

work. An historical collection of no little interest is shown by Mr. M. W. Dunscombe, of Bristol.

In class ix., small telescopes and binoculars, are exhibited various patterns of prism binoculars by Messrs. Aitchison, Dallmeyer, Ross, Ltd., &c. Messrs. Aitchison show also a field glass of novel type with a body machined from a solid casting, focusing being effected by moving each object glass in its own tube.

In class x., microscopes and accessories, the catalogue furnishes a very complete account of the English microscope as produced by the best makers, including binocular microscopes and various forms of instrument for special purposes. Photomicrographic cameras are shown by Messrs. Beck, and Ross, Ltd. Information of interest with regard to different types of photographic lenses is given in class xi., though too much space is perhaps devoted in the catalogue to illustrations of camera bodies.

In the careful classification and selection of instruments to illustrate the various types, class xiii., optical projection apparatus, appears to us to be the most successful in the catalogue. The class includes an exhibit by Messrs. Chance Bros. of a complete lighthouse optical apparatus of the fourth order. Other exhibits of interest are Mr. R. W. Paul's projector lamps, the triple rotating lantern of Messrs. Newton, and animatographs by Messrs. Paul, the Prestwich Manufacturing Co., and J. Wrench and Son.

In class xiii., apparatus for optical measurement, some new optical benches are shown by Messrs. Aitchison and Beck, and there are interesting exhibits from the Cambridge Scientific Instrument Co. and Messrs. Hilger. A half-shadow polarimeter is shown by Prof. Poynting, the half-shadow field being produced by the tilting of two glass plates forming a V between the polariser and analyser.

Under photometric apparatus the Ediswan Co. show specimens of Prof. Fleming's large bulb standard lamps, and various forms of photometer are exhibited by Messrs. Alex. Wright. Class xv. is devoted to ophthalmic apparatus, and includes a novel form of ophthalmoscope of British design and construction. The Cambridge Scientific Instrument Co. and Messrs. Griffin show laboratory apparatus under class xvi. Under class xvii., mathematical and drawing instruments, some new forms of slide rule are shown, including one with additional slides by Messrs. Davis, of Derby, and an optical slide rule with reciprocal division for determination of conjugate foci, &c., by Mr. A. Salomon, of Huddersfield. An arithmometer of English make is exhibited by Mr. S. Tate, and an adding machine by the Burroughs Adding Machine Co.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Among the twelve distinguished men who will receive honorary degrees on June 14 only two are connected with scientific work. These are Commander R. F. Scott, R.N., of the *Discovery*, and Colonel Sir Francis E. Younghusband, K.C.I.E. The latter has been appointed Rede lecturer, and has chosen as his subject "Our True Relationship with India." The lecture will be delivered in the Senate at 11.30 a.m. on Saturday, June 10.

Mr. L. A. Borradaile, of Selwyn College, who is well known for his researches on the crustacea, has been appointed assistant secretary for lectures to the local examinations and lecture syndicate.

A university lectureship in mathematics will shortly be vacant owing to the resignation of Mr. G. B. Mathews, F.R.S., of St. John's College.

The special board for biology and geology has nominated Mr. J. J. Lister, Fellow of St. John's College, to occupy the university table at the laboratory of the Marine Biological Association at Plymouth for one month during the present year.

In spite of the efforts of the master of Pembroke, Prof. Ridgway and others to bring the work of the studies and examination syndicate to an end, the Senate decided by 112 votes to 99 that its deliberations should be continued. It seems evident that a majority of residents is in favour of some change.

The syndicate entrusted with the building of the new medical schools has exceeded the sum granted by Grace of the Senate by 257*l.* 15*s.* 6*d.* It is now asking for authority to pay this amount, and for 920*l.* for the completion and fitting of the Humphry Museum, and 380*l.* for extra fittings and furniture in the departments of surgery, midwifery, medicine, pharmacology, and pathology.

THE *Pioneer Mail* states that a grant of 10,000 rupees has been made to the Victoria Diamond Jubilee Technical Institute of Lahore for buildings and appliances. A permanent grant of 100 rupees a month has also been made, and the assistance thus given will enable the governors to complete the equipment for the teaching of practical and applied chemistry.

At a meeting of the School Nature-Study Union held at the College of Preceptors on Friday, a paper was read on the training of teachers for nature-study by Miss R. Lulham. In it the necessity for a proper ground work was brought out, and during the discussion which followed a resolution was passed urging upon the London County Council the need of providing classes for those who have to teach nature-study, and suggesting that a wild garden for their benefit should be established in at least one of the London parks, in which the botanic gardens arranged for the students of systematic botany have already proved so useful.

