viding the material on which an effective annual review can be based. The number of pledged contributions again increased: for 1956, seventy-seven countries pledged 28·8 million dollars, and for 1957 some eighty countries have already promised about 30·8 million dollars. Nevertheless, as already noted, the financial resources fall far short of what is required to meet the demand, and financial uncertainty still hampers orderly planning. It would be difficult to over-estimate the gain for the Expanded Programme if the Board and Participating Organizations could reasonably count on the expansion of its resources over the next five years to the 50 million dollars a year envisaged.

In evaluating the programme, the report this year emphasizes the increasing effectiveness of co-ordination between the Expanded Programme and other multilateral and bilateral programmes in the assisted countries, and the recipient countries were also agreed as to the value of the contribution made to their national development, and that had more funds been available the three types of assistance—experts, fellowships and equipment—could have been combined more effectively to produce a better balanced economy. With few exceptions, the international experts proved not only technically competent but able also to acclimatize themselves quickly and to collaborate effectively. Of the 530 fellowship holders in some eighteen countries, all but 6 per cent now occupy positions where their training can be put to effective use; and although many had fairly recently returned, 45 per cent were already occupying positions of greater responsibility. The Board was also satisfied that all the equipment and supplies provided under the Expanded Programme were effectively utilized.

Almost a third of the report, apart from the appendixes, is occupied by accounts of some projects in operation in 1956. Many of these are of real interest to the scientist and technologist, but only a few can be selected to illustrate what is being done. In view of the direct relation between the development of potato blight and the meteorological environment of the growing crops, the Government of Chile requested help from the World Meteorological Organization to apply meteorological science to the control of potato blight in particular and to other problems of agriculture, and an expert from the Meteorological Service of Ireland was assigned to advise the Chilean Government. While the main purpose of the Chilean authorities was to lay the foundations for an advisory service on the application of fungicides, it also sought answers to other questions on the relation between blight and weather conditions and the areas suitable for testing or growing seed potatoes. Partial answers were provided to these questions which can be amplified and confirmed when more complete data on weather and the incidence of disease are available, criteria used in Ireland for detecting and forecasting blight weather proving equally applicable in Chile, and the Chilean authorities are setting up a network of agro-meteorological stations at their agricultural experimental farms.

At the request of the East Africa High Commission a mission of two meteorological experts was appointed to investigate the meteorological factors in the control of the desert locust and advise on the application of meteorological science to that end. Excellent progress is being made in a detailed and critical synoptic analysis of locust events in co-operation with all the meteorological services concerned, as well as in collaboration with the Anti-Locust Research Centre in London. A Unesco mission on arid-zone research at Recife in Brazil has led to many other requests for such assistance, including a geological and hydrogeological study for a dam on the River Paraguay and the creation of a diploma in hydrogeological studies at the Engineering School at Recife. The establishment of a forest research laboratory for the Philippines, assistance in vocational and technical education in Turkey which led to the production of a five-year-plan for the vocational and technical education of men and boys, assistance given to Indian industry in the improvement of efficiency and productivity, the development of civil aviation services in Indonesia, technical as well as legal assistance to civil aviation in Salvador, the eradication of malaria in Mexico and tuberculosis surveys in Africa are other projects briefly described in the report which can only be mentioned.

THE NUFFIELD FOUNDATION

REPORT FOR 1956–57

THE wide range of the projects which the Nuffield Foundation supports is once again illustrated by the twelfth report of the Foundation, which covers the year ended March 31, 1957. The introduction to the report reiterates that the Foundation's aim is to assist promising work which for some reason is not attracting support from elsewhere and, after enumerating various purposes which the policy of the Foundation does not allow it to assist, points out that the Foundation subscribes to the view that the pursuit of new knowledge is as much the duty of a university as is the dissemination of existing knowledge. Accordingly, the Foundation does not feel called to assist the everyday investigational work of a university department.

