

other animals. The general conclusion is arrived at that the impression communicated through the senses is the true instrument of intellectual progress, and that in it lies the potentiality of abstract science. Pure geometry, arithmetic, and algebra are merely the last term of abstract simplification reached by the sensuous perception in its intrinsic evolution.

IN the *Nuovo Giornale Botanico Italiano* for July, Sig. P. Voglino publishes critical remarks on a number of species of Fungi belonging to the Agaricini; and Prof. Caruel gives his Annual Report of the Botanical Museum of Florence for the year 1885-86.—Prof. Delpino discusses the chemical and physiological equation of the process of alcoholic fermentation, which he considers to be more simple than it has been regarded by recent writers. Succinic acid and glycerin, which are found in the liquid after fermentation, he believes to be only secondary products of the process, which consists in the simple removal from grape-sugar of a portion of its carbon and oxygen, and its consequent reduction to the constitution of alcohol.

## SOCIETIES AND ACADEMIES.

### PARIS.

**Academy of Sciences, August 29.**—M. Hervé Mangon in the chair.—On tornadoes in the United States, by M. H. Faye. Some observations are made in connexion with the popular work on tornadoes recently issued by Mr. Finley, of the United States Signal Service. In reply to that writer, M. Faye maintains that tornadoes are not ascending but descending movements, being whirlwinds with vertical axes due to the different velocities of moderately elevated atmospheric currents, which, like the eddies in running waters, always descend till arrested by the resistance of the ground. They penetrate like a corkscrew through the lower strata, continually contracting and tapering to a point owing to the increasing pressure of these lower strata. Their progressive movement, mainly towards the north-east, is due to the upper currents where they take their rise, and whose mean velocity and direction they retain. Their ravages are due to the violent shock of the descending spirals against the obstructions of the ground, and their fury is not spent or diminished in overcoming these obstacles, because the source of their energy is always in the upper regions, where it is constantly renewed and transmitted to the earth by the descending motion. It is further shown that the United States comply more than any other region of the globe with the conditions most favourable for the development of these destructive cyclones.—Observations of Barnard's comet, May 12, 1887, made at the Observatory of Bordeaux with the 0.38 m. equatorial, by MM. G. Rayet and Flamme.—Determination of the longitude of Haiphong, Tonquin, by telegraphy, by M. F. La Porte. Its longitude was for the first time determined in 1874 by MM. Héraud and Bouillet, who deduced it from that of Saigon. But at the beginning of this year the meridian of Haiphong was connected with that of Hong Kong by means of the submarine cable, and from the observations taken at both extremities a mean was obtained for the cathedral of Hong Kong of 7h. 27m. 20.43s., and for the Observatory of Haiphong, 6h. 57m. 22.63s. east of Paris. For the latter point Héraud's chronometric observations had given 6h. 57m. 19.8s.—Note on a projection saccharimeter, by M. Léon Laurent. The saccharimeters already constructed by the author are of two types: the rotatory polarimeter, requiring monochromatic light; and the compensating saccharimeter, more specially adapted for sugar, and using ordinary light. The present apparatus, of which a sectional view is given, has the advantage of being adapted for use with the electric light now so generally employed in large scientific establishments.—Experiments in agricultural chemistry, by M. J. Raulin. The experiments here described were carried out last year at the agricultural station of the Rhone. Their special object was to ascertain how the disturbing influences due to the varying fertility of the soil may best be obviated. The land being disposed in three equal plots, A, B, C, the extremes A and C are treated identically, while B serves as the point of comparison for the special circumstance under consideration. Normally the fertility increases or diminishes with a certain uniformity from A to C, so that half of the joint yield of A + C would be equal to that of B if the three plots were subjected to the same treatment. The cause of error due to the inequality of the soil being thus for the most

part removed, the relation of the yield of  $\frac{A+C}{2}$  to that of B will express the actual influence of the circumstance under consideration. In an experiment carried on according to this method, the superphosphate and precipitated phosphate used with Dattel wheat gave a very decided increase, while the result of the application of fossil phosphates and scorie was somewhat doubtful.—Note on the waterspout of August 19 on the Lake of Geneva, by M. Ch. Dufour. This waterspout, formed by the collision of the west and the *vauclaire* or south wind, immediately disappeared on reaching the shore half a mile west of the Rivaz railway-station on the Swiss side. From the data supplied by various observers the author calculates its height at about 106 metres. It churned up the surface of the lake, producing an effect somewhat like that of paddle-steamers, but did no damage of any kind on the land.—M. R. Guérin presented a note on a process by means of which the question of the lunar atmosphere might be elucidated. He remarked that the diurnal motion of the moon, owing to its proper motion, is not the same as that of a star. Hence, under certain conditions, a photographic lunette would give to our satellite a sharp edge, and for a star in the neighbourhood of this edge a luminous streak. It therefore seems certain that, however attenuated may be the lunar atmosphere, the photogenic conditions will be changed at the point of contact of the two heavenly bodies, and that the streak made by the image of the star should show some trace of this change.

## BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Animal Alkaloids: Sir W. Aitken (Lewis).—City and Guilds of London Institute Programme of Technological Examinations, Session 1887-88.—First Steps in Geometry: R. A. Proctor (Longmans).—Easy Lessons in the Differential Calculus: R. A. Proctor (Longmans).—Australian Museum; Report of Trustees.—A Treatise on the Animal Alkaloids: A. M. Brown (Baillière).—Hydrophobia: R. Suzor (Chatto and Windus).—The Glasgow and West of Scotland Technical College Calendar for the year 1887-88 (Anderson, Glasgow).—Elementos de Calculo de los Cuaterniones: V. Balbin (Buenos Aires).—Les Plantes des Champs et des Bois: G. Bonnier (Baillière, Paris).—Bench Book for Test-Tube Work in Chemistry: H. T. Lilley (Hamilton).—Notes upon the History of Floods in the River Darling: H. C. Russell.—Notes upon Floods in Lake George: H. C. Russell.—Results of Rain and River Observations made in New South Wales and part of Queensland, 1886: H. C. Russell (Sydney).—Journal of Chemical Society, September (Gurney and Jackson).

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