

CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY
UNIVERSITY OF MICHIGAN

Vol. VIII, No. 9, pp. 221-230 (3 pls., 1 fig.)

JANUARY 19, 1951

A NEW GENUS AND SPECIES OF PRIMITIOPSIS
OSTRACOD FROM THE DEVONIAN TRAVERSE
GROUP OF MICHIGAN

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UNIVERSITY OF MICHIGAN PRESS
ANN ARBOR

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UNIVERSITY OF MICHIGAN

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A NEW GENUS AND SPECIES OF PRIMITIOPSID
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INTRODUCTION

THIS paper describes a new genus and species of primitiopsid ostracod from the Bell shale, the basal formation of the Middle Devonian Traverse group of Michigan. This shale occurs as sink fillings in the underlying Rogers City limestone at several places in Presque Isle County. Several of these sink fillings are well shown in the quarry of the Michigan Limestone and Chemical Company at Calcite, near Rogers City.

In 1926 Dr. George M. Ehlers, of the Museum of Paleontology of the University of Michigan, collected samples of fossiliferous Bell shale from one of these fillings, which he located as "about one-half mile southeast of the quarry crusher." A tray of washings from these samples was preserved in the Museum of Paleontology. No additional material can be collected from this particular filling because the shale has been completely removed in the process of quarrying the limestone. The washings contain a different fauna from those of Bell shale samples taken from other fillings in the quarry.

The author appreciates the helpful criticism of Dr. George M. Ehlers, who aided in revision of the original draft of the manuscript of this paper.

One of the most unusual species of ostracods which the author separated from the washings of the filling belongs to a new genus and

new species of the family Primitiopsidae. This is the second occurrence of undoubted primitiopsid ostracods in North America, the first being a species of *Primitiopsis* described by Harris (1931, p. 91) from the Ordovician Simpson group of Oklahoma.

SYSTEMATIC DESCRIPTION

Phylum ARTHROPODA

Class CRUSTACEA

Subclass OSTRACODA

Family Primitiopsidae Swartz, 1936

The type genus of this family is *Primitiopsis*, described by T. Rupert Jones (1887, p. 5; 1888, p. 406), with *P. planifrons* Jones 1887 from the Silurian of Gothland as the genotype.

Primitiopsis was assigned to the family Primitiidae until 1936, when Swartz (1936, p. 555) erected the family Primitiopsidae.

Sulcicuneus, gen. nov.

Description.—Pronounced dimorphism; female with a large incurved posterior frill on each valve, and male with no posterior frill. Frills of female in some specimens incurved to meet at their posterior borders, forming an extraneous chamber.

Soft tissues of the animal originally contained in that part of the female carapace here designated the "domicilium." Domicilium of female and complete carapace of male of approximately same size and shape. Valves of both sexes subrectangular in lateral view; in the female more elongate because of the frill. Dorsal border straight, anterior border subrounded, ventral border gently curved, and posterior border slightly rounded in the male and ranging from straight to subrounded in the female. Each half of the domicilium in the female with flat posterior wall and straight posterior contact margin.

Carapace subtriangular in end view; ventral surface flat, lateral surfaces converging at the dorsal border. Ventral half of carapace tumid. Greatest width posterior.

Median sulcus pronounced, slanting downward and forward from the dorsal border, terminating in the central region of the carapace. Carapace slightly inequivalved; left valve larger, with its contact margin rabbeted from the central anterior to the central posterior areas, accommodating the contact edge of the smaller right valve. Hingement simple. Cardinal angles unequal; the anterior one larger, the posterior one slightly smaller in the male and distinctly smaller in the female.

Genotype.—*Sulcicuneus porrectinatum* Kesling, sp. nov.

Remarks.—The genus *Sulcicuneus* differs from *Primitiopsis* Jones 1887, the only previously reported genus of this unusual family, in having a sulcus instead of a pit. The genotype, *S. porrectinatum*, is further distinguished by having a slightly granulose surface rather than the reticulation characteristic of *Primitiopsis* species. Since surface ornamentation may not prove to be a constant generic character, the new genus is based on the presence of a sulcus instead of a pit.

