

## Fossil fauna assemblages from the Strahan Quadrangle

by M. J. Clarke

Fossil assemblages collected from the Strahan Quadrangle are appended. Allocation of these assemblages to their precise positions within the Eldon Group sequence is probably best considered following a brief review of the literature relating to certain other lithological and faunal successions developed elsewhere.

The original subdivision of the Eldon Group is based on the Zeehan area where five formations — in ascending order Crotty Quartzite, Amber Slate, Keel Quartzite, Florence Quartzite and Bell Shale — were established (Gill and Banks, 1950). Further work allowed a more exact subdivision of the strata between the Amber Slate and Florence Quartzite, namely the Keel Quartzite proper and the Austral Creek Siltstone (Blissett, 1962). In the Zeehan area all six formations comprise characteristic lithological associations and all are variously fossiliferous. However, whereas both the Florence and Bell formations yield diverse and abundant faunas, the lower formations are so poorly fossiliferous that their recognition outside the type area on criteria other than a strict lithological basis is perhaps best avoided.

Detailed palaeontological work on the Zeehan sequence is limited to that of Gill (1950). In essence Gill recognised two broad faunas:

- (1) a *Notoconchidium*–*Eatonia*–*Leptostrophia* association, and
- (2) a *Meristella*–*Australocoelia*–*Notanoplia* association.

The two assemblages were respectively equated with the Florence and Bell formations. A fauna occurring in sandstone in the headwaters of the Nelson River and described by Gill (1948) yields *Eatonia* and *Leptostrophia* but lacks *Notoconchidium*. In addition several genera such as *Cyrtia*, *Nucleospira*, *Gravicalymene*, *Cheirurus*, *Dalmanites*, *Leonaspis* and *Encrinurus*, absent at Zeehan, are also present. Quite clearly this fauna differs from that which characterises the main part of the Florence Formation at Zeehan.

The occurrence of the typically Silurian genus *Encrinurus* in an otherwise Devonian fauna led Gill (1948) to place this locality at the base of the Florence Formation. More recent work quoted by Banks (1962) and Banks (*in* Talent and Banks, 1967) suggests that this locality is best placed near the summit of the Florence Formation. The most recent work at Zeehan (Pitt, 1962, quoted by Banks *in* Talent and Banks, 1967) proposed the recognition of three main faunas:

- (1) a *Notoconchidium*–*Eatonia*–*Leptostrophia* association (= Florence Sandstone);
- (2) a *Meristella*–*Australocoelia* association (= Bell Shale lower part of Gill and Banks, 1950); and
- (3) a *Notanoplia*–*Plectadonta* association (= Bell Shale upper part of Gill and Banks, 1950).

The Nelson River fauna has not been recognised in the Zeehan area to date. Preliminary work on the Strahan map sheet tends to corroborate the work of Pitt (1962) and may lead to a more precise zonation since two new faunal assemblages can be tentatively recognised in what appears to be a continuous stratigraphic sequence. These comprise:

- (1) a basal 'Florence fauna' with *Notoconchidium*, *Eatonia* sp. nov. and *Leptostrophia*, but without *Pleurodictyum*. The brachiopods *Molongia* and *Phoenicitoechia* may prove to be important components of this fauna, although fully convincing specimens are not yet to hand; and
- (2) an Upper 'Florence Fauna' without *Notoconchidium* but marked by the first appearance of the trilobite *Trimerus* (*Trimerus*) *zeehanensis* Gill.

As a consequence, the five following faunal units are tentatively proposed (see fig. 1).

**Fauna 3      Index: *Plectadonta***

Abundant *Notanoplia*, *Chonetes cf. ruddockensis* and *Maoristrophia*.

Occurrence: Upper Bell Shale, Zeehan and Strahan.

**Fauna 2      Index: *Trimerus (Trimerus) zeehanensis***

2<sup>2</sup>              *Trimerus*, *Australocoelia*, *Meristella*.

Occurrence: Lower Bell Shale, Zeehan and Strahan;  
Uppermost Unit D<sub>1</sub>, Gordon River

2<sup>1</sup>              *Trimerus*, *Nucleospira*, *Cyrtia*, *Gravicalymene*

Occurrence: Uppermost 'Florence Sandstone', Strahan and Nelson River;  
D<sub>1</sub> Gordon River.

**Fauna 1      Index: *Notoconchidium florencensis***

1<sup>2</sup>              *Notoconchidium*, *Pleurodictyum*, *Eatonia* spp.

Occurrence: Main part of Florence Sandstone, Zeehan, Strahan and lower Unit D<sub>1</sub>, Gordon River.

1<sup>1</sup>              *Notoconchidium*, *Leptostrophia*, *Eatonia* spp., ?*Molongia*, ?*Phoenicitoechia*.

