SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 12.—"On the Parasitism of *Pseudomonas destructans* (Potter)." By M. C. Potter, M.A. F.L.S., Professor of Botany in the University of Durham College of Science, Newcastle-upon-Tyne. Communicated by Sir Michael Foster, K.C.B., Sec.R.S.

The author gives an account of his further study of the action of the cytase and toxin, secreted by this bacterium, upon the living turnip cell; and he has succeeded in tracing the passage of the bacterium into the cells, through the cell-wall. The observations were made from pure cultures, under the most rigid sterile conditions, by means of the hanging drop. The action of the cytase and toxin was surprisingly rapid; the swelling of the cell-wall and contraction of the protoplasm could be observed almost immediately, upon the introduction of the Pseudomonas. Within an hour and a half the cell was dead and its walls in an advanced stage of disintegration. The original cell was kept under observation for some days, and after patient and continuous watching certain of the bacteria were observed slowly forcing their way through the wall, until finally they emerged into the cell-cavity. The penetration of the wall was observed on several occasions, and numerous individuals could be seen in all stages of the process. The time required varied with the thickness of the wall, but on an average occupied about three hours.

Important evidence of the perforation of the cell-wall by *P. destructans* was also afforded by the method of paraffin sections; by fixing and double staining, the cell-wall and bacteria were distinctly differentiated, the latter being shown fixed in the actual process of perforating the wall, and various stages of penetration could be distinguished.

Experiments showed that the old and fully developed cuticle is apparently proof against the action of the enzymes excreted by *P. destructans*, but this parasite can readily effect an entrance into its host through the undeveloped epidermis of young and tender structures.

A comparison of the parasitism of *Botrytis cinerea*, as demonstrated by Nordhausen, presented an exact parallel. The point was established that this bacterium has the power of destroying the living cells of the turnip, and, subsisting upon their dead contents, continues to work its way through the host, and it thus acts in precisely the same manner as one acknowledged parasitic fungus.

Chemical Society, June 18.—Elimination of a nitro-group on diazotisation. Dinitro-*p*-anisidine, by Prof. Meldola and Mr. J. V. Eyre. When dinitro-*p*-anisidine is diazotised in presence of hydrochloric acid the 3-nitro-group is replaced by chlorine.—Preliminary notice of some new derivatives of pinene and other terpenes, by Prof. Tilden and Dr. H. Burrows. Pinene nitrosochloride, when treated with potassium cyanide in alcohol, is converted into pinene nitrosocyanide, a colourless crystalline substance melting at 171°. The latter reacts readily with various reagents, furnishing well-crystallised reaction products.—The colour-changes exhibited by the chlorides of cobalt and some other metals from the standpoint of the theory of electro-affinity, by Messrs. Donnan and Bassett. These colour-changes are shown to be due to the gradual dissociation of the complex molecules of the salts.—The stereochemical formula of benzene, by Mr. Marsh. A discussion of the various possible space formulæ of benzene and a reply to Graebe's objections to the stereocentric representation.—An accurate method of determining the compressibility of vapours, by Dr. Steele. A description of a special apparatus devised for this purpose.—A new type of substituted nitrogen chlorides, by Dr. Chattaway. The author describes a group of these substances containing three negative radicles directly attached to the nitrogen atom, such as dibenzoyl nitrogen chloride, $(C_6H_5CO)_2$:N.Cl.—The preparation of pure chlorine and its behaviour towards hydrogen, by Messrs. J. W. Mellor and E. J. Russell. The chlorine was prepared by electrolysis of fused silver chloride, and the hydrogen by the action of steam on sodium. Mixtures of these gases were found to be exploded by electric sparks even after several months' drying over phosphorus pentoxide.—Derivates of dibenzoyl mesitylene, by Mr. W. H. Mills and Dr. Easterfield.—The molecular condition of borax in solution, by Mr. H. S. Shelton. The author, from a series of measurements of electric conductivity of borax solution of diminishing concentrations, shows that hydrolysis into boracic acid and sodium hydroxide occurs to the extent of 4 per cent. at 25°.—On the union of hydrogen and chlorine, v. and vi., by Dr. Mellor. The author concludes that the chemical change occurring when moist chlorine is exposed to sunlight is due to interaction between the chlorine and the moisture contained in it. No intermediate compound, such as hypochlorous acid or chlorine monoxide, seems to be formed.—On some hydroxy-pyrone derivatives, by Messrs. Tickle and Collie. A description of hydroxydimethylpyrone and hydroxycomenic acid obtained by oxidising dimethylpyrone and meconic acid respectively with hydrogen peroxide.—The absorption spectra of phloroglucinol and some of its derivatives, by Messrs. Hartley, Dobbie and Lauder. The absorption spectra of phloroglucinol and its trimethyl ester are almost identical, whence it follows that the parent substance possesses an enolic structure.—Solubility of mannitol, picric acid and anthracene, by Dr. Findlay. An investigation of the general applicability of the rule recently observed by the author connecting the solubilities of substances.—Menthyl formylphenylacetate, by Messrs. Cohen and Briggs. A description of the principal properties of this substance is given differing in some points from those assigned to it by Lapworth and Hann.—Transformation of diacetanilide into aceto-*p*-aminoacetophenone, by Dr. Chattaway.—Nitrogen chlorides and bromides derived from *ortho*-substituted anilides, by Dr. Chattaway and Mr. Wadmore. A description of several members of this class obtained by the interaction of hypochlorous and hypobromous acids with the corresponding anilides.—Substituted nitrogen chlorides containing the azo-group, by Dr. Chattaway.—The action of chlorine and bromine on nitroaminobenzenes, by Dr. Orton. A description of *sym.* trisubstituted chloro- and bromonitroaminobenzenes obtained by the interaction of the above substances.—The transformation of diazoamido- into aminoazo-compounds and of hydrazobenzene into benzidine, by Dr. Chattaway. A new method of formulating these changes is suggested.—Tribromophenolbromide, by Mr. E. W. Lewis. The melting point of this substance when pure is 148°, not, as generally stated, 118°.