WE have received the first number of the *University Review*, which is published by Messrs. Sherratt and Hughes at 6*d.* net. Dr. Bryce contributes an introductory note on the university movement, and among other articles dealing with many aspects of higher education may be mentioned one by Prof. Arthur Schuster, F.R.S., on "Universities and Examinations," and another by Sir Oliver Lodge, F.R.S., on "Questions for Discussion." Prof. Schuster formulates briefly what the aims of an ideal university should be, and proceeds to divide its work into two parts. These are the acquisition of knowledge and the power of applying it. The second part of the work of the university is the higher, and is what is required for success in life. Prof. Schuster says that it can be taught, and therefore should be taught, in the university, but that this power of applying knowledge cannot be tested satisfactorily by examination. He then considers exhaustively the function of examinations, and shows what they are capable of doing and the qualities they are incompetent to gauge. He concludes by remarking that when a student "has shown that he deserves a degree, it is right and proper that an opportunity shall be given him to develop his special powers and to distinguish himself." Prof. Schuster makes a proposal to secure this by giving a year which is absolutely at the student's disposal to be used under the guidance of his teachers as he thinks fit. Sir Oliver Lodge discusses the possibility of introducing a change in the "time of year when examinations should be held:—whether candidates should be examined directly lectures cease, and before Session ends; or whether they should be given time for revision and digestion, and perhaps oblivion, and be examined just before a new Session commences." The review also supplies full information of current events in British and foreign universities.

### SOCIETIES AND ACADEMIES.

#### LONDON.

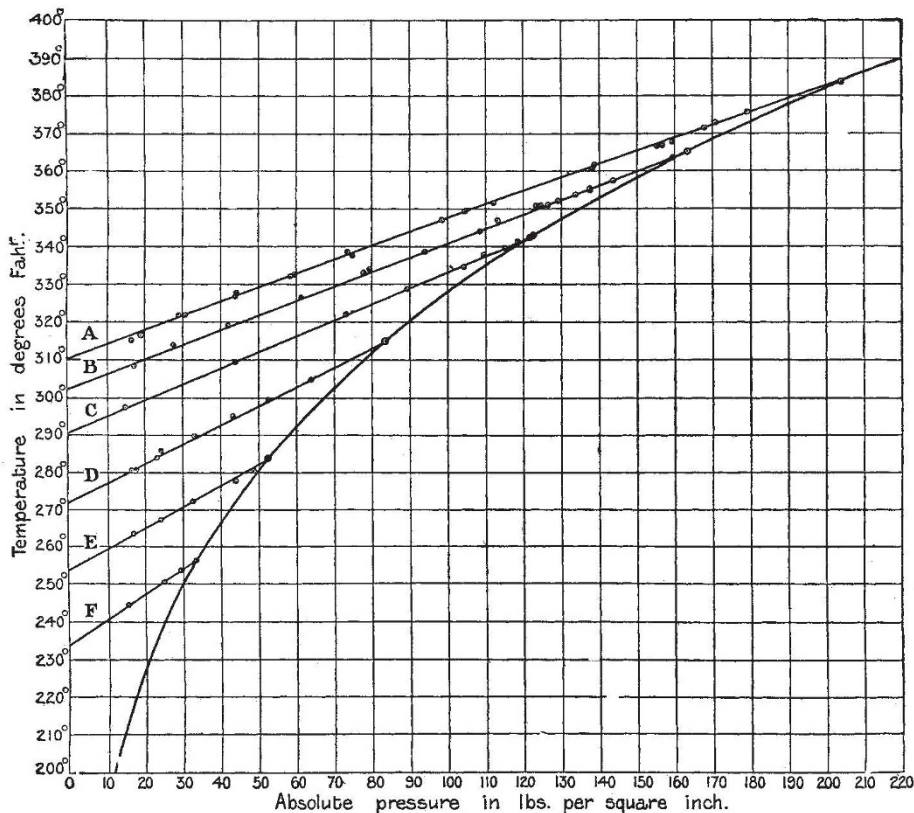
**Royal Society**, March 30.—"The Determination of the Specific Heat of Superheated Steam by Throttling and other Experiments." By A. H. **Peake**. Communicated by Prof. Ewing, F.R.S.

This paper is an account of original investigations undertaken to determine the specific heat of superheated steam. Two methods have been followed:—(1) the throttling or wire-drawing of steam to obtain the law connecting the variation of temperature with pressure, for constant total heat; (2) the direct heating of a current of steam by electrical means.

An account of an investigation on the same lines as method (1), by Mr. J. H. Grindley, was published in the *Philosophical Transactions of the Royal Society*, A, vol.

exciv. pp. 1 to 36. The results here given differ from those obtained by Mr. Grindley in one important particular. Mr. Grindley came to the conclusion that steam taken from a separator contained a definite proportion of suspended moisture, because when he caused such steam to expand through an orifice to a slightly reduced pressure the steam did not become superheated, but its temperature fell to that corresponding to saturated steam at the new pressure. In the research here described, however, it was found that steam taken from a separator and reduced in pressure in the slightest degree by wire-drawing became superheated. This result was only obtained after a considerable amount of experimental work had been done, and a number of improvements made in the apparatus as first constructed.