***Sulcicuneus porrectinatum* Kesling, sp. nov.**

(Pl. I, Figs. 1-21; Pl. II, Figs. 1-9; Pl. III, Figs. 1-39)

Description of female.—Posterior dimorphic frills large, one-fifth to one-fourth of total length of carapace. Frills in some specimens meeting to form a distinct extraneous chamber, and in other specimens gaping through failure to meet. Posterior edges of frills ornamented; ornamentation ranging from tubercles to fused denticles.

Velate ridge parallel to the ventral border of each valve, forming the outer border of flat marginal surface. Edge of velate ridge more or less tuberculate. Contact margin distinctly tuberculate; rabbeted part of contact margin on left valve with two parallel rows of partially fused tubercles, one on each side of the groove. Surface slightly granulose.

Median node anterior to the well-defined median sulcus, the node relatively small and not well-defined in many specimens. Anterior cardinal angle approximately 125 degrees; posterior cardinal angle, seen only in view of interior of valve, approximately 80 degrees. Frill meeting domicilium with an external angle of 120 degrees.

Muscle scars nearly central, slightly posterior in domicilium, arranged in a small rosette formed of six elliptical areas surrounding a subcircular central one. Posterior elliptical scar elongate horizontally and constricted in middle. Muscle scars visible when specimen is immersed in oil of cloves and obliquely lighted from below.

Description of male.—Carapace in dorsal view roughly kite-shaped, with the acute angle anterior, the obtuse angle posterior, and the two equal angles lateral. No posterior velate structure. Anterior cardinal angle approximately 125 degrees; posterior cardinal angle approximately 110 degrees. Surface, ventral velate ridge, tuberculate contact margin, and muscle scars the same as those of female.

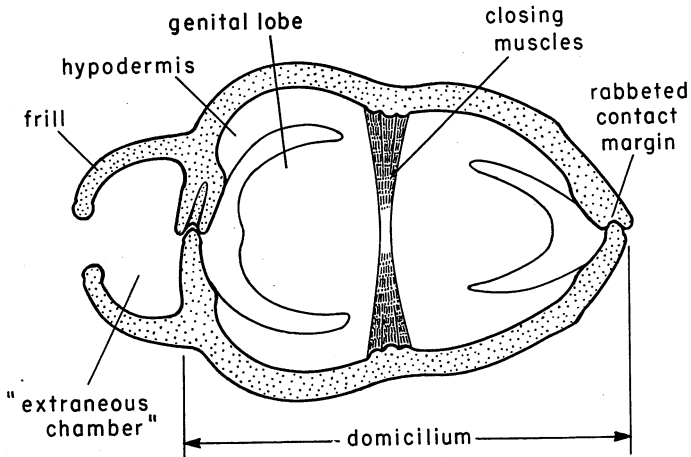


FIG. 1. Reconstruction of an original frontal section of *Sulcicuneus porrectinatum*, sp. nov., based on the morphology of the carapace as seen in polished surfaces on several specimens.

Remarks.—The posterior frills of the females exhibit many variations. The manner in which the frills were formed is responsible for these variations.

A series of polished frontal sections (Pl. III, Figs. 2-39) shows that the frill is formed of the same solid material as the rest of the valve. Figure 1 is a reconstruction of an entire frontal section based on examination of several series of polished sections.

Only the anterior margin of the frill appears to have been in contact with the hypodermis of the living animal. Hence, the frill must have been secreted by a narrow band of hypodermal cells at its base. These particular cells became active immediately after the eighth molting, and the tubercles at the posterior border of the frill resulted from the initial stimulation of small groups of these cells to secrete calcium carbonate. The complete fusion of the base of the frill with the rest of the valve indicates that the entire length of the external frill was secreted before the remainder of the valve was formed. The frill could only have become incurved if the cells at the outer edge of the band produced calcium carbonate more rapidly than those on the inner edge of this band.

Since the frill was formed by the prodigious activity of a limited number of hypodermal cells during a brief critical interval, while the other cells were relatively dormant, it is to be expected that greater variations will occur in the frill than in the form and thickness of the shell material in any other part of the carapace. This is the case. Some frills have discrete tubercles (Pl. I, Fig. 8), others have long fused denticles (Pl. I, Fig. 17); some frills close against those of the opposite valves to form enclosed chambers (Pl. I, Figs. 6, 17), others fail to meet and are gaping (Pl. I, Fig. 8); some frills are wider in their dorsal part (Pl. I, Fig. 6), others are wider in their ventral part (Pl. II, Fig. 1). We may include all such variations within the range of a single species, if we admit that they are normal for a structure originating by such a peculiar and complex process.

