a result which has long been known for a stream-line, but, apparently, not so long known for a vortex-line. It holds also for an infinite number of curves that can be drawn through P, all lying on a certain surface, as is pointed out by Lamb ("Motion of Fluids," p. 173), the surface in question being formed of a network of stream- and vortex-lines. That such surfaces exist in the fluid when the external forces have a potential, is proved most satisfactorily by taking the integral of (α) along a circuit through P, of which a part consists of stream-line and a part of vortex-line; but into the details of this we need not enter.

I observe, also, that this equation (2) holds for the portion of any curve whatever connecting any two points, A, B, on a network surface, although this curve does not lie on the surface.

Another point to which I would call attention is an analytical expression of the state of non-vortical motion. The physical expression has, of course, reference to the non-rotation of the three principal axes of the little ellipsoid into which, at each instant, a small sphere is deforming. The analytical expression of the fact takes usually the form that there is a velocity potential, *i.e.* $\frac{du}{dy} = \frac{dv}{dx}$, with two Cartesian analogues. Here, again, I would suggest a single equation, having no reference to special axes. This equation is simply

$$\frac{d\dot{s}}{d\sigma} = \frac{d\dot{\sigma}}{ds} \quad \ldots\ldots\ldots\ldots (\beta)$$

where s and σ denote arcs of *any two curves whatever* drawn at the point P, and $\dot{s}$ and $\dot{\sigma}$ the component velocities of the fluid along them.

It is obvious that these contain the whole three of the usual Cartesian expressions. The proof is very easy.

Cooper's Hill. GEORGE M. MINCHIN.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The following Examiners in Natural Science have been appointed for the Honour Examinations:—Mr. J. V. Jones and Mr. A. L. Selby (Physics); Prof. McLeod and Mr. V. H. Veley (Chemistry); Prof. Milnes Marshall and Mr. W. Hatchett Jackson (Morphology); Prof. Sanderson and Prof. Schäfer (Physiology); Prof. Boyd Dawkins and Prof. Green (Geology).

The conditions of tenure of the Burdett-Coutts Geological Scholarship are to be altered, so as to make it necessary for the holders to devote themselves to Geology, and to work with the Professor.

Scholarships in Natural Science are announced for competition at Merton and at New College. The examination begins on July 2.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 21.—"The Influence of Bile on the Digestion of Starch. (1) Its Influence on Pancreatic Digestion in the Pig." By Sidney Martin, M.D., B.Sc., British Medical Association Scholar, and Dawson Williams, M.D. (From the Physiological Laboratory, University College, London.)

The experiments of the authors have shown that if pig's bile be added to a solution of starch with pancreatic extract the digestion goes on with greater rapidity than without the bile. The rapidity of digestion is increased with the addition of quantities up to 4 per cent. of dried bile (equivalent to at least 30 per cent. of fresh bile). The rapidity was tested by noticing when the iodine reaction of starch had disappeared. On further research, it was found that this property of the bile depended on the bile salts (hyoglycocholate of sodium). The increased rapidity of digestion was well seen if 0·6 to 2 per cent. of bile salts were added to the digestive mixtures.

It was also found that not only was the change of starch into dextrine hastened, but also the change into sugar; and that the amount of dextrine and sugar formed when bile-salts wer present was one-fifth more than when they were absent. Fo the methods used in estimating the amount of dextrine and sugar, the original paper must be consulted.

"The Innervation of the Renal Blood-vessels." By J. Rose Bradford, M.B., D.Sc., George Henry Lewes Student. Communicated by E. A. Schäfer, F.R.S. (From the Physiological Laboratory of University College, London.)

The research was undertaken in order to map out the origin, cause, and nature of the renal nerves in the dog more accurately than had hitherto been attempted. The method employed consisted in exciting the roots of the spinal nerves, and observing simultaneously the effects produced on the general blood-pressure and on the volume of the kidney, the latter being investigated by means of Roy's oncometer. The anæsthetics used were chloroform and morphia. The general results were shortly as follows:—

No efferent vasomotor fibres were found in the posterior roots.

