

made an unforgettable impression on those who knew him as a teacher and a friend. No pains were too much for him in training men for the arduous career of an engineer, and his guidance and help were freely extended to them after they had graduated. Poverty in material equipment was the lot of all engineering schools until recent times, but FitzGerald had the gift of making improvised models serve the purposes for which expensive apparatus is now widely available.

Before his retirement in 1910, largely due to the stress and strain of his constant but always unobtrusive work in Belfast, FitzGerald had the joy of framing the main lines of a modern engineering school with laboratories in the reconstituted Queen's University. His services were always freely given for the furtherance of the best interests of Belfast and its University. He co-operated heartily with the civic authorities in the foundation and development of their great technical institute, which is most happily linked with the University, and his advice was much appreciated. He took, as Fleeming Jenkin did, an active and potent interest in the improvement of the status and methods of craftsmen employed in plumbing and drainage. This was work of a kind

dear to his heart, as he loved the workman, and longed to bring all good knowledge to his aid. He was an indefatigable worker, and filled in any free periods by the pursuit and criticism of questions of the higher mathematics and the subtle riddles of philosophy. He was, moreover, an excellent classical scholar.

His brother George and he had very acute and analytical minds and foreshadowed, if they did not reveal, some of the important discoveries and now accepted theories which have made later students famous. Withal FitzGerald was one of the most modest and unselfish of men, caring not at all for credit so long as good results were secured. His main work was that of a teacher, but some papers by him on rotating discs, whirling shafts, and other abstruse subjects were published in the proceedings of scientific societies. He prepared, after barometric observations over long trails on the Mourne Mountains, an interesting map of their contours.

In 1893 he married Annie Maria Charnock. Their only child, William, joined the Royal Flying Corps early in the War and was killed on service in France. To know Maurice FitzGerald was to gain an added faith in humanity.

News and Views.

THE Colonial Office Conference at its meeting on May 27 adopted the Report of Committee A on Colonial Scientific and Research Services. The committee restricted its inquiry to the three major groups of applied science affecting the non-self-governing Dependencies—namely, medicine, agriculture with its auxiliary branches, and veterinary science and forestry. Since, however, in most of these territories agriculture, including stock-raising, is the principal occupation of the populations, the committee has dealt chiefly in its report with the organisation of the agricultural services. It recommends the constitution of a central council with a chairman appointed by the Secretary of State for the Colonies (who should be a layman), a director (who should be a scientific worker of standing), and a deputy-director (with Colonial administrative experience). The functions of the council should be to make recommendations to the Secretary of State in regard to the broad lines of research programmes, the establishment and maintenance of a chain of Imperial research stations, the creation of a clearing-house of information, the organisation of a pool of scientific workers, and the organisation and general principles of administration of a Colonial Agricultural Research Service. Liaison is to be established and maintained with the Empire Marketing Board, the Medical Research Council, and any other body already existing or set up for the prosecution and encouragement of research of importance to the Dependencies. Although the committee recommends the immediate establishment of distinct services for medical, agricultural, and forestry research, and so on, the possibility of their eventual fusion into one common research service is

not discounted. In the formation of the Colonial Agricultural Research Service the committee states that the following condition should be fulfilled: it must be well paid, the members of the service should be liable to transfer, but an officer entering the service must be safeguarded against any loss on transfer.

THE annual report for 1926 of the Imperial Institute shows the progress that has been made since the passing of the Imperial Institute Act of 1925, under the administration of the new Director, Lieut.-General Sir William Furse. The Institute is divided into two departments, dealing respectively with plant and animal products, and with mineral resources. The former, which has seven committees and is under the chairmanship of Sir David Prain, appears the more active; it has during the past year answered 920 inquiries on subjects, of which a selection are mentioned in the report; they include the prevention by planting of the migration of sand dunes in Somaliland, the utilisation of locusts for the manufacture of oil, the machinery for oil palm, and inquiries as to many vegetable products. The Mineral Resources Department during the year has answered 430 inquiries, and has a list of 16 committees. The most active development during the year has been the rearrangement of the exhibition galleries on modern museum lines, aided by contributions from seventeen out of the forty-four British Dominions and Colonies. The reserve material is being removed to store and sample rooms, where it will be readily available for examination by experts. The galleries are being devoted to exhibits of popular interest with many attractive dioramas and transparencies. An Empire Art Gallery offers to exhibit gratuitously

the works of artists from any part of the British Empire. The plan is to make the galleries 'a permanent Wembley' to arouse interest in the Empire and serve as demonstration galleries in connexion with the teaching of geography in London schools. The educational work is being aided by the grant of £6000 from the Empire Marketing Board for the equipment of a cinema, and £1000 a year for five years for its maintenance.