The experimental results obtained in the throttling experiments are represented in the accompanying figure. The curves A, B, C, D, E, and F show the connection between the temperature and pressure of superheated steam for constant total heat. The method of obtaining



each of these curves was as follows:—The pressure of steam in the separator was maintained constant at the point where the constant total heat curve meets the curve which connects the pressure with temperature for saturated steam; the pressure on the low-pressure side of the orifice could be regulated by means of a wheel valve, which allowed the steam to escape at any desired rate. This lower pressure was adjusted to various values, and the temperatures corresponding were observed when the conditions had become steady. By plotting these results points were obtained which enabled the curve to be drawn.

The total heat corresponding to each of the curves was obtained from Regnault's tables for saturated steam, and the specific heat at constant pressure calculated for various pressures. The specific heat as thus calculated was found to increase rapidly with increase of temperature from 0.43 at 230° F. to 1.0 at 350° F. This apparent increase in the specific heat led the author to suspect the accuracy of Regnault's tables, and caused him to turn to the direct heating method, with the result that he is now convinced that Regnault's tables are not sufficiently accurate for the

purposes of these calculations, and that a great degree of accuracy would be necessary before such was the case.

In method (2) the rise in temperature was observed in steam flowing at a measured rate, due to the heat imparted by an electric current, and the specific heat calculated from the formula

$$K_p = \frac{\text{electrical input in watts} \times 0.236}{\text{grams of steam passing per sec.} \times \text{temp. rise } ^\circ \text{C.}}$$

The connection between grams of steam passing per minute and the input of electrical energy in watts for a definite rise in temperature was obtained for rates of flow differing over a considerable range; the points thus obtained were plotted on squared paper, and were found to lie on a straight line which did not pass through the origin, but cut the watts ordinate at a height corresponding to the radiation loss expressed in watts.

The difficulty experienced in keeping all the conditions constant during the long time necessary for a complete set of points was always considerable. Numerous experiments were carried out, but the results varied too much amongst themselves to enable conclusions to be drawn as to the manner in which the specific heat may vary with pressure or temperature, except that any such variation must be small, and by no means of the order indicated by the results of the throttling experiments based on Regnault's tables.

The mean value of the specific heat of superheated steam at constant pressure obtained from the most satisfactory experiments was 0.46.

May 11.—“A Study of the Process of Nitrification with Reference to the Purification of Sewage.” By Dr. Harriette Chick. Communicated by Prof. Marshall Ward, F.R.S.

The process of nitrification during sewage purification was studied by means of small experimental filters erected in the institutes of hygiene in Vienna and Munich.

The oxidation of sewage passing through the filters was investigated during the maturing period, and also when the filters were mature, a special study being made, chemically, of the oxidation of the nitrogen from the ammoniacal form to that of nitrites and nitrates, and of the distribution of these processes both in time and space.

Nitrification was traced to the activity of two sets of organisms, the first of which oxidised ammonia to nitrous acid, and the second completed the oxidation to nitric acid. These bacteria were found to differ only very slightly from those isolated from the soil by Winogradsky, thus confirming the recent results of Schultz-Schultzenstein. The activity in sewage filters of these organisms, which are very sensitive to the presence of organic matter, requires explanation, and various explanations are considered, based upon experimental foundation.

The theory of previous physical absorption of ammonia upon the surface of the filtering material and subsequent nitrification was found to be unsupported by experiment; nitrification is rather to be considered as a very rapid biological process, requiring only the time taken by the sewage to trickle through the filter.

