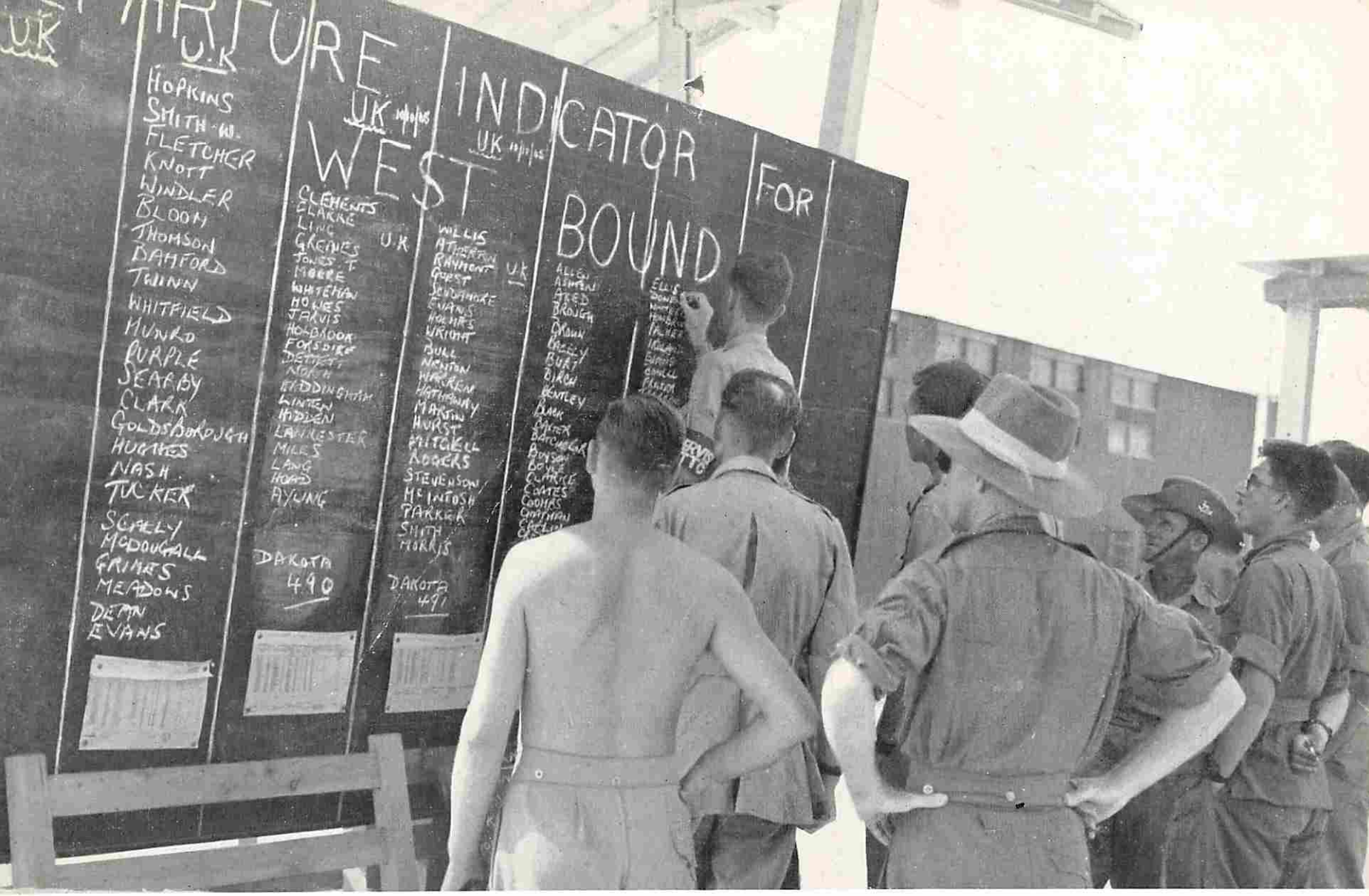
RAF TRANSPORT COMMAND REVIEW

NUMBER TEN JUNE 1946

HANDLEY PAGE HASTINGS ON TEST FLIGHT
Two starboard engines feathered



HORIZONTAL SCANNING. *Troops at Mauripur anxiously search for their names in the passenger lists of trooping aircraft homeward bound*

TRANSPORT COMMAND REVIEW

ISSUED BY H Q TRANSPORT COMMAND
ROYAL AIR FORCE

No. 10 JUNE 1946

CONTENTS

Front Cover photograph of the Hastings by Charles Brown

THE STORY OF AIR TROOPING

Prepared by Traffic Branch, Headquarters, Transport Command

"You are making history. This is the first time that a regular and large scale movement of troops over great distances has been undertaken by air.

Formations and Units have been moved by air many times during the war, notably in the Burma Campaign, but the distances involved, compared with the flight you are about to undertake, were relatively short.

"Your flight is the achievement of strategic mobility in a big way; and the air trooping programme foreshadows the shape of things to come in the sphere of military movement.

"By rail and sea your journey would take a month. You are about to do it in a matter of days."

—(EXTRACT FROM THE TROOPING PAMPHLET GIVEN TO TROOPS BEFORE EMPLANING.)

The Plan

TROOPING to the Far East was planned to start in March, 1945, to move out to India the personnel required to maintain the growing offensive against Japan and to return tour-expired and mid-tour leave personnel to the UK.

The operation was envisaged as the setting up of a pipe-line to move troops concentrated in assembly centres in UK to similar centres in India and similarly to move personnel from India back to UK. A light-weight kitting scale was laid down. The troops were to travel in UK winter dress with greatcoat, two blankets, filled water-bottle, and 30 lb. of baggage (65 lb. in the case of officers). In view of the large numbers of troops to be handled, a special dry ration was issued (Type C), consisting of sweet biscuits, fruit bar, oatmeal block, and sweets packed in tins, one tin being sufficient for one man for a trip of from 4-5 hours. Water, biscuits, and fresh cheese were to be carried in the aircraft. Ample supplies of reading matter and

playing cards were to be provided for each aircraft party.

To assist the Movement Authorities, a special RAF Form No. 2776 (Air Trooping Nominal Roll) was produced by Air Ministry in collaboration with the War Office. This form was eventually adopted as one of the Ship's Papers in substitution for a passenger manifest.

Troops were to proceed to railhead the day before their proposed flights. Air Ministry liaison officers were to be at the airfields to control the flow so that it would coincide with the aircraft departure rate. The troops were to be taken over by Transport Command at railhead, and conveyed to accommodation centres at the departure airfields. There they were to be assembled into aircraft parties with an officer or N.C.O. in charge, were to be checked medically, weighed, briefed in aircraft discipline, escape drill, and the use of safety equipment, and accommodated for the night. Before they were despatched the following morning the Passenger and Freight Sections would raise the documents for the party, consisting of Form 2776 and the new Load Sheets and Weight and Balance Clearance forms which were being tried out for the first time. A final briefing was to be given by the Captain of the aircraft when the party had been emplaned. In the reverse direction, the Passenger and Freight Section would guide incoming drafts through the same channels.

As the aircraft covered the route from end to end in less than four days, a rest stop of 48 hours was planned at Lydda for all troops in both directions. A special system of progressive maintenance was evolved so that aircraft could be scheduled to travel right through and so, by slipping crews *en route*, maximum effort could be obtained from each aircraft.

Small Scale Trooping

Difficulties in the conversion of bomber crews to their new passenger carrying role caused delays, and trooping eventually started on a small scale on May 1, 1945, when one Dakota squadron was given a target of 1,000 troops to be moved from UK to India during the month. This required an effort of 3 despatches every 2 days, which was maintained during the month and resulted in a lift of 1,003 troops eastbound and a return to UK of 599. The control of the operation, which was known as "Small Scale Trooping," was given to 47 Group — the Squadron being based at Merryfield.

Small Scale Trooping continued steadily through June and July, and was increased in August, when a further Dakota Squadron began to operate. In September, the first real troubles were experienced when it was found that summer conditions at the Persian Gulf stations did not permit the full flow to be handled. The effort was, therefore, reduced and 10 Dakotas were made available to carry equipment and spares along the route before positioning at Poona to start the westbound flow when Large Scale Trooping commenced on October 1, 1945. The route was changed and Sharjah was used as the eastbound refuelling stop in the Gulf instead of Bahrein.

Over the five months, Small Scale Trooping resulted in a total lift from UK of 5,807 troops, and to UK of 6,067 troops, and served as a useful test of the special trooping machinery for the much greater effort to come. But this period had seen the end of the war in Europe and the dramatic cessation of hostilities in the Far East. The whole Trooping Scheme took on a new aspect with the emphasis on the westbound flow of troops who were being repatriated as tour expired and for release under the fast growing demobilisation scheme.

Operation "Sketch"

Large Scale Trooping was planned to start on October 1, 1945, with Headquarters No. 47 Group using 6 Liberator, 2 Stirling, and 2 Dakota Squadrons to lift 10,000 troops from 6 airfields in UK (Merryfield, Membury, Oakington, Waterbeach, Tempsford, Stradishall) to 3 terminal airfields in India (Chakulia, Arkonam, and Poona). At the last moment, however, this effort was diverted to Operation "Sketch" and on October 1st the Squadrons positioned aircraft at Melsbroeck (Brussels), to start the move of the personnel of a complete Army Division from their stations in Brussels and UK out to the Middle Base. This task was

The "Chain Gang." Troops loading their own kit at Mauripur.

to be completed during October and a Stirling Squadron of No. 38 Group and an additional 47 Group Dakota Squadron were detailed to assist. These two Squadrons only operated between UK and the Middle East, but the 10 original Squadrons, having landed their troops at Cairo West, were to pick up Indian Army personnel and carry them to the Indian destination airfields. The westbound flow from India was to move troops to UK under the original plan so that the cycle was maintained as planned for Large Scale Trooping.

