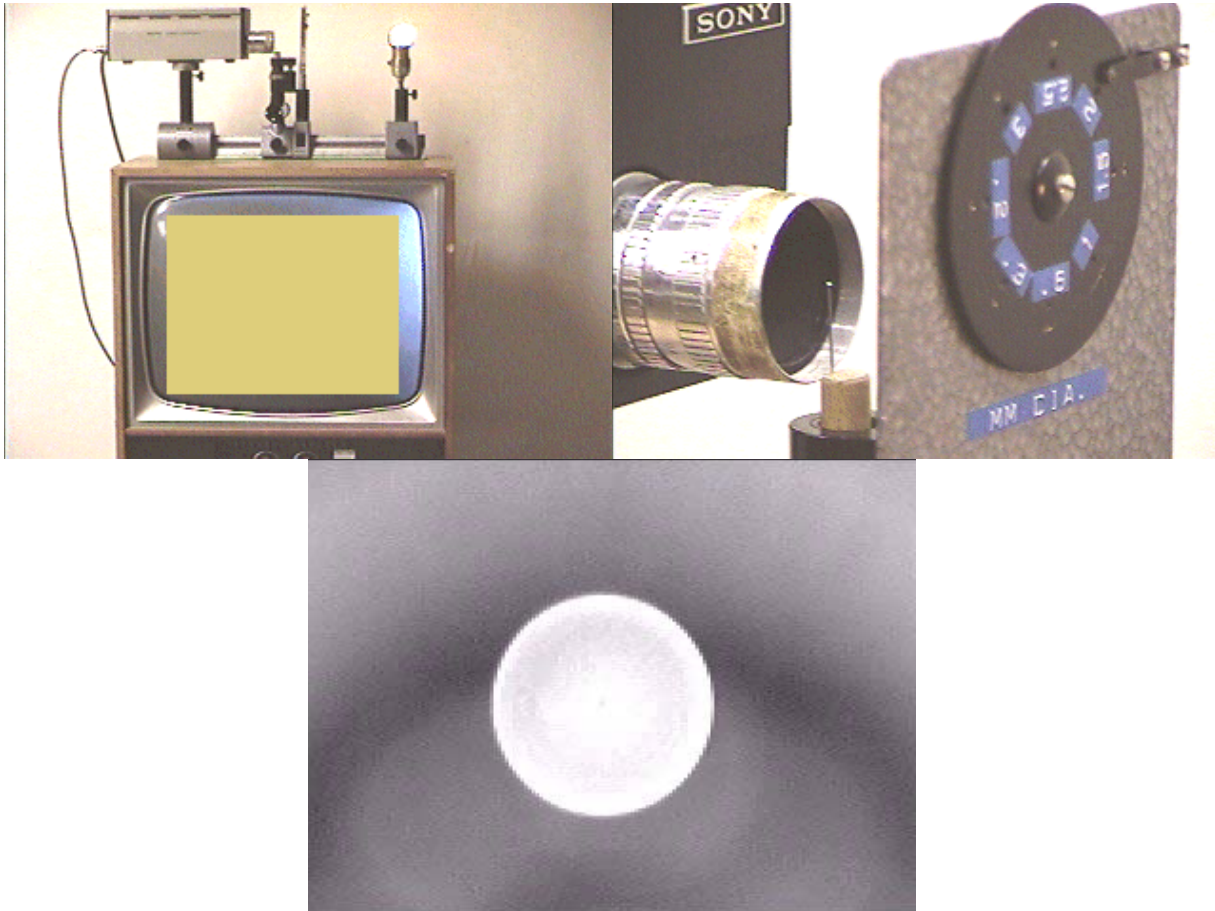


Question #237

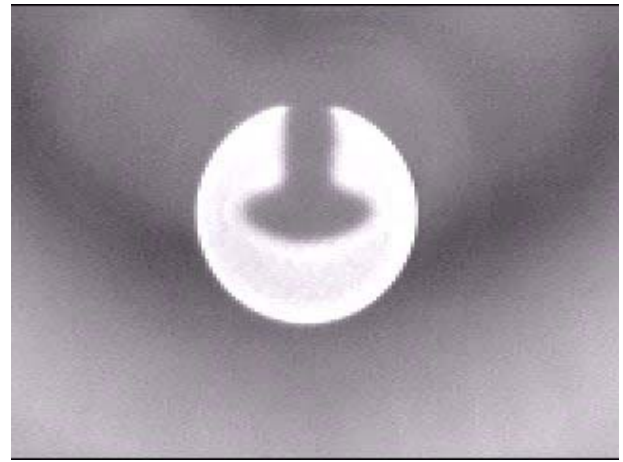
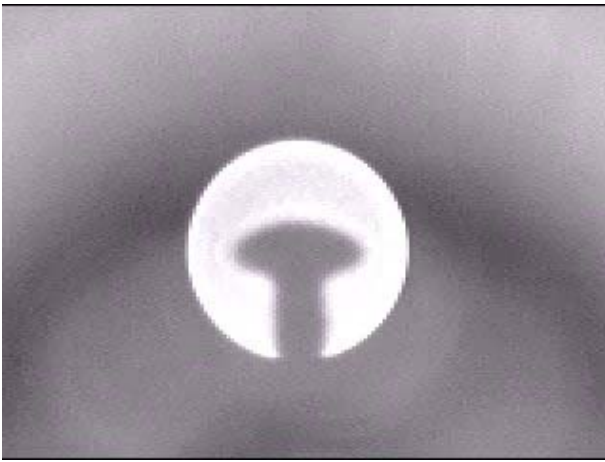
A TV camera views a white light through a 0.6 mm pinhole, as seen in the photographs at the left and center below. The photograph at the center is a close-up of the region near the front of the camera, showing the head of a pin, on an adjustable-height mount, that can be raised into the line of the light passing from the light bulb through the pinhole into the camera. The photograph at the right shows what the camera sees when the pinhead is so low that it does not impinge on any of the light passing through the pinhole into the camera: a uniformly lighted disc. In this photograph the focus of the camera has been set to infinity. What the camera "sees" (if anything) when the pinhead is raised onto the axis of the optical system, where it is located in the photographs at the center and left, has been masked on the photograph at the left.



