If, then, for any reason, summation is required for transneuronal conduction and temporal summation at the individual synapse does not occur while spatial summation occurs from many axonal terminations upon one cell but not in the reverse direction, transneuronal conduction can only occur in the direction in which it does occur in the reflex arc.

In brief, even though there be no irreciprocal property of the individual synapse, there may still be irreciprocity of transneuronal conduction.

Three characteristics of such conduction have in times past been commonly explained by attributing special properties to synapses. Lorente de Nó has demonstrated that the prolonged period of temporal summation in such conduction depends upon delay paths (Forbes) and reverberating chains of internuncial neurons and not on any protraction of the period of latent addition at the synapse itself. Gasser has already accounted for the inhibition in reciprocal innervation in terms of threshold changes in necessary internuncial neurons, instead of in terms of inhibitory synapses. Thus the explanation here offered for the irreversibility of conduction in the reflex arc, without the assumption of irreciprocity of the synapse itself, renders it now unnecessary to attribute to any individual synapse any property except that of a region of decrement.

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DARWIN AND EARLY DISCOVERIES IN CONNECTION WITH PLANT HORMONES

IN the November 19 issue of SCIENCE (p. 468) Professor N. Cholodny calls attention to the point that Charles Darwin first set forth the basic idea of the present hormone theory of tropisms, and that the subject is incorrectly treated in P. Boysen Jensen's "Die Wuchsstofftheorie" (G. Fisher, Jena, 1935), as well as in our English translation and revision of the book.[1]

Reference to the original text (p. 1) shows Darwin's name the first to be treated in the historical discussion of the subject, and Darwin (p. 405)[2] is quoted: "Wir müssen daher folgern, dass, wenn Sämlinge einem seitlichen Lichte frei ausgesetzt sind, ein gewisser Einfluss vom oberen Teil nach dem unteren hingeleitet wird, welcher die Ursache ist, dass sicht der letztere biegt." Similarly, on page 3 of the translation it is stated that Darwin (p. 474)[3] concluded "when seedlings are freely exposed to a lateral light, some influence is transmitted from the upper to the lower part, causing the latter to bend," and on page 4 in the pictorial treatment of the "historical outline of the early discoveries concerning plant growth hormones," Darwin's classic experiment is illustrated, together with those of other early workers. Cholodny cites Darwin as concluding that "these results seem to imply the presence of some matter in the upper part which is acted on by light, and which transmits its effects to the lower part." Boysen Jensen in 1910–11 supplied the *evidence* which enabled him to establish as a fact the opinion which Darwin expressed thirty years earlier; this evidence permitted the definite conclusion that the influence transmitted in tropic curvatures consists of a "substance or of ions."

If we erred or inadequately treated the work of Darwin or any other contributor to this field, it was entirely unintentional. We felt that Professor Boysen Jensen had, as a matter of fact, done a real service in calling attention to Darwin's work. No important mention of it has been found in English reviews published before the translation.

We had hoped that the pictorial treatment referred to above might be perfectly just to all workers, and at the same time illustrate the point so aptly brought out by Professor W. J. Robbins[4] in his reference to the history of growth substance discoveries: "This history, brief and fragmentary as it is, demonstrates that scientific knowledge accumulates slowly; that it does not spring full-formed from the mind of any one individual, but is the result of the contributions of many."

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NITROGEN IN THE NUTRITION OF TERMITES

THE rôle of the symbiotic protozoa found in the hind-gut of certain species of wood-eating termites has been the subject of numerous investigations and is still a debatable question. Cleveland (1925)[1] cultivated reproductive colonies of termites for more than 18 months on a diet of filter paper and concluded that the termites could live indefinitely on a diet of pure cellulose, although he was at a loss to account for the source of nitrogen required for their forty-fold increase in weight. He concluded that "they must be able in some way to fix atmospheric nitrogen which

[1] P. Boysen Jensen, "Growth Hormones in Plants." Translated and revised by Avery, Burkholder, Creighton and Scheer. McGraw-Hill. New York, 1936.

[2] C. and F. Darwin, "The Power of Movement in Plants." London, 1880.

[3] C. and F. Darwin, "The Power of Movement in Plants." D. Appleton-Century Co., New York. 1881.

[4] W. J. Robbins, *School Science and Mathematics*, 158–167, February, 1937.

[1] L. R. Cleveland, "The Ability of Termites to Live Perhaps Indefinitely on a Diet of Pure Cellulose," *Biol. Bul.*, 48: 289–293, 1925.