James Watt, we are told, suggested the screw propeller in 1770; half a century later it commenced to come into use, and now it is almost universally adopted in all new construction.

It is a very interesting and curious fact to note that in the first instance, and for many years, the screw was driven by spur gearing from a very slow-speed engine, presumably because the builders of engines were afraid to design the engines to run so fast as the screw required to be driven. Now for forty years or more gearing has been entirely abandoned, and the high-speed reciprocating engine has worked well.

The turbine has now come on the scene, and its best speed of revolutions is faster than that of the screw, excepting in fast vessels; for the larger portion of the tonnage of the world it is at present unsuited, except to take a secondary but excellent part in the combination system.

We may naturally speculate as to the future, and inquire if there is a possibility of the turbine being constructed to run more slowly and without loss of economy, or whether the propeller can be modified to allow of higher speed of revolution.

Or, again, may a solution be found in reverting to some description of gearing, not to the primitive wooden spur gearing of half a century ago, but to steel gearing cut by modern machinery with extreme accuracy and running in an oil bath, helical tooth gearing or chain gearing, or, again, some form of electrical or hydraulic gearing?

These are questions which are receiving attention in some quarters at the present time, and if a satisfactory solution can be found, then the field of the turbine at sea will be further extended.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—It is proposed to confer the honorary degree of Sc.D. on Dr. Sven Hedin on Thursday, March 4. Dr. Sven Hedin will lecture before the Senate on that date in the Senate House. Before the ceremony he will be entertained at lunch by the master and fellows of Gonville and Caius College.

The Isaac Newton studentship, tenable from April 15, 1909, to April 15, 1812, has been awarded to Mr. W. J. Harrison, of Clare College.

The Lowndean professor, Sir Robert Ball, F.R.S., will lecture on "Ancient and Modern Views of the Constitution of the Milky Way" before the Cambridge Antiquarian Society on Monday, March 1, at 4.30 p.m.

In July of last year letters signed by the Chancellor were sent to more than 300 universities, colleges, academies, and other corporate bodies, inviting them to appoint delegates to attend the Darwin celebration from June 22–24 next. In answer to these invitations more than 200 delegates have been appointed. The expense likely to be incurred in carrying out the programme amounts to considerably more than 500*l*., but it is hoped that it may be possible to provide the excess above that sum by private subscriptions, and the Senate will therefore not be asked to authorise the expenditure of more than 500*l*. from the University chest.

MR. E. C. WILLS has given 10,000*l*. to the Bristol University Fund, thus raising the fund to practically 200,000*l*.

WE learn from a recent number of *Science* that Mrs. E. G. Hood has given the University of Pennsylvania 20,000*l*. to establish graduate fellowships in the law department. Mr. Adolphus Busch, who last August promised to contribute 10,000*l*. towards the 60,000*l*. necessary for the erection of the new building for the Germanic Museum at Harvard University, has increased his gift to 20,000*l*. The General Education Board has offered to give Bryn Mawr College 50,000*l*. on condition that friends of the college subscribe 56,000*l*. by June, 1910. This is in addition to the 20,000*l*. recently given by the alumnæ. Of this sum, 26,000*l*. is to be used to pay the debt of the college, and the balance is to be reserved as an endowment fund.

