scheme began with a period of three weeks pre-entry training in which the change-over from school to work was cushioned and gave the boy and girl some idea of the shape and importance of the firm and of its general organisation. The boy's first job as a messenger lasted eight months, and during this time he obtained more information about individuals, departments and processes. The next phase of training was given in the workshops, when suitable boys were selected as craft apprentices. Junior operatives were then placed in production departments until they were called up for National Service; but during this time they would be given experience in at least three departments as well as opportunities for attending educational institutions on one day a week.

The director of training at Stewarts and Lloyds, Ltd., Mr. Graham Satow, then outlined a scheme for training craft apprentices and suggested re-introduction of the formal method of 'agreements'. Training should include both technical and general aspects, and should be the joint responsibility of the firm and the local education authority. For the more able apprentice, education up to the ordinary and higher national certificate standards should be provided, while for the craftsman who was good with his hands a less academic examination should be instituted. Practical training should be done by the firm, and should include experience in the use of hand and machine tools as well as the actual jobs associated with the boy's future work. Selected craft apprentices should be given both the opportunity of moving up to the technical apprentice-level and of sitting for State technological scholarships.

In opening a discussion on the training of technical apprentices, Mr. Cleghorn Thomson, chief education officer of Richard Thomas and Baldwins, Ltd., indicated that these would generally be recruited from grammar school boys of matriculation standard. His suggestions for training this type of apprentice presupposed that ultimately the heads and chief assistants in the chemical, metallurgical and fuel departments of the larger works would all be honours degree men, or associates of the appropriate professional bodies, that ordinary degree men would be in charge of the main sections under them, and that foremen testers and senior chemists and testers should have at least higher national and national certificates, respectively. Training of technical apprentices in the works should provide progressive movement linked up with their theoretical studies and success in examinations. The period of training would last about five years and would include time spent in other firms. During the ensuing discussion the doubt was expressed whether it would be practicable to insist on matriculation as the prerequisite for this type of entrant to industry, while the need for universities to provide more facilities for part-time studies was strongly advocated.

The training of clerical workers was introduced by Mr. D. R. O. Thomas, chief education officer to the United Steel Companies, who emphasized that this was an aspect of industrial training which had not been given the attention that its importance required and merited. The national certificate in commerce had not yet gained wide acceptance mainly because it had not been sponsored by any single authoritative body. This situation may be altered after the Carr–Saunders Committee, which is deliberating at present, has reported. The training should include preliminary instruction in the history and organisation of the firm, practical training in various departments and, concurrently with the practical training, theoretical training at a commercial college which should not be over-weighted on the vocational side. In summing up this particular session, the chairman insisted that the training provided "must wipe out that unfortunate figure, the routine clerk keeping up appearances on a miserable pittance".

Probably the most difficult subject at the Conference, training in the small firm, was tackled by Mr. A. Roebuck, technical director of Hadfield's, Ltd. Training in the small firm is as necessary as in the big firm, and Mr. Roebuck believed that this would be achieved if small firms would co-operate in groups on a trade or geographical basis. This is already happening in some parts of Great Britain, and in order to extend training facilities throughout the country it is proposed to set up local committees in various steel-making areas to help in the organisation of suitable training schemes. In this way large and small firms would be able to help each other, the small firm often making a contribution to training which was impossible in the bigger firm.

In surveying the work of the Conference, Mr. Geoffrey Summers, director of John Summers and Sons, Ltd., emphasized that all technical training needed to be reinforced with social and humanistic education in which young industrial workers should be taught how to make their leisure a period of profitable active enjoyment.

The Conference closed on an evangelical note with the following remarks by Mr. G. Steel. "We must proselytize. We must make everyone training-conscious. For the welfare of our own industry and the country as a whole, it is essential that we succeed. Only thus can we ensure that the best possible use is made of our strictly limited resources."

These words, and the calling of the Conference, indicate the way in which the iron and steel industry in Britain is adjusting itself to become more and more efficient in a world that daily grows more competitive.

