

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, November 11.—Mr. J. W. L. Glaisher, F.R.S., President, in the chair.—Mr. F. S. McAulay, St. Paul's School, was elected a Member.—The following gentlemen were elected to form the Council for the ensuing session:—President: Sir J. Cockle, F.R.S.; Vice-Presidents: J. W. L. Glaisher, F.R.S., Prof. Harry Hart, and the Right Hon. Lord Rayleigh, Sec.R.S.; Treasurer: A. B. Kempe, F.R.S.; Hon. Secretaries: Messrs. M. Jenkins and R. Tucker; other Members: Prof. Cayley, F.R.S.; E. B. Elliott, Prof. Greenhill, J. Hammond, Prof. M. J. M. Hill, C. Leudersdorf, Capt. Macmahon, R.A., S. Roberts, F.R.S., and J. J. Walker, F.R.S.—The retiring President, J. W. L. Glaisher, F.R.S., delivered an address, which treated of the Mathematical Tripos Examinations at Cambridge, and of the bearings of recent changes in the same upon the advancement of mathematics.—The following communications were made:—Certain operators in connection with symmetric functions, by R. Lachlan.—The transformation of a certain quartic elliptic element, by R. Russell.—Discussion of a multilinear operator, with applications to the theories of invariants and reciprocants, by Capt. Macmahon.—The theory of screws in elliptic space (fourth note), by A. Buchheim.—The rectification of certain curves, by R. A. Roberts.—Rectification of a sphero-conic, by H. F. Burstall.—Third paper on reciprocants, by L. J. Rogers.—The "sine-triple-angle" circle, by R. Tucker.

Linnean Society, November 4.—Mr. William Carruthers, F.R.S., President, in the chair.—The President paid a passing tribute to, and commented on the loss sustained in the death of, Mr. George Busk, a former Secretary and Vice-President of the Society. Afterwards he drew attention to phosphorescent organisms obtained by him in the Firth of Clyde last September.—Mr. John Murray also made remarks on the same, alluding to his own observations of *Ceratium tripos* being found in long chains in the ocean ("Narrative of the Cruise of the *Challenger*"), and to Klebs's opinion of *Ceratium* being a genus of unicellular Algae, and not an infusorian.—Prof. J. Macoun made remarks on a series of cones of Canadian *Piceas*. He showed that the various forms occurring from east to west of the continent, which had been hitherto considered different species, were doubtless local varieties of but one species, slightly modified according to the altitudes and region they inhabited.—Dr. F. Day exhibited a salmon parr, twenty months old, raised at Howietown from parents which had never visited the sea. He also showed coloured drawings of hybrids raised in the same establishment—one being a cross between the American charr and the Loch Leven trout, a second between the American and the British charr, and a third between the last-mentioned hybrid and the Loch Leven trout; all were fertile.—Fresh specimens of a white variety of *Crocus nudiflorus* from Biarritz, France, were shown for Mr. W. D'Arcy Godolphin Osborne, who first observed the variety there in 1882, but since then it has been figured by Mr. G. Maw in his monograph of the genus.—Mr. E. M. Holmes exhibited examples of *Lycopodium echinatum*, Pers., viz. the young plants, and the reticulate appearance of the peridium left by the falling off of the spines.—Mr. F. Pascoe exhibited one of the round olive green balls from Sicily, formed by the action of the sea on fragments of the *Posidonia caulinia*, and reduced, after a few days' exposure, to a flat cake-like body densely covered with minute crystals of salt. He also showed some acorn-shells (*Balanus*), where several individual animals had united their shells into a common tube, and where the outer valves of each animal had lengthened, forming a series of irregular subsidiary tubes radiating from the apex of the primary one.—Mr. E. C. Bousfield read a paper on the natural history of the genus *Dero*. In this he gives a full account of their habits and the best method of observing them. The *Naias digitata*, Müll., he rejects as a specific appellation, Müller's reference being defective. He shows wherein the *Deros* differ from the *Naiades*, viz. in the former having a respiratory apparatus at the end of the tail. He diagnoses seven species, four being new; all are figured.—Mr. S. O. Ridley gave in abstract his researches on the genus *Lophopus*, and description of a new species from Australia. This latter, *L. lendenfeldii*, obtained by Dr. Lendenfeld near Sydney, N.S.W., is distinguished from *L. crystallinus* by length of tentacles equalling the body of the polypide, and by the non-pointed outline of the statoblast. The new species is the fourth fresh-water Polyzoan recorded from Australia, and the first of its

