

vapour and ice-vapour at the same temperature.—Meteorology as a University course, by R. de C. Ward, Instructor in Meteorology in Harvard University. The author's aim is to show the need of more instruction in meteorology, and to emphasise the fact that instruction is needed in general, rather than in the higher mathematical and physical meteorology; while the investigation of problems in the latter branches should be undertaken by eminent physicists who are fitted to do work of such an advanced character. The author considers that, at the present time, Germany takes the lead in the teaching and in the research of meteorology.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 12, 1895.—“Researches on the Structure, Organisation, and Classification of the Fossil Reptilia. Part X. On the complete Skeleton of an Anomodont Reptile (*Aristodesmus Rüttimeyeri*, Wiedersheim), from the Bunter Sandstone of Reichen, near Basel, giving new Evidence of the Relation of the Anomodontia to the Monotremata.” By H. G. Seeley, F.R.S.

The author has examined the fossil described by Dr. Robert Wiedersheim in 1878 as *Labyrinthodon Rüttimeyeri*. The bones are differently interpreted:—

The reputed humerus is the interclavicle.

The reputed right and left coracoids are the pre-coracoid and coracoid of the right side.

The author regards the Labyrinthodont osteology as demonstrating close relationship with Ichthyosauria and Anomodontia. The group forms a branchiate division of the reptilian class.

The fossil now named *Aristodesmus* is identified as an Anomodont reptile chiefly on the basis of resemblances to *Procolophon* and *Pareiasaurus*.

The teeth are in sockets placed obliquely. The proportions of the vertebral column are those of *Echidna*, though the transverse processes are longer. The ribs are those of a Monotreme. The shoulder girdle resembles *Procolophon*, and the humerus does not show the peculiar lateral curvature seen in Monotremes. The ulna gives no evidence of an olecranon process; the pelvic bones are without acetabular or obturator perforations, are not ankylosed together, and the ilium is not expanded transversely. The femur is more slender than in *Echidna*. The fibula is prolonged proximally beyond the stout tibia, round which it may rotate. The proximal row of the tarsus is one large bone, the blended astragalus and os calcis.

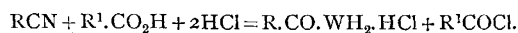
Monotreme mammals make a close approximation to this fossil and other Anomodontia. A group *Theropsida* may be made to include Monotremata and Anomodontia. *Ornithorhynchus* shows pre-frontal and post-frontal bones, and has the malar formed as in Anomodonts.

Aristodesmus is placed in the Procolophonina, which has two occipital condyles, with the occipital plate vertical, without lateral vacuities; and has the shoulder girdle distinct from Pareiasauria in the separate pre-coracoid extending in advance to the scapula.

PARIS.

Academy of Sciences, December 30.—M. Marey in the chair.—Development of the lymphatic vessels, by M. L. Ranvier. The author has examined the development of the lymphatic vessels in the embryo of the pig. By examining the mesentery, hardened in osmic acid and stained with picrocarmine, no lymphatic vessels can be observed in embryos of less than 9 cm. in length, the first signs appearing in those of 10 cm. The conclusion is drawn that the lymphatic system may be considered as an immense vascular gland, having its embryological origin in the venous system, and throwing its secretory product, the lymph, into the veins.—On the second scientific expedition of the *Princesse Alice*, by Albert First, Prince of Monaco. (See pp. 223–225.)—Note on the history of seas, by M. Suess. From the results of geological explorations, by MM. Mojsisovics, Waagen, and Diener, undertaken with special reference to the Trias formation, the conclusion is drawn that at that period the Pacific Ocean possessed two great branches—one (the Arctic branch) stretching over Eastern Siberia as far as Spitzbergen, the other across Central Asia and the Alps up to the Western

