wings : low, elliptical, protruding radiators at leading edge roots, moderate dihedral, clipped tips.

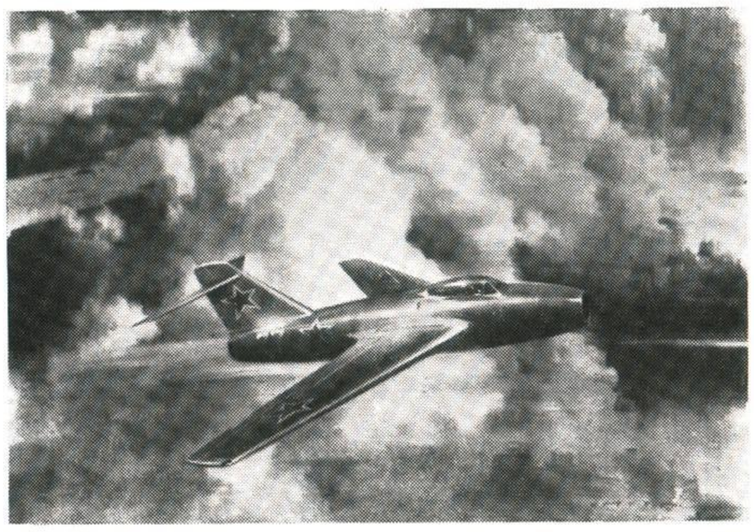
Engine : pointed, small " lip " intake below spinner.

Fuselage : deep, curved baseline forming angle with fin and rudder, straight top aft of stepped-up cockpit.

Tail: tailplane set forward and through fin base, is triangular, triangular fin and rudder with "hump-curve" in leading edge.

Detail : " glasshouse " aft of cockpit, two cannon in each wing, provision for drop tanks inset from wing-tips.





COVER PHOTO : This picture of the nameless Russian swept-wing jet-fighter was specially executed for our cover by Frank Wootton. It was drawn by the method illustrated on page 129.

Answers to Twenty Questions :

1. It has no dihedral.
2. The Howard Hughes Hercules, Span 320 ft.
3. Sabre, Packet, Shooting Star, Tornado and Neptune.
4. They all have twin-booms supporting the tail.
5. 141 ft. 6 in.
6. B-50.
7. B-50.
8. Swept wings and single fins and rudders.
9. IL-12.
10. (*a*) The Balliol's flying surfaces are more severely cut—the Athena's are blunted. (*b*) The Balliol's cockpit is further aft than that of the Athena. (*c*) The Balliol's tailplane is behind its fin and rudder ; that of the Athena is ahead of its fin and rudder.
11. F-80.
12. Attacker.
13. The Sealand is a twin engine high wing civil amphibian with single fin and rudder. The Seaford is a four-engine high wing military flying boat with single fin and rudder.
14. High : Barracuda. Shoulder : P2V-2 ; Neptune. Mid. : Hornet ; P.1040 ; Vampire F.3 ; B-36. Low : Devon ; Hastings ; Brabazon.
15. Their slender, pencil-like aspect.
16. Sea Fury II, 38 ft. 5 ins. ; Firefly 4, 41 ft. 2 ins. ; Firebrand 5, 51 ft. 3 ins.
17. (*a*) Valetta, (*b*) Varsity.
18. They all have contra-rotating propellers, which necessitates large hubs and spinners.
19. Fixed.
20. (*c*).

ACKNOWLEDGEMENT

The article "PO-2," by Leading Observer D. J. Voaden appeared originally in the "Skywatcher," the Journal of No. 20 Group R.O.C., under the title "Flying Jeeps of Soviet Skies." We are indebted to the Editor of that Journal for permission to use the article in slightly modified form.

SOLUTIONS TO RECOGNITION TESTS IN THIS EDITION :

SILLOGRAPHS

692. Chipmunk T Mk. 10
693. Apollo I
694. Brabazon I
695. Varsity T Mk. 1
696. Wellington T Mk.10
697. Hawker P.1052
698. Prentice T Mk. 1
699. F-80A Shooting Star
700. Lancastrian 2
701. FR-1 Fireball
702. Comet 1
703. F7F-3N Tigercat
704. Proctor T Mk. 4
705. Sea Vampire FB Mk. 20.
706. Meteor F Mk. 8
707. Supermarine 510
708. Athena T Mk. 2
709. D-558-2 Skyrocket
710. Sealand 1
711. Gemini 1A
712. Tudor 7

ELEMENTARY

739. Stratocruiser
740. Constellation
741. Seagull ASR Mk. 1
742. Firebrand TF Mk. 5
743. Viking 1B
744. Sea Fury FB Mk. 11
745. Tiger Moth T Mk. 1
746. Dominie
747. Marathon 1
748. PBY-6A Catalina
749. Dove
750. DC-3 Dakota
751. Seafire FR Mk. 47
752. Seaford GR Mk. 1
753. Sea Hornet F. Mk.20
754. Horsa 2
755. Gemini
756. B-29 Superfortress
757. DC-4M Canadair
758. P2V-1 Neptune
759. F-80A Shooting Star

FAMILY FAVOURITES

1. D.H. 108 3rd (P)
2. Sea Hornet NF Mk.21
3. Dominie
4. Mosquito T Mk. 3
5. Sea Hornet PR Mk.22
6. Comet
7. Tiger Moth T Mk. 1
8. Vampire F Mk. 3
9. Sea Hornet NF Mk.21
10. Tiger Moth T Mk. 1
11. Dove
12. Comet
13. Sea Vampire FB Mk.20
14. Chipmunk T Mk. 10
15. Mosquito T Mk. 3
16. Vampire FB Mk. 5

Key to Aircraft shown on Centrespread. Reading from left to right and top to bottom :—

1 Meteor T Mk. 7.
2 Meteor F Mk. 3's.
2 Spitfire F Mk. 22's.
3 B-29's.
1 Vampire F Mk. 1.
1 Vampire FB Mk. 5.
3 B-50's.
1 Vampire F Mk. 3.
2 Meteor F Mk. 4's.
1 Meteor T Mk. 7.
1 F-80A.
1 Mosquito PR Mk. 34.

