

FLIGHT

and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

End of a Chapter

THE dissolution of S.H.A.E.F. (the familiar initials which indicated Supreme Headquarters of the Allied Expeditionary Forces) has been closely followed by the similar disbandment of the Second Tactical Air Force. The place of the latter will be taken by the British Air Forces of Occupation (Germany) under Air Chief Marshal Sir Sholto Douglas.

So ends a glorious chapter in the history of the Royal Air Force. The 2nd T.A.F. was the final outcome of a series of trial and error experiments to provide efficient air support for a British Army in the field. First came the Air Component of the Expeditionary Force which was under the operational control of General Lord Gort in the now distant days of the so-called "phoney" war. This was a formation recognised as necessary in the inter-war years. After a while it was combined with the Advanced Air Striking Force to form the Command of the Royal Air Force in France. After Dunkerque further thought was given to the matter, and the Army Co-operation Command was formed in the R.A.F. Very little was made known to the public about this Command, and it never took part in warlike operations.

Meanwhile in the Middle East there came into being the 1st T.A.F. under Air Marshal Sir Arthur Coningham, which played an indispensable part in Montgomery's great advance through Libya and in Alexander's overwhelming triumph in Tunisia. The 1st T.A.F. had so obviously found the right solution of the problem of combining air power with land power and sea power, that the 2nd T.A.F. was formed on the same model in Great Britain. Sir Arthur Coningham was brought across to take command of it, and the Army Co-operation Command disappeared. The Americans at once formed a similar T.A.F., and at the time of the invasion

of Normandy the two worked together under the general direction of the late Air Chief Marshal Sir Trafford Leigh-Mallory.

Right up to the moment when Germany surrendered, the squadrons of Sir Arthur Coningham's 2nd T.A.F. worked in the closest collaboration with the 22nd Army Group commanded by Field Marshal Montgomery. Nothing could have been more perfect than this collaboration. It is appropriate to remember that when necessary yeoman help was lent by Bomber Command and by the Strategic Air Forces under General Spaatz. It is right that a bomber force should be flexible, and able to support either naval or military efforts when required. Bomber Command continues in existence; but with the conclusion of Army operations the Tactical Air Force has come to an end. The lessons of its success remain on record for the future.

Pacific Strategy

A TOKYO Press report quoted by the Japanese News Agency has said: "The outcome of the battle for Japan will be decided by aircraft." This may be another way of putting Field Marshal Montgomery's dictum that we first win the battle of the air before starting the battle on the ground. It is recognised on all hands as a sound military principle, and it certainly applies to the present operations of the Americans in the Pacific. They are hitting hard with land-based and carrier-borne aircraft at the Japanese air bases.

At the same time, it may be remarked that it is not for the Japanese to lay down what the strategy and tactics of the final struggle will be. The initiative does not rest with them, but with the Allies. The latter must certainly win the air struggle first; but if they succeed in reducing the Japanese Air Force to impotence, then a choice of

naval and land moves lies before them. Command of the seas appears to have been obtained already. The Japanese battle fleet has so far declined to risk a decision and it is now probably so short of carriers, cruisers, and perhaps destroyers as well, that it could not now challenge Admiral Nimitz with any hope of success.

With command of the seas in their hands, the Allies have the choice of first invading the Japanese home islands or of deciding first to attack the enemy in China.

Empire Partnerships and World Relations

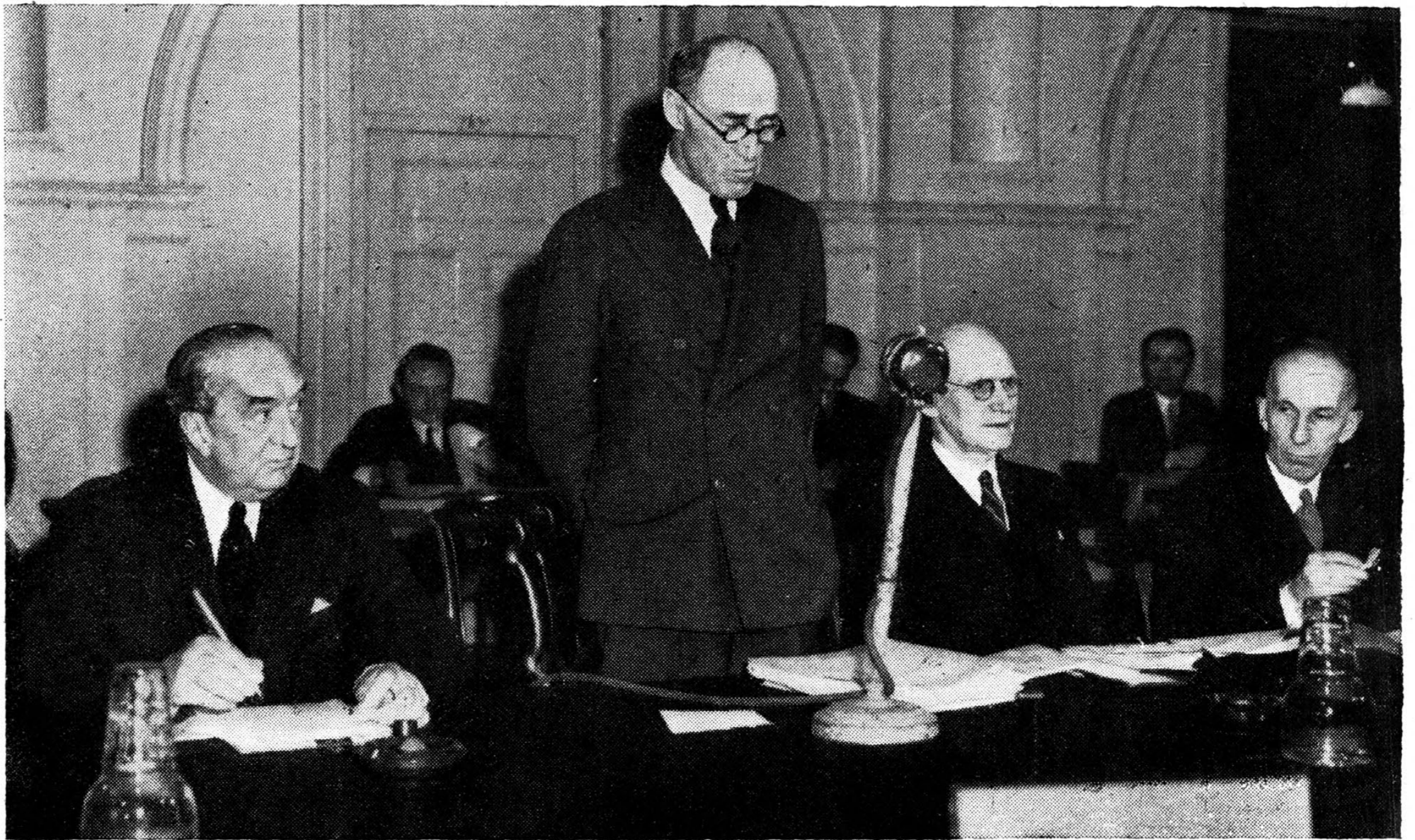
BBRITISH air services on the main routes serving the Empire were bound together on a single plan by last week's conference in London of the Commonwealth Air Transport Council. That plan embodied the principle of economic regulation which was rejected, for international application, by the conference at Chicago last year. The series of British agreements negotiated last week was therefore both a declaration against uncontrolled competition within the Commonwealth and an assertion of a general British intention to insist on similar restraints in the dealings of the British nations with other Powers on the subject of air transport services. As the British are sharing their own air traffic between themselves, so they expect other nations to agree to share with them the still wider traffic which touches their territories. This is the plan which was firmly opposed by the United States at Chicago. It has been most readily accepted by the British Dominions and it will be imposed, in essence, on those foreign Powers which want to handle traffic at British airports. Within the Commonwealth it promises to foster co-operation. Outside the Commonwealth a tendency to avoid British ports and junctions has already appeared. With the help of Eire, the United States could by-pass the United Kingdom on her services to Europe if she wished. She already has a route across

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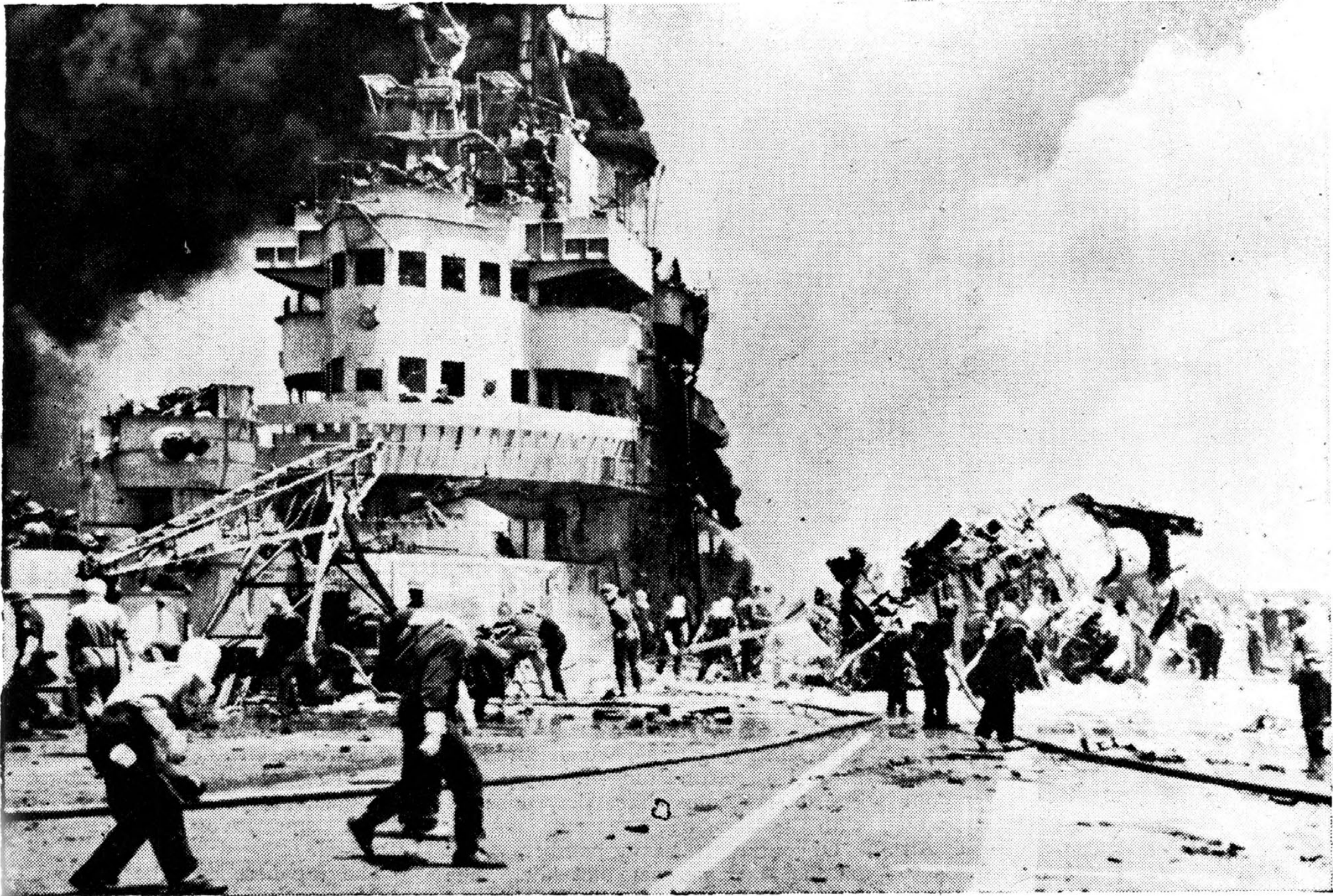
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the Pacific to the Far East which calls at no British port. There are several other main routes on which all operating nations will require British sanction and will evidently have to accept British conditions. Those conditions are solely economic.

Next year the British will begin operating main-line services under this system of mutual economic control. On their ability to prove that it does not discourage enterprise or fail to reward the efficient operator or hamper development and expansion may well depend the attitude of other nations towards a similar plan in the international field. The last thing the British would wish to do is to exclude other services. The first thing they are resolved upon is to avoid being swept off the main routes by competitors who have less wartime leeway to make up. In achieving that end and forestalling the bitterness that could arise, they assume an obligation to see that air transport users shall not suffer. The system has won Empire approval; vigour, enthusiasm and intelligence in its application can win world approval for it.



COMMONWEALTH AIR TRANSPORT CONFERENCE : Viscount Swinton, Minister of Civil Aviation, addresses the delegates. Left to right : Rt. Hon. S. M. Bruce, Viscount Swinton, G. Heaton Nicholls and the Rt. Hon. Vincent Massey.



THROUGH THE BARRAGE : Scene on the flight deck of a British aircraft carrier in the Pacific after a Japanese suicide aircraft had crashed on board. Five of these piloted flying-bombs have hit three of our carriers and three more were near misses.

WAR in the AIR

"First we Win the Air Battle" : Japan's Air Force's Plight

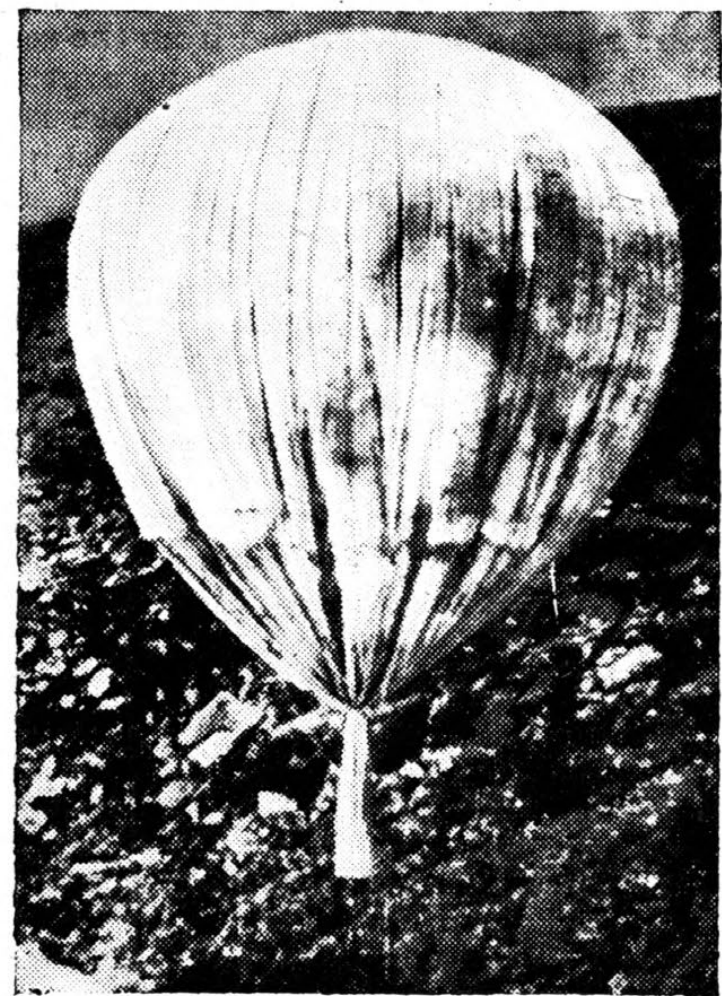
THE rain of shells on the Tokyo area, mostly aimed at the air-fields, recalls the air bombardments in the West which preceded Allied landings in Italy, in Sicily, and in Normandy.

Mr. Forrestal, Secretary of the U.S. Navy, recently announced, "We now control the sea right up to Japan." Strategically the Pacific war must be in the main a naval war; though the final blows will have to be struck by the Allied land forces. Naval superiority has been gained; but the Japanese Air Force has threatened to endanger the position. The Japanese have apparently been playing the game of conserving air strength, much as the Germans did when the British and American Air Forces were sweeping over the enemy lands (including occupied territories) before and after the landing in Normandy. The American aircraft which raided Japan met with little resistance from Japanese fighters. The same absence of resistance in the air marked the victorious advance of the 14th Army in Burma, and it may be that the enemy

had withdrawn his fighter squadrons for defence nearer home.

The danger to Allied naval superiority in the Pacific comes from Japanese bombers, and not least from the suicide pilots. They have had but little success to show for their sacrifices so far; but there is always a risk that some day one of them will be more fortunate and put one or more important naval vessels out of action. Therefore it is only common sense for the Allies to concentrate their preliminary efforts against the Japanese Air Force. We all want to see that force reduced to the same condition of harmlessness to which the *Luftwaffe* was reduced on the eve of Germany's collapse. Then the Allies will have a free hand to move their fleets and armies about as they please.

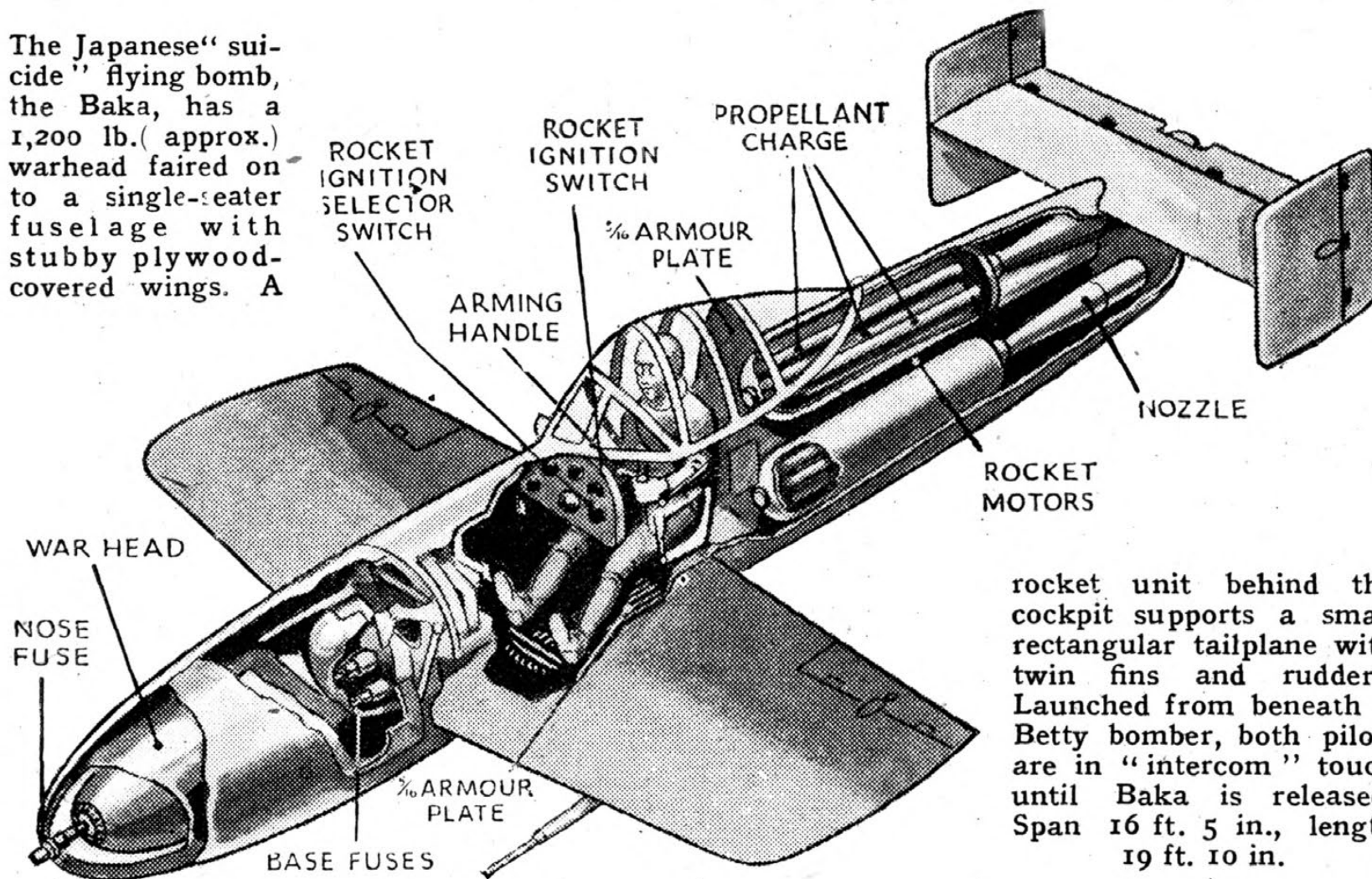
Severe though the ordeal already suffered by Japan has been, the air attack has not yet reached its highest peak. The famous 8th Air Force of the U.S. Army has now left the British Isles and has headed for America on the way to take part in the revenge for Pearl Harbour. Its



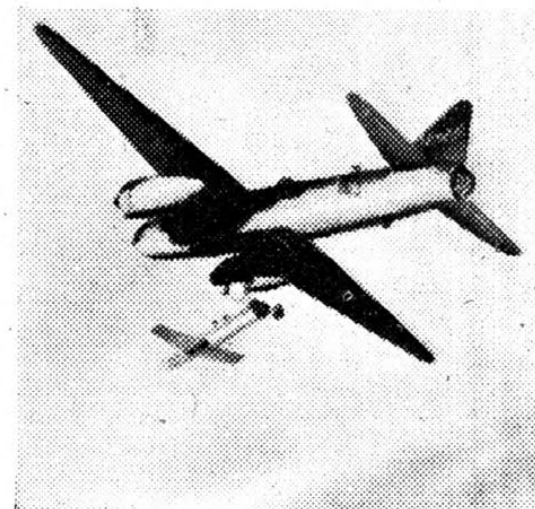
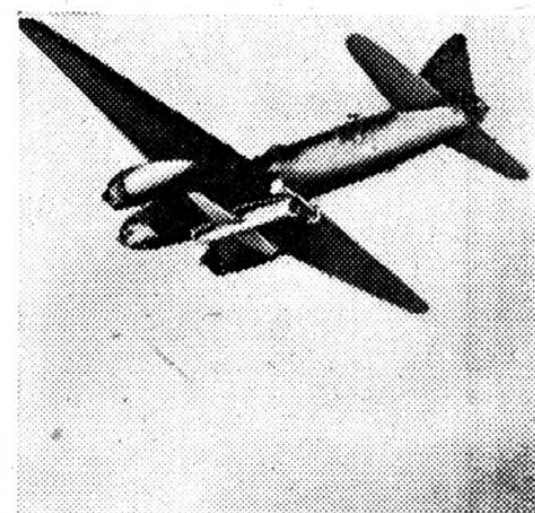
LIGHTER THAN AIR : One of the paper balloons which the Japanese drift over the United States and Canada with anti-personnel and incendiary bombs attached.

"HE'S HAD IT"

The Japanese "suicide" flying bomb, the Baka, has a 1,200 lb. (approx.) warhead faired on to a single-seater fuselage with stubby plywood-covered wings. A



rocket unit behind the cockpit supports a small rectangular tailplane with twin fins and rudders. Launched from beneath a Betty bomber, both pilots are in "intercom" touch until Baka is released. Span 16 ft. 5 in., length 19 ft. 10 in.



WAR IN THE AIR

commander, Gen. Doolittle, has gone on ahead. General Carl Spaatz, who commanded the U.S. Strategic Air Force in the European theatre, is to take similar command of the heavy bombers in the Pacific. In addition to the 8th Air Force he will have under his command the 20th Air Force (Superfortresses) which have been bombing Japan already. These eminent commanders will take to the Far East all the experience they have acquired in Europe and will strengthen the hands of Admiral Nimitz and General MacArthur.

It is said to be more than 80 years since Japan was attacked from the sea, and so it must have come as a great surprise, as well as a shock, when last week American fleets of battleships, cruisers and carriers came right in and shelled factories at their will, while aircraft numbering sometimes 1,000 and sometimes 2,000 flew inland and attacked the airfields. Thousands of people have fled from the neighbourhood of Tokyo to Hokkaido, the most northerly island of the Japanese group, which was for the time being out of the range of even Superfortresses. But the U.S. ships steamed up and shelled the steel centre of Muroran in the south of that island, while the carriers sent their aircraft inland. Kamaishi in the island of Honshu (which is the main island of the group, and on which Tokyo stands) is another steel centre, and it received a similar battering.

We must presume that the Japanese have not neglected to lay mines as a defence round their coasts, and exactly how the Americans dealt with them has not been reported. This series of naval and air raids, coming one after

another, was a fine naval feat. The heavy shells from the American battleships' big guns, which could be trained at leisure and without hostile interference, must have played havoc with the targets.

Of course, the heavy bombers based on the Marianas were not idle. The Superfortresses have to make a round flight of 3,000 miles to get at important centres in Honshu, and they are constantly making this trip. It must be an exhausting effort for the crews, but one can picture the satisfaction which it gives them to be avenging Pearl Harbour. Moreover, they meet with hardly any opposition in the air, and only have to contend with the fire of A.A. guns. In one heavy raid by aircraft from the carriers only 10 machines were brought down, and the loss in life was only seven pilots and

six other members of aircrews. In these attacks at least 15 airfields round Tokyo were completely wrecked, and 342 enemy aircraft were destroyed or damaged, only two in the air. Altogether some 70 or 80 airfields were attacked.

The Japanese have been called the most conceited people in the world. For many years they have lived on the memory of Admiral Togo's victory over the Russian fleet at Tsushima; and the rapid success of their advance in this war up to the gates of India and almost to the shores of Australia will have done nothing to lower their opinion of their own power. The shock to such a people of being hammered from the sea and from the air by their enemies must be even greater than the shock to German pride when Berlin was occupied.

"THE AIR PLAN"

MADE for the Ministry of Information by the R.A.F. Film Unit, "The Air Plan" is one of those documentary films that once again demonstrate the dramatic value of complete simplicity. One might be forgiven for thinking that no 24-minute film could possibly give any adequate idea of a plan which began just after the Battle of Britain and developed phase by phase until it reached culmination in the Normandy campaign. Yet by contenting itself with the presentation of a broad outline it does manage to cover this wide canvas, and thus the general idea of the whole scheme is admirably conveyed.

As all the world knows, the Normandy campaign was (like almost every other) a combined operation of sea, land, and air forces, but while this film only seeks to show the contribution of the Allied air arm, it often uses a wide-angle lens with telling effect; when one sees the Beaufighters of Coastal Command on patrol above the shipping lanes, for example, one also sees the ships themselves, plying between Britain and the Normandy

beach-head. There are telling glimpses, too, of great army convoys rolling along without let or hindrance—not only a testimony to that air superiority which had become air supremacy, but an acknowledgment that the Germans were not defeated by air-power alone.

And on the other side of the account there are some excellent combat scenes from the aircraft's wing cameras, with cannon shells and rockets streaking into enemy transport on road, rail and river, plus some later "shots" of stricken rail yards and broken bridges and other grim examples of the terrifying destruction air-power can achieve.

Two pieces of equipment about which the general public will learn something for the first time when they see this film are the machine used to lay a new kind of dust-proof runway, and known as the "stamp-licker," and the specially converted tank with signal equipment by which the Typhoons were promptly called down on German guns and tanks threatening our advance. Eric Portman speaks the commentary. N. D. R.

HERE AND THERE

To Command in China

LIEUT. GEORGE E. STRATE-MEYER, formerly in charge of Eastern Air Command until he handed over to Air Marshal W. A. Coryton early last month, has gone to Chungking to take over command of the U.S.A.A.F. in the China theatre, where air strength is to be increased.

Wizard!

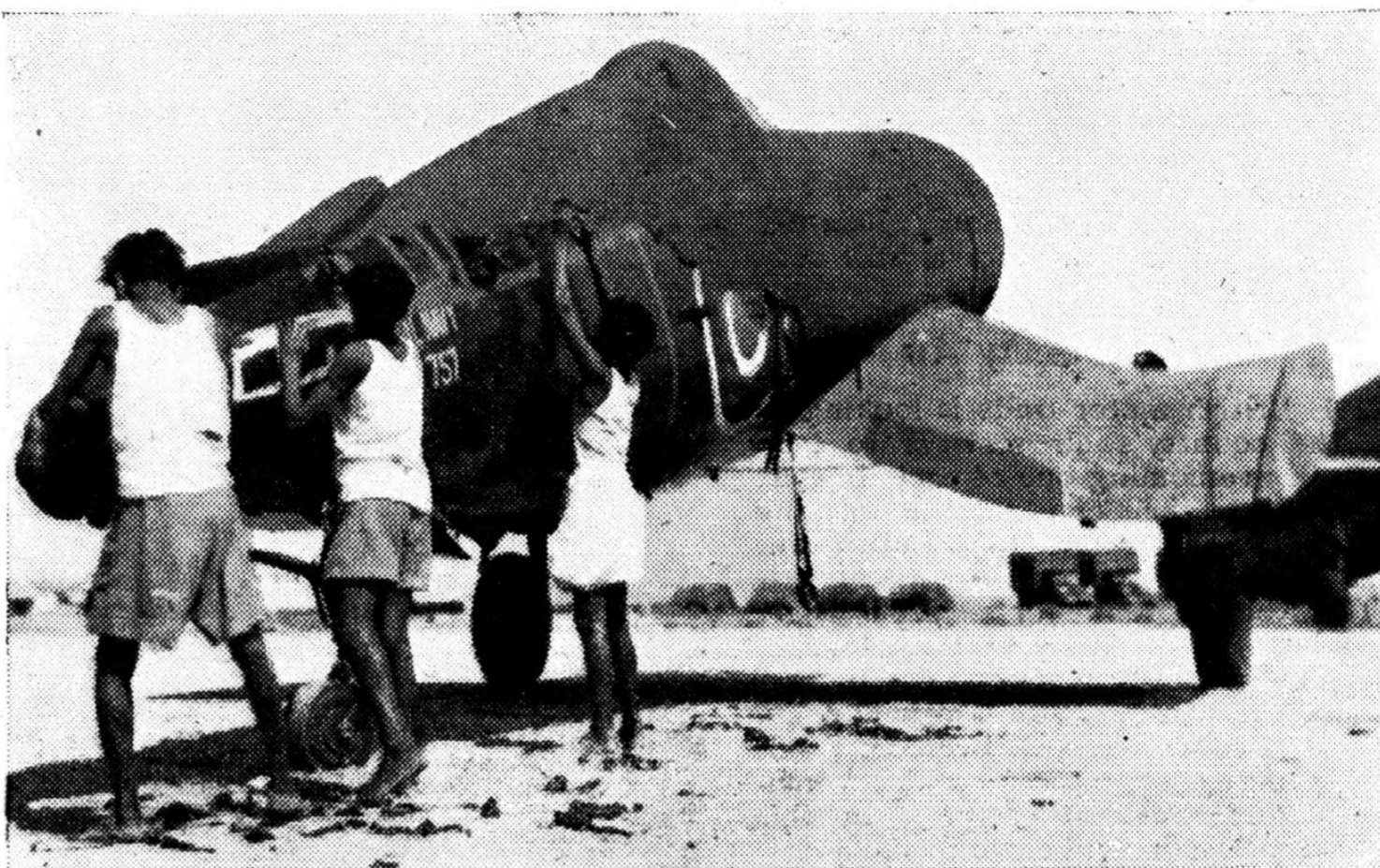
IN three weeks more than half a million people have seen "Britain's Aircraft" exhibition in Oxford Street, London, which was visited last week by Air Chief Marshal Sir Charles Portal, Chief of Air Staff, who spent most of his time among the engine exhibits.

"A wizard show—I must come back and see more of it," the Air Chief Marshal is reported to have said

Another War Secret

IT was recently disclosed that, in November, 1940, experiments were conducted with aerial mines suspended from parachutes by long pieces of piano wire and dropped at night from obsolete Harrows in the path of German raiders.

Four Harrows, each carrying 180 of the mines, were sent up to try out this desperate defensive measure, but only three enemy bombers were definitely known to have been destroyed, and the scheme, which had the curious code name of "Mutton," was abandoned.



PEELING OFF: Aircraft arriving at the Royal Naval Air Station in Cochin, on the Malabar coast, a reception unit, are sheathed in erenol. This is a rubber-like solution which is sprayed on and dries into a thin protective skin easy to peel off on arrival.

Czech Request

THE Czechoslovak Government has asked the British authorities to hasten the return of members of its air force serving with the R.A.F., according to a statement made by Dr. Zdenek Fierlinger, their Prime Minister, to the Czechoslovak Socialist Democratic Party.

Dr. Fierlinger added, said Prague Radio: "Our Government hopes that this request will be granted as soon as possible, in the spirit of our well-trying friendship with Great Britain."

Improved Corsair

REPORTED to be "in the 425 m.p.h. class," the new Corsair fighter-bomber, the F4U-4, was last week announced by the U.S. Navy Department to be in action against the Japs.

It differs mainly from earlier versions in being powered by an 18-cylinder 2,100 h.p. Pratt and Whitney "Double Wasp" engine driving a four-bladed c.s. airscrew with a swept area of 13ft. 2in. It is armed by six 0.5in. machine guns and can carry a 2,000 lb. bomb-load. Other improvements include "push-button" receiving and transmitting sets (long used by the R.A.F.) and a simplified arrangement of controls.

It is also claimed that the Corsair's inverted-gull wings have the (accidentally discovered?) advantage of protecting it from damage when "ditched."

Their Task is Done

THE Balkan Air Force is being disbanded, it has been announced.

In an Order of the Day to the squadrons of eight nationalities that formed the force—British, American, South African, Russian, Polish, Greek, Yugoslav and Italian—Air Marshal Sir Guy Garrod, A.O.C.-in-C. Mediterranean and Middle East, stated:—

"You have performed a greater variety of tasks than any other air force. Besides supporting the regular armed forces of Britain and Yugoslavia, you supported and supplied numerous and widespread partisan forces operating in the Balkans. Now your task is done and well done."

Dinghy Developments

THE amount of thought and work which has been put into the development of rubber dinghies for aircraft is not generally realised, for there is an enormous difference between those available at the start of the war in Europe and the present-day types, of which there are six standard patterns.

The early type was merely a scaled-down version of a pneumatic buoy originally designed to prevent the sinking of the aircraft itself, and its only equipment was food and signalling apparatus transferred from the sinking aircraft at the crew's discretion.

The general improvement in design and equipment has been due to the unceasing teamwork of the Royal Aircraft Establishment, M.A.P., the Air/Sea



COMMAND PERFORMANCE: The Queen of Denmark was among the many thousands of spectators at a recent air display given by the R.A.F. at Copenhagen. With her is Air Comdre. R. B. Maycock, air attaché in Sweden, who was formerly sales manager at Handley Page Ltd.

