

SCIENTIFIC SERIALS.

American Journal of Science, July.—The origin and significance of spines; a study in evolution, by C. E. Beecher. The importance of spines lies not in what they are, but in what they represent. They are simply prickles, thorns, spines or horns. They represent a stage of evolution, a degree of differentiation in the organism, a ratio of its adaptability to its environment, a result of selective forces, and a measure of vital power. Tracing the various groups of forms through their geological development, it is noticed that each group began its history in small, smooth, or unornamented species. As these developed, the spinose forms became more abundant until after the culmination of the group is reached, when this type either became extinct or was continued in smaller or less specialised forms.—Electrical discharge from the point of view of the kinetic theory of matter, by J. E. Moore. When gaseous matter moves in a stream in any definite direction, the pressure of the gas in that direction is increased by an amount proportional to the square of the velocity of translation. The author proves experimentally that the pressure in the direction of discharge is greater than in either of the directions at right angles, by an amount depending upon the velocity of the discharge stream.—Further separations of aluminium by hydrochloric acid, by F. S. Havens. Describes the separation of aluminium from zinc by the action of hydrochloric acid gas in aqueous ethereal solution. Also the separation of the same metal from copper, mercury and bismuth.—On the origin of the corundum associated with the peridotites in North Carolina, by J. H. Pratt. The corundum was held in solution by the molten mass of the dunite when it was introduced into the rock, and separated out among the first minerals when the mass began to cool.—The winter condition of the reserve food substances in the stems of certain deciduous trees, by E. M. Wilcox. Material of the *Liriodendron* collected in October was found to have an abundance of starch in the cells of the cortex, but none in the cells of the medullary sheath, and but few grains in the cells of the wood parenchyma and medullary rays. The cells immediately below the growing point of the stem contained no starch at this time. November and December showed a gradual increase in the amount of the starch in the medullary sheath, but a marked decrease in the amount present in the cortex. At the end of February starch began to appear again in the cortex, but more especially in the cells beneath the growing point.

Annalen der Physik und Chemie, No. 6.—The spectra of iodine, by H. Konen. The author investigates all the different spectra of iodine obtainable by the use of arcs, vacuum tubes, heated vessels, sparks, and fluorescence. He uses the photographic method and an excellent concave grating, and succeeds in cataloguing some 360 lines, extending from 3030 to 5800.—The Leidenfrost drop, by J. Stark. By inserting a drop in the spheroidal state, the hot metallic plate, and a telephone in an electric circuit, the author shows that the drop performs oscillations with respect to the layer of vapour which prevents its evaporation. In the final stages the plate is intermittently wetted. The oscillations are due to differences of surface tension between the hot and cold portions of the drop.—The electromotive behaviour of chromium, by W. Hittorf. Chromium has a different electric behaviour, accordingly as it is in the state to form the monoxide, the sesquioxide, or the peroxide. At ordinary temperatures, and in solutions from which it does not disengage hydrogen, it behaves like a noble metal. But at high temperatures it reduces all the other metals except zinc from their fused salts, and forms its own lowest combination. Fresh surfaces of the metal are in the active state.—The Weston standard cell, by P. Kohnstamm and E. Cohen. The E. M. F. of the cadmium cell shows certain irregularities below 15 degrees, which are due to the fact that the constitution of the cadmium sulphate undergoes some change at that temperature. This change does not affect the water of crystallisation, but corresponds to the change undergone by sulphur at 95 degrees. At temperatures between 15 and 70 degrees the Weston cell is superior to the Clark standard.—On thermophones, by F. Braun. The momentary expansions and contractions produced in a strip of brass or a bolometer by a variable current may be used for the transmission of sound. For this purpose the bolometer is put in circuit with three or four accumulators and a microphone. The effect may be greatly increased by increasing the steady current.—Electric discharge in rarefied gases, by W. Wien. From experiments on the electrostatic deflection of kathode rays, the author calculates their velocity

as one-third that of light. Goldstein's canal rays are the prolongation backwards of the kathode rays, and like them are subject to magnetic and electrostatic deflection.—Polarisation of Röntgen rays, by L. Graetz. Polarised X-rays cannot be produced even by using a fluorescent body as an anti-kathode, although such bodies are known to emit polarised light.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 16.—“The Stomodæum, Mesenterial Filaments, and Endoderm of *Xenia*.” By J. H. Ashworth, B.Sc., Demonstrator in Zoology, Owens College, Manchester. Communicated by Prof. Hickson, F.R.S.

The Xenidiæ are distinguished from all other Alcyonaria by their soft fleshy consistency and non-retractile polyps.

