

GATEWAY TO THE WORLD

The Illustrated Story of the
LONDON AIRPORT



With 28 Pictures and Aerial Map



Alcock and Whitten Brown memorial

THE LONDON AIRPORT

THE AREA of West Middlesex to the west of Hounslow, now the site of London Airport, has a long and varied history, in which many forms of transport, ranging from barges to stage-coaches and from highwaymen's horses to high-speed aircraft, have a quite prominent place. It is therefore singularly appropriate that this area should form one of the focal points of the most modern form of transport, aviation.

In the eighteenth century, mail coaches to the West Country used to roll along the Bath Road (A.4); 'if God permit' they would reach Bath from London in three days, in which time the modern air traveller can reach the other side of the world. At about this period Hounslow Heath, a part of which the airfield now covers, became notorious for the highwaymen—and at least one female of the species—who infested it to prey on the lords and ladies of fashion on their way to take the waters at Bath. Claude Duval is reputed to have been a customer of the 'Three Magpies' inn which still stands next to the airport's main entrance, as was Moll Cutpurse, who was eventually caught and hanged on a gibbet at Cranford.

With the present extensive use that is made of aircraft for survey purposes, it is interesting to note that when General Roy commenced the first ordnance survey of this country in 1784, he chose as the base line of the first triangulation a line from Hampton Hill to Heathrow. During excavations for the airport, an old cannon was found embedded in the ground marking this datum point.



H.R.H. The Duke of Gloucester inspects the crews and their aircraft before the start of the New Zealand Air Race in October, 1953

The preparation of the site for an airfield, although greatly assisted by the flat nature of the terrain, did involve the diversion of two rivers. The first and more ancient of the two was the Longford River, which is said to have been cut to the order of Charles II to feed the fountains at Hampton Court; it has its source in the Colne Brook and eventually reaches the Thames at Hampton Court. The second dates back to the Napoleonic Wars when the Duke of Northumberland, whose home is the famous Syon House in nearby Brentford, wished to provide a waterway for barges to reach his private gunpowder mill on Hounslow Heath. The Duke of Northumberland's River has the same source as the Longford River, but reaches the Thames further downstream near Isleworth. The problem that faced the construction engineers was to square off the south-west corner of the site by running the two rivers in artificial channels for well over a mile. As the older of the two rivers is scheduled as an ancient monument, it was not possible, despite their common origin and outfall, to allow them to commingle; twin channels were therefore built. There is a most peculiar fact that seems to lend justification to the course that had to be adopted—despite their common origin the rate of flow of the two rivers is slightly different and only one of the two has fish in it!

One of the later 'historical' dates is the first to give a hint of the aviation future of the locality. A mile or two away to the south-east, on the 25th August, 1919, the first London to Paris commercial air service was initiated. One wonders whether the passengers could have visualized the day when over 120 services each week would fly between London Airport and Paris.

PLANNING

In 1943 a need arose for a large transport airfield near London for use by the R.A.F. in the closing stages of the war, and to this end over fifty sites were investigated. The site chosen lies between the Bath Road and the Great South West Road, about fourteen miles by road west of Charing Cross, and had the advantages of a flat and almost unobstructed terrain, a gravel sub-soil with good



The departure of H.M. The Queen and H.R.H. The Duke of Edinburgh from London Airport at the start of the Commonwealth tour in November, 1953

drainage characteristics, and the most satisfactory meteorological conditions in the London area. The lay-out planned was a simple triangle of three runways, one of 9,300 feet and two of 6,000 feet, and construction was started in May, 1944.

Because of the unexpectedly early end of the Japanese war, the Heathrow Station of the Royal Air Force was never brought into service use, and at the end of 1945 it was taken over by the civil aviation authorities. The first regular flight from Heathrow was made on the 1st January, 1946, by British South American Airways, later to be amalgamated with British Overseas Airways Corporation, and a few months later the two American airlines then flying into Hurn, near Bournemouth, asked to be allowed to use the airfield because of the difficulties of transporting their passengers from Hurn to London. At the time there were no buildings at the airport other than single-storey units built for the R.A.F. Marquees and caravans were therefore set up at short notice to provide for Customs and Immigration clearance and other purposes, and the London Airport, as it was then officially renamed, swung into action. In July, 1946, B.O.A.C. transferred their own trans-Atlantic and Empire services from Hurn; the first stage of the growth of the airport was marked in September, 1946, when the single-storey buildings were adapted and taken over for passenger handling.

