possible by several men, and the subject has been given a certain amount of attention by nearly all recent students of zoophytes. We are obtaining more information on the physical determinants in the distribution of these organisms, but no one will be able to furnish more than an hypothetical explanation of the facts now accumulating until the conclusions are tested by experiments. Corals that grow in shallow water are fortunately easily experimented with, and I have hoped that the officials of the Carnegie Institution might undertake some work with them. Dr. C. Montague Cooke, of Honolulu, has told me that he intends undertaking a series of experiments on the reefs on the south coast of the Island of Molokai. Probably within a few years it will be possible to present definite data from the *Madrepora* on the questions now especially under consideration.

T. WAYLAND VAUGHAN.

SCIENTIFIC BOOKS.

Les tremblements de terre. Par F. DE MONTESSUS DE BALLORE. Paris, Libraire Armand Colin.

In Vol. IV., 1900, of *Beiträge für Geophysik,* Major de Montessus published a tabular statement of the seismicity of the various portions of the earth, divided into provinces. In the computation, 131,922 earthquakes were used and 10,499 epicenters; numbers far exceeding what had been compiled by preceding systematists taken all together. It was the work of many years, and from the mass of evidence distributively grouped he drew certain important conclusions. They were briefly as follows: (1) In a group of adjacent seismic regions, the most unstable (*i. e.,* most affected by quakes) are those which present the greatest differences of topographic relief. (2) The unstable regions are associated with the great lines of corrugation of the terrestrial crust. (3) Rapidly deepening littorals, especially if they border important mountain ranges, are unstable, while gently sloping littorals are stable, especially if they are the continuations of flat or slightly accidented coastal plains. (4) Though it is possible to indicate regions which present both volcanoes and earthquakes, there is no proof of interdependence between seismicity and volcanicity in general. While there are earthquakes which are certainly of volcanic origin, the one phenomenon does not necessarily imply the other. These views have been borne out and have been generally adopted by seismologists in the period of six years since they were promulgated.

But de Montessus seems to have been unwilling to let the matter rest. The inferences he drew in 1900, indeed, have not been abandoned. They, however, express the relations of seismicity to topography, and not to the causes of earthquakes, which were the real objects of his grand research. He has, therefore, taken up the subject anew, rearranged his facts, added to their number and made new generalizations from a geological as well as a topographical standpoint. And the new generalizations are of even greater interest and more striking than those of 1900. These are set forth briefly in the introductory chapter of the publication before us.

According to this analysis, earthquakes occur about equally, and almost exclusively, in two great circles or zones, which make with each other an angle of 67°. These zones are (1) the Mediterranean, or Alpine-Caucasian-Himalayan, which includes 52.57 per cent. of the quakes, and (2) the circum-Pacific Andean-Japanese-Malayan, which includes 38.51 per cent. of the quakes. These two zones coincide with the two most important lines of relief of the earth's surface. The poles of these great circles are situated 45° 45′ N., 150° 30′ W., and 35° 40′ N., 23° 10′ E., respectively.

This relation, which so far is purely geometric, calls for a geological interpretation, which may be read at once on the geological map of the world. The zones which include the seismic regions coincide exactly with the geosynclinals of the mesozoic age as they are figured by Haug in his well-known memoir, 'The Geosynclinals and the Continental

Areas.'[1] This, in general, is the synthetic law putting seisms into direct dependence upon the principal recent movements of the earth's crust, since it is along those zones that they have attained their greatest amplitudes, positive or negative. As a consequence of pure statistics and pure observation, without introducing any hypothesis, this law may be formulated as follows: "The geosynclinals, where the sediments deposited in the greatest mass have been energetically folded, dislocated and elevated in Tertiary time with the formation of the principal existing mountain chains (or geanticlinals), contain within themselves alone, with two or three doubtful exceptions, all the seismic regions, which consequently characterize them."

The geosynclinals more ancient than Mesozoic, which at various epochs have given place to plicated mountain chains, now eroded and hardly discernible in their present state of peneplains, present the peneseismic regions—the remains of ancient seismic regions which are now tending to stability. The continental areas (in the sense in which Haug uses the term), whose tabular architecture proves them to have always been the seat of collective movements of small amplitude and without large derangements of the subjacent strata, are very generally aseismic or barely peneseismic. In fact, one may say tersely, "The folded architecture of the geosynclinals is unstable, and the reverse is true of the continental areas, and the same has probably been true of all geological periods."

The body of the book is occupied with the discussion of the earthquakes of the different regions of the world, chiefly in their geological relations. It is a wonderful display of learning. To give any idea of it is entirely beyond the scope of this article. The only way is to buy the book and read it.

C. E. Dutton.

Electricity in Every-day Life. By Edwin J. Houston, Ph.D. 3 vols., 5½ by 8 inches, containing respectively 584, 566 and 609 pages. New York, P. F. Collier & Son.

This book has been prepared with the evident purpose of being sold to the lay public irrespective of its possession of scientific knowledge, of education, or of taste for books that improve the mind. It is, therefore, a good example of the modern art of book-making. It is attractively bound in cloth, much as would be a modern novel. It is illustrated by a few full-page plates in color, by a number of full-page half-tones in black and white and by a profusion of ordinary cuts. The subjects of the color plates are 'Edison in his laboratory,' 'Franklin and his kite,' 'aurora borealis,' 'a central station,' 'the broomstick train,' 'electricity on the stage,' 'Holz-machines in electro-therapeutics' and 'landing a sub-marine cable.' The black and white plates are of such subjects as electricity in the kitchen, the hat factory, the dairy, the tailor-shop, the mine and the composing-room. The other cuts will, many of them, be familiar to all those versed in the art, having many of them originated in S. P. Thompson's 'Elementary Lessons on Electricity and Magnetism,' in Ganot's 'Physics' or the catalogues of the makers of philosophical and scientific instruments. The first volume treats of the 'Generation of Electricity and Magnetism,' and the remaining two of the 'Electric Arts and Sciences.' The second volume treats of dynamos, electric lighting and electric power, and the third volume of electro-chemistry, telephony, telegraphy, annunciators and alarms, electric heating and electro-therapeutics. The style is popular, non-mathematical, clear, easy and attractive, considering the subject matter. Each chapter is introduced by a pertinent quotation from the classics or from the writings of men eminent in the profession. Marginal subject notes accompany the more important paragraphs and are of great service to the reader. Each volume has a very complete index. The early history of the various subjects treated is emphasized and because of the giving of dates, references and frequent extensive quotations should render the book of considerable service to those interested in patent litigation.

Samuel Sheldon.

[1] *Bull. Soc. Geol. France*, III., Series XXVIII., 633.