RAF TRANSPORT COMMAND REVIEW

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TRANSPORT COMMAND REVIEW

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No. 12 AUGUST 1946

CONTENTS

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TRANSPORT COMMAND

Aircraft Accident Picture: 1945

SQUADRON LEADER B. R. STANOYLOVITCH, O.Y.C., V.M., *Accident Prevention Officer, Transport Command*

THE words "aircraft accidents" do not belong to the category of glamorous words. The reason is obvious—they remind aircrews of the unpleasant aspect of flying, and the commanding staff of the failures of their planning and execution. For this reason one is often inclined to forget these words and all unpleasant features connected with them. Such an ostrich-like attitude can have but one result: a heavy toll in both lives lost and aircraft destroyed.

There is, therefore, no other choice but to face the menace in order to understand it and reduce its harmful effects. This sound policy was adopted three years ago, and in the spring of 1944 an aircraft accident prevention organisation was spread throughout the Royal Air Force.

How well-founded and justified this decision was can be best understood in the light of its achievements. For example, Fig. 1 (overleaf) shows the accident rate trend in Transport Command since the establishment of its accident prevention organisation in 1944.

This graphic picture shows that in two years the safety of flying in Transport Command improved by 60 per cent. The improvement was steady throughout this period and bears witness to the possibilities of a successful fight against the aircraft accident menace. One must bear in mind, however, that these results have been achieved under the adverse conditions of operational necessity during the war and the transitional period from war to peace. There is, therefore, every reason to hope for still further improvement in our aircraft accident position now in peace-time, when these adverse conditions are progressively disappearing.

The first complete year of Transport Command activities, from the accident prevention point of view, was 1945. The record of results achieved during that year has been recently published in a special study under

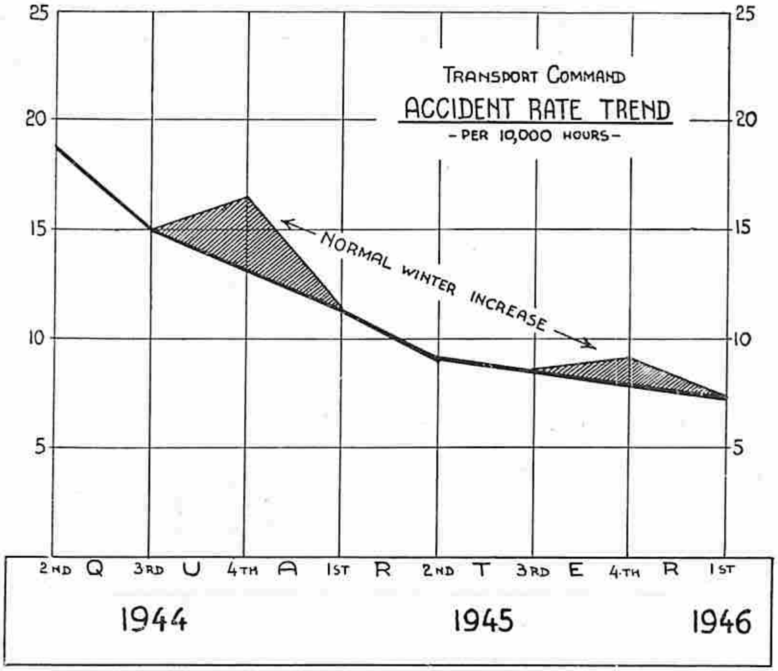


FIG. 1

the title: TRANSPORT COMMAND, YEARLY ACCIDENT ANALYSIS, 1945.

The aim of the Analysis is to give the classified facts, explained and compared, of the accident position in Transport Command in 1945, thus providing a solid and reliable basis for a successful policy for increasing our safety in flying. It is a generally accepted truth that there cannot be a prevention policy if there is not a wide and sound knowledge of the causes of aircraft accidents, just as the cure and prevention of disease is impossible without correct diagnosis and knowledge of causes. The Analysis provides this knowledge.

This study satisfies the law of probability because it is based on one and a half million hours flown and 1,535 accidents. Thus the basis on which the Analysis is built is large and reliable, as Fig. 2 proves. This graph shows that every day, throughout the year, four aircraft were involved in accidents, one of which was written off. The ordinary serving officer probably finds it difficult to relate these massive statistical figures to his own experience of flying accidents as apparently infrequent occurrences, associated with abnormal conditions. The explanation lies in the large amount of flying that Transport Command has been doing. It must be remembered that every day Transport Command aircraft on the average covered a distance equal to twenty times the circumference of the earth at the equator. It must also be borne in mind that all accidents have been included in these figures, even those minor ones repairable by the unit within forty-eight hours.

The results achieved in 1945 by Transport Command, when judged by the accident rate trend, appear satis-

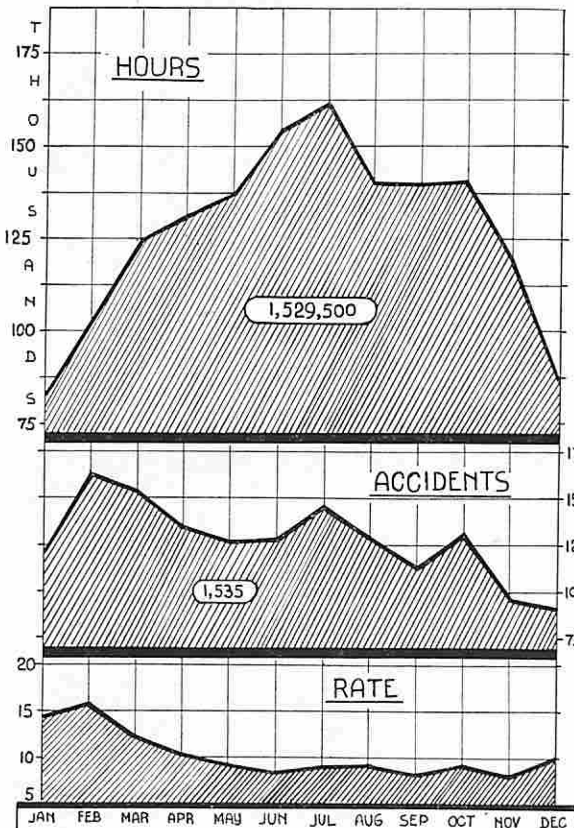


FIG. 2

factory. However, the correct idea can be obtained only by comparing these results with those achieved by another similar organisation for air transportation. Such an organisation is British Civil Aviation. This comparison, which is given in Fig. 3, shows that Transport Command has done very well indeed, and proves that the criticism of the Press regarding our safety in flying was unjustified and incorrect.

It is beyond the scope of this article to go into details of our accident picture for 1945. Here, therefore, are given only a few interesting facts.

The monthly flying time of Transport Command steadily increased during the first half of the year, and from 83,000 hours flown in January, the peak was reached in July with 162,000 hours. After the end of the war with Japan, the flying activities started to decrease so that in December the total amount of flying fell to 90,000 hours.

The accident rate, however, did not follow the same course. The highest monthly rate of 15·92 was reached in February, and afterwards decreased rapidly so that from the month of May it remained stabilised in the vicinity of 9 accidents per 10,000 hours. The lowest rate, 8·04, was achieved in November, the yearly average being 10·03.

Another characteristic feature is the increase by 27 per cent. of the bad weather period rate in comparison with that for the fair weather period, the rates being respectively 11·32 and 8·92.

The study of the accident rates by roles of flying gives these figures as yearly average rates per 10,000 hours: Transport 5·5, Training 15·5 and Ferrying 21·0.

The other aspects of our accident picture are represented in Fig. 4, which is self-explanatory.

These graphs are intended to show the mutual relation of various factors which have determined our accident picture for 1945. They are only the general pointers for accident prevention giving the necessary information regarding the fields which need our attention most.

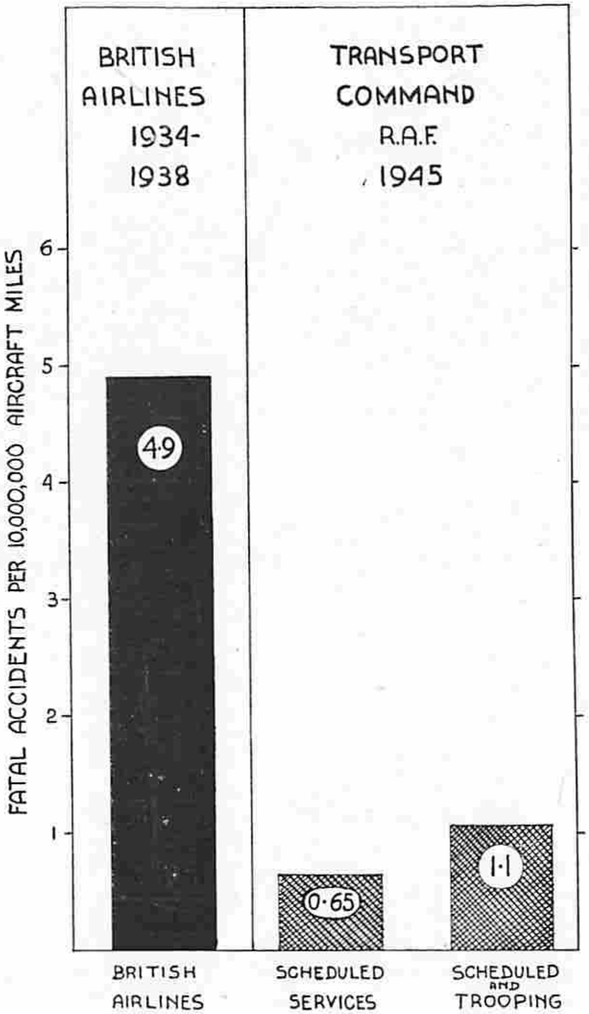


FIG. 3

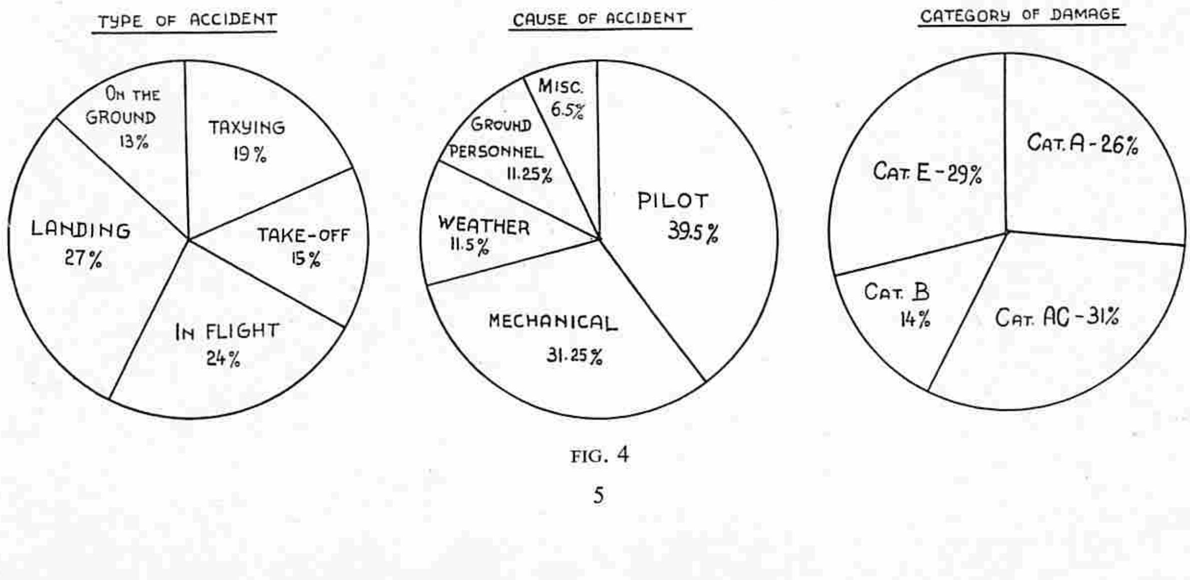


FIG. 4

CAUSE OF ACCIDENT	ACCIDENTS	PER CENT.	RATE
Error of skill	286	18·76	1·88
Taxying	173	11·27	1·13
Cockpit drill	74	4·82	·48
Navigation	27	1·75	·18
Flying discipline	19	1·23	·12
Aircrew drill	9	·58	·06
Other errors	19	1·23	·12
PILOT	607	39·64	3·97
Landing gear	229	14·91	1·49
Power plant	179	11·66	1·17
Airframe	44	2·86	·29
Fire	28	1·82	·18
MECHANICAL	480	31·27	3·13
Flying accidents	122	7·95	·80
Ground accidents	57	3·71	·37
WEATHER	179	11·66	1·17
M.T. drivers	74	4·82	·48
Ground crews	63	4·10	·41
Flying controllers	21	1·37	·14
Others	12	·79	·08
GROUND PERSONNEL ..	170	11·07	1·11
Airfield	36	2·34	·24
Birds	16	1·04	·10
Missing	16	1·04	·10
Org. and equipment ..	10	·65	·07
Other causes	21	1·37	·14
MISCELLANEOUS ..	99	6·44	·65
TOTAL	1,535	100·0	10·03

FIG. 5. *Causes of accidents in Transport Command in* 1945

The study of the causes which have brought about our accidents is the most important part of the Analysis. It comprises both an examination of the causes of accidents from all points of view, as well as the conclusions they force upon us. On the basis of these conclusions are suggested the main lines for combating accidents during the current year.