Although it is the main airport for the London area, 'L.A.P.'—the abbreviated name soon adopted by its users—is not the only one. Gatwick, Blackbushe, Bovingdon, Croydon, and Stansted are also operated by the Ministry of Transport and Civil Aviation. Northolt, so well known to hundreds of thousands of European travellers, was handed back to the R.A.F., and by November, 1954, the remainder of its civil air services had been transferred to London Airport.

By the beginning of 1947 the full plans for the development of London Airport were known. The Advisory Panel set up in 1945 recommended the adoption of a triple parallel runway system, a central area within the runway pattern for the permanent terminal buildings, and three maintenance areas to the east, south-east and south-west of the runways. The triple parallel system was to be achieved by the superimposition of a second triangle of

for motor traffic. Each of the latter is capable of carrying 2,000 vehicles an hour, which is about the same capacity as a main trunk road. On completion of the shell, the trench was refilled and the runway and taxi-tracks relaid. The tunnel is fully air-conditioned and the fluorescent lighting is carefully graded to minimise the change of intensity in light when entering or leaving the tunnel. A portion of the tunnel was first brought into regular use for the public at Easter, 1954, to enable them to reach the Public Enclosure in the centre of the airfield.

Other work at this stage included the provision of vehicle subways at each corner of the new marshalling aprons—the areas where the aircraft load and unload their passengers—to provide access to aircraft parked on the outer standings, and the extension of the drainage scheme. Although the gravel sub-soil provides good natural drainage, the vast areas of concrete have necessitated the provision of some eighty-five miles of storm water drainage ducts; these feed surface water into the Thames via balancing reservoirs which were once gravel pits around the perimeter of the airfield. The necessity for this indirect disposal is pointed out by the fact that one quarter of an inch of rain over the whole of the airport's 2,827 acres is equal to about 69,000 tons of water, so that the result of even the unabsorbed portion of a minor cloudburst over the airport pouring directly into the Thames could well be flooding in the lower reaches of the river.

Another task that had to be undertaken was the provision of ducts for the network of cables of various types which cross and recross the airfield. The electricity cables, over 2,000 miles of them, carry the current from the forty-five sub-stations to the widest variety of electrical apparatus imaginable, from giant cranes in the hangars and powerful floodlights on the marshalling apron to traffic lights in the tunnel and electric fans in the sick bay. It is not remarkable that the annual consumption of electricity on the airport, over two million units, would be adequate for a town the size of nearby Maidenhead. The airport is a flourishing town in its own right, with a working population of well over 13,000, and with most of a town's facilities, even to its own fire service, police force and bye-laws, and its own telephone exchange, most aptly named SKYport.

MAINTENANCE

The development of two of the three maintenance areas mentioned earlier has been proceeding steadily over the past few years. The first area is the largest, and has been allocated to the two British Airways Corporations. Between 1947 and 1950, eight temporary steel hangars, each of about 100 feet span, sprang up, and were used by B.O.A.C. for a large part of their major aircraft maintenance. As the modern four-engined airliner has a wing span of anything from 110 to 140 feet, and the possibility of even larger airliners in the future had to be considered, it was clear that the permanent structure which would eventually replace these hangars would need an unobstructed entrance far in excess of 100 feet.

Plans were therefore drawn up for the B.O.A.C. Headquarters Building, which should be in full operation by B.O.A.C. in 1955. It consists of two pairs of hangar pens, an engineering hall 800 feet long and 90 feet wide, running between the backs of the two pairs, and an eight-storey office block separating each pair. Each pen has an unobstructed entrance 45 feet high and 330 feet wide, and this has been achieved by the use of cantilever arches supporting a portal girder; such is the weight of the roof carried by the arches and portal girder that the counterpoise block on each side of each pen consists of over 1,100 tons of concrete. The specially designed light alloy doors of each pen are in two halves which fold concertina-fashion back between the cantilever arches, and are powered by 8 h.p. electric motors. The whole structure is of reinforced concrete and is believed to be the largest single hangar building in the world; when finally completed it will house, say, twelve Bristol Britannias at once, contain a vast range of stores, and provide working accommodation for about four thousand people.

