The Geology Department (Prof. L. Hawkes) comprises one large general laboratory and museum, a smaller palaeontology laboratory, three research laboratories, a chemical laboratory and a technician's room. Two rooms on the lower ground floor are equipped for rock-cutting and optical work.

CENTRAL PUBLIC HEALTH LABORATORY, COLINDALE

NEW LABORATORY BLOCK

ON January 15 the new laboratory block of the Central Public Health Laboratory at Colindale was formally opened by the Minister of Health. The Minister, accompanied by his Parliamentary Secretary, Miss Hornsby-Smith, Sir John Hawton and Sir John Charles, were met by the chairman of the Medical Research Council (Lord Limerick), the first secretary (Sir Harold Himsworth), the second secretary (Sir Arthur Landsborough Thomson), the director of the Public Health Laboratory Service (Dr. G. S. Wilson), and were conducted over the main buildings by the director of the Colindale Laboratories (Lieut.-Colonel H. J. Bensted).

There were no formal demonstrations set out and the Minister met the heads of the various departments and their staff carrying out their normal duties; of topical interest were the roll-tube tissue culture technique for the cultivation of the poliomyelitis viruses, and the chick embryo cultivation of the influenza virus.

In the library of the new building, the Minister was introduced by Lord Limerick, and in a short address he described the development of the Public Health Laboratory Service and how it came about that the Medical Research Council is directing, and will continue to direct for an indefinite period, this Service for the Ministry of Health. In declaring open the new building he paid tribute to the architect, Mr. Maxwell Ayrton, and the builders, Messrs. Trollope and Colls, Ltd.

The new building consists of a four-floor block of a pleasing brick construction, approximately 180 ft. long and 45 ft. wide, with a central tower extending upwards for a further four floors. The top of the tower houses reinforced concrete water-tanks to supply the needs of all the laboratory buildings. The rooms under this are designed for office and record purposes. A door from the vestibule on the fourth floor leads to the roof space, which runs the full length of the building and in which is housed ventilating plant, air filters, etc., and some of the compressors for the refrigeration units on the laboratory floor below. There is also ample storage accommodation in this space.

A basement under the central part of the building houses more plant and also a gas-fired incinerator, the flue of which passes up to the top of the tower more than 90 ft. above.

The front of the building faces west, and all the windows on that side are protected from the setting sun by green sun-blinds operated from the inside. At the south end there is a service lift for animals and equipment travelling directly to the third floor (Virus Department) without intermediate stops, and at the north end a similar type of lift serves all the other floors. In the centre a passenger lift goes up to the top of the tower. There is a central staircase, broken at the third floor, for normal foot traffic, while there are emergency downstairs cases at either end of the corridors.

In designing this laboratory block, one of the principles kept in mind was, so far as possible, to standardize the layout for each floor but at the same time to make provision (should future requirements necessitate it) for alteration in the size of some of the rooms without interfering with the main construction. On each floor, the first rooms at the south end of the building form a suite comprising preparation room, sterilizing and wash-up kitchen, sterile glass-ware store and sterile room, where a positive pressure of filtered air can be maintained. Each floor also has shower-baths and changing rooms. There are also incubator rooms (37.5°C.) and cold rooms ($+4^{\circ}\text{C.}$). Secretarial assistance in adjacent offices is provided for each group of laboratories.

Central corridors run the full length of the building with laboratory rooms approximately 14 ft. deep on either side. Single-unit rooms are just under 8 ft. wide, and two-, three- and four-unit rooms are multiples of this figure in width. The most common size is the standard two-unit room with a working bench across the windows at 2 ft. 9 in. high, containing one small staining sink in the centre and a drip sink for filter pump, etc., at one end. There are a side bench for water-baths, etc., and a washing-up sink with draining board on the opposite side. A convenient double bench is placed centrally, half of which is 3 ft. high, and the other half, serving as a writing desk,

New laboratory block, Central Public Health Laboratory, Colindale

is 2 ft. 6 in. All benching is of teak, and the under-bench furniture is of West African mahogany. The front and side under-bench furniture consists of movable nests of drawers, paired cupboards with adjustable shelves, and open microscope cabinet containers. The central benches are supported by suitable linking of similar cupboard or drawer units.

Simple services are carried on the walls under the benches and consist of electric points, gas, and hot and cold water only. Other gas and electric points are 9 in. above floor-level for small refrigerators, centrifuges and incubators. Ample ceiling lights are provided by opal tungsten lights, while fitted 'Anglepoise' lamps cover each front bench for close work. 'Opalite' shelving for reagents is fitted over staining sinks and at the sides. A capacious double cupboard with adjustable shelving is suitably placed in one corner.

