"THE AEROPLANE," OCTOBER 8, 1943

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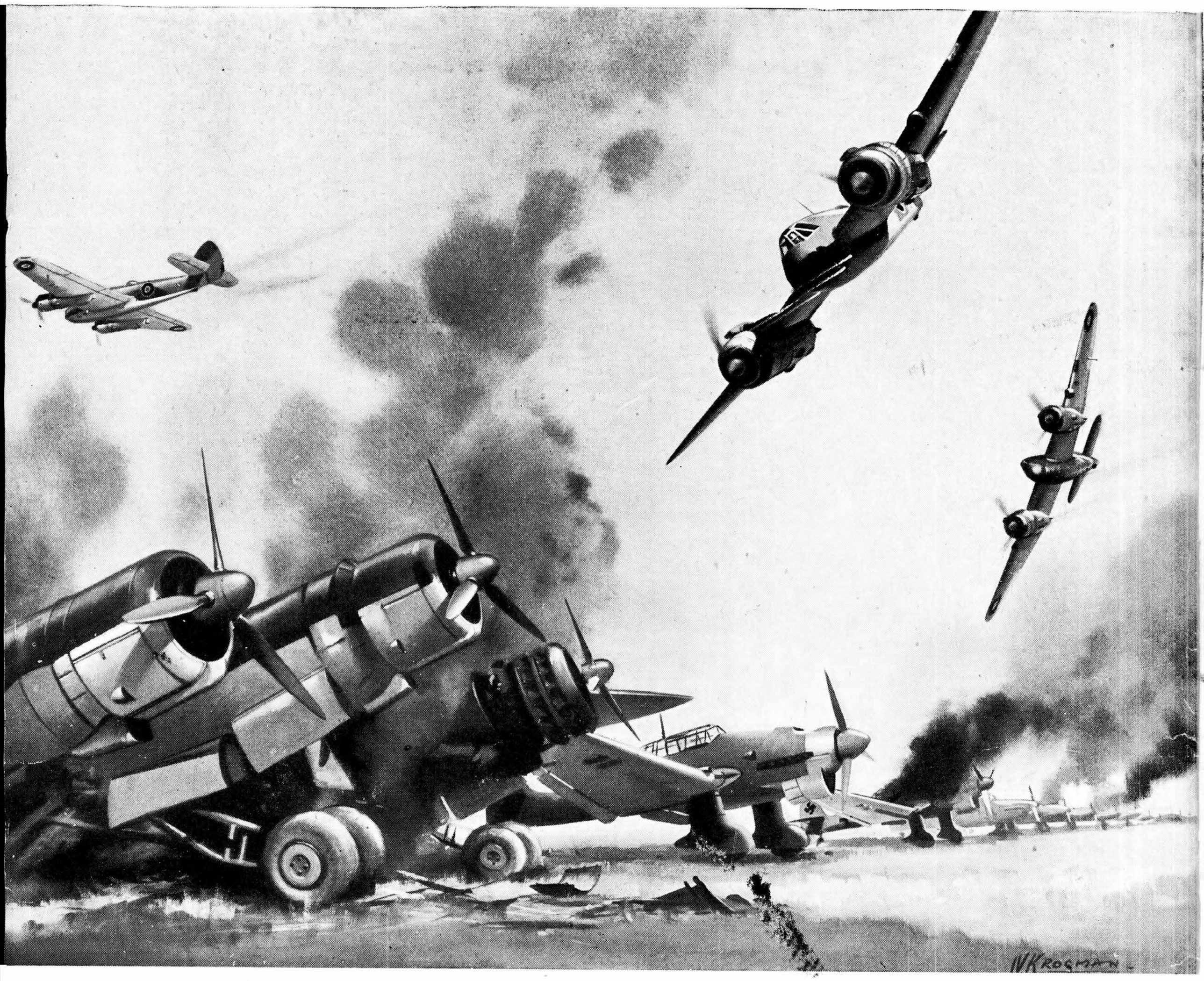

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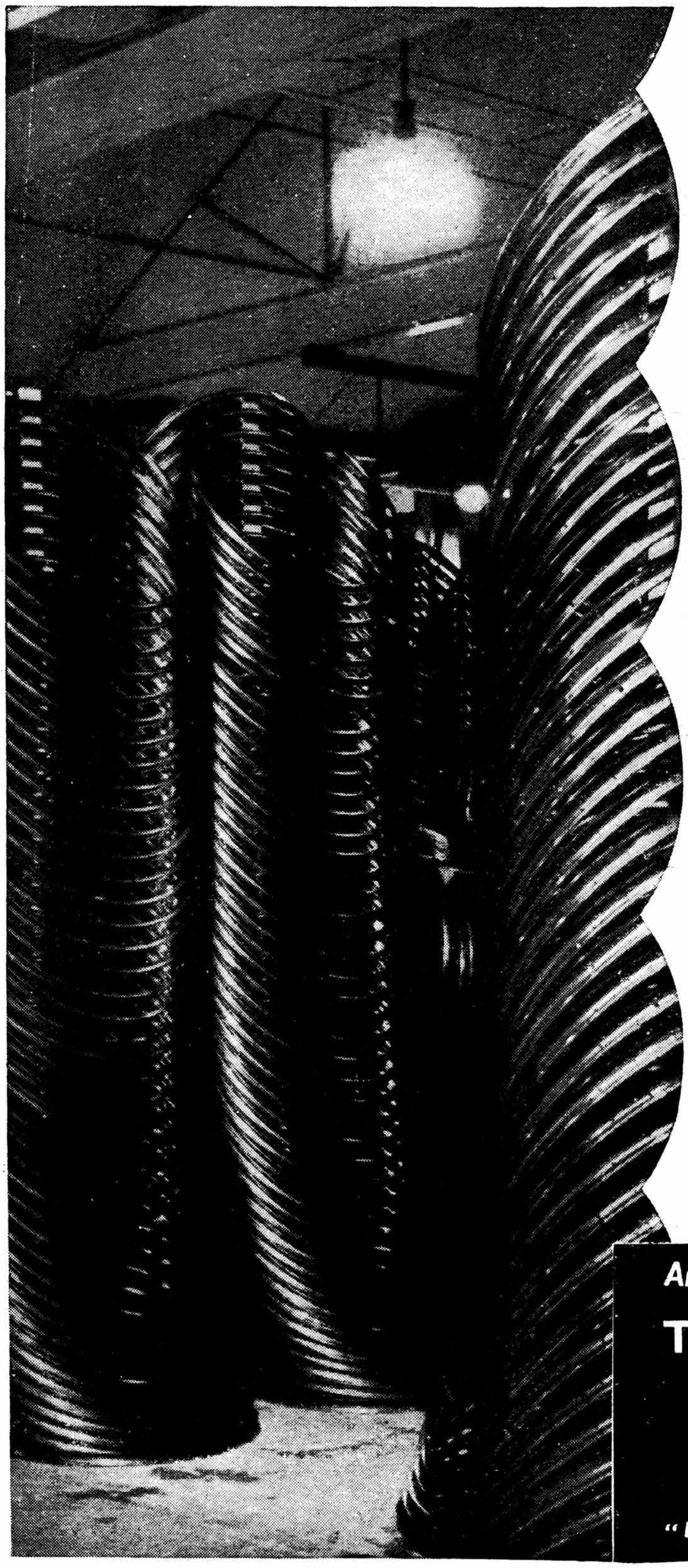

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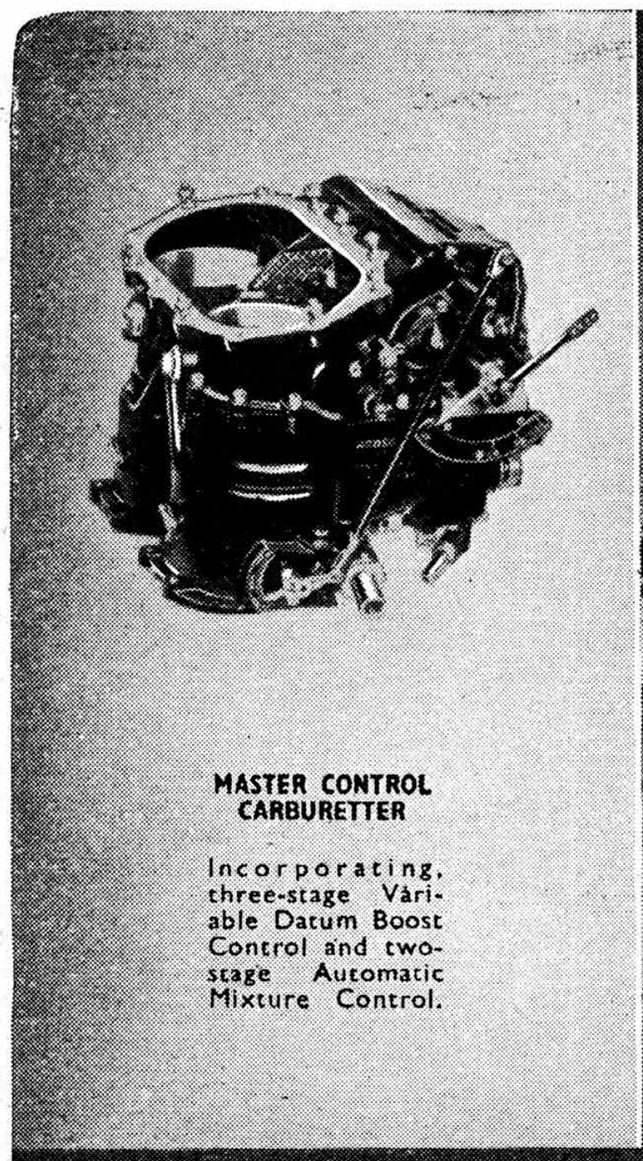

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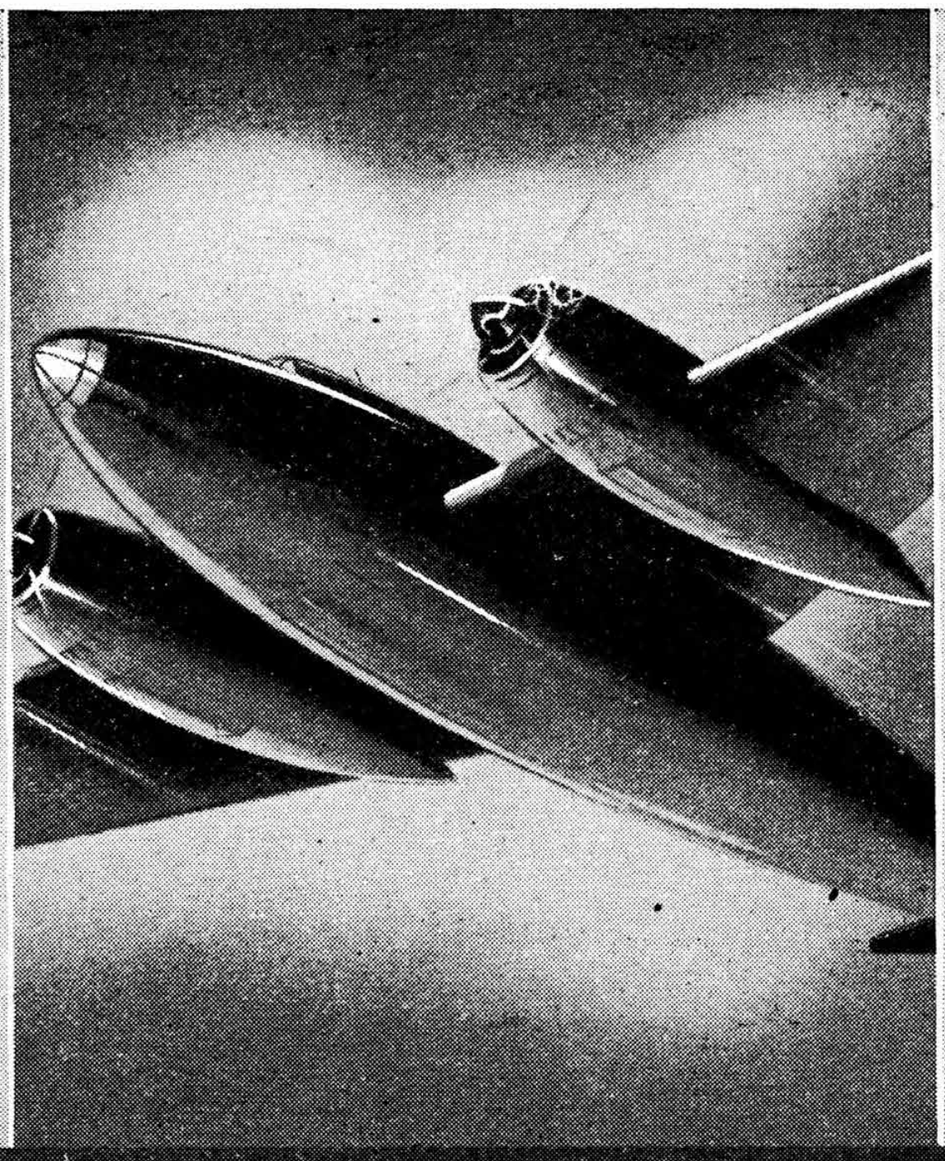

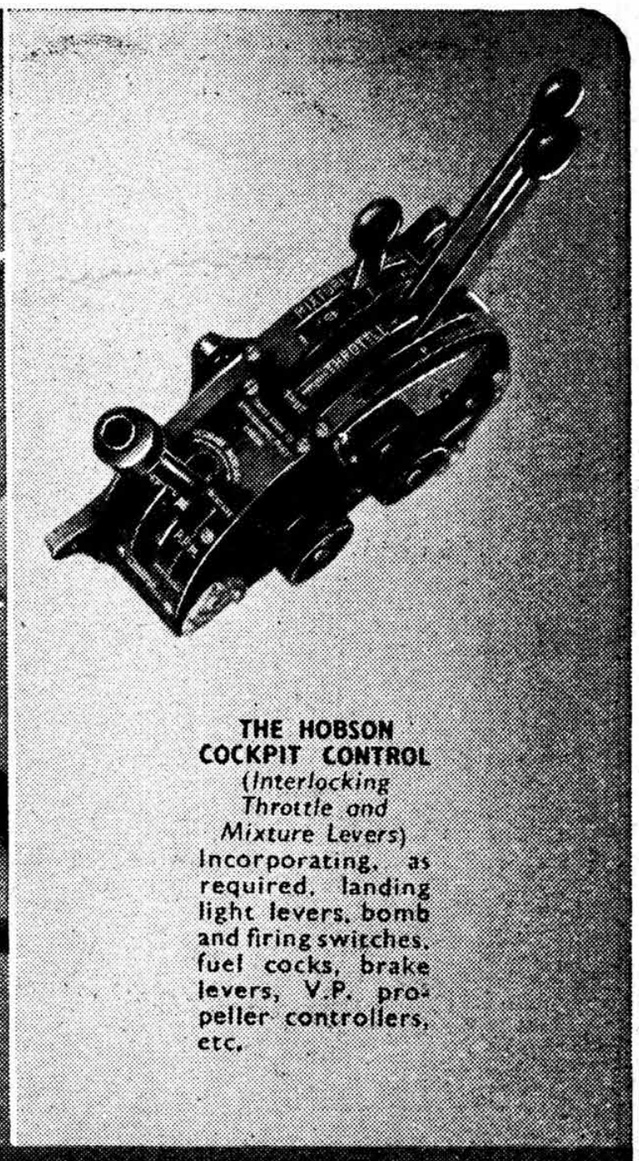

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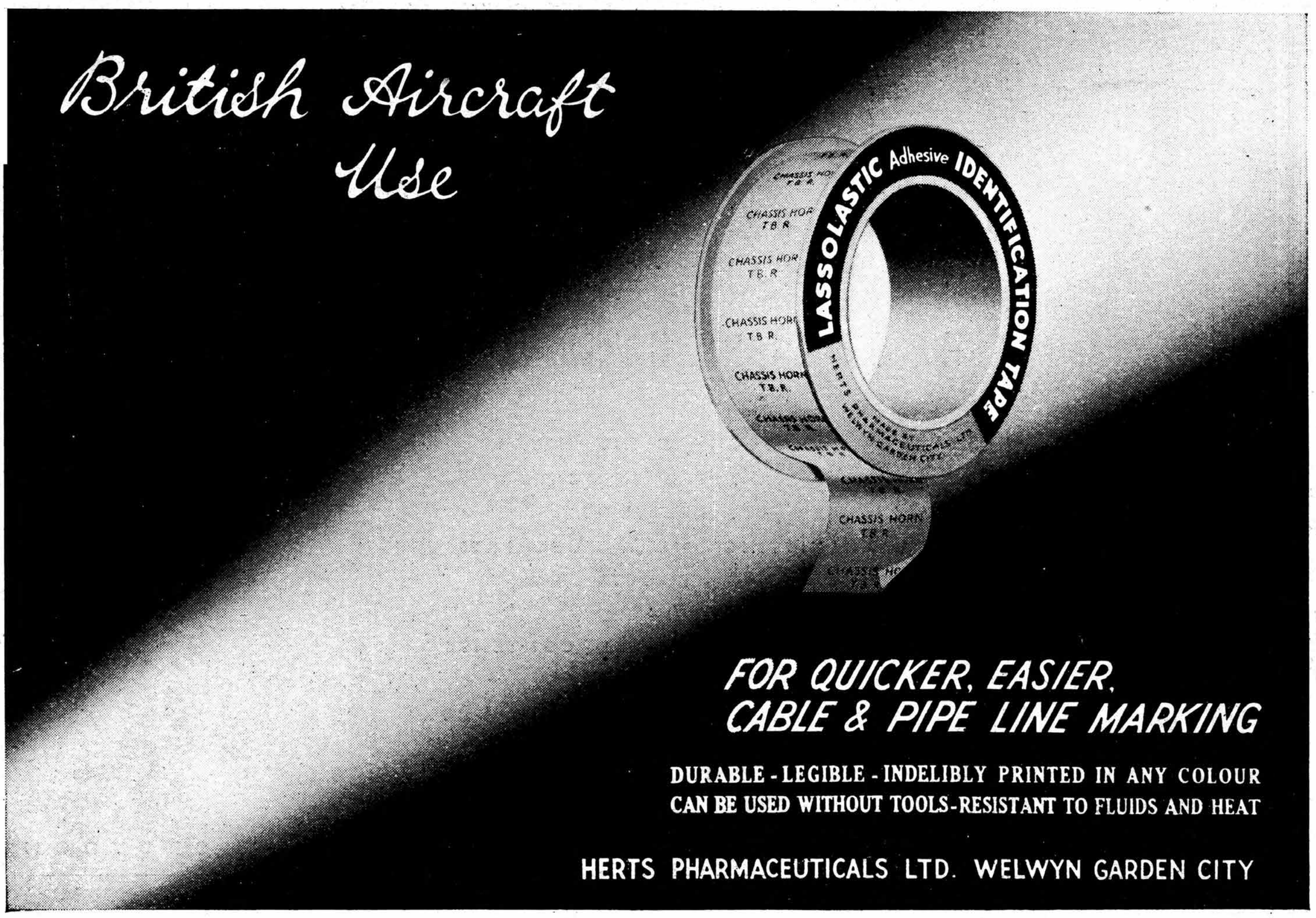

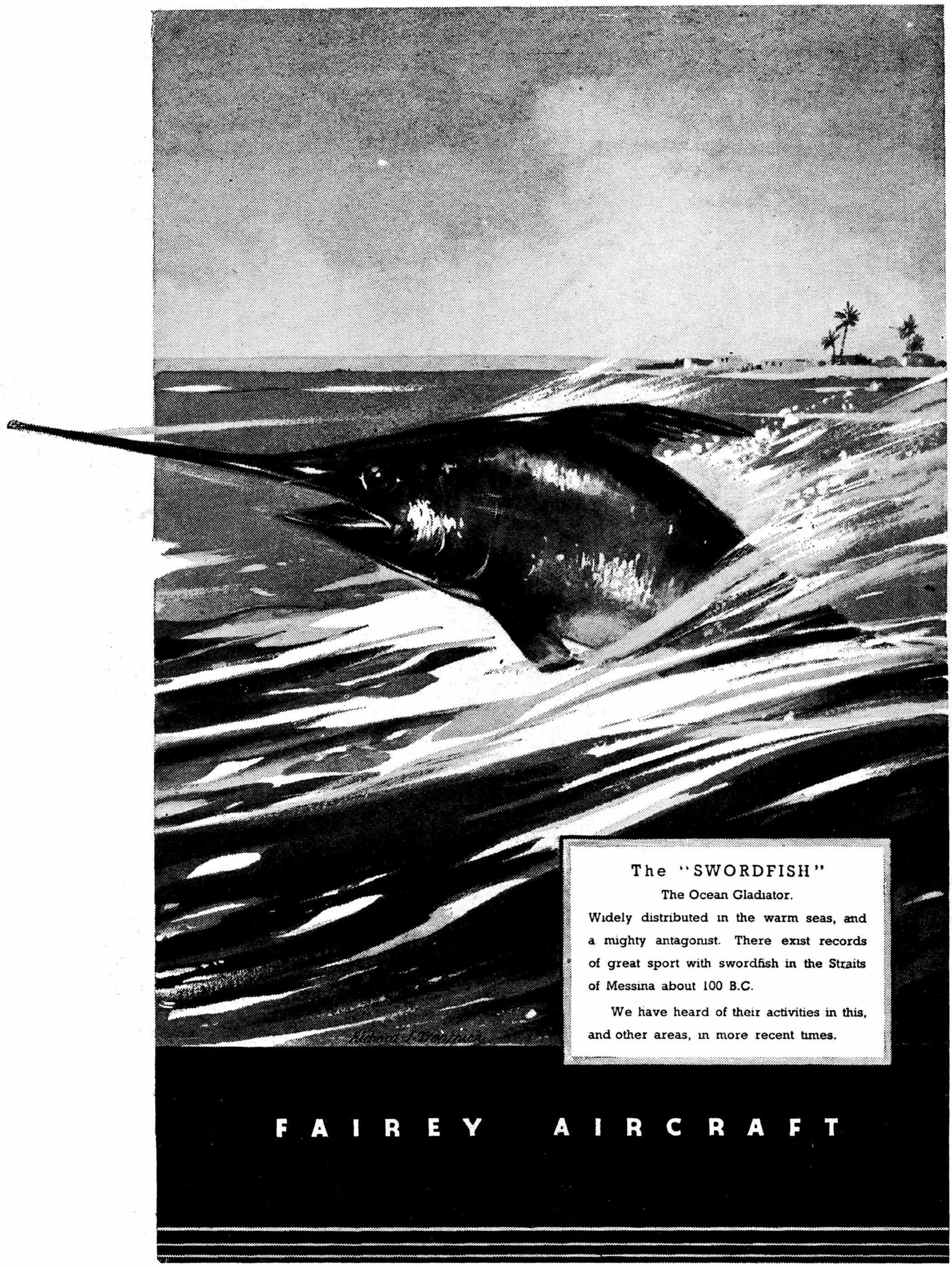
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FAIREY AIRCRAFT

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MATTERS OF MOMENT

Air Power in Combined Operations

ALL OPERATIONS by land and sea have become so impregnated with Air Power that at last, after four years of War, the old distrust of the air arm has changed into a desire to embrace it. Where hostility existed there is not only warm acceptance but an almost dangerous enthusiasm for adding Air Power to the forces of the land and sea. A statement published last week by three former Chiefs of Staff, a former Secretary of the Committee of Imperial Defence, and a former Parliamentary Secretary to the Admiralty, seemed to declare, too, that the old particularist claims of the senior Services to absorb the air arm have merged into something like agreement in the idea of a Combined Staff.

" Air Power," say these experts, in the course of their statement, " is primarily the affair of the Air Force, without which the Navy and the Army cannot exert their full potential strength and which, besides assisting in securing the necessary conditions under which the Navy, the Merchant Navy, the Army, the Air Force and the civil power can operate, uses its principal weapon, aircraft, to strike directly at the enemy's armed forces, at his means of supply and of life.

That acknowledgment is followed by the assertion that the three fighting Services in reality comprise one Service. " Only when the true meaning of total war is realised," they add, " and all allegiances are merged into a larger patriotism, can the full strength of a nation's belligerent power be developed." What the signatories had in mind is conveyed in another comment: " The other (older) Services have undoubtedly the right to call for air support according to its availability and the importance of the operations in hand. But, so far as possible, the call for air co-operation should be foreseen and built into the plans for the operation."

The Aim of Co-ordination

In summing up the significance of this joint statement, " The Times " concludes that it " implies a line of evolution towards a closer fusion of the three arms and to such an institution as a Combined Staff, under a single Chief." There has been no denial by the signatories—Admiral of the Fleet Lord Chatfield, Field Marshal Lord Milne, Marshal of the Royal Air Force Sir John Salmond, Lord Hankey and Lord Winster—that such a change is implicit in their argument. Their belief is, evidently, that the present system of a Committee of Chiefs of Staff advising the Cabinet works well while a brilliant strategist is Prime Minister, but that generations may pass before another Winston Churchill finds himself Prime Minister in time of war.

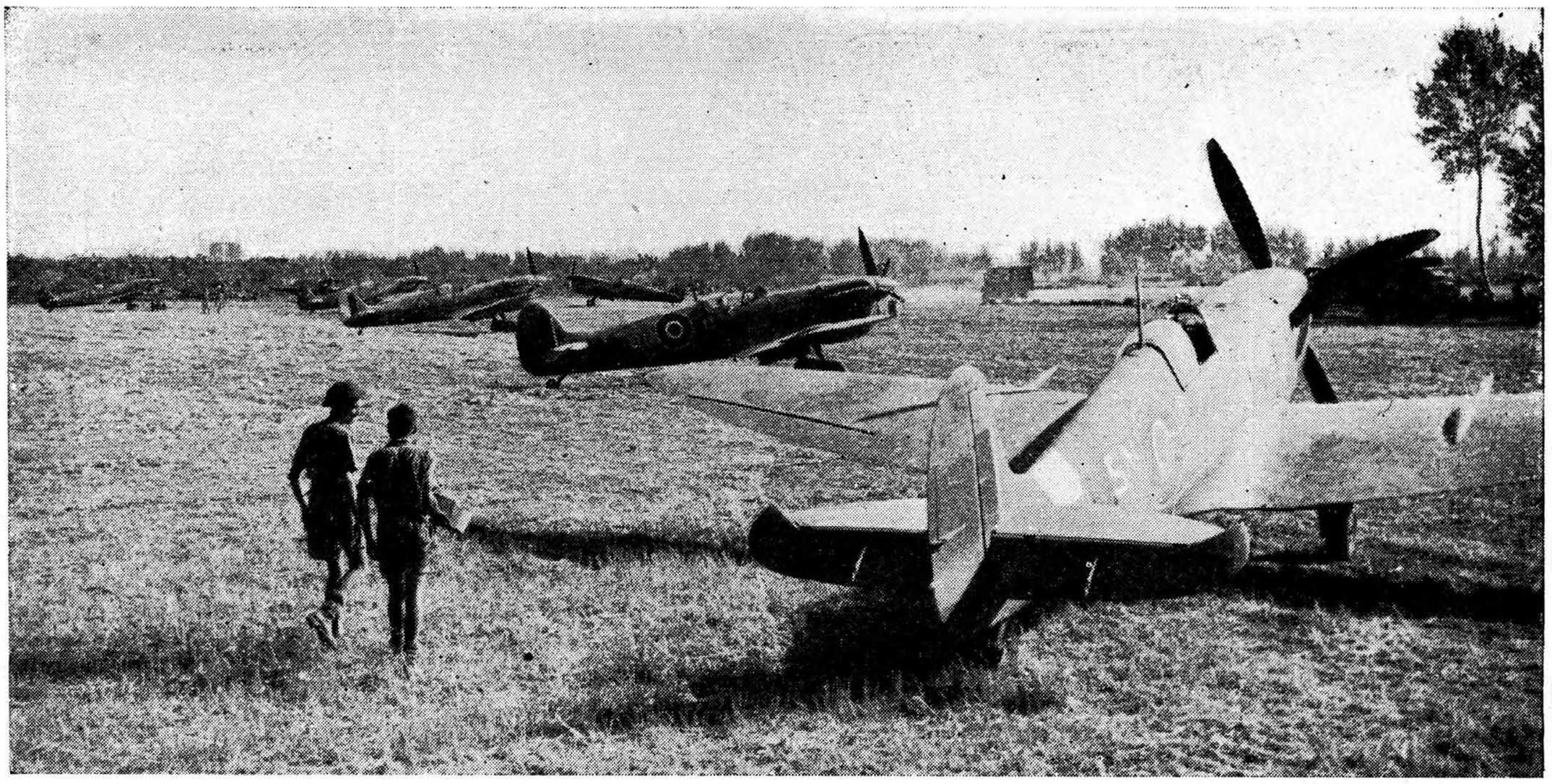
On the other side, those who approve of Mr. Churchill's handling of situations might justly oppose any proposal for a change while he remains the co-ordinator. One possible complication in that form of unification and direction might occur if, as rumour has forecast so often lately, a supreme Commander from the United States were given control of the major operations in Western Europe. Strategy in that event would assuredly be an agreed strategy, but decisions as to the use to be made of the available forces of all arms would no longer be taken by Mr. Churchill, close though his contact would be with the Supreme Commander.

Air Advice and Air Support

An understanding of the functions, purposes and possibilities of Air Power would be essential to its best employment by a Supreme Commander. On a small scale, aided by mutual tolerance and confidence, something like a Combined Staff has been operating the Mediterranean activities during the past year. The result has not been unsatisfactory and there has been a marked profit in some aspects of interaction between the Services. For example, the Fleet Air Arm has given direct help to the land forces, as in the provision of carrier-borne fighter protection over the Salerno beaches; and the R.A.F., particularly through its land-based Beaufighters, has done extremely useful work against enemy shipping.

The essential provision in combined operations is that air advice should be as highly prized as air support. Senior officers, such as might look for appointment as Chief of Combined Staff, may have developed a belated devotion to Air Power without having come to the subject early enough in life to appreciate all the conditions which affect its employment. Those who have grown up with the aeroplane and have devised the means by which it should exert its influence in diverse situations, tend on occasion to suffer from the lack of seniority of their Service and of themselves. That fact is illogical but natural. It has obvious dangers, for nothing runs more risk of disappointment than ill-informed enthusiasm.

Fortunately for the Allied cause, a philosophy of air action has been building itself up during the past four years and expressing itself in preliminary campaigns and

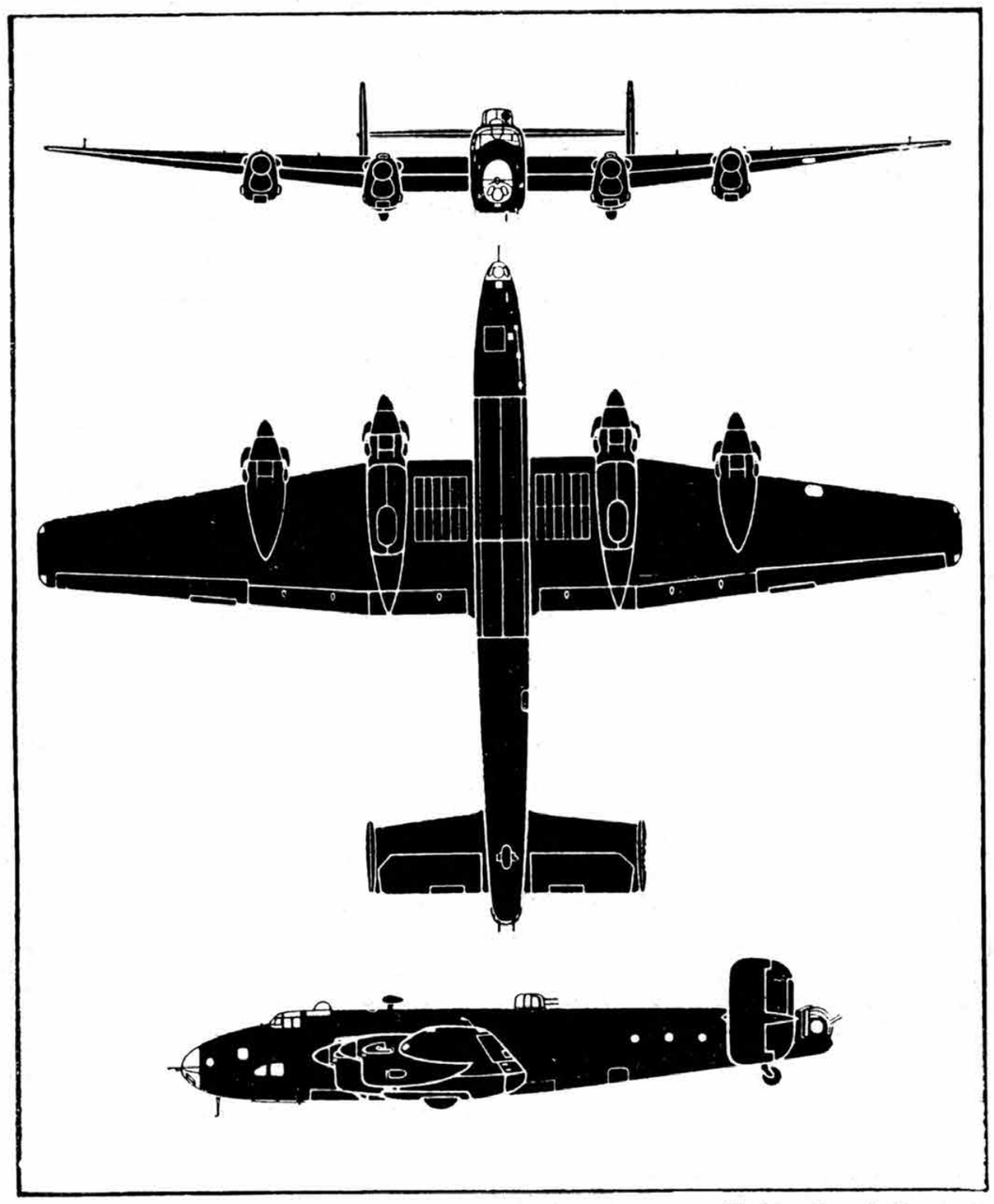


SALERNO SPITFIRES.—This R.A.F. Spitfire squadron was one of the first to go into action in support of the Fifth Army on the Salerno front. The landing ground was still under German shellfire, so these Spitfire IXs and Vbs were parked in a neighbouring orchard.

in the development of aircraft for particular kinds of work. What can and what cannot profitably be done by the air arm is acknowledged broadly in these and in the training given to the Air Forces. A Supreme Commander and a Combined Staff would find their plans already conditioned by these things. The air arm is committed to certain primary duties. It has some obligations which cannot be changed at so late a stage in the War. Such additional duties as a Supreme Commander might have to lay upon it in Western Europe have been foreseen in principle and prepared for.

Subject to good advice on air action, such "closer fusion" of the Service should be an advantage when the main assault on Western Europe is delivered. A gradual change of emphasis in the air attack has marked the whole history of the war in the air during the past four years. Into the main strategic attack have been dovetailed from time to time special efforts to influence the course of the Battle of the Atlantic, to aid the Army in North Africa and Italy, to give assistance to the Russians and to prepare the way for landings in Western Europe. The flexibility of Air Power has been made to serve the changing strategical needs without being subordinated to the interests of either of the other Services.

A combined Staff which aimed at getting out of the combined Services something more than the sum of their individual strengths, would have to accept the Air Force as a Service on precisely the same footing as the other Services. It would have to be ready to regard it as the dominant partner in certain types of operation and it would have to acknowledge the importance of some of the work which, from bases protected by the Army and supplied partly by the Navy, it undertakes alone. If ever the Air Force came to be looked upon as simply an umbrella and a long-range gun, the Combined Staff would have begun to nullify the most powerful arm which modern invention and modern genius in warfare has built up.



["*Aeroplane*" *drawing*

"PLUS CA CHANGE . . . ."—The silhouette drawings of the Handley Page Halifax II, published in our issue of Oct. 1, showed the version in which the inboard motor nacelles had been lengthened to project beyond the trailing edge. That appears not to be the version now generally in service. Above we reproduce the version commonly in use. It embodies the re-designed fins and rudders, but this modification has not been allowed to affect its official description. In this form the bomber is still to be known as the Halifax II Series IA.

The Corollary of Altruism

"FREEDOM OF THE AIR," as advocated by Mr. Roosevelt and (in the President's belief) approved by Mr. Churchill, is now before the World as a proposal which the United States and Great Britain will probably put forward. That marks a long step forward towards a state of affairs in which Air Transport will not be hampered by the need to make bargains for reciprocal rights of operation. If the other Powers, among which Russia looms large, are willing to apply the rules of the freedom of the

sea to air traffic, the rate of route development should be much faster after the War than it could possibly have been in the pre-War restrictive conditions.

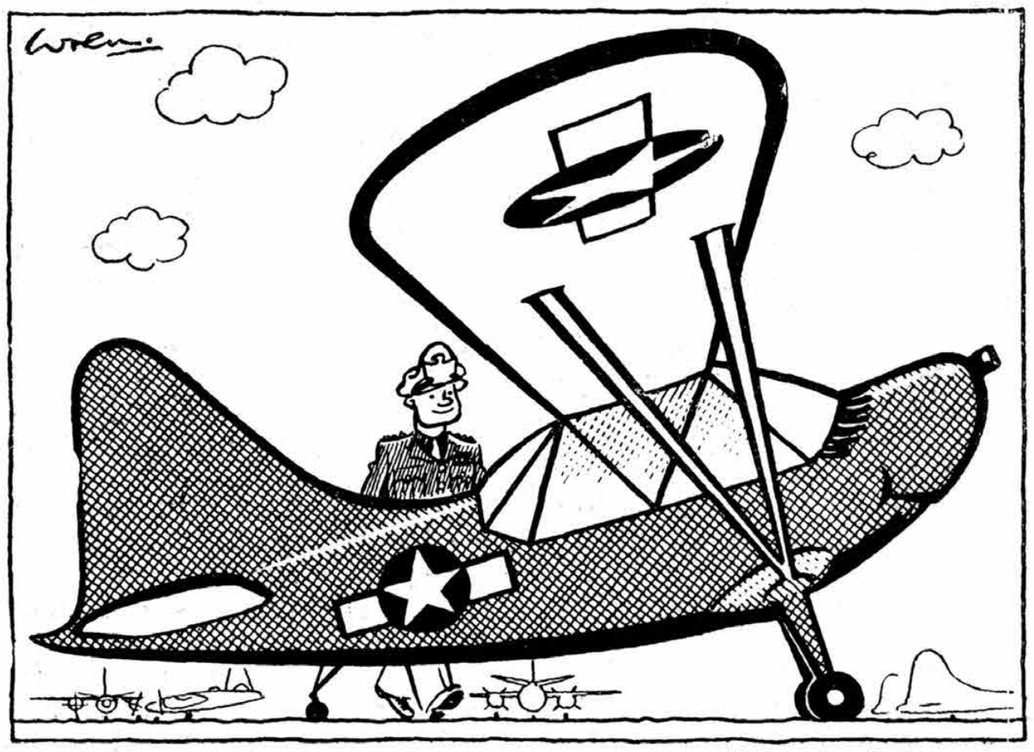
Some may hold that the United States will stand to gain most from this freedom because, after the War, almost alone among the nations, she will have large fleets of transport aircraft and, in fact, will be able to transform forthwith into commercial services certain lines which are now being operated by the Air Transport Commands of her Army and Navy. We would not wish to find a situation in which services within the British Empire had to be operated by American companies through the lack of British aircraft for use by British companies. Nor would we wish to find British companies forced to rely on American aircraft for the maintenance of such services.

These are matters which Parliament has already brought with some insistence to the notice of the Government. They will be pressed upon the Government's attention still more forcibly now that the President has revealed the Prime Minister's sympathy with the ideal of the "freedom of the air." So large a measure of release from the bonds which, in the past, have prevented Air Transport from spreading its wings fully, is not to be opposed for any such negative reason as desiring to prevent the United States from getting a "flying start." This is an occasion for positive reaction. Great Britain accepts a parallel responsibility if she sponsors the plan for the "freedom of the air."

That responsibility is to adopt a policy calculated to ensure a series of British air services worthy of the share which the British Empire has taken in the War and is resolved to take in the shaping of the peace. The Dominions are to meet in London soon to discuss a common policy. Mr. Roosevelt has told them in effect what basic proposal to expect from the Government at Westminster. We trust that they will support it, subject to satisfactory guarantees of encouragement for British enterprise in preparing to make use of the freedom it will get as well as give. Many lesser points of dispute will still remain to be settled. We cannot believe that the Government proposes to adhere to its selection of a single "chosen instrument" and so deny the Nation of the benefits of operational, if not economic, competition. We do hope, nevertheless, that exploitation of air services for large profit will be restricted. Above all, we look for a lively and progressive programme of design and development for the British Aircraft Industry.

