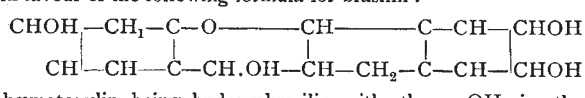
SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, December 19, 1901.—Prof. Emerson Reynolds, president, in the chair.—It was announced that the remaining meetings of the present session would be held alternately on Thursdays at 8 p.m. and Wednesdays at 5.30 p.m., commencing with an evening meeting on Thursday, January 16. The text of the address of congratulation to M. Berthelot was then read, and the secretary recorded the presentation of a plaster cast of the bronze portrait of Bunsen from the tomb at Heidelberg by Sir Henry Roscoe, and of a photograph of a bas-relief of Prof. Julius Thomsen by Mr. H. Faber.—The following papers were read :—(1) The constitution of corydaline, (2) the relations of corydaline to berberine, by Dr. J. J. Dobbie and Mr. A. Lauder. The authors have studied exhaustively the action of various oxidising agents, such as potassium permanganate and dilute nitric acid, upon corydaline, an alkaloid derived from the Tyrolean plant *Corydalis cava*, and by the identification of the ultimate oxidation products have established the fact that it is closely related to the yellow alkaloid berberine, and have therefore assigned to it a constitutional formula of the type suggested by Perkin for the latter alkaloid. The interrelations of the two alkaloids are shown in the following scheme :—

Corydaline (colourless) $C_{22}H_{27}NO_4$	by *oxidation* gives	dehydrocorydaline (yellow) $C_{22}H_{23}NO_4$.
Berberine (yellow) $C_{20}H_{17}NO_4$	by *reduction* gives	tetrahydroberberine (colourless) $C_{20}H_{21}NO_4$.

The constant difference C_2H_6 observed in the corresponding alkaloids of the scheme is accounted for by the presence of a methyl group in the α position of the pyridine ring and the occurrence of two contiguous methoxyls in place of the piperonyl group of the berberine formula of Perkin.—The magnetic rotation of some polyhydric alcohols, hexoses and disaccharoses, by Dr. W. H. Perkin, sen. The phenomena of varying specific rotation shown by solutions of sugars have been explained by the assumptions that these substances in the solid form possessed a structure which became modified gradually in their aqueous solutions, or that the solid was made up of complex molecules which underwent simplification in the presence of a solvent, or that solution was accompanied by gradual hydration. The magnetic rotations of solutions of the various sugars show that the first of these hypotheses is probably the correct one, and incidentally it was found that the observed values for dextrose agreed best with those calculated for Tollens' formula, which represents that substance as similarly constituted to ethylene oxide.—Stereoisomeric halogen derivatives of α-benzoylcamphor, by Dr. M. O. Forster and Miss F. M. G. Micklethwait. α′-Benzoyl-α-bromocamphor and α-benzoyl-α′-bromocamphor were prepared and characterised; the former has the specific rotation $-10°$ in benzene, the latter under the same conditions $-53°$. The corresponding chloro-derivatives have respectively the rotations $-27°$ and $+26°$ in chloroform.—Brasilin and hæmatoxylin, by Prof. W. H. Perkin, jun. These closely related substances are the characteristic colouring matters respectively of Brazil wood and logwood. As the result of a long-continued investigation in conjunction with his pupils, the author had suggested two formulæ which might equally well represent the constitution of hæmatoxylin, and the present paper gives conclusive evidence in favour of the following formula for brasilin :—



hæmatoxylin being hydroxybrasilin with the —OH in the position 1.—Is argon an elementary substance? by Mr. G. Martin. The view is put forward that since argon furnishes no characteristic series of compounds it may be regarded as a mixture of elementary gases.—The action of phosphorus trithiocyanate on alcohol, by Dr. A. E. Dixon. In this reaction thiocyanic acid is formed together with isopersulphocyanic acid, but no substance of the formula $C_8H_{18}N_4S_4O$, as found by Lössner, could be obtained.—The influence of salts and other substances on the vapour pressure of aqueous ammonia solutions, by Dr. E. P. Perman. Alkali salts produce an increase of pressure, while the formation of complex substances with copper salts reduces it.—The action of sodium hypochlorite on benzenesulphoanilide, by Dr. J. B. Cohen and Mr. J. T. Thompson. Benzenesulphonyl-p-chloranilide is the principal product of this reaction, and has been obtained in a pure state and characterised.—The relationship between the substitution and constitution of benzeneazo-α-naphthol, by Dr. J. T. Hewitt and Mr. S. J. M. Auld. This substance is regarded as an oxyazo-compound, since on acetylation and complete decomposition it furnishes aniline, but not acetanilide, and by reduction gives rise to a hydrazo-derivative. The monobrombenzeneazo-α-naphthol behaves similarly, the substitution occurring in the naphthol nucleus.