Royal Astronomical Society, June 13.—Dr. J. W. L. Glaisher, president, in the chair.—M. Bigourdan gave an account of the long series of observations of nebulæ which he is making at the Paris Observatory, his aim being to obtain accurate micrometric measures of a large number of nebulæ. M. Bigourdan presented to the Society two volumes of his observations, and also the volume of Pingré's "Annales Célestes," which the author had left in MS., and which M. Bigourdan had now edited and published.—Dr. Downing read a paper on the distribution of the stars in the Cape Photographic Durchmusterung. He had reduced the places of the stars to galactic coordinates, to investigate their distribution with reference to the Galaxy. The results showed a ring of bright stars nearly in the Galactic plane, stars in the groups mag. 6·5 to 7·0 being more uniformly distributed. After magnitude 8·0 there is a greater difference between the density of the polar and equatorial zones of the Galaxy. The Cape Durchmusterung agrees with the Bonn Survey in assigning an ellipsoidal form to the visible universe.—Mr. Thackeray read a paper on a comparison of Groombridge's and Struve's right ascensions of close circumpolar stars, prefacing it with an account of the life of Stephen Groombridge. The paper was accompanied by a table showing, from an independent comparison of a certain number of Groombridge's stars, that the probable error of an observation is about 0s.·053.—Mr. Filon read a paper on reduction of measures of Swift's comet (*a* 1899) from photographs taken with a portrait lens of 30-inch focus and 5-inch aperture. Apart from the intrinsic value of the comet places, it appeared of interest to determine the degree of accuracy obtainable from measures of stars on plates taken with an ordinary portrait lens, and to find if photographs thus taken would repay the labour of measurement and reduction. The author concluded that such plates can give star places accurate to about 0″·83 of arc.—Mr. Hinks read a paper on the reduction of photographs of Eros for the determination of solar parallax. He concluded that the direct comparison of simultaneous photographs by linear reductions is the most convenient method. He desired to propose that seven or eight observatories, spread over as long an arc of longitude as possible, should agree upon a common list of comparison stars, and measure all their plates taken within a period of nine days. It might then be possible to find out in two or three years whether Eros will give as good results for parallax as other less favourably situated minor planets.—A paper by Mr. H. C. Plummer, on the principle of the arithmetic mean, and other papers, were taken as read

