

## SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 18.—“On the Absorption-Spectra of Metals volatilised by the Oxyhydrogen Flame,” by J. Norman Lockyer, F.R.S., and W. Chandler Roberts, Chemist of the Mint.

The authors state that the researches which have recently been published on the absorption-spectra of various metals, first by Roscoe and Schuster, and subsequently by one of themselves,\* establish beyond all question the facts that—

1. In addition to the well-known line-spectra, channelled-space spectra are produced by the vapours of certain metals; and,

2. Such spectra are produced by vapours which are competent to give, at other times, not only line-spectra, but continuous spectra in the blue, or blue and red.

As the temperature employed for the volatilisation of the metals in these experiments did not exceed bright redness, the range of metals examined was necessarily limited. It was therefore considered desirable to extend these observations to the less fusible metals, as well as to ascertain whether the spectra of those which volatilised at the lower temperature would be modified by the application of a greater degree of heat. For this purpose they employed an oxyhydrogen blowpipe, and the lime still used by Stas for the distillation of silver, his arrangement being modified in order that the metallic vapour might be conducted into a lime tube or tunnel heated to whiteness, so placed that a beam from an electric lamp could readily traverse it.

The apparatus employed consists of a block of lime traversed by a tube 16 centims. long and 30 millims. diameter. A receptacle, open at the upper surface of the lime-block, in order to admit of the introduction of the oxyhydrogen blow-pipe, communicates with the centre of the tube. The ends of the tube or tunnel in the lime were closed by glass plates held on by a suitable clip. Small lateral orifices were cut in the lime for the insertion of tobacco-pipe stems, through which a stream of hydrogen could be passed into the tube and receptacle.

An electric lamp was placed opposite one end of the tube and a spectroscope opposite the other. This last instrument was by Desaga, of Heidelberg, and its single prism, the angle of which was 60°, was capable of distinctly separating the D lines, at the same time that it enabled us to see the whole spectrum in a single field of view, an essential point in such inquiries.

Some preliminary experiments indicated the advisability of increasing the length of the column of vapour. To effect this, a tube 30 centims. long was made in a fresh block of lime, the cavity being arranged as before; in each end a short accurately fitting iron tube, luted with a mixture of graphite and fire-clay, was inserted; and the total length of the column thus became 60 centims.

The lime-block with its fittings was then placed in a charcoal furnace, by means of which the whole could be raised to a high temperature. As soon as the block was heated to bright redness, the metal, the vapour of which was to be examined, was introduced into the receptacle, and the flame of the oxyhydrogen blowpipe was allowed to play on its upper surface, care being taken to employ an excess of hydrogen. In almost every case the metal experimented on was rapidly volatilised (the exceptions being gold and palladium). As the glass plates rapidly became clouded by the condensation of the metallic vapours, it was necessary to adopt an arrangement by which they could be easily replaced. The authors assured themselves that oxides were not present to disturb the accuracy of the results.

They ascertained that the effect of oxides, and of the metallic rain due to condensation, was to produce a general absorption obviously different from the special effects of absorption which they record. Silver may be given as an example of the method.

Fifty grammes of pure metal were placed in the cavity, and this amount produced a continuous supply of vapour for about ten minutes.

With the smaller thickness given by the first lime block, and with a less powerful blast, the spectrum of silver consisted of an absorption in the blue which at times extended almost to the green.

With the elongated tube and a stronger blast an exquisite channelled-space absorption was observed, the channels being far enough apart to render them very conspicuous in the field of view; at the same time there was continuous absorption in the

blue. It was specially observed that there was no absorption in the red.

The results of experiments on the following metals and metalloids are then described:—Copper, sodium, calcium, aluminium, zinc, cadmium, manganese, iron, cobalt, nickel, chromium, tin, antimony, bismuth, lead, thallium, gold, palladium, selenium, and iodine.

The authors conclude that these experiments, conducted at the high temperature of the oxyhydrogen flame, go far to support the conclusions which were drawn from the experiments at a lower temperature. First, in passing from the liquid to the most perfect gaseous state, vapours are composed of molecules of different orders of complexity; and second, this complexity is diminished by the dissociating action of heat, each molecular simplification being marked by a distinctive spectrum. There is also an intimate connection between the facility with which the final stage is reached, the group to which the element belongs, and the place which it occupies in the solar atmosphere.