Geological Society, December 18, 1901.—Mr. J. J. H. Teall, V.P.R.S., president, in the chair.—Prof. H. G. Seeley drew attention to a skull of *Equus fossilis* from Keswick, exhibited by Mr. J. Postlethwaite, and said that it belonged to a species of horse, but the skull appeared to be broader and flatter in front of the orbits than in the *Equus caballus*; and it gave evidence on the upper surface of being an aged specimen, an inference which was supported by the palatal conditions. Mr. Postlethwaite said that the skull was found beneath the floor of one of the rooms of a farm-house about six miles east of Keswick. The house, which is of considerable age, was being altered and repaired, and it was in taking up one of the floors, for the purpose of relaying, that the skull was found. The surface-deposit on the farm is Glacial Drift.—Prof. W. W. Watts called attention to the exhibited set of twenty-two photographs, the first of three sets to be published as typical examples of geological photographs by the committee of the British Association on geological photographs.—Coal and petroleum-deposits in European Turkey, by Lieut.-Colonel Thomas English. In this paper an account is given of the formations which include some recently discovered coal-seams and naphtha-bearing sands of Tertiary age in the little visited stretch of country lying to the north of the Gulf of Xeros in the Mediterranean, and of the western portion of the Sea of Marmora.—On the geological and physical development of Dominica; with notes on Martinique, St. Lucia, St. Vincent and the Grenadines," by Prof. J. W. W. Spencer. These islands form a continuation of the volcanic chain extending from Gaudeloupe, though separated one from the other by embayments in the submarine plateau, reaching to depths of more than 6000 feet, within the line connecting the shores of the islands. These submarine valleys head in cirques, like the amphitheatres which occur on the slopes descending from high plateaux. From the ends of the cirques, valley-like channels can be traced landward on the submerged plateaux, or can be found to cross them in order to join like features on the other side. The cols between the opposite valleys vary in depth from about 2000 to 3600 feet, except that between the Grenadines and the Trinidad banks, where the divide may not be more than 750 feet below the surface of the sea, and one south of St. Vincent (less than 1300 feet). Some of the submarine channels have remarkable tributaries. The drowned valleys, like those about the islands to the north, assume two very different forms—those with broad undulating outlines, such as characterise the features produced during the long Miocene-Pliocene period of erosion, when the surfaces of the land were at or near the base-level of erosion, and other types where very deep valleys and gorges incise the more rounded features of the drowned plateau, which in the early Pleistocene epoch thus appears to have stood for a limited time at an altitude of 6000 or 7000 feet, as shown within the limits of the Antillean mass (and still higher from evidence beyond). There are no coastal plains, strictly speaking; only to a very limited extent are the islands surrounded by shelves submerged to a depth of less than 200 feet. But the Grenadine banks are extensive. One or two outlying remnants of the Antillean plateau occur south-east of Dominica, and another about sixty miles east of Martinique, all of which may be fragments of the old coastal plains. All the islands are underlaid by old Tertiary or pre-Tertiary igneous rocks.—On the geological and physical development of Bardados, with notes on Trinidad, by Prof. J. W. W. Spencer. Barbados, more than 100 miles east of the main chain of islands, is a remnant of the dismembered and sunken Antillean plateau, with the embayment in it, west of the island, reaching to a depth of more than 7000 feet. But the drowned Barbados ridge extends far, both to the south and to the north of the island, and is connected by another ridge with the Martinique mass. Trinidad is part of the South American continent, being on the subcoastal shelf which extends much

farther seaward. Trinidad has more continental features than the other islands. Its surface-topography has been found to owe its origin to the erosion features of the Miocene-Pliocene period, which have been covered by only thin mantles as in Barbados, so that its life-history falls into harmony with that of the other islands. In its older beds it has the deep oceanic oozes as in Barbados. No volcanic phenomena have been added to the features of these islands.