© 1902 Nature Publishing Group

Geological Society, June 11.—Prof. C. Lapworth, F.R.S., in the chair.—A descriptive outline of the plutonic complex of Central Anglesey, by Dr. Charles Callaway. The central complex of Anglesey was originally composed of diorite, felsite and granite. The gneiss and granitoid rock of the area, formerly regarded as sedimentary in origin, are now known to be plutonic masses.—Alpine valleys in relation to glaciers, by Prof. T. G. Bonney, F.R.S. The author discusses some hypotheses about the formation of Alpine valleys which have been advanced by Prof. W. M. Davis, but has left the Ticino Valley, on which the latter lays much stress, to Prof. Garwood, who has very lately visited it. Prof. Davis maintains that the upper and wider parts of Alpine valleys were excavated in pre-Glacial times, the lower and narrower portions during the Great Ice Age. The author tests this hypothesis by applying it first to the valley of the Visp, of the eastern arm of which, and of the "hanging valley" like a gigantic corrie, where Saas Fee is situated, he gives a description, pointing out that all parts are so connected that any separate explanation of their form is impossible. To obtain an idea of the condition of the Alps in Middle and Later Tertiary times, we may consider the effect of alterations of temperature, on the assumption (which, as he shows, is not likely to be seriously incorrect) that the altitude of the Alps during the greater part of their existence has remained unchanged. A rise of temperature of from 6° to 7° F. would have the same effect as lowering the district by 2000 feet; a rise of 10° would correspond with 3000 feet. In the latter case the Pennine chain about the headwaters of the Visp would be comparable with the range from Monte Leone to the Ofenhorn. With a rise of 14° glaciers would almost vanish from the Alps, for the snow-line would then be at 12,000 feet above sea-level. Thus glacial action in the Oligocene and Miocene ages would be a negligible quantity, and it would gradually become sensible during the Pliocene; but glaciers would not invade valleys now free from them until the temperature was some degrees lower than it is at present—in other words, can have only occupied these during a small portion of their existence. The author passes in review a number of other Alpine valleys, which lead to the same conclusion. He calls attention once more to the connection of cirques with valleys, to the impossibility of referring the former to glacial action, and to the unity exhibited by all parts of the Alpine valleys, touching upon some structural difficulties which Prof. Davis has been content to meet with hypotheses. Alpine valleys in all parts, as the author shows, indicate by their forms meteoric agencies other than glaciers, which can only have acted for a comparatively short time and have produced little more than superficial effects.—The origin of some "hanging valleys" in the Alps and Himalaya, by Prof. E. J. Garwood. Lateral valleys which enter the main valley marked by discordant grades in the Jongri district of the Sikhim Himalaya have been attributed by the author to Pleistocene elevation and super-erosion of the main valley by water. Similar valleys in the Val Ticino have recently been attributed to overdeepening of the main valley by ice. The author shows that there is no real proof of this, in fact the evidence seems strongly to point to fluviatile and not glacial erosion of the main valley. This is shown by the overlapping profiles and river-gorges situated both above and below some of these "hanging valleys," and by the fact that a greater relative amount of erosion has taken place towards the upper end of the main valley than at the lower, where the mouths of the "hanging valleys" are less elevated.