A ROYAL COMMISSION has been appointed to consider the position and organisation of university education in London. The terms of the reference to the commission are:—to inquire into the working of the present organisation of the University of London, and into other facilities for advanced education (general, professional, and technical) existing in London for persons of either sex above secondary-school age; to consider what provision should exist in the metropolis for university teaching and research; to make recommendations as to the relations which should in consequence subsist between the University of London, its incorporated colleges, the Imperial College of Science and Technology, the other schools of the University, and the various public institutions and bodies concerned; and further to recommend as to any changes of constitution and organisation which appear desirable. In considering these matters, regard should also be had to the facilities for education and research which the metropolis should afford for specialist and advanced students in connection with the provision existing in other parts of the United Kingdom and of His Majesty's dominions beyond the seas. The chairman of the commission is Mr. R. B. Haldane, K.C., M.P., and the other members are Viscount Milner, G.C.B., G.C.M.G., Sir Robert Romer, G.C.B., Sir R. L. Morant, K.C.B., Mr. Laurence Currie, Dr. W. S. M'Cormick, Mr. E. B. Sargant, and Mrs. Creighton. The joint secretaries are Mr. J. Kemp and Dr. H. F. Heath.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 28.—Mr. A. B. Kempe, treasurer, in the chair.—The action of the venom of *Sepedon haemachates* of South Africa: Sir T. R. **Fraser** and Dr. J. A. **Gunn.**—The colours and pigments of flowers, with special reference to genetics: Miss M. **Wheldale.** The communication gives an account of investigations made upon plant pigments, with a view to the elucidation of phenomena observed in the genetics of flower-colour. A primary classification is made into plastid pigments and pigments soluble in the cell-sap. Of the former, several kinds are shown to exist, in addition to carotin and xanthin. When the type of a species contains more than one plastid pigment, the power to produce each pigment is expressible as a Mendelian factor. Loss of the factors in turn gives rise to varieties of the type. Soluble pigments are classified as red-purple-blue (anthocyanin) and yellow (xantheïn) and of both; various kinds can be differentiated by means of chemical reagents. There is evidence, moreover, of a relationship between the behaviour of the pigments in genetics and their chemical reactions. Colourless tannin or glucoside-like substances are found to be widely distributed in plants, and such substances appear to take part in the formation of some kinds of anthocyanin. This conclusion is based upon examination of pigments of varieties of *Antirrhinum majus*, of which the inheritance of flower-colour has been worked out by the author (previous communication to Roy. Soc.); the results of the present paper show that in this genus both a glucoside-like substance and a reddening factor are essential to the production of anthocyanin of the type. Loss of glucoside gives rise to an albino variety still capable of carrying the reddening factor; loss of the reddening factor gives a variety bearing ivory-white flowers, distinguishable from the albino, and containing the glucoside. Experiments on the same genus further indicate that the xantheïc pigment of a yellow variety is a derivative of the glucoside of the ivory-white, to which it is also hypostatic. Examples are given of genera resembling Antirrhinum in their series of varieties derived from the anthocyanic type, and also of genera forming another series, from which the xantheïc variety is absent. In this connection, stress is laid upon the conception of two forms of albinism, one due to loss of anthocyanin only, the other to loss of both anthocyanin and xantheïn.—The variations in the pressure and composition of the blood in cholera, and their bearing on the success of hypertonic saline transfusion in its treatment: Prof. L. **Rogers.** This communication contains some points of

