BRITISH COLONIAL TERRITORIES

"THE Colonial Territories, 1958–59"* provides the usual convenient compendium of information to such further publications as "Colonial Research" dealing with the British Commonwealth and itself includes a 24-page chapter dealing with "Research and Surveys", to which grants totalling £800,824 were made from Colonial Development and Welfare Funds for a further 134 research schemes. The recommendations of the meeting at Lagos in January 1958 for the future organization of research in West Africa have now been accepted by the Governments of Ghana, Gambia, Nigeria and Sierra Leone, and the West African Research Office came formally into being on April 1, 1959. The Government of Ghana has now abandoned its intention of taking over the West African Cocoa Research Institute, which will accordingly continue as a fully inter-territorial research body. The Commission for Technical Co-operation in Africa South of the Sahara has decided to transfer the headquarters of the joint secretariat from London to Lagos.

Approved technical assistance projects in the British-dependent territories in 1959 under the United Nations Expanded Programme of Technical Assistance (to which the United Kingdom Government at present contributes the sterling equivalent of 2,240,000 dollars a year) amounted to 1,062,750 dollars. Expenditure from Colonial Development and Welfare Funds was £17·8 million and the Vote for Colonial Services included £24,223,000 as financial aid to Colonial Governments. Exports (excluding Northern Rhodesia and Nyasaland) fell by £46 million and imports by nearly £80 million, including about £35 million in Hong Kong and Singapore and nearly £20 million in East Africa. Capital formation in 1958 remained at about the same value as in 1957.

Among some other points which may be mentioned are the rapid expansion of educational facilities, although the provision of new school places and additional teachers remains the over-riding problem in most territories. In October 1958, the two universities and three university colleges in Central Africa had 3,783 students, compared with 3,400 the previous year, and there were 1,615 students at the University of Malaya, which serves Singapore as well as the independent Federation of Malaya. Capital sums provided under the Colonial Development and Welfare Act for university institutions are now almost completely committed, and a main financial problem is now to provide the required increase in accommodation for residence and teaching. The Singapore Polytechnic opened in November 1958 with 385 full-time, 506 day-release and 2,005 evening students, and a second new technical college in Jamaica opened in March 1958 with 60 students. In Jamaica, 11,000 extra primary places were provided out of the 16,000 required, and in Uganda the number of African pupils in aided secondary schools has risen from 5,517 in 1951 to 17,306 in 1958.

Attachments of American teachers to institutions in British Colonial territories continued under the Fulbright Agreement, and the Overseas Visual Aids Centre was officially opened in London in February. Departments of health generally were able to meet increasing demands on all services while maintaining a fair balance between curative and preventive work. Mass campaigns and surveys or pilot projects preceding them have been used extensively to combat endemic diseases, but although the incidence of malaria and yaws has been dramatically reduced in this way, tuberculosis remains a serious problem. Progressive improvement in water supplies in rural and urban areas has considerably assisted the control of water-borne diseases. The Institute of Health in Singapore was completed in 1958 with assistance of a grant of 1,500,000 dollars from Colonial Development and Welfare Funds, and during 1958, 144 medical students and 5 dental students from the Colonial territories were placed by the Colonial Office in teaching schools in the United Kingdom and the Irish Republic. Several overseas governments are now contributing to the Applied Nutrition Unit at the London School of Hygiene and Tropical Medicine.

* Colonial Office. The Colonial Territories, 1958–1959. Pp. xxv + 199. (Cmnd. 780.) (London: H.M. Stationery Office, 1959.) 10*s.* 6*d.* net.

GERM-FREE VERTEBRATES: PRESENT STATUS

IN a recent publication by the New York Academy of Sciences résumés are given of a series of papers delivered at a conference held by the Academy during May 1958*. It is divided into five parts: the first and second are concerned with instrumentation and with rearing of germ-free vertebrates; the third is concerned with the biological characteristics of germ-free animals; the fourth and fifth describe ways in which germ-free animals have been successfully used as a tool to solve otherwise intractable problems and discusses future possibilities in this direction.

It has taken thirty years of technical development to produce germ-free animals of most laboratory species and thereby refute the opinion of Pasteur that germ-free animals would not survive. Although the methods adopted are subject to continuous improvement, simplification and standardization, they remain expensive and complex. Nevertheless, the time has come when germ-free animals are produced on a limited scale for practical research projects and, since the maintenance of the germ-free state over a limited time is much simpler than the production of germ-free animals, a plea is made for wider support for centres to produce and distribute them. Study of the physiology and nutritional requirements of germ-free animals is a necessary preliminary to their use in research. In this connexion, it is noted that their lymphoid tissue is immature compared with that of conventional animals. Plasma cells are present in small numbers and the amount of serum γ-globulin is much reduced.

* Annals of the New York Academy of Sciences. Vol. 78, Article 1: Germfree Vertebrates: Present Status. By James A. Reyniers and 30 other authors. Pp. 1–400. (New York: New York Academy of Sciences, 1959.) 5 dollars.

