

GASTROPODS FROM SOME EARLY DEVONIAN LIMESTONES OF THE WALHALLA SYNCLINORIUM, CENTRAL VICTORIA

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Abstract

Seventeen gastropods from Devonian limestones at Marble Creek (also known as Toongabbie), Deep Creek and Loyola within the Walhalla synclinorium are described. These include four new forms: *Platyceras* (*Platyceras*) *mansfieldense* and *P. (Praenatica)* sp. A. from Loyola, and *P. (Platyceras)* sp. A. and *P. (Orthonychia)* sp. A. from Marble Creek. The other described forms are all platyceratids except *Tremanotus cyclocostatus* and *Michelia* sp. from Marble Creek, *Oriostoma* sp. n., and an indeterminate turbiniform gastropod from Deep Creek and *Scalaetrochus lindströmi* from Loyola. *Tropidodiscus centrifugalis* and *Temnodiscus pharetroides* from the mudstones at Loyola are also redescribed. The gastropod faunas of the limestones are dominated by coprophagic platyceratid gastropods and constitute further examples of this widely known crinoid-gastropod association.

Introduction

The limestone deposits along the eastern limb of the Walhalla synclinorium each consist of a number of small lenses of limestone. The deposits extend about 120 km from Loyola in the north, about 130 km north-east of Melbourne, to Marble Creek in the south, about 140 km east of Melbourne. The limestone at Loyola was the first to be noted in print. Selwyn and Ulrich (1867, p. 35) provided a chemical analysis of a 'white limestone from near Mansfield'. The first note of fossils appears to be that of McCoy, who considered the limestone to be Palaeozoic and was quoted to this effect by Couchman (1877, p. 19). Chapman (1914) mentioned an unidentified form of gastropod and in 1916 he described two gastropods from the Loyola Limestone, *Platyceras cornutum* Hisinger and *Orthonychia brevis* Chapman. However, the latter is one of the nautiloids which are quite common at Loyola. He also described two species of gastropods from the associated mudstones, *Temnodiscus pharetroides* and *Euomphalus centrifugalis*. Since then no further work on the gastropod fauna has been undertaken.

The limestone deposit with the least known fauna is that at Deep Creek, about 6 km east of Walhalla. Together with the limestone at Marble Creek (also known as Toongabbie), it appears to have been first noted by Murray (1878, p. 48). The only mention of a gastropod from this locality is by Chapman (1916) who described *Platyceras minutum*.

Gastropods from the Toongabbie Limestone, Marble Creek, were first noted by McCoy who observed 'some traces of Gasteropoda, apparently of the genus *Acroculia*, too imperfect to render determination possible, and a fragment of *Bellerophon*' Murray (1878, p. 49). Chapman (1907) noted the presence of *Niso (Vetotuba) brazieri* Etheridge and *Trochus (Scalaetrochus)* sp. In 1916 he noted *Tremanotus pritchardi* Cresswell and *Coelocaulus brazieri* (Etheridge) and described *Diaphorostoma incisum*.

Talent and Philip (1956), when describing the gastropod fauna from Marble Creek, erected two new genera, *Ostlerina* and *Cowwarrella*. They also described eight new species and mentioned three poorly known forms. These two new genera were subsequently synonymized by Knight *et al.* (1960).

The lack of work both locally and internationally on Middle Palaeozoic gastropod faunas makes comparison with assemblages of similar age difficult, and has also resulted in a number of genera being used in a very wide sense. As a result of the lack of definition of generic limits, the species described here are compared with the type species as well as other species from south-eastern Australia.

In this study the following abbreviations have been used:

P, National Museum of Victoria Palaeontological Collection;
M.U.G.D., Melbourne University Geology Department;

G.S.V., Geological Survey of Victoria Collection, now housed in the National Museum of Victoria.

All measurements are in millimetres and the following symbols relating to the measurements have been used:

Hap, height of aperture; Ht, total height of shell; L, length measured at the selenizone in the bellerophontids; Lap, length of aperture; Wap, width of aperture; Wh, total number of whorls in shell; Wlt, width at last trema; Wt, total width of shell; *, specimen incomplete.

Acknowledgements

I wish to thank Mr T. A. Darragh, of the National Museum of Victoria, Melbourne, for his discussion and criticism of this work; Dr O. P. Singleton and Dr P. J. Coleman for their helpful comments, criticisms and discussions; Mr M. Cooper, of the University of Melbourne, Geology Department, for the loan of type specimens; Margaret Tassell for the photographs and discussion throughout this study.

Age of the faunas

As knowledge of Middle Palaeozoic gastropods is limited, they do not contribute significantly towards age determinations of the limestones. In this instance the situation is further aggravated by the domination of Platyceratids in each of the gastropod faunas. Most discussions about the age of the limestones at Marble Creek and Deep Creek have usually considered them to be of the same age. This is supported by the presence of the distinctive *Platyceras (Visitator) cylindricum* at both localities. Strusz (1972) assessed the available information from both these localities and considered them to be Late Siegenian.

The age of the Loyola Limestone has been argued for some time. Most recently Cooper (1973) noted the presence of a polygnathan conodont element in the fauna and considered the limestone to be Early Emsian. This age determination has been accepted by other workers (Strusz, 1972; Vandenberg *et al.*, 1976).

Discussion of the ages of these limestones must be placed in the perspective of comments

by Philip (1974). He discussed the current uncertainty in correlations between the different facies of the Lower Devonian stages in Europe. Because of this present uncertainty, their application in Australia should not be dogmatic.

The gastropod evidence for age determinations at Loyola is minimal. *Scalaetrochus lindströmi* occurs at both Lilydale and Loyola. It is generally considered that the Lilydale Limestone is Late Siegenian (Strusz, 1972). However, the only other known occurrence of this genus is *Scalaetrochus fragosus* from the Middle Devonian Anderdon Limestone, Ontario, Canada (Linsley, 1968).

Within the mudstone surrounding the limestone lenses at Loyola, *Straparollus (Straparollus) serpenteus* Talent and *Loxonema* sp. nov. of Talent (1963) occur. These gastropods were originally described from the Kilgower Member, Tabberabbera by Talent (1963). This unit was considered by Strusz (1972) to be Late Siegenian-Emsian in age.

Palaeoecology

The limestone at Marble Creek is composed largely of crinoidal fragments together with a few corals and stromatoporoids. In comparison with the crinoids and coelenterates the other faunal elements comprise only a small percentage of the fauna. These minor elements include gastropods, bivalves, nautiloids, rostroconchians (notably *Conocardium*), brachiopods and trilobites. This faunal abundance and diversity is in complete contrast to that of the surrounding mudstones which are virtually unfossiliferous (Talent, 1956).

