

who is engaged on theoretical and experimental investigations in hydrodynamics and acoustics with special application to the reduction of ship noise and to the examination of cavitation phenomena; H. L. Green (Ministry of Supply), who has made important contributions to the study of particle suspensions and has developed this branch of physics to a very high degree of precision; J. S. Hey (Army Operational Research Group, War Office), who, in the course of his work on radar and the ionosphere, has carried out important investigations on abnormal radiations from the sun and the galaxy and on echoes due to meteors; Dr. H. London (Ministry of Supply), a physicist whose outstanding work before the War was on the effect of high frequencies on supra-conductivity; more recently, he has worked on the separation of stable isotopes, and has achieved results of considerable practical and theoretical importance in the separation of carbon-thirteen by low-temperature distillation; A. R. Rangabe (Admiralty), who was concerned prior to the War with the development in industry of electronic tubes of all descriptions; his ingenuity and flair for developing manufacturing techniques, and his understanding of the problems and difficulties in manufacture, have particular significance at the present time; Dr. E. Roberts (Ministry of Supply) has a long and successful record of important and fundamental work on diverse aspects of the chemistry and production of explosives.

National Institute of Sciences of India: New Fellows

At the meeting of the National Institute of Sciences of India on January 4, 1949, the following elections were announced. *Honorary Fellows*: Prof. Louis de Broglie, professor of theoretical physics, Poincaré Institute, Sorbonne, Paris; Prof. Hans von Euler, emeritus professor of chemistry, University of Stockholm; Dr. Harlow Shapley, director of Harvard Observatory, Cambridge, Mass.; Prof. Georg Tischler, Botanical Institute, University of Kiel. *Ordinary Fellows*: Dr. J. L. Bhaduri, lecturer in zoology, University of Calcutta; Dr. S. Bhagavan-tam, scientific liaison officer for India in the United Kingdom; Dr. S. K. Chakrabarty, director, Colaba and Alibag Observatories, Bombay; Dr. D. Chakravarti, lecturer in chemistry, University of Calcutta; Dr. M. Damodaran, assistant director, National Chemical Laboratories, Delhi; Dr. B. K. Das, professor of zoology, Osmania University, Hyderabad-Deccan; Dr. Kurien Jacob, palaeobotanist, Geological Survey of India, Calcutta; Dr. T. S. Mahabale, lecturer in botany, Royal Institute of Science, Bombay; Dr. H. K. Mitra, refractories engineer, Tata Iron and Steel Co., Ltd., Jamshedpur; Dr. K. Mitra, officer in charge, Nutrition Scheme, Public Health Laboratories, Patna; Dr. A. H. Pandya, director, Hindusthan Aircraft, Bangalore; Dr. N. Parthasarathy, geneticist, Indian Agricultural Research Institute, New Delhi; Dr. C. Racine, professor of mathematics, Loyola College, Madras; Dr. K. C. Sen, director, Indian Dairy Research Institute, Bangalore; Dr. R. S. Varma, reader in mathematics, University of Lucknow.

Production of Radioactive Isotopes in Britain

THE large atomic pile (BEPO) at the Atomic Energy Research Establishment, Harwell, has begun operating for the production of radioactive isotopes. When it is working at full power later this year, it will be able to produce all the artificial radioactive isotopes required in Great Britain by medical, indus-

trial and other research workers. More isotopes will also be available for export, and it is expected that a steadily increasing demand for them will develop overseas. Materials irradiated in the new pile will be twenty times more active than those so far irradiated in the first and smaller pile. The new pile has a rated output of 6,000 kW. and was designed primarily for experimental purposes. The smaller pile, designed to develop about 100 kW. of heat, started up in August 1947 and has been producing radioactive isotopes since September of that year. Present production is about a hundred and fifty specimens a month.