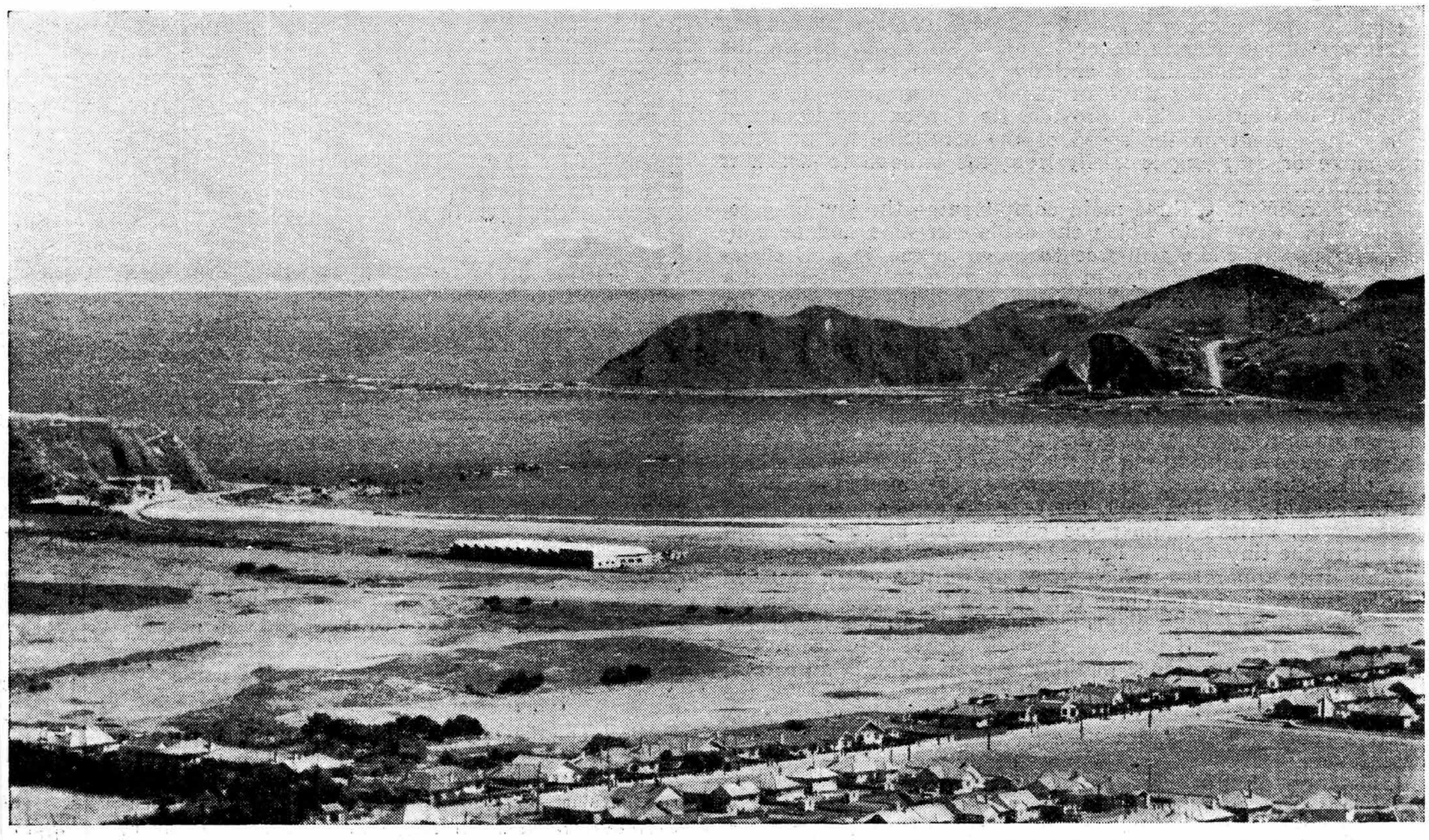
"Freedom of the air" will mean so much for the cause of Air Transport that it ought not to be resisted. But a Government which has the courage to support it cannot hope to evade any of the implications of it in its domestic affairs. The British Empire has the biggest contribution to make to the freedom of the air. Its altruism demands a large practical contribution to balance the scales.

ODDENTIFICATION CXXXI



["Aeroplane" Copyright

Up tilts the nose of this gay little bird.
If her wings wore bright feathers she'd preen them.
They call her the Sentinel—ill-chosen word,
For the troops' gadabout and "addendum."



BEYOND THE BOMBS.—Aircraft of de Havilland design are being built and repaired in the Company's works in New Zealand. This view of the de Havilland factory on the edge of the aerodrome at Rongatai, near Wellington, was taken from the air in days of peace.

W.A.A.F. "Queen Bee"

GROUP OFFICER LADY WELSH, wife of Air Marshal Sir William Welsh, has been appointed Director of the W.A.A.F. and promoted to Air Commandant. She suceeds Air Chief Commandant K. J. Trefusis Forbes, C.B.E., who has been posted for special duties involving a tour overseas and visits to Canada, North Africa and the Middle East. She relinquished the functions of Director of the W.A.A.F on Oct. 4, but remains the senior officer of the Service.

New President of the S.B.A.C.

THE NEW PRESIDENT recently elected by the Society of British Aircraft Constructors is Major H. R. Kilner, M.C., who succeeds Mr. A. F. Sidgreaves, O.B.E., President since November, 1941.

Major Kilner is Director-in-Charge of the Aircraft Section of Vickers-Armstrongs, Ltd. He served in the Army from 1911 to 1930, when he joined the staff of the Company. In 1931 he was appointed General Manager of the Southern group of Vickers factories. He became a director in 1936. In 1940 he transferred to the Aircraft Section, and was made Director-in-Charge in July, 1941. He is also a Director of Cooke, Troughton and Simms, Ltd.

Mr. Sidgreaves will be Deputy President of the Society, and Mr. H. Burroughes, a Director of the Gloster Aircraft Company, has been elected Vice-President.

Heinkel Designations

INCONSTANCY in the designations of German aeroplanes has long been a source of trouble to those whose task is to learn the various versions. The Heinkel 111 has probably been the worst offender. Articles in recent German technical papers have furnished additional information on the designations of this aeroplane.

About 15 versions exist, although in many cases differences are only slight. The standard He 111H and P are developments of the He 111B, E, J and F. The pilot's seat and front gunner's position are no longer separated in the He 111H and P and the other two gun positions have been modified in accordance with tactical and aerodynamic requirements. The index numbers 1 to 6 following the letter indicate types of wireless installation. The He 111H is powered by two Jumo 211 motors as opposed to the Mercedes-Benz DB 601s of the He 111P.

For special operations the He 111H and P can carry a maximum fuel load of 862½ gall. An overload bomb load of 4,400 lb. can be carried. Loaded weight on operational flights is 26,400 lb. Normal take-off run is about 1,200 ft., but this can be reduced with assisted take-off. Maximum speed at sea level is now quoted as 231 m.p.h. and diving speed must not exceed 300 m.p.h.

Paper Petrol Tanks

LONG-RANGE FUEL TANKS constructed from paper, animal glue and gelatine are now being carried by Typhoons and other fighter aeroplanes. The advantages of this type of tank are that there is little loss of valuable material when they are jettisoned and the materials employed produce a satisfactory petrol-proof light structure.

These jettisoned tanks are cigar-shaped and made in three sections, which consist of layers of paper moulded over a cast to the required shape and bonded together with hand-applied animal glue. After drying and sandpapering the three sections are assembled with a gelatine lining which is perfectly petrol-proof. The joints are bounded with wood. The metal support fittings are then attached and the tank is doped and sprayed with silver cellulose paint.

The value of waste paper salvage by the general public is emphasised by this direct application of the scheme to the operations of War.

Protection Against Balloon Cables

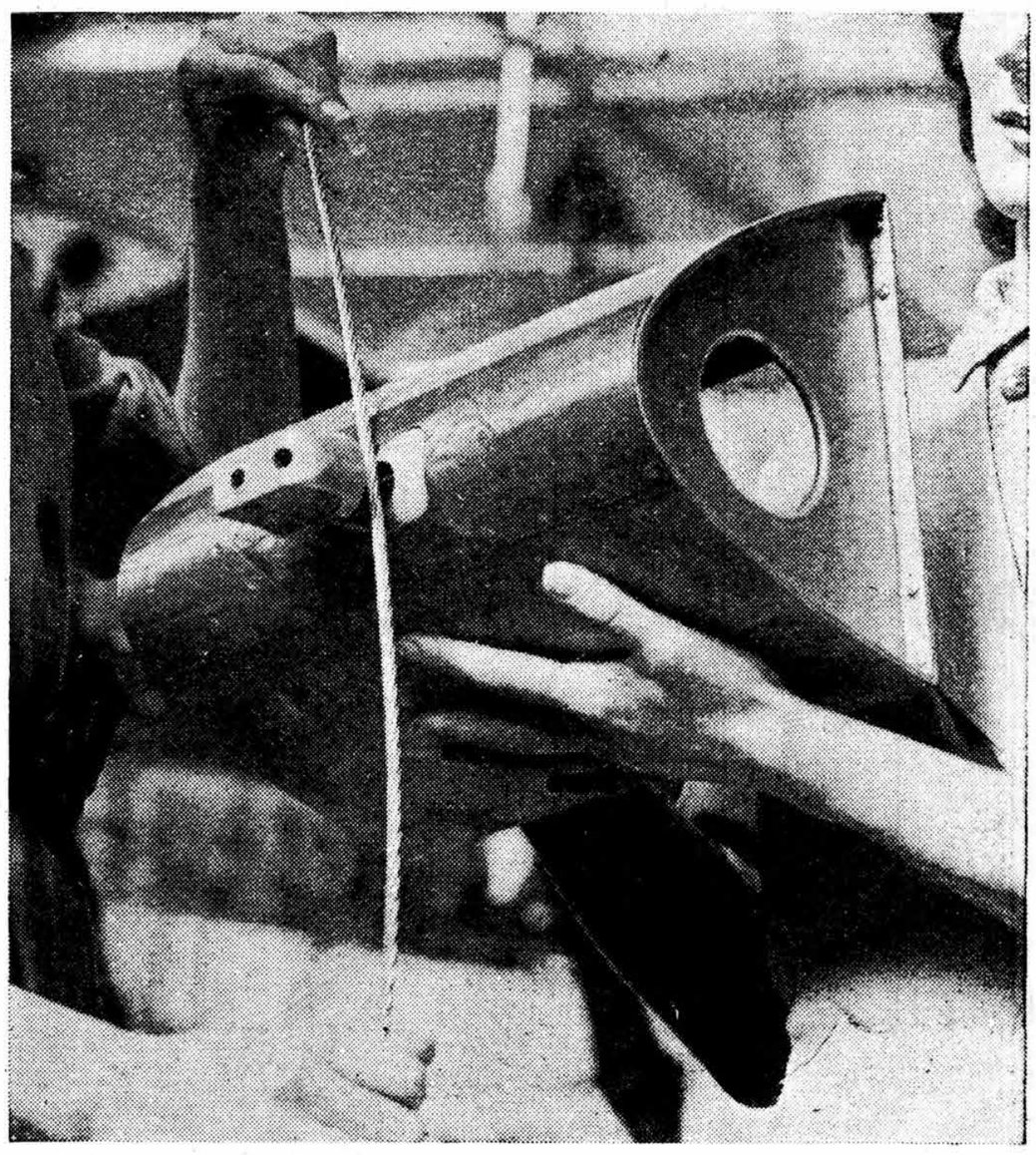
FOR CUTTING CABLES of barrage balloons, British bombers have been fitted for some time with an ingenious device set in the leading edge of the wing which, in fact, was designed and patented by Mr. James Martin, Managing Director of the Martin-Baker Aircraft Co., well before the War. Its principle differs entirely from that tried by the Germans in the early days of the War, and introduces the principle of a cutter which provides its own cutting force and is not dependent on the speed of the aeroplane for breaking the cable or dragging it adrift from the balloon to which it is attached.

The idea employs three main components—the jaw or gate, about ¾ in. wide, into which the cable can slide and be contained laterally while still free to move in the vertical directions; a cutting tool similar in some respects to a chisel; and a little anvil against which the cutter may strike and sever the cable in so doing.

What happens is that when the cable comes into contact with an aeroplane's wing it slides along the leading edge until it arrives at the cutter's jaws. It slips into the gate formed by those jaws and in doing so actuates one or other or both of two small triggers set on either side of the gate. The trigger in turn releases a firing pin at the base of a cartridge in which the chisel-shaped cutter is contained. The explosive charge in the cartridge is thus fired, the chisel is driven forward with great force, strikes against the cable lying in the gate and pins it to the tiny anvil. The cable is severed instantaneously.

This little apparatus, which takes up quite a small space in the leading edge, is sunk into the edge of the wing. The anvil is made of high tensile nickle-chrome steel and the chisel-like cutter has an edge of high-speed steel. Obviously the cutter can only do its work once in the course of a single operation, All that is necessary after the cutter has been fired is for the ground crew to replace the cartridge in the cutter. This is quite a short process and adds little to the labours of aircraft maintenance.

This form of protection for the big aeroplanes has proved of great value and high effectiveness. It serves the double purpose of protecting the bombers against enemy balloon barrages and of securing them against the misfortune of being damaged by British barrage cables if they should get off course in bad weather on their way home from the raid.



CABLE TRAP.—The Martin cable-cutter is here shown as it is fitted in the leading edge of an aeroplane wing. The balloon cable slides into the "gate," moving a trigger as it enters and so firing a cartridge sunk in the base of the cutter. This drives forward a "chisel" which instantaneously cuts the cable against a small anvil set in the upper jaw of the "gate." Sixteen such cutters are fitted at intervals along the leading edge of a big bomber.

["Aeroplane" photograph

STILL TOWING STRONG.—Target towing for air gunners is one of the duties now performed by Westland Lysanders, originally designed for Army co-operation work, but later displaced by the Tomahawk and then by the Mustang in the Royal Air Force. Since 1940, when they were superseded by later types, Lysanders have been employed on a wide variety of jobs.

The Deflation of Göring

REICH MARSHAL GÖRING has suffered another curtailment of his powers by the transfer of aircraft production to Speer's new Ministry for Armament and War Production. This became evident when, a fortnight ago, Speer held a conference of leading aircraft engineers at an aerodrome in the East. Among the speakers were the Chairman of the Central Committees for airframes, motors, and equipment at the Speer Ministry: Frydag, Werner and Heyne, with Willy Messerschmitt, apparently as the representative of the aircraft manufacturers. Field Marshal Milch and several members of the Luftwaffe also attended the meeting and explained the present needs of the fronts to the experts. The fact that Göring, who previously directed such meetings, was not mentioned at all, throws a significant light on his present position.

Flying Kidnappers

THE RECENT decoration of two Luftwaffe officers throws some further light on the tactical execution of the liberation of Mussolini. Contrary to the earlier report, the 18 members of the Security Police did not reach the plateau by parachute, but were transported to the scene of operations in a glider. Its pilot, Lieutenant Elimar Meyer, is a member of a glider unit of the Fliegerkorps XI which is commanded by General der Flieger Kurt Student, who received the Oak Leaves of the Iron Cross for planning what proved to be a successful operation against the gaolers of the deposed Duce.

The Welding of Wrought Aluminium Alloys

ALUMINIUM has been welded successfully for some 40 years, but there are still a great many people in industry who are not familiar with the technique required for fusion welding of aluminum, and even less is known about the welding of the alloys. An interesting booklet on the welding of wrought aluminium alloys by the fusion process has just been produced by the Wrought Light Alloys Development Association.

Special methods are needed in aluminium welding as the characteristics of the metal give rise to certain problems which are not met in the welding of ferrous metals. For example, the temperatures involved are about 800 degrees C. below those encountered in steel welding, and this low melting-point makes the judging of temperatures difficult because there are no visible changes of colour before melting-point. The thermal conductivity is roughly about five times that of steel, and the heat is conducted away from the weld much more rapidly than in steel welding. Hence pre-heating is introduced to secure correct fusion.

Alumina (aluminium oxide) always forms a skin on the surface of aluminium and its alloys, and the melting-point of this deposit is over 2,000 degrees C. Special fluxes consequently have to be used and extra care has to be taken to avoid trapping in the weld any slag which may have been formed by reaction between the oxide and the flux.

Another difficulty is the rapidity of cooling. Unless precautions are taken stresses may be set up in the weld which result in cracking or distortion. Certain alloys, notably of the Duralumin type, are subject to "hot-shortness" at temperatures just below the melting-point, and other shortcomings evident in any heat treatment applied to aluminium alloys include reduction of strength and of resistance to corrosion.

The W.L.A.D.A. Bulletin describes how the characteristics of the metal affect the welding procedure appropriate to each of the fusion processes, and a table is included which summarises the various procedures required for each type of aluminium alloy.

Well illustrated with photographs and diagrams, the booklet contains data on the oxy-acetylene and other oxy-gas methods, details of metallic arc welding, and information on other processes which has not hitherto been published.

Two items of special interest in the booklet are reproductions of radiographs of unsatisfactory welds in aluminium plates, and a description and illustration of "wheeling" the annealed zone of a welded panel to restore strength.

This Bulletin, No. 5 of the W.L.A.D.A., should reach a wide public and is of great value at the moment because of the extensive use of light metals in aircraft construction.

The 213th Week of

THE WAR IN THE AIR

QUENCHING THE MONSTER'S THIRST.—An Avro Lancaster I being refuelled by a petrol bowser while the Rolls-Royce Merlin motors are checked over by the mechanics. Lancasters are being used on all Bomber Command's night attacks on Germany.

EVEN on the Western front the enemy has clearly given up hope of recovering air superiority. In that area he is stronger in fighters than anywhere. Nearly half the front-line strength of the Luftwaffe is assembled in Western Europe, and the bulk of it consists of fighters, including, of course, its faster bombers adapted for fighter work. Nevertheless, the enemy still does his best to avoid combat with Allied fighters.

German fighters in these days are reserved for attacks on the bombers. As an immediate defensive measure, at a time when most of the Allied bomber attacks are delivered beyond the range of the high-performance fighters, this policy may seem at first sight to have something to recommend it. In the long run it may have disastrous effects on the relatively small fighter force of the Luftwaffe, for the policy appears to be becoming a habit. In the attack made by the U.S. Army Eighth Air Force on Emden on Oct. 2 there were escorting Thunderbolts, which the German fighters affected to ignore.

There has never been any wisdom in air warfare in turning the blind eye to danger and pretending that it need not be taken into account. At some stage in the proceedings the German fighters will have to accept combat. Ranges are beginning to shorten in the South. Before long they will become shorter in the West. When invasion is undertaken in the West, the Allied fighter umbrella will have to be challenged unless the Germans hope to rely solely on coast defences and counter-attacks by armoured forces against the landing forces.

The generation of pilots which has come into service since the Battle of Britain has little first-hand experience of the dogfight. Those who shared in the air fighting at Dieppe were heavily handled. Now for much more than a year the German fighter pilots have been restrained from "mixing it." In Sicily and in Italy the same state of affairs has persisted. It is significant of lacking confidence—a lack which in part may arise from inferiority in numbers, but which is also to be partly explained by a lowering in the standard of training in the Luftwaffe.

During the Summer of 1942, when the Germans believed that they could drive home their attack in Russia, they drained all possible sources of Air Power, including the training pools, and threw everything into the scales. They are now paying the price of that rashness. Quality has suffered. At the same time they have attempted to revise the composition of the Luftwaffe, turning bomber units into fighter units. Because of the change in policy from the offensive to the mainly defensive, they have had to nurse many new fighter units by restricting them to attacks on the bombers. If that should continue, such units will have a bad time when they have to engage in real battles.

Tokens of this kind reveal again the unsoundness of the German attitude towards air superiority. They have always expected the bomber to carry the main burden in establishing air supremacy. In the heyday of the Luftwaffe the fighters did duty as escorts to the bombers which raided the air bases in South-East England. They did not set out to do combat with British fighters and to drive them out of the sky. Nowadays the Germans are not seeking air supremacy but protection from bombs, and they are not prepared to attack the true basis of Allied Air Power—the fighters—until they are forced to do so in a situation which cannot be ignored.

Putting off the evil day is, indeed, a national aim in present-day Germany. We have no right to be surprised at the permeation of the Luftwaffe with the same idea, nor on the whole need we complain. So long as the Allied Air Forces hold the initiative and preserve intact their creed of air supremacy, founded on fighter power, they can determine the time, place and methods by which their superiority shall be asserted and bring the enemy to a decisive battle of their choosing.

The First Phase in Italy

THE ALLIED ADVANCE in Italy continued last week, and on Oct. 1 the fall of Naples to the Fifth Army was announced. This represented the climax to the first stage of the Italian campaign. When Allied troops entered the city they received a hysterical welcome from the population.

Besides the damage caused by bombing, German demolitions had left deep scars on the city. The Germans fought a stubborn rearguard action and suffered heavy losses. They scattered mines everywhere as they fell back, sowing them at night when the Italians were indoors and, therefore, unable to show them to our troops as they advanced. (In Sicily the populace saved many lives by showing where mines had been laid.)

The railway junction of Avellino on the right flank of the

Fifth Army was also captured. On the Western flank the Fifth Army occupied Torre Annunziata on the coast North of Castellammare. Inland from the coast the Fifth Army line at the week-end ran eastward through Benevento to link up with the Eighth Army front, which continued to Melfi and North of Foggia to the Adriatic coast of Manfredonea. The Eighth Army was reported to be moving forward rapidly and to be in contact with elements of the enemy's rearguard.

The capture of Foggia with its large main aerodrome and 12 subsidiary landing fields is a valuable asset to our armies, and will doubtless be used shortly to great advantage, especially for fighter bases.

One point of interest is that when Pompeii was entered little damage was found to have been done to the historic relics. Many mines were discovered among the ruins but, fortunately, no casualties occurred among the hundreds of Fifth Army troops that paid hurried visits to the dead city.

Earlier in the week, after consolidating their supply lines, the Fifth Army had captured Calabritto and Cassano, two important villages dominating the network of roads in the mountainous North-Eastern sector of the front.

Meanwhile, on General M. Clark's right flank, the Eighth Army had continued its advance against weak enemy opposition and, after crossing the river Ofanto on Sept. 27, captured Cerignola.

Throughout the week, Allied Air Forces maintained their pressure on the lines of communications in the enemy's rear. They met little opposition from aircraft of the Luftwaffe and, except on two days when flying weather was bad, the bombers and fighter-bombers found good targets on the railways and roads.

One of the first consequences of the Allied advance into Italy was seen in the opening of attacks on Germany from the South. On Oct. 2 heavy bombers from North-West Africa were over Germany for the first time, and also over Austria. Flying Fortresses of the North-West African Air Forces crossed the Alps and flew over the Munich region of Southern Germany. They made a round trip of some 1,800 miles, their longest yet from North African bases. Heavy cloud over the targets prevented observation of results. Some enemy fighters were encountered.

At the same time, U.S.A.A.F. Liberators attacked the Messerschmitt factory at Wiener Neustadt, 25 miles South-West of Vienna. Hits were observed in particular on the airframe assembly shop. The formation consisted of B.24s of the Eighth Army Air Force operating under the direction of the North-West African Air Force, and B.24 units formerly with the Ninth Air Force.

On Sept. 30 further heavy enemy air attacks were made against the island of Cos. One enemy bomber was destroyed. On Oct. 2, reports of an attack on the island by airborne and seaborne enemy troops was reported.

During the night of Sept. 28 aerodromes in Greece and Rhodes were bombed, probably by Wellingtons.

In Corsica, in spite of the systematic and large-scale demolitions by the enemy and notwithstanding concentrated minefields along the North-Eastern coastal strip, a shock battalion, together with patriot troops, steadily pursued the enemy between Alena and Gale. The French Air Force shot down six German aircraft, including four Ju 52 transports, and also attacked an enemy convoy off Bastia.

The patriot forces in Yugoslavia have now apparently gathered sufficient men together to enable them to come out into the open and fight pitched battles with the German invaders. Gen. Mihailovitch's forces were driven out of Fiume after holding the town for a short time. At the week-end the Slav patriots were still fighting outside the town, and other fierce battles were in progress around Split and Suskak on the Dalmatian coast.

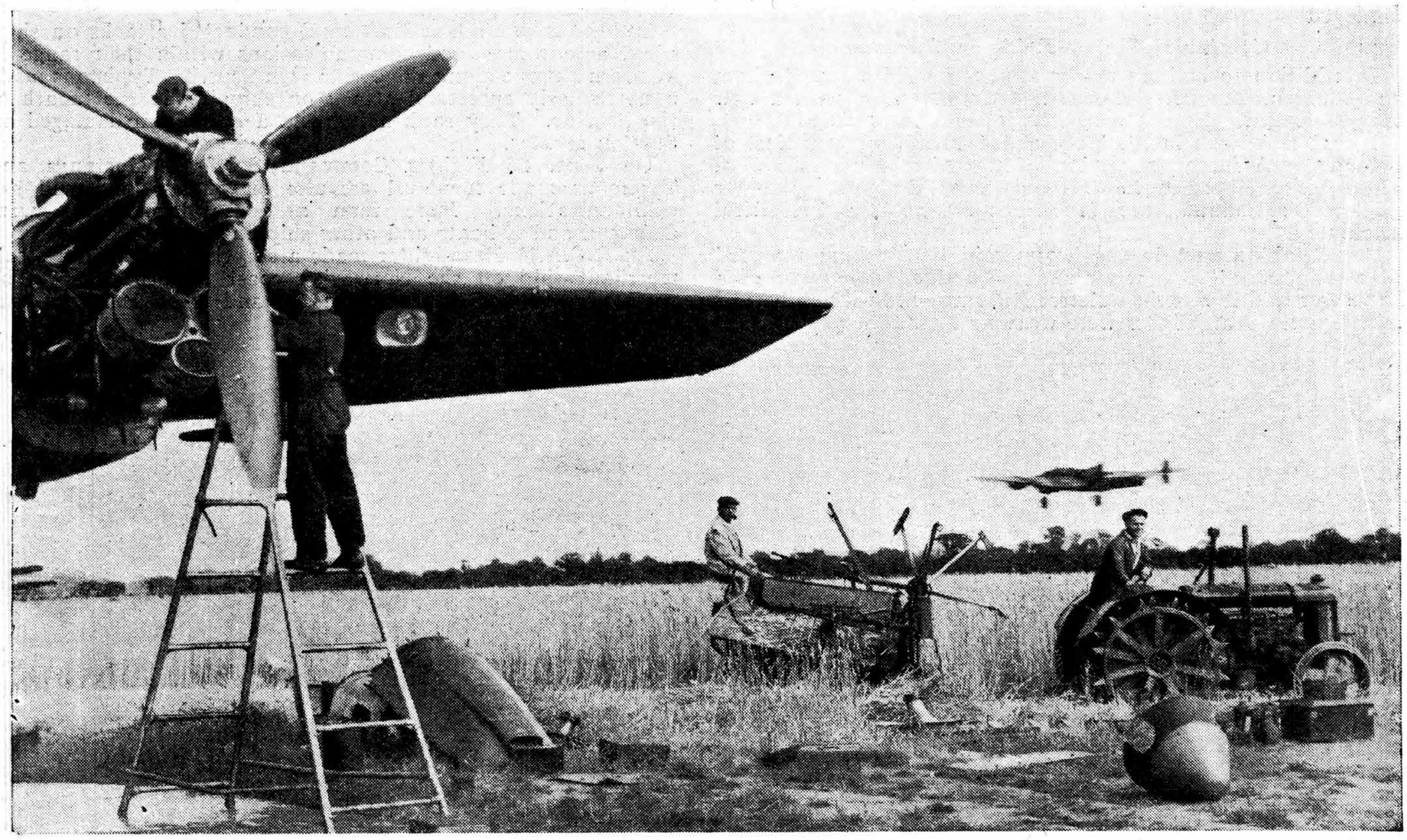
Violent Battles on the Russian Front

The Red Army continued to advance all along the 700-mile front from Vitebsk to the Sea of Azov. Russian forces which crossed the Dnieper at several points earlier in the week were still resisting the fierce German counter-attacks at the week-end. The greatest Russian success during the week was the capture of Kremenchug on Sept. 29, which came as a complete surprise to the enemy. German sources were still sending out descriptions of the strength of the German defences there, even after Marshal Stalin had announced the capture of the town.

Largest and most important of the battles on the Eastern Front was the one raging South of Zaporozhe, where Manstein fought desperately to prevent the Russians from driving forward to the lower reaches of the Dnieper. The attainment of this by the Red Army would seal the fate of the German forces in the Crimea, for their only escape would be by sea—a most difficult operation in face of the Black Sea Fleet and Red Air Force. Farther North the threat to Kiev grew. The Germans were stubbornly fighting to hold the East bank of the river and to keep their strong bridgehead there intact.

Since capturing Smolensk on Sept. 25, the Russians have advanced down the Smolensk-Minsk railway in the direction of Orsha. Many gains were made on this front, including the capture of Gori (45 miles South-West of Orsha), Lyadi (30 miles East of Orsha), Shamovo (50 miles South-East of Orsha), and Nyulino (35 miles South-East of Vitebsk). Several hundred inhabited places were also occupied.

All their advances, and especially those towards the Southern



THE REAPERS.—A strange contrast is afforded by the Halifax II bomber and a reaping machine on the edge of an aerodrome "somewhere in Britain." Mechanics are busy making adjustments to the Merlin XX motor. Halifaxes in their new form are playing a big part in the night raids on Germany.

part of the line, were accompanied by heavy bombing of railways and rail junctions in the rear of the German armies. Most of this work was done by night, undertaken, doubtless, by the four-motor TB-7 bombers of the Red Air Fleet. In this form of activity the Russian tactics are similar to those employed by the Allied Air Forces in Italy. Both Air Forces evidently put great faith in the dislocation of communications in the rear of a retreating enemy.

At the week-end, the Russians increased their pressure in the White Russia area, and at one point were less than 60 miles from the Polish frontier.

In the Kuban the Germans lost their last port, when, on Sept. 27, the Red Army occupied Temryuk, on the South coast of the Sea of Azov. As Russian pressure increased, there were signs that the enemy intended to evacuate his Kuban bridgehead. A German source stated that a naval action had taken place off the Taman Peninsula. The statement claimed that Russian forces attempting to molest a German convoy were repelled.

The Red Air Force has been giving close support to the land forces all along the front. Resistance by the Luftwaffe has been on a small scale, as is shown by the fact that only about 100 enemy aircraft were reported by the Russians to have been shot down during the week.

More Successes in New Guinea

Only 10 days after the initial landing in the area, Allied troops on Oct. 2 captured Finschafen. Earlier in the week Bostons had kept up heavy air attacks on Japanese positions in the Finschafen area. These attacks certainly contributed greatly to the Japanese defeat. Almost daily attacks were also made on Wewak and the surrounding district to neutralise any attempts to give air cover to Finschafen from the more distant bases. On Sept. 29 air crews taking part in a raid on Wewak reported a terrific explosion obscuring the whole peninsula. This was thought to mark the destruction of the main Japanese ammunition dump in the area.

Japanese fighters offered strong resistance to most of the Allied attacks, and many were destroyed. Allied losses were light.

In the Solomons, the American forces on Arundel Island were engaged in mopping up isolated Japanese parties.

Beaufighters and Hurricanes continued their attacks on river and rail traffic in Burma. A Beaufighter attack on oil tanks at Yanatha on Sept. 30 resulted in one large tank being destroyed, two others damaged and three smaller ones left on fire. None of our aircraft was lost during the week's operations.

American bombers based in China made a heavy attack on the port of Haiphong on Oct. 1 Many Mitsubishi S-00 fighters attacked the bombers, but 29 were shot down and many others damaged

Continuing Heavy Raids on Germany

In addition to making heavy attacks on Hanover, Bochum and Munich, Bomber Command last week dealt with a new target—Hagen. Here a concentrated raid took place.

Hagen is a town in the Ruhr about 40 miles North-East of Cologne. A large proportion of the town's population of 150,000 is employed in the steel and electrical plants. Another large factory manufactures batteries for U-boats and electrical machinery.

Crews taking part in the heavy raid on Bochum reported that the "flak" was weak and ineffective. One pilot of a Lancaster said it was the quietest Ruhr attack in which he had taken part. Searchlights were weaving about the sky in hundreds, but there seemed to be little co-ordination of defences. Only eight bombers of the R.A.F. were lost.

GIVING IT THE WORKS.—Workers at a British aircraft factory fitting a 20 mm. British Hispano cannon in the wing of a Spitfire IX. This photograph also shows the split flap clearly.

Unlike the attack on Bochum, the bombing of Hanover was undertaken in the face of heavy opposition by enemy night fighters. Anti-aircraft fire was active only at the beginning of the attack, and either died away under the rapid bombing or was withdrawn to leave the air clear for the fighters. The now familiar flare-dropping tactics were employed by the night fighters during this attack to illuminate our bombers. Pilots' reports indicate that, as the attack was pressed home, a fierce air battle developed and the sky above the city was filled with streams of tracer. In conjunction with this attack, other bombers attacked Brunswick and Emden.

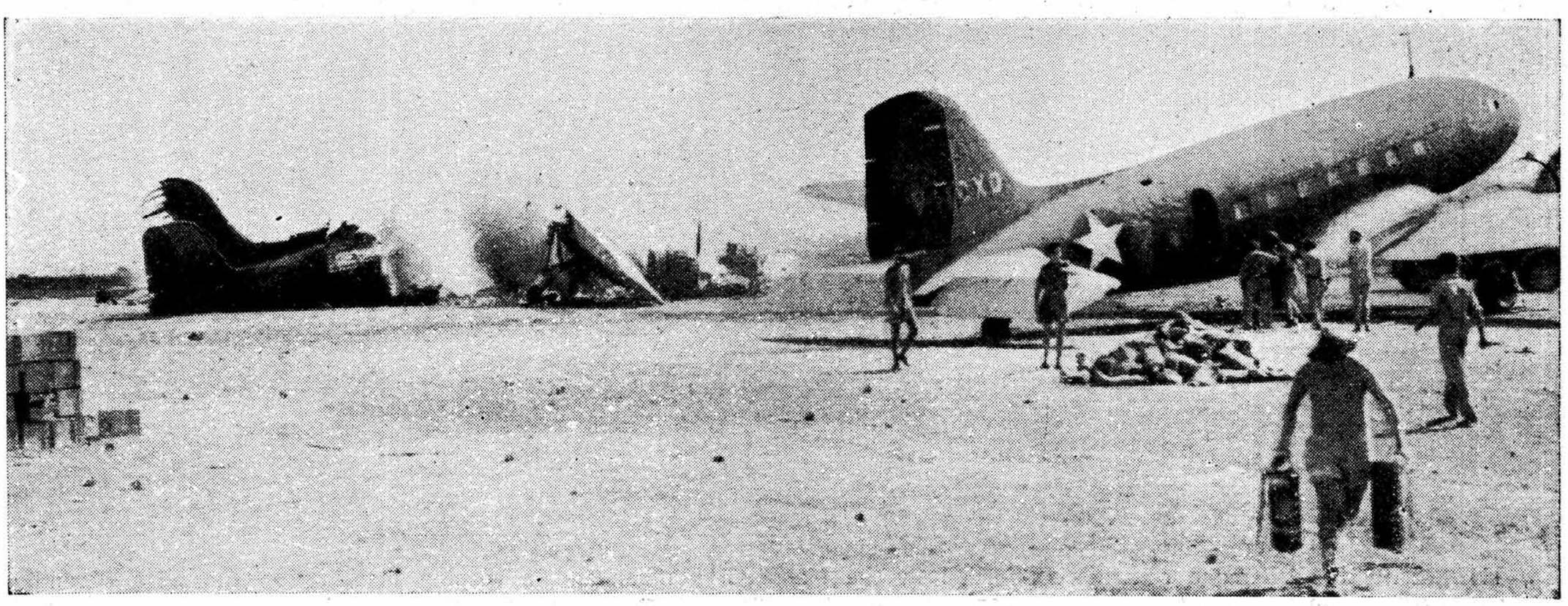
Mosquitoes continued their raids on the Rhineland and Ruhr, and Fighter Command intruders shot down a number of enemy aircraft. Intruders had a particularly successful night on Sept. 27, when seven enemy aircraft were destroyed.

Fortresses and Marauders of the U.S.A.A.F. and R.A.F. Mitchells went on with their attacks on enemy airfields during the week. Fortresses also made a heavy attack on the port and its apparatus at Emden on Sept. 27; others raided targets at Aurich on the same day. In the course of these attacks, many combats took place with enemy fighters which were encountered in large numbers.

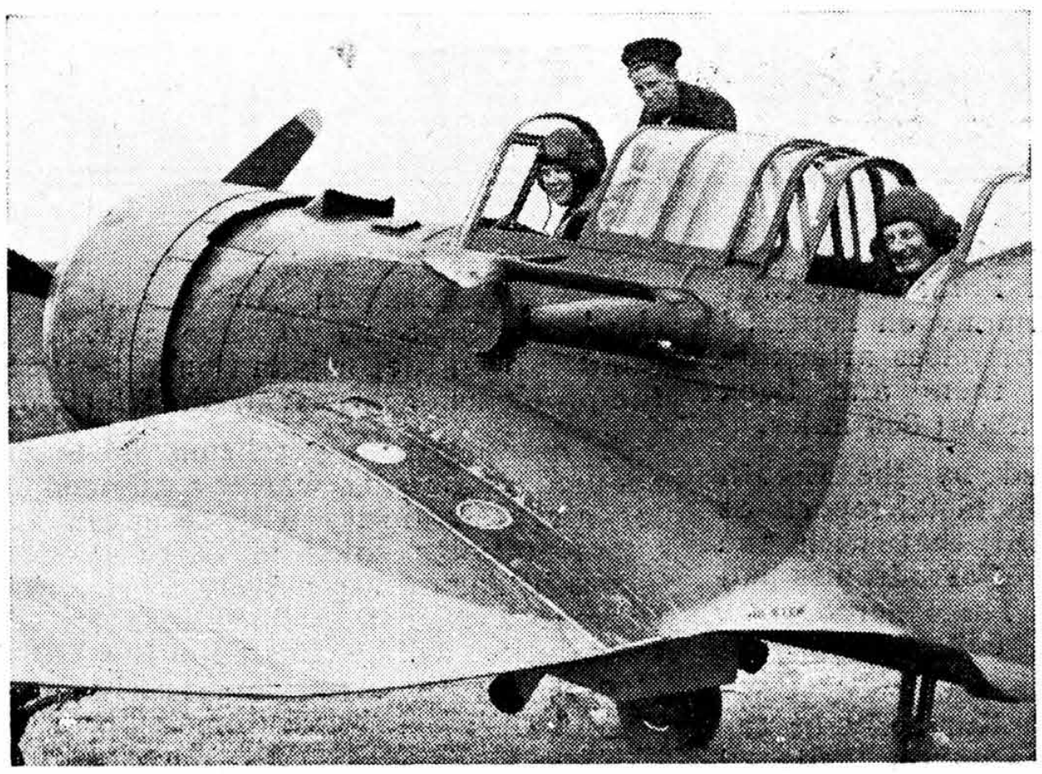
Typhoons of Fighter Command conducted attacks on shipping, aerodromes, and communications within their range in Western Europe along the coasts. On Sept. 27 Typhoons made a particularly successful attack on shipping in the mouth of the Scheldt. They sank a tug and a barge and damaged an 800-ton coaster.

On Sept. 29 Fighter Command Spitfires, Mustangs and Typhoons made low-level assaults on enemy land and sea communications. More than a dozen locomotives were damaged and E-boats and other shipping were attacked.

An R.C.A.F. Beaufighter made a surprise attack on a small merchant ship off the Norwegian coast on Sept. 30. The vessel was riddled with cannon fire and when last seen was burning fiercely.



PACIFIC INCIDENT.—Taken during a raid on Port Moresby, this photograph shows ground crews running to extinguish a fire in a Douglas Dakota, while a Douglas C-54 Skymaster burns unheeded in the background.



["Aeroplane" photograph

THE WILLING HORSE.—A Miles Martinet I target-tower of the Fleet Air Arm is made ready to take off. The windmill is the donkey engine which hauls in the towing cable at the end of the shoot.

Diary of the Week

Offensive Operations of the Fighter, Coastal and Bomber Commands of the Royal Air Force, and of the U.S. Army Eighth Air Force. From September 26 to October 2, 1943

Sunday, September 26

DAY .. Fortresses of the U.S.A.A.F. attacked the Champagne airfield at Rheims. U.S. Thunderbolts and R.A.F., Dominion and Allied Spitfires escorted and covered the bombers. All our aircraft returned. On offensive patrols earlier in the day two R.A.F. fighters were lost.

NIGHT .. Mosquitoes bombed targets in the Rhineland without loss. An enemy bomber was destroyed over France by an R.C.A.F. intruder.

Monday, September 27

DAY .. Strong formations of Fortresses of the U.S.A.A.F. attacked port installations at Emden and targets at Aurich. Thunderbolts of the U.S.A.A.F. escorted the bombers to the target and made diversionary sweeps. The Fortresses were met on their return by R.A.F. Spitfires. Eighteen enemy fighters were destroyed by Fortresses and 22 by Thunderbolts. Marauders of the U.S.A.A.F. attacked airfields at Beauvais-Tille and Conches. R.A.F. Mitchells bombed railway centre at Rouen-Sotteville and Typhoon bombers attacked enemy aerodrome at Abbeville-Drucat. R.A.F., Dominion and Allied Spitfires escorted and covered all these operations. Marauders destroyed four enemy fighters and Spitfires destroyed 14. Seven Fortresses, one Marauder and seven Spitfires lost. Typhoon bombers escorted by Typhoons attacked shipping in the mouth of the Scheldt. Two Typhoons missing. One other fighter missing from patrol.

NIGHT . Main target: Hanover. Brunswick and Emden also bombed. Intruders of Fighter Command destroyed seven enemy aircraft. Thirty-eight bombers and one fighter lost. Slight enemy activity over Eastern England.

Tuesday, September 28

DAY . Mustangs attacked locomotives in Northern France. One Mustang lost.

Wednesday, September 29

DAY .. Fighter Command Spitfires, Mustangs and Typhoons attacked land and sea communications in France and off the coast of Holland. None lost.

NIGHT .. Main target: Bochum. Other targets in the Ruhr also bombed and mines laid in enemy waters. Intruders of Fighter Command destroyed one enemy aeroplane. Eight bombers lost.

Thursday, September 30

DAY .. Typhoons attacked shipping off Dutch coast. None lost.

NIGHT .. Beaufighters attacked a vessel off Norwegian coast. None lost.

Friday, October 1

DAY .. Fighters attacked locomotives in Northern France. None lost.

NIGHT .. Main target: Hagen. Two bombers lost.

Saturday, October 2

DAY .. U.S.A.A.F. Fortresses escorted by Thunderbolts, attacked port installations at Emden. Fortresses destroyed 14 enemy fighters and Thunderbolts destroyed five. Marauders escorted and covered by R.A.F., Dominion and Allied Spitfires, bombed the aerodrome at St. Omer-Lenguenesse, in Northern France. From all operations two Fortresses lost.

NIGHT .. Main target: Munich. Targets in the Ruhr and Rhineland were also attacked and mines were laid in enemy waters. Nine bombers lost.

U.S. EIGHTH ARMY AIR FORCE

In operations during the week Sept. 26-Oct. 2, the U.S. Army Eighth Air Force lost nine heavy bombers and one medium bomber. Total reported losses now stand at 560 heavy bombers, 20 medium bombers, and 44 fighters, and reported successes in air combat at 2,027 enemy fighters shot down.

