

In a book, however, which must necessarily be intended for use by pupils of very different attainments, it would be difficult to avoid criticisms of this kind, and we think the experiments on the whole judiciously selected and clearly explained. We shall look with interest for the appearance of the second volume, and when finished "Physical Manipulation" will no doubt be considered the best and most complete text-book on the subjects of which it treats.

A. W. R.

### OUR BOOK SHELF

*Mineralogy.* By F. Rutley, F.G.S. (Murby's Text Books.)

MR. RUTLEY'S little treatise on mineralogy has the merit of expressing in a clear and simple form the facts that are most wanted to be known by the general student of a science for which a small elementary English book is needed. The descriptions are concise, and the selection of the matter under each mineral generally good. Mr. Rutley, furthermore, gives some fifty pages of preliminary matter, which, though not always put in the most intelligible form, yet embodies a considerable amount of useful technical teaching in regard to the physical properties of minerals. Mr. Rutley even enters, and very rightly does so, on the subject of optical characters. But in these pages, as in the page on thermo-electricity, the author does not seem to have carefully revised what he wrote, or he would not have followed other authors in speaking of boracite as a uniaxial crystal, and would hardly have classed the dispersion of light by a diamond with the play of colour exhibited by an opal. Nor is an optic axis correctly described as the only direction by looking along which the doubly refracted images of a spot can be got to coincide, as Mr. Rutley will see if he looks at the spot through two opposite faces of the hexagonal prism of a calcite crystal. He ingeniously endeavours to indicate the nature of the faces of his crystals by a sort of heraldic hatching and marking. The use of small letters always indicating the character of the faces, as in Des Cloizeaux and other French treatises, might have done this usefully; Mr. Rutley's puzzling figures will probably only serve to scare away the English student, who needs every allurements to the study of the neglected science of crystallography—a science neglected merely because the rudiments of geometry and trigonometry are not made a necessary part of every scientific student's education. And it is a significant circumstance in connection with this neglect of scientific crystallography, that the geometrical methods and simple notation introduced forty years ago by our distinguished fellow-countryman, the first living crystallographer, Prof. Miller, are, we believe, untaught in any single lecture-room in London. Is England to be the last country to adopt a system made European by Sénarmont, Sella, Beer, and Grailich, and which is fast overcoming even in Germany itself a natural prejudice in favour of the more unwieldy, though in its time useful and ingenious, notation of the great Leipzig Professor?

*Sanitary Arrangements for Dwellings, intended for the use of Officers of Health, Architects, Builders, and Householdors.* By William Eassie, C.E., &c. (Smith, Elder and Co. 1874.)

THIS volume gives, in a collected form, a series of papers published originally in the *British Medical Journal*. Its object, the author states, is to give "an account of the most ordinary sanitary defects in dwelling-houses and public institutions, in respect to drainage, water-supply, ventilation, warming, and lighting;" and "to set forth, what he believes, "the most simple and effective means of preventing or remedying such defects." He

thinks it necessary to say further:—"The purpose of this small work is to point out, in the plainest language, what ought to be done to render ancient and modern houses healthy. I will eschew all extraneous matter, as much as possible, and will not fall into the common practice, better honoured in the breach than the observance, of heading the chapters, or interlarding the matter, with lines from the poets." It is but due to the author to say that he has faithfully avoided this tendency "to drop into poetry" on the subject of house-drains, sewers, &c.; on the plainness of the language, however, we cannot speak very highly. Many householders, it is to be feared, will find some difficulty in recognising an S-shaped pipe under the name of a "sigmoid"; or in appreciating the beauty of a description in which the overflow sewage from a cesspool is said to "debouch into the fields."

The greater part of the book is occupied with a description of the various sanitary appliances for buildings which have from time to time been proposed, or which have been brought into actual use: such as drain-pipes, of which twenty-two different kinds are figured and described; traps, of which thirty-six are given; fire-grates and stoves, &c. In many places, indeed, it reminds us of nothing so much as a manufacturer's or tradesman's catalogue. On the whole, however, this work contains much useful information and many excellent suggestions. On the subject of house-drainage, we are glad to see that Mr. Eassie has adopted and advocates the principle of leading all house-drains into one collecting drain, outside the house if possible, and placing in this main drain an efficient trap, properly ventilated, so as to prevent any of the sewer gases finding their way into the house through the drains or pipes.

### LETTERS TO THE EDITOR

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

Robert Brown and Sprengel

IN the notice of Mr. Darwin (vol. x. p. 80, bottom of 2nd col.) a mishap has somehow occurred which blunts the point intended to be made prominent and renders the statement untrue. I supposed that I had written "And we know from another source that he (Mr. Brown) looked upon Sprengel's ideas as by no means fantastic. Yet instead," &c. The object was to show how very near Mr. Brown came to reaching the principle that Nature abhors close-fertilisation in plants, and yet did not reach it at all. The authority for the statement I wished to make will be found in a footnote in Mr. Darwin's book on the "Fertilisation of Orchids," p. 340.

ASA GRAY

Cambridge, Mass., June 19

On the Physical Action taking place at the Mouth of Organ-pipes

THE most interesting, and perhaps the most important, fact disclosed in the experimental study of the organ-pipe on the air-reed theory is this—that the aeroplasic reed has a law of its own, unique amongst the phenomena heretofore observed in musical vibrations. It may be stated thus—*As its arcs of vibration are less, its speed is greater.* All our knowledge of rods and strings, of plates and membranes, would lead us to expect the usual manifestation of the law of isochronism, that in the air-reed considered as a free rod fixed at one end and vibrating transversely, the law would be observed, "though the amplitude may vary, the times of vibration will be the same." Yet here we meet with its absolute reversal, viz.—*the times vary with the amplitude.* This information does not rest on theory; every eye may verify it. A principle so strange, when first its action was observed, might well lead to disbelief in one's senses, although the mind had by its reasonings led up to the fact and sought for it as the one thing needed to give consistency to theory and make it a perfect whole. Familiar as the air-reed had been to me, the one secret had been hidden from my eyes; seeing, they saw not. Faith in the known mode of activity of the transversely