

tion both in the text and in the diagrams. There are chapters on the nature of sound, waves of sound, musical scales, organ pipes, "time" and movement, the ear, and the voice. Nothing could be happier than the exquisite drawings by Miss Martin Mohun showing an ideal couple—a boy and girl—waltzing and drawing sound curves on the seashore. Mr. Lapidge's diagrams are also excellent. To assist the teacher six models, made by Mr. Lapidge, may be obtained for the illustration of the book for one guinea. These models show the structure of the middle ear and the chain of bones. They are accurate in all anatomical details. The box also contains a nightingale pipe, which is in miniature an adjustable stopped organ-pipe. Mr. Edmunds has succeeded in showing how science may be made interesting to young people. There is a constant appeal to observation and experiment, and the whole subject is treated in such a way as to promote the healthy development of the mental faculties in early life. JOHN G. MCKENDRICK.

Historical and Modern Atlas of the British Empire, specially prepared for Students. By C. Grant Robertson and J. G. Bartholomew. Sixty-four plates. (London: Methuen and Co., 1905.) Price 4s. 6d. net.

Phillips' Model Atlas. Fifty Maps and Diagrams in Colour. (London: George Philip and Son, Ltd. n.d.) Price 6d. net.

THE first of these atlases is full of material designed to show students and teachers how intimately the studies of geography and history are related. The excellently executed plates serve as graphic object-lessons demonstrating the interdependence of cause and effect, and are skilfully conceived with a view to impress various important lessons pictorially. The atlas may be commended to the careful attention of both teachers of geography and history.

The sixpenny atlas of Messrs. Philip gives great prominence to photographic relief maps of the countries dealt with, and these plates will prove of great assistance in enabling young pupils to form mental pictures of the distribution of highlands and lowlands in the countries they are studying, thus providing them with a means to understand the direction of flow of rivers, the distribution of rainfall, and other important geographical features. This wonderfully cheap atlas deserves to be used widely in junior classes.

Natural Science in Hygiene, or the Life-History of the Non-Bacterial Parasites affecting Man. By Dr. James Rodger Watson. Pp. vi+62. (Bristol: John Wright and Co.; London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd., 1905.) Price 1s. 6d. net.

It is stated in the preface that this little book is intended to place before the student of public health, in a convenient and realistic way, the life-histories of those members of the vegetable and animal kingdoms which by their mode of life are of importance from a public health point of view, and with which he is expected to make himself familiar.

If by "student of public health" is meant the medical man who is going to devote his life to public health, the details given, though on the whole fairly accurate and up to date, are far too meagre and inadequate to be of much service, but the diagrams of life-cycles of the parasites discussed may serve to impress the facts on the memory. The book seems to be more suited to the requirements of the sanitary or meat inspector or health visitor than of the student of hygiene. R. T. HEWLETT.

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LETTERS TO THE EDITOR.

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A Plea for Absolute Motion.

THE title of Prof. Schuster's letter is somewhat wider than its contents. The writer does not discuss whether the term "absolute motion" is significant, but only whether, assuming that the words have a definite meaning, the absolute motion of any body can be determined by physical inquiry. By implication he has himself answered the question in the negative, for at the critical stage of his discussion he introduces arguments which are not physical, but philosophical.

Prof. Schuster asks, "Does it require explanation that all star groups have the same velocity vector imposed upon them?" Certainly; it requires explanation no more and no less than any other distribution of velocities. It is highly desirable that the equations of the proper motions of the stars should be established and their past history traced until the physical circumstance that determined those motions is discovered. But this circumstance need not be a body at absolute rest. In the analogy which Prof. Schuster gives, the inhabitant of a gaseous molecule would be quite wrong if he decided that the rest of the containing vessel was absolute. Accordingly, Prof. Schuster has recourse to philosophical arguments. We have determined, he says, the velocity relative to a material body which does not come within the range of our observations. I should have thought that the mere fact that we had determined a velocity relative to it proved that it had come within the range of our observations; the deduction from the motion of some of the stars of the existence of dark satellites near them seems an analogous case; and since, he continues, this conclusion is absurd, the body must be replaced by something immaterial. Why is it less absurd to determine a velocity relative to an unknown immaterial than to an unknown material substance? Finally, since the something is immaterial, it cannot be in motion, and therefore it must be at absolute rest. The term immaterial may have many meanings; but I should have thought that an immateriality which precluded a substance from being in motion also precluded it from being at rest. A thought, for example, is incapable of motion, but it is equally incapable of rest; any application to it of the terms motion or rest is not true or false, but simply meaningless.

It may also be pointed out that if the "something at rest" is immaterial, the analogy breaks down. The distribution of the velocities of molecules in a gas depends on the collisions with the walls; but a star cannot collide with an immaterial boundary.

Prof. Schuster says that the attempt to make all motion relative to the æther is inconsistent. With all respect, I do not think he sees the point. The reasons for our preference of the Copernican to the Ptolemaic hypothesis are two-fold. The first reason is that the equations of motion of the solar system are simpler on the former theory. The second reason is precisely that which made the theologians object to the Copernican hypothesis; it points out that it is the sun, and not the earth, which holds a unique place in the solar system; this is a question of scientific taste. There are the same reasons for referring all motions to axes fixed in the æther—if we could determine them. Firstly, an attempt is being made to reduce all laws to electrodynamic laws, and these are simplest on the basis of a fixed æther. Secondly, the æther holds such a unique place in the physical universe that it is desirable to direct attention to the fact. The question of the "absolute motion of the æther"—if any—cannot come within the range of physical discussion any more than the "absolute motion of the sun" can come within the range of any discussion based on the properties of the solar system.

I should like to add a few remarks on the subject of "absolute rotation." "Rotation," it seems to me, like