The stomodæum of each polyp is moderately long (1.8–2.2 mm.), and has a well-marked ventral groove or siphonoglyphe, the cells of the lower third of which bear long flagella. Among the cells forming the remainder of the wall of the stomodæum are numerous “goblet cells,” which have not hitherto been noticed in the stomodæum of the Alcyonaria. These cells generally appear empty, having discharged their secretion, which, in some cases, can be seen issuing from the cell into the cavity of the stomodæum. These secreting cells occur chiefly in the middle and lower portions of the stomodæum, and are most abundant on the lateral walls near the siphonoglyphe.

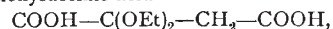
These “goblet cells” of the stomodæum are the only secreting cells connected with the digestive cavity, as the six thick ventral and lateral mesenterial filaments, which bear the gland cells in other Alcyonaria, are absent in all polyps of this *Xenia*. The two dorsal mesenterial filaments are present and have a similar course and structure to those of *Alcyonium*. Wilson and Hickson have shown that the ventral mesenterial filaments bear the cells which produce the digestive secretion. The absence of these filaments in this *Xenia* is probably correlated with the presence of gland cells in the stomodæum, which from their position and structure appear to perform some digestive function.

The siphonozooids which occur in Pennatulids and some other Alcyonaria are the only recorded examples of polyps in which the ventral and lateral mesenterial filaments are absent. According to Wilson, these siphonozooids derive their food supply from the autozooids or feeding polyps, and therefore do not require cells to produce a digestive secretion.

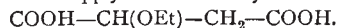
The endoderm cells which line the coelentera and the cavities of the tentacles contain numerous small vacuoles which give the protoplasm a reticulate appearance. Among the ordinary endoderm cells are numerous cells, the inner or free end of which is produced into a long pseudopodium, which is from four to eight times as long as the basal portion of the cell. The pseudopodia, which appear to be flexible, may attain a length of .12 mm. They are not vacuolated, their protoplasm being homogeneous or very finely granular. The basal part of the cell from which the pseudopodium arises has the reticulate protoplasm of an ordinary endoderm cell, and the nucleus of the cell is situated in this portion. These pseudopodia-bearing cells are very numerous and occur in all parts of the endoderm, lining the coelentera and the cavities of the tentacles.

EDINBURGH.

Royal Society, July 18.—Lord McLaren in the chair. In a note on the electrolysis of ethyl potassium diethoxysuccinate, Prof. Crum Brown and Dr. H. W. Bolam showed that the electrolytic synthesis of dibasic acids applies to the unsymmetrical diethoxysuccinic acid



although it does not apply to monoethoxysuccinic acid



—Mr. W. W. Taylor communicated a note on the freezing point of aqueous solutions of sodium mellitate. The work was undertaken at Prof. Crum Brown's suggestion to test Van t' Hoff's theory of the depression of the freezing point of solutions of electrolytes. The molecular depressions obtained experimentally for solutions of different concentration were from 4 to 6 times the normal molecular depression, 1.87. According to the theory the greatest possible depression is 7 times the normal.—Sir John Murray, K.C.B., presented two papers—one on the deposits collected by the s.s. *Britannia* in the Western

Atlantic in 1897, and the other on some of the deposits collected by the German ship *Gazelle* in 1874 and 1875. In an appendix to the former paper, Mr. R. G. Peakes compared the mean temperature of the sea-bottom between the Bermudas and the West Indies as determined by thermometric observations with that estimated from the resistance of the telegraph cable. The values were respectively $36^{\circ}57$ and $33^{\circ}3$ F., a serious discrepancy, which seemed to be difficult to trace to any fault in the electrical resistance method.—In notes on coral reefs at Port Louis and Grand Port, Mauritius, Mr. W. Shield gave an account of twelve borings at these places, one of which at Port Louis reached a depth of 68 feet. The character of the material brought up from each boring was described in detail, but no general result was indicated.—Dr. James Burgess, in a note on finding log sines and log tangents of small arcs, gave formulæ which were much simpler and more accurate than those hitherto published. For example, the log sine of an arc of x minutes and h seconds was given by the expression

$$\log \sin x' + \log (x'' + h'') - \log x'' - .12 x'' h'',$$

where x' is the x minutes expressed in seconds and x'' the same expressed in degrees.—Prof. Tait gave a generalisation of what is known as Josephus' problem, and showed how by a simple arithmetic process the problem could be extended to huge numbers. Thus he found that if every third man were removed from a ring of 8,968,992 until only one was left, that one would be the first.—Prof. Tait also communicated some recent experimental results on the compressibility of sugar solutions, which was found to be not much less than that of water, whereas the compressibility of brines is notably less. The results accord with the general principle that the greater the change of volume on dissolving the less the compressibility.—The Chairman read a short review of the work of the session.