The commensal relationship between the coprophagic gastropods of the family Platyceratidae and crinoids has been known for a long time. Lane (1973) described in detail such a relationship from the Carboniferous of Indiana. At Marble Creek the disarticulated nature of the crinoid crowns implies some post-mortem transport. Although the gastropod fauna at Marble Creek is dominated by members of the Platyceratidae, none have been found *in situ* on a crinoid crown.

Apart from the dominant platyceratids, the gastropod fauna from Marble Creek is limited.

Tremanotus cyclocostatus is considerably smaller than *T. pritchardi* from the Lilydale Limestone of comparable age. Also present are poorly preserved specimens of *Michelia* sp. Again considerably larger forms are known from both the Lilydale Limestone and the slightly younger limestone at Taemas, N.S.W. Chapman (1907) noted the presence at Marble Creek of *Scalaetrochus* sp. but this specimen has not been relocated.

The gastropod fauna of the Toongabbie Limestone is markedly different from the only other adequately known Lower Devonian gastropod fauna from Victoria, that of the Lilydale Limestone. This latter fauna from a protected shallow marine environment is dominated by large gastropods, both high-spired and planispiral (Tassell, 1976). Significantly, no coprophagic gastropods are known from this limestone. Also this limestone is not dominated by crinoidal fragments.

The limestones at Deep Creek differ in composition from those at Marble Creek in a number of ways. They are not dominated by crinoidal remains; rather, corals comprise the major biological component of the limestone. The minor components of the Marble Creek fauna are considerably more important constituents of the Deep Creek Limestone. This is so particularly of bryozoa, ostracods and brachiopods. Other minor components include trilobites, algae, rostroconchians, bivalves and gastropods.

The total fauna at Deep Creek is as diverse as the faunas from both Marble Creek and Loyola. But the gastropod fauna, dominated by platyceratids, is noticeably less diverse. In the case of the coprophagic platyceratids, this may be a reflection of the limited number, or diversity, of the crinoids. Not only is the gastropod fauna of restricted diversity, it is also composed only of small forms. The most abundant gastropod *P. (P.) minutum* rarely exceeds 5 mm in diameter. *P. (V.) cylindricum* at Deep Creek is smaller in all cases than members of that species at Marble Creek. An explanation of such apparent dwarfing is not readily apparent, particularly as none of the other faunal elements exhibits such a tendency. The limestone at Loyola consists of four dis-

inct bodies of limestone interbedded with the surrounding highly fossiliferous mudstones (Cooper, 1973). This limestone exhibits a great deal more variation in composition than the limestones from Deep Creek and Marble Creek. In part it is composed largely of crinoidal material only slightly disarticulated. Coelenterates dominate the limestone in other areas.

The total fauna of the limestones is diverse but the gastropod component is quite limited being represented by only a few species. However, there is no tendency at Loyola towards reduction in size; rather the platyceratids from this limestone are comparable in size to, or larger than, those from Marble Creek.

The low gastropod diversity of the limestones is in marked contrast to the gastropod fauna of the associated mudstones. Chapman (1916) described from the mudstones ? *Temnodiscus pharetroides* and *Tropidodiscus centrifugalis* as well as noting *Platyceras cornutum*. *Straparollus (Straparollus) serpenteus* Talent and *Loxonema* sp. nov. of Talent 1963 also occur in the mudstones.

Systematic descriptions

Family	BELLEROPHONTIDAE McCoy, 1851
Subfamily	TROPIDODISCINAE Knight, 1956
Genus	<i>Tropidodiscus</i> Meek and Worthen, 1866

Type Species: Tropidodiscus curvilineatus (Conrad), 1842; Lower Devonian; Schoharie, New York, U.S.A.

Tropidodiscus centrifugalis (Chapman), 1916

(Plate 7, figure 5)

1916 *Euomphalus centrifugalis* Chapman, pp. 89, 101, pl. 4, figs. 30-31, pl. 6, figs. 54-55.

Diagnosis: Small form of genus with foliaceous growth lines that vary slightly during growth and are moderately widely spaced.

Description: Small to medium-sized form with prominent angular dorsal crest; whorl profile gently rounded from the angular dorsal crest to the edge of the umbilici, then rounded more

strongly; umbilici moderately deep and wide; aperture not greatly expanded, sub-triangular in shape; parietal lip probably thin, with high ridge formed by dorsal angulation of preceding whorl; outer lip with a deep v-shaped sinus culminating at the dorsal angulation in a narrow slit that probably produces a narrow selenizone; shape of outer lip slightly variable throughout growth; selenizone details unknown; collabral lines moderately widely spaced, tendency to be foliaceous.

Dimensions (in mm):

	L	Wh
P12844	13.7	5
P12845	9.1	4
P41828	12.1	5

Location of Types: National Museum of Victoria. Holotype, P12844. Paratype, P12845.

Type Locality: Chapman designated the holotype as the specimen from Killara and the paratype as the specimen from Loyola. In his plate explanation (p. 101) this situation is reversed with the Loyola specimen being designated as the holotype. The specimen from Loyola is both an external mould and internal mould whereas the specimen from Killara is only an external mould. In view of this, the specimen from Loyola is accepted as the holotype.

Material: Holotype, paratype and 12 other specimens.

Discussion: Comparison between this species and the type species is limited by the mode of preservation of the former. The larger *T. curvilineatus* appears to have a deeper sinus and more regular growth lines than *T. centrifugalis*. The growth lines of *T. centrifugalis* appear to be more foliaceous than those of the type species. Otherwise, little comparison can be made between the two species.

T. centrifugalis differs from *Tropidodiscus* sp. A. described by Talent (1963) from the Kilgower Member, Tabberabbera, in the coarser, more widely spaced nature of its collabral lines.

Genus *Temnodiscus* Koken, 1896

Type Species: *Temnodiscus lamellifer* (Lindström), 1884; Middle Silurian; Visby, Gotland, Sweden.

? *Temnodiscus pharetroides* Chapman

(Plate 3, figure 1)

1916 *Temnodiscus pharetroides* Chapman, p. 78, pl. 2, figs. 4-5, pl. 6, figs. 50-51.