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interest in physiology, pathology, and therapeutics. The blood of Bengalis has been found by Captain Mackay to contain a higher proportion of salts and a less proportion of red blood corpuscles than the blood of Europeans. The author has found that the blood pressure in the natives is lower than in Europeans, averaging about 100 millimetres of mercury. The pathological observations are that in cholera the enormous secretion of fluid into the bowel drains away the fluid part of the blood. There is a very definite relationship between the amount of fluid thus lost from the blood and the severity and mortality of the disease. Injections of normal saline solution (0·65 per cent. of NaCl) into the veins have an almost miraculous effect in relieving the symptoms and restoring the patient to apparent health. This improvement is, however, only transient, and in the course of a few hours the symptoms recur and the patients die. It occurred to the author that if, instead of using a normal saline solution, he were to inject a hypertonic solution of 1·35 per cent. NaCl into the veins, there would be less likelihood of the diarrhœa recurring, and the blood being again drained of its fluid parts. The result of this treatment was extraordinary. It has simply revolutionised the results, so that, whereas formerly the recovery of a collapsed case was a surprise, its non-recovery is now a disappointment. In severe cases the proportion of chlorides in the blood falls below the normal, notwithstanding the great concentration of the blood from loss of water. He therefore sometimes uses a saline solution of 1·65 per cent., but usually 1·35 per cent. is sufficient. In bad cases the coagulability of the blood is very greatly reduced, so that the author now generally adds 3 gr. of calcium chloride to a pint of saline solution. The development of uræmia in the reaction stage of cholera is associated with a comparatively low blood-pressure; measures to raise it, such as the hypodermic administration of adrenalin and digitalis, are indicated for the prevention and treatment of this very serious complication.—The British fresh-water phytoplankton, with special reference to the desmid-plankton and the distribution of British desmids: W. **West** and G. S. **West.** The paper is in part a comprehensive summary of the known facts concerning the phytoplankton of British fresh waters. It has been possible to institute a close comparison between the British phytoplankton and that of continental Europe, proving that the British lakes are relatively richer in green algæ and poorer in blue-green forms than the generality of continental lakes. The large percentage of green species in the British lakes is due, in most instances, to the dominance of desmids. Certain diatoms also stand out conspicuously, especially some of the large species of the Surirellaceæ. As the plankton investigations were not commenced until the authors had acquired a very extensive knowledge of the general British alga-flora, it has been a comparatively easy matter to see wherein the phytoplankton differs from the algæ of the littoral region and of the bogs, &c. An extended study of the distribution of British desmids has shown that the rich desmid areas correspond (1) to a considerable extent with the areas of greatest rainfall, and (2) to a much closer extent with the outcrops of the older Palæozoic and pre-Cambrian strata. The really rich desmid-floras only occur in those western and north-western districts in which the geological formations are older than the Carboniferous, and these are likewise the districts in which the British lakes are situated. Therefore, the dominance of desmids in the phytoplankton is not so remarkable as might at first be supposed. Numerous desmids are continually washed from the drainage-areas into the limnetic region of the lakes, and some of them have become leading constituents of the phytoplankton, either with or without change of morphological characters. Many of them form a well-marked assemblage, the individual constituents of which are limited in their British distribution to the western lake-areas, although most of them occur in the lakes and bogs of Scandinavia on precisely similar outcrops of old rocks. It is suggested that perhaps the most important factor in this relationship is a chemical one, but, so far as observations have been made, ordinary chemical analysis of the drainage-waters has offered no clue to the solution of the problem.—The selective permeability of the coverings of the seeds of *Hordeum vulgare*: Prof. Adrian J. **Brown.** It has been pointed out previously ("Annals of Botany," 1907, vol. xxi., p. 79) that the coverings of the seeds of barley act as an exceptionally perfect semi-permeable membrane, resisting the passage of acids, of alkalies, and of salts, but not of iodine. Experiments are now described from which it appears that not only strong electrolytes, but also dextrose, cane sugar, and other non-electrolytes are unable to penetrate the membrane. On the other hand, mercuric chloride and cyanide, but neither the nitrate nor sulphate, cadmium iodide, but not the chloride nor the sulphate, ammonia, acetic acid and several of its homologues, alcohol and ethylic acetate, are all capable of passing into the corns. Glycollic and lactic acids also pass in, but far less rapidly than acetic. The water-absorbing capacity of the seeds when immersed in various solutions has been contrasted with that of the seeds when placed in water alone. Far less water is absorbed from solutions of substances which do not penetrate the seed covering than from those containing substances which do. In the case of substances which diffuse readily into the corn, such as ammonia and ethylic acetate, the rate at which water passes in is much more rapid than from solutions of substances which do not penetrate the covering, or from water alone.—The origin of osmotic effects, ii., differential septa: Prof. H. E. **Armstrong.** It is shown that the effects described by Prof. Brown may be explained in terms of the theory of the conditions of substances in solution recently communicated to the society by the author. Substances such as ammonia, acetic acid, &c., which exist in solution in a slightly *hydrolated* state, would pass the hydrolated surfaces of the intramolecular passages in the colloid membrane, whilst hydrolated solutes would be held back. The increased rapidity with which water enters in some cases is traceable to the effect which the diffusing substance has in raising the osmotic stress in the water within the corn.

February 4.—Sir Archibald Geikie, K.C.B., president, in the chair.—The electricity of rain and its origin in thunderstorms: Dr. G. C. **Simpson.** During 1907–8, an investigation was undertaken at the Meteorological Office of the Government of India, Simla, into the electrical phenomena which accompany rain and thunderstorms, with results which have led to the following theory. It is exceedingly probable that in all thunderstorms ascending currents greater than 8 metres a second occur. Such currents are the source of large amounts of water, which cannot fall through the ascending air. Hence, at the top of the current, where the vertical velocity is reduced on account of the lateral motion of the air, there will be an accumulation of water. This water will be in the form of drops, which are continually going through the process of growing from small drops into drops large enough to be broken. Every time a drop breaks, a separation of electricity takes place, the water receives a positive charge, and the air a corresponding amount of negative ions. The air carries away the negative ions, but leaves the positively charged water behind. A given mass of water may be broken up many times before it falls, and, in consequence, may obtain a high positive charge. When this water finally reaches the ground, it is recognised as positively charged rain. The ions which travel along with the air are rapidly absorbed by the cloud particles, and in time the cloud itself may become highly charged with negative electricity. Now within a highly electrified cloud there must be rapid combination of the water drops, and from it considerable rain will fall; this rain will be negatively charged. A rough quantitative analysis shows that the order of magnitude of the electrical separation which accompanies the breaking of a drop is sufficient to account for the electrical effects observed in the most violent thunderstorms. All the results of the observations of the electricity of rain described in the paper are capable of explanation by the theory, which also agrees well with the actual meteorological phenomena observed during thunderstorms.—The effect of pressure upon arc spectra, No. 3, silver, λ 4000–λ 4600: Dr. W. G. **Duffield.** This paper is the third that the author has presented to the Royal Society upon the effect of pressure upon arc spectra. The behaviour of the iron, copper, and silver arc spectra (region λλ 4000–4600) has now been described, the former under pressures up to 100 and the last two up to 200 atmospheres. In course of time the

