

Lastett.) Timber yields, under all forms of stress, to an extent about proportional to the load.—Mr. James Smith sketches a plan for water-supply of Philadelphia, viz., a gravity-supply by aqueduct from Perkiomen.—A modification of Tisley's compound pendulum, by Mr. Queen, of Philadelphia, whereby the motions and figures may be exhibited on a screen to large audiences, is described, and there is an account of the zinc veins and works of Lehigh Valley.

Bulletin of the United States Geological and Geographical Survey of the Territories, vol. v. No. 2, September.—J. A. Allen, on the Coatis (genus *Nasua*, Storr).—Dr. Coues, on the present status of *Passer domesticus* in America.—Dr. Peale, on the Laramie group of Western Wyoming and adjacent regions.—A. R. Grote, on Lithophane and some new Noctuidæ (describes many new species).—Dr. A. White, Palæontological Papers, No. II., on carboniferous fossils from Colorado, Arizona, Utah, and Wyoming, and on cretaceous corals from Colorado (describes several new species).—F. V. Hayden, the so-called Two-Ocean Pass.—E. D. Cope, on the extinct species of Rhinocerotidæ of North America, and their allies.—Dr. Coues, second instalment of American ornithological bibliography.

Bulletin de l'Académie Royale des Sciences de Belgique, No. 8.—M. Plateau here defends, at some length, his theory of the superficial viscosity of liquids in opposition to the theory of Signor Marangoni, who, without denying a viscosity proper to the surface and different from that of the interior, thinks its influence (e.g., in retarding the movement of a needle on the surface) very small in comparison with that of other causes, especially, in liquids which can be inflated in large bubbles, the elasticity of a layer of impurity (*imbrattamento*) arising from exposure in the air, while in liquids like water and most saline solutions, changes in tension, through alteration of the surface and changes in curvature of the menisci at the sides of the needle, &c., are operative.—M. Petermann writes on the presence of grains of *Lychnis githago* in alimentary flour, and indicates a method of detecting it.—There is also a paper on the quartziferous diorite of Champ-Saint-Veron (Lembecq), by MM. Poussin and Renard.

Journal de Physique, October.—On the inscription of meteorological phenomena, particularly electricity and pressure, by M. Mascart.—On the rectifying apparatus of M. Duboscq, by M. Bertin.—On a phenomenon similar to Peltier's phenomenon, by M. Bouty.—A regulator of temperature, by M. Benoit.

Cosmos, 5 Heft, August.—Prof. Dr. Schultze, history of the origin of the "Despising" of Nature.—Ernst Haeckel, on the common relationship between the ctenophora and the medusæ, with an account of a form connecting the two groups. This extraordinary form is beautifully figured.—Dr. Mehlis, the barrowfield near Hagenau and its probable epoch.—Henry Potonié, Alexander Braun's attitude towards the theory of descent.—Short notices and criticisms.

THE *Nyt Magazin for Naturvidenskaberne* (Christiania, vol. 24, pt. 4, and vol. 25, pt. 1).—From these parts we note the following papers:—On the geology of the Folge Fon peninsula, by T. Ch. Thomassen.—On the ornithology of Madagascar, by Leonard Stejneger.—On microline, a new species of triclinic potash-feldspar; its optical, crystallographical, and chemical characters, by A. Des Cloizeaux.—On the insect fauna of Dowrefjeld and the Gudbrands valley, by W. M. Schoyen.—On the changes which some plants undergo in northern latitudes by Prof. F. C. Schübeler.—On the occurrence of iridium in northern minerals, by S. Wleugel.—On dislocation lines in the so-called Skrimfjeld, by O. E. Corneliussen.—Diary of a journey in the Trysil district, by L. Meimich.—Account of a botanical tour in Hardangerviddan, by N. Wille.—On some contact rocks of the Christiania Silurian basin, by A. Penck.

