flush the spark chamber of a direct reading instrument) increased the impurity-levels of oxygen and water vapour in the gas and this contamination could cause erroneous results in the analysis of steels containing more than 1 per cent of silicon. Replacement by copper tubing and purification of the argon over heated magnesium reduced impurity-levels to 7 and 1 parts per million of water vapour and oxygen respectively, and these levels allowed satisfactory analyses for carbon, silicon, phosphorus, manganese and tin in the steels.

The chairmen during the symposium—E. H. S. van Someren (British Welding Research Association),

F. R. Bareham (Aluminium Laboratories, Ltd.), H. T. Shirley (Brown-Firth Research Laboratory) and W. Ramsden (Applied Research Laboratories)—successfully supervised the discussion which arose after the papers. Both the comments made then and at more informal sessions showed the values of such a gathering as a means of exchanging information on common problems, but some disappointment was expressed that very few of the more junior analysts were present to profit from hearing the various points of view. It is expected that the papers and comments will be published by Hilger and Watts later this year. L. BOVEY

THE ONTARIO RESEARCH FOUNDATION

THE annual report for 1961 of the Ontario Research Foundation* includes the reports of the director, Dr. A. D. Misener, and the director of research, Dr. A. E. R. Westman, together with the accounts, lists of scientific and technical papers published in 1961 and of professional and technical staff. Dr. Misener claims that in all categories the growth of research and development in Canada is substantial and compares favourably with the rate of growth in the United States and the United Kingdom. During 1956–58, that financed by industry itself in Canada increased by about 20 per cent per annum; in the same period the Foundation's contract research for industry increased by 22 per cent per annum, but research expenditure by both Government and industry is low by a factor of 3–4 when expressed as a percentage of the gross national product, and in research performed by industry but financed by Government is low by a factor of 11 compared with the United Kingdom and 19 compared with the United States.

Dr. Westman notes an overall expansion in sponsored research in 1961, particularly in chemistry, a reduction in science activities, particularly in engineering and metallurgy, and difficulties in recruiting junior staff. The Department of Biochemistry

* Ontario Research Foundation. Annual Report, 1961. Pp. 64. (Toronto: Ontario Research Foundation, 1962.)

concluded a study of the effect on the serum cholesterol-level in rats of a diet containing hydrogenated sunflower oil, but a new investigation was commenced on the effect of agitation on the isomeric fatty acids produced in hydrogenation. Basic research was continued in the Department of Chemistry on the study of stereo-specific catalysts for polymerization and the mechanism of the polymerization of butene by the heterogeneous catalyst aluminium triisobutyl-titanium trichloride, as well as work on phosphate glasses, while in physical metallurgy, unsponsored research included studies in metal physics, the magnetic properties of iron ore and copper alloy surfaces. The Department of Parasitology completed a study of the throat bots of deer and established the mode of transmission of 'brain worms' of deer with certain land snails as intermediate hosts. A survey of fish parasites in lakes was extended, and a new study on a warble fly, the larvae of which live under the skin of certain wild animals, showed that the activity of the animal is reduced if it harbours many of these parasites, which may cause death directly or make the animal unable to escape predators. The Department of Physiography made further examination of the Algonquin Lake plain, and in the Department of Textiles unsponsored research was concerned with the chemical modification of cotton cellulose, wool and hair to give improved fabrics.

ENGINEERING DEVELOPMENTS IN THE BRITISH BROADCASTING CORPORATION

THE excellent series of monographs describing the work of the Engineering Division of the British Broadcasting Corporation (*Nature*, 191, 1355; 1961), has been supplemented by five further issues* since September 1961.

As their titles indicate, these monographs deal with a range of subjects from basic research in the

techniques necessary for a high-quality broadcasting service, to the actual design and development of the equipment installed at the steadily increasing number of transmitting stations in Britain.

In Monograph No. 39, the director of engineering, B.B.C., Sir Harold Bishop, presents a comprehensive review of the development of the television service in Britain, starting with a reminder of the early history of the subject, thus: "Although all the fundamentals of an electronic transmitting and receiving system were put forward by A. A. Campbell-Swinton in his famous letter to *Nature* as far back as June 1908 [Vol. 78, 151], no practical realization of his proposals was attempted until the early 'thirties'".

The earliest B.B.C. television transmissions started in 1926 when pictures from John Logie Baird's

* B.B.C. Engineering Monograph No. 38: "Operational Research on Microphone and Studio Techniques in Stereophony", D. E. L. Shorter. Pp. 23. No. 39: "Twenty-five Years of B.B.C. Television", Sir Harold Bishop. Pp. 41. No. 40: "The Broadcasting of Music in Television". Part I, Introduction, R. F. A. Pottinger. Part II, Sound and Vision, L. Salter. Part III, Operational Technique, E. G. M. Alkin. Part IV, Acoustic Treatment of Television Studios, C. L. S. Gifford, pp. 23. No. 41: "The Design of a Group of Plug-In Television Studio Amplifiers", K. J. Austin. Pp. 19. No. 42: "Apparatus for Television and Sound Relay Stations", F. A. Peachey, R. Toombs and D. L. Smart. Pp. 22. (London: British Broadcasting Corporation, 1961 and 1962. 5s. each.)