PARIS.

Academy of Sciences, July 25.—M. Wolf in the chair.—On the numerical calculation of the coefficients in the development of the function of perturbation, by M. O. Callandreaux.—Thermogenesis in tetanus, by MM. d'Arsonval and Charrin. Experiments upon rabbits show that disturbances, of an oscillatory character, in the production of animal heat make their appearance at an early stage of incubation, and increase in strength until the crisis of the disease is reached.—Note upon animal heat, by M. Émile Blanchard. Some observations on the temperature of insects, more especially of those which are remarkable for their rapid movements.—On a theorem of M. Poincaré, by M. S. Zaremba.—On the absorption of the light emitted by a body placed in a magnetic field, by M. Auguste Righi.—Electrical resistance at the contact of two discs of the same metal, by M. Edouard Branly. Two smooth, plane discs of zinc or copper, when pressed together, offer practically no resistance to an electric current under any circumstances. In the case of aluminium, iron and bismuth, however, the resistance, although small when the discs are simply pressed together, is greatly increased when they are forcibly brought together by falling from a height. The author is unable to offer any explanation of these phenomena.—On the diffusion of kathode rays, by M. P. Villard. The phenomena attributed by Prof. S. P. Thompson to *parakathode rays* appear to be really caused by diffusion of kathode rays.—Measurement of the velocity of the electrified particles during discharge under the influence of ultra-violet light, by M. H. Buisson. The velocity found varied from 25 to 135 centimetres per second, according to the difference of potential between the plates of the condenser, and was independent of the intensity of the light employed.—On the determination of arsenic in antimony and other metals, by M. O. Ducru. The author recommends the process of distillation with hydrochloric acid and ferric chloride, the arsenic in the distillate being afterwards precipitated by hydrogen sulphide.—On the composition of phosphorescent sulphides of strontium, by M. José Rodriguez Mourello. The specimens of sulphide of strontium employed in the author's previous researches contained as impurities, varying in amount according to the method of preparation, strontium sulphate, sulphide and sulphate of barium, calcium sulphide, sodium sulphide, sodium chloride, and traces of aluminium and iron. Pure monosulphide of strontium is not phosphorescent.—Detection and estimation of methyl alcohol in ethyl alcohol, by M. A. Trillat. The process described depends upon the formation of methylal, when methyl alcohol is oxidised with potassium bichromate and sulphuric acid, and the conversion of this substance, by condensation with dimethylaniline, into tetramethyldiamidodi-

phenylmethane. This compound, when oxidised with peroxide of lead in acetic acid solution, gives an intense blue coloration, the depth of which is proportional to the amount of methyl alcohol originally present in the liquid under examination.—On the aloins, by M. E. Léger. A number of substitution derivatives of barbaloin and of isobarbaloin are described, and the conviction is expressed that these are the only aloins which exist in the various aloes of commerce.—Study of the phosphoric acid dissolved by the water of the soil, by M. Th. Schloesing fils. The dissolved phosphoric acid appears to be independent of the amount of water in the soil.—On the composition and alimentary value of millet, by M. Ballard. This grain is rich in nitrogen and fat; it resembles maize in composition, and forms a more complete food than wheat.—Contributions to the study of the function of the nucleolus by M. Antoine Pizon.—On the different phases in the development of a new species of *Sarcina*, by M. E. Roze. The new species, for which the name *Sarcina evolvens* is suggested, was observed upon the macerated tubercles of *Boussingaultia baselloides*.—On a silicified *Lepidodendron* from Brazil, by M. R. Zeiller.—Production of acute meningoencephalo-myelitis in the dog by the bacillus of septicæmia of the guinea-pig.—On the polar vortex, by M. A. Poincaré. This paper deals with the movements of the atmosphere in the polar regions.—On the adherence of the copper washes used in combating the cryptogamic diseases of the vine, by MM. G. M. Guillon and G. Gouirand. For the destruction of the parasites of the vine, the use of a large quantity of cupric sulphate is of less importance than the close adherence of the salt to the surface of all the organs of the plant. This adherence is sought to be effected by the addition of such substances as molasses, soap, gelatine, lime and other alkalies, to the solution of cupric sulphate. The present paper gives the results of a number of experiments in which glass plates were sprinkled with the various washes, dried in the sun, exposed for a certain time to the action of rain, and the amount of copper left determined. Lime and gelatine appear to be the most effective fixing agents.

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