

very recently, British manufacturers have been unable to offer high-performance oscilloscopes having trace brightness and amplifier band-width suitable for the display of single-pulses having fractional microsecond duration. This has meant that workers in such fields as nuclear physics and high-speed computing have either obtained equipment from North America or have constructed their own display systems. New types of oscilloscopes are now available from Messrs. Cossors, EMI, Marconi Instruments and Solartron. The cathode-ray tubes are mostly of the post-deflexion acceleration type and run at voltages of 6–10 kV., amplifier band-widths are 10–20 Mc./s., and the deflexion sensitivity at full gain is about 100 mV. per cm. This specification is adequate for all but the fastest applications, and for these, two manufacturers are offering oscilloscopes with distributed amplifiers having a band-width from

d.c. to 40 Mc./s. Messrs. Cossor and Heathkit showed kits of parts that can be assembled to make items of test gear such as valve-voltmeters and simple oscilloscopes. The kits normally employ printed circuits, which simplify the wiring, and can be assembled with semi-skilled labour. A wide variety of silicon devices are now available, and Messrs. Ferranti showed a range of silicon photo-voltaic cells; these have a response time in the microsecond region and have applications in equipments using modulated light. The new cells have a high conversion efficiency and in the larger sizes can be used as solar cells to provide electrical energy from sunlight.

This annual exhibition continues to be well attended and it provides an opportunity for scientific workers in the north-west of Britain to keep abreast of current electronic equipment and components.

V. H. ATTREE

UNITED KINGDOM CIVIL SERVICE COMMISSION

THE ninety-third annual report of the Civil Service Commissioners, covering the year April 1, 1958–March 31, 1959, records an increase in the number of candidates successful in open competition from 13,057 to 14,616, but for the administrative class the number of successful candidates decreased from 39 to 37, though well above the 1956–57 figures, and some departments were short of recruits, although the number of unfilled vacancies is not large (Report of Her Majesty's Civil Service Commissioners for the period 1st April, 1958 to 31st March, 1959. Pp. 36. (London: H.M. Stationery Office, 1959.) 2s. 6d. net).

The Commissioners are continuing their efforts to attract a larger number of good candidates from the universities. Candidates in the limited competition for the administrative class further decreased in number. Recruitment to the senior branch of the foreign service was also disappointing, and the shortage of candidates for the statistician class persists. Less than 50 per cent of the declared vacancies as patent examiner have been filled and there was again a shortage of good candidates for scientific officer, engineering and draughtsmen posts, and many vacancies remain unfilled, particularly through a

dearth of physicists. Grave shortages remain in the telecommunications and other electronic fields; however, there was a small increase in the number of candidates in the senior scientific officer competition and most of the vacancies which had been notified were filled.

Applications in the assistant experimental officer/experimental officer competition remained remarkably steady and generally sufficient candidates were successful to meet departmental needs. The supply of biologists again exceeded the limited demand. The research fellowship competition continued to attract interest from workers in all fields of research, and thirteen candidates were offered the award. There is some evidence that it is becoming harder to attract good applicants for junior fellowships.

Results of interviews in Ottawa and Washington in April 1958 to select applications for research fellowships and scientific officer posts were less satisfactory than originally appeared likely, and in the event only one candidate joined the Service as Research Fellow and one as a senior scientific officer, although some well-qualified men appear to have been stimulated to return to Great Britain in the universities or in industry.

EUROPEAN NUCLEAR ENERGY RESEARCH

THE seventh annual report of the Netherlands–Norwegian Joint Establishment for Nuclear Energy Research*, describing the work of the Establishment during the period July 1, 1957–June 30, 1958, mentions that the research reactor, *Jeep*, was in almost continuous operation at 450 kW. during the year, with a total release of heat of 105.6 MW. days, but that the corrosive effects of the heavy water have grown worse and a minor leakage of heavy water occurred during April. The completion of the Halden boiling water reactor, which is an Institutt for Atomenergi project and which is situated inside a rock excavation near the paper pulp factory, Saug-

* Seventh Annual Report, July 1957–June 1958, of the Netherlands–Norwegian Joint Establishment for Nuclear Energy Research. Pp. 32. (Kjeller near Lillestrøm: Netherlands–Norwegian Joint Establishment for Nuclear Energy Research, 1959.)

brugsforeningen, will be delayed by about a year because of construction and design problems. The reactor tank was completed during the spring of 1958. The necessary amount of heavy water which was purchased from the United States of America is now stored at Halden, and part of the uranium ordered from Great Britain has been delivered. An agreement between Norway, Denmark, Sweden, Austria, Great Britain, Switzerland and Euratom, on the joint operation of the reactor, was signed by representatives on June 11, 1958.

