great deficiency of apparatus. The building itself appears to me to be very convenient and adequate to its purpose, but the advantages which it should afford cannot be fully realised without a large addition to the existing stock of apparatus. Even with an adequate outfit, a considerable annual expenditure is necessary for renewals and to meet the wants of students engaged in original research. Knowing that the University is not likely for several years to be in a position to meet the want, and feeling that Cambridge ought not to remain in this respect behind several Continental and American Universities, I have been endeavouring to raise an apparatus fund, to be spent in eight or ten years at the discretion of the Professor, by inviting contributions from persons interested in Cambridge and in science. I have been fortunate enough to secure the co-operation of the Chancellor, to whom the University is already indebted for the building and for most of our existing apparatus; and the proposal has met with such a degree of support from others that it may be considered to be already a partial success. It is difficult to form an exact estimate beforehand, but I should suppose that 2,500*l.* will be required during the next ten years to put the institution upon a proper footing." Lord Rayleigh announces that he has received promises and donations amounting to 1,825*l.*

IN connection with the Science and Art Department at South Kensington the following courses of instruction for science teachers will probably be organised this summer:—(1) Chemistry, from July 7 to 29, Dr. W. R. Hodgkinson. (2) Light, from June 29 to July 14; (3) Magnetism and Frictional Electricity, from July 15 to 30, Prof. Guthrie, F.R.S. (4) Applied Mechanics, from June 30 to July 22, Prof. Goodeve, M.A. (5) Geology, from June 30 to July 22, Prof. Judd, F.R.S. (6) Botany, from July 7 to July 29, Prof. W. T. Thiselton Dyer, F.R.S.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 13.—Abstract of paper "On the Chemical Composition of Aleurone-Grains," by Dr. Vines.

This paper continues the account of this investigation, which appeared in the *Proceedings* for 1878. It was therein shown that the aleurone-grains of the Lupin consist of three proteid substances, namely, of two globulins—the one belonging to the myosin group, the other to the vitellin group—and of a substance, allied to the peptones, provisionally termed hemialbumose. In the present communication the results of the investigation of the grains of the peony and of the castor-oil plant (*Ricinus*) are given. The grains of the peony are found to be readily soluble in distilled water. Treatment with 10 per cent. NaCl solution, however, proves the existence of a myosin-globulin. Apparently no vitellin-globulin is present. The grains contain hemialbumose in considerable quantity. The grains of Ricinus present a complex structure. They consist of a mass of ground-substance of proteid nature, inclosing a crystalloid of proteid substance and a globoid which consists of inorganic matter. The ground-substance is found to be composed, like the grain of the Lupin, of the two globulins and of hemialbumose. The chemical nature of the crystalloid is not so clearly made out. It is slowly soluble in 10 per cent. NaCl solution, and readily soluble in 20 per cent. or in saturated NaCl solution after treatment with alcohol. The crystalloids of several plants were investigated with the view of ascertaining their relative solubility in solutions of this salt. Those of *Viola elatior* and of *Linum usitatissimum* were found to resemble those of Ricinus in this respect; those of Bertholletia and of Cucurbita are readily soluble in 10 per cent., and saturated NaCl solutions; those of *Musa ensete* and *hillii* and those of *Sparganium ramosum* are either insoluble or only partially soluble in these solutions.

The points of more general interest are the action of alcohol in promoting the solution of the crystalloids of Ricinus in 20 per cent. and in saturated solutions of NaCl, and the fact that long-continued exposure to alcohol does not render the vegetable globulins insoluble in these solutions.

The author finally expresses his opinion that the caseins which Ritthausen has extracted from various seeds consist to a considerable extent of precipitated hemialbumose.

