Among the spectra taken by my assistant, Herlofson, only a few need be mentioned. On the same Agfa ISS plate were taken two spectra when the spectrograph was pointed towards the green arc in the south mentioned in the first part of this report. They show the green line 5577 A. as the strongest; then come with decreasing intensity the lines 6300 A., 6550 A. and 4278 A. On the same plate were taken two spectra when the spectrograph was pointed towards red areas. They show 6300 A., by far the strongest, next 5577 A. and faint traces of 6550 A. and 4278 A.

On Agfa red ultra-rapid plate was taken with the same spectrograph a spectrum of the red colour in the southwest between 0^h 10^m and 0^h 30^m G.M.T. Here 6300 is again by far the strongest line, then 6550 and 5577 about equally strong, and traces of 4278. On the same plate were taken spectra of pulsating auroras and corruscations between 2^h and 4^h G.M.T., situated in the height interval from 90 to 120 km. Here all four lines have about the same intensity.

Photometric measurements of these spectra will be made later.

Medical Research in Great Britain

THE report of the Medical Research Council for 1936–37* gives, in summary form, an account of the researches carried out by members of its staff, either at the National Institute for Medical Research or in external institutions, as well as by the numerous investigators, working in different laboratories, who receive grants-in-aid from the Council. In this report, separate sections are devoted to the work carried out by members of the Council's staff in external institutions, instead of its being included in the sections also describing the investigations aided by grants, in order to give a truer picture of the organization of the Council's activities.

Lord Mildmay of Flete, treasurer of the Council, resigned his membership during the year; Mr. Goodenough was appointed to succeed him. Sir Thomas Lewis and Sir David Wilkie retired in rotation and were succeeded by Prof. Gask and Prof. Witts. The Council has made appointments to Dorothy Temple Cross research fellowships, to research fellowships in tropical medicine and also to Rockefeller medical fellowships. It will be recalled that last year it was announced that the Rockefeller Foundation had suspended the arrangement under which the Council awarded these fellowships, as it wished to concentrate its activities on certain selected fields of medical research: the Foundation has, however, now generously agreed to restore and augment the former arrangement. The Council has continued to maintain close touch, at relevant points in its work, with the Government departments concerned with questions of health and has also been closely concerned with international health work under the League of Nations, and especially with regard to questions of nutrition and of biological standards, upon the Commissions dealing with which it is directly represented.

The need for additional laboratories for work on chemotherapy and biological standards and for nutritional studies as well as to relieve the present overcrowding at the National Institute for Medical Research has led the Council to consider the possibilities of development at the present site at Hampstead and at the site of the farm laboratories at Mill Hill. Owing to the fact that the Hampstead site has been reported on as unsuitable for further development on the scale which is now in view, even without allowing any margin for future expansion, the Council has decided in principle to abandon this site and to concentrate the whole of the National Institute at Mill Hill. A final decision can be taken only in the light of a definite estimate of the cost, based on the detailed plans which are now being worked out. If the project can be undertaken at once, it should be possible to complete it within about two years, and to provide additional accommodation for some purposes at an earlier date.

The grant-in-aid provided by Parliament for the expenditure of the Medical Research Council was greater by £30,000 than the amount in the previous year, the difference representing special provision for the development of research work in chemotherapy. Chemotherapy is the treatment of infective diseases by the administration of chemical compounds synthesized in the laboratory, which have been found to have specific actions on the infective organisms associated with these diseases. The principal successes of this form of treatment have so far been in infections with spirochætes and protozoa rather than with bacteria, in venereal and tropical diseases rather than in the bacterial infections common in a temperate climate. Quite recently, however, success has attended the use

* Committee of the Privy Council for Medical Research. Report of the Medical Research Council for the Year 1936–37. Pp. 165. (London: H. M. Stationery Office, 1938). 3s. net.

of the sulphanilamide group of drugs in streptococcal and other infections, thus opening up a new field of chemotherapy, which is being rapidly and effectively developed.

Although this is the usual sense in which the word "chemotherapy" is employed, there is a much wider field of medical treatment in which advance depends on the same kind of investigation, made by chemists and biologists working in close collaboration. In this field is included the discovery of chemical substances which have specific actions on certain bodily functions, and therefore great value in the systematic treatment of disease. The Council points out that the discovery of chemical compounds of this nature has depended almost entirely on German science and industry, and still so depends, although several fundamental discoveries were made in Great Britain. There is therefore great need for further research in Great Britain aimed at the discovery of new chemical substances of therapeutic value, and strong reason for developing a national scheme of investigation not unworthy of comparison with the work that is done abroad, especially considering that the British Empire is the chief consumer of drugs used in the treatment of tropical diseases. The financial requirements of an effective scheme are too large to be met from the ordinary resources for medical research, so that it can only be supported by funds specially provided as a matter of national policy. In Germany, the research work has been mainly carried out in institutions maintained by manufacturing chemists: in Great Britain the interests of the larger firms have lain in other directions, and the smaller firms have been content to act as agents for the foreign producers. In the absence of the necessary expansion of chemical industry, the only possibility of securing that Great Britain takes its proper part in this matter, in relation to its imperial responsibilities, is a national scheme supported from public funds.

For some years, the Council has supported research work on chemotherapy at different centres and valuable results have been obtained; witness the recent discovery of the trypanocidal properties of compounds with terminal iso-thiourea and amidine groupings. Notwithstanding the results obtained under the present scheme, it had become clear that improved research facilities were needed to secure substantial advances in chemotherapy from the point of view of the ultimate practical effect on diseases inaccessible to other forms of treatment, and especially on the major problems of protozoal infections in the tropics. It is considered that a central research laboratory is an essential factor in a national scheme: it will provide for the close association of the biological investigators with those engaged in the synthetic production of new compounds: and it will provide mass data from which it may be possible to discover laws relating chemical structure to therapeutic effect, so that research in this field will become less empirical than it is at present.

