magnetic fields to the practical limit, Prof. Cotton, of Paris, has designed and has under construction a very large electro-magnet. The cross-section of the iron will be of the order of one square metre, and about 500 kilowatts will be required to excite it. Such a large electro-magnet will not give a much stronger maximum field than existing ones, but will produce a field of given intensity through a larger volume. No doubt this electro-magnet will prove very useful in experiments where steady fields of high intensity are required through a reasonable volume.

In order to provide magnetic fields of the order of half a million gauss, the use of the electro-magnet must be abandoned. Some years ago, Dr. Kapitza suggested that intense momentary magnetic fields could be obtained by sending a very strong current through a coil for such a short interval that the heating effect in the coil is restricted to a permissible value. It is well known that momentary currents of great intensity can be produced by the discharge of a large high-voltage condenser through a coil. Experiments of this kind have been made by Dr. Wall, in which the duration of the discharge was of the order of one-thousandth of a second. It is estimated that in this way a field of about 200,000 gauss may be reached.

In his experiments to obtain intense magnetic fields, Dr. Kapitza at first employed a special form of accumulator to send a very strong current through a coil for about one-hundredth of a second, the current if necessary being sharply broken after this interval. In this way it was shown to be practicable to carry out experiments on the Zeeman effect, and in bending α-particles in magnetic fields considerably stronger than those obtainable with ordinary methods. In subsequent experiments, a generator of special design was installed, which gives a very large current, of the order of 70,000 amp., at 2000 volts when short-circuited. A heavy current from the generator is passed for about one-hundredth of a second through a coil and then sharply broken by means of a specially designed automatic break. By this means very strong momentary currents can be produced.

The main difficulty in these experiments has been to construct a coil strong enough to withstand the enormous disrupting forces which arise when a large current is passed through the coil. By special attention to the design, a coil has been made which gives a field of 320,000 gauss over a volume of about 3 c.c. without any signs of fracture. Measurements have been regularly carried out in fields of this magnitude. It is anticipated that the present design of coil will give about 500,000 gauss before bursting, and that still higher fields can be obtained in coils specially constructed for the purpose.

As the current only lasts about one-hundredth of a second, oscillograph methods have to be employed to determine the strength of the current and magnetic field. There seems to be no inherent difficulty in conducting magnetic experiments in these momentary fields, for the shortness of the time available is in many cases compensated for by the magnitude of the effects which arise in such intense fields. The investigations, which have been carried out in the Cavendish Laboratory, have been made possible by the generous support of the Department of Scientific and Industrial Research, which has defrayed the cost of the apparatus and experiments.

The application of these new methods of producing intense fields opens up a wide region of research, where all magnetic properties can be examined in fields ten to twenty times stronger than those hitherto available. Such researches cannot fail to yield results of great interest and importance and to advance our knowledge of magnetic phenomena.

While the application of external magnetic fields of the order of one-million gauss will no doubt markedly perturb the orbits of electrons in the outer structure of the atom, it is not to be anticipated that they will seriously affect the stability of atomic nuclei. General evidence indicates that the magnetic fields within the nucleus are much too great for such a relatively weak external field to cause a disruption of the nucleus. In this direction, the bombardment by high-speed particles is likely to be far more effective than the strongest magnetic field we can hope to generate.

This advance of science depends to a large extent on the development of new technical methods and their application to scientific problems. The recent work to which I have referred, on the development of methods of producing high voltages and intense magnetic fields, is not only of great interest to scientific men in itself but also promises to provide us with more powerful methods of attack on a number of fundamental problems.

News and Views.