genus satisfactorily determined from the southern hemisphere. Staining with borax-carminé brings out multipolar cells in the ectocyst, indicating mesodermal elements, and denoting that the ectocyst is something more than mere epithelium. A modification of the diagnosis of the genus is necessitated from these observations.

Chemical Society, November 4.—W. Crookes, F.R.S., Vice-President, in the chair.—Messrs. H. Crompton, G. Dyson, T. B. Tyson, and S. Williamson were admitted Fellows of the Society.—The following papers were read:—The action of chlorosulphonic acid on naphthalene- α - and β -sulphonic acids, by Henry E. Armstrong and W. P. Wynne, B.Sc.—The action of bromine on (Schäfer's) β -naphtholsulphonic acid, by Henry E. Armstrong and F. W. Streatfeild.—The action of bromine on the naphthalenesulphonic acids, by Henry E. Armstrong and W. P. Wynne, B.Sc.— α -Nitro-, α -bromo-, and α -chloronaphthalenesulphonic acids, by Henry E. Armstrong and S. Williamson.—The hydrolysis of sulphonic acids, by A. K. Miller, Ph.D.—The action of bromine on tolueneparasulphonic acid, by A. K. Miller, Ph.D.—Phosphorus tetroxide, by T. E. Thorpe, F.R.S., and A. E. Tutton.—Conversion of ditolane-azotide into diphenanthrylene-azotide, by Francis R. Japp, F.R.S., and Cosmo Innes Burton, B.Sc.—A chemical study of vegetable albinism; part 3, experiments with *Quercus rubra*, by A. H. Church.—The synthetical formation of closed carbon-chains; part 2, some derivatives of tetramethylene, by W. H. Perkin, Jun., Ph.D.—The action of the halogens on the salts of organic bases; part 2, tetramethylammonium salts, by Leonard Dobbin, Ph.D., and Orme Masson, M.A., D.Sc.—Glycyphyllin, the sweet principle of *Smilax glycyphylla*, by Edward H. Rennie, M.A., D.Sc.

