

THERE will be an exhibition of scientific apparatus at the conference of science teachers to be held at Festiniog on May 15 (see p. 599, April 24). Good apparatus is urgently required in many Welsh schools, and manufacturers ought to hasten to avail themselves of the opportunity which the conference affords of exhibiting instruments and materials essential to practical instruction in science. Mr. J. Griffith, County School, Festiniog, has entire charge of the exhibition arrangements, and would provide rooms and allocate space for the display of scientific apparatus.

THE Technical Education Board of the London County Council will shortly award five senior county scholarships. The scholarships are open to young men and young women who are resident within the administrative county of London whose parents are in receipt of an income not exceeding 400*l.* a year. They are tenable for three years at British or foreign Universities and technical colleges of University rank, and are of the value of 90*l.* a year. Candidates should as a rule be not more than twenty-two years of age, preference being given to those who are under nineteen years of age. In addition to the scholarships, the Board offers for competition a limited number of free places at the principal London colleges. Application forms can be obtained from the secretary of the Technical Education Board, and must be returned not later than Monday next, May 12.

A MEETING of the Association of Technical Institutions will be held between the second reading of the Government Education Bill and the Committee stage. At this meeting the council will recommend the Association to adopt the following resolutions in regard to the Bill:—(1) That this Association cordially approves the general principles upon which the Government Education Bill is based, and strongly urges His Majesty's Government to pass the Bill in the present session of Parliament. (2) That this Association is strongly of opinion that the new local authorities should be responsible for all grades of education in their districts, and that proper educational co-ordination would be seriously and unnecessarily hindered if this principle were not adopted; it therefore urges the Government to amend the Bill by deleting the clauses making it optional for the County and Borough Councils to undertake the supervision of elementary education. (3) That this Association regrets to note that the Bill makes optional the application to the purposes of higher education of the residue under the Local Taxation (Customs and Excise) Act, 1890, and it requests the Government to make such application compulsory. (4) That this Association regrets the exclusion of London from the Bill and trusts that the metropolis may receive attention early next year, and, while recognising that the case of London requires special treatment, is of opinion that it would be unwise to depart from the general principles of the present Bill in the case of London.

### SOCIETIES AND ACADEMIES.

#### LONDON.

Royal Society, December 12, 1901.—“On the Action of the Spurge (*Euphorbia hiberna*, L.) on Salmonoid Fishes.” By H. M. Kyle, M.A., D.Sc., St. Andrews University. Communicated by Prof. McIntosh, F.R.S.

It has been known for some years that the Irish peasantry employed a simple method of procuring salmon and trout through the agency of the Spurge (*E. hiberna*, L.). The plant cut into small pieces and pounded with stones, or simply trampled upon at some convenient spot on a river, forms an emulsion in the water which, being swept downward into the pools, carries death to all fishes in its course. The fatality thus produced seems to have been enormous—80 to 100 salmon are reported to have been killed at one time, and again in the Bandon rivers 500 to 1000 fish of various descriptions are said to have been poisoned during one season. In the light of the experiments to be recorded presently, these statements do not seem exaggerated, for the Spurge-extract, even in small quantities, is almost as fatal to fishes as corrosive sublimate.

The fatal effect of the Spurge on fishes has been known in other countries besides Ireland, but to what ingredient or ingredients of the plant these effects are due seems never to have been investigated. The experiments described in the present paper throw considerable light upon the action of the Spurge, and open out to view some interesting problems.

Chemical analysis of the Spurge-extract shows that it contains

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tannic acid. Experiments on the circulation in the lung and mesentery of the frog reveal a close similarity between the action of the Spurge-extract and of tannic acid. In the case of trout the similarity extends to the non-recovery of the fish in fresh water, after they have come under the influence of either Spurge-extract or tannic acid. The power of the Spurge-extract to produce fatal effects persists for several days without diminution. Twenty per cent. of the fresh extract is fatal within five minutes, whilst 0.01 per cent. takes 4 to 6 hours, and seems to be the smallest percentage which has fatal results. In the case of fishes, death is considered to ensue from the inflammation of the gills and consequent stasis of the circulation, set up by the action of the tannic-acid component of the Spurge-extract. The fresh extract is calculated roughly to contain about 1 per cent. of tannic acid, but on this estimation the Spurge-extract is fatal within a shorter period than the corresponding quantity of tannic acid. Hence, the percentage of tannic acid has been under-estimated, or some other substance or substances in the extract also aid in producing fatal effects.

