States to institutions in Colonial territories, while five awards to teachers from the United States working at schools in the Colonial territories were renewed.

Generally, there is evidence of growing mastery in the Colonies over preventable diseases and of increased public understanding of their causes and the logical basis of measures taken against them; but the freedom from major epidemics was marred by outbreaks of acute anterior poliomyelitis in Jamaica and Trinidad, both of which have also had to combat typhoid in endemic form. Abnormal social conditions caused by overcrowding increased the incidence of communicable disease in Hong Kong, and falling infantile mortality and general death-rate, together with a high birth-rate, make it difficult to provide a medical service in Singapore adequate for the needs of a rapidly increasing population. Famine conditions were again present in the Mayoni, Dodoma and Mpapwa districts of Tanganyika, an invasion of the army worm destroying crops which had survived the drought. A striking feature of the year was the extent to which large-scale operations of the health departments was assisted and promoted by the World Health Organization and the United Nations Children's Fund, the scientific backing, financial support and material aid of which permitted many schemes to be carried out that would have been beyond the unaided resources of the territories. Malaria has ceased to be a public health problem in Cyprus and Mauritius, and for the first time the total number of deaths from malaria in the Federation of Malaya fell below a thousand, attributable to the protection in rural areas alone of more than half a million persons by house spraying. The death-rate from malaria in Trinidad is also steadily falling, but the hyperendemic areas of tropical Africa still constitute a great challenge. Research and experiment have continued extensively, and in western Sokoto in Northern Nigeria control is being attempted in an area of six hundred square miles containing a population of 124,000, with a controlled residual spraying technique which has already been used in eighty thousand huts and houses. Recruitment of nursing sisters from the United Kingdom and Commonwealth countries remained difficult; but many more Colonial student nurses are now in training in hospitals in the United Kingdom, and the training of nurses in the Colonial territories is developing rapidly.

The chapter on research and surveys deals with work and investigations which are covered more fully in "Colonial Research 1954–55", and it is unnecessary here to refer to more than a few outstanding features of the year. It is expected that some £8 million will be available for expenditure on research during the period 1955–60; but there is still a shortage of scientific staff both in the United Kingdom and in the Colonial territories, and a very definite improvement in recruitment will be needed if the new annual ceiling of expenditure is to be approached. During the year fifty-two research schemes, estimated to cost £533,548, were approved, and increased assistance to Colonial research projects was also given by extending the arrangements for visits overseas by specialists from the United Kingdom and by strengthening the pools of entomologists, plant pathologists and soil surveyors whose members are available for short-term assignments. The East African Agriculture and Forestry Organization is well established, and its investigations into maize rust-resistance promise early control of this disease. The work is closely linked with that of the Maize Rust Research Unit in West Africa. The second of a series of Anglo-French Research Conferences was held at Bambey, Senegal, to discuss work on groundnuts and millets. The research team of the Joint Fisheries Research Organization for Northern Rhodesia and Nyasaland continued the survey of Lake Nyasa from the Nkata Bay base and has revealed remarkable formations on the lake floor. A site in Malacca was selected for the Fish Culture Research and Training Institute, and it is hoped that the building will be complete by the end of 1956. In the Federation of Malaya intensive investigations into filariasis were in progress in the State of Pahang, and heavy doses of dieldrin were effective for six months against the *mansonia* species of mosquitoes, the main vectors in this region. Notable progress was made by the Regional Virus Laboratory, Trinidad, in the study of the viruses of the East Caribbean region. The Central Trypanosomiasis Laboratory at Sukulu, Uganda, was completed and partly occupied, and at Mariakani in Kenya cattle exposed to attack from tsetse but treated with injections of 'Antrycide' pro-salt every two months for more than two years acquired and maintained resistance to strains of *T. congolense*. The review includes some strong criticism of the attempts at the United Nations General Assembly to discredit the work of the Trusteeship Council and castigate the administering authorities, and its clear factual statements amply indicate the unrealistic nature of such attempts.

ROYAL GREENWICH OBSERVATORY

ANNUAL REPORT FOR 1954–55

THE annual report of the Astronomer Royal for the period May 1, 1954–March 31, 1955*, deals with the Royal Greenwich Observatory under the headings of Greenwich, Abinger, Herstmonceux and Hartland.

The main mirror of the Yapp 36-in. reflector was removed during the winter and sent to Messrs. Cox, Hargreaves and Thomson for a test of its figure, but none of the suspected 'patchy errors of figure' or astigmatism was found. If, however, colour-temperature work is resumed, re-figuring would be an advantage.

The instruments and equipment of the Physics and Optics Laboratory at Abinger are in course of transfer to Herstmonceux. The Admiralty Civilian Hospital at Feldemore, Holmbury St. Mary, which provided accommodation during the past nine years for many of the Abinger staff, was closed on February 13. It is intended to use some of the rooms for stores and other official purposes.

