

style in which it is printed and the excellent plates seem to promise that the Transactions will be quite on a level with any journal published in Europe. The illustrations are, indeed, unnecessarily large; but this cannot be pointed to as a fault—at least by those who are not responsible for the cost.

Prof. Spencer's paper is of considerable interest, particularly that section which refers to the nephridia. *Megascolides*, like *Perichata* (as was first pointed out by Beddard, not by Perrier, as Prof. Spencer asserts), possesses a ramifying network of nephridial tubes which are continuous from segment to segment, and which open on to the exterior by numerous pores; connected with these there are—in the posterior segments of the body—a pair of large nephridial tubes in each segment, which open internally by a funnel. It is from these latter that the single pair of nephridia per segment of *Lumbricus*, &c., are to be derived; the network of minute tubules, which represents the excretory system of the flatworms, has disappeared in such forms as *Lumbricus*.

Prof. Spencer discusses the much-vexed question of the homologies of the sexual ducts, and concludes that they are not derived from nephridia.

Other points of interest cannot be touched upon in this short notice.

*Lectures on Geography, delivered before the University of Cambridge, during the Lent Term, 1888.* By Lieut.-General Strachey, R.E., C.S.I., President of the Royal Geographical Society. (London: Macmillan and Co., 1888.)

THESE lectures are published opportunely at a time when it is most desirable that the now almost general effort to further geographical education should be properly directed. They form a short course introductory to the work of the Lectureship on Geography now established in Cambridge, and in them General Strachey describes the aspects of the subject which he considers most suitable for the instruction of students at the University. He thus gives a complete summary of the aims and matter of scientific geography—of geography as a natural science related to other natural sciences, much as mathematics is to physical science. He assumes that students, before going to University, have acquired a general knowledge of geography; and, in passing, he points out that the primary object of the school teaching of geography is to impart an accurate knowledge of the main topographical features of the entire earth, all trivial details being omitted, and suitable instruction being given in the physical, economical, and historical characteristics of important places.

As material for the higher or University teaching of geography, the author practically claims the various branches of science which in recent years have been assembled under the term "physiography"; but he is most successful in showing that the science is not a mere patchwork, but a connected whole; and he sees no reason for abandoning the well-known name "geography." Certainly from many points of view the introduction of the new term has retarded the spread of a knowledge of the science.

An excellent epitome of the growth of our knowledge of the astronomical relations of the earth, and a short account of the methods of projection and orography, prepare the way for the history of geographical discovery. This department is reviewed in a manner of once interesting and philosophical, indicating clearly the close connection between the progress of discovery and the political movements of the world. The influence of the form and movements of the earth on terrestrial phenomena, terrestrial magnetism, our knowledge of the interior of the globe, and the relation of geology to geography, are in turn shortly discussed. The sections on land, sea, and air, and on the history of life and of man, indicate the results of

recent investigation, and suggest many points which may well receive much attention from students of geography.

The lectures are written throughout in an agreeable and simple style, and will prove valuable to general readers as an elementary epitome of scientific geography.

F. GRANT OGILVIE.

*A Text-book of Elementary Metallurgy for the Use of Students.* By Arthur H. Hiorns. (London: Macmillan and Co., 1888.)

WE recently had occasion to notice a useful little work on practical metallurgy by Mr. Hiorns. He has now endeavoured to write a purely elementary treatise on theoretical metallurgy, adapted to the capacity of beginners. The attempt can scarcely be considered successful. In 172 pages printed in large type he deals with the whole of the wide field of metallurgy. This necessitates a very fragmentary treatment. And besides this, errors are so frequent as to render the book quite unsuited for beginners. The following examples may be cited:—The barrel method of amalgamation is stated (p. 90) to be carried on at Freiberg, where it was discontinued twenty-four years ago. One of the seven methods of producing steel is stated (p. 74) to be "by melting raw steel in crucibles." The Coppée coke-oven is described (p. 40) as being of the Appolt type. The coke-oven described (p. 42) as the Simon-Carvès is in reality a Carvès oven. The author appears to be ignorant of the existence of the principality of Catalonia, for the Catalan process is said (p. 54) to be carried on at "Catalan in the Pyrenees."

Altogether, the book compares very unfavourably with the author's work on assaying, and appears to have been hastily written. An illustration of the want of care displayed is afforded by the table of the specific gravities of eighteen metals (p. 11), in which in nine cases the figures differ from those given in the author's companion volume. With a little care, the author could have avoided such statements as—"An analogous compound, 'Boghead' of Scotland, which is a bituminous schist, is richer in bitumen than ordinary coal." Again, manganese, the author states (p. 74), "prevents the separation of carbon in the form of graphite, which is the opposite of silicon." The appendix of examination questions, covering 65 pages, appears to indicate that Mr. Hiorns's intention has been to write a cram-book for the elementary stage of the Science and Art Department's examination in metallurgy. It is, however, doubtful whether a student who made such blunders as occur in this book, would satisfy his examiners.

B. H. B.

#### LETTERS TO THE EDITOR.

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#### Weismann's Theory of Variation.

ACCORDING to Weismann ("Die Bedeutung der sexuellen Fortpflanzung für die Selektions-Theorie," Jena, 1886), heredity does not consist in the parent having the power to reproduce offspring in its own likeness, but in the property of the germ (ovum or spermatozoon) in each generation to develop into an individual of a certain invariable type. He starts from the fact that in development the germinal cells are separate from the beginning, are portions separated off from the original fertilized ovum. He distinguishes between actual and virtual differences. Different individuals developed from successive remnants of a given *Keimplasma* may show actual differences; but these are due to the action of conditions affecting the particular individual during its development and life: these differences are not inherited, cannot possibly be transmitted to the offspring, because