HERE AND THERE

Rescue Service, and many commercial firms and private individuals. This development work is, of course, still continuing.

Car Spares by Air

THE British motor trade is looking to the country's air services to help them in overcoming one of their biggest difficulties in their export trade—getting urgently needed spares to remote countries as quickly as possible.

The Rootes group, for example, is reported to be planning to export spare parts by air, when necessary, to any part of the world. "We are looking to British air services to overcome this long-standing handicap," said an official of the group recently. "In this way air transport will come to the assistance of its elder brother, road transport."

He added that many other British industries would doubtless take the same course, but much would depend on freight rates, speed, and regularity.

THE Salvation Army in Australia is to acquire a Tiger Moth to carry members of its staff to Servicemen in isolated areas, Melbourne Radio announced last week.

The prototype of a new French fighter, the drawings for which are reported to have been largely prepared during the German occupation and finished since the liberation, began its test flights last week.

A squadron of Swedish fighters escorted the Dakota in which Air Chief Marshal Sir Arthur Harris, Bomber Command's chief, left Stockholm after his recent visit to Sweden.

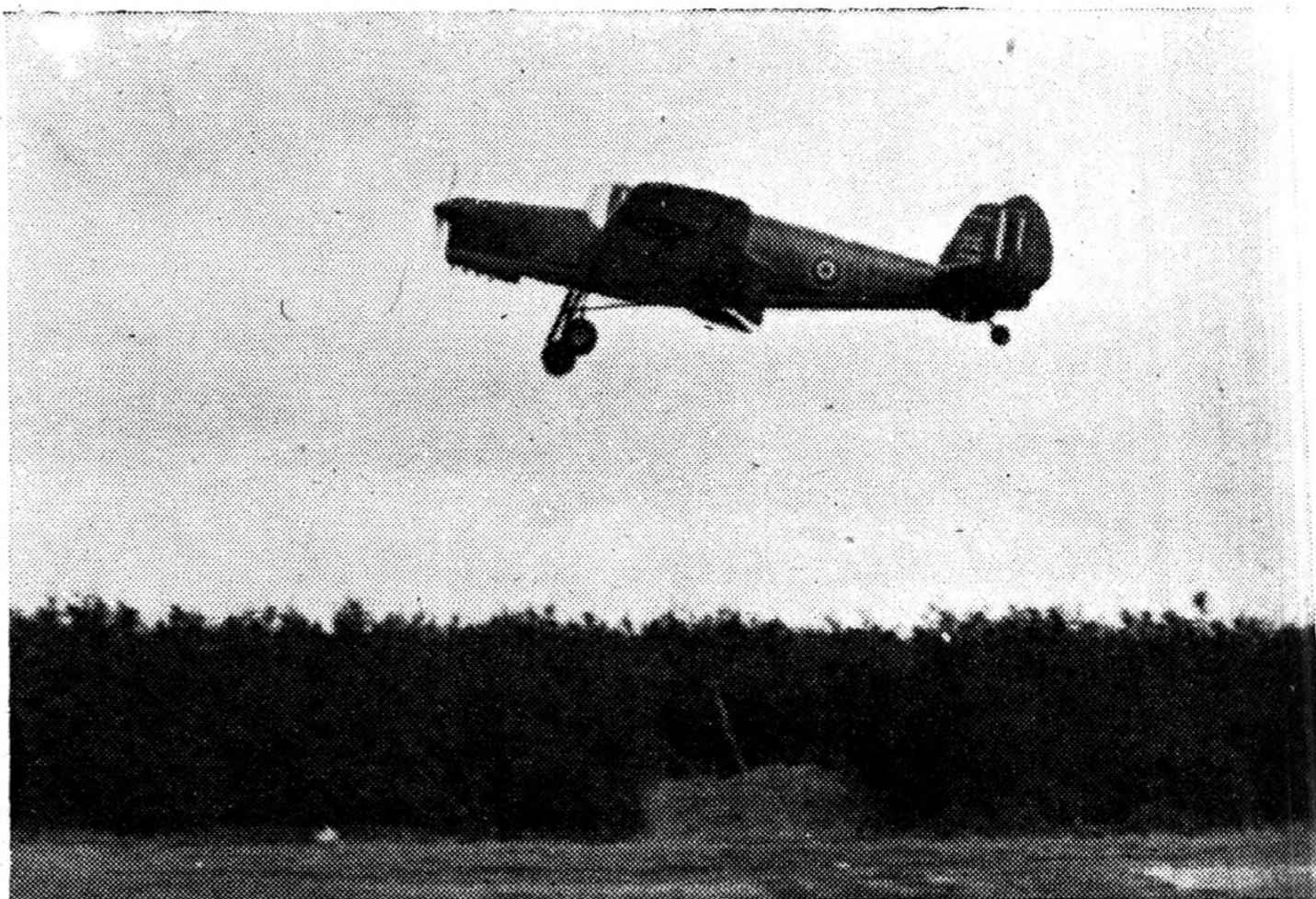
Major Alexander de Seversky, the well-known American designer, flew from Paris to Stockholm on a two-day visit last week. He told the Press it was "a mere social visit to discuss Allied experiences in the air war."

Officials of the Douglas Aircraft Co. in Santa Monica, Calif., have been notified that production on the B-17 Flying Fortress is to halt immediately.

The last Halifax bomber to be built at the Rootes factory at Speke, Liverpool, left the assembly line last week and was flown by Flt. Lt. J. R. Palmer, who has been test pilot there since 1939. This factory is to be taken over by Dunlops, as previously reported in *Flight*.

Mr. Harry Armitage, general manager of Hobourn Aero Components, Ltd., of Coventry, has been appointed works director of the company.

War casualties in the R.A.A.F. up to April 30th, recently announced by the Aus-



MONTY'S MESSENGER: To keep in touch with his commanders on the Western Front during the closing phases of the war, Field Marshal Montgomery used this Miles Messenger, whose short, steep take-off and landing made it ideal for the job.

News in Brief

tralian Air Dept., totalled 14,414, of which 7,889 are dead or presumed dead. Among 3,988 decorations awarded are three V.C.s and 60 D.S.O.s

Mr. T. P. Norris has been appointed advisor on all matters concerning labour relations, welfare, apprentice training, medical services and kindred subjects at Vickers-Armstrongs, Ltd. He has had many years' experience in this field.

Mr. G. T. Craig, who was sales manager of the Anglo-American Oil Co., Ltd., for Scotland and Northern Ireland before the war, has been appointed general manager of Intava, Ltd. Mr. Christopher Clarkson (now Group Capt. Clarkson, A.F.C.), who held this post until he was recalled to the R.A.F., and who for five years has been with the British Air Commission in the U.S., is to join Intava Inc. in New York when he leaves the Service.

Mr. H. L. Mabbott, works office controller at Westland Aircraft, Ltd., has been appointed commercial manager in succession to Mr. T. H. Burleigh, who will be resigning as from September 1st to become contracts manager at Thomas Firth and John Brown, Ltd., Sheffield.

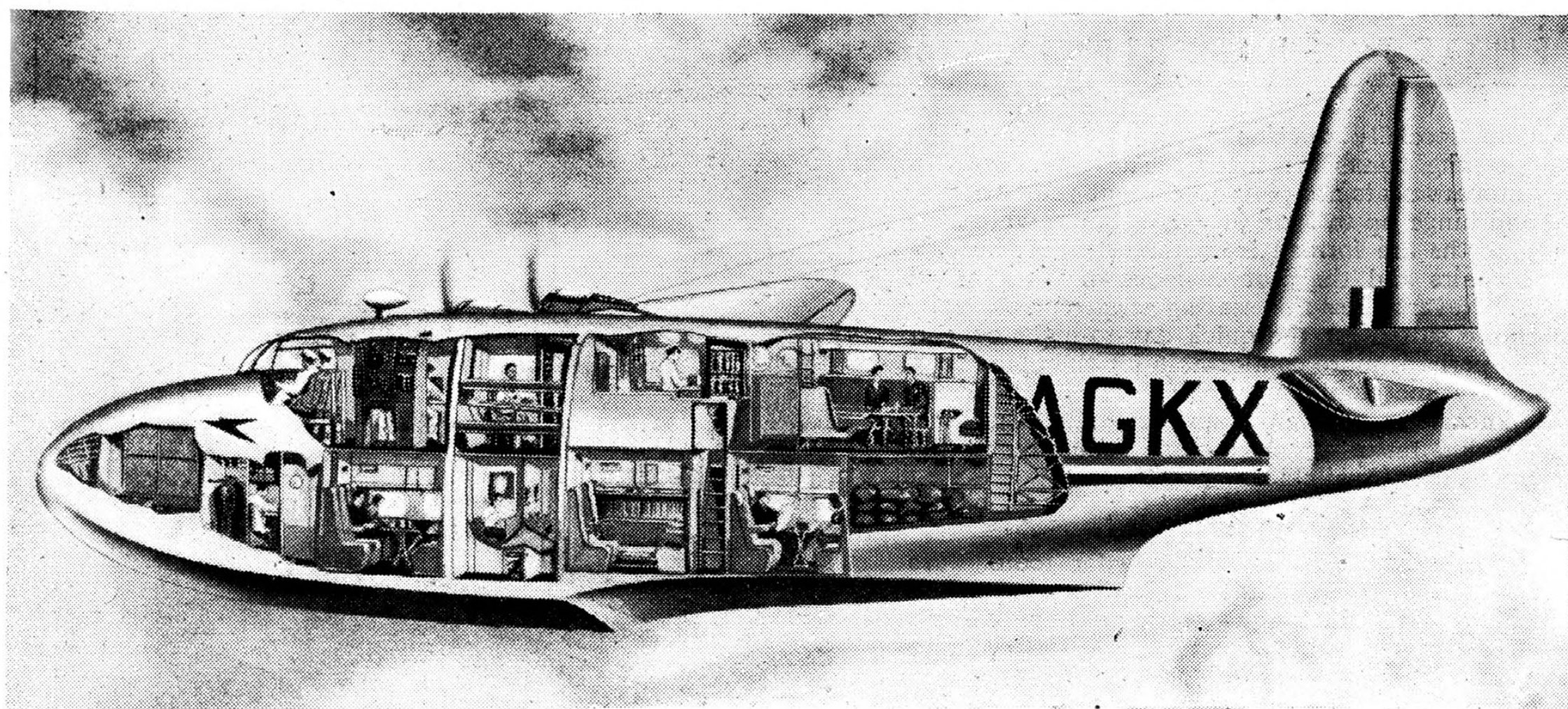
"The British have recently been carrying out exercises and demonstrations with jet-propelled aircraft in Norway," the Swedish radio recently stated. "This," it added, "probably accounts for reports of jet-propelled aircraft of unknown nationality over Swedish provinces; the aircraft may have been German but they were piloted by allies."

Mr. Leonard Morgan, who for the last three years has combined the duties of assistant general manager of K.L.G. Sparking Plugs, Ltd., with those of aviation manager, has now been appointed general manager and a director of the aircraft and marine division of Smiths Aircraft Instruments, Ltd., with which K.L.G. is associated. Mr. J. E. Chorlton becomes a director of Smiths and takes up the position of Government contracts manager.

Air Comdre. Albert Fletcher, one of the last officers on the active list who were in the Air Battalion, R.E., before the R.F.C. was constituted in 1912, has been appointed to the Administrative and Special Duties Branch of the R.A.F. He held a succession of commands in France during the 1914-18 war, subsequently served in the Air Ministry and with Imperial Airways, and, recalled from retirement in October, 1939, later became Deputy Senior Air Staff Officer on liaison with B.O.A.C. at Transport Command H.Q.

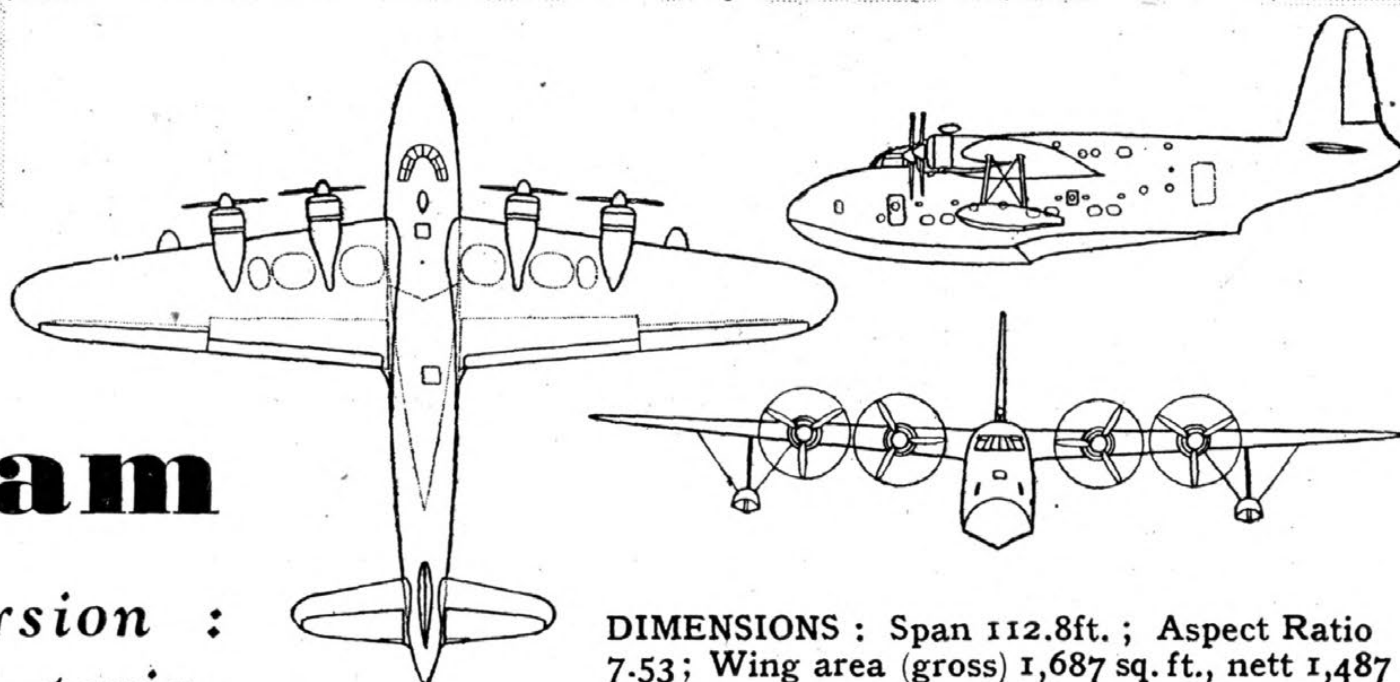


"Quick eat the chocolate ration here comes the rescue launch!"



Short Sandringham

Sunderland's Civil Version : Improved Form and Interior



DIMENSIONS : Span 112.8ft. ; Aspect Ratio 7.53 ; Wing area (gross) 1,687 sq. ft., nett 1,487 sq. ft.

FEW aircraft types have ever rendered such excellent and versatile service both in peace and at war as Short flying boats. In pre-war days the entire family of boats was the mainstay of Empire air communications and nothing has more enhanced the prestige and popularity of British air lines than these thoroughbreds.

What the future has in store for the flying boat is not within the province of this article to speculate. But one is tempted to venture a forecast that if commercial traffic is to be supported by such excellent types as the Shetland, recently reviewed in this journal, the flying boat will hold its own.

It is encouraging to see, however, that for the interim period as well there will be no dearth of efficient flying boats. For this transition phase the Short Sandringham is an admirably executed job which, if available in required numbers, should be of great service to the revival of Commonwealth air communications.

The Sandringham is, of course, a conversion and the primary airframe structure is identical with the civil version of the Sunderland III. An aerodynamically improved form is secured by the redesigned bow and tail and the disadvantages of military characteristics eliminated. Outside this, the main modifications introduced in the Sandringham which make it different from the Sunderland III are confined to secondary structural changes.

The object of these modifications was to provide accommodation for 24 passengers by day and 16 by night as well as stowage for mail and freight, and it is with this object and to ensure up-to-date standards of comfort, that the interior and equipment have been completely altered. All these alterations, one is glad to record, have been influenced by the operational experience of the B.O.A.C.

The Sandringham's flight deck is essentially the same in

its layout as in previous Sunderland conversions. Side-by-side dual flying-controls are provided with each seating position modelled on the Empire boat, thus ensuring an undisturbed field of vision. Accessible to each position is a centrally-located control pedestal embodying engine, air-screw and other hand controls. In conformity with B.O.A.C. requirements the pilots' instrument panel has been replaced by a new unit.

Immediately behind the pilots' seats, to starboard, is the commodious navigator's station, and the wireless operator's station is to port. The latter has been modified to bring it in line with modern needs and equipment. Further down is the flight engineer who is seated to starboard facing aft, and who has also been provided with an improved layout of the instrument panel. Across the gangway, to port, is the rest room for the Sandringham's crew of seven.

Mooring operations are conducted from a hatch in the extreme bow compartment, while another hatch located between the pilots' seats provides access from the flight deck to the lower deck which is, in the main, reserved for the "payload."

Passenger Accommodation

Passenger accommodation comprises three main cabins on the lower deck in which seating is arranged for 16 passengers and night accommodation for a total of twelve, as well as a dining room on the upper-deck seating eight or accommodating four passengers for sleeping.

The main passenger door, situated in the port bow, leads to three main cabins which are distinguished by their well-planned interior and finish, designed to the requirements of the B.O.A.C. A feature which will be welcomed by many a traveller is the design and location of the windows which afford an excellent view from each seat.

SHORT SANDRINGHAM

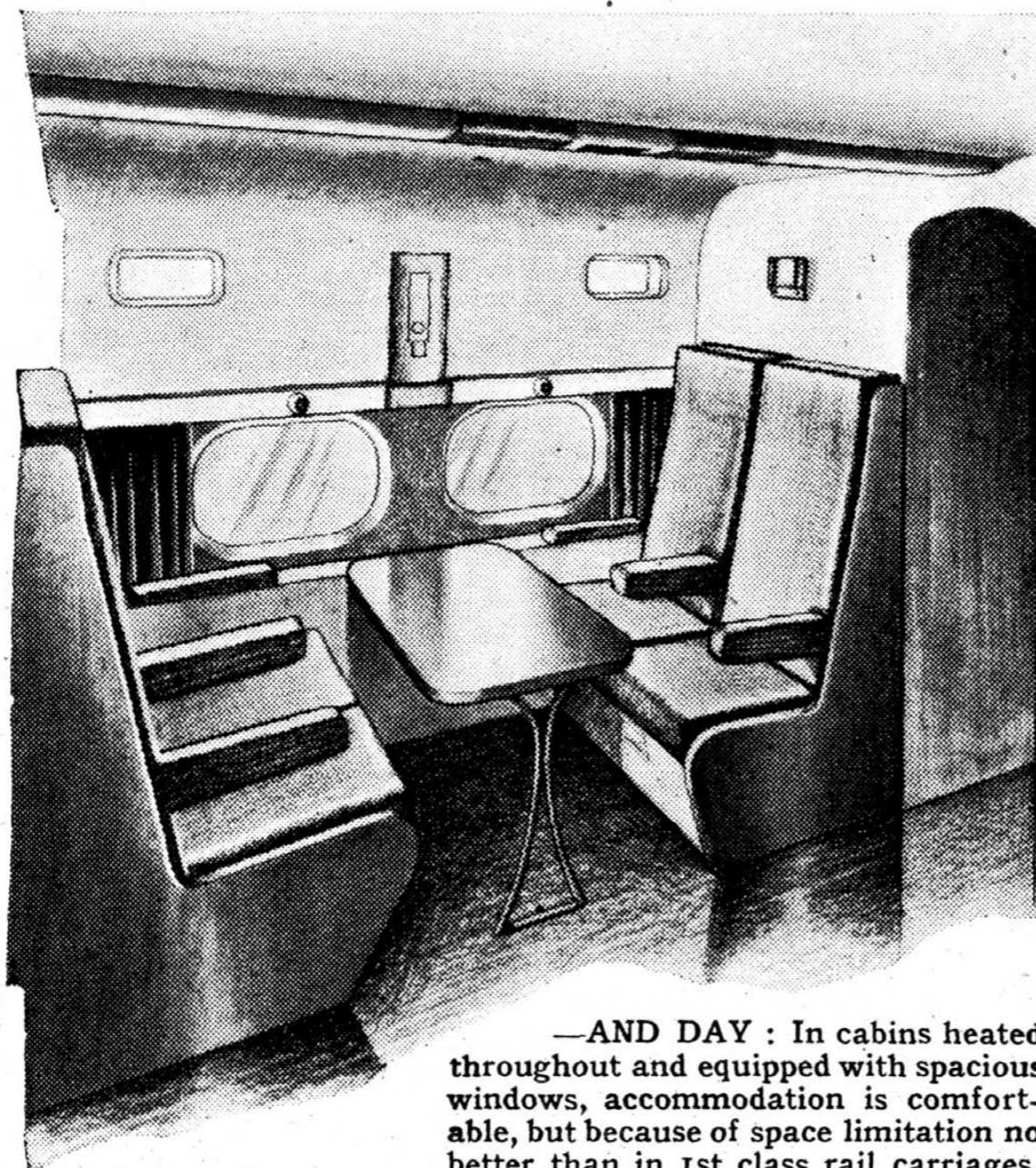
Chairs specially developed for rapid conversion into sleeping bunks are fitted. The chair-backs of the outboard seats are pivotable about the head rest line and hinge up to form an upper bunk, whilst the lower berths are formed from the seats of the outboard chairs and the seat cushions of the inboard chairs. Nevertheless this seating arrangement, while admirably suited for the quick day-to-night conversion, is perhaps more comfortable for the night than for its daytime employment. For within the available dimensions, daytime seats with fully adjustable pitch would mean a considerable reduction in the accommodation available.

Amenities

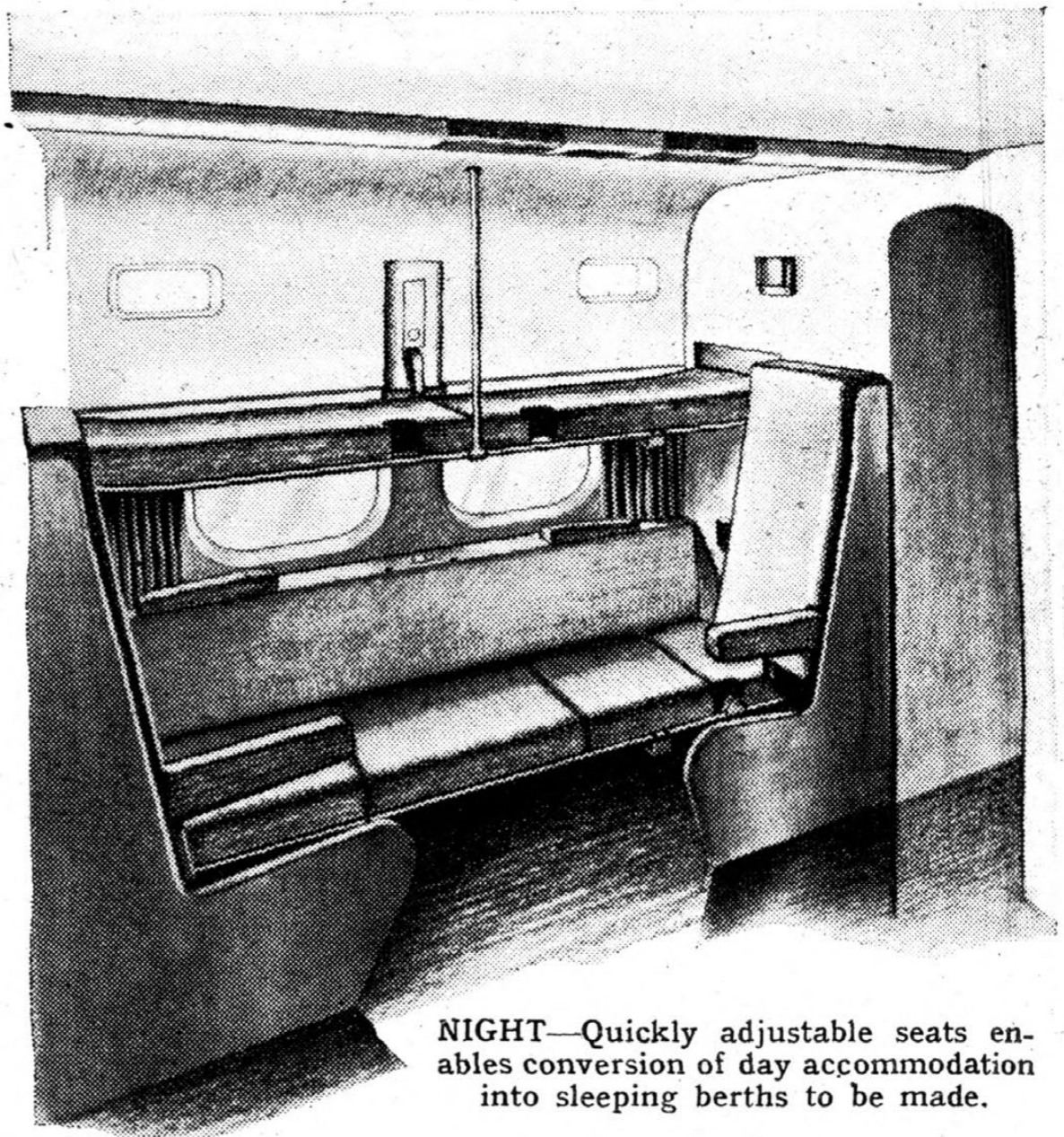
Dressing-rooms and ladies' "powder room" are located to starboard, amidships, and are equipped with h. and c. running water, points for electric razors, and other little amenities. A toilet and a linen locker are amidships to port, and a cloak room for stowage of outdoor wear is provided near the entrance to the port bow.

The upper deck is reached by a staircase situated athwartship to starboard and separating the midship cabin from the one aft. It houses that part of passenger amenities which frequently forms the most lasting of the traveller's impressions—the bar and the buffet, fully equipped with all the necessary paraphernalia, including refrigerator and steam oven. Adjoining it, a spacious dining saloon comfortably accommodates eight passengers. As already mentioned, these settee-type seats can be converted to sleeping bunks, thus making night accommodation available for a further four passengers. The trick is simply performed by hinging up the backs of two settee seats about the top edge to form an upper bunk, whilst the seat portions form a lower berth, curtains providing privacy.

A sidelight on the type of living space provided for the Sandringham's passengers may be obtained from specific volume figures per passenger. On the day version, this



—AND DAY : In cabins heated throughout and equipped with spacious windows, accommodation is comfortable, but because of space limitation no better than in 1st class rail carriages.



NIGHT—Quickly adjustable seats enables conversion of day accommodation into sleeping berths to be made.

figure, based on the total of cabins and dining saloon, is 76.2 cu. ft., and on the night version 114.4 cu. ft. By way of comparison it is interesting to note that, for the Shetland, these figures are 70 cu. ft. per passenger on the day version carrying 56 passengers and 128.6 cu. ft. on the 24-passenger night version. If based not only on cabin accommodation, but on total space at their disposal, the specific volume per passenger on the Sandringham is 105 cu. ft. as against 94.4 cu. ft. on the 56-seater Shetland version and, on the night versions of Sandringham and Shetland, 157.6 and 132.2 cu. ft. respectively.

For the carriage of mail and freight stowage is provided in two compartments, one placed forward between the mooring station and the purser's office and the other located aft. The former has a net capacity of 137 cu. ft., and is loaded via the main entrance door. The aft stowage, loaded through a special door to starboard, has a gross capacity of 640 cu. ft. and a maximum nett of 340 cu. ft. stacked 4ft. high.

Performance and Loads

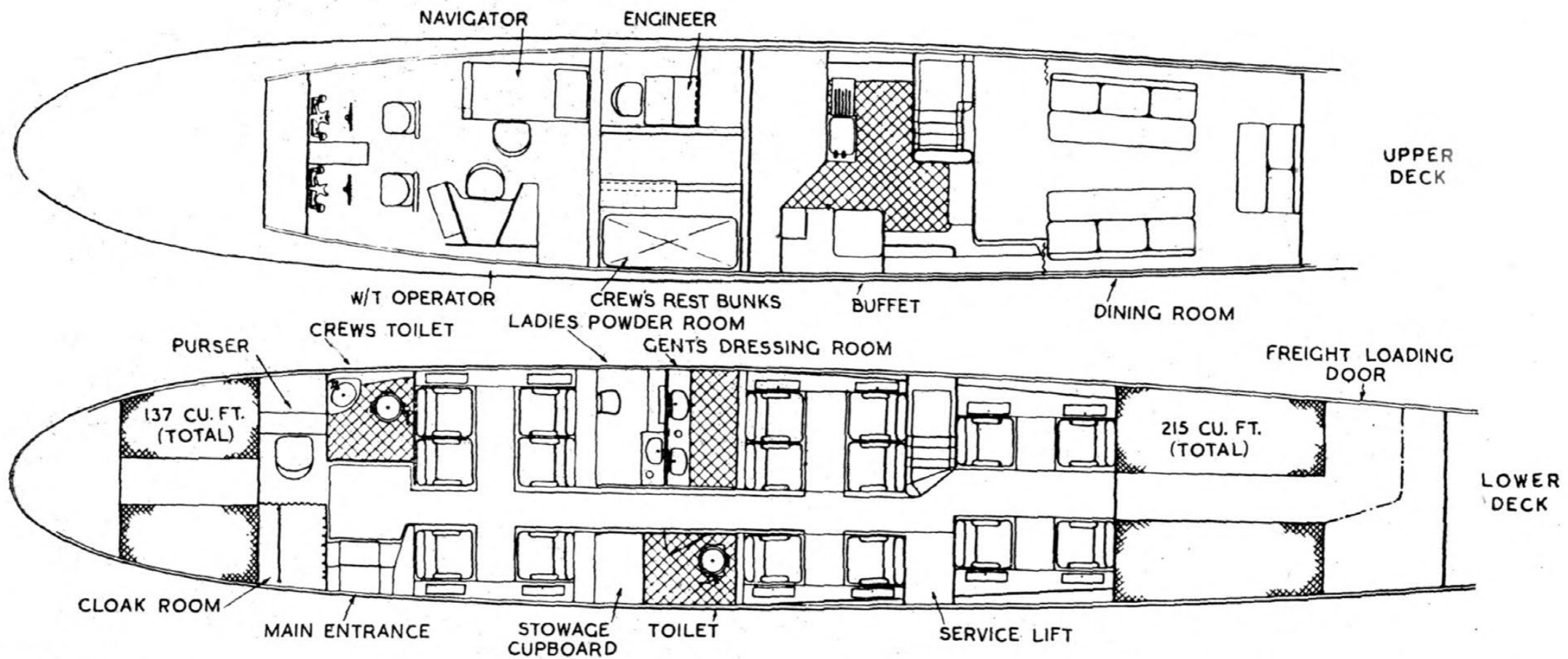
Here the following data on the hull volume might help to round off the mental picture:—

Cabins (total)	1,493 cu. ft.
Dining Saloon	696 „ „
Dressing Rooms, etc.	333 „ „
Miscellaneous	387 „ „
Crew's Stations	915 „ „
Freight Stowage	477 „ „

Total 4,301 cu. ft.

The Sandringham is powered by four Bristol Pegasus 38 air-cooled radials, each developing 1,030 h.p. at take-off and driving three-bladed c.s. fully feathering de Havilland Hydromatic airscrews of 12ft. 6in. diameter. The cruising speeds vary, of course, with the method of control used, but a few examples may serve as a useful illustration: with an all-up weight of 56,000 lb. the Sandringham's minimum comfortable continuous cruising speed is 132 (true air speed) knots at 5,000ft., increasing by about 6 per cent. at 10,000ft. and at the same rate at 14,000ft. Corresponding performances for 46,000 lb. a.u.w. are about 10 per cent. lower.

Although the Sandringham is slightly smaller than



INTERIOR LAYOUT : The lower deck comprises three cabins accommodating 16 passengers by day or 12 by night ; the upper deck houses the flight deck, a buffet bar and a dining saloon convertible into sleeping bunks for four passengers.

the Empire (S.23) class, the span being 112.8ft., compared with 114ft., and the length 85.3ft. compared with 88ft., it carries a larger crew and more passengers, by virtue of its greater depth of hull.

Its weight, less payload, is 45,380 lb., and payload is 7,600 lb., giving an all-up weight of 52,980 lb. Its maximum permissible all-up weight is 56,000 lb., at which it can carry a maximum payload of 8,197 lb. With an all-up weight of 53,300 lb. for t.o. and 46,000 lb. landing, and a

DIMENSIONS

1. Hull	Overall length	85.34 ft.
	Max. Beam at chine	9.75 "
	„ depth	17.75 "
2. Control Surfaces	Tailplane and elevators	205 sq. ft.
	Ailerons	134 "
	Flaps	286 "
	Fin and rudder	136 "
Tare Weight	34,150 lb.	Empty Weight 36,555 lb.
Tankage capacity—Petrol		2,032 galls.
Oil		138 "

payload of 8,197 lb., the still air range is 1,000 sea miles. With the same payload but a higher t.o. all-up weight of 56,000 lb., the range is still 1,370 miles. In both cases a full day complement of 24 passengers could be carried plus a total freight load of 4,117 lb. A combined passenger-freighter variety carries 16 passengers restricted to lower

R.Ae.C's SHORTAGE

THE Royal Aero Club is short of tablecloths and is asking members if they have any they do not require and would be prepared to sell. But we feel sure that Mr. B. Stevenson, the house secretary, would welcome additions to his inadequate stock of table-linen even if the offers came from persons outside the club membership. Anyway, we just mention the matter in case any non-member reader can help and would like to do a little trade on these lines.

Incidentally, the club will be shut (except for bed and breakfast) from Saturday, July 28th, until Sunday, August 12th, inclusive, for the usual staff holiday.

AIR MAIL BY THE TON

THE "flying postmen" of the 2nd T.A.F. Air Despatch Letter Service have ferried nearly 2,000 tons of official mail, press "copy" and photographs, and high-priority equipment between key countries on the Continent since the service was inaugurated shortly after D-Day.