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author hopes to publish the results of investigations upon the spectrum of gold, iron, and nickel under pressures up to 200 atmospheres, and of other regions of the copper and silver spectrum up to the same pressure. Photographs of all these have been obtained.—The tension of metallic films deposited by electrolysis: G. G. **Stoney.** It is well known that metallic films deposited electrolytically are in many cases liable to peel off if deposited to any considerable thickness, especially in the case of nickel, which, if deposited above a certain thickness, curls up into beautiful close rolls in cases where the film does not adhere closely to the body on which it is deposited. The late Earl of Rosse, F.R.S., also found it impossible to produce flat mirrors electrolytically on account of the "contraction" of the coat of copper, and the author has observed similar phenomena in protecting the silver film of searchlight reflectors when the thickness of the copper coat was above 0·01 mm. Dr. Gore, F.R.S., and others have observed similar phenomena. These phenomena would be explained if the metal were deposited from the solution under tension, and it was found that when a thin steel rule was coated on one side with nickel it became bent, even to the extent of 3 mm. or 4 mm. in 100 mm. This bending could not be caused by any difference of expansion between nickel and steel, as the whole was immersed in the depositing solution, and this was at a constant temperature. From the thickness of the rule, the amount of nickel deposited, and the bending, the tension under which the film was deposited was calculated; and found to amount to 2840 kilos. per square cm., or 18·1 tons per square inch. It was also found that this tension was independent of the temperature and strength of the solution, as well as the current density, so long as the deposit was a good dense one. When the rules were heated to a red heat to anneal them, the deflection was reduced to from one-third to one-half the original. —A further note on the conversion of diamond into coke in high vacuum by kathode rays: A. A. Campbell **Swinton.** In a previous paper on this subject by the Hon. Charles A. Parsons and the writer (Proc. Roy. Soc., A, vol. lxxx., pp. 184–5), experiments were described designed to ascertain whether any gas was emitted by diamond during its conversion into coke. The present note has reference to further and more detailed investigation, made on the suggestion of Mr. Parsons by the writer, with special regard to the possibility of diamonds containing neon, krypton, or other rare gas which would be emitted on the diamond being converted into coke. As before, spectrum tubes connected with the kathode-ray furnace were sealed off so as to contain samples of the residual gas before and after the conversion. The spectra of these were compared both photographically and also by direct visual examination in the spectroscope, with the result that, though differences were observed in regard to the relative brightness of various individual lines in the two spectra, careful observation showed that in no single instance was there any line in one spectrum that could not be obtained in the other by suitably adjusting the strength of the electric discharge through the spectrum tube. From this it would appear that the conversion of diamond into coke, if it sets free any gas at all, at any rate does not liberate any other than one or more of the comparatively common gases that are generally found as residuals in kathode-ray tubes exhausted from air in the ordinary way. Though this is a negative result, it has been thought well to put it on record.

Geological Society, February 10.—Prof. W. J. Sollas, F.R.S., president, in the chair.—Note on some geological features observable at the Carpalla china-clay pit in the parish of St. Stephen's (Cornwall): J. H. **Collins.** An east-and-west fault traverses this pit near its southern wall, with a downthrow to the south of more than 50 feet. North of the fault there is china-clay rock or "carclazyte," at one point underlying granite not sufficiently altered to yield china-clay, and sometimes containing embedded lenticles or irregular masses of partly kaolinised granite. South of the fault there is nearly horizontal tourmaline-schist. Underlying the schist there occurs also china-clay rock to a distance of many fathoms from the fault. This occurrence of china-clay under a thick schistose overburden is unique in Cornwall. It is maintained that this example is in favour of the pneumatolytic origin of carclazyte, the gases producing the change being possibly in part carbonic acid, but probably to a more important degree chlorine, fluorine, and boron.—Some recent observations on the Brighton cliff-formation: E. A. **Martin.** Features presented by the face of the cliffs between successive falls at Black Rock, Brighton, during the past eighteen years are recorded. As the cliffs have worn back, the base-platform of Chalk grows in height, and the layer of sand above the Chalk grows thinner and thinner, until it disappears. The raised beach has grown in thickness from 1½ feet to 12 feet. In 1890 there were 6 feet of sand, with a foot and a half of beach above it. In 1892 the sand had decreased to between 3 feet and 4 feet, but the beach remained as in 1890. Many falls of cliff took place between 1892 and 1895, and at the latter date the beach had increased to between 4 feet and 5 feet. The eastern limit of the beds had become more clearly defined. In 1897 10 feet of chalk formed the lower portion of the cliff, with 8 feet of raised beach above it in places, but there was a mere trace of sand left. In 1899 the raised beach had reached a thickness of 10 feet. Great masses of moved and reconstructed chalk were observed on the eastern boundary embedded in the beach. In 1903 the beach was but a little more than 8 feet thick in the exposed parts, but the platform of Chalk was 14 feet thick. In 1906 the raised beach had increased from 15 feet to 20 feet; farther west, however, the thickness was not so great. In 1908 there were 17 feet of Chalk, 12 feet of beach. If the material is to be prevented from disappearing into deep water, some such contrivance as chain-cable groynes seems to be demanded, fixed somewhere between low and high tide-marks.

