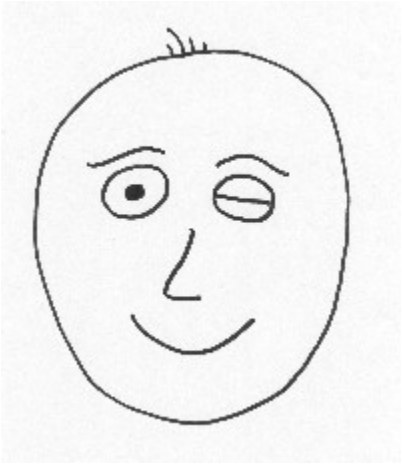
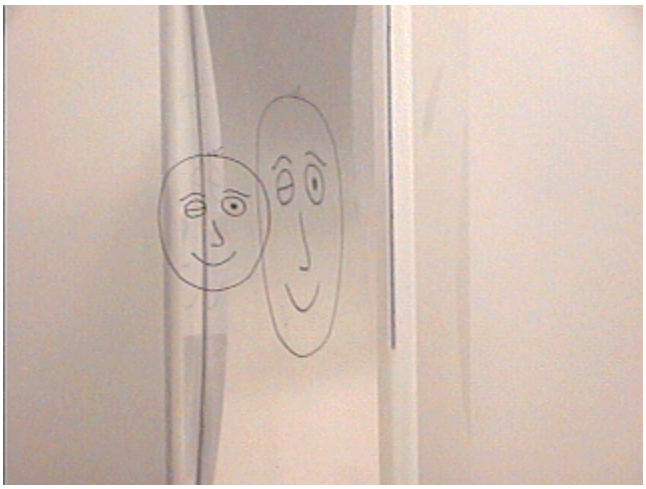
Answer #105

We will review the three problems in the order they were presented in the question. Here is Otto:



- 1. **A vertically focusing cylindrical concave mirror**: Otto will stand at a distance of f/2 in front of the mirror, so that an observer *at the mirror* would see Otto's face as in the photograph above.

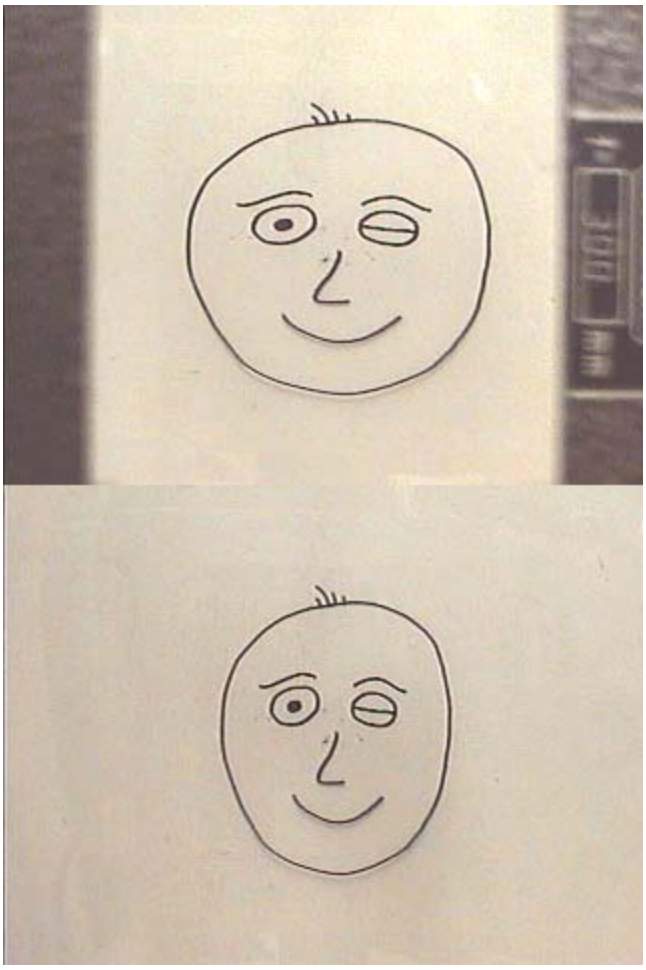
  The image will appear as image (o), as seen in the photograph below.