As the operation proceeded various adjustments had to be made to maintain the flow. Difficulties were experienced with Stirling maintenance. An extra refuelling stop was scheduled at Istres. Dakotas of No. 229 Group were used to complete the lift east of Mauripur, and by the end of the month, three Squadrons were available to undertake the lift of all troops from Mauripur eastwards so that all the UK based aircraft could be turned round one day earlier at Mauripur.

By October 23rd, 8,384 troops had been flown out of Melsbroeck. Use was made of the empty aircraft flying from UK to Melsbroeck to move 42 tons of urgently required winter clothing that had been held up by a dock strike.

After October 23rd, the aircraft picked up the balance of the Division from the trooping airfields in UK and 2,094 troops had been moved when the lift from UK was completed on October 24th. The entire Division had been moved into Egypt by the end of the month as required. In addition, 6,720 Indian troops were picked up in the Middle East and taken to India and a total of 6,930 troops returned to the UK.

Operation "Annexe"

The last two days' effort from UK in October saw the start of the Large Scale Trooping, which was undertaken by 47 Group as Operation "Annexe," using the 10 original Squadrons. In these two days 579 troops were flown out of the UK.

Operation "Annexe" continued during November, the target for the month being 10,500 troops in each direction, and for this the same intensity of 52 Liberator, 42 Dakota, and 48 Stirling despatches per Squadron per 28 days was maintained. Extra lift was planned with the use of an extra Dakota or York Squadron by the middle of the month at an intensity of 28 and 16 despatches per 28 days respectively. This effort, if maintained, would have given a total of 13,300 troops (aircraft capacities were fixed at Liberators 26, Stirlings 24, Dakotas 22, and Yorks 32), but it was estimated that the loss through bad weather and unserviceability would be at least 20 per cent.

Difficulties did, in fact, arise in November, through congestion owing to bad weather hold-ups, mounting unserviceability rate for Stirlings, and a reduction from 62,000 to 60,000 lb. in the all-up take-off weight of the Liberator. The UK figures of despatches and arrivals only totalled 9,278 and 9,243 respectively, and when

SUMMARY OF PERSONNEL CARRIED IN TROOPING OPERATIONS

			Outgoing		*Incoming*
1945					
May			1,003		599
June			986		915
July			1,010		962
August			1,513		2,113
September			1,295		1,478
			5,807		6,067
October:					
	"Sketch"				
	Ex Brussels	8,384		Small	
	Ex UK	2,094		Scale	347
		10,478			
	"Annexe"	579			
			11,057	Sketch	6,583
November	„		9,278	Annexe	9,243
December	„		4,599	„	5,001
1946					
January	„		5,521	„	4,911
February	„		4,334	„	5,699
March	„		4,308	„	5,657
April	„		211	„	1,967
	Grand Totals		45,115		45,675

the Stirlings were withdrawn at the beginning of December, a reduced target of 8,500 was given to the Command.

During December, considerable changes were made. A Canadian Liberator Squadron was withdrawn for repatriation. The all-up take-off weight of Liberators was again reduced to 56,000 lb., limiting the number of passengers carried on the UK—Castel Benito leg to 17.

To combat this drop in lift, No. 48 Group (which took over the control of the Liberator Squadrons on December 15th) kept the flow as high as possible by supplementary lifts, and by shuttling aircraft on the UK—Castel Benito stretch, and No. 47 Group raised the York despatches to a frequency of one per day on December 21st, and operated 2 Dakota Squadrons as a Wing to give interchangeability of slip crews.

At Christmas, a four-day break was made in the trooping operation, but full use was made of the respite to position aircraft to clear backlogs at Lydda and Castel Benito.

The figures for the month were low, only 4,599 troop departures and 5,201 arrivals. The January target, however, was fixed at 9,000 and by the middle of the month an extra refuelling stop at Istres allowed the full capacity of 26 troops to be carried on Liberators again. In addition, one Liberator and one Dakota Squadron were given extra crews to enable them to despatch 2 flights per day. Despite these efforts to increase the flow, a continued spell of bad weather both in UK and in the Western Mediterranean had an over-riding effect and the flow was well behind schedule when information was received from Air Ministry that the monthly target was to be reduced to 5,000 troops in each direction. This reduced target (a Cabinet decision), and the prospect of better weather conditions, allowed a reduction to be made in the effort of the Squadrons and the intensity was fixed at 1 despatch per Squadron per day.

Contraction programmes began to function and 1 Liberator Squadron was withdrawn for disbandment while 2 Dakota Squadrons were transferred to scheduled roles. But, even then, 4,334 troops were lifted out of, and 5,699 into, the UK during the month of February.

A stage on the way home. Troops at Shaibah Staging Post

PHOTO BY L.A.C. A. H. MONAGHAN

March saw further contractions, when Elmas and Catania were reduced and the Dakotas of the remaining Squadron were routed direct from Istres to Castel Benito. Over this leg the troop capacity was reduced to 13. This Squadron was withdrawn in the middle of the month, but 1 York Squadron and 5 Liberator Squadrons operated to the end of the month when trooping finished.

Operation "Refuge"

There was a small balance of the March programme of troops to be moved in the first few days of April, and these were cleared by 4 remaining Liberator Squadrons which were scheduled for disbandment at 14-day intervals. These Squadrons continued to move passengers from India to UK under normal scheduled service arrangements, under the code name "Refuge," until the end of May.

A summary of the troops carried into and out of the United Kingdom is shown on the preceding page. The swift carriage of over 45,000 service personnel from overseas to this country not only saved shipping space but speeded up the troops' demobilisation. In addition, very valuable lessons have been learned concerning the rapid movement of large bodies of troops along the strategic air routes.

Traffic

TRAFFIC instructions for the RAF have now been issued by Air Ministry in a provisional Air Publication entitled, ROYAL AIR FORCE AIR MOVEMENTS INSTRUCTIONS.

Copies have already been issued by the Traffic Branch, Headquarters, Transport Command, to all Transport Command formations and units in UK and France, and by Air Ministry to all formations and units concerned overseas.

These Instructions contain the latest policy on traffic and air movements matters, and have been issued with the object of achieving uniformity of method and procedure throughout the Royal Air Force. Subjects covered are:

Traffic Organisation.
Load Control Procedure.
Passenger Procedure.
Freight Procedure.
Mails Procedure.
Trooping Procedure.
Traffic Charges.
Traffic Signals.
Appendices giving details and specimens of all forms and documents used in traffic work.

SHORT STORY of a long history

IN 1917 one of the results of the public demand for reprisal raids on Germany was the formation of "A" Squadron, Royal Naval Air Service, with Handley Page bombers. Shortly afterwards the Squadron was renamed 16 Squadron and on April 1, 1918, became 216 Squadron, Royal Air Force.

After a short, but useful bombing life, 216 was despatched to Egypt in 1919, and there it has remained in service for 27 years. Its associations with air transport began with mail-carrying while the Squadron was still in France, and later the Handley Pages were among the first passenger and air mail aircraft in the Middle East. Vimys replaced the Handley Pages, and in 1926 Victorias replaced the Vimys.

Between the wars No. 216 was known as a Bomber/Transport Squadron and it was during this period that training began in novel developments of air transport, such as casualty evacuation, troop emplaning and supply dropping. The Victorias flew from Cairo to the Cape in 1931, and again in 1934, when parachute descents were demonstrated in South Africa.

But in retrospect, perhaps the most important work of the Squadron at this time was its part in the planning, surveying, and, in 1930, the opening of the route between Egypt and West Africa. As the crews flew their Victorias (at a ground speed of 80 m.p.h.) over the fearsome country between Bathurst and Khartoum, they can have had little conception of how vitally important their pioneer work was to prove 10 years later, when this route became the lifeline for air reinforcements to the Middle East.

In 1935 the Squadron was partly re-equipped with the famous Valentias (which continued in service as late as 1942). Meanwhile, the work went on; transport of freight, mail and passengers, desert searches, route surveys, training in bombing, troop carrying, and parachute work, relieved by occasional disciplinary appearances over areas of civil disturbance.

When war was declared in 1939, 216 Squadron was the one Heavy Bomber/Transport Squadron in the Middle East, and its first task was to carry RAF units to their war stations. Before the end of the year the first Bombays were collected from England. Three days after Italy's entry into the war, the Squadron returned to its bombing role for the first time since 1918.

The first heavy transport commitment of the Squadron was carried out in November, 1940, when No. 30 Squadron was conveyed into Greece. By this time, the ferry and reinforcement route from the West African Coast was showing dividends, and the Squadron sent a detachment to Takoradi to follow the convoys and keep them on the move. After assisting in the air evacuation from Greece and Irak, the Squadron was partly re-equipped with Hudsons, and with the advance from Alamein, operated shuttle services between the forward troops and bases.

After the formation of Transport Command, in 1943, Dakotas replaced the Bombays and Hudsons. Transport schedules were extended and paratroop training was intensified in preparation for airborne assaults on the Aegean Islands.

A detachment of 216 Squadron went to ACSEA in April, 1944, and for two months distinguished itself in supply operations during the siege of Imphal. The main part of the Squadron remained in the Middle East and took part in operations in connection with the invasion and re-occupation of the mainland of Greece, supply operations to the partisans, and the invasion of the South of France. At one time the Squadron's establishment was 51 Dakotas, and detachments were at work all over the Middle East.

With the recent decision of the British Government to withdraw military forces from Egypt, the long association of No. 216 Squadron with that country will presumably be broken, but 216 is likely to continue to provide transport services for Middle East forces, from another base.

U.S. TRANSPORT AIRCRAFT PRODUCTION

THE following tabulation of transport aircraft production in the United States from July 1, 1940, to July 31, 1945, is extracted from the American journal, AVIATION.

