LXXIV. THE SUCTION PRESSURE OF THE PLANT CELL.

A NOTE ON NOMENCLATURE.

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As a result of the work of Pfeffer and de Vries during the last thirty years of the nineteenth century, the vacuolated cell came to be regarded as a system consisting of a solution containing osmotically active substances (the cell sap) surrounded by a semi-permeable membrane (the protoplasm) permeable to water but impermeable to the solutes in the cell sap, the whole being enclosed by an elastic cellulose envelope (the cell wall), supposed to be permeable both to water and dissolved substances. How far such a view really represents the facts is not in question here.

When such a system is immersed in water, it is to be expected that water will enter the cell on account of the osmotic pressure of the cell sap. This must result in the development of a hydrostatic pressure and consequent stretching of the wall, which, being elastic, exerts an inwardly directed pressure on the cell contents. At any time, therefore, there is a pressure, the osmotic pressure, tending to send water into the cell, and the inwardly directed component of the pressure exerted by the wall tending to compress the cell contents and so send water out. The hydrostatic pressure of the water in the cell is called the turgor pressure, to which the inwardly directed wall pressure must be equal and opposite. If this pressure is denoted by T and the osmotic pressure by P , the net pressure sending water into the cell when this is surrounded by water is thus $P - T$, which varies from P when the cell is completely deturgid to zero when it has absorbed so much water that $T = P$ and the cell can be regarded as saturated with water.

Just as it is convenient to have the term osmotic pressure to denote the pressure developed when a solution is separated from pure water by a semi-permeable membrane, so it is convenient to have a term to denote the actual net pressure sending water into the cell when this is immersed in pure water. For this quantity Ursprung and Blum [1916] have used the term "suction force" (Saugkraft) and there appears to be a tendency for other continental writers to adopt this. The chief objection to this term is that the quantity is a pressure and not a force, and is equated with a pressure (osmotic pressure). In this country Thoday [1918] has proposed the term "water absorbing power"

of the cell for this quantity. This term appears particularly unfortunate, for not only is it perhaps a trifle clumsy, but if the quantity in question is not a force, still less is it a power, a rate of doing work. Nevertheless there is a tendency for the term to be accepted by English writers, one of whom indeed gives an equation in which a quantity defined as a surface tension (a force per unit length) is put equal to a quantity defined as a pressure (a force per unit area) less a quantity defined as a power (work per unit time).

To avoid such anomalies in nomenclature, I propose for this quantity, already described as a force and a power, but which is in reality a pressure, the term "suction pressure." This gives an accurate description of the quantity, is not clumsy, and practically embodies the term used by Ursprung and Blum, whose expression, other things being equal, is entitled to precedence on the ground of priority.

REFERENCES.

- Thoday (1918). *New Phyt.* **17**, 108.
Ursprung and Blum (1916). *Ber. deut. bot. Ges.* **34**, 539.