IN February 1925 the residuary trust funds of the estate of the late Dr. Conway Evans, medical officer for the Strand district, who died in 1892, were transferred to the president of the Royal Society and the president of the Royal College of Physicians of London, and their successors in office, that in accordance with the terms of his bequest they "shall apply the same in giving rewards to such person or persons who, in the opinion of the Presidents, have rendered, or shall from time to time render, some valuable contribution or addition to science as it exists at the time of my death, either by invention, discovery, or otherwise." In accordance with this trust, the president of the Royal Society and the president of the Royal College of Physicians of London have made the first award of the Conway Evans Prize, amounting to 500 guineas, to Sir Charles Sherrington, on the ground that his work on the physiology of the nervous system, and chiefly on the physiology of the brain and spinal cord of the higher animals, has brought many complex nervous functions for the first time within the range of investigation and analysis. His discoveries have had a profound influence throughout the world on the experimental sciences of physiology and

psychology and have thrown a flood of new light on many of the symptoms of nervous disease. In making this first award for some valuable contribution to science as it existed at the time of the death of the testator, the presidents of the Royal Society and of the Royal College of Physicians state that they have had no hesitation in selecting as conspicuously worthy of such recognition the work of Sir Charles Sherrington, which they believe to be of outstanding value for science and for humanity.

THE twenty-fifth annual report of the Imperial Cancer Research Fund gives an account of another year of steady progress without any sensational discoveries. The interesting facts about multiple tumours receive special attention. Two independent cancers in the same person are very uncommon, and it has been found impossible to produce tar-cancer in mice after removal of a spontaneous mammary cancer or of an experimental cancer. One malignant tumour evidently causes the body to do something which to some extent protects it against another tumour. The nature of this mechanism is under investigation: it might well be the explanation of some of the vagaries of the occurrence of cancer in man. As in most cancer research institutes, the hypothesis of Gye and Barnard is under intensive examination: confirmatory results have been obtained, but there is as yet no unanimity about the facts or their interpretation. The financial position of the Fund is fairly satisfactory, but an uncomfortably large proportion of the income comes from temporary and casual sources.

WE learn from the Annual Report of the British Photographic Research Association that the Department of Scientific and Industrial Research has offered to the Association a block grant for the five years ending May 31, 1932, that will make up the income of the Association from other sources (its members' subscriptions) to £5000 per annum. There are certain conditions, and the one that is essentially new requires the appointment of a "Research Committee of technical and scientific persons in whom shall be vested the supervision of the scientific investigations of the Association." It is very satisfactory to know that, although the income of the Association will probably be rather less than it has been, the useful work that it has been carrying on for the last ten years will be continued. The Report gives the details of the last year's work, and states that investigations into the fundamental properties of the silver halides are being continued in order to ascertain whether the mechanism of the latent image formation can be connected directly with some purely physical property which can be studied in the absence of such complicating factors as gelatin.

THE kinematograph film is being increasingly used for educational purposes, and we note with interest that two films dealing with disease-carrying insects have recently been produced by the National Department of Health of Argentina, one on the house-fly and its relation to disease, and the other on mosquitoes and malaria. Both films were prepared at Buenos Aires under the direction of Dr. Barbará, of the Bacteriological Institute, but though primarily intended for propaganda purposes in Latin America, they could readily be adapted for instructional courses in medical entomology elsewhere; we believe copies can be obtained on loan. The house-fly film is particularly good, and includes photographic records from Nature of the complete life-history of the fly; habits of adults, oviposition (the actual deposition of an egg is shown), egg-hatching, larval growth and movements, pupation and hatching of adults. The characteristics of various Muscidæ are shown, and there are some remarkable photographs of the development of bacteria and the life-history of trypanosomes. The mosquito film is not quite so full, and the producers have made greater use of drawings and diagrams, but the life-history of culicine mosquitoes is well shown, also various control methods, and the development of malarial parasites, besides symptoms and treatment of the disease.

