

The other Royal Medal is awarded to Prof. E. Ray Lankester, F.R.S., for his labours, now extending over more than twenty years, in the field of animal morphology (especially invertebrate anatomy and embryology) and of palæontology.

Prof. Lankester has been active in many directions, and has everywhere left his mark, not only as an energetic teacher and accurate worker and a philosophical thinker; but as one who, in times when the example is more than ever valuable, has always been careful to remember that speculation should be the servant and not the master of the biologist.

The Davy Medal is awarded to Prof. Stas of Brussels.

Prof. Stas's great research, for which it is proposed that the Davy Medal be awarded to him, is that on atomic weights. There are probably no researches in chemistry, the results of which appeal so little to the imagination, and which are so little applauded, as those on atomic weights, yet for difficulty and importance they are hardly surpassed by any. The determination of these fundamental constants of chemistry has engaged the attention of many of the leading chemists, and before the time of M. Stas's experiments, an immense amount of careful labour had been bestowed on finding methods for the more accurate and complete purification of the compounds employed for the purpose.

The indefatigable and conscientious care which M. Stas has devoted to the re-determination of a certain number of the most important atomic weights, and the marvellous skill with which he has overcome the various difficulties which successively presented themselves, render his memoir on the subject one of the most remarkable and valuable of chemical monographs.

I regret to say that the state of M. Stas's health has not permitted him to be with us to-day, but the representative of his Sovereign, the King of the Belgians, in this country, has kindly consented to receive the medal for him.

M. le Baron Solvyns, I request your Excellency to be so good as to receive the medal awarded to M. Stas; and to assure him of the pleasure which it gives the Royal Society to show their sense of his high merits, by asking his acceptance of this memorial of his illustrious predecessor, Humphry Davy.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—In the Examination for Chemistry and Physics for 1st M.B. last June, an unusually large proportion of candidates were rejected. At the request of the Special Board for Medicine, the Examiners, Messrs. Pattison Muir, A. Scott, A. Schuster, and W. N. Shaw, have stated their opinion that the candidates showed very little mental training; they had almost no power of expressing clearly what they knew, whether facts, or conclusions from facts. Prof. Michael Foster has written a letter to Prof. Paget on this subject, partly derived from his recent experience in examining in Physiology in the 2nd M.B., and deploring the condition in which men enter the University, not only ignorant of Chemistry and Physics, but unprepared by any adequate discipline to receive the truths of experimental science. He believes no proper reform can come until the University makes such a change in the Previous or Preliminary Examination as shall permit a lad at school to study Chemistry and Physics, and give him time to do so by relieving him of some other subjects. The last clause is most important, and we are glad Prof. Foster emphasised it. The University requirements in the Preliminary Examinations determine the whole current of school work, and to move them in the direction of requiring, or at any rate permitting, Chemistry and Physics to be adequately taught at schools, should be a foremost object of scientific educationists.

Mr. R. G. Moulton, one of the most experienced lecturers on the University extension scheme, writes to advocate the establishing of a general organisation on a permanent basis. He points out that the best lecturers are lost when most valuable, owing to the lack of an assured position; also that the local committees need to be brought into connection with each other. A body also is needed which could seek and receive endowments. During the last ten years 50,000*l.* has been spent in the scheme, and 60,000 students have attended full courses of lectures.

The following Colleges offer Natural Science Scholarships or Exhibitions for open competition during the present and next month; the respective dates of examination being affixed:—Gonville and Caius, December 8; King's College, December

10; Jesus College, January 4; Christ's, Emmanuel, and Sidney-Sussex Colleges in common, January 5; St. John's College, December 10; Trinity College, December 10.

SCIENTIFIC SERIALS

Rivista Scientifico-Industriale, October 15.—On lateral atmospheric refraction, by Dr. G. Andries.—Transport and distribution of electricity by means of induced transformers: system of Zipernowsky, Deri, and Blathy, by Emilio Piazzolo.—On electric contrivances for illuminating fluids in scientific laboratories (four illustrations), by the editor.—On the microscopic organisms present in drinking-water: their life in waters charged with carbonic acid, by Dr. T. Leone.