**Linnean Society, May 4.**—Prof. W. A. Herdman, F.R.S., president, in the chair.—The botany of Gough Island, part 1., phanerogams and ferns: R. N. **Rudmose-Brown**. Gough Island, or Diego Alvarez, lies in the mid South Atlantic, lat.  $40^{\circ} 20' S$ , long.  $9^{\circ} 56' 30'' W$ , and may be regarded as the most outlying member of the Tristan da Cunha group, a small island between seven and eight miles long, and half as wide, rising to a height of 4000 feet. It has been occasionally visited, but never permanently inhabited. The chief features of the vegetation are the tree *Phyllica nitida* and the tree-fern *Lomaria Boryana*. Four of the seventeen species of phanerogams are almost certainly introduced, while two are new to science, a species of *Cotula* and an *Asplenium*. The Scottish Antarctic Expedition lay off the island for three days in April, 1904, but owing to high sea landing was only practicable on one day, when the materials for the present paper were collected.—The study of vegetation: its present condition and probable development: Prof. A. G. **Tansley**. The word *ecology*, introduced by Prof. Haeckel, means the study of the vital relations of organisms to their environment, and by Prof. E. Ray Lankester was termed *bionomics*. Restricting his remarks to a special branch of the subject, the author proceeded to consider the plant-association as the unit, the great fact being the association of plants under definite conditions of environment. Instances were given of sets of plants found in meadows, woods, cultivated fields, moors, and dunes.—*Schizopoda* captured in the Bay of Biscay during a cruise of H.M.S. *Research*: E. W. L. **Holt** and W. M. **Tattersall**, with an appendix dealing with the distribution statistically by Dr. G. H. **Fowler**. The paper forms part v. of the series on Biscayan plankton. Ten genera and eleven species were described; of these one species is new to science, and one, previously known from a single example, is represented by eight specimens. All the commoner forms are epiplanktonic, but of these some are represented by scattered specimens from greater depths. *Euphausia pellucida*, essentially epiplanktonic, with a centre of distribution about 50–75 fathoms, seems to show a marked vertical oscillation, rising by night and sinking by day; it was plentiful in bright moonlight; by day scattered specimens occurred between 250 and 100 fathoms. *Meganyctiphanes norvegica*, caught in small numbers and on few occasions, was only captured by night, never by day at any depth whatsoever. Messrs. Holt and Tattersall suggest that this species is sufficiently sharp-sighted to see and avoid a net by daylight, even at a depth of 100 fathoms. *Nematoscelis megalops*, with the same distribution as *Euphausia pellucida*, showed a less clearly marked oscillation.

**Anthropological Institute, May 9.**—Dr. A. C. Haddon, F.R.S., vice-president, in the chair.—Some tribes of the Uganda Protectorate: Lieut.-Colonel C. **Delmé-Radcliffe**. The author described the customs and habits of the natives with whom he came in contact, including the Kavirondo and other tribes on the Victoria Nyanza, and the Acholi in the Nile Province. The paper was illustrated by numerous lantern slides, illustrating the peoples, animals, and scenery, and by a large and interesting collection of ethnographical specimens from the Protectorate.

**Challenger Society, May 10.**—Prof. d'A. W. Thompson, C.B., in the chair.—A new species of *Tuscarusa* from the North Atlantic: Dr. **Wolfenden**.—Observations on the temperature and salinity of the water of the North Atlantic, made during two cruises of Dr. Wolfenden's yacht *Silver Belle* during the summers of 1903 and 1904: Dr. H. N. **Dickson**. In 1900–2 much valuable work had been done by Dr. Wolfenden in the Færøe Channel, but as this area lay within the field of the International Council for the Study of the Sea, he worked in 1903 farther out in the Atlantic, to the west of Ireland, and at the entrance to the Færøe Channel south of the Wyville-Thomson Ridge, the observations connecting directly with those of the International Council in the Channel itself and in the Norwegian Sea during the August cruises. The work in 1904 was more directly concerned with the general oceanic movements of Atlantic waters; a line of soundings was run from the south-west of Ireland to the Azores, thence into the Mediterranean through the Straits of

Gibraltar, and thence to the English Channel. Dr. Dickson illustrated the observations by diagrams of temperature and salinity along the sections, and discussed the considerable light thrown on the behaviour of the easterly drift on reaching the shores of Europe, the exchange of waters between the Atlantic and the Mediterranean, the volume of current in the straits, and the extension in the Atlantic of Mediterranean water of high temperature and salinity.

**Geological Society, May 10.**—Mr. R. S. Herries, vice-president, in the chair.—The geology of Dunedin (New Zealand): Dr. P. **Marshall**. A detailed account of the petrography of the district was given. The age of the oldest rocks seen, mica-schists, is not definitely known. They are followed by Tertiary sandstones and limestones. Fine, plant-bearing shales succeed unconformably, and upon these, again, rests a light scoria-bed. The igneous rocks next described cover them. These rocks include an ill-exposed, gold-bearing syenite, a diorite, lavas, rhomboporphry, tinguaitite, hypabyssal trachydolerite, a teschenitedyke, and trachyte. Trachytoid phonolites occur as interbedded sheets. The andesites are characterised by hornblende and augite. Dolerites of two principal types occur in dykes, one type being the commonest of all the rocks in the area. A considerable series of chemical analyses follows, showing that the silica-percentage varies from 66 in the Portobello trachyte to 44.84 in one of the dolerites. The relative ages of the volcanic rocks are worked out so far as possible.—The Carboniferous limestone of the Weston-super-Mare district: T. F. **Sibly**. The Carboniferous limestone of the Weston-Worle ridge includes part of the *Syringothyris*-zone (C), extending from the "laminosa-dolomites" upwards, and part of the *Seminula*-zone (S). While the dip of the rocks of the ridge is towards the south, a reversed fault throws the *Syringothyris*-beds on the south against the *Seminula*-beds to the north, and the latter rocks are over-folded on the north side of the fault. The lower part resembles the equivalent part of the Clevedon sequence, and indicates shallow-water conditions; the upper part of C resembles the corresponding part of the Burrington section, and indicates the predominance of a Mendip-facies. The Woodspring ridge shows a sequence exactly similar to that of Clevedon. There were two periods of volcanic activity, one of which occurred at the close of Zaphrentis-time and the other early in *Syringothyris*-time.