THE following appointments have been made by the principal trustees of the British Museum: Mr. R. A. Smith, to be Keeper of British and Medieval Antiquities, in succession to Mr. O. M. Dalton, who retires in December; Mr. E. J. Forsdyke, to be a Deputy Keeper in the Departments of Antiquities, in succession to Mr. R. A. Smith; Mr. H. I. Bell, to be a Deputy Keeper in the Department of Manuscripts, in succession to Mr. J. A. Herbert, who has just retired. The principal trustees have also made the following appointments in the Natural History Museum: Dr. L. J. Spencer, to be Keeper of Mineralogy, in succession to Dr. G. T. Prior, who retires on Dec. 16; Dr. W. D. Lang, to be Keeper of Geology, in succession to Dr. F. A. Bather, who retires next February. Mr. J. Ramsbottom, to be a Deputy Keeper in the Department of Botany, on the promotion of Dr. Spencer; Mr. M. A. C. Hinton, to be a Deputy Keeper in the Department of Zoology, on the promotion of Dr. Lang.

IN February next, after forty years' service in the British Museum (Natural History), Dr. F. A. Bather retires from the post of Keeper of the Department of Geology. His vigorous and cheery personality will be missed by geologists visiting the Museum no less than by his colleagues. Educated at Winchester and Oxford, he joined the staff of the British Museum in 1887 as assistant in the Department of Geology, and was placed in charge of the Echinoderma. After becoming assistant keeper, and later deputy keeper, he succeeded Sir Arthur Smith Woodward as Keeper of the Department in 1924. Dr. Bather was elected F.R.S. in 1909; was awarded the Lyell Medal by the Geological Society in 1911; has been president of Section C of the British Association, and of the Museums Association; he is now president of the Geological Society. Dr. Bather's original work on the palæontology of the echinoderms has gained him a world-wide reputation, and amongst the distinguished palæontologists of to-day he stands in the front rank. His memoirs and papers are too well known to need mention here; not only are they models of scientific method, but also they possess a literary charm seldom found in the writings of scientific authors.

IN his presidential addresses to Section C of the British Association at Cardiff (1920), and to the Geological Society last February, Dr. Bather dealt in a masterly manner with the principles of palæontology, and his listeners felt that those addresses were worthy of Huxley. Dr. Bather does more than look on fossils from the point of view of a morphologist and evolutionist; as is so well shown in his "Caradocian Cystidea of Girvan," he regards them as animals which once lived, and endeavours to correlate form with function, morphology with physiology. For several years Dr. Bather contributed the section on Echinoderma to the *Zoological Record*; although these are masterpieces of bibliography and analysis, one cannot avoid a feeling of regret that so much of his time was taken away from original research. In another direction, by the active interest which he has taken in the work of the Museums Association, Dr. Bather has rendered good service to his country; he has contributed many papers to the Association's journal dealing with the preparation and exhibition of specimens and other matters of importance to the curators of provincial museums. After his release from the cares and responsibilities of office, all who know Dr. Bather, whether personally or only from his writings, will fervently hope that leisure and health will enable him to continue for many years his splendid work in palæontology.

DR. W. D. LANG, who has been appointed Keeper of the Department of Geology in the British Museum in succession to Dr. F. A. Bather, was educated at Harrow and at Pembroke College, Cambridge. He graduated in 1901, and obtained the degree of Sc.D. in 1919. Dr. Lang became an assistant in the Department of Geology in 1902, and was placed in charge of the lower groups of invertebrates; he became assistant-keeper in 1924, and afterwards deputy-keeper in the Department. His palæontological work deals mainly with corals and Polyzoa, treated from an evolutionary viewpoint—his conclusions concerning genetic relationship being based on ontogeny and zonal succession as well as on morphological characters. Of his numerous memoirs on these groups of fossils, we can only mention "Growth-stages in Parasmilia" (1909), "The Pelmatoporinæ, an essay in the evolution of a group of Cretaceous Polyzoa" (1919), and "Catalogue of the Fossil Bryozoa (Polyzoa) in the British Museum: Cretaceous" (1921, 1922). In a series of papers in the *Proceedings of the Geologists' Association*, Dr. Lang has done yeoman service for students by his lucid exposition of some of the general principles of palæontology; of these papers we may name "Old Age and Extinction in Fossils," "Homœomorphy in Fossil Corals," "Trends in Carboniferous Corals." Dr. Lang has not confined himself to work in the Museum, but for many years has devoted his vacations to the investigation of the faunal succession of the Lias of the Dorset coast; the last of his numerous papers on this subject was read before the Geological Society on Nov. 16. We feel confident that Dr. Lang will worthily maintain the high standard set by his two predecessors in the Department of Geology.

