

being of interest in itself, also has reference to the important subject of denudation :—

“Little horizontal ledges, one above another, have been observed on steep grassy slopes in many parts of the world. Their formation has been attributed to animals travelling repeatedly along the slope in the same horizontal lines while grazing, and that they do thus move and use the ledges is certain; but Prof. Henslow (a most careful observer) told Sir J. D. Hooker that he was convinced that this was not the sole cause of their formation.”

It is then shown that the initial cause of these ledges is the burrowing of earthworms. For,

“If the little embankments above the Corniche Road, which Dr. King saw in the act of formation by the accumulation of disintegrated and rolled worm-castings, were to become confluent along horizontal lines, ledges would be formed. Each embankment would tend to extend laterally by the lateral extension of the arrested castings; and animals grazing on a steep slope would almost certainly make use of every prominence at nearly the same level, and would indent the turf between them; and such intermediate indentations would again arrest the castings.”

Thus, on the whole, it will be seen how important an agency in nature Mr. Darwin has shown the action of worms to be, so that, in his own concluding words, “it may be doubted whether there are many other animals which have played so important part in the history of the world as have these lowly organised creatures.”

GEORGE J. ROMANES

#### OUR BOOK SHELF

*The Atlas-Geography.* By A. H. Macdonell. (London: H. K. Lewis, 1881.)

UNDER this title Mrs. Macdonell has attempted to supply what she believes to be a want long felt in teaching geography to young children. She finds, as every teacher finds, that children prefer the map to the book, and so she provides the means of teaching geography by means of an atlas. The Atlas-Geography consists of nine double maps. First we have in each case a coloured map with the leading names filled in, and facing it a list of the leading features in the map, countries, their divisions, towns, oceans, islands, capes, rivers, &c., which the children learn by heart, fixing at the same time their positions on the maps. Following this is a corresponding uncoloured map, without names, on which the children should be able to point out the features without assistance. Facing this is an interesting and simple descriptive account of the leading characteristics of the continent or country to which the map refers. It will thus be seen that in the hands of a painstaking and judicious parent or teacher the Atlas-Geography ought to prove a most valuable help in interesting children in the subject, and in enabling them to acquire the leading facts. The maps are well executed, clear, and not over-crowded; they are the World, Europe, Asia, Africa, Australia, North America, South America, the British Isles, and Palestine.

*Gesammelte Abhandlungen und kleinere Schriften zur Pflanzengeographie.* The collected treatises and shorter writings on Phytogeography of the late A. Grisebach, edited by his son, Dr. Ed. Grisebach. 8vo, pp. 628. (Leipzig: Wilhelm Engelmann.)

As the editor states in his preface, the present volume combines for the first time the numerous writings on phytogeography of the late Prof. A. Grisebach, spread over a period of thirty years, and scattered in various journals and publications, several of them very difficult of access.

Constant reference is made to many of these writings in the “Vegetation der Erde” (1872); hence their publication in a collected form is a great boon. In addition to those articles published previous to the “Vegetation der Erde,” this volume contains the author’s subsequent reports (1866-76) on the progress in the geography of plants. It also contains a biographical sketch of the late Prof. Grisebach, together with the bibliography of his works. An excellent French translation of the “Vegetation der Erde” appeared in 1874, but no English edition has been published, nor would we recommend the publication of one now, because the data that have been accumulating during the last decade would justify the publication of an original work, treating the subject from a different standpoint.

W. B. H.

#### LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

#### The Solar Outburst of July 25, 1881

IN the interesting account of a solar outburst on July 25 contained in your last number (p. 508), Mr. Hennessey says that “unhappily the sun remained invisible till July 30.” Referring to our sketches of the solar surface, I find that the nearest in time to the date of the outburst are those made on July 21 and 27. On the intervening days clouds prevented all solar work. The sketch on July 21 shows the groups in the [n p] quarter of Mr. Hennessey’s disk, and that of July 27 gives those in the [n f] and [s f] portions, and also the two groups in the [n p] which were farthest from the centre on the 21st. There was certainly not the slightest trace on the 21st of the remarkable group which burst forth so suddenly on the 25th, and there can be very little doubt that the spots in the [n p] quarter on the 27th are identically the same as those in the [n f] quarter on the 21st. Drawings of the solar disk are made here on every available day, and the position of each spot is marked with the greatest exactness; but when the sky is cloudy, as on the 27th, it is not always possible to fill in all the details. The exact position of each spot is invariably marked before any details are sketched, and therefore, as the definition on the 27th was good, the group, which suddenly appeared near the centre of the disk on the 25th, must already have completely vanished. I might mention, in conclusion, that our magnetic photograms show no sign of any disturbance synchronous with the solar outburst.

S. J. PERRY

Stonyhurst Observatory, Whalley, September 30

#### On the Velocity of Light

WITH reference to Lord Rayleigh’s article on the Velocity of Light (vol. xxiv. p. 382) I, and possibly others, find it difficult to follow him when he says, in the case of all the methods for determination of the velocity of light except the aberration method, that the velocity arrived at is the “group velocity,” and not necessarily the “wave velocity.” I, for one, should be glad of further exposition. Does not Foucault’s revolving mirror experiment, for instance, measure the velocity of motion of the centre of the disturbance which is transmitted from mirror to mirror? And would it not be the case that, if the waves moved faster than the groups, new groups would be continually formed ahead, the old ones dropping out behind: so that the centre of the disturbance would not remain in any given group? Further, is any credence to be given to the result that blue light travels anything like 1·8 faster than red light, while this is unconfirmed by the colours of Jupiter’s satellites? W. H. MACAULAY

Mountsorrel, August 29

#### An Aquatic Hymenopterous Insect

THE following circumstance may prove interesting, and probably new, to some of your entomological readers. On Septem-