

of obtaining the spectra of refractory materials, such as silicates. The substance is mixed with sodium carbonate, placed on platinum foil heated by a Mecker burner, and sparked. Perhaps his best-known work is the investigation of the *raies ultimes* of the elements; *i.e.* the spectrum lines which are most persistent when an element is gradually reduced in quantity. The presence of the *raies ultimes* is the readiest criterion of the presence of an impurity in a substance.

Spectroscopy at the present time is developing more rapidly on the theoretical than on the practical side, because the theoretical workers are more numerous. The loss of M. de Gramont is, therefore, particularly to be deplored. He leaves in the minds and hearts of those who knew him a memory cherished no less

because of his noble character and kindly disposition than because of his scientific eminence.

WE regret to announce the following deaths:

Capt. Alfred Bertrand, an honorary corresponding member of the Royal Geographical Society and of the Royal Scottish Geographical Society, a well-known African traveller, on January 30, aged sixty-eight.

Sir Kennedy Dalziel, formerly professor of medical jurisprudence and public health, and also of surgery, at Anderson's College, Glasgow, on February 10, aged sixty-two.

Dr. H. Rashdall, Dean of Carlisle, the author of numerous philosophical works, on February 9, aged sixty-five.

Current Topics and Events.

QUITE recently a Committee, on which science was not represented, recommended curtailment of the operations of the Imperial Institute, including the closing of the public exhibition galleries, which contain representative collections of the natural products of the British Dominions and Colonies, and the reduction of its laboratory work to merely preliminary investigations. It is interesting in this connexion to see that the Dutch have opened recently a Colonial Institute in Amsterdam, which is to carry on for the Dutch Colonies work similar in type to that which the Imperial Institute has conducted for so many years for the British Empire. The new Institute is a handsome building containing excellent collections of Dutch Colonial produce, partly derived from the old Colonial Museum at Haarlem, which has been merged in the new organisation. Extensive laboratories have also been provided in which these products will be investigated systematically. The maintenance of the Institute is secured by annual grants from the Ministries of the Colonies and the Interior and the Municipality of Amsterdam. This Institute has long been under consideration in Holland, and before the War a number of the most earnest advocates for its establishment visited the Imperial Institute and accounts of the operations of the latter played a considerable part in propaganda for the opening of a similar institution in Holland. But in Holland scientific matters are dealt with by scientific men, and as a result the Dutch have, in Java and Sumatra, tropical agricultural industries, such as cinchona-planting, which other countries cannot hope to compete with, and in addition they are able in these Colonies to start the cultivation of such things as tea, rubber, and the oil palm, and by the superiority of their methods to attract British capital away from British Colonies, and to compete seriously with the latter even when their entry into the industry is belated.

VISITORS to the Royal Society's soirée in 1900 and also in 1921 will recall, perhaps, an exhibit of a large enclosed box with peep-holes at either end, through which one saw a painted representation of the interior of a Dutch house, approximately of seventeenth century date. This box belonged to the late Sir Henry Howorth. The authorities of the National

Gallery, who deem the box of high interest, have received it as a gift from Col. Howorth, the former owner's son. The chief interest of the interior, apart from its character as a painting, is that it is an extraordinary *tour de force* in perspective, since the picture is painted on three planes and there are no lenses in the holes. Sir Henry Howorth always considered the portrayal of the interior to be the most remarkable example of the application of the scientific principles of perspective extant.

THE British Science Guild is inaugurating on Monday, February 18, a science news service, to which a number of lay journals have already subscribed. It is intended that the service shall provide a weekly signed article dealing with some subject of special interest and a weekly column of science notes. It will also furnish reports of scientific progress. The possibilities of such a service doing useful work for science in promoting the dissemination of accurate information on scientific work are indeed great, but its success must depend on the extent to which it secures the co-operation of men of science. To this end, the Guild is asking for correspondents in the various laboratories throughout the country, in order that it may be possible to keep the public informed of the work that is being done by British men of science. Scientific workers who would be prepared to act as correspondents for the laboratories in which they are working are requested to communicate with Mr. Gordon D. Knox, 2 Guilford Street, London, W.C.1.