Physical Society, February 12.—Dr. C. Chree, F.R.S., president, in the chair.—Annual general meeting.—Presidential address: Dr. **Chree.** An account was given of some work the president had recently been engaged in, in connection with the reduction of the magnetic observations of the National Antarctic Expedition of 1902–4. This referred to an inter-comparison of simultaneous records of magnetic disturbances obtained in the Antarctic and at the observatories of Kew, Falmouth, Colaba (Bombay), Mauritius, and Christchurch (New Zealand). He exhibited a number of lantern-slides showing the sudden commencement of some magnetic storms, and the forms of some special types of disturbance observed in the Antarctic. Some results were given as to the directions and intensities of the disturbing forces to which the disturbances recorded at the different stations might be attributed.

Royal Meteorological Society, February 17.—Mr. H Mellish, president, in the chair.—Report on the phenological observations for 1908: E. **Mawley.** The most noteworthy features of the weather of the phenological year ending November, 1908, were the severe frosts early in January, the exceptionally heavy fall of snow and remarkably low temperatures in the latter part of April, and the marked periods of unusually wet and dry weather during the summer. In February and March wild plants came into blossom in advance of their usual time, but throughout the rest of the flowering season were more or less behind their average dates. Such early spring migrants as the swallow, cuckoo, and nightingale made their appearance very late. The only deficient farm crop was that of barley. The yield of wheat, oats, and beans was rather above the average, that of peas and hay very good, while the crops of turnips, mangolds, and potatoes, taken together, were the most abundant for many years.—The cold spell at the end of December, 1908: W. **Marriott.** The most remarkable feature was the intense cold which prevailed over the central and south-eastern portion of England on December 28–31. At several places the lowest temperature recorded was about zero. For the month of December the cold was very exceptional, as the only instances in the neighbourhood of London or at Greenwich in which the maximum temperature was below 25°·5 for the day were the following:—1796, 25, 19°·5; 1798, 28, 19°·5; 1816, 22, 24°·0; 1830, 24, 22°·0; 1855, 21, 23°·2; 1874, 31, 24°·5; 1890, 22, 23°·7; and 1908, 29, 25°·4, and 30, 23°·3.

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CAMBRIDGE.

Philosophical Society, January 25.—Sir J. J. Thomson, vice-president, in the chair.—A string electrometer: T. H. **Laby.** An electrometer consisting of a stretched silvered quartz-fibre between two charged plates was shown. Tested on steady potentials it had the following properties:—(1) The sensitiveness for a constant fibre tension increased rapidly with increasing potential difference between the plates. (2) With the plates at 6·7 mm. apart and charged to +10 volts and −10 volts the sensitiveness was more than 70 eye-piece divisions per volt. (3) The deflection of the fibre is proportional to its potential. (4) When not very sensitive it may be used as an oscillograph. Further work is being done on this application of it.—The secondary Röntgen radiation from air and ethyl bromide: J. A. **Crowther.** The amounts of secondary Röntgen radiation from air and ethyl bromide have been compared, using ethyl bromide as the absorbing gas. The results in the main confirm those previously obtained with air as the absorbing medium. Corrected results for the relative amounts of secondary radiation from these gases are given.—Interference fringes with feeble light: G. I. **Taylor.** Interference photographs were taken with light of such small intensity that single exposures extended over several months. The fact that they were well defined was taken to indicate an upper limit to the magnitude of the indivisible unit of energy occurring in the non-homogeneous wave-front theory of light. The solution of linear differential equations by means of definite integrals: H. **Bateman.**