DR. GEORGE THURLAND PRIOR, Keeper of Minerals in the British Museum (Natural History), who retires on Dec. 1 at the age of sixty-five years, entered the museum in 1887 to fill the vacancy caused by the death of Walter Flight, who had done the greater part of the chemical work of the department. Dr. Prior was well qualified for this work. He had obtained a demyship in natural science at Magdalen College, Oxford, in 1881, and gained a first class in the honours schools of natural science in both chemistry (1885) and physics (1886), and had also studied for a short time in Germany. His papers on chemical mineralogy dealt with many minerals presenting interesting problems for the analyst, such as the niobates and tantalates of the rare earths, the cerargyrite group, and some of the sulpharsenites and sulphantimonites of copper and silver. About 1893 he undertook the care of the rock collections in the department in addition to his chemical work, since when he has published many petrographical papers of which the most important are his account of the volcanic rocks of British East Africa and the report on the rock specimens collected by Scott's (*Discovery*) Antarctic Expedition of 1901–4. On the appointment of Sir Lazarus Fletcher as Director of the Natural History Museum in 1909, Dr. Prior was made Keeper of Minerals. He then turned his attention to the meteorite collection, and here he found ample scope for careful critical chemical investigation, which led to the publication of numerous descriptions of meteorites and two papers of particular interest giving his views on their genetic relationships and classification. In addition he has written a "Catalogue of Meteorites," giving a full account of the falls represented in the museum collection. He was elected a fellow of the Royal Society in 1912, and was awarded the Murchison Medal of the Geological Society in 1927. He is now president of the Mineralogical Society, of which he had been the secretary since 1909.

DR. LEONARD JAMES SPENCER, who succeeds Dr. G. T. Prior, entered the Department of Minerals in 1894. He was then twenty-four years of age, and had studied at Bradford Technical College, at the Royal College of Science in Dublin, and at Cambridge, where he was a scholar of Sidney Sussex College. He gained a first class in Part 2 of the Natural Sciences Tripos in 1893, taking geology, for which he was awarded the Harkness Scholarship. Before taking up his duties at the museum he studied for a short time under Prof. Groth in Munich. He has published a great number of papers on descriptive mineralogy, including accounts of the new minerals miersite, parahopeite, tarbuttite, chloroxiphite, and diaboleite. He translated Max Bauer's "Precious Stones" in 1904 and R. Braun's "Mineral Kingdom" in 1908–12, wrote "The World's Minerals" in 1911, and has contributed numerous articles on crystallography and mineralogy to Thorpes' "Dictionary of Applied Chemistry," and to the "Encyclopædia Britannica." But it is as an abstractor, editor, and indexer of mineralogical papers that Dr. Spencer has rendered especially useful service to the science. Since 1895 he has written abstracts for the Chemical Society. From 1900 until 1914 he was

referee for the mineralogy volumes of the "Catalogue of Scientific Literature." He undertook the editing of the *Mineralogical Magazine* in 1901, became collaborator for mineralogy and crystallography in the International "Tables annuelles de constantes et données numériques" in 1912, and commenced the publication of *Mineralogical Abstracts* in 1920, the majority of the abstracts for which have been written by himself. For his earlier work he was awarded the Wollaston Fund of the Geological Society in 1902. He was elected a fellow of the Royal Society in 1925.

