A CONVENIENT METHOD OF SHOWING ANOMALOUS DISPERSION.

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Anomalous dispersion may be shown by means of a sodium vapor prism as indicated by Wood (Wood's Optics, pp. 420-21). In this article a method is described that by means of a prism of sodium vapor, this dispersion may be conveniently shown and also photographed. The apparatus is easily made and material can be purchased for a few cents.

Material. A piece of iron bicycle tubing, approximately 2.5 cm. in diameter and about 30 cm. long may be used, together with a few feet of copper automobile gas line tubing. A tube is soldered in the top of the tubing near one end in order to evacuate the tube after it has been sealed. Within the tube are placed a few small pieces of metallic sodium. Over each end of the tube is sealed tightly a piece of double strength glass. Each end and the top of the tube is cooled by running water. The bottom of the tube is heated by a series of gas burners. The tube is evacuated to 4 or 5 cm.

Method of Cooling. Four turns of the copper tubing were made around each end of the iron tube. Two strips were placed from end to end across the top of the tube. The three pieces, on top and ends, were soldered at one end to a single intake tube approximately three times the size of the copper tubing. The other ends of the respective pieces of tubing were soldered to a single outlet tube. Having each piece of tubing coming from the same intake permits water to pass around each end and across the top at the same temperature. The intake is connected with a water faucet, the outlet to a drain. The round copper tube across the top is a double means of keeping the top cold, which is especially necessary to demonstrate the absorption band and dispersion. The cold copper tube is in direct contact with the iron tube which furnishes one source of cooling, but the chief source is probably in the fact that moisture is constantly being condensed from the air and gas which collects on the top of the iron tube. This is indicated by the moist appearance of the tubing and the frying noise as the water evaporates. The temperature gradient of the sodium prism thus formed seems to be apparently uniform, making possible the use of the whole aperture of the tube, permitting more light to pass through it.

The tube containing the sodium should be evacuated to about 4 or 5 cm. It is best that the tube should be sufficiently tight to hold this vacuum four or five hours so the pump or aspirator need not be kept running continuously. The burners should be arranged to control the heat for the proper temperature.

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This furnishes a neat, inexpensive method for showing the dispersion. With the apparatus once set up (fig. 1) the dispersion can be obtained in two or three minutes. Several demonstrations may be made over a period of several weeks with one filling of sodium. In the

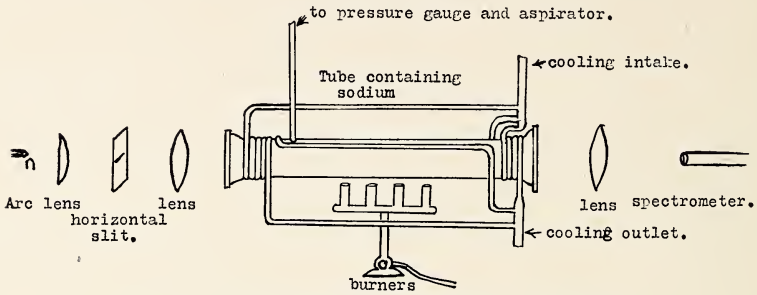

Fig. 1—Apparatus used to show anomalous dispersion.

spectrometer used the absorption band was a distinctly black band apparently 1 mm. wide. The image can be obtained and held sufficiently long enough to photograph. It is this extensive cooling, especially of the top while the bottom of the tube is being heated, that makes the density gradient uniform, thus forming the clear cut image.