Vegetation-types Map of Tanganyika

THE *Geographical Review* has published a reprint of an article from the January 1949 issue entitled "A Vegetation-types Map of Tanganyika", by the late Clement Gillman. This study of the natural vegetation of Tanganyika Territory by a man who had profound knowledge of the country and of its people is one that should be used as a basis for wise planning, and development. The classification is strictly physiognomic and provides an essential basis for further ecological and geographical investigations. The vegetation of the greater part of Tanganyika Territory is a mixture of woodland or bushland with grassland, the distribution being primarily determined by variations of soil and water conditions and the use made of them by man, although, as the author points out, topography and tectonics influence the climate and distribution of vegetation. The main types shown on the coloured map on a scale of 1:2,000,000 include forest, woodland, bushland and thicket, grassland, permanent swamp vegetation, desert and semi-desert, and vegetation actively induced by man in native and non-native cultivations. The term "actively induced vegetation" includes the mixed and constantly changing pattern of cultivated crops, pastures and interspersed remnants of the original vegetation and of scattered small areas of secondary growth. Complexes of vegetation occurring in close conjunction are shown on the map symbolically, using the colour of the dominating type for the ground colour with intrazonals or complexes shown by circles or dots in the colour of their type. Sequences of vegetation types caused by regularly repeated physiographic or hydrographic conditions are shown as "catenas"—a word originally applied to soils in East Africa. The map brings out at a glance the small remnants of evergreen forest left on the main watersheds, and the author stresses the urgency of the threat to the country's water resources. The map also rectifies a commonly held exaggerated view of the size of alien plantations and farming settlements, which appear as tiny specks compared with the great extent of native-cultivated land.

Statistical Estimation

THE current mathematical theories concerned with the estimation of one or more unknown parameters in a frequency distribution have been the occasion of much controversy, and the absence of a systematic review of this field at a sufficiently elementary level has been a serious obstacle to the student. Two recent articles by Dr. Leon Solomon published in the *Journal of the Institute of Actuaries Students' Society* (7, 144 and 213) go a long way towards meeting this need, and form a most welcome addition to the literature. The first article is chiefly concerned with 'point' estimation. The concept of sufficiency is discussed, the minimum-variance theorem is proved, and

the method of maximum likelihood is introduced, the proofs of its main properties being given in outline. The second article is concerned with 'interval' estimation, first from the point of view of the theory of confidence intervals and then in terms of fiducial probability, the contrast between these two methods of approach being illustrated by a discussion of the Behrens-Fisher problem. Rigorous proofs of the theorems are not attempted, and the emphasis throughout is laid on the new ideas which are involved. Another welcome feature of the presentation is the inclusion of many worked examples.

Chemical Society's Anniversary Meeting: Chemistry and Atomic Research

THE Chemical Society is holding its anniversary meetings for 1949 in Oxford, during March 28-30, and then in London, during March 31-April 1. The keynote throughout these meetings will be the recent chemical developments in the field of atomic energy and the way in which radioactive elements may be used in chemical and biochemical investigations. A noteworthy feature is that the Ministry of Supply has invited a number of distinguished men of science from Europe and America to participate in the general discussion and interchange of ideas; it is expected that the following will be present: Prof. R. E. Connick, Prof. J. W. Irvine, Dr. G. Wilkinson (United States); Dr. G. Bouissères, Dr. J. Gueron, Dr. B. Goldschmidt, Dr. M. Haissinsky (France); Dr. L. Yasse, Dr. R. H. Betts (Canada); Prof. O. Hahn, Dr. F. Strassman (Germany); Prof. G. Hevesy (Denmark); K. E. Zuimen, H. Hillert, G. Johannson, E. Berne, R. Lidner (Sweden). The Oxford meeting, at Rhodes House, South Parks Road, will be devoted principally to a symposium on "The Chemistry of the Heavy Elements", consisting of four sessions under the chairmanship of Dr. R. Spence (for the first two), Dr. E. Glueckauf and Dr. J. S. Anderson respectively. This symposium has been arranged in conjunction with the Chemistry Division of the Atomic Energy Research Establishment, and the programme will include a visit to Harwell. In addition, there will be two sessions on "Radioactive Tracers", the first session, "Preparation", being under the chairmanship of Dr. J. M. Fletcher, and the second, "Nuclear Aspects", under Dr. W. Wild. March 31 will be devoted to the annual general meeting of the Chemical Society, and this will be held at Burlington House, London, W.1. The Longstaff Medal will be presented to Sir Cyril Hinshelwood, and this will be followed by Sir Ian Heilbron's presidential address: "Concerning Amino-Acids, Peptides and Purines". On April 1, at the Institution of Civil Engineers, Great George Street, London, S.W.1, there will be a discussion on "The Use of Radioactive Tracers in Chemistry". This will be divided into two parts: the first, on "Applications in Inorganic and Physical Chemistry", with Prof. F. A. Paneth in the chair, and the second, on "Applications in Organic Chemistry and Biochemistry", with Prof. G. Hevesy presiding.