“On Traumatic Inflammation of Connective Tissue,” by G. Thin, M.D. Communicated by Prof. Huxley, Sec. R.S.

Linnean Society, April 1.—Dr. G. J. Allman, F.R.S., president, in the chair.—The President, on taking the chair, said: “I cannot allow the business of the evening to commence without one word expressive of the deep sorrow which we all feel in the death of one of our most distinguished Fellows and ablest officers. In our late treasurer we had a man of refined and cultivated mind, of honest and straightforward purpose, and of a simplicity and kindness of character that endeared him to all who knew him. Mr. Hanbury has been taken away from us at a time of life when we might still have looked forward to much and valuable work, and it now only remains for us to accept in sorrow the loss which deprives the Society of a conscientious and efficient officer, and many of us of a valued friend.”—The following papers were read:—Notes on *Octopus vulgaris*, Lam., by Mr. W. S. Mitchell.—On the connection of vegetable organisms with small-pox, by Dr. E. Klein, Assistant-Professor at the Laboratory of the Brown Institution. A report of this paper will shortly appear in the Proceedings of the Royal Society.

Chemical Society, April 1.—Prof. Abel, F.R.S., in the chair.—Researches on the action of the copper-zinc couple on organic bodies (viii.): on chloroform, bromoform, and iodoform, by Dr. J. H. Gladstone and Mr. A. Tribe, was read by the latter.—Dr. W. A. Tilden then read a paper on the action of nitrosyl-chloride on organic bodies (ii.): on turpentine oil. The action gives rise to a molecular compound of terpene and the chloride, which, by the action of alcoholic potash, yields *nitroso-terpene*,  $C_{10}H_{16}NO$ .—Dr. A. W. Hofmann made two communications to the Society: one, on the decomposition of the fulminates by ammonia and by sulphuretted hydrogen; the other, a striking lecture experiment showing the atomic relations of oxygen and chlorine.

Royal Horticultural Society, March 17.—Scientific Committee. Mr. P. Edgeworth, F.L.S., in the chair.—Flowering specimens of *Bambusa gracilis*, Hort., were sent from Trentham Gardens by Mr. Stevens.—Mr. Grote, F.L.S., sent extracts from the Proceedings of the Agri-Horticultural Society of India, relative to the growth of fungi in the interior of ant-hills. According to Dr. Cunningham the species was an *Agaricus* of the section *Lepiota*. They arise from a peculiar substance found in the ant-hills, and which probably consists of vegetable debris permeated by mycelium. According to Belt, a similar substance is found in the nests of the leaf-cutting ants of Nicaragua, and is supposed by him to serve as food, the ants cutting and storing the leaves for the sake of the fungi which are subsequently developed in the debris.—Prof. Thielton Dyer exhibited, under the microscope, examples of the ascospores of yeast. They were obtained by cultivating yeast on moist slabs of plaster of Paris in a damp atmosphere. After about ten days the cells of the yeast, which had been starved by this treatment, developed from two to four spores in their interior. These, when placed under appropriate conditions, were found to be capable of germinating, and so of reproducing actively growing yeast. De Seynes had observed them in *Mycoderma vini* in 1868, but they had been first described by Max Reess in 1870, in yeast.—Copies of the Meteorological Society’s report on the observations of phenological phenomena were placed on the table.—Dr. Masters called attention to the beautiful specimen of the fruit of *Helvichium Gardnerianum*, sent by Mr. Bennett from Hatfield. It had not hitherto been known to fruit in cultivation.

\* Lockyer: Proc. Roy. Soc., v. xxii. p. 371.

General Meeting.—W. A. Lindsay, secretary, in the chair.—The Rev. M. J. Berkeley called attention to the various objects of interest exhibited.

