identical optical properties. Brilliant green alone in thin layers is blue rather than green, and though it shows dichromatism, the change from blue to red is not nearly so striking as a change from green to red. The prisms can be made in the following way.

A quantity of Canada balsam is boiled in an evaporating dish until a drop placed on a cold surface becomes quite hard. The dye must not be added until the balsam has cooled almost to the point of becoming thick, otherwise it will be decomposed and a very muddy green result.

Enough brilliant green must be dissolved in the balsam to make it appear deep red in layers 1·5 cm. thick. Thin layers will be found to be blue. The naphthol yellow is now added in quantity sufficient to change the tint of thin layers from blue to green. Possibly some samples of the dye will not require the addition of the yellow, but all which I have tried are improved by the process. A hollow prism is now made by fastening two pieces of thin plate glass between two grooved strips of wood. The base of the prism should be about 2 cm. thick if the strips of glass are 4 cm. long. The plates are warmed with a flame and the coloured balsam poured between them. After the balsam has cooled it is a good plan to run a quantity of melted sealing-wax upon the top of it, which strengthens the prism. An incandescent lamp or gas flame viewed through the prism is seen divided into a green and a red image, the former gradually fading away as the eye is moved towards the base of the prism.

If a larger amount of the colouring matter be added to the balsam and the fluid be pressed out between pieces of plate glass, screens can be made which transmit a very good secondary yellow. Through these screens a sodium flame is absolutely invisible, though a gas flame appears of a colour very closely resembling the soda flame in tint. The colour of the transmitted light depends also on the original composition of the light. By a suitable adjustment of the dyes a screen can be made which appears red by lamplight and green by daylight, illustrating very well the peculiarity of the Alexandrite crystals.

Johns Hopkins University, Baltimore. R. W. WOOD.

Sun-pillar and Parhelion.

As the area over which such effects are visible is of some interest, it may be well to mention that a sun-pillar was visible in Dublin at 7 p.m. on Monday, April 28. It was preceded at 6 p.m. by an unusually fine parhelion display, a portion of which was hidden from my view by houses. Two concentric circles and an inverted arc touching the inner one were visible, with a mock sun at the left hand end of the horizontal diameter of the inner circle, and probably another, hidden from me, on the right. The wind all the previous day had been cold from the north-east, in a fairly clear air, and still blew from about north. The sky was full of streamers and wisps of cirrus cloud. Doubtless a far more complete account can be given by other observers. GRENVILLE A. J. COLE.

Royal College of Science, Dublin, April 30.

A Rare Wild Sheep.

SPORTSMEN and naturalists will be interested to learn that Mr. Talbot Clifton, who has recently been travelling in northern Siberia, has brought home from the valley of the Lena the skin and skull of a wild sheep of which no complete examples have hitherto been known in England. This sheep is the *Ovis borealis* of Severtzoff, a near ally of the bighorns of Kamchatka and Alaska. As it has no English name, it may well be known as Clifton's bighorn. The skin is being mounted by Rowland Ward, Ltd., and will before long be exhibited to the Zoological Society. R. LYDEKKER.

Beechen Hedges on Elevated Ground.

IN your issue of April 10, Mr. Wm. Gee, of Buxton, expresses his surprise that some beechen hedges and smaller trees in his neighbourhood have maintained their foliage through this winter, "contrary to the habit of deciduous trees."

I beg to state that in Denmark, where beeches abound, these trees always behave in the same manner as those in Buxton did this year. An underwood of young beeches, densely covered with dry, brown, rattling foliage, is quite a characteristic feature of Danish woodland scenery.

It would be most interesting to learn whether the beeches in England really used to throw off their leaves in autumn, and to ascertain the causes of such a different behaviour of the same species of tree in two countries of approximately the same climate. How this holding of the leaves could be a protective device to the individual young beech I cannot imagine; but to the whole underwood, or wood, this phenomenon might be protective, keeping out the cold winds of winter.

18 V. Boulevard, Copenhagen. JUL. WULFF.

IN reply to the interesting communication from Copenhagen anent the Buxton beeches, I would remind your correspondent that, as stated, the matured trees in the plantations hereabouts drop their leaves in the autumn as usual, the retention of them being observable only upon small young trees, and in the beechen hedges, and that this effect is not noticed, in this neighbourhood, for the first time.

It may give colour to the suggestion that this holding of the past season's leaves is an extra device under pressing circumstances to remember that the tissue of such accessory organs as scales, bracts and stipules is of feebly conducting material, and that these dry beech leaves, acting as such, would also enclose a film of air which would tend to give fuller protection from the frosts which this winter have been uncommonly severe, the local observatory (in connection with Westminster) registering down to 3° Fahr.

We have the highest authority for considering the beech as an unusually resourceful tree, as shown in its vernation, the growth of its bark and the care of its seeds; and it would not be surprising to hear of its making a special defence against a special attack, and being successful as a "survival of the fittest."

Barlbro' Cottage, Buxton, April 28. WM. GEE.

CHEMICAL INSTRUCTION AND CHEMICAL INDUSTRIES IN GERMANY.

NO more striking illustration of the position which Germany has won for herself in chemical technology, and of the industrial preeminence which she has thereby secured in one of the most highly developed branches of the chemical arts, could have been given than that afforded by Prof. Witt in the lecture theatre of the Royal Institution on Friday evening, March 21; and to the observant eye no object-lesson could be more significant or more forcible than that presented by the remarkable series of chemical products, the outcome of the work of German manufacturers, which Prof. Witt had gathered together to point the moral of his discourse.

In a few years we shall behold the extinction of one more agricultural industry, and the indigo plantations of India will have gone the way of the madder fields of Avignon. The death-knell of natural indigo has been sounded; the planter may struggle on for a while in a futile effort to withstand the inevitable; prejudice and trade customs may delay the fall of the fateful sword; but the machinations of the German chemist, backed by the German capitalist, have slowly but surely compassed his ruin, and it is but a question of time when it will be accomplished.

The conditions which have conduced to this result have been indicated, time and again, in these columns. But no more eloquent commentary on these causes could be adduced than is afforded by the report on chemical instruction and chemical industries in Germany recently made to the Foreign Office by Dr. Frederick Rose, His Majesty's Consul at Stuttgart, and which has recently been published.[1]

This report deals with the facilities, and expenditure, for chemical instruction at the two Prussian Technical High Schools at Berlin and Hanover, and at the University of Berlin, and is supplementary to a report on chemical instruction and chemical industries in Germany already made public by the Foreign Office.

The following brief analysis of this report will serve to show by what methods the State has deliberately

[1] Diplomatic and Consular Reports, No. 573, Miscellaneous Series.