

*A First Book of Rural Science.* By J. J. Green. Pp. viii + 146. (London: Macmillan and Co., Ltd., 1913.) Price 1s. 6d.

THE teacher who wants to give a rural bias to his school work still has to depend at least as much on his text-book as on his garden for help in his lessons. Amidst the vast number of books on rural science that the nature-study movement has called forth, a few stand out prominently as being eminently adapted to the purpose. Amongst them we have no hesitation in placing this little book. The information is sound, and is clearly and concisely set out; while the order is both logical in method and convenient in practice.

Beginning with seeds, the author follows on with plant growth, plant nutrition, and reproduction. Next he passes to the subject of soils, and then to the relationship between the soil and the crop. Throughout the author displays a vivid knowledge of rural conditions, and he seeks to connect up the child's training with the things that come into the scholar's daily experience. This desirable end is successfully accomplished. New varieties of plants, for example, are now among the common incidents of rural life. The book gives a short but good account of how they are formed. The micro-organisms of the soil have also come in for much attention from agricultural lecturers and others, and here, again, sufficient information is given to enable the student to form an intelligent grasp of the matter. Manures are described in sufficient detail for the purpose, and manurial trials are illustrated. Altogether the book can be cordially recommended both to teachers and students.

*Dent's Practical Notebooks of Regional Geography.* By Dr. H. Piggott and R. J. Finch. Book ii. Asia. Pp. 64. Book iii. Africa. Pp. 48. (London: J. M. Dent and Sons, Ltd., 1913.) Price 6d. net each.

THESE books, and others like them, are a welcome indication that teachers in schools are beginning to understand that children learn more satisfactorily by doing than by listening. The authors are experienced teachers who recognise that with the small amount of time available for geography in ordinary classes every expedient must be tried to select only practical exercises of prime importance. In these little books the practical work is all worth doing, and the instructions given are precise and to the point.

*Earthquakes and other Earth Movements.* By Prof. John Milne. Sixth edition. Pp. xvi + 388. (London: Kegan Paul, Trench, Trübner and Co., Ltd., 1913.)

THE additions and alterations rendered necessary by the knowledge gained since 1903, the date of publication of the fifth edition of his book, are collected by Prof. Milne in an additional appendix of some eleven pages. The chief topics of the appendix are the teleseismic observations which, Prof. Milne says, have already thrown new light upon the homogeneity and rigidity of our world, and have led to the explanation of phenomena in other departments of science.

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## LETTERS TO THE EDITOR.

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### The Ionisation of Gases in the Schumann Region.

IN July last I published a note in the *Physikalische Zeitschrift* (July 13, p. 583) on the ionisation of gases by light and the spectrum of aluminium in the Schumann region. As my views therein expressed have recently been misquoted in print on two occasions, I fear I did not make myself clear. It may be worth while, therefore, to add a word.

It was my object to explain the results of Lenard's volume ionisation experiments by exhibiting the spectrum of his source of light. To this end I published a spectrogram of the aluminium spark in air in the Schumann region. The illustration showed that, though the spectrum contained some strong lines between  $\lambda 1850$  and  $\lambda 1600$ , there was but one group of any strength between  $\lambda 1600$  and  $\lambda 1250$ ; this group occurred near  $\lambda 1300$ . Lenard's data indicated that the rays which produced most of the ionisation lay on the more refrangible side of  $\lambda 1600$ . I stated, therefore, that the group near  $\lambda 1300$  was probably responsible for most of the effect which Lenard observed, because it was the *only* strong group existing in the aluminium spectrum in the region under consideration. This is evidently very different from the opinion ascribed to me by Mr. A. L. Hughes (*Phil. Trans.*, vol. cexii., p. 226): "... Lyman concludes that the ionisation of air by light does not take place unless the light contains wave-lengths less than about  $\lambda 1300$ ."

While I am on the subject, I should like to add that the question as to what wave-lengths are responsible for the volume ionisation observed in gases seems to me to be still open. We know that the effect increases with decrease in wave-length in the Schumann region, but that it "sets in about  $\lambda 1350$ " is not perfectly obvious. Prof. Palmer has been kind enough to test the volume ionisation due to the mercury arc, at my suggestion. He finds a small but perfectly definite effect. This confirms the recent results of Bloch, obtained with an arc in quartz (*C.R.*, vol. clv., p. 1076). I have just concluded a study of the spectrum of the arc, and I have been unable to discover any lines below  $\lambda 1400$ . The most refrangible line which I have observed through quartz is at  $\lambda 1775$ . It seems fairly certain, therefore, that some volume ionisation can be produced by light of wave-length longer than  $\lambda 1700$ .

THEODORE LYMAN.

Jefferson Laboratory, Cambridge, Mass., May 22.

### Artificial Hiss.

HAS Lord Rayleigh tried the effect of holding a piece of sheet iron or of compressed charcoal in the small pointed flame of an ordinary foot blowpipe when the air supply is somewhat in excess of the needs of the flame? By adjusting the gas supply, the air pressure, and the position of the iron sheet, sounds can be obtained varying from *f* to *s* or *sh*. The oxy-hydrogen flame, supplied with a slight excess of oxygen, is even better. The air entering a vacuum desiccator through a narrow stopcock gives a fairly good *s* sound.

E. R. MARLE.

Hartley University College, Southampton,  
May 30.