One of the basic requirements of such a form of apparatus is that it must be capable of yielding reproducible results. This necessitates control of all disturbing factors and makes desirable, for example, some system of cooling to make possible the maintenance of a constant temperature during the process. Effective stirring of the solution of suspension during electrodialysis hastens removal of the ions and tends to make their removal more complete. This is especially the case in electrodialysis of soils.

With these and other considerations in mind, the writer has designed a modification of the three-compartment electrodialysis apparatus, and a multiple-compartment apparatus with four, five or more compartments. The middle chamber, in which is placed the material to be electrodialyzed, is globular shaped, with a capacity of 450 cc. The distance between the outside edges of the flanges is 8 cm. This bulb is fitted with an enlarged neck at the top and a stopcock drain at the bottom. The globular shaped chamber gives relatively large volume in relation to the distance between the electrodes, and permits very energetic agitation of the suspension by means of a mechanical stirring device, the agitator of which is inserted through the neck of the chamber.

The cooling system consists of a hollow brass ring which is placed around the neck of the middle chamber. A jet, to which a rubber tube may be attached, provides an inlet for water from the tap, and a series of holes on the under edge of the ring provides an outlet which causes the water to flow down and over the sides of the globular chamber. A pan with an outlet tube attached in the bottom serves as the drain for the cooling water. This cooling system has proved very effective, and under ordinary experimental conditions it eliminates the need for any form of resistance in the electrical circuit.

The end chambers which hold the electrodes are of 125 cc capacity and are similar to those of other types of apparatus in common usage. In the five-compartment apparatus two extra chambers are inserted, one on either side of the middle chamber, and between this chamber and the end or electrode chambers. These have flanges on both sides, and all cathode and anode chambers have an opening in the top and an outlet tube at the bottom. This multiple unit apparatus may, of course, be used with two cathode chambers and one anode chamber, or with three cathode chambers and one or two anode chambers or any similar combination. By a proper choice of membranes and experimental conditions it has been found possible, to a certain extent, to make fractionations of the dialysates in a manner which should be very desirable in the investigation of various types of problems.

The three-compartment apparatus, which is made by the Central Scientific Company of Chicago, is described in detail in an article in the *Journal of the American Society of Agronomy,* Vol. 24, No. 1. A second article with a detailed description of the five-compartment apparatus has appeared in *Soil Science,* Vol. XXXIII, No. 5.

AASULV LÖDDESÖL
VOLL AGRICULTURAL EXPERIMENTAL STATION,
MOHOLTAN BY TRONDHEIM, NORWAY

A LANTERN SLIDE TECHNIQUE

IN SCIENCE for November 21, 1930, there appeared an interesting article on lantern slide technique by J. and J. M. Van De Erve. The following procedures used by the writer will extend to an unlimited degree the methods referred to above.

In addition to the plain slides with india ink drawings the writer has for years used an etched slide which extends the possibilities of visual presentation of illustrative scientific data. With the discovery of a highly translucent glass and good transparent colored pencils the delineations have been decidedly improved. This better grade of etched glass slide and colored pencils have been evolved by the Keystone View Company, Meadville, Pennsylvania.

The technique is quite simple. The etched glass, the size of the regulation lantern slide, is placed over the drawing and traced with an ordinary lead pencil. The colors are used as the subject demands. This slide lends itself nicely to free-hand sketches. The writer has, with the use of the new type of vertical projector that is placed on the lecture table, worked out a scheme of animated drawings. The slide being on the holder in full view right side up, the subject-matter to be illustrated is sketched on the slide as the subject develops, the drawing appearing on the screen above the blackboard in full view of the class. This "modus operandi" has the advantage of having the drawing in a vertical position and makes for clarity by making possible the sketching of details as they are explained. One additional word about the colors referred to above—these are the only colors so far tried that project true to hue.

When using line drawings the writer uses a piece of amber glass in the path of the light, thus avoiding eyestrain from looking into the intense light of the projector.

Add to the above the cellophane slide and one has at hand a wide range of illustrative material easily prepared.

GEORGE HARRIS WEBBER
GEORGIA STATE COLLEGE FOR WOMEN,
MILLEDGEVILLE, GEORGIA