



DEPARTMENT OF BOTANY

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SUBSIDIARY PART - II

GROUP C - PLANT PHYSIOLOGY

ASCENT OF SAP - II

Vital theories :

All those theories which consider the living cells to be responsible for ascent of sap are called vital theories. These include :

Relay pump theory : Proposed by Godlewski 1884, this theory assumes that the upward movement of water was due to the pumping activity of living cells of xylem parenchyma and medullary rays due to rhythmic change in the Osmotic pressure.

Pulsation theory : It was proposed by Sir JC Bose 1923, on the basis of his experiments consisting of an electric probe a galvanometer, a potted plant and an electric circuit. one terminal of the galvanometer was connected with the electric probe and the other at some point in the plant. As the needle was inserted into the stem, the galvanometer started showing momentary oscillation but when the needle reached the inner most cortex layer, the oscillations became violent and sustained. Bose thus believed that the cells of

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this layer were pulsating (i.e. expanding and contracting alternatively) which ultimately cause a rise of the sap upwards.

The vital theories stand severely criticized because we have already known through the girdling experiment that living cells are not concerned in the ascent of sap.

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