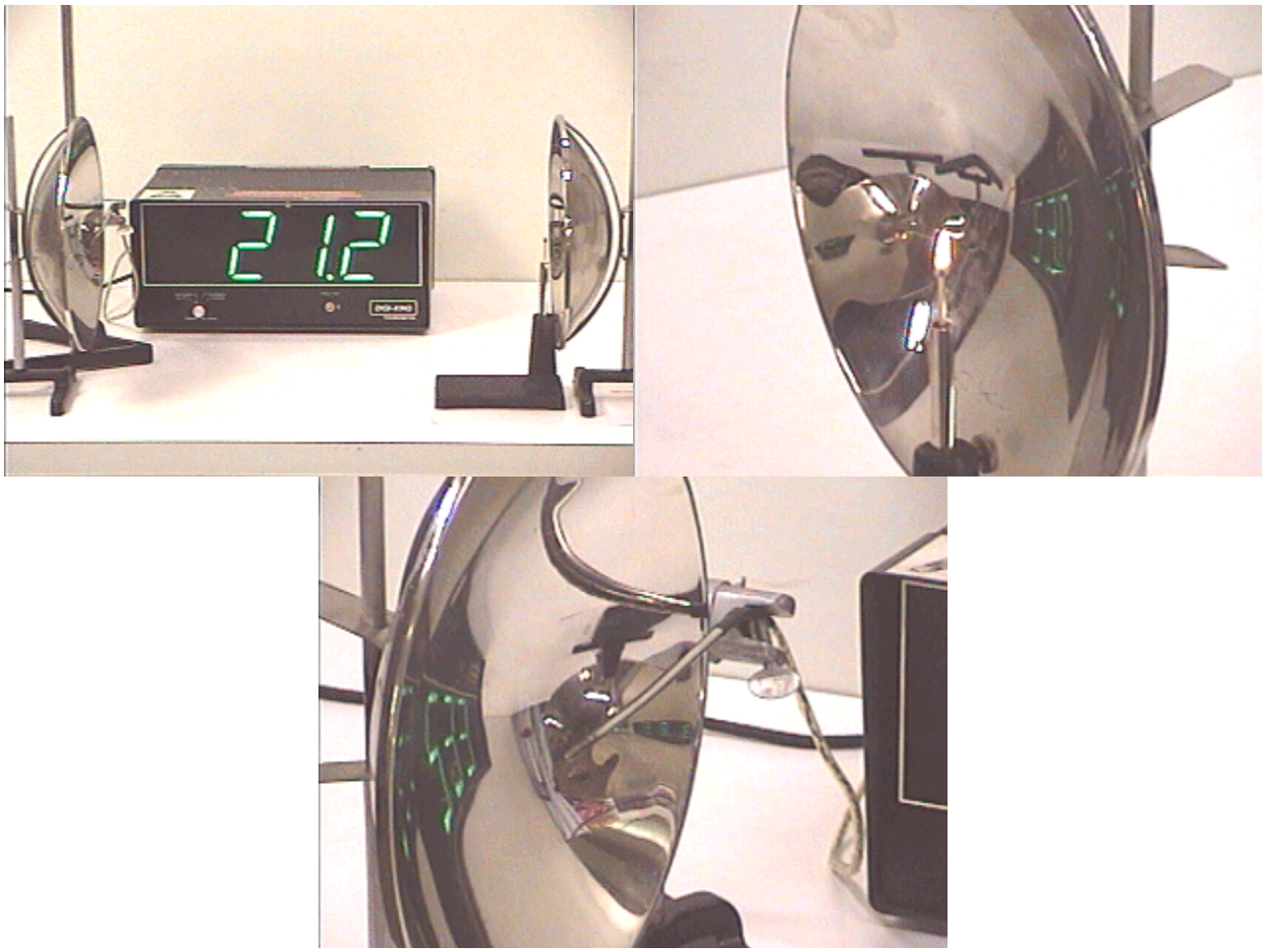
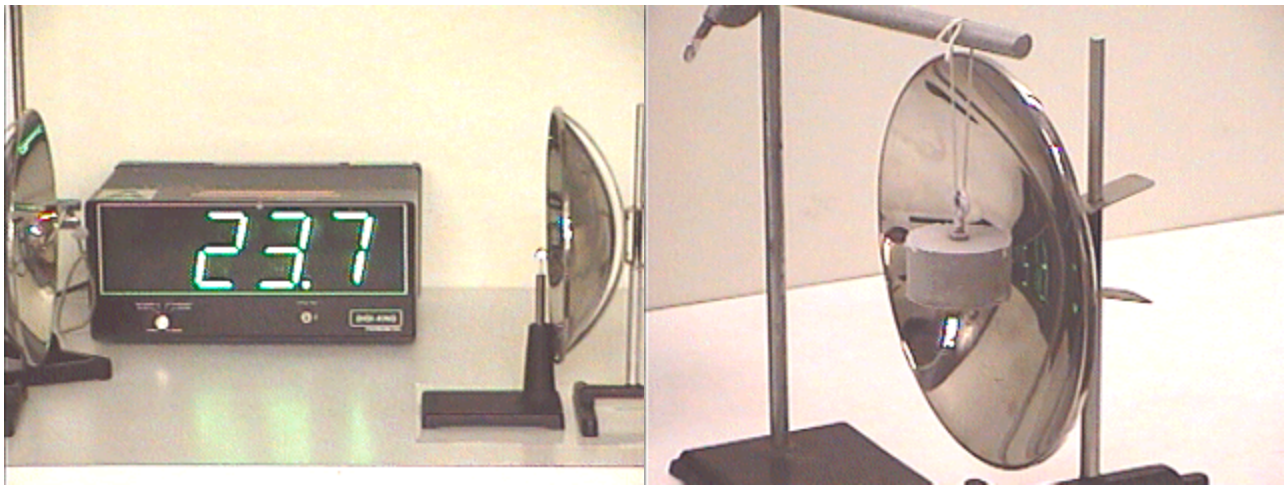
Question #148

The photograph at the left below shows two short focal length parabolic concave mirrors. The mirror at the right has a heat source (a match) at its focus and the mirror at the left has a thermal probe at its focus, seen in the photographs at the center and right. The match has not yet been lit in the photograph at the left, so the probe is at room temperature, 21.2^{o} C, as read by the meter in the picture.



When the match is lit, as shown in the photograph at the left below, infrared radiation from the flame is reflected by the mirror at the right into a parallel beam, then focused by the mirror at the left onto the thermal probe. This causes the temperature to rise to 23.7^{o} C, as seen in the photograph. This temperature took a couple of minutes and a couple of matches, but virtually any type of small heat source will work.



Now suppose that the heat source is replaced by a copper cylinder that has been cooled to the temperature of liquid nitrogen, seen in the photograph at the right below. What will happen? You must say why your predicted behavior occurs. If you suggest an unusual answer you must justify it with some type of "physics" logic.

With the cooled copper cylinder at the focus of the mirror at the right:

- (a) the temperature will become higher.
- (b) the temperature will become lower.
- (c) the temperature will remain the same.

Click here for Answer #148 after April 21, 2003.

Question of the Week

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For questions and comments regarding the *Question of the Week* contact
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given on the Lecture-Demonstration Home Page.