ADDITIONAL LOSSES: Later reports now show that three additional enemy aircraft were destroyed in the Mediterranean area on Sept. 25. Also, two additional Ju 52s were shot down in this area on Sept. 24.

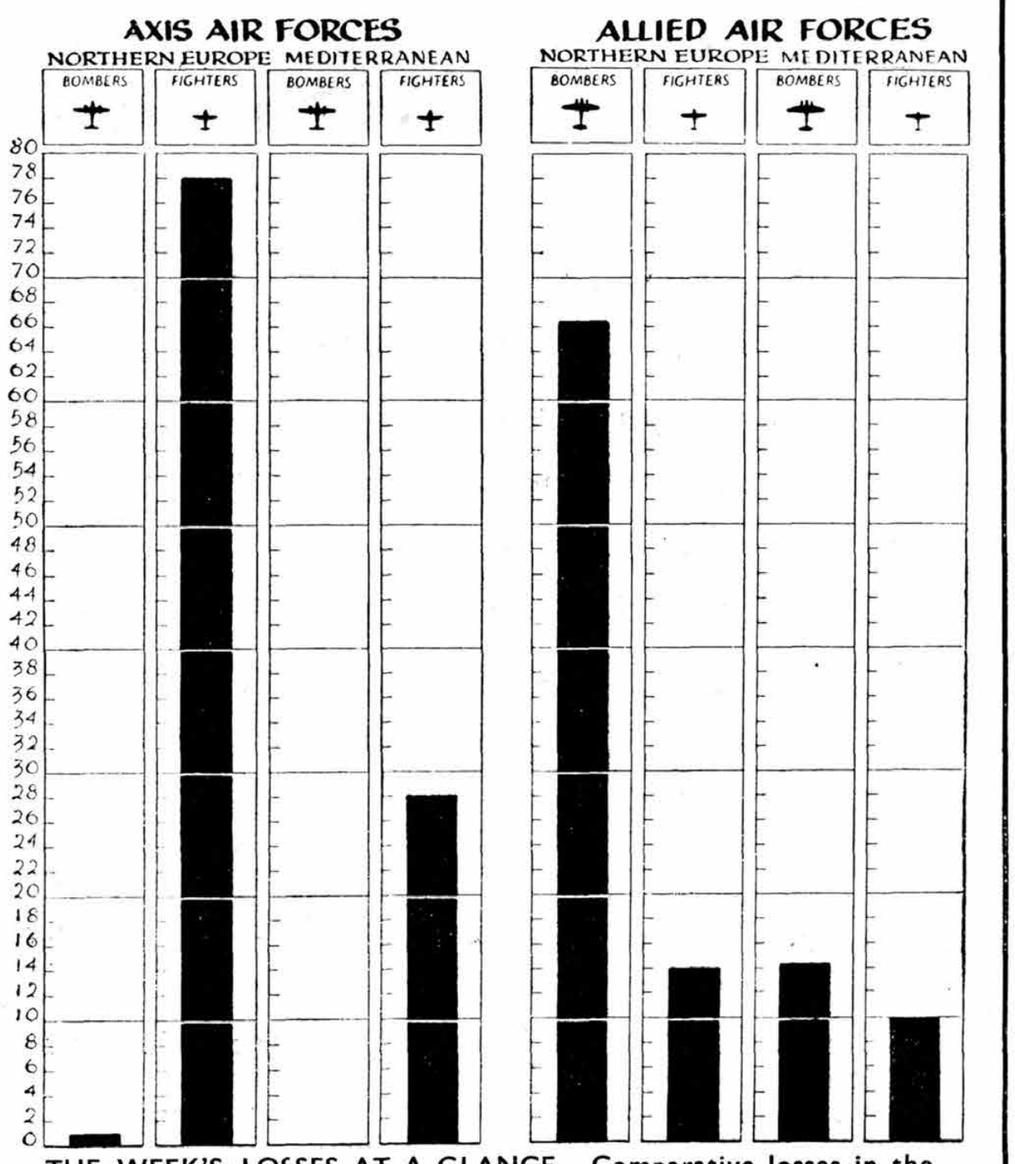
AXIS AND ALLIED LOSSES—SEPT. 26-OCT. 2. 1943

Date	Axis (N. Europe)		Axis (Medit.)		Allied (N. Europe)		Allied (Medit.)	
	Aircraft	Personnel	Aircraft	Personnel	Aircraft	Personnel	Aircraft	Personnel
26- 9-43	1	4	—	—	2	2	—	—
27- 9-43	58	58	3	5	57	352	3	3
28- 9-43	—	—	1	1	1	1	3	3
29- 9-43	1	1	2	8	8	56	1	1
30- 9-43	—	—	—	—	—	—	1	5
1-10-43	—	—	19	19	2	14	14	70
2-10-43	19	19	3	3	11	83	3	3
Totals	79	82	28	36	81	508	25	85

TOTAL LOSSES IN THE AIR WAR* (To dawn, Oct. 3).

	Axis Air Forces	Allied Air Forces
Aircraft destroyed in combat or by A.A. gunfire	17,279	11,734
Personnel	38,336	46,008

* Excluding Russia and the Far East.



THE WEEK'S LOSSES AT A GLANCE.—Comparative losses in the Air War for the week September 26 to October 2, 1943, inclusive. The chart does not include aeroplanes destroyed on the ground or those destroyed in Russia and the Far East. The figures for Northern Europe are: Axis (defence by day) 77 fighters; (defence by night) 1 bomber and 1 fighter. Allied (daylight offensive) 10 bombers and 13 fighters; (night offensive) 57 bombers and 1 fighter. The figures for the Mediterranean theatre are: Axis, 28 fighters; Allied, 15 bombers and 10 fighters. Approximate personnel losses are: Northern Europe: Axis, 82; Allied, 508; Mediterranean theatre: Axis, 36; Allied, 85.

NEWS OF THE WEEK

PRESIDENT ROOSEVELT stated at a Press conference at Washington on Oct. 1 that the problem of post-War aviation had been under discussion for six or eight months. The objectives, he thought, were freedom of the air, which meant freedom to use airports with one limitation. He had discussed this with Mr. Churchill, who, he thought, shared his ideas. They felt that the apparatus of aviation within the borders of any country should be owned and run by that country. As an example of their ideas, he said that a Canadian air line flying to the Bahamas should be permitted to refuel in the U.S.A., but not to pick up passengers, just as should an air line flying from England to Australia.

Where routes could be flown at a profit they should be in the hands of private companies and not the Government, but there might be a few exceptions. The U.S.A. might desire air communication with a particular point for some reasons, and might find that the route could not be profitably operated; in such a case probably a Government or United Nations service would be established.

Air bases abroad were a question of "mutuality," and he was not worried. When the suggestion was made that some senators believed that the U.S.A. ought to have sovereignty over bases which it was building, he asked how Americans would feel about other nations having sovereignty over bases in U.S. territory, and said that he thought the question would "work out all right."

Naples was captured by the Fifth Army on Oct. 1.

Heavy bombers from North-West Africa were over Germany for the first time on Oct. 1 and also over Austria, when Fortress bombers of the U.S.A.A.F. crossed the Alps and flew over Munich and the region of Southern Germany. They made a round trip of some 1,800 miles, the longest to be made yet from North-West African bases. At the same time Liberators of the U.S. Army Eighth Air Force, operating under the direction of the N.W. African Air Force, and B-24s from the U.S. Ninth Air Force attacked factories at Wiener Neustadt.

More than 5,400 tons of bombs were dropped during September by Bomber Command of the U.S. Army Eighth Air Force, an increase of 53 per cent. over the total of bombs dropped by them in August. Fortress and Liberator bombers destroyed 262 enemy aircraft in the air during September for the loss of 85 U.S. bombers, less than 4 per cent. of the number employed. The U.S. bombers were in action on 10 days of the month and attacks were made on 35 targets.

Finschafen was captured by the Australians on Oct. 2 after 11 day's fighting. General MacArthur, commenting on its capture, said that it had eliminated all the defensive value of Japanese-held centres to the North and West as far as Madang. The Allies had thus gained complete control of the Huon gulf.

Ten 4,000 lb. bombs a minute were dropped on Munich by Avro Lancasters of R.A.F. Bomber Command on the night of Oct. 2. The raid lasted 25 mins.

A sea and airborne attack was officially stated from Cairo on Oct. 3 to have been made by the Germans against the Dodecanese island of Cos which was recently captured by the Allies.

Republic P-47 Thunderbolts of the U.S. Army Eighth Air Force made their longest flight into Germany on Sept. 27 when they escorted Fortresses attacking Emden. The flight there and back involved a distance of about 600 miles.

Foggia was captured by the Eighth Army on Sept. 27. Unofficial reports at the same time claimed that with the town the whole group of aerodromes had also been captured. These aerodromes are, roughly, about 500 miles from Munich and Vienna.

Nanumea, the most Northerly of the Ellice Islands, was stated on Sept. 29 to have been occupied by U.S. Marines on Sept. 4. Reports from New York suggest that an aerodrome is to be built at Nanumea, which is 450 miles South-East of the Japanese base at Tarawa, Gilbert Islands.

Three new types of aeroplane were reported by the Japanese news agency on Sept. 29 to be in service at a base in the South Pacific. They were:—The Shoki fighter, the Donryu long-range bomber and the Shitei reconnaissance aeroplane.

The tonnage of bombs dropped in a minute by the R.A.F. in heavy raids on Germany is now three times greater than a year ago. In the 1,000 bomber raid on Cologne on May 30, 1942, bombs fell at the rate of about 17 tons every 60 seconds. The policy of concentration has been so developed that the R.A.F. now drops bombs at the rate of 50 tons a minute.

The British Army, Navy and Air Mission which is to study the problems of the War against Japan will arrive shortly in New Zealand, according to a statement made by Mr. Frazer, New Zealand Prime Minister on Oct. 1. He said that British co-operation with the U.S.A. in operations against Japan was being planned. The Mission had spent some weeks in the U.S.A. and would go on to Australia after visiting New Zealand.

Air Commodore J. C. Findlay has been appointed head of the New Zealand Joint Staff Mission in Washington. He also becomes R.N.Z.A.F. representative with the Combined Chiefs of Staff at Washington. Announcing the appointment, Mr. Jones, N.Z. Defence Minister, said that the air War in the South Pacific was growing in importance and the equipment of the New Zealand forces and bases with U.S. aircraft tended to throw the balance of military negotiations with the U.S.A. on the Air Force. During the past 12 months the R.N.Z.A.F. had become much stronger in the South Pacific. New striking units would be in action soon and more were being prepared. Before long, New Zealand squadrons in action would include bombers, patrol and reconnaissance aircraft, torpedo-bombers, fighters and dive bombers.

Fifty thousand additional members are wanted by the Air Training Corps between now and the end of the year to maintain the strength of the Corps at about 180,000. Hundreds of cadets are leaving the Corps every week now for service in the air crews of the R.A.F. and Fleet Air Arm, or as glider pilots with the Army. About 75 per cent. of the young men passing into R.A.F. air crew receiving centres now are A.T.C. members.

M. Gilbert Perier, Managing Director of Sabena (Belgian Air Lines), was stated on Sept. 29 to have arrived in London from the Belgian Congo to study the problems of post-War Air Transport.

A new recruiting scheme is to be adopted in Canada whereby all men fit for air crew duties will be given the opportunity to enlist in that capacity. Those fit for overseas Army service, but without specialist qualifications for air crew duties, will be enlisted in the Army. Men fit for the Army overseas or possessing air crew qualifications will not be allowed to enlist for Air Force ground duties.

Air Ministry statistics for the month of September give the following facts:—Aircraft of the R.A.F., R.C.A.F., R.A.A.F., R.N.Z.A.F. and Allied squadrons operating from this country with the U.S. Army Eighth Air Force were over Germany and occupied territories on 25 nights and every day. Bomber Command of the R.A.F. dropped about 14,000 tons of bombs, more than two-thirds of the previous month's total. During the amphibious Channel exercise on Sept. 9 more than 2,000 fighter and 1,000 bomber sorties were flown. Ten major attacks were made at night and intruder operations and offensive patrols were made on 21 nights.

R.A.F. medium, light and fighter-bombers operated on 29 days. Aerodromes were attacked on 13 days and 12 nights and more than 130 trains were attacked. Bombing formations were escorted by fighters on 21 occasions and sweeps were made on 17 days.

Attacks on shipping at sea and inland waterways were made on 22 days and nine nights on 200 vessels. Coastal Command operated every day on reconnaissance and anti-submarine patrols; escort duties were flown on 26 days and Fighter Command operated on shipping protection duties on 27 days and one night. Bomber Command did mine-laying on 13 nights.

Enemy aircraft dropped bombs on this country on nine nights and none by day.

In the Mediterranean theatre more than 2,800 sorties were flown by Spitfires, Lightnings and Mustangs during the first four days of the landings on Salerno beaches; more than 1,000 daylight sorties were flown by heavy and medium bombers, and the N.W. African Air Forces dropped more than 15,000 tons of bombs on targets in Italy in September. Offensive operations were flown by the N.W.A.A.F. on 29 days and 27 nights; on 15 days and 20 nights by Middle East Command, and on four nights from Malta.

In India and Burma, offensive operations were flown on every day and on two nights, and supplies were dropped on 28 days. Sorties were made on anti-submarine patrol, reconnaissance or shipping escort duties on every day from West Africa.

In offensive operations over Europe from home bases 173 enemy aircraft were destroyed and 17 over Great Britain, making a total of 190. R.A.F. losses over Europe were 282 aeroplanes. Middle East Command announced losses of 23, against 69 Axis destroyed, and Allied Forces in North Africa losses of 101 against the destruction of 277 enemy aircraft. Four Allied aircraft were lost in India and Burma and one enemy destroyed.

11,000 FEET HIGHER THAN EVEREST

Power maintained at 40,000 feet

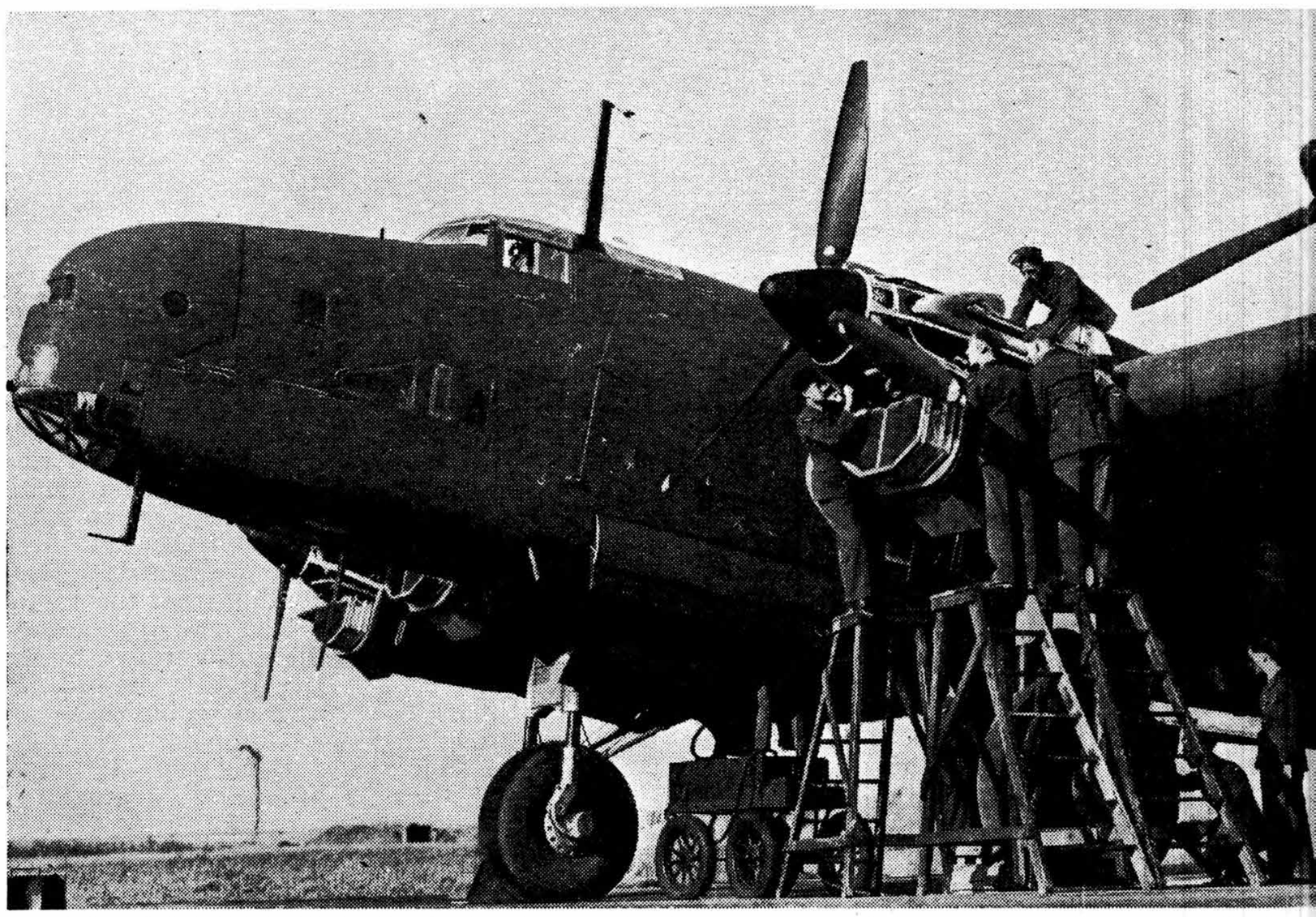
"The new Rolls-Royce Merlin 61 engine is certainly the outstanding achievement in power-plant development which the war has produced. It has a power output at great heights which exceeds that of any other engine. The latest Spitfire and Merlin combination upholds the technical superiority of British Flying aircraft in comparison with anything else in this class flying today."—*Sunday Times*.

ROLLS-ROYCE

AERO ENGINES

FOR SPEED AND RELIABILITY

SERVANTS OF THE HALIFAX



DAILY INSPECTION.—Flight Engineers checking motor and bomb gear adjustments during a course of technical instruction at a manufacturer's school. This picture illustrates the advantage gained by a close association of trainees with Service types about to go into operations.

TECHNICAL TRAINING COMMAND of the Royal Air Force and the British Aircraft Industry have combined forces in the establishment of technical training courses for Service maintenance staffs. The Flight Engineer, who has now replaced the Second Pilot on the "heavyweights," looms large in this scheme of instruction. At the production line he is now given a chance to make the close acquaintance of the particular type of aeroplane in which he will go into action as the pilot's right-hand man. In operations, upon him devolves the responsibility of maintaining watch on the running of the motors and of the general working of all the ancillary services that go to make the modern aeroplane such an intricate and complex piece of mechanism.

On these "post-graduate" courses, which were begun in 1940, he is accompanied by the Electrician and Flight Mechanic. The course under review deals with the Handley Page Halifax heavy bomber in production at a shadow factory. It is concerned with the thorough dissection of the airframe and includes an exhaustive investigation into the correct attention to be given to the motors, an examination of the hydraulic and pneumatic systems, and a close scrutiny of the intricate electrical wiring layouts, as well as other essential services.

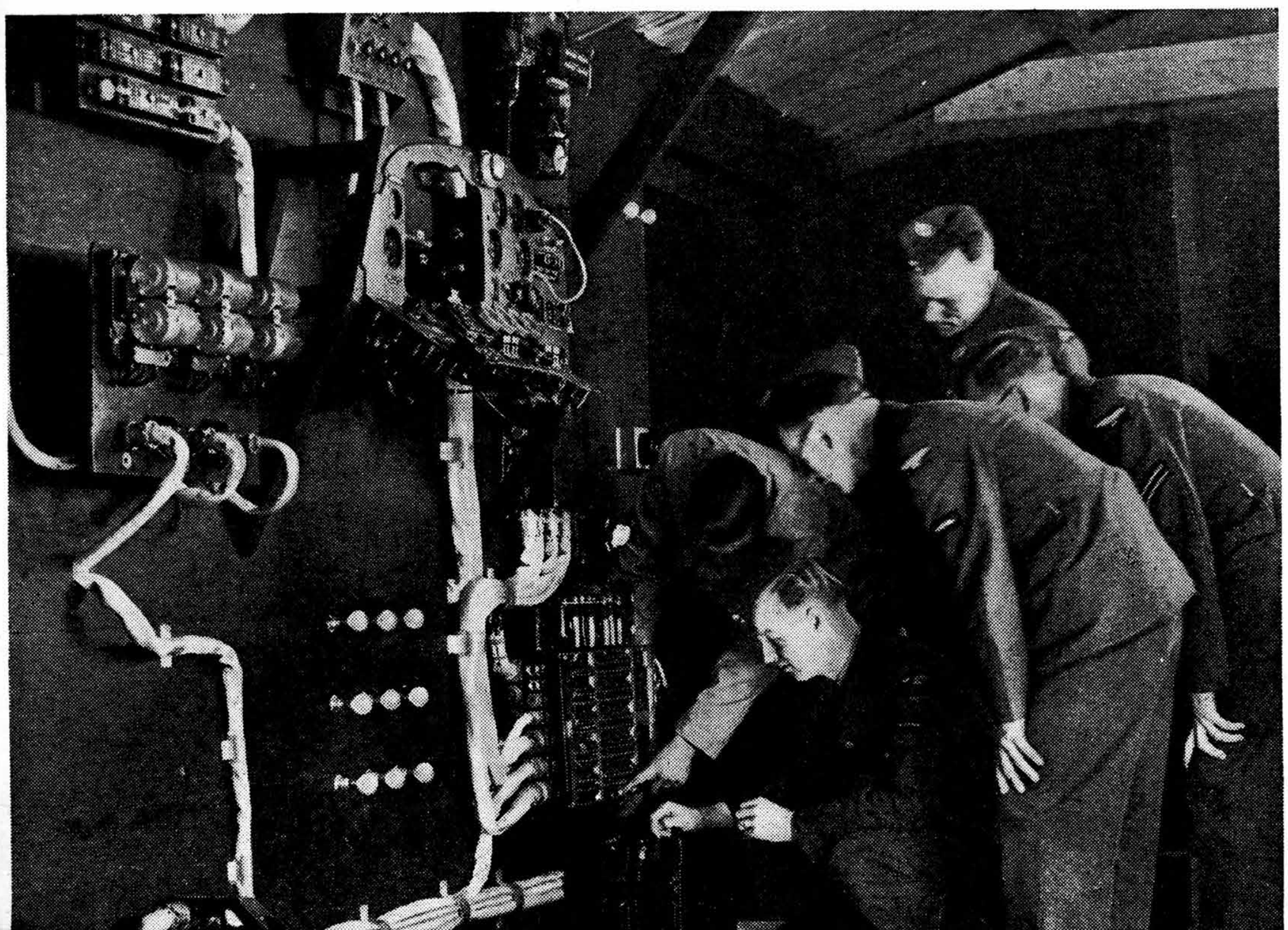
There is a particular and telling reason for the introduction of this additional training, which comes after the R.A.F. tradesmen have qualified for their respective jobs. In a recent address to assembled aircraft manufacturers' representatives, an executive officer of Technical Training Command laid emphasis on the value of these manufacturers' courses in relation to the efficient handling and maintenance of the products of the industry in the field. Such practical training represents a secondary production line. It maintains a high standard of "serviceability" in aircraft which would otherwise be grounded for want of that little extra knowledge on the part of the ground staffs, and of that member of the air crew who is concerned with getting the bomber there and back.

A manufacturer's course, therefore, achieves a saving of time, a vital factor in air warfare. It exposes the special characteristics of any one type of aeroplane to its operators. A link is forged between the producer (the aircraft manufacturer) and the customer (the Services). The Air Officer drew an analogy from the last War when new types of aircraft were put into action without so much as a maintenance or rigging manual to guide the perplexed ground staffs. Ball, McCudden and other notable pilots of the R.A.F., who flew in that war, commented pointedly on some of the technical hold-ups which, at times, handicapped their flying efficiency. Perhaps an outstanding case was the introduction of the Constantinesco gun-synchronising gear when first fitted to tractor fighters. Much trouble was experienced through gun jamming, caused principally by a lack of experience in handling this pioneer type of hydraulic wave transmission.

The particular scheme of training which we were invited to inspect is a model manufacturer's course. To those who are mere onlookers in air warfare it provides comforting reflections. That quiet confidence which bespeaks efficiency marks this school of technical training on Halifax airframes. The N.C.O. instructors, seconded from Bomber and other Commands, the majority of whom have been on "ops," know their subject from experience and also from contact with production, and they put it across clearly and concisely. They do not attempt to conceal the pitfalls of aeroplane service and maintenance.

During a visit to a morning classroom session we watched in the electrical section an able Flight Sergeant demonstrate diagrammatically on his blackboard the operation of the electrical controls of the bomb-dropping mechanism. He was indicating one particular snag in connection with the signal lights. The class, a mixed bag of Electricians I and II, were lapping up the information readily. The next classroom housed Flight Mechanic (A) students who were putting some awkward questions to their instructor on various Halifax mechanisms. Ready replies and explanations indicated that the instructor was not quoting from a text book of standard answers, but from practical experience.

After listening for some time to a debate on hydraulics in another room we passed on to the show piece of the school, which has justifiably acquired its own nickname—the "Museum." This is a large hut constructed by the instructors and students themselves from two Brewster Bermuda packing cases. Its equipment, which was also erected by the members of the school staff in their spare time, nakedly exposes on the walls "mock-up" layouts of the auxiliary mechanisms of the Halifax. The Messier-Lockheed hydraulic system is set out side by side with the Dowty system. Both systems are in use



CONNECTIONS AND CONDUITS.—Here the instructor on Halifax electrical layout at a manufacturer's school, is seen showing pupils the finer points of the main junction box. The electrical panel is seen above and the opal bulbs to the left of the junction box indicate the dropping of bombs. An interesting feature of this picture is that the multi-coloured wiring is now superseded by a flexible conduit. The intricate wiring now adopted on the later types of Service aircraft puts the older method of identifying the different circuits out of date

News from Germany

DURING the past fortnight, practically all German and neutral reports of the activities of the Luftwaffe in the "North Cape-Kiev-Salerno-Brest quadrangle" gave new evidence of the shortage of men and material from which the Luftwaffe is suffering. German Air Force reporters on the shores of the Arctic Sea, at the Dnieper bend, in Southern Italy, and on the Channel front had one common subject—the adverse conditions in which Luftwaffe squadrons have to conduct their defensive battles.

In the neighbourhood of the Arctic Sea, Me 109 and Me 110 pilots had hardly a chance to rest between sorties because of the continuous attacks of the Soviet Air Force. Their comrades over the Dnieper bend had an equally hectic time. The Red Air Fleet, which Berlin claimed to have annihilated several times during the past two years, showed no sign of shortage of men and aircraft.

Luftwaffe reporters on the Eastern front seem to have been instructed to give some explanation of this amazing fact to their readers. Thus, from different parts of the front, reports were sent home, declaring that Russian airmen only attack if they are numerically superior, and that their low fighting spirit is stimulated by heaping upon them decorations and money awards. Similar arguments were used by German war reporters in the beginning of September, 1940, when the Luftwaffe had practically lost the Battle of Britain.

From Italy, the Luftwaffe's "ace" correspondent, Fritz Dettmann, reported that Marshal Kesselring's experienced airmen were overworked as the young pilots had no time to accustom themselves to the conditions of this sector, which, being interpreted in the light of former explanations, means that they had not enough operational experience. Another report, which came through Sweden, dealt with Crete. According to it, German public opinion is being prepared for an evacuation of the island.

Military circles in Berlin stated that Crete is no longer a vital basis for air operations against Allied convoys off the North African Coast as each sortie involves a round trip of over 400 miles. Two years ago German newspapers were loud in their insistence on the menace of the Luftwaffe to Allied shipping in the Eastern Mediterranean. They published maps at that time to prove that between Crete and Alexandria no British vessel was safe from German bombers.

If a reason has to be found for the evacuation of the island it will be that the Luftwaffe cannot spare sufficiently strong forces for the defence of Crete. It has now a mere 200 aeroplanes for operations in the Balkans and the Eastern Mediterranean, and the Luftwaffe is in much the same relation to the defence of Crete as was the R.A.F. in 1941.

A Swiss report from Northern Italy indicates that Marshal Rommel's forces are unlikely to accept a decisive battle in the Po Valley as no fortifications have been constructed along the Northern bank of the river. On the other hand the aerodromes are being improved and extended. This supports previous reports which suggest that Rommel's Army is intended only to cover the retreat of Kesselring's forces across the plain to the mountains, and that the Luftwaffe will be relied upon to hamper the advance of the Allies as long as possible.

Shortly before the invasion of Italy, the Luftwaffe had completed the re-grouping of its squadrons. North-Western Europe and Germany down to the line of the River Main, as the principal theatre of air operations, had received by far the greatest force of fighters and "destroyers." The successful landing at Salerno and the occupation of the Foggia aerodromes are forcing the enemy to adapt his air defence plans to this potential menace from the South. He may be expected to try to give protection to the newly endangered districts: (1) by a new regrouping of his home defence; (2) by a greater elasticity of defence based on high mobility of the units; and (3) by better equipment for his squadrons and ground defence units.

The danger of simultaneous attacks from North and South will demand a complete re-grouping of the home defence which hitherto has had to deal only with attacks from the one direction. Already, for the defence of Italy, air units have had to be taken away from the Eastern front. Any further transfers from the East to other theatres may cause a complete breakdown of the thin air umbrella over the Russian front. Thus reinforcements for the defence of the Reich will only be forthcoming from the operational training units.

The new situation therefore demands either a further shortening of the fronts, by withdrawal from Crete and other islands in the Ægean, or spreading the available home-defence units over a greatly increased area. Both measures have tactical disadvantages.

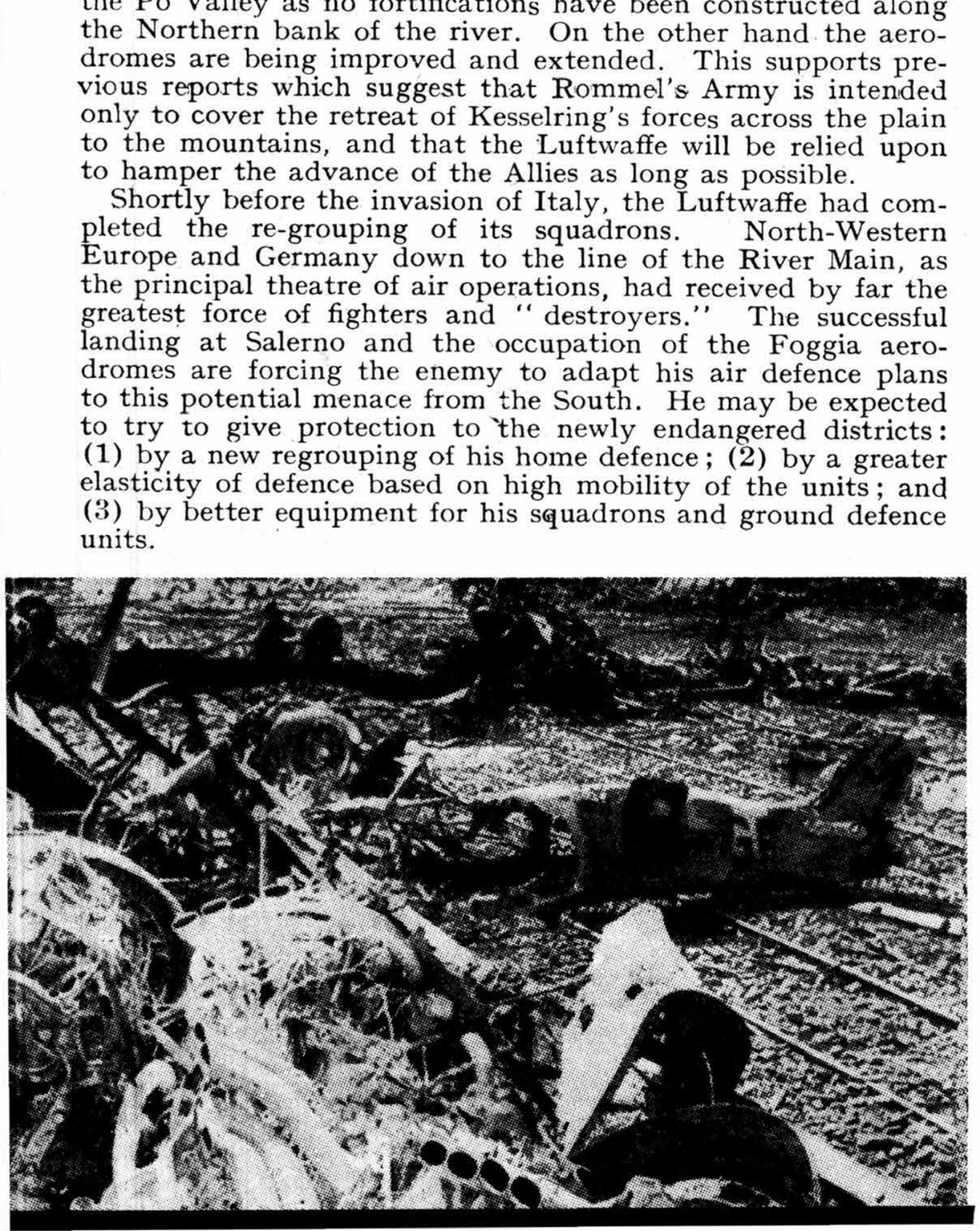
Deficiency in numbers the Luftwaffe is trying to offset by a greater elasticity in the tactical employment of its forces, based on an improved mobility of the individual unit. Luftwaffe squadrons have operated frequently from two aerodromes simultaneously (for instance during the Battle of Britain) or were often transferred from one sector of a front to another (as was the Richthofen Fliegerkorps during the first year of the Russian campaign), but they will be moved in future from one front to another, over distances of up to 1,000 miles.

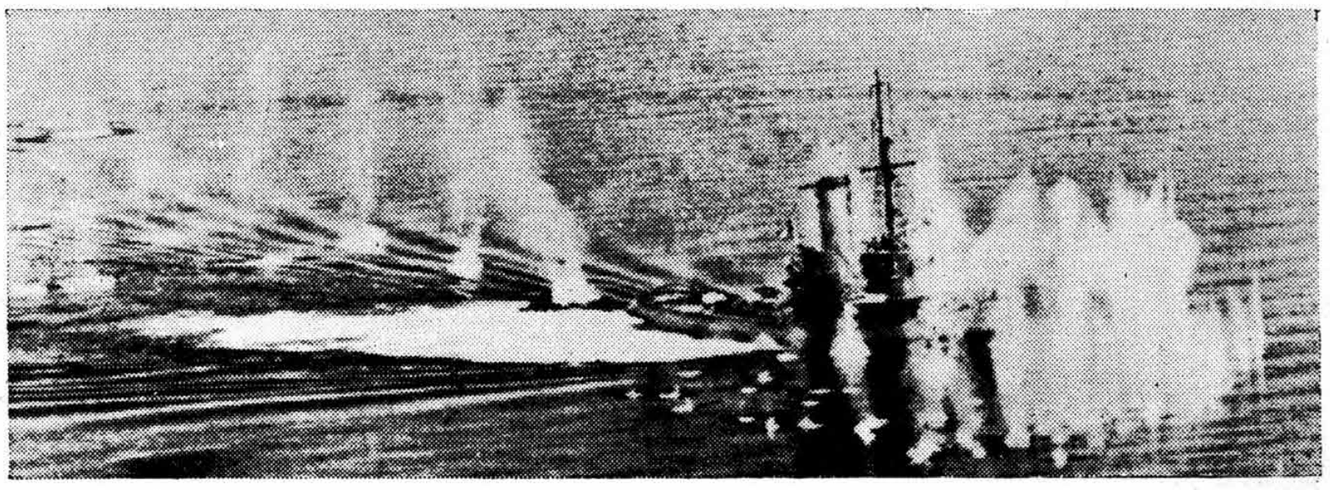
Three years ago, the Luftwaffe was in a fortunate position as it had sufficient surplus ground crews to maintain an individual squadron operating from two widely separated bases. To-day this is no longer possible as many skilled mechanics and fitters were sent to the Luftwaffe-Field Divisions. Thus, if squadrons must be transferred to another theatre of war, the ground crews have to be transferred as well within the shortest possible time. Glider transport will, therefore, become more common in the Luftwaffe than hitherto, the available multi-motor transport aeroplanes being earmarked for the front. Whether improved mobility of individual squadrons will make good the numerical inferiority is doubtful, particularly as the Allied Air Forces have the initiative and can choose time and target of future operations.

There is some possibility that the Luftwaffe may improve the equipment of its flying and ground defence. A similar method can be observed among the ground troops. By introducing new weapons, such as the six-barrelled rocket-gun or the new machine-gun, the fire-power of the individual infantry unit has been much improved. A similar development can be expected in the Luftwaffe.

Most of the references by the German Press and radio to new "secret weapons" are probably part of the propaganda programme, but there can be no doubt that German engineers are busy preparing improved types of aircraft and equipment of all kinds in the hope of preventing Allied airmen from bombing Germany into submission. Unless a new weapon can be introduced into service in such quantities that the enemy's resistance can be broken in a short time, it can only win a battle or two, but never a whole war. And that is as much a matter of production as of development.

The Germans did not observe this principle in the last war when they introduced a new weapon, gas. They may endeavour to-day to avoid a repetition of this mistake, and every blow against Germany's productive capacity represents a handicap on her employment of whatever improved weapons she may have decided to try.





GRECIAN FOUNTAIN.—(Above) Beaufighters of the Middle East Command are regularly marauding over the Mediterranean. A tug leaving the harbour of Preveza, Greece, receives treatment from the four cannon and six machine-guns of a patrolling Beaufighter.

UNDELIVERED REPLACEMENTS.—(Left) This photograph of a marshalling yard near Crotone in Italy bears solemn witness to the accuracy of Allied bomb-aimers. The wreckage indicates that Messerschmitt Me 109 fighters and B.M.W. 801 radial motors were the contents of the trucks.

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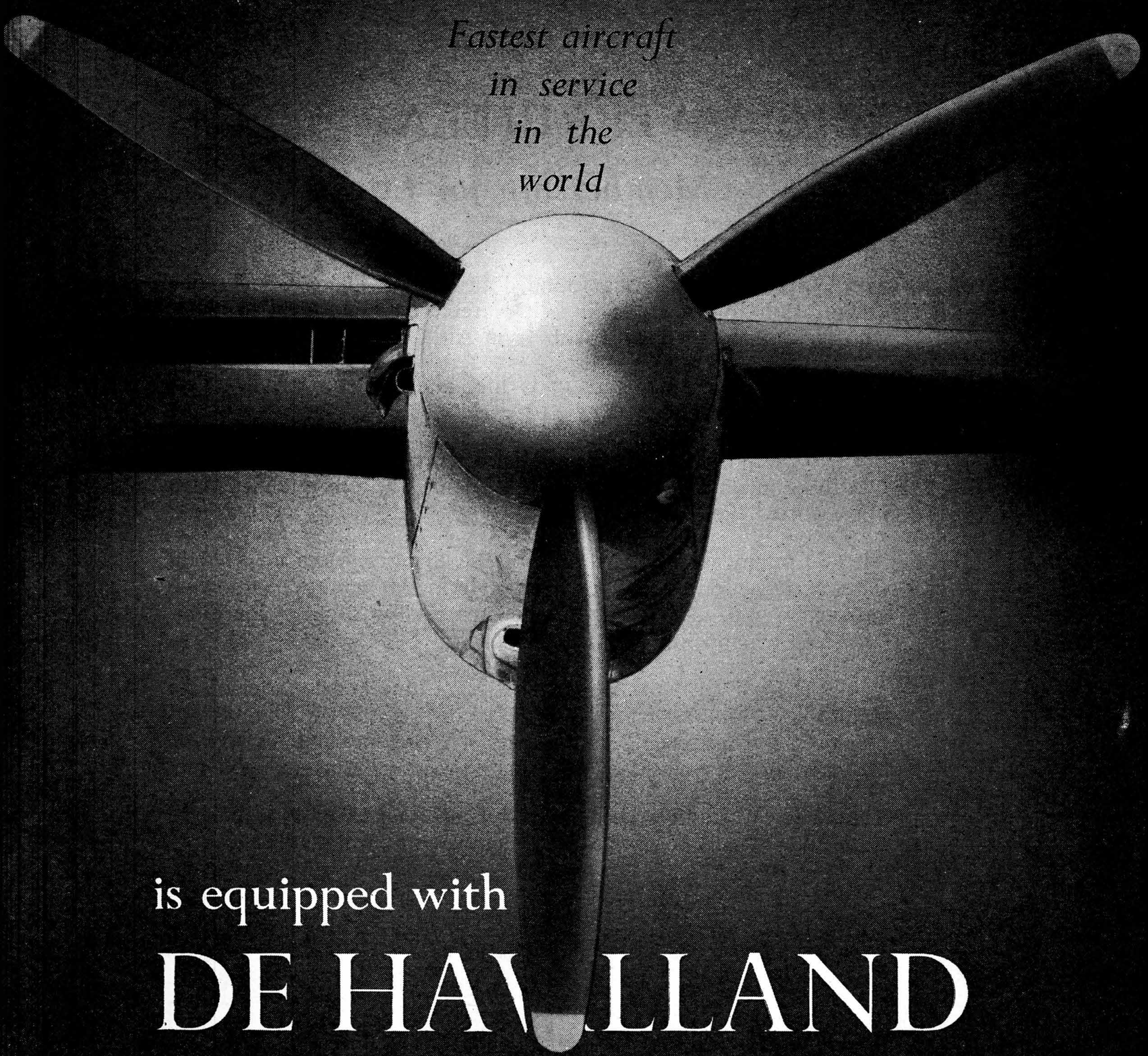

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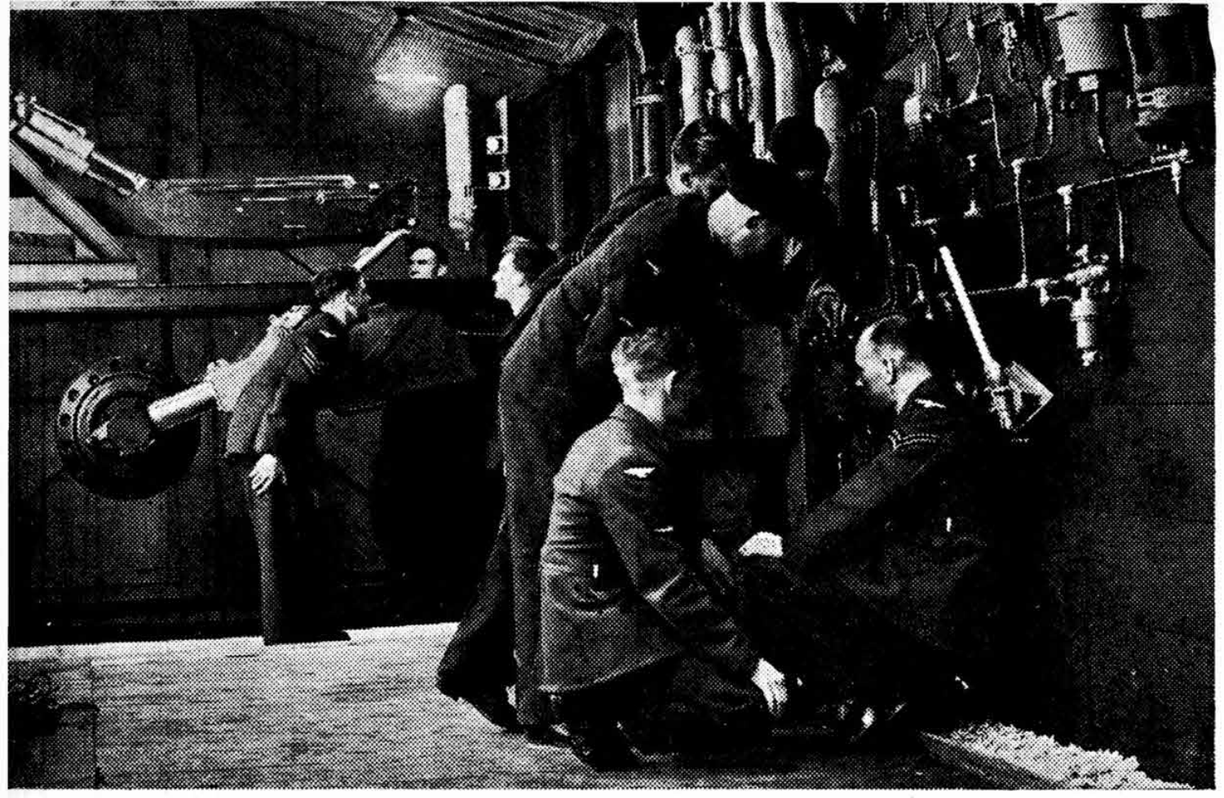


UNDERSTANDING THE UNDERCARRIAGE.—A conference of pupils at a manufacturer's school on the Halifax is shown debating a technical point in relation to the selector valve on the Messier-Lockheed hydraulic system. Other trainees are seen examining the Messier-Lockheed undercarriage in the half-way position.

on various marks of the Halifax. There is also an interesting exposition of the Bloc-Tube controls.