At Herstmonceux, repairs to the west tower of the south gateway are nearing completion, and portions of the stonework which had been badly weathered have been rebuilt. The unsafe upper portion of the tower was dismantled and has been rebuilt. In the Meridian Group of buildings, the painting of the Cooke reversible transit circle building is completed and entrance steps have been provided. The small pavilion to house the Bamberg small

* Report of the Astronomer Royal to the Board of Visitors of the Royal Greenwich Observatory. Pp. 33. (Herstmonceux: Royal Greenwich Observatory, 1955.)

transit and the pavilion for the photographic zenith tube have been erected. A new pavilion for the Melbourne reversible transit circle is to be erected, and will be generally similar in design and dimensions to the Cooke building. In the construction of the equatorial group, the steel frameworks of the domes of the 30-in. reflector, the Schmidt reflector and the 26-in. refractor have been erected, and, as soon as the domes have been completed, it is planned to commence the erection of the telescopes.

The ground at Hartland, North Devon, the future site of the Magnetic Observatory, has been purchased, and the civil engineer-in-chief has prepared detailed drawings of the buildings which, it is expected, will be completed in time for observations to be commenced before the beginning of the International Geophysical Year (July 1957–December 1958). One of the buildings to be used for testing magnetic instruments will contain a system of large coils designed to provide artificial horizontal and vertical fields, comparable with those at any point upon the surface of the earth.

Cosmic-ray recording with the Clintel apparatus was continued until February 9, 1955, when one-half of the sensitive area was modified. This was done in accordance with the recommendations of the Cosmic Ray Commission of the International Union of Pure and Applied Physics, with the object of detecting only the flux of mesons capable of penetrating 10 cm. of lead, and entering from a smaller solid angle around the zenith than the previous arrangement would accept. The other half will soon be similarly modified. These modifications are required to make the data comparable with those obtained by many other stations, thereby facilitating the study of world-wide distribution and changes of this flux.

Full-scale meteorological observations have been maintained on a routine basis, and monthly reports have been submitted to the Meteorological Office. Those who remember the conditions last summer will not be surprised to learn that, during the four months May–August 1954, there was a deficiency of sunshine of about two hundred hours as compared with the mean of the preceding four years. The total amount of clear sky at night during the same period was also well below the totals for the preceding years, but the cloudiness was less marked at night than during the day-time. Unbroken trails of δ Ursae Minoris were recorded on twenty nights, while no records were shown on seventy-nine nights.

It was mentioned in the report for 1953–54 and is again referred to in the present report, that the first part of the "Nautical Almanac" for 1960 has been re-designed to meet the recommendations of the International Astronomical Union. Beginning with the 1960 editions, "the American Ephemeris and the Nautical Almanac shall be, apart from a few introductory pages, identical publications". H.M. Nautical Almanac Office will be responsible for the first part of the "Almanac", and the U.S. Nautical Almanac Office for the second part. While no substantial change of content or arrangement will be involved, there will not only be a considerable reduction in price, but the scheme should also lead to wider international co-operation in the field of astronomical ephemerides.

Further tests of the figure of the 98-in. disk of the Isaac Newton telescope were made by Prof. R. O. Redman at the works of Sir Howard Grubb, Parsons and Co. during the works holiday period in August. While the figure was found to be appreciably free from astigmatism, the tests showed some differences from those previously made, and the mirror has been put aside for further tests, for which there is ample time as the telescope will not be constructed for some years.

At the end of the report reference is made to the participation of the Observatory in the general programme of work to be undertaken during the International Geophysical Year, which will require additional staff at the Observatory. The removal from Greenwich to Herstmonceux has reached a stage at which full observing programmes can shortly be commenced, and for these the present staff of the Observatory is seriously inadequate. In a separate memorandum proposals for the adequate staffing of the Observatory will be submitted to the Board of Visitors. If the Board of Admiralty approves, the additional staff required for the special programmes during the International Geophysical Year can be provided for this increase and afterwards absorbed into other observational programmes.

WORK STUDY AND SOME RESULTS

WORK study methods are quite common in American industry and have proved their efficacy. In Britain, industrial organizations have been slow in introducing these techniques, and this is one of the reasons why productivity lags so much behind that of the United States. Were it not for chemical manufacturers in Britain, the rate of introducing work study would have been even slower than it has been. Once more they have placed the whole of British industry in their debt by producing two most practical booklets (Association of British Chemical Manufacturers. 2*s*. 6*d*. each). The first describes effective ways of introducing work study into individual firms, and the second gives an account of some of the results which have been achieved.

The first booklet describes the nature of work and the benefits accruing from it; the kind of man who should be appointed as work study officer and the way in which he should be trained; the organization and content of work study appreciation courses for senior, middle and junior management; the means of obtaining co-operation with the trade unions; the kind of jobs which should first be investigated; and the employment of consultants.

The results obtained by using work study methods in fourteen chemical firms differing in size, complexity and the goods they produce are described in the second booklet and form a valuable series of case histories which should encourage the lagging and give succour to the faint-hearted. In the case of Hardman and Holden, Ltd., for example, the labour cost of one product was reduced by 50 per cent; output in one plant increased by 40 per cent by a change in procedure, with an increase in labour force of 12 per cent over the original. In one process there were seventeen handling operations in the finishing stage of the product. These have now been reduced to one—with a resultant saving of 30 per cent in manpower and the elimination of the use of two machines. Because of the building up of intermediate stocks between two processing operations it was originally thought it would be necessary to increase the capacity of the second plant; work study demonstrated that