Germ-free animals are free from antibacterial agglutinins readily demonstrable in conventional animals, although in some instances antibodies are later developed due to antigen in the autoclaved diet. Undoubtedly germ-free animals will provide a useful tool for immunologists in such questions as the source of 'natural antibodies' or whether serum γ-globulin exists apart from that produced in response to an antigenic stimulus. Indeed, germ-free animals raised on diets free from antigenic materials would be a boon to immunologists. In one paper, germ-free animals were indispensable in experiments to refute the hypothesis that irreversible hæmorrhagic shock was due to absorption of bacterial endotoxins from the bowel.

Interesting experiments are described to show that the increased growth-rate of conventional chicks, reared on diets containing penicillin, did not occur in germ-free chicks, but did occur after particular bacterial species had been experimentally established in their intestines. Another paper gives an account of experiments which show that infection with *Entamoeba histolytica* produces no lesions in germ-free guinea pigs, whereas it produces extensive ulceration of the intestinal mucosa in conventional guinea pigs. The potential value of germ-free animals in investigation of dental caries is, of course, obvious. In addition, the process of ageing in germ-free animals offers possibilities, but very little has been achieved so far in this respect on account of competition for available germ-free animal accommodation. However, perhaps the most exciting possibilities of germ-free animals at present relate to investigation of latent viruses, cancer and the relationship between them. No work upon latent viruses with germ-free animals is reported but a beginning has been made with cancer.

Filtrates from methylcholanthracene-induced tumours in conventional chicks are not infective, but when such tumours are induced in germ-free chicks inoculation of cell-free suspensions, produced by filtration through coarse filters, produces tumours and inoculation of suspensions produced by filtration through fine filters produces a fatal wasting disease. Purification procedures and electron microscopy tend to associate the tumour-producing activity with microsomal or virus-like particles of 50–150 mμ diameter and the wasting disease with smaller particles (20 mμ). In uncompleted experiments with germ-free C_3H mice, no mammary tumours in the females or hepatomas in the males have appeared in 100 mice of which the oldest are more than 700 days, whereas in comparable conventional C_3H mice 90 per cent die of these tumours within about 300 days.

It seems that germ-free experimental animals are likely to prove indispensable tools to answer certain basic questions of capital importance in several fields of biological research ; yet after these questions have been answered the value of germ-free animals may perhaps decline. This poses a difficult problem for those called upon to decide whether to support the production of germ-free animals, an expensive and long-term undertaking. A. W. GLEDHILL

WATER POLLUTION RESEARCH, 1958*

APPLIED scientific research must ensure that projects and results are directly relevant and immediately available, so it is satisfactory to see from the annual report of the work of the Water Pollution Research Laboratory that contacts with the industries and authorities concerned are increasing and producing useful conclusions. Apart from the report itself, information is exchanged through numerous publications in journals, the invaluable *Water Pollution Abstracts*, a new series entitled "Notes on Water Pollution", and several committees recently established where the Laboratory makes close contact with the River Boards, the Institute of Sewage Purification and the Federation of British Industries. Financial support by the latter body has enabled two new investigations of considerable importance to industry to be started, and there are many examples in the report of valuable short-term studies undertaken in collaboration with specific industries, often on a repayment basis. In particular, suggestions made by the Laboratory have enabled several firms to reduce the danger of pollution by simple changes in manufacturing processes instead of expensive purification plant, and anaerobic digestion has been shown to be suitable for the treatment of slaughterhouse wastes but not for whisky wastes.

In the field of automatic apparatus it is anticipated that the merits of the dissolved oxygen recorder developed and applied by the Laboratory will be recognized by commercial production. The use of continuous recorders for oxygen and temperature has made it clear that isolated samples often do not give sufficient information for the accurate assessment of the condition of a river.

The studies made in the Laboratory of the foaming of detergents, and their behaviour in sewage treatment plant, are of particular interest. As the detergents normally used are resistant to biological treatment in percolating filters or activated sludge plant, the effluents may cause objectionable frothing in rivers. Recently, a new active material has been developed by the industry and tests have shown that a much greater proportion is destroyed during sewage treatment. If this is confirmed in large-scale trials, and if it could then replace existing detergents, the state of many rivers and drinking-water supplies should be improved directly. There might also be a general improvement in the quality of many effluents, as the efficiency of treatment can be affected by the amount of detergent present.

It is to be hoped that successes in empirical investigations will not distract attention from more prolonged and fundamental studies which are likely to be more economical in the long run. For example, the detailed results of the analysis of domestic sewage are proving to be very interesting and it will be extremely useful to know exactly the nature of the substances which treatment must aim to destroy. Biologists will be encouraged to see the success of modern analytical methods for the detailed separation and identification of the components of such a complex material.

* Department of Scientific and Industrial Research. Water Pollution Research 1958 : The Report of the Water Pollution Research Board with the Report of the Director of the Water Pollution Research Laboratory. Pp. v+113+4 plates. (London : H.M. Stationery Office, 1959.) 7*s*. net.