The general picture of the causes of our accidents is given in Fig. 5. It shows that preventive action for reduction of accidents has to be taken by all branches: training, engineering, flying control, motor transport and meteorological officers, etc., but in the first place it should be taken by station and squadron commanders. In other words, the offensive against accidents must be made on the whole front, and in this cause the constant co-operation of every officer and airman in Transport Command is sought.

Our goal for the present year is to achieve the all-round reduction in the Transport Command accident rate by at least 25 per cent. compared with that for 1945. Here, therefore, are the goals—the accident rates which should not be exceeded:

4 Group	6·0	accidents per 10,000 hours
38 Group	10·0	,, ,, ,, ,,
46 Group	9·0	,, ,, ,, ,,
47 Group	6·0	,, ,, ,, ,,
Transport	4·0	,, ,, ,, ,,
Training	12·0	,, ,, ,, ,,
Ferrying	15·0	,, ,, ,, ,,
Engineering	2·5	,, ,, ,, ,,
Navigation	0·1	,, ,, ,, ,,
Flying Control	0·1	,, ,, ,, ,,
M.T. Branch	0·35	,, ,, ,, ,,
Aircrews	3·0	,, ,, ,, ,,
Ground crews	0·3	,, ,, ,, ,,
TRANSPORT COMMAND ..	7·5	accidents per 10,000 hours

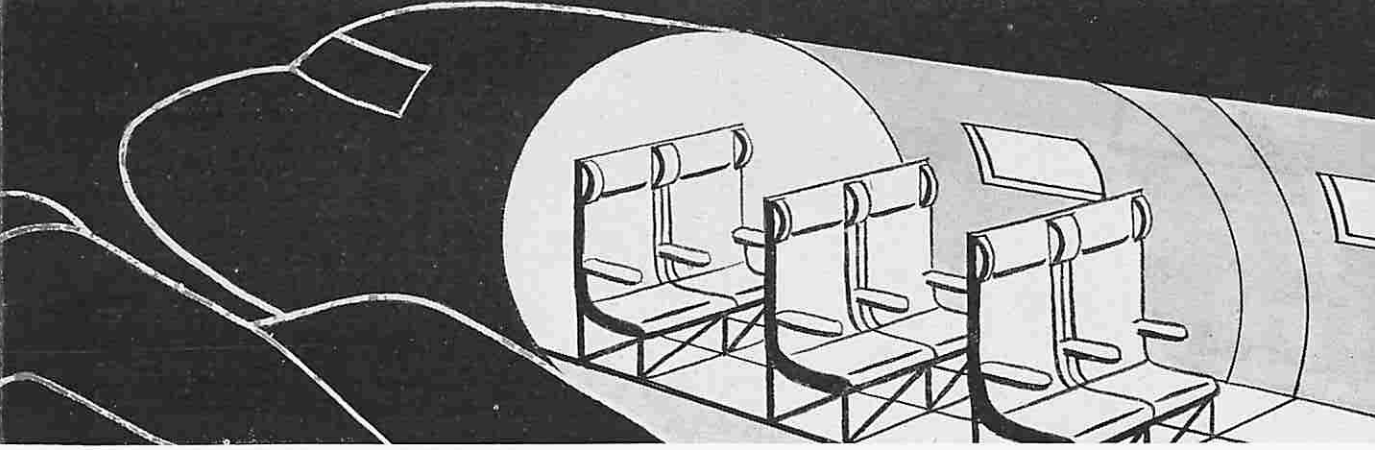
There will, of course, be good and bad months, successes and setbacks, but when they are all reckoned at the end of the year, we are certain that the majority will have remained well within the limits allotted them. This great contribution to our safety of flying and the reputation of Transport Command is a mathematical certainty if our units preserve the same fine spirit of teamwork, perseverance and determination. Accidents cannot be prevented by mere drafting of regulations, but they tend to disappear like magic when flying and ground personnel unite in a common enthusiasm to eliminate them.

ALLIES STUDY RAF AIRBORNE ASSAULT TACTICS

MILITARY missions from France and the Netherlands are at present touring this country studying the latest British methods on which the re-organisation of their own armed forces will be partly based. Particular attention is being paid to the new tactical developments of the late war. Parachute assault is not the least of these.

The Dutch East Indies defence programme plans a paratroop battle school which will embody the latest in airborne technique. Staff representatives of the Netherlands Army and Air Force, under Lieut.-Colonel Platte, have seen the type of training evolved out of the experiences of the European campaigns at Upper Heyford, Transport Command's No. 1 Parachute Training School. This mission is now studying the course of instruction in detail. Three of the members, Captain Cox (Air Force), First Lieutenant Sisselaar and Second Lieutenant Van der Veer (Army), have already made two of the eight required jumps.

This branch of military operations is also being examined by a group of ten French experts, headed by General Regnault.



Let's Look Aft

In this article, WING COMMANDER C. C. BARKER, AFC, F/PMO *at Headquarters, Transport Command, expresses his personal views and invites criticism*

THE question of securing the maximum safety for crew and passengers in an accident is obviously important. Until such time as engines, de-icing equipment, aids to navigation, aids to bad weather flying and, above all, *homo sapiens* become perfect and accident proof, mishaps will occasionally happen.

It is unfortunate that this premise has to be accepted, but the incidence will be materially reduced with the increase in the perfection of aircraft equipment and meteorological aids. In addition, methods of training of crews are constantly under review. Accidents, however, will still occasionally occur. How can we assist in decreasing the risk of injury to crews and passengers in the case of an accident?

For two or more years I have been advocating the use of aft-facing seats for passengers at all times, and for crew members not actually concerned with the ditching or the crash landing of an aircraft.

The idea is not new. During the war operational commands, using multi-seater aircraft, found from experience that the best ditching stations for all but the pilot or pilots were in some position in the aircraft with the crews' backs against a main spar or bulkhead facing aft. Operational crews were briefed accordingly.

But in passenger carrying aircraft the conventional forward-facing seats present difficulties in protection against rapid deceleration (up to 25G) which are well-nigh insuperable. Although the floor, seats and seat-fixings can all be stepped up to take a force of 25G deceleration, they still offer no protection to a freely wagging head. In such circumstances, even though the body is held in the seat by a Sutton or "Q" type harness, a fracture dislocation of the cervical vertebrae is likely to occur, and death is the result.

True, the addition of a forehead strap would probably obviate this difficulty. But think for a moment of the briefing staff and passengers having to learn to adjust a Sutton or "Q" type harness and a forehead strap on take-off, on landing or in an emergency. Anyone who has seen an air passenger for the first time endeavouring to do up a simple lap strap will understand what I mean.

And what of the unexpected crash when there is no time to take precautions? Why not use common sense? Operational commands used the aft-facing position for ditching whenever possible; why not adopt this principle in the arrangement of seats?

What are the advantages of aft-facing seats for passengers? Let us enumerate them:

(*a*) Passengers at all times will be in crash positions. The only addition necessary will be a lap strap for bumps and for preventing excessive lateral movements.

(*b*) The forces of deceleration would be taken by the body from the head down to the sacrum, or base of the spine, spreading the force evenly over the strongest part of the body and offering complete security to the head and neck.

(*c*) Live tests have already been carried out with decelerations amounting to nearly 20G and there seems no reason to suppose that the human frame cannot stand up to a deceleration of 40G for a short period, such as in a crash, if it is adequately supported in this manner.

(*d*) The manufacturers of the Vickers Viking and the Airspeed 60 have already designed a floor with aft-facing seats and seat fixings which will withstand a deceleration of 25G, thus overcoming any design objections. Admittedly, such strength must involve a weight penalty, but the penalty applies equally to forward-facing seats stressed to withstand the same deceleration, plus the additional weight of harness and forehead strap.

(*e*) Crews, other than pilots, could have their seats arranged on a ring which could be swivelled and locked in the aft-facing position for take-off, landing and in an emergency.

So much for the points in favour of aft-facing seats. The only factors that I have heard put forward against such a safety precaution are these:

(*a*) *It is psychologically unsound.* This is a debatable point, but I don't agree that it is psychologically unsound. We sit facing backwards in trains, taxis and trams without complaint. In any case, if passengers are told that this method of seating is an added safety precaution, there will be no genuine complaints. As far as military aircraft are concerned there is no need to raise this issue at all, as service personnel will do as they are told.

(*b*) *That there is impairment of vision.* I agree that there will be limitation of vision forwards, but actually one can see more landscape by looking backwards and, in any case, mid-wing and low-wing monoplanes obscure the forward vision for quite a large proportion of passengers.

(*c*) *That the seat, facing backwards, in the tail-down position, will slope forward and be uncomfortable.* I agree, but surely designers can overcome this problem; and if they cannot, I consider that the slight discomfort experienced for a short time is worth the measure of additional safety offered.

(*d*) *That airsickness is increased.* This has no evidence to support it.

To sum up: I feel that common sense points to the adoption of this elementary precaution to ensure the greatest possible degree of immunity to crew and passengers from death or injury in a crash.

Can anybody have any strong objections?

EDITOR'S NOTE: *Letters or articles on this subject are invited.*

A COSTLY WARNING

This is a lesson which must be learnt by pilots and navigators the world over. It is a summary compiled by the Accidents Branch of Transport Command Headquarters and details the causes which led to the loss of many lives in a most serious accident: it emphasises the folly of approaching a hilly coast at night, below the safety height and when conditions preclude accurate fixing. The need to have at least one independent check on the position of the aircraft is imperative, e.g. a bearing from the airfield, to ensure that the aircraft is flying along a safe lane of approach

A DAKOTA aircraft returning to the UK with twenty-three passengers reached Catania without incident. After a short stop there the aircraft took off at 1202 hours GMT to fly to Bordeaux, but during the flight it changed its destination to Istres. Regular wireless contact was maintained up to 1704 hours GMT when the aircraft gave its final ETA at Istres as 1720 hours GMT. Shortly afterwards, in the dark, the aircraft flew into the high ground on the coast south east of the airfield. There were only two survivors.

From the mass of evidence collected by the Court of Inquiry it was possible to reconstruct the circumstances leading up to this serious accident. From data regarding the time and position at which the aircraft crossed the west coast of Sardinia, it was established that it was adhering to the flight plan and that forecast winds had proved correct up to this point. Course was then changed for a DR position south of Istres, using the same wind as for the previous leg. The aircraft then ran into a severe local storm in which it was impossible to see the surface. The flight was continued, apparently without any attempt to avoid the severe weather.