Anthropological Institute, March 23.—Col. A. Lane Fox, president, in the chair.—The President communicated a note on the chest measurement of recruits for the army, pointing out how the departure from a uniform method of measuring gave rise to unnecessary public expenditure, and often to the loss of good and sound men to the service. The method employed by Col. Fox himself at his depot was explained, and a table of statistics was exhibited in illustration of his remarks.—The Rev. Dunbar J. Heath, M.A., read a paper entitled "Molecules and Potential Life." The object of the author was to adduce arguments to show that there is a physical foundation for the measurement of vitality. The labours of Dr. Lionel Beale enabled us to put the amount of protoplasm, or living matter in the adult human body, at about 15lbs. in weight. Every vital action of every sort or kind kills a portion of that matter, and the mechanism by which its death is compensated, by the vitalisation of fresh pabulum, was anatomically and physiologically described. Hence it followed that every unit of physical action corresponds to the death of a unit of protoplasm, and a unit of vital action is at the same time exhibited. The death of protoplasm at the outside of a cell was described as diminishing the velocity and therefore the pressure of the outside dissociated atoms, the consequence of which was the deposit of the proximate principles such as fibrine, &c., and a rush of fresh pabulum inwards into the cell.—Mr. G. H. Kinahan, F.G.S., contributed a paper on a prehistoric road at Duncan's Flow, Balbyalbaugh, Co. Antrim.

Entomological Society, March 15.—Sir Sidney Smith Saunders, president, in the chair.—Mr. Sealy exhibited specimens of an *Ornithoptera* bred from larvæ taken in Malabar in great numbers on *Aristolochia indica*.—Prof. Westwood exhibited drawings of several undescribed Coleoptera of remarkable forms, of which he intended to communicate the descriptions. Amongst them was an insect from the collection of M. Mniszech which bore a strong resemblance to a *Rhysodes*, and which he had named *Rhysodina Mniszechii*, but was really a Heteromerous insect.—Mr. McLachlan remarked that on close examination the species of *Lepisma* exhibited at the last meeting by Mr. F. H. Ward did not correspond with the description of *L. domestica* of the United States, nor with the descriptions of any species with which he was acquainted.—Mr. Butler communicated some critical remarks on the recently published work on the *Sphinxidae* by Dr. Boisduval.—The Rev. K. P. Murray read some remarks on the species of *Terias*, forming the Hecabe group, which tended to show that the insects which had hitherto been considered distinct species under the names of *Æsiopæ*, *Mén*, *Brenda*, *Doubl*, and *Hew*, and *Sari*, *Horsf*, were mostly, if not all, referable to but one species, *T. Hecabe*, Linn. Prof. Westwood suggested that the case might be analogous to certain species of *Pieris*, where certain forms, e.g. *P. napeæ*, Esp., and *P. Sabellica*, Steph., now universally recognised as varieties of *P. napi*, Linn., had long been considered as specifically distinct. Prof. Westwood also suggested that attention should be paid to the times of appearance of the various forms, and the period noted during which they remained in the pupa stage. Mr. Butler remarked that the latter circumstance had an important bearing in the case of *Papilio Ajax*, Linn.—Mr. J. S. Baiy communicated descriptions of new genera and species of Phytophagous Coleoptera.—Mr. C. O. Waterhouse communicated a paper on the Lamellicorn Coleoptera of Japan.—Mr. F. Smith read descriptions of new species of Indian Aculeate Hymenoptera collected by Mr. G. R. James Rothney, and also descriptions of new species of bees of the genus *Nomia*, Latrielle.

Institution of Civil Engineers, March 23.—Mr. Thos. E. Harrison, president, in the chair.—The papers read were on the Hull Docks, by Sir William Wright, Assoc. Inst. C.E.; and on the construction of the Albert Dock at Kingston-upon-Hull, by Mr. John Clarke Hawkshaw, M.A., M. Inst. C.E.

Victoria (Philosophical) Institute, April 5.—Mr. C. Brooke, F.R.S., in the chair.—A paper on the relation of the Scripture account of the Deluge to Physical Science, by Prof. Challis, F.R.S., was read.

#### MANCHESTER

Literary and Philosophical Society, March 23.—Mr. Edward Schunck, F.R.S., president, in the chair.—On discoveries in a cave at Thayingen, near Schaffhausen, by Arthur Wm. Waters, F.G.S.

