6. A WATER CULTURE TECHNIC FOR STUDIES IN TOBACCO NUTRITION

A. B. Beaumont and G. J. Larsinos

In studying problems of nutrition of the tobacco plant by means of water cultures at the Massachusetts Experiment Station, some methods and devices have been developed which may be helpful in similar studies with tobacco and other plants having some similar characters. Tobacco plants have been grown under conditions of partial and complete sterility. Four devices and methods of using them will be described.

In the study of the assimilation of different forms of nitrogen, it has been necessary to change the nutrient solution frequently, sometimes daily. It was soon discovered that the jar jacket suggested by Shive and commonly used by plant physiologists for such work, was not suitable. This jacket, the purpose of which is to exclude light from the roots, is made of Bristol board cut at the top in such a way that it may be lap-folded to conform partially to the shoulder of the jar and is held in place by a string which, in studies with tobacco, must be untied and tied every time the solution is changed. With many cultures to change, this procedure was found to consume an undue amount of time. Further, it was found to be very difficult to avoid maltreatment of the lower leaves of the plant in the course of the operation. To obviate these objections, apparatus as shown in Fig. 1 was devised. This equipment has the following advantages over the common form, so far as tobacco is concerned: (a) Time required for changing solutions may be considerably reduced; (b) the jar cover may be readily removed, or the plant removed from the solution, for examination of the roots; and (c) maltreatment of the lower leaves of the plant may be reduced to a minimum.

The equipment just described has proved satisfactory with transplanted tobacco plants, but there is some objection to the use of transplants in nutrition studies. Previous growth in a nutrient solution affects the later behavior of a plant, and it appears that the larger a plant is at the time of transplanting, the more serious this factor becomes. In order to eliminate the effects of previous growth, the device shown in Fig. 2 was worked out. This is used with other

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2Professor and Assistant, respectively.