Passers-by on the nearby Staines road must often ponder on the use of the strangely-shaped high brick wall near this enormous building. Thirty feet high and 180 feet across the points of its crescent shape, it is, in fact, an experimental acoustic screen wall, designed by Ministry experts in an endeavour to shield from neighbouring houses the noise of aircraft engines being tested on

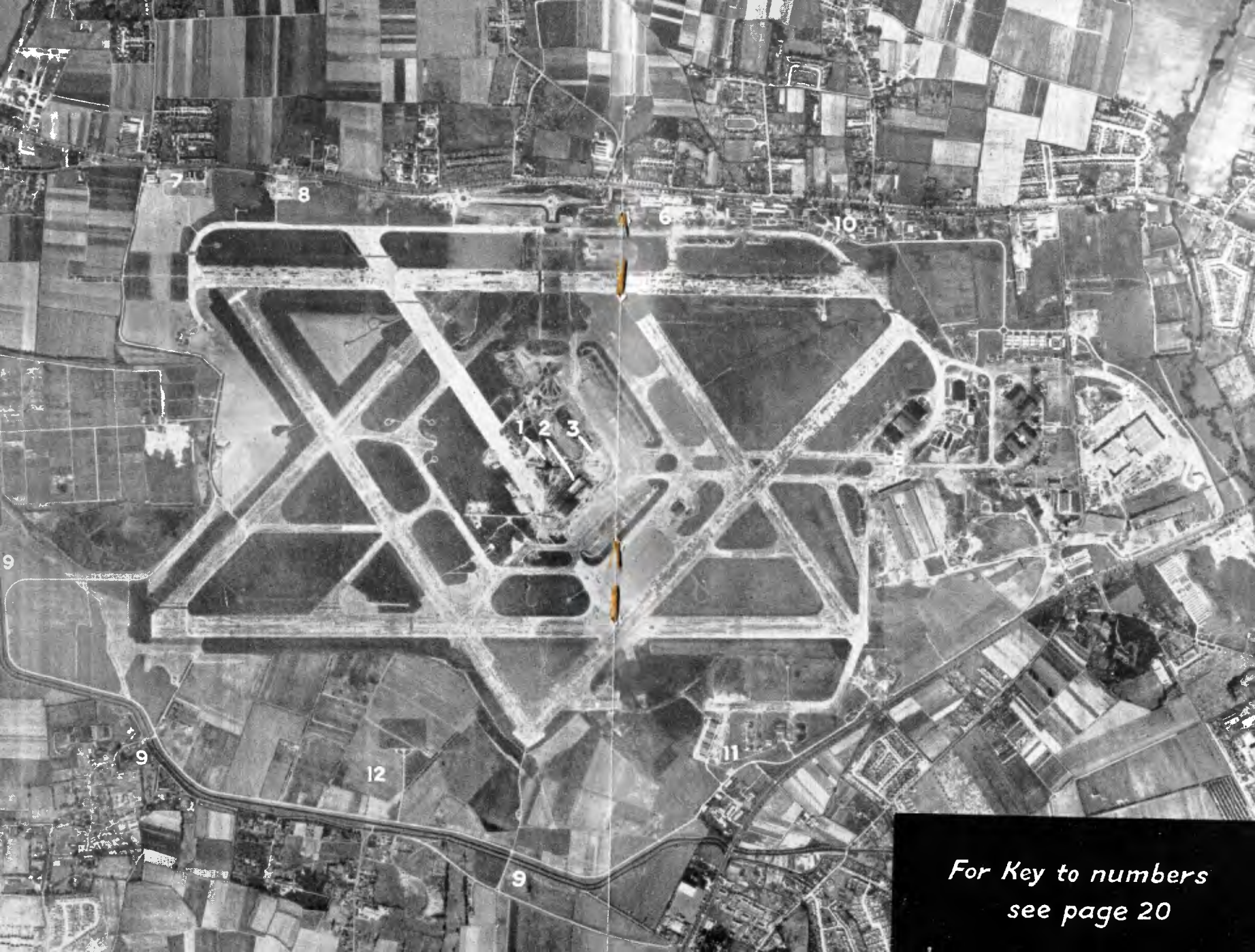
hangar built largely of aluminium, and the first of its type ever to be built. The first tenant of this rather unusual hangar was B.O.A.C.'s Comet Unit.