March 20.—“Persulphuric Acids.” By Prof. Henry E. Armstrong, V.P.R.S., and T. Martin Lowry, D.Sc.

The “remarkable disappearance of oxygen” which Faraday, in 1834, observed to take place on electrolysing strong solutions of sulphuric acid was shown by Berthelot, in 1878, to be due mainly to peroxidation of the sulphuric acid. An anhydride,  $S_2O_7$ , was isolated, and he therefore concluded that the corresponding perdisulphuric acid,  $H_2S_2O_8$ , was formed when sulphuric acid was peroxidised either by anode oxidation or by interaction with hydrogen peroxide. The perdisulphates were isolated by Marshall, in 1891, by electrolysing solutions of acid sulphates, and have found a technical application in photography. This simple explanation of the peroxidation of sulphuric acid remained unchallenged until Caro found, in 1898, that when the perdisulphates are dissolved in sulphuric acid and the solution is again neutralised, a product is obtained which possesses the property of oxidising aniline to nitrosobenzene. None of the salts of Caro's modified persulphuric acid have yet been isolated, and only indirect methods are therefore available for determining its constitution.

Von Baeyer and Villiger have determined the ratio of sulphur to active oxygen in a solution containing the barium salt of Caro's acid, and found the ratio to be  $SO_3 : O = 1 : 1$ , the ratio for Marshall's salts being  $SO_3 : O = 2 : 1$ . They therefore assigned to Caro's acid the formula  $H_2SO_5$  of a permonosulphuric acid. If this acid be dibasic its salts must remain neutral when reduced, thus  $CaSO_5 = CaSO_4 + O$ , whereas any higher member of the series would liberate acid, thus  $CaS_2O_8 + H_2O = CaSO_4 + H_2SO_4 + O$ . Caro's salts are extremely unstable in presence of caustic alkalis, but neutral solutions can be prepared by neutralising with carbonates; when such solutions are heated they lose their active oxygen and liberate acid in the ratio  $H_2SO_4 : O_2$ . This result can only be reconciled with the formula of von Baeyer and Villiger by assuming permonosulphuric acid to be monobasic,  $NaHSO_5 = NaHSO_4 + O$ ; a more probable view is that Caro's acid is the anhydro-acid,

$\begin{matrix} O \\ \diagdown \\ SO_2 \cdot O \cdot OH \\ \diagup \\ O \end{matrix}$ , and that its salts are comparable with the pyrosulphates and the dichromates,  $CaS_2O_9 + H_2O = CaSO_4 + H_2SO_4 + O_2$ .

In concentrated solutions containing less than 50 per cent. of water, the peroxidation of sulphuric acid proceeds differently, the chief product being probably a per-tetrasulphuric acid,  $H_2S_4O_{14}$  (Lowry and West, Chem. Soc. Trans., 1900, 950). This acid, the fourth member of the series  $H_2O_2 \cdot nSO_3$ , bears to pyrosulphuric acid the same relationship as that which perdisulphuric acid bears to sulphuric acid,  $2H_2S_2O_7 - H_2 = H_2S_4O_{14}$ ,  $2H_2SO_4 - H_2 = H_2S_2O_8$ . On dilution and neutralisation it is hydrolysed to a salt of Caro's acid.

At the present time it is therefore necessary to postulate the existence of at least three persulphuric acids, in which the ratio  $SO_3 : O$  is 1:1, 1:2 and 1:4 respectively. In spite of the stability of the perdisulphates, the least stable of these is perdisulphuric acid, for when liberated from its salts it rapidly passes in dilute solution to a permonosulphuric acid (Caro's acid), whilst in presence of concentrated sulphuric acid it is converted mainly into per-tetrasulphuric acid.

“On a Throw-testing Machine for Reversals of Mean Stress.” By Osborne Reynolds, F.R.S., and J. H. Smith, M.Sc.