**Physical Society, May 12.**—Dr. C. Chree, F.R.S., vice-president, in the chair.—A simple method of determining the radiation constant, suitable for a laboratory experiment: Dr. A. D. **Denning**. The apparatus consists of a hemispherical copper cap to the outside of which is affixed a jacket through which steam or water can be passed. The receiving surface consists of a silver plate, and the rate of rise of temperature of the plate is measured by means of a silver-constantan thermo-junction. When performing the experiment, a non-conducting pad is placed between the hemisphere and the silver disc until the temperature of the jacket is uniform. Then the pad is slid out, and the deflections of the galvanometer in the thermo-junction circuit are noted every few seconds. By plotting these deflections on a curve the initial slope of the curve, i.e. the initial rate of rise of temperature of the silver disc, is obtained; and from this, knowing the constants of the disc, &c., the radiation constant can be calculated.—A bolometer for the absolute measurement of radiation: Prof. H. L. **Callendar**. It is now generally agreed that the electric compensation method, in which the heat received by radiation on a metallic strip is determined by measuring the electric current required to produce the same rise of temperature in the strip, is the most satisfactory and accurate method for absolute measurement. In the practical application of the bolometric method for the absolute measurements of solar radiation, the author has introduced certain modifications suggested by experience in platinum thermometry, with the object of securing (1) temperature compensation, so that the zero remains constant in spite of changes in the surrounding temperature; (2) conduction compensation, so that loss of heat by conduction at the ends of the strips may not affect the readings; (3) accurate measurement of the area of radiation absorbed. Comparisons have been made between

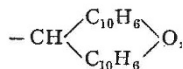
the bolometer, in which the platinum strips are directly exposed to radiation, and one of the author's ordinary sunshine receivers enclosed in a glass bulb, in order to determine the effect, if any, of the glass bulb in selective absorption. The values of the reduction constant obtained for the glass receiver showed no certain variation over a wide range of quality of radiation, from sunshine or arc-light down to a dull red heat. This result is probably to be attributed to a self-compensating action of the glass bulb, which radiates to the enclosed coils precisely those rays which it absorbs.—Results of experiments carried out at Crompton's works at Chelmsford, by Mr. C. H. Wright, on the possibility of using the resistance of a conductor heated by an alternating electric current as a measure of the current: W. H. Price.

**Zoological Society, May 16.**—Mr. G. A. Boulenger, F.R.S., vice-president, in the chair.—Examples of a new golden mole obtained in connection with Mr. C. D. Rudd's exploration of South Africa: O. Thomas. It is proposed to call the mole *Amblysomus corriae*, sp. n.—Microscopic slides of *Lankesterella tritonis*, a hæmogregarine parasitic in the blood-corpuscles of a newt, *Triton cristatus*: H. B. Fantham. This parasite was recently found by Mr. A. S. Hirst and the exhibitor, and their observations had since been independently confirmed by Dr. A. C. Stevenson.—A contribution to the knowledge of the encephalic arterial system in Saurapsida: F. E. Beddard.—Criticisms of the Hon. Walter Rothschild's proposed classification of the anthropoid apes: Sir H. H. Johnston. The author was disposed to agree with Mr. Rothschild's classification of the African apes, but suggested that the proper transcription of the native name for the bald chimpanzee should be *nkulunkamba* instead of (as Du Chaillu wrote it) *koolookamba*. He, however, could not agree with Mr. Rothschild's proposed change of the generic name of the orang from *Simia* to *Pongo*, and although considering him right in applying the former name, at present used for the orang, to the chimpanzees, he was of opinion that either *Satyrus* or *Pithecius* was a far preferable name to *Pongo* for the orang. He concluded the paper with a list of words used in several African languages for the name of the chimpanzee, and with a *précis* of the history of European knowledge of the anthropoid apes down to the eighteenth century.—Some species of bats of the genus *Rhinolophus*: K. Andersen. The author showed the progressive evolution from the Austro-Malayan *R. simplex* (allied to *megaphyllus*), through a long series of Oriental forms, to the W. Palearctic *R. ferrum-equinum*, and a similar chain from the Oriental *R. lepidus* (allied to *minor*) to the W. Palearctic *R. blasii* and *R. euryale*. *R. hipposiderus* was traced back to the Oriental *R. minor*. A slight difference between the British colony of *R. hipposiderus* and the central European form of the same species was pointed out. All the Ethiopian species of *Rhinolophus* were shown to be of Oriental origin.—Results of observations on the stridulating-organs and descriptions of five new species (two of which were referred to new genera) of the hemipterous family Halyinæ: Dr. E. Bergroth.—On the anatomy of limicoline birds, with special reference to the correlation of modifications: Dr. P. C. Mitchell. The paper dealt with the anatomy, chiefly muscular, of Charadriidæ, Chionididæ, Glareolidæ, Thincoridæ, Ædicnemidæ, and Parridæ.—Results of observations made upon a female specimen of the Hainan gibbon (*Hylobates hainanus*), now living in the society's gardens: R. I. Pocock.

