it Cleland directed attention to the remarkable changes in shape which the human skull passes through at various stages of growth of the child and at later phases of life. Even in adult years head form is not fixed; significant changes may occur in the later decades of life. Between 1855 and 1906 he published more than fifty separate papers and covered a variety of subjects. He was a poet and published a book of verse, "Scala Naturae" (1887); a volume of essays, "Evolution, Expression, and Sensation" (1881); he was one of the editors of the seventh edition of Quain's "Anatomy" (1867); with his former pupil, now Principal J. Yule Mackay of University College, Dundee, he wrote a text-book on "Anatomy (Human Anatomy, General and Descriptive)," 1896, and a "Directory for the Dissection of the Human Body" (1877). A. K.

DR. A. DE WATTEVILLE.

DR. DE WATTEVILLE, whose death, at the age of seventy-eight, occurred in Switzerland on February 24 last, was a prominent member of the medical profession in London between twenty and thirty years ago. A Swiss by birth, scion of one of the oldest families of Switzerland, he was an Englishman by education, and qualified for the medical profession. He specialised in neurology, and more particularly in electro-therapeutics, which he did much to establish on a scientific basis. His work on "Medical Electricity," which ran through two editions—the second in 1884—established his reputation as the chief authority on the subject in Great Britain. He specially insisted on measurements of current strength as the essential condition of a rational application of electricity, and led to the milliampere being adopted as the electro-therapeutic unit by the International Congress of Electricians.

It was, however, as editor of *Brain* that Dr. de Watteville found his chief interest and occupation. In 1883 he became associated as co-editor with the original founders and editors of this important journal—the late Sir J. C. Bucknill, Dr. Hughlings Jackson, Sir J. Crichton-Browne, and Sir David Ferrier—and in 1886 was appointed sole editor, when *Brain* became the official journal of the newly founded Neurological Society. This post he held until 1900. On his resignation the council of the Neurological Society by unanimous resolution paid him the following well-merited tribute:

The Council accepts with great regret Dr. de Watteville's resignation of the Editorship of *Brain*, and desires to take this opportunity of recording the deep debt of gratitude that the Society owes him for the way in which he has conducted the Journal for the past twenty years. The Council feels that parting with Dr. de Watteville is an event of great moment to the Society, for he has not only brought *Brain* to a high standard of perfection and secured for it a great European reputation, but even the existence of the Journal at the present time is due to his energetic action at a critical juncture in 1880. Moreover, the Council is mindful that the Society itself took origin on Dr. de Watteville's initiative at a meeting held at his house on November 14, 1885.

Soon after resigning the editorship of *Brain*, Dr. de Watteville left London and went to reside in Switzerland, and spent the remainder of his life in quiet study and contemplation among the beautiful surroundings of his native land. Dr. de Watteville was a man of wide culture and great force of character, charitable and self-sacrificing almost to a fault, and the outspoken foe of quackery and pretence of every description.

D. F.

WE regret to announce the following deaths:

Dr. W. F. Hillebrand, chief chemist of the U.S. Bureau of Standards, who was distinguished for his work on rock and mineral analysis, on February 7, aged seventy-one.

Prof. A. von Wassermann, emeritus professor of experimental therapy and immunology in the University of Berlin and director of the Kaiser Wilhelm Institute for Experimental Therapy in Berlin-Dahlem, on March 16, aged fifty-nine.

Current Topics and Events.

ELSEWHERE in this issue is an article by Prof. Raymond Dart dealing with certain evidence which, on his view, reveals a long history of cultural contact between South Africa and the outside world from an early date. It is scarcely necessary to emphasise the importance of Prof. Dart's views in relation to the "diffusionist" theories which have been put forward by Prof. Elliot Smith and his colleagues. Perhaps the most striking piece of evidence with which Prof. Dart deals is the parallel drawn between the head-dress and clothing of certain figures in the Bushmen paintings of the Kei River Valley and of figures in the art of Babylonia and Western Asia. Bushmen paintings are thought by some, for good reason, to be relatively modern; the evidence of the incrustation of which Prof. Dart speaks is of little value without further information as to its character and rate of deposit. If the identification of the Babylonian cap were accepted, it would suggest the eighth century B.C. as a probable date, but without a strong corroborative evidence the identification is precarious, especially as this type of cap is of extreme rarity in Babylonian art. Prof. Dart is on surer ground when he points to the problem presented by the extensive traces of early mining activity in Rhodesia. It may be that the researches of the Committee of the British Association which is investigating the composition of early bronzes may point to South Africa as one of the possible sources of supply and thus afford some clue to the date of some of these workings. It is, however, beyond question that the discovery by Dr. Randall-MacIver in the ruined structures of Rhodesia of Nankin china which could not be dated at the earliest much before the fourteenth century, is a great stumbling-block in the way of those who seek to prove an early date for the Zimbabwe culture.