THE financial statement for the year shows that the Imperial Institute has an income of £43,600, of which £33,500 is required for the expenses of the staff, and £1245 for publications. The popular exhibition of material and the development of the Institute to supplement the geographical classes in London schools will not by themselves fulfil the purpose of the Institute and are not likely to secure the permanent financial support of the Dominions and Colonies. They at present contribute £21,000 a year. The statement, however, that the Mineral Resources Department is to publish reports on its investigations shows that the Institute is preparing to improve its service as an information bureau for the Empire by undertaking further investigations on the natural products of our overseas Dominions and Colonies. The permanent success of the Institute will largely depend upon this side of its work. It is discouraging to hear that, in spite of the vast size of the Imperial Institute buildings, the lack of storage space renders necessary the sacrifice of specimens, and that, as regards the Library, "unless further accommodation is provided, much valuable reference material may have to be destroyed, which would considerably affect the efficiency of the two technical departments."

THE annual meeting of the British Science Guild was held on May 26, Lord Askwith occupying the chair. The report presented by Sir Richard Gregory, chairman of the Executive Committee, described the varied work of the Guild, special reference being made to the Supplement, published during the year, to the Catalogue of British Scientific and Technical Works. The Supplement was compiled by Miss D. Shaw from the lists published monthly in *NATURE*, and its publication was aided by the Carnegie United Kingdom Trust. Sir Richard Gregory admitted the disadvantages of keeping the Catalogue up-to-date by means of annual supplements, and stated that no more supplements would be published, though the issue of a new volume might be undertaken by the Guild later. The report included the text of a leaflet prepared by the Guild's Health Committee on the important question of the medical certification of the fact of death and on the signs of death, in which three simple tests of the fact of death are described. The Guild has been fortunate in securing Sir Alfred Mond as its president in succession to Lord Askwith, whose term of office has expired. Sir Alfred Mond possesses an unusual combination of qualifications for his new work. His name is known and honoured in science, politics, and industry, and his recent achievement in forming the great chemical combine known as Imperial Chemical Industries, Ltd., must con-

tribute, directly and indirectly, to the advancement of pure and applied scientific research. But perhaps his most valuable qualification is possession of the "Yes" complex, to use his own expression, a qualification valuable in any president of a society, but especially in one with such an ambitious programme of work as the British Science Guild.

THE twelfth lecture of the series "Physics in Industry," arranged by the Institute of Physics, was given on May 25 in the rooms of the Institution of Civil Engineers, by Prof. W. E. S. Turner, professor of glass technology in the University of Sheffield. The subject was "Physics in the Glass Industry." Prof. Turner said that although individual scientific workers, among them Faraday, investigated the properties of glass, the subject received little attention in scientific institutions until very recent years. He referred to the research initiated in industrial laboratories on the processes of glass-making and on the properties of the material, and to the impetus which the War gave to these investigations, particularly on optical glass. Manufacturers have believed, and the belief is difficult to eradicate, that correct annealing depends on 'baking' the glass; but recent research on the variation of viscosity with temperature, and in particular the relationship deduced by Twyman, as well as the further investigations which followed from his observations, have shown that the rate of cooling is the important factor. These observations, and related research at the National Physical Laboratory, the University of Sheffield, and elsewhere have resulted in highly important improvements in annealing practice and economy of time in manufacture. Three of the principal physical properties of glass are providing fruitful fields of research, namely, thermal expansion, electrical conductivity, and optical properties. For example, expansion measurements as carried out at the Research Laboratories of the General Electric Company have led to improvements in the manufacture of electric lamps; while observations of the absorptive properties of glass for radiation in different parts of the spectrum have led to the introduction of special glasses for therapeutic and other purposes, for example the 'vitaglass' of Messrs. Chance Brothers.

