

remarkable, the omissions are not less so. The explanation that Dr. Förstemann offers for the absence of reference to Jupiter or Saturn in these hieroglyphs is that their synodic periods are too nearly equal to the solar year. This can scarcely be regarded as a satisfactory explanation. But still more curious is the small attention paid to the moon. It is true that the writer traces a reference to the synodic period of $29\frac{1}{2}$ days, but the effort strikes one as rather forced, and the reference is by no means so prominent as in the case of Venus. There is, too, no mention of eclipses. In one passage Dr. Förstemann finds an allusion to clouds, and one need be very cautious how he disagrees with the opinion of so distinguished an expert. But it seems scarcely likely that such ordinary phenomena as clouds should be referred to, in what is evidently the production of considerable labour, intended for a permanent record. This omission is the more strange if we accept Dr. Seiler's view that the Maya documents declare an advance on the Mexican pictorial writings, and possess greater accuracy, indicating more elaborate computation. For in a Mexican MS., Codex Vaticanus, No. 3773, we have a distinct reference to the sun being devoured by a jaguar, and causing or explaining a solar eclipse (Kingsborough, iv., 22).

The commentary offers many other instances in which ingenuity and resource are exhibited in deciphering or in assigning meanings to these pictures, but here we can do no more than express our admiration of the patience and skill, which have solved so many enigmas and offered so many interesting suggestions.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The Robert Boyle lecture for 1907 will be delivered by Prof. Karl Pearson, on "The Scope and Importance to the State of Physical Eugenics," on Friday, May 17, at 9 p.m., in Balliol Hall.

The Herbert Spencer lecture for 1907 will be given by Mr. Francis Galton, on "Probability, the Foundation of Eugenics," in the Sheldonian Theatre on Wednesday, June 5, at 2.30 p.m.

Mr. C. G. Douglas, formerly Demy of Magdalen College, has been elected to an official fellowship in natural science at St. John's College.

CAMBRIDGE.—During their visits to England, it is proposed to confer the degrees of Doctor of Law upon the King of Siam and Prince Fushimi.

At a congregation to be held in June, the degree of Doctor of Science, *honoris causa*, will be conferred upon Sir Clements R. Markham, Colonel Sir T. H. Holdich, and Sir T. R. Fraser, professor of materia medica and of clinical medicine in the University of Edinburgh.

Prof. Hughes has been nominated to represent the University at the celebration of the centenary of the Geological Society of London in September.

Mr. A. D. Imms, Christ's College, has been appointed professor of biology at Allahabad University.

Prof. Nuttall will deliver his inaugural lecture in the anatomical lecture theatre on Wednesday, May 22, at 4.30 p.m.

An exhibition of 50l. a year tenable for two years is offered by the governing body of Emmanuel College to an advanced student commencing residence at the college in October. Application should be sent to the Master of Emmanuel not later than October 1.

The professorship of agriculture is vacant by the resignation of Prof. Middleton. The title of the professorship will in future be "The Drapers Professorship of Agriculture." The election of a professor will take place on Saturday, June 1, at the University Offices, St. Andrew's Street. Candidates for the chair are requested to communicate with the Vice-Chancellor of the University on or before Thursday, May 23.

THE Mercers' Company lectures on "The Internal Media of the Body and their Relation to the Tissues" will be given in the physiological department of University College (University of London) by Prof. E. H. Starling, F.R.S.,

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on Fridays at 5 p.m., commencing Friday, May 10. These lectures are open to all students of the London medical schools, and to medical men on presentation of their cards.

In the course of some remarks at the annual dinner of the Institution of Mining and Metallurgy on May 3, Mr. R. McKenna, M.P., President of the Board of Education, referred to the new Imperial College of Science and Technology, and said he hopes that a year hence it will be in a state of flourishing existence. He announced that this week it will be his duty to petition the King for a charter for the new college. The Bessemer memorial fund now amounts to 13,000*l.* or 14,000*l.*, and it is hoped that the amount will rapidly be increased to 30,000*l.* or 40,000*l.* The very best equipment the world can produce is needed for the Royal School of Mines, which even without such facilities has created a world-wide reputation for itself.

