

communicated to the Royal Society a description of his reflecting octant; and, after some hesitation, Halley declared himself satisfied that Hadley's idea was quite different from that of Newton, who had invented an instrument founded on the same principle. It is no doubt true that Thomas Godfrey, a glazier of Philadelphia, had invented an instrument of this kind about the year 1730; but the first intelligence of his invention did not reach England before the month of May 1732, in a letter from James Logan to Halley. Godfrey's instrument was made of wood by Edmund Woolley, a carpenter, about November 1730, and had been tried on board the ship *Truman*, of which John Cox was master. The first model of Hadley's octant had, however, been constructed by his brother George about the middle of the summer of 1730. The thanks of those interested in the history of astronomy are due to Dr. Dreyer for the effort which he has made to correct the errors on this point which are found in Poggenorff's "Biographisch literarisches Handwörterbuch," in Wolf's "Geschichte der Astronomie," and elsewhere.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 SEPTEMBER 19-25

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on September 19

Sun rises, 5h. 43m.; souths, 11h. 53m. 42'7s.; sets, 18h. 5m.; decl. on meridian, 1° 25' N.; Sidereal Time at Sunset, 17h. 59m.

Moon (at Last Quarter September 21) rises, 20h. 39m.\*; souths, 4h. 7m.; sets, 11h. 44m.; decl. on meridian, 15° 12' N.

Planet	Rises		Souths		Sets		Decl. on meridian
	h.	m.	h.	m.	h.	m.	
Mercury ...	4	55	11	29	18	3	6° 0' N.
Venus ...	3	50	10	45	17	40	9° 56' N.
Mars ...	10	44	15	11	19	38	18° 12' S.
Jupiter ...	7	7	12	52	18	37	3° 43' S.
Saturn ...	23	34*	7	37	15	40	21° 32' N.

\* Indicates that the rising is that of the preceding evening.

Occultations of Stars by the Moon (visible at Greenwich)

Sept.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image	
					h. m.	h. m.
20 ...	130 Tauri...	6	23 34	0 30†	68	229
21 ...	26 Geminorum...	5½	22 46	23 26	23	273
25 ...	B.A.C. 3345	6	1 53	2 41	61	206

† Occurs on the following morning.

Sept.	h.	Event
22 ...	12	Saturn in conjunction with and 3° 29' north of the Moon.
23 ...	—	Sun in equator.

Variable Stars

Star	R.A.		Decl.		Sept.	h. m.	
	h.	m.	h.	m.			
U Cephei ...	0	52'2	81	16 N.	21,	19 4 m	
ζ Geminorum ...	6	57'4	20	44 N.	24,	0 57 m	
U Monocerotis ...	7	25'4	9	32 S.	21,	M	
U Cancri ...	8	29'3	19	17 N.	25,	M	
δ Libræ ...	14	54'9	8	4 S.	21,	2 11 m	
U Coronæ ...	15	13'6	32	4 N.	22,	1 45 m	
U Ophiuchi...	17	10'8	1	20 N.	22,	4 27 m	
			and at intervals of 20 8				
β Lyræ...	18	45'9	33	14 N.	18,	21 30 M	
					22,	2 0 m	
η Aquilæ ...	19	46'7	0	43 N.	25,	5 0 m	
S Cygni ...	20	3'1	57	40 N.	24,	M	
U Cygni ...	20	16'1	47	32 N.	20,	M	
T Cephei ...	21	8'0	68	2 N.	20,	m	
δ <sub>2</sub> Cephei ...	22	24'9	57	50 N.	22,	22 0 M	

M signifies maximum; m minimum.

Meteor Showers

The following are amongst the showers of the period:—Near θ Cassiopeæ, R.A. 14°, Decl. 50° N.; near α Arietis, R.A. 31°, Decl. 18°; and near Polaris, R.A. 68°, Decl. 87° N.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

UNIVERSITY COLLEGE, LONDON.—We notice from the prospectus of the Engineering Department that the examination for the Gilchrist (Entrance) Engineering Scholarship of 35% per annum is to be held on the 28th and 29th inst. Candidates must be under nineteen, and the subjects of examination are:—(1) Mathematics; (2) any two or more of the following—(a) mechanics, (b) mechanical drawing, (c) examination on some subject connected with engineering, (d) French or German, (e) the use of tools. The examination is intended to be of such a standard as can be passed by lads from school who have begun to acquire some knowledge of mechanical pursuits. The appliances of the engineering laboratory (under Prof. Alexander B. W. Kennedy) have been very much extended during the past year, mainly through a grant from the Gilchrist Trustees, and are now very complete in the direction both of experiments in elasticity and the strength of materials, and in the economic work of engines and boilers. Laboratory work is so arranged that students go through a systematic course of experimental instruction in these and other connected subjects during the session.

