

REVISION OF MCCOY'S 'PRODROMUS' TYPES FROM THE LILYDALE AND KILLARA DISTRICTS OF VICTORIA

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Summary

Early in the scientific history of Victoria, McCoy described Lower Devonian fossils from the Lilydale and Killara districts, and these are now revised. With most of them only changes of nomenclature are required, but McCoy's type specimens of *Pentamerus australis* prove to be referable to the genera *Meristella* and *Conchidium*.

Introduction

Professor Sir Frederick McCoy made a classic contribution to the palaeontology of Victoria in the early days of this State by preparing a series of works entitled 'Prodromus of the Palaeontology of Victoria, or Figures and Descriptions of Victorian Organic Remains.' Seven of the ten proposed decades appeared, being published by the Geological Survey of Victoria between the years 1874 and 1882 inclusive.

In connection with the study of the palaeontology of the Lilydale and Killara districts, east of Melbourne, it has become necessary to review McCoy's early work, and the results are listed in the following table:

Names in 'Prodromus'	Present Nomenclature
<i>Spirigerina reticularis</i> (Linnaeus)	<i>Atrypa reticularis</i> (Linnaeus) var.
<i>Leptaena</i> (<i>Leptagonia</i>) <i>rhomboidalis</i> (Wilckens)	<i>Leptaena rhomboidalis</i> (Wilckens) var.
<i>Lichas australis</i> (McCoy)	<i>Acanthopyge australis</i> (McCoy)
<i>Orthoceras lineare</i> (Münster)	<i>Orthoceracone</i> indet.
<i>Pentamerus australis</i> (McCoy)	{ <i>Meristella australis</i> (McCoy) <i>Conchidium</i> sp.
<i>Phacops</i> (<i>Portlockia</i>) <i>fecundus</i> Barrande	<i>Phacops</i> sp. nov.
<i>Spirifera sulcata</i> (Hisinger)	<i>Cyrtinopsis</i> cf. <i>cooperi</i> Gill

Stratigraphy

McCoy considered all these forms to be 'Upper Silurian' in age, which term at that time was equivalent to what is now called Silurian, the 'Lower Silurian' then being the present Ordovician. The Lilydale fossil *Atrypa reticularis* and the two Killara fossils *Lichas australis* and *Orthoceras lineare* were referred simply to the Upper Silurian (=Silurian). *Pentamerus australis* and *Phacops fecundus* were referred to the May Hill (=Llandovery) and *Spirifera sulcata* and *Leptaena rhomboidalis* to the Wenlock. All these forms are now regarded as being of Yeringian (Lower Devonian) age.

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Palaeontology

BRACHIOPODA

Genus *Meristella* Hall 1860

Cooper (1944) defined this genus as 'Small to large, smooth, biconvex usually with dorsal fold; oval in outline; rostrate, with circular foramen; ventral interior with dental plates and deeply impressed muscular area forming a trapezoidal or triangular pit; hinge plate divided, supported by a strong median septum and forming a small sub-rostral chamber; jugum similar to *Merista*. U. Sil. to Mid. Dev.'

McCoy's *Pentamerus australis* fits this generic description and is comparable with the shells figured by Hall. McCoy's species is not referable to the genus *Pentamerus* because it does not possess a 'ventral valve with long spondylium duplex; dorsal valve with two long subparallel plates supporting long curved brachial processes' (op. cit.). McCoy looked upon *P. australis* as 'an Australian representative of the European and American *P. oblongus* of exactly the same geological horizon at the base of the Upper Silurian, which it strongly resembles in size, shape, and surface.' Etheridge (1892), when writing on the Pentameridae of N.S.W., accepted this view, and referred fossils described by Mitchell as *P. oblongus* from N.S.W. to this species, and also stated that specimens described by Jenkins as *P. oblongus* probably belonged to it. Gurich (1901) also accepted these interpretations. The name *Pentamerus australis* has appeared in numerous lists, e.g. McCoy 1867, Basedow 1909, Chapman 1914, Brown 1941.

Meristella australis (McCoy)

Plate II, figs. 1, 2, 7, 8.

Pentamerus australis McCoy, 1877, p.p. 28-29, Pl. 47,
figs. 9, 9a, 11, 12, non 10.

? *P. australis* Etheridge, 1892, pp. 50-52.