WITH the past two or three weeks reports have reached Great Britain of a new experiment carried

out by Prof. Michelson and Dr. Silberstein in the United States, on the principle of the Michelson-Morley experiment, to test the drift of the ether in relation to matter in motion. No authenticated account of the experiment is yet available, but references have been made to it in letters from the United States, and the *Morning Post* of March 2 and 7 published articles stating that evidence of relative motion of ether had been obtained. It is stated that a triangle of three water conduit pipes was used, and that the velocity of light travelling round the triangle was found to be different in two opposite directions. Sir Oliver Lodge, in reply to an inquiry as to whether he had received any details of the experiment and the result, has been good enough to favour us with the following comments upon the subject: "In response to your inquiry, and judging solely from the newspaper accounts, the experiment mentioned as having been conducted by Prof. Michelson and Dr. Silberstein appears to be a repetition of the Fizean moving-water experiment, in which the water is this time kept stationary with respect to the earth, and only shares the earth's rotation. If the rest of the apparatus did not share the earth's rotation, no one would doubt a perfectly calculable positive result. The difficulty and interest arise from the obvious fact that the rest of the apparatus must have shared in the earth's rotation; so that an effect was (presumably) observed which did not involve relative motion of matter. But, assuming all this true, the obvious way out is that 'rotation' has always been regarded as exceptional; and the observation, however interesting and important, need be no more perturbing than Newton's bucket or the shape of the earth."

AN important discovery by the Harvard-Boston Expedition to Egypt, which is working among the Giza pyramids, is announced. According to a *communiqué* issued by the Egyptian Ministry of Public Works which appeared in the *Times* of March 10, a tomb has been found of which the burial chamber is at the bottom of a 150 ft. shaft. Although no detailed examination had then been possible owing to the unsafe condition of the shaft, a rectangular alabaster coffin was visible with a number of poles, the tops of which were covered with gold foil. Among inscriptions on a plank by the side of the coffin was the cartouche of Seneferu, first king of the Fourth Dynasty, which would suggest that it is the burial-place of a member of his family. The unusual depth of the shaft, however, and the fact that it is filled with concrete and cement instead of rubble as in other tombs in this area, have been taken to support the view that this is the tomb not merely of a personage of importance—a high official or a member of the Royal Family—but possibly of King Seneferu himself, although he is usually supposed to have been buried at Medum, where he built a pyramid. Dr. Reisner, however, who is in the United States, has cabled since the announcement of the discovery that the tomb is that of the Princess Medti-Seneferu. Presumably he has definite evidence to this effect. The floor of the tomb is covered by a quantity of objects, including alabaster bowls, a copper basin or ewer, and remains of heavily gilded chairs. If it should appear eventually that this is the tomb of the King himself, it would constitute a discovery of great historical importance; but scarcely of less moment to the archæologist is the evidence which the tomb will afford in regard to the art and technique of the smaller objects mentioned, of which at this period little is known.

THE sixth of Sir Oliver Lodge's series of "talks" on "Ether and Reality," broadcasted from the London station (2LO) of the British Broadcasting Company on Tuesday March 17, dealt with matter as one of the forms of energy. Sir Oliver said that one of the functions of the ether is the constitution of matter itself. Atoms are built of electrons and protons, and electrons are evidently composed of ether, because whatever mass they have is represented by the energy of their electric field; though we cannot yet, with any certainty, make a similar statement about a proton. We know, however, that both are more massive when moving than when they are at rest. Their mass and energy increase together, the extra mass behaving like additional matter, but not like permanent matter. When an electron is stopped, the additional matter disappears: it is changed into radiation and travels out as a quantum with the speed of light. There is a curious kind of discontinuity in the immediate neighbourhood of a material nucleus: the satellites can occupy certain positions and no others. But they can drop from one of these positions to another, and they then emit energy in the form of radiation, which depends on how far they have dropped and where they drop to. The process is a reversible one; and when radiation is absorbed, the electron is jerked up again. How far it is jerked up depends on the kind of radiation. The important thing is that matter is turning out to be one of the forms of energy. This has been proved for temporary matter, and is probably true for permanent matter also, a conversion of which is believed to account for stellar radiation. Whether the process is reciprocal—whether radiation can ever generate not only temporary matter but so-called permanent matter—still remains to be discovered.

