

never exceed  $2\frac{1}{2}$  knots, and that this velocity will be reached only for a few hours at the equinoctial syzygies every year. It is incidentally stated that the Canal will be 72 kilometres long, 21 metres wide at bottom, with a slope of  $45^\circ$ , and a depth of 11.50 metres below the mean level at Panama, and of 9 metres below that of Colon.—Observations of Barnard's Comet (1887 *e*) made at the Algiers Observatory with the 0.50 m. telescope, by MM. Trépied and Rambaud. These observations give, in tabulated form, the apparent right ascension, the declination, and number of comparisons with other stars for the period from May 16 to May 24; also the positions of the stars and the apparent positions of the comet for the same period.—On simultaneous linear equations with partial derivatives of the second order, by M. Painlevé. Some remarks are offered in connexion with M. Goursat's recent paper on this subject, including the explanation of a different method for obtaining the same results.—On a melograph, by M. J. Charpentier. The apparatus here described and presented to the Academy have been devised and constructed for the purpose of offering a solution of the problem relating to the fixation of musical improvisations, and are applicable to the piano type of instruments.—On the vapour-tensions of liquid cyanogen, by MM. J. Chappuis and Ch. Rivière. While studying the compressibility of cyanogen the authors have had occasion to measure some maxima tensions of this gas, with results differing considerably from those obtained by Faraday and Bunsen. The discrepancies are attributed partly to the great difficulty of introducing cyanogen free from nitre into the barometric chamber; but chiefly to the manometric methods employed by those physicists, these methods being much inferior in accuracy to the open air manometer adopted by the authors.—On the reproduction of a carbonate of soda known as urao and trona, by M. Paul de Mondésir. These remarks are intended to throw some light on the subject of sesquicarbonate of soda, under which title are grouped various more or less unsatisfactory data and observations.—Action of selenious acid on the bixide of manganese, by M. P. Laugier. During the course of his researches to discover an oxygenated product  $Se_2O_3$  corresponding to  $S_2O_6$ , obtained by the action of sulphurous acid on the bixide of manganese, the author has obtained some new compounds, here described, resulting from the combination of selenious acid with the sesquioxide of manganese.—On a simplified calcimeter, by M. A. Bernard. For the apparatus here described it is claimed that it possesses several advantages over that of Scheibler, although based on the same principle.—Researches on the relations existing between the spectrum of the elements of inorganic substances and their biological action, by Mr. James Blake. The author's further researches with over forty inorganic elements confirm his previous conclusions; all except nitrogen and potassium showing a definite relation between their biological action and their conditions of isomorphism.

BERLIN.

Physical Society, May 20.—Prof. Du Bois-Reymond, President, in the chair.—Dr. Gross spoke on the electrical condition of magnets during their magnetization. His experiments were made with Joule magnets. A cylindrical piece of iron was split along its axis, and the lower half of the cylinder surrounded lengthways by the spiral wire which conveyed the magnetizing current, completely insulated from it; the ends of the upper half of the cylinder were perforated by copper spikes, which were then connected by means of copper wires with a galvanometer so as to form a closed circuit. After this circuit, which included the upper half-cylinder, had been brought into electrical equilibrium, the magnetizing current (in the spiral surrounding the other half of the cylinder) was reversed, and the galvanometer gave a throw. The direction of the current thus indicated was always opposite to that of the magnetizing current passing along the inner surface of the half-cylinder. The speaker thought himself justified in excluding the possibility of this result being due to a simple inductive action of the magnetizing current on the galvanometer circuit, inasmuch as when the iron half-cylinder was replaced by one of copper the galvanometer then gave no throw. (In the discussion which followed it was remarked, in opposition to this view, that the resistance of the galvanometer was too great to admit of its indicating a simple induced current when experimenting with the copper half-cylinder.) Similarly, Dr. Gross is inclined to exclude as an explanation any induction of the magnet upon itself, and thinks that the cause of the current is the difference of potential between the inner and outer side of the cylindrical magnet. This point

he proposes to investigate carefully in a future series of experiments.—Prof. Lampe criticised two papers which appeared last year in the *Repertorium für Physik*, of which one contained an explanation of gravitation, the other treated of the motion of a Foucault pendulum. The speaker pointed out very fully the mathematical and physical mistakes which had made it possible for the author of the first paper to regard gravitation as due to the rotation of the earth.—Prof. von Bezold gave an extremely lucid description of Sprung's balance-barograph.—Prof. C. W. Vogel communicated the most recent discovery in connexion with instantaneous photography, by which it is now possible to obtain instantaneous photographs not only at night but also in the darkest places. Messrs. Goedicke and Miethe have prepared a mixture of pulverized magnesium, chlorate of potash, and sulphide of antimony, which when ignited produces an explosive lightning-like illumination of such intensity that by means of it an instantaneous photograph can be taken. The speaker then gave a demonstration of the discovery by taking photographs of several persons present; he used the artificial light, of which each flash lasted one-fortieth of a second, and in a few minutes produced a picture during the meeting. The powders, as prepared by the discoverers, cost only a few pennings each, and will hence readily come into general use.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Papers and Proceedings of the Royal Society of Tasmania for 1886.—Guide to the Science of Photo-Micrography: E. C. Bousfield (Kent).—Questions on Physics: S. Young (Rivingtons).—Encyclopædie der Naturwissenschaften, Erste Abth. 52. Lief., Zweite Abth. 42 and 43. Lief. (Trewendt, Breslau).—Elements of Physiological Psychology: G. T. Ladd (Longmans).—Les Pigmées: A. de Quatrefages (Baillière, Paris).—Official Record, New Zealand Industrial Exhibition, 1885.—Report of the Metropolitan Board of Works, 1886.—British Dogs, No. 7: H. Dalzel (Gill).—Bees and Bee-keeping, vol. ii. Part 8: F. R. Cheshire (Gill).—Reports of Experiments with various Insecticide Substances (Washington).—Our Shade-Trees: C. V. Riley (Washington).—Bulletin of the Iowa Agricultural College, November 1886 (Iowa).—Report of the Felsted School Natural History Society, 1886.—Diseases of the Hair, &c.: J. Startin (Harrison).—International Journal of the Medical Sciences, April (Cassell).—Journal of the College of Science, Imperial University, Japan, vol. i. Part 2 (Tokyo).

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