	HEAVY	MEDIUM	LIGHT	TOTALS
July 1, 1940, through 1941	8	365	323	696
1942..	116	1,237	631	1,984
1943..	536	2,907	3,570	7,013
1944..	1,865	4,927	3,042	9,834
Jan. 1, 1940, through July 31, 1945 ..	1,961	1,431	745	4,137
Totals: July 1, 1940, through July 31, 1945 ..	4,486	10,867	8,311	23,664

DECCA: *a navigational aid*

THE navigator of to-day is faced with a bewildering choice of navigational aids. Some of these systems belong to the pre-war period; some, such as Gee and Loran, are war-time inventions; others, of which there is now talk, are clearly some long way ahead. The radio engineer approaches the problem of air navigation along the path of radio and through a maze of technical principles and techniques. The navigator has a different approach to the problem. He requires a device which provides him with the fundamental knowledge of his position at any moment of flight. He wants this information to be accurate, always available and, being a busy man, he wants to obtain it with the minimum of effort.

To the navigator, the main interest of the Decca System lies in the simple manner in which the information is presented.

Very briefly, a system of ground stations radiate a continuous radio wave transmission which is received in the aircraft on a simple radio receiver weighing less than 25 lb. Controlled by this receiver are three meters with clear, easily readable dials, called "Decometers," situated on the pilot's instrument panel. A glance at the readings indicated on the dials, and reference to the Decca Lattice Chart for the area in which the aircraft is flying, provides an immediate but highly accurate fix of the position of the aircraft at the moment of reading the dials. There is no calculation, no setting up, no comparison or measuring, merely the act of translating dial reading to chart position.

This position information, moreover, is continuous throughout the flight of the aircraft within the area of the Ground Station cover. The track of the aircraft, therefore, can be accurately plotted from the moment of commencing flight, and the aircraft "position on track" plotted as a progressive check on the navigator's

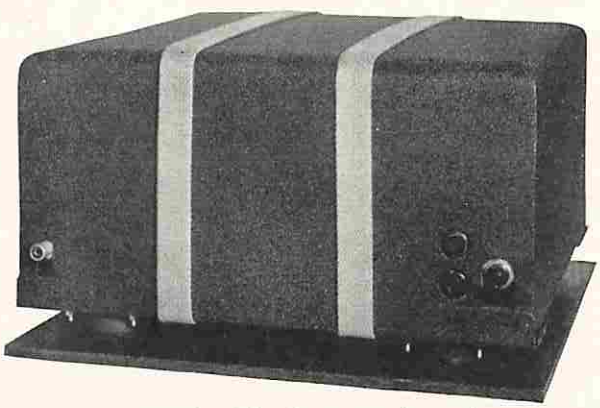


FIG. 1. *The Decca receiver unit*

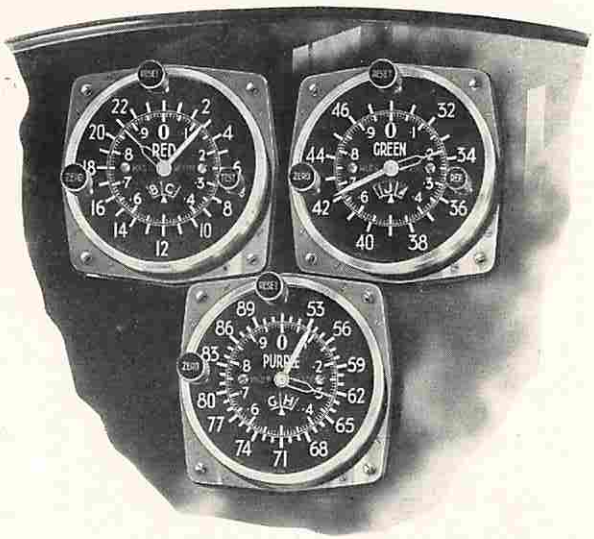


FIG. 2. *The Decometers*

calculated position. The radiation pattern set up by the Decca Navigator Ground Stations produces, as in Gee and Loran, a system of "lanes" which form the Lattice Lines on the navigator's chart, and because of the continuous reading facility of the Decometers it is possible to set a course or to "home" along any particular lane merely by keeping the pointer on one Decometer constant at the reading indicating that lane and to plot regular position fixes on course by checking the progressively changing readings of either one of the other dials.

So much for the answer to the operational problem of air navigation provided by the Decca System. Now for a few words on how the system works.

In the Gee system the navigator's chart is made up from a pattern of intersecting hyperbolae coloured Red and Green, produced as the result of a *time difference* in the transmissions from two ground stations which are locked together. The Decca Navigator transmission produces an exactly similar pattern by means of a *phase difference* between the transmissions from two ground stations. Let us suppose that there are two Decca stations situated some 80 miles or so apart. These stations are called the Master and Red Slave respectively. Their transmissions are on different frequencies but locked together so that both commence transmission together, and from thereon remain in "step." At any point, therefore, covered by the transmissions from the two stations, there is a fixed phase relationship between them. Thus the phase relationship varies as the

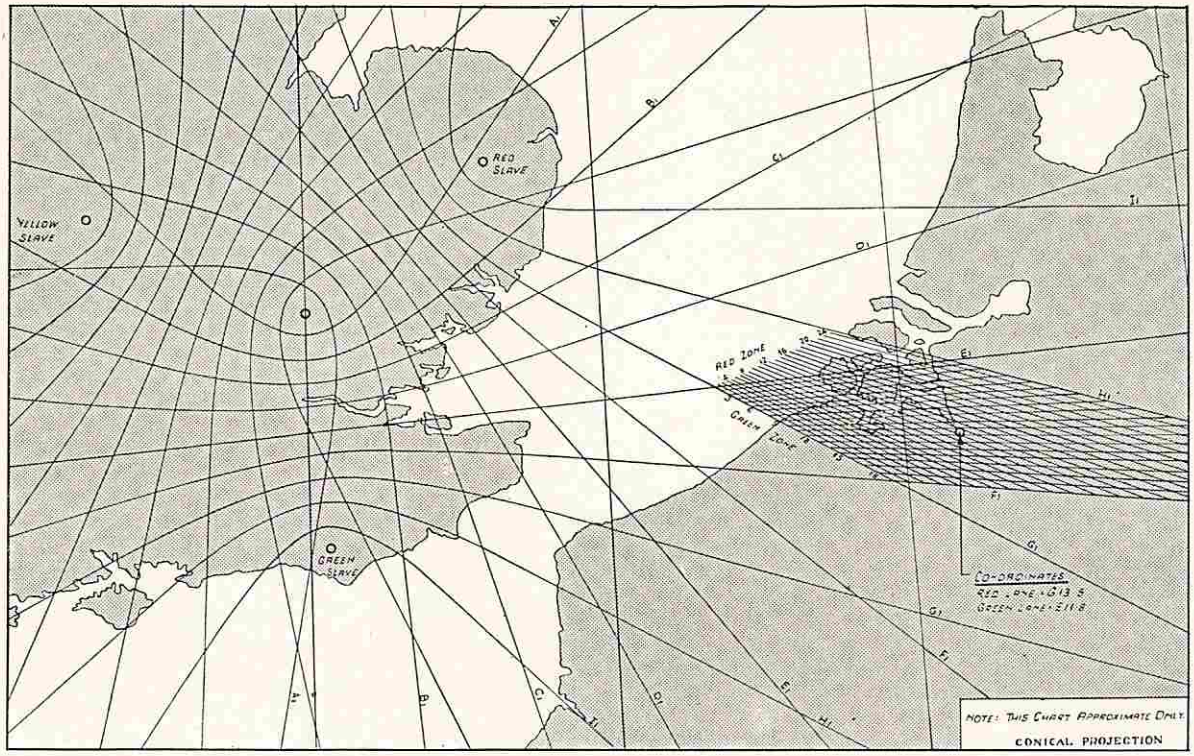


FIG. 3. *Typical lane pattern for four-station chain*

distance varies from either one or the other station. Now, if the phase difference is plotted for different distances from the stations, the result is a series of hyperbolic curves, or "lanes" as they are more commonly described.

Add an additional station called the Green Slave, whose transmission is also locked to the Master, and a further series of hyperbolae are set up which intersect the pattern created by the Master and Red Slave Transmitters. The aircraft receiver displays on the Red Decometer the phase difference between Master and Red Slave in terms of the lane number and fraction and, similarly, on the Green Decometer, the Green lane number and fraction. It then follows that where the Red and Green lanes cross is the exact position of the aircraft. In Fig. 3 is shown a typical lane pattern for a four station Chain (Master and three slaves). A third Slave, called the Purple Slave, is usually provided to give 360° cover.

Fig. 2 shows the Decometers as mounted on the instrument panel of an aircraft, with the meters giving the following readings: Red Zone C 2·87, Green J 42·2, Purple H 53·30.

Low Frequencies give cover at Ground Level

The Decca transmissions are carried out on low frequencies (long waves), which have the facility of following the curvature of the earth and are not limited by the "optical horizon," as in the case of high frequency systems. The Decca ground station, therefore, does not need to be sited on high ground to secure reasonable coverage. It gives equally efficient results from ground level upwards, and is actually just as efficient for marine as for air navigation. On a 24-hour service basis the Decca system gives highly accurate coverage at a range of 300 miles from the ground station, but during daylight hours the coverage is increased beyond 1,000 miles. The reason for this is that the frequencies used by the Decca System are affected by the so-called "skywave" at night, which reduces the accuracy at ranges in excess of 400 miles. Reliable performance in the hours of darkness is, therefore, only claimed up to 300 miles.