Mediterranean.—On the acoustic analysis of mixtures of two gases of different densities, by M. E. Hardy. The method was capable of detecting one volume of illuminating gas in 1000 volumes of air.—Observations, made at the observatory of Algiers, of Brooks' and Perrine's comets, by MM. Rambaud and Sy.—Observations of Faye's comet and a minor planet, made at the Toulouse Observatory, by M. F. Rossard.—Observations of the sun, made at the observatory of Lyons, by M. J. Guillaume.—On some problems in variations, by M. G. Königs.—On the summation of divergent series, by M. E. Borel.—On a new transformation of Taylor's theorem, by M. N. U. Bougaief.—On the unicursal varieties of three dimensions, by M. Antonne.—New properties of the cathode rays, by M. Jean Perrin. According to the views of Goldstein, Hertz, and Lenard, the cathode rays are due, like light, to a vibration of the ether; whilst Crookes and J. J. Thomson prefer to attribute the phenomena to matter charged negatively travelling with a high velocity. All the results of the extremely ingenious experiments of M. Perrier tend to show that the latter view is the correct one.—Observations on the zodiacal light, made at the observatory of the Pic du Midi, by M. E. Marchand.—On the elliptical refraction of quartz, by M. G. Quesneville. It is shown by a recalculation of Jamin's experiments, that the formula used by Jamin, calculated from Airy's theory, gives quite erroneous results in the neighbourhood of the axis.—The position in the solar spectrum of the calorific maximum, by M. Aymonnet. A comparison of the results obtained by various workers in this subject, shows that the position of this maximum depends not only on the composition of the prism, but also on the other parts of the spectroscopic which reflect or transmit the ray. The continual variation in the intensity of the solar radiation is also a source of grave error in these measurements.—On the mechanical production of extreme temperatures, by M. E. Solvay. Remarking on the liquefaction of air in quantity recently achieved by M. Linde, M. Solvay observes that he used the same principle, the successive expansions of the same quantity of gas, in 1886, but, having imposed on himself as practical conditions that the pressure must not exceed 5 atmospheres, and not take more than 15-horse power, the lowest temperature he actually reached in this way was -95° . It is further pointed out that inversely the same principle would serve to reach extremely high temperatures, were it not for the fact that these can be more easily attained by electrical means.—On the combustion of acetylene, by M. H. Le Chatelier. Mixtures of acetylene with air containing less than 7.7 per cent. of acetylene, burn completely to water and carbon dioxide, for proportions of acetylene between 7.7 per cent. and 17.4 per cent., the products consist of water, carbon monoxide and dioxide, water, and hydrogen, in mixtures containing more acetylene than this free carbon and unburnt acetylene are found. With oxygen, mixtures containing anything between 2.8 per cent. and 93 per cent. of acetylene will catch fire; with air the limits are 2.8 per cent. and 65 per cent. In tubes, these limits are narrowed down, until in tubes of 0.5 m.m. diameter or less it is impossible to propagate a flame.—On the fixation of nitrogen by the metals of the alkaline earths, by M. L. Maquenne. After referring to his earlier work on this subject, the author describes a simple lecture experiment illustrating the ease with which nitrogen is absorbed. A mixture of lime and magnesium powder heated in a hard glass tube over a Bunsen burner will, in five minutes, absorb 96 per cent. of a confined volume of air.—On crystallised titanium and the combinations of titanium and silicon, by M. L. Levy. A silicide of the composition Ti_2Si has been isolated.—On the rotatory power of rhamnose in a state of superfusion, by M. D. Gernez. The rotatory power of fused rhamnose diminishes regularly with rise of temperature; at 100° it is only 61 per cent. of its value at 0° , and is in all cases less than that deduced from the rotatory power of its solutions.—On some dithiazolic derivatives, by M. C. Lauth.—Syntheses of acid chlorides and amide hydrochlorides, by M. A. Colson. The following reaction is found to occur.



when R, R¹ may be methyl or ethyl. This reaction is suggested as a method for preparing acid chlorides without the use of the phosphorus chlorides. If the acid is replaced by its anhydride the yield is improved.—Action of the halogens upon formaldehyde, by M. A. Brochet. In the case of chlorine, the primary reaction is $CH_2O + Cl_2 = CO + 2HCl$. The $COCl_2$, previously observed, is a secondary product.—On essence of lemon, by