Occurrence: Lowest Florence, Zeehan, Strahan and D<sub>1</sub>, Gordon River.

An inherent character of benthonic faunas is that they are greatly affected by rapidly changing facies. The resultant successive faunal migrations can lead to discontinuous distribution patterns and the spectre of homotaxial correlation is always present. Nevertheless, and admitting that whereas it is unusual to collect two exactly similar faunas from any two localities (compare Gill, 1950), the above scheme appears to be valid since nearly all the constituent species occur in a variety of lithologies. *Notoconchidium* is a notable exception and only occurs in a sandy facies. However *Trimerus*, *Pleurodictyum*, *Meristella* and *Australocoelia* apparently serve as independent controls in a variety of rock types.

Overall the proposed scheme shows a close similarity with the Zeehan sequence and allows a confident placing of the Nelson River fauna as Fauna 2. A basis for further investigation necessitates proving the presence or absence of this fauna at Zeehan. In the event of its absence, it will be necessary to admit a break in the Zeehan sequence, or alternatively that *Notoconchidium* persisted longer and that *Trimerus* entered later in the type sequence. The latter possibilities are not considered probable.

The development of a pronounced Modiola Phase fauna with *Actinopteria*, *Nuculites*, *Ctenodonta*, *Cyrtodonta*, *Glossites*, *Leptodomus* etc. in great abundance near the 4 mile post in Fauna 2 indicates an unusual and restricted environment, and may have important palaeogeographical implications.

Recognition of the above faunal sequence within the Eldon Group emphasises the unusual character of the succession developed in the Lower Gordon River area (Gee *et al.*, 1969). In this area not only faunas 1<sup>1</sup>, 1<sup>2</sup> and 2<sup>1</sup>, but also 2<sup>2</sup> occur in the sandstone unit D<sub>1</sub>, and thereby indicate the diachronism of the Florence facies. Fauna 3 is not readily recognised in the lower Gordon sequence, whereas the highest faunal assemblages, dominated by *Gypidula (Gypidula) cf. vultur* Talent, are apparently wholly younger than any part of the Eldon Group at Zeehan or Strahan. Fauna 3 may be represented by the poorly fossiliferous Unit D<sub>2</sub>, and the distinctive massive bioclastic limestone Unit D<sub>3</sub>, unknown in other Eldon Group sequences, may indicate the initiation of post Bell Shale (Fauna 3) sedimentation.