WE learn from *Science* that a Metric Standards Bill, providing for gradual adoption in the United States of the metric units of weights and measures in commerce, has been introduced in the House of Representatives by Mr. F. A. Britten, of Illinois, and in the Senate by Mr. E. F. Ladd, of North Dakota. More than 100,000 petitions, directly representing several millions of voters, and urging adoption of world units for weighing and measuring, have been prepared. According to the provisions of the Britten-Ladd bill, the buying and selling of goods, wares and merchandise will be in terms of the metric units after a period of ten years. Manufacturers

are to use whatever measures they choose in production, the bill providing "That nothing in this Act shall be understood or construed as applying to the construction or use in the arts, manufacture or industry of any specification or drawing, tool, machine, or other appliance or implement designed, constructed, or graduated in any desired system." This safeguards manufacturing interests. Many great industrial concerns are stated to be urging metric legislation on this basis.

THE Ministry of Agriculture and Fisheries has instituted at the Reaseheath School of Agriculture, Nantwich, Cheshire, a series of breeding experiments on the effects of inbreeding and outbreeding on the egg-laying qualities of poultry. The experiments are to be carried out as a scheme of the National Poultry Institute, by a sub-committee nominated by the National Poultry Council, and consisting of eight practical poultry breeders from the northern counties with Prof. S. J. Hickson as chairman. Experiments are to be made with white leghorns, Rhode Island reds and white wyandottes. The extensive experiments of Pearl, Harris and others on the inheritance of fecundity in fowls shows that the subject is complex and by no means fully understood. Part of this work indicates that various hereditary factors influencing fecundity are involved, some of which appear to be transmitted by the males to a portion of their female offspring. It is therefore probable that difficulties may be met with in distinguishing between these inherited factors and any direct effects of inbreeding.

M. D'ARSONVAL gave a short description of the Ampere testing laboratory for high voltages at the meeting of the Paris Academy of Sciences on December 10. The laboratory, which is built in Paris, is 18 metres in height, 20 metres broad, and 36 metres long. There are no windows, as darkness is necessary to see when faint coronas appear on the electrodes. A synchronous motor of 190 h.p. is driven from the public supply mains and drives a 500 volt alternator at a frequency of 50. Three large air-cooled single phase alternators are connected with this alternator, each giving a secondary voltage of 375,000. These transformers can be connected in parallel when large power is required. Their windings are so arranged that they can also be connected in cascade or in star. When connected in cascade an effective voltage of a million is obtained between one of the terminals and earth. This gives a crest voltage of 1.4 million, as the voltage wave is sine shaped. Connected in star a three phase voltage equal to 660,000 is obtained, so that the most modern three phase insulators for use on lines at 220,000 volts can be tested with a factor of safety of three. The pressure at the secondary terminals is measured by a spark gap between spherical electrodes. The diameters of the spheres used are 25, 50 or 100 cm., depending on the pressure. Artificial rain is used when chains of insulators are tested at high pressure. There is also a large tank three metres deep filled with oil for tests on the perforation of insulating materials under electric stress.

THE annual general meeting of the Physical Society of London, held on February 8, was marked by the presentation to Prof. H. L. Callendar of the first Duddell Memorial medal. This medal, which was instituted last year, in honour of the late William Du Bois Duddell, is awarded to "persons who have contributed to the advancement of knowledge by the invention or design of scientific instruments or by the discovery of materials used in their construction." Dr. Alexander Russell, the retiring president of the Society, in making the presentation, mentioned briefly the many contributions to the science of heat and allied subjects which Prof. Callendar had made. These included: (1) the electrical resistance thermometer, first communicated to the Royal Society in 1886 and 1887, which affords an accurate instrument for research and a convenient one for industrial purposes. In connexion with this were developed the Callendar-Griffiths bridge and various forms of recorder. (2) The electrical continuous flow calorimeter (invented in 1886, communicated to the British Association in 1897, and more fully described to the Royal Society in 1902), in which the water equivalent is eliminated and the radiation correction simply determined—an instrument which has rendered possible important work on specific heat and other subjects. The method employed therein has been reversed in the compensated electric air flowmeter (recently described by the Aeronautical Research Committee), which gives direct readings independent of temperature and pressure. (3) The compensated air thermometer described before the Royal Society in 1891, and the radio balance described before the Physical Society in 1910. (4) The Callendar steam equation enunciated to the Royal Society in 1900, and kindred researches on steam. (5) Researches on internal combustion engines, leading, amongst other things, to the design of the Watson high speed indicator for such engines. (6) A number of papers on thermometric scales, radiation, vapour pressure, and kindred subjects communicated to the Royal and Physical Societies, the *Philosophical Magazine*, the "Encyclopædia Britannica," etc. Prof. Callendar was warmly acclaimed on receiving the medal.