A SCHOOLBOY once replied to the question "What is an egg?" by stating that an egg is "an oval-shaped article of diet." The Concise Oxford Dictionary says that it is a "spheroidal body produced by female of birds, etc., especially of domestic fowl, containing germ of a new individual." Neither of these definitions can be regarded as entirely satisfactory from the scientific point of view, but the latter has the advantage of grasping to some extent the fundamental point and of restricting the application of the term to bodies of a similar nature. A more precise definition is usually given by biologists of the Latin word "ovum," used as a technical term; an ovum, or egg-cell, is a nucleated cell capable of developing (usually after union with a spermatozoon) into a new individual; a conception, of course, that was as unfamiliar to Latin writers as it still is to dealers in eggs. An embryo, on the other hand, is an individual in an

early stage of its development from the ovum. Unfortunately even men of science still use these terms in a very unscientific manner. Human embryologists not infrequently apply the term "ovum" to quite advanced embryos, thus counteracting the efforts of those biologists who wish to emphasise the fundamental fact that every typical animal starts life as a single nucleated cell—to which alone the term "ovum" should be applied.

IN their interesting and beautifully illustrated paper on "The Early Development of the Cat" (*Quarterly Journal of Microscopical Science*, vol. 68, Part IV.), Prof. J. P. Hill and Dr. Margaret Tribe use the word "egg" in much the same way, but what justification can there be for this usage? It fulfils the requirements neither of popular language nor of scientific terminology. It is perhaps less objectionable than the illegitimate use of the word "ovum," which is evidently intended as a technical term and therefore ought to be used only with scientific precision. But in what possible sense of the word are these early embryos of the cat eggs? They are not articles of diet, and they are in no way comparable to the egg of a fowl, but only to something which may, in certain circumstances, be found in the egg of a fowl. We call this something an embryo—why should not the same term be used for the early stages in the development of the cat? It is in no mere carping spirit that we venture to make these criticisms, but with the view of directing attention to the necessity for a more rational system of terminology in embryological writings, and nothing that we have said must be regarded as indicating any want of appreciation of a most careful and accurate piece of work, a notable contribution to embryological science.

A TIDE predictor has been presented to the Tidal Institute at Liverpool and has been installed at Bidston Observatory. The machine has 10 semi-diurnal components, 6 diurnal, 3 third-diurnal, 4 quarter-diurnal, and 3 sixth-diurnal components, 26 in all; provision has been made for the addition of other components, if desired. Long-period components have been omitted, as such constituents are easily allowed for, if of importance. Very great care has been given to matters of design and workmanship, and the machine has been constructed in an admirably efficient manner by Messrs. Kelvin, Bottomley and Baird, of Glasgow. The accuracy of performance of the machine is very great, and it is capable of being used even for research work. A noteworthy feature of the machine is the provision of apparatus for recording electrically the time at which the tide reaches a definite height. The electrical contact is made by a roller on the edge of a wheel, which is attached by a flexible wire to the pen, and the electrical circuit is completed through a dotting apparatus which registers on a revolving drum. The dots are arranged on a spiral line. This chronograph can be used for registering the exact time of high (or low) water by setting on the machine the desired harmonic constants representing the rate of rise and fall of tide. The donors of the machine are Messrs. Alfred Holt, the Booth, Cunard and Orient S.S. Cos., Mr. Harrison Hughes, Mr. C. Livingston, and the Local Committee for the Liverpool meeting (1923) of the British Association.

