

conventional electron-gun with parallel wire grids which, for measurement purposes, are placed before and after the lens to be tested. All the lens characteristics are deducible from measurements made on shadows cast by these measuring grids upon a fluorescent screen placed in the electron beam at a suitable distance from the gun.

The measured characteristics of the electron lenses are presented in the form of object-image distance curves termed p - q curves. These show the relation between object distance and image distance for any ratio of the voltages applied to the electrodes; they also show the lateral magnification associated with any combination of object and image distances. These curves are a graphical presentation of the complete solution of the lens formulae and they give immediately and directly the relation between all quantities necessary for lens design. The p - q curves further show the interrelation between all the operating characteristics, the quantities involved being object distance, image distance, lateral magnification, and voltage ratio. The object distance (p) is the distance from some reference plane in the lens structure to the point from which the rays emanate. The image distance (q) is the distance from the same reference plane in the lens structure to the point on which the rays are focused. The lateral magnification is the ratio between the height of any corresponding portions of image and object. The voltage ratio is the ratio of potentials on the two components of the electrode structure calculated on the basis of zero potential at the point at which the electron velocity is approximately zero, usually at the cathode. It is only the ratio of potentials and not the absolute magnitude that is of importance, since electron paths are independent of the scale of the potential for the same starting conditions. For completeness, the lens characteristics are also presented in the form of the conventional focal distance curves which show the variation with voltage ratio of the two focal lengths and of the two focal points. All the image-forming properties of the lens may be deduced from these parameters.

FORTHCOMING EVENTS

Wednesday, April 12

TOWN AND COUNTRY PLANNING ASSOCIATION (at St. Martin's School of Art, Charing Cross Road, London, W.C.2, in conjunction with the Exhibition "Reconditioning England"), at 3 p.m.—Mr. F. J. Osborn: "Preservation and Progress".

INSTITUTION OF ELECTRICAL ENGINEERS (TRANSMISSION SECTION) (at Savoy Place, Victoria Embankment, London, W.C.2), at 5.30 p.m.—Mr. G. W. Preston and Dr. H. G. Taylor: "Copper Conductors for Overhead Lines".

INSTITUTE OF WELDING (at the Institution of Civil Engineers, Great George Street, Westminster, London, S.W.1), at 6 p.m.—Dr. L. Reeve: "Factors Controlling the Weldability of Steel".

Thursday, April 13

GENETICAL SOCIETY (at the Linnean Society, Burlington House, Piccadilly, London, W.1), at 11.30 a.m.—Symposium on "The Application of Genetics to Plant and Animal Breeding".

INSTITUTION OF ELECTRICAL ENGINEERS (INSTALLATIONS SECTION) (at Savoy Place, Victoria Embankment, London, W.C.2), at 5.30 p.m.—Mr. C. A. Cameron Brown: "The Electrical Aspect of Farm Mechanization".

Friday, April 14

INSTITUTION OF CHEMICAL ENGINEERS (at the Connaught Rooms, Great Queen Street, London, W.C.2), at 11 a.m.—Twenty-second Annual Corporate Meeting; at 12 noon—Mr. F. A. Greene: "Our Title—a Reminder" (Presidential Address); at 3 p.m.—Mr. J. G. Bennett: "Coal and the Chemical Industry" (First J. Arthur Reavell Lecture).

SOCIETY OF CHEMICAL INDUSTRY (PLASTICS GROUP) (at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2), at 2.30 p.m.—Symposium on "Electrical Properties of Plastics" (Mr. H. A. Nancarrow: "A Survey of Thermal Plastics as Dielectrics"; Dr. L. Hartshorn: "The Principles of High Frequency Heating"; Mr. E. Rushton: "Tracking").

ROYAL ANTHROPOLOGICAL INSTITUTE (joint meeting with the INTERNATIONAL AFRICAN INSTITUTE) (at 21 Bedford Square, London, W.C.1), at 5 p.m.—Mrs. G. M. Culwick: "Nutrition in East Africa".

ROYAL ASTRONOMICAL SOCIETY (at Burlington House, Piccadilly, London, W.1), at 4.30 p.m.—Prof. E. A. Milne, F.R.S.: "On the Nature of Universal Gravitation".

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS (at the Literary and Philosophical Society, Newcastle-upon-Tyne), at 6 p.m.—General Discussion on "Radiological Testing" (Speakers: Sir Lawrence Bragg, F.R.S., Dr. S. F. Dorey, Dr. V. E. Pullin, Dr. H. Harris).

APPOINTMENTS VACANT

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

MASTER FOR MATHEMATICS AND SCIENCE—The Clerk to the Governors, North-East Essex Technical College and School of Art, Colchester (April 11).

