

Seeliger, it is admitted, has by his suggestions and revision materially improved the chapter on gravity. If the section on telescopes had also been overlooked by a competent authority, perhaps Herschel's giant telescope would have been erected at Slough rather than at Bath; but wherever these eminent authorities have co-operated with the author, it is needless to say that we have an admirable result, correct in all important particulars.

As an example of the character of the second part of the work, entitled "Motion of the Celestial Bodies," we select the chapter on the figure of the earth. We make this selection the more readily because it affords an apt instance, not only of the successful treatment of a difficult subject, but illustrates the thoroughness attempted in German popular works. In English books of similar character the tendency is rather to adhere to subjects that lend themselves to pictorial illustrations of an interesting kind, or are capable of easy description, making no great demand upon the attention. Sir Robert Ball, it is true, has given us some charming chapters on the wanderings of the Pole, but writers who wield a less facile pen have generally left the subjects connected with geodetic measurements severely alone. In the Ipswich Lectures, Airy taught us how a base line was measured, and how triangulation was effected; but his example has not been generally followed. Newer methods and more sensational results have swallowed up the interest that once belonged to the science of exact measurement. But to Dr. Meyer the subject is not unwelcome. Adhering to his general plan of first showing the main principles underlying any process, without introducing needless niceties invented to provide against sources of error, he keeps the attention of the reader fixed on the main object of the investigation, without being lost in the intricacies of detail. In this way we see how latitude and longitude are determined, the gradual elimination of errors from the observations, and the regular approach to scientific accuracy. There is nothing wearisome in the account of triangulation, for it is brightened and relieved here and there by references to ancient history, to past expeditions, and the results of previous measurements. As might be anticipated, one does not find much reference to English work, that is not the object of the book; it is not the history of results, but the history of methods that is under consideration, and the countryman of Bessel can find all he wants in the writings of that astronomer and in the work of the "Europäischen Gradmessung." The deviations of the earth's figure from that of the surface of an ellipsoid of revolution, and the variation of gravity with the causes that contribute to it, are set out in great detail, showing that the author expects an audience of very considerable intelligence to follow him. This is a point that constitutes for us the real interest of the book, the evidence it affords of the existence of more general information than is usually to be met with in English readers. The author must have been aware of the eagerness of a large class to possess exact information, and has catered for it; but we cannot imagine that this book would enjoy a very large circulation in this country. Between the mathematical reader and the "man in the street" there is a great gulf fixed, which works of this character are calculated to bridge, but which at present find no great support from either description of reader.

W. E. P.

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OUR BOOK SHELF.

La Vie: Mode de Mouvement. Essai d'une Théorie Physique des Phénomènes Vitaux. Par E. Préaubert, Professeur au Lycée d'Angers, &c. Pp. 310. (Paris: Félix Alcan, 1897.)

WE can hardly suppose that M. Préaubert intends his remarkable speculation to be taken seriously. His contention is that life is essentially a mode of motion of the ether, and as such is closely allied with electricity and magnetism; finding, like these forces, its expression but not its origin in ponderable matter. It is, he maintains, in consequence of the failure to recognise the ether as the true seat of vital activity that all attempts to explain the phenomena of life on a purely chemical or physical basis have hitherto broken down. With the removal of "vitality" to the region of the ether, the material difficulties vanish; the connection between vitality and the other forces of the physical universe becomes declared, and biology resolves itself essentially into a mere question of mechanics. What then is the true distinction between life, on the one hand, and light, radiant heat and electricity on the other? The author answers that life is a series, not of vibrations, but of vortex-movements; his discovery, in fact, could hardly be better expressed than in the words of the puzzle-headed old Athenian in the "Clouds"—

Δίνος βασιλεύει, τὸν Δι' ἐξεληλεκτός.

It need, perhaps, scarcely be said that in support of his central position he has nothing to offer but a collection of assumptions and analogies, the former practically baseless, and the latter more or less loose. He seems, indeed, to forget in practice, though he recognises in words, the distinction between analogy and identity; and anything deserving the name of proof is conspicuously lacking. Space will not allow us to deal with his statements in detail; he commits himself to many that would be called in question by both physiologists and morphologists. We cannot, however, refrain from expressing our wonder that so many writers on evolution should virtually ignore the firm foundation laid by Darwin. So far as M. Préaubert's biological arguments are concerned, the theory of natural selection might almost as well be non-existent.

We doubted at the outset whether the author expected to be taken seriously. His closing passage contains what is in effect a *reductio ad absurdum* of his whole theory.

F. A. D.

The Barometrical Determination of Heights. By F. J. B. Cordeiro, Surgeon U.S. Navy. Pp. 28. (London: E. and F. N. Spon, Ltd., 1898.)

IN the calculation of mountain heights by means of the mercurial barometer, accuracy depends on the efficiency of the formulæ employed. These formulæ are based necessarily on assumptions, as we do not know exactly the varying conditions of the air, and we therefore fail to take into account the exact data for the correct solution of the problem. As a rule, the formulæ are at most only approximations; but it is astonishing what good results may be obtained by paying strict attention to all details.

In this neatly bound little book we have an essay on this subject, which was originally entered in the Hodgkin Prize Competition under the auspices of the Smithsonian Institution, and was awarded honourable mention. The author has briefly brought up to date the problem of barometrical hypsometry discussed many years ago by Guyot. He points out where the old theories were lacking in accuracy, and furnishes a method which, besides being rigidly correct in theory, gives trustworthy results in practice. As an illustration of this, a series of observations is added. In the appendix the author describes a form of