PARIS.

**Academy of Sciences, May 22.**—M. Troost in the chair.—New experiments in experimental parthenogenesis in Asterias: Yves Delage. Additional proof is given of the fact that it is not an increase in the osmotic pressure alone which determines parthenogenesis, several of the reagents employed, manganese chloride, sodium phosphate, &c., acting as well, if not better, when the total concentration of the mixture is lower than that of sea water. Attention is directed to the marked action of solutions of manganese chloride, a salt which is not present in sea water.—Magnetic hysteresis produced by an oscillating field superposed on a constant field. Comparison between theory and experiment: P. Duhem. The author compares

the results obtained by him in a theoretical study recently published with some experimental results of M. Maurain, and shows that his theoretical conclusions are completely confirmed.—On the voyage of the *Princesse Alice*: the Prince of Monaco. A sketch is given of the work attempted in oceanography, bacteriology, chemical biology, zoology, and the meteorological exploration of the upper atmosphere by means of kites.—On a condition of convergence of Fourier's series: Henri Lebesgue.—On minimal curves: E. Vessiot.—On the compressibility of different gases below atmospheric pressure and the determination of their molecular weights: Adrien Jaquerod and Otto Scheuer. The compressibility of several gases has been measured at 0° C. for pressures between 400 mm. and 800 mm. of mercury, and for ammonia and sulphur dioxide for pressures between 200 mm. and 400 mm. From the measurements the coefficient of deviation from Boyle's law has been determined, and this has been applied to the formula of D. Berthelot for the limiting density of gases and the estimation of their molecular weight. The molecular weights calculated agree with those obtained by the best analytical methods with the exception of nitrogen compounds, for which an atomic weight of 14.01 must be assumed.—The atomic weight of nitrogen deduced from the ratio of the densities of nitrogen and oxygen: Philippe A. Guye. From a consideration of the whole of the experimental data available, the mean value  $N=14.009$  must be regarded as the most probable value for the atomic weight.—On the fusibility of the mixtures of antimony sulphide formed with cuprous sulphide and mercuric sulphide: H. Pélabon.—The equilibrium between acetone and hydroxylamine hydrochloride: Philippe Landrieu. This equilibrium has been previously studied by means of the acid set free during the reaction, but owing to the rapidity with which the equilibrium is displaced this method is not trustworthy. In the present paper the reaction is followed by calorimetric studies.—Physicochemical researches on hæmolytic: Mlle. P. Cernovodeanu and Victor Henri.—The action of the metal ammoniums on the polyatomic alcohols: E. Chablay. The alcohol is dissolved in liquid ammonia and is then acted on by the solution of the alkali metal, sodium or potassium, also dissolved in ammonia, and the result of the reaction washed several times with liquid ammonia at -40° C. In this way one of the hydroxylic hydrogen atoms of the alcohol is replaced by potassium (or sodium), the alcohols studied being mannite, erythrite, and glycerol.—On benzhydroxamic and dibenzhydroxamic acids: R. Marquis.—A new method of preparing mesoxalic esters: their condensation with cyanacetic esters: Ch. Schmitt. The corresponding malonic esters are treated with nitrous fumes, descriptions being given of the preparation of the methyl and ethyl esters. These condense with cyanacetic esters in the presence of piperidine, one or two molecules of the cyanacetate entering into the reaction according to the experimental conditions.—The basicity of pyranic oxygen. Double halogen salts of some metals and dinaphthopyryl: R. Fosse and L. Lesage. The group



possesses basic properties attributable to tetrabasic oxygen strikingly analogous to an alkaline metal, and the present communication gives details of the preparation of several double salts of this radical.—On some circumstances influencing the physical state of starch: J. Wolff and A. Fernbach.—Researches on animal lactase: Ch. Porcher. It is shown that ether saturated with water is capable of extracting from the intestines of certain animals considerable quantities of lactase.—Contribution to the study of histological staining substances: G. Halphen and André Riche. The albuminoid substances in animal tissues preserved in formol solutions are profoundly altered, and the methods of staining to be employed require considerable modifications.—On some minerals of Djebel-Ressas (Tunis): L. Jecker.—Variation in the histological characters of leaves in the galls of *Juniperus Oxycedrus* from the Midi and Algeria: C. Houard.—On the biology of *Melampyrum pratense*: L. Gautier.—On the transformations of the nitrogenous materials in seeds in the course of maturation: G. André.—Observations on the fibrous intersections of

the polygastric muscles: J. **Chaine**.—The respiratory curve in the newly-born: L. **Vallois** and C. **Fleig**.—On the food value of different kinds of bread: Pierre **Fauvel**.

