Gegenbaur's morphologisches Jahrbuch, 5 Bd., 4 Heft.—Reinhold Hensel, on the homologies and varieties of the teeth formulæ of some mammals —Carl Rabl, on the development of the embryo in Planorbis, with Plates 32 to 38, and woodcuts.—A. Rauber on the formation of form and the disturbance thereof during the development of the vertebrata, first section, introductory remarks, Plates 39 to 41.

Cosmos, November.—Prof. O. Caspari, Darwinism and philosophy, with respect to the homonymous writings of Gustav Teichmüller, of Dorpat.—Baron Dellingshausen, the metaphysical foundation for the mechanical theory of warmth.—Dr. Wernich, on dying and on being killed in the lower forms of life.—Dr. Speyer, protective resemblance in some native insects (end) with woodcuts, communicated by Dr. Fritz Müller.—On Christian Conrad Sprengel; being sketches by two of his pupils. —Smaller contributions literary and critical.

Revue Internationale des Sciences, November 15, contains:—M. Vulpian, introduction to the physiological study of poisons. —Prof. Donders, on science and the art of medicine, being the introductory address to the International Congress of Physicians held this year at Amsterdam; this admirable address will well repay perusal.—M. Villot, the experimental method and the positive limits of natural history.—F. Lataste and R. Blanchard, on the peritoneum in Seba's python.—M. Hallez, on the classification and on the phylogeny of the turbellarians.—Proceedings of the Anthropological Society of Paris. — Bibliographical Bulletin.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, November 27.—"On the Changes in Pepsin-forming Glands during Secretion," by J. N. Langley, M.A., Fellow of Trinity College, Cambridge, and H. Sewall, B.Sc., Fellow of the Johns Hopkins University, Baltimore, U.S.A. Communicated by Prof. Michael Foster, M.D., F.R.S.

The Œsophageal Glands of the Frog.—In a frog three to four days after food, the alveoli of the œsophageal glands are, in the living state, granular throughout. The outlines of the cells are not visible.

Shortly after food is given, the granules thin away at the peripheries of the alveoli, and thus render the alveolar outlines more obvious. This thinning proceeds so rapidly that in a few hours there is a well-marked clear zone in the outer part of each alveolus, the part nearest the basement membrane.

Later the clear zone becomes larger, the granular zone becoming smaller, but as the clear zone enlarges it ceases to form in section a ring, it dips down into the granular zone at intervals.

Nuclei are not seen either in the resting or the digesting gland.

The points mentioned above as observable in the fresh tissue, can also in the main be observed in glands treated with osmic acid; the border granules, however, stain more deeply and readily than the central granules. The mucous cells are fewer in the active than in the resting glands; it is only in the fresh state that they appear granular.

The granules we consider as stored up cell-products, which, on suffering molecular re-arrangement during the secretion, give rise amongst other substances to the proteid ferment.

We cannot agree with Nussbaum's view that the depth o staining with osmic acid is a trustworthy index of the amount of ferment present in the cells. On his view, it appears to us, the border, rather than the central, granules should be connected with the ferment.

The Gastric Glands of the Newt (*Triton tœniatus*).—In the newt, the glands were observed through the muscular coat of the stomach with a rapid capillary circulation still going on.

Twenty-four hours after feeding, the glands of the fundus are thickly granular throughout; about three hours after feeding, the maximal change takes place; it corresponds in the main to that already described for the œsophageal glands of the frog.

The glands recover their granular appearance comparatively quickly; in six hours after feeding, the granules have usually again crept up to the periphery; they then increase in number throughout the cells up to about the twenty-fourth hour. Later than this they diminish somewhat; in six days the peripheries of the glands have become more sparsely populated.

In *Triton cristatus* the digestive changes are of the same nature, but much less pronounced.

The Gastric Glands of Stickleback.—In the gastric glands of the hungry fish the granules thin away somewhat from the centre to the periphery; the lumina are inconspicuous. Three to five hours after feeding, the lumina are much larger, the granules are aggregated about it, leaving a peripheral clear rim, the glands are more unequal in size, some having lost more granules and diminished more in size than others.

