

# The Occurrence of Fossil Plants at Warrentinna, Tasmania

By

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(Communicated by P. B. Nye, M.Sc.<sup>1</sup>)

PLATE XX

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## INTRODUCTION

An outcrop in which plant-remains of early Palaeozoic type occur is situated in the railway-cutting 8 chains south of Warrentinna Railway-station, in North-Eastern Tasmania. My attention was drawn to this locality by Mr. P. B. Nye, M.Sc., whose kindly assistance with arrangements for a visit to the area I wish to acknowledge. The actual discovery there of fossil-plants is due to Mr. F. Blake, of the Geological Survey of Tasmania. Mr. Blake very generously provided me with detailed plans and directions by which I was able to find and work the fossiliferous beds more exhaustively than he had previously had time to do. The results of this work at Warrentinna,

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<sup>1</sup> In communicating this paper Mr. Nye makes the following remarks:—

'The plant-remains referred to in this paper were discovered by Mr. F. Blake, Field Geologist, on 15th February, 1934, while engaged in a survey of the Warrentinna goldfield. The location of the discovery is a railway-cutting eight chains south of the Mara siding, on the Launceston-Herrick railway. The plant-remains are contained in fine-grained sandstones, interbedded with slates, which strike north and south and dip westerly at 66 degrees.

'Owing to the doubt as to their origin, little time was spent in the examination, and only a few specimens were collected. The specimens were brought to the notice of Dr. Cookson, and finally arrangements were made by Dr. Cookson to visit the site of the discovery. Further collections were made and examined by Dr. Cookson, and the following paper is the result.

'While the Mathinna series of slates and sandstones are referred by the Geological Survey of Tasmania to the Cambro-Ordovician System, there is no direct evidence for such, and the series might possibly belong to the Silurian System.

'This discovery is the first one in Tasmania of fossil plant-remains older than the Permo-Carboniferous period, and is therefore of considerable scientific interest.'

though unsatisfactory on account of the imperfect and fragmentary nature of the specimens obtained, are recorded here in the hope that interest may be stimulated in Tasmania which will lead to the discovery of new fossiliferous beds in the same rock series. The sedimentary rocks exposed in the railway-cuttings between Branxholm and Tarlita stations belong to the Mathinna series, and have been referred by Nye (1925) to the Cambro-Ordovician period. He says that 'no fossils have been found in this series of rocks anywhere in the north-eastern part of Tasmania, so that their age cannot be definitely determined, and they are referred to the Cambro-Ordovician system. The same belt extends southwards to the Alberton and Mathinna goldfields, and is found in other localities in the north-east of Tasmania, and is referred to as the Mathinna slates and sandstones. The similar strata of the Balfour and Bischoff slates and sandstones in North-Western Tasmania are correlated with this series. Lithologically and structurally it is very similar to the Ordovician system in Victoria, but no graptolites have yet been found in it.'

The rocks of the cutting at Warrentinna consist of slates and sandstones. The latter are pink or yellow in colour, and most are fine-grained. The plant-remains occur in a few narrow beds of sandstone adjacent to bands of slates. The fracture of the sandstone is very uneven, so that only small lengths of plant-stems are evident on the exposed surfaces. These are preserved as flattened incrustations in the sandstone. In the majority of examples the flattened cast of matrix is enclosed by a thin layer of a brown mineral which represents the transformed outer tissues of the stem. Occasionally, as in fig. 6, small carbonaceous particles may remain on the outer surface of the incrustation, or, as in fig. 2, on the inner surface of the concave mould after removal of the core of matrix.

#### DESCRIPTION OF PLANT REMAINS

The plant-fragments collected at Warrentinna are of strikingly uniform character, and are devoid of special diagnostic features. For this reason they cannot be specifically identified, and only tentative comparisons can be made. Most are unbranched, smooth stems, from 1.5 mm. in width and 6 cms. or less in length. The longest piece of stem found is represented of natural size in fig. 1. It has a width of 2 mm., and a length of 6 cms. is exposed on the rock. The surface is non-striated, and shows no evidence of appendages. A similar fragment is shown in fig. 2. In this case the core of matrix has fallen out from the greater part of the incrustation, and has left a thin layer of brown material, with small carbonaceous particles to represent the outer tissues of the stem. Fig. 3 represents another stem-fragment, 2 mm. wide and 3.5 cms. long. The incrustation in this case is much flattened, and in the upper portion the sandy

cast has come away, exposing a median longitudinal ridge. It is possible that this ridge indicates the position in the stem of a median vascular strand, but there is no evidence to substantiate this.

A few branched stems were found at Warrentinna. These provide more definite characters for comparison with early plants from other countries, and therefore are of greater value than the more numerous unbranched fragments. The specimen shown of natural size in fig. 4 shows the division of a stem 5 mm. wide into two equal daughter-axes. The latter are each 4 mm. in breadth. A second branched example is represented at a magnification of 5 diameters in fig. 6. In it the relatively main axis, which has a diameter of 1 mm., gives off at right-angles a small lateral branch. Both examples are disconnected pieces of stem, and have a Y-shaped form. Their appearance suggests that the branching was probably based on a dichotomy.