This research was undertaken at the suggestion of Prof.

Osborne Reynolds, who proposed an investigation of "repeated stress" on the following lines:—The stress should be direct tension, and compression of approximately equal amounts, such tension and compression being obtained by means of the inertia force of an oscillatory weight. The rapidity of repetitions should be much higher than in the experiments of Wöhler, Spangenberg, Bauschinger and Baker—in fact, ranging as high as 2000 reversals per minute.

The conclusions arrived at are:—

(1) The reversals for rupture with a given range of stress diminish as the periodicity of the reversals increases.

(2) The hard steels will not withstand a greater number of reversals of the same range of stress than the mild steels if the periodicity of the reversals is great.

**Zoological Society, April 15.**—Prof. G. B. Howes, F.R.S., vice-president, in the chair.—On behalf of Prof. F. Jeffrey Bell were exhibited two arms of an injured starfish of the genus *Luidia* from the west coast of Ireland, which had undergone repair at their ends. These regenerated parts were unlike the rest of the arm and had a striking, though not exact, resemblance to the free ends of the arms of an *Astropecten*.—Dr. Forsyth Major exhibited some selected specimens from a collection of fossil bones recently received by the Natural History Museum from Cyprus, where they had been discovered in caves by Miss Dorothy M. A. Bate. The remains proved to be those of a pigmy hippopotamus, about half the size of *Hippopotamus amphibius*, and could not be distinguished from Cuvier's "Petit *Hippopotame fossile*" (*H. minutus*, Blainv.), which was smaller than the so-called "*H. minutus*" from Malta, and otherwise different. The fossils exhibited showed affinities on the one hand with the pigmy hippopotamus of Western Africa, "*Chocropsis liberiensis*," on the other with some remains from the Lower Pliocene of Casino (Italy); they were considered by the exhibitor as a further illustration of the assumption that many of the Pleistocene mammals of the Mediterranean islands were the little-modified survivors of Tertiary forms from the adjoining continents, from which the islands had been severed during the Tertiary period.—Mr. W. P. Pycraft read the fifth part of his "Contributions to the Osteology of Birds," which dealt with the Falconiformes.—Mr. F. E. Beddard, F.R.S., read a paper dealing with the sexual differences observed in the windpipe of the condor. It also treated of a rudimentary equivalent of the septal flap of the right auriculo-ventricular valve met with in the hearts of that bird and of a form of cuckoo (Scythrops).—A paper by Mr. Hesketh Prichard, on the larger mammals of Patagonia, contained field-notes on the huemul (*Xenelaphus bisulcus*), the puma (*Felis concolor*), Pearson's puma (*Felis concolor pearsoni*), the Patagonian cavy (*Cavia patagonica*), and the guanaco. The extraordinary tameness of the huemul was dwelt upon. The habits of the grey puma (*Felis concolor*) were described, a contrast being pointed out between their method of killing their prey and that of the jaguar (*Felis onca*). Pearson's puma, a new subspecies of puma, was alluded to as being much rarer than the grey puma, smaller, fiercer, and in colour reddish at the extremities. The fact of the distribution of the cavy (*Cavia patagonica*) being arbitrarily limited in the neighbourhood of the 45th parallel of latitude was commented upon as being strange, inasmuch as there was no change either in the vegetation or in the nature of the ground to account for it.—Mr. F. Pickard Cambridge read a paper on the spiders of the genus *Latrodectus*, which had a universally bad reputation of being extremely venomous in various parts of the world, although more exact evidence was required on this question. A list of the recognised species and subspecies was given.—A paper by Mr. Frank Finn contained some notes on the painted snipe (*Rostratula capensis*) and the pheasant-tailed jacana (*Hydrophasianus chirurgus*), of which birds he had recently presented some specimens to the Society's Gardens.—A paper by Mr. G. A. Boulenger, F.R.S., contained descriptions of eight new species of fishes from the Congo, forming part of a collection entrusted to him for study by the Director of the Royal Museum of Natural History in Brussels. The paper also contained a list of forty-one species of fishes from the Lindi River, Upper Congo, collected by M. Maurice Storms for the Brussels Museum.