Of the grants for science in the United Kingdom, those for biological research, which totalled £54,545, included two further grants of £725 and £2,500 to Dr. Dorothy Crowfoot Hodgkin's unit in the Laboratory of Chemical Crystallography, Oxford, for work on X-ray analysis of large molecules; £5,000 in support of work in the Department of Zoology, Liverpool, on the initial causes of mucosal damage in patients with peptic ulcer and on the evolution of mimicry in polymorphic butterflies with a view of showing how much the effect of major genes can be modified as a result of the evolution of a new gene-complex by natural selection; a further grant of £14,000 over five years in support of the two units in the Department of Zoology and Comparative Anatomy, Oxford, working on evolution in wild populations, industrial melanism, analysis of the causation of behaviour (with emphasis on sensory perception prior to learning and on motivation), the survival value of various anti-predator devices and adaptive radiation in evolution; £7,400 over three years in support of Prof. H. E. Street's work at the University College of Swansea on the nutrition and metabolism of excised root cultures; and £2,000 over three years to the University of Durham for work on the hatching mechanism of the potato-root eelworm. The grant towards the work on non-specific immunity at the Lister Institute of Preventive Medicine has been renewed for a further five years at the rate of £3,000 a year. Other grants for scientific research

include £1,135 to Dr. N. R. Hanson to enable him to write a book, "The Positron: a Chapter in the History of Ideas", illuminating the interplay of theory and observation at the frontiers of scientific discovery as shown in the discovery of the positive electron, and an additional £2,000 to the Research Laboratory for Archæology, Oxford, towards increases in expenditure during 1956–57.

Of the £125,000 allocated for technology, the largest grant is £3,300 over two years for an investigation—into the effectiveness of existing experiments in removing hindrances to the application of science—which the Science and Industry Committee, formed jointly by the Royal Society of Arts, the British Association and the Nuffield Foundation, now proposes to undertake. Besides a grant of £1,200 over three years towards an investigation into the training of design engineers at the Department of Engineering, Cambridge, another grant of £400 was made to the same Department for a further experimental course to study the application in a different environment of techniques developed for training graduate engineers for junior executive posts and to experiment with a technique of examining the relations within a group of managers, while a grant of £1,000 a year for three years was offered to the Borough Polytechnic for research scholarships in food chemistry.

In the field of medicine, the Foundation, with the help of the Oliver Bird Fund, continued to concentrate its support of research in rheumatism in a few centres where fundamental research is under the direction of men of proved ability. The final results of one long-term chemical trial of cortisone have shown that cortisone is no better than aspirin in the treatment of early rheumatoid arthritis. A grant of £9,595 over three years was offered to the University of London for research on hypnosis by Prof. H. J. Eysenck at the Institute of Psychiatry, and £6,330 over three years for Dr. J. G. L. Williams's investigation at St. Thomas's Hospital Medical School of the possibility of using the measurement of cardiovascular responses in the diagnosis or classification of psychiatric patients and in measuring the efficiency of the therapy they undergo.

A further grant of £1,400 a year over two years was provided for Dr. Honor Smith and her team at the Radcliffe Infirmary, Department of Neurology, Oxford, to study in greater detail the abnormal immunological patterns in disseminated sclerosis, while a grant of £10,000 was made to assist the erection and equipment of a rehabilitation unit for the disabled agricultural worker, consisting of a hostel for twelve patients and a remedial therapy section which provides occupations which the agricultural worker is likely to need. The Foundation is also providing £16,000 to carry the industrial health service being set up at the Central Middlesex Hospital by the North-West Metropolitan Regional Hospital Board through its first three years and has set aside £7,150 over three years in support of Mr. R. H. Hunt Williams's research at the Royal Berkshire Hospital, Reading, on problems of hearing and deafness in early infancy. An offer of £9,000 over three years has been made to the University of Leeds and the United Leeds Hospitals in support of research on problems of screening in diagnostic radiology, including the use of television techniques.

