

last year; and the donations 33*l.* 2*s.*, as against 18*l.* There had been several large legacies realised, amongst them one of 405*l.* from Mrs. George Oakes.

MANCHESTER.—We understand that a sum of 1500*l.* has been offered by a benefactor to the Council of Owens College for five fellowships of 100*l.* a year, each renewable for a second or third year, the conditions being that they shall be awarded on evidence given by the candidates of their past work in literature or science, and on their satisfying the electors as to their subsequent devotion to original work. The scheme is as yet only under consideration. We likewise understand that Mr. Waterhouse is preparing plans for completing a portion of the buildings required for Owens College, including museums for natural history, geology, and mineralogy, and for the lecture-rooms and laboratories required for the professors of the above subjects.

On Saturday next (May 21) Prof. Boyd Dawkins, F.R.S., will begin the seventh series of Field Lectures in Geology, at Miller's Dale Station, Derbyshire. That and the two following Saturdays will be devoted to the examination of the Carboniferous rocks of the Pennine Chain. On Saturday, June 9, the class will visit the British Museum (natural history) under the guidance of Dr. Woodward, F.R.S., for the study of the mammalia associated with Pleistocene Man. On June 10 the brickfields at Crayford and Erith, in Kent, will be visited under the guidance of Mr. F. C. Spurrell; and on the 11th the subject of the Antiquity of Man will be finished by an examination of the collections of prehistoric archaeology in the British Museum (Bloomsbury).

THE Queen has directed letters patent to be passed under the Great Seal granting and declaring that the degrees of Bachelor and Master of Arts and Bachelor and Doctor of Medicine, of Laws, of Science, and of Music, granted or conferred by the University of Adelaide, South Australia, on any person, male or female, shall be recognised as academic distinctions and rewards of merit, and be entitled to rank, precedence, and consideration in the United Kingdom and in the colonies and possessions of the Crown throughout the world, as fully as if the said degrees had been granted by any university of the United Kingdom.

### SCIENTIFIC SERIALS

*Journal of the Royal Microscopical Society* for April, 1881, vol. i. ser. ii. part 2, contains—Prof. P. Martin Duncan, on a Radiolarian and some Microspongidae from considerable depths in the Atlantic Ocean (plate 3).—Dr. Lionel S. Beale, the President's address.—Prof. E. Abbe, on the conditions of orthoscopic and pseudoscopic effects on the binocular microscope.—A. D. Michael, on a species of *Acarus* believed to be unrecorded (plate 4).—Prof. E. Abbe, on the estimation of aperture in the microscope. The summary of current researches, pp. 217–364.—Proceedings of the Society. (In the summary of current researches appears a memoir by Mr. Crisp, "On Aperture, Microscopical Vision, and the Value of Wide-Angled Immersion Objectives," in which the whole subject is very exhaustively and clearly put.)

*Annalen der Physik und Chemie*, No. 4.—Experimental investigation of the connection between refraction and absorption of light, by E. Ketteler.—On the ratio of intensity of the two sodium lines, by W. Dietrich.—On the condensation of gases on surfaces in their relation to pressure and temperature, by H. Kayser.—Influence of pressure on the surface-tension of liquids, by A. Kundt.—Variations of the vapour-density of some esters with pressure and temperature, by P. Schoop.—On differences of tension between liquids touching each other, with reference to concentration, by E. Kittler.—On electric ring-figures and their alteration of form by the magnet, by E. Reitlinger and F. Wächter.—On the divergence of Ampère's theory of magnetism from the theory of electro-magnetic forces, by J. Stefan.—On some remarks of Herr C. Neumann on electro-dynamics, by R. Clausius.—The law of Clausius and the motion of the earth in space, by E. Budde.—On the extent of the electric expansion in glass and caoutchouc, by Dr. J. Korteweg and V. A. Julius.—The glass plate battery, by Th. Erhard.—Some remarkable properties of flames, by W. Holtz.