Physical Society, May 8.—Sir William Thomson, president, in the chair.—New Members: E. F. Bamber, Dr. E. Obach, R. D. Turner, E. Woods, H. E. Roscoe, H. Watts.—Prof. Minchin, of Cooper's Hill Engineering College, described his further researches on the subject of photoelectricity, brought by him before the last meeting of the Society. He has found that the current in a sensitive silver cell does not always flow from the uncoated to the coated plate. It does when chloride or bromide of silver is used, but when the sensitive emulsion is iodide of silver and the liquid water tinctured with iodide of potash, the current is from the coated to the uncoated plate. He demonstrated that the current set up by the fall of light on the cell could be sent by wire to a receiving cell, and made to produce a *local* effect on the sensitive plate therein. He also proved that electricity is developed in fluorescent bodies by the action of light, and hopes to show that it is also developed in phosphorescent bodies. Neither heat nor the red rays produce this electricity, but it is the blue and violet rays which do so. The fluorescent silver plates he employed were coated with an emulsion of eosine and gelatin, and had been kept sensitive for twelve days. They would thus be a permanent source of photoelectricity, did the eosine not tend to leave the gelatin. Mr. Wilson had suggested naphthaline red for eosine, as not apt to leave the gelatin, and he had found it give good results.—Dr. O. S. Lodge described certain improvements which he had made in his electrometer key designed for delicate electrical and especially electrostatic experiments. Assisted by the British Association, he had made it more convenient, and fitted it into an air-tight case which could be artificially dried. The contact-pins were now of phosphor-bronze gilt instead of platinum, and the contacts were made by press-pins from the outside. Dr. Lodge also exhibited a new inductometer or modified form of Prof. Hughes's induction balance, conbining a Wheatstone balance, and expressly designed for comparing capacities and resistances, especially the resistances of coils having no self-induction. A telephone takes the place of a galvanometer in the bridge, and the current in the primary coil is interrupted by a clockwork make and break. There is one primary coil of fine wire $3\frac{1}{2}$ ohms in resistance and two secondaries, one on each side of it, of fine wire, each about 270 ohms. These are fixed, but the primary is adjustible by a screw. Prof. Hughes remarked that he had pointed out in his paper to the Royal Society that the induction-balance could be used in this way; and Dr. Lodge disclaimed any novelty in the apparatus beyond its arrangement. Sir W. Thomson added that it was satisfactory to see so serviceable an adaptation of the induction-balance to research.—Dr. Hopkinson, Prof. Perry, and Sir W. Thomson offered remarks on the element of time in comparing discharges from condensers of different dielectrics. Sir William said that, in 1864, he had made experiments on air and glass dielectrics, and found the discharge about the same for the first quarter-second.—Prof. Adams then took the chair, and Sir. W. Thomson made a communication on the elimination of air from a water steam-pressure thermometer, and on the construction of a water steam-pressure thermometer. He said it was a mistake to suppose that air was expelled by boiling water, because the water dissolved less air when warm than when cold. The fact was due to the relations between the density of air in water and the density of air in water vapour. There was fifty times more air in the water vapour over water in a sealed tube than in the water below. If this air could be suddenly expelled only $\frac{1}{50}$th part of air would remain, and of this only $\frac{1}{2500}$ in the water, the rest being in the vapour. This suggested a means of eliminating air from water, whichhe had employed with success. It consisted in boiling the water in a tube, and by means of a fluid mercury valve allowing a puff of the vapour to escape at intervals. Sir W. Thomson also described his new water-steam thermometer now being made by Mr. Casella. It is based on the relations of temperature and pressure in water-steam as furnished by Regnault's or other tables, and will consist of a glass tube with two terminal bulbs, like a cryophorous, part containing water, part water-steam, and the stem inclosed in a jacket of ice-cold water. Similar vapour-thermometers will be formed, in which sulphurous acid and mercury will be used in place of water, or in conjunction with it. For low or ordinary temperatures they will be more accurate than ordinary thermometers.