The Gastric Glands of Mammals.—In the glands of the fundus of the stomach of all mammals investigated, viz., dog, cat, rat, and rabbit, the chief cells are, in rest, crowded with conspicuous granules; the border cells are either without conspicuous granules or are finely granular.

During digestion the granules in the chief cells diminish.

The stomach of the rabbit has certain structural peculiarities; the principal of these is that a large portion of the greater curvature contains glands, in which the chief cells are not coarsely granular. The glands of the greater curvature contain scarcely more pepsin than the glands of the smaller curvature and pylorus. But in the smaller curvature and pylorus there are few if any border cells, whilst there are many in the greater curvature.

Hence the border cells are not directly connected with the formation of pepsin.

The glands of the fundus contain a very much larger amount of pepsin than the glands of the greater curvature; that is, where there are coarsely granular chief cells there is a large amount of ferment.

Further, during digestion the fundus-glands contain less ferment than in hunger—a fact observed first by Grützner—and it is during digestion that the chief cells have fewest granules.

Hence the conspicuous granules in the chief cells are directly connected with the formation of ferment.

Since in passing from the fundus to the greater curvature we meet all stages of granularity in the chief cells, and since the chief cells of the greater curvature do not differ in any essential point from the pyloric gland cells, we conclude with Heidenhain that the pyloric gland cells and the chief-cells of the fundus are fundamentally the same. We consider, however, the chief cells of the fundus to be a highly differentiated form of the pyloric gland cells, a form more especially designed for the production of pepsin, and probably other solids of the gastric secretion.

December 11.—"Thermo-Electric Behaviour of Aqueous Solutions with Mercurial Electrodes," by G. Gore, LL.D., F.R.S.

In this research the author has examined, by means of a new form of apparatus, the thermo-electric properties of a number of liquids in relation to mercury. The liquids include those of acid, neutral, and alkaline reaction. The results obtained are arranged in a table or series, with the solution at the top, in which hot mercury was the most positive at 180° F., and that at the bottom, in which it was most negative, the amount of deflection of the galvanometer needle with each solution being stated.

Another table is also given, in which the solutions are arranged according to the relative degrees of electro-motive force of the currents obtained from them. This series was arrived at by employing two similar apparatus with different solutions in each and ascertaining the difference of strength of their currents by passing the two currents simultaneously in opposite directions through the coils of a differential galvanometer, the amount of difference of deflection produced by each two consecutive pairs being given.

The results obtained from this research have not revealed any very striking phenomena nor disclosed any relation to chemical action or property, but are reasonably explicable upon the hypothesis that the rise of temperature of the liquid is attended by a change of molecular arrangement of the solution, of such a kind as to enable a portion of heat to be converted into an electric current.

The most peculiar phenomenon observed was, that if a solution of a salt, made with distilled water freed from dissolved air, was divided into two equal parts, one of which had been heated and cooled without loss of water or other constituent, previous to making an experiment, the non-preheated portion gave a stronger current than the other, probably in consequence of a change of molecular arrangement of the solution produced by the heating. The method may therefore be employed for detecting molecular differences in conducting liquids having the same chemical composition.

In the class of cases in which the differences of molecular arrangement were the least and the currents the most feeble, the

direction of the currents was the most uniform. This is in accordance with the common truth in science, that the smallest phenomena are the most constant.

The author has ascertained by separate experiments of a different kind that mercury, when sufficiently agitated with solutions neutral to test paper, of salts of the alkali metals, renders some of those liquids feebly alkaline; the effect, however, is so slight, requires such extensive and long-continued contact of the substances that it appears consistent with the view that chemical action is not the cause of the currents in these thermo-electric experiments.

"Quantitative Spectroscopic Experiments," by Prof. G. D. Liveing, M.A., F.R.S., and Prof. James Dewar, M.A., F.R.S.