The Service uses Ansons, Dakotas, Spitfires, Hurricanes and Austers, and has been maintained, often in weather conditions almost bad enough to make the birds walk, with a

All-up weight, lb.	TAKE-OFF	
	Time to unstick, secs.	Unstuck speed knots.
56,000	56	80.5
50,000	36	75

PERFORMANCE ON CLIMB
(All-up weight at sea level, 56,000 lb.)

Condition.	Engines.	Rate of Climb, ft./min.	
		Sea level.	10,000 ft.
Normal climb power	4	557	312
„ „	3	203	10
Max. weak mixture	4	235	238

CEILINGS

Condition.	Engines.	Absolute Ceiling, ft.	Service Ceiling, ft.
„ „	3 2,250 „	10,400	7,300
Max. weak mixture	4 2,250 „	14,650	12,650

deck only, with freight stowage loaded to maximum capacity and totalling 5,455 lb. over the same ranges.

From this it would appear that the most suitable class of operation of the Sandringham would be on medium range, non-express services on Empire routes.

loss of mail officially described as "an infinitesimal fraction" During the perilous days of the Normandy beach-head four A.D.L.S. pilots were lost, but there has not been a single loss since.

FIRST R.A.F. FLIGHT TO LUZON

A LIBERATOR of R.A.F. Transport Command recently made a remarkable flight from England to Manila, in the Philippines. A picked all-British crew pioneered the route eastward from Calcutta to become the first men to fly a Royal Air Force aircraft to Luzon.

The first 7,000 miles from England to Calcutta were routine. Eastward from there the route was over high mountains and a good deal of enemy-held territory. There was still fighting around Bataan and Manila as the outward part of the flight ended and the Liberator actually circled at 1,500ft. over an area near Bataan, where a big enemy force was at that time still resisting.

The flying experience of the crew of five totals 15,000 hours, and they were picked for their experience of long-distance missions. They have flown together on the England-Azores and England-Iceland routes. They flew by easy stages to Calcutta, where they were finally briefed for the trip to Manila.

New de Havilland Airscrews

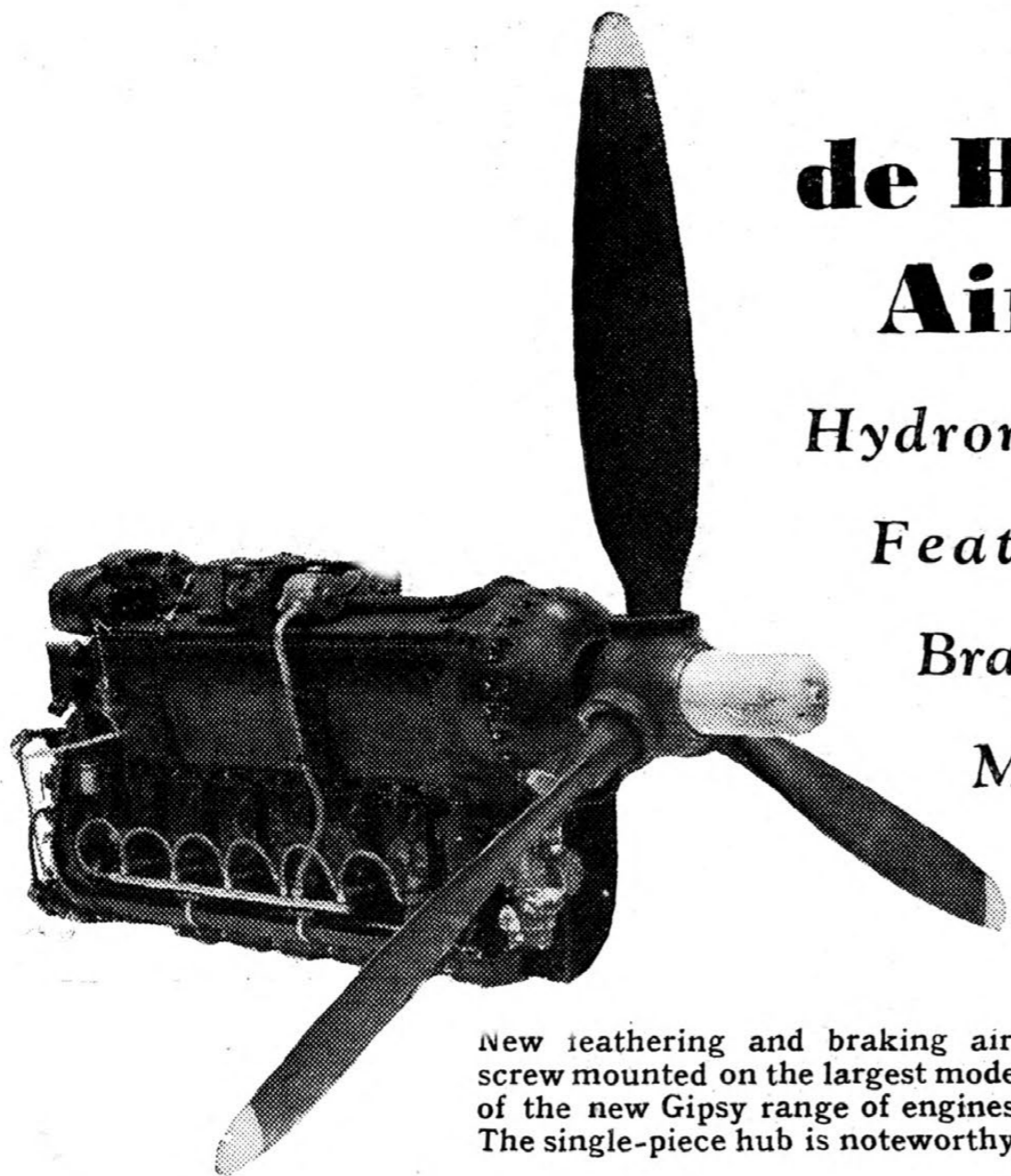
Hydromatic C.S.

Feathering and

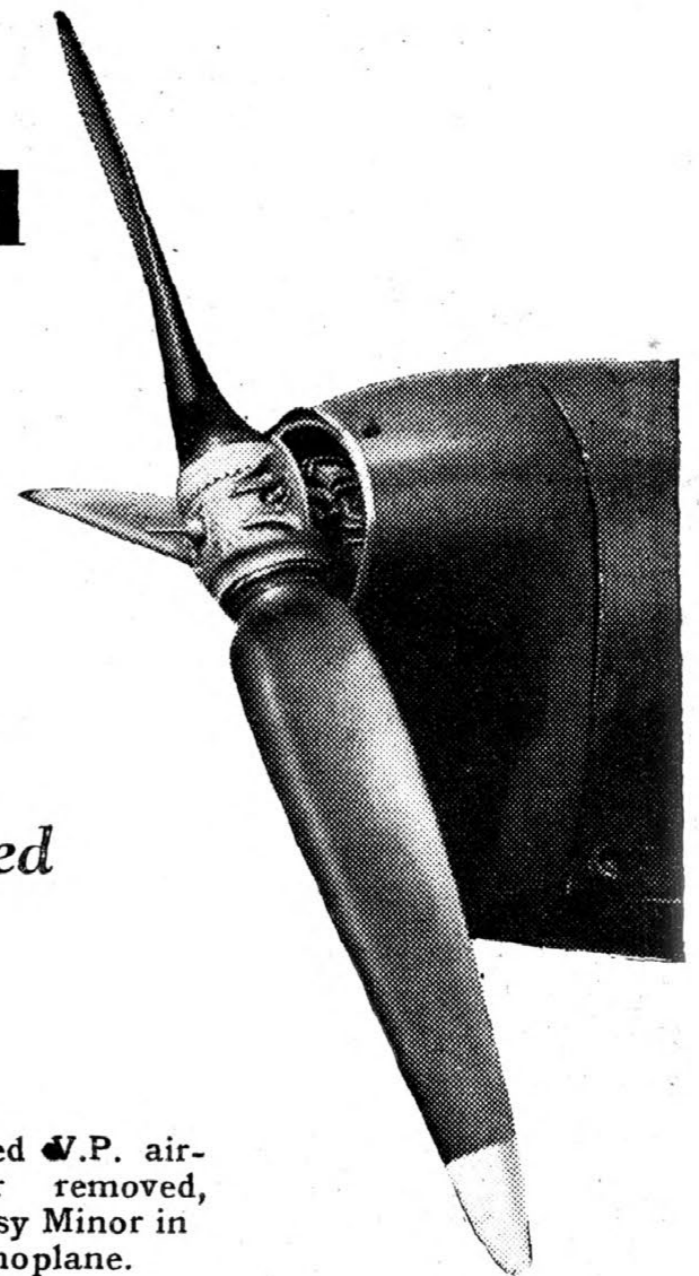
Braking Airscrew :

Manually Operated

Type



New feathering and braking air-screw mounted on the largest model of the new Gipsy range of engines. The single-piece hub is noteworthy.



The manually operated V.P. air-screw, with spinner removed, shown fitted to a Gipsy Minor in a Moth Minor monoplane.

IN order to complement the new range of de Havilland four- and six-cylinder engines which are to be produced, the company are preparing to make available three different air-screws. Two of these are new, whilst the other is a much smaller and modernised version of the bracket-type which was used so extensively in the early days of the war.

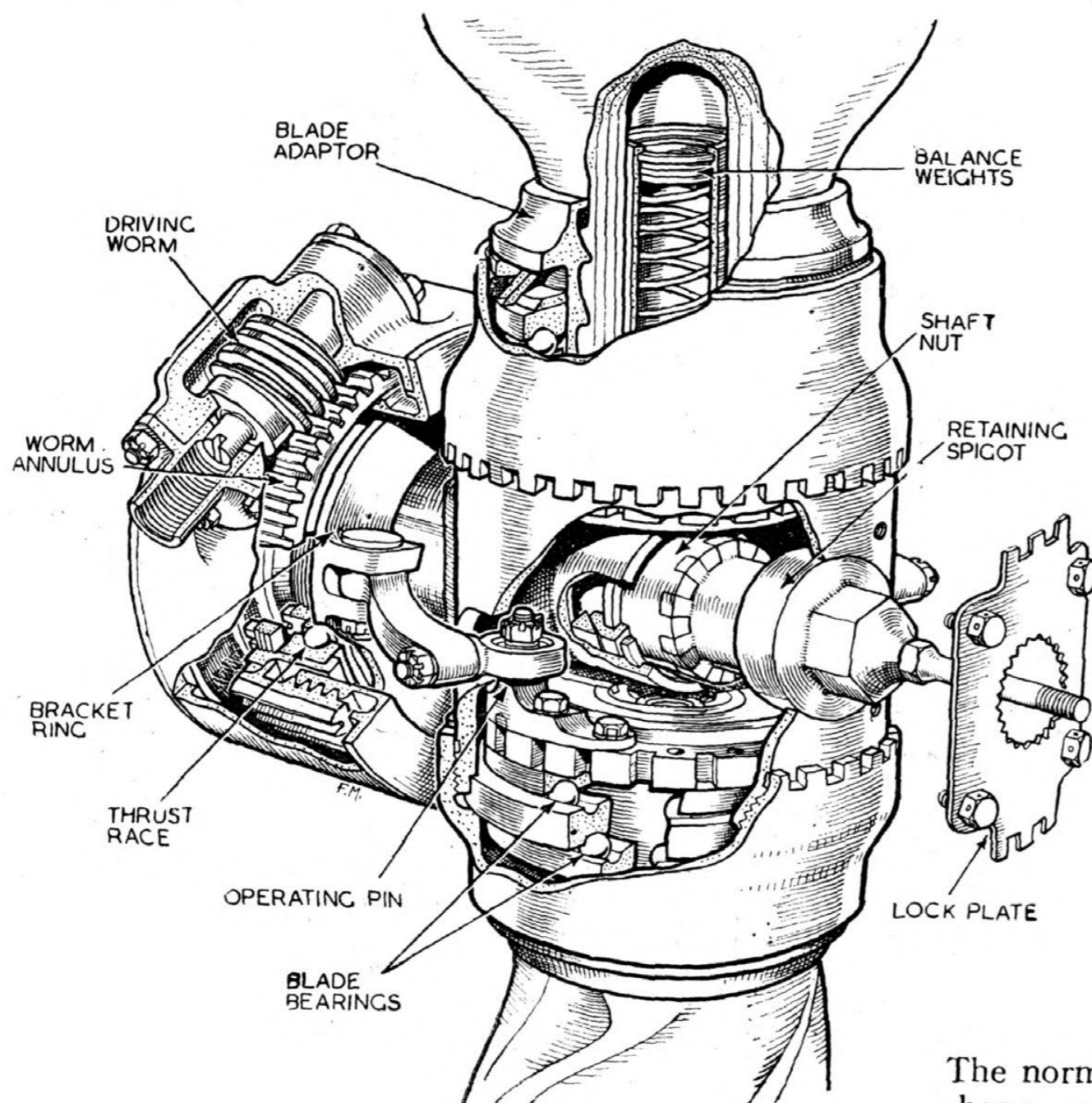
To take them in size rotation, the first is a two-blade variable-pitch screw for powers up to 200 h.p. and suit-

able for mounting on No. 1 S.B.A.C. shafts. Swept diameters available for this model are from 5ft 6in. to 6ft. 6in. Blades are manually varied for pitch angle through a range of 15 degrees and, of course, the air-screw is not a constant speeding type. It is intended for light aircraft as a refinement by means of which better take-off and climb characteristics are available together with enhanced cruising economy. Blades are of improved wood and the hub and mounting spider are integral, this resulting in what is claimed to be the lightest V.P. air-screw in the world.

The second air-screw is also a two-blader, but is, as mentioned, a hydraulically actuated bracket type. It is suitable for No. 2 S.B.A.C. shafts and for powers from 200 h.p. up to 300 h.p., for which the swept diameters vary from 7ft. to 7ft. 6in. This air-screw employs metal blades and is of constant speed design.

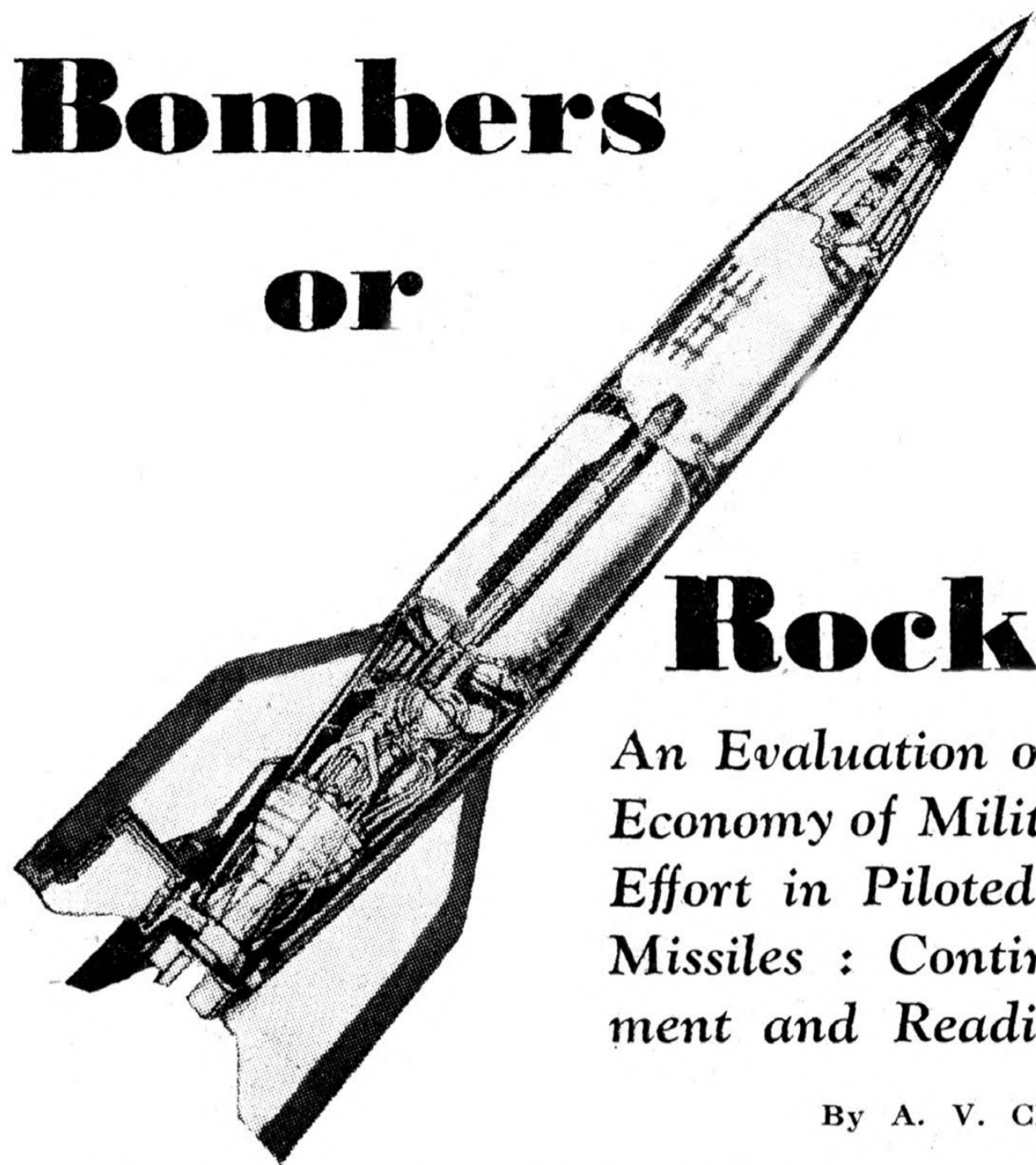
Finally, there is the three-blade (metal), Hydromatic constant-speed, feathering and braking air-screw as scheduled to be fitted to the new de Havilland Dove feeder-line aircraft. A pitch range of 120 deg. is required for the normal and braking functions, and the rate of pitch change is of the order of 18 to 20 deg./sec., this being necessary to prevent the engine r.p.m. from increasing unduly whilst the blades are moving through the neutral pitch zone from positive to braking pitch. The screw is intended for No. 2 size S.B.A.C. shafts and is suitable for powers of from 250 h.p. to 330 h.p., for which the swept diameters vary, according to the aircraft and engine, from 7ft. 6in. up to 9ft. Although of basic Hydromatic form, this new model embodies considerable modifications to cater for the braking function.

The normal cam slots are extended to an opened "Z" shape, and an entirely new system of pitch stops and operating valves has also been incorporated.



Sectioned drawing of the manually operated V.P. air-screw.

Bombers or



Rockets ?

An Evaluation of the Relative Economy of Military Technical Effort in Piloted and Pilotless Missiles : Continued Development and Readiness Essential

By A. V. CLEAVER

THE author of these notes, in common with all other civilised men, deploras the fact that we are apparently still not intelligent enough to avoid recurrent world wars. Also, no one has more regret than he that this state of affairs results in the prodigious wastage of technical effort which now goes into the prostitution of science for military purposes.

It is most fervently to be hoped that the immediate post-World War II years will see the establishment of an international organisation capable of maintaining a lasting peace. However, unless and until that world organisation exists effectively, the wastage of technical effort must continue, and none must be more active in this respect than the nations possessing the most civilised cultures and ideals. Expressed bluntly, the bare truth is that until we can put an end to wars, we must at least ensure that the right side wins wars, otherwise wars will put an end to civilisation as we know it.

Perhaps that will happen in any event; if there is another war, perhaps there will be no victor. However, presumably one side would emerge from the conflict relatively less ruined, and at least we should then hope that it would be the one most deserving of survival.

Dynics will point out the obvious difficulty of saying who is qualified to decide which nations are most worthy to endure, but few, even among them, would deny that the British Commonwealth, the U.S.A. and the U.S.S.R., deserve such a distinction as compared with Nazi Germany or Japan. It therefore behoves the United Nations to ensure that their continued military technical effort shall be directed along the most effective channels, and, moreover, that *all* such channels shall be followed up.

With all these thoughts in mind, the matters discussed

below should be of interest and concern to all associated with British aviation, and the reasons already outlined should be sufficient excuse for considering such matters at a time when it might be thought better that we should devote ourselves (apart from the effort still required for the Pacific war) to such things as Vikings, Shetlands, Doves, White Papers on civil aviation, and Brabazon specifications.

Lord Brabazon himself certainly agrees with this view on May 30th, in the House of Lords, he raised the question of our future policy and action in regard to "directed missiles," such as V-2. Lord Cherwell, in his reply to Lord Brabazon, made out a case for the superiority of

bombers over devices such as the German V-weapons, which was based (according to newspaper accounts) purely on the man-hours required to build a bomber, capable of delivering a certain bomb tonnage during its operational life, as compared with the man-hours required to build V-weapons to deliver the same tonnage.

Such an argument, which has often been put forward by other official or semi-official spokesmen and by the Press, fails to take account of many important, but obvious, factors. Unless Lord Cherwell's omission of reference to these was deliberate, it is to be regretted that a man of his scientific reputation should indulge in such an easy and misleading over-simplification of the facts.

If the issue of "Bomber or Rocket?" is to be argued on a basis of economy of effort, then it is submitted that the following is a sounder basis for discussion:—

I.—Effort Required for "Bomber Method"

- (1) Production of basic bomber aircraft force, with all equipment fitted.
- (2) Production of replacements and spares to make up

THE author of this article is Chief Project Engineer (Aircrews) of the de Havilland Aircraft Company. He takes to task Lord Cherwell, who, in a recent statement in the House of Lords, by over-simplification, made it appear that the bomber is a superior device for delivering a given tonnage of bombs.

Lord Cherwell based his argument entirely on the number of man-hours required to build the piloted and "directed" types. Mr. Cleaver takes many other aspects into consideration and comes to the conclusion that rocket missiles may offer a greater economy of effort.

Mr. Geoffrey Smith, M.B.E., managing editor of "Flight," spoke to many audiences during his recent stay in the United States, and in the course of discussions following these talks he advanced many of the arguments used by Mr. Cleaver. These talks were, however, often "off the record," and we feel that the subject deserves to be discussed by much wider circles.

losses of above, due to enemy action, accidents, and normal depreciation.

(3) Production of bombs dropped and ammunition fired, both operationally and for training.

(4) Production of fully equipped training aircraft for supply of aircrews and their replacements, with due allowance for accident rate and depreciation.

(5) Production of fuel, etc., used for all flying on operations, testing and training.

(6) Building and upkeep of airfields with runways and all base installations (radio, radar, repair shops, etc.).

(7) Provision of, not only the aircrew personnel required for operational aircraft (allowing for losses), but also: training personnel, ground crews, clerical and other personnel required to support them—an army of men vastly outnumbering the actual aircrews.

(8) Provision of facilities for housing, feeding and clothing all the men covered by item (7), and for their ground training in their various functions.

Compared with the above, item by item, we have:—

II.—Effort Required for "Rocket Method"

(1) Production of rockets actually fired.

(2) Given further technical development, the "accident rate," or number of "duds," should be very low, i.e., nearly all the rockets fired in a future war should reach the target area. There will be no losses due to enemy action, other than those associated with destruction of factories and firing bases; exactly equivalent sources of loss exist for the bomber, but the rocket should be rather better off in that its bases, at least, can be made less vulnerable.

(3) and (4) No analogous items, other than the production of a relatively very small number of rockets, presumably, for practice training of ground crews.

(5) Production of fuel, used mainly for actual operations only.

(6), (7) and (8) Here there are exactly analogous items, but obviously the "Rocket Method" will call only for an enormously reduced man-power for its operation and for very much simpler and cheaper base installations.

It is suggested that a *complete* analysis, including all the above considerations, might reveal the rocket as a much more economical proposition than Allied statements, so far, have implied that it could ever be. Possibly it might be shown to be potentially more economical than the bomber.

No doubt such an analysis has been, or is being, made by our appropriate authorities. The author started to make such a survey for inclusion in this article, but gave up only for lack of the necessary statistical data. It is easy enough to write down the simple equations involved, but not so easy to obtain the arithmetical information required to substitute numerical values for the symbols employed.

Multi-step Rockets

Many of the arguments put forward above apply to the V-1 type of weapon as well as to the V-2; however, only the latter has been considered because it is thought to have more effective future possibilities. Improved rocket motor design and development generally will substantially increase the possible range. The introduction of the multi-step rocket principle (in which one rocket "step" is used to start a smaller one, which is launched at an advanced stage of the trajectory of the projectile) will probably make possible a sweeping range improvement—rather similar to the effect on aircraft performance of the advent of the monoplane. If the possibility of increasing the energy of explosives by the application of atomic physics exists as a practical possibility, then this could be used, both to increase the destructive power of a given warhead weight, and also, very probably, to increase range by improving the propellant fuel of the rocket.

Apart from the economic aspect considered so far, the rocket as compared with the bomber (or the pilotless plane type of missile) has two further powerful advantages.

First, it is completely independent of weather.

Secondly, if launched in sufficient quantities, its approach without warning, due to its supersonic speed, could not

fail to have a terrible morale effect, probably much worse than conventional bombing. (This war seems to have shown that bombing effect on morale is not quickly decisive, but it has certainly not shown it to be unimportant.) The number of V-2 rockets launched by the Germans against London was not enough fully to demonstrate this morale argument, but the following explanation is given to support it.

Up to a certain point, in terms of tonnage dropped, morale will be more affected by conventional bombing, or V-1 bombing, than by an equivalent weight of rocket. People even remote from the locality where bombs are actually falling are

BOMBERS OR ROCKETS?

affected by hearing the aircraft, sirens, gunfire, etc., and are wondering whether the scene of the activity will shift nearer to them. On the other hand, for the same scale of rocket attack, they hear the projectile land, heave a sigh of relief, and say, "Ah, we've had that one." They can, relatively speaking, comfortably forget their own possible danger from the next projectile. There is a fair basis of probability to justify their so doing.

However, if rockets were falling day and night all around them, without warning, this would not be so. After a certain critical weight of attack was reached, people would surely become conscious of an ever-present danger to themselves, against which there was no defence, and against which no precautions could be taken—other than evacuation of the target area.

Defence Difficulties

It is said that every new means of attack results in the production of a new defensive weapon. However, the difficulty of defence against rockets is obvious, and even this war, with all its wonderful (even though deplorable) developments in the military application of science, has produced no means of stopping an artillery projectile in full flight.

No mention has been made of the very important factor of the accuracy possible with future rockets. It seems unlikely that they will ever be accurate enough to attack individual targets such as a relatively small factory. This sort of task, whatever the outcome of the total issue, seems likely always to remain the prerogative of the precision bomber.

However, against a large target such as a big city, even the German V-2 effort was not so very bad a beginning, and further development, probably with the use of aircraft photo-reconnaissance and spotting, will surely improve the accuracy obtained. No one aware of the scientific developments during this war, such as bombing through cloud or radar developments in general, will doubt the ability of technicians to deal with this problem. And it is futile to protest that, in modern total war, the bombing of entire cities is not legitimate; gentlemen's "legitimate" rules of war, forbidding attacks on civil centres of population, are as dead as the dinosaur.

Perhaps that is not wholly such a bad thing as it at first appears. If mankind does not like the situation—and who does?—then the solution is in mankind's own collective hands, namely, to put an end to war as a whole.

Air Vice-Marshal D. C. T. Bennett, D.S.O., M.P., recently put forward some interesting suggestions* as to how to do this; on June 2nd he is also reported to have made a speech stating his opinion that rocketry was in its infancy, and that the next war, if it came, would make the V-2 attacks on London appear to have been mere nuisance raids.

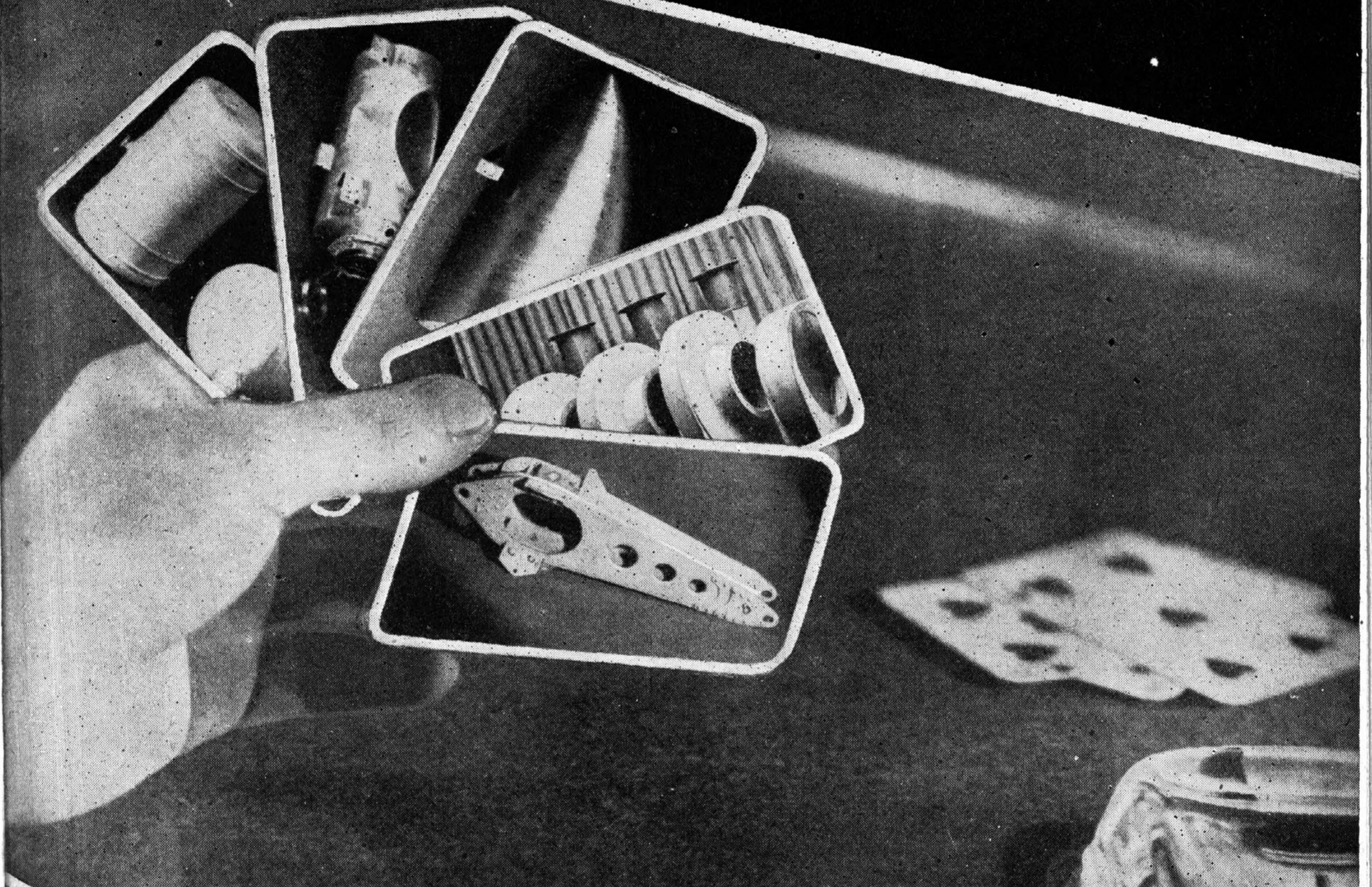
It would be well if all of us paid great attention to Air Vice-Marshal Bennett's views on these matters. If we do not, the rocket seems fated to receive, at an even earlier stage in its development, the same condemnation from the man in the street which is frequently given to aircraft. Its loftier purposes will be obscured and forgotten because of its perverted military applications.

* In his book "Freedom from War."

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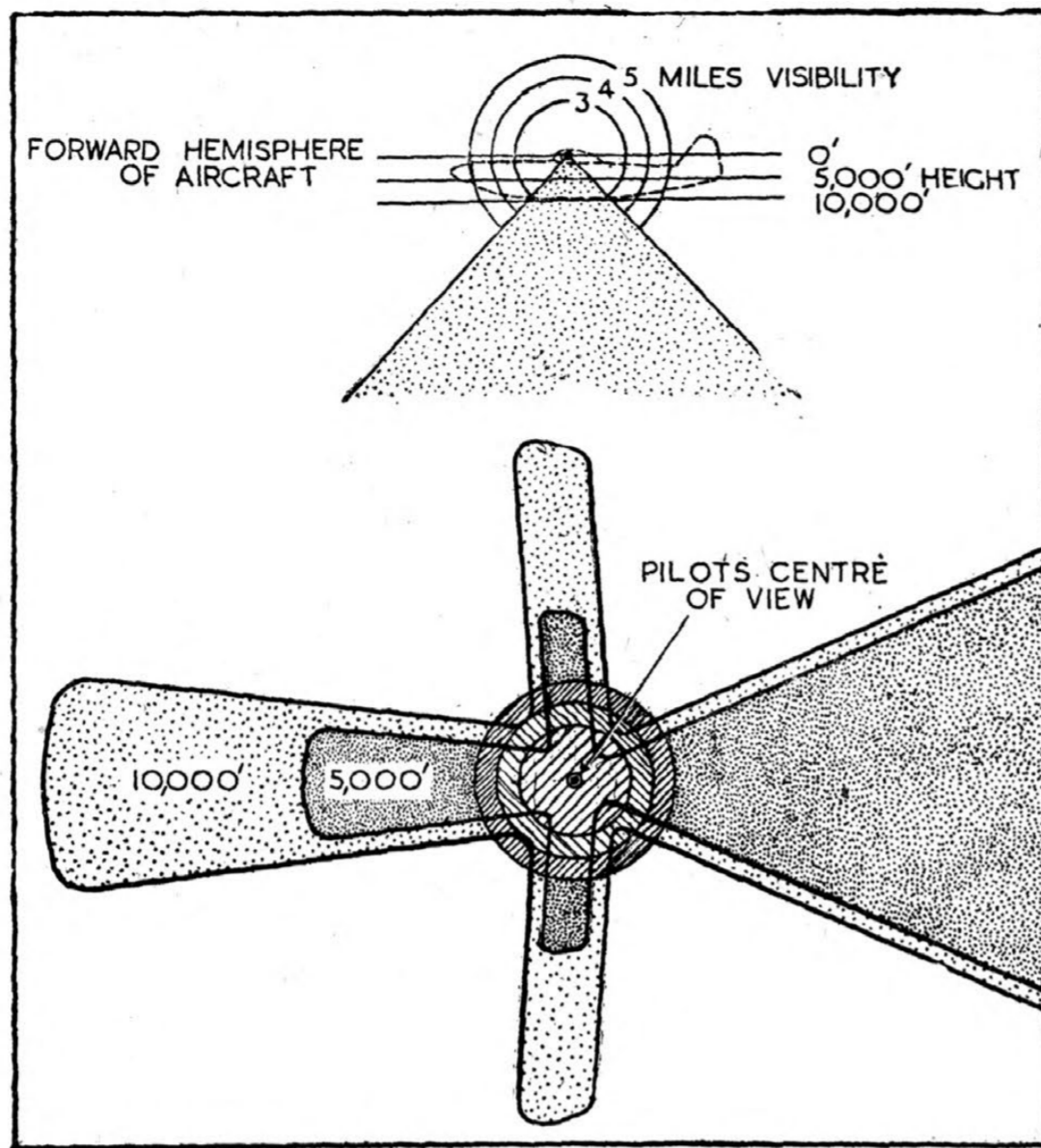


Fig. 1. Projection of blind area contours of fighter aircraft for two altitudes, together with spheres of visibility.