Royal Microscopical Society, December 18, 1901.—Mr. William Carruthers, F.R.S., president, in the chair.—Messrs. R. and J. Beck exhibited a new micrometer microscope, the body of which was made to traverse across a long stage by means of a fine screw, the milled head of which was divided so as to indicate a movement of 1/100 millimetre. The body could also be placed in a horizontal position, when it could be used as a telescope to measure distant objects.—Mr. F. W. Watson Baker exhibited a number of microscopic specimens illustrating the development and structure of eyes. They were shown under twenty microscopes and were the most perfect sections which could be obtained from the best preparers in this country and abroad.—Mr. Nelson sent three notes which in his absence were read by the secretary. The first was a description of Holtzapffel's microscope. The date of it is 1830 and in it are found four original devices, (1) the clamp foot for clamping the instrument to the edge of a table, predating a similar device of Varley's in 1831; (2) the back of the mirror is flat polished brass so that monochromatic light may be reflected by it; (3) the stage is focussed by an excentric which differs from and predates the somewhat analogous devices of Pacini and Plössl; (4) the movement of the lens holder by means of a steel tape and pinion. The second note was a description of the first English achromatic objective, made by W. Tulley. It was a triplet and was made at the suggestion of Dr. C. R. Goring, who paid 90*l.* for it. The focus of the combination is 0·933 inch, initial magnifying power 10·72, N.A. ·259, and the O.I. the large amount of 24·2. Mr. Nelson then described the Chevalier-Euler achromatic objectives of 1823-24 and 1824-25. These were doublets, and in 1827 Mr. J. J. Lister put one of the Chevalier doublets as a front and a Tulley's triplet as a back lens. The focus of the combination was 0·52 inch and it was the finest microscopic objective that had up to that time been produced, and was, strictly speaking, the first really successful scientific microscopic objective. Lister's labours in perfecting objectives and the great use they had been to the leading opticians of the day were referred to. The third note was on a useful caliper gauge. It can be purchased at any watchmaker's tool shop for three or four shillings. It is convenient for measuring the thickness of cover glasses, and for low-power work the scale may be placed on the stage of a microscope and the constant of an eye-piece micrometer found by comparison with the mm. divisions.—The president gave an account of some investigations which he had made in reference to a disease that had caused great mischief in the cherry orchards in Kent. About fourteen months ago, when his attention was first directed to it, the disease was prevalent over a considerable area, a noticeable feature in connection with it being the persistence in the autumn of the dead leaves on the branches, instead of their falling off, as they would if the trees were healthy. The leaves of affected trees were pervaded by the mycelium of a fungus which destroyed them, and as the food of the tree was prepared by the leaves, the growth of the tree would, as a consequence, be arrested. The results of experiments in the cultivation of the fungus showed it to be one which belonged to the genus Gnomonia. Many of the fungi in this class passed through various stages in their life-history, for example, the mildew on wheat, which was first developed on the berberry and then spread to the wheat, appearing first as rust and afterwards as mildew from the same mycelium. The president referred to the absence in this country of any authority competent to investigate cases such as this; on the continent, however, the Governments had taken up the matter, and the experts who had inquired into it had found that to check the spread of the disease it was necessary to collect all the dead leaves and burn them. The president had consequently urged upon the fruit growers the necessity of following this recommendation, but had only been able to persuade two growers to do so; both of these, however, had found it to be thoroughly effective. Prof. A. W. Bennett in his remarks enlarged upon the absence in this country of investigations into such matters by State-paid establishments, and described what was being done in the United States, where every State had its own experimental station.

PARIS.