Although the fragments just described cannot be specifically identified, a comparison with fossil plants from other localities is fully justified. The age of the Warrentinna plants is not actually determined, but is clearly pre-Devonian, since the Mathinna series are intruded by granites of Devonian age. The natural comparison is therefore with the Silurian plants of Eastern Victoria. Plant-containing beds of Upper Silurian age occur on the mainland along the Walhalla Geosyncline at Gaffney's Creek, Wood's Point, Walhalla, and further south on the coast at Livingstone Creek, Waratah Bay (Lang and Cookson, 1927, 1935). From these localities slender, smooth, branching stems of similar type to those from Warrentinna have been described under the form-genus *Hostimella* sp. Some have shown a more detailed comparative feature in the presence of a small oval area on the surface of the incrustation in the angle between the main axis and the branch. This axillary 'bud' is also represented in some of the smooth-branched axes from the Middle Devonian of Scotland (Lang, 1925), and in *Hostimella hostimensis* from the Middle Devonian of Bohemia (Potonie and Bernard, 1904). A close comparison of the Victorian stems with some remains from the Devonian of the Northern Hemisphere has therefore been established.

The specimens from Warrentinna come within the range of size met with in the Victorian specimens named *Hostimella* sp., and the Y-shaped fragments are also in agreement (Lang and Cookson, 1930, figs. 1 and 4). None shows, however, the presence of an axillary 'bud,' the presence of which would provide a distinctive and satisfactory basis of comparison. The identification of the present material as cf. *Hostimella* sp. is given on the understanding that such a designation is purely descriptive and probably includes plant types of varied affinities.

A single, rather obscure specimen which differs from the above-described stems must be mentioned. It is shown magnified 3 diameters

in fig. 7. In it the smooth axis, which is 1 mm. wide, shows a terminal subdivision into three more slender daughter-axes. Two of these are shown in the figure, the third, which lay beneath the rock on the left-hand side, having been exposed only after the subsequent removal of the covering-stone. During this operation portion of the middle branch came away, so that it is impossible to support, with an illustration, this more complete description of the specimen. The right-hand daughter-axis shows an early and equal division into two more slender branches, and there was some evidence that the middle axis branched in a similar manner. The third daughter-axis on the left-hand side (not shown in the figure) lies at a slightly lower level, and partially underlies the centrally-placed branch. It has not been possible to determine whether or not it also underwent bifurcation. The distal regions of the branch-system have not been preserved. Comparisons of such an incomplete specimen must be made cautiously, and can only be tentative. The only type with a terminal branch-system to which this specimen is at all similar is *Hedra corymbosa*, a fructification described and known from the Upper Silurian at Alexandra, Victoria (Cookson, 1935, figs. 25 and 26). The main axis is more slender than in any known specimen of *H. corymbosa*, and since no information as to the terminations of its branches is available, this passing reference to a possible similarity of construction is sufficient.

#### CONCLUSION

No evidence has been obtained that the specimens from Warrentinna were parts of vascular plants, but their general appearance suggests that they were most probably portions of land plants. They have been compared with the smooth-branched axes of the type known as *Hostimella* sp., which are abundant constituents of many early Palaeozoic floras.

The question of the age of the Mathinna series is raised by the occurrence of these plant-remains. There are no records of land plants in the Ordovician. The oldest vascular plants at present known with any completeness are those from the Upper Silurian of Victoria, types of which have been used for comparison with the Tasmanian fragments. If the latter are vascular, as seems probable from their general appearance, and if the beds containing them are definitely proved by other means to be Ordovician, the interest in these plant-remains will be greatly increased. Mr. Nye, in his paper previously referred to, gives the age of the beds as Cambro-Ordovician, and draws attention to the lithological agreement with the Ordovician rocks of Victoria. He particularly mentions, however, the absence of graptolites and other fossils, by means of which an exact determination of age could be made.

The plant-containing sandstones at Warrentinna are also very similar lithologically to the plant-beds at Wood's Point and other localities in the Victorian Silurian, the irregular, conchoidal fracture being an additional point of agreement. The Silurian plant-bearing sandstones on the Victorian coast near Waratah Bay, with fragments which agree closely with those from Tasmania, are of particular interest in this connection. They are the nearest geographically, and are situated almost in a direct line north from the Tasmanian area. Although plants are not usually a satisfactory index of precise age, in this case, where the age appears to be a somewhat open question, they assume considerable importance. The presence of plant-remains in the Mathinna series, and their agreement with similar remains in Victorian Silurian rocks, renders it very probable that there is error in placing the beds as Cambro-Ordovician, and points to a higher level, presumably near the Silurian of Victoria.

The small fragment which shows some points of agreement with *Hedeia* from Victorian rocks is not sufficiently well defined to be used in support of a relationship between the Victorian and Tasmanian series. Its occurrence, however, increases the possibility that future work may result in the establishment of a more complete and comparable flora in the pre-Carboniferous rocks of Tasmania.

#### SUMMARY

1. Plant fragments have been described from rocks mapped as Cambro-Ordovician in North-Eastern Tasmania.
2. Some have been identified as cf. *Hostimella* sp.
3. A comparison with Silurian plants from Victoria is made.
4. The suggestion is put forward that the plant-bearing-series may later be proved to be of Silurian age.

#### REFERENCES

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EXPLANATION OF PLATE XX

(All the figures are from untouched negatives. The figured specimens will be housed in the Mines Department, Hobart, Tasmania.)

- Fig. 1. Cf. *Hostimella* sp.: An unbranched stem. (Nat. size.)  
Fig. 2. ( Cf. *Hostimella* sp.: Flattened incrustations, from each of which portion of  
Fig. 3. ) the core of matrix has been removed. (Nat. size.)  
Fig. 4. A piece of sandstone showing plant-remains (cf. *Hostimella* sp.); one of these is branched and has a y-shaped form. (Nat. size.)  
Fig. 5. Cf. *Hostimella* sp.: Two flattened incrustations, the right-hand specimen shows evidence of branching. (Nat. size.)  
Fig. 6. Cf. *Hostimella* sp.: A small y-shaped fragment. ( $\times 5$ .)  
Fig. 7. *Incertae sedis*: A small branched axis. (Nat. size.)

