agencies of development, to which the comprehensive system in its structure and physiognomy points. Whatever there is of system in the greater feature-lines, whether marked in troughs or in mountain chains, or island ranges, must come primarily from systematic work within. The work may have been manifested in long lines of flexures or fractures as steps in the process, but the conditions which gave directions to the lines left them subject to local causes of variation, and between the two agencies, the resulting physiognomy has been evolved.

We have from the Pacific area one observation of a volcanic nature bearing on the comprehensiveness of the system of feature lines in the oceans, and although I have already referred to it, I here reproduce the facts for use in this place.

If the ranges of volcanic islands were, in their origin, lines of fissures as a result of comprehensive movements, the lines should continue to be the courses of planes of weakness in the earth's crust. The New Zealand line, including the Kermadec Islands and the Tongan group, has been pointed to as one of these lines, and one of great prominence, since it is the chief north-eastward range of the broad Pacific, and nearly axial to the ocean. The series of volcanoes along the axis of New Zealand is in the same line. It was noticed, at the Tarawera eruption of 1883, that *four or five days after* the outbreak, and three after it had subsided, White Island, in the Bay of Plenty, at the north end of the New Zealand series, became unusually active; and *two months later* there was a violent eruption in the Tonga group, on the Island of Niuafou. The close relation in time of the latter to the New Zealand eruption is referred to by Mr. C. Trotter, in NATURE of December 7, 1886.[1] May it not be that these disturbances were due to a slight shifting or movement along a series of old planes of fractures, taking place successively from south to north; and, hence, that even now changes of level may take place through the same comprehensive cause that determined the existence of the earth's feature lines? Owing to the long distance of the Tonga group from New Zealand an affirmative reply to the question cannot be positively made. But there is probability enough to give great interest to this branch of geological enquiry. JAMES D. DANA.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, July 28.—M. Hermite in the chair.—Aquatic locomotion studied by photo-chronography, by M. Marey. The author has made similar investigations on animal locomotion to those of Mr. Muybridge, but with different apparatus. A single camera, the sensitive plate of which takes the form of an endless band moving past the focus of the lens, has been used in the investigations, and appears to possess many advantages over the multiple camera system. The contractions and dilatations of the body of the medusa, the undulations of the lateral fins of the ray, and the rapid movements of the dorsal fin of the *Hippocampus* (sea-horse), have all been analyzed, and in the zoëtrope the successive photographs appear to have reproduced the motions to perfection.—Observations, orbit, and ephemeris of the comet discovered by M. Coggia (*b* 1890) at Marseilles Observatory, by M. Stephan.—On the observation of the annular eclipse of the sun of June 17, by M. A. de la Baume Pluvinel. A detailed description of the instruments employed by the author for his observations in Canea (Island of Crete) is given. As previously noted (NATURE, July 10), the results give further support to the view that the oxygen absorption bands in the solar spectrum are of telluric origin.—Observations of the minor planet recently discovered by M. Charlois (294), made with the *coudé* equatorial and the Foucault telescope at Algiers Observatory, by MM. Rambaud and Sy. Some observations of position and comparison stars are given.—Observations of Coggia's comet, made with the great equatorial of Bordeaux Observatory, by MM. Picart and Courty.—Observations of the same comet made at Paris Observatory, by Mdlle. D. Klumpke.—On a new method of exposition of the theory of theta functions, and on an elementary theorem relative to hyperelliptic functions of the first dimension, by M. F. Caspary. It is shown that the fifteen hyperelliptic functions of the first dimension are proportional to the fifteen elements of an orthogonal system.—Earthquakes in Madagascar, by M. R. P. Colin, Director of the Antananarivo Observatory. The five earth-tremors observed this year appear to have had an influence on the azimuth error of the transit instrument.—On the water of crystallization of neutral sulphate of alumina; analysis of a natural product, by M. P. Margueritte-Delacharlonny. The analysis of two samples of definitely crystallized natural sulphate of alumina from Bolivia supports the author's previous conclusion that its formula should be written with sixteen instead of eighteen molecules of water of crystallization.—On the optical rotatory power of camphor in solution in various oils, by M. P. Chabot. The author finds that the rotation produced by the solutions is sensibly proportional to their strengths, and that, after allowing for the slight rotation due to the oil, the calculated molecular rotatory power of camphor is practically constant.—On the malonates of lithia and on the malonate of silver, by M. G. Massol. Some experiments on the heats of formation are given.—Researches on the optical dispersion of organic compounds; fatty acids, by MM. Ph. Barbier and L. Roux. The authors have examined the normal fatty acids from formic to pelargonic as well as isobutyric and isovaleric acids, and find that the specific dispersive powers increase with the molecular complexity, and that those of isomeric acids are practically equal, though the normal acids have slightly the higher value.—On the presence of furfural in commercial alcohols, by M. L. Lindet.—Contribution to the study of artificial musk, by M. Albert Baur.—Mode of action of bacterial secretions on the vasomotor nervous system; connection between these phenomena and diapedesis, by MM. A. Charrin and E. Gley.—Does hæmoglobin exist in the blood as a homogeneous substance?, by M. Christian Bohr.—On the identity of structure of the central nervous system of Pelecypoda and other Mollusca, by M. Paul Pelseneer.—On the bathymetric distribution of the deep-sea Brachiopods collected in the *Travailleur* and *Talisman* expeditions, by MM. P. Fischer and D. P. Œhlert.—On the position in the plant of the compounds which produce the sulphuretted essential oils of the Cruciferæ, by M. Léon Guignard.

[1] *American Journal of Science*, III., xxxiii., 311.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

The Theory of Light: T. Preston (Macmillan).—Weather Forecasting of the British Isles: Captain H. Toynbee (Stanford).—Psychology: M. Maher (Longmans).—Geometrical Conics, Part 1: Rev. J. J. Milne and R. F. Davis (Macmillan).—Text-book of Mechanics: T. W. Wright (New York, Van Nostrand).—Sap: Does it rise from the Roots? J. A. Reeves (Kenning).—The History of Federal and State Aid to Higher Education in the United States: Dr. F. W. Blackmar (Washington).—Proceedings of the Department of Superintendence of the National Educational Association at its Meeting in Washington, March 6 to 8, 1889 (Washington).

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