The name of this species is derived from Latin *porrectus*, -a, -um ("horizontally extended"), and *nates*, -ium ("the rump"), and refers to the unusually large frills in the female.

Occurrence.—All specimens are from that part of the Bell shale which occurred as a sink filling in the Rogers City limestone in the Michigan Limestone and Chemical Company quarry at Calcite, Presque Isle County, Michigan, about one-half mile southeast of the quarry crusher. This particular outcrop of the shale has been removed by quarrying.

Types.—All type specimens are preserved in the Museum of Paleontology of the University of Michigan. The holotype is a complete female carapace, No. 26626. A male carapace is designated the allotype, No. 26627. Three males and five females are designated paratypes, Nos. 26628 to 26635.

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PLATES

EXPLANATION OF PLATE I

(All figures $\times 40$)

	PAGE
<i>Sulcicuneus porrectinatum</i> Kesling, sp. nov.	223

FIGS. 1-4. Two dorsal, right lateral, and ventral views of a complete male carapace. Specimen in Figure 1 tilted to show the relation of the left sulcus to the hinge line. Allotype No. 26627.

FIGS. 5-7. Dorsal, right lateral, and ventral views of a complete female carapace. Holotype No. 26626.

FIGS. 8-9. Left lateral and ventral views of a complete female carapace. Specimen destroyed by sectioning for an examination of the contact margins of the two valves.

FIG. 10. Lateral view of left male valve. Specimen largely replaced by pyrite. Paratype No. 26633.

FIGS. 11-12. Lateral and interior views of left male valve. Paratype No. 26634.

FIG. 13. Interior view of right male valve. Paratype No. 26635.

FIGS. 14-15. Lateral and interior views of left female valve. Specimen destroyed by sectioning for an examination of the frill. A series of polished surfaces of this specimen shown in Plate III, Figures 2 to 39.

FIG. 16. Lateral view of left female valve. Specimen destroyed by sectioning for an examination of the frill.

FIGS. 17-18. Left lateral views of a complete female carapace. Figure 17 showing carapace after washing from the shale matrix, and Figure 18 showing same carapace after mild treatment with dilute hydrochloric acid. Unusually long fused denticles on posterior edge of the frill in this specimen. Paratype No. 26628.

FIGS. 19-20. Lateral and interior views of right female valve. Paratype No. 26631.

FIG. 21. Lateral view of left female valve. Paratype No. 26630.