No large grants were made during the year in the social sciences, to which £81,975 was allotted, but special attention is directed to two projects. The first of these is the pilot study being made at Leeds University Library, of how it is used for borrowing by undergraduates and scholars, for which the Foundation has set aside £2,000. It is hoped that something will be learnt of how many titles are required for the undergraduates of a large mixed university and of gaps in the collection, from an examination of loans obtained from other libraries. Some of the material may form the basis of further studies in connexion with the use of the library for research purposes. The second project, which may also lead to further investigation, is into the wilful damage which is being done to social amenities by young people in the new towns. Dr. James Macintosh is in the first place collecting the facts with the ultimate object of suggesting what action might be taken or what further studies are required, and he will also study the methods of education in citizenship of children, adolescents and their parents provided by official and unofficial bodies: the Foundation has allocated £2,350 for the first year of the investigation. A further grant of £3,915 was offered to the Shoreditch project for the revised version of its family service unit to help families which appear to be in danger of breakdown, on condition that the final design of the research is approved by Prof. R. M. Titmus.

The University of Manchester received £2,000 to enable Prof. S. Devons to carry out a pilot experiment with young physicists in part-time university work combined with part-time science teaching at local grammar schools. A grant of £950 to The Queen's University of Belfast was to enable Mrs. J. M. Alexander to continue her study of factors which affect the supply and training of scientists, such as the problem of schoolchildren capable of advanced scientific work, who either leave school early for non-scientific fields or who are directed to arts subjects at an early age, and the difficulties which seem to exist in the full use of women in scientific and technical employment.

The Royal Institute of Public Administration has been assisted in its comparative and critical study of the organization of building construction and maintenance in local authorities with a grant not exceeding £2,250 a year for up to two years. Mr. J. G. G. Wootton's study of the organization and working of the Association of Engineering and Shipbuilding Draughtsmen is being assisted by a grant of £375 over two and a half years, and a grant of £6,000 over three years was made to the University of Leicester in support of an eight-volume agrarian history of England. A brief progress report from the Division for Architectural Studies notes that the team engaged in the study of laboratories has completed its survey into the utilization of space and services and also the studies of daylight conditions in laboratory rooms, made jointly with the Building Research Station; that the first stage of the building programme at the Imperial College of Tropical Agriculture, Trinidad, was designed during 1956; and that the Division is to prepare plans for a small Agricultural Research Council Laboratory at Cambridge.

A grant of £3,000 a year for three years was offered in support of Mr. P. Townsend's study at the London School of Economics and Political Science of the institutional care of old people, and a further £9,000 has been set aside for Prof. K. J. Franklin's work on the ageing effects of ionizing radiation at St. Bartholomew's Hospital Medical College, in continuation of his studies on the physiology of ageing.

The grant to the University of Bristol for field studies on the employment of elderly workers has been renewed for two years at the rate of £3,700 a year.

Among grants for the Commonwealth overseas, which totalled £32,741, may be mentioned a further £800 to the Departments of Anthropology and Anatomy, University of Sydney, in support of the expedition to the Western Highlands of New Guinea; £20,000 over three years to the Central Pedagogical Institute, Allahabad, in support of its work in teaching English; a further £3,500 to enable the Smuts Archive Trust to complete its work; £3,600 over two years to the University of the Orange Free State in support of research on soil organic matter; £1,800 over three years to the Plant Physiological Research Institute, University of Pretoria, for research on amino-acid metabolism and other aspects of the assimilation of nitrogen; £2,450 over three years to the University College of the West Indies for marine biological research; and £8,000 to the Uganda Foundation for the Blind for capital expenditure and maintenance costs over two years of a scheme for the training and employment of the rural blind.

Travel grants included one to enable Dr. L. Guttmann to visit cities in six of the Australian States to advise on the development of spinal centres and on facilities to be provided for vocational training of the physically handicapped.

