

cessing of natural materials. In agriculture the production of improved fertilizers, weed-killers, fungicides and insecticides, as well as antibiotics to eliminate disease in man and animals, is still in its infancy, and a vast new field awaits the large-scale application of biochemistry.

Amid so many possibilities, continued Sir Harold, only one thing seems certain—there are not nearly enough chemical engineers for the task, especially in Great Britain: for every chemical engineer now training in Britain there are more than twenty in the United States. It would be of some help if chemical engineering were included in the curriculum of every institution now teaching engineering of the older kind, but urgent action is required. If British industry is to maintain the lead won for it by its engineers in the past, a great and rapid increase in the number of chemical engineers must be regarded as one of the major needs of to-day.

TECHNOLOGY AND THE HISTORY OF MAN

IN his L. T. Hobhouse Memorial Trust Lecture at the London School of Economics and Political Science on October 23, 1951 (Pp. 19. London: Oxford University Press, 1952. 2s. net), Dr. Charles Singer, dealing with technology and history, said that it was largely through Hobhouse's influence that the view that the history of mankind should be considered as a whole and include all major human activities is now a commonplace among the English-speaking peoples. Nevertheless, Dr. Singer continued, despite the limitations of the idea of history that prevailed in the nineteenth century, efforts to integrate the records of the various manifestations of the human spirit can be traced back at least to L. Laurent's "Études sur l'Histoire de l'Humanité", which began to appear in 1855, to J. R. Green's "History of the English People" in the late seventies, and to H. D. Traill's "Social England", the last volume of which appeared in 1897. The United Nations Educational, Scientific and Cultural Organization is now engaged on the preparation of an integrated "Scientific and Cultural History of Mankind", some part of which might be expected about 1958.

One of the difficulties in this task, Dr. Singer pointed out, is that the time-curves of the rise and fall of the different forms of human activity do not always fit each other; and, for the history of technology in particular, the ordinary year-sequences cannot yield a useful framework. Division on a cultural basis appears to be more promising, and Dr. Singer suggested that for the history of technology the most convenient divisions are those made as follows: first, between the fishing and hunting stage (roughly, the Old Stone Age) and the agricultural stage (roughly, the New Stone Age); secondly, between the latter and the great social change which Prof. V. Gordon Childe has named the "Urban Revolution"; thirdly, between the latter and the discovery of gold and copper and the invention of writing; and fourthly, from this to the decline of the ancient empires about 500 B.C.

For the following period, until A.D. 1500, there is at present, said Dr. Singer, neither the knowledge nor the scholar to write an adequate history of Far Eastern technology, and in its place we can only substitute an account of the technology of the civil-

izations of the Mediterranean and the Near East and their medieval successors. The rise of experimental science in the period 1450–1650 gave the fifth great dividing line, and from the latter date self-conscious science began to determine the main direction of technology. There is no comprehensive survey of the history of technology, though for the mid-eighteenth century Diderot and his collaborators in the "Encyclopædia of the Sciences, Arts and Crafts" have provided more detailed and complete information than we have for any other. Dr. Singer concluded with a brief reference to the industry and contributions of C. Frémont and Dr. Henry Dickinson.

BRITISH HYDROMECHANICS RESEARCH ASSOCIATION

REPORT FOR 1951

AT the annual general meeting of the British Hydromechanics Research Association, Viscount Waverley was re-elected president, and a council of eighteen elected with Dr. A. Ivanoff (Hayward-Tyler and Co., Ltd.) as chairman and Mr. H. N. G. Allen (W. H. Allen, Sons and Co., Ltd.) deputy chairman. Mr. G. A. Wauchope (Gwynne Pumps, Ltd.), the retiring chairman, was elected the first vice-president of the Association.

In the fourth annual report of the council, covering the period October 1950–September 1951*, reference is made to the completion of the Association's 14,000 sq. ft. laboratory and to the official opening, on May 24, 1951, by the president. The laboratory was the first industrial building to be erected in the new satellite town of Harlow, Essex. It consists of a large, mainly single-story, building. Sufficient experimental equipment has been installed and workshop facilities provided to enable the Association's staff to commence active research, in addition to maintaining the information and abstracting services to members of the Association. The two-story office block which adjoins the laboratory includes a library, drawing office, dark room and instrument laboratory.

The membership of the Association continues to increase, though somewhat slowly. A list of the ordinary and associate members is given in the annual report. It comprises forty manufacturing and user members, and forty-nine consultants and academic workers. The majority of the eligible companies in the pump industry are now members of the Association, but it is regrettable that, as yet, no financial support has been forthcoming from water-supply authorities, though they are among the principal users of much of the plant and machinery with which the Association is concerned. A grant is received from the Department of Scientific and Industrial Research, and close contact is maintained with the Fluid Mechanics Division of the Mechanical Engineering Research Organization at East Kilbride, Glasgow, and with university and independent research workers in hydraulics. The staff consists of the director of research, Mr. L. E. Prosser, a secretary, five research engineers, two research assistants and one draughtsman, in addition to library, office and workshop staff. It has been strengthened during the year under review by the recruitment of several junior staff.