laboratory were radiated experimentally; but for nearly ten years thereafter there was much divergence of opinion among engineers and scientists as to the most effective means of scanning a picture or scene, and as to the band-width required in the radio-spectrum for its transmission. However, what has since been generally conceded to be the best public television service in the world was formally opened by H.M. Postmaster-General on November 2, 1936. Sir Harold Bishop's monograph describes in a most interesting manner the fundamental techniques of the British television system, the growth and progress of the public service over the past quarter of a century, together with a brief review of current and future development. In the latter connexion, reference is made to research in colour television, and the problems which will be encountered in the extension of television broadcasting into the ultra-high-frequency bands, and the use of a 625-line scanning standard. This monograph is illustrated with 14 plates, four of which are in colour.

With the extension of the sound and television broadcasting service towards the objective of full national coverage, limitations of staff have made it necessary for the B.B.C. to develop remote and automatic control facilities for unattended relay stations. Monograph No. 42 describes the development of such stations, which vary in radiated power

from a few watts to several kilowatts, and derive their programme modulation 'feed' either by direct line or radio link, or by normal broadcast reception from the appropriate regional transmitter. Some eleven such stations are in service, and another fourteen are under construction; many of these are in remote areas where difficulties have been experienced by the listening and viewing public in obtaining satisfactory reception. With regard to maintenance, the B.B.C.'s plan is for a regular call to be made by an engineer at each of the new unattended stations. While attempts are made to anticipate a breakdown, such as the replacement of a valve seen to be approaching the end of its useful life, no steps are taken towards major repairs in the field. When necessary, the faulty unit is removed and replaced by a spare; a practice which causes the minimum disruption to the service.

The work described in these and other monographs indicates the realization by the B.B.C. of its responsibility to provide the best and most complete national broadcasting service from a technical point of view; and to take all practicable steps to keep this service up to date. With the encouragement given in the Government's recent White Paper (H.M.S.O., Cmd. 1770, July 1962), it can be confidently expected that the service will continue to develop in the future on the existing high standard. R. L. SMITH-ROSE

THE JOHN INNES INSTITUTE

THE satisfactory progress made in genetical studies of various economic plants is recorded in the annual report of the John Innes Institute*, and work on cellular mechanisms is aided by the Department of Cell Biology—now a functional unit.

The long-term project of improving varieties of apples has continued, and there is hope eventually of selecting seedlings with resistance to both scab and mildew. The work on selection of cherry varieties has been helped by the discovery that inoculation of the bacterial canker organism into 2-year-old wood in December give results closely resembling those found in the field, and progress has been made in development of reliable methods of testing the resistance of first-year seedlings. Some selections of strawberries show resistance to mildew and give heavy yields of large fruit. It is hoped to combine these attributes with good quality and resistance to other diseases. The possibility of breeding tomatoes resistant to tobacco mosaic virus is being explored; but the occurrence of symptomless carriers is a drawback because a commercial variety with complete tolerance of the virus is undesirable since it is a reservoir of infection.

In the Department of Genetics investigations of genetic control of the enzyme triphosphopyridine nucleotide-linked glutamic dehydrogenase of *Neurospora crassa* has been continued, and methods developed for obtaining pure preparations. Work has continued on the mechanisms of recombination and mutation in *Ustilago maydis* and mutability in *Antirrhinum majus*. From a stock of tomato seed stored at 27°C for 14 years it has been established that there is a much higher incidence of rogues from

plants grown from old seed than among those raised from one-year-old seed. Prolonged storage of seed also affected earliness but not total yield of fruit.

In the Department of Potato Genetics advances have been made in classification of cultivated varieties and an extensive range of behaviour has been revealed in the interspecific relationship of Central American wild species. Assessment of scab resistance has been advanced by perfection of a pot test which gives results comparable with field trials. Some scab-resistant clones have been revealed in *Andigena* stocks and it is hoped to transfer this resistance to a *Tuberosum* background.

The main theme of research in the Department of Cell Biology has been the examination of the structure and function of the ribonucleic acid of the nucleus. There is evidence that nuclear RNA is not necessarily a precursor of the cytoplasmic RNA but is mainly broken down within the cell to low-molecular weight compounds.

The growth rooms and cabinets developed in the Department of Physiology and Plant Culture are now in routine use for various investigations. One of these is the effect of temperature and light-intensity on the development of the shoot apex of the tomato. Considerable enlargement of the shoot apex always takes place during the vegetative phase before the first inflorescence is initiated. The processes of formation of leaf primordia and apical enlargement appear to be independent. More leaves are produced at 25°C before flowering than at 15°C, and the number of extra leaves produced is greater the lower the light-intensity. Experiments have been initiated to define more precisely the nature of the rogue characters in tomato and to express it in quantitative terms.

* John Innes Institute. Fifty-second Annual Report, 1961. Pp. 42. (Bayfordbury, Hertford: John Innes Institute, 1962.) 5s.