Geological Society, May 12.—Robert Etheridge, F.R.S., president, in the chair.—Rev. Samuel Gasking, Thos. J. George, and Cuthbert Chapman Gibbes, M.D., were elected Fellows of the Society.—The following communications were read:—On the structure and affinities of the genus *Protospongia*, Salter, by W. J. Sollas, F.G.S.—Note on *Psephophorus polygonus*, von Meyer, a new type of Chelonian reptile allied to the leathery

turtles, by Prof. H. G. Seeley, F.R.S.—On the occurrence of the Glutton (*Gulo luscus*, Linn.) in the forest-bed of Norfolk, by E. T. Newton, F.G.S. Remains of the Glutton have hitherto been obtained only from cave-deposits. The author has lately received from Mr. R. Fitch, of Norwich, a portion of the lower jaw of this animal obtained from the forest-bed of Mundesley, Norfolk. The specimen consists of about two inches of the left ramus, bearing the first true molar and the hinder half of the fourth premolar in place. The jaw is smaller than in average specimens of the recent Glutton, but presents all the characters of the species as described in detail by the author.—A review of the family Diastoporidæ, for the purpose of classification, by George Robert Vine. Communicated by Prof. Duncan, F.R.S. —On annelid jaws from the Wenlock and Ludlow formations of the West of England, by G. J. Hinde, F.G.S.

Entomological Society, May 5.—H. T. Stainton, F.R.S., vice-president, in the chair.—Mr. Peter Inchbald, of Hovingham, York, was elected a member of the Society.—Mr. W. C. Boyd exhibited a very pale specimen of *Nyssia hispidaria*, taken at Cheshunt.—Mr. M. J. Walhouse exhibited some Geodephagous beetles, which were found only on the summits of some of the highest mountains in India.—Mr. W. L. Distant exhibited a long series of specimens of the Madagascar homopteron *Ptyelus goudoti*, Benn., to illustrate the extreme variability of the species. The series showed a gradation from melanic to albinic forms, and one specimen was asymmetrical in the markings of the tegmina, thus exhibiting the characters of two varietal forms, an occurrence which Mr. Distant stated was not altogether exceptional in extremely variable species of the order Rhynchota.—Mr. T. R. Billups exhibited two living specimens of *Carabus auratus*, which had been found in the Borough Market. In reference to a prediction by Mr. Wallace that a sphinx moth would be found in Madagascar with a proboscis of sufficient length to reach into the nectary of *Anagræcum sesquipedale*, Mr. Pascoe stated that he had heard a rumour that such an insect had been discovered, and endeavoured without success to find any corroboration of the statement from members of the Society. —Miss E. O. Ormerod made some remarks as to the contents of a work which she had edited and presented to the Society, and which contained the meteorological observations taken by Miss Molesworth for a period of forty-four years. Some attempt was made to contrast the meteorological conditions with the dominant phases of plant and animal life during that period.

Victoria (Philosophical) Institute, May 10.—A paper upon the data of ethics, with special reference to Mr. Herbert Spencer's views, was read by Prof. Wace.