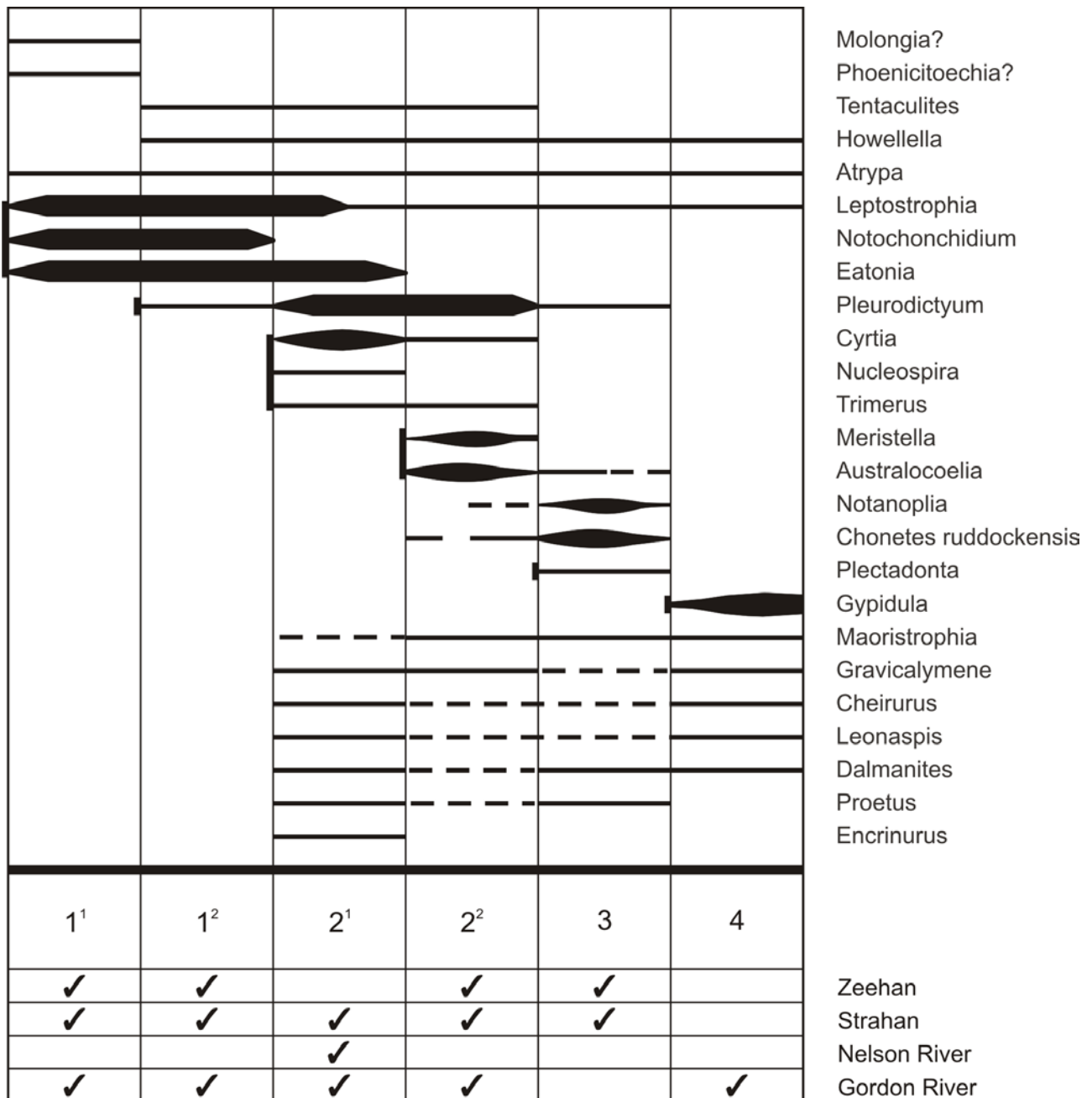


Figure 1

Recognition of horizons below the Florence Formation in the Strahan Quadrangle must at the moment rest solely on strict lithological criteria and stratigraphic sequence. Gritty quartzite and slate developed south of the 16 mile post and between the 17–18 mile posts are lithologically similar to the Crotty Quartzite at Zeehan, but occur in juxtaposition with Florence Sandstone. As at Zeehan, fossils are rare and poorly preserved. Incomplete specimens of a large, coarsely ribbed rhynchonellid occur and these may be *Rostricellula*, which in itself may suggest equivalence with the Crotty Quartzite proper. A number of poorly preserved leptaenoid forms, possibly *Notoleptaena*, also occur and on known distributions suggest a much higher position within the Eldon Group. Further mapping should clarify this point since assuming that this is the Crotty Quartzite, the formations between it and the Florence Sandstone ought to occur in an undisturbed sequence somewhere on the map sheet.

Whereas *Tentaculites* is generally regarded as a reliable index fossil for the Amber Slate (Banks, 1962) personal collecting of the Zeehan sequence indicates its occurrence throughout the Eldon Group succession. It also occurs at several horizons in the Strahan Quadrangle and is commonest in Fauna 2 at the 4 mile post. Similarly the genus *Leptostrophia* appears to range throughout Faunas 1 to 4.

## References

- BANKS, M. R. 1962. Silurian and Devonian systems, *in*: SPRY, A.; BANKS, M. R. (ed.). The geology of Tasmania. *J. geol. Soc. Aust.* 9(2): 177–187.
- BLISSETT, A. H. 1962. One Mile Geological Map Series. K/55-5-50. Zeehan. *Explan. Rep. geol. Surv. Tasm.*
- GEE, R. D.; MOORE, W. R.; PIKE, G. P. 1969. The geology of the Lower Gordon River — particularly the Devonian sequence. *Rec. geol. Surv. Tasm.* 8.
- GILL, E. D. 1948. Eldon Group fossils from the Lyell Highway, western Tasmania. *Rec. Qn Vict. Mus.* 2:57–74.
- GILL, E. D. 1950. Preliminary account of the palaeontology and palaeoecology of the Eldon Group formations of the Zeehan area, Tasmania. *Pap. Proc. R. Soc. Tasm.* 1949:231–258.
- GILL, E. D.; BANKS, M. R. 1950. Silurian and Devonian stratigraphy of the Zeehan area, Tasmania. *Pap. Proc. R. Soc. Tasm.* 1949:259–271.
- PITT, R. P. B. 1962. *The geology of the Zeehan area*. B.Sc. (Hons) thesis, University of Tasmania.
- TALENT, J. A.; BANKS, M. R. 1967. Devonian of Victoria and Tasmania, *in*: OSWALD, D. H. (ed.). International symposium on the Devonian System, Calgary. *Alberta Soc. Petrol. Geol.* 2:147–163.