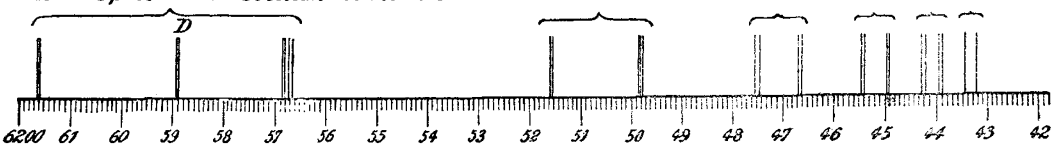
"On the Spectra of Sodium and Potassium." By G. D. Liveing, M.A., F.R.S., Professor of Chemistry, and J. Dewar, M.A., F.R.S., Jacksonian Professor, University of Cambridge.

The authors notice that as seen in the electric arc in one of their lime crucibles, there are in each spectrum several lines hitherto undescribed, which make the whole very regular and symmetrical. The authors have generally used carbonates of the metals, sometimes chlorides.

The pair of lines (5155, 5152) are sharply defined, and have no other line close to them; but the bright green pair, or fifth group (4983, 4982), are diffuse lines, usually seen as one band, but noted by Lockyer to be a double line, and have a third line on their more refrangible side. The authors feel sure that there ought to be a fourth line in this group, but have never been able to detect it.

The sixth group consists of a pair of lines sharply defined. The first only of this pair is described by Lecoq de Boisbaudran. The seventh group is a pair of lines with diffuse edges, which the authors have seen reversed as fine dark lines in the middle of diffuse blue bands. The first only is described by Lecoq de Boisbaudran. By putting some titanic oxide into the crucible the titanium line 4666·5 was seen between the sodium lines, and the authors have no doubt that it is sodium which gives the winged appearance to the corresponding ray in the solar spectrum The eighth group is a more sharply defined pair, the ninth a diffuse pair, the tenth group again a more sharply defined pair,

Dia 1 Spectrum of sodium in the arc



and the eleventh group a very diffuse pair, sometimes seen as a continuous band dividing as the sodium evaporates. The twelfth group is a diffuse but narrow band, which the authors have not seen divided, and the thirteenth group a diffuse broad band nearly bisected by the iron line 4325.

The successive groups become fainter and more diffuse as they are more refrangible, at the same time the distance between successive groups diminishes. Their positions are shown on the accompanying diagram to a scale of wave-lengths. It is worthy of note that every alternate group is much more sharply defined than the others. Moreover, it is only the diffuse groups (3) (5) (7) which show reversal except the first group, in the orange, which, however, is more difficult of reversal than the others. The whole series, exclusive of D, looks very like repetitions of the same set of vibrations in a harmonic progression; the first (visible) term consisting of the six vibrations represented by the orange pair (6160, 6154) and the four lines of group (3); the next term of the five lines of the fourth and fifth groups, one of the six vibrations being now too faint to be seen; the next three terms, of each of which only four lines are visible, consisting of the six and seventh, the eighth and ninth, and the tenth and eleventh groups, and the last term of the two faint bands of the twelfth and thirteenth groups.

Simple harmonic relations can be found to subsist between some of the groups, for instance, the wave-lengths of the fifth, seventh, and eleventh groups are very nearly as $\frac{1}{15} : \frac{1}{16} : \frac{1}{17}$, but the whole series cannot be represented as simple harmonics of one set of six vibrations with any probability. The smallest numbers, which are nearly proportional to the reciprocals of the wave-lengths of groups (1), (4), (6), (8), (10), (12), are 81, 97, 105, 110, 113, 115; and these numbers are only approximately in the same ratios as the reciprocals of wave-lengths.

Lines closely corresponding to all these lines except the faint ones of the 3rd and 5th groups, and the last two groups are found in the solar spectrum.

The potassium spectrum as seen in the arc, leaving out of account the two pairs of lines in the red and that in the violet, consists of a series of groups of four lines each, succeeding one

Dia. 2. Spectrum of potassium between D & G

another at shorter intervals and becoming fainter as they are more refrangible. They all are more or less diffuse, markedly more so on their less refrangible edges. They are shown on the accompanying diagram to a scale of wave-lengths.

The first and least refrangible group of this series consists of the four lines to which Lecoq de Boisbaudran assigns the wave-lengths 5831, 5812, 5801, 5783. The second of these lines (5812) is much less strong than the others as seen in the spark. In the arc they are all nearly equal in brightness, but the authors have not seen the second line reversed. Six groups of four lines each follow.