Acadamy of Sciences, December 30, 1901.—M. Fouque in the chair.—M. Albert Gaudry was elected vice-president for the year 1902.—On double fertilisation in the Solanaceæ and Gentianaceæ, by M. L. Guignard. A study of *Nicotiana tabacum* and *Datura loevis* in the Solanaceæ and of *Gentiana ciliata* shows that double fertilisation is effected in both of these orders in essentially the same manner as in other cases which have been observed.—On a series of factorials, by M. Niels Nielson.—On linear differential equations which are of the same species, by M. Alfred Lœwy.—Some new theorems on entire functions, by M. Ernst Lindelöf.—On integral invariants and differential parameters, by M. Alf. Guldberg.—Internal tensions produced by two equal directly opposed forces acting on an indefinite solid, by M. Mesnager.—The critical constants and molecular complexity of some hydrocarbons, by MM. Ph. A. Guye and Ed. Mallet. The critical pressures and temperatures are given for durene, naphthalene, diphenylmethane and diphenyl. From these are calculated the critical coefficients, the constants a and b in Van der Waals' formula and the ratios of the real critical density to the theoretical. The conclusion is drawn that none of the hydrocarbons studied are associated at the critical point.—The extension of Kirchhoff's laws, by M. E. Carvallo. The results of this investigation are expressed as follows: The flux of the total current through the whole of a closed surface is zero, and the total electromotive force which rules in a closed circuit is zero.—On a new reaction between electrostatic tubes and insulators, by M. W. de Nicolaiève.—The action of high-frequency currents upon animals, by MM. H. Bordier and Lecomte. It has been shown that high-frequency currents can be applied directly to man without any sensation being produced, in spite of the large amount of energy which can be thus transmitted. It has been suggested as an explanation of the absence of sensation that the currents pass over the surface of the body without penetrating it. The experiments of the author negative this view, as such currents were found to be fatal to the rabbit, guinea-pig and rat.—Remarks on the preceding communication, by M. d'Arsonval. The facts described by MM. Bordier and Lecomte are in full accord with previous observations of the author. Stress is laid upon the conditions which must be observed in studying high-frequency currents. It is necessary to avoid all action on the sensibility, muscular contraction, and all abnormal elevation of temperature.—On the existence of rays capable of reflection in the radiation emitted by a mixture of the chlorides of radium and barium, by M. Th. Tommasina.—On the electro-capillary maxima of some organic compounds, by M. Gouy.—The heat of formation of the hydrate of chlorine, by M. de Forcrand. The number deduced from the dissociation curves of Isambert, Roozeboom and Le Chatelier is 18·16 calories; the value obtained from direct experiment is 18·57.—On the determining causes of the formation of the visual organs, by M. Antoine Pizon. The phenomenon of vision is regarded simply as a consequence of the accumulation of pigmentary granules at certain points of the body, and of the absorbing power of these granules for light rays. These views are regarded as affording an explanation of the occurrence of the eyes in the regions of greatest illumination, the position of the cephalic eyes, the extraordinary number of eyes in certain annelids, the more or less complete disappearance of the eyes in species inhabiting caves and in internal parasites.—The leaf trace in ferns, by MM. C. E. Bertrand and F. Cornaille.—On the eclogites of the Aiguilles Rouges, by M. Étienne Joukowsky.—On ergot of rye, by M. Marcel Guédras. The therapeutic action of this drug is due to sphacelinic acid and to cornutine. These active principles cannot be separated practically, since they have nearly the same solubility.

NEW SOUTH WALES.

Linnean Society, November 27, 1901.—Prof. J. T. Wilson in the chair.—The following papers were read:—Descriptions of new genera and species of Australian Lepidoptera, by Mr. Oswald B. Lower. Sixty-seven species referable to six families, namely, Arctiadæ 2, Noctuidæ 39, Thyrididæ 1, Pyralidæ 23, Tortricidæ 1, Plutellidæ 1.—The deterioration of raw and refined sugar crystals in bulk, by Mr. R. Greig Smith. The deterioration of bulk crystals is in many cases caused by *Bac. levaniformans*

which was separated from many samples of inverting sugar. The conditions necessary for the degradation are a moist state of the sugar and a warm temperature. The formation of gum levan is in abeyance, probably on account of the infinitesimal amount of nitrogenous food. The bacillus is widely distributed, having been found in beet crystals from France and Germany and in cane sugar from Java, Egypt and Australia.—The acid fermentation of raw sugar crystals, by Mr. R. Greig Smith. *Bac. levaniformans* may set up an acid fermentation whereupon the sugar smells strongly of acetic and butyric acids.—Notes on the botany of the interior of New South Wales, part v., by Mr. R. H. Cambage. The conspicuous vegetation of the country around the Lachlan River, extending from Parkes to Marsden, is dealt with.—Studies in Australian entomology, No. xi. Description of a new ground-beetle from Victoria, by Mr. Thomas G. Sloane. The insect here described is a species of Morphnos, easily distinguished from the only other member of the genus, *M. flindersi*.—On the skeleton of the snout and os carunculæ of the mammary fœtus of monotremes, by Prof. J. T. Wilson.—The protoconchs of some Port Jackson gasteropods, by Mr. H. Leighton Kesteven.—Studies on Australian Mollusca, part v., by Mr. C. Hedley. Several land shells hitherto unfigured, collected by the Chevert Expedition, are herein illustrated.

ST. LOUIS.

