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CONTENTS

TRANSPORT COMMAND AIRCREW EXAMINING UNIT

WING COMMANDER R. C. E. SCOTT, AFC, *Officer Commanding TCAEU*

THE existence of the Examining Unit is by now well known to all the transport squadrons in this country, for it has visited all the Dakota squadrons and most of the York units. Overseas, however, it may not be so well known, although it has been referred to in recent articles in this REVIEW and in the AEROPLANE. This article is an attempt to explain the charter, the composition and the working methods of the unit, and so enable unit commanders and potential VIP crews to co-operate more easily.

The Transport Command Aircrew Examining Unit (formerly called the Transport Command Testing and Grading Unit) was formed at Headquarters Transport Command in late 1945, under Transport Command Training Instruction No. 8/45, which was in turn authorised by the Air Ministry. The unit did not, however, function until early in 1946, as there was much preliminary work to be done in the setting up of an examination scheme which would ensure adherence to the standards already laid down. These standards are fully described in Transport Command Air Staff Instructions, Volume IX, No. 4.

The first difficulty facing the unit was the selection of suitable examining personnel, for it will be appreciated that only officers with extensive experience of Transport Command work, together with intimate knowledge of

Dropping food-bags over the stricken areas of Chittagong Division, Eastern Bengal, after the disastrous 1946 floods. In this Division, 600 square miles were inundated. From July 15th onwards many of the marooned and endangered inhabitants were victualled from the air, the RAF placing four Dakotas at the disposal of the local inhabitants. The photograph opposite, an unusual composition in curves for emphasis of vigorous action, was taken by a staff photographer of THE CALCUTTA STATESMAN *in flight over the affected area on July 19th*

the aircraft currently in use, could undertake to examine crews in such a way that the examiner's judgment would be respected and his decisions accepted. So the unit was slowly built up by the withdrawal from Transport Command squadrons and elsewhere of experienced pilots, navigators, signallers and flight engineers. At present, the unit consists of eight pilots, four navigators, four signallers and four flight engineers, all of whom hold Category "A." There are vacancies for more pilots, although with its present strength the unit is able to categorise a cross-section of the Command's flying personnel.

Almost as soon as the unit began its work two notable misapprehensions were discovered to be widespread in the squadrons operating. These were, in the first place, that any candidate failing an AEU test was thereby debarred from receiving a higher category for six months, and, secondly, that the AEU would test all crews of every squadron.

Now that the unit has had dealings with the majority of home-based squadrons, these misapprehensions have been corrected, but in order to clear the minds of all transport personnel on these points it is as well to explain that both errors arose from a misreading of Air Staff Instructions. The first error arose because ASIs say that each member of an aircrew *must* be categorised once every six months ; there is, however, certainly nothing in the Air Staff Instructions to fix any minimum period between tests. The second error was even more unfortunate, for it led squadrons to expect far too much of the Examining Unit. Bearing in mind that the strength of the unit is only eight pilots, and the categorisation of squadron personnel is only one of the unit's several commitments, it is easy to see that the categorisation of up to forty crews in one squadron would occupy the AEU for such a time that the intervals between visits to each squadron in turn would be far too long. Therefore, the AEU can at present check only selected crews of each squadron, relying upon the squadron training organisation to check all remaining aircrew as part of its normal duty. Even so, the AEU's task is not unlike the painting of the Forth Bridge, for no sooner is a tour of all home-based squadrons completed than the first squadron checked is ready for a further visit. This situation is, of course, accentuated by the present high demobilisation rate which causes rapid and sweeping changes in the composition of crews in squadrons.

By the terms of the Training Instruction establishing the Aircrew Examining Unit, these tasks were given to it:

Testing on type of VIP personal pilots and crews, and others recommended by Air Officers Commanding for VIP duties. Testing on type of trunk route and communication squadron crews (to which were later added airborne forces crews). Checking transport crews on operational flights on the established routes. Observing and reporting on the standard of squadron training and of training officers and leaders. Testing ferry crews to ascertain their standard of efficiency, and studying and reporting on the level of uniformity of standard of examination, and testing for aircrew categorisation at all Transport Command units. In turn, these tasks were broken down into several components. For instance, a test of a VIP or personal crew now comprises seven written examinations, two oral examinations, three flight tests on the aircraft type, a route test in which twenty-one checks must be made, completion of the "VIP Booklet" which ultimately goes to Air Ministry, recording of all test results in triplicate and rendering a consolidated report on the crew to its parent group, pointing out faults and recommending any special training required.

Thus, it will be seen that the unit's task is by no means an easy one, and the checking of only one pilot involves a considerable amount of work. Therefore, the unit appeals for the close co-operation of all squadron commanders and leaders to ensure that the crews nominated for tests for high categories are in fact of approximately the required standard.

The extensive commitments of the unit have necessitated the temporary establishment of a scheme of priorities designed to get the most urgent tasks done first. Under this scheme, priority of allocation of the unit's resources will always be given to the task of testing potential VIP crews and others specially nominated by their parent groups for duty as personal crews to VIPs. Subject to this over-riding priority, the work of the unit during a visit to any squadron will be done in this order:

(*a*) Tests of training officers, navigation, signals and engineer leaders. This is to ensure that these officers, on whom lies the burden of categorising the rank and file of squadrons, are fully aware of the standards to be maintained and the methods to be used in checking these standards.

(*b*) Tests of squadron and flight commanders. Here again it is desirable that senior officers of squadrons should have high categories and that they should be fully familiar with the categorisation scheme. Although it is often found that the administrative duties of senior officers preclude their giving full time to categorisation tests, the unit will always be ready to arrange for them to take their tests in sections as and when they are free to do so.

(*c*) Tests of crews considered by squadrons to be of Category "A" standard. In this connection it should be noted that squadron commanders are not permitted to award a final Category "A," which must always be checked by Group Headquarters or the Examining Unit.

(*d*) Percentage checks of crews holding other than Category "A" who have been categorised by their own squadron. The object of this is obvious, as the check of a cross-section of a squadron will indicate the closeness of adherence to the standards of professional ability laid down by Headquarters Transport Command.

(*e*) Route tests. Ultimately these will form an integral part of a categorisation test, but the present pressure on the AEU makes it necessary often to

omit route tests (except for VIP crews) and to carry them out only when time for them can be spared. The object of such tests is the same as in sub-paragraph (*d*) above.

The fast demobilisation rate, which in turn brings about a rapid turnover of squadron personnel, necessitates the unit's attention being given only to those who will repay the expenditure of effort. Thus, only crews with at least three months effective service left will be tested by TCAEU, unless they are engaged on VIP work, when a test will be given for almost-time-expired crews, if their parent group requests it.

It will be observed that although reference was made earlier to the categorisation of airborne forces crews being part of this unit's duty, no reference to the special problems involved has yet been made. This is because the work of Transport Support squadrons is a specialised duty and accordingly requires the preparation of specialised examination schedules, unlike those used for Transport Route squadrons. These examination schedules are now in course of preparation and will be circulated in due course to all transport support squadrons at home and overseas. In the reasonably near future, a representative examining team will begin to visit the ABF squadrons to carry out categorisation by the same methods as those used for the transport route squadrons.

That is the picture of the tasks before the unit. The method of carrying them out is either to receive special crews at the unit's base, which is fully equipped for testing, or to detach visiting "teams" to squadron bases. These teams usually consist of two pilots, a navigator, a signaller and a flight engineer, under the command of a squadron leader, and they reside with the squadron for at least a week. Visits do not usually extend beyond two weeks unless urgently requested.

The unit is under the operational control of Headquarters Transport Command, but it is permitted to accept commitments from Group Headquarters direct. Therefore, nominations for special tests or requests for visits should be made by squadron commanders through their Group Headquarters. Normally, however, the unit keeps direct contact with the squadron commanders in the United Kingdom and with the training staffs of home-based groups so that it is fairly easy to arrange an urgent commitment by telephone, provided that the appropriate Group Headquarters is kept informed.

For the purpose of examining transport flying personnel in overseas squadrons, the TCAEU is sent out by the Air Ministry. This ensures that as far as possible a common standard of efficiency is maintained among all transport crews. The TCAEU teams fly out in their own aircraft and examine individuals on the same priority as for home-based squadrons.

Squadron commanders overseas can assist the AEU by forwarding through the usual channels an estimate of the task, based on the priorities scheme set out in an earlier part of this article, and by providing for the unit the continuous use of at least one training aircraft.

This completes the account of the unit's charter, its task and its method of carrying out its work. In the foregoing paragraphs certain requests have been made, and it is hoped that squadron commanders will give every assistance in meeting these. Squadron commanders should ensure that their crews do not regard these visitations as a nuisance, for it is worth noting that experience shows that crews who show most opposition to being tested are not nearly as good as they think. A pilot can do important and apparently efficient work for months or years on end and yet prove inefficient when tested, because what has been good enough in his own opinion may not prove efficient, or even safe, when judged by an impartial observer; and the AEU examiners *are* impartial and, further, they know their aircraft well enough to detect any attempt to pass tests by elaborate pretence of efficiency.

The Aircrew Examining Unit does not exist for the purpose of ruining careers, nor is it a terror weapon or a Gestapo. It exists for the sole purpose of ensuring that the high standard of efficiency is maintained among transport flying personnel. It does not "fail" candidates lightly or from inborn malice, but only because they are not up to the required standard. Its award of a category is based on the adage that the strength of a chain is that of its weakest link. Accordingly it grades a man according to his ability in his weakest subject, for no matter how good a man is in certain subjects, it is in his weak ones that any danger of a mistake lies, and we cannot afford to employ crews who might make a serious mistake. Those who are efficient and keen on their job have nothing to fear, and the examiner will co-operate with them up to the limit; but the disinterested, the unwilling, or the pretender will not pass the scrutiny of the examiner. The announcement of an impending Examining Unit visit does not imply a forthcoming attack on a squadron or a crew, and there is no need for the preparation of a bitter defence.

The AEU is on the same side as the squadrons and its object is to assist them in sorting out the best material; to do this the co-operation of all parties is obviously needed.