**Entomological Society, April 16.**—The Rev. Canon Fowler, president, in the chair.—Mr. O. E. Jansen exhibited specimens of both sexes of *Ornithoptera victoriae* from Ysabel, Solomon Islands, recently taken by Mr. Albert Meek, and

remarked on the variation in the colour and markings in the males.—Mr. H. W. Sheppard-Walwyn exhibited a series of *Euchelia jacobaeae* taken by him at Winchester in July 1889, showing considerable variations of size and colouring.—Mr. Willoughby Gardner exhibited *Coelioxys mandibularis*, Nyl., from the Cheshire coast, a species new to Britain; and *Osmia xanthomeana*, ♂ and ♀, and *Osmia parietina*, Curt., ♂ and ♀, from North Wales.—Mr. A. J. Chitty exhibited a specimen of *Aglais urticae* taken at sallow on March 28, having a large portion of the hind wings cut off so that when folded they were symmetrical in outline. From their appearance he concluded they had been bitten off by some animal, probably during hibernation.—Dr. T. A. Chapman called attention to the remarkable bilateral asymmetry in the male appendages of the Hemarid Sphinx, *Cephonodus hylas*, Linn. He said that bilateral asymmetry in insects was sufficiently rare to make it always notable. In the male apophyses of Lepidoptera he had only been able to find records in the case of the Hesperid genus *Thanaos*, to which Scudder and Burgess first called attention—though it seems highly probable that the facts can hardly have been unobserved in so common a species as *C. hylas*. He also exhibited specimens of the appendage removed from the insect, and of the several parts, as well as sketches of the clasps and tegumen.—Mr. C. P. Pickett exhibited many varieties and forms of *Hybernia leucophaeaaria* taken during March at Chingford, Highgate and Finchley. He also showed series of *Phigalia pedaria*, *Anisopteryx aescularia* and *Nyssia hispidaria* from the north metropolitan district.—Mr. H. J. Turner, on behalf of Mr. W. West, of Greenwich, exhibited specimens, ♂s and ♀s, of *Stictocoris flaveola*, Bohm., a species new to the British fauna, found amongst long grass in damp places at Lee, Kidbrook and Shooter's Hill, also several specimens of *Typhlocyba candidula*, Kirr., a species first discovered by Mr. West at Lewisham and Blackheath on *Populus alba*.—Dr. D. Sharp communicated a paper by Miss Alice L. Embleton on the economic importance of the parasites of Coccidæ.—Colonel Charles Swinhoe read a paper entitled "Eastern and Australian Drepanulidæ, Epiplimidæ, Microniidæ and Geometridæ in the British Museum collection."—Mr. W. F. Kirby contributed a paper entitled "Additional Notes on Mr. Distant's Collection of African Locustidæ."

**Royal Microscopical Society, April 16.**—Dr. Hy. Woodward, F.R.S., president, in the chair.—A pocket microscope was presented on behalf of Mr. Jacob Pillscher. It was made by his uncle, Mr. M. Pillscher, and is described and figured in Dr. Golding Bird's work on "Urinary Deposits" (5th ed., 1857). The design is most ingenious. A small stage plate for carrying a 3" x 1" slide forms the base of the instrument; attached below to a jointed arm is a plane mirror and a diaphragm with suitable apertures. Above the plate and at one corner is a pillar carrying an arm, which reaches to the centre of the stage, for holding the lenses, which are Coddingtons of  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$  inch foci; the pillar contains a direct acting screw fine adjustment. The whole packs in a small case, which can be carried in the waistcoat pocket. With achromatic lenses it is a pattern which might have its uses at the present day.—Mr. C. Beck exhibited and described Standing's embedding microtome, an ingenious and simple hand microtome designed for cutting botanical sections, and extremely cheap. Mr. Beck also directed attention to some exceedingly fine rulings on glass, ruled by Mr. Grayson, of Melbourne. They had been brought from Australia by Mr. Wedeles, and were exhibited in the room. They were mounted in realgar, a medium having a refractive index of 2.5, which added considerably to the distinctness with which the lines could be seen. Three examples were exhibited, one being a micrometer divided into  $\frac{1}{1000}$ ths and  $\frac{1}{10000}$ ths of an inch, and fourths, tenths and hundredths of a millimetre, another, a test plate of ten bands varying from 1000 to 10,000 lines to the inch, and another of twelve bands varying from 5000 to 60,000 lines to the inch. Mr. Wedeles stated that Mr. Grayson had ruled bands up to 120,000 lines to the inch.—Mr. J. C. Webb exhibited an old microscope by Pritchard the date of which he was unable to give, but thought it probably anterior to the advent of the engiscope which Pritchard brought out in 1832. The principal features of the instrument were a device for protecting the objective from injury when focussing—the first eyepiece was triple, it admitted plenty of light, and gave a good field with low powers. There was a fine adjustment to the nose-piece, and the body could be removed and the instrument used as a dissecting microscope.—Mr. Ersser ex-