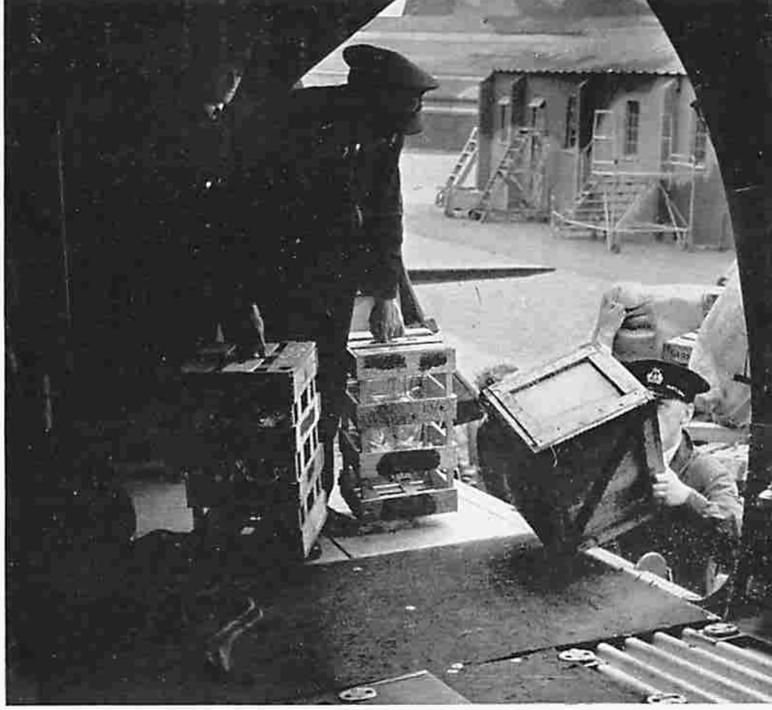
The navigator must then have obtained a fix (by some means which the Court were unable to establish) and from this calculated a new wind, which proved to be incorrect. The course was again changed to fly into Istres on a northerly heading, but as the navigator had calculated a false wind, this alteration of course was made too soon; shortly afterwards the aircraft flew into high ground at 1,300 feet.

Evidence showed that the navigator signalled three widely different ETAs after leaving Sardinia. This suggests that he was obtaining some navigational data but was finding it difficult to achieve accurate navigation. At no time, however, was any use made of the radio facilities at Istres to obtain a bearing from the airfield to ensure that the aircraft was approaching along a safe lane.

Examination of the scene of the accident established the fact that the aircraft struck the ground when flying on a northerly heading, and it is assumed, therefore, that the captain was under the impression that he was approaching Istres over the sea and over the low ground south of the airfield. As the coastline was approached no attempt appears to have been made to increase altitude to clear the high ground.

This accident was clearly caused by three main factors: the captain made no effort to fly round the severe local storm; on flying into the bad weather area he failed to maintain safety height, though he must have been aware of the existence of high ground flanking his intended track to Istres; and the navigator failed to make sure of the exact position of the aircraft before making the final alteration of course, which was intended to ensure that the aircraft approached Istres along the Rhône valley.

FREIGHTING BY AIR



SQUADRON LEADER H. W. AINSLEY

Traffic Branch (Freight), H.Q., Transport Command

FREIGHT has always been the Cinderella of air traffic. In pre-war days the freight traffic on American scheduled airlines amounted in ton-miles to less than 4 per cent. of the passenger traffic. From Great Britain, on the main trunk routes to the Middle and Far East, the total was about 10 per cent. of the passenger traffic. The highest percentage of freight traffic was carried on European airlines, where it totalled some 30 per cent. It is extremely difficult to classify the types of freight carried, but it is roughly correct to say that on the main trunk routes items of air freight were normally of small bulk but high intrinsic value; on shorter routes, such as European services, all types of goods, which come under the classification of general merchandise, were carried.

The development of air freighting has been most rapid in areas such as the north of Canada, New Guinea and parts of Australia, where railways, roads and waterways are often non-existent and their construction would have been difficult and extremely expensive. The discovery of new natural resources and the resulting rapid industrialisation in these areas created new and urgent demands for improved methods of transport. The aeroplane was used instead of surface transport for the conveyance of mining apparatus, machinery and domestic supplies required for opening up these new industries.

The war has proved that comparatively few articles are too large for air transportation. Movement by air of jeeps, small tanks, motor vehicles, large field guns and aircraft engines weighing in excess of one ton, has now become commonplace; ten years ago such feats would have been considered impossible. To obtain maximum mobility, military planners will soon be demanding aircraft capable of lifting tanks and armoured vehicles weighing up to, and even exceeding, 10 tons. This does not necessarily mean that it will soon be a commercial proposition to move items weighing as much as 10 tons by air, but it does mean that as a result of such military demands, freight-carrying aircraft with a much higher carrying capacity and with greatly reduced power loading will eventually be developed.

In 1943, the first year of its existence, RAF Transport Command's freight lift from the UK to destinations overseas amounted to 1,100 tons; by 1944 the figure had risen to 19,310 tons, and by 1945 to 24,245 tons. The peak month was April, 1945, when the weight of freight flown from this country totalled 5,075 tons. The total weight of freight carried on Transport Command aircraft throughout the world for the year 1945 was 209,820 tons. Expressing this figure in the normal working weight of pounds, this gives the total freight lift of 469,996,800 lb., or as an average aircraft load of 7,000 lb. it represents 67,142 complete aircraft loads of freight carried throughout Transport Command in 1945.

The freight handling system employed by Transport Command has been gradually developed from the improvisations of the early days to the month of September, 1945, when the present consolidated freight handling instructions were issued. During the war, all space in transport aircraft has been at the disposal of the Government, and has been directly controlled by the Air Priorities Board. All applications for freight lift were submitted on Form 1380 to the appropriate Air Priorities Board, who decided whether freight was of sufficient urgency to justify air space. The approved applications were passed to RAF Transport Command Freight Control Office

Freight shed at Lyneham

where the controller decided by which service it was to be flown to the destination, and the consignors were then instructed to deliver the freight to the appropriate airfield for despatch. Each consignment of freight is given a freight identity number, and by a system of Progress Records it is then possible to trace the passage of the freight until it is eventually delivered to the consignees. In the past many cases of freight mishandling have been attributable to insufficient addressing and marking by consignors. To obviate this trouble, standard freight labels have now been produced in separate colours according to the priority of the consignment.

The types of freight handled by the Command cover an extremely wide range of articles, from emergency supplies of vaccines, blood plasma, penicillin, etc., to complete aircraft power plants. All aircraft spares for transport aircraft, grounded through unserviceability, are termed AOG TRANS spares and are sent on the first available aircraft, taking preference over all priority loads. The freight handling personnel must be conversant with the special regulations for handling dangerous cargoes such as explosives, acids, tinned petrol, etc. In addition, they must always be prepared to use their ingenuity to consign by air such cargoes as live animals, birds and reptiles. It is impossible to provide for these exigencies in detail in the general freight handling instructions. Such strange cargoes are not so infrequent as may be commonly imagined. In 1944, the writer was called upon to send by air from Rabat, in Morocco, a consignment of monkeys to replenish the dwindling colony in Gibraltar. On another occasion, a York aircraft landed with a caged brown bear *en route* from Russia to UK.

A few words must be said about the greatest freighting operation of the war, namely the airborne supply work in support of the Burma campaign. For the first time in history, a campaign was planned in the knowledge that the troops taking part would have to rely for their manifold needs almost entirely upon transport aircraft. These aircraft operated across the most dangerous country in South-East Asia, enabling the Burma campaign to be brought to a successful conclusion. Between August and the middle of November, 1944, over 11,000 tons of supplies were flown to the Fourteenth Army. In the preparation for the battle of Mandalay an even greater effort was needed; in January and February, 1945, over 60,000 tons of supplies were flown into Burma. Throughout the whole of the Burma campaign some 500,000 tons of supplies were moved by air in American and British transport aircraft.

So much for past achievements—what of the future of air freighting? Undoubtedly the extensive use of aircraft for the movement of military supplies during the war has roused an immense interest in the potentialities of this means of transport for peace-time commercial shipments. From the military angle the future is assured: the trooper-freighter aircraft is essential for ensuring the complete mobility of combat squadrons and airborne troops. It has the advantage of being able to fulfil both functions with little adjustment. In addition, owing to its austerity finish, the payload is high in comparison with the all-up-weight of the aircraft.

What of the commercial future? Critics state that war-time achievements have no bearing on commercial air transport; they stress the fact that transportation by air of war supplies has been uneconomical in monetary cost. It is untrue to say that in the operation of military airlines no regard has to be paid to the question of cost: no country in the world is in the happy position of having unlimited supplies of manpower; the greatest headache of the military staffs is the employment of

Priority freight—diplomatic mail
PHOTO BY COURTESY OF "ILLUSTRATED"

manpower to the best advantage. Availability of military air transport facilities is closely allied to the availability of personnel for servicing and operating the aircraft.

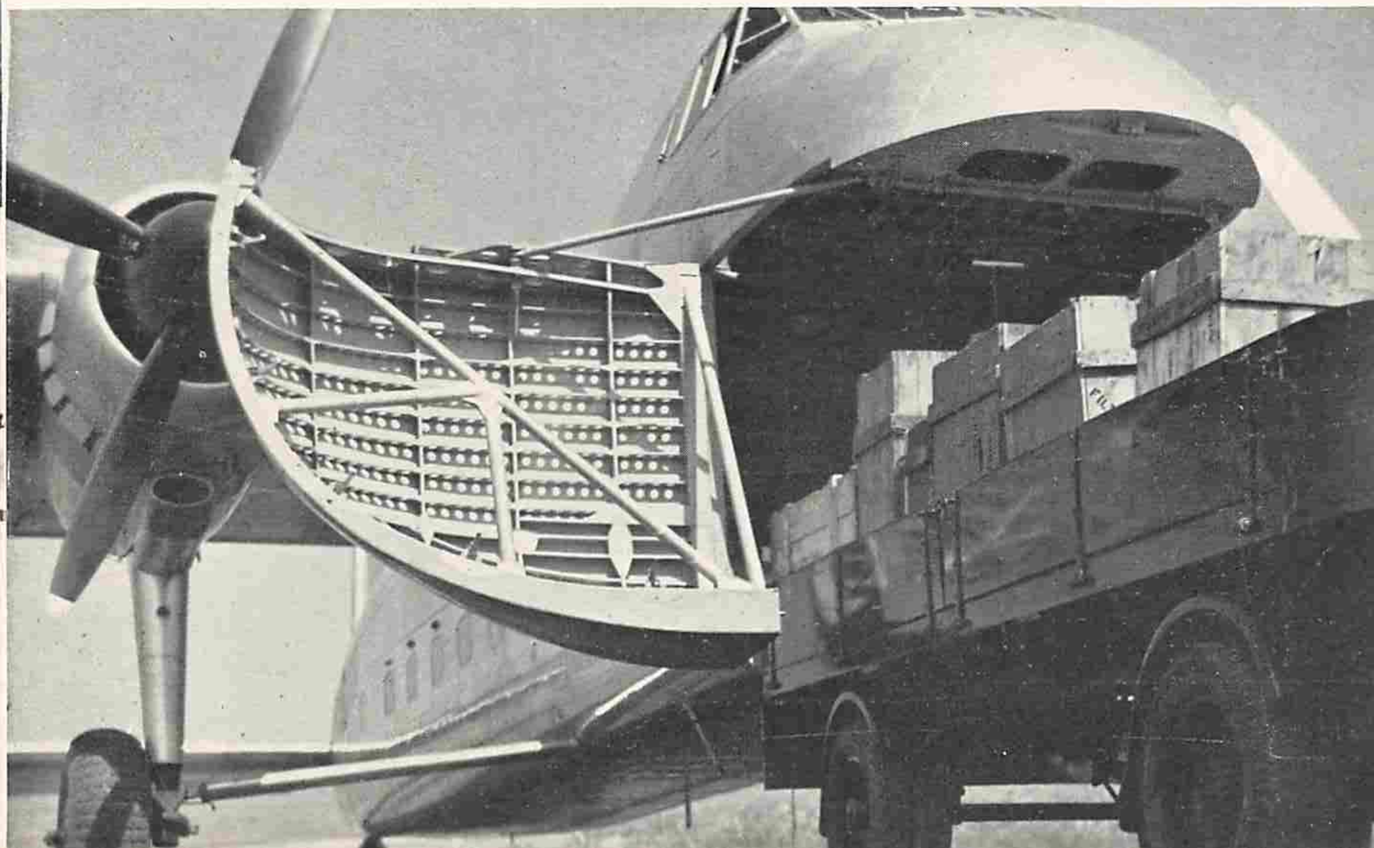
For the commercial operator economy in operation is of paramount importance. The economics of freighter airline operation are, therefore, similar in both cases: for the military airlines, economy in manpower cost per ton-mile, and for the commercial operator, economy in monetary cost per ton-mile.