PROF. W. A. BONE, lecturing before the Chemical Society on Nov. 24, took as his subject "Gaseous Combustion at High Pressures." Since 1920, Prof. Bone and his junior colleagues at the Imperial College of Science and Technology have been engaged in the study of the combustion of mixtures of hydrogen, carbon monoxide, or methane with oxygen and diluent gases under considerable initial pressures; as was recently announced in NATURE, this work is shortly to be extended and amplified. Prof. Bone commenced his discourse by emphasising the actual abnormality of the conditions which man is in the habit of regarding as normal, and quoted Prof. Eddington's statement that, apart from the interstellar cloud which is at the moderate temperature of 15,000°, probably nine-tenths of the matter of the universe is above 1,000,000°. "We must," he said, "keep our minds open to the reception of knowledge accruing from a study of gaseous interactions under what until recently would have been considered abnormal conditions of density and pressure." Had the pressure of our atmosphere been several hundred times what it actually is, the story of chemistry would have been rather different. The value of high pressure work lies in the fact that it accentuates the operation of influences which are either masked or overlooked at the ordinary pressure. There is a great increase in the rate of chemical change, and a proportionate decrease in cooling and dissociation effects; moreover, the increase in density of the medium may affect both the emission and the absorption of radiation during the explosion.

BOMBS and other apparatus now in use at the Imperial College were described and illustrated by Prof. Bone in his lecture referred to above; the spherical bombs are capable of withstanding explosion pressures up to 2000 atm., and a cylindrical one withstands explosion pressures of 1200 atm. The latter can be fitted with quartz windows for spectrographic work, and may then be used up to 500 atm. The behaviour of theoretical hydrogen—air and carbon monoxide—air mixtures is in striking contrast; the pressure in the former rises in about 0·005 sec. to 400 atm. (max.), then immediately beginning to fall, whereas in the latter the pressure takes 0·18 sec. to reach 410 atm. (max.), and begins to fall only after a considerable interval. The replacement by hydrogen of a very small proportion of the carbon monoxide enormously accelerates the pressure rise in explosions in gases initially at 50 atm. Prof. Bone also described experiments leading to the recognition of the phenomenon of nitrogen 'activation,' and dealt with the consequent secondary production of nitric oxide in the presence of excess oxygen. The spectrographic evidence shows that steam does not function chemically, but that carbon monoxide reacts directly with oxygen in carbon monoxide-air explosions, that the radiation emitted in such direct interactions is strongly absorbed by either carbon monoxide or nitrogen, and that in a carbon monoxide-air (excess) explosion at 25 atm. initial pressure, no nitric oxide is formed during the actual explosion period, although more than 2·5 per cent. of nitrogen dioxide may be found in the cooled final explosion products. Prof. Bone paid tribute to the devotion and skill of his junior colleagues, the late Mr. W. A. Haward, and Drs. D. M. Newitt and D. T. A. Townend.

AT the water engineers' congress on Nov. 17, in connexion with the Public Works, Roads and Transport Exhibition at the Royal Agricultural Hall, Islington, Prof. J. W. Gregory gave a lecture upon water-finding. He defined the geological problem as being why a method once used in the search for so many objects is now practically restricted to that for water, for which it is perhaps now more used than at any previous time. He explained this as due to shallow water being so widely distributed that the diviner is bound to have a large percentage of successes, while the failures are forgotten. In many cases there is no clue to such water, and the search for it must be often 'wild-catting'; men expert in the search for such water may be often particularly successful. There are three rival explanations—that the rod moves in response to a physical force, to clairvoyance, or to muscular response to the recognition, often perhaps unconsciously, by the diviner of faint clues to water. Prof. Gregory considers that the decision between these views must depend upon the evidence. He discussed the chief British evidence and claimed that all the controlled experiments are against the divining rod. He referred especially to those organised by the *Sanitary Record and Municipal Engineering* at Guildford in 1913, to the tests by Prof. Wertheimer and Prof. Sollas, and to that for oil divining under the supervision of Sir John Cadman at the Anglo-Persian Company's experimental station. Four cases put forward as most convincing evidence for the divining rod by Barrett and Besterman were also discussed, but Prof. Gregory claims that they give no support to either the physical or clairvoyant explanation of the divining rod.