In the House of Commons on Monday, Mr. Murray Macdonald asked the Prime Minister whether, in view of the recent and prospective increased expenditure upon the improvement and development of State-aided education, of the importance of connecting it more closely with the universities, and of the fact that more than twenty-six years had elapsed since the last public inquiry into the universities and colleges of Oxford and Cambridge was held, he would appoint a commission to examine into the desirability of amending the existing enactments with regard to the finances, emoluments, and government of these universities. In reply to the question, Sir H. Campbell-Bannerman said:—I am disposed to agree with my hon. friend that the conditions of the universities are ripe for a thorough and comprehensive inquiry, but I am not disposed to add, at the present moment, to the number of Royal Commissions already existing.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 28.—"On the Dispersion in Artificial Double Refraction." By Dr. L. N. G. Filon. Communicated by Prof. F. T. Trouton, F.R.S.

It is well known that glass compressed unequally in different directions behaves like a temporary crystal. If T_1, T_2 be the principal stresses in the wave-front, τ the thickness of glass traversed, then the relative retardation of the two oppositely polarised rays is $R=C(T_1-T_2)\tau$. C may be called the "stress-optical coefficient" of the glass.

The experiments described were undertaken in order to find out how C for borosilicate glasses varied with the colour of the light used and with the composition of the glass.

Polarised light was passed through a combination of glasses under flexure optically equivalent to a slab under uniform stress. It was then analysed by a Nicol and spectroscope. The spectrum was crossed by a dark band whenever R =integer multiple of λ . The measurement of λ then gave R and C .

It is found that, on the whole, the dependence of the stress-optical coefficient on the colour is very well expressed by the empirical formula

$$\left(\frac{C}{C_0} - 1\right) \left(\frac{\lambda}{\lambda_0} - 1\right) = 1,$$

C_0, λ_0 being constants. This gives a hyperbolic law.

In certain glasses, however, systematic deviations from this law exist. These deviations are local in character, and their study suggests a strong analogy with the effect of absorption bands on the dispersion in single refraction.

With regard to the effect of chemical composition, it appears that an increase in the percentage of B_2O_3 increases C_0 ; an increased percentage of K_2O probably decreases C_0, λ_0 , on the other hand, seems roughly independent of the composition, so that, for the glasses examined, the curves of C plotted to λ differ only in their scale; the dispersion increases with the stress-optical coefficient.

