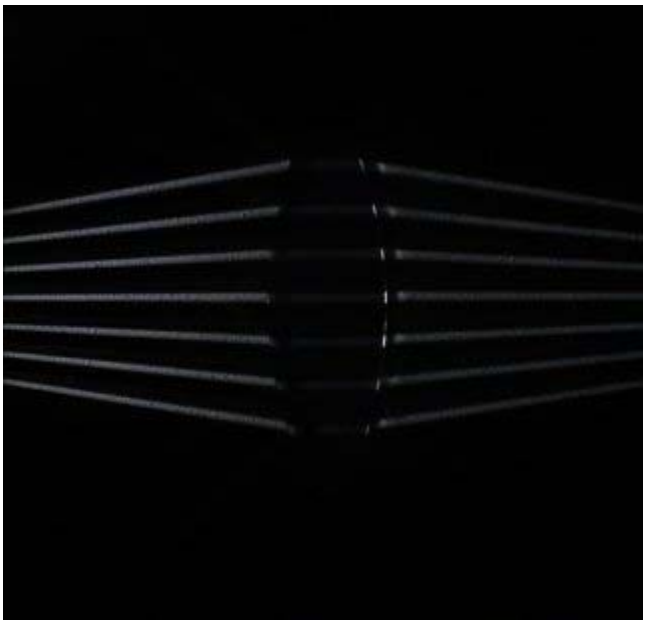
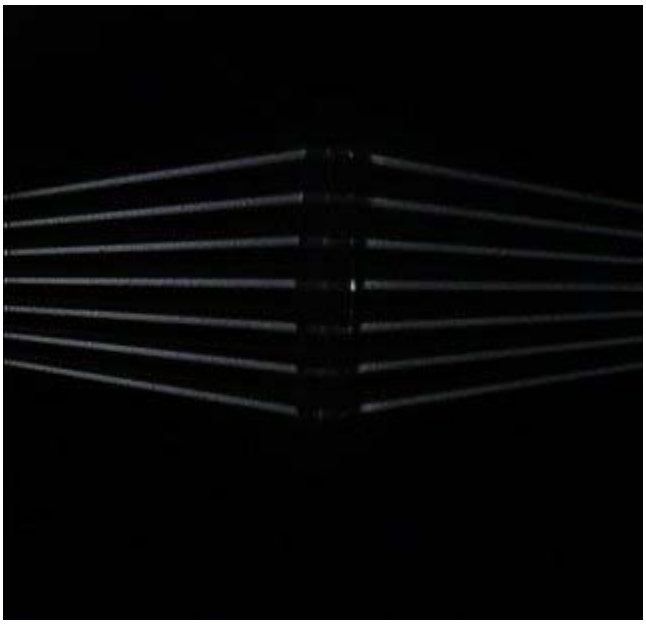
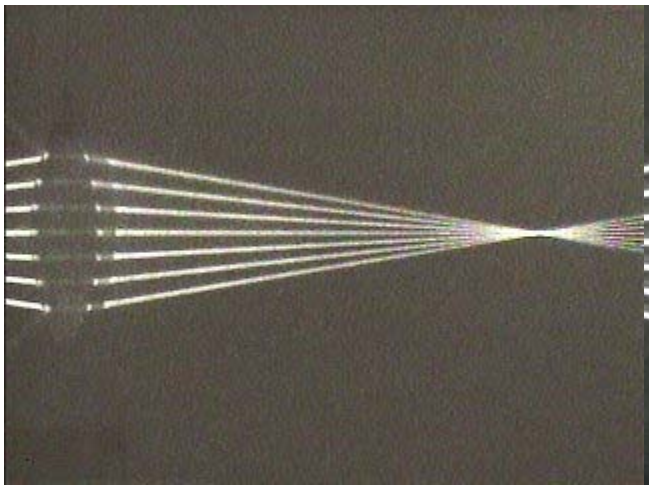
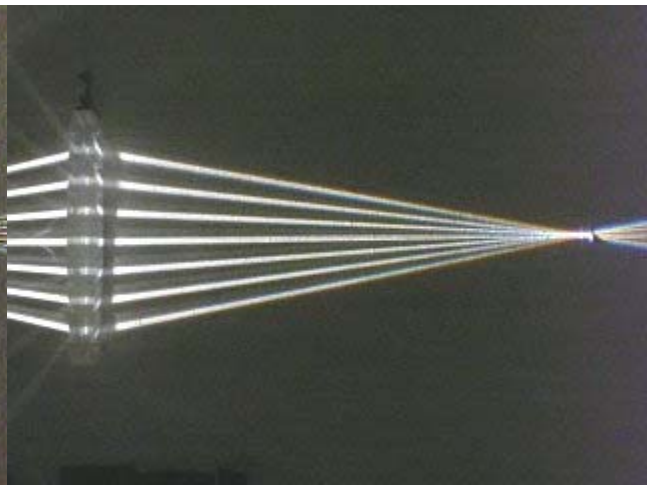
Answer #312

The answer is (c): The light rays will be focused to nearly the same point as those from the original hyperbolic lens, as seen by comparison of the photographs below, showing the focusing of the regular lens with that of the segmented *Fresnel* lens.









The refraction of a lens occurs when the light *enters* or *exits* the lens, and no bending of the light occurs as the light travels *through* the lens. Because the entrance and exit angles of the original lens and the equivalent Fresnel lens are identical for a light ray entering the lens at the same distance from the optic axis, the focal properties of the two lenses will be virtually identical.

Augustin Fresnel (1788-1827) became the French Commissioner of Lighthouses in 1819, and later invented the Frenel lens as an alternative to use of an array of mirrors to enhance the brightness of lighthouse beams. Such a Fresnel lens is seen in the photograph below.

Fresnel lenses now have a myriad of uses, as can be seen in Question #313.

Question of the Week

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.