THE A.E.U.
WOULD LIKE TO KNOW:

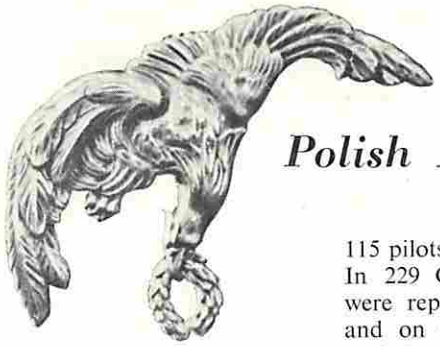
(i) If anyone can suggest names for the unit's aircraft (two Dakotas, one Lancastrian) as appropriate to their task as those given to the aircraft of the Empire Air Navigation School.

(ii) If there are any suggestions from readers of this REVIEW for a form of unit crest and motto.

Facetious suggestions will not be appreciated, as the unit has already received a surfeit of these. With its Empire-wide commitments the unit should have a badge and a motto in keeping with its task, so suggestions would be welcomed.

TRANSPORT OPERATIONS

by the Polish Air Force



ALTHOUGH Transport Command itself was not formed until April, 1943, all types of transport duties had been undertaken by the RAF since the beginning of the war.

In June, 1940, when France collapsed many Polish airmen came to the UK to continue their fight against the enemy, and it was from this date that the Polish Air Force took an active part in transport operations. Although most of the pilots saw almost immediate action in Bomber and Fighter Commands there were many who were over the age limit for this work. Amongst them were men with long experience, many being ex-civil air-line pilots.

It was during the early stages of the war that aircraft deliveries became a job of high priority and these pilots were well suited to fulfil this new and urgent task.

In June, 1940, when Italy entered the war, the Takoradi-Cairo delivery route was opened, and when agreement was reached between the Air Ministry and the Polish Air Force authorities, the first group of Polish personnel were sent to Takoradi; that was in November. They started by flying in mixed convoys, but within a few months Polish convoys were being led by Polish convoy leaders.

During the years 1941 and 1942 sixty Polish pilots were employed on delivering aircraft to airfields all over Africa, and by the end of this intensive spell of duty they had delivered 1,438 aircraft, 917 of them on the Takoradi-Cairo route alone.

It was not long before Polish pilots were also delivering aircraft along the routes from the Sudan and India, from South and East Africa; to bases in North Africa, from Africa to India and to Southern Europe.

Perhaps one of the most interesting duties of these Polish fliers was the delivery of American aircraft across the North and South Atlantic from the newly-formed base at Dorval, Canada. This started in the autumn of 1941 when six Polish pilots joined 45 Group and started their deliveries in mixed crews. Towards the end of 1943 many complete crews were sent to 45 Group when they had completed their tour of operations in Europe. Altogether this Group had 110 Polish pilots, navigators, wireless operators and engineers, and in the course of their duties they delivered 429 aircraft from Canada and made 1,199 Atlantic crossings. On the disbandment of the Group, forty-five Poles were demobilised and granted permission to settle in Canada.

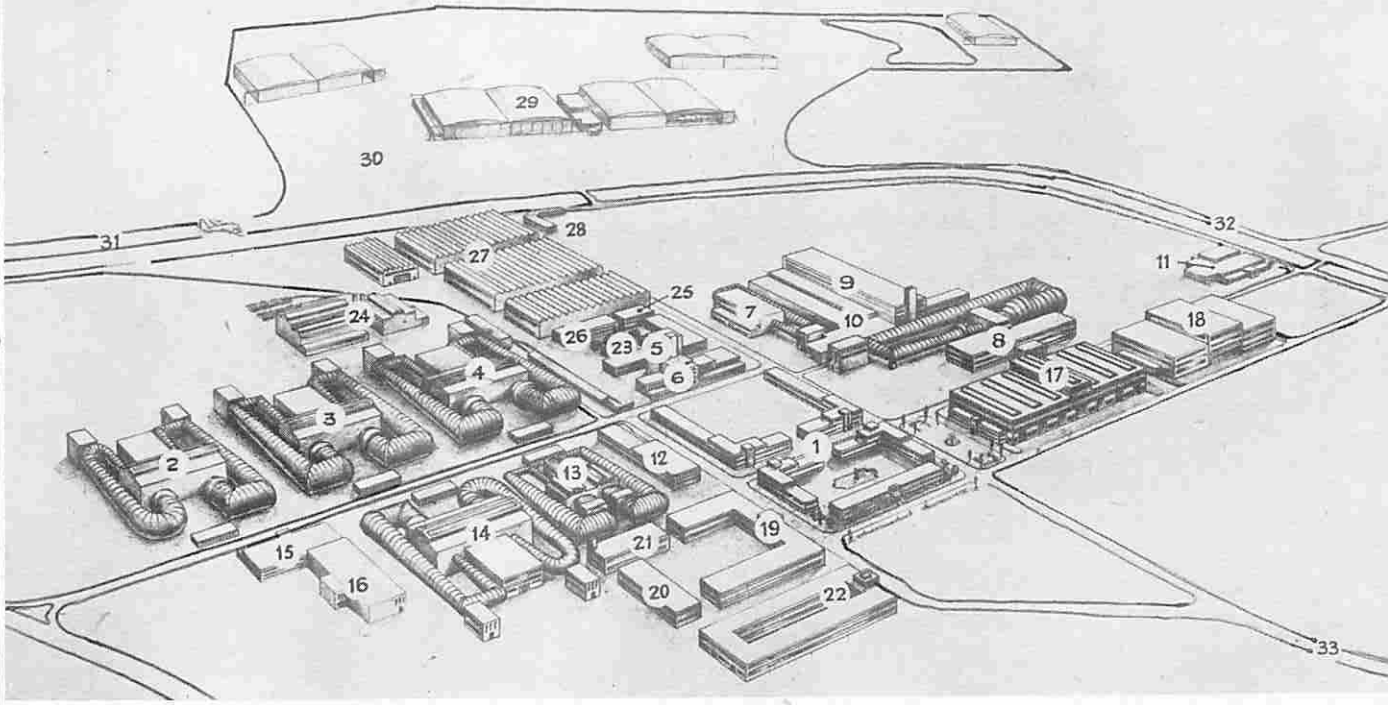
As the war progressed, so Polish Air Force personnel spread their wings still further. In four years' work with No. 216 Group, Polish crews delivered 3,687 aircraft and flew 49,430 hours with a total at one time of 115 pilots, and four complete Polish crews. In 229 Group in India, Polish personnel were represented from its very formation, and on the routes between India, Ceylon and Burma the sixteen pilots employed at Nos. 8, 9 and 10 Ferry Units delivered 771 aircraft up to the end of 1945. Although Polish pilots did not join 44 Group until April, 1944, they were attached to No. 1 ADFL and Nos. 1, 11, 12 and 16 FUs, and until the end of December, 1945, they delivered 187 aircraft (twenty-three different types) to parts throughout Great Britain, the Middle East and the Far East. Until April of this year many personnel flew with 1680 Flight. Between the autumn of 1943 and March, 1944, four complete crews flew with 511 Squadron, servicing Army communication lines between the UK and the Middle East. In the famous 24 Squadron ten Polish pilots took active parts helping in the evacuation of women and children from Malta and carrying many VIPs to the Teheran and Potsdam Conferences.

Apart from serving in these Units, Polish personnel flew with BOAC, first on the return Ferry Service across the Atlantic, and finally on routes from the UK to North-West Africa, the Middle East, India, along the West African coast to Lagos and across the African Continent to Khartoum and Cairo. To-day, many of those who were seconded to BOAC as early as 1943 are the seniors of all RAF seconded personnel.

It was not until 1945 that the first two entirely Polish squadrons were formed. In March of that year No. 301 Polish Bomber Squadron came into Transport Command and regular services were flown between the UK, Norway, Italy and Greece. Three months later No. 304 Polish Squadron from Coastal Command became part of Transport Command and began flying between the UK, Italy and Germany.

The cherished desire for Polish Wings to return to an Independent Poland was a dream that did not come true but Transport Command with many duties still to fulfil has work for her Polish allies, who to-day fly with 46 Group and with Nos. 53, 206 and 525 Squadrons in the UK; with 216 Group and No. 78 Squadron in the Middle East; with 52 and 76 Squadrons in the Far East; and with, until very recently, 231 Squadron in Canada. They still fly in the Metropolitan Communication Squadron and with Special Flights in 24 Squadron.

Arrangements are being made between British and Polish authorities concerning the future of the Polish Air Force, but what shape these arrangements will take is not yet known. But the services of the Polish Air Force to the Allies' cause have been valiant and invaluable.



The broad method of planning aircraft research, which Scientific Research (Air) Branch of the Ministry of Supply propose to adopt for the future, is influenced greatly by the magnitude of the research equipment required to deal with the problems of high speed and low drag : it needs very large wind tunnels, test beds for engines under high altitude conditions, structural test apparatus, and the like. The above diagram shows the plans for the establishment which will be built near Bedford to provide facilities for better dealing with these problems. See end of article for key to plan.

AERONAUTICS AND THE FUTURE

SIR BEN LOCKSPEISER
Director General of Scientific Research (Air) at the Ministry of Supply

THE importance to this country both in peace and war of research and development in aeronautics needs no emphasis. Without command of the air no defence of these islands is possible—the destruction of our ports alone would squeeze the life out of us. In peace the aeroplane is the magic carpet of our age enabling us to span the distant parts of the Commonwealth in a matter of days. The astronomers tell us we are living in an expanding universe, but we are undoubtedly at the same time living in a rapidly contracting world. The political and social consequences of this are as yet hardly realised, and to a dispersed Commonwealth such as ours they are of the first importance.