February 8.—Mr. S. Ruhemann, vice-president, in the chair.—Further studies on dihydroxymaleic acid: Dr. **Fenton** and W. A. R. **Wilks.** The authors are continuing the investigation of the properties and transformations of dihydroxymaleic and dihydroxytartaric acids, and in the present communication a brief account is given of some recent results.—Homologues of furfural: Dr. **Fenton** and F. **Robinson.** New syntheses have been effected by the application of the Friedel and Crafts reaction to the halogen derivatives of methylfurfural with various hydrocarbons, and the results promise a wide field for further investigation.—Action of urethane on esters of organic acids and mustard oils: S. **Ruhemann** and J. G. **Priestley.** The sodium-derivative of ethyl carbamate reacts with ethyl phenylpropiolate, not by addition, but with formation of ethyl phenylpropiolylcarbamate. Similarly, the esters of fatty saturated acids furnish acid derivatives of ethyl carbamate. Phenyl mustard oil reacts with ethyl sodiocarbamate, and yields the anhydride of diphenylthiobiuretcarboxylic acid. Besides this compound, a small quantity of carboxyethylphenylthiocarbamide is formed. Analogous is the action of ethyl sodiocarbamate on other mustard oils.—The absorption spectra of solid tetramethyl picene and of its solutions: Annie **Homer** and J. E. **Purvis.** The absorption bands of a very thin film of the hydrocarbon were compared with those when the substance was in solution in benzene and in alcohol. The results showed that the three bands were identical in each case, but that there was a shift of both the bands and the general absorption towards the red end of the spectrum, according to the density of the medium. The bands of the solid were shifted towards the red end of the spectrum more than those of the benzene solution, and those of the benzene solution more than in the alcoholic solution. The vapour of the substance was also examined, and it showed a beautiful blue fluorescence, but it decomposed so rapidly that no observations could be made as to its fluorescent spectrum.—The absorption spectra of mesitylene and trichloromesitylene: J. E. **Purvis.** The absorption spectra of N/1000 alcoholic solutions were compared, and the absorption curves were drawn from the numbers obtained. It was found that there was a shift of the bands of the trichloromesitylene towards the red end of the spectrum when compared with those of mesitylene. The strong band of mesitylene, λ 275–λ 245, was shifted in the trichloromesitylene to λ 287–λ 263, and, besides that, the persistence of the absorption curve of the latter was considerably increased.—The absorption spectra of concentrated and diluted solutions of chlorophyll: J. E. **Purvis.** The ratio of the dilutions was 1/719, and the diluted solution was placed in a tube 719 times larger than that containing the strong solution. The light, therefore, passed through the same amount of chlorophyll. The two solutions showed exactly the same phenomena at the commencement of the observations. The bands at λ 538 and λ 565 were equally well marked, and the general absorption was the same. After standing some hours, the diluted solutions showed changes in the appearance of the bands; λ 538 became more diffuse, and λ 538 and λ 565 appeared to diffuse into each other, whilst a band at λ 508 appeared, and the general absorption was almost the same as at the commencement. The change continued very slowly for several days. The final result showed that in the strong solution the band λ 538 was as well marked as at the beginning, and that the band λ 508, which appeared after some hours, remained the same, and the band λ 565 appeared to be the same as at the beginning. On the other hand, the general absorption had lessened very considerably as compared with the dilute solution. These changes are ascribed to the action of enzymes, probably oxydases.—A coloured thio-oxalate: H. O. **Jones** and H. S. **Tasker.** Diphenyldithio-oxalate is readily prepared by the action of oxalyl chloride on thiophenol, and crystallises in beautiful bright yellow prisms melting at 119°–120°. The compound is the first dithio-oxalate known, and it is interesting in that it is coloured, while oxalates are colourless. It appears to distil unchanged, decomposes into thiophenol and potassium oxalate when boiled with caustic potash, and gives off carbon monoxide when treated with sodium or sulphuric acid.—Note on some double fluorides of sodium: W. A. R. **Wilks.** Cryolite, a double fluoride of sodium and aluminium, has already been prepared synthetically. The author shows that by carrying out the precipitation in a different way another double fluoride is obtained, which is so insoluble that it may be used as a test for sodium.

PARIS.