Academy of Science, December 2, 1901.—Mr. J. Arthur Harris presented in abstract a paper on normal and teratological thorns of *Gleditschia triacanthos*, L.—Prof. A. S. Chessin, of Washington University, delivered an address on the harmony of tone and colour. The speaker said that although the idea is not new that colours, like tones, are subject to laws of harmony, he did not know that any systematic theory concerning this had thus far been presented, and the object of the paper was to establish such a theory. A colour-scale was constructed, and the properties of the intervals corresponding to those appearing in the musical scale were discussed, and the conclusion was reached that within the limit of an octave the laws of harmony in tone and colour are identical.—A paper by Prof. A. S. Chessin, on the true potential of the force of gravity, was presented and read by title, the author remarking that this was the first of a series of detailed papers bearing upon the general subject, the broad conclusions concerning which he had presented in synopsis at a recent meeting of the Academy.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 9.

MATHEMATICAL SOCIETY, at 5.30.—Non-uniform Convergence, and the Integration of Series: the President.—Network: S. Roberts, F.R.S.—On Quartic Curves with a Triple Point: A. B. Basset, F.R.S.—On the Integrals of the Differential Equation

$$\frac{du}{\sqrt{f(u)}}+\frac{dv}{\sqrt{f(v)}}=0,$$

where $f(x)\equiv ax^4+4bx^3+6cx^2+4dx+e$, Considered Geometrically: Prof. W. Snow Burnside.—On the Fundamental Theorem of Differential Equations: W. H. Young.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Discussion of the Technical Reports on the Institution Visit to Germany, 1901, by the Committees on Traction, Light and Power; Manufacturing, and Telegraphs and Telephones.

FRIDAY, JANUARY 10.

ROYAL ASTRONOMICAL SOCIETY, at 5.—The Attraction of the Himalaya Mountains upon the Plumb-line in India: Major S. G. Burrard.—The Period and Light Curve of the Variable Star 6685 Y Lyræ: A. Stanley Williams.—Note on a Further Attempt to observe the Corona without an Eclipse: Rev. C. D. P. Davies.—The Double Star Σ 1639 Comæ Berenicis: Thomas Lewis.

MALACOLOGICAL SOCIETY, at 8.

MONDAY, JANUARY 13.

SOCIETY OF ARTS, at 8.—The Purification and Sterilisation of Water: Dr. Samuel Rideal.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—From Shanghai to Bhamo: Dr. R. Logan Jack.

TUESDAY, JANUARY 14.

ROYAL INSTITUTION, at 3.—The Cell: Prof. A. Macfadyen.

ZOOLOGICAL SOCIETY, at 8.30.—Observations on some Mimetic Insects and Spiders from Borneo and Singapore: R. Shelford.—On Variation in the Number and Arrangement of the Male Genital Apertures in *Nephrops norvegicus*: F. H. A. Marshall.—On some Remarkable Digestive Adaptations in Diprotodont Marsupials: Dr. Einar Lönnberg.

INSTITUTION OF CIVIL ENGINEERS, at 8.—American Workshop Methods in Steel Construction: H. B. Molesworth.

WEDNESDAY, JANUARY 15.

SOCIETY OF ARTS, at 8.—Elliptographs: Frank J. Gray.

ENTOMOLOGICAL SOCIETY, at 8.—Annual Meeting.

ROYAL METEOROLOGICAL SOCIETY, at 7.45.—Annual General Meeting.—Address on The Element of Chance in relation to various Meteorological Problems: W. H. Dines, President.

ROYAL MICROSCOPICAL SOCIETY, at 8.—Annual Meeting.—Address by the President.

GEOGRAPHICAL ASSOCIATION, at 3.—Annual Meeting.—Address on The Importance of Geography in Education: Right Hon. James Bryce, M.P.

THURSDAY, JANUARY 16.

LINNEAN SOCIETY, at 8.—On the Use of Linnean Specific Names: H. and J. Groves.—Exhibitions: Branches of Cherry affected by the Gnomonia Disease, with Remarks on its Effects and Climatic Causes: A. O. Walker.—Photographs and Specimens of Heads of Wild Sheep, to Illustrate a recent Suggestion as to the Use of Large Horns in Feral Species: J. E. Harting.

CHEMICAL SOCIETY, at 8.—Myricetin, Part II.: A. G. Perkin.—The Colouring Matters of Green Ebony: A. G. Perkin and S. H. C. Briggs.—An Investigation of the Radioactive Emanation produced by Thorium Compounds, I.: E. Rutherford and F. Soddy.

FRIDAY, JANUARY 17.

ROYAL INSTITUTION, at 9.—Interference of Sound: Lord Rayleigh.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Theory of Heat-Engines: Captain H. Riall Sankey.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Modern Machine Methods: H. F. L. Orcutt.

EPIDEMIOLOGICAL SOCIETY, at 8.30.

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