MM. P. Barbier and L. Bouveault.—Study in germination, by M. J. de Rey-Pailhade.—On the simultaneous determination of the mineral and organic acidity in the juice of the beetroot, by M. D. Sidersky. Advantage may be taken of the indifference of Congo-red paper to the organic acids, but a simpler method is to use a colouring matter present in the juice itself.—The origin of the three-colour theory of the optic nerve, by M. J. P. Durand. A recognition of the work of Thomas Young.—On the influence of lecithin on the growth and multiplication of organisms, by M. B. Danilewsky.—Comparative study of the buccal mass of gasteropods, by M. A. Amaudrut.—Cephalopods from the stomach of a cachalot, caught at the Azores, by M. L. Joubin.—Some effects of the synodic revolution of the moon on the distribution of atmospheric pressures in the autumn season, by M. A. Poincaré.—On a meteor observed in Algeria, December 14, 1895, 10h. 15m. p.m., by M. J. Triboulet.

DIARY OF SOCIETIES.

LONDON.

THURSDAY, JANUARY 9.

SOCIETY OF ANTIQUARIES, at 8.30.

MATHEMATICAL SOCIETY, at 8.—On a certain Ternary Cubic: Prof. Lloyd Tanner.—Further Communication on Boltzmann's Minimum Function: S. H. Burbury, F.R.S.—Examples illustrating Lord Rayleigh's Theory of the Stability or Instability of certain Fluid Motions: A. E. H. Love, F.R.S.

ROYAL INSTITUTION, at 3.—Sound, Hearing, and Speech: Prof. McKendrick, F.R.S.

FRIDAY, JANUARY 10.

MALACOLOGICAL SOCIETY, at 8.—List of South Australian Pleurotomidae with Descriptions of New Species: G. B. Sowerby.—Descriptions of New Land Mollusca from New Zealand and Macquarie Island: Henry Suter.—The Genus *Hyalimax*, or a near Ally (*Neohyalimax*), in Brazil: Dr. H. Stmroth.—On a Collection of Slugs from the Sandwich Islands: Walter E. Collinge.

ROYAL ASTRONOMICAL SOCIETY, at 8.

CLINICAL SOCIETY, at 8.30.

SATURDAY, JANUARY 11.

ASSOCIATION FOR THE IMPROVEMENT OF GEOMETRICAL TEACHING (University College), at 11.—At 2.—Business Meeting.—Geometrical Methods: Dr. Iarmor.

ROYAL BOTANIC SOCIETY, at 3.45.

SUNDAY, JANUARY 12.

SUNDAY LECTURE SOCIETY, at 4.—Pasteur and his Work: Prof. Percy Frankland, F.R.S.

MONDAY, JANUARY 13.

MEDICAL SOCIETY, at 8.30.

TUESDAY, JANUARY 14.

ROYAL INSTITUTION, at 3.—The External Covering of Plants and Animals: its Structure and Functions: Prof. C. Stewart.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Sanitary Works of Buenos Ayres: Sewerage, Drainage, and Water-Supply: Hon. R. C. Parsons.

ZOOLOGICAL SOCIETY, at 8.30.—A Preliminary Revision and Synonymic Catalogue of the Hesperidae of Africa and the adjacent Islands, with Descriptions of some apparently New Species: Rev. W. J. Holland.—On a Collection of Butterflies obtained by Mr. R. Crawshaw in Nyasaland between the Months of January and April, 1895: Dr. Arthur G. Butler.—On a Newly-discovered Modification of the Iris in the Eyes of certain of the Ungulata adapted for assisting Vision: Dr. G. Lindsay Johnson.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Astigmatism and a New Stigmatic Portrait Lens: H. L. Aldis.

ROYAL ASIATIC SOCIETY, at 3.

ROYAL MEDICAL AND CHIRURGICAL SOCIETY, at 8.30.

WEDNESDAY, JANUARY 15.

SOCIETY OF ARTS, at 8.—The Making of a Great University for London: Prof. Silvanus P. Thompson, F.R.S.

ENTOMOLOGICAL SOCIETY, at 8.—Annual Meeting.—Election of Council and Officers.—The Speculative Method in Entomology: Prof. Meldola, F.R.S., President.

ROYAL MICROSCOPICAL SOCIETY, at 8.—Annual Meeting.—Election of Council.—Address by the President, A. D. Michael.