Academy of Sciences, February 15.—M. Emile Picard in the chair. The construction of orthogonal systems which comprise a family of Dupin cyclids: Gaston **Darboux.**—The tectonic of the Palæozoic strata at the north-west and north of Sablé (Sarthe): D. P. **Œhlert.**—M. Jungfleisch was elected a member in the section of chemistry in the place of the late A. Ditte.—Observations of the comet 1908*c* (Morehouse), made at the Observatory of Athens with the Gautier 40-cm. equatorial: D. **Eginitis.** Four sets of observations, made on November 28, December 1, 3, and 4, 1908, are given for this comet, together with the apparent positions of the comet and mean positions of the comparison stars.—Selective effect in the ionisation of a gas by an alternating field: Henry A. **Perkins.**—The melting point of platinum: C. **Féry** and C. **Chéneveau.** The Féry absorption pyrometer used in these experiments, the indications of which, based on Wien's law, are only accurate for a black body, was calibrated against a Le Chatelier couple. The platinum was fused in two ways, by passing an electric current through a wire placed in a horizontal and a vertical position, and by heating in a suitable gas burner. The melting points obtained varied from 1690° C. to 1750° C. The variations in the melting point appear to be related to the nature of the gas in which the fusion is produced.—The reversal of the green radiation produced by the mercury arc in a vacuum: A. **Perot.**—The influence of the extreme regions of the spectrum in phenomena of solarisation: A. Gargam **de Moncetz.**—The compressibility of gases between 0 and 3 atmospheres and at all temperatures: A. **Leduc.** A re-calculation for twenty gases of the constants required for determining their molecular volumes at 0° C. and 100° C.—The thermal phenomena accompanying the action of water on aluminium powder: E. **Kohn-Abrest** and J. **Carvallo.** Water acts on aluminium with evolution of heat (about 1700 calories per gram) at a temperature of about 83° C.—The magnetic properties of some easily liquefiable gases: P. **Pascal.** The values of the specific magnetic susceptibility are given for eight gases in the liquid state, and, on the assumption that the specific susceptibility is independent of its physical state, the values for this constant for the same gases at 0° and 760 mm. pressure are calculated.—The catalytic oxidation of hypophosphorous acid by copper: J. **Bougault.** Precipitated

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copper exerts a catalytic action on hypophosphites, hydrogen being given off; one gram-molecule of copper was found to produce 30 gram-molecules of hydrogen in this way.—An exception to the general method of preparation of aldehydes by means of the glycidic acids: René **Pointet.** The general method indicated by Darzens does not give the expected diphenylacetic aldehyde, the glycidic ester splitting up into diphenylacetic acid and carbon monoxide instead of into carbon dioxide and the corresponding aldehyde.—Some halogen derivatives of γ-oxycrotonic acid: MM. **Lespieau** and **Viguier.**—Theory of the colour reactions of dioxyacetone in sulphuric acid solution: G. **Deniges.** Methylglyoxal, in sulphuric acid solution, gives the same colour reactions with alkaloids as dioxyacetone, and it is probable that the latter is converted into methylglyoxal in these reactions by the acid.—The oxidation of alcohols by the simultaneous action of tannate of iron and solution of hydrogen peroxide: E. **de Stœcklin.** Methyl, ethyl, normal propyl, and normal butyl alcohols are oxidised to aldehydes by hydrogen peroxide in presence of tannate of iron, as also are the alcohols glycol, glycerol, and sorbitol. Capryl, isopropyl, and isobutyl alcohols resist this oxidation.—Castration in *Zea mays*, var. *tunicata*, produced by *Ustilago maydis*: M. **Chifflot.**—Variations in grafted vines: F. **Baco.**—The influence of grafting on some annual plants, and plants living by their rhizomes: Lucien **Daniel.** Details of experiments, spreading over thirteen years, on the grafting of the potato on the tomato, and of Helianthus provided with rhizomes (*H. tuberosus, lactiflorus,* and *multiflorus*) on an annual (*H. annuus*).—The phytogeographical divisions of Algeria: G. **Lapil.**—The anatomical distinction of the genera Lithothamnion and Lithophyllum: Mme. Paul **Lemoine.**—A case of abnormal multiple cephalisation in Syllidians in stolonisation: Aug. **Michel.**—A special method of electrodiagnosis: M. **Guyenot.** An application of the instantaneous discharge of a condenser through an induction coil without an iron core to the quantitative study of the electrical stimulation of nerves. It has proved of practical service in the detection of cases of feigned paralysis.—Prehistoric rock engraving discovered at Ile-d'Yeu (Vendée): Marcel **Baudouin.**—Seismic movements of February 9, 1909: Alfred **Angot.**—The solution of ferruginous dust of cosmic origin in the sea: M. **Thoulet.**

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 25.

