

ment that arose later he showed that his application for a patent was the result of work at Rothamsted with bones and mineral phosphates from 1839, and with bone dust from 1843. Liebig had suggested phosphatic manure in a report to the British Association in 1840.

But in May 1837 an unnamed correspondent of the *Farmers' Magazine* (2nd series), writing on the difficulty and expense of obtaining bone dust in the required quantities, proposed the making of a "fictitious bone dust by impregnating lime with phosphoric acid." Another correspondent in answer asserted (May 1837) that there was no cheaper way of getting phosphorus than by burning bones, adding, however, "phosphate of lime if it could be found so as to be available to the farmer, would be invaluable. Whether it exists in England I know not, but in Spain there are entire mountains of it; it is compounded of phosphoric acid 41 parts, lime 59"; showing an earlier appreciation in England of the fertilising possibilities of Spanish phosphorites than is generally realised.

Whether or not Lawes had read these letters we do not know, but they form an interesting foreshadowing of the great work he began two years later.

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Soil Reaction, Water Snails, and Liver Flukes.

MAY I be allowed to add a few words to the discussion on *Limnæa peregra* and the liver rot of sheep, etc. First with regard to outbreaks of the disease following the application of lime. During a considerable experience of Mid and North Wales I have had a number of such cases brought to my notice by farmers (in one case basic slag had been used). In all cases the dressings had been applied to rough wet pastures of the "sour" type, which are not grazed closely by stock. In parts of these fields *L. truncatula* was present, but, owing to light grazing of the abundant herbage, the encysted cercariæ had presumably not been ingested. Following an application of lime, a "sweetening" or improvement of the pasturage leads to closer grazing and a more or less intense infection of the stock. This, at any rate, is my opinion following the investigation of actual cases.

Secondly, as to the distribution of the two species of *Limnæa* (in the same regions). Both are abundant, and although they may occur together now and again, it is usual for *L. peregra* to frequent the softer muds and *L. truncatula* the firmer substrata. For example, if a small streamlet be followed, *truncatula* will often be found in its upper and *peregra* in its lower (and more muddy) portions. In a wide ditch, *truncatula* may occupy the margins and *peregra* the soft central portion. These habitat differences are probably due to the relative size and expanse of foot. While working on the bionomics of *truncatula* I made some notes on *peregra* also; these were incorporated in a paper published in *Parasitology*, x., No. 2, December 1917.

With regard to *peregra* acting as an intermediate host for *Fasciola hepatica*, I have on several occasions obtained cercariæ from that species which I cannot distinguish from that of *F. hepatica* (*Cercaria fasciolæ hepaticæ*, Thomas). This, however, is not a common occurrence in my experience, although I have examined numerous samples of *peregra*. The last two cases were (a) from ill-drained fields, near Llanwnda, Carnarvonshire, elevation about 100 feet; (b) on the mountains near Bethesda, elevation more than 1000 feet. In both instances liver rot had occurred. In the

first *truncatula* was present also; in the second only *peregra* could be found.

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The Silent Zone in Explosion Sound-Areas.

IN the recent interesting article on the Oldebroek explosion, it is stated (*NATURE*, January 6, p. 33) that in no case has it been found that the nearer margin of the outer sound-area lies at so short a distance as 114 km. from the source. When the minute-guns were fired at Spithead during Queen Victoria's funeral procession on February 1, 1901, there was a clearly marked silent zone, and the nearest point of the outer sound-area was 80 km. from the flagship. In this case the sounds were easily recognised, as they recurred at regular intervals (*Knowledge*, vol. 24, 1901, pp. 124-25; *Science Progress*, vol. 14, 1920, pp. 625-26). In the sound-area of one of the Asama-yama explosions (December 25, 1910) the corresponding distance was about 87 km. (*Bull. Imp. Earthq. Inves. Com.*, vol. 6, 1912, pp. 61-63 and plate 18). These figures have an important bearing on the origin of the silent zone.

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Time Relations in a Dream.

IT is commonly believed that a dream which appears to be of long duration lasts in reality for a short time only. Since precise knowledge on the point is difficult to get, the following observations may be of interest. Having fallen asleep again, after being called a few mornings ago, I dreamt I was visiting a strange laboratory. On entering I was aware of a deafening hammering noise which rendered conversation impossible. My host took me to another room, where the noise was inaudible, but on returning to the first room it continued, the blows being at about the same interval. I then noticed, what I had not seen before, some one striking a pipe in a shaft in the wall, but I reflected that the force used seemed quite insufficient to produce the sound heard.

On awaking suddenly I connected the sound with the chipping of a stone-mason at work on the war memorial across the road. Remembering Mr. J. Barcroft's letter to *NATURE* (1919, vol. 104, p. 154), I timed the chipping blows. They were from 26-34 per 10 seconds, averaging 3 per second. Going over the dream it seemed that the loud sounding blows, which produced a continuous reverberation, were about 15 or 16 per 10 seconds; thus the time in the dream proceeded at about—or possibly slightly less than—twice the normal rate.

Both before and after the cessation in the dream—corresponding probably to one of the mason's pauses—the rate was the same. In this respect the experience differs from Dr. Barcroft's, for his clock ticking four to the second appeared to give a five-second interval, namely a twentyfold exaggeration; this, later in the dream, was reduced to a fourfold exaggeration. The noise of which I was conscious in the dream appeared to go on before the interval for about a minute and after it for two or three, with about a minute between. The duration of the dream appears accordingly to have been about two minutes or slightly longer. The loudness of the noise, as it was experienced in the dream, is remarkable in view of the actual loudness. The note was also far more metallic.

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