the rocking arms have been finally reduced to hardened steel pins of small diameter, and so mounted that their motions, when of small range, should be rolling not sliding motions, and great delicacy is thus obtained. The centre of gravity is brought to within 0·0065 in. of the axis of suspension, and the time of a single swing is over thirty-five seconds. Yet so great is the delicacy of the suspension, a weight of $\frac{1}{250000}$ part of that of the wheel itself, if placed at its extreme radius, will produce an oscillation of $1\frac{1}{4}$ in, in range, and which will continue for many minutes; or if the wheel be moved 90° from its position of rest, the oscillations will continue for nearly twenty minutes, the movement being so slow and solemn as to impress on the mind of an observer who had not seen it put in motion that the action was self-originated, or induced by some mysterious agency. The oscillation of a ship can scarcely communicate any motion at all to the wheel, and any minute rotation which is, in fact, communicated will assume the form of an oscillation, having so long a "period" that its effects will be easily separable from those proper to the oscillation of the ship. Thus the indications will be more exact than those produced by the rocking arm on deck. This improved apparatus has not yet been tried, but is ready, waiting a suitable day for trial on board a ship at Plymouth.

Mr. Froude stated that though the apparatus he had described was purely his own invention, it had interested him greatly to learn recently that an arrangement substantially identical with that combination which he first described had about two years previously been invented and successfully used by an able French naval architect (M. Bertin, of Cherbourg), with whom, partly in virtue of this circumstance, it has since been his good fortune to become acquainted and to correspond. It was, however, a satisfaction to him that he was at the present time ahead of his friendly competitor in the race, so far as regarded the delicately-hung heavy fly-wheel which was to furnish an automatic constant record of the angles or absolute rolling or deviations from the horizontal assumed at each moment by the ship.

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, Aug. 5.—Prof. Cayley presented a memoir on Orthogonal Surfaces.—M. E. Becquerel communicated a spectroscopic analysis of the light emitted by the phosphorescent uranium compounds.—M. Daubrée presented a note on the discovery of a second meteorite, which fell on the 23rd of July last, in the canton of St. Amand (Loir-et-Cher). This appears to have formed part of the fall noticed at the meeting of the Academy on July 29.—A long letter, illustrated with figures, from Father Secchi, on the solar eruption observed on July 7, and on the phenomena which accompanied it, was communicated. In this paper the author referred to the phosphorescent light emitted by certain animals, and upon this subject MM. de Quatrefages, Milne-Edwards, and E. Becquerel made some remarks.—M. Dumas read an important memoir on alcoholic fermentation, and a note on the ferments belonging to the diastase group.—MM. Favre and Valson presented a continuation of their researches upon crystalline dissociation.—M. G. Ville presented a memoir on the quick quantitative determination of phosphoric acid.—A note by M. Houzeau, on the decolorising power of concentrated ozone, was read, and upon this M. P. Thenard made some remarks.—M. Wurtz presented a note by M. E. Grimaux, on some derivations of tetrachloride of naphthaline.—A note was read by M. Sirodot on a bone-deposit situated at the foot of Mont Dol, containing bones and teeth of elephant, horse, ox, rhinoceros, and other mammals, generally broken and often calcined, with a few fragments of flints and at least one stone implement.—M. C. Sainte-Claire Deville presented a note by M. Gorceix, containing a summary of the phenomena presented by the volcano of Santorin at the close of the eruption of 1866, or from December 1869, to October 1871.—M. T. Lestiboudois presented a note on what he calls heterogeneous Dicotyledons, or those which do not produce their new tissues exclusively in the generative zone between the wood and the bark.—M. Duchartre communicated a note by M. J. Duval Jouve on a form of epidermic cell which appears to be peculiar to the Cyperaceæ.—M. de Quatrefages read a memoir on the Mincopies and the Negrito race in general, containing a discussion of the characters of the Andaman islanders, and of their relations to the other black races of man.—M. Blanchard presented a note by M. J. Kunckel on the development of the striated muscular fibres in insects, in which the author maintains that the primitive element of the muscle is a cell, which, by its elongation, forms the fibrilla, the fibre or primitive bundle being a secondary formation.—M. Blanchard also communicated a note by M. A. Tillot on the embryonic form of the Hairworms (*Gordius*), in which the development of those parasites from the egg is described, and they are shown to possess, in the embryonic state, some analogy with the *Echinorhynchi*.—A note by M. J. Gerbe on the formation of the adventitious products of the ovum of the Plagiostomi was presented by M. C. Robin.

August 12.—Prof. Cayley communicated a continuation of his memoir on orthogonal surfaces.—M. Yvon Villarceau presented a further memoir on the applications of his new theorem of general mechanics to the equilibrium of gases.—General Morin presented a report upon a memoir by M. Graeff, on the action which the breakwater of Pinay exerts upon the floods of the Loire at Roanne.—A note on the vibrations of cords and rods in liquids, by M. E. Gripon, was read.—M. Pasteur presented a note, by M. E. Brauly, on the measurement of the intensity of currents by means of the electrometer.—A note, by M. Broun, on magnetic variations observed at Trevandrum during the eclipse of December 11, 1871, was presented; as also a note containing observations of meteors at various stations on August 9, 10, and 11, by MM. Le Verrier and Wolf.—A short note on the observations relating to presence of magnesium in the chromosphere of the sun, by M. Tacchini, was transmitted by M. Faye.—MM. Favre and Valson presented the continuation of their thermo-chemical researches upon crystalline dissociation.—M. Berthelot presented a note on the partition of a base between several acids in solutions, in which he treated of the monobasic acids; and M. Pasteur communicated a note, by M. E. Jungfleisch, on the conversion of right tartaric acid into racemic acid by exposure to heat in the presence of water.—M. Dumas called attention to some researches, by M. Latimau, on *Phylloxera vastatrix*.—M. Brongniart presented a detailed report upon a most important memoir, by M. Grand-'Eury, on the Carboniferous flora of the Department of the Loire.

BOOKS RECEIVED

FOREIGN.—Through Williams and Norgate—Alexander von Humboldt, 3 vols.: Karl Bruhns.—Etudes sur les Facultés des animaux comparés à celles de l'homme: J. C. Houzeau, 2 vols.—Oeuvres des Verdet, Tome vii.—Théorie mécanique de la chaleur: E. Verdet, Vol. i. and Vol. ii., Parts 1 and 2.

AMERICAN.—Report of the Palæontology of Eastern Nebraska: T. B. Meek.

CONTENTS

ERRATA.—Vol. vi., p. 382, Section C, Geology, line 7, for "graptolite" read "graptolites;" line 20, for "*T. serrus*" read "*T. serra*;" line 25, for "*Dictyograptus*" read "*Dichograptus*;" line 31, for "*Phyllograptus*" read "*Ptilograptus*;" line 35, for "not" read "two."