The great advantage of air transport lies in its speed, and in its mobility, *i.e.* its capacity to fly the direct route without regard to normal geographical barriers. So far, its great disadvantage has been its operating cost.

One matter which has a very great bearing on operating cost is the type of aircraft employed on freight carrying. This brings up the question of the advantages of using special aircraft for freighting, in preference to the passenger-cum-freighter type. In the normal passenger aircraft mail or freight is usually carried as make-up load. The weight so carried is small, and usually limited by the size of the loading doors, which are usually cramped at the rear, or near the underside of the fuselage. On most flights the payload available depends upon the length of the leg to be flown, and in such cases the freight is used as ballast to be off-loaded when the payload is low. The advantage of the special freighter aircraft lies in the fact that it can be designed with a high wing giving a lower loading platform and large loading doors (front and rear if possible). In addition, the elimination of sound-proofing, floor covering, fitted seats, kitchen, food stores and passenger lavatory accommodation reduces the basic weight of the aircraft and gives a large proportion available for payload. The Bristol Freighter's cargo hold, for example, has a capacity of 2,020 cubic feet. Access to it is gained by hydraulically-operated doors which split the nose of the fuselage wide open. The sides of the fuselage are rectangular, making it far easier to load. To facilitate loading and stowage the manufacturers have designed five standard-type containers for use with the Freighter. These containers can be pre-loaded at the air terminal and then each loaded on to its special truck and lifted to the 4 feet 6 inch floor level of the aircraft by a hoist in the nose. Alternatively, it can be loaded direct from a ground vehicle which can be backed up to the loading doors.

An aircraft can earn money only while it is flying, therefore every improvement in ground handling equipment will ensure a quicker turn-round and an ultimate reduction in operating cost. Experiments are also proceeding with light-weight lashing gear and light-weight cases and packing materials for air cargo. Every reduction in such non-income-earning load means more payload capacity. Air freighting is becoming a definite commercial proposition, and reductions in operating costs and increased facilities will be rapidly followed by an increased demand for air freight space.

OPENING FOR BRITISH GOODS: *The big mouth of the Bristol Freighter measures between 7 ft. and 8 ft. in width, and 7 ft. 10 ins. in height, to admit air freight loads of exceptional bulk.*



WEST INDIAN WEATHER

FLIGHT LIEUTENANT N. E. DAVIS, M.A.

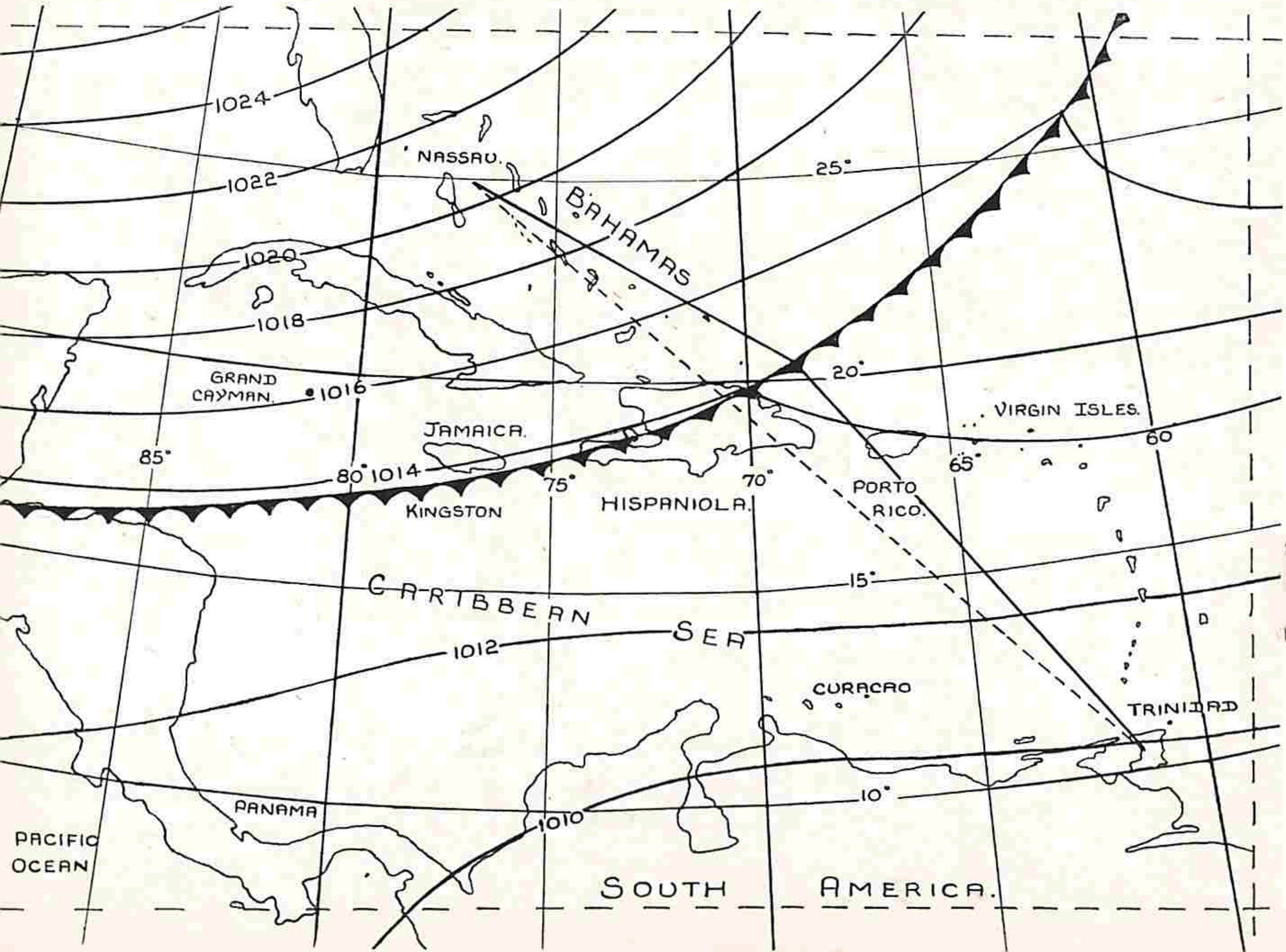
THE West Indies form a chain of islands running eastwards from Florida and Central America roughly along the 20° parallel between 85° and 60° west, and thence southwards to the coast of South America. They lie almost entirely in the tropics. For the most part the weather is pleasant and flying conditions good, so that the aviator may feel, after a prolonged spell of fair weather, that it is scarcely worth consulting the Met. Office. But it is well to remember that, when the weather is bad, it is some of the worst in the world.

For the most part, except for the Bahamas, the islands are mountainous, the highest points being over 10,000 feet in Hispaniola and over 7,000 feet in Jamaica. As a consequence the local terrain has a marked effect on the weather at certain places. For example, the annual rainfall at Kingston (Jamaica) is about 30 inches, while in the mountains some twenty-five miles away it is well over 200 inches.

The year may be divided into two seasons, the dry from December to April, and the wet from May to November. The terms dry and wet are merely relative, and on occasions heavy rain may fall in the dry season and a long dry spell occur in the wet season. For example, more than 6 inches fell at Kingston (Jamaica) during February, 1941 (normal half an inch), and less than one-tenth of an inch in June, 1940 (normal three and a half inches).

The dry part of the year is characterised by cold fronts moving slowly from north-west to south-east through the area. The only poor weather likely to occur is

FIG. 1 *below shows a typical dry season situation. A cold front is moving slowly SE through the Caribbean*



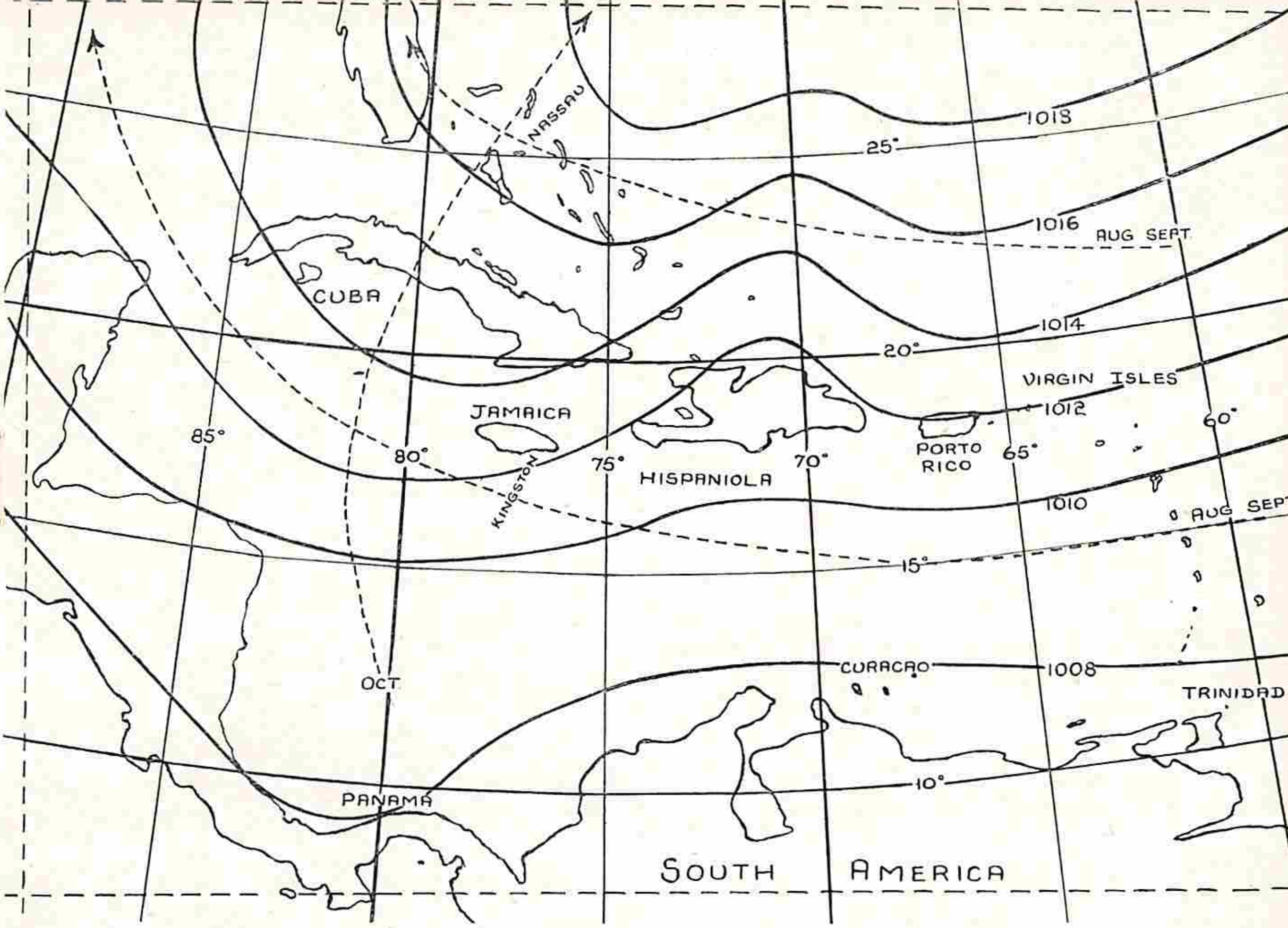


FIG. 2 *above shows a typical wet situation. A wave of the inter-tropical front is moving WNW*

associated with these fronts. As there are not more than one or two crossing the area at any one time, flying during the dry season is generally good, normal conditions being good visibility and a small amount of cumulus cloud, except on the windward side of mountainous areas.