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, September 6.—M. Émile Blanchard in the chair.—On presenting to the Academy a copy of a volume issued on the occasion of M. Chevreul's centenary, August 31, 1886, M. Berthelot remarked that this seemed a suitable occasion for reviving the old custom of celebrating Academic solemnities by the publication of special scientific and literary essays. The present work, in the preparation of which MM. Ch. Richey, G. Pouchet, E. Grimaux, E. Gautier, Dujardin-Beaumetz, E. Demarçay, and Berthelot had co-operated, has been executed with rare taste and care by the editor, M. Alcan, and by him dedicated to M. Chevreul on behalf of himself and his fellow-contributors.—Fluorescence of the compounds of manganese subjected to electric effluvia in vacuum, by M. Lecoq de Boisbaudran. In the experiments here described the author has aimed especially at determining the effects due to the presence of manganese. The fluorescence of some of its compounds is an extremely sensitive reaction, by means of which imponderable traces of this metal may be detected in natural or artificial substances that might otherwise be supposed free from its presence.—Paralytic ataxy of the heart, by M. Mariano Semmola. In this communication the author resumes the results of his further observations on cardiac disorders, already reported in the *Transactions* of the International Medical Congress, seventh session, London, August 1881.—Remarks in connection with three Italian essays submitted to the Academy, by M. Govi. The first of these papers deals with an episode in the life of Galileo, showing that the hostility of the Jesuits to the Florentine philosopher was not due to the letter addressed by him to his brother in 1606, announcing the expulsion of the Order from Venice. The second describes a curious plano-convex lens executed by Torricelli some time between 1644 and 1647, and recently discovered in the Cabinet of Physics attached to the University of Naples. The third refers to an unpublished letter written by Volta in 1785 on Lavoisier's pneumatic theory, which, although not accepted without reservations, is defended against the assumptions of an Englishman named Lubbock, who had essayed to transform oxygen into a new principle called by him the "sorbile principle."—On certain differential equations of the first order, by M. Roger Liouville. It is shown that the differential equation—

$$y' + a_1 y^3 + 3a_2 y^2 + 3a_3 y + a_4 = 0,$$

is reducible to the quadratures if its coefficients  $a_1, \dots, a_4$  and their derivatives  $a'_1, \dots$  satisfy the equation—

$$a_1 L' + KL^{\frac{3}{2}} - 3[a'_1 + 3(a_2^2 - a_1 a_3)]L = 0,$$

where  $L$  represents the combination

$$L = a_0 a'_1 - a_1 a'_2 + a_1(a_1 a_4 - a_2 a_3) + 2a_2(a_2^2 - a_1 a_3),$$

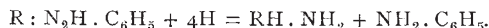
and  $K$  an arbitrary constant which may vanish.—Note on the

theory of dissociation, by M. G. Chaperon. It is argued that the theory of dissociation may be expressed with simplicity by means of certain cycles, which are easily formed, if the possibility be admitted of separating at a constant temperature several mixed gases or vapours without the expenditure of convertible labour or of heat.—On the conjugation of the Paramécia, by M. E. Maupas. Fresh observations on *Paramecium caudatum* have led the author to the determination of a fact of great physiological importance, which had hitherto escaped his notice, and which seems to foreshadow in these organisms the fecundating processes of the higher animals.—On the family of the Polyclinians, by M. Lahille. The Polyclinians of Roscoff—studied, for the first time, in 1872 and 1873, by M. Giard—are here divided into two distinct families—Polyclinidæ and Aplididæ.—On the affinities of the Eocene ferns of West France and Saxony, by M. Louis Crié. The already-determined affinities of the Tertiary flora of these two regions are here considerably enlarged by a comparative study of their respective ferns.—Note on the telluric currents, by M. J. J. Landerer. The author's further observations on meteorological phenomena connected with electricity lead to the general inference that the great telluric current of the globe has its origin in the difference of the negative potentials. The constancy and amplitude of the régimes of the winds whence it results insure both its normal direction and permanence.—On the discovery made in Belgium of a grave contemporary with the mammoth and rhinoceros, by M. Nadailac. In a cave recently explored by MM. Marcel de Puydt and Sohest near Spy, in the province of Namur, were discovered two skulls of the Neanderthal type associated with the remains of *Rhinoceros tichorhinus* and *Elephas antiquus* (?). It thus appears that the Neanderthal race had already penetrated to the Meuse valley in the remotest times. From the relics found in the undisturbed soil of this cave it appears that they could make flint implements, utilise the tusks of the mammoth, manufacture earthenware baked in the fire, that they buried their dead, and in a word possessed the first rudiments of civilisation.

