



Australian Government
Geoscience Australia

PROFESSIONAL OPINION

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**Macrofossils from Petrofina Arafura 1, Goulburn Graben,
Arafura Basin**

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SPATIAL INFORMATION FOR THE NATION

Macrofossils from Petrofina Arafura 1 well, Goulburn Graben, Arafura Basin.

John R. Laurie

Samples

Macrofossils (trilobites) were obtained from cuttings in Arafura 1 well at depths of 3268m, 3300m and 3374m

Taxonomic determinations

3268m

Indeterminate agnostid 1 (Fig. 1A)

Pentagnostus shergoldi Laurie, 2004 (Fig. 1B)

Pagetia sp. (Fig. 1C-D)

indeterminate eodiscid (Fig. 1H-I)

3300m

indeterminate polymerid 1 (Fig. 1J)

indeterminate agnostid 2 (Fig. 1E-F)

3374m

indeterminate polymerid 2 (Fig. 1G)

Interpretation

3268m

The presence of the very distinctive *Pentagnostus shergoldi* Laurie, 2004 at this depth immediately indicates a Templetonian *Pentagnostus shergoldi* Zone age (see Fig. 2) for this interval. While other species from this interval cannot be identified to species level, the presence of *Pagetia* sp. is not inconsistent with the age above. Similarly, the indeterminate agnostid 1 from this interval is of a morphology which is also not inconsistent with this age.

3300m

The indeterminate polymerid 1 is only a very young individual and cannot be assigned to any species or genus and consequently it is not age diagnostic. The two agnostid pygidia probably belong to the same species, with the smaller specimen being a juvenile. While they cannot be assigned to a genus or species, their morphology indicates an early Middle Cambrian age.

3374m

The indeterminate polymerid 2 only comprises the glabella which is damaged on the right anterior margin. Its parallel-sided shape tends to indicate that it is a corynexochid and most likely a dolichometopid. If this is so, an age of late Early Cambrian to early Late Cambrian is indicated.

References

Laurie, J.R., 2004. Early Middle Cambrian trilobite faunas from Elkedra 3 corehole, southern Georgina Basin, Northern Territory. *Memoir of the Association of Australasian Palaeontologists* 30, 221-260.

Laurie, J.R., submitted. Early Middle Cambrian trilobite faunas from Pacific Oil & Gas Baldwin No. 1 well, southern Georgina Basin, Northern Territory. *Memoir of the Association of Australasian Palaeontologists*

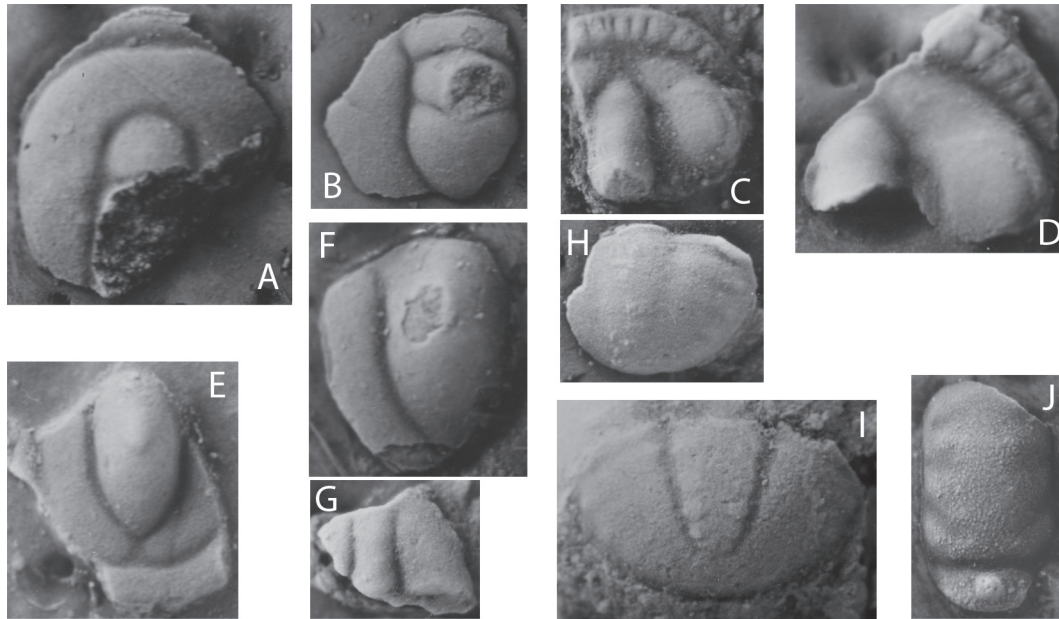


Figure 1. Macrofossils from Arafura 1 well. All x24. A, indeterminate agnostid 1, partial cephalon, 3268m. B, *Pentagnostus ?shergoldi* partial pygidium, 3268m. C, *Pagetia* sp., partial cranidium, 3268m. D, *Pagetia* sp., partial cranidium, 3268m. E, indeterminate agnostid 2, partial pygidium, 3300m. F, indeterminate agnostid 2, partial pygidium, 3300m. G, indeterminate polymerid 2, meraspid cranidium, 3374m. H, indeterminate eodiscid, pygidium, 3268m. I, indeterminate eodiscid, pygidium, 3268m. J, indeterminate polymerid 1, partial cranidium, 3300m.

MIDDLE CAMBRIAN	Mindyallan	
	Boomerangian	<i>Lejopyge laevigata</i>
	Undillan	<i>Goniagnostus nathorsti</i>
		<i>Doryagnostus deltoides</i>
		<i>Ptychagnostus punctuosus</i>
	Floran	<i>Euagnostus opimus</i>
		<i>Acidusus atavus</i>
	Templetonian	<i>Triplagnostus gibbus</i>
		<i>Pentagnostus shergoldi</i>
		<i>Pentagnostus praecurrens</i>
<i>Pentagnostus anabarensis</i>		
Ordian	unzoned	

Figure 2. Middle Cambrian agnostid biostratigraphy of Australia, as modified by Laurie (submitted).