The sixth group has lines of about the wave-lengths 4808, 4803, 4796, 4788.

The seventh group is too faint and diffuse to be distinctly resolved. The wave-length of the least refrangible edge is about 4759.

None of the last three groups are seen by Lecoq de Boisbaudran, and they are too diffuse for exact measurement; on the other hand, he gives several other lines which are not noticed in the arc.

As in the case of sodium the repetition of these quartets of lines at decreasing intervals with decreasing brightness and sharpness as they proceed from the less to the more refrangible, gives the impression of a series of harmonics; but the wave-lengths do not seem to be in a simple harmonic progression, though simple harmonic relations may be found between some of the groups.

Linnean Society, December 4.—Prof. Allman, president, in the chair.—Mr. W. Carruthers exhibited a bottle of Pteropods (*Spirialis retroversus*) obtained in abundance by Dr. J. Grieve in the Gareloch, Ross-shire, Scotland, in July. A letter from Dr. Grieve was read, wherein he states that these mollusca swam rapidly to the surface, rising with a perpendicular fluttering motion, and having reached the top they raised their wing-like appendages above their heads, and thus upholding them motionless, would then drop quietly to the bottom. Some of the pteropods would occasionally stop half way, and paddle back to the surface to repeat the falling motion; seldom or ever did they swim along the surface. Dr. Grieve did not witness the creatures use their wings (epipodia) as feet to walk or crawl along the

bottom, as A. Agassiz has stated to be the case.—Dr. Maxwell Masters gave a communication on certain relations between the morphology and the functions in the leaves of conifers (see *Science Notes*).—Prof. P. M. Duncan next read a paper on a synthetic type of Ophiurid. This specimen was dredged by Dr. Wallich in the *Bulldog* expedition, 1860, fifty miles north of Cape Valloe, East Greenland, and from a depth of 228 fathoms. On casual inspection this brittle-star might be regarded as an Amphiuran, but the spinulose disk and hooked side-arms oppose this notion. Again, resemblances to species of *Ophiothrix* suggest themselves, but the large scaling of the disk, absence of tooth papillæ, and the presence of accessory pieces around the aboral edge of the upper arm-plates, are distinctive characters, and which to a certain extent are indicative of Ophiolepian affinities, but the dental apparatus does not conform. Thus in shape and dental characters it (*Polyopholis echinata*) approaches *Amphiura;* spinules and arm-hooks are those of *Ophiothrix;* and the accessory plates re emble those of *Ophiolepis*. Provisionally the author places it among the family Amphiuridæ, and he remarks that, though rare, such forms cast doubts on the value of the characters employed in the classification of the Ophiuridæ.—Mr. C. B. Clarke followed with a paper on Indian Begonias. This is supplementary to the author's account of the group in Sir J. D. Hooker's "Flora of British India." It treats of the classification of the whole genus (*i.e.*, order) except *Hillebrandtia* and *Begoniella*, and it is maintained that it (the group) can be naturally divided into the six subgenera employed in the "Flora of British India." The author discards the differences in the stamens and styles for subgeneric characters, and employs exclusively the structure and dehiscence of the fruit.—The following gentlemen were elected Fellows of the Society:—Messrs. Samuel Wright (St. Neots, Huntingdon), George Malcolm Thomson (Dunedin, N.Z.), J. Otto Tepper (Adelaide), Henry B. Spotton, (Ontario), John Cameron (Bot. Gard., Bangalore), Major Collet (Kurrum Field Force), and Sir Samuel Wilson (Victoria).