THE *Journal of the Royal Microscopical Society*, vol. v. ser. ii part 5, October, contains:—On new British micro-fungi, by G. Masee (plate 13).—On erosion of the surface of glass when exposed to the joint action of carbonate of lime and colloids, by Dr. W. M. Ord.—On a septic microbe from a high altitude, by G. F. Dowdeswell.—On the use of the avicularian mandible in the determination of the chilostomatous Polyzoa, by Arthur W. Waters (plate 14).—The usual summary of current researches.

THE *American Naturalist* for October contains:—Mythic dry-paintings of the Novayos (illustrated), by W. Matthews.—The relations of mind and matter, by C. Morris.—A biography of the halibut, by G. B. Goode.—Traces of prehistoric man of the Watash, by John T. Campbell.—Editor's Table, Recent Literature, and General Notes.

THE *Victoria Royal Society Transactions*, vol. xxi. issued June 30, among other papers contains the following:—Evidences of a Glacial epoch in Victoria during post-Miocene times, by G. S. Griffiths.—The Phanerogama of the Mitta-Mitta Source Basin, II., by James Stirling.—Shingle on the east coasts of New Zealand, by W. W. Culcheth, M.Inst.C.E.—New or little-known Polyzoa, Part VII. (Plates 1 to 3), Part VIII. (Plates 1 to 5, by P. H. MacGillivray, M.A.—On the reproduction of the Ornithorhynchus, by P. H. MacGillivray, M.A.—On the Diabase rocks of the Buchan district; supplementary notes by A. W. Howett.—The meteorology of the Australian Alps, by James Stirling.

SOCIETIES AND ACADEMIES LONDON

Linnean Society, November 19.—Prof. Moseley, F.R.S., in the chair.—Mr. A. D. Michael exhibited and described the remarkable nymphal stage of *Tegeocranus cepheiformis*, a species of the Oribatidæ, which he lately discovered for the first time in England. He has furthermore succeeded in tracing the whole life-history of this animal. The creature in its nymphal stage is exceedingly strange and beautiful. It carries on its back as concentric shields the dorsal portions of all its cast-skins, and these are bordered by projections each bearing a rose-leaf-like cuticular process of transparent membrane with chitinous nerves. The drawing of the nymph was first sent to Mr. Michael, two years ago, by Herr Pappe, of Bremen.—Mr. C. Stewart demonstrated, under the microscope, the stridulating apparatus of a species of *Spherotherium*, differing in some respects from that described by Mr. Bourne (*infra*).—Dr. J. Murie exhibited and made remarks on the caudal end of the spine of a haddock with an arched deformity, recalling what is recorded of the so-called hump-backed cod (*Morrhua macrocephala*).—Mr. G. J. Fookes called attention to some twin-apples, of teratological interest. These were grown at Shepherd's Bush, upon a tree eighty years old, which last year was nearly barren, but this year produced abundantly, many of the fruits being good examples of syncarpy.—Prof. P. M. Duncan read a paper on the perignathic girdle of the Echinoidea. The author maintained that as the structures which give attachment to the muscles that protrude and retract the jaws of the Echinoidea (which are parts of the test surrounding the peristome within) are not homologous in all the families of the group, therefore it is unadvisable to retain the old name of "auricles." He suggests to substitute the term "perignathic girdle." The girdle consists of processes usually united above (though occasionally disconnected), and of "ridges" which connect the processes on the side remote from the ambulacra. The ridges are modifications of the inter-radial

