

SOME MISLEADING TERMINOLOGIES IN THE LITERATURE OF "PLANT TISSUE CULTURE"

MOST of the so-called tissues of the higher plants contain varying proportions of cells whose protoplasts are capable of division and subsequent growth. Under traumatic and other excessively abnormal influences, such protoplasts frequently proliferate and form callus, *e.g.*, in wound healing, in grafting, etc. Callus-like proliferations derived from excised parts of plants, when grown under controlled conditions *in vitro*, obviously provide extremely significant material for the experimental investigation of various morphological and physiological problems. It is misleading, however, to refer to such proliferations as cultures of a specific tissue even when the exact source of the callus is accurately known.

In the case of putative cultures of the cambium, not only is the callus entirely unlike the cambium in its cellular structure and its functional activities, but also there is no convincing evidence to indicate that the proliferations originated from the cambium.

The cambium consists of a layer of initials having a radial diameter of from 4 to 8 microns. It is flanked internally by elements of the xylem in varying stages of maturation and externally by elements of the phloem in varying stages of development. The parenchyma of the xylem and phloem commonly retains a capacity for cell division, as do tracheary elements, fibers and sieve cells during the earlier stages of their maturation. Even by using a microtome, it is unfortunately impossible to cut a tangential longitudinal section of a stem or root that consists entirely of living cambial initials. In the techniques employed by Gautheret,¹ White² and others, the bulk of the excised tissue, from which proliferations develop, consists of maturing xylem and phloem. In other words, there is no evidence to indicate that the callus originates solely from the cambium, rather than entirely or in part from its derivative tissues. Furthermore, the assumption that the bark of growing plants tends to split away from the wood along the cambium is entirely without justification. During the active growing season, the zone of excessive weakness lies well within the maturing xylem, *viz.*, in the region where tracheary elements have attained their maximum size, but haven't initiated the process of secondary wall formation. Thus, the cellular proliferations obtained on tangential surfaces that are exposed by peeling, splitting, tearing or cutting commonly do not originate from the cambium.

Until methods are perfected for actually isolating parts of meristems and for inducing them to grow

without profoundly modifying their constituent cells, it is inadvisable to refer to abnormal proliferations obtained from heterogeneous bits of stems, roots or other organs as cultures of the cambium, procambium, cork cambium, etc.

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RELATIVE VALUES FOR DESCRIPTIVE WORDS

THE interest in the uniform usage of words of indefinite meaning is probably not new. It is encouraging to note that recently several SCIENCE readers want to do something about it. One more suggestion may contribute to this interest and to a solution of the problem.

A numerical word has a definite value and wherever the figure appears it has the same value. For example, the figure 75 per cent. has an actual value and also indicates a value midway between half and total. But one statement that "oaks are common" has very little value when compared to another similar statement unless the value of the word "common" is rather definitely established. An observer may report that "the disease is prevalent in Brown County and common in White County." Without knowing the relative values of the words "prevalent" and "common," the reader can not learn from the report whether the disease is more, the same or less in Brown County compared to White County. To correct this situation, the relative values of such terms as "common" and "prevalent" should be established and used in such reports. With a standardized relative value, a word which ordinarily has an indefinite value may be used to convey a meaning about as definite as the condition on which the word is based.

It is proposed that a table of relative values be established for the use of a particular profession or a group of professions such as plant pathology, entomology, etc. A procedure similar to that employed in standardizing common names of trees or insects by a consensus of opinions might be used for this job. Of course, all individual opinions should yield to a consensus of opinions, and all reporters should adhere to the established relative values.

The relative values of a set of words could be based on an average or mean point and vary from that point to a maximum or minimum. For example, for such words as "abundant," "common" and "trace," indicating frequency of occurrence, the term "common" might be taken as the average or mean occurrence, "abundant" as the maximum frequency, and "trace" as the minimum amount. With this as a starting point such terms as "scarce," "light," "frequent," "prevalent," etc., could be given similar or in-between relative values. The same procedure could be used for

¹ R. J. Gautheret, *Rev. Cytol. et Cytophysiol. Vég.*, Paris, 1935.

² P. R. White, *A Handbook of Plant Tissue Culture*. Jaques Cattell Press. 1943.