In the studies of the Division of Soil Fertility Investigations, Bureau of Plant Industry, field plats have been used to obtain the effect of fertilizers, crop residues and tillage practices on the incidence of cotton root rot, a disease caused by a soil-borne fungus, Phymatotrichum omnivorum (Shear) Duggar. A report of some of the earlier work (5) indicated a need for an understanding of the effect of differential fertilizer treatment on the composition of the cotton plant. Reports on some of the carbohydrate components of the cotton plant have been made (2, 3) as well as the electrodialysis procedure used to separate certain nitrogen fractions (1). The relation of seasonal conditions and fertilizer treatment to the pigmentation of the cotton root, as found in the Blackland prairie section of Texas, has also been discussed (6). Appropriate resumes of the literature have been presented in these reports.

In this study an improved electrodialysis technique has been used for the segregation of some of the nitrogenous and mineral components of whole cotton plants.

**Methods**

A detailed discussion of methods has been given (1, 2) so only variations from those previously reported are given here.

**Sampling.** Plants were collected from field plats according to the procedure given by Ergle (2). Composites of whole plants were used rather than the segregates of roots and aerial portions, as in 1935; these were prepared by a power chopper instead of by grinding. At maturity the seed cotton was removed, the seed crushed, and an amount added to the chopped sample in proportion to the amount originally present.

The **Electrodialysis Apparatus and Technique.** Further studies were made of conditions affecting the rate and extent of the removal of the various fractions by dialysis; these showed the desirability of affecting continuous drainage of the cells. This was accomplished by means of the accessory equipment shown in Figure 1. In addition to facilitating dialysis, this equipment eliminated the attention necessary for the periodic draining of the cells. Use of 0.1 N acetic acid for the cathode increased the rate for the removal of positively charged fractions, and prevented the separation of the sludge which formerly appeared late in the dialysis; the appearance of this material in solution early in the dialysis, under acid conditions, was proven by periodic neutralization of the catholyte. The rate of removal of anions was not appreciably altered.

The delivery of liquid from reservoirs to the cells was adjusted so that was completed in ten hours, the rate rapid at first and gradually decreasing to the end. The total quantity of water delivered to the anode compartment was 840 cc., while the volume of 0.1 N acetic acid for the cathode was 650 cc.; this difference in volume accommodated the water transferred from the anode to the cathode by electroendosmosis.

**Ammonia and Amide Nitrogen.** These two fractions were determined together instead of separately, as previous work showed the content of ammonium nitrogen to be low throughout the season and quiescent.

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1 Contribution from the Soil Fertility Division, Bureau of Plant Industry.
2 Formerly Assistant Chemist, Bureau of Plant Industry; now with the North Carolina Experiment Station, Raleigh, North Carolina; Assistant Chemist; Associate Soil Technologist in charge of the Soil Fertility Cotton Root-Rot Investigations at Austin, Texas, respectively.
3 Numbers in parentheses refer to references at end of article.