mentation Station, who wanted to know if I could suggest a method whereby the amount of free water in samples of forest vegetation could be determined with reasonable accuracy. It occurred to me that by determining the heat capacity of a sample of a plant tissue, then driving off the moisture and then redetermining the heat capacity, a measure of the amount of free water, which has a specific heat of approximately one calorie per gram per degree Centigrade, could easily be obtained.

A sample experiment convinced me that the method could be used to good advantage. For my test experiment, I selected a sample of potato tissue, and in order not to destroy any of the cell structure in the process, I cooled the sample to a temperature near the freezing point of water, then placed it in a calorimeter, the water content of which had a temperature slightly above that of the room and thus determined from the temperature fall of the water the heat capacity of my weighed sample of potato tissue.

After two days and nights of gentle drying on a moderately warm radiator, I determined the heat capacity of the dry residue, subtracting this heat capacity, which was quite small, from the original heat capacity. I found that the water originally in the potato had in that state an average specific heat of .70 calories per gram per degree, indicating that only a part of this water could have been present in the form of free water. The rest must then have been present in a chemically bound form.

Since the determination of free water in plant tissue is a somewhat cumbersome process, and at times yields dubious results due to the effects of maceration, I hope this description of a calorimetric method will be found useful by horticulturists, plant pathologists and others.

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AN IMPROVED TISSUE CULTURE CHAMBER[1]

THE observation of tissue cultures, made in the hanging drop on a cover glass, is often difficult because of the excessive and uncontrollable thickness of the drop, and also because of the curvature of its free surface. In addition, the spherical surface of the depression in the slide increases the optical difficulties. Although there are on the market hollow slides with a plane-parallel bottom of the chamber, all of them are so thick that even the employment of a long focused condenser can not render proper illumination.

To correct these imperfections, a chamber was devised which consists primarily of an ordinary slide, about 0.75 mm thick, with a round hole of about 1.5 cm in diameter, drilled through its center. This hole is bridged over by a cover glass which is cemented to the lower surface of the slide along the edge of the hole, thus forming a shallow container with a plane and thin bottom (Fig. 1) which obviates the optical difficulties mentioned above.

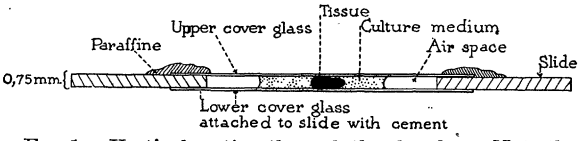

FIG. 1. Vertical section through the chamber. Note the plane-parallel surfaces of the chamber and the even thickness of the culture medium.

In preparing the tissue culture, one places the drop of the medium and the tissue particle in the center of the chamber so that the peak of the drop reaches slightly above the level of the upper surface of the slide; then the drop flattens out to a plane-parallel layer between the two cover slips. Care must be taken that the drop does not fill the entire chamber so that enough air space is left for the respiration of the tissue. The upper cover glass is sealed with paraffin in the usual manner.

The advantages of this chamber are: simplicity of construction, use of standard material (ordinary slide and cover glass), easy replacement of bottom when broken, elimination of surfaces causing optical disturbance and close proximity of culture to condensor.

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