The third maintenance area for which provision was made in the planning of the airport is yet to be developed; it seems possible that this 91-acre area may eventually be used for the main refuelling installations among other things, but this is not yet finalised.

THE PERMANENT AIRPORT BUILDINGS

In the early stages of planning the airport, it was at first decided to replace the present temporary passenger buildings on the northern edge of the airfield with another set of temporary buildings on a more elaborate scale in the Central Terminal Area. Experience of the existing buildings, however, soon made it clear that a further interim stage in the production of the permanent airport would be a very expensive proposition with few advantages. The planners therefore made up their minds to take the plunge, and to go ahead with three of the permanent buildings in the 158 acre diamond-shaped space in the centre of the airfield. In 1950 Mr. Frederick Gibberd, C.B.E., F.R.I.B.A., M.T.P.I., was appointed by the Minister to design the buildings, and his work was approved by the Royal Fine Art Commission before construction was started.

The first of the three buildings is the Control Building in the centre of the diamond. The tower of this will be the nerve centre of the whole airport—the focal point of an almost fantastically complex system of radio and line communication, radio and radar navigational aids, airfield lighting and ground movement control. A later section of this booklet will deal at greater length with some of this modern magic—for the moment, a closer look at this unique building is needed. It has been sited practically in the centre of the airfield so that the upper floors of the tower containing the Air Traffic Control organisation will command an all-round view of the whole dual parallel runway system and of all the taxiways right up to the outer edge of the central aprons. In

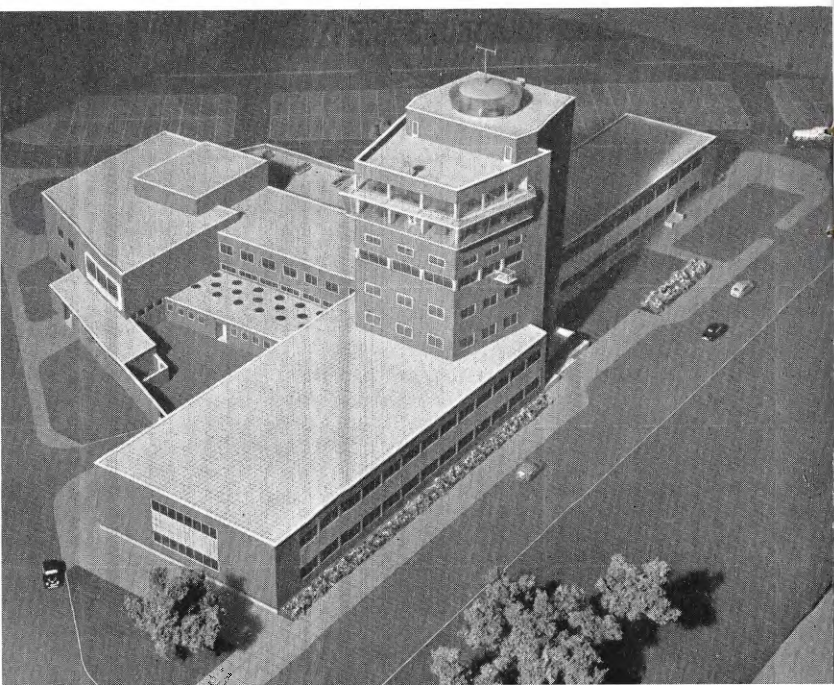


*For Key to numbers
see page 20*

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|-------------------------------------|---------------------------------------|
| 1. Control Building | 7. R.S.P.C.A. Hostel |
| 2. S.E. Face Building | 8. London Radar |
| 3. Eastern Apex Building | 9. River diversions |
| 4. B.O.A.C. Headquarter
Building | 10. New Skyport telephone
exchange |
| 5. B.E.A. Base | 11. No. 2 Maint. area |
| 6. Temporary terminal
area | 12. No. 3 Maint. area site |

A key to the air photograph on the preceding pages

*A view of the architect's
model of the Control Building from the north-east*



addition it will be the administrative headquarters, with other portions housing the tele-communications section, the medical centre, welfare facilities and a comprehensive staff catering branch.