PARIS

Academy of Sciences, May 17.—M. Edm. Becquerel in the chair.—The President presented the new edition of the works of Laplace, with letter from Laplace's granddaughter.—The following papers were read:—Meridian observations of small planets at the Greenwich and Paris observatories during the first quarter of 1880; communicated by M. Mouchez.—On saccharine, by M. Peligot. It is dextrogyrous, like ordinary sugar; its rotatory power, in Laurent's polarimeter, represented by 93° 5′ (sugar, 66° 18′). Saccharine from starch-glucose, and that from crystallised levulosate of lime, showed the same rotatory power. The essential character of saccharine is its relative stability and its inertia towards agents which act on other matters of the sugar group. It is much more easily got from crystallised levulosate of lime than from inverted sugar or starch-glucose.—Researches on the proportion of carbonic acid in the air; second note by M. Reiset. He made (ninety-one) fresh experiments in the country from June to November last year, day and night, and the average obtained was 29·78 CO_2 in volume, for 100,000 dry atmospheric air at 0° and 760 mm.; (this closely agrees with the figure 29·42 he got in 1872-73). He describes a new absorption apparatus, with the aid of which six or seven hours was sufficient to ascertain the yield of 600 litres of air. 28·91 was the average proportion of CO_2 for the day, 30·84 for the night. The maxima were in times of fog and mist; the average of twelve such cases was 31·66; the absolute maximum, 34·15, in a dense fog on September 3. He questions the accuracy of the method by which MM. Levy and Allaire found variations last year ranging from 22 to 36.—On the Furens dam, by M. de Lesseps. The dam of the Chagres (40 m. high) should be built on this type, and not cost over 25,000,000 fr.—M. Peters' death was announced.—On some nutritive effects of alkaline substances in moderate doses, from experimentation on man in good health, by MM. Martin Damourette and Hyades. The substances tried were bicarbonate of soda (3 gr. daily) and Vichy water from the spring Elizabeth de Cuaset (0·5 to 1 lit. a day). So taken, they are trophic agents, and they diminish uric acid largely (though the former causes gastric disorders).—Position of the comet *b* of 1880, determined at Bordeaux Observatory, by M. Rayet.—On the transcendants which play a fundamental *rôle* in the theory of planetary perturbations, by M. Callandreau.—On the number of cyclic groups in a transformation of space, by M. Kantor.—The tensions of saturated vapours have different modes of variation according as they are emitted above or below the point of fusion, by M. de Mondesir. The passage through the point of fusion always gives a variation at least four or five times greater than that found in two liquids in an equal thermometric range.—On the interversion of temperatures of the air with the height, by M. André. This is shown to occur (under like conditions) within much shorter vertical distances than those indicated by M. Alluard.—On the freezing mixtures formed of an acid and a hydrated salt, by M. Ditte. In such a mixture the cooling is not due to simple dissolution of the salt; there is always a double decomposition, conformably to the law of maximum work. The salt containing much water, this separates out, and the change of state absorbs the heat liberated by the reaction, borrowing from the liquid itself the surplus of energy necessary to its complete accomplishment. Hence results a considerable lowering of temperature.—Influence of alkaline or acid media on the life of crayfish, by M. Richet. Acid or basic liquids are not poisonous in the direct ratio of their acidity or basicity. With equal weight nitric acid is five times more toxical than sulphuric acid, and twenty-five times more than acetic acid. Generally bases have a more hurtful action than acids. The least toxical is baryta; a crayfish will live two or three hours in water containing 3 grs. of it per litre. Soda and lime are fatal in two or three hours in proportion of 1·5 grs. per litre; potash in one of 1 gr. Ammonia, however, is the most poisonous of all; in the proportion of 0·8 gr. per litre, its action is almost instantaneously fatal. It is thirty times more toxical than baryta, and fifteen than soda. —On some of the conditions of cortical excitability, by M. Couty. The movements caused by faradisation of the brain seem to vary like the less complex contractions caused by faradisation of the central end of the sciatic, pointing to a common origin of the two orders of movements in the same bulbo-medullary elements.—Local and general anæsthesia produced by bromide of ethyl, by M. Terrillon. The substance seems especially suited for short operations not requiring complete muscular resolution. It acts rapidly, is less dangerous than chloroform, and the awaking is not disagreeable.—Variations of urea in poisoning by phosphorus, by M. Thibaut.—Influence of the fattening of animals on the constitution of fats formed in their tissues, by M. Muntz. In animals submitted to a fattening process the fat is always poorer in solid fatty matters.—On the fixity of composition of plants; analysis of *Soya hispida*, or Chinese oleaginous pea, by M. Pellet.—On the respiratory and circulatory apparatus of some larvæ of diptera, by M. Viallanes. The heart of insects is at first a simple tube open only at its two ends. So long as it has no lateral orifices it is completely arterial.

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