plates, the processes developments from the ambulacral plates. In the Cidaridæ, the muscular attachments are all on disconnected ridges, and there are no processes. In the Temno-pleuridæ, Echinidæ, Echinometridæ, and Diadematidæ, the retractor muscles are attached to "processes" which are growths of the poriferous portions of the ambulacral plates; and the protractor muscles and ligament of the radiales are attached to the ridge which is developed on the inter-radial plates, and is united by suture to the base of the "process." In the Clypeastridæ there are disconnected growths which carry the jaws and have slight muscular attachments. In *Clypeaster* there are ten processes, each arising from an ambulacral plate; and there are no inter-radial structures like ridges. In *Laganum* there are five growths, each arising from a first inter-radial plate; hence these are the homologues of ridges. The Clypeastridæ may thus be divided into two groups, on account of the presence of processes in one, and of the homologues of ridges in the other.—Prof. Moseley communicated a paper on the anatomy of *Sphærotherium* by Mr. G. C. Bourne. The author mentioned that while the general exterior features and specific distinctions of the genus had been amply discussed, the internal structures had hitherto received scant attention. Among other anatomical peculiarities he describes a well-defined stridulating organ in the male. This consists of a prominent bolster-shaped swelling on the postero-external edge of the second joint of the second pair of copulatory appendages. The swelling occupies the entire margin of the joint, and shows a number of chitinous cross ridges and furrows. On the opposite interior surface of the last tergite are chitinous points. The former rasp-like organ of the second accessory appendages when rubbed rapidly against the latter produce a shrill note resembling that emitted by the house cricket. A true auditory organ exists in the antennary fossa beneath the eye. The tracheal system is unlike the majority of that of the Diplopoda, rather resembling that of Chilopoda and Insecta, though differing in the branched spiral filament not taking origin directly from the stigmata themselves. It appears that the tracheæ of *Sphærotherium* are a transition from those of the Julus type to those of the Scolopendra type. It would thus seem that the character of the tracheæ, the curved alimentary tract, the numerous chitinous pieces composing each segment, and the presence of a special hearing organ on the head, mark off the family Glomeridæ (to which *Sphærotherium* belongs) very sharply from the other families of the Diplopoda.—Prof. Moseley afterwards read extracts of letters from Mr. G. C. Bourne, who is now in the Chagos Archipelago, and from Mr. Sydney Hickson in the Celebes (Oxford graduates), and now investigating the natural history of the regions in question.—There followed a paper, contributions to South African botany, Orchideæ, part 2, by Mr. H. Bolus, with additional notes by Mr. N. E. Brown.

PARIS

Academy of Sciences, November 23.—M. Jurien de la Gravière, President, in the chair.—Observations of the minor planets made with the great meridian of the Paris Observatory during the third quarter of the year 1885, communicated by M. Mouchez.—Researches on the functions of Wrisberg's nerve, by M. Vulpian.—On a new theory of algebraic forms, by M. Sylvester.—On the sulphate of sparteine as a dynamic medicine and cure for the irregular action of the heart, by M. Germain Sée. This alkaloid (C₁₅ or C₁₃, H₂₆N₂), obtained in 1850 by Stenhouse from *Spartium scoparium*, is found to be a sovereign remedy for feeble, irregular, and abnormal pulsation. It also instantaneously restores enfeebled circulation, while preserving or increasing muscular vigour.—Action of lime (milk of lime) on the vine attacked by mildew, by the Duchess de Fitz-James. The author regards this preparation as the most practical, efficacious, and economical for vines attacked by mildew in the south of France.—Note on Lagrange's interpolating formula as presented by M. Hermite in *Crelle's Journal*, vol. lxxiv., by M. Bendixson.—Note on Kœnig's theorem regarding the living force animating a material system at a given moment, by M. Ph. Gilbert.—Application of the cryoscopic method to the determination of molecular weights, by M. F. M. Raoult. It is shown that by this method the molecular weight of any substance may be determined with great certainty, provided such substance, or one of its compounds, or one of its derivatives obtained by substitution, be soluble either in water, acetic acid, or benzene. It presents the further advantage that the results thus obtained are susceptible of verification in several ways.—Researches on

