

guished French *savant* has never had any hold, it may seem superfluous now-a-days to take up time in the disproof of it. But those who know what a power Elie de Beaumont has been and still is in France, how with all his abilities and knowledge and the excellent service which he has rendered by his map and other publications, he has for many years been a kind of dark shadow on the progress of the newer geology in his country, will thank the Professor at Poitiers for taking such pains to demolish the *réseau pentagonal*.

OUR BOOK SHELF

Handbook of Natural Philosophy. By Dionysius Lardner, formerly Professor of Natural Philosophy and Astronomy in University College, London. "Hydrostatics and Pneumatics." New Edition, edited, and the greater part rewritten by Benjamin Loewy, F.R.A.S. (London: Lockwood and Co., 1874.)

DR. LARDNER'S treatise on Natural Philosophy is quite familiar to those who studied Science ten or fifteen years ago. Before Ganot and Privat-Deschanel were translated, Lardner was *the* book which everyone used. It was originally almost a translation of Pouillet's "Éléments de Physique," but was added to from time to time, and is still a valuable text-book, especially the new editions of it edited by Prof. G. C. Foster, and (as in the present instance) by Mr. Benjamin Loewy. The value of the book is indeed shown by the fact, that although first published many years ago, it is still deemed worthy of new editions, and of being edited by well-known men. The volume before us has been carefully edited, augmented to nearly twice the bulk of the former edition, and all the most recent matter has been added. The treatment is essentially experimental and elementary; a slight knowledge of mathematics is needful. It is to be regretted that Mr. Loewy has not introduced metrical weights and measures. A few omissions may be noticed: the *action latérale* of Venturi is scarcely alluded to; the theory of the trompe is omitted, as are also the hydrodynamic experiments of Plateau and Magnus, and the account of Dr. Guthrie's experiments on approach caused by vibration. But the book has in the main been carefully edited and improved.

Les explorations Sous-Marines. Par Jules Girard. (Paris: Libraire, F. Savy, 1874. London: Dulau and Co.)

No nation surpasses the French in brilliant popular expositions of the various departments of Science. They already possess a large number of works of this kind, several of which have been translated into English, and the present work by M. Girard deserves to take its place among them as an extremely interesting and wonderfully full account of the numerous and valuable results which have of late years been obtained by deep-sea exploration. The two introductory chapters give a rapid *résumé* of the history of deep-sea exploration, with a short description of the interior economy of the *Challenger*, and a clear and pretty full description of the various apparatus used in carrying on the explorations. The subsequent part of the work consists of four divisions, the first of which treats of the characteristics of the sea-bottom looked at in its geographical relations; the second treats of life in the depths of the sea, describing eloquently the various organisms which inhabit the ocean; the third division deals with the waters themselves, pointing out the chemical properties and the physical phenomena which take place in the midst of the ocean; in the last division an attempt is made to depict the seas of ancient geological epochs, and compare them with the discoveries which have been made by recent soundings. The author seems to have fairly mastered the literature of his subject, and has managed to write a book containing a vast deal of infor-

mation conveyed in clear and eloquent language. The work is profusely illustrated with artistically executed, useful, and most attractive woodcuts. The work might well be translated into English.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

The Habits of various Insects

[The following letter on this subject, from Fritz Müller to Mr. Charles Darwin, F.R.S., has been forwarded to us for publication by the latter.—ED.]

I DELAYED answering your kind letter of January 1 till I should have had an opportunity of examining once more some nests of leaf-cutting ants, to which you had directed my attention. In the meantime I received Belt's "Nicaragua," which I have read with extraordinary interest, and for which I must express to you my hearty thanks.

I was much surprised to learn from Mr. Belt's book how closely the far-distant province of Chontales resembles by its vegetation and animal life our own of Sta. Catharina. I am thus enabled fully to appreciate the exactness of many of his statements; he is an excellent observer, and most of his theories are very seducing. As to leaf-cutting ants, I have always held the same view which is proposed by Mr. Belt, viz. that they feed upon the fungus growing on the leaves, they carry into their nests, though I had not yet examined their stomachs. Now I find that the contents of the stomach are colourless, showing under the microscope some minute globules, probably the spores of the fungus. I could find no trace of vegetable tissue which might have been derived from the leaves they gather; and this, I think, confirms Mr. Belt's hypothesis. Here, as in Nicaragua, the Cecropiæ are always inhabited by ants, but, I think, by only a single species. I have cut down hundreds of them and never missed the ants. I wonder that it had never occurred to me that the trees are protected by the ants; but there can be no doubt that this is really the case, for young plants of Cecropiæ, not yet inhabited by ants, are often attacked by herbivorous insects.

A few days ago I caught on the flower of a Vernonia a female moth belonging to the Glaucopidæ, of which family there are here numerous species. When I seized it by the wings nearly the whole body became suddenly enveloped in a large cloud of snow-white wool, which came out of a sort of pouch on the ventral side of the abdomen, and consisted of very thin flexuous hairs 1—2 mm. long, three, four, or five of which used to proceed from the same point. I preserved the moth alive for some time, and as often as I seized her by the wings, by inflating the abdomen, a large naked membrane became visible, and somewhat protruded behind the first (white) segment of the ventral face of the abdomen (the rest of which is black), and a little more wool appeared under the posterior margin of this segment. I am at a loss as to the meaning of this curious contrivance. There is in the males of the same family an interesting secondary sexual character; they are able to protrude from near the end of the abdomen a pair of long hollow hairy retractile filaments, which in some species exceed the whole body in length. In the beautiful *Belemnia inaurata* there is a second pair of shorter filaments which are wanting in all the other species I examined (*Eunomia eagrus*, *Euchromia jucunda*, *Agyrtia cærulea*, *Eudule invaria*, *Leucopsumis* sp., *Philoros* sp., &c., the names of which I owe to the kindness of Dr. A. Gerstæcker, of Berlin). In some species, most distinctly in *Belemnia inaurata*, I perceived a peculiar odour when the filaments were protruded; this, I think, may serve to allure the females, which in all our species appear to be much less numerous than the males.

I mentioned to you that with our stingless honey-bees wax is secreted on the dorsal side of the abdomen; now this is also the case with some of our solitary bees, for instance, *Anthophora fulvifrons* Sm., and with some species nearly allied to that genus. These solitary bees probably use the wax only to cement the materials with which they build their nests. Our species of *Melipona* and *Trigona* also never employ pure wax in the construction of their cells or of the large pots wherein they guard their provisions; they mix it with clay, resinous substances, &c., so that in some species wax forms hardly 10 per cent. of the material. The only case, as far as I know, in which pure wax is