The responsibilities, therefore, of the Ministry of Supply for research and development in the aeronautical and associated sciences are great. The Royal Aircraft Establishment is the country's chief centre of scientific research and experimental development in aeronautics. Aerodynamics is the basic science of aeronautics and at RAE the theoretical study of the subject, laboratory experiments and work in flight are carried out. Practically all the prototype model testing of the industry is carried out in its wind tunnels, the most modern of which is a high-speed wind tunnel in which models of aircraft with a 3-foot wing span are tested at speeds up to 600 miles per hour. In the Structural and Mechanical Engineering Department means of testing a complete aircraft structure up to the size of the Lincoln have been provided. Its Instrument Division has designed all the bomb-sights used by the RAF during the war, and the Photographic Department has designed cameras and photographic equipment for air reconnaissance. Its Radio Division introduced VHF communications equipment; its Armament Division produced the gyro gun-sight which was adopted by, and manufactured in, the USA as well as in this country.

But there are far too many exciting tasks ahead of us to linger on what has been accomplished. If I describe some of the high spots in aeronautical research I must not forget to mention that a good deal of the time of our staff is engaged on work of a more routine character. One of our most important jobs is to assist the aircraft industry in solving the difficult problems which are always arising in new types of aircraft, engines and equipment.

It is only just over forty years since the Wright brothers flew, and the emergence of the Spitfire just before the war signified the completion of a revolutionary period in design. During the war the achievements of that period were consolidated and we are now taking the first steps in a new era which will involve radical departures from present conceptions both in airframe and power plant designs. This will, I believe, be the second revolutionary era in aeronautics and I imagine that some ten or fifteen years will elapse before the next period for consolidation arrives.

Low Drag

There are two main reasons for taking this broad view of how things are going in aeronautics. In the first place, we have been learning a good deal about the control of air flow from theoretical study, wind tunnel and flight experiments, and we have come to the conclusion that the drag of aircraft ought to be very much less than it is now. The ideal to be aimed at is what is known as laminar flow, and we now know how to build wings in which laminar flow can be maintained over more than half the wing surface. But we also know that we cannot extend these conditions to the whole wing by reliance on shape alone, and so we have been experimenting also with wing suction in which the boundary layer of air is sucked into the wing. To put the matter briefly, a combination of shape, accurate manufacture and high finish of wing surfaces, together with wing suction, promises very large reduction of wing drag.

But we see little possibility in treating fuselages in this way. And this leads directly to the conclusion that if we wish to fly economically we should do away with bodies, and that of course involves the disappearance of the tail; so we arrive logically at the all-wing aircraft.

For practical flying it will have to be large, with its wings thick enough to house the engines, passengers or freight, and because these conceptions of how to obtain low drag require that the wings encounter undisturbed air, the familiar tractor propeller will have to give way to either the pusher propeller or jets.

In order to try out these ideas, we asked Armstrong Whitworth to build a twin jet-propelled aircraft on these lines weighing about 30,000 lb. First, a glider model was built to serve as the basis for the design of this jet aircraft which is due to fly either at the end of this or early next year.

The Consequences of Flying at the Speed of Sound

All that I have said relates to speeds not exceeding 500 miles per hour at sea level, and here emerges the second reason for recognising the great changes that are coming in the field of aeronautics. At or about the speed of sound the air flow changes its character, accompanied by very large drag increases. At speeds well below that of sound, the air ahead of the aerofoil is prepared in advance for its arrival, part being accelerated to flow over the upper surface and part over the lower surface. The moving aerofoil possesses, as it were, a signalling system to warn the air ahead of its approach and allow it to take full advantage of its shape to slip through.

But if the aerofoil is travelling at or above the speed of sound (or sonic and supersonic velocity) the air can be no longer prepared for its arrival. The aerofoil now meets the air inevitably head on, producing a shock wave which is the source of the large increased drag.

In actual practice, we encounter very large increases of drag at high speeds below the speed of sound, and this is because the air in its passage over the curved surfaces of wings, bodies, etc., is accelerated and reaches the speed of sound locally. Whenever the speed of sound is reached on any part of the aircraft a shock wave is formed, and if this is accompanied, as it usually is, by a separation of the air behind the shock wave, large increases of drag are inevitable. The speed of sound at sea level is 760 miles per hour and we may get into trouble due to shock waves and their consequences in an aircraft at a speed of 500 miles per hour. We are very liable to, and have run into serious trouble at 600 miles per hour.

Flight Above the Speed of Sound

In the supersonic region, shock waves govern everything and introduce new problems of control. In passing from subsonic to supersonic flight we shall meet at the speed of sound conditions about which we are at present in ignorance. Our present intention is to accelerate through this region as rapidly as possible, but we do not yet know how serious are the difficulties we may meet. Years of research will be necessary before we can achieve supersonic flight. The impression that supersonic aircraft are just around the corner is quite erroneous.

New Power Planes

Into this revolutionary picture in the field of aerodynamics there enter new conceptions in power plants. The gas turbine is, of course, in its infancy and much research remains to be done on axial flow compressors of high compression ratios and high efficiencies, on the shape and spacing of blades of compressors and turbines, on high temperature materials and on combustion, particularly at high altitudes.

Looking further ahead, we can see that at supersonic speeds the dynamic pressure at the entry duct is so high as to make the compressor superfluous. At 1,250 miles per hour at sea level, for example, the dynamic pressure is about 60 lb. per square inch, which corresponds to the compression ratio of about four to one of existing turbine engines. Since a turbine is only necessary to drive the compressor, the turbine becomes superfluous also. This leads directly to the simple conception of a shaped tube, called a propulsive duct, without any moving parts as a power unit for supersonic flight.

The rocket motor is likely to prove of great value in aircraft propulsion of the future. Unlike other power

units it does not draw oxygen from the atmosphere but obtains it from its own fuel, which it burns very extravagantly to provide the maximum possible thrust. For this reason it has the unique characteristic among power plants of maintaining a constant thrust at altitude, but of course this high thrust can only be maintained for short periods.

We have, therefore, a fairly clear picture in our minds of the way things are going in the air for civil and Service aircraft, but what are the prospects of the owner-flier taking the air as the owner-driver took to the roads? Here we must take account of the possibilities of the helicopter. Helicopters have been built and flown successfully, but many problems have to be solved before they can be regarded as a safe type for the average man to fly. But I have little doubt that the helicopter will be productionised for large scale use.

I would expect the helicopter to become the air taxi of the future, transporting passengers from the main airports situated outside towns to town centres. We attach great importance to the problems associated with helicopters, and within our limited resources are engaged in their solution.

Blind Landing

Air transport will not become the reliable and regular means of communication it should be until we can take off, fly and land in all weathers. The navigational problem, with the many radar aids one can visualise, should not present great difficulties, but to take off and land blind under any weather conditions is a very serious problem. The solution of the problem is absolutely vital to the future of civil aviation, no less than for military aircraft, and we are devoting a special team to its solution.

Air Photography in War and Peace

Air photography was developed to a high pitch of excellence during the war and in its later stages was the main source of our intelligence. Air photography can play a large and varied part in peace-time activities. Large areas can be mapped with precision and detail in a very short time. Where basic survey maps exist they can be frequently revised to keep up-to-date records of new building development, roads, etc. In town and country planning air photography can be used to great advantage in the zoning of regions, the compilation of agricultural statistics on land utilisation, or in the maintenance of continuous records of arable and grass land, different types of crops and the distribution of cattle.

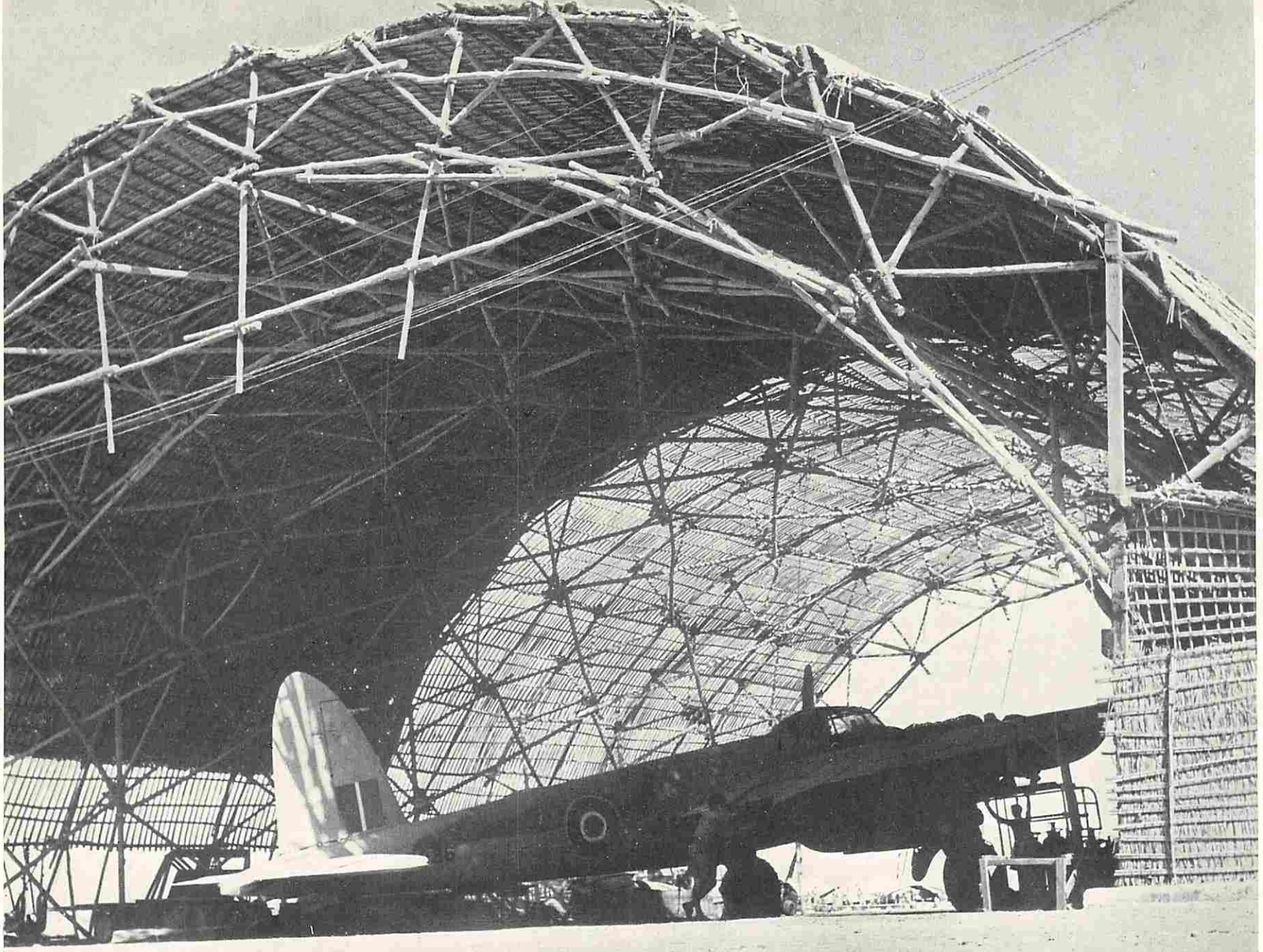
I have used this example of air photography as typical in the way in which aircraft can be used to contribute to our national economic life. There are very great possibilities ahead, but our resources are limited and we have to make up our minds how those resources can best be used. We have to judge the significant lines of advance and construct our programmes accordingly.

