lower micro-organisms and foreign matter (charcoal, &c.): there are both macro- and microphages; these are stages, the larger can swallow the smaller and digest them.—Notes on the hydroid phase of *Limnocodium sowerbyi*, by Dr. G. Herbert Fowler (plate xxxii.), records observations made during May 1883; neither medusoid or hydroid appeared in 1889; two hydroids and a budding medusoid are figured.—Note on certain terminal organs resembling touch corpuscles or end bulbs in intramuscular connective tissue of the skate, by Dr. G. C. Purvis (plate xxxiii.).—Note on the transformation of ciliated into stratified squamous epithelium as the result of the application of friction, by Drs. J. B. Haycroft and E. W. Carlier (plate xxxiii.).—On the development of the ear and accessory organs in the common frog, by Francis Villy (plates xxxiv. and xxxv.).—On *Thelaceros rhizophoræ*, n.g. et sp., an Actinian from Celebes, by P. C. Mitchell (plate xxxvi.). The Actinian here described was obtained by Dr. Hickson in a mangrove swamp in Celebes, by the side of one of the roots of a Rhizophora; the tentacles have compound hollow protuberances round the margins of the oral surface, with numerous small simple or compound hollow protuberances (rudimentary accessory tentacles) in radial lines on the oral disk.—Notes on the genus Monstrilla, Dana, by Gilbert C. Bourne (plate xxxvii.). Gives details of all the known species of this aberrant genus of Copepods.—On the maturation of the ovum, and the early stages in the development of Allopora, by Dr. Sydney J. Hickson (plate xxxviii.). Gives a general summary of events; the formation and fate of the trophodisc, the changes of the germinal vesicle, the formation of the embryonic ectoderm the history of the yolk, and general considerations.

SOCIETIES AND ACADEMIES

LONDON.

Royal Society, March 27.—"The Variability of the Temperature of the British Isles, 1869-83 inclusive." By Robert H. Scott, F.R.S.

The material discussed has been the daily mean temperature derived from twenty-four hourly measurements of the thermograms at the seven British observatories during the period of their continuance, 1869-83.

The differences between the successive daily means have been extracted, irrespective of sign, and these values averaged monthly.

To the figures for the 7 observatories certain values have been added from Dr. Hann's paper in the *Sitzungsberichte* of the Vienna Academy for 1875 for Makerstoun and Oxford, the only British stations in Hann's list, and for Vienna, St. Petersburg, and Barnaul, as instances of Continental climates, as well as for Georgetown, Demerara, as an instance for a tropical station.

The figures for the 7 stations are much lower than those for Makerstoun and Oxford, probably owing to the fact that the means used in the two latter cases were not twenty-four hourly, nor for as many as fifteen years.

The highest variability on the mean of the year is at Kew (2°·7). Then follow Armagh, Glasgow, and Stonyhurst (2°·5), Aberdeen (2°·4), and Falmouth and Valencia (1°·9). The greatest absolute monthly value is 5°·4 for Glasgow, November 1880; the least, 0°·7, for Valencia, July 1879.

The mean values for each month are given.

The question of whether great changes are more frequently positive or negative has been investigated. Mr. Blanford states ("Climate of India") that in India (Calcutta and Lahore) sudden falls of temperature are more frequent and greater than sudden rises.

A preliminary inquiry showed that it was not interesting to investigate all changes, as the numbers showing + and − signs respectively were nearly equal.

The changes above 5° in the twenty-four hours were all examined, and the result showed that in these islands sudden rises of large amount are more frequent and more extensive in amount than sudden falls—the reverse to what obtains in India.

One instance of a rise of 23°·8 at Aberdeen, December 16, 1882, was the greatest recorded, and this disturbance was confined to the east of Scotland.

The figures were then examined for frequency. The values were arranged, irrespective of sign, according to their magnitude, in six subdivisions:—0-0°·9, 1°·0-4°·9, 5°·0-9°·9, 10°·0-14°·9, 15°·0-19°·9, 20°·0-24°·9, and the totals divided by 15. The first two intervals taken together are equal to one of the others, but, as by far the greater number of the changes fell below 5°·0, it seemed well to see how many fell below 1°·0.

The range of changes is least at Falmouth and Valencia. In all cases the mean number of changes between 1°·0 and 4°·9 exceeds half the number of days in the month.

The daily mean values have also all been examined, with the view of discovering their distribution on the thermometer scale.

Seven columns were taken, covering the space from 10° to 80°, of 10° each, excepting that the space from 20° to 40° was not divided equally.