"THE Nile and the Use of its Waters" was the subject taken by Sir Murdoch Macdonald for his recent presidential address to the Junior Institution of Engineers. Sir Murdoch described the possibilities of land reclamation and irrigation improvements which still exist in Egypt, and explained the constructional works at present under consideration. One proposal, he said, is to heighten the Aswan dam by seven metres, and, so far as stability is concerned, it would be perfectly safe. The Gebel Aulia site for a new dam and reservoir in the White Nile just beyond Khartum is an excellent position, and a relatively low dam built on the sandstone formation would be capable of keeping in a large volume of water. Other suggested

sites for dams are at Lake Tsana and Lake Albert. To meet all the demands of Upper and Lower Egypt for reclamation and irrigation, the summer supply of the river must be increased to about 1500 tons per second, with correspondingly greater volumes during the other periods of the year. Account must also be taken of developments in the Sudan, but the Sudan area is too restricted to take such a quantity of water from the Blue Nile as would harm Egypt. Sir Murdoch said that there is conjoined with all these works, and others which may yet be suggested, a political aspect, but if the builders of all or any of them do not forget the rule that the right of first user to water can not be taken away, that it is a right which can not be separated from the property to which it applies, then justice would be done in the distribution of water to all the inhabitants of the Nile Valley, and the immemorial position in this respect of Egypt in the lower part of that valley would be fully conserved.

SIR J. C. W. REITH writes an interesting article on the connexion between the State, the people, and broadcasting, in the *Nineteenth Century* for November. He points out that we are accustomed to associate controversy with heated crowds, exaggeration, misrepresentation, and general unreasonableness. We think of broadcast politics as differing only in degree and not in kind from platform politics. This, however, is not the case. From the programme department's point of view, politics of the platform type would be quite unsuitable. Statesmen will find it necessary to develop a new technique of political argument. This technique will develop as the years go by, but it may be said in advance that it will derive little from classical or even from parliamentary oratory, and nothing at all from the pulpit or the soap-box. We cannot say how far it will dare to go into a detailed exposition of facts and figures. It is idle to speculate, for the capacity of broadcasting audiences is always developing, and the type of matter acclaimed yesterday is barely conceivable to-day. The possibility of harm can only be prevented by securing a high and conscientious type of man or woman for the profession; one independent alike of the frown of the threatening tyrant and the ardour of the citizens bidding evil. The essential qualification is implicit in the conception of service. The word 'fairness,' with all its unspoken connotations, may be taken as representing it in this particular sphere of action.

THE publication last week of Sir Baldwin Spencer's work on the Arunta coincided, appropriately enough, with the announcement that he had been awarded the Rivers Memorial Medal for 1927 by the Council of the Royal Anthropological Institute. This medal, which was founded in memory of the distinguished president of the Institute whose death took place while he was still in office, is awarded for work of pre-eminent merit in the field; in the case of Sir Baldwin Spencer, for the epoch-making work which he carried out in collaboration with the late Mr. F. J. Gillen among the native tribes of Central and Northern Australia.

THE Hopkins Prize of the Cambridge Philosophical Society has been awarded as follows: For the period 1912–15, to Prof. R. A. Sampson, Astronomer Royal for Scotland, for his researches on the internal constitution of the sun, on optical systems, on Jupiter's satellites, and on practical chronometry; for the period 1915–18, to Sir Frank Dyson, Astronomer Royal, for his contributions to the general progress of astronomy, and to the spectroscopy of the solar atmosphere; for the period 1918–21, to Prof. A. S. Eddington, Plumian professor of astronomy and experimental philosophy in the University of Cambridge, for his work on the classification of the motions of the stars, and on their structure, and on the influence of gravitation on rays of light; for the period 1921–24, to Dr. J. H. Jeans, secretary of the Royal Society, for his work on the theory of gases, and on radiation, and on the evolution of stellar systems.