The cold front itself is normally of moderate intensity and may not be very wide, but, due to its slow movement, any one place may be affected for very many hours. Over the area the frontal cloud may be broken, and it is generally possible to negotiate the tops at about 10,000 feet. The method to be preferred, however (a rule that is best followed when encountering any tropical front over the sea), is to fly underneath at very low level, avoiding the heaviest rain.

Over land the front is usually more active by day due to the increased convection caused by surface heating and forced uplift over the mountains, and exceptionally the front may give thunderstorms.

Fig. I illustrates a typical dry season situation, with a cold front moving slowly south-east across the island of Hispaniola, but only on rare occasions would a flight from Nassau to Trinidad have to be planned to a point north-east of Hispaniola, rather than through the front on the direct track.

The wet season commences with the advance of the inter-tropical front northwards from a position south of 10° North up the east coast of South America into the Caribbean. Further, the inter-tropical front from the South-East Pacific may advance north-east across the Isthmus of Panama. At the same time cold fronts from the USA will continue to move slowly south-east into the area (but less frequently than in the dry season). Disturbances are liable to form on all the fronts, and in exceptional circumstances they may develop into tropical depressions or hurricanes. The front moving across the Isthmus of Panama is especially liable to develop a hurricane but, fortunately, the activities of this front are confined to the months May, October and November. Even when no disturbances form, weather is still liable to be very poor. Twenty-two inches of rain fell at Swift River (Jamaica) one night in November, 1940, in connection with the Panama front, and 20 inches in one day at Grand Cayman Island with the passage of a cold front in May, 1941.

The worst weather is to be met on one of these fronts when a disturbance is passing along it. Giant cumulo-nimbus rising to 30,000 feet, and higher over land, may be expected. On flying towards one of these fronts, pilots should make for the weakest and lightest part of the cloud structure, and fly underneath at very low level, attempting to avoid the heaviest rain. At all times when negotiating severe weather in the tropics, the pilot should alter course to take every advantage of slight gaps or thin parts in the cloud or, if conditions are becoming dangerous, turn round and seek another way through.

The pilot of a Catalina, flying from Trinidad to Bermuda in 1942, encountered heavy cumulus at about 10,000 feet just north of the Virgin Islands. Shortly after entering the cloud, hail was encountered and the aircraft was promptly turned round and flown out of the cloud—much to the chagrin of the navigator whose recent fixes over the Virgin Islands were now valueless. Further penetration of the cloud, however, might have meant damage to the aircraft from hail, or severe upward currents might have carried the aircraft above the freezing level with consequent severe and rapid icing.

The number of wet weather disturbances varies much from one year to another. A typical example is shown in Fig. II in which one is moving westwards over the Caribbean Sea. It is indicated by a shallow trough in the isobars though the precise frontal structure is uncertain. A definite feature of these disturbances in the easterlies is the fall of pressure in front (to the west) of them. Well south of the disturbance conditions are fair with scattered cumulo-nimbus clouds. In the trough to the north heavy squalls occur with occasional cloud tops reaching 30,000 feet. At times during the passage of the disturbance the weather is very bad indeed with heavy and prolonged thunder, and solid cloud from 400 to 40,000 feet in places. In certain circumstances, particularly between August and October, the disturbances develop into complete circulations ; on an average about five or six of these occur each year, and about half of them are of hurricane intensity. Some typical hurricane tracks are shown by the pecked lines in Fig. II.

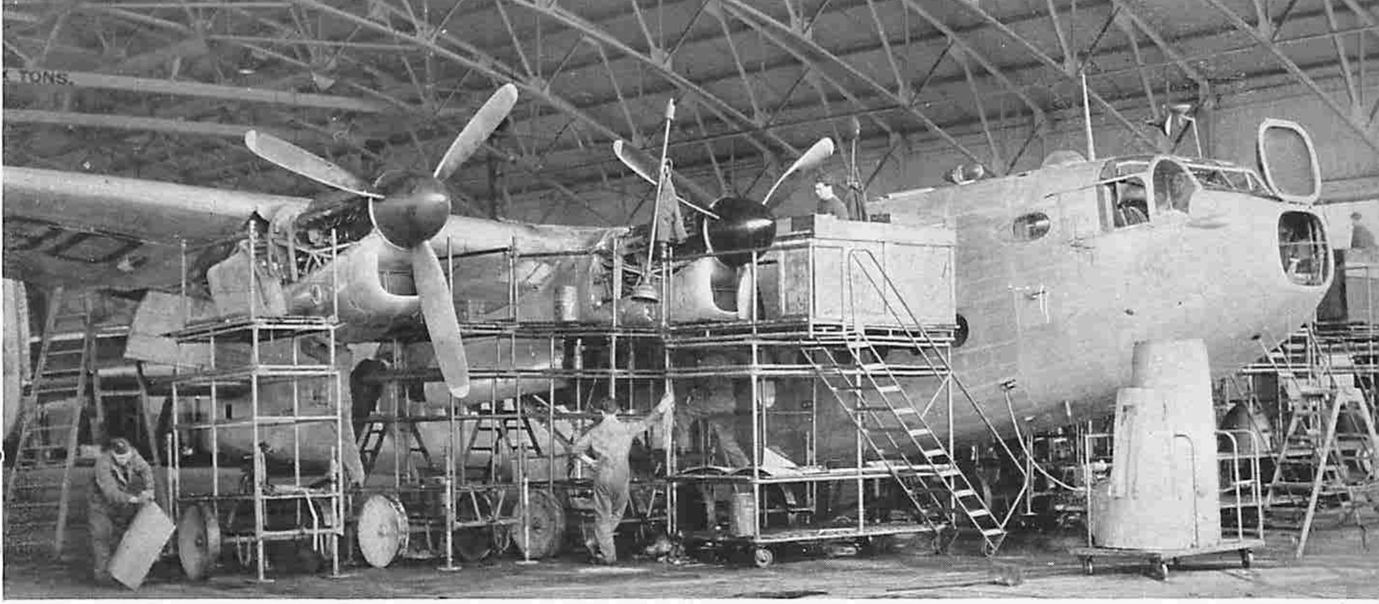
In some hurricanes flying conditions (at least over the sea) could be safely encountered by modern aircraft, as they are not so severe as in the case of disturbances associated with waves. But, as a general rule, hurricanes should be given a wide berth. Winds over 100 m.p.h. are not uncommon at the surface, and winds up to 200 m.p.h. should be expected aloft.

Generally speaking, wet season flying conditions are comparable with south-west monsoon flying in India, but are not on the average so severe. However, the worst weather is quite as bad as the worst monsoon weather. Some of the world's record rains are credited to West Indian stations. Silver Hill, Jamaica, had 125 inches in eight days in November, 1909, whilst another station nearby had 96 inches in four days.

One other feature must be mentioned. Most of the larger islands experience marked land and sea breezes. For example, at Kingston, Jamaica, the land breeze is a northerly wind of some 5 m.p.h., and the sea breeze a south-easterly of 15 to 30 m.p.h. Normally the land breeze backs through west to south-east during the morning, the reverse process taking place during the evening. However, if the gradient is south of east the sea breeze will come in quite suddenly, a very sharp line of demarcation existing between the land and sea breeze. At times squalls over 50 m.p.h. have occurred at the onset of the sea breeze. On one occasion a reinforced land breeze of 15 m.p.h. was suddenly replaced by a sea breeze of the same velocity, the line of demarcation lying across the runway for about half an hour. Several aircraft attempting to land at the time overshot, as the approach to the runway from either end was downwind.

In the picture looking across the runways at Palisadoes airfield, the tops of some turbulent cumulus can be seen behind, but the peaks themselves are clear of cloud. This is a common feature—especially of non-frontal conditions in the wet season. During the morning, cumulus will develop quickly and by noon giant cumulo-nimbus will cover all the mountains, except those in the immediate foreground, with cloud tops higher than anything over the sea. Pilots flying between Curacao and Jamaica reported that if on approaching Jamaica at a distance of some 100 to 200 miles, course was set for the highest cumulo-nimbus visible, landfall would be made very near to the airfield.

View from the Control Tower Palisadoes Airfield, Jamaica, looking ENE across the runways to the Blue Mountains, taken in the early morning. The peak on the mid-right is 7,388 feet



THE UTILISATION OF *Technical Manpower*

WING COMMANDER N. G. N. DAVIS, *Engineering Plans, Headquarters, Transport Command*

THE large turn-over in manpower due to the release of airmen, and contraction to peace-time strength has brought many problems on how to "get things done." The release of airmen has not only caused a reduction in the strength/establishment ratio but also the loss of many key personnel, and others experienced in aircraft servicing.

The problem is how to obtain the optimum use of servicing personnel. Obviously, key personnel cannot be replaced until experience has been gained by those airmen now being posted to units. Aircraft servicing will, therefore, take longer, supervision must be more strict and, in fact, some work may not be possible at all. These facts must be faced since any deterioration in the standard of servicing must not be tolerated.

The Progressive Servicing Scheme lends itself to forecasting a flying commitment which can be maintained with available personnel. Each scheduled service operated results in a given number of inspections at base, a number of which will be "on the floor" daily. To meet this commitment there must be the requisite number of inspection teams supported by a rectification team, specialist bays and a daily servicing element. During that period when manpower was almost unlimited, the number of men required on a unit was the result of operating the available aircraft to the highest possible intensity. To-day, aircraft are available for such high intensity operation, but manpower is not. We can, however, still operate a service to the maximum capacity of the manpower available.

In the majority of scheduled services the departure rate per week is dependent upon the output of aircraft from the R and I Squadron, *i.e.* the number of terminals, inter-base or base inspections which can be completed in a working week. For planning purposes the working week is five days. The output of the R and I Squadron is calculated from the formula:

$$\text{OUTPUT} = \frac{\text{Working days per week} \times \text{Number of teams available}}{\text{Average time of inspection}}$$

The average time of inspection is the average of the total time taken for terminal, inter-base and base inspection.

It is Command policy that the five-day working week be employed. The average time of inspection is obtained from statistics. The number of inspection teams available must be decided after consideration of the support required by them (*i.e.* PP and Tyre Bays, Ancilliary w/s, etc.). Each inspection team must be well supervised and must contain a large percentage of experienced personnel. Having decided upon the number of teams which can be made up from experienced tradesmen, the output of the R and I Squadron is easily calculated. This will give the departure rate which can be maintained. A servicing plan must now be drawn up ensuring that the inspections required at base are so arranged that there are never more inspections "on the floor" than there are inspection teams to deal with them. (*Contd. on page 18*)

Some Thoughts on
Air and Sea Navigation

FLIGHT LIEUTENANT R. E. MANNING

Many of us must often have turned our thoughts to our fellow-navigators of the sea and wondered just how much sea and air navigation have in common.

Crossing the Atlantic recently on a small cargo liner, I had the opportunity, by courtesy of the master, of gaining a first acquaintance with ordinary sea navigation as it stands to-day, and these notes are based on very general talks with the ship's officers; I leave detailed technicalities to a more qualified pen.

Our own traditions go no farther back than flying itself, and our experience of more refined air navigation may perhaps be said to date only from 1940, or thereabouts. How far, I wonder, did the earliest air navigators base their technique on the mariner's methods? Was the development of a distinct air pathfinding system rapid or halting?

The Triangle of Velocities

My first query was where our familiar triangle of velocities came in at sea. I was told that its theory was applied only to calculate the effect of sea currents, the current vector replacing our wind vector; the strength and direction of currents being supplied by recent reports and cumulative experience.