Other set-ups contemplated will eventually include the pneumatic systems, cabin heating and dinghy installations, automatic control, vacuum service, fire extinguishers, and the latest "mods." as they go through the adjacent factory. Perhaps the most striking exhibit of all in this remarkable show is the electrical panel and wiring. Such detail has been incorporated in this electrical working model that even the sequence of bomb-dropping is indicated by small opal bulbs which light up to represent "bombs gone," singly, in salvos or in broadsides. An oxygen apparatus is laid out in working order, and the flare chutes are shown in readiness for operation.

Power for Demonstration

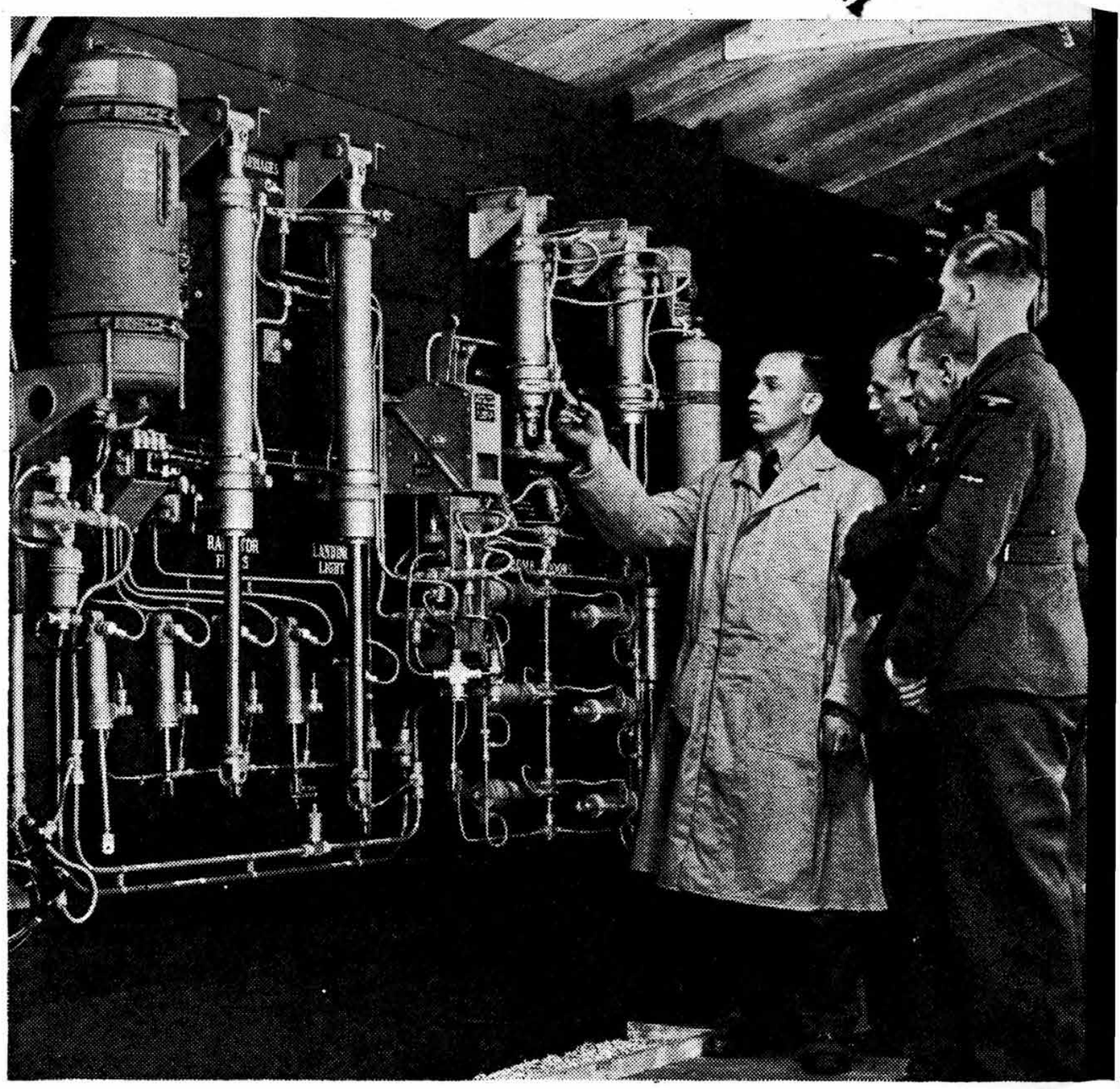
Much of the credit for constructing this mock-up room should be given to the Chief Instructor, a commissioned Flight Engineer of much operational and aeronautical experience. He showed us with some pride the heart of the "Museum," a 10 h.p. electric motor driving a Bristol gearbox on which were fitted three Lockheed Mark VI pumps, two for the Dowty and one for the Messier-Lockheed hydraulic systems; a 24-volt 1,500-watt generator for the electrical panel, and one Heywood compressor, which at the moment provides air for the pneumatic brake system on the Messier undercarriage. This Messier-Lockheed undercarriage is rigged up complete at the end of the hut. Much thought and ingenuity had gone into the erection of the steel girder framework upon which the undercarriage was mounted.

The sequence of instruction given to Flight engineers is first the fuel system, then the lubricant system. Training next passes to an exposition of Dowty hydraulics, and the electrical layout of the Halifax, including an explanation of the main circuits and electrical faults and remedies. Instruction on the oxygen system includes advice as to action to be taken when supply of oxygen dries up through enemy action or other causes. Advice on the working of Bloc-Tube controls includes the issuing of a stencilled sheet showing possible faults and methods of rectifying the damage. The rest of the auxiliary services are then dealt with and the course is wound up with revision and a written examination.

Instruction given to Flight Mechanics and Fitters diverges somewhat from that given for the Flight Engineer. Practical work is given greater emphasis and here the mock-ups in the "Museum" are of great value. The electrician also requires a special training, both in theory and practice. A thorough understanding of the Breeze wiring system is essential to this tradesman and when he has acquired this he passes to instruction in layouts, wiring, junction boxes, power supplies, parallel connections, regulators, cut-outs and warning lights. Special lectures are given in the electrical section on voltage, regulator panel wiring, generator circuits, gun turrets and bomb-gear wiring and the setting of regulators.

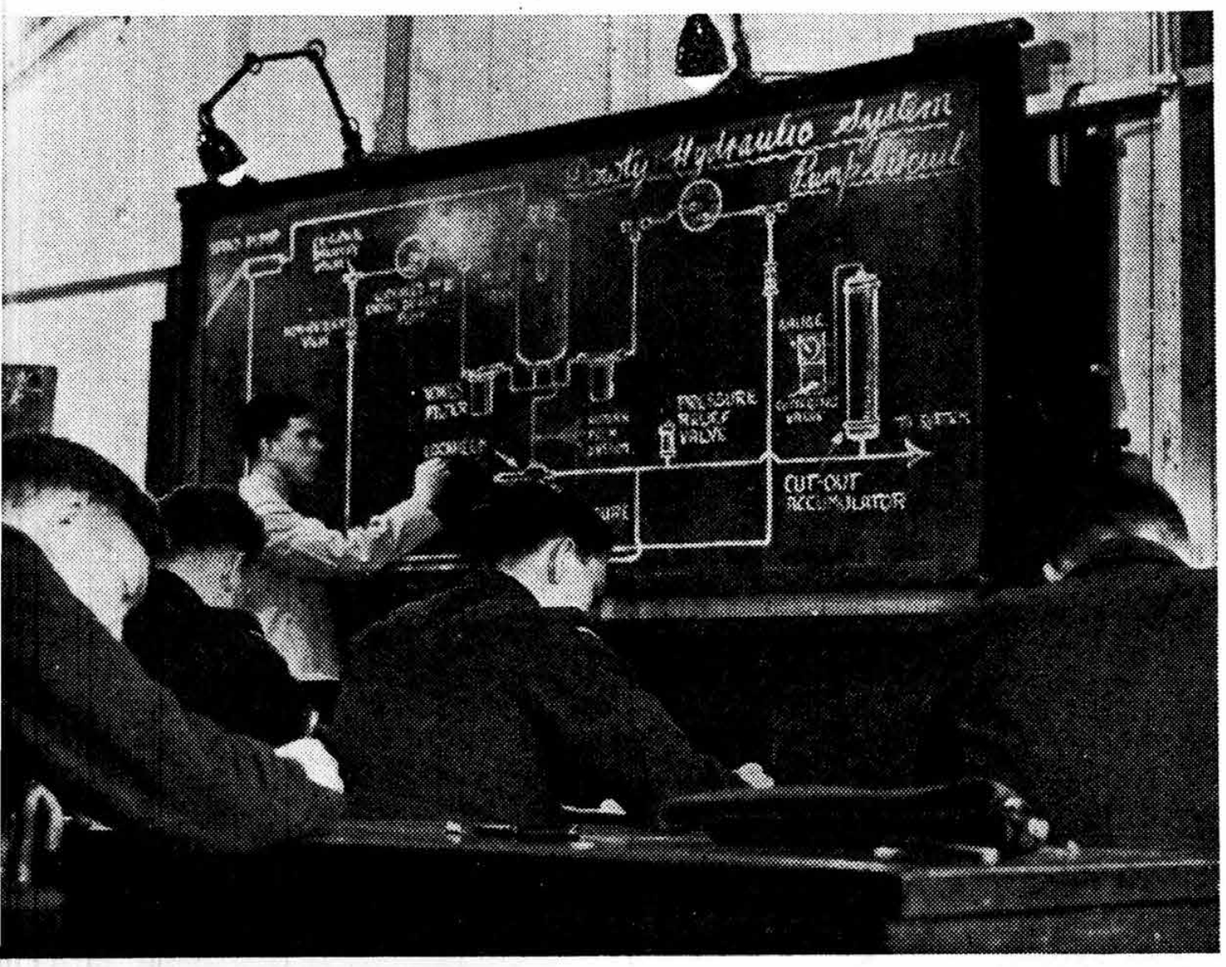
An hour each day on the average is devoted to actual inspection of the construction and erection of aircraft components in the factory. Because of the possibility of delaying production, students on this manufacturer's course of technical training are unable to inspect a complete airframe in skeleton with auxiliaries attached. Therefore, the value of the "Museum" of mock-up layouts is all the greater. A certain amount of inspection is possible for the students on Halifaxes being made ready for test flights. This is particularly useful in ascertaining the methods of correcting engine adjustments.

Perhaps the outstanding impression gained by the visitor to this school is of the whole-hearted co-operation which exists between the manufacturers of the aircraft, the Technical Train-

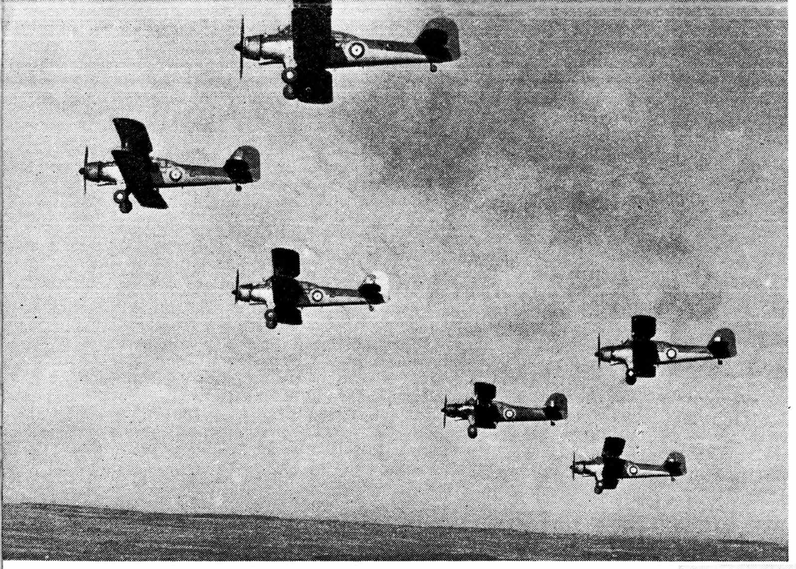


RAMS AND JACKS.—The diagrammatic working "mock-up" of the Dowty system of hydraulics. Extreme left top may be seen the fluid header tank and beside it the two undercarriage jacks. The smaller rams underneath are for operating the radiator shutters and the one on the extreme right, hidden by the extended strut of the undercarriage ram is for lowering the landing light. The Instructor is pointing out the return valve of the flap jacks and underneath, disposed laterally, are the six hydraulic rams for opening and shutting the bomb doors. The selector valve is in the centre of the picture with its operating levers and Purolator and Vokes filters can be seen. The cylinder on the extreme right over the Instructor's shoulder contains compressed air to operate the mechanisms pneumatically should the hydraulic pressure fail.

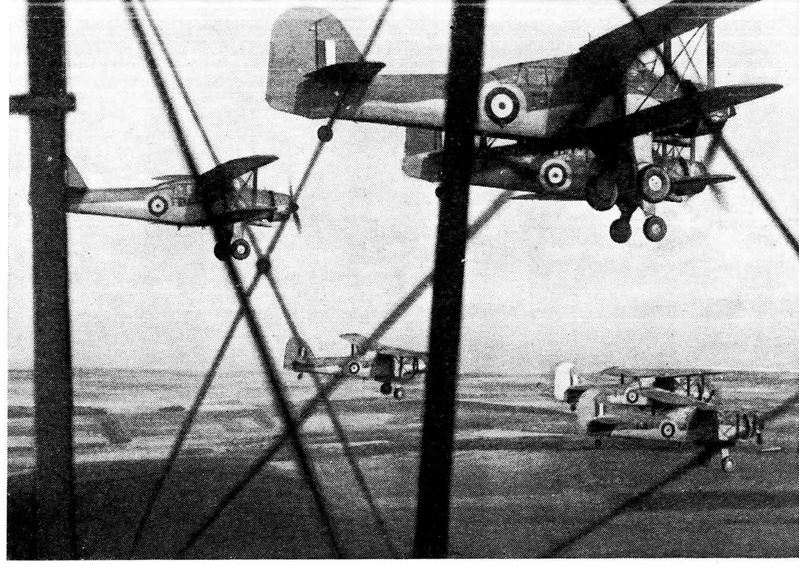
ing Command, the Instructors and the pupils. Another impressive factor is the laudable individual enthusiasm, best illustrated in the entirely voluntary effort put into the building up of the mock-up "Museum." As with most enterprises in wartime this enterprise was accompanied by a certain amount of "scrounging," but such extemporisation, if it produces the goods, is not to be too harshly judged.—C.F.A.



THE LIE OF THE LINES.—The judicious mixture of theoretical and practical training is found to yield good results among mechanics. A batch of Flight Engineers are here receiving blackboard instruction on a diagram of the Dowty hydraulic pump circuit at a Halifax School of a manufacturer.



["Aeroplane" photograph



["Aeroplane" photograph

LAST OF A LINE.—Last biplane to go into service with the Royal Air Force and Fleet Air Arm, the Fairey Albacore is a development of the famous Swordfish. That the Albacore is a worthy successor is shown in this article, which describes some of its exploits at El Alamein. These pictures give an impression chiefly of its work at sea. In the picture below an Albacore is seen in a desert setting.

THE CAMELS CAME

By Fougueux

SOME of the strange mystery of the East, with its uncanny prescience of events to come which are shrouded from mere western minds, can be scented if you will take the Oxford English Dictionary and make an etymological exploration of the word Albacore.

This name, which has so frequently figured in communiqués concerning Fleet Air Arm activities, conveys to the hard-boiled aeronaut a torpedo-bomber biplane which, labouring under the inevitably descending mantle of obsolescence by present standards, none the less contrives to operate with persistent efficiency as a "warplane." And that, say many, is all that really matters.

You will see, then, that Albacore is described in the reference book as a large species of tunny fish; and that for some odd reason its etymological root is Arabic, from "el" meaning the and "bakr" meaning small camel. Pursuing the trail we read, absorbed, that the camel is an ungulate much used in Africa as a beast of burden, the Arabian brand having only one hump on its back.

How true: for our Albacore was much used as a beast of burden through the long battles in Africa, and if the Fairey Aviation Company could not possibly have seen the Arab connection far back in 1937 when it was no more than Specification 41/36, clearly the occult influences were at work in the selection of the name Albacore, the small camel.

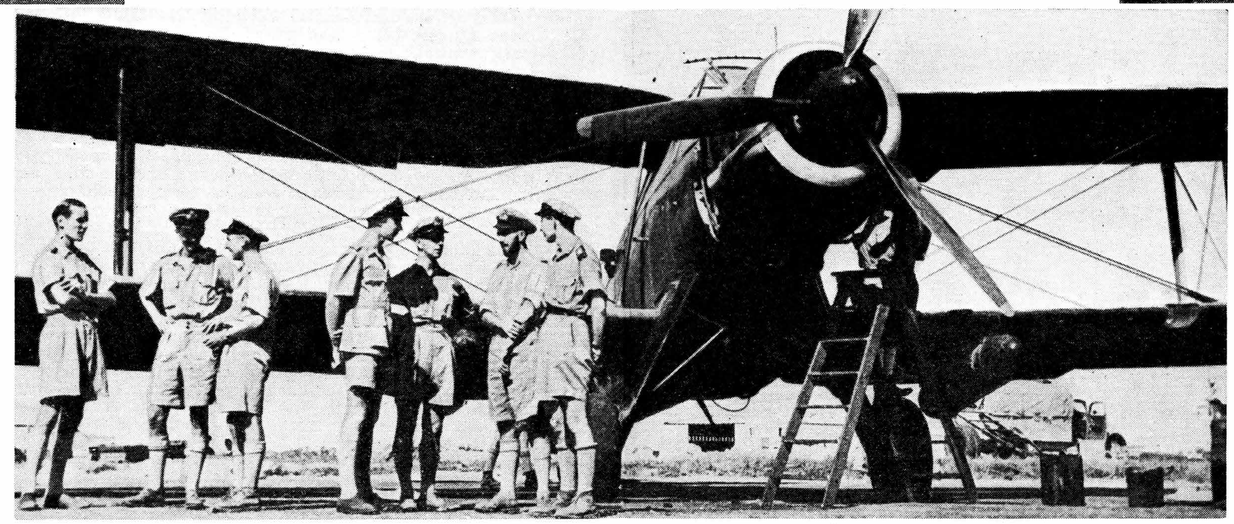
Yes; the small camels came in a big way to the Western Desert, and though their work was extensive and continuous and devoid of the glamour of sleeker aeroplanes, I fancy that to recount some of their story at and before El Alamein would not be inappropriate.

In brief capitulation of events, the Army having suffered reverses in Cyrenaica, at Tobruk, Bardia and Mersa Matruh, a stand in the retreat was made at El Alamein. You could easily fly over this point and notice no difference between it and the surrounding drab terrain except the railway halt on the shimmering hot line that threads east-west across the desert. On the right, the sea protected the Army; on the left stood the impassable Qattara Depression; and, connecting these two barriers in the way of panzer forces, extended the Alamein Line, an empty expanse of soft limestone rock with much loose sand and small stone surface—a dreary, dun, desolation of desolations devoid of any living thing except desert dogs and the desperate "Desert Rats" of both armies confronting each other.

Into the defence of this line, which stood as the foremost bastion to Alexandria, was flung every available aeroplane. By day our insuperable fighters swept the skies, their presence ridding the enemy of the dive bombers on which he had so much relied in the past.

Partly to avoid our day air attacks, partly to effect without our knowledge movements of troops and supplies, the Germans operated mainly by night. It therefore became of first importance to disrupt these movements and break up the enemy's concentrations (without which he could not hope to breach the defence line).

The only effective method of getting at these forces was by bombing. But because the desert is so unbelievably vast, easily permitting skilled troops to disperse, yet to be able to reassamble rapidly and because a near miss meant only the hideous blossoming of a macabre mushroom of sand and soft rock without harm to forces even within 20 yards of the exploding bomb, the need was for accurate and saturation bombing of the chosen concentrations of the enemy.



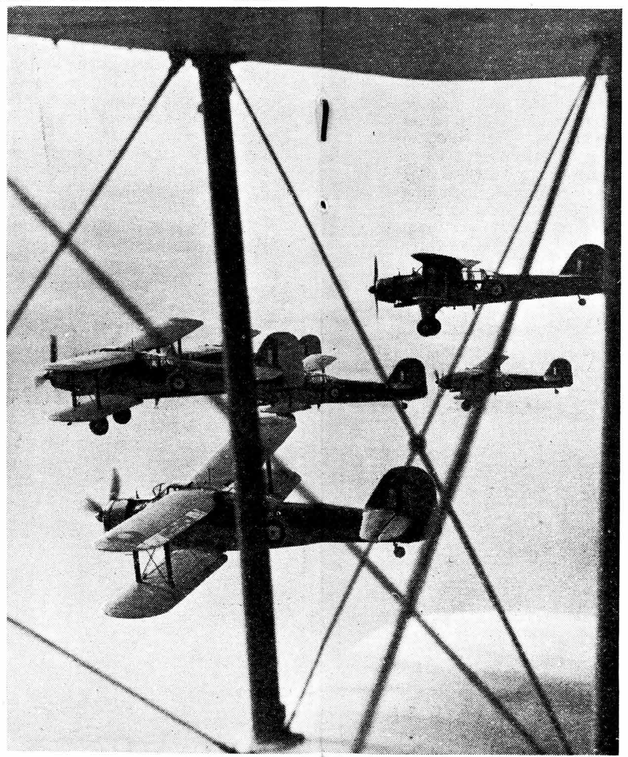
with a taper so that the cohorts of bombers in being above could swoop down and enflame all the candles on the Christmas tree.

Now, it is a special feature of F.A.A. training that its Observer officers should have mastered the mystery of dead reckoning navigation. This training, devised basically that aircraft might operate over the sea where no point for fixes exists, stood in good stead in Western Desert operations where, except for terra firma in lieu of the expansive seas, the conditions are closely similar.

On moonlit or flare illuminated nights, for example, the jaundiced carpet of the desert presents no identifiable points, but many a deceptive shadow. To search for objectives in such a locality presents much the same navigational problems as sweeping areas of sea.

This work the Albacores did supremely well. As an indication of the extent of the operations over a comparatively short front, one should mention that on the average 400 flares were dropped per night for several weeks in succession leading up to the attack. More than 10,000 flares were consumed in these operations. Such was their consumption, and such the rich dividends accruing as the Allied bomber forces swept in where the Albacores had led the way, that at one time stores of flares were almost exhausted—and to prevent operations from stopping, a train composed entirely of flares was given absolute priority, a "Clear All Lines" transit, to the base. (Anyone having the slightest knowledge of Egyptian railways can imagine what that meant!)

Thus, turning the desert night into day, the movements of the enemy were as an open book for all who flew to read—and bomb. It



was really a quite remarkable piece of war work.

Behind this bald statement of great accomplishments — without which the bomber offensive could not have obtained the success it did—lies a story of brilliant staff work between R.A.F., Army and F.A.A., of unremitting toil by armourers, fitters, electricians and riggers at the operational base (for whom there would be no bouquets and no bemedalled breasts), of sustained courage and cheerful alacrity to accept hazardous flights by aircraft crews.

Invidious, indeed, to mention any one name where all were so much in the fray; and yet this record should say that the star pilot, now an Acting Lieutenant-Commander and still barely in his majority, wears the D.S.O., the D.S.C. and two bars, and has no fewer than seven Mentions in Despatches—an inspiration to all who have long believed in the operational efficiency of the Naval Air Service. He would be the first to assert emphatically that none of this could have been possible but for the backaching, dusty toil of unnamed men (including Egyptian natives) behind the scenes, preparing ceaselessly for non-stop operations.

For, to achieve a dusk to dawn illumination of the desert with only a limited number of aircraft available demanded from individual air crews frequently two sorties a night and sometimes even three. In the day-time, fortified by nice slices of bully, nice dollops of tinned salmon, nice brackish tea and the personal attentions of ten million flies, they prepared for the coming night, keeping up this pressure for two months.

All this may be described as the defensive and preparatory stages. By September 25, 1942, the time for the flood tide of attack could be gauged. By that date the enemy had learned to be excessively wary of concentrating anywhere and had learned the sting in these seemingly outmoded biplanes of which any good Ju 88 ought to have made cat's meat.

Furthermore, with increasing daring, the flare droppers would come down really low to hot up the lurking enemy with 250-lb. persuaders that their cause was hopeless, these harrying operations being independent of the onslaught by the bomber fleets in being overhead.

In this way an extraordinary situation arose. Pilots and crews trained basically for torpedo attack operations (a form of attack requiring a specialised technique) were able to exploit their knowledge to bring off some devastating coups.

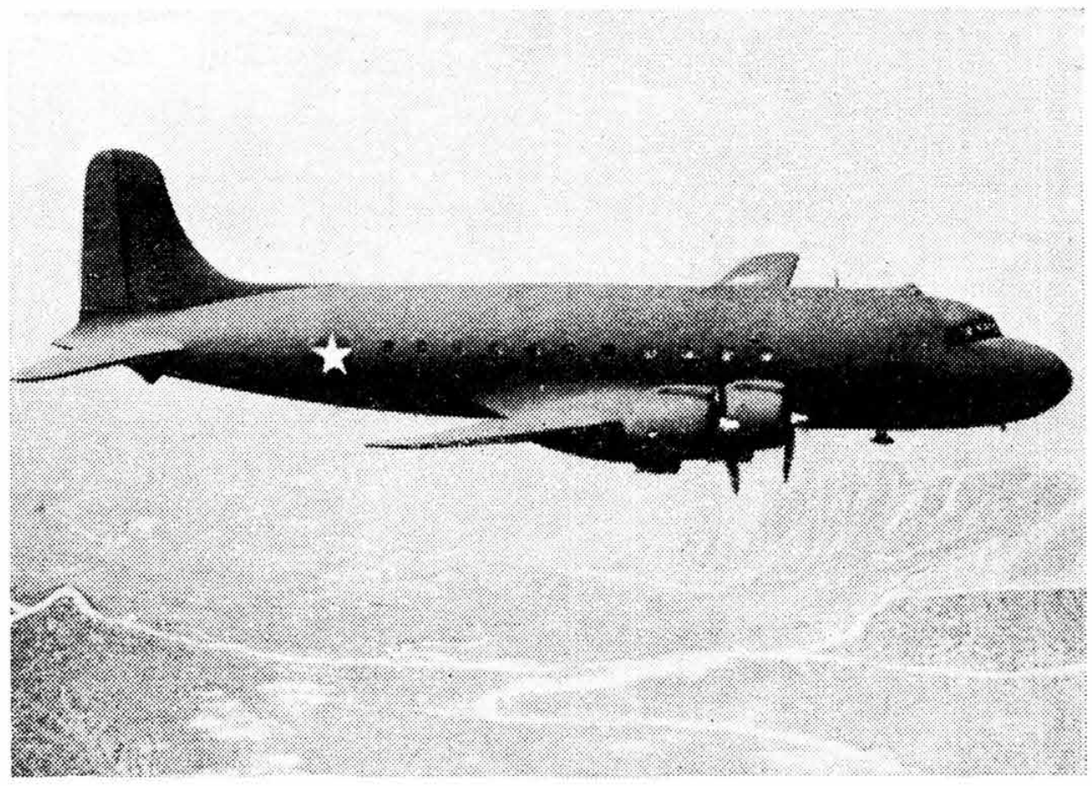
As with their sea operations, the aircraft would release their flares at a convenient height—Ah, and how much more accurate it is to drop flares from a slow aeroplane than a fast!—and then manœuvre for a combined attack from different angles just as though they are making a pukka torpedo attack.

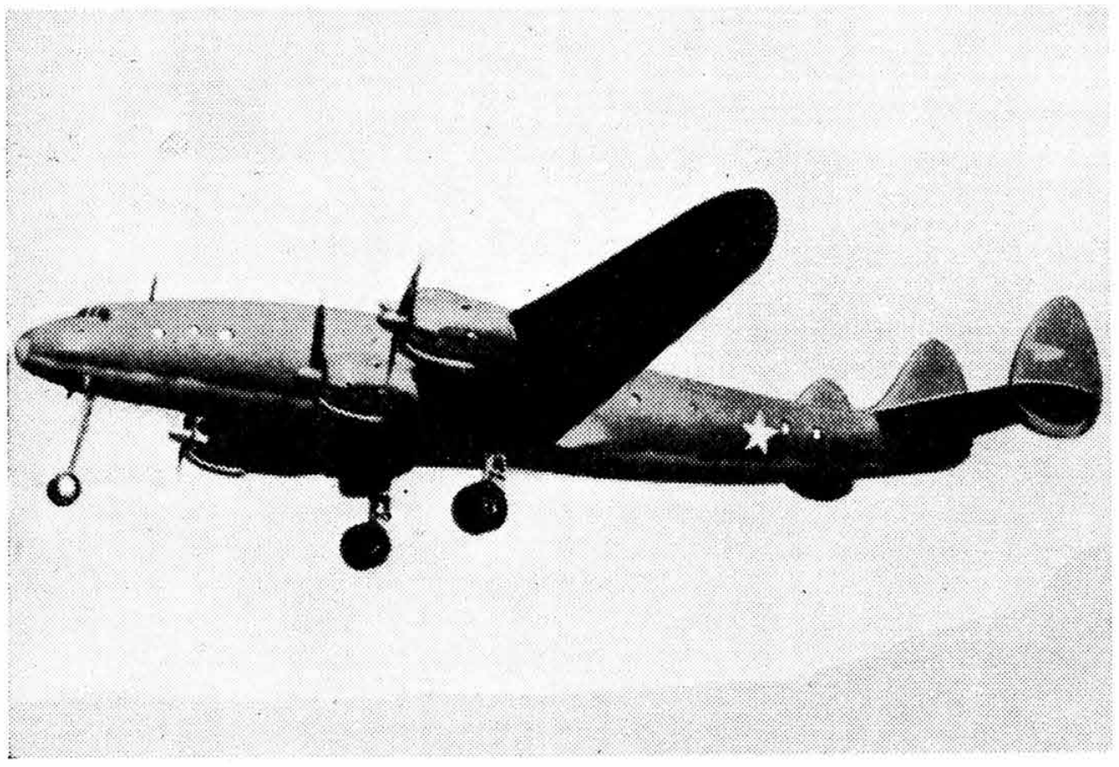
These manœuvres were quite disconcerting to a confused enemy who had installed heavy flak to guard vital points. It is gratifying to record that though theoretically perhaps casualties should have been high, in point of fact they were exceptionally low.

A conclusion reached as the outcome of these manœuvres was that this unique form of attack against land objectives opened up wide possibilities. Purely speculatively, were there to be such things as gliding bombs—a possibility discussed in many pre-War works on air strategy and tactics—clearly the Fleet Air Arm technique could bring about results as astonishing as have been already achieved at sea.

Thus did the "small camels" come to the desert with their burdens; and now that their nights of doing there are spent they are cited from time to time as dealing with German E-boats in the North Sea and English Channel. Already one squadron alone has sunk 89 of these and allied targets in the waters we must rule, and there is evidence that much work still remains to be done, though of this nothing may at present be said.

One sidelight on these desert operations is that all these young Naval officers and men who did such excellent work in the desert become qualified for the Africa Star. The common tendency, indulged by newspaper correspondents who ought to know better, is to regard this Star (so far as it relates to the Navy) as a piece of jam for those patiently sitting in Alexandria, watching the ships go out and letting nothing interfere with their tennis. Perhaps there might have been some such officers; but nothing of this can attach itself to those who know how much the Fleet Air Arm has done in the Western Desert, how much its light has been under the most unbiblical of bushels, how much a veil has had, of necessity, to be drawn over activities that required to be anonymous in order to fox the enemy. For, as the cynic remarked, there is no news value in virtue.





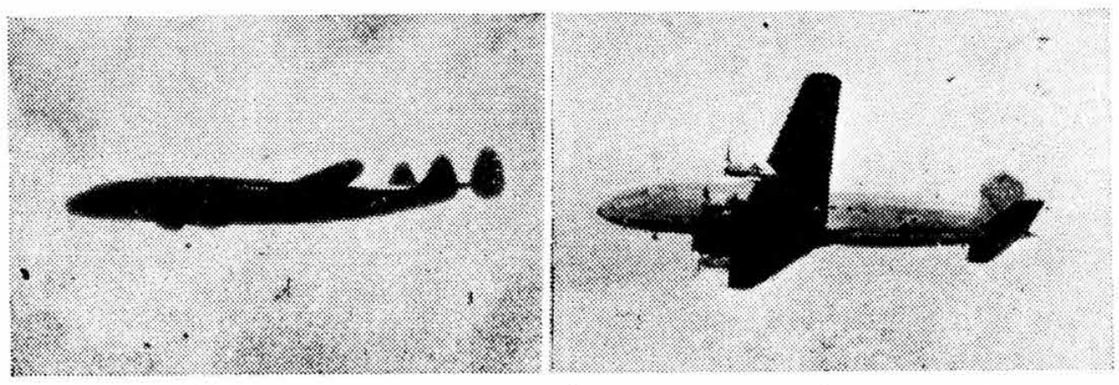
RECOGNITION POINTS.—The above photographs of (left) the Constellation and (right) the Skymaster and the tone drawings on the opposite page illustrate clearly the identification features of both aeroplanes.

Aircraft Recognition

THE Lockheed C-69 Constellation (four 2,000 h.p. Wright Duplex Cyclone 18-cylinder air-cooled radial motors) and the Douglas C-54 Skymaster (four 1,350 h.p. Pratt and Whitney Twin Wasp 14-cylinder air-cooled radial motors) were the subjects of the previous identification tests.

Most advanced air transport aeroplane yet known to be flying, the Constellation made its test flights early this year. The Constellation was originally designed to carry 55 passengers and a crew of nine at high speed in the sub-stratosphere but it has now replaced Hudsons in production at Lockheed's Burbank factory as a military transport. The design layout is reminiscent of that chosen for the Fairey F.C. 1 civil transport projected before the War. The most interesting features of the design are the pressure cabin, which maintains up to 35,000 ft. an air density usually found at 8,000 ft., and the three fins and rudders.

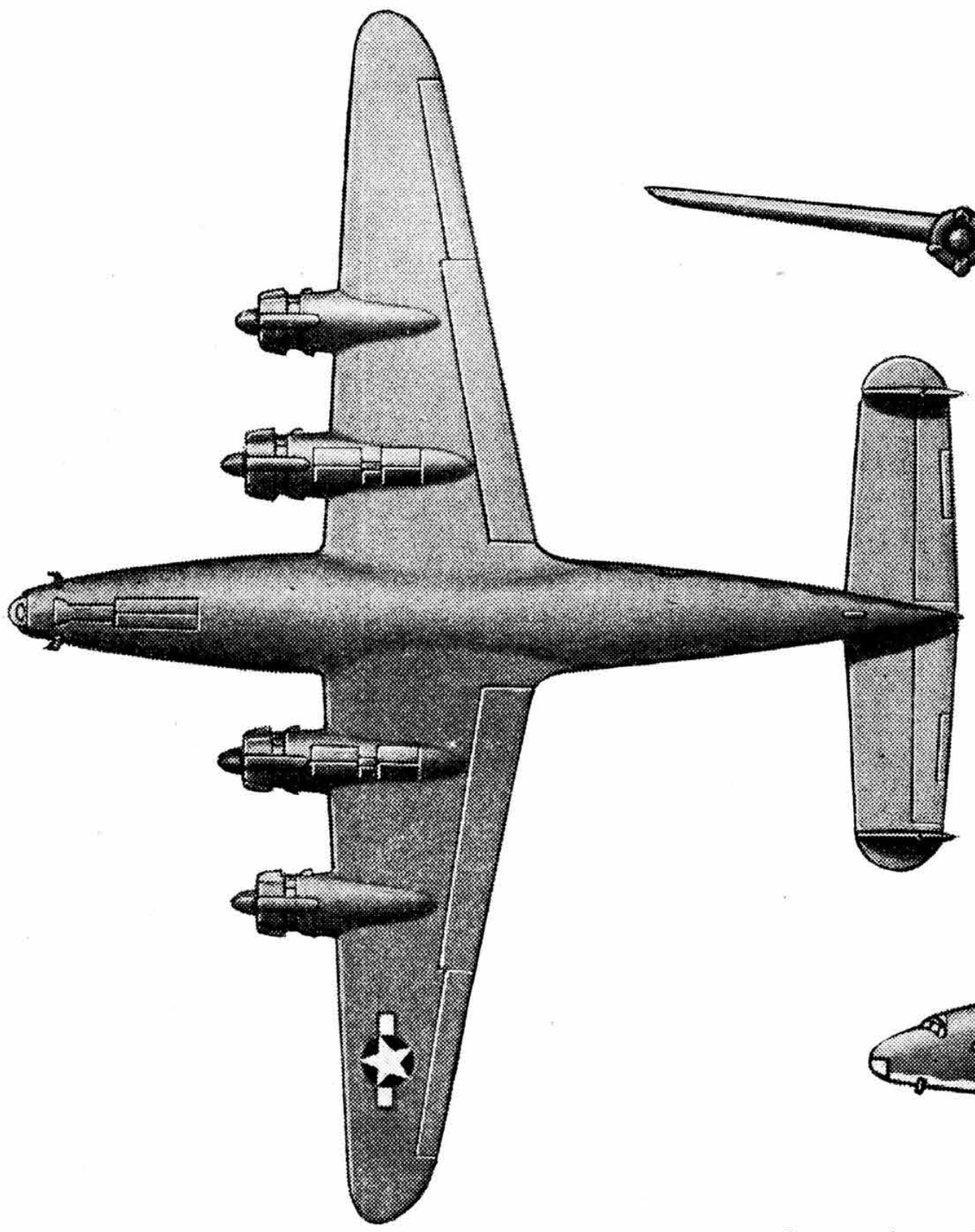
The Douglas Skymaster is a military version of the DC-4, which first flew in 1938 with three fins and rudders. The prototype was later fitted with a single fin and rudder and, after test flights, was sold to Japan. Many Skymasters are now flying with the U.S. Army Air Forces in various parts of the World, including Great Britain. Both the Constellation and Skymaster have tricycle undercarriages, the Skymaster having double main wheels and the Constellation having double wheels on all three legs.

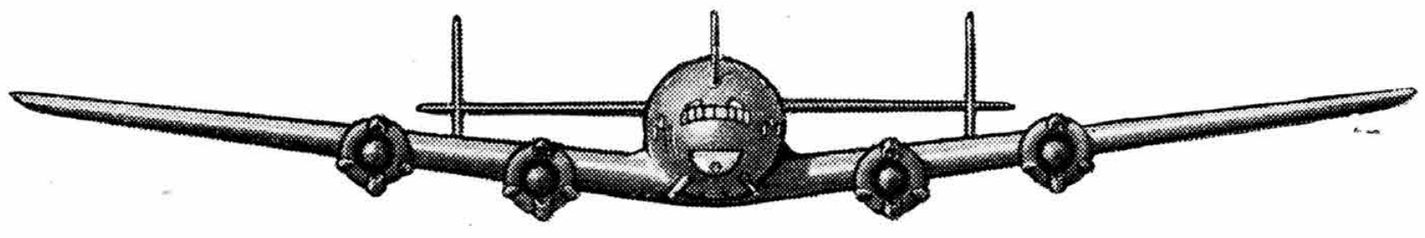


293 PREVIOUS PROBLEMS.—(Left) A Constellation and (right) a Skymaster. 294

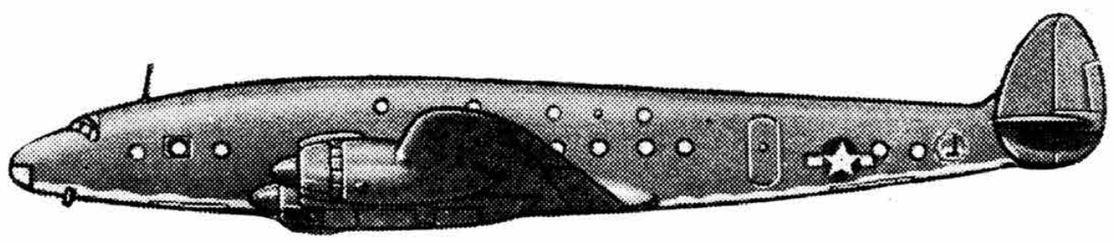
TWO MORE TESTS.—CXLVIII. Drawings and photographs of the above aeroplanes will be published on Oct. 22.