T. H. HAWKINS

POTATO VIRUS X

THE drastic roguing which is performed on crops of potatoes for seed has resulted in a reduction of the amount of the more obvious viruses leaf-roll and rugose-mosaic. Potato virus *X*, however, causes a slight mottle of the foliage which is noticeable only under certain conditions of weather, and may often be missed by the roguers. F. C. Bawden, B. Kassanis and F. M. Roberts conclude, in a recent paper (*Ann. App. Biol.*, 25, No. 2, 250–265; June 1948), that the control of virus *X* must involve methods additional to those of field inspection. Presence of the virus in a stock of potatoes can be tested by inoculation to indicator plants and by serological methods. Spread of the virus is slow under natural conditions, and the authors conclude that the maintenance of stocks from which virus *X* has been eliminated by testing is feasible under commercial conditions. The virus reduces yield by 5–24 per cent; but it is refreshing to find the idea of clonal selection also considered along with questions of yield and loss due to virus.

Potato virus *X* is shown by F. M. Roberts (*Ann. App. Biol.*, 35, No. 2, 266–278; June 1948) to be transmitted by contact of leaves or roots. About ten per cent of healthy plants in contact with diseased

ones become infected, and the more virulent strains of the virus spread more rapidly than the less virulent ones. The rate of spread is much greater in tomato than potato plants. *Datura stramonium* and tomato, indeed, become infected when grown in soil containing only sap or residues from virus-infected plants. The fungus *Rhizoctonia solani* cannot effect transfer of virus *X*.

Variations in the properties of virus *X* have been studied by F. C. Bawden and A. Kleczkowski (*J. Gen. Microbiol.*, 2, No. 2, 173; May 1948). Concentration of the virus extract by high-speed centrifugation or precipitation with acids and salts results in an insoluble form of the virus which is, nevertheless, infective and serologically active. Ribonuclease readily hydrolyses the nucleic acid derived from virus *X*, but has no action on the active virus.

FORTHCOMING EVENTS

*(Meeting marked with an asterisk * is open to the public)*

Monday, March 28—Wednesday, March 30

CHEMICAL SOCIETY (joint meeting with the CHEMISTRY DIVISION of the ATOMIC ENERGY RESEARCH ESTABLISHMENT, at Rhodes House, South Parks Road, Oxford).—Symposium on "The Chemistry of the Heavy Elements".

Tuesday, March 29

MANCHESTER GEOGRAPHICAL SOCIETY (in the Geographical Hall, St. Mary's Parsonage, Manchester), at 6.30 p.m.—Mr. Wm. A. Singleton: "Impressions of Sweden".

INSTITUTION OF THE RUBBER INDUSTRY, LONDON AND DISTRICT SECTION (at Caxton Hall, Caxton Street, London, S.W.1), at 7 p.m.—Prof. H. W. Melville, F.R.S.: "Redox Polymerization". (Members of the Plastics Group of the Society of Chemical Industry are invited.)

PHARMACEUTICAL SOCIETY, MANCHESTER, SALFORD AND DISTRICT BRANCH (in the Council Chamber, Houldsworth Hall, Manchester), at 7.45 p.m.—Dr. C. Melville, Mr. H. Steinman, Mr. J. B. Lloyd and Mr. H. Burlinson: Papers on "Different Aspects of Pharmacy".

Wednesday, March 30

PHYSICAL SOCIETY, COLOUR GROUP (at the Royal Photographic Society, 16 Princes Gate, London, S.W.7), at 3 p.m.—Ninth Annual General Meeting; at 3.15 p.m.—Discussion on "Photoelectric Spectrophotometers and Tricolorimeters" (to be opened by Dr. T. Vickerstaff)

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY, CHEMICAL SECTION (at the Portico Library, Mosley Street, Manchester), at 5.30 p.m.—Dr. Hill: "Chemistry at the Shirley Institute".*

ROYAL INSTITUTE OF CHEMISTRY, LONDON AND S.E. COUNTIES SECTION (joint meeting with the BRITISH ASSOCIATION OF CHEMISTS and the ASSOCIATION OF SCIENTIFIC WORKERS, at Gas Industries House, 1 Grosvenor Place, London, S.W.1), at 6.15 p.m.—Discussion on "Part-time Education in Chemistry".