Planning of Aircraft Research

The broad method of planning of aircraft research which we propose to adopt for the future is influenced greatly by the magnitude of the research equipment required to deal with the problems of high speed and low drag; we need very large wind tunnels, test beds for engines under altitude conditions, structural testing apparatus, and the like. Such apparatus is very expensive and can only be provided at a central establishment. We are planning such an establishment near Bedford which will provide facilities for better dealing with our problems than we have at present.

We shall no doubt make mistakes, but we can look forward to the future with confidence. British aeronautical research has always stood high in reputation among the countries of the world, and we have a young, capable and enthusiastic staff who, I am sure, will enhance that reputation.

1. *Central Admin. and Departmental HQ Offices*
2. 16 *ft.* × 12 *ft. Compressed Air Tunnel*; 16 *ft.* × 12 *ft. Atmospheric Tunnel*
3. 16 *ft.* × 12 *ft. Atmospheric Tunnel*; 16 *ft.* × 12 *ft. High Speed Tunnel*
4. 16 *ft.* × 12 *ft. Atmospheric Tunnel*; 16 *ft.* × 12 *ft. High Speed Tunnel*
5. *Spinning Tunnel*
6. *High Speed Airflow Laboratory*
7. 8 *ft.* × 8 *ft. High Speed Tunnel*
8. *Large High Speed Altitude Tunnel*
9. *Exhausting and Compressing Plant*
10. *Refrigeration and Cold Chamber Buildings*
11. 3 *ft.* × 3 *ft. Supersonic Tunnel*
12. *General Purpose Aero Laboratory*
13. *Two* 13 *ft.* × 9 *ft. Atmospheric Tunnels*
14. 16 *ft.* × 12 *ft. Compressed Air Tunnel*; 16 *ft.* × 12 *ft. Atmospheric Tunnel*
15. *Naval Aircraft Laboratory and Offices*
16. „ „ *Wind Tunnel*
17. *No.* 1 *Structures Laboratory*
18. *No.* 2 „ „ (*Research*)
19. *Metallurgy Division Main Building*
20. „ „ *Laboratory Forge*
21. „ „ „ *Foundry*
22. *Chemistry* „ *Laboratories and Offices*
23. *Central Electrical Sub-station*
24. „ *Heating Plant and Power Station*
25. *Medical and Welfare HQ*
26. *Workshop Organisation Offices*
27. *Main Workshops and Stores*
28. *Departmental Flight HQ and Laboratories*
29. *Flight Hangars*
30. *Paved Flight Apron*
31. *Taxi Track to Thurleigh Airfield*
32. „ „ „ *Twinwood* „
33. *Main Access Road from Bedford*



IN A PERSIAN HANGAR.

CONTINENTAL

FLIGHT INFORMATION

FLIGHT LIEUTENANT K. S. KING

FLIGHT Information Sections are attached to each of the Air Traffic Centres on the Continent. Their main functions are twofold: firstly, intelligence, maintaining up-to-the-minute records of the serviceability of the various Continental airfields, and the passing of information from fields in their area to other traffic centres; secondly, aircraft safety, the tracing of overdue aircraft and the arranging of diversions in the case of bad weather or distress. Neither of these tasks is easy, and they are becoming increasingly more difficult as peacetime conditions return.

The Flight Information Sections originated when the joint Anglo-American Continental Flying Control was set up by SHAEF at Le Bourget. Later, it was affiliated to the Paris Air Traffic Centre and moved to Orly. Other traffic centres were set up at Brussels, Bad Eilsen and Berlin. Thus the various Flight Information Sections are responsible for well-defined areas in Europe. Bad Eilsen serves the British zone in Germany; Brussels serves Belgium and Holland; and Paris serves France and the American zone in Germany.

Each of these FIS is connected by direct telephone lines to FIS Uxbridge and Bad Kissingen, the American equivalent of headquarters BAFO. In the American and British zones of occupation the communications are excellent. Direct military lines connect Headquarters, Groups, Wings and airfields, and information on any British or American field is readily available. Each evening a daily bulletin is issued by the FIS at Paris, which contains all changes of serviceability and facilities of airfields on the Continent and Mediterranean. This goes to the FIS at Uxbridge and to all Headquarters and airfields in France, Germany, Austria, Italy and the Mediterranean.

In the Paris and Brussels areas communications are not so easy. The Germans made extensive use of requisitioned civilian telephone lines. The Allies followed their example and, as the tide of war swept beyond the frontiers, all but the most essential lines were returned to their natural owners. A country that has recently been occupied and is struggling to rehabilitate itself, understandably regards an extensive military communication system as a luxury, and, consequently, most of their lines go back to civil use.

These Traffic Centres and Information Sections in Allied countries are faced with an entirely different set of conditions from those in England and occupied Germany. Information on all but British and American aerodromes is scanty, difficult to obtain and not always reliable. The controllers have to rely on indifferent telephones, common sense and their knowledge of the country. Language is a further headache. Nothing is more difficult to follow or more conducive to loss of temper than English with a strong foreign accent, or French with a pronounced British accent, on a 'phone which crackles, pops and splutters.

Overdue aircraft provide the largest amount of work. FIS Paris handles an average of seventy of these each month. A large proporation of them are due to failure in booking in and wrong signal action. Overdue action has been taken on many an aircraft which has never taken off. Controllers are only too familiar with the aircraft which definitely took off for Paris and arrived at Brussels or the Hague; or the sportsman who was signalled to Naples and arrived at Rome. Likewise there are many crews which arrive back at their home stations blissfully unaware that the whole of Europe has been scoured for them while they have been at an Allied field not bothering unduly about the tiresome formality of booking in. A controller soon develops a sort of sixth sense which helps him to detect the genuine from the false. After vigorous chases there are few that are missing for more than several hours. The average number for which the FIS Paris broadcasts overdue action, is about twenty a month.

During the years of war an elaborate chain of aircraft safety organisations was set up which stretched from the UK to India. Unfortunately, as the RAF and the US Army Air Force contract, and leave the European countries to their own people, so these safety organisations tend to languish and fade. It is only the British and American personnel which keep them going. This is understandable since countries which are struggling to build up air forces and air lines with old German JU 52s and what out-of-date equipment they can find, tend to regard elaborate safety organisations as luxurious refinements. When the RAF and the Americans finally withdraw from the Allied countries the remaining safety centres will fall into obscurity for lack of suitable personnel, communications and interest. It seems a pity that these organisations that have served the military so well could not be converted to suit the ever-increasing volume of civil traffic.

Fresh Fields for E.V.T.

TRANSPORT COMMAND has every reason to take pride in its extensive range of EVT services, for all personnel in the Command have ample opportunity to further their education both in theory and in practice. Among the specialised trades and professions for which the Command provides training are plumbing, watch and clock repairing, automobile engineering, hairdressing, driving, teachers' pre-training and agriculture.

The school of agriculture at Bassingbourn is an excellent example of a vocational training course in Transport Command, and it shows how the entire school has been designed to give in detail the general subjects which the students will encounter if they go to a university or if they take up farming seriously. It also stresses the type of practical work that is met with by all types of farmers and horticulturists. The practical side is simulated as nearly as possible to that of farm life. The syllabus of the school is divided into the theoretical and the practical sides, and although a daily schedule has been made out, it has to vary from day to day as weather permits. On both sides the work is sub-divided into agriculture and horticulture.

A typical day's work might include a lecture on such things as crop husbandry (the soil, the principles of cultivation, rotation of crops, pests, etc.), another lecture accompanied by a cinema demonstration by a member of the Cambridge War Agricultural Committee or of Cambridge University, and then some practical work on ploughing, harrowing or sowing; this might be followed by a period covering the principles of farm management. And then a short time may be spent on examining bottled specimens of insect pests, plant diseases and fungi. All these subjects, together with lectures on animal husbandry, dairy farming, botany, soil, vegetables, fruit and flowers are thoroughly covered in a four-weeks' course.

It must be mentioned that the practical side of the work, which cannot all be covered owing to the limited supply of implements and materials, is, nevertheless, supplemented by the generous co-operation of the local farmers. These farms allow the EVT instructors and students to visit their lands and to take an actual hand in the operations carried out, such as milking cows and attending to the daily needs of farm life.

The course is supervised by a flight sergeant who has with him four instructors specialising in agriculture, horticulture, engineering and dairy farming. The intention of the school is not so much to teach men to

pass examinations, but to show those who are interested in farming that it is a very strenuous life, that one's hours are not one's own and that the work is unending; and those who feel that they are still keen on farming at the end of the course can be sure that they are the right type to take it up as a career. Those who, having finished the course, find that they are not suited to farming, have not wasted their time, for they will not then make demands upon the post-service Government scheme for further training and education.

The school is well equipped with its own laboratory, reading room, reference library, small dairy, engineering repair shop, demonstration room, class room, and a total of 66 acres of land (32 acres under plough, 9 acres of peas and oats, 1 acre of blackcurrants and the rest growing plants and horticultural specimens).

The school has now been in operation for almost six months and about twenty personnel have attended each course.