The nearer the aircraft is to the line joining the pair of stations, the Transmitter base line, the greater is the accuracy of the Decca System. The following estimated accuracies are based on a large series of readings and under differing weather conditions:

Distance from Transmitter Base Line	*Estimated accuracy of Position Line*	
	DAY	NIGHT
50 miles	10 yards ..	20 yards
100 miles	20 yards ..	50 yards
200 miles	40 yards ..	200 yards
300 miles	100 yards ..	500 yards
500 miles	200 yards	
1,000 miles	500 yards	

Operation of Decca Airborne Apparatus

In operation the Decca system is simple, all control manipulation being carried out before take off. After switching on the receiver, the Decometers are adjusted to read zero, and the receiver is phase corrected by the small knob marked "Zero" shown in Fig. 2. This avoids instrumental inaccuracies. The meters are then set to the Zone letters and lane numbers corresponding to the lane in which the aircraft is situated. The setting up is carried out by rotation of the knob marked "Reset" in Fig. 2. The small hand on the meters automatically takes up the reading of the fraction of the lane because it is showing the phase difference. In order to verify that the equipment is in working order, a test button is provided, marked "Test" in the illustration shown. This causes the Decometers to deflect momentarily when the button is pressed, if the receiver and transmitter are functioning correctly. The receiver is arranged for fixed tuning and can, therefore, be stowed in any convenient position in the aircraft.

Decca System Facilities

The Decca System combines in one small radio receiver and associated indicating instruments the facilities of accurate long and short range fixing, homing, and aerodrome approach. Because it can be installed without difficulty in the smallest types of aircraft, procedures which were previously confined to medium and large size aircraft can be used universally, and there is the opportunity of unification of air and marine navigational aids. This would, from the aeronautical viewpoint, greatly simplify air traffic control and would be of importance in air-sea rescue operations. The system has been in experimental operation over a period of about two years and is shortly to be working on a permanent basis to provide a 360° coverage centred on England.

Future Development

The future development of the Decca Navigator System clearly lies in the use of very low frequencies which accentuate the advantage gained from transmissions following the curvature of the earth, and produce extremely efficient results at very great ranges, substantially free of the night effect caused by the presence of skywave radiation. The frequencies concerned lie in the band from 11 to 14 kilocycles per second and should provide highly accurate results over the 24-hour period up to a distance of some 3,000 miles from the ground stations. Thus it would be possible to provide practical navigational cover over the entire area of the Atlantic and Pacific Oceans by means of Decca Navigator Stations working on these very low frequencies.

On this application of the Decca Navigator System, arrangements are now in hand to carry forward a proposal to install two high-power Decca Navigator Stations on the west coast of Eire, so sited that one of the lanes in the hyperbolic pattern laid by their transmissions will follow the Great Circle route from the London Airport to New York. An aircraft flying this route would merely have to fly on a constant Decometer reading to maintain "on track" position.

On the successful conclusion of accuracy and performance tests of this Transoceanic Decca System, it is estimated that a small number of these very high-power stations, placed at some 2,000 or 3,000 miles apart, would enable an entire global system of long range navigational aid to be set up so that wherever flying takes place 90° cuts may be obtained.

The Point-to-Point Flying Meter

Amongst other developments allied to the Decca Navigator System, one other may be mentioned as having particular interest to navigators. This is the Decca "Point-to-Point" flying meter, on which design has now reached an advanced stage. An additional small unit is added to the present aircraft receiver and is remotely coupled to two dial indicators which are fitted on the instrument panel. One dial gives immediate visual indication to the pilot of the distance of the aircraft from a predetermined point, registering the diminishing distance continuously as the aircraft flies towards that point, and the other dial gives similarly continuous indication of the distance to right or left of the correct track.

The initial setting up of this system is extremely simple. Before take off, the Decca Navigator Lattice Chart references, both for the aerodrome from which the aircraft is leaving and that to which it is flying, are set on the "point to point" flying unit. From then onwards throughout the flight, the Decca System will control the "Point-to-Point" flying meter without further attention from the pilot or navigator. Thus the system will give all the facilities of radio range flying but will, at the same time, give the pilot or navigator complete freedom of movement should he desire it, without loss of navigational aid service. In other words, it combines the simplicity of the American radio range technique with the freedom of movement which we in Europe believe essential to the flying of the future.

The Decca System will shortly undergo trials to be carried out by Marine and Air interests, including the RAF.

THUNDERSTORM LOCATION

C. V. OCKENDEN, B.Sc.

In the article entitled "Pampa" which appeared in the May number of TRANSPORT COMMAND REVIEW, it was pointed out that the lack of meteorological reports from the Continent during the war years, coupled with the absence of reports from Atlantic ships (which had perforce to maintain radio silence) rendered forecasting for RAF operations, and indeed other operations, a very perplexing job. The article described one way in which the British Meteorological Office sought to reduce the handicap by the institution of what were called "Pampa" aircraft sorties.

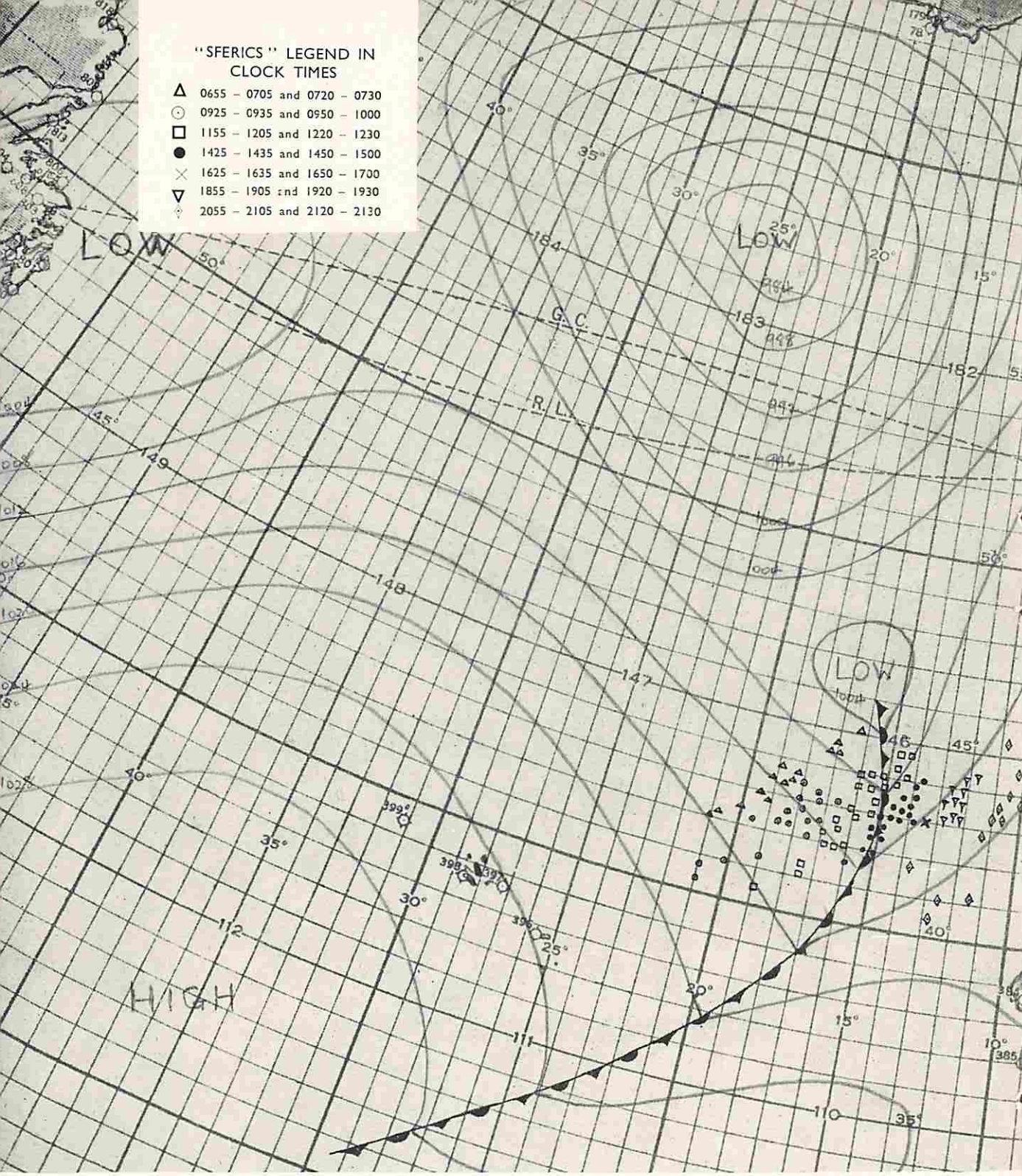
To reduce the handicap further another service was rapidly developed during the war years; this was known as the "Sferic" organisation and its function was to locate the sources of atmospherics produced by lightning flashes. It was realised that this could be done fairly reliably up to distances of 1,000-1,500 miles and would provide a means not only of warning aircraft of the existence of thunderstorms, but of giving forecasters extremely valuable information concerning the characteristics of air-masses and positions of cold fronts over enemy-held territory, and over sea areas from which weather reports were unobtainable.

A lightning flash radiates electro-magnetic waves covering a very wide band of frequencies; the long waves are most prominent and for this and other reasons the Cathode Ray Direction Finding apparatus employed is tuned to 10 kc's (30,000 meter wave length). There are four observing stations located at Dunstable (the Central Forecast Station), Leuchars, St. Eval, and Irvinestown (N. Ireland), and each is equipped with frame aerials, one orientated in a North-South plane and the other in an East-West plane. The frames are fixed and great care taken to ensure accuracy of bearing. Connections are made to two separate but identical amplifiers in an adjoining hut and the outputs from these amplifiers are fed to the plates of a Cathode Ray Tube. Impulses received on the N-S frame deflect the electron beam in the tube in a vertical direction, whilst those on the E-W frame deflect the beam horizontally. Thus the electron beam traces a line on the tube whenever an atmospheric is received, the direction of the line being determined by the resultant of the two deflecting forces. It will be clear that by marking a scale of degrees round the edge of the Cathode Ray tube, we can read off the direction of origin of the lightning flash which caused the atmospheric. There is, of course, an ambiguity of 180°, but this is resolved as soon as bearings from all four stations are plotted on a map. It should be mentioned here that the face of the tube is fluorescent so that, although the duration of an atmospheric is usually only between 1/500 and 1/1,000 second, an observer has no difficulty in reading the bearing because of the persistent after-glow.