Type material. 1. Lectoholotype consisting of the steinkern of a ventral valve in a siltstone covered with iron oxide (N.M.V.* 12243) from 'section 12, Parish of Yering, Victoria.' For map and description of locality see Gill 1940. McCoy figured this specimen from two positions (figs. 9, 9a).

2. Lectoparatype. McCoy's fig. 11 is also a steinkern of a ventral valve in a similar matrix and from the same locality (N.M.V. 12242). The specimen is slightly compressed laterally.

3. Lectohypotype.† McCoy's fig. 12 is a very poor steinkern of perhaps a ventral valve. As the specimen is so inadequate and adds nothing fundamental to the description of the species, only the standing of a hypotype is suggested for it (N.M.V. 12241). McCoy's figure is a reconstruction not showing the breaks and imperfections of the specimen, so much so that his drawing looks like an exterior.

Descriptions. 1. Lectoholotype ventral valve sub-circular in outline, greatest width 43 mm. and greatest length the same. These measurements are taken in plan, i.e. not following the contours of the valve. Valve moderately and evenly convex, the median longitudinal profile rising about 13 mm. above the plane joining the anterior and posterior margins. Anterior margin non-plicate. Beak projects about 4 mm. beyond the posterior margin; erect. Interior of valve has large rostral cavity and deeply excavated muscle area. The dental plates are lost by the thickening of

* N.M.V. = National Museum of Victoria registered number.

† The terms *lectoholotype*, *lectoparatype*, and *lectohypotype* are used in a parallel sense to Singleton's (1945) *tectoholotype*, *tectoparatype*, and *tectohypotype*.

the shell on each side of the rostral cavity, but the steinkern shows that they were 5 mm. high. The somewhat heart-shaped rostral cavity between these plates is about 11 mm. wide at widest, and about 13 mm. long. The muscle field anterior to this has a pointed posterior end, and reaches anteriorly a point about 32 mm. from the umbo. It is widest anteriorly, where its width is 8 mm. This ventral valve of *Meristella* was mistaken by the original describer for a dorsal valve of *Pentamerus*.

2. Lectoparatype ventral valve is crushed, but nevertheless suggests a more ovate outline than that of the holotype. It is a valve from a younger animal, as shown by its lack of secondary thickening and its smaller size. Length in plan about 35 mm.; the width of the valve before crushing is estimated to be about 30 mm. in plan. This steinkern suggests that the exterior of the valve was smooth except for growth lines. Beak erect. Sides of delthyrium (see Plate II, fig. 8) constitute an angle of 90°. Dental plates 6.5 mm. long. Rostral cavity and muscle field as in holotype, but not so deeply excavated.

Comment. As was the custom at the time of description, no distinctions were made by McCoy between the type specimens. Following the more recent practice of basing a species fundamentally on a single holotype as far as possible, one is selected above. Specimen 12243 was apparently regarded as the chief specimen by McCoy because he drew two figures of it. This steinkern is of a fully mature or old age shell, the lectoparatype (12242) being the stage of development more commonly found.

Meristella australis is fairly common in the Upper Yeringian strata at Lilydale, being noted from Hull Road, Lilydale (loc. 1), Wilson's (loc. 2), Flowerfield Quarry (loc. 4), Flowerfield Cutting (loc. 5), Melbourne Hill, Lilydale (loc. 7), Hull Road, Mooroolbark (loc. 13), and from Chapman's Killara collection (loc. 34 or 35). The species is limited to fine siltstones, and does not occur as far as is known in the intercalated sandy horizons. It is common to find an association of smooth shells with fine sediments.

Meristella australis is nearest *M. bellensis* from the Bell Shale (Gill and Banks 1950) of the Zeehan area, West Tasmania (Gill 1950b), which is of Lower Devonian age. Both species have affinities with *M. nasuta* of North America (Hall 1867). No dorsal valve good enough for figuring has been found yet, but the structures are similar to those of *M. bellensis*, except that the muscle field is a little different in shape and not so strongly excavated. A related form has also been noted in the author's collection from Baton River, New Zealand (*vide* Shirley 1938). Mansuy (1916) has described *Meristella miarensis* from Indochina.

Genus **Conchidium** Hisinger 1799

Conchidium sp.

Plate II, fig. 9.

Pentamerus australis McCoy, 1877, Pl. 47, fig. 10.