One of the instructors prepares the mechanical milker while one of the students looks on.

Above, a sergeant instructor shows an interesting specimen of lucerne to one of the students, and below the chief instructor looks on approvingly as his students make short work of the weeds around the tomato plants.

Above can be seen one of the WAAFs attending the course. She is inspecting a botanical specimen in the Laboratory, and below is the chief instructor checking up on the School's beef production.

LOOKING AFT AGAIN

This article has been written on behalf of the Air Officer Commanding No. 46 Group by
WING COMMANDER A. G. DUDGEON, DFC

In March, 1945, No. 46 Group started casting around for some method of increasing the safety of passengers who travel by air. Up till that time it had seemed that most of the effort in this direction had gone into eliminating accidents, a very laudable object, but accidents *do* happen and so a method was sought of safeguarding the passenger if and when a crash occurs. During the course of the investigations an RAE Farnborough paper, dated February, 1942, was found, which put forward the theory that passengers should sit facing the rear of the aircraft. If there is an accident, the aircraft stops suddenly; the passenger tends to be thrown towards the nose. Therefore, put the back of the seat between him and it. It's as simple as that.

There are other physical advantages, however, which accrue from a rearward facing position. The spine is the strongest and most important part of the body (and therefore in most need of protection), and if supported over its length some truly amazing forces can be withstood without injury. Taking the acceleration (or deceleration) produced by gravity as "G" a passenger can take, without injury, a deceleration of 120—150 G in a rearward facing seat, which is equivalent to stopping in 9½ feet from 200 miles per hour. In case you don't believe this is true, there was a case in New York of a lady wishing to commit suicide. To do so, she jumped out of a tenth-story window and achieved a speed of approximately 50 mph in her fall. Unfortunately for her (or fortunately, if you prefer it), she fell flat on her back in a newly dug flower bed and came to rest in 5 inches. Calculation shows that her deceleration was approximately 200 G, and records show that her only injury was a broken left collar bone, which healed quite satisfactorily.

All this showed that the backward facing seat, designed to withstand crash loads, really *was* a safety precaution, for it meant that, given such seats and barring fire, it would be possible to fly into a hill-side and have all the passengers walk out, or at any rate, most of them! It also produced some knotty problems, for no such seats existed and no aircraft had a floor strong enough to take them when produced.

Visits were paid to Farnborough where rearward facing seats were being developed and were on show; to BAFO, where the problem was also being investigated, and to any other place where information could be gleaned. An attempt was made to obtain statistics from the railways to find out if people who sat with their backs to the engine fared better in accidents than those who faced the engine, or were standing and strap-hanging. This latter produced no result, except for a chance meeting with a man who was sharing a carriage with another man who was seated facing the engine. An accident occurred, and the man facing the engine, who was thrown across the carriage, bumped his head so smartly against an advertisement for Clacton-on-Sea that he was killed, whilst his fellow traveller was unhurt.

46 Group, having proved the matter to their own satisfaction, therefore put the matter up to Higher Authority, who, it appeared, were not unacquainted with the idea. The stumbling block was reputed to be the passenger himself. It was maintained that the psychological effect of turning the passenger round for his own safety would produce an instant dislike of the scheme, make him nervous, and would produce unfavourable comparisons with the civilian airline operators. The Group, having nothing to lose and everything to gain, declined to subscribe to this point of view and pressed for a trial. In May, 1946, at the Group Commanders' Conference, the C-in-C authorised 46 Group to carry out the trials, and since then all 46 Group scheduled services have been running with passenger seats turned to face the rear of the aircraft.

In order not to dismay the passengers, no mention was made of the real reason for the change, but they were asked to fill in proformae giving their views on the new seating arrangement. Since the change has been resisted steadily since 1942 on the anticipated objections of the passengers, the passengers' own statements summarised below are revealing and have a certain humour :—

(i) Only 1 passenger in 5 objects to facing backwards, and the majority strongly prefer it. The proportion of objectors is almost exclusively made up of aircrew personnel.
(ii) 99 per cent. of the passengers consider the view from the windows is better.
(iii) 1 passenger in 3 considers that you definitely feel less airsick when facing backwards and the remainder could see no difference.
(iv) Bumps are less noticeable.
(v) Noise is less noticeable.

Which is all very surprising, and it just goes to show that you can sell anybody anything these days, but the hardest things are those that one ought to have but no one has ever had before. Backward facing seats have come to stay, new chairs are being designed, new aircraft are being stressed for them, and all that remains is for someone to think up a way of putting the crew in the tail of the aircraft looking out over the stern, and everyone will be happy.

It is interesting to speculate on the effect this will have on aircraft internal layouts. The fuselage aft of the main spar suffers least damage in a crash, so, as far as possible, the passengers must be located there. Forward will be the lavatories, galleys, luggage and mail space, and presumably the crew compartment. The wireless operator will sit facing backwards and perhaps the navigator too (he can't see out much anyway, these days). Farnborough have already designed a compartment, a species of padded cell, to go in the rear of an aircraft, bulging with hidden strength for the special benefit of VIPs. In fact one can go on *ad lib.* If one gets really carried away there is a strong desire to redesign the seating in buses, Tube trains and the like ; after all, it's only a simple safety precaution, like lifeboats and aircraft dinghys.

Let's Look BOTH Ways

In this article on aft-facing seats a widely experienced Airline pilot gives his personal views on the subject and mentions Wing Commander Barker's article in the August issue of the REVIEW.

WHILE Wing Commander Barker speaks with the dual authority of a medical officer and an experienced pilot, nevertheless his statement that "if passengers are told that this method of seating (*i.e.* backwards) is an added safety precaution, there will be no genuine complaint," is somewhat sweeping. But although there is no precedent to back this statement, it is true that there have been civil air liners with seats facing aft, such as the amidships cabin on the old Empire flying-boats, but they merely made up a very convenient set around a table.

The question, therefore, as to what the reactions of the flying public (omitting military personnel) will be, can only be a matter of conjecture based on experience. Unfortunately, experience points the other way; passengers would not like it.

The argument put forward, against backward-facing seats, that it is psychologically unsound, appears to be a forceful one. With what relish would the story be told afterwards of the airline which is so dangerous that seats have to be fixed facing aft, with all the added discomforts which are mostly imaginary.

The air is not man's natural element, and journeying into it will always be attended, perhaps only subconsciously, by a sense of danger. Are we going to face our passengers backwards, thereby providing them with a continuous reminder of this fact throughout their flight?

The answer surely lies, like so many other problems, in a compromise. The obvious advantages of backward facing seats should not be sacrificed to prejudice, however well-founded.

It is not beyond the ingenuity of the aircraft designer to produce a chair swivelling through 180° and of sufficient strength to withstand 20G. It is true that there will be some increase in weight, but properly presented to the flying public, it should be more than compensated for by added goodwill in a sphere which will become fiercely competitive.

Passengers are now accustomed to being strapped in and forbidden to smoke during take-off and landing. How much less trouble merely to swivel the seat around and face backwards, the psychological aspect being equal in both cases. Besides, there is always the odd individual who prefers to travel facing backwards anyhow. So let's face both ways.

A LETTER TO THE EDITOR

FROM A TRANSPORT COMMAND PILOT

In the August issue of the "Review" I read an article on the subject "Aft-Facing Seats." I read it with the feeling that here were the claims of a single individual who must advance the theories of common-sense and psychological exactitudes to prove that passengers facing aft in an aircraft are doing something quite usual and quite natural.

To me, as one of many pilots who has spent hundreds of hours as a passenger as well as member of a crew, I can claim that my point of view is a much more open one, and one more like that of the casual passenger than that viewpoint so openly claimed in this article, where the argument seems to be entirely based on medical theory as a proof that aft-facing seats are more natural and more safe.

As a matter of interest, I have flown thousands of miles in almost every position that one can humanly imagine—lying flat on the metal floor of a Liberator; crammed like a sardine head to feet with other passengers for fifteen hours on end; sitting vertically facing sideways; packed inside bomb-bays; squeezed between auxiliary petrol tanks, looking aft through a small section of a window; sitting in the blister of a Catalina and scanning the horizon; up in the pilot's seat of most types of aircraft; lying prone, facing both forward and aft; lying supine in the same way. I have also flown as passenger in most of Transport Command's VIP aircraft and in the American ATC's civilian Skymasters. I have crossed the Atlantic in BOAC's luxurious Clippers, and as they were usually flown with many vacant seats owing to the weight of important freight and fuel, it was only too easy to wander about the aircraft and try sitting in their forward and aft-facing seats alternately as a change to the monotony of flying long distances over large expanses of ocean in the same seat.

Having read carefully all the points put forward in support of aft-facing seats, I am left with the firm conviction that the essence of these points is entirely against all principles for making passengers feel *safe in aircraft.*

Suppose, in the future, passengers are all to be seated in seats facing backwards, then they must of necessity

be briefed on the reason for it. They are told that it is for their safety in case of accident. They must be told the reason for it, because it is a natural tendency to face forward and to see where one is going, and not from whence one has come.

If all air passengers are to be reminded of the danger of accidents, then why not brief all travellers on Undergrounds, trains, buses and trams? They are not briefed for their short or long trips, but they take the same chances as passengers do in aircraft. To-day, whether the trip is made by land, sea or air, the chances of being involved in an accident are very remote; in fact, they are infinitesimally small. Take one glance at the figures of road deaths: those people never thought that their end was coming. Is it not better that way?

Is it worth that additional safety to enforce passengers to face backwards, so that if by chance they are involved in a crash, their necks will not be so liable to be broken? It offers no guarantee that the passenger will survive, but offers a slightly better chance of survival.

I detest facing backwards.

THE AIRSPEED CONSUL

FOR operation in the immediate post-war period, Airspeed Ltd. have produced a civil conversion of their famous Oxford trainer. Named the Airspeed Consul, this aircraft will fulfil the urgent needs of private owners and operators of light transport feeder-lines and charter services. It is now coming off the production line in increasing numbers.