THE *Welsh Journal of Agriculture*, of which the first number has recently been issued, is intended to fill a definite need by providing a channel whereby farmers and others in the Principality can be kept informed of the progress of agricultural education and research in Wales. The published articles are to be based on scientific investigations, and will convey scientific and technical information set out in plain language to render it of the greatest possible value to the agricultural community. The first number appropriately leads off with an outline of the history of agriculture in Wales, by C. Bryner Jones, followed by an article on the human side of the farming business by A. W. Ashby. Other articles of a general character, but all having a bearing on agricultural development, are given, dealing with genetics and the stock breeder, modern tendencies in soil research, and with various aspects of research in such fundamental matters as animal breeding, dairying, horticulture, and fruit culture. The rest of the volume is occupied by a number of short papers on various Welsh investigations and by an important article by Prof. Stapledon on "Seeds Mixtures for Temporary Grass." This outlines the results of investigations carried out in Denmark and Sweden in comparison with observations on similar trials now in progress at Aberystwyth, and is of much value as a contribution to the perennial problem which confronts the farmer who desires to put down leys of long or short duration. A useful list of recently published agricultural books is included, together with a section of abstracts, reviews, and bibliographical notes.

SIR E. JOHN RUSSELL, Director of the Rothamsted Experimental Station, Harpenden, Herts., has been elected a corresponding member of the Paris Academy of Sciences, in the Section of Rural Economy, in succession to Prof. Winogradsky, who has been elected a foreign associate.

THE Summer Time Bill was read a second time in the House of Commons on March 13. By it the dates between which legal or clock time is to be one hour in advance of Greenwich Mean Time are from the Sunday following the first Saturday in April to the Sunday following the first Saturday in October. If the measure is passed, summer time will begin this year on April 5 and end on October 4. The period during which legal time is thus to be advanced has been decided upon in agreement with France and Belgium, and is to be the same every year instead of being determined year by year, as has been the case since summer time was first introduced in 1916.

ON Tuesday next, March 24, at 5.15, Prof. A. S. Eddington will begin a course of two lectures at the Royal Institution on the internal constitution of the stars; on Thursday, March 26, at the same hour, Mr. T. Thorne Baker will deliver the first of two lectures on the chemical and physical effects of light:

(i.) " Reproduction of Light Images by Photography," (ii.) " Transmission of Light Images by Electricity " ; and on Saturday, March 28, at 3 o'clock, Prof. J. H. Ashworth commences a course of two lectures on the nervous system and some reactions. The Friday evening discourse on March 27 will be delivered by Sir Ernest Rutherford on " Studies of Atomic Nuclei," and on April 3 by Sir Daniel Hall on " The Productivity of English Land."

THREE research assistants are required at the Building Research Station of the Department of Scientific and Industrial Research. Candidates must be honours graduates in chemistry or have an equivalent qualification, with some experience in research. One post requires a special theoretical knowledge of paints and varnishes, another of physical chemistry, and another of inorganic chemistry, a good knowledge of metallography, and ability to read French and German. Applications, upon a special form, must be received by, at latest, March 28 by the Secretary, Department of Scientific and Industrial Research, 16 Old Queen Street, S.W.1.

AT the annual general meeting of the Ray Society on March 12, the following officers were re-elected : *President*, Prof. W. C. M'Intosh ; *Treasurer*, Sir Sidney F. Harmer ; *Secretary*, Dr. W. T. Calman. Lord Rothschild was elected a vice-president, and Prof. A. E. Boycott and Mr. R. T. Gunther were elected new members of council. It was announced that the first volume of " British Hydracarina," by Mr. C. D. Soar and Mr. W. Williamson, would shortly be published, and that the issue for 1925 would be the " Life of Wilhelm Hofmeister," by K. v. Goebel, translated by Prof. F. O. Bower. The Society published in 1862 a translation of Hofmeister's work on " The Higher Cryptogamia," and it seems fitting that the life of the author should now be included in the same series. The Council has also undertaken to publish a monograph on " British Sea Anemones," by Mr. T. A. Stephenson, which will be illustrated with coloured plates from drawings by the author. It is intended that the first volume shall form the issue for 1927.