Comment. McCoy misinterpreted this fossil, which is a steinkern of a ventral valve of *Conchidium* (N.M.V. 12244), preserved in a reddish siltstone from Yering, Victoria (loc. 4). A related species, *Conchidium polymitum*, has recently been described from the beds at Sandy's Creek, Gippsland (Gill 1949b), and the occurrence of *Conchidium* at Lilydale and Killara in Victoria, and on the Baton River in New Zealand noted.

Genus **Cyrtinopsis** Scupin 1896

Shirley (1938) and the writer (Gill 1942) have referred to this genus brachiopods from New Zealand and Victoria respectively, naming them *C. perlamellosa*

(Hall). Cooper has noted that *Delthyris* develops a spondylium-like structure secondarily, thus simulating *Cyrtinopsis*, and that Hall's species belongs to *Delthyris* and not *Cyrtinopsis* (Cooper 1944). In a recent paper (Gill 1950a) the Victorian form was re-named *Cyrtinopsis cooperi*, and it is probable that the New Zealand specimens are referable to this species. In both cases the fossils appear to be comparatively rare.

Cyrtinopsis cf. *cooperi* Gill

Spirifera sulcata McCoy, 1877, Pl. 46, figs. 9, 9a, 9b, 10, 10a.

Comment. The two specimens figured by McCoy are N.M.V. 12257 (which is fig. 9) and N.M.V. 12256 (which is fig. 10). In both cases the figures are reversed and somewhat idealized. Both are from 'Yering, Victoria,' and like his specimens of *Atrypa reticularis*, retain much of the calcic material of the original shell. This is unusual in the rocks of the Lilydale District, and the precise locality from which they came is unknown.

McCoy's specimens are comparable with *Cyrtinopsis cooperi*, but their internal structures are unknown, and the detail of the external morphology of *C. cooperi* has not yet been ascertained owing to rarity of material.

Fragments of *Cyrtinopsis* probably belonging to *C. cooperi* have been found in collections from Wilson's, Lilydale (loc. 2), Kilsyth (loc. 29), and from Taylor Road, Mooroolbark (a new locality at Mr. W. Widdows' home, 6 chains east of Hull Road and 72 feet north of Taylor Road). The holotype comes from the nearby locality (13) of Hull Road, Mooroolbark.

Genus *Atrypa* Dalman 1828

Atrypa reticularis (Linnaeus) var.

Spiriferina reticularis McCoy, 1877, pp. 25-26, Pl. 47, figs. 1, 1a, 1b, 1c, 2.

Comment. McCoy's specimens are recorded as coming from 'Yering, Victoria,' and the original calcic material of the shells is preserved. The matrix (as shown by the material between the valves) is a siltstone, and so the specimens do not come from the Cave Hill limestone. In any case, the locality would then be called Lilydale and not Yering. No fossil locality at present known has such a type of preservation, and so for the present, anyway, the precise stratigraphical position cannot be ascertained.

The specimen with the two valves (McCoy's figs. 1, a-c) is N.M.V. 12258, and the ventral valve showing the muscle impressions (McCoy's fig. 2) is N.M.V. 12259. The latter was a frail valve without matrix attached, and it was broken when transported with other types to a place of safe keeping during the war.

Kozłowski (1929) and the Fentons (1930, 1932, 1935) have made helpful studies of *Atrypa*. Poulsen (1943) proposed a new classification of the Atrypidae, but supposed that *Atrypa* s.s. possessed a dorsal median septum, which is not the case. Alexander (1949) has made a clear study of the genotype, and shown that with a study of evolutionary series *Atrypa reticularis* can have stratigraphical significance. Dr. Alexander described English varieties and stated that in Poland and Sweden there appear to be forms of stratigraphical significance. She points out, too, that American forms on the whole show a more vigorous and extravagant development than European forms.

A number of specimens in Victoria have been given variety names, or referred to European and American species, but the need is really for a study of the whole group instead of isolated individuals, thus arriving at the delineation of an evolutionary series.

Genus *Leptaena* Dalman 1828*Leptaeana rhomboidalis* (Wilckens) var.*Leptaena (Leptagonia) rhomboidalis* McCoy, 1877, pp. 19-20, Pl. 46, fig. 1.*Leptaena rhomboidalis* Hill, 1942, pp. 40-41, Pl. 5, figs. 3, 8.