In 1881, Stonyhurst had four days in January with a mean below 20°, and nineteen days in which the mean temperature was below 32°. At Aberdeen and Glasgow the cold was not so intense. Neither at Falmouth nor Valencia did the mean temperature ever fall below 20°. The hottest station is Kew. In the fifteen years it shows in all thirty-five days with a mean above 70°.

The figures were then divided by 15, to obtain frequency, as before, and the results shown. They are also shown graphically in a plate, but there all the curves do not appear. Those for Valencia and Falmouth agree almost exactly, except in July and August. Those for Armagh, Glasgow, and Stonyhurst are so close to each other, that one curve is taken to represent all.

Royal Microscopical Society, March 19.—Prof. Urban Pritchard, Vice-President, in the chair.—A letter from the President, regretting his inability to attend in consequence of a fall, was read.—Mr. J. Mayall, Jun., read a letter from Prof. E. Abbe, of Jena, announcing the donation of one of Zeiss's new apochromatic $\frac{1}{6}$ objectives of 1·6 N.A. He also sent a condenser of 1·6 N.A., and a flint glass slide containing mixed diatoms mounted by Dr. H. van Heurck, of Antwerp, together with a supply of flint glass slips and cover-glasses for use in mounting objects for examination with the new objective. It was of course understood that in order to exhibit the full power of the increased aperture it was necessary to employ a condenser of corresponding aperture, and the objects to be viewed must be mounted on slips with covers, and mounting and immersion fluids of correspondingly high refractive power. In order to further test this lens, a committee has been appointed.· Mr. Mayall called attention to and described two microscopes by MM. Nachet and Pellin, of Paris, which were exhibited by Mr. Crisp.—Mr. Rousselet exhibited a number of Rotifers to show their abundance at this season of the year.—A specimen sent by Colonel O'Hara, supposed to be some kind of entozoon which had been passed in urine, was exhibited.—Prof. Bell gave a *résumé* of Mr. A. D. Michael's paper on the variations of the female reproductive organs, especially the vestibule, in different species of *Uropoda*, the author being unavoidably absent through illness.—Mr. C. H. Wright exhibited and described specimens of a new British Hymenolichen, *Cyconema interruptum*.—Mr. E. M. Nelson read a short note on the images of external objects produced from the markings of *P. formosum*.—A note was read from Dr. H. van Heurck correcting an error in his recent communication to the Society relating to the structure of diatoms.—Mr. Mayall read a translation of an article by Prof. E. Abbe on the use of fluorite for optical purposes, in which it appeared that the special qualities of the new apochromatic lenses were due to the employment of this mineral in their construction.—Mr. C. H. Gill read a paper on some methods of preparing diatoms so as to exhibit clearly the nature of the workings, which was illustrated by numerous photomicrographs.—Mr. P. Braham exhibited and described a new form of oxyhydrogen lamp adapted for microscopical purposes, the lamp being so mounted as to be used in any position above or below the object. Its application to photomicrography was demonstrated in the room.—Mr. Clarkson also exhibited one of the same lamps separate from the photomicrographic arrangement.—The next *conversazione* was announced to take place on April 30.

Zoological Society, March 18.—Prof. W. H. Flower, F.R.S., President, in the chair.—The Secretary exhibited (on behalf of the Rev. G. H. R. Fisk) a specimen of a White Bat, obtained at Somerset West, near Cape Town, believed to be an albino variety of *Vesperus capensis*.—Captain Percy Armitage exhibited and made remarks on two heads of the Panolia Deer (*Cervus eldi*), obtained on the Sittang River, Burmah. One of

these was of an abnormal form.—Mr. Sclater exhibited (on behalf of Mr. Robert B. White) examples of four species of Mammals, obtained in the Upper Magdalena Valley, in the department of Tolima, U.S. of Colombia.—Dr. Mivart, F.R.S., read a paper on the South-American Canidæ. The author called attention to the difficulties in the way of the correct discrimination of these animals, and to what appeared to him to be the unsatisfactory character of some of Burmeister's determinations and descriptions. Forms to which the names *fulvipes*, *griseus*, *patagonicus*, *entrerianus*, *gracilis*, *vetulus*, and *fulvicaudus* had been assigned were declared to be quite insufficiently discriminated from *Canis azaræ*. On the other hand, two very marked varieties, or possibly species, were noted and distinguished under the appellations *Canis parvidens* and *Canis urostictus*, the type of each of which was in the British Museum, both the skin and the skull extracted from it in each case.—Mr. R. I. Pocock read a revision of the genera of Scorpions of the family *Buthidæ*, and gave descriptions of some new South African species of this family.—Mr. F. E. Beddard read a paper on some points in the anatomy of the Condor (*Sarcorhamphus gryphus*).—A communication was read from Prof. R. Collett, containing the description of a new Monkey from North-East Sumatra, proposed to be called *Semnopithecus thomasi*.