DISCOVERIES of considerable archæological and historical importance have been made by M. F. Bisson de la Roque on behalf of the Louvre, while working under M. Georges Foucart, Director of the French Institute of Oriental Archæology, at the Temple of Madamud near Luxor. In 1925, a temple of the Twelfth Dynasty was found underneath the Greco-Roman temple, which lies a metre below the present surface, and statues of Senosrit III. and Senosrit II., as well as inscriptions, revealed the existence here of an important sanctuary of the Middle Empire. In 1926, four groups of statuary were discovered, figuring the local god of war, Montou, and his consort Ra Tooui, the first statues ever discovered of these deities, whose cult, lasting down to Greco-Roman times, evidently rivalled that of Ammon

Ra himself. A remarkable bas-relief figures a Roman family partaking of the annual ritual feast held at night. The operations of the current season, which are described by the Cairo correspondent of the *Times* in the issue of May 24, have been directed towards clearing the sacred enclosure around the Temple and its annexes, and have demonstrated the limits of the sacred lake.

THE sensational find of the past season's work, however, came from the Ptolemaic temple itself, where excavations of the interior have brought to light, from the relatively small areas as yet explored, a mass of stone fragments—panels, statues, pillars—used by the builders of the temple for their foundations. On these fragments, which were derived from older buildings formerly standing on the site, are inscriptions and sculptures of the Twelfth Dynasty and, of more importance, of the Thirteenth Dynasty, the first dynasty of the period between the Twelfth and Seventeenth Dynasties of which both historically and culturally practically nothing is known. Seven kings have left at Madamud evidence of their architectural activity, one of them a king hitherto unknown. It is said that the art of the Thirteenth Dynasty here revealed is very characteristic and quite distinct from that of the Twelfth Dynasty, though showing the same qualities of sobriety and elegance. The evidence to be obtained from this discovery, both now and after further exploration, will undoubtedly carry great weight in the discussion of Egyptian chronology and the length of the period which intervened between the Twelfth and Seventeenth Dynasties.

AMONG the greatest of recent earthquakes, whether measured by disturbed area or the range of its recorded oscillations, is that of Dec. 16, 1920, in the province of Kansu in north-west China. Yet even this great shock seems to have been exceeded in violence by that which occurred on the evening of May 22. According to a letter from Prof. Turner (*Times*, May 25), the first tremors reached Oxford at 10.32 P.M. (G.M.T.). From the records there and at four other observatories (Kew, Helwan, Hyderabad, and Perth in West Australia), he places the epicentre in lat. 35.8° N., long. 103.4° E., or near the western margin of the province of Kansu. That of the earthquake of Dec. 16, 1920, lay in lat. 35.8° N., long. 105.7° E. Eight days later, a strong after-shock occurred about 90 miles to the west, in lat. 35.5° N., long. 104.0° E. Earthquakes of the first magnitude are rarely repeated within the same origin except at very long intervals, say, a century or more, and it is interesting to notice the continued westerly migration of the focus, the distance between the origins of the great earthquakes of 1920 and 1927 being about 130 miles.

MANY readers of NATURE will regret to learn that Mr. John Jones, the Registrar of the Imperial College of Science and Technology (which includes the City and Guilds College), retires at the end of the current session. Mr. Jones became a member of the staff of the City and Guilds College when it was opened in

1884—it was then known as the Central Institution—and he has ever since been engaged in its administrative work. His influence on the students has been far reaching. He has taken a personal interest in their welfare; in fact, it is not too much to say that he has devoted the greater part of his life to this purpose, and not only has he followed closely the progress of each one of them in the College, but also, as secretary of the Appointments Board, he has helped many of them in their subsequent careers. His knowledge of the hundreds of students who have passed through the College is remarkable, and he has often astonished men who left many years ago by recalling forgotten incidents of their youth. He leaves the Imperial College with the good wishes of every one, and a deep appreciation of his work, ability, and personality will long remain in the minds of all who have been associated with him there.