#### RIGA

Society of Naturalists, Sept. 2, 1874.—A number of specimens, mainly of ornithological interest, were presented to the Society by Dr. C. Berg, of Buenos Ayres, and others.—Prof. Schweder then spoke at length on self-ignition of hay; he attributes the first cause of the rise of temperature in bundles of hay to the chemical decomposition of the hay itself.

Sept. 16.—M. Behrmann spoke on the constitution of red and yellow prussiate of potash, and gave the graphic representation of both, showing the four free atomicity bonds in  $Cfy$  ( $Fe^v Cy_6$ ), and the six in  $Cidy$  ( $Fe^{iv}_2 Cy_{12}$ ).

Oct. 14.—Prof. Kieseritzky presented a number of rare species of plants for the herbarium of the Society. The paper read was "On Microscopic Investigation of Rocks," by Prof. Petzhold.—Dr. Nauck then exhibited some specimens of *Stegoporus pisciformis* bred by him.—The publication of the Society contains a detailed list, by J. H. Kawall, of all the work done by the new Russian societies of naturalists, and comprises the societies of Charkow, St. Petersburg, Moscow, Kasan, and Odessa.

#### STOCKHOLM

Kongl. Vetenskaps Akademiens Förhandlingar, Sept. 9 and Oct. 14, 1874.—The following papers were read:—On some peculiarities in the isothermal curves and the relations amongst different kinds of specific heats in the mechanical heat theory, by Prof. G. R. Dahlander.—On the influence of birds upon the composition of fossiliferous strata, by Dr. G. Eisen.—On two deductions from Cauchy's theorem of mathematical roots, by G. Mittag-Leffler.—On the magnetic measurement of iron ore deposits, by Prof. R. Thalén.—Calculation of the relative disturbances of planet (112) Iphigenia, by Dr. J. O. Backlund.

#### GÖTTINGEN

Royal Society of Sciences, Dec. 1874.—The following papers were read:—On the influence of the position of sun and moon upon volcanic eruptions, by S. von Waltershausen.—On the Sanskrit verbal root *śi*, and its derivatives in Greek and Latin, by Th. Benfey.—On the laws of voltaic induction, by Ed. Riecke.—On the molecular motion of two particles, with reference to Weber's law of electric force, by the same.—On the morphology and physiology of the facet eye of *Articulata*, by Dr. Grenacher of Rostock; an elaborate treatise on the subject, with a view to prove that the morphology of the compound eyes is perfectly compatible with Darwin's theory.

#### PARIS

Academy of Sciences, March 22.—M. M. Frémy in the chair.—The following papers were read:—Study of the process in the human mind in the research of the unknown, by aid of observation and experience, &c., by M. Chevreul. This is the author's second paper on the subject, and treats of the laws of vision and of the simultaneous contrast of colours.—On the stability of the salts of the fatty acids in the presence of water, and on the reciprocal displacement of these acids, by M. Berthelot. Mainly the alkaline salts are considered in their behaviour with excess of water, base or acid, and the acids treated of, with regard to substitution of each other, are formic, acetic, butyric, and valeric acids.—On the association of native platinum with rocks of a chrysolite base in the Ural; original relation of this metal to chromite, by M. Daubrée.—On the variations or periodical changes in the temperature (tenth note); period of the twelve-fold twentieth day, by M. Ch. Sainte Claire Deville.—The Academy then proceeded to the nomination of a new correspondent to its Mechanical Section, in lieu of the late Mr. Fairbairn. M. Boileau was duly elected in his stead.—The President then addressed a few words to M. Bouquet de la Grye, the chief of the expedition sent to Campbell Island to observe the Transit of Venus, and thanked him and the other members of the expedition, in the name of the Academy, warmly for their untiring efforts to obtain satisfactory results. After a short acknowledgment M. Bouquet de la Grye read a paper on the scientific documents recording the observations made at Campbell Island; the observations of the Transit of Venus were not successful, but the observers have brought home numerous results of other scientific observations, which in some degree atone for the disappointment with the rare phenomenon of the Transit.—A note by M. Mannheim on M. Kibaucour's paper read at the last meeting, on some properties of curves traced on surfaces.—A note by M. Moutard, on the linear differential equations of the second order.—On the quantity of oxygen which the blood can absorb at the diffe-