Entomological Society, November 3.—Mr. Robert McLachlan, F.R.S., President, in the chair.—The following gentlemen were elected Fellows:—Messrs. P. Cameron, F. Archer, H. J. S. Pryer, H. Norris, N. P. Fenwick, J. Brown, J. P. Tutt, and A. P. Green.—Mr. E. B. Poulton exhibited a mass of minute crystals of formate of lead, caused by the action of the secretion of the larva of *Dicranura vinula* upon suboxide of lead. He stated that a single drop of the secretion had produced the crystals which were exhibited; and he called attention to the excessively high percentage of formic acid which must be present in the secretion.—Mr. S. Stevens exhibited a specimen of *Laphygma exigua*, recently captured by Mr. Rogers in the Isle of Wight.—Mr. W. F. Kirby exhibited, and read notes on, a specimen of *Perilampus manrus* recently bred by Mr. Walter de Rothschild from *Antheraea tirrhea*, one of the rarer South African Saturniæ.—Mr. T. W. Hall exhibited a number of specimens of *Xanthia fulvago* (*cerago*), somewhat remarkable in their variation, and showing a graduated series, extending from the pale variety, *flavescens* of Esper, to an almost melanic form.—Mr. Boyd exhibited, and made remarks on, the larva of a species of *Ornithoptera* from New Guinea.—Mr. H. Goss exhibited a series of *Banksia argentula* collected by him in Cambridgeshire in June last; and also, for comparison, a series of specimens of the same species taken at Killarney in June 1877. It appeared that the Irish form of the species was larger and more brightly coloured than the English form.—Mr. Eland Shaw exhibited a female specimen of *Decticus verrucivorus* taken in July last at St. Margaret's Bay, Kent.—Mr. Waterhouse recorded the recent capture of *Deiopeia pulchella* at Ramsgate, by Mr. Buckmaster; and the capture of *Anosia flexippus* at Gibraltar was also announced.—Mr. J. W. Slater read a paper on the relations of insects to flowers, in which he stated that many flowers which gave off agreeable odours appeared not so attractive to insects as some other less fragrant species; and he stated that *Petunias*, according to his observations, were comparatively neglected by bees, butterflies, and Diptera. Mr. Distant, Mr. Stainton, Mr. Weir, Mr. Stevens, and the President took part in the discussion which ensued, and stated that, in their experience, *Petunias* were often most attractive to insects. Mr. Stainton referred to the capture, by himself, of sixteen specimens of *Sphinx convolvuli* at the flowers of *Petunias*, in one evening in 1846.—Jonkeer May, the Dutch Consul-General, asked whether the reported occurrence of the Hessian fly (*Cecidomyia destructor*) in England had been confirmed. In reply, Mr. McLachlan stated he believed that several examples of an insect, thought to be the Hessian fly, had been bred in this country, but that everything depended upon correct specific determination in such an obscure and difficult genus as *Cecidomyia*.

EDINBURGH

Mathematical Society, November 12.—Dr. R. M. Ferguson, President, in the chair.—The President gave a retiring address, for which, and for the gratuitous use of the rooms of the Edinburgh Institution for the Society's meetings a vote of thanks was awarded to him.—Mr. J. S. Mackay read a paper on the solutions of Euclid's problems with a ruler and one fixed aperture of the compasses by the Italian geometers of the sixteenth century; and communicated a note from Mr. R. Tucker giving some novel properties connected with the triangle.—Mr. A. Y. Fraser read a note by Mr. William Renton on the equivocal sign.—The following office-bearers were elected for the session:—President: Mr. George Thom; Vice-President: Mr. W. J. Macdonald; Secretary: Mr. A. Y. Fraser; Treasurer: Mr. John Alison; Committee: Mr. R. E. Allardice, Dr. R. M. Ferguson, Mr. George A. Gibson, Mr. William Harvey, Mr. J. S. Mackay, Mr. Thomas Muir.

SYDNEY

Royal Society of New South Wales, September 1.—Mr. Ch. Rolleston, President, in the chair.—Mr. Fredk. B. Gipps, C.E., read a paper on "Our Lakes and their Uses." The lakes of New South Wales being all liable to dry up, Mr. Gipps stated that it is possible, however, to impound large artificial lakes. The leading features of Lake George were described, and a means of utilising its waters for irrigating a large area were entered into.—A very beautiful specimen of gold from calcite was exhibited by Dr. Leibius, of the Mint. The lime having been dissolved in acid, the gold was left as a network of the finest ramifying filaments.