Wednesday, March 30—Friday, April 1

INSTITUTE OF METALS (at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, on March 30 and 31, and at 4 Grosvenor Gardens, London, S.W.1, on April 1), at 10 a.m. each day—Annual General Meeting.

Thursday, March 31

CHEMICAL SOCIETY (at Burlington House, Piccadilly, London, W.1), at 2.30 p.m.—108th Annual General Meeting; at 3.30 p.m.—Sir Ian Heilbron, F.R.S.: "Concerning Amino-acids, Peptides and Purines" (Presidential Address).

ROYAL SOCIETY (at Burlington House, Piccadilly, London, W.1), at 4.30 p.m.—Scientific Papers.

MINERALOGICAL SOCIETY (at the Geological Society, Burlington House, Piccadilly, London, W.1), at 5 p.m.—Scientific Papers.

TEXTILE INSTITUTE (at 16 St. Mary's Parsonage, Manchester), at 7.15 p.m.—Mr. H. Marsden: "Nylon Yarn Processing in U.S.A.".

Thursday, March 31—Monday, April 4

BRITISH PSYCHOLOGICAL SOCIETY (at Bristol).—Annual General Meeting.

Friday, April 1

CHEMICAL SOCIETY (joint meeting with the CHEMISTRY DIVISION of the ATOMIC ENERGY RESEARCH ESTABLISHMENT, at the Institution of Civil Engineers, Great George Street, London, S.W.1), at 9.30 a.m.—Discussion on "The Use of Radioactive Tracers in Chemistry".

SOCIETY OF PUBLIC ANALYSTS AND OTHER ANALYTICAL CHEMISTS, PHYSICAL METHODS GROUP (in the Chemistry Lecture Theatre, The University, Highfields, Nottingham), at 3.30 p.m.—Discussion on "Electrophoretic Analysis".

INSTITUTION OF MECHANICAL ENGINEERS, APPLIED MECHANICS GROUP (at Storey's Gate, St. James's Park, London, S.W.1), at 6 p.m.—Dr. F. P. Bowden, F.R.S.: "Seizure of Rubbing Surfaces"; Dr. J. R. Bristow: "The Measurement of Kinetic Boundary Friction or the Experimental Investigation of 'Oiliness'".

ROYAL STATISTICAL SOCIETY, LONDON GROUP of the INDUSTRIAL APPLICATIONS SECTION (at the E.L.M.A. Lighting Service Bureau 2 Savoy Hill, Strand, London, W.C.2), at 6 p.m.—Mr. C. Wainwright: "Statistical Principles in Quality Specifications for Plastics".

SOCIETY OF CHEMICAL INDUSTRY, MANCHESTER SECTION (at the Engineers' Club, Albert Square, Manchester), at 6.45 p.m.—Mr. H. V. Potter: "Synthetic Fibres" (Jubilee Memorial Lecture).

ROYAL INSTITUTION (at 21 Albemarle Street, London, W.1), at 9 p.m.—Prof. S. Tolansky: "The Examination of Crystal and Metal Surfaces using Interferometry".

APPOINTMENTS VACANT

APPLICATIONS are invited for the following appointments on or before the dates mentioned:

PHYSICAL CHEMISTS (Scientific Officer grade) at a Ministry of Supply Research and Development Establishment near London, for duties in (*a*) high temperature refractories, (*b*) crystallography and practical microscopy, (*c*) spectrography, and (*d*) plant development—The Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting F.1025/48A (April 2).

