

constitution of the sun, by Ch. Fievez. Given the high temperature, chemical composition, and slight mean density of the sun, its chemical elements cannot exist in the solid or fluid state, or even to any large extent in the condition of highly compressed vapours. Assuming, further, with most physicists, that the sun consists of a gaseous mass whose temperature increases from the circumference towards the centre, it is argued that the solar spectrum must be formed by the superposition of all the radiations of the chemical elements present in the sun. The luminous part of the spectrum would thus be constituted by the radiations of like vibratory period, and Fraunhofer lines by the radiations of unlike vibratory periods. From this it would follow that a chemical element might exist in the sun without being revealed by a dark line in the solar spectrum.

*Schriften der Physikalische-Ökonomischen Gesellschaft zu Königsberg i/Pr.*, 1885.—Herr Fritsch here gives the result of a study of certain gaps in the pith of Coniferæ, discovered by Prof. Caspary some years ago. In its middle course the pith of a year's growth consists of elongated parenchyma, but at the end of the growth it presents cubic or egg-shaped cells in loose union. Those gaps the author finds in species of the genera *Abies*, *Picea*, and *Larix*, and in *Cedrus Deodara*. The last-named differs from the others in not having a partition of cross-lying cells through the pith, above the gaps. All Coniferæ with persistent bud scales have this, and some Coniferæ (*Tsuga canadensis* and *Torreya nucifera*) have it, and are without the gaps. Finally, the Juniperæ, Podocarpeæ, Taxinæ, and Pinus have neither. The gaps seem to arise through stretching of the wood-cells, and their size depends on the age and moisture of the stem and branches.—Herr Franz writes on the magnetism observed at the end of long iron well-tubes (200 and 250 m.) at Königsberg, and of some railway lines. The attractive force was proportional to the distance (not its square), the magnetism being pretty equally distributed over a line several metres long. In one well, the horizontal component at 1 metre distance was as much as fifteen times that of the earth's magnetism.—Herr Klien describes experiments in plant cultivation by the water-method (specifying the substances given in solution and their amount), and points out its advantage in study of the action of poisons, such as the sulphocyanite of ammonium occurring in ammonia superphosphate from gas manufacture, and spoiling that product for manure purposes.—A paper by Herr Scharlop appears to throw light on the production of some prehistoric urns in Prussia, from a mode of manufacture which has lately died out.—Dr. Tischler discusses the representations of weapons and costumes on old bronzes of the Hallstadt-Italian period.

## SOCIETIES AND ACADEMIES

### LONDON

**Entomological Society**, September 1.—Robert McLachlan, F.R.S., President, in the chair.—The following gentlemen were elected Fellows:—The Rev. Prof. Dickson, D.D., and Messrs. P. Cowell, A. O. Walker, and Lyddon Surrage.—The President remarked with regard to the gnats from the Kent Waterworks, exhibited at the last meeting, that Prof. Westwood had since informed Mr. Douglas that they were only *Culex pipiens*.—Mr. Slater exhibited certain parasites found on the body of a larva of *Smerinthus tilie*, which Mr. Waterhouse believed to be *Uropoda vegetans*, a species of *Acari*.—Mr. W. Warren exhibited *Eupithecia fraxinata*, *E. innotata*, a variety of *E. satyrata*, a *Gelechia* caught in Wicken Fen twenty years ago by Mr. Bond, and believed to be a new species, *G. fumatella*, *G. vilella*, *Lithocolletis scabiosella*, and *Catoptria parvulana*. He also exhibited larvæ of *Gelechia vilella*.—Mr. South exhibited specimens of *Dicrorampha distinctana*, and stated that he considered it to be merely a local form of *D. consortiana*, from which, in the larval stage, it could not be separated.—Mr. Stevens exhibited a living specimen of *Clerus formicarius*, recently found under the bark of an ash-tree in Arundel Park.—Mr. Billups exhibited *Chrysis succincta*, Linn., taken by sweeping at Chobham on July 28 last; he also exhibited *Microphysa elegantula*, taken at Broadstairs in August last.—The Rev. W. W. Fowler exhibited, on behalf of Mr. Theodore Wood, a larva of *Langelandia anophthalma*, a species new to Britain.—Mr. H. Goss exhibited specimens of *Oxygastra Curtisi* recently taken near Christchurch, Hants. He stated that he had met with the species in the same locality in 1878, but had never seen it any-

