CERTAIN physical properties of the cotton fiber are of importance to cotton breeders and spinners. For many years length of staple has been considered one of the most important properties affecting the market and spinning value of cottons. In more recent years, strength, diameter, drag or clinging power, and unit fiber weight per inch have been measured in cotton varieties and their influence upon spinning quality noted.

In our American upland varieties of cotton, diameter of fiber is a property which appears to influence spinning value; that is, a smaller diameter is apparently associated with an increasing yarn strength. In an investigation of the relation of diameter and other physical properties of the cotton fiber to spinning value in seven American upland strains, Moore (6) found that a decreasing fiber diameter was associated with an increasing yarn strength. In investigations of the spinning value of 14 samples of Egyptian cotton, Barritt (1) concluded, "that the selection of cotton for staple and low diameter would appear to offer everything the spinner can reasonably ask and all the grower can hope to supply."

The writer has noted during recent years that diameter is an inherited property, and other investigators state that this property depends mostly upon heredity. Different seasonal conditions may, of course, cause fluctuations in fiber diameter, but we can expect cottons differing significantly in fiber diameter to show these relative differences consistently in successive seasonal progenies. Since fiber diameter appears to be a fairly stable genetic property which can be selected and perpetuated and since it influences the spinning value of cottons it seems that breeders and other cotton investigators should select for this property in a program of cotton improvement.

Green, uncollapsed mature cotton fibers are tubular in form as shown by transverse sections in Fig. 1, B. Upon drying, however, such fibers assume irregular forms as indicated in Fig. 1, C. Measuring the diameter of the collapsed fibers is not very practicable, and the investigator could not always depend upon measurements of green material for the necessary data. The most practicable method of measuring fiber diameter consists of mercerization with a sodium hydroxide solution to restore the fiber to a roughly cylindrical form as illustrated in Fig. 1, A.

The object of this investigation is to note the relation of green, uncollapsed diameter to mercerized diameter and to make recommendations concerning the measurement of this property.

1Published with the approval of the Director as Technical Paper No. 103 of the North Carolina Agricultural Experiment Station, Raleigh, N. C. Received for publication March 12, 1938.
2Cotton Technologist.
3Figures in parenthesis refer to "Literature Cited", p. 609.