The main part of the report is devoted to short accounts of the researches carried out by members of the Council's staff or by workers assisted with grants-in-aid; but certain subjects are selected for more detailed consideration in the introduction, of which two have been referred to above. Among others may be mentioned influenza and the study of viruses, the surgery of the heart, the causes of mental defect, the role of salt in the body, the diagnosis of cholera and the experimental study of leprosy. It is now known that the virus of influenza is multiple, that responsible for the 1933 epidemic being of a different strain from that isolated in the 1936–37 epidemic. Hence, if vaccination is to have the best chance of success in any future outbreak, it will be necessary to choose an inoculum made from a virus belonging to the same immunological group as that responsible for the immediate outbreak. Experiments with ferrets suggest that such vaccination may successfully prevent the ordinary human contact infection. The discovery that many viruses will grow in the chorio-allantoic membrane of the developing chick provides an experimental method of research into their properties, which is simpler and more precise than that involving inoculation of laboratory animals. It is possible that the egg-culture technique may be used in the future for producing vaccine to protect against smallpox on a large scale, thus superseding the lymph of infected calves.

An interesting account is given of recent experimental work on the surgery of the heart and its application to cases of heart disease in man. Vascular obstruction in the heart cannot ordinarily be remedied as in most other organs by the development of a collateral circulation: it has been found, however, that the great omentum can be brought up from the abdomen through the diaphragm and secured to the heart, when new blood vessels will grow into the heart muscle from it. Several patients have now been operated on and only one may be considered to have died as the direct result of the operation; the survivors are all improved and some formerly bed-ridden patients are now leading a life of normal activity. About a quarter of the patients operated on only survived a few months, but it is pointed out that individuals suffering from diffuse disease of the vessel walls in the heart are in any event liable to sudden death; two in fact died suddenly a few days before the date on which the operation had been arranged for them.

The discovery that the bacillus of rat leprosy can be transmitted to the Syrian hamster, has been followed by the announcement from Palestine that this species can be similarly infected with the causative organism of human leprosy. This work should provide the basis of a new attack on the problems of this disease, and, in particular, make possible the experimental study of the treatment of leprosy by chemotherapeutic methods.

A few only of the subjects dealt with in the report have been selected for notice in this review: for a fuller picture of the Council's activities reference must be made to the original. It may be mentioned that full titles and references to the original papers published by members of the Council's staff and other investigators are given throughout the report, so that those interested can easily obtain the further details they require.

The Linnæan Tradition

FOUNDED ten years after the death of the celebrated Linnæus, the Linnean Society of London has for the past hundred and fifty years carried on the work he initiated in systematic botany and zoology. The anniversary was celebrated in London by appropriate meetings on May 24–27. Without any doubt the founding of the Society was due to the presence of the Linnæan Collections in England in 1784, in which year they had been received by purchase from Linnæus's widow by James Edward Smith, a medical student then twenty-four years of age. That close contact with the materials used by the great Swede resulted in the English naturalists adhering very closely to what may be called the Linnæan tradition; and although the systems used by Linnæus have been greatly changed or superseded, it is significant that his authority and influence are still felt strongly to-day.

The tradition left by Linnæus was indeed a great and a worthy one. Despite the carping criticisms of certain historians, there is no doubt at all that Linnæus wrought a great and fundamental work in both botany and zoology. Concentrating his efforts on the classification and description of plants and animals, he did the task most needed for his time; leaving a vast body of completed work, and, as the result of his deep and sincere thought, methods which are followed in the main by taxonomists to-day. Looking across two centuries, we can visualize that short sturdily built man with his keen-sighted brown eyes and his open and pleasant face, who worked from boyhood to old age with singleness of purpose towards one objective—to know and classify all forms of living organisms. No living organism can be named correctly until it is known; none known properly until it is classified correctly.

Linnæus's achievements in botany and zoology can be gauged rightly only when considered in relation to the states of those sciences at the time when he worked. He came at a time when Western naturalists had succeeded in disentangling themselves from the ancient authority and superstition that had clung to them long after the Renaissance. Men had turned from the authority of books to study Nature; from travels and exploration more new plants and animals were becoming known each succeeding year; attempts were being made to present in systematic form the knowledge then extant; but the net result had been a chaos in which each worker had put forward his own ideas of system and nomenclature.

Coming at the very time when he was urgently needed, Linnæus, clear-headed, practical, imaginative, resolved that chaos into order. Although so early as 1738 he had published in "Classes plantarum" a sketch of a natural system in botany, and throughout his life continued to elaborate it, his botanical works were always arranged according to the sexual system, which he had devised when he was twenty-four years of age. His reason for adhering to that system was a sound one: at the time he worked, an insufficient number of plants were known to found properly a natural system. Nevertheless, his own system brought together automatically some of the natural groups; and when the rise of the natural system began with the work of the de Jussieus, Robert Brown and others, much of Linnæus's work on genera and species still held good. In zoology, also, Linnæus's influence continues in spite of changes of system.

The Linnean Society's early history reflects most clearly that almost religious adherence to the Linnæan tradition; but the rise of the natural system in botany, the impact of the Darwinian theory of natural selection, the influence of the great school of German physiological botanists, or the specialistic developments of modern biology, have not obliterated that tradition. None of these waves of influence could or can sweep away the ultimate necessity of presenting the facts of Nature in taxonomic form. Under his will, Darwin left a sum of money to be devoted to the