

# Transmission of impulses in Biophytum.

By

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Professor Haberlandt has recently published the results of some observations on *Biophytum sensitivum* DC. (*Oxalis sensitiva* L.)<sup>1)</sup> in which he records the discovery of the repetition of the reaction movement in response to a single stimulation. As a result of his work it was found that impulses were transmitted through the midrib of a leaf at a rate of 2.5 to 3 mm per second, through the midnerve of a pinna at a rate of 5 to 1 mm per second, and through the inflorescence at the rate of 1 mm per second. Impulses could be transmitted through girdled midribs but not through sections of that organ killed by hot water, and he therefore concludes that the path of transmission is the parenchyma of the fibrovascular bundles, and that the impulse is conducted plasmatically.

The writer of this note carried on some observations on this subject in the Botanic Institute at Leipzig in 1895 unter the direction of Geh. Rath Prof. Pfeffer, the results of which were published in 1896.<sup>2)</sup> Although numerous experiments were made with both *Oxalis* and *Mimosa* the discussion was chiefly directed to the results obtained from the latter plant. I find the following references to *Oxalis* however:<sup>3)</sup> „I was able to transmit impulses from an incision or flame through dead portions of stems (of *Mimosa*) 3 cm in length; in some instances in which desiccation had proceeded to such an extent that the cell lumina of the dead portion were devoid of liquid contents, and in one instance through a portion bent at right angles by the weight of the leaf. I was able to obtain similar transmissions in the midrib of *Oxalis sensitiva* which offers many of features of *Mimosa*. In support of this last paragraph I find the following entries in my notes. June 27. Apical pinnae of leaf in which a middle region 5 mm long had been killed by boiling water on the previous day, snipped with scissors. Impulse transmitted through dead portion, and five pairs of basal leaflets closed. Air temperature 27° C. In greenhouse, July 1. Flame and scissor snip applied to apical pinnae of leaf in which a middle portion 1 cm long had been killed by boiling water an which had desiccated to such extent that the midrib was bent at an angle of 50 degrees. Reaction of nearly normal amplitude in the basal leaflets. Temperature 27° C. in experiment room

<sup>1)</sup> Ueber die Reizbewegungen und die Reizfortpflanzung bei *Biophytum sensitivum* DC. (Ann. d. Jard. Bot. d. Buitenzorg. 2nd Supplement. 1898. p. 33.)

<sup>2)</sup> The mechanism of movement and transmission of impulses in *Mimosa pudica* and other „sensitive plants“. (Botanical Gazette. Vol. XXII. 1896. p. 293.)

<sup>3)</sup> l. c. p. 296.

of Institute. In both instances as well as in others the midribs were examined microscopically and found to be entirely dead. A comparison of the results recorded shows that transmission through dead portions of midribs was much more difficult to accomplish than through girdled members.

In the conclusions to the previous paper I have said<sup>1)</sup> „Impulses may be transmitted by *Mimosa* and *Oxalis* through dead portions of stems and petioles in which the conditions are such that a transmission by the cell wall, or the water in the cell wall only are possible. — It is to be noted however that while it is proven that an impulse may be transmitted by a wall of a dead cell, it does not follow that the entire transmission from the point reception to the motor organ is accomplished by this means alone. It seems quite possible that protoplasmic action plays a part at both ends of the chain connecting the two points, and that while hydrostatic disturbance does not constitute an impulse, it may play a minor part in the its transmission.“

Professor Haberlandt makes no attempt to explain the discrepancy between my previously published results and his own, and in fact my paper seems to have escaped his attention. The writer is wholly unable to account for the differences in the reactions obtained. It is to be said that the experimental plants used by Professor Haberlandt in the Botanic Garden at Java were perhaps under more natural conditions, but those grown at Leipzig were fairly normal as may be seen from the following data obtained as to the rate of transmission of impulses in the midrib of the leaf.

June 19. 2 to 3 P. M. In greenhouse. Air temperature 24 o C. Impulses given by a snip of the forceps to the apical leaflets traversed the midrib in the periods: 50 mm in 45 seconds, 55 mm in 45 seconds, 55 mm in 40 seconds, 50 mm in 40 seconds in young leaves, and 55 mm in 65 seconds, 55 mm in 50 seconds, 50 mm in 60 seconds, and 45 mm in 90 seconds in old mature leaves. This gives a rate of. 5 to 1,25 mm per second, but Professor Haberlandt does not state the temperatures at which his results were obtained no direct comparisons can be made.

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## Ueber *Puccinia* und betreffende Magnus'sche Einwände.

Von

Otto Kuntze.

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Es ist erfreulich, dass ein bewährter Mycolog, wie Professor Paul Magnus, sich bestrebt, die Nomenclatur der Pilze nach dem Pariser Codex von Fall zu Fall zu prüfen und anzuerkennen. Bisher herrschen bei neueren Mycologen insofern geradezu erschreckliche Zustände und Willkürlichkeiten. Fehlten doch in

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<sup>1)</sup> l. c. p. 299.

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