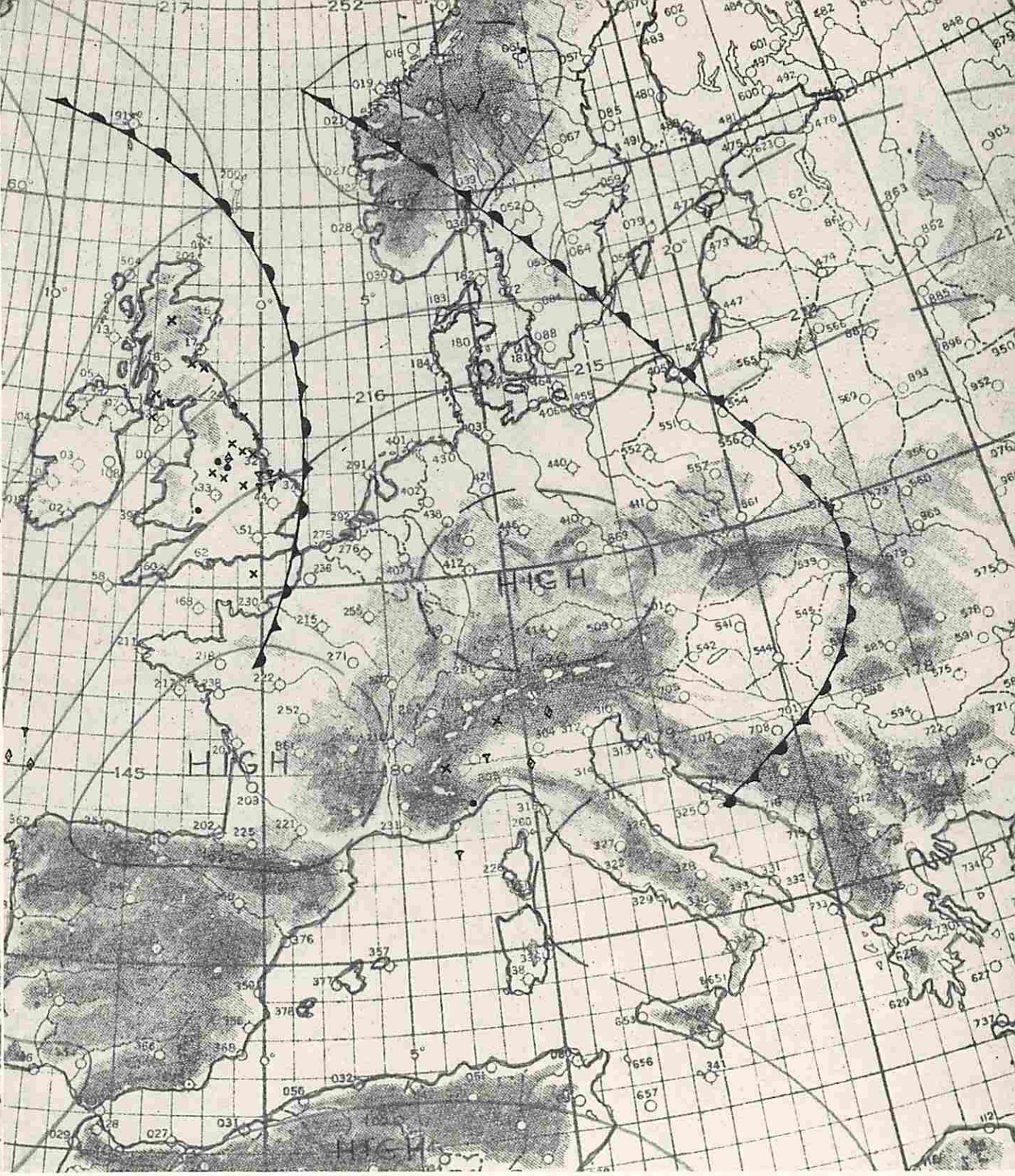
The station at Dunstable is the Control station and is connected by telephone to each of the other three. Observations are made in a series of 12 "runs" during the course of every day; the "runs" last for 15 minutes each, the first starting at 0600 GMT and the last at 2100 GMT. Intermediate observations are made if necessary on special occasions, but good rest periods are essential because of the eye strain involved and because of the limited life of the tubes. Just before a series of observations is due to begin, the Dunstable observer, wearing headphones and microphone, calls up the outstations in turn. Curtains are drawn across the windows of the observing huts (to enable the flashes on the tubes to be more readily observed), and the sets are "lined up." This process involves switching on a local oscillator, which injects exactly equal signals into each frame aerial. If a set is properly adjusted and amplifiers properly matched, the line artificially produced on the tube will indicate a bearing NW—SE.

When all necessary adjustments have been carried out and the sets at all stations have become properly warmed up, observing starts. The Control station calls out the word "NOW" whenever a flash appears,

Interior of "Sferics" Hut at the Control Station, Dunstable, showing observer viewing the Cathode Ray Tube and method of plotting the fixes



A reproduction of the Weather Map for 1300 *GMT on April* 11, 1944, *on which have been plotted the positions of storms found by "Sferics" plots during that day. It will be noted that there were sporadic storms over Britain during the afternoon, in the rear of the occlusion which had reached the North Sea by* 1300 *GMT, and that a few storms were also in progress just south of the Alps. The most interesting*



feature of the chart, however, is the regular progression of storms associated with the occlusion which was moving quickly eastwards, with the secondary depression centred about 500 miles off North-West Spain. The chart forms a good example of the way in which "Sferic" reports can be used by forecasters to determine the probable position of a "front" when no other evidence is available.

which is considered to be long enough to be readily identifiable at all stations. The sets can be adjusted for sensitivity; on a hot summer afternoon flashes may be practically continuous, with outbreaks of thunderstorms in the British Isles and the Continent, and it would be impossible to attempt to identify every flash. On the other hand, in stable types of weather in winter months, it may happen that not more than one or two flashes occur during a whole 15-minute run. Immediately "NOW" is called, the observers at Leuchars, St. Eval, and Irvinestown note the direction of the flash as shown on their tubes and give it by phone to the Dunstable office, where each direction is recorded for subsequent plotting.

Plotting is commenced immediately after all bearings have been received and takes 5 to 10 minutes on the average. As all D/F personnel will realise, the bearings rarely intersect at an exact point on the outline map —normally each result gives a small quadrilateral or triangle, and the "fix" is taken to be at the in-centre unless it is obvious that more weight should be given to the readings from any particular station or stations. As soon as the positions of storms have been determined on the plotting-board, the information is put into a simple code and issued without delay on the teleprinter broadcast, which serves all Meteorological stations in this country, and on the W/T issue for stations overseas.

Of the very great value of "Sferics" during the war there can be no doubt. Lightning gives the clue to the existence of Cumulo-nimbus clouds, which may extend upwards to heights well over 20,000 feet. The importance of this to "Ops" is obvious. Thick cloud would obscure bombing targets, flying would be extremely bumpy with treacherous vertical air currents, and there would be serious hazards due to ice formation on the aircraft and the possible upsetting of instruments by electrical storms. In peace time, even with improved facilities for collecting weather data quickly from a wide field, the network of reporting stations is not sufficiently close to ensure that all storms are reported, whilst over the sea "Sferics" will for a long time constitute the best and cheapest method of obtaining information about the existence and movement of thunderstorms.

Forewarned is to be forearmed, and all pilots of Transport Command and Civil airways will, if only for the benefit of their passengers, be prepared to make reasonable detours to avoid areas in which thunderstorms are known to have broken out. To locate these areas accurately is the daily task of the personnel working in the "Sferics" department of the Meteorological Office and they are as keenly alive to their responsibilities at the present time as they were during the war.

The Tudor line. A view of the assembly hangar at Woodford. The new and larger tail can be seen on the foremost machine. *(See page 20.)*

Operation Alacrity

an account of the occupation of the Azores

TRANSATLANTIC traffic has made use of the Azores ever since Columbus revictualled his ship there on returning from America in 1493. In peace commercially valuable, in global war these islands became strategically vital.

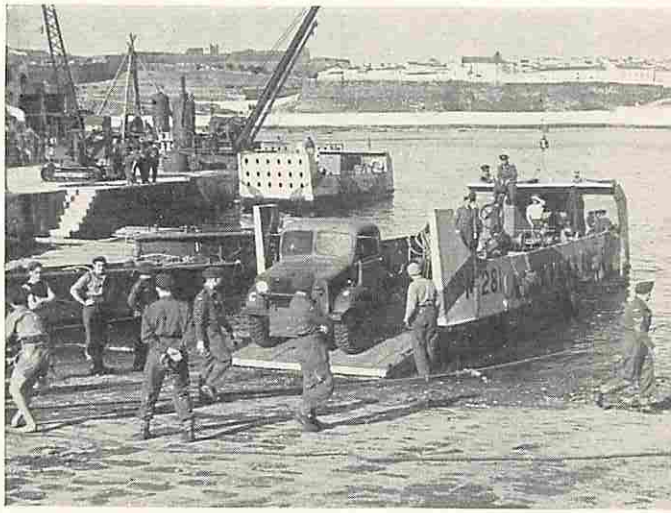
Early in the war, it was obvious that the use of a sea-air base in this important and convenient position would have far-reaching benefits. There was the "Gap" in the battle of the Atlantic which could be closed by operations based on the Azores. And there were the growing demands from the Middle and Far East for air deliveries and air supplies. A route via the Azores would provide a third line of traffic across the Atlantic, shorter than the South Atlantic route, and more hospitable than the Northern route in the winter months.