IN the course of three lectures on advanced psychology delivered at University College on February 4, 6, and 7, Dr. Morton Prince said that his views differed widely from those of his friends the psychoanalysts. He showed how to all perception there is a background of emotions, secondary images, ideas, and neurograms, which compose the settings and root-dispositions. Differences in these settings, which lie in the twilight zone and in the ultramarginal zone or co-conscious, determine differences in conscious awareness. Under hypnosis the setting can be divorced from ideas and perceptions. For example, "the hand of the doctor" can change into "somebody's dead hand." Thus the egocentric (private) meaning is determined by the setting. When a person has had two or more distinct and incompatible experiences of life, the settings and root-dispositions arising therefrom form two or more co-conscious

personalities. Therapy consists in synthesising these dissociated selves into one by altering the setting. For example, a woman had a phobia of towers and steeples. Under hypnotism and by automatic writing the phobia was revealed as hate for church bells. They rang when her mother died. Her history further revealed fear that she had been the cause of her mother's death. Dr. Prince was able to show to her own satisfaction that she could not have been guilty, and thus changed the co-conscious setting of her conscious memories, ideas, and perceptions. This procedure freed the subject from the phobia. From his experiments with visions and hallucinations, particularly with those artificially induced, Dr. Prince believes, in opposition to the psycho-analysts, who regard them as regressions to childish modes of thinking, that they are highly complicated mental processes comparable in every way with conscious processes. In fact, the dissociated "selves," the phenomena of the "unconscious" and of multiple personality, are but different traits of character that have not been reconciled.

MAJOR A. G. CHURCH, secretary of the National Union of Scientific Workers, has been appointed Parliamentary private secretary to Mr. Sidney Webb, president of the Board of Trade.

THE name of Sir Otto John Beit appears in the list of resignation honours recommended by the late Government as having been created baronet for services rendered to the Imperial College of Science and Technology at South Kensington.

APPLICATIONS are invited from honours graduates in chemistry for two posts at the Fuel Research Station, East Greenwich, viz. those of an assistant chemist and a junior assistant chemist. Applications have to be made in writing by March 1 to the Secretary, Department of Scientific and Industrial Research, 16 Old Queen Street, S.W.1.

A JUNIOR technical assistant for wireless experimental work is required at the Royal Aircraft Establishment, South Farnborough, Hants. Candidates must have had technical training to the standard of an honours degree, and some experience in electrical engineering research or physics. Applications for the post, marked A. 24, should be sent to the Superintendent.

APPLICATIONS are invited by the Department of Scientific and Industrial Research for the position of director of research into building materials and methods of construction. Candidates should possess high general scientific qualifications, with research and architectural-engineering experience. The latest date for the receipt of applications (which should be addressed to the Secretary, Department of Scientific and Industrial Research, 16 Old Queen Street, S.W.1) is Saturday, March 1.

SIR JOHN BLAND-SUTTON, president of the Royal College of Surgeons; Dr. James Colquhoun Irvine, principal and vice-chancellor of the University of St. Andrews; and Mr. William Barclay Squire, have been elected members of the Athenæum Club under

the provisions of Rule II. of the Club, which empowers the annual election by the Committee of a certain number of persons "of distinguished eminence in Science, Literature, the Arts, or for public service."

THE following committee has been appointed by the Postmaster General to consider and advise him without delay on the policy to be adopted as regards the Imperial wireless services so as to protect and facilitate public interest: Mr. Robert Donald (chairman), Mr. F. J. Brown, Prof. W. H. Eccles, Sir Drummond D. Fraser, and Sir Henry H. Slessor. Mr. W. E. Weston, of the Post Office, will be secretary to the committee.