ROYAL METEOROLOGICAL SOCIETY, at 8.—Annual General Meeting.

BRITISH ARCHÆOLOGICAL ASSOCIATION, at 8.

THURSDAY, JANUARY 16.

ROYAL SOCIETY, at 4.30.

LONDON INSTITUTION, at 6.—Experiments with Incandescent Lamps: Prof. Fleming, F.R.S.

LINNEAN SOCIETY, at 8.—On the Fistulose Polymorphinæ and the Ramulinæ: Prof. T. Rupert Jones, F.R.S., and F. Chapman.

SOCIETY OF ARTS, at 4.30.—The Shan Hills: their Peoples and Products: Colonel R. G. Woodthorpe, C.B., R.E.

SOCIETY OF ANTIQUARIES, at 8.30.

CHEMICAL SOCIETY, at 8.—The Acetylene Theory of the Luminosity of Hydrocarbon Flames: Prof. Vivian B. Lewes.—And other Papers.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Presentation of Premiums.—Inaugural Address of the President, Dr. John Hopkinson, F.R.S.

NUMISMATIC SOCIETY, at 7.

FRIDAY, JANUARY 17.

ROYAL INSTITUTION, at 9.—More about Argon: Lord Rayleigh.

QUEKETT MICROSCOPICAL CLUB, at 8.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Iron Tunnels: W. O. Leitch.

EPIDEMIOLOGICAL SOCIETY, at 8.—Experiences in Relation to Cholera in India from 1842-79: Surgeon-General C. A. Gordon, C.B.

SATURDAY, JANUARY 18.

ROYAL INSTITUTION, at 3.—To the North of Lake Rudolf and among the Gallas: Dr. A. Donaldson Smith.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Annuaire pour l'an 1896, publié par Le Bureau des Longitudes (Paris, Gauthier-Villars).—Le Mouvement: F. J. Marey (Paris, Masson).—Principi della Teoria Matematica del Movimento dei Corpi: Prof. G. A. Maggi (Milano, Hoepli).—Elementary Treatise on Electricity and Magnetism: Profs. Foster and Atkinson (Longmans).—History of the Cholera Controversy: Sir G. Johnson (Churchill).—Quain's Elements of Anatomy, 10th edition, Vol. 3, Part 4, Splanchology: Profs. Schäfer and Symington (Longmans).—Comité International des Poids et Mesures. Procès-Verbaux des Séances de 1894 (Paris, Gauthier-Villars).—Travaux et Mémoires de Bureau International des Poids et Mesures, tome xi. (Paris, Gauthier-Villars).—Transactions of the Royal Society of Victoria. Vol. iv. A Monograph of the Tertiary Polyzoa of Victoria: Dr. P. H. MacGillivray (Melbourne).

PAMPHLETS.—Special Map of British Guiana (Phillip): Frederic Kitton (Redway).—Guide to the British Mycetozoa exhibited in the Department of Botany, British Museum (Natural History) (London).—Ninth Annual Report of the Liverpool Marine Biology Committee and their Biological Station at Port Erin: Prof. W. A. Herdman (Liverpool).

SERIALS.—National Review, January (Arnold).—Norges Geologiske Undersøgelse, Nos. 10 to 17 (Kristiania).—Bulletin of the American Mathematical Society, December (New York).—Geographical Journal, January (Stanford).—Science Progress, January (Scientific Press).—Mind, January (Williams).—Zeitschrift für Wissenschaftliche Zoologie, Sechzigster Band, Drittes Heft (Williams).—Annals of Scottish Natural History, January (Edinburgh, Douglas).—Proceedings of the Aristotelian Society, Vol. 3, No. 1 (Williams).—Brain, Part 72 (Macmillan).—Journal of the Royal Agricultural Society of England, Vol. 6, Part 4 (Murray).—Minnesota Botanical Studies, Bulletin No. 9 (Minneapolis).—Scribner's Magazine, January (S. Low).—Académie des Sciences de l'Empereur François Joseph I. Bulletin International Classe des Sciences Mathématiques et Naturelles, II.—Journal of the Royal Statistical Society, December, Stanford.—Geological Magazine, January (Dulau).

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