AIRCRAFT RECOGNITION

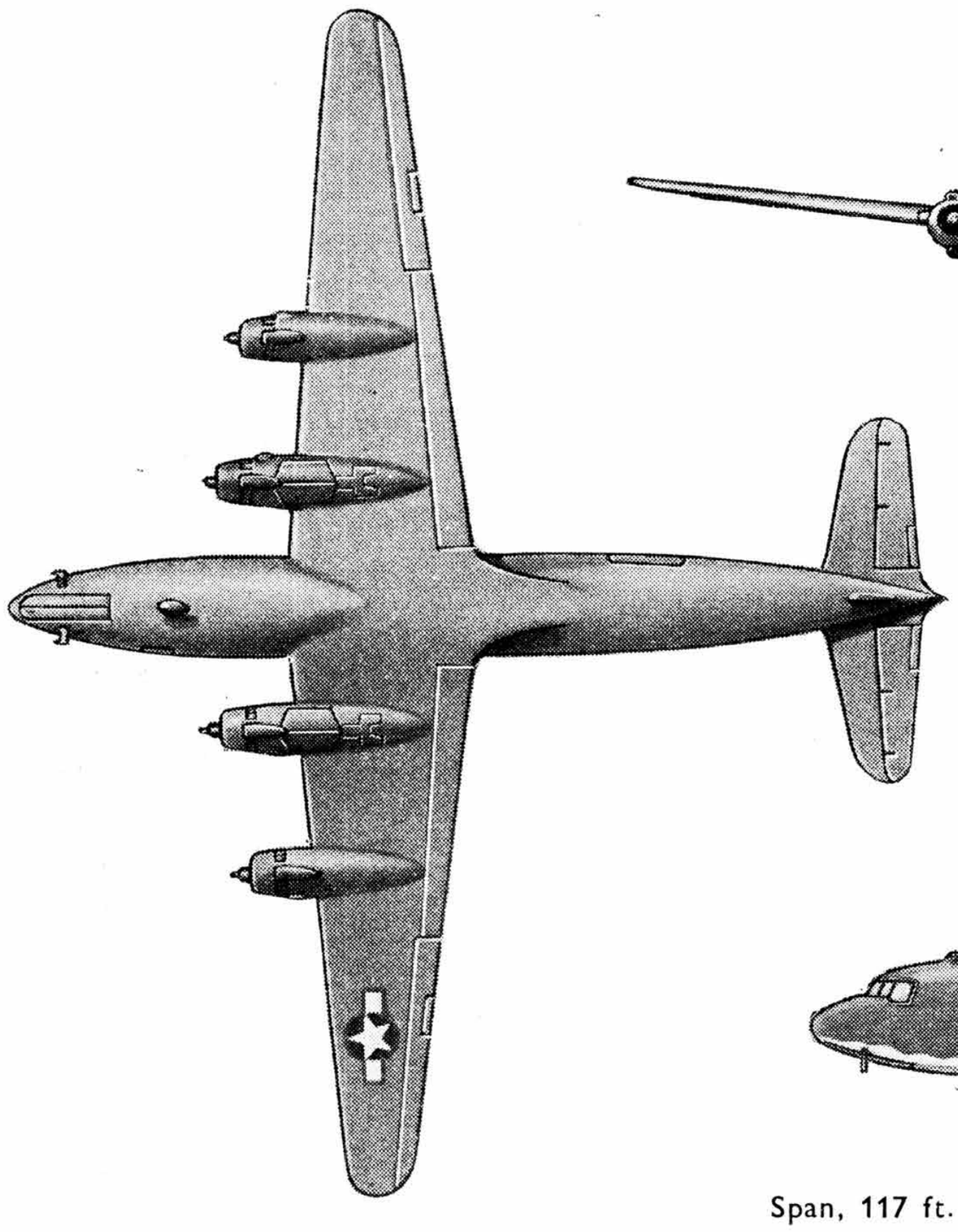




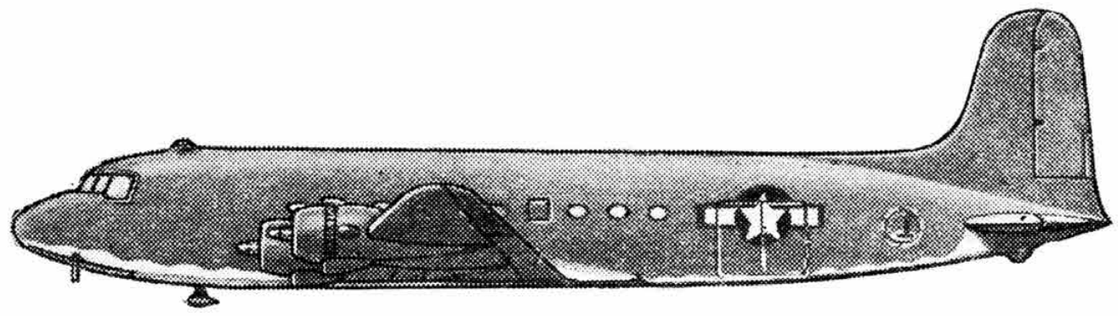
THE LOCKHEED C-69 CONSTELLATION



Span, about 110 ft.



THE DOUGLAS C-54 SKYMASTER



Span, 117 ft. 6 in.

"The Aeroplane"
Drawings by W. J. Everest

An Outline of Wooden Construction

By John A. Sizer, A.R.Ae.S., A.I.N.A.

A TIMBERED EDIFICE.—The Cody biplane of 1912 which won the £5,000 prize in the Military Trials with a 120 h.p. Austro-Daimler motor. It was constructed of wood throughout, but was covered with Pegamoid fabric. The outriggers were of stout bamboo, bound with tape. Silver spruce was used for the spars and struts. The undercarriage and motor bearers were of American hickory.

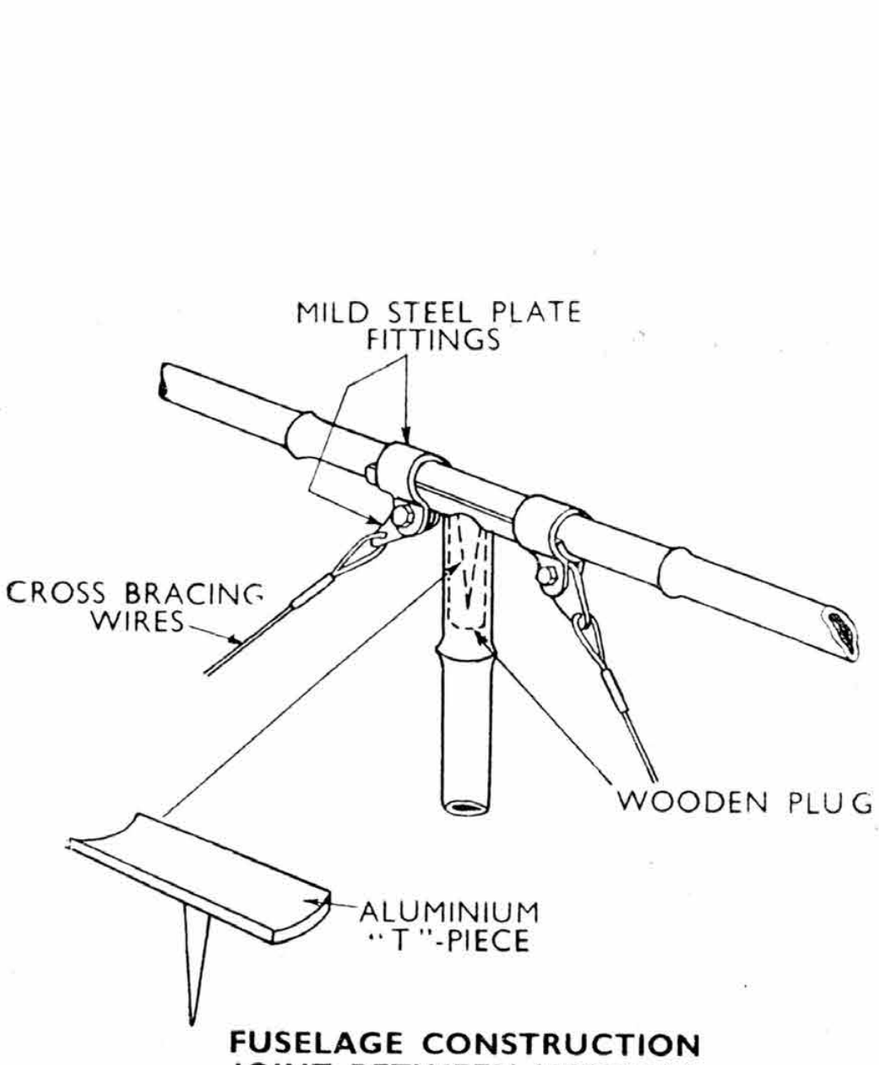
A RETURN to wooden construction for aircraft in this country is foreshadowed by the emergence of the successful de Havilland Mosquito. Experiments in further applications of the newly established materials such as plastic compregnated woods have revived interest in the subject. This article outlines the development of wooden aircraft structures from the days of the powered box-kite glider. From the large number of varieties of timber only a few have been found suitable for aircraft construction and a still smaller number have been generally accepted by aeronautical engineers. The half dozen or so varieties used from the earliest days are ash, American white wood, pine, elm, mahogany, hickory, spruce, poplar, cedar and basswood.

No aeronautical survey of this description would be complete without some reference to bamboo, which structurally has many properties similar to wood but is in fact a grass belonging to the family Gramineae. Until its many serious drawbacks became apparent, bamboo featured fairly prominently as a primary material for aeroplane construction. Supplies were fairly good and not unduly expensive, but great care had to be exercised in selecting suitable lengths for use. Every foot had to be closely examined for rot, splits and insect holes. Inferior bamboo would split under sudden shock.

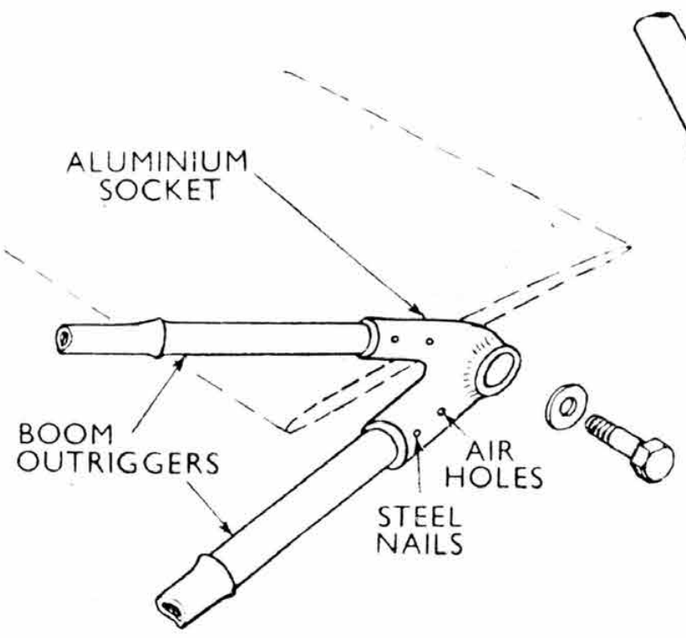
The making of satisfactory joints in bamboo offered some difficulties. Glued joints were not satisfactory, because both longitudinal members and vertical struts were circular in section. Drilling was also difficult and the only practical way to make a connection in bamboo was by clipping and/or plugging. Because splits had a nasty habit of starting midway between the knots, the material had sometimes to be bound at those points as an extra precaution. Breakages to bamboo members in early aeroplanes were of distressing frequency and a special technique had to be developed for their repair.

All these drawbacks mitigated against the continued use of

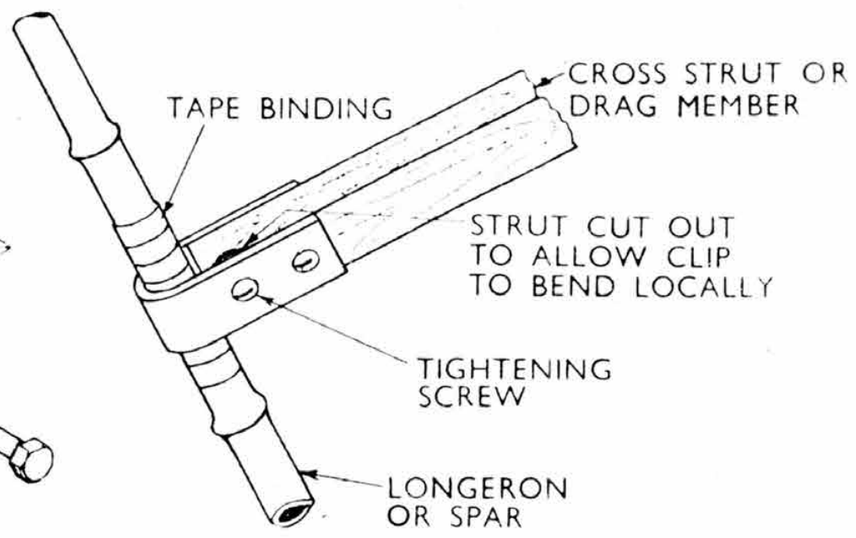
BAMBOOZLE.—The nearest approach to the hollow bone of the bird was the bamboo spar. The pioneers turned to this material for airframe construction, but soon discovered that it had more faults than virtues. Connections were difficult and some of the methods employed are shown in this diagram.

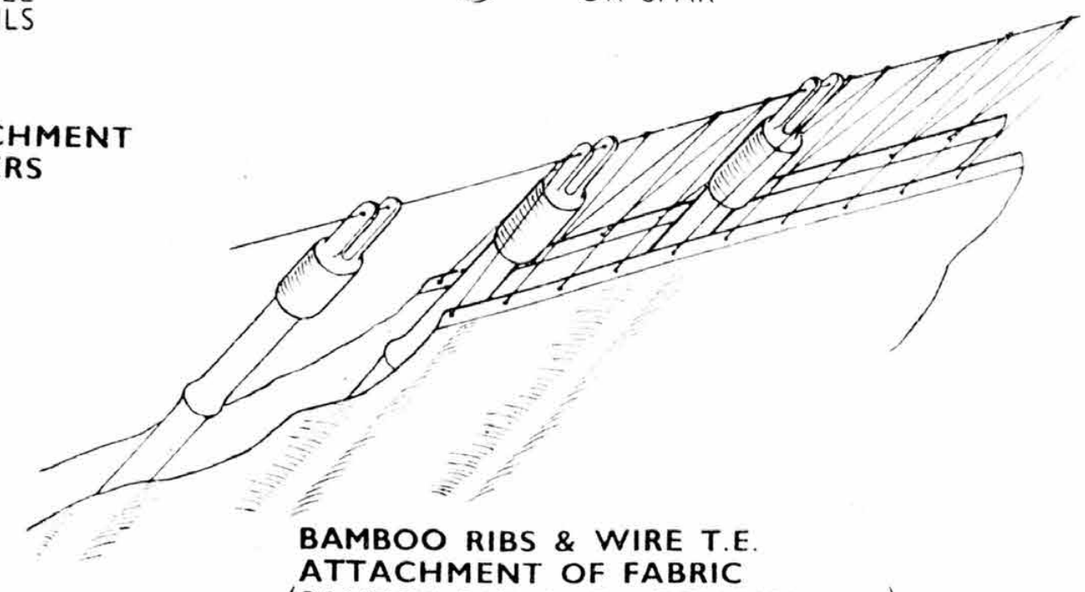


FUSELAGE CONSTRUCTION JOINT BETWEEN VERTICAL STRUT & LONGERON

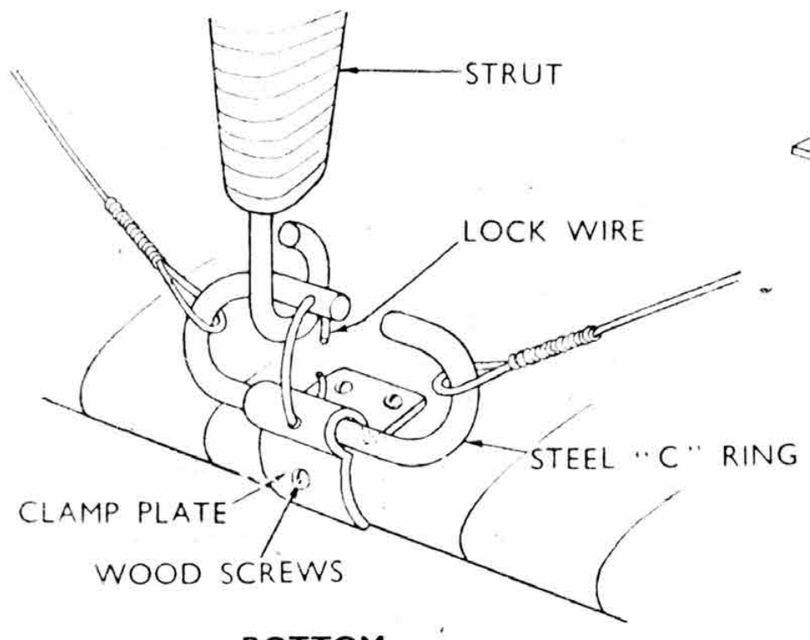


TAIL-PLANE ATTACHMENT TO OUTRIGGERS

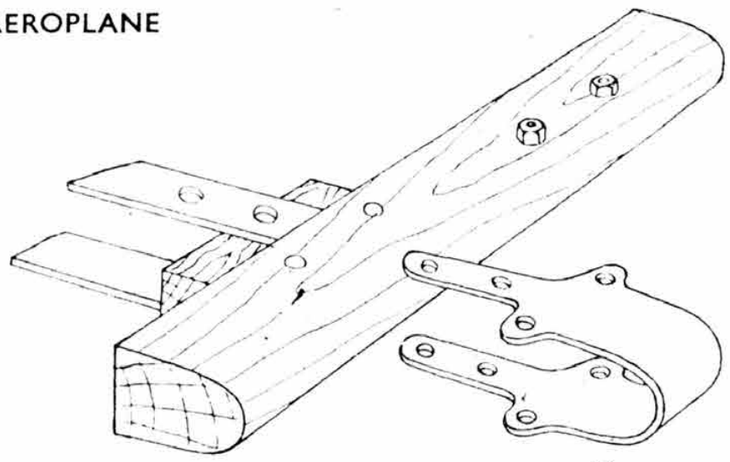


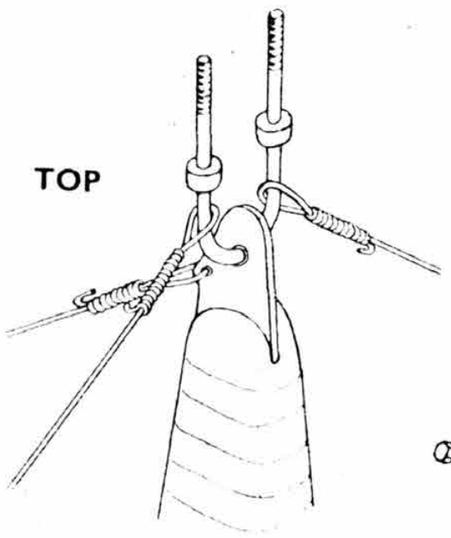


BAMBOO RIBS & WIRE T.E. ATTACHMENT OF FABRIC (SANTOS DUMONT "DEMOISELLE")



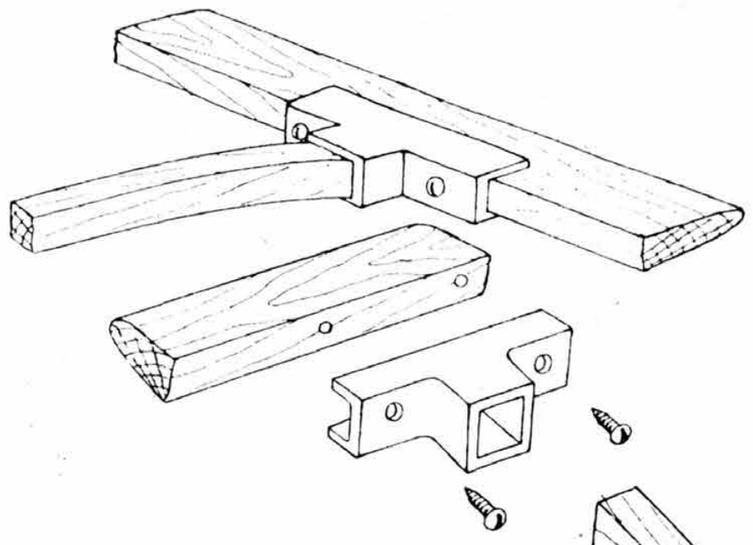
BOTTOM



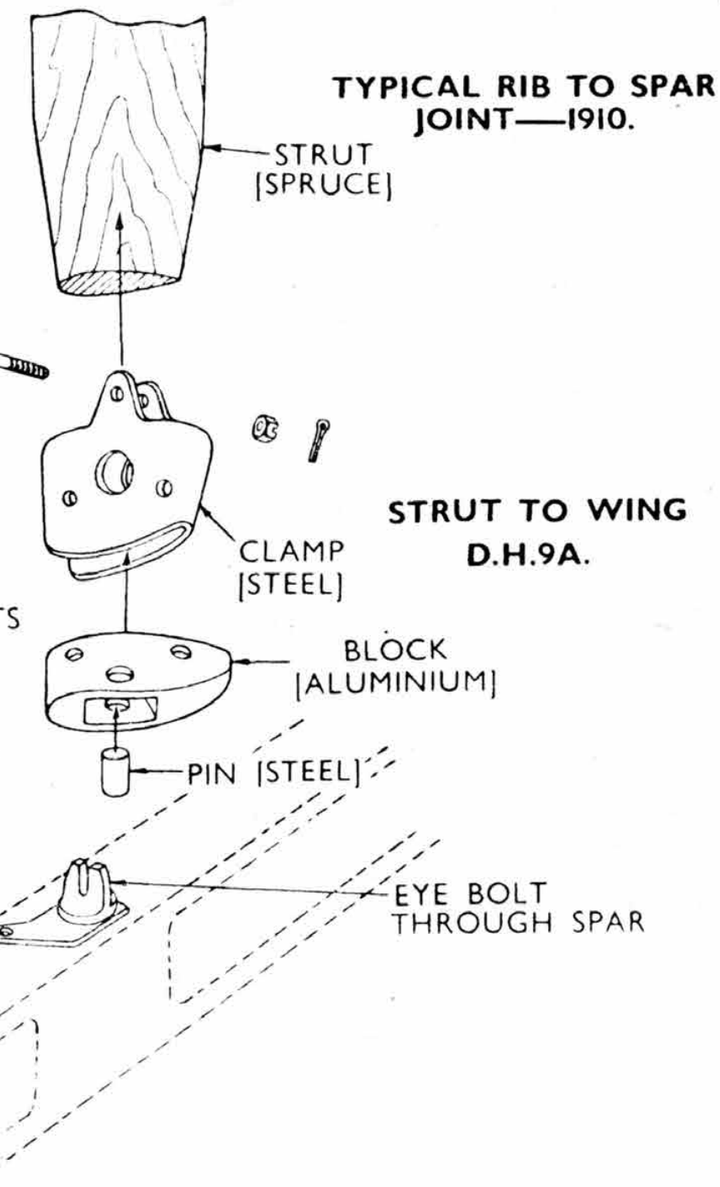


TOP

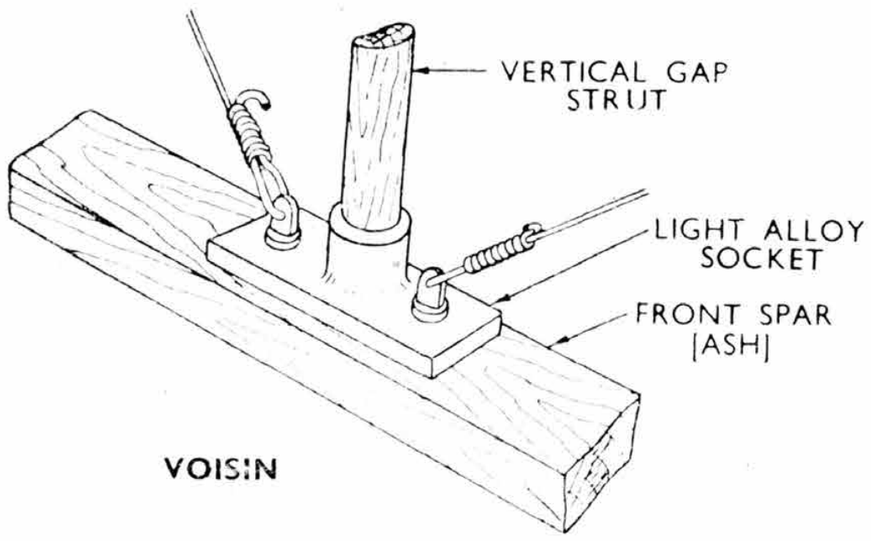
WRIGHT BROS.
STRUT TO WING ATTACHMENTS



TYPICAL RIB TO SPAR JOINT—1910.



STRUT TO WING D.H.9A.



VOISIN

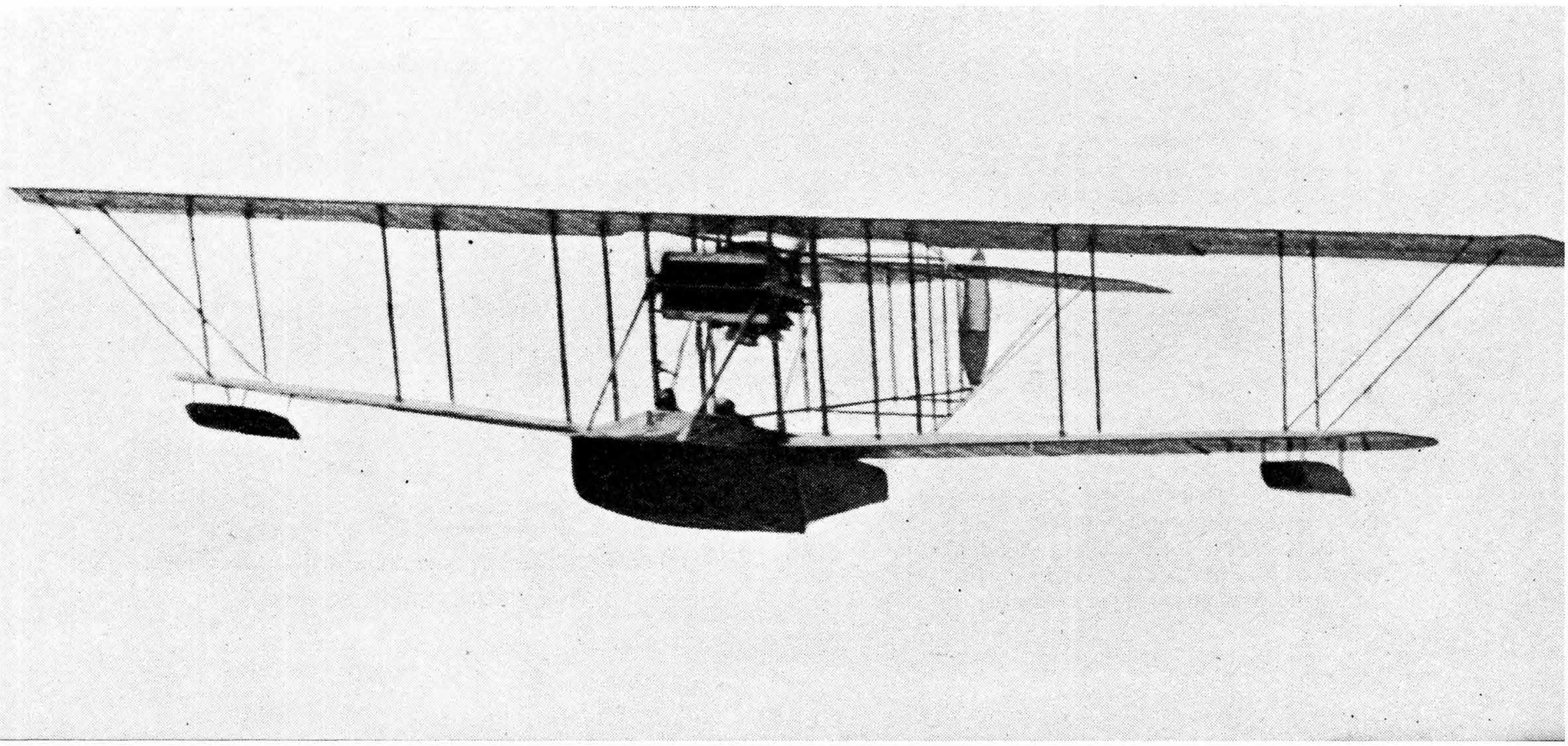
EARLY ATTACHMENTS.—The connection of the various members of wooden aeroplanes raised a number of difficulties and a selection of some of the solutions is depicted above.

bamboo. As more plentiful supplies of high grade timber became available it gradually became obsolete. Samuel Franklin Cody, who met his death almost exactly 30 years ago when flying one of his own machines, was probably the leading exponent of bamboo construction in this country. In America Glenn Curtiss also used bamboo profusely in some of his early designs.

Plywood had been known to exist for a long period, but its use, as a primary structural material, was not widely adopted until the eighteen-sixties. At that time large factories were started all over the World wherever the right cements and veneers were obtainable. Russia possessed ideal facilities for the production of this material and soon became a large supplier.

The use of plywood in aircraft first came into vogue contemporaneously with its use in high speed motorboats. S. E. Saunders of East Cowes had, from 1900 onward, built a number of high speed " hydroplanes," and had as competitors, Thornycroft's, J. Samuel White, Borwick and Sons and other smaller ship constructors. When the building of aeroplanes for operation from water became practical, these firms took a hand in the design and construction of seaplane hulls and

MARINE PRACTICE.—Saunders "Consuta" plywood hulls were built for the Sopwith Bat-Boats of 1913. The version shown above is the Bat-Boat with a 200 h.p. Canton-Unné water-cooled radial motor. This improved type was supplied to Germany early in 1914.



floats. Fabric was not an ideal framework covering below the water-line, and thin plywood with special waterproofing was used.

Saunders made perhaps the greatest contribution in the development of this special material for wooden hulls and floats, when he patented a plywood known as "Consuta." This plywood was sewn with copper wire around the edges and in rows at six-inch intervals to prevent the onset of veneer separation. In the Sopwith Bat-Boat, winner of the Mortimer-Singer prize for the first practical British amphibian, two layers of cedar planking were sewn together in this manner. Before Saunders produced the Bat-Boat hull, he had built similar hulls for the Revaud flying-boat of 1909 (probably the World's first flying-boat) and for the Wigram, an Australian design.

Plywood was also being used on the Continent in marine aircraft, chiefly by Oertz in Germany and by Fabré, Caudron, Tellier (D'Artois) and Donnét-Lévèrgne in France. In the United States, Curtiss, Burgess, Benoist, Christoffersen and others used plywood in the hulls of their flying-boat designs, but an interesting point to note in passing is that Grover Loening designed and made a light alloy hull for the Wright Aero-boat of 1912.

Early Stressed Plywood Skins

These early users of plywood employed various ways of waterproofing. The general practice was to use planking of spruce, mahogany or cedar, with a layer of fabric set in marine glue between the two outer layers of wood.

Germany had ample supplies of raw material for the manufacture of high grade three-ply before 1914, and, with an eye on its aeronautical development, lost no time in developing her resources. Germany was thus in the forefront of plywood covered aeroplanes, in particular the stressed skin monocoque. The Germans were the first to get down to the really streamlined fuselage and the torsion-box ply-covered wing, the accumulated experience of which was ultimately embodied in that fine aeroplane, the Heinkel He 70.

On the other hand, the French also produced examples of circular monocoque three-ply fuselages in the Deperdussin racer and the Borel monoplanes of 1912. Turning to the construction of aeroplane wings in wood one finds that the powered "box-kites" of 1908 were just beginning to use the double surface wing. The aerofoil section was of constant thickness-chord ratio, for all practical purposes. Upper surfaces were convex, lower surfaces concave. The earliest wing ribs were curved members of ash, or spruce. The leading edge nosing served as the main spar and the ribs terminated at the rear spar. Secondary ribs supported a trailing edge made either of steel stranded cable or tough, tight balloon cordage. Shear-bracing of the ribs and internal wing drag-bracing as we know them nowadays were not catered for. Wing drag-bracing was external and consisted of steel cables running from the outer strut-to-wing fixings to nodal points on the fuselage or open boom structure. In many designs of early aeroplane these drag-bracing wires were so numerous, usually tying up each wing strut to the body or cellule, that approach to aircraft of the period was accompanied by a serious risk of decapitation.

The Onset of Rigging

The struts were not pinned to the spars, the theory being that they were compression members only. Accordingly sockets were provided at points along the front and rear spars into which the interplane struts fitted. The lift, landing and incidence wires were then tensioned up to form a box structure. Thus the job of rigger was born. The main requirement of this system was to maintain tension on all the bracing wires.

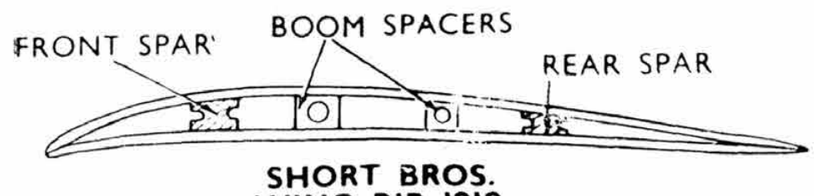
The Wright Brothers' biplane had hooks on the ends of the interplane struts. These hooks were passed over a bent "C" bar and were prevented from sliding by a piece of locking wire. They were clipped to the leading edge spar by steel plates and wood screws. Structural engineers will be interested to learn that the general opinion was that these wood screws were in tension during almost all their life in the air because the lift and drag wires were fixed to the same "C" hook.

Wing ribs in some early designs were butted, glued and screwed to the spars. Later, light alloy sockets were screwed to the rear face of the front spar and to the front face of the rear spar. They housed the rib ends. This scheme was later improved by the introduction of a top and bottom boom type of rib in place of a solid one with the advantage that the rear spar could then lie between the rib booms and dispense with the socket.

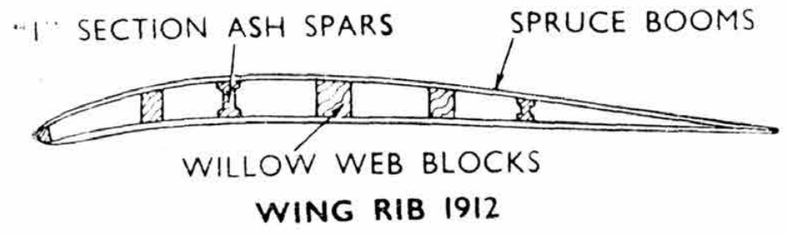
Increase of aeroplane performances, consequent on the provision of higher powered motors, demanded more robust wing structures and a strengthening of design generally. Deeper spars began to appear which could take bending and compression loads and internal drag bracings were introduced.

EARLY WING RIB

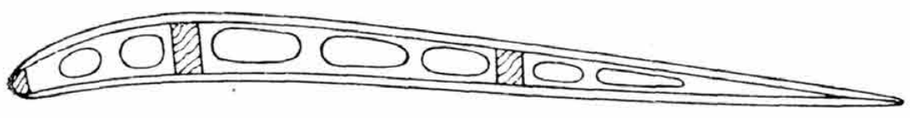
WING RIB ABOUT 1909

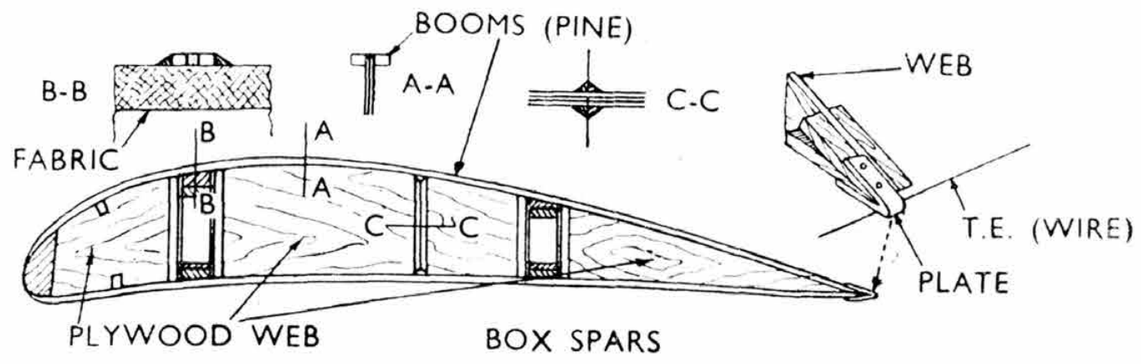


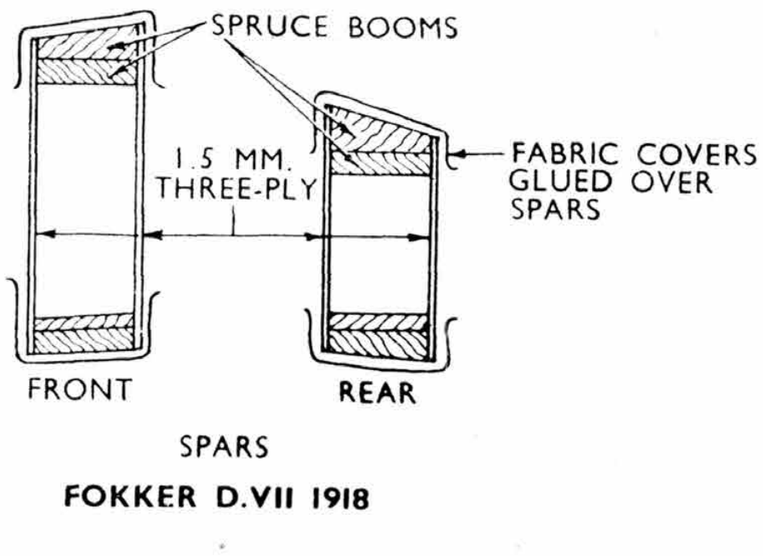
SHORT BROS. WING RIB 1910



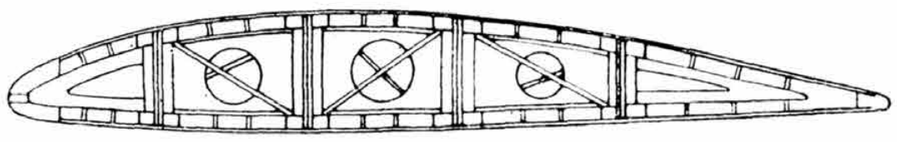
WING RIB 1912

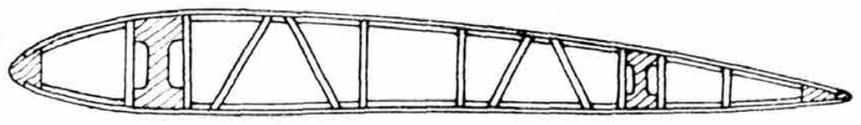

WING RIB 1912-18





FOKKER D.VII 1918


THE HANDASYDE TYPE H-2 1922


THE ORIGINAL D.H. 60 1925

WING RIB DESIGN.—A selection of wooden ribs from the early days to 1925, when the original D.H.60 (Moth) utilised wooden construction for the production in quantity of the first cheap light aeroplane.

THE AEROPLANE
OCT. 8, 1943

An Avro Lancaster flying at 10,000 feet on full load test with two port engines stationary

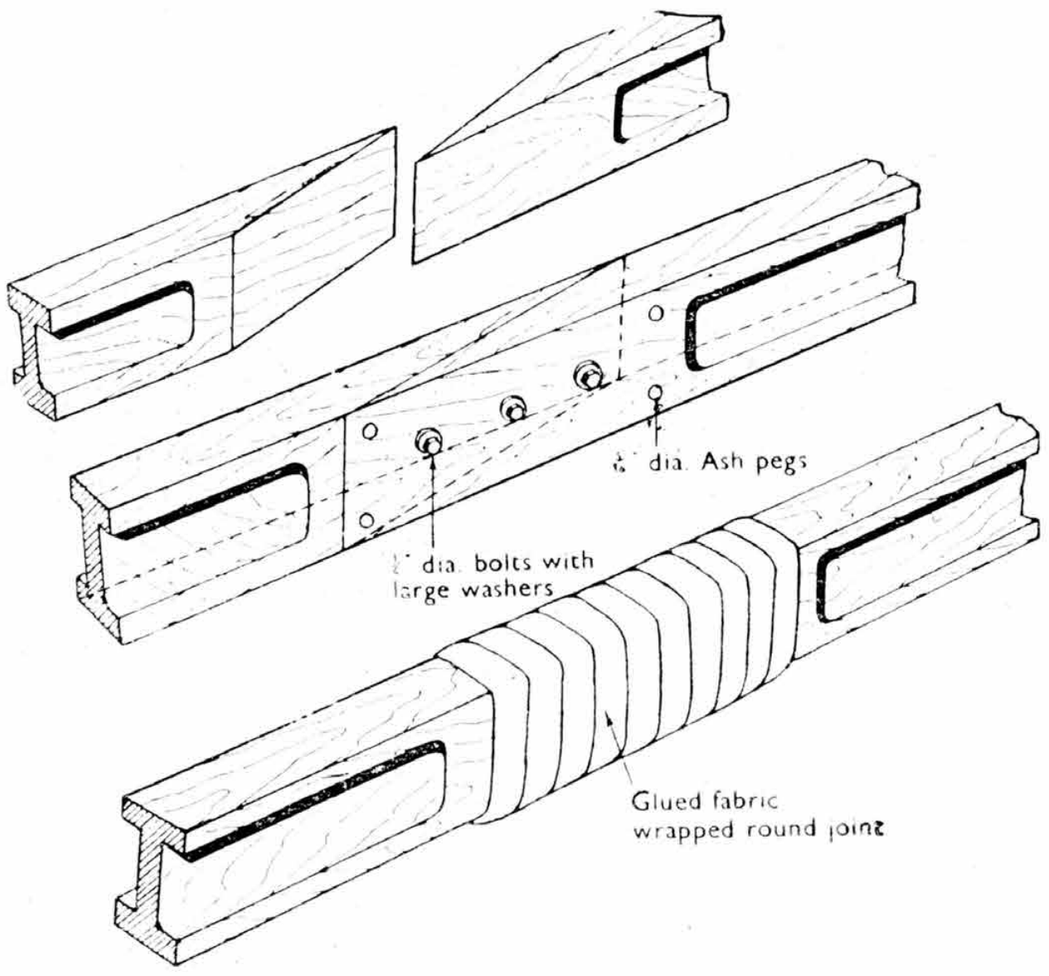
Miles
AIRCRAFT

MILES MASTER

. . . Without it, the steady flow of pilots to our fighter squadrons could never be maintained.