hibited a reversible live box intended for use in observing large living objects, such as spiders while spinning their webs.—Messrs. Powell and Lealand exhibited a new  $\frac{1}{2}$ -inch semi-apochromatic homogeneous immersion objective of 1.4 N.A. It was made of glass which would stand any climate without deterioration, and the cost was exceedingly moderate.

**Linnean Society, April 17.**—Prof. S. H. Vines, F.R.S., president, in the chair.—Mr. A. C. Seward, F.R.S., read a paper by Miss S. O. Ford and himself on the anatomy of *Todea*, with notes on the affinity and geological history of the Osmundaceæ. The main points were:—(1) the investigation of the anatomical structure of *Todea* as represented by *T. barbara* and two of the filmy species, *T. superba* and *T. hymenophylloides*, with a view to a comparison with that of *Osmunda*; (2) a summary of the geological history of the Osmundaceæ and Osmundaceous characters; and (3) the question of the interpretation of the stelar structures of *Osmunda* and *Todea*.—On behalf of Mr. G. M. Thomson, of Dunedin, N.Z., the Rev. T. R. Stebbing, F.R.S., read a paper on the New Zealand Phyllobranchiate Crustacea *Macrura*. This embodied a general revision of the group, with detailed descriptions and figures of several rare or imperfectly known species.

#### MANCHESTER.

**Literary and Philosophical Society, April 29.**—Mr. Charles Bailey, president, in the chair.—Mr. Frank F. Laidlaw made a communication on the peoples of Malacca. Special attention was directed to a number of savage nomadic communities, which inhabit the forest country of the interior for the most part. Owing to intermarriage between the various communities, as well as to the careless nomenclature employed in speaking of them, it is difficult to classify them in a satisfactory manner. In the northern half of the peninsula, however, these savages exhibit almost universally negro characteristics, viz. curly (almost woolly) hair, very dark skins and moderately long skulls (mesaticephalic); the nose also is extremely wide and very flat. These negroes occur chiefly in Kedah, Kelantan and Perak. Considerable intermixture of negro blood is also found in most of the southern wild tribes, whom many authorities believe to be derived from an admixture of Malay and negro blood, but the evidence tends to show that in Perak, at least, there exists a second race quite distinct from negro or Malay—a dolichocephalic, moderately fair-skinned race with wavy hair, and possibly allied to the Karens of Burmah. Lastly, the people of Johor, Selangor and Pahang are obviously of mongoloid stock. Like the other two groups, their stature is small (average height of a full-grown man 4ft. 6in., of a woman 4ft. 3½in.), but the hair is straight and the skull brachycephalic. It is not improbable that this latter group is largely descended from Malays who refused to adopt the creed of Islam; or they may perhaps more probably be derived from the widely spread pro-Malay race, of which the Malays themselves and the Javanese, &c., are specialised offshoots.

#### DUBLIN.

**Royal Dublin Society, April 16.**—Prof. D. J. Cunningham, F.R.S., in the chair.—Prof. John Joly, F.R.S., read a paper entitled "A Sedimentation Mystery."—Prof. G. A. J. Cole and Mr. T. Crook exhibited a large number of stones dredged by the Irish Fishery Survey from the Porcupine Bank and other places off western Ireland. They pointed out that the stones varied from one place to another so distinctly as to give a real clue to the submarine geology of the area. The basalt-plateau of the north was not here traceable, and the rocks in general represented submerged extensions of those known upon the western coast. The Porcupine Bank includes a large boss of olivine-gabbro like some of those associated with Carboniferous rocks in England. The description of the rocks is reserved for the Fishery Reports of the Department of Agriculture and Technical Instruction for Ireland.