THE *Verhandlungen der k.k. geologischen Reichsanstalt* (No. 12, Vienna) contains the following papers:—On the miocene deposits at the south-western margin of the Galicio Podolian Plateau, by J. Niedzwiedzki.—On the tertiary formation at the eastern slope of the Vogelsberg, by H. Bücking.—On the pliocene mammal-fauna of Hungary, by Th. Fuchs.—On the Flysch question, by the same.—On the geological objects exhibited at Teplitz and relating to the Teplitz basin, by R. Raffelt.—On the marginal mountains of the Vienna bay, by Franz Toula.—The number further contains the following reports of geological excursions undertaken by different members of the Reichsanstalt, viz.: by Dr. O. Lenz from Eastern Galicia,

by Dr. Edmund von Mojsisovics from Bosnia, by E. Tietze from Eastern Bosnia, and by Dr. A. Bittner from the Herzegovina.

SOCIETIES AND ACADEMIES

LONDON

Linnean Society, November 6.—Prof. Allman, president, in the chair.—Mr. W. H. Twelvetrees (of Orenburg, Russia) was elected a Fellow of the Society.—The President, in opening the session, briefly alluded to the demise of Mr. W. Wilson Saunders and Mr. John Miers, whose scientific and official labours in connection with the Society have been well appreciated.—Mr. W. T. Thiselton Dyer exhibited and made remarks on some photographs of vegetation, including *Cinchona Ledgeriana*, in the Botanic Garden of Buitenzorg, Java.—Mr. D. Morris, recently returned from investigating the coffee-leaf disease of Ceylon and South India, read a paper on the structure and habit of *Hemileia vastatrix*. He supports the Rev. R. Abbey's statements as to the destructive character of the fungus and its evident gradual extension over the coffee-producing regions of the East; he even expresses fears of its ultimately being carried to the West Indies and Brazil;—2,000,000%, the estimated annual deficiency in Ceylon alone, is no mean sum to be debited from the revenue and interests of the planters. Mr. Abbey has described the spores as attached to the inner surface of the orange-yellow sporanges (a notion opposed to received ideas respecting free cell formation); but Mr. Morris's observations are opposed to those of the former. The author explains the hitherto puzzling dark brown bodies beneath the sporanges as composed of closely interwoven threads of mycelium. During February, March, and April, both bark and leaves are everywhere covered exteriorly by mycelial filamentous threads which reproduce by germinating spores. In the wet weather these do not enter the stomata. It is in this stage that conidial growth supervenes according to Abbey (secondary spores of Thwaites), but the author has failed to substantiate this phase, though starved plants on glass slides raised conidia. It is during the filamentous stage before penetration that remedial agents—dusting with sulphur and lime, &c.—have a chance of being effective; but a serious disturbing element offers in the large area of abandoned crop still continuing to propagate the fungus.—Dr. F. Day read a paper on the instincts and emotions of fish. Biologists of late have been less attracted by the faculties of fish than of other animals, and even Cuvier's estimate of their total want of intelligence has been quite recently quoted as authentic. The author combats this notion, and, from his own experience and data afforded by other writers, claims evidence of emotions and affections. He shows they construct nests, transport their eggs, protect and defend their young, exhibit affection for each other, recognise human beings, can be tamed, manifest fear, anger, hatred, and revenge, utter sounds, hide from danger, betake themselves for protection to the bodies of other animals, and have other peculiar modes of defence, leave the water for food, and even different families combine for attack and defence. Their faculties, notwithstanding, are greatly subordinated and modified compared with those of higher races of the vertebrata.—The Rev. G. Henslow read a paper on the origin of the (so-called) scorpioid cyme. He pointed out some errors in deducing this from the dichotomous cyme: 1. Opposite pairs of bracts, being successively in planes at right angles, the resulting sympode would be a volute, and not a helix. 2. The position of the bracts (when present, as in *Borago*) are not opposite the flowers. 3. There are always two rows of flowers, not a single one. 4. The appearance of a flower in the fork between the two branches of the inflorescence (as in *Myosotis*) is not usual, and is due to the adhesion between the terminal and the highest axillary raceme. This has given rise to a false impression of dichotomy. 5. Authors have hitherto confounded the "true scorpioid raceme" (Henslow) with spicate degradations of sympodial inflorescence. He refers it to the indefinite system, and explains its origin by a new principle of phyllotaxis, which he first discovered in *Lagerstromia*, viz., in resolving opposite and decussate leaves into alternate, instead of their lying on a continuous spiral line, the line oscillates through three-fourths of a circle, and if a line be drawn from flower to bract, it will represent the so-called scorpioid cyme of Boraginæ.