The efferent vasomotor fibres for the blood-vessels of the kidney leave the cord in the anterior roots of the nerves, extending from the second dorsal to the second lumbar. The renal nerves are, however, most abundant in the tenth, eleventh, twelfth, and thirteenth dorsal nerves.

In individual cases, however, there may be small variations in the number of fibres going on the one hand to the kidney, and on the other hand to the other abdominal viscera.

When quick rates of excitation are used, only contraction of the kidney and increase of general blood-pressure are observed, *i.e.* the vaso-constrictor fibres are excited.

With slow rates, however, expansion of the kidney with no increase of blood-pressure occurs, *i.e.* the vaso-dilator fibres are stimulated.

Hence the renal vessels not only receive constrictor fibres, but also dilator, and these are also most abundant in the eleventh, twelfth, and thirteen dorsal nerves.

Similarly when the peripheral end of the divided splanchnic nerve is excited with slow rates, a fall of blood-pressure is observed instead of the rise seen with quick rates.

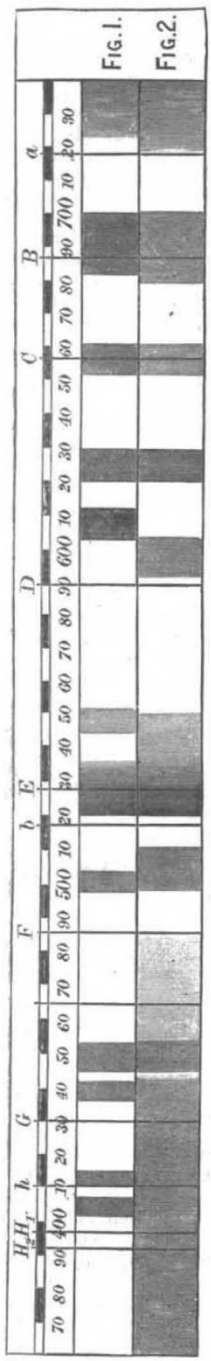
Hence the splanchnic contains not only vaso-constrictor fibres for the abdominal vessels, but also vaso-dilators.

The results of reflex excitation can be summed up shortly by saying that the excitation of an afferent nerve causing a rise of blood-pressure is accompanied by a renal contraction, unless the nerve is one of what may be called the renal area. In this case the rise of blood-pressure is accompanied, as a rule, by either a renal expansion or else by a mixed kidney effect.

The main conclusion of this communication is the demonstration of dilator fibres in the splanchnic and in the renal nerves, and also the fact that these vaso-dilator fibres reach the kidney by the same paths as the constrictor fibres.

Chemical Society, February 7.—Mr. W. Crookes, F.R.S., in the chair.—The following papers were read:—Researches on the constitution of azo- and diazo-derivatives; compounds of the naphthalene-β-series (continued), by Prof. R. Meldola, F.R.S., and Mr. G. T. Morgan.—The action of nitric acid on anthracene, by Mr. A. G. Perkin. Hitherto, only anthraquinone and nitro-anthraquinones have been obtained by treating anthracene with nitric acid; the author, however, finds that nitro- and dinitro-anthracene can readily be prepared by the action of nitric acid upon anthracene if care is taken at once to decompose any nitrous acid which may be formed.—The preparation of glyceric acid, by Dr. Lewkowitsch.—The relation of cobalt to iron as indicated by absorption-spectra, by Dr. W. J. Russell, F.R.S., and Mr. W. J. Orsman, Junr. It is well known that when examined spectroscopically, some coloured metallic compounds are found only to produce a general absorption, but from previous observations it seemed possible to the authors that in some cases at least this might be resolved into bands by employing more powerful chemical agents than are generally used in such cases; experience had indicated that the chloride is usually the most suitable salt, and that it should be dissolved in chlorhydric acid and the liquid saturated with hydrogen chloride, also that, if possible, ether should be taken as solvent. Applying these views to iron, it was found that ferric chloride gave a banded spectrum strikingly similar to that of cobalt chloride. Irons of all kinds were examined: pig-iron, commercial cast-iron, and various manufactured articles; steel in the form of