CALCUTTA.

**Asiatic Society of Bengal**, May 3.—Contributions to Oriental herpetology, iii., notes on the Oriental lizards in the Indian Museum (part ii.), Lacertidæ, Scincidæ, and Dibamidæ: Dr. N. **Annandale**. Three new Indian skinks are described, and four imperfectly diagnosed species re-described, while one, *Lygosoma pulchellum*, is added to the fauna of Burma. Notes on other examples of the family and of the Lacertidæ are given, based on the late Dr. J. Anderson's collection from N.W. Asia and the late Prof. J. Wood-Mason's from Sinking Island and Malaya, as well as the extensive Indian, Burmese, and Persian collections in the museum. A revised list of the species recorded from India, Burma, and Ceylon is appended, with their distribution within these limits.—Materials for a flora of the Malayan Peninsula, No. 16: Sir G. **King** and J. S. **Gamble**. The present contribution to these materials contains the account of the genus *Psychotria* required to conclude the joint account by the authors of the natural order Rubiaceæ commenced in part xiv. and continued in part xv. of this series. This account of *Psychotria* comprises descriptions of 26 completely represented and 3 imperfectly known species; of these, 11 species are new to science. In addition, this fasciculus contains accounts, for which the authors are jointly responsible, of several natural orders.

DIARY OF SOCIETIES.

THURSDAY, JUNE 1.

ROYAL INSTITUTION, at 5.—Electro-magnetic Waves: Prof. J. A. Fleming, F.R.S.

INSTITUTION OF MINING ENGINEERS (in the Rooms of the Geological Society), at 11 A.M.—The Firing of Babcock Boilers with Coke-oven Gases: T. Y. Greener.—Compound Winding-engine at Lumpsey Mine: M. R. Kirby.—Note Supplementary to a Paper on the Electric Driving of Winding-gears: F. Hird.—Electric Winding-engines at the Exhibition of the North of France, Arras, Pas-de-Calais: Ed. Lozé.—The Education of Mining Engineers in the United States: Prof. Howard Eckfeldt.—An Outline of Mining Education in New Zealand: Prof. James Park.—Goaf-blasts in Mines in the Giridih Coal-field, Bengal, India: Thomas Adamson.

LINNEAN SOCIETY, at 8.

CHEMICAL SOCIETY, at 8.—(1) The Constituents of the Seeds of *Hydnocarpus Wightiana* and *Hydnocarpus Anthelmintica*. Isolation of a Homologue of Chaulmoogric Acid.—(2) The Constituents of the Seeds of *Gynocardia Odorata*: F. B. Power and M. Barrowcliff.—The Relation of Ammonium to the Alkali Metals. A Study of Ammonium Magnesium and Ammonium Zinc Sulphates and Selenates: A. E. H. Tutton.—Camphorylazoimide: M. O. Forster and H. E. Fierz.—Influence of Substitution on the Formation of Diazoamines and Aminoazo-compounds. Part III. Azo-derivatives of the Symmetrically Disubstituted Primary Metadiazines: G. T. Morgan and W. O. Wootton.—Diazo-derivatives of Mono-acylated Aromatic Para-diazines: G. T. Morgan and Miss F. M. G. Micklethwait.—The Significance of Optical Properties as Connoting Structure; Camphorquinone-hydrazone-oximes; a Contribution to the Chemistry of Nitrogen: H. E. Armstrong and W. Robertson.—Solubility as a Measure of the Change undergone by Isodynamic Hydrazones. (1) Camphorquinonephenylhydrazone. (2) Acetaldehydephenylhydrazone: W. Robertson.—The Design of Gas-regulators for Thermostats: T. M. Lowry.—The Constitution of Barbaloin. Part I.: H. A. D. Jowett and C. E. Potter.—Influence of Substitution on the Formation of Diazoamines and Aminoazo-compounds. Part IV. 5-Bromo-*as*(4)-dimethyl-2: 4-diamine-toluene: G. T. Morgan and A. Clayton.—The Action of Hypobromous Acid on Piperazine: F. D. Chattaway and W. H. Lewis.—The Action of Magnesium Methyl Iodide on Pinene Nitroschloride: W. A. Tilden and J. A. Stokes.—Racemisation Phenomena during the Hydrolysis of Optically Active Menthyl and Bromyl Esters by Alkali: A. McKenzie, and H. B. Thompson.