RECENT acquisitions to the British Museum (Natural History) include the following: The Department of Zoology has acquired a large and very rare squid (*Stenoteuthis caroli*) which was washed ashore in March last at Scarborough. This is especially interesting, since the stranding of large Atlantic squids on the British coasts is relatively uncommon. Messrs. Lever Bros. have presented to the same Department a complete skull with baleen plates of a Blue Whale from one of their Scottish whaling stations. The specimen from which this skull was taken was a male 72 ft. long, and the skull itself measures 17 ft. 6 in. long by 9 ft. 3 in. wide. Among purchases for the Geological Department, the most important is a beautifully preserved skeleton of an ichthyosaur, nearly 13 ft. long, on a slab of Lias shale from Holzmaden, Württemberg. This is believed to represent a new species of the genus *Eurhinosaurus*, of which only one other example is known—the *E. longirostris* of the Stuttgart Museum. A band of rock in the Devonian of Gerolstein in the Eifel is famous for its crinoids (sea-lilies), but specimens with the stem attached are very rare; a slab bearing four stalked specimens of *Hexacrinus* with arms complete is therefore an unusual acquisition. The Department of Minerals has acquired a magnificent crystal of beryl (aquamarine) of gem quality, 13 cm. high, with a diameter of 10 cm. to 12 cm. and weighing 2505 grams (12,525 carats), from Brazil. This gem is exceptional in size and in the perfection of its crystalline development. Important financial assistance has been given by Mr. J. Spedan Lewis to a collecting expedition in Indo-China under M. Delacour and Mr. Willoughby P. Lowe. The results of this expedition are to be divided between the British Museum (Natural History) and the Paris Museum.

CHINA has been much in the public eye during the last few months: the notoriety achieved would suggest that the atmosphere is not very suitable for scientific work, so that we may congratulate those who have succeeded in producing a new scientific journal and extend a welcome to the first number of the first volume of the *Chinese Journal of Physiology* published in January last. It is to be issued quarterly by the

Chinese Physiological Society, and is edited by R. K. S. Lim, B. E. Read and Hsien Wu of Peking, and H. G. Earle of Hongkong. A number of papers deal with Chinese drugs and their pharmacology, including Chinese aconite, bastard anise, and ephedrine. R. K. S. Lim describes a method of anastomosing blood-vessels by means of aluminium couplers, and with C. T. Loo and A. C. Liu has used the method in transplanting the stomach or a gastric pouch in the dog. By showing that the transplant secretes to a meal they have demonstrated the existence of a humoral, as distinct from a nervous, mechanism of gastric secretion, thus confirming the results of Ivy and Farrell. H. Necheles describes a new method of vividiffusion, using tubes made of goldbeater's skin as dialysers: the method has been applied to show the presence of a gastric secretory stimulant in the circulating blood. All the articles in this number are in English, but articles in French or German will also be published: each paper is accompanied by an abstract in Chinese.

THE firm of Messrs. Ernest Benn, Ltd., has recently begun the issue of a series of booklets which "has the revolutionary aim of providing a reference library to the best modern thought, written by the foremost authorities, at the price of sixpence a volume." Of the titles which have so far been announced, one half relate to scientific subjects, namely, "Modern Scientific Ideas," by Sir Oliver Lodge; "The Age of the Earth," by Prof. Arthur Holmes; "The Atom," by Prof. E. N. da C. Andrade; "Chemistry," by Dr. P. E. Spielmann; "Relativity," by Prof. James Rice; "The Mind and its Workings," by Mr. C. E. M. Joad; "Psycho-Analysis," by Dr. Ernest Jones; and "Introduction to Economics," by Mr. L. C. Robbins. The first three of these have already appeared, and if they are representative of the series as a whole, Messrs. Benn are to be complimented on the provision of a very valuable addition to scientific literature of the popular kind. The subjects are treated in an interesting and easily comprehensible manner, and the scope of about 30,000 words is sufficient to give the reader a good general idea of the present state of knowledge and belief in the various departments of science. Sir Oliver Lodge's contribution is described as "the expanded substance of six talks on 'Atoms and Worlds,' broadcast in October and November 1926." It therefore necessarily covers in the main the same ground as Prof. Andrade's book, and it is of considerable interest to note the varying manner of treatment of the same material by two decidedly individualistic writers.