The counterpart of air speed is measured, not directly as a reading in knots, but by the modern "log," which records, rather in the manner of a car mileage indicator, the number of nautical miles steamed since the instrument was reset. "Ground speed" becomes "distance run" and is calculated from successive fixes. Normally, "sea speed" bears a much closer relation to distance run than air speed does to ground speed.

"Course" is steered by marine compass with great accuracy and is a closer companion of track made good than it often is in the air. "Drift" becomes "leeway" at sea, and leeway is not so much calculated as judged by experience: studying the angle of the wake is used as a method of visual estimation.

The effect of wind on the track of a ship and on distance run usually comes about indirectly, i.e. as a result of whatever swell, or sea motion, the wind may cause. Some direct effect may be experienced from winds of 30 m.p.h. and upwards, but it is always less proportionate to wind speed on the sea than in the air. To calculate wind speed and wind effect precisely would be of little help navigationally unless the swell or swells could also be calculated as a measurable vector. On one day during my voyage there were as many as three swells of varying length and direction.

The sea navigator is not so much concerned with split-second ETA as the airman may be. As the master remarked to me the morning after a gale, "Unlike you chaps, we can always heave to and wait." Therein lies the key to the essential differences in viewpoint of seamanship and airmanship.

This brief comparison springing from the triangle of velocities leads me to think that sea navigation is very similar to the Coastal Command technique at the beginning of the war. Altering course to parallel track and to regain track are manoeuvres known to the mariner, too.

It seemed to me that all our training exercises in various methods fell into place when I clearly saw air navigation as "DR plus the best possible aids at the time," and my friends on the bridge agreed that sea navigation might well be summed up in the same way.

Due to the lesser importance of wind effect, sea DR is based not so much on meteorological forecasts as on observations reinforced by experience.

Sea Aids

Position at sea is fixed at noon each day as a matter of routine by the best means available, and at any other time when observations are possible. In the matter of aids, sea navigation has the following in common with air navigation: position judged from known coastal features, fixes from visual bearings on lights and landmarks, and astro and radio position lines and fixes.

A further sea aid is that of soundings. This third dimension, as it were, is used at sea with the conclusiveness of pin-pointing, whereas, in the absence of precise measuring methods, air-to-ground soundings are as yet impracticable. Perfection of the radio altimeter may bring about the feasibility of air-to-ground soundings sufficiently accurate to take their place alongside the older established aids to an extent which will implant this sense of the third dimension as firmly in the minds of air navigators of the future as it has been in the minds of sailors for many centuries.

Logs and Charts

The ship's log contained more details of weather and general seamanship than the more specialised air navigator's log. Plotting was reduced to a minimum: little more than a track plot, with astro fixes plotted separately and transferred to the chart. For the crossing in general, a Mercator 1/6,000,000 chart was used which showed coastlines, soundings in fathoms and W/T stations. On the final approaches to the port of destination a larger scale chart with greater detail took its place.

There are agreed shipping tracks across the Atlantic just as there are aerial corridors. A chart showing these is carried, and the tracks vary seasonally to avoid the moving ice packs.

Instruments

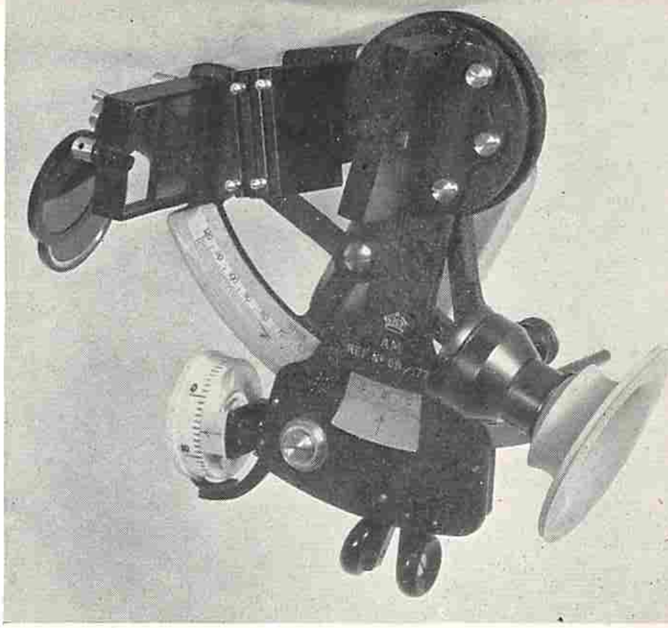
Navigational instruments included the marine compass, complete with deviation book, an azimuth plate and mirror for taking bearings and checking course, marine sextants, charts, plotting equipment, a full-sized chronometer, navigation tables and a Marconi echometer for taking soundings.

The echometer, reflecting radio pulses from the sea bed, and giving a "blip" reading on an oscillograph-type scale, represents a great advance on the former method of sounding by "swinging the lead."

The master and navigating officer swung the compass one calm sunny morning as we approached the coast of Nova Scotia. The wake stretched in a smooth curve behind us. The navigator had pre-computed the sun's azimuth over a period of about forty-five minutes, and he shouted the courses from the "monkey deck" to the helmsman through a speaking-tube, while the master aligned the azimuth plate and checked the compass readings. Ships, like aircraft, adopt a certain magnetic set-up from the direction in which they are built or in which they lie in dry dock undergoing repairs.

Most navigators are familiar with a marine sextant and know it makes use of the horizon. Just as we look for smooth air and a clear sky, so the mariner casts a critical eye at the horizon before he makes an observation. He must beware of a false, or double, horizon. Three single shots per observation were taken by the officer of the watch, who first gave a steadying order to the helmsman. Another officer noted the chronometer reading. Each single shot was worked out separately so that its quality could be assessed and any bad shot rejected.

The noon sun observation is a matter of regular routine, giving a reliable latitude. In some shipping lines, I was told, it is obligatory for all officers and midshipmen to "shoot the sun" at midday and pass



Marine type sextant

their readings to the master. At the same time the accurate GMT to be expected from a full-size chronometer provides a longitude check.

The extra accuracy of astro observations in good conditions at sea makes it possible for the mariner to use position lines cutting at angles, which would be considered poor in the air. Sidereal time is used instead of hour angle, and the formula for the noon sunshots was

$$\text{Hav } P = \frac{\text{Hav } p - \text{hav } (x \sim z)}{\text{Sin } x \text{ sin } z}$$

The third mate was somewhat envious of the short ANT method of reducing shots which I described to him, and the ANT's limits of accuracy did not deter him from thinking that they would be a practical proposition at sea. It was felt, too, that the bubble sextant could usefully be employed at sea when the horizon was not clearly defined, and that the Mark IXA sextant would be a boon in choppy conditions.

The modern "log" consists of a screw apparatus trailed through the water and revolved by its motion through the sea. The instrument drives a mileage recorder, the master recorder being placed in the stern of the ship, with a repeater on the bridge. On some ships the recorder is reset to read zero every noon; in others it is allowed to run continuously throughout the voyage. The rate in knots is thus calculated by distance steamed divided by time, and is not given as a simultaneous instrument reading as in the case of the air-speed indicator.

For D/F, the Bellini-Tosi aerial system is used by the majority of merchant ships, with M/F, D/F giving results up to about 150 miles. The loop is swung by visual bearing checks at a distance of

The Mark IXa Sextant takes 60 shots at 2-second intervals and gives a final average reading over the two minutes of observation, thus reducing the accumulation of errors prevalent in a reading from a single shot.

about one and a half miles from the transmitter. QTE's are also given.

Crew Duties

As to normal crew duties, the master carries the overall responsibility in the same way as the captain of an aircraft. The first mate is the ship's executive officer and is responsible for loading, unloading and care of the cargo during the voyage. The second mate is the navigating officer. The third mate is to some degree "u/t", inasmuch as he has yet to qualify for more advanced "tickets."

The 24-hour watch is divided into three under the control of the three respective mates.

The chief engineer has equal rank with the master, who relies on him for advice on all matters of engine performance and risks. Water supply, heating, electricity and refrigeration are also the chief engineer's responsibility.

It goes without saying that the same team spirit and close crew co-operation are called for at sea as in the air.

Sea navigators look forward keenly to the help that radar will give them, especially in connection with warnings against icebergs and in near-coast navigation in bad visibility.

Although in the air the qualities of skill and experience indispensable to good navigation are exercised in a different medium, over shorter periods and under greater pressure, I feel that the outlook and experiences of flying have become akin to those of the sea to an extent which enables the airman to take his place in the long line of navigators and to share in their proud traditions.

UTILISATION OF TECHNICAL MANPOWER

(*Concluded from page 15*)

Each inspection team must be maintained to that strength required by the inspection cards. The maximum flying effort is obtained by the maximum economical employment of such teams. It may be that the full number of teams cannot be continuously employed. This depends on departure rates and the varying lengths of the inspections. But each squadron has a training commitment, and inspections required on the aircraft used should be phased into the availability of teams not employed on scheduled services aircraft. This may result in an uneconomical use of aircraft, shown up by the number unserviceable, awaiting manpower, serviceable, awaiting departure, or a combination of both. By forecasting (as far ahead as possible) the increases or decreases in the number of inspection teams available, a fairly accurate forecast of potential flying hours can be made.

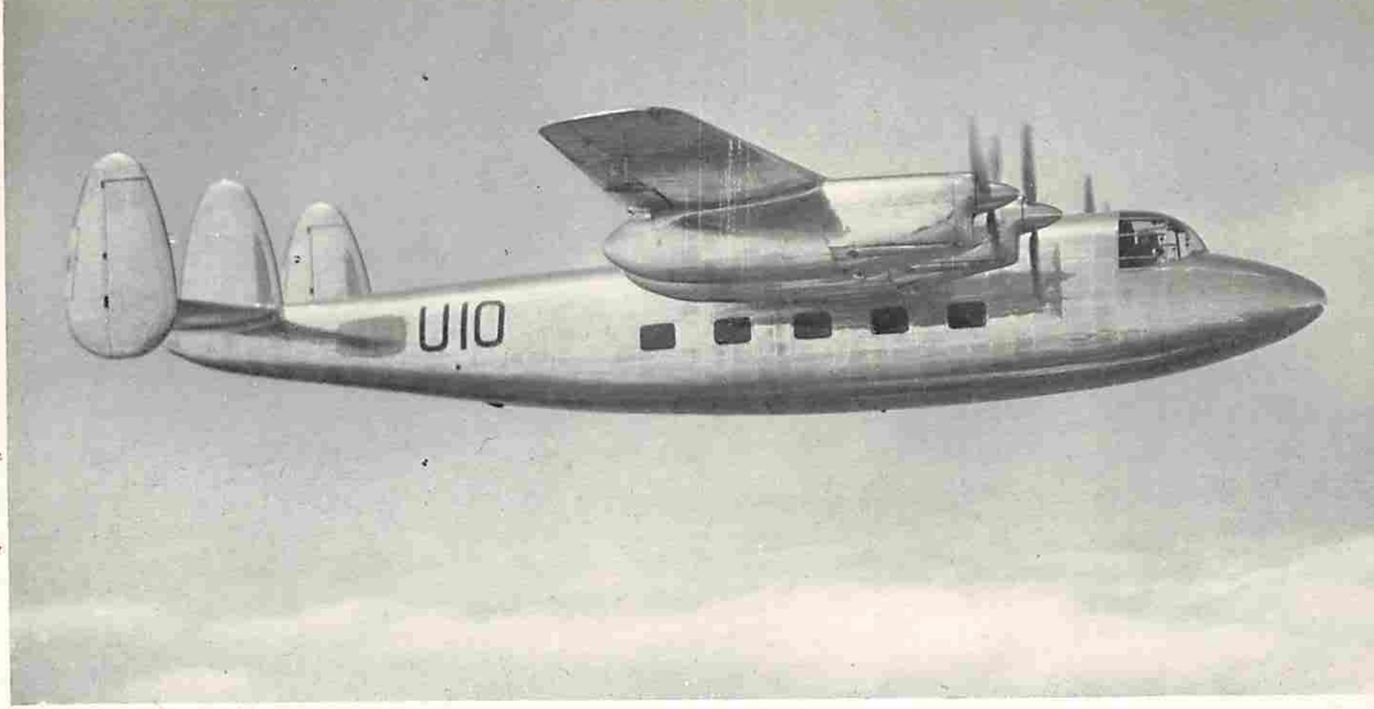
Having formed the maximum number of "safe" inspection teams together with personnel in those sections which support them, the balance of inexperienced airmen will require intensive instruction to fit them for employment on aircraft in the shortest possible time. The necessary classes should be organised. Theoretical instruction should not exceed two hours a day, preferably in hourly periods, with the interim employed in practical work under the strictest supervision. Two to three weeks of such teaching should make these men fit for employment with the experienced airmen. A further period of proving time should be allowed before the pupil is considered fit to work under normal conditions. This all throws extra work on officers and other personnel but it does ensure full useful employment in the minimum time. It is only by such organisation that the highest possible flying intensity can be attained together with a high standard of servicing.