Only one medical fellowship was awarded in 1956, but the dental fellowships and scholarships scheme continued to attract a high standard of applicant and three fellowships and two scholarships were awarded. The schemes for biological and sociological awards continued unchanged. One bursary in biology was given and one scholarship in sociology. The regulations for the Royal Society and Nuffield Foundation Commonwealth Bursaries have been slightly altered to make it clear that applicants should hold salaried posts to which they will return and that they will draw their salary while away. The Foundation arranged with the Indian and Pakistan Governments to provide two travelling fellowships annually from each country to members of the administrative class of the Civil Service for study in the United Kingdom, but otherwise policy for awards from the Commonwealth countries was unchanged. The scheme for overseas farmers is to be enlarged by an additional award, and with the National Research Council of Canada, the Foundation is to provide travel grants to enable senior lecturers or professors to visit the smaller Canadian universities.

THE DEFENCE STANDARDS LABORATORIES, AUSTRALIA

ANNUAL REPORT

THE broad function of the Defence Standards Laboratories in Australia is the application of scientific knowledge and research within the fields of chemistry, physics, metallurgy and engineering to the problems arising in the design, development, manufacture, inspection, storage and use of defence material. In addition, as the name of the establishment indicates, it is concerned with the maintenance of standards of measurement and of quality, its own being based on the national standards held by the National Standards Laboratory, Sydney, and on the specifications prepared and issued by the Standards Association of Australia. In the annual report of the Laboratories for the year ended June 30, 1956*, an account is given of the general activities of the establishment and of the more important projects and investigations either completed, or in which significant progress was made during the period under review.

Recruitment during the year both in the professional and other staff was not sufficient to maintain strength, and the total staff at Maribyrnong, Victoria, and the two inter-State branches (Alexandria, New South Wales, and Finsbury, South Australia) decreased from 594 to 577, reflecting the general shortage of scientific and technical man-power in Australia. The organization consists of a chief superintendent, Mr. A. E. Dawkins; deputy chief superintendent, Dr. F. A. Fox, appointed in February 1956; and four divisions—materials and explosives, protective chemistry, metallurgy and engineering, and physics.

In the Chemistry Division work was done on the analysis of gases by interference refractometry; the determination of small quantities (of the order of two micrograms) of acetone in air; the determination of oxygen and nitrogen in metals and alloys and the recrystallization of barium sulphate. New forms of titanium esters were developed for use in paints, and standard soils for the testing of dishwashing detergents and for metal-cleaning preparations were investigated. In biochemistry a study was made of the organophosphorus compounds which are used as insecticides and plasticizers and in medicine.

The Metallurgy Division was mainly concerned with the production and processing of pure chromium and chromium alloys. Investigations of their properties and structure were largely confined to attempts to elucidate the nature and cause of the lack of ductility of the chromium-base alloys at room temperature. A study was commenced of the embrittlement of the metastable beta-phase alloys of titanium. Other investigations included the lost wax process, corrosion problems associated with iron and steel in cooling waters, cadmium plating, and lead in chromic acid.

The diverse activities of the Physics Division covered the fields of chemical physics, radiological physics, metrology and temperature measurement. Improvements were made to the microwave spectroscope and nuclear spectrometer parts were constructed and tested. The new technique of microwave observation of detonation announced in the 1954–55 annual report was further improved. An apparatus was devised which enables the thermal conductivity of gases and vapours to be determined from the equilibrium temperature attained by a platinum spiral immersed in the fluid, and measurements were made on pure gases and on binary mixtures. In connexion with the study of the accuracy and reproducibility of temperature measurement at the triple point of water, the performance of the Laboratories' Smith resistance thermometry bridge was improved by the use of a stable decade resistor for calibration purposes. A new type of multi-cell inert dry battery composed of ordinary cells made inert by dehydration under heat and vacuum was developed and this is discussed in some detail in the annual report.

Various other miscellaneous investigations included research on xerography; the effects of climates in different parts of Australia on the durability of paint

* Annual Report of the Defence Standards Laboratories for the year ended 30th June, 1956. Pp. iv+44. (Maribyrnong, Victoria: Defence Standards Laboratories, 1957.)