bably derived form. Instead of being circular in section at right angles to the long axis, they were triangular, so that they bore a strong resemblance to the kernels of a beech-nut. The

broad end in this case also was perfectly transparent, and the sharper end banded as before.

I append three diagrams representing typical forms.

Ramnagar, Terai, January 25 C. S. MIDDLEMISS

Snowflakes

IN your issue of January 20 (p. 271) is an interesting sketch of the snowstorm of January 7, 1887, with mention of snowflakes 3½ inches long. Without vouching for the exact details I send you some statements from a letter in the *New York World* of to-day's issue. The letter is dated Fort Keogh, Montana, U.S., February 13. "The winter of 1886–87 will be long remembered throughout the north-west for the extreme severity of the temperature and the unusual depth of snow. From January 6 to 11 the degree of cold was something frightful. Mercury thermometers were often congealed, and spirit thermometers were kept jumping from 40° to 60° below zero. Half a dozen times has the 60° notch been touched, and once this season 62½° below zero has been scored on the Saskatchewan plains. But the authorities in weather in this country are the Indians. The oldest members of the Crow tribe say there have been few such winters as the present since they settled in the Yellowstone Valley. Curious phenomena sometimes attend a snowstorm. Near Matt. Coleman's ranch on January 28 the flakes were tremendous, some were larger than milk-pans. Some flakes measured 15 inches square and 8 inches thick. For miles the ground was covered with such bunches, and they made a remarkable spectacle while falling. A mail-carrier was caught in the same storm and verifies it." The narrative is one of great suffering, and loss of human lives and cattle. "Miss Maggie Bunn, school-teacher at Highmore, while going from the school to her house was frozen to death. The bodies of three Indians who belonged to Berthold Agency were found frozen near Ashland." And so on, in harrowing detail, for a number of whites perished. SAMUEL LOCKWOOD

Freehold, New Jersey, U.S.A., February 14

"Invisible at Greenwich"

I WRITE to note an apparent oversight which I have detected in the *Nautical Almanac* for 1888. The partial solar eclipse of August 7 is stated to be "invisible at Greenwich," but on applying a rigorous calculation I find that it will be visible there to a small extent, the times of contact being as follows:—

	G.M.T. h.	m.	Angle from N. pt.	Angle from vertex
First contact	6	53 ...	11° to E. ...	26° to W.
Greatest phase ...	7	3 ...	·013 (sun's diam. 1)	
Last contact	7	13 ...	30° to E. ...	7° to W.

the angles being for the direct image.

I am aware that this is a very insignificant eclipse, but the greatest attainable accuracy is desirable in our national ephemeris, which, indeed, inserts eclipses much slighter than the above, *e.g.* the lunar eclipse of November 26, 1890, whose magnitude is only ·002. A. C. CROMMELIN

Trinity College, Cambridge, February 15

Lunar Halos

LAST evening (February 8), about a quarter-past eight o'clock (75th meridian time), I saw around the moon a series of coloured rings lying close together. The inner one was two or three diameters of the moon from the moon and *red*, the next was violet, then red, and finally violet again, this last one being very faint. From their proximity to the moon these rings seem to constitute the coronal, but I am puzzled by the fact that the inner ring was red. Do halos ever occur so close to the moon and without an interval between the two pairs of red and violet rings?

February 12.—Since writing to you on the 9th inst. I have found that my colleague here, Prof. W. G. Brown, noticed the rings around the moon about half an hour before I saw them. He says the colour nearest the moon was *yellow*, passing into red outwards, and that immediately following the red was violet, then the colours of the solar spectrum in order from violet to red on the outside. This indicates that the first red was really outside a violet ring which for some reason was invisible, and brings the phenomenon properly under diffraction: in fact, we had a good example of the coronal with the innermost rings wanting. S. T. MORELAND

Washington and Lea University, Lexington, Va., U.S.A.

The Beetle in Motion

IF it can interest Prof. Lloyd Morgan I am in a position to communicate that I have many times observed the progressive movements of insects, spiders, and myriapods. I have not noticed the retardation of hind-legs; it seems to me that this occurs only in the case of bulky and slow-moving beetles, like the larger Melasomata. In general, I find that the mode of progression in articulates does not differ essentially from what we see in vertebrates; the process is only, at first sight, a little obscured by the plurality of the legs. If we consider only the prothoracic ring of a beetle, we find that it walks like all bipeds, alternating one leg with another. Two segments walk in the manner of quadrupeds, which are not amblers. Now the legs of the third segment must necessarily repeat the movements of the legs of the first segment, for the sake of equilibrium. The fourth ring would repeat the movements of the second, and so on.

Tashkend A. WILKINS

A Recently-Discovered Deposit of Celestine

WITH reference to Mr. Madan's letter (p. 391), on "A Recently-Discovered Deposit of Celestine," I beg to inform him that a note was read by me at the last meeting of the Mineralogical Society, describing these crystals as exhibiting a habit and size unknown till then to occur with such crystals of celestine in England. I obtained the crystals at Christmas, from Mr. Henson, of the Strand, and am expecting to receive more material, which I hope to work on at the end of Term; but, unlike Mr. Madan, I have at present been unable to visit the locality where they are found. R. H. SOLLY

Mineralogical Museum, Cambridge, February 28

The Vitality of Seeds

MAY I ask, through the columns of your widely-circulated paper, whether there is any really trustworthy evidence for the following statement made by Prof. Judd in his address to the Geological Association (p. 393 in your last issue): "The botanist cites the germination of seeds, taken from ancient Egyptian tombs, as a striking illustration of how long life may remain dormant in the vegetable world." I know that this is a popular belief, but should like to learn upon what foundation it rests. Probably it would interest other botanists besides.

February 26 N. E. P.

THE RELATIONS BETWEEN GEOLOGY AND THE MINERALOGICAL SCIENCES[1]

II.

LET us now turn from the statical aspect of minerals, their morphology, to the dynamical aspects, their physiology.

Minerals are not fixed and unchangeable entities, as they are sometimes regarded. On the contrary, they exhibit varying degrees of instability, and pass through very definite series of metamorphoses.

We have already seen that every alteration in the temperature or other conditions which surround a crystal leads to striking modifications of molecular structure, which are at once revealed by the delicate tests of optical analysis. So sensitive, indeed, are some crystals to the action of external forces, that even the passage of the

[1] Address to the Geological Society at the Anniversary Meeting on February 18, by the President, Prof. John W. Judd, F.R.S. Continued from p. 396.