**Royal Irish Academy, April 28.**—Prof. R. Atkinson, president, in the chair.—Prof. Chas. J. Joly read a paper on quaternion integrals depending on a single quaternion variable. The method employed is given in Hamilton's lectures, and the author indicated a simple step by means of which the fundamental theorems of Green and Stokes and their quaternion extensions may be deduced from Hamilton's results. The quaternion integrals must be either single, double, triple or quadruple; and in general the difference of two integrals of a given type taken

between the same fixed limits but with different "modes of passage" is expressed as an integral involving one additional quaternion differential. Physical examples are given of the meaning of the different types of integrals, for example the conditions that the scalar double integral should be independent of the mode of passage are the well-known equations connecting the electric displacement and the magnetic force in a non-conducting dielectric.

#### PARIS.

**Academy of Sciences, April 28.**—M. Bouquet de la Grye in the chair.—The president announced to the Academy the death of M. Filhol.—Studies on batteries founded upon the reciprocal reaction of oxidising and reducing liquids. Common solvents. The action of acids on bases, by M. Berthelot.—On the treatment of malarial fevers by latent arsenic, by M. Armand Gautier. In a preliminary note published in February last, an account was given of the treatment of nine cases of malarial fever by injections of minute amounts of sodium methyl-arsenate. These results have now been extended, some twenty-three cases having been under treatment with entirely satisfactory results. All of these were severe cases which had proved refractory to the prolonged action of quinine, even in large doses. Out of ten cases of tertiary fever, four showed a slight relapse, the remaining six being completely cured by three successive injections of five to ten centigrams of the arsenical salt. In two cases of quaternary fever, the specific organism only disappeared after four or five successive injections of .1 to .2 gram. Detailed instructions are given for the mode of application of sodium methyl-arsenate in the various types of malarial fever.—The culture of the forage beet in the experimental field at Grignon in 1900 and 1901, by MM. P. Dehérain and C. Dupont. It has been previously shown that the beet giving the largest gross weight of roots per hectare is not necessarily the best for forage purposes. As the result of two years' experiments on the large scale, the variety known as *Géante demi sucrière rose* was found to be decidedly superior to the old forage beet. It was also found that the mode of arranging the plants was without effect on the yield provided that the number of roots per square metre did not exceed ten.—Geographical work round the central massif of Madagascar, by M. P. Colin. The present paper is confined to geodesic and astronomical results. The magnetic observations will be given in a future paper.—On the third voyage of the *Princess Alice II.*, by S. A. S. Prince Albert of Monaco. A résumé of the results in oceanography, geography, zoology, physiology and bacteriology.—Report presented by the commission charged with the scientific control of the geodesic operations at the Equator, by M. H. Poincaré.—Observations of the comet A (1902) made at the Observatory of Algiers with the 0.318 cm. equatorial, by MM. Rambaud and Sy.—On divergent series and differential equations, by M. Edmond Maillet.—The measurement of high temperatures and Stefan's law, by M. Féry. A cone of rays from the body the temperature of which is to be measured is concentrated by a fluor spar lens upon a delicate iron-constantin thermocouple. The temperatures indicated by this instrument were compared with those calculated by the law of Stefan; the error did not exceed 1 per cent.—A universal scale of periodic movements graduated in savarts and millisavarts, by M. A. Guillemin. The author proposes a new unit in acoustics to replace the octave and the comma. The use of the new unit, the millisavart, leads to a great simplification in numerical calculations.—On the graduation of thermoelectric couples, by M. Daniel Berthelot. The couples used were of platinum in contact with 10 per cent. platinum-iridium. The temperatures of five melting points and eight boiling points were determined by two couples independently, the maximum difference between the two being about 2° C. If  $e$  be the electromotive force of a thermocouple and  $t$  the centigrade temperature,  $\log e$  is a linear function of  $\log t$  for temperatures between 400° and 1100° C. This relation being assumed, it is only necessary to have two standard points to calibrate a couple, and for this purpose the melting points of zinc (419°) and gold (1064°) are recommended as the most suitable. With a good galvanometer there is no difficulty in obtaining a sensibility of 0.1 C. in the neighbourhood of 1000° C.—On the indices of refraction of liquid mixtures, by M. Edm. van Aubel. According to a recent paper by M. Leduc, the refractive energy of a mixture of alcohol and water is the sum of its constituents if the contraction of volume which takes place on mixing is taken into account. Experimental results are now given for mixtures