wire, needles, and knives; and a number of specimens of reputed pure iron, viz. Demidorff's sheet-iron, a sample of which was kindly given to the authors by Mr. Crookes, electro-deposited iron, and some ancient Indian iron from Prof. Roberts-Austen, and iron prepared by the late Dr. Matthiessen. Also a large number of iron ores—hæmatite Elba ore, Welsh bog ore, micaceous ore, ordinary spathic ore, a spathic ore found in cryolite, for which the authors have to thank Dr. Müller; Giderite, pyrites from the chalk, wolfram and rouge. Iron was also separated from the ignited residue of blood. All the specimens examined gave the same result. Fig. 1 represents the bands seen in a solution of cobalt chloride to a scale of wave-lengths; the three most refrangible bands are easily photographed, but are not visible to the eye under ordinary conditions. The iron spectrum (Fig. 2) in general appearance closely resembles the cobalt spectrum, but the band which in cobalt is at 605 is slightly shifted nearer the blue, as shown in the diagram; there appears also to be a shift in the 501 band, but in the opposite direction. It was found that ether always dissolves out of the ferric chloride a substance which gave a band of extraordinary intensity, exactly agreeing in position with the 530 band in the cobalt spectrum; further, that on increasing the strength of the ethereal solution, other bands became visible, agreeing with the bands observed in the strong chlorhydric solution of ferric chloride, and differing only in the case of the 690 and 655 bands, which in the ethereal solution were nearer the blue. Fig. 2 is the spectrum observed in a solution of iron in chlorhydric acid, peroxidized by any ordinary means. For a variety of reasons the authors believe that this spectrum (Fig. 2) does not arise from the presence of cobalt in the iron. In the first place, there is a constant difference between the two spectra, as shown in the position and appearance of the band at 597. A trace of cobalt dissolved along with the iron gives the same spectrum as pure cobalt dissolved in chlorhydric acid. Again, on gradually increasing the strength of a pure cobalt chloride solution, the bands in the red are the first to appear, and the band at 530 is not visible until the general absorption has crept up as far as 580, completely blocking up the red end of the spectrum; in an ethereal solution from iron, on the contrary, this 530 band is the first to appear, and the bands in the red only become visible in comparatively strong solutions. Ether extracts the band-giving substance from the ferric chloride with great ease; but it abstracts nothing from the cobalt chloride. Again, on dissolving iron in chlorhydric acid, no bands are visible, and so long as the iron is in the ferrous state even ether extracts no band-giving substance; but on converting the ferrous into ferric chloride by nitric acid, or potassium chlorate, &c., the band-yielding substance is at once apparent. A known weight of Mr. Crookes's Demidorff iron was converted into chloride and dissolved in a known volume of ether, and the intensity of the bands compared with those given by cobalt chloride dissolved in a similar bulk of chlorhydric acid; it was found that approximately it required a weight of cobalt equal to that of the iron to give bands of similar intensity. Prof. J. Norman Lockyer, F.R.S., said that some years since, in a paper communicated to the Royal Society, he had suggested that there were many different molecular groupings of the same element possible, and that spectrum analysis would disclose these: if the same molecular grouping were demonstrated in several substances, then undoubtedly there was a common constituent. If the bands described by the authors represent a substance common to iron and cobalt, it should be possible to obtain spectroscopic evidence of its presence at some temperature on volatilizing the metals; although he had not fully studied cobalt and nickel comparatively, he had, in fact, found that under certain special conditions some of the spectroscopic appearances were common to both, and in such a marked degree as to render it improbable that they were caused by impurities. Dr. Perkin referred to the non-appearance of bands in an alcoholic solution of purpurin and their appearance in an ethereal solution, as an illustration of the influence of the solvent. Prof. Armstrong remarked that the slight shift of the bands which had been referred to did not necessarily indicate that different substances were primarily the cause of the absorptions, as it is well known that such effects were observed on employing different solvents; the absorbing substance might in the one case be held in combination more firmly than in the other; this view was in harmony with the statement that ether did not extract the band-yielding subtance in all cases. Dr. Russell in reply said that not the spectrum as a whole, but only one of the bands was shifted. His view was that the solvents had broken up the substance into a finer state.—Note on methyl fluoride, by Dr. N. Collie. Methyl fluoride assumes the critical state at 44°·9 C. and at a pressure of 47,123 mm. This pressure is probably slightly too high, owing to a trace of air, and the temperature too low. The error in pressure probably does not exceed 1500 mm., and of temperature 0°·2 C.—The nitration of naphthalene-β-sulphonic acid, by Prof. H. E. Armstrong, F.R.S., and Mr. W. P. Wynne. According to Cleve three isomeric α-nitro-β-sulphonic acids are produced on nitrating naphthalene-β-sulphonic acid; the chlorides of which melt respectively at 169°, 140°, and 125°. The authors find, contrary to the view put forward provisionally by Cleve (*Ber. der Deut. Chem. Gesells.*, xxi. 3275), that the first compound is a heteronucleal derivative and corresponds in constitution with the dichloronaphthalene melting at 63°·5. All attempts to obtain the sulphochloride of intermediate melting-point have been unattended with success.—Action of bromine and chlorine on the salts of tetrethylphosphonium, by Prof. O. Masson and Mr. J. B. Kirkland.—Preparation of the salts of triethylsulphine, tetrethylphosphonium, and analogous bases, by the same.