Vide "The Aeroplane"

PHILLIPS & POWIS AIRCRAFT LTD, READING, ENGLAND.



WOOD SPLICING.—A typical spar joint (of the D.H.9A) as introduced towards the end of the last War because of the shortage of timber.

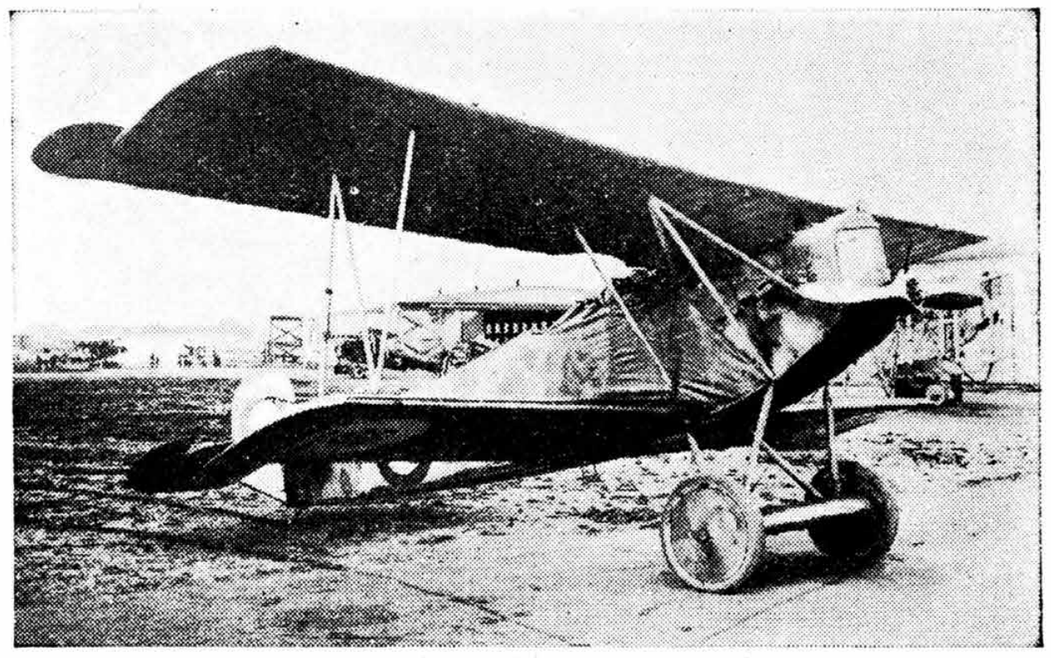
Ribs became deeper and necessitated the use of shear bracing between the top and bottom rib booms. The practice mentioned of allowing wood screws to take tension loads disappeared and bolts passing through substantial packing block at spar points came into favour. The earlier method of tensioning bracing wires was to use a ferrule through which the bracing wire was doubled and then, tugging viciously with pliers on the bent end of the bracing wire, the rigger made fast with the ferrule. In 1912 wire strainers came into universal use in wing bracings.

Between 1910 and 1912 the spindled spruce spar made its appearance. Methods of lightening spars were borrowed from marine practice in the design of masts and spars for racing yachts and consisted of glueing two spindled sections together. With the advance of aerodynamic knowledge, still thicker wings made their appearance. This affected rib design and the webbed rib with spruce or other wood for capping booms or flanges came into use. The Sopwith company used poplar for rib webs. Most designers had adopted the bi-curved aerofoil, with the same early sections but with a greater thickness-chord ratio.

The Splicing of Spruce Spars

Just when the box spar was brought into aircraft construction has not been established. Its advantages were that it was economical in material and was simpler to make since spindling was eliminated. During the Great War of 1914-18 the box spar was used in a number of German designs. A shortage of plywood in Great Britain prevented any great use of the design here because box spar webs were constructed from that material. British sources of supply of plywood depended upon Russia and the early collapse of that country dried up our resources. The effects of this shortage of plywood and the declining supplies of first grade spruce led to much improvisation on the part of British designers. Almost all operational types of aeroplanes produced for the British Services had spindled spruce spars but closer examination revealed splicings at well chosen points. Research into splicing had been undertaken and some previously unsuitable material for long runs was brought into use.

For the introduction of the thick high lift section cantilever wing the Germans appear to have the credit. The Fokker D.VII single-seat type was a notable example and proved to be a highly satisfactory fighter holding a position towards the end of the last War analagous to that of the Focke-Wulf Fw 190 in this War. British designers adhered to the trussed biplane throughout the War and for some years after. Apart from



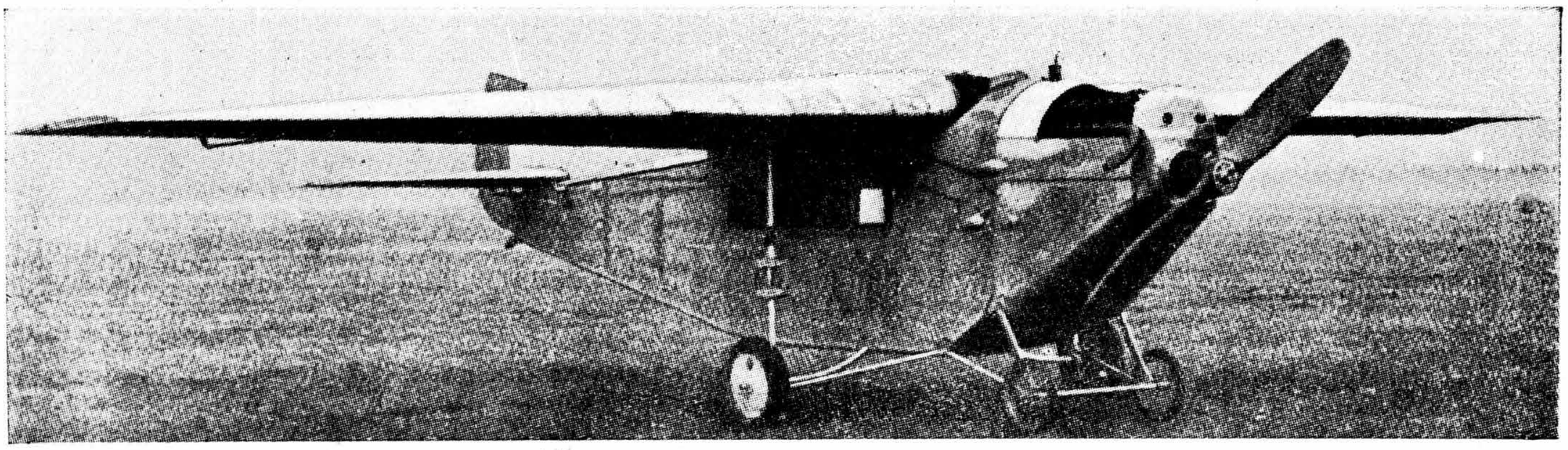
CANTILEVER CONSTRUCTION.—A Fokker D.VII biplane of 1918. The thick cantilever wood wing reached a new standard in this design. The absence of bracing wires will be noted. This type had the 160 h.p. Mercedes-Daimler six-cylinder liquid-cooled in-line motor.

the introduction of design details concerned with the conservation of material, they developed no really far-reaching innovations. One typical economy was the use of struts made of laminated spruce instead of being machined from the solid.

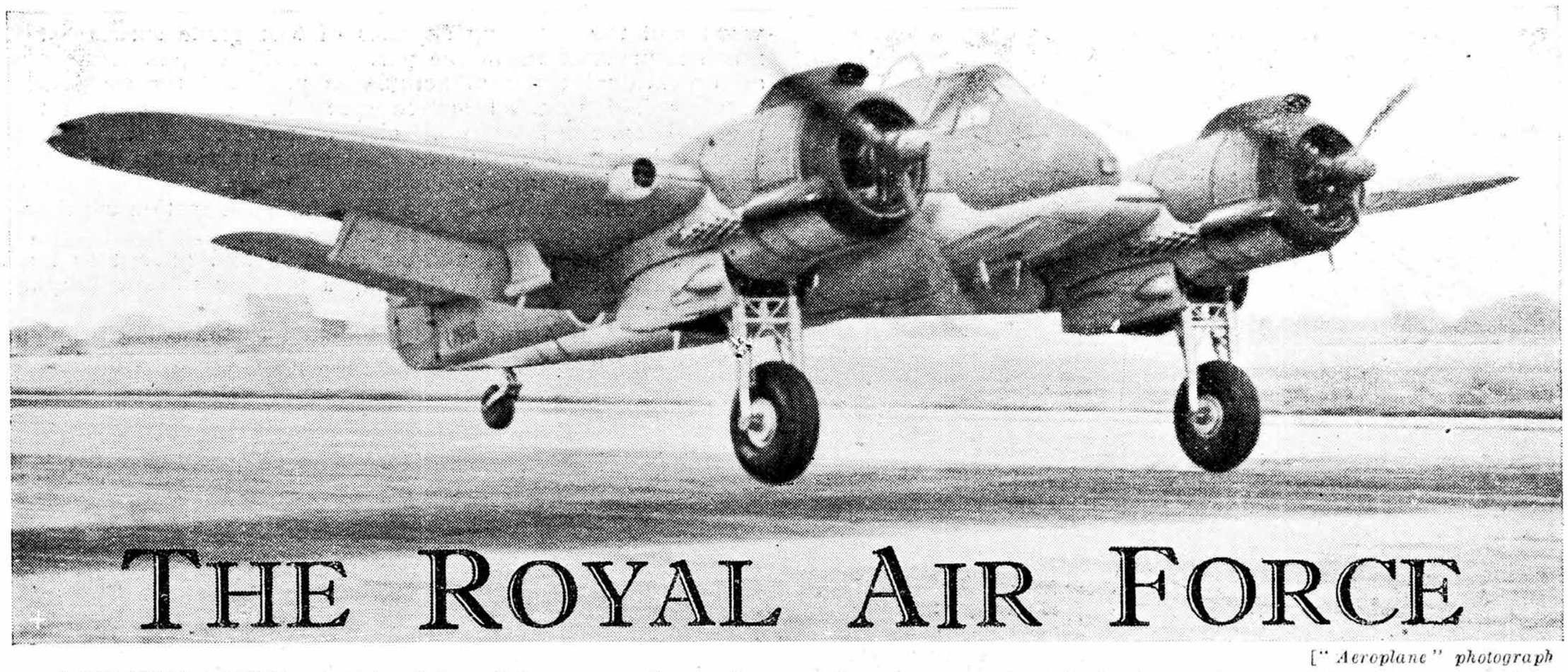
One of the first thick completely plywood covered monoplane wings in England was that designed by Mr. G. H. Handasyde for his H.2 monoplane of 1922. This was built at the Blériot works, Addlestone, Surrey, and was almost certainly the first British aeroplane with a multi-spar wing. Four spars were used and the wing section was deep and bi-convex at the root, but the under-surface was flat at the tips. The spars had two-ply webs of spruce and booms of the same timber. Fabric was used to reinforce the sides of the webs which were made up of thin strips glued back to back diagonally. There were stringers between the spars, ribs being notched as necessary. The leading edge was of $\frac{1}{16}$ in. thick three-ply, and the remainder was thinner three-ply laid on in narrow spanwise strips. This aeroplane was a six-seater high wing monoplane designed for use in Australia. A tricycle-style undercarriage (with nose wheels) was fitted.

Interesting as the type was, it did not become universally adopted and a number of years elapsed before the ply-covered wing became accepted practice, especially in England.

(To be continued.)



BEFORE ITS TIME?—The Handasyde H.2 monoplane of 1922 which carried wooden construction to the limit. This promising experiment, which incorporated the "tail-up" undercarriage idea, was ultimately destined for the scrap-heap. The motor was a 360 h.p. Rolls-Royce Eagle IX.



THE ROYAL AIR FORCE

["Aeroplane" photograph

LEFT WING LOW.—A Bristol Beaufighter torpedo-bomber touches down with a slight list to port. The air intakes, oil coolers and flame-damped exhausts can be seen clearly.

THE ROLL OF HONOUR

THE 288th and 289th Casualty Lists were published by the Air Ministry on September 27 and 28. They contain the names of 586 R.A.F. officers and airmen, including those of 211 mentioned in previous lists as missing or missing believed killed and now presumed killed in action or on active service or Prisoner of War.

The lists include 82 killed in action or on active service, 35 died or died of wounds or injuries received in action or on active service, 11 wounded or injured in action or on active service and 247 missing or missing believed killed in action or on active service.

The total R.A.F. casualties officially reported since the War began is now 57,255.

The 288th and 289th Casualty Lists are:—

ROYAL AIR FORCE

Killed in Action

1317890 Sgt. H. Badge.
1319447 Sgt. M. A. Bidgood.
1043394 Sgt. F. Hadcraft.
950684 Sgt. E. Higgins.
45724 F/L A. C. Jepps.
48525 F/O F. D. Mottram.
47296 F/O G. B. Reid.
1230748 Sgt. J. A. Spence.
991246 Sgt. R. Wood.
1149750 Sgt. A. C. Wright.
133113 F/O R. W. Buckland.
1385748 Sgt. J. M. A. Clarke.
124654 F/O D. C. Colahan.
1605270 Sgt. R. J. C. Dean.
139848 P/O D. A. Dyball.
1483399 Sgt. T. Gates.
1059601 F/Sgt. B. P. Hall.
132156 F/O J. Kyle.
1194381 Sgt. C. W. Privett.
1112033 F/Sgt. A. L. Reynolds.
1346873 Sgt. H. Scott.
1694468 Sgt. A. Smith.
132746 F/O W. R. Tidball.
112490 F/O D. J. N. Towle.
145861 P/O A. E. Tribbeck.
530636 F/Sgt. R. Watson.
1068109 Sgt. A. T. Wright.
1049789 Sgt. G. W. Yare.

Previously Reported Missing Believed Killed in Action, Now Presumed Killed in Action

1024020 Sgt. S. Bland.
1239045 Sgt. G. W. Brothwell.
574813 Sgt. V. J. M. Donaldson.
1318066 Sgt. A. Jacobsen.
655598 F/Sgt. M. W. Lofthouse.
1553494 Sgt. D. C. Nelson.
1389926 Sgt. R. E. Roberts.
1576603 Sgt. G. Roe.
1195462 Sgt. A. J. Symonds.
1377524 Sgt. J. Webber.
120246 F/O H. Bardsley.
1170430 F/Sgt. M. F. Carlin.
1325001 Sgt. C. G. Cave.
1322050 Sgt. E. J. Chapman.
1259996 Sgt. F. Greaves.
572280 F/Sgt. G. Green.
981144 Sgt. E. T. Jones.
1018129 F/Sgt. J. P. R. Julian.
935090 Sgt. R. Leese.
1340067 Sgt. T. McL. Millar.
1000351 Sgt. J. B. Ritchie.
964253 Sgt. M. I. Sharpley.
49173 P/O E. J. Sleigh.
1377300 Sgt. G. J. Smale.
777606 P/O J. H. Thwaits.

Previously Reported Missing, Now Presumed Killed in Action

1553931 Sgt. J. C. Allan.
1148934 Sgt. A. R. Ashford.
1312006 F/Sgt. H. Barton Smith.
1164373 Sgt. L. H. Bell.
953518 Sgt. W. Bell.
655089 Sgt. E. Benning.
573732 F/Sgt. R. N. B. Brooker.
1044874 Sgt. A. D. Chance.
1542878 Sgt. S. Cookson.
1378555 Sgt. O. R. O. Cotter.
1310153 Sgt. D. B. Crabb.
612405 Sgt. T. R. Elliott.
118619 P/O F. H. Ellis.
1266038 Sgt. L. Fitzgerald.
1166524 F/Sgt. F. D. Hamilton-Wilkes.
1195323 Sgt. R. Harris.
1115315 F/Sgt. L. Horn.
1201247 Sgt. S. F. Howe.
646348 Sgt. J. A. Hunter.
655704 Sgt. E. A. Kelly.
1379754 Sgt. J. H. W. Livesey.
1326326 Sgt. R. McCulloch.
1379880 F/Sgt. W. M. Marvin.
1324301 F/Sgt. R. G. D. Mathews.
1111811 F/Sgt. R. Miller.
547288 Sgt. A. J. Ottoway.
1197660 Sgt. L. N. Owen.
110644 P/O R. D. Owen.
550699 F/Sgt. L. M. Peterson.
628018 F/Sgt. D. K. Potter.
1095594 Sgt. A. Quinn.
1312781 Sgt. I. H. Ridge.
924483 F/Sgt. S. D. G. Roberts.
567796 Sgt. J. V. Robinson.
1252611 Sgt. S. O. Rogers.
1267013 F/Sgt. R. S. I. Ryder.
1061861 F/Sgt. F. Quigley.
992623 F/Sgt. F. Sanderson.
656315 Sgt. J. D. Sargeant.
1127646 Sgt. N. Sephton.
1111468 Sgt. P. S. Sharman.
1540792 Sgt. A. Short.
63414 S/L W. A. Smith.
1433222 Sgt. R. Spencer.
1376849 F/Sgt. E. F. Talbot.
746495 Sgt. A. M. Temple.
1272068 Sgt. A. F. Thomas.
1062347 Sgt. J. E. Thomas.
1060636 Sgt. R. G. Thomlinson.
1061243 Sgt. J. Tunnacliffe.
1165290 F/Sgt. K. Wakefield.
798632 Sgt. H. M. Williams.
1436485 Sgt. W. G. Woodhouse.
1378917 F/Sgt. L. R. T. Wright.
1499893 Sgt. S. Wright.
1293291 Sgt. W. E. R. Wright.
1333842 Sgt. R. E. Bates.
130457 P/O R. H. Bramwell.
1177608 Sgt. S. G. Brooking.
1291956 Sgt. G. A. Carter.
135485 P/O D. G. Chell.
1114094 Sgt. A. Cooke.
1377639 Sgt. W. R. Downing.
63787 F/O D. Fulford, D.F.C.
130437 P/O G. A. Hamman.
113870 F/O F. C. Hammond.
1109095 F/Sgt. M. Hanna.
1331850 Sgt. B. P. Norwood.
1056197 F/Sgt. J. Howells.
1104367 Sgt. R. D. Hustler.
1126184 Sgt. R. V. Ievers.
118894 P/O F. G. R. Jeffries.
114169 F/O D. St. J. Jowitt.
1379419 Sgt. F. E. Kirby.
1312083 Sgt. C. Lucas.
1088097 Sgt. C. McCreedy.
101467 F/O A. W. R. Morisse.
1163981 Sgt. A. I. Mugford.
1365070 Sgt. D. Noble.
934418 Sgt. E. C. Ringham.
1006798 Sgt. A. E. Roberts.
1336016 Sgt. H. A. Roberts
547371 Sgt. L. A. Roff.
1183329 F/Sgt. R. J. Rogers.
654120 Sgt. W. J. Salter.
1195426 Sgt. P. W. A. Samwell.
1430261 Sgt. L. A. Shepherd.
1384304 Sgt. J. T. Sullivan.
1014904 Sgt. J. R. N. Thorpe.
1053439 Sgt. G. Tough.
1055128 F/Sgt. R. B. Whitcombe.
40774 Act. S/L B. J. Wicks, D.F.C.
40332 S/L F. C. Willis.

Wounded or Injured in Action

627999 Sgt. P. B. McDonnell.
143372 P/O G. S. Richardson.

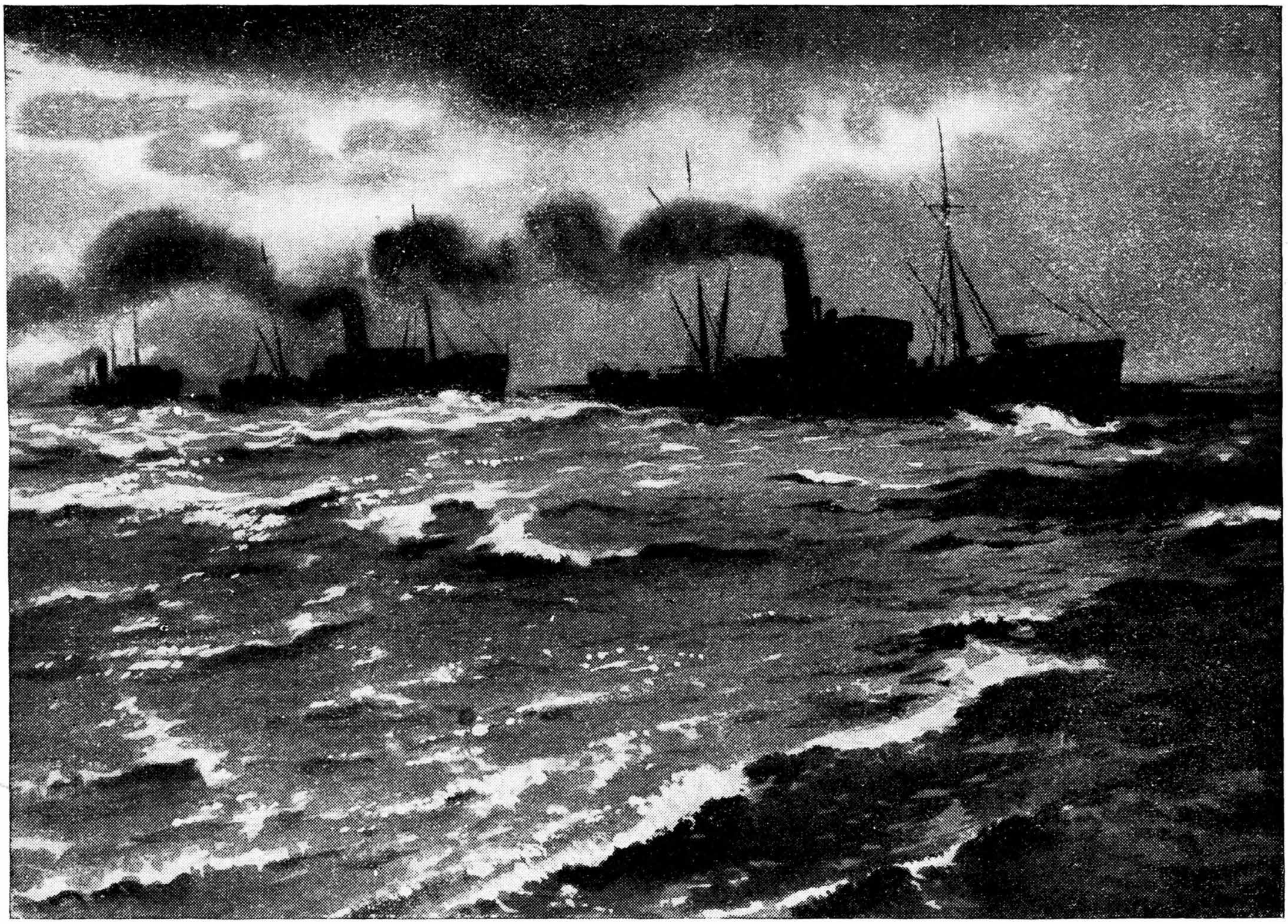
Missing, Believed Killed in Action

148756 P/O D. B. Ackerley.
656918 F/Sgt. W. C. Batkin.
1600763 Sgt. W. Collins.
125931 F/O G. Downey.
972626 Sgt. H. Gossop.
1214522 Sgt. D. Hawcroft.
1043842 Sgt. A. J. Maginnis.
553948 F/Sgt. J. B. Horsburgh.
1211834 Sgt. A. Millband.
135886 P/O E. Crouch.

Missing

901343 Sgt. P. D. Ablett.
135683 F/O R. F. W. Allison.
1379537 Sgt. W. F. Ardron.
1561872 Sgt. I. G. Armet.
1393720 Sgt. F. L. Backhouse.
70789 S/L The Hon. R. A. G. Baird.
1432057 Sgt. D. A. Barnfather.
1437124 Sgt. G. H. Brown.
1388532 Sgt. R. H. Burn.
131029 F/O C. Burne.
1366510 Sgt. G. L. Campbell.
1339076 F/Sgt. N. P. I. Castells.
1039009 F/Sgt. J. B. Charters.
1442849 Sgt. C. E. Clark.
124479 F/O L. R. Crampton.
1324627 Sgt. L. H. Croad.
1451682 Sgt. R. H. Connor.
133356 F/O W. A. Damsell.
146356 P/O R. E. Dodd.
1399543 Sgt. J. Donaldson.
907282 Sgt. D. W. Downes.
1588990 Sgt. J. W. Doyle.
45806 F/L J. A. P. Drummond, D.F.M.
1151937 Sgt. E. H. Eke.
1032917 Sgt. R. H. Fisher.
1129762 Sgt. J. Fleming.
132146 F/O B. J. Fox.
129582 F/O D. J. Gibson.
1050457 Sgt. E. Gough.
1026588 Sgt. W. McK. Grant.
135404 P/O E. A. Haddock.
657882 Sgt. R. Harbour.
131601 F/O W. J. J. Hitchcock.
149902 P/O T. A. Holman.
1021591 Sgt. S. F. Hughes.
1384790 Sgt. V. R. Jacon.
148459 P/O W. Jones.
1397047 Sgt. E. B. Jordan.
1379544 F/Sgt. F. E. Juggins.
700760 Sgt. R. B. L. Kent.
1575932 Sgt. G. J. Kinnersley.
127911 Act. F/L B. M. Laing.
919585 Sgt. J. L. Leader.
1338225 Sgt. B. A. Lee.
1344081 Sgt. D. McM. McCullock.
1377432 Sgt. G. Macgregor.
1550725 Sgt. R. McWilliams.
1096832 Sgt. W. S. Maben.
1483123 Sgt. L. E. Maidment.
1055280 P/O O. P. Marshall.
1080667 Sgt. J. Marsh.
1558725 F/Sgt. H. M. Matheson.
1318179 Sgt. H. Mathews.
1585237 Sgt. R. L. Mathias.
133723 F/O P. H. May.
127974 F/O W. J. Moorcroft.
1379660 Sgt. E. R. Moore
515976 Sgt. S. H. Mortimer.
1336423 Sgt. D. A. Page.
1580317 Sgt. H. Pettie.
125422 F/O N. S. M. Reid.
1390940 Sgt. M. D. Rice.
1395178 Sgt. C. W. Robertson.
653317 Sgt. F. Robertson.
532227 F/Sgt. G. Robinson
1049564 Sgt. S. Robson.
1077030 Sgt. J. W. Rooke.
655247 F/Sgt. N. Rosenblatt.
70597 S/L K. H. Salisbury-Hughes.
1311760 Sgt. I. J. Sansum.
948645 Sgt. A. S. Scott.
537395 Sgt. R. M. Shepley.
957593 Sgt. H. W. C. Simms.
644138 Sgt. W. A. R. Sinclair.
1496119 Sgt. G. R. Slack.
1330882 Sgt. E. Smith.
1213143 Sgt. R. A. Smith.
1575752 Sgt. J. Tarver.
642761 Sgt. J. A. Tyler.
117305 F/O J. M. Vaughan.
1235107 F/Sgt. R. A. Walker.
1321904 Sgt. P. W. Wallis.
1321748 Sgt. F. F. Ward.
1291444 Sgt. S. H. Welch.
1231515 F/Sgt. F. W. Whittaker.
149950 P/O A. R. Wilden.
149140 P/O D. Williams.
576865 Sgt. J. W. G. Wilson.
129042 F/O H. W. Woodsend.
638104 Sgt. I. R. L. Acton Hill.
1214350 Sgt. V. Allen.
1417057 Sgt. G. G. Arnold.
1551651 Sgt. S. Arthur.
1358996 Sgt. L. C. Baker.
1385206 Sgt. F. E. Bamberger.
1052254 Sgt. F. Barnes.
952706 Sgt. L. G. Bentley.
1235499 Sgt. D. W. Bettinson.
1211327 Sgt. D. G. Bingley.
113394 F/O G. B. Blunn.
124433 F/O W. C. Bond.
1188708 Sgt. L. W. Booth.
1501434 Sgt. J. D. G. Bunker.
1550978 Sgt. R. Burnett.
655402 F/Sgt. W. Caldwell.
658529 Sgt. D. Campbell.
1267471 Sgt. G. T. Causer.
128604 Act. F/L J. R. Childs.
1126817 F/Sgt. T. J. Clayton.
574703 Sgt. N. C. Cleaver.
1129034 Sgt. B. G. A. Cooper.
1318539 Sgt. D. Crome
155092 P/O J. A. H. Dale.
564614 Sgt. D. Daniels.
134732 P/O P. W. Davis.
1116784 Sgt. T. B. Dawson.
1343832 Sgt. R. Deans.
542725 Sgt. J. Dolan.
845654 Sgt. S. E. R. Douglas.
1321285 Act. W.O. R. Gafford.
1074974 Sgt. J. P. McM. Garland
1528101 Sgt. C. H. Glover.
1319988 Sgt. J. E. Goddard.
1768162 Sgt. E. E. R. Gomershall.
957450 Sgt. P. A. Goodyear.
1311363 Sgt. B. Gorman.
1338742 Sgt. S. F. Hathaway.

. . . down below are the ships. In touch, through fair weather or foul, by wireless communication that guides and warns and directs the convoy on its journey; keeping open the long sea lanes . . . bringing our cargoes to safe harbour.



MARCONI

1081225 Sgt. J. Haworth.
1337670 Sgt. D. H. Head.
1332496 Sgt. L. S. Hill.
1334010 Sgt. A. E. A. Holden.
1202849 Sgt. F. W. Holmes.
1315897 F/Sgt. D. P. P. Hurst.
1586023 Sgt. N. F. Hyde.
1382281 Sgt. W. G. Imrie.
1333888 Sgt. L. H. Johnson.
134069 F/O D. G. Jones.
646237 Sgt. G. Jones.
1384540 Sgt. F. C. Kingston.
1450378 Sgt. H. Hadfeld.
657444 Sgt. J. B. Lamont.
1699658 Sgt. J. Land.
128586 F/O W. E. Leddiman.
658501 Sgt. J. Little.
130280 F/O G. Lockie.
1318280 Sgt. D. S. Loveland.
999000 F/Sgt. J. Lynch.
1802900 Sgt. J. G. Lysaght.
1567335 Sgt. G. D. McCullock.
143982 Act. F/L G. H. McDougal.
1620745 Sgt. R. D. McKeown.
1065812 Sgt. J. McLaughlin.
1183352 F/Sgt. A. C. Mack.
658718 Sgt. H. B. Mellor
1336380 Sgt. J. W. Merrie.
126710 F/O J. G. Millar.
1297114 Sgt. R. A. W. Morse.
39562 Act. W/C J. A. Piddington.
925177 Sgt. R. Newcombe.
1319822 Sgt. G. E. Palmer.
1321294 Sgt. R. W. Paulin.
1817261 Sgt. W. E Pearce.
1558903 Sgt. R. Raisbeck.
1577332 Sgt. B. S. Rate.
1335292 Sgt. H. G. J. H. Read.
136395 P/O P. Renton.
591518 Sgt. R. Scarth.
1367183 Sgt. J. Scott.
138056 P/O C. H. Seymour.
1504927 Sgt. A. Smith.
1430569 Sgt. H. M. Smith.
131955 Sgt. D. E. H. Stroud.
1215235 Sgt. J. Sullivan.
1315558 Sgt. W. J. Thorne.
1239994 Sgt. R. Wilkinson.

Missing, Believed Killed on Active Service

1568965 A.C.2 H. Hogg.
1494440 Sgt. A. Agar.

Killed on Active Service

1376786 W.O. R. J. Badger.
1652832 L.A.C. I. G. J. Davies.
1333319 F/Sgt. W. F. Frost.
1375797 Sgt. B. Gallant.
1338924 Sgt. P. R. Hope.
1575040 Sgt. A. H. Iremonger.
1392936 Sgt. G. C. Lawrance.
710260 Act. Sgt W. B. K. Lewis.
659109 Sgt. R. K. MacAndrew.
137470 P/O J. McKenna.
1555319 Sgt. W. L. Nicol.
104497 F/L J. F. Page.
1124862 Sgt. S. Schofield.
149673 P/O R. S. Towler.
968165 W.O. B. C. Walmsley.
1330205 F/Sgt. R. Wilson.
1569447 Act. Sgt. R. R. D. Marsden.
1344055 F/Sgt. H. D. Bryson.
1375194 Sgt. W. C. Bull.
1207235 Sgt. E. C. Buttle.
1690312 Sgt. J. A. Campbell.
1579842 Sgt. R. D. Carpenter.
1545420 Sgt. S. H. Carter.
1603440 L.A.C. J. H. Clayton.
1027840 Sgt. R. D. Eaglen.
1579031 Sgt. K. C. Earnshaw.
1670453 Act. Sgt. J. Eastwood.
1577779 Sgt. K. Edwards.
131555 F/O W. Hemmings.
1567822 L.A.C. H. F. Hewitt.
1167828 W.O. R. A. Hodges.
658749 Sgt. S. F. Hook.
1185183 Sgt. R. G. Kings.
1387539 Sgt. B. Lillyman.
70502 F/L T. M. Niemeyer.
133718 P/O R. H. Rutherford.
151332 P/O G. H. I. Smith.
966541 Sgt. R. D. Smith.
1804500 Sgt. G. F. A. Wix.

Previously Reported Missing Believed Killed on Active Service, Now Presumed Killed on Active Service

745922 F/Sgt. D. Shackell.

Previously Reported Missing, Now Presumed Killed on Active Service

916421 Sgt. J. J. S. Corderoy.
1086900 Sgt. W. G. Dryburgh.
1280771 Sgt. A. C. Loeber.
1255736 F/Sgt. H. H. Sawyer.
1189553 Sgt. J. R. Stocker.
1124718 Sgt. J. S. Wardle.
658032 Sgt. C. H. Willmot.
1202556 Sgt. F. Wright.
125677 P/O E. J. Dando.
1070177 Sgt. C. S. George.
1002346 Sgt. L. W. Roberts.
1289637 Sgt. D. A. Saunders.
1135365 Sgt. T. G. Sinnett.

Wounded or Injured on Active Service

1386897 Sgt. L. J. Knott.
1081243 F/Sgt. T. R. Furber.
572572 Cpl. F. J. Reeve.

Died of Wounds or Injuries Received on Active Service

1317455 Sgt. J. S. Powell.

Died on Active Service

1038499 A.C.1 D. Astle.
1319795 A.C.1 C. E. Bozworth.
635157 Cpl. E. K. Davis.
1397073 A.C.2. K. G. H. Elliott.
1054250 L.A.C. W. G. Gibson.
1006518 L.A.C. C. R. Harrison.
1013972 L.A.C. W. McKechnie.
1149711 A.C.1 N. A. Makin.
1452554 L.A.C. B. K. Osborne.
1656022 L.A.C. K. W. Peckham.
1565306 A.C.2 R. Price.
1163302 L.A.C. A. Rae.
526078 L.A.C. W. M. M. Wilkie.
1348927 L.A.C. A. H. Wilson.
127108 F/O E. S. Woodhead.
1282426 L.A.C. R. J. Baker.
1250638 Cpl. D. J. Brown.
1274566 L.A.C. D. B. Cameron.
1483302 L.A.C. G. H. Carter.
1152895 L.A.C. R. W. Castell.
2213022 A.C.2 T. Fleming.
942233 Cpt. R. E. Gillard.
525353 F/Sgt. A. McAllan.
950891 Cpl. J. W. McKenzie.
1468681 A.C.1 E. S. Mulcahy.
1851278 A.C.2 D. H. Russell.
1676093 Act. Cpl. J. H. Taylor.
958571 Cpl. F. H. Thorpe.
541394 Sgt. R. M. Williams.
1365308 Sgt. J. F. Wilson.

Previously Reported Missing, Now Reported Prisoner of War

129477 P/O R. Donnan.
1332270 Sgt. F. Tees.
1330122 Sgt. H. J. Adams.
47704 F/O S. W. Gould.
127316 F/O P. Hyden.

WOMEN'S AUXILIARY AIR FORCE

Died on Active Service

895047 A.C.W.2 M. M. J. Wheeler

ROYAL AUSTRALIAN AIR FORCE

Killed in Action

Aus.410446 F/Sgt. R. O. C. Brett.

Previously Reported Missing Believed Killed in Action, Now Presumed Killed in Action

Aus.402823 Act. F/L J. W. Yarra, D.F.M.
Aus.10169 Act. Sgt. J. Carr.
Aus.412049 P/O W. G. Diehm.
Aus.401623 F/O C. A. Graham.

Previously Reported Missing, Now Presumed Killed in Action

Aus.401601 P/O H. J. Fraser.
Aus.400621 Sgt. H. C. Hunt.
Aus.405080 Sgt. R. D. Macdonald.
Aus.401010 P/O K. Milligate.
Aus.402989 F/O J. S. Ward.
Aus.401739 Sgt. I. G. Brodie.
Aus.404600 Sgt. N. G. Bass.
Aus.403160 P/O R. A. Brittingham.
Aus.403396 P/O W. M. J. Matchett.
Aus.400480 F/Sgt. P. J. O. Mueller.
Aus.403878 F/O F. C. Pinfold.
Aus.401053 F/Sgt. N. H. Simpson.
Aus.407994 F/Sgt. J. K. Swain.
Aus.6946 Sgt. T. H. Williams.

Missing

Aus.413370 F/O C. C. Godley.
Aus.406795 F/Sgt. N. A. B. Robinson.
Aus.415222 F/Sgt. R. T Bilsby.
Aus.408418 Sgt. A. J. H. Bock.
Aus.411303 F/O D. W. Ellis.
Aus.415337 Sgt. T. P. Laird.
Aus.410605 Sgt. N. R. Linton.
Aus.412176 F/Sgt. E. E. Norman.
Aus.412701 F/Sgt. L. G. Potts.
Aus.410382 Sgt. H. J. Richardson.
Aus.408739 F/Sgt. N. A. Rubens.
Aus.411618 F/Sgt. K. Van Waning.

Killed on Active Service

Aus.413825 F/Sgt. H. P. Clancy.
Aus.413863 Sgt. F. Harrison.
Aus.417302 F/Sgt. A. G. Potter.
Aus.425224 Sgt. E. H. B. Saker.
Aus.409454 P/O L. G. Sellars.
Aus.409951 F/O A. M. Shalless.
Aus.416238 Sgt. P. J. Whittard.

Previously Reported Missing, Now Presumed Killed on Active Service

412563 Sgt. B. O. K. McRoberts.

Wounded or Injured on Active Service

Aus.420231 F/Sgt. W. K. F. Merrett.

Died on Active Service

Aus.411135 Cpl. W. Fleming.
Aus.412987 Sgt. E. A. Madsen.

ROYAL CANADIAN AIR FORCE

Killed in Action

J.16675 P/O J. M. Chalifour.

Previously Reported Missing Believed Killed in Action, Now Presumed Killed in Action

R.135059 Sgt. W. A. Gillen.
J.21716 P/O R. L. Alexander.
J.10415 F/O R. F. L. Anderson.
R.82074 Sgt. J. W. Dubroy.
R.86838 F/Sgt. F. McL. Macdonald.
R.86929 Sgt. R W. L. Mills.

Previously Reported Missing, Now Presumed Killed in Action

R.111658 Sgt. M. E. Buechler.
R.127686 Sgt. D. Crossthwaite.
R.93162 Sgt. R. Doherty.
R.99798 F/Sgt. H. A. Dunn.
R.68262 Act. W.O. H. A. Elliott.
J.10250 P/O M. Holub.
R.90778 F/Sgt. V. A. Hugli.
R.86378 F/Sgt. G. A. Keil.
R.85449 F/Sgt. W. K. Martin.
R.75869 Sgt. R. C. Mutch.
R.90773 Sgt. M. J. Paige.
R.90158 Sgt. G. E. Robson.
R.51824 Sgt. J. H. G. Shaw.
R.91316 Sgt. W. O. Snow.
J.5798 F/O E. W. Wallace.
4285 F/Sgt. R. O. Warren.
R.78865 F/Sgt. F. E. Wise.
R.82050 F/Sgt. M. Zumar.
R.69145 Sgt. J. J. G. Chabot.
R.90227 Sgt. W. C. Colwill.
R.83543 F/Sgt. W. J. Dempster.
J.10222 F/O E. R. Gray.
R.71321 F/Sgt. B. J. Hardesty.
R.87408 F/Sgt. M. R. Lockwood.
R.59361 Sgt. R. K. McGrath.
J.9510 F/O J. F. Osborne.
R.102451 F/Sgt. K. E. Stilborn.
J.6388 F/O J. B. Wilson.

Wounded or Injured in Action

J.5547 F/O A. A. Bishop.
11602 Sgt. H. E. Finn.
J.8107 F/O A. E. Mountford.
R.82762 F/Sgt. J. A. V. Richard.
J.14560 F/O D. M. Wettlaufer.

Died of Wounds or Injuries Received in Action

R.139157 Sgt. C. McK. Goudy, D.F.M.

Previously Reported Missing Believed Killed in Action, Now Reported Died of Wounds or Injuries Received in Action

R.81762 Sgt. A. V. Milot.

