

Canidæ family now extinct may be found that will explain the anomaly.

Unfortunately, the prehensile lips and snout, so well indicated by the unique and very ancient bronze head which Messrs. Spink, of St. James's, have kindly permitted us to publish, would not be indicated by any of the bones.

It may be that the animal was very scarce, and that after its association with the detested deity it was exterminated by the Horus - following, orthodox Egyptians.

JOSEPH OFFORD.

TECHNICAL OPTICS.

THE establishment of a Department of Technical Optics at the Imperial College of Science and Technology, and the appointment of Mr. F. J. Cheshire as the director of the department, were announced in NATURE of May 24 (p. 257). The report of the Board of Education for the year 1915-16 just issued (Cd. 8594, price 6d.) includes the following reference to this subject:—

After many years of discussion the establishment of a Department of Technical Optics is at last assured, and the Board desires in this connection to express its appreciation of the action of the London County Council, to whom the realisation of the scheme is largely due. The scheme involves the co-operation of the Imperial College of Science and Technology at South Kensington and the Northampton Polytechnic Institute in Clerkenwell. The more elementary instruction will be given at the Northampton Polytechnic Institute; the advanced full-time courses, and most of the research work, will be centred at the Imperial College. The work in technical optics at both institutions will be under the control of a director, who will be a professor of the Imperial College, and will be given the position of honorary head of a department in the Northampton Institute.

The governors of the Imperial College have appointed a Technical Optics Committee to manage under them the work for which they are responsible; and the London County Council has appointed the same committee to advise it as to the work to be done at the Northampton Institute. The Right Hon. A. H. D. Acland, who is chairman of the Executive Committee of the Imperial College and a member of the Committee of His Majesty's Privy Council on Scientific and Industrial Research, has consented to act as chairman of the Technical Optics Committee. This committee will contain representatives of the Admiralty, the War Office, and the Ministry of Munitions, and also of employers and workers in the trade.

At the outset the annual cost of maintaining the new scheme is estimated to be not less than 5000*l.*, while 5500*l.* is needed for alterations and equipment. Of these sums the London County Council is prepared to find 2000*l.* a year (including 1000*l.* for the work at the Imperial College, and an increase of not more than 1000*l.* in its maintenance grant to the Northampton Institute), together with 750*l.* towards the necessary equipment at South Kensington and 2500*l.* for alterations and new equipment at Clerkenwell. The Board of Education will make an additional annual grant of 2000*l.* to the Imperial College as from April 1, 1917, and a capital grant of 1500*l.* for equipment, while the extended provision for technical optics at the Northampton Institute will be taken into account in fixing the amount of the Board's block grant to that institution under the Regulations for Technical Schools. The Department of Scientific and Industrial Research is prepared to make a grant of 1000*l.* a year for five years to the Imperial College

and an equipment grant of 750*l.* in respect of the research work which will be undertaken by the new Institute of Technical Optics.

Mr. Frederic J. Cheshire has been appointed head of the new department at the Imperial College for a period of five years, with the title Director of Technical Optics and Professor of Technical Optics at the Imperial College. Mr. Cheshire's long experience and great ability in optical matters practically ensure a successful beginning. He has been associated with optical instruments for many years at the Patent Office, and since the formation of the Ministry of Munitions has been Deputy Director-General of the Ministry and Technical Director of the Optical Department of the Ministry. He is the present president of the Optical Society. It is expected that, subject to the conclusion of certain arrangements with the Treasury, Mr. Cheshire will accept the directorship, and it is anticipated that the organisation of the department will be rapidly completed, and that training will begin at an early date.

THE CONFIGURATIONS OF ASTRONOMICAL MASSES AND THE FIGURE OF THE EARTH.¹

A STUDY of the forms which can be assumed by masses of actual compressible matter under their own gravitation is of obvious importance for cosmogony and astronomy. A theorem of fundamental importance is that for a given mass, acted on by given forces and rotating at a given speed, there is only one equilibrium arrangement of the internal strata when the boundary is fixed. Thus possible figures of equilibrium can be classified by their boundaries; the interior matter will arrange itself.

A simple application is to the figure of the earth. Regarding the earth's surface as roughly spherical, the internal layers of equal density must be concentric spheres. The view that the internal strata may be, or in some past age may have been, excentric, is found to be illusory, and an attempted explanation of the major inequalities of the earth's surface in terms of this idea fails.

A more complex application is to the figures of compressible masses, such as gases, in rotation. It is found that a shrinking compressible mass will, in general, assume in turn figures which may be described as pseudo-spheroids and pseudo-ellipsoids, these being derived by continuous distortion from the spheroids and ellipsoids which form the only stable figures of equilibrium for incompressible masses. The pseudo-spheroids are more lens-shaped than a spheroid, and the pseudo-ellipsoids are more spindle-shaped than an ellipsoid. A sharp periphery may develop on the pseudo-spheroid or a sharp point on the pseudo-ellipsoid, in which case streams of matter are ejected through centrifugal force outbalancing gravity.

Considering in detail the figures appropriate to the law $p = \kappa \rho \gamma$, it is found that a sharp periphery will develop on the pseudo-spheroids before the series of pseudo-ellipsoids is reached, if $\gamma < 3$ (approximately). Thus a mass of ideal gas for which $\gamma < 1\frac{2}{3}$ can never attain the pseudo-ellipsoidal form and so can never divide into two detached masses. But as the density of an actual gas increases with shrinkage, the ideal laws are departed from. The value $\gamma = 3$ is reached, perhaps, at a density of $\frac{1}{4}$ to $\frac{1}{3}$, roughly that of a B-type star. So far, then, a "giant" star can lose matter equatorially, but cannot divide by fission. The

¹ Abstract of the Bakerian Lecture delivered before the Royal Society on May 17 by Mr. J. H. Jeans, F.R.S.

latter process can only begin at about type B. This agrees exactly with Campbell's discussion of spectroscopic binaries.