Chemical Society, April 18.—Sir William Ramsay, K.C.B., F.R.S., president, in the chair.—The magnetic rotation of hexatriene, $\text{CH}_2 : \text{CH} : \text{CH} : \text{CH} : \text{CH}_2$, and its relationship to benzene and other aromatic compounds, also its refractive power: Sir W. H. Perkin. Hexatriene was found to have the rotation 12.196, which, when reduced by 0.982, the constant due to the effect of ring formation, gives 11.214 for benzene as against 11.284 actually found for benzene. This indicates that benzene contains three contiguous unsaturated groupings (Kekulé's formula), and that these have substantially the same values as in open chain compounds.—Aromatic azoimides, part i., *p*-hydroxyphenylazoimide: M. O. Forster and H. E. Fierz. The properties of *p*-hydroxyphenylazoimide were described and compared with those of camphorylazoimide.—Measurements of the velocities of saponification of the *l*-menthyl and *l*-bornyl esters of the stereoisomeric mandelic acids: A. McKenzie and H. B. Thompson. *l*-Bornyl *d*-mandelate is saponified more quickly than *l*-bornyl *l*-mandelate. The bornyl esters are more quickly saponified than the menthyl esters.—The constituents of the essential oil of American pennyroyal. Occurrence of a dextromenthone: M. Barrowcliff. The oil has been found to consist of (1) an undetermined phenol; (2) *l*-pinene; (3) *l*-limonene; (4) dipentene; (5) *l*-methyl-3-cyclohexanone; (6) pulegone; (7) *l*-menthone; (8) *d*-isomenthone; (9) a sesquiterpene alcohol; (10) esters of formic, acetic, octoic, decylic, and salicylic acids, and the ester of a dibasic acid of the probable formula $\text{C}_8\text{H}_{14}\text{O}_4$, together with formic, butyric, octoic, and decylic acids in the free state.—Studies in the camphane series, part xxiii., oximes of camphorylsemicarbazide and camphorylazoimide: M. O. Forster and H. E. Fierz.—The action of ethyl oxalate on thioacetanilide and its homologues: S. Ruhemann.—The action of tribromopropane on the sodium derivative of ethyl acetacetate: T. E. Gardner and W. H. Perkin, jun.—Indican. Preliminary notice: A. G. Perkin and W. P. Bloxam. A process is described for the isolation of the glucoside from *Indigofera* leaves, and it is shown that the indican from *I. sumatrana* is identical with that from *I. arrecta*.—Cupric nitrite: P. C. Ray.—The action of hydrogen peroxide on potassium cyanide: O. Masson. The products of the action are potassium cyanate and potassium and ammonium carbonates.—The reaction between calcium carbonate and chlorine water: A. Richardson.—The density of hydrogen chloride: R. W. Gray. The highest value obtained for the weight of a litre of the gas at 0° and 760 mm. in London was 1.64091 grams, and the lowest 1.64026 grams. The mean value, corrected to lat. 45°, is 1.6397 grams, which is practically identical with the value 1.6398 grams found by Prof. Guye.—Di-iodocamphor: J. E. Marsh and R. de J. F. Struthers.—Acyl- ψ derivatives of iminothiocarbamic acid and their isomerides: A. E. Dixon and J. Taylor.

Institution of Mining and Metallurgy, April 18.—Prof. W. Gowland, president, in the chair.—A visit to the gold fields of Orenburg, Russia: F. H. Hatch. Notes of a journey recently made through the district, with a brief review of its physical characteristics, the occurrence of gold in alluvials and quartz, and the systems of mining adopted.—The McMurtry-Rogers process for desulphurising copper ores and matte: communicated by T. C. Cloud. A description of this process as carried on at the Wallaroo Works. It consists in calcining sulphide ores containing a large proportion of silica or siliceous material in converters fitted with blast-pipes and air-holes, thereby allowing a strong current of air to pass through the charge; an important part of the process is the preliminary "swamping" of the ore and the materials to be treated with water.—The ironstone of Cleveland: A. E. Pratt. A brief account of the Cleveland ironstone beds, which produce 40 per cent. of the iron ore raised in this country. The author described the geology, mining, and calcination methods pursued at leading mines, with practical notes on the working of the Cleveland kiln.—Laboratory crucible and muffle furnaces: G. T. Holloway. An illustrated description, accompanied by a complete specification, of furnaces erected in the author's own laboratory.

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PARIS.