Missing, Believed Killed in Action

C.18022 P/O C. E. Hightower.
R.87870 F/Sgt. J. S. Kelly.
J.16610 P/O H. B. Parliament.

Missing

J.22215 P/O D. A. Campbell.
R.118109 Sgt. F. M. Cole.
J.11953 F/O J. W. Crowley.
R.178676 Sgt. R. S. L. Day.
J.16328 Act. F/L H. F. Ewer.
R.83848 Sgt. J. R. Fitch.
J.15609 F/L J. H. Foy.
J.16808 P/O G. K. Hignell.
J.13071 F/O H. T. Huston.
J.1326 S/L A. Lambert, D.F.C.
J.22569 P/O E. V. Lee.
J.18114 P/O J. B. McDougall.
R.119526 Sgt. E. G. McLeod.
R.178390 Sgt. O. Minor.
R.115295 Sgt. T. J. Roche.
J.12681 F/O T. W. Simpson.
J.20378 F/O G. L. Barker.
J.11650 F/O J. A. Belecky.
J.17735 P/O J. E. Bemister.
J.18209 P/O J. H. Borley.
R.136372 Sgt. B. Buckley.
J.10328 F/O W. C. Davidson.
J.8202 F/O R. C. East.
J.14805 F/O A. R. A. Farguhar
R.97647 Sgt. J. A. Firth.
R.89875 F/Sgt. J. W. Gillin.
R.102359 Sgt. R. O. Hunter.
R.60903 F/Sgt. L. M. Lavallee.
R.115974 Sgt. J. R. A. Leblanc.
J.21030 P/O E. B. McCutcheon
J.12329 F/O H. W. McDonald.
R.126941 Sgt. R. C. McLellan.
J.17769 P/O R. F. Mang.
J.10046 F/O J. A. W. Melrose.
R.77208 Sgt. E. F. Parker.
J.17693 P/O W. G J. Richardson.
J.16835 F/L C. C. Stovel, D.F.C.
R.80721 F/Sgt. F. R. Vance.
R.120070 F/Sgt. R. E. Vanderbeck.
J.21545 F/O L. H Walton.

Killed on Active Service

J.23738 P/O T. Johnstone.
J.21964 P/O H. C. Miller.
R.144142 Sgt. D. L. R. Redfern.
J.14046 F/O M. J. W. Aspinall.
J.21991 P/O C. A. Crites.
R.128432 Sgt. R. H. Murdock.

Previously Reported Missing, Now Presumed Killed on Active Service

R.102019 Sgt. M. J. Bracey.
R.102803 Sgt. R. Sandham.
R.106876 Sgt. R. J. Woodruff.

Previously Reported Missing, Now Reported Prisoner of War

J.13808 F/O B. A. G. Campbell.
J.17696 P/O J. W. Fraser.
J.22523 P/O T. R. C. Irwin.
R.134856 Sgt. J. O. Mander.

ROYAL NEW ZEALAND AIR FORCE

Previously Reported Missing Believed Killed in Action, Now Presumed Killed in Action

NZ.412872 F/Sgt. J. S. Durward.
NZ.41336 F/O K. S. Kibble.
NZ.413165 Sgt. P. T. W. Wiltshire.

Previously Reported Missing, Now Presumed Killed in Action

NZ.411723 Sgt. W. H. Lipquey.
NZ.411098 Sgt. L. J. Pearce.
NZ.403600 Sgt. A. D. Glover.
NZ.403790 Act. F/L B. Martin.
NZ.411951 F/O K. Tahiwi.
NZ.411107 Sgt. W. S. Thompson.

Missing

NZ.415372 F/Sgt. E. W. Saywell.
NZ.412185 P/O C. Baker.
NZ.405778 F/O S. M. Hunt.
NZ.413429 F/Sgt. I Kippenberger.

Previously Reported Missing, Now Presumed Killed on Active Service

NZ.413016 Sgt. T. M. Blakemore.

SOUTH AFRICAN AIR FORCE

Previously Reported Missing, Now Presumed Killed in Action

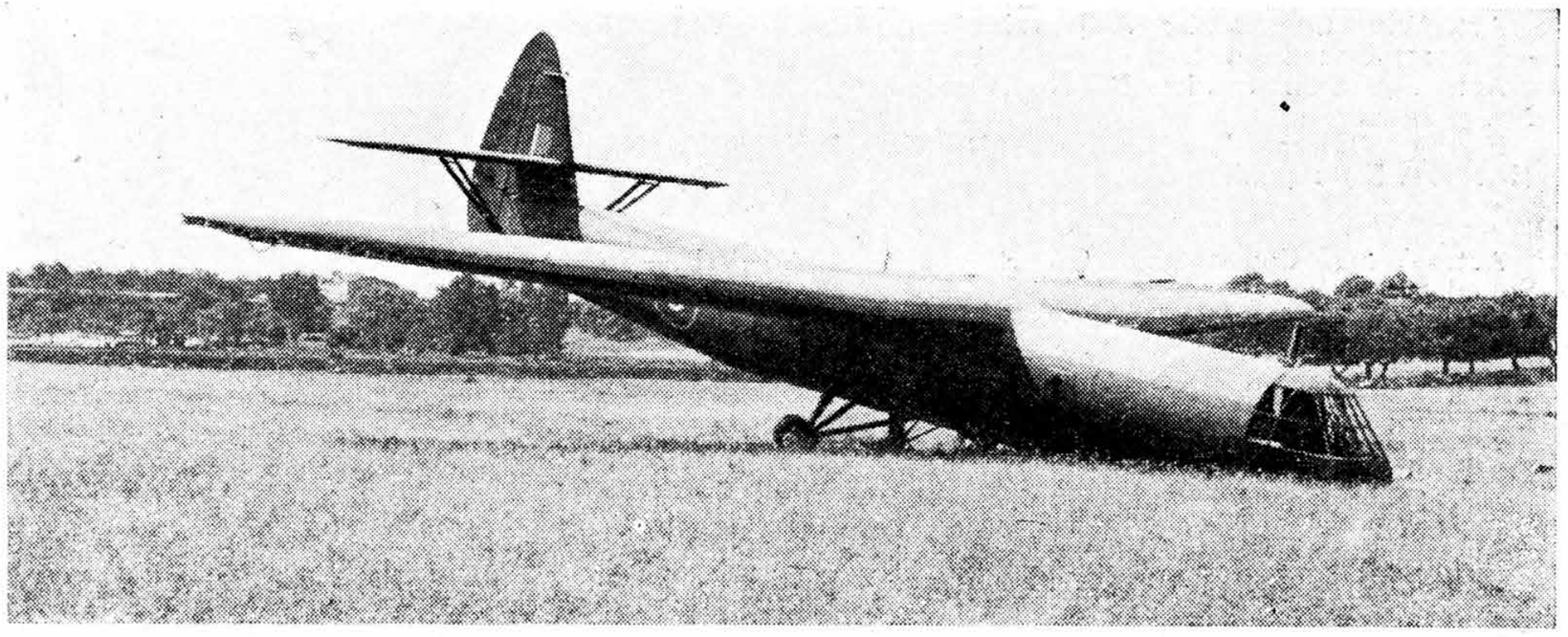
205396 Lt. G. W. Brodziak.

Missing, Believed Killed in Action

2714 Lt. C. A. Halliday.

Previously Reported Missing, Now Reported Prisoner of War

206179 Lt. V. Mundell.
205707 2nd Lt. C. Southwood



SOFT LANDING.—An Airspeed Horsa glider which landed near Syracuse carrying troops. One wheel seems to have run into soft ground and to have caused the Horsa to put its chin down.

ROYAL AIR FORCE AWARDS

HIS MAJESTY THE KING has approved the following awards in recognition of skill and devotion to duty during night sorties, bombing attacks on enemy territory and other air operations. The list includes awards for distinguished services in the Mediterranean Air Command from February to May, 1943:—

Commanders of the British Empire

Air Commodore John Whitford, O.B.E.
Act. Air Commodore F. B. Ludlow, O.B.E., M.C.
Group Captain J. H. Edwardes-Jones, D.F.C., A.F.C.
Act. Group Captain H. D. Jackman.
Colonel H. J. Martin, D.F.C., S.A.A.F.

Officers of the British Empire

Wing Commander H. A. R. Holford.
Act. Wing Commander W. J. Maggs.
Act. Wing Commander D. R. P. Mills, R.A.F.O.
Act. Wing Commander S. H. E. Mitchell.
Squadron Leader William Wolfenden.
Act. Squadron Leader H. Barratt-Atkin.
Act. Squadron Leader E. M. Downes.
Act. Squadron Leader Frank Ellis, R.A.F.V.R.
Act. Squadron Leader E. F. Hine, R.A.F.V.R.
Act. Squadron Leader L. F. Odell, R.A.F.V.R.
Act Squadron Leader F. J. D. Oldland.
Act. Major T. R. Jones, S.A.A.F.
Flight Lieutenant (now Act. Squadron Leader) R. A. Coleman
Flight Lieutenant C. N. Kington, R.A.F.V.R.
Flight Lieutenant John Moffett, R.A.F.V.R.
Flight Lieutenant L. D. Scott, R.A.F.V.R.
Act. Flight Lieutenant Gerald Burke.
Act. Flight Lieutenant A. G. Clennett.
Act. Flight Lieutenant R. J. Ginn, R.A.F.V.R.
Act. Flight Lieutenant S. E. St. A. James.
Act. Flight Lieutenant E. E. Legg, R.A.F.V.R.
Act. Flight Lieutenant A. M. Paterson.
Act. Flight Lieutenant W. L. Ross.
Act. Flight Lieutenant C. W. E. Whowall, R.A.A.F.
Flying Officer F. L. Rogers.
Flying Officer W. H. Turner, R.A.F.V.R.
Pilot Officer H. A. Alward, R.A.F.V.R.
Captain L. G. Trichardt, S.A.A.F.
Warrant Officer R. C. Norton.
Warrant Officer M. R. Milburn.
Warrant Officer F. W. Smith.
Warrant Officer D. J. Strange.

Bar to Distinguished Service Order

Act. Wing Commander J. R. D. Braham, D.S.O., D.F.C.—No. 141 Squadron.
Act. Wing Commander J. E. Johnson, D.S.O., D.F.C., R.A.F.V.R.

Distinguished Service Order

Wing Commander James McLaughlin, D.F.C.—No. 144 Squadron.
Act. Wing Commander R. E. Bailey, D.F.C., R.A.F.O.—No. 466 (R.A.A.F.) Squadron.
Act. Wing Commander K. H. Burns, D.F.C., R.A.F.O.—No. 97 Squadron.
Act. Wing Commander W. V. Crawford-Compton, D.F.C., R.A.F.V.R.
Act. Wing Commander J. E. Fauquier, D.F.C., R.C.A.F.—No. 405 (R.C.A.F.) Squadron.
Act. Wing Commander R. S. C. Wood, D.F.C., R.A.F.O.—No. 12 Squadron.
Squadron Leader T. O. Prickett, D.F.C., R.A.F.O.—No. 103 Squadron.
Act. Squadron Leader F. B. Slade—No. 12 Squadron.
Act. Flight Lieutenant P. R. Coldwell, D.F.M., R.A.F.V.R.—No. 7 Squadron.

Military Cross

Flight Lieutenant A. C. Langham, R.A.F.V.R.
Flying Officer Thomas Dun, R.A.F.V.R.

Bar to Distinguished Flying Cross

Act. Wing Commander V. J. Wheeler, M.C., D.F.C., R.A.F.V.R.—No. 157 Squadron.
Act. Squadron Leader R. N. B. Stevens, D.F.C., R.A.A.F.—No. 3 Squadron.
Flying Officer J. D. Rae, D.F.C., R.N.Z.A.F.—No. 485 (R.N.Z.A.F.) Squadron.

Distinguished Flying Cross

Act. Wing Commander G. R. Park, R.A.F.V.R.—No. 256 Squadron.
Squadron Leader W. B. W. Gracey, A.A.F.—No. 144 Squadron
Squadron Leader A. W. Mack, R.A.F.O.—No. 605 Squadron.
Flight Lieutenant D. G. Andrews, R.A.A.F.—No. 453 (R.A.A.F.) Squadron.
Flight Lieutenant N. R. Fowlow, R.C.A.F.—No. 421 (R.C.A.F.) Squadron.
Flight Lieutenant P. J. Kelley, R.A.F.V.R.—No. 683 Squadron
Flight Lieutenant G. A. Sawtell, R.A.F.V.R.—No. 58 Squadron
Act. Flight Lieutenant B. G. Harris, R.A.A.F.—No. 3 Squadron
Flying Officer A. R. D'A. Clutterbuck, R.A.F.V.R.—No. 58 Squadron.
Flying Officer E. S. Dicks-Sherwood, R.A.F.V.R.—No. 92 Squadron.
Flying Officer R. J. Foster, R.A.F.V.R.—No. 108 Squadron.
Flying Officer R. W. Marshall, R.A.F.V.R.—No. 58 Squadron.
Flying Officer M. F. Newton, R.A.F.V.R.—No. 108 Squadron.
Flying Officer H. E. White, R.A.F.V.R.—No. 141 Squadron.
Flying Officer Harry Woolstencroft, R.A.F.V.R.—No. 144 Squadron.
Pilot Officer N. C. Richards, R.A.F.V.R.—No. 51 Squadron.
Act. Warrant Officer L. H. Wright, R.A.F.V.R.—No. 100 Squadron.

Conspicuous Gallantry Medal

Flight Sergeant A. W. J. Larden, R.C.A.F.—No. 218 Squadron.
Flight Sergeant Daniel Rees, R.A.A.F.—No. 460 (R.A.A.F.) Squadron.
Flight Sergeant O. H. White, R.N.Z.A.F.—No. 75 (R.N.Z.A.F.) Squadron.
Sergeant J. C. Bailey, R.C.A.F.—No. 622 Squadron.
Sergeant B. G. Bennett—No. 623 Squadron.

Military Medal

Corporal John Boyd.
Aircraftman 1st Class Robert Quigley.
Sergeant Leslie Pearman—No. 101 Squadron.

Distinguished Flying Medal

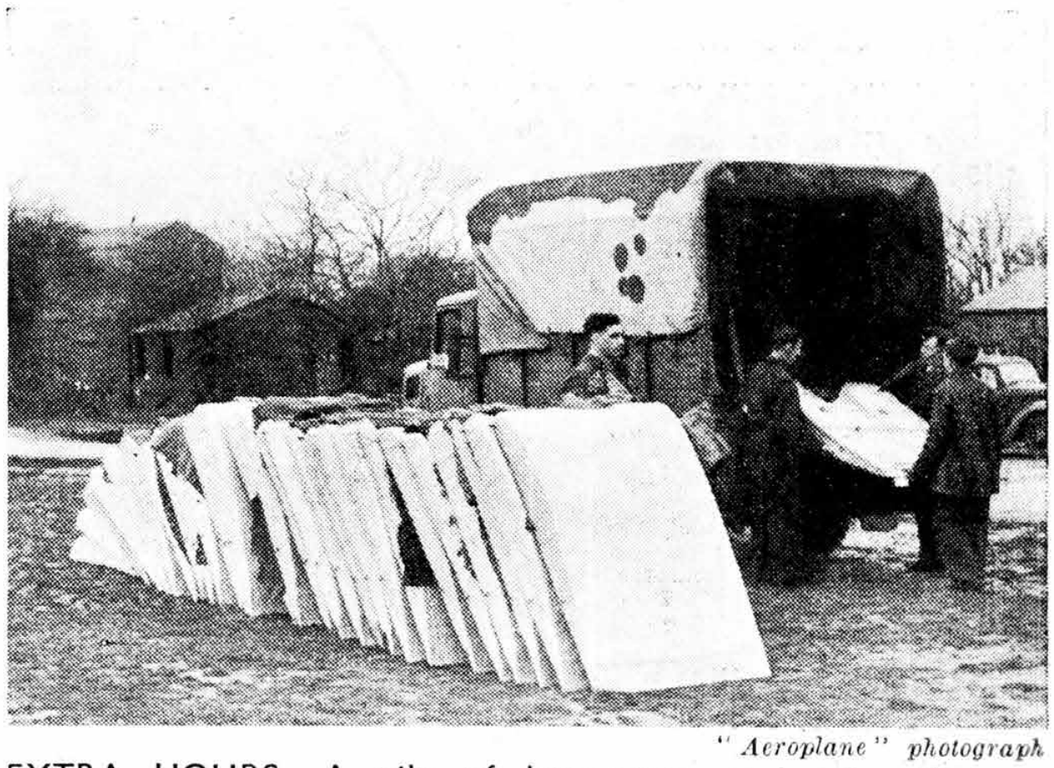
Flight Sergeant R. J. Daffey, R.A.F.V.R.—No. 77 Squadron.
Flight Sergeant A. J. Rhodes, R.N.Z.A.F.—No. 90 Squadron
Flight Sergeant A. C. Smith, R.A.F.V.R.—No. 137 Squadron.
Sergeant T. J. Collins, R.A.F.V.R.—No. 75 (R.N.Z.A.F.) Squadron.
Sergeant Robert Currie, R.A.F.V.R.—No. 199 Squadron.
Sergeant S. W. Farr, R.A.F.V.R.—No. 51 Squadron.
Sergeant J. A. W. Howe, R.A.F.V.R.—No. 144 Squadron.
Sergeant George Kelly, R.A.F.V.R.—No. 51 Squadron.
Sergeant B. E. Mitchell, R.C.A.F.—No. 58 Squadron.
Sergeant G. E. Russell, R.A.F.V.R.—No. 78 Squadron.
Sergeant C. A. Worledge—No. 75 (R.N.Z.A.F.) Squadron.

Air Force Medal

Flight Sergeant C. G. K. Edlund.
Flight Sergeant N. E. Freeman.
Flight Sergeant D. W. Palmer.

British Empire Medal

Flight Sergeant William Beach, A.A.F.
Flight Sergeant S. F. Brockway.
Flight Sergeant C. F. Brown.
Flight Sergeant A. S. Clark.
Flight Sergeant S. G. Goodridge.
Flight Sergeant S. G. Hall.
Flight Sergeant L. G. Landon.
Flight Sergeant Wallace Mackie, R.A.A.F.—No. 461 (R.A.A.F.) Squadron.
Flight Sergeant William Oliver.
Flight Sergeant L. C. Webb.
Flight Sergeant I. M. Wright.
Act. Flight Sergeant Francis Thompson, R.A.F.V.R.
Sergeant R. A. C. Grimshaw.
Sergeant Oliver Keene.
Sergeant G. W. L. Mathews.
Sergeant James Morrison.
Sergeant Edward Ramsden, R.A.F.V.R.
Sergeant Norman Webb
Sergeant Eric Williams, R.A.F.V.R.
Corporal T. L. Johnson—No. 165 Squadron.
Corporal A. E. Mills.
Corporal Jesse Nicklin.
Leading Aircraftman Ivor Williams.
Aircraftman 2nd Class R. B. Parton—No. 165 Squadron.



"Aeroplane" photograph

EXTRA HOURS.—A pile of long-range tanks for Vickers-Armstrong Supermarine Spitfire IXs. The cut-out that houses the carburetter air intake when these tanks are fitted beneath the fuselage can be seen on the tank being moved in the rear

Mr. J. B. Joel's 'Sunstar' winning the Coronation Derby, May 31, 1911.

WHEN WE WERE YOUNG

We had no time to go to the Derby that year, although we live so near the course. Cellon had just been launched and young businesses need nursing. For that matter we haven't found any of the succeeding thirty odd years particularly leisurely, for no sooner has one department of our activities got into its stride than a new one has been born. It has rather been like raising a large family. That is the price of enterprise. There are compensations, however.

CELLON LTD., KINGSTON-ON-THAMES. TELEPHONE: KINGSTON 1234 (5 lines)
Sole Licensees in Canada: THORP-HAMBROCK LTD., 2720 St. Patrick's Street, Montreal.
Sole Licensees for Australia and New Zealand: CELLON CORPORATION PTY. LTD., Sydney.

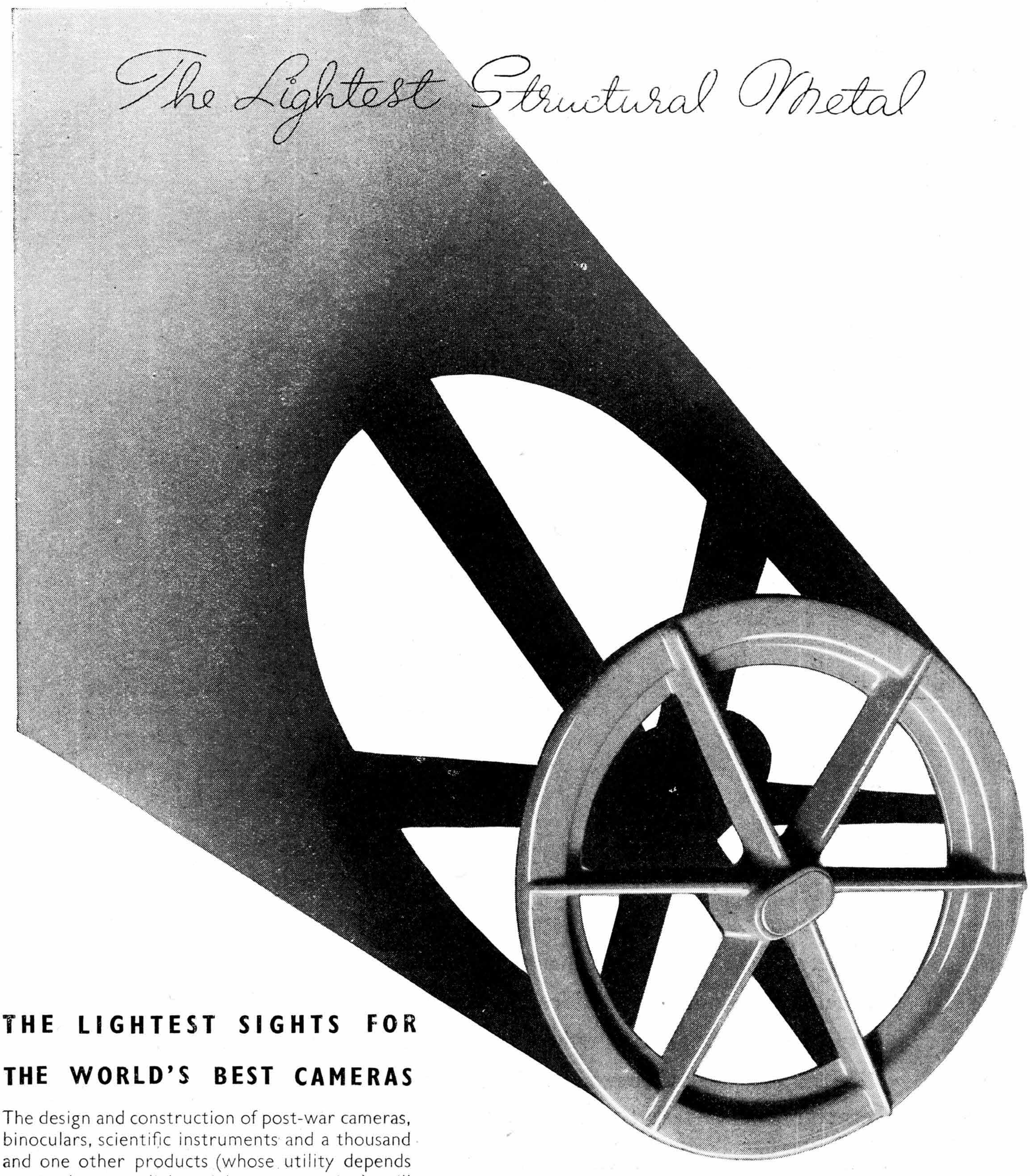
The perfect finish

CELLON
CERRIC CERRUX

CELLON

CVS-520

The Lightest Structural Metal



THE LIGHTEST SIGHTS FOR THE WORLD'S BEST CAMERAS

The design and construction of post-war cameras, binoculars, scientific instruments and a thousand and one other products (whose utility depends so much upon lightweight construction) will be reviewed as a result of war-time development. In the forefront of such materials are **MAGNUMINIUM** magnesium base alloys. Magnuminium is four times lighter than steel—possesses outstanding strength/density ratios—and a notable range of other properties and characteristics. Technical data is available from the Development Department on request.

MAGNUMINIUM

MAGNESIUM BASE ALLOYS

MAGNESIUM CASTINGS & PRODUCTS LTD • SLOUGH

EXTRACTS FROM THE LONDON GAZETTE

Air Ministry, May 11, 1943.

ROYAL AIR FORCE VOLUNTEER RESERVE

GENERAL DUTIES BRANCH.—To be Plt. Offs. on prob. (emergency):—Sgts.: Feb.: George Smith, G. S. Lawson, E. F. Curtis, I. M. Marshall, D. B. Bellis, J. R. A. Hodgson, Alexander Urquhart, Arthur Wilkes, J. A. M. Weatherill, V. W. G. Musgrove. Mar.: A. R. Smith, Henry Catch, A. C. Kneeshaw, I. R. Lewis, Ernest Bell, L. E. McKenzie, A. V. Freeman, C. A. Macdonald, Jack Cummin, J. H. Jones, R. W. G. Vaughan, E. V. Eastman, J. R. Randall, Arthur Feeley, N. J. Furlong, J. E. Sanderson, W. T. Trotman, E. W. Tickler. Apl.: J. F. Waterman. Temp. Sgt.: Feb.: E. J. Plumridge. Cpls.: Nov., 1942: H. T. MacDonald. Jan.: J. S. Sanderson. Feb.: C. L. Brown, G. J. Clemence, M. J. Crofton-Sleigh. Ldg. Acm.: June, 1942: T. S. Matthews. July, 1942: John Watson. Sept., 1942: H. A. Middleton, M. H. Barrett, W. A. B. Carter, H. S. Fraser, R. B. Levack, I. F. McLean, I. R. MacOnie, Ian MacPherson, J. L. Mill, J. J. Millar, A. H. Reid. Oct., 1942: Frank Noon, J. H. L. German, G. I. Gunter, H. R. Murray, C. W. Hailstone, R. C. Rice. Nov., 1942: Philip Eaude. Dec., 1942: J. M. Dicks, R. M. Adam, W. C. Frearson, Peter Hodder, J. M. Holder, C. D. Lawson, B. W. Parsons, G. F. Aspinwall, G. F. Heathcote-Peirson, T. M. Telford, Guy Cribb, R. L. Hawkey A. R. Hutchinson, A. R. Lee, A. S. Lyburn, G. W. Meadow, D. C. Orriss, R. B. Sudderick, Edward Thackway, P. G. Wilson, G. W. J. Wills, W. S. Northcott. Jan.: H. C. Adams, A. J. N. Berry, Anthony Birch, D. F. Carter, D. A. Collett, J. T. Evans, Peter Jones, Percy Knowles, R. E. Robinson, J. P. B. Savile, G. T. Tait, E. J. Turner, H. W. Duckitt, H. A. S. Doughty, W. R. R. Blackbird, D. A. T. Tibbitt, Ronald Stobo, R. R. Crofts, M. T. Clarke, W. M. Douglas, T. J. Davies, R. M. Dubock, T. D. Elliot, Wilfred Groome. Feb.: T. S. Hope, R. H. Kemp, C. A. Kidd, J. B. McDonald, Dominick O'Brien, D. C. Rooke, H. F. Simmonds, P. W. Smith, R. L. Smith, James Stanners, F. E. Thayer, E. J. Tyler, J. W. A. Armstrong, Leslie Emmerson, P. E. Falkner, D. M. Hamilton, P. L. Harte-Lovelace, P. F. P. Cordy, W. J. Evans, H. J. Richardson, W. F. Iles, G. D. M. Kynman, R. N. Lawson, G. V. Lorimer, C. A. R. Mackley, L. G. Metz, E. C. Milnes, D. W. Osborn, J. T. Stevens, B. G. Thomas, B. W. Thynne, G. J. Tonks, O. K. Chrimes, W. A. Daysh G. U. Evans, D. R. Fellows, J. S. Cross, I. G. Downie, N. G. S. Marshall, R. P. Merrit, W. G. M. Papworth, Thomas McCloghry, R. K. Pile, B. M. Twilley, W. R. de Winton Wigley, W. G. Driscoll, C. V. French, R. J. Affleck, G. D. Askew, R. B. Barber, R. A. Crawford, S. G. Dale, A. H. F. Lamberth, A. J. Mabey, D. N. McNee, D. I. O'Toole, J. R. Pygram, D. F. Robins, L. A. Skingley, N. C. Teasdale, R. W. W. Coggins, H. J. Gallimore, C. W. Graham, J. W. C. Darvall, P. A. Lockton, C. E. Daw, A. J. Angus, H. J. May, S. I. Millar, Arthur Lloyd, K. O. Pawley, G. D. Rees, J. N. G. Wyatt. Mar.: E. G. McGlorry, K. J. Avent, W. B. Conn, George Crabtree, William Creed, F. A. Chubb, R. J. Debenham, A. J. Hewetson, W. A. McCormack, K. G. Mullett, George Watson, G. E. M. Parker, David Pickard, R. A. Winn, G. V. Smith, R. G. Taylor, N. G. Woodward, F. T. Rix, J. C. Holland. Apl.: F. A. N. Clifton, Vernon Cresswell, K. T. Dale, R. G. C. Pagett, E. C. Cook, A. E. Emans, G. T. Freemantle, Stanley Smith, R. H. Taylor, A. J. Wakefield, John Weaver.

To be Flt. Lts. (emergency):—Apl., 1940: W. F. Byanton (Sen. Dec. 23, 1939). (Subs. for notifn. of Aug. 4, 1942). Sept., 1941: P. C. Fletcher (Sen. July 1, 1941). (Subs. for notifn. of Sept. 12, 1941). Oct., 1941: M. C. H. Barber (Sen. July 1, 1941). (Subs for notifn. of Sept. 19, 1941.) M. B. Bowker. (Subs. for notifn. of Aug. 25, 1942.)

To be Flg. Offs. (emergency):—Nov., 1940: Hyman Baron (Sen. Oct. 17, 1939). (Subs. for notifn. of Apl. 11, 1941.) Apl., 1940: R. J. D. Christie, A. T. R. Hutchinson, E. W. S. Jacklin, E. E. Spence (Sen. Aug. 25, 1939). (Subs for notifns. of Aug. 4, 1942.)

To be transf. to the Admin. and Spec. Duties Br.:—Flg. Offs.: Apl.: A. E. Abraham, A. R. Pears, H. G. Jordan, D.S.O. Plt. Offs.: E. Armitage, E. C. W. Dowding, G. L. Heath.

Flg. Off. R. A. Cadman relinquishes his commn. on account of ill-health and retains his rank. Apl.

Plt. Off. F. V. Spencer-Thomas relinquishes his commn. on account of ill-health. Apl.

Flg. Off. B. R. W. Blogg is dismissed the Service by sentence of General Court-Martial. Apl. 15.

TECHNICAL BRANCH.—To be Plt. Offs. on prob. (emergency):—Wt. Off.: Apl.: S. A. Worthy. Flt. Sgts.: John Calder, D. V. Flavell, D.F.M., W. W. Harrison, George Wood, D.F.M., K. W. B. Fouweather. Sgts.: H. M. A. Kay, D. B. Cassie, Ernest Edwards, Ronald Harris, Francis Judd Cpls.: William Anderson, R. J. Hughes. Apl.: G. W. F. Ashford, Alexander Cormack, N. W. Lyon, J. H. Turner, F. A. Vallat, A. P. Weir. Act. Cpl.: P. F. Seebohm. Ldg. Acm.: M. H. Hawkins, N. A. Sturgess, L. B. Fletcher.

To be Act. Plt. Offs. on prob. (emergency):—Apl.: Flt. Sgt.: J. G. Balshaw. Sgts.: C. W. Crews, L. R. Hooper, Thomas Loker, R. F. Rosoman, Needham Shannon. Cpls.: Frank Judson, D. F. Tait.

Act. Plt. Off. (prob.) D. Weatherhead is transf. to the Admin. and Spec. Duties Br. and graded as Plt. Off. (Prob.). Mar.

BALLOON BRANCH.—To be transf. to the Admin. and Spec. Duties Br.:—Flt. Lt.: Jan.: H. W. Bennett, A. Kenworthy, P. K. B. Steadman. Flg. Off.: Mar.: W. Pritchard.

ADMINISTRATIVE AND SPECIAL DUTIES BRANCH.—To be Plt. Offs. on prob. (emergency):—Apl.: Ldg. Acm.: Leon Clore, F. C. Gradwell, Jack Houghton, B. F. Robinson, H. T. Thorpe, Alec Woodfield.

To be Act. Plt. Offs. on prob. (emergency):—Flt. Sgts.: Apl.: G. B. Bell, R. W. Harris, Harry

STEEL ROAD.—General Mark Clark, G.O.C. Fifth Army, with Air Marshal Sir Arthur Coningham on a beach road near Salerno. The surface is of steel rods and wire to carry heavy transport over soft sand.

Jones, G. R. Herrick, E. R. Turnham. Act. Flt. Sgts.: Thomas Allison, Raymond Coton, H. J. Dawson. Sgts.: Mar.: B. P. M. Mulcahy. Apl.: A. H. Ashworth, S. J. Bradbrook, R. H. Evans, J. C. Gagg, N. R. Long, H. W. Parslow, W. J. Randall, F. S. Smith, James Smith, Leslie Threadgold, Tom Walmsley, J. J. Callander, Basil Clayton, F. E. Watts. Act. Sgt.: C. N. Smee. Cpls.: C. H. Alexander, James Bell, Lionel Darlow, D. G. Davies, James Davy, G. F. L. Feltham, C. A. Gulliford, P. D. Lough, F. A. L. Macdonald, T. H. Moore, T. R. Newton, F. E. Wadley, A. C. Walker, K. H. B. Brown, R. W. Champ, D. S. Gillham, K. H. Mason, A. T. Nance, D. B. Pertwee, John Robertson. Act. Cpls.: R. H. Bunch, F. C. Vickers. Ldg. Acm.: J. H. Boyd, G. H. McA. Bryson, G. J. Gimblett, F. W. Goldsmith, K. A. Hodgson, E. G. Johnson, G. H. Mayhew, R. E. W. Morgan, J. V. Morris, E. A. W. Mossey, T. W. Roberts, H. A. Rogers, F. J. Saffery, D. W. Swain, Charles Wannop, A. H. Warner, Kenneth Mackenzie, Maurice Tibber. Acm. 1st Cl.: J. R. Bradshaw, L. B. Frewer, John Walker, E. H. Wicks, C. E. Ives, H. A. B. Peters, S. G. Phillips, G. H. Pilkington. Acm. 2nd Cl.: A. T. Allaway, William Corcoran, A. E. Mason, J. F. Smith, L. G. Wrathall, W. E. Barton, L. V. Davis.

George Bryson to be Flg. Off. (emergency). July, 1941. (Sen. May 26, 1941). (Subs. for notifn. of Aug. 25, 1942.)

Flt. Lt. Sir A. H. Seton relinquishes his commn. on account of ill-health and retains the rank of Sqn. Ldr. Apl.

Plt. Off. W. A. Grant relinquishes his commn. on account of ill-health and retains the rank of Flg. Off. Apl.

Flg. Offs. relinquish their commns. on account of ill-health and retain their rank:—Apl.: E. J. Newton. May: J. A. Greenwood.

Plt. Off. R. J. Powell relinquishes his commn. on account of ill-health. Apl.

Sqn. Ldr. The Marquis of Casa Maury resigns his commn. and retains the rank of Wg. Cdr. Apl.

Flt. Lt. B. Travers resigns his commn. and retains the rank of Sqn. Ldr. Apl.

Flg. Off. J. E. Doyle, D.F.C., resigns his commn. and retains the rank of Flt Lt. Apl.

Flt. Lts. resign their commns. and retain their ranks:—Apl.: J. H. Thomas, B. B. A. Whitton.

Flt. Lt. M. G. de B. Epstein resigns his commn. May.

METEOROLOGICAL BRANCH.—David Girdwood to be Flt. Lt. (emergency). Apl.

H. W. Hill to be Flg. Off. (emergency). Feb.

TRAINING BRANCH.—Act. Plt. Off. R. B. Henderson relinquishes his commn. on appt. to the Tech. Br. Mar.

Plt. Off. K. Mellanby relinquishes his commn. on appt. to a commn. in the Army. Apl.

To resign their commns.:—Plt. Offs.: Apl.: C. J. Murfitt, C. Ramsden, H. Huxley, C. D. Reeve, J. L. Roberts. Act. Plt. Offs.: E. F. Gadsen, E. A. V. O'Neil, R. Smith, W. Reynolds, A. L. Sampson, F. R. Sharvill. May: N. G. Barratt.

The commns of the folg. Plt. Offs. are terminated:—Apl.: W. R. Newton, J. G. Mason, L. Cowan.

EQUIPMENT BRANCH.—To be Act. Plt. Offs. on prob. (emergency):—Apl.: Sgts.: J. A. Bates, Albert Fletcher, R. N. Stevenson. Cpls.: H. T. Cooper, Cecil Haward, J. W. Holt, W. J. Janowsky, A. R. Kely, H. J. Mullins, J. A. Shanks, T. M. Shields, F. E. Shiers, J. E. J. Shobbrook, Harry Tayler, C. D. Waights. Act. Cpl.: John Adshead. Ldg. Acm.: H. H. Barker, S. E. Collingbourne, G. A. Fox, F. C. Head, T. E. Irving, W. M. Jemson, Lachlan Mackinnon, J. R. G. McRitchie, J. H. Rawlinson. Acm. 1st Cl.: F. P. E. Green, C. F. Osborn, G. D. Tait. Acm. 2nd Cl.: Ralph Brough, J. H. Cross, Raymond Flint, W. H. Greenwood, J. A. Lawrence, Thomas McLean, E. A. Smith, G. A. Smith, F. H. Tozer.

To be Flg. Offs. (emergency):—May, 1941: Norman Greenslade (Sen. Feb. 2, 1940). (Subs. for notifn. of Aug. 4, 1942.) June, 1941: J. E. S. Harrison (Sen. June 1, 1941). (Subs. for notifn. of Aug. 25, 1942.)

Flg. Off. B. S. Ottley resigns his commn. and retains his rank. May.

ACCOUNTANT BRANCH.—To be Act. Plt. Offs. on prob. (emergency):—Apl.: Sgt.: S. C. Thomas. Cpl.: J. M. Gray. Ldg. Acm.: W. L. Binns. Acm. 2nd Cl.: C. H. Bartram, James Cameron, J. E. Doughty.

MEDICAL BRANCH.—Flg. Off. I. I. Thomas, L.R.C.P. and S., relinquishes his commn. on account of ill-health and retains his rank. Apl.

CHAPLAINS BRANCH.—To be Chaplains (emergency) with the relative rank of Sqn. Ldr.:—Mar.: The Rev. F. P. C. Swaab. Apl.: The Rev. G. S. Froggatt, B.A., The Rev. M. E. Gawne.

The Rev. G. H. Daniels resigns his commn. Apl.

ROYAL AIR FORCE REGIMENT.—Flg. Off. G. F. Cooke is transf. to the Admin. and Spec. Duties Br. Apl.

Flg. Off. C. L. Ballantine resigns his commn. and retains his rank. Apl.

WOMEN'S FORCES

WOMEN'S AUXILIARY AIR FORCE.—To be Asst. Sec. Offs. on prob. (emergency):—Apl.. A. M. Russell, Cecily Allen, G. P. Barrett, J. L. Brown, P. P. Caussa, B. M. Gooch, K. M. Maddison, I. Parker-Smith, M. R. Reid, S. M. Rostron, E. McC. Wilson, E. M. Younger.

To relinquish their commns. on account of ill-health:—Sec. Offs.: May: O. Kay, O. J. Wilson, A. C. Bostock. Ast. Sec. Off. on prob.. M. A. Hebblethwaite.

To resign their commns.:—Sec. Offs.: Apl.: M. L. Coughlan, M. Deane-Drummond, V. Shaw, D. J. H. Binns. May: F. M. Ahalt. Sec. Offs. (prob.) Apl.: K. A. Mirarchi, C. J. Stickland. Asst Sec. Off. (prob.): C. I. Fryar.

Air Ministry, May 14, 1943.

ROYAL AIR FORCE

GENERAL DUTIES BRANCH.—Flg. Offs. to be Flt. Lts. (war subs.):—Jan.: T. H. Baker, D.F.C., D.F.M., A. G. Dickenson (Sen. Aug. 14, 1942). H. S. Burrows (Sen. Nov. 18, 1942). Feb.: H. W. Edwards (Sen. Feb. 19). Apl.: A. H. Hemsley, A.F.C., R. A. H. Smith, J. F. S. Lawley, D.F.M., E. Merch-Chammon, G. M. Keith, J. F. Smith, C. R. W. Armes, R. W. Morton. May: F. G. Constable, D.F.M. (Sen. Apl. 16).

Plt. Off. (prob.) P. A. R. Keates to be Flg. Off. on prob. (war subs.), Apl., 1942, and confmd. in appt. June, 1942. (Subs. for notifn. of Jan. 15.)

Plt. Off. M. B. Cooper to be Flg. Off. (war subs.). Apl.

Plt. Offs. (prob.) to be Flg. Offs. on prob. (war subs.):—Jan.: W. J. McDonald, K. G. Jones, R. S. Needham, P. H. Sharland, A. J. K. Moon, D.F.M., E. R. Adams, A. G. Allen, G. E. Bailey, D.F.M., R. J. Wallace, D. K. Lawson, A. McL. Blackburn, W. Baird, J. E. Kilduff, B. Currall, A. V. Wallace, G. Duncan, H. V. Gwyther. Feb.: L. H. Lister, P. J. Evans. Mar.: J. E. Bury, W. O. Morgan. Apl.: G. Brown, J. R. Keevil.

AMENDMENT.—In notifn. of Nov. 27, 1942, concern. Plt. Off. J. B. Walmsley, for Oct. 1 read Sept. 13.

TECHNICAL BRANCH.—Flt. Lt. (war subs.) G. Costick to be Flt. Lt. July (Sen. June 12, 1942).

The folg. are granted the rank of Flt. Lt. (war subs.):—Flt. Lts. (temp.): Feb.: F. H. R. Hazel. Mar.: E. A. Luckhurst. Flg. Off: Jan.: W. C. Steel.