WAYNEFLETE PROFESSORSHIP OF METAPHYSICAL PHILOSOPHY—The Registrar, University Registry, Oxford (April 13).

LECTURER for Degree and National Certificate subjects in MECHANICAL ENGINEERING—The Organizer of Further Education in Rugby, College of Technology and Arts, Eastlands, Rugby (April 14).

LABORATORY STEWARD in the Science Department of the Doncaster Grammar School—The Chief Education Officer, Education Offices, Doncaster (April 15).

RESEARCH WORKER (who should be a PHYSICIST with some research experience) in the Coal Treatment Laboratory of the Mining Department—The Secretary, The University, Edmund Street, Birmingham 3 (April 15).

LECTURER (preferably a woman) IN BIOLOGY—The Warden, Goldsmiths' College, at University College, Nottingham (April 15).

ASSISTANT HYDROGRAPHIC SURVEYORS by the Kenya Government Public Works Department—The Ministry of Labour and National Service, Central (Technical and Scientific) Register, Advertising Section, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. E.904A) (April 15).

PRINCIPAL of the Yeovil Art and Technical Institute—The Chief Education Officer, County Hall, Taunton (April 15).

HEADMASTER of the Junior Technical School—The Chief Education Officer, Education Offices, Doncaster (April 15).

GRADUATE ASSISTANTS (full-time) FOR MECHANICAL ENGINEERING, ELECTRICAL ENGINEERING, and a GRADUATE (or equivalent qualification) IN BUILDING OR STRUCTURAL ENGINEERING, at the Darlington Technical College and Technical School—The Chief Education Officer, Education Office, Darlington (April 15).

TEACHER (full-time) OF ENGINEERING SUBJECTS, including Electricity—The Principal, Technical and Art Institute, Queen's Road, Watford, Herts. (April 17).

ASSISTANT (full-time) to teach WORKSHOP PRACTICE, ENGINEERING DRAWING, MATHEMATICS and ENGINEERING SCIENCE, at the Jarrow Technical School and Evening Institute—The Director of Education, Shire Hall, Durham (April 19).

SENIOR AND JUNIOR ENGINEERS (MECHANICAL AND ELECTRICAL) to carry out work of national importance in a Government Department (location, London)—The Ministry of Labour and National Service, Room 432, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. C.2097A) (April 22).

RESEARCH METALLURGIST, preferably with knowledge of ENGINEERING, by well-known North Country firm specializing in the Use and Heat Treatment of High-Carbon and Alloy Steels—The Ministry of Labour and National Service, Central (Technical and Scientific) Register, Room 432, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. F.2019XA) (April 29).

PROFESSORSHIP OF ENGINEERING SCIENCE—The Registrar, University Registry, Oxford (April 30).

LECTURER (full-time) IN CHEMISTRY at the Cardiff Technical College—The Director of Education, Education Offices, Cardiff (May 1).

CHAIR OF PHILOSOPHY at the University of the Witwatersrand, Johannesburg—Dr. William Cullen, 4 Broad Street Place, London, E.C.2 (May 1).

DIRECTOR OF THE INSTITUTE OF MEDICAL AND VETERINARY SCIENCE, Adelaide—The Agent-General and Trade Commissioner for South Australia, South Australia House, Marble Arch, London, W.1 (May 31).

CHAIR OF NATURAL PHILOSOPHY, United College, St. Andrews—The Secretary, The University, St. Andrews (June 15).

LECTURER FOR BIOLOGY AND HYGIENE—The Principal, St. Katharine's College, Tottenham, at Cary Park, Babbacombe, Torquay.

LECTURER in the Junior Technical School (subjects: MATHEMATICS, SCIENCE, DRAWING)—The Registrar, Technical College, Cheltenham.

SENIOR SCIENCE AND MATHEMATICS MASTER—The Headmaster, Alleyne's Grammar School, Stevenage, Herts.

DESIGNING ENGINEER for the Steel Tube Trade in Birmingham—The Ministry of Labour and National Service, Appointments Office, 2 Calthorpe Road, Birmingham 15 (quoting Reference No. 1368).

ASSISTANT MECHANICAL ENGINEER for the Sudan—The Secretary, Overseas Manpower Committee, Ministry of Labour and National Service, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. 1302).

REPORTS and other PUBLICATIONS

(not included in the monthly Books Supplement)

Great Britain and Ireland

British Standard Recommendations for the Storage of Micro-Film (British Standard 1153—1944). Pp. 6. (London: British Standards Institution.) 1s.

Town and Country Planning Association. Forty-fifth Annual Report. Pp. 8. (London: Town and Country Planning Association.) 143