Chemical Society, December 4.—Mr. Warren De La Rue, president, in the chair.—The following papers were read:—On the comparative value of different methods of fractional distillation, by F. D. Brown. When fractional distillation is carried out on a large scale, either or both of two well-defined processes can be used: in the first "washing" the mixed vapours are passed through several layers of liquid obtained by their own partial condensation; in the second "cooling" the mixed vapours are partially condensed by allowing radiation to take place or by passing them through a coil kept at a given temperature; in both processes the liquids of highest boiling-point are kept back, and a better distillate is accordingly obtained. The author concludes that there is an essential difference between washing and cooling. The best distillate is obtained by keeping the still-head at the lowest possible temperature compatible with the passage of vapour into the condenser; he has contrived an apparatus to carry out this principle, and has obtained with it very satisfactory results.—On the influence exerted upon the course of certain chemical changes by variations in the amount of water of dilution, by M. M. P. Muir and C. Slater. The authors find that the amount of chemical change which ensues when solutions of calcium-chloride and sodium-carbonate are mixed decreases as the dilution increases, but when solutions of strontium-chloride and sulphuric acid, or barium chloride and potassium oxalate are mixed, various irregularities in the amount of chemical change are noticed as the dilution increases. These irregularities the authors have studied in detail; they conclude that they are due to the entire system being brought into a state of strain, the principal forces of which this stress is compounded being the force tending to produce cryohydrates and other hydrated molecules, the force tending to split up these molecules and the force tending to separate, and so to impart greater mobility to the chemically active molecules of the system.—On the influence of temperature upon the decomposition of barium chloride by potassium oxalate in aqueous solution, by M. M. P. Muir.—On α and β phenanthrene carbonic acids, by Dr. F. R. Japp. The author, since preparing the alpha acid with Dr. Schultz, has obtained a purer specimen melting at 266°; from a syrupy liquor left in the preparation of the calcic phenanthrene sulphonate, the author obtained the beta acid melting at 250°–252°; he also prepared the sodium and barium salts and studied the oxidation products of the acid. He discusses the constitutional formula of phenanthrene, and concludes that this substance consists of three benzene nuclei, one of which shares four adjacent carbon atoms with the two others.—On some derivatives of phenylacetic acid, by P. Philipps Bedson. The author has separated para- and ortho-nitro-phenylacetic acids, their bromo derivatives, a dibromo body, and a β bromonitro-phenylacetic acid, with its amido derivative.

Geological Society, November 19.—Henry Clifton Sorby, F.R.S., president, in the chair.—Edmund Knowles Binns, and John Dawson, were elected Fellows of the Society.—The following communications were read:—Supplementary note on the vertebræ of *Ornithopsis*, Seeley (=*Eucamerotus*, Hulke), by J. W. Hulke, F.R.S., F.G.S.—The author in this communication describes several cervical and trunk vertebræ of this remarkable Dinosaur. The former are characterised by great length; the anterior articular surface is strongly convex, and the posterior correspondingly hollow. In place of the side chamber characterising the trunk vertebral centra, is a long shallow pit. An upper and a lower transverse process are given off from an upper and a lower plate, which project from the side of the centrum above the pit, and these are connected by a short, forked cervical riblet. The neural arch is dwarfed, and there is no spinous process, and no zygosphenal and zyganteal mechanism. The structure of these vertebræ indicates a long, mobile, and light neck. In the trunk the convexity of the anterior articular surface lessens in passing from the neck to the loins, the anterior ball gradually subsiding till the great articular surface becomes plane, the posterior surface retaining, however, a slight hollowness. The trunk vertebræ have superadded to the ordinary articular processes a mechanism comparable to zygosphene and zygantrum, which must have given great fixity to this part of the vertebral column, contrasting strongly with the flexibility of the neck. The longitudinal side chambers reach their greatest development in the vertebræ referable to the fore part of the trunk; they lessen toward the loins, and are absent from the neck, which is regarded as conclusive of their pneumaticity, and against their having been occupied by cartilaginous and fatty tissues, which might have equally occurred through the whole length of the vertebral column, and not been limited to a particular region in close vicinity to the lungs. The whole construction affords a notable illustration of immense bulk attained with the use of the smallest quantity of bony tissue, which occurs in the form of very thin sheets or plates. The transverse and spinous processes are strengthened by flying buttresses. The vault of the neural canal is beautifully groined, whence the original name *Eucamerotus*. The author then pointed out the family resemblances between the Isle of Wight Wealden form and the new Colorado Dinosaurs, which have many points in common, but are both generically and specifically distinct from *Ornithopsis*. — On the concretionary patches and fragments of other rocks sometimes contained in granite, by J. Arthur Phillips, F.G.S. There are two classes of inclusions, (1) the result of the abnormal aggregation of the minerals constituting the granite itself, containing generally more plagioclastic felspar, mica, or hornblende than it, with some other distinctions: most probably concretions formed contemporaneously with the solidification of the mass; (2) fragments of included schistose or slaty rock, often not very highly altered, caught up from the rock-masses through which the granite has forced its way.—Certain geological facts witnessed in Natal and the border countries during nineteen years' residence, by the Rev. George Blencowe. Communicated by the Rev. H. Griffith, F.G.S. Shales and sandstones are the prevalent rocks from the coast for about twenty-four miles inland. Here is a protrusion of granite; beyond the sandstones come ferruginous shales, with scattered boulders of trap on the surface. The northern third of Natal is white sandstone, formed into hills and ridges by denudation, with a long trap-capped plateau near Helpmakaar. Coal-seams occur in the sandstones. There are frequent vertical pipes in these sandstones which, the author thinks, mark the site of trunks of trees, round which the sand-beds had accumulated. Rorke's House and Isandhlwana are near the above plateau. Near the former is an extinct mud volcano. A remarkable "vitreous shale" is found near the Buffalo; isolated pinnacles of it occur at the spot where the few survivors of the fight crossed that river. A range of mountains, with mural escarpments, remnants of an ancient plateau, rising to a height of some 2,000 feet above another plateau which is 5,000 to 6,000 feet above the sea, extends for about 500 miles from the north of Natal to near Cradock in the Cape Colony; they are sandstone horizontally stratified, capped by trap. Some other geological features are described. The Transvaal consists of undulating hills of soft limestone, a