THE A.E.U. (*Aircrew Examining Unit*)
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, and suggestions would be welcomed.



The Miles Marathon on test flight. On this prototype a central fin has been added to the original design in compliance with ARB requirements. The outboard fins are adjustable longitudinally and it is hoped by this novel means to provide for directional stability on take-off without the necessity for the central fin.

THE MILES MARATHON

Since our article on the Marathon, in the January issue of the REVIEW, *this aircraft has completed some of its first trials, and more detailed information on its performance is now available*

STILL under test at Miles Aircraft, Ltd., the new all-metal medium airliner Marathon has been designed with an eye to peace-time passenger requirements. High wing construction leaves unobstructed floor space and affords passengers a good downward view, while the tricycle under-carriage gives the best vision for the pilot and ensures a level floor whether the aircraft is stationary, taking off or landing. The four engines are underslung, making for accessibility and easy maintenance.

The cockpit will accommodate a crew of three, but two pilots only are normally considered necessary. Dual controls are detachable, permitting the option of a permanent navigation table. A "push-pull" dashboard control column, full radio equipment and latest navigational aids are fitted, and provision has been made for the installation of an automatic pilot. Seats are adjustable for height, and when fully "up" permit a view to within twelve feet of the aircraft's nose; 210 degrees visibility is afforded without opening the side windows. The power units, supercharged DH Gypsy Queen engines, type 71, of 330 h.p. each, drive full-feathering reversible pitch airscrews. The under-carriage retracts pneumatically, and in an emergency can be lowered and locked mechanically; it is fitted with twin tyres on each side.

The 774 cubic feet of main cabin—the floor of which is specially stressed for concentrated loads of freight—will comfortably seat up to eighteen passengers, and can be converted to seat twenty in a few moments. Doors are only 2 feet 5 inches from the ground. The cabin is air conditioned and thermostatically heated—maintaining 65°F when the temperature outside is as low as —15°F. The hull can be pressurised to a differential pressure of 2½ lb. per square inch.

It is estimated by the manufacturers that the Marathon has a still air range of 1,000 miles and a maximum cruising speed of 210 m.p.h. (economical cruising speed 175–200 m.p.h.); the all-up weight is 16,500 lb. and the payload is calculated at 3,600 lb. (eighteen passengers plus 540 lb. of luggage) for a 500-mile range. Initial climb is reckoned at 1,550 feet per minute and a fifty-foot obstacle can be cleared in a 600-yard take-off run. After take-off, flight can be maintained on two engines. The designers have so planned the aircraft that the present engines can be replaced by two Gas Turbine Power Units without major modifications.

SPORT

IN TRANSPORT COMMAND

Presentation of the Inter-Group Rifle Team Championship Trophy by Air Vice Marshal S. E. Storrar, CBE, to Flight Lieutenant Steele, AFC, Captain of 46 Group

Cricket

The draw for the final stage of the Inter-Station Cricket is:

Dishforth *v.* Waterbeach
Upper Heyford *v.* Blakehill Farm

Inter-Group Final
No. 47 Group beat No. 46 Group by 4 wickets.

Inter-Group WAAF Tennis

No. 46 Group easily beat No. 4 Group at Sudbury Hill by 11 matches to 3.

Boxing

Last season Transport Command won the Inter-Command Tournament. Next season we revert to the pre-war system of "Wakefield Tournaments" and the Individual Championships. The "Wakefield" is an Inter-Station competition for *novices only* and it is hoped Station PFOs will concentrate and build up their teams for this Tournament, which will be held before Christmas.

Rifle Shooting

THE Imperial meeting at Bisley followed the RAF meeting on June 28, 1946. Three members of Transport Command were selected to remain for various RAF teams: Air Commodore W. E. Staton, DSO, MC, DFC, ADC, AOC No. 46 Group, Flight Lieutenant Steele, AFC, RAF Station, Hendon, and Flight Sergeant Farrel, RAF Station, Blackbushe.

For the first time in the history of the event, HM the King's Prize was won by a serving officer of the RAF, Squadron Leader C. C. Willott, of Coastal Command. Of the Transport Command representatives at the Imperial meeting, Air Commodore Staton and Flight Lieutenant Steele were selected, and shot for the RAF Revolver VIII in the Whitehead Cup against all Services, which the RAF won from the RN by 2 points. Flight Lieutenant Steele was selected for the RAF Rifle VIII in the United Services Cup, in which the RAF were fourth, Flight Lieutenant Steele and Squadron Leader Willott scoring highest for the RAF with 163 each. Flight Lieutenant Steele also shot for the RAF XX in the XX match. In this match the RAF were third, Flight Lieutenant Steele making 140 points against the highest score of 141 by Group Captain Watts. The big attraction of the meeting, HM the King's Prize, was concluded on Saturday, July 13th, and Transport Command had their first representative, Flight Lieutenant Steele, in the coveted "King's Hundred," the leading hundred competitors at Stages 1 and 2 who qualify to fire in the final stage of the "King's." Flight Lieutenant Steele finished thirty-second in this final stage with a fine score of 269 against the winner's 280, a very creditable performance.

NOT SEEN IN BURMA

THE picture above appeared on the back cover of the May issue of TRANSPORT COMMAND REVIEW and was entitled "A Scene in Burma," no other details being available from Air Ministry.

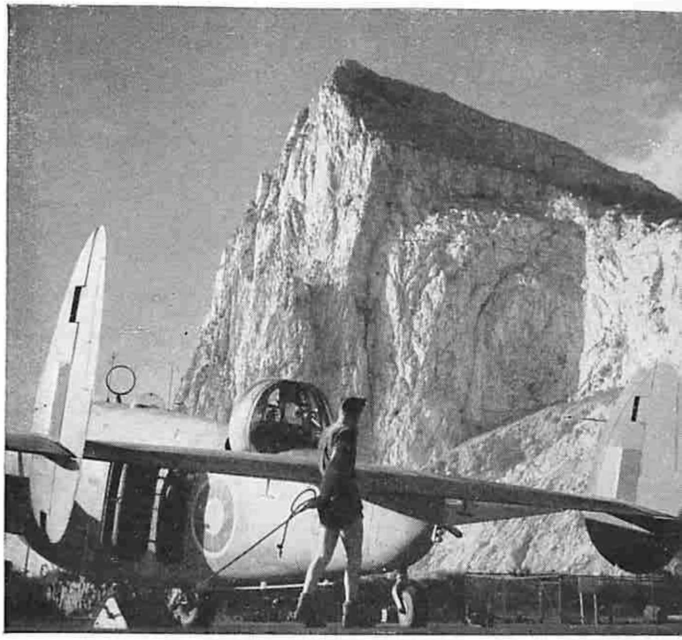
We are indebted to Warrant Officer L. Fitton, of 52 Squadron, for the following description of the scene.

"*The airfield is* KEMAJORAN *at* BATAVIA, *in* JAVA. *Those who are playing cricket are members of No. 31 Squadron ground staff. The Dakota in the background is a 96 Squadron aircraft, 'Christmas-tree-ed' by 31 Squadron for its much needed parts.*"

The Strange Story of

NORTH FRONT, GIBRALTAR

for much of which we are indebted to Intelligence Staff, Air Headquarters, Gibraltar, and to their history, "Flying from the Rock"



Hudsons of Coastal Command and Hudsons on delivery were among North Front's most familiar aircraft in 1941

HISTORY shows that possession of Gibraltar has not always been appreciated by the British. But there can be no doubt of its value to us during the 1939–1945 war. Gibraltar was, in fact, the essential stepping-stone between the United Kingdom and the North African Campaign; only from Gibraltar could aircraft be provided to guard the Straits against the U-boats, to assist the relief convoys to reach Malta, shoot down enemy bombers, escort invasion forces and carry paratroops for the airborne assault on North Africa. Without Gibraltar none of our aircraft could have got near the enemy in the Western Mediterranean.

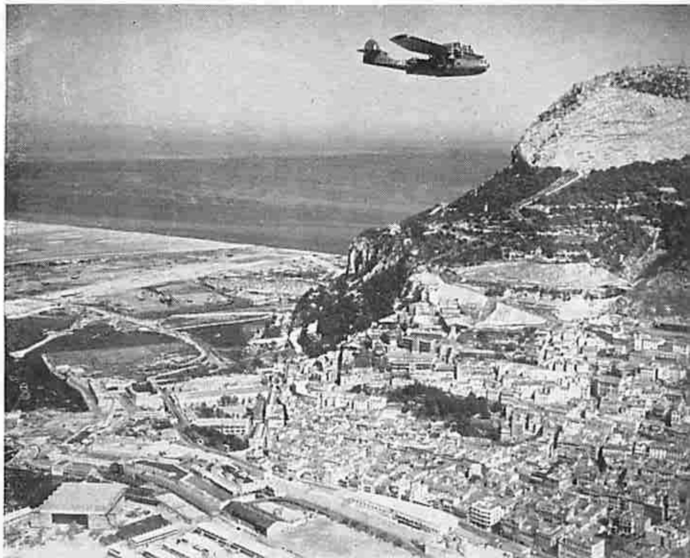
Although the Rock has been traditionally an Army garrison and Naval base, its potentiality as a base for aerial observation began to be realised in December, 1903 (the year and month of the Wright brothers' first aeroplane flight), when a party from the Balloon Section of the Royal Engineers arrived with balloons to carry out experimental ascents.

After the departure of the balloons in 1905, nothing is heard of flying at Gibraltar until the 1914–1918 war, when the racecourse on North Front, the flat stretch of land to the north of the Rock, was used as a landing ground by the 80 h.p. Gnome Caudrons and 70 h.p. Bleriot Experimentals. This distressing misemployment of the racecourse was erased as quickly as possible from Gibraltar's memory. Not until 1932 was the idea of a Service airfield at Gibraltar given serious consideration, and the principal thinkers in this direction were among the Navy. The opposition was numerous and varied. There were those interested in the racecourse (and the Jockey Club was a generous benefactor of welfare to those serving and living in Gibraltar); there were the military authorities who claimed the space as the only available area for exercising troops, horses and weapons; civilians, with truth, claimed that the loss of the Victoria Gardens and the racecourse would deprive them of almost the only open space in their realm. Against these considerations, the benefits of an airfield seemed remote and problematic. Private and official argument delayed any action, and when war came in 1939 only an emergency landing strip was available for the RAF and Fleet Air Arm.

The unforeseen ebb and flow of war precipitated decision at the end of 1941. Reinforcement aircraft could no longer fly safely direct to the Middle East. The Germans were in Sicily and were taking over from the Vichy French in North Africa. It looked as if the Mediterranean fighting might at any moment spread westwards, inflame Spain and engulf the Rock itself.

(Continued overleaf)

Catalina passing the Rock



Orders were given for the landing strip on the racecourse to be cleared and extended for the use of reinforcement aircraft. But a bigger surprise followed. The runway was to be made 150 yards wide and extended westwards for 570 yards into the sea. In the words of Lord Gort, the Governor, it appeared "to be a major engineering feat."

Action was as vigorous as the plan was ambitious. Stones and rubble were blasted from the Rock and dug from tunnels; over 400,000 tons of filling were thrown into the sea to form the foundation of this freakish runway.

