Nature (*London*) **107** 747 (1921)

Conical refraction in biaxial crystals

An arrangement for demonstrating conical refraction usually found in laboratories is a piece of aragonite crystal mounted inside a little tube which has one end covered with a metal foil pierced by a number of pin-holes, and an eye-lens in a focussing mount at the other end. When the tube is directed against a luminous object and the eye-lens focussed on the pin-holes through the crystal suitably oriented they are seen as luminous rings of light. Writers on physical optics who describe this experiment refer to it as illustrating *internal* conical refraction—that is, as due to the fact that the Fresnel wave-surface has a tangent-plane which touches it along a circle. I wish to point out that this is really an error. A little consideration will show that as the eye-lens is focussed on the pin-holes, which may be as small as we please, we are concerned here with the waves *diverging* from them in all directions within the crystal, and the observed effect is due to the fact that the two sheets of the wave-front intersect at a conical point. In other words, the experiment really illustrates *external* conical refraction. This is confirmed by the fact that an extended source of light may be used without interfering with the success of the experiment.

A remarkable effect is observed if, with the tube pointed towards an open window, the eye-piece is steadily drawn back from the crystal. It will be noticed that a well-defined image of each pin-hole may be traced behind the crystal for a distance of several centimetres. The formation of this continuous image by a crystalline plate with parallel faces cannot be explained on geometrical principles, and is of great interest. The effect appears to be due to the dimpled form of the wave-front within the crystal, and is being further investigated by Mr V S Tamma and myself.

C V RAMAN

22 Oxford Road
Putney, S.W.15
4 August