attraction due to transpiration at the leaf above, and also by "root-pressure" from below. Mr. Shutt stated that root-pressure was not well understood, that it could not be accounted for on physical grounds alone, and that we must assume that the vital activity of the cell plays an important part in the rise of the sap.

The flow of sap in the maple was then discussed in detail. For many of the facts upon which he based his statements, Mr. Shutt said he was indebted to Bulletin 103 of the Vermont Agricultural Experiment Station, copies of which, to a limited extent, the Director of that Station had kindly placed at his disposal for distribution among the members of the Club. At the Vermont Station it was established that pressure and flow went hand in hand. Pressure is a cause of the flow, but not the sole cause. Cold nights followed by warm days make the ideal sugar weather. Uniform temperatures, whether high or low, do not favor a flow of sap. The higher temperature, following cold nights, seems to excite the protoplasm to activity. The root-hairs absorb water, and since there is no transpiration, as the buds have not opened, the water accumulates in the tree, setting up a high pressure. Pressure is further increased by the expansion of the gases in the tree due to the rise in temperature. Tapping the tree relieves this pressure. The water, in escaping, carries out with it in solution the sugar which was stored from the previous season in the tissues of the sap-wood. The direction of the movement is principally through the Xylem vessels and downward through the phloem elements, but it is also in every direction, more or less, depending upon pressures, and these again chiefly on changing temperatures. In summer the movement is generally upwards.

The lecturer closed his interesting address by pointing out the utility of a knowledge of plant physiology. To instance but one of several illustrations, he gave his studies and experiments on apple twigs, which showed him that the greater the water-content of the twigs the less hardy they were. This being true, it is obviously advantageous to reduce, if possible, the amount of water in the tree, at the close of the summer, to enable it to withstand the severe conditions of a winter season. Cultivation of the soil of an orchard should not, therefore, be continued in the autumn. A "cover" crop, sown in July, withdrew the moisture