A bird flying over the building—perhaps one of the many skylarks which still defy the roar of engines with their song—would see it as a giant T with the nine-storey tower rising from its intersection. In the base leg of the T to the south are grouped the staff cafeterias and restaurants, all served from a central kitchen. The left side of the cross-bar of the T houses the medical centre, with administrative offices above it on the first floor; in addition to the usual first-aid functions of such a centre, this one will also deal with some of the stringent bi-annual medical examinations which civil airline crews have to pass. The right side of the cross-bar, to the east, will provide rooms on both floors for the tele-communications section of the Ministry staff and the main electrical switchboards for the whole of the area.

The height of the tower—just over 127 feet—and its rather peculiar shape were dictated by a number of practical considerations. The need for an all-round view for the controllers determined the height; the shape, which has only the east and west walls parallel, was so arranged on varying planes at angles to each other to minimise the interference which large flat surfaces cause to radio and radar navigational aids. The planners were also acutely conscious of the network of cables, pneumatic tubes and ventilation ducts which had to run throughout the whole building. The tower therefore has a central services core, which runs vertically through the centre of the tower adjacent to the lift shafts, and contains two large ducts—one for ventilation equipment and one for cables. All the control rooms have false floors through which cables and tubes can be run from the core. This is a wise precaution in view of the need for maintenance and the essential flexibility that must be preserved in the installation of modern electronic equipment.

The top of the tower is surmounted by a cupola consisting largely of a special non-actinic glass; this will house the aerodrome or local controllers, who, as their names imply, are responsible for the control of all aircraft from just before touch-down to just after take-off and for all surface movement. The G.M.C., or ground

movement control system used is similar to the block system used on railways in this country; all the runways and taxi-ways are divided into over ninety sections by means of transverse rows of countersunk red lights known as 'stop bars'. An aircraft or vehicle arriving at one of these bars must await the extinction of the lights before proceeding; this ensures that the block ahead is clear. The floor beneath houses the ventilating plant and lift motors, and on the sixth and seventh floors there is the nerve centre of the whole building, the Approach Control room. It is here that the team of controllers, under a watch supervisor, will keep a constant check on the comings and goings of the airliners and keep contact with the pilots by radio-telephony. For an inbound flight, the aircraft is usually taken over from the nearby Southern Air Traffic Control Centre when it reaches the radio range at either Epsom or Watford, and is handed over to the aerodrome controller just before touch-down; the outbound aircraft are similarly taken over from local control and directed safely on to their particular 'airway'. The west wall will have an enormous control information panel on which are set out all the maps and charts needed for quick reference; later, this panel may be used in connection with a more advanced system of displaying aircraft movements. The three other walls are fully glazed—in common with the other control rooms and many offices the glazing is double to help suppress outside noise and to maintain the air conditioning so vital to delicate electronic equipment—and slope outwards to avoid any reflection of light. At mezzanine level balconies run both inside and outside these three walls to permit students of air traffic control and other visitors with a technical interest to watch operations without interfering with the very essential concentration of the controllers.

On the fifth and fourth floors is a similar but somewhat smaller control room, once more occupying two floors in height. This is reserved for Ground Movement Control equipment which is likely to be developed in the future, and here again the windows are sloped to avoid reflections. The third and second floors, the lowest two of the tower itself before it joins the main block, contain a conference room, administrative offices, and the offices of the aerodrome commandant and his deputies. The building as a whole

should be completed in July, 1955, but the control tower and certain technical accommodation are already complete but for the installation of equipment.

The second building in the Central Terminal Area is one in which the traveller by air is likely to have the most interest. It is the first of the passenger buildings, and its internal design results from considerable research into the important matter of getting passengers to and from their aircraft smoothly and efficiently. Known during the construction stage as the South East Face building, for a reason that is obvious when one looks at the lay-out of the central diamond-shaped area, this building, under a more appropriate name yet to be decided upon, will undoubtedly become as familiar to the air traveller as many other terminals are to the passenger using surface transport.

The building, which is over 600 feet in length by over 250 feet in width, is built on three floors, with a series of terraces on the roof for spectators. The ground floor is given over to the handling of baggage, the accommodation of technical staff and equipment and to kitchens, both for the passenger restaurants and for aircraft catering. The first floor is given over entirely to passengers and offices for the Customs, Immigration and Health officials. Above it, and immediately under the terraced roof, is office accommodation for some of the airline operating companies, together with an extension of the main concourse and a restaurant for the general public.