PLATE I

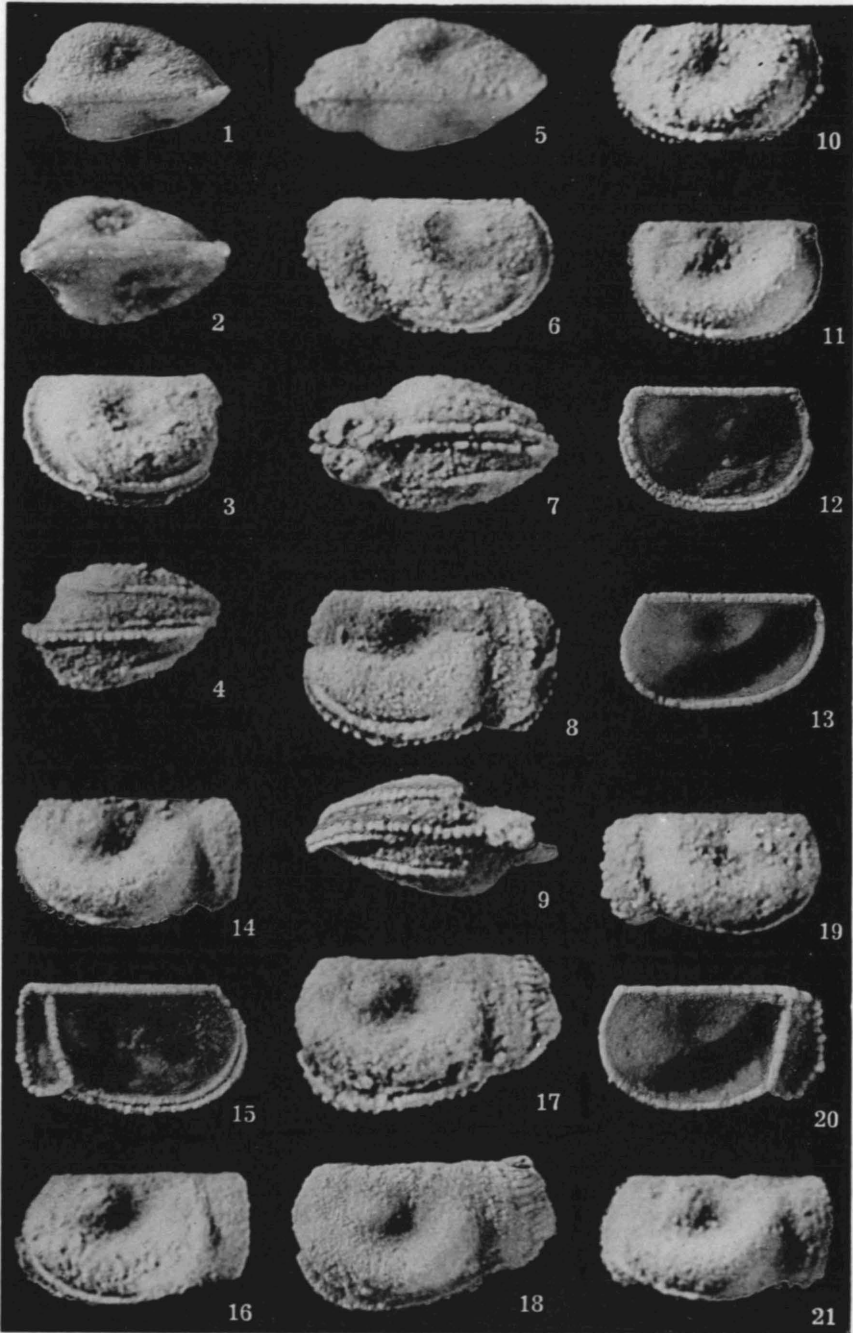
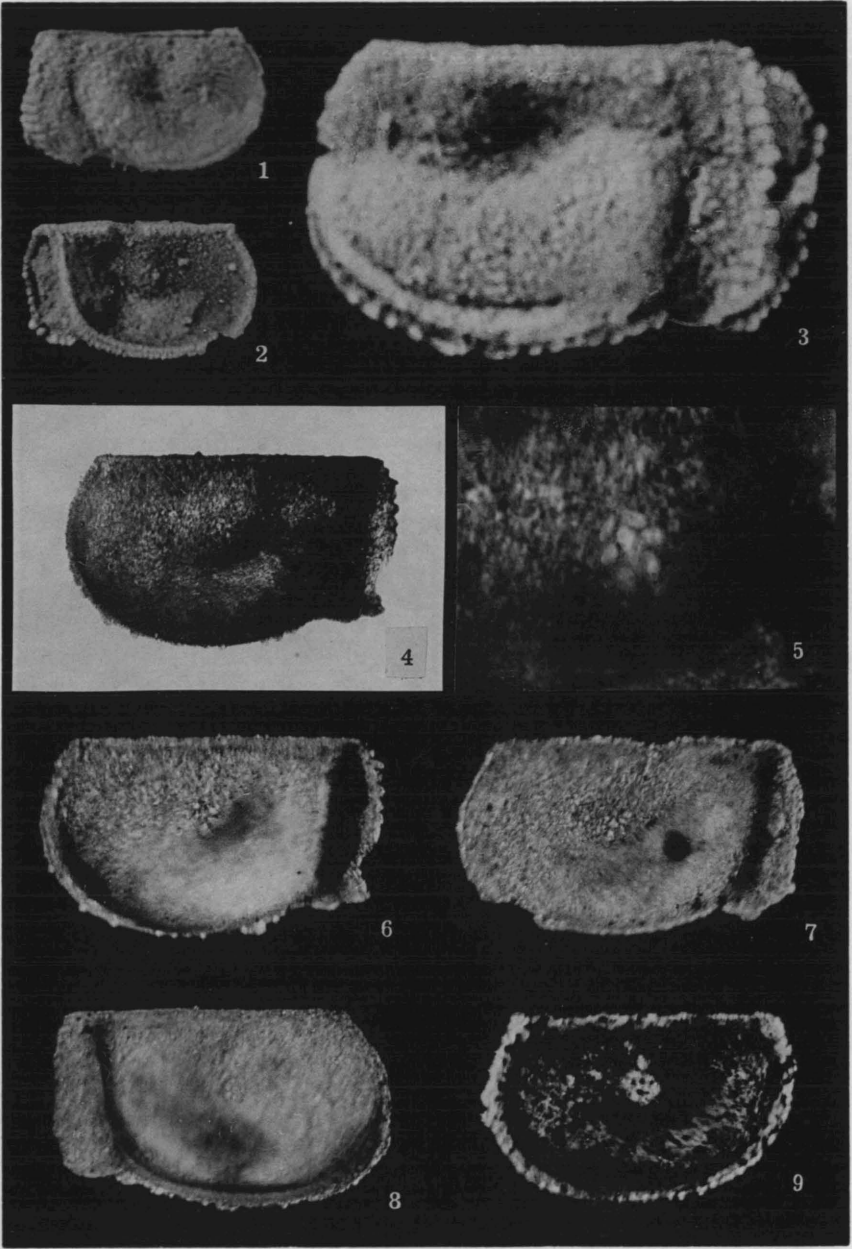