TRICKY TRIO

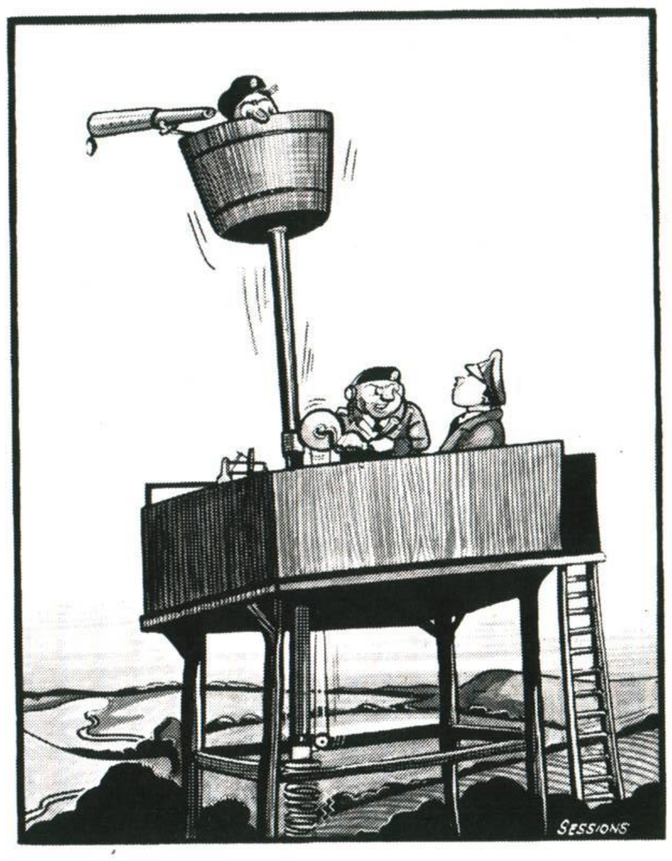
Left to right : Douglas DC-4 ; Douglas DC-6 ; Handley Page Hermes IV.

AEROGRAM

PINK CHUM = CHIPMUNK

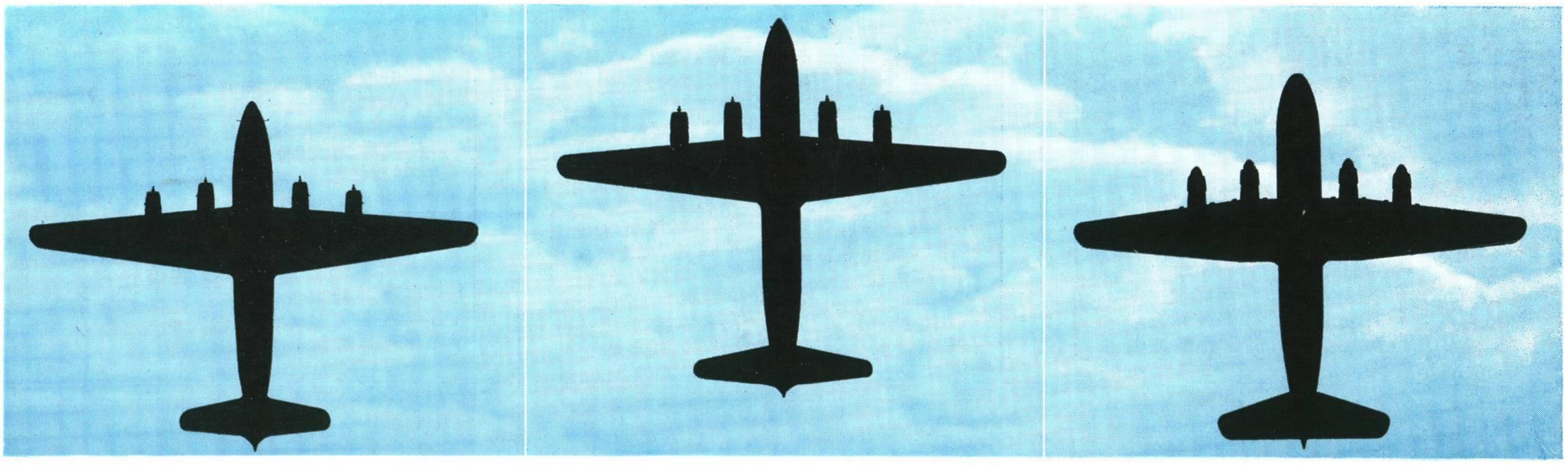
WRECK-COGNITION

FIAT G.212



"Our own idea for this high flyin' stuff."

TRICKY TRIO



52M. 3/50 38-241-0

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