Description: Small planispiral form with a distinctive dorsal crest; whorl profile from angular dorsal crest moderately curved to edge of umbilici where it is rounded more strongly into the umbilici aperture flared, sub-ovoidal in shape; final whorl expanded, whorls few in number; other details unknown because of poor preservation.

Dimensions:

	L	Ht	Wt
P12835	7.1	6.6	4.2

Location of Types: National Museum of Victoria. Holotype, P12835.

Type Locality: Loyola.

Material: Holotype.

Discussion: The holotype is an internal mould which shows clearly a dorsal crest; otherwise there is little diagnostic information. The assignment by Chapman of this single specimen to the genus *Temnodiscus* on such inadequate material is unwarranted. Furthermore, there is no evidence on the holotype of a sculpture of concentric rugae as claimed by Chapman. Until more specimens can provide further information, the specimen is left tentatively in this genus. Talent (1963) described two species of *Temnodiscus* from the similarly aged mudstones of the Kilgower Member in the Tabberabbera area of eastern Victoria.

Family SINUITIDAE Dall (in Zittel-Eastman, 1913)

Subfamily TREMANOTINAE Peel, 1972

Genus *Tremanotus* Hall, 1865
(= *Boiotremus* Horny, 1962)

Type Species: *Tremanotus alpheus* Hall, 1865; Middle Silurian; Bridgeport, Illinois, U.S.A.

Tremanotus cyclocostatus Talent and Philip, 1956

(Plate 7, figures 9, 13)

1916 *Tremanotus pritchardi* Cresswell; Chapman, p. 79 (in part).

1956 *Tremanotus cyclocostatus* Talent and Philip, p. 61, pl. 6, figs. 11 & 15, pl. 7, figs. 16-17, text fig. 4.

Diagnosis: Small form of genus with fine growth lines and sculptural elements which can be quite sinuous; few foliaceous growth rugae, irregularly developed.

Description: Medium, widely umbilicate, planispiral form with a widely expanded aperture in the final growth stage; whorl profile gently arched dorsally, more strongly curved on the sides when turning into the wide, deep, umbilici; concave on the inner or columellar surface; aperture in final growth stage sub-oval, greatly expanded; neither a sinus nor tremata developed on the dorsal surface of the expanded region; the outer lip before the final growth stage strongly deflected posteriorly from the columellar lip and culminates in a small slit situated medially on the dorsal crest of the outer surface; along the selenizone formed by the slit numerous evenly spaced, sub-rectangular tremata are developed; the number of open tremata unknown; between tremata the growth lines directed posteriorly towards the earlier tremata; prominent foliaceous rugae are rarely developed; growth lines typically very fine and closely spaced; sculpture composed of at least two orders of fine spiral elements; sculpture irregularly spaced and frequently quite sinuous; growth lines and sculpture form a reticulate pattern over whorl surface; sutures deep.

Dimensions:

	L	Wt	Lap	Wap	Wlt	Wh
M.U.G.D. 2279	24*	12*	—	—	11.5	5
M.U.G.D. 2167	19*	—	—	—	11*	—
P913	47*	—	—	—	17*	5+

Location of Types: Melbourne University Geology Department. Holotype, M.U.G.D. 2279. Paratype, M.U.G.D. 2167. Hypotype, M.U.G.D. 5031.

Type Locality: Toongabbie Limestone, lower quarry, Marble Creek.

Material: Holotype and counterpart, one paratype, one hypotype and one other specimen.

Discussion: Comparison between this species and the type species is limited by the nature of preservation of the American species. However, *T. cyclocostatus* is considerably smaller and has very much finer growth lines and sculptural elements. It has fewer foliaceous

growth rugae and those present are irregularly developed. The finer spiral sculpture is more numerous and irregular, often becoming quite sinuous.

T. cyclocostatus differs in a number of ways from *T. pritchardi* Cresswell, the only other species described from Victoria (Tassell, 1976). It is considerably smaller in size and has much finer growth lines and sculptural elements. The spiral sculpture of *T. cyclocostatus* is not as frequent and becomes quite sinuous in places. The growth rugae are less frequently developed and those present are not as prominent as in *T. pritchardi*. During the growth stages prior to the development of the flared aperture the outer lip of *T. cyclocostatus* is deflected more strongly posteriorly. Whereas the inner lip of *T. pritchardi* is straight, that of *T. cyclocostatus* is distinctly convex inwards.

Chapman (1916), when discussing *T. pritchardi* from the Lilydale Limestone, noted that a specimen from the Thomson River had larger tremata and a spiral sculpture that was more sinuous. However, he considered it to be *T. pritchardi*. Re-examination of this specimen P913 reveals that it is quite clearly distinguishable from *T. pritchardi* and identical with *T. cyclocostatus*.

Family PLATYCERATIDAE Hall, 1859

Genus *Platyceras* Conrad, 1840

Subgenus *Platyceras* (*Platyostoma*) Conrad, 1842

Type Species: *Platyostoma ventricosum* Conrad, 1842; Lower Devonian; near Saugerties, New York, U.S.A.

Discussion: Talent and Philip (1956, p. 59) erected a new genus *Ostlerina*, distinguished by being naticiform, narrowly umbilicate, without a sinus, with sculpture composed only of growth lines and a simple nucleus. The type species and only member of the genus was *Ostlerina delicata* Talent and Philip from both the quarries at Marble Creek. Subsequently Knight *et al.* (1960, p. 1240) synonymized this genus with the subgenus *P. (Platyostoma)*. The assignment of the form from Marble Creek to *Platyostoma* required the expansion of the subgeneric concept to include minutely umbilicate forms.

Platyceras (Platyostoma) incisum Chapman,
1916

(Plate 7, figures 6, 14)

1916 *Diaphorostoma incisum* Chapman, p. 99, pl. 5, fig. 46, pl. 6, fig. 59.

1956 *Ostlerina delicata* Talent and Philip, p. 59, pl. 6, figs. 1-4, text figs. 2-3.

Diagnosis: Medium, explanate, minutely umbilicate form of the subgenus.

Description: Medium, explanate, naticiform, minutely umbilicate gastropod with several whorls; last whorl greatly expanded; spire short, low; whorl profile moderately to gently arched with a tendency to become flatter on the last whorl; sutures adpressed; columellar lip long, thin and arcuate; no apparent parietal inductura; outer lip thin, prosocyrte and slightly irregular; subcircular aperture large and very shallow; growth lines irregular, becoming coarser with age; no other sculpture present.

