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] White[2] 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 pealing, 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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[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.

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

words describing the health of a plant, so that such terms as "vigorous," "thrifty," "normal," "suppressed," etc., would have known relative values.

Table 1 is presented as an illustration of how relative terms on these subjects may be arranged. There is no contention that all the terms in the table are somewhat similar conditions. Furthermore, it would be known that the terms "sickly," "low vitality," "failing" and "weak" indicate a condition less favorable than that indicated by the above terms.

The writer will appreciate various opinions on this plan as well as suggestions on how it might be worked

TABLE 1

Abundant	Frequent many	Prevalent	Common normal average	Light scattered	Scarce few	Trace rare
luxuriant abundant	vigorous robust	strong thrifty good condition	normal healthy ordinary	declining suppressed impaired poor condition	sickly low vitality failing weak	dying deteriorating

appropriate to the subject or are properly placed. Such definite selection and placement must be based on a consensus of opinions.

If such relative values were established and used by all reporters on plant growth, for example, the readers would know that the terms "declining," "suppressed," "impaired" and "poor condition" indicate

out. He is especially interested in learning how other writers would place the words used in the table. Examples of how descriptive words on other subjects might be arranged will be appreciated. If sufficient opinions are offered, the possibilities of arriving at a fair consensus of opinions may be indicated.

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SCIENTIFIC BOOKS

NUTRITION

The Science of Nutrition. By HENRY C. SHERMAN. xi + 253 pp. Columbia University Press. 1943. $2.75.

THIS book, written by a master in the field, is quite unique in its content. Not only does it attempt to present in a non-technical manner the general principles of nutrition, but the second half of the book is largely concerned with such chapters as "Are We Well Fed?," "The Nutritional Improvement of Life," "Nutrition for Realization of the Potentialities of Youth and of Maturity," "Nutritional Guidance for 'The Backward Art of Spending Money'" and "Nutrition Policy." It is concluded with a chapter dealing with "Scientific Critique of the 'Offer' of Higher Health and Longer Life." It is suggested in the preface that certain of the chapters which are heavy reading may be omitted without loss of understanding of the balance of the book; this may account for some amount of repetition.

The choice of title is unfortunate, for it is likely to be confused with the comprehensive text of the late Professor Graham Lusk of the same title. The treatise is logically written and well outlined; its manner of presentation should make it equally interesting to the trained nutritionist as well as to the uninitiated layman. The style and content are not sufficiently simple, however, to appeal to the uneducated man.

In discussing "Food as a fuel and body as a machine" (Chapter II), the author postulates that the excess of calories measured by direct calorimetry (0.25 per cent.) over those calculated by indirect calorimetry may be accounted for from the energy derived from light in causing an impulse in the optic nerve or resulting from the activation of vitamin D. However, from the reviewer's experience in this field, it would seem that the differences compiled by Armsby for experiments with dogs and herbivora (1,445,398 calories by direct; 1,441,691 calories by indirect) can best be explained as in the range of experimental error. As a criterion for overweight, Sherman cites the interesting case of Joe Louis, who, when in condition, would have been judged by ordinary standards too heavy for the Army or Navy. Specific gravity rather than absolute weight is a better measure and

> So by weighing him in water as well as in air, it was duly determined that Mr. Joe Louis was physically fit for service in the armed forces of the United States.

The historical discussion of the vitamins is especially well done. The author suggests that the layman should recognize "vitamine" as well as the present accepted spelling without the "e" and then proceeds to be inconsistent by spelling it both ways in later pages.

There is an interesting anecdote of the country doctor in the Virginia of the nineties who ordinarily made his rounds on horseback and who, like most people, was more or less troubled with rheumatism in the winter and spring. He ignored this until his joints became so sore that they troubled him in getting on his horse; "then he sucked lemons until the soreness of his joints went away." Later the author cites the work of Crandon and coworkers at the Har-