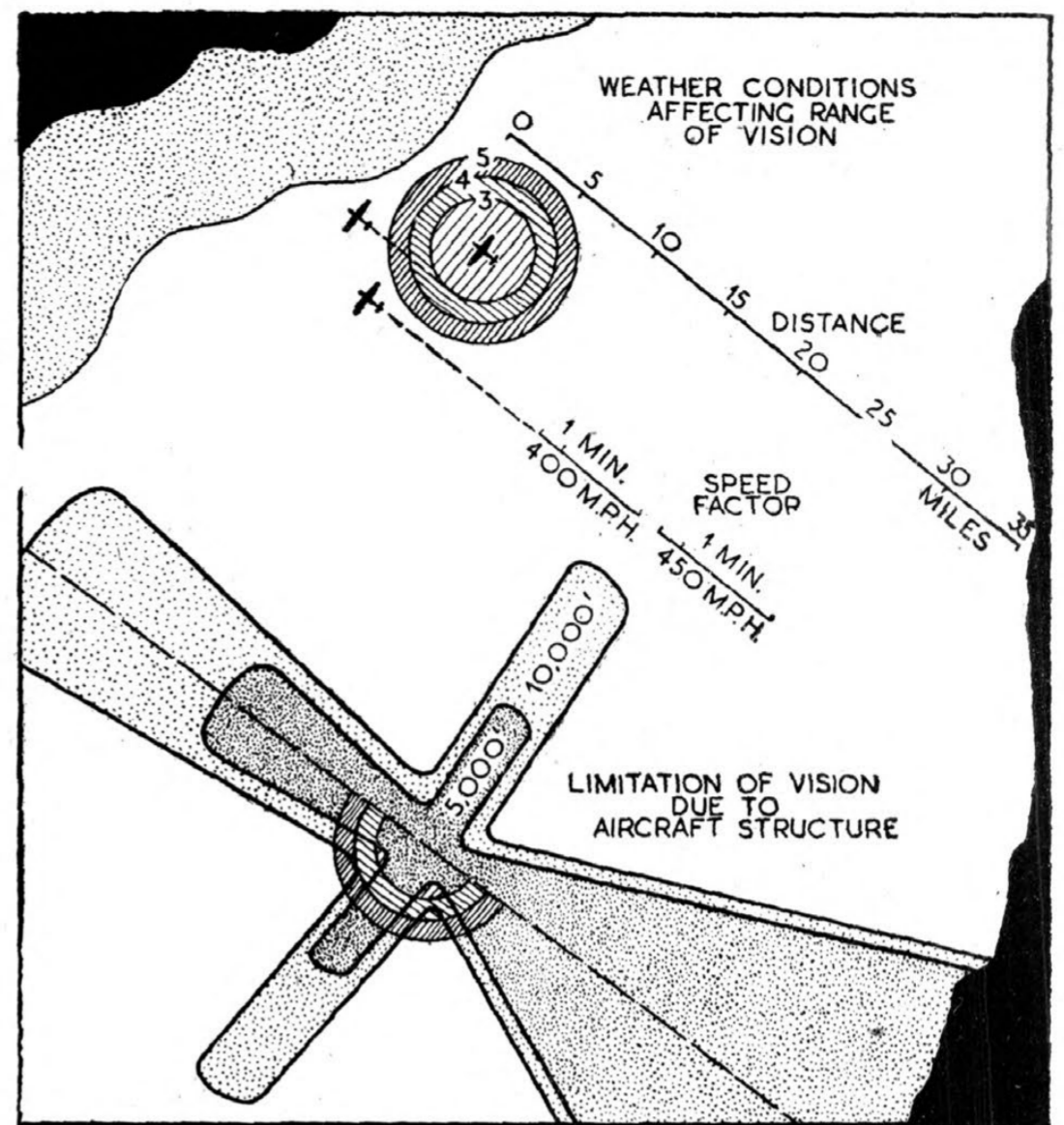


Fig. 2. Diagrammatic illustration of visibility factors affecting interception of enemy aircraft in the English Channel area.

Pilot's View

Limitations of Field Imposed by Aircraft Structure : A Yardstick of Measurement

By R. DYRGALLA
(Flt. Lt., Polish Air Force)

THE first precept in operational fighter flying is to spot the enemy as early as possible. "To see first" is one of the most essential factors in air fighting as it prevents being taken by surprise as well as giving other tactical advantages.

But spotting from a fighter aircraft is hampered by so many factors, probably the most important of which is that the pilot cannot see in every direction. His aircraft has enormous areas under the wings and fuselage which are completely blind, and the magnitude of the blind

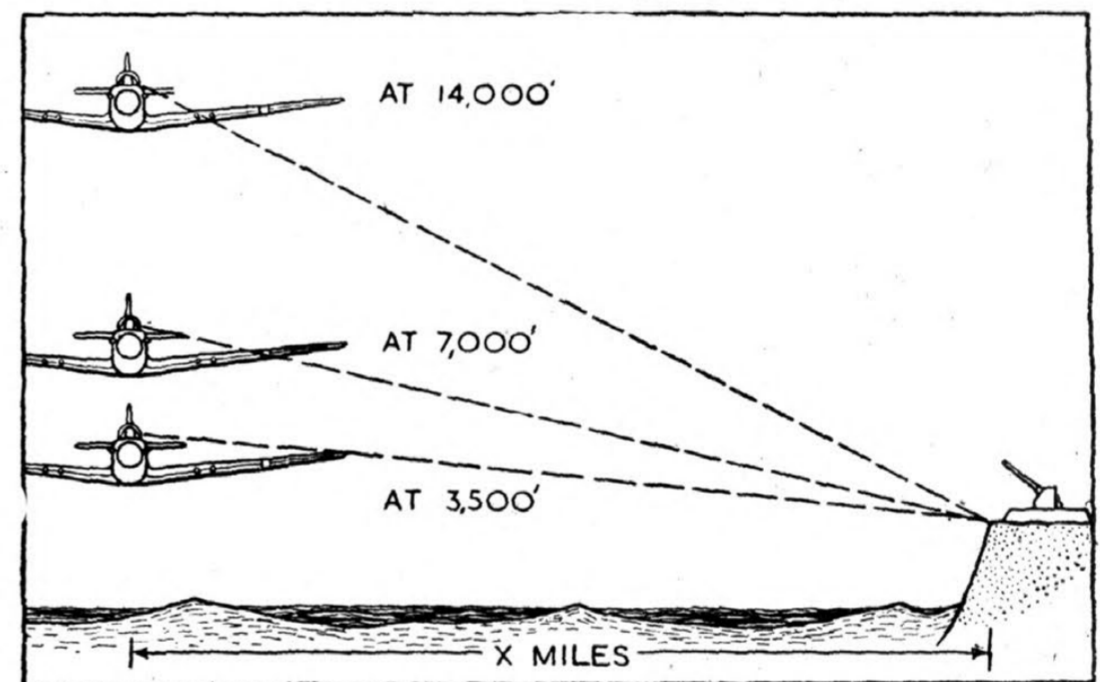


Fig. 4. By sighting across critical points of wing contour a safe distance from gun defences may be measured according to height.

area increases proportionally with increase of altitude. This, together with poor weather conditions, presses for a greater need of vigilance on the part of the pilot as a surprise attack may be made from any direction.

The accompanying diagrams, Figs. 1 and 2, give an idea of how large a field of vision is obstructed by the aircraft structure. This unfortunate hindrance to view can, however, be put to good use, and the following suggestion is given of a simple yet essentially practical method of determining the relative position of the aircraft directly from the pilot's field of view.

By training the line of sight across given stations around the wing plan contour, figures in graticules painted on the wing at the critical stations will correspond, at given heights, to distances on the ground. This is shown diagrammatically in Fig. 3, the figures in the top squares of the

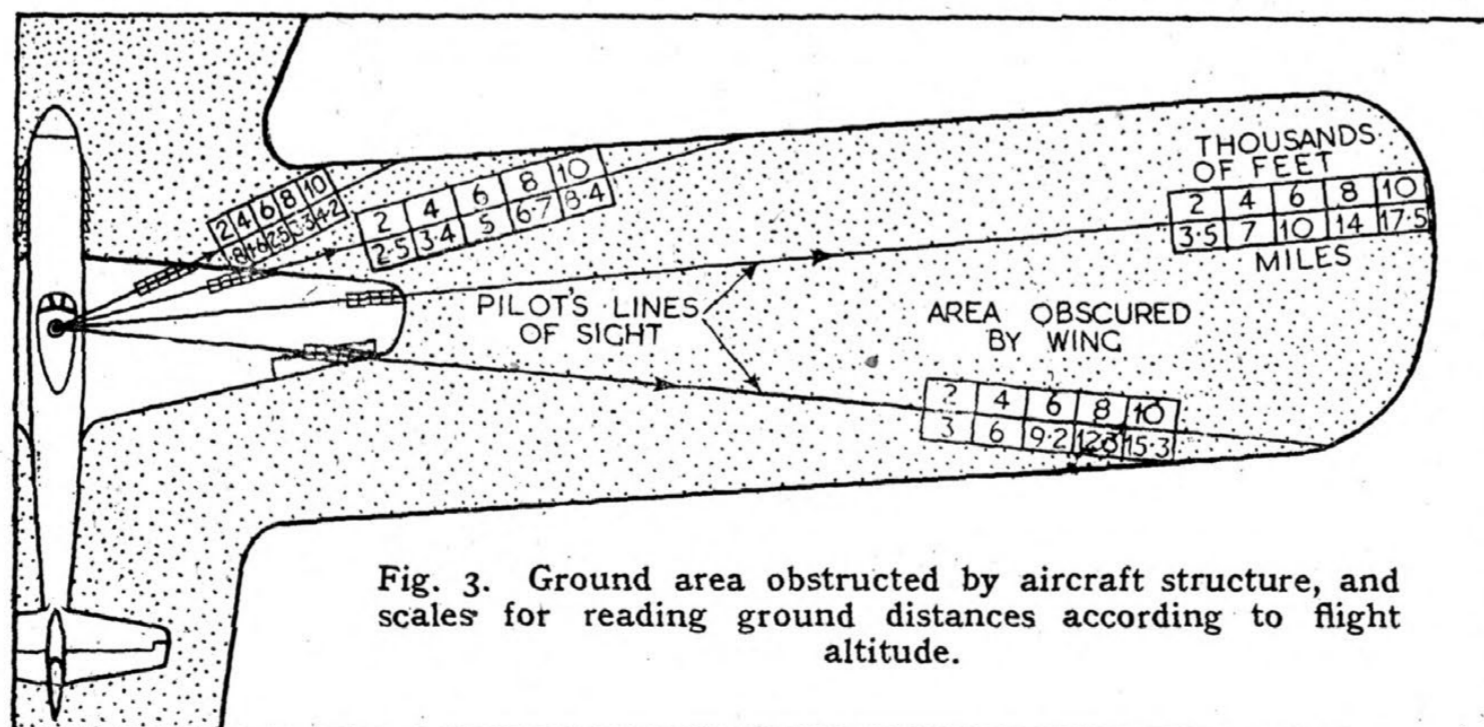


Fig. 3. Ground area obstructed by aircraft structure, and scales for reading ground distances according to flight altitude.

PILOT'S VIEW

graticules being thousands of feet altitude and the lower squares the corresponding distance in miles from the spot over which the aircraft is poised to the position at which the pilot's line of sight, intersecting the wing station, meets the ground. Fig. 4 will help in making this clear. It is assumed in all of these cases that the pilot's eye is at gunsight level.

A practical example of the same principle for maintaining a line of flight at a required distance from, for example, a coastline is given in Fig. 5. Quantitative data on visibility can, by the method outlined, be obtained by comparison of similar aircraft with each other.

Many readers will undoubtedly be aware that the habit of sighting across given points of an aircraft's structure is, of course, a common method of determining relative positions, but it is suggested that an extension of the principle, as outlined, offers concrete advantages

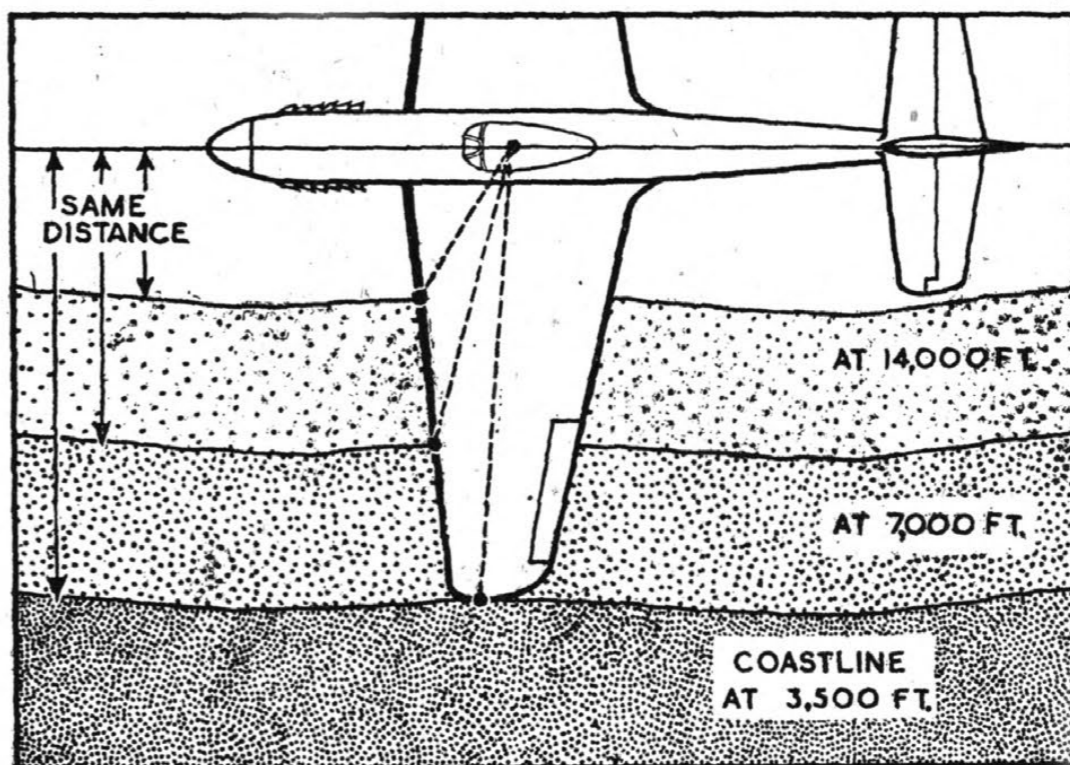


Fig. 5. Method of judging maintenance of a given distance from coast at various heights.

over and above the limited use to which the principle is most commonly put.

"Indicator" Discusses Topics of the Day

Essential Simplification

The Parting of the Ways in Civil Aviation : State-owned Luxury or Business Proposition? : Reducing Development, Production and Maintenance Costs : "Controlled Freedom"

TO most of us it seems that some very far-reaching decisions will need to be made within the next few years by manufacturers and operators throughout the world if civil flying is to be stabilised as it should be. Otherwise it is easy to visualise a condition in which national and international airline operation settles down to a futureless state in which the various concerns are competing as uneconomically as the luxury liners in their efforts to make the fastest Atlantic crossing.

Given adequate financial backing there is no obvious reason why we, as fare-paying passengers, shouldn't be flung about the world in exceptional comfort at stratospheric heights and super-sonic speeds in extraordinary projectiles. Aerodynamic development has no limits. Each problem can be surmounted in turn—but at greater and greater cost. Any country which is prepared to subsidise research, development and actual operation to an unlimited extent can, in due course, offer the fastest and most comfortable air transport.

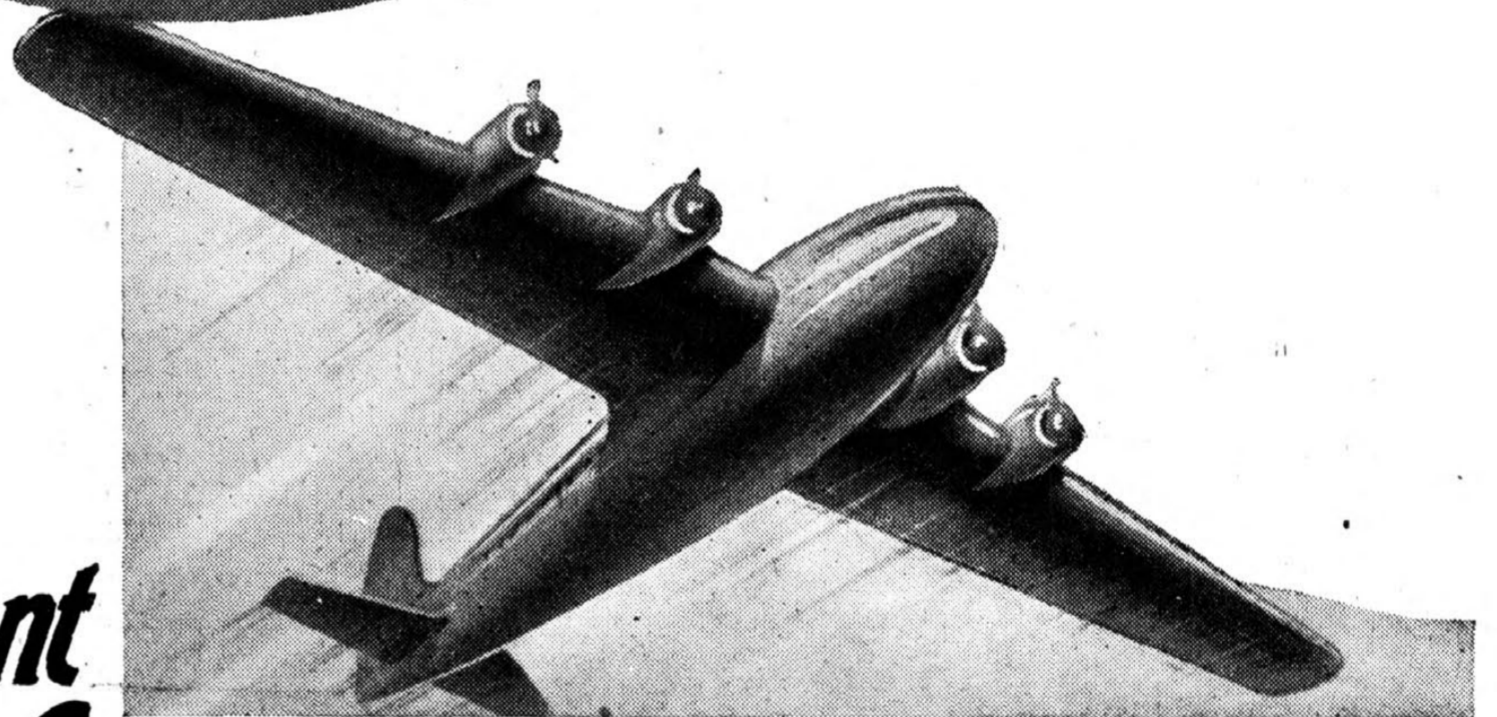
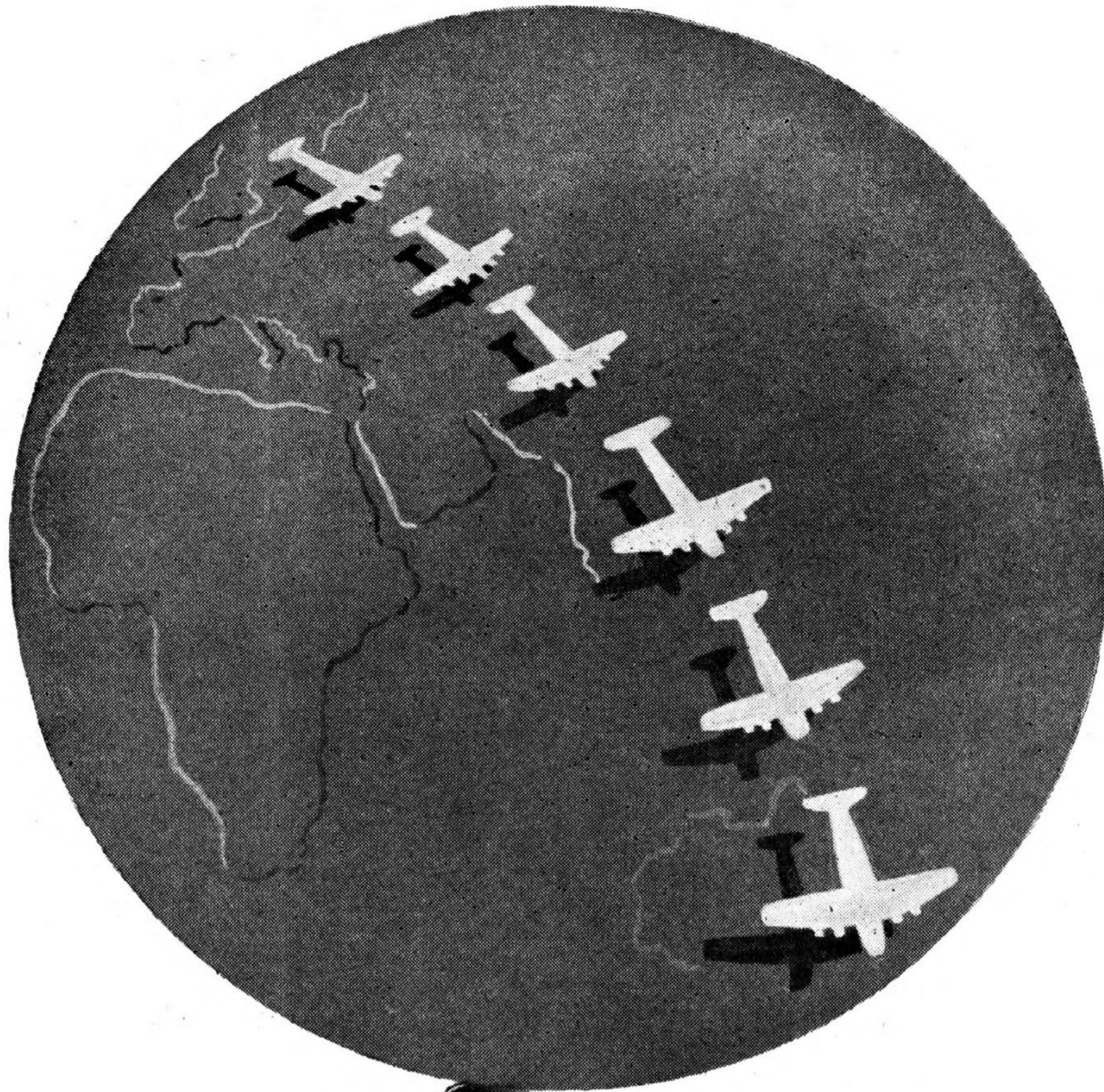
Somewhere or other there must be what I can only describe as an economic "norm" in development progress—a *status quo* which will suit all parties. Not, of course, a stage at which there is no progress, but one at which the progress is steady; movement without acceleration or deceleration. The simple problems of production will tend to steady down the graph, since, having built a suitable type or types, these, with minor modification, will remain in service until made out of date by use or competition, and until the manufacturer can prepare the assembly shops for a later type. But this steadying influence will be far less effective in a business such as airline operation, when State may be competing against State, using direct and indirect subsidy.

For the next few years the industry will be able to progress on the momentum given to it by cost-no-object war research and by the fact that there will be more or less suitable power units, ancillary units and even basic airframes in ample supply as the contracts run out. Until

the Japanese war is won, too, there will be more than adequate progress and production which, since long range will be a *sine qua non* in the Pacific operations, are likely to be even more valuable to civil aircraft design. In fact, I imagine that the kind of aircraft which are being, and will continue to be, developed for very long-range operations in competition with short-range defensive armament, will show a tremendous advance on anything used in the European theatre of operations and will be infinitely more useful as "prototypes" for later civil designs. Manoeuvrability and load-carrying will need to be coupled with speed and long range, while the jet projects are likely to be forced past their present snags in a fraction of the time which would have been needed in ordinary conditions.

But such forced-growth progress cannot all be counted on the credit side. For the sake of immediate production, uneconomic methods and materials may, for the time being, be employed; for the sake of performance, unsafe take-off and approach characteristics may be tolerated; for the sake of large temporary power outputs, either for take-off or combat, very expensive fuels and metals may be used, and engine life reduced to the barest minimum necessary for operations. In the end, only the knowledge of what *can* be done remains as credit, and the industry must begin again when it attempts to "build-in" commercial performances on a commercial basis. The other week while looking round a wartime factory devoted to the job of making a very important and complicated aircraft item, I was shown a very simple little part on which some dozen operations are necessary in the way of machining and hardening. Maybe there is no other way of making that item so that it will do its job satisfactorily as a part of the present design. Well, in a plain profit-and-loss competitive world, production would have been held up for six months while the design staff found a way in which that and a dozen other parts could be simplified.

As I have tried to explain in a previous article, the present-day aircraft is an expensive thing to make and,



*In the
development*

of Air Transport....

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ESSENTIAL SIMPLIFICATION

relatively, a still more expensive thing to maintain in safe operating condition. During this war there has been production on an enormous scale—far exceeding that which is likely in the most sanguine dream of airline expansion—yet, so far as it can be approximately calculated, the purchase price of a quantity-produced military aircraft is still out of all proportion to its value as a transporting medium. Value, that is, in possible percentage return on the capital outlay—and return there must be, whether in prestige, invisible trade increases, or plain profit. A very large proportion of this initial cost is a “repayment” for initial development and research on the prototypes and, of course, payment to keep the research department going in preparation for the next venture. Exactly what the proportion is, I suppose, depends on the amount of military aircraft development going on at the same time, and on the use that can be made of the information obtained at Government expense.

It seems to me that civil aircraft must be simplified and standardised if costs are to be kept down, and I see no reason why this should materially reduce operational efficiency in peacetime conditions. The number of types and engines must be reduced to a sensible minimum; individual ancillary items must, as far as design permits, be interchangeable; and the entire layout of each type must be planned, of course, for simple production and maintenance. We certainly cannot afford to fiddle about, as we did in the years before the war, with dozens of different types ordered and hand-made in penny numbers, yet it will be equally fatal to progress if the individual firms cannot be reasonably free to proceed with what used to be known as “private ventures.” At least one of the most outstandingly successful aircraft of this war was a “P.V.” to the degree, I believe, that the manufacture of the prototype was all but forbidden by the Ministry in case it interfered with the production of other much-needed types. A very nice balance will have to be arranged between individual effort and bureaucratic control.

In any normal industry, ruled by sink-or-swim conditions, production would find its own level very quickly. Fortunately or unfortunately, the aircraft industry is likely always to be dependent on Government contracts, and this same Government has the consequent power to force the firms to work to detailed specifications. Since airline operation would, at present, be impossible without State support in some form or another, the Government can also call *their* tune. Governments are not by any means always right, and are liable to change their policies with-

DEATH OF SIR FRANCIS SHELMEKDINE

WITH great regret we record the death of Lieut.-Col. Sir Francis Shelmerdine, C.I.E., O.B.E., F.R.Ae.S., which occurred last week at Bideford, Devon.

Originally an officer in the regular Army (his regiment being the Green Howards), he was attached to the Royal Flying Corps in 1915. After the Armistice he served at the Air Ministry as Controller of Aerodromes and Licences until he was sent to Cairo to supervise the Cairo-Karachi air service. In 1927 he was appointed Director of Civil Aviation in India at a critical time. The unique conditions in India then were making it difficult for Imperial Airways to complete the great Empire route from England to Australia.

Sir Francis made such a reputation in India that when the post of Director of Civil Aviation in Britain fell vacant in 1930 through the death of Sir Sefton Brancker in the airship R 101, Col. Shelmerdine (as he then was) was chosen to fill it. It was difficult to follow in the footsteps of such a dynamic personality as Sir Sefton Brancker, but Sir Francis (who



The late Lt.-Col. Sir Francis Shelmerdine.

out warning. All will be well so long as operators and manufacturers are merely guided “in outline,” and left to carry on otherwise under their own steam.

My personal conviction is that civil aviation, if it is to survive usefully and make real progress, must “fly by itself” and separate itself from official control at the earliest possible moment. And I can see no reason, with everyone determined that it should do, why not. Aircraft would be designed with that end in view and fares would be raised to an economic level. Those who really need to get somewhere quickly will pay them—and there will always be mail contracts to level out the income and give the operator a basis on which to work out the unknown factor in his costing problems.

One or the Other

Surely everything would be very much simpler if we took off our rose-coloured spectacles and tried to see the whole thing quite clearly. Either civil aviation can be made to pay for itself or not. This business of having a “chosen instrument”—a publicly subscribed company which is, at the same time, State-controlled and subsidised—is not going to get us anywhere at all. Certainly it will never learn to be self-supporting so long as there is no need for it to be so; a common-sense knowledge of human nature will tell us that.

If an imaginary committee of experts decides that, in the present state of aeronautical progress, aircraft cannot reasonably be made to earn their own keep, then let the transport services be run by the State, and let the passengers be those who can convince the authorities that their need for such rapid travel facilities is great enough. If, on the other hand, this committee decides that, with a careful selection of types, an airline can, eventually, pay for itself, then let us get on with the job of making the kind of aircraft that will be needed, and let us give the operators so many months or years in which to prepare to launch out by themselves.

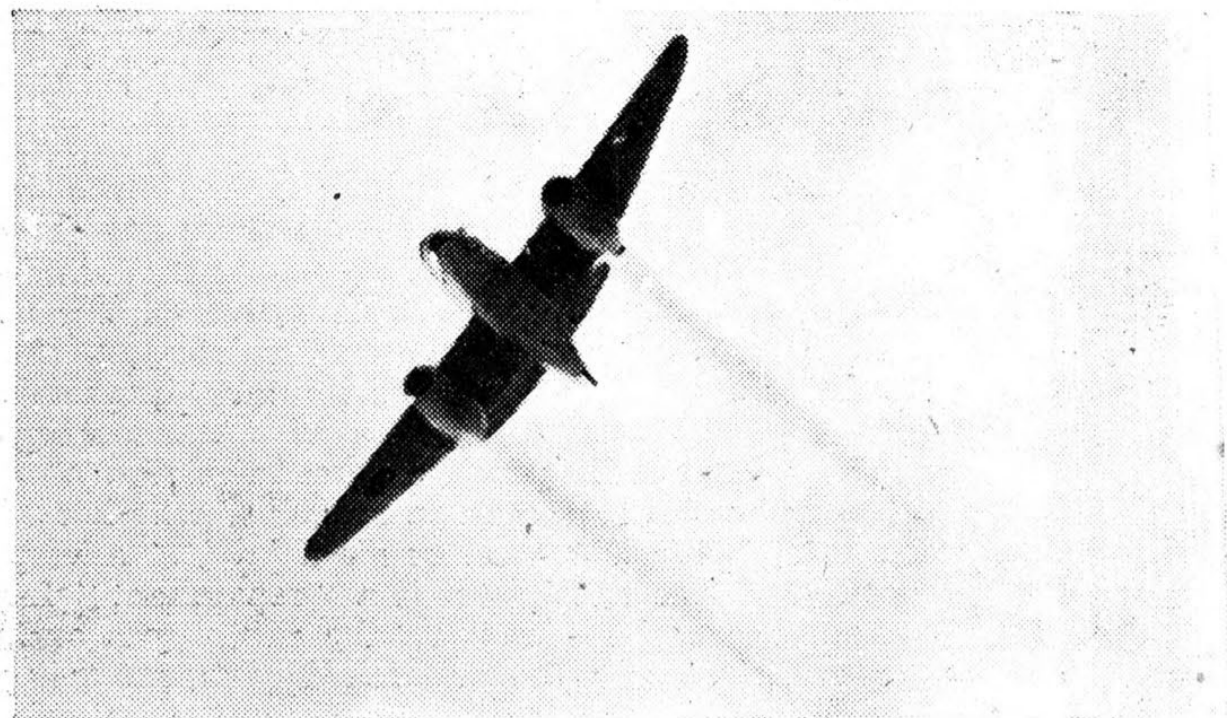
Maybe the results will be a little pedestrian for a start. But if the taxpayer feels that national prestige demands the introduction of certain uneconomic services for special needs, then let the Air Ministry go ahead separately. There is no reason at all why the Air Force shouldn't develop all new routes and de-bug all new types in the course of its duties. Heaven knows that Air Force personnel were, in pre-war days, divorced from, and often sumblingly ignorant of, civil aviation matters; such separatist tendencies must not reappear. But the bread-and-butter services should be run on bread-and-butter lines. Jam will appear in due course and by natural progress.

“INDICATOR.”

was knighted in 1931) was a very hard worker and a great enthusiast for civil air transport. He avoided the limelight, and preferred to do his work quietly. The status of his office was magnified in 1931 when Sir Francis was given the title of Director-General of Civil Aviation. It was thought by some at the time that this was largely an attempt to avoid separating Civil Aviation from the military side of the Air Ministry; but if so it failed in its object, for we now have a separate Minister of Civil Aviation. Sir Francis retired in 1941 on reaching the age limit, but he continued to work for the cause of air transport. His hard work and his gentle personality deserve to be remembered at a time when civil flying seems about to enter upon a new sphere of importance.