Dimensions:

	Ht	Wt	Wh
P1083	—	—	3
M.U.G.D. 2164	15.5	24.8	3
M.U.G.D. 2165	13.8	22.6	3
M.U.G.D. 2178	—	—	3

Location of Types:

(i) *D. incisum*. National Museum of Victoria. Holotype, P1083. Previously 91F, Geological Survey of Victoria Collection.

(ii) *O. delicata*. Melbourne University Geology Department. Holotype, M.U.G.D. 2164. Paratypes, M.U.G.D. 2165 and 2178.

Type Locality:

(i) *D. incisum*, Toongabbie Limestone, northern outcrop (or lower quarry), Marble Creek.

(ii) *O. delicata*, Toongabbie Limestone, upper quarry, Marble Creek.

Material: Holotype, 3 hypotypes and 13 other specimens.

Discussion: The type locality for *D. incisum* is the northern outcrop of limestone, the site of the lower quarry of Talent and Philip (1956, text fig. 1). *O. delicata* is moderately common at this site, more so than at the upper quarry where it is 'relatively rare' (Talent and Philip, 1956). Comparison of all the material from both quarries indicates that *O. delicata* is a junior synonym of *P. (P.) incisum*.

P. (P.) incisum differs from the type species

most importantly in possessing a minute umbilicus. It is also more explanate, has a lower spire, more rapidly expanded whorls and a very much larger aperture. The type species has an obviously developed parietal inductura, a structure wanting on *P. (P.) incisum*.

Platyceras (Platyostoma) triangulare Talent
and Philip, 1956
(Plate 7, figure 4)

1956 *Platyostoma triangularis* Talent and Philip, p. 64, pl. 4, figs. 5-6.

Diagnosis: Small, naticiform gastropod with moderately irregular aperture and whorl profile which becomes angular with growth.

Description: Small, naticiform gastropod with rapidly expanding whorls; large last whorl; low spire; whorl profile changes with growth, initially well rounded from the upper suture to the base with the periphery at mid-whorl; with growth whorl profile becomes more angular, gently rounded to nearly flat from upper suture to angular shoulder then nearly flat outer whorl surface to sub-angular basal periphery; base nearly flat; umbilicus lacking; sutures change from canaliculate to impressed with growth; outer lip moderately thick, from the upper suture it passes backwards to the shoulder, on the outer whorl surface it is gently opisthocyrte, forming a shallow wide sinus, from the basal periphery it passes backwards across the base; inner lip not known; aperture large, irregular; sculpture of growth lines only.

Dimensions:

	Ht	Wt	Wh
M.U.G.D. 2175	7.6	11.5	1

Location of Types: Melbourne University Geology Department. Holotype, M.U.G.D. 2175.

Type Locality: Toongabbie Limestone, lower quarry, Marble Creek.

Material: Holotype.

Discussion: *P. (P.) triangulare* differs substantially from *P. (P.) incisum*, the other species of the subgenus occurring at Marble Creek. Besides being much smaller than *P. (P.) incisum*, it is characterized by a whorl profile which becomes progressively more angular. It lacks an umbilicus and is more naticiform in shape than the explanate *P. (P.) incisum*. The

latter's growth lines are also considerably finer.

Comparison of *P. (P.) triangulare* with the type species is limited by the lack of material from Marble Creek. It is smaller and more irregular. The whorl profile becomes progressively more angular with growth and the outer lip is more irregular.

Subgenus *Platyceras* (*Platyceras*) Conrad, 1840
Type Species: Pileopsis vetusta J. de C. Sowerby, 1829; Lower Carboniferous; Queens County, Ireland.

***Platyceras* (*Platyceras*) *decorum* Talent and Philip, 1956**

1956 *Platyceras decorum* Talent and Philip, p. 64, pl. 7, fig. 21.

Diagnosis: Small horn-shaped form of subgenus with a sinuous to near crenulated small sub-circular aperture.

Description: Small, irregular coiled, horn-shaped gastropod with about two whorls; nucleus and initial whorl coiled discoidally and in contact; last whorl rapidly expanding and disjunct; whorl profile sub-rounded with sub-angular ridges running from apex to aperture, variably developed; whorl section generally sub-circular; aperture sinuous, irregular and variable; sculpture composed only of growth lines, concave toward the aperture on the ridges and convex toward the aperture between the ridges.

Dimensions:

	Ht	Wt	Wh
M.U.G.D. 2173a	4.3	7.6	2
M.U.G.D. 2174	3.5	7.2	—

Location of Types: Melbourne University Geology Department. Holotype, M.U.G.D. 2173a and b. Paratype, M.U.G.D. 2174.

Type Locality: Toongabbie Limestone, lower quarry, Marble Creek.

Material: Holotype and paratype.

Discussion: Besides being much smaller than the type species, *P. (P.) decorum* does not possess the typical capuliform shape because of its slower whorl expansion rate. Accordingly, the aperture of *P. (P.) decorum* is much smaller than that of the type species. The Marble Creek form also possesses distinct longitudinal ridges which are completely absent on the type species. The aperture of *P. (P.)*

decorum is much more sinuous and irregular than that of *P. (P.) vetustum*.

The distinctive sinuous, almost crenulated aperture of *P. (P.) decorum* is also a feature of the species of the subgenus *Platyceras* (*Orthonychia*) occurring at Marble Creek. These are all substantially larger than *P. (P.) decorum* and do not possess its initial coiling. However, the great variability of this genus and in cases only arbitrary distinctions between subgenera means that *P. (P.) decorum* and *P. (O.) marblecreekense* may in fact be the same species.

***Platyceras* (*Platyceras*) *minutum* Chapman, 1916**

(Plate 7, figure 8)

1916 *Platyceras minutum* Chapman, p. 97, pl. 5, fig. 41, pl. 6, figs. 57-58.

Diagnosis: Small, regularly coiled, horn-shaped form with regular growth lines.

Description: Small, horn-shaped gastropod of 2-3 whorls; shell rapidly expanding; body whorl disjunct; whorl section sub-ovoid; from sutures whorl profile gently rounded to nearly flat, becoming well-rounded at the mid-whorl periphery; aperture ovoidal; outer lip from both sutures strongly prosocylt to the mid-whorl periphery; a broad open sinus formed at the mid-whorl; inner lip strongly curved; both lips thin; sculpture composed of prominent strong costae developed reasonably regularly; numerous finer growth lines between the costae.

Dimensions:

	Ht	Wt	Wh
P12853	—	4.8	3
P41713	—	5.3	3
P41714	—	5.2	3
P41716	2.2	4.5	2

Location of Types: National Museum of Victoria. Holotype, P12853. Paratype, P12854. Hypotype, P41713, A. W. Cresswell Collection.