The above description is typical of the standard two-unit room, and although somewhat different arrangements appear in the rooms of other sizes, the same general principles are observed.

The top laboratory floor is devoted to the study of virus diseases, and it is here that refrigeration units are of greatest importance. There is a large $+4^{\circ}\text{C}$. room, a -30°C . room, and inside the latter are chambers maintained at -70°C . The compressors for these are housed in the roof space. In the centrifuge room on this floor there are also two small independent -70°C . refrigerator cabinets and a high-speed refrigerated centrifuge. Two animal inoculation rooms with special inoculation boxes connected to exhaust ducts are not quite complete; these ducts are being provided with high-temperature heaters to burn away virus-laden air before it passes out to the open.

The second floor houses the Air Hygiene Laboratories and, under the same director, the Streptococcal and Staphylococcal Reference Laboratories. The novel feature here is an experimental room for research into the bacterial contamination of air. On the same floor is an assembly room for special apparatus required in this section, much of which is machined in an associated outbuilding workshop.

On the first floor are the Food Hygiene Laboratory, Salmonella and the Dysentery Reference Laboratories. These are situated in one-, two- and three-unit rooms of standard design.

The Epidemiological Research Laboratory occupies one-half of the ground floor, the remainder of which consists of small and medium-sized research laboratories for individual workers.

The Routine Department, the Central Enteric Reference Laboratory and Bureau, the Standards Laboratory for Serological Reagents and the Media Kitchens, etc., remain in the old building, but with improved accommodation, while the National Collection of Type Cultures continues to occupy the same rooms as previously.

Owing to economy cuts, it has not been possible to carry out all the improvements originally planned; but it has been possible to convert the old stable, used for inoculating calves when the building belonged to the Government Lymph Establishment, into an excellent research library. It can serve also as a lecture hall for an audience of about a hundred persons, and it was in this very recently completed room that the Minister of Health addressed the invited gathering after his inspection of the new building.

H. J. BENSTED

THE 'COMET' AIR-LINER

In a Friday Evening Discourse delivered at the Royal Institution, London, on November 21, Mr. C. T. Wilkins, assistant chief designer of the De Havilland Aircraft Co., Ltd., discussed the new 'Comet' air-liner.

The end of the Second World War left United States aircraft manufacturers with undisputed supremacy in the field of transport aeroplanes. Some six to eight years are needed to bring a modern air-liner into service from the initial design stage, and Mr. Wilkins pointed out that any attempt of the De Havilland Co. to base its designs on United States practice would not have been likely to produce an aeroplane with the necessary competitive margin. Instead, it was decided to draw on the mounting British experience with the jet engine, the main potential gains being speed, absence of vibration and relative simplicity.

The most promising configuration of aeroplane for this engine appeared to be the tail-less with swept-back wings, and a De Havilland 'Vampire' was modified into the 'D.H. 108'. This became the first British aeroplane to fly faster than sound in a dive, while level speeds at a little more than 600 m.p.h. were possible. This layout, when translated into air-liner practice, promised to be only 50 m.p.h. faster than the rather more orthodox configuration now seen in the 'Comet', and this latter was chosen mainly in order to provide a design for which production orders could be prudently made from the 'drawing board'. The British Overseas Airways Corporation, the former British South American Airways Corporation and the Ministry of Supply were courageous enough to give orders for a total of sixteen 'Comets' at that stage. This has meant a saving of two years in getting the aircraft into service due to the elimination of the 'prototype' stage. It took two and three-quarter years from the time that the conception was settled to the first flight, and an equal period until the 'Comet' came into service. The following are some of the problems which had to be solved.

Choice of engine. The 'Comet I' is fitted with the 'Ghost' centrifugal engine. This choice was dictated by expediency, and the later 'Comet' series will have the more powerful and efficient 'axial' engines which are now available.

Flying at high altitude. The optimum altitude for a flight of given stage-length is a function of the aircraft weight, and it therefore changes during flight as the fuel is consumed. A typical cruising procedure worked out for the 'Comet' requires an initial climb to 33,000 ft. in thirty minutes, followed by a gradual ascent to 40,000 ft. At this height the atmospheric pressure is 2 lb./sq. in., a temperature of -73°C . has been recorded and the air is practically dry. These figures indicate the need for reliably engineered cabin pressurization, heating and humidification. At the time of design, little was known of conditions in the upper atmosphere, and a De Havilland 'Vampire' was adapted for making the necessary high-altitude research. This aeroplane established the present world altitude record of 59,446 ft.

Drag. The critical Mach number of flight above which the 'compressibility' drag rise becomes severe has been kept relatively high by the use of a thin swept-back wing and by careful design of the rest of the aeroplane. This is particularly necessary, since the speed of sound at the cruising altitude is only nine-tenths of its sea-level value.