ON Dec. 7, Prof. Louis Dollo, Honorary Conservator at the Royal Museum of Natural History at Brussels, will attain the age of seventy years. On that day there will be presented to him a commemorative volume containing articles by fifty-five biologists, as an appreciation of his work in extending to fossils the laws that govern all forms of life. The British contributors to the book are the late William Bateson, F. A. Bather, W. T. Calman, C. Forster Cooper, H. Gadow, E. S. Goodrich, J. P. Hill, J. E. Marr, W. D. Matthew, G. E. Pilgrim, C. T. Regan, A. C. Seward, W. J. Sollas, J. Stanley Gardiner, and A. Smith Woodward. The volume will be the first of a new serial, *Palæobiologica*, edited by Prof. O. Abel and published by E. Haim in Vienna.

THE annual general meeting of the Decimal Association will be held at the Institution of Electrical Engineers on Tuesday next, Dec. 6, at 5 P.M., and will be open to anyone interested in promoting the adoption of the metric system of weights and measures—the international language of quantity—and decimal coinage into Great Britain. Addresses will be given by Sir Richard Gregory, the retiring president, and by Sir Hugo Hirst, who is succeeding him in that office.

REFERRING to the paragraph in NATURE of Nov. 19, p. 740, on the proposed Institute of Indexing, we are asked to state that the primary object of Mr. W. R. Douglas Shaw's proposal to establish such an Institute is to improve the standard of book indexes. The proposal provides for the compilation of indexes by the Institute which, however, would neither be conducted for profit nor as a trade union, but as an international fellowship of those interested in the use or production of books and indexing facilities.

IN our issue of Nov. 5, p. 648, we published a review of Vol. I of Dr. George Sarton's "Introduction to the History of Science," at the head of which appeared the names of the American publishers. We are now informed that Messrs. Ballière, Tindall, and Cox, 8 Henrietta Street, London, W.C.2, are publishing this work in the British Empire at 45*s*.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A temporary assistant on the scientific staff of the *Discovery* Expedition to undertake the preliminary sorting of the zoological collections—The Secretary, *Discovery* Committee, Colonial Office, Whitehall, S.W.1 (Dec. 9).

A lecturer in physics in the Egyptian University, Cairo—The Dean of the Faculty of Science, Egyptian University, Cairo (Dec. 9). An assistant in the botany department of the West of Scotland Agricultural College—The Secretary, West of Scotland Agricultural College, 6 Blythswood Square, Glasgow (Dec. 12). A controller of technical education under the Egyptian Ministry of Education—The Director, Egyptian Educational Office, 39 Victoria Street, S.W.1 (Dec. 14). A Government analyst and bacteriologist, Cyprus—The Private Secretary (Appointments) Colonial Office, 2 Richmond Terrace, Whitehall, S.W.1 (Dec. 15). A professor of economics (including economic history and statistics) in the University of the Witwatersrand, Johannesburg—The Secretary, Office of the High Commissioner for the Union of South Africa, Trafalgar Square, W.C.2 (Dec. 31). Eight appointments to the Forest Service of Burma—The Secretary to the High Commissioner for India, General Department, 42 Grosvenor Gardens, S.W.1 (April 7). Two first-class honours graduates for research in optics and allied studies, and in vacuum physics, in the Research Laboratories of the General Electric Co., Ltd.—The Director, Research Laboratories, General Electric Co., Ltd., Wembley. A full-time teacher of rubber technology at the Northern Polytechnic, Holloway—The Clerk, Northern Polytechnic, Holloway, N.7. A full-time teacher of engineering subjects and metal work at the Doncaster Technical College—The Principal, Technical College, Doncaster. A lecturer in tropical sanitation and hygiene at the Liverpool School of Tropical Medicine—The Hon. Dean, School of Tropical Medicine, Pembroke Place, Liverpool. A young graduate with good general chemical and physical knowledge, preferably with some experience of the technique of colour and colour lake manufacture—The Director, Research Association of British Paint, Colour, and Varnish Manufacturers, Waldegrave Road, Teddington.