FIRST NUFFIELD HOUSE IN BURMA

THE first Nuffield House in Burma will be opened shortly by Air Marshal Sir Keith Park, Allied Air Commander-in-Chief. Formerly a training school for teachers, situated about a mile and a half from the centre of Rangoon, the club will provide recreation for British other ranks. Food will be available, and there will be a shop and rooms for reading, writing and games. The whole of the cost is being defrayed by Lord Nuffield, and the club will be staffed by members of the W.V.S. This will be the second R.A.F. Nuffield House opened by Sir Keith. The first was at Malta in 1943, just after the siege was raised by the advance of the 8th Army under General Montgomery.

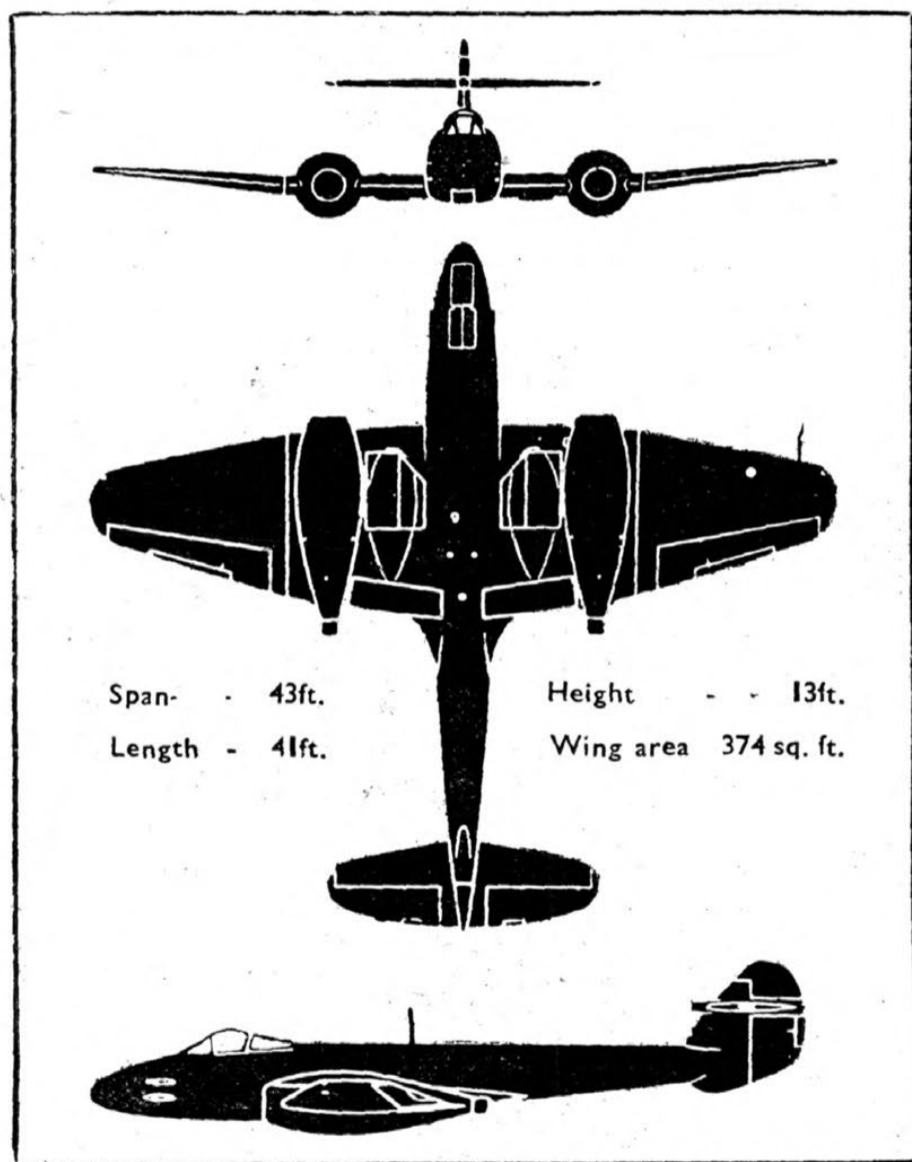


Exhaust efflux. Trails of gases leaving the two Rolls-Royce power units of the Meteor. They are not always visible. On the left is the normal appearance.

Progress Prop

Details of the Meteor : Two Rolls-Royce

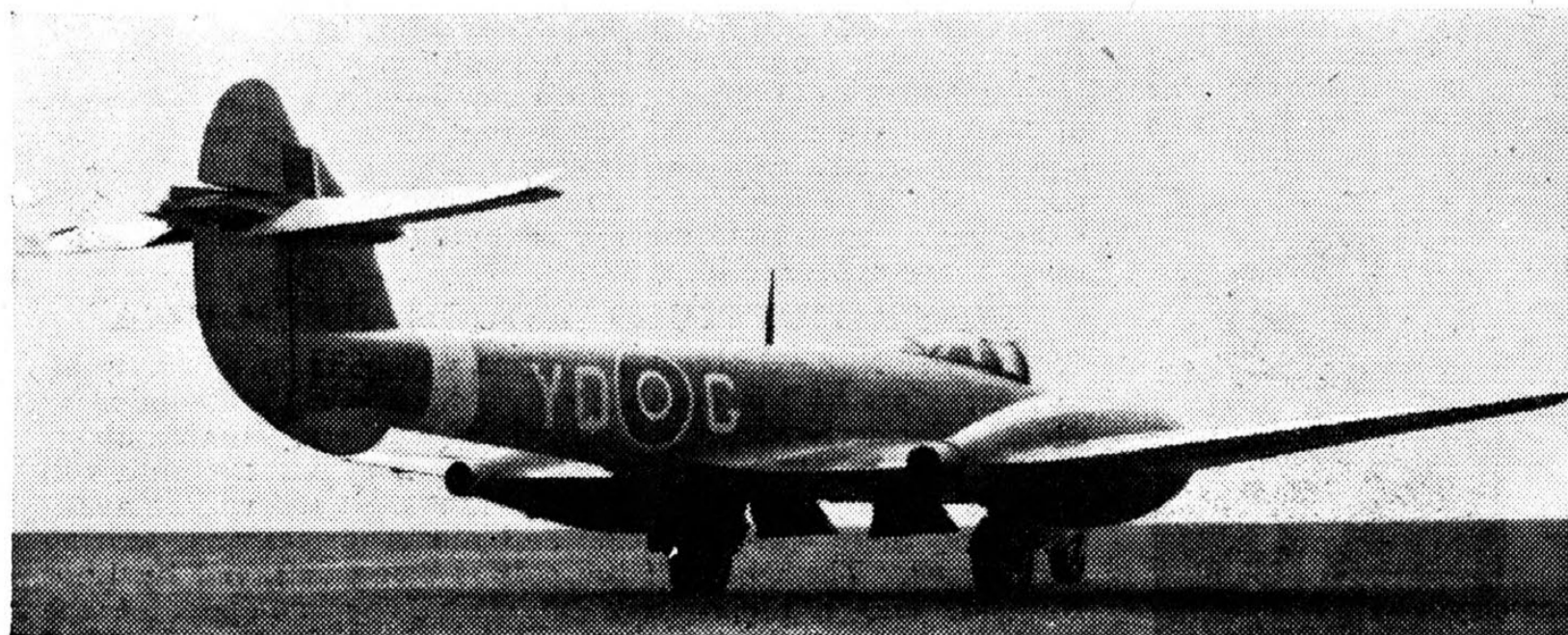
By G. GEOFFREY



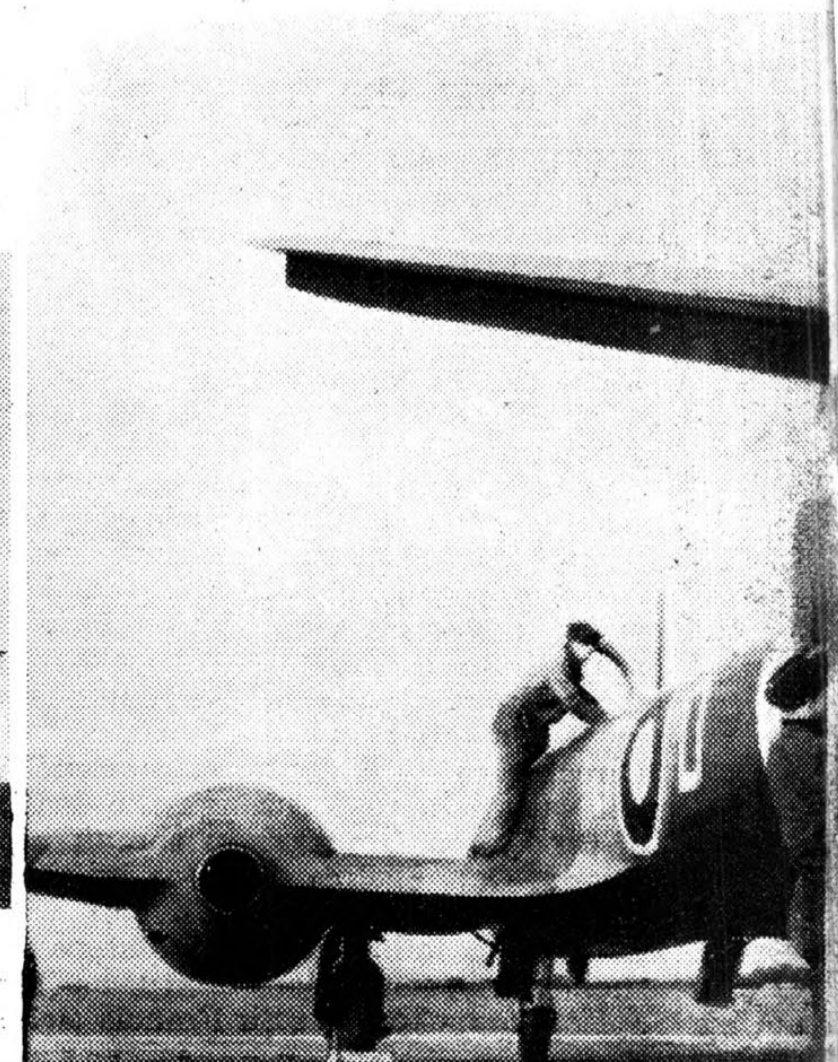
DETAILS of the Meteor twin turbine jet plane published in last week's issue indicated the general lines of the Gloster Aircraft Company's latest single-seat, low-wing monoplane. This was the first Allied jet fighter to go into combat. It first flew experimentally in March, 1943, and in the interim many improvements have been effected. In the summer of 1944 it was used with success against the V1 flying bomb, and provided useful training for pilots for ensuing action on the Western front. The first success was on August 4th, and subsequently Meteor pilots shot down a substantial number of flying bombs, the speed of which, it will be remembered, exceeded 400 m.p.h. Naturally, the Meteor is of greatly superior speed, but no actual figure may be quoted at this stage of progress.

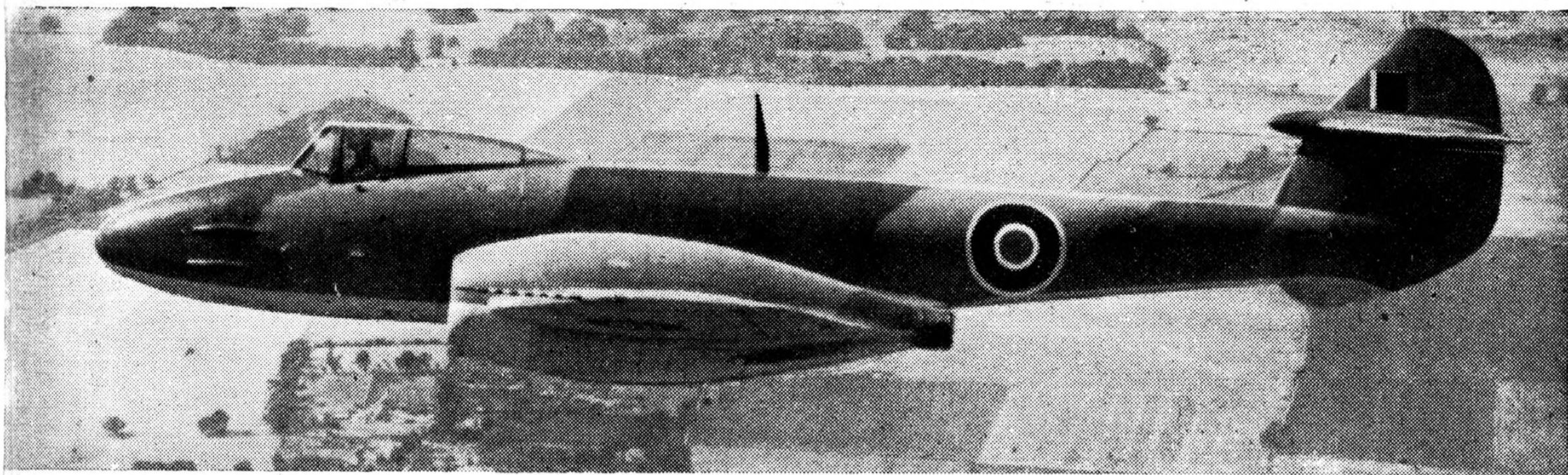
Notable for its extremely clean design and smooth finish, the Meteor—successor to the Gloster Company's experimental jet-propelled aircraft of 1941, the single-engined

The high position of the tail, necessary to avoid the slipstream from the power units, has introduced a certain amount of complication in that both rudder and elevator are "split."



Although appearing large in proportion to the wing, the jet power units are of excellent streamline shape. The tail-up attitude in this view is, of course, due to the tricycle undercarriage.





With Jet ulsion

The exceptionally clean lines of the Meteor are well exemplified in these views. Visibility for the pilot is a feature of the design, and landing is simplified.

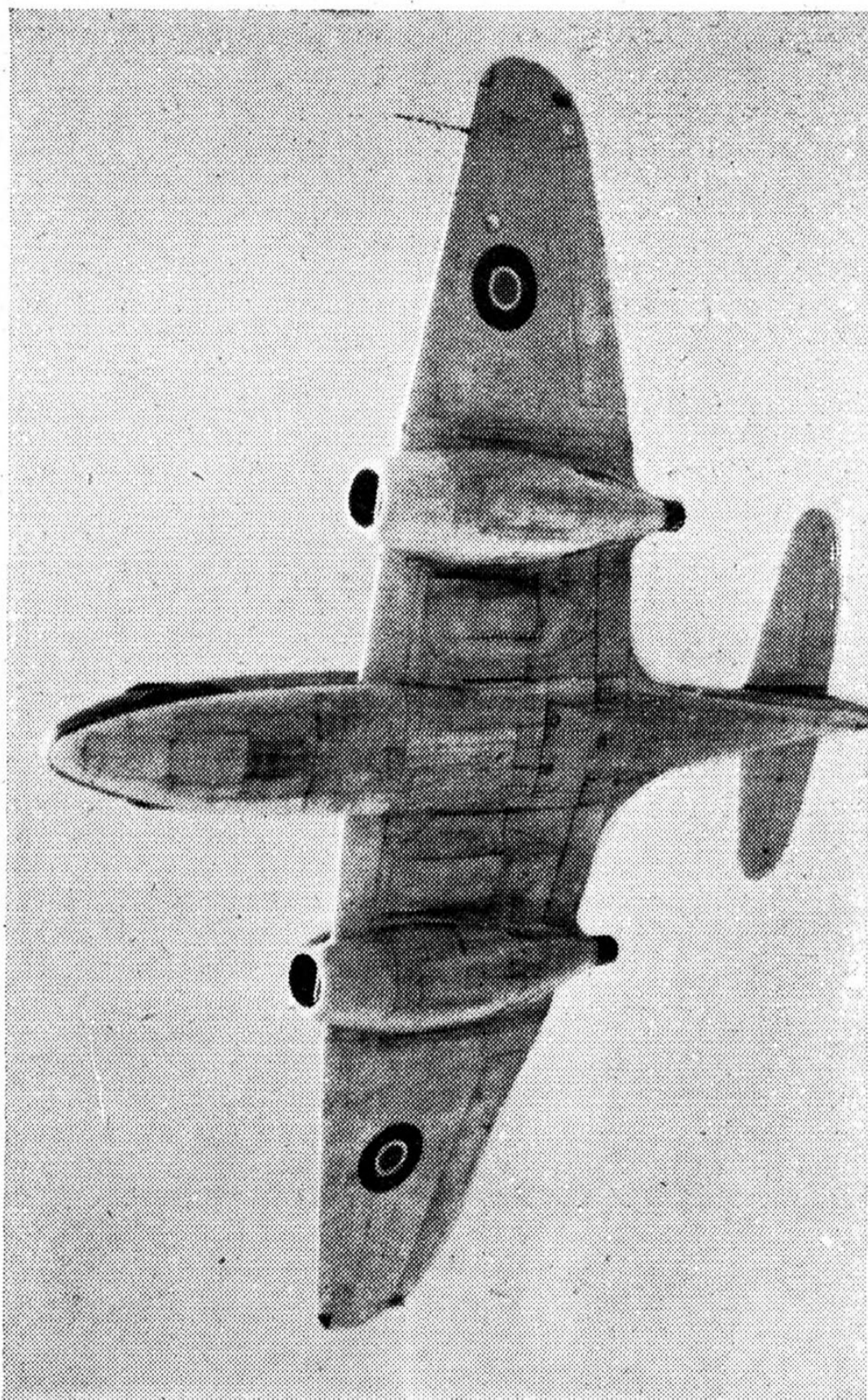
Units Employed : New Civil Aircraft

HTH, M.B.E.

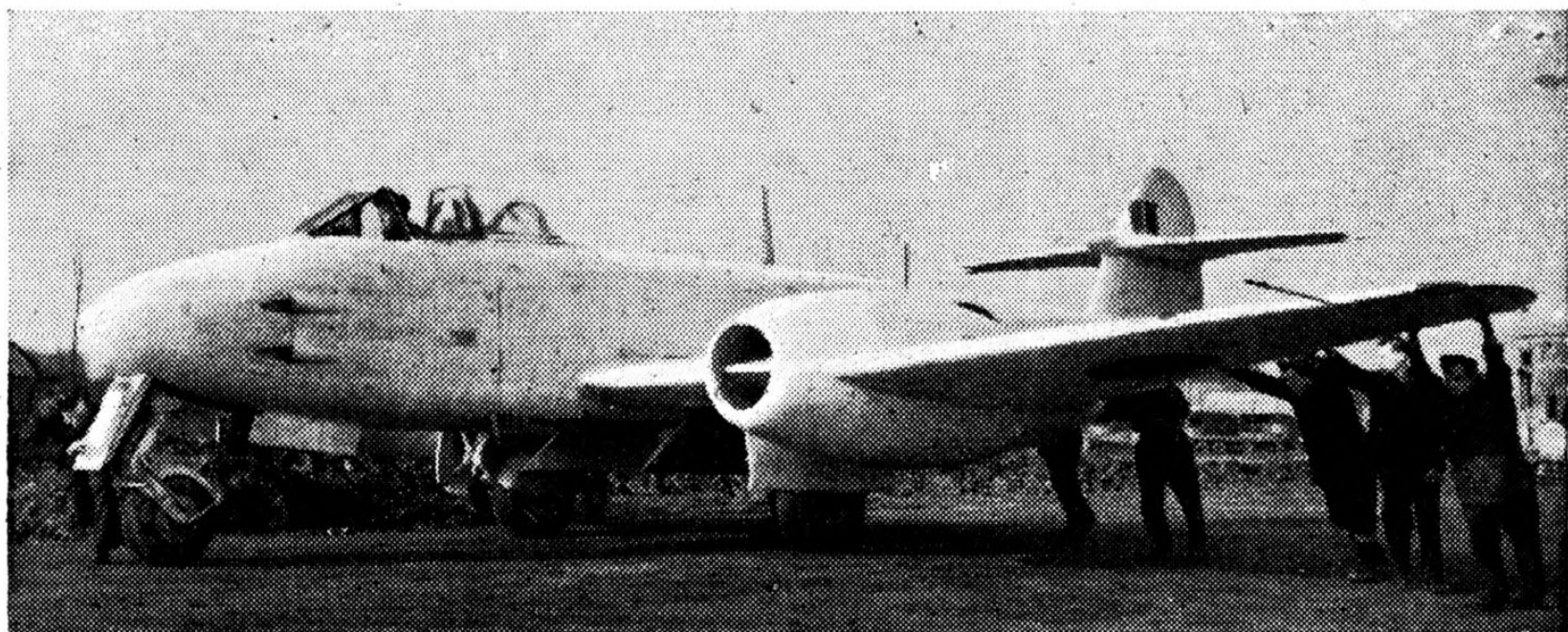
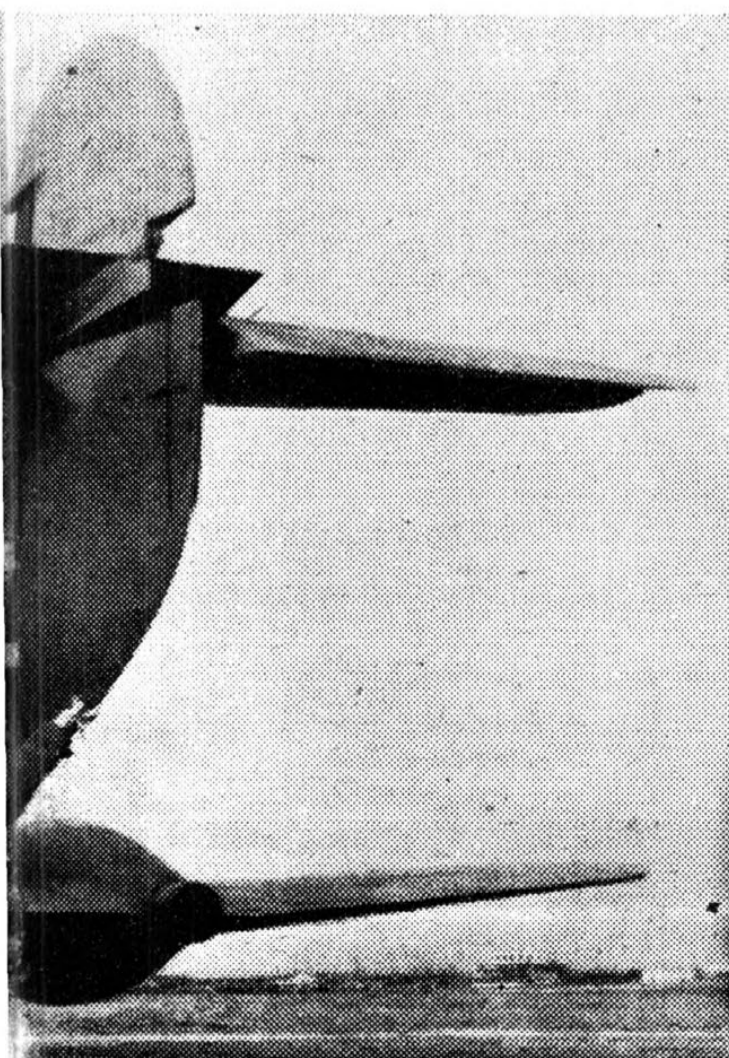
E 28/39—resembles an orthodox type of twin-engined aircraft save for its extremely low build and the absence of airscrews. Both were built to the design of Mr. W. J. Carter, M.B.E.

Unlike the ME 262, which has underslung nacelles, the turbine compressor units are carried in nacelles mounted centrally in the wings, with the exhaust nozzles extending a foot or so beyond the trailing edge. The jet stream necessitates a high tailplane to avoid the high-temperature blast, and this has entailed splitting the rudder into two parts; a nose fairing is applied to the tailplane at its junction with the fin. Trimming tabs are fitted to each half elevator and to the lower portion of the rudder, and operated by normal-type hand wheels.

All-metal stressed-skin construction is used throughout, and a breakdown of sections shows that separate units are (a) the fuselage nose, (b) front fuselage with nose wheel, (c) centre section, which embodies the centreplane with



The absence of any torque-reaction helps to make the Meteor very manoeuvrable. Covers and skin joints appear exaggerated by the underneath lighting. In the picture below the short undercarriage feature is well brought out.



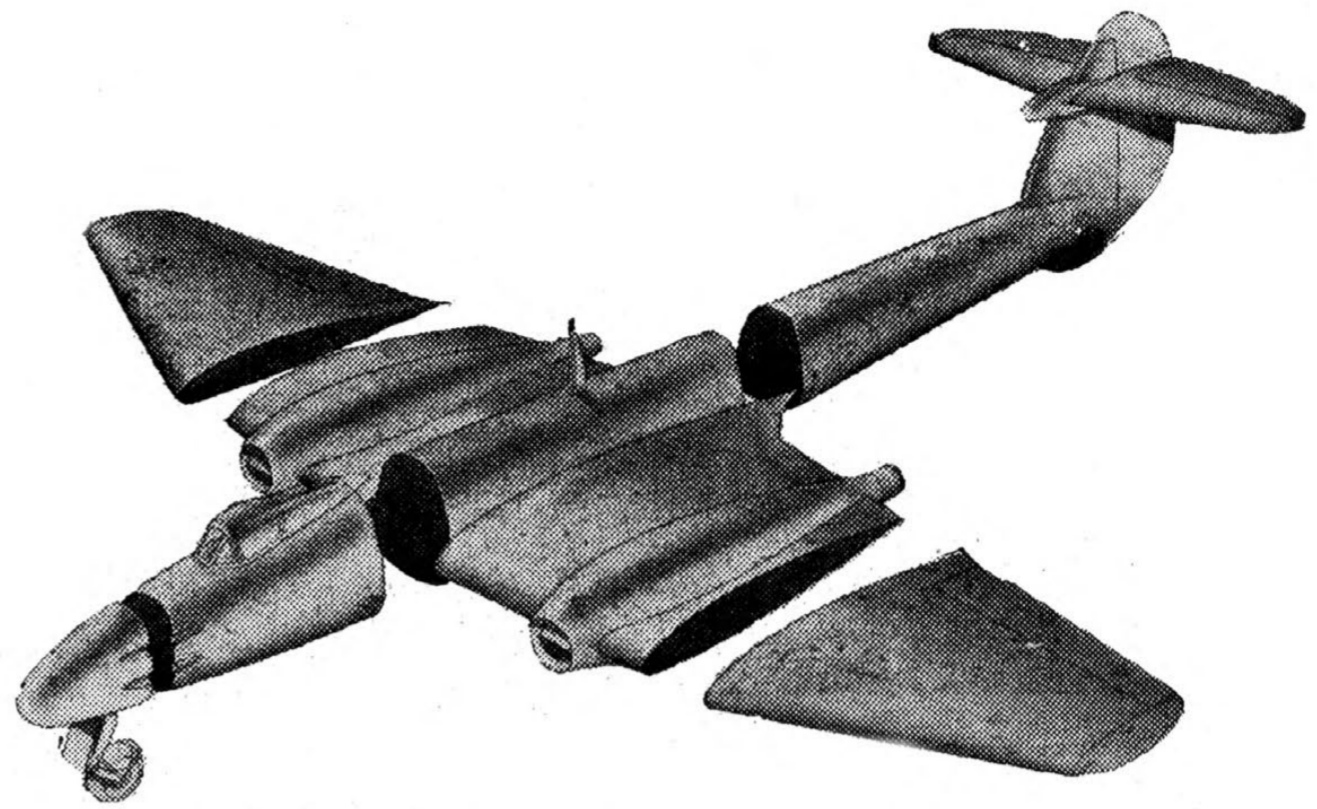
PROGRESS WITH JET PROPULSION

two undercarriage units, the two nacelles and their engines, (d) the outer plane with aileron, (e) rear fuselage complete with tail portion, and (f) the tail unit complete with rudders and elevators. The internally mass-balanced ailerons have automatic balance tabs.

Armament consists of four 20 mm. Hispano guns in the nose and a camera gun is mounted in the fuselage nose fairing. The low build of the aircraft on its tricycle undercarriage is very convenient for mechanics to service the engine and make necessary overhauls and adjustments to the aircraft and accessories at a natural level as on a bench without recourse to ladders or stagings. The same advantage applies with equal force during manufacture and assembly.

As to the gas turbine power units, they are of Rolls-Royce manufacture known as Welland or Derwent, and based upon the original design of Air Comdre. Frank Whittle in collaboration with Power Jets, Ltd., British Thomson-Houston Co., Ltd., and the Rover Co., Ltd. Hitherto it has not been revealed that the famous car manufacturers, the Rover Co., quite early began development work on gas turbine power units following the original success with Whittle-B.T.H. units in the first Gloster jet plane. Their research work was subsequently taken over by Rolls-Royce, Ltd., to enable the Rover Company to embark on the production of the Meteor 12-cylinder V-type tank engine—a detuned, un-supercharged version of the Merlin. The power of the Rolls-Royce gas turbine unit has not been divulged, but it may be estimated to be close upon 2,000 lb. thrust, taking the German Jumo 004 as a reasonable basis of comparison. That unit develops a thrust of 1,980 lb. for a total weight of 1,600 lb., and two units give the Me 262 an indicated speed of 546 m.p.h.

Extremely smooth and quiet operation (so far as the pilot is concerned) are characteristics of the continuous combustion gas turbine. Simplicity of engine controls is another attribute. The noise emitted is best described as resembling an oversize vacuum cleaner, but at full throttle there is a high-pitched hissing noise created by the mass of air, hundredweights a minute, which rush through the turbine plant. Acceleration is extremely rapid; R.A.F. pilots say that opening the throttle suddenly gives a sensation akin to being kicked in the back. A big advantage is that a relatively safe fuel—paraffin—is employed. Normally turbines emit no flame or smoke, but leave in their wake the typical smell given off by a hot paraffin stove. Pilots report most favourably on the general comfort and manoeuvrability of the Meteor over its wide range of speed.



The sub-assembly breakdown for production of the Gloster Meteor.

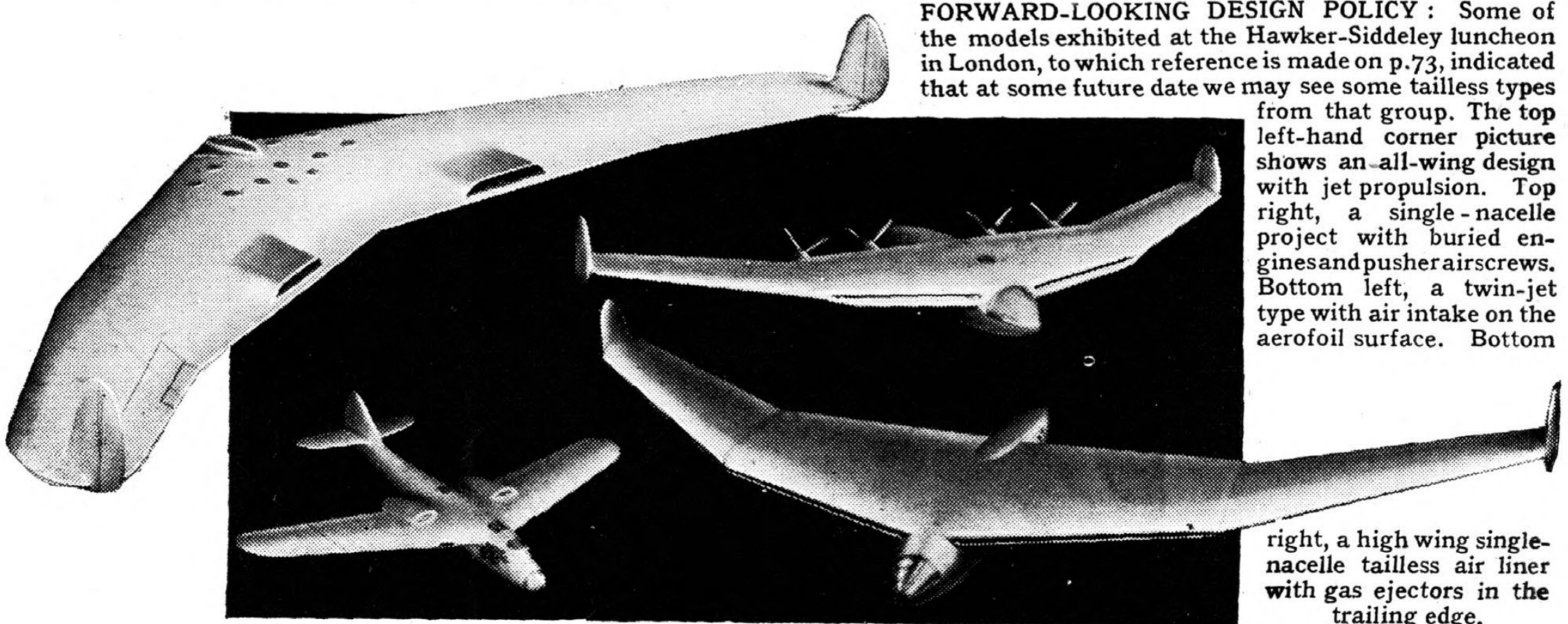
Visibility, as will be appreciated from the illustrations, is excellent by reason of the forward cockpit and absence of airscrews. Apart from their vibrationless rotary motion, gas turbine power units are much simpler and lighter than orthodox piston engines and far more easily serviced. They may be readily interchanged. The Rolls-Royce unit has been officially described as being more efficient and of longer operational life than the Jumo turbine unit of the Me 262.

Features of the Tricycle Undercarriage

A specially designed Dowty tricycle undercarriage is used on the Meteor, in which the main wheel units shorten while they retract. This important innovation will be incorporated in many future aircraft. Exigencies of space demanded a compact undercarriage as there was insufficient space to accommodate orthodox telescopic-type shock-absorber struts. Dowty levered suspension provided the solution. The units retract sideways and inboards, the movement being effected by the extension of a conventional hydraulic jack. Because of the low ground clearance, mudguards are provided to prevent the entry of mud and foreign matter. The nose wheel is also levered suspension, an interesting feature being the shock absorber in tension to reduce occupied space. It has no brake. The aircraft auxiliary services, such as alighting gear, flaps and airbrakes, are operated by a Dowty Live-line hydraulic system, power being supplied by a pump mounted on an auxiliary gear box driven by a flexible shaft from the propulsion unit. An emergency hand pump will operate all services.

