This abnormality appears to be of considerable interest in connexion with recent discussions¹ concerning the morphology of the synangium-bearing organ in the Psilotaceae. There seem to be two possible views as to the nature of the stalked cluster of synangia. It may be looked upon as equivalent to one of the normal aerial branches of *Psilotum*, which has for some reason become abortive in development; on the other hand, it may be regarded as derived from a single proliferated synangium-bearing appendage. The common stalk, arising from the main axis, and bearing the cluster of synangia, affords a striking point of difference from the ordinary sessile 'sporophyll,' but, since in the nearly allied *Tmesipteris* the synangium-bearing organs are stalked, this difficulty does not seem insurmountable. The presence of a terminal synangium is of extraordinary interest, and has not, so far as I am aware, been yet described in *Psilotum* (cf. *Tmesipteris*²). The theory that the abnormality is equivalent to a single 'sporophyll' appears to me far the more probable, especially when considered in the light of similar abnormalities in *Tmesipteris*, in which genus ordinary branches do not occur. It is not easy to suppose such a structure as this cluster to be of a foliar nature, for it can hardly be described as a repeatedly dichotomizing leaf.³ It is more possible to look upon it as a proliferated sporangiophore (primitively non-foliar in nature⁴), bearing several synangia, associated with several bracts, and terminated by a synangium at its apex.

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INTERNAL PHLOEM IN MYRISTICA.—In *M. fragrans*, Houtt., the midrib of the lamina of the leaf, which is a direct continuation of the petiole, contains a vascular cylinder which is much greater in diameter in the tangential than in the radial direction; its dorsal half is arc-shaped, while the ventral half is flat, the xylem of the latter is incomplete, two of the phloem-groups composing it being without any xylem, while what xylem there is present is much less thick than that belonging to the dorsal half of the cylinder. Four angular groups of *medullary phloem* occur, one of which is in direct connexion with one of the large phloem-groups of the ventral half of the cylinder which has lost its xylem. In the petiole these medullary phloem-groups at once tend to pass into the broad medullary rays, which they entirely fill, but one group is still left in the pith. At the base of the petiole the cylinder becomes, by the passing across of its ventral bundles, an arc of three arched bundles, each of which has a medullary phloem-group bending round each of its ends, thus standing half-way between pith and normal phloem. Thus, *before the leaf-bundles enter the stem, the medullary phloem leaves the pith and unites with the ordinary phloem of the cylinder.*

In *M. glaucescens*, Jack., essentially the same structure occurs.

In the *peduncle* of the fruit of the first-named species it was very interesting to find, what one might, in an organ of this nature, *a priori* expect, a transitional struc-

¹ Scott, D. H., Proc. Roy. Soc., 1897, and Prog. rei. bot., 1907; Thomas, A. P. W., Proc. Roy. Soc., 1902; Sykes, M. G., Ann. of Bot., January, 1908.

² Sykes, M. G., l. c. Text-fig. vii, x.

³ Cf. Abnormalities in *Psilotum*, referred to by Thomas, l. c., p. 349.

⁴ Sykes, l. c., p. 82.

ture between that of the leaf and that of the vegetative *stem*, which latter is *entirely devoid of medullary phloem*. There was no phloem in the middle of the pith, as is the case in the leaf, but at the *inner* angle of one of the bundles, just at the entrance to a medullary ray, I observed a small isolated group of phloem, and I also noticed a large group of phloem in two or three of the medullary rays which was in direct connexion with, and a continuation of, the ordinary phloem of the cylinder. Both of

Myristica fragrans, Houtt.

FIG. 1. Transverse section of vascular cylinder of midrib of leaf-blade showing the groups of medullary phloem (*mph*). +, xylem; *ph*, normal phloem.

FIG. 2. Transverse section of segment of vascular cylinder of vegetative stem showing complete absence of medullary phloem.

(Both Figs. diagrammatic and $\times 75$.)

these appear to me to represent fixed stages in the passage of the medullary phloem from the pith outwards to the external phloem of the cylinder.

Holding the view which I do that the present-day structure of the leaf reveals to us in so many cases what was the structure of the *stem* in the not very remote ancestors of the plant, I draw the conclusion that *Myristica* once had *internal* phloem in the stem, but has now lost it, and I go further and say that this medullary phloem of the leaf of to-day represents a vestige of a system of complete medullary bundles which were characteristic of both stem and leaf.

The peduncle, an organ which I have found in so many other cases to retain a primitive structure which has vanished from the vegetative stem, has in this genus *partially* retained the primitive character of medullary phloem, of which there is no trace remaining in the vegetative axis.

W. C. WORSDELL.

Worsdell, Wilson Crosfield. 1908. "Internal phloem in *Myristica*." *Annals of botany* 22, 526–527. <https://doi.org/10.1093/oxfordjournals.aob.a089188>.

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