

which has hitherto been published only in various Journals and Transactions of Societies. The book commences with a chapter on ancient traditions, giving a chronological table of the more important shocks which have occurred since 79 A.D. The second chapter briefly discusses the connection between earthquakes and volcanoes, a subject of which we have apparently a good deal still to learn. Then follow descriptions and illustrations of various seismometers and seismographs, including the latest forms devised by Profs. Gray and Milne. In this chapter there are given several interesting comparisons of earthquake curves automatically recorded by the instruments, and curves artificially produced by the application of forces of known direction and magnitude. The propagation of shocks through land and water, and their destructive effects, are also considered, the latter being illustrated by sketches of some of the more remarkable fractures and displacements which have been observed. The last chapter summarises the suggestions which have been made as to possible connections between earthquakes and astronomical and meteorological phenomena. In conclusion, M. Girard points out the necessity for continued systematic observations, and enumerates the chief points on which further information is required.

To those who know little or nothing of the subject, M. Girard's little book will form an admirable introduction; and to the initiated it will be a handy book of reference to its latest developments.

*La Photographie à la Lumière du Magnésium.* By Dr. J. M. Eder. Translated by Henry Gauthier-Villars. (Paris: Gauthier-Villars and Son, 1890.)

THIS is a translation of a very interesting little German work on the employment of magnesium light for the purposes of photography, and will form a useful addition to our photographic literature. The author first gives a brief account of the earlier stages of the subject, taking us back to the time when Bunsen and Roscoe, in the year 1859, indicated the considerable advantages the light of magnesium presented for photo-chemical studies and lighting. He then shows how Crookes afterwards employed the light for photographic purposes.

Amongst the very first attempts of artificial lighting, the wire of magnesium was used. It was burnt in a specially-made lamp, and the light thus produced answered fairly well for interiors, but was useless for portrait work, being too harsh. The next advance was the employment of a mixture consisting of the powder of magnesium, chlorate of potassium, and a sulphide of antimony; the light was produced by igniting the mixture, which flared up instantaneously. The chief drawback to this method was the great precaution that had to be taken during the mixing, as the slightest blow caused an explosion. Saltpetre in place of potassium was sometimes used so as to lessen the chances of explosion.

The methods described in chapters v. and vi. were those which gave the best results. They consisted in blowing powdered magnesium through a tube and allowing this powder to come out at the other extremity into a gas or candle flame; the light thus produced was extremely actinic, and did not present any danger. The lamps of Schirm and Loehr, illustrations of which are given in these chapters, were on this principle, and gave great satisfaction for portraiture, being worked by means of a pneumatic india-rubber ball. Chapter vii. treats of the combustion of magnesium in oxygen, and in it is described Piffard's apparatus for the production of this light, which was found to be enormously increased by the presence of the oxygen. The remaining chapters deal with methods of taking groups by this artificial light; and there is a very interesting illustration of the pupil of the human eye, photographed in a dark room by means of the flash light, the exposure of which was so short that the pupil had no time to contract. The book concludes

with some hints on the precaution necessary to insure successful development of the negatives taken by these processes, and with a short appendix by M. Alexandre.

#### LETTERS TO THE EDITOR.

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#### Panmixia.

BUT for his statement that I "cannot be sincere," I should not have deemed it necessary again to answer Prof. Lankester; anyone who is read in the literature of Darwinism must already have perceived that a further reply on my part is needless. An accusation of insincerity, however, ought not to pass unnoticed; and therefore I will ask your more general readers to observe the ground on which it has been made.

In my answer to his original criticism I endeavoured to show that Prof. Lankester "fails to distinguish between the cessation and the reversal of selection," or, more particularly, between panmixia and the economy of growth; and this is the point with regard to which insincerity is charged. Yet this is just the point—and the only point—in dispute. I have always represented that the cessation of selection is *per se* a cause of degeneration, whether or not it be associated with the economy of growth. Prof. Lankester, on the other hand, represented that the cessation of selection is not *per se* a cause of degeneration; but merely a "state," which is precedent to, and contemporaneous with, the economy of growth—the latter being the cause, while the former is but a condition to the occurrence of this cause. Such, at any rate, appeared to me the only meaning that could be gathered from his paragraph at the top of p. 488; and it is now over and over again repeated in his last letter. For instance:—"Cessation of selection *must be supplemented by economy of growth* in order to produce the results attributed to 'panmixia.' And inasmuch as economy of growth as a cause of degeneration involves the condition of cessation of selection, Mr. Darwin in recognizing the one recognized the other. . . . It is true that Mr. Darwin did not recognize that such unrestricted variation must lead to a diminution in size of the varying part *without the operation of the principle of 'economy of growth.'* This was no strange oversight: *he would have been in error had he done so.* . . . The term ['panmixia'], like its correlative 'cessation of selection,' *does not indicate a principle, but a natural condition:* it does not involve the inference that a dwindling in the size of the organ must result from inter-breeding; but *simply points to a precedent condition*" (p. 559: italics mine).<sup>1</sup>

Where, then, is the insincerity in saying that Prof. Lankester does not perceive the distinction between the cessation of selection and the economy of growth as two totally different causal "principles"? Or what remains for me but to repeat, with all sincerity, "he confounds the 'idea' of panmixia with that of the economy of growth," and "fails to perceive the 'essence of the idea' in the all-important distinction between selection as withdrawn and selection as reversed"?

It is true that at the close of his last letter Prof. Lankester admits, "when we consider shape and structure, and not merely size, it is clear that panmixia without economy of growth would lead to a complete loss of that complex adjustment of parts which many organs exhibit, and consequently to degeneration without loss of bulk." But how was it possible to surmise from his first letter that he had in his mind such reservations as to "shape" and "structure"? Or, indeed, how is it possible to reconcile such reservations with the passages above quoted from his last letter, to the effect that the cessation of selection is "not a principle at all," but merely "a condition which alone cannot produce any important result"? Are we to conclude that in Prof. Lankester's opinion neither "a complete loss of complex

<sup>1</sup> I may remark that the term "cessation of selection" is not the "correlative," but the *synonym* of the term "panmixia." And I may further remark that the term "reversal of selection" is not, as Prof. Lankester supposes, the synonym of the term "economy of growth." Economy of growth, where useless structures are concerned, may determine a reversal of selection; but the reversal of selection may also be determined by many other causes and conditions, which are equally potent—or even very much more potent—in this respect.