Operation "Alacrity" began at the end of September, 1943. For the first time on record a combined force of Navy, Army, and Air Force personnel was commanded by a Royal Air Force officer; Air Vice Marshal Sir G. R. Bromet was appointed Force Commander in recognition of the fact that the air base was the primary advantage desired from the operation. The expedition set sail with little time to spare before the Atlantic swell would set in and, for six months, make landing operations impossible for all but the smallest craft able to use the tiny harbour at Angra. For this reason a six-months' supply of consumable stores had to be taken.

After ten days at sea the convoy, shadowed by U-boats all the way, reached the islands. In spite of several attacks no vessel was lost and the only casualty was a Swordfish which failed to return to the escorting carrier. That night the German radio made much of an account of the decimation of a large British convoy, the remnants of which had "fled for shelter to the Azores." The irony of these words was not lost on the troops, for shelter was what they most needed. There were no huts; messes were in the open, with everyone sitting on benches or packing cases. It rained in torrents for two nights and the hastily erected bivouacs were flooded.

Nevertheless, the whole force was very vulnerable to attack as it lay off-shore in deep water, and it was imperative to complete the landing with all speed. There were, of course, no docking facilities for an operation of this sort. Indeed, there was only one LCT in the whole force; everything that it could not carry had to be off-loaded from the ships and ferried to the shore on assault landing craft. Stores were put ashore at the rate of 1,000 tons a day, a tremendous achievement on the part of the men of the Pioneer

(*Continued at foot of page 16*)



Unloading in the little harbour at Angra

The tented camp of the Transport Command Staging Post

The hard life . . .

The first mail arrives

Rice from the Skies

FLIGHT LIEUTENANT E. A. ELDERS

THE largest peace-time supply dropping operation of the RAF in ACSEA was carried out during the months of March and April to relieve famine imminent among the hill tribes of Kachin on the Northern borders of Burma.

The Kachin people had several claims on our assistance. They had fought guerilla warfare bravely against the Japanese and destroyed their own rice fields against the advance of the enemy. Stores were exhausted and there were no prospects of further food supplies until after the monsoon.

Six thousand tons of rice were required immediately and only about half this quantity could be sent by overland routes. Transport aircraft in Burma were already heavily committed in supply operations to troops engaged in anti-bandit operations in the frontier areas. No. 62 Squadron was the only unit in Burma then available to take on a new commitment, and even this was due to disband in mid-March.

Five Squadrons were, therefore, called in from India. Dakotas of No. 10 Squadron from Poona, Liberators of Nos. 159, 355, and 232 Squadrons, and Halifaxes of 298 Squadron were all placed under the control of No. 341 Wing of 232 Group.

Eight dropping zones, selected by the civil authorities, had to be reconnoitred. The Kachin terrain from the air resembles a thick green carpet crumpled into a mass of folds, mountains up to 10,000 and 12,000 feet, split by deep gorges.

As far as possible, dropping zones had to be located on the ridges to provide sufficient approach and get-away, and they had to be cleared of jungle and marked recognisably. Storehouses were prepared by the villagers and the headmen organised distribution of the stores to be dropped.

On March 15th the Dakotas and Halifaxes, based at Meiktila, started operations. The Liberators were based at Pegu and were used to carry loads of 7,000 lb. of rice each up to the advanced base at Myitkyina. The Halifax aircraft could carry 12,000 lb. of rice on each trip, dropping 6,000 lb. on the DZ and landing the other half of their loads (carried in bomb-bay panniers) at the advanced base. The Dakotas shouldered the bulk of the job. Early each morning they took off from Meiktila, flew some 400 miles over Mandalay to the mountains to drop their sacks, and returned to Myitkyina, re-loaded and carried out a second, and sometimes a third, drop before cumulo-nimbus build-up and the gathering darkness sent them back to base.

All the rice was delivered by free drops in three-fold sacks, necessitating a run over the DZ at something like 200 feet. Throughout the operation an average delivery of 60 tons per day was maintained, and on the evening of April 24th—nine days ahead of schedule—the task had been completed.

Apart from the normal hazards of weather in these parts, special dangers attend this sort of operation; if a pilot selects a wrong valley to fly up he may suddenly find himself in a cul-de-sac with no opportunity to climb out of it.

Operation "Hunger II" was not completed without heavy loss. Three Dakotas failed to return from a dropping mission to Htawgaw and, in spite of extensive searches, only two of the crashed aircraft and one Indian survivor could be found.

Concluded from page 15)

Corps and the Docks Battalions; POL stores alone totalled 12,000 tons—all handled in six-gallon jerry cans.

While the assault craft were plying back and forth between the ships and the beaches, officers and men were toiling inland to make an operational airfield out of a grass field which had been the base for a Portuguese squadron of Gladiators. A thousand tons of Summerfelt tracking was laid down in 48 hours. Ten days after landing, Lagens airfield was able to receive the first two VLR Coastal Command aircraft. Shortly afterwards there arrived a Dakota of No. 24 Squadron from the East, with the Senior Air Staff Officer of HQ Transport Command, and a Catalina from the West carrying SASO, 45 Group. The new Atlantic bridge was completed.

The importance of this operation was soon to be seen. The Navy and Coastal Command effectively covered the gap in our anti-U-boat activities, and a trickle of reinforcement aircraft quickly grew to an important and steady flow. During 1944 and 1945 a total of 1,575 RAF reinforcement aircraft of various types passed eastwards through the Azores, piloted by 45 Group delivery crews. American air traffic through the airfield was considerably bigger.

Laying Summerfelt tracking on the airfield at Lagens

AIR TRANSPORT INTELLIGENCE

These items, extracted from BOAC's NOTES AND NEWS, *are reproduced by kind permission of the Corporation*

New Construction Material

Mr. W. E. Beall, a vice-president of the Boeing Aircraft Company, has announced that, as it is considered present aircraft construction materials will be wholly inadequate to offset the high pressure temperatures and abrupt changes in speed foreseen in future high-speed aircraft, experiments are being carried out by the company in the use of " sandwich-type " materials made up of thin sheets of a strong but light alloy, between which is inserted some medium density material such as balsa wood, foamed magnesium, foamed hard rubber, glass fibre, plywood, cork, etc. The experiments are directed towards the development of a lightweight construction material strong enough to permit the building of fuselages and wings without bulkheads, longerons, or stiffeners.

* * *

New Plastics

Among new plastics recently announced by the Du Pont Company is a tetrafluorothylene resin, to be known as "Teflon," a new resin known as BCM, and a new industrial plastic which withstands acid. It is claimed that the latter material retains its strength and form at higher temperatures than any known organic material.

" Teflon " is a good electric insulator and was manufactured during the war for special military uses. BCM is used in structural panels reinforced with glass, fabric or other materials, and is at present undergoing tests by various aircraft manufacturers.

* * *

Lockheed " Constitution "

The following preliminary details of the " Constitution " have been issued by the Lockheed Company.

Span	200 ft.
Length	155 ft.
Weight ..	180,000 lb. approx.
Engines ..	4 P.W. Wasp Major
Top Speed	350 m.p.h.
Max. Range ..	2,300 miles
Capacity	128 seats

The aircraft will have nine 2-berth State-rooms, twelve single berths. The remaining accommodation will be in the form of reclining chairs.

* * *

New Aircraft Design

The Briggs Manufacturing Company have been assigned the patent rights of a new " Flying Wing " type aircraft. A feature of the design is stated to be the location of four pusher-type propellers, which are positioned in such a way as to create a partial vacuum above the wing, making for vertical lift.

The rudder is carried at the end of a fin which runs above the wing from fore to aft. The wing tips are hinged vertically during take-off, returning to normal position during flight.

* * *

Aircraft Heater

A Janitrol heater, weighing 100 lb., some 50 lb. less than the conventional D.C.3 system, has been developed for use in this type aircraft.

Contained in an aluminium case measuring 12 × 15 × 49 in. is a 125,000 b.t.u. Janitrol heater, fuel pump, ignition system, ventilating and combustion fans, thermostatic temperature controls, and other components.

It is designed for fitting in the cargo compartment, and is stated to be capable of being replaced for servicing and inspection in fifteen minutes.

* * *

P.I.C.A.O.

The first session of the Airworthiness Division of the Provisional International Civil Aviation Organisation ended at Montreal on April 13th.

Among the chief proposals of the " Highway Code " of the air laid down by the session is a recommendation that only multi-engined aircraft should be flown on scheduled international services.

Stringent standards, which are to apply to all passenger transport aircraft manufactured after January 1, 1951, have been agreed.

It was stated that an earlier enforcement of the new requirements would be impossible without injustice to manufacturers with new aircraft already under design or construction.

The new recommendations include:

1. International methods for testing engine performances, to ensure that engines will possess the same high degree of reliability irrespective of the country of manufacture.

2. Stringent protective measures against outbreaks of fire aboard.

3. All aircraft to show sufficient structural strength to withstand the roughest conditions in the air and on landing.

4. Measures to guarantee passenger safety in the event of engine failure under any circumstances, even during take-off and climb.

International requirements for sound aircraft construction and the installation of engines and equipment have also been laid down.

In Load Control: ''I shall be taking off at . . .''

Briefing: ''You may have to use your oxygen mask''

"TRAFFIC OFFICER"

An Instructional Film

WHEN No. 1 Air Traffic School* was reorganised and enlarged in July, 1944, the Instructional Staff were faced with a two-fold task. In addition to instructing in the all-important subject of despatching and receiving passengers, freight, and mail by air, it was soon apparent that the subject of Traffic generally would first have to be ''sold'' to the students, if any real success was to be achieved.

