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On the scientific explanation of parhelia.

Math. Gaz. 87, No. 509, 243-249 (2003).

Haloes, unlike rainbows, occur on sunny days when there is plenty of cirrus cloud, but no rain. The red band is on the inside and the arc is centred round the sun, in contrast to rainbows. The theory of haloes and parahelia was initiated by Mariotte in the 17th century and completed two hundred years later by Bravais, but neither used calculus. This article gives the mathematical arguments regarding this work. Mention is made of Snell's law and its application in 3 dimensions, as well as of orthogonal and oblique incidence.

Classification: M50

Keywords: haloes; optics; refraction; Snell's law; history of mathematics; meteorology