A tricycle undercarriage is particularly convenient with

FORWARD-LOOKING DESIGN POLICY: Some of the models exhibited at the Hawker-Siddeley luncheon in London, to which reference is made on p.73, indicated that at some future date we may see some tailless types from that group. The top left-hand corner picture shows an all-wing design with jet propulsion. Top right, a single-nacelle project with buried engines and pusher airscrews. Bottom left, a twin-jet type with air intake on the aerofoil surface. Bottom



right, a high wing single-nacelle tailless air liner with gas ejectors in the trailing edge.

PROGRESS WITH JET PROPULSION

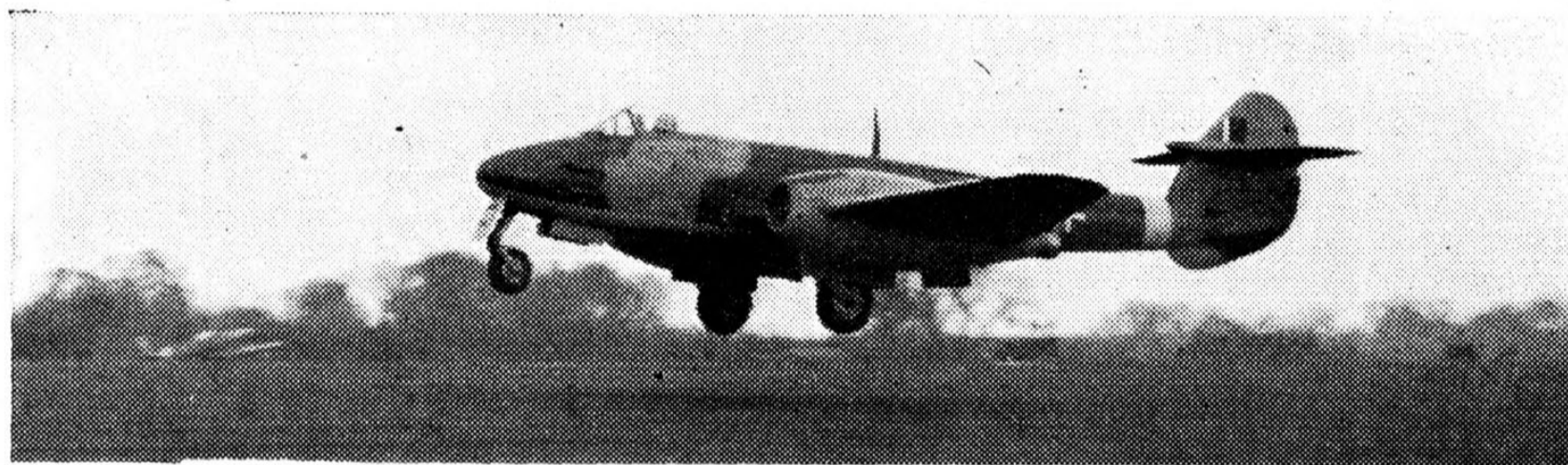
a jet aircraft, since owing to the absence of a slip stream over the control surfaces, the swivelling nose wheel enables handy manoeuvrability on the airfield.

Quite apart from military types of aircraft, it is now clearly evident that many manufacturers are convinced of the future of turbine-jet propulsion for civil aircraft. For instance, at a luncheon given by the Hawker-Siddeley group in London last week, presided over by the chairman, Mr. T. O. M. Sopwith, C.B.E., small-scale models of some extremely interesting future types were displayed. Certain examples of this advanced design theory closely follow the lines of aircraft often discussed in these columns as desirable types of the future, and include a jet-propelled flying wing of large dimensions with the turbines enclosed in the wing section, and two designs with wings acutely swept back and having a fuselage without tail control surfaces. One of them has buried turbines driving airscrews on the trailing edge of the wing. Still another type, not illustrated, was a twin-boom type with the power unit in

the tail of the short fuselage and driving a pusher-type propeller.

It has already been forecast that the next five years will witness more changes of a revolutionary character in the design of aircraft and power units than any similar period in the progress of aeronautical science. The successful advent of jet propulsion units capable of flight in the stratosphere, and the acceptance of smooth-running, compact and light turbine units of greater power output than is practicable with piston engines, will exert a profound influence upon the general layout and design of military and civil aircraft. Though jet propulsion is still in its infancy, the day of turbine propulsion, whether pure jet or airscrew or in combination, is fast dawning. In the broad term "jet" must be included aircraft propulsion by means of liquid rockets, which are no longer a mere figment of the imagination.

Whether present orthodox types of aircraft can be regarded as obsolescent to-day is a matter of argument, but it is nevertheless clearer than ever that within the comparatively brief space of two or three years, existing designs of aircraft, as well as the engines which propel them, will have been completely outmoded.



A Magnificent War Record

Mr. T. O. M. Sopwith Discloses Achievements
of Hawker-Siddeley Group

FOLLOWING the annual general meeting of the Hawker-Siddeley Aircraft Co., Ltd., in London last Thursday, the directors gave a luncheon party to representatives of the Ministries and of the Press. Lord Brabazon of Tara, in proposing the toast of the Hawker-Siddeley group of companies, began his speech with a tribute to a pioneer whose company is now a member of the group, but who is no longer personally connected with it: Sir Alliott Verdon-Roe.

Lord Brabazon outlined the many products of the group which had won fame in the war (the group had produced 30 per cent. of all British aircraft), and recalled that it was the Hurricane which was mainly responsible for winning the Battle of Britain and thereby the war. That was made possible by the fact that the company put down manufacturing plant for 1,000 Hurricanes before any official order was given. At a period when minutes counted that was of the greatest possible importance.

At a time, Lord Brabazon said, when we were being asked to rely on the State instead of on our own strong arm, it was well to remember the past. He recalled that in the early days neither the War Office nor the Admiralty would give any encouragement to flying, and that the Schneider Trophy, the contest for which had had such vast influence on our fighter design, was only won outright as the result of Lady Houston's generosity.

Advent of Rocket

One great danger we had to guard against, Lord Brabazon continued, was that of living in a fool's paradise of complacency. On the day when the first V2 landed in London all previous forms of war weapons were rendered obsolescent. He wondered whether, now that we were faced once more with a new form of weapon, the nation was any more alive to the fact than it was in the days of early aircraft. There were only two alternatives where directed missiles were concerned: either we must suppress them or we must lead in the technique of making and using them.

Mr. Sopwith responded to the toast. He pointed out that in addition to the Hurricane, other types with which we began the war were private ventures, such as the Spitfire, the Blenheim and the Wellington. Lest history should repeat itself he recalled that before the first world war the Royal Aircraft Factory controlled design, with results which hampered and stifled private initiative. In the United States they tried a system whereby a design was selected from several submitted by private firms, and the manufacture in quantities was then let to the lowest bidder. It took America a long time to get over the ill-effects of that system. In France the aircraft industry was nationalised, with the result that France started the war almost without an air force. Germany standardised too early and on too large a scale before the war began, and that was partly responsible for our superiority in the Battle of Britain.

In the years between the wars the British aircraft industry suffered from spasmodic placing of orders, being busy one moment and with nothing to do the next. That must not happen again. A healthy and competitive aircraft industry was needed to keep us ahead.

A souvenir of the first post-war ordinary general meeting of the company—in the form of a very attractive illustrated booklet—contained some very interesting information. The number of employees increased from 33,700 in 1938/39 to a peak of 100,157 in December, 1943. From 1938/39 to 1943/44 deliveries of aircraft increased from 1,753 to 8,795; in the same period engine production grew from 2,175 to 3,711. During the war period the group delivered a total of 40,089 aircraft and 38,564 engines.

The souvenir booklet also disclosed, in pictorial diagrammatic form, the fact that for each £ of turnover, 12s. was expended on material, 5s. on wages, 1s. 8d. on overheads, 1s. 1d. on taxation, 1½d. on dividends, and 1½d. on reserves. These illuminating facts should interest those who are so fond of accusing aircraft manufacturers of "profiteering."

Empire Route Partnerships

Good Results at Commonwealth Air Transport Conference

A PLAN for an Empire partnership in organising and operating the trunk air routes was agreed last week at the conference of the Commonwealth Air Transport Council. The conference, having sat throughout the week, held its final plenary session on Saturday, July 14, but delayed a public statement on the results of its work until later. It has since announced the satisfactory conclusion of its consultations but, at the time when this report had to be closed, it had not disclosed the details.

Each route required separate treatment because different partners are involved in each set of services. The United Kingdom is concerned on every route, but it will work with a different partner or partners on each. Conditions for the Africa route had been settled before this conference began. They had been worked out at the conference at Capetown in February last at which ten countries, including the U.K. and seven Colonial territories, were represented.

That agreement cleared the way for direct co-operation between Britain and the Union of South Africa in arranging main line services. It included an amicable agreement between Britain and the Dominion to operate an equal number of services each, to share responsibility for the ground organisation with a dividing line at Nairobi, to pool non-divisible costs and to pool revenue and share profits in accordance with the number of services flown by each partner. As both partners also undertook to use the same types of aircraft, they arranged to hold a common pool of reserve aircraft for use in emergency.

With that plan before it, the London conference had a useful model and basis for the consideration of the other main routes. The aim of the conference was to apply the same principle, with such modifications as might be needed in particular instances, to the Atlantic, Pacific, Australia, and India routes. The partners to be brought into schemes for joint operation and organisation were Canada (on both Atlantic and Pacific), New Zealand (on the Pacific), Australia and India. They were all represented at the conference. Southern Rhodesia, as having a special interest in the port of call of Salisbury, together with the Union of South Africa, were also present; and Newfoundland, as the Power controlling the Atlantic terminal at Goose, had its representative in attendance.

"Parallel Partnerships"

Reports of the complete success of the conference meant that the task of adapting the system of "parallel partnership" to these other routes had been accomplished. That is to say that Britain has arrived at a plan for apportioning services between herself and the Dominions and India, possibly on lines similar to those which she advocated for the control of competition between the nations at the Chicago International Conference last November. To that she has added a further series of unifying influences dealing with the cost of technical and commercial service on the ground, provision of aircraft and pooling of revenue.

In a variety of ways, the Commonwealth Air Transport Council has gone so far beyond the idea of regulating competition between the nations on the air routes as to create a unity of interests. For practical purposes, the Empire's activities on the trunk routes will become those of a single unit compounded of a number of co-operating units. This allows all the British nations to present a united front, when negotiations with other Powers have to be entered upon. There have been no reports yet of applications for permission to pick up and set down traffic at British airports.

If such applications have not already been lodged, they can be expected soon. The United States has authorised three companies to operate Atlantic services and has given licences to two of them to operate services to India. The services across the Atlantic can be so routed as to by-pass the United Kingdom. Eire has expressed herself as willing to receive international services without imposing any eco-

nomie conditions. Aircraft of the United States can therefore fly direct to the Shannon airport and thence across Britain to destinations in Scandinavia, France, Belgium or any other country which may be willing to subscribe to the United States' idea of the fifth freedom of the air.

In operating to India, the American companies will have to be authorised by a special agreement with the British. If any of the Atlantic operators wish to avoid flying at extreme range, they will seek to call at Goose (in Newfoundland), or Gander (in Labrador) for fuel, and this right is embraced by the general acceptance of the four freedoms of the air, at the Chicago conference; but if they want to treat Goose as a junction and an exchange point for passengers and freight, then the U.S. Government will have to approach a British Power for permission.

Condemned to Bilateral Agreements

By failing to agree at Chicago on some form of economic control to prevent unfair competition on the air routes, the nations condemned themselves to separate negotiations with the countries whose territory they wish to use. Every international air route will, therefore, be subject to bilateral agreements between all the countries concerned. Into those bilateral agreements the nations can put such economic safety clauses as they may think desirable. The nations of the British Commonwealth last week acquired a common interest with the United Kingdom in those main air routes which touch or terminate in British territory. They are to be presumed to have a similar common interest in preventing any attempt by other nations to overload a route with services or to interpret the "fifth freedom of the air" in such a way as to introduce the principle of tramp shipping on the air routes.

When the Commonwealth Air Transport Council was set up last year in Montreal, a suggestion that all the British nations should use the same form in making bilateral agreements to cover air services had been made. Last week's conference in London, applying the principle of economic regulation to the operators of the Empire, has evidently strengthened the case for the application of a similar principle in the dealings of all the British nations with other Powers. The bilateral agreements will probably be found to contain identical clauses. Speaking of the Southern Africa agreement, in the course of last week's conference, Lord Swinton, Minister of Civil Aviation, said: "The same kind of agreements we make together, we will make most gladly with other countries as well and, in so doing, make the highways of the air the ways of peace and friendship for all nations."

These agreements between Britain and the respective Dominions are intended to be Government agreements. They do not necessarily prescribe how a Government shall arrange for the handling of its own share of the services on a given route. In practice the Empire Governments are nominating a single operating company for each route. On the South Africa route, the B.O.A.C. will operate the three weekly services on behalf of the U.K. and South African Airways the three on behalf of the Union.

This is not essential to the plan. Either party to three partnership agreements could nominate two or more operators to maintain its share of the services, if it wished. There are some routes on which, for the present, the traffic offering would not justify the introduction of a second operator. The decision of the Civil Aeronautics Board of the U.S.A. to license two operators on the route between New York and India, suggests an expectation of ample traffic along that line, encouraged probably by the use of two Atlantic crossings, by way of Newfoundland and the Azores.

Britain has plumped for the single operator as representing administrative convenience; and all the Dominions have followed her example, but each party to the agreements will still be at liberty to vary this method of fulfilling its share of the partnerships.

CIVIL AVIATION NEWS

LINK WITH BERLIN

A REGULAR air service between Berlin, Paris and London is reported by Luxembourg Radio to be in operation from the Tempelhof airfield in Berlin.

Tempelhof, the pre-war home of the *Lufthansa*, was handed over to the Americans by the Red Army.

COMMONWEALTH AIR OPERATORS

REPRESENTATIVES of Commonwealth air transport companies who came here to assist the Air Council on the practical issues are now holding their own conference in London to discuss operational problems and establish means of better collaboration.

Among operators taking part at the conference are the B.O.A.C., Qantas, South African Airways and Southern Rhodesian Airways.

INTER-DOMINION LINK

THE belief that Canadian air lines will be able to take travellers to Australia in the near future was expressed by Mr. J. A. Wilson, director of air services, Canadian Department of Transport.

Mr. Wilson, who recently returned from an extensive tour of the Antipodes at the invitation of Australian air authorities, predicted that the inter-Dominion air link, with its Canadian terminus at Vancouver, will be via San Diego and Hawaii, through Canton or Fiji to Sydney.

HEATH ROW

ALTHOUGH for some incomprehensible reasons information on the Heath Row airport is still jealously kept back by the authorities, it is reported that the problem of christening the airport is now under consideration.

Since Heath Row will be difficult for many foreign crews to pronounce, it is rumoured that the name Swintonfield has been put forward. If Heath Row is to be one of the world's finest airfields, truly representative of Britain's achievements in the air (which still remains to be seen), then why not call it Britonfield?

RINGWAY

MANCHESTER Airport Committee's report that the Ministry of Civil Aviation would most likely agree to the use of Ringway for internal and Continental services has raised local hopes.

In the Government survey plans now in preparation as to choice of airports for civil or military purposes, it is understood that Ringway will be regarded as the official airport to serve the wider area of Manchester and the huge populations of its surrounding towns. Its favourable location in a highly industrial region would appear to ensure that Ringway will become one of the most prominent airports in Britain. This seems to be generally appreciated. Only recently, Mr. W. P. Bradbury, of Railway Air Services, said that Manchester must have a prominent place in the comprehensive scheme of air services to large towns in Britain, to Ireland and to Europe, while the chairman of Manchester's Airport Committee, Councillor A. Ellison, expressed the view that his Committee expected such a large demand for air transport from and to this district that not only Ringway but also Barton (Manchester's previous airport) would be needed.

It was thought that Barton would prove useful for the shorter air services to Ireland, the Isle of Man and Lancashire coast resorts.

One of the most prominent pre-war services to Manchester was that of the K.L.M. from Amsterdam and touching Doncaster since 1934; however, as the rehabilitation of Holland may take some months, this service is not expected to be resumed until the early months of 1946. Other North European countries may soon want direct air links with the industrial north-west.

Even at the outbreak of war Ringway was as well equipped as any other airport in Britain, and it is believed it has been kept up to date throughout the war. It has long been used as one of the main training points for airborne and parachute troops.

FREIGHT SERVICES WANTED

THERE is a growing interest in Eire in the possibility of speeding up deliveries of agricultural and other produce to Britain by the use of air transport.

Senator J. J. Coughlin has tabled a motion which requests the Minister for Industry and Commerce to investigate the possibility of the creation of an air transport service from Eire in the near future. The motion, which is likely to come up for early discussion, expresses the opinion that the provision of swift transport for agricultural produce exported from Eire will be of vital importance in future export trade.

POOLING

AGREEMENT has already been reached on many civil air transport problems by the three committees set up by the Commonwealth Air Transport Council which is now in conference.

Lord Swinton, who is presiding over the conference, stated that it had already been agreed that for services between Britain and South Africa all passenger, freight and mail revenue should go into a common pool. That would be divided between the South African Airways and the B.O.A.C. in proportion to the number of services operated by each.

Air liners will make the trip between London and Johannesburg in 70 hours, and when pooling of aircraft has been arranged the time will probably be cut by 12 hours.

The route will be operated via Malta, Cairo, Khartoum, Salisbury to Johannesburg, and the British sector will end as far as Nairobi. The frequency of the services is likely to be restricted to two weekly with gradual increase up to six weekly each way. Landplanes will probably replace flying boats with which the service was operated before the war.

The same question as applied to services to various parts of the Commonwealth is now under discussion.

The type of aircraft to be used on each route and the principle that where the same aircraft is used by both partners there should be a common pool of reserve air liners is equally under consideration. The principle has been approved that each of the partners would provide the use of commercial and technical facilities on agreed sectors of a route.

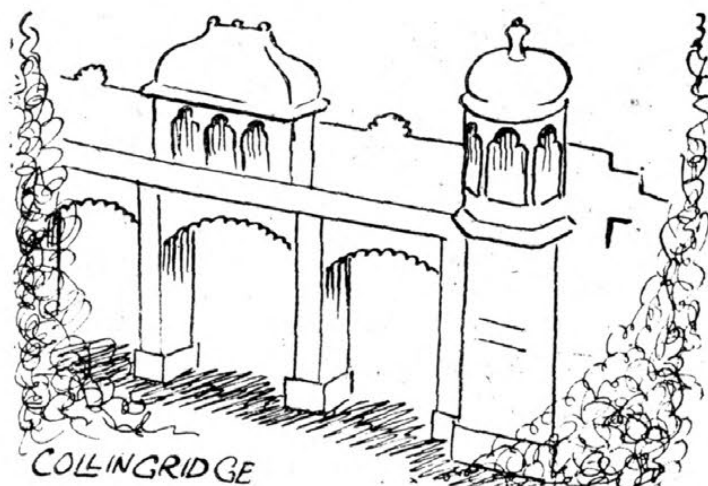
On the future of the Empire Air Mail Scheme Lord Swinton explained that ultimately they would have to decide whether it should be continued or varied, but in the meantime they would maintain present postal arrangements.

INSECTICIDE

DURING the past year an effective method of fighting dangerous forest insects has been tested in Sweden. From low-flying aircraft a poisonous powder is spread over the area attacked by the small enemies, generally the "pine-looper," a butterfly caterpillar possessing an insatiable appetite for pine-needles. The method has also been used in South Sweden against an insect with the Latin name of *Meligethes Brassicæ*, which ravages the rape fields when in bloom.

The poison used, a preparation called Gesarol, is sprayed from the aircraft over strips 25 metres wide by means of a special apparatus. It is a contact poison harmless to human beings and the higher animals, but it immediately paralyses certain small insects which die after 24 hours.

The successful results have inspired the Swedes to make fresh experiments. Recently the same method was applied for killing flies and gnats in a district especially severely harassed by these pests. In the areas "treated" by aircraft the flies and gnats completely disappeared, and it is estimated that this district will be free from its tormentors for at least a month.



What's all this fuss about post-war aviation?

Apprenticeship Training

Sir Frederick Handley Page on the Importance of Maintaining a High Standard of Skill

THAT manufacturing capacity as represented by numbers of works operatives must naturally be less in peacetime than in war was admitted by Sir Frederick Handley Page in a talk which he gave to representatives of the Press and of training establishments last week. But Sir Frederick stressed the importance of not only maintaining but increasing the standard of skill. How it is proposed to ensure this at the Handley Page Cricklewood works in London was explained by him at considerable length.

At one end of the scale, training was required for the research worker, scientist, aerodynamicist, etc. Here the emphasis was on university and college training. At the other end there was the training of skilled craftsmen, coppersmiths, toolmakers, turners, millers, fitters, etc. In this case the stress was on the practical side, for which training was only possible in a works. Between these two lay the training of engineering apprentices to provide a steady flow of fully trained engineers for ultimate posts of responsibility in the technical, production and administrative departments. A feature common to all Handley Page apprenticeship courses was that there was no premium, and apprentices received pay according to agreed standards.

Two distinct courses are in operation at Cricklewood, and a third is likely to be given experimental trial soon. There are the training courses for aeronautical engineers and those for skilled craftsmen. The third course mentioned is really a variant of the first.

For the aeronautical engineer there are two alternative courses: a graduate apprenticeship course, which provides practical instruction at the works for students taking a full-time engineering degree course at a university or engineering college; and a five-year technical apprenticeship course which combines practical instruction in the

works with part-time theoretical instruction at the Northampton Polytechnic, Islington. In the former the intention is to provide practical workshop training for engineering students, both during their period of study for and after the attainment of a university degree. Students agree to work in the factory during the whole of the two summer vacation periods of their three-year degree course and for a further two years after obtaining a degree. They are required to continue theoretical studies while serving the two-year apprenticeship.

The technical apprenticeship course covers practical training in the works concurrently with theoretical training at the Northampton Day Engineering College. The apprenticeship period is of five years, and candidates are selected from students between the ages of 16 and 17½ years. They must have passed Matriculation or School Certificate with six Credits, of which one should be Maths. and one a science subject.

Practical Instruction

In the technical apprenticeship course the training covers a period of 3½ years' practical instruction in the works, followed by a further 1½ years in the particular branch for which the apprentice has shown special aptitude. This may be on the technical side or on the production. The theoretical work at the Northampton covers two days a week.

The trade apprenticeship course is calculated to train lads to become skilled artisans in one of the following trades: Fitting, turning, milling, machining, tool-making, sheet metal work, or millwrights. Candidates are selected from shop and office boys and from pupils at junior technical or secondary schools. They must not be more than 16, no premium is required, and wages are paid from the start. The trade apprentices are required to attend evening classes at the local technical colleges.

The third course mentioned, which is an alternative graduate course, was described by Sir Frederick as a "sandwich scheme" for aeronautical engineers. A proposal by Professor Southwell, now being considered, was that applications for apprenticeship would be considered from students who had completed two years at Imperial College and who had passed their final B.Sc. examinations, but who were not eligible for the degree until their third residential college year had been completed. The long vacations would be spent in the workshops, and the student would then go to the firm, at the end of the second college year, for one year's practical training, returning to Imperial College to qualify for his degree. A second year (fifth in all) would be spent in the firm's shops, the total result of a five-year course being 30 months in the shops and 27 months at Imperial College.

"ARIES" CREW AT LINCOLN

WING CDR. D. C. MCKINLEY and members of his crew who during May carried out the successful Polar flights in the Lancaster, *Aries*, were recently entertained by Mr. C. Hatton, manager of the Avro repair organisation at Lincoln, where the extensive modifications to their aircraft were carried out. Next day McKinley gave a personal account of the expedition to the workpeople in their canteen.

CANADA TO BUILD JET AIRCRAFT

CANADA will build jet aircraft for use by the R.C.A.F., said an Ottawa broadcast last week. A Government-owned company was designing a jet propulsion unit, Air Force Headquarters stated. Canada was in a good position to develop an industry for the manufacture of the gas turbine type of power plant, and this would hold together some of the men with valuable experience in war production. Civil aviation would also benefit by the research.

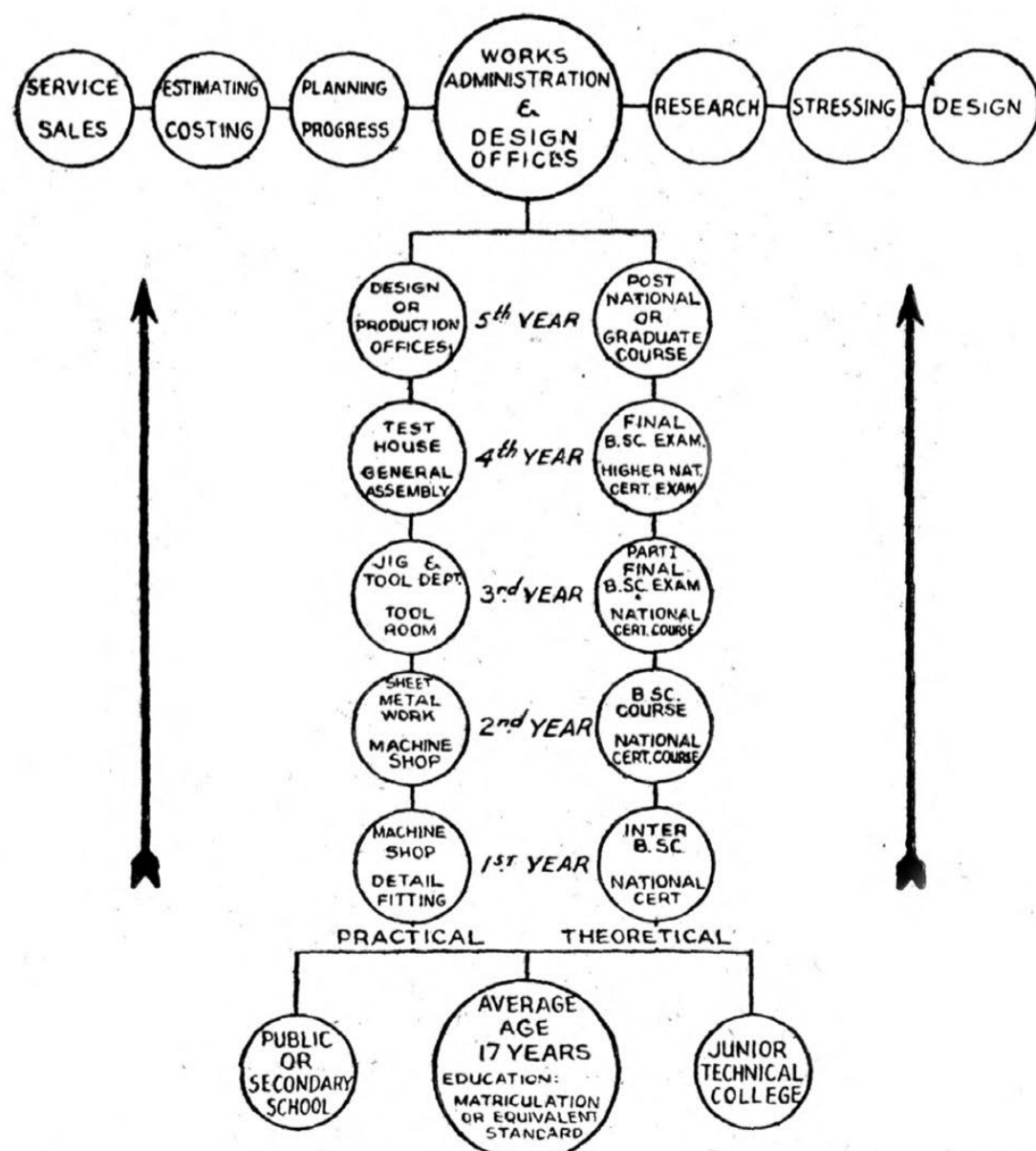


Chart of the combined practical and theoretical engineering course.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

POST-WAR AIRCRAFT INDUSTRY Should Employ Only British Personnel

WHILE I fully appreciate that *Flight* is not, and should not be, interested in the present-day domestic and international social problems, as such, I feel that space should be available for news and views in so far as these affect the British aircraft industry.

May I express the hope that all concerned will undertake to employ only British men and women, thus making as great a contribution to the peace as they made to the war?

HAROLD PRATLEY.

ATLANTIC COMPETITION General Critchley Undismayed

WITH reference to the article on "Atlantic Competition" published in your issue of July 12th, in which you imply that three American airlines might be more difficult to compete with than one.

Surely "unity is strength"; I think the British operator would prefer three lines to compete with rather than one combined U.S.A. unit.

In my humble opinion, B.O.A.C. will be capable of holding its own, even against the three airlines mentioned.

The B.O.A.C. family are in good fettle and trained to the minute; I believe our air and ground crews to be unequalled the world over.

A. C. CRITCHLEY.

[While we do not share it, we welcome and admire General Critchley's confident view of the future so far as the North Atlantic air service is concerned. It is good to learn that "the B.O.A.C. family are in good fettle and trained to the minute." It seems to us that it will need to be in view of the fact that three separate American operating companies will be competing with it. The point we wished to make in our leading article was that the B.O.A.C. will be faced with having a single section of its services (the others being devoted to Commonwealth routes) in opposition to three American concerns, presumably operating on separate routes and thus forcing General Critchley to "fight on three fronts," so to speak, a situation which few other generals would welcome.]

AIRCRAFT NOISE Explanation and Laudation

RE W. Parker's letter stating that high tip speeds cause the noise on a Harvard. Might I add to that? The Harvard has a direct-drive system, making the airscrew revolve at the same speed as the engine.

Might I also say that *Flight* is getting better every issue, but we (I and my Spotters' Club) agree that a few more silhouettes of Japanese aircraft would make this paper even better? We all rush to see who can get a look at *Flight* first at our hall, and we especially like the articles about civil aircraft.

DAVID DICKINSON.

(And 15 Air-minded Lads.)

And What of the Pilot?

AS an ex-Harvard flying instructor, I think I can explain to Mr. Campbell the reason for his discomfort, as it is obvious he lives near an airfield where flying training is carried out, or near a field used for practice landings.

First, I must assure him that it is indeed very necessary to the pupil pilots undergoing training that this "ear splitting din" happens. It is part of the landing drill on the downwind leg for the throttle to be completely closed to make sure that the undercarriage horn is working, and as the Harvard is cruising at about 1,800 r.p.m. the natural tendency is for the constant speed unit automatically to put the airscrew into fully fine pitch in an endeavour to maintain the revs. Of course, when the throttle is suddenly opened again to cruising boost, the sudden increase of power causes the airscrew to turn at a very high number of revolutions until the c.s.u. has time to take over and once again govern the revs. at the set position for cruising.

Almost everyone knows that the Harvard has no reduction gear and that at maximum thrust the airscrew blade tips are almost at the speed of sound—hence all the noise. Do I have to explain the theory of sound waves, Mr. Campbell? It is

indeed unfortunate that the general public has to be disturbed thus, but if this little thing did not happen more student-pilots would land with their wheels up with the resultant strain on the already overcharged taxpayer. So what's a little headache, Mr. Campbell? How about the pilot who sits behind the engine—all the time?

A. N. WERNER (Flt. Lt., B.L.A.).*

Partly Due to Extreme Valve-timing

THE strident exhaust beat of the Harvard appears to be due to: (1) extreme valve-timing, (2) lack of muffling, and (3) doppler effect.

Items (1) and (2) begin at the drawing board and do not necessarily aid B.H.P. This was proved at Brooklands many years ago.

"Country life," lived among airports, test houses and trainers, becomes more and more like a certain famous "tea party"!

Two engines with which I was personally familiar had this same "beat" and had free exhaust systems: (a) the 1913 Hillman track racer of 1,100 c.c. and (b) the 1,496 c.c. Anzani, circa 1920. In both these cases (as in the engine fitted to the Airspeed Oxford—indeed, all A./Siddeley engines) there was extreme timing, as follows:—

Hillman (3,700 r.p.m. max.):—

Inlet opens	5 degrees before T.D.C.
" closes	50 sec. after B.D.C.
Exhaust opens	52 sec. B./B.D.C.
" closes	20 sec. A./T.D.C.

Anzani (4,500 r.p.m. max.):—

I.O.	3 degrees B./T.D.C.
I.C.	46 sec. A./B.D.C.
E.O.	70 sec. B./B.D.C.
E.C.	16 sec. A./T.D.C.

TIM HALEY.

[It should be pointed out that the Airspeed Oxford V, which has similar sound characteristics to the Harvard, is fitted with Pratt and Whitney "Wasp Junior" engines. Other versions powered by Armstrong Siddeley "Cheetah" engines are no more guilty of this "tearing calico" noise than is the similarly equipped Anson.—ED.]

BRITISH AND BEST Publicity for Home Products

NOW that British aviation is at last showing signs of real advance, I feel I must congratulate *Flight* on the wide publicity given to recent British aeronautical achievements. The quality of the articles is, I consider, unsurpassed by that of any similar paper.

Some of the recently reviewed developments must lead the world in their class. Can anybody name a radial engine superior to the Centaurus; a transport aircraft, nearly ready for full production, superior to the Tudor; or a reaction-propelled machine superior to the Vampire?

The Lincoln will probably achieve speeds and ranges with a heavy load at least equal to the Superfortress, and the Spiteful and Hornet seem supreme in their categories. That remarkable aircraft, the Mosquito, is still unequalled; I refuse to believe that the Invader is better. The Brabazon I shows great possibilities of being superior to the Consolidated Super Clipper, which the Americans claim will revolutionise trans-oceanic travel.

Only in the flying-boat class is Britain still lagging behind. The Shetland marks little (if any) advance over the Mars. As was stated in *Flight* in the article on the Blackburn project, this class must not be neglected. If this Blackburn machine is swiftly put into production, Britain may yet secure a lead.

Congratulations, again, to *Flight* on the publicity given to recent British developments. Keep up the good work.

R. E. GREGORY.

A CIVIL AVIATION PROBLEM Airfield Fire Prevention and Crash Rescue Services

ONE of the most important problems inseparably associated with the operation of aircraft is the arrangements intended to secure the safety of life and the protection of aircraft and equipment from the ravages of uncontrolled fire. This par-

CORRESPONDENCE

ticular problem, of primary interest to those responsible for the general organisation of airfields and airports, will require very careful consideration, not only in the drafting of regulations, but in their implementation.