McCoy's specimen appears to be a smaller individual of the variety described by the author in 1942 from Hull Road, Mooroolbark (loc. 13). This sub-quadri-lateral form is characteristic of the upper beds of the Yering Group, and differs from that found in the lower beds such as at Ruddock's Quarry (loc. 20), although the facies is very similar. Singleton (1945, pp. 252-253) listed this form.

CEPHALOPODA

Orthoceracone indet.*Orthoceras lineare* McCoy, 1879, p. 28, Pl. 57, fig. 6.

Comment. This specimen (N.M.V.12128) was submitted to Dr. C. Teichert, who kindly informs me that on account of the absence of any internal structures it is not possible to provide even a generic name for this fossil. However, if forms are found at the same locality with such structures, it may then be possible to discover the taxonomic standing of the specimen figured by McCoy.

TRILOBITA

Genus *Acanthopyge* Corda 1847

When describing *Lichas australis*, McCoy (1876, p. 19) stated that 'this species belongs to that very restricted section of *Lichas* named *Acanthopyge* by Hawle and Corda, in which the head seems greatly simplified from the absence of the middle and posterior segmental furrows, leaving only one segmental lobe on each side of the glabella.' McCoy compared *Lichas australis* with Barrande's *Lichas haueri*.

Gürich (1901) established the subgenus *Euarges* with *Lichas (Euarges) haueri* as genotype. The Richters (1917) accepted this nomenclature for the genotype, and Reed (1923) discussed *Euarges* as a subgenus, but in 1932 the Richters re-established Corda's *Acanthopyge*, and used it as a generic name, apparently concluding that Gray's use of *Acanthopyga* in 1838 did not invalidate it. Bouček (1933) used *Acanthopyge* as a subgeneric name throughout his paper except on page 4, where he heads a description '*Lichas (Ceratarges) pragensis*, n. sp.' with a footnote reading 'Synonymum of subgenus: *Euarges* Gür.' This is difficult to follow. Phleger (1936) used *Euarges* as a generic name and emended Gürich's subfamily of *Euarginae*. As Fletcher (1950) notes, he included Australia in the range of *Euarges*, and so must have regarded *Lichas australis* as belonging to that genus. Phleger (1936, 1937a, b) studied the whole Lichadid family, suggesting a new classification and establishing the superfamily Lichadaceae, but Warburg (1937, footnote pp. 213-214) is not pleased with it. Fletcher (1950) referred McCoy's species to *Euarges*.

Acanthopyge australis (McCoy)

Plate II, figs. 3-6.

Lichas australis McCoy, 1876, pp. 18-19, Pl. 22, figs. 11a, b.*Acanthopyge australis* Etheridge and Mitchell, 1917, pp. 503-504.*Lichas australis* Gill, 1939, pp. 140-142, Pl. 5, figs. 1-2.*Acanthopyge australis* Gill, 1948, pp. 14-17.

Type material. 1. Lectoholotype consisting of the steinkern of a cranidium preserved in brownish siltstone (N.M.V. 7490) from 'Junction of Woori Yallock and Yarra,' Victoria. For precise locality see Gill 1945, p. 184 and fig. 2. McCoy

figured two specimens under the same figure number 11. The more complete specimen is the higher and the more enlarged on his plate 22, and this is now selected as the holotype. For ease of reference it will be called fig. 11a and the lower, less enlarged figure, 11b.

2. Lectoparatype consisting of the steinkern of a part of a cranidium preserved in the same matrix and from the same locality (N.M.V. 7489).

3. Hypotype A. Steinkern of an almost complete carapace figured by the writer (1939, Pl. 5, fig. 1) and derived from grey siltstone with brown (oxidized) patches, from Syme's Quarry (loc. 35), Killara, Victoria (N.M.V. 14087).

4. Hypotype B. Steinkern of an incomplete cephalon showing eye pedicel, in the same matrix, from Syme's Tunnel, Killara (loc. 34), figured in Gill 1939, Pl. 5, fig. 2.

Descriptions. 1. Lectoholotype cranidium 8 mm. long in plan, and from the midline to the outer edge of the right fixed cheek along the posterior margin of the cephalon is 6 mm., so the complete cranidium must have had a maximum width of approximately 12 mm. The cranidium is very inflated, the middle of the glabella being 4 mm. higher than the anterior margin. The lobes are like those in *A. haueri* (Barrande), but as McCoy noted, the segmental lobes are narrower. The preglabellar furrow is more pronounced in *A. australis* (as shown in Pl. 11, fig. 3) than in *A. haueri*. Other cephalic differences were noted earlier (Gill 1939, pp. 142-143).