The Consul is a cantilever, low-wing monoplane of 8,250 lb. all-up weight. Mainly of wooden construction it incorporates stressed-skin, ply-covered mainplanes and a semi-monocoque fuselage. Accommodation is provided for a crew of two, five passengers and baggage; a sixth seat can easily be mounted if baggage capacity and range are limited. The passengers are separated from the crew's compartment by a bulkhead fitted with double doors. All seats are leather upholstered and adequate ventilation is provided through individual regulators, while both crew and passenger cabins are heated by operating two valve controls.

The aircraft is powered by two Armstrong Siddeley Cheetah X moderately supercharged radial engines, each of 395 bhp. An outstanding feature of these engines is their long life between overhauls (1,250 hours) and their low maintenance costs. At full load the Consul has a maximum weak mixture cruising speed of 165 mph at 3,000 feet and 2,100 rpm. Cruising at 145 mph at 10,000 feet it has a range of 900 miles and its maximum speed at maximum power altitude (4,800 feet) is 192 mph. Rate of climb after take-off is good—over 1,000 feet per minute; 5,000 feet is reached in 4 minutes, 10,000 feet in 10 minutes. Petrol consumption is less than 15 gallons per hour per engine.

The centre of gravity has its limitations more forward than those on the Oxford trainer in order to give increased fore and aft stability (forward movement of the centre of gravity increases stability on any conventional aircraft). A blind climb, which is to-day a normal procedure, will show the Consul pleasing in its handling. A standard blind-flying panel is fitted. Take-off distance to 66 feet in a 5 mph wind is 575 yards and the landing run in zero wind conditions is 275 yards. The approach speed should relate to load and weather conditions; 90 mph may be quoted for the worst of both. Having been developed from a military trainer, the Consul can be described as an aircraft tested under widely varying conditions by almost every category of pilot. It is interesting to note that the Consul's strength factors are considerably greater than those required by ARB.

Flying as a Career

WHAT are the prospects in civil aviation for RAF pilots? This question has been asked many times in recent months, but whatever views the individual may have on the subject there is no doubt that civil aviation does offer an attractive and well-paid career for the Service pilot of good average ability.

Prospects are not only bright, but opportunities at the present time are particularly good. The main air-line operators and the numerous charter companies are urgently in need of qualified pilots. That need is likely to increase as civil aircraft production is stepped up and as the nation becomes more and more air-minded.

A great number of RAF pilots, and especially those who have been flying the Transport Command trunk routes, are well fitted to uphold the traditions of British civil aviation. Ability and experience, however, are not sufficient assets in themselves to ensure an engagement. A pilot must be in possession of a Class "B" licence issued by the Ministry of Civil Aviation. Without it the door is closed to him. The licence is granted to pilots who pass a medical and a technical examination.

The standard set is high, but the average Service pilot should have no difficulty in passing the medical examination, while the technical test is well within his scope, provided he is prepared to devote sufficient time to serious study of the subjects of which he is expected to possess a fairly comprehensive knowledge. These subjects include radio D/F organisation and procedure, general regulations, lights and signals, air navigation, general meteorology, meteorological organisation, and engine handling.

The syllabus is an imposing one, but with the object of helping pilots prepare for and obtain their "B" licences a schedule of study has been drawn up by the Navigation Staff at Transport Command Headquarters. This is being printed in booklet form and will be circulated throughout the Command to unit adjutants, from whom copies will be available.

The schedule has been approved by the Ministry of Civil Aviation, and the booklet contains all the relevant information concerning the licence, fees payable and reference books needed by candidates. The schedule itself is divided up into 39 periods of $1\frac{1}{2}$ hours each, which means the entire syllabus can be covered in $58\frac{1}{2}$ hours, or in less than a month if 3 hours a day for 5 days a week are devoted to it. More time, of course, can be spent on any subject on which a pilot feels uncertain, the essential aim of the schedule being a basis on which a pilot can plan his studies. At the end of most study periods will be found a list of questions similar to those asked by the Ministry of Civil Aviation examiners, which will enable a candidate to check the progress he is making.

Most RAF pilots interested in a career in civil aviation and who are desirous of obtaining their "B" licence are in the happy position of having facilities for learning, in addition to the various text books. Queries and knotty problems which are bound to crop up can always be taken to and cleared up by station navigation, meteorological, signals and engineering officers.

The important thing is that the approach to the examination must be concentrated and determined. Success was never attained by half-hearted methods, and in this case the sacrifice of a comparatively few hours of leisure will pay a handsome dividend.

Additional copies of the schedule will be available on application to the Navigation Section, Headquarters, Transport Command, RAF, Bushy Park, Teddington, Middlesex, in the near future.

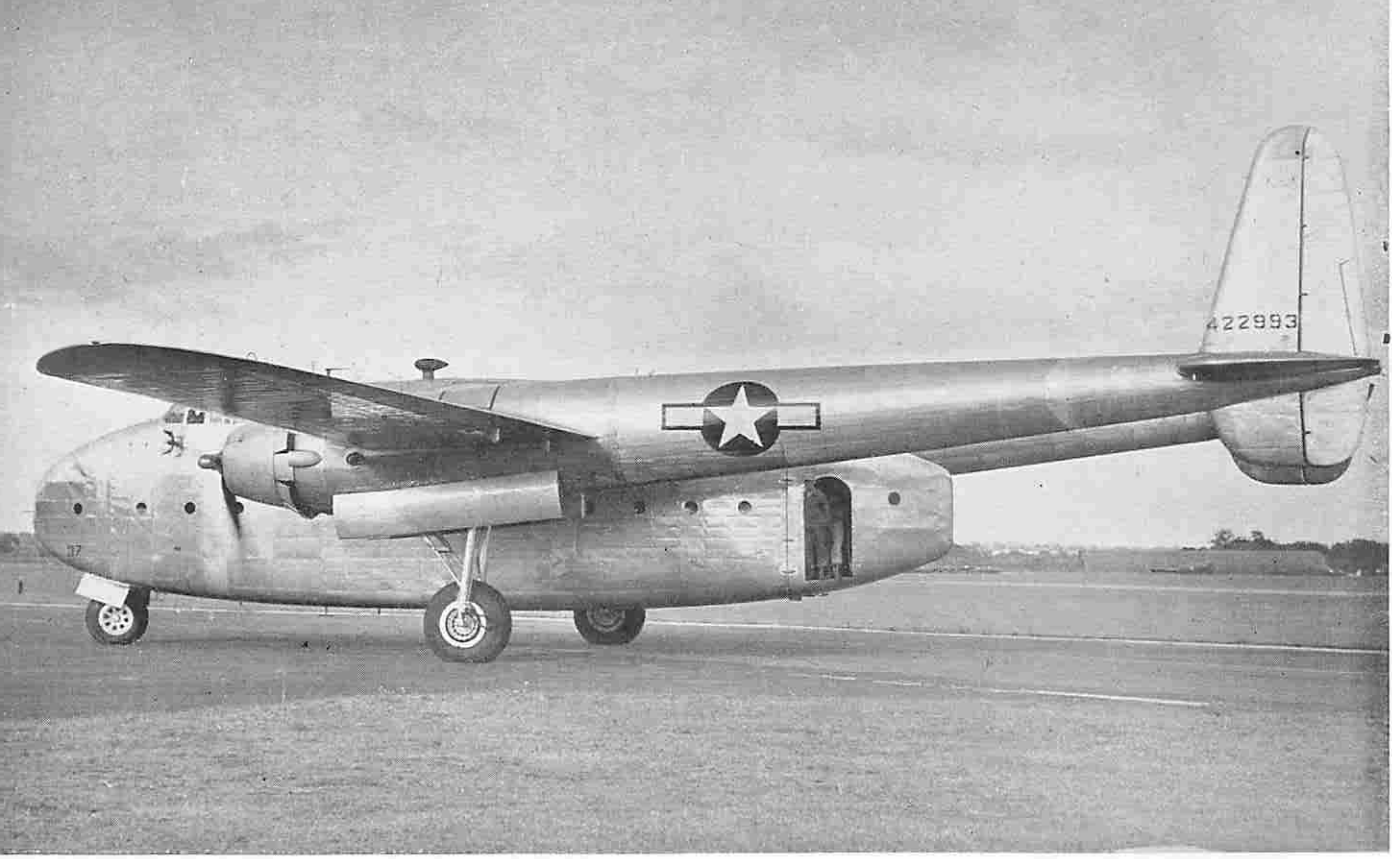
MOBILE CLASSROOMS

THE existing manning position of units makes it extremely difficult for airmen to be released for courses of instruction. At the same time a sound working knowledge of the individual components, which comprise an aircraft and its ancillary equipment, is essential if the most efficient servicing of these components is to be attained.

To convey information, in a practical manner, to the maximum number of personnel, Technical Training Command have put in use a number of mobile classrooms. Each classroom deals with a particular component and is staffed by competent instructors. Instruction is given by means of sectioned models and pictorial representation. In some cases pamphlets are issued.

The advantages of the mobile classroom are that up-to-date information can be conveyed to all available personnel on the occasion of a visit, and that visits can be arranged as frequently as desired. An example of the former is shown in the Mobile Instructional Unit on Jet Propulsion which has already visited Fighter Command.

The value of these units cannot be too highly emphasised as a means of keeping abreast with recent technical developments.