Chemical Society, Nov. 6.—Mr. Warren De la Rue, F.R.S., President, in the chair.—The following papers were read:—On the transformation products of starch, by C. O'Sullivan. In this paper, which was originally presented to the Societe Chi-

mique de Paris on June 18, the author criticises the results published by MM. Musculus and Gruber, pointing out some errors into which they had fallen. He reasserts the fundamental facts of his former paper, viz., that starch splits up under the influence of malt extract in four principal ways. The author also investigates the action of malt extract on the products of the above reactions. He inclines to the belief that the dextrins are not a series of polymers, but rather a series of bodies of the same molecular weight, the molecules being arranged differently as regards one another, the molecules being arranged in groups all dependent on one another.—Note on the formulæ of the carbohydrates, by Dr. Armstrong. The author discusses the various formulæ of glucose, and inclines to that which represents glucose as being an aldehyde and a penthydrilic alcohol; the cane sugars are probably related to the glucoses as ether is to alcohol. The author discusses the probable arrangement of the molecules in starch, and arrives at a conclusion differing from that of O'Sullivan.—On a new method of determining sulphur in coal, by Teikichi Nakamura of Tôkiô. The author mixes intimately one part of finely-powdered coal with three or four parts of sodium carbonate and ignites very gradually, so that no smoke or odorous gases escape; a white or reddish ash is left, which is treated with water, &c.—On the bromine derivatives of *B* naphthol, by A. J. Smith.—On the dissociation of ammonia iron alum, by J. S. Thomson. Dilute neutral solutions of ferric salts, when heated, deposit a basic salt; this dissociation can be prevented by the addition of dilute sulphuric acid. By using sulphuric acid of known strength, the author has studied the subject quantitatively. A solution of ammonia iron alum containing more than 1 gm. in 14.37 cc., does not dissociate; this dissociation begins in more dilute solutions, and increases regularly with successive additions of water; ammonia and potash salts increase the dissociation.—On α methyl oxysuccinic acid, the product of the action of anhydrous hydrocyanic acid upon acetoacetic ether, by G. H. Morris.—Demarcay described an uncrystallisable acid obtained as above, whose baryta salt was unstable. The author has repeated the experiments, and obtained a well-crystallised acid melting at 108°. The barium salt is stable when boiled with water.—On the action of phosgene on ammonia, by H. J. H. Fenton. The author has examined the white amorphous substance obtained in the above reaction, and extracted guanidine and urea quite identical with ordinary urea.—On the rehydration of dehydrated metallic oxides, by C. F. Cross. The author has obtained various anhydrous basic metallic oxides by igniting the hydrates. These oxides, when exposed to a saturated atmosphere, absorb water up to a definite limit of a molecular character. The investigation includes oxides of aluminium, chromium, cobalt, iron, and copper.—On alizarin blue, by G. Auerbach. The author gives the method of preparing and purifying this substance; when pure it forms brown, shining needles, melting 268°–270°. He has also prepared various salts and bromo derivatives; the actions of zinc dust, chlorine, and acetic anhydride were studied. In constitution the author thinks the body must be closely related to the aldehydines of Ladenburg.