BERLIN

Chemical Society, July 12.—C. Scheibler, Vice-President, in the chair.—Ferd. Tiemann gave an account of some reactions of substituted amidoximes.—C. Scheibler discussed the important question for the sugar industry, whether a definitely characterised strontium dihydrate ( $\text{SrO}, 2\text{H}_2\text{O}$ ) exists as such, or whether the substance having the percentage composition of a dihydrate is not rather a monohydrate ( $\text{SrO}, \text{H}_2\text{O}$ ) containing a higher hydrate mixed with it. He described his experiments on the action of carbon dioxide on the hydrates of the alkaline earths at different temperatures and containing varying amounts of water. He finds that the facts agree with the latter view.—H. Noerdlinger has studied the oxidation products obtained by the action of nitric acid on myristic acid: the chief products are succinic and adipic acids, besides smaller quantities of glutaric, pimelic, suberic, oxalic, and carbonic acids.—R. J. Friswell and A. G. Green described their researches on the constitution of diazoamidobenzene, from which it is concluded that the constitutional formula  $\text{C}_6\text{H}_5 \cdot \text{N} : \text{N} \cdot \text{NH} \cdot \text{C}_6\text{H}_5$  usually assigned to it is the correct one.—M. Rosenfeld described lecture experiments for the demonstration of the volumetric decomposition of hydrochloric acid and of the sublimation of sulphur.—J. Bongartz gave an account of compounds which aldehydes, ketones, and ketonic acids give with thioglycolic and thioacetic acids.—R. Otto discussed the conditions under which the whole of the arsenic can be removed from hydrochloric acid by hydrogen sulphide, and he showed that the last traces of arsenic can be precipitated when the addition is made of a certain quantity of a substance which gives an insoluble precipitate with the hydrogen sulphide. Since crude hydrochloric acid always contains such substances (e.g. ferric chloride, chlorine, &c.), it can readily be freed from arsenic by means of hydrogen sulphide.—P. Klason gave an account of a new method for the estimation of sulphur and of the halogens in organic compounds by burning them in a current of oxygen.—H. Kiliani has isolated the lactone of levulosecarboxylic acid, and has more closely examined the pentoxypimelic acid resulting from the oxidation of dextrosecarboxylic acid, and also its lactone.—E. Fischer has obtained a base named isoglucosamine,  $\text{C}_6\text{H}_{13}\text{NO}_5$ , by the reduction of phenylglucosazone with zinc dust and acetic acid, aniline and ammonia being simultaneously produced; isoglucosamine is isomeric with glucosamine, and closely resembles the latter in its properties, and probably bears

the same relation to levulose as glucosamine does to dextrose.—J. Tafel described a new method of preparing primary amines, which consists in the action of sodium amalgam and glacial acetic acid on the alcoholic solution of the substances produced from ketones or aldehydes and phenylhydrazine; the reaction takes place according to the equation—



—E. Erlenmeyer offered an explanation of the remarkable isomerism occurring in the cinnamic acid and acrylic acid series.—K. Heumann and Th. Heidlberg are experimenting with a view to ascertain the influence exerted on the shade of certain dyes by the introduction of substitution groups and elements: in the present communication they describe the effect produced by the introduction of chlorine.—W. Staedel and H. Bauer gave an account of their experiments on the methylation of metanitriline; on the demethylation of tertiary aromatic amines, and also on a convenient method of preparing azo-compounds.—G. Ciamician and P. Silber had a paper on the constitution of certain di-substitution derivatives of pyrroline.—K. Elbs and G. Steinike have studied  $\alpha$ -naphthylphenylketone.—W. Kelbe has found ordinary cymene and an aromatic hydrocarbon of the formula  $\text{C}_9\text{H}_{12}$  in rosin-spirit.—R. Anschütz and P. N. Evans have found that antimony pentachloride boils under diminished pressure without appreciable decomposition.—A. G. Ekstrand gave the results of his research on the naphthoic acids; he has prepared and described the various nitro-derivatives.

BOOKS AND PAMPHLETS RECEIVED

"American Journal of Mathematics," vol. viii. No. 3.—"18th and 19th Annual Reports of the Trustees of the Peabody Museum," vol. iii. Nos. 5 and 6 (Cambridge, Mass.).—"Field and Other Experiments Conducted on the Farm and in the Laboratory of Sir J. B. Lawes, June 1886."—"A History of the Theory of Electricity," vol. 1, by Isaac Todhunter and Karl Pearson (University Press, Cambridge).—"Industrial and High Art Education in the United States," by J. E. Clarke (Washington).

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