RESISTANCE to lodging merits consideration in any program of improving small grains. Several workers in recent years have studied the relation between resistance to lodging in wheat varieties and the breaking strength of the straw. These measurements were made on plants harvested at or near maturity without determining whether the comparative breaking strength was the same as at earlier stages when lodging usually occurs. The present investigations of the breaking strength of straw at intervals from preheading to maturity were undertaken in an attempt to answer this question, and to ascertain the strength of straw in wheat plants harvested or dried prematurely as under drought conditions.

Salmon (4) has described an apparatus for determining the breaking strength of straw. He found a relationship between lodging and breaking strength in winter wheat varieties. A similar relationship was reported by Salmon and Laude (5). Davis and Stanton (2), using the same type of apparatus, made determinations on a large number of oat varieties at Aberdeen, Idaho. In general, the stiffer-strawed varieties, as determined by field observations, showed the highest resistance to breaking. Clark and Wilson (1) described a straw-breaking machine and tested numerous varieties of wheat and barley. They found no significant correlation between breaking strength of straw and lodging. Helmick (3) obtained differences in straw strength between two varieties of winter wheat by using an apparatus he devised.

METHODS

Determinations on the breaking strength of straw were made during the years 1932 to 1935 on the Sonora, Baart, and Marquis varieties of wheat grown with normal irrigation at the University Farm, Tucson, Ariz. The mild winters allow spring wheat varieties to be sown in the late fall or winter months without serious frost injury. The average date of seeding for the three varieties was November 1. Baart was also sown early in the spring, the average date being February 21. The varieties were grown in rows 8 feet long and 1 foot apart. A row of each variety was cut as close to the ground as possible on alternate days from 6 days before one-tenth of the heads were emerged from the boot until maturity. The bundles were wrapped with paper, dried in the field, and kept under uniform conditions at least 3 weeks before any determinations were made. The straws in each bundle were thoroughly mixed before making any determinations. The apparatus and method as outlined by Salmon (4) were used.