

Vitis-idae. A paper now in the press, recording the regular and extensive digestion of mycelium in the mycorrhiza cells of *Calluna*, contributes additional details respecting the distribution of mycelium in the shoot of *Ling* and supplies final experimental proof of the identity of the fungus (in the vegetative shoots as in the fruits) with that found in the (root) mycorrhiza.

In view of the conclusions published by Stahl in 1900, the genus *Vaccinium* is of special interest. In a paper shortly to be published, an account will be given of experimental researches on *Vaccinium* spp. extending over a number of years and evidence supplied that the relation between fungus and vascular plant is even more intimate in this genus than in *Calluna*. That roots of *Vaccinium* are infected by mycelium of the endophyte when growing in sterilised soil was overlooked by Stahl,—as more recently by Christoph in the case of *Calluna*,—because the formation of typical mycorrhiza is partially inhibited in the roots of both these species when growing in a sterilised medium. Under these conditions, the demonstration of mycelium in the mycorrhiza cells demands a more careful technique than was bestowed upon it by either of these observers.

The interesting observations on conifers contributed by Prof. Lewis confirm the view long held by the present writer, that the distinction between ectotrophic and endotrophic mycorrhizas is one of degree of infection only. Many of the so-called ectotrophic forms yield evidence of the presence of intercellular mycelium when a suitable technique is employed. This view receives further confirmation from the recent extensive researches of Melin ("Experimentelle Untersuchungen über die Konstitution und Ökologie der Mykorrhizen von *Pinus silvestris* L. und *Picea Abies* (L.) Karst," *Sonderabdr. aus myk. Untersuch. und Berichte*, Bd. II., 1923, Stockholm).

At the same time, it must be pointed out that the presence of mycelium throughout the shoot tissues does not in itself constitute a proof of identity with the mycorrhizal fungus of the same plant. Experimental proof of such identity has been obtained for *Calluna* and *Vaccinium*, but it is perhaps rash to assume, by analogy, that the same is true for *Picea canadensis* and other conifers.

Prof. Lewis's allusion to "symbiosis" raises the question of the exact significance to be attached to this term. In my opinion the term "symbiosis" can be correctly applied to the relationship between flowering plant and fungus in mycorrhiza plants if it is used as originally defined by de Bary. Its use when *mutualism* is implied is justified only if supported by experimental evidence. Each case requires investigation on its merits.

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The Nature of Verse.

THE experimental results reported by Prof. Scripture in *NATURE* of October 11, p. 534, are of course to be accepted as accurate, but they do not lead inevitably to his conclusions. He is dealing only with "the physical nature of verse," with verse "as it comes from the speaker" and passes to the hearer. Of this he gives a faithful and valuable account; but it is wrong to draw conclusions as to the nature of verse from an inquiry into only one aspect of it.

To express the rhythmical effect of verse Prof. Scripture uses a concept—that of the centroid—which deserves fuller recognition. He states that "The simplest English poetical line consists of a quantity of speech-sound distributed so as to produce

an effect equivalent to that of a certain number of points of emphasis at definite intervals." Few will take exception to this, so far as it goes; but he draws the conclusion that verse is "purely a matter of rhythm; it has no metre. The usual scheme of prosody with feet, syllables, iambus, trochee, etc., is a fantastic fabric of fancy without the faintest foundation in fact."

A certain amount of poetical work makes no claim to be metrical, but apart from this it is untrue, even on Prof. Scripture's evidence, that verse "has no metre." If the centroids recur at definite intervals then they may be said to mark out measures, bars, or feet, the "point of emphasis" marking either the beginning or the end of the foot. There is no need for the feet to be conterminous with syllables, or to be cut off one from another as if the speech sound were not continuous, or to show any simple or indeed any fixed internal ratio between their parts. Prof. Scripture may object that this is not the *usual* scheme of prosody, with feet, syllables, etc., that he is attacking. But we may believe in metre without supporting the orthodox prosody of mid-Victorian days. That scarcely needs slaying thrice, although modern metricians who no longer accept it find the old schemes and terminology convenient to use for rough and ready purposes.

A more important point is that Prof. Scripture takes no account of the fact that the physical rhythm is the external manifestation of a psychological rhythm. One of his examples illustrates this. Whoever read the line from "Hamlet" for him to record evidently felt "is" to be more important than "that," and the record accordingly shows the arrangement of centroids to be

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But many, if not most, readers would place the point of emphasis on "that"—

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the record showing a different arrangement of centroids.

The nature of the sound rhythm depends on the nature of the mental rhythm with which it corresponds (or perhaps we may find that they are mutually dependent). Consequently, experimental methods, however accurately carried out, can by themselves reach no finality. "The first step in the study of verse," says Prof. Scripture, "must be the purely physical one of registering and analysing the air-vibrations." But even if this is so, it is not all. We have also to inquire why the vibrations come to be arranged in that particular way. The problem of metre is not a merely phonetic problem, for the effect of verse depends not merely on some stimulation of the senses, but on something that is a matter for apprehension on a higher or more complex level than mere sensation, on the *recognition* of some sort of recurrence.

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The Origin of the Satellites of Mercury Lines.

INTEREST in the complex structure of the important lines in the arc spectrum of mercury has been revived by the suggestion of Nagaoka, Sugiura, and Mishima (*NATURE*, March 29, 1924) that the satellites are due to isotopes of mercury. The suggestion is based on the agreement of the wave-lengths calculated according to a hypothetical formula (similar to Kratzer's formula for the spectrum of hydrogen chloride) with