Zoological Society, June 3.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Mr. Lydekker exhibited the mounted head of a male Siberian wapiti, and made remarks on the various forms of the wapiti met with in northern Asia.—Mr. G. A. Boulenger, F.R.S., exhibited a strap made of the skin of the okapi (*Okapia johnstoni*), which had been received in Belgium from the Mangbetta country (lat. 30° N., long. 28° E.) in December, 1899, a year previous to the arrival in this country of the two bandoliers upon which the name *Equus johnstoni* had been founded.—Dr. Forsyth Major exhibited a reduced photograph of the skin of a female okapi (*Okapia johnstoni*), recently received by the Congo State Museum at Brussels, together with the skeleton of a male. Dr. Forsyth Major also made some remarks on this material, which had been handed over to him for publication.—Mr. E. J. Bles exhibited and made remarks upon some living tadpoles of the Cape clawed frog (*Xenopus laevis*). This species had bred in the Society's Gardens, and the event had formed the subject of a paper in the Society's *Proceedings* by Mr. F. E. Beddard (*cf. P.Z.S.* 1894, p. 101), but Mr. Bles was able to supply some additional particulars.—Mr. Lydekker described the head and skin of a wild sheep from the Thian Shan, recently presented by Mr. St. George Littledale to the British Museum, as belonging to a new subspecies, which he proposed to call *Ovis sairensis littledalei*. He also exhibited and described a specimen of the sheep named by Severtzoff *Ovis borealis*, which had been brought home by Mr. Talbot Clifton from the Yana Valley.—A communication was read from Dr. R. Broom containing an account of the differences exhibited in the skulls of Dicynodonts from the Karroo deposits of South Africa. The author was of opinion that these differences, in many cases, were not specific, but were due to sex, and, consequently, that many of the specimens which had received specific rank really belonged to the same form.—Mr. F. E. Beddard, F.R.S., read a paper on the gonad ducts and nephridia of the annelid worm Eudrilus, in which supplementary facts to those already ascertained by previous authors concerning these organs were adduced.—Dr. C. I. Forsyth Major read a paper on the pigmy hippopotamus from the Pleistocene of Cyprus, in which he described the fossil remains of *Hippopotamus minutus*, Blainv., exhibited by the author at the meeting of the Society on April 15. The characteristic features of this primitive hippopotamus were pointed out, and reasons were given for the assumption that the type-specimens of the species, Cuvier's *Petit Hippopotame fossile*, supposed to have been found near Dax in the Landes, had been brought over from Cyprus.—Mr. Hamilton H. Druce contributed a paper containing remarks on several species of butterflies of the family Lycænidæ from Australia, especially in reference to those described by Herr Semper. He also read descriptions of several apparently new species of the same family from the Eastern Islands and from Africa.—Mr. R. I. Pocock read a paper which dealt with the habits of the littoral spiders belonging to the genus Desis. The seven known species were enumerated, and one of them was described as new, under the name *Desis kenyonae*.—Mr. H. R. Hogg contributed a paper which contained additional information concerning the Australian spiders of the suborder Mygalomorphæ. Out of a collection of forty specimens (comprising examples of eleven species and nine genera) received by the author, no less than nine species and five genera had proved to be new, and were described in this paper.

EDINBURGH.

Royal Society, June 2.—Dr. Ferguson in the chair.—Prof. Metzler communicated a paper on some identities connected with alternants and with elliptic functions, in which it was shown that an identity established by Cayley and discussed by Muir, and believed by them to be of general validity, was not true in a particular set of cases.—Prof. A. Smith read a paper on amorphous sulphur and its relation to the freezing point of liquid sulphur. He showed that the freezing point, which in books is stated to be very variable within certain limits, was determined by the amount of amorphous sulphur present. When the amount of amorphous sulphur present was plotted against the freezing point an almost perfect straight line was obtained, indicating 119·25 as the freezing point of liquid sulphur quite free from the amorphous form, although practically that had never been obtained. Taking this value and estimating the depressions of the freezing point due to the presence of the amorphous sulphur, he calculated the molecular depression by means of van 't Hoff's formula and finally found 7·6 as the estimated molecular weight of amorphous sulphur—a value which under the difficulties of the experiment was a good approximation to 8.—Dr. W. Peddie, in a paper on the use of quaternions in the theory of screws, &c., showed how by a new interpretation of the scalar and vector parts of a quaternion a screw could be completely symbolised, and the whole theory developed in a compact and systematic way. The direction of the axis of the screw was determined by the direction of the vector part of the quaternion, and the scalar part of the quaternion represented the associated translation, the pitch being the ratio of the scalar to the tensor of the vector part. Any quaternion so regarded represented a screw through the origin; but the same quaternion could be made to represent a screw with axis not passing through the origin by breaking up the vector part into two portions, one of which represented the displacement, while the other represented the axis and with the scalar gave the pitch.—Dr. Hugh Marshall contributed a short paper on the dissociation of the compound of iodine and

© 1902 Nature Publishing Group

thiourea, in which it was shown that in aqueous solutions of the compound there appears to be a complex balanced action of the kind represented by the equations

$$2CSN_2H_4 + I_2 \rightleftharpoons (CSN_2H_4)_2I_2 \rightleftharpoons (CSN_2H_4)_2^{\cdot\cdot} + 2I'.$$

The addition, to such a solution, of any substance which diminishes the ionisation results in increased dissociation, as shown by the increased intensity of the colour of the solution.

PARIS.

