XLI. On the achromatism of the eye: in reply to some remarks in the Lond. and Edinb. Phil. Mag. and Journal of Science, No. 33

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heat, have not, in fact, a certain small amount of it, very delicate thermometers will be required. These instruments must be susceptible of indicating variations of temperature equivalent only to small fractions of a degree on any of the scales at present in use, as the differences of temperature of nearly allied species, in the one line of research, and those between the animal and the ambient medium, in the other, must unquestionably be very minute.

A popular exposition of this subject, including the enunciation of the approximate law above explained, was delivered, in the form of a Lecture, in the Theatre of the London Institution, to the company assembled at a *Conversazione* on the 27th of February last (1833), on which occasion the foregoing views were for the first time explicitly announced.

London Institution, June 19, 1833.

XLI. *On the Achromatism of the Eye: in reply to some Remarks in the Lond. and Edinb. Phil. Mag. and Journal of Science, No. 33. By the Rev. B. POWELL, M.A., F.R.S., Savilian Professor of Geometry, Oxford.**

OBSERVING in the last Number of this Journal (p. 161) that Sir David Brewster has honoured my paper on the achromatism of the eye with a notice, I think it necessary, in order to prevent misconception, to offer the following brief statement in reply.

1st. I believe I have stated in my paper, that I readily admit that *many individual eyes may not be achromatic*. If the dispersive powers of the media vary ever so little, the achromatic adjustment may be destroyed. I am therefore far from wishing to controvert any particular observations which may show that individual eyes have not the requisite adjustment.

2ndly. The main object of my paper was to show, in contradiction to the assertions of many theoretical writers, *that in a combination similar to the eye, achromatism is perfectly possible in principle*. Their position is that the result is *impossible* upon *theoretical* and *mathematical* grounds. I have shown in a way which can only be refuted by disproving the whole established theory of foci and refractive indices, that, as far as theory is concerned, achromatism is perfectly obtained, in a combination of a lens and one medium, if only the indices and radii fulfill the conditions of a certain formula. I have also shown by observation, that in the particular in-

* Communicated by the Author.

stance of an ox's eye the indices are as nearly as possible in the required ratio.

3rdly. It follows as a necessary and mathematical consequence that an eye may be perfectly achromatic for direct central pencils, though not for excentric and oblique pencils, which appears also to accord with observation.

These positions, I believe, will be found to stand quite independently of Sir D. Brewster's remarks, which may yet be perfectly correct in reference to the particular cases examined, and I should be among the first to acknowledge their value as bearing those marks of excellence which characterize all the observations of their author.

Oxford, March 3, 1835.

XLII. *Trigonometrical Height of Ingleborough above the Level of the Sea.* Part I. By JOHN NIXON, Esq.*

[With a Plate.]

MY *standard* altitude, that of Ingleborough, having been originally determined from insufficient data†, the details of a more satisfactory measurement are now presented.

All the requisite observations might have been made at any of the numerous places on the margin of the sea in the bay of Morecambe, which command a view of Ingleborough and several other stations of the Ordnance Survey; but as differences of level may be measured with peculiar advantages from intermediate positions, four eminences situated between Ingleborough and the bay were fixed upon as stations whence the elevation of the hill and the depression of Hest breakwater pole could be observed.

A brief description of the stations and their signals may not be deemed superfluous. About two miles north-east of Burton-in-Kendal a saddle-shaped ridge, chiefly of limestone, extends upwards of two miles from north-west to south-east. The precipitous northern end, noted for its resemblance to the Rock of Gibraltar, is called *Farleton Knot*. Near the south-west side of the boundary wall that runs along the watershed of the ridge, a lofty pile of huge fragments of rock, constructed, from the difficulties of the situation, of an irregular figure, was erected upon a highly inclined bed of limestone, close to its basset edge at the loftiest point of the Knot. The southern, more gradual termination of the ridge, is known by the names of *Hutton-Roof Moor* (or *Crags*) north-east of the division wall, and of Dalton Fell south-west of it.

* Communicated by the Author.

† See *Philosophical Magazine* for 1823, vol. lxi. p. 262.