

## EAST AFRICA HIGH COMMISSION

## REPORT FOR 1955

THE annual report on the East Africa High Commission for 1955\* follows a different pattern from its predecessors. The general review is omitted, and the seven chapters in Part 1 deal successively with financial matters, social services, legislation, communications, research and scientific services, economic services and defence. Part 2 consists of two chapters, the first giving a brief history of the Commission, while the second sets forth its constitution, scope and legislative powers. Despite staff shortages, the East African Statistical Department was able to maintain the collection of statistics of industrial production started in 1954, and an attempt is being made to develop the library of the Department into the best economic and statistical library in East and Central Africa.

Most of the information of scientific interest is to be found in the chapter on research and scientific services. The first phase of the development of the East African Agriculture and Forestry Research Organization, which now has twenty-seven senior research officers in fifteen scientific divisions, ended in 1955. The Soil Physics Division continued its study of the soil-water relations in the Lower Rufiji Basin of Tanganyika and is also investigating the influence of different types of vegetation and land management on the amount and uniformity of stream flow out of catchment areas. The Soil Chemistry Division is studying factors which control the humus content of East African soils, particularly those which determine the rate of conversion of organic matter to carbon dioxide. Work on the chemistry of sulphur in forest soils has shown that much of the sulphur is being returned to the soil by the forest litter as soluble sulphate. The Plant Physiology Section concluded its examination of the effect of rainfall distribution on the yield of maize in Kenya, and the existence of two genes of value in giving resistance against American maize rust has been established. The breeding programme on cassava and the survey of East African forest insect pests both continued. Work proceeded on the estimation of the productivity of pastures and on the digestibilities of animal feeding stuffs, and a relationship has been established between the crude protein content of hays and green fodders and their apparent digestibility.

Special stress is laid on the value of the training course in rabies held in the laboratories of the East African Veterinary Research Organization in July 1955. The Division of Virus Diseases has concentrated on rinderpest research and the production of rinderpest vaccines for the East African and adjacent territories. The East African Inland Fishery Research Organization began its deep-water investigations of the potentialities of Lake Victoria as a source of food in 1956, and the survey of East African coastal waters was continued. The East African Council for Medical Research met for the first time in January 1955. The renamed East African Institute of Malaria and Vector-Borne Diseases has organized a malaria control project in the Tavita-Pare area. The most important work of the East African Virus Research

Institute was a study of the behaviour of Rift Valley fever virus in the laboratory mouse. Another basic study was concerned with the behaviour on the Mengo strain of encephalomyocarditis virus in the animal host. The first phase of a survey of the health of the East African population was completed during the year by the East African Medical Survey and Research Institute.

The Lake Victoria Fisheries Service was seriously concerned about illegal fishing, but during the year the Lake was restocked with 12,150 *Tilapia zillii*. Considerable progress was made with the reorganization of the East African Tsetse and Trypanosomiasis Research and Reclamation Organization. At Shinyanga laboratory studies were directed to the reaction of tsetse flies to changes in the humidity of the air, while the Lambwe Valley Field Station is seeking a cheap and productive method of eliminating thickets which form the habitat of *Glossina pallidipes*. Work at Tinde has demonstrated that the twenty-one year old strain of *Trypanosoma rhodesiense*, transmitted throughout by the tsetse fly, remains infective to man; but another strain, derived from the Tinde strain seventeen years ago and since maintained in England by syringe transmission, has lost its infectivity to man.

Under the East African Industrial Research Organization which came into existence on April 1, 1955, investigations on coffee processing have assumed increasing importance. The investigation into extraction of hecogenin from sisal waste has been completed and cetyl alcohol was prepared in pellet form for use by the Meteorological Department in reducing evaporation from reservoirs. The East African Industrial Research Board has been reconstituted with fresh terms of reference.

## QUEUEING: THEORY AND PRACTICE

THE mathematical theory of queues and of allied congestion phenomena was created about fifty years ago by the Danish telephone engineer, A. K. Erlang, but its relevance to a wide range of other problems in industry was not fully appreciated until quite recently. The realization that a single class of abstract probability problems could be recognized in a wide variety of practical situations has been the main driving force behind a revival of interest in the mathematical theory; this had been further advanced by F. Pollaczek, A. Khintchine and others in the nineteen-thirties, but had not been adequately related to the modern theory of stochastic processes.

During the past five years a great number of mathematical papers has appeared in this field, and it was with the object of translating these results of mathematical research into industrial practice that the University of Birmingham's Institute for Engineering Production held a five-day residential course during January on "Queueing Theory and Practice" for about thirty senior executives from industry. The course was organized by R. S. Gander, staff tutor in operational research at the Institute.

\* Colonial Office. Annual Report of the East Africa High Commission, 1955. (Colonial No. 326.) Pp. v+81+4 plates. (London: H.M. Stationery Office, 1956.) 5s. 6d. net.