Academy of Sciences, April 29.—M. A. Chauveau in the chair.—A suspended collimator for giving the position of the zenith: G. Lippmann. A vertical collimator carrying a very fine hole in its focal plane is suspended by a very flexible spring in such a manner that it is perfectly free to oscillate in a vertical plane. The suspending spring is formed of steel ribbon, 1/20th of a millimetre thick, 1 cm. wide, and 20 cm. long. The system is damped by a set of plates dipping in oil, and ceases to oscillate in two minutes. The apparatus is not sensitive to slight earth tremors, and the luminous image returns to exactly the same spot even after violent shocks.—The representations of an integral by a sum of ten or twelve squares: G. Humbert.—The direct hydrogenation of allyl compounds: Paul Sabatier. The vapour of allyl alcohol in a current of hydrogen carried over reduced nickel maintained at a temperature of between 130° C. and 170° C. gives nearly pure propyl alcohol, the only impurity being a trace of propionic aldehyde. Reduced copper at 180° C. produces the same reaction, but both the yield and the quality of the product are inferior.—Observation of the eclipse of the sun of January 14, 1907, at the Observatory of Phu-Lien, Tonkin: G. Le Cadet. An account of visual observations, actinometric measurements, and barometric changes during the partial eclipse.—The distances of the satellites of Uranus and of Jupiter: Émile Belot.—The analytical nature of the solutions of certain partial differential equations of the second order: Charles Goldziher.—The development of hyperelliptic functions in trigonometrical series: Z. Krygowski.—The surfaces developed by a circular helix: E. Barré.—The most general representation of the equation of nomographical order 3 by a conical nomogram: Maurice d'Ocagne.—The sharp edge integrator: M. Jacob. This form of planimeter is capable of dealing with important questions arising from the equations of Abel and Riccati, and presents especial interest from the point of view of artillery.—The action of a horizontal aerial current upon a vertical vortex: Bernard Brunhes.—The direct determination of the absolute value of the electric charge of a monovalent electrolytic ion: H. Pellat. It has been shown by Townsend that the electric charge carried by a gaseous ion is the same as the charge carried by a monovalent ion during electrolysis; J. J. Thomson has determined the first of these two quantities, thus giving the second indirectly. In the present note a method is given for measuring the charge carried by a monovalent electrolytic ion without assuming any of the properties of gaseous ions. The numerical results are of the same order as those furnished by the Thomson-Townsend method.—The dielectric constant of ice and of water in the neighbourhood of 0° C.: F. Beaulard. It is found that the dielectric constant of ice is of the same order of magnitude as the square of the refractive index; the constant for water near 0° C. is about double that of ice.—An apparatus for measuring the rate of consumption of petrol in motors: M. Krebs. An acknowledgment of priority for a similar apparatus invented by M. Parenty.—The acoustic efficiency of the telephone: Henri Abraham. Leaving cases of resonance out of account, the best telephone does not transmit more than one-thousandth part of the energy which it receives to the line.—A new microscope and its applications to stereoscopic photomicrography: A. Quidor and A. Nachet.—The limit of inflammability of mixtures of ether vapour and air: O. Boudouard and H. Le Chatelier. Referring to a paper on this subject published recently by J. Meunier, the authors point out that they anticipated these results ten years ago.—Researches on the compressibility and vapour pressure of mixtures of methyl ether and sulphur dioxide; the formation of a compound between these two bodies: E. Briner and E. Cardoso. Data are given proving the existence under strong compression of a compound having the composition $(\text{CH}_3)_2\text{O} \cdot \text{SO}_2$. The critical temperature and pressure of this compound were measured.—The temperature of formation of the carbides of strontium and barium: Morel Kahn. The reduction of baryta and strontia by carbon can be realised at a temperature near that of the fusion of platinum, with formation of the corresponding carbides.—The preparation and proper-

ties of a new variety of chromium: Binet du Jassonneix. At a high temperature copper dissolves about 1.6 per cent. of chromium, and this separates out during cooling in the form of a spongy mass. The chromium can be isolated by dissolving away the copper in nitric acid.—The limit to the proportion of silicon which can be taken up by copper: Em. Vigouroux. In the presence of lead, bismuth, or antimony, silicon in excess reacts with the copper to form a copper silicide, the maximum percentage of silicon taken up being about 10 per cent.—The higher oxides of rubidium: E. Rengade. By the regulated action of oxygen upon rubidium, evidence is obtained of the formation of a black oxide intermediate between the dioxide and the peroxide, and of a composition approximating to Rb_2O_3 .—The isomeric dioximidosuccinic acids: A. Wahl.—The dibromides of the allyl phenolic ethers; the formation of cyclopropanols: MM. Tiffenau and Daufresne.—The bitterness of milk: MM. Trillat and Sauton. The bitterness of milk, as of cheese, is produced whenever contamination occurs with any organism capable of producing both aldehydes and ammonia, or by several species of organisms, some of which are capable of producing ammonia, others aldehydes.—The presence of sympathetic ganglia situated below the spinal ganglia; microsympathetic and hypo-spinal ganglia: G. Marinesco and J. Minea.—The nephro-poietical activity of the foetal kidney: P. Carnot and A. Lelièvre.—The mode of action of sodium salicylate on the uric excretion: Pierre Fauvel. Salicylate of soda does not increase the amount of uric acid or xantho-uric products, but only exerts a modifying action on the secretion.—The discovery of a human jawbone in a Quaternary breccia: A. Favraud.—The relations between glacial erosion and fluvial erosion: Jean Brunhes.—The movements of sands along the coastline: M. Thoulet.