[9 April 1969]

## APPENDIX 1

### Fossil assemblages collected in the Strahan Quadrangle

#### **R. D. Gee: Sst. location 15**

*Trimerus (Trimerus) zeehanensis* Gill  
*Australocoelia polyspera* Gill  
*Meristella bellensis* Gill  
*Platyceras* sp. Fauna 2<sup>2</sup>  
*Tentaculites* sp.  
Crinoid and trepostome debris

#### **R. D. Gee: Slate location 17**

*Notanoplia pherista* Gill  
*Pleurodictyum megastomum* M'Coy  
*Ctenodonta* sp. and other lamellibranchs indeterminate  
*Tentaculites* sp.  
Worm burrows Fauna 3

#### **R. D. Gee: Location 57**

*Notanoplia pherista* Gill Fauna 3  
*Chonetes cf. ruddockensis*

#### **R. D. Gee: Location 104**

*Australocoelia polyspera* Gill  
*Leptostrophia* sp. cf. *L. affinalata* (Gill)  
*Maoristrophia banksi* Gill Fauna 3  
*Pleurodictyum megastomum* M'Coy

#### **R. D. Gee: location 33**

*Australocoelia polyspera* Gill  
*Cyrtia tasmaniensis* Gill  
*Leptostrophia cf. affinalata* (Gill) Fauna 2<sup>2</sup>  
*Eospirifer parahentius* Gill  
Chonetids  
*Pleurodictyum megastomum* M'Coy  
*Meristella bellensis* Gill  
*Actinopteria* sp., *Ctenodonta* sp., crinoid debris.

#### **A. P. Bravo: Tully River location.**

*Australocoelia polyspera* Gill  
*Chonetes* sp.  
*Isorthis alpha* (Gill)  
Spiriferid  
?Howellella sp.  
?Orbiculoidea sp.  
Ophiuroid  
*Dalmanites* sp. (or ?*Odontochile* sp.)

Probably Fauna 2<sup>2</sup>, but *Meristella* not present. Absence of *Notanoplia* critical. Ophiuroids known only from 2<sup>2</sup> at Zeehan.

**A. B. Gulline: Upper reaches of Rapid Creek**

*Eatonia* sp. nov.

*Leptostrophia plateia* (Gill)

*Notoconchidium florencensis* Gill

?*Pleurodictyum* sp.

Fauna 1<sup>2</sup>

**P. J. Legge, Henty River location (33760/82410).**

Atrypoid

*Howellella* sp.

*Isorthis* sp.

*Meristella bellensis* Gill

Crinoid ossicles

Fauna 2<sup>2</sup>

**Permian micaceous siltstone: 4 mile post**

*Actinopteria* sp.

*Ctenodonta* sp.

?*Cystodonta* sp.

*Glossites* sp.

*Leptodomus* sp.

*Modiolopsis* sp.

*Nuculites* sp.

?*Australecoelia* sp.

?*Isorthis* sp.

*Tentaculites* sp.

*Hyalithes* sp.

*Nautiloids*

Crinoid, trepostome and plant debris

??Eurypterid plates

*Trimerus* (*Trimerus*) *zeehanensis* Gill

This is Fauna 2, probably Fauna 2<sup>2</sup>. Interest in the restricted Modiola Phase development with plant debris and ??Eurypterid remains.

**Sandstone 4 mile post**

*Trimerus* (*Trimerus*) *zeehanensis* Gill

*Actinopteria* sp.

*Ctenodonta* spp.

*Nuculites* sp.

*Tentaculites* sp.

Platycterid and trepostome debris

Fauna 2, should be Fauna 2<sup>1</sup> unless ssc. facies markedly diachronous.

**Grits 17–18 mile posts and just S of 16 mile post: G. P. Pike location**

?*Rostricellula* sp.

Leptaenid

??*Notoleptaena* sp.

Crinoid and trepostome debris

Possible Crotty

**Siltstone and slate, 20 mile post: G. P. Pike location**

*Australocoelia polyspera* Gill

*Isorthis*

Crinoid ossicles (scalloped Bell type)

?*Trimerus*

lamellibranch indet

Fauna 2<sup>2</sup>

**Slate 21, mile post: G. P. Pike location**

*Notanoplia pherista* Gill

*Dalmanites* sp. (or ?*Odontochile*)

Problematical spicule-like structures

Fauna 3

**Main Ssts, several locations between 8–10 mile posts, 15 mile post, 17 mile post and 19 mile post**

*Eatonia euplecta*

*Eatonia* sp. nov.

*Atrypa* sp.

*Isorthis alpha* (Gill)

*Leptostrophia plateia* (Gill)

*Notoconchidium florencensis* Gill

*Pleurodictyum megastomum* M'Coy

Favositids

Heliolitids

*Tentaculites* sp.

Orthocone nautiloids

Loxonemids

Straparolids

Crinoid, bryozoan debris

Faunas 1<sup>1</sup> and 1<sup>2</sup>