rent barometrical pressures, by M. P. Bret.—On the embryogeny of *Lamellaria perspicua*, a species of Gasteropoda, by M. A. Giard.—On the influence of the nervous system upon the respiration of insects, with special reference to *Dytiscus marginalis*, by M. E. Faivre.—On a new electro-medical galvanoscope, by M. J. Morin.—A note by M. L. Hugo, on the scientific basis of the decimal and metric system.—A memoir by M. L. A. Raimbert, on the treatment of carbuncles by sub-cutaneous injections of anti-virulent liquids.—A memoir by M. Barot, on an apparatus with continuous and graduated extension for the treatment of fractured legs.—M. Churchill then made some communications relating to cholera, and MM. Crussard and Molins some on Phylloxera.—Through M. José da Silva Mendes-Leal, the Portuguese Minister, the Academy received an original letter from Senor Manoel Godinho de Heredia, indicating the discovery of Australia by the Portuguese.—M. Boussingault then read a translation which he had made of this letter, and M. de Lesseps made some highly interesting observations on the same subject.—A note by M. Langley, director of the Alleghany Observatory, on the relative temperature in different solar regions. This is the first communication on the subject, and it treats principally of the temperature of the black nuclei of sun-spots.—A note, by M. Maurice Levy, on the theory of continued straight beams.—On the equations of the fifth degree, by M. Briochi.—A memoir, by M. Max. Marie, on the classification of cubical integrals of terminated volumes by algebraic surfaces; geometrical definition of surfaces which are capable of algebraic cubature.—A note, by M. J. M. Gauguin, on the theory of the processes of magnetisation.—On the molecular equilibrium of solutions of chrome alum, by M. Lecoq de Boisbaudran.—On the boiling-point determinations of the chlorinated derivatives of toluene, by M. G. Hinrichs.—M. Des Cloiseaux then presented to the Academy an instrument constructed upon the indications of M. Jannettaz, for the determination of the axes of ellipses in crystals.

March 29.—M. Frémy in the chair.—The following papers were read.—On the observations of temperature, made at the Jardin des Plantes, during the meteorological year 1874, with the electrical thermometers, under naked and grass-covered soils; by MM. Becquerel and Edm. Becquerel.—Researches on sugar beet-root, by MM. E. Frémy and P. P. Dehérain.—A note by M. Des Cloiseaux, on the pyroxenic element in the rocks associated with platinum, in the Ural.—A memoir by M. Boussingault, on the comparative analysis of glutinous biscuits and some other feculent aliments. MM. Thenard, Bouilland, and Chevreul then made some remarks on this subject.—The Academy then nominated M. Joly as correspondent to its section for Zoology and Anatomy in lieu of M. P. Gervais, who was elected a member of the Academy; and a number of commissions were nominated to superintend the competitions for the different prizes of the Academy.—On the dissolution of hydrogen by metals and the decomposition of water by iron, by M. L. Troost and P. Hautefeuille: researches treating principally of iron, nickel, cobalt, and manganese.—On the chemical equilibrium among gases: iodine and hydrogen, by M. G. Lemoine.—A note by M. Fordos, on a quick way of assaying solderings containing lead.—On the influence of the roots of living plants on putrefaction, by M. Jeannel.—On the natural wells of the coarse limestone, by M. Stan. Meunier.—A note by MM. Trève and Durassier, on the relation existing between the nature of steel and its coercitive force.—A note by M. Decharme, on a new means of producing sonorous vibrations and phenomena of interference on mercury.—M. F. Garrigou then made a communication of his new researches on the mineral waters of the Pyrenées.—A memoir by M. Peaucellier, on the application of articulate systems ("à liaison complète") to the arts and the sciences of observation.—M. J. J. Cazenave then read an abridged history of the probes and urethro-vesicular sounding instruments used up to the present day.—M. de Molon, à propos of a recent communication of M. Menier, reminds the Academy of his observations which prove the necessity of crushing the nodules of phosphate of lime to render their use efficacious in agriculture.—A note by M. J. Tardes, on the reflexion of light.—A note by M. Mailland, on the treatment of cholera.—MM. B. Dugas, A. Mornard, Barthélémy, A. Bouteille, and Dupoux, then made some communications on Phylloxera.—The Minister for Foreign Affairs transmitted to the Academy a letter from the French Consul at the Cape of Good Hope, announcing the arrival at Table Bay of the members of the Commission sent by the Government of the United States to Kerguelen Island to observe the Transit of Venus. The observations were generally