2. Hypotype A. In addition to the earlier observations on this specimen, it is noted that each segment of the thorax possesses anteriorly a narrow dorsally curved edge, which catches under the accommodating posterior edge of the segment in front of it. There are also locking mechanisms at the distal ends of the pleurae where the spines commence. There are two or three tubercles on each pleuron.

The pygidium possesses a doublure about 1 mm. wide, which has on it about four raised lines (imprinted in the matrix as fine furrows), more or less evenly spaced, and running parallel to the pygidial margin.

Comment. *Acanthopyge australis* (McCoy) is closely comparable with *A. haueri* (Barrande), which has been described from both Europe (Richters 1917) and Asia (Weber 1932). McCoy's species has been listed from localities in the Killara and Lilydale Districts (Gill 1938, 1939), and to these is now added that of Melbourne Hill, Lilydale (loc. 7), where a young specimen has been found (N.M.V. 14849). *A. australis* is listed as a typical fossil by Basedow (1909) and Chapman (1914).

Genus *Phacops* Emmrich 1839

Shimer and Shrock (1949) epitomize this genus as being characterized by 'Glabella more or less swollen; subcranial furrow continuous; genal angles generally rounded; marginal rim narrow; cephalic doublure slightly convex.' The genotype is *P. latifrons* Bronn. A closely allied genus is *Reedops*, which has the 'subcranial furrow absent in front; eyes small, well forward; otherwise like *Phacops*' (op. cit.). The genotype is *P. bronni* Barrande. *Phacops* occurs occasionally in the Silurian but has its maximum development in the Devonian. *Reedops* is a Lower Devonian genus.

McCoy's species lies between these two genera in that the subcranial furrow is almost obliterated or is absent anteriorly, and the eyes have migrated well forward, but are still large as in *Phacops*, and not small as in *Reedops*. A comparison can thus be made with *Reedops deckeri* (Delo 1935), which Delo referred to *Reedops* with some reserve (see also Delo 1940, p. 25). In Victoria there is a series of

Lower Devonian Phacopid trilobites which have been given mostly the names of species in the Upper Silurian of N.S.W. These are under review at present, and it appears that in most cases these names do not hold. The specimen referred to *Phacops crosslei* (Chapman 1915, Pl. 15, fig. 14, N.M.V. 12679) does not belong even to that genus. That referred to *P. serratus* (op. cit. Pl. 15, fig. 16, N.M.V. 2304) has most of the cephalon missing, and so is difficult to determine accurately. Some years ago, through the courtesy of Mr. H. O. Fletcher, Curator of Fossils, I looked through the phacopid specimens in the Australian Museum, Sydney, and came to the conclusion that the forms found in the Lilydale and Killara Districts of Victoria do not occur in the Yass-Bowning District of N.S.W. so far as present collecting shows.

***Phacops* sp. nov.**

Phacops (*Portlockia*) *fecundus* McCoy, 1876, pp. 15-16.

Pl. 22, figs. 8-9, Pl. 23, figs. 1-6.

Comment. In 1895 Etheridge and Mitchell described as *Phacops sweeti* fossils collected by Mr. George Sweet from the Mansfield District of Victoria, and thought they were the same species as McCoy's *Phacops fecundus* described in the *Prodromus*, but they were not sure. They noted that McCoy's form was different from Barrande's *P. fecundus*. Basedow, apparently in error, recorded *P. fecundus* from N.S.W. (1909, p. 321). In 1939 the writer distinguished between *P. sweeti* and the *P. fecundus* of McCoy on the number of lenses in the eyes—an important morphological feature in this group (R. and E. Richter 1933, Störmer 1949)—and has confirmed this by examining McCoy's types, viz.

