

OUR BOOK SHELF

British Manufacturing Industries.—Edited by G. Phillips Bevan, F.G.S. "Jewellery," by George Wallis; "Gold Working," by Rev. C. Boutell; "Watches and Clocks," by F. J. Britten; "Musical Instruments," by E. F. Rimbault, LL.D.; "Cutlery," by F. Callis. (London: Stanford, 1876.)

THIS little volume (which is intended for popular reading) is comprised of several short essays, by different writers, upon the separate subjects indicated. Each essay contains a fairly good account of the history and general trade position of its subjects, but so far as their mechanical construction and the manufacturing operations involved therein are concerned, all are more or less disappointing. No doubt this is in great measure to be attributed to the nearly entire absence of diagrams, the essay on watches and clocks alone being illustrated, and that but scantily. Naturally some subjects suffer more than others. In jewellery, gold working, and cutlery the forms produced are familiar, the tools employed are simple, and what is the method of shaping and fitting together the various portions can easily be imagined. But with musical instruments and watches and clocks the case is different; people, *a priori*, are unacquainted with the apparatus or mechanism made use of, and a free reference to diagrams or figures becomes indispensable. In the essays upon jewellery and gold working, especially in the latter, their aspects and bearings as branches and developments of art are particularly dwelt upon. Cutlery, of course, is treated as an industry, so are watches and clocks. We are afraid the last-mentioned essay is not very carefully written, the writer, amongst other things, actually forgetting to tell us that there is any connection between the length of a pendulum and the time of its swing. And what he can be thinking of to describe Huyghens as a "French clock-maker of eminence," who "about 1650 showed great skill and ingenuity in arranging pendulums to clocks, so as to describe a cycloid," we do not know. The essay upon musical instruments (considering its not being illustrated) is much more intelligible than it might have been.

The book is neatly bound and printed, but will require considerable alteration and extension before it becomes what from its title we expected to find it.

An Introduction to the Osteology of the Mammalia. By Prof. W. H. Flower, F.R.S. 2nd Edition. (London: Macmillan and Co., 1876.)

PROF. FLOWER'S valuable "Osteology of the Mammalia" holds so high a position among scientific manuals that the appearance of a second edition requires but a passing notice from us. The author is himself so continually adding to our knowledge of the anatomy of the higher Vertebrata, at the same time keeping fully *au courant* with the investigations of both British and foreign zoologists, that there are several minor additions which he has had to make after an interval of six years, since the appearance of the volume originally. Amongst the most important of these, we notice the record of the conical form of the odontoid process of the axis vertebra in the Chevrotains (*Tragulina*), the introduction of a summary of Prof. Parker's study of the development of the skull of the pig, the account of the hyoid bones of the Ant-eater, of the large pectineal process in Phyllorhine Bats, and of the peculiarly ankylosed tarsus in the Muntjacs. In the first edition the typography and the printing of the woodcuts was too black throughout; in the new one this defect has been entirely removed, both the type and the figures being all that can be desired. There is a new outline diagram of special interest introduced to illustrate the mutual relations of the various elements of what may be termed the typical mammalian skull. This re-

places a plan drawn out for a similar purpose in which the names of the bones were distributed over a page in such a way as to indicate their relative positions. In the new diagram the employment of outlines to the bones renders the exact situation much more distinct and enables the commencing student to carry away with him a much more precise idea of the exact neighbourhood of each part of each bone than was possible from the older plan. We welcome with much pleasure this new edition of the "Osteology of the Mammalia."

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.]

On the word "Force"

PROF. TAIT in his lecture on *Force* said that this word must be used in a certain definite sense and in this sense only. In order to claim Newton's authority for the one definite sense to which he would confine the word, he has to assume, not only that Newton translated *force* by *vis impressa*, but that he—an Englishman writing in Latin—used *vis insita*, *vis motrix*, &c., without any English equivalents. Until good evidence for these assumptions—improbable as they are on the face of them—is brought forward, Prof. Tait cannot claim the authority of Newton *in his favour*.

In the communication I made to NATURE (vol. xv. p. 8) I contended that the authority of Newton was *against* the restriction of the word to this one sense, on the assumption that the equivalent of Newton's word *vis* is *force*. To those who demur to this assumption I propose the questions: (1) Is it likely that Newton had in his mind no English equivalents for *vis insita*, *vis gravitatis*, *vis centrifuga*? (2) If *force* is not English for *vis*, what English word had Newton in his mind? Until some new light is thrown on these questions I maintain that Newton's authority is claimed for the restriction of *force* to the sense of *vis impressa* on, to say the least, insufficient grounds; and that the obvious interpretation of Newton's words is dead against it.

I have, I hope, in a previous communication done justice to Prof. Tait's zeal for definiteness and accuracy; and with him I feel what supreme virtues these are in a scientific man. But I contend that the wide sense of the word *force*—which I attribute to Newton—is not loose and inaccurate; it is simply general and comprehensive; each of the narrower uses, as in *vis impressa*, *vis insita*, is not more accurate but more special: these special senses are not inconsistent, though they are not identical; they are neither inconsistent with each other nor with the use of the word *force* in its widest sense. Some English mathematicians wish to have this valuable word all to themselves for a special technical sense; Newton claims no such monopoly, nor is it claimed by all foreign mathematicians, nor conceded by metaphysicians; nor is the claim to this monopoly likely to be conceded until a better title to it has been shown.

Cambridge, November 24

P. T. MAIN

Peripatus N. Zealandiæ

IN the November number of the *Annals and Magazine of Natural History* is a paper by Capt. Hutton on *Peripatus N. Zealandiæ*, in which the author comes to the astounding results that this species is hermaphrodite, and that its horny jaws are not foot jaws but homologous with those of annelids such as Eunice. If such were in reality the case much of my results concerning *Peripatus capensis* (*Phil. Trans. R. Soc.*, 1874, vol. clxiv. Part 2) would lose its value, and since I believe *Peripatus* to be a most important form, and a representative of the ancestral stock of all tracheates, in fact of the Protracheata of Prof. Haeckel, I hasten to write a few words in reply.

I obtained specimens of *Peripatus N. Zealandiæ* at Wellington from Mr. W. T. L. Travers, who has done so much for science in New Zealand, and who most kindly assisted me and my late colleague, R. von Willemoes-Suhm, in many ways, and who first pointed out *P. N. Zealandiæ* to Capt. Hutton also. I had further at least fifty specimens of *Peripatus* collected for me and brought to me alive. I examined these and made notes, but have been prevented by other work from publishing