where else in the United Kingdom, nor was he aware of any recent record of its capture. Mr. McLachlan observed that the species was taken many years ago in Dorsetshire by the late Mr. Dale, but that he knew of no recent captures except those recorded by Mr. Goss. He also made some remarks as to the distribution of the species on the continent of Europe.—Mr. McLachlan exhibited a specimen of *Dilar meridionalis* taken by him in July last in the Pyrenees, also about 150 examples of the genus *Chrysopa* from the same district. Amongst them were *C. vulgaris*, *perla*, *Walkeri*, *viridana*, *tenella*, *prasina*, *flava*, *septempunctata*, *flavifrons*, and others not yet fully identified. He also exhibited a few Coleoptera from the same district, and remarked on the extraordinary abundance of a pretty Lamellicorn, which was so common as to give the meadows the appearance of being studded with multitudes of brilliant blue flowers.—Mr. C. O. Waterhouse called attention to the numerous reports which had lately appeared in the newspapers of the supposed occurrence of the Hessian Fly (*Cecidomyia destructor*) in Britain, and inquired whether any communication on the subject had reached the Society. The Rev. W. W. Fowler stated that he had been in communication with Miss Ormerod on the subject, and that she had informed him that neither the imago nor larva of the species had been seen, and that the identity of the species rested on the supposed discovery of the pupa.—Mr. A. H. Swinton communicated a paper entitled "The Dances of the Golden Swift." In this paper the author expressed an opinion that the peculiar oscillating flight of the male of this and allied species had the effect of distributing certain odours for the purpose of attracting the females.

### PARIS

**Academy of Sciences**, September 27.—M. Émile Blanchard in the chair.—Researches on the sugars, by M. Berthelot. The results are given of recent studies of some new principles obtained from the association of sugars with themselves, not by a stable combination of the class of saccharose substances, but by a combination easily dissolved, analogous to that of the hydrates and alcoholates. The facts observed illustrate the difficulties so often met with in the preparation of the double salts. They supply a fresh proof of the special part played by the dissolvents in the extraction of immediate principles, for, according as water or alcohol is employed, melitose or raffinose may be obtained.—Conditions determining the rapidity of images in chronophotography, by M. Marey. By the process here described, which is based on M. Chevreul's method of obtaining a perfectly black ground, the author is enabled to reduce the time of pose for each image to the two-thousandth of a second, and hopes by further improved dispositions to reduce it still more. The new photographs show that this reduction of time greatly increases the delicacy of the images obtained by this process of chronophotography.—Kinematic analysis of the locomotion of a horse, by M. Marey. In this paper are described and illustrated the movements of the fore-leg in the step, trot, and gallop. The tendency to economy of labour displayed in various degrees in the movements of all "animal machines" appears to attain the greatest perfection in the action of the horse, being, however, less evident in the trot and the gallop than in the slow pace.—Note on the removal of the Imperial Observatory of Rio de Janeiro to a new site, by M. Cruls. The new site, to which the Observatory will soon be removed, occupies about 40 hectares (100 acres) of the Imperial Fazenda of Santa Cruz, the usufruct of which is granted by the Emperor for this purpose. The new Observatory will stand on the same parallel, and about 2 metres to the west of the present establishment, and will be able to undertake observations both on atmospheric electricity and terrestrial magnetism much more successfully than was possible in its old home.—On the transformation of algebraic surfaces in themselves, and on a fundamental number in the theory of surfaces, by M. E. Picard. Having recently shown that surfaces capable of transformation in themselves by a birational substitution, including two arbitrary parameters, are of the genus zero or one, the author now examines the case of a single parameter, which he finds leads to totally different conclusions.—On a new method of determining the coefficient of expansion for solids, by M. Robert Weber. If a solid body be suspended like a pendulum, its oscillations will depend upon its form, its mass, and the distance of its molecules from the axis of rotation. At two varying temperatures this distance varies, whence results a change in the oscillations. Hence for a given body there is a determined relation between its temperature,  $\mu$ , the coefficient



of expansion, *a*, its dimensions, *d*, and time of oscillation, *t*. The value of *a* with these data may be calculated by the process here described, and in a future communication the author promises some values of coefficients of expansion determined by this method.—On the microscopic flora of sulphurous waters, by M. Louis Olivier. While prosecuting his researches on the reduction of the sulphates by living beings, the author has been led to the discovery of low organisms in sulphurous cold and thermal waters. These organisms are found to be very active at very high temperatures, thriving and multiplying themselves in the hot springs of Des Ceufs (Cauterets), and elsewhere, at temperatures of from 46° to 50° C. Carefully collected and transplanted to an extract of beef, they continued to propagate at 65°, and even nearly to 70° C.—Influence of the organism of the guinea pig on the virulence of tuberculosis and scrofula, by M. S. Arloing. It results from several experiments that the virus of scrofula is not intensified by its presence for two generations in the guinea-pig. But the effect is different with true tuberculosis, which in its attenuated forms acquires by inoculation sufficient virulence to affect the rabbit, an animal otherwise so difficult to infect with this poison.—On the vascular system of the Echinidæ, by M. Henri Prouho. In reply to a statement recently made by M. Kœhler, the author shows by numerous quotations that, except on two points, their views are not in accord on the vascular system of these organisms.—The earthquake of August 27, 1886, in Greece, by M. Léon Vidal. The paper contains a detailed account of the disturbances in various parts of the mainland and adjacent archipelagoes, from which it appears that the phenomenon was due to a general cause situated somewhere to the south-west of the Island of Alphiros, beyond the Strophades.—Remarks on a chart representing the Granitic and Cretaceous formations of the Spanish Pyrenees, and their disposition in a series of oblique ridges, by M. F. Schrader. On this map, drawn to a scale of 1 : 200,000, the author gives the results of his own surveys in a deep colour, marking off the districts which he has not yet visited, and for which he has utilised the works of Dufrenoy and Élie de Beaumont.—Explanation of the solar spots and faculæ, by M. J. Delauney. To explain these phenomena it is assumed that the sun consists of a very hot nucleus of metals in the fluid state wrapped in an atmosphere at a very high temperature and pressure, and formed almost entirely of hydrogen; further, that the nucleus contains in solution a large quantity of gas derived from the atmosphere; that the atmospheric pressure is least at the poles and at the equator, with a maximum at low latitudes on either side of the equator; lastly, that this atmosphere is subject to variations of pressure. The spots would then be caused by any atmospheric depression in any region of the solar surface, while the faculæ would correspond to an inverse phenomenon, the atmospheric hydrogen being absorbed or dissolved by the nucleus under the influence of high pressures. The spots would be the result of a cyclone, the faculæ of an anti-cyclone, the former being accompanied by a diminution of heat employed to transport the hydrogen from the interior of the sun to and even beyond the atmosphere, while the latter represent a liberation of heat resulting from the precipitation of the hydrogen absorbed in the solar mass.