* British Hydromechanics Research Association. Fourth Annual Report, October 1950 to September 1951. Pp. 28. (Harlow, Essex: the Association, 1951.)

Six research committees dealing with fundamental fluid mechanics, measurement and laboratory technique, centrifugal and allied pumps and turbines, control and motion of fluids in pipes and valves, seals and joints, and reciprocating machinery and displacement pumps and motors, respectively, assist the director of research in his work. The programme of research is large in view of the limited staff and financial resources of the Association, but it is being carried out actively and successfully. Details of several of the investigations in progress or recently completed are given in the annual report, and the results of some of these have been published as technical notes and in the journals of scientific societies. The various publications of the Association are listed in the report, and are in addition to the Association's *Bulletin*, in which appear translations and abstracts of papers on hydraulics and allied topics.

A development during the year has been the increasing demand for the Association to undertake special investigations for individual members on a cost payment basis, and five small investigations of this kind have been carried out. The most interesting of these, perhaps, is the one on the overflow spillway and outlet tunnel for a reservoir which is being constructed by the Weir Wood Water Board for the new town of Crawley. In connexion with this a 1/20 scale model of the Weir Wood scheme has been constructed at the Association's laboratory, the overflow spillway and outlet tunnel being made of transparent 'Perspex' so that the air entrainment and the flow at the entrance to the tunnel may be observed. An illustrated brief account of this together with that of other investigations has appeared recently in the April issue of *Water Power*.

INTERNATIONAL STATISTICAL INSTITUTE

CONFERENCES IN INDIA

THE twenty-seventh session of the International Statistical Institute, held in New Delhi during December 5-11, 1951, and in Calcutta during December 16-18, was the first occasion on which the Institute had met in India. The International Biometric Society, the International Econometric Society, the International Association for Research in Income and Wealth, and the International Union for the Scientific Study of Population, which are affiliated organizations, also held joint or associated meetings with the Institute. In addition, a special session was convened of the International Statistical Association for Asia and the Far East. All these meetings combined together were called the "International Statistical Conferences: India 1951". The Indian Statistical Institute, Calcutta, acted as the host society.

Nearly a hundred and fifty statisticians from forty countries, other than India, participated in the conferences. Participants also included representatives of the United Nations Organization and several affiliated bodies. This was the first international conference in which the Peoples' Republic of China participated side by side with the United States.

Dr. Rajendra Prasad, President of the Republic of India, inaugurated the conferences. Shri C. D. Deshmukh, in his capacity as the Finance Minister,

chairman of the Executive Committee and president of the Indian Statistical Institute, gave a review of the progress of statistics in India. After this the Prime Minister, Shri Jawaharlal Nehru, addressed the delegates and remarked that he was glad to notice a tendency among statisticians to deal more and more with the human aspects of a problem. Dr. S. A. Rice, president of the International Statistical Institute, then gave his address and very aptly termed the twenty-seventh session "the session of fulfilling". Prof. P. C. Mahalanobis presided.

Several meetings were held in the form of 'round table' discussions, which centred on the development of national statistical systems relating to population, agriculture and labour problems in the participating countries. These were followed by discussions on the concept of national wealth and income, estimation of national production in under-developed countries and related statistical problems, biometry and statistical sampling. The accuracy of demographical data, including the accuracy of censuses and the problem of quality in census data, problems of industrial statistics and statistical control of industrial products were also discussed.

Many excursions were arranged, including an air trip to Jaipur, and a special train took the delegates from Delhi to Calcutta with special halts at Agra and Benares. At the Indian Statistical Institute in Calcutta the delegates had the opportunity of studying the working of the National Sample Survey Project of the Government of India; and a trip to Nahazari, a sample village near Calcutta, provided the visitors with a first-hand opportunity of seeing village maps and their uses, plot identification, acreage survey work, the development of crop-cutting techniques, distribution of sampled households, etc.

The Calcutta session of the conferences was followed by statistical seminars during December 19-22, 1951; and lectures were delivered by well-known statisticians on population and vital statistics, labour statistics, national income and theoretical statistics. In addition, the United Nations Sub-Commission on Statistical Sampling held its fifth session in Calcutta during December 19, 1951-January 2, 1952. At the first meeting of the session, Prof. P. C. Mahalanobis was elected chairman for the fifth time. Many subjects of special interest were discussed in the session, among which may be mentioned: the use of survey and experimental techniques for the development of agriculture and small-scale (household and cottage) industries, especially in under-developed countries; sample surveys of current interest; use of sampling techniques for the improvement of statistics on acreage yield and forecast; statistical techniques for the development of methods for the testing of standards for countries entering into international trade; statistical technique in industry as a national resource; sample surveys carried out by the Indian Statistical Institute; sampling in population censuses; report on sampling to obtain road statistics; sampling of administrative forms, etc.

These international conferences in New Delhi and Calcutta were a reminder of Indian contributions to, and applications of, the science of statistics. The very facts that the United Nations Sub-Commission met in India, and that Prof. P. C. Mahalanobis has been serving as the elected chairman for five consecutive sessions, are but two facets of the recognition by the world at large of India's contributions to the science of statistical sampling.

H. HOME