Linnean Society, February 21.—Mr. Carruthers, F.R.S., President, in the chair.—Mr. George Murray exhibited a fossil Alga, *Nemitophycus Logani*, Carr.—Mr. G. C. Druce exhibited some rare British plants from Scotland, amongst which were *Calamagrostis borealis*, *Ranunculus acris*, var. *pumilus*, and *Bromus mollis*, var. *decipiens*.—Prof. Marshall Ward exhibited a sclerotium of a Fungus produced from a Botrytis spore, and explained the method by which it had been obtained.—A paper was then read by Mr. F. Townsend, M.P., on *Euphrasia officinalis*, with a description of a new sub-species, and a discussion followed, in which the President, Mr. J. G. Baker, and others took part.—In the absence of the author, a paper by Mr. C. T. Druery, on sexual apospory in *Polystichum angulare*, was read by the Botanical Secretary, Mr. B. D. Jackson, upon which remarks were made by Mr. Murray and Dr. D. H. Scott.—Mr. Murray then gave the substance of a paper on a new genus of Green Algæ, proposed to be named *Boodlea*, and in so doing made some instructive observations on the affinities and distinguishing characters of allied genera. The paper was criticized by Messrs. A. W. Bennett, Reay Greene, and D. H. Scott.—In continuation of his researches upon the eyes of insects, Mr. B. T. Lowne gave an admirable exposition of the structure of the retina in the blow-fly, illustrated by preparations under the microscope, and some excellent photographs.

Geological Society, February 15.—Annual General Meeting.—Dr. W. T. Blanford, F.R.S., President, in the chair.—The Secretaries read the reports of the Council and of the Library and Museum Committee for the year 1888. The Council stated

