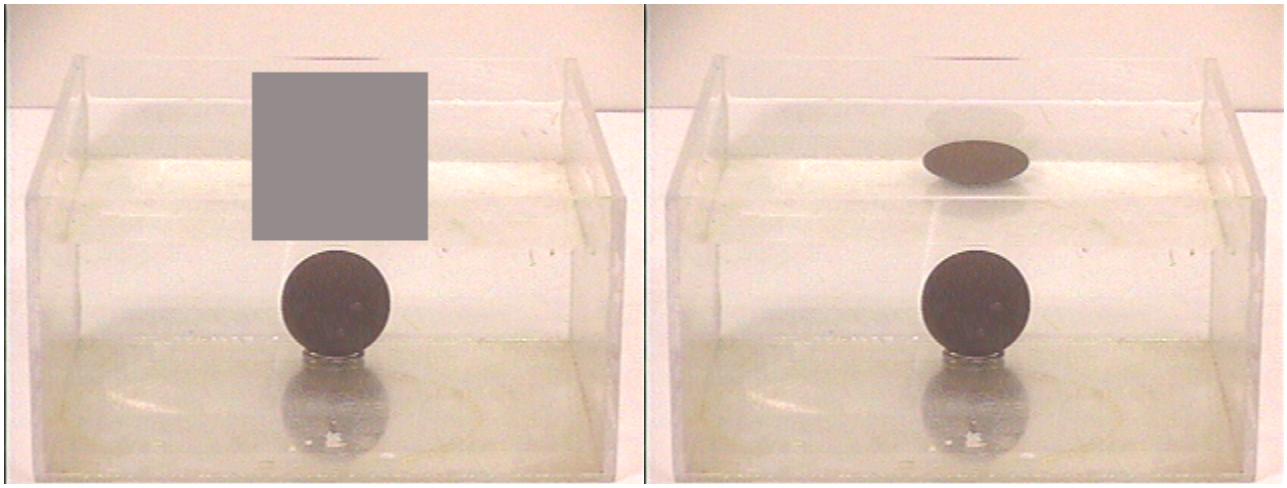
Answer #100

The answer is (c): the vertical dimension of the ball is demagnified, so the ball looks like it has been squished by someone sitting on it, as seen in the photograph at the right below.



When the light rays from the ball emerge from the top surface of the water, the rays from the top of the ball are at a smaller angle with respect to the surface of the water, and therefore are refracted at a greater angle. (Rays emerging in the vertical direction from a point below the surface of the water are not bent at all!) Refraction of the light from the ball as it emerges from the surface of the water makes the ball appear to be shallower in the water than it actually is. However, in order for rays from both the top and the bottom of the ball to get to the same eye position, the ray from the top of the ball is bent more than the ray from the bottom, so the ball appears shortened in the vertical dimension. Rays from the two sides of the ball are refracted in nearly the same way, so the horizontal dimension of the ball is unaffected.

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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.