successful, as well as those of the English party of observers at the same island.—MM. Sivel, Crocé-Spinelli, G. and A. Tissandier, and Jobert, then announced the success of their balloon ascent made on March 23 and 24, under the auspices of the French Aeronautical Society. They remained twenty-two hours and forty minutes in the atmosphere, and they hope shortly to communicate to the Academy the scientific results of their observations and experiments.—M. Dumas then produced before the Academy the copy of a document existing in the archives of the city of Paris, and discovered there by M. Read, relating to Salomon de Caus, with a view to complete the information regarding this sage, who died in Paris in 1626.—A note by M. G. Fouret, on some consequences of a general theorem relating to an implex and a system of surfaces.—A note by M. Hugo Gylden, on a method to calculate the absolute perturbations of comets.—On the residues of the seventh power, by M. P. Pepin.—A note by M. Briochi, on his paper read at the last meeting on equations of the fifth degree.—On the relative temperature in the different regions of the sun, by M. Langley. This is the second paper on this interesting subject (the first was read at the last meeting), and treats of the equatorial and polar regions.—A note by M. Laguerre, on a theorem of geometry. M. Ossian Bonnet then made some remarks on the subject.—On the error in Poncelet's formula relating to the evaluation of areas, by M. Chevallier.—On the double interior reflection in doubly refractive uniaxial crystals, by M. Abria.—Chemical researches on the uric group, by M. E. Grimau.—On the Amphipoda of the Gulf of Marseilles, by M. J. D. Catta.—On the saline deposits in the lavas of the last eruptions of Santorin, by M. F. Fouqué. M. Ch. Sainte Claire Deville then made some remarks on this paper. The same gentleman presented to the Academy the meteorological observations made at Barèges, at the Plantade Station, and on the summit of the Pic du Midi. M. H. Resal presented a new publication of the Society of Civil Engineers of Great Britain, and made some remarks upon it.—M. Chasles remarked on a note of M. Genocchi à propos of a recent communication of M. Roberts, on the expression of the arcs of Descartes' ovals in the function of three elliptical arcs.

#### BOOKS AND PAMPHLETS RECEIVED

BRITISH.—Report of the Thirteenth Annual Meeting of the West Riding Consolidated Naturalists' Society, 1874.—Annual Report of the Geologists' Association, 1874, together with List of Members and Catalogue of Library, Laws of the Association, &c. (University College).—On the Establishment in connection with the India Museum and Library, of an Indian Institute: J. Forbes Watson, M.A., M.D. (William H. Allen and Co.)

AMERICAN.—Remarks on the Family Nemophidæ: F. W. Putnam (Boston Society of Natural History).—Remarks on the Mammoth Cave and some of its Animals; Bulletin of the Essex Institute.

FOREIGN.—Les Fourmis de la Suisse, Neue Denkschriften: Auguste Forel (Zürcher and Furrer, Zürich).—Expériences sur la température du Corps Humain dans l'acte de l'ascension sur les montagnes: 1st, 2nd, and 3rd series: F. A. Forel (H. Georg, Genève).—Une Variété nouvelle ou peu connue de Gloire Étudiée sur le lac Léman: Dr. F. A. Forel (Rouge and Dubois, Lausanne).—Carte Hydrographique du lac Léman: F. A. Forel.—Note sur les tremblements de Terre en 1871: Alexis Perrey (l'Académie Royale de Belgique).—Über das Studium der Mineralogie auf den Deutschen Hochschulen: Von P. Groth (Strasburg; Karl J. Trübner).—Ergebnisse der Beobachtungsstationen an den Deutschen Küsten über die physikalischen Eigenschaften der Ostsee und Nordsee und die Fischerei, January 1874 (Berlin: Wiegandt, Humpel, and Pary).—Les Bois-Indigènes et Etrangers: Adolphe E. Dupont and Bouquet de la Grye (Paris, J. Rothschild).

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