Acoustics Measurements on Church Bells

DURING the Second World War, when the Germans occupied Holland, they ordered that church bells should be collected to provide a source of bronze for war prospects. This plan met with great resistance from the Dutch, so that after the liberation, several hundreds of bells of different origin and ages, which had escaped being melted down, were gathered at a number of places. At the end of the War, the Dutch

Department for Research in Arts and Measurements took the opportunity to collect complete information on the æsthetic and acoustical properties of these bells, many of which were two or three hundred years old. Part of this work was carried out by E. W. van Heuven, who is to read a paper on this investigation at a meeting of the Acoustics Group of the Physical Society, to be held at the Royal Society of Arts, John Adam Street, London, W.1, on March 18 at 3 p.m.

Announcements

THE Committee for Agricultural Research of the Privy Council has appointed Prof. James Gray, professor of zoology in the University of Cambridge, to be a member of the Agricultural Research Council. This is Prof. Gray's second term of office as a member, his first being during 1942-47.

It is announced from the University of London that Dr. J. H. Taylor has been appointed to the University chair of geology tenable at King's College as from October 1, 1949. The following doctorates have been conferred: *D.Sc.* on Mr. R. L. Wain (reader at Wye College); *D.Sc. (Eng.)* on Mr. A. R. Collins (Imperial College of Science and Technology).

MR. A. L. FLEET, formerly assistant secretary and registrar of the University of Bristol, has been appointed assistant secretary of the Association of Universities of the British Commonwealth, the office of which is now at 5 Gordon Square, London, W.C.1.

THE Rouse Ball Lecture in the University of Cambridge will be given by Prof. W. Pauli, of Zurich, at noon on March 10. His subject will be "Physical and Mathematical Aspects of Recent Developments in Quantum Electrodynamics". The lecture will be in English and open to all who are interested.

A MEETING at Göttingen of the Deutsche Bunsengesellschaft für physikalische Chemie has been arranged for April 23-24, 1949.

THE Institute of Welding and the British Welding Research Association are arranging a Conference on "Welding as an Aid to the Saving of Steel and Manpower", to be held at Ashorne Hill, near Leamington Spa, during March 22-25. Applications for tickets and all correspondence should be addressed to the Secretary, Institute of Welding, 2 Buckingham Palace Gardens, London, S.W.1.

UNDER the terms of a grant from the Cotton Industry War Memorial Trust, the Textile Institute is offering to young craftsmen in the cotton spinning and weaving industry a three-year scholarship (of about £750 total value) to study textiles at a university. This scholarship is in addition to the new £1,000 open scholarship of the Institute. Details of both scholarships are available from the General Secretary, Textile Institute, 16 St. Mary's Parsonage, Manchester 3.

THE Institution of Naval Architects is offering the following scholarships to British subjects less than nineteen years of age: Trewent, for naval architecture, £175 a year, tenable at the Universities of Durham, Glasgow, Liverpool, and the Royal Naval College, Greenwich, for 3-4 years. Denny, for marine engineering, £130 a year, tenable for four years at the University of Glasgow. Entries for the above close on May 31. Full particulars may be obtained from the Secretary of the Institution of Naval Architects, 10 Upper Belgrave Street, London, S.W.1.