DIARY OF SOCIETIES.

THURSDAY, MAY 9.

ROYAL SOCIETY, at 4.30. The Anatomy of the Julianiaceae considered from the Systematic Point of View: Dr. F. E. Fritsch.—The Ascent of Water in Trees, Second Paper: Prof. A. J. Ewart.—Increase in the Complement-Content of Fresh Blood-Serum: Dr. J. Henderson Smith.—On the Periodic Variations of the Nile Flood: E. B. H. Wade.
 ROYAL INSTITUTION, at 3.—Spectroscopic Phenomena in Stars, (1) Chemistry: H. F. Newall, F.R.S.
 INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Telephonic Transmission Measurements: B. S. Cohen and G. M. Shepherd.
 IRON AND STEEL INSTITUTE, at 10.30 A.M.—Presidential Address.—Electrically Driven Reversing Roller Mills: D. Selby-Bigge.—(1) Steel Making from High Silicon Phosphoric Pig Iron by the Basic Bessemer Process: (2) Steel Making from Pig Iron containing Chromium, Nickel, and Cobalt: A. W. Richards.—The Use of Steam in Gas Producer Practice: Prof. W. A. Bone and R. V. Wheeler.
 MATHEMATICAL SOCIETY, at 5.30.—Rational Expression of the Invariants of a Quintic by Means of Three: Dr. H. F. Baker.—Secular Stability: Prof. H. Lamb.—A Lemma connected with Fourier's Series: F. J. W. Whipple.

FRIDAY, MAY 10.

ROYAL INSTITUTION, at 9.—Recent Excavations on Forum Romanum, and the Forum Ulpium: Signor Com' Giacomo Boni.
 PHYSICAL SOCIETY, at 8.—Stereoscopy with long Base-line illustrated on the Screen: Dr. T. C. Porter
 ROYAL ASTRONOMICAL SOCIETY, at 5.—On the Presence of Tin in Stellar Atmospheres: J. Lunt.—Tables to Accompany Mr. Innes's Paper on Computation of Secular Perturbations: F. Robbins.—Note on Certain Photo-visual Objectives: W. J. S. Lockyer.—On the Variable Stars *RV* and *RX Andromedae*: A. Stanley Williams.—Note on Le Verrier's Tables of Saturn: A. M. W. Downing.—Note on the Range in Brightness at Maximum of Long-period Variables: H. H. Turner.—An apparent Influence of the Earth on the Numbers and Areas of Sun-spots in the Cycle 1889-1901: Mrs. A. S. D. Maunder.—Some Notes on the Classification of Long-period Variables: H. H. Turner.—*Promised Papers*: Distribution of Prominences in Latitude in the Year 1906: John Evershed.—Description of the 30-inch Reflector recently erected at the Helwan Observatory, Egypt: J. H. Reynolds.—Note on the Spectrum of α Orionis: H. F. Newall.—Observations of Jupiter's Sixth and Seventh Satellites from Photographs taken with the 30-inch Reflector in 1906-7: Royal Observatory, Greenwich.—Recent Work at the Kodaikānal Observatory: Prof. Michie Smith.
 MALACOLOGICAL SOCIETY, at 8.—The Pairing of *Limnaea peugra* with *Planorbis cornuus*: W. D. Lang.—Notes on *Achatina denisoni*, Reeve, and *Achatina magnifica*, Pfr.: E. A. Smith.—Review of the New Zealand Acmaeidae, with Descriptions of New Species and Sub-species: Henry Suter.
 IRON AND STEEL INSTITUTE, at 10.30 A.M.—Sentinel Pyrometers and their Application to the Heat Treatment of Tool Steel: H. Brearley and F. Colin Moorwood.—Induced Draught with Hot-air Economisers for Steel-Works and Blast-Furnace Boilers: A. J. Capron.—The Influence of Process of Manufacture on Some of the Properties of Steel: F. W. Harbord.—The Distribution of Sulphur in Metal-Ingot Moulds: J. Henderson.—The Ageing of Mild Steel: C. E. Stromeyer.—Carbon-Tungsten Steels: T. Swinden.—The Nomenclature of Iron and Steel:

