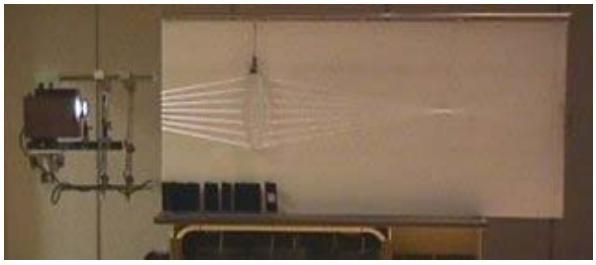
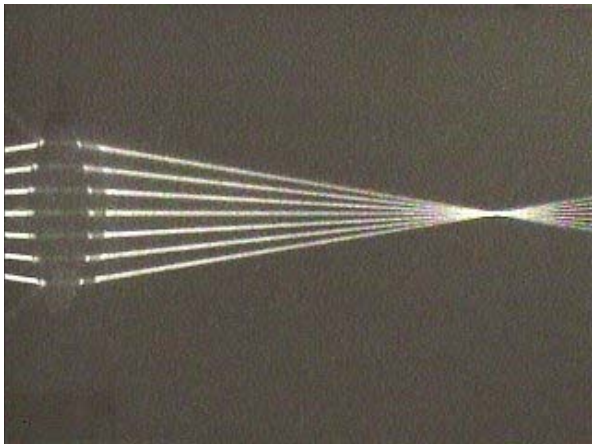
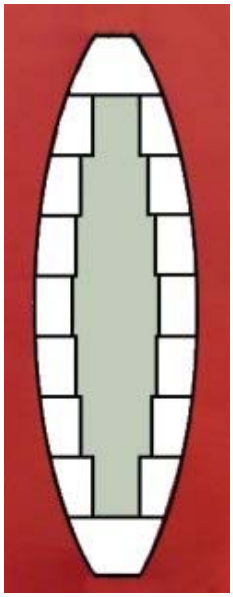
Question #312



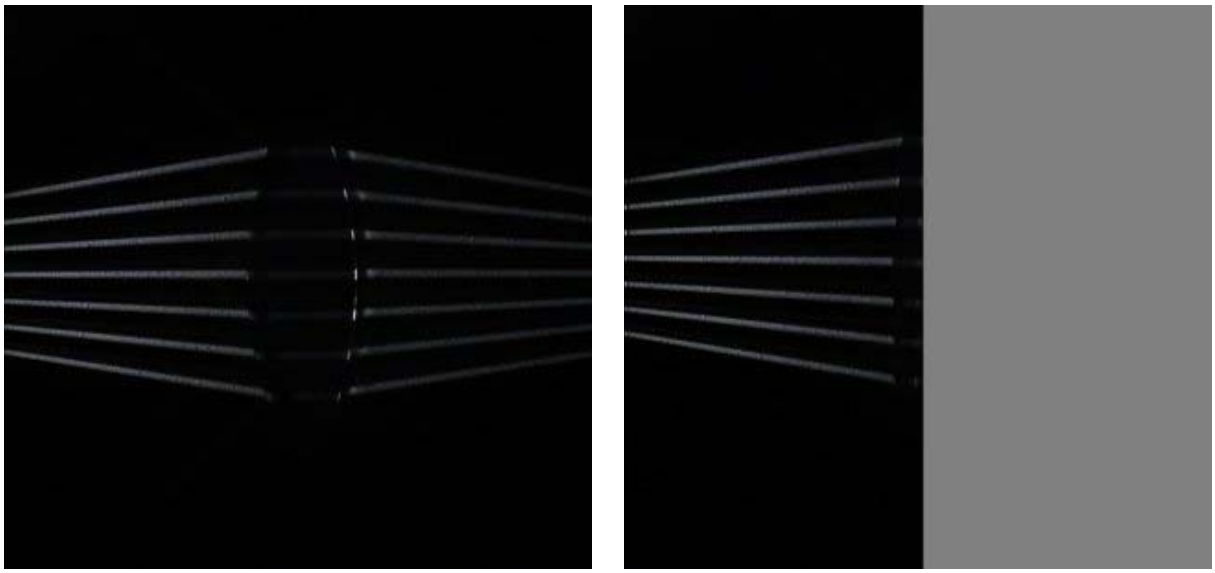
A lens with its surfaces hyperbolic in shape will focus rays from a point object to a point image, as seen in the photograph above and the photograph at the left below.





Now suppose that the lens is replaced by the peculiar looking "lens" photographed at the center above. This lens is constructed by removing rectangular segments from the center of the hyperbolic lens and sliding the two outer pieces together to form a sort of "segmented" lens. The figure at the right above shows the outline of the segmented "lens" superposed on the original hyperbolic lens.

Suppose that we now allow the same array of light rays from the source to strike the segmented lens in the photograph at the center above.



The rays entering and leaving the hyperbolic lens are seen at the left above, and for the segmented lens at the right above. Unfortunately, the right side of the photograph has been masked out, so you cannot see what the rays do after they leave the segmented lens.

What will the light rays do after they pass through the segmented "lens?"

- (a) The light rays will emerge as a parallel beam.
- (b) The light rays will be focused to a point much further from the lens than the original hyperbolic lens.
- (c) The light rays will be focused to nearly the same point as those from the original hyperbolic lens.
- (d) The light rays will be focused to a point much closer to the lens than the original hyperbolic lens.
- (e) The light rays will emerge going random directions, and will not focus at a single point.

Click here for Answer #312 after April 7, 2008.

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.