noticed it before. Of course when the apparatus is in full working order there is little opportunity for doing so.

The only explanation I could think of was:—(i) that the light of the lamp had produced some molecular change in the paint coating the notice board; (ii) that this had affected differently the blue and the white paint; (iii) that the same cause had set up some differential electrical condition of the board and the glass; (iv) that a bombardment of particles of the blue paint had taken place on to the glass to which they had adhered; and that (v) the particles so adhering, by dispersing the light, produced the effect of the pale illuminated ground while the spaces occupied by the letters being relatively clean stood out dark.

Royal Gardens, Kew, W. T. THISELTON-DYER.
February 1.

MR. W. B. CROFT'S paper on Breath-Figures in your issue of December 22 reminded me of some curious impressions of monumental brasses which are to be seen on the walls of Canterbury Cathedral. When I saw these impressions a few years ago, it occurred to me that they might have been produced by mere contact, the brass plates having possibly been hung for many years against the walls, in secluded corners, at a time when the Reformers would not let them remain in their proper matrices on the church floor. I had forgotten the particulars of these figures, but Dr. Sheppard, of Canterbury, has kindly sent me the following notes by favour of Canon Fremantle:—"A number of impressions of brasses are in the basement (which is open to the air) under Henry IV.'s chantry in the Cathedral. A very good impression is on the western column of the crypt of Trinity Chapel. . . . On the walls appear the shapes of the effigies. Sometimes the stone is unstained all over the area of the figure, and surrounded by a broad dark smudge: and sometimes the case is reversed, and the figure is the exact negative of the former kind; that is to say, the area of the figure is indicated by an uniform dark tint, whilst the surrounding stone is unstained." Dr. Sheppard suggests "that an exact pattern seems to have been made in paper and then fixed to the wall whilst it was brushed over with linseed oil. But this does not account for the white effigies on a dark ground."

I would commend these impressions to the notice of those interested in the subject. It may be that, though some were made intentionally, others are the result of simple contact.

F. J. ALLEN.

Mason College, Birmingham, February 4.

Fossil Plants as Tests of Climate.

IN continuation of my recent letter, permit me to call attention to a communication on the bread fruit trees in North America, by Mr. F. H. Knowlton, of the National Museum, Washington, U.S., which appears in your American contemporary *Science* for January 13. The forty living species of *Artocarpus* are all confined to tropical Asia and the Malay Archipelago. *A. incisa*, the true bread fruit tree, and one or two others, are largely cultivated in the tropics. They are small or medium-sized trees with a milky juice, large leathery leaves, and monœcious flowers. The female flowers are long club-shaped spikes, which uniting form one large mass known as the "bread fruit," the interior containing a pulp when ripe like new bread.

The first fossil bread fruit was discovered in boulder county Colorado in late cretaceous rock, and was named by the late Prof. Leo Lesquereux *Myrica* (?) *Lessigiana*, other fragments he called *Aralia pungens*. The subsequent researches, or more perfect specimens of Dr. A. S. Nathorst, proved these to belong to one species, *Artocarpus Lessigiana*. Dr. Nathorst is the discoverer of another species closely allied to *A. incisa*, which he calls *A. Dicksoni*, which he obtained from the cretaceous flora of Waigatt, West Greenland, which the previous labours of Profs. Heer and Nordenskiöld had shown to be of a tropical or sub-tropical character, containing as it does numerous species of ferns of the order Gleichenialeæ, and several species of cycas.

CHAS. E. DE RANCE.

H.M. Geological Survey, Alderley Edge, Manchester.

Lunar Rainbow in the Highlands.

THIS interesting phenomenon (a very unusual one in this latitude) was observed near here on the morning of the 3rd inst., about six a.m. The moon was two days past full, and was not shining particularly brightly, being obscured, except at considerable intervals, by driving mist and light clouds. The bow, however, was exceedingly well marked, and formed a singularly beautiful object, stretching as it did completely across the north-western end of Loch Oich, glimmering against the dark background of the mountains, and sinking into the water on the southern shore of the loch. The general colour of the bow was yellow deepening into orange, several of the prismatic colours, however, being intermittently visible, especially a tinge of violet on the upper side. O. S. B.

The Abbey, Fort-Augustus, N.B.

OPTICAL CONTINUITY.[1]

KEENNESS of sight is measured by the angular distance apart of two dots when they can only just be distinguished as two, and do not become confused together. It is usually reckoned that the normal eye is just able or just unable to distinguish points that lie one minute of a degree asunder. Now, one minute of a degree is the angle subtended by two points, separated by the 300th part of an inch, when they are viewed at the ordinary reading distance of one foot from the eye. If, then, a row of fine dots touching one another, each as small as a bead of one 300th part of an inch in diameter, be arranged on the page of a book, they would appear to the ordinary reader to be an extremely fine and continuous line. If the dots be replaced by short cross strokes, the line would look broader, but its apparent continuity would not be affected. It is impossible to draw any line that shall commend itself to the eye as possessing more regularity than the image of a succession of dots or cross strokes, 300 to the inch, when viewed at the distance of a foot. Every design, however delicate, that can be drawn with a line of uniform thickness by the best machine or the most consummate artis, admits of being mimicked by the coarsest chain, when it is viewed at such a distance that the angular length of each of its links shall not exceed one minute of a degree. One of the apparently smoothest outlines in nature is that of the horizon of the sea during ordinary weather, although it is formed by waves. The slopes of *débris* down the sides of distant mountains appear to sweep in beautifully smooth curves, but on reaching those mountains and climbing up the *débris*, the path may be exceedingly rough.

The members of an audience sit at such various distances from the lecture table and screen, that it is not possible to illustrate as well as is desirable, the stages through which a row of dots appears to run into a continuous line, as the angular distance between the dots is lessened. I have, however, hung up chains and rows of beads of various degrees of coarseness. Some of these will appear as pure lines to all the audience; others, whose coarseness of structure is obvious to those who sit nearest, will seem to be pure lines when viewed from the furthest seats.

Although 300 dots to the inch are required to give the idea of perfect continuity at the distance of one foot, it will shortly be seen that a much smaller number suffices to suggest it.

The cyclostyle, which is an instrument used for multiple writing, makes about 140 dots to the inch. The style has a minute spur wheel or roller, instead of a point; the writing is made on stencil paper, whose surface is covered with a brittle glaze. This is perforated by the teeth of the spur wheel wherever they press against it. The half perforated sheet is then laid on writing paper, and an inked roller is worked over the glaze. The ink passes through the perforations and soaks through them on to the paper below; consequently the impression consists entirely of short and irregular cross bars or dots.

[1] Extract from a lecture on The Just-Perceptible Difference," delivered before the Royal Institution on Friday, January 27, by Francis Galton, F.R.S.