of acetone and water, aniline and ethyl alcohol. In the case of the first mixture, the difference between the experimental figure and that calculated according to M. Leduc's hypothesis amounts as a maximum to four units in the fourth decimal place, in the second case the deviation amounts to double this amount. The conclusion is therefore drawn that the refractive energy,  $n-1/d$ , is not constant in liquid mixtures within the limits of experimental error.—Variations of the temperature of the open air in the zone comprised between a height of 8 and 13 kilometres, by M. L. Teisserenc de Bort. The results of the discussion of observations carried out in 236 captive balloon experiments. These results represent all seasons of the year and cover several years.—On the manufacture of certain metallic tools by the Egyptians, by M. Albert Colson. Analysis of an ancient Egyptian bronze tool.—The composition of the hydrate of chlorine, by M. de Forcrand. By the application of the principle described in previous papers, the conclusion is drawn that the composition of chlorine hydrate is  $Cl_2 \cdot 7H_2O$ .—On some derivatives of oxyisopropylphosphinic acid, by M. C. Marie. The mode of preparation and properties of the sodium, lead, copper and silver salts.—On the transformation of proteids in plants during germination, by M. G. André.—Observations on orogenic poles, by M. Stanislas Meunier.—Glycosuria of muscular origin; the appearance of glycuronic compounds and glyucose in the urine of animals submitted to a ligature or crushing of the muscles, by MM. Cadeac and Maignon.—Does lipase exist in normal serum? by MM. Doyon and A. Morel. Hanriot has supposed that there exists in normal serum of vertebrates a soluble ferment, lipase, which possesses the power of saponifying organic esters. None of the experiments here given support this view, and the existence in normal serum of a lipase acting upon olein cannot be demonstrated.—On acute polymicrobial osteomyelitis, by M. Ragalski. In a case of osteomyelitis of the clavicle, both the coli bacillus and staphylococcus were found to be present in the blood from the bone.

## GÖTTINGEN.

**Royal Society of Sciences.**—The *Nachrichten* (physico-mathematical section), part 1 for 1902, contains the following memoirs communicated to the Society:—

January 11.—Emil Bose: on the nature of the electrical conduction in Nernst's electrolytic luminescent oxides. M. Abraham: the dynamics of the electron.

January 25.—Alfred Loewy: on reducible linear homogeneous differential equations.

February 8.—W. Voigt: contributions to the theory of pleochroic crystals. O. Wallach: researches from the University Chemical Laboratory (series x.)—(1) new syntheses in the terpene series; (2) on the separation of  $\alpha$ - and  $\beta$ -methyladipinic acid; (3) on a series of new isomeric cyclic ketones of the formulae  $C_9H_{14}O$  and  $C_9H_{16}O$ ; (4) on the formation of  $\epsilon$ -betaines; (5) on phellandrene. C. Jacobi: contribution to the physiological action of the organic ammonium iodides and polyiodides.

## DIARY OF SOCIETIES.

## THURSDAY, MAY 8.

IRON AND STEEL INSTITUTE, at 10.30 a.m.

ROYAL INSTITUTION, at 3.—Recent Geological Discoveries: Dr. A. Smith Woodward, F.R.S.

SOCIETY OF ARTS (Indian Section), at 4.30.—The Past and Present Connection of England with the Persian Gulf: T. J. Bennett.