SENIOR SCIENTIFIC OFFICERS and SCIENTIFIC OFFICERS (with a good honours degree, or equivalent, in physics, and an interest in photography from high-speed aircraft and in air survey photography) at the Royal Aircraft Establishment, Farnborough, Hants—The Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting A.43/49A (April 2).

RESPONSIBLE LECTURER IN MECHANICAL ENGINEERING, and a LECTURER IN MATHEMATICS—The Principal, Royal Aircraft Establishment Technical College, Farnborough, Hants (April 2).

PHYSICISTS (Senior Scientific Officer and Scientific Officer grades) in Ministry of Supply Research and Development Establishments in South England and South Midlands—The Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting A.42/49A (April 2).

SENIOR EXPERIMENTAL OFFICER in Ministry of Supply Headquarters, London, for the co-ordination of thermionic valve requirements and supervision of an information service on valves for Government Departments and associated organisations—The Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting D.69/49A (April 2).

LECTURER (qualified to teach up to B.Sc. general degree standard in Mathematics) IN THE PHYSICS AND MATHEMATICS DEPARTMENT—The Clerk to the Governors, South-East Essex Technical College and School of Art, Longbridge Road, Dagenham (April 2).

SENIOR ASSISTANT IN PHYSICS at the Bradford Technical College—The Director of Education, Town Hall, Bradford (April 2).

VENTILATION ENGINEER in the Production Department at the Board's Headquarters in London—The National Coal Board, Establishments (General) Branch, Hobart House, Grosvenor Place, London, S.W.1, endorsed TT/126 (April 4).

LECTURER (Grade IIb) IN INDUSTRIAL METALLURGY—The Secretary, The University, Birmingham 3 (April 9).

ENGINEERS or PHYSICISTS IN THE HYDRAULICS RESEARCH ORGANIZATION (Department of Scientific and Industrial Research) for work in connexion with the design and development of new instruments for hydraulics laboratory and oceanographic research—The Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting A.51/49A (April 9).

PRINCIPAL SCIENTIFIC OFFICER (Ref. F.134/49A) to be responsible, under the Superintendent, for research on chemical, physical and engineering problems of flax cultivation and processing, a SENIOR SCIENTIFIC OFFICER or SCIENTIFIC OFFICER (Ref. A.36/49A) for research in connexion with fibre grading and testing, etc., a SCIENTIFIC OFFICER (Ref. F.135/49A) to undertake research into some aspects of chemical and biological retting, etc., a SENIOR EXPERIMENTAL OFFICER or EXPERIMENTAL OFFICER (Ref. F.136/49A) to take charge of the chemical testing and analytical section, and an EXPERIMENTAL OFFICER or ASSISTANT EXPERIMENTAL OFFICER (Ref. A.37/49A) to take charge of the technical library and information section, at the Norfolk Flax Establishment, King's Lynn—The Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting the appropriate Ref. No. (April 9).

DIRECTOR OF THE MARINE BIOLOGICAL STATION which is being established at Bangor to develop the facilities for the study of Marine Biology within the University of Wales—The Secretary and Registrar, University College of North Wales, Bangor (April 9).

LECTURER IN AGRICULTURAL ZOOLOGY—The Secretary of University Court, The University, Glasgow, W.2 (April 12).

SENIOR BIOCHEMIST to direct the research activities of a cell metabolism unit at the Australian Institute of Anatomy, Canberra—The Chief Medical Officer, Australia House, Strand, London, W.C.2 (April 14).

LECTURER IN PHARMACOLOGY—Prof. J. H. Gaddum, Pharmacology Department, The University, Edinburgh (April 15).

ASSISTANT IN THE DEPARTMENT OF NATURAL PHILOSOPHY, University College, Dundee—The Secretary, The University, St. Andrews (April 15).

LECTURER (Grade III) IN GEOGRAPHY—The Registrar, Queen Mary College, Mile End Road, London, E.1 (April 22).

CHEMIST to assist in research with radioactive isotopes—The Secretary and House Governor, Royal Cancer Hospital, Fulham Road, London, S.W.3 (April 22).