that they had once more to congratulate the Fellows upon the prosperous state of the Society's affairs. The report of the Library and Museum Committee, after enumerating the additions made to the Society's Library and collections during 1888, referred briefly to the work done in the Museum, in the way of cleaning and putting it in order.—The President then presented the Wollaston Gold Medal to Prof. T. G. Bonney, F.R.S.; the Murchison Medal to Mr. William Topley, F.R.S., for transmission to Prof. James Geikie, F.R.S.; the Lyell Medal to Prof. W. Boyd Dawkins, F.R.S.; the Bigsby Medal to Mr. J. J. Harris Teall; the balance of the proceeds of the Wollaston Fund to Mr. A. Smith Woodward; the balance of the Murchison Geological Fund to Mr. Grenville A. J. Cole; and the balance of the proceeds of the Lyell Geological Fund to M. Louis Dollo. —The President read his Anniversary Address, in which, after giving obituary notices of Mr. W. Hellier Baily, Mr. H. Carvill Lewis, Vice-Admiral T. A. B. Spratt, Viscount Eversley, Mr. John Brown, Mr. W. Ogilby, and other deceased Fellows, together with notices of the Foreign Members and Correspondents of the Society who had died since the last anniversary meeting (Prof. Gerhard Vom Rath, Prof. T. Kjerulf, Prof. Giuseppe Meneghini, and Prof. Giuseppe Seguenza), he noticed the papers which had been published by the Society during the past year. The remainder of the address consisted chiefly of a discussion of the work of the International Congress from its commencement to the last meeting in London in 1888, and dwelt upon the influence which such meetings exercise upon the progress of geological science, quite apart from any formal resolutions which may be arrived at by the members.—The ballot for the Council and Officers was taken, and the following were duly elected for the ensuing year:—President: Dr. W. T. Blanford, F.R.S. Vice-Presidents: Dr. John Evans, F.R.S., Prof. T. McKenny Hughes, Prof. J. W. Judd, F.R.S., Prof. J. Prestwich, F.R.S. Secretaries: Mr. W. H. Hudleston, F.R.S., Mr. J. E. Marr. Foreign Secretary: Sir Warington W. Symth, F.R.S. Treasurer: Prof. T. Wiltshire. Council: Prof. J. F. Blake, Dr. W. T. Blanford, F.R.S., Prof. T. G. Bonney, F.R.S., Mr. James Carter, Dr. John Evans, F.R.S., Mr. L. Fletcher, Dr. A. Geikie, F.R.S., Prof. A. H. Green, F.R.S., Rev. Edwin Hill, Mr. W. H. Hudleston, F.R.S., Prof. T. McKenny Hughes, Prof. J. W. Judd, F.R.S., Major-General C. A. McMahon, Mr. J. E. Marr, Mr. E. T. Newton, Prof. J. Prestwich, F.R.S., Mr. F. W. Rudler, Prof. H. G. Seeley, F.R.S., Sir Warington W. Smyth, F.R.S., Mr. W. Topley, F.R.S., Rev. G. F. Whidborne, Prof. T. Wiltshire, Rev. H. H. Winwood.

Zoological Society, February 19.—Dr. St. George Mivart, Vice-President, in the chair.—Mr. Sclater exhibited specimens of the eggs and chicks of the Hoatzin (*Opisthocomus cristatus*) from a series collected by Mr. R. Quelch in British Guiana, and called attention to the extraordinary development of the wings in the chick, in reference to the statement that these organs are used like hands for climbing-purposes.—Mr. Sclater exhibited heads and skins of a new Antelope obtained by Mr. H. C. V. Hunter, in Eastern Africa, which he proposed to call *Damalis hunteri*, after its discoverer.—Sir E. G. Loder, Bart., exhibited and made some remarks on a skeleton of the Rocky Mountain Goat (*Haplocerus montanus*).—Dr. Günther exhibited a mounted specimen of Thomson's Gazelle (*Gazella thomsoni*), and pointed out its complete distinctness from Grant's Gazelle (*Gazella granti*). The specimen in question had been obtained in Masailand by Mr. H. C. V. Hunter.—Mr. R. Lydekker read a paper on the skull of *Lytoloma*, an extinct genus of Chelonians allied to *Chelone*.—Mr. R. Lydekker pointed out the characters of an apparently new species of *Hyracodontotherium*, based on specimens from the phosphorites of Bach, near Lalbengue, in France. —Dr. A. Günther, F.R.S., described some new fishes from the Kilima-njaro district in Eastern Africa, based on specimens obtained by Mr. F. J. Jackson during his recent expedition into that country. He also exhibited a dried specimen of a fish obtained by Mr. H. C. V. Hunter from one of the crater-lakes in the same district, which he referred to a new genus and species of Chromidæ, proposed to be called *Oreochromis hunteri*. —Dr. Günther also exhibited a pair of horns of an Antelope obtained many years ago in the interior of Southern Central Africa, which were remarkable for their length and gentle backward curvature, with only a very slight twist near the tips. He referred these horns to a new species, proposed to be called *Antilope triangularis*.—Dr. Günther read some notes on a Bornean Porcupine, which he had formerly described as being without a tail, and named *Trichys lipura*. It now appeared that some specimens of this animal possessed a long and slender tail, but that other characters would necessitate the retention of the genus as distinct from *Atherura*.—Mr. F. E. Beddard read a paper directing attention to certain points in the anatomy of the Accipitres with reference to the affinities of *Polyboroides*. This form was shown to belong to the Falconidæ, and to have no real affinities with *Serpentarius*.—Sir Walter Buller read a paper on a species of Crested Penguin from the Auckland Islands, based on a specimen lately living in the Society's Gardens, which he proposed to call *Eudyptes sclateri*.