The folg. Flg. Offs. (since promoted Flt. Lts.) to be Flt. Lts. (temp.):—Dec., 1941: E. S. Gentry, E. G. Cheesman, C. F. Giles, C. F. Hunt, P. F. Overton, G. J. Downs, F. E. Pearce, E. F. Price, R. W. Ackerman, M.B.E., A. E. Hewes, W. B. Wilson.

Plt. Offs. (prob.) to Flg. Offs. on prob. (war subs.):—Jan.: I. T. G. Paul, S. R. Murray, F. Pembry, W. G. Shannan, W. A. Walker, C. B. Dodridge, S. A. Lovett, C. Mapp, W. H. C. Williams, E. J. R. Young, G. Morgan, J. C. Parry-Jones, J. E. Cheadle, J. Ryley, R. K. Ray (Sen. Dec. 29, 1942), S. Potterton, H. Wheatley, R. P. Manning, D. R. Warfield, A. S. Woolstencroft, G. E. Cass (Sen. Jan. 15), F. H. Fearnside, L. R. Hallett, G. A. Lewis, T. E. Roberts, R. F. T. Gibbs, F. J. Greenfield, M.B.E., R. Los, W. C. H. Stevens, H. Johnston. Feb.: H. H. Isaac, J. H. Maclaren, T. Taylor (Sen. Jan. 20), A. Vaudrey, C. P. Horton, W. Gwinnell, E. J. Brimblecombe, S. Braithwaite, J. Burnett, R. Clarke, R. Ingarfield, A. R. Newman (Sen. Feb. 23), D. R. Lodge, A. L. Lowery, E. L. Orchard, H. T. Pasco, J. E. Knox. Mar.: S. W. Griffen.

Act. Plt. Offs. (prob.) to be Plt. Offs (prob.):—Nov., 1942: R. R. G. White. Feb.: J. A. Blythe, C. F. Thomas (Sen. Aug. 14, 1942). May, 1942: L. M. Courtenay (Sen. Apl. 10, 1942). July, 1942: E. T. Hutchings (Sen. June 10, 1942). Dec., 1942: F. E. Murphy.

AMENDMENT.—The notifn. of Dec. 4, 1942, concern. Plt. Off. E. E. Swinbourn, for July 31 read June 4, 1942.

(The rest of the appointments under this date will be published next week.)

AIR TRANSPORT

An Empire Conference

REPRESENTATIVES of the Dominions are expected to attend a conference in London on post-War Air Transport in the near future. There are suggestions that the conference may be held some time this month. The British Government has been in consultation with the Dominions and India for some time about post-War Air Transport problems and the fact that these negotiations have reached the stage where a definite conference in London is to be held will be warmly welcomed. There have been many pleas for an Empire conference and, provided that the British Government has some definite suggestions to offer, some progress towards laying plans for the future Air Transport of the Empire may be made.

Ala Italia

ITALY'S main airline company has changed its name again. Formerly Ala Littoria, it assumed the name Ala Roma immediately after the fall of the Fascisti in Italy. Now the name has been changed again to Ala Italia.

U.S. Study of International Routes

AN INFORMAL study of post-War international air routes which are likely to be of particular importance to the U.S.A. is being made by the Civil Aeronautics Board. The survey will be used later as a basis for formal consideration of applications for U.S. international air routes. Those interested have been asked to submit their views on routes which they think should be operated, together with any supporting data.

U.S. Air Transport in Great Britain

AN AIR TRANSPORT GROUP of the Service Command of the U.S. Army Eighth Air Force has been operating internal services in Great Britain for the past year. The service began as a small shuttle service, mainly for freight; to-day the Group operates more than 20 aeroplanes of various types and capacity. These aeroplanes are averaging more than 4,000 miles a day in flights round a circuit which includes four principal passenger stops and 14 cargo points. A regular schedule is maintained, but aeroplanes are also available for special and urgent journeys.

Weather has proved only a "slight deterrent" and although some persons thought it would not be able to fly in British weather the Group has proved that it can. The pilots fly on instruments at times but are said to have set a fine safety record. They are all experienced U.S. Army pilots with more than 1,000 hrs.' flying. The C.O. is said to be approaching the culmination of his aim to make the airline service conform as nearly as possible to the standards of comfort and efficiency set by U.S. internal air lines, except that stewardesses are not carried.

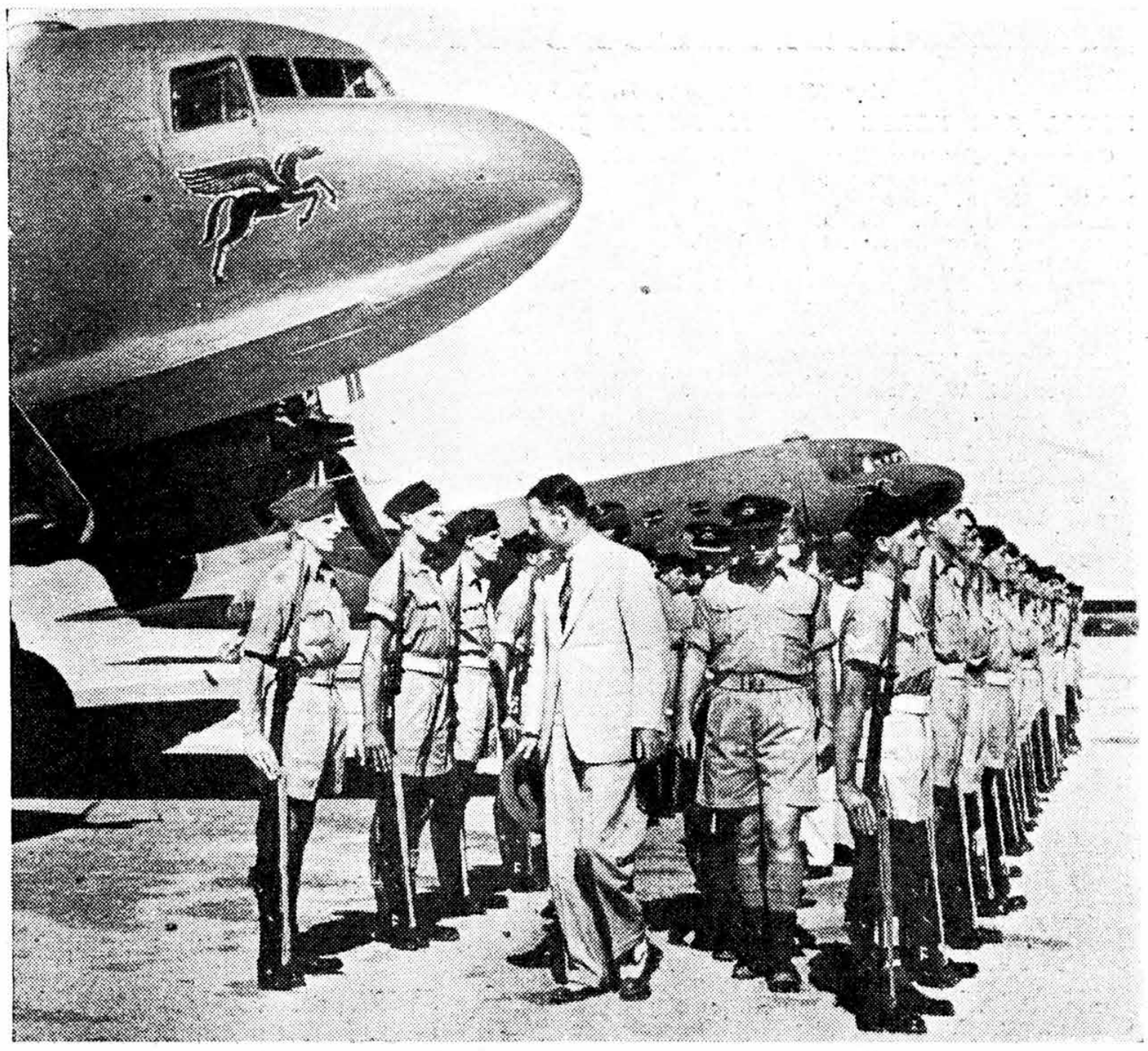
The U.S. service in Great Britain is available to all Allied personnel.

Seadromes

U.S. INTEREST in seadromes is serious, according to the Sept. 15 issue of "American Aviation," which states that the seadrome idea is bound to get attention in post-War plans and that one of its chief backers will be the Civil Aeronautics Authority The C.A.A. is said to be deeply interested in seadromes for several reasons, of which one of the most important is meteorological. "American Aviation" states that but for the War one or two seadromes would have been stationed in the oceans.

The First Constellation

THE FIRST Lockheed Constellation is expected to be delivered to the U.S. Army Air Transport Command in October.



SEEING HOW THEY RUN.—Lord Knollys, Chairman of British Overseas Airways, inspecting men of the R.A.F. Regiment and squadrons of R.A.F. Transport Command during his tour of the Middle East recently. This particular R.A.F. Transport Group was under the command of Air Commodore W. Whitney Straight, M.C., D.F.C. The Douglas Dakotas in the background bear Transport Command insignia.

Australia's Plans

THE AUSTRALIAN Minister for Air (Mr. A. S. Drakeford) has announced that the Commonwealth Government is to consider a plan for post-War civil aviation which would cost approximately £5,000,000 at the start. It provides for the carriage of all first-class mail by air, for transport of freight at 1d. per lb. per 100 miles and passenger fares of not more than 3d. per mile. An estimate has been made that 28 large air transports would be needed to provide the basic service.

The plan anticipates the construction of 22 major airports in different parts of Australia, each no more than 300 miles from populated centres, which would be served by feeder lines from the main airports. Some of these have been constructed already as part of the defence programme.

The foundations are to be laid for an immediate start after the War, using converted bombers until such time as commercial air liners are available. The construction of ground works will provide post-War employment and the frequency of service guaranteed by the carrying of all first-class mail by air will ensure employment for a number of war-trained pilots and ground staff. The claim is also made that the improved communications will assist development and migration. New overseas routes are also being planned, linking with the internal routes as part of the general policy of looking ahead.

For the year ending June 30, 1940, Australian civil aircraft flew 9½ million miles and carried 112,000 passengers. The figures for 1942 showed a decrease to 6½ millions in mileage flown, but an increase to 123,000 in passengers carried. Freight loads have doubled.

Post-War Transport Types

A FORECAST that during the first five years after the War air transport aeroplanes will have a limit of 60 passengers has been made by Mr. W. Littlewood, Vice-President (Engineering) of American Airlines, according to the Sept. 15 issue of "American Aviation." If the War ends in 1944 Mr. Littlewood expects that such types as the DC-4, the Constellation and reconverted DC-3s will be used for from one to three years. After that interval he thinks that such contemplated types as the Douglas C-74, Boeing C-97 and the Consolidated-Vultee "400-passenger" C-99 may come into general use.

The C-74 is understood to be a four-motor aeroplane with a capacity about triple that of the DC-4 and the C-99 to be a six-motor type.

FORTHCOMING EVENTS

Oct. 10

London.—The Institute of Economic Engineering.—Waldorf Hotel.—Paper on "Estimators and Estimating," by E. E. Bean, M.I.Ec.E. Visitors are invited by the Secretary, E. W. Barrell, 12, Brook Lane, Chester.—14.30 hrs.

Oct. 11

London.—N London Supervisors' Discussion Group.—Enfield Technical College, Queensway, Ponders End.—Talk entitled "The Future of Management," by Mr. E. C. Gordon England, F.R.Ae.S., F.I.M.T., M.I.P.E.—19.00 hrs.

Oct. 20

London.—Royal United Service Institution, Whitehall.—Lecture entitled "The Air Campaign in Libya and Tripolitania," by Air Marshal Sir P. R. M. Drummond, K.C.B., D.S.O., O.B.E., M.C. Marshal of the Royal Air Force Sir Edward Ellington, G.C.B., C.M.G., C.B.E., in the Chair.—15.00 hrs.

Back Copies of THE AEROPLANE

THE FOLLOWING have back copies of THE AEROPLANE for disposal:—

Mrs. D. McKechnie, Avington, Hungerford, Berks.: 1941, April 18, May 2, 23, June 13, July 11, 18; 1942, Mar. 20, Apl. 3, 10, May 29, June 5, 12, 26, Sept. 25, Oct. 30, Nov. 20, Dec. 4, 11, 18, 25; 1943, Jan 1. Mr. A. Rigamonte, Lismore, Richmond Place, Brighton 7, Sussex: 1942, Mar. 27, Apl. 10, May 8, 15, 22, 29, June 5, 19, 26, July 3, 10, 17, 24, 31, Aug. 7, 14, 21, 28, Sept. 11, 18, 25, Dec. 11; 1943, Jan. 8, Mar. 26, May 7, 14, June 11, July 2. Mr. J. G. Simms, Compton Manor Gardens, King's Somborne, Nr. Stockbridge, Hants: Jan., 1942, to June, 1943, with the exception of Jan. 2, 23 and Feb. 13, 1942.

Mr. T Mossop, "Cordoba," Seaward Avenue, Barton-on-Sea, Hants: 1940, May 3, 10, 17, 24, 31, June 7 14, 21, 28, July 5, 12, 19, 26, Aug. 2, 9, 16, 23, 30, Sept. 6, 13, 20, 27, Oct. 11, 18, 25, Nov. 1, 8, 15, 22, 29, Dec. 13, 20, 27; 1941, Jan. 3, 17, 24, 31, Feb. 14, 21, Apr. 4, 11, 18, 25, Aug. 1, 8, 15, 29, Sept. 26, Oct. 3; 1942, Mar. 6, Nov. 6.

Back copies are required by:

1697606 A/C Bradley, W., Royal Air Force, India Command, who is stationed where books are difficult to come by, and who would be willing to pay a reasonable price for back copies.

Mr. Maurice Austin, 609, Yardley Wood Rd., Billesley, Birmingham, 14, is anxious to buy copies from 1914 to 1919, bound or unbound.

Company Notices

NEW COMPANY

Holoplast, Ltd.—Private co. Reg. Sept. 11. Cap. £140,000 in 100,000 redeemable pref. and 40,000 ordinary shares of £1. To acquire the whole of the undertaking of or shares in Aerolectric Mouldings, Ltd., and to carry on the business of manfrs. of and wholesale and retail dealers in synthetic resin-bonded laminated products, including fabric materials such as those described in British Patents 537,668, 537,773, 542,914 and 546,089; synthetic resin varnished papers and fabrics, and all articles, materials, by-products, residuals and things made therefrom. Directors: Guy P. Harben, Desire Gonda, Clement I. Casey, Walter J. Worboys, Gavin S. McClay and Sir Percy H. Mills. Sols.: Halsey, Lightley and Hemsley, 32, St. James Place, S.W.1.

Decoration for Major-General Doolittle

MAJOR-GENERAL JAMES H. DOOLITTLE, Commander of the North-west African Strategic Air Force, received the Distinguished Service Medal recently from the Allied Commander-in-Chief General Dwight D. Eisenhower at a ceremony in North Africa. Major-General Doolittle led the daylight raid on Tokyo and other Japanese cities made on April 18, 1942, by North American Mitchells which took off from the aircraft carrier Hornet.

New Patents

APPLICATIONS ACCEPTED

555,824.—Ferranti, Ltd., and E. S. Cluderay.—Aircraft instruments—April 19, 1941.

555,831.—G. Ingram.—Parachutes.—Jan. 23, 1942.

555,758.—Kigass, Ltd., and C. A. Gret.—Tail wheel supports of aircraft.—Dec. 3, 1941.

Opposition period expires Nov. 22, 1943.

Printed specifications available Oct. 7, 1943.

The following is a list of the sources of the photographs in this issue of THE AEROPLANE:—

Bippa: pp. 411 left and right, 414-415 middle, 425.
Central: p. 408, top and bottom
"Evening Standard": p. 404, top.
Wm May and Co.: p. 418, top.
P.N.A.: pp. 402 top; 407, 426, 427.
Planet: pp. 404, bottom; 416, second from top on left.
Sport and General: pp. 406, top; 416, top left, and third from top on left.

All not included above are either THE AEROPLANE photographs or come from private sources or are captured from the enemy.

PERSONAL NOTICES

BIRTHS

Barnett.—On Sept. 22, at the Belvedere, Scarborough, to Mary and Flt. Lt. Ronald Barnett, R.A.F.V.R.—a son

Cawthorne.—On Sept. 23, at Upminster, to Ethel Anne, wife of Sqdn. Ldr. J. E. Cawthorne—a son.

Clayton.—On Sept. 28, at Ashridge Hospital, Berkhamsted, to Doreen, wife of Plt. Off. M. J. Clayton—a daughter.

Coombs.—On Sept. 19, at Carlton Drive Nursing Home, S.W.15, to Sqdn. Ldr. and Mrs. R. H. A. Coombs (*née* Trevor-Lewis)—a daughter.

Crew.—On Sept. 22, to Maisie (*née* Mears), wife of Flt. Lt. G. V. S Crew—a daughter.

Crowther.—On Sept. 26, at the Royal Bucks Hospital, Aylesbury to Dorothy, wife of Wng. Cmdr. H. Crowther—a daughter.

Dunford.—On Sept. 22, at Maycroft Nursing Home, South Woodford, to Brenda (*née* Nichols), wife of Flt. Lt. A. H. Dunford—a daughter.

Gore.—On Sept. 17, at the Willows Nursing Home, High Wycombe, Bucks, to Catherine (Chimpie), wife of Group Capt. C. W. Gore—a daughter.

Hall.—On Sept. 17, at No. 18 Canadian General Hospital, to Louise (*née* Blaylock), wife of Sqdn. Ldr. James D. Hall, R.C.A.F.—a daughter.

Harrington.—On Sept. 26, at Sefton Nursing Home, High Wycombe, to "Ike" (*née* Walker), of Longwick, Bucks, and Lt. J. C. Harrington, U.S.A.A.F.—a son.

Harvey—On Sept. 21, at Guy's Hospital, to Sheelagh (*née* Phelps), wife of Sqdn. Ldr. Warren Harvey—a son.

Hayley Bell.—On Sept. 21, at the Chalfont Nursing Home, Gerrards Cross, to Elizabeth (*née* King), wife of Sqdn. Ldr. D. Hayley Bell, D.F.C.—a son.

Hayward.—On Sept. 17, at Nevern Square, London, S.W.5, to Peggy, wife of Flg. Off. David R. Hayward, A.T.A—a son.

Higgins.—On July 15, to Arlene (*née* Muir), wife of Flt. Lt. T. L Higgins, of Ponca City, Oklahoma, U.S.A.—a son.

Hudson.—On Sept. 26, at Bengeo Nursing Home, Hertford, to Sheila (*née* Leppard), wife of Flt. Lt. W. H. Hudson, R.A.F.V.R.—a son.

Leest.—On Sept. 24, at George, South Africa, to Beatrice (*née* Brewis), wife of Flt. Lt. A. F. Leest—a son.

Oliver.—On Sept. 25, at Douglas, to Dorothy, wife of Flg. Off. A. H. W. Oliver—a daughter.

Pardoe.—On Sept. 24, at Hillside Nursing Home, Purley, to Mary (*née* Fischer) and Flt. Lt. J. G. M. Pardoe—a son.

Parry.—On Sept. 22, to Valerie (*née* Jay), wife of Flg. Off. H. W. Parry (Baron), R.A.F.V.R.—a daughter.

Robertson.—On Sept. 21, at The Grange, Bletchingley, Surrey, to Bess, the wife of Sqdn. Ldr (Dr.) Douglas Robertson—a son.

Rolston.—On Sept. 28, at Gatley Nursing Home, to Margarey, wife of Flt. Lt. J. Rolston—a son.

Roy.—On Sept. 26, at Wellsbourne, Hartley Avenue, Plymouth, to Miriam (*née* "Bunny" Edwards), wife of Sqdn. Ldr. Charles Lambert Roy—a daughter.

Saunders.—On Sept. 28, at York, to Christine (*née* Harrowell), wife of Wng. Cmdr. P. H. R. Saunders—a son.

Seig.—On Sept. 27, at Jenny Croft, Walton, Wakefield, to Nancy (*née* Clarke), wife of Flg. Off. Roy V. Seig—a daughter.

Shaw.—On Sept. 24, at Caerthillian Nursing Home, Fordwych Road, N.W.2, to Lily (*née* Rose), wife of Jack Shaw, R.A.F.—a daughter.

Stabb.—On Sept. 21, at Freeland House, Freeland, Oxon, to Dorothy (*née* Leckie), wife of Flt. Lt. W. W. Stabb—a daughter.

Stewart.—On Sept. 28, at Thurlow Park Nursing Home, West Dulwich, to Betty (*née* Head) and Flg. Off. Alan Stewart, D.F.C., R.A.F.V.R.—a son.

Thomas.—On Sept. 20, at Grappenhall Maternity Home, Cheshire, to Mary (*née* Dale late of Maadi, Egypt), wife of Sqdn. Ldr. C. W. S. Thomas, R.A.F.O.—a son.

Thomas.—On Sept 25, at Weymouth, to Kathleen, wife of Flg. Off. C. S. Thomas (formerly Capt. R.E.), missing from air operations since January, 1943—a daughter.

Vere-Hodge.—On Sept. 27, at the Victoria Nursing Home, Northwood. to Ann (*née* Budgen), wife of Sqdn. Ldr. N. Vere-Hodge, R.A.F.V.R., B.N.A.F.—a son.

Walsh.—On Sept. 15, at the Grappenhall Nursing Home, to Doris wife of Flt. Lt. D. L. (Hank) Walsh, R.A.F.—a son.

White.—On Sept. 24, at Rossal Nursing Home, Inverness, to Frances (*née* Smith), wife of Flt. Lt. D. P. White—a daughter.

Wiseman.—On Sept. 16, at King's College Hospital, to Aviva (*née* Nurock), wife of Flt. Lt. M. M. Wiseman, D.F.M., R.A.F.V.R.—a daughter.

MARRIAGES

Colman—Hughes.—On Sept. 19, at All Souls', Hampstead, N.W.6, Flg. Off. Sidney John Colman, to Rebecca Violet Hughes.

Dale—Elliott-Lockhart.—On Sept. 23, at the Brompton Oratory, Flt. Lt. P. J. Dale, only son of Mr. and Mrs F. A. Dale, of Wimbledon, to Susan, only daughter of Mr. and Mrs. David Eliott-Lockhart, of London, W.8.

Hartley—Eden.—On Sept. 18, at Hollington-in-the-Wood, Flt. Lt. Gordon Herbert Hartley, D.F.C., R.A.F., son of the late Mr. Hartley and Mrs. Wakelin, of North Harrow, to Mary Lois (Molly) Eden, elder daughter of Mr. and Mrs. E. A. Eden, of Holmwood, The Green, St. Leonards-on-Sea.

Higgins—Watson.—On Sept. 17, at Bramley, Guildford, Plt. Off. Robert Higgins, son of Major and Mrs. Higgins, of Tanganyika, to Kathleen, daughter of the late C. J. Watson, of Hunstanton, and Mrs. Watson, of Folkestone.

Horton—Aggleton.—On Sept. 23, at St. Peter's, Leckhampton, Cheltenham, John Horton, R.A.F., elder son of Mrs. L. A. Green and stepson of Mr. L. A. Green, of Cheltenham, to Jean Aggleton, W.A.A.F., daughter of Major and Mrs. H. P. Aggleton, of Southport (late of Coventry).

Jenkins—Andrew.—On Sept. 21, at St. James's Presbyterian Church, Charlottetown, Flt. Lt. Henry Archibald Jenkins, R.A.F., elder son of the late Lt. Col. Jenkins, O.B.E., M.C., R.A.F., and of Mrs. Jenkins, now at Skaill House, Sandwick, Orkney, to Marion Doris, only daughter of Mr. and Mrs. H. M. Andrew, Charlottetown, Prince Edward Island.

Jones—Rayner.—On Sept. 25, at Bowdon Parish Church, Wng. Cmdr. Graham Danson Jones, D.S.O., D.F.C., to Mary, second daughter of Mr. and Mrs. H. H. Rayner, of Lark Hill, Bowdon, Cheshire.

Peill—Mabon.—On Sept. 25, at Corstophine Parish Church, Edinburgh, Wng. Cdr. Ralph S. Peill, R.A.F., M.B., Ch.B., Edinburgh, to Elizabeth Low Mabon, P.M.R.A.F.N.S.R., Jedburgh.

Potter—Lane.—On Sept. 24, Flt. Lt. Kenneth H. Potter, R.A.F.V.R., to Miss Marjorie Lane, P.M.R.A.F.N.S. (R.).

Robertson—Whyle.—On Sept. 18, at St. Michael's, Watford, Plt. Off. Charles Stewart Lennox Robertson, R.N.Z.A.F., of Herne Bay, Auckland, son of C. G. Lennox Robertson, of 3, Woodside S.W.19, to Eveline Maude, daughter of T. W Whyle, of Cuckoos Nest, Ridge Hill, Hereford Auckland, N.Z.

Rowland—Oakley.—On Sept. 21, at St. Andrew's Church, Bedford, Flg. Off. Peter Rowland, son of Mr. and Mrs.. S. H. Rowland, of Bedford, to Coral, daughter of the late Mr. and Mrs. C. L. E Oakley, of Bedford.

Scott—Payne.—On Sept. 25, at St. Mildred's Church, Addiscombe, Flg Off. David L. Scott M.R.C.S., L.R.C.P., only son of Dr. and Mrs. D. Scott, of Leyton, to Margaret, younger daughter of Mr. and Mrs. F. W. Payne, of Eastbourne.

Sherwood—Frazer.—On Sept. 24, at Felbridge Church, 2nd Lt. Peter D. Sherwood, R.A., son of Dr. and Mrs. Sherwood, of Eastbourne, to Cpl. Sheila Suzanne Frazer, W.A.A.F., daughter of Mr. and Mrs. Kenneth Frazer, of Felbridge.

Styles—Stock.—On Sept. 18, at Holy Trinity Church, Brompton Road, London, Flt. Lt. George Raymond Styles, R.A.F.V.R., of Bristol, to Flt. Off. Valerie Cridland Stock, W.A.A.F., of Bognor Regis.

Tait—Hoggarth.—On Sept. 25, at St. Olaf's, Poughill, Bude, Paul John, R.A.F.V.R., second son of the Rev. and Mrs. E. H. Tait, to Elsie, elder daughter of Mr. and Mrs. A. E. Hoggarth, of Birtley, Co. Durham.

Wordsworth—Mason.—On Sept. 28, Flg. Off. Andrew Wordsworth, to Phyl Mason, F.A.N.Y., daughter of the late Major P. G. Mason and of Mrs. P. G. Mason, of Longbottom, Biddesden, Andover.

CORRESPONDENCE

The Cult of the Leathered Elbow

MR. ASCOUGH has only to ask any member of a drawing office and he will understand the amount of wear caused by continually working at a drawing board. In "civvy-street" I worked in a large drawing office and I, personally, am all for leather patches—especially in these days of clothes rationing. J. W. PARKIN.

AS FAR AS I KNOW, the cult of the leathered elbows originated at Metro-Vicks, Manchester, among the students who were going through the works, and these leather flashes denoted that Pater had bought them a car. Of course, in these dreadful days of petrol rationing the boys cannot run the car, but the elbow flash is still retained as a reminiscence of days passed.

Your correspondent is quite right in his assumption that elbow pads and brain work don't go together—if one is doing brain work these days one should not wear one's elbows out!

P. B. D'MAN.

THE "CULT OF LEATHERED ELBOWS" is of no recent origin. Legend tells that it was originated by Robert Bruce who, after days of watching a spider engaged in development work on monofiler suspension, found his garment wearing thin at the elbows through continually resting them on his knees. The resourceful Scot saved the price of a new one by patching with portions of a discarded bagpipe. The "cult" has been adopted by the Sassenach following the migration to the South, of Scotsmen who have taken Dr. Johnson's famous remark literally.

I. G. MACLEOD.

WE HAVE OBSERVED that those who never wear out the elbows and cuffs of their jackets are the people who walk around factories and offices with their hands in their pockets. Further, speaking for ourselves and, no doubt, for other aircraft draughtsmen, we find on sitting down to worry out a problem we often have to clasp our heads in our hands and stuff our fingers in our ears in order to avoid distraction by the brayings of the aforementioned individuals.

THREE AIRCRAFT DRAUGHTSMEN.

[Brains evidently need buttressing and those who prop their brains on knees and desks are in some danger of acquiring thinker's elbow, the badge of which is the leather patch. —ED.]

C. G. G. and Recognition

MR. C. G. GREY'S statement that the best Observer cannot recognise with glasses an aeroplane which is more than three miles away shows that either he has misunderstood those "people who know" who have informed him or that these are inexperienced or incompetent Observers or Spotters. After more than four years of duty at an R.O.C. Post, and many exchanges of experience with members of other Posts, we can affirm with absolute certainty—and we believe the majority of members of the R.O.C. will agree—that aeroplanes (of all sizes) can be recognised at a distance of considerably more than three miles in the horizontal plane, given reasonably good visibility. Aeroplanes may often be identified without the aid of binoculars at more than three miles. In the vertical plane aeroplanes can be recognised at heights of more than three miles, if the upper atmosphere is clear and the machine is not too far away in the horizontal plane—with binoculars, of course.

Incidentally, would Mr. Grey be sure that the Lysander head-on was not a Stinson Reliant?

Those Observers and Spotters who have a poor opinion of the value of silhouettes and photographs in aircraft recognition training are usually the unenthusiastic ones who make little more rapid progress than Mr. Grey has done in 35 years. If a man knows his silhouettes thoroughly he knows what to look for when observing. For example—Halifax or Lancaster? Lancaster, because the greater part of the fins and rudders are above the tailplane (apart from the difference in shape)—and so on. No, Mr. Grey, the more silhouettes and photographs of an aeroplane a man sees, the more likely he will be to recognise it in the air, at different angles and heights and at various degrees of visibility.

The R.O.C. Club proved that tests and competitions are of great value in raising the general standard of recognition ability in a body like the R.O.C. and we believe that similar results have been obtained by these methods in the R.A.F., the Navy and the A.A. Command. While it is possible so to swot up silhouettes that one could pass a test on them with 100 per cent. marks every time, the reasonably good Observer can also identify, nine times out of ten, photographs which he has not seen before, even when they are small and not very clear. SOUTHERN POST.

Aircraft Armament

EXPERTS such as C. G. Grey have quoted the advantages and disadvantages of the .303-in. and .50-in. machine-guns. Some have faith in the .303 in. as the right weapon for night bomber defence, and others, comparing American records, prefer the .50 in. I have never heard an R.A.F. air-gunner decry the .303 in., and I sincerely hope none have cause to.

The Americans improved on our .303-in. gun turrets by, roughly, .2 in., and, surely, our experts can improve on the .50-in. gun turret by that .2 odd of an inch and give the Allies a turret really worth remembering. I think it would be better for our factories making .303-in. machine-guns to divert to 20-mm. cannon.

I do not think the helicopter has a chance against U-boats equipped with good anti-aircraft guns. Only last week a Sunderland was destroyed by A.A. fire from a U-boat, which the Sunderland's gallant crew sank. Surely a helicopter crawling along at approximately 100 m.p.h. would never reach the U-boat it was attacking. J. KNIGHT.

That Helicopter Complex

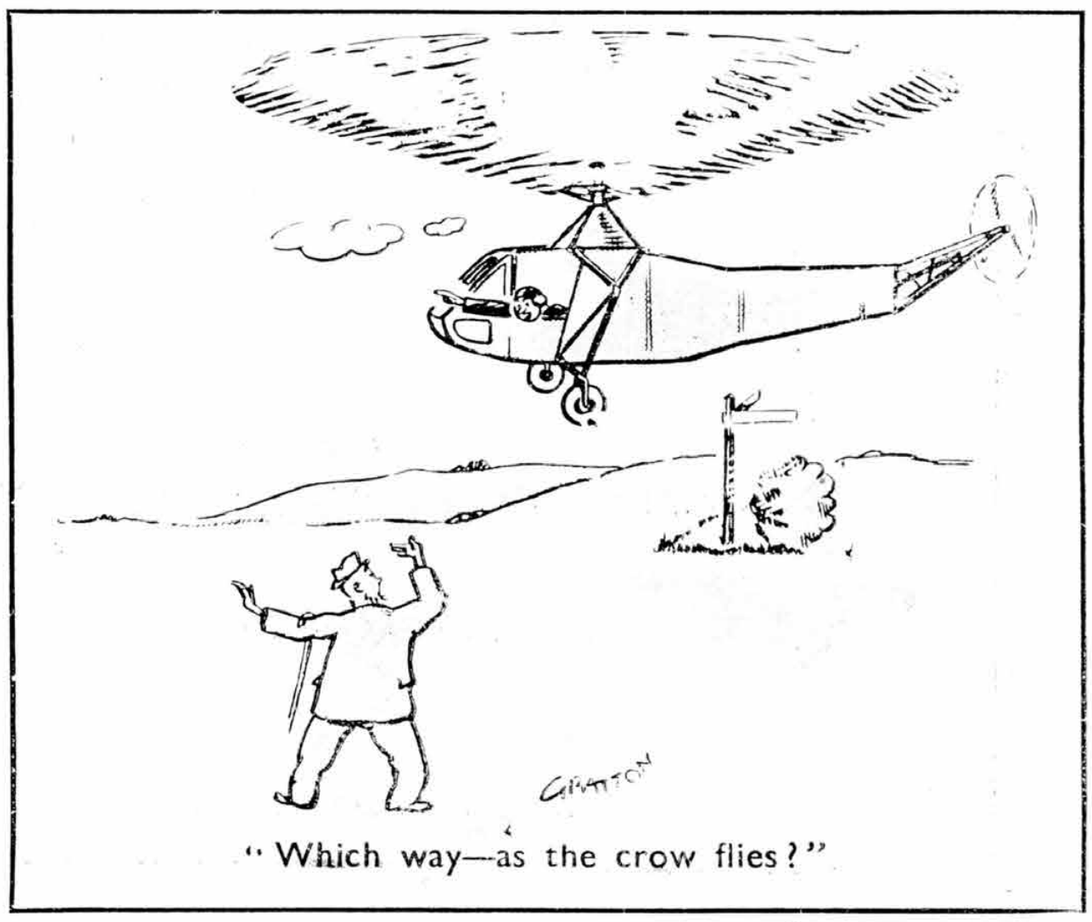
HAVING WRITTEN a great deal of nonsense about helicopters with the definite object of arousing controversy and boosting public interest in that machine, I would refer to the letters from C. G. Grey and P. Cameron. I agree with some of their views. With regard to shooting up rotor blades, the hovering helicopter is not liable to be quite such a sitting target as many people imagine. Most of us at one time or another have shot at those balls bobbing up and down on jets of water. By watching the jet carefully for some time, one can usually predict the movement of the ball to some extent, but a helicopter is controlled by human intelligence and its movements are quite unpredictable. It can jump off the jet, so to speak, and streak away at any angle.

Mr. Cameron's winding-in suggestion sounds practical, but in the near future expedients of this kind should hardly be necessary when landing on a moving deck. The measure of delicate control already arrived at is not too bad and we are only just starting to develop the helicopter after more than 30 years of neglect. A point seems to be that even with the present machines, a pilot is not obliged to approach the ship from one direction only, as in the case of an aeroplane, when about to make a deck landing. L. GRAHAM DAVIES.

Against the Dive Bombers

IN YOUR ISSUE of July 30, Mr. A. Hawke states:—"A dive-bombing attack can be a real thrill, whereas a low, medium or high level attack is a comparatively dull test of endurance." I was not aware that any form of air attack was intended to thrill or otherwise entertain anybody, or, for that matter, to provide anyone with a test of endurance.

The point which Mr. Hawke overlooks is that if the Luftwaffe had not wasted something over 6,000 perfectly good DB 601 motors and probably many millions of man-hours in the production of the Ju 87 there might have been enough Me 109s to change the result of the Battle of Britain. Furthermore, even Germany has not seen fit to bring out any new type of aeroplane designed solely for dive bombing, but is relying on other types of aircraft modified for this form of attack. PETER D. SNOW.



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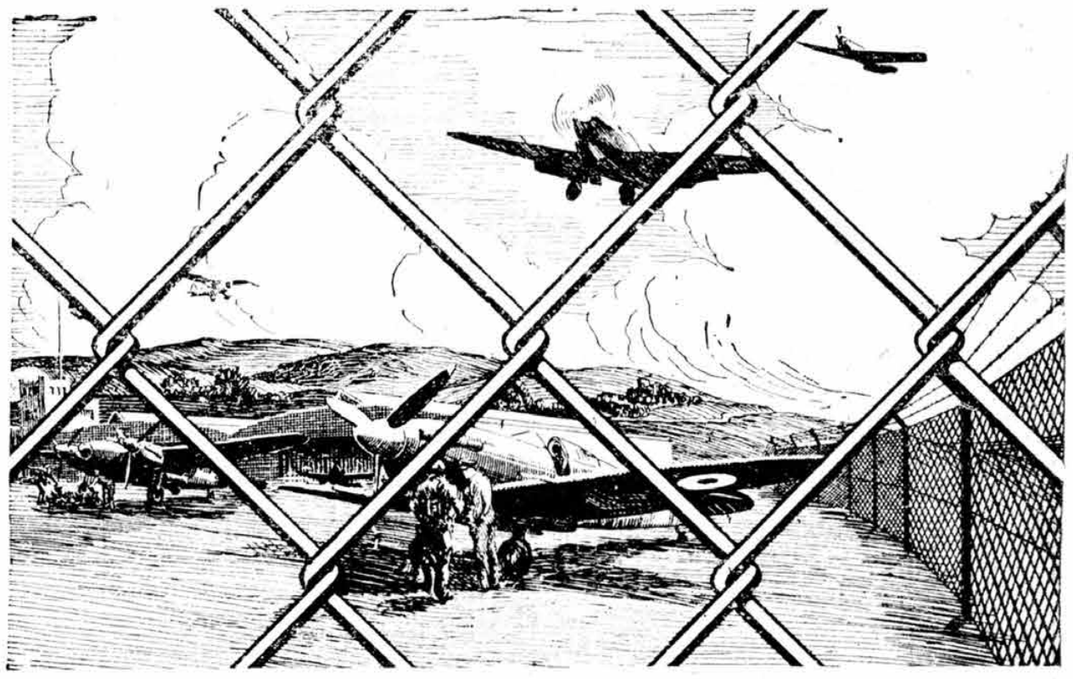

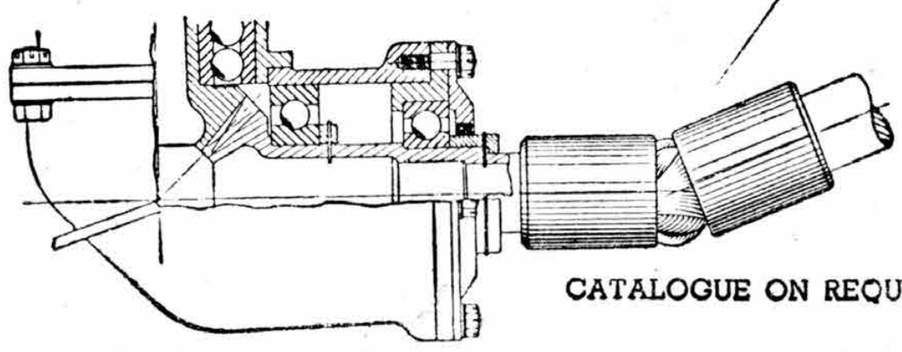

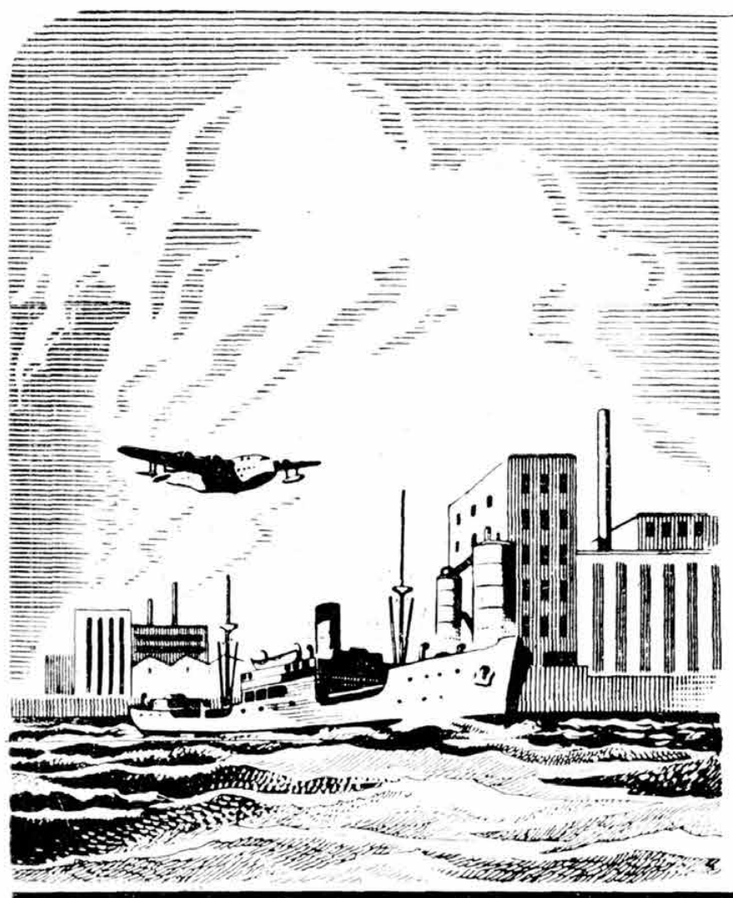

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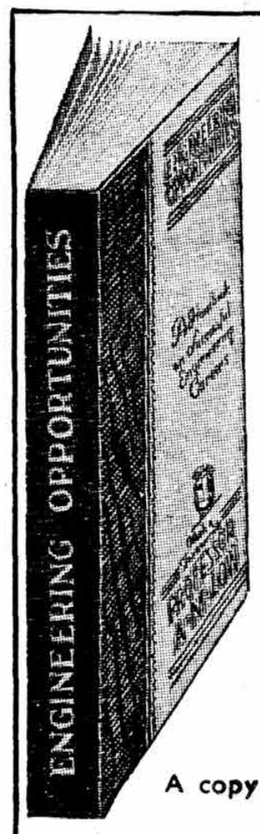

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