

*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.

In reply to the letter in NATURE of May 29 (p. 319) under the heading "Artificial Hiss," the following is a suggestion which may be an answer to the question, though not a practical solution to the problem.

A loud hissing noise accompanies the passing of an electric arc across the gap in such a lamp as is used for optical lanterns, &c. Though this hissing noise does as a rule last for only a short time, yet it appears to me quite a simple matter to regulate the carbons so as to prolong the sound. The actual "hiss" sounds much more of a sibilant than an *f*, such as is produced by a current of air or steam being forced under pressure through a small opening.

Charterhouse, June 2.

H. L. KIEK.

#### Red Water.

IN NATURE of April 4, 1912, Messrs. Mackenzie and Finlay wrote relative to the cause of the occurrence of colouring matter in a sample of water from a crater lake in Uganda, and subsequently in the issues of April 11 and June 6 Messrs. H. Warth and C. Crossland respectively wrote describing the occurrence of similar characteristics in the great salt lake of Sambhar, in Rajputana, also pools at Suez, and near the Rawaya salt lake.

Dr. Gavin McCallum, in a paper read at a meeting of the Geelong Field Naturalists' Club, in March, 1911, entitled "Forms of Life at the Salt-pans," directed attention to this coloration of the water and its blood-red appearance, and described it as being not due to the "colour of the liquid itself, but to the presence in enormous numbers of uniform small round cells. Dr. McCallum also mentions another form as being oval in shape with two cilia or lashes at the narrower end," the cilia and a small portion at the narrower end being colourless. At various times samples of the "red water" have been collected, and kept constantly under microscopical examination both by Dr. McCallum and myself, with the result that we can say the colouring is wholly due to a flagellate organism not unlike *Polytoma uella*, Müll, as figured in the last edition of the "Encyclopædia Britannica," but as this is given as being a species of *Chlamydomonadidæ* in the article on Flagellata, and as a similar genus appears in the article on algæ by a different writer, some confusion evidently exists as to both these orders.

The oval form, as mentioned by Dr. McCallum, has two flagella, about one-third longer than the body, which appear to arise from a sort of collar or circular opening at the anterior end; there are two contractile vacuoles near the base of the flagella, and an eyepot; except the flagella and a small portion at the anterior end, the whole organism is so deeply pigmented with red matter that it is difficult to determine its constituent parts. There are other features, but these it is at present premature to mention. The globular form appears as the brine reaches saturation point, and is a sort of resting stage conditioned by the salinity of the medium in which it lives; this form gives rise to zoospores.

Associated with the flagellate organism is an interesting crustacean, the brine shrimp, very similar to *Artemia salina*, but in all the articles dealing with this crustacean the female is said to carry the eggs underneath the tail, whereas in this shrimp they are carried in sacs on either side, like the egg sacs of the Cyclops. The male, which is much larger than the female, has the usual claspers for holding the female. Dr. McCallum mentions in his article that at 7° to 8° Baume the shrimp sickens and dies; at this stage it becomes the host of the flagellate organism, which absorbs the decaying organic matter in the

interior of the shrimp's body, leaving an absolutely hyaline cast skin.

I may mention that during this period of the organism's existence it is nearly always green, the red matter only making its appearance at a later stage. As the brine reaches crystallisation the ensuing salt is of a reddish hue, due, of course, to the pigmented organism, and it is a matter of conjecture as to whether or no each spherical monad does not form the nucleus of each crystal of salt. The salt, upon exposure to the sun, bleaches, but the zoospores contained within the spherical or globular membrane retain their vitality and issue forth in countless numbers of infinitely small green, actively moving flagellate organisms, upon redissolving the salt.

FRED WHITTERON.

Geelong, Victoria, March 31.

#### Phreatoicus in South Africa.

AT the beginning of this month I found some isopods in one of the swift-running streams on the top of Table Mountain; they were quite common in and under the moss covering the stones in the bed of the stream, and were very sluggish. On examination they prove to belong to the family Phreatoicidæ. The occurrence in South Africa of a member of this peculiar family, which hitherto has been recorded only from New Zealand, Australia, and Tasmania, is of great interest as bearing on the question of the ancient land connection between the southern continents.

It is a new species, and will shortly be described in the Annals of the South African Museum.

KEPPEL H. BARNARD.

South African Museum, Cape Town,  
Cape of Good Hope, May 20.

#### GEOGRAPHY AND TRAVEL.<sup>1</sup>

(1) THIS work has originated in the desire of its author to make some public statement of indebtedness. It is, as it were, a memorial laid upon an altar. Dr. Cornish, in his researches, has dealt with phenomena that are cosmic rather than humane; yet we now perceive them set against a background, old as that of the cave-dwellers, where accomplishment is due to the fact that man does not live his life alone. Whether their vessel is rolling fifty-six degrees in the Bay of Biscay, or nearing Ceylon in incense-laden air, whether they are walking in the symbolic garden of the Shogun, or in the shattered streets of Kingston, the essential feature is that the travellers are together. The form adopted as a title merely adds emphasis to this impression.

Except for the stirring adventure of the Jamaican earthquake of 1907, these travellers saw little that others have not seen and liberally described. But what they saw they realised as trained observers. "The greatest astronomical

<sup>1</sup> (1) "The Travels of Ellen Cornish." Being the Memoir of a Pilgrim of Science. By Dr. Vaughan Cornish. Pp. xvi+293+plates+maps. (London: W. J. Ham-Smith, 1913.) Price 12s. 6d. net.

(2) "The Continents and their People: Asia." A Supplementary Geography. By J. F. Chamberlain and A. H. Chamberlain. Pp. ix+198+3 maps. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1913.) Price 3s.

(3) "Modern Geography for High Schools." By R. D. Salisbury, H. H. Barrows, and W. S. Tower. Pp. ix+418+vii plates. (New York: Henry Holt and Co., 1913.) Price 1.25 dollars.

(4) "Three Years in the Libyan Desert: Travels, Discoveries, and Excavations of the Menas Expedition." By J. C. Ewald Falls. Translated by Elizabeth Lee. Pp. xii+356+plates. (London: T. Fisher Unwin, n.d.) Price 15s. net.