

regretted, as there are two well-known works to which the epithet is fairly applicable, and which are at least free from such erroneous facts and false or exploded theories as have been pointed out in Dr. Page's volume.

ALFRED R. WALLACE

OUR BOOK SHELF

Half-hours in the Green Lanes: a Book for a Country Stroll. By J. E. Taylor. (Hardwicke.)

THERE are two ways at least in which the first principles of Natural Science may be taught to the youthful mind, as well as to "intelligent people who have not had time to enter into the technicalities of scientific questions." One which, if we may judge from the number of elementary works on Physics in which it is adopted, has many arguments in its favour, consists in the careful and logical working out in detail of a few of the most important principles of the Science, together with the different steps by which they were arrived at; the knowledge of minutæ being left for future observation and study, on the foundation supplied: and the other is little more than a compilation of disconnected facts, of unequal importance, arranged with an endeavour to make them impressive from their almost endless number, and strung together with teleological argument. The tenants of the "tarns and green lanes being the objects treated of, there is an expanded field for the 300 or so short pages, in which the fishes, molluscs, and reptiles of the former, as well as the birds, insects, and plants of the latter, are rapidly passed in review. Several excellent figures illustrate the work, Mr. Wood and Mr. Keulemans contributing to the ornithological section; however, we are surprised to see so many on subjects of comparatively little importance, as the 14 on the slight variations in the shape and marking of cycloid scales, and the 32 on the different species of snails. Turning to the letterpress, many of the descriptions will be found to be accurate and clear, and a few sufficiently long to enable the uninitiated to form a fair idea of the subject. Many however are so short and incomplete that but little can be made of them without extraneous assistance, and in some the carelessness in the choice of words adds to the difficulty, as where the Vapourer Moth (*Orgyia antiqua*) is said to derive its name "from the habit of the winged males rising and falling simultaneously in their flight." A fact is sometimes stretched to make a *simile*, as when we are inaccurately told that "the generic name of the Kingfisher (*Haleyon*) is derived from the ancient belief that when it was hatching its eggs, the water was always calm and still." The genus *Turdus* is more than once called *Tardus*, and several other mistakes show that the author's knowledge of the subject is not of the deepest, as when the hind wing of the Clifden Nonpareil (*Catocala fraxini*) is said to be black and red, and the wide geographical distribution of the Kingfisher is given as a reason for supposing that it has a comparatively high geological antiquity. Notwithstanding its faults, however, there are many points in this small work which will make it of more than ordinary interest to the general reader.

The Royal Readers. Nos. 1 to 6. (Nelson and Sons. London and Edinburgh.)

THE excellence of these reading books and their adaptation to the broader culture of the present day demand from us some notice. The editor of the series, who has done his work with unusual ability, tells us in the preface that his aim has been to cultivate the *love* of reading. So far as we are able to judge, this aim he has successfully carried out by presenting interesting subjects in an attractive way. Opening any one of these Readers, we are struck with the air of freshness and interest it possesses.

An intelligent child, instead of closing the book with relief, is far more likely to leave it with regret. And added to the happy way in which the lessons have been prepared, the pages abound with capital woodcuts, some of which are of real beauty. There are none of the stereotyped cuts of stale children in old-fashioned dresses and hair in pig-tails, primly grouped at play, and supposed to illustrate the story of the goody-goody girl, or the naughty-naughty boy. Our children are mercifully spared from these haunting ghosts of our childhood and have their Royal Readers instead. But these books have a wider scope than mere reading lessons. In the fifth and sixth books we find a large amount of sound scientific knowledge conveyed in a course of lessons carefully prepared by the editor. Then there are articles on physical geography, the bed of the sea, the various ocean routes, and lessons on useful inventions, besides some other novel features which we have not room to detail. The employment of these reading books will certainly tend to create a love for healthy reading, and at the same time they seem likely to be of the highest service in training and furnishing the minds of children.

LETTERS TO THE EDITOR

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

Atoms and Ether

I AM not enough of a metaphysician to say whether a substance which can be compressed and expanded necessarily contains void spaces.

If so, the idea of air, furnished to a beginner by instruction in "Boyle's Law," is self-contradictory; and any molecular theory afterwards developed in order to account for "Boyle's Law," may claim not only ingenuity but necessity in order to abate a crying grievance to all right-minded persons.

I do not myself believe in Prof. Challis's æther, but at the same time I do not believe in the power of the human mind to pronounce that a continuous medium capable of being compressed is an impossibility.

But, on the other hand, I am sure that a medium consisting of molecules is essentially viscous; that is, any motions on a large scale which exist in it are always being converted into molecular agitation, otherwise called heat, so that every molecular medium is the seat of the dissipation of energy, and is getting hotter at the expense of the motions which it transmits. Hence no perfect fluid can be molecular. So far as I can see, Prof. Challis intends his æther to be a perfect fluid, and therefore continuous (see p. 16 of his Essay), though he does not himself pronounce upon its intimate constitution.

Hansemann* makes his æther molecular, and in fact a gas with the molecules immensely diminished in size.

With regard to Mr. Mott's iron bar, when he pulls one end he diminishes, in some unknown way, the pressure between the particles of the iron, and allows the pressure of the æther on the other end to produce its effect.

N.B. This is only the language of a theory, and that theory not mine; nevertheless, I think it is consistent with itself.

Glenlair, Aug. 13

J. C. M.

Reflected Rainbows

I READ with great interest, in Prof. Tyndall's American lectures, a statement about the rainbow which appeared to me so extraordinary, that I determined to test it on the first opportunity.

The statement (I have not the book with me here, and give merely my recollection of the substance) is that, owing to the want of the necessary condition of parallelism the rays scattered from rain-drops cannot be so reflected as to show a rainbow by reflection from the surface of a lake.

Of course we all know that the same rainbow cannot be seen from two places at the same time, and therefore no one would

* Die Atome und ihre Bewegungen, von Gustav Hansemann. E. H. Mayer: Coln, 1871.)