Type Locality: Deep Creek.

Material: Holotype, hypotype and three other specimens.

Discussion: The small number of specimens limits the comparisons that can be made between this species and *P. (P.) vetustum*.

P. (P.) minutum is smaller and is coiled more regularly than the capuliform type species. The growth lines of *P. (P.) vetustum* are much more irregular than those of *P. (P.) minutum*.

P. (P.) minutum differs considerably from *P. (P.) decorum* occurring at Marble Creek. It is very much smaller and lacks the distinctive ridges of the latter form. Nor does it possess the distinctive irregular crenulated aperture of *P. (P.) decorum*. It also expands more rapidly and more regularly than the Marble Creek form.

The species from Deep Creek is very similar to the initial growth stages of the Devonian *P. (Platyceras)* sp. from Canada, figured by Bowsher (1955, pl. 2, fig. 1) attached to the crinoid *Arthroacantha carpenteri* Hinde. Both are of similar size and possess the same distinctive simple sculpture and apertural shape. However, with growth the Canadian form develops the irregular and variable growth lines that are typical of the subgenus.

Chapman (1916) considered that this species resembled the initial growth stages of a variety of *P. cornutum* (Hisinger). As figured by Hisinger (1828, pl. 6, fig. 6), (1837, pl. 12, fig. 11), and Lindström (1884, pl. 2, figs. 29-51, pl. 3, figs. 6-9, 19-26) no specimen is comparable with the Deep Creek form. None of the specimens figured by these authors possesses such pronounced and regular growth lines as does *P. (P.) minutum* or the Canadian form. Nor in general do the figured specimens cited by Chapman lack spiral sculpture as does *P. (P.) minutum*.

***Platyceras (Platyceras) mansfieldense* sp. nov.**
(Plate 7, figure 11)

1916 *Platyceras cornutum* (Hisinger); Chapman, p. 97, pl. 5, fig. 42.

Diagnosis: Large capuliform gastropod lacking sculpture except for fine irregular foliaceous growth lines and irregular rugae.

Description: Medium to large, irregularly capuliform gastropod of one or two whorls, first whorl coiled discoidally and in contact; last whorl rapidly expanding and disjunct; whorl profile sub-rounded; last whorl section sub-ovate; aperture sinuous, irregular and variable;

lips of variable thickness; sculpture lacking except for exceedingly fine irregular foliaceous growth lines and irregular rugae.

Dimensions:

	Ht	Wt	Wh
P12855	24*	32*	1+
P40344	37*	37*	1+

Location of Types: National Museum of Victoria. Holotype, P12855.

Type Locality: Loyola Limestone, Loyola.

Material: Holotype and two other specimens.

Discussion: Chapman (1916) considered that the Loyola species was the same as the intermediate, neritoid, depressed spire form of the Silurian *P. (P.) cornutum* (Hisinger) from Gotland, Sweden.

Originally figured by Hisinger (1828, pl. 6, fig. 6) as *Turbinites* sp., this species is totally different from the Loyola form. Similarly, the figure of *Pileopsis cornuta* Hisinger (1837, pl. 12, fig. 11) differs significantly from the Loyola form. Lindström (1884) redescribed *Platyceras cornutum* (Hisinger) and synonymized with it a great range of forms of varying ages from Europe. None of the forms which he figured are comparable in terms of both general shape and sculpture with the Loyola species.

Although the subgenera and species of this genus exhibit considerable morphological variation and are known to be intergrading, it is considered that the Loyola form is quite distinct from the Silurian *P. cornutum* occurring in Europe.

***Platyceras (Platyceras)* sp. A.**

Description: Medium, irregularly capuliform gastropod with rapidly expanding whorls; large last whorl; low spired; whorl profile changes with growth; from sutures whorl profile gently rounded at the mid-whorl periphery; with growth mid-whorl periphery weakens considerably; whorl section changes from being sub-ovoidal to sub-circular with growth; aperture sinuous, slightly irregular; sculpture consists of fine slightly irregular foliaceous growth lines; tendency for occasional growth rugae to develop later.

Dimensions:

	Ht	Wt	Wh
P44067	20.4	25.5	1+

Location of Types: National Museum of Victoria. Mentioned specimen, P44067.

Type Locality: Toongabbie Limestone, Marble Creek.

Discussion: This species is readily distinguishable from the other species of the subgenus *P. (Platyceras)* found at any of the limestone deposits discussed here. It is significantly larger than either *P. (P.) decorum* or *P. (P.) minutum* although both have a comparable number of whorls. Both these smaller forms appear to have growth sequences which differ from this species. The only other member of the subgenus, *P. (P.) mansfieldense*, is distinguishable by its considerably larger size, fewer whorls and different style of growth.

Again the lack of specimens prevents a satisfactory taxonomic assignment of the form or comparison with *P. (P.) vetustum*. Certainly the type species has a much more regular pattern of growth, more rapid whorl expansion and more explanate aperture than this species from Marble Creek.

Subgenus *Platyceras (Visitor)* Perner, 1911

Type Species: *Visitor extraneus* Perner, 1911; Silurian; Dvorce, Bohemia.

Discussion: The genus *Cowwarrella* was erected by Talent and Philip (1956) and distinguished by having a near rectangular whorl section, simple nucleus, absence of sculpture except growth lines, and an outer lip with an anteriorly directed tongue-like projection. *Cowwarrella cylindrica* Talent and Philip, the type species and only member of the genus, was from the Toongabbie Limestone, lower quarry, Marble Creek.

Knight *et al.* (1960, p. 1240) subsequently synonymized this genus with the subgenus *P. (Visitor)*.

Platyceras (Visitor) cylindricum (Talent and Philip), 1956
(Plate 7, figure 2)

1956 *Cowwarrella cylindrica* Talent and Philip, p. 61, pl. 4, figs. 12-14.

Diagnosis: Small, umbilicate, subcylindrical gastropod with few whorls, low to depressed spire, canaliculate sutures and narrow elongate aperture.