sandstone range, and a country rich in metals,—iron-ore, cobalt, nickel, copper, and gold occur, as well as plumbago.

Zoological Society, December 2.—Prof. Newton, F.R.S., vice-president, in the chair.—A letter was read from Mr. E. L. Layard, F.Z.S., advocating the desirability of a fixed scale of colour for use among naturalists, in describing the plumage and pelage of birds and other animals.—A letter was read from Mr. R. B. White, C.M.Z.S., of Medellin, U.S., of Colombia, S.A., on a mode of protecting plantations from the ravages of an ant (*Atta cephalotes*).—A communication was read from Dr. G. E. Dobson, C.M.Z.S., containing notes on some species of chiroptera, from Zanzibar, with descriptions of new and rare species.—A communication was read from Prince Ladislas Lubomirski, containing the description of a collection of shells made in High Peru, by Messrs. Jelski and Stolzman.—Mr. G. French Angas, C.M.Z.S., read a paper in which he gave the descriptions of two new species of helix (*Euryceratera*) from south-east Betsileo, Madagascar.—Mr. Arthur G. Butler, F.Z.S., read a paper on some Arachnida of Madagascar and the Mascarene Islands, in which an account was given of a collection of spiders recently received by the British Museum from Réunion and Mauritius, through Mr. H. H. Slater.—Lieut. Col. H. H. Godwin-Austen, F.Z.S., and Mr. G. Nevill, C.M.Z.S., gave descriptions of two collections of land shells obtained at Perak and in the Nicobar Islands by Surgeon-Major E. Townsend and Dr. F. Stolizka.—A communication was read from Dr. A. Günther, F.R.S., containing a notice of a collection of mammals and reptiles recently received from Cyprus by Lord Lilford.—Dr. F. Day, F.Z.S., read a paper upon the fishes of Weston-super-Mare, a locality he had lately visited in order to inquire into some species described by Yarrell and Couch as found on this coast. Mr. Day also gave some account of the results of Lord Ducie's trawling investigations in Ballinskelley Bay, on the Coast of Ireland, and described a specimen of the long flounder received from Mr. M. Dunn of Mevagissy, in Cornwall.

Institution of Civil Engineers, November 18.—Mr. W. H. Barlow, F.R.S., vice-president, in the chair.—The paper read was on tunnel outlets from storage reservoirs, by Mr. C. J. Wood, M.Inst.C.E.

December 2.—Mr. Bateman, F.R.S., president, in the chair.—The paper read was on "The Passenger Steamers of the Thames, the Mersey, and the Clyde," by Mr. W. Carson, M.Inst.C.E.