Academy of Sciences, June 23.—M. Bouquet de la Grye in the chair.—New researches on batteries founded on the reciprocal action of two liquids, by M. Berthelot. The smallest amount of hydrogen visible in a voltameter of special form after one minute was determined for pressures of 760 and 5 mm., in the latter case 0·000014 mgr. This sensitive voltameter was then applied to the determination of the minimum electromotive force required to produce visible decomposition, and to measure the effects produced by liquid batteries.—The properties of a certain anomaly which is capable of replacing the anomalies already known in the calculation of the disturbances of the minor planets, by M. O. Callandreau.—The influence of the photographic magnitude of stars upon the scale of reduction of a negative, by M. Prosper Henry. Instead of comparing the results obtained by eye and photographically as has been proposed by Gill, a purely photographic method is here suggested. A portion of the sky is photographed upon a given plate first with a short exposure and then with prolonged exposure, the pointer micrometer having been slightly displaced between the two exposures. The results of the application of this method with the large objective of the Paris Observatory are now given. —The extension of the kathode hypothesis to nebulæ, by M. H. Deslandres. The light emitted by nebulæ has been attributed by Arrhenius to electrified particles, by Nordman to Hertzian waves, but the author regards both these explanations as inadmissible, since, for the same reason, the earth's atmosphere at night should glow with an equal lustre. The kathodic hypothesis appears to offer a better explanation.—On algebraic continued fractions, by M. R. de Montessus de Ballore.—Researches on actino-electric phenomena, by M. Albert Nodon. When light rays or ultra-violet rays are thrown upon a thin conducting plate they give rise, on the dark face of this plate, to radiations analogous to X-rays. They differ from kathode rays, since they easily pass through metals and black paper, and appear to possess properties intermediate between X-rays and radium rays.—On a phenomenon observed on an excitor, the spheres of which are connected to a Ruhmkorff coil, by M. H. Bordier.—The effect of self-induction on the ultra-violet portion of spark spectra, by M. Eugène Néculcéa.—On the heats of dilution of sodium sulphate, by M. Albert Colson.—The chlorinating properties of a mixture of hydrochloric acid and oxygen, by M. Camille Matignon. Gold, tellurium and platinum are attacked by a mixture of oxygen and pyrochloric acid at temperatures much below the temperature of reaction between hydrogen chloride and oxygen. The mixture may in certain cases replace chlorine.—On the acidity of pyrophosphoric acid, by M. H. Giran. By a study of the heats of neutralisation and heats of solution of the sodium pyrophosphates, the conclusion is drawn that pyrophosphoric acid is a tetrabasic acid, the acid value of each of the hydroxyl groups being identical.—The displacement of strong bases by ammoniacal copper oxide, by M. Bouzat.—On the phenyl migration of phenylethylene and its derivatives, by M. M. Tiffeneau. Evidence is given showing that in several instances the migration of the phenyl group is probable.—Study of the action of selenyl chloride upon erythritol, by MM. C. Chabrié and R. Jacob.—On dibenzoylhydrazobenzene, by M. P. Freundler. MM. Biehringer and Busch have recently described a new mode of decomposition of diazo-compounds by means of copper powder, in which dibenzoyl-hydrazobenzene is stated to be formed. It is here shown that the compound really formed in this reaction is benzanilide, the benzoyl derivative of hydrazobenzene possessing entirely different properties.—Acyl derivatives of isopyromucic acid: the acetate, benzoate and pyromucate of isopyromucyl, by M. G. Chavanne.—Chemical analysis of *Piper Famechoni* or Kissi pepper, by M. A. Barillé. —On the phenomena of migration in ligneous plants, by M. G. André.—On the composition of ewe's milk, by MM. Trillat and Forestier.—On the estimation of organic nitrogen in water, by M. H. Causse.—Analysis of the mode of action of lecithins upon the animal organism, by MM. A. Desgrez and Aly Zaky. —Orthogonal skiagrams of the thorax; their use for the localisation of anomalies and for the measurement of organs, by M. H. Guilléminot.—The physiological secretion of the pancreas, by MM. C. Delezenne and A. Frouin.—Physiology of the heart in some colonies of compound Ascidians, by M. Antoine Pizon.—On the idea of depth applied to African metalliferous layers, by M. L. de Launay.—On the presence of Carboniferous strata in Tidikelt, Sahara, by M. G. B. M. Flamand.—Reproduction of some Palæolithic figures drawn on the walls of the grotto of Font-de-Gaume (Dordogne), by MM. Capitan and Breuil. Four reproductions are given, three of the bison and one of reindeer.—On the colouring matter used in the figures described in the previous paper, by M. Henri Moissan. The colours are ochres formed of the oxides of iron and manganese. —The cyclone at Javaugues (Haute-Loire), on June 3, 1902, by M. Bernard Brunhes.

CONTENTS.

© 1902 Nature Publishing Group