Description: Small, umbilicate, subcylindrical gastropod with few whorls, short to depressed spire and subcylindrical last whorl; sutures deep, canaliculate; whorl profile nearly flat from upper suture to slightly obtuse shoulder, outer whorl surface flat to sub-angular basal margin, base rounded to nearly flat and near perpendicular to outer whorl surface; aperture narrow, elongate; columellar lip long, thin; parietal lip short and of the same thickness as columellar lip; moderately thin outer lip passes slightly forwards from the upper suture to the shoulder, on the outer surface it arches further forwards to mid-whorl so forming a distinct deep sinus near the upper suture; below mid-whorl the lip passes backwards to just above the basal margin, from this point continues backwards much more strongly before turning forwards midway across the base and continuing into the umbilicus; the second lower sinus so formed is smaller but proportionally deeper than the upper sinus; growth lines of varying size are well developed; sculpture possibly variably present, composed of very widely spaced spiral ridges on the outer whorl surface.

Dimensions:

	Ht	Wt	Hap	Wap	Wh
M.U.G.D. 2169	12.9	10.8	—	—	3+
M.U.G.D. 2280	10.6	9.2	10.1	2.9	3
M.U.G.D. 2281	—	6.4	—	1.9	3

Location of Types: Melbourne University Geology Department. Holotype, M.U.G.D. 2169. Paratypes, M.U.G.D. 2280-2281.

Type Locality: Toongabbie Limestone, lower quarry, Marble Creek.

Distribution: Toongabbie Limestone and Deep Creek Limestone.

Material: Holotype, 2 paratypes, and 4 other specimens.

Discussion: *P. (V.) cylindricum* differs significantly from the type species. The form from Marble Creek is small and has a distinctive sub-cylindrical shape, whereas the type species is large and naticiform. Accordingly, the aper-

ture of *P. (V.) cylindricum* is narrow and elongate while that of *P. (V.) extraneum* is sub-ovoidal. Knight (1941) considered the type species to be 'seemingly anomphalous'. *P. (V.) cylindricum* has an umbilicus. The presence of this species at Deep Creek has not been previously reported.

Subgenus *Platyceras* (*Orthonychia*) Hall, 1843
Type Species: Platyceras (Orthonychia) sub-rectum Hall, 1859; Devonian; near Williams-ville, Erie County, New York, U.S.A.

Platyceras (Orthonychia) marblecreekense

Talent and Philip, 1956

(Plate 7, figures 10, 12)

- 1956 *Orthonychia marblecreekensis* Talent and Philip, p. 65, pl. 7, fig. 22.
 1956 *Platyceras trirotundolobatum* Talent and Philip, p. 64, pl. 7, figs. 26-27.
 1956 *Orthonychia pentalvea* Talent and Philip, p. 65, pl. 7, figs. 28-29.

Diagnosis: Medium, variable horn-shaped form with up to 5 variably developed longitudinal ridges running from the apex to aperture.

Description: Medium, horn-shaped, uncoiled gastropod with up to 5 variable longitudinal ridges running from apex to aperture; shape irregular; initial region of the shell curved inwards; shell rapidly expanding; whorl section irregularly polygonal to sub-ovoidal; apertural margin irregular with a tendency to have a crenulated appearance; lips thin; sculpture absent except for longitudinal ridges and growth lines; growth lines variable, ranging from moderately regular fine lines which are convex towards the aperture between the longitudinal ridges and concave towards the aperture on the ridges, to coarse growth rugae which although irregular are not sigmoidal or crenulated.

Dimensions:

	Ht	Wt	Hap	Wap	Wh
M.U.G.D. 2171	14.2	22.1	—	16.9	1
M.U.G.D. 2168	20.1	29.0*	—	—	1
M.U.G.D. 2170	18.5	30.7	18.5	17.7	1

Location of Types: Melbourne University Geology Department.

- (i) *Orthonychia marblecreekensis*. Holotype, M.U.G.D. 2171.

- (ii) *Platyceras trirotundolobatum*. Holotype, M.U.G.D. 2168.

- (iii) *Orthonychia pentalvea*. Holotype, M.U.G.D. 2170.

Type Locality: Toongabbie Limestone, lower quarry, Marble Creek.

Material: Holotype and 2 hypotypes.

Discussion: As the holotype of *P. trirotundolobatum* lacks the apical region of its shell, a critical feature in the present classification of subgenera of the genus *Platyceras*, the former name has not been selected as the senior synonym. The holotype of *O. marblecreekensis*, which name has page priority over *O. pentalvea*, is complete, and the former is accepted as the name for this taxon.

The three species of the two subgenera synonymized here are all uncommon, being represented by only one specimen each. All come from the same locality. The known mode of life of members of these subgenera and the influence such a life has upon individual shell morphology does not warrant the erection of three separate taxa for three individuals from the same locality.

The assignment of one form to the subgenus *Platyceras* is unjustified in view of its close similarity to the species of *Orthonychia* from the same locality and the absence of the apical region of the shell, the critical region in distinguishing between these two subgenera. As preserved there is no suggestion that the apical region of this shell was coiled.

All the specimens in this collection are considered to belong to a single species. This species is characterized by its medium size, uncoiled horn shape and the presence of about 5 variably developed longitudinal ridges. Otherwise there is considerable variation, particularly in the strength of the longitudinal ridges and the nature of the sculpture. These differences are distinguished by the establishment of 3 variants within the species.

- (i) Variant 1 (as represented by the holotype, M.U.G.D. 2171).

This variant possesses the weakest development of the longitudinal ridges. In some instances these ridges are not continuous from the apex to the aperture. The ridges tend to be

more strongly developed in the apertural region. The sculpture is exceedingly variable. Initially fine crenulated growth lines are present. This type of growth line is replaced rapidly by coarse growth rugae which are roughly straight rather than crenulated.

(ii) Variant 2 (as represented by hypotype M.U.G.D. 2170).

This more elongate variant is distinguished by a decidedly more curved but totally disjunct apical region. It also possesses fine, moderately uniform, growth lines which are typically crenulated. The longitudinal ribs are continuous from the apical region to the aperture.

(iii) Variant 3 (as represented by hypotype M.U.G.D. 2168).

This variant is distinguished by the height of the longitudinal ribs, which extend from the apical region to the aperture. The growth lines are typically crenulated.

Platyceras (Orthonychia) sp. A.

(Plate 7, figure 7)

Description: Medium, irregularly capuliform gastropod with one and a half whorls; disjunct whorls expand rapidly; whorl profile probably sub-rounded; last whorl section sub-circular; sculpture where preserved composed of moderately irregular growth lines; aperture slightly irregular.

Dimensions:

	Ht	Wt	Wh
P1082	14.5	24.0*	1+

Location of Types: National Museum of Victoria. Figured specimen, P1082 ex G.S.V. Collection, 91F.