Aircraft, because of their construction, and of the fuel at present used for their propulsion, must at all times constitute a high potential fire risk; and a fire once started will assume large proportions at great speed.

It cannot be too strongly emphasised that the rapid development of aircraft both in size and complexity has brought with it correspondingly increased problems on the technique of dealing with outbreaks of fire on the ground, and these problems are further complicated by the requirement that the special fire-fighting equipment necessary must possess a high degree of mobility. This in turn restricts the limits of suitable rescue and fire-fighting apparatus. It is certain that success in dealing with outbreaks of fire in aircraft on the ground can only be achieved provided that the aircraft crash, rescue and fire-fighting crews are trained specialists in this particular work.

It is not always appreciated that it is not enough for the whole-time personnel employed at airfields on crash-tender duties to be completely conversant with the use of their rescue tools and the operation of the fire-fighting apparatus; they must also have some knowledge of the construction of aircraft and be familiar with its interior.

It is often said that crash-tender crews have nothing to do but to wait idly around until an accident happens. Nothing is farther from the truth. If they are to be effective, aircraft crash rescue crews must, in a special degree, always be ready for action with the absolute minimum delay. It is, therefore, necessary to keep them mentally alert by constant training. The maintenance of equipment and precautionary duties also afford scope for the employment of their time to good advantage.

We may expect that the post-war aircraft accident rate will be low, but when incidents do occur, as they undoubtedly will, split seconds, sound organisation and well-trained, efficient crews will often constitute the difference between success and catastrophe. The selection of personnel for these duties is of very great importance. Aircraft fire-fighting and rescue work require a very high physical standard of strength and fitness and it is a calling which can be followed by only comparatively young and active men.

It is suggested that the requirements for the solution of this problem are of sufficient importance to warrant—when circumstances permit—the establishment by some suitable authority of a school where men selected for airfield fire-fighting duties can be given training on specialist lines, and on the successful conclusion of their training certified as proficient in this branch of a difficult and dangerous profession.

In some instances the cost of maintaining a body of well-trained men exclusively for aircraft rescue and fire-fighting duties appears to be prohibitive. It should, however, be possible, by proper planning and organisation, to combine fire-fighting duties with others such as those of security police, flying control, or men handling aircraft. Personnel so employed must, however, conform to the standard of physique and intelligence required for fire fighters and it would need to be understood that fire fighting was their primary function.

The syllabus for a course of training for airfield fire fighters

should, it is suggested, include instruction in the following subjects:—

- (1) Elementary knowledge of the construction of aircraft including:—
 - fuel systems; electrical installations; controls and switches; emergency exits; "break-in" positions; fire bulkheads; built-in fire extinguishing installations; and technical terms used.
- (2) Inspection of aircraft from fire risk point of view.
- (3) Elementary knowledge of flying regulations of interest to crash-tender crews.
- (4) Elementary lectures on flying control.
- (5) Lectures on "Fire Drill" in flight.
- (6) Local topography, grid maps, how used and their value.
- (7) Thorough training with all types of fire-fighting rescue apparatus, and the maintenance of equipment.
- (8) First-aid to the injured.
- (9) Team work; physical training; appearance and discipline.
- (10) Organisation; roll-calls; reading of Orders and Regulations.

It is hoped that the Air Ministry will advise civil airfield owners on fire-fighting and allied subjects, and afford all possible assistance by the appropriate department of the Air Ministry, based upon its wartime experience of handling every description of fire started by enemy action and other causes.

"KLAXON."

A PILOT'S JOB

More Esprit de Corps Wanted

IN "Indicator's" "A Pilot's Job Is No Sinicure," published in *Flight*, June 7th, I am sure most people will agree that the time is now ripe for the encouragement of better understanding between all sections of aviation.

It is not fully appreciated by ground personnel, especially engineers, that the pilot who has just landed may have had a particularly sticky flight, and consequently is rather apt to "go off the deep end" with the person he first meets on landing—unfortunately most often the poor old ground engineer. It is rarely a personal issue, but often develops into one. I have long considered that the physiological aspect has been much neglected in aviation's curriculum, but I do consider that it would benefit all if the pilot would reserve his comments, oft-times very acid, until what "Indicator" terms "the ten minute period" has elapsed; it often happens that the snag he is grouching about could have been rectified if the previous pilot had reported it and given the G.E.s a chance to do something about it.

We as a body should be far closer knit and realise that one without the other would put all out of aviation circulation; therefore it calls for what we termed in the R.F.C. "squadron spirit," or perhaps just plain *esprit de corps*.

Unfortunately, many pilots grab the first mechanic they see and then proceed to "get it off their chest." It is quite reasonable to expect that if they reserved their comments and placed the facts before the senior engineer officer they would invariably receive full attention, and then, by discussing the facts, come to that happy state of co-operation that is so necessary; after all, the majority of engineers do realise that the chap that flies the aircraft is entitled to air his views.

I certainly agree with "Indicator's" last paragraph, but would like to suggest that the word "expert" should read "everyone" and that confidence is the only successful basis to build upon.

G. E. (ex-R.F.C., ex-R.A.F., etc.).

BOOK REVIEWS

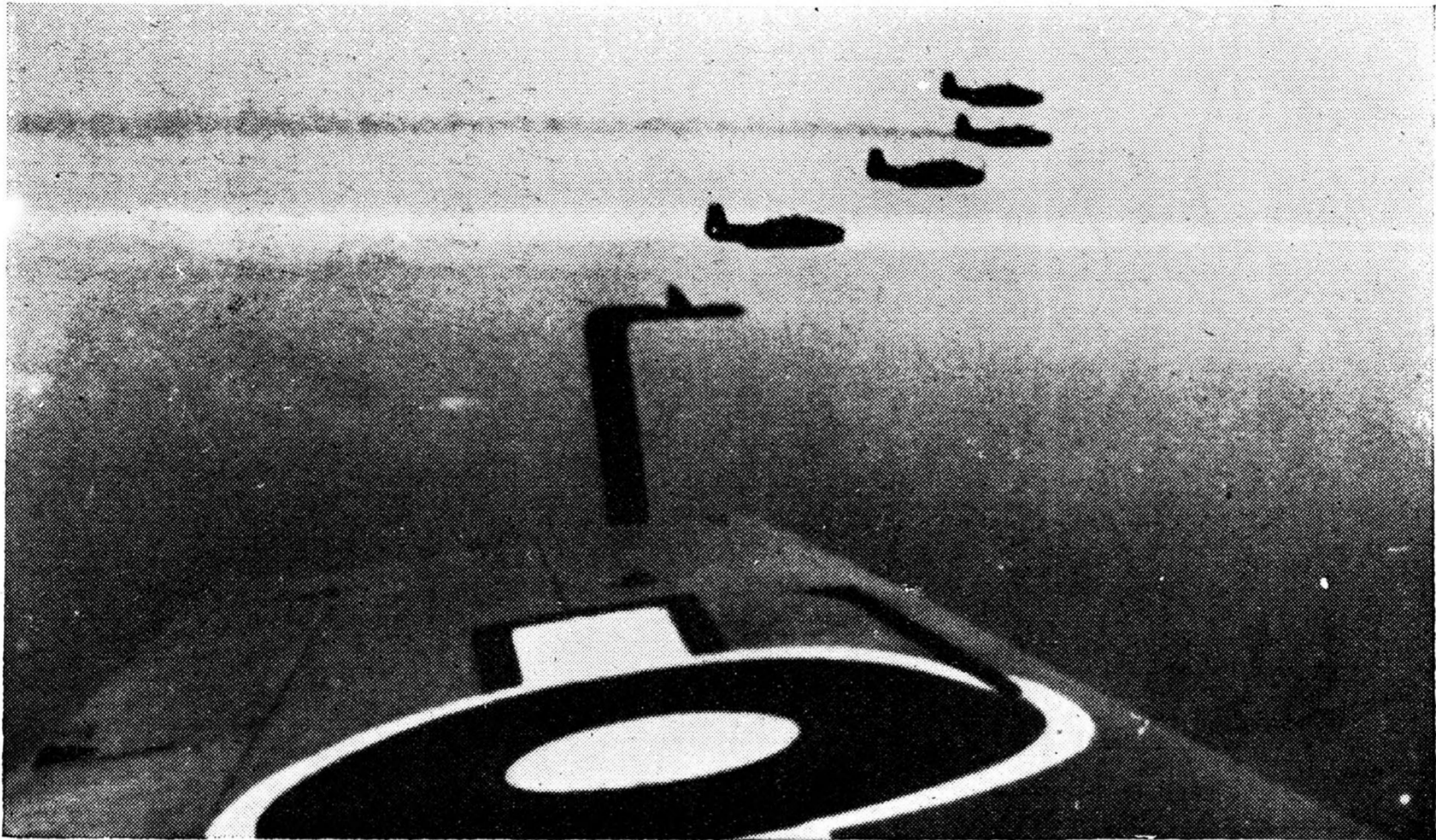
R.A.F. Parade. Compiled by S. Evelyn Thomas. John England Publications, Ltd. 13s. 6d., post free.

THIS anthology of R.A.F. humour gathers together into 96 pages a collection of some of the brightest efforts of a number of writers and cartoonists famous for their laugh-making ability. Nobody, for example, needs any introduction to that priceless double-act, Raff and Anthony Armstrong, whose treatise on "Nice Types" opens the fun in this volume.

Then there are many little gems from *Punch* and other journals, including, if we may modestly mention it, some that have graced the more light-hearted pages of *Flight* from time to time. Evelyn Thomas has struck a nice balance between text and pictures, so that one is always lured on to turn just one more page before setting this book down. As a most palatable tonic, it is, in fact, just the sort of book to pick up at odd moments but don't expect to be able to put it down again so easily.

They Fly From Britain. By R. G. Davies and V. J. Galliano. Harborough. 21s.

THIS extremely well-presented book deals with 14 types of aircraft (eight British and six American, all of which have played a big part in the war in Europe) and may perhaps be described as a meritorious attempt to encourage recognition (not *teach* it) by presenting the "atmosphere" of the aircraft rather than a dull specification. The subject-matter of the text is chosen on the basis that different aircraft are remembered for different reasons, which may be structural, functional or historical, and each type is illustrated by a coloured caricature with small perspective silhouettes above, and nose and tail line-drawings beneath. Some are also illustrated photographically. This book may seem rather a slim guinea's worth, but its 44 pages measure 11in. x 8½in. and are of fine-quality art paper, the colour printing being most attractive. It has the additional appeal of the unusual.



Fleet Air Arm Avengers returning from an attack on the Sakishima Islands. The Avenger with a smoke trail forced-landed in the water and the crew was picked up six hours later.



SERVICE AVIATION



Royal Air Force and Fleet Air Arm News and Announcements

Awards Fleet Air Arm

FOR bravery, skill and devotion to duty, whilst serving in H.M. ships *Victorious*, *Illustrious*, *Indefatigable*, *Indomitable*, in attacks on enemy oil installations at Palembang, Sumatra.

Distinguished Service Order

Temp. Act. Lt. Cdr. (A) D. R. FOSTER, D.S.C., R.N.V.R.

Temp. Act. Lt. Cdr. (A) J. CROSSMAN, R.N.V.R.

Temp. Lt. (A) G. J. CONNOLLY, R.N.V.R.

Capt. (Temp. Major) R. C. HAY, D.S.C., R.M.

Second Bar to Distinguished Service Cross

Temp. Act. Lt. Cdr. (A) A. M. TRITTON, D.S.C., R.N.V.R.

Bar to Distinguished Service Cross

Temp. Lt. (A) F. L. JONES, D.S.C., R.N.V.R.

Distinguished Service Cross

Act. Lt. Cdr. (A) C. J. I. CUNNINGHAM, R.N.

Act. Lt. Cdr. (A) T. W. HARRINGTON, R.N.

Temp. Lt. Cdr. (A) C. C. TOMKINSON, R.N.V.R.

Temp. Lt. (A) D. P. DAVIES, R.N.V.R.

Temp. Lt. (A) D. M. JUDD, R.N.V.R.

Temp. Lt. (A) J. O. CRAWFORD LEE, R.N.V.R.

Temp. Lt. (A) F. J. WILLET, R.N.V.R.

Temp. Lt. (A) M. D. VIRGIN, R.N.V.R.

Temp. Sub. Lt. (A) L. FLETCHER, R.N.V.R.

Temp. Sub. Lt. (A) K. E. WARD, R.N.V.R.

Temp. Sub. Lt. (A) R. F. MACKIE, R.N.Z.N.V.R.

Distinguished Service Medal

Temp. P.O. Airman W. G. LAMBERT.

Temp. P.O. Airman R. MURPHY.

Temp. P.O. Airman A. N. TAYLOR.

Act. Temp. P.O. Airman D. COX.

Act. Temp. P.O. Airman F. C. SHIRMER.

Temp. Ldg. Airman M. REES.

Naval Airman 1 cl. A. G. EASOM.

For courage and skill shown while serving in Eastern waters.

Distinguished Service Cross

Temp. Lt. (A) B. A. MACCAW, R.N.V.R.

Temp. Lt. (A) J. MYERSLOUGH, R.N.V.R.

FOR great gallantry and devotion to duty in completing his task of destroying an

enemy ammunition ship, though he and his bombardier were both wounded at the time of the attack.

American D.F.C.

Lt. (A) B. AIKENS, R.N.V.R.

M.B.E. (Mil.)

Air Art. 3 cl. D. MCFADZEAN.

Air Art. 4 cl. A. R. RAPLEY, D.S.M.

Temp. P.O. Air Mech. (E) G. F. MORRIS.

Air Art. 4 cl. W. J. HUGHES.

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Bar to Distinguished Service Order

Act. Wing Cdr. R. C. ALABASTER, D.S.O., D.F.C., R.A.F.V.R., No. 608 Sqn.—This officer

has a splendid operational record, having participated in a hundred bombing sorties. In these operations he has attacked a wide range of strongly defended targets, and throughout has set the highest standard of devotion to duty. Highly skilled, brave and resolute at all times, Wing Cdr. Alabaster has set an example which has been well reflected in the operational efficiency of the squadron he commands.

Act. Wing Cdr. C. G. CALDER, D.S.O., D.F.C., R.A.F.V.R., No. 617 Sqn.—Since being awarded the D.S.O., this officer has completed many sorties. Throughout these operations he has shown the greatest resolution, and the successes obtained are a splendid tribute to his great skill and courage. Wing Cdr. Calder led the squadron on the operation when the first 22,000lb. bomb was dropped over Germany. The target was the viaduct at Bielefeld, and complete success was achieved. This officer has rendered much loyal and devoted service.

Distinguished Service Order

Wing Cdr. W. J. SCOTT, A.F.C., R.A.F., No. 107 Sqn.—This officer is an exceptionally able and courageous squadron commander who has consistently set a fine example by his skill and devotion to duty. Under his fine leadership the squadron has attained many successes, often in the face of intense enemy opposition and in very adverse weather. A typical example of Wing Cdr. Scott's skill was in February, 1945, when he led 16 aircraft of his squadron in an attack on the enemy's lines of communication. Results achieved were excellent, and included attacks on ten trains, three stations, four railway sidings and other railway facilities.

Act. Sqn. Ldr. A. G. GARDNER, D.F.C., R.A.F.V.R., No. 613 Sqn.—Since the award of the D.F.C., this officer has completed many more operational sorties. Now on his second tour of duty he has flown on numerous long range escorts, and on attacks against shipping off the north-west coast of Germany, and he has obtained valuable information of enemy convoys. His photographs have frequently been obtained in the face of intense and accurate fire from enemy ships and despite the presence of escorting enemy fighters. On one occasion, during an attack on the communication centre of Schleswig, north of Kiel, Sqn. Ldr. Gardner's aircraft was hit by anti-aircraft fire and the port engine rendered useless. Despite this he skillfully flew his crippled



BADGES AND MOTTOES: (Left) No. 18 Bomber Squadron, R.A.F. "Animo et Fide" (With Courage and Faith). (Right) No. 82 Squadron, R.A.F. "Super Omnia Ubique" (Over All Things Everywhere).

SERVICE AVIATION

aircraft, over a well-defended area and the North Sea, safely back to the United Kingdom. At all times this officer has pressed home his attacks with determination and set an inspiring example by his gallantry, leadership and devotion to duty.

Act. Wing Cdr. C. F. MERVYN-JONES, D.F.C., R.A.F.V.R., No. 104 Sqn.—Wing Cdr. Mervyn-Jones has completed two tours of operational duty which have been distinguished by his enthusiasm and skill as a pilot and his ability to imbue those serving under him with his own fine fighting spirit. In April, 1945, after a successful attack on the heavily defended railway sidings at Budapest, this officer's aircraft was badly damaged. Flying with great skill and shaking off an attack by an enemy fighter, he crossed the coast of Yugoslavia and, with his tanks almost dry, he was forced down on to the sea, but was rescued the same day. A commander of resource, ability and courage, this officer has materially contributed to the successes attained by his squadron.

Flt. Lt. J. W. BARLING, D.F.C., R.A.F.V.R., No. 224 Sqn.—This officer has completed two tours of operational duty. During his first tour he attacked and destroyed a U-boat in the Eastern Mediterranean. Since the award of the D.F.C. he has taken part in many operational sorties, and has continued to display outstanding courage and devotion to duty. Flt. Lt. Barling sighted an enemy submarine, which he immediately attacked, straddling it with five depth charges. By dint of excellent co-operation four naval vessels were brought to the scene of the attack, and next morning wreckage and oil were collected from the area. Later, he sighted a U-boat near the French coast, but the U-boat scuttled herself before an attack could be made. More recently this officer has been flying on patrols over northern waters and off the Norwegian coast, and, on two occasions, has completed his mission in the face of persistent opposition from enemy shore batteries. On another occasion he made a skillful attack on an enemy submarine. Throughout a long operational career, Flt. Lt. Barling has consistently displayed outstanding keenness and skill.

Group Captain K. R. J. PARSONS, D.F.C., R.A.A.F.—Group Capt. Parsons has an impressive war record, having participated in more than 100 sorties. On one occasion, in February, 1945, his aircraft sustained severe damage and went into a steep, uncontrollable dive. Only at the last possible moment did Group Capt. Parsons get clear of the aircraft before it crashed. This gallant officer was soon on operations again, and executed a successful sortie against Misburg. His last operational mission was an attack on Berchtesgaden. This officer has invariably displayed the highest qualities of skill, courage and leadership, qualities which have inspired all.

Lt. Col. G. C. KRUMMECK, S.A.A.F.—This officer has a splendid operational record, having participated in a very large number of sorties, during which a wide range of enemy targets have been attacked. Throughout, he has displayed unflinching devotion to duty, coupled with a high degree of skill and courage. In March, 1945, he led a formation of aircraft against an ammunition dump near Margherita. The operation was well executed, and caused much destruction amongst a cleverly camouflaged target. In April, 1945, this officer took part in an attack against a locomotive with 12 coaches. In spite of strong opposing fire the attack was pressed home relentlessly. The target was set on fire. By his skilful leadership and personal example of bravery, Lt. Col. Krummeck contributed materially to the successes obtained.

Bar to Distinguished Flying Cross

Flt. Lt. D. B. ROSS, D.F.C., R.A.F.V.R., No. 427 (R.C.A.F.) Sqn.—Flt. Lt. Ross is now on his third tour of operational duty. Throughout he has proved himself to be a skilful and determined air gunner. On one occasion his aircraft was detailed to attack Cologne. One engine was rendered unserviceable and on leaving the target area an attack was made by a Messerschmitt 210. Flt. Lt. Ross skilfully directed evasive action and, by his accurate fire, drove off the enemy fighter. By his cool courage, efficiency and devotion to duty over a long period he has set an outstanding example to all members of his squadron.

Flt. Lt. J. C. STEAD, D.F.C., R.A.F., No. 192 Sqn.—Since the award of the D.F.C. this navigator has almost completed a third tour of operational duty. He has taken part in attacks on many of the major targets in Europe. On all his missions his courage and skill as a pilot have contributed much to the success obtained.

Act. Flt. Lt. R. H. ANDERSON, D.F.C., R.A.F.V.R., No. 640 Sqn.—This officer has completed numerous operational sorties, which have included attacks against such heavily defended targets as Kiel, Duisburg and Dusseldorf. On one occasion, during a daylight attack on Sterkrade, the ailerons of his aircraft were seriously damaged by anti-aircraft fire, which made it extremely difficult to control. Undeterred, Flt. Lt. Anderson pressed home a successful attack with the utmost determination and flew his aircraft safely back to its base. In his capacity as deputy flight commander this officer has shown a tireless energy and cheerful enthusiasm which have been an inspiration to all in his squadron.

Act. Flt. Lt. I. W. BAGSHAW, D.F.C., R.A.F.V.R., No. 582 Sqn.—Flt. Lt. Bagshaw has completed a large number of operational sorties, including attacks against such heavily defended targets as Berlin, Stettin, Stuttgart and Nuremberg. By his consistent skill and determination he has materially contributed to the successful completion of many missions. Since the award of the D.F.C. this officer has continued to operate with courage, enthusiasm and devotion to duty of the highest order.

Act. Flt. Lt. D. E. MILLER, D.F.C., R.A.F.V.R., No. 7 Sqn.—This officer has shown himself to be a skilful and enthusiastic navigator. He has participated in many further important operational sorties since the award of the D.F.C. and has played a large part in the successes achieved by his crew. His courage and determination in the face of danger, together with his cheerfulness



The Duke of Gloucester practising at the stop butts during a visit to H.M.S. *Nabberley*, a Royal Naval Air Station on the East coast of Australia.

and unflinching devotion to duty have always merited high praise.

Act. Flt. Lt. D. J. ORAM, D.F.C., R.A.F.V.R., No. 617 Sqn.—This officer has completed numerous operational sorties and is now on his second tour of operations. He has participated in attacks against many heavily defended targets including five sorties against Berlin and two attacks against the *Tirpitz*. He attacked in daylight such vital targets as Brest, Lorient and La Pallice. Since the award of the D.F.C. he has continued to maintain a high standard of leadership, courage and devotion to duty which have won the admiration and confidence of all his crew.

Act. Flt. Lt. D. A. SHAW, D.F.C., R.A.F.V.R., No. 550 Sqn.—Throughout an extended tour of operations, Flt. Lt. Shaw has proved himself to be a skilful pilot and a gallant captain of aircraft. He has taken part in attacks on a wide variety of targets, ranging from heavily defended industrial areas to tactical objectives in France and the Low Countries. His example of courage and determination has been an inspiration to the entire squadron.

Act. Flt. Lt. J. WOULD, D.F.C., R.A.F.V.R., No. 97 Sqn.—As air bomber, Flt. Lt. Would has completed a large number of sorties, many of which have penetrated deeply into enemy territory with excellent results. When his crew had completed its tour of duty, this officer volunteered to remain with the squadron and flew on operations when even a spare crew member was required. His experience and tenacity have been invaluable and his calmness under fire a source of confidence to his crew. During two important missions to Darmstadt and Karlsruhe, Flt. Lt. Would, by his skill and accuracy contributed much to the success obtained.

F/O. J. W. G. EATON, D.F.C., R.A.F.V.R., No. 105 Sqn.—F/O. Eaton has completed a large number of operational missions since the award of the D.F.C. These have included attacks against a wide range of strongly defended targets. Throughout all these operations he has displayed outstanding courage and cool judgment, together with great tenacity of purpose and noteworthy airmanship. Despite enemy opposition, he has always shown the utmost determination to complete his mission successfully. By his consistently successful operational record he has set an excellent example to other pilots.

F/O. P. S. HOBBS, D.F.C., R.A.F.V.R., No. 608 Sqn.—F/O. Hobbs has displayed great courage and gallantry as a navigator during a large number of operational missions. He has always executed his allotted task with efficiency and coolness, even in the face of the heaviest defences. Since the award of the D.F.C. this officer has continued to display outstanding enthusiasm and determination during many successful sorties.

Distinguished Flying Cross

- F/O. K. A. BEATTIE, R.N.Z.A.F., No. 635 Sqn.
 F/O. T. R. PALMER, R.N.Z.A.F., No. 15 Sqn.
 F/O. A. McH. SPEEDY, R.N.Z.A.F., No. 158 Sqn.
 F/O. F. R. OKEY, R.N.Z.A.F., No. 153 Sqn.
 P/O. R. L. BREMER, R.N.Z.A.F., No. 158 Sqn.
 P/O. S. R. McLAUGHLIN, R.N.Z.A.F., No. 149 Sqn.
 P/O. K. D. SINCLAIR, R.N.Z.A.F., No. 158 Sqn.
 P/O. W. O. J. WALKER, R.N.Z.A.F., No. 166 Sqn.
 P/O. H. J. HAMMOND, R.N.Z.A.F., No. 102 Sqn.
 Act. Flt. Lt. G. S. WHYTE, R.N.Z.A.F., No. 170 Sqn.
 F/O. J. L. BIRTLES, R.N.Z.A.F., No. 619 Sqn.
 F/O. A. G. CHATFIELD, R.N.Z.A.F., No. 514 Sqn.
 Flt. Lt. I. P. J. MASKILL, R.N.Z.A.F., No. 1 Sqn.
 Act. Sqn. Ldr. M. R. D. HUME, R.N.Z.A.F., No. 130 Sqn.
 Act. Sqn. Ldr. K. J. MACDONALD, R.N.Z.A.F., No. 222 Sqn.
 Flt. Lt. L. GASSON, R.N.Z.A.F., No. 107 Sqn.
 Flt. Lt. O. D. STAPLE, R.N.Z.A.F., No. 107 Sqn.
 Flt. Lt. W. H. WASEY, R.N.Z.A.F., No. 226 Sqn.
 Act. Flt. Lt. J. H. STAFFORD, R.N.Z.A.F., No. 486 (R.N.Z.A.F.) Sqn.
 F/O. R. D. BREMNER, R.N.Z.A.F., No. 486 (N.Z.) Sqn.
 F/O. D. F. CLARKE, R.N.Z.A.F., No. 485 Sqn.
 F/O. R. J. DANZEY, R.N.Z.A.F., No. 486 (N.Z.) Sqn.
 F/O. N. D. FREEMAN, R.N.Z.A.F., No. 180 Sqn.
 W/O. J. A. TAYLOR, R.A.F.V.R., No. 357 Sqn.
 W/O. E. R. B. WOODHOUSE, R.A.F.V.R., No. 60 Sqn.
 Act. W/O. F. O. A. DAWKINS, R.A.F.V.R., No. 97 Sqn.
 Act. Flt. Lt. J. G. MIDDLEMASS, R.C.A.F., No. 35 Sqn.
 Flt. Lt. N. L. HOSEBLADE, R.C.A.F., No. 190 Sqn.
 Flt. Lt. A. SUTHERLAND - BROWN, R.C.A.F., No. 177 Sqn.
 F/O. W. P. MALONEY, R.C.A.F., No. 625 Sqn.
 F/O. F. W. MATTHEWS, R.C.A.F., No. 90 Sqn.
 F/O. J. E. MOFFATT, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
 F/O. W. G. MULDOWNY, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
 F/O. L. J. L. MARCEL PAPINEAU, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
 F/O. J. H. PEACH, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
 F/O. B. L. PETERSON, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
 F/O. T. R. PETERSON, R.C.A.F., No. 138 Sqn.
 F/O. J. D. ROBERTSON, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
 F/O. R. A. ROBINSON, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
 F/O. F. W. ROSE, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
 F/O. H. L. RUFFELL, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
 F/O. S. D. SANDERS, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
 F/O. P. D. SAUNDERS, R.C.A.F., No. 166 Sqn.
 F/O. P. D. SCANLAN, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
 F/O. S. J. SINCLAIR, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
 F/O. A. G. SQUIBB, R.C.A.F., No. 49 Sqn.
 F/O. I. A. STEVENSON, R.C.A.F., No. 550 Sqn.
 F/O. R. B. TIBBS, R.C.A.F., No. 101 Sqn.
 F/O. F. L. J. TINEVEZ, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
 F/O. R. E. A. TONNELIER, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
 F/O. C. W. TRUAX, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
 F/O. W. J. UNDERHILL, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
 F/O. R. J. C. WHETTER, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
 F/O. J. G. WIGLE, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
 F/O. M. G. WILLIAMS, R.C.A.F., No. 35 Sqn.
 F/O. R. WOODHOUSE, R.C.A.F., No. 433 (R.C.A.F.) Sqn.

SERVICE AVIATION

F/O. H. ZLOTNIK, R.C.A.F., No. 625 Sqn.
 Act. F/O. V. F. LEWIS, R.C.A.F., No. 158 Sqn.
 Act. F/O. T. H. LOVE, R.C.A.F., No. 192 Sqn.
 Act. F/O. T. C. MURPHY, R.C.A.F., No. 77 Sqn.
 Act. F/O. E. N. STARINK, R.C.A.F., No. 158 Sqn.
 P/O. L. G. ANDERSON, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
 P/O. J. V. BOUZEK, R.C.A.F., No. 578 Sqn.
 P/O. R. V. CURRIE, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
 P/O. D. R. GIBSON, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
 P/O. J. J. J. GUILBEAULT, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
 P/O. E. C. HILL, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
 P/O. C. C. HUFF, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
 P/O. D. R. IDLER, R.C.A.F., No. 12 Sqn.
 P/O. M. KUTYN, R.C.A.F., No. 10 Sqn.
 P/O. C. N. LEA, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
 P/O. G. E. LINCOLN, R.C.A.F., No. 76 Sqn.

Distinguished Flying Medal

Flt. Sgt. A. F. ANDERSON, R.A.F.V.R., No. 102 Sqn.
 Flt. Sgt. C. H. BARRON, R.A.F.V.R., No. 582 Sqn.
 Flt. Sgt. A. J. BOLTON, R.A.F.V.R., No. 102 Sqn.
 Flt. Sgt. H. W. A. BUDDEN, R.A.F.V.R., No. 158 Sqn.
 Flt. Sgt. H. T. BYSOUTH, R.A.F.V.R., No. 15 Sqn.
 Flt. Sgt. R. E. CATT, R.A.F.V.R., No. 635 Sqn.
 Flt. Sgt. G. F. CHANCE, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. R. G. CHAPMAN, R.A.F., No. 622 Sqn.
 Flt. Sgt. R. COOKE, R.A.F.V.R., No. 51 Sqn.
 Flt. Sgt. D. H. COTTERILL, R.A.F.V.R., No. 218 Sqn.
 Flt. Sgt. F. W. EDMONDSON, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. J. R. FLOYDE, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. L. FREEMAN, R.A.F.V.R., No. 635 Sqn.
 Flt. Sgt. S. R. GALE, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. G. IRVINE, R.A.F.V.R., No. 7 Sqn.
 Flt. Sgt. H. A. JAMES, R.A.F.V.R., No. 195 Sqn.
 Flt. Sgt. R. G. LAMBERT, R.A.F.V.R., No. 185 Sqn.
 Flt. Sgt. T. M. LAPPIN, R.A.F.V.R., No. 7 Sqn.
 Flt. Sgt. G. LEWIS, R.A.F.V.R., No. 102 Sqn.
 Flt. Sgt. A. H. MCCARTNEY, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. V. J. MCCLOSKEY, R.A.F.V.R., No. 156 Sqn.
 Flt. Sgt. J. R. MCFARLANE, R.A.F.V.R., No. 186 Sqn.
 Flt. Sgt. MCLEAN, R.A.F.V.R., No. 635 Sqn.
 Flt. Sgt. G. MCQUEAN, R.A.F.V.R., No. 156 Sqn.
 Flt. Sgt. D. MARSHALL, R.A.F.V.R., No. 465 (R.C.A.F.) Sqn.
 Flt. Sgt. D. MICKLETHWAITE, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. T. MORRIS, R.A.F.V.R., No. 218 Sqn.
 Flt. Sgt. L. NICHOLSON, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. J. H. PARKER, R.A.F.V.R., No. 635 Sqn.
 Flt. Sgt. G. H. PARSONS, R.A.F.V.R., No. 35 Sqn.
 Flt. Sgt. F. DOBSON, R.A.F.V.R., No. 189 Sqn.
 Flt. Sgt. G. W. JACKSON, R.A.F.V.R., No. 575 Sqn.
 Flt. Sgt. R. SEDDON, R.A.F.V.R., No. 575 Sqn.
 Flt. Sgt. S. W. A. DUNBAR, R.A.F., No. 10 Sqn. (since deceased).
 Flt. Sgt. E. D. MACPHERSON, R.A.F.V.R., No. 83 Sqn. (since deceased).
 Sgt. K. B. REEVES, R.A.F.V.R., No. 12 Sqn. (since deceased).
 Sgt. J. RINGWOOD, A.A.F., No. 625 Sqn. (since deceased).
 Sgt. G. Y. NISBET, R.A.F.V.R., No. 185 Sqn.
 Flt. Sgt. S. G. BOYES, R.A.F.V.R., No. 40 Sqn.
 Flt. Sgt. H. T. S. JONES, R.A.F.V.R., No. 10 Sqn.
 Flt. Sgt. J. L. SHIELDS (later P/O.), R.A.F.V.R., No. 15 Sqn. (since deceased).
 Act. Flt. Sgt. F. C. MILTON (later P/O.), R.A.F.V.R., No. 83 Sqn. (since deceased).
 Flt. Sgt. J. H. O'KANE, R.A.F.V.R., No. 502 Sqn.
 Flt. Sgt. J. W. SHOWELL, R.A.F.V.R., No. 524 Sqn.
 Flt. Sgt. G. W. TURNER, R.A.F.V.R., No. 236 Sqn.
 Flt. Sgt. R. FERGUSON, R.A.F.V.R., No. 11 Sqn.
 Flt. Sgt. E. HASKINS, R.A.F.V.R., No. 240 Sqn.

Roll of Honour

Casualty Communiqué No. 526.

