Use a plastic tube approximately 8 cm in diameter and 90 cm long, filled with a solution of sugar in water to which a small amount of milk has been added. (See Note 1.) Place the tube on the lecture table so that the polaroid mount at the side of the tube is on the student's side. Adjust the lantern so that the light beam is horizontal and approximately parallel. Set the lantern with its lens roughly 2" from the polaroid mount at the end of the tube. The light reaching the students is scattered light.

Note that the color of the scattered light changes along the length of the tube, showing that blue light is scattered more than red light.

Place a polaroid in the mount at the side of the tube. Rotating the polaroid shows that the scattered light is partially plane polarized. (See Note 2.)

Now place a polaroid in the mount at the end of the tube. Note, and explain, the colored regions along the length of the tube. Note that these regions travel longitudinally as the polaroid is rotated. Viewing the tube from the bottom, the view seen in the mirror, helps to show that a region of a given color is a spiral.

Place in the light beam first a red and then a green filter, rotating the polaroid in the beam in each case. By comparing the longitudinal distances between two consecutive regions of the same color, one can show that the solution rotates the plane of polarization more for green light than for red light.

Notes:— (1) The volume required to fill the tube is approximately 4.5 liters. In preparing a new solution, place from 0.40 to 0.45 gm of milk and 2,500 gm of water in a kettle. Heat, but do not boil, and gradually stir in a total of 3,500 gm (7.5 lbs) of pure cane sugar. Let the solution cool and then, using a large funnel, pour into the tube. (2) Light scattered once at exactly 90° is completely plane polarized. Because of considerable multiple scattering, light scattered here, even at exactly 90°, is only partially plane polarized.