Type Locality: Toongabbie Limestone, Marble Creek.

Material: Figured specimen on which the external sculpture is poorly preserved.

Discussion: This specimen provides an example of the often arbitrary distinction between the subgenera *P. (Platyceras)* and *P. (Orthonychia)*. Although having $1\frac{1}{2}$ coils it is completely disjunct. The availability of more specimens may enable its taxonomic status to be determined satisfactorily. At present it is placed in the subgenus *Orthonychia* because of its disjunct

nature, minimal coiling and its great similarity with *P. (O.) marblecreekense*. This latter uncoiled species is characterized by the presence of variably developed longitudinal ridges and crenulated margin. Knight *et al.* (1960) considered that the apertural irregularities of the genus *Platyceras* were primarily a reflection of the host crinoid's characters rather than an inherent characteristic of the gastropod. Thus the apparent absence of a crenulate margin in *P. (Orthonychia)* sp. A. is not considered to be a significant taxonomic distinction between it and *P. (O.) marblecreekense*. At present these two species are differentiated on the basis of their coiling, general shape and the degree of development of the longitudinal ridges. However, further specimens may indicate that *P. (O.)* sp. A. is in fact another variant of *P. (O.) marblecreekense*.

P. (Orthonychia) sp. A. is similar to *P. (P.) mansfieldense* in general appearance and the nature of the growth lines. It differs in being much smaller, disjunct and having fewer whorls.

Subgenus *Platyceras (Praenatica)* Perner, 1903
Type Species: *Strophostylus gregarius provea* Perner, 1903; Lower Devonian; Lockov, Bohemia.

Platyceras ? (Praenatica) sp. A.

Description: Large explanate naticiform to auriform gastropod; body whorl greatly expanded; spire very low; sutures shallow; whorl profile changes with growth, becoming progressively more gently rounded; whorl periphery in lower half of whorl, initially strongly rounded, becomes less pronounced and more gently rounded with growth; inner lip and umbilical region unknown; aperture large; outer lip moderately thin and irregular; from the upper suture the outer lip strongly prosocyrte; sculpture composed only of foliaceous growth lines; coarse growth lines near apex.

Location of Types: National Museum of Victoria. Mentioned specimen, P40348. Rev. R. Thomas Collection.

Type Locality: Loyola Limestone, Loyola.

Material: One crushed specimen.

Discussion: The lack of material limits com-

parison with the type species. Externally both species are very similar, although the *Loyola* species is slightly larger and has one more whorl. The absence of internal details precludes definite subgeneric placement.

Platyceras subgen. et sp. indet.

1956 *Orthonychia* sp. Talent and Philip, p. 66.

Description: Small explanate gastropod with gently rounded whorl profile; apical region missing; sculpture composed of collabral lines only preserved in the remaining 'apical' region; outer lip thin; apertural margin apparently regular.

Dimensions:

	Ht	Wt	Hap	Wap	Wh
M.U.G.D. 2182a	11.0	9.7*	11.0	8.7	1

Location of Types: Melbourne University Geology Department. Mentioned specimen, M.U. G.D. 2182.

Type Locality: Toongabbie Limestone, upper quarry, Marble Creek.

Material: One specimen.

Discussion: Absence of the apical region precludes subgeneric determination. Although broken it is apparent that the apical region narrows rapidly and curves, suggesting that the shell may have been coiled. The regularity of the few growth lines and the segment of the aperture preserved distinguishes it from all members of the subgenus *P.* (*Orthonychia*) from Marble Creek.

? **Platyceras** subgen. et sp. indet.

1956 *Platyceras* sp. Talent and Philip, p. 65.

Description: Small irregularly capuliform platyceratid gastropod; rapidly expanding last whorl.

Dimensions:

	Ht	Wt	Hap	Wap	Wh
M.U.G.D. 2181	7.7	10.4	7.7	—	1

Location of Types: Melbourne University Geology Department. Mentioned specimen, M.U. G.D. 2181.

Type Locality: Toongabbie Limestone, upper quarry, Marble Creek.

Material: One specimen.

Discussion: The single specimen is poorly pre-

served, lacking both its nucleus and sculpture. If the initial whorls were in contact, this specimen would possess a distinctly capuliform shape which would distinguish it from *P.* (*P.*) *decorum* from Marble Creek, the only species of approximately similar size.

Family **ORIOSTOMATIDAE** Wenz, 1938

Genus *Oriostoma* Munier-Chalmas, 1876

Type Species: *Oriostoma barrandei* Munier-Chalmas, 1876; Lower Devonian; Bois Roux quarry at Gahard, near Rennes, France.

Oriostoma n. sp.

(Plate 7, figure 3)

Description: Small, low spired, discoidal gastropod with few whorls; whorls increasing in size rapidly; body whorl large; whorl profile well rounded, from upper suture arched upwards to rounded shoulder, then arched gently to the round keel which surrounds the moderately wide umbilicus, then curved more tightly into the umbilicus; periphery at or below mid-whorl; inner and outer lip thin; outer lip weakly prosocline, retroussé at each of the major spiral sculptural elements; sculpture consists of two orders of numerous strong spiral elements; collabral growth lines range from moderately fine to foliaceous and are retroussé at the intersection with each of the major spiral elements.

Dimensions:

	Ht	Wt	Wh
P40319	—	5.4	3
P41727	—	11.6	—

Location of Types: National Museum of Victoria. Figured specimen P41728, A. W. Cresswell Collection.

Locality: P40319, Middle Crossing, Deep Creek. P41727 and P41728, Deep Creek.

Material: Figured specimen and two other specimens.

Discussion: This species differs from *O. barrandei* principally in possessing many more elements of spiral sculpture which are also more strongly developed. In this respect alone it resembles the sculpture of *Beraunia bifrons* (Perner). However, it is considerably smaller

than this species which is not a large member of the genus *Beraunia*. Because the spiral elements are more closely spaced in the form from Deep Creek, the posterior deflection of the collabral growth lines at their intersection with the spiral elements is markedly less than that occurring in the type species.

The Deep Creek form also differs from the type species in being smaller and having a more rounded whorl profile. *O. rotundimuratus* Tassell from the Lilydale Limestone is very similar to the Deep Creek form. However, the Lilydale species is slightly more turbinate and has fewer, more widely spaced and less strongly developed spiral sculptural elements.