THE FAIRCHILD PACKET

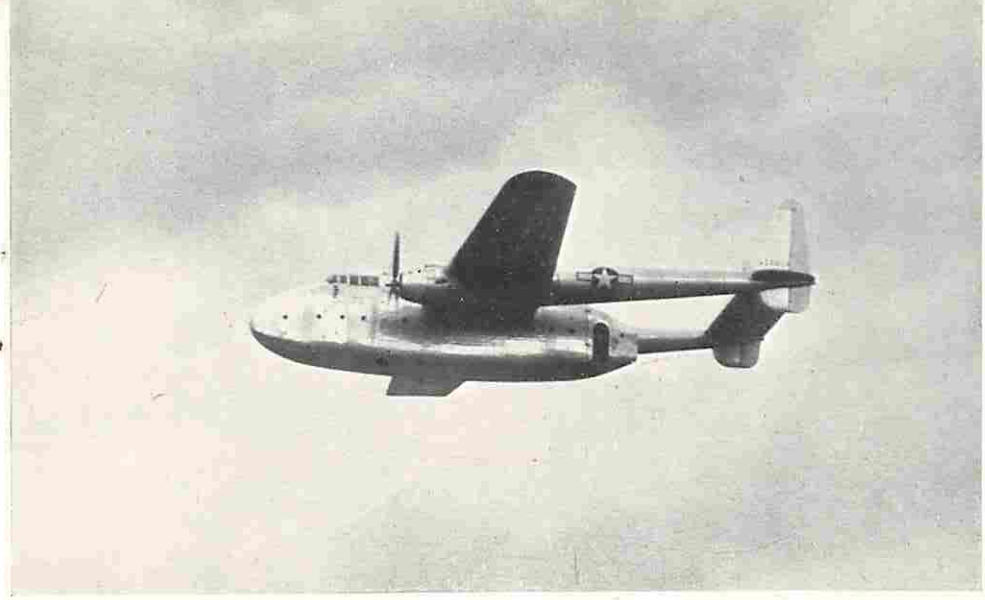
FLIGHT LIEUTENANT A. F. BROWN, *submitted by TCDU*

AIRBORNE operations are planned by the United States Army in three phases—the assault, carried out by parachute and glider-borne troops, the consolidation, by the landing of equipment and personnel on forward landing strips prepared during the assault, and the expansion, by the landing of infantry, armoured divisions and heavy equipment. The C-82 was designed in 1942 as a replacement for the Dakota (C-47) and the Commando (C-46) and was to be used in the first two phases only, the third phase being carried out by larger aircraft.

It is a high wing, all-metal aircraft of unorthodox design, and is probably the first of its type to go into service with any air force. It was demonstrated recently in this country by members of the American Ground Forces Airborne Liaison Detachment, and on July 29th, 1946, personnel of the Army Airborne Transport Development Centre and Transport Command Development Unit had an opportunity of seeing the demonstration at Brize Norton, Oxford. The particular aircraft shown was one in which over forty modifications have been incorporated and are being tested, but not all of these will necessarily be included in production models.

The layout of the aircraft embodies a large square-section fuselage with two '' clam shell '' doors at the rear, which open 100° outwards to give unobstructed access to the cargo compartment. Twin booms extend from the engine nacelles, an arrangement which permits vehicles to be driven into position for direct loading. The aircraft has a tricycle undercarriage and therefore the floor of the cargo compartment is level when the aircraft is on the ground.

The role of the C-82 in the first phase of an operation is primarily as a paratroop carrier, but it may also be used as a glider tug. It is capable of carrying 42 fully equipped paratroops, which are dropped in two sticks of 21 men each simultaneously from both sides of the aircraft through exits in the '' clam shell'' doors. At this point the fuselage is well tapered so that the jump is made at only 70° to the slipstream, reducing the time taken to dispatch a stick and giving a greater



The Fairchild C-82 is an American replacement for the Dakota C-47 and the Commando C-46.

concentration on the dropping zone. During the demonstration at Brize Norton, 42 men in two sticks, one of Army personnel and the other of RAF Instructors from No. 1 Parachute Training School, Upper Heyford, were dispatched in 12 seconds after only three practice jumps from this aircraft. As the C-82 flies at approximately 105 mph during jumping, the theoretical ground distance covered by the complete stick of 42 is about 610 yards.

The C-82 is equipped with an experimental electrically operated monorail system which is suspended from the roof of the cargo compartment and carries fifteen trollies to which containers up to 350 lb. in weight are attached. As the aircraft approaches the dropping zone, the system is put into operation, automatically dispatching the containers through the "paratainer" doors in the bottom of the fuselage; the fifteen containers can thus be dropped in approximately 6 seconds. Canvas curtains can be fitted on both sides of the monorail to obviate the risk of fouling static lines when paratroops and containers are dispatched over the same dropping zone.

In phase two the C-82 is used to convey personnel and equipment to forward landing strips, and in this role it is seen to the best advantage. The procedure for loading vehicles and equipment was explained during the demonstration; the "clam shell" doors were opened and locked to the side of the fuselage by struts; two tail support jacks were lowered to prevent the fuselage from tilting during the loading of heavy equipment. The rams were positioned for the appropriate track width and enabled a vehicle to back into the cargo compartment pushing a 25-pounder gun.

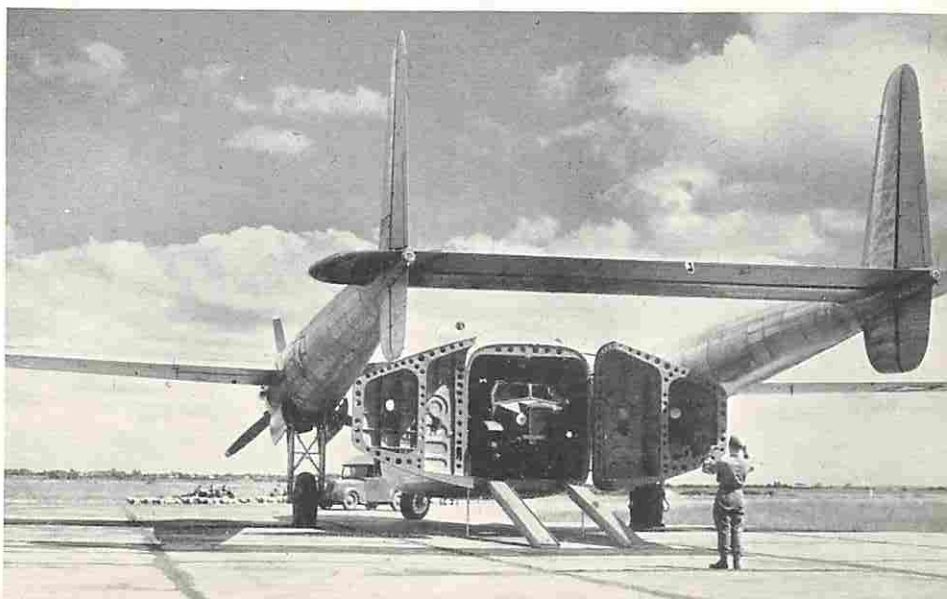
Loads are lashed by chains to tie-down points in the compartment floor; strong points are arranged in three rows, one along the centre-line and one on either side, each point being capable of taking a load of 7,000 lb. vertically and 5,000 lb. at 45°. In addition there are four rows of 1,150 lb. tie-downs at 20-in. intervals in the floor.

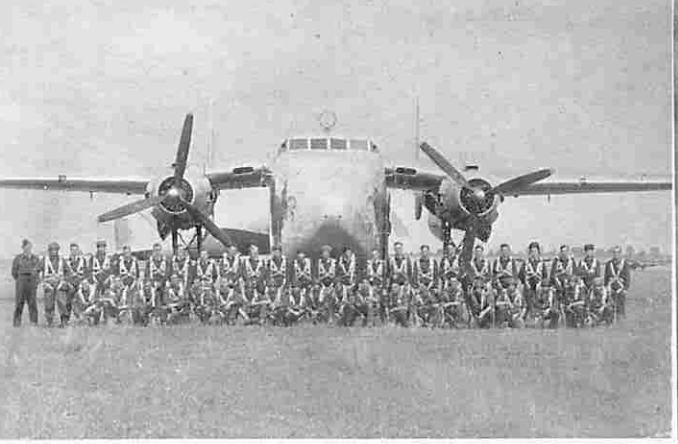
The cargo compartment is capable of accommodating most types of military equipment required in phase two of an airborne operation; the compartment has an overall length of 37 ft. 6 in. and a cross section 8 ft. square, with the exception of the front 10 ft. where the height is reduced to 6 ft. 3 in. by the cockpit floor. A heavy load not on wheels can be manhandled and moved into position along steel runners from a truck directly on to the compartment floor, which is at a convenient height of 48 in. from the ground.

The procedure for unloading is quite simple and possesses the tactical advantage that loads, such as a vehicle and 25-pounder gun, can be driven straight out in a very short time.

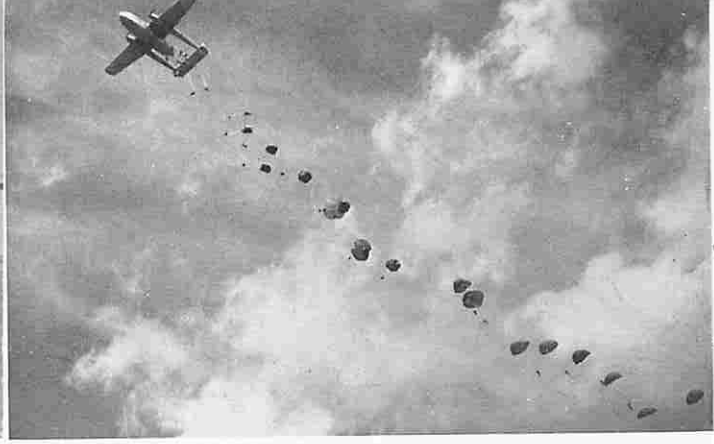
In addition to the roles already mentioned, the C-82 can also be used as an air ambulance and can accom-

The "clam-shaped" doors open wide to give easy access to the large interior.





The complement of 42 airborne troops shows the impressive size of the Fairchild Packet. The 8 ft. square internal cross-section of the fuselage provides ample space.



During the demonstration at Brize Norton 42 men in two sticks were dispatched in 12 seconds after only three practice jumps from this type of aircraft.

modate 34 stretcher casualties and 4 attendants, besides the normal flight crew of 5.

The weight of the empty aircraft is approximately 33,000 lb. The disposable load is 23,000 lb. and is made up of 2,500 gallons of fuel weighing 18,000 lb. and 5,000 lb. payload for a maximum range of 2,500 miles. In a more normal case, the aircraft would carry a payload of 14,000 lb. for a range of 1,000 miles. The performance varies with the type of load carried, but the aircraft normally cruises at 10,000 ft. at about 180 mph, with 21-in. Hg. manifold pressure and 2,100 rpm; with an all-up weight of 56,000 lb. the C-82 requires a take-off run of 3,580 ft. to clear an obstacle 50 ft. high ; and a run of 2,500 ft. to clear the same obstacle on landing.