MATHEMATICAL SOCIETY, at 5.30.—On Groups in which every two Conjugate Operations are Permutable: Prof. Burnside, F.R.S.—Fermat's Theorem on Binary Powers: A. E. Western.—The Application of Contour Integration to the Solution of Problems in the Theory of Conduction of Heat, and to the Development of an Arbitrary Function in Series: Mr. H. S. Carslaw.—The Application of Fourier's Series to the Conduction of Heat: Dr. Ganeshi Prasad.—Some formulae in Elimination: Dr. F. S. Macaulay.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Form of Model General Conditions. (Conclusion of Discussion).

## FRIDAY, MAY 9.

PHYSICAL SOCIETY, at 5.—A Simple Electric Micrometer. Part I.: Dr. P. E. Shaw.—The Conservation of Entropy: J. A. Erskine.—Rational Units of Elektromagnetism: Sig. G. Giorgi.

COLD STORAGE AND ICE ASSOCIATION (Society of Arts), Afternoon.—The Rationale of Cooling Phenomena: Dr. W. Hampson.—The Business Side of Cold Storage: R. J. Key.

ROYAL INSTITUTION, at 9.—Exploration and Climbing in the Canadian Rocky Mountains: Prof. J. Norman Collie, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Jacobi's Noine (q) in Astronomical Formulae, with Numerical Tables: R. T. A. Innes.—Series in the Nebular Spectrum, and in the Bright-line Spectrum of Nova Persei: E. F. J. Love.—The Spectrum of Nova Persei, 1901, on and after September 5: Rev. W. Sidgreaves.—Visual and Spectroscopic Observa-

tions of the Sun-spot Group of 1901 May 19–June 26: Rev. A. L. Cortie.—Reduction of Extra-Meridian Observations of Planets: P. H. Cowell.—Micrometrical Measures of Double Stars with the 17 $\frac{1}{2}$ -inch Reflector: Rev. T. E. Espin.—*Promised papers*: On the Accuracy of Photographic Measures. Second Note: H. C. Plummer.—Photographic Observations of the Satellite of Neptune: Royal Observatory, Greenwich.

MALACOLOGICAL SOCIETY, at 8.

## MONDAY, MAY 12.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—On Snow-Waves and Snow-Drifts in Canada: Dr. Vaughan Cornish.

VICTORIA INSTITUTE, at 4.30.—Some Diseases mentioned in the Bible: Dr. T. Chaplin.

HAMPSTEAD SCIENTIFIC SOCIETY, at 8.30.—The Relation of Science to Art: Sir Samuel Wilks, Bart, F.R.S.

## TUESDAY, MAY 13.

ROYAL INSTITUTION, at 3.—Recent Geological Discoveries: Dr. A. Smith Woodward, F.R.S.

## WEDNESDAY, MAY 14.

SOCIETY OF ARTS, at 8.—Boats and Boat Building in the Malay Peninsula: H. Warrington Smyth.

GEOLOGICAL SOCIETY, at 8.—On Pliocene Glacio-Fluvialite Conglomerates in Subalpine France and Switzerland: Dr. Charles S. Du Riche Preller.—Overthrusts and other Disturbances in the Radstock Series of the Somerset Coalfields: F. A. Steart.

## THURSDAY, MAY 15.

ROYAL SOCIETY, at 4.30.—*Probable papers*: Microscopic Effects of Stress on Platinum: T. Andrews, F.R.S., and C. R. Andrews.—Cyanogenesis in Plants. Part II. The Great Millet, *Sorghum vulgare*: Prof. W. R. Dunstan, F.R.S., and Dr. T. A. Henry.—The Minute Structure of Metals and other Plastic Solids: G. Beilby.—On Electro-Motive Wave accompanying Mechanical Disturbance in Metal immersed in Electrolyte: Prof. J. C. Bose.—On some Phenomena affecting the Transmission of Electric Waves over the Surface of the Sea and Earth: Capt. H. B. Jackson, R.N., F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS (Society of Arts), at 8.—Electrical Traction on Steam Railways in Italy: Prof. C. A. Carus-Wilson.

CHEMICAL SOCIETY, at 8.

## FRIDAY, MAY 16.

ROYAL INSTITUTION, at 9.—The Nebular Theory: Sir Robert Ball, F.R.S.

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