WE learn from *Science* that it has been decided to establish a National Hall of Fame for Engineers, Inventors, and Industrialists in the proposed National Museum of Engineering and Industry to be erected in Washington. Records of the achievements of the outstanding leaders in invention and engineering, now scattered throughout the country, are to be assembled, and all original models, so far as recoverable, are to be obtained for the museum. In addition to the central museum, it is hoped to form a chain of local museums of industry in the industrial centres of the country. Among those who probably will be represented in marble or in bronze in the Hall of Fame will be Charles P. Steinmetz, Alexander Graham Bell, Thomas A. Edison, Orville and Wilbur Wright, Eli Whitney, Captain John Erikson, Mergenthaler, and Robert Fulton.

THE report of the Department of Agriculture of the Tanganyika Territory for the year ending March 31, 1924, gives an account of attempts to improve and extend crop production in that region of Africa. Among the most important features of these experiments was the introduction of ploughing among native cultivators. The sub-district of Shinyanga was selected for the experiment as having certain advantages in a closely settled population and extensive areas of cultivable soil in open country free from the tsetse fly. The attempt was facilitated by the growing interest of the natives in cotton production, while the tribal organisation lent itself readily to a system of cultivation by communities. A station for the training of oxen was established, where the natives were instructed in ploughing. Twenty-five ploughs were then issued to native villages, with the result that 500 acres of land were put under cotton, and requests have been made for a supply of 320 additional ploughs for use during next cotton season. A further development of the work which is even more striking consists in the extension of ploughing into areas at present covered by bush and infested by tsetse fly. This not merely increases the area available for cultivation but also causes the recession of the fly-stricken bush, which was advancing into open country and restricting cattle-grazing grounds.

THE Botanical Society and Exchange Club of the British Isles issues with its report for 1923 a plate illustrating the little sedge *Carex microglochin* Wahl, the discovery of which at Glen Lyon, Perthshire, by Lady Davy and Miss Gertrude Bacon, is described by Dr. G. Claridge Druce, the secretary of the Club, as the great botanical event of the year. In addition to the usual notes upon rare finds during the year, or references to interesting work upon British species and new county records, the report contains several papers of distinct interest to systematists, such as the paper upon British forms of Thymus by K. Ronniger, Vienna, notes on British mints by J. Fraser, on violets by E. S. Gregory, upon *Orchis maculata* L. and *O. Fuchsii* Druce, by G. Claridge Druce. Descriptive accounts of special areas of vegetation include that upon the vegetation of Beinn Laoigh (Perthshire) by Donald Patton, and of the Culbin Sands by E. J. A. Stewart and Donald Patton. The report closes with a very interesting illustrated account of the foundation of the Oxford Botanic Garden and its tercentenary by Dr. Druce. No one is better qualified than this writer to evoke in a few brief pages memories of the many botanists officially connected with this historic botanic garden.

IN his article on " Early Activities of the Royal Society," in NATURE of January 31, Mr. T. E. James referred to the election of Pepys and his undertaking in 1674/5 to provide a lecture for the Society. Mr. James was unable to find any record of Pepys having kept the promise or paid the fine in default, and he remarked that there was " no reference to this lapse in the well-known Diary." Mr. C. Macnamara writes from Arnprior, Ontario, to point out that the last date in the Diary is May 31, 1669, that is, several years before Pepys made the promise mentioned in the article.

THE efficient equipment of observatories calls for the services of the engineer as well as the scientific-instrument maker and the optician. The firm of Messrs. Cooke, Troughton and Simms, Ltd., Buckingham Works, York, are fortunate in having at their command facilities for the production of all the apparatus and equipment required for astronomical observation. Several well-known observatories have been built and equipped by the firm, and this branch of their production is now being further developed. A recently issued catalogue, No. 570, contains a full list of astronomical instruments and apparatus manufactured by them, including domes from 10 to 40 feet in diameter, telescopes with objectives up to 20 inches in aperature, a full range of eyepieces, photographic and spectroscopic accessories and position micrometers. Portable equatorial and alt-azimuth stands, semi-portable and fixed equatorial telescope mountings and transit instruments, of various types, are described and illustrated, as well as mechanical and electrical accessories. The articles included in the catalogue are all standard apparatus and instruments, for which prices are quoted; but the firm undertakes also the design and construction of instruments for special purposes.