PARIS

Academy of Sciences, November 8.—M. Jurien de la Gravière, President, in the chair.—On the relations of geodesy and geology, by M. Faye. This is a reply to M. de Lapparent's recent criticisms of the author's well-known views on the relations of the geodetic and geological sciences. M. de Lapparent's objections are treated in detail, and it is argued that the law of unequal cooling of the terrestrial crust dates back to times anterior to the astronomico-geological epoch, when the seasons began to be established. It controlled the whole series of geological evolutions from the first formation of the oceanic basins.—Thermic researches on the reactions between ammonia and the magnesian salts, by M. Berthelot. These studies tend to define the action of ammonia on the magnesian salts, determining the analytical conditions which enable magnesia to be separated from the other alkaline salts, and showing that, by union with sulphuric acid or with hydrochloric acid, the complex ammoniaco-magnesian base liberates a quantity of heat greater than pure ammonia or pure magnesia, and very near that liberated by potassa and soda.—On the incandescent substance in fusion recently reported to have fallen during a thunderstorm at Luchon, by M. A. Trécul. In connection with M. St. Meunier's remarks on this subject, the author refers to a communication made by him to the Academy in 1881 (*Comptes rendus*, xcii. p. 775), showing that in thunder-clouds there may exist an incandescent substance in fusion, which under certain conditions may fall to the ground in the form of variable drops or globules.—Report made on behalf of the Section for Chemistry on M. Moissan's researches relating to the isolation of fluor, by M. Debray. After describing the attempts made by Davy and subsequent chemists to solve this problem, the report gives a detailed account of M. Moissan's researches, and considers his final conclusion fully justified, that the gas liberated by the electrolysis from the pure anhydrous hydrofluoric acid, with which he experimented, is undoubtedly fluorine. The question consequently now enters on a new phase, and chemistry may henceforth deal directly with fluorine, and attack problems of great interest, formerly regarded as insoluble.—Observations of the new planet 261, made at the Paris Observatory (equatorial of the West Tower), by M. G. Bigourdan.—On an extended class of uniform transcendents, by M. H. Poincaré.—On Maclaurin's series in the case of a real variable: application to the development of a homogeneous body in series of the potential, by M. O. Callandreaux.—Note on the octahedron, by M. P. Serret.—On the transport of force; a reply to M. Deprez, by M. Hippolyte Fontaine. It is admitted that the principle of a series of machines linked together is not new; but the author claims that the results of his researches obtained by the employment of special dynamos, and by a re-

arrangement of the mechanical elements, must be regarded as new. The transport of 50 horse-power through a resistance of 100 ohms with a loss of only 48 per cent., by employing dynamos jointly weighing only 8400 kilograms and costing only 658*l.*, is now realised for the first time.—Determination of the heats of neutralisation of the malonic, tarttronic, and malic acids: remarks on the heats of neutralisation of the homologous acids of oxalic acid and of the corresponding hydroxylated acids, by MM. H. Gal and E. Werner. The results here tabulated of the authors' researches show that the heat of neutralisation of the homologous bibasic acids under consideration diminishes in proportion as the molecular weight increases.—General methods of crystallisation by diffusion; reproduction of mineral species, by M. Ch. Er. Guignet. These experiments are described as a generalisation of M. Becquerel's ingenious researches on the slow action set up between two liquids separated by a film, a porous wall, or even a glass tube with a fissure or capillary aperture. The methods employed are applicable to a large number of bodies, and yield crystals in any required quantities.—Synthesis of concine, by M. A. Ladenburg. The processes are described by which the author has succeeded in obtaining synthetically three bases possessing the same mutual relations as racemic and tartaric acids, one of which is absolutely identical with natural concine.—On the chemical transformations brought about by the action of solar light, by M. E. Duclaux. Having already examined the sterilising action of solar light on microbes, the author here proceeds to show that the influence at play belongs to the order of chemical phenomena, which in this case assume a physiological character. The action of the solar rays is shown to be analogous to that of the ferments.—On a new means of preventing secondary fermentations in the alcoholic fermentations of commerce, by MM. U. Gayon and G. Dupetit. This process consists in adding to the wort antiseptic substances capable of arresting the development of the countless germs contained in the primary substances and in the yeast, without, however, impairing the activity of the leaven itself.—On the alcoholic fermentation of dextrine and of starch, by MM. U. Gayon and E. Dubourg. A new kind of mucor is described, which possesses the twofold property of fixing the water on dextrine, and even on starch, and superinducing fermentation in the products of this saccharification, without, however, affecting cane-sugar or transforming it to alcohol.—On the reduction of the sulphate of copper during vinous fermentation, by M. H. Quantin.—On the genus *Cepon*, by MM. A. Giard and J. Bonnier. Two new species (*C. pilula* and *C. elegans*) of this little-known genus have been discovered by the authors, the former a parasite of *Xantho floridus*, the latter of *Pilumnus hirtellus*. Both occur on the French seaboard.—On the homologies of the larvæ of Comatulæ, by M. J. Barrois.—On the cave-dwellers of Bêche-aux-Roches, by MM. Marcel de Puydt and Max. Lohest. The authors disclaim all responsibility for the recent remarks of M. de Nadaillac describing the culture of this prehistoric race in somewhat exaggerated language.—On the affinities of the Eocene floras of West France and Saxony, by M. Louis Crié.—On a serious malady analogous to scurvy observed in certain reptiles, by M. Magitot.—On a technical process for the diagnosis of Gonococcus, whereby this parasite may be distinguished from other species of cocci, by M. Gabriel Roux.

