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FURTHER OBSERVATIONS ON THE CAUDEX OF
GLOSSOPTERIS.

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(Fig. 3.)

In 1894 I described a specimen of a *Glossopteris*, found by Mr. C. J. Horsley, in the Upper Coal Measures on the Woller Road, about seventeen miles from Mudgee, "showing the attachment of the fronds to the caudex."¹ This is now supplemented by the equally fortunate discovery by Mr. John Mitchell, Resident Teacher, Technical College, Newcastle, of part of a much larger caudex, with large leaf-scars, associated in the same bed of shale with, although not actually attached to, immense leaves of *Glossopteris*. The shale in question is above the Victoria Tunnel Coal Seam of the Upper Coal Measures at Shepherd's Hill, Newcastle.

The specimen approximately represents half the caudex split longitudinally, and is three and a half inches long, by two inches wide in its present more or less compressed condition; it is a matrix cast with adherent fragments of a black carbonaceous pellicle. This stem fragment is covered with transversely oval leaf scars, which have a longitudinal diameter of from three-eighths of an inch to half an inch, and a transverse measurement varying from half to one inch. The scars are placed alternately or in oblique rows forming a spiral arrangement; thirteen scars are visible, more or less perfect. They are separated from one another above and below by narrow interstitial spaces, with the upper and lower margins raised above the general level of the specimen. The leaf-scar surface is vertically wrinkled, and slightly concave, but there are no traces of vascular bundle openings. The opposite surface of the stem is hidden by matrix, except at one spot of limited extent, from which the latter has been removed.

The leaves associated with this stem, are of very large size, but as the remains are matted together in layers in the shale, it is impossible to obtain an absolutely perfect frond, and in consequence difficult to estimate the size to which they attained. One leaf, however, has been exposed over a very considerable portion of its surface, and even in this imperfect state, measures eleven inches in length by eight inches in breadth. By continuing the outlines I estimate this leaf to

¹ Etheridge—Proc. Linn. Soc. N.S.W., (2), ix., 1894, p. 228.

have been, when perfect, at least two feet in length by one foot wide. The mid-rib is very stout and strong; the veins coarser



FIG. 3.

at their point of issue from the former, and arising at an acute angle, proceed to the margins in open curves. The reticula-

tion is close, and the meshes long, narrow and apically pointed. Over a wide inter-marginal area the veins break up into closely crowded, very numerous veinlets, giving to the leaf over this portion a totally different appearance to that presented along the mid-rib. These veinlets are certainly less reticulate than the veins proper.

It is only reasonable to surmise from the plentitude of this leaf in the shale of the Victoria Tunnel Seam, to the almost total exclusion of the other leaves, that they and the stem belong to one and the same form. The only species of *Glossopteris* occurring in our Coal Measures, the leaves of which agree with the above, is *Glossopteris ampla*, Dana,² and with the latter's description our fossils agree very closely. Dana remarked:—"The full size of this species we cannot ascertain from our specimens, as the frond was evidently quite thin and tender, and is much broken. The breadth could not have been less than six inches, and the length probably exceeded considerably a foot."

One of Dana's figures³ of *G. ampla* is very suggestive. It represents the basal portion of one of these large fronds, with a petiole expanding proximally to such a size, one inch in breadth, as would adapt it to any of these leaf scars; the rachis in the figure is nearly three-quarters of an inch wide. In all probability the fronds known as *G. ampla* represent one of the largest, if not actually the largest fern in our Coal Measures, and is a worthy rival to the huge *Gangamopteris cyclopteroides*, Feistmantel, from the Talcher Shales of India.

In 1878 Dr. O. Feistmantel described a fern trunk from the Newcastle Coal Measures as *Caulopteris adamsi*⁴, showing the presence of large spirally arranged transversely-oval leaf scars, and on the whole by no means unlike that now under description. The interspaces between the leaf scars are, however, very much greater in *C. adamsi*, and the scars show a number of transverse cicatrices. The community of characters, and similarity of horizon raises a suspicion that the two stems may be one and the same, and also the caudex of *Glossopteris ampla*, Dana. Feistmantel remarked of his specimen:—"The specimen is hardly sufficiently complete to decide its nature and systematical position with absolute certainty; but supposing it to be, what it most probably is, a fragment of a fern trunk and, taking the disposition of the scars to be quincuncial, I

² Dana—Wilkes' U.S. Explor. Exped., x., Geol., 1849, p. 717, pl. 13 f. 1 a and b.

³ Dana—*Loc. cit.*, pl. 13, f. 1a.

⁴ Feistmantel—*Palaeontographica*, 1878, Suppl. Bd. iii., 3, p. 93, pl. xii., f. 1 and 2; *Mem. Geol. Survey N.S.W., Pal.*, 3, 1890, p. 135, pl. xii., f. 1 and 2.

thought it would be more correct to place this specimen with the genus *Caulopteris*, as there are not sufficient characters for placing it anywhere else, or for making it the type of a new genus."

Neither the precise locality at Newcastle, nor the horizon in the measures of *C. adamsi* were recorded, but, now that we have a portion of a second fern trunk associated with leaves which cannot be distinguished from *Glossopteris ampla*, I think we may tentatively conclude that—(1.) The portion now described is the caudex of the species known under Dana's name; and (2) that Feistmantel's *C. adamsi* is the same thing, and hence the latter will become a synonym of *G. ampla*, Dana.

The following section of the Upper Coal Measures, kindly furnished by Mr. Mitchell, approximately shows the position of the bed yielding the stem and leaves of *G. ampla*, at Shepherd's Hill:—

HORIZON.	STRATA.	THICKNESS.
		Ft.
Shepherd's Hill	Conglomerate ...	80
	Thick bedded Sandstone...	40
<i>Glossopteris ampla</i> , stem	and { Conglomerate or argil- laceous sandstone ... Shale ...	20 10
	Coal (Victorian Tunnel Seam) with parting	20
Nobby's	Cherts ...	70
	Coal (Pipe-clay Seam)	10
<i>Phyllothea ramosa</i> , <i>Glos-</i> <i>sopteris browniana</i> and <i>G. linearis</i>	} Sandstones and Shales ...	80
	Coal (Dirty Seam) with partings ...	10
<i>Cingularia</i> in lower part	} Sandstones and Shales ...	70
	Coal (Yard Seam) ...	5
	Sandstones and Shales ...	75
	Coal (No. 5 Seam) with partings ...	7
<i>Phyllothea</i> and <i>Verte-</i> <i>braria</i> in lower part ...	} Sandstones and Shales ...	80
	Coal (Borehole Seam) ...	10
	Thick-bedded Grey Sand- stones ...	—

The thicknesses are approximate only.