The students were all ex-aircrew personnel whose flying career in the RAF had finished on cessation of hostilities in Europe. They were, naturally, unhappy on this account, and viewed with displeasure the prospect of tackling a ground job, about which they knew nothing. To help them to gain a clear picture of the duties of Traffic Officers and Air Movement Assistants as quickly as possible, it was decided to produce, under Air Ministry authority, a film dealing with all aspects of the subject. Merton Park Studios were commissioned to prepare the film, and Mrs. Louise Burt, the producer, and S/Ldr. D. J. Cash, then Chief Instructor at the Air Traffic School, jointly wrote the script.

The principal scenes were filmed at Rabat Sale, and at the Air Booking Centre and Air Freight Centre at Cairo. The sound recording was added afterwards in studio mock-ups, with the aid of personnel of HQTC. Also featured in the film is RAF Station " Fandar,''

* The School has now been transferred to Technical Training Command.

''This is the Form 1380''

Staging Post, "Fandar'' (actually taken at Rabat)

The Captain signs the Form 700

which past students will remember as the mock-up Passenger and Freight Section at the Air Traffic School, where exercises in passenger and freight handling were carried out.

The main object of the film is to convert the unbeliever, because of the difficulties experienced in the early days of the Traffic School. Actually, the film serves a double purpose, for it shows how correct procedure on the part of the crew can make all the difference in the world to the passengers who are in their care.

In fact, "Traffic Officer" gives, in an interesting and instructive way, a comprehensive picture of traffic procedure and methods used in the scheduled services run by Transport Command, and now, of course, by the air transport services run by Overseas Commands.

If you have not yet received a copy of the film, be sure to apply at once to your Group Training Officer.

"Here is your Captain of aircraft, sir"

Strange Freight

FLIGHT LIEUTENANT SYDNEY MOORHOUSE

FEW arrivals by air in Great Britain have created more interest than that of Miss Unity, the 50 lb. baby giant panda, which recently reached the London Zoological Gardens from China.

Not only was Miss Unity the first panda to travel by aeroplane, but her safe arrival in such excellent condition promises to solve one of the biggest problems of the Zoo authorities—the transportation of rare and delicate creatures from the far corners of the world.

While the panda's successful flight is interesting in itself, it is more important as opening out new channels for zoological research. Such organisations as the London Zoological Society exist not only to display their collections of wild animals, but to provide scientists, biologists and others with the opportunity to increase their knowledge of the ways and habits of the creatures of the wild.

During the war, official (and high priority) freight in Transport Command aircraft has often included mice, rats, guinea pigs, and reptiles and insects, required in connection with medical research; crews of 45 Group carried most of this traffic between UK and USA. And it is recorded that a South African Air Force pilot was required to fly a number of monkeys from Africa to replenish the dwindling colony on "The Rock."

Taken as a whole, animals are much less affected by air travel than by sea and the experience seems to have a quietening effect on them. Birds, for example, cease to call when placed on board an aircraft and even monkeys stop their chatter. As a result they arrive at their destination in quite good fettle and present far fewer problems to those entrusted with the job of settling them in their new quarters than do creatures which have come by sea and rail.

Already the officials of London Zoo see great potentialities for future developments. Many animals from the remoter parts of the world have never been exhibited because of the difficulty not only of transport, but of getting in fresh supplies of essential native foodstuffs. Now these, too, can be brought by air.

Soon after the outbreak of war, the Zoo authorities took the precaution of destroying all the poisonous snakes and scorpions in their possession so that, in the event of bombing, they would not escape and cause consternation in the vicinity of Regent's Park. To-day, nearly all have been replaced, and the new ones have come to Britain by air.

Perhaps the greatest potential development is in bringing the eggs of rare birds and tropical insects by air for hatching out at the Zoo. These can be placed in incubators at the place of despatch and the incubation finished at Regent's Park.

The Pressurised TUDOR

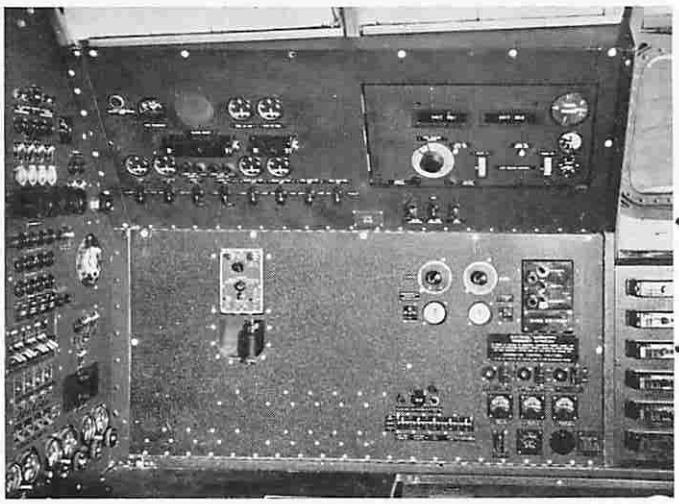
EARLY last month we had the opportunity of experiencing a high altitude flight in the first British airliner to be pressurised—the Avro Tudor I.

We were at 24,600 feet within 38 minutes of take-off from Woodford airfield and, although the writer is more than usually sensitive to pressure changes, nothing but a periodic "click" in the ears was felt. The truest description of the flight would be that it was singularly unspectacular, but all the more convincing for that.

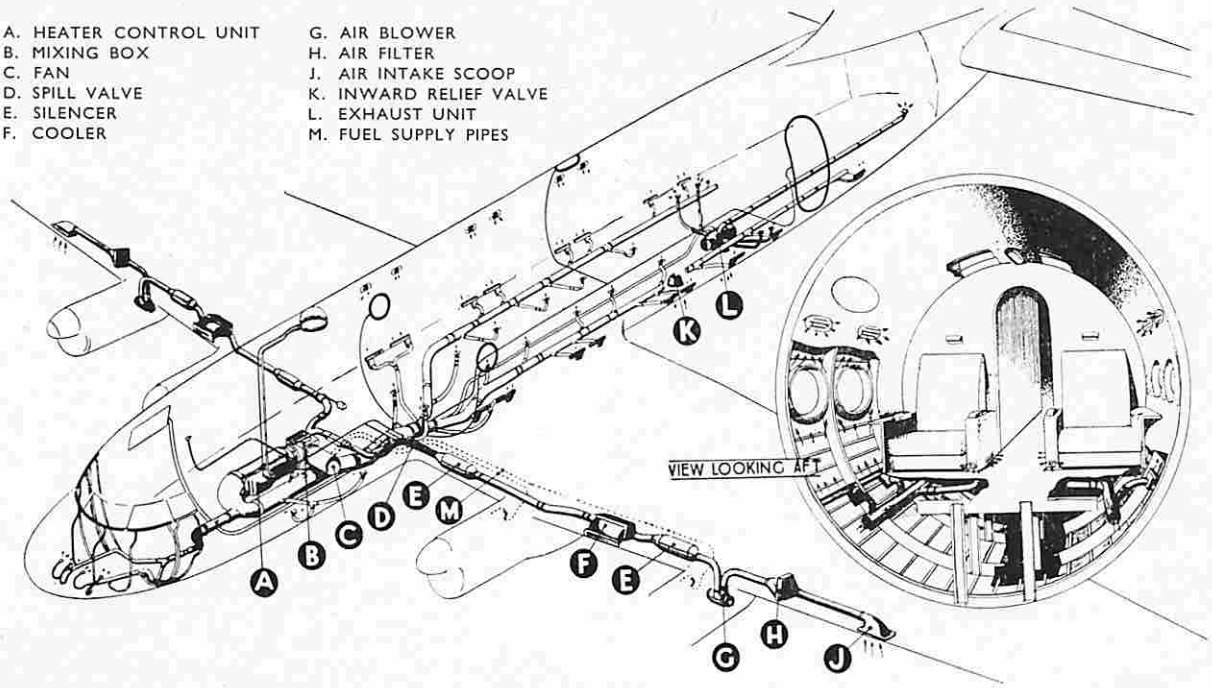
The decision to build a pressurised transport aircraft was taken at the end of 1943, when the Tudor designs were under consideration. The chief reason for this decision was the need for an aircraft able to fly the North Atlantic route at an altitude which would ensure freedom from the troublesome icing conditions so frequently met in the winter months. In order to maintain a service of high regularity, the aircraft must be able to fly at an altitude above 20,000 feet, where the air is so dry that chances of ice formation are practically eliminated. To provide for exceptional conditions, the Tudor I is designed to climb to, and fly at, 25,000 feet, whilst a differential pressure of 5.5 lb. per square inch is maintained within the fuselage. This means that at 25,000 feet the pressure within the cabin registers as equal to that of the mean atmospheric pressure at 8,000 feet. By pegging the pressure at this figure, rather than attempting to achieve sea-level conditions all the way up, considerable saving of equipment weight is effected and problems of fuselage strength are more easily soluble. These conditions were approved by medical authorities as being comfortable for most people.

Pressure is changed within the aircraft during ascent

A view of the flight engineer's station showing the Westland Control panel on the starboard side of the fuselage.



A. HEATER CONTROL UNIT
B. MIXING BOX
C. FAN
D. SPILL VALVE
E. SILENCER
F. COOLER
G. AIR BLOWER
H. AIR FILTER
J. AIR INTAKE SCOOP
K. INWARD RELIEF VALVE
L. EXHAUST UNIT
M. FUEL SUPPLY PIPES



or descent at a rate limited to 300 feet per minute, and the air intake is adjusted to provide slightly more than 1½ lb. of air per minute for each person. On our actual flight at 7,000 feet the atmospheric pressure in the cabin registered equal to that of a height of 1,000 feet; at 17,000 feet it was as at 2,500 feet, at 24,600 feet pressure was as at 7,000 feet, and this was maintained for some minutes before descending.