TWO important catalogues of second-hand books of science have just been issued by Messrs Wheldon and Wesley, Ltd., 2 Arthur Street, W.C.2, viz. No. 15, Zoology, Part 2—Vertebrate Faunas, containing nearly 1500 titles, and No. 16, Lepidoptera, with some 262 titles. A number of scarce works are offered for sale, and the catalogues should appeal to many readers of NATURE.

Our Astronomical Column.

MIRA CETI.—There have been three interesting discoveries made concerning this famous variable in recent months. The finding of the faint companion, that is responsible for the bright lines seen in the spectrum at minimum, has already been reported in this column. The next step was the investigation of its heat radiation by the thermocouple by Messrs. Nicholson and Pettit at Mt. Wilson; this was described by Prof. Eddington at the February meeting of the Royal Astronomical Society (see *Observatory* for March, p. 58). While the visual magnitude varies from the third to the ninth, a 200-fold range, the "heat magnitude" varies only from 1·5 mag. to 3 mag., a 4-fold range. This shows that the loss of light is almost wholly in the short wave-lengths.

The third discovery, reported in the *Times* of March 12, is that Dr. F. Pease has successfully applied the 20-ft. interferometer on the 100-inch reflector at Mt. Wilson to the measurement of the angular diameter of Mira, obtaining the value of 0·06″, which is the largest yet found for any star, though its linear diameter would be about equal to that of Betelgeuse, each being about 250 million miles, assuming that their adopted parallaxes are correct.

It is evident that the surface brightness of Mira must be very low, since in spite of its greater angular diameter it is some two magnitudes fainter than Betelgeuse even when at its maximum light. It will probably be followed for as long a portion of the light curve as the interferometer method permits, in order to see whether the diameter varies periodically. Such a variation was strongly suspected in the case of Betelgeuse, itself a variable but with a much smaller range.

Mira is probably the nearest to us of the long-period variables, and anything found about it may be applicable to the whole class. They were formerly thought to be expiring suns, but are now considered to be at an early stage of star-life.

A NEW APPLICATION OF THE SPECTROHELIOGRAPH.—Mr. Royds, Director of the Kodaikanal Observatory, described at the meeting on March 13 of the Royal Astronomical Society, a new method of using this instrument. Instead of placing the second slit wholly on the H_α line of hydrogen, it was made to project on to the light spectrum; the character of the image was then found to be entirely different. Instead of measuring the amount of light from glowing hydrogen in different regions, it now measures the varying pressure of the gas by the varying width of the line, and consequent reduction of light where it is broadest and the pressure greatest.

Each sunspot is found to be surrounded by a narrow bright ring; outside this there is a large dusky region, showing a good deal of structure. The general mottling of the whole disc is very clearly brought out, and seems to have more regularity than in ordinary pictures. The method is quite a hopeful one for bringing out some new points concerning the distribution of gases over the sun's surface.

THE SYSTEM OF β-LYRÆ.—Prof. H. H. Turner, at the meeting on March 13 of the Royal Astronomical Society, announced an interesting result which Miss Blagg has obtained. She finds that there is a small subsidiary variation of light, the amplitude of which is about 0·1 magnitude, and period 6·595 days, very little in excess of the 6·454 days which is the half period of the main variation. It is this approach to synchronism that has prevented the new term from being detected earlier. It shows itself not as a separate curve, but as a slow alteration in the amplitude of the principal curve. No suggestion was made of the explanation of this new term. As the two stars are supposed to be almost in contact, there would not seem to be room for a third orb in their immediate vicinity.

THE DISTANCE OF THE ANDROMEDA NEBULA.—Prof. H. N. Russell gives some further details in *Scientific American* for March of Prof. Hubble's investigation of the distance of this nebula by photographing the Cepheid variables in it. He mentions the possibility that was alluded to in NATURE of March 7, p. 349, that absorption by the nebula might diminish the stars' light and so give too large an apparent distance. But he says that several stars in different parts of the nebula agreed in giving the same distance, thus showing that the absorption effect must be very small, since otherwise it could scarcely be the same for all the stars. Prof. Russell also notes that stars that are individually visible in the nebula must be a thousand times as luminous as the sun; hence only the extreme giants are separately visible, and the great mass of the stars in it are only seen as a general glow. There is still something of a puzzle about the very rapid diminution of light as we pass away from the centre that was found by Mr. Reynolds's photometric measurements. This seems to indicate a different structure from that in our sidereal system.