Tests are at present being carried out with a "track type" landing gear and reversible-pitch propellers, and these modifications will reduce the landing run considerably for tactical use.

From the demonstrations that have been seen, it is clear that the C-82 is far superior to the aircraft it will replace and, having been designed solely for use in airborne and air transport operations sets a very high standard in this field.

MODEL BRIEFING AT BASSINGBOURN

HOWEVER well a map is layered and tinted it cannot compare with a relief model for emphasising contours and high ground. This principle has been employed at Bassingbourn in the construction of large-scale relief models of certain Continental airfields and surrounding districts. These models have proved very useful to briefing officers for pointing out to crews high ground or built-up areas in the vicinity of the airfield modelled. In addition to the high ground factor, the models are useful for giving crews a better idea of the lay-out and surroundings of an airfield than can be obtained from a map or a photograph.

A good example of the use to which the models can be put is in the case of Gibraltar. Here on the model, the bulk of the Rock stands up in sharp relief and shows the landing strip clearly at its foot so that crews can be shown the correct approach to the landing strip and the circuit round the Rock in the event of an overshoot.

It is pointed out that the use of the models is purely a refinement to normal briefing and that they are in no way a substitute for any part of the briefing routine.

A pilot being briefed with the aid of a relief model of Gibraltar.

SPORT IN TRANSPORT COMMAND

With the advent of the 1946/47 *winter sports season we welcome a return to the old order in the RAF sporting world. The numerous Associations which functioned before the war are again back in operation, and to simplify matters for those who are interested I have prepared a Sportsman's Quiz. This should keep everyone up-to-date, but if you have any more questions, ask your Sports Officer. Every Station has a Sports Officer whose duty it is to help you to play your part in the many forms of recreation that have been planned for you.*

SQUADRON LEADER J. S. LANCASTER, *Command Physical Fitness Officer*

Cricket

Upper Heyford (38 Group) are champions of Transport Command, and by beating Dishforth (4 Group) by 170 runs to 76, at Doncaster on August 15, they have qualified for the semi-final of the RAF Inter-Station competition. Their opponents will be either St. Atham or Grantham, of Technical Training Command.

In the first round of the Inter-Group competition Transport Command Group winners (No. 47 Group) were knocked out of the competition, being beaten by 6 wickets. The scores were: No. 47 Group, 63 runs; No. 11 Group, 64 for 4 wickets.

In the first round of the Inter-Command competition Technical Training Command played Transport Command at Cambridge on August 14. Technical Training Command needed 29 runs to stave off defeat when stumps were drawn at eight o'clock, owing to bad light. Score: Transport Command, 201 runs; Technical Training Command, 173 for 8 wickets.

In the re-play at Uxbridge on August 23, Transport Command defeated Technical Training Command by 166 runs to 93, thus qualifying for the final of the competition, which will be played at the Oval some time in September.

Lawn Tennis

The WAAF Inter-Command Lawn Tennis Championship was decided on August 21-22, at the Lyon's Club sports ground, Sudbury Hill, when Transport Command won the doubles and Bomber Command won the singles. Representing Transport Command were: Flight Officer Caustin (HQ 46 Group) and Section Officer Ripley (HQ 46 Group); Flight Officer Anderson (Syerston) and Flight Sergeant Nutt (HQ Transport Command); Flight Officer Wollen and Corporal Dixon, both of Stoney Cross.

The RAF Lawn Tennis Association has decided to institute an Inter-Command competition for the "Brady Challenge Cup." Transport Command's team of three pairs will meet No. 90 Group in the first round.

Swimming and Water Polo

The Inter-Command Water Polo Championship was decided at St. Atham on August 21, 22 and 23, when Transport Command's water polo team was defeated in the first round by Technical Training Command by 6 goals to 3.

In the Individual Swimming Championships, held at the same time, Flight Lieutenant Lumsdaine (Kershore) won the 100 yards backstroke race in 69 3/5 seconds, breaking the existing RAF record of 1 minute 11 1/10 seconds. He represented the RAF in this event in the Inter-Services Championships which were held at Aldershot on September 4 and 5.

SPORTSMAN'S QUIZ

Soccer

Has your station entered for the Inter-Station competition ? (AMO N.614/46)

Is your Group to compete in the Inter-Group competition ? (AMO N.614/46)

Has your name been submitted as a suitable player for inclusion in the RAF representative team ? (AMO N.614/46)

Do you want to qualify or register as a referee ? (AMO. N.636/46)

Rugby

Has your Station joined the RAF Rugby Union and paid its annual subscription ? (AMO. N694/46)

Has your Station entered for the Inter-Unit competition ? (AMO N.695/46)

Have you answered the request for referees ? (AMO N.615/46)

Boxing

Will your Station be represented at the general meeting of the RAF Boxing Association on September 13, 1946 ? (AMO N.693/46)

Hockey

Was your Station represented at the general meeting of the RAF Hockey Association on August 12, 1946 ? (AMO N.637/46)

Lawn Tennis

Has your name been entered for the Airmen's Championships at Halton Camp, September 9–14 ? (AMO N.692/46)

Golf

Have you been recommended for inclusion in the Command Golf Team ?

Squash Rackets

Have you thought of entering for the RAF Individual Championship in November ?

ASK YOUR SPORTS OFFICER

NATAL

In late 1943, *the first RAF unit landed at Natal, Brazil, a place of tents and construction work. The intention was clear: the establishment of radio communication between Trinidad, Belem, Natal, Ascension and Accra as early as possible. After a few months' work Natal began its two and a half years of service, passing British delivery machines from the USA to India. It saw most of the traffic of* 45 *Group at some time or other: Dakotas, Baltimores, Mitchells for India, the Liberator Saferry to Accra, the Mosquito run during the northern winter, the alternate stop of the BOAC Boeings, the PBYs being ferried to Russia by joint RAF and Russian crews.*

In 1945, *with the collapse of enemy resistance, special flights came that way. Pioneer of the diplomatic journeys was Air Chief Marshal Sir Arthur Harris, who flew the round route from UK via Africa, Rio de Janeiro, Trinidad and Washington, back to UK again with three Lancasters. Soon after, Natal tended its first York, flying a Brazilian Aeronautical mission to London, and a short time later its first Lancastrian, surveying for British South American Airways. At long last the Royal Air Force in Brazil felt it had achieved equal status with its American hosts; and a great many of those willing boys who stood guard of honour at those times owned to a queer feeling whenever the ensign broke from a new arrival. Only five British families reside in the city; only thirty-odd officers and ranks comprised the unit. But there was as much concern for Britain and her doings in Natal as in any British stronghold.*

The Air Force was well received in Brazil. It should go on record, nevertheless, that certain of our habits were found strange in the city. It is especially recalled that after a shocked silence created by our first appearance in shorts, onlookers spread large smiles and exclaimed, "Bambinos." But Brazilian etiquette proved so strict that eventually it became diplomatic to prohibit the wearing of shorts in the city except on duty. Sincerely appreciated was the last tribute of a Brazilian village to one of our crews—the only British crew to come to grief in that region. The rescue party found our three fliers already surrounded with flowers. To-day there are three graves in Natal cemetery bearing the RAF roundel.

By midsummer of 1945 *the route was well planned. Aircraft flying from Belem through Natal to the South or East had well designed navigational aids. There were five ranges for guidance between Belem and Natal, and three between Natal and Ascension; southward, the chain continued to Buenos Aires; so that it was possible to fly the ranges all the way. Rather were they used as position lines, however, since aircraft had frequently to run one or two hundred miles out to sea to circumvent storm fronts.*

American aircraft relied entirely upon R/T, except in emergency, and the service was good. RAF aircraft used the more reliable W/T, checking with the R/T stations at Sao Luiz and Fortaleza. During the operation when American troops in Europe were being flown back to the United States at the rate of 4,000 *per month, close liaison was necessary between the RAF W/T stations and the American Control Centres. At all terminals the RAF used the American approach and control tower facilities.*

The unit at Natal was housed, serviced and fed by its American hosts. Barrack blocks were long, low and well built of brick and concrete. Windows, covered with close-mesh wire screens, ran continuously around the walls. In the centre of each block, the wash-room contained true sanitation, a dozen wash basins and half a dozen showers. The largest "PX" in the world provided many a transport flier with leather goods, silk stockings and watches. The snack bar was open most of the day; the dining rooms ran 24-*hour continuous service. Ice cream was plentiful. This was a temporary base incidentally.*

The laundry service for transients was exceptional. Within twenty-four hours clothes were returned in excellent condition. The bus service plied every hour to the city from 0600 *to* 2359 *and used proper passenger vehicles. And how many must remember the hourly bus which ran to Ponta Negra—a better beach by far than Miami, Florida.*

The crews until the latter days were all veterans of civil flying and knew Natal well—the swimming in Lake Bom Fim, the unlimited hospitality of the British Vice-Consul, of the Shell agent, of the Cable and Wireless Manager. They knew the unit staff, and "the boy on the other key"—something that our latter-day crews overlooked. There was a real friendship between the transients and the permanent staff.

Failure was never in the dictionary in Natal and EVT was a complete success. The unit functions flourished and the Officers were honoured with membership of the "Aero Clube do Rio Grande do Norte" and of the "Clube Hipico do Natal." Officers and other ranks alike were grateful for the constant, willing and prompt assistance of their American hosts, and especially for the services of the hospital staff.

Natal was a unit which people were sorry to leave: like Belem, its northern link, and Ascension to the east, it served its purpose well; and those of us who saw it may be thankful that the foundations were laid then, not only of the present BSAA route, but of firm Anglo-American friendship and mutual respect.

(18721) Wt. 8211 N2337 4,000 9.46 S.P. & S. G 8/35

Code 476

DARREL'S ISLAND, BERMUDA
Until quite recently this was the flying boat base of No. 80 S.P. The RAF buildings are on the extreme left.