ERRATUM.—In NATURE of Nov. 26, p. 770, col. 2, line 9, for "$0{\cdot}137d^3$" read "$0{\cdot}137d^8$." The equation should thus read: $\theta = \sqrt{6(d + 0{\cdot}3d^2 + 0{\cdot}137d^8 + \ldots)}$.

Our Astronomical Column.

THE TOTAL LUNAR ECLIPSE OF DEC. 8.—No total lunar eclipse at a sufficient altitude for refined work is visible in England between the years 1920 and 1938. We therefore have to make the most of those that are somewhat unfavourable. The first contact of the moon with the umbra on Dec. 8 occurs at 3.52 P.M., with the moon on the horizon; totality begins at 4.54 and ends at 6.15, the moon's altitudes, as seen from London, being 9° and 21° respectively; the last contact with umbra is at 7.18; penumbral eclipse continues for another hour, but for the latter portion of it the dimming of the moon's light is too slight to be discernible.

There are two classes of observations that can be usefully made during total lunar eclipses. The first is examination of the amount of light on the eclipsed disc, and its variation in different regions. It is only the lower regions of the earth's atmosphere that have sufficient refractive power to bend the sunlight into the inner part of the shadow; these regions are liable to have their transparency affected by cloud, so that observation of the eclipsed moon gives an integrated measure of the clearness of the earth's atmosphere round the great circle that has the moon in the horizon at the time of observation. Some have tried to establish a correlation between the illumination of the eclipsed moon and the sunspot cycle, and there are advantages in considering an integrated atmospheric effect of this kind rather than the records of isolated stations.

The other useful observations to make during lunar eclipses are occultations of faint stars; the best values of the moon's semidiameter were derived from such observations. During the coming eclipse, ι Tauri, mag. 4·7, will disappear at 4.30 P.M., P.A. 84°, and reappear at 5.19, P.A. 245°; B.D. 21° 754, mag. 8·2, will disappear at 4.57, P.A. 90°, and reappear at 5.46, P.A. 238°. The latter is taken from the *B.A.A. Handbook*. The times are for London. The darkness of totality can also be utilised for observing comets, which are usually lost for several days about full moon.

COMETS.—The comet Schwassmann-Wachmann has now been photographed on three days at Bergedorf, the following positions having been telegraphed from the I.A.U. Bureau, Copenhagen:

			R.A. 1927·0.	Decl. 1927·0.
Nov.	15d 21h	33·6m U.T.	1h 32m 14·2s	+20° 54′ 42″
	18 20	24·8	1 31 10·7	+20 46 47
	22 18	27·8	1 29 53·5	+20 36 25

From these, Mr. J. Möller, of Copenhagen Observatory, has computed the following parabolic orbit:

T	1926 May 3·368 U.T.
ω	328° 23′
Ω	331 38
i	10 5
log q	0·44793

This orbit implies that the comet passed perihelion 18 months before discovery, and is now outside the orbit of Jupiter. It would have been near opposition at the time of perihelion, and very much brighter than it is now.

It must be borne in mind that the preliminary orbit of such a distant comet is subject to considerable uncertainty. Thus, in the case of comet Shajn-Comas Sola in 1925, the early elements differed much from the final ones. The following ephemeris, calculated from the above elements, is not likely to be much in error:

0h.	R.A.	N. Decl.	log Δ.
Nov. 30	1h 27m 54s	20° 18′	0·7211
Dec. 8	1 26 22	20 0	0·7331
16	1 25 32	19 46	0·7457
24	1 25 25	19 34	0·7587

The *Bulletin of Tokyo Observatory* gives the following orbit of an object discovered there last January (designated Tokyo 1) which seems from its movement to be a comet, though its aspect was planetary.

T	1927 April 9·4662 U.T.	
Ω	343° 5′ 10″	1927·0
ω	199 10 4	
i	5 59 59	
ϕ	62 27 25	
n	101·933″	
log a	1·027796	
Period	34·809 years	

The perihelion distance is 1·20 units, the aphelion is near the orbit of Uranus. From the moderate inclination, the object would be liable to make close approaches to Jupiter.