Hang power supply at extreme left end of rod below chalkboard. Hang support B at extreme right end of two rods, and mount on it the converging lens (f = 22 cm). Hang support A approximately 100 cm to the left of B. Darken the room as desired. (The darker the room the better light rays show up, but some light is helpful in seeing the apparatus.)

Although the lecturer will probably wish to improvise frequently, the following basic demonstrations are suggested:

1. (a) Using two rays parallel to the axis (from S1 and S2) as indicated in Fig. 1 (see back of sheet), determine, and mark the position of, the principal focus F. Leave the lens in this position for all subsequent demonstrations. (b) Using a single source placed well off the axis, orient the ray so that it strikes first one and then other portions of the lens. Note particularly the refracted ray when the incident ray is: (1) Parallel to the axis; (2) Directed toward the center of the lens; (3) Directed through the principal focus on the same side of the lens as the source.

2. Using two rays crossing appropriately before striking the lens and outside the principal focus, as indicated in Fig. 2, observe the real, inverted image formed beyond the lens. By moving S2 vertically and/or reorienting this ray, change the position of the object 0 and note the change in the image. For one particular arrangement draw in both the object and the real image.

3. Arrange the two rays so that the object 0 is inside the principal focus, as indicated in Fig. 3, and note the virtual, erect, enlarged image formed on the same side of the lens as the object.

4. Place a single source S at the point farthest from the axis in the object drawn in section 2, nearly fill the lens with a divergent beam as indicated in Fig. 4, and observe that all rays from a given point in the object pass through a common, corresponding point in the real image. The entire image can be traced, point for point, by moving S vertically along the length of the object.

5. Place a single source with a divergent beam at the principal focus F, and note that the refracted beam is parallel.