PARI

Academy of Sciences, November 3.—M. Daubrée in the chair.—M. Mouchez presented the last published volume of *Annales de l'Observatoire de Paris*, giving observations made in 1876. He stated that the Ministry of Public Education had decided that a certain number of astronomical students should be admitted to the Observatory for two years' instruction and practice, after which those found fit should be appointed assistant astronomers in government observatories.—Nautical instructions on the coasts of Algeria, by M. Mouchez. The volume he presented describes first the meteorology, then the physical character of the coast.—Experiments with an inverted syphon having two horizontal branches, capable of raising water without a movable piece to considerable heights relatively to that of waves, or to exhaust at considerable depths relatively to the hollow of waves, when a retaining valve system is added, by M. De Caligny.—On some pathological states of the tympanum, causing nervous phenomena, which Flourens and De Goltz attribute exclusively to the semicircular canals, by M. Bonnafont. Displacement of the tympanic membrane away from or towards the internal wall of the tympanic cavity (*e.g.* in the latter case, by a concretion of wax or polyptous excrescence), causes, through the chain of small bones, variations of pressure of the liquids in the vestibule and semicircular canals, with consequent giddiness, staggering, &c.—On the abnormal spectrum of light, by M. De Klercker. Two hollow glass prisms having

the same angle (25°) and filled with alcohol, are placed on the stage of spectroscope with their refracting angles in opposite directions; the image of the slit is not deflected. To one prism are then added crystals of fuchsine; the original image then divides into two parts, one going to the right and widening into a distinct regular spectrum of the less refrangible rays; the other remains in the same place without widening, and takes a blue-violet colour. M. De Klercker attributes the effect to the different amount of retardation by molecules of different species in the solution.—On determination of the elements of a vibratory motion; measurement of amplitudes, by M. Mercadier. He uses a (so-called) vibrating micrometer.—Stomachic digestion and duodenal digestion; action of pancreatine, by M. Defresne. Hydrochloric acid in gastric juice is combined with an organic base which moderates its action and changes its properties. The acidity of mixed gastric juice, half an hour after ingestion, is no longer due to chlorhydrate of leucine, but to lactic, sarco-lactic, tartaric, malic, and other acids. The best reagent of this transformation is pancreatine. This difference in acidity of pure and mixed gastric juice becomes still more manifest in artificial digestion of nitrogenised food.—Result of researches into the origin of reinvasions of phylloxera, by M. Faucon. He contends for the superiority of submersion to insecticides, and indicates a method.—On uniform analytic functions in the neighbourhood of a singular essential point, by M. Picard.—On the ultra-violet absorption spectra of nitric and nitrous ethers, by MM. Soret and Riillet. The known characters of the absorption spectra of metallic nitrates are not met with in nitric ethers. A solution of amyl nitrous ether gives six absorption bands between H and R.—On a new stellar spectroscope, by M. Thollon. He uses two compound direct-vision prisms of special form (one in the collimator, the other in the telescope tube), whereby he seeks to reduce the loss of light as much as possible. The larger of the simple (or component) prisms has an angle of 100°, and contains a mixture of ether and sulphide of carbon; and two rectangular prisms of crown glass (one on either side) have faces parallel to each other and to the bisecting line of the angle of 100°.—On the tensions of vapour of saline solutions, by M. Fauchon. The value of coefficient α , in Kirchhoff's formula, varies continually with the concentration, in some cases increasing, in others diminishing.—On an electro-capillary thermometer, by M. Debrun. The principle is that mechanical action deforming a mercury meniscus like that in Lippmann's electrometer, produces a current.—On animal cellulose or tunicine, by M. Franchiment. The difference between animal and plant cellulose, if such exist, is not due to a difference of the groups $C_6H_{10}O_5$ forming it, but to a difference in the manner of their union.—Researches on the different modes of combination of phosphoric acid in the nervous substance, by M. Jolly. In the calf the brain is very rich in phosphorised elements; in the grown ox it is the spinal cord that contains most of them; and after alkaline phosphates, phosphate of iron is the most abundant.—On hairs and hairy glands in some kinds of Nympeææ, by M. Heckel.—On the growth of stems of dicotyledonous trees, and on the descending sap, by M. Guinier. He thinks it is perhaps time to renounce the ordinary theory of descending sap.

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