In an actual star internal ionisation and pressure of radiation must be considered, so that a star of sufficient mass can break up before B-type is reached, and there can be "giant" double stars.

The results obtained fit in well with observation and suggest a simple view of stellar cosmogony.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—Mr. G. H. Holcroft has presented to the University a valuable collection of fossils and recent shells which belonged to the late Sir Charles Holcroft.

Dr. J. W. Russell has been elected joint professor of medicine to succeed Prof. Saundby, whose resignation takes effect on September 30 next. The council has resolved to recommend the court of governors at its next meeting to confer the title of "Emeritus Professor" on Prof. Saundby, "in recognition of his conspicuous services to the University and his eminence in the general field of medicine."

Messrs. A. W. Nuthall and J. T. Hewetson have been reappointed honorary curators of the Pathological Museum, in the sections of surgery and gynaecology respectively, for a term of three years from October next.

OXFORD.—On June 12 the honorary degree of D.Sc. was conferred on Prof. Arthur Schuster, who afterwards delivered the Halley lecture. In presenting Prof. Schuster, the Public Orator (Mr. A. D. Godley) spoke of his eminence in various departments of physical research, deploring the inadequacy of the Latin language for dealing with the technical details of the professor's work in the subjects of electricity and magnetism. He alluded also to Prof. Schuster's services as secretary of the Royal Society, and to the value of his labours to the nation at large.

THE Gilchrist Studentship for Women, of the University of London, has been awarded to Miss B. J. Schlumberger, an internal student, of University College.

PROF. J. G. ADAMI'S course of Croonian lectures at the Royal College of Physicians of London begins to-day, and will be continued on June 19, 21, and 26, at 5 o'clock. The subject of the course is "Adaptation and Disease."

A FUND of the value of 2000*l.*, to be known as the Osler Testimonial Fund, has been raised by the medical and chirurgical faculty of Maryland; the income will be devoted to the purchase of books for the library of the faculty and for the upkeep of the Sir William Osler Hall.

THE Prime Minister has informed Mr. Fisher that the urgent demand for further accommodation for war staff which must be housed in the immediate vicinity of the War Office and Admiralty necessitates the removal of the offices of the Board of Education. The new quarters of the Board are to be at the Victoria and Albert Museum, South Kensington. A sufficient number of rooms in Whitehall will, however, be retained for the use of the President, Parliamentary Secretary, and Permanent Secretary of the Board and for conferences, deputations, and interviews.

DR. T. BRAILSFORD ROBERTSON, professor of biochemistry and pharmacology in the University of California, has given to the regents of the University of California his patents for the growth-controlling substance tetelin, isolated by him from the anterior lobe of the pituitary body and used to accelerate repair in

slowly healing wounds. The proceeds which may accrue from the sale or lease of these patents are to constitute a fund which will be entitled "The University of California Foundation for International Medical Research," and will be expended in the furtherance of medical research, preferably research in the physiology, chemistry, and pathology of growth.

WE have received a letter from the Rev. A. J. Ashley, hon. secretary of the Church Esperantist League, in reference to the paragraph which appeared in this column in our issue of May 31. Mr. Ashley writes:—"Ido stands now about where Esperanto stood in the eighties of last century; it has no literature worth mentioning, while many of the finest works of every great literature can now be obtained in Esperanto." Mr. Ashley is of opinion that Esperanto, having thousands of societies and being used daily by tens of thousands of people, is continually spreading, and that such popular acceptance should be a preliminary condition of any Government support. As regards the teaching of a universal language in schools, Mr. Ashley says that in the Patricroft Council School in Eccles Esperanto is being taught as a regular school subject with great success. An account of this experiment will be found in the June-July issue of the *Esperanto Monthly*, which may be obtained from the secretary of the B.E.A., 17 Hart Street, London, W.C.1.

THE new chemical laboratories at University College, London, have been planned and designed so as to meet the requirements of modern chemical teaching and research, including provision for physical chemistry, in which branch immediate and rapid progress is urgent. The funds for these laboratories have been raised by a committee, of which H.R.H. Prince Arthur of Connaught is the president, and Capt. the Hon. Rupert Guinness the chairman and treasurer. The total cost of the site, building, and equipment will be 120,000*l.* One hundred thousand pounds has already been raised, leaving 20,000*l.* still to be found. In order to facilitate the immediate provision of this 20,000*l.*, Sir Ralph C. Forster, Bt., who has already subscribed generously to the cost of these laboratories, has promised 5000*l.* on condition that the remaining 15,000*l.* is raised speedily. Upwards of 700*l.* has already been raised towards the 15,000*l.* required. Those who are anxious to see chemical science in London adequately equipped are invited to assist in completing the sum needed. An appeal has been issued by a sub-committee formed by Lord Glenconner and Capt. the Hon. Rupert Guinness for this purpose. Further particulars may be obtained at the college. Subscriptions should be addressed to Lord Glenconner at the college.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 24.—Sir J. J. Thomson, president, in the chair.—Prof. A. Dendy and Prof. J. W. Nicholson: The influence of vibrations upon the form of certain sponge-spicules. It has been suggested recently by one of the authors that the positions of the whorls which appear on certain siliceous spicules in the genus *Latrunculia* may be determined by vibrations to which the spicule is subjected at a certain stage of its development, corresponding, in fact, with the nodal points of a vibrating rod. The object of the present communication is to describe a similar case in a closely allied, but hitherto undescribed, genus, and to subject it to mathematical analysis with the view of testing this vibratory theory. The problem was to determine the