

the scheme of a general education, and the publication of such books, as the one now before us, as guides to a practical knowledge of the structure of animals, will break up the conservative instincts of the purely human anatomists, and will lead in time to the adoption of a more scientific nomenclature.

To turn now to the descriptive part of this book. The impression we have derived from its perusal leads us to say that it is well adapted to the purpose for which it has been written. The authors have evidently studied the anatomy of the cat, not from the dissection of a single animal, but from numerous specimens. The methods of displaying structure, and preserving the parts for future observation and study are workmanlike and practical. The descriptions are clear and concise. Though at times terms are employed, such as ectal for external, ental for internal, trochiter for the great tuberosity of the humerus, and trochin for the lesser tuberosity, which are novel, and at first require a little thought to gather their meaning, they soon become familiar, and without doubt conduce to give clearness and accuracy to the description.

We ought not to omit to say that, as preliminary to the description of the cat's brain, the authors give an account of the dissection of the brain of the frog and the Menobranchus.

The work is illustrated with 130 figures in the text, and with four lithographed plates of the brain of the cat. The plates are neatly executed; but the figures in the text are in many cases coarse and inartistic. Surely in the United States, where the art of engraving on wood, as is shown in the illustrations to Scribner's and other monthly magazines, has attained such a high order of excellence, the authors ought to have been able to procure a draughtsman and woodcutter who could represent muscles, more like nature, than is given in say Figs. 66, 67, and 72.

#### OUR BOOK SHELF

*Magyarország Ásványai, Különös tekintettel termőhelyeik megállapítására. (The Minerals of Hungary, with Special Regard to the Determination of their Occurrences.)* By Michael Tóth, S.J., Professor at the Gymnasium, Kalocsa. (Budapest, 1882.)

WE have here a contribution to science which reaches us from the far east of Europe, from Hungary. The author has aimed at nothing less than to give a complete catalogue of all the minerals that occur in that country, noting the exact place of the occurrence of each, and adding such statistical and other information as may enable the reader to form a judgment as to the economic value of the subject of the article. Special attention is given to such minerals as are of recent discovery or of such importance as to be likely to affect the future history of the district in which they are found.

Prof. Tóth is, we believe, the first writer who has attempted a complete account of the minerals of Hungary. His work would have been more widely useful had he seen fit to employ some language that is more widely known than his native Hungarian. But in the case of a work like this, which consists largely of names of places and of those technical names of species which are common to all the civilised world, the unfamiliar tongue does not render the book altogether useless. The author would seem to have looked forward to his work being used in England, for he has prefixed an English title-page, and frequently refers to the collections in the British Museum and the Museum of Practical Geology.

#### 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 insure the appearance even of communications containing interesting and novel facts.]

#### Natural Selection and Natural Theology

THE amicable discussion between Dr. Romanes and myself, 'endeavouring to help in determining the true position of an important question,' has now (in NATURE, vol. xxvii. p. 527) reached a critical point, one seemingly capable of settlement by scientific inquiry, and upon which a brief note may be pertinent.

I take Dr. Romanes now to agree with me that the physical distinction of the less fit organisms, or, more generally, that the action of the environment, is not in a proper sense the cause of the advantageous variations of surviving organisms; also that natural selection does not explain and has no call to explain the cause of variation. As to this, he says, the theory merely supposes that variations of all kinds and in all directions are constantly taking place, and that natural selection seizes upon the more advantageous. Now if variation in animals and plants is lawless, of all kinds and in all directions, then no doubt the theory of natural selection may be "the substitute of the theory of special design," so as to efface that evidence of underlying intelligence which innumerable and otherwise inexplicable adaptations of means to ends in nature was thought to furnish. If it is not so, then the substitute utterly fails. For omnifarious and purely casual variation is essential to it in this regard. Fity is it said that "the theory merely supposes" this. For omnifarious variation is no fact of observation, nor a demonstrable or, in my opinion, even a warrantable inference from observed facts. It is merely an hypothesis, to be tried by observation and experiment. I am curious to know how far the observations and impressions of the most experienced naturalists and cultivators conform to my own, which favour the idea that variations occur, in every degree indeed, but along comparatively few lines. That the investigator of any flora or fauna should so conclude as to actual and accomplished variation, is natural, but may go for little, the theory of course supposing that numberless non-occurring forms have failed in the struggle and disappeared. But there is no evidence that all sorts of varieties ever appeared or tended to appear, and there is a *musty maxim* about "*de non apparentibus et de non existentibus*" which is not devoid of application.

Moreover, as to the vegetable kingdom, it would seem that this question of omnifarious variation may be tested in the seed-bed and the nursery, from which Darwin took the idea and the term of natural selection. These indeed are actual experiments—very numerous and extensive—for the testing of incipient variation. If experienced nurserymen, gardeners, and others who raise plants from seed in a large way, usually with eyes watchful for variation, would give their testimony in this regard, they might materially contribute to the settlement of an interesting question.

We need not hold Dr. Romanes to the terms of his fundamental supposition, "that variations of all kinds and in all directions are constantly taking place." He probably means only that incipient variations are wholly vague and irrespective of ends—are as likely to occur in the direction of unfitness as of eventual fitness to the environment and to use, the divinity that shapes the ends—if ends there be—acting only through the surroundings. And we all understand that the particulars in which progeny differs from parent are potential in the germ, or in the cells of which the germ consists, and therefore wholly beyond observation. The upshot is, that, so far as observation extends, it does not warrant the supposition of omnifarious and aimless variation; and the speculative assumption of it appears to have no scientific value.

ASA GRAY

#### The Fauna and Flora of the Keeling Islands, Indian Ocean

I HAVE only recently been able to obtain my copy of Mr. Wallace's "Island Life," in which I find an estimate of the fauna and flora of the Keeling Atoll in the South Indian Ocean. I had the fortune to visit that outlying spot in the year 1879,