With the exception of a small portion of the rear of the fuselage, the whole of the cabin volume of the Tudor I, both above and below the floor level, is pressurised. Heating and ventilation are combined in the pressurisation system. Atmospheric air is drawn in through a combined scoop and inertia filter in each leading edge, outboard of the outer engine. The air is directed to Marshal type XV blowers, and after passing through silencers and coolers, enters the fuselage through a combined spill and non-return valve; it is finally heated by a Janitrol heater, and delivered to the main distributing ducting which runs the length of the aircraft below the floor. Manifolds are welded to form part of this ducting and terminate in mushroom headed outlets in the crew stations and toilets, but the passenger cabin supply is distributed through louvres fitted to the tubular arms of the chairs. Exhausted air is extracted through slots cut round the periphery of the roof light reflectors. The current of incoming air could be distinctly felt if the hand was held immediately in front of the louvres, but no draughts were noticeable in the ordinary seat position. Ventilation is achieved by mixing and circulating fresh air and some of the air from the cabin.

The master control valve for the pressurisation is on the Westland control panel fitted to the starboard side of the flight engineer's station. Two aneroids on the control panel are connected with the exhaust-valve and regulate the amount of air passing out. After an initial setting by the flight engineer, the interior pressure is automatically controlled by the action of duplicated discharge valves near the rear of the cabin. As well as watching the pressure changes with ascent and descent, the flight engineer can regulate the temperature according to requirements.

The sealing of the cabin is effected by a special compound interposed between all riveted and other metal-to-metal joints, and all control rods and cables pass through pressure seals; the nose cap is sealed with a solid rubber insert; among smaller points of interest is the waste pipe of the steward's sink, which is closed by a spring loaded suction plug.

The designers and technicians of A. V. Roe, and of the companies specialising in the final equipment, had many stimulating problems to solve in the development of the pressurised Tudor. Nevertheless, several further developments can be expected from this first achievement. Remaining to be solved are such problems as the completely automatic air conditioning of the cabin —at present, temperature control is the responsibility of the flight engineer; probably automatic humidfying of the air will have to be introduced, especially for long flights at high altitude to tropical countries, where the contrast between the dry "pressurised" air in the cabin and the damp heat on the airfield could be quite distressing. For similar conditions, air refrigeration must be developed. In each of these, and in other fields, too, research and experiment are continuing.

The interior of the passengers' cabin of the first pressurised Avro Tudor I, G-AGRC. This aircraft, with 12 seats, convertible to night berths, will be delivered to BOAC for North Atlantic operation. Note air conditioning inlet louvres in the arm rests of the chairs, near the floor.

Whilst at Woodford, we took the opportunity of inspecting the assembly hangar and it was encouraging to see a number of the Tudors in advanced stages of construction.

Progress in production of Tudor aircraft is actually better than recent press reports have indicated. The first aircraft off the production line has been flying for several months, whilst awaiting clearance of the prototype. Four more were flying at the beginning of June, and the remainder, totalling 15, will be ready to fly at intervals of approximately one week. The principle delay was occasioned by the fitting of a new and larger fin and rudder in order to get the aircraft licensed for the shortest possible runways.

TAKORADI

In the critical years of the war against Germany and Italy, when France had fallen, there remained only one way of getting reinforcement aircraft quickly to our positions at the far end of the Mediterranean. That was the route from the West Coast of Africa across the Sudan and up to Cairo, a trail that had been blazed by the RAF as early as 1925 and extensively surveyed in 1930 (notably by 216 Squadron Victorias and by Imperial Airways). Up to 1939, BOAC and other civil airlines ran regular schedules over this route.

Anticipating the situation which would arise if Italy declared war, an RAF party arrived at Takoradi trading post in the early summer of 1940. New workshops, runways, hangars were built, and always the staff was outgrowing the accommodation. By 1942 the camp was housing more than 3,000 men.

Within three months of their arrival, the advance party had sent off their first reinforcement aircraft. Most of the early reinforcements were Hurricanes or Blenheims, carried in crates by sea to Takoradi, where they were assembled by non-stop shifts of ground crews. As soon as the South Atlantic route was opened, medium bombers were flown across from America, and Liberators and Dakotas began to appear, creating new problems for the overworked servicing crews. Malaria, a serious problem in 1942, when the sickness rate went up to over 170 per 1,000 Europeans, was tackled energetically by the RAF and Colonial Medical Staffs. Breeding grounds of the mosquito were sprayed from aircraft, inoculations and preventative measures were strictly enforced. In three months the rate was reduced to below 40 per 1,000 and has gone down steadily ever since.

But deliveries from Britain to the Middle East were accelerated by two months after the opening of Takoradi, and on July 30, 1943, the 500th aircraft had been sent across the bush to Egypt. " The construction and maintenance of Takoradi were of incalculable assistance to the fortunes of battle in the desert."*

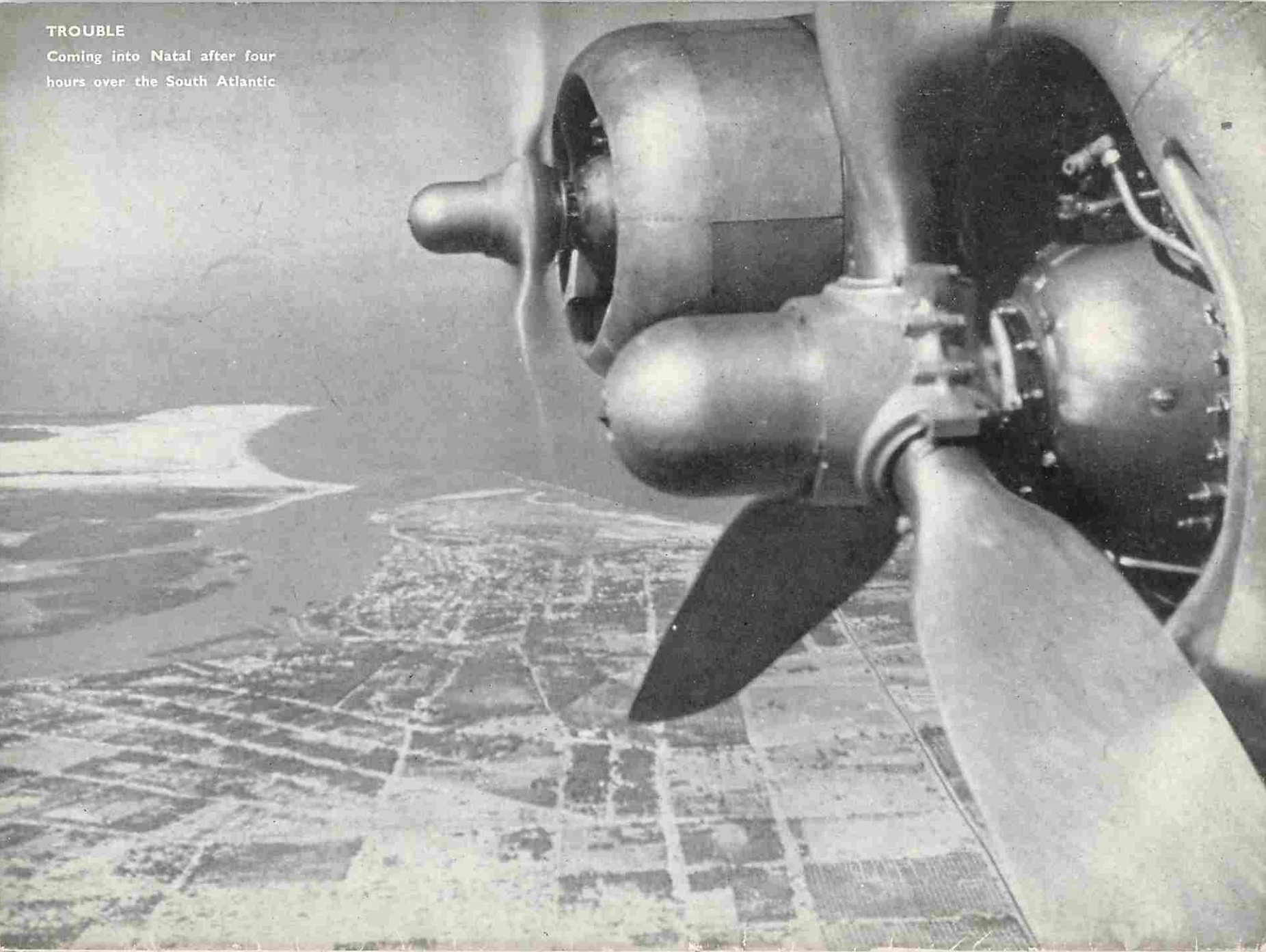
No. 68 Staging Post, Takoradi, now under AHQ, West Africa, remains as a small but useful RAF outpost, serving the air schedules between the UK and West Africa. Men of No. 117 West African Air Corps are employed in all trades to supplement and release RAF men for demobilisation. The scene is strangely quiet after the roar and dust of the reinforcement peak. There is plenty of time and plenty of opportunity for sport; there is sea bathing and the yacht club; food is good with fresh fruit in abundance. The average maximum temperature is 90°F, and though the humid climate is monotonous, the heat is relieved by the sea breezes.

* " Atlantic Bridge " (H.M. Stationery Office).

Scene of quiet; Takoradi airfield to-day

View from the living site

(18155) Wt. 8211 D2337 5,000 6.46 S.P. & S. G 8/35 Code 476



TROUBLE

Coming into Natal after four hours over the South Atlantic