From 'land-side' to 'air-side' the ground and first floors of the building are divided into ten parallel passenger channels for international traffic and two for internal passengers. Experience has shown that inward and outward traffic peaks seldom coincide, so all of these ten channels have been made completely reversible, thus reducing the number needed and achieving a considerable economy. Each channel is served by a conveyor belt for baggage which runs right through the building mainly at ground-floor level, rising only to first-floor or passenger level in the Customs hall where it is necessary, for examination purposes, temporarily to reunite the passenger with his luggage.

Probably the easiest way to describe the channel system is to follow an imaginary passenger, Mr. X, through the building. He

the centre. It contains sales counters for the airline operators, shops, banks, post and cable offices and buffet counters. On the second floor a balcony lounge overlooks the main floor, and a restaurant with a lounge bar overlooks the airfield; there are also more shops, hairdressing saloons and lavatories. A terrace from which passengers' friends can watch the departure of an aircraft opens directly from the lounge bar; this has already been named the 'waving base'. Accommodation has also been provided at the north-east end of the building for the Very Important Persons, such as royalty, heads of states and diplomats, who use the airport more and more each year. It was on the temporary marshalling apron, on the 7th February, 1952, that Her Majesty Queen Elizabeth first set foot in her own country as its Queen, and from a point nearby that the Royal party set out on the Commonwealth Tour in 1953.

As mentioned before, advantage has been taken of the large flat roof area to design a series of gardens and terraces at varying levels from which spectators will have an excellent panoramic view of the eastern half of the airfield. Such, then, is the first of the central passenger buildings, which will be brought into use in the spring of 1955 for most of the airport's short-haul services and so relieve the pressure on the temporary terminal buildings.

The third of the permanent buildings, due for completion in early 1956, once again has a temporary name derived from its position on the eastern point of the central diamond. The Eastern Apex building has two major purposes—the handling by operating companies of aircraft operations and crews, and the provision of amenities for the general public who visit the airport in ever-increasing numbers each year. In the summer season of 1953, well over half a million visitors came to the temporary Public Enclosure to watch the busy scene, and it is intended to provide in the permanent airport unparalleled facilities for this entertaining and instructive pastime. Many visitors from other parts of the country and from overseas find it convenient to incorporate a visit to the airport in their tour of the Thames Valley and nearby Windsor and Hampton Court.

Like the Control building, the Eastern Apex building is most unusual in shape; it is best described as a broad wedge, with the

point cut off and the upper edge curved. Each edge of the wedge is about 230 feet long and the flat base just under 200 feet. The central spine of the building is of three floors and the outer segments of two, and the flat roofs of the passenger building are repeated on an even larger scale. Careful study of the requirements has produced a design which caters equally well for each major function and at the same time keeps each function completely divorced.

Grouped on the ground floor are airline offices, flight planning and briefing, the meteorological office and a Customs hall to deal exclusively with air crews. Above them are dining and rest rooms for the crews. Opposite the main door of the building—on the 'land-side'—will eventually be sited the memorial statue to Sir John Alcock and Sir Arthur Whitten Brown, who made the first direct crossing of the Atlantic by air in 1919. The statue is at present adjacent to the temporary marshalling apron on the north side of the airfield. The main door is for the public, and from it they will have access to a large exhibition hall, a news theatre, post office, and, above these, to the roof gardens and terraces. Beyond the exhibition hall and cantilevered out over the edge of the marshalling apron are the restaurant facilities for visitors. The curved upper edge of the wedge is the 'air-side' limit of the building, and it will be fully glazed. Behind this enormous series of windows will be a grill room, with a stepped floor so that all tables have a good view and a small dance floor. There will also be some suites of private dining rooms and some snack bars, so that the catering will be able to provide for all tastes from full à la carte meals to snacks. In common with the other buildings, the Eastern Apex building will have artificial ventilation in all public rooms; the grill room and cinema are to be fully air-conditioned.

These, then, are the first three of London Airport's permanent buildings; there is no doubt that the near future will see work beginning on some of the remaining four for which provision has been made. Passenger traffic has risen from 523,000 in 1950 to 1,205,000 in 1953, and it has been estimated that 1960 will see over three and a half million passengers pass through the airport.

Controllers at work inside the G.C.A. caravan



AIDS TO SAFE FLYING

London Airport has already gained the reputation of being one of the safest and best-equipped airports in the world from the pilot's viewpoint, and some mention must be made of the devices that help to maintain this standard.