The mathematical foundations of the subject were covered in a core of six lectures by D. G. Kendall and supported by a further four by F. Downton and R. R. P. Jackson, and the applications of the theory to 'machine interference' and to other practical problems were explained in nine further lectures by F. Benson and others. Two representatives of the Mathematisch Centrum, Amsterdam, also attended the course and contributed greatly to its success.

To one observer the course illustrated the growing importance of applied probability theory as a subject in its own right, and also demonstrated the encouraging fact that, when sufficient trouble is taken, the mathematical subtleties of the theory of stochastic processes can be expounded in a form acceptable to the industrial mathematician. It is generally felt that the course was a success, and a repetition is now being planned to take place in July of the present year.

## SCIENCE IN FRANCE

AN article entitled "Science in France" by Dr. A. C. Copisarow, who is scientific attaché at the British Embassy in Paris, appeared in the winter issue of *Britain and France*, the quarterly journal of the Franco-British Society (Vol. 12, 1956; 1s. net). Research in France is organized at three levels. First, under the control of the Ministry of National Education are the universities, the Grandes Écoles and the forty laboratories throughout the country administered by the Centre Nationale de la Recherche Scientifique, which corresponds roughly to the British Department of Scientific and Industrial Research. The Association Nationale de la Recherche Technique, the main French technological research complex, has no counterpart in Britain. Secondly, there are some thirty industrial co-operative research organizations, financed by the industries they serve. Finally, there are a number of private establishments, ranging from the Pasteur Institute to the research departments of individual companies.

The development of nuclear power in France began slowly after the Second World War, but in 1955 M. Gaston Palewski prepared a comprehensive plan and obtained for the Atomic Energy Commission the equivalent of £100 million for research and development during 1955-58, to be spent chiefly on industrial contracts. At present, about 1,800 technologists are employed in work on atomic energy in France, as compared with 1,000 for the rest of western Europe, 5,000 in Britain and 15,000 in the United States. The first nuclear reactor is in small-scale operation at Marcoule, near Avignon, a second is scheduled to begin later this year, and a third in 1958, when a total of 50,000 kW. of electric power from nuclear sources will be added to the national grid system. The 200 lb. of plutonium produced annually by the three reactors at Marcoule will be used industrially; it is not intended to manufacture bombs, but the design of nuclear marine and submarine engines is being investigated.

There is a severe shortage of scientific man-power in France, due chiefly to post-war disorganization of the educational system. Of 151,000 students enrolled in 1954, only 29,000 were studying science or engineering: of these, only 3,900 reached the standard required for the diploma and a mere 650 continued as research students. The recent Landucci Com-

mission on Scientific Man-power recommended that the number of scientific and engineering students should be doubled within the next decade and that more grants should be provided for postgraduate work. The Higher Council for Scientific Research and Technical Progress, under the chairmanship of Prof. Henri Longchambon, has also undertaken a detailed inquiry into the deployment of French technological resources. It has initiated a comprehensive stocktaking of the nation's scientific potential in men and materials, defining and financing a number of national research objectives; it is investigating the existing conditions of training scientists and the industrial exploitation of their discoveries; and it is examining the co-ordination of research and the communication of information between the various research organizations.

## FORECASTING TORNADOES AND SEVERE THUNDERSTORMS

THE publication by the United States Weather Bureau of "Forecasting Guide No. 1"\*, the first of a series, stimulates thought on the degree of official guidance given to weather forecasters. Directors of meteorological services have never, so far as is known to the writer, considered it advisable to lay down fixed rules of forecasting procedure. They have recognized that it is impossible to legislate for all the complex details of the weather and that the forecaster must be given all the information likely to be helpful to him and then offered every encouragement to use his best judgment. This new 'forecasting guide' is unusual in that it seems to be the first time a major meteorological service has produced a publication with so definite an indication of official approval of a code of practice as is implied in the title 'guide'. It is, however, an aid to decision, not a set of rules. We find, in fact, the sentences: "In common with other types of weather forecasting the formulation of a tornado forecast does not entail a simple weighing of parameters or direct application of rules. Instead, the forecaster must arrive at some decision, or series of decisions, in each individual situation regarding the combined relative importance of the climatological, synoptic, thermodynamic and dynamic factors previously discussed".

Tornadoes cause great damage in central North America but are very infrequent at any one place. During June, between 3 p.m. and 9 p.m., in which tornadoes are most frequent in Kansas, the overall probability that one will appear in an area of 20,000 sq. miles on a day chosen at random is only 0.04. This is much lower than the climatological probability of other phenomena covered in weather forecasts. Tornado warnings enable some useful protective steps to be taken, such as sheltering underground and alerting first-aid workers, yet a warning naturally causes great anxiety which should only be aroused for very good reason. The guide includes a history of tornado forecasting which shows that, after some tentative efforts at forecasting in the nineteenth century, the United States Weather Bureau from 1905 until 1938 specifically prohibited mention of the word 'tornado' in the forecasts because

\* United States Department of Commerce: Weather Bureau. Forecasting Guide No. 1: Forecasting Tornadoes and Severe Thunderstorms. Edited by Jay S. Winston. Pp. v+34. (Washington, D.C.: U.S. Department of Commerce, 1956.)