Geological Society, March 26.—J. W. Hulke, F.R.S., Vice-President, in the chair.—The following communications were read:—On a new species of *Cyphaspis* from the Carboniferous rocks of Yorkshire, by Miss Coignou, Cambridge. Communicated by Prof. T. McK. Hughes, F.R.S.—On composite spherulites in obsidian from hot springs, near Little Lake, California, by Frank Rutley, Lecturer on Mineralogy in the Royal School of Mines. The spherulites which form the subject of the present communication have been previously noticed, and it was then suggested that a smaller spherulitic structure was set up in the large spherules after their formation. In the present paper evidence was adduced in favour of a different mode of origin. It was argued that the small spherulitic bodies (primitive spherulites) were developed in the obsidian before it assumed a condition of rigidity, and that they floated towards certain points in the still viscid lava, and segregated in more or less spherical groups, though there is no evidence to show what determined their movements; furthermore, that from a point or points situated at or near the centre of each group, crystallization was set up, giving rise to a radiating fibrous structure, which gradually developed zone after zone of divergent fibres until the entire mass of primitive spherulites was permeated by this secondary structure—a structure engendering a molecular rearrangement of the mass, such as would obliterate any trace of structure which the primitive spherulites might have originally possessed. In a supplementary note the views of Mr. J. P. Iddings with reference to the spherulites in question were given. Mr. Iddings considers that the structures here described as primary are of secondary origin. The author stated in detail his reasons for adhering to the conclusions given in this paper. The Chairman said that the sequence of the different portions brought forward with so much care by the author is one which admits of much discussion. Rev. E. Hill said that the explanation of the divergence of these crystallizations was extremely interesting. As to which structure came first, it is difficult to determine. In the section exhibited under the microscope he agreed with Mr. Rutley as to the sequence. The question of molecular motion after consolidation in igneous rocks is a subject of great importance.—A monograph of the Bryozoa (Polyzoa) of the Hunstanton Red Chalk, by George Robert Vine. Communicated by Prof. P. Martin Duncan, F.R.S.—Evidence furnished by the Quaternary glacial-epoch morainic deposits of Pennsylvania, U.S.A., for a similar mode of formation of the Permian breccias of Leicestershire and South Derbyshire, by William S. Gresley.

PARIS.