Talent (1963) described and figured *Oriostoma* sp. from his locality 35 in the Kilgower Member of the Tabberabbera Formation. The two specimens he found were poorly preserved and considerably smaller than the form from Deep Creek. Both species appear to have a comparable number of spiral elements. However, *Oriostoma* sp. from the Kilgower Member lacks growth lines, so further comparison is limited.

Until more complete material is available from Deep Creek I will not name this species.

Family MURCHISONIIDAE Koken, 1896

Genus *Michelia* Roemer, 1852

Type Species: *Michelia cylindrica* Roemer, 1852; Devonian; Bockswiese, near Clausthal, Germany.

Michelia sp.

- 1907 *Niso* (*Vetotuba*) *brazieri* Chapman non Etheridge, pp. 73 and 79.
- 1913 *Vetotuba brazieri* Etheridge; Chapman, p. 227 (in part).
- 1916 *Coelocaulus brazieri* (Etheridge); Chapman, p. 86 (in part).
- 1956 *Coelocaulus* sp. Talent and Philip, p. 62, pl. 7, fig. 8.

Description: Small to medium, narrowly umbilicate, cyrtocoid gastropod; numerous whorls with profile gently convex between shallow impressed sutures; periphery about mid-whorl; apertural region unknown; pseudoselenizone present on lower half of whorl; sculpture unknown.

Dimensions:

	Ht	Wt	Wh
M.U.G.D. 2172	25.8	8.6	8+
M.U.G.D. 2177	12.8	4.8	5
P38510	29*	10.0	9

Location of Types: Melbourne University Geology Department. Figured specimen, M.U.G.D. 2172.

Type Locality: Toongabbie Limestone, upper quarry, Marble Creek.

Material: Figured specimen and 2 other specimens. All material is poorly preserved.

Discussion: Comparison of this material with the two better known species *M. brazieri* (Etheridge) from Lilydale and *M. darwini* (de Koninck) from Taemas is difficult because of its very poor preservation. The specimens from Marble Creek are considerably smaller than either of the other two species.

Chapman (1907) noted the presence of *Niso* (*Vetotuba*) *brazieri* at Marble Creek. This specimen (P38510) is very poorly preserved. The apertural region is not preserved nor is the columella visible. There is a suggestion of a pseudoselenizone on the lower half of the last whorl. The disconcerting feature about this specimen is the rather more rapid expansion of whorl diameter compared to whorl height than is typical of either the other two specimens from Marble Creek or the other two species. Assignment of this specimen to this genus is at best tentative.

Family PSEUDOPHORIDAE S.A. Miller, 1889

Genus *Scalaetrochus* Etheridge, 1890

Type Species: *Trochus* (*Scalaetrochus*) *lindstroemi* Etheridge, 1890; Lower Devonian; Lilydale Limestone quarry, Lilydale, Victoria.

Scalaetrochus lindstroemi Etheridge, 1890

Description: Large trochiform gastropod with mildly concave base; irregular sutures flush to slightly protruding; whorl profile gently convex; periphery angular forming frill; peripheral region thickened by callus deposit; thickened outer lip moderately prosocline from upper suture to the basal periphery, continues obliquely across the base; umbilical region unknown;

collabral growth lines, fine to slightly foliaceous on the outer whorl surface; collabral lines on the base fine.

Dimensions:

	Ht	Wt	Wh
P40349	28*	34	6

Location of Types: National Museum of Victoria. Mentioned specimen, P40349. G. Sweet Collection.

Type Locality: Lilydale Limestone, Lilydale.

Distribution: Lilydale Limestone and Loyola Limestone.

Material: Mentioned specimen.

Discussion: Although only one specimen has been found at Loyola, it is sufficiently well preserved for it to be assigned to this species. Its presence there extends the known occurrence of this species. Chapman (1907, p. 73) mentioned the presence of a fragment of *Trochus* (*Scalaetrochus*) sp. at Marble Creek; as yet this specimen has not been relocated and his identification confirmed.

Turbiniform gastropod gen. et sp. indet.

Description: Small turbiniform gastropod of at least 3 whorls; last whorl slightly expanded; whorl profile gently arched between sutures, becoming more strongly arched onto the base; base arched; umbilicus probably present; sutures shallow, impressed; inner lip unknown; outerlip moderately thin, other details of outer lip unknown; aperture probably ovoidal.

Dimensions:

	Ht	Wt	Wh
P41729	5.4*	5.2	3+

Location of Types: National Museum of Victoria. Mentioned specimen, P41729. A. W. Cresswell Collection.

Type Locality: Deep Creek.

Material: Mentioned specimen.

Discussion: The single specimen does not show growth lines on the small fragments of the outer shell present. Thus assignment to a genus is impossible. However, its mode of coiling distinguishes it from all the other gastropods discussed.

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Explanation of Plate

PLATE 7

Figure 1—? *Temnodiscus pharetroides* Chapman, P12835, holotype, X1.

Figure 2—*Platyceras* (*Visitor*) *cylindricum* (Talent and Philip), M.U.G.D. 2169, holotype, X2. Apical view.

Figure 3—*Oriostoma* n. sp., P41728, figured specimen, X1½. Apical view.

Figure 4—*Platyceras* (*Platyostoma*) *triangulare* Talent and Philip, M.U.G.D. 2175, holotype, X1½. Apical view.

Figure 5—*Tropidodiscus centrifugalis* (Chapman), P12844, holotype, X1½ approx.

Figure 6—*Platyceras* (*Platyostoma*) *incisum* Chapman, M.U.G.D. 2164, hypotype, X1½. Apical view.

Figure 7—*Platyceras* (*Orthonychia*) sp. A., P1082, figured specimen, X2 approx.

Figure 8—*Platyceras* (*Platyceras*) *minutum* Chapman, P41713, hypotype, X3.

Figure 9—*Tremanotus cyclocostatus* Talent and Philip, M.U.G.D. 5031, hypotype, X2 approx.

Figure 10—*Platyceras* (*Orthonychia*) *marblecreekense* Talent and Philip, M.U.G.D. 2171, holotype, X2 approx.

Figure 11—*Platyceras* (*Platyceras*) *mansfieldense* sp. nov., P12855, holotype, X1½ approx.

Figure 12—*Platyceras* (*Orthonychia*) *marblecreekense* Talent and Philip, M.U.G.D. 2170, hypotype, X1½ approx.

Figure 13—*Tremanotus cyclocostatus* Talent and Philip, M.U.G.D. 5031, hypotype, X2 approx.

Figure 14—*Platyceras* (*Platyostoma*) *incisum* Chapman, P1083, holotype, X1.



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