A free public lecture on "The Eclipse of the Sun" is to be given at the East London College on Tuesday, June 14, at 5 o'clock, by Sir Frank Dyson, Astronomer Royal.

THE University of California has conferred the degree of doctor of laws upon Prof. H. H. Turner, Savilian professor of astronomy in the University of Oxford.

At the annual general meeting of the Linnean Society of New South Wales, Prof. L. Harrison,

Challis professor of zoology in the University of Sydney, was elected president for the present session.

MR. H. J. PAGE has resigned his position as chief chemist and head of the Chemical Department at the Rothamsted Experimental Station on his appointment as head of the Research Laboratories of Nitram, Ltd.

At the tenth annual general meeting of the Society of Glass Technology, held in Sheffield on Wednesday, April 27, Mr. W. Butterworth was re-elected president and the following officers were elected to fill vacancies: *Ordinary Members of Council*, Mr. J. D. Cauwood, Mr. F. Graves Clark, Miss V. Dimpleby, Mr. G. V. Evers, and Mr. W. W. Warren. *Honorary Secretary*, Prof. W. E. S. Turner.

IN connexion with the meeting at Essen on June 7-19 of the Association of German Chemists (*Verein Deutscher Chemiker*) "Achema" (*Ausstellung für chemisches Apparate-Wesen*) is arranging an exhibition of chemical apparatus and appliances. The exhibition will be held in the exhibition ground in the Norbertstrasse at Essen. The offices of the "Achema" are at Seelze, Hannover, to which all communications should be addressed.

DONATIONS amounting to £250 were received by the Committee formed to found a memorial to the late Mr. F. S. Spiers, secretary of the Faraday Society and the Institute of Physics. The interest on this fund is to be available for the payment of an honorarium to a lecturer on some subject in physical chemistry, the lecture to be given once in three years and to be called the Spiers Lecture. The Faraday Society has undertaken the administration of the fund for this purpose.

THE twenty-eighth annual meeting of the American Roentgen Ray Society will be held in Montreal on Sept. 20-23, under the presidency of Dr. A. Howard Pirie, of Montreal. This is the first occasion on which the Society has met outside the United States; and, to acknowledge the honour paid to a British radiologist by his election to the presidency of the Society, a party of radiologists from Great Britain is proceeding to Montreal in September to take part in the proceedings. Dr. G. W. C. Kaye has been invited by the Society to give the Caldwell lecture.

SOME details of an exploring expedition now at work in New Guinea are contained in the *Geographical Journal* for May. The expedition, which is under government auspices, is led by Mr. C. H. Karius, and left Port Moresby for the Fly River some four months ago. The Fly was to be ascended to Lario Bank by boat, where the party were to cross overland, east of the swamps, through unexplored country to the head waters of the Fly at Palmer River and the Sepik River. Thence Mr. Karius hopes to strike across the Victor Emmanuel Range and reach the Sepik lower down and follow it to Marienburg near the mouth.

THE history of science quarterly, *Archivio di Storia della Scienza*, directed by Prof. Aldo Mieli and published at Rome by the Casa Editrice Leonardo da

Vinci (Roma, 40; Via Casalmoferrato, 29), has hitherto contained articles mainly by Italian scholars. In order to render its character more international and to widen its sphere of influence, honorary editorial representatives of other nationalities have been appointed to further the cause of the journal in their respective countries. The editor for England is Mr. E. J. Holmyard (Clifton College, Bristol), who will be pleased to receive articles for publication in the *Archivio* and also to supply any information as to rates of subscription, etc. Books for review in the *Archivio* may be sent to him, or direct to Prof. Mieli, c/o the publishers, at the above address.

AN appreciation of William Bateson by an anonymous writer (*Jour. of Heredity*, vol. 17, No. 12) gives a short account of his life and work, showing that by his death the whole scientific world suffered an irreparable loss. A photograph of Merton House, Grantchester, where he lived eleven years, is given, as well as Rupert Brooke's exquisite poem on the old vicarage. It was here that the phenomenon of coupling and repulsion was discovered in sweet peas; here also that the inheritance of the various types of combs in fowls was investigated; and that "Mendel's Principles of Heredity" was written. As the exponent of discontinuity in biology and the founder of genetics, Bateson's place is secure in the history of biology, while his personal qualities will long be an inspiration to those who knew him. The article concludes with a list of his chief published papers.

