

Dwight. In this paper (No. 6 of the series) the author deals with the discovery of additional fossiliferous Potsdam strata and pre-Potsdam strata of the Olenellus group near Poughkeepsie. This review of the latest palæontological facts makes it evident that the strata in Dutchess County are simply the continuation of the strata characterizing the Taconic and adjoining series lying northward. But while proving a grand unity, they indicate also an interesting and unexpected variety of rock structure.—Image transference, by M. Carey Lea. By image transference are here denoted curious effects produced on sensitive films, and specially interesting in connexion with the subjects of papers which appeared in the May and June numbers of the journal. In supplement to those papers the possibility is here shown of developing on a film of silver haloid a complete image, a print from a negative for example, without either exposing the silver haloid to light, or to the action of hypophosphite, or subjecting it to any treatment whatever, between the moment of its formation and that of its development. The film of silver haloid comes into existence with the image already impressed upon it.—The theory of the wind vane, by George E. Curtis. The author's theoretical studies lead to the inference that the oscillations of both spread and straight vanes are smaller as the vanes are longer and larger; that the spread is always more stable than the straight vane; and that this advantage in stability is greater for long than for short vanes, and is independent of the wind velocity.—On the manner of deposit of the glacial drift, by O. P. Hay. The author's studies of this great geological problem lead to the following conclusions: (1) an ice-sheet moving over a nearly level surface would possess far less abrading power than it would have while descending at a higher angle; (2) through subsidence of the glacial mass by the earth's heat and other causes a constantly increasing proportion of inert matter would collect in the lower-layers of the moving ice; (3) this accumulated material would tend to retard and finally arrest the motion of the lower portions of the glacier, and a permanent deposit would then be gradually made; (4) other detritus might accumulate at the foot of the glacier as a terminal moraine, and still other masses on the top of the already formed deposit when the glacier finally melted.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 5.—M. Hervé Mangon in the chair.—Photochronography applied to the dynamic problem of the flight of birds, by M. Marey. Having in a previous note shown that the kinematics of flight may be completely illustrated by photochronography, the author here proves that the same process contains all the elements necessary for solving the dynamic problem of flight; that is to say, for measuring the muscular forces and the work performed by the bird. Here is applied the mechanical principle that, if the mass of a body and the movements animating it be known, it is possible to deduce the value of the forces by which those movements are produced. On the photochronograph are measured all the displacements of the mass of the bird on the wing, together with the velocities of these movements. On the other hand the weight, that is, one of the forces to which the mass is submitted, is also known, while the resistance of the air, another of these forces, may be determined experimentally. Consequently the unknown quantity to be eliminated will be the muscular force of the bird with its momentum of action, and the value of its two components, one acting vertically against the weight, the other horizontally against the inert resistance of the mass and of the air. In these experiments the displacements of the bird are successively measured according to these two vertical and horizontal elements.—Measurement of luminous sensations in function of the quantities of light, by M. Ph. Breton. Since the invention of Bouguer's photometer it is known that if a dull white surface be disposed in contiguous zones receiving equi-different quantities of light, the perceptible contrasts between such zones are very far from being equal. To explain this phenomenon it has been suggested that the eye perceives the relation between two contiguous lighted surfaces. But the law (attributed to Fechner and Weber) based on this assumption—to the effect that, if several contiguous luminous surfaces are in geometrical progression, the sensations of the contrasts are equal—is shown to be incorrect by the experiment here described.—Observations of Brooks's new comet, made at the Observatory of Algiers with the 0.50-metre telescope, by

MM. Trépied, Rambaud, and Sy.—Observations of the same comet made at the Observatory of Lyons with the 6-inch Brunner equatorial, by M. Le Cadet. The positions of this comet for August 29 and 30 and September 1 are also given from measurements taken by M. Gruey at the Observatory of Besançon. Its brightness is that of a star of the tenth magnitude.—Differential formulas for the variation of the elements of an orbit, by M. R. Radau. To correct a provisional system of elements it is often preferable to have recourse to the equations supplied by the ephemerides, rather than repeat the direct calculation of the elements. But the method is somewhat laborious, as the equations generally include six unknown quantities. The author, however, here shows that it is possible to give them a form in which the number of unknown quantities will be diminished without causing any complication in the calculation of the coefficients.—Note on M. Bertrand's problem, by M. Désiré André. A direct solution is given of this problem, followed by some remarks by M. Bertrand himself, pointing out its application to the question of chances in games of hazard as treated by Huygens, Moivre, Laplace, Lagrange, and Ampère. He offers a fresh solution of the problem: if a player stake the n th part of his fortune and continue the game indefinitely, what is the probability of his being ruined within a given number of rounds?

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

A Revised Currency System: H. Bull (Hamilton).—Laws and Definitions connected with Chemistry and Heat: R. G. Durrant (Rivingtons).—Educational Ends: S. Bryant (Longmans).—Challenger Report, Zoology, vol. xv. (Eyre and Spottiswoode).—A Short Introduction to the Study of Logic: L. Johnstone (Longmans).—The Instability of Gold as a Standard of Value: H. Bull (Hamilton).—The Eruption of Tarawera, N.Z.: S. P. Smith (Wellington).—The Iceery or Fluted Scale (Washington).—U.S. Department of Agriculture, Division of Entomology, Bulletins No. 13 and 14 (Washington).—Kryptogamen-Flora von Schlesien, iii. Band, 3 Lief. (Kern, Breslau).—Beiblätter zu den Annalen der Physik und Chemie, 1887, No. 8 (Barth, Leipzig).

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