RÖNTGEN SOCIETY, at 8.15.—The Röntgen Congress in Berlin: Dr. W. Deane Butler.

FRIDAY, JUNE 2.

INSTITUTION OF MINING ENGINEERS (in the Rooms of the Geological Society), at 10.30 A.M.—The Conveyor-system for filling at the Coal-face, as practised in Great Britain and America: W. C. Blackett and R. G. Ware.—Underground Fires at the Greta Colliery, New South Wales: J. Jeffries.—The Geology of Chunies Poort, Transvaal: A. R. Sawyer.—Underground Horses at an Indian Colliery: T. Adamson.—Description of the Eimbeck Duplex Base-line Bar: W. Eimbeck.

GEOLOGISTS' ASSOCIATION, at 8.—Note on a Piece of Mosasaurian Jaw obtained by G. E. Dibley from the Chalk of Cuxton, Kent: Dr. A. Smith Woodward.—The Chalk Area of North-east Surrey: G. W. Young.

SATURDAY, JUNE 3.

ROYAL INSTITUTION, at 3.—Exploration in the Philippines: A. H. Savage Landor.

MONDAY, JUNE 5.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Exploring Journeys in Asia Minor: Colonel P. H. H. Massy.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Manufacture and Use of Art Papers: R. W. Sindall.—The Influence of Gelatine Sizing on the Strength of Paper: C. Beadle and H. P. Stevens.

INSTITUTE OF ACTUARIES, at 5.—Annual General Meeting.

TUESDAY, JUNE 6.

ZOOLOGICAL SOCIETY, at 8.30.—Notes on the Natural History of Western Uganda: Colonel C. Delmé-Radcliffe.—Descriptions of New Species of *Cedionychis* and Allied Genera: M. Jacoby.—On the Intestinal Tract of Mammals: Dr. P. C. Mitchell.

WEDNESDAY, JUNE 7.

ENTOMOLOGICAL SOCIETY, at 8.—New African *Lasiocampidæ*: Prof. C. Aurivillius.—*Rhynchota* collected by Dr. A. H. Willey at Birara and Lifu: G. W. Kirkaldy, with an introduction by Dr. David Sharp.

GEOLOGICAL SOCIETY, at 8.—The Microscopic Structure of Minerals forming Serpentine, and their Relation to its History: Prof. T. G. Bonney and Miss C. A. Raisin.—The Tarus of the Canton Ticino: Prof. E. J. Garwood.

VICTORIA INSTITUTE, at 4.—Annual Meeting. The Earl of Halsbury will take the chair.

SOCIETY OF PUBLIC ANALYSTS, at 8.—The Separation of Strychnine and Brucine: D. L. Howard.—Ammonium Oxalate, its Formula and Stability: P. V. Dupré.—(1) Notes on some Abnormal Milks from Cleveland and South-east Durham; (2) A Simple and Convenient Camera for Photomicrographic Work: A. C. Wilson.—The Composition and Analysis of Milk: H. D. Richmond.

THURSDAY, JUNE 8.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: (1) On the Thermoelectric Junction as a Means of Determining the Lowest Temperatures; (2) Studies with the Liquid Hydrogen and Air Calorimeters: Sir James Dewar, F.R.S.—Colours in Metal Glasses, and in Metallic Films and Metallic Solutions: J. C. M. Garnett.—Correction to Dr. H. A. Wilson's Memoir "On the Electric Effect of Rotating a Dielectric in a Magnetic Field": S. J. Barnett.—On the Application of Statistical Mechanics to the General Dynamics of Matter and Ether. The General Method of Statistical Mechanics: J. H. Jeans.—On the Magnetic Qualities of some Alloys not containing Iron: Prof. J. A. Fleming, F.R.S., and R. A. Hadfield.—On the Phosphorescent Spectrum of *S* and Europium: Sir William Crookes, F.R.S.—On the Perturbations of the Biellid Meteors: Dr. A. M. W. Downing, F.R.S.—The Pharmacology of Imdaconitine and Bikhacointine: Prof. J. T. Cash, F.R.S., and Prof. W. R. Dunstan, F.R.S.—And other papers.

ROYAL INSTITUTION, at 5.—Electromagnetic Waves: Prof. J. A. Fleming, F.R.S.

MATHEMATICAL SOCIETY, at 5.30.—On a Class of Many-valued Functions Defined by a Definite Integral: G. H. Hardy.

FRIDAY, JUNE 9.

ROYAL INSTITUTION, at 9.—Submarine Navigation: Sir William White, K.C.B., F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 5.

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