ROYAL SOCIETY, at 4.30.—The Statistical Form of the Curve of Oscillation for the Radiation emitted by a Black Body: Prof H. A. Wilson, F.R.S.—The Flight of a Rifled Projectile in Air: Prof. J. B. Henderson.—On the Cross-breeding of Two Races of the Moth *Acidalia virgularia*: L. B. Prout and A. Bacot.

ROYAL INSTITUTION, at 3.—Problems of Geographical Distribution in Mexico: Dr. Hans Gadow, F.R.S.

ROYAL SOCIETY OF ARTS, at 4.30.—The Bhuddist and Hindu Architecture of India: Prof. A. A. Macdonell.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—*Further discussion*: The Use of Large Gas Engines for Generating Power: L. Andrews and R. Porter.

FRIDAY, FEBRUARY 26.

ROYAL INSTITUTION, at 9.—Osmotic Phenomena, and their Modern Physical Interpretation: Prof. H. L. Callendar, F.R.S.

PHYSICAL SOCIETY (at Finsbury Technical College, Leonard Street, City Road, E.C.), at 5.—A Laboratory Machine for applying Bending and Twisting Moments simultaneously: Prof. Coker.—On the Self-demagnetising Factor of Bar Magnets: Prof. Silvanus P. Thompson, F.R.S., and E. W. Moss.—Exhibition of Optical Properties of Combinations of Mica and Selenite Films (after Reusch and others) in Convergent Polarised Light: Prof. Silvanus P. Thompson, F.R.S.—Exhibition of Apparatus: C. R. Darling.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Standardisation in Engineering Practice: Dr. W. C. Unwin, F.R.S.

SATURDAY, FEBRUARY 27.

ROYAL INSTITUTION, at 3.—Properties of Matter: Sir J. J. Thomson, F.R.S.

MONDAY, MARCH 1.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—On some Requirements of a Colour Standard: J. W. Lovibond.—Sulphur as a Cause of Corrosion in Steel: G. N. Huntly.

ROYAL SOCIETY OF ARTS, at 8.—Modern Methods of Artificial Illumination: Leon Gaster.

TUESDAY, MARCH 2.

ROYAL INSTITUTION, at 3.—The Evolution of the Brain as an Organ of the Mind: Prof. F. W. Mott, F.R.S.

ZOOLOGICAL SOCIETY, at 8.30.—The Development of the Sub-divisions of the Pleuro-peritoneal Cavity in Birds, illustrated by Lantern-slides: Miss Margaret Poole.—The Growth of the Shell of *Patella vulgata*, L.: E. S. Russell.—The Life-history of the Agrionid Dragon-fly: F. Balfour-Browne.—Growth-stages in the British Species of the Genus Parasmilia: W. D. Lang.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Some recent Grain-handling and Storing Appliances at the Millwall Docks: M. Mowat.

FARADAY SOCIETY, at 8.—On the Rate of Evolution of Gases from Homogeneous Liquids: V. H. Veley, F.R.S., and Dr. J. C. Cain.—The Electro-analysis of Mercury Compounds with a Gold Kathode: Dr. F. Mollwo Perkin.—The Relation between Composition and Conductivity in Solutions of *meta*- and *ortho*-Phosphoric Acids: Dr. E. B. R. Prideaux.

WEDNESDAY, MARCH 3.

SOCIETY OF PUBLIC ANALYSTS, at 8.—The Composition of Cider: B. T. P. Barker and E. Russell.—The Composition and Analysis of Chocolate: N. P. Booth, C. H. Cribb, and P. A. Ellis Richards.—Note on the Determination of Petroleum in Turpentine: J. H. Coste.

ENTOMOLOGICAL SOCIETY, at 8.—Birds as a Factor in the Production of Mimicry among Butterflies: Guy A. K. Marshall.

THURSDAY, MARCH 4.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Presence of Hæm-agglutinins, Hæm-opsonins, and Hæmolysins in the Blood obtained from Infectious and Non-infectious Diseases in Man (Second Report): L. S. Dudgeon.—The Action on Glucoside by Bacteria of the Acid-fast Group, with a New Method of isolating Human Tubercle Bacilli directly from Tuberculous Material contaminated with other Micro-organisms (Preliminary Note): F. W. Twort.—The Effect of Heat upon the Electrical State of Living Tissues: Dr. A. D. Waller, F.R.S.

ROYAL INSTITUTION, at 3.—Problems of Geographical Distribution in Mexico: Dr. Hans Gadow, F.R.S.

RÖNTGEN SOCIETY, at 8.15.—Some Vacuum Tube Phenomena: A. A. Campbell Swinton.

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