Because of the higher demand for radioisotopes, and technical improvements in the production system, the number of isotope deliveries from Kjeller to customers outside the Establishment increased by 33 per cent over the previous year. The deliveries

were mainly to the Scandinavian countries. Detailed information about the type of isotopes produced and their distribution is given in the report. Separate sections deal with the activities of the Chemistry, Metallurgy, Reactor Engineering, Physics and Health Physics Divisions. The chemical analysis of uranium and D_2O is now carried out on a routine basis and the spectrographical methods used for impurity control of medical isotope products and the determination of plutonium have been improved. The main task of the metallurgical group has been the production of UO_2 pellets, and in addition to considerable computational work and experimental tests connected with the Halden boiling water reactor project, the Physics Division has obtained new neutron diffraction data on U_3O_8 and U_4O_9 . The Health Physics Division is responsible *inter alia* for the daily radiation monitoring in the laboratories; the radiochemical analysis of biological specimens; and the general medical check-up of personnel. Of the 191 persons controlled by the Division during the year, only one received a radiation dose exceeding 5 rems.

The Netherlands-Norwegian Reactor School was officially opened on April 12, and the first nine weeks standard course commenced on April 14 with twenty-eight students: fifteen from Holland, eleven from Norway and two from Switzerland. The construction of the new isotope building was started in January, and of an office building to house the ship propulsion group and the Engineering Division in April. As in former years, the Establishment benefited from the exchange of scientists with similar institutions in other countries. Seven guest scientists worked at the Joint Establishment for Nuclear Energy Research for the whole or part of the period under review. The two sponsoring organizations of the Establishment, the Reactor Centrum Nederland and the Instituut for Atomenergi, took part in international co-operation in the field of atomic energy, in particular, in the European Atomic Energy Society, the Organization for European Economic Co-operation, and the International Atomic Energy Agency. Summaries of the main activities of the two organizations are given in the appendixes to the annual report.

THE FRANKLIN INSTITUTE

THE Board of Managers of the Franklin Institute in presenting their annual report for 1958 (*Journal of the Franklin Institute*, 267, 317; April 1959) express their gratification at the progress during the year in all the Institute's programmes of service to science, but point out that without increased funds the Institute cannot expand and may not be able to maintain its present activities. In addition to the Franklin Institute Laboratories and the Computing Center, both located in Philadelphia, the Institute owns and operates the Bartol Research Foundation in Swathmore, Pennsylvania, and is trustee for the Biochemical Research Foundation in Newark, Delaware. The Institute conducts basic and applied research on a contract basis for government, industry and private concerns, and the Computing Center co-operates with the Laboratories which carry out projects under contract in the fields of engineering and the physical sciences. The Bartol Foundation is concerned with the study of fundamentals in physics, low-energy exploration and cosmic phenomena, and the Biochemical Foundation with cancer research.

It was to be expected that public interest in the activities of the International Geophysical Year, and in rockets, satellites and space travel, would largely colour the work of the Education and other divisions of the Institute during 1958. Of the twenty-one lectures presented at the Institute meetings during the year, eight were on subjects related to the space age; the exhibit, "Progress of Time", contributed to the Institute's Science Museum by the Hamilton Watch Co., included the Mars Space Clock, and other loan exhibits showed the successful launching of the *Explorer* rocket, the *Vanguard* satellite, and the *Pioneer* lunar probe; new presentations in the Planetarium were "The American Satellite" and "Astronomy in History", and the staff of the Planetarium were responsible for the operation of the Institute's Moonwatch Station; and the series of ten semi-technical lectures on astronautics sponsored by

the Astronomy Department were published in December as Monograph No. 6 entitled "Ten Steps into Space".

The Library of the Institute, which began as a small collection in 1824, now comprises 162,054 volumes, of which 3,054 were acquired during 1958—986 by purchase, 544 by gift and 1,524 by binding. New accessions included eighteen Russian periodicals, four in translated English editions, and a remarkable set of the owners' file copies of records and correspondence of the Penang Sugar Estates Co. (British Malaya), comprising twenty-three handwritten volumes of the work of the Company during 1876–97. A symposium on "Thermoelectric Effects" was held on September 8, primarily for research workers in this specialized field, and an all-day symposium on "Odour" on October 21 during the "Cleaner Air Week" in Philadelphia. Three new titles were added to the series of monographs published under the auspices of the *Journal*: "Particulate Emission", "The Airways Modernization Board—Its Mission and Methods" and "Ten Steps into Space" mentioned above.

Details are given in the illustrated report of the long-range research programmes and new developments of the separate research organizations. These include air-pollution research; thermoelectricity and semiconductors; electron microscope studies of dislocations in metals and zone refining of reactive metals; the physics of polymers; and flow loops in nuclear engineering. A novel etching technique has been developed for studying dislocation loops generated in metals under stress and their motion and growth in zinc have been filmed (*Journal of the Franklin Institute*, 267, 335; 1959). A simple sonic-vibration method for the early detection of glaucoma has been demonstrated and an all-transistorized sensitive cane for use by the blind has been successfully tested. The report concludes with brief details of the finances of the Institute, the membership and staff.