One of these is a radar device known as Micro Early Warning, or M.E.W. It is, in fact, the longest range radar unit in the world, and it can pick up aircraft at distances up to 150 miles away. The distinctive orange and white aerials or 'scanners' of 'London Radar' can be seen clearly from the Bath Road, and it is used by the Southern Air Traffic Control Centre to expedite air traffic by reducing separation standards with safety, to assist with navigation if required, and to keep a check on all unidentified aircraft. In addition, two other radar equipments perform the same functions over shorter distances for aircraft approaching and departing from the Airport.

The other radar device in almost daily use is probably better known; it is the Ground Controlled Approach 'talk down'. At the moment this is operated from a mobile caravan sited near the runway in use, but eventually only the 'scanners' will be mobile and the controller will work from the Control Tower. The system is to direct an aircraft in poor visibility to a point about eight miles off the end of the runway, and then to give the pilot precise instructions by radio-telephone on direction and rate of descent until he is less than a quarter-mile from touch-down and can see the runway. This is done with the aid of several cathode ray tubes which tell the trackers exactly where the aircraft is in relation to the runway for both height and direction. Information from the trackers is correlated by the controller, and the result enables him to keep up his calm and reassuring flow of instructions to the pilot.

A third electronic device is the I.L.S. or Instrument Landing System. Two radio beacons, one four and a half miles and one 4,000 feet from the end of the runway, relay information on his height and direction to the pilot by means of a simple twin-pointer dial in his cockpit.

Anyone who has passed London Airport after dark will have

seen the approach lighting systems stretching out from the end of the runways. These are among the best in the world, and are known as Calvert line-and-bar systems. They provide a line of lights leading to the centre line of the runway, crossed by other bars which grow shorter as they near the runway threshold. Two types of lighting are provided—red incandescent lights for normal use, and very powerful sodium discharge lights for poor visibility.

Finally, one of the latest devices is a radar equipment displayed in the aerodrome control room which is used to control traffic on the aerodrome when low visibility prevents this being done visually.

ALL SHAPES AND SIZES!

This account of a major international airport would be incomplete without a reference to freight, both inanimate and live. In 1953 over 23,000 tons of freight and air mail passed through the airport, and the variety of the former is unending. Consignments of minute electrical parts urgently needed to keep a production line in Belfast going, a six-ton propeller shaft for a ship broken down in Calcutta, gold-fish and grass snakes for pet shops in York, and leopards and chimpanzees for a private zoo in New York—that is only an idea of the illimitable scope of air freight.

In order to deal with the infinite variety of live freight now carried as a matter of course, the R.S.P.C.A. has built an Animal Air Hostel in the north-west corner of the airfield. Here animals, who may be starting or finishing their travels or else be in transit, can be fed and watered, and given clean bedding, if necessary in quarantine conditions. The hostel has a veterinary unit, with an operating theatre capable of dealing with any creature, and there are special quarters which can be kept at a high temperature for animals or birds which cannot stand the rigours of the British climate. Since November, 1952, when the hostel opened, an endless variety of creatures including elephants, spiders, crocodiles, snakes, ostriches, penguins, dogs, leopards, monkeys, horses, and cats have been cared for; a record was established recently when no less than 47,000 creatures used the hostel in one month.

Variety also extends to aircraft types and the companies which use them. Few airports in the world can surpass London in this respect. About twenty-five international airline operators were running regular services through the airport at the end of 1954; in addition, the airport is used by several charter operators and by military transport aircraft on special flights. At least fifteen types of aircraft can be seen regularly at the airport, ranging from the 70-ton Boeing Stratocruiser to the twin-engined De Havilland Dove and from the little Rapide—used for pleasure flying from the Public Enclosure—to the latest Lockheed Super Constellation. What is possibly a glimpse into the future can be gained from a sight of the near-vertical take-off of a Bristol Sycamore, used by B.E.A. on their regular daily helicopter service to Southampton.

With the introduction of tourist and reduced fares for 'off-peak' travel, air travel is no longer a luxury business; to stand in the concourse and see Mr. and Mrs. Everyman waiting for flights to and from almost anywhere in the world is direct proof of this, and proof of the fact that London Airport is the hub of the world's network of airways. For the United Kingdom it is truly the gateway to the world.



Oblique aerial view of temporary terminal area