PROF. ALBERT SAUVEUR, of Harvard University, has been awarded the Bessemer gold medal of the Iron and Steel Institute for 1924, in recognition of his eminent services in the advancement of the science of the metallurgy of iron and steel. Prof. Sauveur hopes to make the journey to London in order to receive the medal at the hands of Sir William H. Ellis, who succeeds to the presidency at the annual meeting of the Institute on May 8-9.

AT a recent meeting of the executive committee of the Empire Cotton Growing Corporation, Mr. F. R. Parnell, economic botanist to the Government of Madras, was appointed to a post as plant breeder under the Corporation. He will proceed to South Africa shortly to work under Mr. S. Milligan, who has resigned his post as agricultural adviser to the Government of India to take up an appointment with the Corporation, to advise the Government of the Union of South Africa on all matters connected with cotton growing.

IT may be a sign of the times that a Secretary of State should arrange for a lecture on pure science to be delivered at his office, and that the Prime Minister should attend the lecture and address the meeting. This was the case, however, at the lecture given at the India Office on February 9 by Sir Jagadis C. Bose, who outlined the results of some of his well-known work on vital phenomena in plants, and illustrated the lecture with experiments. The Prime Minister, speaking as an old friend of the lecturer, paid a tribute to his achievements as a scientific worker. The growth of the Bose Institute, founded in Calcutta by the lecturer, proved also that India possesses men of great public spirit; and he suggested that action similar to that of Sir Jagadis Bose might well be imitated in Great Britain, which is greatly in need of such manifestations of genuine patriotism. From the distinguished company present Mr. Bernard Shaw, in characteristic remarks, referred to the circumstance of the presence, at a scientific lecture, of a Prime Minister and a Secretary of State for India, both of them apparently interested in science and able to talk about it.

A COMMITTEE, consisting of Mr. E. G. Pretzman (chairman), Mr. A. Batchelor, Mr. H. German, and Dr. W. R. Smith, has been appointed by the Minister of Agriculture to examine into the circumstances of the recent outbreak of foot-and-mouth disease; to

review and report upon the slaughter policy and the procedure adopted by the Ministry of Agriculture ; to advise whether any further precautions should be taken to guard against the introduction and spread of the disease ; and to consider whether a scheme of insurance can be devised as an alternative to the existing system of compensation for slaughtered animals. Mr. S. A. Piggott, of the Ministry of Agriculture, will be secretary to the committee. With regard to the question of scientific investigation the Minister is awaiting the report of Sir William Leishman, who was invited by the late Government to consider the problem and to advise as to what further scientific investigations and experiments might usefully be undertaken.

THE annual meetings of the Geological, Paleontological, and Mineralogical Societies of America were held in Washington, D.C., at the close of last year. The respective presidential addresses were : David White, gravity observations from the point of view of local geology ; T. Wayland Vaughan, criteria and status of correlation and classification of Tertiary deposits ; E. T. Wherry, the surface of a crystal. Among the larger subjects discussed were : Earth-movements and mountain-building, glacial and Pleistocene geology of North America, geology of Mongolia and the Tsin-Ling-Shan in China, and various stratigraphic problems. The Paleontological Society held a symposium on the correlation of American Tertiary formations with those of Europe, and discussed some of the older palæozoic rocks of North America. At its business meeting Dr. F. A. Bather, of the British Museum, was elected to honorary membership as a correspondent.

THE losses in the Arctic sustained by the Norwegian Meteorological Service in obtaining weather information for the rest of the world to use in drawing daily synoptic charts are referred to in the *Meteorological Magazine* for December by Dr. G. C. Simpson, director of the British Meteorological Office. Last year, prior to September, three men in the Service lost their lives in the Arctic, and further losses of ships and lives have come to hand. In the autumn of 1922 the ship *Annie* reached Mygbugten and commenced a series of weather messages from Greenland which has proved so useful to the British Weather Office. The Norwegians have also maintained weather observations at Jan Mayen, and in July 1923 the ship *Conrad Holmboe* was sent with provisions and men for the stations at Jan Mayen and Mygbugten. After visiting Jan Mayen, the *Conrad Holmboe* in trying to reach Mygbugten was seriously damaged by ice. The *Annie* had left Mygbugten, and nothing more was heard from her. A relief ship *Polaruly* finally brought the damaged *Conrad Holmboe* to Iceland, little more than a wreck but with the fourteen men on board all safe and sound. Afterwards the *Polaruly* in trying to find the *Annie* was involved in disaster, foundering in a storm between Iceland and Greenland. The captain and three men were drowned, but the rest of the crew were saved by a British trawler. When the weather permits, a new relief expedition will be sent to the aid of the *Annie*, the condition of which is causing great anxiety.