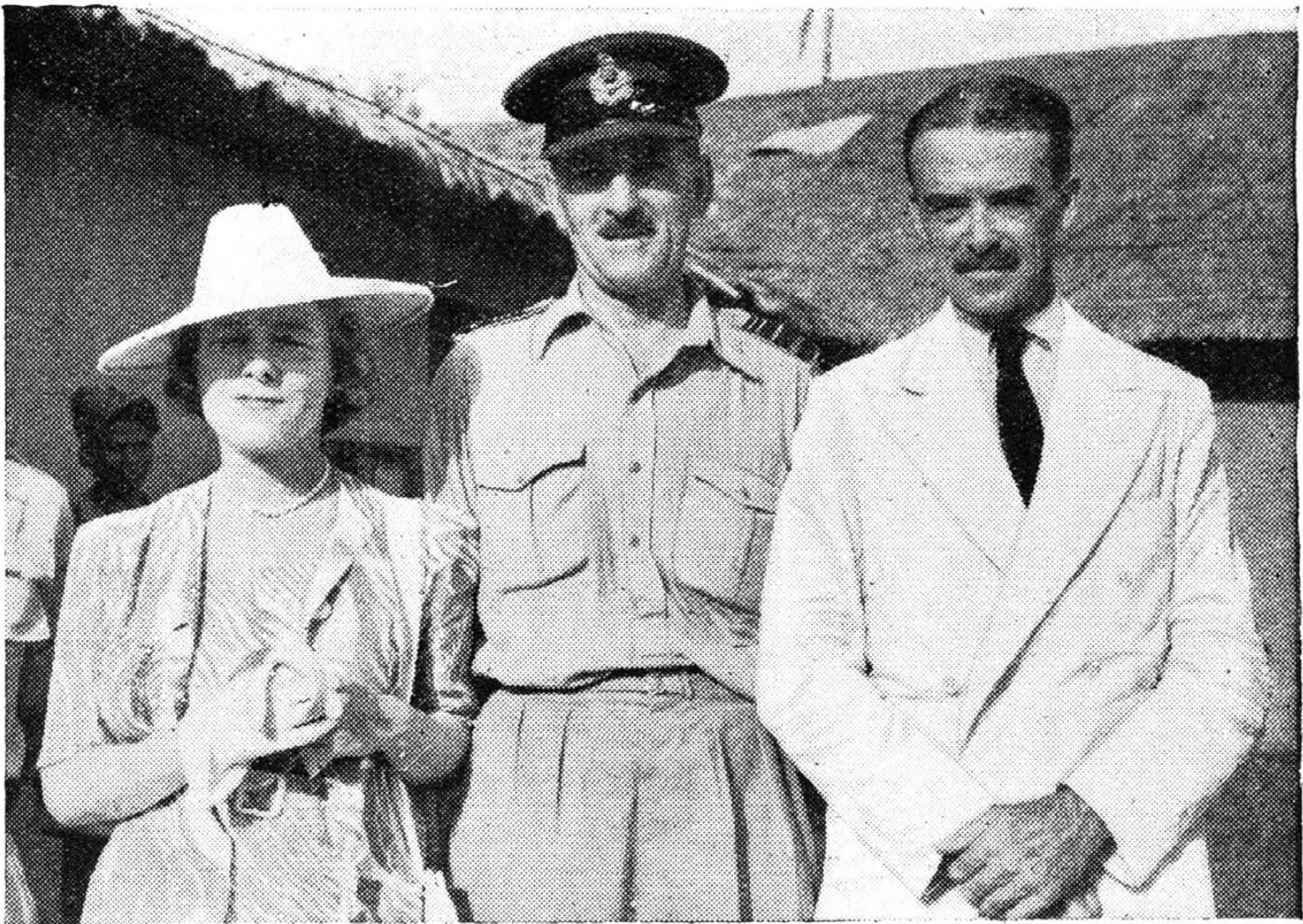
THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of these 196 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—F/O. D. A. J. W. Ball, D.F.M.; F/O. C. Coombes; Group Capt. A. C. Evans-Evan, D.F.C.; Flt. Lt. W. C. Fitch, D.F.C.; Sgt. C. S. Ford; F/O. S. Marsh; F/O. C. E. Merrett; Flt. Sgt. R. J. Takle; Sqn. Ldr. W. G. Wishart.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. D. E. Balsdon; Sgt. G. J. Burns; Flt. Sgt. A. B. Christie; Sgt. L. F. Death; Flt. Sgt. R. S. L. Walters.



Mrs. Casey, Air Marshal Coryton and Mr. R. G. Casey, the Governor of Bengal, during a visit by the latter to an R.A.F. photographic reconnaissance unit in connection with the air photography of Calcutta's slum area.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—W/O. R. H. Adams; Sgt. P. D. V. Ager; F/O. A. K. Aiken; Flt. Sgt. T. Ashton; Sgt. A. C. Barrett; Flt. Sgt. E. Bates; Sgt. E. A. Bland; Sgt. D. F. Bowthorpe; Flt. Lt. J. H. Bracewell; Sgt. A. S. Broadbent; Sgt. W. H. Broadmore; Flt. Sgt. E. M. Buckingham; Sgt. N. V. Burgess; Flt. Lt. H. C. Butler; Flt. Sgt. H. R. Butterworth; P/O. D. Carbutt; Sgt. A. G. Chandler; Flt. Sgt. W. Chapman; W/O. S. Clarke; Sgt. J. H. Clayton; P/O. W. D. Coates, D.F.M.; Sgt. R. C. Collings; F/O. D. A. Colombo, D.F.C.; Sgt. L. W. Cox; Sgt. J. N. Craig; Sgt. W. R. Crompton; Sgt. R. N. Cunningham; Sgt. J. Davies; Flt. Lt. W. E. Dawes; F/O. H. A. Devon; F/O. C. J. Dineen; Sgt. L. H. J. Dixon; Sgt. D. Dushman; Flt. Sgt. R. D. Falconer; Sgt. A. W. V. Farley; Flt. Sgt. E. A. Farnell; Sgt. R. J. Faulkner; Sgt. F. E. Fountaine; Sgt. F. H. Fowler; Flt. Lt. E. Francis, D.F.C.; Sgt. A. A. F. Goddard; F/O. L. F. Green; Sgt. J. Hamlin; P/O. R. A. Hanks; Sgt. G. W. Henson; Sgt. C. W. Hicks; Sgt. A. A. Holmes; W/O. R. Howells; F/O. A. B. Hunter; Sgt. B. M. Jacques; W/O. J. A. Jenkinson; Sgt. A. J. Johnson; Sgt. A. O. Johnston; Sgt. P. H. Kano; Sgt. J. W. Kearley; P/O. L. G. Kellow; Sgt. A. Kennedy; Flt. Sgt. L. Lockwood; Flt. Sgt. G. T. A. Lovell; Flt. Sgt. J. McC. McMaster; Sgt. C. D. F. Mackenzie; Flt. Sgt. J. Miller; Sgt. R. Millns; F/O. M. N. Milner; Flt. Sgt. K. G. Mitchell; Flt. Lt. T. Neilson, D.F.C.; Sgt. B. H. Nicholas; Sgt. R. G. Norris; Sgt. H. N. Norton; Sgt. J. R. Nutman; Flt. Sgt. S. Nuttall; Sgt. H. A. Osborn; Sgt. E. Osborne; Flt. Sgt. K. A. Oswald; Sgt. E. W. Palmer; P/O. C. W. Pantou; Sgt. W. G. Perrie; Sgt. J. Porrelli; Sgt. G. T. Probert; P/O. C. F. Prowles; Sgt. F. N. Rice; Flt. Lt. G. Richardson; Sgt. T. K. Rigby; Sgt. S. Robson; Sgt. F. C. Ryall; Sgt. S. J. Saunders; Sgt. B. H. Schofield; Sgt. R. P. Scott; Sqn. Ldr. J. L. Shaw; P/O. W. M. Shaw; Sgt. H. E. Short; F/O. L. Simpson; F/O. R. H. Smart; P/O. A. Snell; Flt. Sgt. M. C. Spice; Sgt. F. Stanton; Sgt. J. Stevens; F/O. R. H. Stevens; Flt. Sgt. J. H. Storey; Sgt. R. Surtees; Sgt. D. F. O. Synnott; Sgt. F. Thompson; Sgt. J. S. Thompson; Sgt. G. H. Thornton; F/O. A. Thorpe; Sgt. R. F. Torrance; Sgt. G. S. Vaughan; F/O. N. J. Wakeham; Sgt. C. Walker; Sgt. A. L. Wangler; Flt. Sgt. M. A. Ward; Sgt. R. C. Waters; Sgt. T. C. Watson; Flt. Sgt. R. A. Webb; Sgt. H. West; Flt. Sgt. L. J. H. Whitebread; Sgt. R. Whitelaw; Flt. Sgt. I. G. Williams; Sqn. Ldr. C. H. Wilson, D.F.C.; Sgt. L. J. Witcomb; Flt. Sgt. R. F. Yates; Sgt. W. L. York.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. G. R. Munton.

WOUNDED OR INJURED IN ACTION.—Sgt. A. Gibb; F/O. A. F. Woodcock.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. R. G. Clifford; W/O. W. A. Livesley; Flt. Sgt. N. H. W. Stuart.

MISSING.—Flt. Sgt. S. R. Allen; Sgt. J. R. Alves; Flt. Sgt. A. F. Barratt; Sgt. H. T. Batten; P/O. R. Blackley; Sgt. J. B. F. Brown; Flt. Sgt. A. M. Brunton; Sgt. M. A. Callaghan; Sgt. J. M. Cartmell; Flt. Sgt. J. F. Carvell; Flt. Sgt. G. A. Chugg; Sgt. N. A. Clarke; F/O. J. Cockburn, D.F.M.; Sgt. G. Cole; Flt. Sgt. P. S. Cooper; Sgt. T. F. Creedy; Flt. Sgt. W. E. Dalby; F/O. G. E. Barking; Sgt. E. R. Davis; Sgt. J. Devlin; Sgt. J. A. Doherty; Sgt. W. Dolan; Sgt. C. S. Drake; F/O. F. S. Eastwell; Sgt. H. J. Erben; P/O. W. J. Gibbs; F/O. D. S. Gladstone; Sgt. M. C. Godfrey; Sgt. L. W. Greaves; Sgt. B. R. Hasler;

F/O. P. H. Hatcher; Flt. Sgt. J. S. Henderson; P/O. W. Hooper; Flt. Lt. H. G. Hurrell; Sgt. R. G. B. Hyslop; Flt. Sgt. W. Irwin; Sgt. L. J. Jeffrey; F/O. J. Johnson; Flt. Lt. E. L. Jones; Sgt. R. Jones; Sgt. F. Kendall; Flt. Sgt. R. A. Lane; Sgt. H. G. Lawley; Flt. Sgt. E. F. Lea; Sgt. G. A. Letts; Flt. Sgt. K. F. Lord; Flt. Lt. A. A. McIntyre; Sgt. R. McRae; Flt. Lt. H. K. Mepham; Flt. Lt. H. E. Miller; Sgt. C. L. Milner; Flt. Sgt. G. A. C. Morgan; Sgt. D. Mortimer; F/O. C. H. Mottershead; Flt. Sgt. D. P. Murnane; Sgt. A. Nicholson; Sgt. J. O'Brien; Sgt. O. O'Rourke; Flt. Sgt. K. Parkin; Flt. Sgt. E. Parkinson; Flt. Sgt. R. Patterson; Sgt. G. N. Pearce; Flt. Lt. G. R. Phelps; F/O. G. Phillips; Flt. Lt. D. Potts; Sgt. T. A. Purvis; F/O. L. J. Rich; Sgt. W. D. Rich; Flt. Lt. P. C. W. Sage, D.F.C.; Sgt. A. J. Sayers; P/O. A. Sharman; Sgt. J. Shearer; Flt. Sgt. E. W. Sinkinson; Sgt. J. A. Slater; F/O. J. B. Spence; Sgt. E. Spencer; Sgt. G. A. Stephens; Sgt. R. C. Stokes; F/O. A. W. Stuart; Flt. Sgt. E. J. Summerfield; Sgt. R. T. Terry; Flt. Sgt. A. E. Tyreman; Sgt. F. Valentine; Sgt. H. MacD. Walcott; Sgt. J. P. Watson; Flt. Lt. W. W. Watt; Sgt. F. W. Webster; Flt. Sgt. W. F. Webster; Sgt. E. Wheeler; Sgt. H. E. Whyles; Sgt. C. Wilkins; Sgt. W. M. Wilkinson; Flt. Sgt. K. C. Williams; Flt. Sgt. R. G. Williams; Sgt. R. E. A. Winstone; Flt. Sgt. J. Woodhouse.

KILLED ON ACTIVE SERVICE.—Flt. Lt. A. I. Albertson; Flt. Lt. M. Corrie, D.F.M.; W/O. W. E. Fielder; L.A./C. R. Latham; P/O. J. W. Marshall; Sgt. C. J. Masefield; Sgt. J. Mellor; Sgt. A. A. Pardoe; Flt. Sgt. G. Strong; P/O. K. R. Tatham.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. D. S. Green; P/O. J. B. Murphy; Sgt. D. Oliver.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A./C. G. A. Brown; Sgt. O. M. Ormond.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Cpl. T. Davies; L.A./C. P. McGinn.

DIED ON ACTIVE SERVICE.—L.A./C. W. J. Barker; L.A./C. W. Barton; Flt. Sgt. F. Collie; L.A./C. G. W. Croot; Cpl. L. J. Cropley; Sgt. H. McConkey; Cpl. D. V. Shepherd; Cpl. N. H. Wilshaw.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. G. R. Balcombe; Flt. Sgt. J. Daley; Flt. Sgt. J. R. Everett; Flt. Sgt. R. C. Ferguson; W/O. H. S. Fidge; P/O. K. J. Godwin; Flt. Sgt. F. A. Hennessey; P/O. P. W. Hewitt; Flt. Sgt. C. B. Hopgood; F/O. C. J. Johnson; Flt. Sgt. F. T. Langley; Flt. Sgt. L. A. Laver; P/O. K. H. McKnight; W/O. A. N. D. McPhee; W/O. J. F. Moran; F/O. W. H. Murray; Flt. Sgt. S. J. Nelson; F/O. M. G. Pepper; Flt. Sgt. N. J. Randell; P/O. F. P. Stanger; P/O. E. L. Woolcott.

MISSING, BELIEVED KILLED IN ACTION.—W/O. R. A. Denholm.

MISSING.—F/O. A. J. Bloy; Flt. Sgt. K. T. Brown; F/O. T. N. Downes; Flt. Sgt. W. W. Foy; Flt. Sgt. J. M. Gerrard; W/O. H. V. Gordon; Flt. Sgt. K. Gowlett; F/O. C. S. Hart; Flt. Lt. J. H. Holmes; P/O. A. A. McGrath; F/O. A. J. McMahon; F/O. L. E. Murray; Flt. Lt. W. F. Neubeck; Flt. Sgt. D. J. Paterson; Flt. Sgt. G. W. Rankin; Flt. Sgt. T. A. Thomson.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. J. Eaton; F/O. E. M. England, D.F.C.; F/O. M. L. Hubbard.

SERVICE AVIATION

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. F. Anderson; P/O. N. Baker; P/O. R. H. Cameron; F/O. A. P. Campbell; P/O. J. C. Corbally; P/O. J. B. Durne; F/O. J. F. Fennessey; P/O. D. I. Gage; P/O. J. A. Greenidge; P/O. L. M. Hawkes; P/O. N. H. Jones; F/O. J. I. Labow; F/O. T. W. Lavery; P/O. F. G. Lebrano; F/O. R. F. Litchfield; F/O. T. C. McGowan; Sgt. D. V. McIntyre; F/O. W. N. McPhee; F/O. I. H. Nicolson; P/O. C. J. E. O'Neill; F/O. H. W. Pond; F/O. E. K. Reid; Flt. Lt. V. T. Robinson; F/O. M. Shapiro; P/O. J. J. H. Sheahan; W/O. D. M. Thorpe; F/O. I. J. Toppings; P/O. J. A. Whittaker; P/O. A. E. Yarrington.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—P/O. G. J. Young.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. R. S. Davis; F/O. R. W. Ledger.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. E. S. Jacques; P/O. H. J. McLean; P/O. A. D. Morton; Flt. Lt. R. R. Perry.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. S. D. Muir; F/O. F. W. MacD. Stout.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—W/O. W. H. Cooke; Sqn. Ldr. A. H. Green.

MISSING.—F/O. S. A. J. Askew; F/O. L. D. Gilbertson; W/O. R. J. Graham.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. A. W. C. Gledhill.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. A. Hodge.

South African Air Force

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Capt. J. V. Rockford. MISSING.—W/O. A. L. Anderson; Capt. T. A. Harris; Lt. F. D. Kane; W/O. C. M. L. Kruger; Lt. A. McD. Thomsen.

Casualty Communiqué No. 527

Of the names in this list 155 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. A. Ainsley; Flt. Sgt. J. McK. Alfred; Flt. Sgt. C. E. Cox; Sgt. W. E. Davies; Flt. Sgt. E. Dixon; Wing Cdr. P. F. Dunham, D.F.C.; Flt. Sgt. J. W. Kenny; Sgt. E. R. Knowles; Sgt. J. H. Law; F/O. J. C. Liddiard; Sgt. J. McLuskey; Sgt. G. W. McManus; Sgt. W. H. Marshall; Sgt. J. C. Monaghan; P/O. T. F. Morrison; P/O. R. F. Newberry; Sgt. F. H. Saffill; F/O. F. W. Snapes; Sgt. K. F. Stocker; F/O. P. W. Sutton.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. H. E. Bowen; Flt. Sgt. S. H. D. Brendon; Flt. Sgt. T. H. Duff; Sgt. J. E. Emmett; F/O. J. V. MacDonald; F/O. A. E. G. Malin; F/O. B. G. Sheldon; Sgt. R. Treveltham.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. W. I. Adamson; Sgt. C. Bailey; Flt. Sgt. W. S. Bancroft; Sgt. R. Bartram; Sgt. P. R. Beilby; Sgt. P. F. Butler; Sgt. R. A. Castle-Hall; P/O. F. Colville; Sgt. J. R. Cowell; Sgt. L. J. Craven; Sgt. S. G. Fielder; Sgt. A. B. Freemantle; F/O. A. J. Gapper; F/O. J. G. Gray; W/O. H. E. L. Griffiths; Flt. Sgt. G. L. Grimes; Flt. Lt. A. E. Grubb; Sgt. T. H. Guest; Sgt. W. F. Harrison; Sgt. H. L. Hepworth; Sgt. C. M. Hill; Sgt. A. W. Hughes; Sgt. T. Hughes; Sgt. D. W. Jennings; Flt. Sgt. E. J. Kemish, D.F.M.; Sgt. J. Kilgour; P/O. E. McC. Kippen; Sgt. J. W. Lane; Sgt. J. A. Lauder; Sgt. H. Lees; F/O. J. J. Logan; Sgt. J. Macfie; Sgt. T. McKinstry; Flt. Sgt. J. R. Maidment; Sgt. W. Melrose; Sgt. J. D. Morris; Flt. Sgt. V. V. Mortlock; Sgt. J. D. Murphy; Flt. Sgt. D. C. Newman; Sqn. Ldr. T. M. Nicholls; Sgt. J. T. Nixon; Sgt. G. T. Osborne; F/O. C. R. Phillips; Sgt. F. Phillips; Flt. Lt. R. W. Pickett; Sgt. A. W. Price; Sgt. J. E. Prosser; Sgt. H. R. Pursglove; Sgt. J. Rhodes; Sgt. G. Shutt; Sgt. C. N. Stalker; Sgt. H. V. D. Thompson; F/O. I. A. Turnbull; Sgt. N. L. Wallis; F/O. J. Watson; Sgt. E. N. Whitfield; Sgt. K. P. C. Williams; F/O. L. Wolfson; P/O. J. R. S. Wood; Sgt. A. F. Woolley; Sgt. N. Worboys; Flt. Sgt. G. L. Wright.

WOUNDED OR INJURED IN ACTION.—Sgt. S. B. Bridgman; Sgt. K. D. Baracatt; F/O. R. Breakwell; Flt. Sgt. D. R. C. Glossop; Flt. Lt. R. J. Hampshire; Sgt. H. Hark; Flt. Sgt. D. R. Mustoe; Flt. Sgt. E. A. Stead; Sgt. E. J. V. Thompson.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. J. L. Duke; Sgt. J. B. Pridding; F/O. J. Yates.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. A. P. Mann

MISSING.—P/O. R. B. T. Adams; Flt. Sgt. E. C. Bangs; Flt. Sgt. P. T. Barlow; Sgt. D. Bates; Sgt. J. E. Bennett; Sgt. C. E. Billard; Flt. Lt. G. H. Borham; Sgt. J. E. Bozeat; Wing Cdr. M. A. Brogan, D.F.C.; F/O. W. G. Brooks; Sgt.

E. Buckley; F/O. H. F. J. Carlton; Flt. Sgt. T. S. Carr; W/O. K. J. Clarke; F/O. N. Clarke; Sgt. R. H. Conning; Sgt. H. Connor; P/O. F. A. Cresswell; F/O. S. G. Crow; F/O. K. L. Cutts; P/O. L. F. Davis; F/O. A. W. Delieu; F/O. P. Donnelly; F/O. D. H. Fenner; Flt. Sgt. R. B. Goldsmith; W/O. E. E. Gray; F/O. A. Harman; Flt. Sgt. B. W. Harris; Flt. Sgt. L. B. Horrax; F/O. E. G. Hull; W/O. D. K. Jordan; Flt. Sgt. R. S. Lewis; F/O. D. H. P. Lott; Sgt. K. McKirgan; F/O. J. P. MacWilliams; W/O. F. Mahoney; Sgt. J. M. M. Millar; Flt. Sgt. R. Morgan; Flt. Sgt. J. M. Murray; Sgt. L. A. Page; Flt. Lt. A. D. Pelly; Flt. Lt. B. F. Prodow; W/O. J. M. Roberts; Flt. Sgt. R. Rome; Sgt. J. D. Routledge; Flt. Lt. H. O. Sharman, D.F.C.; F/O. D. F. Sinfield; Flt. Lt. N. F. Snelson; Flt. Lt. L. J. Trapp; W/O. A. T. Wainwright; Sgt. C. J. Walden; F/O. F. J. Watson; F/O. H. T. Wigley, D.F.C.; Flt. Lt. L. A. Wood; F/O. P. A. G. Ythier.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. W. G. Impey; Sgt. S. A. Parsons; Sgt. J. Scott.

KILLED ON ACTIVE SERVICE.—P/O. H. Anderson; Flt. Lt. L. R. Bacon, D.F.C.; Flt. Sgt. H. W. Bennett; Sgt. H. E. Benwell; Sgt. R. W. Biggs; Sgt. A. Bladon; F/O. G. F. Churchman; Sgt. A. L. Cleaver; Sgt. G. W. Dixon; Flt. Lt. P. J. Donnelly; Flt. Sgt. D. W. Dunthorne; Flt. Sgt. E. V. Emmins; Sgt. W. Essex; Flt. Lt. K. D. Faulkner, D.F.C.; Sgt. E. Glover; Sgt. D. Grant; P/O. G. H. Hawkey; Flt. Sgt. H. Hayes; Flt. Lt. T. W. Heath; Flt. Sgt. H. B. Jones; F/O. D. F. Law; Sgt. R. Leigh; Sgt. R. F. Luck; F/O. E. R. Matthews; F/O. W. W. Miller, D.F.C.; Sgt. J. W. G. Moncaster; Sgt. J. E. Morgan; Sgt. F. J. Plant; Flt. Lt. A. J. Roberts; Sgt. J. V. Roberts; Sgt. J. V. Robinson; Flt. Sgt. J. Ross; Flt. Lt. J. B. Sayers, A.F.C.; F/O. P. G. Sim; Flt. Lt. M. J. M. Slater; L.A./C. W. R. Tambling; Sgt. P. F. Thorns; P/O. W. J. Trice; Flt. Lt. D. F. Turnbull; Sgt. H. Vaudrey; Sgt. S. J. Webb; F/O. P. N. Young.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A./C. J. J. Beech; F/O. P. C. E. Cox; Flt. Sgt. D. H. Gordon; Sgt. W. Howden; Flt. Lt. M. R. S. MacKay, D.F.C.; Flt. Sgt. T. V. W. Rigby.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Lt. G. B. Earle; L.A./C. J. Lewis; Sgt. K. R. Martin; F/O. B. C. Roberts, D.F.C.; Sgt. B. W. Smith.

DIED ON ACTIVE SERVICE.—L.A./C. B. Burnell; L.A./C. C. H. Higgins; L.A./C. A. King; Cpl. E. S. Lawrence; A/C.1 E. Mills; L.A./C. L. A. Newham; L.A./C. E. A. Sizer; L.A./C. H. G. Wilson.

Royal Australian Air Force

KILLED IN ACTION.—W/O. L. B. Holmes; P/O. P. B. Manton.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. G. R. Barker; Flt. Lt. J. R. Beckett; Flt. Sgt. J. W. J. Buckland; Flt. Sgt. W. S. Cook; Flt. Lt. H. A. L. Ellis, D.F.C.; P/O. J. W. Fisher; P/O. D. Fletcher; P/O. R. A. Glasson; Flt. Sgt. D. V. Harvey; Flt. Sgt. T. King; Flt. Sgt. N. A. McAllister; Flt. Sgt. J. R. McGrath; F/O. O. S. MacPhillamy; W/O. F. E. Muller; Flt. Sgt. R. D. Murdoch; Flt. Sgt. N. L. Newell; Flt. Sgt. R. G. O'Neill; W/O. D. H. Padman; F/O. A. L. Pearall; P/O. D. A. Priddle; Flt. Sgt. B. E. Rawlings; F/O. J. Roberts; Flt. Sgt. J. S. Scott; Flt. Sgt. F. L. Webster; Flt. Sgt. M. D. H. Williams; F/O. F. M. Wilson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—P/O. C. J. Girling; Flt. Sgt. M. L. Wood.

MISSING.—Flt. Sgt. O. B. Elliott; F/O. F. J. Howells; W/O. W. G. Pearce.

KILLED ON ACTIVE SERVICE.—F/O. J. E. Gibberd, D.F.C.; Flt. Sgt. A. G. Shaddick.

Royal Canadian Air Force

KILLED IN ACTION.—Flt. Sgt. G. J. L. Barnes; Flt. Lt. R. G. Charlton; P/O. W. Fedorchuk; F/O. W. R. Thomson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. D. K. Adair; Flt. Lt. W. A. Black, A.F.C.; Flt. Lt. W. J. Mahagan; Flt. Lt. E. E. Tribble; F/O. G. G. Welch; P/O. J. S. Winder.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. A. Anderson; Flt. Sgt. W. S. A. Birks; P/O. J. D. Bishop; P/O. A. E. C. Boehmer; F/O. J. S. Brown; P/O. G. A. Bullock; F/O. W. D. Carson; P/O. R. D. Davidson; F/O. D. Elphick; P/O. T. G. Evans; W/O. J. C. Francis; Sgt. J. Geddes; P/O. W. A. Good; P/O. J. M. Hickey; F/O. L. G. Hill; P/O. F. C. Hollenbeck; P/O. F. R. Hopkins; P/O. O. P. Hughes; F/O. R. C. Leckie; W/O. W. G. McClelland; P/O. A. D. MacKay; Flt. Lt. J. A. MacKellvie; F/O. K. A. Moderwell; Flt. Sgt. P. O. K. Noren; W/O. S. A. Motriuk; W/O. W. H. Oakley; P/O. W. H. Pool; Flt. Sgt. A. Rodd; P/O. B. A. M. Rutherford; W/O. A. J. Ryan; F/O. G. R. G. Shannon; F/O. J. F. E. Tabor; F/O. J. Wenger; F/O. G. A. White; W/O. R. J. Wilson; P/O. S. Young.

MISSING.—Flt. Lt. F. C. Aldworth; F/O. D. A. Bayley; Flt. Sgt. S. E. Bostwick; W/O. D. J. Campbell; Flt. Sgt. G. S. Guthrie; F/O. C. E. S. Hamlyn-Louis; F/O. L. E. Long; P/O. R. J. McCallum; F/O. A. J. MacLeod; Flt. Sgt. K. C. McMurphy; F/O. T. Metcalfe; Flt. Sgt. K. A. Miller; P/O. E. E. Newell; Flt. Lt. R. J. Radcliffe; F/O. K. W. Rainford; F/O. E. E. Reaney; F/O. J. D. Sharples, D.F.C.; Flt. Lt. J. W. Slater; Flt. Sgt. V. B. Smith; F/O. R. A. Thorne.

KILLED ON ACTIVE SERVICE.—P/O. G. J. Gray; F/O. J. C. Howden; Flt. Lt. J. N. Punshon; F/O. M. E. L. Scovell; F/O. A. F. Whitney.

WOUNDED OR INJURED ON ACTIVE SERVICE.—W/O. B. Ridding.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Lt. R. T. Hyde.

Royal New Zealand Air Force

KILLED IN ACTION.—F/O. N. H. Thorpe. PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. W. R. Baillie; F/O. D. P. Bain; Flt. Sgt. J. L. Duffy; Flt. Sgt. C. G. Foster; F/O. W. F. Hughes; P/O. H. K. Kemp; P/O. M. Lammas; Flt. Sgt. D. N. Laxton; F/O. J. M. Mee, D.F.C.; Flt. Lt. K. B. O'Connor; P/O. B. C. Riddle.

MISSING.—P/O. J. A. Howard.

South African Air Force

WOUNDED OR INJURED IN ACTION.—2nd Lt. N. De Gruchy.

MISSING, BELIEVED KILLED IN ACTION.—Lt. J. W. Bailey.

MISSING.—Lt. M. F. W. Austin; Lt. R. H. R. Flack; Lt. L. Hingle.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Lt. A. G. Askew.

Official Corrections

Casualty Communiqué No. 519.

Under PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION, F/O MacKinnon's initials should read L. J.

Under MISSING, delete Sgt. A. T. Blackshaw and insert KILLED IN ACTION.

Delete Flt. Sgt. E. Ellis, F/O. D. L. Howell, Flt. Sgt. P. A. Murphy, Flt. Lt. H. D. Mitchell, F/O. G. J. North, Flt. Sgt. L. A. E. Papworth.

Under DIED ON ACTIVE SERVICE, Sgt. Marnock's initials should read J. G.

Under Royal Canadian Air Force KILLED IN ACTION, Flt. Sgt. A. G. Bradley should read P/O. F/O. D. A. Buchanan should read Flt. Lt. Flt. Sgt. J. A. Chismore should read P/O. F/O. W. R. Kearns should read Flt. Lt. Flt. Sgt. J. Leeming should read P/O. P/O. W. G. Whitton should read F/O.

Under MISSING, BELIEVED KILLED IN ACTION, F/O. W. G. Schroeder should read Flt. Lt.

Under MISSING, delete Flt. Lt. J. P. Barlow and insert under KILLED IN ACTION.

Flt. Sgt. P. F. English should read P/O.

Under MISSING, delete Flt. Lt. E. A. Magee.

Under Royal New Zealand Air Force MISSING, delete Flt. Sgt. C. C. Greenhough, Flt. Sgt. I. A. Horsley, Flt. Lt. W. L. Miller, and P/O. F. Moresby.

Casualty Communiqué No. 520.

Alter number of second entries to 147.

Under MISSING, BELIEVED KILLED IN ACTION, delete Flt. Sgt. F. J. Flattery and insert under KILLED IN ACTION.

Under MISSING, delete Flt. Sgt. W. P. R. Boobyer, Sqn. Ldr. J. W. Bradley, D.F.C., Flt. Sgt. L. W. Cromarty, D.F.M., F/O. J. Fletcher, P/O. G. Gray, Flt. Sgt. D. Hancock, F/O. F. S. Holly and F/O. A. G. Jeffrey.

Under MISSING, delete F/O. J. H. Lascelles, D.F.M., and insert under KILLED IN ACTION. Also delete Sgt. T. McKnight, F/O. K. Middlemast and F/O. E. Walker.

Under KILLED ON ACTIVE SERVICE, Flt. Sgt. J. Jones should read W/O. A/C.2 W. Walker should read L.A./C. Sgt. J. A. Woodgate should read Flight Sgt.

Under Royal Australian Air Force MISSING, delete Flt. Sgt. J. Harper and insert under KILLED IN ACTION.

Delete the heading PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR, and the name beneath.

Under Royal Canadian Air Force KILLED ON ACTIVE SERVICE, delete W/O. B. H. McLellan and insert under KILLED IN ACTION.

Under Royal New Zealand Air Force MISSING, delete F/O. D. G. L. Taylor and insert under KILLED IN ACTION.

Casualty List No. 522.

Under MISSING, delete Sgt. A. Burnett, Flt. Lt. G. P. Elliott, Sgt. S. Foster, Sgt. H. Mariner, F/O. A. R. Pewsey.

Under R.C.A.F. KILLED IN ACTION, Sgt. J. D. Campbell should read P/O. Flt. Sgt. G. M. Fetherston should read P/O. Sgt. C. E. Houston should read P/O. Flt. St. J. C. Laing should read P/O. Flt. Sgt. E. A. M. Sills should read P/O.

Under MISSING, delete Sqn. Ldr. W. M. Foster, Flt. Lt. R. W. Jones, F/O. J. R. Savard.

Casualty List No. 524.

Change to 146 are second entries.

Delete W/O. J. H. P. W. Crowther, P/O. T. Dillon, Sgt. F. G. Fox, Flt. Sgt. B. S. Hall, F/O. J. V. Malloch.

Delete Sgt. G. F. Rudge, P/O. J. MacF. Scott.

Delete three PRISONERS OF WAR.

Under R.A.A.F. MISSING, BELIEVED KILLED IN ACTION, W/O. J. Rensison should be under KILLED IN ACTION.

Under MISSING, delete Flt. Sgt. C. G. Cooper, F/O. B. Heffer, P/O. M. E. Jordan, Flt. Sgt. A. R. Main, Flt. Sgt. F. J. Sheridan, Flt. Sgt. R. C. Styles, W/O. A. N. Fletcher should read P/O.

Under R.C.A.F. MISSING, delete F/O. R. V. Dallin, F/O. C. J. Driscoll, Sgt. G. A. McLarty, Sgt. H. L. G. Mayer, Sgt. A. L. Morrison, Flt. Sgt. A. R. Williams.

P/O. W. H. Russell should be inserted under KILLED ON ACTIVE SERVICE.

Delete R.N.Z.A.F. PRISONER OF WAR.

Under S.A.A.F. MISSING, Lt. Aberdein should be inserted under DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION, and delete Capt. Snymon.