The question this week involves what the camera will "see" when the pinhead is raised so that it is on the axis of the pinhole, as seen in the center photograph above. It might see an image of the pinhead, or perhaps an inverted image of the pinhead. On the other hand, because the pinhead is so close to the camera lens and the focus is set to infinity, the camera may see the same thing as seen in the above right photograph. Or, perhaps because the light cannot be focused, the pinhead may produce a large shadow, causing the screen to become dark. These four possibilities are seen in the four photographs below. Perhaps the camera will see something else.

(a)

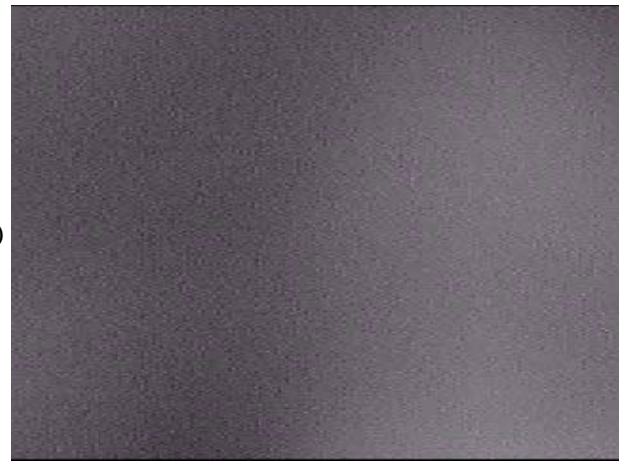
(b)



(c)



(d)



When the pinhead is raised to the central axis of the optical system, the picture on the monitor will look like:

- (a) figure a.
- (b) figure b.
- (c) figure c.
- (d) figure d.
- (e) other.

Click here for [Answer #237](#) after January 16, 2006.

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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](#).