BERLIN

Meteorological Society, November 2.—Prof. von Bezold in the chair.—Prof. Spörer spoke of stormy movements in the atmosphere of the sun. He discussed a long series of details respecting the physics of the sun, which were illustrated by heliographic maps, and emphasised the fact that spots invariably appeared only in very hot luminous regions of the solar surface. Of his theoretical explanations it may be more particularly mentioned that, in the opinion of the speaker, the luminous regions originated in the ascending of gases and vapours from the hot interior of the sun. When such a thing happened at the circumference of the sun, then metallic prominences were observed. In consequence of their higher temperature the luminous regions caused ascending currents, whither cooler gases streamed from all sides. The gases, which in certain circumstances mounted to heights of 30,000 German (135,000 English) miles, cooled, sank as cooler masses endowed with greater linear velocity to the same localities, and there formed the sunspots. In the discussion following this address, Prof. Spörer stated that according to his observations the last maximum had shown itself 1884.0. He further stated that occasionally, under special conditions of illumination, he had, with the aid of the tele-

scope, seen in clouds small, round bodies moving up and down, which he had taken for rain-drops, and commended to those interested in the study of the atmosphere such observations of clouds. Respecting the possibility of seeing the rain-drops of clouds in this manner there arose a lengthy discussion.

Physical Society, November 4.—Prof. von Helmholtz in the chair.—Prof. Spörer produced and made the subject of discussion a long series of heliographic maps which he had drawn from phenomena he had himself witnessed, and which demonstrated in a very graphic manner the occasionally very important proper motions of different spots. These self movements always occurred on the west side of the spots, and of the groups of spots. They always followed therefore in the sense of the sun's rotation. They were recognised when the spots were observed several times in the course of a day, and they sometimes attained values of from 1000 to 2000 geographical miles in one day. These movements were specially intense in the case of the formation of larger spot-groups; later on they grew slower. For the explanation of these proper motions, the speaker adduced that sunspots invariably formed themselves only over luminous surfaces, that is, at spots of the solar surface possessing a higher temperature. In his measurements of temperature, which had not yet been published, having reference to the year 1880, he made use of a thermo-element on which, through a fine opening in a thick pasteboard disk, he caused to fall the position of the sun's image which he wanted to measure. According to these observations, the emission of heat from a spot-umbra stood to the radiation of heat from a luminous surface as 10 : 13, and the radiation of a spot-umbra to the radiation of the usual solar surface as 10 : 15. Seeing that the temperatures on the sun stood probably in the same relation as did the radiations, so in the luminous surfaces which possessed a higher temperature (in the relation of 6 : 5) must an ascending gas-current develop, to which a descent of colder gas-masses must necessarily correspond. These descending colder gases it was which generated the spots, and gave them—seeing they possessed a greater linear speed of rotation than did the solar surface—a displacement towards the west in the sense of the rotation.—Dr. Pernet spoke on the determination of the air in the vacuum of the barometer, in accordance with the Arago method, connecting his observations with a publication by Dr. Schreiber, who, on comparing the barometer of the Saxon station with the normal barometer, found, after taking due account of all corrections in the latter, volumes of air far surpassing the permissible quantities. Dr. Pernet had now found that two very essential corrections were overlooked: first, the determinations of the air in vacuum under the pressures 0, 40, and 80 millimetres, were carried out in much too rapid succession, so that compensations of temperature were impossible; second, the effect of the capillarity was not observed, an effect which in the case of syphon barometers played so far a great part, as the lower surface of the quicksilver affected by oxidation and dust had a different surface-tension and different angles of rim from the upper surface of the quicksilver, which was comparatively pure. The registrations were therefore not exact if the menisci were not simultaneously measured. This tension of the surface was in the case of thermometers also very important. In consequence of it, the readings of thermometers with narrow tube and less mass of quicksilver were less exact than the readings of thermometers with wider tube and more quicksilver. It was the cause that thermometers with elliptical tubes were less exact than thermometers with circular ones. The effect of the capillarity, again, was, in the opinion of the speaker, the cause of the "dead point" of Mr. Pickering.