STOCKHOLM

Academy of Sciences, September 15.—A refutation of the remarks of Dr. Hoppe on the new theory of unipolar induction, by Prof. E. Edlund.—On the Salmonidæ of the Swedish State Museum with reference to a work recently published on them, by Prof. F. A. Smith.—On the new parts (15-17) of "Algeæ aquæ dulcis exsiccatae quas distribuerunt," V. Wittrock and O. Nordstedt, exhibited and commented upon by Prof. V. Wittrock.—Researches on the general Jupiter-perturbations of the asteroid Thetis, by Herr C. V. L. Charlier.—Some new developments of the elliptic functions, by Prof. Hugo Gylden.—On the habits of two Swedish species of the solitary wasps, by Prof. Chr. Aurivillius.—On a new nitro-naphthaline-sulphuric acid, by Prof. P. T. Cleve.—On glycolurite and acetylurea, by Prof. O. Widman.—On the products of oxidation of the ortho-nitrocumenolocryl-acid and its combinations, by the same.—New researches on the re-arrangements of the atoms in the propyl group, by the same.—On the curve of coincidence of the common algebraic differential equations of the first order, by Prof. C. F. E. Björling.—On the integration of the differential equations in the problem of the N-bodies, iii., by Prof. Dillner.—On the connection between the coefficients of expansion and

the coefficients of elasticity at different degrees of temperature, by Prof. G. R. Dahlander.—On the determination of sulphur and haloids in organic combinations, by Dr. P. Klason.

BOOKS AND PAMPHLETS RECEIVED

"Lehrbuch der Vergleichenden Anatomie der Wirbelthiere," by Prof. Dr. R. Wiedersheim (Fischer, Jena).—"Edinburgh Astronomical Observations," vol. xv., by Prof. P. Smyth (Neill and Co.).—"Pictorial Arts of Japan," part 4, by Wm. Anderson (Low and Co.).—"A Treatise of Spherical Trigonometry," part 2, by W. J. McClelland and T. Preston (Macmillan and Co.).—"Illustrated Hand-book of Victoria, Australia (Ferres, Melbourne).—"Journal of Statistical Society," September (Stanford).—"Euclid Revised," Books i. and ii., by C. J. Nixon (Clarendon Press).—"Hand-book of Zoology," 3rd edition, by Sir J. W. Dawson (Dawson, Montreal).—"Bulletin of the Amer. Mus. of Nat. Hist.," July 1886 (New York).—"British Fungi," vol. ii., by J. Stevenson (Blackwood).—"Challenger Reports, Zoology," vols. xv.-xvi.—"Explosions in Coal-Mines," by W. N. and J. B. Atkinson (Longmans).—"Philosophische Studien," Dritter Band, 4 Heft, by W. Wundt (Engelmann, Leipzig).—"Proceedings of the Boston Society of Natural History," vol. xxiii. part 2 (Boston).—"Memoirs of the Boston Society of Natural History," vol. iii. No. 12, by W. K. Brooke; No. 13, by S. H. Scudder (Boston).—"Des Mesures absolues de la Chaleur rayonnante," by K. Angström (Upsal).—"Stonyhurst College Observatory: Results of Meteorological and Magnetical Observations, 1885," by Rev. S. J. Perry.—"Rules regarding Defects of Vision," by Sir J. Fayer (Churchill).—"Ancient and Modern Methods of Arrow Release," by E. S. Morse (Essex Inst.).—"Results of Experiments at Rothamsted on the Growth of Earley," by Prof. J. H. Gilbert.—"Descriptive List of Native Plants of South Australia Recommended for Cultivation," by J. G. O. Tepper.

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