Academy of Sciences, March 31.—M. Hermite in the chair.—M. de Jonquières, having presented a memoir containing the complete text and review of a posthumous work of Descartes, "De Solidorum Elementis," with a translation and commentary of the work, addressed a note giving some brief explanations of the matter contained in it. In communications made on February 10 and 17, the author endeavoured to show that Descartes knew and applied the relation between the faces, apices, and edges of a polyhedron, known as Euler's formula, and expressed as $F + S = A + 2$. The present communication seems to put the matter beyond doubt.—M. P. Schutzenberger, in reply to criticisms of M. Berthelot, adduces experiments pointing to the conclusion that the condensation of carbonic oxide by the silent discharge cannot be effected without the presence of water.—Some further remarks on the preceding communication, and on the desiccation of gases, by M. Berthelot. The author still holds the opinion that the water shown by M. Schutzenberger to be present in his condensed carbonic oxide may have passed through the glass tube under the action of the electric discharge.—A new method for the microscopical study of warm-blooded animals at their physiological temperatures has been devised by M. L. Ranvier, and consists of placing the microscope and the preparation under examination in a bath of warm water (36° C. to 39° C.).—Deformities of the feet and toes following phlebitis of inferior members; phlebitic club-feet, by M. Verneuil.—Observations of Brooks's new comet (*a* 1890), made at the Paris Observatory, by M. G. Bigourdan.—Observations of the same comet, made with the great equatorial of Bordeaux, by MM. Rayet and L. Picart.—Observations and elements of the new minor planet (289) discovered at the Nice Observatory on March 10, by M. Charlois.—On the position of the sun-spot of March 4, by M. Spœrer.—On the graphic statics of elastic arcs, by M. Bertrand de Fontviolant.—Theoretical and experimental researches on Ruhmkorff's coil, by M. R. Colley. The author has investigated the current which results from the superposition of two currents—one non-periodic, diminishing according to the law of an exponential curve; the other periodic, and with progressively decreasing amplitude.—On the conductivities of the phenols and of oxybenzoic acids, by M. Daniel Berthelot. In this important paper the author gives the results of an examination of the three oxybenzoic acids by means of their electrical conductivities, and a research into the way they behave in the presence of one, two, or three molecules of soda. These acids having both phenol and acid functions, the conductivities of alkaline phenates were first determined.—The laws of annealing, and their consequences from the point of view of the mechanical properties of metals, by M. André Le Chatelier. These laws have been studied by heating metallic wires, hardened by a series of passages through a draw plate, to different temperatures and during different periods of time.—On the indices of refraction of salt-solutions, by M. B. Walter.—Action of hyposulphite of soda on silver salts, by M. J. Fogh. The amount of heat disengaged during the action of hyposulphite of silver upon various silver salts has been investigated.—M. V. Marcano, from his anthropological researches at Venezuela, gives evidence of the existence of metallurgy in South America previous to Columbus.—Influence of the chemical constitution of compounds of carbon upon the sense and variation of their rotary power, by M. Philippe A. Guye.—On the preparation and some of the properties of fluoroform, by M. Meslans. The density of the gas obtained is 2·44, and it is found to liquefy at 20° under a pressure of 40 atmospheres.—On some thiophenols derived from ordinary camphor, by M. P. Cazeneuve.—On the stranding of a whale on the island of Rhé, by MM. Georges Pouchet and Beauregard.—On the blood and the lymphatic gland of the Aphysia (sea-hare), by M. L. Cuénot.—On the method of union of sexual cells in the act of fecundation, by M. Léon Guignard.—On a new and dangerous parasite of the vine, by M. G. de Lagerheim. The description of the parasite is here given:—"*Uredo Vialæ*: Soris hypophyllis, solitariis majoribus vel dense gregariis minimis, solitariis in pagina superiore foliorum maculas parvas formantibus; uredosporis pyriformibus vel ovoideis 20μ-27μ longis, 15μ-18μ latis, membrana hyalina tenui aculeata et contentu aureo præditis, paraphysibus cylindricis curvatis incoloribus circumdatis. Hab in foliis vivis *Vitis* sp. parasitica in insula Jamaica, inter Kingston et Rockfort, Octob. 1889."—On the series of eruptions of Mézenc and Meygal (Velay); also a note on the existence of ægyrine in the phonolites of Velay, by M. P. Termier.—Composition of some rocks from the north of France, by M. Henri Boursault.—General results of a study of the carboniferous earths of the central plateau of France, by M. A. Julien.

BERLIN.

Physical Society, March 21.—Prof. du Bois-Reymond, President, in the chair.—Dr. Brodhun described a new contrast-photometer, based on the principle of one he and Dr. Lummer had previously constructed (see NATURE, vol. xxxix. p. 336), and intended to compare by contrast the intensity of any

illumination with that of the standard light. Experiment had shown that the sensitiveness of the instrument is greatest when the difference of the contrasted illuminations is 3 per cent., and amounts then to ¼ per cent. He further gave an account of experiments which he and Dr. Lummer had made on the utilization of glow-lamps as standards of comparison. When fed by accumulators these lamps yield a light which only varies by 1 per cent. during a period of 200 hours provided the E.M.F. of the accumulators is kept constant. The authors are now busy with the endeavour to construct a standard glow-lamp for comparison with unknown sources of light. Dr. Lummer demonstrated Abbé's apparatus for testing transparent films with plane-parallel surfaces. After briefly describing the interference phenomena produced by thick plane-parallel glass plates, he explained how Tizeau's bands and Newton's rings are employed for testing the plates, using monochromatic sodium-light. The light passes through a reflecting prism and through a lens, and then falls on the plate, from which it is reflected and passes back by the same path to the eye, being now passed through a second lens by means of which the bands or rings may be seen. The occurrence of interference-bands is entirely dependent upon the thickness of the plate: if this is absolutely uniformly thick throughout, the interference phenomena show no change if the plate is moved from side to side in its own plane, and by so doing the parallelism of its sides may be rapidly tested.

AMSTERDAM.