hypophosphoric acid (PHO₄,2HO or PH₃O₈,4HO), by M. A. Joly.—Heat of combustion of some substances of the fat series, by M. Louguine. The substances here studied with a view to determining their heat of combustion are: paraldehyde; normal propionic acid and anhydride; normal propionic acid purified and analysed by the author; aldol.—Note on a new method of chlorination, by MM. Albert Colson and Henri Gautier. Two points are established: (1) that the perchloride of phosphorus allows the introduction of a determined quantity of chlorine into the homologues of benzene; (2) that the chlorine liberated by the perchloride of phosphorus acts on the benzenic hydrogen only after being substituted for the hydrogen of the lateral series.—On the presence of methylic alcohol in the products derived from the distillation of plants with water, by M. Maquenne.—On the gutta-percha of *Bassia* (*Butyrospermum parkii*, G. Don, and its chemical composition, by MM. Ed. Heckel and Fr. Schlagdenhauffen. The gutta-percha obtained from this plant is shown to be in every respect comparable to, and in structure almost identical with, that yielded by the better-known *Isanandra gutta*, Hooker.—On the pretended circulation in the ganglion cells of animal organisms, by M. W. Vignal.—Remarks on the acicular apparatus of some Echinidæ of the Chalk and Tertiary epochs, by M. Munier-Chalmas.—Note on a meteor observed in Paris on November 18, by M. Stanislas Meunier.—On the shower of meteors which may, perhaps, accompany the transit of the earth through the descending nucleus of Biela's comet on November 27, by M. Zenker.—A second reply to M. Charpentier respecting the functions of the several elements of the retina producing the sensations of light, colour, and form, by M. H. Parinaud.—Observations on MM. Martel and de Launay's note on certain fragments of human crania and a fragment of pottery found in the cave of Nabriguas, and said to be contemporary with *Ursus spelæus*, by M. Émile Cartailhac. The author, who has several times visited this cave, is satisfied that it has been exposed to frequent inundations, and that, consequently, the ground has been disturbed even since the beginning of the Quaternary period. Hence, although man was certainly contemporary with *Ursus spelæus* in the west of Europe, he did not live in association with that animal, but probably took possession of the Nabriguas and other similar caves after its extinction in Neolithic times. The potsherd in question has been subjected to the action of fire, and is evidently of comparatively recent date, washed into the cave by the flood waters.

CONTENTS

PAGE

The Etiology of Cholera	97
A Manual of Telegraphy	98
Our Book Shelf:—	
Shepard's "Elements of Inorganic Chemistry"	98
Hand's "Numerical Exercises in Chemistry"	99
Millar's "Introduction to the Differential and Integral Calculus"	99
Letters to the Editor:—	
The Whole Duty of a Chemist.—Prof. William Odling, F.R.S.	99
A Stray Balloon.—Gen. Sir J. H. Lefroy, F.R.S. "Evolution without Natural Selection."—Charles Dixon; George J. Romanes, F.R.S.	100
On Radiation of Heat from the Same Surface at Different Temperatures.—J. T. Bottomley	101
The November Meteors. By W. F. Denning; Prof. A. S. Herschel; Admiral Sir Erasmus Ommanney, F.R.S.; Robert Leslie; F. T. Mott; E. F. Bates; Percy T. Ingram; James Smieton; G. J. Symons, F.R.S.	101
The Late Sir William Siemens	104
Notes	105
Our Astronomical Column:—	
The Dearborn Observatory	107
Astronomical Phenomena for the Week, 1885, December 6–12	107
Geographical Notes	108
Explosions in Coal Mines. By Sir Frederick Abel, F.R.S.	108
The Royal Society. Address by the President, Prof. T. H. Huxley	112
University and Educational Intelligence	119
Scientific Serials	119
Societies and Academies	119