A REVIEWER in NATURE of May 21, p. 739, referred appreciatively to Bragg's crystal structure discoveries, and mentioned Sir William Bragg's name alone. The reference should, however, have been to both son and father, for both were jointly concerned with the notable work on crystal structure. Indeed, Sir William Bragg says in the preface of the joint book on "X-rays and Crystal Structure" by Prof. W. L. Bragg and himself, published in 1915: "I am anxious to make one point clear, viz. that my son is responsible for the 'reflection' idea which has made it possible to advance, as well as for much the greater portion of the work of unravelling crystal structure to which the advance has led."

A BOOKLET entitled "The Production and Distribution of Clean Milk" has been prepared by Mr. A. T. R. Mattick (*The Dairyman, Ltd.*, 43 Great Tower St., E.C. 2s. net), dealing with the essential factors for the production of clean milk. It is profusely illustrated and gives much useful information. Clean milk is of importance not only to the consumer but also to the producer, for clean milk is milk with improved keeping qualities, and much monetary loss (estimated at £425,000 per annum) falls upon the producers in Great Britain owing to souring before delivery.

"WHY Everybody should assist in fighting Disease in the Tropics" is the title of a pamphlet issued by the Ladies' Committee of the Ross Institute and Hospital for Tropical Diseases, Putney Heath, appealing to members of the public to become

associates of the Institute (minimum annual subscription, 10s. 6d.). It is hoped in this manner to obtain the funds necessary for maintenance purposes, so that other donations may be placed to the endowment fund. Mr. John Masefield contributes a forceful foreword on the value of research in tropical diseases and of Sir Ronald Ross's contributions to the subject.

UNDER the title "Modern Fruit Tree Spraying and what it Costs," the Ministry of Agriculture has recently issued an illustrated brochure, by Mr. J. Turnbull, useful to fruit-growers. It is issued as Miscellaneous Publications, No. 58, and is obtainable at the office of the Ministry, 10 Whitehall Place, London, S.W.1, price 6d. post free. The pamphlet is written to meet the difficulties that growers often encounter in their spraying operations and are nearly always due to inattention to some detail the importance of which is frequently not realised. The grower can be confidently recommended to consult this publication for information respecting the type of spraying plant best adapted to his needs and the relative costs of operation in each case.

MESSRS. G. CUSSONS, Ltd., of the Technical Works, Manchester, have sent us a copy of their folder of illustrations showing types of apparatus and equipment suitable for use in technical schools and colleges. The excellence of Messrs. Cussons' models is widely appreciated, and in this pamphlet will be found particulars of apparatus for teaching dynamics, building construction, hydraulics, steam, electricity and solid geometry. Among, perhaps, the most interesting of the appliances illustrated are the model for explaining the winding of armatures, the experimental air channel and fan-testing apparatus, and a complete hydraulic plant, including an electrically driven centrifugal pump, reservoir, Pelton wheel, Thomson turbine, weir tank, sump and Pitot tube. Many of the pieces of apparatus are designed especially for laboratories where wall space is limited or where portable apparatus is desirable.

MESSRS. GALENKAMP'S catalogue of general and industrial apparatus (19 Sun Street, Finsbury Square, E.C.2) has been very greatly expanded to meet the multifarious demands of scientific workers not only in pure chemistry but also in the cognate sciences and in various branches of technology. Thus, in the eighth edition, in addition to the ordinary equipment of furniture and apparatus used in educational laboratories, ample provision is made for the consultant and for the research worker in every department of chemistry, and also for the study of such special kinds of work as the testing of coal, cement, asphalt, petroleum, soils, milk, sugar, beer, wines, spirits, vinegar, and textiles. Mechanical apparatus offered for sale includes petrol-gas generators, high vacuum pumps, and centrifugal machines of various types, and amongst the electrical equipment we find drying-ovens, furnaces, motors, and commutating rectifiers. There is also a wide choice of optical apparatus such as microscopes, spectrometers, quartz

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.I.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.I.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

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.