spectrographs, polarimeters, refractometers, projection lanterns, and epidiascopes, whilst the botanist will find a lengthy list of fresh and preserved material, together with microtomes and other essential apparatus. A valuable feature of the book is the inclusion of a mass of useful information interspersed at intervals, much of the apparatus being not only clearly depicted but somewhat minutely described. Thus there is a general description of the electrometric apparatus used for determining hydrogen-ion concentrations, together with details for its use and for the preparation of the electrodes. Similarly, anemometers for measuring the speed of draughts in flues, viscometers, electric furnaces, pyrometers, and also the automatic recording balance for studying the sedimentation and flocculation of soils, are well described. At the end there is a long list of text-books and works of reference, classified according to subjects, and 46 pages are devoted to chemicals and reagents-products of the British Drug Houses, Ltd. The volume is attractively bound and well illustrated.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned :—An assistant in the medical unit of the Welsh National School of Medicine—The Secretary, University College, Cardiff (June 15). A lecturer in painters' oils, colours, and varnishes at the L.C.C. Hackney Institute, Dalston Lane, E.8—The Education Officer (T.1.a.), The County Hall, Westminster Bridge, S.E.1 (June 15). A Government Inspector of Mines, Tanganyika Territory-The Private Secretary (Appointments), Colonial Office, 38 Old Queen Street, S.W.1 (June 18). An assistant lecturer in physics in the University of Sheffield-The Registrar, University, Sheffield (June 18). Junior assistants in the electricity and engineering departments of the National Physical Laboratory-The Director, National Physical Laboratory, Teddington (June 18). Visiting instructors at the L.C.C. School of Engineering and Navigation, Poplar, for the following subjects : carpentry and joinery, acetylene welding, electrical installation work, engineering workshop practice, and engineering economics-The Education Officer (T.1.a.), The County Hall, Westminster Bridge, S.E.1 (June 20). A demonstrator of physics at St. Bartholomew's Medical College-The Dean of the College, E.C.1 (June 23). A junior technical officer for the Air Ministry Technical Development Staff, to assist in development work in connexion with aeronautical instruments and small precision apparatus, with special reference to problems relating to high altitude flying-The Chief Superintendent, R.A.E., South Farnborough, Hants (June 25, quoting A.158). A head of the textile department of the Harris Institute, Preston-The Principal and Secretary, Harris Institute, Preston (June 30). A demonstrator in the department of mechanical engineering and motive power of the City and Guilds (Engineering) College-Prof. W. E. Dalby, City and Guilds (Engineering) College, Exhibition Road, S.W.7.

Our Astronomical Column.

EXPLODED WIRES.—The reports of the great American observatories in recent years make frequent mention of observations on 'exploded wires.' Those who wish for information on the nature and object of these experiments will welcome an article on the subject by Prof. H. N. Russell in the *Scientific American* for May. The wires are made of various metals or alloys and drawn out to extreme thinness. A powerful current from a condenser charged up to about 40,000 volts is then passed through them, instantly reducing them to gas. The spectra of this gas at its various stages of cooling are then photographed with the aid of a rapidly revolving mirror, the whole phenomenon lasting about 1/25,000 of a second.

From the initial brightness it is estimated that temperatures of 20,000° C. are attained. The vapour at this time is far hotter and brighter than the solar photosphere, and approximates closely to the photospheres of the hottest stars. It has been proved that when hottest and least expanded, the column of glowing gas is opaque, and gives a continuous spectrum. It is at that time a good conductor of electricity, which is given as an explanation of its opacity. A bright-line spectrum from an electric spark shows up when placed in front of the exploded wire, but is invisible behind it. On the other hand, as the gas of the exploded wire cools, the continuous spectrum weakens and disappears, and the bright lines due to the incandescent gas appear.

The two stages correspond to the spectra of the solar photosphere (hot and opaque) and of the reversing layer (cooler and transparent). It is possible to get both spectra at once by placing the wire to be

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exploded inside a wooden groove, thus retarding the expansion of the gas. The cooler gas in the outer part of the groove acts as the transparent reversing layer; the hotter gas within acts as the photosphere, and the familiar Fraunhofer lines are seen.

The changes in the spectrum of the exploded wire are similar to those in a nova, and show that the phenomena exhibited by the latter are due to the rapid expansion of the gases at its surface owing to abnormal heating from some unknown cause. These experiments have probably produced the highest temperatures and the closest approach to photospheric conditions that have yet been attained on earth.

THE POSITION OF THE AXIS OF MARS .- There are now three determinations of the position of this axis that have some claim to precision: (1) Lowell, from the polar cap; (2) W. H. Pickering, from other markings on the disc; (3) Struve, from the satellites. The question has been brought before the superintendent of the American Ephemeris, Prof. W. S. Eichelberger, as the computations for physical observations of the planets are made in that office. He has taken the opinion of several astronomers and has himself revised Struve's work of 1911, using observations up to 1924. His revision indicates that Struve's position accords well with recent observations, and further, he notes that a recent revision by Prof. W. H. Pickering gives a result much nearer Struve's position than his published result. On these grounds he has decided to use Struve's position in the American Ephemeris (and the other almanacs that use its data), beginning with the year 1931.