IN his presidential address to the American Association for the Advancement of Science delivered at the Cincinnati meeting on December 27, Prof. J. Playfair McMurrich (*Science*, Dec. 28, 1923, p. 521) refers to various incidents in the development of American science during the period of the history of the Association since its beginning in 1848. He points out that in the history of the Association two other Canadian men of science besides himself have been elected to the position of president, Prof. T. Sterry Hunt in 1870 and Sir William Dawson in 1882. In the latter part of his address he goes on to consider the development of evolutionary opinion during this period. The publication of the "Origin of Species" in 1859 was shortly followed by the Civil War, during which period meetings were suspended, so it was not until 1872 that Asa Gray, in a presidential address to the Association, expressed belief in organic transformation. Reference is made to the views of Agassiz, Dana, Huxley, Gegenbaur, Fritz Müller, Weismann, Galton, Mendel, and modern workers. The problem of evolution has changed from the origin of species to that of variations, and in the meantime embryological development and the phenomena of heredity have been analysed from the morphological and physiological points of view. The most recent phases are in genetics and in attempts to alter the germplasm experimentally.

MESSRS. LONGMANS AND CO. have in the press a second series of J. G. Millais's "Rhododendrons and the Various Hybrids." The work will contain 17 coloured plates by Miss Beatrice Parsons, Miss Winifred Walker, and Miss Lilian Snelling ; 14 collotype plates ; and numerous illustrations from photographs.

UNDER the title of "The Study of Earthquakes," the *Quarterly Review* for January contains a popularly written account by Prof. H. H. Turner of the most recent development of seismology. The chief points of interest in the article are the contrast drawn between the methods of investigation of a recent earthquake, such as the Californian earthquake of 1906, and of one that occurred nearly half a century earlier (the Neapolitan earthquake of 1857) ; the influence of the time of occurrence of a great earthquake on the destruction by subsequent fires ; the various phases of earthquake-motion ; the method of locating the epicentre ; and the connexion between the depth of the focus and the intensity of the earthquake at the surface.

The World's Health is a monthly review published by the League of Red Cross Societies in three editions, English, French, and Spanish. It deals in non-technical language with problems of medical aid and public health work in all countries. In the November number (vol. iv., No. 11) the question of training public-health nurses by Red Cross Societies is discussed and different views are expressed, some advocating this procedure, others doubting its expediency.

MESSRS. W. HEFFER AND SONS, LTD., Cambridge, announce the publication in February of the two following books by Dr. T. S. P. Strangeways : "Tissue

Culture in Relation to Growth and Differentiation," in which numerous experiments and observations on animal tissues grown *in vitro* will be described, and their bearing on fundamental problems in connexion with growth and differentiation discussed, and "The Technique of Tissue Culture *in vitro*," which will aim at giving a full description of the setting up and sterilisation of the apparatus required, and detailed instructions for the preparation both of the medium and the method used for the implantation of the tissues. Methods for staining the cultures both *intra vitam* and after fixation will also be described.

PUBLICATION No. 555, issued by Messrs. Cooke, Troughton and Simms, Ltd., contains descriptions of a full range of surveying and other field instruments manufactured by the firm, and also certain of their other products of general interest to those connected with civil and railway engineering work. Many of the instruments described represent a combination of the best points of various patterns formerly

manufactured in competition by the two firms, T. Cooke and Sons, Ltd., and Troughton and Simms, Ltd., now merged under one constitution, and illustrate the many developments that have taken place during recent years in the design and construction of surveying instruments. The present publication is more than a catalogue. It contains an interesting chapter on the history of the two firms and refers to several instruments of historic importance, *e.g.* the Troughton dividing engine (1793), now in the Science Museum, South Kensington, and the Cooke instruments used in the British Antarctic Expedition (1910-11). Other chapters deal with subjects of a more practical nature, *e.g.* optical systems, stadia lines, collimation and eccentricity errors, and the adjustment of instruments. Thus the catalogue becomes quite a useful text-book.