Anthropological Institute, February 26.—Dr. J. Beddoe, F.R.S., President, in the chair.—Mr. Francis Galton exhibited a new instrument for testing the delicacy of perception of differences of tint; also an instrument for telling reaction time. Both instruments will be exhibited in the Paris Exhibition.—Major C. R. Conder, R.E., read a paper on "The Early Races of Western Asia."

EDINBURGH.

Royal Society, February 4.—The Rev. Prof. Flint, Vice-President, in the chair.—Prof. T. R. Frazer read a paper on the natural history, chemistry, and pharmacology, of *Strophanthus hispidus*.—Mr. John Aitken exhibited and described his improved apparatus for counting the dust particles in the atmosphere.—Prof. Rutherford read a paper by Dr. G. N. Stewart, on the electrotonic variation in nerve with strong polarizing currents.

February 18.—Dr. Thomas Muir, Vice-President, in the chair.—Prof. Crum Brown communicated a paper by Mr. Alex. Johnstone, on the prolonged action of sea-water on pure natural magnesium silicates.—A paper by Dr. A. B. Griffiths on the so-called liver of *Carcinus mœnas* was also read.—Dr. Muir communicated a paper by Mr. Alex. M'Aulay, Melbourne, on the differentiation of any scalar power of a quaternion, and a note by Prof. Tait on Mr. M'Aulay's paper.—Prof. Crum Brown read an account by Mr. Albert Campbell of the change in the thermo-electric properties of Wood's fusible metal at its melting-point.—Prof. Brown also read a paper by Mr. Frank Beddard on the anatomy and physiology of *Phreoryctes*.

PARIS.

Academy of Sciences, February 25.—M. Des Cloizeaux, President, in the chair.—Note on the question, whether their original infectious properties can be recovered by pathogenic microbes, which have apparently preserved nothing beyond the power of vegetating outside the living animal organism, by M. A. Chauveau. In continuation of his recent communication (*Comptes rendus*, cviii. p. 319), the author here describes some experiments which show that, in *Bacillus anthracis* apparently deprived of all infectious virulence, this virulence may be as easily restored as the simply diminished virulence is renovated in M. Pasteur's attenuated microbes. It results generally from these studies that in losing or recovering their virulence pathogenic microbes undergo no specific transformation. These physiological metamorphoses are merely an extension of the law well known to botanists that the conditions of culture may modify not only the form, but also and specially the functions of plant. On some points in the theory of the sextant, by M. Gruey. The points here discussed are (1) the possibility of constructing the sextant with a single glass, which is decided in the affirmative, a means being indicated by which the practical inconvenience of such an instrument may be obviated; (2) the use of the transparent part of the small glass. This is suppressed by some, preserved by others, and M. Gruey considers that it is in fact useless.—On a question in the doctrine of probabilities, by M. E. Mayer. A solution is here proposed of M. Bertrand's 57th problem, dealing with the case of two players with equal chances and equal capital, and the probability of one ruining the other in a given number of throws.—Remarks on the conductivity and mode of electrolysis of concentrated sulphuric acid solutions, by M. E. Bouty. The main object of these experiments is to measure the molecular conductivity of sulphuric acid at or about the temperature of 0° C. An attempt is also made to determine the coefficients of temperature α and β in the formula—

