

alone. We have no doubt that this excellent little work will be a great success, but we should like the elementary principles of dynamics more amply illustrated. The introduction of the principle of limits on several occasions is highly commendable: the student should make its acquaintance early, but we believe in the old methods of proof to bring the matters more home to students, although they start, in a scientific view, from an inconsistency.—B. L.

Geodesy.—*Studien über höhere Geodäsie.* By Dr. C. Bremiker. (Berlin, 1869.)

FROM great scientific undertakings, such as geographical expeditions, or geodetical, geological, and magnetic surveys of large areas, mankind generally derives, besides the utility of the work itself, a vast amount of contingent benefit. The result forms not only a landmark of scientific progress, but the work serves also for applying and testing a number of antecedent theoretical or practical discoveries, for separating what is sound from the unsound, and finally it rouses contemporaneously the mental energy of those more or less intimately connected with it to new exertions.

Of such a wide bearing is the great European arc-measurement now in progress, in which for the first time the curvature of parallels of latitude will be simultaneously determined with that of the meridians, and the question will be decided whether the figure of the earth, as represented by the surface of the ocean, is really an ellipsoid of rotation, or whether a triaxial ellipsoid will have to be substituted for it. Of the mathematical, physical, and geodetical investigations, which the progress of this great work has already created, Dr. Bremiker's ranks among the foremost. It discusses the methods of reduction with reference to deviation of the plumb-line, latitude, azimuth, difference in longitude, latitude, and azimuth, small angles, deduction of triangles; and employs everywhere practical and interesting formulæ. The mathematical attainments necessary for understanding this excellent little work are not too high, and we feel certain that nobody who takes an interest in higher surveying will read it without extending his experience and knowledge. B. L.

Our Bodies. By Ellis A. Davidson. (London: Cassell, Petter, and Galpin.)

WE cannot highly commend this little book, though we would wish to speak well of its author. He is evidently a thoroughly good and earnest teacher; and we have no doubt his oral lessons are far better than his written book, which may be described as "Goody Lessons in Physiology, written in words of either one or of more than five syllables." It consists of many terribly stony technicalities floating in a mass of very pappy information. On one page we find children warned, on physiological grounds, not to crack hard nuts with their teeth, and on another a description of the *axis-cylinder of nerves*, the *white Substance of Schwann*, and the *canaliculi of bone*. When will popular teachers of physiology and anatomy find out that these sciences are best taught free from technical hard nuts which splinter the enamel of the mind and worse? In not a few respects, too, we observe that "our bodies" of Mr. Davidson are not the same as *our bodies*.

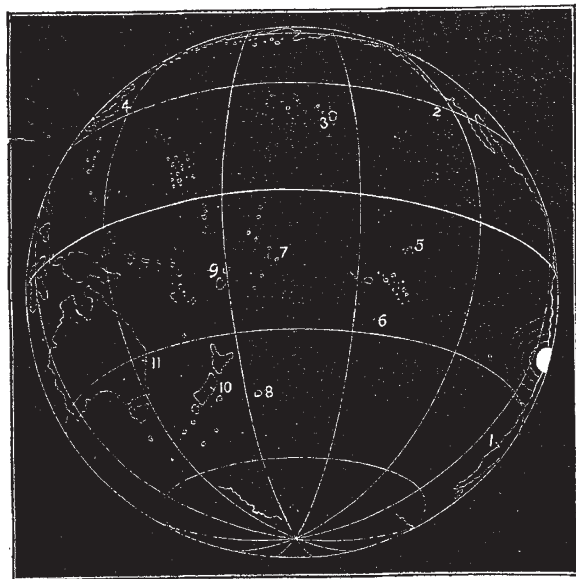
The Intelligence of Animals.—*From the French of Ernest Menault.* (London: Cassell, Petter, and Galpin.)

THE intelligence of animals may be studied in a scientific or in an anecdotal manner. M. Menault has chosen the latter method. We have not been led to form a very high opinion of his physiology or of his general philosophy; but he has compiled a most entertaining volume, crammed with most amusing stories about all kinds of animals, from ants to orang-outangs. It is illustrated with numerous pictures, some of which are as good as the stories.

EARTHQUAKE WAVES IN THE PACIFIC

UNLIKE their great rivals, the Himalayas, which seem to have upreared themselves to a position where they can remain at rest, the Andes are disturbed from time to time by tremendous throes, whose effects are sometimes felt over a full third part of the earth's surface. To this class belonged the earthquake of August 13-14, 1868, and in many respects it was the most remarkable of all the great earth-throes which have desolated the neighbourhood of the Peruvian Andes. As in the great earthquake which overthrew Riobamba in 1797, a tremendous vertical upheaval seems simultaneously to have affected a region of enormous extent. But terrible as were the direct effects of the first vertical shock and the others which followed, it was the action of the earth-throe on the ocean which caused the greatest devastation. It is hardly necessary to recall to the reader's remembrance the fearful effects experienced at Chala, at Arica, and at other places along the Peruvian shore; for few, doubtless, have forgotten how a countryman of our own described the ominous retreat of the ocean, and the overmastering fury with which it rushed back and swept far inland, destroying at once the shipping it carried with it, and the buildings which it encountered in its course.

So fearful a disturbance of the seas around the Peruvian shores could not but generate a widely-extended oscillation of the waters of the great Pacific Ocean. Yet



it is impossible to hear, without surprise, of the enormous waves which reached the far-off shores of the islands which lie scattered over that enormous ocean-tract. The accounts which came gradually in of waves which had swept past Honolulu and Hilo, into the ports of Yokohama and Lyttleton, and had even disturbed the waters which surround the East Indian Archipelago, seemed at first scarcely explicable as the direct results of a disturbance occurring so many thousands of miles from those places.

But when the accounts are carefully compared together, they are found to point most clearly to the South American shores as the true centre whence the great wave of disturbance had spread over the whole surface of the Pacific. Professor von Hochstetter* has brought together all the accounts which seem to throw light on the progress of the great earthquake-waves from Arica. For the most part, unfortunately, the waves visited the islands and ports of

* Petermann's "Geographische Mittheilungen," part vi. 1869.