Royal Academy of Sciences, February 22.—Prof. van de Sande Bakhuysen, in the chair.—Prof. Behrens added a number of reagents for microscopical analysis to those already known from former publications by himself and MM. Streng and Haushofer:—

For K and Na: sulphate of bismuth.
,, Ba, Sr, Ca: chloride of tin and oxalic acid.
,, Ba, Sr: bichromate of ammonium.
,, Sr, Ca, Mg: tartrate of sodium and potassium.
,, Al: fluoride of ammonium and sulphate of thallium.
,, Be: chloride of mercury and oxalic acid.
,, Ce, La, Di: oxalic acid, ferrocyamide of potassium.
,, Zn, Ca: acetate of aluminium and oxalic acid.
,, Zn, Cn, Co: sulphocyanide of mercury and ammonium.
,, Co, Ni: nitrite of potassium and acetate of lead.
,, Pb, Bi, Fe: bichromate of potassium and potash.
,, Bi, Sb, Sn: oxalic acid, chloride of rubidium.
,, Sb, Sn, Ti: chloride of barium and oxalic acid.

Details will soon be published, when the necessary finish has been given to the methods for separation, hitherto somewhat neglected.—M. Martin read a paper on the geology of the Kei Islands, and, in connection therewith, on the Australian-Asiatic boundary line. In accordance with the fact that in Great Kei we meet with nothing but a Tertiary formation, and that the nature of the rocks of Great Kei agrees with that of the coast of New Guinea, M. Martin inferred that this boundary line must be drawn geognostically, to the west of Great Kei and to the north-west of Timor.—Dr. Beyerinck treated of the luminous food and the plastic food of phosphorescent Bacteria. Of the six species of phosphorescent Bacteria hitherto known, four—viz. the alimental gelatine non-melting *Bacterium phosphorescens* and *B. Pflügeri* of luminous fish, and the Baltic phosphorescent Bacteria, *B. Fischeri* and *B. balticum*, require, besides peptone, a second carbonic combination, as glycerine, glucose, or asparagine, for their complete nourishment, *i.e.* to "phosphoresce" and grow. They may be called peptone-carbon-bacteria. The gelatine quick-melting phosphorescent bacteria from the West Indian Sea and the North Sea, *B. indicum* and *B. luminosum*, can phosphoresce and grow on peptone alone. They are, therefore, peptone-bacteria. Again, other bacteria can derive their nitrogen either from amids, the amid-bacteria, or from ammoniac, the ammoniac-bacteria. Also moulds, yeasts, and some Protozoa may be classed in this system. The *Bacterium Pflügeri* does emit light with peptone and glucose, but not with peptone and maltose, while the *Bacterium phosphorescens* emits light both with glucose and maltose. Now if we mix some starch in a phosphorescens-peptone-gelatine, obtained by mixing this gelatine with a very great number of *B. phosphorescens*, and place upon this some ptyaline, pancreas-diastase, or urindiastase (nefrozymase), fields of light make their appearance; if, however, we placed these same sorts of diastase on a Pflügeri-peptone-starch-gelatine, then no fields of light would appear, which proves that in this instance no glucose whatever is formed, as was lately believed to be the case. The development of luminosity is constantly accompanied by the transition of peptones into organized, living matter, under the influence of free oxygen, with or without the concurrence of another carbonic combination.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Among the Selkirk Glaciers: W. S. Green (Macmillan).—Flora Tangutica, fasc. i.: C. J. Maximowicz (Petropoli).—Enumeratio Plantarum Hucusque in Mongolia, fasc. i.: C. J. Maximowicz (Petropoli).—The Human Epic, Canto i.: J. F. Rowbotham (K. Paul).—Agende de Chimiste, Salet, Girard and Pabst (Hachette).—The Theory of Determinants in the Historical Order of its Development; Part i., Determinants in General: T. Muir (Macmillan).—The Microtomist's Vade-Mecum, 2nd Edition: A. B. Lee (Churchill).—Guide Pratique de L'Amateur Électricien: E. Keignart (Paris, Michelet).—Musiconomia o Leggi Fondamentali della Scienza Musicale: P. Crotti (Parma, Battei).—L'Éclairage Électrique Actuel, 2nd Edition: J. Couture (Paris, Michelet).—Das Reizleitende Gewebesystem der Sinnpflanze: Dr. G. Haberlandt (Leipzig, Engelmann).—Traité Ency. de Photographie, 15 Mars: C. Fabre (Paris, Gauthier-Villars).—Proceedings of the Aristotelian Society, vol. i. No. 3, Part 1 (Williams and Norgate).—Mind, April (Williams and Norgate).—Geological Magazine, April (K. Paul).—Quarterly Journal of Microscopical Science, April (Churchill).—Journal of the Royal Agricultural Society of England, 3rd Series, Part 1 (Murray).—Journal of the Royal Horticultural Society, vol. xii. Part 1 (London).

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