PARIS

Academy of Sciences, December 8.—M. Daubree in the chair.—The following papers were read:—On the satellites of Mars, by M. Tisserand. By a different analysis from that of Prof. Adams, he concludes that, if Mars be homogeneous, or if the law of densities in it be the same as in the earth (a certain flattening being supposed), the orbits of the two satellites, Phobos and Deimos, will always coincide with the planet's equator, or at least will diverge from it very little.—Remarks on saccharoses, by M. Berthelot. He calls attention to the resemblance of the new substance, saccharine, in general reactions and crystalline form, to trehalose.[1]—Relation between the heat of solution and the heat of dilution in complex solvents, by M. Berthelot. The difference between the two heats of solution is equal to that between the two heats of dilution, observable when there is added to the concentrated liquor before and after having dissolved in it the third substance, the water necessary to bring it to the state of dilute liquor.—On the protochloride of copper, by M. Berthelot. This relates to heat of solution and heat of formation.—Reply to the two questions about chlorophyll in M. Chevreul's last note, by M. Trécul. Crystals of chlorophyll dissolve without residue in alcohol and ether. Each grain, in plants, composed of protoplasm and the chlorophyll it has secreted, should be considered a particular living organ.—Agronomic map of Seine-et-Marne, by M. Delesse. This shows the comparative fertility of the land, and its features, physical, chemical, geological, &c.—Experiments with divergent ajutages, divided into several parts by plates, by M. De Caligny.—On a function of direction in the flight of insects, by M. Jousset de Bellesme. Birds can, but insects in general cannot, alter at will the angle at which the wing is vibrated (the muscles of insects are not inserted in the wing, but in the piece of thorax which supports them). Direction of flight is determined in insects by altering the relative position of the centre of gravity and the axis of sustention, the former being most commonly displaced, and in some cases by movements of the abdomen, in others, of the elytra, in others, of the balancers.—Experiment relative to transport of phylloxera by the wind, by M. Faucon.—On the direct visibility of the photospheric network of the sun, by Dom Lamey. On November 16, observing the sun with a 6-inch equatorial at Grignon (Cote d'Or), he saw quite well that two spots on the left side were surrounded by a reticulated region. With a weak magnifying power the crateriform aspect was manifest.—On series relative to the theory of numbers, by M. Lipschitz.—Coloured rings produced at the surface of mercury, by M. Guébhard. Having carefully cleared off the grey pellicle which forms on the surface of mercury, breathe on the clear metal. Beautiful ring systems are formed in light by the layer of condensed vapour. They contract as evaporation diminishes the thickness. Better results are had by dropping a volatile oil on the surface, and the best with collodion. Diluted with ether, the latter gives pellicles which can be detached, after having regulated their thickness and colours, at will, and transferred to paper.—Reply to M. Trécul and M. Chevreul regarding crystallised chlorophyll, by M. Gautier.—Influence of phosphorus on the urinary secretion, by M. Cazeneuve. Experiments on the dog and the cat show that phosphorus, given in toxic doses, causes increase of urea, phosphoric acid, sulphuric acid, the total nitrogen, and iron. The author disagrees with the view of certain physiologists who regard the liver as the principal organ formative of urea.—On alcoholic fermentation (reply to M. Berthelot), by M. Cochin.—On the inferior Pyrenomycetes of New Caledonia, by M. Crie.—Note on the general circulation of the atmosphere on the surface of the globe, by M. Brault. The fourth and last of the author's series of maps of winds is now published; it relates to the Pacific. M. Brault points out that the problem of atmospheric circulation falls into two parts; finding what the circulation would be if all the earth were covered with water (it would be in a system of zones oscillating from south to north, and *vice versâ*), and finding in the actual circulation what is due to the presence of continents and unequal distribution of land and sea. The former question is best studied in the southern hemisphere.—On a glazed frost observed at Angers on December 4, 1879, by M. Decharme. It commenced about 8 A.M., after a night of strong east wind, and lasted till 4 P.M.

[1] In last week's "Paris," on this subject, the phrase "or saccharine, not yet sugar" should read "or saccharose, yet not sugar."

CONTENTS