PLATE II



EXPLANATION OF PLATE II

- PAGE
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- FIG. 1. Right lateral view of complete female carapace. Frill unusually wide in the ventral part. Paratype No. 26629. $\times 40$.
- FIG. 2. Interior view of left female valve, a lateral view of the same valve shown in Plate I, Figure 21. Paratype No. 26630. $\times 40$.
- FIG. 3. Enlargement of the female carapace shown in Plate I, Figure 8, illustrating the granulose nature of the surface. $\times 80$.
- FIG. 4. Left female valve photographed when immersed in oil of cloves and seen by transmitted light. Paratype No. 26632. $\times 59$.
- FIG. 5. Enlargement of part of Figure 4 to show the muscle scar pattern. $\times 175$.
- FIG. 6. Left female valve photographed when immersed in oil of cloves and obliquely illuminated from below. Paratype No. 26632, also shown in Figure 4. $\times 60$.
- FIG. 7. Left female valve photographed when immersed in oil of cloves and obliquely illuminated from below. Paratype No. 26630, also shown in Figure 2. $\times 60$.
- FIG. 8. Interior view of left female valve photographed when immersed in oil of cloves and obliquely illuminated from below. Muscle scars in a small rosette near center of domicilium. Specimen destroyed by sectioning. A series of polished surfaces of this specimen shown in Plate III, Figures 2 to 39. $\times 60$.
- FIG. 9. Left male valve photographed when immersed in oil of cloves and obliquely illuminated from below. Valve largely replaced by pyrite. Apparently replacement not affecting muscle scars, hinge, and contact margin as much as the rest of the valve. Paratype No. 26633. $\times 60$.

EXPLANATION OF PLATE III

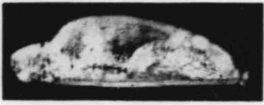
(All figures $\times 40$)

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FIG. 1. Dorsal view of left female valve. This specimen is also illustrated in Plate I, Figures 14 to 15, and Plate II, Figure 8. Specimen destroyed by making polished sections.

FIGS. 2-39. A series of polished frontal surfaces from the specimen shown in Figure 1. Surfaces are spaced as follows: Fig. 2, .01 mm. below the dorsal margin; Figs. 2-17, .02 mm. between surfaces; Figs. 17-22, .01 mm. between surfaces; Figs. 22-34, .004 mm. between surfaces; and Figs. 34-39, .002 mm. between surfaces.

PLATE III



1



14



27



2



15



28



3



16



29



4



17



30



5



18



31



6



19



32



7



20



33



8



21



34



9



22



35



10



23



36



11



24



37



12



25



38



13



26



39

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