$$C_t = C_0(1 + \alpha t + \beta t^2).$$

—On the electro-chemical measurement of the intensity of currents, by M. A. Potier. Arguments are advanced to show that the electrolytic measurement of intensity cannot be regarded

as rigorously accurate except on the condition of the electrodes presenting no trace of polarization. This condition is generally supposed to be strictly complied with when the electrodes are formed of molten metals; but the present researches prove that such is not always the case.—On the reciprocal influence of two rectangular magnetizings in iron, by M. Paul Janet. A piece of iron being magnetized in a given direction by a given magnetic force, the author inquires whether this magnetic state becomes modified by the establishing or interrupting a fresh magnetic current perpendicular to the first.—On drops of mercury as electrodes, by M. Ostwald.—A correction as regards the action of sulphurous acid on the alkaline thiosulphates, by M. A. Villiers. In a previous note (*Comptes rendus*, cvi. pp. 851 and 1354) the author described the sodium salt of a new oxy-acid of sulphur as obtained by the action of sulphurous acid on the sodium thiosulphate, and as having the formula $S_4O_8Na_2$. But he has since discovered that this salt contains two atoms of hydrogen, so that its formula is $S_4O_8Na_2H_4 = S_4O_6Na_2.2H_2O$; that is to say, it is hydrated tetrathionate of soda.—On the valency of aluminium, by M. Alphonse Combes. The vapour-density of $Al(C_5H_7O_2)_3$ at 360° in an atmosphere of nitrogen was found to be 11·25, agreeing with the above formula. Its valency at this comparatively low temperature therefore shows its analogy with indium and other triad elements.—Combination of mannite with the aldehydes of the fatty series: ethylic acetal, by M. J. Meunier. Two processes are described, by means of which the ethylic acetal of mannite may easily be prepared. The combination of mannite with an aldehyde of the aromatic series (benzoic aldehyde) has already been studied. It now appears that an acid solution of mannite, mixed with equal molecular weights of acetic and benzoic aldehydes, yields ethyl acetal, and not an acetal resulting from the simultaneous combination of the two aldehydes.—M. A. Haller describes the preparation of some new neutral and acid ethers of the camphols, and also gives an easy process for the separation of camphor and camphol.—M. Aimé Girard reports the results of some protracted experiments on the cultivation of the potato in France, with a view to the selection of the best tubers, and a more abundant yield of starch-producing roots.—M. G. Hayem studies the causes of the fatal effects resulting from the transfusion of blood between animals of different species, and more especially from the injection of dogs' blood in the rabbit.—The porphyritic rocks of Cavenac, near Saint-Pons, are described by MM. P. de Rouville and Auguste Delage; and those of the Forez district by M. U. Le Verrier.—M. Ed. Piette gives an account of some human and animal remains representing a transitional epoch between Quaternary and modern times, recently discovered by him in a cave on the left bank of the Arize.

Astronomical Society, February 6.—M. Flammarion in the chair.—M. Guiot, of Soissons, sent observations of Uranus made with the naked eye, and of Neptune with an opera-glass.—M. Schmoll showed diagrams of solar activity during 1888. He had noted 190 days without spots. M. Bruguière placed the minimum at 1888·8. MM. Lihou and Jacquot sent some remarks on the same subject.—M. Flammarion read a paper on γ Arietis, calling attention to the remarkable relative fixity of the two components. His measures at Juvisy gave 8″·51 and 359°·1.—M. Ch. Moussette made some remarks on the lunar eclipse of January 17.—General Parmentier read a note on the planetoids discovered in 1888, and showed that they confirmed the classification of those bodies which he published a few years ago.—M. Gunziger exhibited some Thompson's disks, and showed their utility for drawing and accurately placing sun-spots.