*American Journal of Science*, April.—Monograph by Prof. Marsh on the Odontornithes, or toothed birds of North America, by G. B. Grinnell.—On some elements in orographic displacement, by W. J. McGee.—On the indices of refraction of certain compound ethers, by J. H. Long.—On the Whitfield County,

Georgia, meteoric iron, by W. E. Hidden.—The basin of the Gulf of Mexico, by J. E. Hilgard.—On the geology of Florida, by E. A. Smith.—The magnetic survey of Missouri, by F. E. Nipher.—American sulpho-selenides of mercury, by G. J. Brush.—Analysis of Onofrite from Utah, by W. J. Comstock.—Effect of great cold on magnetism, by J. Trowbridge.—Channel fillings in Upper Devonian shales, by H. S. Williams.—A new order of Jurassic reptiles (*Cælia*), by O. C. Marsh.—Discovery of a fossil bird in the Jurassic of Wyoming, by the same.—American pterodactyls, by the same.

*Journal of the Franklin Institute*, March.—Experiments with the Perkins machinery of the *Anthraxite*, by Mr. Isherwood.—The wearing power of steel rails in relation to their chemical composition and physical properties, by Dr. Dudley.—Note on steam cylinders, by Prof. Marks.—Novel mode of originating an index wheel, by Dr. Grimshaw.—The polarisation of sound and the nature of vibrations in extended media, by Prof. Robinson.—Gyroscope model for class-illustration, by Dr. Rand.

*Reale Istituto Lombardo di Scienze e Lettere*. Rendiconti, vol. xiv. fasc. vii.—Grafts of the vine, by Count Trevisan.—On the determination of maximum moments, &c. (continued), by Prof. Clericetti.—On two rare helminths of reptiles, by Prof. Pavesi.

### SOCIETIES AND ACADEMIES

#### LONDON

Royal Society, April 28.—"The influence of Stress and Strain on the Action of Physical Forces." By Herbert Tomlinson, B.A. Communicated by Prof. W. Grylls Adams, M.A., F.R.S. Part I.—Elasticity. "Young's Modulus."

The values of "Young's modulus" were determined for several metals by a method devised by Sir W. Thomson.

A large number of experiments with different loads were made, and after a great many unsuccessful attempts to account for certain discrepancies which could not be explained away as errors of observation, the following facts were elicited:—

1. After a wire has suffered permanent extension, the temporary elongation which can be produced by any load becomes less as the interval between the period of permanent extension and that of applying the load becomes greater.

2. This increase of elasticity is greater in proportion for large loads than for small ones.

3. The increase of elasticity takes place whether the wire be allowed to remain loaded or unloaded between the period of permanent extension and that of the testing for the elasticity.

4. The rate of increase of elasticity varies considerably with different metals; with some the maximum elasticity is apparently attained in a few minutes, and with others not till some days have elapsed, iron and steel being in this last respect very remarkable.

5. The elasticity can also be increased by heavily loading and unloading several times, the rate of increase diminishing with each loading and unloading.

6. A departure from "Hooke's law" more or less decided always attends recent permanent extension, even when the weights employed to test the elasticity do not exceed one-tenth of the breaking weight.

7. This departure is diminished very noticeably in the case of iron, and much less so in the case of other metals, by allowing the wire to rest for some time either loaded or unloaded; it is also diminished by repeated loading and unloading.

The effect of permanent extension on the value of "Young's modulus" was tried according to the direct method for iron and copper, and indirectly for most of the metals.

From both the direct and indirect methods results were obtained which showed:—

1. That, in all metals, provided the wire has not been kept heavily loaded for some time before testing, permanent extension produces decrease of elasticity, if the strain be not carried beyond a certain limit.

2. That, if the extension be carried beyond the above-mentioned limit, further permanent increase of length causes increase of elasticity.

3. That, in the case of iron, heavy loading for some time so increases the elasticity that, even when the extension would have caused diminution of elasticity without such continued loading, the latter will, if sufficient time be allowed, change this diminution into an increase; in the case of copper this is not so.

The effect of suddenly chilling steel heated to a high tempera-