  You must view the image from behind Otto, so in the picture Otto appears horizontally inverted from how he looks when you are facing him. The image is virtual, is located at a distance of one focal length behind the mirror, and has a vertical magnification of two.

- 2. **A horizontally focusing cylindrical convex lens**: Otto will stand at a distance of f/2 in front of a horizontally focusing cylindrical convex lens, oriented like a vertical log in front of Otto, so that an observer at the lens would see Otto's face as in the photograph above.

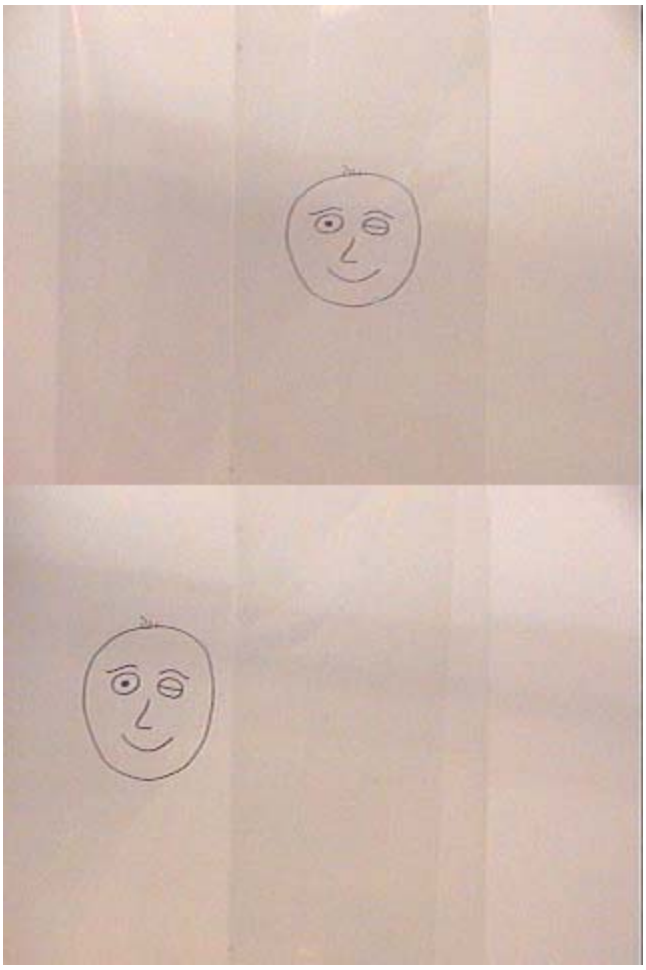
  The image will appear as image (u), as seen in the photograph at the left below. The photograph at the right is taken with the camera pointing in the same direction but with the lens removed.



You must view the image looking looking through the lens toward Otto. The image will be will be virtual and located at a distance of one focal length behind the lens (just like the spherical concave lens (question 99), but will only be magnified in the horizontal direction.

- 3. **A vertically focusing cylindrical concave lens**: Otto will stand at a distance at a distance equal to the focal length from a vertically focusing cylindrical concave lens, oriented like a horizontal log in front of Otto. He again faces the lens so that an observer at the lens would see Otto's face as in the photograph above.

  The image will appear as image (q), as seen in the photograph at the left below. The photograph at the right shows Otto moved to the side of the lens for comparison.



You must view the image looking through the lens toward Otto. The image will be virtual, located at a position of one-half focal distance behind the lens (on the same side as Otto) and have a magnification of 1/2 in the vertical direction. In the picture Otto is not back the full distance of f/2, so he is not de-magnified as much.

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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.