ERRATUM.—In NATURE of February 9, p. 212, col. 1, line 9, for "Sir Francis Darwin" read "Sir Horace Darwin."

Our Astronomical Column.

TOTAL ECLIPSE OF THE MOON.—There are two total eclipses of the moon in 1924, both partially visible in London. In that of February 20, totality ends at 4^h 57^m P.M., some 25 minutes before sunset. The moon will rise about half eclipsed, the last contact with the umbra occurring at 5^h 58^m. A smokiness due to the penumbra will be quite perceptible for about 20 minutes after this. It is, of course, quite useless to attempt to observe the last contact with the penumbra, which occurs at 7^h 1^m, since the diminution of light in the outer portion of the penumbra is quite imperceptible.

FREQUENCY OF TOTAL SOLAR ECLIPSES.—Rev. W. Rigge discusses the question of the frequency of total solar eclipses at a particular station in *Popular Astronomy* for January, with special reference to his own station Omaha. He fails to find a single totality there in the past four or the coming two centuries. The nearest approach of the moon's shadow was 23 miles.

He also examines the numbers for London and Rome in the interval A.D. 600-1800, using the maps recently published by J. Fr. Schroeter. He finds two totalities in London (in 878 and 1715) and three for Rome. The writer of this note, in a rough investigation made several years ago, found about 3 totalities in 1000 years for a given point on the earth's surface. The number in a country of considerable size is of course much greater. On the average there is one totality every 70 years in the British Isles; the present blank period of 203 years, from 1724 to 1927, is of very unusual length.

COMETS.—Since the detection of D'Arrest's comet Mr. H. E. Wood has re-examined some plates taken in September last, and has succeeded in finding two faint images of it in the following positions:

G.M.T.	R.A. 1923.0.	S. Decl. 1923.0.
Sept. 5 ^d 6 ^h 53 ^m 21.3 ^s	17 ^h 34 ^m 28 ^s	15° 33' 34"
7 6 20 33.2	17 39 57	16 31 54

These will be of great use in helping to determine the present orbit. The estimated magnitude was 14, whereas on November 10 it was 11, although the distance from sun and earth was then much greater. It is clear then that some remarkable physical change caused the comet's brightness to increase fiftyfold in

the interim. This may be compared with the remarkable fluctuations of light exhibited by Holmes's Comet in 1892.

Mr. F. J. Morshead, of New Plymouth, New Zealand, independently found the Comet Bernard-Dubiago on November 6 in the field with γ Trianguli Australis (R.A. 15^h 11^m 41^s, S. Decl. 68° 24'). He described it as faint. Clouds and moonlight prevented further observations until November 29; on November 30 it was in the field with ϵ^2 Arae (R.A. 16^h 56^m 59^s, S. Decl. 53° 7') and moving towards θ Scorpii. New Zealand does not receive the Copenhagen telegrams, so no intimation of the previous discovery was available.

DARK NEBULÆ.—Prof. G. E. Hale contributes an interesting article on Barnard's Dark Nebulæ to the January issue of *Scribner's Magazine*. It begins with Sir W. Herschel's astonishment on finding what he called "a hole in heaven." This is the region near Rho Ophiuchi. A photograph taken by Prof. Barnard with the Bruce telescope is reproduced, and makes Herschel's wonder easy to understand. In immediate juxtaposition to rich galactic starfields is a large black starless region of complicated form. Barnard is shown at work with this instrument, and some other dark markings are reproduced, both from Bruce plates and from those taken with the 100-inch Hooker telescope. Hale notes that both he and Barnard originally shared Herschel's view that these regions were "holes in heaven," but were gradually brought to look on them as obscuring clouds of dust; this is sometimes faintly luminous, as in the Pleiades nebulae, which have been found to have spectra similar to those of the adjacent stars, so that they are presumably shining by reflection. The suggestion is made that the diameters of the dust-particles are of the order of a wave-length of light, so that radiation pressure, especially near stars of types B and A, becomes very effective. The clouds are supposed to have masses hundreds of times that of the sun, and to be held together by mutual gravitation. An enormous cloud is supposed to cover most of the constellation Orion; the great nebula is "chiefly a superficial fluorescence of the gaseous elements in a small region" of the cloud; perhaps excited by the radiation of the trapezium stars.