OUR BOOKSHELF.

Studies in Insect Life, and Other Essays. By Dr. A. E. Shipley. Pp. ix+338. (London: T. Fisher Unwin, Ltd., 1917.) Price 10s. 6d. net.

IT is Dr. Shipley's gift to write scientific essays artistically, using many-coloured lights from reading and experience to illumine and humanise hard grey facts. He has humour and a light touch, and things are so interesting to himself that they become interesting to us. Not that we pretend to explain his style, which permits of luminous, dignified discourse on lice and fleas, as well as on fisheries and grouse. "Le style," said Buffon, "est comme le bonheur; il vient de la douceur de l'âme."

The book, based on previously published essays and lectures, has eleven chapters, dealing with insects and war, honey-bees, humble-bees, wasps, the depths of the sea, fisheries, Sir John Murray, grouse-disease, zoology in the time of Shakespeare, the revival of science in the seventeenth century, and hate. We have seen no more successful rapidly drawn picture of a haunt of life than is to be found in the chapter on "The Romance of the Depths of the Sea." Another fine picture of a very different kind is that of Sir John Murray. It is very interesting to have Dr. Shipley's lively summary of his own investigations on what is called "grouse-disease," of which, adapting Sydney Smith, he says: "Little stoppages, food pressing in the wrong place, a vext duodenum, and an agitated blind-gut, and there you have 'grouse-disease.'"

In the essay on hate an exposition is given, after Cannon and others, of the part the secretion of the supra-renal capsules plays in "the bodily changes which occur in states of extreme pain, fear, or rage, and serve to place 'un enragé' in an eminently favourable state for wreaking his passion on his opponent." It has been suggested that the use of golden mice in connection with emerods may have implied some awareness of the correlation between rodents (with their fleas) and bubonic plague; Dr. Shipley wonders whether the ancient Hebrews knew anything about the potency of the supra-renal capsules, because they were so very particular in their burnt offerings to offer up "the fat upon the kidneys." We have but one fault to find with this entertaining volume, that it comes to an end too soon.

The Tutorial Chemistry. Part ii., *Metals and Physical Chemistry.* By Dr. G. H. Bailey. Edited by Dr. W. Briggs. Third edition. Pp. viii+460. (London: W. B. Clive, University Tutorial Press, Ltd., 1917.) Price 4s. 6d.

THE general character of this widely known textbook was described in the review of the first edition which was published in NATURE for April 14, 1898 (vol. lvii., p. 559). In the present issue the second half of the section of the book dealing with physical chemistry has been completely recast by Mr. H. W. Bausor. The whole text has been revised, and the pages concerned with crystallography have been transferred to an appendix.

LETTERS TO THE EDITOR.

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The Stability of Lead Isotopes from Thorium.

SINCE my recent letter on the subject of "thorium" lead (NATURE, February 15, p. 469) I have had some correspondence with Dr. Arthur Holmes, who, in agreement with Boltwood, had previously concluded from geological evidence that lead could not be the end product of thorium, because thorium minerals often contain so little lead in comparison with what is to be expected from their age. He pointed out that the age of Ceylon thorite as determined from the ratio of lead to thorium was curiously anomalous. Taking, as preferable, Rutherford's values for the periods of uranium and thorium, 0·72 and 1·9 ($\times 10^{10}$ years) respectively (in the ratio of 1 to 2·6, instead of 3·2, the figure used in the previous letter), the proportion of the thorite lead derived from the thorium would be 95·5 per cent., and from the uranium 4·5 per cent. The quantity of thorium lead per gram of thorium would be 0·0062. The rate of growth would be $4{\cdot}72\times10^{-11}$ gram of lead per gram of thorium per year, and the age of the mineral 131 million years. A Ceylon pitchblende (U=72·88 per cent., Pb=4·65 per cent.) has a ratio of lead to uranium of 0·064, giving the age as 512 million years, and Dr. Holmes considers that this is likely to be of the same geological age as the thorite, and to be, of all the Ceylon results, the most trustworthy for age measurements.

It must be remembered that there are two end products of thorium, both being isotopes of lead with the same atomic weight. Thorium-C, an isotope of bismuth, disintegrates dually, 35 per cent. of the atoms expelling first an α and then a β ray, and 65 per cent. first a β and then an α ray. More energy is evolved in the latter mode than in the former, and although the two isotopes have the same atomic mass and the same chemical character, there may be a difference in stability. From analogy with the uranium series, where the same thing is true for radium-C, except that all but a minute fraction of the atoms follow the second mode, it is the 65 per cent. isotope of thorium lead which should further disintegrate, for it is analogous to radium-D.

On the supposition that only the 35 per cent. isotope is stable enough to accumulate, the age of the mineral calculated from the data given would become 375 million years, in nearer agreement with the pitchblende. But the most interesting point is that if we take the atomic weight of the lead isotope derived from thorium as 206·0, and that from thorium as 208·0, and calculate the atomic weight of thorite lead on this basis, we get the same value, 207·74, which I obtained from the density, and Hönigschmid obtained for the atomic weight (207·77).

The question remains, What does the unstable isotope change into? Clearly the rate of change must be excessively slow to account for the apparently complete decay of the radiation of thorium-C. A β or an α ray expelled would result in the production of bismuth or mercury respectively, elements of which I could find no trace in the lead group separated from 20 kilos of mineral. But an α and a β change would produce thallium, which is present in the mineral in amounts that sufficed for chemical as well as spectroscopic identification. On this view, then, this particular lead should give a feeble specific α or β radiation, in addition, of course, to that produced by other lead isotopes present. Circumstances do not permit me to test the