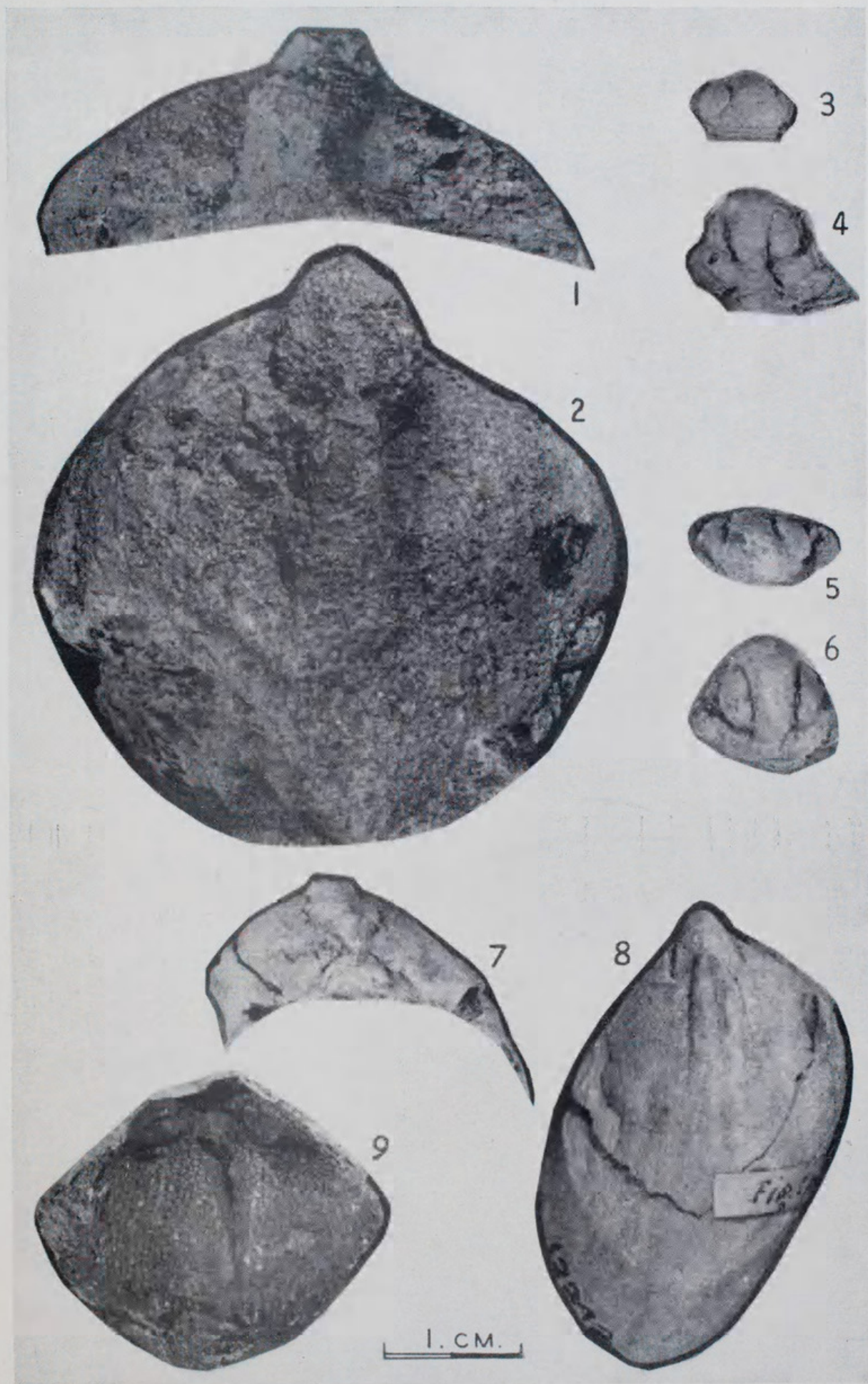
Plate 23, fig. 1	N.M.V. 12116
fig. 2	12117
fig. 3	12118
fig. 4	12119
fig. 5	12120.

It should be noted that McCoy's drawings are slightly reconstructed and show the specimens as being better preserved than they really are. For this reason it is desirable that any new species concerned should be established on other than the above material. The matrix at the locality from which McCoy's specimens came does not lend itself to good preservation. Only specimen N.M.V. 12116 (McCoy's Pl. 23, fig. 1) is well enough preserved to allow a count to be made of the lenses of the eyes. Fig. 2 (N.M.V. 12117) may be a different species from fig. 1. The specimens figured in McCoy's Pl. 22, figs. 8-9 have not been located in the Museum. In 1948 (p. 14) the writer pointed out that McCoy's *Phacops fecundus* is not referable to Barrande's Bohemian species, and in 1949 described some phacopid hypostomes, including one apparently belonging to the same species as McCoy's specimens. Fletcher (1950) has recently commented on the genus *Phacops* in Australia, and described a new species from the Lower Silurian of New South Wales.

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