Although the work went on night and day, urgent demands for quicker results came from London in March, 1942. As a result, a total length of 1,150 yards was completed by April 3rd, twenty-seven days earlier than had been estimated.

So much activity within sight of the Spanish border could not fail to be of interest to the enemy, but they did less about it than was expected. On April 1, 1942, Italian aircraft attempted to raid North Front. The Gibraltar defences were surprised to find that they were receiving assistance from the Spanish AA; but perhaps the surprise was greater among the Italians.

Shortly after this the RAF took over North Front airfield from the Fleet Air Arm and began to extend its powers of strike and defence. The first big task of the RAF in Gibraltar was to assist the relief of Malta. Flying boats of Coastal Command, from the New Camp, provided most of the escorts for the sea convoys. But Malta could not endure long without fighters, and these had to be brought by sea to Gibraltar, assembled by the furiously-working Special Erection Party, and flown to Malta for immediate action. The work went on night and day at tremendous pressure. Empty crates were seized as workshops and officers' quarters.

Meanwhile air traffic on the lengthening runway continued to increase. Evacuees from Malta, on their way to the UK, were being brought in by Liberators of 1425 Flight (shortly afterwards formed into 511 Squadron) and reinforcement Wellingtons were using North Front instead of Malta on their flight East.

In October, 1942, the runway had reached a length of some 1,500 yards, and work was still going on at breakneck speed in preparation for Operation Torch, the allied landings in North Africa. On the night of November 7th—the day before the invasion began—there were about 650 aircraft assembled and parked; dispersal was out of the question. And next morning, from the Judge's Box of the obliterated racecourse, Flying Control moved off fighter after fighter. On November 10th, 36 Dakota troop carriers arrived, followed by Fortresses, Beaufighters and Lightnings, and all took off the next day. Between November 8th and 14th there were 1,274 aircraft movements—one every 7 minutes 54 seconds. Thirty-seven Dakotas took off at night in 93 minutes, 27 Lightnings landed in 17 minutes, 6 Fortresses and 6 Lightnings took off in 6 minutes, 16 Spitfires in 4 minutes, 11 Dakotas and 9 Spitfires in 12 minutes. The Special Erection Party had assembled 485 aircraft, and 466 were despatched to North Africa. These figures make aviation history.

After this North Front settled down to a more orderly existence. But transit aircraft increased in numbers. Transport aircraft, then a growing arm of the RAF, were obliged to fly far west of France and Spain and to refuel at Gibraltar. In March, 1943, aircraft movements totalled 4,292. In August, when the 1,800-yard runway had been completed, there were 6,386 movements. All this transit traffic made new demands on North Front's facilities, and the newly formed Transport Command formed a Staging Post utilising those buildings present, hardly larger than those of a wayside railway halt, as the foundation of No. 73 Staging Post.

In July, 1944, North Front saw another sudden burst of activity, when USAAF aircraft passed through on their way to take part in the invasion of the south of France. In two days, 196 aircraft landed and took off. Ninety-four of the first arrivals, plus a York and a B17, landed in 79 minutes. These, and the earlier figures quoted, are effective answers to those who, in the 1930s, doubted whether a manageable airfield could ever be made at Gibraltar.

The short but crowded history of North Front cannot be told without a special tribute to the ceaseless vigil kept by the Coastal Command aircraft, flying east and west of the Rock on anti U-boat and shipping patrols, air-sea rescues, general reconnaissance and meteorological flights. From the early days of the war, their Hudsons, and then their Blenheims and Wellingtons, assisted by flying boats from New Camp, maintained a watch on the Straits and the surrounding seas that was vital to our Middle East and North African campaigns. For most of the time there was no possible diversion base to which these aircraft could return. Some of the squadrons taking part in those operations later earned further distinction as transport support units in Transport Command—notably Nos. 233, 48 and 52 Squadrons.

With the liberation of France, transport and reinforcement aircraft could be re-routed, and now North Front's traffic has dropped to a few scheduled RAF and BOAC aircraft a week, plus the tireless meteorological sorties of Coastal Command, and the Staging Post has now been passed to the control of Coastal Command.

But the airfield at North Front, prepared with great vision, at tremendous speed, and in spite of much indifference and some opposition, enabled Gibraltar to play a part in recent years as momentous as any since 1704.

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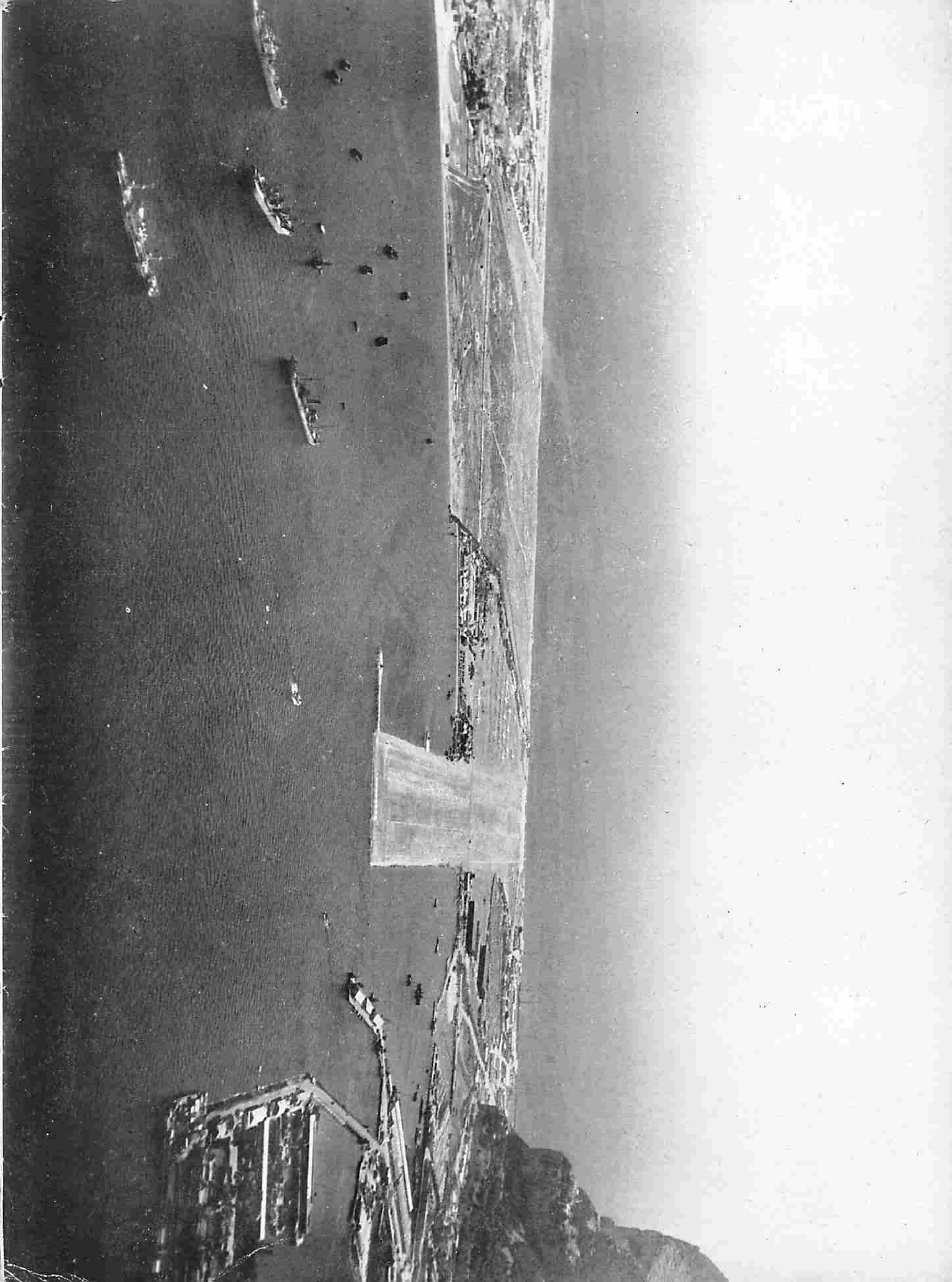

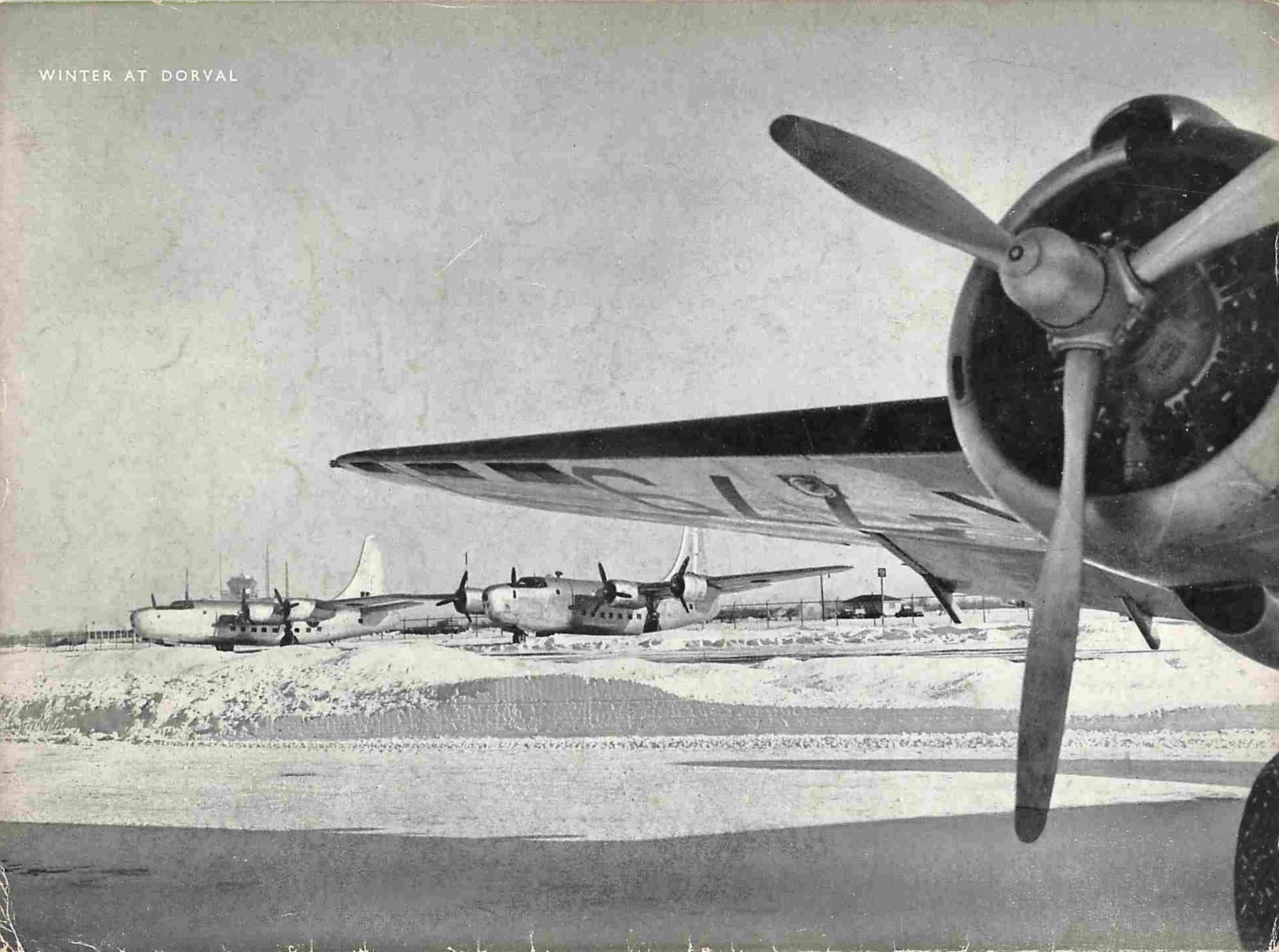

WINTER AT DORVAL