VIENNA

Imperial Academy of Sciences, October 7.—On Hall's phenomenon, by A. von Ettingshausen and W. Nernst.—On the data wanted for proving Avogadro's law, by L. Boltzmann.—On the theory of the electro-magnetic phenomenon discovered by Hall, by the same.—On the density of liquefied methene and liquefied oxygen, by K. Olszewski.—On the comets discovered by Mr. Finlay on September 26, and by Dr. Hartwig on October 6, by E. Weiss.—On colchicine, by S. Zeisel.—Contributions to the knowledge of the Tertiary flora of Australia, second paper, by C. von Ettingshausen.

October 14.—Researches on strychnine, especially on the action of zinc-dust on strychnine, by W. F. Loebisch and P. Schoop.—A preliminary communication on the statistics of comets, by T. Unterweger.

October 21.—To histology and physiology of mucous secretion, by W. Biedermann.—Remarks on L. Hermann's galvanotropic experiment, by E. Mach.—On hydrocarotin and carotin, by F. Reinitzer.—On the anatomy and systematics of gall-mites, by A. Nalepa.

BOOKS AND PAMPHLETS RECEIVED

Encyclopædia der Naturwissenschaften, Erste Abtheil., 48-49 Lief.; Zweite Abtheil., 37-38 Lief. (Trewendt, Breslau).—Index Catalogue of the Library of the Surgeon-General's Office, U.S. Army, vol. vii. (Washington).—Proceedings of the Linnean Society of New South Wales, 2nd series, vol. i., part 2 (Cunningham, Sydney).—Quarterly Journal of Microscopical Science, October (Churchill).—Alpine Winter, 3rd edition: Dr. A. T. Wise (Churchill).—Encyclopædia Britannica, vol. xxi. (Black, Edinburgh).—Structure and Life-History of the Cockroach: L. Miall and A. Denny (L. Reeve).—Madagascar, 2 vols.: Capt. S. P. Oliver (Macmillan).—Journal of the Anthropological Institute, November (Trübner).—First Year of Scientific Knowledge, 3rd edition: P. Bert (Reife).—Nouvel Atlas Céleste: R. A. Proctor; translated into French by P. Gérigny (Gauthier-Villars, Paris).—Ordnance Survey of the United Kingdom: Lieut.-Col. White (Blackwood).—La Photographie sans Objectif: R. Colson (Gauthier-Villars, Paris).—L'Aurora Boréale: M. S. Lemström (Gauthier-Villars, Paris).—Les Hypothèses Cosmogoniques: Examen des Théories Scientifiques Modernes sur l'Origine des Mondes, suivi de la Traduction de la Théorie du Ciel de Kant: C. Wolf (Gauthier-Villars, Paris).—Hand-book of Jamaica for 1886-87: A. C. Sinclair and L. R. Fyfe (Stanford).—Quarterly Journal of the Royal Meteorological Society, October (Stanford).—Monthly Results of Observations made at the Stations of the Royal Meteorological Society, vol. vi., No. 22 (Stanford).

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