NOTES ON A FOSSIL PINE FROM THE PERMO-CARBONIFEROUS STRATA *(DADOXYLON PENMANI*, SP. NOV.).

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General Notes.

The fossil came from the air-shaft of the Aberfoyle Mine, and its age was determined by the Government Geologist (Mr. P. B. Nye) as being Permo-Carboniferous. This field note is of some importance, since of recent years the old genus *Dadoxylon* has been revived to meet the case of all such Australian Palæozoic specimens as are duly segregated from the more ancient type of *Cordaites*. In the same connection the genus *Araucarioxylon* is now restricted to Mesozoic pines, of more or less Araucarian habit. Such being the case, our fossil must therefore be either a true survival of the Devonian *Cordaites*, or else the more recently evolved *Dadoxylon*.

In his "Prodromus of the Palæontology of Victoria" Sir Frederick McCoy says that *Cordaites australis* has no medullary rays, but retains the older structure of scalariform ducts. As the present specimen *has medullary rays*—although, curiously enough, quite absent from many chipped specimens of the wood—and *no ladder ducts*, it seems correct to classify it as a *Dadoxylon*. In the item of a species, I have called it "*Penmani*," after Mr. C. J. Penman, who secured the fossil for us.

Appended is a detailed account of the microscopical structure of the three faces of the wood.

Transverse.

It is impossible, with the imperfect state of preservation, to obtain a series of zonal growths, but from microscopical specimens the following can be determined:—

The tracheids are thick-walled, and both quadrangular and circular (or an approach to it); the wood has been

badly compressed during preservation, so much so that the autumnal wood zone has been driven out of alignment. No evidence of any value can be collected from this aspect of the wood respecting the medullary rays *in the majority of instances;* indeed, it was at first regarded as useless to expect any; but a fortunate scrap came to light in which the structure was good enough to determine the following facts:—

The rays may be very narrow, and apparently only a single tier wide, or two or three tiers in structure, the wider ones showing most commonly in the autumnal wood; possibly distortion may here accentuate appearances to some extent.

Some, beyond all doubt, grow wider in the autumnal zone, and can be traced throughout their course.

RADIAL.

As might be expected from the transverse structure of the wood, the radial aspect depicts an even grain, and by measurement it was found that an average tracheid was 1-500th of an inch wide, as against the 1-438th of an inch for *Araucaria cunninghami,* while *Agathis* was slightly coarser. Fractured specimens showed that quite a number of pieces could be found without any medullary rays at all, and in making a duplicate study set much waste was involved. When found, however, the rays were noted as being in bundles of 1, 2, 5, 6, 8, 9, 10, 12, 15, 22, and all very strongly built. In the fossil state, the rays, as they cross the tracheids, communicate by a single perforation that occupies the whole of the crossing space, and may have done so in life, although a network of small apertures might have so commingled. Against the latter idea, however, must be set the fact that all the tracheid-bordered pits are perfectly preserved, and many modern pines still adopt the single aperture plan. The ray pits in *Araucaria cunninghami* are quite often *bordered* pits, even when the tracheids on either side of the ray band are devoid of pits. These in tangential section give very clear proof of their structure! As I cannot, in the fossil, trace multiple pits, nor evidence of there being bordered pits in the rays, I shall record the ray pits as being the full size of the ray-tracheid crossings.

The bordered pits in the tracheids are in double rows, and run throughout their length without any special crowding at the ends. Now and again an end may develop three rows of pits, with very slight dilation, but without the oval termination seen in Araucarian pines. On the whole, the tracheid ends meet and blend with very little upward or downward displacement, and some junction by direct harmonia. Where the ray bands are widely separated the wood roughly suggests the Araucarian habit, but where the bands are numerous it recalls *Agathis.*

TANGENTIAL.

No tracheid-bordered pits have been detected in this aspect of the wood, and the medullary ray evidence is not as satisfactory as that obtained from the fortunate fracture in transverse section. The ray elements in single tiers have been detected, but where two or more tiers existed the evidence is obscure, even under the best microscopy, since all the elements seem compressed into a single mass.

As far as is known to me no pine of this age has been listed for Tasmania under the generic name of *Dadoxylon,* although our coal measures frequently yield leaf impressions of *Nœggerathiopsis,* which Newell Arber regards as being the foliage of these conifers (" The Glossopteris Flora," page 191), rather than that of *Cycas,* as suggested by Fiestmantel.

TAXONOMIC.

Genus — *Dadoxylon.* Species — *penmani.* (Sp. nov. — Extinct.)

From the Tasmanian Permo-Carboniferous, and the oldest plant-yielding horizon as yet explored.

Three cotypes in Queen Victoria Museum, Launceston.

ADDENDUM.

The microscopy has been done with the stereoscopical binocular and the best lenses, fitted with Lieberkuhns, up to powers as high as the ¼ of an inch, the material being factured.