STOCKHOLM.

Royal Academy of Sciences, February 13.—Sir Joseph Lister was elected a Foreign Member of the Academy.—Prof. Wittrock gave an account of the present state of the Bergian Garden belonging to the Academy.—An examination of some Algæ referred to the genus Adenocystis, Hooker fil. et Harvey, by Prof. F. R. Kjellman.—Contributions to the flora of Medelpad, by Dr. L. M. Neuman.—Report on investigations relating to the flora and fauna of the peat-bogs of Scania, by Herr G. Andersson.—Report on investigations relating to the Ascomycetes, especially the coprophilous, of Öland, by Herr C. Starbäck.—A special case of the problem of three bodies, by Prof. Gyldén.—On Odonatæ collected during the Swedish Expedition to Yenisei in 1876, by Dr. F. Trybom.—*Ichneumones pneustici*, by the late Lector A. E. Holmgren.—An experiment with an electric spark and a small flame, by Dr. C. A. Mebius.—Prof. Nilsson gave an account of the researches of Dr. Krüss on cobalt and nickel.—On the singular points of the common algebraic differential equations, by Dr. J. Möller.—On maximi and minimi convergents of a certain class of distinct integrals, by Herr C. B. Cavallin.—On naphtoë acids, &c., by Dr. Ekstrand.—On the δ^1-δ^2-brom-naphthalin-sulphon acid, by Herr Forsling.—On the reaction of the fuming sulphuric acid on α^1-δ^1-chlor-naphthylamin and on α^1-δ^2-chloracetnaphthalid, both combined with hydrochloric acid, by Herr P. Hellström.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Mémoires de la Société de Physique et d'Histoire Naturelle de Genève, tome xxx. Première Partie (Genève).—History of the Linen Hall Library, Belfast: J. Anderson (Belfast).—Glimpses of Feverland: A. P. Crouch (Low).—Ueber den Einfluss der Festsitzenden Lebensweise auf die Thiere: Arnold Lang (Jena, Fischer).—Lehrbuch der Vergleichenden Anatomie, Erste Abthg.: Arnold Lang (Jena, Fischer).—Darwinism and Politics: D. G. Ritchie (Sonnenschein).—New South Wales, 1887, Report of the Minister of Public Instruction (Sydney, Potter).—Annual Report of the Department of Mines, N.S.W., for the Year 1887 (Sydney, Potter).—New South Wales Australian Museum, Report of Trustees for 1887 (Sydney, Potter).—New South Wales Report on Technical Education: E. Combes (Sydney, Potter).—Molekularphysik, Zweiter Band: Dr. O. Lehmann (Leipzig, Engelmann).—Histologische Beiträge, Heft 2: E. Strasburger (Jena, Fischer).—Ueber die Hypothese einer Vererbung von Verletzungen: Dr. A. Weismann (Jena, Fischer).—Intracellulare Pangenesis: H. de Vries (Jena, Fischer).—The Best Forage Plants fully described and figured: Drs. Stebler and Schröter; translated by A. N. McAlpine (Nutt).—Index of Publications on Methods of Communication in the Field, and on Torpedo Warfare: R. von Fischer-Treuenfeld (Alabaster).—Electricity in the Service of Man, Part 1, edited by R. Wormell (Cassell).—The Asclepiad, No. 21, vol. 6: Dr. B. W. Richardson (Longmans).—Note on the Lapps of Finmark: Prince Roland Bonaparte (Paris).—La Nouvelle-Guinée, 3rd Notice—Le Fleuve Augusta; 4th Notice—Le Golfe Huon: Prince Roland Bonaparte (Paris).—Himmel und Erde, Heft 6 (Berlin, Paetel).—Beiblätter zu den Annalen der Physik und Chemie, 1889, No. 2 (Leipzig, Barth).—Verhandlungen des Naturhistorischen Vereines, Fünfte Folge, 5 Jahrgang, Zweite Hälfte (Bonn, Max Cohen).—Geological Magazine, March (Trübner).

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