Report of a Committee of the International Association for Testing Materials.
 SOCIETY OF CHEMICAL INDUSTRY, at 8.—Consideration of the Patents and Designs Bill, 1907.
 SATURDAY, MAY 11.
 ROYAL INSTITUTION, at 3.—Scientific Work in the Sea-Fisheries: Prof. W. C. McIntosh, F.R.S.
 MONDAY, MAY 13.
 ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—An Expedition from the Niger to the Nile: Lieut. Boyd Alexander.
 VICTORIA INSTITUTE, at 4.30.—Recent Discoveries in Palestine and Syria: Dr. Ernest W. G. Masterman.
 TUESDAY, MAY 14.
 ROYAL STATISTICAL SOCIETY, at 5.
 ANTHROPOLOGICAL INSTITUTE, at 8.15.—Exhibition of Australian Specimens and Photographs recently received from Dr. Ramsay Smith, of Adelaide: Prof. D. J. Cunningham, F.R.S.—Dolls: N. W. Thomas.
 WEDNESDAY, MAY 15.
 SOCIETY OF ARTS, at 8.—Trypanosomiasis or Sleeping Sickness: Dr. H. W. G. Macleod.
 ROYAL METEOROLOGICAL SOCIETY, at 4.30.—The Standard Rain Gauge, with Notes on Other Forms: Dr. Hugh Robert Mill.—On a Method and Apparatus for Measuring Fog Densities: J. W. Lovibond.—Note on a Balloon Struck by Lightning, April 11, 1907: Colonel J. E. Capper.—Account of a Remarkable Excavation made by Lightning in Peat-earth on August 2 or 3, 1906: J. Nevin and A. S. Herschel, F.R.S.
 ROYAL MICROSCOPICAL SOCIETY, at 8.—Diffraction Rings due to a Circular Aperture: Prof. A. W. Porter and P. F. Everitt.—An Improved Vertical Illuminator: E. M. Nelson.
 GEOLOGICAL SOCIETY, at 8.—The Origin of certain Cañon-like Valleys Associated with Lake-like Areas of Depression: F. W. Harmer.
 THURSDAY, MAY 16.
 ROYAL INSTITUTION, at 3.—Spectroscopic Phenomena in Stars, (2) Motion: H. F. Newall, F.R.S.
 CHEMICAL SOCIETY, at 8.30.—The Relation Between the Crystalline form and the Chemical Constitution of Simple Inorganic Substances: W. Barlow and W. J. Pope.—Experimental Investigation into the Process of Dyeing: J. Hübner.—Some Derivatives of β -Pyranol allied to certain Derivatives of Brazilin and Hamatein, Preliminary Communication: W. H. Perkin, jun., and R. Robinson.—Mixed Semi-ortho-Oxalic Compounds: G. D. Lander.—The Mechanism of Bromination of Acylamino-compounds, Preliminary Notice: J. B. Cohen.
 INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Present State of Direct Current Design as Influenced by Interpoles: F. Handley Page and Fielder J. Hiss.

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